

C O N T R O L L E R I N F O R M A T I O N S H E E T

Maple Model(s)	PLC or Controller
HMI5000 Series	Aerotech Motion Controllers (Ethernet)



Summary

Maple Systems' **HMI5000 Series** Human/Machine Interface Terminals (Maple HMIs) communicate with Aerotech controllers using the ModbusTCP/IP Master protocol. When configured with EZware-5000, the Maple HMI is the master in a point-to-point single master, multiple slave format. Please refer to the *HMI5000 Programming Manual* (Maple p/n 1010-1007) for information on connecting multiple Maple HMIs to a single PLC port.

The ModbusTCP/IP Master Communications driver has the following features

- Ability to read individual bits in 3x memory (function code 4)
- Ability to read/write individual bits in 4x memory (function code 3)
- Ability to swap the word order when accessing data in 4x memory
- Supports multiple bit-write in 0x memory (function code 15)
- Supports multiple- and single-word writes (function codes 16 and 06)

Compatible PLCs

Family
Soloist, Ensemble Controllers

Communications Cable

The Maple HMI should be connected directly to the Ethernet port on the controller. A list of communications cables offered by Maple Systems as well as cable assembly instructions to assist you in assembling your own communications cable are available on our website at www.maplesystems.com.

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

Controller Settings

The controller must be set for ModbusTCP Slave.
The Aerotech ModbusTCP program must be loaded into the controller.

Accessible PLC Memory

Register Memory

The following table lists the PLC's register memory ranges that the Maple HMIs are able to access. Please note that your PLC's memory range may be *smaller* or *larger* than that supported by these HMIs. The following register memory can be displayed in 16 or 32-bit format on the Maple HMI.

(Note: d = decimal)

PLC Register Type	Address Range	Format	PLC Register Description
3x	1-65535	dddd	Input Registers (Read Only)
4x	1-65535	dddd	Holding Registers
5x	1-65535	dddd	Same as the 4x type, but swaps the word order for 32-bit values
6x	1-65535	dddd	Same as the 4x type, but executes a single-word write

Discrete Memory

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

(Note: d=decimal, b=bit)

PLC Bit Type	Address Range	Format	PLC Bit Description
0x	1-65535	dddd	Coils
1x	1-65535	dddd	Input Bits
3x_Bit	100-6553515	ddddbb	Bits in an Input Register
4x_Bit	100-6553515	ddddbb	Bits in a Holding Register
6x_Bit	100-6553515	ddddbb	Bits in a Holding Register, but will be written by a single-word write
0x_multi_coils	1-65535	dddd	Writes to multiple coils in a single command

Supported Modbus Function Codes

PLC Register Type	Modbus Function Code (Read / Write)
3x	04 / Not Applicable
4x	03 / 16
5x	03 / 16
6x	03 / 06
0x	01 / 05
1x	02 / Not Applicable
3x_Bit	04 / Not Applicable
4x_Bit	03 / 16
6x_Bit	03 / 06
0x_multi_coils	01 / 05

Important Memory Considerations

If your PLC's memory range is smaller than the range supported by the Maple HMIs, it is possible to configure the HMI to monitor a PLC memory address which does not exist. Since this can cause unpredictable results, when you configure the HMI please ensure that all selected PLC memory addresses are valid for your PLC model.

Do not configure the HMI to write to any PLC memory address which should only be written to by the PLC.

EZware Settings

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

- The **Recommended Settings** column provides the recommended setting based upon the default settings most commonly used in the ModbusTCP Controllers.
- The **Options** column lists EZware's options; your PLC may not support every option

Name	Recommended Settings	Options	Important Notes
Name:	<i>Soloist</i> or <i>Ensemble</i> , as appropriate		Description label
HMI or PLC	PLC		
Location	Local	Local, Remote	Select <i>Local</i> if PLC directly connected to HMI, <i>Remote</i> if PLC connected thru another HMI
PLC type:	Modbus TCP/IP 32Bit		
PLC I/F:	Ethernet	RS-232, RS-485 2W, RS-485 4W, Ethernet	Must match the controller port setting
PLC default station no.:	1	0-255	Must match the controller's setting.
Use UDP	Unchecked	Checked or Unchecked	Must be unchecked.
Settings: IP Address:	xxx.xxx.xxx.xxx	0.0.0.0-255.255.255.255	Must match the controller port's IP Address. See Below
Settings: Port	502	0-65535	Must be 502
Settings: Timeout (sec)	1.5	0.1 to 25.5	Adjust if longer timeout is required
Settings: Turn around delay (ms):	0	0-1000	Timeout period between HMI polls

Name	Recommended Settings	Options	Important Notes
Settings: Send ACK Delay:	0		Not Applicable
Settings: Parameter 1:	0		Not Applicable
Settings: Parameter 2:	0		Not Applicable
Settings: Parameter 3:	0		Not Applicable
Interval of Block Pack (words)	5	0-512	
Max. read-command Size (Words)	120		Not Adjustable
Max. write-command Size (Words)	120		Not Adjustable