

Application Note

Using the Yaskawa AC Drive “Ethernet Modbus TCP/IP” Option with Modicon MSTR Function Blocks

Applicable Product: CM090 Ethernet
Modbus TCP/IP Option Kit

Subject: Product Use	Product: CM090	Doc#: AN.AFD.07
Title: Using the Yaskawa AC Drive "Ethernet Modbus TCP/IP" Option Kit with Modicon MSTR Function Blocks		

INTRODUCTION

The following document describes the use of the Modicon MSTR function for communicating with the CM090 Ethernet Modbus TCP/IP option kit for the 7 series Yaskawa AC Drives. In this example, the information describes the use of the MSTR function to write to 2 registers in the AC Drive (i.e. the AC Drive Control word and the Frequency Reference Command word) in order to control the AC Drive. In general it will define the PLC ladder used, the control block data and the data block information, to be written to the AC Drive's registers.

Since each system application is typically different, the following may be accomplished in different ways, yet the basic principles shown may be built on for the specific system application requirements.

INTENDED AUDIENCE

This document assumes that the reader is familiar with Yaskawa 5 and 7 Series AC Drives, Modbus TCP/IP and Ethernet technical terminology and operation, and is also familiar with PLC programming.

PLC SAMPLE

The following is a sample of PLC ladder that can be used for implementing the MSTR method of communication to the CM090. Note, the CM090 only allows up to 10 MSTR block functions to be activated at the same time.

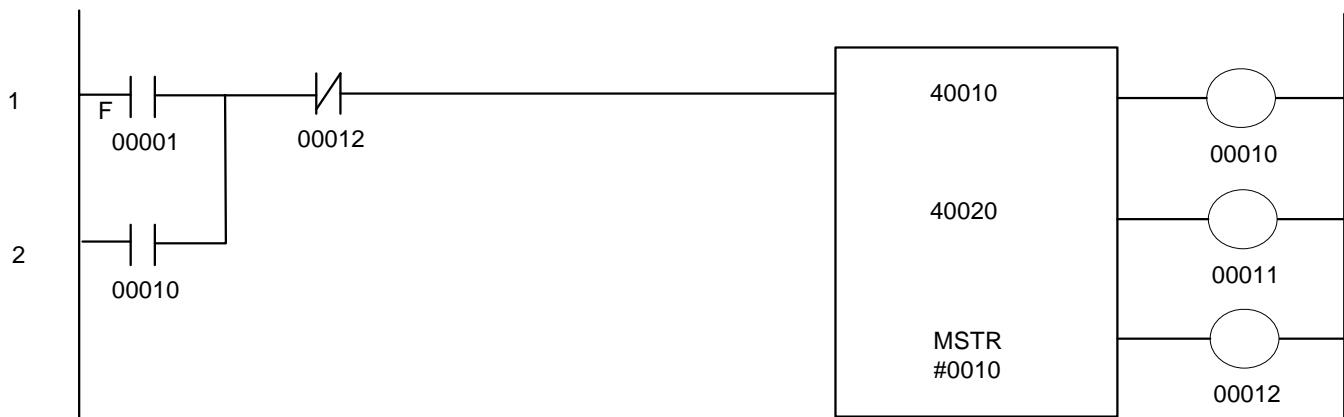


Figure 1. PLC ladder for implementing the MSTR method of communication to the CM090

Figure 1. shows the PLC control necessary for implementing the MSTR function. For this example, the control block for the MSTR will be located at register 40010 in PLC memory and the data block will be located at 40020. By defining the registers as described in the following tables, this ladder will perform the write function to the CM090 Ethernet Modbus TCP/IP option kit, and essentially to the AC Drives control word (Drive Register 001h) and the Frequency Reference command (Drive Register 002h).

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The Control Block is defined in Table 1:

Register	Data Value	Description
40010	0001	Operation Type (Write = 1, Read = 2)
40011	0000	Error Status (0 = success, 6XXX Routing Err, Refer to PLC documentation for further error definitions)
40012	0002	# of Registers (1 to 16 valid for CM090)
40013	0001	Start Register # (Refer to Drive Modbus Register Map)
40014	0101	Quantum NOE Slot # (Hi-byte), Unit ID (Low-byte)
40015	00C0	Drive IP Address Octet 4 (192)
40016	00A8	Drive IP Address Octet 3 (168)
40017	0001	Drive IP Address Octet 2 (001)
40018	000A	Drive IP Address Octet 1 (010)
40019	0000	Routing Termination

Table 1. Control block

IP Address Octets are defined as follows: Example: “192.168.1.10”

Where -> “192” = Octet 4, “168” = Octet 3, “1” = Octet 2, “10” = Octet 1

The Data Block is defined in Table 2:

Register	Data Value	Description
40020	0001	Drive Control Word (1 = Run Fwd, 2 = Run Rev)
40021	1000	Frequency Ref Command (Hz, depends on 01-03) 1000 = 10.00 Hz

Table 2. Data block

By defining the control block and data block, and activating contact 00001, in the ladder logic, the MBTCP message will make a connection, write the data, and then terminate the connection to the CM090 Ethernet Modbus TCP/IP option card. Note: Any non-zero value that is displayed in the Error Status Register after activation will indicate an error had occurred. If the Error Status value returns as ‘0’ the data was correctly written.

Please, note that with some versions of PLC firmware there is a need to wait a few minutes for the internal PLC network tables to be updated. Please take this into consideration when making control logic changes and testing.

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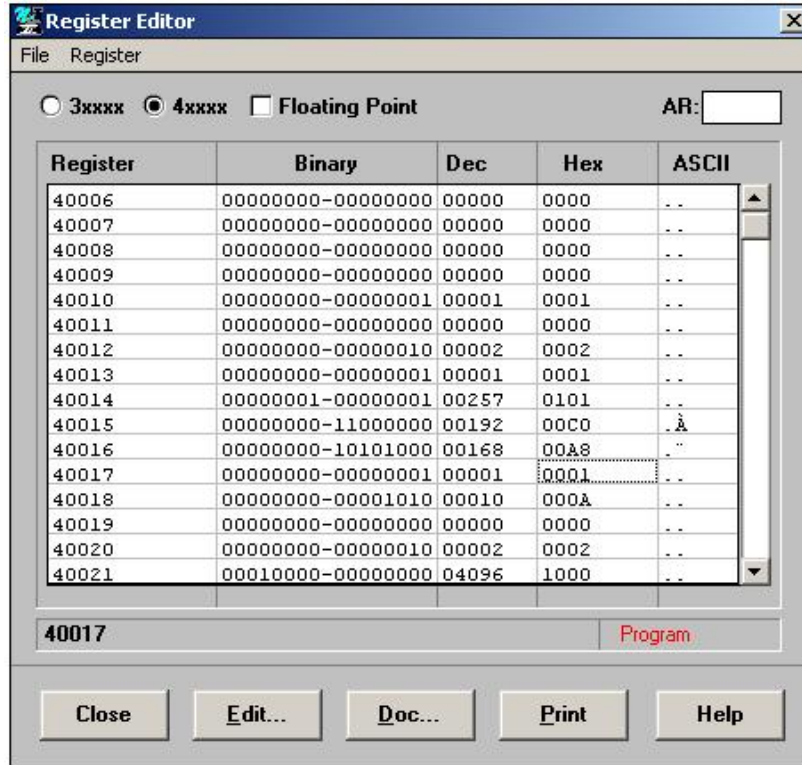


Figure 2. Sample screen capture from the PLC software register editor contents.

Figure 2. shows shows a sample screen capture from the PLC software register editor contents. In this condition the drive will be running reverse, at a speed of 40.96 Hz. The system was tested with a sample F7 AC Drive and a Momentum PLC for verification.

For questions or comments regarding this example, please feel free to contact Yaskawa Electric America, Inc. For support please call: 1-800-YASKAWA.