



# GE Fanuc

## CMM 321 - Modbus TCP/IP

### Overview

Maple Systems' **Silver Series** Terminals (Maple OITs) communicate with the GE Fanuc CMM 321 using the Modbus TCP/IP protocol. The OIT uses MODBUS TCP/IP protocol driver, to allow the Maple OIT to act as the master in a point-to-point single master, single slave format.

Note: Single master, single slave signifies that the OIT can only communicate with one Ethernet device. See technote 1088 for information on connecting multiple Ethernet devices.

The MODBUS TCP/IP protocol driver in EZware also has the following features:

- Ability to communicate over Ethernet for 100m
- Ability to communicate over Ethernet at 10 Mbps
- Ability to read/write to individual bits in 3x and 4x memory

### Communications Cable

The Maple HMI should be connected to the CMM 321's 10BaseT Ethernet port.

A crossover 10baseT Ethernet cable should be used between the OIT and the CMM321. A list of cables offered by Maple Systems as well as cable assembly instructions to assist you in assembling your own Ethernet cable are available on our website.

**WARNING:** If your communications cable is not wired exactly as shown in our cable assembly instructions, damage to the OIT or loss of communications can result.

### Controller Settings

The Ethernet port on the 321 module must be set to Modbus TCP/IP Slave mode in order to properly communicate with the OIT.

# Accessible Memory

The CMM 321 provides access to the PLC's internal memory addresses by 'mapping' them to ranges of Modbus addresses. See the tables below. Refer to GE Fanuc publication GFK-1541B for more information.

## Register Memory

The following table lists the controller's register memory ranges that the Maple OITs are able to access. The following register memory can be displayed in 16, 32, or 64 bit format on the Maple OITs.

PLC Address	Modbus Device Type	Modbus Device Address	Offset <sup>1</sup>
%AI1-16384	4x	257-16640	+256
%AQ1-12288	4x	16897-29184	+16896
%R1-32640	4x	29185-61824	+29184
%I1-4096	4x	1-256	+N/A <sup>2</sup>
%Q1-4096	4x	16641-16898	+N/A <sup>3</sup>

## Discrete Memory

The following table lists the controller's discrete memory ranges that the Maple OITs are able to access. Please note that your controller's memory range may be *smaller* or *larger* than that supported by these OITs. The following discrete memory is displayable in single-bit format on the Maple OIT.

PLC Address	Modbus Device Type	Modbus Device Address	Offset <sup>1</sup>
%I1-4096	1x	1-4096	0
%Q1-4096	0x	1-4096	0
%M1-4096	4x_Bit	6182500-6208015	+N/A <sup>4</sup>

### NOTES:

1. Add this value to the %n address to get the Modbus address.
2. Returns a 16-bit binary value. 400001 contains bits 1-16; 400256 contains bits 4081-4096.
3. Returns a 16-bit binary value. 416641 contains bits 1-16; 416898 contains bits 4081-4096.
4. Returns a 16-bit binary value. 461825 contains bits 1-16; 462080 contains bits 4081-4096.

The CMM321 makes the data available to the Modbus '3x' device type as well, with the same addresses. However, Modbus does not provide a means to write to a '3x' device. Therefore it is recommended to use '4x' devices in the OIT.

# EZware Settings

The following table lists the communications settings that must be configured in EZware. These settings can be found in the Edit-Set System Parameters menu under the PLC tab. Please note:

- the **Recommended Settings** column provides the recommended setting based upon default settings most commonly use in the CMM 321.
- the **Options** column lists EZware’s options; your controller may not support every option

Name	Recommended Settings	Options	Important Notes
PLC type:	Modbus TCP/IP		
PLC I/F Port:	Ethernet	RS232, RS485 default, RS485 4W, RS485 2W, Ethernet	Using Modbus TCP/IP requires the use of the Ethernet port.
Data Bits:	n/a	7 or 8	Does not apply to this protocol.
Stop Bits:	n/a	1 or 2	Does not apply to this protocol.
Baud Rate:	n/a	9600,19200, 38400,57600, 115200	Does not apply to this protocol.
Parity:	n/a	Even, Odd, None	Does not apply to this protocol.
HMI station No.:	0	0-255	Use for multiple OITs
PLC station No.:	0	0-255	Does not apply to this protocol.
Multiple HMI:	Disable	Disable, Master, Slave	Use for multiple OITs
HMI-HMI link speed:	38400	38400, 115200	Use for multiple OITs
Connect I/F:	n/a	Ethernet, Serial	Use for multiple OITs
Local IP Address:	192.168.0.255	XXX.XXX.XXX.XXX	The IP address assigned to the OIT Use same three octets as CMM321
Server IP Address:	192.168.0.10*	XXX.XXX.XXX.XXX	*Use the IP address assigned to the CMM 321
Subnetwork Mask:	255.255.255.0	XXX.XXX.XXX.XXX	A mask for the subnet
Default Route IP Address:	0.0.0.0	XXX.XXX.XXX.XXX	Used if the OIT is connected through a router
PLC time out constant (sec)	3.0	1.5 to 5.0	adjust if longer timeout is required
PLC block pack:	0	0-10	Number of words read at one time
Parameter 2	15	1-999	Turn around delay in Msec