

neptronic CMU-Modbus Compact Make-up Air Unit User Guide

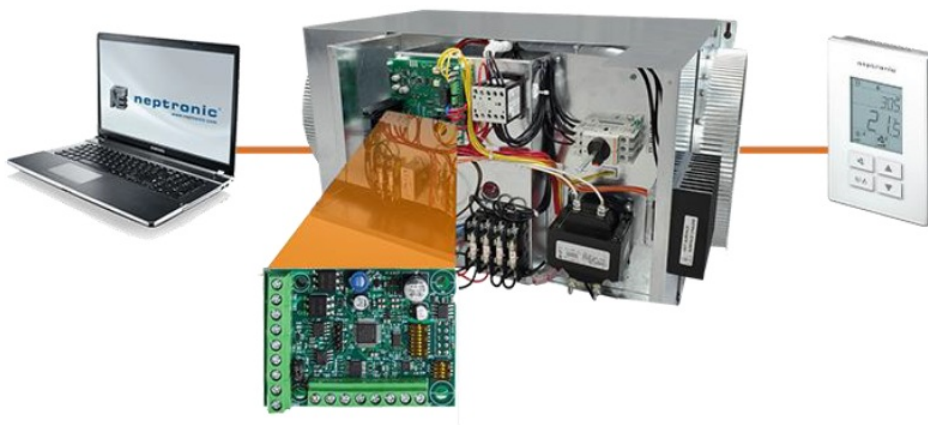
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neptronic CMU-Modbus Compact Make-up Air Unit



Introduction

The Compact Make-up Air Unit Modbus Communication Module User Guide provides information for using the Neptronic communication feature. The controller uses Modbus communication protocol over a serial line in the RTU mode and provides a Modbus network interface between client devices and Neptronic Compact Make-up Air

Unit devices. The Compact Make-up Air Unit Modbus Guide assumes that you are familiar with Modbus terminology. The following are the requirements for Modbus:

- Data Model. The Compact Make-up Air Unit Modbus server data model uses only the Holding Registers table.
- Register Address:
 - As per the protocol base (base 0); for PLC add 1 to the protocol base.
 - As per the holding register (base 40001).
- Function Codes. The Compact Make-up Air Unit Modbus server supports a limited function codes subset comprising:
 - Read Holding Registers (0x03)
 - Write Single Register (0x06)
 - Write Multiple Registers (0x10)
- Exception Responses. The Compact Make-up Air Unit Modbus server supports the following exception codes:
 - Illegal data address
 - Illegal data value
 - Slave device busy
- Serial Line. The Compact Make-up Air Unit Modbus over serial line uses RTU transmission mode over a two-wire configuration RS485 (EIA/TIA-485 standard) physical layer.
 - The physical layer can use fixed baud rate selection or automatic baud rate detection (default) as per the Modbus Auto Baud Rate device menu item or holding register index 1.
 - The supported baud rates are 9600, 19200, 38400, 57600, and 76800 bps.
 - The physical layer also supports variable parity control and stop-bit configuration as per the Modbus Comport Config device menu item or holding register index 2.
 - In auto baud rate configuration, if the device detects only consecutive bad frames (2 or more) for one second with any given baud rate, it will reinitialize itself to the next baud rate.
 - If the device does not detect any activity for one second or more, it will find a silent line to prevent a possible baud rate scan on the next frame it detects.
- Addressing. The Compact Make-up Air Unit device only answers at the following address:
 - The device's unique address (1 to 247) can be set through the device menu or by holding the register index

Holding Registers Table

Glossary

Name	Description	Name	Description
W	Writable Register	ASCII	For registers containing ASCII (8-bit) characters
RO	Read Only Register	MSB	Most Significant Byte
Unsigned	For range of values from 0 to 65,535, unless otherwise specified	LSB	Least Significant Byte
Signed	For range of values from -32,768 to 32,767, unless otherwise specified	MSW	Most Significant Word
Bit String	For registers with multiple values using bit mask (example, flags)	LSW	Least Significant Word

Holding Register Table

Prot ocol Base	Holdi ng Re gister	Description	Data Typ e	Range	Writa ble
0	40001	Modbus product type and address.	Unsigned	MB = Modbus Address (e.g. 110), LB = 1-247	W
1	40002	Analog input 1 voltage.	Unsigned <i>Scale 1000</i>	Unit: Volts (V), Range: 0V to 10V <i>Value x 1000 (e.g. 2V = 2000)</i>	RO
2	40003	Analog input 2 voltage.	Unsigned <i>Scale 1000</i>	Unit: Volts (V), Range: 0V to 10V <i>Value x 1000 (e.g. 2V = 2000)</i>	RO
3	40004	Analog input 3 temperature.	Signed <i>Scale 100</i>	Units: °C/°F, Range: -40°C to 85°C or -40°F to 185°F <i>Value x 100 (e.g. 25°C = 2500 or 25°F = 2500)</i>	RO
4	40005	Analog input 4 temperature.	Signed <i>Scale 100</i>	Units: °C/°F, Range: -40°C to 85°C or -40°F to 185°F <i>Value x 100 (e.g. 25°C = 2500 or 25°F = 2500)</i>	RO
5	40006	Room air temperature value measured by TDF.	Unsigned <i>Scale 100</i>	Units: °C/°F, Range : 0°C to 50°C or 32°F to 122°F <i>Value x 100 (e.g. 5°C = 500 or 50°F = 5000)</i>	RO
6	40007	Room air relative humidity value measured by TDF.	Unsigned <i>Scale 10</i>	Unit: %RH, Range: 0 to 100%RH <i>Value x 10 (e.g. 10%RH = 100)</i>	RO
7	40008	Room CO2 concentration value measured by TDF.	Unsigned <i>Scale 1</i>	Unit: PPM, Range: 0 to 2000 PPM <i>Value x 1 (e.g. 2 PPM = 2)</i>	RO
8	40009	The volatile organic compound index measured by TDF.	Unsigned <i>Scale 1</i>	Unit: No Unit, Range: 0 to 65535, <i>Value x 1 (e.g. 100 = 100)</i>	RO

Prot ocol Base	Holdi ng Re gister	Description	Data Typ e	Range	Writa ble
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9	40010	Luminous flux measured by TDF.	Unsigned <i>Scale 1</i>	Unit: Lux, Range: 0 to 16000 Lux <i>Value x 1 (e.g. 2 Lux = 2)</i>	RO
10	40011	CMU on-board potentiometer temperature setpoint.	Unsigned <i>Scale 100</i>	Units: °C/°F, Range: 0°C to 35°C or 32°F to 95°F <i>Value x 100 (e.g. 2°C = 200 or 50°F = 5000)</i>	RO
11	40012	CMU intake temperature.	Signed <i>Scale 100</i>	Units: °C/°F, Range: -40°C to 85°C or -40°F to 185°F <i>Value x 100 (e.g. 23°C = 2300 or 23°F = 2300)</i>	RO
12	40013	CMU outtake temperature.	Signed <i>Scale 100</i>	Units: °C/°F, Range: -40°C to 85°C or -40°F to 185°F <i>Value x 100 (e.g. 23°C = 2300 or 23°F = 2300)</i>	RO
13	40014	CMU board temperature.	Signed <i>Scale 100</i>	Units: °C/°F, Range: -40°C to 85°C or -40°F to 185°F <i>Value x 100 (e.g. 23°C = 2300 or 23°F = 2300)</i>	RO
14	40015	CMU SSR temperature.	Signed <i>Scale 100</i>	Units: °C/°F, Range: -40°C to 85°C or -40°F to 185°F <i>Value x 100 (e.g. 23°C = 2300 or 23°F = 2300)</i>	RO
15	40016	AI3/BI3 multi-mode input state.	Unsigned	0 = Open, 1 = Closed	RO
16	40017	AI4/BI4 multi-mode input state.	Unsigned	0 = Open, 1 = Closed	RO
17	40018	Room movement detection occupancy sensor.	Unsigned	0 = No, 1 = Yes	RO
18	40019	CMU On/Off contact input state.	Unsigned	0 = Off, 1 = On	RO
19	40020	Analog output 1 voltage.	Unsigned <i>Scale 100</i>	Unit: Volts, Range: 0V to 10V <i>Value x 100 (e.g. 3V = 300)</i>	RO
20	40021	Analog output 2 voltage.	Unsigned <i>Scale 100</i>	Unit: Volts, Range: 0V to 10V <i>Value x 100 (e.g. 3V = 300)</i>	RO
21	40022	Binary output 1 state.	Unsigned	0 = Open, 1 = Closed	RO

22	40023	Binary output 1 state.	Unsigned	0 = Open, 1 = Closed	RO
23	40024	Supply air temperature.	Unsigned <i>Scale 100</i>	Units: °C/°F, Range: 0°C to 100°C or 32°F to 212°F <i>Value x 100 (e.g. 2°C = 200 or 50°F = 5000)</i>	RO
24	40025	Supply air relative humidity.	Unsigned <i>Scale 100</i>	Units: %RH, Range: 0 to 100%RH <i>Value x 100 (e.g. 23%RH = 2300)</i>	RO
25	40026	Outside air temperature.	Signed <i>Scale 100</i>	Units: °C/°F, Range: -40°C to 50°C or -40°F to 122°F <i>Value x 100 (e.g. 23°C = 2300 or 23°F = 2300)</i>	RO
26	40027	Outside air relative humidity.	Unsigned <i>Scale 100</i>	Units: %RH, Range: 0 to 100%RH <i>Value x 100 (e.g. 23%RH = 2300)</i>	RO
27	40028	Duct static pressure.	Unsigned <i>Scale 10</i>	Units: Pascal (Pa), Range: 0 to 1250 Pa <i>Value x 10 (e.g. 50 Pa = 500)</i>	RO

Protocol Base	Holding Register	Description	Data Type	Range	Writable
28	40029	Damper position feedback.	Unsigned <i>Scale 1</i>	Unit: %, Range: 0% to 100%, <i>Value x 1 (e.g. 100% = 100)</i>	RO
29	40030	Current airflow setpoint in percent of maximum capacity.	Unsigned <i>Scale 1</i>	Unit: %, Range: 0% to 100%, <i>Value x 1 (e.g. 100% = 100)</i>	RO
30	40031	CMU ECM fan speed feedback value.	Unsigned <i>Scale 1</i>	Unit: RPM, Range: 0 to 10000 RPM, <i>Value x 1 (e.g. 100 RPM = 100)</i>	RO
31	40032	Heater vernier stage duty cycle.	Unsigned <i>Scale 10</i>	Unit: %, Range: 0 to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
32	40033	Network temperature setpoint.	Unsigned <i>Scale 100</i>	Unit: °C/°F, Range: 0°C to 35°C or 32°F to 95°F, <i>Value x 1 (e.g. 5°C = 500 or 50°F = 5000)</i>	W

33	40034	TDF temperature setpoint.	Unsigned <i>Scale 100</i>	Unit: °C/°F, Range: 0°C to 35°C or 32°F to 95°F, <i>Value x 1 (e.g. 5°C = 500 or 50°F = 5000)</i>	W
34	40035	CMU anti-freeze setpoint.	Unsigned <i>Scale 100</i>	Unit: °C/°F, Range: 0°C to 35°C or 32°F to 95°F, <i>Value x 1 (e.g. 5°C = 500 or 50°F = 5000)</i>	W
35	40036	Occupied airflow setpoint in percent of maximum capacity.	Unsigned <i>Scale 1</i>	Unit: %, Range: 0 to 100%, <i>Value x 1 (e.g. 100% = 100)</i>	W
36	40037	Unoccupied airflow setpoint in percent of maximum capacity.	Unsigned <i>Scale 1</i>	Unit: %, Range: 0 to 100%, <i>Value x 1 (e.g. 100% = 100)</i>	W
37	40038	Binary input 3 stage weight.	Unsigned <i>Scale 1</i>	Unit: %, Range: 0 to 100%, <i>Value x 1 (e.g. 100% = 100)</i>	W
38	40039	Binary input 4 stage weight.	Unsigned <i>Scale 1</i>	Unit: %, Range: 0 to 100%, <i>Value x 1 (e.g. 100% = 100)</i>	W
39	40040	Exhaust fan start delay.	Unsigned <i>Scale 1</i>	Unit: Seconds, Range: 1 to 255 seconds <i>Value x 1 (e.g. 10 secs = 10)</i>	W
40	40041	Exhaust fan control signal minimum value.	Unsigned <i>Scale 100</i>	Unit: Volts (V), Range: 0 to 10V, <i>Value x 100 (e.g. 3V = 300)</i>	W
41	40042	Exhaust fan control signal maximum value.	Unsigned <i>Scale 100</i>	Unit: Volts (V), Range: 0 to 10V, <i>Value x 100 (e.g. 3V = 300)</i>	W
42	40043	Damper stroke time.	Unsigned <i>Scale 1</i>	Unit: Seconds, Range: 1 to 255 seconds, <i>Value x 1 (e.g. 100 secs = 100)</i>	W
43	40044	Occupancy inputs minimum time.	Unsigned <i>Scale 1</i>	Unit: Minutes, Range: 0 to 240 minutes, <i>Value x 1 (e.g. 10 mins = 10)</i>	W

Protocol Base	Holding Register	Description	Data Type	Range	Writable
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44	40045	Temperature setpoint minimum value.	Unsigned Scale 100	Unit: °C/°F, Range: 0°C to 35°C or 32°F to 95°F, Value x 1 (e.g. 5°C = 500 or 50°F = 5000)	W
45	40046	Temperature setpoint maximum value.	Unsigned Scale 100	Unit: °C/°F, Range: 0°C to 35°C or 32°F to 95°F, Value x 1 (e.g. 5°C = 500 or 50°F = 5000)	W
46	40047	Dry mode relative humidity setpoint.	Unsigned Scale 1	Unit: %RH, Range: 10 to 90%RH Value x 1 (e.g. 10%RH = 10)	W
47	40048	Dry mode relative humidity setpoint dead band.	Unsigned Scale 1	Unit: %RH, Range: 1 to 10%RH Value x 1 (e.g. 10%RH = 10)	W
48	40049	Occupied static pressure control loop setpoint.	Unsigned Scale 10	Unit: Pascal (Pa), Range: 0 to 1250 Pa Value x 10 (e.g. 3 Pa = 30)	W
49	40050	Unoccupied static pressure control loop setpoint.	Unsigned Scale 10	Unit: Pascal (Pa), Range: 0 to 1250 Pa Value x 10 (e.g. 3 Pa = 30)	W
50	40051	CO2 concentration setpoint.	Unsigned Scale 1	Unit : PPM, Range : 0 to 1000 PPM Value x 1 (e.g. 3 PPM = 3)	W
51	40052	CO2 concentration setpoint dead band.	Unsigned Scale 1	Unit : PPM, Range : 0 to 200 PPM Value x 1 (e.g. 3 PPM = 3)	W
52	40053	Supply air temperature offset.	Signed Scale 100	Unit: °C/°F, Range: ± 5°C or +/-9°F Value x 100 (e.g. 2°C = 200 or 3°F = 300)	W
53	40054	Supply air temperature humidity offset.	Signed Scale 100	Unit: %RH, Range: ± 5%RH Value x 100 (e.g. 2%RH = 200)	W
54	40055	Outside air temperature offset.	Signed Scale 100	Unit: °C/°F, Range: ± 5°C or +/-9°F Value x 100 (e.g. 2°C = 200 or 3°F = 300)	W
55	40056	Outside air temperature humidity offset.	Signed Scale 100	Unit: %RH, Range: ± 5%RH Value x 100 (e.g. 2%RH = 200)	W
56	40057	Room air temperature offset.	Signed Scale 100	Unit: °C/°F, Range: ± 10°C or ± 18°F Value x 100 (e.g. 2°C = 200 or 3°F = 300)	W

57	40058	Room air relative humidity of fset.	Signed <i>Scale 100</i>	Unit: %RH, Range: $\pm 5\%$ RH Value x 100 (e.g. 2%RH = 200)	W
58	40059	Static pressure offset.	Signed <i>Scale 10</i>	Unit: Pascal (Pa), Range: ± 125 Pa Value x 10 (e.g. 2 Pa = 200)	W
59	40060	Minimum fan speed.	Unsigned <i>Scale 1</i>	Unit: %, Range: 0 to 100% Value x 1 (e.g. 3% = 3)	W

Protocol Base	Holding Register	Description	Data Type	Range	Writable
60	40061	Temperature control proportional band.	Unsigned <i>Scale 100</i>	Unit: °C/°F, Range: 0.5°C to 20°C or 33°F to 68°F, Value x 100 (e.g. 5°C = 500 or 50°F = 5000)	W
61	40062	Temperature control integral time.	Unsigned <i>Scale 1</i>	Unit: Seconds, Range: 0 to 255 seconds, Value x 1 (e.g. 100 secs = 100)	W
62	40063	Temperature control derivative time.	Unsigned <i>Scale 1</i>	Unit: Seconds, Range: 0 to 255 seconds, Value x 1 (e.g. 100 secs = 100)	W
63	40064	Static pressure control proportional band.	Unsigned <i>Scale 1</i>	Unit: Pascal (Pa), Range: 0 to 250 Pa Value x 1 (e.g. 3 Pa = 3)	W
64	40065	Static pressure control integral time.	Unsigned <i>Scale 1</i>	Unit: Seconds, Range: 0 to 255 seconds, Value x 1 (e.g. 100 secs = 100)	W
65	40066	Static pressure control derivative time.	Unsigned <i>Scale 1</i>	Unit: Seconds, Range: 0 to 255 seconds, Value x 1 (e.g. 100 secs = 100)	W
66	40067	Control band.	Unsigned <i>Scale 100</i>	Unit: °C/°F, Range: 2°C to 10°C or 36°F to 50°F, Value x 100 (e.g. 5°C = 500 or 50°F = 5000)	W

67	40068	Modbus timeout.	Unsigned <i>Scale 1</i>	Unit: Seconds, Range: 15 to 1800 seconds, <i>Value x 1 (e.g. 100 secs = 100)</i>	W
68	40069	Number of synchronization timeouts.	Unsigned <i>Scale 1</i>	Unit: No Unit, Range: 0 to 65535, <i>Value x 1 (e.g. 100 = 100)</i>	W
69	40070	No heat detection deadband.	Unsigned <i>Scale 100</i>	Unit: °C/°F, Range: 2°C to 8°C or 36°F to 46°F, <i>Value x 100 (e.g. 5°C = 500 or 5°F = 500)</i>	W
70	40071	No heat detection delay.	Unsigned <i>Scale 1</i>	Unit: Seconds, Range: 30 to 240 seconds, <i>Value x 1 (e.g. 100 secs = 100)</i>	W
71	40072	Exhaust fan state.	Unsigned	0 = Off, 1 = On	RO
72	40073	On/Off damper state.	Unsigned	0 = Closed, 1 = Open	RO
73	40074	On/Off damper feedback.	Unsigned	0 = Closed, 1 = Open	RO
74	40075	CMU fan enable.	Unsigned	0 = No, 1 = Yes	RO
75	40076	CMU heater stage 2 state.	Unsigned	0 = Off, 1 = On	RO
76	40077	Binary input 3 contact type.	Unsigned	0 = NO, 1 = NC	W
77	40078	Binary input 4 contact type.	Unsigned	0 = NO, 1 = NC	W
78	40079	Binary output 1 contact type.	Unsigned	0 = NO, 1 = NC	W
79	40080	Binary output 2 contact type.	Unsigned	0 = NO, 1 = NC	W

Protocol Base	Holding Register	Description	Data Type	Range	Writable
80	40081	Enable occupancy inputs.	Unsigned	0 = No, 1 = Yes	W
81	40082	Dry mode.	Unsigned	0 = Disable, 1 = Enable	W
82	40083	CO2 extract.	Unsigned	0 = Disable, 1 = Enable	W
83	40084	Static pressure loop.	Unsigned	0 = Disable, 1 = Enable	W
84	40085	Occupancy inactive mode.	Unsigned	0 = Unoccupied, 1 = Off	W
85	40086	CMU occupancy state.	Unsigned	1 = Occupied 2 = Unoccupied 3 = Off	W
86	40087	Temperature setpoint source.	Unsigned	1 = On Board 2 = TSTAT 3 = Network	W
87	40088	AI1 input mode.	Unsigned	1 = Off 2 = SAT 3 = SARH 4 = OAT 5 = OARH 6 = Static Pressure 7 = Fan Setpoint 8 = Damper Feedback	W

88	40089	AI2 input mode.	Unsigned	1 = Off 2 = SAT 3 = SARH 4 = OAT 5 = OARH 6 = Static Pressure 7 = Fan Setpoint 8 = Damper Feedback	W
89	40090	AI3/BI3 input mode.	Unsigned	1 = Off 2 = SAT 3 = OAT 4 = Damper Feedback 5 = Occupancy 6 = Fan Speed Stage	W
90	40091	AI4/BI4 input mode.	Unsigned	1 = Off 2 = SAT 3 = OAT 4 = Damper Feedback 5 = Occupancy 6 = Fan Speed Stage	W
91	40092	AO1 output mode.	Unsigned	1 = Off 2 = Exhaust Fan 3 = Damper	W
92	40093	AO2 output mode.	Unsigned	1 = Off 2 = Exhaust Fan 3 = Damper	W
93	40094	BO1 output mode.	Unsigned	1 = Off 2 = Exhaust Fan 3 = Damper	W
94	40095	BO2 output mode.	Unsigned	1 = Off 2 = Exhaust Fan 3 = Damper	W
95	40096	Static pressure sensor range.	Unsigned	1 = 250 Pa 2 = 500 Pa 3 = 1250 Pa	W
96	40097	Analog input 1 signal range.	Unsigned	1 = 2-10Vdc 2 = 0-10Vdc	W
97	40098	Analog input 2 signal range.	Unsigned	1 = 2-10Vdc 2 = 0-10Vdc	W
98	40099	Analog output 1 signal range.	Unsigned	1 = 2-10Vdc 2 = 0-10Vdc	W
99	40100	Analog output 2 signal range.	Unsigned	1 = 2-10Vdc 2 = 0-10Vdc	W
100	40101	Control temperature source.	Unsigned	1 = SAT 2 = RAT	W
101	40102	LCD screen top line value.	Unsigned	1 = None 2 = Time 3 = CO2 4 = SARH 5 = RARH	W
102	40103	LCD screen displayed temperature.	Unsigned	1 = Default 2 = Alternate 3 = SAT 4 = TSTAT	W
103	40104	LCD screen last reset reason.	Unsigned	1 = No reason 2 = Independent Watchdog 3 = Window Watchdog 4 = Software Reset 5 = Power Down	RO

Protocol Base	Holding Register	Description	Data Type	Range		Writable
104	40105	Alarm status.	Bit String	B0 = Unblocking Damper Required B1 = SSOR1 Sens Not Detected B2 = SSOR2 Sens Not Required B3 = SAT Not Detected B4 = RAT Not Detected	B5 = Timeout Comm B6 = AI1 Reading Error B7 = AI2 Reading Error B8 to B31 = Reserved	RO
105	40106	System alarm host.	Bit String	B0 = Thermal Cutout B1 = Comm Timeout B3 = Heater Temp Cutout B4 = SSR Temp Cutout B5 = Board Temp Cutout B6 = Duct Temp Cutout B7 = Heater Temp 1 Failure B8 = Heater Temp 2 Failure B9 = Board Temp Failure B10 = SSR Temp Failure	B11 = TRL Failure B13 = Invalid Config B14 = Fan Temp Failure B16 = External Temp Failure B17 = Supply Temp Failure B22 = Fan Feedback Error B30 = Air Flow Not Detected B31 = Heat Not Detected B2, B12, B15, B18 to B21, B23 to B29 = Reserved	RO

400 Lebeau blvd, Montreal, Qc, H4N 1R6, Canada www.neptronic.com

Toll-free in North America: 1-800-361-2308

Tel.: (514) 333-1433

Fax: (514) 333-3163

Customer service fax: (514) 333-1091

Monday to Friday: 8:00 am to 5:00 pm (Eastern time)

Documents / Resources

	neptronic CMU-Modbus Compact Make-up Air Unit [pdf] User Guide CMU-Modbus, Compact Make-up Air Unit, Make-up Air Unit, Compact Air Unit, Air Unit, CMU-Modbus
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References

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Manuals+.