TOSHIBA

ACE-tronics G9 ASD Installation and Operation Manual

ACE-tronics G9 Adjustable Speed Drive

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Leading Innovation >>>

Document Number: 62078-000

Date: October, 2009

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Introduction

Congratulations on the purchase of the new **G9 True Torque Control² Adjustable Speed Drive**!

The G9 True Torque Control² Adjustable Speed Drive (ASD) is a solid-state AC drive that features True Torque Control². Toshiba's Vector Control Algorithm enables the motor to develop high starting torque and provide compensation for motor slip, which results in smooth, quick starts and highly efficient operation. The ACE-tronics G9 ASD uses digitally-controlled pulse width modulation. The programmable functions may be accessed via the easy-to-use menu selections or via the **Direct Access Numbers** (see page 79). This feature, combined with Toshiba's high-performance software, delivers unparalleled motor control and reliability.

The ACE-tronics G9 ASD is a very powerful tool, yet surprisingly simple to operate. The user-friendly **Electronic Operator Interface** (EOI) of the ASD has an easy-to-read LCD screen. There is also a read-only LED screen with enhanced visibility that can be read from a greater distance. The **EOI** provides easy access to the many monitoring and programming features of the ASD.

The motor control software is menu-driven, which allows for easy access to the motor control parameters and quick changes when required.

To maximize the abilities of your new ACE-tronics G9 ASD, a working familiarity with this manual will be required. This manual has been prepared for the ASD installer, user, and maintenance personnel. This manual may also be used as a reference guide or for training. With this in mind, use this manual to develop a system familiarity before attempting to install or operate the device.

Important Notice

The instructions contained in this manual are not intended to cover all details or variations in equipment types, nor may it provide for every possible contingency concerning the installation, operation, or maintenance of this equipment. Should additional information be required contact your ACE World Companies Customer Support Center.

The contents of this manual shall not become a part of or modify any prior or existing agreement, commitment, or relationship. The sales contract contains the entire obligation of ACE World Companies. The warranty contained in the contract between the parties is the sole warranty of ACE World Companies and any statements contained herein do not create new warranties or modify the existing warranty.

Any electrical or mechanical modifications to this equipment without prior written consent of ACE World Companies may void all warranties and may void the UL/CUL listing or other safety certifications. Unauthorized modifications may also result in a safety hazard or equipment damage.

Misuse of this equipment could result in equipment damage or injury to personnel. In no event will ACE World Companies be responsible or liable for direct, indirect, special, or consequential damage or injury that may result from the misuse of this equipment.

About This Manual

This manual was written by the **ACE World Companies** Technical Publications Group. This group is tasked with providing technical documentation for the **G9 Adjustable Speed Drive**. Every effort has been made to provide accurate and concise information to you, our customer.

At **ACE World Companies** we're continuously searching for better ways to meet the constantly changing needs of our customers. E-mail your comments, questions, or concerns about this publication.

Manual's Purpose and Scope

This manual provides information on how to safely install, operate, maintain, and dispose of your **G9 Adjustable Speed Drive**. The information provided in this manual is applicable to the **G9 Adjustable Speed Drive** only.

This manual provides information on the various features and functions of this powerful cost-saving device, including

- Installation,
- System operation,
- Configuration and menu options, and
- Mechanical and electrical specifications.

Included is a section on general safety instructions that describe the warning labels and symbols that are used throughout the manual. Read the manual completely before installing, operating, performing maintenance, or disposing of this equipment.

This manual and the accompanying drawings should be considered a permanent part of the equipment and should be readily available for reference and review. Dimensions shown in the manual are in metric and/or the English equivalent.

Because of our commitment to continuous improvement, **ACE World Companies** reserves the right, without prior notice, to update information, make product changes, or to discontinue any product or service identified in this publication.

ACE World Companies shall not be liable for direct, indirect, special, or consequential damages resulting from the use of the information contained within this manual.

Printed in the U.S.A.

Contacting ACE World Companies Customer Support Center

ACE World Companies Customer Support Center can be contacted to obtain help in resolving any **Adjustable Speed Drive** system problem that you may experience or to provide setup information.

The center is open from 8 a.m. to 5 p.m. (CST), Monday through Friday. The Support Center's toll free number is (800) 431-4223 / Local (817) 237-7700 / Fax (817) 237-2777.

You may also contact **ACE World Companies** by writing to:

ACE World Companies

10200 Jacksboro Highway

Fort Worth, Texas 76135

Attn: Mike Perkins

Or send an e-mail

For additional information on **ACE World Companies**' products and services, please visit our web site.

ACE World Companies Corporation

ACE-tronics G9 Adjustable Speed Drive

Please complete the Warranty Card supplied with the ACE-tronics G9 ASD and return it to **ACE World Companies** by prepaid mail. This will activate the 12 month warranty from the date of installation; but, shall not exceed 18 months from the shipping date.

Complete the following information and retain for your records.

Model Number: _____

Serial Number:_____

Project Number (if applicable):_____

Date of Installation:_____

Inspected By:_____

Name of Application:_____

Table of Contents

General Safety Information

DO NOT attempt to install, operate, maintain, or dispose of this equipment until you have read and understood all of the product safety information and directions that are contained in this manual.

Safety Alert Symbol

The **Safety Alert Symbol** is comprised of an equilateral triangle enclosing an exclamation mark. This indicates that a potential personal injury hazard exists.

Signal Words

Listed below are the signal words that are used throughout this manual followed by their descriptions and associated symbols. When the words **DANGER**, **WARNING**, or **CAUTION** are used in this manual they will be followed by important safety information that must be carefully adhered to.

The word **DANGER** preceded by the safety alert symbol indicates that an imminently hazardous situation exists that, if not avoided, will result in serious injury to personnel or loss of life.

 **DANGER**

The word **WARNING** preceded by the safety alert symbol indicates that a potentially hazardous situation exists that, if not avoided, could result in serious injury to personnel or loss of life.

 **WARNING**

The word **CAUTION** preceded by the safety alert symbol indicates that a potentially hazardous situation exists that, if not avoided, may result in minor or moderate injury.

 **CAUTION**

The word **CAUTION** without the safety alert symbol indicates a potentially hazardous situation exists that, if not avoided, may result in equipment and property damage.

CAUTION

Special Symbols

To identify special hazards, other symbols may appear in conjunction with the **DANGER**, **WARNING**, or **CAUTION** signal words. These symbols indicate areas that require special and/or strict adherence to the procedures to prevent serious injury to personnel or loss of life.

Electrical Hazard Symbol

A symbol that is comprised of an equilateral triangle enclosing a lightning bolt that indicates a hazard of injury from electrical shock or burn.

Explosion Hazard Symbol

A symbol that is comprised of an equilateral triangle enclosing an explosion that indicates a hazard of injury from exploding parts.

Equipment Warning Labels

DO NOT attempt to install, operate, perform maintenance, or dispose of this equipment until you have read and understood all of the user directions that are contained in this manual.

Warning labels that are attached to the equipment will include the exclamation mark within a triangle. **DO NOT** remove or cover any of these labels. If the labels are damaged or if additional labels are required, contact your ACE World Companies Customer Support Center.

Labels attached to the equipment are there to provide useful information or to indicate an imminently hazardous situation that may result in property or equipment damage, serious injury, or loss of life if safe procedures or methods are not followed as outlined in this manual.

Qualified Personnel

Installation, operation, and maintenance shall be performed by **Qualified Personnel <u>Only</u>**. A Qualified Person is one that has the skills and knowledge relating to the construction, installation, operation, and maintenance of the electrical equipment and has received safety training on the hazards involved (Refer to the latest edition of NFPA 70E for additional safety requirements).

Qualified Personnel shall:

- Have carefully read the entire operation manual.
- Be familiar with the construction and function of the ACE-tronics G9 ASD, the equipment being driven, and the hazards involved.
- Be able to recognize and properly address hazards associated with the application of motor-driven equipment.
- Be trained and authorized to safely energize, de-energize, ground, lockout/tagout circuits and equipment, and clear faults in accordance with established safety practices.
- Be trained in the proper care and use of protective equipment such as safety shoes, rubber gloves, hard hats, safety glasses, face shields, flash clothing, etc., in accordance with established safety practices.

For additional information on workplace safety visit www.osha.gov.

Equipment Inspection

- Upon receipt of the equipment inspect the packaging and equipment for shipping damage.
- Carefully unpack the equipment and check for damaged parts, missing parts, or concealed damage that may have occurred during shipping. If any discrepancies are discovered, it should be noted with the carrier prior to accepting the shipment, if possible. File a claim with the carrier if necessary and immediately notify your ACE World Companies Customer Support Center.
- Ensure that the rated capacity and the model number specified on the nameplate conform to the order specifications.
- Modification of this equipment is dangerous and are to be performed by factory-trained representatives. When modifications are required contact your ACE World Companies Customer Support Center.
- **DO NOT** install the ASD if it is damaged or if it is missing any component(s).
- Inspections may be required after moving the equipment.
- Contact your ACE World Companies Customer Support Center to report discrepancies or for assistance if required.

Handling and Storage

- Use proper lifting techniques when moving the ACE-tronics G9 ASD; including properly sizing up the load, getting assistance, and using a forklift if required.
- Store in a well-ventilated location and preferably in the original carton if the equipment will not be used upon receipt.
- Store in a cool, clean, and dry location. Avoid storage locations with extreme temperatures, rapid temperature changes, high humidity, moisture, dust, corrosive gases, or metal particles.
- The storage temperature range of the ACE-tronics G9 ASD is -14° to 104° F (-10° to 40° C).
- **DO NOT** store the unit in places that are exposed to outside weather conditions (i.e., wind, rain, snow, etc.).
- Store in an upright position.

Disposal

Never dispose of electrical components via incineration. Contact your state environmental agency for details on disposal of electrical components and packaging in your area.

Installation Precautions

Location and Ambient Requirements

- The ACE-tronics G9 ASD is intended for permanent installations only.
- Installation should conform to the **2008 National Electrical Code — Article 110** (NEC) (*Requirements For Electrical Installations*), all regulations of the **Occupational Safety and Health Administration**, and any other applicable national, regional, or industry codes and standards.
- Select a mounting location that is easily accessible, has adequate personnel working space, and adequate illumination for adjustment, inspection, and maintenance of the equipment (refer to 2008 NEC Article 110-13).
- **DO NOT** mount the ASD in a location that would produce catastrophic results if it were to fall from its mounting location (equipment damage or injury).
- **DO NOT** mount the ASD in a location that would allow it to be exposed to flammable chemicals or gases, water, solvents, or other fluids.
- Avoid installation in areas where vibration, heat, humidity, dust, fibers, metal particles, explosive/corrosive mists or gases, or sources of electrical noise are present.
- The installation location shall not be exposed to direct sunlight.
- Allow proper clearance spaces for installation. Do not obstruct the ventilation openings. Refer to the section titled Installation and Connections on pg. 14 for additional information on ventilation requirements.
- The ambient operating temperature range of the ACE-tronics G9 ASD is 14° to 104° F (-10° to 40° C).

Mounting Requirements

- Only **Qualified Personnel** should install this equipment.
- Install the unit in a secure and upright position in a well-ventilated area.
- As a minimum, the installation of the equipment should conform to the **2008 National Electrical Code — Article 110** (NEC), OSHA, as well as any other applicable national, regional, or industry codes and standards.
- Installation practices shall conform to the latest revision of NFPA 70E Electrical Safety Requirements for Employee Workplaces.
- It is the responsibility of the ASD installer/maintenance personnel to ensure that the unit is installed into an enclosure that will protect personnel against electric shock.

Conductor Routing and Grounding

⚠ WARNING ⚠

- Use separate metal conduits for routing the input power, output power, and control circuits.
- A separate ground cable shall be run inside of the conduit with the input power, output power, and control circuits.
- **DO NOT** connect **CC** to earth ground.
- **ONLY** use the **IICC** terminal as the return for the **V/I** input.
- Always ground the unit to prevent electrical shock and to help reduce electrical noise.
- It is the responsibility of the ASD installer/maintenance personnel to provide proper grounding and branch circuit protection in accordance with the **2008 NEC** and any other applicable national, regional, or industry codes and standards.

— The Metal Of Conduit Is Not An Acceptable Ground —

Grounding Capacitor Switch

The ACE-tronics G9 ASD is equipped with noise reduction capacitors which are used to reduce the EMI leakage via the 3-phase power-input circuit and for compliance with the **Electromagnetic Compatibility Directive** (EMC).

The effective value of the capacitor may be increased, reduced, or removed entirely via the **Selector Switch**, **Switching Bar**, or the **Switching Screw** — the type used is typeform-specific.

The **Grounding Capacitor Switch** allows the user to quickly change the value of the leakage-reduction capacitance of the 3-phase input circuit without the use of tools.

See the section titled System Grounding on pg. 18 for more on the Grounding Capacitor.

See figures 4, 5, 6, and 7 on pg. 19 for an electrical depiction of the leakage-reduction functionality of the Grounding Capacitor and the methods used to set the capacitance value.

Power Connections

⚠ DANGER ⚠

Contact With Energized Wiring Will Cause Severe Injury Or Loss Of Life.

- Turn off, lockout, and tag out all power sources before proceeding to connect the power wiring to the equipment.
- After ensuring that all power sources are turned off and isolated in accordance with established lockout/tag out procedures, connect the 3-phase power source wiring of the correct voltage to the correct input terminals and connect the output terminals to a motor of the correct voltage and type for the application (refer to NEC Article 300 – Wiring Methods and Article 310 – Conductors For General Wiring). Size the branch circuit conductors in accordance with NEC Table 310.16.
- Ensure that the 3-phase input power is **NOT** connected to the output of the ACE-tronics G9 ASD. This will damage the ASD and may cause injury to personnel.
- **DO NOT** connect resistors across terminals PA – PC or PO – PC. This may cause a fire.
- Ensure the correct phase sequence and the desired direction of motor rotation in the **Bypass** mode (if applicable).
- Turn the power on only after attaching and/or securing the front cover.

Protection

- Ensure that primary protection exists for the input wiring to the equipment. This protection must be able to interrupt the available fault current from the power line. The equipment may or may not be equipped with an input disconnect (option).
- All cable entry openings must be sealed to reduce the risk of entry by vermin and to allow for maximum cooling efficiency.
- External dynamic braking resistors must be thermally protected.
- It is the responsibility of the ASD installer/maintenance personnel to setup the **Emergency Off** braking system of the ASD. The function of the **Emergency Off** braking function is to remove output power from the drive in the event of an emergency. A supplemental braking system should also be engaged in the event of an emergency. For additional information on braking systems see parameters F250 and F304.

Note: *A supplemental emergency stopping system should be used with the ASD. Emergency stopping should not be a task of the ASD alone.*

- Follow all warnings and precautions and do not exceed equipment ratings.

System Integration Precautions

The following precautions are provided as general guidelines for the setup of the ACE-tronics G9 ASD within the system.

- The ACE-tronics G9 ASD is a general-purpose product. It is a system component only and the system design should take this into consideration. Please contact your ACE World Companies Customer Support Center for application-specific information or for training support.
- The ACE-tronics G9 ASD is part of a larger system and the safe operation of the ASD will depend upon observing certain precautions and performing proper system integration.
- Improperly designed or improperly installed system interlocks may render the motor unable to start or stop on command.
- The failure of external or ancillary components may cause intermittent system operation (i.e., the system may start the motor without warning).
- A detailed system analysis and job safety analysis should be performed by the systems designer and/or systems integrator before the installation of the ASD component. Contact your ACE World Companies Customer Support Center for options availability and for application-specific system integration information if required.

Personnel Protection

- Installation, operation, and maintenance shall be performed by **Qualified Personnel** **Only**.
- A thorough understanding of the ACE-tronics G9 ASD will be required before the installation, operation, or maintenance of the ASD.

⚠ WARNING

- Rotating machinery and live conductors can be hazardous and shall not come into contact with personnel. Personnel should be protected from all rotating machinery and electrical hazards at all times.
- Insulators, machine guards, and electrical safeguards may fail or be defeated by the purposeful or inadvertent actions of workers. Insulators, machine guards, and electrical safeguards are to be inspected (and tested where possible) at installation and periodically after installation for potential hazardous conditions.
- **DO NOT** allow personnel near rotating machinery. Warning signs to this effect shall be posted at or near the machinery.
- **DO NOT** allow personnel near electrical conductors. Contact with electrical conductors can be fatal. Warning signs to this effect shall be posted at or near the hazard.
- Personal protection equipment shall be provided and used to protect employees from any hazards inherent to system operation.

System Setup Requirements

- When using the ACE-tronics G9 ASD as an integral part of a larger system, it is the responsibility of the ASD installer/maintenance personnel to ensure that there is a fail-safe in place (i.e., an arrangement designed to switch the system to a safe condition if there is a fault or failure).
- System safety features should be employed and designed into the integrated system in a manner such that system operation, even in the event of system failure, will not cause harm or result in system damage or injury to personnel (i.e., E-Off, Auto-Restart settings, System Interlocks, etc.).
- The programming setup and system configuration of the ASD may allow it to start the motor unexpectedly. A familiarity with the Auto-Restart settings are a requirement to use this product.
- Power factor improvement/correction capacitors or surge absorbers **MUST NOT** be installed on the output of the ACE-tronics G9 ASD.
- Use of the built-in system protective features is highly recommended (i.e., E-Off, Overload Protection, etc.).
- The operating controls and system status indicators should be clearly readable and positioned where the operator can see them without obstruction.
- Additional warnings and notifications shall be posted at the equipment installation location as deemed required by **Qualified Personnel**.

CAUTION

- There may be thermal or physical properties, or ancillary devices integrated into the overall system that may allow for the ACE-tronics G9 ASD to start the motor without warning. Signs to this effect must be posted at the equipment installation location.
- If a secondary magnetic contactor (MC) or an ASD output disconnect is used between the ASD and the load, it should be interlocked to halt the ASD before the secondary contact opens. If the output contactor is used for bypass operation, it must be interlocked such that commercial power is never applied to the ASD output terminals (U, V, W).
- When using an ASD output disconnect, the ASD and the motor must be stopped before the disconnect is either opened or closed. Closing the output disconnect while the 3-phase output of the ASD is active may result in equipment damage or injury to personnel.

Operational and Maintenance Precautions

⚠ WARNING

- Turn off, lockout, and tag out the main power, the control power, and instrumentation connections before proceeding to connect/disconnect the power wiring, inspecting or servicing the drive, or opening the door of the enclosure.
- The capacitors of the ACE-tronics G9 ASD maintain a residual charge for a period of time after turning off the ASD. The required time for each ASD typeform is indicated with a cabinet label and a **Charge LED** (shown for smaller ASDs in Figure 2 on pg. 16; LED is located on the front panel of larger ASDs). Wait at least the minimum time indicated on the enclosure-mounted label and ensure that the **Charge LED** has gone out before opening the door of the ASD once the ASD power has been turned off.
- Turn the power on only after attaching (or closing) the front cover and **DO NOT** remove or open the front cover of the ACE-tronics G9 ASD when the power is on.
- **DO NOT** attempt to disassemble, modify, or repair the ACE-tronics G9 ASD. Contact your ACE World Companies Customer Support Center for repair information.
- **DO NOT** place any objects inside of the ACE-tronics G9 ASD.
- If the ASD should emit smoke, or an unusual odor or sound, turn the power off immediately.
- The heat sink and other components may become extremely hot to the touch. Allow the unit to cool before coming in contact with these items.
- Remove power from the ASD during extended periods of non-use.
- The system should be inspected periodically for damaged or improperly functioning parts, cleanliness, and to ensure that the connectors are tightened securely.

Motor Characteristics

Listed below are some variable speed AC motor control concepts with which the user of the **G9 Adjustable Speed Drive** should become familiar.

Motor Autotuning

Motor production methods may cause minor differences in motor operation. The negative effects of these differences may be minimized by using the **Autotune** feature of the ACE-tronics G9 ASD. **Autotuning** is a function of the ASD that measures several parameters of the connected motor and places these readings in a stored table. The software uses the information in the table to help optimize the response of the ASD to application-specific load and operational requirements. The **Autotuning** function may be enabled for automatic tuning, configured manually at F400, or disabled.

The measured parameters include the rotor resistance, the stator resistance, the required excitation inductance, rotational inertia values, and leakage inductance values.

Pulse Width Modulation Operation

The ACE-tronics G9 ASD uses sinusoidal **Pulse Width Modulation** (PWM) control. The output current waveform generated by the ASD approaches that of a perfect sine wave; however, the output waveform is slightly distorted. For this reason, the motor may produce more heat, noise, and vibration when operated by an ASD, rather than directly from commercial power.

Low-Speed Operation

Operating a general-purpose motor at lower speeds may cause a decrease in the cooling ability of the motor. Reducing the torque requirement of the motor at lower speeds will decrease the generated heat at lower speeds.

When the motor is to be operated at low speed (less than 50% of full speed) and at the rated torque continuously, a Toshiba VF motor (designed for use in conjunction with an ASD) is recommended.

Overload Protection Adjustment

The ACE-tronics G9 ASD software monitors the output current of the system and determines when an overload condition occurs. The overload current level is a percentage of the rating of the motor. This function protects the motor from overload.

The default setting for the overload detection circuit is set to the maximum rated current of the ASD at the factory. This setting will have to be adjusted to match the rating of the motor with which the ASD is to be used. To change the overload reference level, see Motor Overload Protection Level 1 on pg. 175.

Operation Above 60 Hz

A motor produces more noise and vibration when it is operated at frequencies above 60 Hz. Also, when operating a motor above 60 Hz, the rated limit of the motor or its bearings may be exceeded; this may void the motor warranty.

Contact the motor manufacturer for additional information before operating the motor above 60 Hz.

Power Factor Correction

DO NOT connect a power factor correction capacitor or surge absorber to the output of the ACE-tronics G9 ASD.

If the ASD is used with a motor that is equipped with a capacitor for power factor correction, remove the capacitor from the motor.

Connecting either of these devices to the output of the ASD may cause the ASD to malfunction and trip, or the output device may cause an over-current condition resulting in damage to the device or the ASD.

Light Load Conditions

When a motor is operated under a continuous light load (i.e., at a load of less than 50% of its rated capacity) or it drives a load which produces a very small amount of inertia, it may become unstable and produce abnormal vibration or trips because of an over-current condition. In such a case, the carrier frequency may be lowered to compensate for this undesirable condition (see Program ⇒ Special ⇒ Carrier Frequency ⇒ PWM Carrier Frequency).

Note: *When operating in the **Vector Control** mode the carrier frequency should be set to 2.2 kHz or above.*

Motor/Load Combinations

When the ACE-tronics G9 ASD is used in combination with one of the following motors or loads, it may result in unstable operation.

- A motor with a rated capacity that exceeds the motor capacity recommended for the ASD.
- An explosion-proof motor.

When using the ASD with an explosion-proof motor or other special motor types, lower the carrier frequency to stabilize the operation. **DO NOT** set the carrier frequency below 2.2 kHz if operating the system in the vector control mode.

Note: *When operating in the **Vector Control** mode the carrier frequency should be set to 2.2 kHz or above.*

If the motor that is coupled to a load that has a large backlash or a reciprocating load, use one of the following procedures to stabilize its operation.

- Adjust the **S-Pattern** acceleration/deceleration setting,
- If operating in the **Vector** control mode, adjust the response time, or
- Switch to the **Constant Torque** control mode.

Load-Produced Negative Torque

When the ACE-tronics G9 ASD is used with a load that produces negative torque (an overhauling load), the over-voltage or over-current protective functions of the ASD may cause nuisance tripping.

To minimize the undesirable effects of negative torque the dynamic braking system may be used. The dynamic braking system converts the regenerated energy into heat that is dissipated using a braking resistor. The braking resistor must be suitably matched to the load. Dynamic braking is also effective in reducing the DC bus voltage during a momentary over-voltage condition.

⚠ CAUTION

If under extreme conditions the dynamic braking system or a component of this system were to fail, the dynamic braking resistor may experience an extended over-current condition. The DBR circuit was designed to dissipate excessive amounts of heat and if the extended over-current condition were allowed to exceed the circuit parameters, this condition could result in a fire hazard.

To combat this condition, the 3-phase input may be connected using contactors that are configured to open in the event of an extended DBR over-current condition or an internal circuit failure. Using a thermal sensor and/or overload protection as the 3-phase input contactor drive signal, the contactors will open and remove the 3-phase input power in the event of an extended DBR over-current or system over-voltage condition. See Dynamic Braking Enable on pg. 140 for more information using Dynamic Braking with the ASD.

Motor Braking

The motor may continue to rotate and coast to a stop after being shut off due to the inertia of the load. If an immediate stop is required, a braking system should be used. The two most common types of motor braking systems used with the ACE-tronics G9 ASD are **DC Injection Braking** and **Dynamic Braking**.

For additional information on braking systems, see DC Injection Braking on pg. 127 and Dynamic Braking Enable on pg. 140.

ASD Characteristics

Over-Current Protection

Each ACE-tronics G9 ASD is designed for a specified operating power range. The ASD will incur a trip if the design specifications are exceeded.

However, the ASD may be operated at 115% of the specified output-current range continuously (or 110% continuously if ≥ 60 HP for the 230-volt system or if ≥ 125 HP for the 460-volt system) or at 150% for a limited amount of time as indicated in the section titled Current/Voltage Specifications on pg. 270. Also, the Stall Prevention Level may be adjusted to help with nuisance over-current trips (see F601).

When using the ASD for an application to control a motor that is rated significantly less than the maximum current rating of the ASD, the over-current limit (Thermal Overload Protection) setting will have to be changed to match the FLA of the motor. For additional information on this parameter, see Motor Overload Protection Level 1 on pg. 175.

ASD Capacity

The ACE-tronics G9 ASD must not be used with a motor that has a larger capacity than the ASD, even if the motor is operated under a small load. An ASD being used in this way will be susceptible to a high-output peak current which may result in nuisance tripping.

Do not apply a level of input voltage to an ASD that is beyond that which the ASD is rated. The input voltage may be stepped down when required with the use of a step-down transformer or some other type of voltage-reduction system.

Using Vector Control

Using **Vector Control** enables the system to produce very high torque over the entire operating range even at extremely low speeds. **Vector Control** may be used with or without feedback. However, using feedback increases the speed accuracy for applications requiring precise speed control.

See F015 on pg. 85 for additional information on using **Vector Control**.

Installation and Connections

The ACE-tronics G9 ASD may be set up initially by performing a few simple configuration settings. To operate properly, the ASD must be securely mounted and connected to a power source (3-phase AC input at the R/L1, S/L2, and T/L3 terminals). The control terminals of the ASD may be used by connecting the terminals of the **ACE G9-120V-PCB** to the proper sensors or signal input sources (see the section titled ACE G9-120V-PCB on pg. 21 and Figure 8 on pg. 24).

System performance may be further enhanced by assigning a function to the output terminals of the **ACE G9-120V-PCB** and connecting the terminals to the proper indicators or actuators (LEDs, relays, contactors, etc.).

Note: *The optional ACE-tronics G9 ASD interface boards may be used to expand the I/O functionality of the ASD.*

Installation Notes

⚠ CAUTION

When a brake-equipped motor is connected to the ASD, it is possible that the brake may not release at startup because of insufficient voltage. To avoid this, **DO NOT** connect the brake or the brake contactor to the output of the ASD.

If an output contactor is used for bypass operation, it must be interlocked such that commercial power is never applied to the output terminals of the ASD (U/T1, V/T2, and W/T3).

DO NOT apply commercial power to the ASD output terminals **U/T1**, **V/T2**, and **W/T3**.

Though the default settings of the ASD do not include the use of a physical discrete input terminal being programmed to the **ST** function, the system may be configured to use a physical discrete input terminal set to **ST**. When configured properly, the externally-activated **ST** terminal acts as a permissive in allowing for normal system operation. See parameter F110 for more information on the use of the **ST** terminal.

If a secondary magnetic contactor (MC) is used between the output of the ASD and the motor, it should be interlocked such that the **ST** terminal activation is deactivated before the output contactor is opened.

DO NOT open and then close a secondary magnetic contactor between the ASD and the motor unless the ASD is off and the motor is not rotating.

Note: *Re-application of power via a secondary contact while the ASD is on or while the motor is still turning may cause ASD damage.*

The ASD input voltage should remain within 10% of the specified input voltage range. Input voltages approaching the upper or lower limit settings may require that the over-voltage and under-voltage stall protection level parameters be adjusted. Voltages outside of the permissible tolerance should be avoided.

The frequency of the input power should be ±2 Hz of the specified input frequency.

DO NOT use an ASD with a motor that has a power rating higher than the rated output of the ASD.

The ACE-tronics G9 ASD is designed to operate NEMA B motors. Consult with the ACE World Companies Customer Support Center before using the ASD for special applications such as with an explosion-proof motor or applications with a piston load.

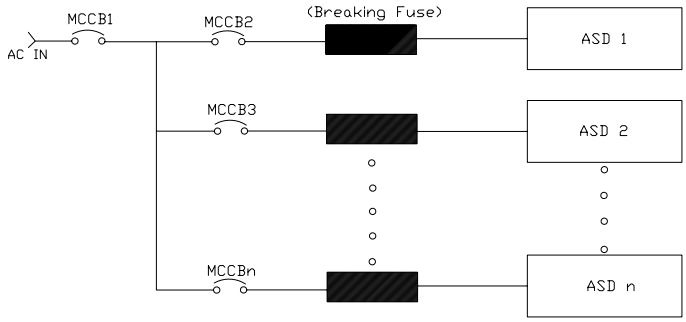
Disconnect the ASD from the motor before megging or applying a bypass voltage to the motor.

Interface problems may occur when an ASD is used in conjunction with some types of process controllers. Signal isolation may be required to prevent controller and/or ASD malfunction (contact your ACE World Companies Customer Support Center or the process controller manufacturer for additional information about compatibility and signal isolation).

Use caution when setting the output frequency. Over speeding a motor decreases its ability to deliver torque and may result in damage to the motor and/or the driven equipment.

Not all ACE-tronics G9 ASDs are equipped with internal primary power input fuses (typeform-dependent). When connecting two or more drives that have no internal fuse to the same power line as shown in Figure 1, it will be necessary to select a circuit-breaking configuration that will ensure that if a short circuit occurs in ASD 1, only MCCB2 trips, not MCCB1. If it is not feasible to use this configuration, insert a fuse between MCCB2 and ASD 1.

Figure 1. Circuit Breaker Configuration.



Mounting the ASD

CAUTION

— The following thermal specifications apply to the 230- and the 460-Volt ASDs ONLY —

Install the unit securely in a well ventilated area that is out of direct sunlight.

The process of converting AC to DC, and then back to AC produces heat. During normal ASD operation, up to 5% of the input energy to the ASD may be dissipated as heat. If installing the ASD in a cabinet, ensure that there is adequate ventilation.

DO NOT operate the ASD with the enclosure door open.

The ambient operating temperature rating of the ACE-tronics G9 ASD is 14° to 104° F (-10° to 40° C).

When installing adjacent ASDs horizontally ACE World Companies recommends at least 5 cm of space between adjacent units. However, horizontally mounted ASDs may be installed side-by-side with no space between the adjacent units — side-by-side installations require that the top cover be removed from each ASD.

For 150 HP ASDs and above, a minimum of 50 cm of space is required above and below adjacent units and any obstruction. This space is the recommended minimum space requirement for the ASD and ensures that adequate ventilation is provided for each unit. More space will provide a better environment for cooling (see the section titled Enclosure Dimensions and Conduit Plate Information on pg. 261 for additional information on mounting space requirements).

Note: *Ensure that the ventilation openings are not obstructed.*

Connecting the ASD

⚠ DANGER ⚠

Refer to the section titled Installation Precautions on pg. 4 and the section titled Lead Length Specifications on pg. 20 before attempting to connect the ASD and the motor to electrical power.

Power Connections

⚠ DANGER ⚠

Contact With Energized Wiring Will Cause Severe Injury Or Loss Of Life.

See Figure 20 on pg. 30 for a system I/O connectivity schematic.

An inductor (DCL) may be connected across the **PO** and **PA/+** terminals to provide additional filtering. When not used, a jumper must be connected across these terminals.

PA/+ and **PB** are used for the DBR connection if using a braking resistor.

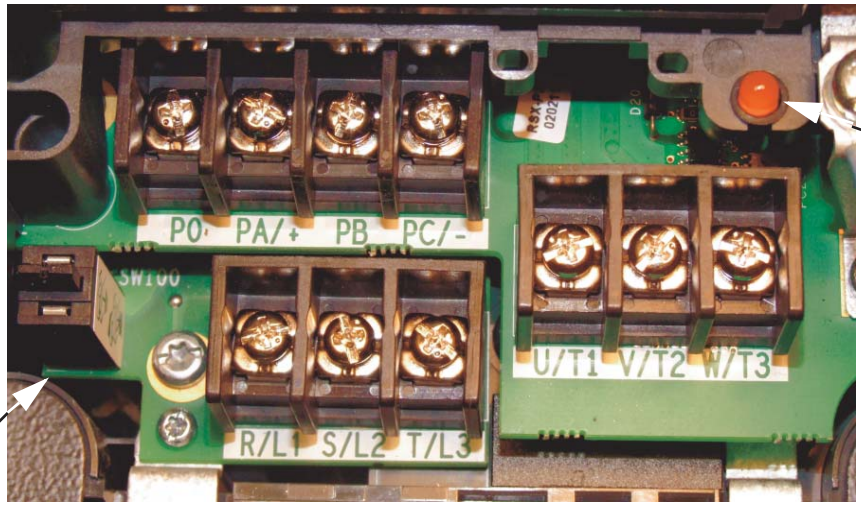
PC/- is the negative terminal of the DC bus.

R/L1, **S/L2**, and **T/L3** are the 3-phase input supply terminals for the ASD.

U/T1, **V/T2**, and **W/T3** are the output terminals of the ASD that connect to the motor.

The location of the **Charge LED** for the smaller typeform ASD is provided in Figure 2. The **Charge LED** is located on the front door of the enclosure of the larger ASDs.

Figure 2. Typical ASD Input/Output Terminals and the Grounding Capacitor Switch.



Power Connection Requirements

Connect the 3-phase input power to the input terminals of the ASD at **R/L1**, **S/L2**, and **T/L3** (see Figure 3 for the typical electrical connection scheme). Connect the output of the ASD to the motor from the ASD terminals **U/T1**, **V/T2**, and **W/T3**. The input and output conductors and terminal lugs used shall be in accordance with the requirements listed in the section titled Current/Voltage Specifications on pg. 270.

If multiple conductors are used in parallel for the input or output power and it is necessary to use separate conduits, each parallel set shall have its own conduit and not share its conduit with other parallel sets (i.e., place U1, V1, W1, and a ground wire in one conduit and U2, V2, and W2, and a ground wire in another; refer to NEC Article 300.20 and Article 310.4). National, regional, and industry electrical codes should be referenced if three or more power conductors are run in the same conduit (refer to 2008 NEC Article 310 adjustment factors).

Note: *Local and national codes should be referenced when running more than three conductors in the same conduit.*

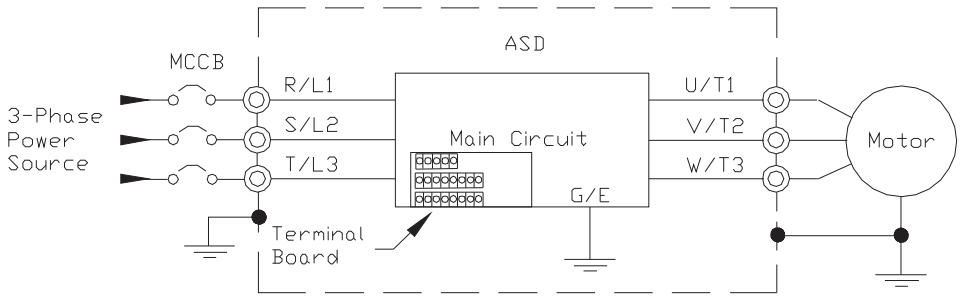
Install a molded case circuit breaker (MCCB) or fuse between the 3-phase power source and the ASD in accordance with the fault current setting of the ASD and **2008 NEC Article 430**.

The ACE-tronics G9 ASD is designed and tested to comply with UL Standard 508C. Modifications to the ASD system or failure to comply with the short circuit protection requirements outlined in this manual may disqualify the UL rating. See Table 23 on pg. 276 for typeform-specific short circuit protection recommendations.

As a minimum, the installation of the ASD shall conform to **2008 NEC Article 110**, the **Occupational Safety and Health Administration** requirements, and to any other local and regional industry codes and standards.

Note: *In the event that the motor rotates in the wrong direction when powered up, reverse any two of the three ASD output power leads (U, V, or W) connected to the motor.*

Figure 3. G9 ASD/Motor Typical Connection Diagram.



System Grounding

Proper grounding helps to prevent electrical shock and to reduce electrical noise. The ACE-tronics G9 ASD is designed to be grounded in accordance with **Article 250** of the **2008 NEC** or **Section 10/Part One** of the **Canadian Electrical Code** (CEC).

The grounding conductor shall be sized in accordance with **Article 250-122** of the **NEC** or **Part One-Table 6** of the **CEC**.

— The Metal Of Conduit Is Not An Acceptable Ground —

The input, output, and control lines of the system shall be run in separate metal conduits and each shall have its own ground conductor.

ASDs produce high-frequency noise — steps must be taken during installation to avoid the negative effects of noise. Listed below are some examples of measures that will help to combat noise problems.

- **DO NOT** install the input power wires and output power wires in the same duct or in parallel with each other, and do not bind them together.
- **DO NOT** install the input power wires, output power wires, and the wires of the control circuit in the same duct or in parallel with each other, and do not bind them together.
- Use shielded wires or twisted wires for the control circuits.
- Ensure that the grounding terminals (G/E) of the ASD are securely connected to ground.
- Connect a surge suppressor to every electromagnetic contactor and every relay installed near the ASD.
- Install noise filters as required.

Grounding Capacitor

The **Grounding Capacitor** plays a role in minimizing the effects of leakage current through the ASD system and through ground paths to other systems. Leakage current may cause the improper operation of earth-leakage current breakers, leakage-current relays, ground relays, fire alarms, and other sensors — and it may cause superimposed noise on CRT screens.

The **Grounding Capacitor Switch** allows the user to quickly change the value of the leakage-reduction capacitance of the 3-phase input circuit. See figures 4, 5, 6, and 7 on pg. 19 for an electrical depiction of the leakage-reduction functionality and the methods used to change the capacitance value. The method used is typeform-specific.

If using a 460-Volt 5 HP ASD or a 460-Volt ASD that is in the range of 7.5 HP to 25 HP, and the **U/T1**, **V/T2**, and **W/T3** connections to the motor are 100 meters or more in length, the ASD **Carrier Frequency** must be set to 4 kHz or less when activating or deactivating the **Grounding Capacitor Switch**. ASD overheating may occur if the **Carrier Frequency** is set above 4 kHz when activating or deactivating the **Grounding Capacitor Switch**.

See pg. 5 for more information on the **Grounding Capacitor Switch** and pg. 16 for the location of the switch.

Figure 4. The **Grounding Capacitor Switch** is used on typeforms **230-volt** 0.5 HP to 10 HP and the 25 and 30 HP/ **460-Volt** 1.0 HP to 250 HP.
The value may be set to **Maximum** (default setting) or to **Zero** by pushing or pulling the switch actuator, respectively.

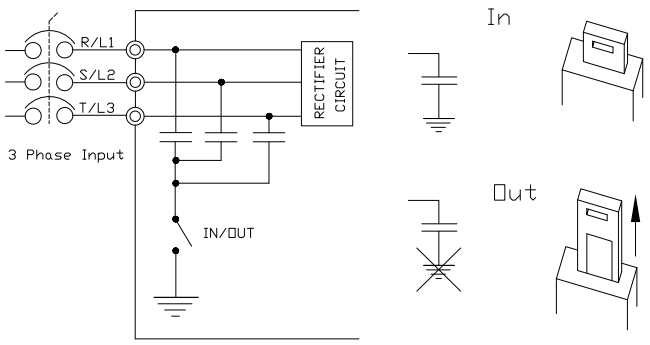


Figure 5. The **Grounding Capacitor Switch** is used on typeforms **230-volt** 15 HP to 20 HP and the 40 HP to 60 HP/**460-Volt** 30 HP to 100 HP.
The value may be set to **Large** (default setting) or **Small** by pushing or pulling the switch actuator, respectively.

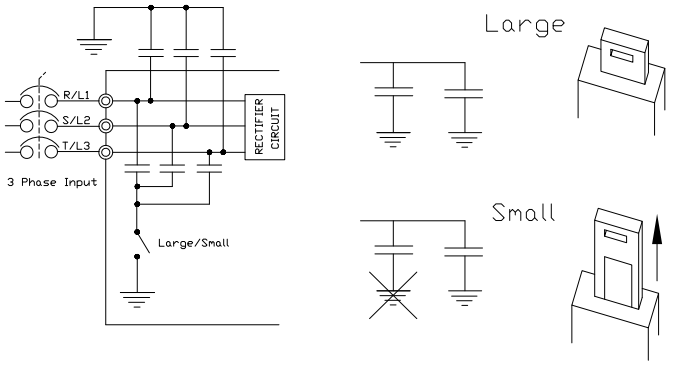


Figure 6. The **Grounding Capacitor Bar** is used on typeforms **230-volt** 75 HP and the 100 HP/**460-Volt** 125 HP and the 150 HP.
The value may be set to **Small** (default setting) or **Large** by connecting or disconnecting the switching bar, respectively.

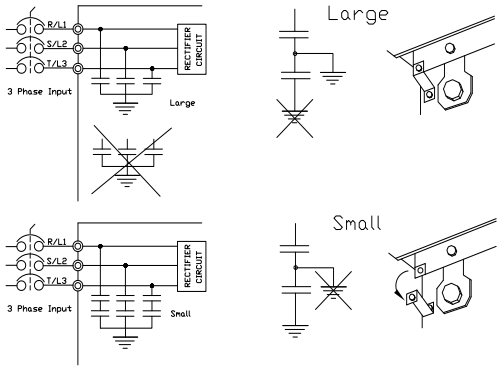
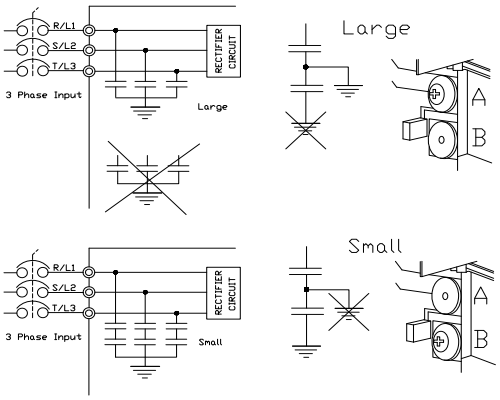


Figure 7. The **Grounding Capacitor Screw** is used on typeforms **460-volt** 175 HP and above.
The value may be set to **Small** (default setting) or **Large** by placing the screw in the **A** position or by placing the screw in the **B** position, respectively.



Lead Length Specifications

Adhere to the NEC and any local codes during the installation of ASD/motor systems. Excessive lead lengths may adversely effect the performance of the motor. Special cables are not required. Lead lengths from the ASD to the motor in excess of those listed in Table 1 may require filters to be added to the output of the ASD. Table 1 lists the suggested maximum lead lengths for the listed motor voltages.

All Toshiba **CT** motors incorporate an insulation system that is in compliance with **NEMA MG1 Part 30**.

All Toshiba **XT** motors incorporate an insulation system that is in compliance with **NEMA MG1 Part 31**.

Table 1. Lead Length Recommendations.

Model	PWM Carrier Frequency	NEMA MG-1 Part 30 Compliant Motors	NEMA MG-1 Part 31 Compliant Motors
230-Volt	All	450 feet	1000 feet
460-Volt	< 5 kHz	200 feet	600 feet
	≥ 5 kHz	100 feet	300 feet
575-Volt	< 5 kHz	75 feet	200 feet
	≥ 5 kHz	50 feet	100 feet

Note: *Contact the **ACE World Companies** Customer Support Center for application assistance when using lead lengths in excess of those listed.*

Exceeding the peak voltage rating or the allowable thermal rise time of the motor insulation will reduce the life expectancy of the motor.

*When operating in the **Vector Control** mode the carrier frequency should be set to 2.2 kHz or above.*

ACE G9-120V-PCB

The ACE-tronics G9 ASD can be controlled by several input types and combinations thereof, as well as operate within a wide range of output frequency and voltage levels. This is accomplished with the use of the **ACE G9-120V-PCB** (shown in Figure 8 on pg. 24).

The **ACE G9-120V-PCB** is designed to allow for a discrete or analog signal to control the speed and/or torque of the motor.

A 120 VAC On/Off input signal may be used to activate and deactivate the discrete input terminals (i.e., F, R, Jog, etc.), or an analog voltage or current may be used to vary the speed or torque of the motor. The gain and bias of the analog control signal may be adjusted for application-specific suitability by the user.

The analog and discrete outputs of the **ACE G9-120V-PCB** may be used to annunciate an active condition or to activate an ancillary device (e.g., brake, LED, etc.).

No special programming or program changes are required to use the **ACE G9-120V-PCB**. However, application-specific setup programming may be required.

Table 4 on pg. 25 lists the names, descriptions, and the default settings (of programmable terminals) of the input and output terminals of the **ACE G9-120V-PCB**.

Note: *To use the input lines of the **ACE G9-120V-PCB** to provide **Run** commands the **Command Mode** setting must be set to **Terminal Board**.*

Figure 20 on pg. 30 shows a typical connection diagram for the ASD system.

ACE G9-120V-PCB Precautions

⚠ DANGER ⚠

- The ASD contains high voltage parts. Contact with live circuits will result in electric shock.
- Ensure that the ASD system is tagged out before attempting to perform maintenance or when making adjustments to the ASD system.
- Ensure that all system/ASD power is off and that the **Charge** LED of the ASD is off.
- **DO NOT** open the door of the ASD when the ASD power is on. **DO NOT** attempt to operate the ASD with the door open. Failure to do so can lead to electric shock and may result in serious injury or loss of life.
- The **ACE G9-120V-PCB** uses 120 VAC and may cause serious injury if it is used improperly or if it comes into contact with personnel.
- PCB-mounted LEDs are active-signal indicators and are not to be used for system troubleshooting.
- **ONLY** use the **X2** terminal(s) of the **CN2** connector as the return for the discrete 120 VAC inputs.
- **DO NOT** use the **CC** terminals of the **ACE G9-120V-PCB** as a return for the 120 VAC signal. The **CC** terminals are to be used as the return lines for the DC I/O signals of the **ACE G9-120V-PCB ONLY**.
- When connecting stranded wires to the terminals of the **ACE G9-120V-PCB** ensure that there are no stray or unsecured wire strands at the terminal connection.
- Shielded cables are recommended for control line cabling.
- **DO NOT** run the control cabling within the same conduit as the power cables.

- Electrical connections, wire types, and layouts that are external to the ASD shall adhere to all local and regional codes and standards.
- Ensure that the system is properly grounded and that all grounds are secure.
- This system is to be configured and operated by **Qualified Personnel** only.

Terminal Functions

The input and output terminals of the **ACE G9-120V-PCB** are used to control and monitor the functions of the ASD.

See the **Direct Access Information on pg. 79** for an in-depth description of the functionality and application-specific setup requirements of the input and output terminals.

Input Terminals

Analog Inputs

The analog input terminals include the **V/I**, **RX**, and the **RR** terminals.

The **V/I** terminal is an isolated input that accepts a 0–10 VDC input voltage or 0–20 mA input current as determined by the setting of **SW2**. Only **IICC** is to be used as the return for the **V/I** input terminal.

The **RX** terminal accepts a ±10 VDC input voltage.

The **RR** terminal accepts a 0–10 VDC input voltage.

Either analog input may be used to control the speed or torque of the motor.

Discrete Inputs

The 120 VAC discrete inputs include the **F**, **R**, **I1**, **I2**, **I3**, **I4**, **I5**, and **I6** terminals. The discrete input terminals accept a 120 VAC discrete input signal that is used to activate the terminal and the assigned function.

Discrete terminals that have a function assigned are activated for the duration of the activation. Discrete terminals with no function assigned will not respond to an input signal.

Unused discrete terminals may be assigned any of the functions listed in Table 7 on pg. 236. Duplicate terminal assignments will be OR'd (either will be used to activate the assigned function).

Terminals labeled **X2** of **CN2** are the neutral return connections for the 120 VAC discrete inputs. No other terminals of the **ACE G9-120V-PCB** are to be used for the neutral return of the 120 VAC input.

CAUTION: ***DO NOT*** *use the* ***CC*** *terminals of the ACE G9-120V-PCB as a return for the 120 VAC input signals.*

Output Terminals

Analog Outputs

Analog outputs include the **AM**, **FM**, and **FP** output terminals. To use the output terminals a function must be assigned to the terminal.

The **AM** terminal must be further defined by parameter settings F670, F671, F685, and F686.

The **FM** terminal must be further defined by parameter settings F005, F006, F681, F682, and F683.

The **FP** terminal must be further defined by parameter settings F676 and F677.

Discrete Outputs

The form-A output contacts of **OUT1** (A and C), **OUT2** (A and C), and the form-C output contacts **BRAKE** (A, B, and C) comprise the list of discrete output terminals. The output terminals are rated for 1 A/125 VAC.

All discrete output terminals are programmable and may be set to change state upon the occurrence of a user-selected event.

10 VDC

PP is a 10 VDC/10 mA max. output for customer use.

24 VDC

P24 is a 24 VDC/200 mA max. output for customer use.

Communications

CN4 is the 2-Wire or 4-Wire serial communications port as selected by the setting of **SW1**.

See Program ⇒ **Communications** for more information on the requirements for setting up the ASD for ASD-to-ASD communications and for ASD-to-host (i.e., PC, PLC, etc.) communications.

Alternate I/O Terminal Board

The ACE-tronics G9 ASD may also be controlled using the 24-Volt I/O Terminal Board (optional).

The 24-Volt I/O Terminal Board (P/N 3D658344_G901) control functions operate the same as the 120-Volt I/O Terminal Board with the exception that the discrete terminal activation is carried out using a **Sink** or **Source** method of terminal activation.

In the **Sink** operating mode the **CC** terminal is connected to a discrete input terminal to activate the assigned function — in the **Source** mode a 24 VDC signal is input to a discrete input terminal to activate the assigned function.

There are no software changes required to use the 24-Volt I/O Terminal Board.

ACE G9-120V-PCB Specifications/Layout

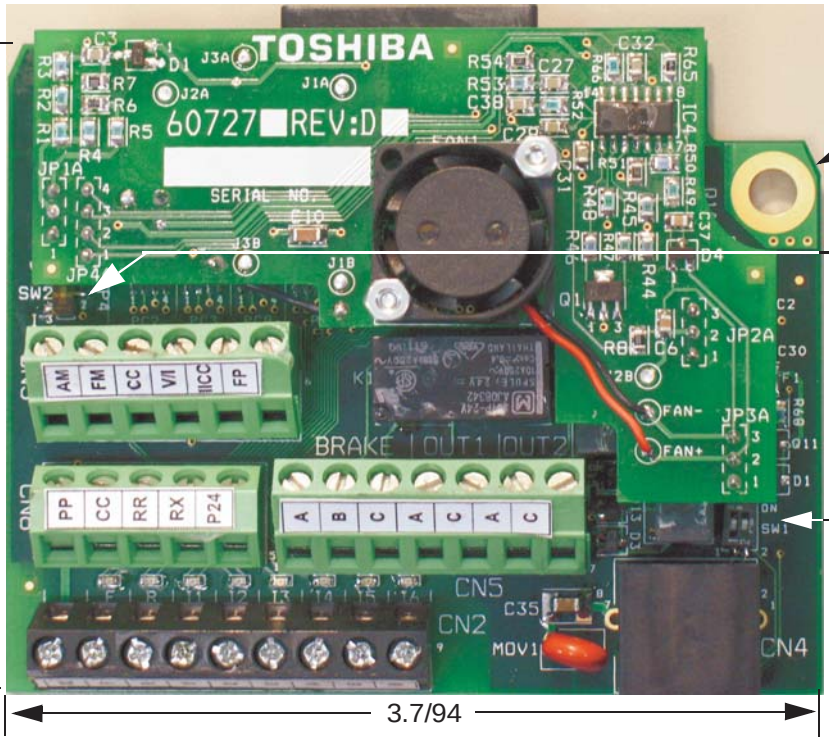
Table 2. Ratings Information.

Parameter	Rating
Isolation Voltage	850 V_{rms}
Input Voltage	0 – 120 VAC +10% — Hysteresis 60/90 ±10 VAC
Input Current (Terminal)	4.8 mA ±2.5 mA
Operating Temperature	14° to 104° F (-10° to 40° C)
Input Impedance	36 kΩ

Table 3. Connector Pin Assignments.

	Pin Assignments									
Connector	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CN2	X2	F	R	I1	I2	I3	I4	I5	I6	X2
CN3	AM	FM	CC	V/I	IICC	FP				
CN5	BRAKE-A	BRAKE-B	BRAKE-C	OUT1-A	OUT1-C	OUT2-A	OUT2-C			
CN6	PP	CC	RR	RX	P24					

Figure 8. ACE G9-120V-PCB Layout.

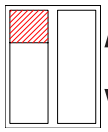


CAUTION

Ensure that the ground screw is securely in place to prevent arcing, intermittent operation, or system failure.

SW2 — Voltage or current selection for the **V/I** input.

SW1 — Open or close both switches for half or full duplex, respectively.



See Figure 20 on pg. 30 for more information on the **ACE G9-120V-PCB** connections.

Note: *Dimensions are in inches/mm.*

Table 4. ACE G9-120V-PCB Default Assignment Terminal Names and Functions.

Terminal Name	Input/Output	Default Function (Also See Terminal Descriptions on pg. 26)	Circuit Config.
F	Discrete Input Apply 120 VAC to activate.	**Forward Run Command** — Multifunctional programmable discrete input.	Figure 10 on pg. 29.
R		**Reverse Run Command** — Multifunctional programmable discrete input.	
I1		**Input 1** — Multifunctional programmable discrete input.	
I2		**Input 2** — Multifunctional programmable discrete input.	
I3		**Input 3** — Multifunctional programmable discrete input.	
I4		**Input 4** — Multifunctional programmable discrete input.	
I5		**Stop Limit-Switch Forward** — Multifunctional programmable discrete input.	
I6		**Stop Limit-Switch Reverse** — Multifunctional programmable discrete input.	
OUT1	Switched Output	**Brake Failure** — Multifunctional programmable discrete output.	Figure 16 on pg. 29.
OUT2		**Brake Release** — Multifunctional programmable discrete output.	
BRAKE-A		BRAKE relay (N.O.).	Figure 19 on pg. 29.
BRAKE-B		BRAKE relay (N.C.).	
BRAKE-C		BRAKE relay (Common).	
RR	Analog Input	Multifunctional programmable analog input. (0.0 to 10 VDC input).	Figure 11 on pg. 29.
RX		Multifunctional programmable analog input (±10 VDC input).	Figure 12 on pg. 29.
V/I (Select **V** or **I** via SW2)		**V** — Multifunctional programmable isolated analog voltage input (0 to 10 VDC input).	Figure 13 on pg. 29.
		Frequency Mode 2 (Default Setting) **— I** —Multifunctional programmable isolated analog current input (4 [0] to 20 mADC input — 0 Hz to Maximum Frequency).	
AM	Analog Output	**Output Current —** Voltage output that is proportional to the output current of the ASD or to the magnitude of the function assigned to this terminal (see Table 8 on pg. 240 for assignment listing).	Figure 18 on pg 29
FM		**Output Frequency —** Current or Voltage output that is proportional to the output frequency of the ASD or to the magnitude of the function assigned to this terminal (see Table 8 on pg. 240). Select **Current** or **Voltage** at F681.	
P24	DC Output	24 VDC output (200 mA max.).	Figure 14 on pg. 29.
PP		10.0 VDC/10 mA voltage source for the external use (e.g., potentiometer).	Figure 15 on pg. 29.
FP	Pulsed Output	**Frequency Pulse** — Multifunctional programmable output pulse train of a frequency based on the output frequency of the ASD (see Table 8 on pg. 240).	Figure 17 on pg. 29.
IICC	—	Return for the isolated **V/I** input terminal.	**Do Not** connect to **Earth Gnd** or to each other.
CC	—	Return for the **AM**, **FM**, **RR**, **RX**, **P24**, and the **PP** analog terminals.	

Terminal Descriptions

The programmable terminal assignments may be accessed and changed from their default settings as mapped on pg. 57 or via the **Direct Access** method: Program ⇒ Direct Access ⇒ **Applicable Parameter Number**. See the section titled Program Mode Menu Navigation on pg. 57 for the applicable **Direct Access** parameter numbers.

For additional information on terminal assignments and default setting changes, see the sections titled Default Setting Changes on pg. 40 and Terminal on pg. 60.

See the section titled Cable/Terminal/Torque Specifications on pg. 272 for information on the proper cable/terminal sizes and torque specifications when making **ACE G9-120V-PCB** connections.

F — The default setting for this terminal is **Forward** run command. The **F** input terminal is activated by applying 120 VAC to this terminal. This terminal may be programmed to any of the functions listed in Table 7 on pg. 236 (see F111).

R — The default setting for this terminal is **Reverse** run command. The **R** input terminal is activated by applying 120 VAC to this terminal. This terminal may be programmed to any of the functions listed in Table 7 on pg. 236 (see F112).

I1 — The default setting for this terminal is **Preset Speed 1** (see Preset Speed 1 on pg. 87). The **I1** input terminal is activated by applying 120 VAC to this terminal. This terminal may be programmed to any of the functions listed in Table 7 on pg. 236 (see F115).

I2 — This input terminal may be programmed to any of the functions listed in Table 7 on pg. 236 (see F112).

I3 — This input terminal may be programmed to any of the functions listed in Table 7 on pg. 236 (see F115).

I4 — This input terminal may be programmed to any of the functions listed in Table 7 on pg. 236 (see F116).

I5 — The default function assigned to this input terminal is **Stop Limit-Switch Forward**. Activating this terminal applies the **Stop** command and may be used to indicate the end-of-travel on any axis via a limit switch. The **Stop** command stopping method is selected at the **Limit-Switch Stopping Method** parameter. This input terminal may be programmed to any of the functions listed in Table 7 on pg. 236 (see F117).

I6 — The default function assigned to this input terminal is **Stop Limit-Switch Reverse**. Activating this terminal applies the **Stop** command and may be used to indicate the end-of-travel on any axis via a limit switch. The **Stop** command stopping method is selected at the **Limit-Switch Stopping Method** parameter. This input terminal may be programmed to any of the functions listed in Table 7 on pg. 236 (see F118).

RR — The default function to which this analog input terminal is assigned is **Frequency Mode 1** setting. The **RR** terminal accepts a 0 – 10 VDC input signal that is used to control the function to which this terminal is assigned. This input terminal may be programmed to control the speed or torque of the motor via an amplitude setting or regulate by setting a limit. The gain and bias of this terminal may be adjusted for application-specific suitability (see F210 – F215).

RX — The default function to which this analog input terminal is assigned is **Torque Command** setting. The **RX** terminal accepts a ±10 VDC input signal that is used to control the function to which this terminal is assigned. This input terminal may be programmed to raise or lower the speed or torque of the motor via an amplitude setting. This terminal may also be used to regulate the speed or torque of

a motor by setting a limit. The gain and bias of this terminal may be adjusted for application-specific suitability (see F216 – F221). See Figure 20 on pg. 30 for an electrical depiction of the **RX** terminal.

V/I — The **V/I** terminal has the dual function of being able to receive an input voltage or current. The function as a voltage input is to receive a 0 – 10 VDC input signal. The function as a current input is to receive a 0 – 20 mA input signal. Using either input type, the function is to control the 0.0 – Maximum Frequency output or the 0.0 to 250% torque output of the ASD. This is an isolated input terminal. This terminal may be programmed to control the speed or torque of the motor and cannot process both input types simultaneously. **SW2** must be set to **V** or I to receive a voltage or current, respectively (see Figure 8 on pg. 24). Terminal scaling is accomplished via F201 – F206. The gain and bias of this terminal may be adjusted for application-specific suitability (see F470 and F471).

P24 — +24 VDC at 200 mA power supply for customer use.

PP — The function of output **PP** is to provide a 10 VDC/10 mADC max. output that may be divided using a potentiometer or other transducer. The tapped voltage is applied to the **RR** input to provide manual control of the **RR** programmed function.

OUT1 — The default function assigned to this terminal is **Output Low Speed**. This output may be programmed to provide an indication (open or closed) that any one of the functions listed in Table 10 on pg. 242 has occurred or is active. This function may be used to signal external equipment or to activate the brake (see F130). The **OUT1** terminal is rated at 2 A/120 VAC and 2 A/30 VDC.

OUT2 — The default function assigned to this terminal is **ACC/DEC Complete**. This output may be programmed to provide an indication (open or closed) that any one of the functions listed in Table 10 on pg. 242 has occurred or is active. This function may be used to signal external equipment or to activate the brake (see F131). The **OUT2** terminal is rated at 2 A/120 VAC and 2 A/30 VDC.

FP — The default function of this output terminal is to output a series of pulses at a rate that is a function of the output frequency of the ASD (50 mA max. at 1.0 kHz to 43.3 kHz). As the output frequency of the ASD goes up so does the **FP** output pulse rate. This terminal may be programmed to provide an output pulse rate that is proportional to the magnitude of any of the user-selected items from Table 8 on pg. 240. For additional information on this terminal see F676 on pg. 188.

AM — This output terminal produces an output voltage that is proportional to the output frequency of the ASD or of the magnitude of the function assigned to this terminal. This terminal may be programmed to provide an output voltage that is proportional to the magnitude of any of the user-selected items from Table 8 on pg. 240. For additional information on this terminal see F670 on pg. 186.

FM — This output terminal produces an output current or voltage that is proportional to the output frequency of the ASD or of the magnitude of the function assigned to this terminal. This terminal may be programmed to provide an output current or voltage that is proportional to the magnitude of any of the user-selected items from Table 8 on pg. 240. For additional information on this terminal see F005 on pg. 81. The Voltage/Current output selection is performed at F681.

BRAKE-A — One of two normally open contacts that, under user-defined conditions, connect to **BRAKE-C**.

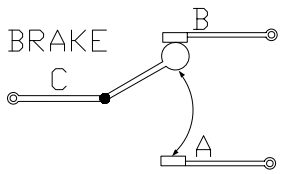
BRAKE-B — One of two normally closed contacts that, under user-defined conditions, connect to **BRAKE-C**.

BRAKE-C — **BRAKE-C** is the common leg of a single-pole double-throw form-C relay. The **BRAKE** relay is the **Fault Relay** by default, but may be programmed to any of the selections of Table 10 on pg. 242. For additional information on this terminal see F132 and Figure 9 on pg. 28.

Note: *The **BRAKE-A**, **BRAKE-B**, and **BRAKE-C** contacts are rated at 2 A/120 VAC and 2 A/30 VDC.*

Figure 9. BRAKE Switching Contacts.

Note: *The BRAKE relay is shown in the de-energized state.*



I/O Circuit Configurations

Figure 10. Discrete Input.

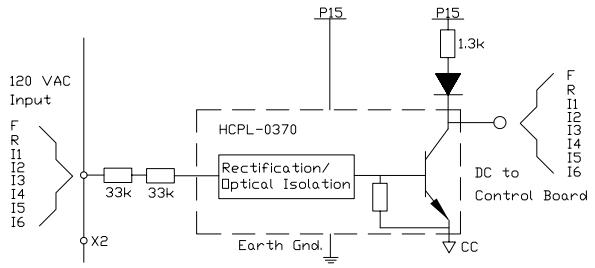


Figure 11. RR Input.

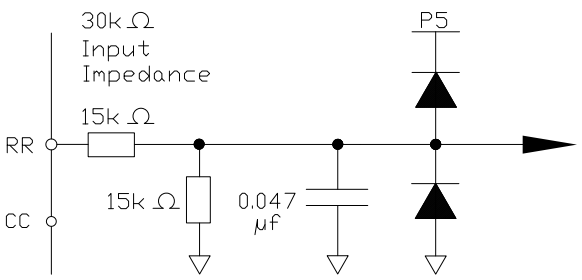


Figure 12. RX Input.

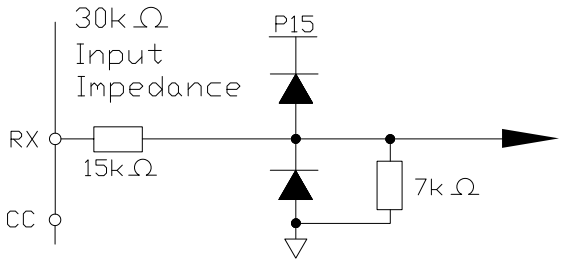


Figure 13. V/I Isolated Input.

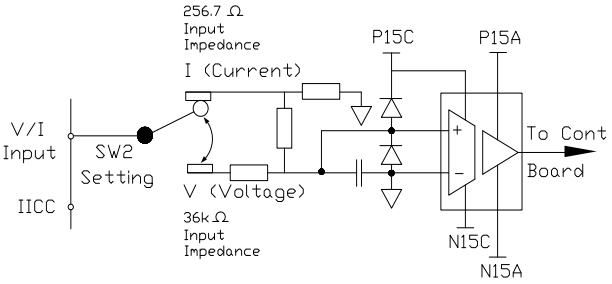


Figure 14. P24 Output.

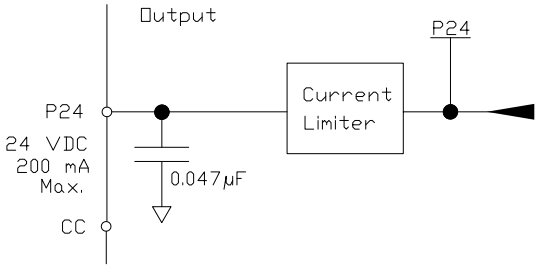


Figure 15. PP Output.

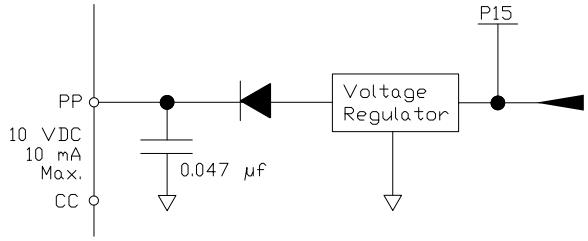


Figure 16. OUT1/OUT2 Output.

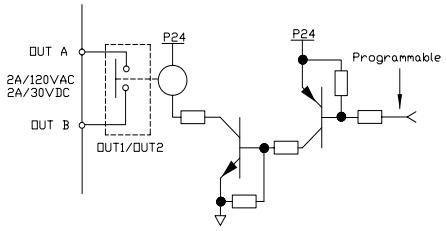


Figure 17. FP Output.

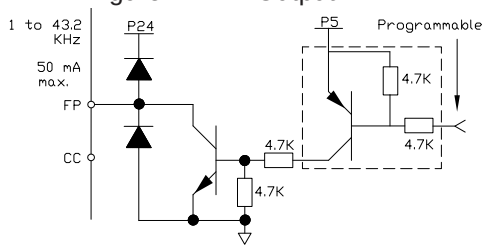


Figure 18. AM/FM Output.

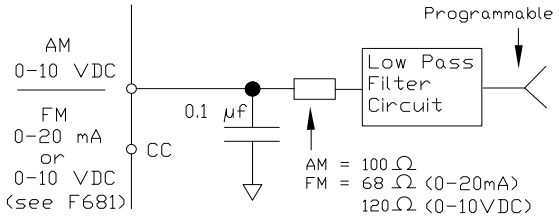
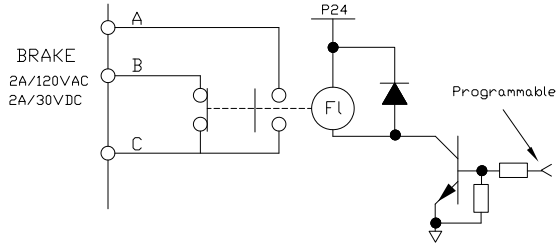


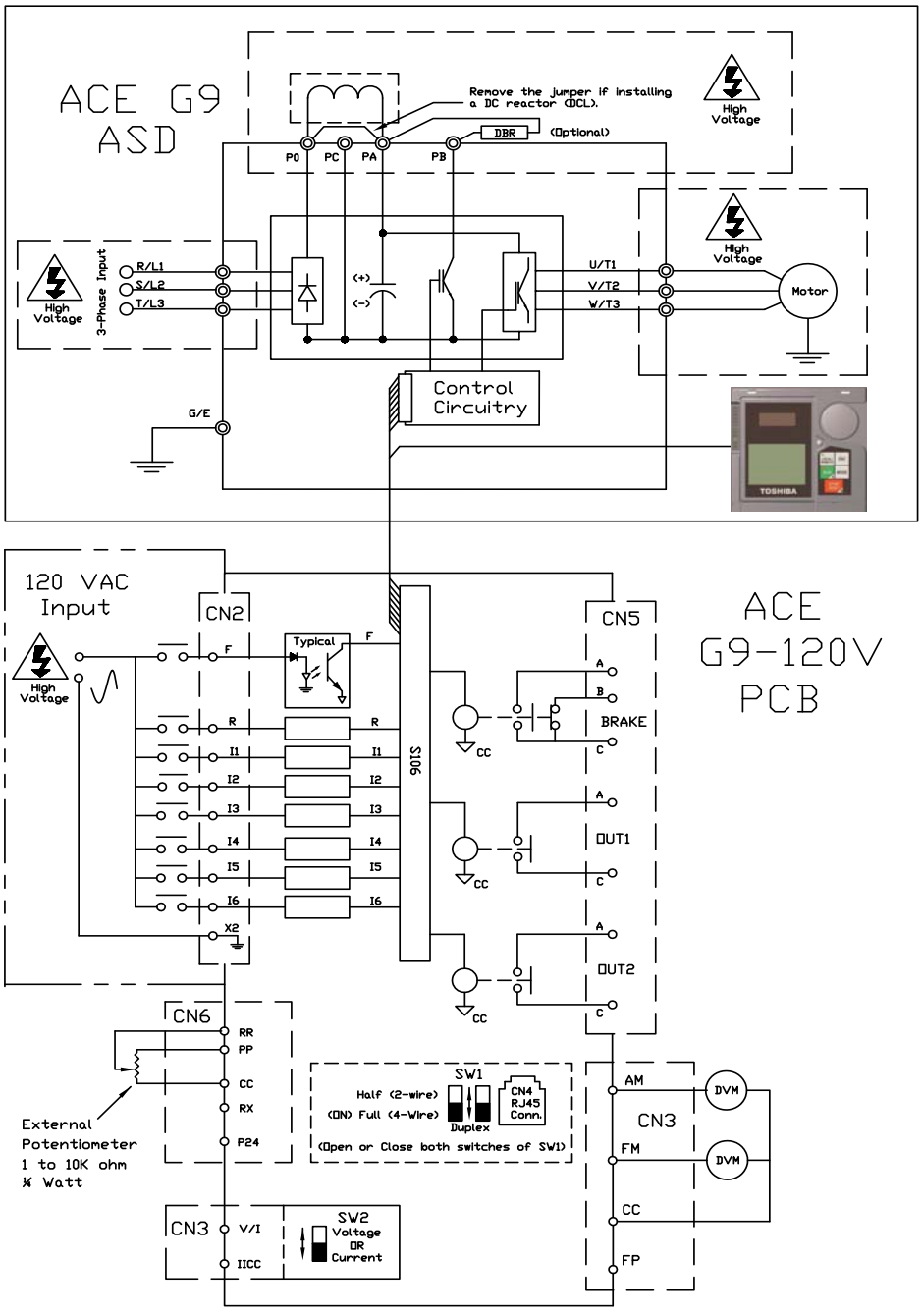
Figure 19. BRAKE Output.



Typical Connection Diagram

Figure 20. The ACE-tronics G9 ASD Typical Connection Diagram.

Note: *When connecting multiple wires to any of ASD terminals, do not connect a solid wire and a stranded wire to the same terminal.*



Note: *The **AM**, **FM**, **PP**, **RR**, **RX**, and the **P24** analog terminals are referenced to **CC**. The isolated **V/I** analog terminal referenced to **IICC**. **F**, **R**, **I1**, **I2**, **I3**, **I4**, **I5**, and **I6** referenced to **X2**.*

Startup and Test

Before turning on the ASD ensure that:

- **R/L1**, **S/L2**, and **T/L3** are connected to the 3-phase input power.
- **U/T1**, **V/T2**, and **W/T3** are connected to the motor.
- The 3-phase input voltage is within the specified tolerance.
- There are no shorts and all grounds are secure.
- All personnel are at a safe distance from the motor and the motor-driven equipment.

Electronic Operator Interface

The ACE-tronics G9 ASD **Electronic Operator Interface** (EOI) is comprised of an LED screen, an LCD screen, two LEDs, a rotary encoder, and five keys. These items are shown and described on pg. 33.

EOI Operation

The **EOI** is the primary input/output device for the user. The **EOI** may be used to monitor system functions, input data into the system, perform diagnostics, and view performance data (e.g., motor frequency, bus voltage, torque, etc.).

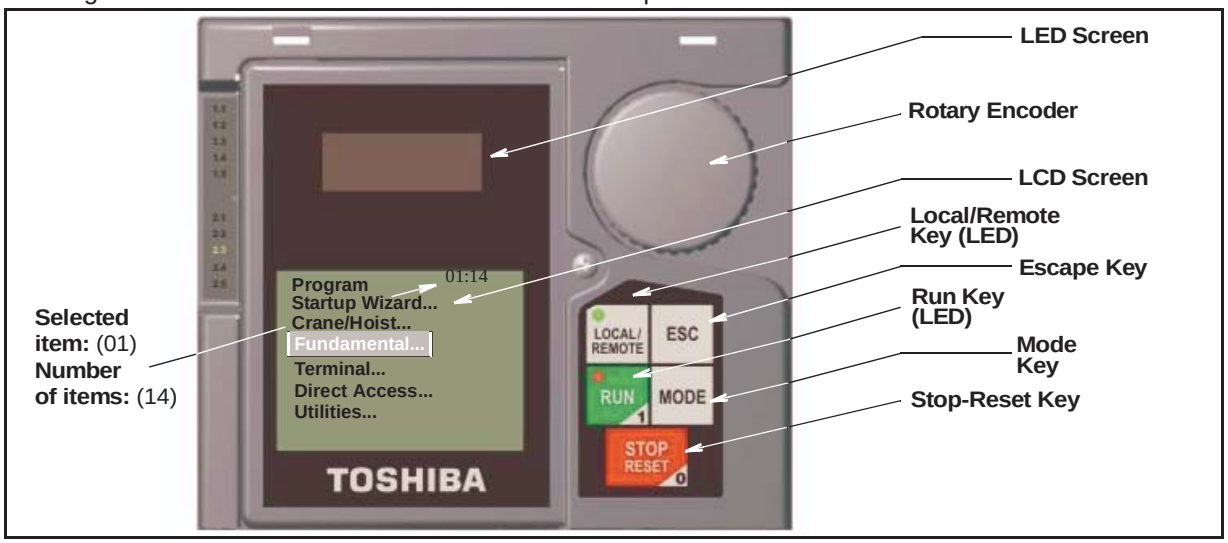
The software used with the ASD is menu driven; thus, making it a select-and-click environment. The operating parameters of a motor may be selected and viewed or changed using the **EOI** (or via communications).

EOI Remote Mounting

The **EOI** may be mounted remotely using the optional **ASD-MTG-KIT9**. The kit contains all of the hardware required to mount the **EOI** of the 9-Series ASD remotely.

System operation and **EOI** operation while using the remotely-mounted **EOI** are the same as with the ASD-mounted configuration.

Figure 21. The ACE-tronics G9 ASD Electronic Operator Interface Features.



EOI Features

LED Screen — Displays the running frequency, active **Fault**, or active **Alarm** information.

Rotary Encoder — Used to access the ASD menu selections, change the value of a displayed parameter, and performs the **Enter** key function. Turn the **Rotary Encoder** either clockwise or counterclockwise to perform the **Up** or **Down** functions of the displayed menu selection. Press the **Rotary Encoder** to perform the **Enter** (select) function.

LCD Screen — Displays configuration information, performance data (e.g., output frequency, bus voltage, torque, etc.), diagnostic information, and **LED** screen information in expanded text.

Local/Remote Key — Toggles the system to and from the **Local** and **Remote** modes. The **Local/Remote** key is disabled while the **Fault** screen is displayed. The LED is on when the system is in the **Local Command** mode. The **Local** mode allows the **Command** and **Frequency** control functions to be carried out via the **EOI**.

The **Remote** mode enables the **Command** and **Frequency** control functions to be carried out via the **ACE G9-120V-PCB**, **RS485**, **Communication Card**, **Pulse Input**, or the settings of F003/F004. The selection may be made via Program ⇒ Fundamental ⇒ Standard Mode Settings ⇒ **Command Mode** or **Frequency Mode 1**, respectively.

The availability of **Local** mode control (Command and Frequency control) may be disabled via Program ⇒ Utilities ⇒ Prohibition ⇒ **Local/Remote Key Command Override** or **Local/Remote Key Frequency Override**. The availability of the **Local** mode of operation may be reinstated by changing this setting or performing a **Reset** (see F007).

ESC Key — Returns the system to the previous level of the menu, toggles between the **EOI Command** screen and the **Frequency Command** screen, or cancels changes made to a field if pressed while still in the reverse video mode (dark background/light text). The three functions are menu-specific.

Run Key — Issues the **Run** command while in the **Local** mode. The **Run** key LED illuminates green while stopped or red while running to alert personnel.

Mode Key — Provides a means to access the three root menus. Pressing the **Mode** key repeatedly loops the system through the three root menus (see Figure 29 on pg. 52). While looping through the root menus, the **Program** menu will display the root menu screen or the **Program** sub-menu item being accessed prior to pressing the **Mode** key.

Stop-Reset Key — This key has three functions.

1. Issues the **Off** command (decelerates to **Stop** at the programmed rate) if pressed once while in the **Local** mode in accordance with the setting of F721.
2. Initiates an **Emergency Off Fault** if pressed twice quickly from the **Local** or **Remote** modes. The **Emergency Off** function terminates the ASD output and stops the motor in accordance with the setting of F603.
3. Resets active **Faults** if pressed twice quickly. The source of the **Faults** must be determined and corrected before normal ASD operation can resume.

LED/LCD Screen

The LED screen is used to display the output frequency, active alarms and active faults, or Off.

If there are no active alarms or faults, the output frequency is displayed.

During an active alarm, the display toggles to and from the running frequency and the active alarm.

During an active fault, the fault is displayed.

Loss of the **ST** terminal activation (if so configured; see F110) flashes **Off**.

LED Character/Font Information

Characters displayed on the LED screen will be of the seven-segment format. Not all alpha-numeric characters are used.

Shown to the right are the seven-segment characters used on the LED screen along with the same characters as they are displayed on the LCD screen.

LCD Character Information

All alpha-numeric characters are used.

LED/LCD Screen Information

LED	LCD	LED	LCD
A	A	1	1
b	b	2	2
C	C	3	3
d	d	4	4
E	E	5	5
F	F	6	6
G	G	7	7
H	H	8	8
I	I	9	9
J	J	0	0
L	L		
M	M		
n	n		
O	O		
P	P		
q	q		
r	r		
S	S		
t	t		
U	U		
v	v		
y	y		
-	-		

LCD Screen

The **LCD** screen is the primary user input/output information center. Parameter settings may be viewed or changed using the LCD screen module of the **EOI**. To view or change a parameter setting using the LCD screen, press the **Mode** key until the **Program** menu is displayed. Turn the **Rotary Encoder** until the desired **Primary Menu** item (see pg. 57) is within the cursor block. Press the **Rotary Encoder** to select the item from the **Primary Menu** (repeat the press-to-select function for sub-menu items).

See the section titled Default Setting Changes on pg. 40 for more information on changing parameter settings.

Upon reaching the desired parameter selection the current setting may be viewed, or selected and changed by pressing the **Rotary Encoder** — the setting will take on the reverse video format (dark background/ light text). Turn the **Rotary Encoder** to change the parameter setting. Press the **ESC** key while the new parameter setting is in the reverse video mode to exit the selection without saving the change or press the **Rotary Encoder** while the parameter setting is in the reverse video mode to accept the new setting.

Repeated **ESC** key entries at any time takes the menu back one level each time the **ESC** key is pressed until the **Frequency Command** screen is reached. Further **ESC** entries will toggle the system to and from the **Frequency Command** screen and the **EOI Command** menu.

Note: *Changes carried out from the **EOI Command** screen will be effective for EOI-controlled ASD operation only. See the section titled EOI Command Mode on pg. 53 for additional information on **EOI Command Mode** operations.*

Primary Menus of the LCD Screen

The three primary LCD screens are displayed while accessing the associated operating modes: the **Frequency Command**, **Monitor**, and **Program Menu** screens.

Figure 22. **Frequency Command** Screen.

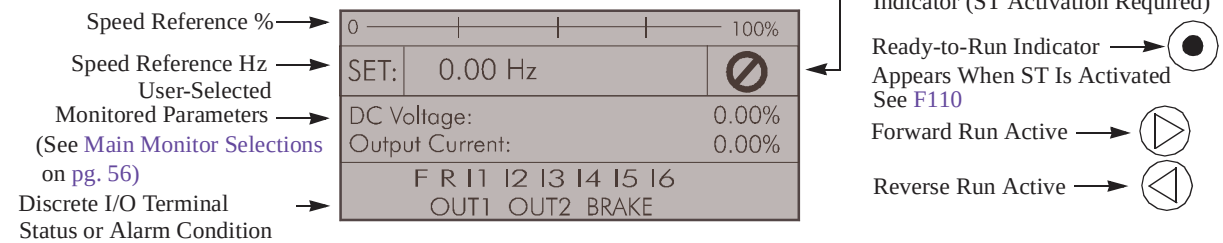


Figure 23. **Monitor** Screen (see pg. 54 for more on the Monitor Screen).

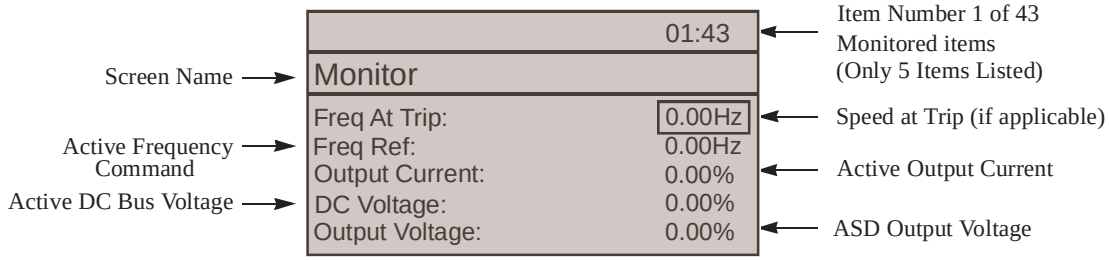
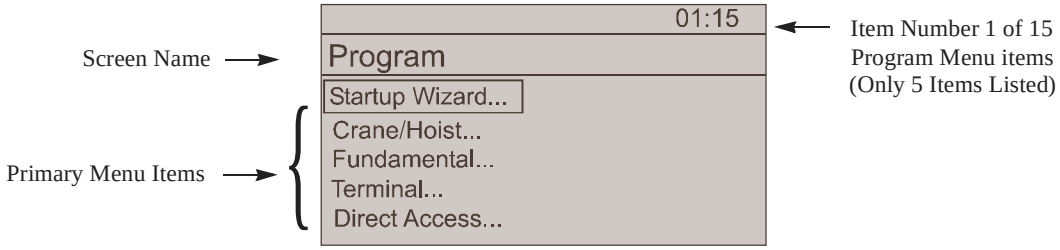


Figure 24. **Program Menu Screen** (see pg. 57 for more on the Program Menu Screen).



LED/LCD Screen Installation Note

When installing the LED/LCD display module of the **EOI** ensure that the left side of the display is inserted first with the top and bottom catches (see Phillips screws at underside of display) securely in place. This ensures the proper alignment and electrical connection of the CNX connector of the **LED/LCD** display module PCB. Gently hold the display in place while securing the Phillips mounting screw.

If improperly seated, the periphery of the **LED/LCD** display module will not be flush with the front panel surface and the unit will not function properly.

EOI Remote Mounting

The ASD may be controlled from a remotely-mounted **EOI**. For safety and application-specific reasons, some ASD installations will warrant that the operator not be in the vicinity during operation or that the **EOI** not be attached to the ASD housing. The **EOI** may be mounted either with or without the optional **Remote Mounting Kit** (P/N ASD-MTG-KIT). The ease of installation is enhanced by the **Remote Mounting Kit** (P/N 58333) which allows for **EOI** placement and easier cable routing.

Remote mounting will also allow for multiple **EOI** mountings at one location if controlling and monitoring several ASDs from a central location is required.

The **EOI** can operate up to nine feet away from the ASD. A **EOI** extender cable is required for remote mounting. The **EOI** extender cable is available in a nine-foot length and may be ordered through the ACE World Companies Customer Support Center.

The optional dust cover (P/N ASD-BPC) may be used to cover the front panel opening of the ASD housing after removing the **EOI**.

Remote EOI Required Hardware

EOI Mounting Hardware

- EOI Remote-Mount Housing — P/N 58333 (included with 230-volt 40-HP and above; and with the 460-volt 75 HP and above)
- 6-32 x 5/16” Pan Head Screw — P/N 50595 (4 ea.)
- #6 Split-Lock Washer — P/N 01884 (4 ea.)
- #6 Flat Washer — P/N 01885 (4 ea.)

Bezel Plate Mounting Hardware

- Bezel Plate — P/N 52291
- 10-32 Hex Nut — P/N 01922 (4 ea.)
- #10 Split-Lock Washer — P/N 01923 (4 ea.)
- #10 Flat Washer — P/N 01924 (4 ea.)
- Dust Cover — P/N ASD-BPC (Optional)

Extender Cable

- ASD-CAB10F: Cable, 9 ft.

EOI Installation Precautions

Install the unit securely in a well ventilated area that is out of direct sunlight using the four mounting holes at the rear of the **EOI**. The ambient temperature rating for the **EOI** is 14° to 104° F (-10° to 40° C).

- Select a mounting location that is easily accessible by the user.
- Avoid installation in areas where vibration, heat, humidity, dust, metal particles, or high levels of electrical noise (EMI) are present.
- Do not install the **EOI** where it may be exposed to flammable chemicals or gases, water, solvents, or other fluids.
- Turn on the power only after securing the front cover of the ASD.

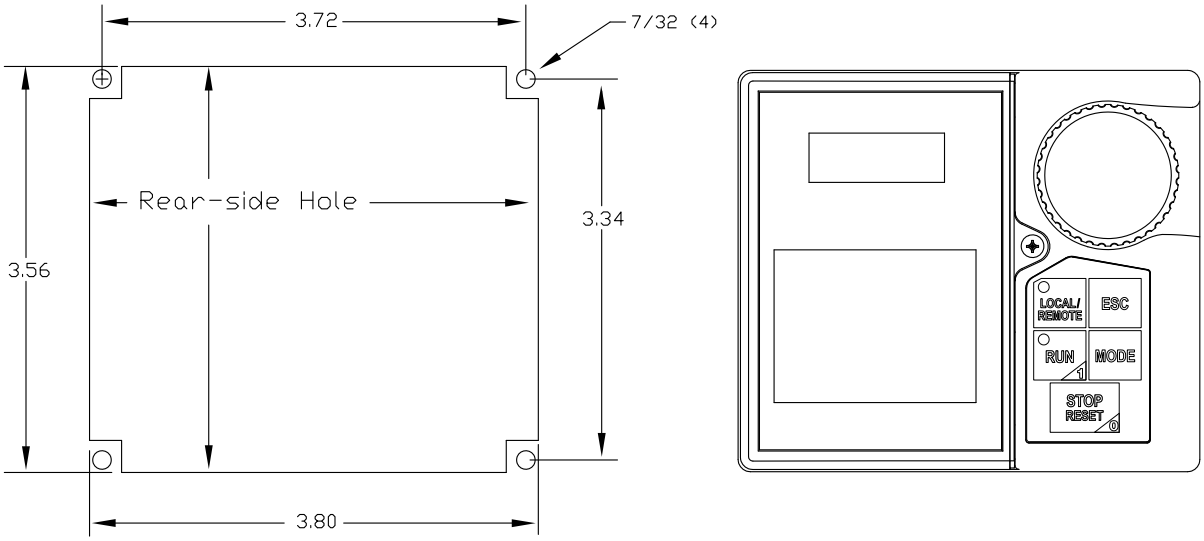
EOI Remote Mounting w/o the ASD-MTG-KIT

Note: *See Figure 25 for the dimensions and the item locations referenced in steps 1 through 5.*

1. At the **EOI** mounting location, mark the 3.80” by 3.56” hole and the four 7/32” screw holes.
2. Cut the 3.80” by 3.56” rectangular hole.
3. Drill the four 7/32” screw holes.
4. Attach and secure the **EOI** to the front side of the mounting location using the four 6-32 x 5/16” pan head screws, the #6 split lock washers, and the #6 flat washers.
5. Connect the extension cable.

EOI Mounting Dimensions

Figure 25. EOI Mounting Dimensions.



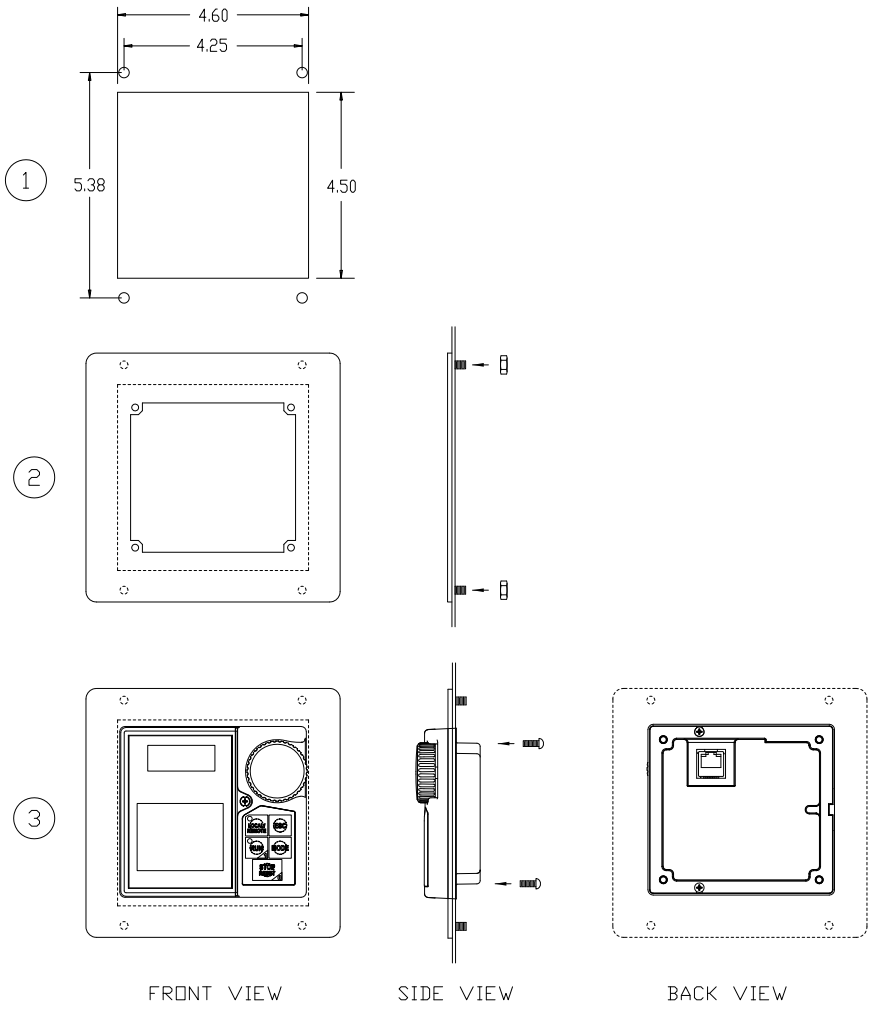
EOI Remote Mounting Using the ASD-MTG-KIT

Note: *See Figure 26 for the dimensions and the item locations referenced in steps 1 through 6.*

1. At the **EOI** mounting location, mark the 4.60” by 4.50” hole and the four 11/32” screw holes.
2. Cut the 4.60” by 4.50” rectangular hole.
3. Drill the four 11/32” holes for the Bezel Plate mount.
4. Attach and secure the Bezel Plate to the front side of the mounting location using the four 10-32 hex nuts, #10 split lock washers, and the #10 flat washers.
5. Attach and secure the **EOI** to the front side of the Bezel Plate using the four 6-32 x 5/16” pan head screws, #6 split lock washers, and the #6 flat washers.
6. Connect the extension cable.

EOI ASD-MTG-KIT Mounting Dimensions

Figure 26. EOI Bezel Plate Mounting Dimensions.



System Operation

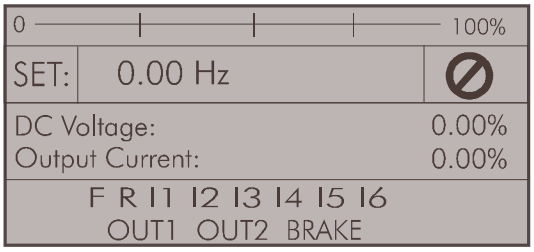
Operation (Local)

Note: *See the section titled EOI Features on pg. 33 for information on **Remote** operation.*

To turn the motor on perform the following:

1. Press the **Mode** key until the **Frequency Command** screen is displayed.
2. Press the **Local/Remote** key to enter the **Local** mode (green **Local** LED illuminates).
3. Turn the **Rotary Encoder** clockwise until the desired **Frequency Command** value is displayed in the **SET** field of the LCD screen.
4. Press the **Run** key and the motor runs at the **Frequency Command** value.

Frequency Command Screen



Note: *The speed of the motor may be changed while the motor is running by using the **Rotary Encoder** to change the **Frequency Command** value.*

5. Press the **Stop-Reset** key to stop the motor.

Default Setting Changes

To change a default parameter setting go to the root level of the **Program** menu. Turn the **Rotary Encoder** until the desired parameter group is within the cursor block. Press the **Rotary Encoder** to select an item or to access a subgroup (repeat if required until reaching the parameter to be changed).

Press the **Rotary Encoder** to enter the **Edit** mode and the value/setting takes on the reverse video format (dark background/light text). Turn the **Rotary Encoder** to change the parameter value/setting.

Press the **Rotary Encoder** while the parameter setting is in the reverse video mode to accept the new setting or press the **ESC** key while the new parameter setting is in the reverse video mode to exit the menu without saving the change.

For a complete listing of the **Program** mode menu selections, see the section titled Program Mode Menu Navigation on pg. 57. **Program** menu items are listed and mapped for convenience. The **Direct Access Numbers** are listed where applicable.

The default settings may also be changed by entering the **Parameter Number** of the setting to be changed at the **Direct Access** menu (Program ⇒ Direct Access ⇒ *Applicable Parameter Number*). A listing of the **Direct Access Numbers** and a description of the associated parameter may be found in the section titled Direct Access Information on pg. 79.

A listing of all parameters that have been changed from the default setting may be viewed sequentially by accessing the **Changed From Default** screen (Program ⇒ Utilities ⇒ Changed From Default).

The **Changed From Default** feature allows the user to quickly access the parameters that are different from the factory default settings or the post-reset settings. Once the **Changed From Default** screen is displayed, the system scrolls through all of the system parameters automatically and halts once reaching a changed parameter.

Once stopped at a changed parameter, the **Rotary Encoder** may be clicked once clockwise to continue scrolling forward or clicked once counterclockwise to begin scrolling in reverse. With each click of the **Rotary Encoder** from a stop, the system scrolls through the parameters and stops at the next parameter that has been changed.

Press the **Rotary Encoder** while stopped at a changed parameter to display the settings of the changed parameter. Press the **Rotary Encoder** to enter the **Edit** mode — the parameter value/setting takes on the reverse video format (dark background/light text).Turn the **Rotary Encoder** to change the parameter setting.

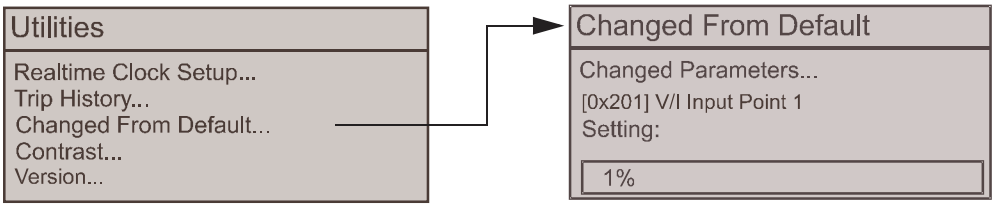
Press the **ESC** key while the setting is in the reverse video format to exit the **Edit** mode without saving the change and to resume the **Changed From Default** search. Or press the **Rotary Encoder** while the setting is in the reverse video format to save the change. Press **ESC** to return to the **Changed From Default** search.

Pressing **ESC** while the system is performing a **Changed From Default** search terminates the search. Pressing **ESC** when finished searching (or halted at a changed parameter) takes the menu back one level.

Note: *Communications setting changes will require that the ASD power be removed and then re-applied for the changes to take affect.*

Note: *Parameter F201 was changed to create the example shown in Figure 27.*

Figure 27. Changed From Default Screen.



Save User Settings

A profile of an existing setup may be saved and re-applied when required by using the **Save User Setup** feature. This function is carried out via Program ⇒ Utilities ⇒ Type Reset ⇒ **Save User Settings**.

With the initial setup saved, troubleshooting and diagnostics may be performed and the starting setup may be re-applied when finished via Program ⇒ Utilities ⇒ Type Reset ⇒ **Restore User Settings**.

Note: ***EOI*** *settings are not stored using the* ***Save User Settings*** *or using the* ***Restore User Settings*** *features (i.e., contrast setting, voltage/current units, display gradient characteristics, etc.).*

Startup Wizard Requirements

⚠ CAUTION

In the event of a power loss while programming the system using the Startup Wizard the parameter entries completed before the power loss will be retained and used by the system upon system startup. Confirm that all settings are as required for the application before system startup.

The **Startup Wizard** is used to quickly setup the commonly used parameters of the ACE-tronics G9 ASD — it queries the user for information on **Motion Control** settings and on the input and output signal parameters. The ASD may also be setup by directly accessing each of the control settings via the **Program** menu (see pg. 57) or the **Direct Access Numbers** (see pg. 79).

To run the **Startup Wizard**, go to the **Program** menu and click **Startup Wizard**.

At the subsequent screen either click **Exit** to end the **Startup Wizard** or click **Next** to continue with the wizard.

Click **Next** at each parameter screen to accept the setting and to go to the next screen.

Upon completion of the **Startup Wizard** click **Exit** to return the system to the Frequency Command Screen.

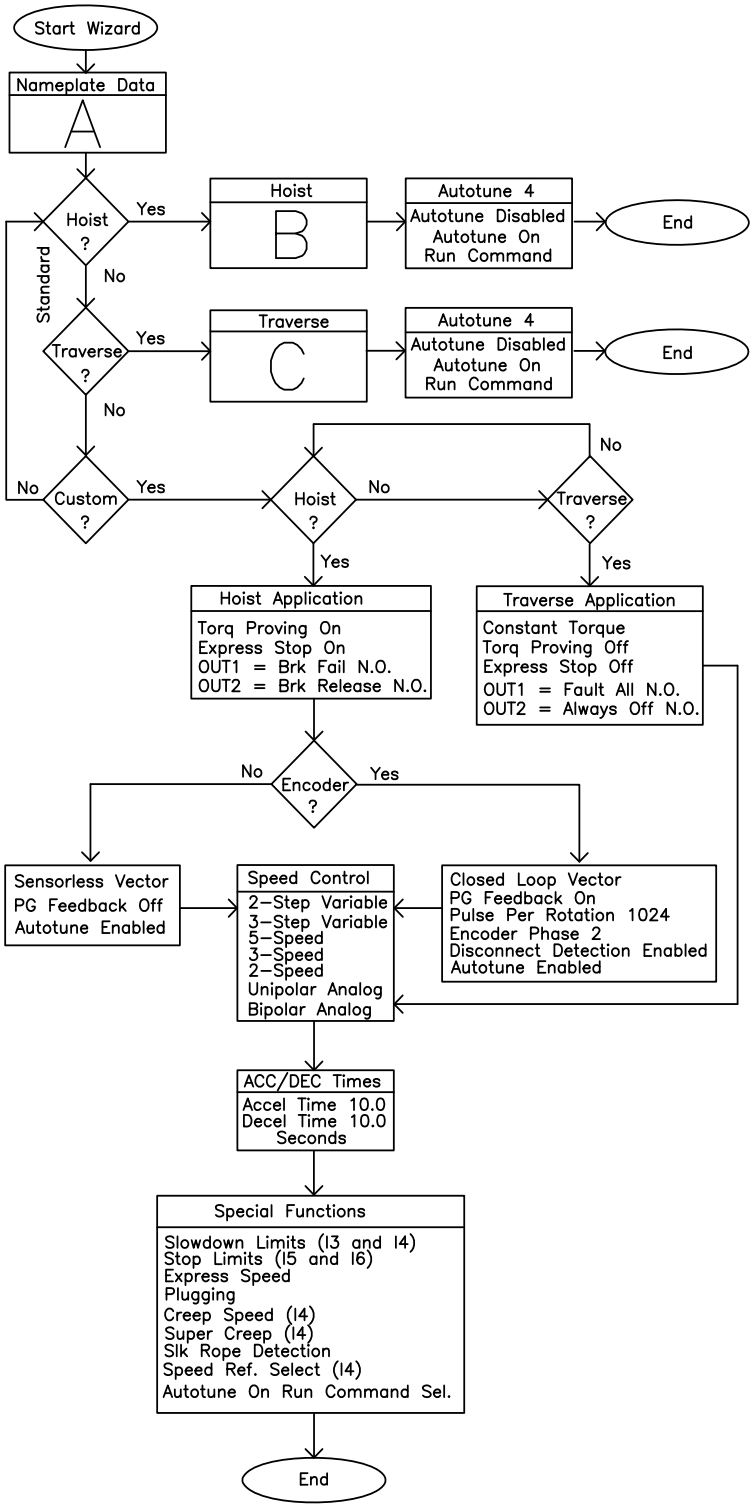
Note: *The **Startup Wizard** is disabled during an active **Run** command. Remove the **Run** command (deactivate F and/or R) to enable the **Startup Wizard** function.*

The **Startup Wizard** queries the user for the parameter settings listed below.

- Startup Wizard Introduction Screen
- Motor Capacity
- Motor RPM
- Motor Current
- ASD Control Configuration
  - Standard Hoist Control
  - Standard Traverse Control
  - Custom
    - Hoist
    - Traverse
- Autotune Enable
- Speed Control (F986)
- Accel/Decel Times
- Special Functions

Figure 28. Startup Wizard Flow Chart.

A (Nameplate Data)		
F014	60.0	Hz
F017	On	
F304	On/No OL	
F402	On	
F405	20	HP
F406	26.4	Amps.
F407	1750	RPM
F409	460	Volts
F426	60	Hz
F427	60	Hz
F441	150	%
F443	180	%
F990	0.5	Seconds
F991	0.5	Seconds
B (Hoist)		
F009	3.0	Seconds
F010	1.5	Seconds
F113	Increase	
F114 – F118	Unassigned	N.O.
F130	Brake Fail	N.O.
F132	Brake Release	N.O.
F360	PG Feedback Option	
F375	1024	PG PPR
F376	2	Phase No.
F377	On	Detect
F493	On	Express Stop
F494	Off	Plugging
F511	1.5	Seconds
F985	Closed-Loop Hoist	
F986	2-Step Variable	Volts
C (Traverse)		
F009	6.0	Seconds
F010	6.0	Seconds
F015	Constant Torque	
F113	Increase	
F114 – F118	Unassigned	N.O.
F130	Fault All	N.C.
F132	Always Off	N.O.
F360	Off	
F493	Off	Express Stop
F494	Off	Plugging
F986	2-Step Variable	Volts



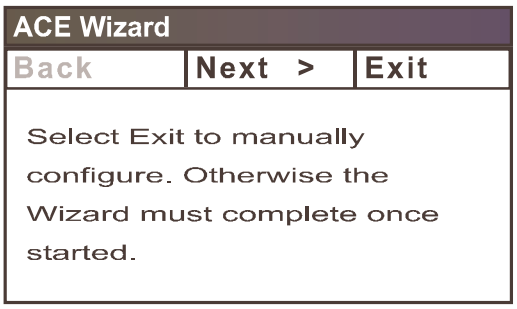
See F986 on pg. 231 for specifics on the setup and functional descriptions of the associated discrete input terminals for a given **Speed Control** mode selection.

Startup Wizard Introduction Screen

The introduction screen provides an opportunity to exit the wizard before launching. Once started, the wizard must be completed to exit the program.

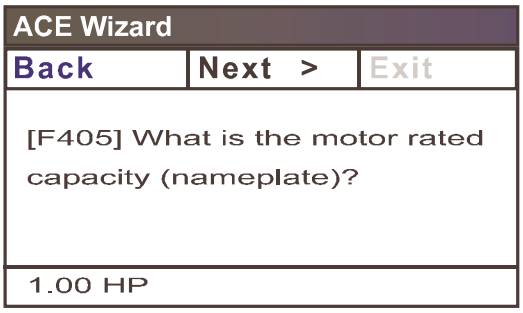
Select **Exit** to terminate the wizard and configure manually. Go to the **Program** screen and select the parameters to be configured.

To continue with the wizard click **Next**.



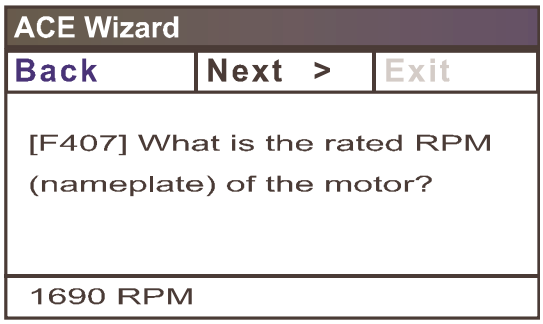
Motor Capacity

This parameter is used to set the (Nameplate) rated capacity of the motor being used.



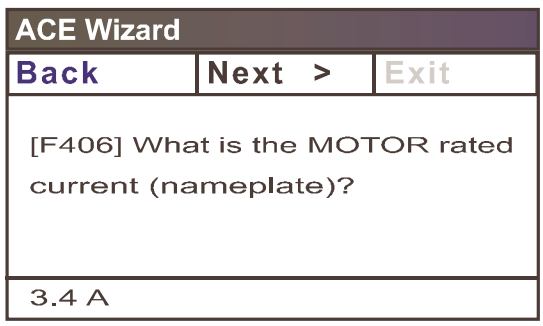
Motor RPM

This parameter is used to set the (Nameplate) RPM of the motor being used.



Motor Current

This parameter is used to set the (Nameplate) rated current of the motor being used.



ASD Control Configuration

This parameter is used to set the operating mode of the ASD. Selections are **Standard Hoist Control**, **Standard Traverse Control**, and **Custom Control**.

Select **Standard Hoist Control** to use the ASD for **Hoist Control** and to place the following settings in effect:

- Closed-Loop Vector Control.
- PG Feedback = On.
- Torque Proving = Enabled.
- 1024 PG Pulse/Rotation.
- PG Encoder Phase = 2.
- PG Disconnection Detection = Enabled.
- Control = 2-Step Variable.
- I2 – I6 = Unassigned.
- OUT1 = Brake Failure (154), N.O.
- OUT2 = Brake Release (68), N.O.
- BRAKE = Brake Release (68), N.O.
- Express Stop = Disabled.
- Plugging = Disabled.
- Accel Time 1 = 3 Seconds.
- Decel Time 1 = 1.5 Seconds.

Next = Go to Autotune Enable on pg. 46.

Select **Standard Traverse Control** to use the ASD for Traverse Control and to place the following settings in effect:

- Constant Torque Control.
- PG Feedback = Off.
- Torque Proving = Disabled.
- Control = 2-Step Variable.
- I2 – I6 = Unassigned.
- OUT1 = Fault All (10), N.C.
- OUT2 = Always Off (254), N.O.
- BRAKE = Brake Release (68), N.O.
- Express Stop = Disabled.
- Plugging = Disabled.
- Accel Time 1 = 6 Seconds.
- Decel Time 1 = 6 Seconds.

Next = Go to Autotune Enable on pg. 46.

Select **Custom** to use the ASD for application-specific **Hoist Control** or **Traverse Control** and to place the following associated settings in effect:

Hoist Control — **Next** →
Torque Proving = Enabled.
OUT1 = Brake Failure (154), N.O.
OUT2 = Brake Release (68), N.O.
BRAKE = Brake Release (68), N.O.

Traverse Control
Constant Torque.
Torque Proving = Disabled.
OUT1 = Fault All (10), N.C.
OUT2 = Always Off (254), N.O.
BRAKE = Brake Release (68), N.O.
Express Stop = Disabled.

Select **Yes** or **No** at **Encoder Being Used?**

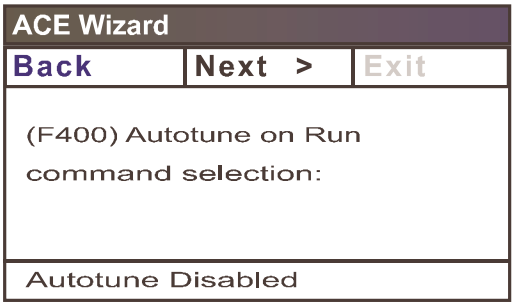
Encoder Being Used?	No	Yes
Speed Sense	Sensorless Vector	Closed Loop
PG Feedback	Off	On
Autotune	Enabled	Enabled
Pulses/Rotation	N/A	1024
Encoder Phases	N/A	2
Disconnect Detection	N/A	Enabled

Go to Speed Control (F986) on pg. 46.

Autotune Enable

This parameter is used to enable/disable the **Autotune** function.

Autotune 1 = Autotune **Disabled** or **Enabled Autotune on Run Command**.



Speed Control (F986)

2-Step Variable — **F**, **R**, and **I1**.

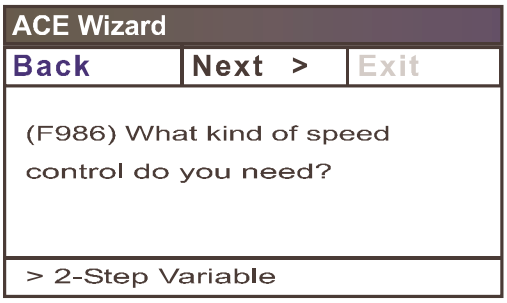
3-Step Variable — **F**, **R**, **I3** and **I4**.

5-Speed — **F**, **R**, and **Preset Speeds 1 – 4**.

2-Speed and 3-Speed — Same as **5-Speed** using only the required number of **Preset Speed** settings.

Unipolar Analog (RR).

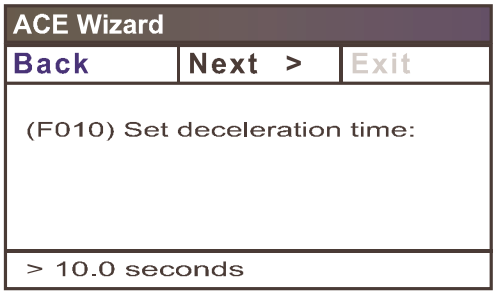
Bi-Polar Analog (RX).



Accel/Decel Times

Accel Time 1 = 10.0 S

Decel Time 1 = 10.0 S



Special Functions

Enable Slow-Speed Limit-Switch — Sets **I3** and **I4** to **Slow-Speed Limit Switch Forward** and **Slow-Speed Limit Switch Reverse**, respectively.

Enable Stop Limit-Switch for **F** and **R** — Sets **I5** and **I6** to **Stop Limit-Switch Forward** and **Stop Limit-Switch Reverse**, respectively.

Enable Express Speed (F328).

Enable (Plugging F494).

Creep Speed LL (F492) — Sets **I4** to Creep Speed 1 Command.

Enable Super Creep — Sets **I4** to **Super Creep**.

Enable Slack Rope Detection (F867).

Speed Reference — Sets **I4** to Frequency Reference Priority Switching.

Enable Autotune On Run Command (F400).

Note: *Enabling any of the above functions will overwrite the previous function assigned to the associated discrete input terminal.*

Command and Frequency Mode Control

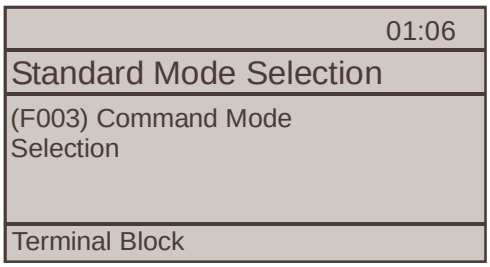
Command control includes instructions such as **Stop**, **Run**, **Jog**, etc. The source of the **Command** signal must be established for normal operation.

Frequency commands control the output speed of the ASD. The source of the frequency control signal must be established for normal operation.

The source of the command control and frequency control may be either internal or external. Once the source signal is selected for either function, the system may be configured to use the selected signal all of the time or switch under user-defined conditions.

Command and **Frequency** control may be carried out using any one of several control methods (signal sources) or combinations thereof. In the event that multiple control commands are received, the signal sources are assigned priority levels. The primary control method for **Command** and **Frequency** control uses the settings of F003 and F004, respectively.

Command Control (F003)



The **Command Mode** selection of F003 establishes the primary source of the command input for the ASD. However, the **Override** feature may supersede the F003 setting as indicated in Table 5.

Table 5 on pg. 49 shows the hierarchy of the control sources managed by the **Override** function. The level of the control item of the hierarchy is listed from left to right, most to least, respectively. As indicated in the table, the **Override** setting may supersede the F003 setting.

Placing the **EOI** in the **Local** mode selects the **RS485 2-Wire** as the **Command Mode** control source. **Local** mode operation may be superseded by other **Override** settings.

Example: With the **EOI** set to **Local**, **Communication Board** input or **RS485 4-Wire** input will supersede **EOI** control input.

The remaining control sources may be placed into the **Override** mode using communications.

The source of the **Command** control signal may be selected by:

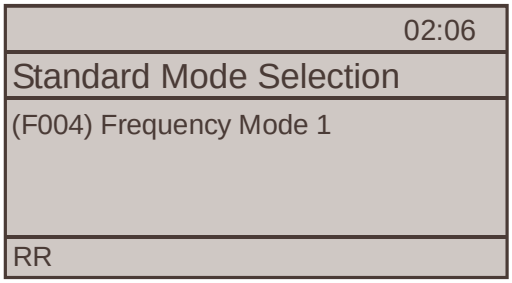
- The F003 setting,
- Placing an item from the **Command** signal source selections in the **Override** mode via communications, or
- Placing the **EOI** in the **Local** mode (places only the RS485 [2-Wire] or the RS485 [4-Wire] in the Override mode).

Possible **Command** signal source selections include the following:

- Terminal Board (default),
- EOI Keypad,
- RS485,
- Communication Option Board, or
- F003 setting (is used if no signal sources are in the Override mode).

Note: *The **Terminal Board** is placed in the **Override** mode for **Command** functions by assigning a discrete terminal to **Command Terminal Board Priority** and activating the terminal by applying 120 VAC. Once activated (Run command required), the **Terminal Board** settings will be used for **Override Command** control (F, R, Preset Speeds, etc.).*

Frequency Control (F004)



The **Frequency Mode 1** (or the Frequency Mode 2) setting establishes the user-selected source of the frequency-control input for the ASD. The signal source selected here is used for frequency control unless the **Reference Priority Selection** parameter is configured to switch this setting automatically (see F200) or if the **Override** feature is enabled.

Table 5 on pg. 49 shows the hierarchy of the control sources managed by the **Override** function. The level of the control item of the hierarchy is listed from left to right, most to least, respectively. As indicated in the table, the **Override** setting may supersede the selection at F004.

Placing the **EOI** in the **Local** mode selects the **RS485 2-Wire** as the **Frequency Mode 1** control source. **Local** mode operation may be superseded by other **Override** settings.

Example: With the **EOI** set to **Local**, the **Communication Board** input or the **RS485 4-Wire** input will supersede **EOI** control input.

The remaining control sources may be placed into the **Override** mode using communications.

The source of the **Frequency** control signal may be selected by:

- The F004 setting,
- Placing an item from the **Frequency** control source selections in the **Override** mode via communications, or
- Placing the **EOI** in the **Local** mode (places only the RS485 [2-Wire] in the Override mode).

Possible **Frequency** control source selections include the following:

- Communication Board,
- RS485,
- EOI Keypad,
- Terminal Board (the default setting), or
- F004 setting (used if no other items are in the Override mode).

Note: *The **Terminal Board** is placed in the **Override** mode for frequency control functions by assigning a discrete terminal to **V/I Terminal Priority** and activating the terminal by applying 120 VAC to the terminal. Once the discrete terminal is activated, **V/I** is used as the **Terminal Board Override** control item.*

Command and Frequency Control Selections

The user may select only one **Command** source and only one source for **Frequency** control. The default settings for **Command** and **Frequency** control are **Terminal Board** and **RR**, respectively.

The ASD has a command register for each item listed as a **Command** or **Frequency** source. The registers store the **Override** setting for each control source. The registers are continuously scanned to determine if any of the listed items are in the **Override** mode.

For each scan cycle, the command registers of the control sources are scanned for the **Override** setting in the order that they are listed in Table 5. The first item of the **Command** section and the first item of the **Frequency** section detected as being in the **Override** mode will be used for **Command** and **Frequency**

control, respectively. If no items are detected as being in the **Override** mode, the settings of F003 and F004 will be used for **Command** and **Frequency** control, respectively.

Any or all of the **Command** and **Frequency** control input sources may be placed in the **Override** mode.

Placing the ASD in the **Local** mode (Local/Remote LED on) via the **EOI** places the **RS485 2-Wire** control selection in the **Override** mode for **Command** and **Frequency** input (see the section titled Override Operation on pg. 49 for the proper setting). The **Local/Remote** control **Override** feature for **Command** and **Frequency** (or either) may be enabled/disabled at Program ⇒ Utilities ⇒ Prohibition ⇒ **Local/Remote** key (Command or Frequency) **Override**.

Communications may be used to place the remaining **Command** and eligible **Frequency** control input sources in the **Override** mode. Once placed in the **Override** mode this setting is valid until it is cancelled, the power supply is turned off, or the ASD is reset.

Override Operation

The signal sources of Table 5 are scanned from left to right in the order that they are listed to determine which input sources are in the **Override** mode (active Command or Frequency command present). The first item detected as having the **Override** function turned on is the selection that is used for **Command** or **Frequency** control input.

The **Override** control setting supersedes the setting of the **Command** mode setting (F003) and the **Frequency** mode setting (F004). However, the F003 and F004 settings will be used in the event that the register scan returns the condition that none of the listed items have the **Override** feature turned on or a discrete input terminal is set to **Serial/Local Switch** and is activated.

Command and Frequency-Control Override Hierarchy

Table 5 lists the input conditions and the resulting output control source selections for **Command** and **Frequency** control **Override** operation.

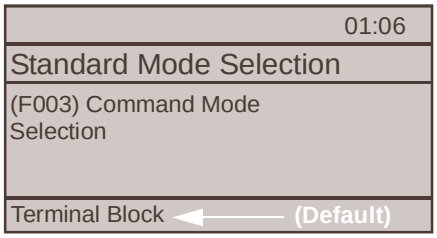
The ASD software reads the memory locations of the listed control sources from the left to the right.

The first item to be read that has the **Override** feature turned on will be used for **Command** or **Frequency** control.

Table 5. **Command** and **Frequency** Control Hierarchy.

1	2	3	4	5	6	Priority Level
Forced F003/ F004 by I/P Terminal (Assign to Serial/ Local Switch)	**Comm. Board**	**RS485**	**EOI Keypad**	**Terminal Board** (Binary/BCD Input)	**F003/F004**	**Command/ Frequency Mode**
1	X	X	X	X	X	F003/F004 Setting
0	**1**	X	X	X	X	Communication Board
0	0	**1**	X	X	X	RS485
0	0	0	**1**	X	X	EOI Keypad
0	0	0	0	**1**	X	Terminal Board
0	0	0	0	0	**F003/F004 Setting**	F003/F004 Setting
***Note: 1** = Override feature is turned on for that control input source; **0** = Override Off; **X** = Don't Care.*						

Command Control Selections



The following is a listing with descriptions of the Command Mode (F003) selections (Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ **Command Mode Selection**).

Settings:

0 — Terminal Board

Allows for **Command** control input via the **Terminal Board**.

1 — Not Used

Unused.

2 — EOI Keypad

Used for EOI command control.

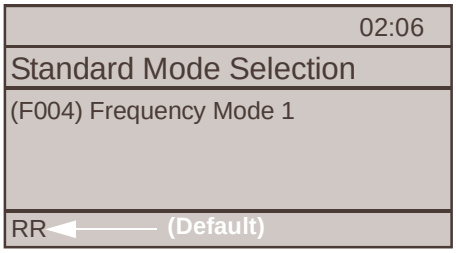
3 — RS485

Used to transfer commands to the ASD via **RS485 4-Wire**.

4 — Communication Option Board

Use this setting if using the optional **Communication Board** for command control.

Frequency Control Selections



The following is a listing with descriptions of the **Frequency Mode** (F004) selections (Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode 1).

Settings:

1 — V/I

Used when a 0 to 10 VDC analog input or a 0 – 20 mA DC current input is used as the frequency control input. Only one input signal type may be used at a time. Set **SW2** to the desired signal type.

2 — RR

Used for a 0 to 10 VDC analog input signal.

3 — RX

Used for a ±10 VDC analog input signal.

4 — Not Used

Unused.

5 — EOI Keypad

Used for EOI frequency control.

6 — RS485

Used to transfer speed commands to the ASD via **RS485 4-Wire**.

7 — Communication Option Board

Use this setting if using the optional **Communication Board** for frequency control.

8 — RX2 Option (AI1)

Used for a ±10 VDC analog input signal.

9 — Option V/I

Allows for the use of the optional voltage/current frequency-control interface.

10 — UP/DOWN Frequency

A discrete terminal may be configured to increase or decrease the speed of the motor by momentarily activating the terminal by applying 120 VAC to the terminal. See F264 on pg. 131 for additional information on this feature.

11 — Pulse Input Option

Used to allow the system to use a pulsed input for frequency control. See PG Input Point 1 Setting on pg. 125 for additional information on this feature.

12 — Pulse Input (Motor CPU)

Used to allow the system to use a pulsed input for frequency control. See PG Input Point 1 Setting on pg. 125 for additional information on this feature.

13 — Binary/BCD Input Option

Allows for discrete terminal to be used for frequency-control input.

System Configuration and Menu Options

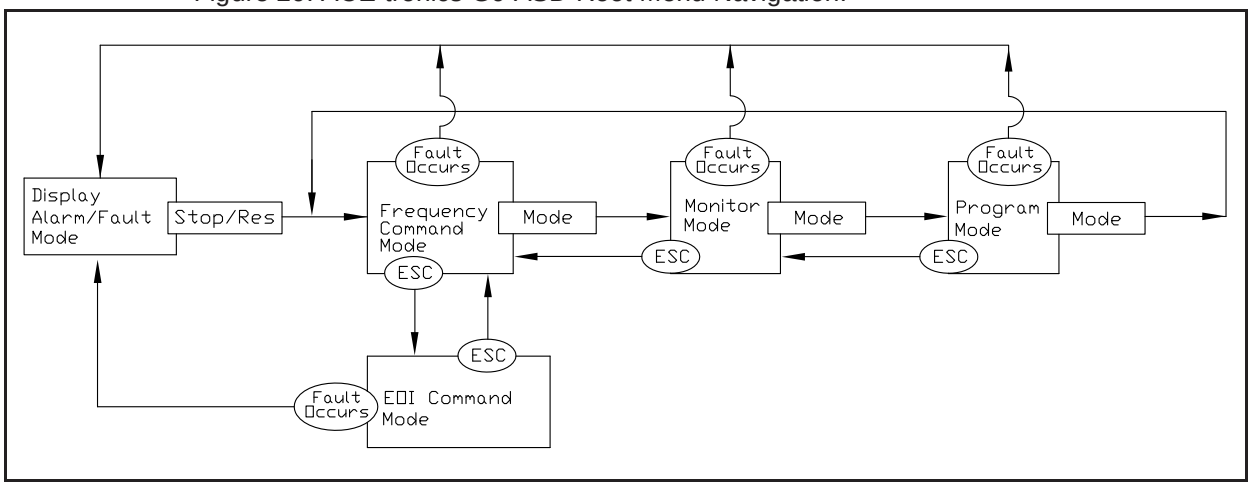
Root Menus

The **Mode** key accesses the three primary modes of the ACE-tronics G9 ASD: the **Frequency Command** mode, the **Monitor** mode, and the **Program** mode. From either mode, press the **Mode** key to loop through to the other two modes (see Figure 29). While in the **Frequency Command** mode, pressing the **ESC** key toggles the menu to and from the **EOI Command** mode and the **Frequency Command** mode.

The **Alarm** or **Fault** information will be displayed in the event of an active **Alarm** or **Fault**. **Alarm** text will be displayed on the **Frequency Command** screen and on the LED screen when active. **Fault** information will be displayed via the **Fault** screen. See Alarms and Trips on pg. 248 for more information on **Alarms** and **Trips**.

Note: ***EOI Command*** *mode changes are effective for* ***EOI*** *control* ***Only***.

Figure 29. ACE-tronics G9 ASD Root Menu Navigation.



Frequency Command Mode

Frequency Setting

While operating in the **Local** mode (Local LED is illuminated on the front panel), the running frequency of the motor may be set from the **Frequency Command** screen. Using the **Rotary Encoder**, enter the **Frequency Command** value, provide a **Run** command (F and/or R), and then press the **Run** key. The motor will run at the **Frequency Command** speed and may be changed while running. See Figure 22. on pg. 35 and Operation (Local) on pg. 40 for more information on the **Frequency Command** mode.

EOI Command Mode

The **EOI Command** mode is accessed by pressing the **ESC** key from the **Frequency Command** screen.

The control settings of the **EOI Command** menu are effective for **EOI** control only.

The **EOI Command** mode provides quick access to the following menu parameters:

Direction — **Forward** or **Reverse**.

Stop Pattern — The **Decel Stop** or **Coast Stop** settings determines the method used to stop the motor when using the **Stop-Reset** key of the **EOI**. The **Decel Stop** setting enables the **Dynamic Braking** system setup at F304 or the **DC Injection Braking** system setup at F250, F251, and F252. The **Coast Stop** setting allows the motor to stop at the rate allowed by the inertia of the load.

Note: *The **Stop Pattern** setting has no effect on the **Emergency Off** settings of F603.*

V/f Group — One of four **V/f** profiles may be selected and run. Each **V/f** profile is comprised of 4 user settings: **Base Frequency**, **Base Frequency Voltage**, **Manual Torque Boost**, and **Electronic Thermal Protection**. Expanded descriptions of these parameters may be found in the section titled Direct Access Information on pg. 79.

Accel/Decel Group — One of four Accel/Decel profiles may be selected and run. Each of the Accel/Decel profiles is comprised of three user settings: **Acceleration**, **Deceleration**, and **Pattern**. Expanded descriptions of these parameters may be found in the section titled Direct Access Information on pg. 79.

Feedback in Panel Mode — Enables or disables the **PID** feedback function.

Torque Limit Group — Used to select one of four preset positive torque limits to apply to the active motor (of a multiple motor configuration). The settings of profiles 1 – 4 may be setup at F441, F444, F446, and F448, respectively.

Monitor Mode

The **Monitor** mode allows the user to monitor motor performance variables, control settings, and configuration data during motor operation. The items that are viewable from this mode are listed and described below.

Note: *The **Monitor** mode is a read-only mode. The settings **cannot** be changed from the **Monitor** mode. For information on how to change the values, see the section titled* *Default Setting Changes on pg. 40**.*

Note: *Any two of the Underlined monitored items may be selected for display at the **Frequency Command** screen while running via Program ⇒ Utilities ⇒ Main Monitor Selections (see* *pg. 56* *for information on using the Main Monitor Selections feature).*

Note: *The F701 setting will determine if the Current and Voltage values displayed appear as **A** (Amps) and **V** (Voltage), or if the value is shown as a **%** (percentage) of the ASD rating.*

Frequency at Trip — Displays the at-trip frequency.

Frequency Reference — Displays the **Frequency Setpoint**.

Output Current — Displays the **Output Current** as a percentage of the rated capacity of the ASD.

DC (Bus) Voltage — Displays the **Bus Voltage** as a percentage of the rated capacity of the ASD.

Output Voltage — Displays the **Output Voltage** as a percentage of the rated capacity of the ASD.

AM Output — Displays the **AM** output terminal value for the function assigned to the **AM** terminal.

FM Output — Displays the **FM** output terminal value for the function assigned to the **FM** terminal.

Motor OL (Overload) Real — Displays the real-time **Motor Overload** value as a percentage of the rated capacity of the motor.

Motor OL (Overload) Trip — Displays the **Motor Overload Trip** value as a percentage of the rated capacity of the motor.

Motor Load — Displays the real-time **Motor Load** as a percentage of the rated capacity of the motor.

ASD OL (Overload) Real — Displays the real-time **ASD Overload** as a percentage of the rated capacity of the ASD.

ASD OL (Overload) Trip — Displays the **ASD Overload Trip** value as a percentage of the rated capacity of the ASD.

ASD Load — Displays the **ASD Load** as a percentage of the rated capacity of the ASD.

Run Time — Displays the **Cumulative Run Time** in hours. Set to zero by selecting **Clear Run Timer** at parameter F007.

Compensation Frequency — Displays the **Output Frequency** after the application of the slip compensation correction value (Post Compensation Frequency).

DBR OL (Overload) Real — Displays the real-time **DBR Overload** value as a percentage of the **Dynamic Braking Resistor** capacity.

DBR OL (Overload) Trip — Displays the **DBR Overload Trip** value as a percentage of the **Dynamic Braking Resistor** capacity.

DBR Load — Displays the **DBR Load** as a percentage of the **Dynamic Braking Resistor** capacity.

Feedback (Inst) — Provides a status of the **Real Time Feedback** in Hz.

Feedback (1 Second) — Provides a status of the **1-Second Averaging** feedback in Hz.

Torque — Displays the **Output Torque** as a percentage of the rated capacity of the ASD.

Torque Reference — Displays the **Torque Reference** as a percentage of the maximum torque available.

Torque Current — Displays the torque-producing current value.

Excitation Current — Displays the current value required to produce the excitation field.

PID Feedback — Provides a status of the **PID Real Time Feedback** in Hz.

Input Power — Displays the **Input Power** in Kilowatts (kW).

Output Power — Displays the **Output Power** in Kilowatts (kW).

Pattern Group Number — Displays the active **Pattern Run Group Number**.

Pattern Cycle Number — Displays the cycle number of the active **Pattern Run Group**.

Pattern Preset — Displays the active **Preset Speed** being run of the active **Pattern Run Group**.

Pattern Time — Displays the remaining time for the active **Pattern Run Group**.

RR — Displays the **RR** input value as a percentage of the full range of the **RR** value (potentiometer input).

V/I — Displays the **V/I** input setting as a percentage of the full range of the **V/I** value.

Note: *The isolated **V/I** input terminal may receive **Current** or **Voltage** to control the output speed or the output torque. The input signal type must be selected at **SW2** on the **ACE G9-120V-PCB**.*

*The **V** input setting of **SW2** is used for the 0 – 10 VDC analog input signal and the **I** input setting of **SW2** is used for the 0 – 20 mA analog input signal. Either may be used as a frequency or torque command source. See parameter F201 for more information on the setup of this terminal.*

RX — Displays the **RX** input setting as a percentage of the full range of the **RX** value (±10 VDC input).

RX2 Option (AI1) — Displays the **RX2** input setting as a percentage of the full range of the **RX2** value.

Note: *The RX2 function is available on the **Expansion IO Card Option 1** option board (P/N ETB003Z) only.*

Trip Code — Displays **None** if there are no errors, or displays one of the associated **Fault Codes** listed in Table 15 on page 254 if there is an active **Fault** (e.g., E = Emergency Off).

Past Trip 1 — This function records and displays the last trip incurred. Subsequent trips will replace **Past Trip 1**. As trip records are replaced they are shifted to the next level of the **Past Trip** locations until being deleted (i.e., Past Trip 1 is moved to Past Trip 2 and then to Past Trip 3 until being shifted out of Past Trip 4). Once shifted out of **Past Trip 4** the record is deleted. If no trips have occurred since the last reset, **None** is displayed for each trip record.

Past Trip 2 — Past trip information or **None**.

Past Trip 3 — Past trip information or **None**.

Past Trip 4 — Past trip information or **None**.

Note: *An improper ASD setup may cause some trips — reset the ASD to the **Factory Default** settings before pursuing a systemic malfunction (Program ⇒ Utilities ⇒ Type Reset ⇒ Reset to Factory Settings).*

Direction — Displays the **Direction** command (forward/reverse).

Discrete Input Terminals — Displays the status (activated = reverse video) of the discrete input terminals of the **ACE G9-120V-PCB**.

Discrete Output Terminals — Displays the status (activated = reverse video) of the discrete output lines of the **ACE G9-120V-PCB**.

Main Monitor Selections

Two (2) **Monitor Mode** items may be selected from the **Main Monitor Selections** screen to be displayed on the **Frequency Command** screen while the ASD is running.

The selected items, along with their real-time values, are displayed on the **Frequency Command** screen while running. Not all **Monitor Mode** items are available for display on the **Frequency Command** screen. The available items are underlined on pg. 54 and pg. 55.

Any two of the underlined items may be selected from the listing at Program ⇒ Utilities ⇒ **Main Monitor Selections**. Select an item from the **Monitor 1** listing and another item from the **Monitor 2** listing to be displayed as shown in Figure 22. on pg. 35.

Program Mode Menu Navigation

The following table lists the menu items of the **Program** mode and maps the flow of the menu selections. The **Parameter Numbers** for the listed functions are provided where applicable.

The functions listed may be viewed, or selected and changed as mapped below or via the **Direct Access** method: Program ⇒ Direct Access ⇒ ***Applicable Parameter Number***.

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
STARUP WIZARD	See the section titled Startup Wizard Requirements on pg. 42 for **Startup Wizard** setup information.		
CRANE / HOIST	**Motion Control**	Motion Control	F985
	Speed Control	Speed Control	F986
		Preset Speed 1	F018
		Preset Speed 2	F019
		Preset Speed 3	F020
		Preset Speed 4	F021
	Express Stop	Express Stop Enable	F493
		Express Stop Deceleration Time	F511
	Plugging	Plugging Enable	F494
		Plugging Acceleration Time	F514
		Plugging Deceleration Time	F515
	Creep Control	Creep Multiplier 1	F490
		Creep Multiplier 2	F491
		Creep Speed Lower Limit	F492
	Super Creep Control	Super Creep Pulse Count	F863
		Super Creep Repeat Delay	F864
		Super Creep Speed	F865
	Limit-Switch Control	Upper-Limit Speed at Slow-Speed Limit-Switch UP	F294
		Deceleration Time at Slow-Speed Limit-Switch UP	F283
		Stopping Time at Stop Limit-Switch UP	F284
		Upper-Limit Speed at Slow-Speed Limit-Switch DOWN	F293
		Deceleration Time at Slow-Speed Limit-Switch DOWN	F285
		Stopping Time at Stop Limit-Switch DOWN	F286
		Limit-Switch Stopping Method	F282

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
CRANE / HOIST	Express Speed	Express Speed Selection	F328
		Express Speed Switching Frequency	F330
		Express Speed Operation Switching Lower-Limit Frequency	F331
		Express Speed Waiting Time	F332
		Express Speed Detection Time	F333
		Switching Load Torque During Power Run	F335
		Express Speed Operation Heavy-Load Detection Time	F334
		Heavy-Load Torque During Power Run	F336
		Heavy-Load Torque During Fixed-Speed Power Run	F337
		Switching Load Torque During Dynamic Braking	F338
	Closed Loop Hoist Control	Brake-Failure Pulse Count	F994
		Brake-Release Torque Reference	F987
		Brake-Release Torque (Proving) Time	F988
		Brake-Release Mechanical Delay Time	F990
		Brake-Set Mechanical Delay Time	F991
		Brake-Seized Pulse Check	F993
		Load Hover Time	F997
		Brake-Failure Continual Monitoring Pulse Count	F995
		Drooping Pulses Allowed	F998
		Brake-Release Torque Stabilization Time	F989
		Brake-Seized Pulse Time	F992
		Brake-Failure Maximum Speed UP	F996
		Encoder Error Detection Time	F999
	Timed-Run	Timed-Run Run Time	F861
		Timed-Run Repeat Delay	F862
	Slack Rope	Slack Rope Detection	F867
		No Load Torque	F868
		No Load Detection Time	F869
	Bearing Greaser	Bearing Greaser (Alarm) Time	F621
		Bearing Greaser Speed Multiplier	F489

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
CRANE / HOIST	External Fault	External Fault Stopping Method	F280
	Emergency Lift	Emergency-Lift Selection	F656
		Emergency-Lift Maximum Speed	F657
		Emergency-Lift Lower-Limit Reference	F658
		Emergency-Lift Torque Proving Time	F659
	Speed Reference	Speed Reference	F116
		Frequency Mode 2	F207
FUNDAMENTAL	Acc/Dec 1	Automatic Acceleration/Deceleration	F000
		Acceleration Time 1 — UP/DOWN Frequency Accel Time	F009
		Deceleration Time 1 — UP/DOWN Frequency Decel Time	F010
		Acceleration/Deceleration Suspended Function	F349
		Acceleration Suspend Frequency	F350
		Acceleration Suspend Time	F351
		Deceleration Suspend Frequency	F352
		Deceleration Suspend Time	F353
	Frequency	Maximum Frequency	F011
		Upper-Limit Frequency	F012
		Lower-Limit Frequency	F013
		V/f Pattern	F015
		Time Limit for Lower-Limit Frequency Operation	F256
	Motor Set 1	Automatic Torque Boost	F001
		Base Frequency 1	F014
		Manual Torque Boost 1	F016
		Motor Overload Protection Level 1	F600
	Standard Mode Selection	Command Mode	F003
		Frequency Mode 1	F004
		Forward/Reverse Run	F008
		Frequency Priority	F200
		Frequency Mode 2	F207
		Frequency Mode Priority Switching Frequency	F208

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
TERMINAL	**Analog Output Terminals**	FM Output Terminal Function	F005
		FM Output Terminal Adjustment	F006
		FM Output Gradient Characteristic	F682
		FM Bias Adjustment	F683
		FM Voltage/Current Output Switching	F681
		AM Output Terminal Function	F670
		AM Output Terminal Adjustment	F671
		AM Output Gradient Characteristic	F685
		AM Bias Adjustment	F686
		MON 1 Terminal Meter Selection	F672
		MON 1 Terminal Meter Adjustment	F673
		MON 1 Output Gradient Characteristic	F689
		MON 1 Bias Adjustment	F690
		MON 1 Voltage/Current Output Switching	F688
		MON 2 Terminal Meter Selection	F674
		MON 2 Terminal Meter Adjustment	F675
		MON 2 Output Gradient Characteristic	F692
		MON 2 Bias Adjustment	F693
		MON 2 Voltage/Current Output Switching	F691
		Pulse Output Function	F676
		Pulse Output Frequency	F677
	Input Special Functions	Input Terminal Priority	F106
		16-Bit Binary/BCD Input	F107
		V/I Analog Input Breakage Detection Level	F633
	Input Terminal Delays	Input Terminal 1 (F) Response Time	F140
		Input Terminal 2 (R) Response Time	F141
		Input Terminal 3 (I1) Response Time	F142
		Input Terminal 4 (I2) Response Time	F143
		Input Terminal 5–12 Response Time	F144
		Input Terminal 13–20 Response Time	F145

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
TERMINAL	**Input Terminals**	Always ON Terminal Function	F110
		Input Terminal 1 (F) Function	F111
		Input Terminal 2 (R) Function	F112
		Input Terminal 3 (I1) Function	F113
		Input Terminal 4 (I2) Function	F114
		Input Terminal 5 (I3) Function	F115
		Input Terminal 6 (I4) Function	F116
		Input Terminal 7 (I5) Function	F117
		Input Terminal 8 (I6) Function	F118
		Input Terminal 9 (LI1) Function	F119
		Input Terminal 10 (LI2) Function	F120
		Input Terminal 11 (LI3) Function	F121
		Input Terminal 12 (LI4) Function	F122
		Input Terminal 13 (LI5) Function	F123
		Input Terminal 14 (LI6) Function	F124
		Input Terminal 15 (LI7) Function	F125
		Input Terminal 16 (LI8) Function	F126
		Input Terminal 17 (B12) Function	F164
		Input Terminal 18 (B13) Function	F165
		Input Terminal 19 (B14) Function	F166
		Input Terminal 20 (BI5) Function	F167
		Virtual Input Terminal Selection 1	F973
		Virtual Input Terminal Selection 2	F974
		Virtual Input Terminal Selection 3	F975
		Virtual Input Terminal Selection 4	F976
	Line Power Switching	Commercial Power/ASD Switching Output	F354
		Commercial Power/ASD Switching Frequency	F355
		ASD-Side Switching Waiting Time	F356
		Commercial Power-Side Switching Waiting Time	F357
		Commercial Power Switching Frequency Holding Time	F358

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
TERMINAL	**Output Terminals**	Output Terminal 1 (OUT1) Function	F130
		Output Terminal 2 (OUT2) Function	F131
		Output Terminal 3 (BRAKE) Function	F132
		Output Terminal 4 (OUT3) Function	F133
		Output Terminal 5 (OUT4) Function	F134
		Output Terminal 6 (R1) Function	F135
		Output Terminal 7 (OUT5) Function	F136
		Output Terminal 8 (OUT6) Function	F137
		Output Terminal 9 (R2) Function	F138
		Output Terminal 10 (R3) Function	F168
		Output Terminal 11 (R4) Function	F169
	Reach	Low Speed Signal Output Frequency	F100
		Speed Reach Frequency	F101
		Speed Reach Detection Band	F102
DIRECT ACCESS		Parameter Number	N/A
		Unknown Numbers Displayed	
UTILITIES	**Display Parameters**	Automatic Function Selection	F040
		Current/Voltage Units Setup	F701
		Free Unit Multiplication Factor	F702
		Free Unit	F703
		Free Unit Display Gradient Characteristic	F705
		Free Unit Display Bias	F706
		Change Step Selection 1	F707
		Change Step Selection 2	F708
	Prohibition	Parameter Write Lockout	F700
		Command Mode/Frequency Mode Change Lockout	F736
		Lockout All Keys	F737
		Local/Remote Key Command Override	N/A
		Local/Remote Key Frequency Override	
		Skip Changed-From-Default Uninitialized Parameters	

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
UTILITIES	**Trace**	Trace Selection	F740
		Trace Cycle	F741
		Trace Data 1	F742
		Trace Data 2	F743
		Trace Data 3	F744
		Trace Data 4	F745
	Alarm Prohibition (Prohibits an EOI alarm display **ONLY** — alarm still activated)	Over-Current Alarm	N/A
		ASD Overload Alarm	
		Motor Overload Alarm	
		Over-Heat Alarm	
		Over-Voltage Alarm	
		Under-Voltage of Main Power Alarm	
		Reserved (POFF) Alarm	
		Under-Current Alarm	
		Over-Torque Alarm	
		Dynamic Braking Resistor Overload Alarm	
		Bearing Greaser Alarm	
		DeviceNet/Profibus/CC-Link Alarm	
		RS485 Communications	
		Stop After Instantaneous Power-Off Alarm	
		Stop After Lower-Limit Continuous Time	
		Switch Out of Sequence	
		Heavy-Load Alarm	
		Maintenance Timer Alarm	
		Over-Torque Alarm	
		Soft Stall Alarm	
	Type Reset	Reset	F007
	Real-Time Clock Setup	Set Real-Time Clock	N/A
	Trip History (Read-Only)	Trip Number	N/A
		Trip Type	

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
UTILITIES	**Trip History** (Read-Only)	Frequency at Trip	N/A
		Output Current	
		Output Voltage	
		Direction	
		Frequency Reference	
		DC Voltage	
		Discrete Input Terminals	
		Discrete Output Terminals	
		Run Timer	
		Post Compensation Frequency	
		Speed Feedback (Real-Time)	
		Speed Feedback (1 Second)	
		Torque Feedback	
		Torque Reference	
		Torque Current	
		Excitation Current	
		PID Feedback	
		Motor Overload Ratio	
		ASD Overload Ratio	
		DBR Overload Ratio	
		Motor Load	
		ASD Load	
		DBR Load	
		Input Power	
		Output Power	
	Changed From Default	Changed Parameters	N/A
	Contrast	Contrast Adjustment	N/A
	Version (Read-Only)	G9 EOI (Ver:DB)	N/A
		ASD Type	
		CPU Code Version	

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
UTILITIES	**Version** (Read-Only)	CPU Code Revision	N/A
		MC Version	
		MC Revision	
		Main Board EEPROM Version	
	Main Monitor Selections	Monitor 1	
		Monitor 2	
PROTECTION	**Abnormal Speed**	Abnormal Speed Detection Time	F622
		Over-Speed Detection Frequency Upper Band	F623
		Over-Speed Detection Frequency Lower Band	F624
	Base Frequency Voltage	Supply Voltage Correction	F307
	DC (Injection) Braking	DC (Injection) Braking Start Frequency	F250
		DC (Injection) Braking Current	F251
		DC (Injection) Braking Time	F252
		Forward/Reverse DC (Injection) Braking Priority	F253
		Motor Shaft Fixing Control	F254
	Dynamic Braking	Dynamic Braking Enable	F304
		Dynamic Braking Resistance	F308
		Continuous Dynamic Braking Capacity	F309
		Braking Resistance Overload Time (10x Rated Torque)	F639
	Emergency Off	Emergency Off	F603
		Emergency DC Braking Control Time	F604
	Low-Current	Low-Current Trip	F610
		Low-Current Detection Current	F611
		Low-Current Detection Time	F612
		Low-Current Detection Hysteresis Width	F609
	Overload	Motor Overload Protection Configuration	F017
		Overload Reduction Start Frequency	F606
		Motor 150% Overload Time Limit	F607
		ASD Overload	F631

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
PROTECTION	**Over-Torque**	Over-Torque Trip	F615
		Over-Torque Detection Level During Power Running	F616
		Over-Torque Detection Level During Dynamic Braking	F617
		Over-Torque Detection Time	F618
		Over-Torque Detection Hysteresis	F619
	Phase Loss	ASD Output Phase Failure Detection	F605
		ASD Input Phase Failure Detection	F608
	Retry/Restart	Auto Restart Enable	F301
		Number of Times to Retry	F303
		Ridethrough Time	F310
		Random Mode	F312
	Stall	Over-Voltage Limit Operation	F305
		Stall Prevention Factor 1	F416
		Power Running Stall Continuous Trip Detection Time	F452
		Dynamic Braking Stall Prevention Mode	F453
		Stall Prevention Level	F601
		Over-Voltage Limit Operation Level	F626
	Trip	Retain Trip Record at Power Down	F602
	Under-Voltage/ Ridethrough	Regenerative Power Ridethrough	F302
		Synchronized Deceleration Time	F317
		Synchronized Acceleration Time	F318
		Under-Voltage Trip	F627
		Under-Voltage Detection Time	F628
		Regenerative Power Ridethrough Control Level	F629
	Special Protection Parameters	Short Circuit Detection at Start	F613
		Cooling Fan Control	F620
		Bearing Greaser (Alarm) Time	F621
		Brake Answer Wait Time	F630
FREQUENCY	**Analog Filter**	Analog Input Filter	F209

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
FREQUENCY	**Forward/Reverse Disable**	Forward/Reverse Disable	F311
	Jog	Jog Frequency	F260
		Jog Stop Pattern	F261
		Panel Operation Jog Mode	F262
	UP/DOWN Frequency Functions	UP/DOWN Up Response Time	F264
		UP/DOWN Up Frequency Step	F265
		UP/DOWN Down Response Time	F266
		UP/DOWN Down Frequency Step	F267
		Initial UP/DOWN Frequency	F268
		Initial UP/DOWN Frequency Rewriting	F269
	V/I	Option V/I Terminal Voltage/Current Selection (AI2 Option Board Input)	F109
	Preset Speeds	Preset Speed 1	F018
		Preset Speed 2	F019
		Preset Speed 3	F020
		Preset Speed 4	F021
		Preset Speed 5	F022
		Preset Speed 6	F023
		Preset Speed 7	F024
		Preset Speed 8	F287
		Preset Speed 9	F288
		Preset Speed 10	F289
		Preset Speed 11	F290
		Preset Speed 12	F291
		Preset Speed 13	F292
		Preset Speed 14/Lower-Limit Slow Speed	F293
		Preset Speed 15/Upper-Limit Slow Speed	F294
	Speed Reference Setpoints	V/I Input Point 1 Setting	F201
		V/I Input Point 1 Frequency	F202
		V/I Input Point 2 Setting	F203

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
FREQUENCY	**Speed Reference Setpoints**	V/I Input Point 2 Frequency	F204
		RR Input Point 1 Setting	F210
		RR Input Point 1 Frequency	F211
		RR Input Point 2 Setting	F212
		RR Input Point 2 Frequency	F213
		RX Input Point 1 Setting	F216
		RX Input Point 1 Frequency	F217
		RX Input Point 2 Setting	F218
		RX Input Point 2 Frequency	F219
		RX2 Option (AI1) Input Point 1 Setting	F222
		RX2 Option (AI1) Input Point 1 Frequency	F223
		RX2 Option (AI1) Input Point 2 Setting	F224
		RX2 Option (AI1) Input Point 2 Frequency	F225
		BIN Input Point 1 Setting	F228
		BIN Input Point 1 Frequency	F229
		BIN Input Point 2 Setting	F230
		BIN Input Point 2 Frequency	F231
		PG Input Point 1 Setting	F234
		PG Input Point 1 Frequency	F235
		PG Input Point 2 Setting	F236
		PG Input Point 2 Frequency	F237
		V/I Input Bias	F470
		V/I Input Gain	F471
		RR Input Bias	F472
		RR Input Gain	F473
		RX Input Bias	F474
		RX Input Gain	F475
		RX2 Option (AI1) Input Bias	F476
		RX2 Option (AI1) Input Gain	F477
		V/I Input Bias (AI2 Option Board Input)	F478
		V/I Input Gain (AI2 Option Board Input)	F479

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
SPECIAL	**Acc/Dec 1 – 4**	Acceleration Time 2	F500
		Deceleration Time 2	F501
		Acc/Dec Pattern 1	F502
		Acc/Dec Pattern 2	F503
		Acceleration Time 3	F510
		Express Stop Time	F511
		Express Stop Acceleration/Deceleration Pattern	F512
		Plugging Acceleration Time	F514
		Plugging Deceleration Time	F515
		Plugging Acceleration/Deceleration Pattern	F516
	Acc/Dec Special	Acc/Dec Pattern 1 – 4	F504
		Acc/Dec Switching Frequency 1	F505
		S-Pattern Acceleration Lower-Limit Adjustment	F506
		S-Pattern Acceleration Upper-Limit Adjustment	F507
		S-Pattern Deceleration Lower-Limit Adjustment	F508
		S-Pattern Deceleration Upper-Limit Adjustment	F509
		Acc/Dec Switching Frequency 2	F513
		Acc/Dec Switching Frequency 3	F517
	Carrier Frequency	PWM Carrier Frequency	F300
		Carrier Frequency Control Mode	F316
	Crane/Hoist	Express Speed Operation	F328
		Express Speed Learning Function	F329
		Automatic Express Speed Operation Frequency	F330
		Express Speed Operation Switching Lower-Limit Frequency	F331
		Express Speed Operation Load Wait Time	F332
		Express Speed Operation Detection Time	F333
		Express Speed Heavy-Load Detection Time	F334
		Switching Load Torque During Power Running	F335
		Heavy-Load Torque During Power Running	F336
		Heavy-Load Torque During Constant Power Running	F337

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
SPECIAL	Crane/Hoist	Switching Load Torque During Dynamic Braking	F338
	V/f 5-Point Setting	V/f 5-Point Setting Frequency 1	F190
		V/f 5-Point Setting Voltage 1	F191
		V/f 5-Point Setting Frequency 2	F192
		V/f 5-Point Setting Voltage 2	F193
		V/f 5-Point Setting Frequency 3	F194
		V/f 5-Point Setting Voltage 3	F195
		V/f 5-Point Setting Frequency 4	F196
		V/f 5-Point Setting Voltage 4	F197
		V/f 5-Point Setting Frequency 5	F198
		V/f 5-Point Setting Voltage 5	F199
	Frequency Control	Start Frequency	F240
		Run Frequency	F241
		Run Frequency Hysteresis	F242
		End Frequency	F243
	Special Parameters	0 Hz Dead Band Signal	F244
		0 Hz Command Output	F255
		Exciting Strengthening Coefficient	F415
		Annual Average Ambient Temperature	F634
		Rush Current Suppression Relay Activation Time	F635
		PTC 1 Thermal Selection	F637
		PTC 2 Thermal Selection	F638
	Jump Frequencies	Jump Frequency 1	F270
		Jump Frequency 1 Bandwidth	F271
		Jump Frequency 2	F272
		Jump Frequency 2 Bandwidth	F273
		Jump Frequency 3	F274
		Jump Frequency 3 Bandwidth	F275
	Operation Panel Parameters	Operation Command Clear Selection With Standby Terminal Deactivated	F719
		Panel Stop Pattern	F721

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
SPECIAL	Operation Panel Parameters	Panel Torque Command	F725
		Panel Tension Torque Bias	F727
		Panel Load Sharing Gain	F728
		Panel Override Multiplication Gain	F729
		Panel Frequency Lockout	F730
		Panel Emergency Off Lockout	F734
		Panel Reset Lockout	F735
MOTOR	Motor Set 2	Base Frequency 2	F170
		Base Frequency Voltage 2	F171
		Manual Torque Boost 2	F172
		Overload Protection Level 2	F173
	Motor Set 3	Base Frequency 3	F174
		Base Frequency Voltage 3	F175
		Manual Torque Boost 3	F176
		Overload Protection Level 3	F177
	Motor Set 4	Base Frequency 4	F178
		Base Frequency Voltage 4	F179
		Manual Torque Boost 4	F180
		Overload Protection Level 4	F181
	PM Motor	PM Motor Constant 1 (D-Axis Inductance)	F498
		PM Motor Constant 2 (Q-Axis Inductance)	F499
		Step-Out Detection-Current Level (For PM Motors)	F640
		Step-Out Detection-Current Time (For PM Motors)	F641
	Vector Motor Model	Autotune 1	F400
		Slip Frequency Gain	F401
		Autotune 2	F402
	Vector Motor Model	Motor Rated Capacity (Nameplate)	F405
		Motor Rated Current (Nameplate)	F406
		Motor Rated RPM (Nameplate)	F407
		Base Frequency Voltage 1	F409
		Motor Constant 1 (Torque Boost)	F410

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
MOTOR	Vector Motor Model	Motor Constant 2 (No Load Current)	F411
		Motor Constant 3 (Leak Inductance)	F412
		Motor Constant 4 (Rated Slip)	F413
TORQUE	Manual Torque Limit	Power Running Torque Limit 2 Level	F444
		Dynamic Braking Torque Limit 2 Level	F445
		Power Running Torque Limit 3 Level	F446
		Dynamic Braking Torque Limit 3 Level	F447
		Power Running Torque Limit 4 Level	F448
		Dynamic Braking Torque Limit 4 Level	F449
	Setpoints	V/I Input Point 1 Rate	F205
		V/I Input Point 2 Rate	F206
		RR Input Point 1 Rate	F214
		RR Input Point 2 Rate	F215
		RX Input Point 1 Rate	F220
		RX Input Point 2 Rate	F221
		RX2 Option (AI1) Input Point 1 Rate	F226
		RX2 Option (AI1) Input Point 2 Rate	F227
	Torque Control	Torque Command	F420
		Tension Torque Bias Input (Torque Control)	F423
		Load Sharing Gain Input	F424
		Forward Speed Limit Input	F425
		Forward Speed Limit Input Level	F426
		Reverse Speed Limit Input	F427
		Reverse Speed Limit Input Level	F428
		Power Running Torque Limit 1	F440
		Power Running Torque Limit 1 Level	F441
	Torque Limit	Dynamic Braking Torque Limit 1	F442
		Dynamic Braking Torque Limit 1 Level	F443
		Acceleration/Deceleration Operation After Torque Limit	F451
	Torque Speed Limiting	Speed Limit (Torque = 0) Center Value Reference	F430

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
TORQUE	Torque Speed Limiting	Speed Limit (Torque = 0) Center Value	F431
		Speed Limit (Torque = 0) Band	F432
		Allow Specified Direction ONLY	F435
FEEDBACK	Drooping Control	Drooping Gain	F320
		Speed at 0% Drooping Gain	F321
		Speed at F320 Drooping Gain	F322
		Drooping Insensitive Torque	F323
		Drooping Output Filter	F324
	Feedback	PID Control Switching	F359
		PID Feedback Signal	F360
		PID Feedback Delay Filter	F361
		PID Feedback Proportional Gain	F362
		PID Feedback Integral Gain	F363
		PID Deviation Upper Limit	F364
		PID Deviation Lower Limit	F365
		PID Feedback Differential Gain	F366
		Process Upper Limit	F367
		Process Lower Limit	F368
		PID Control Wait Time	F369
		PID Output Upper Limit	F370
		PID Output Lower Limit	F371
		Process Increasing Rate	F372
		Process Decreasing Rate	F373
		Speed PI Switching Frequency	F466
	Override Control	Adding Input Selection	F660
		Multiplying Input Selection	F661
	PG	Number of PG Input Pulses	F375
		Number of PG Input Phases	F376
		PG Disconnection Detection	F377
		Simple Positioning Completion Range	F381

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
FEEDBACK	**PG**	Current Control Proportional Gain	F458
		Speed Loop Proportional Gain	F460
		Speed Loop Stabilization Coefficient	F461
		Load Moment of Inertia 1	F462
		Second Speed Loop Proportional Gain	F463
		Second Speed Loop Stabilization Coefficient	F464
		Load Moment of Inertia 2	F465
MY FUNCTION	**My Function Selection**	My Function Operating Mode	F977
	My Function Unit 1	Input Function Target 1	F900
		Input Function Command 1	F901
		Input Function Target 2	F902
		Input Function Command 2	F903
		Input Function Target 3	F904
		Output Function Assigned	F905
	My Function Unit 2	Input Function Target 1	F906
		Input Function Command 1	F907
		Input Function Target 2	F908
		Input Function Command 2	F909
		Input Function Target 3	F910
		Output Function Assigned	F911
	My Function Unit 3	Input Function Target 1	F912
		Input Function Command 1	F913
		Input Function Target 2	F914
		Input Function Command 2	F915
		Input Function Target 3	F916
		Output Function Assigned	F917
	My Function Unit 4	Input Function Target 1	F935
		Input Function Command 1	F936
		Input Function Target 2	F937
		Input Function Command 2	F938

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
MY FUNCTION	My Function Unit 4	Input Function Target 3	F939
		Output Function Assigned	F940
	My Function Unit 5	Input Function Target 1	F941
		Input Function Command 1	F942
		Input Function Target 2	F943
		Input Function Command 2	F944
		Input Function Target 3	F945
		Output Function Assigned	F946
	My Function Unit 6	Input Function Target 1	F947
		Input Function Command 1	F948
		Input Function Target 2	F949
		Input Function Command 2	F950
		Input Function Target 3	F951
		Output Function Assigned	F952
	My Function Unit 7	Input Function Target 1	F953
		Input Function Command 1	F954
		Input Function Target 2	F955
		Input Function Command 2	F956
		Input Function Target 3	F957
		Output Function Assigned	F958
	My Function Data	My Function Percent Data 1	F918
		My Function Percent Data 2	F919
		My Function Percent Data 3	F920
		My Function Percent Data 4	F921
		My Function Percent Data 5	F922
		My Function Frequency Data 1	F923
		My Function Frequency Data 2	F924
		My Function Frequency Data 3	F925
		My Function Frequency Data 4	F926
		My Function Frequency Data 5	F927

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
MY FUNCTION	**My Function Data**	My Function Time Data 1	F928
		My Function Time Data 2	F929
		My Function Time Data 3	F930
		My Function Time Data 4	F931
		My Function Time Data 5	F932
		My Function Count Data 1	F933
		My Function Count Data 2	F934
	My Function Analog	Analog Input Function Target 11	F959
		Analog Function Assigned Object 11	F961
		Analog Input Function Target 21	F962
		Analog Function Assigned Object 21	F964
	My Function Monitor	Monitor Output Function 11	F965
		Monitor Output Function Command 11	F966
		Monitor Output Function 21	F967
		Monitor Output Function Command 21	F968
		Monitor Output Function 31	F969
		Monitor Output Function Command 31	F970
		Monitor Output Function 41	F971
		Monitor Output Function Command 41	F972
COMMUNICATIONS	**Communications Adjustments**	Frequency Point Selection	F810
		Point 1 Setting	F811
		Point 1 Frequency	F812
		Point 2 Setting	F813
		Point 2 Frequency	F814
	Communications	RS485 2-Wire Baud Rate	F800
		RS485 2-Wire and 4-Wire Parity	F801
		ASD Number	F802
		RS485 2-Wire and 4-Wire Communications Time-Out	F803
		RS485 2-Wire and 4-Wire Communications Time-Out Action	F804

Program Mode Menu Navigation

Primary Menu	Sub Menu	Parameter Name	Parameter Number
COMMUNICATIONS	Communications	RS485 2-Wire Send Wait Time	F805
		RS485 2-Wire ASD-to-ASD Communications	F806
		RS485 4-Wire Baud Rate	F820
		RS485 Send Wait Time	F825
		RS485 4-Wire ASD-to-ASD Communications	F826
		RS485 4-Wire Protocol (TSB/MODBUS)	F829
		Communication Option (DeviceNet/Profibus) Setting 1	F830
		Communication Option (DeviceNet/Profibus) Setting 2	F831
		Communication Option (DeviceNet/Profibus) Setting 3	F832
		Communication Option (DeviceNet/Profibus) Setting 4	F833
		Communication Option (DeviceNet/Profibus) Setting 5	F834
		Communication Option (DeviceNet/Profibus) Setting 6	F835
		Communication Option (DeviceNet/Profibus) Setting 7	F836
		Communication Option (DeviceNet/Profibus) Setting 8	F841
		Communication Option (DeviceNet/Profibus) Setting 9	F842
		Communication Option (DeviceNet/Profibus) Setting 10	F843
		Communication Option (DeviceNet/Profibus) Setting 11	F844
		Communication Option (DeviceNet/Profibus) Setting 12	F845
		Communication Option (DeviceNet/Profibus) Setting 13	F846
		Disconnection Detection Extended Time	F850
		ASD Disposition at Disconnection	F851
		Preset Speed Operation	F852
		Communication Option Station Address Monitor	F853
		Communication Option Speed Switch Monitor DeviceNet/CC-Link	F854
		Block Write Data 1	F870
		Block Write Data 2	F871
		Block Read Data 1	F875
		Block Read Data 2	F876
		Block Read Data 3	F877
		Block Read Data 4	F878

Program Mode Menu Navigation			
Primary Menu	**Sub Menu**	**Parameter Name**	**Parameter Number**
COMMUNICATIONS	**Communications**	Block Read Data 5	F879
		Free Notes	F880
		Network Option Reset Setting	F899
	Ethernet	IP	N/A
		Sub Net	
		Gateway	
		DHCP Mode	
		MAC ID	
PASSWORD AND LOCKOUT	**Enter Password**		N/A
	Change Password	Enter New Password	N/A
	Lockouts	Reset From Trip	N/A
		Local/Remote	
		Run/Stop from EOI	
		Frequency Change From EOI	
		Monitor Screen	
		Parameter Access	
		Parameter Write	

Direct Access Information

The ACE-tronics G9 ASD has the ability to allow the user direct access to the motor control functions. There are two ways in which the motor control parameters may be accessed for modification: Program ⇒ Direct Access ⇒ ***Applicable Parameter Number*** *or* Program ⇒ ***Applicable Menu Path***. Both methods access the parameter via the **Program** mode. Once accessed, the parameter may be viewed or changed.

The **Program** mode allows the user to develop an application-specific motor-control profile. Motor control functions may be set to accommodate application-specific power and timing requirements.

The configurable parameters of the **Program** mode that have user-accessible **Parameter Numbers** are listed and described below. The parameters that do not have a Direct Access number and are accessible via the **Program** mode menu hierarchy only are listed and described on pg. 57.

Note: *The setup procedures included within this section may require a **Reset** before performing the procedure. Application-specific settings may then be performed. The pre-reset conditions may be saved (see F007).*

Note: *Communications setting changes will require that the power be removed and then re-applied for the changes to take effect.*

Direct Access Parameters/Numbers

Automatic Acceleration/Deceleration

Direct Access Number — F000

Parameter Type — **Selection List**

Factory Default — **Manual**

Changeable During Run — **No**

Program ⇒ Fundamental ⇒ Acc/Dec 1

This parameter is used to enable automatic acceleration and deceleration rates in accordance with the applied load.

The adjusted acceleration and deceleration times range from 12.5% to 800% of the programmed values for **Acceleration Time 1 — UP/DOWN Frequency Accel Time** (F009) and **Deceleration Time 1 — UP/DOWN Frequency Decel Time** (F010).

Settings:

Manual
Automatic ACC/DEC
Automatic ACC Only

Note: *The motor and the load must be connected prior to selecting **Automatic Acceleration/Deceleration**.*

Automatic Torque Boost

Direct Access Number — F001

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

Program ⇒ Fundamental ⇒ Motor Set 1

This parameter allows the ASD to adjust the output torque in accordance with the applied load automatically. When enabled, an **Autotune** is performed — the motor should be connected before performing an **Autotune**.

Settings:

Disabled
Automatic Torque Boost + Autotuning
Sensorless Vector Control + Autotuning

Command Mode

Direct Access Number — F003

Parameter Type — **Selection List**

Factory Default — **Terminal Board**

Changeable During Run — **No**

Program ⇒ Fundamental ⇒ Standard Mode Selection

The **Command Mode Selection** establishes the source of the command input for the ASD. **Command** inputs include **Run**, **Stop**, **Forward**, etc. The **Override** feature may supersede the **Command Mode Selection** setting (see Command and Frequency Mode Control on pg. 47).

Settings:

Terminal Board
EOI Keypad
RS485
Communication Option Board

Frequency Mode 1

Direct Access Number — F004

Parameter Type — **Selection List**

Factory Default — **RR**

Changeable During Run — **No**

Program ⇒ Fundamental ⇒ Standard Mode Selection

The **Frequency Mode 1** setting establishes the source of the frequency-control input for the ASD. The **Frequency Mode 2** setting or the **Override** feature may supersede the **Frequency Mode 1** setting (see Command and Frequency Mode Control on pg. 47 and F200 for additional information on this feature).

Note: *Only **bolded** items from the **Settings** list below may be placed in the **Override** mode.*

Settings:

V/I
RR
RX
EOI Keypad
RS485
Communication Option Board
RX2 Option (AI1)
Option V/I
UP/DOWN Frequency
Pulse Input (Option)
Pulse Input (Motor CPU)
Binary/BCD Input (Option)

FM Output Terminal Function

Direct Access Number — F005

Parameter Type — **Selection List**

Factory Default — **Signed Speed Feedback (Realtime)**

Changeable During Run — **Yes**

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter is used to set the output function of the **FM** analog output terminal. The **FM** output terminal produces an output current or voltage that is proportional to the magnitude of the function assigned to this terminal (select current or voltage at F681). The available assignments for this output terminal are listed in Table 8 on pg. 240.

Note: *To read **voltage** at this terminal connect a 100 – 500Ω resistor from the **FM** (+) terminal to the **CC** (-) terminal. Using a voltmeter read the voltage across the 100 – 500Ω resistor.*

*To read **current** at this terminal connect a 100 – 500Ω resistor from the **FM** (+) terminal through a series Ammeter to the **CC** (-) terminal.*

*The **FM** analog output has a maximum resolution of 1/1024 and a maximum load rating of 500 ohms.*

FM Terminal Setup Parameters

F005 — FM Output Terminal Function
F006 — FM Output Terminal Adjustment
F681 — FM Voltage/Current Output Switching
F682 — FM Output Gradient Characteristic
F683 — FM Bias Adjustment

FM Output Terminal Adjustment

Direct Access Number — F006

Parameter Type — **Numerical**

Factory Default — **493**

Changeable During Run — **Yes**

Minimum — 1

Maximum — 1280

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter is used to calibrate the **FM** analog output.

To calibrate the **FM** analog output, connect a meter (current or voltage) as described at F005.

With the ASD running at a known value (e.g., output frequency), adjust this parameter until the assigned function produces the desired DC level output at the **FM** output terminal.

See F005 for additional information on this setting.

Reset

Direct Access Number — F007

Parameter Type — **Selection List**

Factory Default — **None**

Changeable During Run — **No**

Program ⇒ Utilities ⇒ Type Reset

This feature assists the user when performing fault analysis or by allowing a quick system setup change when required. Performing a **Type Reset** results in one of the following user-selected post-reset configurations.

Settings:

None
50 Hz Setting
60 Hz Setting
Reset to Factory Settings
Clear Past Trips
Clear Run Timer (Bearing Greaser)
Initialize Typeform
*Save User Settings
Restore User Settings
Clear Cumulative Fan Timer (FE79)
Accel/Decel Time Setting 0.01 – 600.0 Seconds
Accel/Decel Time Setting 0.1 – 6000.0 Seconds
Update EOI Firmware
Set EOI Memory to Default

Note: *User settings that are stored in the memory of the **EOI** are not saved via the **Save User Settings** selection.*

Forward/Reverse Run

Direct Access Number — F008

Parameter Type — **Selection List**

Factory Default — **Forward**

Changeable During Run — **Yes**

Program ⇒ Fundamental ⇒ Standard Mode Selection

While operating in the **Local** mode, this parameter sets the direction of motor rotation.

From the **Frequency Command** screen press the **ESC** key. At the subsequent **EOI Command** screen select the **Direction** field and change the setting. Press the **Rotary Encoder** and the new setting will be in effect.

This setting will not override parameter F311 (**Forward/Reverse Disable**).

If either direction is disabled via parameter F311, the disabled direction will not be recognized if commanded by the **EOI**. If both directions are disabled via parameter F311, the direction command from the **EOI** will determine the direction of the motor rotation.

Settings:

Forward
Reverse
Switchable F/R by EOI (Forward)
Switchable F/R by EOI (Reverse)

Acceleration Time 1 — UP/DOWN Frequency Accel Time

Direct Access Number — F009

Program ⇒ Fundamental ⇒ Acc/Dec 1

Parameter Type — **Numerical**

Factory Default — **3.0**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

This is a dual-function parameter. The two functions are described below.

1) This parameter specifies the time in seconds for the output of the ASD to go from 0.0 Hz to the **Maximum Frequency** for the **#1 Acceleration** profile.

2) This parameter specifies the time in seconds for the output of the ASD to go from 0.0 Hz to the **Maximum Frequency** during the **UP/DOWN Frequency Functions**. See F264 for additional information on the **UP/DOWN Frequency Functions**.

The Accel/Decel pattern may be set using F502. This parameter may be further defined by the settings of F506 – F509.

Note: *An acceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. **Automatic Accel/Decel**, **Stall**, and **Ridethrough** settings may lengthen the actual acceleration times.*

Acceleration

The acceleration rate of a motor is determined by several factors: applied power, applied load, and the physical properties of the motor (winding parameters, motor size, etc.). The ASD will control the first of these factors: input power. The settings of the ASD will control the frequency and amplitude of the applied voltage to the motor.

Under most operating conditions, as the output frequency of the ASD goes up so does the output voltage (linear acceleration). The ASD has the ability to modify the relationship between frequency and voltage automatically to produce smoother operation or increased (starting) torque (see F502).

Deceleration Time 1 — UP/DOWN Frequency Decel Time

Direct Access Number — F010

Program ⇒ Fundamental ⇒ Acc/Dec 1

Parameter Type — **Numerical**

Factory Default — **1.5**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

This is a dual-function parameter. The two functions are described below.

1) This parameter specifies the time in seconds for the output of the ASD to go from the **Maximum Frequency** to 0.0 Hz for the **#1 Deceleration** profile.

2) This parameter specifies the time in seconds for the output of the ASD to go from the **Maximum Frequency** to 0.0 Hz during the **UP/DOWN Frequency Functions**. See F264 for additional information on the **UP/DOWN Frequency Functions**.

The Accel/Decel pattern may be set using F502. This parameter may be further defined by the settings of F506 – F509.

Note: *A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. **Automatic Accel/Decel**, **Stall**, and **Ridethrough** settings may lengthen the actual deceleration times.*

Maximum Frequency

Direct Access Number — F011

Program ⇒ Fundamental ⇒ Frequency

This setting determines the absolute maximum frequency that the ASD can output.

Accel/Decel times are calculated based on the **Maximum Frequency** setting.

The **Maximum Frequency** is not limited by this setting while operating in the **Drooping Control** mode (see F320 for additional information on this setting).

Note: *This setting may not be lower than the **Upper-Limit Frequency** setting (F012).*

Parameter Type — **Numerical**

Factory Default — **65.0**

Changeable During Run — **No**

Minimum — 30.0

Maximum — 299.0

Units — Hz

Upper-Limit Frequency

Direct Access Number — F012

Program ⇒ Fundamental ⇒ Frequency

This parameter sets the highest frequency that the ASD will accept as a frequency command or frequency setpoint. The ASD may output frequencies higher than the **Upper-Limit Frequency** (but, lower than the Maximum Frequency) when operating in the **PID Control** mode, **Torque Control** mode, or the **Vector Control** modes (sensorless or feedback).

Note: *This setting may not be higher than the **Maximum Frequency** (F011) setting.*

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — **Max. Freq.** (F011)

Units — Hz

Lower-Limit Frequency

Direct Access Number — F013

Program ⇒ Fundamental ⇒ Frequency

This parameter sets the lowest frequency that the ASD will accept as a frequency command or frequency setpoint. The ASD will output frequencies lower than the **Lower-Limit Frequency** when accelerating to the lower limit or decelerating to a stop. Frequencies below the **Lower Limit** may also be output when operating in the **PID Control** mode, **Torque Control** mode, or the **Vector Control** modes (sensorless or feedback).

Parameter Type — **Numerical**

Factory Default — **13.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Upper Limit** (F012)

Units — Hz

Base Frequency 1

Direct Access Number — F014

Program ⇒ Fundamental ⇒ Motor Set 1

The **Base Frequency 1** setting is the frequency at which the output voltage of the ASD reaches its maximum setting. The **Base Frequency Voltage 1** parameter is set at F409.

For proper motor operation, the **Base Frequency** should be set for the nameplate frequency of the motor.

Parameter Type — **Numerical**

Factory Default — **60.0**

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — **Upper Limit** (F012)

Units — Hz

V/f Pattern

Direct Access Number — F015

Parameter Type — **Selection List**

Factory Default — **PG Feedback Vector Control (Speed/Torque Switching)**

Changeable During Run — **No**

Program ⇒ Fundamental ⇒ Frequency

This function establishes the relationship between the output frequency and the output voltage.

Bolded selections use the motor tuning parameters of the ASD to properly configure the ASD for the motor being used. If **Load Reactors** or **Long Lead Filters** are used, or if the capacity of the ASD is greater than the motor, manual tuning of the motor parameters may be required for optimum performance.

Settings:

Constant Torque
Voltage Decrease Curve
Automatic Torque Boost
Sensorless Vector Control (Speed)
Sensorless Vector Control (Speed/Torque Switching)
V/f 5-Point Curve (Go to F190 to configure the V/f 5-point settings)
PM Drive (Permanent Magnet)
PG Feedback Vector Control (Speed)
PG Feedback Vector Control (Speed/Torque Switching)

Note: *When operating in the **Vector Control** mode the carrier frequency should be set to 2.2 kHz or above.*

Manual Torque Boost 1

Direct Access Number — F016

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0.0

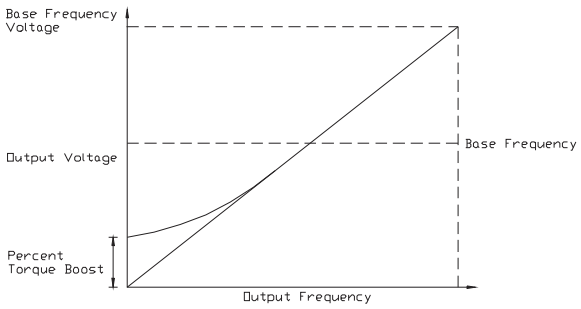
Maximum — 30.0

Units — %

Program ⇒ Fundamental ⇒ Motor Set 1

The **Manual Torque Boost 1** function is used to increase the low frequency torque for high-inertia loads by increasing the output voltage at frequencies below ½ of the **Base Frequency 1** (F014) setting.

The value programmed as a boost percentage establishes an output voltage vs. output frequency relationship to be used to start the motor or to provide smoother operation.



Note: *Setting an excessive **Torque Boost** level may cause nuisance tripping and mechanical stress to loads.*

Motor Overload Protection Configuration

Program ⇒ Protection ⇒ Overload

Direct Access Number — F017

Parameter Type — **Selection List**

Factory Default — **Overload Trip Without Stall**

Changeable During Run — **Yes**

This parameter is used to protect the motor from an over-current condition. The type of motor being used and the **Overload/Stall** setting is selected here to better match the application.

This parameter setting may extend the **Over-Voltage Stall** time settings.

This parameter may be affected by the setting of the **Power Running Stall Continuous Trip Detection Time** (F452).

Settings:

Overload Trip without Stall
Overload Trip with Stall
No Overload without Stall
Stall Only
V/f Motor-Overload without Stall
V/f Motor-Overload with Stall
V/f Motor-No Overload without Stall
V/f Motor-Stall Only

Preset Speed 1

Direct Access Number — F018

Parameter Type — **Numerical**

Factory Default — **60.0**

Changeable During Run — **Yes**

Minimum — **Lower Limit** (F013)

Maximum — **Upper Limit** (F012)

Units — Hz

Program ⇒ Frequency ⇒ Preset Speeds

Up to fifteen (15) output frequency values that fall within the **Lower-Limit** and the **Upper-Limit** range may be programmed into the ASD and output as a **Preset Speed**. This parameter assigns an output frequency to binary number 0001 and is identified as **Preset Speed 1**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed**.

Perform the following setup to allow the system to receive **Preset Speed** control input at the **I1 – I4** terminals:

1. Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.
2. Program ⇒ Terminal ⇒ Input Terminals ⇒ **I1** (set to **Preset Speed 1**; LSB of 4-bit count). Repeat for **I2** – **I4** (MSB of 4-bit count) as **Preset Speed 2 – 4**, respectively (all Normally Open).
3. Program ⇒ Frequency ⇒ Preset Speeds ⇒ **Preset Speed 1** (set an output frequency as **Preset Speed 1**; repeat for **Preset Speeds 2** – **15** as required).
4. Program ⇒ Pattern Run ⇒ Operation Mode ⇒ Preset Speed Operation Mode ⇒ **Enabled/Disabled**.

   Select **Enable** to use the direction, accel/decel, and torque settings of the **Preset Speed** being run. The torque settings used will be as defined in F170 – F181 and as selected via the associated discrete input terminals **V/f Switching 1** and **2** in Table 7 on pg. 236.

   Select **Disabled** to use the speed setting only of the **Preset Speed** being run.
5. Place the system in the **Remote** mode (Local/Remote LED Off).
6. Provide a **Run** command (activate F and/or R).

Activate **I1** to run **Preset Speed 1** (120 VAC to I1 = 0001 binary).

With **I1 – I4** configured to output **Preset Speeds** (F115 – F118), 0001 – 1111 may be applied to **I1 – I4** of the **ACE G9-120V-PCB** to run the associated **Preset Speed**. If bidirectional operation is required **F** and **R** must be activated.

With **I1** being the least significant bit of a binary count, the **I1 – I4** settings will produce the programmed speed settings as indicated in the **Preset Speed Truth Table** to the right.

Preset Speeds are also used in the **Pattern Run** mode.

Preset Speed Truth Table

Preset	I4 MSB	I3	I2	I1 LSB	Output
1	0	0	0	**1**	**F018**
2	0	0	**1**	0	**F019**
3	0	0	**1**	**1**	**F020**
4	0	**1**	0	0	**F021**
5	0	**1**	0	**1**	**F022**
6	0	**1**	**1**	0	**F023**
7	0	**1**	**1**	**1**	**F024**
8	**1**	0	0	0	**F287**
9	**1**	0	0	**1**	**F288**
10	**1**	0	**1**	0	**F289**
11	**1**	0	**1**	**1**	**F290**
12	**1**	**1**	0	0	**F291**
13	**1**	**1**	0	**1**	**F292**
14	**1**	**1**	**1**	0	**F293**
15	**1**	**1**	**1**	**1**	**F294**

Note: *1 = Terminal activated.*

Preset Speed 2

Direct Access Number — F019

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — **Lower Limit** (F013)

Maximum — **Upper Limit** (F012)

Units — Hz

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 0010 and is identified as **Preset Speed 2**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Preset Speed 3

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 0011 and is identified as **Preset Speed 3**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F020
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 4

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 0100 and is identified as **Preset Speed 4**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F021
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 5

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 0101 and is identified as **Preset Speed 5**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F022
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 6

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 0110 and is identified as **Preset Speed 6**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F023
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 7

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 0111 and is identified as **Preset Speed 7**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F024
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Automatic Function Selection

Direct Access Number — F040

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

Program ⇒ Utilities ⇒ Display Parameters

This parameter setting is used to configure multiple parameters with the setting of only one parameter. From the selection below multiple parameters may be set as indicated in the table.

Once set, the selected configuration is placed in effect and remains in effect until this parameter is changed or the individual settings are changed.

Set this parameter to **Disable** to set these parameters individually.

Note: *After performing the desired selection the **EOI** display returns to **Disabled** though the selected function has been carried out (i.e., without this, if selection **1** is performed, F004 and F207 would hold the RR terminal setting regardless of attempts to change the settings individually).*

Settings:

Disabled
RR
V/I
RR or V/I Switched via Terminal Board (ACE G9-120V-PCB)
Keypad Frequency/Terminal Board Command (ACE G9-120V-PCB)
Keypad Frequency and Command

		User Settings					
Related Params	**Default Settings**	**0-Disable**	**1-RR**	**2-V/I**	**3-RR or V/I via TB**	**4-Keypad/ Freq. CMD/TB**	**5-Keypad Freq/CMD**
Command Mode F003	Terminal Board	N/C				Terminal Board	*Keypad
Frequency Mode 1 F004	RR	N/C	RR	N/C	RR	*Keypad	
I3 Terminal F117	Preset Speed 3	N/C			Freq. Ref. Priority	N/C	
Freq. Priority F200	Terminal Board	N/C	Terminal Board				
V/I Setup F201	0.0%	N/C		20.0%		N/C	
Frequency Mode 2 F207	V/I	N/C	RR	V/I		*Keypad	
N/C = No Change — the setting remains as it was before setting parameter F040.							

Note: **Go to **F003** and/or **F004** and select **EOI Keypad** to use the **EOI** for control.*

Low-Speed Signal Output Frequency

Direct Access Number — F100

Program ⇒ Terminal ⇒ Reach

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

The **Low-Speed Signal Output Frequency** parameter sets a frequency threshold that activates the assigned output terminal for the duration that the ASD output is equal to or above this setting (see Table 10 on pg. 242 for the available output assignments).

Speed Reach Frequency

Direct Access Number — F101

Program ⇒ Terminal ⇒ Reach

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

The **Speed Reach Frequency** sets a frequency threshold that, when reached or is within the bandwidth specified by parameter F102, activates the assigned output terminal for the duration that the ASD output is within the bandwidth specified (see Table 10 on pg. 242 for the available output assignments).

This setting is also a permissive when using the **Express Speed** function.

Speed Reach Detection Band

Direct Access Number — F102

Program ⇒ Terminal ⇒ Reach

Parameter Type — **Numerical**

Factory Default — **2.50**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter sets the bandwidth of the **Speed Reach Frequency** (F101) setting.

Input Terminal Priority

Direct Access Number — F106

Program ⇒ Terminal ⇒ Input Special Functions

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

This parameter is used to allow the **Jog** and **DC Injection Braking** input signals to control the ASD when received via the **ACE G9-120V-PCB** even though the system is in the **Local** mode.

With this parameter enabled**,** a **Jog** command or a **DC Injection Braking** command received from the **ACE G9-120V-PCB** will receive priority over commands from the **EOI**.

See F260 for additional information on using the **Jog** function.

See F250 – F252 for additional information on **DC Injection Braking**.

Settings:

Disabled
Enabled

16-Bit Binary/BCD Input

Direct Access Number — F107

Parameter Type — **Selection List**

Factory Default — **None**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Input Special Functions

The extended terminal function is used with the **Expansion IO Card Option** (P/N ETB004Z).

This parameter defines the format of the binary or BCD data when using the option card.

Note: *The **Expansion IO Card Option 2** option board is required to use this terminal.*

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Settings:

None
12-Bit Binary
16-Bit Binary
3-Digit BCD
4-Digit BCD
Inverted 12-Bit Binary
Inverted 16-Bit Binary
Inverted 3-Digit BCD
Inverted 4-Digit BCD

Selections using 16-bit binary or 4-digit BCD will require the configuration of terminals I1-I4 on the **ACE G9-120V-PCB** as binary bits 0 – 3 (F115 – F118). The **Frequency Mode 1** (F004) parameter must be set to **Binary/BCD**.

For proper scaling of the binary or BCD input, parameters F228 **–** F231 must be configured.

Option V/I Terminal Voltage/Current Selection

Direct Access Number — F109

Parameter Type — **Selection List**

Factory Default — **Voltage Input**

Changeable During Run — **No**

Program ⇒ Frequency ⇒ V/I

This parameter is used to set the **AI2** input terminal to receive either current or voltage as a control signal.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

Settings:

Voltage Input
Current Input

Always ON Terminal Function

Direct Access Number — F110

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **ST**

Changeable During Run — **No**

This parameter is used to set the functionality of the virtual discrete input terminal **ON**. As a virtual terminal, the **ON** control terminal exists only in memory and is considered to always be in its **True** (activated) state.

It is often practical to assign a function to this terminal that the user desires to be maintained regardless of external conditions or operations.

This parameter sets the programmable **ON** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

This terminal is set to **ST** (Standby) to allow for ready-to-run operation and allows for the use of the discrete input terminals for other functions.

Input Terminal 1 (F) Function

Direct Access Number — F111

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Forward**

Changeable During Run — **No**

This parameter is used to set the functionality of the **F** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **F** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Input Terminal 2 (R) Function

Direct Access Number — F112

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Reverse**

Changeable During Run — **No**

This parameter is used to set the functionality of the **R** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **R** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Input Terminal 3 (I1) Function

Direct Access Number — F113

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Preset Speed 1**

Changeable During Run — **No**

This parameter is used to set the functionality of the **I1** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **I1** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Input Terminal 4 (I2) Function

Direct Access Number — F114

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **I2** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **I2** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Input Terminal 5 (I3) Function

Direct Access Number — F115

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **I3** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **I3** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Input Terminal 6 (I4) Function

Direct Access Number — F116

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **I4** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **I4** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Input Terminal 7 (I5) Function

Direct Access Number — F117

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **I5** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **I5** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Input Terminal 8 (I6) Function

Direct Access Number — F118

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **I6** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **I6** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Input Terminal 9 (LI1) Function

Direct Access Number — F119

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **LI1** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **LI1** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Input Terminal 10 (LI2) Function

Direct Access Number — F120

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Input Terminals

This parameter is used to set the functionality of the **LI2** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **LI2** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Input Terminal 11 (LI3) Function

Direct Access Number — F121

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Input Terminals

This parameter is used to set the functionality of the **LI3** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **LI3** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Input Terminal 12 (LI4) Function

Direct Access Number — F122

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Input Terminals

This parameter is used to set the functionality of the **LI4** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **LI4** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Input Terminal 13 (LI5) Function

Direct Access Number — F123

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **LI5** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **LI5** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

Input Terminal 14 (LI6) Function

Direct Access Number — F124

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **LI6** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **LI6** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

Input Terminal 15 (LI7) Function

Direct Access Number — F125

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **LI7** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **LI7** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

Input Terminal 16 (LI8) Function

Program ⇒ Terminal ⇒ Input Terminals

Direct Access Number — F126
Parameter Type — **Selection List**
Factory Default — **Unassigned**
Changeable During Run — **No**

This parameter is used to set the functionality of the **LI8** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **LI8** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

Output Terminal 1 (OUT1) Function

Program ⇒ Terminal ⇒ Output Terminals

Direct Access Number — F130
Parameter Type — **Selection List**
Factory Default — **Brake Failure**
Changeable During Run — **No**

This parameter is used to set the functionality of the **OUT1** discrete output terminals **OUT1-A** and **OUT1-C**.

The **OUT1-A** to **OUT1-C** output terminals change states (open or close) as a function of a user-selected event. See Table 10 on pg. 242 for listing the possible assignments for the **OUT1** terminals.

In addition, the output terminals must be specified as **Normally Open** or **Normally Closed**.

Output Terminal 2 (OUT2) Function

Program ⇒ Terminal ⇒ Output Terminals

Direct Access Number — F131
Parameter Type — **Selection List**
Factory Default — **Brake Release**
Changeable During Run — **No**

This parameter is used to set the functionality of the **OUT2** discrete output terminals **OUT2-A** and **OUT2-C**.

The **OUT2-A** to **OUT2-C** output terminals change states (open or close) as a function of a user-selected event. See Table 10 on pg. 242 for listing the possible assignments for the **OUT2** terminals.

In addition, the output terminals must be specified as **Normally Open** or **Normally Closed**.

Output Terminal 3 (BRAKE) Function

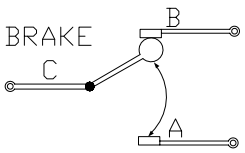
Program ⇒ Terminal ⇒ Output Terminals

Direct Access Number — F132
Parameter Type — **Selection List**
Factory Default — **Brake Release**
Changeable During Run — **No**

This parameter is used to set the functionality of the **BRAKE** output terminals (A, B, and C) to one of the functions listed in Table 10 on pg. 242.

In addition, the output terminals must be specified as **Normally Open** or **Normally Closed**.

BRAKE Relay is shown in the de-energized state.



Output Terminal 4 (OUT3) Function

Direct Access Number — F133

Parameter Type — **Selection List**

Factory Default — **Always Off**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Output Terminals

This parameter is used to set the functionality of the **OUT3** discrete output terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **OUT3** terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Output Terminal 5 (OUT4) Function

Direct Access Number — F134

Parameter Type — **Selection List**

Factory Default — **Always Off**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Output Terminals

This parameter is used to set the functionality of the **OUT4** discrete output terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **OUT4** terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Output Terminal 6 (R1) Function

Direct Access Number — F135

Parameter Type — **Selection List**

Factory Default — **Always Off**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Output Terminals

This parameter is used to set the functionality of the **R1** discrete output terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **R1** terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Output Terminal 7 (OUT5) Function

Direct Access Number — F136

Parameter Type — **Selection List**

Factory Default — **Always Off**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Output Terminals

This parameter is used to set the functionality of the **OUT5** discrete output terminal.

In addition, this output terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **OUT5** terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

Output Terminal 8 (OUT6) Function

Direct Access Number — F137

Parameter Type — **Selection List**

Factory Default — **Always Off**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Output Terminals

This parameter is used to set the functionality of the **OUT6** discrete output terminal.

In addition, this output terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **OUT6** terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

Output Terminal 9 (R2) Function

Direct Access Number — F138

Parameter Type — **Selection List**

Factory Default — **Always Off**

Changeable During Run — **No**

Program ⇒ Terminal ⇒ Output Terminals

This parameter is used to set the functionality of the **R2** discrete output terminal.

In addition, this output terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **R2** terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

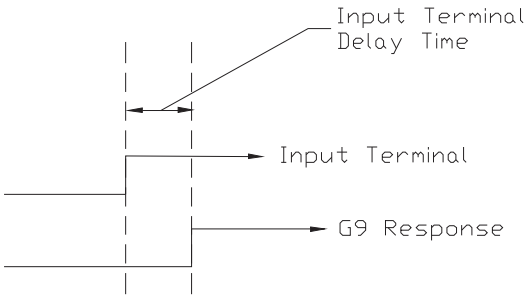
Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

Input Terminal 1 (F) Response Time

Program ⇒ Terminal ⇒ Input Terminal Delays

This parameter delays the response of the ASD to any change in the **F** terminal input by the programmed value.



The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F140
Parameter Type — **Numerical**
Factory Default — **8.0**
Changeable During Run — **No**
Minimum — 2.0
Maximum — 200.0
Units — mS

Input Terminal 2 (R) Response Time

Program ⇒ Terminal ⇒ Input Terminal Delays

This parameter delays the response of the ASD to any change in the **R** terminal input by the programmed value (see waveforms at F140).

The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F141
Parameter Type — **Numerical**
Factory Default — **8.0**
Changeable During Run — **No**
Minimum — 2.0
Maximum — 200.0
Units — mS

Input Terminal 3 (I1) Response Time

Program ⇒ Terminal ⇒ Input Terminal Delays

This parameter delays the response of the ASD to any change in the **I1** terminal input by the programmed value (see waveforms at F140).

The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F142
Parameter Type — **Numerical**
Factory Default — **8.0**
Changeable During Run — **No**
Minimum — 2.0
Maximum — 200.0
Units — mS

Input Terminal 4 (I2) Response Time

Program ⇒ Terminal ⇒ Input Terminal Delays

This parameter delays the response of the ASD to any change in the **I2** terminal input by the programmed value (see waveforms at F140).

The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F143
Parameter Type — **Numerical**
Factory Default — **8.0**
Changeable During Run — **No**
Minimum — 2.0
Maximum — 200.0
Units — mS

Input Terminal 5 – 12 Response Time

Program ⇒ Terminal ⇒ Input Terminal Delays

This parameter delays the response of the ASD to any change in the **5 – 12** terminal inputs by the programmed value (see waveforms at F140).

The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F144
Parameter Type — **Numerical**
Factory Default — **8.0**
Changeable During Run — **No**
Minimum — 2.0
Maximum — 200.0
Units — mS

Input Terminal 13 – 20 Response Time

Program ⇒ Terminal ⇒ Input Terminal Delays

This parameter delays the response of the ASD to any change in the **13 – 20** terminal inputs by the programmed value (see waveforms at F140).

The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F145
Parameter Type — **Numerical**
Factory Default — **8.0**
Changeable During Run — **No**
Minimum — 2.0
Maximum — 200.0
Units — mS

Input Terminal 17 (B12) Function

Program ⇒ Terminal ⇒ Input Terminals

This parameter is used to set the functionality of the **B12** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **B12** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Direct Access Number — F164
Parameter Type — **Selection List**
Factory Default — **Unassigned**
Changeable During Run — **No**

Input Terminal 18 (B13) Function

Program ⇒ Terminal ⇒ Input Terminals

This parameter is used to set the functionality of the **B13** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **B13** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Direct Access Number — F165
Parameter Type — **Selection List**
Factory Default — **Unassigned**
Changeable During Run — **No**

Input Terminal 19 (B14) Function

Program ⇒ Terminal ⇒ Input Terminals

This parameter is used to set the functionality of the **B14** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **B14** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Direct Access Number — F166
Parameter Type — **Selection List**
Factory Default — **Unassigned**
Changeable During Run — **No**

Input Terminal 20 (B15) Function

Program ⇒ Terminal ⇒ Input Terminals

This parameter is used to set the functionality of the **B15** discrete input terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **B15** terminal to any one of the user-selectable functions listed in Table 7 on pg. 236.

Direct Access Number — F167
Parameter Type — **Selection List**
Factory Default — **Unassigned**
Changeable During Run — **No**

Output Terminal 10 (R3) Function

Program ⇒ Terminal ⇒ Output Terminals

This parameter is used to set the functionality of the **R3** discrete output terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **R3** terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

Direct Access Number — F168
Parameter Type — **Selection List**
Factory Default — **Off**
Changeable During Run — **No**

Output Terminal 11 (R4) Function

Program ⇒ Terminal ⇒ Output Terminals

This parameter is used to set the functionality of the **R4** discrete output terminal.

In addition, this input terminal must be specified as **Normally Open** or **Normally Closed**.

This setting assigns the function of the programmable **R4** terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

Direct Access Number — F169
Parameter Type — **Selection List**
Factory Default — **Off**
Changeable During Run — **No**

Base Frequency 2

Program ⇒ Motor ⇒ Motor Set 2

The **Base Frequency 2** setting is the frequency at which the output voltage of the ASD reaches its maximum setting. The **Base Frequency Voltage 2** parameter is set at F171.

This parameter is used only when the parameters for motor set **2** are configured and selected. Motor set **2** may be selected by a properly configured input terminal (see Table 7 on pg. 236).

For proper motor operation, the **Base Frequency** should be set for the nameplate frequency of the motor.

Direct Access Number — F170
Parameter Type — **Numerical**
Factory Default — **60.0**
Changeable During Run — **Yes**
Minimum — 25.0
Maximum — 299.0
Units — Hz

Base Frequency Voltage 2

Program ⇒ Motor ⇒ Motor Set 2

The **Base Frequency Voltage 2** setting is the **Motor #2** output voltage at the **Base Frequency** (F170). Regardless of the programmed value, the output voltage cannot be higher than the input voltage.

The actual output voltage will be influenced by the input voltage of the ASD and the **Supply Voltage Compensation** setting (F307).

This parameter is used only when the parameters for motor set **2** are configured and selected. Motor set **2** may be selected by a properly configured input terminal (see Table 7 on pg. 236).

Direct Access Number — F171
Parameter Type — **Numerical**
Factory Default — (ASD-Dependent)
Changeable During Run — **Yes**
Minimum — 50.0
Maximum — 660.0
Units — Volts

Manual Torque Boost 2

Program ⇒ Motor ⇒ Motor Set 2

The **Manual Torque Boost 2** function is used to increase the low frequency torque for high inertia loads by increasing the output voltage at frequencies below ½ of the **Base Frequency 2** setting (F170).

See parameter F016 (**Manual Torque Boost 1**) for an explanation of torque boost.

This parameter is used only when the parameters for motor set **2** are configured and selected. Motor set **2** may be selected by a properly configured input terminal (see Table 7 on pg. 236).

Direct Access Number — F172
Parameter Type — **Numerical**
Factory Default — (ASD-Dependent)
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 30.0
Units — %

Motor Overload Protection Level 2

Direct Access Number — F173

Program ⇒ Motor ⇒ Motor Set 2

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 10

Maximum — 100

Units — %

The **Motor Overload Protection Level 2** parameter specifies the motor overload current level for motor set 2. This value is entered as either a percentage of the full-load rating of the ASD or as the FLA of the motor.

The unit of measurement for this parameter may be set to **Amps** (A/V) or it may be set as a percentage of the ASD rating. The nameplate FLA of the motor may be entered directly when **Amps** is selected as the unit of measurement (see F701 to change the display unit).

The **Motor 2 Overload Protection Level** setting will be displayed in **Amps** if the **EOI** display units are set to **A/V** rather than **%**.

Base Frequency 3

Direct Access Number — F174

Program ⇒ Motor ⇒ Motor Set 3

Parameter Type — **Numerical**

Factory Default — **60.0**

Changeable During Run — **Yes**

Minimum — 25.0

Maximum — 299.0

Units — Hz

The **Base Frequency 3** setting is the frequency at which the output voltage of the ASD reaches its maximum setting. The **Base Frequency Voltage 3** parameter is set at F175.

This parameter is used only when the parameters for motor set **3** are configured and selected. Motor set **3** may be selected by a properly configured input terminal (see Table 7 on pg. 236).

For proper motor operation, the **Base Frequency** should be set for the nameplate frequency of the motor.

Base Frequency Voltage 3

Direct Access Number — F175

Program ⇒ Motor ⇒ Motor Set 3

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 50.0

Maximum — 660.0

Units — Volts

The **Base Frequency Voltage 3** setting is the **Motor #3** output voltage at the **Base Frequency** (F174). Regardless of the programmed value, the output voltage cannot be higher than the input voltage.

The actual output voltage will be influenced by the input voltage of the ASD and the **Supply Voltage Compensation** setting (F307).

This parameter is used only when the parameters for motor set **3** are configured and selected. Motor set **3** may be selected by a properly configured input terminal (see Table 7 on pg. 236).

Manual Torque Boost 3

Direct Access Number — F176

Program ⇒ Motor ⇒ Motor Set 3

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 30.0

Units — %

The **Manual Torque Boost 3** function is used to increase the low frequency torque for high inertia loads by increasing the output voltage at frequencies below ½ of the **Base Frequency 3** setting (F174).

See parameter F016 (**Manual Torque Boost 1**) for an explanation of torque boost.

This parameter is used only when the parameters for motor set **3** are configured and selected. Motor set 3 may be selected by a properly configured input terminal (see Table 7 on pg. 236).

Motor Overload Protection Level 3

Direct Access Number — F177

Program ⇒ Motor ⇒ Motor Set 3

Parameter Type — **Numerical**

Factory Default — **100.0**

Changeable During Run — **Yes**

Minimum — 10

Maximum — 100

Units — %

The **Motor Overload Protection Level 3** parameter specifies the motor overload current level for motor set 3. This value is entered as either a percentage of the full-load rating of the ASD or as the FLA of the motor.

The unit of measurement for this parameter may be set to **Amps** (A/V) or it may be set as a percentage of the ASD rating. The nameplate FLA of the motor may be entered directly when **Amps** is selected as the unit of measurement (see F701 to change the display unit).

The **Motor Overload Protection Level 3** setting will be displayed in **Amps** if the **EOI** display units are set to **A/V** rather than **%**.

Base Frequency 4

Direct Access Number — F178

Program ⇒ Motor ⇒ Motor Set 4

Parameter Type — **Numerical**

Factory Default — **60.0**

Changeable During Run — **Yes**

Minimum — 25.00

Maximum — 299.0

Units — Hz

The **Base Frequency 4** setting is the frequency at which the output voltage of the ASD reaches its maximum setting. The **Base Frequency Voltage 4** parameter is set at F179.

This parameter is used only when the parameters for motor set **4** are configured and selected. Motor set **4** may be selected by a properly configured input terminal (see Table 7 on pg. 236).

For proper motor operation, the **Base Frequency** should be set for the nameplate frequency of the motor.

Base Frequency Voltage 4

Direct Access Number — F179

Program ⇒ Motor ⇒ Motor Set 4

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 50.0

Maximum — 660.0

Units — Volts

The **Base Frequency Voltage 4** is the **Motor 4** output voltage at the **Base Frequency** (F178). Regardless of the programmed value, the output voltage cannot be higher than the input voltage.

The actual output voltage will be influenced by the input voltage of the ASD and the **Supply Voltage Compensation** setting (F307).

This parameter is used only when the parameters for motor set **4** are configured and selected. Motor set **4** may be selected by a properly configured input terminal (see Table 7 on pg. 236).

Manual Torque Boost 4

Direct Access Number — F180

Program ⇒ Motor ⇒ Motor Set 4

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 30.0

Units — %

The **Manual Torque Boost 4** function is used to increase the low frequency torque for high inertia loads by increasing the output voltage at frequencies below ½ of the **Base Frequency 4** setting (F178).

See parameter F016 (**Manual Torque Boost 1**) for an explanation of torque boost.

This parameter is used only when the parameters for motor set **4** are configured and selected. Motor set **4** may be selected by a properly configured input terminal (see Table 7 on pg. 236).

Overload Protection Level 4

Direct Access Number — F181

Program ⇒ Motor ⇒ Motor Set 4

Parameter Type — **Numerical**

Factory Default — **100.0**

Changeable During Run — **Yes**

Minimum — 10

Maximum — 100

Units — %

The **Motor 4 Overload Protection Level** parameter specifies the motor overload current level for motor set 4. This value is entered as either a percentage of the full-load rating of the ASD or as the FLA of the motor.

The unit of measurement for this parameter may be set to **Amps** (A/V) or it may be set as a percentage of the ASD rating. The nameplate FLA of the motor may be entered directly when **Amps** is selected as the unit of measurement (see F701 to change the display unit).

The **Motor 4 Overload Protection Level** setting will be displayed in **Amps** if the **EOI** display units are set to **A/V** rather than **%**.

V/f 5-Point Setting Frequency 1

Direct Access Number — F190

Program ⇒ Special ⇒ V/f 5-Point Setting

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **No**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

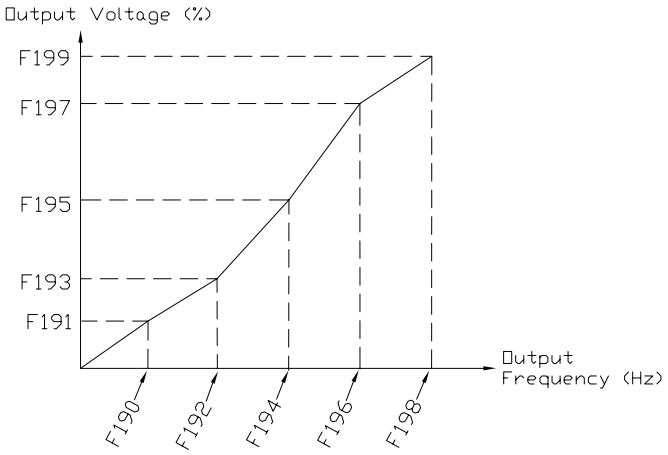
Units — Hz

The **V/f 5-Point Setting Frequency 1** setting establishes the frequency that is to be associated with the voltage setting of F191 (V/f 5-Point Setting Voltage 1).

The **V/f 5-Point** settings define a custom volts per hertz relationship for the startup output of the ASD.

To enable this function, set the **V/f Pattern** (F015) selection to the **V/f 5-Point Curve** setting.

Custom **V/f Curves** may be useful in starting high inertia loads such as rotary drum vacuum filters.



V/f 5-Point Setting Voltage 1

Direct Access Number — F191

Program ⇒ Special ⇒ V/f 5-Point Setting

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **No**

Minimum — 0.0

Maximum — 100.0

Units — V or % (F701)

The **V/f 5-Point Setting Voltage 1** establishes the output voltage level that is to be associated with the frequency setting of F190 (V/f 5-Point Setting Frequency 1).

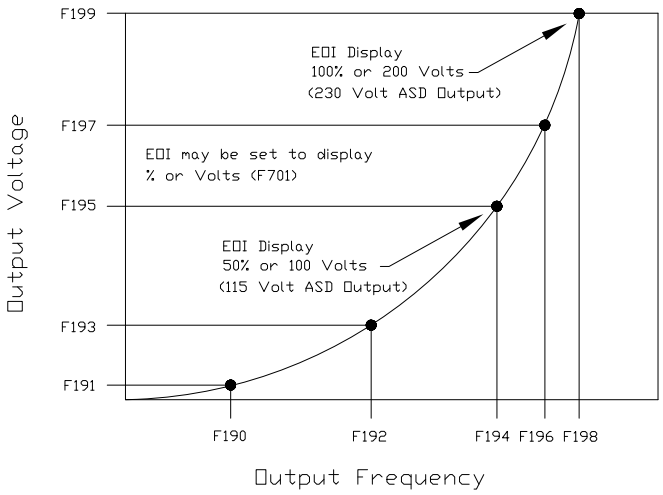
The F701 parameter setting will determine if the on-screen selection for this parameter appears in the form of a voltage (V) or as a percentage (%) of the ASD rating.

If using **Voltage** as a unit of measure and with no voltage correction (F307 Disabled), the limit of the on-screen display value for this parameter is 200 volts for the 230-volt ASD and 400 Volts for the 460-volt ASD.

The actual output voltage is scaled to the maximum **EOI** display values (e.g., a 100-volt **EOI** display corresponds to a 115-volt actual output for the 230-volt ASD — ½ of the full display range).

If using **%** as a unit of measure and with no voltage correction (F307 Disabled), the ASD output voltage will be the percentage setting times 230 for the 230-volt unit (or % times 460 Volts for the 460-volt unit).

See F190 for additional information on this setting.



V/f 5-Point Setting Frequency 2

Direct Access Number — F192

Program ⇒ Special ⇒ V/f 5-Point Setting

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **No**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

The **Custom V/f 5-Point Setting Frequency 2** sets the frequency to be associated with the voltage setting of parameter F193 (V/f 5-Point Setting Voltage 2).

See F190 and F191 for additional information on this setting.

V/f 5-Point Setting Voltage 2

Program ⇒ Special ⇒ V/f 5-Point Setting

The **V/f 5-Point Setting Voltage 2** establishes the output voltage level that is to be associated with the frequency setting of F192 (V/f 5-Point Setting Frequency 2).

The F701 parameter setting will determine if the selection for this parameter appears in the form of a Voltage (V) or as a Percentage (%) of the ASD rating.

The default setting is **%**.

See F190 and F191 for additional information on this setting.

Direct Access Number — F193
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **No**
Minimum — 0.0
Maximum — 100.0
Units — V or % (F701)

V/f 5-Point Setting Frequency 3

Program ⇒ Special ⇒ V/f 5-Point Setting

The **Custom V/f 5-Point Setting Frequency 3** sets the frequency to be associated with the voltage setting of parameter F195 (V/f 5-Point Setting Voltage 3).

See F190 and F191 for additional information on this setting.

Direct Access Number — F194
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — **Max. Freq.** (F011)
Units — Hz

V/f 5-Point Setting Voltage 3

Program ⇒ Special ⇒ V/f 5-Point Setting

The **V/f 5-Point Setting Voltage 3** establishes the output voltage level that is to be associated with the frequency setting of F194 (V/f 5-Point Setting Frequency 3).

The F701 parameter setting will determine if the selection for this parameter appears in the form of a Voltage (V) or as a Percentage (%) of the ASD rating.

The default setting is **%**.

See F190 and F191 for additional information on this setting.

Direct Access Number — F195
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **No**
Minimum — 0.0
Maximum — 100.0
Units — V or % (F701)

V/f 5-Point Setting Frequency 4

Program ⇒ Special ⇒ V/f 5-Point Setting

The **Custom V/f 5-Point Setting Frequency 4** sets the frequency to be associated with the voltage setting of parameter F197 (V/f 5-Point Setting Voltage 4).

See F190 and F191 for additional information on this setting.

Direct Access Number — F196
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — **Max. Freq.** (F011)
Units — Hz

V/f 5-Point Setting Voltage 4

Program ⇒ Special ⇒ V/f 5-Point Setting

The **V/f 5-Point Setting Voltage 4** establishes the output voltage level that is to be associated with the frequency setting of F196 (V/f 5-Point Setting Frequency 4).

The F701 parameter setting will determine if the selection for this parameter appears in the form of a Voltage (V) or as a Percentage (%) of the ASD rating.

The default setting is **%**.

See F190 and F191 for additional information on this setting.

Direct Access Number — F197
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **No**
Minimum — 0.0
Maximum — 100.0
Units — V or % (F701)

V/f 5-Point Setting Frequency 5

Program ⇒ Special ⇒ V/f 5-Point Setting

The **Custom V/f 5-Point Setting Frequency 5** sets the frequency to be associated with the voltage setting of parameter F199 (V/f 5-Point Setting Voltage 5).

See F190 and F191 for additional information on this setting.

Direct Access Number — F198

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **No**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

V/f 5-Point Setting Voltage 5

Program ⇒ Special ⇒ V/f 5-Point Setting

The **V/f 5-Point Setting Voltage 5** establishes the output voltage level that is to be associated with the frequency setting of F198 (V/f 5-Point Setting Frequency 5).

The F701 parameter setting will determine if the selection for this parameter appears in the form of a Voltage (V) or as a Percentage (%) of the ASD rating.

The default setting is **%**.

See F190 and F191 for additional information on this setting.

Direct Access Number — F199

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **No**

Minimum — 0.0

Maximum — 100.0

Units — V or % (F701)

Frequency Priority Selection

Program ⇒ Fundamental ⇒ Standard Mode Selection

Either **Frequency Mode 1** or **Frequency Mode 2** may control the output frequency of the ASD. This parameter determines which of the two will control the output frequency and the conditions in which control will be switched from one to the other.

Note: ***Frequency Mode*** *is abbreviated as* ***FMOD****.*

Settings:

FMOD changed by Terminal Board (ACE G9-120V-PCB)
FMOD (F208)

The **Frequency Mode 1** or **Frequency Mode 2** selection specifies the source of the input frequency command signal. These selections are performed at F004 and F207, respectively.

If **FMOD changed by Terminal Board** is selected here, the ASD will follow the control of the discrete input terminal assigned the function of **Frequency Priority**. The discrete terminal **Frequency Priority** will toggle control to and from **Frequency Mode 1** and **Frequency Mode 2** with each activation/ deactivation.

If **FMOD** (F208) is selected here, the ASD will follow the control of the **Frequency Mode 1** setting for the duration that the commanded frequency of the **Frequency Mode 1** setting is greater than the setting of F208.

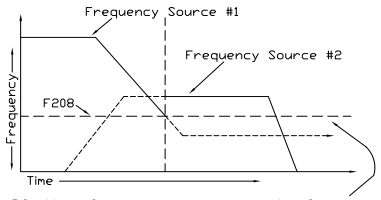
If the commanded frequency of the **Frequency Mode 1** setting is less than or equal to the setting of F208 the ASD will follow the setting of **Frequency Mode 2**.

Direct Access Number — F200

Parameter Type — **Selection List**

Factory Default — **FMOD (changed by TB)**

Changeable During Run — **Yes**



If the frequency command of Frequency Mode 1 is greater than the F208 setting, Frequency Mode 1 has priority over Frequency Mode 2.
If the frequency command of Frequency Mode 1 is equal to or less than the F208 setting, Frequency Mode 2 has priority.

V/I Input Point 1 Setting

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Direct Access Number — F201

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

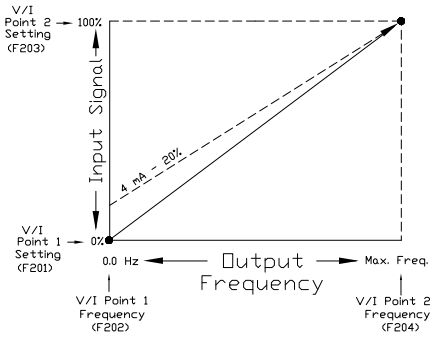
Units — %

This parameter is used to set the gain and bias of the isolated **V/I** input terminal when the **V/I** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This parameter sets the **V/I** input level that is associated with the **V/I Input Point 1 Frequency** (F202) setting when operating in the **Speed** control mode or is associated with the **V/I Input Point 1 Rate** (F205) setting when operating in the **Torque Control** mode.

Note: *See note on pg. 55 for additional information on the **V/I** terminal.*

Frequency Settings



V/I Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **V/I** input terminal:

- Set **SW2** of the **ACE G9-120V-PCB** to **Voltage** or **Current** (see Figure 8 on pg. 24).
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode 1 ⇒ **V/I**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.

Speed Control

Perform the following setup to allow the system to perform **Speed** control from the **V/I** input terminal:

- Set **V/I Input Point 1 Frequency** (F202).
- Set **V/I Input Point 1 Setting** (F201) — the input analog signal level that corresponds to the frequency setting at **V/I Input Point 1 Frequency**.
- Set **V/I Input Point 2 Frequency** (F204).
- Set **V/I Input Point 2 Setting** (F203) — the input analog signal level that corresponds to the frequency setting at **V/I Input Point 2 Frequency**.
- Provide a **Run** command (F and/or R).

Once set, as the **V/I** input voltage or current changes, the output frequency of the ASD will vary in accordance with the above settings.

This parameter value is entered as 0% to 100% of the **V/I** input signal range.

The **V/I** input is commonly used for a 4 – 20 mA current loop signal where 4 mA equals 20% of a 20 mA signal. Set this parameter to 20% for 4 – 20 mA current loop signal applications.

Note: *When using the isolated **V/I** input terminal the **IICC** terminal must be used as the return (negative) connection.*

V/I Input Point 1 Frequency

Program ⇒ Frequency ⇒ Speed Reference Setpoints

This parameter is used to set the gain and bias of the **V/I** input terminal when the **V/I** terminal is used as the control input while operating in the **Speed Control** mode.

This parameter sets **V/I Input Point 1 Frequency** (F202) and is the frequency that is associated with the setting of **V/I Input Point 1 Setting** (F201) when operating in the **Speed Control** mode.

See V/I Input Point 1 Setting (F201) for additional information on this setting.

Direct Access Number — F202

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

V/I Input Point 2 Setting

Program ⇒ Frequency ⇒ Speed Reference Setpoints

This parameter is used to set the gain and bias of the **V/I** input terminal when the **V/I** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This parameter sets the **V/I** input level that is associated with **V/I Input Point 2 Frequency** (F204) when operating in the **Speed** control mode or is associated with the **V/I Input Point 1 Rate** (F205) when operating in the **Torque Control** mode.

This value is entered as 0% to 100% of the **V/I** input signal range.

See **V/I Input Point 1 Setting** (F201) for additional information on this setting when used for **Speed** control.

See **V/I Input Point 1 Rate** (F205) for additional information on this setting when used for **Torque Control**.

Direct Access Number — F203

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

Units — %

V/I Input Point 2 Frequency

Program ⇒ Frequency ⇒ Speed Reference Setpoints

This parameter is used to set the gain and bias of the **V/I** input terminal when the **V/I** terminal is used as the control input while operating in the **Speed Control** mode.

This parameter sets **V/I Input Point 2 Frequency** and is the frequency that is associated with the setting of **V/I Input Point 2 Setting** (F203) when operating in the **Speed Control** mode.

See **V/I Input Point 1 Setting** (F201) for additional information on this setting.

Direct Access Number — F204

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

V/I Input Point 1 Rate

Program ⇒ Torque ⇒ Setpoints

This parameter is used to set the gain and bias of the isolated **V/I** input terminal when the **V/I** terminal is used as the control input while operating in the **Torque Control** mode.

Direct Access Number — F205

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 250.00

Units — %

V/I Input Torque Control Setup

Perform the following setup to allow the system to receive **Torque Control** input at the **V/I** input terminal:

- Set **SW2** of the **ACE G9-120V-PCB** to **Voltage** or **Current** (see Figure 8 on pg. 24).
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode 1 ⇒ **V/I**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.

Torque Control

Perform the following setup to allow the system to perform **Torque Control** from the **V/I** input terminal:

- Set **V/I Input Point 1 Rate** (F205).
- Set **V/I Input Point 1 Setting** (F201) — the input analog signal level that corresponds to the torque setting at **V/I Input Point 1 Rate**.
- Set **V/I Input Point 2 Rate** (F206).
- Set **V/I Input Point 2 Setting** (F203) — the input analog signal level that corresponds to the torque setting at **V/I Input Point 2 Rate**.
- Provide a **Run** command (F and/or R).

Torque Control is accomplished by establishing an associated **V/f** output pattern for a given **V/I** input level.

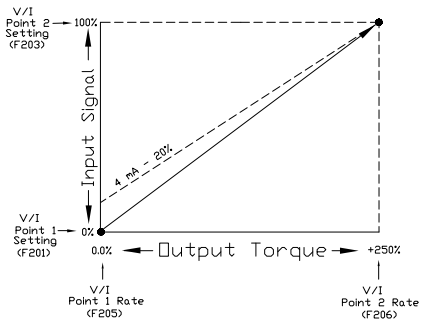
Once set, as the **V/I** input voltage changes or the **V/I** current changes, the output torque of the ASD will vary in accordance with the above settings.

This parameter sets **V/I Input Point 1 Rate** and is the output torque value that is associated with the setting of **V/I Input Point 1 Setting** when operating in the **Torque Control** mode.

This value is entered as 0% to 250% of the rated torque.

Note: *When using the isolated **V/I** input terminal the **IICC** terminal must be used as the return (negative) connection.*

Torque Settings



V/I Input Point 2 Rate

Direct Access Number — F206

Program ⇒ Torque ⇒ Setpoints

Parameter Type — **Numerical**

Factory Default — **100.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 250.00

Units — %

This parameter is used to set the gain and bias of the **V/I** input terminal when the **V/I** terminal is used as the control input while operating in the **Torque Control** mode.

Torque Control is accomplished by establishing an associated **V/f** output pattern for a given **V/I** input level.

This parameter sets **V/I Input Point 2 Rate** and is the output torque value that is associated with the setting of **V/I Input Point 2 Setting** (F203) when operating in the **Torque Control** mode.

This value is entered as 0% to 250% of the rated torque.

See **V/I Input Point 1 Rate** (F205) for additional information on this setting.

Frequency Mode 2

Direct Access Number — F207

Program ⇒ Fundamental ⇒ Standard Mode Selection

Parameter Type — **Selection List**

Factory Default — **V/I**

Changeable During Run — **Yes**

This parameter is used to set the source of the frequency command signal to be used as **Frequency Mode 2** in the event that **Frequency Mode 1** is disabled or if **Frequency Mode 2** is set up as the primary control parameter.

See F004 and F200 for additional information on this setting.

Settings:

V/I
RR
RX
EOI Keypad
RS485
Communication Option Board
RX2 Option (AI1)
Option V/I
UP/DOWN Frequency (ACE G9-120V-PCB)
Pulse Input (Option)
Pulse Input (Motor CPU)
Binary/BCD Input (Option)

Frequency Mode Priority Switching Frequency

Direct Access Number — F208

Program ⇒ Fundamental ⇒ Standard Mode Selection

Parameter Type — **Numerical**

Factory Default — **0.10**

Changeable During Run — **Yes**

Minimum — 0.10

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter establishes a threshold frequency that will be used as a reference when determining when to switch the output frequency control source from the **Frequency Mode 1** setting to the **Frequency Mode 2** setting.

See F200 for additional information on this setting.

Analog Input Filter

Program ⇒ Frequency ⇒ Analog Filter

Direct Access Number — F209

Parameter Type — **Selection List**

Factory Default — **None**

Changeable During Run — **Yes**

Analog filtering is applied after the analog reference signal is converted to a digital signal. The type of filtering used is **Rolling Average** over time.

Settings:

None (1 mS)
Small (8 mS)
Medium (16 mS)
Large (32 mS)
Huge (64 mS)

The analog input signal is sampled and converted to a digital signal. With no filtering applied, the resulting digital value is scaled for use by the microprocessor of the ASD.

If the filtering selection **Small** is selected, the ASD averages the last **8 mS** of sampled signal and converted (digital) values. The rolling average is updated (every 4 µS) and scaled for use by the microprocessor.

This holds true for the **Medium**, **Large**, and **Huge** selections providing a larger sample to produce the average for use by the microprocessor.

False responses to electrical noise are eliminated with no loss in bandwidth because the value used by the ASD is the average value of several samples.

RR Input Point 1 Setting

Direct Access Number — F210

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — 0

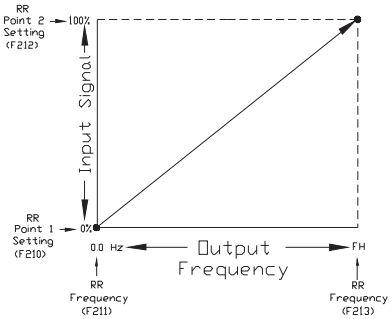
Maximum — 100

Units — %

This parameter is used to set the gain and bias of the **RR** input terminal when the **RR** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This parameter sets the **RR** input level that is associated with the **RR Input Point 1 Frequency** setting when operating in the **Speed** control mode or is associated with the **RR Input Point 1 Rate** (F214) setting when operating in the **Torque Control** mode.

Frequency Settings



Speed Control

Perform the following setup to allow the system to perform **Speed** control from the **RR** input terminal:

- Set **RR Input Point 1 Frequency** (F211**)**.
- Set **RR Input Point 1 Setting** (F210) — the input analog signal level that corresponds to the frequency setting at **RR Input Point 1 Frequency**.
- Set **RR Input Point 2 Frequency** (F213).
- Set **RR Input Point 2 Setting** (F212) — the input analog signal level that corresponds to the frequency setting at **RR Input Point 2 Frequency**.

RR Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **RR** input terminal:

- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode 1 ⇒ **RR**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.
- Provide a **Run** command (F and/or R).

Once set, as the **RR** input voltage changes, the output frequency of the ASD will vary in accordance with the above settings.

This parameter value is entered as 0% to 100% of the **RR** input signal range.

RR Input Point 1 Frequency

Direct Access Number — F211

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the gain and bias of the **RR** input terminal when the **RR** terminal is used as the control input while operating in the **Speed Control** mode.

This parameter sets **RR Input Point 1 Frequency** and is the frequency that is associated with the setting of **RR Input Point 1 Setting** (F210) when operating in the **Speed Control** mode.

See **RR Input Point 1 Setting** (F210) for additional information on this setting.

RR Input Point 2 Setting

Direct Access Number — F212

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

Units — %

This parameter is used to set the gain and bias of the **RR** input terminal when the **RR** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This parameter sets the **RR** input level that is associated with **RR Input Point 2 Frequency** (F213) when operating in the **Speed** control mode or is associated with the **RR Input Point 1 Rate** (F214) when operating in the **Torque Control** mode.

This value is entered as 0% to 100% of the **RR** input signal range.

See **RR Input Point 1 Setting** (F210) for additional information on this setting when used for **Speed** control.

See **RR Input Point 1 Rate** (F214) for additional information on this setting when used for **Torque Control**.

RR Input Point 2 Frequency

Direct Access Number — F213

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the gain and bias of the **RR** input terminal when the **RR** terminal is used as the control input while operating in the **Speed Control** mode.

This parameter sets **RR Input Point 2 Frequency** and is the frequency that is associated with the setting of **RR Input Point 2 Setting** (F212) when operating in the **Speed Control** mode.

See **RR Input Point 1 Setting** (F210) for additional information on this setting.

RR Input Point 1 Rate

Direct Access Number — F214

Program ⇒ Torque ⇒ Setpoints

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 250.00

Units — %

This parameter is used to set the gain and bias of the **RR** input terminal when the **RR** terminal is used as the control input while operating in the **Torque Control** mode.

RR Input Torque Control Setup

Perform the following setup to allow the system to receive **Torque Control** input at the **RR** input terminal:

- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode ⇒ **RR**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.

Torque Control

Perform the following setup to allow the system to perform **Torque Control** from the **RR** input terminal:

- Set **RR Input Point 1 Rate** (F214).
- Set **RR Input Point 1 Setting** (F210) — the input analog signal level that corresponds to the torque setting at **RR Input Point 1 Rate**.
- Set **RR Input Point 2 Rate** (F215).
- Set **RR Input Point 2 Setting** (F212) — the input analog signal level that corresponds to the frequency setting at **RR Input Point 2 Rate**.
- Provide a **Run** command (F and/or R).

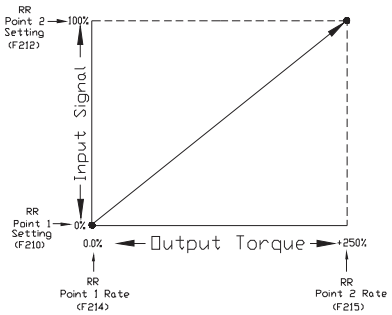
Torque Control is accomplished by establishing an associated **V/f** output pattern for a given **RR** input level.

Once set, as the **RR** input voltage changes, the output torque of the ASD will vary in accordance with the above settings.

This parameter sets **RR Input Point 1 Rate** and is the output torque value that is associated with the setting of **RR Input Point 1 Setting** when operating in the **Torque Control** mode.

This value is entered as 0% to 250% of the rated torque.

Torque Settings



RR Input Point 2 Rate

Direct Access Number — F215

Program ⇒ Torque ⇒ Setpoints

Parameter Type — **Numerical**

Factory Default — **100.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 250.00

Units — %

This parameter is used to set the gain and bias of the **RR** input terminal when the **RR** terminal is used as the control input while operating in the **Torque Control** mode.

Torque Control is accomplished by establishing an associated **V/f** output pattern for a given **RR** input level.

This parameter sets **RR Input Point 2 Rate** and is the output torque value that is associated with the setting of **RR Input Point 2 Setting** (F212) when operating in the **Torque Control** mode.

This value is entered as 0% to 250% of the rated torque.

See **RR Input Point 1 Rate** (F214) for additional information on this setting.

RX Input Point 1 Setting

Direct Access Number — F216

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — -100

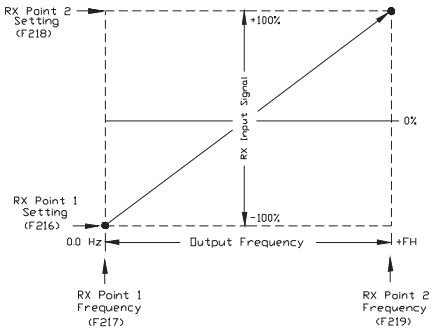
Maximum — +100

Units — %

This parameter is used to set the gain and bias of the **RX** input terminal when the **RX** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This parameter sets the **RX** input level that is associated with **RX Input Point 1 Frequency** when operating in the **Speed Control** mode or is associated with the **RX Input Point 1 Rate** (F220) when operating in the **Torque Control** mode.

Frequency Settings



RX Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **RX** input terminal:

- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode 1 ⇒ **RX**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.

Speed Control

Perform the following setup to allow the system to perform **Speed** control from the **RX** input terminal:

- Set **RX Input Point 1 Frequency** (F217).
- Set **RX Input Point 1 Setting** (F216) — the input analog signal level that corresponds to the speed setting at **RX Input Point 1 Frequency**.
- Set **RX Input Point 2 Frequency** (F219).
- Set **RX Input Point 2 Setting** (F218) — the input analog signal level that corresponds to the speed setting at **RX Input Point 2 Frequency**.
- Provide a **Run** command (F and/or R).

Once set, as the **RX** input voltage changes, the ASD output speed and/or torque will vary in accordance with the above settings.

This parameter value is entered as -100% to +100% of the **RX** input signal range.

See parameter F474 and F475 for information on fine-tuning this terminal response.

RX Input Point 1 Frequency

Direct Access Number — F217

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the gain and bias of the **RX** input terminal when the **RX** terminal is used as the control input while operating in the **Speed Control** mode.

This parameter sets **RX Input Point 1 Frequency** and is the frequency that is associated with the setting of **RX Input Point 1 Setting** (F216) when operating in the **Speed Control** mode.

See **RX Input Point 1 Setting** (F216) for additional information on this setting.

RX Input Point 2 Setting

Direct Access Number — F218

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **+100**

Changeable During Run — **Yes**

Minimum — -100.0

Maximum — +100.0

Units — %

This parameter is used to set the gain and bias of the **RX** input terminal when the **RX** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This parameter sets the **RX** input level that is associated with **RX Input Point 2 Frequency** (F219) when operating in the **Speed** control mode or is associated with the **RX Input Point 2 Rate** (F221) when operating in the **Torque Control** mode.

This value is entered as -100% to +100% of the **RX** input signal range.

See **RX Input Point 1 Setting** (F216) for additional information on this setting when used for **Speed** control.

See **RX Input Point 1 Rate** (F220) for additional information on this setting when used for **Torque Control**.

RX Input Point 2 Frequency

Direct Access Number — F219

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00.

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the gain and bias of the **RX** input terminal when the **RX** terminal is used as the control input while operating in the **Speed Control** mode.

This parameter sets **RX Input Point 2 Frequency** and is the frequency that is associated with the setting of **RX Input Point 2 Setting** (F218) when operating in the **Speed Control** mode.

See **RX Input Point 1 Setting** (F216) for additional information on this setting.

RX Input Point 1 Rate

Direct Access Number — F220

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — -250.00

Maximum — +250.00

Units — %

Program ⇒ Torque ⇒ Setpoints

This parameter is used to set the gain and bias of the **RX** input terminal when the **RX** terminal is used as the control input while operating in the **Torque Control** mode.

RX Input Torque Control Setup

Perform the following setup to allow the system to receive **Torque Control** input at the **RX** input terminal:

- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode ⇒ **RX**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.

Torque Control

Perform the following setup to allow the system to perform **Torque Control** from the **RX** input terminal:

- Set **RX Input Point 1 Rate** (F220).
- Set **RX Input Point 1 Setting** (F216) — the input analog signal level that corresponds to the torque setting at **RX Input Point 1 Rate**.
- Set **RX Input Point 2 Rate** (F221).
- Set **RX Input Point 2 Setting** (F218) — the input analog signal level that corresponds to the speed setting at **RX Input Point 2 Rate** (F221).
- Provide a **Run** command (F and/or R).

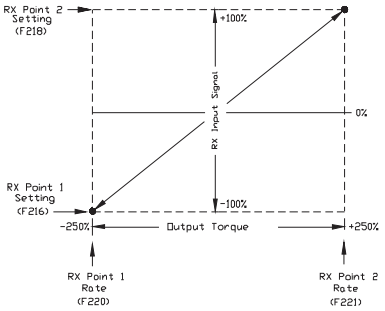
Torque Control is accomplished by establishing an associated **V/f** output pattern for a given **RX** input level.

Once set, as the **RX** input voltage changes, the ASD output speed and/or torque will vary in accordance with the above settings.

This parameter sets **RX Input Point 1 Rate** and is the output torque value that is associated with the setting of **RX Input Point 1 Setting** when operating in the **Torque Control** mode.

This value is entered as -250% to +250% of the rated torque.

Torque Settings



RX Input Point 2 Rate

Direct Access Number — F221

Parameter Type — **Numerical**

Factory Default — **100.00**

Changeable During Run — **Yes**

Minimum — -250.00

Maximum — +250.00

Units — %

Program ⇒ Torque ⇒ Setpoints

This parameter is used to set the gain and bias of the **RX** input terminal when the **RX** terminal is used as the control input while operating in the **Torque Control** mode.

Torque Control is accomplished by establishing an associated **V/f** output pattern for a given **RX** input level.

This parameter sets **RX Input Point 2 Rate** and is the output torque value that is associated with the setting of **RX Input Point 2 Setting** (F218) when operating in the **Torque Control** mode.

This value is entered as -250% to +250% of the rated torque.

See **RX Input Point 1 Rate** (F220) for additional information on this setting.

RX2 Option (AI1) Input Point 1 Setting

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Direct Access Number — F222

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — -100

Maximum — +100

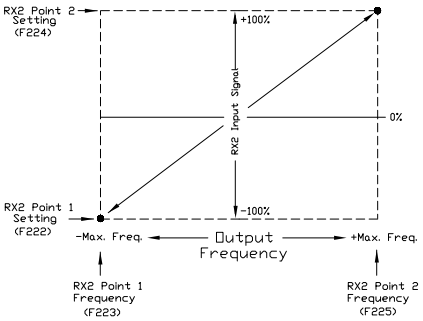
Units — %

This parameter is used to set the gain and bias of the **RX2** (AI1) input terminal when the **RX2** (AI1) terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

This parameter sets the **RX2** (AI1) input level that is associated with **RX2** (AI1) **Input Point 1 Frequency** when operating in the **Speed Control** mode or is associated with the **RX2** (AI1) **Input Point 1 Rate** when operating in the **Torque Control** mode.

Frequency Settings



RX2 (AI1) Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **RX2** (AI1) input terminal:

- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode 1 ⇒ **RX2**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.

Speed Control

Perform the following setup to allow the system to perform **Speed** control from the **RX2** (AI1) input terminal:

- Set **RX2** (AI1) **Input Point 1 Frequency** (F223**)**.
- Set **RX2** (AI1) **Input Point 1 Setting** (F222) — the input analog signal level that corresponds to the speed setting at **RX2** (AI1) **Input Point 1 Frequency**.
- Set **RX2** (AI1) **Input Point 2 Frequency** (F225).
- Set **RX2** (AI1) **Input Point 2 Setting** (F224) — the input analog signal level that corresponds to the speed setting at **RX2 Input Point 2 Frequency**.
- Provide a **Run** command (F and/or R).

Once set, as the **RX2** (AI1) input voltage changes, the ASD output speed and/or torque will vary in accordance with the above settings.

This parameter value is entered as -100% to +100% of the **RX2** (AI1) input signal range.

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

See parameter **F476** and **F477** for information on fine-tuning the responsiveness of this terminal.

RX2 Option (AI1) Input Point 1 Frequency

Direct Access Number — F223

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the gain and bias of the **RX2** (AI1) input terminal when the **RX2** (AI1) terminal is used as the control input while operating in the **Speed Control** mode.

This parameter sets **RX2** (AI1) **Input Point 1 Frequency** and is the frequency that is associated with the setting of **RX2** (AI1) **Input Point 1 Setting** (F222) when operating in the **Speed Control** mode.

See **RX2** (AI1) **Input Point 1 Setting** (F222) for additional information on this setting.

RX2 Option (AI1) Input Point 2 Setting

Direct Access Number — F224

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **+100**

Changeable During Run — **Yes**

Minimum — -100

Maximum — +100

Units — %

This parameter is used to set the gain and bias of the **RX2** (AI1) input terminal when the **RX2** (AI1) terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This parameter sets the **RX2** (AI1) input level that is associated with **RX2** (AI1) **Input Point 2 Frequency** when operating in the **Speed** control mode or is associated with the **RX2** (AI1) **Input Point 2 Rate** (F227) when operating in the **Torque Control** mode.

This value is entered as -100% to +100% of the **RX2** (AI1) input signal range.

See **RX2** (AI1) **Input Point 1 Setting** (F222) for additional information on this setting when used for **Speed** control.

See **RX2** (AI1) **Input Point 1 Rate** (F226) for additional information on this setting when used for **Torque Control**.

RX2 Option (AI1) Input Point 2 Frequency

Direct Access Number — F225

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the gain and bias of the **RX2** (AI1) input terminal when the **RX2** (AI1) terminal is used as the control input while operating in the **Speed Control** mode.

This parameter sets **RX2** (AI1) **Input Point 2 Frequency** and is the frequency that is associated with the setting of **RX2** (AI1) **Input Point 2 Setting** (F224) when operating in the **Speed Control** mode.

See **RX2** (AI1) **Input Point 1 Setting** (F222) for additional information on this setting.

RX2 Option (AI1) Input Point 1 Rate

Program ⇒ Torque ⇒ Setpoints

This parameter is used to set the gain and bias of the **RX2** (AI1) input terminal when the **RX2** (AI1) terminal is used as the control input while operating in the **Torque Control** mode.

Note: *The **Expansion IO Card Option 1** option board (P/N ETB003Z) is required to use this terminal.*

Direct Access Number — F226

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — -250.00

Maximum — +250.00

Units — %

RX2 (AI1) Input Torque Control Setup

Perform the following setup to allow the system to receive **Torque Control** input at the **RX2** (AI1) input terminal:

- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode ⇒ **RX2**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.
- Provide a **Run** command (F and/or R).

Torque Control

Perform the following setup to allow the system to perform **Torque Control** from the **RX2** (AI1) input terminal:

- Set **RX2** (AI1) **Input Point 1 Rate** (F226**)**.
- Set **RX2** (AI1) **Input Point 1 Setting** (F222) — the input analog signal level that corresponds to the speed setting at **RX2** (AI1) **Input Point 1 Rate**.
- Set **RX2** (AI1) **Input Point 2 Rate** (F227).
- Set **RX2** (AI1) **Input Point 2 Setting** (F224) — the input analog signal level that corresponds to the speed setting at **RX Input Point 2 Rate** (F221).
- Provide a **Run** command (F and/or R).

Torque Control is accomplished by establishing an associated **V/f** output pattern for a given **RX2** (AI1) input level.

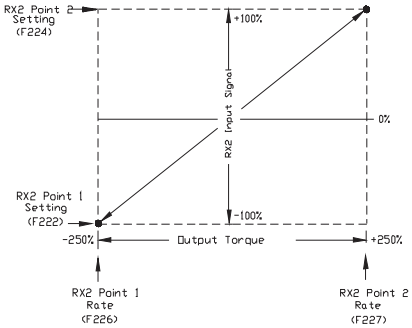
Once set, as the **RX2** (AI1) input voltage changes, the ASD output speed and/or torque will vary in accordance with the above settings.

This parameter sets **RX2** (AI1) **Input Point 1 Rate** and is the output torque value that is associated with the setting of **RX2** (AI1) **Input Point 1 Setting** when operating in the **Torque Control** mode.

This value is entered as -250% to +250% of the rated torque.

See the ***Expansion IO Card Option 1 Instruction Manual*** (P/N 58685) for additional information on the function of this terminal.

Torque Settings



RX2 Option (AI1) Input Point 2 Rate

Program ⇒ Torque ⇒ Setpoints

This parameter is used to set the gain and bias of the **RX2** (AI1) input terminal when the **RX2** (AI1) terminal is used as the control input while operating in the **Torque Control** mode.

Torque Control is accomplished by establishing an associated **V/f** output pattern for a given **RX2** (AI1) input level.

This parameter sets **RX2** (AI1) **Input Point 2 Rate** and is the output torque value that is associated with the setting of **RX2** (AI1) **Input Point 2 Setting** (F224) when operating in the **Torque Control** mode.

This value is entered as -250% to +250% of the rated torque.

See **RX2** (AI1) **Input Point 1 Rate** (F226) for additional information on this setting.

Direct Access Number — F227

Parameter Type — **Numerical**

Factory Default — **100.00**

Changeable During Run — **Yes**

Minimum — -250.00

Maximum — +250.00

Units — %

BIN Input Point 1 Setting

Program ⇒ Frequency ⇒ Speed Reference Setpoints

This parameter is used to set the gain and bias of the **BIN** input terminals when the **BIN** terminals are used as the control input while operating in the **Speed Control** mode.

The discrete input terminals of the **ACE G9-120V-PCB** are used as the **BIN** terminals.

Direct Access Number — F228

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

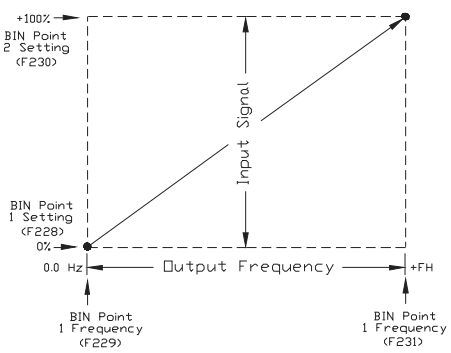
Units — %

BIN Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **BIN** input terminals:

- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode 1 ⇒ **Binary/BCD**.
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Command Mode Selection ⇒ **Terminal Board**.
- Program ⇒ Terminal ⇒ **Input Terminals**; select and set the desired discrete input terminals to **Binary Bit**(s) **0 – 7** (or 0 – MSB). The binary input byte will control the speed of the motor.
- Program ⇒ Terminal ⇒ **Input Terminals**; select and set a discrete input terminal to **Binary Data Write**. Activation of the **Binary Data Write** terminal will transfer the status of the **Binary Bit**(s) **0 – 7** (or 0 – MSB) to the control board for speed control.

Frequency Settings



Speed Control

Perform the following setup to allow the system to perform **Speed** control from the **BIN** input terminals:

- Set **BIN Input Point 1 Frequency** (F229).
- Set the **BIN** input value (% of 255_D) (F228) that represents **BIN Input Point 1 Frequency**.
- Set **BIN Input Point 2 Frequency** (F231).
- Set the **BIN** input value (% of 255_D) (F230) that represents **BIN Input Point 2 Frequency**.
- Provide a **Run** command (F and/or R).

Note: *255_D is the decimal equivalent of the 8-bit BIN byte with all input terminals set to 1 (255 decimal = 11111111 binary).*

Once set, as the **BIN** input signal changes are transferred to the control board, the output frequency of the ASD will vary in accordance with the above settings.

This parameter sets **BIN Input Point 1 Setting** (F228) and is entered as 0% to 100% of the of the range represented by the **BIN** binary input byte 11111111 (255_D) or the binary bit(s) 0 – MSB.

BIN Input Point 1 Frequency

Direct Access Number — F229

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the speed of the **BIN** input terminals when the **BIN** terminals are used as the control input.

This parameter sets **BIN Input Point 1 Frequency** and is the frequency that is associated with the setting of **BIN Input Point 1 Setting** (F228).

See **BIN Input Point 1 Setting** (F228) for additional information on this setting.

BIN Input Point 2 Setting

Direct Access Number — F230

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

Units — %

This parameter is used to set the speed of the **BIN** input terminals when the **BIN** terminals are used as the control input.

This parameter sets the **BIN** input signal that is associated with **BIN Input Point 2 Frequency** (F231).

This value is entered as 0% to +100% of the **BIN** input signal range.

See **BIN Input Point 1 Setting** (F228) for additional information on this setting.

BIN Input Point 2 Frequency

Direct Access Number — F231

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Maximum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the speed of the **BIN** input terminals when the **BIN** terminal are used as the control input.

This parameter sets **BIN Input Point 2 Frequency** and is the frequency that is associated with the setting of **BIN Input Point 2 Setting** (F230).

See **BIN Input Point 1 Setting** (F228) for additional information on this setting.

PG Input Point 1 Setting

Direct Access Number — F234

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100.0

Units — %

This parameter is used to set the gain and bias of the **PG** input terminal of the option board when a shaft-mounted encoder is used as the control input while operating in the **Speed Control** mode.

Note: *See Instruction Manual P/N 58687 for additional information on the **PG Option Board**.*

PG Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **PG** input terminal:

- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ Frequency Mode 1 ⇒ **Pulse Input** (option).
- Program ⇒ Fundamental ⇒ Standard Mode Selection ⇒ **Command Mode Selection** ⇒ (Any Setting).
- Provide a **Run** command (F and/or R).

Speed Control

Perform the following setup to allow the system to perform **Speed** control from the **PG** input terminals:

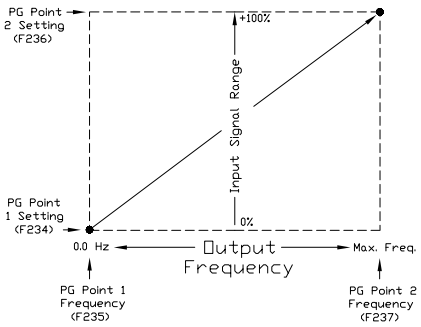
- Set **PG Point 1 Frequency** (F235**)**.
- Set the **PG** input value (F234) that represents **PG Point 1 Frequency**.
- Set **PG Point 2 Frequency** (F237).
- Set the **PG** input value (F236) that represents **PG Point 2 Frequency**.

Once set, as the **PG** input pulse count rate changes, the output frequency of the ASD will vary in accordance with the above settings.

This parameter sets the **PG** input pulse count that represents **PG Point 1 Frequency**. The range of values for this parameter is 0% to 100% of the **PG** input pulse count range.

Note: *Additional application-specific **PG** settings may be performed from the following path: Program ⇒ Feedback ⇒ **PG Settings**.*

Frequency Settings



PG Input Point 1 Frequency

Direct Access Number — F235

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the speed of the **PG** input terminals when the **PG** terminal is used as the control input.

This parameter sets **PG Point 1 Frequency** and is the frequency that is associated with the setting of **PG Point 1 Setting** (F234).

See **PG Point 1 Setting** (F234) for additional information on this setting.

PG Input Point 2 Setting

Program ⇒ Frequency ⇒ Speed Reference Setpoints

This parameter is used to set the direction and speed of the **PG** input terminals when the **PG** terminals are used as the control input.

This parameter sets the **PG** input signal that is associated with **PG Point 2 Frequency** (F237).

This value is entered as 0% to 100% of the **PG** input signal range.

See **PG Point 1 Setting** (F234) for additional information on this setting.

Direct Access Number — F236

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

Units — %

PG Input Point 2 Frequency

Program ⇒ Frequency ⇒ Speed Reference Setpoints

This parameter is used to set the direction and speed of the **PG** input terminals when the **PG** terminal are used as the control input.

This parameter sets **PG Point 2 Frequency** (F237) and is the frequency that is associated with the setting of **PG Point 2 Setting**.

See **PG Point 1 Setting** (F234) for additional information on this setting.

Direct Access Number — F237

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

Start Frequency

Program ⇒ Special ⇒ Frequency Control

The output of the ASD will remain at 0.0 Hz until the programmed speed value exceeds this setting during startup. Once exceeded during startup, the output frequency of the ASD will accelerate to the programmed setting.

Output frequencies below the **Start Frequency** will not be output from the ASD during startup. However, once reaching the **Start Frequency**, speed values below the **Start Frequency** may be output from the ASD.

If the setting of this parameter results in an over-current condition at startup, reduce the setting of this parameter to a value less than the rated slippage of the motor.

If zero-speed torque is required, set this parameter and F243 to 0.0 Hz.

This setting will override the setting of F244 if this setting has a higher value.

This parameter setting is used during a **Jog** as the **Lower-Limit** frequency (see F260).

Direct Access Number — F240

Parameter Type — **Numerical**

Factory Default — **0.10**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

Run Frequency

Program ⇒ Special ⇒ Frequency Control

This parameter establishes a center frequency (Run Frequency) of a frequency band.

Parameter F242 provides a plus-or-minus value for the **Run Frequency**; thus, establishing a frequency band.

During acceleration, the ASD will not output a signal to the motor until the lower level of the band is reached.

During deceleration, the ASD will continue to output the programmed deceleration signal to the motor until the lower level of the band is reached; at which time the output will go to 0.0 Hz.

Direct Access Number — F241

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

Run Frequency Hysteresis

Program ⇒ Special ⇒ Frequency Control

This parameter provides a plus-or-minus value for the **Run Frequency** (F241) setting.

Direct Access Number — F242
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 30.0
Units — Hz

End Frequency

Program ⇒ Special ⇒ Frequency Control

This parameter sets the lowest frequency that the ASD will recognize during deceleration before the ASD goes to 0.00 Hz.

Direct Access Number — F243
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 30.0
Units — Hz

0 Hz Dead Band Signal

Program ⇒ Special ⇒ Special Parameters

This parameter sets an output frequency threshold that, until the commanded frequency surpasses this setting, the ASD will output 0.00 Hz to the motor.

This setting will override the **Start Frequency** (F240) setting if this setting has a higher value.

Direct Access Number — F244
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 5.00
Units — Hz

DC (Injection) Braking Start Frequency

Program ⇒ Protection ⇒ DC Braking

During deceleration this is the frequency at which **DC Injection Braking** will start.

DC Injection Braking

DC Injection Braking is a braking system used with 3-phase motors. Unlike conventional brakes, there is no physical contact between the rotating shaft and a stationary brake pad or drum. When braking is required, the ASD outputs a DC current that is applied to the windings of the motor to quickly brake the motor. The braking current stops when the time entered in F252 times out.

The intensity of the DC current used while braking determines how fast the motor will come to a stop and may be set at F251. The intensity setting is entered as a percentage of the full-load current of the ASD.

DC Injection Braking is also used to preheat the motor or to keep the rotor from spinning freely when the motor is off by providing a pulsating DC current into the motor at the **Carrier Frequency**. This feature may be enabled at F254.

Direct Access Number — F250
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 120.00
Units — Hz

DC (Injection) Braking Current

Program ⇒ Protection ⇒ DC Braking

This parameter sets the percentage of the rated current of the ASD that will be used for **DC Injection Braking**. A larger load will require a higher setting.

Direct Access Number — F251
Parameter Type — **Numerical**
Factory Default — **50**
Changeable During Run — **Yes**
Minimum — 0
Maximum — 100
Units — %

DC (Injection) Braking Time

Program ⇒ Protection ⇒ DC Braking

This parameter setting is used to set the on-time duration of the **DC Injection Braking**.

Direct Access Number — F252
Parameter Type — **Numerical**
Factory Default — **1.0**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 20.0
Units — Seconds

Forward/Reverse DC (Injection) Braking Priority

Program ⇒ Protection ⇒ DC Braking

This parameter setting determines if **DC Injection Braking** is to be used during a change in the direction of the motor.

Settings:

Disabled
Enabled

Direct Access Number — F253
Parameter Type — **Selection List**
Factory Default — **Disabled**
Changeable During Run — **Yes**

Motor Shaft Fixing Control

Program ⇒ Protection ⇒ DC Braking

This parameter **Enables/Disables** a continuous DC injection at half of the amperage setting of F251 into a stopped motor. This feature is useful in preheating the motor or to keep the rotor from spinning freely.

Motor Shaft Stationary Control starts after the DC injection brake stops the motor and continues until the **ST** activation ceases (if so configured; see F110), power is turned off, an **Emergency Off** command is received, or this parameter is changed.

Enabling this feature will also require a non-zero entry at F250.

Settings:

Disabled
Enabled

Direct Access Number — F254
Parameter Type — **Selection List**
Factory Default — **Disabled**
Changeable During Run — **Yes**

0 Hz Command Output

Program ⇒ Special ⇒ Special Parameters

This parameter is used to set the go-to-zero method to be used by the ASD in the event that the ASD is commanded to go to 0 Hz.

Settings:

Standard (DC Injection Braking)
0 Hz Command

Direct Access Number — F255
Parameter Type — **Selection List**
Factory Default — **Standard (DC Injection Braking)**
Changeable During Run — **No**

Time Limit For Lower-Limit Frequency Operation

Program ⇒ Fundamental ⇒ Frequency

This parameter sets the time that the ASD is allowed to operate below the **Lower-Limit** setting before an alarm and subsequent fault is incurred.

Direct Access Number — F256
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 600.0
Units — Seconds

Jog Run Frequency

Program ⇒ Frequency ⇒ Jog

Direct Access Number — F260

Parameter Type — **Numerical**

Factory Default — **5.00**

Changeable During Run — **Yes**

Minimum — **F240** Setting

Maximum — 20.00

Units — Hz

This parameter sets the output frequency of the ASD during a **Jog**. **Jog** is the term used to describe turning the motor on for small increments of time and is used when precise positioning of motor-driven equipment is required.

The **Jog** function may be initiated from the **EOI**, remotely via the **ACE G9-120V-PCB**, or using **Communications** (for additional information on using Communications for Jogging, see the Communications manual P/N 53840).

The **Jog** function can be activated from zero Hz or from any frequency below the **Jog Run** frequency (Jog can only increase the speed). A **Jog** command will not be recognized when the running frequency is above the **Jog Run** frequency setting. The **Jog** command has priority over other **Run** commands and is not limited by the **Upper Limit** setting of parameter F012.

Jog commands received while running for the opposite direction will follow the programmed stopping method of F261 until reaching zero Hz and will then ramp to the programmed **Jog Frequency** and direction.

Jog Setup and Execution

To initiate a **Jog Run** from the **EOI** perform the following:

1. Enable the **Jog** function at F262.
2. Set the **Command Mode Selection** (F003) to **EOI Keypad**.
3. Assign the **Jog Run** setting to a discrete input terminal (see Table 7 on pg. 236).

   Note: *Any unused discrete input terminal may be used for the **Jog Run** setting.*

4. Set up a **Jog Run Frequency** at F260.
5. Set up a **Jog Stop Pattern** at F261.
6. Set the **Input Terminal Priority** (F106) function to **Disable** to receive **Jog** commands from the **EOI**.
7. Set the **Local/Remote** key to **Local**.
8. Activate the **Jog Run** terminal (from step 3) and provide a **Run** command (F or R).
9. Press the **Run** key and the ASD will output the frequency setting of F260 for the duration of the activation.

To initiate a **Jog Run** from the **ACE G9-120V-PCB** perform the following:

1. Using the setup above, set the **Input Terminal Priority** (F106) function (from step 6) to **Enable** to receive **Jog** commands from the **ACE G9-120V-PCB** using the **Jog Run** terminal without regard to the **Local/Remote** setting.
2. Use the **Jog Run** terminal of step 3 above to activate the **Jog** function.

Jog Stop Pattern

Direct Access Number — F261

Program ⇒ Frequency ⇒ Jog

Parameter Type — **Selection List**

Factory Default — **Deceleration Stop**

Changeable During Run — **Yes**

This parameter sets the stopping method used while operating in the **Jog** mode.

Note: *This parameter setting is used for the **Jog** operation only. The **Emergency Off** stopping method setting of parameter **F603** has priority over this setting and changes made here do not affect the function or setting of parameter **F603**.*

Settings:

Deceleration Stop
Coast Stop
DC Injection Braking Stop

Panel Operation Jog Mode

Direct Access Number — F262

Program ⇒ Frequency ⇒ Jog

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

This parameter enables the **Jog** command to be received from the **EOI**. When disabled the **Jog** command received from the **EOI** is ignored.

Jog commands may also be received from the **ACE G9-120V-PCB**. Priority as to which is allowed to override the other is selected at F106.

The priority selection at F106 enables the selected source for **Jog** control and disables the other. The F106 setting overrides this parameter setting.

Settings:

Disabled
Enabled

UP/DOWN Frequency (UP) Response Time

Program ⇒ Frequency ⇒ UP/DOWN Frequency Functions

This parameter functions in conjunction with the parameter settings of F265, F266, F267, F268, and F269. The purpose of these settings is to setup the ASD to allow an externally-supplied discrete input signal to control the output frequency of the ASD.

This method uses the discrete input terminal settings **UP/DOWN Frequency (UP)** and **UP/DOWN Frequency (DOWN)** to change the ASD speed. Activation of either terminal increases or decreases the output frequency at the **Accel 1** or **Decel 1** rates, respectively.

Depending on the **Delay** setting, the **UP/DOWN Frequency (UP/DOWN)** terminal may perform **1)** the increase/decrease function for the duration of activation or **2)** the **UP/DOWN Frequency (UP/DOWN)** terminal may act as a momentary contact that loads a new commanded frequency upon activation.

In either case, to activate-and-hold will continue the up or down function until reaching the **Upper-Limit Frequency** or the **Lower-Limit Frequency**, respectively. At which point further activation will be ignored.

See Figure 30 on pg. 133 for additional information on the **UP/DOWN Frequency** function.

Setup Requirements

F003 — Selects the **Command** control source; set to **Terminal Board**.

F004 — Selects the **Frequency Control Mode 1** control source; set to **UP/DOWN Frequency**.

F207 — Selects the **Frequency Control Mode 2** control source; set to **UP/DOWN Frequency** if used.

Set one unused discrete input terminal to **UP/DOWN Frequency (UP)** and one unused discrete input terminal to **UP/DOWN Frequency (DOWN)**.

F264 — Sets the system-response delay to the initial activation of the discrete input terminal **UP/DOWN Frequency (UP)**. Also sets the response delay of subsequent terminal activations of the **UP/DOWN Frequency (UP)** terminal during an activate-and-hold.

F265 —Sets the frequency increase amount for each activation of the **UP/DOWN Frequency (UP)** terminal activation. The rate of the frequency increase is set at **Acceleration Time 1 — UP/DOWN Frequency Accel Time** (F009).

F266 — Sets the system-response delay to the initial activation of the discrete input terminal **UP/DOWN Frequency (DOWN)**. Also sets the activation delay of subsequent terminal activations of the **UP/DOWN Frequency (DOWN)** terminal during an activate-and-hold.

F267 —Sets the frequency decrease amount for each activation of the **UP/DOWN Frequency (DOWN)** terminal activation. The rate of the frequency decrease is set at **Deceleration Time 1 — UP/DOWN Frequency Decel Time** (F010).

F268 — At power up or after a reset, this parameter setting is used to provide a starting frequency for the **UP/DOWN Frequency** function.

F269 — At power down while running, and when enabled, this parameter writes the running frequency into the F268 location and, upon a system restart, uses this setting as the startup frequency.

Provide a **Run** command (F or R). The motor will run at the F268 setting.

Direct Access Number — F264

Parameter Type — **Numerical**

Factory Default — **0.1**

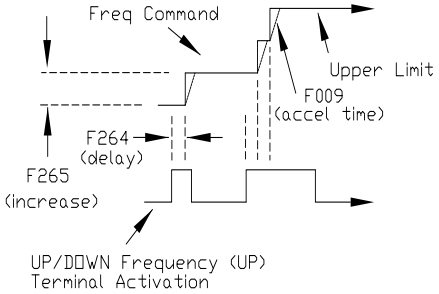
Changeable During Run — **Yes**

Minimum — 0.0

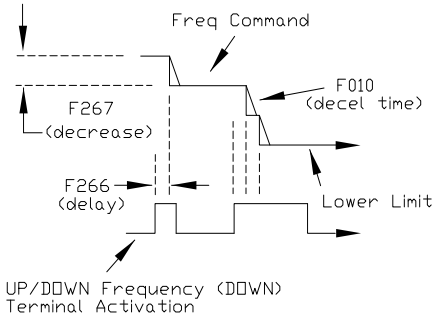
Maximum — 10.0

Units — Seconds

UP/DOWN Frequency (UP) Mode



UP/DOWN Frequency (DOWN) Mode



UP/DOWN Frequency (UP) Frequency Step

Program ⇒ Frequency ⇒ UP/DOWN Frequency Functions

This parameter sets the frequency increase amount for each activation of the **UP/DOWN Frequency (UP)** terminal activation. The rate of the frequency increase is set at **Acceleration Time 1 — UP/DOWN Frequency Accel Time** (F009).

See F264 for additional information on this parameter.

Direct Access Number — F265
Parameter Type — **Numerical**
Factory Default — **0.10**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — **Max. Freq.** (F011)
Units — Hz

UP/DOWN Frequency (DOWN) Response Time

Program ⇒ Frequency ⇒ UP/DOWN Frequency Functions

This parameter sets the system-response delay to the initial activation of the discrete input terminal **UP/DOWN Frequency (DOWN)**. Also sets the activation delay of subsequent terminal activations of the **UP/DOWN Frequency (DOWN)** terminal during an activate-and-hold.

See F264 for additional information on this parameter.

Direct Access Number — F266
Parameter Type — **Numerical**
Factory Default — **0.1**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 10.0
Units — Seconds

UP/DOWN Frequency (DOWN) Frequency Step

Program ⇒ Frequency ⇒ UP/DOWN Frequency Functions

This parameter sets the frequency decrease amount for each activation of the **UP/DOWN Frequency (DOWN)** terminal activation. The rate of the frequency decrease is set at **Deceleration Time 1 — UP/DOWN Frequency Decel Time** (F010).

See F264 for additional information on this parameter.

Direct Access Number — F267
Parameter Type — **Numerical**
Factory Default — **0.10**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — **Max. Freq.** (F011)
Units — Hz

Initial UP/DOWN Frequency

Program ⇒ Frequency ⇒ UP/DOWN Frequency Functions

At power up or after a reset, this parameter setting is used to provide a starting frequency for the **UP/DOWN Frequency** function.

See F269 for additional information on this parameter setting.

Direct Access Number — F268
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Initial UP/DOWN Frequency Rewriting

Program ⇒ Frequency ⇒ UP/DOWN Frequency Functions

At power down, and when enabled, this parameter writes the running frequency into the F268 location and, upon a system restart, uses this setting as the startup frequency.

Disable this parameter and set parameter F268 to the desired startup frequency if the same starting frequency is required at each startup.

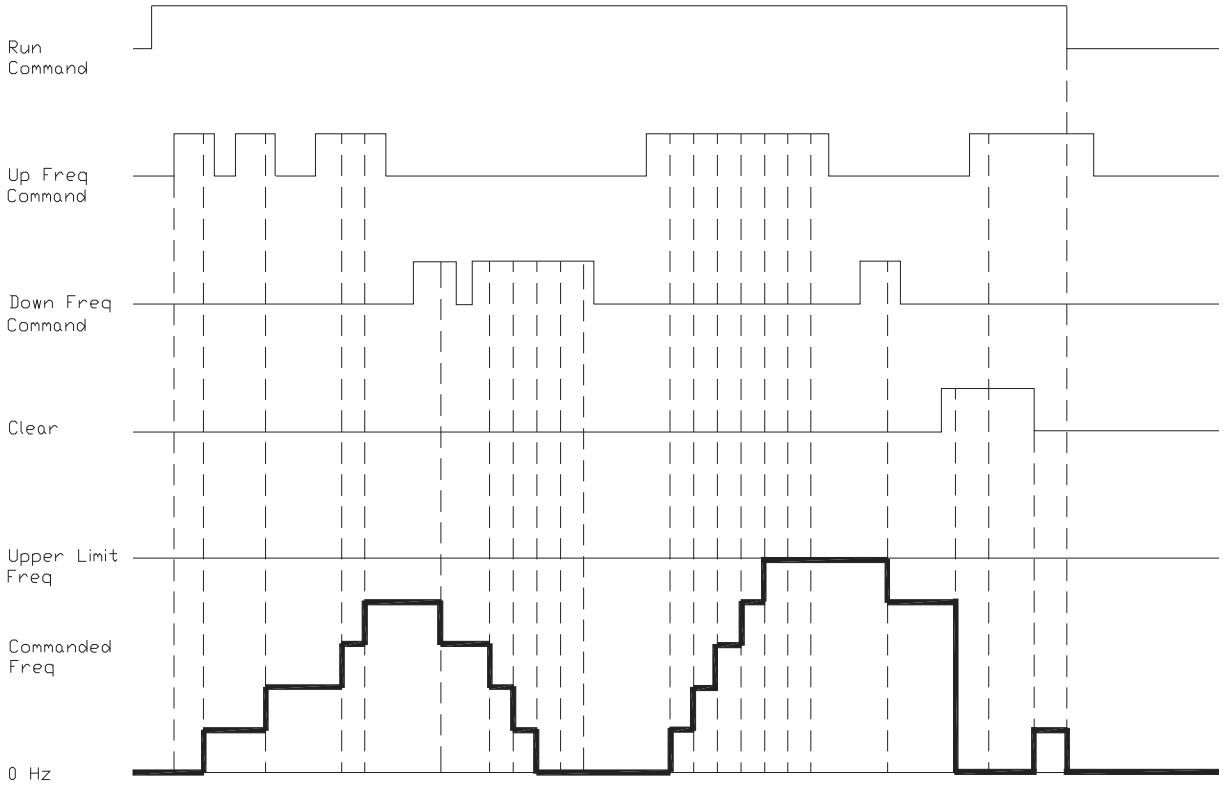
Note: *This parameter setting may be different at each startup when enabled.*

Settings:

Disabled
Enabled (Overwrite F268 at Power Off or Reset)

Direct Access Number — F269
Parameter Type — **Selection List**
Factory Default — **Enabled**
Changeable During Run — **Yes**

Figure 30. UP/DOWN Frequency Operation Control Timing Diagram.



Jump Frequency 1

Program ⇒ Special ⇒ Jump Frequencies

In conjunction with parameter F271, this parameter establishes a user-defined frequency range: the **Jump Frequency** and a plus-or-minus value.

During acceleration, the output frequency of the ASD will hold at the lower level of the **Jump Frequency** range until the programmed acceleration ramp reaches the upper level of the **Jump Frequency** range. At which time the output frequency of the ASD will accelerate to the upper level of the **Jump Frequency** range and continue upward as programmed.

During deceleration, the output frequency of the ASD will hold at the upper level of the **Jump Frequency** range until the programmed deceleration ramp reaches the lower level of the **Jump Frequency** range. At which time the output frequency of the ASD will decelerate to the lower level of the **Jump Frequency** range and continue downward as programmed.

Once set up and enabled, it is on in all control modes.

User-selected frequencies may be jumped to avoid the negative effects of mechanical resonance.

Direct Access Number — F270

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

Jump Frequency 1 Bandwidth

Program ⇒ Special ⇒ Jump Frequencies

This parameter establishes a plus-or-minus value for **Jump Frequency 1** (see F270).

Direct Access Number — F271
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 30.00
Units — Hz

Jump Frequency 2

Program ⇒ Special ⇒ Jump Frequencies

Same as **Jump Frequency 1** (F270) and is used when multiple frequencies are to be jumped (see the plus-or-minus value setting at F273). When multiple jump frequencies overlap, the system will recognize the lowest and the highest frequencies as one jump range.

Direct Access Number — F272
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — **Max. Freq.** (F011)
Units — Hz

Jump Frequency 2 Bandwidth

Program ⇒ Special ⇒ Jump Frequencies

This parameter establishes a plus-or-minus value for **Jump Frequency 2** (F272).

Direct Access Number — F273
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 30.0
Units — Hz

Jump Frequency 3

Program ⇒ Special ⇒ Jump Frequencies

Same as **Jump Frequency 1** (F270) and is used when multiple frequencies are to be jumped (see the plus-or-minus value setting at F275).

When multiple jump frequencies overlap, the system will recognize the lowest and the highest frequencies as one jump range.

Direct Access Number — F274
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — **Max. Freq.** (F011)
Units — Hz

Jump Frequency 3 Bandwidth

Program ⇒ Special ⇒ Jump Frequencies

This parameter establishes a plus-or-minus value for **Jump Frequency 3** (F274).

Direct Access Number — F275
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 30.0
Units — Hz

External Fault Stopping Method

Program ⇒ Crane/Hoist ⇒ External Fault

In a multiple ASD configuration a faulted ASD signals the remaining ASDs, via a discrete input terminal, that a fault has occurred and shuts down the non-faulted ASDs. The non-faulted ASDs experience an **External Fault**.

This parameter selects the stopping method in the event that a **External Fault** is incurred.

Settings:

Coast Stop
Deceleration Stop
DC Injection Braking Stop

Direct Access Number — F280
Parameter Type — **Selection List**
Factory Default — **Coast Stop**
Changeable During Run — **No**

Limit-Switch Stopping Method

Program ⇒ Crane/Hoist ⇒ Limit Switch Control

This parameter determines the method used to stop the motor if the **Stop** command is initiated via a limit switch.

Settings:

Coast Stop
Deceleration Stop
DC Injection Braking Stop

Direct Access Number — F282
Parameter Type — **Selection List**
Factory Default — **Deceleration Stop**
Changeable During Run — **No**

Deceleration Time at Slow-Speed-Limit UP

Program ⇒ Crane/Hoist ⇒ Limit Switch Control

Closure of the **Upper-Limit Slow-Speed Limit-Switch** implements the modified **Upper-Limit Speed** (F294) and **Deceleration Time** (F283) settings.

This parameter sets the time to reach the modified **Lower-Limit Slow Speed**.

Direct Access Number — F283
Parameter Type — **Numerical**
Factory Default — **1.5**
Changeable During Run — **No**
Minimum — 0.1
Maximum — 1.5
Units — Seconds

Stopping Time at Stop Limit-Switch UP

Program ⇒ Crane/Hoist ⇒ Limit Switch Control

A **Stop** command is initiated upon activation of the **Upper-Limit Stop Limit-Switch**.

This parameter sets the **Decel** rate to be used upon activation of the **Upper-Limit Stop Limit-Switch**.

Direct Access Number — F284
Parameter Type — **Numerical**
Factory Default — **1.5**
Changeable During Run — **No**
Minimum — 0.0
Maximum — 25.0
Units — Seconds

Deceleration Time At Slow-Speed Limit-Switch DOWN

Program ⇒ Crane/Hoist ⇒ Limit Switch Control

Closure of the **Lower-Limit Slow-Speed Limit-Switch** implements the modified **Lower-Limit Slow Speed** (F293) and **Deceleration Time** (F285) settings.

This parameter sets the time to reach the modified **Lower-Limit Slow Speed**.

Direct Access Number — F285
Parameter Type — **Numerical**
Factory Default — **1.5**
Changeable During Run — **No**
Minimum — 0.0
Maximum — 25.0
Units — Seconds

Stopping Time at Stop Limit-Switch DOWN

Program ⇒ Crane/Hoist ⇒ Limit Switch Control

A **Stop** command is initiated upon activation of the **Lower-Limit Stop Limit-Switch**.

This parameter sets the **Decel** rate to be used upon activation of the **Lower-Limit Stop Limit-Switch**.

Direct Access Number — F286
Parameter Type — **Numerical**
Factory Default — **1.5**
Changeable During Run — **No**
Minimum — 0.0
Maximum — 25.0
Units — Seconds

Preset Speed 8

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 1000 and is identified as **Preset Speed 8**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F287
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 9

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 1001 and is identified as **Preset Speed 9**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F288
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 10

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 1010 and is identified as **Preset Speed 10**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F289
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 11

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 1011 and is identified as **Preset Speed 11**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F290
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 12

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 1100 and is identified as **Preset Speed 12**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F291
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 13

Program ⇒ Frequency ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 1101 and is identified as **Preset Speed 13**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

Direct Access Number — F292
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 14/Lower-Limit Slow Speed

Program ⇒ Frequency ⇒ Preset Speeds

This is a dual-function parameter. The two functions are described below.

1) This parameter assigns an output frequency to binary number 1110 and is identified as **Preset Speed 14**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

2) The **Lower-Limit** speed and **Deceleration** time settings are changed once the crane approaches the end of its range (hoist or traverse). Upon approaching the end-of-range, as detected by the closure of the **Lower-Limit Slow-Speed Limit-Switch**, the implementation of the modified **Lower-Limit Slow Speed** (F293) and **Deceleration Time At Slow-Speed Limit-Switch DOWN** (F285) settings take effect.

Direct Access Number — F293
Parameter Type — **Numerical**
Factory Default — **6.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Preset Speed 15/Upper-Limit Slow Speed

Program ⇒ Frequency ⇒ Preset Speeds

This is a dual-function parameter. The two functions are described below.

1) This parameter assigns an output frequency to binary number 1111 and is identified as **Preset Speed 15**. The binary number is applied to **I1 – I4** of the **ACE G9-120V-PCB** to output the **Preset Speed** (see F018 for additional information on this parameter).

2) The **Upper-Limit** speed and **Deceleration** time settings are changed once the crane approaches the end of its range (hoist or traverse). Upon approaching the end-of-range, as detected by the closure of the **Upper-Limit Slow-Speed Limit-Switch**, the implementation of the modified **Upper-Limit Slow Speed** (F294) and **Deceleration Time at Slow-Speed-Limit UP** (F283) settings take effect.

Direct Access Number — F294
Parameter Type — **Numerical**
Factory Default — **6.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

PWM Carrier Frequency

Program ⇒ Special ⇒ Carrier Frequency

This parameter sets the frequency of the Pulse Width Modulation (PWM) signal applied to the motor.

Note: *When operating in the **Vector Control** mode the carrier frequency should be set to 2.2 kHz or above.*

Note: *If the PWM carrier frequency is set at 2.0 kHz or above, it cannot be decreased below 2.0 kHz while running. If the PWM carrier frequency is set at 1.9 kHz or below, it cannot be increased above 2.0 kHz while running. Either change requires that the ASD be stopped and restarted for the changes to take effect.*

Direct Access Number — F300
Parameter Type — **Numerical**
Factory Default — **2.5**
Changeable During Run — **No**
Minimum — 1.0
Maximum — (ASD-Dependent)
Units — kHz

Auto Restart Selection

Direct Access Number — F301

Parameter Type — **Selection List**

Factory Default — **Off**

Changeable During Run — **No**

Program ⇒ Protection ⇒ Retry/Restart

This parameter **Enables/Disables** the ability of the ASD to start into a spinning motor when the **ST** activation ceases (if so configured; see F110) momentarily and is then reactivated (ST deactivation/ST activation) or after a power interruption (momentary power failure).

Settings:

Off
Enabled (at Power Failure)
Enabled (at ST Activate/Deactivate)
Enabled (at ST Activate/Deactivate or Power Failure)
Enabled (at Run)

Regenerative Power Ridethrough

Direct Access Number — F302

Parameter Type — **Selection List**

Factory Default — **Off**

Changeable During Run — **Yes**

Program ⇒ Protection ⇒ Under-Voltage/Ridethrough

This parameter determines the motor-control response of the ASD in the event of a momentary power outage or under-voltage condition.

During a **Ridethrough**, regenerative energy is used to maintain the control circuitry settings for the duration of the **Ridethrough**; it is not used to drive the motor. The motor(s) of the system are stopped and then restarted automatically if so configured.

In a multiple-motor application, there will be a requirement to synchronize the stopping and restarting of the motors as not to cause breakage in the product being processed by the motors stopping/starting at different times (e.g., wire spools, bobbin winder for textile machines, etc.). Parameters F317 and F318 must be setup to synchronize motor operation as to avoid breakage in these types of applications.

Note: *If used to restart the motors, the Retry setup of **F301** is required.*

Note: *The **Jog** function will not operate while in the **Synchronized Decel/Accel** mode.*

Settings:

Off
Ridethrough On
Decel Stop
Synchronized ACC/DEC (TB)
Synchronized ACC/DEC (TB + Power Off)

Ridethrough Setup Requirements

1. Select the **Ridethrough Mode** at F302.
2. Select the **Ridethrough Time** at F310.
3. Select the **Synchronized Stop/Start Times** at F317/F318 (if required).

Note: ***F317** and **F318** are not functional while operating in the **Torque** or **Position** control modes, or for the **Jog Run** function (F260).*

4. Set a discrete input terminal to **Power Failure Synchronized Signal** and activate the terminal to enable the **Synchronized Accel/Decel** function.
5. Select the **Ridethrough Control Level** at F629.

Number of Times to Retry

Direct Access Number — F303

Parameter Type — **Numerical**

Factory Default — **00**

Changeable During Run — **Yes**

Minimum — 00

Maximum — 10

Program ⇒ Protection ⇒ Retry/Restart

After a trip has occurred, this parameter sets the number of times that an automatic system restart is attempted for a qualified trip.

The trip conditions listed below will not initiate the automatic **Retry/Restart** function:

- Input Phase Loss (Input Phase Failure)
- Output Phase Loss (Output Phase Failure)
- Output Current Protection Fault
- Output Current Detector Error
- Load Side Over-Current at Start
- Earth Fault (Ground Fault)
- Over-Current During Acceleration
- Arm Over-Current at Start-Up
- DBR Resistor Over-Current
- Low-Current
- Voltage Drop In Main Circuit
- EEPROM Data Fault (EEPROM Fault)
- Flash Memory/Gate Array/RAM-ROM Fault
- CPU Fault
- Emergency Off (EMG)
- Communication Error
- Option Fault
- Sink/Source Setting Error (not used with the ACE-tronics G9 ASD)
- Over-Speed Error
- Over-Torque
- Key Error
- External Thermal Error
- Externally-Controlled Interrupt

See the section titled System Setup Requirements on pg. 8 for additional information on this setting.

Dynamic Braking Enable

Direct Access Number — F304

Parameter Type — **Selection List**

Factory Default — **Enabled without Overload Detection**

Changeable During Run — **No**

Program ⇒ Protection ⇒ Dynamic Braking

This parameter **Enables/Disables** the **Dynamic Braking** system.

Settings:

Off
Enabled with Overload Detection
Enabled without Overload Detection

Dynamic Braking uses the transistor **IGBT7** to dissipate the bus voltage when required.

IGBT7 is a standard item on the 25 HP and below ACE-tronics G9 ASD 230-volt systems and is standard on the 400 HP and below for the for the 460-volt systems. **IGBT7** is optional for all remaining systems.

Dynamic Braking

Dynamic Braking is used to prevent over-voltage faults during rapid deceleration or constant speed run on cyclic overhauling applications.

Dynamic Braking dissipates regenerated energy in the form of heat. When using a DBR use thermal protection.

The resistive load is connected across terminals **PA** and **PB** (non-polarized). Using a low-value, high-wattage resistance as a load for the generated current, the resistive load dissipates the induced energy.

Dynamic Braking helps to slow the load quickly; it cannot act as a holding brake.

The **Dynamic Braking** function may be setup and enabled by connecting a braking resistor from terminal **PA** to **PB** of the ASD and providing the proper information at F304, F308, and F309.

See the section titled Dynamic Braking Resistor Specifications on pg. 274 for additional information on using the DBR system and for assistance in selecting the appropriate resistor for a given application.

Over-Voltage Limit Operation

Direct Access Number — F305

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

Program ⇒ Protection ⇒ Stall

This parameter enables the **Over-Voltage Limit** function. This feature is used to set the upper DC bus voltage threshold that, once exceeded, will cause an **Over-Voltage Stall**.

An **Over-Voltage Stall** increases the output frequency of the ASD during deceleration for a specified time in an attempt to prevent an **Over-Voltage Trip**.

If the over-voltage threshold level setting of parameter F626 is exceeded for over 4 mS, an **Over-Voltage Trip** will be incurred.

Note: *This parameter setting may increase deceleration times.*

Settings:

Enabled (Over-Voltage Stall)
Disabled
Enabled (Forced Shorted Deceleration)
Enabled (Forced Dynamic Braking Deceleration)

Supply Voltage Correction

Direct Access Number — F307

Program ⇒ Protection ⇒ Base Frequency Voltage

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

This parameter **Enables/Disables** the **Voltage Compensation** function.

When **Enabled**, this function provides a constant V/f ratio during periods of input voltage fluctuations.

Settings:

Disabled (Output Voltage Unlimited)
Enabled (Supply Voltage Compensation)
Disabled (Output Voltage Limited)
Enabled (Supply Voltage Compensation w/Output Voltage Limited)

Dynamic Braking Resistance

Direct Access Number — F308

Program ⇒ Protection ⇒ Dynamic Braking

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **No**

Minimum — 0.5

Maximum — 1000.0

Units — Ω

This parameter is used to input the resistive value of the **Dynamic Braking Resistor** being used.

Light-duty and heavy-duty resistors vary from a few ohms to several hundred ohms. The appropriate resistance size will be typeform- and application-specific.

See the section titled Dynamic Braking Resistor Specifications on pg. 274 for additional information on using the DBR system and for assistance in selecting the appropriate resistor for a given application.

Note: *Using a resistor value that is too low may result in system damage.*

Continuous Dynamic Braking Capacity

Direct Access Number — F309

Program ⇒ Protection ⇒ Dynamic Braking

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **No**

Minimum — 0.01

Maximum — 600.00

Units — kW

This parameter is used to input the wattage of the **Dynamic Braking Resistor**.

See the section titled Dynamic Braking Resistor Specifications on pg. 274 for additional information on using the DBR system.

Note: *Using a resistor with a wattage rating that is too low may result in system damage.*

Ridethrough Time

Direct Access Number — F310

Program ⇒ Protection ⇒ Retry/Restart

Parameter Type — **Numerical**

Factory Default — **2.0**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 320.0

Units — Seconds

In the event of a momentary power outage, this parameter determines the length of the **Ridethrough** time.

The **Ridethrough** will be maintained for the number of seconds set using this parameter.

See parameter F302 for additional information on the Ridethrough function.

Note: *The actual **Ridethrough Time** is load-dependent.*

Forward Reverse Disable

Direct Access Number — F311

Program ⇒ Frequency ⇒ Forward/Reverse Disable

Parameter Type — **Selection List**

Factory Default — **Off**

Changeable During Run — **No**

This parameter **Enables/Disables** the **Forward Run** or **Reverse Run** mode.

If either direction is disabled, commands received for the disabled direction will not be recognized.

If both directions are disabled, the received direction command will determine the direction of the motor rotation.

Settings:

Off
Disable Reverse Run
Disable Forward Run

Random Mode

Direct Access Number — F312

Program ⇒ Protection ⇒ Retry/Restart

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

This parameter adjusts the carrier frequency randomly. This feature is effective in minimizing the negative effects of mechanical resonance.

Settings:

Disabled
Enabled

Carrier Frequency Control Mode

Direct Access Number — F316

Program ⇒ Special ⇒ Carrier Frequency

Parameter Type — **Selection List**

Factory Default — **Valid Decrease and No Limit**

Changeable During Run — **Yes**

This parameter provides for the automatic decrease of the carrier frequency.

Select **1** to decrease the **Carrier Frequency** setting as a function of an increased current requirement.

Selection **2** or **3** may also include an output voltage drop as a function of an increased current requirement. The **Carrier Frequency** should be set below 4 kHz.

Settings:

No Decrease and No Limit
Valid Decrease and No Limit
No Decrease and Limit Small Pulse
Valid Decrease and Limit Small Pulse

Synchronized Deceleration Time

Direct Access Number — F317

Program ⇒ Protection ⇒ Under-Voltage/Ridethrough

Parameter Type — **Numerical**

Factory Default — **2.0**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000.0

Units — Seconds

In the event that the **Ridethrough** function activates in a multiple-motor application it will be necessary to manage the stopping motors synchronously as not to damage the product being processed (e.g., wire spools, bobbin winder for textile machines, etc.).

This parameter is used to minimize the product breakage during a momentary power outage. This function stops multiple machines simultaneously or makes them reach their respective command frequencies simultaneously by regulating their deceleration times.

See parameter F302 for additional information on this setting.

Synchronized Acceleration Time

Direct Access Number — F318

Program ⇒ Protection ⇒ Under-Voltage/Ridethrough

Parameter Type — **Numerical**

Factory Default — **2.0**

Changeable During Run — **Yes**

Minimum — 0.10

Maximum — 6000.0

Units — Seconds

In the event that the **Ridethrough** function activates in a multiple-motor application it will be necessary to manage the accelerating motors synchronously as not to damage the product being processed (e.g., wire spools, bobbin winder for textile machines, etc.).

This parameter is used to minimize the product breakage during a momentary power outage. This function orchestrates the acceleration of multiple machines simultaneously or makes them reach their respective command frequencies simultaneously by regulating their acceleration times.

See parameter F302 for additional information on this setting.

Drooping Gain

Direct Access Number — F320

Program ⇒ Feedback ⇒ Drooping Control

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 100.0

Units — %

This parameter sets the effective 100% output torque level while operating in the **Drooping Control** mode. This value is the upper torque limit of the motor being driven by a given ASD while operating in the **Drooping Control** mode.

Note: *The maximum frequency output is not limited by the setting of F011 while operating in the **Drooping Control** mode.*

Drooping

Drooping Control, also called **Load Share**, is used to share the load among two or more mechanically coupled motors. Unlike **Stall**, which reduces the output frequency in order to limit the load once the load reaches a preset level, **Drooping** can decrease or increase the V/f setting of a motor to maintain a balance between the output torque levels of mechanically coupled motors.

Because of variances in gearboxes, sheaves, belts, motors, and since the speed of the motor is constrained by the mechanical system, one motor may experience more load than its counterpart and may become overloaded. **Drooping Control** allows the overloaded motor to slow down, thus shedding load and encouraging a lightly-loaded motor to pick up the slack. The goal of **Drooping Control** is to have the same torque ratios for mechanically coupled motors.

Speed at 0% Drooping Gain

Direct Access Number — F321

Program ⇒ Feedback ⇒ Drooping Control

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 320.0

Units — Hz

This parameter sets the motor speed when at the 0% output torque gain while operating in the **Drooping Control** mode. This function determines the lowest speed that **Drooping** will be in effect for motors that share the same load.

Speed at F320 Drooping Gain

Direct Access Number — F322

Program ⇒ Feedback ⇒ Drooping Control

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 320.0

Units — Hz

This parameter sets the motor speed when at the 100% output torque gain while operating in the **Drooping Control** mode. This function determines the speed of the individual motors at the 100% **Drooping Gain** setting for motors that share the same load.

Drooping Insensitive Torque

Direct Access Number — F323

Program ⇒ Feedback ⇒ Drooping Control

Parameter Type — **Numerical**

Factory Default — **10.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 100.0

Units — %

This parameter defines a torque range in which the **Drooping Control** settings will be ignored and the programmed torque settings will be followed.

Drooping Output Filter

Direct Access Number — F324

Program ⇒ Feedback ⇒ Drooping Control

Parameter Type — **Numerical**

Factory Default — **100.0**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 200.0

Units — Radians/Second

This parameter is used to set the rate of output change allowed when operating in the **Drooping Control** mode.

Jerky operation may be reduced by increasing this setting.

Express-Speed Selection

Direct Access Number — F328

Program⇒ Crane/Hoist ⇒ Express Speed

Parameter Type — **Selection List**

Factory Default — **Off**

Changeable During Run — **Yes**

This parameter enables the **Express Speed** function by selecting an operating mode. The **Express Speed** function accelerates the output frequency of the ASD from the programmed speed to the setting established in F330.

Select **Off** to disable the **Express Speed** feature.

Enabling the **Express Speed** function requires that an operating mode be selected here, and that the criteria of parameters F331 – F333 be met.

Settings:

Off
Auto Speed (F-Motor: Up, R-Generator:Down)
Auto Speed (F-Generator: Down, R-Motor:Up)
F330 Setting (F-Motor: Up, R-Generator:Down)
F330 Setting (F-Generator: Down, R-Motor:Up)

Express Speed Setup and Run Criteria.

F328 = Off or Enabled.

If enabled, the following criteria must be met for **Express Speed** operation:

ASD output speed > F331 setting.

ASD output torque < F335 setting.

F331 and F335 condition exists for longer than F333 setting.

Express-Speed Learning Function

Direct Access Number — F329

Program ⇒ Crane/Hoist

Parameter Type — **Selection List**

Factory Default — **Off**

Changeable During Run — **No**

The **Express Speed** function accelerates the output frequency of the ASD from the programmed speed to the setting established in F330 and is primarily used with **Crane/Hoist** functions.

The **Express-Speed Learning Function** is to be run with the maximum load that will allow for the **Express Speed** (Auto Speed ONLY) function to be engaged. During the execution of the **Express-Speed Learning Function** parameters F335, F336, F337, and F338 are automatically adjusted and set as a function of the load.

Application-specific adjustments may be required.

Note: *This function should be setup with a light load only.*

Settings:

Off
Forward/Reverse
Forward Only

Automatic Express-Speed Operation Frequency

Direct Access Number — F330

Program⇒ Crane/Hoist ⇒ Express Speed

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **No**

Minimum — 30.00

Maximum — **Upper Limit** (F012)

Units — Hz

This parameter establishes the speed to which the ASD will ramp when operating in the **Express Speed** mode.

Express-Speed Operation Switching Lower-Limit Frequency

Direct Access Number — F331

Program⇒ Crane/Hoist ⇒ Express Speed

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 30.0

Maximum — **Upper Limit** (F012)

Units — Hz

This parameter sets an output frequency threshold that, once surpassed, allows the **Express Speed** function to be used.

The **Express Speed** function may be used if the frequency threshold set at this parameter and the following conditions are met:

1) **Express-Speed Operation Enable** is configured at F328.

2) The output torque is less than the setting established in F335 when reaching the frequency setting here.

Express-Speed Operation Load Wait Time

Direct Access Number — F332

Program⇒ Crane/Hoist ⇒ Express Speed

Parameter Type — **Numerical**

Factory Default — **0.5**

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 10.0

Units — Seconds

This parameter determines the length of time that the load requirement must meet the **Express Speed** criteria before the **Express-Speed Enable** (F328) is recognized.

Once recognized, the timer setting of F333 must expire to engage the **Express Speed** function.

Express-Speed Operation Detection Time

Program⇒ Crane/Hoist ⇒ Express Speed

After the time setting of F332 times out, this parameter determines the length of time that the **Express Speed** criteria must be met until the **Express Speed** function engages.

Direct Access Number — F333
Parameter Type — **Numerical**
Factory Default — **1.0**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 10.0
Units — Seconds

Express-Speed Operation Heavy-Load Detection Time

Program⇒ Crane/Hoist ⇒ Express Speed

While operating in the **Express Speed** mode, this parameter determines the length of time that a load exceeding the **Express Speed** operation criteria may exist before the **Express Speed** mode is terminated and normal operation resumes.

Direct Access Number — F334
Parameter Type — **Numerical**
Factory Default — **0.5**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 10.0
Units — Seconds

Switching Load Torque During Power Running

Program⇒ Crane/Hoist ⇒ Express Speed

During power running, this parameter establishes the threshold torque level that is used to determine if the **Express Speed** (F328) operation may engage or remain engaged if active.

This parameter is automatically adjusted during **Express-Speed Learning**.

If the **Express Speed** operation is terminated normal operation resumes.

Note: *Power running may be during forward, reverse, acceleration, or deceleration, but not during regeneration.*

Direct Access Number — F335
Parameter Type — **Numerical**
Factory Default — **40.00**
Changeable During Run — **No**
Minimum — -250.00
Maximum — +250.00
Units — %

Heavy-Load Torque During Power Running

Program⇒ Crane/Hoist ⇒ Express Speed

During power running, this parameter establishes the threshold torque level that is used to determine if the **Express Speed** (F328) operation may engage or remain engaged if active.

If the **Express Speed** operation is terminated normal operation resumes.

Direct Access Number — F336
Parameter Type — **Numerical**
Factory Default — **150.00**
Changeable During Run — **Yes**
Minimum — -250.00
Maximum — +250.00
Units — %

Heavy-Load Torque During Fixed-Speed Power Running

Program⇒ Crane/Hoist ⇒ Express Speed

During constant power running, this parameter establishes the threshold torque level that is used to determine if the **Express Speed** (F328) operation may engage or remain engaged if active.

If the **Express Speed** operation is terminated normal operation resumes.

Direct Access Number — F337
Parameter Type — **Numerical**
Factory Default — **150.00**
Changeable During Run — **Yes**
Minimum — -250.00
Maximum — +250.00
Units — %

Switching Load Torque During Dynamic Braking

Direct Access Number — F338

Program⇒ Crane/Hoist ⇒ Express Speed

Parameter Type — **Numerical**

Factory Default — **30.00**

Changeable During Run — **Yes**

Minimum — -250.00

Maximum — +250.00

Units — %

During dynamic braking, this parameter establishes the threshold torque level that is used to determine if the **Express Speed** (F328) operation may engage or remain engaged if active.

If the **Express Speed** operation is terminated normal operation resumes.

Accel/Decel Suspended Function

Direct Access Number — F349

Program ⇒ Fundamental ⇒ Acc/Dec 1

Parameter Type — **Selection List**

Factory Default — **Off**

Changeable During Run — **Yes**

To maintain a constant speed setting while running, this parameter may be used to suspend speed changes for a user-set length of time.

The **Accel/Decel Suspend** function is enabled by setting this parameter to either **Terminal Board Input** or to F350 – F353.

Selecting **Terminal Board Input** at this parameter requires that a discrete input terminal be set to **Dwell Signal** (see Table 7 on pg. 236 for a listing of available settings). Upon activation of the **Dwell Signal** terminal the output frequency remains at the at-activation speed for the duration of the activation. When deactivated the programmed accel or decel ramp resumes.

Selecting F350 – F353 at this parameter requires that the acceleration and/or the deceleration **Suspend Frequency** and **Suspend Time** settings be completed at F350, F351, F352, and F353. Upon reaching the frequency setting of F350 (Accel) or F352 (Decel), the Accel/Decel ramp will cease and the output frequency will hold at the threshold frequency setting for the time setting of F351 for acceleration or F353 for deceleration.

Settings:

Off
F350 – F353 Settings
Terminal Board Input (ACE G9-120V-PCB)

Acceleration Suspend Frequency

Direct Access Number — F350

Program ⇒ Fundamental ⇒ Acc/Dec 1

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

When **Enabled** at F349, this parameter is used to set the frequency at which the **Acceleration Suspend** function will activate.

During acceleration, this parameter sets the frequency at which acceleration will stop and the motor will run at the setting of this parameter for the time setting of F351.

Acceleration Suspend Time

Direct Access Number — F351

Program ⇒ Fundamental ⇒ Acc/Dec 1

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 10.0

Units — Seconds

When **Enabled** at F349, this parameter is used to set the duration of activation of the **Acceleration Suspend** function when initiated by reaching the **Acceleration Suspend Frequency** setting (F350).

Once this parameter times out the acceleration rate will resume from the point of suspension.

Deceleration Suspend Frequency

Program ⇒ Fundamental ⇒ Acc/Dec 1

When **Enabled** at F349, this parameter is used to set the frequency at which the **Deceleration Suspend** function will activate.

During deceleration, this parameter sets the frequency at which deceleration will stop and the motor will run at the setting of this parameter for the time setting of F353**.**

Direct Access Number — F352

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

Deceleration Suspend Time

Program ⇒ Fundamental ⇒ Acc/Dec 1

When **Enabled** at F349, this parameter is used to set the duration of activation of the **Deceleration Suspend** function when initiated by reaching the **Deceleration Suspend Frequency** setting (F352).

Once this parameter times out the deceleration rate will resume from the point of suspension.

Direct Access Number — F353

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 10.0

Units — Seconds

Commercial Power/ASD Output Switching

Program ⇒ Terminal ⇒ Line Power Switching

Direct Access Number — F354

Parameter Type — **Selection List**

Factory Default — **Off**

Changeable During Run — **No**

This parameter **Enables/Disables** the **Commercial Power/ASD Output Switching** function.

When enabled, the system may be set up to discontinue using the output of the ASD and to switch to the commercial power in the event that 1) a trip is incurred, 2) a user-set frequency is reached, or 3) if initiated by a discrete input terminal.

Once set up with the proper switching frequency and hold times, the system will switch to commercial power upon reaching the F355 frequency criterion.

Switching may also be accomplished manually by activating the discrete input terminal **Commercial Power ASD Switching**. Terminal activation forces the ASD output speed to accelerate to the F355 switching frequency, resulting in the ASD-to-commercial power switching.

Deactivation of the discrete input terminal starts the hold-time counter setting (F356) for ASD-to-commercial power switching. Once timed out the motor resumes normal commercial power operation.

Settings:

Off
Switch at Signal Input and Trip
Switch at Signal Input with Switching Frequency
Switch at Signal Input and Trip with Switching Frequency

Switching Setup Requirements

F354 — Enable the switching function.

F355 — Set the switching frequency.

F356 — (Speed) Hold -time before applying ASD output after the switching criteria has been met.

F357 — (Speed) Hold -time before applying commercial power after the switching criteria has been met.

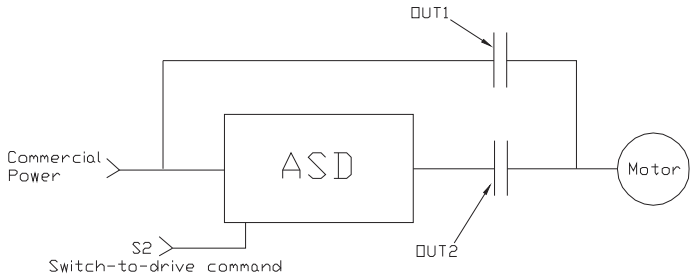
F358 — (Speed) Hold -time of applying commercial power after the switching criteria has been met.

Set a discrete input terminal to **Commercial Power ASD Switching**.

Set **OUT1** and **OUT2** to **Commercial Power/ASD Switching 1** and **2**, respectively.

Note: *Ensure that the switching directions are the same and that F311 is set to **Permit All**.*

Note: *The **OUT1** and **OUT2** outputs assigned to **Commercial Power/ASD Switching Output** are used to actuate the re-routing contactors.*



Commercial Power/ASD Switching Frequency

Direct Access Number — F355

Program ⇒ Terminal ⇒ Line Power Switching

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

When enabled at F354 and with a properly configured discrete output terminal, this parameter sets the frequency at which the **At Frequency Powerline Switching** function engages.

The **At Frequency Powerline Switching** function commands the system to discontinue using the output of the ASD and to switch to commercial power once reaching the frequency set here.

See parameter F354 for additional information on this setting.

ASD-Side Switching Waiting Time

Direct Access Number — F356

Program ⇒ Terminal ⇒ Line Power Switching

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0.10

Maximum — 10.00

Units — Seconds

This parameter determines the amount of time that the ASD will wait before outputting a signal to the motor once the switch-to-ASD-output criteria has been met.

See parameter F354 for additional information on this setting.

Commercial Power Side Switching Waiting Time

Direct Access Number — F357

Program ⇒ Terminal ⇒ Line Power Switching

Parameter Type — **Numerical**

Factory Default — **0.62**

Changeable During Run — **Yes**

Minimum — (ASD-Dependent)

Maximum — 10.00

Units — Seconds

This parameter determines the amount of time that the ASD will wait before allowing commercial power to be applied to the motor once the switch-to-commercial-power criteria has been met.

See parameter F354 for additional information on this setting.

Commercial Power Switching Freq. Holding Time

Direct Access Number — F358

Program ⇒ Terminal ⇒ Line Power Switching

Parameter Type — **Numerical**

Factory Default — **2.00**

Changeable During Run — **Yes**

Minimum — 0.10

Maximum — 10.00

Units — Seconds

This parameter determines the amount of time that the connection to commercial power is maintained once the switch-to-ASD-output criteria has been met.

See parameter F354 for additional information on this setting.

PID Control Switching

Direct Access Number — F359

Program ⇒ Feedback ⇒ Feedback

Parameter Type — **Selection List**

Factory Default — **PID Off**

Changeable During Run — **No**

This parameter is used to set the PID control mode.

Selecting **Process PID** uses the upper- and lower-limit settings of parameters F367 and F368.

Selecting **Speed PID** uses the upper- and lower-limit settings of parameters F370 and F371.

Settings:

PID Off
Process PID
Speed PID
Easy Positioning PID (Not Used)

PID Feedback Signal

Program ⇒ Feedback ⇒ Feedback

This parameter **Enables/Disables PID** feedback control. When enabled, this parameter determines the source of the motor-control feedback.

Settings:

PID Control Disabled
V/I
RR
RX
RX2 (AI1)
Option V/I
PG Feedback Option

Proportional-Integral-Derivative (PID) — A closed-loop control technique that seeks error minimization by reacting to three values: One that is proportional to the error, one that is representative of the error, and one that is representative of the rate of change of the error.

Direct Access Number — F360
Parameter Type — **Selection List**
Factory Default — **PID Control Disabled**
Changeable During Run — **Yes**

PID Feedback Delay Filter

Program ⇒ Feedback ⇒ Feedback

This parameter determines the delay in the ASD output response to the motor-control feedback signal (signal source is selected at F360).

Direct Access Number — F361
Parameter Type — **Numerical**
Factory Default — **0.1**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 25.0

PID Feedback Proportional Gain

Program ⇒ Feedback ⇒ Feedback

This parameter determines the degree that the **Proportional** function affects the output signal. The larger the value entered here, the quicker the ASD responds to changes in feedback.

Direct Access Number — F362
Parameter Type — **Numerical**
Factory Default — **0.10**
Changeable During Run — **Yes**
Minimum — 0.01
Maximum — 100.0

PID Feedback Integral Gain

Program ⇒ Feedback ⇒ Feedback

This parameter determines the degree that the **Integral** function affects the output signal. The smaller the value here, the more pronounced the effect of the integral function on the output signal.

Direct Access Number — F363
Parameter Type — **Numerical**
Factory Default — **0.10**
Changeable During Run — **Yes**
Minimum — 0.01
Maximum — 100.00

PID Deviation Upper Limit

Program ⇒ Feedback ⇒ Feedback

This parameter determines the maximum amount that the feedback may increase the output signal.

Direct Access Number — F364
Parameter Type — **Numerical**
Factory Default — **60.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 60.00
Units — Hz

PID Deviation Lower Limit

Program ⇒ Feedback ⇒ Feedback

This parameter determines the maximum amount that the feedback may decrease the output signal.

Direct Access Number — F365
Parameter Type — **Numerical**
Factory Default — **60.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 60.00
Units — Hz

PID Feedback Differential Gain

Program ⇒ Feedback ⇒ Feedback

This parameter determines the degree that the **Differential** function affects the output signal. The larger the value entered here, the more pronounced the effect of the differential function for a given feedback signal level.

Direct Access Number — F366
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 2.55

Process Upper Limit

Program ⇒ Feedback ⇒ Feedback

Selecting **Process PID** at parameter F359 allows for this parameter setting to function as the **Upper Limit** while operating in the **PID Control** mode.

Direct Access Number — F367
Parameter Type — **Numerical**
Factory Default — **60.00**
Changeable During Run — **No**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Process Lower Limit

Program ⇒ Feedback ⇒ Feedback

Selecting **Process PID** at parameter F359 allows for this parameter setting to function as the **Lower Limit** while operating in the **PID Control** mode.

Direct Access Number — F368
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **No**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

PID Control Wait Time

Program ⇒ Feedback ⇒ Feedback

This parameter is used to delay the start of PID control at start up. During the wait time set here, the ASD will follow the frequency control input of the process value and the feedback input will be ignored until this setting times out. At which time the PID setup assumes control.

Direct Access Number — F369
Parameter Type — **Numerical**
Factory Default — **0**
Changeable During Run — **Yes**
Minimum — 0
Maximum — 2400
Units — Seconds

PID Output Upper Limit

Program ⇒ Feedback ⇒ Feedback

Selecting **Speed PID** at parameter F359 allows for this parameter setting to function as the **Upper Limit** while operating in the **PID Control** mode.

Direct Access Number — F370
Parameter Type — **Numerical**
Factory Default — **60.00**
Changeable During Run — **No**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

PID Output Lower Limit

Program ⇒ Feedback ⇒ Feedback

Selecting **Speed PID** at parameter F359 allows for this parameter setting to function as the **Lower Limit** while operating in the **PID Control** mode.

Direct Access Number — F371
Parameter Type — **Numerical**
Factory Default — **4.00**
Changeable During Run — **Yes**
Minimum — **Lower Limit** (F013)
Maximum — **Upper Limit** (F012)
Units — Hz

Process Increasing Rate

Program ⇒ Feedback ⇒ Feedback

This parameter is used to limit the rate that the output of the ASD may increase for a given difference in the speed reference and the PID feedback value.

Direct Access Number — F372
Parameter Type — **Numerical**
Factory Default — **10.0**
Changeable During Run — **Yes**
Minimum — 0.1
Maximum — 600.0
Units — Seconds

Process Decreasing Rate

Program ⇒ Feedback ⇒ Feedback

This parameter is used to limit the rate that the output of the ASD may decrease for a given difference in the speed reference and the PID feedback value.

Direct Access Number — F373
Parameter Type — **Numerical**
Factory Default — **10.0**
Changeable During Run — **Yes**
Minimum — 0.1
Maximum — 600.0
Units — Seconds

Number of PG Input Pulses

Program ⇒ Feedback ⇒ PG

This parameter is used to set the number of pulses output from a shaft-mounted encoder that is used to indicate one revolution of rotation (360°) of the motor or of the motor-driven equipment.

Direct Access Number — F375
Parameter Type — **Numerical**
Factory Default — **1024**
Changeable During Run — **No**
Minimum — 12
Maximum — 9999

Number of PG Input Phases

Program ⇒ Feedback ⇒ PG

This parameter determines the type of information that is supplied by the phase encoder.

Settings:

Single Phase
Two Phase

Direct Access Number — F376
Parameter Type — **Selection List**
Factory Default — **Two Phase**
Changeable During Run — **Yes**

PG Disconnection Detection

Direct Access Number — F377

Program ⇒ Feedback ⇒ PG

Parameter Type — **Selection List**

Factory Default — **Enabled (Detect Momentary Power Failure)**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the system's monitoring of the PG connection status when using encoders with line driver outputs.

Note: *The PG Vector Feedback Board option is required to use this feature.*

Settings:

Disabled
Enabled with Filter
Enabled (Detect Momentary Power Failure)

Simple Positioning Completion Range

Direct Access Number — F381

Program ⇒ Feedback ⇒ PG

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 1

Maximum — 4000

While operating in the **Positioning Control** mode, this parameter sets the range of accuracy for a **Stop** command initiated via the **ACE G9-120V-PCB**.

If the setting is too low the stop may be too abrupt.

Autotune 1

Direct Access Number — F400

Program ⇒ Motor ⇒ Vector Motor Model

Parameter Type — **Selection List**

Factory Default — **Autotune Disabled**

Changeable During Run — **No**

This parameter sets the **Autotune** command status.

Selecting **Reset Motor Defaults** for this parameter sets parameters F410, F411, F412, and F413 to the factory default settings.

If selecting **Autotune on Run Command**, **Autotune Initiated by Input Terminal**, or **Autotune of Detail Parameters** for this parameter set the **Base Frequency**, **Base Frequency Voltage**, and the **Motor Rated Revolutions** to the nameplate values of the motor to achieve the best possible **Autotune** precision.

Settings:

Autotune Disabled
Reset Motor Defaults
Enable Autotune on Run Command
Autotuning by Input Terminal Signal (see Table 7 on pg. 236)
Motor Constant Auto Calculation

Slip Frequency Gain

Direct Access Number — F401

Program ⇒ Motor ⇒ Vector Motor Model

Parameter Type — **Numerical**

Factory Default — **70**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 150

Units — %

This parameter provides a degree of slip compensation for a given load. A higher setting here decreases the slip allowed for a given load/ASD output ratio.

Autotune 2

Program ⇒ Motor ⇒ Vector Motor Model

This parameter introduces a thermal element into the autotuning equation and is used to automatically adjust the **Autotune** parameter values as a function of increases in the temperature of the motor.

Settings:

Off
Self-Cooled Motor Tuning
Forced Air Cooled Motor Tuning

Direct Access Number — F402
Parameter Type — **Selection List**
Factory Default — **Off**
Changeable During Run — **No**

Motor Rated Capacity

Program ⇒ Motor ⇒ Vector Motor Model

This parameter is used to set the (Nameplate) rated capacity of the motor being used.

Direct Access Number — F405
Parameter Type — **Numerical**
Factory Default — **11.0**
Changeable During Run — **Yes**
Minimum — 0.1
Maximum — 500.00
Units — HP

Motor Rated Current

Program ⇒ Motor ⇒ Vector Motor Model

This parameter is used to set the (Nameplate) current rating of the motor being used.

Direct Access Number — F406
Parameter Type — **Numerical**
Factory Default — **20.3**
Changeable During Run — **Yes**
Minimum — 0.1
Maximum — 2000.0
Units — Amps

Motor Rated RPM

Program ⇒ Motor ⇒ Vector Motor Model

This parameter is used input the (Nameplate) rated speed of the motor.

Direct Access Number — F407
Parameter Type — **Numerical**
Factory Default — **1730**
Changeable During Run — **Yes**
Minimum — 100
Maximum — 60000
Units — RPM

Base Frequency Voltage 1

Program ⇒ Vector ⇒ Vector Motor Model

The **Motor Base Frequency Voltage 1** is the **Motor 1** output voltage at the **Base Frequency** (F014). Regardless of the programmed value, the output voltage cannot be higher than the input voltage.

The actual output voltage will be influenced by the input voltage of the ASD and the **Supply Voltage Correction** setting (F307).

Direct Access Number — F409
Parameter Type — **Numerical**
Factory Default — (ASD-Dependent)
Changeable During Run — **Yes**
Minimum — 50.0
Maximum — 660.0
Units — Volts

Motor Constant 1 (Torque Boost)

Program ⇒ Motor ⇒ Vector Motor Model

This parameter sets the primary resistance of the motor. Increasing this value can prevent a drop in the torque of the motor at low speeds. Increasing this value excessively can result in nuisance overload tripping.

Direct Access Number — F410
Parameter Type — **Numerical**
Factory Default — (ASD-Dependent)
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 30.0
Units — %

Motor Constant 2 (No-Load Current)

Program ⇒ Motor ⇒ Vector Motor Model

This parameter is used to set the current level required to excite the motor. Specifying a value that is too high for this parameter may result in hunting (erratic motor operation).

Direct Access Number — F411
Parameter Type — **Numerical**
Factory Default — (ASD-Dependent)
Changeable During Run — **No**
Minimum — 10
Maximum — 90
Units — %

Motor Constant 3 (Leak Inductance)

Program ⇒ Motor ⇒ Vector Motor Model

This parameter is used to set the leakage inductance of the motor.

A larger setting here results in higher output torque at high speeds.

Direct Access Number — F412
Parameter Type — **Numerical**
Factory Default — (ASD-Dependent)
Changeable During Run — **Yes**
Minimum — 0
Maximum — 200
Units — %

Motor Constant 4 (Rated Slip)

Program ⇒ Motor ⇒ Vector Motor Model

This parameter is used to set the secondary resistance of the motor.

An increase in this parameter setting results in an increase of compensation for motor slip.

Direct Access Number — F413
Parameter Type — **Numerical**
Factory Default — (ASD-Dependent)
Changeable During Run — **Yes**
Minimum — 0.01
Minimum — 25.00
Units — %

Exciting Strengthening Coefficient

Program ⇒ Special ⇒ Special Parameters

This parameter is used to increase the magnetic flux of the motor at low-speed. This feature is useful when increased torque at low speeds is required.

Direct Access Number — F415
Parameter Type — **Numerical**
Factory Default — **100**
Changeable During Run — **Yes**
Minimum — 100
Maximum — 130
Units — %

Stall Prevention Factor 1

Direct Access Number — F416

Program ⇒ Protection ⇒ Stall

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **No**

Minimum — 10

Maximum — 250

This parameter is to be adjusted in the event that the motor stalls when operated above the base frequency.

If a momentary heavy load occurs the motor may stall before the load current reaches the stall prevention level setting of F601.

A drop in the supply voltage may cause fluctuations of the load current or may cause motor vibration. A gradual adjustment of this parameter may alleviate this condition.

Start with a setting of 85 at these parameters and gradually adjust them from there one at a time until the desired results are produced.

Adjustments to this parameter may increase the load current of the motor and subsequently warrant an adjustment at the **Motor Overload Protection Level** setting.

Torque Command

Direct Access Number — F420

Program ⇒ Torque ⇒ Torque Control

Parameter Type — **Selection List**

Factory Default — **Panel Keypad (F725 Setting)**

Changeable During Run — **Yes**

When operating in the **Torque Control** mode, this parameter allows the user to select the source of the torque command signal.

Settings:

V/I
RR
RX
Panel Keypad (F725 Setting)
RS485 2-Wire
RS485 4-Wire
Communication Option Board
RX2 Option (AI1)

Tension Torque Bias Input

Direct Access Number — F423

Program ⇒ Torque ⇒ Torque Control

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the **Tension Torque Bias** input function.

This feature is enabled by selecting a **Tension Torque Bias** input signal source.

Settings:

Disabled
V/I
RR
RX
Panel Keypad (Not Used)
RS485 2-Wire
RS485 4-Wire
Communication Option Board
RX2 Option (AI1)

Load Sharing Gain Input

Direct Access Number — F424

Program ⇒ Torque ⇒ Torque Control

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the **Load Sharing Gain** input function.

This feature is enabled by selecting a **Load Sharing Gain** input signal source.

Settings:

Disabled
V/I
RR
RX
Panel Keypad
RS485 2-Wire
RS485 4-Wire
Communication Option Board
RX2 Option (AI1)

Forward Speed Limit Input

Direct Access Number — F425

Program ⇒ Torque ⇒ Torque Speed Limiting

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the **Forward Speed Limit Input** control function. When enabled and operating in the **Torque Control** mode, the forward speed limit is controlled by the input selected here.

If **Setting** is selected, the value set at F426 is used as the **Forward Speed Limit** input.

Settings:

Disabled
V/I
RR
RX
F426 Setting

Forward Speed Limit Level

Direct Access Number — F426

Program ⇒ Torque ⇒ Torque Control

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Upper Limit** (F012)

Units — Hz

This parameter provides a value to be used as the **Forward Speed Limit** setting if F426 **Setting** is selected at F425.

Reverse Speed Limit Input

Direct Access Number — F427

Program ⇒ Torque ⇒ Torque Control

Parameter Type — **Selection List**

Factory Default — **F428 Setting**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the **Reverse Speed Limit Input** control function. When enabled and operating in the **Torque Control** mode, the reverse speed limit is controlled by the terminal selected here. If **Setting** is selected, the value set at F428 is used as the **Reverse Speed Limit** input.

Settings:

Disabled
V/I
RR
RX
F428 Setting

Reverse Speed Limit Input Level

Direct Access Number — F428

Program ⇒ Torque ⇒ Torque Control

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Upper Limit** (F012)

Units — Hz

This parameter provides a value to be used as the **Reverse Speed Limit** setting if **Setting** is selected at F427.

Speed Limit (Torque=0) Center Value Reference

Direct Access Number — F430

Program ⇒ Torque ⇒ Torque Speed Limiting

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

The system has the ability to limit the amount that the speed may vary as a function of a changing load while operating in the **Torque Control** mode. This parameter sets the input terminal that will be used to control the allowable speed variance.

Settings:

Disabled
V/I
RR
RX
F431 Setting

Speed Limit (Torque=0) Center Value

Direct Access Number — F431

Program ⇒ Torque ⇒ Torque Speed Limiting

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

The system has the ability to limit the amount that the speed may vary as a function of a changing load while operating in the **Torque Control** mode. This parameter sets the targeted speed. The plus-or-minus value (range) for this setting may be set at F432.

Speed Limit (Torque=0) Band

Direct Access Number — F432

Program ⇒ Torque ⇒ Torque Speed Limiting

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

The system has the ability to limit the amount that the speed may vary as a function of a changing load while operating in the **Torque Control** mode. This parameter sets a plus-or-minus value (range) for the **Speed Limit Torque Level** (F431).

Allow Specified Direction ONLY

Direct Access Number — F435

Program ⇒ Torque ⇒ Torque Speed Limiting

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

This parameter **Enables/Disables** the **Forward Run** or **Reverse Run** mode.

If either direction is disabled, commands received for the disabled direction will not be recognized.

If both directions are disabled, the received direction command will determine the direction of the motor rotation.

Settings

Disabled
Enabled

Power Running Torque Limit 1

Direct Access Number — F440

Program ⇒ Torque ⇒ Torque Limit

Parameter Type — **Selection List**

Factory Default —**F441 Setting**

Changeable During Run — **Yes**

This parameter determines the source of the control signal for the positive torque limit setting.

If **Setting** is selected, the value set at F441 is used as the **Power Running Torque Limit 1** input.

Settings:

V/I
RR
RX
F441 Setting

Power Running Torque Limit 1 Level

Direct Access Number — F441

Program ⇒ Torque ⇒ Torque Limit

Parameter Type — **Numerical**

Factory Default — **250.0 (Disabled)**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 250.0 (Disabled)

Units — %

This parameter provides a value for the **Power Running Torque Limit 1** setting if F441 **Setting** is selected at parameter F440.

This value provides the positive torque upper limit for the #1 motor.

Dynamic Braking Torque Limit 1

Program ⇒ Torque ⇒ Torque Limit

This parameter determines the source of the **Regenerative Torque Limit** control signal.

If **Setting** is selected, the value set at F443 is used for this parameter.

Settings:

V/I
RR
RX
F443 Setting

Direct Access Number — F442
Parameter Type — **Selection List**
Factory Default — **F443 Setting**
Changeable During Run — **Yes**

Dynamic Braking Torque Limit 1 Level

Program ⇒ Torque ⇒ Torque Limit

This parameter provides a value to be used as the **Regeneration Torque Limit 1** if F443 **Setting** is selected at parameter F442.

Set this parameter to **250%** to disable this function.

Direct Access Number — F443
Parameter Type — **Numerical**
Factory Default — **250.0 (Disabled)**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 249.9
Units — %

Power Running Torque Limit 2 Level

Program ⇒ Torque ⇒ Manual Torque Limit

This parameter is used to set the positive torque upper limit for the #2 motor profile when multiple motors are controlled by a single ASD or when a single motor is to be controlled by multiple profiles.

Direct Access Number — F444
Parameter Type — **Numerical**
Factory Default — **250.0 (Disabled)**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 250.0 (Disabled)
Units — %

Dynamic Braking Torque Limit 2 Level

Program ⇒ Torque ⇒ Manual Torque Limit

This parameter is used to set the negative torque upper limit for the #2 motor profile when multiple motors are controlled by a single ASD or when a single motor is to be controlled by multiple profiles.

Direct Access Number — F445
Parameter Type — **Numerical**
Factory Default — **250.0 (Disabled)**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 250.0 (Disabled)
Units — %

Power Running Torque Limit 3 Level

Program ⇒ Torque ⇒ Manual Torque Limit

This parameter is used to set the positive torque upper limit for the #3 motor profile when multiple motors are controlled by a single ASD or when a single motor is to be controlled by multiple profiles.

Direct Access Number — F446
Parameter Type — **Numerical**
Factory Default — **250.0 (Disabled)**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 250.0 (Disabled)
Units — %

Dynamic Braking Torque Limit 3 Level

Program ⇒ Torque ⇒ Manual Torque Limit

This parameter is used to set the negative torque upper limit for the #3 motor profile when multiple motors are controlled by a single ASD or when a single motor is to be controlled by multiple profiles.

Direct Access Number — F447
Parameter Type — **Numerical**
Factory Default — **250.0 (Disabled)**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 250.0 (Disabled)
Units — %

Power Running Torque Limit 4 Level

Program ⇒ Torque ⇒ Manual Torque Limit

This parameter is used to set the positive torque upper limit for the #4 motor profile when multiple motors are controlled by a single ASD or when a single motor is to be controlled by multiple profiles.

Direct Access Number — F448
Parameter Type — **Numerical**
Factory Default — **250.0 (Disabled)**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 250.0 (Disabled)
Units — %

Dynamic Braking Torque Limit 4 Level

Program ⇒ Torque ⇒ Manual Torque Limit

This parameter is used to set the negative torque upper limit for the #4 motor profile when multiple motors are controlled by a single ASD or when a single motor is to be controlled by multiple profiles.

Direct Access Number — F449
Parameter Type — **Numerical**
Factory Default — **250.0 (Disabled)**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 250.0 (Disabled)
Units — %

Accel/Decel Operation After Torque Limit

Program ⇒ Torque ⇒ Torque Limit

In a Crane/Hoist application that is operating using a mechanical brake, this parameter is used to minimize the delay between the brake release and the output torque reaching a level that can sustain the load.

This setting may reference time or the operating speed of the motor.

Settings:

In Sync with Accel/Decel
In Sync with Minimum Time

Direct Access Number — F451
Parameter Type — **Selection List**
Factory Default — **In Sync with Accel/Decel**
Changeable During Run — **Yes**

Power Running Stall Continuous Trip Detection Time

Program ⇒ Protection ⇒ Stall

This parameter is used to extend the **Over-Voltage Stall** (F305) and the **Over-Current Stall** (F017) time settings.

Direct Access Number — F452
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 1.0
Units — Seconds

Dynamic Braking Stall Prevention Mode

Direct Access Number — F453

Program ⇒ Protection ⇒ Stall

Parameter Type — **Selection List**

Factory Default — **Enabled**

Changeable During Run — **Yes**

The function of this parameter is to disable the **Over-Voltage Stall** (F305) and the **Over-Current Stall** (F017) function during regeneration only.

Application-specific conditions may occur that warrant disabling the **Stall** function during regeneration.

Settings:

Disabled (Stall During Dynamic Braking)
Enabled (No Stall During Dynamic Braking)

Current Control Proportional Gain

Direct Access Number — F458

Program ⇒ Feedback ⇒ PG

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **No**

Minimum — 0.0

Maximum — 100.0

This parameter sets the sensitivity of the ASD when monitoring the output current to control speed.

The larger the value entered here, the more sensitive the ASD is to changes in the received feedback.

Speed Loop Proportional Gain

Direct Access Number — F460

Program ⇒ Feedback ⇒ PG

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **No**

Minimum — 1

Maximum — 9999

During closed-loop operation, this parameter sets the response sensitivity of the ASD when monitoring the output speed for control.

The larger the value entered here, the larger the change in the output speed for a given received feedback signal.

Speed Loop Stabilization Coefficient

Direct Access Number — F461

Program ⇒ Feedback ⇒ PG

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 1

Maximum — 9999

During closed-loop operation, this parameter sets the response sensitivity of the ASD when monitoring the output speed for control.

The larger the value entered here, the quicker the response to changes in the received feedback.

Load Moment of Inertia 1

Direct Access Number — F462

Program ⇒ Feedback ⇒ PG

Parameter Type — **Numerical**

Factory Default — **35**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

This parameter is used for calculating accel/decel torque when compensating for load inertia while operating in the **Drooping Control** mode.

Second Speed Loop Proportional Gain

Direct Access Number — F463

Program ⇒ Feedback ⇒ PG

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **No**

Minimum — 1

Maximum — 9999

During closed-loop operation, this parameter sets the sensitivity of the ASD when monitoring the output speed for control.

The larger the value entered here, the more sensitive the ASD is to changes in the received feedback.

Second Speed Loop Stabilization Coefficient

Program ⇒ Feedback ⇒ PG

During closed-loop operation, this parameter sets the response sensitivity of the ASD when monitoring the output speed for control.

The larger the value entered here, the quicker the response to changes in the received feedback.

Direct Access Number — F464
Parameter Type — **Numerical**
Factory Default — **1**
Changeable During Run — **Yes**
Minimum — 1
Maximum — 9999

Load Moment of Inertia 2

Program ⇒ Feedback ⇒ PG

This parameter is used for calculating accel/decel torque when compensating for load inertia while operating in the **Drooping Control** mode.

Direct Access Number — F465
Parameter Type — **Numerical**
Factory Default — **35**
Changeable During Run — **Yes**
Minimum — 0
Maximum — 100

Speed PID Switching Frequency

Program ⇒ Feedback ⇒ Feedback

While running, this parameter establishes the threshold speed setting that is used to determine if PID control may engage or remain engaged if active.

Direct Access Number — F466
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — **Max. Freq.** (**F011**)
Units — Hz

V/I Input Bias

Program ⇒ Frequency ⇒ Speed Reference Setpoints

This parameter is used to fine-tune the bias of the **V/I** input terminals.

Note: *See note on pg. 55 for additional information on the **V/I** terminal.*

This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system.

This is accomplished by setting the input source to zero and adjusting this setting to provide an output of zero from the ASD.

Direct Access Number — F470
Parameter Type — **Numerical**
Factory Default — **127**
Changeable During Run — **Yes**
Minimum — 0
Maximum — 255

V/I Input Gain

Program ⇒ Frequency ⇒ Speed Reference Setpoints

This parameter is used to fine tune the gain of the **V/I** input terminals.

Note: *See note on pg. 55 for additional information on the **V/I** terminal.*

This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system.

This is accomplished by setting the input source to 100% and adjusting this setting to provide an output of 100% from the ASD.

Direct Access Number — F471
Parameter Type — **Numerical**
Factory Default — **129**
Changeable During Run — **Yes**
Minimum — 0
Maximum — 255

RR Input Bias

Direct Access Number — F472

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **128**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

This parameter is used to fine tune the bias of the **RR** input terminal when this terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system.

This is accomplished by setting the input source to zero and adjusting this setting to provide an output of zero from the ASD.

RR Input Gain

Direct Access Number — F473

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **154**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

This parameter is used to fine tune the gain of the **RR** input terminal when this terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system.

This is accomplished by setting the input source to 100% and adjusting this setting to provide an output of 100% from the ASD.

RX Input Bias

Direct Access Number — F474

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **127**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

This parameter is used to fine tune the bias of the **RX** input terminal when this terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system.

This is accomplished by setting the input source to zero and adjusting this setting to provide an output of zero from the ASD.

RX Input Gain

Direct Access Number — F475

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **127**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

This parameter is used to fine tune the gain of the **RX** input terminal when this terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system.

This is accomplished by setting the input source to 100% and adjusting this setting to provide an output of 100% from the ASD.

RX2 Option (AI1) Input Bias

Direct Access Number — F476

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **128**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

This parameter is used to fine tune the bias of the **RX2** (AI1) input terminal when this terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system.

This is accomplished by setting the input source to zero and adjusting this setting to provide a zero output from the ASD.

RX2 Option (AI1) Input Gain

Direct Access Number — F477

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **128**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

This parameter is used to fine tune the gain of the **RX2** (AI1) input terminal when this terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system.

This is accomplished by setting the input source to 100% and adjusting this setting to provide an output of 100% from the ASD.

V/I Input Bias (AI2 Option Board Input)

Direct Access Number — F478

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **128**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

This parameter is used to fine tune the bias of the **Optional AI2** input terminal when this terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system.

This is accomplished by setting the input source to zero and adjusting this setting to provide a zero output from the ASD.

V/I Input Gain (AI2 Option Board Input)

Direct Access Number — F479

Program ⇒ Frequency ⇒ Speed Reference Setpoints

Parameter Type — **Numerical**

Factory Default — **128**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

This parameter is used to fine tune the gain of the **Optional AI2** input terminal when this terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system.

This is accomplished by setting the input source to 100% and adjusting this setting to provide an output of 100% from the ASD.

Bearing Greaser Speed Multiplier

Direct Access Number — F489

Program ⇒ Crane/Hoist

Parameter Type — **Numerical**

Factory Default — **0.50**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 1.00

This parameter is used to reduce the motor speed once the **Bearing Greaser (Alarm) Time** (F621) setting has expired.

Upon expiration of the **Bearing Greaser (Alarm) Time** setting, the commanded speed is multiplied by the factor set at this parameter to modify the speed of the motor.

Creep Multiplier 1

Direct Access Number — F490

Program ⇒ Crane/Hoist ⇒ Creep Control

Parameter Type — **Numerical**

Factory Default — **0.10**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 1.00

This parameter provides a modifier for the output frequency of the ASD that multiplies the commanded frequency by the value set at this parameter.

The **Creep Multiplier 1** function may be activated via the **EOI** or a discrete input terminal on the **ACE G9-120V-PCB** (Creep Speed 1).

This parameter setting has priority over the **Creep Multiplier 2** (F491) setting.

Creep Multiplier 2

Direct Access Number — F491

Program ⇒ Crane/Hoist ⇒ Creep Control

Parameter Type — **Numerical**

Factory Default — **0.10**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 1.00

This parameter provides a modifier for the output frequency of the ASD that multiplies the commanded frequency by the value set at this parameter.

The **Creep Multiplier 2** function may be activated via the **EOI or** a discrete input terminal on the **ACE G9-120V-PCB** (Creep Speed 2).

The **Creep Multiplier 2** function is ignored if the **Creep Multiplier 1** (F490) function is active.

Creep Speed Lower Limit

Direct Access Number — F492

Program ⇒ Crane/Hoist ⇒ Creep Control

Parameter Type — **Numerical**

Factory Default — **0.60**

Changeable During Run — **No**

Minimum — 0.00

Maximum — 30.0

Units — Hz

This parameter sets the lower limit while operating in the **Creep** mode.

This setting supersedes the **Lower-Limit Frequency** setting of F013.

Express Stop

Direct Access Number — F493

Program ⇒ Crane/Hoist

Parameter Type — **Selection**

Factory Default — **Disabled**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the ability of the ASD to use an alternate **Decel** rate when a **Stop** command is received.

The **Express-Stop Deceleration Time** is set at F511.

Settings:

Disabled
Enabled

Plugging

Direct Access Number — F494

Program ⇒ Crane/Hoist

Parameter Type — **Selection**

Factory Default — **Disabled**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the **Plugging** feature of the ASD. **Plugging** assigns alternate **Acceleration** and **Deceleration** time settings to be used during a direction change only.

The **Plugging** acceleration and deceleration times are set at parameters F514 and F515, respectively.

This parameter is further defined by the **ACC/DEC Pattern** selection of F516.

Settings:

Disabled
Enabled

PM Motor Constant 1 (D Axis Inductance)

Direct Access Number — F498

Program ⇒ Motor ⇒ PM Motor

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

Units — %

This parameter is used with synchronous motor applications only.

Contact ACE World Companies Customer Support Center for information on this parameter.

PM Motor Constant 2 (Q Axis Inductance)

Direct Access Number — F499

Program ⇒ Motor ⇒ PM Motor

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

Units — %

This parameter is used with synchronous motor applications only.

Contact ACE World Companies Customer Support Center for information on this parameter.

Acceleration Time 2

Direct Access Number — F500

Program ⇒ Special ⇒ Acc/Dec 1 – 4

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000.0

Units — Seconds

This parameter specifies the time in seconds for the output of the ASD to go from 0.0 Hz to the **Maximum Frequency** for the **#2 Deceleration** profile.

The Accel/Decel pattern may be set using F503. This parameter may be further defined by the settings of F506 – F509.

Note: *An acceleration time shorter than that which the load will allow may cause nuisance tripping and mechanical stress to loads.* ***Automatic Accel/Decel****,* ***Stall****, and* ***Ridethrough*** *settings may lengthen the actual acceleration times.*

Deceleration Time 2

Program ⇒ Fundamental ⇒ Acc/Dec 1

This parameter specifies the time in seconds for the output of the ASD to go from the **Maximum Frequency** to 0.0 Hz for the **#2 Deceleration** profile.

The Accel/Decel pattern may be set using F503. This parameter may be further defined by the settings of F506 – F509.

Note: *A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads.* ***Automatic Accel/Decel****,* ***Stall****, and* ***Ridethrough*** *settings may lengthen the actual deceleration times.*

Direct Access Number — F501

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

Acc/Dec Pattern 1

Direct Access Number — F502

Program ⇒ Special ⇒ Accel/Decel 1 – 4

Parameter Type — **Selection List**

Factory Default — **Linear**

Changeable During Run — **Yes**

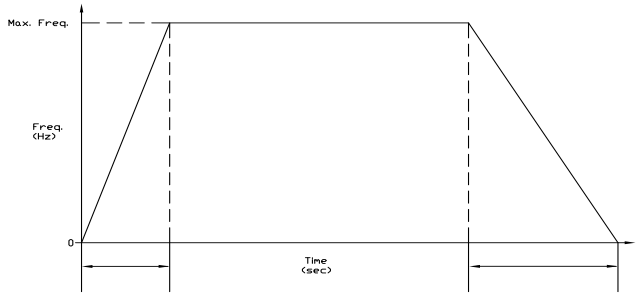
This parameter enables a user-selected preprogrammed output profile that controls the acceleration and deceleration pattern for the **#1 Accel/Decel** profile.

Settings:

Linear
S-Pattern 1
S-Pattern 2

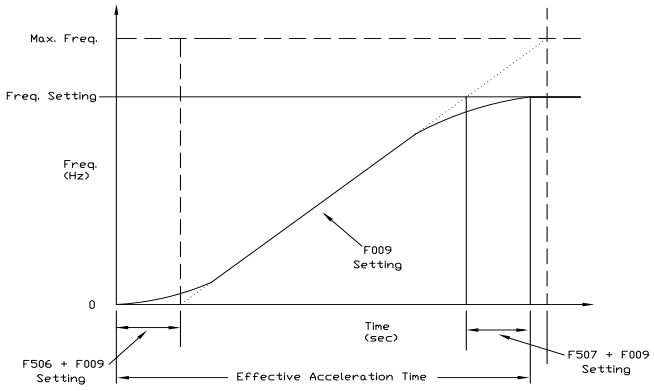
The figures below provide a profile of the available accel/decel patterns.

Linear acceleration and deceleration is the default pattern and is used on most applications.



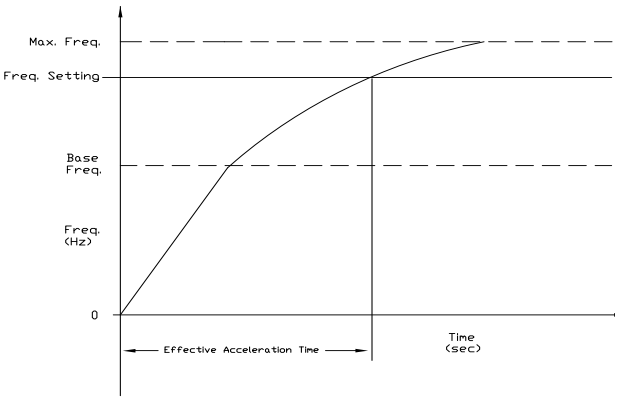
Linear Acceleration/Deceleration

S-Pattern 1 is used for applications that require quick acceleration and deceleration. This setting is also popular for applications that require shock absorption at the start of acceleration or deceleration.



S-Pattern Acceleration/Deceleration 1

S-Pattern 2 decreases the rate of change above the base frequency for acceleration and deceleration.



S-Pattern Acceleration/Deceleration 2

Acc/Dec Pattern 2

Program ⇒ Special ⇒ Accel/Decel 1 – 4

This parameter enables a user-selected preprogrammed output profile that controls the acceleration and deceleration pattern for the **#2 Accel/Decel** profile.

See F502 for additional information on this parameter.

Settings:

Linear
S-Pattern 1
S-Pattern 2

Direct Access Number — F503

Parameter Type — **Selection List**

Factory Default — **Linear**

Changeable During Run — **Yes**

Acc/Dec Pattern 1 – 4

Direct Access Number — F504

Parameter Type — **Selection List**

Factory Default — **1**

Changeable During Run — **Yes**

Program ⇒ Special ⇒ Acc/Dec Special

Four acceleration times and four deceleration times may be set up and run individually. One of four accel/decel times may be selected by 1) using this parameter selection, 2) by discrete input terminal, or 3) switched via user-set threshold frequencies.

This parameter is used to select one of the four configured accel/decel profiles to be used.

Settings:

Acc/Dec 1 (F009/F010)
Acc/Dec 2 (F500/F501)
Acc/Dec 3 (F510/F511)
Acc/Dec 4 (F514/F515)

Each Accel/Decel selection is comprised of an **Acceleration Time**, **Deceleration Time**, and a **Pattern** selection. Selection 1, 2, and 3 have a **Switching Frequency** setting. The **Switching Frequency** is used as a threshold frequency that, once reached, the ASD switches to the next **Acc/Dec** selection. **Switching Frequency** settings are used during acceleration and deceleration. A switching frequency setting is not required for **Acc/Dec 4**.

Acc/Dec 1 is set up using parameters F009 (Acc Time), F010 (Dec Time), F502 (Pattern), and F505 (Switching Frequency).

Acc/Dec 2 is set up using parameters F500 (Acc Time), F501 (Dec Time), F503 (Pattern), and F513 (Switching Frequency).

Acc/Dec 3 is set up using parameters F510 (Acc Time), F511 (Dec Time), F512 (Pattern), and F517 (Switching Frequency).

Acc/Dec 4 is set up using parameters F514 (Acc Time), and F515 (Dec Time), F516 (Pattern).

This parameter (F504) is used to manually select **Acc/Dec 1 – 4**.

To switch using the **ACE G9-120V-PCB**, assign the functions **Acc/Dec Switching 1** and **Acc/Dec Switching 2** to two discrete input terminals. Activation combinations of the two terminals result in the **Acc/Dec 1 – 4** selections as shown in Table 6.

Figure 31 shows the setup requirements and the resulting output frequency response when using **Switching Frequency** settings to control the **Acc/Dec** response of the ASD output.

While operating using **S-Pattern 1** the system performance may be further defined by the adjustment of parameters F506 – F509. These settings provide for upper and lower **Acc/Dec** limit adjustments. These settings are used to extend or shorten the upper or lower **Acc/Dec** curve.

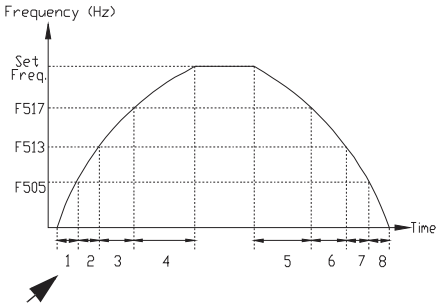
Note: *If operating from the **Local** mode, press **Esc** from the **Frequency Command** screen to access this parameter (ACC/DEC Group).*

Table 6.

Using combinations of discrete terminal activations Accel/Decel profiles 1–4 may be selected.

Acc/Dec Switching Truth		
A/D SW 1	**A/D SW 2**	**Acc/Dec # Out**
0	0	1
0	1	2
1	0	3
1	1	4
1 = Discrete terminal activation.		

Figure 31. Using Acc/Dec Switching.



1 — Accel Time 1 (F009 Setting)
2 — Accel Time 2 (F500 Setting)
3 — Accel Time 3 (F510 Setting)
4 — Accel Time 4 (F514 Setting)
5 — Decel Time 4 (F515 Setting)
6 — Decel Time 3 (F511 Setting)
7 — Decel Time 2 (F501 Setting)
8 — Decel Time 1 (F510 Setting)

Accel/Decel Switching Frequency 1

Direct Access Number — F505

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

Program ⇒ Special ⇒ Accel/Decel Special

This parameter sets the frequency at which the acceleration control is switched from the **Accel 1** profile to the **Accel 2** profile during a multiple-acceleration profile configuration.

S-Pattern Acceleration Lower-Limit Adjustment

Direct Access Number — F506

Program ⇒ Special ⇒ Accel/Decel Special

Parameter Type — **Numerical**

Factory Default — **10**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 50

Units — %

During an **S-Pattern 1** or **2** sequence, this parameter setting modifies the acceleration rate for the lower part of the acceleration curve by the percentage set here.

This function is commonly used with transportation and lifting applications.

See parameter F502 on pg. 170 for additional information on this setting.

S-Pattern Acceleration Upper-Limit Adjustment

Direct Access Number — F507

Program ⇒ Special ⇒ Accel/Decel Special

Parameter Type — **Numerical**

Factory Default — **10**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 50

Units — %

During an **S-Pattern 1** or **2** sequence, this parameter setting modifies the acceleration rate for the upper part of the acceleration curve by the percentage set here.

This function is commonly used with transportation and lifting applications.

See parameter F502 on pg. 170 for additional information on this setting.

S-Pattern Deceleration Lower-Limit Adjustment

Direct Access Number — F508

Program ⇒ Special ⇒ Accel/Decel Special

Parameter Type — **Numerical**

Factory Default — **10**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 50

Units — %

During an **S-Pattern 1** or **2** sequence, this parameter setting modifies the deceleration rate for the lower part of the deceleration curve by the percentage set here.

This function is commonly used with transportation and lifting applications.

See parameter F502 on pg. 170 for additional information on this setting.

S-Pattern Deceleration Upper-Limit Adjustment

Direct Access Number — F509

Program ⇒ Special ⇒ Accel/Decel Special

Parameter Type — **Numerical**

Factory Default — **10**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 50

Units — %

During an **S-Pattern 1** or **2** sequence, this parameter setting modifies the deceleration rate for the upper part of the deceleration curve by the percentage set here.

This function is commonly used with transportation and lifting applications.

See parameter F502 on pg. 170 for additional information on this setting.

Acceleration Time 3

Direct Access Number — F510

Program ⇒ Special ⇒ Accel/Decel 1 – 4

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

This parameter specifies the time in seconds for the output of the ASD to go from 0.0 Hz to the **Maximum Frequency** for the **#3 Acceleration** profile. The Accel/Decel pattern may be set using F502. The minimum Accel/Decel time may be set using F508.

Note: *An acceleration time shorter than that which the load will allow may cause nuisance tripping and mechanical stress to loads.* ***Automatic Accel/Decel****,* ***Stall****, and* ***Ridethrough*** *settings may lengthen the actual acceleration times.*

Express Stop Decel Time

Direct Access Number — F511

Program ⇒ Special ⇒ Accel/Decel 1 – 4

Parameter Type — **Numerical**

Factory Default — **1.5**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

This parameter specifies the time in seconds for the output of the ASD to go from the **Maximum Frequency** to 0.0 Hz during an **Express Stop**. When enabled at F493, this setting is used as an alternate deceleration time.

The **Accel/Decel Pattern** may be set using F512.

This parameter may be further defined by the settings of F506 – F509.

Note: *A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads.* ***Automatic Accel/Decel****,* ***Stall****, and* ***Ridethrough*** *settings may lengthen the actual deceleration times.*

Express Stop Acceleration/Deceleration Pattern

Direct Access Number — F512

Program ⇒ Special ⇒ Accel/Decel 1 – 4

Parameter Type — **Selection List**

Factory Default — **Linear**

Changeable During Run — **Yes**

This parameter enables a user-selected preprogrammed output profile that controls the acceleration and deceleration pattern during an **Express Stop**.

See F502 for additional information on this parameter.

Settings:

Linear
S-Pattern 1
S-Pattern 2

Acceleration/Deceleration Switching Frequency 2

Direct Access Number — F513

Program ⇒ Special ⇒ Accel/Decel Special

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter sets the frequency at which the acceleration control is switched from the **Accel #2** profile to the **Accel #3** profile during a multiple-acceleration profile configuration.

Plugging Acceleration Time

Direct Access Number — F514

Program ⇒ Special ⇒ Accel/Decel 1 – 4

Parameter Type — **Numerical**

Factory Default — **1.5**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

This parameter specifies the time in seconds for the output of the ASD to go from 0.0 Hz to the **Maximum Frequency** during **Plugging**. When enabled at F494, this setting is used as an alternate acceleration time.

The **Plugging Acc/Dec Pattern** may be selected at F516.

This parameter may be further defined by the settings of F506 – F509.

See F494 for additional information on the **Plugging** function.

Note: *An acceleration time shorter than that which the load will allow may cause nuisance tripping and mechanical stress to loads.* ***Automatic Accel/Decel****,* ***Stall****, and* ***Ridethrough*** *settings may lengthen the actual acceleration times.*

Plugging Deceleration Time

Direct Access Number — F515

Program ⇒ Special ⇒ Accel/Decel 1 – 4

Parameter Type — **Numerical**

Factory Default — **1.5**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

This parameter specifies the time in seconds for the output of the ASD to go from the **Maximum Frequency** to 0.0 Hz during **Plugging**. When enabled at F494, this setting is used as an alternate deceleration time.

The **Plugging Acc/Dec Pattern** may be selected at F516.

This parameter may be further defined by the settings of F506 – F509.

See F494 for additional information on the **Plugging** function.

Note: *A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. **Automatic Accel/Decel**, **Stall**, and **Ridethrough** settings may lengthen the actual deceleration times.*

Plugging Acceleration/Deceleration Pattern

Direct Access Number — F516

Program ⇒ Special ⇒ Accel/Decel 1 – 4

Parameter Type — **Selection List**

Factory Default — **Linear**

Changeable During Run — **Yes**

This parameter enables a user-selected preprogrammed output profile that controls the acceleration and deceleration pattern while **Plugging**.

See F502 for additional information on this parameter.

Settings:

Linear
S-Pattern 1
S-Pattern 2

Acceleration/Deceleration Switching Frequency 3

Direct Access Number — F517

Program ⇒ Special ⇒ Accel/Decel Special

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter sets the frequency at which the acceleration control is switched from the **Accel #3** profile to the **Accel #4** profile during a multiple-acceleration profile configuration.

Motor Overload Protection Level 1

Direct Access Number — F600

Program ⇒ Fundamental ⇒ Motor Set 1

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 10

Maximum — 100.0

Units — %

This parameter specifies the motor overload current level for motor set 1. This value is entered as either a percentage of the full-load rating of the ASD or as a percentage of the FLA of the motor.

The unit of measurement for this parameter may be set to **A/V** (Amps) or it may be set as a percentage of the ASD rating. The nameplate FLA of the motor may be entered directly when **Amps** is selected as the unit of measurement (see F701 to change the display unit).

Motor Overload Protection Level 1 settings will be displayed in **Amps** if the **EOI** display units are set to **A/V** rather than **%**.

Stall Prevention Level

Direct Access Number — F601

Program ⇒ Protection ⇒ Stall

Parameter Type — **Numerical**

Factory Default — **150**

Changeable During Run — **Yes**

Minimum — 10

Maximum — 165

Units — % (or **A**; see F701 setting)

This parameter specifies the output current level at which the output frequency is reduced in an attempt to prevent a trip. The over-current level is entered as a percentage of the maximum rating of the ASD.

Note: *The **Motor Overload Protection** parameter must enabled at **F017** to use this feature.*

Retain Trip Record at Power Down

Direct Access Number — F602

Program ⇒ Protection ⇒ Trip

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the **Trip Record Retention** setting. When enabled, this feature logs the trip event and retains the trip information when the system powers down. The trip information may be viewed from the (Program ⇒ Utilities ⇒) **Trip History** screen or the **Monitor** screen.

When disabled, the trip information will be cleared when the system powers down.

Settings:

Disabled
Enabled

Emergency Off Mode

Direct Access Number — F603

Program ⇒ Protection ⇒ Emergency Off

Parameter Type — **Selection List**

Factory Default — **Coast Stop**

Changeable During Run — **No**

This parameter determines the method used to stop the motor in the event that an **Emergency Off** command is received and the system is configured to use this feature.

This setting may also be associated with the **BRAKE** terminals to allow the **BRAKE** relay to change states when an **EOFF** condition occurs by setting the **BRAKE** output to **Emergency Off Active** (see F132).

Note: *A supplemental emergency stopping system should be used with the ASD. Emergency stopping should not be a task of the ASD alone.*

Settings:

Coast Stop
Deceleration Stop
DC Injection Braking Stop
Deceleration Stop (Decel 4 setting; F515)

Emergency Off DC Braking Control Time

Direct Access Number — F604

Program ⇒ Protection ⇒ Emergency Off

Parameter Type — **Numerical**

Factory Default — **1.0**

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 20.0

Units — Seconds

When **DC Injection** is selected at F603 this parameter determines the time that the **DC Injection** braking is applied to the motor.

ASD Output Phase Failure Detection

Direct Access Number — F605

Program ⇒ Protection ⇒ Phase Loss

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

This parameter **Enables/Disables** the monitoring of each phase of the 3-phase output signal (U, V, or W) of the ASD. If either line is missing, inactive, or not of the specified level for one second or more, the ASD incurs a trip.

Note: *Autotune checks for phase failures regardless of this setting.*

Settings:

Disabled (No Detection)
Enabled (Run at Startup and Retry)
Enabled (Every Run Command and Retry)
Enabled (During Run)
Enabled (At Startup and During Run)
Enabled (Detects an ALL-PHASE Failure ONLY - Will Not Trip, Restarts at Reconnect)

Overload Reduction Start Frequency

Direct Access Number — F606

Program ⇒ Protection ⇒ Overload

Parameter Type — **Numerical**

Factory Default — **6.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 30.00

Units — Hz

This parameter is primarily used with V/f motors. It is used to reduce the starting frequency at which the **Overload Reduction** function begins and is useful during extremely low-speed motor operation.

During very low-speed operation the cooling efficiency of the motor decreases. Lowering the start frequency of the **Overload Reduction** function aides in minimizing the generated heat and precluding an **Overload** trip.

This function is useful in loads such as fans, pumps, and blowers that have the square reduction torque characteristic.

Set parameter F607 to the desired **Overload Time Limit**.

Motor 150% Overload Time Limit

Direct Access Number — F607

Program ⇒ Protection ⇒ Overload

Parameter Type — **Numerical**

Factory Default — **300**

Changeable During Run — **Yes**

Minimum — 10

Maximum — 2400

Units — Seconds

This parameter establishes a time that the motor may operate at 150% of its rated current before tripping. This setting applies the time/150% reference to the individual settings of each motor (e.g., this setting references 150% of the F600 setting for the #1 motor).

The unit will trip sooner than the time entered here if the overload is greater than 150%.

ASD Input Phase Failure Detection

Direct Access Number — F608

Program ⇒ Protection ⇒ Phase Loss

Parameter Type — **Selection List**

Factory Default — **Enabled**

Changeable During Run — **No**

This parameter enables the 3-phase input power phase loss detection feature. A loss of either input phase (R, S, or T) results in a trip.

Settings:

Disabled
Enabled

Low-Current Detection Hysteresis Width

Program ⇒ Protection ⇒ Low Current

During a momentary low-current condition, this parameter provides a current threshold level to which the low-current condition must return within the time setting of F612 or a **Low-Current Trip** will be incurred.

Direct Access Number — F609
Parameter Type — **Numerical**
Factory Default — **10**
Changeable During Run — **Yes**
Minimum — 1
Maximum — 20
Units — %

Low-Current Trip

Program ⇒ Protection ⇒ Low Current

This parameter **Enables/Disables** the low-current trip feature.

When enabled, the ASD will trip on a low-current fault if the output current of the ASD falls below the level defined at F611 and remains there for the time set at F612.

Settings:

Disabled
Enabled

Direct Access Number — F610
Parameter Type — **Selection List**
Factory Default — **Disabled**
Changeable During Run — **No**

Low-Current Detection Current

Program ⇒ Protection ⇒ Low Current

With the **Low-Current Trip** (F610) parameter enabled, this function sets the low-current trip threshold.

The threshold value is entered as a percentage of the maximum rating of the ASD.

Direct Access Number — F611
Parameter Type — **Numerical**
Factory Default — **0**
Changeable During Run — **Yes**
Minimum — 0
Maximum — 100
Units — % (or A; see F701 setting)

Low-Current Detection Time

Program ⇒ Protection ⇒ Low Current

With the **Low-Current Trip** (F610) parameter enabled, this function sets the time that the low-current condition must exist to cause a trip.

Direct Access Number — F612
Parameter Type — **Numerical**
Factory Default — **0**
Changeable During Run — **Yes**
Minimum — 0
Maximum — 255
Units — Seconds

Short Circuit Detection At Start

Program ⇒ Protection ⇒ Special Protection Parameters

This parameter determines when the system will perform an **Output Short Circuit** test.

Note: *Selection 3 is recommended for high-speed motor applications. Because of the low impedance of high-speed motors the standard-pulse setting may result in a motor malfunction.*

Settings:

Every Start (Standard Pulse)
Power On or Reset (Standard Pulse)
Every Start (Short Pulse)
Power On or Reset (Short Pulse)

Direct Access Number — F613
Parameter Type — **Selection List**
Factory Default — **Every Start** (standard pulse)
Changeable During Run — **No**

Over-Torque Trip

Program ⇒ Protection ⇒ Over-Torque Parameters

This parameter **Enables/Disables** the **Over-Torque Tripping** function.

When enabled, the ASD trips if an output torque value greater than the setting of F616 or F617 exists for a time longer than the setting of F618.

When disabled, the ASD does not trip due to over-torque conditions.

Note: *A discrete output terminal may be activated when an over-torque alarm occurs if so configured (see F130).*

Settings:

Disabled
Enabled

Direct Access Number — F615
Parameter Type — **Selection List**
Factory Default — **Enabled**
Changeable During Run — **No**

Over-Torque Detection Level During Power Running

Program ⇒ Protection ⇒ Over-Torque Parameters

This parameter sets the torque threshold level that is used as a setpoint for over-torque tripping during positive torque. This setting is a percentage of the maximum rated torque of the ASD.

This function is enabled at F615.

Direct Access Number — F616
Parameter Type — **Numerical**
Factory Default — **150.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 250.00
Units — %

Over-Torque Detection Level During Dynamic Braking

Program ⇒ Protection ⇒ Over-Torque Parameters

This parameter sets the torque threshold level that is used as a setpoint for over-torque tripping during negative torque (regen). This setting is a percentage of the maximum rated torque of the ASD.

This function is enabled at F615.

Direct Access Number — F617
Parameter Type — **Numerical**
Factory Default — **180.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 250.00
Units — %

Over-Torque Detection Time

Program ⇒ Protection ⇒ Over-Torque Parameters

This parameter sets the amount of time that the over-torque condition may exceed the tripping threshold level set at F616 and F617 before a trip occurs.

This function is enabled at F615.

Direct Access Number — F618
Parameter Type — **Numerical**
Factory Default — **2.50**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 10.0
Units — Seconds

Over-Torque Detection Hysteresis

Program ⇒ Protection ⇒ Over-Torque Parameters

During a momentary over-torque condition, this parameter provides a torque threshold level to which the over-torque condition must return within the time setting of F618 or an **Over-Torque Trip** will be incurred.

Direct Access Number — F619
Parameter Type — **Numerical**
Factory Default — **10.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 100.00
Units — %

Cooling Fan Control

Direct Access Number — F620

Program ⇒ Protection ⇒ Special Protection Parameters

Parameter Type — **Selection List**

Factory Default — **Always On**

Changeable During Run — **Yes**

This parameter sets the cooling fan run-time command.

Settings:

Automatic
Always On

Bearing Greaser (Alarm) Time

Direct Access Number — F621

Program ⇒ Protection ⇒ Special Protection Parameters

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 65535

Units — Hour

This parameter **Enables/Disables** the **Maintenance Timer Alarm**. The timer sets a run-time value in hours that, once exceeded, initiates the **Maintenance Timer Alarm**.

This setting, in conjunction with the setting of F489, may also affect the commanded speed of the motor by providing a value for the **Bearing Greaser Speed Multiplier**, if so configured.

A discrete output contactor may be set to **Total-Operation-Hours Alarm** to control ancillary equipment (e.g., engage a brake) upon activation of the discrete output contactor.

This feature is disabled by setting this parameter to **Zero**.

See Table 10 on pg. 242 for additional information on output terminal selections.

Abnormal Speed Detection Time

Direct Access Number — F622

Program ⇒ Protection ⇒ Abnormal Speed

Parameter Type — **Numerical**

Factory Default — **1.00**

Changeable During Run — **Yes**

Minimum — 0.01

Maximum — 100.00

Units — Seconds

This parameter sets the time that an over-speed condition must exist to cause a trip.

This parameter functions in conjunction with the settings of F623 and F624.

Over-Speed Detection Frequency Upper Band

Direct Access Number — F623

Program ⇒ Protection ⇒ Abnormal Speed

Parameter Type — **Numerical**

Factory Default — **5.00**

Changeable During Run — **Yes**

Minimum — 0.0 (Disabled)

Maximum — 30.00

Units — Hz

This parameter sets the upper level of the **Base Frequency** range that, once exceeded, will cause an **Over-Speed Detected** alarm.

This parameter functions in conjunction with the settings of F622 and F624.

Over-Speed Detection Frequency Lower Band

Direct Access Number — F624

Program ⇒ Protection ⇒ Abnormal Speed

Parameter Type — **Numerical**

Factory Default — **5.00**

Changeable During Run — **Yes**

Minimum — 0.00 (Disabled)

Maximum — 30.00

Units — Hz

This parameter sets the lower level of the **Base Frequency** range that, once the output speed falls below this setting, will cause a **Speed Drop Detected** alarm.

This parameter functions in conjunction with the settings of F622 and F623.

Over-Voltage Limit Operation Level

Direct Access Number — F626

Program ⇒ Protection ⇒ Stall

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **Yes**

Minimum — 100

Maximum — 150

Units — %

This parameter sets the upper DC bus voltage threshold that, once exceeded, will cause an **Over-Voltage Stall**. An **Over-Voltage Stall** increases the output frequency of the ASD during deceleration for a specified time in an attempt to prevent an **Over-Voltage Trip**.

If the over-voltage condition persists for over 4 mS, an **Over-Voltage Trip** will be incurred.

This parameter is enabled at F305.

Note: *This parameter setting may increase deceleration times.*

Under-Voltage Trip

Direct Access Number — F627

Program ⇒ Protection ⇒ Under-Voltage/Ridethrough

Parameter Type — **Selection List**

Factory Default — **Enabled**

Changeable During Run — **No**

This parameter **Enables/Disables** the **Under-Voltage Trip** function.

With this parameter **Enabled**, the ASD will trip if the under-voltage condition persists for a time greater than the F628 setting.

A user-selected contact may be actuated if so configured.

If **Disabled** the ASD will stop and not trip; the **BRAKE** contacts are not affected.

Settings:

Disabled
Enabled

Under-Voltage (Trip Alarm) Detection Time

Direct Access Number — F628

Program ⇒ Protection ⇒ Under-Voltage/Ridethrough

Parameter Type — **Numerical**

Factory Default — **0.03**

Changeable During Run — **No**

Minimum — 0.01

Maximum — 10.00

Units — Seconds

This parameter sets the time that the under-voltage condition must exist to cause an **Under-Voltage Trip**.

This parameter is enabled at F627.

Regenerative Power Ridethrough Control Level

Direct Access Number — F629

Program ⇒ Protection ⇒ Under-Voltage/Ridethrough

Parameter Type — **Numerical**

Factory Default — (ASD-Dependent)

Changeable During Run — **No**

Minimum — 55

Maximum — 100

Units — %

This parameter is activated during regeneration. It is used to set the low end of the DC bus voltage threshold that, once the bus voltage drops below this setting, activates the setting of F302 (Ridethrough Mode).

Activation may be the result of a momentary power loss or an excessive load on the bus voltage.

During a **Ridethrough**, regenerative energy is used to maintain the control circuitry settings for the duration of the **Ridethrough**; it is not used to drive the motor.

The motor(s) of the system are stopped and then restarted automatically or may continue seamlessly if so configured.

See F302 for additional information on this parameter.

Note: *This parameter setting may increase deceleration times.*

Brake Answer Wait Time

Direct Access Number — F630

Program ⇒ Protection ⇒ Special Protection Parameters

Parameter Type — **Numerical**

Factory Default — **0.0 (Disabled)**

Changeable During Run — **Yes**

Minimum — 0.0 (Disabled)

Maximum — 10.0

Units — Seconds

This parameter is used in conjunction with the discrete input terminal setting **Brake Answerback Input** (see Table 7 on pg. 236 for additional information on this feature).

After activating the discrete input terminal **Braking Request**, the setting of this parameter starts a count-down timer in which 1) a **Brake Answerback Input** response must be received or 2) the brake must release before the timer expires.

Should this timer setting expire before the **Brake Answerback Input** is returned or the brake releases, a **Brake Sequence Response Error** (E-11) is incurred. Otherwise, the brake releases and normal motor operations resume.

ASD Overload

Direct Access Number — F631

Program ⇒ Protection ⇒ Overload

Parameter Type — **Selection List**

Factory Default — **Thermal Detection + Overload**

Changeable During Run — **No**

This parameter is used to protect the ASD from an over-current condition. The standard overload rating of the ACE-tronics G9 ASD is 150% operation for 60 seconds.

This setting allows for the overload protection to be switched from the standard overload detection means (Thermal Detection and Overload) to thermal detection only.

Settings:

Thermal Detection + Overload
Thermal Detection Only

The **Thermal Detection Only** selection is used when multiple devices are installed horizontally as described on pg. 15.

V/I Analog Input Breakage Detection Level

Direct Access Number — F633

Program ⇒ Terminal ⇒ Input Special Functions

Parameter Type — **Numerical**

Factory Default — **0 (Disabled)**

Changeable During Run — **No**

Minimum — 1

Maximum — 100

Units — %

This parameter is enabled by providing a non-zero value here. This function monitors the **V/I** input signal and if the **V/I** input signal falls below the level specified here and remains there for a period of 0.3 seconds or more a trip will be incurred (E-18).

This value is entered as 0% to 100% of the **V/I** input signal range.

Annual Average Ambient Temperature

Direct Access Number — F634

Program ⇒ Special ⇒ Special Parameters

Parameter Type — **Selection List**

Factory Default — **Under 30°**

Changeable During Run — **No**

This parameter is used in conjunction with a discrete output terminal setting to notify the operator of the remaining useful life of critical components of the ASD system.

With a discrete output terminal set to **Part Replacement Alarm** (see Table 10 on pg. 242) and the calculation derived from the parameter setting, maintenance scheduling may be enhanced.

Settings:

Under 10° C (50° F) — 60,000 Hours
Under 20° C (68° F) — 60,000 Hours
Under 30° C (86° F) — 60,000 Hours
Under 40° C (104° F) — 60,000 Hours
Under 50° C (122° F) — 40,000 Hours
Under 60° C (140° F) — 2,666 Hours

Rush Current Suppression Replay Activation Time

Direct Access Number — F635

Program ⇒ Special ⇒ Special Parameters⇒ Rush Relay Current Activation Time

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **No**

Minimum — 0.0

Maximum — 2.5

Units — Seconds

At system startup, this parameter sets a time-delay for the start of the **Rush Relay** activation in an attempt to allow the DC bus voltage to reach the normal operating level before outputting a signal to the motor.

PTC1 Thermal Selection

Direct Access Number — F637

Program ⇒ Special ⇒ Special Parameters⇒ PTC1 Thermal Selection

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

This parameter **Enables/Disables** the optional external thermal detection circuit of the **Expansion IO Card Option 1**. A thermistor is connected from **TH1+** to **TH1-** of **TB3** on the **Expansion IO Card Option 1**.

Should the thermistor resistance reading fall below 50Ω because of an over-temperature condition or exceed 3000Ω because of an open circuit an **External Thermal Fault** (OH2) will be incurred.

Note: *While this parameter is **Enabled**, the system cannot be restarted until the thermistor value recovers to the level of 1.8 kΩ from an over-temperature condition. An **Auto-Restart** will not be initiated subsequent to an **External Thermal Trip** (OH2). A manual restart will be required in the event of an **OH2** trip.*

Settings:

Disabled
Detect Disconnect

PTC2 Thermal Selection

Direct Access Number — F638

Parameter Type — S**election List**

Factory Default — **Disabled**

Changeable During Run — **No**

Program ⇒ Special ⇒ Special Parameters⇒ PTC2 Thermal Selection

This parameter **Enables/Disables** the optional external thermal detection circuit of the **Expansion IO Card Option 2**. A thermistor is connected from **TH1+** to **TH1-** of **TB4** on the **Expansion IO Card Option 2**.

Should the thermistor resistance reading fall below 50Ω because of an over-temperature condition or exceed 3000Ω because of an open circuit an **External Thermal Fault** (OH2) will be incurred.

Note: *While this parameter is **Enabled**, the system cannot be restarted until the thermistor value recovers to the level of 1.8kΩ from an over-temperature condition. An **Auto-Restart** will not be initiated subsequent to an **External Thermal Trip** (OH2). A manual restart will be required in the event of an **OH2** trip.*

Settings:

Disabled
Detect Disconnect

Braking Resistance Overload Time (10x rated torque)

Direct Access Number — F639

Parameter Type — **Numerical**

Factory Default — **5.0**

Changeable During Run — **No**

Minimum — 0.1

Maximum — 600.0

Units — Seconds

Program ⇒ Protection ⇒ Dynamic Braking

This parameter sets the time that the braking resistor is allowed to sustain and overload condition before a trip is incurred.

This feature is useful for applications that have a fluctuating load or for loads that require a long deceleration time.

Step-Out Detection Current Level

Direct Access Number — F640

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 10

Maximum — 150

Units — % (or A; see F701 setting)

Program ⇒ Motor ⇒ PM Motor

This parameter is used with synchronous motor applications only.

Contact ACE World Companies Customer Support Center for information on this parameter.

Step-Out Detection Current Time

Direct Access Number — F641

Parameter Type — **Numerical**

Factory Default — **00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 25.0

Units — Seconds

Program ⇒ Motor ⇒ PM Motor

This parameter is used with synchronous motor applications only.

Contact ACE World Companies Customer Support Center for information on this parameter.

Emergency-Lift

Program ⇒ Emergency Lift

In the event of an encoder malfunction, this parameter may be used to **Enable/Disable** the **Emergency Lift** mode of operation.

In the **Emergency Lift** mode of operation, the hoist-control function switches from closed-loop operation to open-loop operation and does not require or use an encoder feedback signal.

This parameter may be enabled via the **EOI** (set this parameter to Enabled) or via a discrete input terminal (see Table 7 on pg. 236).

Settings:

Disabled
Enabled

Direct Access Number — F656
Parameter Type — **Selection**
Factory Default — **Disabled**
Changeable During Run — **Yes**

Emergency-Lift Maximum Speed

Program ⇒ Emergency Lift

While operating in the **Emergency Lift** mode, this parameter setting determines the maximum commanded speed allowed.

Direct Access Number — F657
Parameter Type — **Numerical**
Factory Default — **30.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 30.00
Units — Hz

Emergency-Lift Lower Speed Limit

Program ⇒ Emergency Lift

When operating in the **Emergency Lift** mode, this parameter sets the lowest frequency that the ASD will accept as a frequency command or frequency setpoint.

Direct Access Number — F658
Parameter Type — **Numerical**
Factory Default — **6.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 30.0
Units — Hz

Emergency-Lift Torque Compare Time

Program ⇒ Emergency Lift

When operating in the **Emergency Lift** mode, the output-torque level requirement for the brake-release function must be met before the brake can release.

This parameter is used to set a time in which the required brake-release torque criteria must be achieved. If this time setting is too short the brake will not release.

Direct Access Number — F659
Parameter Type — **Numerical**
Factory Default — **1.0**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 1000.0
Units — Seconds

Adding Input Selection

Direct Access Number — F660

Program ⇒ Feedback ⇒ Override Control

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the feature that allows for the external adjustment of the **Output Frequency**.

Selecting either of the input methods listed enables this feature. The selected input is used as a modifier of the programmed **Output Frequency**.

Settings:

Disabled
V/I
RR
RX
Panel Keypad
RS485 2-Wire
RS485 4-Wire
Communication Option Board
RX2 Option (AI1)
Option V/I
UP/DOWN Frequency (ACE G9-120V-PCB)
Pulse Input (Option)
Pulse Input (Motor CPU)
Binary/BCD Input (Option)

Multiplying Input Selection

Direct Access Number — F661

Program ⇒ Feedback ⇒ Override Control

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

This parameter **Enables/Disables** the feature that allows for the external adjustment of the commanded frequency.

Selecting either of the input methods listed enables this feature. The selected input is used as a multiplier of the commanded frequency.

If **Setting** (F729) is selected, the % value entered at parameter F729 is used as the multiplier of the commanded frequency.

Settings:

Disabled
V/I
RR
RX
Setting (F729)
RX2 Option (AI1)

AM Output Terminal Function

Direct Access Number — F670

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Selection List**

Factory Default — **Output Current**

Changeable During Run — **Yes**

This parameter is used to set the output function of the **AM** analog output terminal. The **AM** analog output terminal produces an output current that is proportional to the magnitude of the function assigned to this terminal. The available assignments for this output terminal are listed in Table 8 on pg. 240.

AM Terminal Setup Parameters

F670 — Set AM Function
F671 — Calibrate AM Terminal
F685 — Output Response Polarity Selection
F686 — Bias Adjustment

AM Output Terminal Adjustment

Direct Access Number — F671

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Numerical**

Factory Default — **512**

Changeable During Run — **Yes**

Minimum — 1

Maximum — 1280

This parameter is used to calibrate the **AM** analog output.

To calibrate the **AM** analog output connect a voltmeter to the **AM** and **CC** terminals.

With the ASD is running at a known value (e.g., output frequency), adjust this parameter until the associated function of parameter F670 produces the desired DC level output at the **AM** output terminal.

See F670 for additional information on this setting.

MON1 Terminal Meter Selection

Direct Access Number — F672

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Selection List**

Factory Default — **Output Voltage**

Changeable During Run — **Yes**

This parameter is used to set the output function of the **MON1** analog output terminal. The available assignments for this output terminal are listed in Table 8 on pg. 240.

The **MON1** analog output terminal produces an output voltage or current that is proportional to the magnitude of the function assigned to this terminal.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

MON1 Terminal Setup Parameters

F672 — MON1 Output Function
F673 — MON1 Terminal Meter Adjustment
F688 — MON1 Voltage/Current Output Switching
F689 — MON1 Output Gradient Characteristic
F690 — MON1 Bias Adjustment Set Zero Level

MON1 Terminal Meter Adjustment

Direct Access Number — F673

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Numerical**

Factory Default — **512**

Changeable During Run — **Yes**

Minimum — 1

Maximum — 1280

This parameter is used to set the gain of the **MON1** output terminal and is used in conjunction with the settings of parameter F672.

See parameter F672 for additional information on this setting.

MON2 Terminal Meter Selection

Direct Access Number — F674

Parameter Type — **Selection List**

Factory Default — **Output Frequency**

Changeable During Run — **Yes**

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter is used to set the output function of the **MON2** analog output terminal. The available assignments for this output terminal are listed in Table 8 on pg. 240.

The **MON2** analog output terminal produces an output voltage or current that is proportional to the magnitude of the function assigned to this terminal.

Note: *The **Expansion IO Card Option 2** option board (P/N ETB004Z) is required to use this terminal.*

See the ***Expansion IO Card Option 2 Instruction Manual*** (P/N 58686) for additional information on the function of this terminal.

MON2 Terminal Setup Parameters

F674 — MON2 Output Function
F675 — MON2 Terminal Meter Adjustment
F691 — MON2 Voltage/Current Output Switching
F692 — MON2 Output Gradient Characteristic
F693 — MON2 Bias Adjustment Set Zero Level

MON2 Terminal Meter Adjustment

Direct Access Number — F675

Parameter Type — **Numerical**

Factory Default — **512**

Changeable During Run — **Yes**

Minimum — 1

Maximum — 1280

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter is used to set the gain of the **MON2** output terminal and is used in conjunction with the settings of parameter F674.

See parameter F674 for additional information on this setting.

FP Terminal Pulse Output Function

Direct Access Number — F676

Parameter Type — **Selection List**

Factory Default — **Output Frequency**

Changeable During Run — **Yes**

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter sets the functionality of the **FP** output terminal to any one of the user-selectable functions listed in Table 10 on pg. 242.

As the assigned function changes in magnitude or frequency, the pulse count of the **FP** output terminal pulse train changes in direct proportion to changes in the assigned function.

Note: *The duty cycle of the output pulse train remains at 65 ±5.0 µS.*

This parameter is used in conjunction with parameter F677.

Pulse Output Frequency (FP)

Direct Access Number — F677

Parameter Type — **Numerical**

Factory Default — **3.84**

Changeable During Run — **Yes**

Minimum — 1.00

Maximum — 43.20

Units — Pulses/Second

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter scales the **FP** output terminal by setting the pulses-per-second output signal of the **FP** terminal.

See F676 for additional information on this parameter.

FM Voltage/Current Output Switching

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter is used to select the type of output signal provided at the **FM** terminal (i.e., voltage or current).

The output voltage and current range is 0 – 10 VDC and 0 – 20 mA, respectively.

See F005 for additional information on this setting.

Settings:

0 – 10 V
0 – 20 mA

Direct Access Number — F681
Parameter Type — **Selection List**
Factory Default — **0–10V**
Changeable During Run — **No**

FM Output Gradient Characteristic

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter sets the output response polarity of the **FM** output terminal. The **FM** output terminal response may be set to respond inversely (-) or directly (+) to the input signal.

See F005 for additional information on this setting.

Settings:

Minus (Negative Gradient)
Plus (Positive Gradient)

Direct Access Number — F682
Parameter Type — **Selection List**
Factory Default — **Plus**
Changeable During Run — **Yes**

FM Bias Adjustment

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter setting is used to ensure that a zero-level input signal produces a zero-level output at the **FM** terminal.

Set the function of F005 to zero and then set this parameter to zero for proper operation.

See F005 for additional information on this setting.

Direct Access Number — F683
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — -10.0
Maximum — +100.0
Units — %

AM Output Gradient Characteristic

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter sets the output response polarity of the **AM** output terminal.

The **AM** output terminal response may be set to respond inversely (-) or directly (+) to the input signal.

See F670 for additional information on this setting.

Settings:

Minus (Negative Gradient)
Plus (Positive Gradient)

Direct Access Number — F685
Parameter Type — **Selection List**
Factory Default — **Plus**
Changeable During Run — **Yes**

AM Bias Adjustment

Program ⇒ Terminal ⇒ Analog Output Terminals

This parameter setting is used to ensure that a zero-level input signal produces a zero-level output at the **AM** terminal.

Set the function set at F670 to zero and then set this parameter to zero for proper operation.

See F670 for additional information on this setting.

Direct Access Number — F686
Parameter Type — **Numerical**
Factory Default — **0.0**
Changeable During Run — **Yes**
Minimum — -10.0
Maximum — +100.0
Units — %

MON 1 Voltage/Current Output Switching

Direct Access Number — F688

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Selection List**

Factory Default — **0 – 10V**

Changeable During Run — **Yes**

This parameter is used to set the output signal type of the **MON1** output terminal.

Settings

-10 V – +10 V
0 – 10 V
0 – 20 mA

MON 1 Output Gradient Characteristic

Direct Access Number — F689

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Selection List**

Factory Default — **Plus**

Changeable During Run — **Yes**

This parameter sets the output response polarity of the **MON1** output terminal. The **MON1** output terminal response may be set to respond inversely (-) or directly (+) to the input signal.

See parameter F672 for additional information on this setting.

Settings:

Minus (Negative Gradient)
Plus (Positive Gradient)

MON 1 Bias Adjustment

Direct Access Number — F690

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — -10.0

Maximum — 100.0

Units — %

This parameter setting is used to ensure that a zero-level input signal produces a zero-level output at the **MON1** terminal.

Set the assigned function of parameter F672 to zero and then set this parameter to a zero output.

See parameter F672 for additional information on this setting.

MON 2 Voltage/Current Output Switching

Direct Access Number — F691

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Selection List**

Factory Default — **0 – 10V**

Changeable During Run — **Yes**

This parameter is used to set the output signal type of the **MON2** output terminal.

See parameter F674 for additional information on this setting.

Settings

-10 V – +10 V
0 – 10 V
0 – 20 mA

MON 2 Output Gradient Characteristic

Direct Access Number — F692

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Selection List**

Factory Default — **Plus**

Changeable During Run — **Yes**

This parameter sets the output response polarity of the **MON2** output terminal. The **MON2** output terminal response may be set to respond inversely (-) or directly (+) to the input signal.

See parameter F672 for additional information on this setting.

Settings:

Minus (Negative Gradient)
Plus (Positive Gradient)

MON 2 Bias Adjustment

Direct Access Number — F693

Program ⇒ Terminal ⇒ Analog Output Terminals

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — -10.0

Maximum — 100.0

Units — %

This parameter setting is used to ensure that a zero-level input signal produces a zero-level output at the **MON2** terminal.

Set the assigned function of parameter F674 to zero and then set this parameter to a zero output.

See parameter F674 for additional information on this setting.

Parameter Write Lockout

Direct Access Number — F700

Program ⇒ Utilities ⇒ Prohibition

Parameter Type — **Selection List**

Factory Default — **Enabled**

Changeable During Run — **Yes**

This parameter **Enables/Disables** the **Run** and **Stop** keys.

Settings:

Enabled
Disabled

Current/Voltage Units Setup

Direct Access Number — F701

Program ⇒ Utilities ⇒ Display Parameters

Parameter Type — **Selection List**

Factory Default — **%**

Changeable During Run — **Yes**

This parameter sets the unit of measurement for current and voltage values displayed on the **EOI**.

Settings:

%
A/V

Free Unit Multiplication Factor

Direct Access Number — F702

Program ⇒ Utilities ⇒ Display Parameters

Parameter Type — **Numerical**

Factory Default — **0.00 (Off)**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 200.00

This parameter provides a multiplier for the displayed speed value shown on the front panel screen of the ASD.

This parameter may be used to display the rate that a commodity is being processed by the driven load in process units (i.e., units/time).

Example: *An output frequency of 100 Hz would be displayed as 50 Hz if using a multiplier of 0.5 for this parameter.*

Note: *PID frequency-limiting parameters are not affected by this setting (i.e., F364, F365, F367, and F368).*

Free Unit

Direct Access Number — F703

Program ⇒ Utilities ⇒ Display Parameters

Parameter Type — **Selection List**

Factory Default — **All Frequencies**

Changeable During Run — **Yes**

This parameter is used in conjunction with F702 to set the method in which the frequency is displayed on the front panel.

The multiplier setting of F702 will be applied to the display of all frequencies if **All Frequencies** are selected at this parameter.

The multiplier setting of F702 will be applied to parameters F364, F365, F367, and F368 ONLY if **PID Process Data** is selected at this parameter.

Settings:

All Frequencies
PID Process Data

Free Unit Display Gradient Characteristic

Direct Access Number — F705

Program ⇒ Utilities ⇒ Display Parameters

Parameter Type — **Selection List**

Factory Default — **Plus**

Changeable During Run — **Yes**

The ASD-displayed response to output speed changes will be displayed as directly proportional or inversely proportional as a function of this parameter setting.

Selecting **Negative Gradient** displays an increased output speed as going more negative.

Selecting **Positive Gradient** displays an increased output speed as going more positive.

Settings:

Minus (Negative Gradient)
Plus (Positive Gradient)

Free Display Bias

Direct Access Number — F706

Program ⇒ Utilities ⇒ Display Parameters

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

In conjunction with the setting of F702, this parameter sets the bias of the front panel speed display.

The frequency entered here will be multiplied by the setting of F702 and then displayed as the zero value on the front panel screen.

Change Step Selection 1

Direct Access Number — F707

Program ⇒ Utilities ⇒ Display Parameters

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

In conjunction with the parameter setting of F708, this parameter sets the amount that the output speed will increase or decrease for each speed command change entered from the front panel using the **Rotary Encoder**.

Change Step Selection 2

Direct Access Number — F708

Program ⇒ Utilities ⇒ Display Parameters

Parameter Type — **Numerical**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

The parameter is used to modify the degree that the setting of F707 affects the output speed changes that are input from the front panel using the **Rotary Encoder**.

Selecting a zero value here disables this parameter and the resulting non-zero value of parameter setting F707 is output from the ASD.

Selecting a non-zero value here provides a dividend that will be used in the following equation resulting in the actual output frequency applied to the motor.

$$OutputFrequencyDisplayed = InternallyCommandedFrequency \times \frac{F708}{F707}$$

ASD Disposition at ST Deactivation

Direct Access Number — F719

Program ⇒ Special ⇒ Operation Panel Parameters

Parameter Type — **Selection List**

Factory Default — **Retain Panel Run Command**

Changeable During Run — **Yes**

Upon deactivation of the **ST** terminal (if so configured; see F110) while operating in the **Local** mode, the ASD output to the motor will cease — this parameter setting is used to allow for the restart of the motor (ASD output) without user intervention upon the reactivation of the **ST** terminal.

Upon reactivation of the **ST** terminal in this condition the ASD will resume the Run condition and the motor will start (Retain Panel Run Command).

This feature may be **Disabled** and the Run command must be re-initiated by the user for ASD operation (Clear Panel Run Command).

⚠ DANGER

WHEN ENABLED THE ASD WILL RESUME THE RUN CONDITION WHEN THE ST TERMINAL IS REACTIVATED.

Settings:

Clear Panel Run Command
Retain Panel Run Command

Panel Stop Pattern

Direct Access Number — F721

Program ⇒ Special ⇒ Operation Panel Parameters

Parameter Type — **Selection List**

Factory Default — **Deceleration Stop**

Changeable During Run — **Yes**

While operating in the **Local** mode this parameter determines the method used to stop the motor when the stop command is issued via the **EOI**.

The **Decel Stop** setting enables the **Dynamic Braking** system that is setup at F304 or the **DC Injection Braking** system that is setup at F250, F251, and F252.

The **Coast Stop** setting allows the motor to stop at the rate allowed by the inertia of the load.

Settings:

Deceleration Stop
Coast Stop

Note: *The **Stop Pattern** setting has no effect on the **Emergency Off** settings of F603. This parameter may also be accessed by pressing the **ESC** key from the **Frequency Command** screen.*

Panel Torque Command

Direct Access Number — F725

Program ⇒ Special ⇒ Operation Panel Parameters

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — -250.00

Maximum — +250.00

This parameter provides a torque value to be used in the event that **Panel Keypad (F725 Setting)** is selected at parameter F420.

Panel Tension Torque Bias

Program ⇒ Special ⇒ Operation Panel Parameters

This function is not used with the ACE-tronics G9 ASD.

The **Tension Torque Bias** selection is performed at F423.

Direct Access Number — F727
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — -250.00
Maximum — +250.00
Units — %

Panel Load Sharing Gain

Program ⇒ Special ⇒ Operation Panel Parameters

This function is not used with the ACE-tronics G9 ASD.

The **Load Sharing Gain** selection is performed at F424.

Direct Access Number — F728
Parameter Type — **Numerical**
Factory Default — **100.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 250.00
Units — %

Panel Override Multiplication Gain

Program ⇒ Special ⇒ Operation Panel Parameters

This parameter provides a value to be used in the event that **Setting (**F729**)** is selected for the **Frequency Override Multiplying Input** (F661).

Direct Access Number — F729
Parameter Type — **Numerical**
Factory Default — **0.00**
Changeable During Run — **Yes**
Minimum — -100.00
Maximum — 100.00
Units — %

Panel Frequency Lockout

Program ⇒ Special ⇒ Operation Panel Parameters

This function is not used with the ACE-tronics G9 ASD.

Settings:

Unlocked
Locked

Direct Access Number — F730
Parameter Type — **Selection List**
Factory Default — **Unlocked**
Changeable During Run — **Yes**

Panel Emergency Off Lockout

Program ⇒ Special ⇒ Operation Panel Parameters

This function is not used with the ACE-tronics G9 ASD.

Settings:

Unlocked
Locked

Direct Access Number — F734
Parameter Type — **Selection List**
Factory Default — **Unlocked**
Changeable During Run — **No**

Panel Reset Lockout

Program ⇒ Special ⇒ Operation Panel Parameters

This function is not used with the ACE-tronics G9 ASD.

Settings:

Unlocked
Locked

Direct Access Number — F735
Parameter Type — **Selection List**
Factory Default — **Unlocked**
Changeable During Run — **Yes**

Command Mode/Frequency Mode Change Lockout

Direct Access Number — F736

Program ⇒ Utilities ⇒ Prohibition

Parameter Type — **Selection List**

Factory Default — **Locked**

Changeable During Run — **Yes**

This function is not used with the ACE-tronics G9 ASD.

Settings:

Unlocked
Locked

Lockout All Keys

Direct Access Number — F737

Program ⇒ Utilities ⇒ Prohibition

Parameter Type — **Selection List**

Factory Default — **Unlocked**

Changeable During Run — **Yes**

This function is not used with the ACE-tronics G9 ASD.

Settings:

Unlocked
Locked

Trace Selection

Direct Access Number — F740

Program ⇒ Utilities ⇒ Trace

Parameter Type — **Selection List**

Factory Default — **At Trip**

Changeable During Run — **Yes**

In conjunction with parameter F741 – F745, this parameter is used to monitor and store 4 ASD output waveform data points. The data may be read and stored as a function of a trip (At Trip) or it may be initiated by the activation of a discrete terminal activation (At Trigger).

Set a discrete input terminal to **Trace Back Trigger Signal** and activate the terminal to initiate the **At Trigger** read/store function.

Table 12 on pg. 245 lists the items that may be selected for the data read/store function along with the associated communication number for each selection.

The duration of the read/store cycle for the selected items is set at parameter F741.

To acquire and store the data a communications device and a PC are required. The ACE-tronics G9 ASD supports the following communications protocols: RS485 (MODBUS-RTU) Toshiba Protocol, USB Toshiba Protocol, CC-Link, ProfiBus, and DeviceNet (Refer to the manual of each protocol type for additional information).

Trace data may be viewed graphically via Program ⇒ Utilities ⇒ **View Trace Data**.

Settings:

None (Disabled)
At Trip
At Trigger

Trace Cycle

Direct Access Number — F741

Program ⇒ Utilities ⇒ Trace

Parameter Type — **Selection List**

Factory Default — **100 mS**

Changeable During Run — **Yes**

This parameter sets the record time for the **Trace Data** events selected at F742 – F745.

See F740 for additional information on this parameter setting.

Settings:

4 mS
20 mS
100 mS
1 Second
10 Seconds

Trace Data 1

Direct Access Number — F742

Program ⇒ Utilities ⇒ Trace Data 1

Parameter Type — **Selection List**

Factory Default — **Output Frequency**

Changeable During Run — **Yes**

This parameter is used to select the **Trace Data 1** item from Table 11 on pg. 244 to be read and stored in accordance with the setup of parameters F740 and F741.

See F740 for additional information on this parameter setting.

Trace Data 2

Direct Access Number — F743

Program ⇒ Utilities ⇒ Trace Data 2

Parameter Type — **Selection List**

Factory Default — **Freq. Reference**

Changeable During Run — **Yes**

This parameter is used to select the **Trace Data 2** item from Table 11 on pg. 244 to be read and stored in accordance with the setup of parameters F740 and F741.

See F740 for additional information on this parameter setting.

Trace Data 3

Direct Access Number — F744

Program ⇒ Utilities ⇒ Trace Data 3

Parameter Type — **Selection List**

Factory Default — **Output Current**

Changeable During Run — **Yes**

This parameter is used to select the **Trace Data 3** item from Table 11 on pg. 244 to be read and stored in accordance with the setup of parameters F740 and F741.

See F740 for additional information on this parameter setting.

Trace Data 4

Direct Access Number — F745

Program ⇒ Utilities ⇒ Trace Data 4

Parameter Type — **Selection List**

Factory Default — **DC Voltage**

Changeable During Run — **Yes**

This parameter is used to select the **Trace Data 4** item from Table 11 on pg. 244 to be read and stored in accordance with the setup of parameters F740 and F741.

See F740 for additional information on this parameter setting.

RS485 2-Wire Baud Rate

Direct Access Number — F800

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — **19200**

Changeable During Run — **Yes**

Units — bps

This parameter plays a role in the setup of the communications network by establishing the **Baud Rate** of the communications link.

The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

9600
19200
38400

RS485 2-Wire and 4-Wire Parity

Direct Access Number — F801

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — **Even Parity**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the communications network by establishing the **Parity** setting of the communications link.

The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

No Parity
Even Parity
Odd Parity

ASD Number

Direct Access Number — F802

Program ⇒ Communications ⇒ Communication

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 247

This parameter plays a role in the setup of the communications network by assigning an identification (ID) number to each ASD in the communications network.

The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

RS485 2-Wire and 4-Wire Communications Time Out

Direct Access Number — F803

Program ⇒ Communications ⇒ Communication

Parameter Type — **Numerical**

Factory Default — **0 (Off)**

Changeable During Run — **Yes**

Minimum — 0 (Off)

Maximum — 100

Units — Seconds

This parameter plays a role in the setup of the communications network by setting the time that no activity may exist over the communications link before the link is severed (Time Out).

The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

RS485 2-Wire and 4-Wire Communications Time-Out Action

Direct Access Number — F804

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — **Trip/Trip**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the communications network by determining the action to be taken in the event of a time-out (Time-Out Action).

The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

No Action/No Action
Alarm/No Action
Trip/No Action
No Action/Alarm
Alarm/Alarm
Trip/Alarm
No Action/Trip
Alarm/Trip
Trip/Trip

RS485 2-Wire Send Wait Time

Direct Access Number — F805

Program ⇒ Communications ⇒ Communication

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 2.00

Units — Seconds

This parameter sets the RS485 2-Wire response delay time.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

RS485 2-Wire ASD-to-ASD Communications

Direct Access Number — F806

Parameter Type — **Selection List**

Factory Default — **Follower (Decel Stop)**

Changeable During Run — **Yes**

Program ⇒ Communications ⇒ Communication

The function of this parameter is 2-fold:

1) In a Master/Follower configuration and while communicating via RS485 2-Wire, this parameter sets the ASD as the Master or the Follower.

2) This parameter determines the function of the ASD while operating as the Master or the Follower. If operating as the Master ASD, an output parameter of the Master ASD is used to control the Follower ASDs and is set here. If operating as a Follower ASD, the ASD response if an error is incurred is set here.

Note: *Select a Follower function here if **F826** is configured as a **Master Output** controller for any other ASD in the system. Otherwise, an **EOI** failure will result.*

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

Follower (Decel Stop If Error Detected)
Follower (Continues Operation If Error Detected)
Follower (Emergency Off If Error Detected)
Master (Frequency Command)
Master (Output Frequency)
Master (Torque Reference)
Master (Torque Command)

Frequency Point Selection

Direct Access Number — F810

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

Program ⇒ Communications ⇒ Communication Reference Adjust

This parameter is used to set the communications reference for scaling.

See F811 — F814 for additional information on this setting.

Note: *Scaling the communications signal is not required for all applications.*

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

Disabled
RS485 (2-Wire — NOT USED)
RS485 4-Wire
Communication Card

Point 1 Setting

Direct Access Number — F811

Program ⇒ Communications ⇒ Communication Reference Adjust

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

Units — %

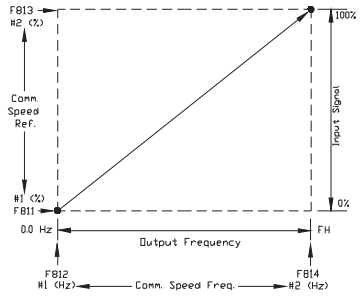
When enabled at F810, this parameter is used to allow the user to set the gain and bias of the speed control input to the ASD when the speed control signal is received via the source selected at F810 (Communications).

Gain and Bias Settings

When operating in the **Speed Control** mode and using one of the control sources from parameter F810, the settings that determine the gain and bias of the input signal are:

- **Point 1 Frequency** (F812),
- the communications input signal value that represents **Point 1 Frequency**: (Point 1 Setting) F811,
- **Point 2 Frequency** (F814), and
- the communications input signal value that represents **Point 2 Frequency**: (Point 2 Setting) F813.

Once set, as the input signal value changes, the output frequency of the ASD will vary in accordance with the above settings.



This parameter sets the **Reference** input value (Point 1 Setting) that represents **Point 1 Frequency**. This value is entered as 0 to 100% of the **Reference** input value range.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Point 1 Frequency

Direct Access Number — F812

Program ⇒ Communications ⇒ Communication Reference Adjust

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the gain and bias of the **Reference** speed control input.

This parameter sets **Point 1 Frequency**.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

See F811 for additional information on this setting.

Point 2 Setting

Direct Access Number — F813

Program ⇒ Communications ⇒ Communication Reference Adjust

Parameter Type — **Numerical**

Factory Default — **100**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 100

Units — %

This parameter is used to set the gain and bias of the **Reference** speed control input.

This parameter sets the **Reference** input value (Point 2 Setting) that represents **Point 2 Frequency**. This value is entered as 0 to 100% of the **Reference** input value range.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

See F811 for additional information on this setting.

Point 2 Frequency

Direct Access Number — F814

Program ⇒ Communications ⇒ Communication Reference Adjust

Parameter Type — **Numerical**

Factory Default — **60.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — **Max. Freq.** (F011)

Units — Hz

This parameter is used to set the gain and bias of the **Reference** speed control input.

This parameter sets the **Point 2 Frequency**.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

See F811 for additional information on this setting.

RS485 4-Wire Baud Rate

Direct Access Number — F820

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — **19200**

Changeable During Run — **Yes**

This parameter sets the RS485 baud rate.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

9600 bps
19200 bps
38400 bps

RS485 Send Wait Time

Direct Access Number — F825

Program ⇒ Communications ⇒ Communication

Parameter Type — **Numerical**

Factory Default — 0.00

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 2.00

Units — Seconds

This parameter sets the RS485 response delay time.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

RS485 4-Wire ASD-to-ASD Communications

Direct Access Number — F826

Parameter Type — **Selection List**

Factory Default — **Follower (Decel Stop)**

Changeable During Run — **Yes**

Program ⇒ Communications ⇒ Communication

The function of this parameter is 2-fold:

1) In a Master/Follower configuration and while communicating via RS485 4-Wire, this parameter sets the ASD as the Master or the Follower.

2) This parameter determines the function of the ASD while operating as the Master or the Follower. If operating as the Master ASD, an output parameter of the Master ASD is used to control the Follower ASDs and is set here. If operating as a Follower ASD, the ASD response if an error is incurred is set here.

Note: *Select a Follower function here if **F806** is configured as a **Master Output** controller for any other ASD in the system. Otherwise, an **EOI** failure will result.*

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

Follower (Decel Stop If Error Detected)
Follower (Continues Operation If Error Detected)
Follower (Emergency Off If Error Detected)
Master (Frequency Command)
Master (Output Frequency)
Master (Torque Reference)
Master (Output Torque)

RS485 4-Wire Protocol Selection (TSB/ModBus)

Direct Access Number — F829

Parameter Type — **Selection List**

Factory Default — **Toshiba**

Changeable During Run — **Yes**

Program ⇒ Communications ⇒ Communication

This parameter sets the communications protocol for ASD-to-ASD communications.

Settings:

Toshiba
Modbus

Communications Option (DeviceNet/Profibus) Setting 1

Direct Access Number — F830

Parameter Type — **Selection List**

Factory Default — **0**

Changeable During Run — **Yes**

Program ⇒ Communications ⇒ Communication

While using the DeviceNet/Profibus communications protocol, this parameter allows the user to select the read and write information communicated between the ASD and the Host.

Read information may include the ASD fault status, ASD speed, ASD MAC ID, etc. Write information may include Enable/Disable DeviceNet commands, Forward run, ACC/DEC command, etc.

See the **DeviceNet Option Instruction Manual** (P/N 58683) for additional information on this parameter.

Settings:

0 – 7

Communications Option (DeviceNet/Profibus) Setting 2

Program ⇒ Communications ⇒ Communication

Direct Access Number — F831
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

While using the DeviceNet/Profibus communications protocol, parameters F831 – F836 allow the user to select the ASD memory location that holds the Command/Frequency/Monitoring instructions to be applied to the ASD for **Communications Option Settings 2 – 7**, respectively.

See the **DeviceNet Option Instruction Manual** (P/N 58683) for additional information on this parameter.

Settings:

Disabled
FA06 (ALCAN Command 1)
FA23 (ALCAN Command 2)
FA07 (ALCAN Frequency Command, 0.01 Hz)
FA33 (Torque Command, 0.01%)
FA50 (Terminal Output)
FA51 (Analog Output Data from Comm. [FM])
FA52 (Analog Output Data from Comm. [AM])
F601 (Stall Prevention Level, %)
F441 (Power Running Torque Limit 1 Level, 0.01%)
F443 (Dynamic Braking Torque Limit 1 Level, 0.01%)
F460 (Speed Loop Proportional Gain)
F461 (Speed Loop Stabilization Coefficient)

Communications Option (DeviceNet/Profibus) Setting 3

Program ⇒ Communications ⇒ Communication

Direct Access Number — F832
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

Same as F831. See F831 for information on this parameter

Communications Option (DeviceNet/Profibus) Setting 4

Program ⇒ Communications ⇒ Communication

Direct Access Number — F833
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

Same as F831. See F831 for information on this parameter

Communications Option (DeviceNet/Profibus) Setting 5

Program ⇒ Communications ⇒ Communication

Direct Access Number — F834
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

Same as F831. See F831 for information on this parameter

Communications Option (DeviceNet/Profibus) Setting 6

Program ⇒ Communications ⇒ Communication

Direct Access Number — F835
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

Same as F831. See F831 for information on this parameter

Communications Option (DeviceNet/Profibus) Setting 7

Program ⇒ Communications ⇒ Communication

Direct Access Number — F836
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

Same as F831. See F831 for information on this parameter

Communications Option (DeviceNet/Profibus) Setting 8

Program ⇒ Communications ⇒ Communication

Direct Access Number — F841
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

While using the DeviceNet/Profibus communications protocol, parameters F841 – F846 allow the user to select the ASD memory location that holds the Command/Frequency/Monitoring instructions to be applied to the ASD for **Communications Option Settings 8** – **13**, respectively.

See the **DeviceNet Option Instruction Manual** (P/N 58683) for additional information on this parameter.

Settings:

Disabled
FD01 (ASD Status 1)
FD00 (Output Frequency, 0.01 Hz)
FD03 (Output Current, 0.01%)
FD05 (Output Voltage, 0.01%)
FC91 (ASD Alarm)
FD22 (PID Feedback Value, 0.01 Hz)
FD06 (Input Terminal Status)
FD07 (Output Terminal Status)
FE36 (V/I)
FE35 (RR Input)
FE37 (RX Input)
FD04 (Input Voltage [DC Detection], 0.01%)
FD16 (Realtime Speed Feedback
FD18 (Torque, 0.01%)
FE60 (My Monitor)
FE61 (My Monitor)
FE62 (My Monitor)
FE63 (My Monitor)
F880 (Free Notes)
FD29 (Input Power, 0.01 kW)
FD30 (Output Power, 0.01 kW)
FE14 (Cumulative Operation Time, 0.01=1 Hour)
FE40 (FM Terminal Output Monitor)
FE41 (AM Terminal Output Monitor)

Communications Option (DeviceNet/Profibus) Setting 9

Program ⇒ Communications ⇒ Communication

Direct Access Number — F842
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

Same as F841. See F841 for information on this parameter

Communications Option (DeviceNet/Profibus) Setting 10

Program ⇒ Communications ⇒ Communication

Direct Access Number — F843
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

Same as F841. See F841 for information on this parameter

Communications Option (DeviceNet/Profibus) Setting 11

Program ⇒ Communications ⇒ Communication

Direct Access Number — F844
Parameter Type — **Selection List**
Factory Default — **0000h**
Changeable During Run — **Yes**

Same as F841. See F841 for information on this parameter

Communications Option (DeviceNet/Profibus) Setting 12

Direct Access Number — F845

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — **0000h**

Same as F841. See F841 for information on this parameter

Changeable During Run — **Yes**

Communications Option (DeviceNet/Profibus) Setting 13

Direct Access Number — F846

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — **0000h**

Same as F841. See F841 for information on this parameter

Changeable During Run — **Yes**

Disconnection Detection Extended Time

Direct Access Number — F850

Program ⇒ Communications ⇒ Communication

Parameter Type — **Numerical**

Factory Default — 0.0

This parameter is used to set the length of time that no communications activity may exist before the communications link is disconnected.

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 100.0

Units — Seconds

ASD Operation at Disconnection

Direct Access Number — F851

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — **Stop, Communication Release**

This parameter is used to set the ASD action to be carried out in the event of the loss of communications.

Changeable During Run — **Yes**

Settings:

Stop and Terminate Communications
Do Nothing (Continue Programmed Operation)
Deceleration Stop
Coast Stop
Emergency Off
Preset Speed (Setting of F852)

Preset Speed Operation

Direct Access Number — F852

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — 0 (Disabled)

This parameter is used in conjunction with parameter F806.

Changeable During Run — **Yes**

This parameter setting is used to set the **Preset Speed** selection to be used if **Preset Speed** is selected at parameter F851.

Settings:

0 — Disabled
1 – 15 — Preset Speed Number

Communications Option Station Address Monitor

Direct Access Number — F853

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — 0 (Disabled)

This parameter is used in the setup of the communications network by reading the Media Access Code (MAC) address of the ASD that is connected to a node of the communications system.

Changeable During Run — **Yes**

Minimum — 0

Maximum — 255

The MAC Address is set via DIP switches of the optional device.

See the **DeviceNet Option Instruction Manual** (P/N 58683) for additional information on this parameter.

Communications Option Speed Switch Monitor DeviceNet/ CC-Link

Program ⇒ Communications ⇒ Communication

This parameter is used in the setup of the communications network by reading the hardware-specific settings of the option card being used with the ASD.

If using the **DEV002Z** Devicenet card, this parameter reads the hardware switch SW300 setting of the Devicenet card. SW300 sets the baud rate and the MAC address of the option card that is connected to a node of the communications system.

Direct Access Number — F854
Parameter Type — **Hardware Selectable**
Factory Default — **Option-Specific**
Changeable During Run — **No**
Minimum — 0
Maximum — 255

Timed-Run Run-Time

Program ⇒ Crane/Hoist ⇒ Timed-Run

This parameter sets the amount of time that the ASD outputs the commanded speed (from RR, Communications, etc.). The **Timed Run** is activated by assigning a discrete terminal to **Timed Run** and momentarily activating the assigned terminal.

If activated longer than this time setting, the **Timed Run** will repeat at the rate setting of F862.

Direct Access Number — F861
Parameter Type — **Numerical**
Factory Default — **1.0**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 5.0
Units — Seconds

Timed-Run Repeat Delay

Program ⇒ Crane/Hoist ⇒ Timed-Run

If the **Timed Run** input terminal remains activated past the **Timed Run** duration setting (F861), this parameter setting will determine the wait-time before restarting the **Timed Run** sequence.

Direct Access Number — F862
Parameter Type — **Numerical**
Factory Default — **1.0**
Changeable During Run — **Yes**
Minimum — 0.0
Maximum — 5.0
Units — Seconds

Super Creep Pulse Count

Program ⇒ Crane/Hoist ⇒ Super Creep Control

This parameter requires that a discrete input terminal be set to **Super Creep** for activation (see Table 7 on pg. 236). Any unused discrete input terminal may be assigned to the **Super Creep** function.

Activating the **Super Creep** terminal rotates the motor for the amount of encoder pulses set at this parameter at the frequency setting of F865.

Note: *Available in closed-loop operation only.*

Direct Access Number — F863
Parameter Type — **Numerical**
Factory Default — **1024**
Changeable During Run — **Yes**
Minimum — 0
Maximum — 16383
Units — Pulses

Super Creep Speed Repeat Delay

Program ⇒ Crane/Hoist ⇒ Super Creep Control

If the **Super Creep Pulse Count** (F863) discrete input terminal remains activated past the **Super Creep Pulse Count** setting, this parameter setting will determine the wait-time before restarting the **Super Creep Pulse Count** sequence.

Direct Access Number — F864
Parameter Type — **Numerical**
Factory Default — **2.00**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 60.0
Units — Seconds

Super Creep Speed

Program ⇒ Crane/Hoist ⇒ Super Creep Control

This parameter sets the **Super Creep Speed**.

Direct Access Number — F865
Parameter Type — **Numerical**
Factory Default — **0.60**
Changeable During Run — **Yes**
Minimum — 0.02
Maximum — 20.00
Units — Hz

Slack Rope Detection

Program ⇒ Crane/Hoist ⇒ Slack Rope

This parameter **Enables/Disables** the **Slack Rope Detection** function. **Slack Rope Detection** is used while lowering the load to determine if the load has reached the end of its travel (hit the floor, truck bed, etc.).

With this parameter enabled during hoist lowering, should the load torque reach or fall below the **No-Load Torque** setting (F868) for the **No-Load** (Torque) **Detection Time** setting (F869), the ASD will stop automatically.

Settings:

Disabled
Enabled

Direct Access Number — F867
Parameter Type — **Selection List**
Factory Default — **Disabled**
Changeable During Run — **No**
Minimum — 0
Maximum — 1

No-Load Torque

Program ⇒ Crane/Hoist ⇒ Slack Rope

With the **Slack Rope Detection** (F867) feature enabled during hoist lowering, should the load torque reach or fall below this setting (F868) for the **No-Load (Torque) Detection Time** setting (F869), the ASD will stop automatically.

If the load torque falls below this setting and returns to a value above this setting within the time of F869, normal operations will resume.

Direct Access Number — F868
Parameter Type — **Numerical**
Factory Default — **20.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 100.0
Units — %

No-Load (Torque) Detection Time

Program ⇒ Crane/Hoist ⇒ Slack Rope

With the **Slack Rope Detection** (F867) feature enabled during hoist lowering, should the load torque reach or fall below the **No-Load Torque** setting (F868) for the **No-load** (**Torque**) **Detection Time** setting (F869), the ASD will stop automatically.

Direct Access Number — F869
Parameter Type — **Numerical**
Factory Default — **0.10**
Changeable During Run — **No**
Minimum — 0.01
Maximum — 2.00
Units — Seconds

Block Write Data 1

Direct Access Number — F870

Parameter Type — **Selection List**

Factory Default — **None**

Changeable During Run — **Yes**

Program ⇒ Communications ⇒ Communication

This parameter plays a role in the setup of the communications network by establishing the type of data to be written to the ASD of the communications link.

The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

None
FA00 (Command 1)
FA20 (Command 2)
FA01 (Frequency)
FA50 (TB Output)
FA51 (Analog Output)

Block Write Data 2

Direct Access Number — F871

Parameter Type — **Selection List**

Factory Default — **None**

Changeable During Run — **Yes**

Program ⇒ Communications ⇒ Communication

This parameter plays a role in the setup of the communications network by establishing the type of data to be written to the ASD of the communications link.

The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

None
FA00 (Command 1)
FA20 (Command 2)
FA01 (Frequency)
FA50 (TB Output)
FA51 (Analog Output)

Block Read Data 1

Direct Access Number — F875

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — 0 (None)

Changeable During Run — **Yes**

This parameter plays a role in the setup of the communications network by establishing the type of data to be read from the ASD using the communications link.

The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.

Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect.

Settings:

None
Status Information
Output Frequency
Output Current
Output Voltage
Alarm Information
PID Feedback Value
Input Terminal Status
Output Terminal Status
V/I
RR
RX
DC Voltage
PG Feedback
Torque
My Monitor 1
My Monitor 2
My Monitor 3
My Monitor 4
Free Memo

Block Read Data 2

Direct Access Number — F876

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — None

Changeable During Run — **Yes**

This parameter plays a role in the setup of the communications network by establishing the type of data to be read from the ASD of the communications link.

See parameter F875 for additional information on this setting.

Block Read Data 3

Direct Access Number — F877

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — None

Changeable During Run — **Yes**

This parameter plays a role in the setup of the communications network by establishing the type of data to be read from the ASD of the communications link.

See parameter F875 for additional information on this setting.

Block Read Data 4

Direct Access Number — F878

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — None

Changeable During Run — **Yes**

This parameter plays a role in the setup of the communications network by establishing the type of data to be read from the ASD of the communications link.

See parameter F875 for additional information on this setting.

Block Read Data 5

Direct Access Number — F879

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — None

Changeable During Run — **Yes**

This parameter plays a role in the setup of the communications network by establishing the type of data to be read from the ASD of the communications link.

See parameter F875 for additional information on this setting.

Free Notes

Direct Access Number — F880

Program ⇒ Communications ⇒ Communication

Parameter Type — **Numerical**

Factory Default — **0**

Changeable During Run — **Yes**

Minimum — 0

Maximum — 65534

This is an unused parameter that has allocated memory space.

The space may be used at the discretion of the user. This space may be used to store information or a note to be transferred using communications.

Network Option Reset

Direct Access Number — F899

Program ⇒ Communications ⇒ Communication

Parameter Type — **Selection List**

Factory Default — **Reset ASD only**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the communications network by establishing the targets of a Reset command received via the communications link.

Settings:

Reset ASD only
Reset Option Board and ASD

Input Function Target 1

Direct Access Number — F900

Program ⇒ My Function ⇒ My Function Unit 1

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 1** terminal.

This setting assigns the function of the programmable **Input Function Target 1** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 1

Direct Access Number — F901

Program ⇒ My Function ⇒ My Function Unit 1

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 2

Direct Access Number — F902

Program ⇒ My Function ⇒ My Function Unit 1

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 2** terminal.

This setting assigns the function of the programmable **Input Function Target 2** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 2

Direct Access Number — F903

Program ⇒ My Function ⇒ My Function Unit 1

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 3

Direct Access Number — F904

Program ⇒ My Function ⇒ My Function Unit 1

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 3** terminal.

This setting assigns the function of the programmable **Input Function Target 3** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Output Function Assigned

Direct Access Number — F905

Program ⇒ My Function ⇒ My Function Unit 1

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the **Output Function Assigned** terminal.

This setting assigns the function of the programmable **Output Function Assigned** data location to one of the functions listed in the **Input Setting** field of Table 9 on pg. 241.

Settings:

0 – 3099

See the F977 for additional information on this parameter.

Input Function Target 1

Direct Access Number — F906

Program ⇒ My Function ⇒ My Function Unit 2

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 1** terminal.

This setting assigns the function of the programmable **Input Function Target 1** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 1

Direct Access Number — F907

Program ⇒ My Function ⇒ My Function Unit 2

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 2

Direct Access Number — F908

Program ⇒ My Function ⇒ My Function Unit 2

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 2** terminal.

This setting assigns the function of the programmable **Input Function Target 2** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 2

Direct Access Number — F909

Program ⇒ My Function ⇒ My Function Unit 2

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 3

Direct Access Number — F910

Program ⇒ My Function ⇒ My Function Unit 2

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 3** terminal.

This setting assigns the function of the programmable **Input Function Target 3** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Output Function Assigned

Direct Access Number — F911

Program ⇒ My Function ⇒ My Function Unit 2

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the **Output Function Assigned** terminal.

This setting assigns the function of the programmable **Output Function Assigned** data location to one of the functions listed in the **Input Setting** field of Table 10 on pg. 242.

Settings:

0 – 3099

See F977 for additional information on this parameter.

Input Function Target 1

Direct Access Number — F912

Program ⇒ My Function ⇒ My Function Unit 3

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 1** terminal.

This setting assigns the function of the programmable **Input Function Target 1** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 1

Direct Access Number — F913

Program ⇒ My Function ⇒ My Function Unit 3

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 2

Direct Access Number — F914

Program ⇒ My Function ⇒ My Function Unit 3

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 2** terminal.

This setting assigns the function of the programmable **Input Function Target 2** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 2

Direct Access Number — F915

Program ⇒ My Function ⇒ My Function Unit 3

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 3

Direct Access Number — F916

Program ⇒ My Function ⇒ My Function Unit 3

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 3** terminal.

This setting assigns the function of the programmable **Input Function Target 3** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Output Function Assigned

Direct Access Number — F917

Program ⇒ My Function ⇒ My Function Unit 3

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the **Output Function Assigned** terminal.

This setting assigns the function of the programmable **Output Function Assigned** data location to one of the functions listed in the **Input Setting** field of Table 10 on pg. 242.

Settings:

0 – 3099

See F977 for additional information on this parameter.

My Function Percent Data 1

Direct Access Number — F918

Program ⇒ My Function ⇒ My Function Data

Parameter Type — **Numerical**

Factory Default — 0.00

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 200.00

Units — %

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Percent Data 1**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

Once the assigned output value reaches the threshold setting of this parameter the output value is transferred to **My Function Out 1**.

See F977 for additional information on this parameter.

My Function Percent Data 2

Direct Access Number — F919

Program ⇒ My Function ⇒ My Function Data

Parameter Type — **Numerical**

Factory Default — 0.00

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 200.00

Units — %

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Percent Data 2**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

My Function Percent Data 3

Direct Access Number — F920

Program ⇒ My Function ⇒ My Function Data

Parameter Type — **Numerical**

Factory Default — 0.00

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 200.00

Units — %

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Percent Data 3**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

My Function Percent Data 4

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Percent Data 4**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

Direct Access Number — F921
Parameter Type — **Numerical**
Factory Default — 0.00
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 200.00
Units — %

My Function Percent Data 5

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Percent Data 5**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

Direct Access Number — F922
Parameter Type — **Numerical**
Factory Default — 0.00
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 200.00
Units — %

My Function Frequency Data 1

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Frequency Data 1**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

Direct Access Number — F923
Parameter Type — **Numerical**
Factory Default — 0.00
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 200.00
Units — %

My Function Frequency Data 2

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Frequency Data 2**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

Direct Access Number — F924
Parameter Type — **Numerical**
Factory Default — 0.00
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 200.00
Units — %

My Function Frequency Data 3

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Frequency Data 3**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

Direct Access Number — F925
Parameter Type — **Numerical**
Factory Default — 0.00
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 200.00
Units — %

My Function Frequency Data 4

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Frequency Data 4**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

Direct Access Number — F926
Parameter Type — **Numerical**
Factory Default — 0.00
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 200.00
Units — %

My Function Frequency Data 5

Direct Access Number — F927

Program ⇒ My Function ⇒ My Function Data

Parameter Type — **Numerical**

Factory Default — 0.00

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 200.00

Units — %

This parameter is used to set the trigger threshold level of the analog signal of the **My Function Frequency Data 5**.

The analog signal is selected using the **Input Setting** number from Table 10 on pg. 242.

My Function Time Data 1

Direct Access Number — F928

Program ⇒ My Function ⇒ My Function Data

Parameter Type — **Numerical**

Factory Default — 0.01

Changeable During Run — **Yes**

Minimum — 0.01

Maximum — 600.00

Units — Seconds

This parameter is used to set the response delay of the **My Function Time Data 1** terminal.

The applied discrete input signal must be present at the input terminal of the ASD for the time setting here for a system response.

Discrete terminal input activation that does not equal or exceed this setting will be ignored.

My Function Time Data 2

Direct Access Number — F929

Program ⇒ My Function ⇒ My Function Data

Parameter Type — **Numerical**

Factory Default — 0.01

Changeable During Run — **Yes**

Minimum — 0.01

Maximum — 600.00

Units — Seconds

This parameter is used to set the response delay of the **My Function Time Data 2** terminal.

The applied discrete input signal must be present at the input terminal of the ASD for the time setting here for a system response.

Discrete terminal input activation that does not equal or exceed this setting will be ignored.

My Function Time Data 3

Direct Access Number — F930

Program ⇒ My Function ⇒ My Function Data

Parameter Type — **Numerical**

Factory Default — 0.01

Changeable During Run — **Yes**

Minimum — 0.01

Maximum — 600.00

Units — Seconds

This parameter is used to set the response delay of the **My Function Time Data 3** terminal.

The applied discrete input signal must be present at the input terminal of the ASD for the time setting here for a system response.

Discrete terminal input activation that does not equal or exceed this setting will be ignored.

My Function Time Data 4

Direct Access Number — F931

Program ⇒ My Function ⇒ My Function Data

Parameter Type — **Numerical**

Factory Default — 0.01

Changeable During Run — **Yes**

Minimum — 0.01

Maximum — 600.00

Units — Seconds

This parameter is used to set the response delay of the **My Function Time Data 4** terminal.

The applied discrete input signal must be present at the input terminal of the ASD for the time setting here for a system response.

Discrete terminal input activation that does not equal or exceed this setting will be ignored.

My Function Time Data 5

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the response delay of the **My Function Time Data 5** terminal.

The applied discrete input signal must be present at the input terminal of the ASD for the time setting here for a system response.

Discrete terminal input activation that does not equal or exceed this setting will be ignored.

Direct Access Number — F932
Parameter Type — **Numerical**
Factory Default — 0.01
Changeable During Run — **Yes**
Minimum — 0.01
Maximum — 600.00
Units — Seconds

My Function Count Data 1

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the pulse-count threshold value used to trigger the discrete output **COUNT1 (ON Timer)**.

COUNT1 (ON Timer) outputs a 1 upon reaching the threshold setting of this parameter.

Direct Access Number — F933
Parameter Type — **Numerical**
Factory Default — 0
Changeable During Run — **Yes**
Minimum — 0
Maximum — 9999
Units — Pulses

My Function Count Data 2

Program ⇒ My Function ⇒ My Function Data

This parameter is used to set the pulse-count threshold value used to trigger the discrete output **COUNT2 (ON Timer)**.

COUNT2 (ON Timer) outputs a 1 upon reaching the threshold setting at this parameter.

Direct Access Number — F934
Parameter Type — **Numerical**
Factory Default — 0
Changeable During Run — **Yes**
Minimum — 0
Maximum — 9999
Units — Pulses

Input Function Target 1

Program ⇒ My Function ⇒ My Function Unit 4

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 1** terminal.

This setting assigns the function of the programmable **Input Function Target 1** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See **F977** for additional information on this parameter.

Direct Access Number — F935
Parameter Type — **Selection List**
Factory Default — **0 (Disabled)**
Changeable During Run — **Yes**

Input Function Command 1

Program ⇒ My Function ⇒ My Function Unit 4

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Direct Access Number — F936
Parameter Type — **Selection List**
Factory Default — 0 (NOP)

Input Function Target 2

Direct Access Number — F937

Program ⇒ My Function ⇒ My Function Unit 4

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 2** terminal.

This setting assigns the function of the programmable **Input Function Target 2** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 2

Direct Access Number — F938

Program ⇒ My Function ⇒ My Function Unit 4

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 3

Direct Access Number — F939

Program ⇒ My Function ⇒ My Function Unit 4

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 3** terminal.

This setting assigns the function of the programmable **Input Function Target 3** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Output Function Assigned

Direct Access Number — F940

Program ⇒ My Function ⇒ My Function Unit 4

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the **Output Function Assigned** terminal.

This setting assigns the function of the programmable **Output Function Assigned** data location to one of the functions listed in the **Input Setting** field of Table 10 on pg. 242.

Settings:

0 – 3099

See F977 for additional information on this parameter.

Input Function Target 1

Direct Access Number — F941

Program ⇒ My Function ⇒ My Function Unit 5

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 1** terminal.

This setting assigns the function of the programmable **Input Function Target 1** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 1

Direct Access Number — F942

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

Program ⇒ My Function ⇒ My Function Unit 5

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 2

Direct Access Number — F943

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Unit 5

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 2** terminal.

This setting assigns the function of the programmable **Input Function Target 2** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 2

Direct Access Number — F944

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

Program ⇒ My Function ⇒ My Function Unit 5

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 3

Direct Access Number — F945

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Unit 5

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 3** terminal.

This setting assigns the function of the programmable **Input Function Target 3** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See **F977** for additional information on this parameter.

Output Function Assigned

Direct Access Number — F946

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Unit 5

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the **Output Function Assigned** terminal.

This setting assigns the function of the programmable **Output Function Assigned** data location to one of the functions listed in the **Input Setting** field of Table 10 on pg. 242.

Settings:

0 – 3099

See F977 for additional information on this parameter.

Input Function Target 1

Direct Access Number — F947

Program ⇒ My Function ⇒ My Function Unit 6

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 1** terminal.

This setting assigns the function of the programmable **Input Function Target 1** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 1

Direct Access Number — F948

Program ⇒ My Function ⇒ My Function Unit 6

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 2

Direct Access Number — F949

Program ⇒ My Function ⇒ My Function Unit 6

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 2** terminal.

This setting assigns the function of the programmable **Input Function Target 2** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 2

Direct Access Number — F950

Program ⇒ My Function ⇒ My Function Unit 6

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 3

Direct Access Number — F951

Program ⇒ My Function ⇒ My Function Unit 6

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 3** terminal.

This setting assigns the function of the programmable **Input Function Target 3** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Output Function Assigned

Direct Access Number — F952

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Unit 6

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the **Output Function Assigned** terminal.

This setting assigns the function of the programmable **Output Function Assigned** data location to one of the functions listed in the **Input Setting** field of Table 10 on pg. 242.

Settings:

0 – 3099

See F977 for additional information on this parameter.

Input Function Target 1

Direct Access Number — F953

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Unit 7

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 1** terminal.

This setting assigns the function of the programmable **Input Function Target 1** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 1

Direct Access Number — F954

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

Program ⇒ My Function ⇒ My Function Unit 7

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 2

Direct Access Number — F955

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Unit 7

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 2** terminal.

This setting assigns the function of the programmable **Input Function Target 2** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Input Function Command 2

Direct Access Number — F956

Parameter Type — **Selection List**

Factory Default — 0 (NOP)

Program ⇒ My Function ⇒ My Function Unit 7

This parameter is used to assign a user-selected logical operator to two user-selected **Input Function Target** variables, enable a counter/timer function, or perform a hold/Reset function.

Table 13 on pg. 247 lists the available selections. Their use and selection requirements are described in an example at F977.

Input Function Target 3

Direct Access Number — F957

Program ⇒ My Function ⇒ My Function Unit 7

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Input Function Target 3** terminal.

This setting assigns the function of the programmable **Input Function Target 3** terminal to any one of the user-selectable functions listed in Table 9 on pg. 241, Table 10 on pg. 242, or Table 12 on pg. 245.

See F977 for additional information on this parameter.

Output Function Assigned

Direct Access Number — F958

Program ⇒ My Function ⇒ My Function Unit 7

Parameter Type — **Selection List**

Factory Default — **0 (Disabled)**

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the **Output Function Assigned** terminal.

This setting assigns the function of the programmable **Output Function Assigned** data location to one of the functions listed in the **Input Setting** field of Table 10 on pg. 242.

Settings:

0 – 3099

See F977 for additional information on this parameter.

Analog Input Function Target 11

Direct Access Number — F959

Program ⇒ My Function ⇒ My Function Analog

Parameter Type — **Selection List**

Factory Default — 0 (Disabled)

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Analog Input Function Target 11** terminal.

The function selected at F961 may be adjusted using the input analog control signal selected here.

Settings:

Disabled (None)
V/I
RR
RX
Optional RX2+, RX2-
Optional V/I

Analog Function Assigned Object 11

Direct Access Number — F961

Parameter Type — **Selection List**

Factory Default — 0 (Disabled)

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Analog

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality to which the adjustment of F959 is applied.

Settings:

Disabled (None)
Acceleration Rate
Upper-Limit Frequency
Acceleration Multiplication Factor
Deceleration Multiplication Factor
Manual Torque Boost
Over-Current Stall (F601)
Thermal Protection (F600)
Speed Loop Proportional Gain (F460)
Drooping Gain (F320)
PID Proportional Gain (F362)

Analog Input Function Target 21

Direct Access Number — F962

Parameter Type — **Selection List**

Factory Default — 0 (Disabled)

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Analog

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality of the programmable **Analog Input Function Target 21** terminal.

The function selected at F964 may be adjusted using the input analog control signal selected here.

Settings:

Disabled (None)
V/I
RR
RX
Optional RX2+, RX2-
Optional V/I

Analog Function Assigned Object 21

Direct Access Number — F964

Parameter Type — **Selection List**

Factory Default — 0 (Disabled)

Changeable During Run — **Yes**

Program ⇒ My Function ⇒ My Function Analog

This parameter plays a role in the setup of the **My Function** feature by selecting the functionality to which the adjustment of F962 is applied.

Settings:

Disabled (None)
Acceleration Rate
Upper-Limit Frequency
Acceleration Multiplication Factor
Deceleration Multiplication Factor
Manual Torque Boost
Over-Current Stall (F601)
Thermal Protection (F600)
Speed Loop Proportional Gain (F460)
Drooping Gain (F320)
PID Proportional Gain (F362)

Monitor Output Function 11

Direct Access Number — F965

Program ⇒ My Function ⇒ My Function Monitor

Parameter Type — **Selection List**

Factory Default — 2000

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by establishing the function that is to be recorded and output as the **Peak**, **Minimum**, or **Normal** (Avg.) value as selected at parameter Proportional.

Select the **Monitor Display Input Setting** number from Table 12 on pg. 245 to output the corresponding function.

Use the Communication Number if operating using communications.

Monitor Output Function Command 11

Direct Access Number — F966

Program ⇒ My Function ⇒ My Function Monitor

Parameter Type — **Selection List**

Factory Default — Normal

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by allowing the user to select the **Peak**, **Minimum**, or **Normal** (Avg.) value of the parameter F965 selection to be recorded and output as a monitored function.

Settings:

Normal
Peak
Minimum

Monitor Output Function 21

Direct Access Number — F967

Program ⇒ My Function ⇒ My Function Monitor

Parameter Type — **Selection List**

Factory Default — 2000

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by establishing the function that is to be recorded and output as the **Peak**, **Minimum**, or **Normal** (Avg.) value as selected at parameter F968.

Select the **Monitor Display Input Setting** number from Table 12 on pg. 245 to output the corresponding function.

Use the Communication Number if operating using communications.

Monitor Output Function Command 21

Direct Access Number — F968

Program ⇒ My Function ⇒ My Function Monitor

Parameter Type — **Selection List**

Factory Default — Normal

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by allowing the user to select the **Peak**, **Minimum**, or **Normal** (Avg.) value of the parameter F967 selection to be recorded and output as a monitored function.

Settings:

Normal
Peak
Minimum

Monitor Output Function 31

Direct Access Number — F969

Program ⇒ My Function ⇒ My Function Monitor

Parameter Type — **Selection List**

Factory Default — 2000

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by establishing the function that is to be recorded and output as the **Peak**, **Minimum**, or **Normal** (Avg.) value as selected at parameter F970.

Select the **Monitor Display Input Setting** number from Table 12 on pg. 245 to output the corresponding function.

Use the Communication Number if operating using communications.

Monitor Output Function Command 31

Direct Access Number — F970

Program ⇒ My Function ⇒ My Function Monitor

Parameter Type — **Selection List**

Factory Default — Normal

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by allowing the user to select the **Peak**, **Minimum**, or **Normal** (Avg.) value of the parameter F969 selection to be recorded and output as a monitored function.

Settings:

Normal
Peak
Minimum

Monitor Output Function 41

Direct Access Number — F971

Program ⇒ My Function ⇒ My Function Monitor

Parameter Type — **Selection List**

Factory Default — 2000

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by establishing the function that is to be recorded and output as the **Peak**, **Minimum**, or **Normal** (Avg.) value as selected at parameter F972.

Select the **Monitor Display Input Setting** number from Table 12 on pg. 245 to output the corresponding function.

Use the Communication Number if operating using communications.

Monitor Output Function Command 41

Direct Access Number — F972

Program ⇒ My Function ⇒ My Function Monitor

Parameter Type — **Selection List**

Factory Default — Normal

Changeable During Run — **Yes**

This parameter plays a role in the setup of the **My Function** feature by allowing the user to select the **Peak**, **Minimum**, or **Normal** (Avg.) value of the parameter F971 selection to be recorded and output as a monitored function.

Settings:

Normal
Peak
Minimum

Virtual Input Terminal Selection 1

Direct Access Number — F973

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **Virtual Input Terminal 1**. As a virtual terminal, it exists only in memory and is considered to always be in its **True** state (activated).

It is often practical to assign a function to this terminal that the user desires to be maintained regardless of external conditions or operations.

This parameter sets the programmable **Virtual Input Terminal 1** terminal to one of the functions that are listed in Table 7 on pg. 236.

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

Virtual Input Terminal Selection 2

Direct Access Number — F974

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **Virtual Input Terminal 2**. As a virtual terminal, it exists only in memory and is considered to always be in its **True** state (activated).

It is often practical to assign a function to this terminal that the user desires to be maintained regardless of external conditions or operations.

This parameter sets the programmable **Virtual Input Terminal 2** terminal to one of the functions that are listed in Table 7 on pg. 236.

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

Virtual Input Terminal Selection 3

Direct Access Number — F975

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **Virtual Input Terminal 3**. As a virtual terminal, it exists only in memory and is considered to always be in its **True** state (activated).

It is often practical to assign a function to this terminal that the user desires to be maintained regardless of external conditions or operations.

This parameter sets the programmable **Virtual Input Terminal 3** terminal to one of the functions that are listed in Table 7 on pg. 236.

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

Virtual Input Terminal Selection 4

Direct Access Number — F976

Program ⇒ Terminal ⇒ Input Terminals

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

This parameter is used to set the functionality of the **Virtual Input Terminal 4**. As a virtual terminal, it exists only in memory and is considered to always be in its **True** state (activated).

It is often practical to assign a function to this terminal that the user desires to be maintained regardless of external conditions or operations.

This parameter sets the programmable **Virtual Input Terminal 4** terminal to one of the functions that are listed in Table 7 on pg. 236.

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

My Function Operating Mode

Program ⇒ My Function Selection

This parameter **Enables/Disables** the configured **My Function** feature of the ACE-tronics G9 ASD.

Settings:

None (Disabled)
My Function with Terminal Board Signal (ACE G9-120V-PCB)
My Function Always On

My Function

The **My Function** feature is configured using the settings of F900 to F977 and is used to enhance the programmability of the ASD by performing two programmable functions: 1) the Combined Terminal Function, and 2) Logic Operations.

Combined Input Terminal Function

Assigning more than one function to a discrete input terminal provides two advantages: it effectively expands the number of input terminals, and reduces the number of cables required to support the input/output functions (e.g., assigning **Accel/Decel Switching** selections to one terminal). Using **Virtual Terminals 1 – 4** (F973 – F976) are required to use this function.

In the example below, the **Accel/Decel Switching 1** terminal assignment and the **Accel/Decel Switching 2** terminal assignment will be combined as one terminal to illustrate this feature. However, any two of the discrete input terminal assignments listed in Table 7 on pg. 236 may be combined in this manner.

Note: *Accel/Decel Switching requires the use of two discrete input terminals to select the user-configured Accel/Decel profiles identified with the binary numbers 1 – 4 (i.e., 00=1_B, 01=2_B, 10=3_B, and 11=4_B).*

Setup (Input Terminal Example)

1. Disable the **My Function** parameter at F977 to prevent the system from starting upon completion of the setup.
2. Assign the **Accel/Decel Switching 1** function to the **I1** terminal (F113).
3. Assign the **Accel/Decel Switching 2** function to **Virtual Input Terminal 1** (F973).
4. Set **Input Function Target 1** to **5 (**F900**)**. This setting assigns **I1** as the control input terminal.
5. Set **Output Function Assigned** to **21 (**F905**)**. This setting is a command that writes the F113 selection (I1**)** to **Virtual Input Terminal 1**, activating both.

(Continued on pg. 228)

Direct Access Number — F977

Parameter Type — **Selection List**

Factory Default — **None** (Disabled)

Changeable During Run — **No**

DANGER

This parameter must always be set to **None** at the start of the **My Function** setup and remain set to **None** until all of the **My Function** parameter settings have been confirmed as being correct.

If enabled for normal operation using settings **1** or **2**, the motor may start and engage the driven equipment unexpectedly upon receiving a **Run** signal during the **My Function** setup.

Combined Input Terminal Function (Cont.)

6. Enable the **My Function** parameter at F977 by selecting **My Function Always On** or selecting **My Function With TB Signal**.

   If set to **My Function Always On**, the combination of **Accel/Decel Switching 1** and **Accel/Decel Switching 2** are always On (both are activated during the I1 activation).

   If set to **My Function With TB Signal**, set a discrete input terminal to **My Function Run Signal** and activate it to enable **My Function**. Activate **I1** to activate the **Accel/Decel Switching 1** and **Accel/Decel Switching 2** functions. A disconnection at either terminal will terminate the **My Function** programming (discrete input terminal **My Function Run Signal** is Anded with discrete input terminal **I1**).

Activate **I1** and the **Accel/Decel Switching 1** and **Accel/Decel Switching 2** functions will be carried out using only **I1**.

With the aforementioned setup completed, provide a **Frequency Command** (F004) and the motor will run at the commanded frequency.

Combined Output Terminal Function

Output terminals may also be combined to produce one output response to multiple conditions using the computational operators of Table 13 on pg. 247. Assigning more than one function to a discrete output terminal provides two advantages: it effectively expands the number of input terminals, and reduces the number of cables required to support the input/output functions (e.g., assigning Low-Speed Detection and Low-Current Detection to one output terminal). Using **Virtual Terminals 1 – 4** (F973 – F976) are required to use this function.

In the example below, the **Low Speed Signal** (detection) terminal assignment and the **Low-Current Detection** terminal assignment will be combined as one terminal output to illustrate this feature. However, any two of the discrete output terminal assignments may listed in Table 10 on pg. 242 may be combined in this manner.

Setup (Output Terminal Example)

1. Disable the **My Function** parameter at F977 to prevent the system from starting upon completion of the setup.
2. From Program ⇒ Direct Access ⇒ Unknown Numbers, select **Enabled**.
3. Set the **OUT1** terminal (F130) to **My Function Output 1** (222).
4. Set **Input Function Target 1** (F900) to **1004** (Low Speed Signal detection). See Table 10 on pg. 242 for a complete listing of available settings.
5. Set **Input Function Target 2** (F902) to **1026 (**Low-Current Alarm**)**. See Table 10 on pg. 242 for a complete listing of available settings.
6. Set **Input Function Command 1** (F901) to **AND** (3). This setting assigns an operator to the **Input Function Target 1** and the **Input Function Target 2** settings.
7. Set **Output Function Assigned** (F905) to **1222**. This setting will transfer the results of the logical AND to **My Function Output 1** (OUT1).
8. Enable the **My Function** parameter at F977 by selecting **My Function Always On**.

With the aforementioned setup completed in the example, once the **Low Speed Signal** AND the **Low-Current Alarm** are active, the **OUT1** terminal is activated for the duration of the **Low-Speed/Low-Current** condition.

Direct Access Number — F977

Parameter Type — **Selection List**

Factory Default — **None** (Disabled)

Changeable During Run — **No**

⚠ DANGER

This parameter must always be set to **None** at the start of the **My Function** setup and remain set to **None** until all of the **My Function** parameter settings have been confirmed as being correct.

If enabled for normal operation using settings **1** or **2**, the motor may start and engage the driven equipment unexpectedly upon receiving a **Run** signal during the **My Function** setup.

Traverse Selection (Not Used With the ACE-tronics G9 ASD)

Program ⇒ Special ⇒ Traverse

This parameter setting is used in the setup of the **Traverse** control mode of operation and is used in conjunction with the discrete terminal activation of the **Traverse Permission Signal**.

This parameter is used to enable the **Traverse** function. The **Traverse** function is activated via the discrete input terminal (see Table 7 on pg. 236).

See the ***Traverse Control Instruction Manual*** (P/N E6581337) for additional information on this feature.

Settings:

Disabled
Enabled

Direct Access Number — F980
Parameter Type — **Selection List**
Factory Default — **Disabled**
Changeable During Run — **No**

Traverse Acceleration Time (Not Used With the ACE-tronics G9 ASD)

Program ⇒ Special ⇒ Traverse

This parameter setting is used in the setup of the **Traverse** control mode of operation. This setting establishes the acceleration rate used during the **Traverse** function.

See the ***Traverse Control Instruction Manual*** (P/N E6581337) for additional information on this feature.

Direct Access Number — F981
Parameter Type — **Numerical**
Factory Default — **25.0**
Changeable During Run — **No**
Minimum — 0.1
Maximum — 120.0
Units — Seconds

Traverse Deceleration Time (Not Used With the ACE-tronics G9 ASD)

Program ⇒ Special ⇒ Traverse

This parameter setting is used in the setup of the **Traverse** control mode of operation. This setting establishes the deceleration rate used during the **Traverse** function.

See the ***Traverse Control Instruction Manual*** (P/N E6581337) for additional information on this feature.

Direct Access Number — F982
Parameter Type — **Numerical**
Factory Default — **25.0**
Changeable During Run — **No**
Minimum — 0.1
Maximum — 120.0
Units — Seconds

Traverse Step (Not Used With the ACE-tronics G9 ASD)

Program ⇒ Special ⇒ Traverse

This parameter setting is used in the setup of the **Traverse** control mode of operation. This setting is used as a multiplier to establish the amount that the frequency is increased or decreased while using the **Traverse** function.

See the ***Traverse Control Instruction Manual*** (P/N E6581337) for additional information on this feature.

Direct Access Number — F983
Parameter Type — **Numerical**
Factory Default — **10.0**
Changeable During Run — **No**
Minimum — 0.0
Maximum — 25.0
Units — %

Traverse Jump Step (Not Used With the ACE-tronics G9 ASD)

Direct Access Number — F984

Parameter Type — **Numerical**

Factory Default — **10.0**

Changeable During Run — **No**

Minimum — 0.0

Maximum — 50.0

Units — %

Program ⇒ Special ⇒ Traverse

This parameter setting is used in the setup of the **Traverse** control mode of operation. This setting is used as a multiplier to establish the amount that the frequency is increased or decreased while using the **Traverse** function when a short burst of rapid speed change is required.

See the ***Traverse Control Instruction Manual*** (P/N E6581337) for additional information on this feature.

Motion Control

Direct Access Number — F985

Parameter Type — **Selection List**

Factory Default — **Closed Loop Hoist**

Changeable During Run — **No**

Program ⇒ Crane/Hoist ⇒ Motion Control

This parameter sets the axis of motion to be controlled by the ASD.

Settings:

Closed Loop Hoist
Open Loop Hoist (Used During Emergency Lift ONLY)
Main Hoist
Bridge
Rotate

Speed Control Mode

Program ⇒ Crane/Hoist ⇒ Speed Control

This parameter setting determines the speed-control method to be used for motor control.

Settings:

Standard (ACE G9) **—** Normal ASD default settings and operation.

2-Step Variable

Required inputs — **F**, **R**, and **I1** (default via Startup Wizard).

F or **R** — Provides a **Run** command and outputs 6 Hz when activated. Decelerates to zero when deactivated or when both are on.
I1 — Provides a command to accel toward the **Upper-Limit** setting when activated. **Holds** (frequency) when deactivated.

3-Step Variable

Required inputs — **F**, **R**, **I3** (default), and **I4** (default).

F or **R** — Provides a **Run** command and outputs 6 Hz when activated. Decelerates to zero when deactivated or when both are on.
I3 — Provides a command to accel toward the **Upper-Limit** setting when activated.
I4 — Holds the **Run** frequency when activated. Returns to the **Run** command (6 Hz or stop) when deactivated.

5-Speed

Required inputs — **F**, **R**, and **Preset Speeds 1 – 4**.

F or **R** — Provides a **Run** command and outputs 6 Hz when activated. Decelerates to zero when deactivated or when both are on.
I3 – **I6** — Sequentially activates **Preset Speeds 1** – **4**. All of the preceding **Preset Speeds** must be active for a given **Preset Speed** to be output from the ASD (i.e., PS1 = PS1, PS1 & PS2 = PS2, PS1 & PS2 & PS3 = PS3, etc.). If not all of the preceding **Preset Speeds** are active, the highest **Preset Speed** number with all of the preceding **Preset Speeds** active will be output from the ASD (i.e., PS1 & PS2 & PS4 = PS2).

2- and 3-Speed

Same as **5-Speed** using only the required number of **Preset Speed** settings.

Unipolar Analog

Required inputs — **F**, **R**, and **RR** input.

F or **R** — Provides a **Run** command and outputs 6 Hz when activated. Decelerates to zero when deactivated or when both are on.
RR — Controls the output speed from the **Lower Limit** to the **Upper Limit**.

Bi-Polar Analog

Required inputs — **F**, **R**, and **RX** input.

F or **R** — Provides a **Run** command and outputs 6 Hz when activated. Decelerates to zero when deactivated or when both are on.
RX — Controls the output speed from the **Lower Limit** to the **Upper Limit** (Forward or Reverse).

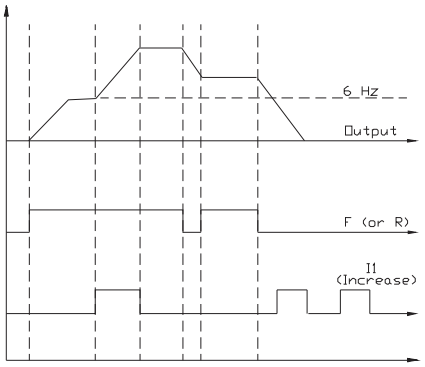
Direct Access Number — F986

Parameter Type — **Selection List**

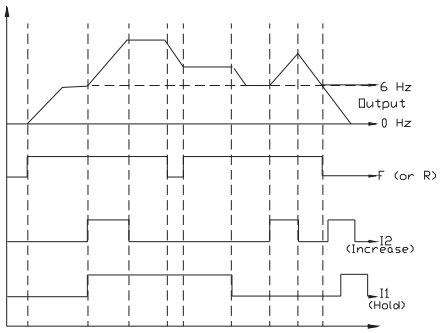
Factory Default — **2-Step Variable**

Changeable During Run — **N**

2-Step Variable operation



3-Step Variable operation



Note: *Incorrectly activated discrete input terminals will result in a* ***Switch Out Of Order Alarm*** *halting the ASD (e.g., F and R activated simultaneously when not required).*

To clear this condition, deactivate all discrete input terminals.

Brake-Release Torque Reference

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

This parameter sets the output torque level threshold that must be reached within the time setting of the **Brake-Release Torque (Proving) Time** (F988) to initiate the **Brake Release** during normal operation.

This setting is also used as a reference during the count-down of the **Brake-Release Torque Stable Time**.

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F987
Parameter Type — **Numerical**
Factory Default — **100.00**
Changeable During Run — **Yes**
Minimum — 10.00
Maximum — 250.0
Units — %

Brake-Release Torque (Proving) Time

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

The output-torque level requirement for the brake-release function must be met before the brake can release.

This parameter is used to set a time in which the **Brake-Release Torque Reference** (F988) criteria must be achieved.

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F988
Parameter Type — **Numerical**
Factory Default — **1.0**
Changeable During Run — **No**
Minimum — 0.5
Maximum — 10.0
Units — Seconds

Brake-Release Torque Stable Time

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

Once the brake signal is initiated this parameter sets the time that the output torque level must remain at or above the torque level set at F987 before the brake is released.

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F989
Parameter Type — **Numerical**
Factory Default — **0.20**
Changeable During Run — **Yes**
Minimum — 0.00
Maximum — 2.55
Units — Seconds

Brake-Release Mechanical (Delay) Time

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

This parameter sets the time for completing the **Brake-Seized Pulse Check** (F992).

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F990
Parameter Type — **Numerical**
Factory Default — **0.75**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 2.50
Units — Seconds

Brake-Set Mechanical (Delay) Time

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

Once the brake signal is initiated this parameter sets the time that must elapse before the brake engages.

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F991
Parameter Type — **Numerical**
Factory Default — **0.50**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 2.50
Units — Seconds

Brake-Seized Pulse Check Time

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

This parameter sets the time for completing the **Brake-Seized Pulse Check**.

With a forward or reverse signal applied to the motor, a brake that is seized closed will not allow the motor to rotate. To check for this condition, this parameter sets the minimum number of encoder pulses that are expected to occur within the time setting of F990.

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F992
Parameter Type — **Numerical**
Factory Default — **1.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 2.50
Units — Seconds

Brake-Seized Pulse Check

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

With a forward or reverse signal applied to the motor, a brake that is seized closed will not allow the motor to rotate.

To check for this condition, this parameter sets the minimum number of encoder pulses that are expected to occur within the time setting of the **Brake-Release Mechanical (Delay) Time** (F990) parameter.

Direct Access Number — F993
Parameter Type — **Numerical**
Factory Default — **20**
Changeable During Run — **No**
Minimum — 0
Maximum — 1024
Units — Pulse

Brake-Failure Pulse Count

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

If while the brake is applied the encoder pulse count reaches this setting within the time setting of the **Brake-Release Torque (Proving) Time** (F988) setting the system will incur a **Brake Failure** fault.

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F994
Parameter Type — **Numerical**
Factory Default — **100**
Changeable During Run — **No**
Minimum — 5
Maximum — 100
Units — Pulses

Continuous Monitoring Brake-Fail Pulse-Count

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

During normal operation this parameter establishes the maximum number of encoder pulses allowed after the brake is applied before a **Brake Failure** fault is incurred.

Direct Access Number — F995
Parameter Type — **Numerical**
Factory Default — **200**
Changeable During Run — **No**
Minimum — 0
Maximum — 1024
Units — Pulses

Maximum Up Speed At Brake Fail

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

In the event of a brake failure this parameter setting is used as the hoist-up speed limit.

Direct Access Number — F996
Parameter Type — **Numerical**
Factory Default — **6.00**
Changeable During Run — **No**
Minimum — 0.00
Maximum — 60.0
Units — Hz

Load Hover Time

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

This parameter sets the time that the system will hold the load before the brake is applied during a normal stop.

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F997
Parameter Type — **Numerical**
Factory Default — **5.0**
Changeable During Run — **No**
Minimum — 0.0
Maximum — 300.0
Units — Seconds

Drooping Pulses Allowed

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

This parameter sets the number of encoder pulses allowed in the opposite direction of the commanded direction before a **Load Drooping** fault occurs.

If commanded to lift (forward) and the load is dropping (reverse or falling), this condition is annunciated via the **Load Drooping** fault and indicates that the requirements of the load are in excess of the capability of the motor.

Direct Access Number — F998

Parameter Type — **Numerical**

Factory Default — **350**

Changeable During Run — **Yes**

Minimum — 2

Maximum — 1024

Units — Pulses

Encoder Error Detection Time

Program ⇒ Crane/Hoist ⇒ Closed Loop Hoist Control

Upon receiving a frequency command, should the motor response be anything other than the commanded frequency for longer than the time set at this parameter, an encoder error in incurred.

See **Figure 32 on pg. 235** for additional information on this parameter.

Direct Access Number — F999

Parameter Type — **Numerical**

Factory Default — **0.50**

Changeable During Run — **No**

Minimum — 0.00

Maximum — 2.55

Units — Seconds

Figure 32. Closed-Loop Hoist Start and Stop Timing Diagrams.

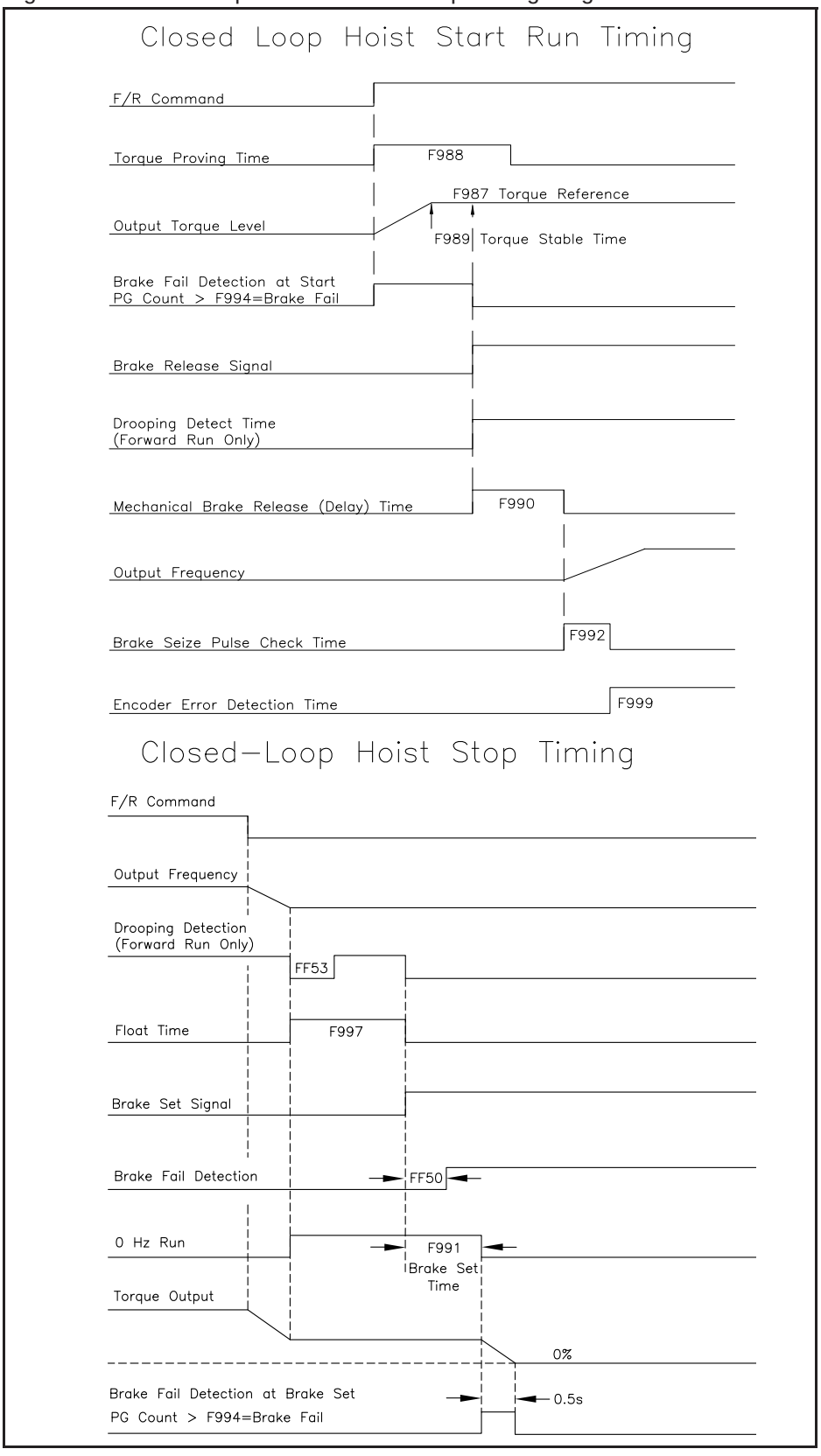


Table 7. Discrete Input Terminal Assignment Selections and Descriptions.

<table>
<tr><th colspan="2">Sel. No.</th><th rowspan="2">Terminal Selection Descriptions</th></tr>
<tr><th>NO</th><th>NC</th></tr>
<tr><td>0</td><td>1</td><td>Unassigned — No operation.</td></tr>
<tr><td>2</td><td>3</td><td>Forward — Provides a Forward run command.</td></tr>
<tr><td>4</td><td>5</td><td>Reverse — Provides a Reverse run command.</td></tr>
<tr><td>6</td><td>7</td><td>Standby — Enables the Forward and Reverse operation commands.</td></tr>
<tr><td>8</td><td>9</td><td>Reset — Resets the device and any active faults.</td></tr>
<tr><td>10</td><td>11</td><td>Preset Speed 1 — Preset Speed 1 is used as the LSB of the 4-bit nibble that is used to select a Preset Speed.</td></tr>
<tr><td>12</td><td>13</td><td>Preset Speed 2 — Preset Speed 2 is used as the second bit of the 4-bit nibble that is used to select a Preset Speed.</td></tr>
<tr><td>14</td><td>15</td><td>Preset Speed 3 — Preset Speed 3 is used as the third bit of the 4-bit nibble that is used to select a Preset Speed.</td></tr>
<tr><td>16</td><td>17</td><td>Preset Speed 4 — Preset Speed 4 is used as the MSB of the 4-bit nibble that is used to select a Preset Speed.</td></tr>
<tr><td>18</td><td>19</td><td>Jog Run — This terminal activates a Jog for the duration of the activation. The Jog settings may be configured at F260 – F262.</td></tr>
<tr><td>20</td><td>21</td><td>Emergency Off — Terminates the output signal from the ASD and may apply a brake if so configured. The braking method may be selected at F603.</td></tr>
<tr><td>22</td><td>23</td><td>DC Braking — Upon activation the ASD outputs a DC current that is injected into the windings of the motor to quickly brake the motor.</td></tr>
<tr><td>24</td><td>25</td><td rowspan="2">Accel/Decel Switching 1/Accel/Decel Switching 2 — Activating combinations of discrete input terminals Accel/Decel Switching 1 and 2 allow for the selection of Accel/Decel profiles 1 – 4 as shown below.
See F504 for additional information on this terminal setting.
<table>
<tr><th colspan="2">A/D SW Terminal</th><th rowspan="2">A/D Profile Selection</th></tr>
<tr><th>#1</th><th>#2</th></tr>
<tr><td>0</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>2</td></tr>
<tr><td>1</td><td>0</td><td>3</td></tr>
<tr><td>1</td><td>1</td><td>4</td></tr>
<tr><td colspan="3">1=Terminal Activated</td></tr>
</table>
The settings of the A/D selections 1 – 4 are performed at F009/F010, F500/F501, F510/F511, and F514/F515, respectively.
Accel/Decel profiles are comprised of the Accel/Decel settings, Pattern, and Switching Frequency.</td></tr>
<tr><td>26</td><td>27</td></tr>
<tr><td>28</td><td>29</td><td rowspan="2">V/f Switching 1/V/f Switching 2 — Activating combinations of discrete input terminals V/f Switching 1 and 2 allow for the selection of a V/f switching profile as listed below.
<table>
<tr><th colspan="2">V/f Switching Terminal</th><th rowspan="2">V/f Selection</th></tr>
<tr><th>#1</th><th>#2</th></tr>
<tr><td>0</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>2</td></tr>
<tr><td>1</td><td>0</td><td>3</td></tr>
<tr><td>1</td><td>1</td><td>4</td></tr>
<tr><td colspan="3">1=Terminal Activated</td></tr>
</table>
The 1–4 settings of the V/f Switching selections are performed at parameters F170 – F181.</td></tr>
<tr><td>30</td><td>31</td></tr>
<tr><td colspan="3">Note: NO/NC = Normally Open/Normally Closed. Selection numbers are used when selecting using communications.</td></tr>
</table>

Table 7. (Continued) Discrete Input Terminal Assignment Selections and Descriptions.

<table>
<tr><th colspan="2">Sel. No.</th><th rowspan="2">Terminal Selection Descriptions</th></tr>
<tr><th>NO</th><th>NC</th></tr>
<tr><td rowspan="2">32

34</td><td rowspan="2">33

35</td><td>Torque Limit Switching 1/Torque Limit Switching 2 — Activating combinations of discrete input terminals Torque Limit Switching 1 and 2 allow for the selection of a torque limit switching profile as listed below.
<table>
<tr><th colspan="2">Torque Limit Switching Terminal</th><th rowspan="2">Torque Limit Selection</th></tr>
<tr><th>#1</th><th>#2</th></tr>
<tr><td>0</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>2</td></tr>
<tr><td>1</td><td>0</td><td>3</td></tr>
<tr><td>1</td><td>1</td><td>4</td></tr>
<tr><td colspan="3">1=Terminal Activated</td></tr>
</table>
The 1–4 settings of the torque limit switching selections are performed at parameters F440 – F449.</td></tr>
<tr><td>36</td><td>37</td><td>PID Off — Turns off PID control.</td></tr>
<tr><td>38</td><td>39</td><td>Pattern Operation Group 1 — Initiates the Pattern #1 Pattern Run.</td></tr>
<tr><td>40</td><td>41</td><td>Pattern Operation Group 2 — Initiates the Pattern #2 Pattern Run.</td></tr>
<tr><td>42</td><td>43</td><td>Pattern Operation Continuation — Initiates a continuation of the last Pattern Run from its stopping point.</td></tr>
<tr><td>44</td><td>45</td><td>Pattern Operation Trigger — Initiates the first Preset Speed of a Pattern Run and initiates each subsequent enabled Preset Speed with continued activations.</td></tr>
<tr><td>46</td><td>47</td><td>External Overheat — Causes an Overheat Trip (OH).</td></tr>
<tr><td>48</td><td>49</td><td>Local Priority (Cancels Serial Priority) — Activation overrides all active serial control and returns the Command and Frequency control to the settings of F003 and F004 for the duration of the activation.</td></tr>
<tr><td>50</td><td>51</td><td>Hold (3-Wire Stop) — Decelerates the motor to a stop.</td></tr>
<tr><td>52</td><td>53</td><td>PID Differentiation/Integration Clear — Clears the PID value.</td></tr>
<tr><td>54</td><td>55</td><td>PID Forward/Reverse Switching — Toggles the gradient characteristic of the feedback response of the V/I terminal during PID-controlled operation.</td></tr>
<tr><td>56</td><td>57</td><td>Forced Continuous Operation — Ignore PID control settings for the duration of activation.</td></tr>
<tr><td>58</td><td>59</td><td>Specified Speed Operation — Runs speed as commanded by the Frequency Mode setting.</td></tr>
<tr><td>60</td><td>61</td><td>Dwell Signal — Used in conjunction with the Acceleration/Deceleration Suspend function (F349) — suspends the Accel/Decel function for the duration of the activation.</td></tr>
<tr><td>62</td><td>63</td><td>Power Failure Synchronized Signal — Activates the Synchronized Accel/Decel function of the Regenerative Power Ridethrough feature. See F302 for additional information on this terminal setting.</td></tr>
<tr><td>64</td><td>65</td><td>My Function Run — Activates the configured My Function feature. See F977 for additional information on this parameter.</td></tr>
<tr><td>66</td><td>67</td><td>Autotuning Signal — Initiates the Autotune function. Set F400 to Autotuning by Input Terminal Signal.</td></tr>
<tr><td>68</td><td>69</td><td>Speed Gain Switching — Toggles the ASD operating mode from and to Speed Control and Torque Control. Speed Control operation references parameter settings F460 and F461. Torque Control operation references parameter settings F462 and F463.</td></tr>
<tr><td>70</td><td>71</td><td>Servo Lock — Holds the motor at 0 Hz until a Run command is received.</td></tr>
<tr><td>72</td><td>73</td><td>Simple Positioning — While operating in the Positioning Control mode, activation initiates the Stop command. See F381 for additional information on this terminal setting.</td></tr>
<tr><td>74</td><td>75</td><td>kWH Display Clear — Clears the kWH meter display.</td></tr>
<tr><td>76</td><td>77</td><td>Trace Back Trigger— Initiates the data Read/Store function of the Trace Selection parameter. See F740 for additional information on this feature.</td></tr>
<tr><td>78</td><td>79</td><td>Express-Speed Disable — Terminates the Express Speed operation.</td></tr>
<tr><td colspan="3">Note: NO/NC = Normally Open/Normally Closed. Selection numbers are used when selecting using communications.</td></tr>
</table>

Table 7. (Continued) Discrete Input Terminal Assignment Selections and Descriptions.

Sel. No.		Terminal Selection Descriptions
NO	NC	
86	87	**Binary Write** — Writes the status of the discrete input terminals to the control board during binary input speed control.
88	89	**UP/DOWN Frequency (UP)** — Increases the speed of the motor for the duration of activation until reaching the **Upper-Limit** setting or increases the speed of the motor in steps (see F264 for additional information on this feature).
90	91	**UP/DOWN Frequency (DOWN)** — Decreases the speed of the motor for the duration of activation until reaching the **Lower-Limit** (F013) setting or decreases the speed of the motor in steps (see F264 for additional information on this feature).
92	93	**UP/DOWN Frequency** (Clear) — While operating in the **UP/DOWN Frequency** speed control mode this terminal initiates a 0 Hz output command. If operating with an activated **UP/DOWN Frequency** (up or down) terminal, the output goes to the **Lower-Limit** (F013) setting.
98	99	**Forward/Reverse** — This setting operates in conjunction with another terminal being set to the **Run/Stop** function. When configured to **Run** (Run/Stop activated), the activation/deactivation of this terminal changes the direction of the motor.
100	101	**Run/Stop** — This terminal enables the motor to run when activated and disables the motor when deactivated.
102	103	**Commercial Power/ASD Switching** — Initiates the **ASD-to-Commercial Power** switching function. See parameter F354 for additional information on this feature.
104	105	**Frequency Reference Priority Switching** — Toggles frequency control to and from the settings of F004 and F207.
106	107	**V/I Terminal Priority** — Assigns **Speed** control to the **V/I Terminal** and overrides the F004 setting.
108	109	**Command Terminal Board Priority** — Assigns **Command** control to the **ACE G9-120V-PCB** and overrides the F003 setting.
110	111	**Edit Enable** — Allows for the override of the lockout parameter setting (F700) allowing for parameter editing.
112	113	**Control Switching** — Toggles the system to and from the speed control and the torque control modes.
122	123	**Fast Deceleration** — Using dynamic braking (if enabled and supported), stops the motor at the fastest rate allowed by the load.
124	125	**Preliminary Excitation** — Applies an excitation current to the motor (holds shaft stationary) for the duration of the activation.
126	127	**Brake Request —** Initiates the **Brake-Release** command. This setting requires that another discrete input terminal be set to **Brake Answerback Input** to complete the **Brake-Release** command and to convey the status of the braking system to the user or to a dependent subsystem. Once the braking release function is initiated, the **Trouble Internal Timer** begins to count down (**Trouble Internal Timer** value is set at F630). Should the count-down timer expire before the brake releases or before the **Brake Answerback Input** is returned, fault **E-11** will occur. Otherwise, the brake releases the motor and normal motor operations resume. The **Braking Release** function is primarily used at startup; but, may be used when the brake is applied while the motor is running.
130	131	**Brake Answerback Input —** This setting is required when the **Braking Request** function is used. The function of this input terminal is to receive the returned the status of the braking system. The returned status is either **Released** or **Not Released**. If **Released** is returned within the time setting of F630, normal system function resumes. If **Not Released** is returned or if the F630 time setting times out before either signal is returned, then fault **E-11** occurs. The returned signal may also be used to notify the user or control a dependent subsystem.
132	133	**3-Step-Variable Speed Hold** — Holds the run frequency for the duration of the activation.
134	135	**Traverse Permission Signal —** This feature is not used with the ACE-tronics G9 ASD.
136	137	**Slow-Speed Limit-Switch Forward —** Activating this terminal applies the modified **Upper-Limit Slow Speed** setting of F294 and the modified **Deceleration** setting of parameter F283 for the duration of the activation.

Note: *NO/NC = Normally Open/Normally Closed. Selection numbers are used when selecting using communications.*

Table 7. (Continued) Discrete Input Terminal Assignment Selections and Descriptions.

Sel. No.		Terminal Selection Descriptions
NO	NC	
138	139	**Stop Limit-Switch Forward —** Activating this terminal applies the **Stop** command. The deceleration rate is set at parameter F284.
140	141	**Slow-Speed Limit-Switch Reverse —** Activating this terminal applies the modified **Upper-Limit Slow Speed** setting of F293 and the modified **Deceleration** setting of parameter F285 for the duration of the activation.
142	143	**Stop Limit-Switch Reverse —** Activating this terminal applies the **Stop** command. The deceleration rate is set at parameter F286.
144	145	**Emergency Lift —** Activating this terminal initiates the **Emergency-Lift** function and continues for the duration of the activation. This feature requires that the **Emergency-Lift** function be enabled at F656.
146	147	**Timed Run —** Activating this terminal outputs the commanded speed (from RR, Communications, etc.) for the duration of the **Timed-Run Run-Time** setting.
148	149	**External Fault —** In a multiple ASD configuration a faulted ASD signals the remaining ASDs that a fault has occurred and shuts down the non-faulted ASDs. The non-faulted ASDs receive an **External Fault** signal via this terminal from the faulted ASD.
150	151	**Creep Speed 1 Command —** Activating this terminal modifies the output frequency of the ASD by multiplying the commanded frequency by the setting at the **Creep Multiplier 1** parameter. The modified output is allowed to run for the number of pulse counts of the **Super Creep Pulse Count** parameter.
152	153	**Creep Speed 2 Command —** Activating this terminal modifies the output frequency of the ASD by multiplying the commanded frequency by the setting at the parameter. The modified output is allowed to run for the number of pulse counts of the **Super Creep Pulse Count** parameter. This setting is ignored if **Creep Multiplier #1** is active.
154	155	**Brake Failure —** This terminal is activated via a transducer in the event that, during closed-loop operation, encoder pulses are detected while the brake is applied.
156	157	**Super Creep —** Terminal activation rotates the motor for the amount of encoder pulses set at the **Super Creep Pulse Count** parameter at the frequency setting of **Super Creep Speed** parameter. Available in closed-loop operation only.
Note: *NO/NC = Normally Open/Normally Closed. Selection numbers are used when selecting using communications.*		

Table 8. Output Terminal Assignments for the **FP**, **AM**, **FM**, **MON1**, and **MON2** Output Terminals.

Output Meter Terminal Assignments and Display Item Selections			
Selection/ Comm Number	**Terminal Assignment Name**	**Selection/ Comm Number**	**Terminal Assignment Name**
0	Output Frequency	30	100% Meter Adjust Value
1	Frequency Reference	31	Data from Communications
2	Output Current	32	185% Meter Adjust Value
3	DC Bus Voltage	33	250% Meter Adjust Value
4	Output Voltage	34	Input Watt Hour
5	Compensated Frequency	35	Output Watt Hour
6	Speed Feedback (Realtime)	45	Gain Display
7	Speed Feedback (1 Sec Filter)	46	My Function Monitor 1 Without Sign
8	Torque	47	My Function Monitor 2 Without Sign
9	Torque Command	48	My Function Monitor 3 With Sign
11	Torque Current	49	My Function Monitor 4 With Sign (FP End)
12	Excitation Current	50	Signed Output Frequency
13	PID Feedback Value	51	Signed Frequency Reference (Before PI)
14	Motor Overload Ratio	52	Signed Compensated Frequency
15	ASD Overload Ratio	53	Signed Speed Feedback (Realtime)
16	DBR Overload Ratio	54	Signed Speed Feedback (1 Sec Filter)
17	DBR Load Ratio	55	Signed Torque
18	Input Power	56	Signed Torque Command
19	Output Power	58	Signed Torque Current
23	Option V/I Input	59	Signed PID Feedback Value
24	RR Input	60	Signed RX Input
25	V/I Input	61	Signed RX2 Option (AI1) Input
26	RX Input	62	Signed 100% Meter Adjust Value
27	RX2 Option (AI1) Input	63	Signed 185% Meter Adjust Value
28	FM Output	64	Signed 250% Meter Adjust Value
29	AM Output		

Table 9. **My Function** Input Function Target Selections.

Selection/ Communications Number	**Terminal Assignment** (Physical Terminals Or Memory Locations Where Virtual/Internal)	**Selection/ Communications Number**	**Terminal Assignment** (Physical Terminals Or Memory Locations Where Virtual/Internal)
0	Unassigned	17	B12
1	Forward	18	B13
2	Reverse	19	B14
3	Standby	20	B15
4	Reset	21	Virtual Input Terminal 1
5	I1	22	Virtual Input Terminal 2
6	I2	23	Virtual Input Terminal 3
7	I3	24	Virtual Input Terminal 4
8	I4	25	Internal Terminal 1
9	LI1	26	Internal Terminal 2
10	LI2	27	Internal Terminal 3
11	LI3	28	Internal Terminal 4
12	LI4	29	Internal Terminal 5
13	LI5	30	Internal Terminal 6
14	LI6	31	Internal Terminal 7
15	LI7	32	Internal Terminal 8
16	LI8		

Table 10. **My Function** Input Setting (Input Function Target) Assignments, and Parameter/Input Setting Numbers for the **BRAKE-A/B/C**, **OUT1**, **OUT2**, **OUT3**–**OUT6**, and **R1**–**R4** Terminals.

Discrete Output Terminal Assignment Selections (Positive Logic)					
Input Setting	**Param. Setting**	**Function**	**Input Setting**	**Param. Setting**	**Function**
1000	0	Lower-Limit Frequency	1074	74	Reverse Speed Limit (Torque Control)
1002	2	Upper-Limit Frequency	1076	76	ASD Healthy Output
1004	4	Low Speed Signal	1078	78	RS485 Communication Error
1006	6	Acceleration/Deceleration Completion	1080	80	Error Code Output 1
1008	8	Speed Reach Signal	1082	82	Error Code Output 2
1010	10	Failure BRAKE (All Trips)	1084	84	Error Code Output 3
1012	12	Failure BRAKE (Except EF, OCL, EPHO, OL2)	1086	86	Error Code Output 4
1014	14	Over-Current (OC) Alarm	1088	88	Error Code Output 5
1016	16	ASD Overload (OL1) Alarm	1090	90	Error Code Output 6
1018	18	Motor Overload (OL2) Alarm	1092	92	Specified Data Output 1
1020	20	Overheat Alarm	1094	94	Specified Data Output 2
1022	22	Over-Voltage Alarm	1096	96	Specified Data Output 3
1024	24	Main Circuit (MOFF) Under-Voltage Alarm	1098	98	Specified Data Output 4
1026	26	Low-Current Alarm	1100	100	Specified Data Output 5
1028	28	Over-Torque Alarm	1102	102	Specified Data Output 6
1030	30	DBR Overload Alarm	1104	104	Specified Data Output 7
1032	32	Emergency Off Active	1106	106	Switch Out Of Sequence
1034	34	Retry Active	1108	108	Heavy Load
1036	36	Pattern Operation Switching Output	1110	110	Positive Torque Limit
1038	38	PID Deviation Limit	1112	112	Negative Torque Limit
1040	40	Run/Stop	1114	114	External Rush Suppression Relay Activated
1042	42	Serious Failure (OCA, OCL, EF, Phase Failure, etc.)	1118	118	Completion of Stop Positioning
1044	44	Light Failure (OL, OC1, 2, 3, OP)	1120	120	L-STOP
1046	46	Commercial Power/ASD Switching Output 1	1122	122	Power Failure Synchronized Operation
1048	48	Commercial Power/ASD Switching Output 2	1124	124	Traverse Active
1050	50	Cooling Fan On/Off	1126	126	Traverse Deceleration Active
1052	52	Jogging Operation Active (Jog Run Active)	1128	128	Part Replacement Alarm
1054	54	Panel/Terminal (Board) Operation Switching	1130	130	Over-Torque Alarm
1056	56	Bearing Greaser Run-Time Alarm	1132	132	Frequency Command ½ Selection
1058	58	ProfiBus/DeviceNet/CC-Link Communication Error	1134	134	Failure BRAKE (Non-Emergency Off)
1060	60	Forward/Reverse Switching	1136	136	External Fault
1062	62	Ready for Operation 1	1138	138	Drooping Fault
1064	64	Ready for Operation 2	1140	140	Run Before Ready
1068	68	Brake Release (BR)	1142	142	Slow-Speed Limit Switch
1070	70	Alarm Status Active	1144	144	Stop Limit-Switch Forward
1072	72	Forward Speed Limit (Torque Control)	1146	146	Slow-Speed Limit Switch

Table 10. (Continued) **My Function** Input Setting (Input Function Target) Assignments, and Parameter/Input Setting Numbers for the **BRAKE-A/B/C**, **OUT1**, **OUT2**, **OUT3**–**OUT6**, and **R1**–**R4** Terminals.

Discrete Output Terminal Assignment Selections (Positive Logic)					
1148	148	Stop Speed-Limit Switch	1232	232	My Function Output 6
1150	150	Emergency Lift	1234	234	My Function Output 7
1152	152	Timed Run	1236	236	My Function Output 8
1154	154	Brake Failure	1238	238	My Function Output 9
1156	156	Brake Seized	1240	240	My Function Output 10
1158	158	Slack Rope	1242	242	My Function Output 11
1160	160	Encoder Loss	1244	244	My Function Output 12
1162	162	Fault Stop	1246	246	My Function Output 13
1222	222	My Function Output 1	1248	248	My Function Output 14
1224	224	My Function Output 2	1250	250	My Function Output 15
1226	226	My Function Output 3	1252	252	My Function Output 16
1228	228	My Function Output 4	1254	254	Always Off
1230	230	My Function Output 5			

Table 11. **Trace Back Data** Selections.

Selection Number	Comm. Number	Trace (Monitor) Function	Resolution/ Unit
0	FD00	Output Frequency	0.01 Hz
1	FD02	Frequency Reference	0.01 Hz
2	FD03	Output Current	0.01%
3	FD04	DC Bus Voltage	0.01%
4	FD05	Output Voltage	0.01%
5	FD15	Compensated Frequency	0.01 Hz
6	FD16	Speed Feedback (Realtime)	0.01 Hz
7	FD17	Speed Feedback (1 Sec Filter)	0.01 Hz
8	FD18	Torque	0.01%
9	FD19	Torque Command	0.01%
11	FD20	Torque Current	0.01%
12	FD21	Excitation Current	0.01%
13	FD22	PID Feedback Value	0.01 Hz
14	FD23	Motor Overload Ratio	0.01%
15	FD24	ASD Overload Ratio	0.01%
16	FD25	DBR Overload Ratio	1%
17	FD28	DBR Load Ratio	1%
18	FD29	Input Power	0.01 kW
19	FD30	Output Power	0.01 kW
23	FE39	V/I Option (AI2)	1%
24	FE35	RR Input	0.01%
25	FE36	V/I Input	0.01%
26	FE37	RX Input	0.01%
27	FE38	RX2 Option (AI1)	1%
28	FE40	FM Output	0.01%
29	FE41	AM Output	0.01%
30	FE51	Signed 100% Meter Adjust Value	1%
31	FA51	Communication Data	N/A
32	FE50	Signed 185% Meter Adjust Value	1%
33	FE67	Signed 250% Meter Adjust Value	1%
34	FE76	Input Watt-Hour	0.01 kWhr
35	FE77	Output Watt-Hour	0.01 kWhr
45	0006/0671	AM/FM Gain Display	1
46	FE60	My Function Monitor 1 (Unsigned Value)	1
47	FE61	My Function Monitor 2 (Unsigned Value)	1
48	FE62	My Function Monitor 3 (Signed Value)	1
49	FE63	My Function Monitor 4 (Signed Value)	1

Table 12. **Input Function Target** Selections and the Associated Communications Numbers.

Input Setting/Communication Number				Function	Resolution /Unit
AM/FM/FP Input Setting	Comm. Number	Monitor Display Input Setting	Comm. Number		
2000	FD00	3000	FE00	Output Frequency	0.01 Hz
2002	FD02	3002	FE02	Frequency Reference	0.01 Hz
2003	FD03	3003	FE03	Output Current	0.01%
2004	FD04	3004	FE04	DC Bus Voltage	0.01%
2005	FD05	3005	FE05	Output Voltage	0.01%
2015	FD15	3015	FE15	Compensated Frequency	0.01 Hz
2016	FD16	3016	FE16	Speed Feedback (Realtime) *(See Note 1)*	0.01 Hz
2017	FD17	3017	FE17	Speed Feedback (1 Sec Filter) *(See Note 1)*	0.01 Hz
2018	FD18	3018	FE18	Torque *(See Note 2)*	0.01%
2019	FD19	3019	FE19	Torque Command *(See Note 2)*	0.01%
2020	FD20	3020	FE20	Torque Current *(See Note 2)*	0.01%
2021	FD21	3021	FE21	Excitation Current	0.01%
2022	FD22	3022	FE22	PID Feedback Value	0.01 Hz
2023	FD23	3023	FE23	Motor Overload Ratio	0.01%
2024	FD24	3024	FE24	ASD Overload Ratio	0.01%
2025	FD25	3025	FE25	DBR Overload Ratio	1%
2028	FD28	3028	FE28	DBR Load Ratio	1%
2029	FD29	3029	FE29	Input Power	0.01 kW
2030	FD30	3030	FE30	Output Power	0.01 kW
		3031	FE31	Pattern Operation Group Number	0.1
		3032	FE32	Pattern Operation Cycles Remaining	1
		3033	FE33	Pattern Operation Preset Speed Number	1
		3034	FE34	Pattern Operation Preset Speed Time Remaining	0.1
2050	FD50			Express-Speed Load Torque Monitor 1	0.01%
2051	FD51			Express-Speed Load Torque Monitor 2	0.01%
		3035	FE35	RR Input	1%
		3036	FE36	V/I Input	1%
		3037	FE37	RX Input *(See Note 2)*	1%
		3038	FE38	RX2 Option (AI1) Input *(See Note 2)*	1%
		3039	FE39	RX2 Option (AI1) Input	1%
		3040	FE40	FM Output	1
		3041	FE41	AM Output	1

Note 1: *If no PG feedback is used an estimated speed value is displayed.*

Note 2: *My Function cannot process negative values — A negative value is processed by* ***My Function*** *as an absolute value.*

Table 12. (Continued) **Input Function Target** Selections and the Associated Communications Numbers.

Input Setting/Communication Number				Function	Resolution /Unit
AM/FM/FP Input Setting	Comm. Number	Monitor Display Input Setting	Comm. Number		
3050	FE50			Communication Data Output 2	
3051	FE51			Communication Data Output 1	
3052	FE52			Communication Data Output 3	
3060	FE60			My Function Monitor 1 (Output of Unsigned Value)	
3061	FE61			My Function Monitor 2 (Output of Unsigned Value)	
3062	FE62			My Function Monitor 3 (Output of Signed Value)	
3063	FE63			My Function Monitor 4 (Output of Signed Value)	
		3066	FE66	Expansion I/O Card 1 CPU Version	
		3067	FE67	Expansion I/O Card 2 CPU Version	
		3076	FE76	Integral Input Power	0.01 kW
		3077	FE77	Integral Output Power	0.01 kW
		3084	FE84	16-Bit BIN/BCD Input Value	1

Note 1: *If no PG feedback is used an estimated speed value is displayed.*

Note 2: *My Function cannot process negative values — A negative value is processed by* ***My Function*** *as an absolute value.*

Table 13. **My Function** Operator Selections.

My Function Computational Selections		
Input Function Command	**Function Name**	**Function Description**
0	NOP (No Operation)	Disables the My Function feature.
1	ST	Execute data read/transfer.
2	STN	Execute inverted data read/transfer.
3	AND	Logical product of A AND B.
4	ANDN	Logical product of A AND $\overline{B}$.
5	OR	Logical sum of A OR B.
6	ORN	Logical sum of A OR $\overline{B}$.
7	EQ	Compares data — Outputs 1 if Equal; 0 if not Equal.
8	NE	Compares data — Outputs 0 if Equal; 1 if not Equal.
9	GT	Compares data — Outputs 1 if A>B; 0 if A≤B.
10	GE	Compares data — Outputs 1 if A≥B; 0 if A<B.
11	LT	Compares data — Outputs 1 if A<B; 0 if A≥B.
12	LE	Compares data — Outputs 1 if A≤B; 0 if A>B.
13	ASUB	Outputs absolute difference between A and B — |A–B|.
14	ON (Timer)	Enables the On response time delay settings of **My Function Time Data 1 – 5** (F928 – F932) for **My Function Data**.
15	Off (Timer)	Enables the Off response time delay settings of **My Function Time Data 1 – 5** (F928 – F932) for **My Function Data**.
16	COUNT1 (Timer)	Outputs a 1 upon reaching the pulse count setting of F933.
17	COUNT2 (Timer)	Outputs a 1 upon reaching the pulse count setting of F934.
18	HOLD	Outputs the peak output value since powering up or since the last reset.
19	SET	Sets data.
20	RESET	Resets data.

Alarms, Trips, and Troubleshooting

Alarms and Trips

This section provides information that assists the user in the event that a **Fault** is incurred.

If a user setting or a ASD parameter has been exceeded, or if a data transfer function produces an unexpected result, a condition that is referred to as a **Fault** is incurred.

An **Alarm** is an indication that a **Fault** is imminent if existing operating conditions continue unchanged. An **Alarm** may be associated with an output terminal to notify the operator of the condition remotely, close a contact, or engage a brake. At the least, an **Alarm** will cause an alarm code to appear on the EOI screen. Table 14 on pg. 249 lists the **Alarm** codes that may be displayed during operation of the ASD.

In the event that the condition that caused the **Alarm** does not return to its normal operating level within a specified time, the ASD **Faults** and a **Trip** is incurred (**Fault** and **Trip** are sometimes used interchangeably).

A **Trip** is a safety feature (the result of a **Fault**) that disables the ASD system and removes the 3-phase power to the motor in the event that a subsystem of the ASD is malfunctioning, or one or more of the variables listed below exceeds its normal range (time and/or magnitude).

- Current,
- Voltage,
- Speed,
- Temperature,
- Torque, or
- Load.

See Table 15 on pg. 254 for a listing of the potential **Trips** and the associated probable causes.

The operating conditions at the time of the trip may be used to help determine the cause of the trip. Listed below are operating conditions that may be used to assist the operator in correcting the problem or that the ASD operator should be prepared to discuss when contacting ACE World Companies Customer Support Center for assistance.

- What trip information is displayed?
- Is this a new installation?
- Has the system ever worked properly and what are the recent modifications (if any)?
- What is the ASD and motor size?
- What is the CPU version and revision level?
- What is the EOI version?
- Does the ASD trip when accelerating, running, decelerating, or when not running?
- Does the ASD reach the commanded frequency?
- Does the ASD trip without the motor attached?
- Does ASD trip with an unloaded motor?

Alarms

Table 14 lists the alarm codes that may be displayed during operation of the ASD. Each alarm code listed is accompanied by a description and a possible cause. In the event that the source of the malfunction cannot be determined, contact your ACE World Companies Customer Support Center for additional information on the condition and for an appropriate course of action.

Table 14. ACE-tronics G9 ASD Alarms.

LCD Screen	LED Screen	Description	Possible Causes
***ASD Overload**	OL 1	Load requirement in excess of the capability of the ASD.	• The carrier frequency is too high. • An excessive load. • Acceleration time is too short. • DC damping rate is set too high. • The motor is starting into a spinning load after a momentary power failure. • The ASD is improperly matched to the application.
Autotuning	AtN	Autotune active.	• Autotune active.
Brake Failure	brKF	Encoder pulses greater than F994 setting detected while brake is set or during normal operation more pulses than the F995 setting occurred after applying the brake.	• Brake Failure.
Brake Fault	brF	Encoder pulses received with brake on during torque proving or during continuous brake load-hold.	• Pulses received from encoder during torque proving. • Closed-loop Hoist Mode operation, brake is on with no Run command and encoder pulses are received.
***Brake Resistor Overload**	OLr	Excessive current at the **Dynamic Braking Resistor**.	• Deceleration time is too short. • DBR configuration improperly set.
Brake Seized	brS	No encoder pulses received after brake release with active Run command.	• Closed-loop Hoist Mode operation, encoder pulses less than the F993 setting received after brake release with an active Run command.
Comm1 Error	Cn1	Internal communications error.	• DeviceNet/Profibus/CC-Link Failure. • Improperly programmed ASD. • Improper communications settings. • Improperly connected cables.
*** Reset ignored if active.**			

LCD Screen	LED Screen	Description	Possible Causes
Comm2 Error	Cn2	External communications error.	• RS485 Failure. • Improperly programmed ASD. • Improper communications settings. • Improperly connected cables.
***Control Under-Voltage**	POFF	Under-voltage condition at the 5, 15, or the 24 VDC supply.	• Defective Control board. • Excessive load on power supply. • Low input voltage.
Drooping	droP	Encoder pulses received in excess of F998 setting of the opposite direction of the commanded frequency.	• Requirements of the load are in excess of the capability of the motor. • Falling load.
Emergency Lift	L IFt	Hoist-control function switches from closed-loop operation to open-loop operation. Max speed UP = F657. Max speed DOWN = F656.	• Encoder feedback signal has been lost and discrete input terminal #144 is activated or F867 is set to Enabled.
External Fault	EFLt	Non-faulted ASD in a multiple ASD system.	• ASD of a multiple ASD system has faulted — the non-faulted ASD(s) incur an External Fault.
Forward Limit Switch	FLS	Forward Limit Switch Activated.	• Crane has approached the end-of-travel for the selected operating plane as indicated by the limit switch.
Heavy Load	HLd	Output torque requirement has exceeded the setting of F337.	• Load too heavy for motor. • Resets when output torque requirement drops below the setting of F337
Main Under-Voltage	nOFF	Under-voltage condition at the 3-phase AC input to the ASD.	• Low 3-phase utility voltage.
Maintenance Timer	LtA	Bearing Greaser Time has expired.	• Bearing Greaser Alarm Time setting has expired (F621). • Ambient Average Temperature Time setting has expired (F634).
Motor Overload	OLn	Load requirement in excess of the capability of the motor.	• V/f parameter improperly set. • Motor is locked. • Continuous operation at low speed. • Load too heavy for motor.
*** Reset ignored if active.**			

LCD Screen	LED Screen	Description	Possible Causes
MS Relay Off/Soft Start Alarm	nOFF	Under-voltage condition at the 3-phase AC input to the ASD.	• Low 3-phase utility voltage.
Over-Current	OC	ASD output current greater than F601 setting.	• Defective IGBT (U, V, or W). • ASD output to the motor is connected incorrectly. • ASD output phase-to-phase short. • The ASD is starting into a spinning motor. • Motor/machine jammed. • Mechanical brake engaged while the ASD is starting or while running. • Accel/Decel time is too short. • Voltage Boost setting is too high. • Load fluctuations. • ASD operating at an elevated temperature.
***Over-Heat**	OH	ASD ambient temperature excessive.	• ASD is operating at an elevated temperature. • ASD is too close to heat-generating equipment. • Cooling fan vent is obstructed (see Mounting the ASD on pg. 15). • Cooling fan is inoperative. • Internal thermistor is disconnected.
Over-Torque	OL	Torque requirement in excess of the setting of F616 or F617 for a time longer than the setting of F618.	• ASD is not correctly matched to the application. • F616 or F617 setting is too low. • Obstructed load.
*** Reset ignored if active.**			

LCD Screen	LED Screen	Description	Possible Causes
***Over-Voltage**	OP	DC bus voltage exceeds specifications.	• ASD attempting to start into a spinning motor after a momentary power loss. • Incoming utility power is above the specified range. • Decel time is too short. • Voltage spikes at the 3-phase input. • Inductive filter required. • DBR required. • DBR resistance value is too high. • DBR function is turned off. • Over-Voltage Stall feature is turned off. • System is regenerating. • Load instability. • Disable the Ridethrough function (F302).
Pre Over-Torque	POt	Output torque of ASD is greater than 70% of parameter F616 setting.	• Parameter F616 requires an adjustment. • Load requirement exceeds ability of the motor.
Reverse Limit Switch	rLS	Reverse Limit Switch Activated.	• Crane has approached the end-of-travel for the selected operating plane as indicated by the limit switch.
Run Before Ready	rbr	Run command received at power up or Reset activated while running.	• F or R terminal on during application of power or system receives a Reset while running.
Slack Rope	SLCr	Output torque level is too low.	• Closed-loop Hoist Mode operation in the reverse direction with F867 enabled, output torque is less than F868 setting for F869 time.
Switch Out Of Sequence	OSF	Run command active during power up or Reset activated while running.	• Run command active during power up or Reset activated while running.
Timed Run	trUn	Timed Run Active.	• Timed Run Activated via discrete input terminal. • F861 set to a non-zero value.
Cumulative Run Time	OJ	Run-time counter exceeded.	• Type Reset required; select Clear Run Timer.
Torque Proving	tPF	Output torque level is too low.	• Closed-loop Hoist Mode operation, within F988 time setting the ASD output torque level has not reached the F987 setting or is unable to maintain the F987 setting for F989 time setting during active Run command.
*** Reset ignored if active.**			

LCD Screen	LED Screen	Description	Possible Causes
Under-Current	UC	With the **Low-Current Trip** (F610) parameter enabled, the output current of the ASD is below the level defined at F611 and remains there for a time longer than the setting of F612.	• The ASD is improperly matched to the application. • Motor lead disconnected.

Trips/Faults

A **Trip** is an ASD response to a **Fault** (though Fault and Trip are sometimes used interchangeably). A **Trip** is a safety feature that disables the ASD system in the event that a subsystem of the ASD is malfunctioning or a parameter setting has been exceeded.

Listed in Table 15 are the **Faults** that may result in a **Trip** and the possible causes. When a **Trip** is incurred the LCD screen shows the **Fault** screen and the LED screen displays the active **Fault** code.

Table 15. ACE-tronics G9 ASD Fault Listing.

LCD Screen	LED Screen	Possible Causes
Analog Input Loss	E- 18	• **V/I** signal loss. • **ACE G9-120V-PCB** failure. • P24 over-current condition. • F633 setting is too high.
Analog Input Over-Voltage	E- 10	• Over-voltage at the **V/I**, **RX**, or **RR** input(s).
ASD Overload	OL 1	• Acceleration time is too short. • DC Injection current is too high. • Improper V/f setting. • Motor running during restart. • ASD or the motor is improperly matched to the application.
Autotune Error	Etn	• **Autotune** readings that are significantly inconsistent with the configuration information. • A non-3-phase motor is being used. • Incorrect settings at F400 or F413. • Using a motor that has a significantly smaller rating than the ASD. • ASD output cabling is too small, too long, or is being housed in a cable tray with other cables that are producing an interfering EMF. • Motor is running during the **Autotune** function.
	Etn1	• F402 adjustment required (Motor temperature is too high). • F410 adjustment required (Motor Constant 1 improperly set).
	Etn2	• F412 adjustment required (Motor Constant 3 improperly set).
	Etn3	• **Autotune** setting F400 is set to **Auto Calculation** and there is a problem with the **Motor Constant** readings; F405, F406, and F407.
Brake Sequence Response Error	E- 11	• F630 is set to a non-zero value. • Braking sequence discrete input and output terminals are not setup properly.
Communication Error	Err5	• Communication time out error. • Communication malfunction. • Improper or loose connection. • Improper system settings.

LCD Screen	LED Screen	Possible Causes
Control Power Under-Voltage	UP2	• This fault is caused by an under-voltage condition at the 5, 15, or the 24 VDC supply. • 3-phase input voltage low.
CPU2 Fault	E-26	• CPU malfunction. • Control board malfunction.
CPU Communication Error	E-19	• CPU data Transmit/Receive error.
CPU Fault	Err4	• CPU malfunction. • Control board malfunction.
CPU Processing Error	E-21	• Software processed incorrectly. • Make service call.
Dynamic Braking Resistor Over-Current	OCr	• ASD inability to discharge the bus voltage during regeneration. • No **Dynamic Braking Resistor** (DBR) installed. • DBR value is too low. • Deceleration time is too short. • Improper DBR setup information. • Defective IGBT7 (or IGBT7 ckt.). • 3-phase input voltage is above specification.
Dynamic Braking Resistor Overload	OLr	• Deceleration time is too short. • Improper DBR setup information. • Improper Stall setup information.
EEPROM Fault	EEP1	• EEPROM write malfunction.
EEPROM Read Error	EEP2/EEP3	• EEPROM read malfunction.
Emergency Off	E	• Output signal from the ASD is terminated and a brake may be applied if so configured. • Stop-Reset pressed twice at the **EOI**. • EOFF command received remotely. • ASD reset required.
Encoder Signal-Loss Error	E-12	• ASD is configured to receive a signal from a shaft-mounted encoder and no signal is being received while running. • Disconnection at the Encoder circuit. • Motor is stopped and is generating torque via torque limit control. • ASD is not configured properly.
External Fault	EFLt	• In a multiple-ASD configuration, this is the fault screen display of an ASD that is not the cause of the fault, but is unable to continue with normal operations.

LCD Screen	LED Screen	Possible Causes
External Overheat	OH2	• Excessive-heat signature received at the **TB3** – **TH1**(+) and **TH1**(-) terminals. See F637 for setup information.
Flash Memory Fault	Err9	• Flash memory malfunction.
Gate Array Fault	Err6	• Main Gate Array is defective.
Ground Fault	EF 1/EF2	• Ground fault at the motor. • Ground fault at the output of the ASD. • Current leakage to **Earth Ground**.
Input Phase Failure	EPH 1	• 3-phase input to the ASD is low or missing at the **R**, **S**, or **T** input terminals.
Key Failure	E- 17	• Same key input for 20 seconds or more.
Logic Input Voltage Error	E-22	• Incorrect voltage applied to the discrete input terminals.
Low Current	Err7	• Improper **Low-Current Detection** level settings at F609 – F612.
Main Power Under-Voltage	UP 1	• Input 3-phase voltage is too low. • Momentary power failure longer than the time setting of F628.
Motor Overload	OL2	• Improper V/f setting. • Motor is locked. • Continuous operation at low speed. • Load requirement exceeds ability of the motor. • Startup frequency setting adjustment required.
No Errors	nonE	• No active faults.
Optional Expansion Input Terminal Board 1 Error	E-23	• Optional Expansion Input **Terminal Board 1** is defective.
Optional Expansion Input Terminal Board 2 Error	E-24	• Optional Expansion Input **Terminal Board 2** is defective.
Option Device Fault	Err8	• Check installation, connections, and option device manual.
Output Phase Failure	EPH0	• 3-phase output from the ASD is low or missing at the **U**, **V**, or **W** output terminals or at the input to the motor.

LCD Screen	LED Screen	Possible Causes
Over-Current During Acceleration	OC 1	• Improper V/f setting. • Restart from a momentary power outage. • The ASD is starting into a rotating motor. • ASD/Motor not properly matched. • Phase-to-phase short (U, V, or W). • Accel time too short. • Voltage Boost setting is too high. • Motor/machine jammed. • Mechanical brake engaged while the ASD is running. • ASD current exceeds 340% of the rated FLA on ASDs that are 100 HP or less during acceleration. On ASDs that are greater than 100 HP, this fault occurs when the ASD current exceeds 320% of the rated FLA during acceleration.
Over-Current During Deceleration	OC2	• Phase-to-phase short (U, V, or W). • Deceleration time is too short. • Motor/machine jammed. • Mechanical brake engaged while the ASD is running. • ASD current exceeds 340% of the rated FLA on ASDs that are 100 HP or less during deceleration. On ASDs that are greater than 100 HP, it occurs when the ASD current exceeds 320% of the rated FLA during deceleration.
Over-Current During Run	OC3	• Load fluctuations. • ASD is operating at an elevated temperature. • ASD current exceeds 340% of the rated FLA on ASDs that are 100 HP or less during a fixed-speed run or if during a fixed-speed run the ASD overheats. On ASDs that are greater than 100 HP, it occurs when the ASD current exceeds 320% of the rated FLA on a fixed-speed run.
Over-Heat	OH	• Cooling fan inoperative. • Ventilation openings are obstructed. • Internal thermistor is disconnected.
Overheat During Acceleration	OC 1P	• Cooling fan inoperative. • Ventilation openings are obstructed. • Internal thermistor is disconnected. • Acceleration time is too short. • Improper V/f setting. • ASD or the motor is improperly matched to the application.

LCD Screen	LED Screen	Possible Causes
Overheat During Deceleration	OC2P	• Cooling fan inoperative. • Ventilation openings are obstructed. • Internal thermistor is disconnected. • Deceleration time is too short. • DC Injection current is too high. • ASD or the motor is improperly matched to the application.
Overheat During Run	OC3P	• Cooling fan inoperative. • Ventilation openings are obstructed. • Internal thermistor is disconnected. • Improper V/f setting. • ASD or the motor is improperly matched to the application.
Over-Torque	Ot	• A torque requirement by the load in excess of the setting of F616 or F617 for a time longer than the setting of F618. • The ASD is improperly matched to the application. • The load is obstructed.
Over-Voltage During Acceleration	OP1	• Motor running during restart.
Over-Voltage During Deceleration	OP2	• Deceleration time is too short. • DBR value is too high. • DBR required (DBR setup required). • Stall protection is disabled. • 3-phase input voltage is out of specification. • Input reactance required.
Over-Voltage During Run	OP3	• Load fluctuations. • 3-Phase input voltage out of specification. • DBR required or DBR setup is incomplete.
RAM Fault	Err2	• Internal RAM malfunction.
ROM Fault	Err3	• Internal ROM malfunction.
Speed Error	E-13	• Result of a motor speed that is greater than the commanded speed when using an encoder for speed control. • Improper encoder connection or setup information. • Defective encoder.
Step Out (for PM Motor Only)	SOUt	• Motor shaft is locked. • Output phase is open. • Operating a reciprocating load.

LCD Screen	LED Screen	Possible Causes
Stop Position Retaining Error	E-25	• Load movement while stopped. • F381 setting is too low. • Encoder malfunction. • Creep speed is too high.
Torque Proving	tPF	• The output torque level setting of F987 was not reached in the time setting of F988 to allow for the brake release.
Typeform Error	EtyP	• Firmware information (typeform) loaded into the **Gate Driver** board is inconsistent with the device in which the firmware is being used. • The **Gate Driver** board has been replaced. • The **Gate Driver** board is defective.
U-Phase Over-Current	OCA1	• Internal low impedance at the **U** lead of the ASD.
U, V, or W Over-Current	OCL	• External low impedance at the **U**, **V,** or **W** lead of the ASD output.
V/f Control Error	E-20	• Torque processing error. • Make service call.
V-Phase Over-Current	OCA2	• Internal low impedance at the **V** lead of the ASD.
W-Phase Over-Current	OCA3	• Internal low impedance at the **W** lead of the ASD.

Viewing Trip Information

In the event that the condition causing an **Alarm** does not return to the normal operating level within a specified time, the ASD **Faults** and a **Trip** is incurred.

When a **Trip** occurs, the resultant error information may be viewed either from the LED screen, LCD **Fault** screen (Table 15 on pg. 254), **Monitor** screen, or the **Trip History** screen (Program ⇒ Utilities ⇒ **Trip History**).

Trip Record at Monitor Screen

The at-trip condition of the last four incurred trips may be viewed on the **Monitor** screen. The **Monitor** screen displays the records of up to four trips and catalogs each trip as **Past Trip #1** through **Past Trip #4** (see pg. 56). Once reset (Type Reset), the trip records are erased. If no trips have occurred since being powered up or since the last reset, **None** is displayed for each trip record.

The **Monitor** screen at-trip record is erased when the ASD is reset.

Note: *An improper ASD setup may cause some trips — reset the ASD to the **Factory Default** settings before pursuing a systemic malfunction (Program ⇒ Utilities ⇒ Type Reset ⇒ Reset to Factory Settings).*

Trip History

The **Trip History** screen records the system parameters for up to 20 trips. The recorded trips are numbered from zero to 19. Once the **Trip History** record reaches trip number 19, the oldest recorded trip will be deleted with each new record stored (first-in first-out). The **Trip #** field may be selected and scrolled through to view the recorded trip information for a given trip number. The monitored parameters are listed in Table 16 as **At-Trip Recorded Parameters** (parameter readings at the time that the trip occurred).

Table 16. Trip History Record Parameters.

At-trip Recorded Parameters			
1) Trip Number	8) Frequency Reference	15) Feedback (1 sec.)	22) ASD Overload
2) Trip Type	9) Bus Voltage	16) Torque	23) DBR Overload
3) Time and Date	10) Discrete Input Status	17) Torque Reference	24) Motor Load
4) Frequency at Trip	11) OUT1/OUT2/BRAKE Status	18) Torque Current	25) ASD Load
5) Output Current	12) Timer	19) Excitation Current	26) DBR Load
6) Output Voltage	13) Post Compensation Frequency	20) PID Value	27) Input Power
7) Direction	14) Feedback (inst.)	21) Motor Overload	28) Output Power
Trip records are comprised of the full list of monitored parameters (28).			

Clearing a Trip

Once the cause of the trip has been corrected, performing a **Reset** re-enables the ASD for normal operation.

The trip may also be cleared using either of the following methods:

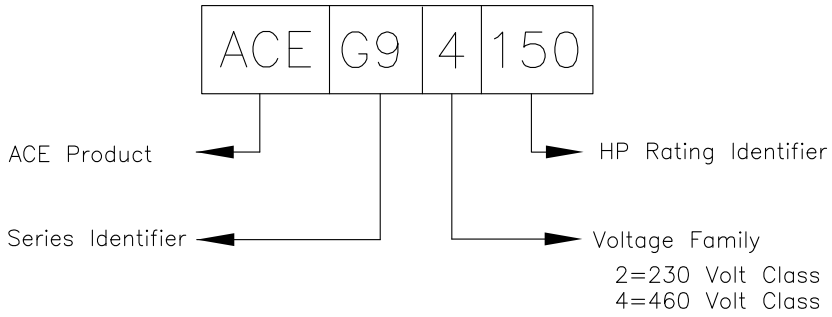
- Cycling power (trip info may be saved via F602 if desired),
- Pressing the **Stop-Reset** key twice,
- Remotely via the communications channel,
- Momentarily activating the **RES** terminal of the **ACE G9-120V-PCB**, or
- Via Program ⇒ Utilities ⇒ Type Reset ⇒ **Clear Past Trip** (clears Monitor screen records only).

Enclosure Dimensions and Conduit Plate Information

The part numbering convention is shown below. Use this information for ordering and to identify the ASD typeform.

The enclosure dimensions for the available models (typeforms) are listed in Tables 17 and 18. The conduit plates referenced are shown in Figures 36, 37, and 38.

G9 Part Numbering Convention.



Note: *The Type 1 enclosed versions of these drives meet or exceed the specification* ***UL 50- 1995****, the* ***Standard for Heating and Cooling Equipment****, and complies with the applicable requirements for installation in a compartment handling conditioned air.*

Note: *All ACE-tronics ASD enclosures carry an IP20 rating.*

Enclosure Dimensions

Table 17. 230-Volt ACE-tronics G9 ASD Systems.

Frame	Model Number	Enclosure Figure Number	A Width (in/mm)	B Height (in/mm)	C Depth (in/mm)	Mounting Hole Dimensions (in/mm)				Conduit Plate
						D	E	R1	R2	
2	ACEG92000	Figure 33	5.2/132	11.2/285	6.1/155	8.7/220	4.5/114	0.098/2.5	0.217/5.5	Figure 36-**A**
	ACEG92001									
	ACEG92002									
3	ACEG92003		6.1/155	12.4/315	6.6/168	9.8/249	5.4/138			
	ACEG92005									
4	ACEG92007		6.9/175	15.0/381		11.1/283	6.2/158		0.236/6.0	Figure 36-**B**
5A	ACEG92010		8.3/211	15.1/384	7.6/193		7.5/190	0.118/3.0	0.276/7.0	Figure 36-**C**
5B	ACEG92015		9.1/231	19.3/490		15.2/386	8.3/210			Figure 36-**D**
	ACEG92020									
6	ACEG92025	Figure 34	11.1/283	25.9/658	13.2/335	25.0/635	8.0/203	0.188/4.8	0.375/9.5	Figure 36-**E**
7B	ACEG92030	Figure 34	14.3/363	33.1/841	15.0/381	32.3/820	8.0/203	0.188/4.8	0.375/9.5	Figure 37-**G**
	ACEG92040									
	ACEG92050									
	ACEG92060									
9	ACEG92075	Figure 35	14.6/371	51.7/1313	17.6/447	50.2/1275	9.2/234	0.344/8.7	0.670/17.0	Figure 37-**I**
10	ACEG92100		15.7/399	53.1/1349		51.7/1313	9.9/252			Figure 37-**J**

Table 18. 460-Volt ACE-tronics G9 ASD Systems.

Frame	Model Number	Enclosure Figure Number	A Width (in/mm)	B Height (in/mm)	C Depth (in/mm)	Mounting Hole Dimensions (in/mm)				Conduit Plate
						D	E	R1	R2	
2	ACEG94001	Figure 33	5.2/132	11.2/285	6.1/155	8.7/220	4.5/114	0.098/2.5	0.217/5.5	Figure 36-A
	ACEG94002									
	ACEG94003									
3	ACEG94005		6.1/155	12.4/315	6.6/168	9.8/249	5.4/138			
4	ACEG94007		6.9/175	15.0/381		11.1/283	6.2/158		0.236/6.0	Figure 36-B
	ACEG94010									
5A	ACEG94015		8.3/211	15.1/384	7.6/193		7.5/190	0.118/3.0	0.276/7.0	Figure 36-C
5B	ACEG94020		9.1/231	19.3/490		15.2/386	8.3/210			Figure 36-D
	ACEG94025									
6	ACEG94030	Figure 34	11.1/283	25.9/658	13.2/335	25.0/635	8.0/203	0.188/4.8	0.375/9.5	Figure 36-E
7A	ACEG94040			30.8/782	14.3/363	29.7/754				Figure 36-F
	ACEG94050									
8	ACEG94060		14.3/363	36.1/917	15.3/389	35.3/897				Figure 37-H
	ACEG94075									
	ACEG94100									
9	ACEG94120	Figure 35	14.6/371	51.7/1313	17.6/447	50.2/1275	9.2/234	0.344/8.7	0.670/17	Figure 37-I
10	ACEG94150		15.7/399	53.1/1349		51.7/1313	9.9/252			Figure 37-J
11	ACEG94200		15.0/381	63.1/1603		61.6/1565				Figure 37-K
12	ACEG94250		18.9/480	68.5/1740		67.0/1701	13.8/351			Figure 37-L
13	ACEG94300		25.6/650	70.0/1778		68.5/1740	21.3/541			Figure 38-M
	ACEG94350									

Figure 33. See Table 17 and Table 18 for Actual Dimensions.

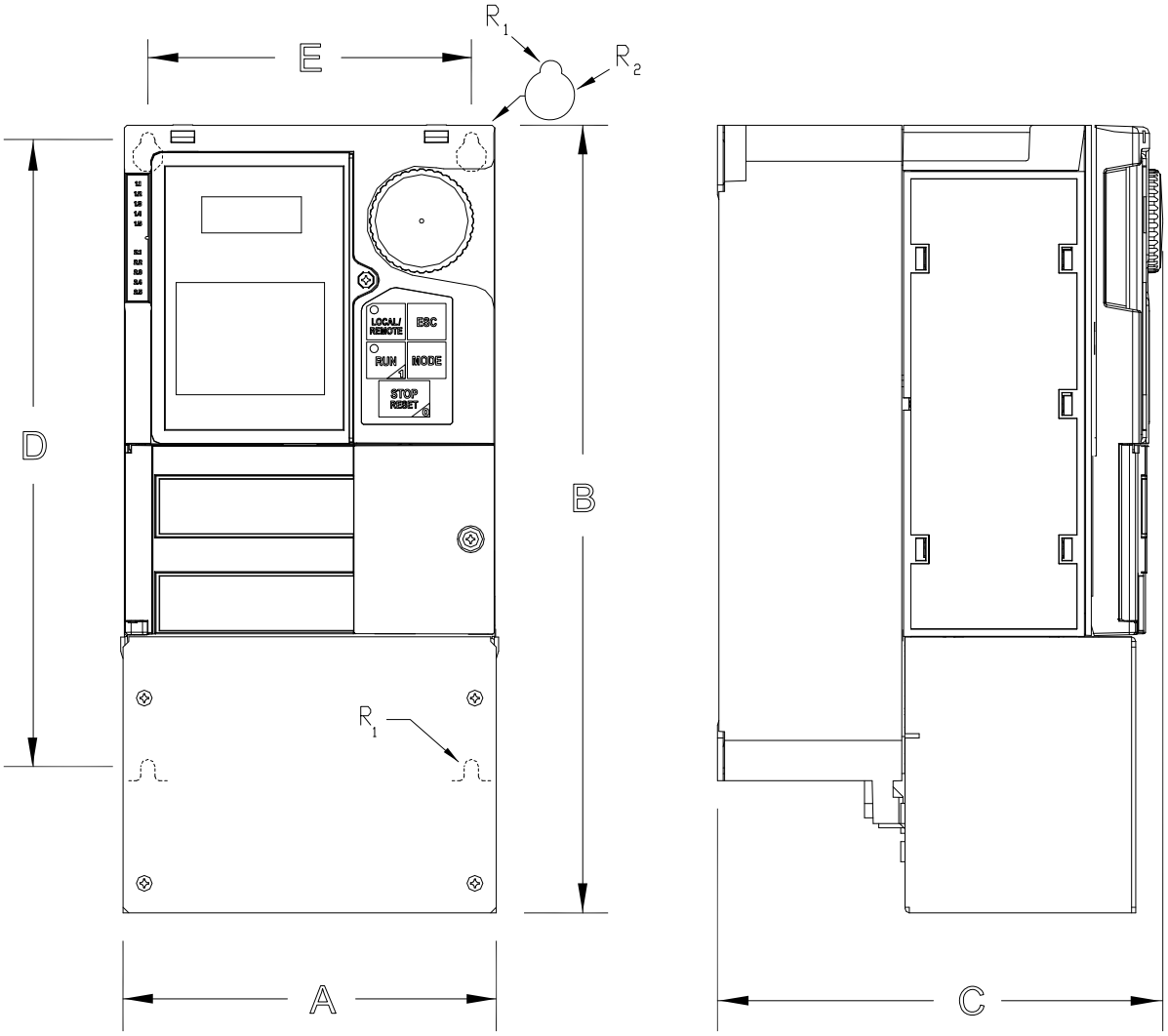


Figure 34. See Table 17 and Table 18 for Actual Dimensions.

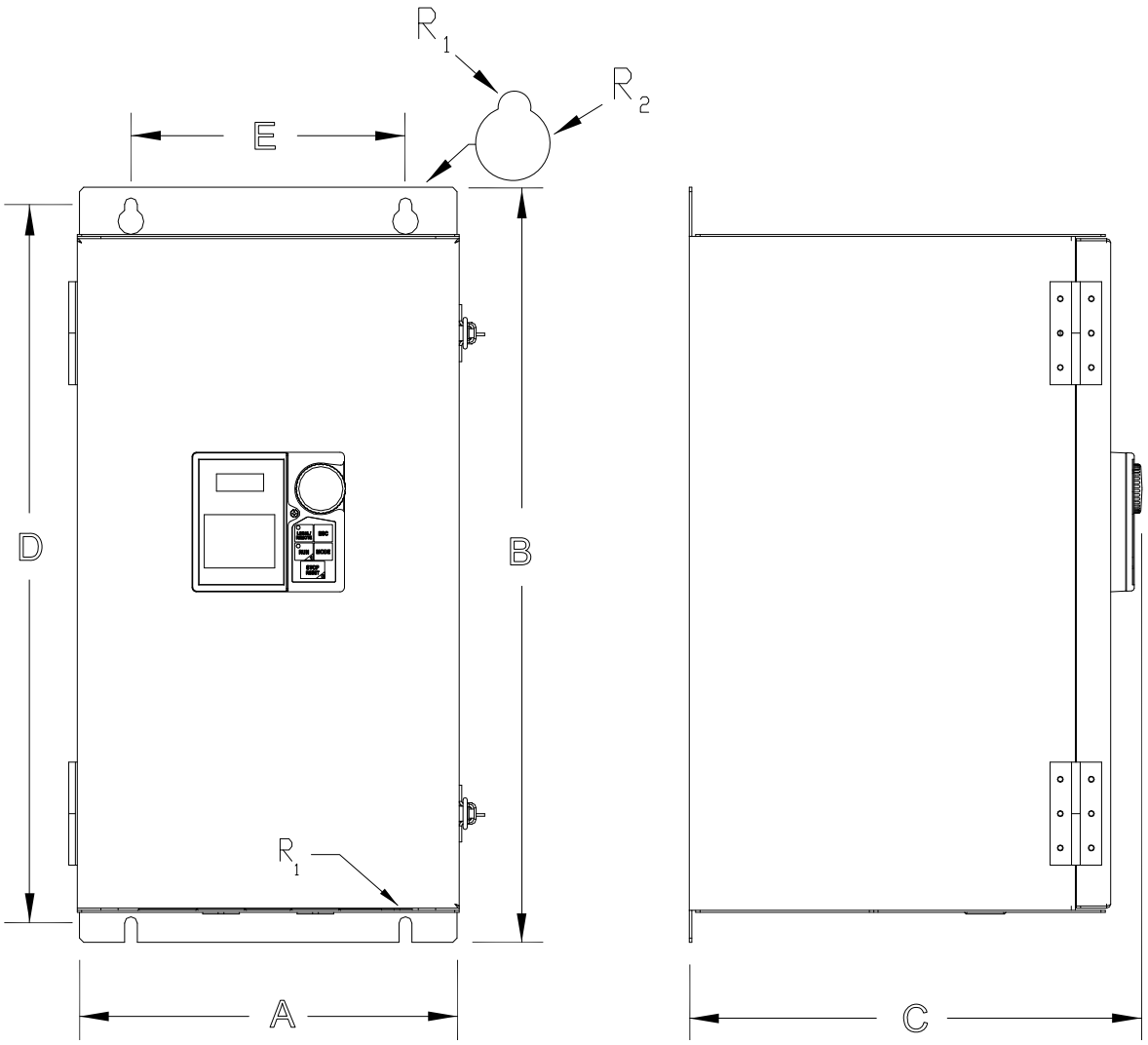


Figure 35. See Table 17 and Table 18 for Actual Dimensions.

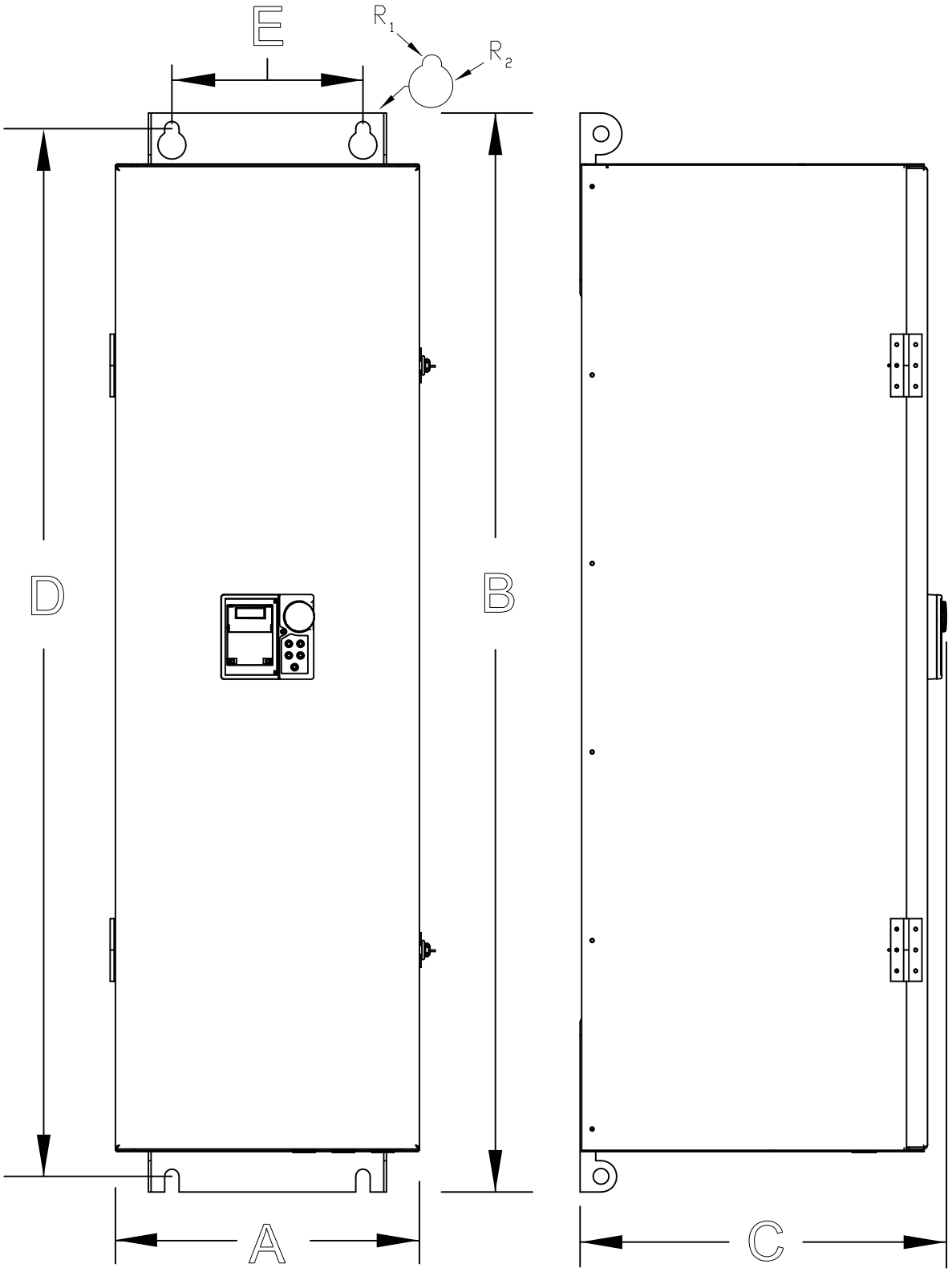


Figure 36. See Table 17 and Table 18 for the Associated Device. Dimensions are in in/cm.

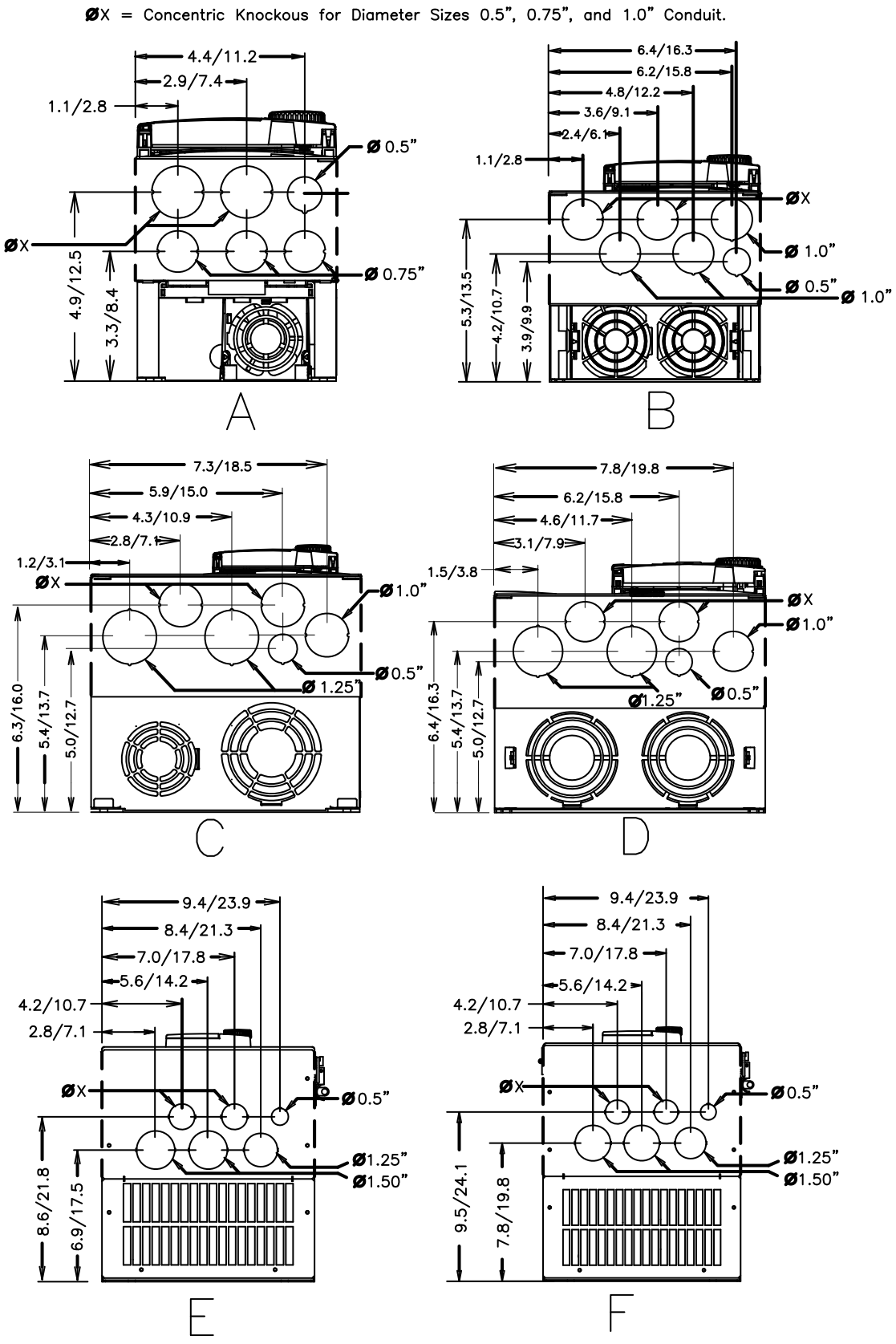


Figure 37. See Table 17 and Table 18 for the Associated Device. Dimensions are in in/cm.

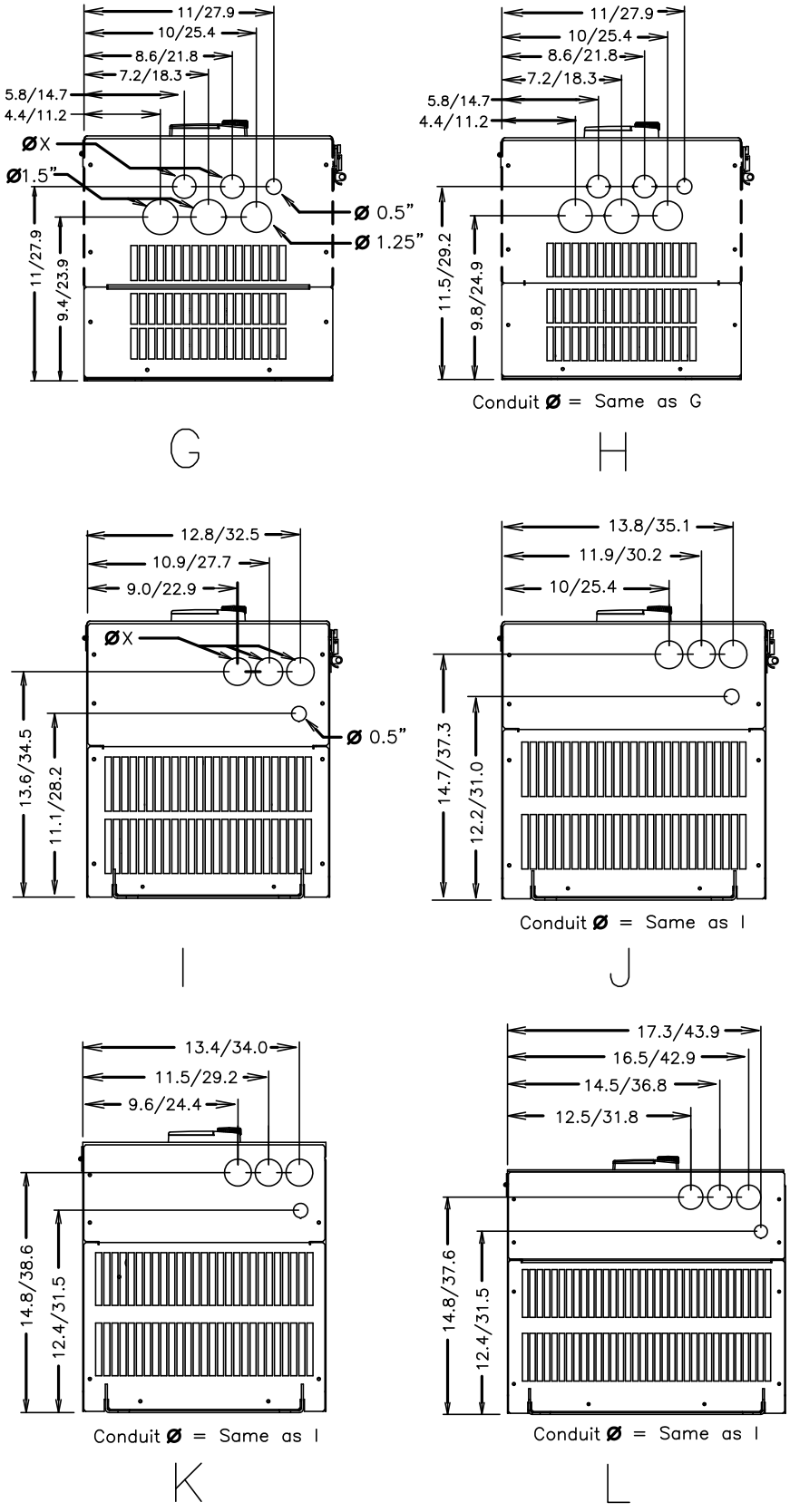
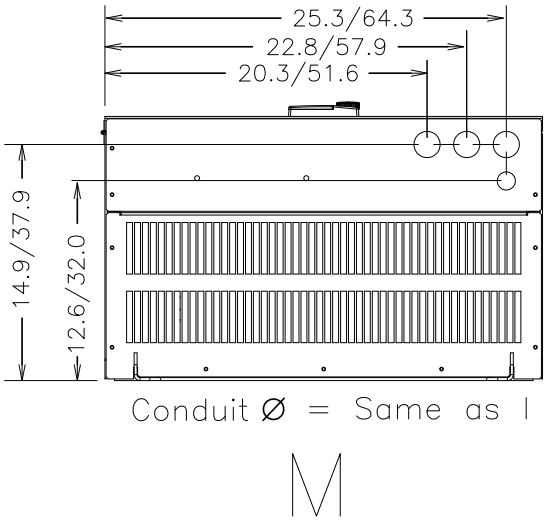


Figure 38. See Table 17 and Table 18 for the Associated Device. Dimensions are in in/cm.



Current/Voltage Specifications

Table 19. 230-Volt UL Type-1/IP-20 Chassis Standard Ratings Table.

Model Number	Output Current 100/115% Cont. (110% Cont. ≥ 60 HP)	Overload Current 150% for 60 Seconds	Overload Current 150% for 120 Seconds	Input Voltage 3-Ph 50/60 ±2 Hz	Output Voltage 3-Ph Variable Frequency	Typical Motor HP
ACEG92000	3.5/4.0 A	N/A	5.3 A	200–240 VAC (±10%)	Input Voltage Level (Max.)	0.75
ACEG92001	4.2/4.8 A		6.3 A			1.0
ACEG92002	6.9/7.9 A		10.4 A			2.0
ACEG92003	10.0/11.5 A		15.0 A			3.0
ACEG92005	15.2/17.5 A		22.8 A			5.0
ACEG92007	23.8/27.4 A		35.7 A			7.5
ACEG92010	28.6/32.9 A		42.9 A			10
ACEG92015	46.8/53.8 A		70.2 A			15
ACEG92020	57.2/65.8 A		85.8 A			20
ACEG92025	76.3/87.8 A		114.5 A			25
ACEG92030	90.0/103.5 A		135.0 A			30
ACEG92040	104.0/119.6 A		156.0 A			40
ACEG92050	152.5/175.4 A		228.8 A			50
ACEG92060	176.0/193.6 A	264.0 A	N/A			60
ACEG92075	221.0/243.1 A	331.5 A				75
ACEG92100	285.0/313.5 A	427.5 A				100

Table 20. 460-Volt UL Type-1/IP-20 Chassis Standard Ratings Table.

Model Number	Output Current 100/115% Cont. (110% Cont. ≥ 125 HP)	Overload Current 150% for 60 Seconds	Overload Current 150% for 120 Seconds	Input Voltage 3-Ph 50/60 ±2 Hz	Output Voltage 3-Ph Variable Frequency	Typical Motor HP
ACEG94001	2.7/3.1 A	N/A	4.1 A	380 – 480 VAC (±10%)	Input Voltage Level (Max.)	1.0
ACEG94002	3.6/4.1 A		5.4 A			2.0
ACEG94003	5.0/5.8 A		7.5 A			3.0
ACEG94005	9.1/10.5 A		13.7 A			5.0
ACEG94007	12.4/14.3 A		18.6 A			7.5
ACEG94010	15.3/17.6 A		23.0 A			10
ACEG94015	24.0/27.6 A		36.0 A			15
ACEG94020	28.6/32.9 A		42.9 A			20
ACEG94025	35.7/41.1 A		53.6 A			25
ACEG94030	42.0/48.3 A		63.0 A			30
ACEG94040	57.2/65.8 A		85.8 A			40
ACEG94050	68.5/78.8 A		102.8 A			50
ACEG94060	81.5/93.7 A		122.3 A			60
ACEG94075	100.8/115.9 A		151.2 A			75
ACEG94100	138.7/159.5 A		208.1 A			100
ACEG94120	179/196.9 A	268.5 A	N/A			125
ACEG94150	215/236.5 A	322.5 A				150
ACEG94200	259/284.9 A	388.5 A				200
ACEG94250	314/345.4 A	471.0 A				250
ACEG94300	387/425.7 A	580.5 A				300
ACEG94350	427/469.7 A	640.5 A				350

Cable/Terminal/Torque Specifications

Installation should conform to the 2008 **National Electrical Code Article 110** (NEC) (Requirements for Electrical Installations), all regulations of the Occupational Safety and Health Administration, and any other applicable national, regional, or industry codes and standards.

Note: *The following ratings are guidelines and shall not be the sole determining factor of the lug or wire size used with the ACE-tronics G9 ASD. Application-specific applicables, wire insulation type, conductor material, and local and regional regulations are but a few of the considerations when selecting the actual lug and wire type to be used with the ASD.*

Note: *Cable/Terminal specifications are based on the rated current of the ASD. The specifications **Do Not** include the 10% Service Factor.*

Note: *Use only 75° C copper wire/cable for motor and power connections.*

For additional installation information see the section titled Installation and Connections on pg. 14.

Table 21. 230-Volt ACE-tronics G9 ASD Cable/Terminal/Torque Specifications.

Model Number	MCP Rating (Amps)	Typical Wire/Cable Size		Lug Size Range		Terminal Board	Torque	
		AWG or kcmil						
		Input/Output Power		Wire-Size/Lug-Capacity for Input/Output Power		TB1 – 4 Terminals	3Ø-Input	3Ø-Output
		Recommended	Maximum	3Ø-Input	3Ø-Output	In-Lbs./Nm		
ACEG92000	15	14	10	14 to 8		20 (3-core shield) 5.3/0.6	11.5/1.3	
ACEG92001								
ACEG92002								
ACEG92003	30	12						
ACEG92005		10						
ACEG92007	50	8	8	12 to 8			17.7/2.0	
ACEG92010		6	4	10 to 4			21/2.4	
ACEG92015	75		3	8 to 3				
ACEG92020	100	4						
ACEG92025	125	2	2	12 to 1/0	4 to 1/0		50/5.7	53/6
ACEG92030	150	1	4/0	6 to 250	2 to 300		275/31	168/19
ACEG92040	175	1/0						
ACEG92050	200	3/0						
ACEG92060	250	4/0						
ACEG92075	300	*3/0	*4/0	6 to 250			275/31	
ACEG92100	400	*250	*250					

Note: *(*) Indicates that the item is one of a set of two parallel cables.*

Table 22. 460-Volt ACE-tronics G9 ASD Cable/Terminal/Torque Specifications.

Model Number	MCP Rating (Amps)	Typical Wire/Cable Size		Lug Size Range		Terminal Board	Torque	
		AWG or kcmil						
		Input/Output Power		Wire-Size/Lug-Capacity for Input/Output Power		TB1 – 4 Terminals	3Ø-Input	3Ø-Output
		Recommended	Maximum	3Ø-Input	3Ø-Output	In-Lbs./Nm		
ACEG94001	15	14	10	14 to 8		20 (3-core shield) 5.3/0.6	11.5/1.3	
ACEG94002								
ACEG94003								
ACEG94005								
ACEG94007	20	12	8	12 to 8			17.7/2.0	
ACEG94010	30	10						
ACEG94015		8	4	10 to 4			21/2.4	
ACEG94020	50	6	3	8 to 3				
ACEG94025	75							
ACEG94030	75	4	2	12 to 1/0	4 to 1/0		50/5.7	53/6.0
ACEG94040	100							
ACEG94050		3						
ACEG94060	125	1	4/0	6 to 250	1 to 300		275/31	168/19
ACEG94075	175	1/0						
ACEG94100	200	3/0						
ACEG94120	250	*1/0	*4/0	6 to 250			275/31	
ACEG94150	300	*2/0	*250					
ACEG94200	400	*4/0						
ACEG94250	500	*250	*350	4 to 350			375/42.4	
ACEG94300	600	**3/0	**350	0 to 500	6 to 350			
ACEG94350	700	**4/0						

Note: *(*) Indicates that the item is one of a set of two parallel cables.*

Note: *(**) Indicates that the item is one of a set of three parallel cables.*

Dynamic Braking Resistor Specifications

Thermal protection for the DBR circuit (see Figure 39. on pg. 275) or an input contactor that will open the 3-phase power input circuit (see Figure 40. on pg. 275) to the ASD in the event that a DBR over-temperature condition occurs is a requirement. If a DBR failure occurs or should a power source over-voltage condition occur the DBR thermal protection circuitry will prevent hazardous DBR temperatures.

To use the **Dynamic Braking** function the following requirements must be met:

- **Enable** the DBR function.
- Select a **Resistance Value**.
- Set the **Continuous Braking Wattage** value at F304, F308, and F309, respectively.

Set the **Braking Resistance Overload Time** at parameter F639 to establish how long the braking resistor is allowed to sustain the overload condition before a trip is incurred (the factory default setting is 5 seconds).

Light-duty and heavy-duty resistors vary from a few ohms to several hundred ohms. The appropriate resistance size will be typeform-specific and application-specific. Contact the ACE World Companies Customer Support Center for more information on your specific DBR requirements.

Heavy-duty DBRs should be wired using the same gauge wire as the motor leads. Light-duty DBRs may use one wire size smaller (AWG or kcmil) than the motor leads.

Because the heat generated by the DBR will affect the cooling capacity of the heat sink, the resistor pack should be mounted above or to the side of the ASD — **Never below the ASD**. Maintain a minimum of six inches between the resistor pack and the ASD.

The total wire length from the ASD to the DBR should not exceed 10 feet.

The wiring from the ASD to the DBR should be twisted approximately two twists per foot throughout the length of the wire.

If EMI/RFI noise is of concern, the DBR wiring should be 3-core screened cable. The screen should connect to the ASD enclosure and the resistor enclosure.

CAUTION

Though the in-line DBR fuse and the thermal relay are designed into the system to prevent a catastrophic DBR over-current condition, they are both intended to be used as backup protection **ONLY**.

A proper typeform-specific and application-specific system setup that includes using the appropriate **Dynamic Braking Resistor** and **Overload** settings will be required.

Figure 39. DBR Configurations.

Braking Resistor circuit with a thermal fuse.

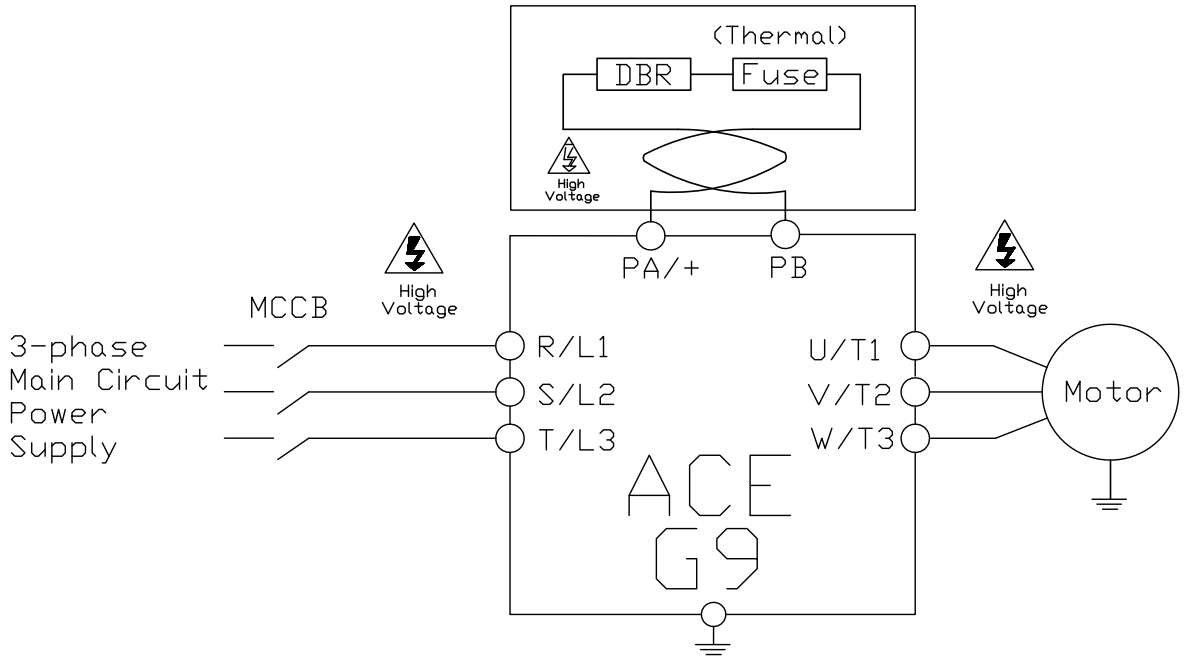
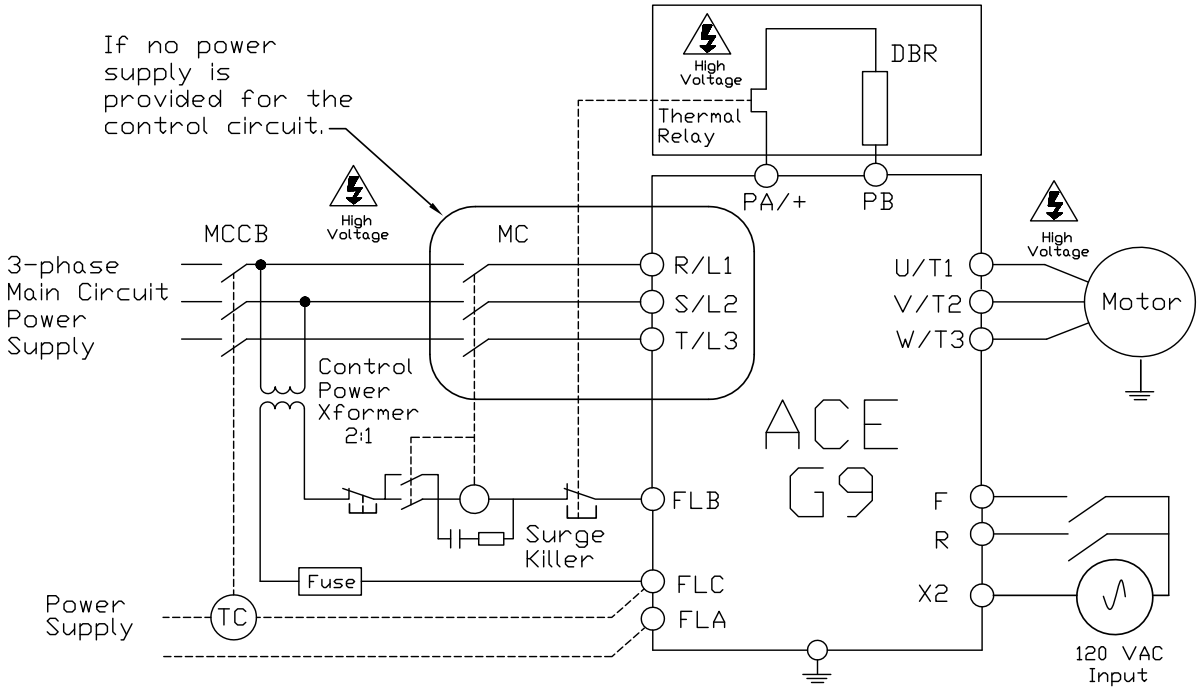


Figure 40. Shown below is a typical connection diagram using an MCCB with a Trip Coil (TC) in lieu of an input contactor. A control transformer is required for 400-Volt models only. The primary MC is opened in the event of a DBR over-current detection. With no power supplied to the ASD the failure will not be displayed on the **EOI**; see the Trip History for failure information once restarted.



Short Circuit Protection Recommendations

Table 23. 230/240 and 400/480-Volt ASD Recommended Circuit Breaker Selection.

Model Number	HP	Continuous Output Current (Amps)	Circuit Breaker Part Number
ACEG92000	0.75	3.5	HLL36015
ACEG92001	1	4.8	HLL36015
ACEG92002	2	8.0	HLL36015
ACEG92003	3	10.0	HLL36025
ACEG92005	5	17.5	HLL36025
ACEG92007	7.5	27.5	HLL36040
ACEG92010	10	33	HLL36050
ACEG92015	15	54	HLL36070
ACEG92020	20	66	HLL36090
ACEG92025	25	76	HLL36100
ACEG92030	30	90	HLL36100
ACEG92040	40	120	HLL36125
ACEG92050	50	152	HLL36150
ACEG92060	60	176	JLL36200
ACEG92075	75	221	JLL36250
ACEG92100	100	285	LIL36300
ACEG94001	1	2.7	Consult NEC
ACEG94002	2	4.1	HLL36015
ACEG94003	3	5.8	HLL36015
ACEG94005	5	10.5	HLL36025
ACEG94007	7.5	14.3	HLL36040
ACEG94010	10	17.6	HLL36050
ACEG94015	15	27.7	HLL36070
ACEG94020	20	33	HLL36090
ACEG94025	25	41	HLL36100
ACEG94030	30	48	HLL36100
ACEG94040	40	66	HLL36125
ACEG94050	50	79	HLL36150
ACEG94060	60	94	JLL36200
ACEG94075	75	116	JLL36225
ACEG94100	100	160	JLL36250
ACEG94120	125	179	LIL36300
ACEG94150	150	215	LIL36300
ACEG94200	200	259	LIL36400
ACEG94250	250	314	LIL36400
ACEG94300	300	387	LIL36450
ACEG94350	350	434	LIL36500

ACE-tronics G9 ASD Optional Devices

The ASD may be equipped with several options which are used to expand the functionality. Table 24 lists the available options and their functions.

Table 24. G9 ASD Optional Devices and Functions.

Part Identifier	Device Name	Device Function
ASD-CAB-USB	G9/G7 USB Communication Cable	Used to connect the ASD to a PC via the PC USB port.
ASD-EOI-HH-G9	Display Module Docking Station	Used to flash the 9-Series display module.
ASD-MTG-KIT9	9-Series EOI Remote Mounting Kit	Hardware used to mount 9-Series ASD **EOI** remotely.
ASD-TB1-SIM9	ASD Input/Output Signal Simulator	Used to simulate the ASD I/O monitor and control signals.
DEV002Z	DeviceNet Module	Allows the ASD to communicate via DeviceNet with other DeviceNet-supported equipment including a host computer.
ETB003Z	Expansion I/O Board 1	Expands the Input/Output functionality of the ASD.
ETB004Z	Expansion I/O Board 2	Expands the Input/Output functionality of the ASD.
PDP002Z	ProfiBus DP Module	Allows the ASD to communicate via ProfiBus with other ProfiBus-supported equipment including a host computer.
USB001Z	USB-to-Serial Converter	Allows for the USB port of a computer to be used as a communications port for monitoring and controlling the ASD.
VEC007Z	PG Vector Feedback Board	Allows for the use of Vector Control using a sensor (for use with a **5-Volt** encoder).
VEC004Z	PG Vector Feedback Board	Allows for the use of Vector Control using a sensor (for use with a **12-Volt** encoder).
VEC005Z	PG Vector Feedback Board	Allows for the use of Vector Control using a sensor (for use with a **15-Volt** encoder).
VEC006Z	PG Vector Feedback Board	Allows for the use of Vector Control using a sensor (for use with a **24-Volt** encoder).
Note: *See the user manual of the applicable option for additional information on each item.*		

Index

Numerics

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W