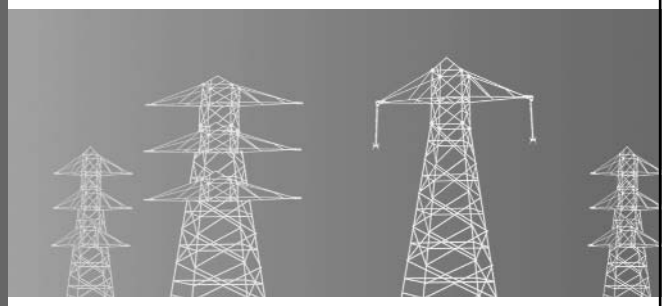
User Manual

3DAA5
3DAA5-H

- Installation
- Operation
- Programming



➠ 3-Phase Amp & Amp Demand Monitors

3DAA5

3DAA5-H
(With Harmonics Measurement)

Electro Industries/GaugeTech
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Electro Industries/GaugeTech

The 3DAA5 and 3DAA5-H
3-Phase Amp and Amp Demand Monitors

Installation, Operation and Programming Manual

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Customer support is available 9:00 A.M. to 4:30 P.M., Eastern Time, Monday through Friday. Please have the model, serial number and a detailed problem description available. If the problem concerns a particular reading, please have **all** meter readings available. When returning any merchandise to E.I.G., a return authorization number is required.	
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PART II: PROGRAMMING YOUR 3DAA5

Part I: Installation & Operation

CHAPTER 1

OVERVIEW: THE 3DAA5 VS. THE 3DAA5-H

- Both the **3DAA5** (**Figure 1.1**, below) and the **3DAA5-H** (**Figure 1.2**, below) display three phases of current simultaneously and adjust to any CT ratio. Both easily access and display maximum and minimum demand and programmable limits (LM1, LM2).
- The **3DAA5-H** *also* accesses and displays **% of T.H.D**. and **K-Factor**. (See Chapter 5).
- Note the only difference in the keypads: where the 3DAA5 has a ***SET*** button, the 3DAA5-H has a ***T.H.D./K*** button. Except for functions specific to % of T.H.D. and K-Factor, the 3DAA5's ***SET*** button and the 3DAA5-H's ***T.H.D./K*** button perform identical tasks. All illustrations and examples shown in this manual pertain to both models.

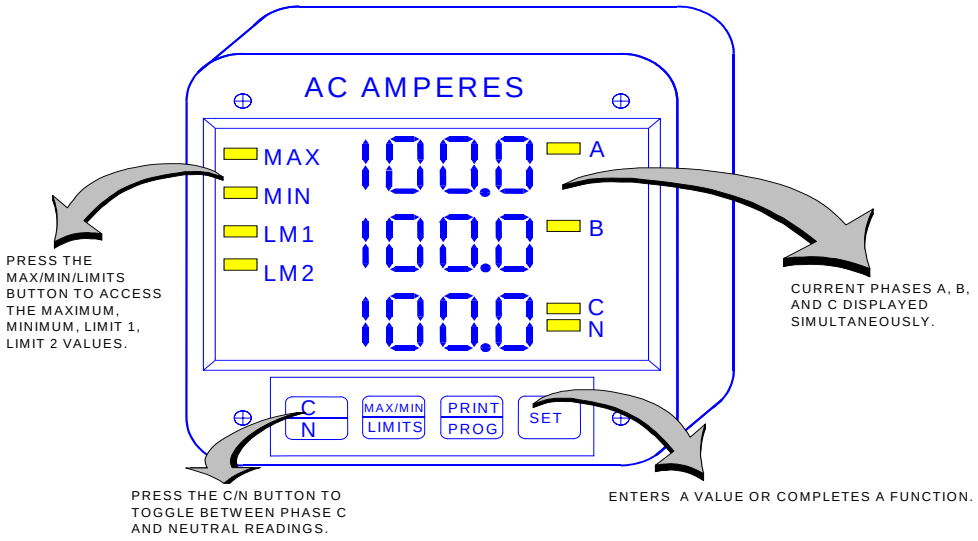


Figure 1-1: The 3DAA5 front panel with display and keypad

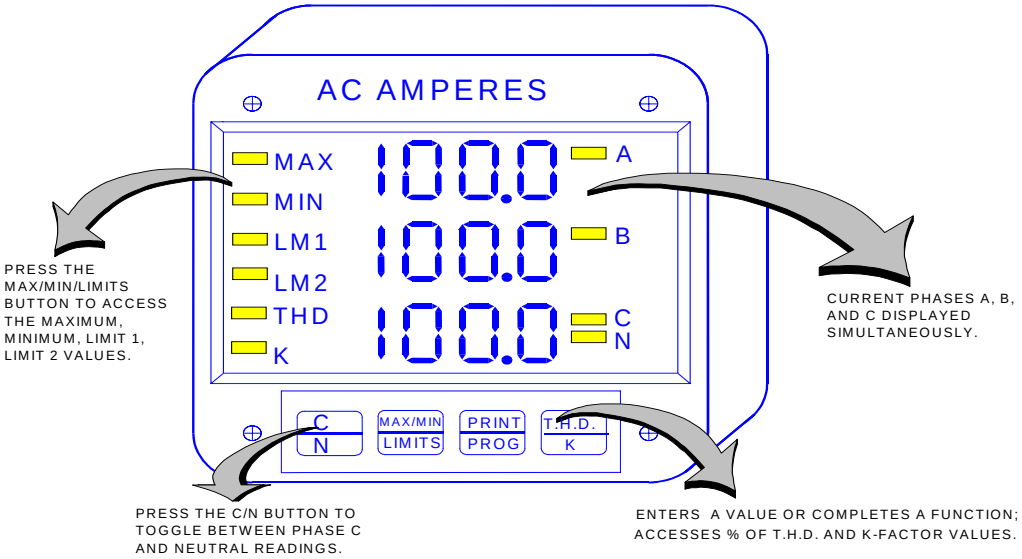


Figure 1-2: The 3DAA5-H front panel with display and keypad

CHAPTER 2
MECHANICAL INSTALLATION

2.1: Explanation of Symbols:

CAUTION, RISK OF DANGER. DOCUMENTATION MUST BE CONSULTED IN ALL CASES WHERE THIS SYMBOL IS MARKED.

CAUTION, RISK OF ELECTRIC SHOCK.

PROTECTIVE CONDUCTOR TERMINAL.

ALTERNATING CURRENT.

BOTH DIRECT AND ALTERNATING CURRENT.

DIRECT CURRENT.

2.2: Mechanical Installation

METER NOTES:

- To clean the meter, wipe it with a clean, dry cloth.
- Meter's environmental conditions:
  - Operating Temperature: -20°C to +70°C/-4.0°F to +158°F
  - Storage Temperature: -30°C to +80°C/-22°F to +176°F
  - Relative Humidity: 90% non-condensing
  - Ventilation requirement: Natural convection cooling is adequate. Allow unobstructed airflow around the unit and monitor for a rise in temperature when the meter is installed in an enclosed cabinet.
  - The meter has no specific protection against ingress of water.
  - The rating of this meter requires all input and output terminals to be connected permanently: modification and maintenance of any kind should be performed **only** by qualified personnel.
  - Rated Altitude: 2,000 meters maximum

The diagrams on the following pages display the possible mechanical installations for the 3DAA5 and installation of the optional Communication Converter. All measurements are in inches.

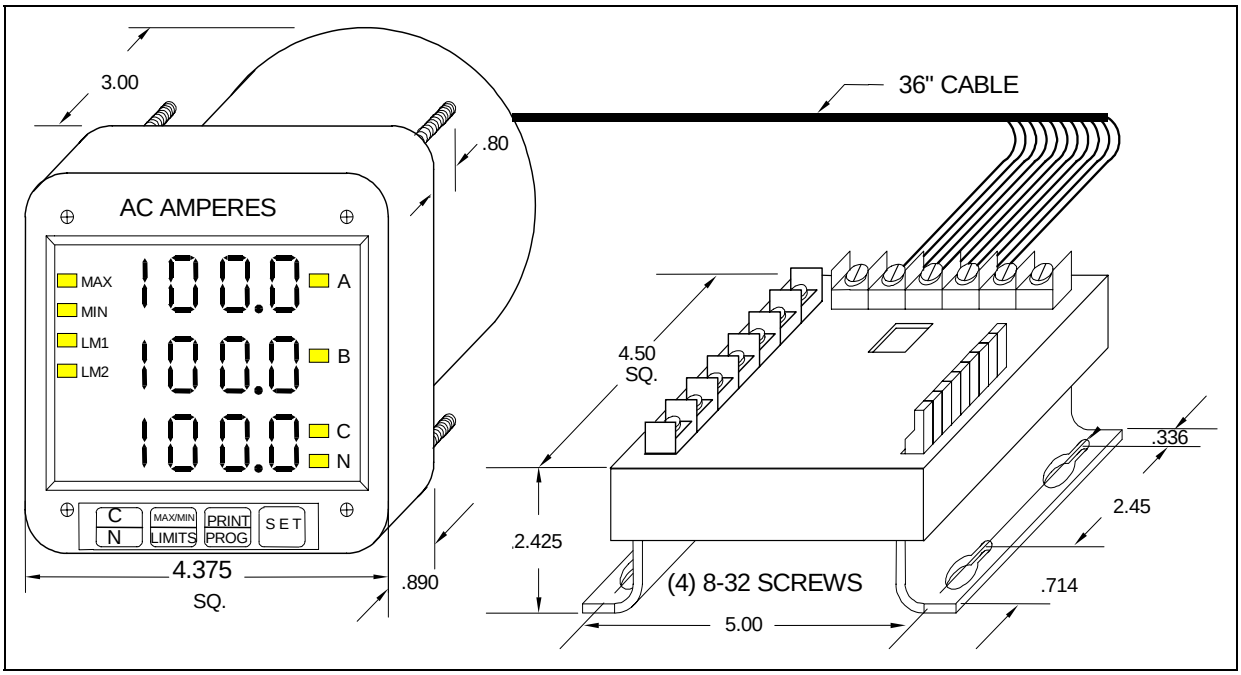


Figure 2.1 Installation of the 3DAA5 meter with K-110 Option for limited space conditions

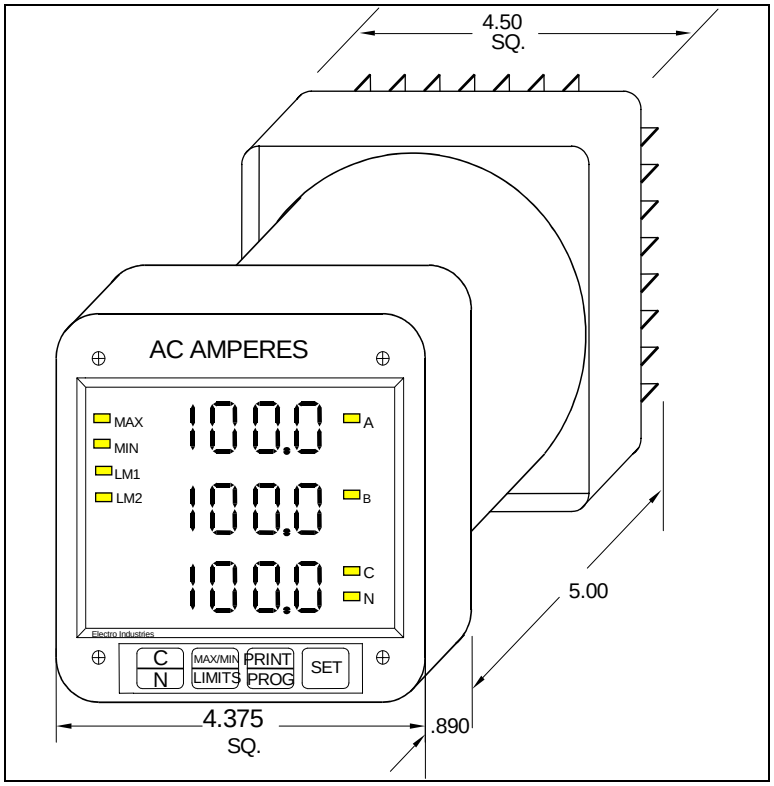


Figure 2.2 Standard Installation of the 3DAA5

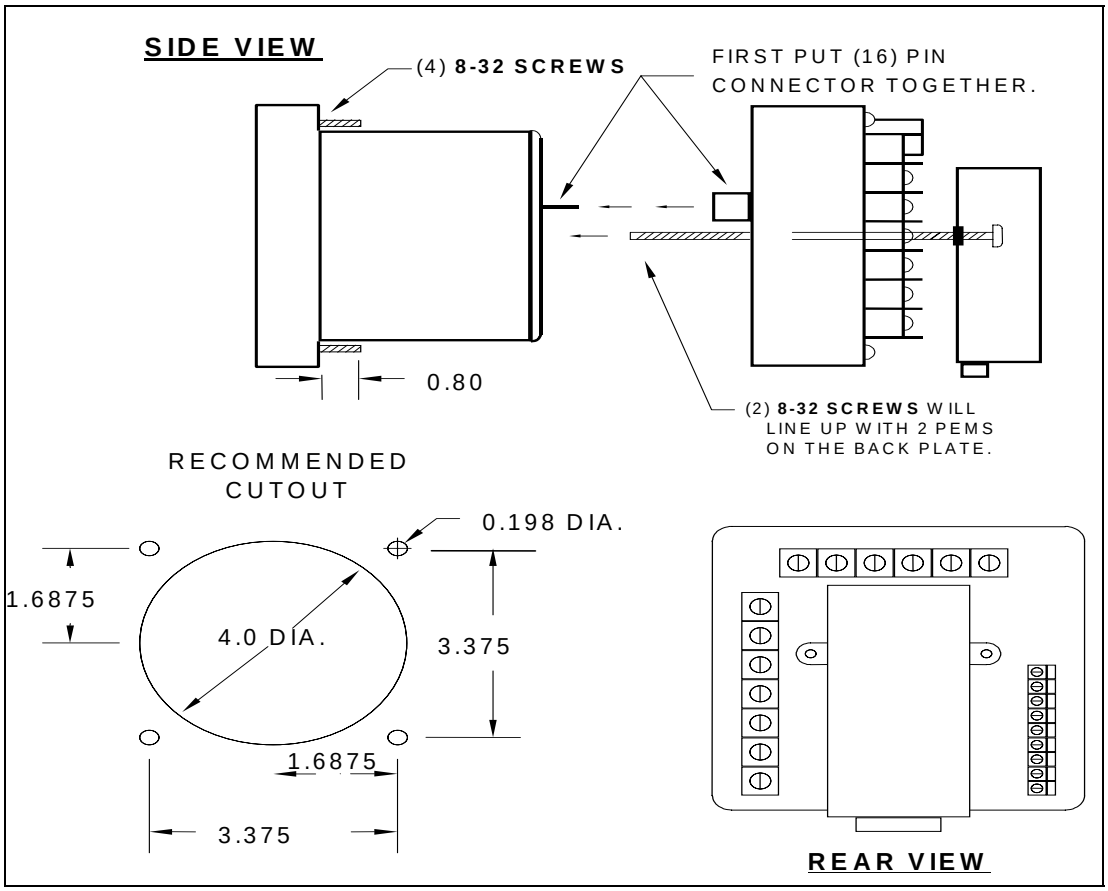


Figure 2.3 Standard Cutout for the 3DAA5

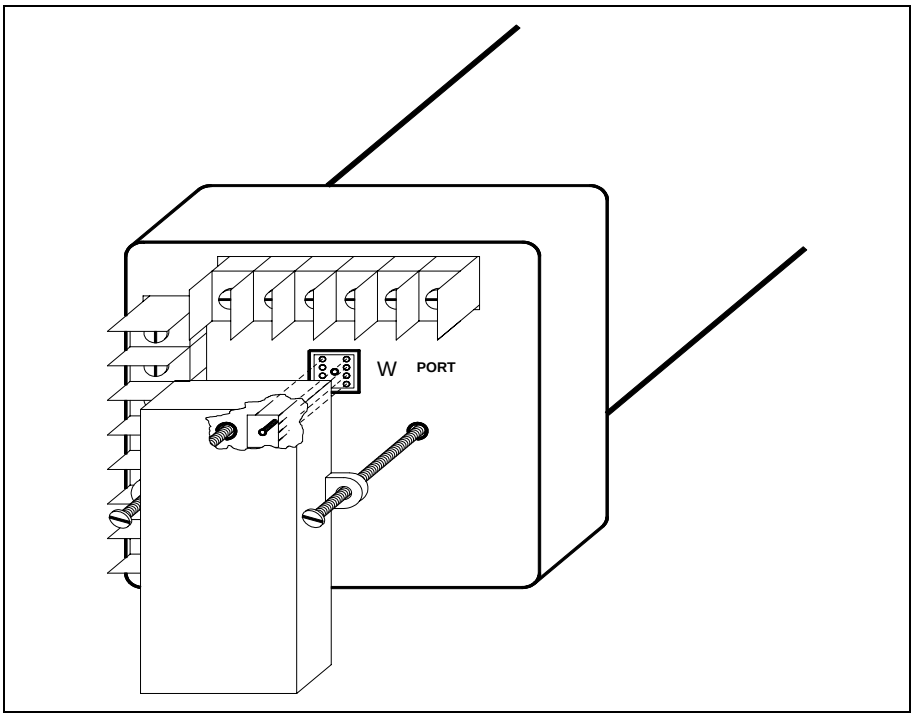


Figure 2.4: Optional Communication Converter or DC Output Module Installation

Note: ***Carefully align the guide screw and 8-pin port connector to prevent pins from breaking.***

CHAPTER 3
ELECTRICAL INSTALLATION

3.1: Important Considerations When Installing Meters

Please read the following sections carefully for important safety information regarding installation and hookup of the meter.

- This meter is rated as "permanently installed equipment" and must be installed in non-accessible areas only, e.g. control panels, switchgear enclosures, etc.

- Installation of the meter must be performed only by qualified personnel who follow standard safety precautions during all procedures. Those personnel should have appropriate training and experience with high voltage devices. Appropriate safety gloves, safety glasses and protective clothing are recommended.

- During normal operation of the meter, dangerous voltages flow through many parts of the meter, including: Terminals and any connected CTs (Current Transformers) and PTs (Potential Transformers), all I/O Modules (Inputs and Outputs) and their circuits. All Primary and Secondary circuits can, at times, produce lethal voltages and currents. Avoid contact with any current-carrying surfaces.

- Do not use the meter for primary protection or in an energy-limiting capacity. The meter can only be used as secondary protection. Do not use the meter for applications where failure of the meter may cause harm or death. Do not use the meter for any application where there may be a risk of fire.

- All meter terminals should be inaccessible after installation.

- Do not apply more than the maximum voltage the meter or any attached device can withstand. Refer to meter and/or device labels and to the Specifications for all devices before applying voltages. Do not HIPOT/Dielectric test any Outputs, Inputs or Communications terminals.

- EIG recommends the use of Shorting Blocks and Fuses for voltage leads and power supply to prevent hazardous voltage conditions or damage to CTs, if the meter needs to be removed from service. CT grounding is optional.

- The UL Measurement Category of the meter is Category III, Pollution Degree II.

- Refer to additional safety notes on the next page.

NOTES:

- IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.

- THERE IS NO REQUIRED PREVENTIVE MAINTENANCE OR INSPECTION NECESSARY FOR SAFETY. HOWEVER, ANY REPAIR OR MAINTENANCE SHOULD BE PERFORMED BY THE FACTORY.

- **DISCONNECT DEVICE**: THE FOLLOWING PART IS CONSIDERED THE EQUIPMENT DISCONNECTING DEVICE. A SWITCH OR CIRCUIT-BREAKER SHALL BE INCLUDED IN THE END-USE EQUIPMENT OR BUILDING INSTALLATION. THE SWITCH SHALL BE IN CLOSE PROXIMITY TO THEEQUIPMENT AND WITHIN EASY REACH OF THE OPERATOR. THE SWITCH SHALLBE MARKED AS THE DISCONNECTING DEVICE FOR THE EQUIPMENT.

3.1.1: Measurement Inputs Rating:

UL Classification: Measurement Category III, Pollution Degree II.

Current Inputs: 10A max.

Voltage Inputs[1]: 150V L-N, 300V L-L

Frequency: (45 to 75) Hz

[1] Suffix - G extends the maximum direct voltage to 300V phase to neutral, 600 volt phase to phase. Models with suffix - G are not UL rated.

3.2: Connecting the Current Circuit

The cable used for the current should be installed at 600V AC minimum. The cable connector should be rated at 6 Amps or greater and should have a cross-sectional area of 16 AWG.

The current transformers (CTs) should be mounted as close as possible to the meter. The following table gives the maximum recommended distances for various CT sizes, assuming the connection is made via 16 AWG cable.

CT Size	Maximum Distance (CT to 3DAA5)
2.5 VA	10 FEET
5.0 VA	15 FEET
7.5 VA	30 FEET
10.0 VA	40 FEET
15.0 VA	60 FEET
30.0 VA	120 FEET

Table 3.1: Maximum recommended distances for CT sizes

***Warning*: DO NOT leave the secondary of the CT open when primary current is flowing. This may cause a high voltage that will overheat the secondary of the CT. If the CT is not connected, provide short on the secondary of CT.**

3.3: CT Connection

When the meter is connected using the CTs, you must maintain the correct CT polarities. CT polarities are dependent upon correct connections of CT leads, and upon the direction the CTs are facing when clamped around conductors. The dot on the CT must face the line side; the corresponding secondary connection must connect to the appropriate input on the meter. Failure to connect CTs properly results in inaccurate power readings. If your meter is not reading power properly, it is more than likely the CT is incorrectly wired.

***Note**: CTs are shorted if connected to the terminal block model DSP2 or 3, even if it is detached from the meter.*

HELPFUL DEBUGGING TOOLS

OPTION 1: ISOLATING A CT CONNECTION REVERSAL POWER READING

If your meter does not read the correct watts after installation, it almost always means that the CT's have been wired in the wrong polarity. To check the polarity of the CT after the monitor has been installed, look at the single phase WATT readings to see that each of the readings are positive (assuming you are consuming power). If one of the WATT readings is negative, that particular phase CT is reversed. To check the single phase WATT reading, press the Power button twice while the annunciator is positioned to WATTS. Then press the Phase/Next button to cycle through the phases. After connecting the polarity of the CTs, the WATT and VAR readings should be correct.

OPTION 2: ISOLATING A CT CONNECTION REVERSAL USING VOLTAGE READINGS

- ⇨ Remove potential connections to terminals 6 and 7. Observe the KW reading. It should be positive.
- ⇨ If negative, reverse the CT wires on terminals 8 and 9.

Connect terminal number 6 potential. If KW decreases to about zero, reverse CT wires on terminals 10 and 11.

Connect terminal number 7 potential. If KW is one-third of expected reading, reverse CT wires to terminals 12 and 13.

3.4: Connecting the Voltage Circuit

For proper meter operation, the voltage connection *must* be maintained. The voltage must correspond to the correct terminal.

The cable required to terminate the voltage sense circuit should have an insulation rating greater than 600V AC and a current rating greater than 0.1 A.

3.5: Selecting the Voltage Fuses

We strongly recommend using fuses on each of the sense voltages and the control power, although connection diagrams do not show them. Use a 1 Amp fuse on each voltage input.

3.6: Connection to the Main Power Supply

The meter requires separate control power to operate. Listed are the four different power supply options and corresponding suffixes. The maximum power consumption is 10VA or 7W. AC unit's frequency rating is 50/60Hz.

CONTROL POWER	OPTION SUFFIX
120V AC	115 A
230V AC/DC	230 A
24-48V DC	D
125V AC/DC (universal)	D2

Table 3.2: Control Power and Current

Note: For DC-powered units, polarity should be observed. Connect the negative terminal to L and positive terminal to L1. An earth ground connection to chassis is mandatory for normal operation (terminal three). Do not ground the unit through the negative of the DC supply.

Note: Externally fuse power supply with a slow-blow 3 Amp fuse.

3.7: Electrical Connection Installation

Choose the diagram that best suits your application and maintain the CT polarity. Follow the outlined procedure to verify correct connection. ***IMPORTANT:*** *For PT connections only, short terminals 3 and 4. Connect local ground to terminal 3. This protects the unit from spikes and transients*.

- The meter and terminal module DSP3 are factory calibrated together; the serial numbers are matched on both. The DSP3 input module and the meter base MUST MATCH!
- Mismatching of the meter and DSP3 input module will cause inaccurate readings because calibration ratios are stored in the meter's memory, not in the DSP3 input module.

LIST OF CONNECTION DIAGRAMS

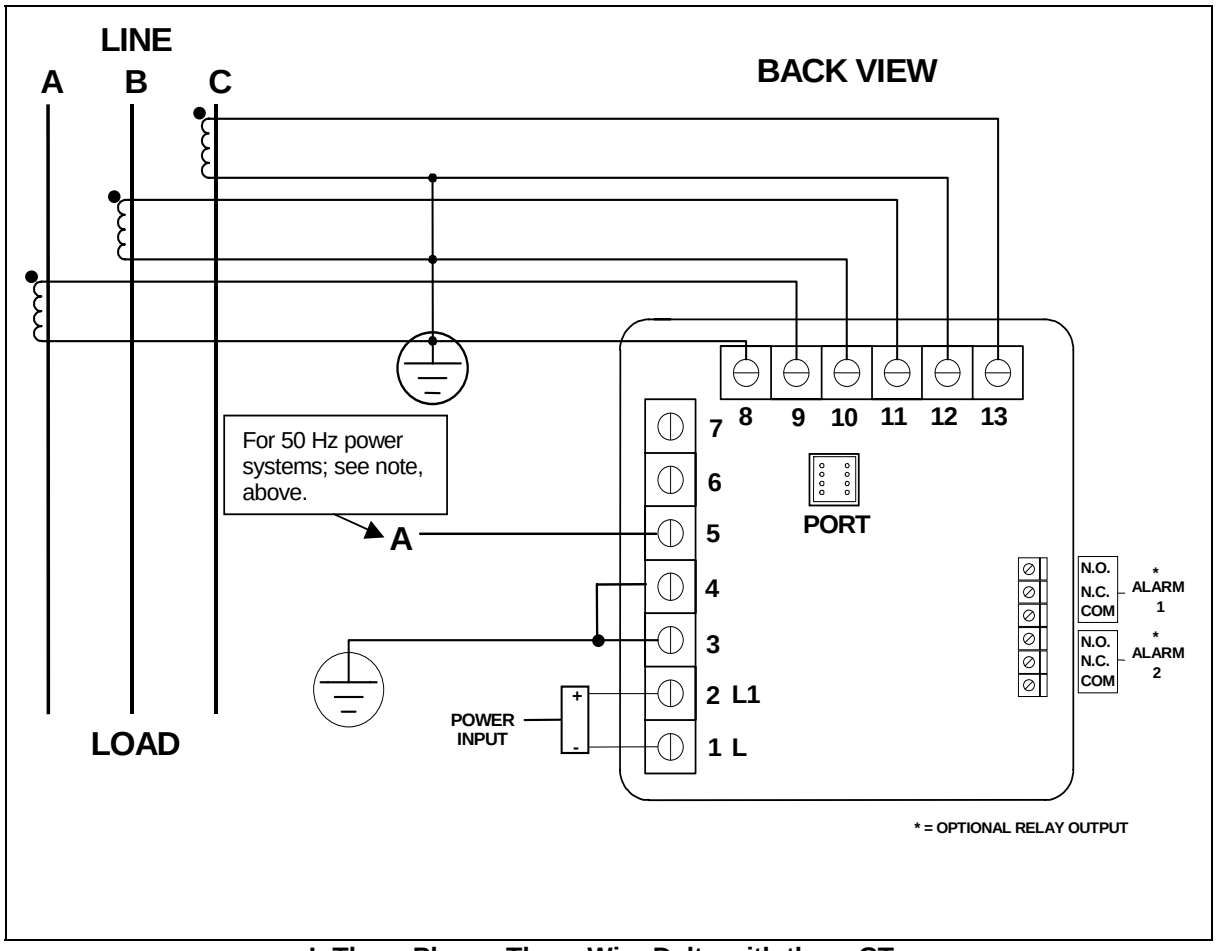
Choose the diagram that best suits your application:

I: Three-Phase, Three-Wire System Delta with three CTs

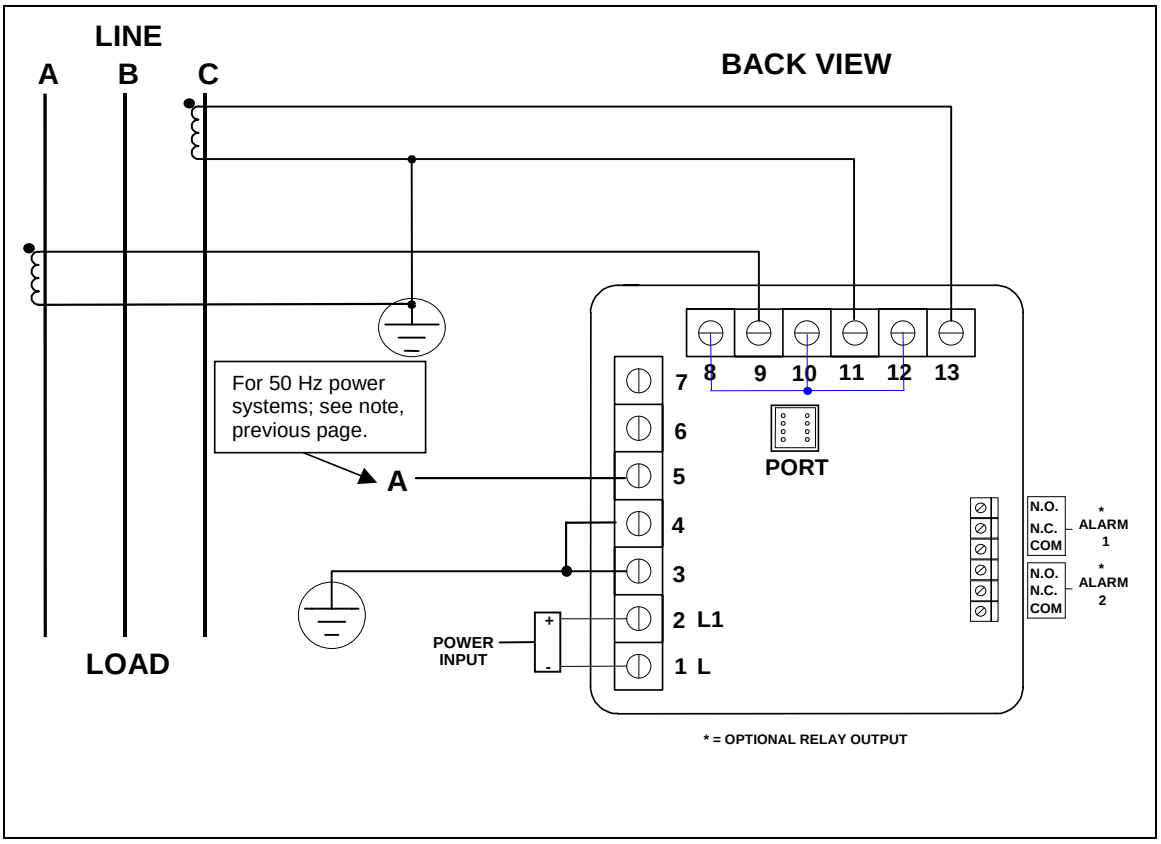
II: Three-Phase, Three-Wire System Delta with two CTs

III: Three-Phase, Four-Wire System Wye with CTs

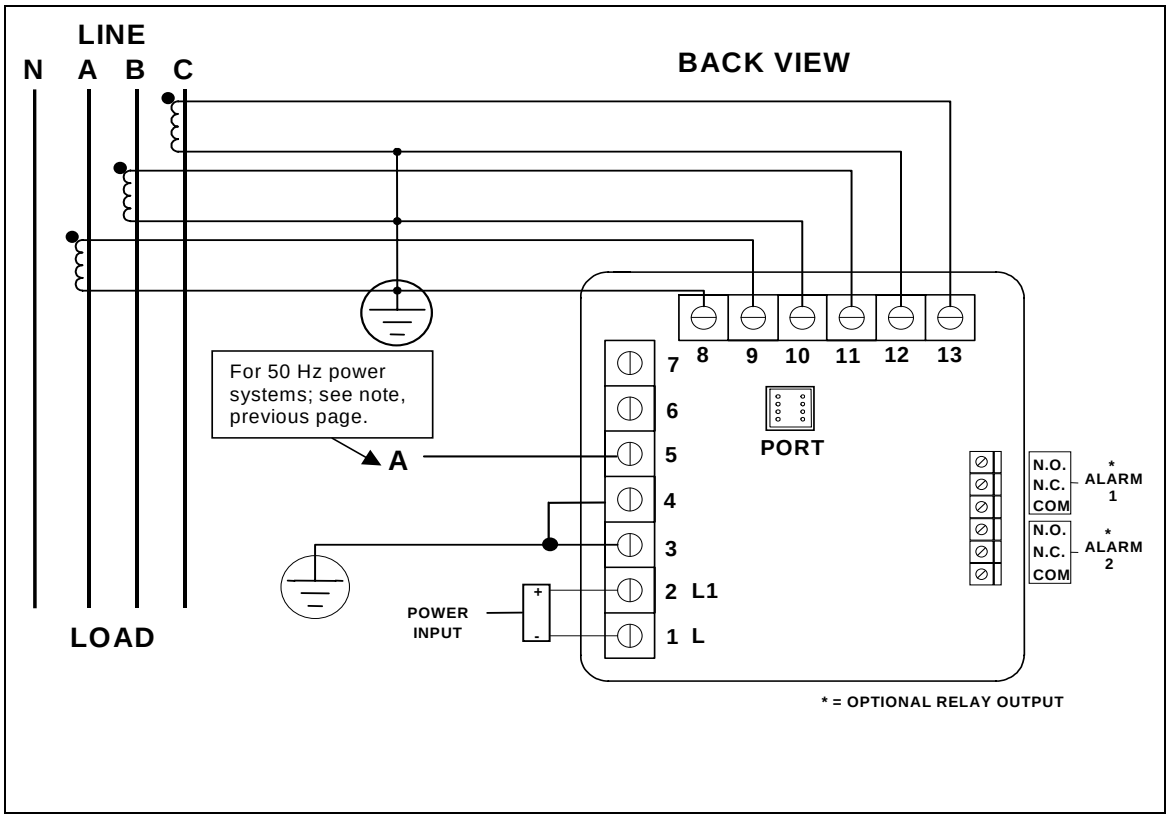
Note: For 50 Hz power systems—Connect phase A voltage to terminal 5 and neutral to terminal 4. Do not exceed 300 VAC L-N. This provides a frequency reference. If no frequency reference is connected, the unit will default to 60 Hz operation.



I: Three Phase, Three-Wire Delta with three CTs



II: Three-Phase, Three-Wire Delta with two CTs



III: Three-Phase Four-Wire Wye with CTs

3.5: Relays and Protection

***Note*: This section applies only to the -NL Relay Option.**

The 3DAA5's flexibility allows the user to access a variety of relay options through the programming mode. The relay option package consists of two relays with two contacts, one normally open and one normally closed. The relays can be either dedicated to alarm or communication controlled, or both.

The time-delay is used to set an alarm alerting the user when an out-of-limit condition has been sustained beyond a user-defined time limit. The time delay can be programmed for up to 9999 seconds.

If the relays are controlled through communication, there are two different modes:

- Lock ON: Relay will not be affected by any alarm condition.
- Lock OFF: Relay will not be affected by any alarm condition.

If the relays are controlled through communication and alarm, there are four different modes:

- Lock ON: Relay stays on regardless of any alarm condition.
- Lock OFF: Relay stays off regardless of any alarm condition.
- Free ON: Relay turns on unless other conditions force it off.
- Free OFF: Relay turns off unless other conditions force it on.

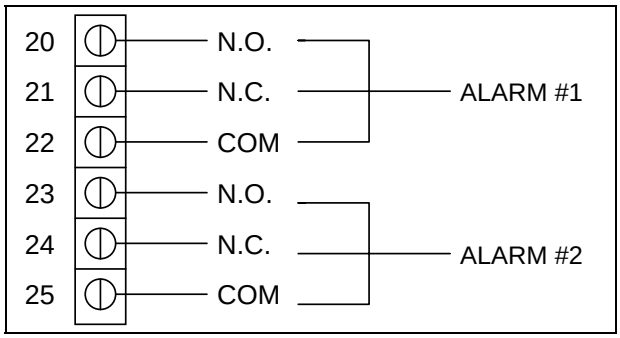


Diagram 3.1: Relay Hookup

Diagram 3.1 is a close-up of the relays on the rear panel. The relays shown are in the NOT energized state (form C relays, rated 250V, 5A, 2 each).

The **3DAA5** can be programmed to detect two levels of alarm for the following functions:

- LM1/LM2 Current: A, B, C, N

The **3DAA5-H** can be programmed to detect two levels of alarm for the following functions:

- LM1/LM2 Current: A, B, C, N
- Over/Under % of T.H.D
- Over/Under % of K-Factor

CHAPTER 4
COMMUNICATION INSTALLATION

All 3DAA5 instruments can be equipped with either of the two basic types of communication links: the **RS232C** or the **RS485**.

4.1: RS232C

The RS232C communication is used to link a single 3DAA5 instrument with a computer. This link is capable for a distance up to 100 feet. A standard 9-pin female serial port connector—the SF232-DB2— is mounted to the 3DAA5 for direct connection to a computer with a 9-pin cable.

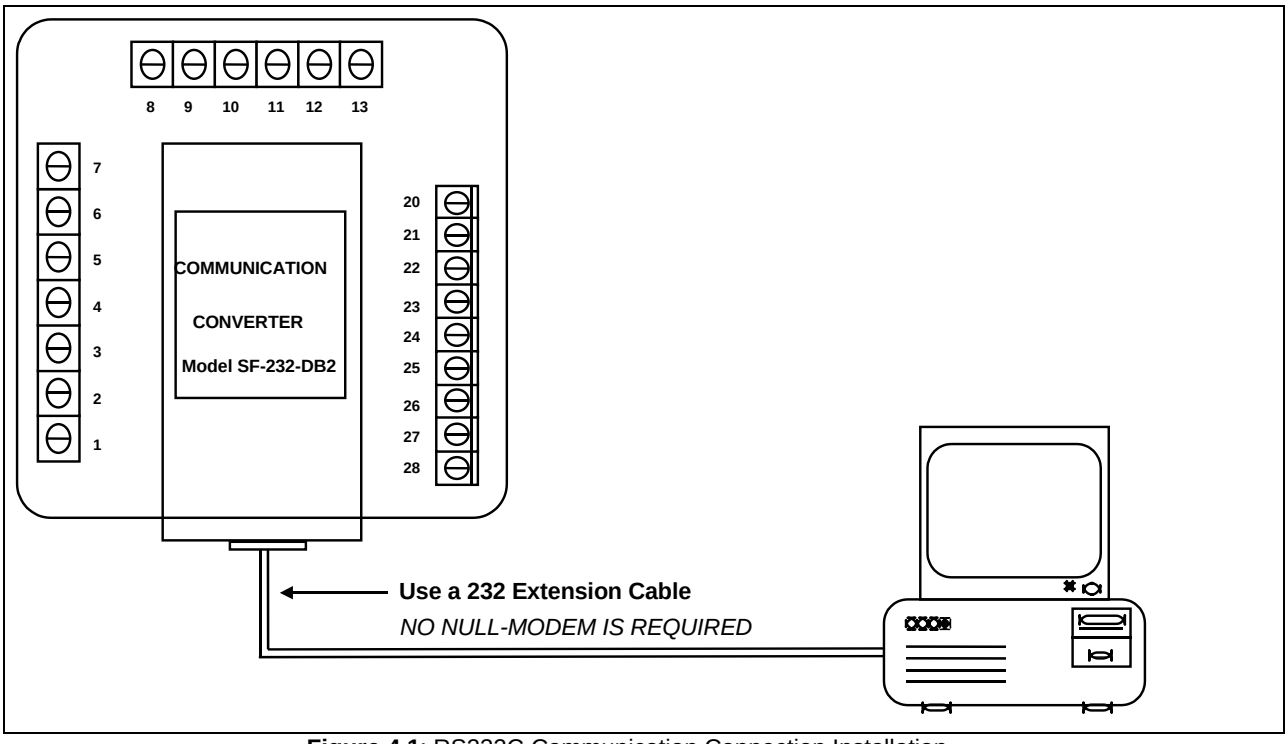


Figure 4.1: RS232C Communication Connection Installation

4.2: RS485

RS485 is used to parallel multiple 3DAA5 instruments on the same link. Its operating capability is for a distance up to 4000 feet. When only 2 wires are used the link can include up to 30 instruments, as illustrated in **Figure 4.2**. When all of the four wires are used, the link can include up to 60 instruments, as shown in **Figure 4.4.**

To insure proper communication between the instruments and the computers, each 3DAA5 can be programmed to have a unique address of up to four digits long. This allows the user to communicate with up to 10,000 instruments. Several standard baud rates are available up to 2400 baud. To select the proper baud rate, the following rules should be applied:

- The more instruments polled by a computer, the higher the baud rate that should be used.
- For a smaller number of instruments over a long distance, a lower baud rate should be used.
- Optimal recommended baud rate is 1200 baud.

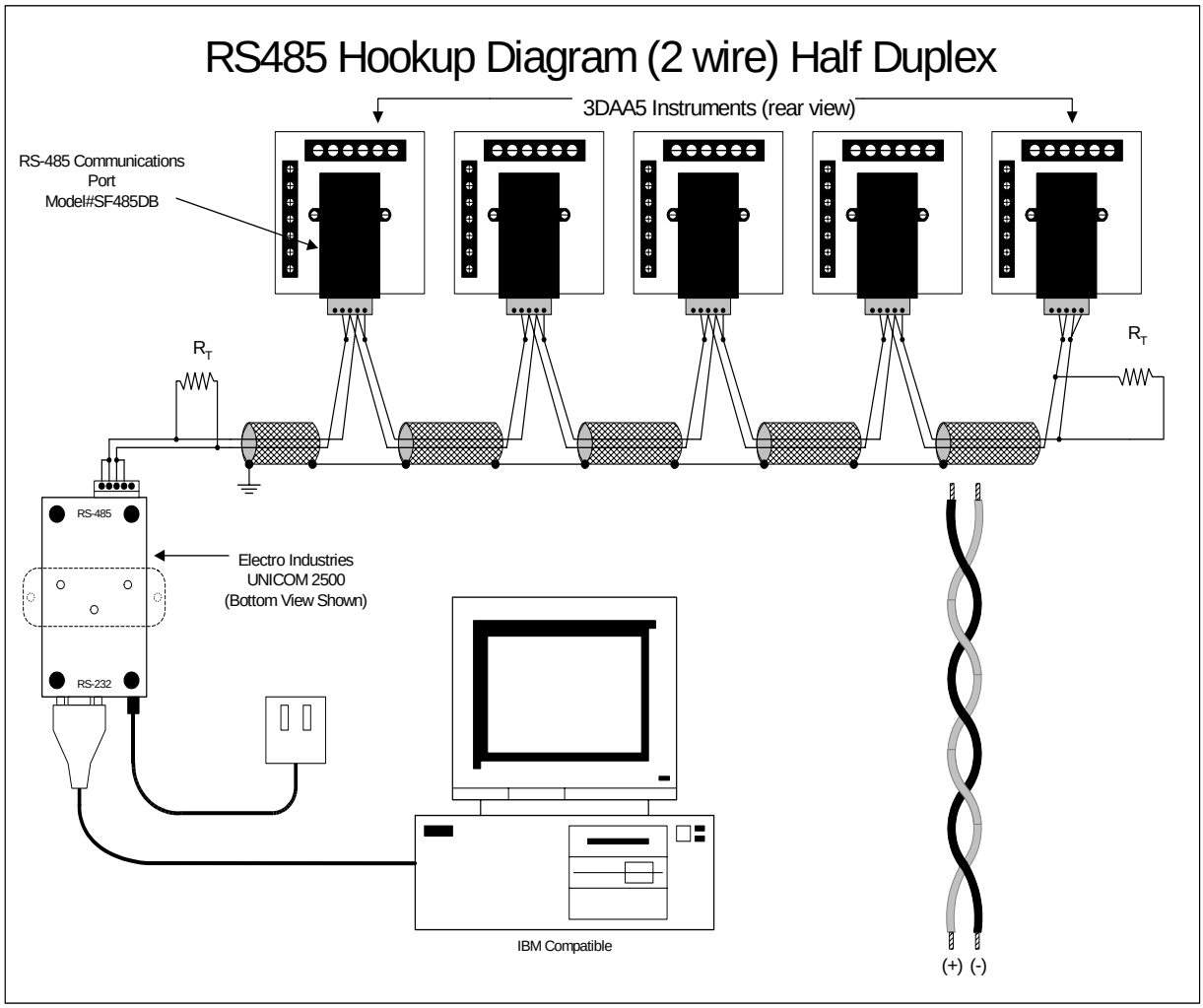


Figure 4.2: 2-Wire RS485 Communication Hookup Installation Half Duplex

—Detail view on following page.

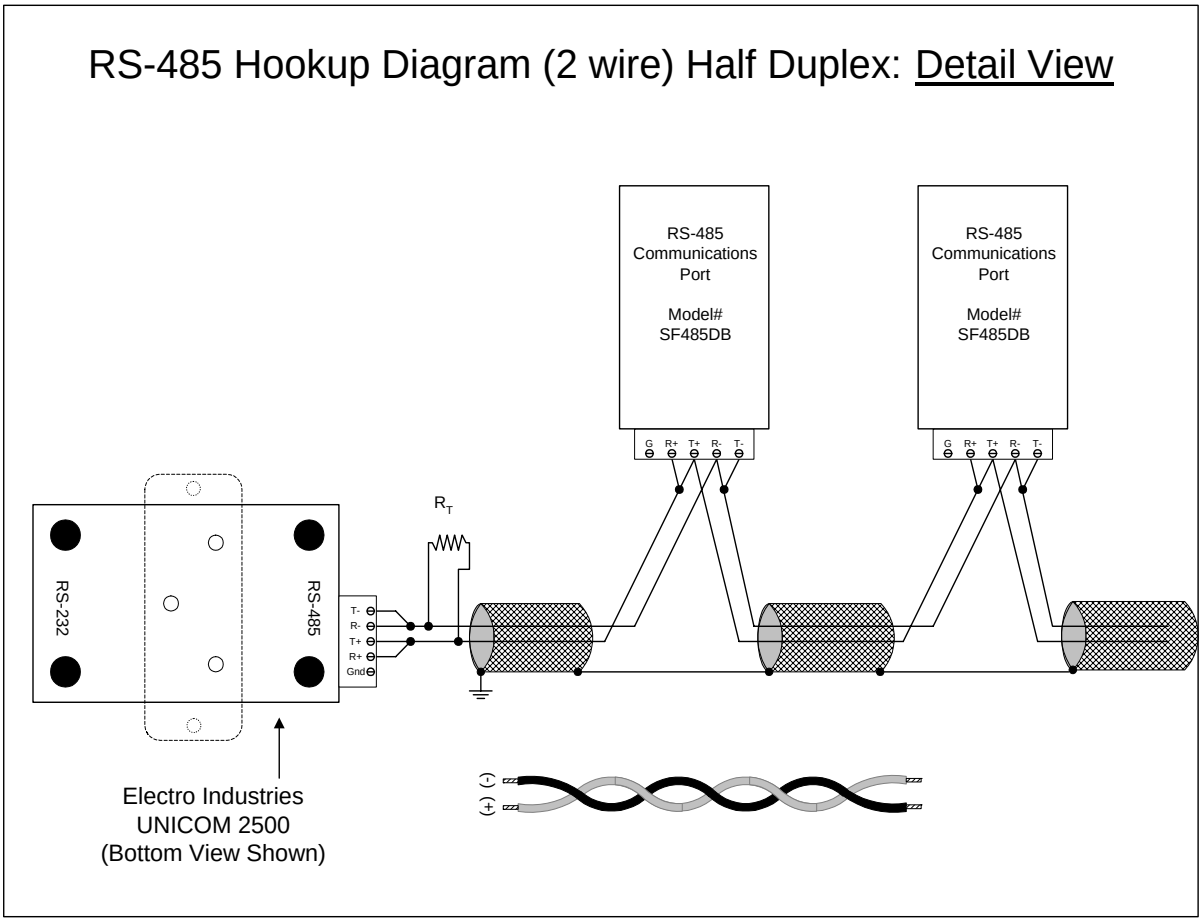


Figure 4.3: 2-Wire RS485 Communication Hookup Installation, Half Duplex, detail view

Connecting two-wire BUS to RS485 Port

1. Take the positive (+) wire and connect to R+ on the RS485 Port.
2. Connect a jumper from R+ to T+ on the RS485 Port.
3. Take the negative (-) wire and connect to R- on the RS485 Port.
4. Connect a jumper from R- to T-.on the RS485 Port.

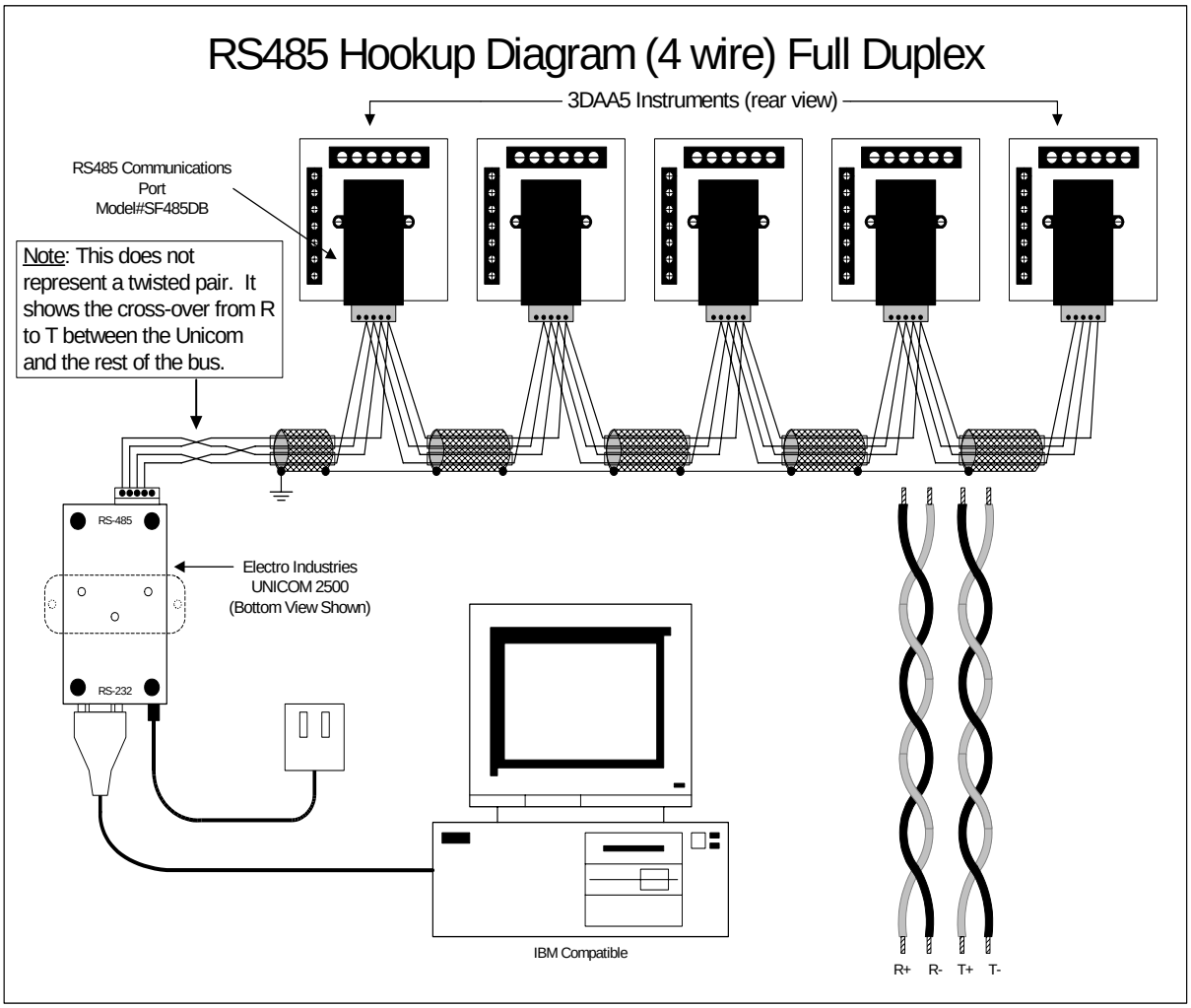


Figure 4.4: 4-Wire RS485 Communication Hookup Installation Full Duplex

—Detail view on following page.

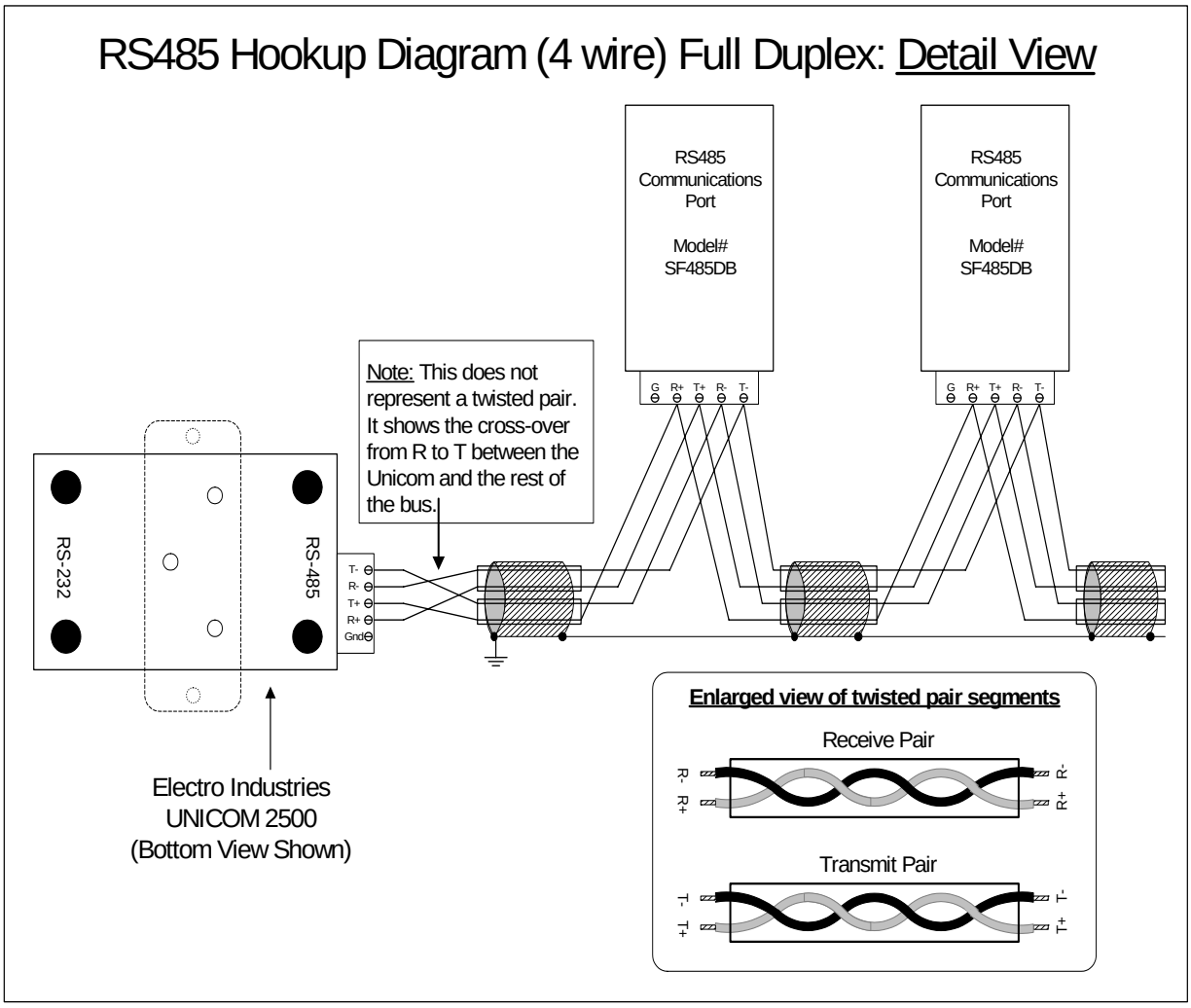


Figure 4.5: 4-Wire RS485 Communication Hookup Installation, Full Duplex, detail view

Connecting 4-Wire BUS to RS485 Port:

- Connect the T- wire of the Unicom 2500 to the R- on the RS485 port
- Connect the R- wire of the Unicom 2500 to the T- on the RS485 port
- Connect the T+ wire of the Unicom 2500 to the R+ on the RS485 port
- Connect the R+ wire of the Unicom 2500 to the T+ on the RS485 port

4.3: Network of Instruments and Long Distance Communication

For a large network of instruments, the RS485 Transponder is required. In a two-wire connection, a maximum of 900 instruments can be included in the same network, as shown in **Figure 4.6**. In a four-wire connection, a maximum of 3600 instruments can be included in the same link, as shown in **Figure 4.7**.

Modems (dedicated or dial-up) can be utilized when the instruments are located at great distances. However, the modem should be setup to have auto-answer at the recommended value of 1200 baud rate.

You may want to use a Modem Manager RS485-RS232 Converter. When speaking to most RS485 or RS232C based devices, the remote modem must be programmed for the communication to work. This task is often quite complicated because modems are quirky when talking to remote devices. To make this task easier, EIG has designed a **Modem Manager** RS485 to RS232C converter. This device automatically programs the modem to the proper configuration. Also, if you have poor telephone lines, modem manager acts as a line buffer, making the communication more reliable. Use modems (dedicated or dial-up) when the instruments are at great distances. However, set the modem to auto-answer at the recommended 1200 baud rate if noise conditions exist.

I. Modem Connected to Computer (Originate Modem)
Programming the Modem

Comply with the modem's instruction manual and follow these instructions:

RESTORE MODEM TO FACTORY SETTINGS:
- This procedure erases all previously programmed settings.

SET MODEM TO DISPLAY RESULT CODES:
- The device uses the result codes.

SET MODEM TO VERBAL RESULT CODE:
- The device uses the verbal codes.

SET MODEM TO IGNORE DTR SIGNAL:
- Necessary for the device to ensure connection with originate modem.

SET MODEM TO DISABLE FLOW CONTROL:
- Necessary to communicate with remote modem connected to device.

TELL MODEM TO WRITE THE NEW SETTINGS TO ACTIVATE PROFILE:
- Places these settings into nonvolatile memory; the settings take effect after the modem powers up.

II. Modem Connected to the Device (Remote Modem)
Programming the Modem

Comply with the modem's instruction manual and follow these instructions:

RESTORE MODEM TO FACTORY SETTINGS:
- This procedure erases all previously programmed settings.

SET MODEM TO AUTO ANSWER ON **N** RINGS:
- Sets the remote modem to answer the call after **n** rings.

SET THE MODEM TO AUTO NEGOTIATE MODE:
- Sets the remote to auto negotiate to communicate successfully with DMMS300+ and other devices in the modem.

SET MODEM TO RETURN NUMERIC RESULT CODES:
- Increases speed connection with DMMS300+.

SET MODEM TO IGNORE DTR SIGNAL:
- Necessary for device to ensure connection with originate modem.

SET MODEM TO DISABLE FLOW CONTROL:
- Necessary to communicate with remote modem connected to DMMS300+.

TELL THE MODEM TO WRITE THE NEW SETTINGS TO ACTIVATE PROFILE:
- Places new settings into nonvolatile memory; settings take effect after the modem powers up.

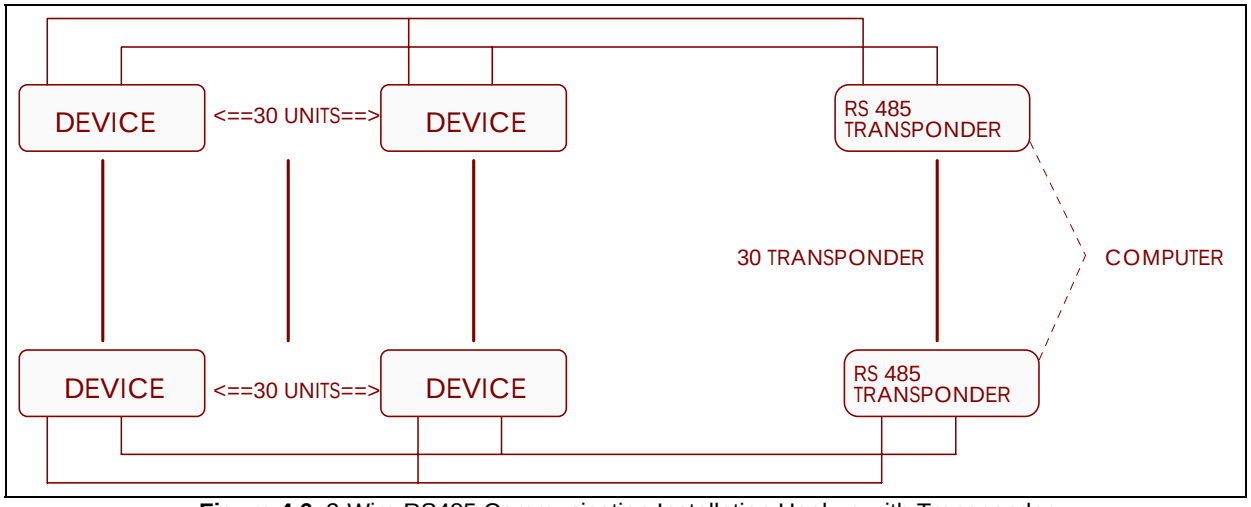


Figure 4.6 2-Wire RS485 Communication Installation Hookup with Transponder

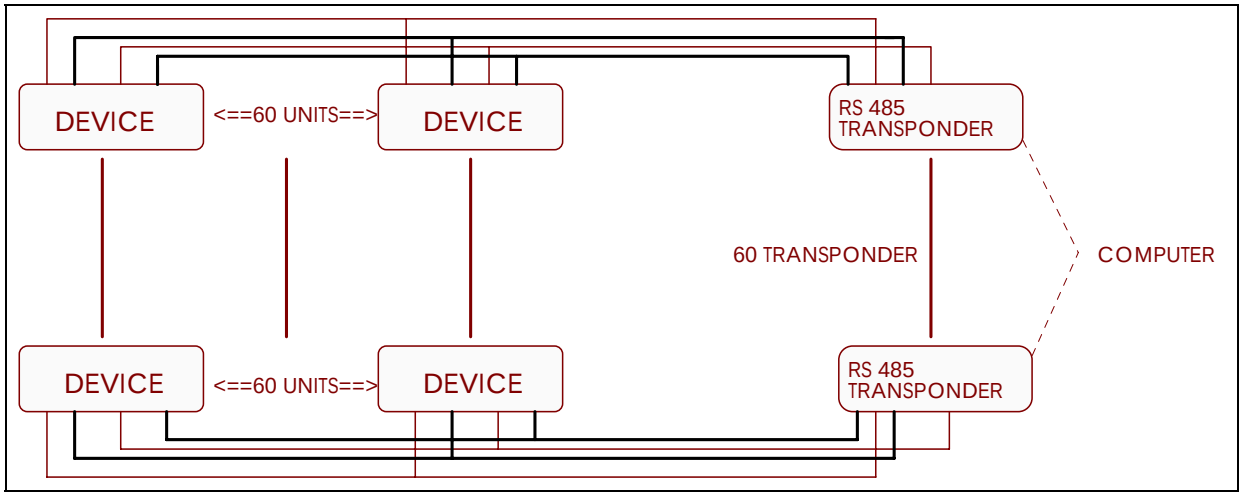


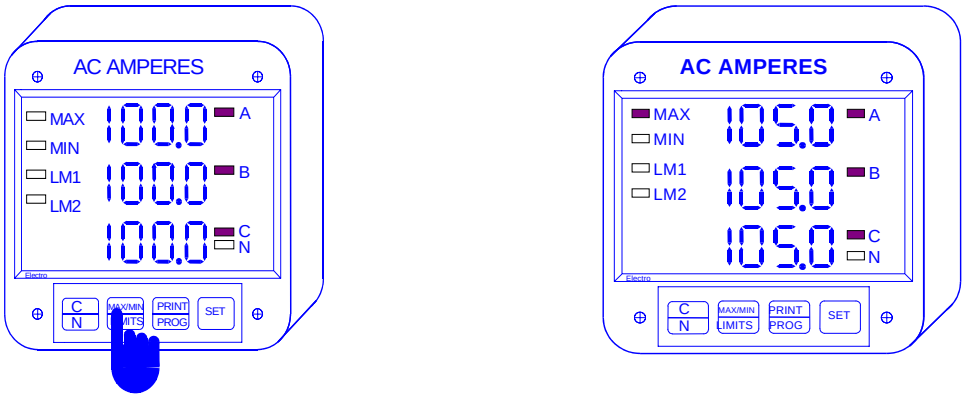
Figure 4.7 4-Wire RS485 Communication Installation Hookup with Transponder

CHAPTER 5
GENERAL OPERATION

5.1: Accessing Max/Min Values

Maximum and minimum values are available for all instantaneous measurements. Maximum and minimum values represent the highest and lowest average demand over a user-programmable period of time, known as the **integration interval**. Readings are calculated using a rolling average technique. Each second a new reading is used to calculate the maximum and the minimum; the last reading of the interval is dropped off.

To view the maximum reading:



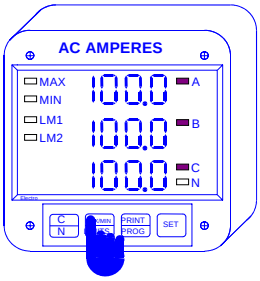
Step 1:
a. Press the ***MAX/MIN/LIMITS*** button once to view the maximum values; twice to view the minimum values.

⇒ Maximum and minimum values are displayed simultaneously for all three phases (or neutral, if selected). The meter automatically returns to Phase A, B and C readings after a few seconds.

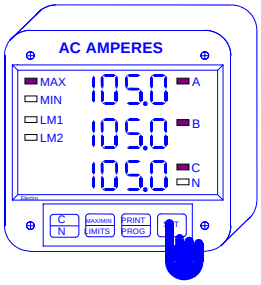
5.2 Resetting Max/Min Values

Use the reset function if a new value is desired. The value is available in two different modes: an **unprotected mode**, which allows quick and easy resetting of maximum and minimum values; and a **password-protected mode**, which prevents unauthorized resetting of the maximum and minimum values. (To select the password protection, enter Group 0, Function 3, Pack 1 of the Programming Mode—see Chapter 7, section 7.4).

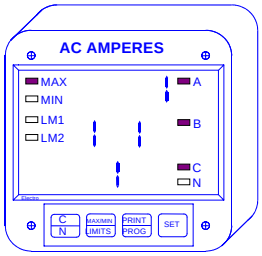
To reset in the unprotected mode:



Step 1:
a Press the ***MAX/MIN/LIMITS*** button once for the max; twice for the min.



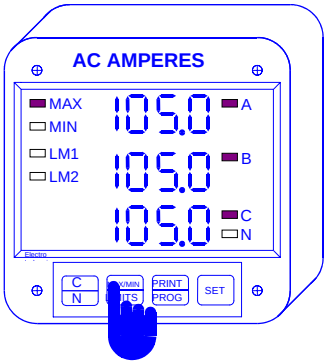
Step 2:
b. While the max or min is displayed, press the ***SET*** (or ***T.H.D./K***) button once to reset.



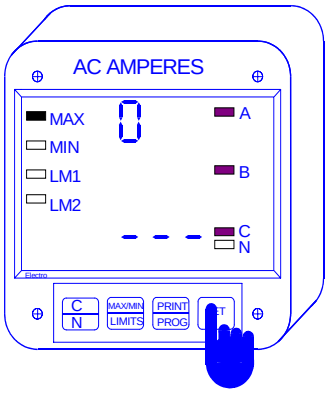
Step 3:
⇒ The display blanks and a check mark appears momentarily to confirm a successful reset.

To reset in the protected mode:

- A password must be entered before any readings may be reset. The password is ***0 0 5***.

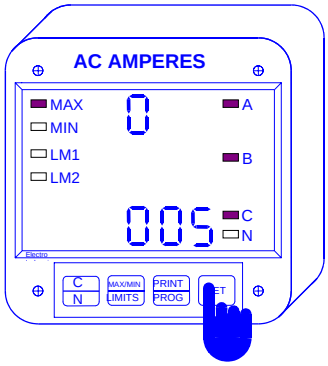


Step 1:
a. Access the max or min by pressing the ***MAX/MIN/LIMITS*** button once or twice, respectively.

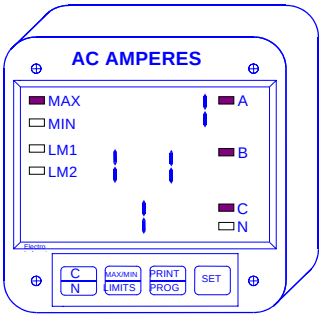


Step 2:
a. While the max or min value is displayed, press the ***SET*** (or ***T.H.D./K***) button once to begin protected reset.

⇒ Three dashes appear in the lower level; scrolling digits appear in the upper level.



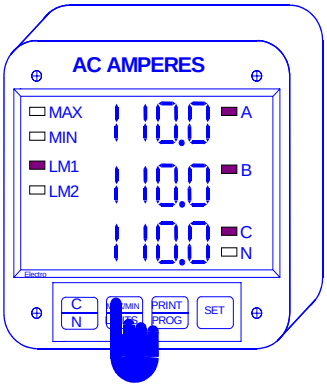
Step 3:
a. Press the ***SET*** (or ***T.H.D./K***) button each time a password digit appears (0-0-5).



Step 4:
⇒ When 005 is entered, the display blanks and a check mark appears momentarily to confirm a successful reset.

5.3 Accessing LM1/LM2 Set Limits

The 3DAA5 is designed with two manual set limits that monitor the instantaneous readings and warn the user of any abnormal conditions. Each limit can be programmed to detect readings that are either above or below the set limit. The set limits are the point when the relay will change position if the 3DAA5 is equipped with the Relay Option Package (Suffix -NL).



Step 1:
a. Press the ***MAX/MIN/LIMITS*** button three times to view the LM1 limit; four times for the LM2 limit.

⇒ These values are displayed momentarily.

5.4: Accessing % of T.H.D. and K-Factor Functions—the 3DAA5-H

Note: This section applies only to the 3DAA5-H.

Ideal power distribution will have sinusoidal waveforms on voltages and currents. In real life applications, where inverters, computers and motor controls are used, distorted waveforms are generated. These distortions will consist of harmonics of the fundamental frequency. The sinusoidal waveform is defined as: $A \cdot \sin(\omega \cdot t)$. A distorted waveform will be defined as:

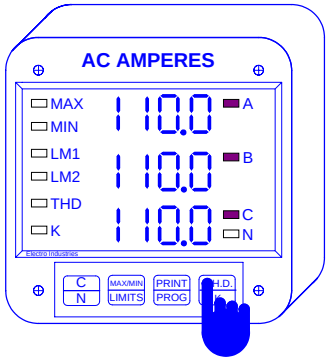
$$A\cdot\sin(\omega\cdot t)+A_1\cdot\sin(\omega_1\cdot t)+A_2\cdot\sin(\omega_2\cdot t)+A_3\cdot\sin(\omega_3\cdot t)+\ldots$$

Total harmonic distortion (T.H.D.) will be defined as:

$$\%\ of\ THD=\frac{\text{RMS of Total Harmonic Distortion Signal}}{\text{RMS of the Fundamental Signal}}\times 100$$

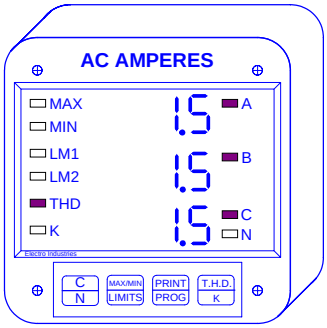
Harmonic distortion is a destructive force in power distribution systems. It creates safety problems, shortens the life span of distribution transformers, and interferes with the operation of electronic devices. The 3DAA5-H measures harmonic waveforms, % of T.H.D., and K-Factor for current phases A, B and C. Measurement capability reaches the 31st harmonic order. K-Factor is defined by IEEE 57.12 Standard as a unit assessing the adverse effects of harmonics on the distribution transformers. Compare readings to transformer K-Factor rating.

To access **T.H.D**. and **K-Factor**:



Step 1:
a. Press ***T.H.D./K*** once to assess T.H.D. values for current phases A, B and C.

b. Press ***T.H.D./K*** twice to access K-Factor values.



Step 2:
⇒ % of T.H.D. or K-Factor values are displayed momentarily.

5.5: Access Modes

Access commands allow the user to perform specific operations.

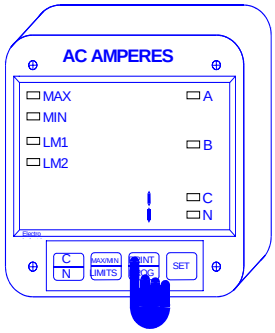
ACCESS COMMANDS	OPERATION
1	Print Programming Data
2	Print Operating Data
3	Enter Programming Mode (see Part II: Programming)
4	Firmware Version/LED Test

Note: ***Print commands 1 and 2 are only available if enabled in the programming mode; they are not recommended when using the multimeter hookup RS485. The print option should be disabled when using the RS485, see Chapter 7, section 7.4. Disabling prevents the user from corrupting data at a computer terminal while multiple meters are being polled.***

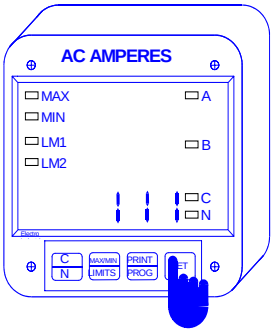
5.6: Print Operating Data

The Print Operating Data function sends data to a serial printer to provide a hard copy of the instantaneous, maximum and minimum values for compiling.

To print operating data:



Step 1:
a. Press the ***PRINT/PROG*** button once; a **1** appears.

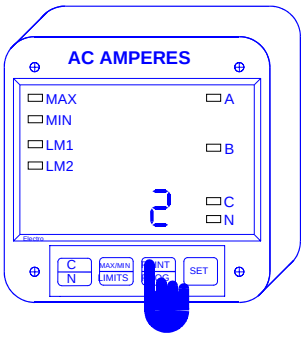


Step 2:
a. While the **1** is displayed, press the ***SET*** (or ***T.H.D./K***) button to activate the Print Operating Data function.
⇒Three **1**s appear momentarily to confirm.

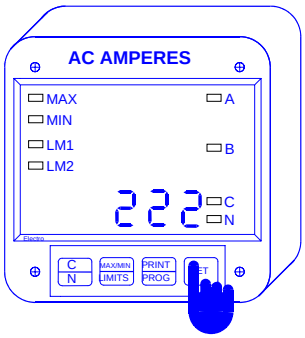
5.7: Print Programming Data

The Print Programming Data function sends the programming data (also known as the **meter setup**) to a serial printer for quick reference and verification.

To print programming data:



Step 1:
a. Press the ***PRINT/PROG*** button until a **2** appears.



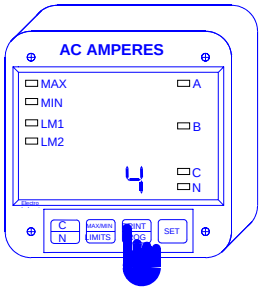
Step 2:
a. While the **2** is displayed, press the ***SET*** (or ***T.H.D./K***) button to activate the Printing Programming Data function.

⇒ Three 2s appear momentarily to confirm; the display then returns to the current reading.

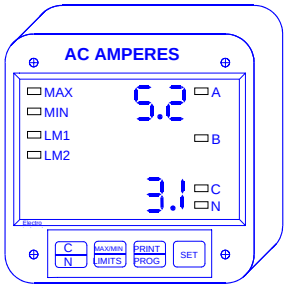
5.8 Firmware Version/LED Test

The 3DAA5 can access the firmware version number of the analog and digital microprocessors. It can also perform a test to check if the LEDs and annunciators are functioning properly.

To access the firmware version and perform an LED test:



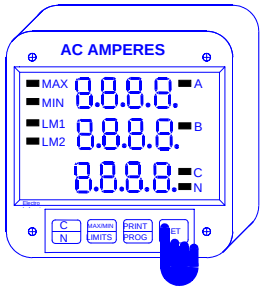
Step 1:
a. Press the ***PRINT/PROG*** button until a **4** appears.



Step 2:
a. While the **4** is displayed, press the ***MAX/MIN/LIMITS*** button to view Firmware Versions momentarily.

⇒ 3DAA5: the **lower level** displays the digital processor version.

⇒ 3DAA5-H only: the **top level** displays the analog processor version; the lower level displays the digital processor version.



Step 3:
a. While the **4** is displayed, press the ***SET*** (or ***T.H.D./K***) button for the LED test.

⇒ All segments and annunciators glow simultaneously; the display will then return to current reading.

Part II: Programming

CHAPTER 6
PROGRAMMING OVERVIEW

6.1 General Procedure

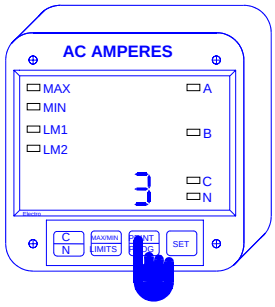
To program your 3DAA5 you will:

1. Enter a **password** to gain access to the programming mode (section 6.2).
2. Select a programming **GROUP** to work in (section 6.3).
3. Select a **FUNCTION** or **SWITCH PACK** within that GROUP (section 6.3).
4. Change the selected parameters of the FUNCTION or SWITCH PACK with **DATA ENTRY** (section 6.4).
5. **Exit** the programming mode to store your changes permanently (section 6.5).

6.2: Password Entry

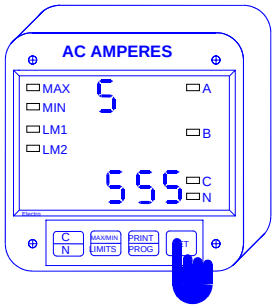
To access the programming mode a password must be entered. Password entry ensures information security and eliminates unauthorized intrusion. The password is preset at the factory and cannot be changed.

To enter the programming mode:



Step 1:
a. Press the ***PRINT/PROG*** button until a **3** appears in the lower display.

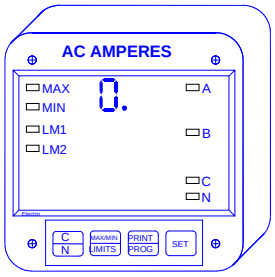
b. While the **3** is displayed, press the ***SET*** (or ***T.H.D./K***) button to select; **333** appears in the lower level.



Step 2:
⇒ Digits will begin scrolling in the upper level.

⇒ The password is **555**.

a. Press the ***SET*** or (***T.H.D./K***) button each time a **5** appears, until **555** is displayed in the lower level.



Step 3:
⇒ When the correct password has been entered, the display blanks and **PPP** flashes in the upper level to confirm.

⇒ PPP is replaced by **0**. The meter is now in the programming mode (Group 0).

6.3: Selecting GROUPS and FUNCTIONS

Programming tasks are bundled into **GROUPS**. Located within each **GROUP** are specific meter **FUNCTIONS**. See the Quick Reference section in the Appendix or Chapters 7–11 for descriptions of the tasks performed by each GROUP.

Some FUNCTIONS are further divided into SWITCH PACKS. SWITCH PACKS are a set of separate ON/OFF or toggle switches. Toggle switches have only two positions: either UP segment or DOWN segment. By setting the segment to UP or DOWN, a particular feature is turned ON or OFF, respectively.

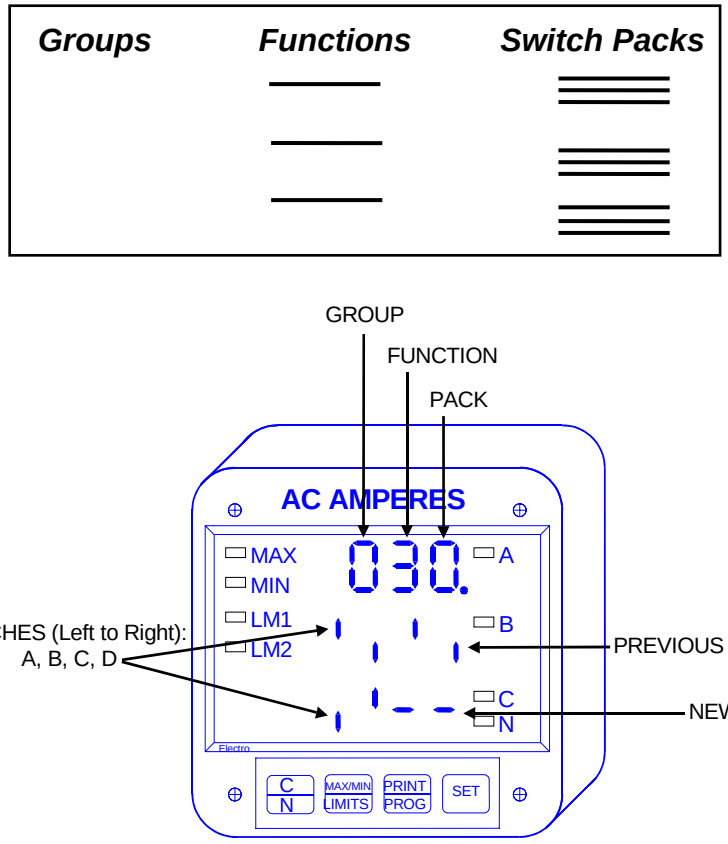


Figure 6.1: The Programming Mode, showing Group 0, Function 3, PACK 0 and its switch settings

***Note*: The steps listed below are also detailed and illustrated in the chapters devoted to specific programming GROUPS (Chapters 7–11).**

To select a **GROUP** and **FUNCTION**:

1. Press the ***C/N*** key to scroll through the GROUPS (0–8) in the upper display;
2. Press the ***PRINT/PROG*** key to gain entry to a selected GROUP;
3. Press the ***C/N*** key to scroll through the FUNCTIONS within the selected GROUP;
4. Press the ***PRINT/PROG*** key to gain entry to a selected FUNCTION (or SWITCH PACK). The FUNCTION'S previous setting appears in the middle display. The lower display is now ready for a new value to be entered—**DATA ENTRY**.

***Note*: Press C/N at any time to cancel and return to the GROUP level.**

6.4: Data Entry

Programmable FUNCTION values are always four-digit numeric fields designed to accept any value between 0000 and 9999. When entering the value of a parameter you must enter all four digits, leading zeros included. For example, if you want to enter the number 25, you must enter 0025.

Note: The steps listed below are also detailed and illustrated in the chapters devoted to specific programming GROUPS (Chapters 7–11).

To change the value of a selected parameter:

1. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit (or toggle segment) of the field;
2. When the display shows a number (or toggle segment) you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until the new value is completely entered.
3. Once the value is entered, the display returns to the selected FUNCTION, showing the new value. From here you may:

- Move to another FUNCTION within the GROUP for more programming: Press ***C/N*** until the upper display shows the FUNCTION number you want; press ***PRINT/PROG*** to gain entry to the new FUNCTION.

- EXIT the GROUP and proceed to a different GROUP for more programming: Press ***C/N*** until an **E** (for Exit) follows the GROUP number in the upper display; press ***PRINT/PROG*** to exit the current GROUP; press ***C/N*** until the GROUP number you want appears in the upper display; press ***PRINT/PROG*** to gain entry into the new GROUP.

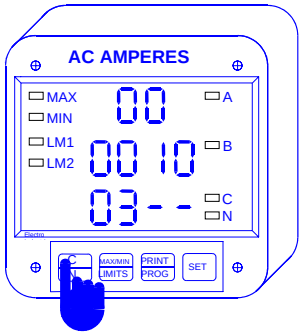
- EXIT the Programming Mode: See section 6.5.

Note: To cancel your entry and return to the FUNCTION level at any time, press the C/N button once.

Note: To store new programming data permanently you must EXIT the programming mode.

6.5: Exiting Programming Mode

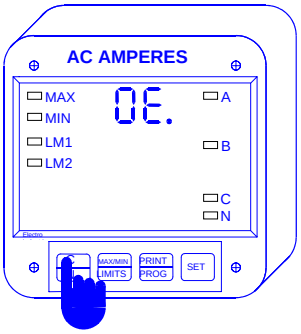
The steps for exiting the programming mode vary depending upon which stage of programming you are in. If you are in the Data Entry Sequence begin at Step 1. If you are in the Function Level begin at Step 2. If you are in the Group Level begin at Step 3.



EXITING FROM DATA ENTRY SEQUENCE
Step 1:

a. Press the ***C/N*** button to cancel the Data Entry Sequence.

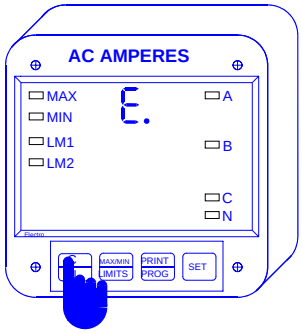
⇒ The 3DAA5 will return to the Function Level.



EXITING FROM FUNCTION LEVEL
Step 2:

a. Press the ***C/N*** button until the Group number in the upper level is followed by an **E** (for Exit).

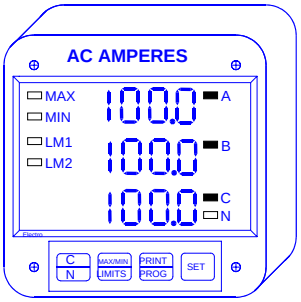
b. Press the ***PRINT/PROG*** button to exit from the FUNCTION Level to the GROUP Level.



EXITING FROM THE GROUP LEVEL
Step 3:

a. Press the ***C/N*** button until **E** (for Exit) appears in the upper level.

b. Press the ***PRINT/PROG*** button to exit entirely from the Programming Mode.



After a moment the meter will return to the Operating Mode.

CHAPTER 7
PROGRAMMING GROUP 0—GLOBAL METER SETUP

Programming **Group 0**, the Global Meter Setup, includes functions **0** through **5**, which control the configuration and basic operation of the 3DAA5. See **Table 7-1**, below, for a list of Group 0 Functions.

Group and Function Number	Function
00	Integration Interval
01	Meter Address for Communication
02	Baud Rate for Communication
03	System Configuration
04	Delay Time in Seconds for Relay I
05	Delay Time in Seconds for Relay II
0E	Exit Programming Group 0

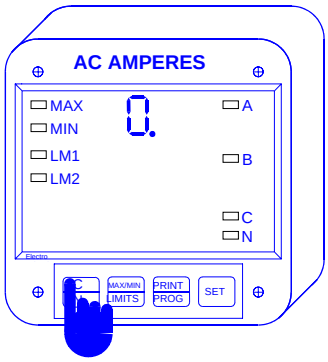
Table 7-1: Group 0 Programming Format

7.1: Group 0, Function 0—Integration Interval

The **Integration Interval** is the time over which all instantaneous readings are averaged to obtain a maximum and minimum demand. The Integration Interval is entered in seconds. If you would like to enter 15 minutes, enter 0900 seconds.

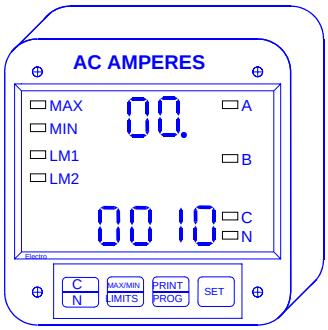
To change the Integration Interval:

Step 1:
Enter programming mode (see Chapter 6).

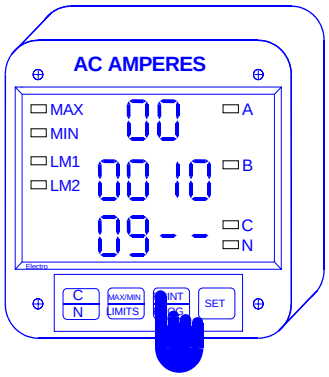


Step 2:
a. Press the ***C/N*** button until Group 0. Appears.

b. Press the ***PRINT/PROG*** button to activate Group 0.



Step 3:
⇒ When activated, the group and function number, here 00, are displayed in the upper level. The current value is displayed in the lower level.

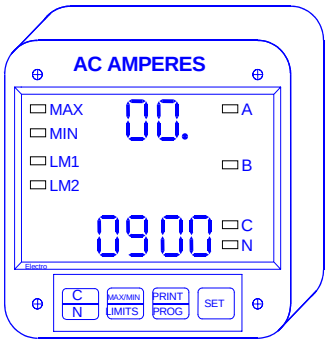


Step 4:
a. Press the ***PRINT/PROG*** button once to begin the data entry sequence.

⇒ The previous value shifts to the middle level and the bottom level is replaced with four dashes.

b. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit of the field.

c. When the display shows a number you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until all digits of the new value are entered.



⇒ Once the entry is complete, the new value is displayed in the lower level, the middle level is blank and the group and function number are displayed in the upper level.

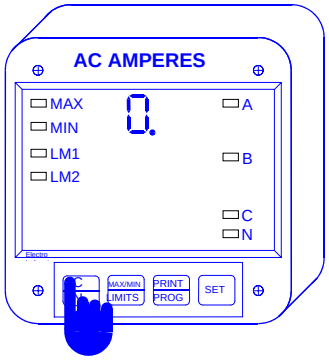
To exit see Chapter 6, section 6.5.

7.2 Group 0, Function 1—Meter Address

The Meter Address is used to identify the meter when it is communicating with a remote computer system. If there are numerous meters at one site it is essential each meter have its own address.

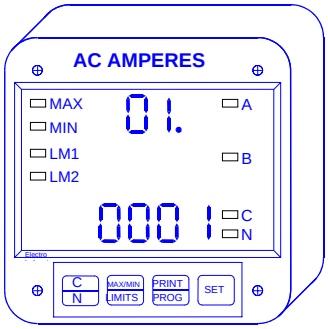
To change the meter address:

Step 1: Enter Programming Mode (see Chapter 6).



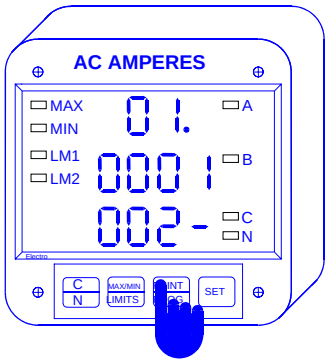
Step 2:
a. Press the ***C/N*** button until 0. appears.

b. Press the ***PRINT/PROG*** button to activate this group.



Step 3:
a. Press the ***C/N*** button until 01. appears.

⇒ The current value is displayed in the bottom level.

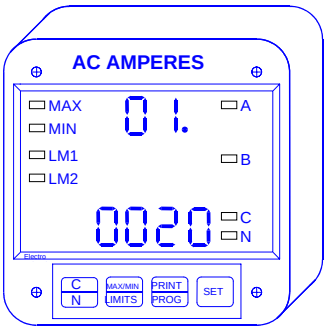


Step 4:
a. Press the ***PRINT/PROG*** button once to begin the data entry sequence.

⇒ The previous value shifts to the middle level and the lower level is replaced with four dashes.

b. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit of the field.

c. When the display shows a number you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until the new value is centered.



⇒ Once the entry is complete, the new value is displayed in the lower level, the middle level is blank and the group and function number are displayed in the upper level.

To exit see Chapter 6, section 6.5.

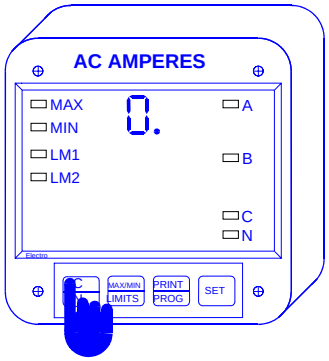
7.3 Group 0, Function 2—Communication Baud Rate

The Baud Rate is the speed at which data is transmitted between the meter and a remote computer or serial printer. The rate programmed into the meter must match the rate used by the remote device. Valid Baud Rates are 110, 150, 300, 600, 1200, and 2400.

***Note*: Remember to include leading zeros for a four-digit entry.**

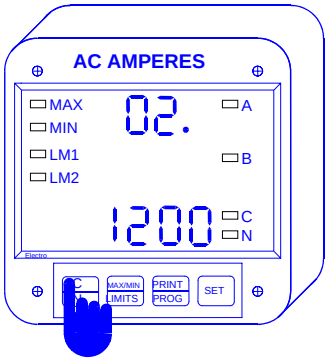
To change or enter the communication baud rate:

Step 1: Enter Programming mode (see Chapter 6).



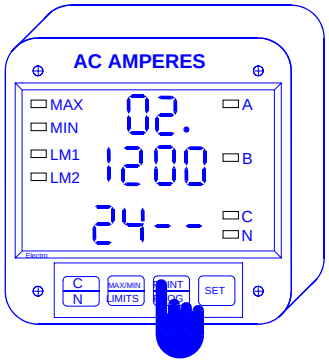
Step 2:
a. Press the ***C/N*** button until 0. appears.

b. Press ***PRINT/PROG*** to activate Group 0.



Step 3:
a. Press the ***C/N*** button until 02. appears.

⇒ Current value is displayed in the lower level.

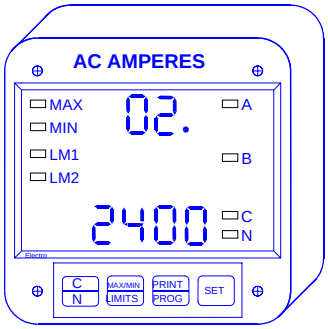


Step 4:
a. Press the ***PRINT/PROG*** button once to begin the data entry sequence.

⇒ The previous value shifts to the middle level and the bottom level is replaced with four dashes.

b. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit of the field.

c. When the display shows a number you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until the new value is entered.

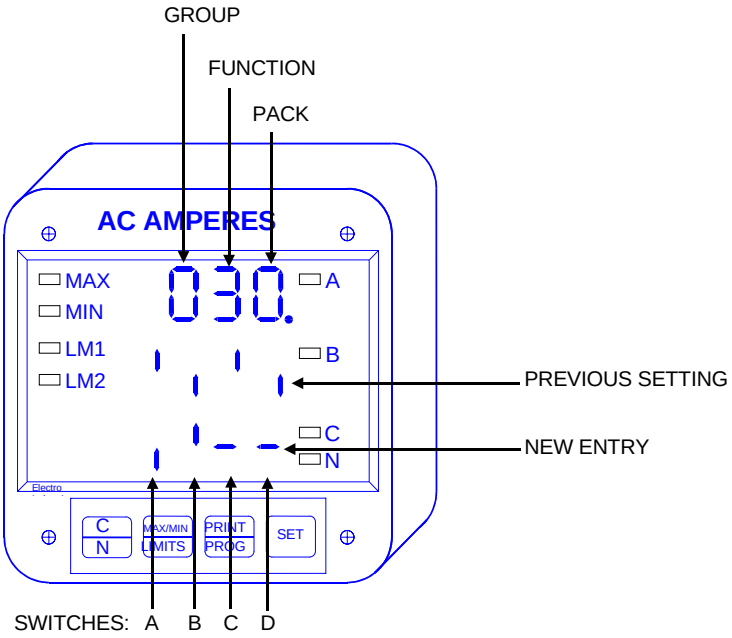


⇒ Once the entry is complete, the new value is displayed in the lower level, the middle level is blank and the group and function numbers are displayed in the upper level.

To exit see Chapter 6, section 6.5.

7.4: Group 0, Function 3—System Configuration

The System Configuration controls the 3DAA5's basic operation parameters. FUNCTION **3** of GROUP **0** contains four separate SWITCH PACKS, numbered 0–3. Each PACK contains four individual UP/DOWN segments. Toggling the segment between UP and DOWN toggles the switch ON or OFF, respectively. The meter displays one Switch PACK at a time. Use ***MAX/MIN/LIMITS*** to scroll from PACK to PACK.



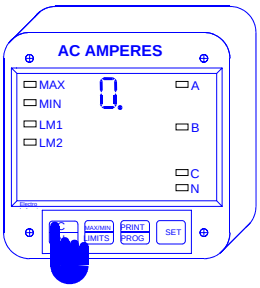
PACK	SWITCH	FEATURE	SEGMENT POSITION
0	A	Reserved	-
	B	Reserved	-
	C	Reserved	-
	D	Reserved	-
1	A	Non-significant Blank Leading Zero	UP Enable DOWN Disable
	B	Reset Protection	UP Enable DOWN Disable
	C	Reserved	-
	D	Reserved	-
2	A	Reserved	-
	B	Reserved	-
	C	Reserved	-
	D	Reserved	-
3	A	Relay Control I Trip through Computer	UP Enable DOWN Disable
	B	Relay Control II Trip through Computer	UP Enable DOWN Disable
	C	Communications	UP Enable DOWN Disable

	D	DC Output or Print Operating and Programming Data	UP© Enable DOWN© Disable

To print operating data (Access Mode 1) and programming data (Access Mode 2) both switches C and D from PACK 3 must be enabled (set in the UP position). Disabling prevents printing through the keypad only and will not affect print commands through communication. The print option should be disabled when using a multimeter communications hookup, RS-485. Disabling prevents the user from corrupting data at a computer terminal while multiple meters are being polled.

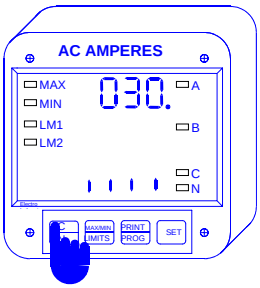
To change the Switch Settings:

Step 1: Enter programming mode (see Chapter 6).



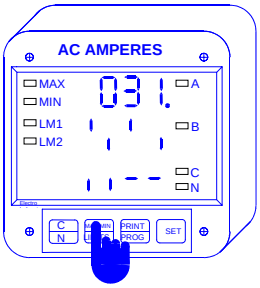
Step 2:
a. Press the ***C/N*** button until 0. appears.

b. Press the ***PRINT/PROG*** button to activate Group 0.



Step 3:
a. Press the ***C/N*** button until 030. appears.

⇒ The current setting for PACK 0 is displayed in the bottom level.

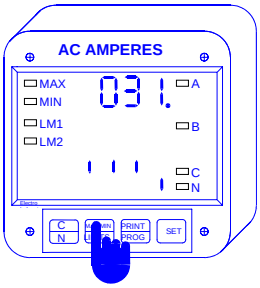


Step 4:
a. Press the ***MAX/MIN/LIMITS*** button until the desired PACK is chosen. For example, PACK 1.

⇒ The current setting is displayed in the bottom level.

b. Press the ***PRINT/PROG*** button to activate the data entry sequence.

⇒ The previous setting shifts to the middle level and four dashes appear in the bottom level.



Step 5:
a. Press the ***MAX/MIN/LIMITS*** button to toggle the first segment to the desired setting.

b. Press the ***PRINT/PROG*** button to store each setting and proceed to the next one.

c. When all the desired switches are set, the new setting will be displayed in the bottom level.

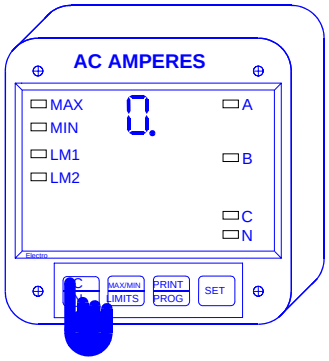
To exit see Chapter 6, section 6.5.

7.5: Group 0, Functions 4–5—Time Delay for Relays I & II (Option -NL)

The time delay for relays 1 and 2 can be set between 0–255 seconds in GROUP **0**, FUNCTIONS **4–5**. This allows a user-specified period of time to pass before a relay or alarm is activated. (If a time greater than 255 seconds is entered, the meter defaults to the maximum value of 255 seconds.) For example, relay 1 is set for 1000 Amps. If the meter measures 1001 Amps, the relay will trip only after the time delay period. If the meter then measures 999 Amps, the relay will trip.

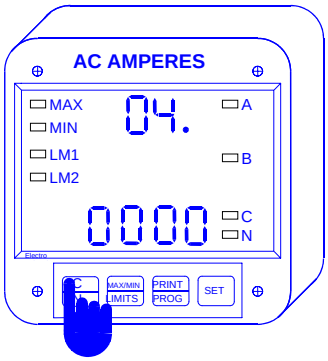
To program a time delay (the procedure is the same for both relays—Functions 4 and 5):

Step 1: Enter Programming Mode (see Chapter 6).



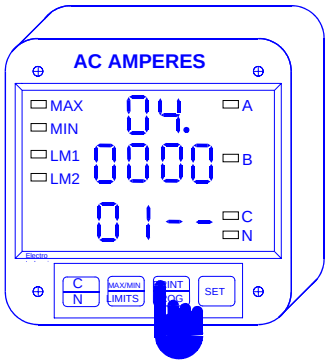
Step 2:
a. Press the ***C/N*** button until 0. appears.

b. Press ***PRINT/PROG*** to activate this group.



Step 3:
a. Press the ***C/N*** button until 04. appears.

⇒ Current setting is displayed in the lower level.

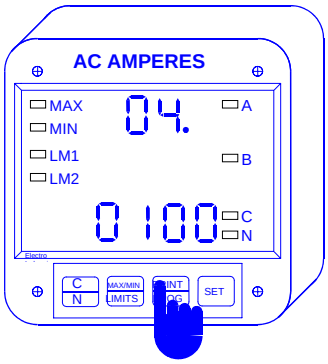


Step 4:
a. Press the ***PRINT/PROG*** button once to begin the data entry sequence.

⇒ The previous value shifts to the middle level and the lower level is replaced with four dashes.

b. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit of the field.

c. When the display shows a number you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until the new value is completely entered.



⇒ Once the entry is complete, the new value is displayed in the lower level, the middle level is blank and the group and function number are displayed in the upper level.

To exit see Chapter 6, section 6.5.

CHAPTER 8
PROGRAMMING GROUP 1—FULL SCALE SETTINGS

The 3DAA5 measures to a resolution of 1 part in 2000. Programming Group 1 Functions provide a selection of Full Scale Settings to accommodate the different CTs that may be in use at the site. The site technician has a choice of Full Scale Selection between Amps and Kiloamps.

Note: ***Due to the resolution capability of the 3DAA5, full scales over 1000 counts will result in a less stable reading.***

INPUT CURRENT	CT TYPE	FULL SCALE
0–5 A	NONE	05.00 A
0–1000 A	1000/5	1000 A
0–2000A	2000/5	2000A
0–5000 A	5000/5	05.00 KA*

Table 8-1: Full Scale Settings for Typical Current Inputs

*A setting 05.00 KA will result in more stable readings.

Group and Function Number	Function
10	Scale Selection/Full Scale for Amps
1E	Exit Programming Group 1

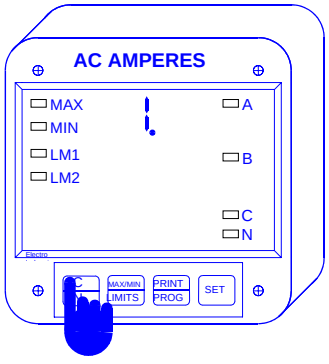
Table 8-2: Group 1 Programming Format

8.1: Group 1, Function 0—Full Scale Setting for Amperage Channels and Decimal Point Placement for Amperages

Note: Decimal point placement for Amp channels is selected through Function 0. Placement must be reset each time this function is used.

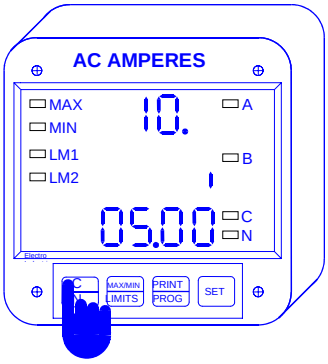
To change the Full Scale Settings:

Step 1: Enter programming mode (see Chapter 6).



Step 2:
a. Press the ***C/N*** button until **1** appears.

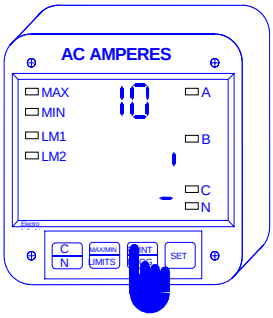
b. Press the ***PRINT/PROG*** button to activate this group.



Step 3:
a. Press the ***C/N*** button until 10 appears.

⇒ The current value is displayed in the lower level.

The middle level displays a single segment. An **UP** position signifies the larger unit (**Kiloamps**); **DOWN** signifies the smaller unit (**Amps**). In the illustration above, the full scale is 05.00 A.



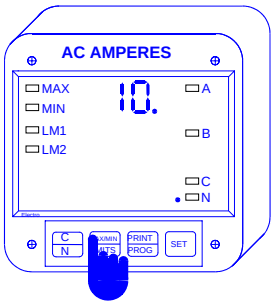
Entering Scale Factor

Step 4:
a. Press ***PRINT/PROG*** to activate Scale Factor Entry.

⇒ The lower level is replaced with a single dash.

a. Press the ***MAX/MIN /LIMITS*** button to toggle the segment UP or DOWN, as desired.

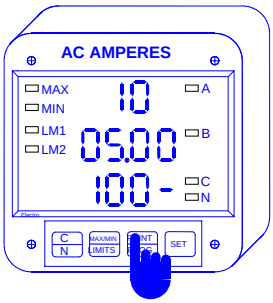
b. Press the ***PRINT/PROG*** button to store and proceed to decimal point selection.



Decimal Point Selection

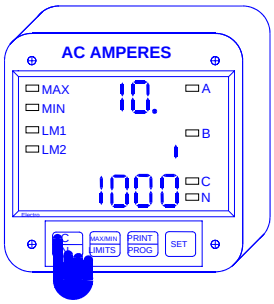
Step 5:
a. Use the ***MAX/MIN/LIMITS*** button to move the decimal point to desired position.

b. Press the ***PRINT/PROG*** button to store and to proceed to entry of the Full Scale.



Step 6:
⇒ The previous value shifts to the middle level and the lower level is replaced with four dashes; the decimal point is in its newly selected position.

a. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit of the field.



Step 7:
a. When the display shows a number you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until the new value is completely entered.

⇒ Once the entry is complete, the new value is displayed in the lower level, the unit segment is displayed in the middle level, and the group and function number are displayed in the upper level.

To exit see Chapter 6, section 6.5.

CHAPTER 9
PROGRAMMING GROUP 2—METER CALIBRATION

Warning—read this section carefully before proceeding:

- The calibration procedure requires highly accurate and stable input signals. Incorrect readings will result from improper calibration procedures. If in doubt, return unit to EIG for calibration.
- BEFORE calibrating any channel, make a note of its Full Scale Setting. Set the Full Scale in accordance with Table 9-2 for calibration. Restore original Full Scale Setting when calibration is completed.
- The first function in Group *2* (STD.CORR) is ***NOT*** to be changed by the user. Please make a note of the value here [_____] before using any *other* function in this group. If the STD.CORR value is inadvertently lost or changed, contact EIG for assistance.

9.1: Calibration Requirements

Functions 0–5 of Group 2 (High and Low End Calibration) can be calibrated by qualified site technicians if a stable calibration source can be applied. Otherwise, the meter should be returned to EIG.

For calibration purposes, the 3DAA5 requires precise inputs of 5 Amps and 2.5 Amps for High and Low end calibration.

Group and Function Number	Function	Amp Value
2P	Standard Correction—*Factory procedure only*.	
20	High End Calibration, Amps A	5A
21	High End Calibration, Amps B	
22	High End Calibration, Amps C	
23	Mid Range Calibration, Amps A	2.5A
24	Mid Range Calibration, Amps B	
25	Mid Range Calibration, Amps C	
2E	Exit Programming Group 2	

Table 9-1: Group 2 Programming Format

Calibration Type/Ranges	Calibration Source	Full Scale Setting/Scale Factor	Calibration Value
AMPS Hi End 1000/5 CT	5A	1000A	1000
AMPS Lo End 1000/5 CT	2.5A	500A	0500

Table 9-2: Calibration Source, Full Scale and Value Settings for Calibration

Note: Contact EIG if calibrating amperage channels with CT ratios other than those shown above.

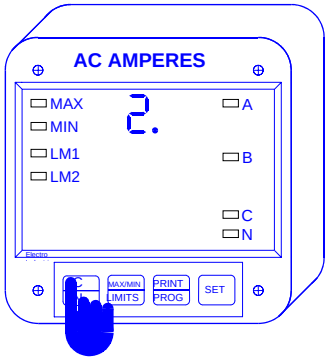
9.2: Group 2, Functions 0–5—High and Mid-Range Calibration of Amp Channels

***Note*: Full Scale Setting for the channel being calibrated must be set according to Table 9-2 BEFORE beginning this procedure.**

To calibrate amperage channels:

For Functions 1 and 2:

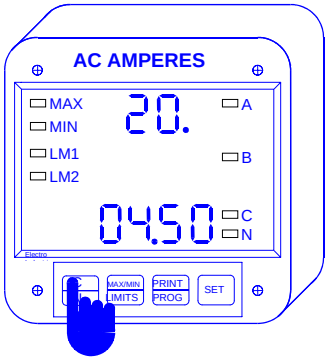
Step 1: Enter programming mode (see Chapter 6).



Step 2:
a. Press the ***C/N*** button until 2. appears.

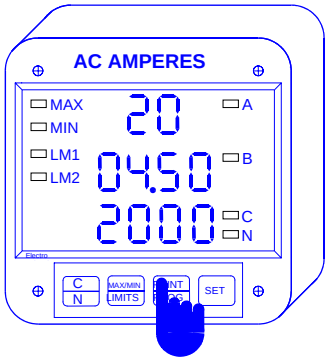
b. Press the ***PRINT/PROG*** button to activate. A one-digit password is required to continue.

c. Press the ***MAX/MIN/LIMITS*** button until a **5** appears in the lower display; press ***PRINT/ PROG*** to select it.



Step 3:
⇒ Refer to Table 9-1 for the Function Number corresponding to the channel you wish to calibrate.

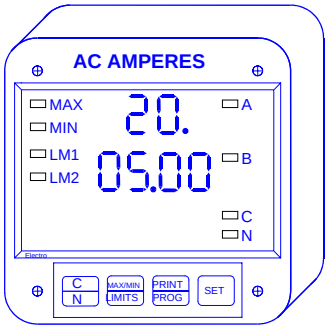
a. Press the ***C/N*** button to scroll through the channels and ***PRINT/PROG*** to activate.



Step 4:

⇒ Enter the calibration value using the standard data entry method.

b. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit of the field.



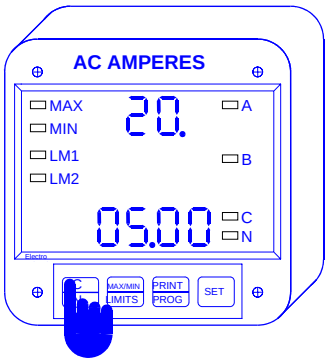
Step 5:
a. When the display shows a number you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until the new value is completely entered.

⇒ When the entry is complete the new value moves to the center level. The bottom level will display the calibrated reading after 10–15 seconds.

Step 6:
a. Press the ***C/N*** button to end the Calibration Sequence.

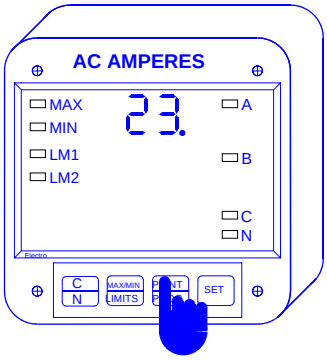
⇒ If the calibrated reading is not acceptable, the procedure should be repeated after checking all connections and the calibration signal.

To exit, see Chapter 6. Section 6.5.



For FUNCTIONS ***3–5***:.

Step 1:
Set the source to half of current HI END SCALE. 5 Amps is changed to 2.5Amps.



Step 2:
a. Press the ***PRINT/PROG*** button to begin Calibration Procedure; **23** appears.

⇒ The middle and lower levels blank. The calibrated number will appear momentarily after 10 seconds in the middle display.

Step 3:
⇒ When the entry is complete the new value moves to the center level. The bottom level will display the calibrated reading after 10-15 seconds. Press **C/N** to end Calibration Procedure. You cannot cancel at this time.

To exit see Chapter 6, section 6.5.

CHAPTER 10
PROGRAMMING GROUP 3—INPUT CORRECTION RATIOS

The 3DAA5 is constructed of two separate modules, joined by a connector and secured with two screws. The front module (*meter module*) contains the microprocessors, displays, and related circuitry; the rear (*input module*) supports all incoming signal connections.

Although simpler in design, the input module does contain some step down circuitry. Due to normal CT tolerance and resistance limitations, small channel offsets unique to each input module can be seen. They are measured at the factory and printed on the face of the input (rear) module. We refer to them as **CORRECTION RATIOS**.

The Programming Mode makes it possible to key in the CORRECTION RATIO values of any input module to which the meter is attached. This allows a site technician to move a meter to a different input module, re-program the correction ratios and resume accurate power metering.

***Warning*: An incorrect entry will result in false readings.**

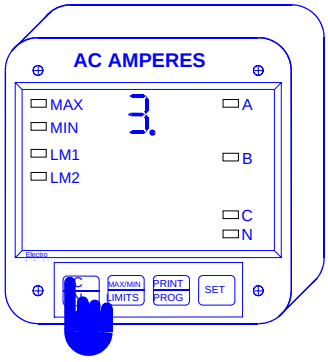
Group and Function Number	Function	Correction Ratio
30	Hi End Correction Ratio, Amps A	02.
31	Hi End Correction Ratio, Amps B	
32	Hi End Correction Ratio, Amps C	
33	Lo End Correction Ratio, Amps A	01.
34	Lo End Correction Ratio, Amps B	
35	Lo End Correction Ratio, Amps C	
3E	Exit Programming Group 3	

Table 10-1: Group 3 Programming Format

10.1 Group 3, Functions 0–5—Hi and Lo Correction Ratios

To change the correction ratio:

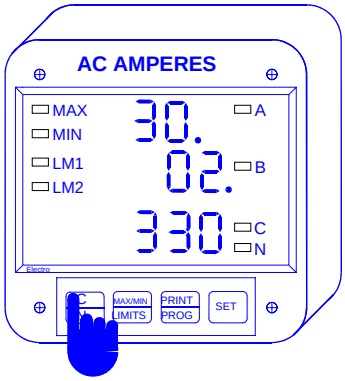
Step 1: Enter programming mode (see Chapter 6).



Step 2:
a. Press the ***C/N*** button until **3**. is displayed. Press the ***PRINT/PROG*** button to activate.

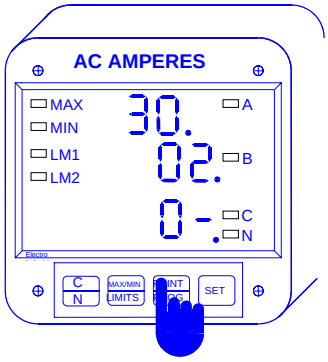
⇒ A one digit password is required to continue.

b. Press the ***MAX/MIN/LIMITS*** button until a **5** appears in the lower display. Press ***PRINT/ PROG*** to select it.



Step 3:
a. Press ***C/N*** button to select the desired FUNCTION (0–5).

⇒ The current value is displayed in the middle and lower levels. The middle level displays the **integer portion** and the bottom the **fractional portion** of the ratio.



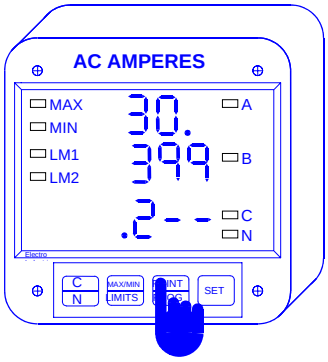
Step 4:

a. Press ***PRINT/PROG*** to begin entering the integer portion of the new ratio.

⇒ Two dashes appear on the bottom level. (To skip to changing the fractional portion press ***C/N*** once and proceed to Step 5.)

b. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit of the field.

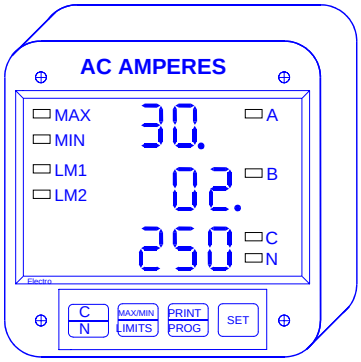
c. When the display shows a number you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until the new value is completely entered.



Step 5:

a. Repeat the procedure for the fractional portion of the ratio.

Note: If .299 is entered, .298 is stored. To store .299 input .300.



⇒ The middle level displays the integer portion and the bottom the fractional portion of the ratio.

To exit, see Chapter 6, section 6.5.

CHAPTER 11
PROGRAMMING GROUP 4—SET LIMITS AND RELAYS

The purpose of the set limit is to alert the user when a particular level of current has been exceeded or has dropped too low. The 3DAA5 has two set limits available for each metered function. The are referred to as LM1 and LM2. Each limit can be set at any desired level.

Group **4** contains LM1 and LM2 Set Limit Values for the amperage scales. It allows the user to program the limits for the two following groups: AMPS A, B, C and AMPS Neutral.

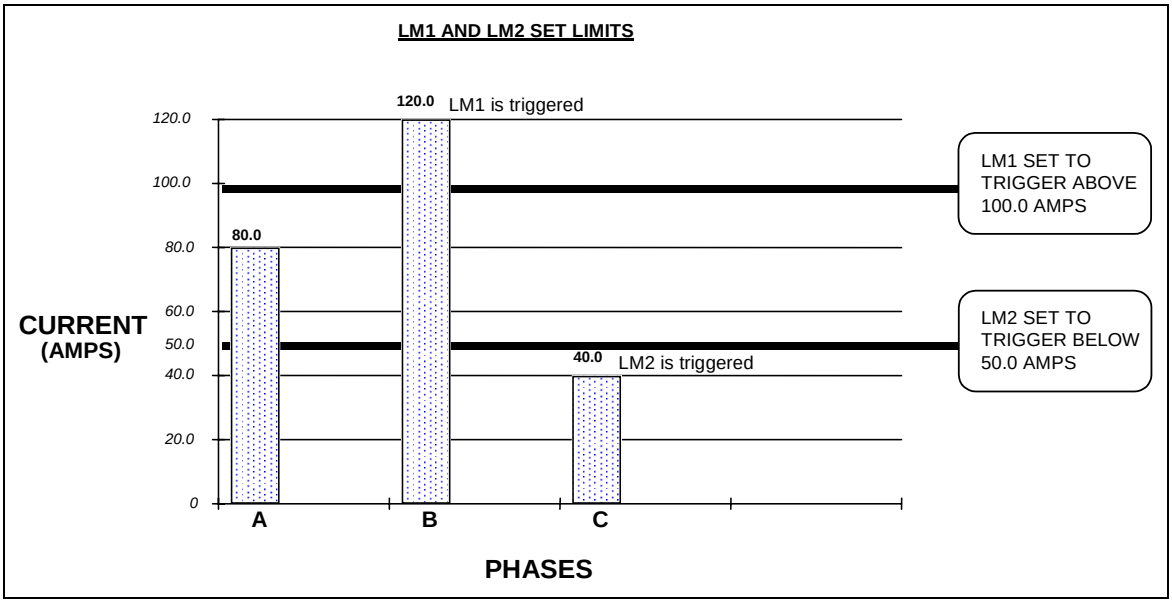


Figure 11-1: Example of LM1/LM2 Set Limits

11.1: Trip Relay

The 3DAA5 has two relays that are linked through the program mode to LM1 and LM2 Set Limits. The relay outputs can be programmed individually to close when LM1 and/or LM2 is triggered. Each relay has provisions for a separate delay time, discussed in Chapter 7, section 7.5.

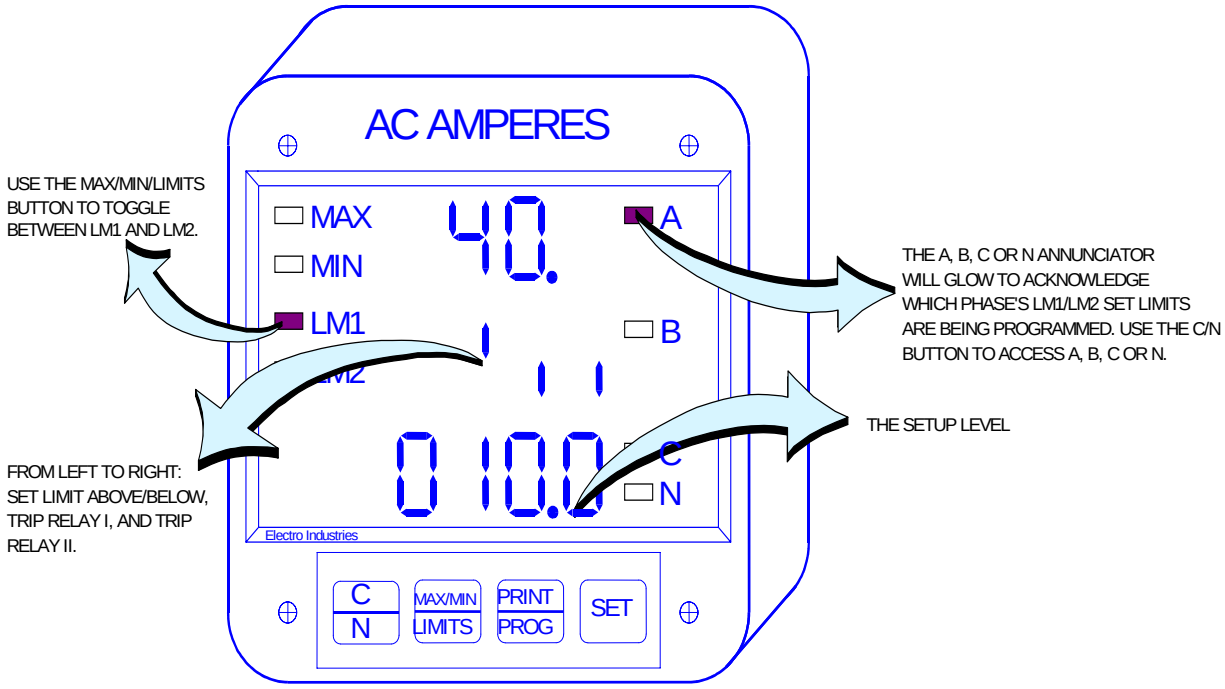
In Table 11-1, all functions contain a two-part entry. The first part is the setup of **Set Above/Below Trip Relay I** and **Trip Relay II** options. The second part is the **Setup Level**.

ABOVE/BELOW: Whether to trip on a signal ABOVE, or BELOW, the selected level.
TRIP RELAY I: Whether to trip relay I.
TRIP RELAY II: Whether to trip relay II.
LEVEL: The level at which the warning mechanism will trip.

Group and Function Number	Function
40	LM1/LM2 Set Limits for Amps A
41	LM1/LM2 Set Limits for Amps B
42	LM1/LM2 Set Limits for Amps C
43	LM1/LM2 Set Limits for Amps Neutral
4E	Exit Programming Group 4

Table 11-1: Group 4 Programming Format

11.2: Group 4, Functions 0–3—LM1/LM2 Set Limits



Programming Group 4: LM1/LM2 Set Limits

LM1 LED	LM2 LED	ABOVE/ BELOW	RELAY 1	RELAY 2	LEVEL
ON	OFF	Digit Up: trigger above level Digit Down: trigger below level	Digit Up: enabled Digit Down: disabled	Digit Up: enabled Digit Down: disabled	0–9999 0–9999
OFF	ON	Digit Up: trigger above level Digit Down: trigger below level	Digit Up: enabled Digit Down: disabled	Digit Up: enabled Digit Down: disabled	0–9999 0–9999

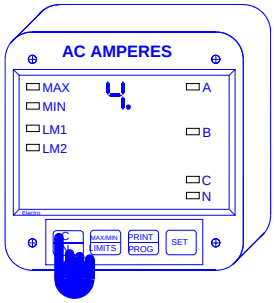
Table 11-2: Functions 0–3

LM1	LM2	ABOVE/BELOW	Relay 1	Relay 2	Level
ON	OFF	Digit Up	Digit Up	Digit Down	012.0
OFF	ON	Digit Down	Digit Down	Digit Up	040.0

Table 11-3: Example of Function 0

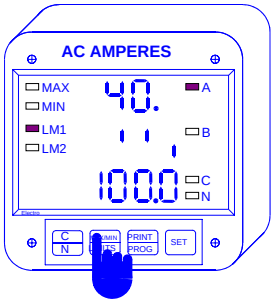
Example:
In Table 11-3, above, if Current Phase A exceeds 120A, LM1 is triggered and relay 1 is enabled. If Current Phase A does not exceed 40A, LM2 is triggered and relay 2 is enabled.

Step 1: Enter programming mode (see Chapter 6).



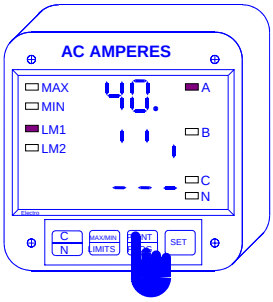
Step 2:
a. Press the ***C/N*** button until 4. appears.

b. Press ***PRINT/PROG*** to activate Group 4.



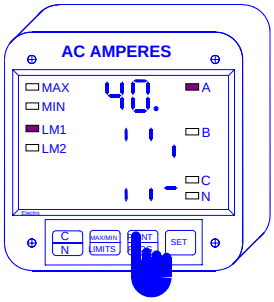
Step 3:
a. Press the ***C/N*** button to select the desired function (0–3).
⇒ The middle level displays, from left to right, the current setting of **Set Above/Below**, **Trip Relay I**, and **Trip Relay II**.
⇒ The lower level displays the Setup Level of the limits.

b. Press the ***MAX/MIN/LIMITS*** button to toggle between LM1 and LM2 settings.
⇒ The annunciator will glow to indicate which limit is being displayed.



Step 4:
a. Press the ***PRINT/PROG*** button once.

⇒ At this point you may program Set Above/Below, Trip Relay I, and Trip Relay II (see Step 5)—or—you may program the Setup Level (see Step 6).



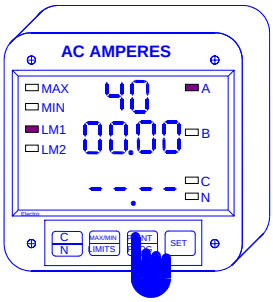
Step 5: Programming Set Above/Below, Trip I & II:

a. Press the ***MAX/MIN/LIMITS*** button to toggle the segments to their desired settings (see Table 11-2 for settings).

b. Press ***PRINT/PROG*** to store each setting and proceed to the next one.

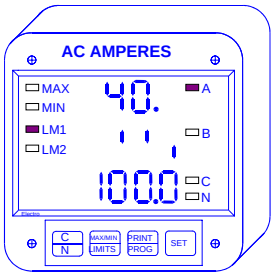
⇒ When complete, the display will automatically proceed to programming the Setup Level.

⇒ To exit to Function Level press the ***C/N*** button once.



Step 6:
⇒ In the Setup Level portion of Group 4, Function 0, the middle display shows the current setting; the lower display shows four dashes.

a. Press the ***MAX/MIN/LIMITS*** key to scroll through the first digit of the field.



Step 7:
a. When the display shows a number you want to enter, press the ***PRINT/PROG*** key to store it and proceed to the next digit in the field. Repeat until the new value is completely entered.

⇒ When complete the display will return to the Function Level of programming.

⇒ The new Set Above/Below, Trip Relay I and Trip Relay II setting is displayed in the middle level; the new Setup Level is displayed in the bottom level.

To Exit Group 4, see Chapter 6, section 6.5.

PROGRAMMING QUICK REFERENCE

PROGRAM GROUP	TASK	DESCRIPTION
0	Global Meter Setup	Sets meter parameters: Integration Interval, Meter Address, Communication Baud Rate, System Configuration and Relay Operation
1	Full Scale Settings	Full Scale Selection
2	Meter Calibration	High and Low End Calibration for Amperage Channels
3	Input Correction Ratios	Changes the Correction Ratios
4	Set Limits for Amps	High and Low Set Limits for Amps A, B, C and Amps Neutral
5	RESERVED	RESERVED
6	LM1/LM2 Set Limits for T.H.D.	High and Low Set Limits for T.H.D. of Amps A, B, and C
7	RESERVED	RESERVED
8	DC Output*	Dc Output Calibration and Setup

*Applies only if DC Output Option was ordered with the 3DAA5.