

ETHERNET/IP

USER'S MANUAL

FUSION SCR POWER CONTROLLERS



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WARNING: The Control Concepts, Inc. power controllers use power thyristors to switch voltage to the connected load. Line voltage must be assumed at the output terminals at all times, even when the control signal has been removed and the load voltage appears to be off. It has been mandated by the National Electrical Code and the Occupational Safety and Health Act of 1970 that a physical disconnect be opened ahead of all remotely actuated controls before performing any maintenance work on the controller or its connected load.

PROPRIETARY DATA

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1. OVERVIEW

Refer to the FUSION Parameter List document for a complete list of all available settable and monitor registers (parameters). A list of parameters (input and output assemblies) for Ethernet/IP is provided in this manual.

Parameter Representation:

In general parameters are stored as 16-bit integer values contained in a single parameter (register) but on occasion a parameter value will span two registers (32-bit value). These long word parameters are documented as HI and LO words in the parameter list.

Floating point values are represented as scaled values in which a parameter with one decimal place is scaled x10 and two decimal places is scaled by x100.

Example:

When writing a value of 5.00 you would scale the value by x100 and send as 500. When read from the parameter the same value (500) you would divide the value by 100 to arrive at the actual value of 5.00.

The maximum supported sampling rate is 5 Hz.

Ethernet/IP is Little Endian by specification. The least significant bit/byte will appear first.

The Digital Setpoints and Digital System command are the only parameters that can be set via the PLC at this time.

Input data may be read using Read Assembly command Class 0x04, Instance 0x65, Attribute 0x03. Output data may be written with Write Assembly command Class 0x04, Instance 0x66, Attribute 0x03.

The configuration assembly object is not implemented. If required, use Instance ID 0x80 with a data length of 0x00.

2. FUSION ETHERNET/IP WIRING

FUSION with Ethernet/IP conforms to the standard Ethernet wiring pin-out shown to the right.

Control Concepts recommends using at least Cat-5e shielded cables between the controller and other Ethernet enabled devices.

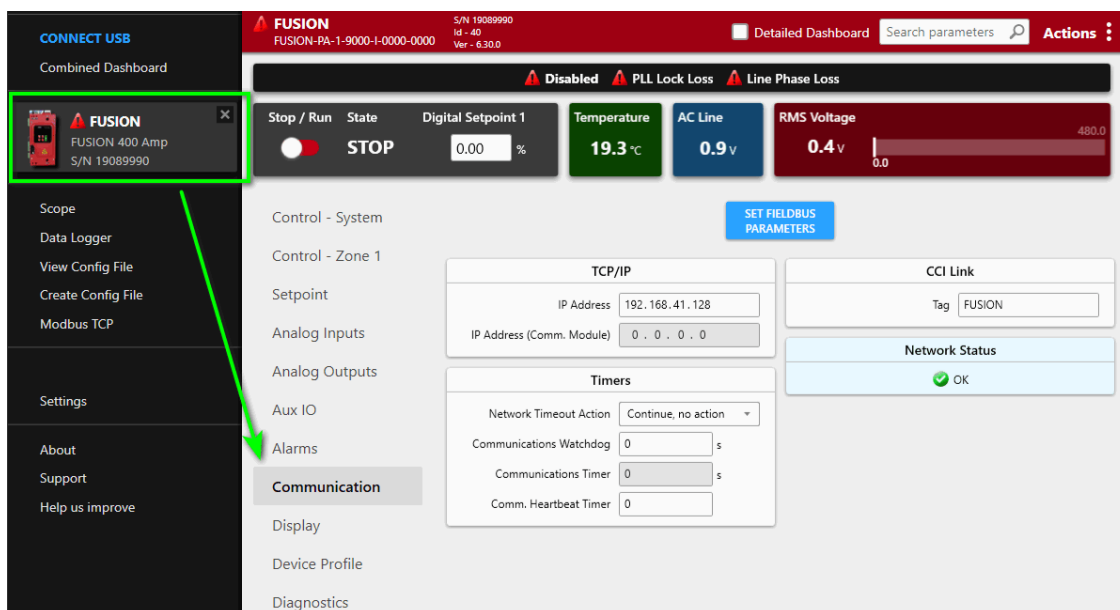
Pin #	Signal Name	Function
1	TD+	Transmit Data
2	TD-	Transmit Data
3	RD+	Receive Data
4	NC	no connection
5	NC	no connection
6	RD-	Receive Data
7	NC	no connection
8	NC	no connection

3. CONNECTING WITH CONTROL PANEL

Connect to the FUSION Controller using a PC running the Control Panel software and a USB cable to the controller.

Control Concepts Control Panel software is available as a free download. Visit www.ccipower.com.

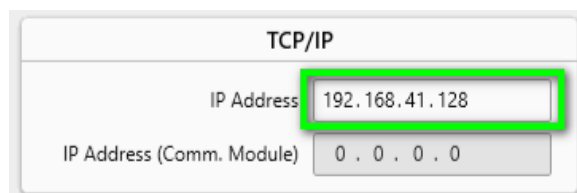
Upon connecting to the Controller open the 'Communications' tab in Control Panel



Control Panel connected to FUSION Controller

3.1. SETTING THE TCP/IP ADDRESS

Enter the desired Ethernet address of the controller into the IP Address field of the TCP/IP dialog box. In the example below the Controller address is being set to 192.168.41.38.



The IP Address is automatically written to the controller when entering valid IP values into the dialog box. (0-255)

The Comm. Module field displays the address that is currently saved in the Controller memory.

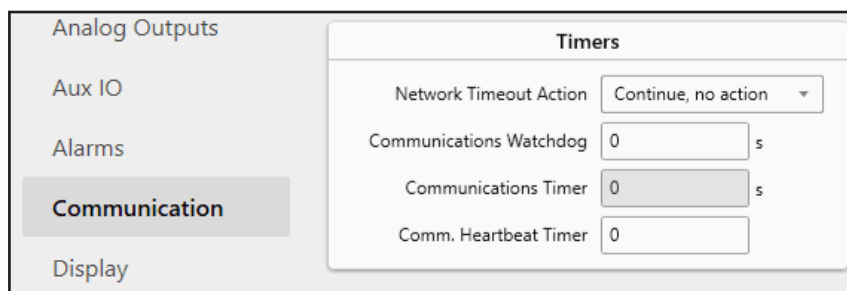
The IP Address (Comm. Module) field may remain at 0.0.0.0 until the ethernet cable is connected from the controller to the network. This normally only occurs during initial configuration.

If the controller fails to respond or the Comm Module address remains at 0.0.0.0 when connected to the network, check wiring and all connections, try changing the desired IP Address to a another value, or contact Control Concepts for technical support.

4. NETWORK COMMUNICATION TIMERS

Network timers (watchdog and heartbeat) have been added to monitor communication with the Ethernet/IP module and provide access to Network Timeout Actions and warnings on the external display and Control Panel application in the event of network errors.

The communication timers are configured using the Control Panel software under the communications tab.



4.1. COMMUNICATIONS WATCHDOG TIMER

The Communications Watchdog timer monitors parameter write requests from the Ethernet/IP module.

The module sends a Modbus multiple parameter write request only if a value written from the master changes.

The Communications Watchdog timer is reset only when a parameter write Modbus message has been received that is different than previous for either Digital Setpoint 1 or 8. Therefore the user must write a different value in one of these two parameters, written to the controller over the network, in order to reset the Communications Watchdog timer and keep it from expiring.

If the Communications Watchdog timer expires, the Ethernet/IP module is reset. This will occur each time the Communication Watchdog timer expires. This is performed in an attempt to recover communications. The network Timeout Action will be executed immediately after the second unsuccessful reset attempt of the Ethernet/IP module. If a parameter write Modbus request with a new value for either Dig SP-1 or Dig SP-8 is received before the second reset attempt, the Network Timeout Action will not be executed.

The first time the Communications Watchdog timer expires, Bit 8 of the Network Status MP-323 will be set to indicate the timeout event. This indication will persist until a multiple parameter write message is received from the Ethernet/IP module. The display will indicate “Network Timeout” immediately after the second rest of the Ethernet/IP module due to no detection of a parameter write request from the module with a different value for either Setpoint 1 or 8.

4.2. HEARTBEAT TIMER

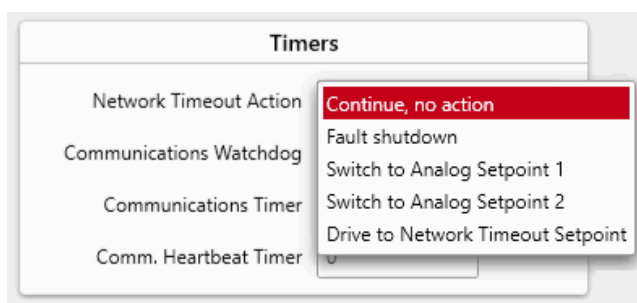
The Heartbeat timer monitors all communications received by the FUSION controller processor from the Ethernet/IP module (FUSION communications module).

The Ethernet/IP & Profinet modules query the controller's processor approximately every 50 ms continuously. The Heartbeat timer is reset upon reception of each query from the module.

If the Heartbeat timer expires due to loss of communication with the module, the module is reset in an attempt to recover communications. If communications is restored after the first, or second, reset event then the Network Timeout action is not executed. However if the module is reset two consecutive times and no queries are received from the module, then the Network timeout action is executed. After two (2) unsuccessful reset attempts there will be no more resets of the module.

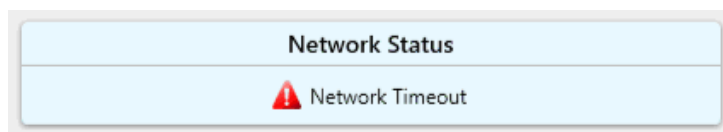
The first time that loss of communications is detected Bit 6 of the Network Status MP-323 is set to indicate that the Heartbeat timer expired. This indication will persist until communications is restored. The display will indicate "Network Timeout" only after the Ethernet/IP module has been reset two (2) times without successfully restoring communications.

4.3. NETWORK TIMEOUT ACTIONS



Continue, no action:

The Continue selection will make no change to the controller's operation, but "Network Timeout" will be indicated on the display and Control Panel application as a Warning Alarm in the Network Status dialog in the communication tab.



Fault shutdown

If the Network Timeout Action selection is "Shutdown", once this action is executed the controller will remain in FAULT state even after network/module communication has been restored.

Switch to Analog Setpoint 1 or 2 and Drive to Network Setpoint:

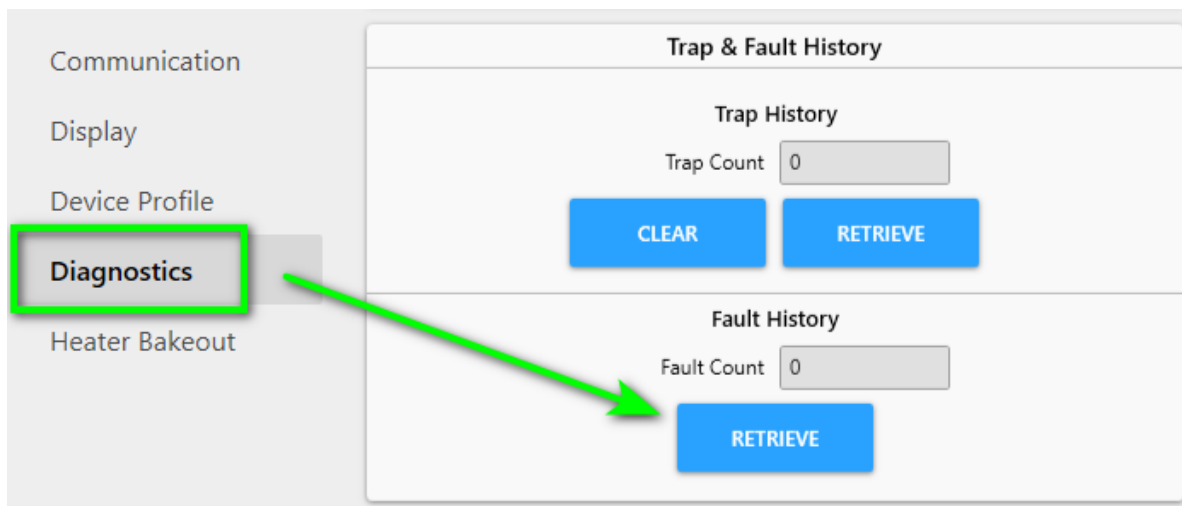
A command to switch to an analog or network setpoint due to a timeout will persist until communication is restored. Once communication has been restored, the controller will change back to its previous mode of operation. The exception is that once the Network Timeout setpoint is in operation, due to timer expiration, it will remain the setpoint value until the master writes a new value to the digital setpoint that is used for normal operation, unless normal operation uses an analog setpoint in which case that will become the setpoint when communications is restored.

The “Drive to Network Setpoint” Network Timeout Action, when executed, will switch the controller operation such that it will use Digital Setpoint 1 for its setpoint. If the controller is a multi-zone single phase controller, then all 4 zones will switch accordingly and all 4 digital setpoints will have the value of Network Timeout Setpoint (SP-108).

4.4. FAULT RECORDS

When the controller is shutdown in FAULT state due to a network timeout event, the event will be recorded in the fault records stored in EEPROM for the controller.

Fault history can be reviewed using the Control Panel application under the Diagnostics tab.

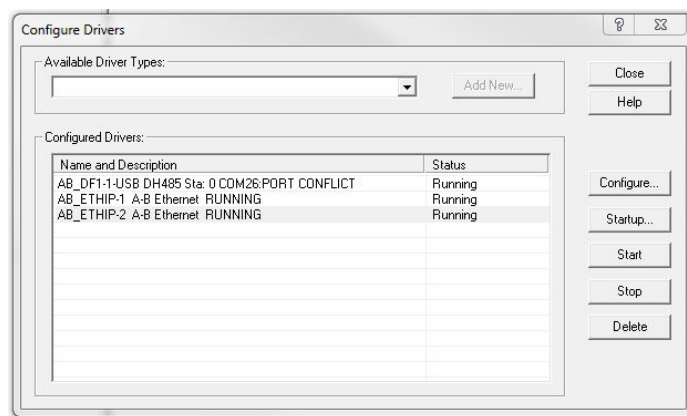


5. PLC/SOFTWARE CONFIGURATION

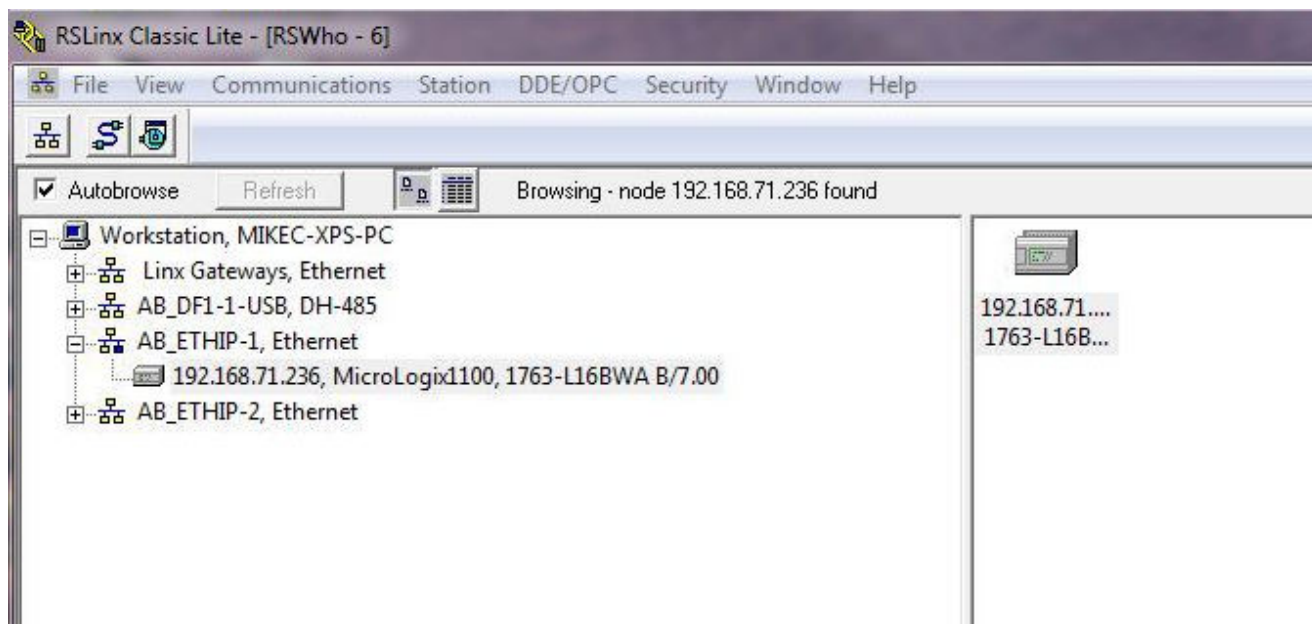
5.1. ETHERNET/IP WITH MICROLOGIX 1100 PLC

Software: RSLinx Classic Lite, MicroLogix Micro Starter Lite
PLC: AB MicroLogix 1100

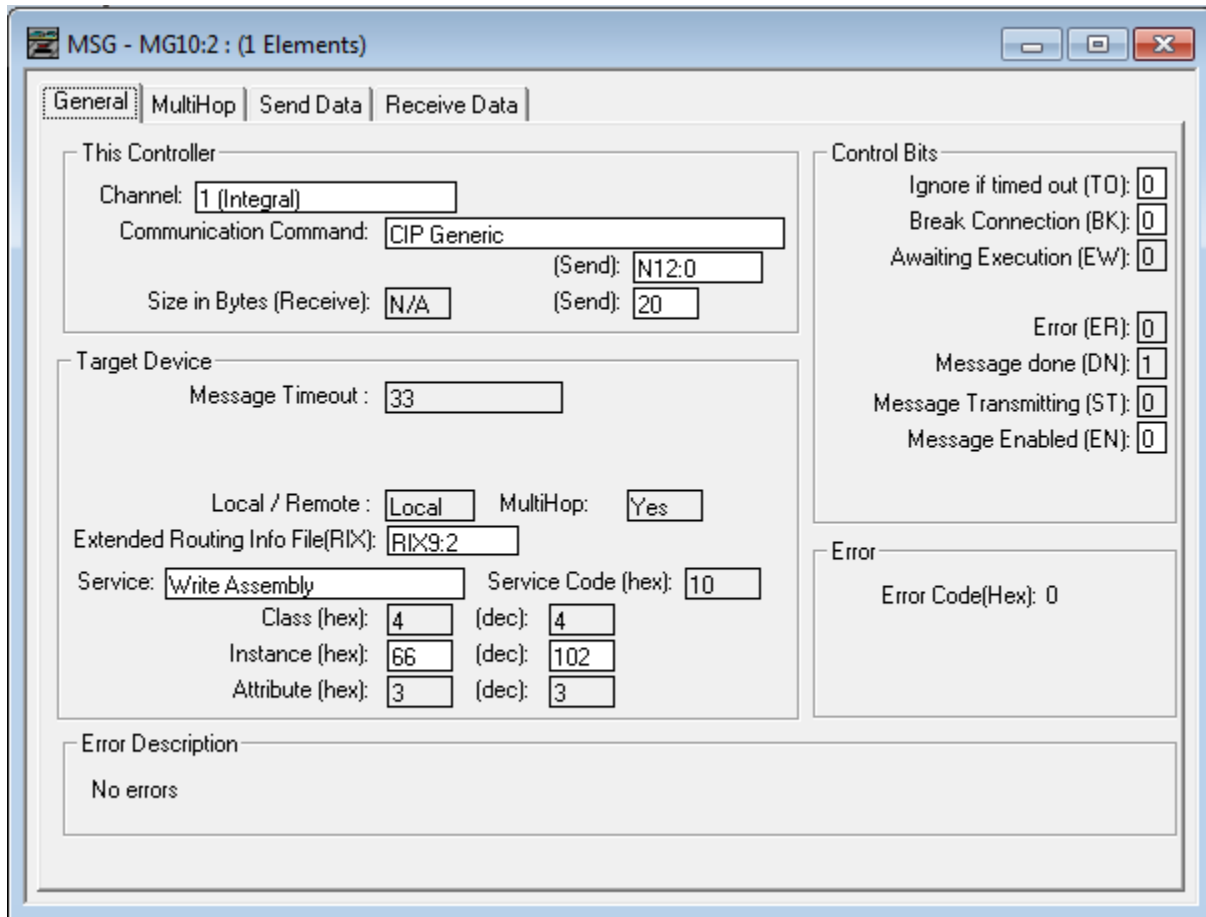
1) Run RSLinx Classic and configure the Ethernet/IP drivers to run state, click Communications -> Configure Drivers and set ETHIP and ETH driver to run. The configured driver status should indicate the drivers are running.



2) Verify the FUSION Controller is present in ETHIP with the IP address set in the FUSION Controller in Control Panel. View the connected hardware in RSLinx Classic by clicking Communications -> RSWho. In the example below the Controller has an IP address set to 192.168.71.236 and the RSLinx software has discovered the device on Ethernet network AB_ETHIP-1.



3) Using the RSLogix Micro Start Lite software create a message to write to the output assembly with message class 0x04, Instance 0x66, and Attribute 0x03.



MSG - MG10:2 : (1 Elements)

General | MultiHop | Send Data | Receive Data

This Controller

Channel:

Communication Command:

(Send):

Size in Bytes (Receive): (Send):

Target Device

Message Timeout:

Local / Remote: MultiHop:

Extended Routing Info File(RIX):

Service: Service Code (hex):

Class (hex): (dec):

Instance (hex): (dec):

Attribute (hex): (dec):

Control Bits

Ignore if timed out (TO):

Break Connection (BK):

Awaiting Execution (EW):

Error (ER):

Message done (DN):

Message Transmitting (ST):

Message Enabled (EN):

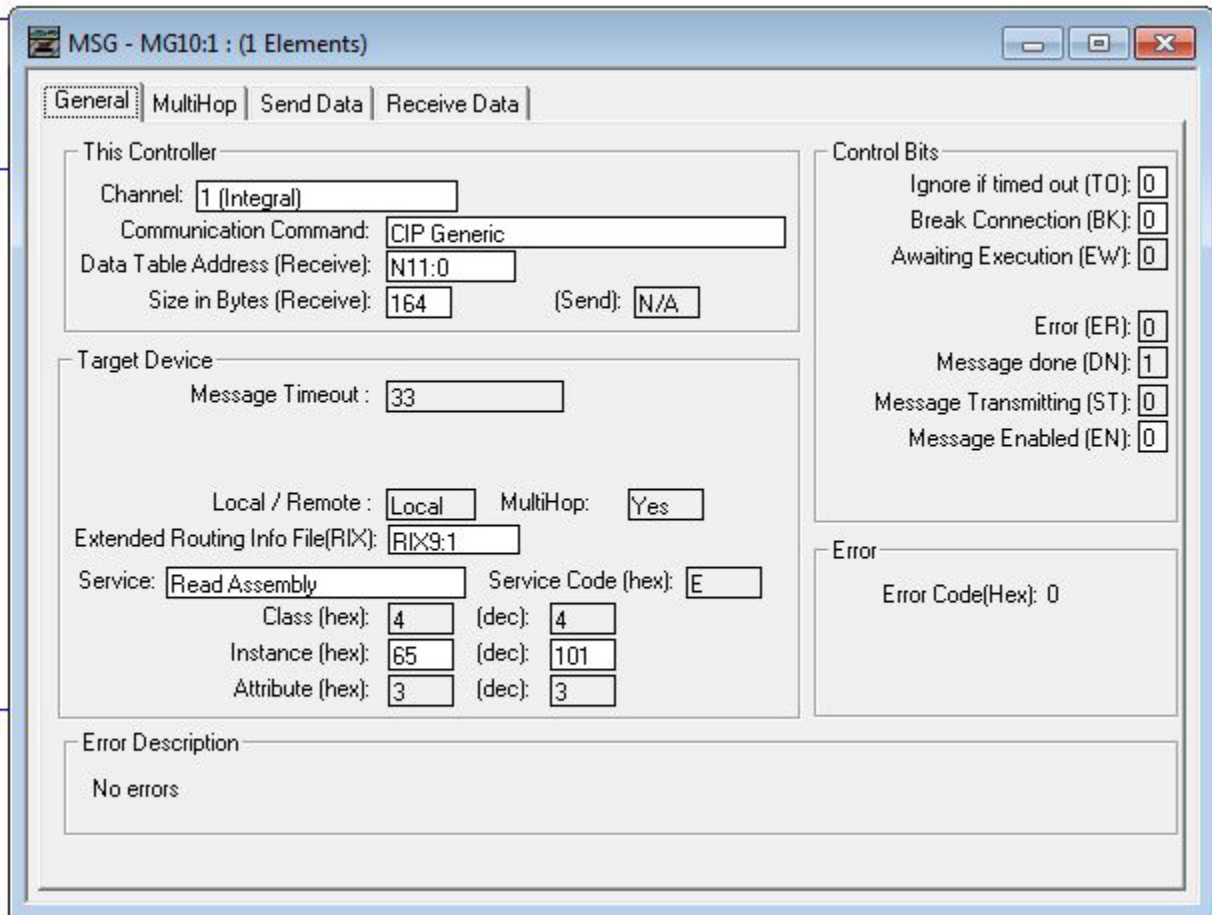
Error

Error Code(Hex):

Error Description

No errors

4) Create data buffer and message to read input buffer. The data buffer size will be 164 bytes with the message class 0x04, Instance 0x65, Attribute 0x03.



MSG - MG10:1 : (1 Elements)

General | MultiHop | Send Data | Receive Data

This Controller

Channel:

Communication Command:

Data Table Address (Receive):

Size in Bytes (Receive): (Send):

Target Device

Message Timeout:

Local / Remote: MultiHop:

Extended Routing Info File(RIX):

Service: Service Code (hex):

Class (hex): (dec):

Instance (hex): (dec):

Attribute (hex): (dec):

Control Bits

Ignore if timed out (TO):

Break Connection (BK):

Awaiting Execution (EW):

Error (ER):

Message done (DN):

Message Transmitting (ST):

Message Enabled (EN):

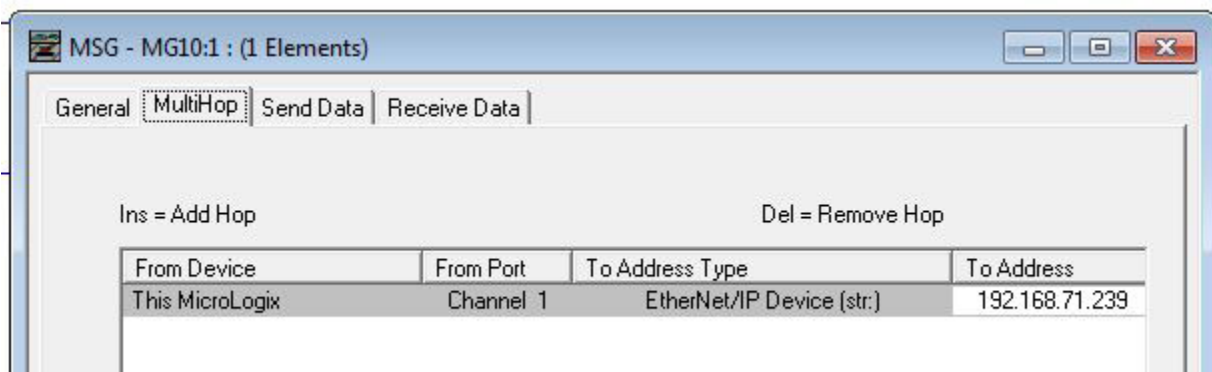
Error

Error Code(Hex): 0

Error Description

No errors

2) Add the IP address of the FUSION Controller in the MultiHop Tab. In the example below, the Controller address is 192.168.71.239.



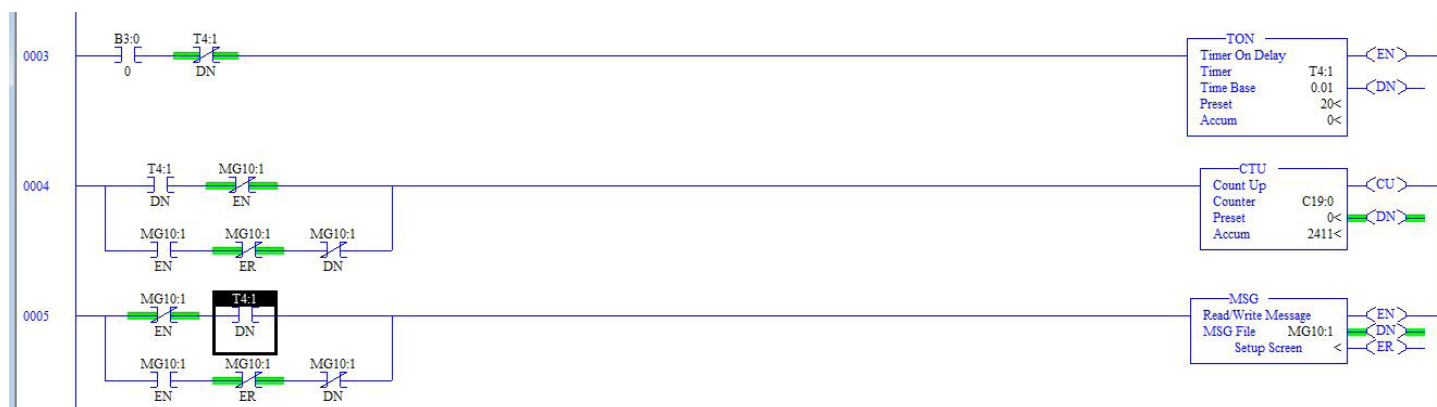
MSG - MG10:1 : (1 Elements)

General | **MultiHop** | Send Data | Receive Data

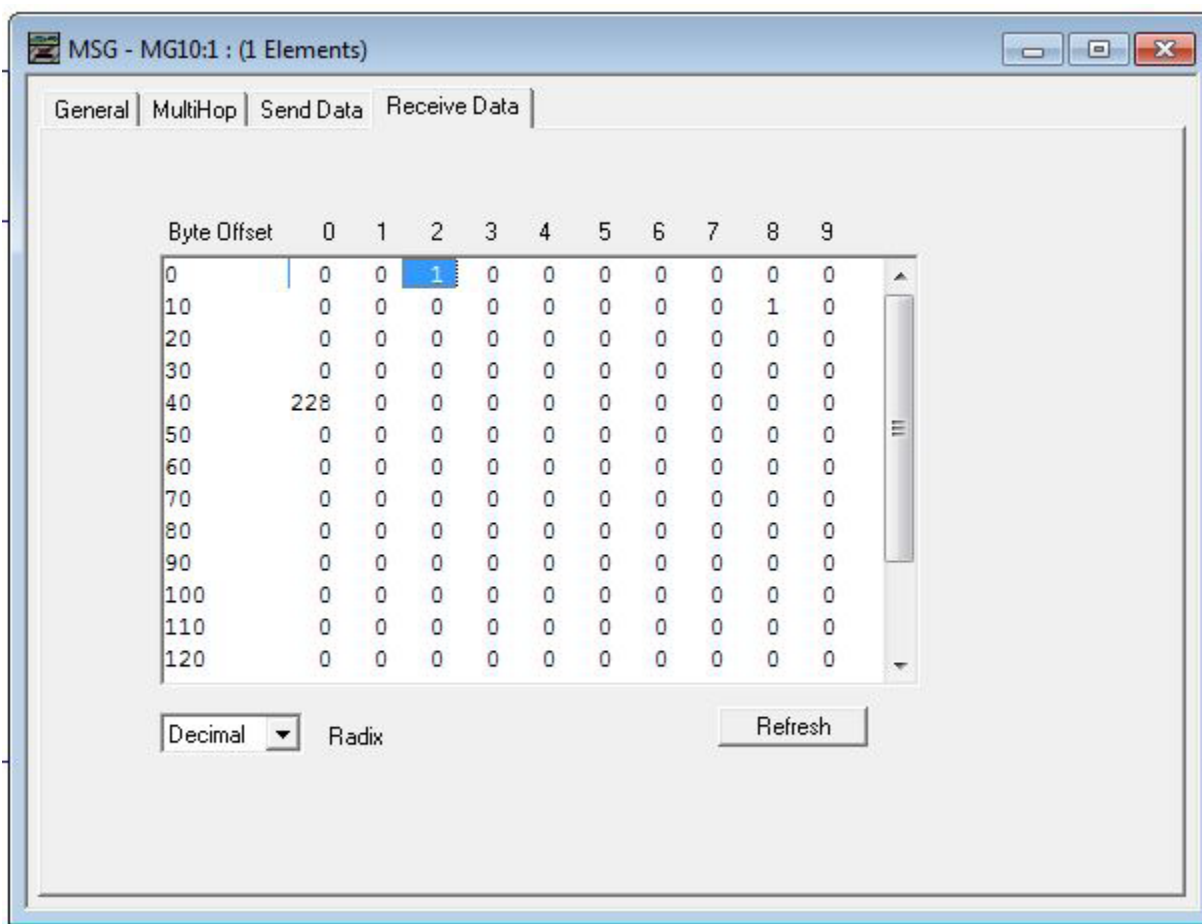
Ins = Add Hop Del = Remove Hop

From Device	From Port	To Address Type	To Address
This MicroLogix	Channel 1	EtherNet/IP Device (str.)	192.168.71.239

3) Create the timer and send message every timer tick



4) To verify proper operation, connect to the FUSION Controller with the Control Panel application using a USB connection. Edit the "Dig Setpoint 1" value to read 0.01. Check that byte 2,3 of the data buffer displays 01 00 as shown in the following screen-shot. (Ethernet/IP is Little Endian by specification; the least significant byte will appear first.)

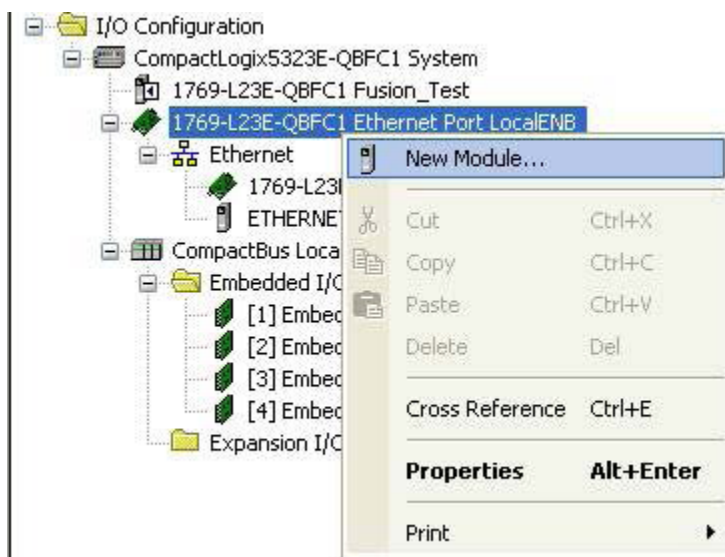


5.2. ETHERNET/IP WITH COMPACTLOGIX L23E

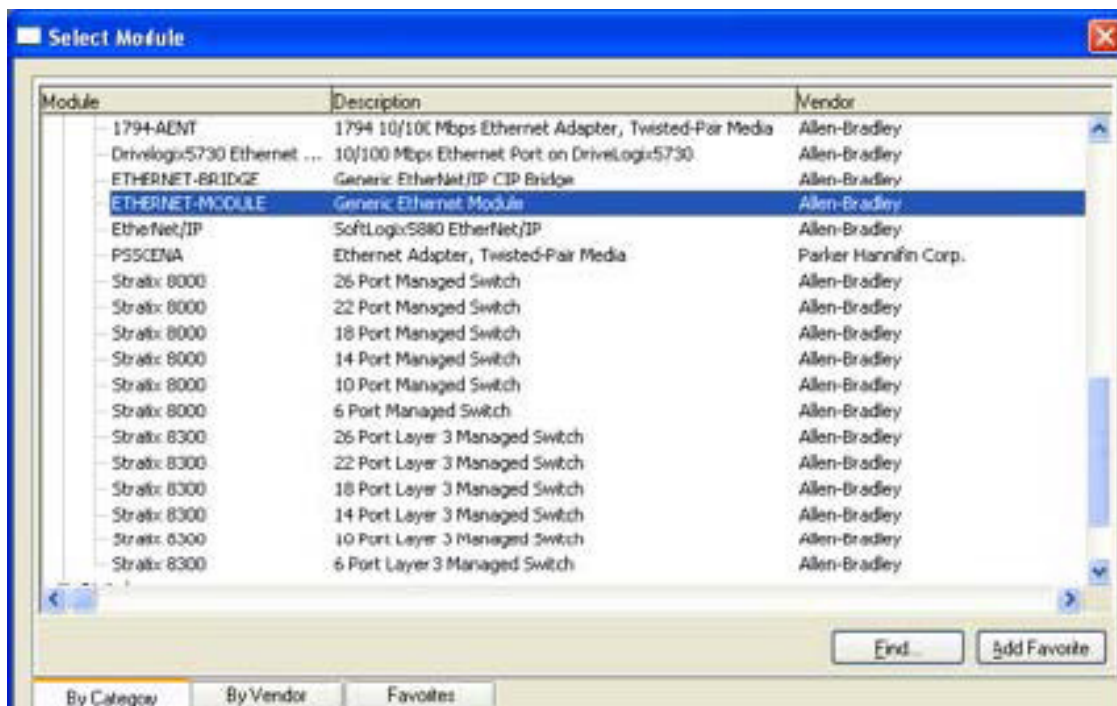
Software: RSLogix 5000

PLC: CompactLogix L23E-QBFC1B

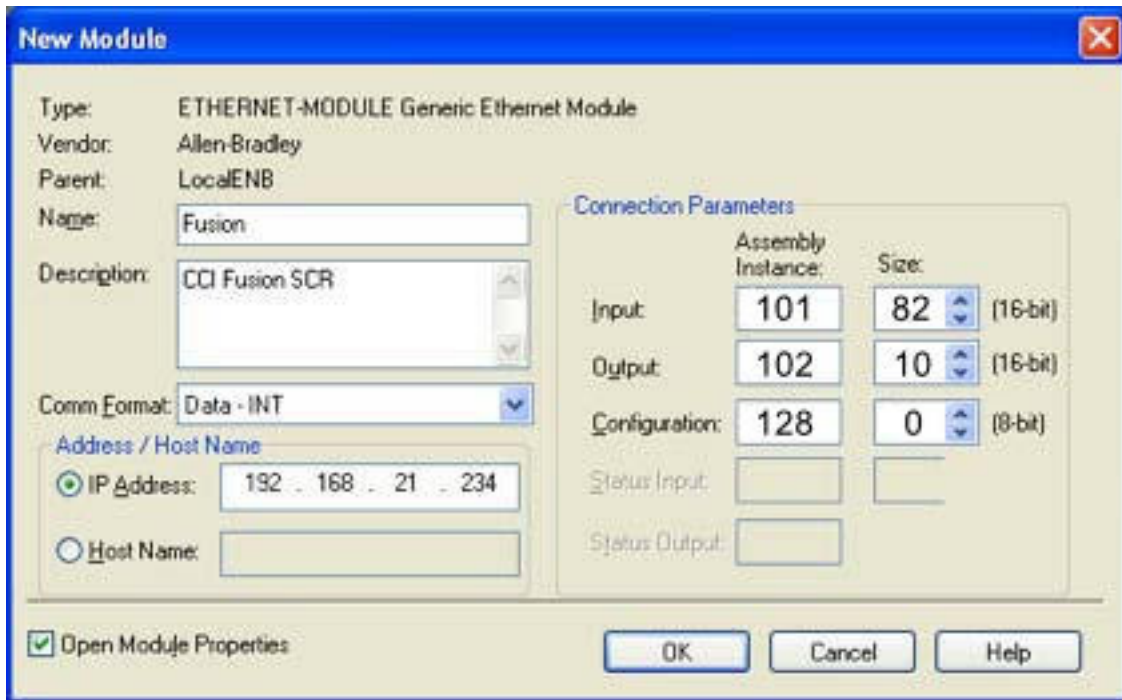
1) Open RSLogix 5000 software. Right click the Ethernet port and select “New module”.



2) Find “Generic Ethernet Module” and click OK.



3) Set the IP address of Fusion with Assembly Instance, size listed below. Click OK.



New Module

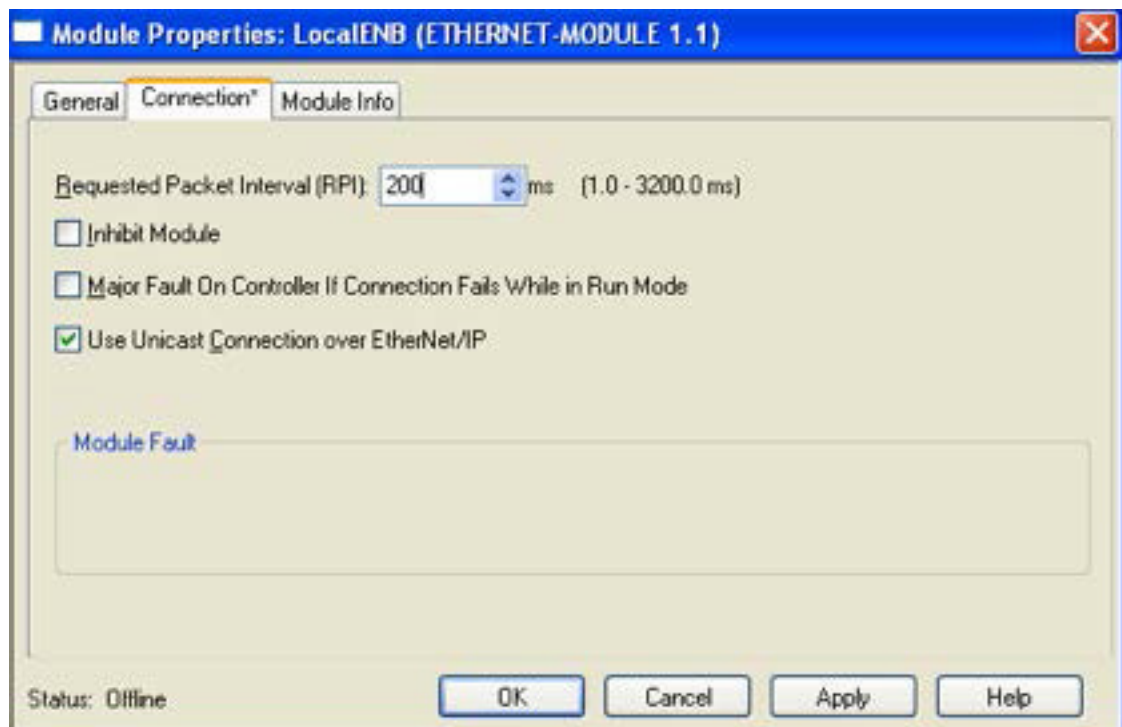
Type: ETHERNET-MODULE Generic Ethernet Module
 Vendor: Allen-Bradley
 Parent: LocalENB
 Name: Fusion
 Description: CCI Fusion SCR
 Comm Format: Data - INT
 Address / Host Name:
☒ IP Address: 192 . 168 . 21 . 234
☐ Host Name:
☐ Open Module Properties

Connection Parameters

	Assembly Instance:	Size:	
Input:	101	82	(16-bit)
Output:	102	10	(16-bit)
Configuration:	128	0	(8-bit)
Status Input:			
Status Output:			

OK Cancel Help

4) Set the Requested Packet Interval (RPI) to 200 ms. Click OK.



Module Properties: LocalENB (ETHERNET-MODULE 1.1)

General Connection* Module Info

Requested Packet Interval (RPI): 200 ms (1.0 - 3200.0 ms)
☐ Inhibit Module
☐ Major Fault On Controller If Connection Fails While in Run Mode
☒ Use Unicast Connection over EtherNet/IP

Module Fault

Status: Offline

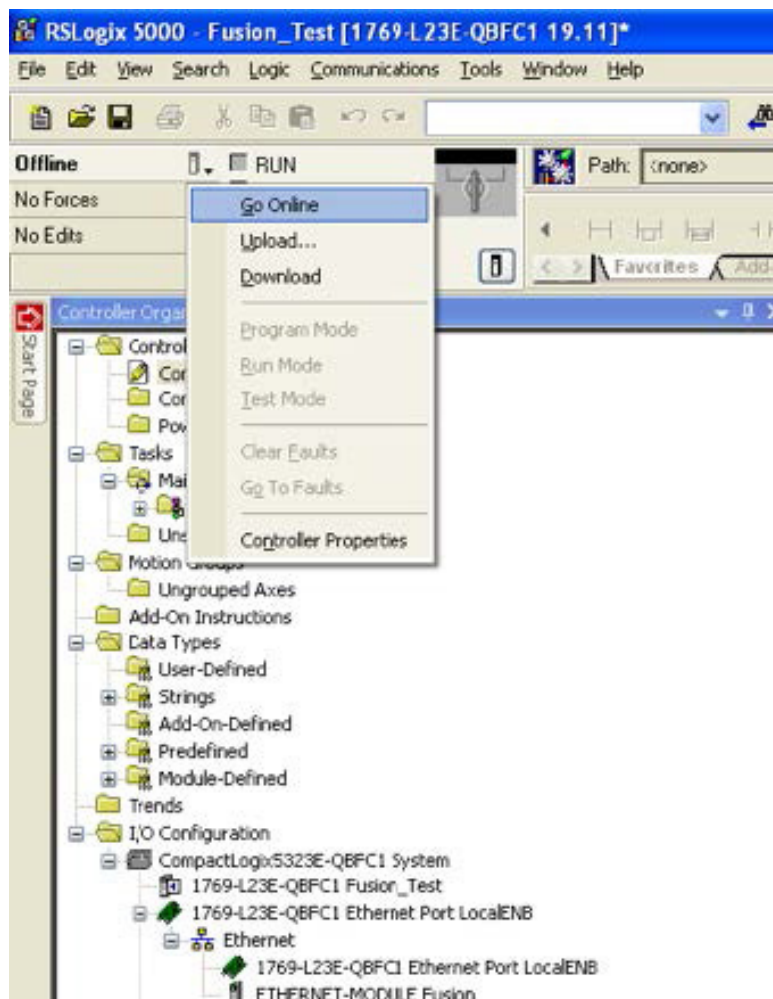
OK Cancel Apply Help

5) The Fusion Ethernet module should appear.

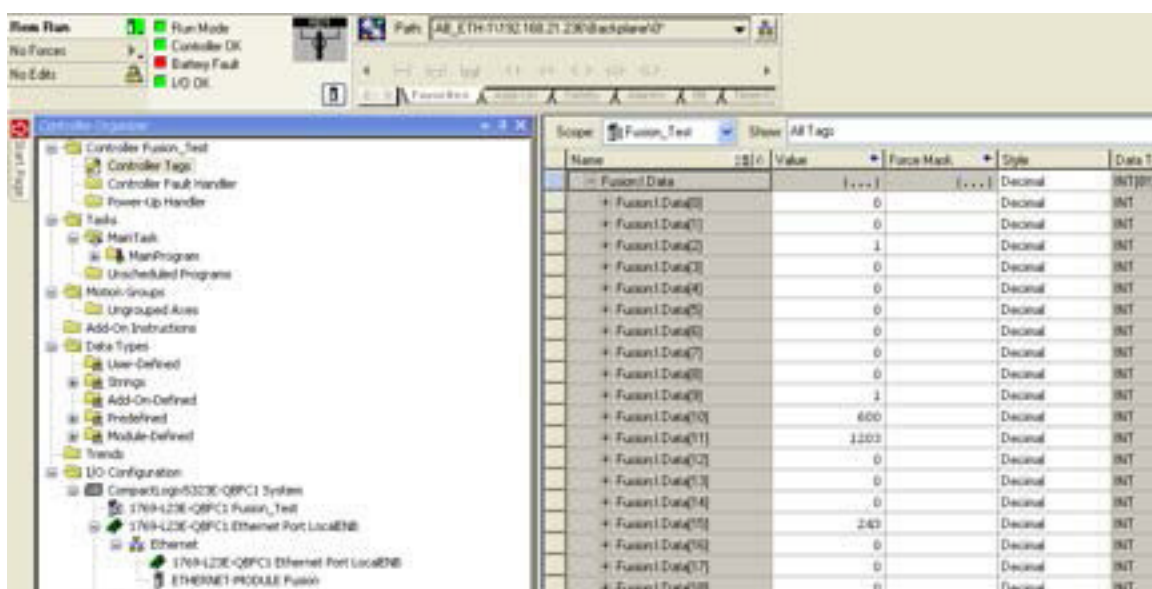
If the communication path is ready, set the PLC to Go Online.

Set the communication path in Communication->Who's Active.

Download the project and set the PLC to Remote Run.

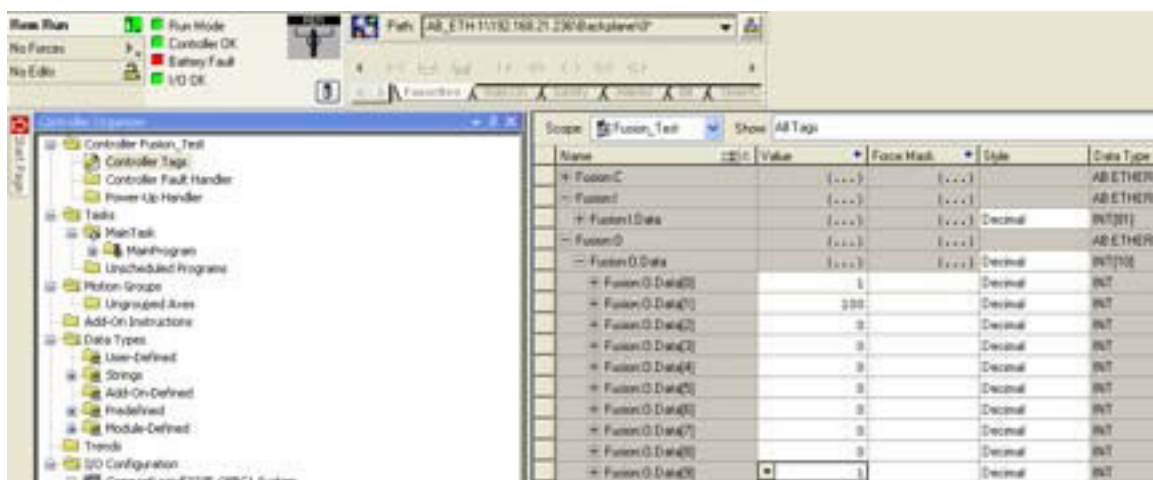


6) With the PLC set to Run, click the Controller Tags. Check the input data buffer. For the example below line frequency (Integer 10) is 60 Hz (600) and Line Voltage (Integer 11) is 120V (1200).



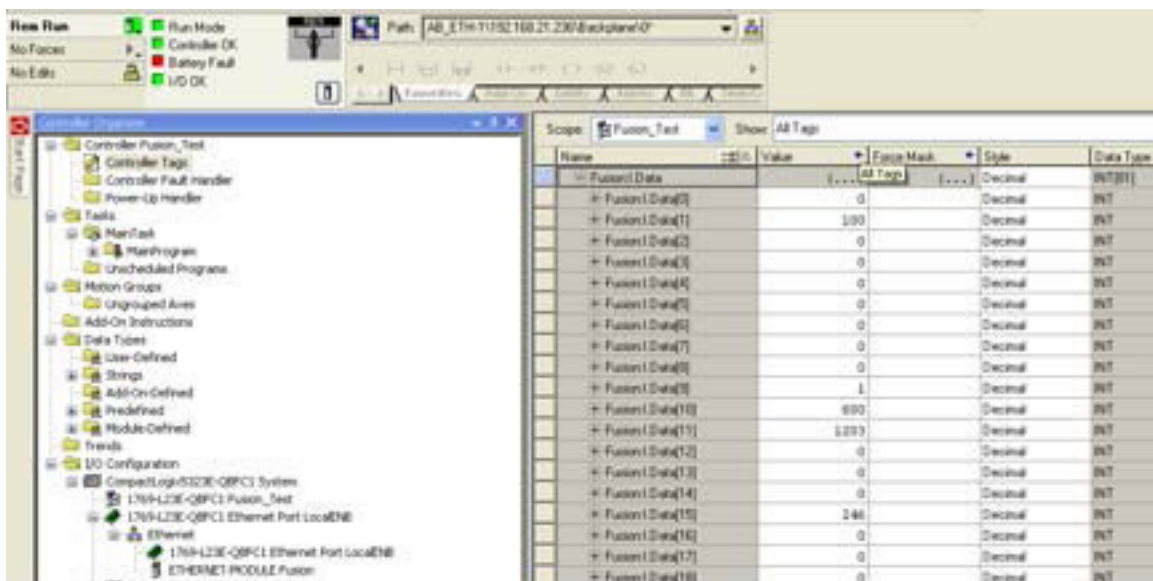
7) Click the output data buffer in Controller Tags.

Set Integer 0 (Output Enable) to 1, Set Integer 1 (Digital Setpoint 1) to 100 (1%),
Set Integer 9 (Digital System Command) to 1.



8) Check the input data buffer.

Integer 1 (Digital Setpoint 1) should be set to 100
Integer 9 (Digital System Command) should be set to 1.



6. INPUT/OUTPUT ASSEMBLY LIST

Input and Output Range: Integer 0 to 9

Integer 0 Write Enable (WRITE)	
Units:	N/A
Minimum:	0
Maximum:	1
Representation:	
0	Output Assembly values are not written to the Controller
1	Output Assembly values are written to the Controller
<u>Note:</u> Writing a '1' to this register enables the values written to the output assembly registers to be written to the controller. Writing a '0' to this register prevents the values written to the output assembly registers from being written to the controller.	

Integer 0 Module Communication Status (READ)	
BIT	Description for when bit is set (1) (0) = OK
0	Modbus Error, Controller is responding with error codes
1	Modbus Error, Communication timed out
2	Modbus Error, Can not communicate with the controller
3-7	Reserved (0)
8	Module is active with default configuration
9	Module has new configuration that will take effect at next reset
10-15	Reserved (0)

Integer 1 SP-100 Setpoint 1 Zone 1 (Digital Setpoint 1)	
Units:	% of Full Scale
Minimum:	0.00
Maximum:	100.00
Default:	0.00

Integer 2 SP-101 Setpoint 2 Zone 1 (Digital Setpoint 2)	
Units:	% of Full Scale
Minimum:	0.00
Maximum:	100.00
Default:	0.00

Integer 3 SP-102 Setpoint 1 Zone 2 (Digital Setpoint 3)	
Units:	% of Full Scale
Minimum:	0.00
Maximum:	100.00
Default:	0.00

Integer 4 SP-103 Setpoint 2 Zone 2 (Digital Setpoint 4)	
Units:	% of Full Scale
Minimum:	0.00
Maximum:	100.00
Default:	0.00

Integer 5 SP-104 Setpoint 1 Zone 3 (Digital Setpoint 5)	
Units:	% of Full Scale
Minimum:	0.00
Maximum:	100.00
Default:	0.00

Integer 6 SP-105 Setpoint 2 Zone 3 (Digital Setpoint 6)	
Units:	% of Full Scale
Minimum:	0.00
Maximum:	100.00
Default:	0.00

Integer 7 SP-106 Setpoint 1 Zone 4 (Digital Setpoint 7)	
Units:	% of Full Scale
Minimum:	0.00
Maximum:	100.00

Integer 7 SP-106 Setpoint 1 Zone 4 (Digital Setpoint 7)

Default:	0.00
----------	------

Integer 8 SP-107 Setpoint 2 Zone 4 (Digital Setpoint 8)

Units:	% of Full Scale
Minimum:	0.00
Maximum:	100.00
Default:	0.00

Integer 9 SP-129 Digital System Command

Units:	N/A
Minimum:	0x0000 = 0
Maximum:	0xFFFF = 65535
Default:	0x0000 (0)
Bit Definition:	
Bit 15 =	Analog Select Zone 4
Bit 14 =	Analog Select Zone 3
Bit 13 =	Analog Select Zone 2
Bit 12 =	Analog Select Zone 1
Bit 11 =	Relay 2 (0 = OFF, 1 = ON)
Bit 10 =	Relay 1 (0 = OFF, 1 = ON)
Bit 9 =	Reserved (should be set = 0)
Bit 8 =	Reserved (should be set = 0)
Bit 7 =	Setpoint 2 Select Zone 4
Bit 6 =	Setpoint 2 Select Zone 3
Bit 5 =	Setpoint 2 Select Zone 2
Bit 4 =	Setpoint 2 Select Zone 1
Bit 3 =	RUN Request Zone 4 (0 = Stop, 1 = RUN)
Bit 2 =	RUN Request Zone 3 (0 = Stop, 1 = RUN)
Bit 1 =	RUN Request Zone 2 (0 = Stop, 1 = RUN)
Bit 0 =	RUN Request Zone 1 (0 = Stop, 1 = RUN)

Integer 10 MP-219 Line Frequency

Units:	Hz
Minimum:	0.0
Maximum:	99.9

Integer 11 MP-220 Line Voltage A

Units:	RMS Volts
Minimum:	0.0
Maximum:	999.9

Integer 12 MP-221 Load Voltage A

Units:	Volts RMS or Average
Minimum:	0.0
Maximum:	999.9

Integer 13 MP-222 Load Current A

Units:	Amps RMS or Average
Minimum:	0.0
Maximum:	9999.9

Integer 14 MP-223 Load Resistance A (Not Active)

Units:	Ohm
Minimum:	0.0
Maximum:	9999.9

Integer 15 MP-224 Heatsink Temperature A

Units:	°C
Minimum:	0.0
Maximum:	999.9

Integer 16 MP-225 Line Voltage B

Units:	RMS Volts
Minimum:	0.0
Maximum:	999.9

Input Only Range: Integer 10 to 81

**Integer 17
MP-226 Load Voltage B**

Units:	Volts RMS or Average
Minimum:	0.0
Maximum:	999.9

**Integer 18
MP-227 Load Current B**

Units:	Amps RMS or Average
Minimum:	0.0
Maximum:	9999.9

**Integer 19
MP-228 Load Resistance B (Not Active)**

Units:	Ohm
Minimum:	0.0
Maximum:	9999.9

**Integer 20
MP-229 Heatsink Temperature B**

Units:	°C
Minimum:	0.0
Maximum:	999.9

**Integer 21
MP-230 Line Voltage C**

Units:	RMS Volts
Minimum:	0.0
Maximum:	999.9

**Integer 22
MP-231 Load Voltage C**

Units:	Volts RMS or Average
Minimum:	0.0
Maximum:	999.9

**Integer 23
MP-232 Load Current C**

Units:	Amps RMS or Average
Minimum:	0.0
Maximum:	9999.9

**Integer 24
MP-233 Load Resistance C (Not Active)**

Units:	Ohm
Minimum:	0.0
Maximum:	9999.9

**Integer 25
MP-234 Heatsink Temperature C**

Units:	°C
Minimum:	0.0
Maximum:	999.9

**Integer 26
MP-235 Line Voltage D**

Units:	RMS Volts
Minimum:	0.0
Maximum:	999.9

**Integer 27
MP-236 Load Voltage D**

Units:	Volts RMS or Average
Minimum:	0.0
Maximum:	999.9

**Integer 28
MP-237 Load Current D**

Units:	Amps RMS or Average
Minimum:	0.0
Maximum:	9999.9

**Integer 29
MP-238 Load Resistance D (Not Active)**

Units:	Ohm
Minimum:	0.0
Maximum:	9999.9

**Integer 30
MP-239 Heatsink Temperature D**

Units:	°C
Minimum:	0.0
Maximum:	999.9

Integer 31
MP-245 Load Power Zone 1 HI (MSW)

Units:	Watts or VA
Minimum:	0
Maximum:	32767

Integer 32
MP-246 Load Power Zone 1 LO (LSW)

Units:	Watts or VA
Minimum:	0
Maximum:	65535

Integer 33
MP-247 Line Power Factor Zone 1

Units:	N/A
Minimum:	0.00
Maximum:	9.99

Integer 34
MP-248 Controller State Zone 1

Units:	N/A
Minimum:	0
Maximum:	2
Value:	
0 =	STOP
1 =	RUN
2 =	FAULT

Integer 35
MP-249 Duty % Zone 1

Units:	% of Full ON
Minimum:	0.0
Maximum:	999.9

Integer 36
MP-250 Setpoint Reference Zone 1 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 37
MP-251 Setpoint Reference Zone 1 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 38
MP-252 Feedback Zone 1 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 39
MP-253 Feedback Zone 1 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 40
MP-254 Control Loop Error Zone 1 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 41
MP-255 Control Loop Error Zone 1 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 42
MP-256 Warning Alarm Zone 1

Units:	N/A
Minimum:	000000000 = 0
Maximum:	111111111 = 511
Value:	
Bit 8 =	High Output %
Bit 7 =	Low Output %
Bit 6 =	Low Output
Bit 5 =	Load Imbalance
Bit 4 =	Shorted SCR
Bit 3 =	Heatsink Temperature

Integer 42
MP-256 Warning Alarm Zone 1

Bit 2 =	Power Limit
Bit 1 =	Current Limit
Bit 0 =	Voltage Limit

Integer 43
MP-260 Load Power Zone 2 HI (MSW)

Units:	Watts or VA
Minimum:	0
Maximum:	32767

Integer 44
MP-261 Load Power Zone 2 LO (LSW)

Units:	Watts or VA
Minimum:	0
Maximum:	65535

Integer 45
MP-262 Line Power Factor Zone 2

Units:	N/A
Minimum:	0.00
Maximum:	9.99

Integer 46
MP-263 Controller State Zone 2

Units:	N/A
Minimum:	0
Maximum:	2
Value:	
0 =	STOP
1 =	RUN
2 =	FAULT

Integer 47
MP-264 Duty % Zone 2

Units:	% of Full ON
Minimum:	0.0
Maximum:	999.9

Integer 48
MP-265 Setpoint Reference Zone 2 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 49
MP-266 Setpoint Reference Zone 2 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 50
MP-267 Feedback Zone 2 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 51
MP-268 Feedback Zone 2 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 52
MP-269 Control Loop Error Zone 2 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 53
MP-270 Control Loop Error Zone 2 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 54
MP-271 Warning Alarm Zone 2

Units:	N/A
Minimum:	000000000 = 0
Maximum:	111111111 = 511
Value:	

Integer 54
MP-271 Warning Alarm Zone 2

Bit 8 =	High Output %
Bit 7 =	Low Output %
Bit 6 =	Low Output
Bit 5 =	Load Imbalance
Bit 4 =	Shorted SCR
Bit 3 =	Heatsink Temperature
Bit 2 =	Power Limit
Bit 1 =	Current Limit
Bit 0 =	Voltage Limit

Integer 55
MP-275 Load Power Zone 3 HI (MSW)

Units:	Watts or VA
Minimum:	0
Maximum:	32767

Integer 56
MP-276 Load Power Zone 3 LO (LSW)

Units:	Watts or VA
Minimum:	0
Maximum:	65535

Integer 57
MP-277 Line Power Factor Zone 3

Units:	N/A
Minimum:	0.00
Maximum:	9.99

Integer 58
MP-278 Controller State Zone 3

Units:	N/A
Minimum:	0
Maximum:	2
Value:	
0 =	STOP
1 =	RUN
2 =	FAULT

Integer 59
MP-279 Duty % Zone 3

Units:	% of Full ON
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Integer 59
MP-279 Duty % Zone 3

Minimum:	0.0
Maximum:	999.9

Integer 60
MP-280 Setpoint Reference Zone 3 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 61
MP-281 Setpoint Reference Zone 3 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 62
MP-282 Feedback Zone 3 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 63
MP-283 Feedback Zone 3 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 64
MP-284 Control Loop Error Zone 3 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 65
MP-285 Load Power Zone 3 LO (LSW)

Units:	Watts or VA
Minimum:	0
Maximum:	65535

Integer 66
MP-286 Warning Alarm Zone 3

Units:	N/A
Minimum:	000000000 = 0
Maximum:	111111111 = 511
Value:	
Bit 8 =	High Output %
Bit 7 =	Low Output %
Bit 6 =	Low Output
Bit 5 =	Load Imbalance
Bit 4 =	Shorted SCR
Bit 3 =	Heatsink Temperature
Bit 2 =	Power Limit
Bit 1 =	Current Limit
Bit 0 =	Voltage Limit

Integer 67
MP-290 Load Power Zone 4 HI (MSW)

Units:	Watts or VA
Minimum:	0
Maximum:	32767

Integer 68
MP-291 Load Power Zone 4 LO (LSW)

Units:	Watts or VA
Minimum:	0
Maximum:	65535

Integer 69
MP-292 Line Power Factor Zone 4

Units:	N/A
Minimum:	0.00
Maximum:	9.99

Integer 70
MP-293 Controller State Zone 4

Units:	N/A
Minimum:	0
Maximum:	2
Value:	
0 =	STOP
1 =	RUN

Integer 70
MP-293 Controller State Zone 4

2 =	FAULT
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Integer 71
MP-294 Duty % Zone 4

Units:	% of Full ON
Minimum:	0.0
Maximum:	999.9

Integer 72
MP-295 Setpoint Reference Zone 4 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 73
MP-296 Setpoint Reference Zone 4 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 74
MP-297 Feedback Zone 4 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 75
MP-298 Feedback Zone 4 LO (LSW)

Units:	V, A, W
Minimum:	0
Maximum:	65535

Integer 76
MP-299 Control Loop Error Zone 4 HI (MSW)

Units:	V, A, W
Minimum:	-99
Maximum:	99

Integer 77
MP-300 Control Loop Error Zone 4 LO (LSW)

Units:	Watts or VA
Minimum:	0
Maximum:	65535

Integer 78
MP-301 Warning Alarm Zone 4

Units:	N/A
Minimum:	000000000 = 0
Maximum:	111111111 = 511
Value:	
Bit 8 =	High Output %
Bit 7 =	Low Output %
Bit 6 =	Low Output
Bit 5 =	Load Imbalance
Bit 4 =	Shorted SCR
Bit 3 =	Heatsink Temperature
Bit 2 =	Power Limit
Bit 1 =	Current Limit
Bit 0 =	Voltage Limit

Integer 79
CP-604 Model - Config Data

Units:	CODED
Minimum:	0000
Maximum:	FFFF
Default:	0000

Integer 80
MP-210 Inhibit Alarm Status

Units:	N/A
Minimum:	00000000 = 0
Maximum:	11111111 = 255
Value:	
Bit 7 =	Watchdog Timeout
Bit 6 =	Memory Error (Not Active)
Bit 5 =	Network Timeout Shutdown
Bit 4 =	unused
Bit 3 =	Line Phase Loss
Bit 2 =	PLL Lock Loss
Bit 1 =	Heatsink Over-Temp

Integer 80
MP-210 Inhibit Alarm Status

Bit 0 =	Current Trip
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Integer 81
MP-344 Zone Status

Units:	N/A
Minimum:	000000000000 = 0
Maximum:	111111110000 = 4080
Bit Definition:	
Bit 15 =	not used
Bit 14 =	not used
Bit 13 =	not used
Bit 12 =	not used
Bit 11 =	Fuse D (0 = OK, 1 = Open)
Bit 10 =	Fuse C (0 = OK, 1 = Open)
Bit 9 =	Fuse B (0 = OK, 1 = Open)
Bit 8 =	Fuse A (0 = OK, 1 = Open)
Bit 7 =	Zone 4 (0 = Not at Setpoint, 1 = at Setpoint)
Bit 6 =	Zone 3 (0 = Not at Setpoint, 1 = at Setpoint)
Bit 5 =	Zone 2 (0 = Not at Setpoint, 1 = at Setpoint)
Bit 4 =	Zone 1 (0 = Not at Setpoint, 1 = at Setpoint)
Bit 3 =	Zone 4 (0 = Normal, 1 = Fault)
Bit 2 =	Zone 3 (0 = Normal, 1 = Fault)
Bit 1 =	Zone 2 (0 = Normal, 1 = Fault)
Bit 0 =	Zone 1 (0 = Normal, 1 = Fault)