

In addition, since all these keys are just digital inputs to the PLC, no special command is needed to use them. You can define them in the PLC's input table and use them as contacts in the ladder program, and you can also read their data into the TBASIC custom function as INPUT[n] variables.

Sample TRiLOGI Programs for MD-HMI

We have provided a sample program that makes use of the keypad and the LCD for you to enter a numerical value into the PLC. The LCD displays the keyed-in values and you can also use the backspace key to erase a wrong entry.

Since the I/O positions that the keypad and the LEDs occupy will depend on which PLC model is being used and whether an EXP4040 is involved, we have therefore provided examples for each of the above-mentioned combinations. You can download these sample TRiLOGI program files from our website at:

<http://www.tri-plc.com/trilogi/HMI.zip>

Please unzip the files into your "C:\TRiLOGI\TL5\usr\samples" directory. These files are named according to the I/O positions that the keypad occupies. The applicable sample programs for each combination of PLCs and EXP4040 are as follows:

FMD88-10 / T100MD888+ FMD1616-10 / T100MD1616+ F1616-BA	HMI17to32.PC5
F2424 / T100MD2424+	HMI25to40.pc5
FMD1616-10 & EXP4040	HMI57to72.pc5
F2424 & EXP4040	HMI65to80.pc5

These programs are essentially the same except for function #255, which is where the relevant inputs are being scanned and tested for pressed key. When a key is pressed, the entered value is being appended to the string variable Z\$. A pressed key must be released before the next key pressed can be recognized. When the "Backspace" key is pressed, a character is removed from the end of Z\$, and when the "Enter" key is pressed, the Z\$ value is converted into an integer and stored in variable A.

Since any one these programs uses up only a single custom function and two ladder logic lines and only occupies 130 words of program memory, you should be able to easily incorporate it into your own program.

Installation Guide for MD-HMI420

- 1) To install the HMI-420 on the front panel, first drill four holes of 1/6" (4.2mm) diameter and then cut out a rectangular hole according to the dimensions shown below:

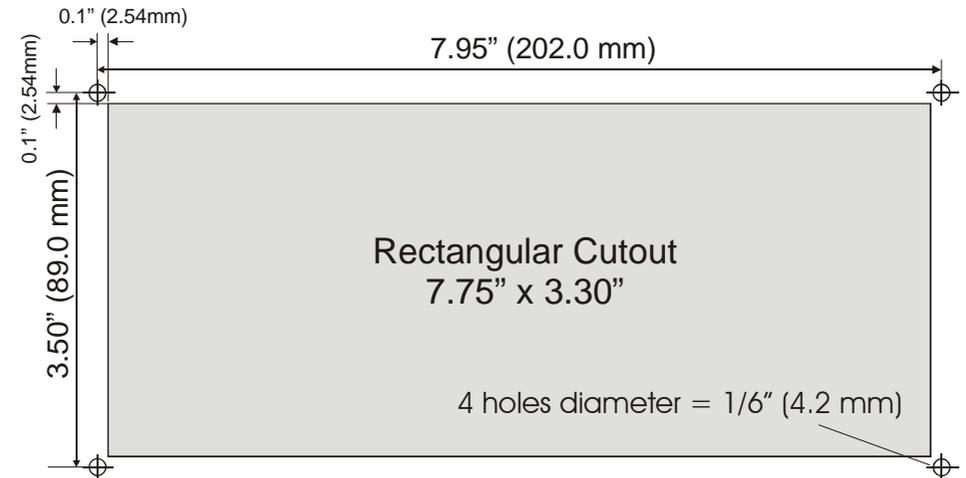


Figure 1

Notice that the edges of the rectangular cutout are actually located at 0.1" (2.54mm) away from the center of each of the four 1/6" mounting holes.

2. Insert the HMI's PCB through the rectangular cutout from the front of the panel. The cut out is slightly bigger than the size of the PCB, but you may still find it easier to insert through if you tilt the whole unit slightly while inserting the PCB through the hole.
3. Insert the four pieces of 4mm flat head bolts (supplied) from the front panel through the four mounting holes. Then fit a nut onto the bolt from the back of the panel. Tighten the nut to secure the HMI on the control panel.
4. Connect the 10-pin ribbon cable between the 10-way header and the Expansion connector on the Super PLCs that incorporate these two ports. Then connect the 14-way ribbon cable between 14-way header and the LCD port connector on the PLC. Finally, connect the power supply for the backlight to the two-way blue screw terminals provided on the PCB. You can use the same 24V DC supply for the PLC to power the backlight, but you **MUST connect a 150-Ohm 5W resistor** in series to the power supply to provide adequate backlight current for the LCD's backlight circuit as shown in Figure 2. **Note:** Direct connection to the 24V power without the resistor or connecting reverse polarity can damage the backlight unit and such damage is not covered by the warranty.

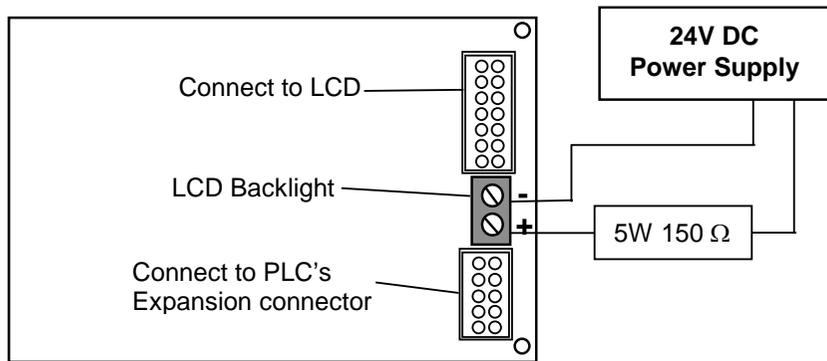


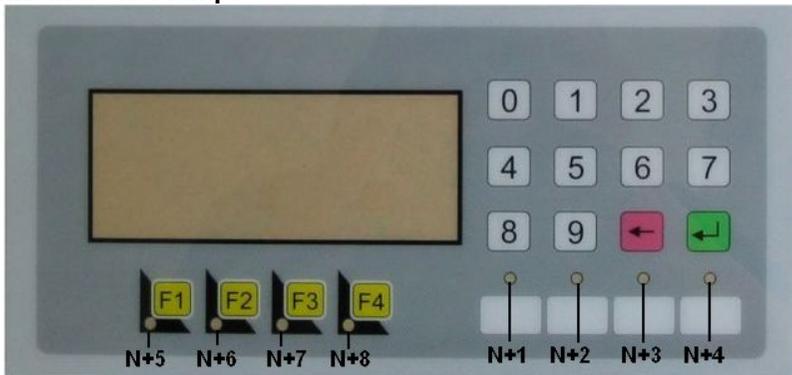
Figure 2 – Ribbon cable and LCD Backlight connection

- A general purpose Lexan overlay supplied with each MD-HMI provides a professional looking front panel for the HMI unit. The overlay has an adhesive backing, which can be peeled off and pasted over the keypad cover plate. OEMs can design their own Lexan layer that includes the company's logo and custom labels for the function keys and LED lamps.

Programming the MD-HMI Keypad and Display

The MD-HMI unit comprises one 4 lines x 20 characters LCD display unit, 8 individual LED indicator lamps and 16 push button keys.

- LCD Display:** Since the MD-HMI's LCD display connects to the PLC's LCD port, it is programmed in the identical manner as the LCD420 unit. Please refer to the TRiLOGI programming manual on the SETLCD command as well as the Installation Guide of your PLC for cursor controls and how to perform clear screen on the LCD display.
- LED Indicator lamp:**



The 8 LED indicator Lamps appear to the PLC as expanded outputs. The above photo shows the relative output position of each of the LED indicators with respect to a base number N. The value of N varies with the PLC model and whether an MD-EXP4040 is being used, as follow:

PLC Model Name	Base address
FMD88-10 / T100MD888+	N = 16
FMD1616-10 / T100MD1616+ / F1616-BA	N = 16
F2424 / T100MD-2424	N = 24
FMD88-10 with 1 EXP4040	N = 56
FMD1616-10 with 1 EXP4040	N = 56
F2424 with 1 EXP4040	N = 64

Table 1

E.g. If you connect the MD-HMI to the FMD88-10+ or FMD1616-10 PLCs, these LEDs appear as outputs #17 to #24. If you connect the MD-HMI to F2424 then the LED indicators occupy outputs #25 to #32.

Four of the LEDs are red color and these are suitable for use as warning lamps. Four white pads are provided on the Lexan overlay below each red lamp for you to create your own custom label to specify the meaning of the lamp. Another 4 green LEDs are located below each of the 4 function keys and these may be used to associate with the pressing action of the function keys. How you want to use them is really up to you!

3. Keypad and Function Keys

There are a total of 16 keys on the MD-HMI. 12 of them are organized as a numeric keypad with numbers from 0 to 9, a Backspace and an Enter key. There are 4 more general-purpose function keys which are labeled as F1 to F4. All 16 keys actually appear as expanded inputs to the PLC. The key occupies the following digital input points:

Key 0	N + 1
Key 1....Key 9	N + 2 to N + 10
Backspace key (Pink)	N + 11
Enter key (Green)	N + 12
F1 key	N + 13
F2, F3, F4 Keys	N + 14 to N + 16

Note that the value of N is the same as the Base Address shown in Table 1. For example, when used with a FMD1616-10 PLC, the function key F1 will occupy input # (16+13) = #29, and the Key #9 will occupy input #26. However, since these are really just general purpose digital inputs you can define them as anything you want if you do not need a numeric keypad.