

# MD-EXP1616R Expansion Board Installation Guide

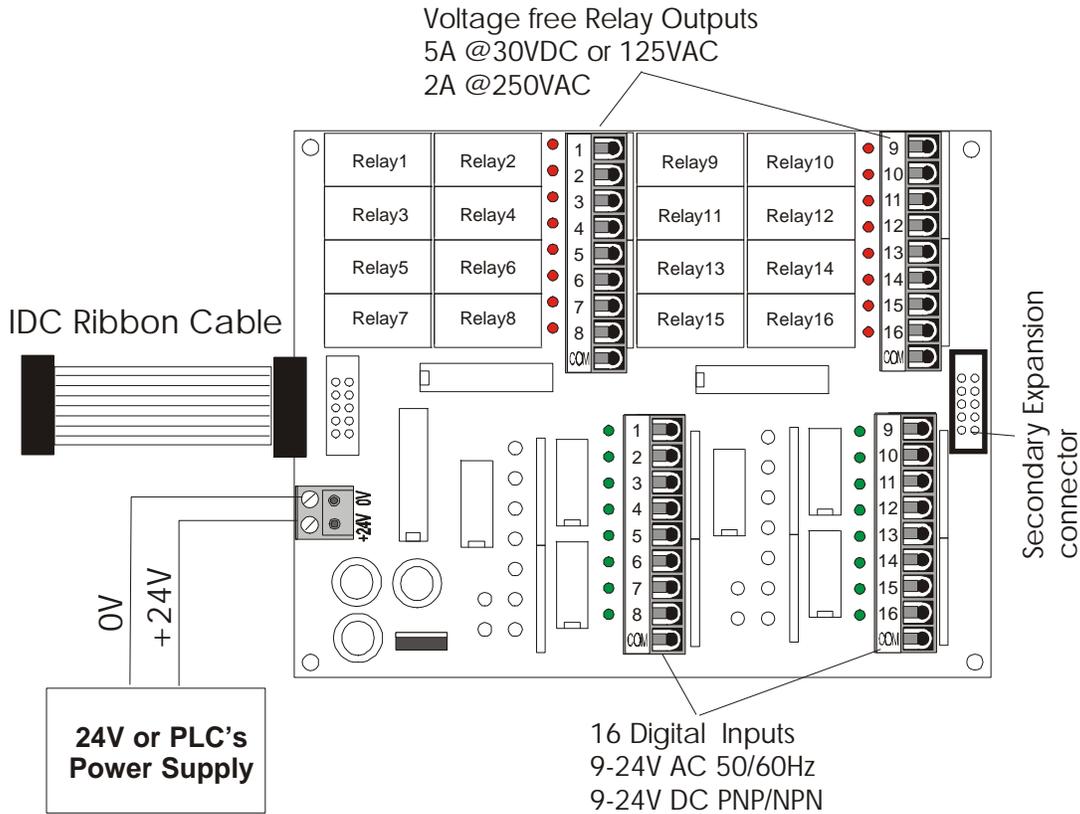


Figure 1 - 32 I/O Expansion board for T100MD PLC

## 1. Introduction

The MD-EXP1616R is an expansion board specifically designed for the T100MD PLC. It adds additional 16 opto-isolated digital inputs and 16 relay outputs to any T100MD+ PLC. The MD-EXP1616R+ also has a secondary expansion connector on the right side of the PCB, which allows multiple expansion boards or a HMI to be connected. A T100MD+ PLC can therefore be expanded to a total I/O of 96 digital inputs and 96 digital outputs.

The MD-EXP1616R is identical in size to the T100MD1616+ PLC. This allows one or more of the expansion board(s) to be “stacked” on top or below a T100MD1616+ PLC for applications where the controllers must be fitted within a very tight space.

## 2. Physical Mounting & Wiring

The MD-EXP1616R requires 4 PCB standoffs (or some screws and nuts) to support the board. It is usually mounted side-by-side to the right of the T100MD+ PLC. You must plug the supplied ribbon cable to the PLC’s expansion connector located along the right edge of the PLC.

The supplied ribbon cable is meant for side by side mounting of the expansion board. If you wish to stack the MD-EXP1616 on top or below the T100MD1616+, you will need to make or purchase a longer expansion ribbon cable (approximately 8 inches long) in order to connect the PLC to the expansion board.

**Digital I/O Ports:** Detachable screw terminals are provided for quick connection to all digital inputs, outputs and power supply wires. Each block of screw terminals can easily be detached from the controller body, enabling easy replacement of the controller board when necessary. Since the terminal block for digital I/Os is inserted vertically to the board surface, you need to remove the terminal block before you can start wiring. Use a small flat-head screw-driver and insert underneath the terminal block, apply even pressure to raise the terminal block until it becomes loosened from the connecting-pin strip, as shown below:

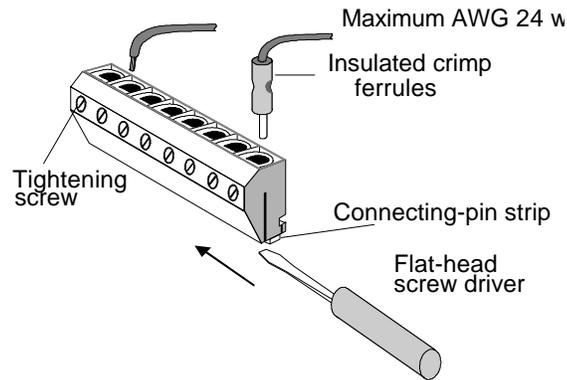


Figure 2 - Removing screw terminal block

### 3. Power Supply

The MD-EXP1616R requires a 24VDC power source to operate properly. The power supply can be the same as the PLC if the PLC is also using 24V. However, if the PLC is operating at a lower voltage (e.g. 12VDC), then you need to use a separate +24V DC power source for the MD-EXP1616R.

The +24VDC should be connected to the power supply screw terminals along the left edge of the MD-EXP1616R as shown in Figure 1. The expansion board may still work even if you don't wire the external power to the power supply screw terminals. This is because it can also draw the +24V power from the PLC via the ribbon cable and through an onboard diode. However, we strongly recommend wiring up the power supply terminals to reduce chances of high current induced spikes from interfering with the expansion board I/O signals.

**Note:** The power supply voltage to the MD-EXP1616R cannot be lower than the power supply voltage to the PLC, otherwise it could cause a high current to flow through the diode that links the PLC's power source to the MD-EXP1616R and blow up the diode.

Please use only industrial grade linear or switching regulated power supply from established manufacturers for best results. Using a poorly made switching power supply can give rise to a lot of problems for the PLC.

Always place the power supply as near to the PLC and the expansion board as possible and use separate wires to connect the power to I/Os. Keep the power supply wire as short as possible and avoid running it along side high current cable in the same cable conduit.

## 4. Digital Input Circuits

When connected to a T100MD888+ or a T100MD1616+ PLC, the first 16 expanded inputs should occupy Inputs #17 to #32. These are all bi-directional opto-isolated that accepts the following industrial voltages:

- a) 9-24V **AC** 50/60 Hz
- b) 9-24V DC NPN
- c) 9-24V DC PNP

Their respective wiring methods are illustrated in Figure 3(a),(b) & (c)

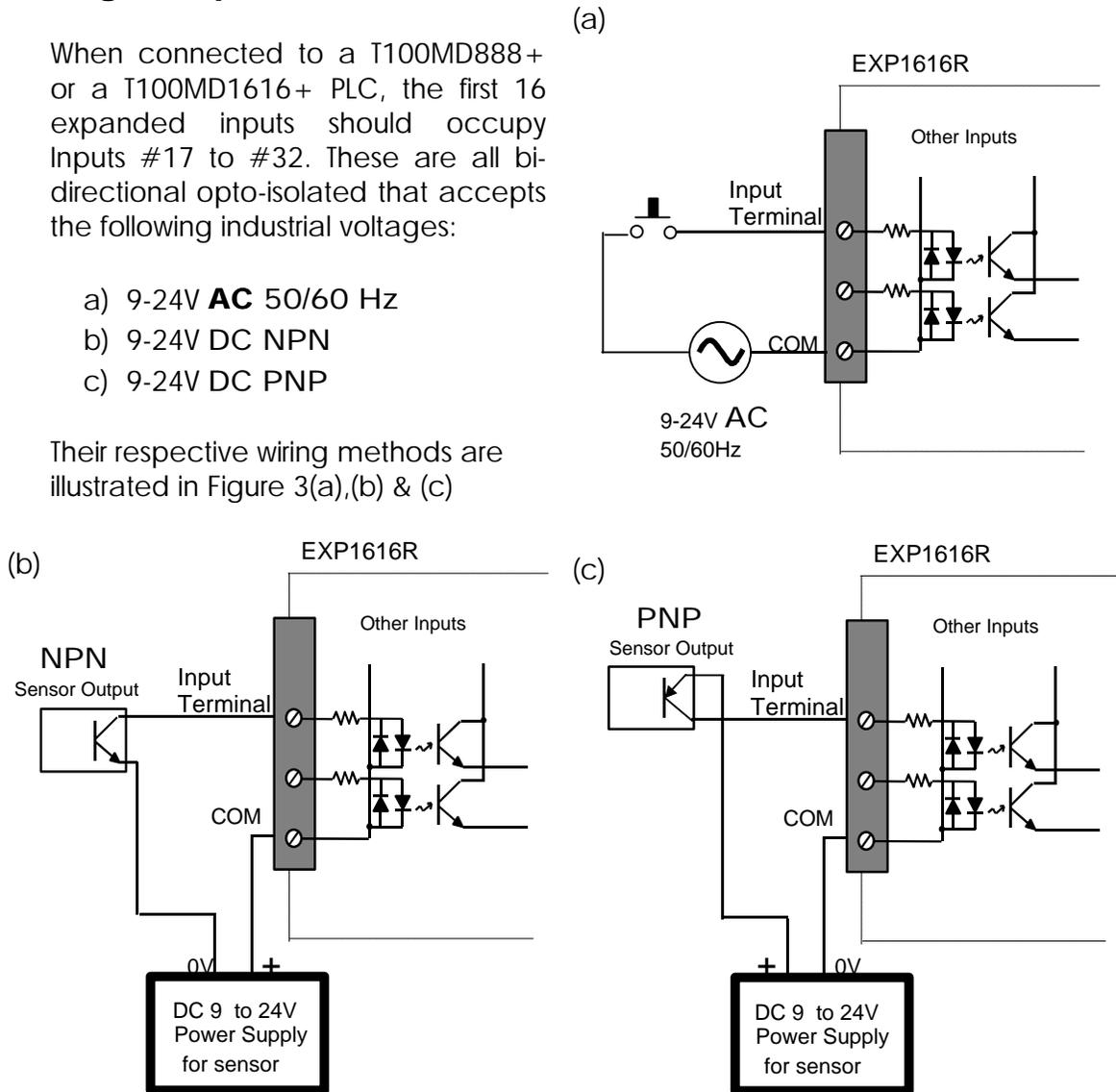


Figure 3 - EXP1616R Input Wirings

All these inputs have green color LED indicators. Every 8 inputs are grouped together into a single strip of detachable screw terminal and share a single common terminal (marked as "COM"). The input numbers are marked on their screw terminals.

(Note: when used with the T100MD2424+ PLC, these inputs occupy #25 to 40, and when used as a second expansion board to another expansion board, these inputs will begin from the number right after the last input number of the first expansion board. Please use the supplied labels for non-default I/O numbering).

## 5. Relay Output Circuits

Each MD-EXP1616R features 16 normally-open, voltage-free relay outputs. Every 8 outputs share a common terminal ("COM"). Each output has an LED indicator adjacent to its terminal that lights up when the output is turned ON.

### Relay Outputs Electrical Specifications:

Current Ratings @30V DC : 5A (Electrical life =  $2 \times 10^5$  cycles)  
 (resistive load) @125V AC : 5A (Electrical life =  $2 \times 10^5$  cycles)  
 @250V AC : 2A (Electrical life =  $2 \times 10^5$  cycles)

Maximum total current : 10A (per block of 8 outputs)

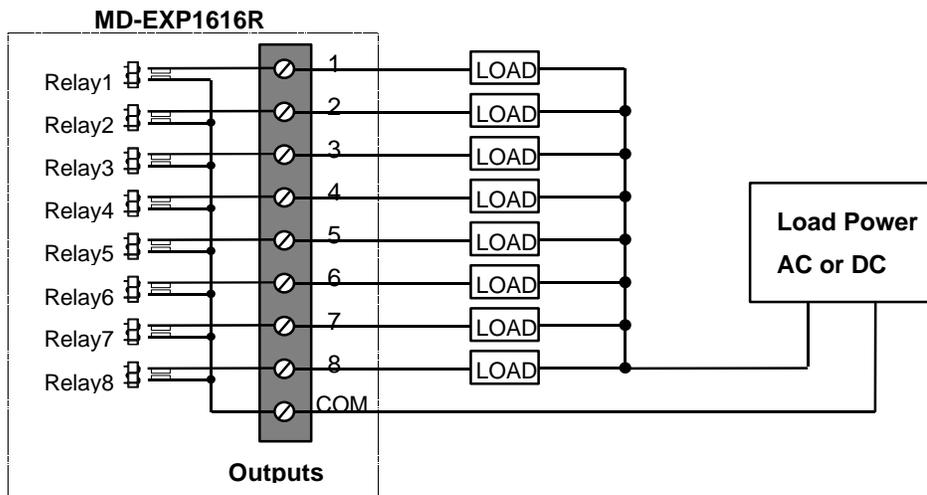


Figure 4 - Relay Output interfacing to load

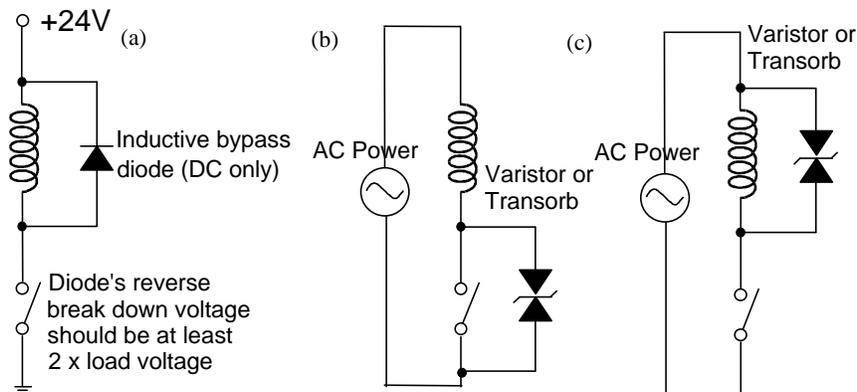


Figure 5 - (a) Inductive snubber circuit - DC load only.  
 (b), (c) Inductive snubber circuit - AC/DC load.

Note: When switching inductive load, always ensure that either a varistor or bypass diode is connected to absorb inductive kick that occurs when the relay contact opens. If left unchecked, the inductive kick causes an electric arc to form across the contact, which will wear out the contact material and severely shorten the contact life of the relay.