

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	Beckhoff BC9000



Summary

Maple Systems' **HMI5000 Series** Human/Machine Interface Terminals (Maple HMIs) communicate with the Beckhoff BC9000 using the Modbus TCP/IP protocol. The HMI5000 Series uses **MODBUS TCP/IP** protocol driver to allow the Maple HMI to act as a master in a **multiple master, multiple slave format**.

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 10/100 Mbps
- Ability to read/write to individual bits in 3x and 4x memory.

Communications Cable

The Maple HMI should be connected to the BC9000's Modbus TCP/IP Ethernet port.

A crossover 10baseT Ethernet cable should be used between the HMI and the Beckhoff BC9000. 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.*

PLC Settings

The Ethernet port on the controller must be set to Modbus TCP/IP Slave mode to properly communicate with the HMI.

Accessible PLC Memory

Register Memory

The user must set up “PLC Variables” in the Beckhoff PLC program, which are accessible from the fieldbus and PLC program. See Beckhoff Application Note: APP-NOTE 500057 “Connecting a BC9000 to an Operator Interface using Modbus TCP” for more information on setting up PLC Variables and referencing them from the fieldbus and PLC program.

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.

Controller Register Type	Controller Register Description
30001 - 39999	Input Registers, Read Only (%QB128=30001)
42049 - 49999	Holding / Output Registers (%IB128=42049)

Note: The 5x memory designator under **Device Type** is used for 32-bit representation. This memory area ‘swaps’ the most significant word and least significant word.

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.

Controller Bit Type	Controller Bit Description
00001-065535	Discrete Coils / Outputs
10001-165535	Discrete Inputs
3x_Bit (see note)	Bits within Input Registers, Read Only
4x_Bit (see note)	Bits within Holding/Output Registers

Note: The 3x_Bit and 4x_Bit memory area is used to read/write to individual bits in the 3x and 4x memory area. To use this feature, select the 3x_Bit or 4x_Bit as **Device Type** for bit-type objects such as bit lamps. Under **Device Address**, use the format nnnbb to enter the word memory area, followed by the 2 digit bit reference. For example, to target the 3rd bit of 42049, enter “204902” into the Device Address (nnn=2049, bb=02).

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 Beckhoff devices.
- The **Options** column lists EZware's options; your PLC may not support every option.

Name	Recommended Settings	Options	Important Notes
Name:	Modbus TCP/IP		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		
PLC I/F:	Ethernet	RS-232, RS-485 2W, RS-485 4W, Ethernet	Must match the PLC port setting.
PLC default station no.:	1	0-255	Must match the default station no. assigned to the PLC.
Settings: IP Address:	User defined		Must match the IP Address assigned to the PLC.

Name	Recommended Settings	Options	Important Notes
Settings: Port no.:	User defined		Must match the Port No. assigned to the PLC.
Settings: COM:	COM1	COM1 – COM3	Serial port of the HMI connected to the PLC
Settings: Baud rate	N/A	9600,19200, 38400,57600, 115200	Does not apply to this protocol.
Settings: Data Bits	N/A	7 or 8	Does not apply to this protocol.
Settings: Stop Bits	N/A	1 or 2	Does not apply to this protocol.
Settings: Parity:	N/A	Even, Odd, None	Does not apply to this protocol.
Settings: Timeout (sec)	1.0	0.1 to 25.5	Adjust if longer timeout is required.
Settings: Turn around delay (ms)	0	0-1000	Timeout period between HMI polls.
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	See <i>HMI5000 Series Programming Manual</i> (Maple p/n 1010-1007)
Max. read-command size (words):	120		Not Adjustable
Max. write-command size (words):	120		Not Adjustable