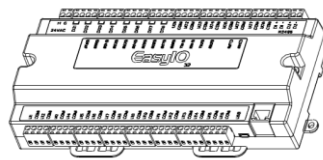


EasyIO FG Series DDC User Reference



Document Change Log

1st April 2013

Document created.

7th July 2013

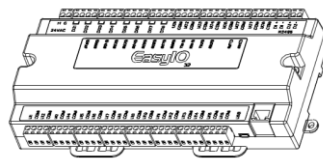
Correct mistakes and typo error.

4th August 2013

Restore Factory settings

10th Sept 2013

Added in wiring diagram



Disclaimer

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

The EasyIO FG-20 was built on the Sedona Framework[®].

Sedona Framework is a trademark of Tridium, Inc.

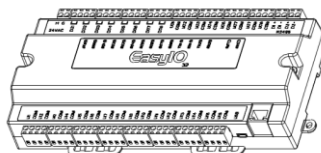
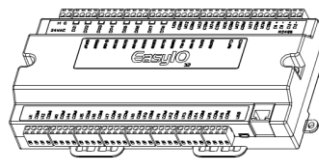


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Introduction

EasyIO FG Series is the most powerful Sedona controller in the market. It is equipped with two 32-bit Processors, the first in the Automation industry, with an ARM9 200 MHz Samsung processor, an ARM M3 Cortex for the I/O management and A-D processing, and also with a Linux 2.6 OS for premium performance. Later in 2013 we will be adding Graphics capability to serve up html templates that will be stored on the Micro SD card. BACnet and Modbus will also be added in 2013. TCOM is available now and is encouraged for premium performance with Niagara.

- The Build bootloader can now be carried out remotely. No more manual service button needed is used.
- Firmware upgrading now can be done remotely and without any assistant.
- Firmware upgrading is via ftp client.

This document describe about basic connection and technical specifications.

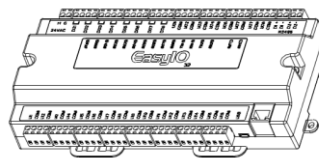
It applies for both EasyIO FG-32 and EasyIO FG-20.

Comparison Chart below shows the different between EasyIO FG-32 and EasyIO FG-20. It is only the total number of Inputs and Outputs quantity.

Both EasyIO FG-32 and EasyIO FG-20 are using the same hardware configurations in term of processor, memory and etc.

Item	FG-32	FG-20
Digital Output	8 Channels	2 Channels
Universal Output	8 Channels	6 Channels
Universal Input	16 Channels	12 Channels

Table shown above show the different between EasyIO FG-32 and EasyIO FG20in terms of IO points

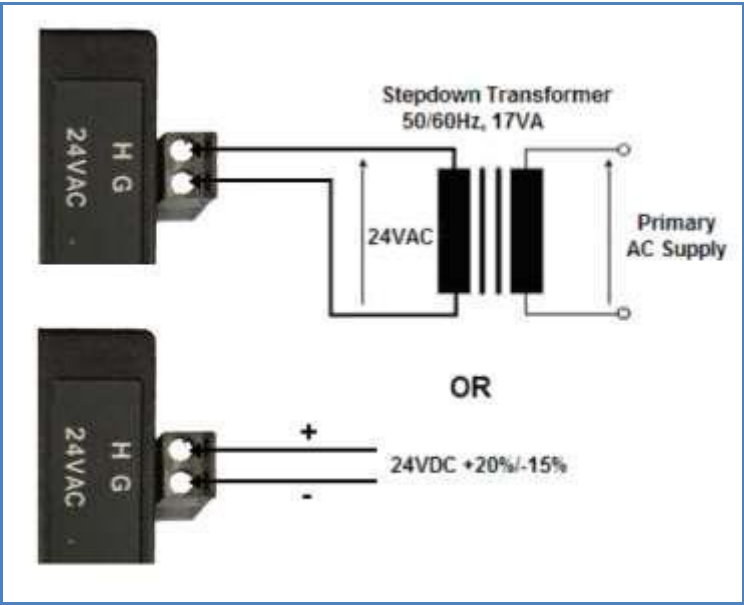


Hardware Configurations

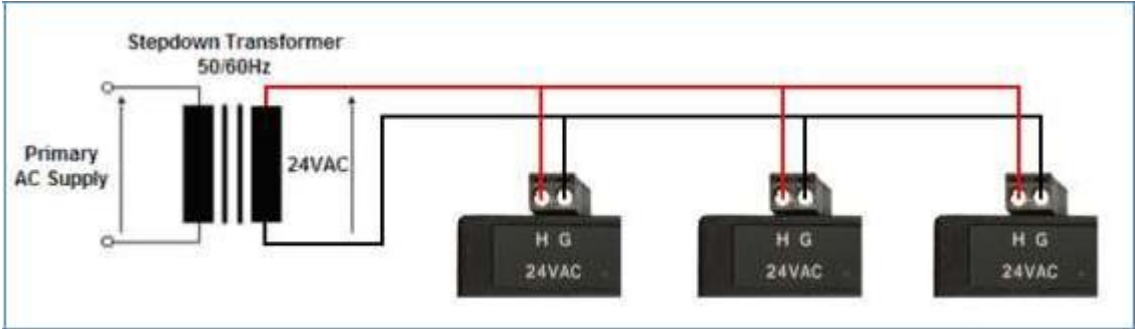
Power supply Connection

Both AC and DC can be used for EasyIO FG Series 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.

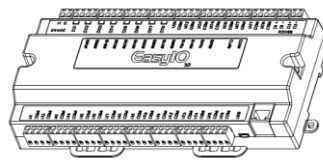
Electrical	
Power Supply	24V AC +/- 5% or 24V DC +20%/-15%
Consumption	750 mA
Operating Temperature	32 to 150 Deg-F (0 to 65 Deg-C)
Storage Temperature	-4 to 150 Deg-F (-20 to 65 Deg-C)
Operating Humidity	10% to 95% relative humidity non-condensing



Power Supply Connection



Multiple controllers share single transformer connection



RS485 Connection

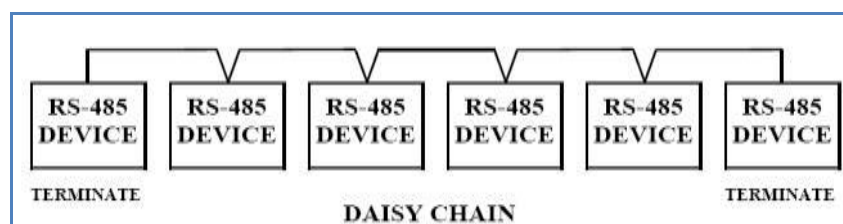
RS485 connection must be terminated at both ends with termination resistor, typically 120Ohms. It is recommended to use shielded twisted pair wire (STP) for the wiring.

The FG series comes with a build in 120Ohm resistor. To enable this simply change the jumper setting to ON position. Refer to jumper image below.

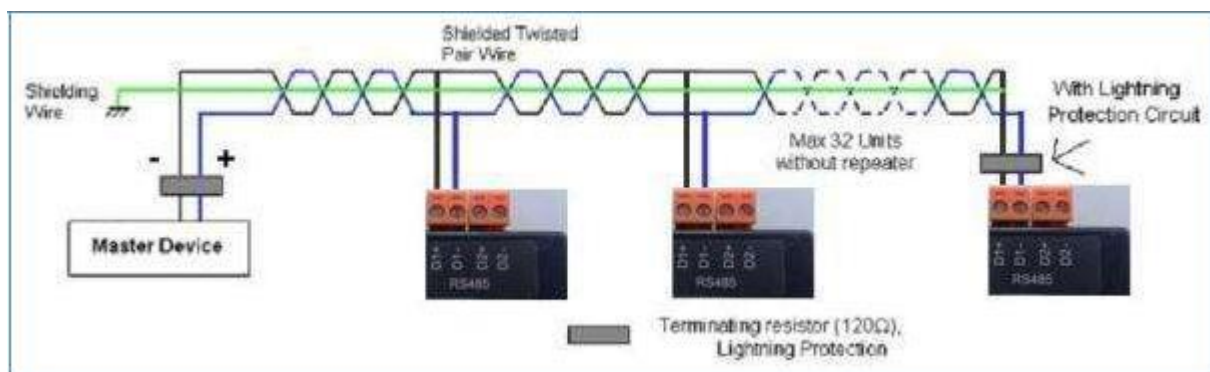
Lightning protection circuit is highly recommended to be installed at one end of the wiring. The controller should be wired in daisy chain network topology as shown as image below. If wire branch can be avoided, keep it as short as possible, and never connect more than one device to the wire branch (it is not recommended).

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.

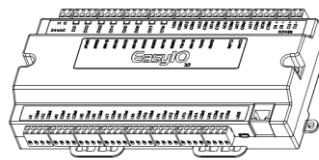
Physical Interface 1 and 2 (Port 1 and 2)	EIA-485 (BUS A,B) Two-wire, Half Duplex
Modbus Baud Rate	Speed:(9.6K, 19.2k, 38.4K, 57.6K, 115.2K bit/s), Data Bit:(8 bits), Parity:(None, Even, Odd)
Bacnet Baud Rate	Speed:(9.6K, 19.2k, 38.4K, 76.8K), Data Bit:(8 bits), Parity:(None)
Ethernet Support	IP, TCP, UDP, ICMP, HTTP,FTP
Application Support	Sedona, Modbus, Bacnet and Tcom



Daisy Chain Network Topology

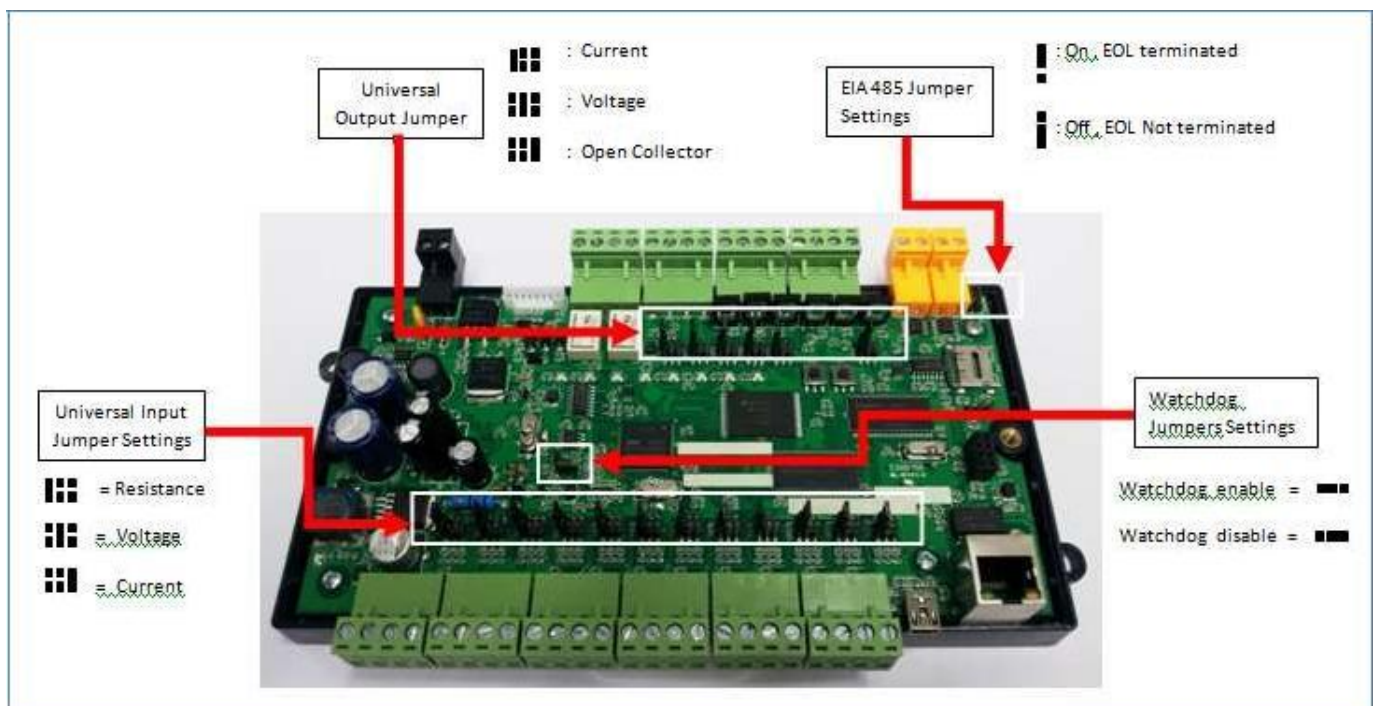
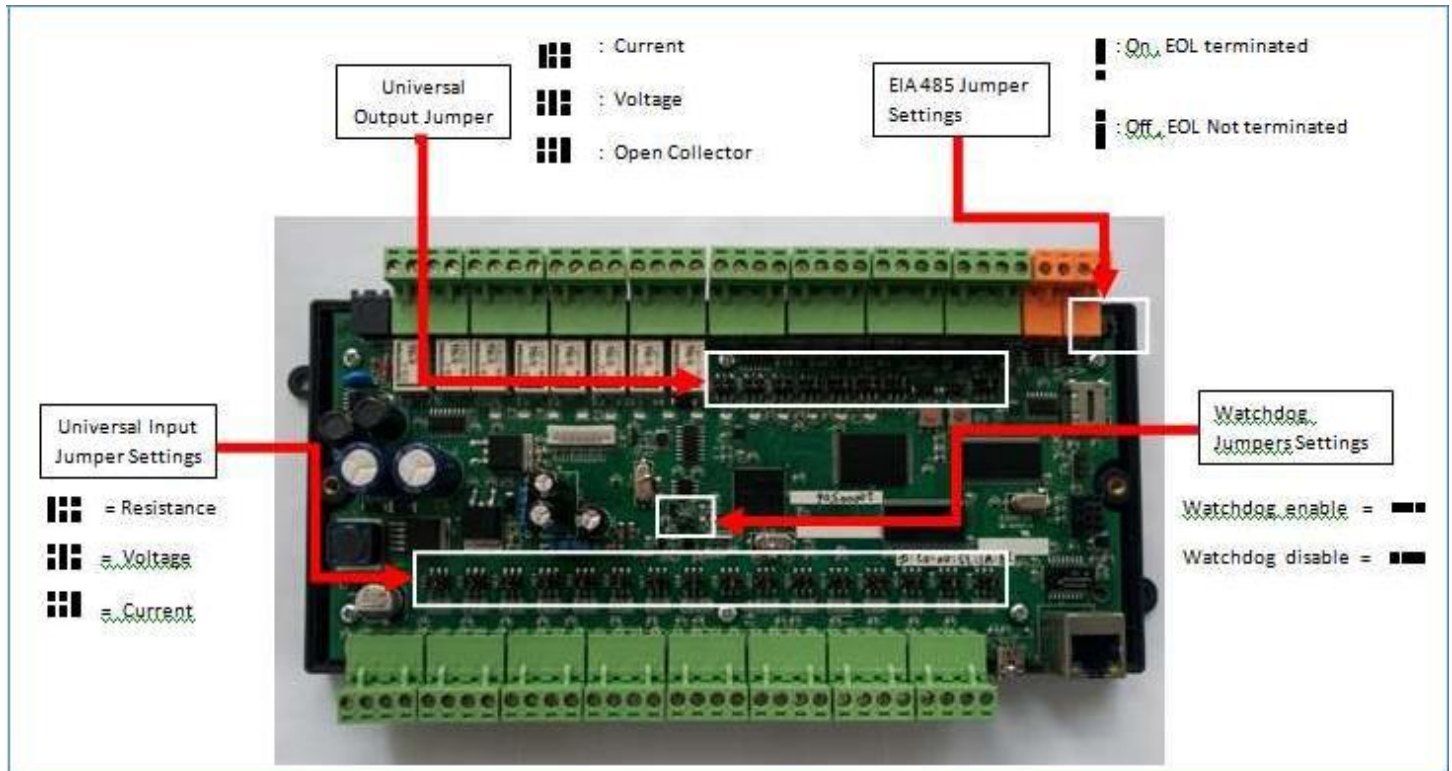


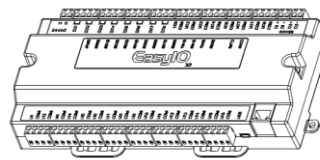
RS485 Connection Diagram



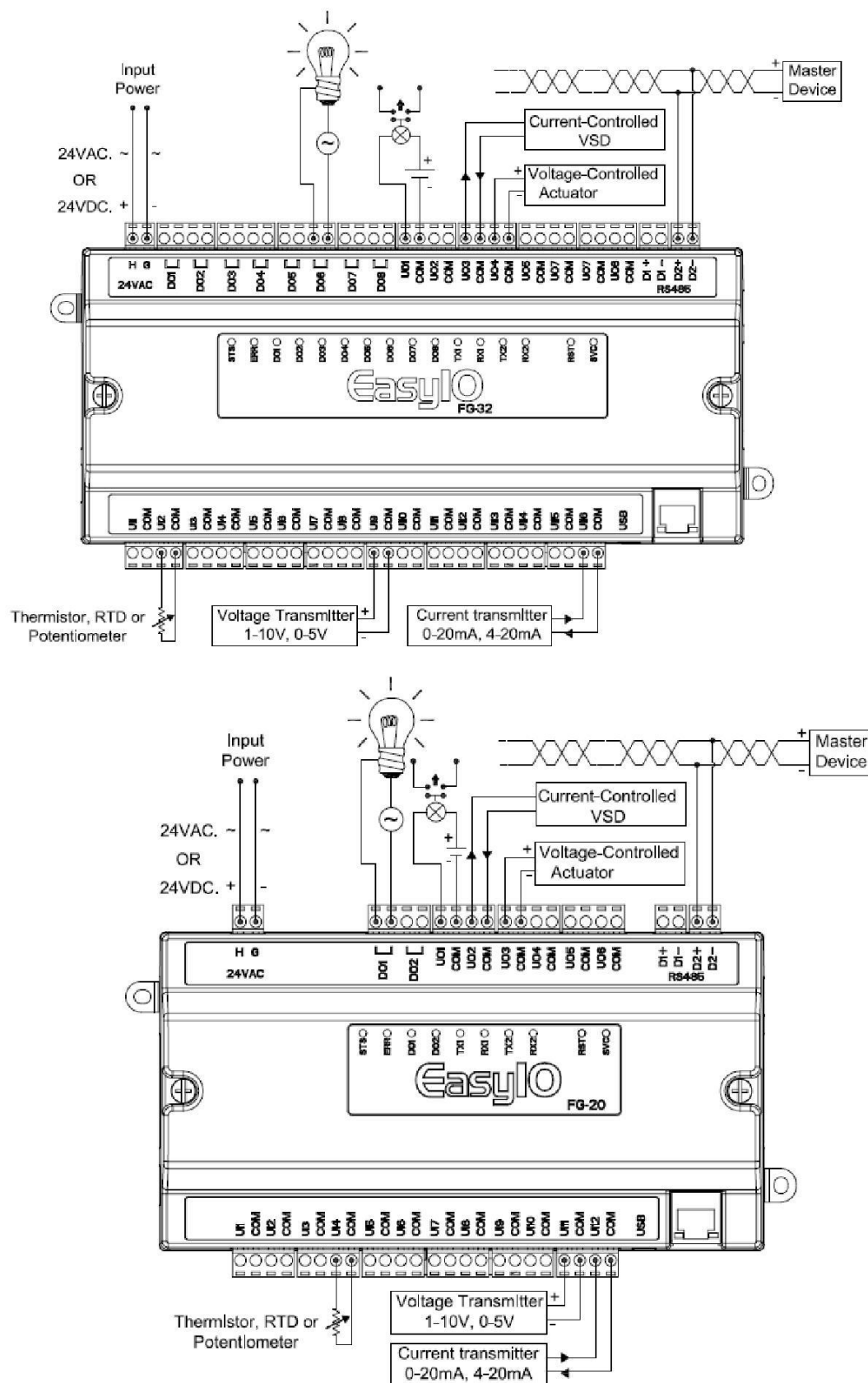
Jumpers Setting

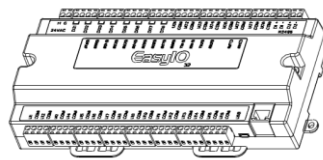
Below image shows the jumper setting for Universal Input, Universal Output, Watchdog and also EIA 485 120 Ohm terminations.





Wiring diagram





Digital Output Wiring Connection

EasyIO FG Series digital output is for general purpose isolated digital output connections (relay output).

General rating is as below (Direct Drive);

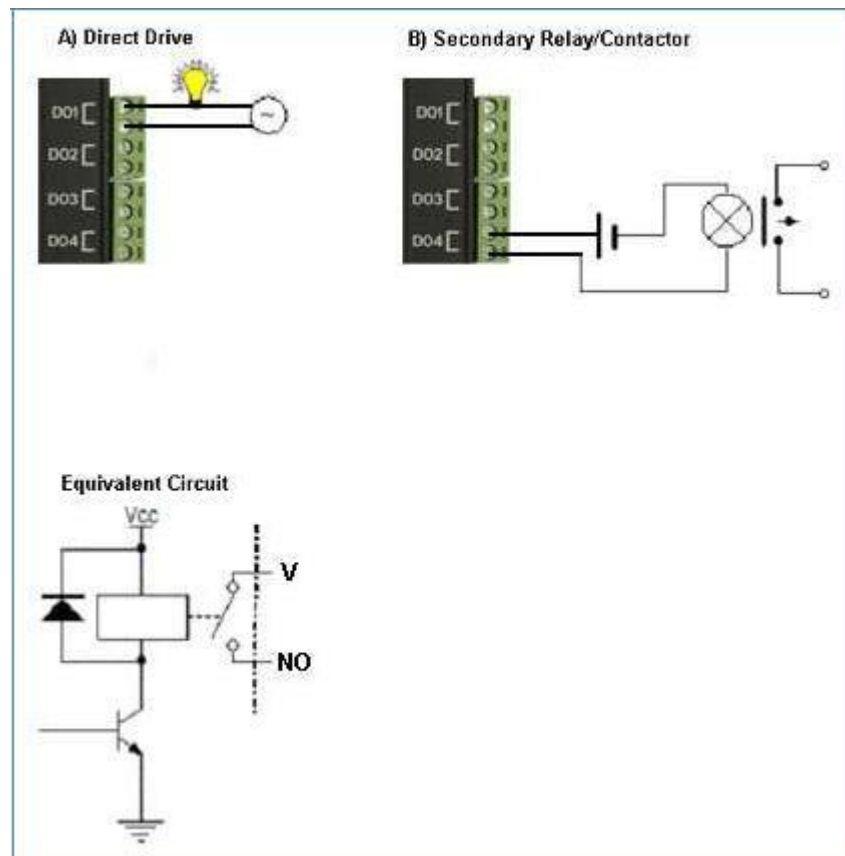
- 125 VAC , 0.5A
- 24 VDC , 2A

Pilot Duty rating is as below (Pilot Duty);

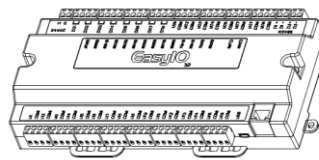
- 24 VAC , 0.5A
- 24 VDC , 0.5A

Digital Output	8 Channels (FG-32) , 2 Channels (FG-20)
Type	Relay Contacts, SPST NO, 48VA at 24VAC, Pilot Duty at 500mA

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



Digital Output Connection

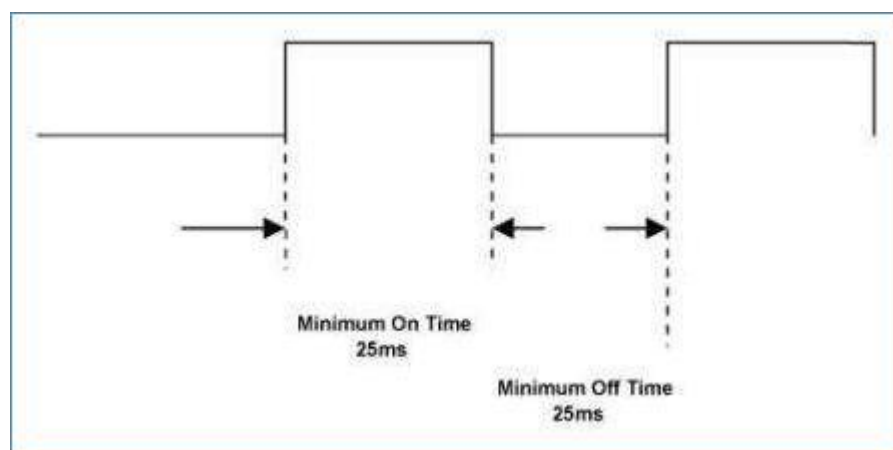
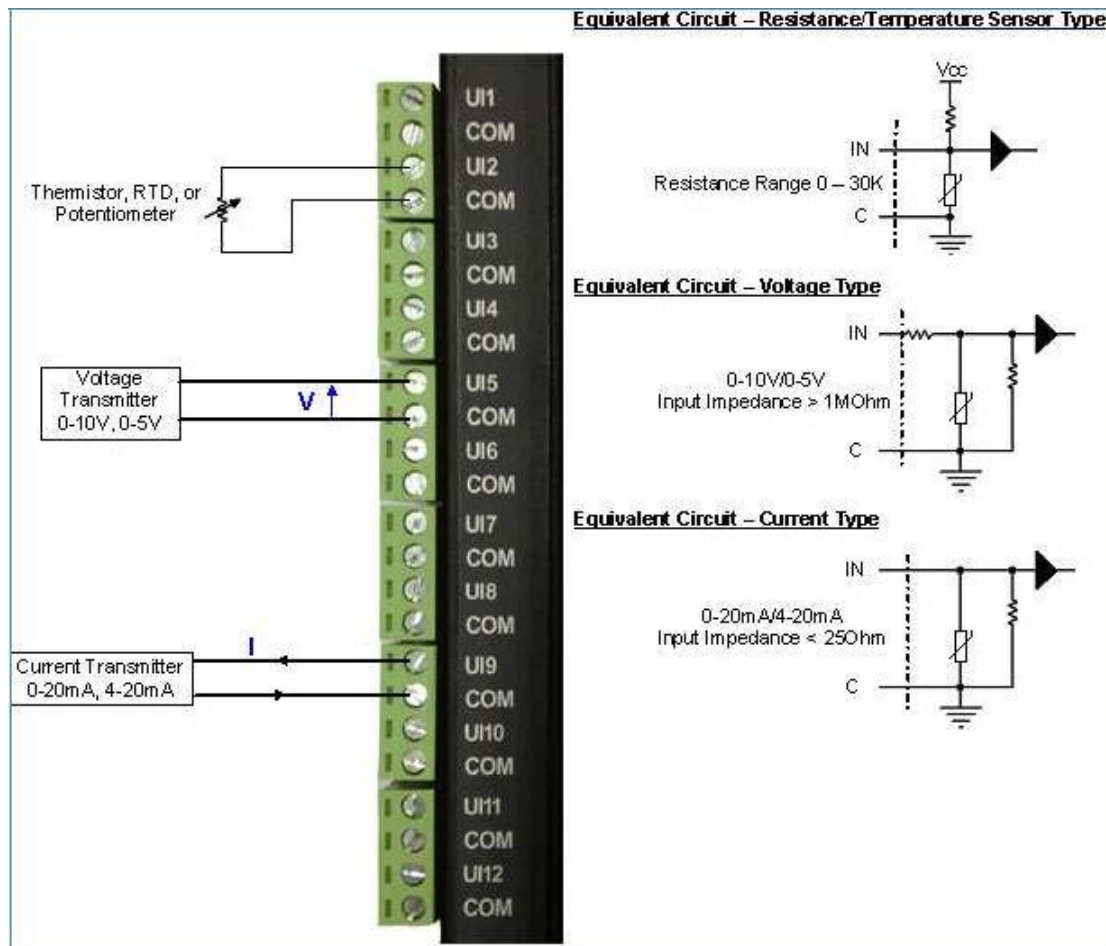
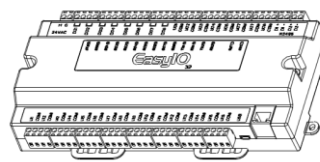


Universal Input Connection

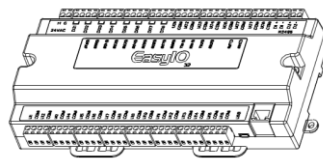
EasyIO FG series has non-isolated universal inputs. The universal input supports three type of analog signal i.e. resistance, voltage and current transmitter via hardware jumper and internal register settings:

Universal Input	16 Channels (FG-32) , 12 Channels (FG-20)
Voltage	0 - 10V DC (+/-0.005V)
Current	0-20mA DC
Resistance	0 - 30K (+/-10 Ohm), 0 - 10K (+/-5 Ohm), 0 - 1.5K (+/-1 Ohm)
Thermistor	10K, 10K Shunt, 1K Balco, 1K Platinum : All (+/-0.01 Deg-C)
UI as Digital Input	Voltage Free Contact

- a) Resistance – The working range of resistance is 500Ohm – 500KOhms. 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
- b) Voltage – Two selection of working range 0 – 5V and 0 – 10V. The minimum input impedance of voltage input is 1 Mega Ohm.
- c) Current – Two selection of working ranges 0 – 20mA and 4 – 20mA. The current input impedance is less than 25 Ohm.
- d) Pulse Input – All Universal Inputs 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 as Pulse Input specifications, Max 20Hz



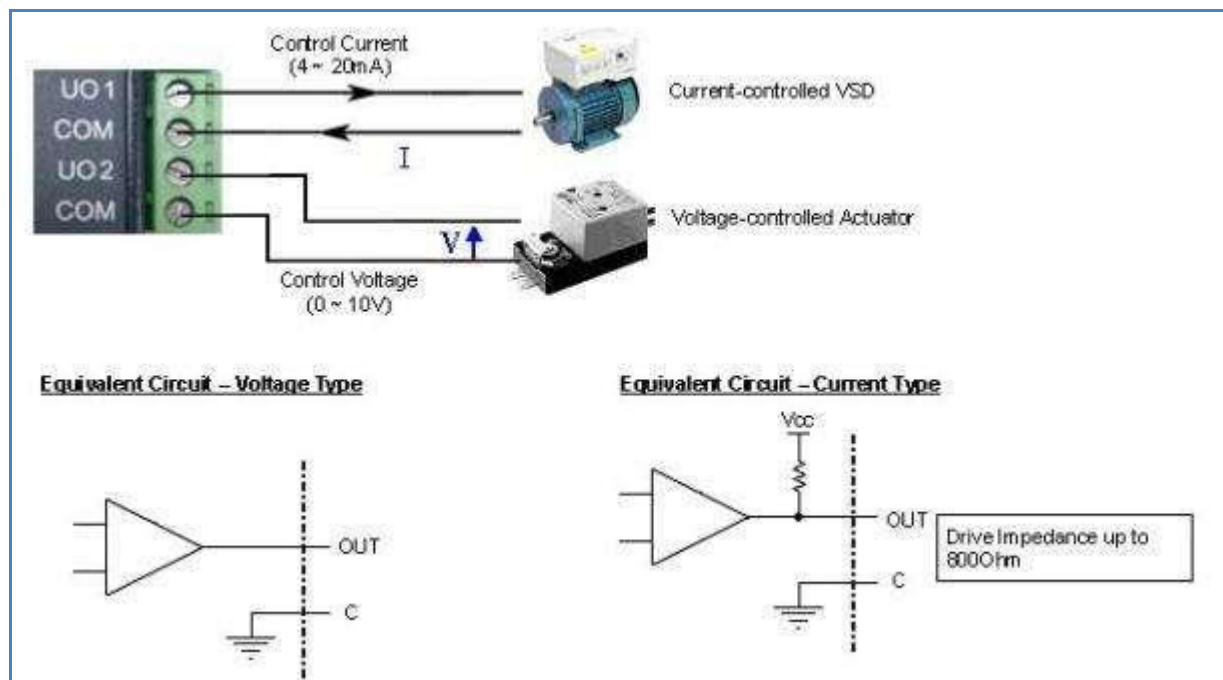
Universal Output Connection

EasyIO FG series has Universal Output connections. Each Universal Output can be configured to drive voltage or current output or digital output via hardware jumper setting and internal register settings.

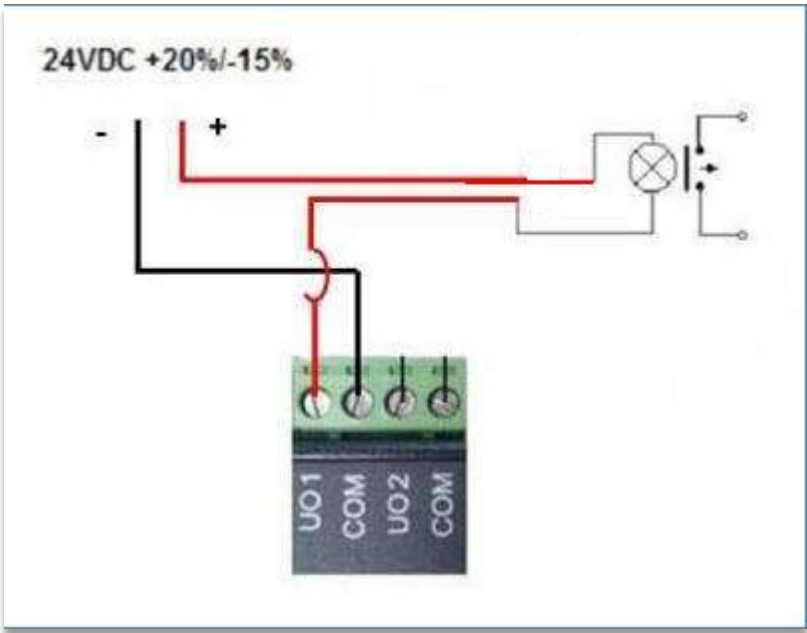
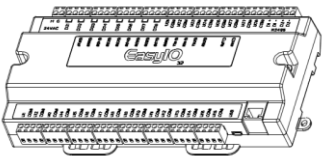
The working range for voltage is 0 – 10V and for current either 0 – 20mA or 4 – 20mA. For current transmitter, the circuit able to drive load impedance up to 800 ohm which is ideal for long wire connection (up to 500 meter wire length).

For digital output it can only support 24VDC and max load is 200mA. AC power source is not allowed. It will damage the controller.

Universal Output	8 Channels (FG-32) , 6 Channels (FG-20)
Type	Current: 0 - 20mA, 4 - 20mA (up to 800 Ohm load) Voltage: 0 – 10VDC Digital Mode ; Max Sinking Current Rating: 0.2A Max



Universal Output Connection for Voltage and Current



Universal Output Connection as Digital Output

Remarks: Universal Output as Digital Output

Only DC power source can be use. If AC power source it will damage the controller. Max DC power source is 24VDC.

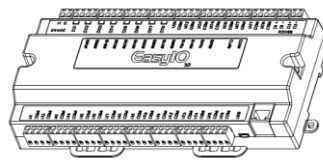
Max load for Universal Output as Digital Output is 200mA.
Refer below table for software configurations of UO as DO. A Digital Output Block must be used.

EasyIO FG32

Physical Universal Output	Digital Output Block Channel
UO1	DO 9
UO2	DO 10
UO3	DO 11
UO4	DO 12
UO5	DO 13
UO6	DO 14
UO7	DO15
UO8	DO 16

EasyIO FG20

Physical Universal Output	Digital Output Block Channel
UO1	DO 9
UO2	DO 10
UO3	DO 11
UO4	DO 12
UO5	DO 13
UO6	DO 14



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.

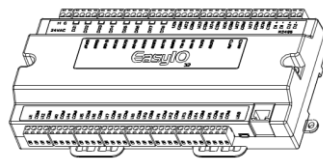
Each digital output has a correspondence LED to indicate its current state.







*Image shows the Reset button, Service button and also TXRX indicators.
Image shown is an EasyIO FG-32 unit.*

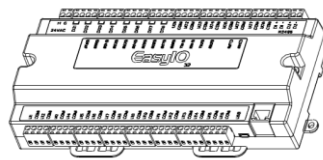


Image shows the Status indicator, Error indicator and individual Digital Output indicator



Button and LED indications. Image shown is an EasyIO FG-32 unit.

		LED Conditions	Description
1		ERR	ERR is to indicate whenever there is Communication errors.
2		STS	STS is used to indicate the heartbeat of the Microcontroller. The STS LED will blink at 1-second interval in normal operation Condition.
3		TX1 RX1	TXRX is used to indicate when there are Communication activities in Port 1. (Transmitting or Receiving) on the Communication port.
4		TX2 RX2	TXRX is used to indicate when there are Communication activities in Port 2. (Transmitting or Receiving) on the Communication port.



Software Configurations

In order to connect to the new EasyIO FG Series Sedona controller, some files are needed. EasyIO FG series has a different Sedona platform, files and kits. These kits are hardware dependent.

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 FG 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

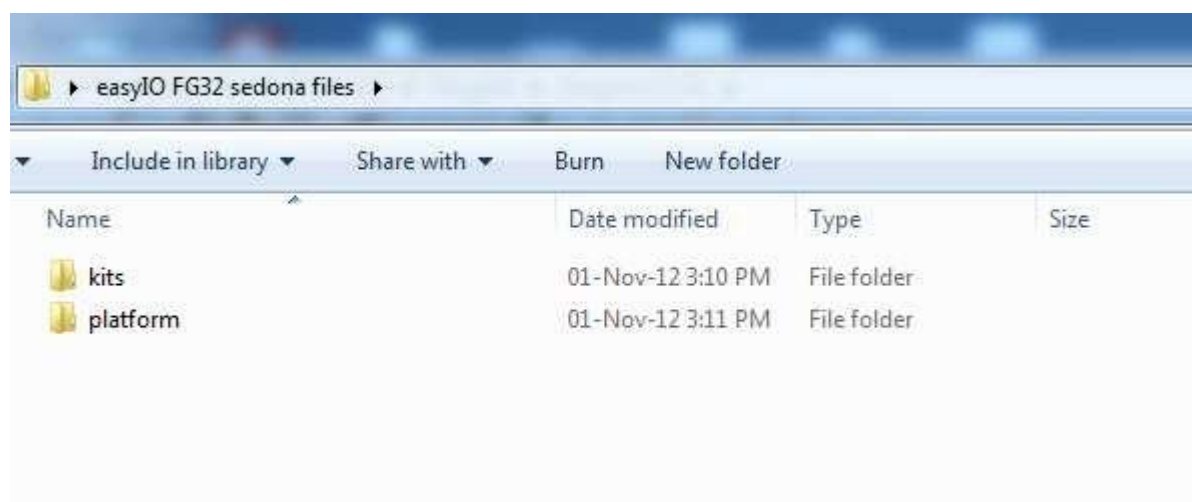
Copy and merge the 2 folders that obtain from EasyIO technical support.

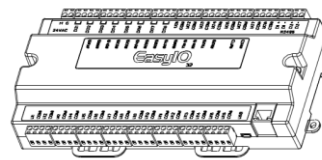
The 2 folders are: platform and *kits*

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

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

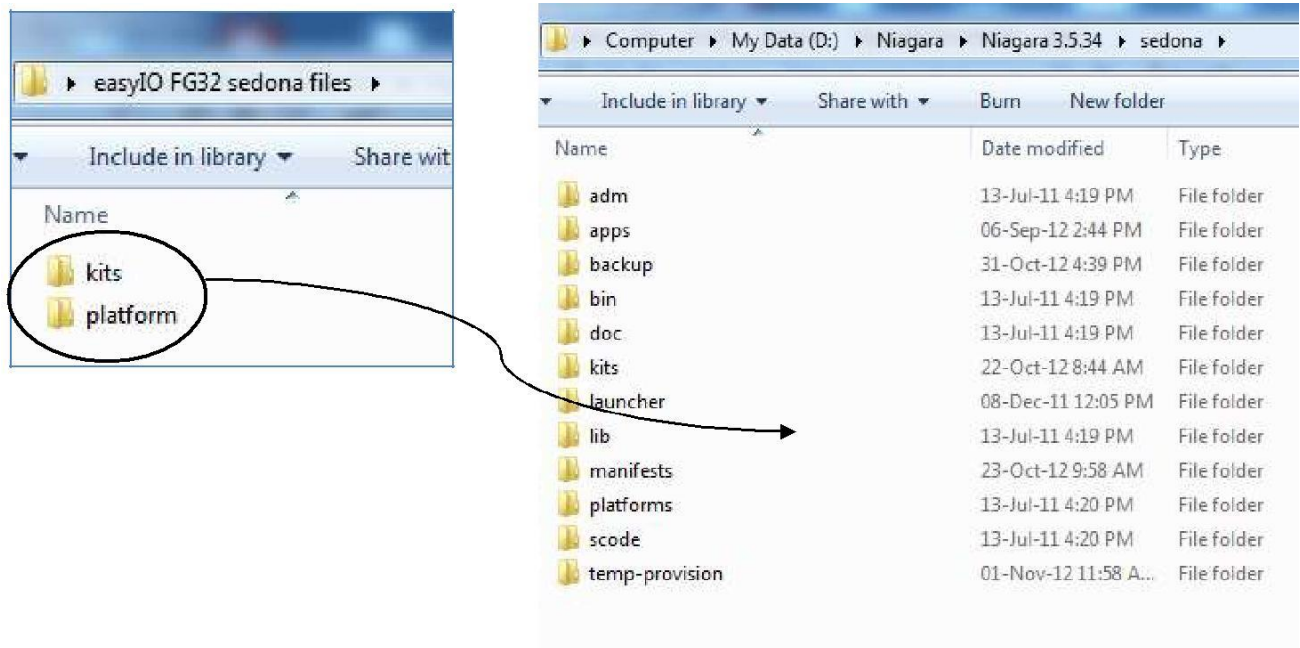
For Niagara Ax 3.7 User go to **step 6**.





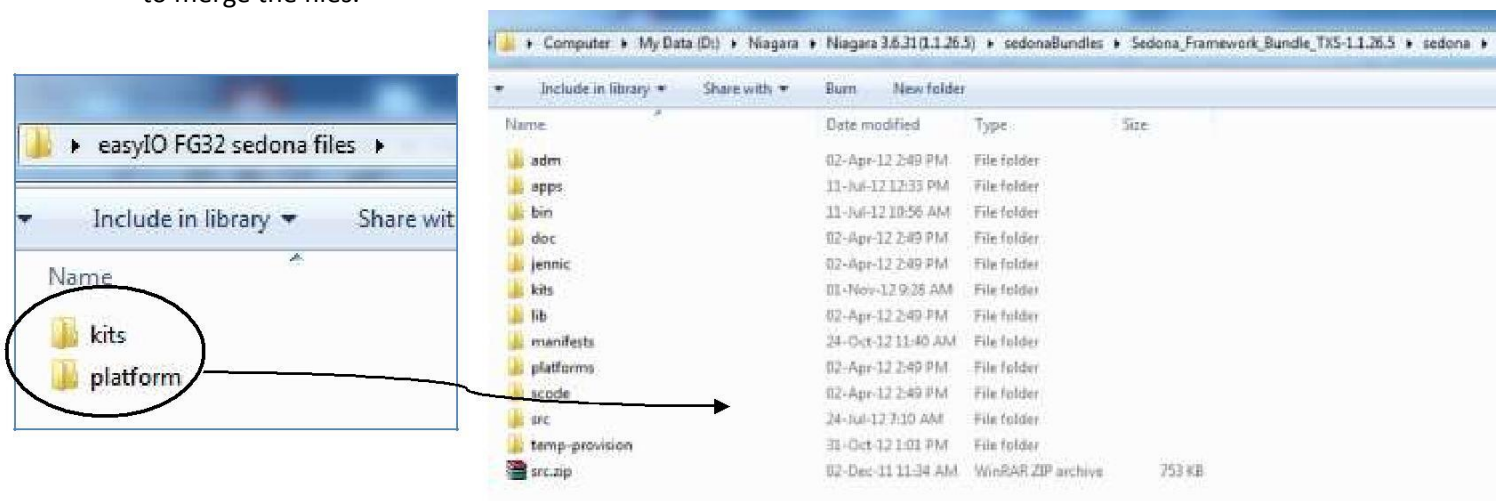
Step 4

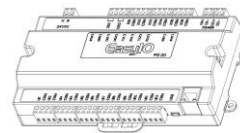
For Niagara Ax 3.5.xx users drag and drop it in to the Sedona root folder. Hit “Yes” on the pop up to merge the files.



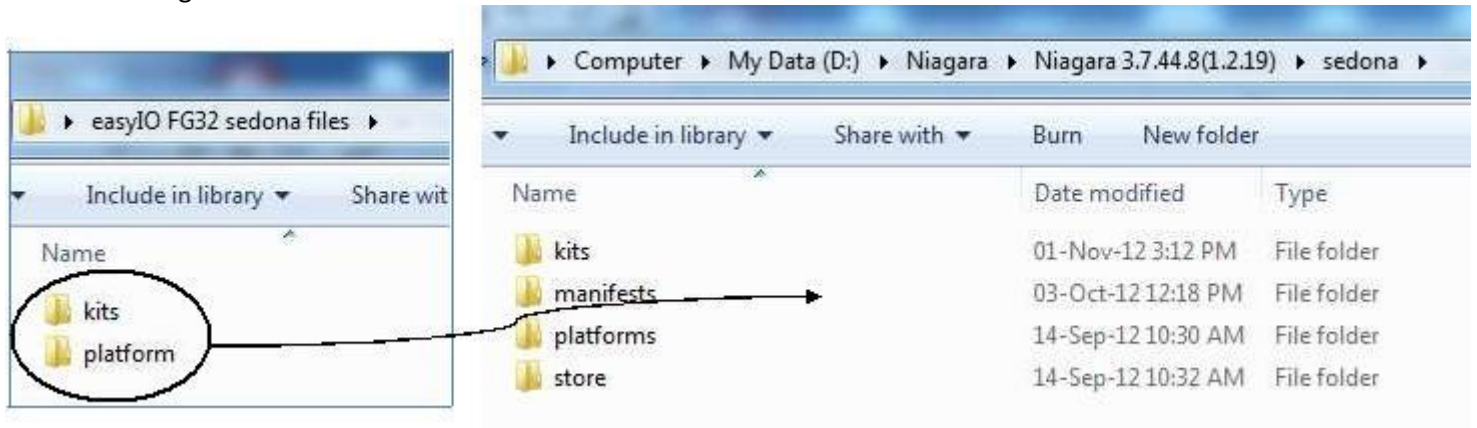
Step 5

For Niagara Ax 3.6.xx users drag and drop it in to the Sedona root folder. Hit “Yes” on the pop up to merge the files.

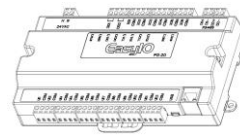


**Step 6**

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 FG32 controller.



Login Details

EasyIO FG Series details are as below.

Sedona Login

Username : admin
Password : <no password>

FTP client Webuser Login

This login allows user to change the web files.

Username : webuser
Password : 123456

FTP client Sdcard Login

This login allows user to upgrade firmware

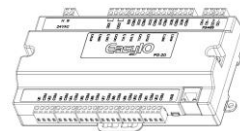
Username : sdcard
Password : 123456

Default IP address : 192.168.10.11
Default Subnet : 255.255.255.0
Default Gateway : 0.0.0.0

Note :

In order to login, the host PC (laptop) has to be in the same subnet. Example:

*IP address : 192.168.10.123
Subnet : 255.255.255.0*



Changing IP address

By default the EasyIO FG series controller IP address is 192.168.10.11.
Changing the IP address can only be done via Sedona workbench.

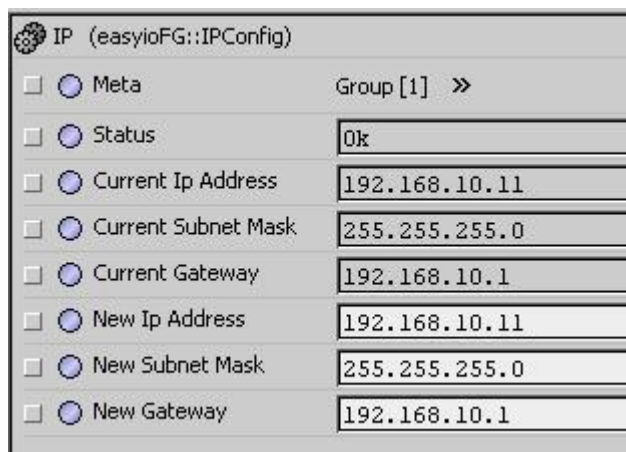
Step 1

Login to the FG32 via Sedona workbench. Locate the object “IP” under the Sedona service folder.



Step 2

Go into the property sheet of the “IP” object.

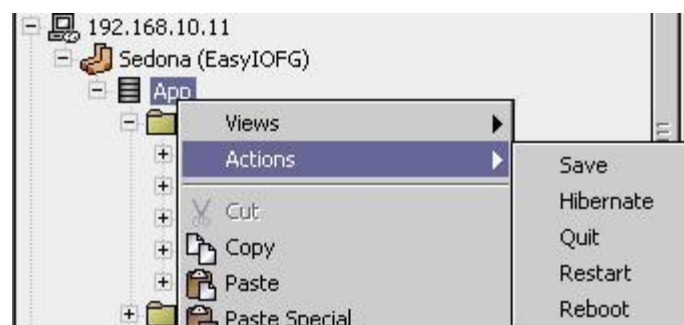


Current IP address that is assign to the controller

New IP address field. Key in the required IP address in these fields. Make sure the IP address and subnet is correct before saving

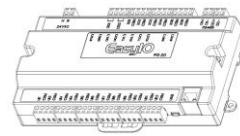
Step 3

Save the Sedona apps and cycle power.



Step 4

Reconnect to the controller via Sedona workbench using the new configured IP address.



Restore factory settings

The new firmware release dated 1st August 2013 comes with “Restore Factory Settings”. This function is done with just the by pressing the “Service” button while the controller is booting up.

A restore to factory settings will do the following;

1. Restore the IP address to the default which is **192.168.10.11**
2. Clear the Sedona application in the Sedona VM back to default (default app is an empty app)
3. A default Sedona apps default login is admin, <no password>.

Follow the steps below to restore to factory settings.

Step 1

Make sure you backup the Sedona apps if you have connection to the EasyIO FG32.

Step 2

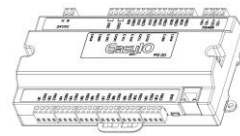
Cycle power and within 5 seconds press and HOLD down the service button until the Error LED starts to flash.

This process will take approximately 10 seconds before the error Led start to blink.



Step 3

Once the Red LED flashes, a momentary press of the service button will restore back the FG Series controller back to factory default state.



Technical Support

For technical issue, please contact

Email : support@easyio.com