



**Models**

- CMMB102** (without expansion option)
- CMMB102E** (with plug-in connectors for expansion)

**Description**

The CMMB extends your BACnet or Modbus network when your application requires additional inputs and outputs on a physical controller. Combining the 8 inputs and outputs of the CMMB with your Building Automation System provides simple expansion of a new or existing controller and reduces unnecessary costs of additional components.

**Features**

**Power & Communication**

- 24Vac or 24Vdc supply
- BACnet® MS/TP or Modbus communication port (selectable)

**Inputs & Outputs**

- 4 universal inputs
- 2 universal outputs (supervised)
- 2 binary outputs (supervised)

**Installation**

- 4 override switches to manually control each output
- LED status indication of each input and output
- DIN rail mounting
- Removable, non-strip, raising clamp terminals
- Removable see-through panel for easy access to DIP switches
- Plug-in connectors allowing for expansion (CMMB102E models only)



CMMB102 Series

**Network Communication**

- BACnet® MS/TP or Modbus communication port (selectable via DIP switch)
- Select MAC address via DIP switch or via network

**BACnet®**

- MS/TP @ 9600, 19200, 38400 or 76800 bps
- Automatic baud rate detection
- Automatic device instance configuration
- Copy & broadcast configuration to other CMMB modules

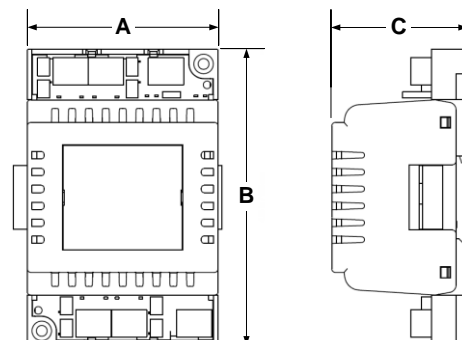
**Modbus**

- Modbus @ 9600, 19200, 38400 or 57600 bps
- RTU Slave, 8 bits (configurable parity and stop bits)
- Connects to any Modbus master

**Technical Specifications**

Specifications	CMMB102 Series
Input Voltage	24 Vac or 24 Vdc
Consumption	3VA (175mA @ 24 Vac)
Universal Inputs (12-bit)	4 [0-10Vdc, Thermistor, on/off (dry contact), 4-20mA] / 12-bit resolution
Universal Outputs	2 [0-10Vdc, pulsed signal (20mA drive), on/off] / 12-bit resolution OptoFET (250mA max)
Binary Relay Outputs	2 [normally open/closed, independent common per relay, 5A resistive]
BACnet	BACnet® MS/TP @ 9600, 19200, 38400 or 76800 bps (BAS-C)
Modbus	Modbus RTU slave @ 9600, 19200, 38400 or 57600. Selectable parity and stop bit configuration: <ul style="list-style-type: none"> <li>• No parity, 2 stop bit</li> <li>• Even parity, 1 stop bit</li> <li>• Odd parity, 1 stop bit</li> </ul>
Communication Connections	24 AWG twisted-shield cable (Belden 9841 or equivalent)
Electrical Connections	0.8 mm <sup>2</sup> [18 AWG] minimum
Operational Temperature	0°C to 50°C [32°F to 122°F]
Storage Temperature	-30°C to 50°C [-22°F to 122°F]
Relative Humidity	5 a 95% non condensed
Weight	0.2 kg [0.4 lb]

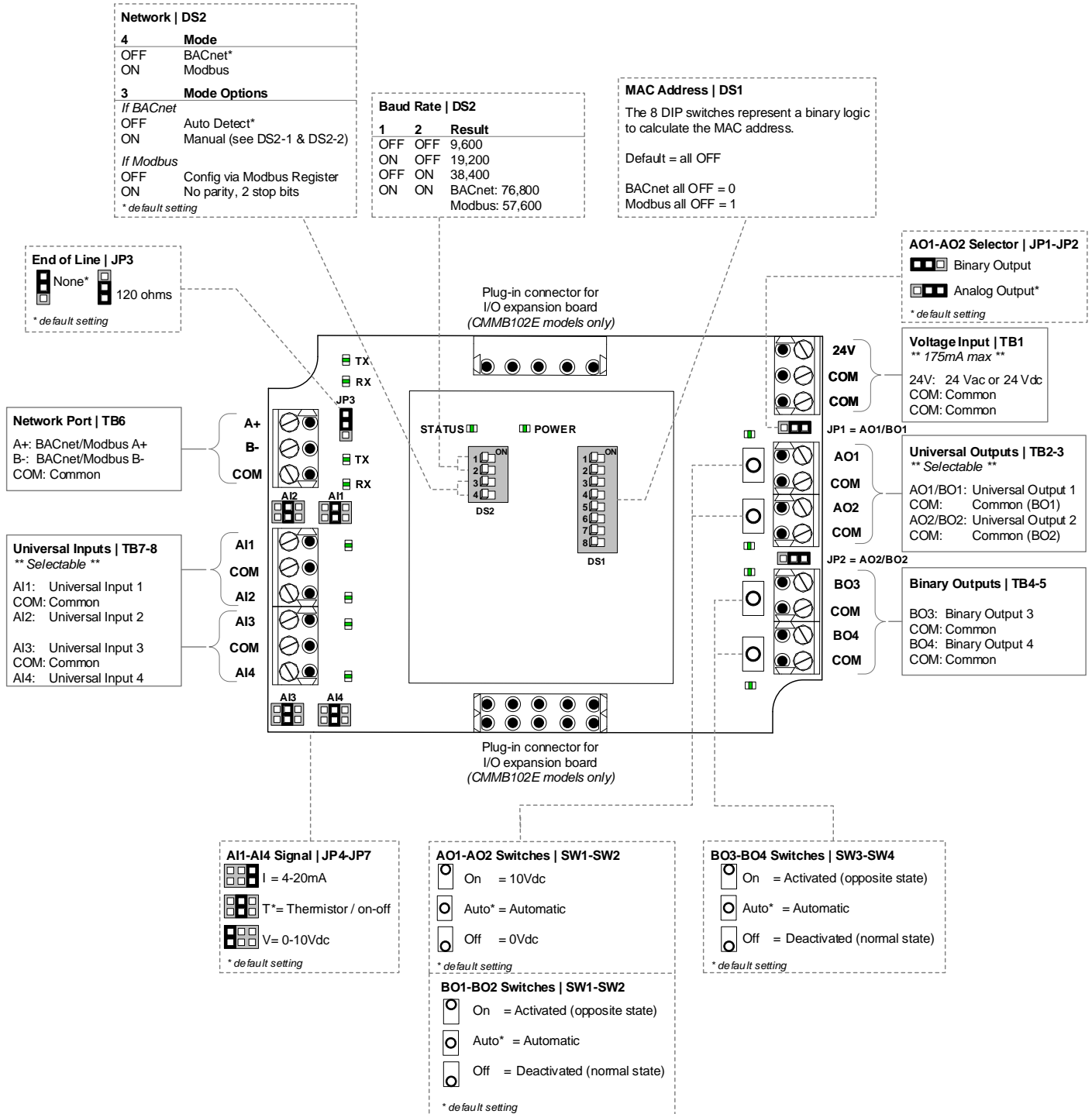
Dimensions  
A = 3.18" / 81 mm  
B = 4.93" / 125 mm  
C = 2.27" / 58 mm





### Connections and Configurations

Please note that all jumper settings must also be set to the same value through BACnet. Some additional configurations are only available through BACnet (see Network Conditions on page 4).





### MAC Address DIP Switch (DS1)

MAC address for BACnet and Modbus communication, are selectable by DIP switch DS1 using binary logic.

#### BACnet

- Highest MAC address is 254.
- Default is all switches OFF = MAC address 0
- If you do not change device instance in program mode, it will be automatically modified according to the MAC address.

MAC Address	DS.1 = 1	DS.2 = 2	DS.3 = 4	DS.4 = 8	DS.5 = 16	DS.6 = 32	DS.7 = 64	DS.8 = 128	Default Device Instance
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	153000
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	153001
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	153002
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	153003
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	153004
...	...	...	...	...	...	...	...	...	...
126	OFF	ON	ON	ON	ON	ON	ON	OFF	153126
...	...	...	...	...	...	...	...	...	...
254	OFF	ON	ON	ON	ON	ON	ON	ON	153254

#### Modbus

- Highest MAC address is 247.
- Default is all switches OFF = MAC address 1
- MAC address is **binary value +1**
- There is no device instance for Modbus.

MAC Address	DS.1 = 1	DS.2 = 2	DS.3 = 4	DS.4 = 8	DS.5 = 16	DS.6 = 32	DS.7 = 64	DS.8 = 128
0+1 = 1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1+1 = 2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2+1 = 3	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3+1 = 4	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
4+1 = 5	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
...	...	...	...	...	...	...	...	...
126+1 = 127	OFF	ON	ON	ON	ON	ON	ON	OFF
...	...	...	...	...	...	...	...	...
246+1 = 247	OFF	ON	ON	OFF	ON	ON	ON	ON

### LEDs

#### Power

- On = Input voltage normal
- Off = No power

#### Status

Flashing = Normal operation (watchdog)

#### RX/TX (BACnet)

Flashing = Receiving (RX) and/or transmitting (TX) data.

#### RX/TX (Modbus)

Flashing = Receiving (RX) and/or transmitting (TX) data.

#### Input Status

- On = Input on
- Off = Input off
- Flashing = Input not connected (thermistor setting only)
- Analog = When Universal Inputs are set to analog values (Vdc, mA, or Thermistor); the LED intensity corresponds to the input value. For example: At 10Vdc, the LED will be fully on. At 5Vdc, the LED will be at 50% intensity. At 0 Vdc, the LED will be off.

#### Output Status

- On = Activated
- Off = Deactivated
- Flashing = Output pulsed
- Analog = When Universal and Analog outputs are set to analog values (Vdc); the LED intensity corresponds to the output value. For example: At 10Vdc, the LED will be fully on. At 5Vdc, the LED will be at 50% intensity. At 0 Vdc, the LED will be off.



## Network Conditions

Please note that all jumper settings must also be set to the same value through BACnet or Modbus. The following is a list of conditions and additional BACnet or Modbus objects.

### Universal Inputs (AI1-AI4)

- **For temperature thermistor reading:** with the jumper set to *Thermistor*, set the AI input type to *10K\_TypeG*, *10K\_Type3A1*, *10K\_Type4A1*, *10K\_NTC*, *20K\_Type6A1* or *30K\_Type6A1*.
- **For on/off contact input reading:** with the hardware jumper set to *Thermistor*, set the AI input type to *Digital\_Input*. The polarity can also be set to direct or reverse. For example, in Reverse an “on” signal would be recognized as an “off” signal.
- **For analog 0-10 Vdc input reading:** with the hardware jumper set to *0-10 Vdc*, set the AI input type to *0\_10V*.

### Universal/Analog Outputs (AO1-AO2)

- You can set the polarity to direct or reverse. For example, in reverse the output range would be 10-0 Vdc instead of 0-10 Vdc. The polarity applies to all settings 0-10Vdc, on/off and pulsed.
- You can also set the outputs to pulsed or digital on/off.
- A fixed output value can only be modified via BACnet when the override switch is in the “Automatic” position.

### Binary Outputs (BO1-BO4)

- A fixed output (open/closed) can only be modified via BACnet when the override switch is in the “Automatic” position.
- The displayed text can be set to either Open/Closed, On/Off, or Alarm/Normal (BACnet only).

### Supervised Outputs

- All outputs are fully supervised via BACnet. This provides the actual state of the output including any manual overrides done using the on-board switches.

## BACnet Objects Table

ID <sup>1</sup>	Name	Description	Writable?	Notes (* = default)
AI.1	UniversalInput1	Universal input 1 mode selected by MSV.1	Out of service	0-10Volt or -40-100°C or -40-212°F or 0-1 Resolution 0.01Volt or 0.01°C/0.02°F
AI.2	UniversalInput2	Universal input 2 mode selected by MSV.12	Out of service	0-10Volt or -40-100°C or -40-212°F or 0-1 Resolution 0.01Volt or 0.01°C/0.02°F
AI.3	UniversalInput3	Universal input 3 mode selected by MSV.15	Out of service	0-10Volt or -40-100°C or -40-212°F or 0-1 Resolution 0.01Volt or 0.01°C/0.02°F
AI.4	UniversalInput4	Universal input 4 mode selected by MSV.48	Out of service	0-10Volt or -40-100°C or -40-212°F or 0-1 Resolution 0.01Volt or 0.01°C/0.02°F
AV.52	AnalogOutput1Min	Min. voltage of analog output 1	Present Value	0* Volt to AV.54   Resolution 0.1 Volt
AV.53	AnalogOutput2Min	Min. voltage of analog output 2	Present Value	0* Volt to AV.55   Resolution 0.1 Volt
AV.54	AnalogOutput1Max	Max. voltage of analog output 1	Present Value	AV.52 to 10.0* Volt   Resolution 0.1 Volt
AV.55	AnalogOutput2Max	Max. voltage of analog output 2	Present Value	AV.53 to 10.0* Volt   Resolution 0.1 Volt
AV.72	AnalogOutput1	Analog output 1 value	Present Value	0-100%   Resolution 0.1%
AV.73	AnalogOutput2	Analog output 2 value	Present Value	0-100%   Resolution 0.1%
AV.226	UniversalInput1Offset	Universal input 1 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.227	UniversalInput2Offset	Universal input 2 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.228	UniversalInput3Offset	Universal input 3 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.229	UniversalInput4Offset	Universal input 4 offset	Present Value	-5.00 to 5.00 °C/°F/Volt/mA (default 0*) Resolution: 0.1 °C/°F/Volt/mA
AV.468	CopyCfgStartAdd	Copy configuration start address	Present Value	0-254 Address of first CMMB to copy Available only if BV.101 is set to No
AV.469	CopyCfgEndAdd	Copy configuration end address	Present Value	AV.468 – (AV.468 + 64) Address of last CMMB to copy Available only if BV.101 is set to No
AV.470	CopyCfgResult <sup>2</sup>	Copy configuration result	Present Value	AV.468 – AV.469 Result of copy is available on Description property and is available only if BV.101 is set to Yes. Results: Succeed, Prog_Error, Type_Error, Model_Error, FW_Error, Mem_Error, Size_Error, Comm_Error, SlaveDevice, InProgress, AllSucceed
AV.500	TPMOutput1	TPM Output 1 value	Present Value	0-100%   Resolution 0.1%
AV.501	TPMOutput2	TPM Output 2 value	Present Value	0-100%   Resolution 0.1%

<sup>1</sup> ID is equal to ObjectType.Instance

<sup>2</sup> Write address in present value, result will be available in description.



ID¹	Name	Description	Writable?	Notes (* = default)
BV.22	ContactOutput1	Binary output 1 status	Present Value	0= Open / Ouvert / Off / Arret / Normal * 1= Close / Fermé / On / Marche / Alarm Text depends of selection in MSV.66
BV.23	ContactOutput2	Binary output 2 status	Present Value	0= Open / Ouvert / Off / Arret / Normal * 1= Close / Fermé / On / Marche / Alarm Text depends of selection in MSV.67
BV.24	ContactOutput3	Binary output 3 status	Present Value	0= Open / Ouvert / Off / Arret / Normal * 1= Close / Fermé / On / Marche / Alarm Text depends of selection in MSV.68
BV.25	ContactOutput4	Binary output 4 status	Present Value	0= Open / Ouvert / Off / Arret / Normal * 1= Close / Fermé / On / Marche / Alarm Text depends of selection in MSV.69
BV.66	AnalogOutput1Direction	Polarity of analog output 1	Present Value	0= Direct *                    1= Reverse
BV.67	AnalogOutput2Direction	Polarity of analog output 2	Present Value	0= Direct *                    1= Reverse
BV.93	UI1_DI_Polarity	Polarity of universal input 1 when used in digital input mode	Present Value	0= Direct * 1= Reverse
BV.94	UI2_DI_Polarity	Polarity of universal input 2 when used in digital input mode	Present Value	0= Direct * 1= Reverse
BV.95	UI3_DI_Polarity	Polarity of universal input 3 when used in digital input mode	Present Value	0= Direct * 1= Reverse
BV.96	UI4_DI_Polarity	Polarity of universal input 4 when used in digital input mode	Present Value	0= Direct * 1= Reverse
BV.101	CopyCfgExecute	Start or stop copy configuration	Present Value	0= No * 1= Yes Start copy and give results, must be reset by user.
BV.102	SystemUnit	Select the unit system to use on the device	Present Value	0= Celsius * 1= Fahrenheit
BV.103	Inhibit Output Override	Inhibit the override of the outputs	Present Value	0= Off * 1= On
MSV.1	UniversalInput1Function	Selected analog input 1 mode	Present Value	0= 0_10V                        5= 10k_NTC 1= 4_20mA                    6= 20k_Type6A1 2= 10K_TypeG *            7= 30k_Type6A1 3= 10K_Type3A1            8= Digital_Input 4= 10K_Type4A1
MSV.12	UniversalInput2Function	Selected analog input 2 mode	Present Value	0= 0_10V                        5= 10k_NTC 1= 4_20mA                    6= 20k_Type6A1 2= 10K_TypeG *            7= 30k_Type6A1 3= 10K_Type3A1            8= Digital_Input 4= 10K_Type4A1
MSV.15	UniversalInput3Function	Selected analog input 3 mode	Present Value	0= 0_10V                        5= 10k_NTC 1= 4_20mA                    6= 20k_Type6A1 2= 10K_TypeG *            7= 30k_Type6A1 3= 10K_Type3A1            8= Digital_Input 4= 10K_Type4A1
MSV.48	UniversalInput4Function	Selected analog input 4 mode	Present Value	0= 0_10V                        5= 10k_NTC 1= 4_20mA                    6= 20k_Type6A1 2= 10K_TypeG *            7= 30k_Type6A1 3= 10K_Type3A1            8= Digital_Input 4= 10K_Type4A1
MSV.54	AnalogOutput1Mode	Select analog output 1 mode	Present Value	1= Analog *                    3= Pulsing 2= On_Off
MSV.55	AnalogOutput2Mode	Select analog output 2 mode	Present Value	1= Analog *                    3= Pulsing 2= On_Off
MSV.66	ContactOutput1Text	Contact output 1 inactive & active text	Present Value	1= Open_Close *            4= Marche_Arret 2= Ouvert_Fermé            5= Alarm_Normal 3= On_Off
MSV.67	ContactOutput2Text	Contact output 2 inactive & active text	Present Value	1= Open_Close *            4= Marche_Arret 2= Ouvert_Fermé            5= Alarm_Normal 3= On_Off
MSV.68	ContactOutput3Text	Contact output 3 inactive & active text	Present Value	1= Open_Close *            4= Marche_Arret 2= Ouvert_Fermé            5= Alarm_Normal 3= On_Off
MSV.69	ContactOutput4Text	Contact output 4 inactive & active text	Present Value	1= Open_Close *            4= Marche_Arret 2= Ouvert_Fermé            5= Alarm_Normal 3= On_Off
MSV.100	OptofetOutput1Mode	Select Optofet output 1 mode	Present Value	1= On_Off *                    2= TimePulseModulation
MSV.101	OptofetOutput2Mode	Select Optofet output 2 mode	Present Value	1= On_Off *                    2= TimePulseModulation

### Modbus Registers


- Register address
  - As per protocol base (base 0); for PLC add 1 to protocol base.
  - As per holding register (base 40001)
- Functions :
  - 03 Read Holding Register
  - 06 Write Single Register
  - 16 Write Multiple Registers
- Error Codes :
  - 02 Illegal Data Address
  - 03 Illegal Value
  - 06 Slave Device Busy
- W = Writable register, [blank] = read only.
- No Real number in modbus register, use scale to calculate real number. Register = Real number \* Scale => Real number = Register / Scale. Scale could be 1, 10 or 100
- Attention when writing a register that contains a bit string. If bit is writable (conditional or not), the write will always be accepted. If bit is reserved or not writable, the write will be ignored and will keep its actual state.
- Use READ-MODIFY-WRITE sequence.

Protocol Base	Holding Register	Description	Data Type	MSB/LSB		Units/Values	Writable	Default Value	
								MB	LB
0	40001	MSB = Neptronic Device ID LSB = MAC Address	Unsigned	105 (69h)	[1..247] (1h- F7h)	* MAC address is writable if all DIP switches of DS2 are OFF.	W*	69h	1h
1	40002	Device Baud Rate	Unsigned Scale 0.01	[96] [192] [384] [576]		9,600 19,200 38,400 57,600	W	96	
2	40003	COM Port Configuration <b>IMPORTANT:</b> The default value is "no parity, 2 stop bits". To change the value, you must set DIP switch DS1-3 to OFF. If set to ON, it will always remain at the default value. Refer to Connections and Configurations on page 2.	Unsigned	[0..2]		0 = no parity, 2 stop bits 1 = even parity, 1 stop bit 2 = odd parity, 1 stop bit	W	0	
3	40004	Product Name (characters 8 & 7)	2 x ASCII	char 8	char 7	Valid ASCII character: 32 (20h) – 122 (7ah), Empty = 0	W	43h [C]	40h [M]
4	40005	Product Name (characters 6 & 5)	2 x ASCII	char 6	char 5	Valid ASCII character: 32 (20h) – 122 (7ah), Empty = 0	W	40h [M]	42h [B]
5	40006	Product Name (characters 4 & 3)	2 x ASCII	char 4	char 3	Valid ASCII character: 32 (20h) – 122 (7ah), Empty = 0	W	31h [1]	30h [0]
6	40007	Product Name (characters 2 & 1)	2 x ASCII	char 2	char 1	Valid ASCII character: 32 (20h) – 122 (7ah), Empty = 0	W	36h [6]	20h [ ]
7	40008	Firmware Version	Unsigned Scale 100	100		1.00		100	
8	40009	Application Version	Unsigned Scale 100	100		1.00		100	



Protocol Base	Holding Register	Description	Data Type	MSB/LSB	Units/Values	Writable	Default Value	
							MB	LB
9	40010	System Status 1	Bit String	[B0..B15]	0 = Normal 1 = Fault ----- B0 = System operation		0000, 0001, 1111, 1110b	
10	40011	System Status 2	Bit String	[B0..B15]	Always 0		0000, 0000, 0000, 0000b	
11	40012	Analog Input 1			Unit: Volts or °C/°F, Range: 0V to 10V, -40°C to 100°C or -40°F to 212°F, Value x 100 (e.g. 3 V = 300/18°C = 1800 or 33°F = 3300)		0	
12	40013	Analog Input 2					0	
13	40014	Analog Input 3					0	
14	40015	Analog Input 4					0	
15 to 19	40016 to 40020	Reserved						
20	40021	Analog Output 1	Unsigned Scale 10	[0..1000]	Unit: %, Range: 0-100.0%, Resolution: 0.1	W	0	
21	40022	Analog Output 2					0	
22 to 23	40023 to 40024	Reserved					0	
24	40025	Relay Output	Bit String	[B0..B5]	B0 = Relay 1                      B3 = Relay 4 B1 = Relay 2                      B4 to B5 = Reserved B2 = Relay 3	W	0000, 0000, 0000, 0000b	
25	40026	Output Overwrite Status <i>Indicates that the output is overridden by the hardware switch (SW1-SW4).</i>	Bit String	[B0..B9]	B0 = Relay 1                      B4 = AO1 B1 = Relay 2                      B5 = AO2 B2 = Relay 3                      B6 to B9 = Reserved B3 = Relay 4		0000, 0000, 0000, 0000b	
26	40027	Universal Input 1 Function	Unsigned	[0..8]	0= 0_10V                              5= 10k_NTC 1= 4_20mA                            6= 20k_Type6A1 2= 10k_TypeG                        7= 30k_Type6A1 3= 10k_Type3A1                      8= Digital_Input 4= 10k_Type4A1	W	2	
27	40028	Universal Input 2 Function					2	
28	40029	Universal Input 3 Function					2	
29	40030	Universal Input 4 Function					2	
30 to 33	40031 to 40034	Reserved						
34	40035	Universal Input 1 Offset	Signed Scale 100	[0..100]	Range: +/- 5.00, Resolution: 0.1	W	0	
35	40036	Universal Input 2 Offset					0	
36	40037	Universal Input 3 Offset					0	
37	40038	Universal Input 4 Offset					0	
38 to 41	40039 to 40042	Reserved						

Protocol Base	Holding Register	Description	Data Type	MSB/LSB	Units/Values	Writable	Default Value	
							MB	LB
42	40043	Analog Output 1 Mode	Unsigned	[1..3]	1 = Analog 2 = On/Off 3 = Pulse	W	1	
43	40044	Analog Output 1 Minimum Voltage	Signed Scale 10	[0..100]	Unit: Volt, Range: 0 V - Register 44, Resolution: 0.1	W	0	
44	40045	Analog Output 1 Maximum Voltage			Unit: Volt, Range: Register 43 - 10.0V, Resolution: 0.1		100	
45	40046	Analog Output 2 Mode	Unsigned	[1..3]	1 = Analog 2 = On/Off 3 = Pulse	W	1	
46	40047	Analog Output 2 Minimum Voltage	Signed Scale 10	[0..100]	Unit: Volt, Range: 0 V - Register 47, Resolution: 0.1	W	0	
47	40048	Analog Output 2 Maximum Voltage			Unit: Volt, Range: Register 46 - 10.0V, Resolution: 0.1		100	
48 to 53	40049 to 40054	<i>Reserved</i>						
54	40055	System Options <i>* = digital input mode only</i>	Bit String	[B0..B15]	0 = Direct                      0 = Off 1 = Reverse                    1 = On ----- B0 = AO1 polarity            B14 = Inhibit Output Override B1 = AO2 polarity            ----- B2 to B3 = <i>Reserved</i> 0 = Celsius B4 = AI1 polarity *            1 = Fahrenheit B5 = AI2 polarity *            ----- B6 = AI3 polarity *            B15 = System Unit B7 = AI4 polarity * B8 to B13 = <i>Reserved</i>	W	0000, 0000, 0000, 0000b	
55	40056	TPM Output 1	Unsigned Scale 10	[0..1000]	Unit: %, Range: 0-100.0%, Resolution: 0.1	W	0	
56	40057	TPM Output 2					0	
57 to 60	40058 to 40061	<i>Reserved</i>						
61	40062	Optofet Output 1 Mode	Bit String	[1, 2]	1 = On_Off 2 = TimePulseModulation	W	1	
62	40063	Optofet Output 2 Mode					1	

	Recycling at end of life: please return this product to your Neptronic local distributor for recycling. If you need to find the nearest Neptronic authorized distributor, please consult <a href="http://www.neptronic.com">www.neptronic.com</a> .
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