



EZ7-TouchPLC Modular Quick Start Guide

EZAutomation

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Warnings

Programmable control devices such as the EZ7-TouchPLC Modular units are not fail-safe devices and such as must not be used for stand-alone protection in any application. Unless proper safeguards are used, unwanted start-ups could result in equipment damage or personal injury. The operator must be made aware of this hazard and appropriate precautions must be taken.

In addition, consideration must be given to the use of an emergency stop function that is independent of the EZ7-TouchPLC Modular.

The diagrams and examples in this user manual are included for illustrative purposes only. The manufacturer cannot assume responsibility or liability for actual use based on the diagrams and examples.

Trademarks

This publication may contain references to products produced and/or offered by other companies. The product and company names may be trademarked and the sole property of their respective owners. AVG Automation disclaims any proprietary interest in the marks and names of others.

Manual part number: EZ7-TouchPLC Modular
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EU Information

The EZ7 Series TouchPLC is manufactured in compliance with European Union (EU) Directives and carries the CE mark. They been tested under CE Test Standard #EN55011, and is submitted for UL Certification. Products with CE marks perform their required functions safely and adhere to relevant standards as specified by EU directives provided they are used according to their intended purpose and that the instructions in this manual are adhered to. The protection provided by the equipment may be impaired if this equipment is not used in accordance with this manual. Only replacement parts supplied by AVG Automation or its agents should be used.

Technical Support

Consult Programming Software Help Directory. You may also find answers to your questions in the operator interface section of our website @ www.ezautomation.net. If you still need assistance, please call our technical support at 1-877-774-EASY or FAX us at 1-877-775-EASY.

SELV Circuits

All electrical circuits connected to the communications port receptacle are rated as Safety Extra Low Voltage (SELV).

Preventative and Maintenance Cleaning

No special preventative measurement is required.

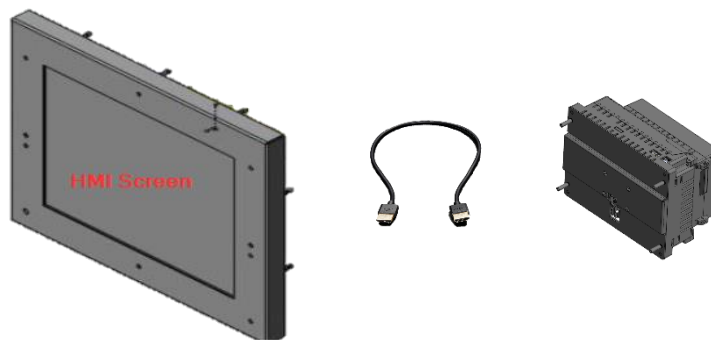
1 Product Overview

Thank You for your interest in AVG Automation's latest unique contribution, the **EZ7 Series TouchPLC**.

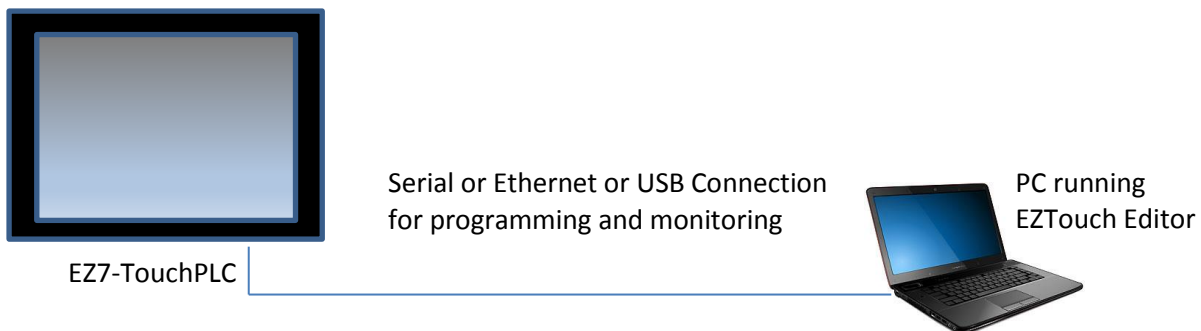
EZ7-TouchPLC is two piece products: Front part containing of display (and touch screen) housed in metal, and a posterior part that has PLC processor. Front part is installed on the front of the control cabinet, while the back part is installed on the back of the control cabinet door. The two are connected using a cable.

This construction has following benefits:

- No large cutouts for the Front and Back PLC, only drill holes for the studs, and a hold for cable
- Easily replace worn-out touch screens instead of changing whole unit
- If required, upgrade to larger display sizes without need to change the back.
- Use the same EZTouch editor that is used for other EZTouch families of TouchPLC
- Support for a variety of PLC Protocols including DH+ and Remote I/O



1.1 System Diagram



1.2 Documents for more information

This manual provides information on installation, wiring and getting started with editor software. Editor software provides help on software. Following documents have more detailed information on the Panel and PLC:

1. [EZ Series Touch Panel Software](#)

2 Part Number

EZ7 is available in 7, 8, 10, and 12 inch display sizes:

EZ7DT-TxC-xx-PLC

Display Sizes

Use	For
7	7" TFT Color
8	8" TFT Color
10	10" TFT Color
12	12" TFT Color

Connectivity

Use	For
E	Ethernet
EH	Ethernet and DH+

Programming software and cable

EZTOUCH-EDITOR
EZ-PGMCBL

TouchPLC Editor runs on windows 7 or higher (common to all EZTouchPLC models)
Serial cable for PC to TOUCHPLC connection

Replacement Part numbers

Back only

EZ7DT-PLC-4BACK EZ7 4 Slot PLC Back (PLC Processor unit)
EZ7DT-PLC-8BACK EZ7 8 Slot PLC Back (PLC Processor unit)

Front (Displays including Touch screen)

EZ7DT-T7C-FR EZ7 7" Inch Display Only
EZ7DT-T8C-FR EZ7 8" Inch Display Only
EZ7DT-T10C-FR EZ7 10" Inch Display Only
EZ7DT-T12C-FR EZ7 12" Inch Display Only

Cable

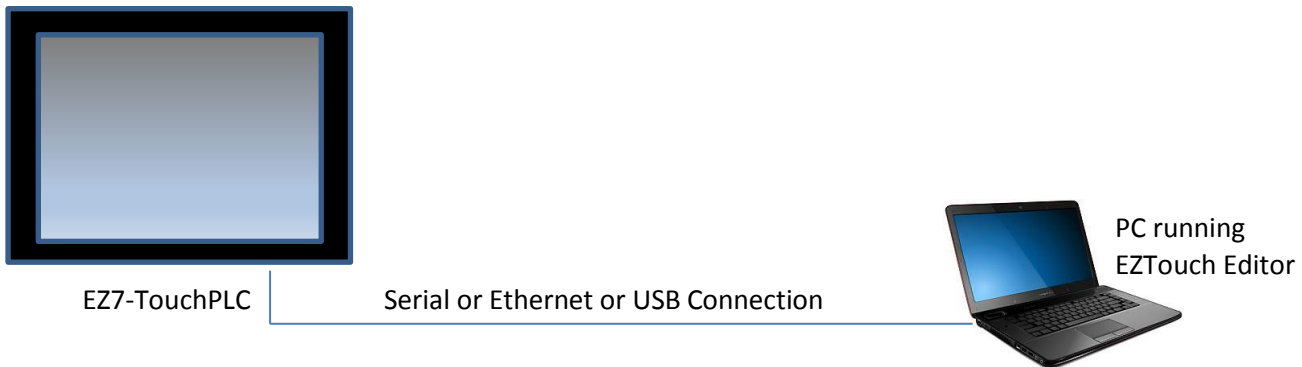
EZ7DT-CBL-012 Cable between Front and back of EZ7, 12"

3 Specification

	EZ7TouchPLC Modular Model Specifications			
Part Number	EZ7DT-T7C-E-PLC-E	EZ7DT-T8C-E-PLC-E EZ7DT-T8C-EH-PLC-E	EZ7DT-T10C-E-PLC-E EZ7DT-T10C-EH-PLC-E	EZ7DT-T12C-E-PLC-E EZ7DT-T12C-EH-PLC-E
I/O Base	4 Slot PLC Base 32 I/Os (Expandable up to 2048 I/O)	8 Slot PLC Base 64 I/Os (Expandable up to 2048 I/O)		
Enclosure	Metal front bezel connects to back-end through HDMI cable, NEMA 4, 4X Class I Div II			
Display Type	7" TFT (65K Colors) Detachable Front panel	8" TFT (65K Colors) Detachable Front panel	10.4" TFT (65K Colors) Detachable Front panel	Detachable Front panel
Brightness/Life	400 nits / 75,000 hours @55 °C			300 nits / 50,000 hours @50 °C
Screen Resolution	800 x 480	640 x 480	800 x 600	
Touch Screen	5-wire Analog Resistive Touch Screen			
Num of Display Screens	Up to 999 Limited by display memory			
Display Screen Saver	Yes, Backlight Off			
HMI User Memory	4MB Built-in Flash Memory (Note Due to how HMI memory is consumed in the EZTouch Hardware this is sufficient for 99% of applications)			
Maximum Power Consumption	25 Watts @ 24VDC		29 Watts @ 24VDC	
Processors	Two 32 Bit, 40 MHz RISC Processors (One for PLC and One for HMI)			
Total PLC Memory	64 KB (Ladder)			
# of PLC Registers	8192 16Bit, 8192 Variables			
PLC Typical Scan Time	3ms (1K Boolean)			
Real Time Clock/Cal.	Built-in			
Battery Backup	Yes (Required only for Real Time Clock as everything else is stored in Flash)			
PLC LED Indicators	Input Power, CPU Status (Run, Program & Run/Program), Low Battery, Program PLC and Run Mode LED indicators			
I/O Supported	EZIO Screw-down modules with status LEDs and Removable Terminal Block; DC / AC / Analog / Relay / Thermocouple / High Speed Counter, PWM, RTD			
Electrical Noise	Nema ICS 2-230 Showering arc; ANSI C37.90a SWC; Level C Chattering Relay Test			
Withstand Voltage	1000VDC (1 minute between power supply input terminal and protective ground)			
Insulation Resistance	Over 20M Ohm between power supply input and terminal and protective ground			
Enclosure	Nema 4, 4x (indoor)			
Operating Temperature	0 to 55°C (32 to 131°F)			
Storage Temperature	-25 to 65°C (-13 to 149°F)			
Vibration	5 to 55Hz 2G's for 2 hours in X,Y,and Z axis			
Shock	10G for under 12ms in the X,Y, and Z axis			
Humidity	10-95% Non-Condensing			
USB & microSD ports	1 USB port for programming, 1 USB port for Datalogging and 1 microSD slot for additional data storage			
Communication Ports	Built-in USB, RS232 and Ethernet Ports			
Agency Approval	UL, CUL, CE			
External Dimensions	8.048" x 6.146" x 4.325" (204.41 x 156.11 x 109.87mm)	10.894" x 8.748" x 4.363" (276.71 x 222.20 x 110.82mm)	13.584"x10.594"x 4.299" (345x269.1x109.20mm)	
Weight	2 lbs		3.5 lbs	4.5 lbs

4 Quick-Start

System diagram shown in introduction is repeated here. As shown, EZTouch Editor is required to program EZ7-TouchPLC. This is a common editor software for all EZTouch Families of panels.



Pre-requisite- Make sure you have everything you need:

This is what you will need to get started:

- EZ7-TouchPLC Unit
- A PC Running Windows 7 or Windows 10 with EZTouch Editor Programming Software* installed
- Proper cable to connect the PC to EZ7 Panel for project transfer and monitoring:
 - RS-232C Programming cable (P/N EZ-PGMCBL) (or make your own) *, and/or
 - USB Type A to Type B cable, and/or
 - Ethernet cable (Ethernet IP must be setup before using Ethernet connection)
- 24VDC Power Supply*
- Optionally, your plc and connecting cable

*These accessories have to be purchased separately

Follow these steps to get started:

1. Please connect power to the unit, and (optionally) connect your PLC.
2. If not already done, please Install EZTouch Editor on the PC. See below.
3. Run EZTouch Edit and start creating project
4. Transfer the project to the panel and start working with screens.

5 Installation

5.1 Guidelines

Safety Considerations

Please follow all applicable local and national codes to ensure maximum safety of the equipment and personnel. The installation and operational environment must be maintained per the latest revision of these codes.

You are responsible to determine the codes to be followed and to verify the compliance of equipment, installation, and operation with the latest revision of these codes.

It is an absolute must to follow all applicable sections of:

- The National Fire Code
- The National Electrical Code (NEC)
- The National Electrical Manufacturer's Association (NEMA) codes

Safety Guidelines

Safety is the most important element of a proper system installation. Adhering to these safety considerations ensures the safety of yourself and others, as well as the condition of your equipment. We recommend reviewing the following safety guidelines:

1) *Disconnecting Main Power*

The main power switch should be easily accessible to the operators and maintenance personnel. It is important to make sure that all other sources of power including pneumatic and hydraulic are de-energized before starting the work on a machine or process controlled by an EZ7 Series TouchPLC.

2) *Safety Circuits*

Most of the machines are installed with safety circuits such as limit switches, emergency stop push buttons, and interlocks. These circuits should always be hardwired directly to the EZ7 Series TOUCHPLC. These devices must be wired in series so that when any one device opens, the PLC is automatically de-energized. This removes power to the machine. These circuits should not be altered in any case, since this could result in serious injury or damage to the machine.

3) *Fail-Safe Operation*

Our products are not fault-tolerant. They are not designed or intended for use as online control equipment in hazardous environments requiring fail-safe performance, such as in operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life-support machines, weapons systems, clutch control systems on presses, in which the failure of the product could lead directly to death, personal injury or severe physical or environmental damage. External fail-safe and/or redundant components are required to make your control system fail-safe.

Installation Considerations

Our products have been designed and tested for operation in the most demanding industrial environments. Modern solid-state industrial controls are complex electronic equipment that operate at low levels of voltage and current, co-existing with components that operate at much higher levels of power. The difference in operating power characteristics between the high and low power control devices creates the possibility of unwanted signals being generated, thus causing interference. The interference, which is a by-product of electrical noise, is not present at all times. However, if it appears at random and for brief periods of time, it can cause disruptions and errors in the operation of a control system.

Enhancement of a system's noise level immunity and its tolerance to other environmental hazards can be accomplished by following proper system installation guidelines. The recommendations are of a general nature and constitute good industrial installation practice.

General Environmental Considerations

Avoid installing EZ7 Series TouchPLC in areas where the following conditions may exist:

- Environmental temperatures above or below those specified by the EZ7 Series TouchPLC
- Prolonged exposure to humidity and liquids which may be sprayed or splashed on the equipment
- Dusty environments where airborne particles may accumulate on equipment causing reduction of heat dissipation and reduction in effective electrical spacing between components
- Areas with excessive vibration
- Areas with high-radiated electrical noise, such as near fields of transmitting antennas and areas in close proximity of arc welding stations

Physical Layout in a Control Cabinet

When possible, cabinets housing electronic equipment should be designed with provisions for natural or forced ventilation to facilitate heat dissipation. Observe the following rules for cabinet installation:

- Heat generating equipment (power supplies and other heat inducing components) should be installed toward the top of the cabinet. The lower space in the cabinet is cooler than the top area.
- Install heat-sensitive components in the lower section.
- Provide enough space between components to allow a free flow of air for better heat dissipation.
- Provide the maximum possible physical separation between solid state and electromechanical controls. If possible, the electromechanical controls (motors, starters, solenoids, etc.) should be housed separately or at the farthest point when enclosed within the cabinet.
- We recommend that the EZ7 Series TOUCHPLC have a minimum clear space of 2" on all sides for adequate ventilation as shown in the image on the left.

Electrical Considerations

This section is designed to provide you with a very basic understanding of electrical noise and how to keep it away from CPUs. Industrial plants have a number of generators of electrical noise that are sometimes also referred to as Radio Frequency Interference (RFI). Anytime an inductive load like a motor, motor starter, or solenoid is turned off, it generates a burst of excess energy that has to flow back to ground, just like electrical energy from a lightning storm has to flow back to Earth. RFI is short bursts of electrical energy at very high frequencies. Other sources include RF Welders or Radio Transmitters.

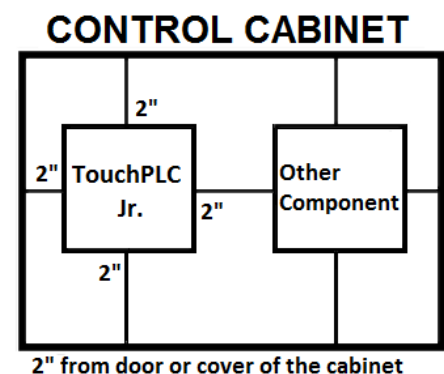
Effect of RFI on Electronic Automation Equipment

Electronic controls use faster and faster CPUs today. These CPUs are also operating at 2.5V to 5VDC logic level power supply. RFI, if allowed to enter the CPU inside, is a killer of logic. A CPU under this environment loses its brain and behaves erratically. A smart industrial-grade CPU like the EZ7 Series TOUCHPLC Card Engine, when faced with RFI, halts its operation instead of giving false outputs.

Types of RFI

RFI enters electronic controls in two ways: radiated RFI or conducted RFI. For most practical purposes, electronic devices, unless sitting right next to a powerful RFI transmitter, will not be affected by noise because air space severely attenuates such interference. On the other hand, conducted RFI travels over conductive surfaces such as power supply wires, electrical wiring of field devices, and worst of all; improper ground planes.

Equipment cabinets usually incorporate one or two doors and/or hinged cabinet panels. Relying on door hinges and swinging panels for a good metallic bond between hinged parts and the main body of the cabinet does not insure adequate grounding. Instead, the use of ground straps is recommended. It is vital for the reliable operation of any electronic device to have any of its metallic surfaces well ground to Earth. This not only provides for safe operation, it will also drain out any conducted RFI to Earth, away from the CPU's signal ground.



Shielding from RFI

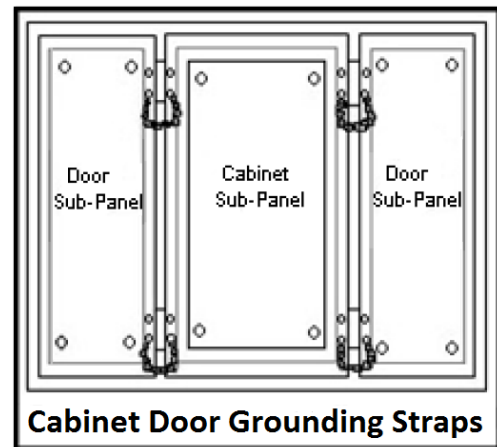
Shielded Cables

Power cables, I/O cables or wiring, and communication cables should all be separate so that they do not couple the conducted RFI on any of these wires/cables. Another path for RFI into the PLC is through its RS232 port. Hence, the cables to this port must be shielded properly.

Equipment Cabinets

As mentioned, equipment cabinets typically incorporate one or two doors and/or hinged cabinet panels. In addition, sub-panels may be utilized on those electronic controls and electromechanical items that are mounted. The goal is to create a medium for mounting the equipment and ensure grounding of the control's chassis to it. However, the door hinges and swinging panels by themselves are not enough to ensure adequate grounding.

Similarly, the equipment enclosures are generally either painted or anodized. Mounting of painted or anodized enclosures to like surfaces also does not ensure good metallic contact between the equipment chassis and cabinet. It is imperative that the equipment chassis are grounded such as through the use of grounding straps as illustrated below.



Cabinet Wiring

The wiring of the EZ7 Series TOUCHPLC to the "field" outside the cabinet must be by design. The wiring cannot be random in order to get the various points of the cabinet and the "field" electrically connected. Below are some general rules that apply in most situations:

Provide a separate power source to electronic controls and keep this power bus away from any I/O power.

The cabinet should be wired with a safety ground (the main safety ground wire gauge is determined by the cabinet's total current consumption) and in accordance with all electrical code requirements.

Once the cabinet doors, stationary sub-panels and swing-out sub-panels have been "strapped" to the main cabinet, it is not necessary to run safety ground wires from the equipment chassis terminals to the main safety ground connection.

The safety ground terminal of each component can, and should be, connected with the shortest wire possible, to the cabinet or sub-panel frame.

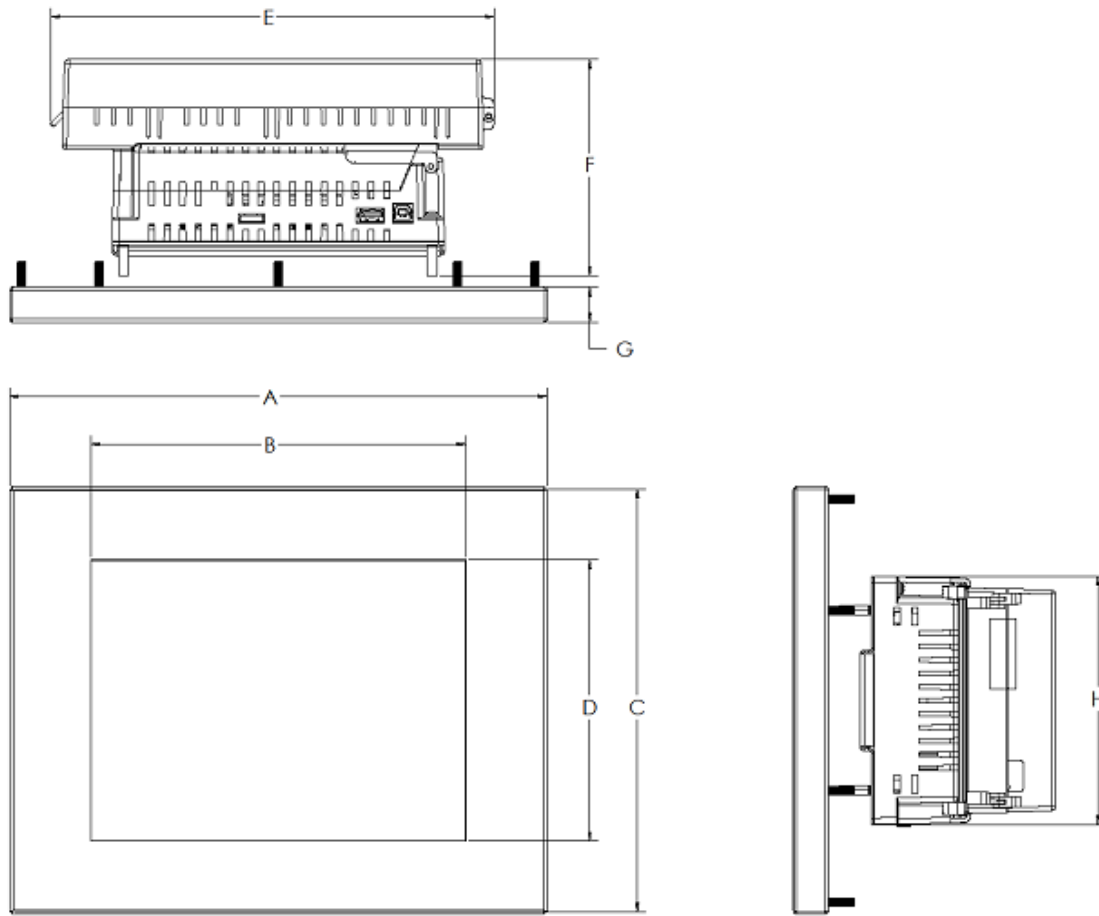
Plan the wiring routing. Keep all switched power in separate ducts and if there is AC and DC power being switched, keep the wiring of each branch separate from all wires and cables carrying low level signals.

Keep all three phase power outside of the cabinet, but if it becomes necessary, keep the runs as short as possible and maintain the maximum possible distance between the three phase bus and all other wiring.

Primary power leads to the control equipment (Base power terminals) should be made with a two wire twisted cable with approximately 12 turns per foot. The length of these cables should be kept to a minimum, and to the greatest extent possible, such cable runs should be kept separate from other wiring.

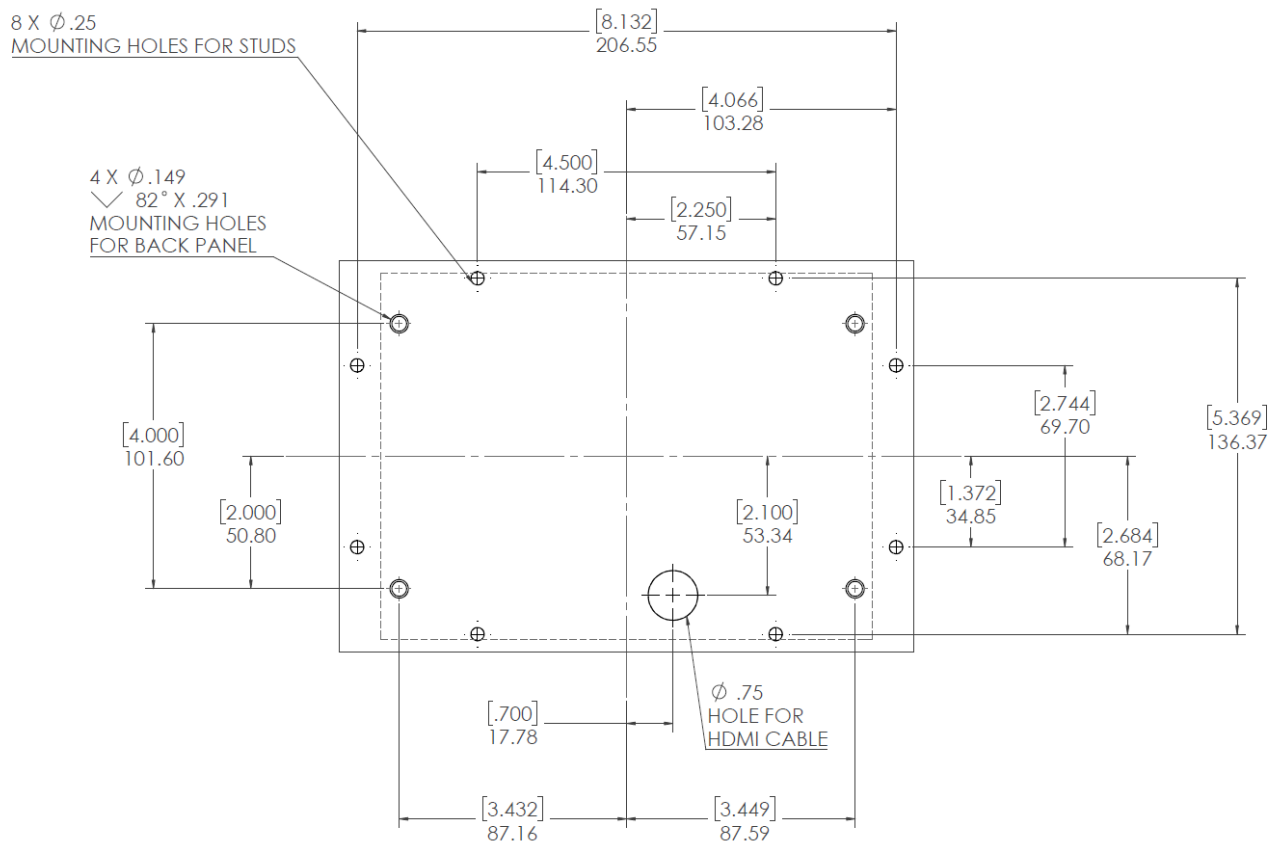
5.2 Mounting Information

5.2.1 Overall Dimensions

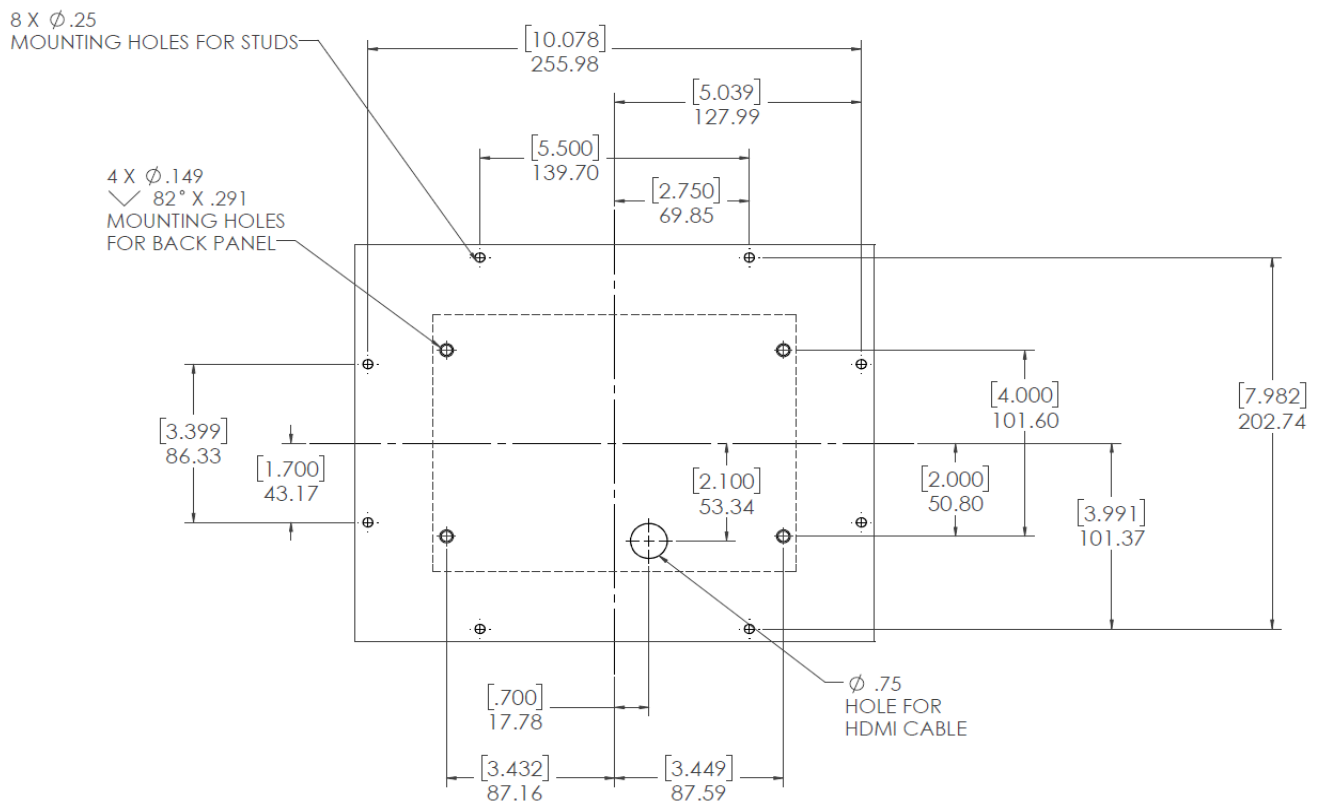


Size	A	B	C	D	E	F	G	H
7"	8.66" [220]	6.09" [154.08]	5.91" [150]	3.43" [87.1]	7.42" [188.3]	4.81" [122.2]	0.78" [19.9]	5.52" [140.2]
8"	10.61" [269.6]	6.41" [162.8]	8.52" [216.4]	4.81" [122.3]	9.89" [251.3]	4.81" [122.2]	0.78" [19.9]	5.52" [140.2]
10"	12.00" [304.8]	8.37" [212.6]	9.50" [241.3]	6.25" [158.6]	9.89" [251.3]	4.81" [122.2]	0.78" [19.9]	5.52" [140.2]
12"	13.19" [335]	9.80" [249]	10.63" [270]	7.38" [187.5]	9.89" [251.3]	4.81" [122.2]	0.97" [24.7]	5.52" [140.2]

5.2.2 T7C (7" Display) Mounting dimensions



5.2.3 T8C (8" Display) Mounting dimensions



5.3 Mounting Instructions

EZ7-TouchPLC comes in two parts:

1. TouchPLC Processor Unit, mounted using 4 studs on backside of the control cabinet door
2. Display Unit, mounted on studs (number of studs depends on size).

A cable connects the two parts, which passes through a $\frac{3}{4}$ " hole in the cabinet door.

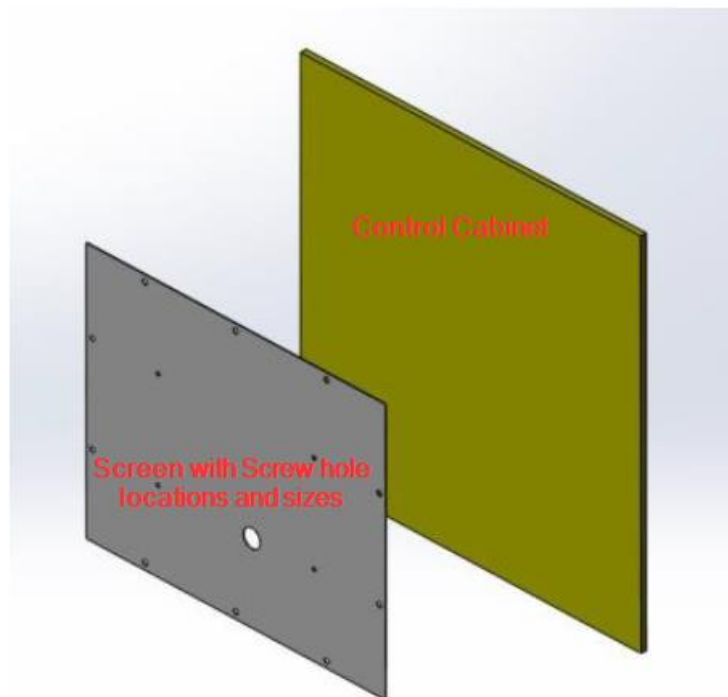
To mount the unit, in summary:

- Mark location of all holes
- Drill holes for the back and front unit mounting studs. (Please note that the mounting holes for the back unit require countersink holes.
- Drill $\frac{3}{4}$ " hole for the cable.
- Connect display cable to the back side and mount the back side
- Thread the display cable through $\frac{3}{4}$ " cable hole to the other side.
- Connect cable to front side and mount the front unit.

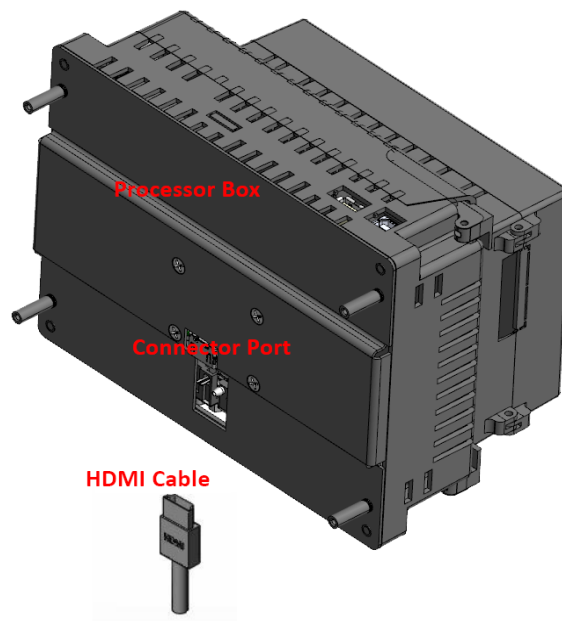
These steps are described below with pictures:

The EZ7-TouchPLC is stud mounted. All the necessary mounting hardware is provided with the unit. Both the processor and the TOUCHPLC screen have studs with nuts provided. Below is a full installation guide with step by step instructions.

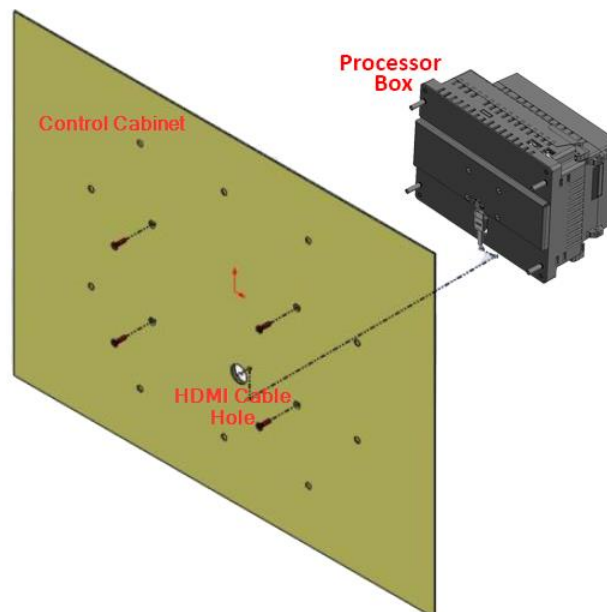
1. Use the provided screen with screw holes indicators to drill holes in your control cabinet.



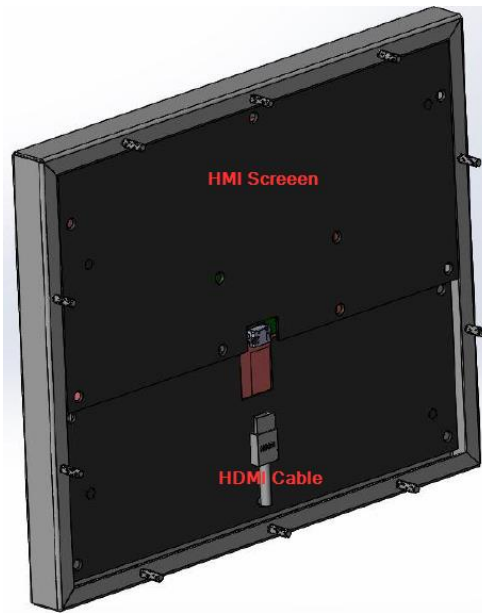
2. Once all the holes have been drilled in the cabinet. Take the Processor Box and plug in the provided HDMI cable into its connector port.



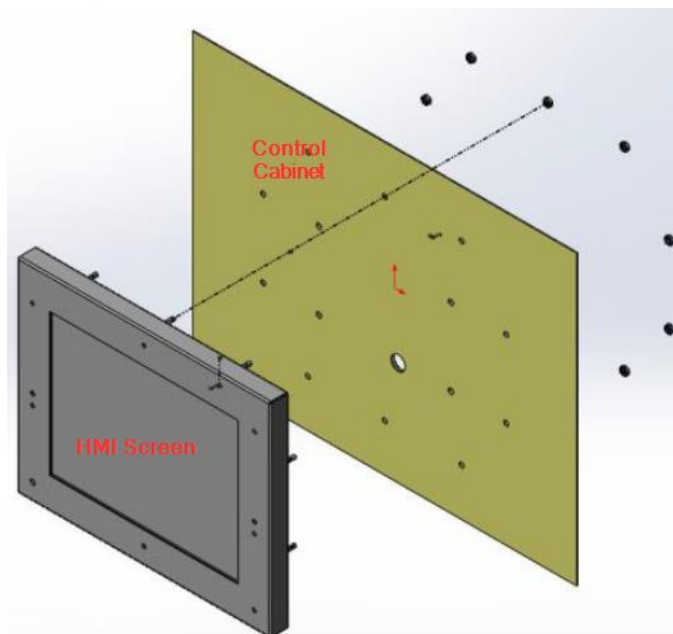
3. Then use the provided screws (6-32 Philips Flat head ½" length. (X 4), Screw driver – Philips #2) to install the Processor Box to the inside of the Control Cabinet. Also make sure that the HDMI cable is pulled through the large middle hole.



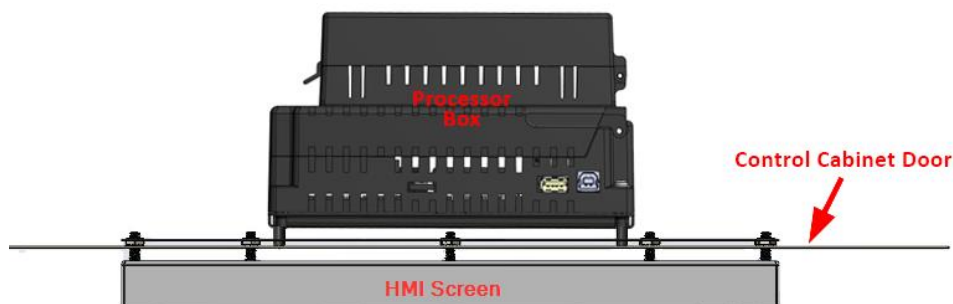
4. Now connect the cable to the Front Display screen, make sure that the cable is pulled through the large middle hole.



5. Now insert all studs through their respective holes, and use provided nuts (Hex-head nut, size 10-32 requiring 3/8" nut driver/wrench) to secure the front to the cabinet.

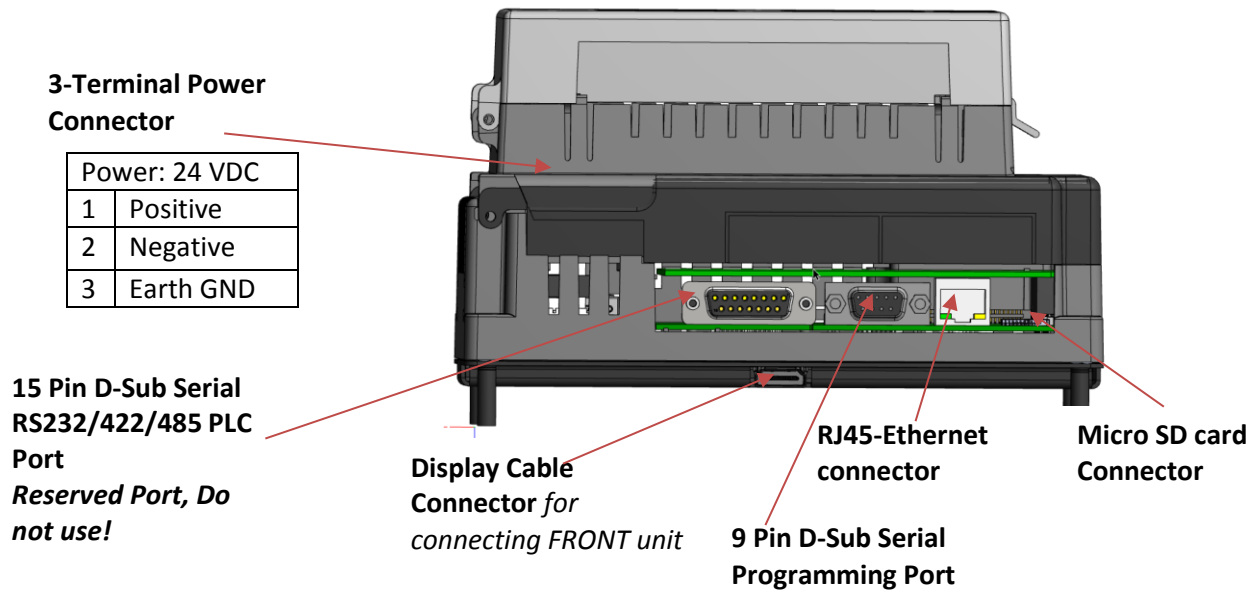


6. When looking from bottom or top the screen should look like the image below.

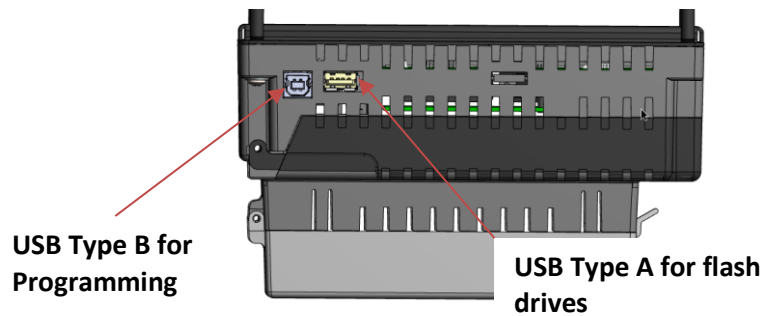
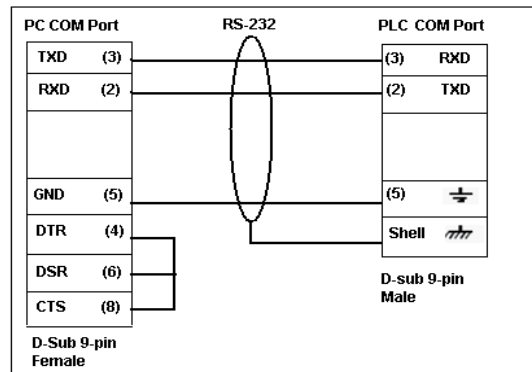


6 Wiring

6.1 Ports and Communications



PGMCBL: Programming Cable Wiring



Indicator Light at the backside of the unit

Flashes Red, then continuously Green	Power connected, Normal Operation
Blinking Red / Continuously Red	Some Panel Issue has occurred. Please try a power cycle, if that does not fix the issue please contact Tech Support.
No Light	Power source not connected or inadequate

6.2 Modular PLC- I/O

EZ7-TouchPLC Modular uses EZAutomations's cube IO modules please check our website for all available module.

[Click here to go online](#)

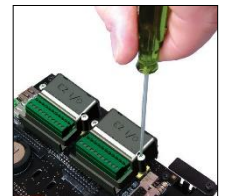
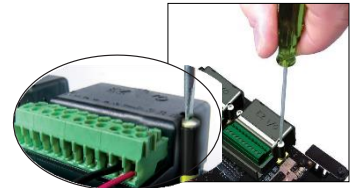
6.2.1 Inserting and Removing I/O modules

Insert I/O modules

EZ I/O modules have a Molex connector & two captive screws which screw-down into base of the PLC. Insert the module in the base and screw down.

Remove I/O Modules

Removed from the female connector on the PLC base, by unscrewing the two captive screws on the sides of the module.



6.2.2 EZ-IO Wiring

Wiring EZI/O Modules

Simply insert the wire and screw to tighten. Use a 2.5mm blade screwdriver Terminal block is rated at 300V, 10A 14AWG.



Removable Terminal Blocks

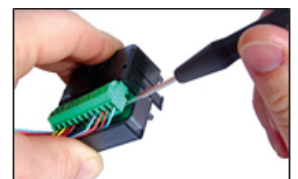
EZIO use removal terminal blocks for easy swapping of modules without need to re-wire.

As EZI/O was built to withstand industrial environments, terminal blocks have a very snug fit on the module. Slip the edge of the screw-driver under the terminal block and lift to pop off.

To insert the terminal block, simply align the terminal block to the pins on the module and insert.

6.2.3 I/O Module Information

For information on I/O module specification and wiring information please check the respective I/O modules wiring instruction insert which comes with product, or [Click here to go online](#) and to download datasheets.



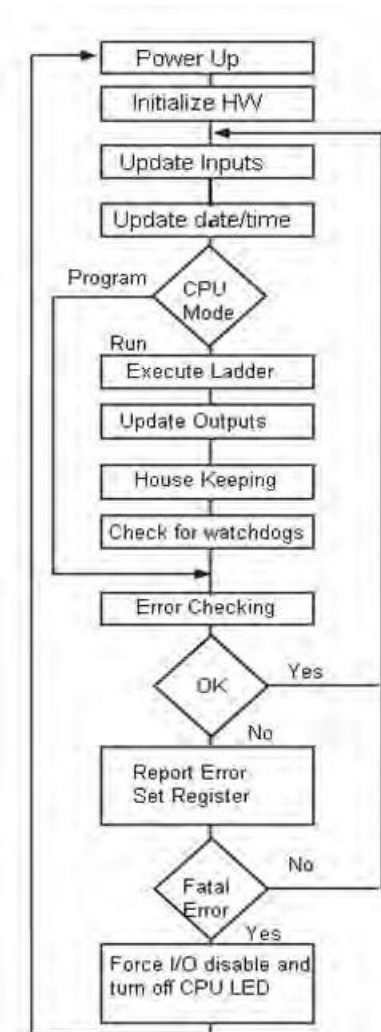
7 Programming

If you already have EZTouch Editor installed, please ignore this section.

EZTouch Editor Software is used to program all EZTouch and EZTouch PLC Panels. This allows you to move projects from one family to another easily. If you don't have a copy of the editor, please acquire one. EZTouch Editor is distributed as a single setup file, typically names as EZTouch Editor x.x.x (FULL).exe, where x.x.x is version number of the software.

To install, just run the file, and follow on-screen instructions. For more information on the editor please refer to the help in software and the EZTouch Editor User Manual (download from website)

7.1 PLC Operation Sequence



A good understanding of the EZ7-TouchPLC Modular CPU operating sequence will help you achieve the proper control for your equipment or process. The flow chart on the left shows how the CPU controls all aspects of system operation.

Power-up Initialization

On power-up, the CPU initializes the internal electronic hardware. It also checks if all the memories are intact and the system bus is operational. It sets up all the communication registers. If all registers are go, the CPU begins its cyclic scan activity as described below.

Read Inputs

The CPU reads the status of all inputs, and stores them in an image table. Image Table is EZ7-TouchPLC Modular internal storage location where it stores all the values of inputs/outputs for ONE scan while it is executing ladder logic. The CPU uses this image table data when it solves the application logic program.

Execute Logic Time

This segment is also called Ladder Scan. The CPU evaluates and executes each instruction in the logic program during the ladder scan cycle. The rungs of a ladder program are made with instructions that define the relationship between system inputs and outputs. The CPU starts scanning the first rung of the ladder program, solving the instructions from left to right. It continues, rung by rung, until it solves the last rung in the Main logic. At this point, a new image table for the outputs is updated.

Write Outputs

After the CPU has solved the entire logic program, it updates the output image table. The contents of this output image table are written to the corresponding output points.

Immediate Inputs/Outputs

There is a possibility that an input changes after the CPU has read the inputs. If you have an application that cannot wait until the CPU returns for the next input scan, you can use Immediate Instructions. These instructions do not use the status of the input from the image table to solve the application program. The Immediate Instructions immediately read the input status directly from I/O modules and update the image table with appropriate status of input module read. Similarly, Immediate Output instructions do not wait for the CPU to complete the ladder scan. Immediate outputs are directly written to the image table and Outputs are updated accordingly.

Subroutines

The CPU executes subroutines when called for in the ladder program. These subroutines are useful in performing the same logic operation time and time again just upon one call so you do not have to repeat the rung logic over and over again.

7.2 Create a Project

EZ Touch Editor 2.2.1
www.ezautomation.net
 1-877-774-EASY(3279)

Step 1: Select Action
 1. **Open / New Project** (circled in red)

Step 2: Project Name
 2. Project Name: MyProject.ezp (circled in red)
 Project Location: C:\EZA\ (circled in red)

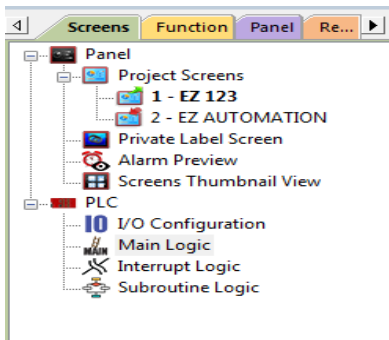
Step 3: EZModel
 3. Panel Family: EZ7 TouchPLC Modular (circled in red)
 4. Size: 10" (radio button selected, circled in red)
 5. Select Model: EZ7DT-T10C-Ex-PLC-E, 10" EZ7 TouchPLC Modular 800x600 (circled in red)

Step 4: Protocol/PLC Model
 6. **Configure I/O** (circled in red)
 7. PC to Panel Connection: Ethernet (radio button selected, circled in red)
 8. Specify IP/Port...: 10.1.200.181/10001 (circled in red)

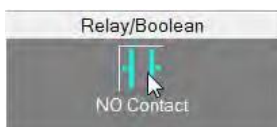
9. Click to Start Designing (circled in red)

- 1 Click on Open/New Project Press ENTER. You may get a confirmation message
- 2 Select Project Name and folder location using Browse button.
- 3 Select EZModel: Panel Family – in this case EZ7-TouchPLC Modular, Junior, Micro and Nano
- 4 Select size (Only radio buttons corresponding to available sizes are enabled)
- 5 From drop down select model (if more than one model is available, drop down would show it)
- 6 Configure PLC I/O (you can configure or modify I/O later also)
- 7 Select PC to Panel Connection—Select Serial for Serial or USB connection for Ethernet, IP address must be set already (see how to set IP address later in the document)
- 8 If Ethernet is to be used, you need to know EZ Unit's IP address. Specify this address her
- 9 Finally click "Click to Start Designing"

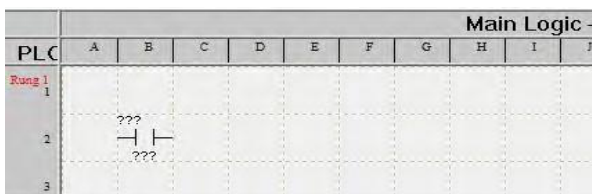
Create PLC Program: On the left side, click on "Main Logic" under the Project Tree to start creating a sample PLC Ladder Logic program as outlined below.



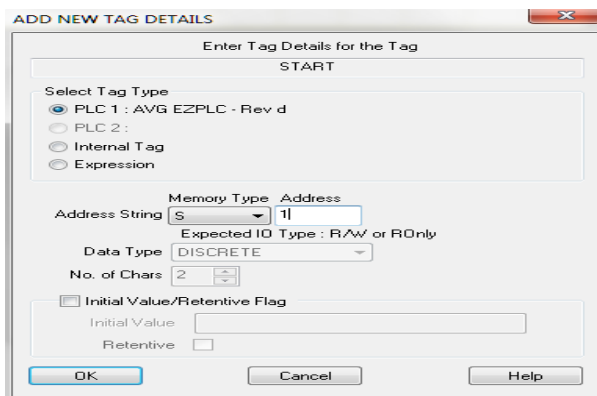
1. Select the "Relay/Boolean" type instruction set in the instruction toolbar (located on the right side of the programming screen). Click on "NO Contact."



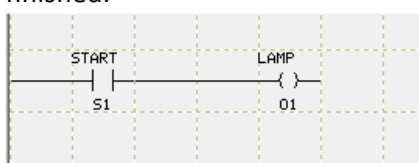
2. Click on the main ladder logic programming window to place the instruction as shown in the image below.



3. Then double-click on the icon and enter the tag name as "Start." Click OK.
4. A new dialog box will appear asking for the PLC address (memory location). Enter "S1" in the field to the right of "Address String." The Data Type should be marked as DISCRETE. Click OK.

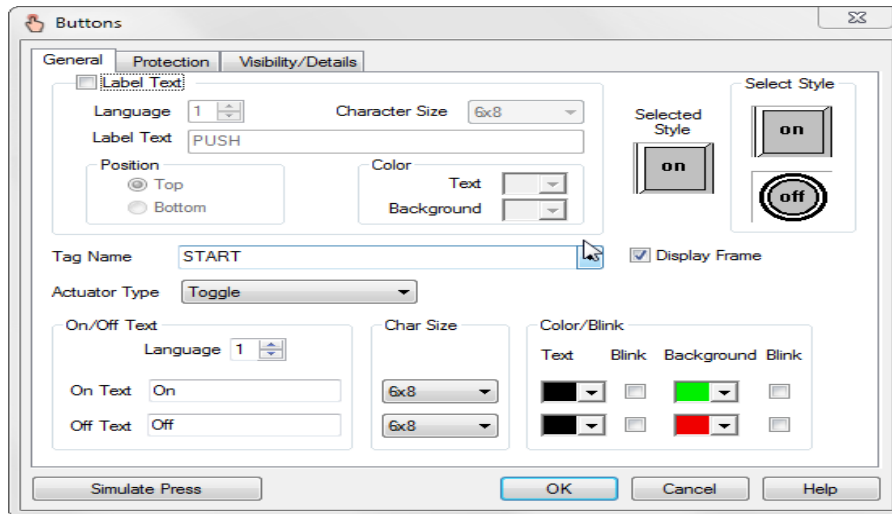


5. Similarly, click on "NO Coil" under the Relay/Boolean instructions and place the instruction in the ladder logic programming window. Double-click the icon to select the tag name as "Lamp."
6. Once again, a dialog box will appear. Enter "O1" as the address string. Click OK.
7. Click on **Instructions > Line** to wire "NO Contact" and "NO Coil." Your screen should look like this when finished:



Create a Panel Program: Click on "Panel" and "Scr 1" to create the Panel display screen as explained in the sample below.

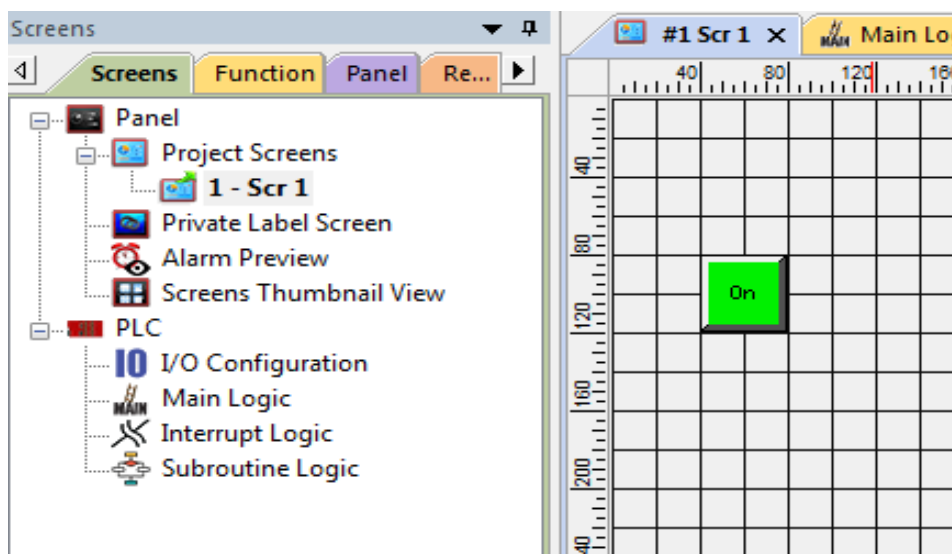
1. In the Main Menu, click on **Objects > Buttons > Buttons**. The screen below will appear. Enter **START** for Tag Name. Click OK.



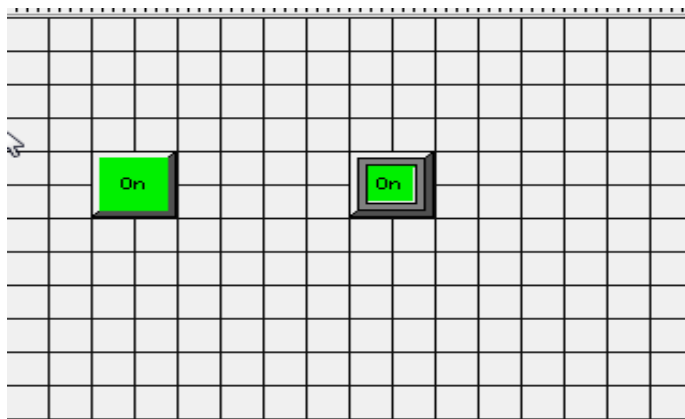
2. A dialog box might appear requesting the memory location. Enter "S1" in the field to the right of "Address String." The Data Type should be marked as DISCRETE. Click OK.



3. Click anywhere on the screen to place the Button object. Double click the icon to open its object dialog box if you need to adjust the object's appearance or attributes. Clicking "Simulates Press" will allow you to toggle between on and off states.



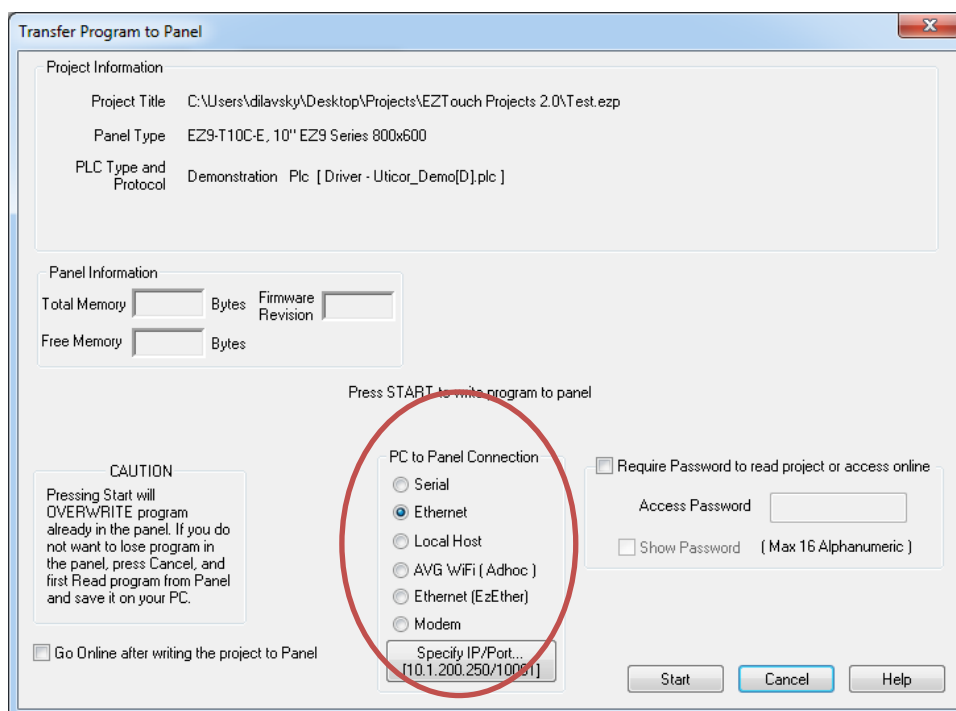
4. Similarly, you can create an Indicator Light Object by selecting **Objects > Data Display > Indicator Light**. Enter **Lamp for** Tag Name. Click OK. Place the object on the panel. Your screen should look like the picture below.



7.3 Transfer Project

After a project is complete, the next step is to transfer the project to the TouchPLC. When editing projects online, programming information is automatically sent to the EZ7 Series TouchPLC unit once the project is saved. When editing in an off-line mode, the project information will need to be transferred. More details about the transfer process is available in our EZ Panel Enhanced Software Manual and the basic instructions are as follows:

From the Project drop down menu, select File > Transfer to Panel. A dialog box similar to the one below will appear.



PC to Panel Connection group box lists several options. You can use Serial or Ethernet, or AVG Wi-Fi (Adhoc) (this requires a special AVG Wi-Fi module that plugs in 9 pin Serial port on panel)

Serial:

Use this option to use Serial port or USB type B on the panel. (When you connect USB cable, the panel would appear as a virtual com port). Here we describe serial port connection to the panel.

1. Verify the RS-232C cable (P/N: EZ-PGMCBL) is connected between the unit and the PC. In the absence of an RS-232 port on the PC, a USB to RS-232 converter may be used to connect the programming cable to the PC.
2. Select in the drop down (that appears next to Serial radio button after the option is chosen) COM port on

the PC that is connected to the panel. And then click Start. If the panel is connected to the right com port, project would be downloaded to the panel.

Ethernet

(Before using Ethernet connectivity, IP address must be setup, please see [Setup IP address](#) below. The IP address of the panel is shown during power up on the panel)

1. Verify the EZ7 Series TouchPLC is connected through the Ethernet connection.
2. Select *Ethernet* as method of transfer, and click Specify IP/Port button. A dialog box will request confirmation of the IP Address associated with the EZ7 Series TouchPLC. Please note that until the IP Address has been changed to match the LAN, the Ethernet connection won't be able to be used to program the unit. If you are unsure of IP Address associated with the EZ7 Series TouchPLC unit, the unit's current IP Address is displayed during the power up sequence.
3. After confirming the mode to transfer the project, click *Start* to write the project data from the PC to the EZ7 Series TouchPLC.

When finished, a Transfer Completed message will be displayed. Click OK to continue and the project is now transferred.

8 CPU Memory

8.1 Memory Types

A PLC system handles many numbers representing different types of information regarding processes/machine parameters. These processes/machine parameters may be anything from status of the input or output devices, timers/counters, or other data values. Before you start programming the EZTouchPLC, it would be helpful if you took a moment to familiarize yourself with how the system represents and stores the various types of data. Each PLC manufacturer has their own conventions for this process in their PLCs.

The [Mapping Conventions](#) section outlines the specific memory types used in the EZTouch I/O in greater detail. The memory types can be used to store a variety of information and can be used within various RLL instructions. See a description of each of the memory types below:

- [Discrete Memory Type](#)
A discrete memory type is one bit that can be either a 1 or a 0 (On or off). Discrete memory area is used for inputs, outputs, control relays, and timer/counter bits.
- [Word Memory Type](#)
A word memory type is a 16-bit location that is normally used to store and manipulate numeric or ASCII data. A word memory location is also called a Register.

The following table displays all the Register/Discrete types supported by the EZTouch I/O along with their address range, syntax, etc.

EZTouch I/O Flex Memory Map					
SYNTAX: TAAAA T - TYPE AAAA - Address of Memory Type in Decimal					
MEMORY TYPE	ADDRESS RANGE	I/O TYPE	VALUE TYPE	SYNTAX EXAMPLES	DISCRETES / REGISTERS RETAINED ON POWER CYCLE
I- Discrete Inputs	1-128	READ_ONLY	DISCRETE	I5	NONE
O- Discrete Outputs	1-128	READ_WRITE	DISCRETE	O6	O1- O128
S- Discrete Internals	1-1024	READ_WRITE	DISCRETE	S4	S1- S1024
IR- Input Register	1-64	READ_ONLY	WORD	1R3	NONE
OR- Output Register	1-64	READ_WRITE	WORD	OR2	OR1 - OR64
R- Register Internals	1-8192	READ_WRITE	WORD	R100	R1 – R8192
SR- System Registers	1-64	READ_WRITE	WORD	SR1	SR1 –SR64
SD- System Discrettes	1-64	READ_WRITE	DISCRETE	SD10	SD1 –SD64
XR- Index Registers	1-4	READ_WRITE	WORD	XR10	NONE
#R – Value Registers	1-4	READ_WRITE	WORD	#R6	#R1 - #R4
Note: Does not Support Access to a Bit of Word (E.g.: R100/ 0, R100/5...etc)					

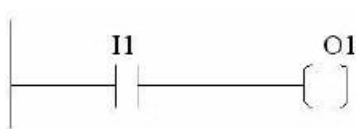
Please Note: Since the PLC Editor is a common programming platform for all the models offered by the AVG PLC family, it may allow you to include 128 Inputs (I), 128 Output (O), 64 input Registers (IR) and 64 Output Registers (OR) in the main logic. However, the TouchPLC Micro only physically supports 24 discrete inputs and 16 discrete outputs; hence it is recommended that you only use I1-I24 and O1-O16 while programming the Micro. Similarly, the TouchPLC Nano only physically supports 16 inputs and 8 outputs; hence it is recommended that you only use I1-I16 and O1-O8 while programming the Nano. The remaining O bits may be used as "Scratch bits." Similarly, only IR1-IR4 and OR1-OR4 should be used to address the I/O Registers, while the rest of the Output Registers may be used as "Scratch Registers." Although there are 64 System Registers (SR) and 64 System Discrete (SD) available in the programming software, many of them are preassigned a function.

8.2 Mapping Conventions

Discrete Inputs/Outputs

Discrete Inputs

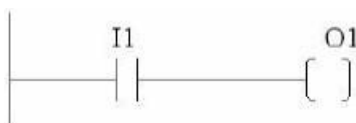
Discrete Inputs are denoted using an "I" pre-fix (e.g. I1, I4, etc.). The maximum number of physical Inputs available in an EZ7-TouchPLC Modular is 24. Hence, you may only use I1 – I24 in your main logic.



Note: All the discrete type EZ7 Inputs are mapped to Discrete Input bits. In the example above, the output bit O1 will be turned on when input I1 allows power through the rung.

Discrete Outputs

Discrete Outputs are denoted using an "O" pre-fix (e.g. O1, O4, etc.). The maximum number of programmable Outputs available is 1 through 128. Discrete Outputs are Read-Write type.



Note: All the discrete type EZ7 Outputs are mapped to Discrete Outputs bits.

Word Inputs/Outputs

Input Register (Word)

Input Registers are denoted using an "IR" pre-fix (e.g. IR1, IR4, etc.). These are 16-bit Word data types (registers). The maximum number of Input Registers available is 1 through 64.

Note: All the EZ7 Analog Inputs (if available) are mapped to Input Registers.

Output Register (Word)

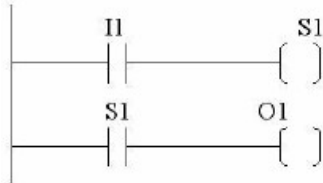
Output Registers are denoted using an "OR" pre-fix (e.g. OR1, OR4, etc.). These are 16-bit Word data types. The maximum number of Output Registers available is 1 through 64.

Note: All the EZ7 Analog Outputs (if available) are mapped to Output Registers.

Internals

Discrete Internals (Discrete)

Discrete Internals are denoted using “S” pre-fix (e.g. S1, S4, etc.). There are 1024 Discrete Internals available in the EZ7-TouchPLC Modular. Internals are Read-write type and are used as “Scratch bits”. Discrete internal bits are mainly used to control the user logic program. They do not represent a real physical device, like a switch, output coil, etc. They are only internal to the CPU. You cannot program discrete internals as discrete inputs or discrete outputs for the physical inputs or outputs.



Note: In this example, memory location S1 will be powered when input I1 turns on; you can then use a discrete internal as an input in another rung.

Register Internals (Word)

Internal Registers are denoted using an “R” pre-fix (e.g. R1, R4, etc.). These are 16- bit Word data types (registers). There are 8192 Internal Registers available in the EZ7-TouchPLC Modular. “R” are Read-Write type of data registers.

System

System Discretes (Discrete)

System Discretes are denoted using an “SD” prefix (e.g. SD1, SD4, etc.). SDs are discrete memory locations with pre-assigned functionality. There are many different types of System Discretes. They are used to help in logic program development, provide system operating status info and more.

Note: Many System Discretes are preassigned a function.

System Registers (Word)

System Registers are denoted using an “SR” prefix (e.g. SR1, SR4, etc.). These are 16- bit Word data types (registers). System registers are Read-Write type data points.

Note: Many System Registers are preassigned a function.

Index and Value Registers (Word)

The Index Register data type is represented by an “XR” prefix (e.g. XR1, XR2 etc.). There are 4 XR memory locations available in EZ7-TouchPLC Modular. “XR” is a Read- Write data type and it is mainly used to point to the correct address of “R” registers. The pointed-to “R” registers data value is stored in “#R” registers.

Value Register data type is represented by a “#R” prefix (e.g. #R1, #R2 etc.). There are 4 #R memory locations available in EZ7-TouchPLC Modular. “#R” is a Read-Write data type and it is mainly used to read/write value of “R” registers as pointed out by “XR” registers.

Both XR and #R registers are used in conjunction with each other and provide a convenient way of addressing R registers.

Example:

Let's assume data values: R59=9874, R8000=32 If XR1=59

Then #R1=9874 (the actual data value of R59) If XR2=8000

Then #R2=32 (the actual data value of R8000)

XR contains the address of the operand (or specifies a register that contains the effective address), #R is used to read or write the actual operand. Indirect addressing is often combined with pre- or post-increment (or decrement) addressing. This allows the address of the operand to be increased or decreased by the specified number either before or after using it. Proper usage of XR variables often saves a lot of programming.

9 Setting IP Address and Date/Time

9.1 Set up IP Address

This section applies only to the units purchased with Ethernet capabilities. Each EZ7 Series TouchPLC unit with Ethernet comes with a factory-programmed IP Address that may need edited to be compatible with your LAN network. The serial port (COM1), in combination with the editing software, can be utilized to update the IP Address information. Alternatively, you can download our free IP Configuration Utility to make the necessary changes to the IP parameters.

IP Address can also be changed by using an object on the screen. (**Menu: Object > Screen Change > Goto Setup Screen**). This object on the panel when pressed would bring up IP address setup screen.

9.1.1 Using EZTouch Editor Serially Connected to EZ7:

The EZ7-TouchPLC Modular will arrive with a factory-programmed IP Address that may need edited to be compatible with your LAN network. Once the IP Address has been adjusted to the LAN, the EZ7-TouchPLC Modular can receive programming instructions through either the serial port (COM1) connection or via the Ethernet. Follow the steps below to use the editing software to update the IP Address information through a COM port on the EZ7-TouchPLC Modular.

1. Insert a USB cable or EZ-PGMCBL programming cable. Then launch the editing software EZTouch Editor.
2. Select Edit Program OFFLINE and enter a project name (e.g. Test). Click OK.

Step 2: Project Name

Project Name : Example.ezp Browse...

Project Location : C:\EZA\

3. Select EZ7 under Panel Family. Then select the size appropriate for your purchased unit (7", 8", 10" or 12").

Step 3: EZModel

Panel Family
☐ EZTouch ☒ EZTouch PLC ☐ Legacy
 EZ7 TouchPLC Modular Jr.

Size
☐ 4" ☐ 5.1" ☐ 6" ☒ 7" ☐ 8" ☐ 10" ☐ 12" ☐ 15"

Select Model
 EZ7DT-T7C-E-PLCJ, 7" EZ7 TouchPLC Modular Jr. 800x480

4. Under PLC, select EZPLC as PLC Model and then select purchased PLC type.

Step 4: Protocol/PLC Model

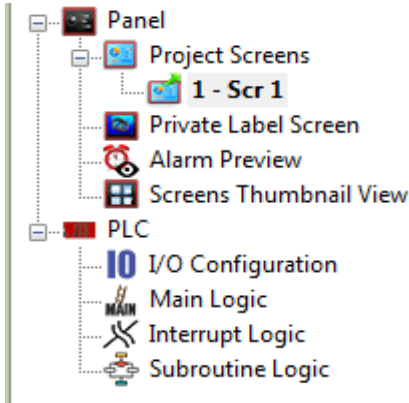
PLC1 / Drive
 PLC Manufacturer : AVG Protocol / PLC Model: EZPLC - Rev d / G View/Edit PLC Com Setup...

PLC Type
☐ Std PLC ☒ Jr PLC ☐ Nano PLC ☐ Micro PLC

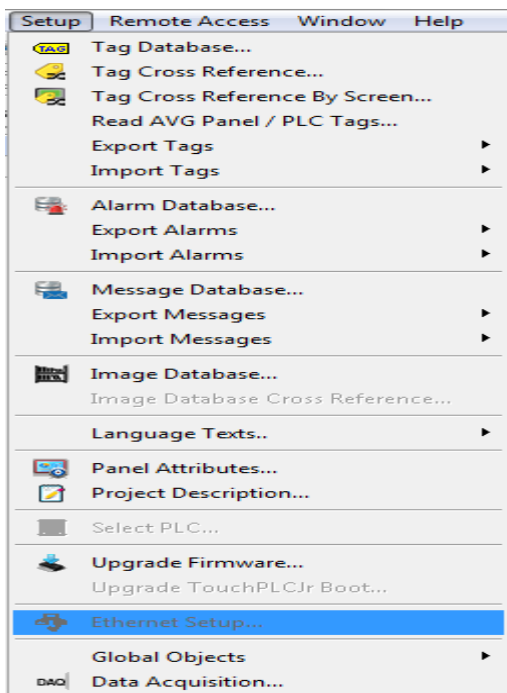
PLC I/O Modules
 4 Modules (32 I/O) Configure I/O

5. Click OK to launch the editing software program.

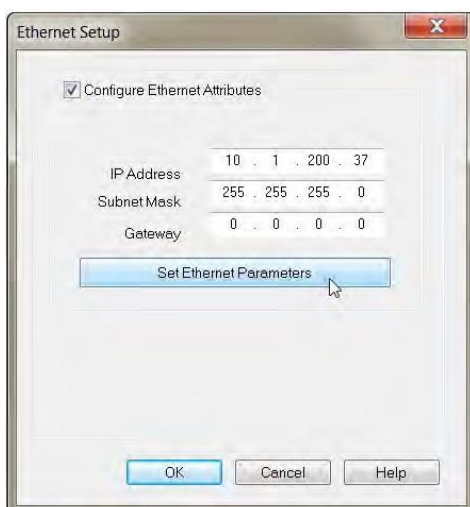
6. The Main Project Window will then appear showing both the PLC and Panel sides to the program. To adjust the IP Address, the Panel side will need to be selected.



7. Click **Set-up > Ethernet Set up**. A dialog box will appear displaying the current IP parameters.



8. Once the dialog box appears, select 'Configure Ethernet Attributes.' Type in the necessary changes and click 'Set Ethernet Parameters.' Click OK.



9. Next, save the project.

9.1.2 Using IP Configuration Utility:

The IP Config Utility enables IP parameter editing through the Ethernet connection and allows automatic discovery of AVG devices connected to the local area network (LAN) even if a device's IP address is not on the same subnet. To download this free utility please visit our website at www.ezautomation.net and click on the downloads tab.

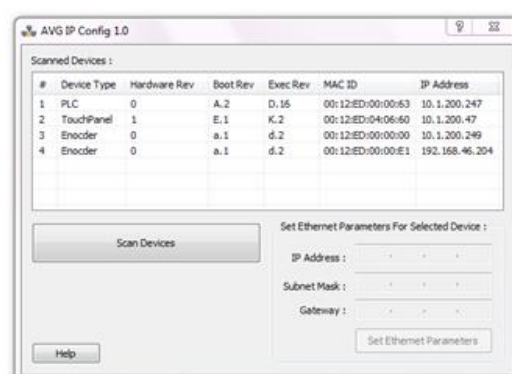
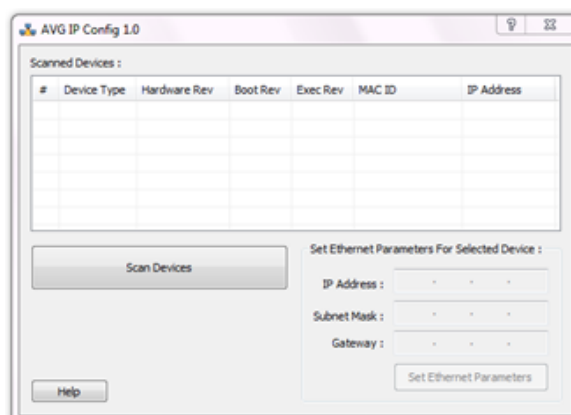
1. Install the IP Config Utility.
2. Once installed, launch the software by clicking on its icon or loading it from the Start Menu. A dialog box similar to the one shown below will appear.
3. Click 'Scan Devices' to locate available AVG devices on the network. While the utility scans, a dialog box will appear temporarily.

Note: If the computer has multiple networks, the utility will prompt you to choose one. Please select the network connected to the EZ7 Series TOUCHPLC unit.

4. When the utility is finished scanning, a list of AVG devices will populate the field similar to the example shown below.
5. Next, identify the device in the list that you would like to edit. For example, if you know its current IP address, MAC-ID, or it's the only device of its type, use this information to select it from the list.

Note: The EZ7 Series TouchPLC displays the MAC-ID address and current IP address at start up.

6. Once selected, the current IP address information for the unit will appear in the IP address field. Type in the necessary changes.
7. Click 'Set Ethernet Parameters' to save the new values for the device.



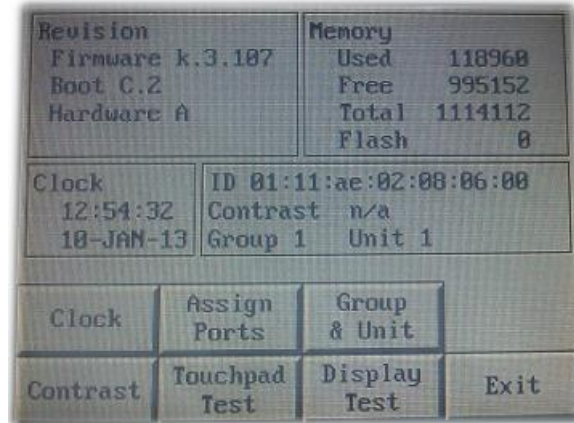
Once the IP Address has been changed, the EZ7 Series TouchPLC can receive programming instructions through either the serial port (COM1) connection or via the Ethernet.

9.2 Setting Date/Time

The EZ7 Series TouchPLC maintains a Real Time Clock (RTC) which can be adjusted from the EZ7 Series TouchPLC unit itself. Touch upper left corner of the panel for more than 6 sec. After selecting the appropriate language for the unit, the screen below will appear displaying the current firmware, the available memory as well as the time and date set on the unit.

To change the Time/Date:

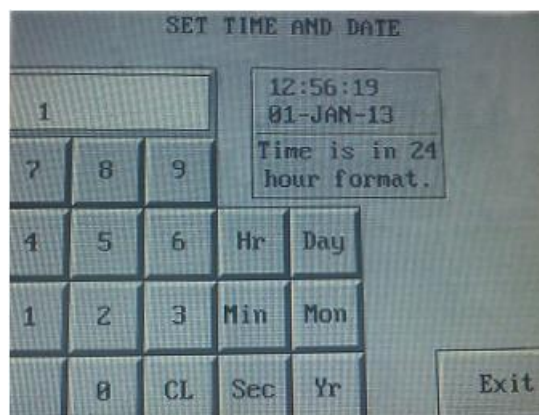
- 1) Press the Clock button.



- 2) A new screen loads which displays a numeric keypad. Enter the hour first, then select Hr to change the hour. Do the same to enter the minutes. Time is displayed in a 24 hour format.

NOTE: If at any time during this process, an incorrect number is pressed, you may use the CL button to clear the entry.

- a. For example, to enter a time of 8:34 am you would press 8 then the Hr button.
- b. Press 3 then 4 followed by the Min button. (Seconds can be inputted as well.)



- 3) Similarly, to change the date, enter the correct day and then press the Day button. Do the same for Month and Year.

NOTE: Since the selection is limited to two digits, only the last two digits from the year may be entered and displayed.

- a. For example, to change the date to January 1, 2013 you would press 1 then Day.
- b. Press 1 then Mon.
- c. Press 1 then 3, followed by Yr.
- 4) Once finished, press Exit to return to the previous screen. Pressing Exit again will bring you back to the main screen.

10 Maintenance and Troubleshooting

10.1 General

Hardware Maintenance

Routine maintenance checks should be performed on the unit to avoid any risk of hardware problems. The EZ7 Series TouchPLC is designed to be a very rugged controller so that just a few checks periodically will help keep it up and running.

The key points to be checked include:

- a. Ambient operating conditions
- b. Wiring and connections

Maintaining the Ambient Operating Conditions

Keeping the EZ7 Series TouchPLC's environment within specified operating conditions is the best method to minimize the maintenance.

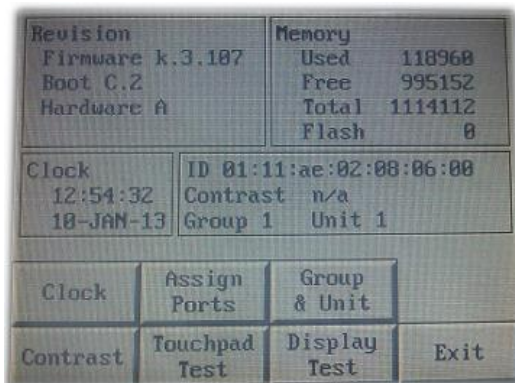
1. Always ensure that ambient temperature inside the cabinet is within EZ7 Series TouchPLC's temperature ratings.
2. If any other equipment inside or outside of the cabinet is producing heat, employ cooling methods like a blower fan to reduce 'hot spots' around the EZ7 Series TouchPLC
3. Periodically inspect and clean if there are any air filters on the cabinet. Ensure that the PLC is free from dust, humidity and corrosive gases.

10.2 Display Verification Tests

The EZ7 Series TouchPLC allows for you to run display verification tests in the field that can check the pixel display and the response of the touchscreen interface. Follow the steps outlined below to utilize these tests.

First, simultaneously press the upper left corner and the bottom left corner of the screen to reach the language selection screen. After selecting the appropriate language for the unit, the screen below will appear displaying the current firmware, the available memory as well as the time and date set on the unit.

To test the touchpad response:



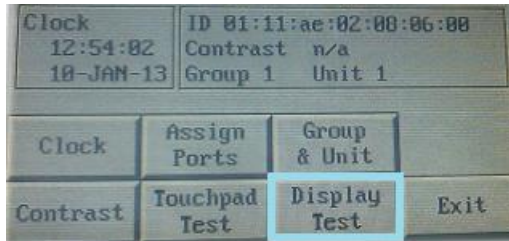
1. Press the Touchpad Test button.



2. A new screen will appear. Press each box individually to ensure that the touchscreen is properly responding.
3. Once finished, press Exit to return to the previous screen. Pressing Exit again will bring you back to the main screen.

To test the pixel display:

1. Press the Display Test button.



2. The screen will then automatically go through a variety of colors. Verify if all elements of the screen are lighting up appropriately.
3. Once finished, press Exit to return to the previous screen. Pressing Exit again will bring you back to the main screen.

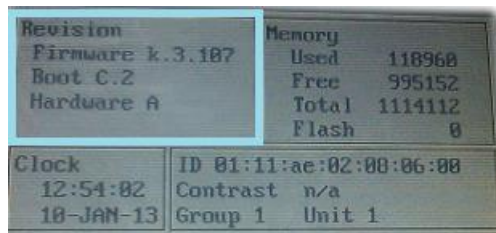
10.3 Update Firmware

Typically, when power flows to the EZ7 Series TouchPLC unit's power terminals, the indicator LED (located on the back of the unit) displays a blinking green LED. If the indicator LED is blinking red, then the firmware on the unit needs updated.

NOTE: Back up the user program stored on the EZ7 Series TouchPLC unit prior to updating the firmware. Existing programs that are saved to flash memory must be resaved to Flash after the upgrade.

To check firmware version:

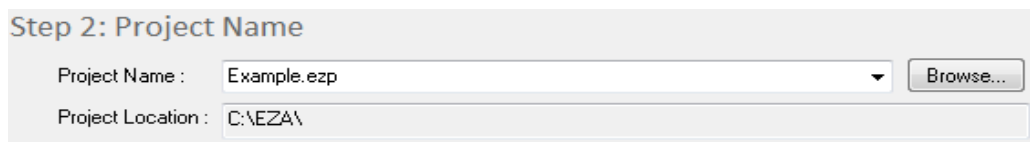
1. Simultaneously press the upper left corner and the bottom left corner of the screen to reach the language selection screen. Select the appropriate language.
2. The upper left corner will then display the firmware currently enabled on the unit.

**To update firmware:**

There are several methods to update the firmware for an EZ7-TouchPLC Modular unit. Previously, it was explained how to update firmware through an OEM Packager file. Alternatively, the user can follow the steps below to update firmware through the EZ Series Software and a COM port on the EZ7-TouchPLC Modular unit.

Note: A firmware upgrade will wipe out the existing project in the unit; it is always advised to take a backup of the project before firmware upgrade process.

1. Insert the EZ-PGMCBL programming cable into the COM1 port. Then launch the EZ Panel Editor software.
2. Select Edit Program OFFLINE and enter a project name (e.g. Test). Click OK.



- Under Panel Family, select EZ7 Series. Then select the size appropriate for your purchased unit (7", 8", 10" or 12").

Step 3: EZModel

Panel Family
☐ EZTouch ☒ EZTouch PLC ☐ Legacy
 EZ7 TouchPLC Modular Jr.
 Select Model EZ7DT-T7C-E-PLCJ, 7" EZ7 TouchPLC Modular Jr. 800x480

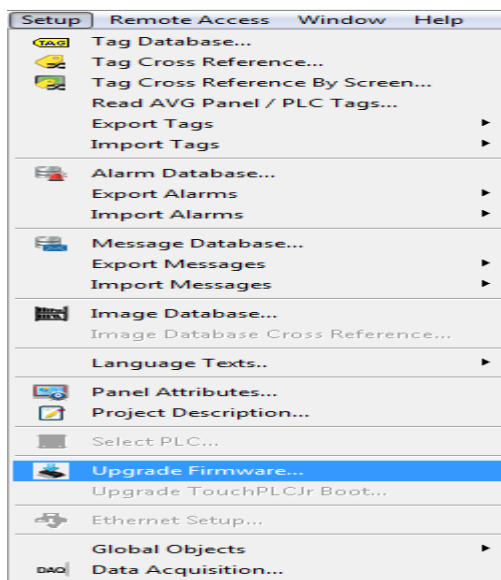
Size
☐ 4" ☐ 5.1" ☐ 6" ☒ 7" ☐ 8" ☐ 10" ☐ 12" ☐ 15"

- Under PLC, select EZPLC as PLC Model and then select purchased PLC type (Jr PLC).

Step 4: Protocol/PLC Model

PLC1 / Drive
 PLC Manufacturer : AVG Protocol /PLC Model: EZPLC - Rev d / G View/Edit PLC Com Setup...
 PLC Type ☐ Std PLC ☒ Jr PLC ☐ Nano PLC ☐ Micro PLC
 PLC I/O Modules 4 Modules (32 I/O) Configure I/O

- After the project loads, click **Setup > Upgrade Firmware**. A dialog box will appear requesting the firmware file you would like to load to the unit.



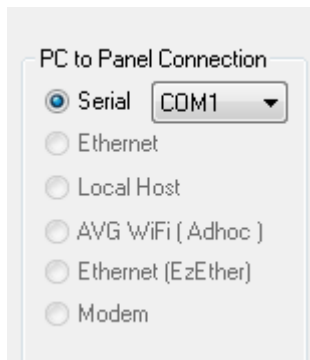
- Use Browse to locate the appropriate firmware version.

☒ Select firmware file for upgrading PLC
 The PLC firmware upgrade file is usually named as PLC(Jr)_x.x.hex_plc (x.x being the firmware version, ie. A.1). Please select PLC(Jr)_x.x.hex_plc (or the file under which you have saved the firmware upgrade file)
 C:\Program Files (x86)\EZAutomation\EZTouch Editor\Firmware\PLC_JR_C_4_82.f Browse...

☐ Select firmware file for upgrading panel
 The firmware upgrade file is usually named as Touchpanel(Jr)_x.x.hex (x.x being the firmware version, eg. H.0 and Jr for specifying TouchPanelJr Panel Firmware files). Please select Touchpanel(Jr)_x.x.hex (or the file under which you have saved the firmware upgrade file)
 Browse...

Firmware Location
 Firmware is generally stored under following directory:
 C:\Program Files (x86)\EZAutomation\EZTouch Editor\Firmware\

7. Verify Serial (COM1) is selected under the PC to Panel Connection, then click OK.



10.4 Troubleshooting

If you encounter difficulties while using our EZ7 Series TouchPLC device, please consult the table below. Additional assistance is also available within the **Panel Editor Programming Software** Help. Alternatively, you may also find answers to your questions on our website www.ezautomation.net.

Problem		Possible Cause	Suggested Action
Operation	Indicator LED is off	Disconnected or faulty power source	Check and repair power source. Also check the wiring for loose contacts and secure them if found. Finally ensure that proper polarity is observed.
		Input power level is outside of Touch EZ7's power rating specifications	Ensure that the power being presented to the EZ7 Series TouchPLC terminal is within the <u>specified range</u> .
	Indicator LED is blinking red	Outdated firmware	Update <u>firmware</u> for unit.
	Real Time Clock function not enabled	Low Battery	Remove old battery and <u>insert</u> new CR1220 3V lithium battery.
Communication	No communication with PC via Ethernet	Disconnected or loose cable	Check the wiring for loose contacts and secure them if found.
		Wrong IP Address	Update <u>IP address</u> associated with unit and reattempt a connection.
	No communication with the PC (RS232 Port error)	Disconnected or loose cable	Check the wiring for loose contacts and secure them if found.
		Wrong/broken cable	Ensure the correct communication cable is being used (PGMCBL).
		Wrong communication port settings	Check and correct the COM port attributes.
		Wrong COM port assignment on the computer	Check if correct Serial Port (Com1) assignments on the computer have been made.

Still Need Help?

Technical Support

Most of the frequently encountered problems regarding the EZ7-TouchPLC Modular unit's operation are answered in the sections above. However, if you still need answers to your questions, please call our technical support at 1-877-774-EASY or email us at **techsupport@ezautomation.net**.

Warranty Repairs

If your EZ7-TouchPLC Modular is under warranty, contact us at **1-877-774-EASY**.

Out of Warranty Services

If your EZ7-TouchPLC Modular is out of warranty, contact EZ Automation at 1-877-774-EASY for an evaluation of repair costs. You can then decide whether it is more economical to proceed with the repairs or to upgrade your system with a new unit.