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Weintek HMI to Control Techniques M400 AC Drive via Modbus TCP/IP Ethernet Module

Introduction: This paper discusses how to communicate between Weintek cMT3090 and a Control Techniques Unidrive M400 AC drive via a SI-Ethernet option module, which is an option module that provides Ethernet interface and can be placed onto M series drives. SI-Ethernet module supports Modbus TCP/IP, a well-known Ethernet communication standard. Weintek Lab released a driver "Control Techniques SI-Ethernet Modbus TCP/IP" in Easybuilder pro version 6.00.01.199, mapping the drive parameters to Modbus addresses. Therefore, an automation engineer doesn't need to choose the Modbus function code and calculate its start register address.

Goal: The goal of this document is to introduce how to correctly access the M400 drive's parameters via a driver "Control Techniques SI-Ethernet Modbus TCP/IP," and provide a template to let HMI programmers know how to establish common drive parameters (Menu 0) in Easybuilder pro.

Equipment:

- 1. Weintek HMI cMT3090
- 2. Control Techniques M400 drive
- 3. SI Ethernet option module

Details of the Programming (HMI Side): Open a new project and choose the HMI model cMT3090. To get the HMI talking to the M400 drive, go to HOME on the top of the menu and then click on System Parameters button.

🖪 EasyBuilder Pro	o : EBProject1 - [1	10 - WINDOW_010]					
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After you get into System Parameters, you can add M400 drive to the communications scheme. The screen shot shows you the communication setup in the HMI for the drive. What you need to do is click on the Settings button (to the right of the IP setting area). Enter your drive IP address and select the same Address mode corresponding to

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Modbus Register Addressing Mode you chose in CT software to the communications dialog box. In my case, the SI-Ethernet is installed in slot 1. The address of the Modbus Register Addressing Mode is 001.15.013.

Name : Control Techniques SI-Ethernet Modbus TCP/IP	
Device	
Location : Local Settings * Select Local for a device connected to this HMI, or Remote for a device connected through another HMI.	
Device type : Control Techniques SI-Ethemet Modbus TCP/IP	IP Address Settings
PLC ID : 528, V.1.20, EMERSON_SI_ETHERNET_MODBUS_TOPIP.c30 I/F : Ethernet Support off-line simulation on HMI (use LB-12358)	IP address: 192 . 168 . 1 . 111 Portno.: 502
IP : [192.168.1.111, Port=502 Settings Use UDP (User Datagram Protocol)	
Device default station no. : 1	
Use broadcast command How to designate the station no. in object's address?	Timeout (sec): 1.0 V Turn around delay (ms): 0 Address mode: Standard V
Interval of block pack (words) : 32 Max. read-command size (words) : 120 Max. write-command size (words) : 120	Standard Modified The number of resending commands :
OK Cancel	OK Cancel

According to the M400 drive user manual, if you want to access a parameter number above 99, you have to switch "Modbus Register Addressing Mode (S.15.013)" to the modified addressing mode in CT software.

Make sure what Modbus Register Addressing Mode you should use. Here is the table to show you the scope of these two modes.

value	Text	Menu Range	Parameter Range
0	Standard	mm<=162	ppp <=99
1	Modified	mm <=63	ppp <= 255

Now we can create objects to make HMI read or write parameters from the drive. This driver allows you to enter parameters as their addresses, like what you are operating on the drive's keypad or PC Tools application.

This table shows the address of the drive. The notation SSS.MM.PPP is used to access these parameters where SSS is the slot number, MM is the menu number, and PPP is the parameter number. For example, to access minimum speed of the drive, its parameter appears in drive Menu 1 and it is referred to as 01.007. The drive is in slot 0. Therefore, the full address is 001.01.007.

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Weintek HMI to Control Techniques Unidrive M400-AC Drive

Device type	Address format	Format range	Easybuider data format	Size	
BIT	SSS.MM.PPP	SSS:0-255, MM:0-99,PPP:0-999	Bit object	1-bit	
BYTE	SSS.MM.PPP	SSS:0-255, MM:0-99,PPP:0-999	16-bit	8-bit	
WORD	SSS.MM.PPP	SSS:0-255, MM:0-99,PPP:0-999	16-bit	16-bit	
DWORD	SSS.MM.PPP	SSS:0-255, MM:0-99,PPP:0-999	32-bit	32-bit	

Let me show you how to read a parameter by using our HMI comms object.

1. Click the Word Lamp object.



2. Under the general tab, select the drive name "Control Techniques SI-Ethernet Modbus TCP/IP" as the PLC name. Enter the parameter 01.15.013 to the Read address box.

Referencing to the SI-Ethernet module user guide, its minimum is 0 (Standard mode), and the maximum is 1 (modified mode). Set up the No. of states to 2. Type is 8 bit, so you know you should choose "Byte" for its device type. Each drive or option module parameter is mapped to a single 16-bit Modbus register, so you have to choose 16-bit unsigned for its data type.

Word Lamp/Multi-State Switch Object's Properties	X
General Security Shape Label Profile	
Comment :	
Word Lamp O Multi-State Switch	
Mode: Value 🗸	
Offset : 0	
⊂ Read address	
Device : Control Techniques SI-Ethernet Modbus TCP/IP V Settings	
Address : BYTE v 01.15.013 16-bit Unsigned	
Attribute No. of states : 2 ~	
Hide picture/shape if no corresponding picture	

3. Under the Label tab, this tab can make the values signify the relative descriptions.

tate 0	State 1				
/ord Lamp/Multi-State Switch Object's Properties	Word Lamp/Multi-State Switch Object's Properties				
General Security Shape Label Profile	General Security Shape Label Profile				
✓ Use label Label Library □ Use label library	Use label Library				
State : 0 1 Attribute Font : Arial [Arial] [Droid Sans]	State : 1 0 1 Attribute Font : Arial [Arial] [Droid Sans]				
Color: Size: 16	Color: Size: 16				
Align : Center V Blink : None V	Align : Center V Blink : None V				
Italic Underline Duplicate these attributes to Every state	Ltalic Underline Duplicate these attributes to Every state				
Movement Direction : No movement V	Movement Direction : No movement				
Content Preview with actual font size	Content Preview with actual font size				
Standard	Modified				
Tracking Duplicate this label to every state	Tracking Duplicate this label to every state				

4. Run online simulation by clicking on the Online Simulation button.

File 🚦	3 🖨 🖬 🛠		s 🔶 🎸 🗧	Home P	Project Ob	ject Data/Hist	ory Ilo	T/Energy	View	Tool							
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Creating other objects is similar. The spreadsheet shown below is convenient for you to reference.

Object	Address	Data type	Description
Toggle Switch	Bit-00.01.010	N/A	Bipolar Reference Enable
Numeric	Dword-00.05.007	32-bit unsigned	Motor Rated Current
Numeric	Word-00.05.009	16-bit unsigned	Motor Rated Voltage
Mutli State Switch	Byte-00.06.009	16-bit unsigned	Catch A Spinning Motor
Numeric	Dword-01.02.006	32-bit unsigned	Option module IP Address

Screen Shot of the Final Project: an operator can immediately monitor the status of a drive or multiple drives and control drives via a HMI.

Minimun spee	d 0.00	Hz	Motor Rated Power Factor 0.66
Maximum spee	d 59.00	Hz	User Security Status All Menus
Acceleration Rate1	4.0	5	Preset Reference 1 2.34 Hz
Acceleration Rate2	6.0	\$	User Security Code 0
Driver Configuration	AV	0	Power-up Keypad Control Reset
Motor Rated Current	0.57	A	
Input Logic Polarity	Positive	e Logic 💿	Ramp Mode Select Fast boost
Jog Reference	1.50	Hz	Parameter Cloning None
Analog Input 1 Mode	4-20mA		Stop Mode Ramp ©
Bipolar Reference Enable	Of		Dynamic V To F Select 0
Motor Rated Speed	1720.0	rpm	Catch A Spinning Motor Disable

Reference Link:

Weintek Labs website: <u>http://www.weintek.com</u> Control Techniques Unidrive M400 AC Drive User Guide: <u>http://www.controltechniques.com/en-</u> <u>US/controltechniques/products/acdrives/unidrivem/m400/Pages/unidrivem400.aspx</u>



Founded in 1996, WEINTEK LABS is a global-leading HMI manufacturer and is dedicated to the development, design, and manufacturing of practical HMI solutions. WEINTEK LAB's mission is to provide quality, customizable HMI-solutions that meet the needs of all industrial automation requirements while maintaining customer satisfaction by providing "on-demand" customer service. WEINTEK LABS brought their innovative technology to the United States in 2016, WEINTEK USA, INC., to provide quality and expedient solutions to the North American industrial market.

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