MA7200 PLUS INVERTER SERIES

Pump Quick Start Manual

3 to 75 HP

Models- MA7200-2003-N1 Thru MA7200-2040-N1 (230V)
&
MA7200-4003-N1 Thru MA7200-4075-N1 (460V)

TECO ⊙ Ⓦ Westinghouse

Rev. 1.2 –May 27th 2008

Quick Start Guide for Pump Applications

This guide is to simplify the start up of the **MA7200 PLUS Inverter series, 3 to 75 HP**, for pump applications. It is not intended to replace the MA7200 PLUS Installation and Operation Manual, and the user is urged review this manual. There are three methods of control or combinations thereof that that may be selected; *Keypad, Analog Signal (external terminal), or Serial Communication.* Only Keypad and analog signal control will be covered as serial communication is beyond the scope of this manual. For serial communication control or special external control, the user is referred to the MA7200 PLUS Installation and Operating Manual.

SAFETY FIRST!

Step 1 - Before Starting the Inverter

• Referring to the MA7200 PLUS Instruction Manual, please review and verify that the correct inverter size for the associated motor was received free of damage. To ensure personnel safety and to avoid equipment damage, follow the precautions and the installation procedures for mounting, wiring, and operating environment.

> ⚠ **CAUTION** - *To avoid damage to the inverter when removing the inverter cover and/or LCD Operator, refer to Appendix B for the proper procedure.*

• In accordance with applicable codes, make electrical connections to the motor and input power terminals. (Refer to the block diagram, Fig. 4). *No other external connections should be made at this time, as the initial control will be from the keypad.*

Step 2 - Apply Power to the Drive

• Apply AC power to the Inverter and observe the LCD Display Line 1; it should read "**Freq. Cmd 000.0**0**Hz**". Line 2 should read "**TECO**". The red LED on the **STOP** key should be *on.* The **DRIVE** and **FWD** LED's should be *on.* (See Fig. 1 below)
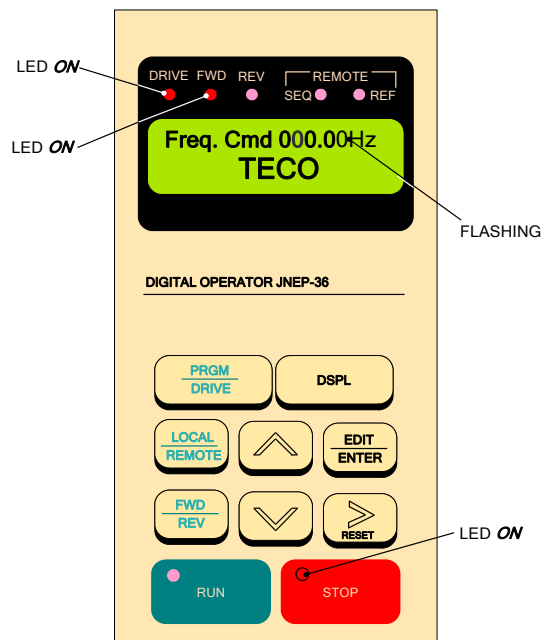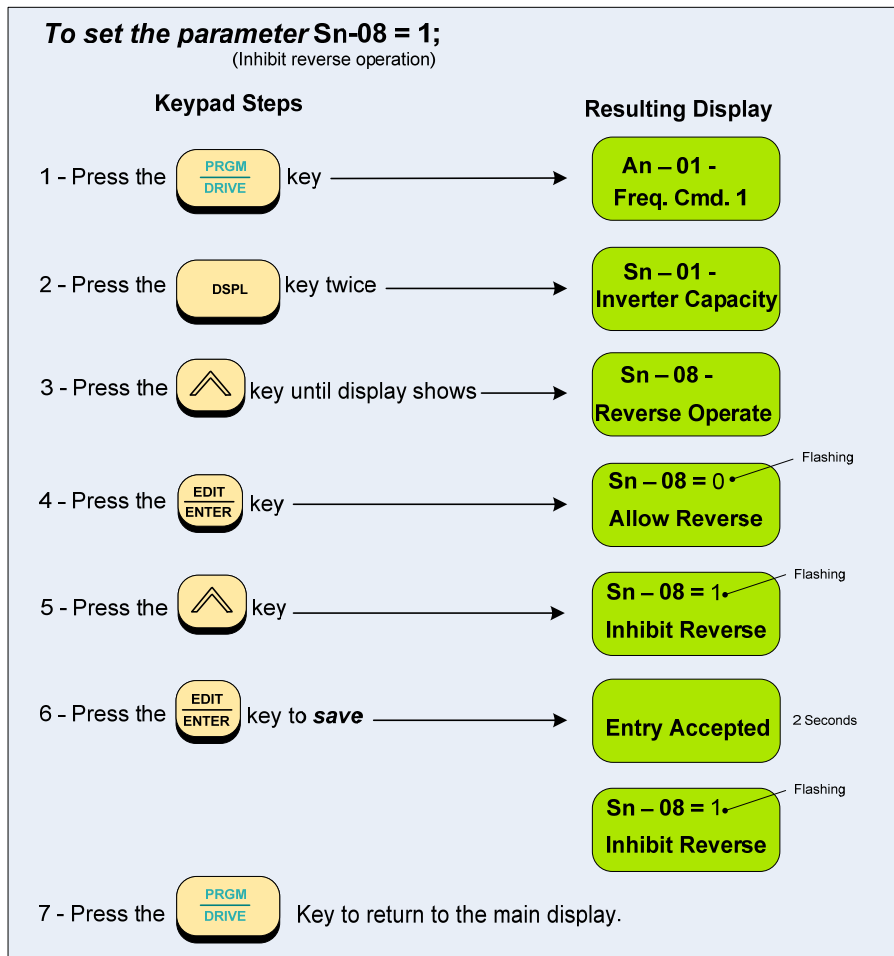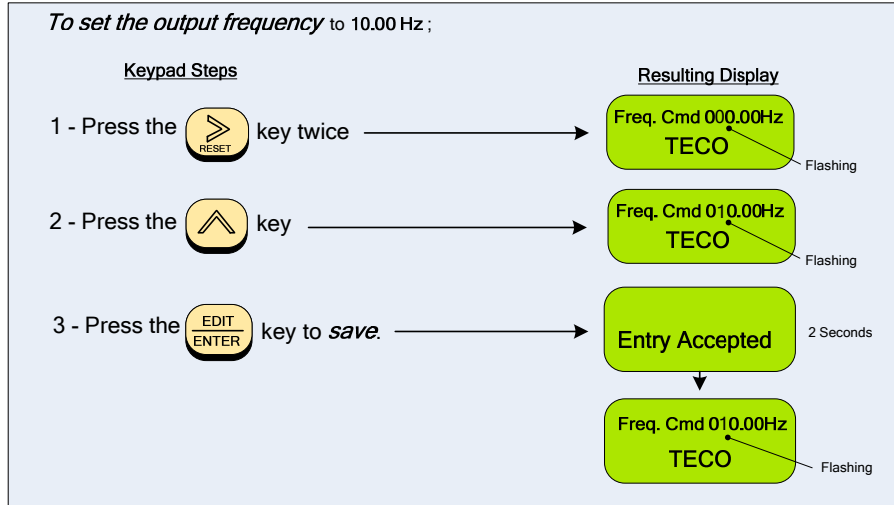

Fig. 1 MA7200 PLUS Keypad

Step 3 - Set Drive to Run Mode

• If the red **DRIVE** LED is not on with AC power up, press the **PGRM / DRIVE** key until the red **Drive** LED is *on.* The Inverter is now in the **RUN** mode.

Step 4 - Check Pump Motor Operation

- Enter **10.00Hz** for the frequency reference and set parameter *Sn-08 =1* to disable Reverse Direction operation. **Note**: *The output from the inverter is displayed in **Hz** as factory default. If desired, the output may be displayed in per cent **(%)** of full speed. **(see appendix)***

To set the output frequency to 10.00 Hz ;

Keypad Steps

Resulting Display

1 - Press the [≫ RESET] key twice ⟶ Freq. Cmd 000.00Hz **TECO** — Flashing

2 - Press the [∧] key ⟶ Freq. Cmd 010.00Hz **TECO** — Flashing

3 - Press the [EDIT ENTER] key to *save*. ⟶ **Entry Accepted** 2 Seconds

⟶ Freq. Cmd 010.00Hz **TECO** — Flashing

To set the parameter Sn-08 = 1;
(Inhibit reverse operation)

Keypad Steps

Resulting Display

1 – Press the [PRGM / DRIVE] key ⟶ An – 01 - Freq. Cmd. 1

2 – Press the [DSPL] key twice ⟶ Sn – 01 - Inverter Capacity

3 - Press the [∧] key until display shows ⟶ Sn – 08 - Reverse Operate

4 – Press the [EDIT ENTER] key ⟶ Sn – 08 = 0 Allow Reverse — Flashing

5 - Press the [∧] key ⟶ Sn – 08 = 1 Inhibit Reverse — Flashing

6 – Press the [EDIT ENTER] key to *save* ⟶ **Entry Accepted** 2 Seconds

⟶ Sn – 08 = 1 Inhibit Reverse — Flashing

7 - Press the [PRGM / DRIVE] Key to return to the main display.

_____

- Press the **RUN** key, and check the pump direction of rotation. If the direction is not correct, press the **STOP** key and wait until the pump has come to a complete *STOP.* Next, *power down the inverter.*

  🔴 **Danger**
    After the power has been turned OFF, wait <u>at least 5 minutes</u> until the charge indicator extinguishes completely before touching any wiring, circuit boards or components.

- Reverse any *two* of the pump motor connections at the inverter (U(T1),V(T2), or W(T3)). Next, following **STEP 2,** power-up the inverter; the motor direction should now be correct.

Step 5 – **Select Method of Control**

- Before selecting the method of control, verify that the inverter is in the **STOP** mode.
- There are two methods of control or combinations thereof that may be selected; *Keypad* and *Analog Signal.*

    RUN / STOP Command - Can be provided from the keypad or from an external contact (see Fig. 2a).
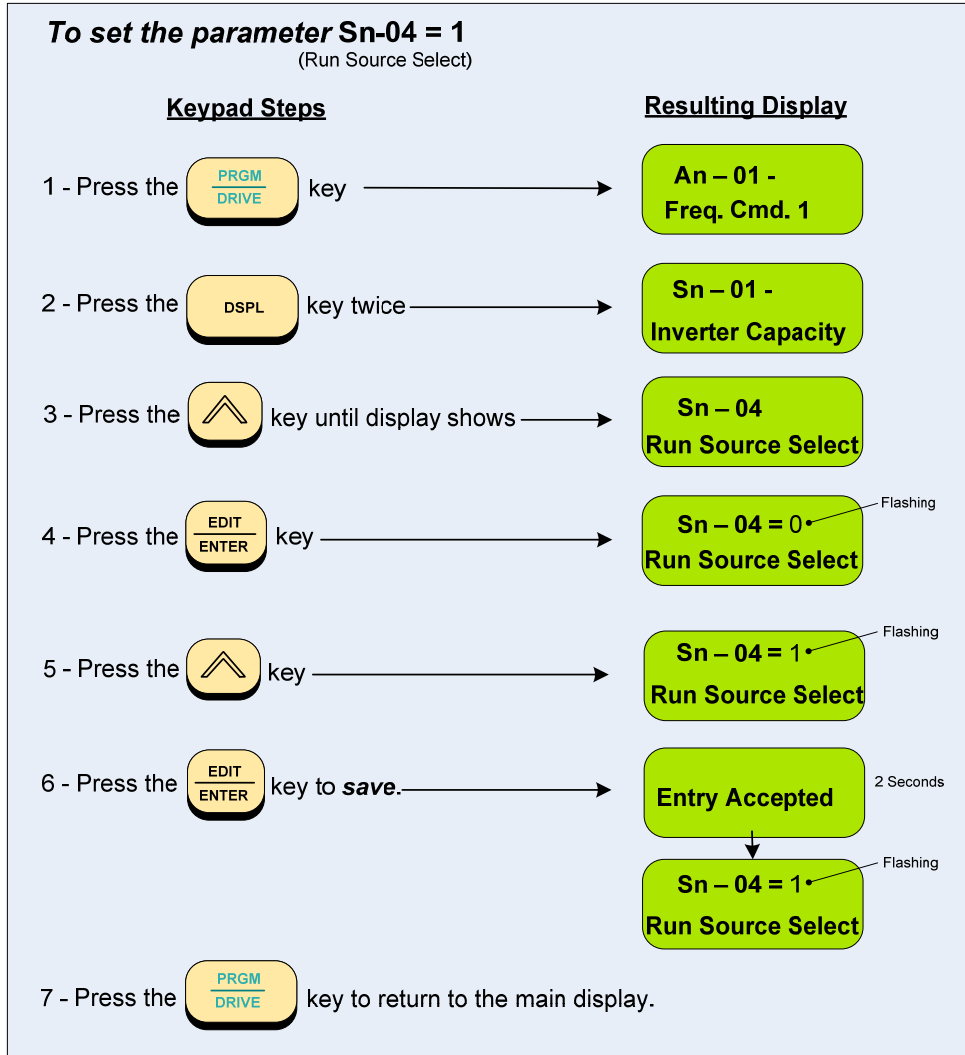   **Speed Reference –** Can be from the keypad or from an external analog signal (0 – 10 VDC or 4 – 20 mA). see Fig's 3a,3b, and 3c.

- The *RUN/STOP* method of control is set by parameter **Sn – 04** and the *Speed Reference* is set by parameter **Sn – 05.** The following table shows the values to be set when selecting.

Value	*Start / Stop* *Sn – 04=*	*Speed Reference* *Sn – 05=*
*0	Keypad	Keypad
1	External Contact	External Analog

* *NOTE*

   The factory default for Sn – 04 and Sn – 05 is set to 0; Digital Operator (Keypad) No further parameter changes are necessary if this is the desired method of control. If *External Contact* **set to Sn – 04 or** *External Analog* **set to Sn – 05 is desired then proceed as follows.**

_____

To set the parameter Sn-04 = 1
(Run Source Select)

Keypad Steps	Resulting Display

1 - Press the [PRGM/DRIVE] key ⟶ An – 01 - Freq. Cmd. 1

2 - Press the [DSPL] key twice ⟶ Sn – 01 - Inverter Capacity

3 - Press the [⟰] key until display shows ⟶ Sn – 04 Run Source Select

4 - Press the [EDIT/ENTER] key ⟶ Sn – 04 = 0 (Flashing) Run Source Select

5 - Press the [⟰] key ⟶ Sn – 04 = 1 (Flashing) Run Source Select

6 - Press the [EDIT/ENTER] key to *save*. ⟶ Entry Accepted (2 Seconds)

⟱ Sn – 04 = 1 (Flashing) Run Source Select

7 - Press the [PRGM/DRIVE] key to return to the main display.

_____

To set the parameter Sn-05 = 1
(External Analog)

Keypad Steps   Resulting Display

1 - Press the [PRGM / DRIVE] key ⟶   An - 01 -
                                                Freq. Cmd. 1

2 - Press the [DSPL] key twice ⟶   Sn - 01 -
                                                Inverter Capacity

3 - Press the [∧] key until display shows ⟶   Sn - 05
                                                Ref. Cmd. Operator

4 - Press the [EDIT / ENTER] key ⟶   Sn - 05 = 0 •— Flashing
                                                Ref. Cmd. Operator

5 - Press the [∧] key ⟶   Sn - 05 = 1 •— Flashing
                                                Ref.Cmd Ext.Term.

6 - Press the [EDIT / ENTER] key to *save.* ⟶   Entry Accepted   2 Seconds

                                                Sn - 05 = 1 •— Flashing
                                                Ref.Cmd Ext.Term.

7 - Press the [PRGM / DRIVE] key to return to the main display.

- After the method of control has been selected, if external control wiring is required, (e.g. external analog) **power down the inverter before removing any covers or making any connections.** In the following pages are wiring examples for Start / Stop, E-Stop, Restart, and Analog Connections.
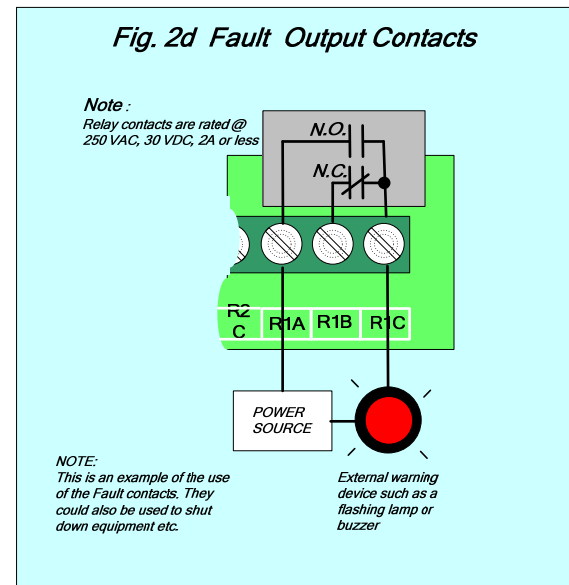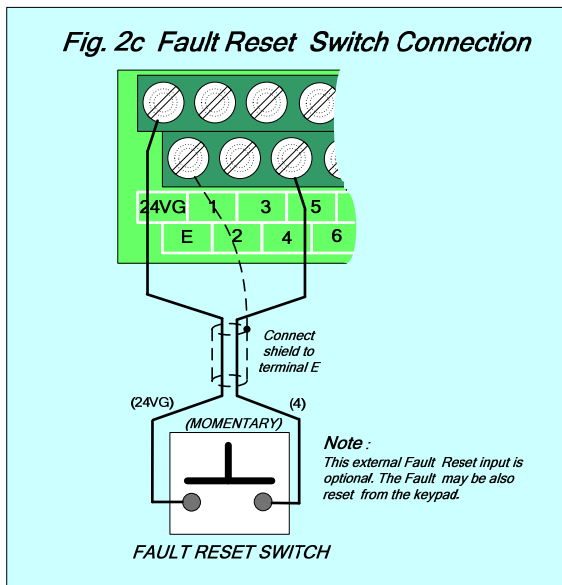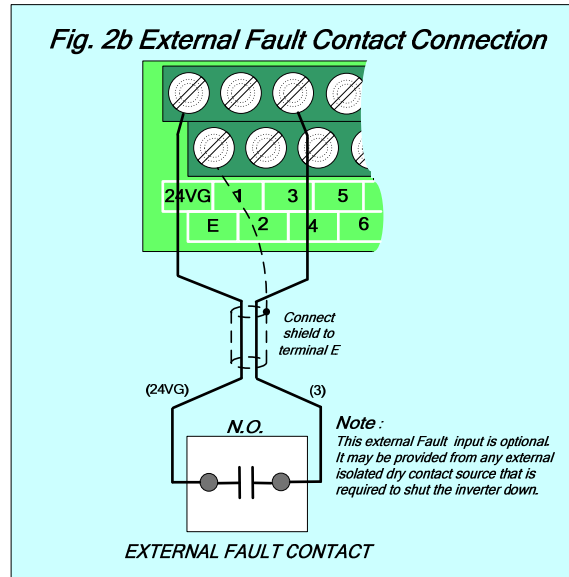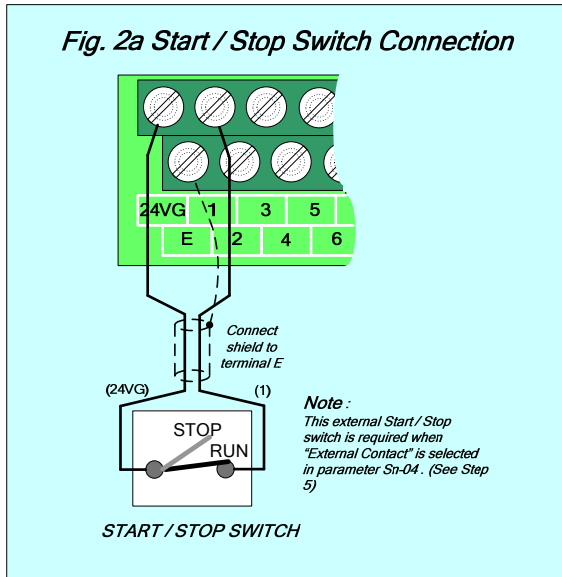
🛑 **Danger**
After the power has been turned OFF, wait at least 5 minutes until the charge indicator extinguishes completely before touching any wiring, circuit boards, or components.
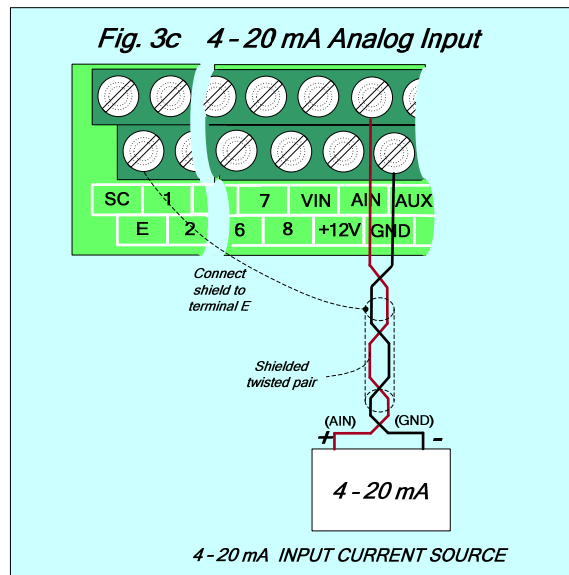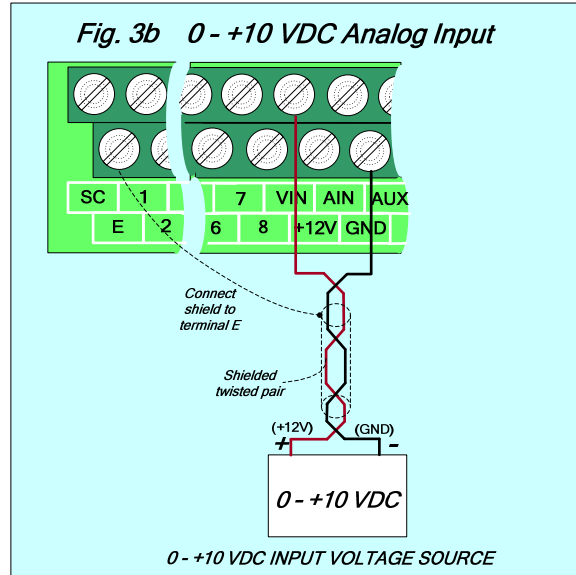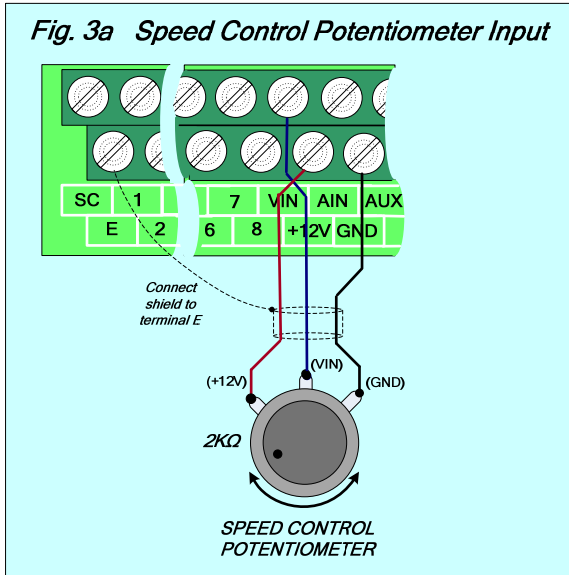
_____

DIGITAL INPUT / OUTPUT **terminal connections (3 – 75 HP)**

Fig's 2a, 2b, and 2c below show the control terminal connections for input control functions. The connections shown are typical and the user is referred to the **MA7200 Manual** if additional information is required. Fig. 2d shows an example for the use of the *Fault Output Relay*.

Fig. 2a Start / Stop Switch Connection

24VG 1 3 5
E 2 4 6

Connect shield to terminal E

(24VG) (1)

STOP
RUN

Note :
This external Start / Stop switch is required when "External Contact" is selected in parameter Sn-04 . (See Step 5)

START / STOP SWITCH

Fig. 2b External Fault Contact Connection

24VG 1 3 5
E 2 4 6

Connect shield to terminal E

(24VG) (3)

N.O.

Note :
This external Fault input is optional. It may be provided from any external isolated dry contact source that is required to shut the inverter down.

EXTERNAL FAULT CONTACT

Fig. 2c Fault Reset Switch Connection

24VG 1 3 5
E 2 4 6

Connect shield to terminal E

(24VG) (4)

(MOMENTARY)

Note :
This external Fault Reset input is optional. The Fault may be also reset from the keypad.

FAULT RESET SWITCH

Fig. 2d Fault Output Contacts

Note :
Relay contacts are rated @ 250 VAC, 30 VDC, 2A or less

N.O.
N.C.

R2 C | R1A | R1B | R1C

POWER SOURCE

NOTE:
This is an example of the use of the Fault contacts. They could also be used to shut down equipment etc.

External warning device such as a flashing lamp or buzzer

_____

TECO – Westinghouse Motor Company

ANALOG INPUT terminal connections (3 – 75 HP)

Fig's 3a,3b, and 3c.show the various analog input schemes that can be used to control the output frequency and thus the speed of the pump motor when *External Analog* is selected by **Sn-05** in *Step 5*. Only one method may be used as the input source with Fig. 3a Potentiometer Input being most common.

Fig. 3a   Speed Control Potentiometer Input

| SC | 1 | | 7 | VIN | AIN | AUX |
| E | 2 | 6 | 8 | +12V | GND | |

Connect shield to terminal E

(+12V)   (VIN)   (GND)

2KΩ

SPEED CONTROL POTENTIOMETER

Fig. 3b   0 - +10 VDC Analog Input

| SC | 1 | | 7 | VIN | AIN | AUX |
| E | 2 | 6 | 8 | +12V | GND | |

Connect shield to terminal E

Shielded twisted pair

(+12V)   (GND)
+   −

0 - +10 VDC

0 - +10 VDC INPUT VOLTAGE SOURCE

Fig. 3c   4 - 20 mA Analog Input

| SC | 1 | | 7 | VIN | AIN | AUX |
| E | 2 | 6 | 8 | +12V | GND | |

Connect shield to terminal E

Shielded twisted pair

(AIN)   (GND)
+   −

4 - 20 mA

4 - 20 mA INPUT CURRENT SOURCE

MA7200 PLUS BLOCK DIAGRAM

Fig. 4 is an overall basic electrical connection diagram for **MA7200 PLUS** inverters rated **3 to 75 HP**. It is used in conjunction with the other sections of this guide to give the user the ability to successfully start up a Pump application. More detailed information is available in the **MA7200 PLUS Manua**l to which the user is referred if further information is required.
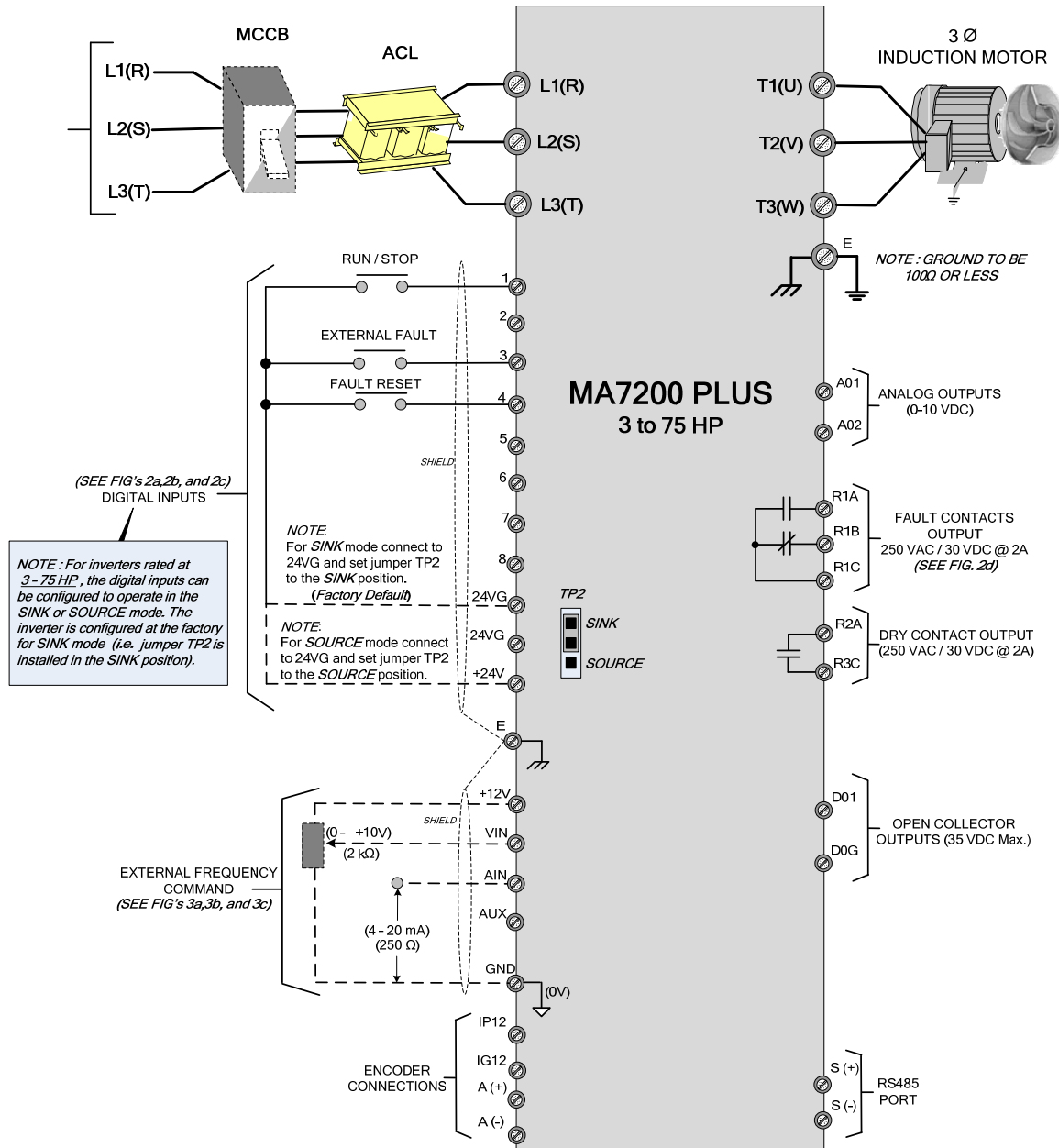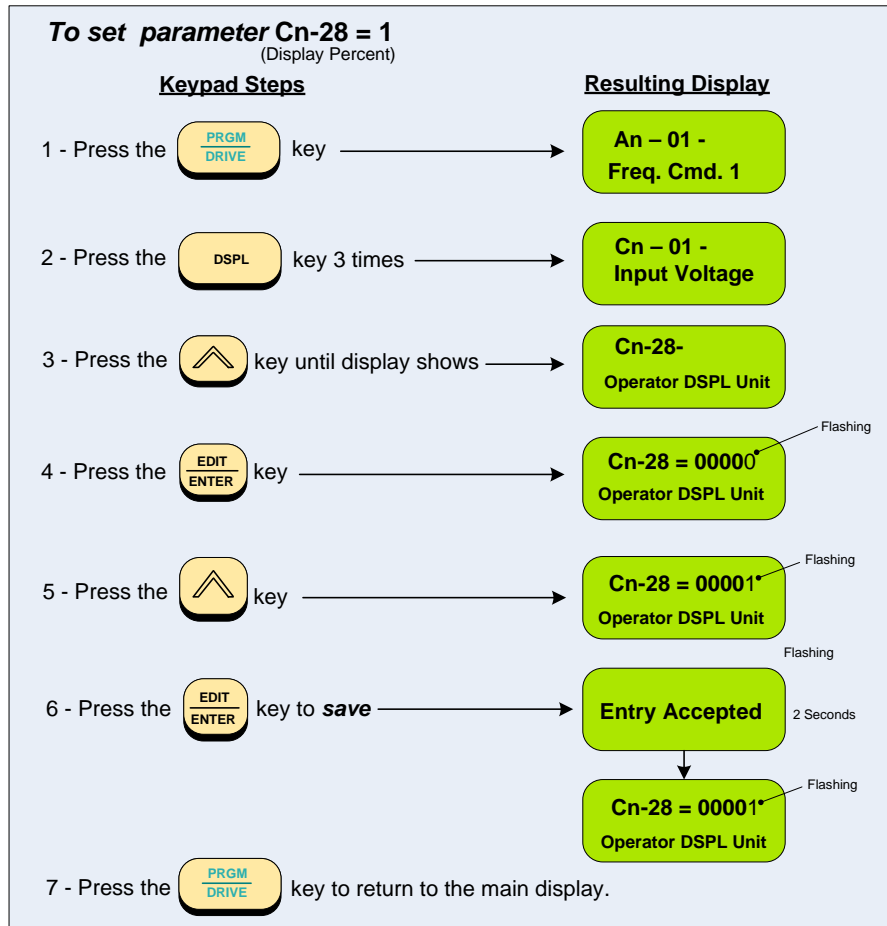
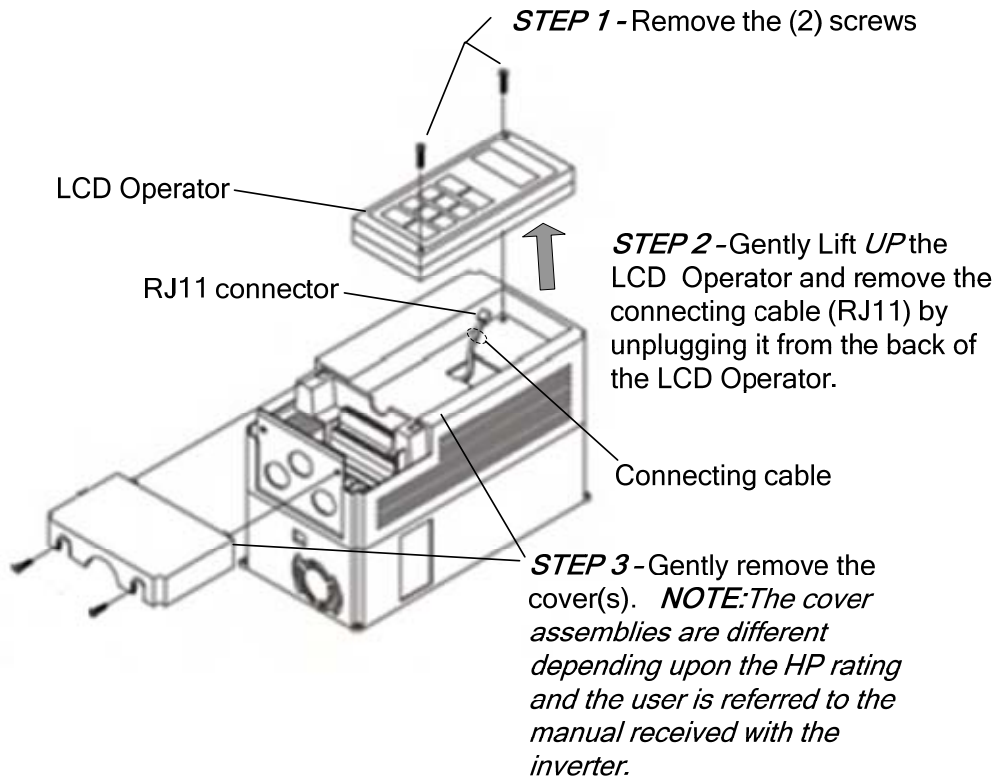**Fig. 4 MA7200 PLUS 3 to 75 HP PUMP Application Diagram**

Appendix A-
Changing display to read output speed in percent (%) of full speed.

The display is factory defaulted to show the inverter output frequency in **Hz**. If desired, the display can be changed to show the output frequency as a ***percentage*** of full speed. To do this parameter **Cn-28** must be changed from (00000) to (00001) as follows:

Appendix B –
Removing the LCD Digital Operator and Inverter Cover(s)

STEP 1 - Remove the (2) screws

LCD Operator

STEP 2 - Gently Lift *UP* the LCD Operator and remove the connecting cable (RJ11) by unplugging it from the back of the LCD Operator.

RJ11 connector

Connecting cable

STEP 3 - Gently remove the cover(s). *NOTE:The cover assemblies are different depending upon the HP rating and the user is referred to the manual received with the inverter.*