

Document Change Log

1st April 2013

Document created.

13th July 2013

Software configurations added.

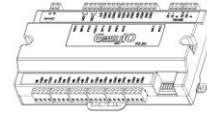
27th Sept 2014

FC now support pulse input.

6th June 2015

Serial address image.

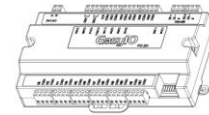
Serial Port settings explanations.



Disclaimer

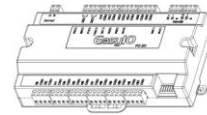
EasyIO FC-20 is a product by EasyIO Holdings Pte Ltd

Sedona Framework is a trademark of Tridium, Inc.



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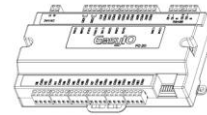
Introduction

The EasyIO FC series is aimed at affordable 'canned' solutions for standalone applications, such as Roof Top Units, Fan Coils, AHU's, package units etc.

EasyIO FC20 controller comes with built in bootloader program. Built in bootloader program will enable user to upgrade firmware without sending back to factory.

EasyIO FC20 does not have a Ethernet port. It only has RS 485 serial port.

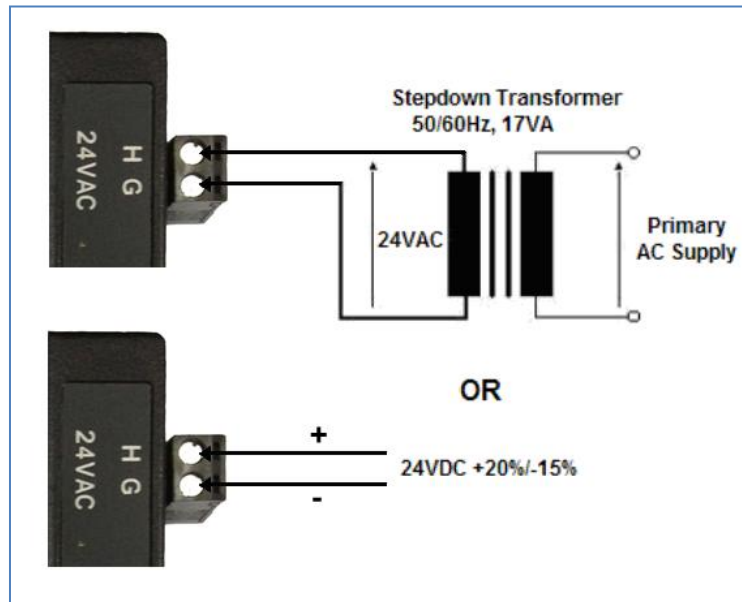
The only way for firmware upgrading is through serial.



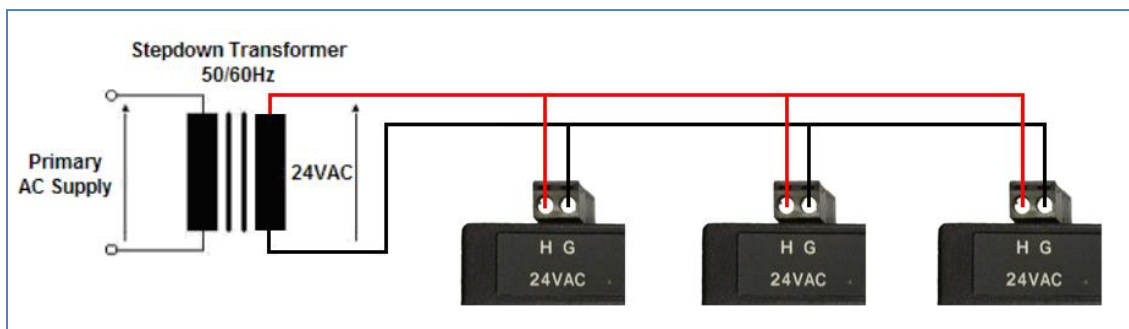
Hardware Configurations

Power supply Connection

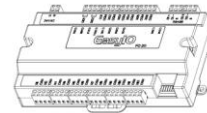
Both AC and DC can be used for EasyIO FC-20 controller. Refer to electrical specification for the working range. In order to avoid damage on the controller input/output devices and RS485 connection, use individual power supply for each controller. If a single power supply is used, make sure controller power supplies are connected with the same polarity.



Power Supply Connection



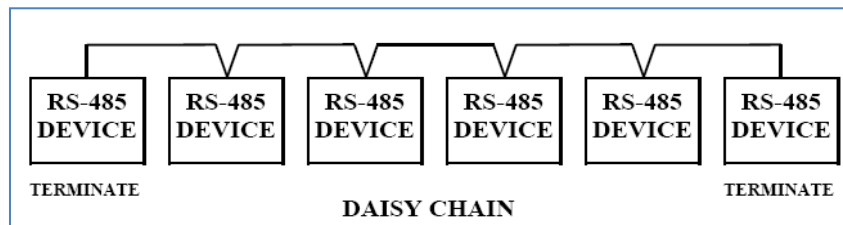
Multiple controllers share single transformer connection



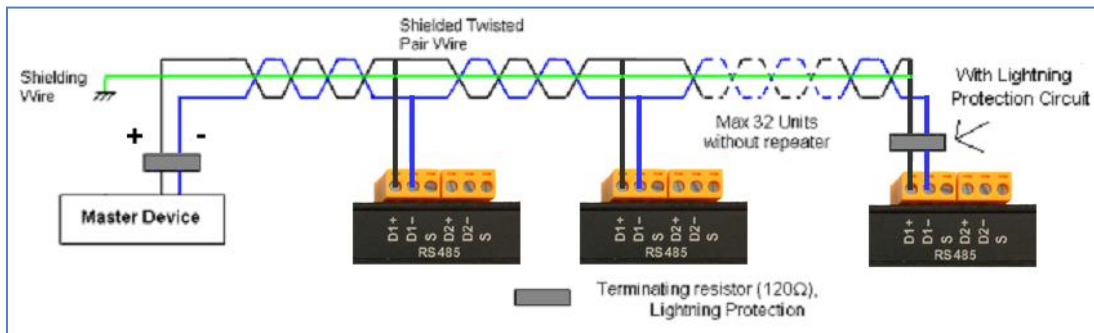
RS485 Connection

RS485 connection must be terminated at both ends with termination resistor, typically 120Ω. It is recommended to use shielded twisted pair wire (STP) for the wiring. Lightning protection circuit is recommended to be installed at one end of the wiring. The controller should be wired in daisy chain network topology as shown as image below. If wire branch can be avoided, keep it as short as possible, and never connect more than one device to the wire branch.

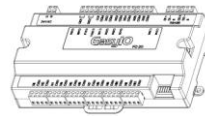
Be careful if single power supply is used for all connected RS485 device, make sure all devices are having the same ground connection. Make sure you are connecting the same wire for the same terminal position, all “H” terminals connected to the same wire.



Daisy Chain Network Topology



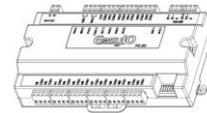
RS485 Connection



RS 485 Serial port settings.

Every EasyIO FC controller comes with 2 RS -485 ports respectively D1 and D2.
Below is a table explaining the details for each serial port configurations.

Port Number	Protocol Communications supported	Default Serial port settings	Remarks
Port 1 (D1+ , D1-)	Modbus OR BACnet Protocol selection is done via DIP switch 1.	Modbus Baud Rate : 19.2K Parity : even Data Bit : 8 (Not editable) Stop Bit : 1	Port 1 is used to perform; - Firmware flashing. (<i>FwTool.exe</i>) - Virtual Device for program downloads. (<i>FcVirtualDevice.exe</i>) - Terminal mode for serial configurations editing. (<i>FwTool.exe</i>)
	DIP 1 = OFF = Modbus RTU DIP 1 = ON = BACnet MSTP	BACnet Baud Rate : 19.2K	
Port 2 (D2+ , D2-)	Only supports Modbus RTU Protocol (Default). It supports Modbus Master as well if configure via FC Virtual Tool.	Modbus Baud Rate : 19.2K Parity : even Data Bit : 8 (Not editable) Stop Bit : 1	If port 2 is configured Modbus Master RTU (<i>Default</i>) Port 2 is used to perform; - Virtual Device for program downloads. (<i>FcVirtualDevice.exe</i>)



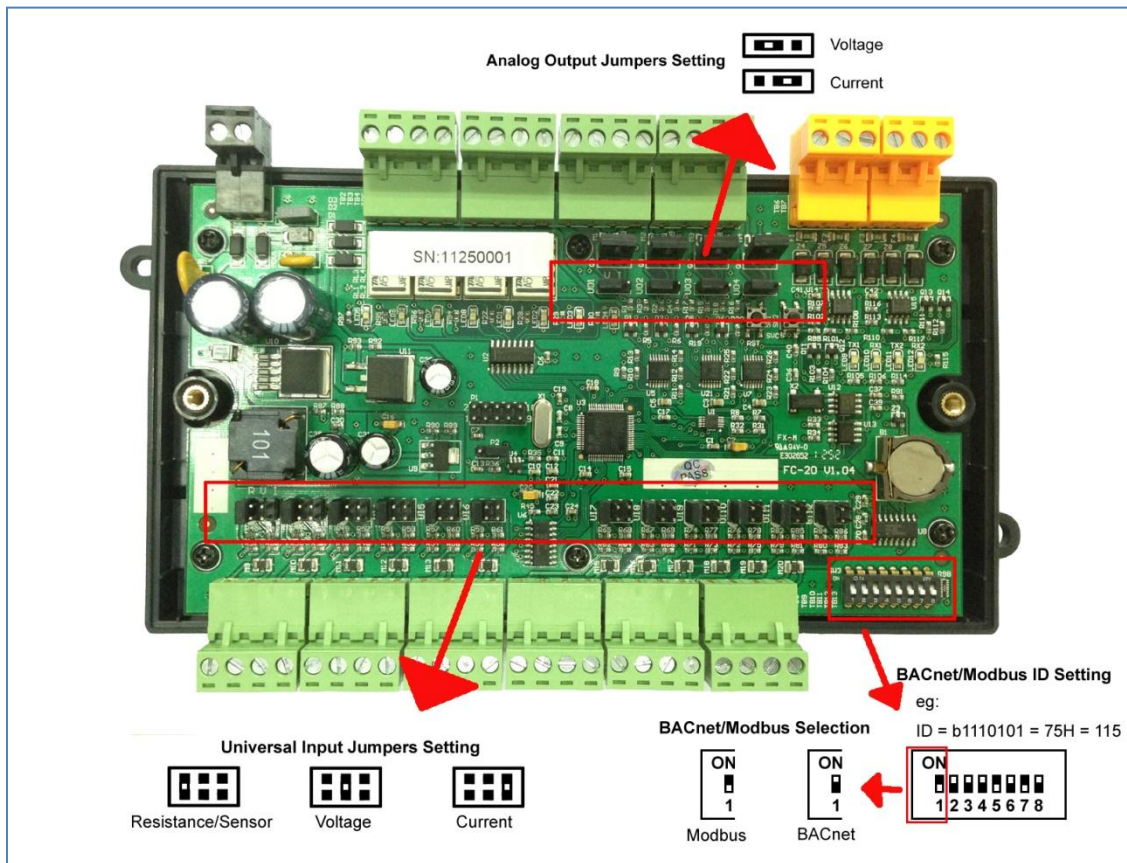
Jumpers Setting

Below image shows the jumper setting for Universal Input, Analog Output, BACnet/Modbus Selection, and the BACnet MSTP ID (1~127) or Modbus Serial ID (1~127).

The controller comes with BACnet and Modbus protocols selection. By default, Modbus protocol is selected. To switch to BACnet protocol, toggle the '1' of the dip switch to ON.

The remaining DIP switch '2' ~ '8' are for BACnet MSTP ID or Modbus Serial ID (address 0 is not available; it will be set to 1) depending on DIP switch 1 selection.

Any changes to the DIP switch, a power cycle is needed.

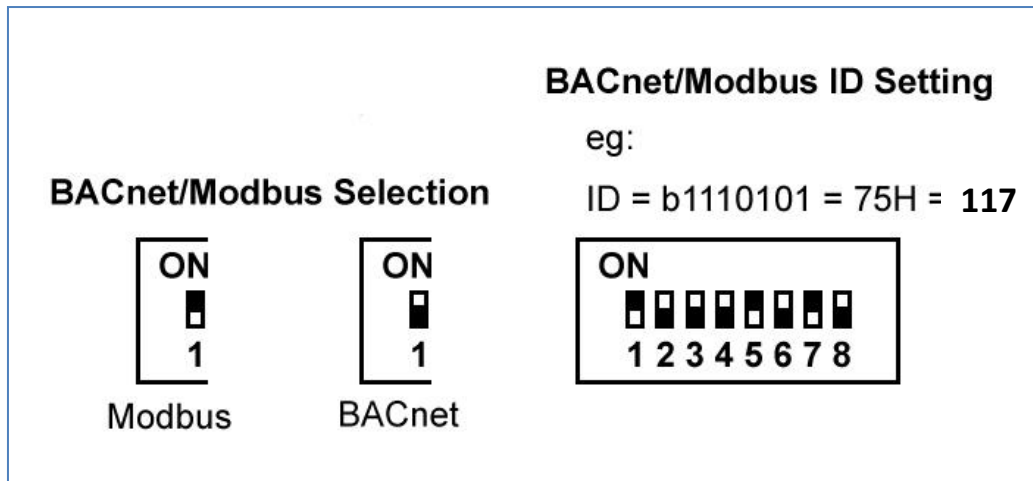
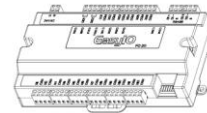


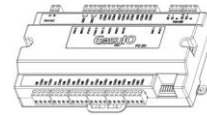
EasyIO FC-20 Jumpers Setting

Image below show the DIP switch settings details.

For serial addressing it uses binary bit. The Least Significant Bit (LSB) in DIP 8. The Most Significant Bit (MSB) is DIP 2.

The white the spot/white square represent the DIP switch in ON position.

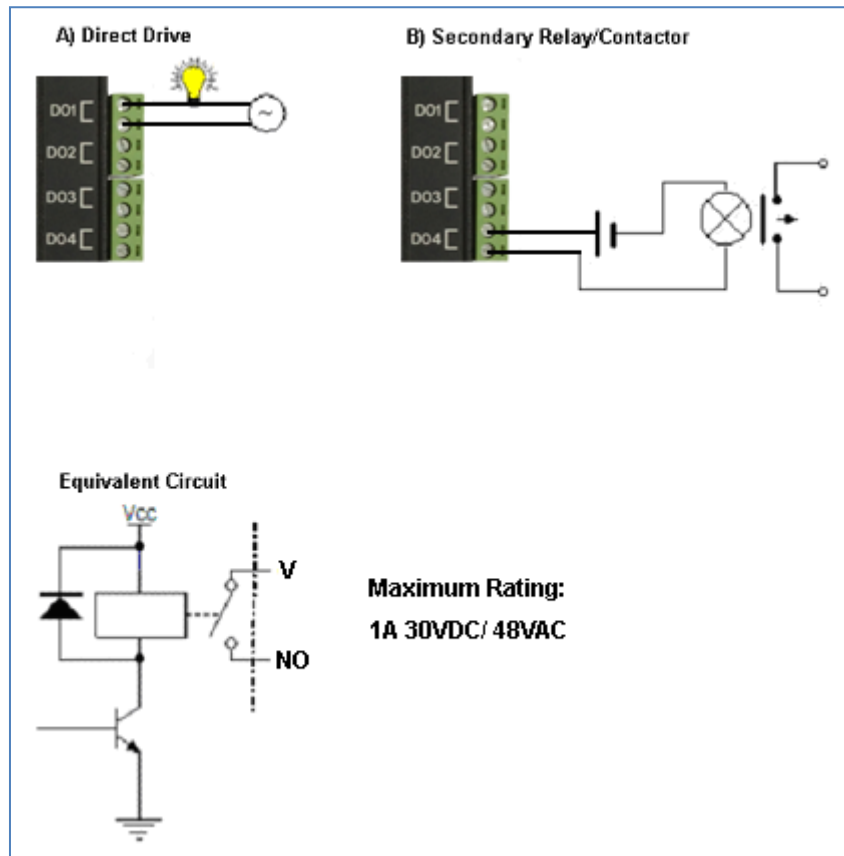




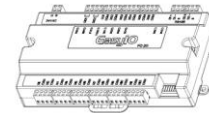
Digital Output Wiring Connection

EasyIO FC-20 has four general purpose isolated digital output connections (relay output). Each relay output able to drive up to 1A 30VDC/ 48VAC load.

It does not output voltage or current. It is a dry relay contact.



Digital Output Connection

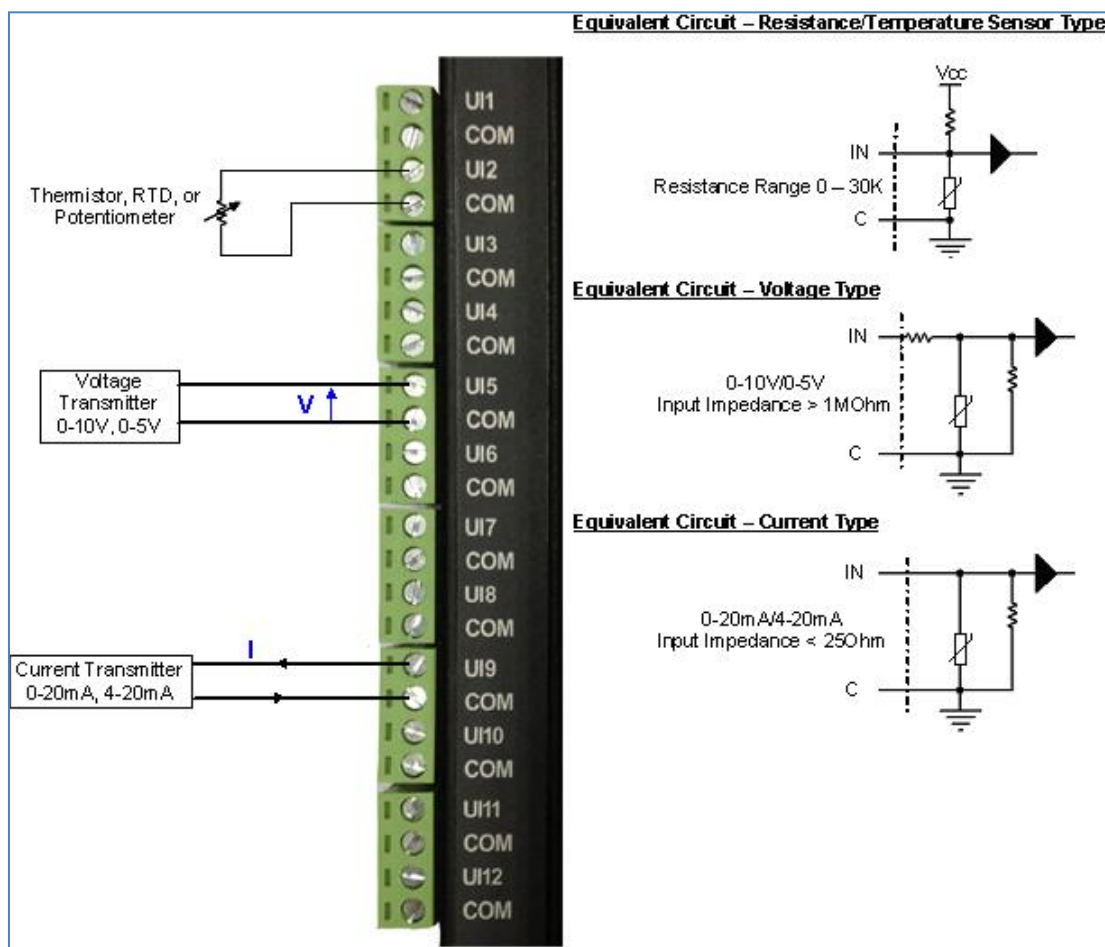


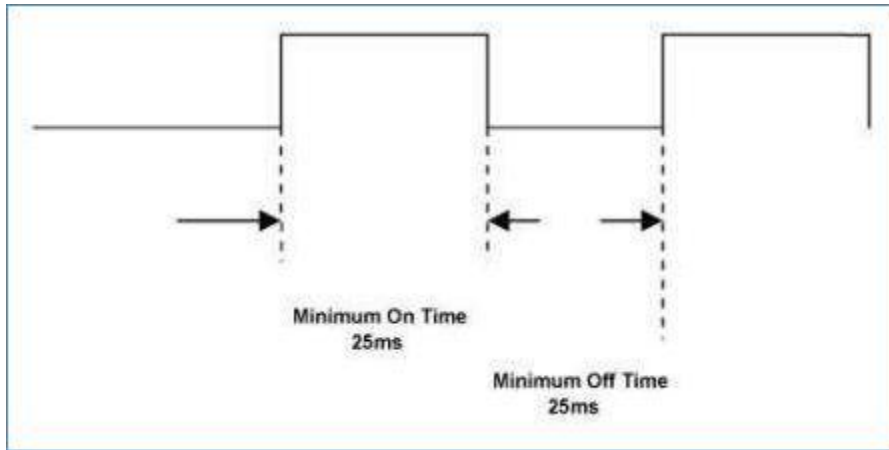
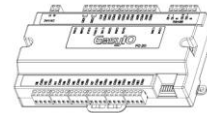
Universal Input Connection

EasyIO FC-20 has twelve non-isolated universal inputs. The universal input supports three type of analog signal i.e. resistance, voltage and current transmitter via hardware jumper and internal register settings:

- Resistance – The working range of resistance is 0 – 300K Ohms. If the input is configured as Thermistor type, the system provides 8 customizable temperature lookup tables for resistance to temperature translation. The commonly used Thermistor like 10K, 10K with Shunt, 1K Balco and 1K Platinum are all supported
- Voltage – Two selection of working range 0 – 5V and 0 – 10V. The minimum input impedance of voltage input is 1 Mega Ohm.
- Current – Two selection of working ranges 0 – 20mA and 4 – 20mA. The current input impedance is less than 25 Ohm.
- Pulse Input – Only UI1, UI2, UI3 and UI4 are capable of receiving high speed pulse. Minimum on time pulse is 25ms and minimum off time is 25ms. Refer to image below.

Universal Input Connection



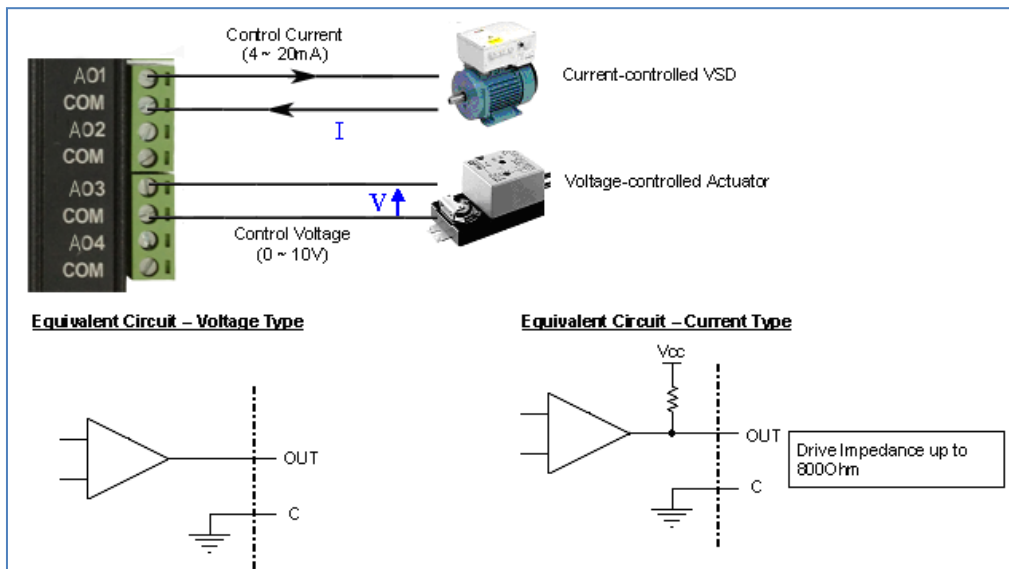


Universal Input as Pulse Input specifications, Max 20Hz

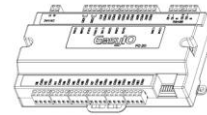
Analog Output Connection

EasyIO FC-20 has four Analog Output connections. Each Analog Output can be configured to drive voltage or current output via hardware jumper setting and internal register settings.

The working range for voltage is 0 – 10V and for current either 0 – 20mA or 4 – 20mA. For current transmitter, the circuit able to drive load impedance up to 800 ohm which is ideal for long wire connection (up to 500 meter wire length).



Analog Output Connection



Buttons and Indications

The controller will do a hardware reset when the Reset Button is pressed whenever manual restart is required.

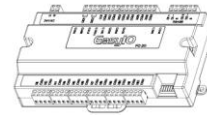
The Service button is used to activate the built-in bootloader program for software upgrade.

Each digital output has a correspondence LED to indicate its current state.



Button and LED indications

LED Conditions		Description
1		PWR PWR is used to indicate the presence of 24VAC power source, and internal power
2		ERR ERR is to indicate whenever there is communication errors.
3		STS STS is used to indicate the heartbeat of the Microcontroller. The STS LED will blink at 1-second interval in normal operation condition.
4		TXRX TXRX is used to indicate when there are communication activities (Transmitting or Receiving) on the communication port.



Software Configurations

In order to connect to the new EasyIO FC Series via the Virtual Machine, some files are needed. **EasyIO FC series is not a Sedona Controller** but it uses the Sedona environment to program it.

Hence there will be no extra software needed.

These kits are hardware dependent. Only works for FC series.

The FC series comes with a User Interface to configure the Temp Table as well. It works only with Sedona workbench or Embedded Sedona Workbench in Niagara Workbench.

Follow the below instructions before connecting to the controller via Sedona Workbench.

Install platform files and kits files

Step 1

Get the required files from EasyIO technical support at support@easyio.com. The files are the Sedona kits and platform manifest for the EasyIO FC series.

Step 2

Close the workbench.

Locate the Sedona folder in the Niagara installation directory;

Niagara Version	Sedona directory
Niagara Ax 3.5.xx	Niagara\niagara 3.5.xx\sedona\
Niagara Ax 3.6.xx	Niagara\niagara 3.6.xx\sedonaBundles\sedona 1.1.xx\sedona\
Niagara Ax 3.7.xx	Niagara\niagara 3.7.xx\sedona\

Step 3

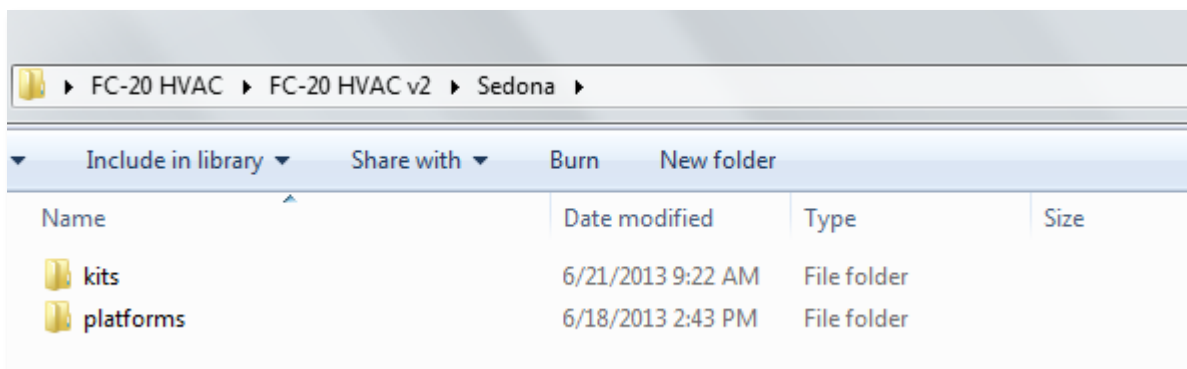
Copy and merge the 2 folders that obtain from EasyIO technical support.

The 2 folders are: platform and **kits**

For Niagara Ax 3.5 User go to **step 4**.

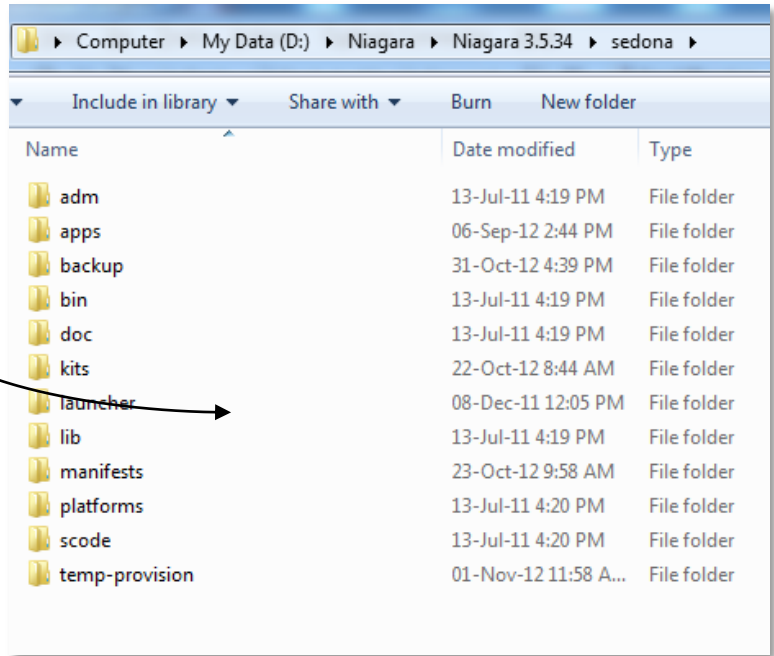
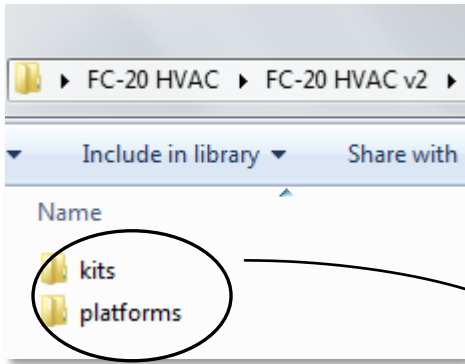
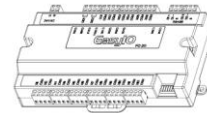
For Niagara Ax 3.6 User go to **step 5**.

For Niagara Ax 3.7 User go to **step 6**.



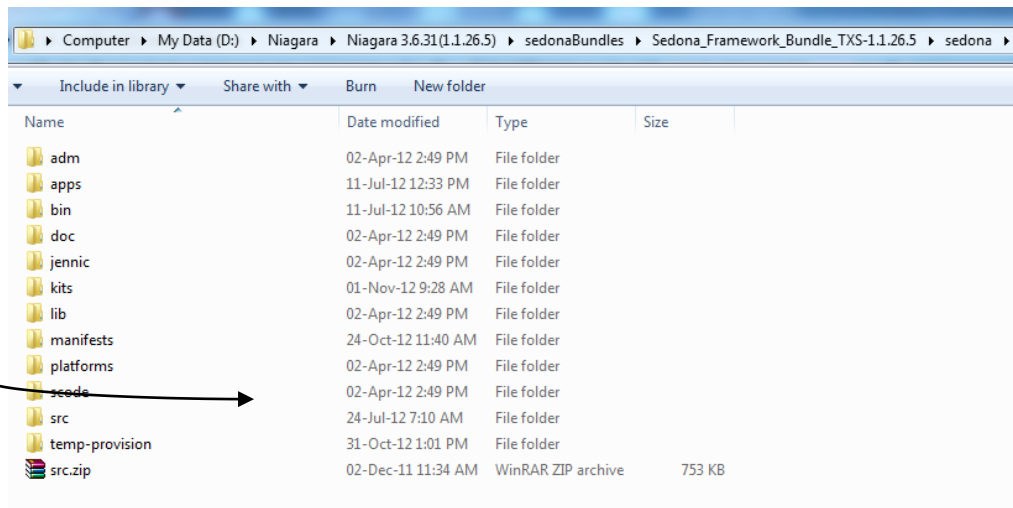
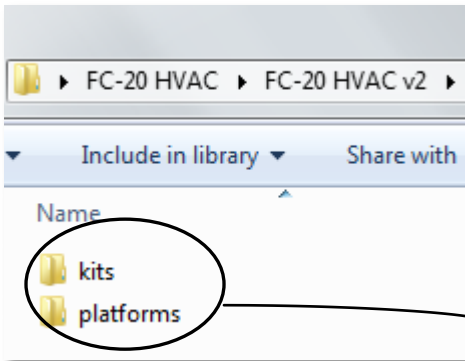
Step 4

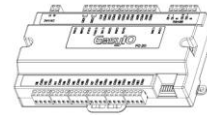
For Niagara Ax 3.5.xx user. Drag and drop it in to the Sedona root folder. Hit "Yes" on the pop up to merge the files.



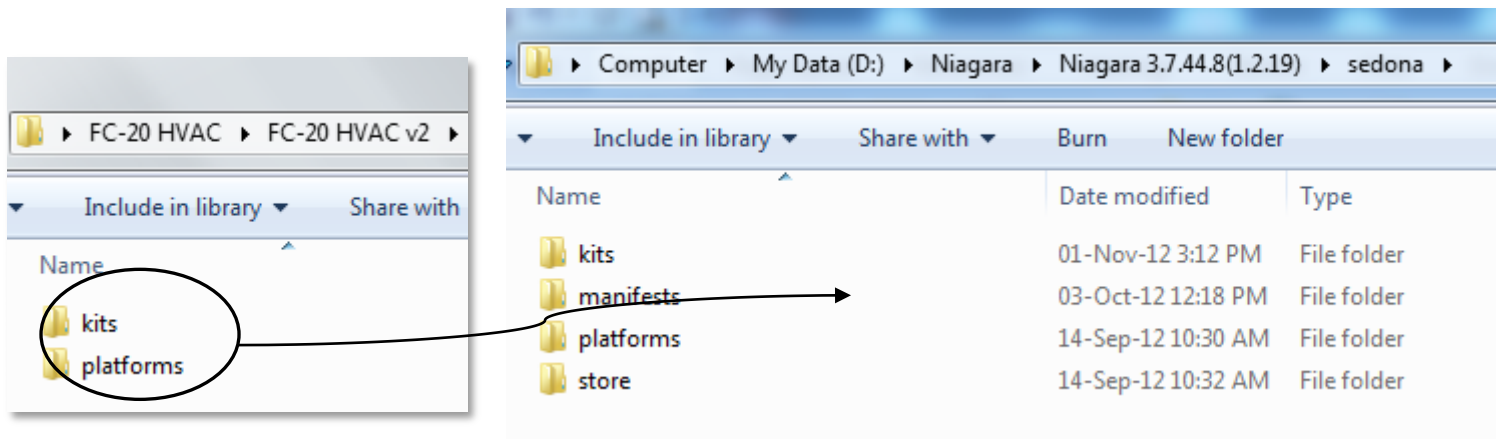
Step 5

For Niagara Ax 3.6.xx user. Drag and drop it in to the sedona root folder. Hit “Yes” on the pop up to merge the files.

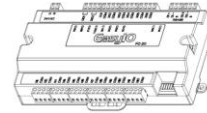


**Step 6**

For Niagara Ax 3.7.xx user. Drag and drop it in to the sedona root folder. Hit “Yes” on the pop up to merge the files.

**Step 7**

Re-open workbench and connect to EasyIO FC-20 controller.
Refer to EasyIO FC-20 Programming Guide for more details.



Technical Support

For technical issue, please contact

Email : support@easyio.com