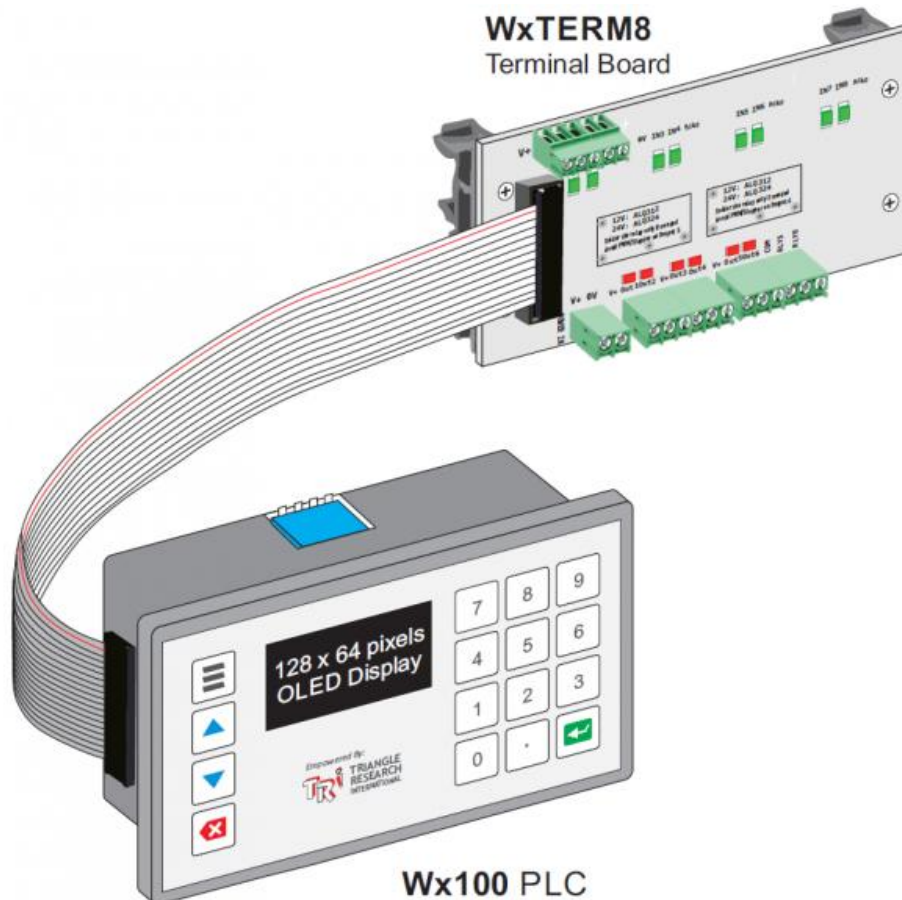


Overview

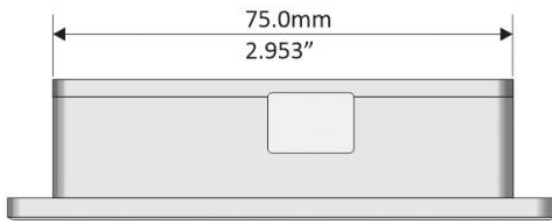
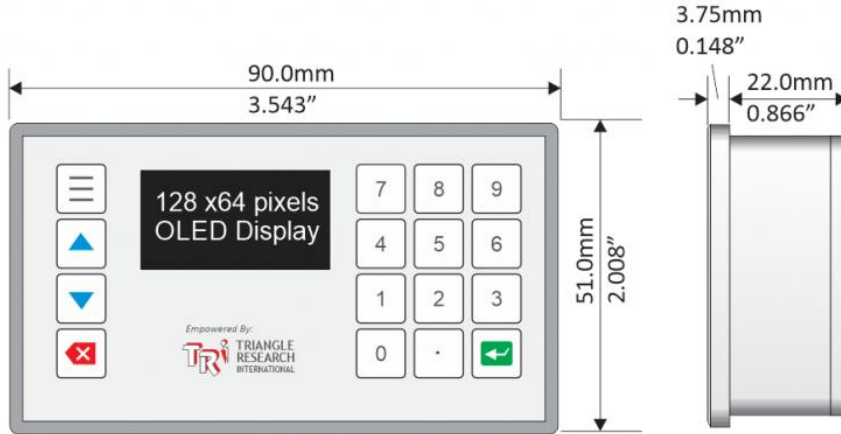
The Wx100 PLC is the main controller of the new Wx PLC family with many integrated features, such as:

- 16-key keypad
- 128 x 64 pixels OLED display screen.
- Full floating-point math
- Wi-Fi (802.11b,g,n) networking capability up to 150Mbps, allowing it to be connected directly to any Wi-Fi access points or router.
- FServer support for remote programming or monitoring)
- Modbus/TCP server for access by third party devices. Each server supports multiple simultaneous connections.
- Modbus/TCP client to connect to:
 - Another PLC
 - Modbus/TCP server devices to exchange data
 - Connect to the cloud to upload data

Wx100 is programmed using the new i-TRiLOGI version 7.4 ladder + TBASIC software that also supports its new keypad and OLED display capability.



Physical Dimensions



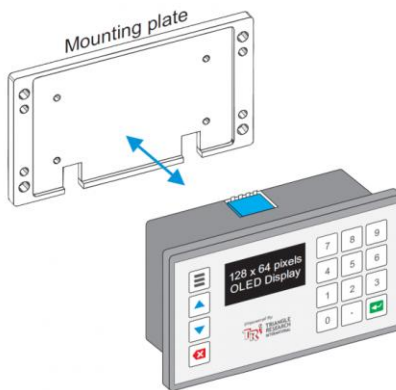
Wx100 Dimensions

Wx100 System Components

A complete Wx100 PLC system comprises two parts:

<p>(1) The Wx100 PLC main controller</p>	<p>(2) The WxTermXX – the wiring terminals and expanded I/O on some models.</p>
<p>The two parts are connected via a 20-pin ribbon cable connector which brings the I/Os from the Wx100 PLC to the wiring terminals to connect to physical devices such as sensors and loads.</p>	<p>20-pin IDC ribbon cable</p> <p>20pin IDC headers</p>

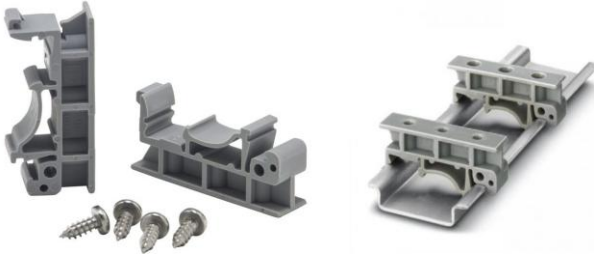
Installing Wx100



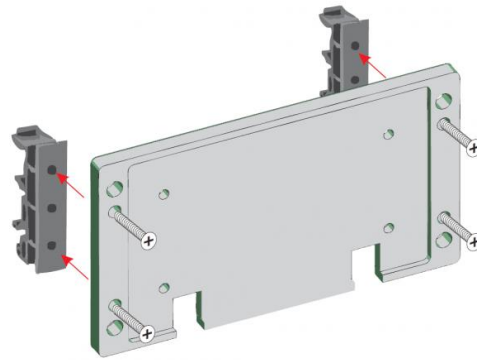
Front Panel Mount: Installing Wx100 PLC on the control panel front door

<p>1. Cut a rectangular hole</p> <p>76mm (3") 47.5mm (1.87")</p>	<p>2. Insert the Wx100</p>
<p>3. Fasten mounting plate to the back</p> <p>4 pc M3 x 10mm screws</p>	<p>4. Attach bolts to lock the Wx100</p> <p>4 pc M4 x 24mm bolts</p>

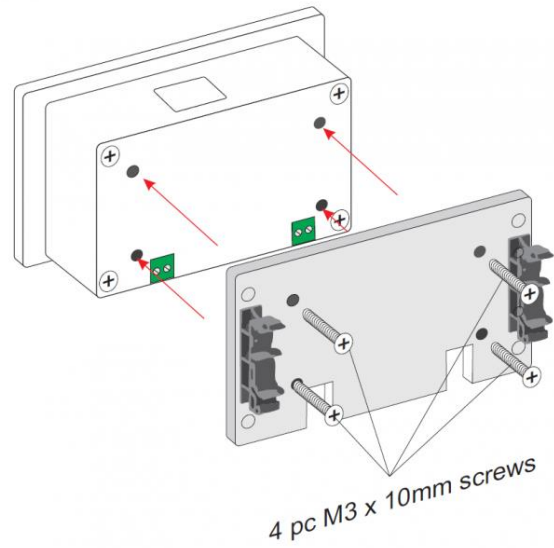
DIN-Rail Mount: Installing Wx100 On A DIN-Rail



1. Attach DIN clips to the back of the Wx Mounting plate using 4 pieces of M3 screws (supplied with the DIN-CLIP-SET)

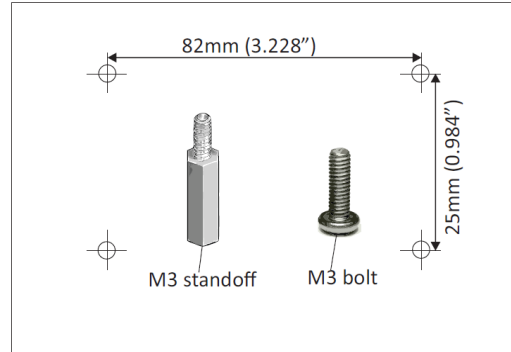


2. Fasten mounting plate to the back of the Wx100 Controller.

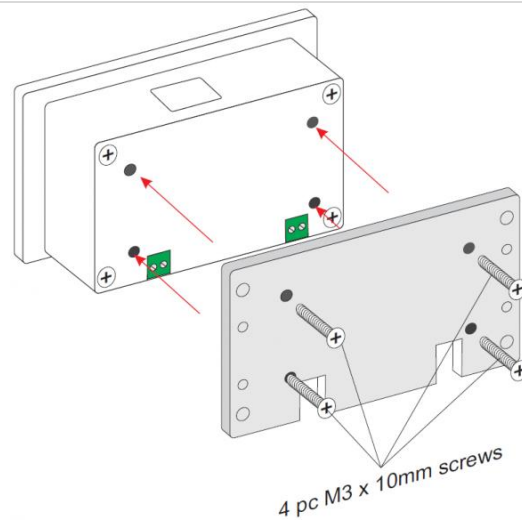


Direct Mount: Installing Wx100 PLC Inside A Control Box Without DIN Rail

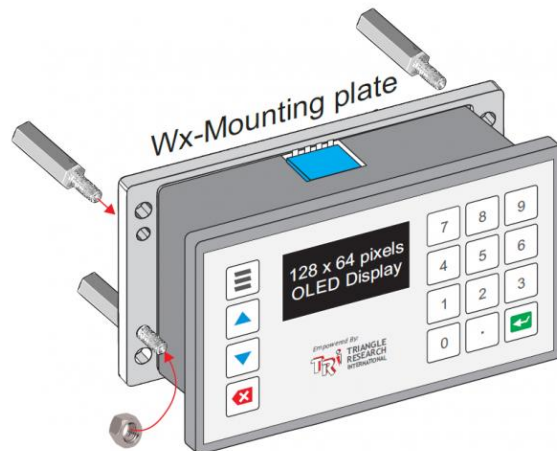
1. Install four pieces of M3 standoffs, or just 4 pieces of M3 bolts inside the control box



2. Fasten mounting plate to the back of the Wx100 Controller.



3. Place the Wx100 PLC over the 4 standoffs (or 4 bolts with or without spacers) and fasten each with an M3 nut as shown below.

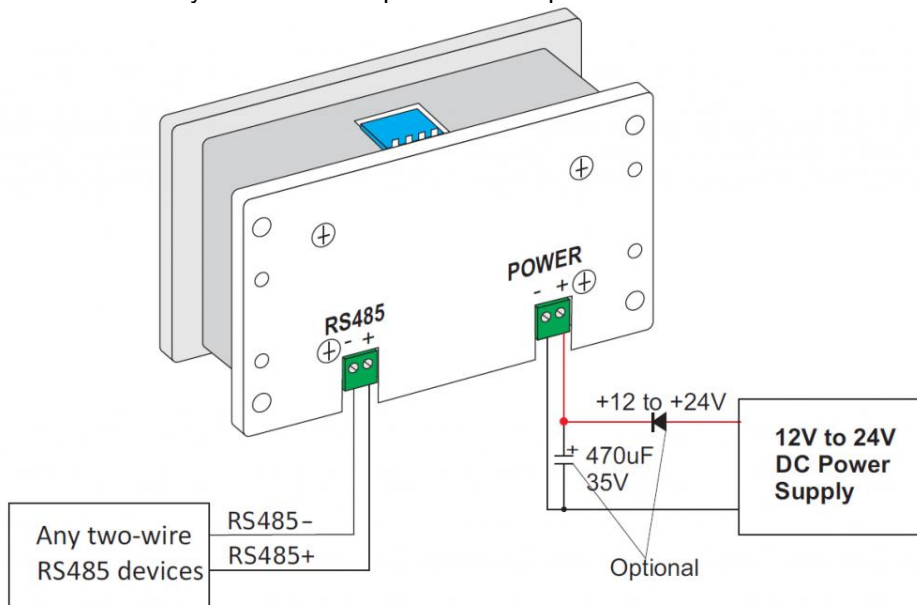


Note: Installing the Wx100 PLC directly onto the bottom surface of the control box is the most compact form of installation. However, the screw terminals on Wx100 will be inaccessible, so you should connect the required wires to the Wx100 power and RS485 (if used) **before** installing it using this method.

Power and Wiring

Wiring Power & RS485

On the bottom side of Wx100 you will find two pieces of two-position screw terminals as shown below:



Power Supply	Industrial grade regulated DC power supply
Supply Range	12 to 24V (+/- 5% ripple) DC
Power Consumption	Note: The Wx100 PLC will be reset when the power supply voltage dips below 7V <100mA typical
Wiring Recommendations	<ol style="list-style-type: none"> 1. Place the power supply close to the PLC 2. Use a separate pair of wires to connect the power to the PLC. 3. Keep the power supply wires as short as possible and avoid running them alongside high current cables in the same cable conduit. 4. Connect a 470mF to 1000mF, >35V electrolytic capacitor near the power supply connector to suppress any undesirable voltage glitches from conducting into the PLC. 5. Connect a diode before the capacitor to prevent reverse current which might flow back to the power supply, as shown in the above diagram. 6. If the AC main is affected by nearby machines drawing large amounts of current (such as large three-phase motors), connect a surge-suppressor to prevent any unwanted noise voltage from being coupled into the Wx100 power supply.

Wiring Physical I/O

<p>The I/Os on the Wx100 are all multi-talented!</p> <p>The inputs can be used as:</p> <ul style="list-style-type: none"> ○ pure digital inputs, analog inputs (IN1 to IN6), ○ quadrature encoder inputs (IN3 to IN8), and ○ pulse measurement inputs (IN3 to IN8). <p>All 6 digital outputs can be used as:</p> <ul style="list-style-type: none"> ○ PWM outputs, ○ stepper motor controller or ○ stepper motor driver outputs. 	<table style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Input1/AI1</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">1</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">2</td> <td style="padding: 5px;">Input2/AI2</td> </tr> <tr> <td style="padding: 5px;">Input3/AI3</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">3</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">4</td> <td style="padding: 5px;">Input4/AI4</td> </tr> <tr> <td style="padding: 5px;">Input5/AI5</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">5</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">6</td> <td style="padding: 5px;">Input6/AI6</td> </tr> <tr> <td style="padding: 5px;">Input7</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">7</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">8</td> <td style="padding: 5px;">Input8</td> </tr> <tr> <td style="padding: 5px;">Reserved</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">9</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">10</td> <td style="padding: 5px;">Reserved</td> </tr> <tr> <td style="padding: 5px;">Reserved</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">11</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">12</td> <td style="padding: 5px;">Reserved</td> </tr> <tr> <td style="padding: 5px;">Output1</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">13</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">14</td> <td style="padding: 5px;">Output2</td> </tr> <tr> <td style="padding: 5px;">Output3</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">15</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">16</td> <td style="padding: 5px;">Output4</td> </tr> <tr> <td style="padding: 5px;">Output5</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">17</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">18</td> <td style="padding: 5px;">Output6</td> </tr> <tr> <td style="padding: 5px;">V+ IN</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">19</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">20</td> <td style="padding: 5px;">0V</td> </tr> </table>	Input1/AI1	1	2	Input2/AI2	Input3/AI3	3	4	Input4/AI4	Input5/AI5	5	6	Input6/AI6	Input7	7	8	Input8	Reserved	9	10	Reserved	Reserved	11	12	Reserved	Output1	13	14	Output2	Output3	15	16	Output4	Output5	17	18	Output6	V+ IN	19	20	0V
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Output3	15	16	Output4																																						
Output5	17	18	Output6																																						
V+ IN	19	20	0V																																						

All Wx100 I/Os are industrial voltage level and can operate from 9V to 30VDC. The following are the specifications of the I/O pins when used together with the Wx-TERM8 terminal Board:

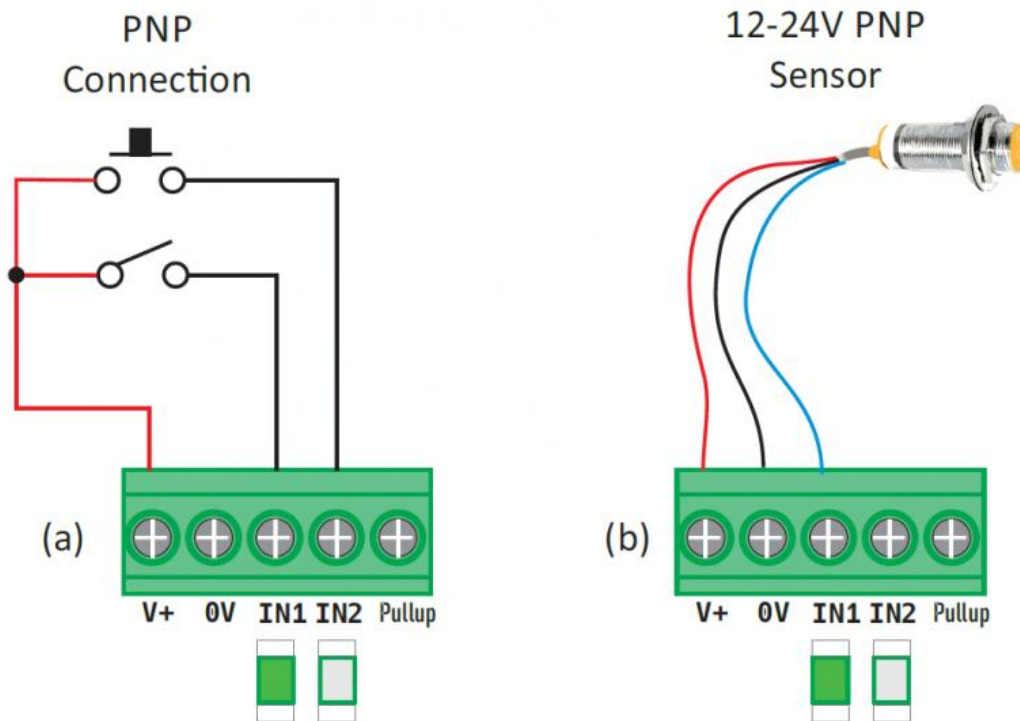
Electrical Characteristics (Vp = 24V)				
	MIN	TYP	MAX	UNIT
IN1-8 Logic '1'				
Voltage	8	–	30	V
Current (sink)	0.055	–	0.21	mA
IN1-8 Logic '0'				
Voltage	-0.3	–	3	V
Current (sink)	0	–	0.021	mA
OUT1-6 Logic '1'				
Voltage	0	0.1	0.8	V
Current (sink)	0.0024	0.5	2	A
OUT1-6 Logic '0'				
Voltage	22	–	30	V
Current (sink)	0	0	0	mA

Digital Input Circuits

To simplify field wiring, the power input that Wx-TERM8 receives via its “POWER IN” connectors are routed by the Wx-TERM8 PCB to the input terminal section. The V+ and 0V terminals beside the IN terminals are electrically connected directly to the “POWER IN” terminals

a) PNP Connection

All Wx100 PLC digital Input are PNP (current sink) by default. This means that to turn ON the digital input you need to supply it a high positive voltage $\geq +8V$. To turn off the digital input you need to supply it $\leq +3V$.



b) NPN Connection#

By connecting the “Pullup” terminal to V+, each digital input in the group (e.g. IN1 and IN2 are in one group, IN3 and IN4 are in another group) will be pulled up to V+ via its individual internal 3.3K 0.5W pullup resistor.

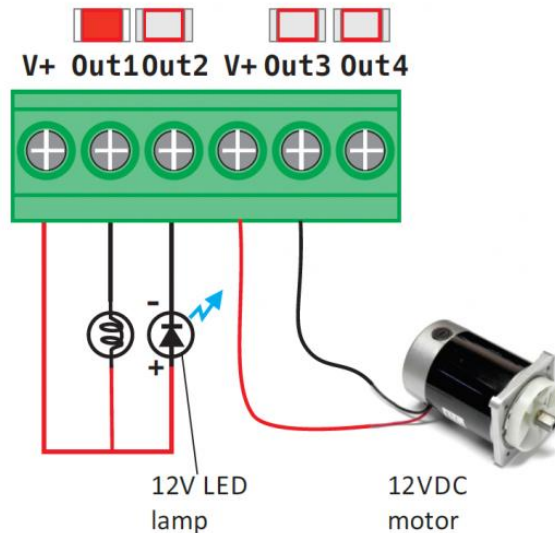
Digital Output Circuits

a) Wiring Digital Outputs

To simplify field wiring, the V+ power input that Wx-TERM8 receives via its "POWER IN" connector is routed by the Wx-TERM8 PCB to the output terminal section.

V+ = 12V

The following shows how to easily use it to turn on a 12V lamp load. By configuring the digital output as a PWM output you can also control how much power to supply to the lamp and thus control the brightness in software.



The load can really be any kind of DC load as long as the working load voltage is compatible to that of V+ and the load current is < 2A continuous. It could be as small as a LED indicator lamp, a solenoid valve, the coil of a 12 or 24V relay or contactor, or a DC motor.

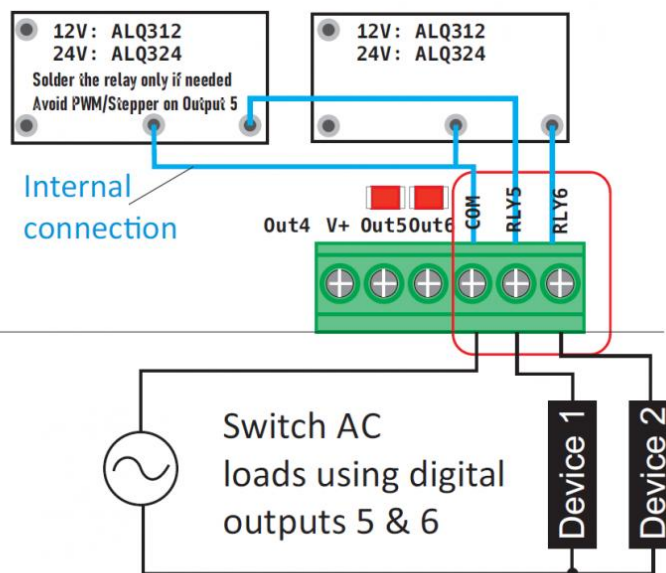
b) Relay Outputs

Wx-TERM8 provides solder pads for you to solder up to two Panasonic ALQ relays, as shown in the following diagram.

The contacts of these two relays are routed to the terminal marked "COM, RLY5 and RLY6" as shown in the figure to the left.

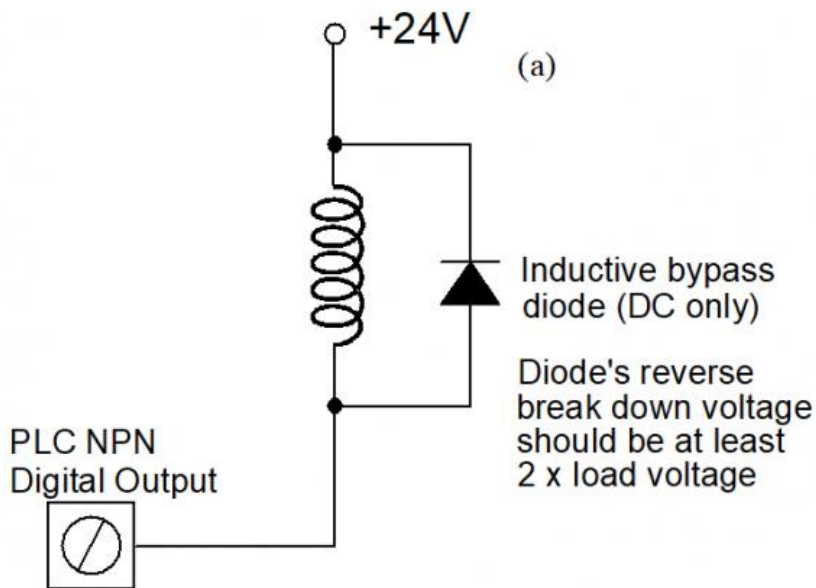
Note:

- These two relays are driven by output 5 and output 6.
- Relay coil voltage **MUST** match your power supply. For 12V system, solder a ALQ312 relay and for 24V system, solder a ALQ324 relay.
- Purchase these relays from www.digikey.com or any electronic components retailers.



c) Inductive Load

When switching inductive loads such as a solenoid or a motor, always ensure that a bypass diode is connected to absorb inductive kick that occurs whenever the output driver is turned OFF. Although all the PLC digital outputs already incorporate either internal diodes or intrinsic Zener bypass diodes to protect the driver, some may only activate when the inductive kick voltage rises above 100V DC. This can result in a large dose of noise being introduced into the system and may have undesirable effects. We recommend using a fast recovery diode such as UF4001 to UF4007 connected as shown in the following diagram to absorb the inductive noise:



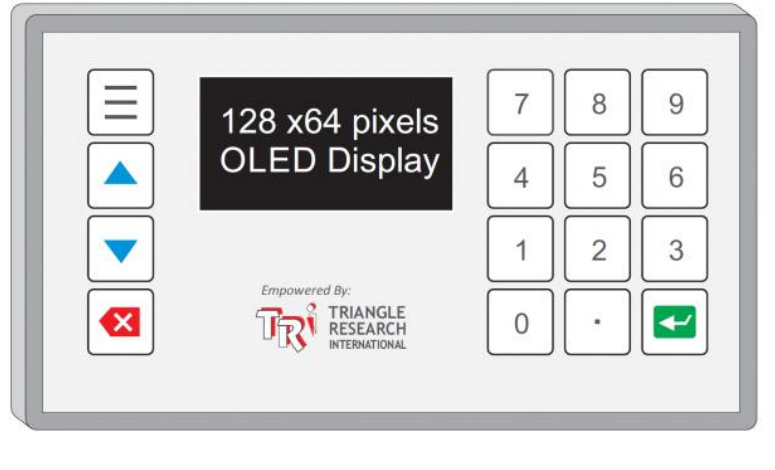
d) Digital Outputs Specs: Output #1 to #6

Output Driver type	N-Channel power MOSFET with low $r_{DS} < 0.05 \text{ Ohm}$
Maximum Breakdown Voltage	40V
Peak Output Current:	2A
Continuous Output Current	0.5A
Output Voltage when OFF	Pulled up to V+ via 3K3 resistor
Output Voltage when ON:	< 0.1V @2A
Inductive Back EMF Bypass	Yes (Intrinsic Zener)

Keypad and OLED Display

The Wx100 PLC has an integrated HMI that comprises a 16-key tactile keypad and a 128 x 64 pixels graphical OLED display.

This provides users essentially with a zero cost HMI to interact with the PLC.

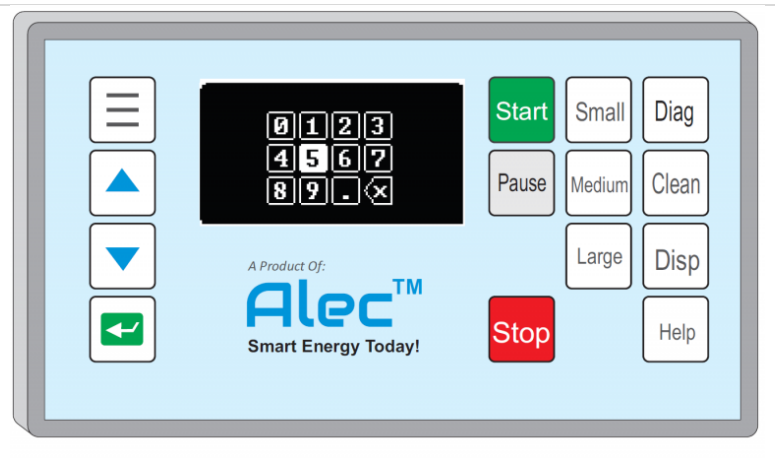


There are simple programming commands that let you very easily create multiple onscreen menus, as shown in some sample screen shots below:



Private Labeling: Customizing The HMI Keypad Legends

OEM with moderate to large volume can work with TRi to design a customized keypad that is specific to the equipment they build and inscribed with their own brand and logo instead of using the standard keypad legend. For example, it is conceivable to customize a keypad as follow:



The OEM will then be able to order the Wx100 PLC with their own branded, customized keypad to be used with their equipment.

Program and Data Memory

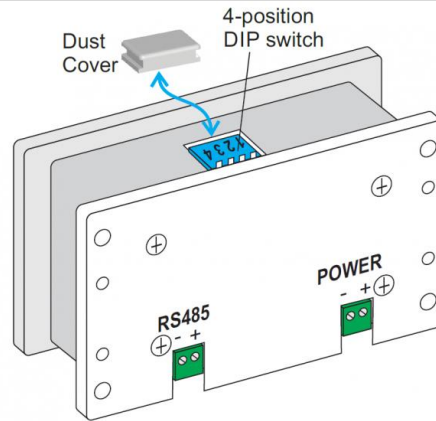
Program Memory	24K words (16-bit) FLASH 10K Write Cycles
Non Volatile EEPROM Memory	14K (16-bit) words EEPROM Store 8, 16 or 32 bit integer data or 32-bit floating point data.
Volatile Data Memory	All TBASIC variables used in the Wx PLC: <ol style="list-style-type: none"> Integer: A to Z, DM[1] to DM[4000], EMINT[1] to EMINT[16] and EMLINT[1] to EMLINT[16] Float: A# to Z#, FP[1] to FP[1000] String: A\$ to Z\$

DIP Switches

There is a 4-position “piano” style DIP switch accessible from the upper side body of the Wx100 PLC.

It may be covered by a silicone rubber dust cover.

To access the DIP switch, simply remove the dust cover to expose the DIP switch and use a pen tip or a small screw driver to turn ON/OFF the switches.



DIP Switch	OFF	ON
SW1-1	–	–
SW1-2	–	–
SW1-3	Regular Wi-Fi networking station mode	Setup the Wx100 PLC to become an Access Point (AP) with an SSID. The PC can connect to this AP to access the PLC and setup its WiFi parameters. (Disables the use of username/password and Trusted IP for FServer and Modbus/TCP Server)
SW1-4	Normal Run mode	Suspends execution of the ladder logic program. But host and Modbus TCP communication remains active.

Real Time Clock

The WxPLC PLC has a built-in Real-Time clock (RTC) but does not have a battery backup option. The RTC will be reset to a factory date when first power on. If the PLC is connected to the Wi-Fi network then it can automatically update its RTC after power on by making a TCP connection to an internet time server or local device/software to obtain Internet time.