HEDY

HD700 Easy start guide

(0.4kW~90kW)

V1.4.0

About this manual

Thank you for choosing the HD700 AC Drive from HEDY.
This manual provides basic information which will allow the user to install, setup and commission the HD700 drive for simple applications.

For full & detailed information on the drive and its options please refer to further documentation that can be found on the HEDY website: **www.hedyiad.com**

Please read the information in this manual carefully.

This user guide is for use with version V2.06 firmware.

Declaration of Conformity (size A, B, C)

Guangzhou HEDY Industrial Automation. Co., Ltd
No.63, Punan Road, Yunpu Industry Park, Huangpu District, Guangzhou, Guangdong, 510760, China

HD700-20D00040	HD700-20D00075	HD700-20D00150	HD700-20D00220
HD700-20T00400	HD700-40T00075	HD700-40T00150	HD700-40T00220
HD700-40T00400	HD700-40T00550	HD700-40T00750	

The AC variable speed drive products listed above have been designed and manufactured in accordance with the following European harmonised standards:

EN 61800-5-1: 2007	Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy
EN 61800-3: 2004	Adjustable speed electrical power drive systems — Part 3: EMC requirements and specific test methods
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with the respect to the restriction of hazardous substances

These products comply with the Low Voltage Directive 2006/95/EC, the Electromagnetic Compatibility (EMC) Directive 2004/108/EC, the RoHS2.0 Directive 2011/65/EU and the CE Marking Directive 93/68/EEC.

Zhao Dawei
R&D Director
Date: 12th Sept, 2013

These electronic drive products are intended to be used with appropriate motors, controllers, electrical protection components and other equipment to form complete end products or systems. Compliance with safety and EMC regulations depends upon installing and configuring drives correctly, including using the specified input filters. The drives must be installed only by professional assemblers who are familiar with requirements for safety and EMC. The assembler is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used. Refer to the User Guide. An EMC Data Sheet is also available giving detailed EMC information.

Declaration of Conformity (size D, E)

Guangzhou HEDY Industrial Automation. Co., Ltd
No.63, Punan Road, Yunpu Industry Park, Huangpu District, Guangzhou, Guangdong, 510760, China

HD700-40T01100	HD700-40T01500	HD700-40T01850	HD700-40T02200

The AC variable speed drive products listed above have been designed and manufactured in accordance with the following European harmonised standards:

EN 61800-5-1: 2007	Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy
EN 61800-3: 2004	Adjustable speed electrical power drive systems — Part 3: EMC requirements and specific test methods
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with the respect to the restriction of hazardous substances

These products comply with the Low Voltage Directive 2006/95/EC, the Electromagnetic Compatibility (EMC) Directive 2004/108/EC, the RoHS2.0 Directive 2011/65/EU and the CE Marking Directive 93/68/EEC.

Zhao Dawei
R&D Director
Date: 12th Sept, 2013

These electronic drive products are intended to be used with appropriate motors, controllers, electrical protection components and other equipment to form complete end products or systems. Compliance with safety and EMC regulations depends upon installing and configuring drives correctly, including using the specified input filters. The drives must be installed only by professional assemblers who are familiar with requirements for safety and EMC. The assembler is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used. Refer to the User Guide. An EMC Data Sheet is also available giving detailed EMC information.

Declaration of Conformity (size F, G)

Guangzhou HEDY Industrial Automation. Co., Ltd
No.63, Punan Road, Yunpu Industry Park, Huangpu District, Guangzhou, Guangdong, 510760, China

HD700-40T03000	HD700-40T03700	HD700-40T04500	HD700-40T05500
HD700-40T07500	HD700-40T09000		

The AC variable speed drive products listed above have been designed and manufactured in accordance with the following European harmonised standards:

EN 61800-5-1: 2007	Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy
EN 61800-3: 2004	Adjustable speed electrical power drive systems — Part 3: EMC requirements and specific test methods
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with the respect to the restriction of hazardous substances

These products comply with the Low Voltage Directive 2006/95/EC, the Electromagnetic Compatibility (EMC) Directive 2004/108/EC, the RoHS2.0 Directive 2011/65/EU and the CE Marking Directive 93/68/EEC.

Zhao Dawei
R&D Director
Date: 12th Sept, 2013

These electronic drive products are intended to be used with appropriate motors, controllers, electrical protection components and other equipment to form complete end products or systems. Compliance with safety and EMC regulations depends upon installing and configuring drives correctly, including using the specified input filters. The drives must be installed only by professional assemblers who are familiar with requirements for safety and EMC. The assembler is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used. Refer to the User Guide. An EMC Data Sheet is also available giving detailed EMC information.

Contents

1.1 General

This chapter provides very important information so that you can use the HD700 drive safely, prevent injury or death, or damage to equipment. Please read this information thoroughly and make sure you observe all the safety information shown below and elsewhere in this manual. Please make this manual available for the end user.

1.2 Safety symbols

Danger: Danger of electrical shock which can cause injury or death, or damage to equipment

Warning: Potential hazard, other than electrical, that can cause physical injury or damage to equipment

Danger

- **The HD700 AC drive should ONLY be installed, commissioned and maintained by qualified and competent personnel.**
- **Before power is applied to the drive ensure all covers are fitted to the drive and that the drive is fitted in a suitable enclosure.**
- **Dangerous voltages are present when the input power supply is connected to the drive. Before attempting any work on the drive or motor, isolate and lock off the input power supply. After disconnecting the supply, wait at least 10 minutes (to let the drive's internal capacitors discharge) before removing the cover. Prove dead using a voltage tester. The voltage tester itself should be proved immediately before and after testing using a proving unit with a low power output.**
- **The drive must be connected to system ground using the drive's PE terminals. The size of the earth conductor and earth loop impedance must comply with national and local electrical regulations.**
- **Do not flash test the drive.**
- **If the drive is supplied from a pluggable power connector, the drive must be turned off for 10 minutes before unplugging the connector.**
- **The HD700 is not a field repairable unit. Contact the supplier of the drive.**
- **The drive must be protected by the recommended fuses or MCB.**

Warning

- **All machinery, in which this drive is used, within the European Union, must comply with directive 98/37/EC, Safety of Machinery.**
- **The HD700 has an Ingress Protection rating of IP20 and therefore must be installed in a suitable enclosure, according to relevant local codes and standards.**
- **Do not install the drive in an explosive environment.**
- **Install the drive on a suitable nonflammable material e.g. metal back plate.**
- **The HD700 drive control functions (for example the STOP key) must not be relied upon in safety critical applications. Any application where malfunction or a fault could cause damage to equipment or injury to personnel, a risk assessment must be carried out to ensure precautions are taken to avoid the risk.**
- **The drive must be installed within the limits specified in the technical data section.**
- **The motor must be used within the manufacturer's guidelines.**
- **Please note that when using the "External fault" trip feature which can be programmed to a digital input terminal to cause the HD700 to trip on (F018), the trip condition must be present for > 2 seconds for the trip to latch under all conditions.**
- **Do not allow conductive material to enter the drive, e.g. from drilling during installation.**

2.1 How to identify the drive from the model reference


The model reference can be found on the drive rating label

HD700	4	0	T	00550

Family

Supply voltage
2 = 230V
4 = 400V

Brake unit
0 = Internal Brake (22KW and below, the internal brake unit is standard).
1 = No Internal Brake

Input Phase
D = 1/3PH
T = 3PH

Power size

00040 = 0.4kW	00750 = 7.5kW	03700 = 37kW
00075 = 0.75kW	01100 = 11kW	04500 = 45kW
00150 = 1.5kW	01500 = 15kW	05500 = 55kW
00220 = 2.2kW	01850 = 18.5kW	07500 = 75kW
00400 = 4kW	02200 = 22kW	09000 = 90kW
00550 = 5.5kW	03000 = 30kW	

2.2 Ratings

Supply voltage = 200 - 240V (+/- 10%), Single/Three phase, 48-62Hz									
Model	Size	Motor power (kW)	Rated Input current		Rated Output Current		Rated Output Overload (1 minute)		Minimum Brake Resistance
			Single Phase	Three Phase					
		kW	A	A	A		A		Ω
HD700-20D00040	A	0.4	7.1	4	100%	2.8	150%	4.2	41
HD700-20D00075		0.75	12.8	7.1		5		7.5	
HD700-20D00150		1.5	20.5	11.3		8		12	
HD700-20D00220	B	2.2	24	14.5		11		16.5	20
HD700-20T00400	C	4	32	16.5		17.6		26.4	12

NOTE: The HD700-20T00400 can be supplied with either single or three phase, 200-240V AC supply

Supply voltage = 380 - 480V (+/- 10%), Three phase, 48-62Hz								
Model	Size	Motor power	Rated Input Current	Rated Output Current		Rated Output Overload (1 minute)		Minimum Brake Resistance
		kW	A	A		A		Ω
HD700-40T00075	A	0.75	3.6	100%	2.5	150%	3.75	120
HD700-40T00150		1.5	5.7		4.2		6.3	
HD700-40T00220	B	2.2	8.3		5.8		8.7	65
HD700-40T00400		4	13.2		9.5		14.25	50
HD700-40T00550	C	5	12.4		13		19.5	24
HD700-40T00750		7.5	16.1		17		25.5	

The models shown below have dual overload ratings:

G = Heavy duty overload (150% rated output current, 1 minute)
Heavy duty is an industry standard name given to the current rating of a drive that is used in constant torque applications or applications that require a high overload capacity. Examples of high overload capacity applications can be cranes and hoists. A heavy duty drive will typically have an overload capacity of 150% drive rated current.
P = Normal duty overload (110% rated output current, 1 minute)
Normal duty is an industry standard name given to the current rating of a drive that is used in variable torque applications or applications that require low overload capacity. Examples of low overload capacity applications can be fans or pumps. A normal duty drive will typically have an overload capacity of 110% drive rated current.

With a dual rated drive, the drive rated current by default is set for heavy duty overload, the drive rated current can be increased to give a higher drive rated current but a lower overload for normal duty applications.

Supply voltage = 380 - 480V (+/- 10%), Three phase, 48-62Hz								
Model	Size	G (150% overload, 1 minute)			P (110% overload, 1 minute)			Minimum Brake Resistance
		Motor power	Rated Input Current	Rated Output Current	Motor power	Rated Input Current	Rated Output Current	
		kW	A	A	kW	A	A	Ω
HD700-20T01100	D	11	24	25	15	31	32	24
HD700-20T01500		15	31	32	18.5	36	38	17
HD700-20T01850	E	18.5	36	38	22	44	46	
HD700-20T02200		22	44	46	30	58	60	
HD700-40T03000	F	30	58	60	37	72	75	
HD700-40T03700		37	72	75	45	93	96	
HD700-40T04500		45	93	96	55	121	125	9
HD700-40T05500		55	121	125	75	151	156	7
HD700-40T07500		75	151	156	90	175	180	
HD700-40T09000	G	90	175	180	110	204	210	4.2

2.3 Maximum Motor Cable Lengths

The maximum motor cable lengths for standard SWA (steel wire armoured) or standard SY cable is 100m for all HEDY HD700 drives.
If high capacitance motor cables are used, the maximum motor cable should be halved to 50m.
If the maximum motor cable length is to be exceeded, an output motor reactor or sine filter must be used. See the Technical Data Guide for details. *www.hedyiad.com*

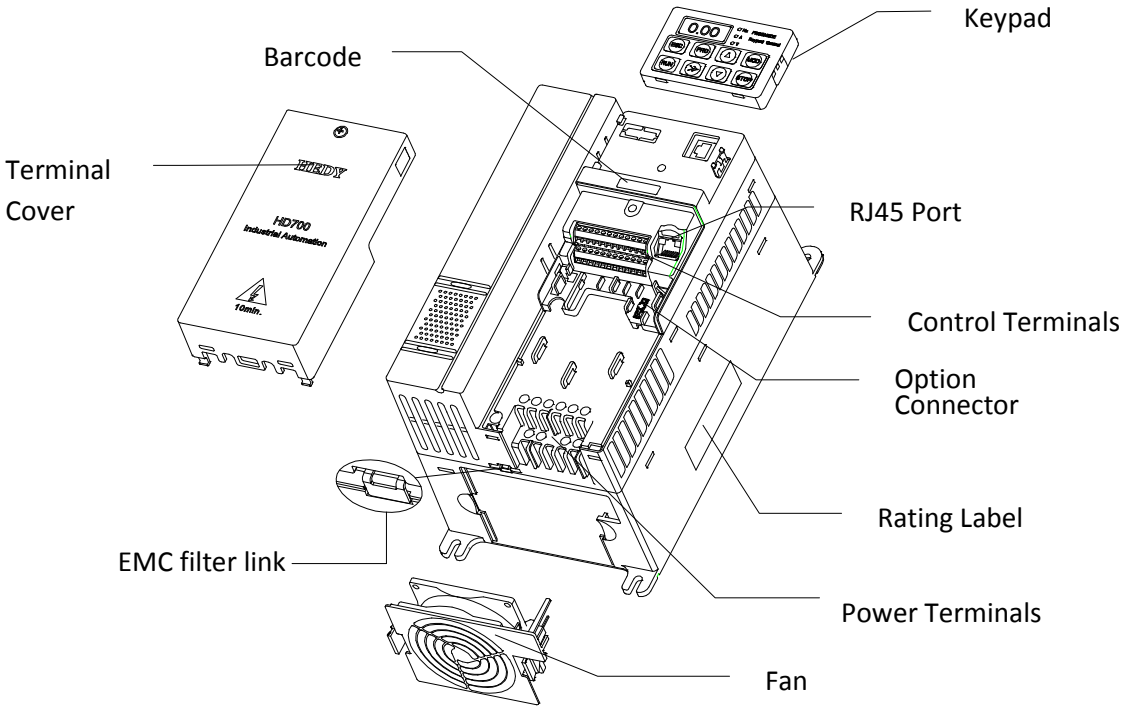
2.4 General Technical Data

Note: For full & detailed technical data please refer to the HEDY website: www.hedyiad.com

Approvals	**UL approval**	**E348255**
	CE approval	CE
Environment	**Altitude**	1000m rated
		1000m～3000m, 1% rated current de-rating per 100m
	Operating Temperature	−10°C～+40°C
	Max. Humidity	≤90%RH, non-condensing
	Vibration	≤5.9m/s^2 (0.6g)
	Storage Temperature	−40°C～+70°C
	Running Environment	Non-flammable, No corrosive gasses, no contamination with electrically conductive material, avoid dust which may restrict the fan
Supported Power Supply Systems		TT
		TN
		IT (removal of internal EMC filter and MOV required)
Enclosure		IP20

3.1 Mechanical installation

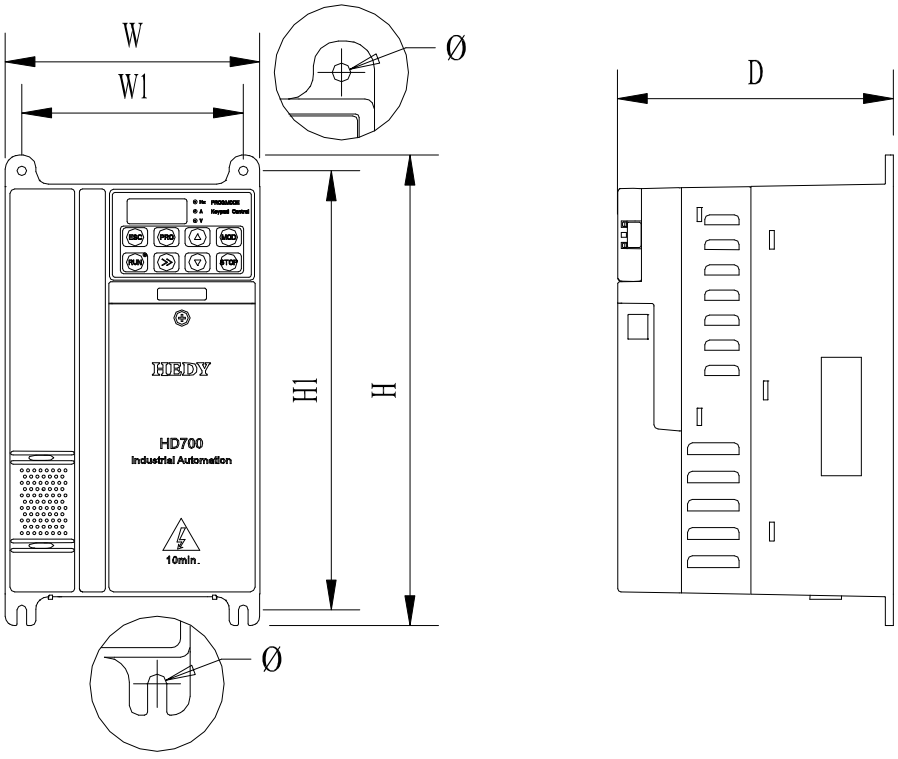
3.1.1 Parts of the drive



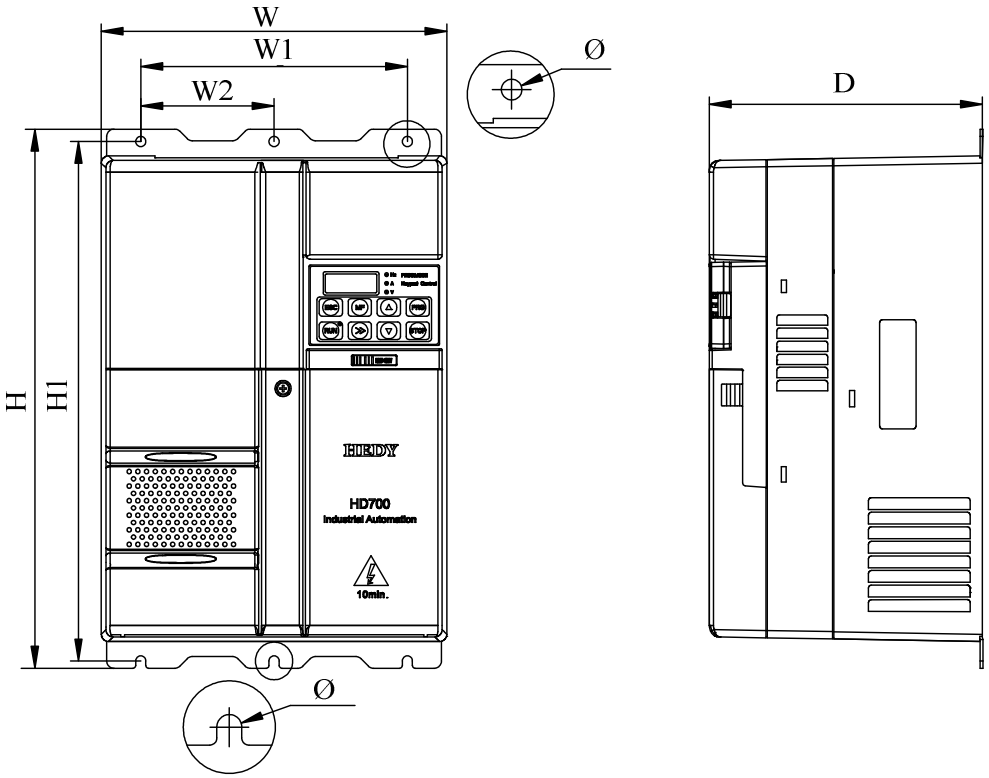
3.1.2 Drive Mounting & Dimensions

Warning:

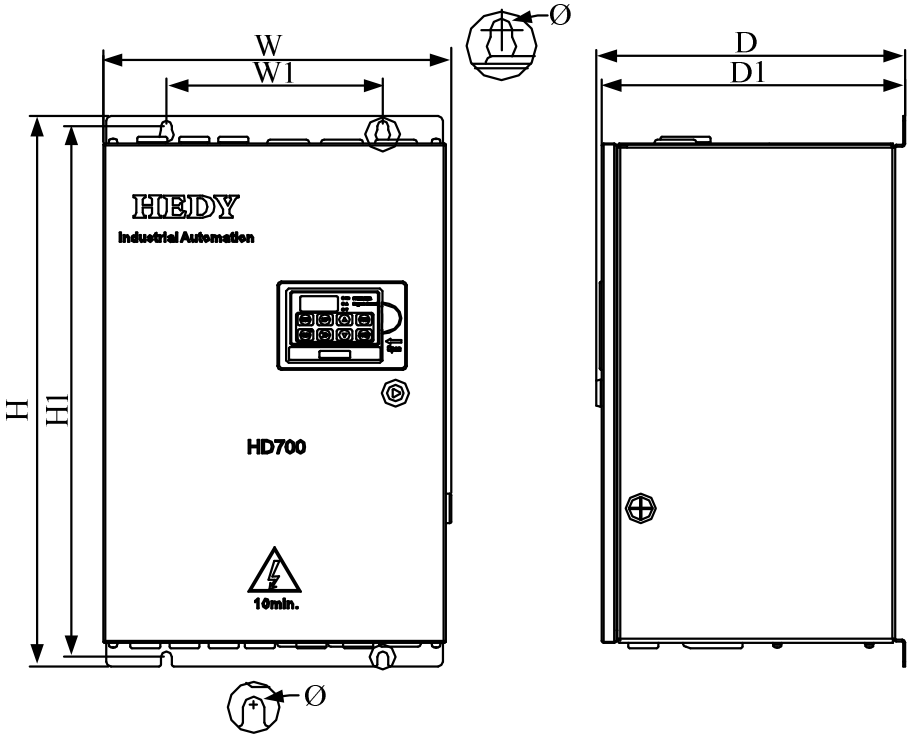
The HD700 has an Ingress Protection rating of IP20 and therefore must be installed in a suitable enclosure, according to relevant local codes or standards.



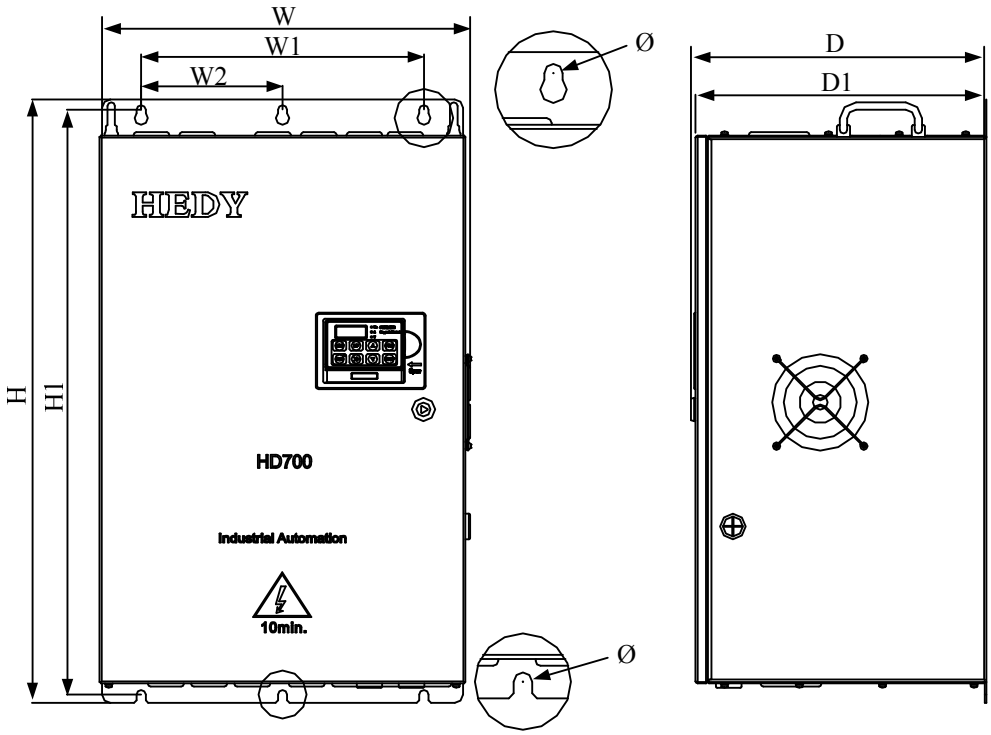
Mechanical dimensions and mounting (Size A, B, C)



Mechanical dimensions and mounting (Size D, E)



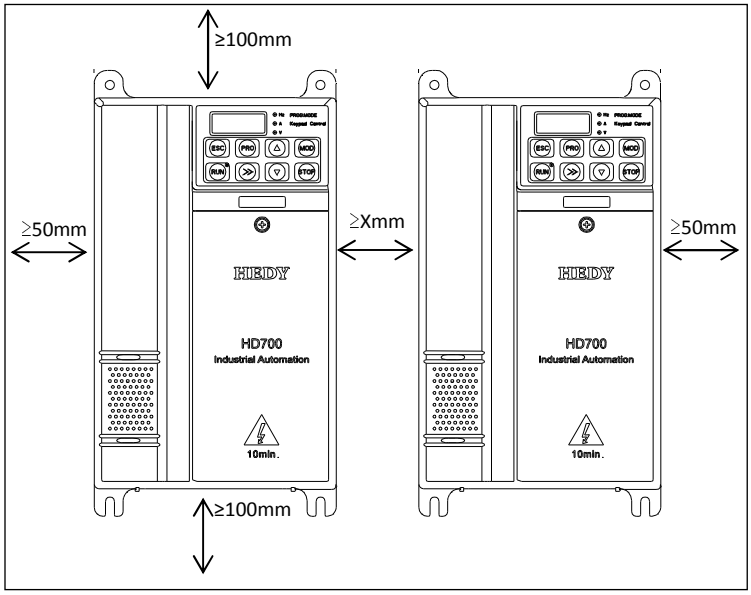
Mechanical dimensions and mounting (Size F)



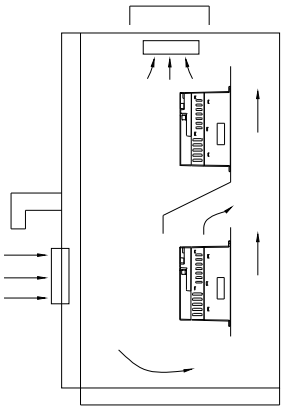
Mechanical dimensions and mounting (Size G)

Size	Model	W (mm)	W1 (mm)	W2 (mm)	H (mm)	H1 (mm)	D (mm)	D1 (mm)	Mounting Hole Ø (mm)	Weight (kg)
A	HD700-20D00040	97.4	80	–	202.4	190	148.8	–	5	1.4
	HD700-20D00075									
	HD700-20D00150									
	HD700-40T00075									
	HD700-40T00150									
B	HD700-20D00220	142.4	123.5	–	220.4	208	155.5	–	5	2.2
	HD700-40T00220									
	HD700-40T00400									
C	HD700-20T00400	163.1	142	–	300	280	176.8	–	6	4.5
	HD700-40T00550									
	HD700-40T00750									
D	HD700-40T01100	238.5	184	92	370	356.5	189	–	7	8.8
	HD700-40T01500									
E	HD700-40T01850	238.5	184	92	435.5	422	200.3	–	7	12.1
	HD700-40T02200									
F	HD700-40T03000	355.5	221	–	573	552.5	315.5	310	10	40
	HD700-40T03700									
	HD700-40T04500									
	HD700-40T05500									
	HD700-40T07500									
G	HD700-40T09000	445.6	340	170	725	701.5	355	349.5	10	63

3.1.3 Drive clearances



Note: Dimension X
Size A, B & C: ≥ 10mm
Size D & E: ≥ 20mm
Size F: ≥ 30mm
Size G: ≥ 50mm



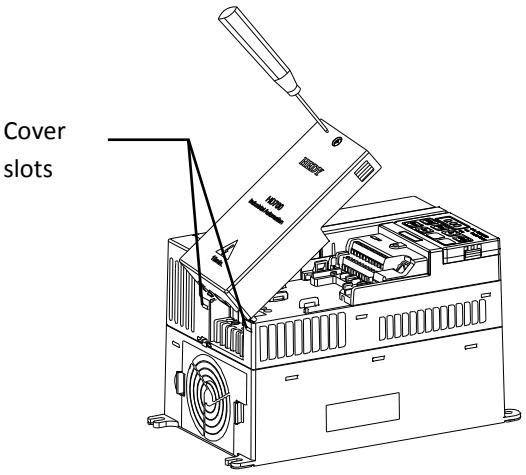
Note: In vertical installations where drives are mounted above each other, there should be suitable air flow to keep the drives cool. Hot air from the lower drives should not flow into the cooling fan/heatsink of the upper drives. Air flow should be drawn in and expelled as illustrated in the picture above.

3.2 Electric installation

Warning:

Recommendations made in this section may be superseded by local regulations. The user is responsible for making sure that local regulations are complied with.

3.2.1 How to remove & fit the terminal cover



Remove:

- Untighten the screw M4x10
- Pull the top of the cover towards you

Fit:

- Insert the cover's clips into the slots (located as shown), push the cover into to place
- Tighten the screw M4×10 (Torque 1.2Nm)

3.2.2 Power terminals

Size A and B Power terminals layout					
L1	L2	L3/N	U	V	W
PE	+DC	+DC1	BR	-DC	PE

Size C Power terminals layout					
L1	L2	L3	U	V	W
PE	+DC		BR	-DC	PE

Size D and E Power terminals layout										
+DC	BR	-DC	L1	L2	L3	PE	PE	U	V	W

HD700-xxT03000 – HD700-xxT04500

			PE	L1	L2	L3
Size F Power terminals layout						
BR	+DC	-DC	PE	U	V	W

HD700-xxT05500 – HD700-xxT07500

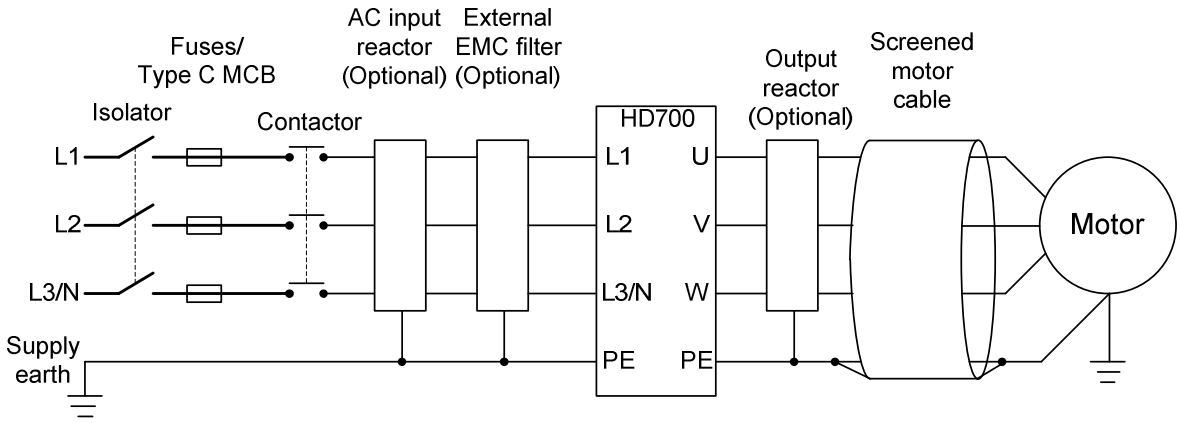
PE	+DC	+DC1	PE	L1	L2	L3
Size F Power terminals layout						
BR	+DC	-DC	PE	U	V	W

HD700-xxT09000

+DC	+DC1		L1	L2	L3	PE
Size G Power terminals layout						
BR	+DC	-DC	U	V	W	PE

Terminal	Function
L1, L2, L3/N	AC power supply. For single phase supply on size A and B use L1, L3/N.
+DC	Positive DC bus connection.
+DC1	For DC choke. Linked to +DC by busbar from factory when external choke not required. Where the choke is required it is supplied with the drive. This terminal is not present on sizes where there is a DC choke fitted inside the drive. See Technical Data Guide for DC choke information
BR	Brake resistor. The other side of the resistor is connected to +DC or +DC1 as indicated by the shaded +DC/+DC1 in the diagrams above.
–DC	Negative DC bus connection.
U, V, W	Output terminals. (Connect U,V,W on drive to U, V, W on motor for forward motor rotation)
PE	Protective earth terminal.

3.2.3 Typical power connections



Warning:
The drive must be connected to system ground using the drive's PE terminals. The size of the earth conductor and earth loop impedance must comply with local electrical regulations.

Warning:
If there is a contactor between the drives output and the motor, the drive must be disabled before opening/closing the contacts.

Warning:
The drive must be protected by the recommended fuses or Type C MCB.

Warning:
If a braking resistor is required for the application, the resistor should be sized correctly and its resistance greater than the minimum resistance specified in the Technical Specification section. Additional precautions must be taken to ensure that the supply to the HD700 is disconnected if a fault occurs with the internal brake circuitry or connected brake resistor. Fitting of a suitably sized thermal overload relay can provide these additional precautions.
Brake resistors can get hot; therefore sufficient cooling is required and precautions should be taken to prevent contact and risk of fire.
See the Technical Data Guide for information on sizing brake resistors.

NOTE: If a contactor is to be fitted between the drive and the motor, the drive must be disabled/stopped when the contactor is opened or closed. If the contactor is opened or closed while the drive is enabled/running, this can cause over current trips, output phase loss trips, increased levels of radio noise emissions and increased contactor wear.

3.2.4 Recommended fuses, power & control cables

Model	Input Current (A)		Supply Fuses IEC gG		MCB (Type C)		Supply Cable & Earth conductor (mm^2)		Motor Cable (mm2)	Control cable (mm2)
	Single phase	Three phase	Single phase	Three phase	Single phase	Three phase	Single phase	Three phase	Three phase	
HD700-20D00040	7.1	4	10	8	10	6	1.5	1	1	≥0.5
HD700-20D00075	12.8	7.1	16	10	16	10	2.5	1	1	≥0.5
HD700-20D00150	20.5	11.3	25	16	32	16	2.5	1.5	1	≥0.5
HD700-20D00220	24	14.5	32	20	32	20	4	2.5	1.5	≥0.5
HD700-20T00400	32	16.5	40	20	40	20	6	2.5	2.5	≥0.5
HD700-40T00075		3.6		8		6		1	1	≥0.5
HD700-40T00150		5.7		10		10		1	1	≥0.5
HD700-40T00220		8.3		16		10		1.5	1	≥0.5
HD700-40T00400		13.2		20		16		2.5	1.5	≥0.5
HD700-40T00550		12.4		20		16		2.5	2.5	≥0.5
HD700-40T00750		16.1		25		20		2.5	2.5	≥0.5
	Input Current (A)		Supply Fuses (A) IEC gG		MCB (Type C)					
	Type G	Type P	Type G	Type P	Type G	Type P				
HD700-40T01100	24	31	32	40	32	40		4	4	≥0.5
HD700-40T01500	31	36	40	50	40	50		6	6	≥0.5
HD700-40T01850	36	44	50	63	50	50		10	10	≥0.5
HD700-40T02200	44	58	63	80	63	63		16	16	≥0.5
HD700-40T03000	58	72	80	110	80	80		25	25	≥0.5
HD700-40T03700	72	93	100	125	100	100		25	25	≥0.5
HD700-40T04500	93	121	125	150	125	125		35	35	≥0.5
HD700-40T05500	121	151	150	200	150	200		70	70	≥0.5
HD700-40T07500	151	175	200	200	200	200		95	95	≥0.5
HD700-40T09000	175	204	200	250	250	250		120	120	≥0.5

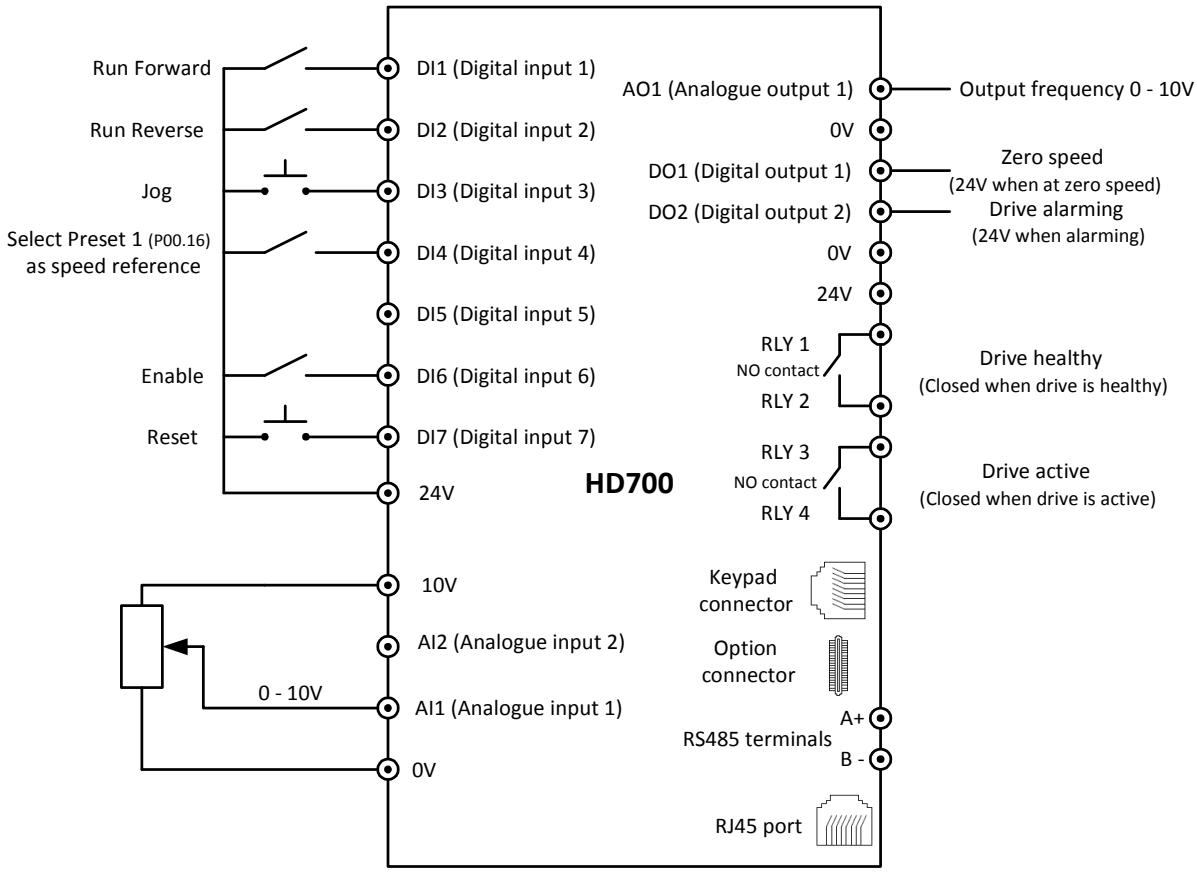
Warning:

- Cable sizes above are typical and given as a guide only, the installer should confirm cable sizes to be used comply with local regulations.
- Use 105°C (221°F) (UL 60/75°C temp rise) PVC-insulated cable with copper conductors having a suitable voltage rating
- Fuses and MCB ratings given above are specified to protect the drive, not the supply cable being used. It is the installer's responsibility to ensure the cable is protected.

Type G – 150% overload for 60s
Type P – 110% overload for 60s

3.2.5 Default control connections

Note: The drive is in keypad control as default



3.2.6 Control terminals specification

Note: For full detailed specification & functionality of the control terminal please refer to the HD700 Technical Data Guide

Type	Terminal Name	Function	Specification
Serial Communications.	RS485	RJ45 Port	Two lines, Modbus RTU protocol
	A	RS485 + signal	Same function with RJ45 port, mainly for multi network
	B	RS485 - signal	
Digital Input	DI1～DI7	Programmable digital input terminals	The common can be 0V or +24V by setting the P09.21 (default is +24V – positive logic) Input resistance: 10 kΩ High, low logic threshold: 10V±1V
Digital output	DO1～DO2	Programmable digital output terminals	Output: 24V/0V Max. output current: 50mA
Analogue Input & Output	AI1	Programmable Analogue input1	0V～10V Input resistance: 100kΩ 0 (4) mA～20mA Load resistance:188Ω Min. Potentiometer resistance: 2kΩ Resolution: 0.1% Accuracy: 2% Sampling period: 5ms
	AI2	Programmable Analogue input 2	0V～10V Input resistance: 30kΩ Min. Potentiometer resistance: 2kΩ Resolution: 0.1% Accuracy: 2% Sampling period: 5ms
	AO1	Programmable Analogue output	0V～10V Max. output current: 5mA Resolution: 0.4% Accuracy: ±5% Update rate: 5ms
Rail supply	+10V	Analogue reference supply	Accuracy: 2% Maximum output current: 5mA
	+24V	User supply	Accuracy: ±15% Maximum output current: 100mA
	0V	Common	Common connection for all external devices
Relay	RL1 & RL2 RL3 & RL4	Programmable Relay output contacts	Type: Normally open Update rate: 5ms Contact rating: 250VAC/2A(cosϕ=1) 250VAC/1A(cosϕ=0.4) 30VDC/1A Default: **Relay 1** = Closed when drive is powered up and healthy **Relay 2** = Closed when drive is active.

3.2.7 EMC

EMC recommendations:

Immunity

- The drive should be installed onto a metal back plate
- 360 degree ground clamps should be used to connect the screen of the cable; avoid "Pigtail" ground connection
- Control and power cables should be separated by a metal partition.
- Use good quality shielded, low capacitance motor cable. The motor cable shield should be connected to both sides – drive and motor.
- Control cables: Use shielded twisted pair and earth at the drive side.
- The earth conductor in the motor cable must be connected directly to the earth terminal of the drive and the motor.

Cable clearance

- Do not place control cables in a zone extending 300mm around the drive and power cables

EMC Filters

- When using an optional EMC filter, place the EMC filter as close to the drive as possible, and keep the cable between the filter and drive as short as possible. The metal enclosure of the filter must be connected with the drives earth terminal.

3.2.8 RCD (residual current device) compatibility and Earth leakage

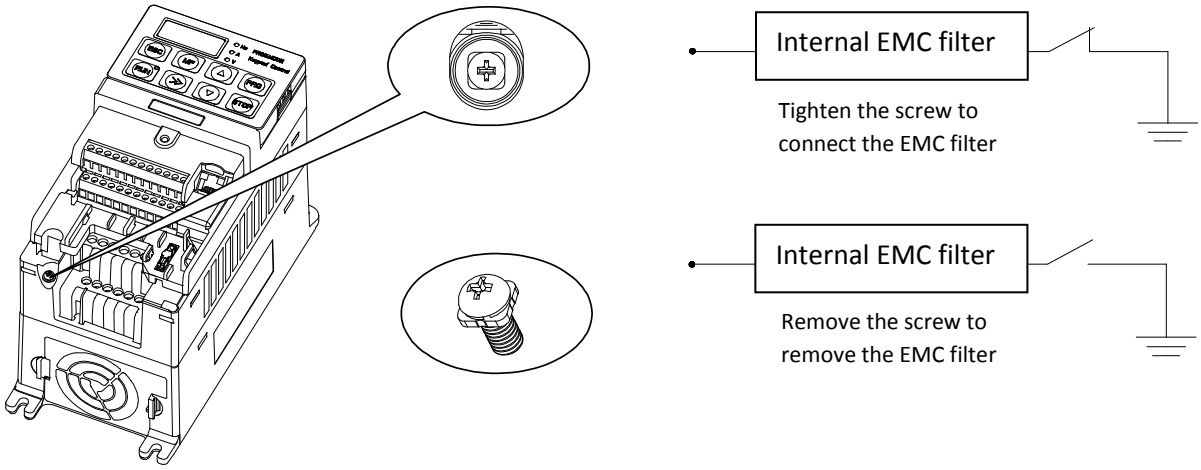
- Single phase drives are suitable to be used with a Type A RCD
- Three phase drives are only suitable to be used with a type B RCD
- Earth leakage currents are higher with the internal EMC filter fitted. Actual earth leakage will depend on a number of factors including motor cable type and length, stray capacitance in the motor, mains supply conditions etc. Where earth leakage causes nuisance tripping of RCD's, the drive's internal EMC filter can be removed as follows:

3.2.9 How to remove the internal EMC filter

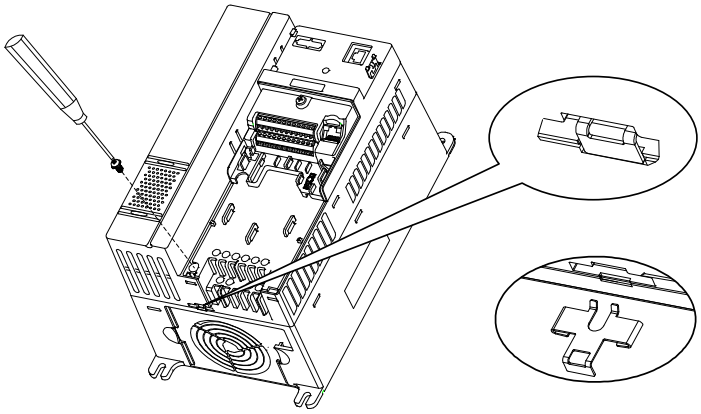
The EMC filter can be removed as follows:

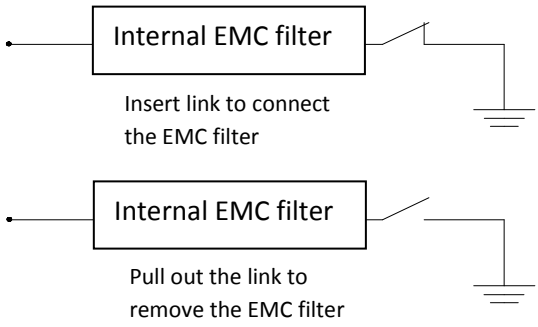
Note: The EMC performance of the drive will be affected by removing the internal EMC filter, the user is responsibility for ensuring that the end application complies with EMC standards that apply.

Fit and remove the internal EMC filter (Size A)



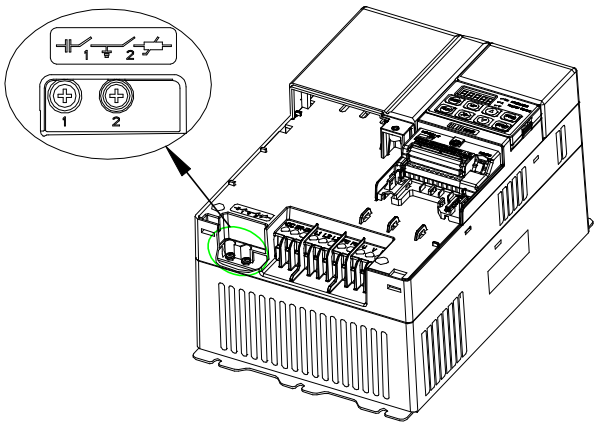
Fit and remove the internal EMC filter (Size B and C)

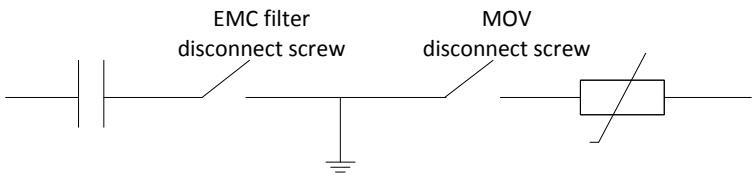




Fit and remove the internal EMC filter (Size D and E)

- Size D: The internal EMC filter can be disconnected by removing screw 1
- Size D: The internal MOV can be disconnected by removing screw 2
- Size E: The internal EMC filter can be disconnected by removing screw 2
- Size E: The internal MOV can be disconnected by removing screw 1

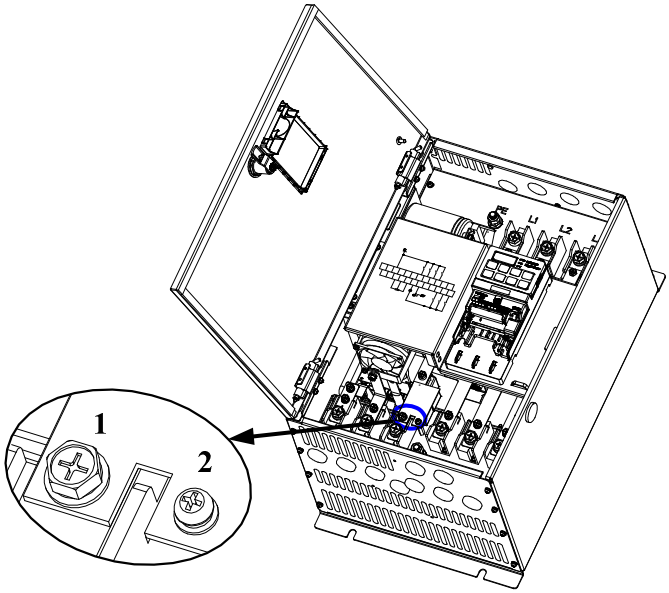




Fit and remove the internal EMC filter (Size F)

- The internal EMC filter can be disconnected by untightening screws 1 and 2 and removing the EMC filter board as shown below.

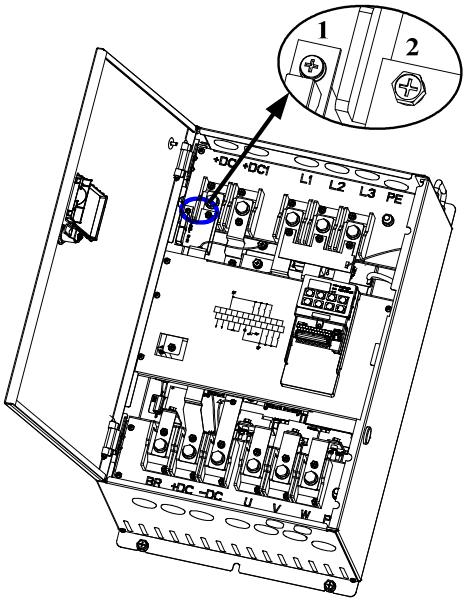
Note: In order to ensure reliable earthing, please tighten the screws 1, 2 after removing the EMC filter board.



Fit and remove the internal EMC filter (Size G)

- The internal EMC filter can be disconnected by untightening screws 1 and 2 and removing the EMC filter board as shown below.

Note: In order to ensure reliable earthing, please tighten the screws 1, 2 after removing the EMC filter board.



4.1 Display overview

5 digit LED display shows drive status, parameter & value, trip codes etc.

Run light turns on when the drives output is active.

Unit	LED lights indicate what the display is showing	
	Light on	Light flashing
Hz	Output frequency	Frequency Reference
A	Output current	N/A
V	Output voltage	DC bus voltage

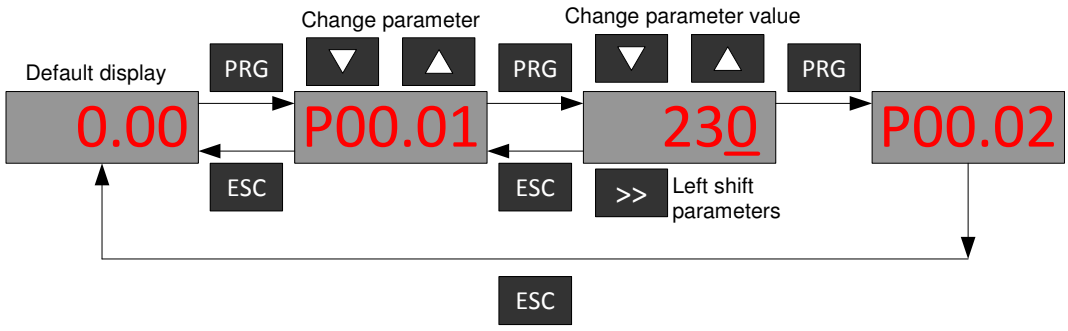
4.2 Key Function

Key	Function
ESC	Pressing the Esc key will return to the previous level. See the flow diagram that follows for illustration.
	Pressing & holding the Esc key will display the output frequency (by default, see P05.01 in the Advanced User Manual for alternative settings)
	When the keypad is locked, pressing and holding the Esc key for 5 seconds will unlock.
MF	Programmable key (by default is JOG, see P05.07 in the Advanced User Manual for alternative settings)
PRG	Enter next level. See the flow diagram that follows for illustration.
RUN	1. When in Keypad control mode (default), pressing this key will make the drive Run.
STOP	1. Pressing the Stop key will stop the drive. **Note:** P05.06 (keypad lock control) can be set so that this key will not stop the drive, see the Advanced User Manual for more details. 2. Pressing the Stop key will reset the drive
▲ ▼	Are used to select parameters and edit their values. In keypad mode, they are used to increase and decrease the speed of the motor.
>>	1. Under Run/Stop mode, pressing this key will change what is displayed, output frequency, frequency reference, output current, output voltage & DC bus voltage in turn 2. Under the edit of parameter value mode, pressing this key will move the flashing digit to the left. See the worked example that follows

4.3 Changing Parameters

The following flow diagram illustrates the process of changing parameters;

Note: The digit shown below with an underline is flashing.

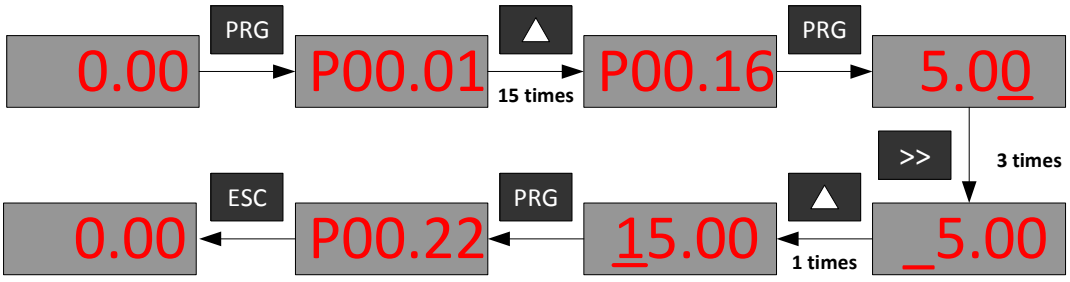


Note: When the value of a parameter is changed the PRG key must be pressed to save the value

Worked example:

- Change the value of P00.16 from 5.00Hz to 15.00Hz

Note: The digit shown below with an underline is flashing.



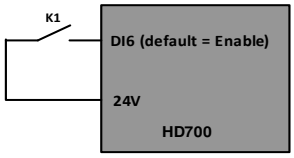
The following quick setup guides show the quickest way to get the motor running in keypad and terminal control. They assume that the drive has factory default parameters set.

5.1 Quick commissioning in keypad control

Note: The drive is in keypad control from default
Note: The drive must have an enable signal to allow keypad control to function

Connections

- Power on
- Close K1 switch to enable the drive



1

Enter motor details into the drive

- Using the information from the motor nameplate set the following

P00.01 (motor rated voltage) = nameplate data
P00.02 (motor rated current) = nameplate data
P00.03 (motor rated frequency) = nameplate data

- Press and hold the ESC button until the display shows 0.00

2

For information on how to set parameters see section 4

JOG

- Press & hold the MF button to JOG, the drive will run to 5.00Hz (default value of P1.04)
- Release the MF button and the drive will ramp to stop

3

Run & control the speed from the keypad

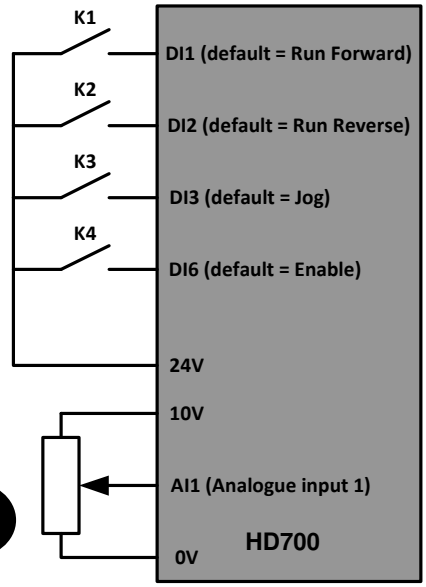
- Press the RUN button, drive will run & run light will come on
- Press ▲ to increase the frequency
- Press ▼ to decrease the frequency
- Press STOP button, drive will ramp to stop then run light will go off
- **Note:** If the enable switch is opened while running, the drive will disable and the motor will coast to a stop

3

5.2 Quick commissioning in terminal control

Make connections

- Ensure the drive is powered OFF
- Make control connections as shown



1

Enter motor details into the drive

- Apply power to the drive
- Using the information from the motor nameplate set the following parameters:

P00.01 (motor rated voltage) = nameplate data
P00.02 (motor rated current) = nameplate data
P00.03 (motor rated frequency) = nameplate data

2

For information on how to change parameters see section 4

Set parameters for terminal control

- Set the following parameters:

P00.04 (Control mode) = 1 (Terminal control)
P00.05 (Reference source selector) = 3 (Reference is from AI1)

- Press and hold the ESC button until the display shows 0.00

3

Run & control the speed from the terminals

- Close switch K4 to enable the drive
- Close switch K1. The drive will run forward & the run light will come on
- Use the potentiometer to change the speed reference on AI1
- Open the switch K1. The drive will ramp to stop and the run light will go off
- Close switch K2. The drive will run reverse & run light will come on
- Use the potentiometer to change the speed reference on AI1
- Open the switch K2. The drive will ramp to stop and the run light will go off
- Close switch K3 to JOG. The drive will run to 5.00Hz (default value of P1.04)
- Open the switch K3. The drive will ramp to a stop and the run light will go off
- Open the switch K4 to disable the drive

4

5.3 Quick commissioning to run at a fixed speed

Enter motor details into the drive

- Apply power to the drive
- Using the information from the motor nameplate set the following parameters:

P00.01 (motor rated voltage) = nameplate data
P00.02 (motor rated current) = nameplate data
P00.03 (motor rated frequency) = nameplate data

1

For information on how to change parameters see section 4

Fixed speed in keypad control

Set parameters for fixed speed

- Set the following parameters:

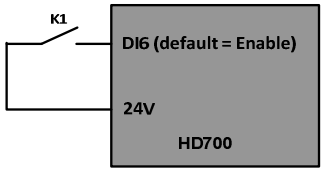
P00.05 (Reference source selector) = 2 (Preset)
P00.16 (Preset 1) = Fixed speed required

- Press and hold the ESC button until the display shows 0.00

2

Make connections

- Close K1 switch to enable the drive



3

Run at a fixed speed

- Press the RUN button, drive will run and the run light will come on
- The drive will ramp to the fixed speed (P00.16)
- Press STOP button, drive will ramp to stop then the run light will go off

4

Fixed speed in terminal control

Set parameters for fixed speed

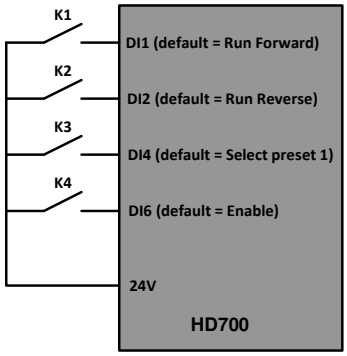
- Set the following parameters:

P00.04 (Control mode) = 1 (terminal)
P00.16 (Preset 1) = Fixed speed required

- Press and hold the ESC button until the display shows 0.00

2

Run at a fixed speed

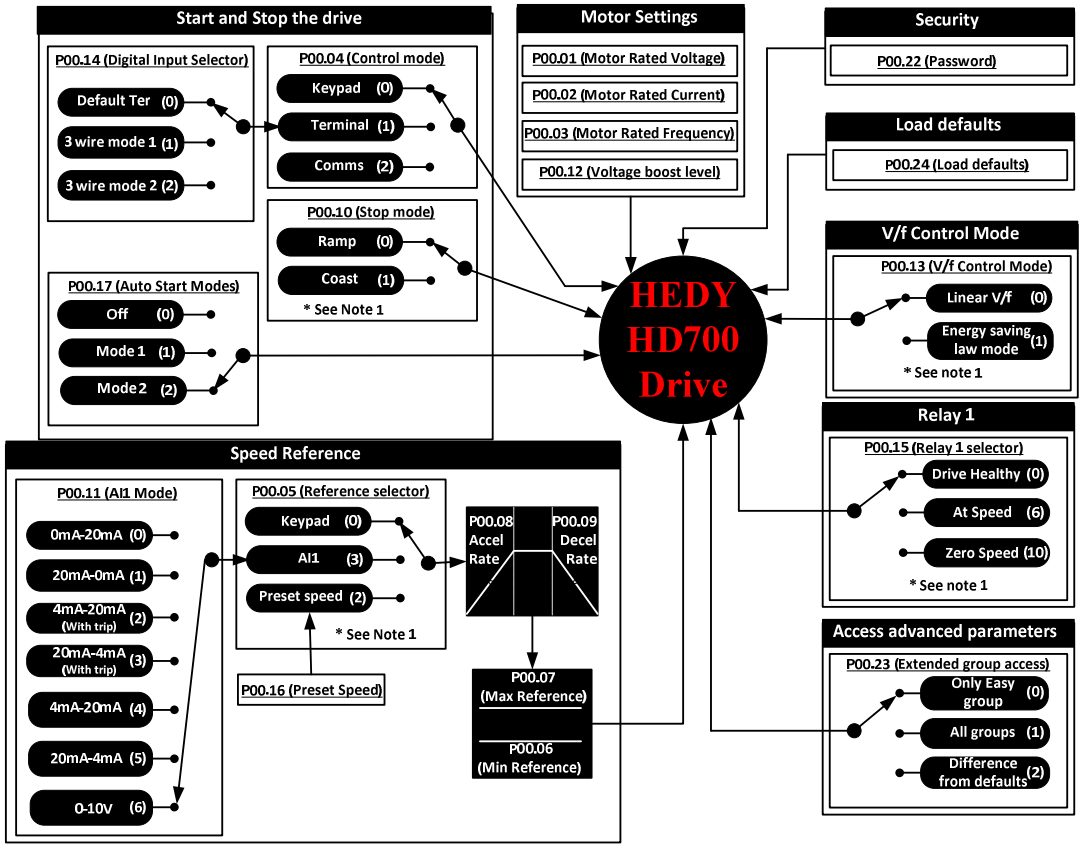


- Close switch K4 to enable the drive
- Close switch K1 or K2, drive will run forward or run reverse and the run light will come on
- Close switch K3, drive will ramp to the fixed speed (P00.16)
- Open switch K4 to disable the drive

3

P00 parameter group contains parameters for basic set up of the drive. Each parameter in this menu is related with a parameter from the extended menus. If a parameter in this menu is changed, the related parameter is also changed. The related parameter is shown in brackets in parameter descriptions. For full details of all parameters available in the drive please refer to the HD700 Advanced User Manual (Download from **www.hedyiad.com**).

6.1 Easy Parameter Group Overview



Note 1
More selections available, please see parameter description for details.

Parameter	Parameter name	Parameter	Parameter name
P00.01	Motor rated voltage	P00.13	V/f control mode
P00.02	Motor rated current	P00.14	Digital input selector
P00.03	Motor rated frequency	P00.15	Relay 1 selector
P00.04	Control mode	P00.16	Preset 1
P00.05	Reference source selector	P00.17	Auto-Start After Power Off
P00.06	Minimum reference	P00.22	Password
P00.07	Maximum reference	P00.23	Extended group access
P00.08	Acceleration time	P00.24	Load defaults
P00.09	Deceleration time		
P00.10	Stop mode		
P00.11	AI1 mode selector		
P00.12	Voltage boost level		

6.2 P00 Parameter Descriptions

Note: Change mode shows what condition the drive needs to be in to allow the parameter to be changed.

Parameter	Parameter name	Range【Default】	Change mode
P00.01 (P13.06)	Motor rated voltage	200V: 0V ～ 240V【230V】 400V: 0V ～ 480V【400V】	Stop only

Rated voltage of the motor (motor nameplate)

Parameter	Parameter name	Range【Default】	Change mode
P00.02 (P13.07)	Motor rated current	0.1A ～ By model【By model】	Stop only

Rated current of the motor (motor nameplate)

Parameter	Parameter name	Range【Default】	Change mode
P00.03 (P13.08)	Motor rated frequency	1.00Hz ～ 300.0Hz【50.00Hz】	Stop only

Rated frequency of the motor (motor nameplate)

Parameter	Parameter name	Range【Default】	Change mode
P00.04 (P10.07)	Control mode	0 ～ 2【0】	Stop only

0: Keypad – Stop/start/speed controlled by drives keypad buttons
1: Terminal – Stop/start/forward/reverse/speed controlled by drive terminals
2: Serial communications - Stop/start/forward/reverse/speed controlled by serial communications
Note: To enable keypad forward and reverse, set P05.07 to 1. MF key becomes keypad forward/reverse

Parameter	Parameter name	Range【Default】	Change mode
P00.05 (P01.01)	Reference source selector	0 ～ 8【0】	Run or Stop

0: Keypad
The frequency reference can be changed using the ▲or ▼ buttons on drives keypad.
The Power up frequency reference is decided by parameter P01.11.

1: E-Pot (motorized/electronic potentiometer)
The E-Pot function allows the speed reference to be controlled by two momentary normally open switches that are connected to two of the drives digital inputs. When the UP switch is closed the frequency reference increases and when the DOWN switch is closed the frequency reference decreases.
Example set up:
Digital inputs DI4 and DI5 are set up as the UP and DOWN function as follows:
P09.05 = 8 DI4 function is UP
P09.06 = 9 DI5 function is DOWN

2: Preset (Preset/constant speeds)
Controlled by the digital input terminals, the frequency reference is the value of P04.01 (preset 1) - P04.16 (preset 16).

Example set up:
Digital inputs DI4 and DI5 are set up as the preset select bits:
P09.05 = 0 DI4 is preset select bit 0
P09.06 = 1 DI5 is preset select bit 1

The preset speed (frequency reference) can be selected as show in the table below:

DI5 status	DI4 status	Speed
Open	Open	Preset 1 (P00.16/P04.01)
Open	Closed	Preset 2 (P04.02)
Closed	Open	Preset 3 (P04.03)
Closed	Closed	Preset 4 (P04.04)

3: AI1 (analogue input 1)
In this mode the frequency reference can be adjusted by changing the value of analogue input 1.
AI1 can be setup for a voltage (default) or current input (see P00.11).

4: AI2 (analogue input 2)
In this mode, the frequency reference can be adjusted by changing the level of analogue input 2.
Note: AI2 can only be set to voltage mode. For detailed setup of AI2 please refer to Group 8.

5: Serial communications
In this mode, users can change the value of P04.01 (Preset 1) for the reference via the serial communications.

6: DI7 Pulse input
In this mode, the frequency can be adjusted by the external pulse counter of DI7.
When P09.24=2, DI7 function is reference channel (by input pulse).

Example:
The maximum frequency of input pulse (P09.27) is set to 20.0 kHz. The actual input pulse is 10.0kHz.
The percentage of DI7 pulse input (P09.38) is 50.0%. Then the reference is:
Reference = DI7 input percentage (P09.38) × maximum reference (P01.02)
= 50.0% × 50.00Hz
= 25.00Hz
Note: For more information please refer to Group 09.

7: PLC or fieldbus card
The frequency reference is controlled by option modules i.e. Profibus module.

8: User-programmed
The user can set up where the reference comes from. For example, the output of the PID controller could be sent to P1.27 (User defined main auxiliary reference).

Parameter	Parameter name	Range【Default】	Change mode
P00.06 (P01.03)	Minimum reference	0Hz ～ P00.07【0.00Hz】	Stop only

Minimum speed at which the motor will run at in both directions.

Parameter	Parameter name	Range【Default】	Change mode
P00.07 (P01.02)	Maximum reference	0Hz ～ 300.0Hz【50.00Hz】	Stop only

Maximum speed at which the motor will run at in both directions.

Parameter	Parameter name	Range【Default】	Change mode
P00.08 (P02.04)	Acceleration time	0.0s ～ 3600.0s【10.0s】	Run or Stop

Time taken to accelerate from 0Hz to maximum reference (P00.07).

Parameter	Parameter name	Range【Default】	Change mode
P00.09 (P02.05)	Deceleration time	0.0s ～ 3600.0s【20.0s】	Run or Stop

Time taken to decelerate from maximum reference (P00.07) to 0Hz.

Parameter	Parameter name	Range【Default】	Change mode
P00.10 (P03.10)	Stop mode	0 ～ 3【0】	Stop only

0: Ramp stop
The drive will ramp the motor to a stop according to the deceleration time set.

1: Coasting
The drive output with inhibit upon a stop command, allowing the motor to coast to a stop.

2: Ramp stop + DC injection
When receiving the stop command, the drive reduces the output frequency according to deceleration time. When the output frequency gets to the Stop DC injection brake frequency (P03.12), the DC injection braking begins. (Please refer to P03.08, P03.09, P03.13 & P03.14 in the HEDY HD700 Advanced User Guide for further information on DC injection braking).

3: Ramp stop + coast stop
Ramp to P03.11 (Stop frequency) then disable and coast to stop.

Parameter	Parameter name	Range【Default】	Change mode
P00.11 (P08.02)	AI1mode selector	0 ～ 6【6】	Stop only

AI1 (analogue input 1) signal can be voltage or current mode:

0: 0mA-20mA
1: 20mA-0mA
2: 4mA-20mA (With F013 current loss trip if input current falls below 3mA)
3: 20mA-4mA (With F013 current loss trip if input current falls below 3mA)
4: 4 mA-20mA (Without trip)
5: 20mA-4mA (Without trip)
6: 0V-10V

Parameter	Parameter name	Range【Default】	Change mode
P00.12 (P06.08)	Voltage boost level	0.0% ～ 30.0%【by model】	Run or Stop

The voltage boost is used to increase motor voltage at low speeds and improve low speed motor starting torque. Smaller motors, which are more resistive, will require higher boost levels when compared to larger motors.
Increasing voltage boost can cause the motor current and temperature to increase. Forced ventilation of the motor should be considered if running at low speeds for periods of time where airflow from the standard motor fan is ineffective.

Parameter	Parameter name	Range【Default】	Change mode
P00.13 (P06.01)	V/f control mode	0 ～ 3【0】	Stop only

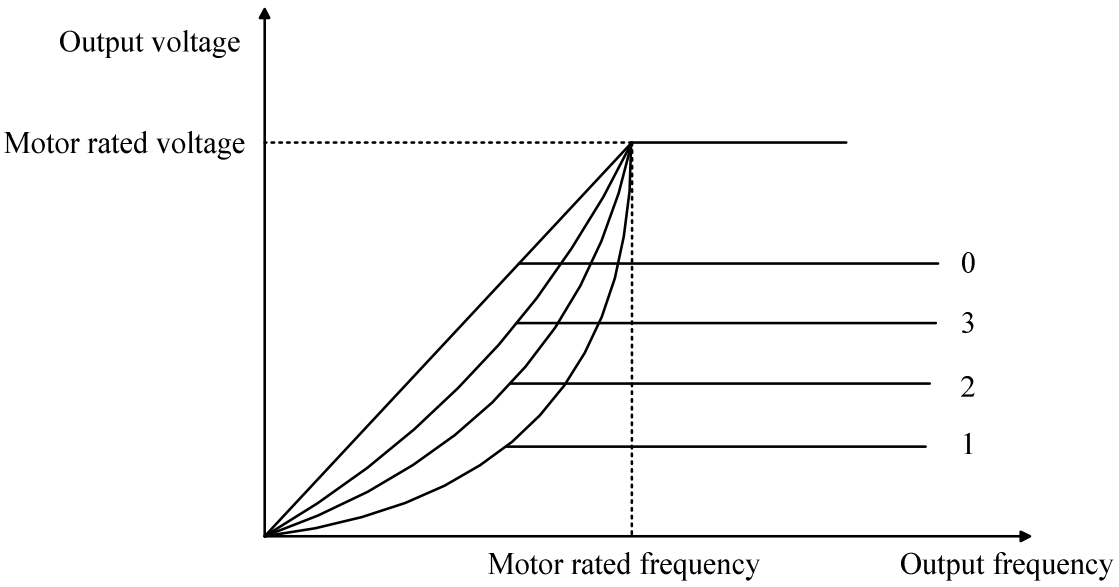
This parameter changes the V/f (voltage/frequency) characteristic the drive applies to the motor. This feature can be used for energy saving on variable torque load.

There are four fixed V/f characteristics:

0: linear V/f

Energy saving characteristics typically for variable torque loads i.e. centrifugal fan and pump applications:

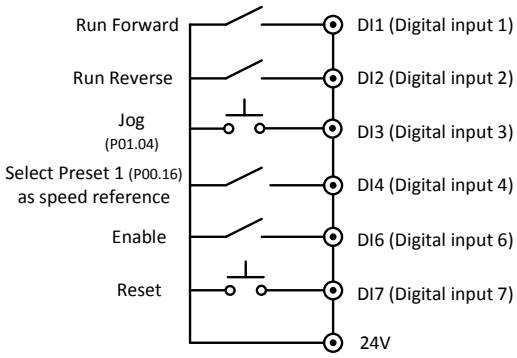
1: 2.0 law ramp, curve 1
2: 1.7 law ramp, curve 2
3: 1.2 law ramp, curve 3



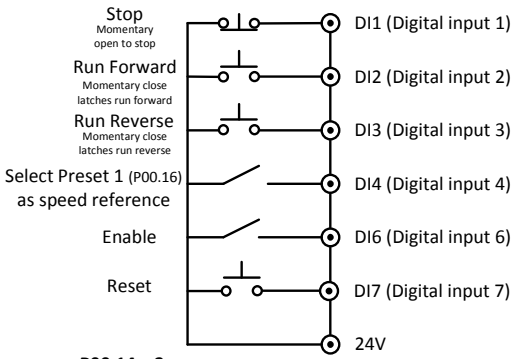
Parameter	Parameter name	Range【Default】	Change mode
P00.14 (P09.22)	Digital input selector	0 ～ 2【0】	Stop only

Setting this parameter automatically configures the drives digital input terminals as per the following diagrams:

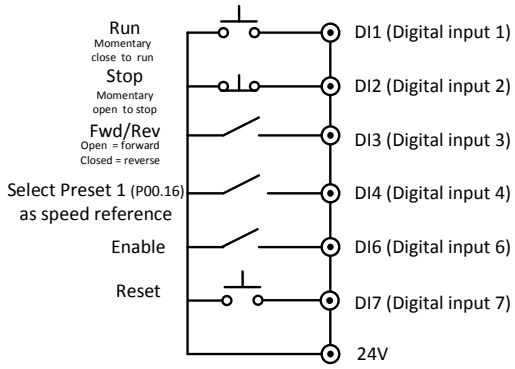
P00.14 = 0:



P00.14 = 1:



P00.14 = 2:



Note: DI5 (digital input 5) is set to OFF by default so therefore has no function

Parameter	Parameter name	Range【Default】	Change mode
P00.15 (P09.10)	Relay 1 function selector	0 ～ 12【0】	Stop only

Selects the functionality of Relay 1 (terminals RL1 & RL2)

0: Drive healthy (P12.01) – Relay contacts closed when drive healthy, open when drive fault
1: Drive active (P5.27)
2: Length arrival (P14.13)
3: External fault (P12.14
4: Under voltage trip (P12.16)
5: PLC finished (P04.53)
6: Frequency reached (P01.23)
7: Torque being limited (P07.24)
8: Time arrival (P10.16)
9: Overload is accumulating (P12.17)
10: At zero speed (P01.24)
11: Dynamic brake is active (P18.08)
12: User Control

Parameter	Parameter name	Range【Default】	Change mode
P00.16 (P04.01)	Preset speed 1	± P00.07【5.00Hz】	Run or Stop

Sets the frequency the drive will run at when preset speed 1 is selected.

Parameter	Parameter name	Range【Default】	Change mode
P00.17 (P03.03)	Auto-Start After Power Off	0 ～ 2【2】	Stop only

0: Auto-Start After Power Off = Disabled (The drive will not start automatically after power up).

1: Auto-Start After Power Off = Mode 1 (when powering up, the drive will start automatically after time defined by P03.04 (wait time for auto-start, default = 0.0 seconds).

When P00.17=1:

- In keypad control mode, the drive will start automatically after power up.
- In terminal control mode a run signal change from OFF to ON needs be seen by the drive after power up, then the drive will start.

2: Auto-Start After Power Off = Mode 2
The same as Mode 1 except:

- In terminal control mode – if there is an active run signal at power up, the drive will start.

Warning: Please use this function carefully.

Parameter	Parameter name	Range【Default】	Change mode
P00.22 (P10.06)	Password	0 ～ 9999【0】	Run or Stop

- When P00.22 = 0 (default value) the password is disabled and all parameters can be accessed.
- When P00.22 is set to a non 0 value and the Esc button is pressed twice the password is enabled and only P00.22 can be accessed.
- To access all parameters enter the password into P00.22 then press the PRG button.
- To remove the password, after entering the password, change the content of P00.22 to 0 then press the PRG button.

Parameter	Parameter name	Range【Default】	Change mode
P00.23 (P05.03)	Extended parameter group access	0 ～ 2【0】	Stop only

0: Only parameter group P00.xx accessible
1: All parameter groups accessible
2: Only display parameters which have different values from default

Parameter	Parameter name	Range【Default】	Change mode
P00.24 (P10.08)	Load defaults	0 ～ 1【0】	Stop only

0: No action

1: Load default parameters. When P00.24 is set to 1 and the PRG button is pressed all parameters are set to their factory default values.

For full details of all parameters available in the drive please refer to the *HD700 Advanced User Manual* (downloadable free from www.hedyiad.com).

7.1 Faults & corrective actions

Note In the unlikely event that a trip occurs that is not listed below, please refer to the HD700 Advanced User Manual for a full list of trip codes

Note: Trip information is recorded in Group P11 (Fault tracking)

Trip Code	Trip Description	Possible Reasons	Corrective Actions
F001	Output over current *The drive will not allow a reset until 10 seconds after the trip*	Output short circuit	Check the motor & motor cabling
		Accel or decel time is too short	Increase accel or decel time
		The motor was still spinning when the drive was given a run command	See P03.05 in the Advanced User Manual. The drive needs to be setup if the motor is spinning on start.
F002	Over voltage	Supply voltage is too high	Make sure the supply to the drive is within the specification
		Sudden load change	Avoid sudden load changes
		Deceleration time is too short	Increase the Deceleration time & consider whether a brake resistor is required for the application
F003	Under voltage	Supply voltage is too low	Check the supply to the drive is within specification
		During drive power off	This is normal
F004	Supply phase loss	Supply phase missing	Check all supply phases
F005	Output phase loss	Output phase lost	Check motor & motor cabling
F006	Braking over current *The drive will not allow a reset until 10 seconds after the trip*	Brake resistor faulty or incorrect value (too low a value)	Check the brake resistor and cabling
F007	Heatsink 1 over temperature	Ambient temperature around the drive is too high	Reduce the ambient temperature around the drive
		Air flow channel blocked	Unblock air flow channel
		Fan failed	Replace the fan
F009	IGBT junction over temperature	High switching frequency	Reduce the switching frequency. Change P10.11 = 1 to automatically reduce switching frequency when IGBTs get hot.
		Frequently accelerating and decelerating under a heavy load condition	Increase the acceleration and deceleration times.
F010	Motor overload	Motor wired incorrectly for input voltage	Check correct motor star or delta connection for input voltage
		V/f not set according to motor nameplate	Setup V/f and voltage boost correctly
		Supply voltage is low	Check the power supply
		Motor load is jammed or the load change is excessive	Check the motor load
		P12.12 is set incorrectly	See the description for P12.12 in the Advanced User Manual
F011	Motor over temperature (If motor thermistor is used)	The motor load is excessive	Check the motor load
		Motor heat dissipation channel is blocked	Check the motor
		Motor fan is not working	Change the motor fan
		Motor thermistor faulty	Check the thermistor

Trip Code	Trip Description	Possible Reasons	Corrective Actions
F012	AI1 Over current	AI1 input current is over 26mA	Check AI1 input
F013	AI1 Input current loss	AI1 input current <3mA	Check AI1 input
F014	User +24V supply overload	Output current of user +24V, DO1 and DO2 >100mA	Check if there is short circuit on the output of +24V, DO1 or DO2
F016	Auto-tune failed	The drive size doesn't match the motor power size	Change the drive to the correct rating
		The wrong motor data has been set	Enter the correct motor nameplate data into drive
		Before the auto-tune finished the user attempted to stop the drive	Try to autotune again, do not attempt to stop the drive when the autotune is taking place
F017	Output motor terminal short circuit at power up	Output motor terminal short circuit	Check motor wiring and motor insulation
F018	External fault	An external fault input to one of the DI terminals	Checking the external equipment
F020	EEPROM read & write failure	Error occurred when reading or writing the control word	Press STOP key to reset the drive and try again
F030	Soft start circuit fault	Internal drive soft start circuit failed	Contact supplier of the drive
F031	Main fan fault	Fan blade not rotating correctly	Check the fan blades
		Fan wiring is wrong	Checking fan wiring. Contact the supplier of the drive
F032	Control fan fault (30kW and above)	Fan blade not rotating correctly	Check the fan blades
F033	Current sense fault	Internal drive fault	Contact the supplier of the drive
F034	Power PCB DSP fault	Internal drive fault	Power off and on. Contact the supplier of the drive
F035	MCU cannot receive data from DSP	Internal drive fault	Power off and on. Contact the supplier of the drive
F036	MCU receives wrong data from DSP	External disturbance	Check cable layout
		Internal drive fault	Contact the supplier of the drive
F037	Over current during power up	Current sense circuit failure	Contact the supplier of the drive
F039	IGBT thermistor failure	IGBT failure	Contact the supplier of the drive
F040	Drive software issue	MCU or DSP failure	Contact the supplier of the drive

Please note that when using the "External fault" trip feature which can be programmed to a digital input terminal to cause the HD700 to trip on (F018), the trip condition must be present for > 2 seconds for the trip to latch under all conditions.

7.2 Alarms

When drive is in an alarm condition, the drive will keep running and Keypad will display the alarm Code (Hxxx). The Alarm code will flash for 3 seconds, then return to the normal display (selected by P05.01). The normal display will flash for 3 seconds, then return back to flashing alarm code. This cycle will continue until the alarm condition is removed or the drive trips.
Parameter P12.13 can be set to decide if to display the alarm warning or not.

Code	Description	Possibilities	Treatments
H001	Current limit is active	The output current has reached the value set in P07.03 (current limit). This may be because the drive is trying to accelerate the load faster than it is able to with the value set in P07.03.	If the actual acceleration rate achieved in the application is acceptable then there is no need to adjust parameters. The current limit is an indication not a fault. If faster acceleration is required with the maximum value set in P07.03 then a larger motor and drive may be needed.
		The load on the motor is excessive	Check the load
		The motor is spinning on start	Check P03.05 (start mode) is set correctly
H002	Motor overload is integrating	Output current is higher than the value of P00.02 (motor rated current)	This can be a normal occurrence if only for short periods of time during accelerating a heavy load. A larger motor and drive may be required for the application in F010 trips occur frequently
H003	Heatsink is hot	High ambient temperature	Reduce the environment temperature
		Air flow channel blocked	Unblock the flow channel
		Fan failed	Replace the fan
H004	IGBT junction temperature is high	Frequently accelerating and decelerating	Modify the parameter setup
			A larger drive may be required
H005	Low DC bus operation (only for 400V models)	Power supply voltage is low	Checking the power supply

Notes

Easy Menu Parameters

Parameter	Parameter name	Setting	Parameter	Parameter name	Setting
P00.01	Motor rated voltage		P00.13	V/f control mode	
P00.02	Motor rated current		P00.14	Digital input selector	
P00.03	Motor rated frequency		P00.15	Relay 1 selector	
P00.04	Control mode		P00.16	Preset 1	
P00.05	Reference source selector		P00.17	Auto-Start After Power Off	
P00.06	Minimum reference		P00.22	Password	
P00.07	Maximum reference		P00.23	Extended group access	
P00.08	Acceleration time		P00.24	Load defaults	
P00.09	Deceleration time				
P00.10	Stop mode				
P00.11	AI1 mode selector				
P00.12	Voltage boost level				

Default Control Terminal Connections