



neptronic®

Fan Coil Controller

EFCB Series

Modbus Communication Module User Guide



EFCB10TU2 (24Vac / 2 relays)

EFCB10TU4 (24Vac / 4 relays)

EFCB11TU2 (120Vac / 2 relays)

EFCB11TU4 (120Vac / 4 relays)

EFCB12TU2 (240Vac / 2 relays)

EFCB12TU4 (240Vac / 4 relays)





Introduction

The EFCB Series Modbus Communication Module User Guide provides information for using Neptronic® communication feature. The controller uses Modbus communication protocol over serial line in the RTU mode and provides a Modbus network interface between client devices and Neptronic EFCB Series devices.

The EFCB Series Modbus Guide assumes that you are familiar with Modbus terminology.

The following are the requirements for Modbus:

- **Data Model.** The EFCB Series Modbus server data model uses only the Holding Registers table.
- **Function Codes.** The EFCB Series Modbus server supports a limited function codes subset comprising:
 - Read Holding Registers (0x03)
 - Write Single Register (0x06)
 - Write Multiple Registers (0x10)
- **Exception Responses.** The EFCB Series Modbus server supports the following exception codes:
 - Illegal data address
 - Illegal data value
 - Slave device busy
- **Serial Line.** The EFCB Series 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, and 57600.
 - 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 EFCB Series device only answers at the following address:
 - The device's unique address (1 to 246) that can be set through the device menu or through holding register index 0.

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

Protocol Address	Convention Notation	Description	Data Type	Range	Writable
0	40001	Address - Neptronic ID and Modbus address of current device.	Unsigned	MB = Modbus Address (e.g. 110), LB = 1-247	W
1	40002	MSTP Baud Rate - BaudRate of device/100.	Unsigned <i>Scale 100</i>	0, 9600, 19200, 38400, or 57600, 0 = Auto Baud Rate Detection <i>Value/100 (e.g. 38400 baud = 384)</i>	W
2	40003	Communication port configuration.	Unsigned	1= No parity, 2 Stop bits 2= Even parity, 1 stop bit 3= Odd parity, 1 Stop bit	W
3	40004	ProdName_87, characters 8-7 of 8 name characters.	ASCII	1 to 65,535 char 8: 0x0045 = E char 7: 0x0046 = F	W
4	40005	ProdName_65, characters 6-5 of 8 name characters.	ASCII	1 to 65,535 char 6: 0x0043 = C char 5: 0x0042 = B	W
5	40006	ProdName_43, characters 4-3 of 8 name characters.	ASCII	1 to 65,535 char 4: 0x0054 = T char 3: 0x0055 = U	W
6	40007	ProdName_21, characters 2-1 of 8 name characters.	ASCII	1 to 65,535 char 2: 0x0034 = 4 char 1: 0x0000 =	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
7	40008	Product actual firmware version.	Unsigned	1 to 65,535 (e.g. 210)	RO
8	40009	Product actual EEPROM version.	Unsigned	1 to 65,535 (e.g. 207)	RO
9	40010	System Status 1.	Bit String	[B1, B5, B7-B11]: Reserved B0: System operation <i>0 = Normal, 1 = Fault</i> B2: System override by NSB <i>0 = Normal, 1 = OFF</i> B3: Change Over Mode <i>0 = Cooling, 1 = Heating</i> B4: Flow Switch Alarm <i>0 = No alarm, 1 = Alarm activated</i> B6: Dirty Filter Alarm <i>0 = No alarm, 1 = Alarm activated</i> B12: Analog Input 3 Mode <i>0 = Temp 10kΩ, 1 = 0-10Vdc</i> B13: Analog Input 4 Mode <i>0 = Temp 10kΩ, 1 = 0-10Vdc</i> B14: Analog Input 5 mode <i>0 = Temp 10kΩ, 1 = 0-10Vdc</i> B15: Analog Input 6 Mode <i>0 = Temp 10kΩ, 1 = 0-10Vdc</i>	RO
10	40011	System Status 2.	Bit String	[B0-B6, B12-B14]: Reserved B7: Override Alarm <i>0 = Off, 1 = On</i> B8: Window Opened Alarm <i>0 = Off, 1 = On</i> B9: Door Opened Alarm <i>0 = Off, 1 = On</i> B10: DI1 Alarm <i>0 = Off, 1 = On</i> B11: DI2 Alarm <i>0 = Off, 1 = On</i> B13: DI4 Alarm <i>0 = Off, 1 = On</i> B15: Overheat Alarm <i>0 = Off, 1 = On</i>	RO
11	40012	Internal temperature sensor reading.	Unsigned Scale 100	Range: 0°C to 50°C or 32°F to 122°F Value x 100 (e.g. 23°C = 2300 or 33°F = 3300)	RO
12	40013	External temperature sensor reading.	Unsigned Scale 100	Range: 0°C to 50°C or 32°F to 122°F Value x 100 (e.g. 23°C = 2300 or 33°F = 3300)	RO
13	40014	Changeover temperature sensor reading.	Unsigned Scale 100	Range: 0°C to 50°C or 32°F to 122°F Value x 100 (e.g. 23°C = 2300 or 33°F = 3300)	RO
14	40015	Control temperature reading.	Unsigned Scale 100	Range: 0°C to 50°C or 32°F to 122°F Value x 100 (e.g. 23°C = 2300 or 33°F = 3300)	W
15	40016	Internal humidity sensor reading. Select models only.	Unsigned Scale 10	Unit: % RH, Range: 5%RH to 100%RH Value x 10 (e.g. 30%RH = 300)	RO



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
16	40017	External Humidity sensor reading. Select models only.	Unsigned Scale 10	Unit: % RH, Range: 5%RH to 100%RH <i>Value x 10 (e.g. 30%RH = 300)</i>	RO
17	40018	Analog input 3 reading.	Signed Scale 100	Unit: Volts or °C/°F, Range: 0V to 10V, -40°C to 100°C or -40°F to 212°F <i>Value x 100 (e.g. 3 V = 300/18°C = 1800 or 33°F = 3300)</i>	RO
18	40019	Analog input 4 reading.	Signed Scale 100	Unit: Volts or °C/°F, Range: 0V to 10V, -40°C to 100°C or -40°F to 212°F <i>Value x 100 (e.g. 3 V = 300/18°C = 1800 or 33°F = 3300)</i>	RO
19	40020	Analog input 5 reading.	Signed Scale 100	Unit: Volts or °C/°F, Range: 0V to 10V, -40°C to 100°C or -40°F to 212°F <i>Value x 100 (e.g. 3 V = 300/18°C = 1800 or 33°F = 3300)</i>	RO
20	40021	Analog input 6 reading.	Signed Scale 100	Unit: Volts or °C/°F, Range: 0V to 10V, -40°C to 100°C or -40°F to 212°F <i>Value x 100 (e.g. 3 V = 300/18°C = 1800 or 33°F = 3300)</i>	RO
21	40022	Digital input status of 4 digital inputs.	Bit String	[B8-B15]: Reserved B0: Digital input 1 0 = Open, 1 = Close B1: Digital input 2 0 = Open, 1 = Close B2: Digital input 3 0 = Open, 1 = Close B3: Digital input 4 0 = Open, 1 = Close B4: AI3 Digital input 0 = Open, 1 = Close B5: AI4 Digital input 0 = Open, 1 = Close B6: AI5 Digital input 0 = Open, 1 = Close B7: AI6 Digital input 0 = Open, 1 = Close	RO
22	40023	Actual system occupancy state.	Unsigned	1 = NoOccupancy 2 = Occupancy 3 = Override	RO
23	40024	Actual night setback state of the system. Not available on all models.	Unsigned	1 = Day 2 = Night 3 = Override	RO
24	40025	Actual heating demand.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
25	40026	Actual local reheat demand.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
26	40027	Actual cooling demand.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
27	40028	Actual changeover demand.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
28	40029	Actual fan demand.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO

Protocol Address	Convention Notation	Description	Data Type	Range	Writable
29	40030	Actual dehumidification demand. Select models only.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
30	40031	Actual humidification demand. Select models only.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
31	40032	Switch timer countdown until the system is able to swap the demand.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 120 minutes, <i>Value x 1 (e.g. 5 mins = 5)</i>	RO
32	40033	Analog output 1 value.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	W
33	40034	Analog output 2 value.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	W
34	40035	Analog output 3 value.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	W
35	40036	Analog output 4 value.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	W
36	40037	Floating output 1 value.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
37	40038	Floating output 2 value.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
38	40039	Pulsing output 1 value.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
39	40040	Pulsing output 2 value.	Unsigned Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
40	40041	Pulsing output 3 value.	Signed Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
41	40042	Pulsing output 4 value.	Signed Scale 10	Unit: %, Range: 0% to 100%, <i>Value x 10 (e.g. 100% = 1000)</i>	RO
42	40043	TRIAC output on-off mode status.	Bit String	[B4-B15]: Reserved B0: On Off output 1 <i>0 = Off, 1 = On</i> B1: On Off output 2 <i>0 = Off, 1 = On</i> B2: On Off output 3 <i>0 = Off, 1 = On</i> B3: On Off output 4 <i>0 = Off, 1 = On</i>	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
43	40044	Digital output - 7 relays output status.	Bit String	[B7-B15]: Reserved B0: Digital output 1 <i>0 = Open, 1 = Close</i> B1: Digital output 2 <i>0 = Open, 1 = Close</i> B2: Digital output 3 <i>0 = Open, 1 = Close</i> B3: Digital output 4 <i>0 = Open, 1 = Close</i> B4: FAN Output High <i>0 = Open, 1 = Close</i> B5: FAN Output Med <i>0 = Open, 1 = Close</i> B6: FAN Output Low <i>0 = Open, 1 = Close</i>	W
44	40045	System command.	Bit String	[B6, B9-B15]: Reserved B0: Service Display Address <i>0 = Off; 1 = Display address on LCD</i> B1: Cooling Ramp Lock <i>0 = Off; 1 = On</i> B2: Condensation Alarm <i>0 = Off; 1 = On</i> B3: Heating Ramp Lock <i>0 = Off; 1 = On</i> B4: Reheat Ramp Lock <i>0 = Off; 1 = On</i> B5: Changeover Ramp Lock <i>0 = Off; 1 = On</i> B7: Humidify Ramp Lock <i>0 = Off; 1 = On</i> B8: Dehumidify Ramp Lock <i>0 = Off; 1 = On</i>	W
45	40046	System mode status.	Unsigned	1 = Auto 2 = Heat 3 = Cool 4 = Off	W
46	40047	Fan speed selection by user.	Unsigned	1 = Auto 2 = Low 3 = Med 4 = High	W
47	40048	Temperature setpoint in occupancy or day mode.	Signed Scale 10	Unit: Volts or °C/°F, Range: min to max setpoint Value x 10 (e.g. 3 V = 300/18°C = 180 or 60°F = 600)	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
48	40049	System options1.	Bit String	B0: Temp unit displayed on Digital Room Sensor <i>0 = °C, 1 = °F</i> B1: Temp unit displayed in Modbus <i>0 = °C, 1 = °F</i> B2: Temp SetPoint Lock <i>0 = Off, 1 = On</i> B3: Humidity SetPoint Lock <i>0 = Off, 1 = On</i> B4: Program Mode Lock <i>0 = Off, 1 = On</i> B5: Floating TO1/TO2 Direction <i>0 = Direct, 1 = Reverse</i> B6: Floating TO3/TO4 Direction <i>0 = Direct, 1 = Reverse</i> B7: Freeze Protection Alarm <i>0 = Off, 1 = On</i> B8: User System Off Modes <i>0 = Enable, 1 = Disable</i> B9: Keypad Bottom Left Lock <i>0 = Off, 1 = On</i> B10: Keypad Upper Left Lock <i>0 = Off, 1 = On</i> B11: Keypad Arrows Lock <i>0 = Off, 1 = On</i> B12: User Fan Auto Mode <i>0 = Enable, 1 = Disable</i> B13: Night SetBack Mode <i>0 = Setpoint, 1 = OFF</i> B14: Humidity Control Source <i>0 = Intern Sensor, 1 = Extern Sensor</i> B15: Time Mode <i>0 = 24h, 1 = 12h</i>	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
49	40050	System options 2.	Bit String	[B0-B1]: Reserved B2: Baud Rate <i>0 = Auto, 1 = Manual</i> B3: Schedule On or Off <i>0 = Off, 1 = On</i> B4: Analog Output 1 Direction <i>0 = Direct, 1 = Reverse</i> B5: Analog Output 2 Direction <i>0 = Direct, 1 = Reverse</i> B6: Analog Output 3 Direction <i>0 = Direct, 1 = Reverse</i> B7: Analog Output 4 Direction <i>0 = Direct, 1 = Reverse</i> B8: TO1 Direction <i>0 = Direct, 1 = Reverse</i> B9: TO2 Direction <i>0 = Direct, 1 = Reverse</i> B10: TO3 Direction <i>0 = Direct, 1 = Reverse</i> B11: TO4 Direction <i>0 = Direct, 1 = Reverse</i> B12: Digital Output 1 Direction <i>0 = Direct, 1 = Reverse</i> B13: Digital Output 2 Direction <i>0 = Direct, 1 = Reverse</i> B14: Digital Output 3 Direction <i>0 = Direct, 1 = Reverse</i> B15: Digital Output 4 Direction <i>0 = Direct, 1 = Reverse</i>	W
50	40051	System options 3.	Bit String	[B0, B2, B5-B6, B8-B15]: Reserved B1: ECM Fan Enable <i>0 = Off, 1 = On</i> B3: Display CO2 <i>0 = Off, 1 = On</i> B4: CO2 Source Select <i>0 = TFL, 1 = Analog</i> B7: Occupancy Control Source <i>0 = DigitalInput3, 1 = InternSensor</i>	W
51	40052	System option4.		[B0-B15]: Reserved	W
52	40053	TFL/TDF display information.	Unsigned	1= Temperature and Demand 2= Setpoint and Demand 3= Temperature Only 4= Setpoint Only 5= Off	W
53	40054	Temperature control source.	Unsigned	1= Network Temp 2= Intern Temp 3= Extern Temp	W
54	40055	Network fallback timeout Present Value.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 60 minutes, <i>Value x 1 (e.g. 30 mins = 30)</i>	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
55	40056	Minimum occupancy/day setpoint.	Signed Scale 10	Unit: Volts or °C/°F, Range: 10°C to max or 50°F to max <i>Value x 10 (e.g. 3 V = 30/18°C = 180 or 60°F = 600)</i>	W
56	40057	Maximum occupancy/day setpoint.	Signed Scale 10	Unit: Volts or °C/°F, Range: min to 40°C or min to 104°F <i>Value x 10 (e.g. 3 V = 30/18°C = 180 or 60°F = 600)</i>	W
57	40058	Cooling temperature setpoint in unoccupied or night mode.	Signed Scale 10	Unit: Volts or °C/°F, Range: 10°C to 40°C or 50°F to 104°F <i>Value x 10 (e.g. 3 V = 300/18°C = 180 or 60°F = 600)</i>	W
58	40059	Heating temperature setpoint in unoccupied or night mode.	Signed Scale 10	Unit: Volts or °C/°F, Range: 10°C to 40°C or 50°F to 104°F <i>Value x 10 (e.g. 3 V = 300/18°C = 180 or 60°F = 600)</i>	W
59	40060	Heating proportional band.	Unsigned Scale 10	Unit: depends on system unit, 0.5°C to 5°C or 1°F to 9° <i>Value x 10 (e.g. 1°C = 10 or 2°F = 20)</i>	W
60	40061	Local reheat proportional band.	Unsigned Scale 10	Unit: depends on system unit, 0.5°C to 5°C or 1°F to 9°F <i>Value x 10 (e.g. 1°C = 10 or 2°F = 20)</i>	W
61	40062	Cooling proportional band.	Unsigned Scale 10	Unit: depends on system unit, 0.5°C to 5°C or 1°F to 9°F <i>Value x 10 (e.g. 1°C = 10 or 2°F = 20)</i>	W
62	40063	Change over proportional band.	Unsigned Scale 10	Unit: depends on system unit, 0.5°C to 5°C or 1°F to 9°F <i>Value x 10 (e.g. 1°C = 10 or 2°F = 20)</i>	W
63	40064	Heating dead band.	Unsigned Scale 10	Unit: depends on system unit, 0.5°C to 5°C or 1°F to 9°F <i>Value x 10 (e.g. 1°C = 10 or 2°F = 20)</i>	W
64	40065	Local reheat dead band.	Unsigned Scale 10	Unit: depends on system unit, 0.5°C to 5°C or 1°F to 9°F <i>Value x 10 (e.g. 1°C = 10 or 2°F = 20)</i>	W
65	40066	Cooling dead band.	Unsigned Scale 10	Unit: depends on system unit, 0.5°C to 5°C or 1°F to 9°F <i>Value x 10 (e.g. 1°C = 10 or 2°F = 20)</i>	W
66	40067	Change over dead band.	Unsigned Scale 10	Unit: depends on system unit, 0.5°C to 5°C or 1°F to 9°F <i>Value x 10 (e.g. 1°C = 10 or 2°F = 20)</i>	W
67	40068	Change over setpoint.	Signed Scale 10	Unit: depends on system unit, 10°C to 40°C or 50°F to 104°F <i>Value x 10 (e.g. 12°C = 120 or 60°F = 600)</i>	W
68	40069	Fan time out in seconds.	Unsigned Scale 1	Unit: Seconds, Range: 0 to 255 seconds, <i>Value x 1 (e.g. 100 secs = 100)</i>	W
69	40070	Fan damping factor in seconds.	Unsigned Scale 1	Unit: Seconds, Range: 0 to 255 seconds, <i>Value x 1 (e.g. 100 secs = 100)</i>	W
70	40071	Heating integral time factor in seconds.	Unsigned Scale 1	Unit: Seconds, Range: 0 to 250 seconds, <i>Value x 1 (e.g. 100 secs = 100)</i>	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
71	40072	Cooling integral time factor in seconds.	Unsigned Scale 1	Unit: Seconds, Range: 0 to 250 seconds, <i>Value x 1 (e.g. 100 secs = 100)</i>	W
72	40073	Delay between cooling and heating or vice versa.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 120 minutes, <i>Value x 1 (e.g. 10 mins = 10)</i>	W
73	40074	Cooling anticycle delay in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 15 minutes, <i>Value x 1 (e.g. 100 mins = 100)</i>	W
74	40075	NSB override delay in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 180 minutes, <i>Value x 1 (e.g. 100 mins = 100)</i>	W
75	40076	Unoccupied override delay in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 180 minutes, <i>Value x 1 (e.g. 100 mins = 100)</i>	W
76	40077	Occupancy minimum time in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 240 minutes, <i>Value x 1 (e.g. 100 mins = 100)</i>	W
77	40078	Unoccupied override delay count down in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 180 minutes, <i>Value x 1 (e.g. 100 mins = 100)</i>	W
78	40079	System Control mode.	Unsigned	1= Auto 2= Heat 3= Cool 4= Heat or Cool	W
79	40080	Digital input 3 mode.	Unsigned	1= Off 2= Occupancy normally open 3= Occupancy normally close 4= NSB normally open 5= NSB normally close	W
80	40081	Override system occupancy or NSB mode. Depending on the selected DI3 mode (40080), some of these options may not be writable.	Unsigned	1= Locally 2= OFF 3= Occupied 4= Unoccupied 5= Day 6= Night	W
81	40082	Internal temperature sensor offset correction.	Signed Scale 100	Unit: depends on system unit, Range: $\pm 5^{\circ}\text{C}$ or $\pm 9^{\circ}\text{F}$ <i>Value x 100 (e.g. $2^{\circ}\text{C} = 200$ or $3^{\circ}\text{F} = 300$)</i>	W
82	40083	External temperature sensor offset correction.	Signed Scale 100	Unit: depends on system unit, Range: $\pm 5^{\circ}\text{C}$ or $\pm 9^{\circ}\text{F}$ <i>Value x 100 (e.g. $2^{\circ}\text{C} = 200$ or $3^{\circ}\text{F} = 300$)</i>	W
83	40084	Change over analog input signal.	Unsigned	3= Sensor 4= Normally Cool 5= Normally Heat	W
84	40085	Change over control mode.	Unsigned	1= Local 2= Cool 3= Heat	W
85	40086	External temperature 0-10V input on analog input.	Unsigned	1= Off 2= 2-10V 3= 0-10V	W
86	40087	Minimum analog input external temperature reading.	Signed Scale 10	Unit: depends on system unit, Range: -40°C to 0°C or -40°F to 32°F <i>Value x 10 (e.g. $-20^{\circ}\text{C} = -200$ or $-20^{\circ}\text{F} = 200$)</i>	W
87	40088	Maximum analog input external temperature reading.	Signed Scale 10	Unit: depends on system unit, Range: 50°C to 100°C or 122°F to 212°F , <i>Value x 10 (e.g. $60^{\circ}\text{C} = 600$ or $140^{\circ}\text{F} = 1400$)</i>	W
88	40089	Fan output signal.	Unsigned	1= 1 speed 2= 2 speeds 3= 3 speeds 4= Analog	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
89	40090	Ramp to control analog output 1.	Unsigned	1= Off 2 = Alarm 3= Changeover with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat 8= HumidifyWithFan (with TFLHxx/TDF digital room sensor with humidity only) 9= Reserved 10= Cooling or Heating	W
90	40091	Minimum voltage for analog output 1 (volt).	Unsigned Scale 10	Unit: Volt, Range: 0V to 10V, Value x 10 (e.g. 3 V = 30)	W
91	40092	Maximum voltage for analog output 1 (volt).	Unsigned Scale 10	Unit: Volt, Range: 0V to 10V, Value x 10 (e.g. 3 V = 30)	W
92	40093	Ramp to control analog output 2.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat 8= HumidifyWithFan (with TFLHxx/TDF digital room sensor with humidity only) 9= Reserved 10= Cooling or Heating	W
93	40094	Minimum voltage for analog output 2 (volt).	Unsigned Scale 10	Unit: Volt, Range: 0V to 10V, Value x 10 (e.g. 3 V = 30)	W
94	40095	Maximum voltage for analog output 2 (volt).	Unsigned Scale 10	Unit: Volt, Range: 0V to 10V, Value x 10 (e.g. 3 V = 30)	W
95	40096	Ramp to control analog output 3.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat 8= HumidifyWithFan (with TFLHxx/TDF digital room sensor with humidity only) 9= Reserved 10= Cooling or Heating	W
96	40097	Minimum voltage for analog output 3 (volt).	Unsigned Scale 10	Unit: Volt, Range: 0V to 10V, Value x 10 (e.g. 3 V = 30)	W
97	40098	Maximum voltage for analog output 3 (volt).	Unsigned Scale 10	Unit: Volt, Range: 0V to 10V, Value x 10 (e.g. 3 V = 30)	W
98	40099	Ramp to control analog output 4.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat 8= HumidifyWithFan (with TFLHxx/TDF digital room sensor with humidity only) 9= Fan 10= Cooling or Heating	W
99	40100	Minimum voltage for analog output 4 (volt).	Unsigned Scale 10	Unit: Volt, Range: 0V to 10V, Value x 10 (e.g. 3 V = 30)	W
100	40101	Maximum voltage for analog output 4 (volt).	Unsigned Scale 10	Unit: Volt, Range: 0V to 10V, Value x 10 (e.g. 3 V = 30)	W
101	40102	Timing of floating motor TO1-TO2 in seconds.	Unsigned Scale 1	Unit: seconds, Range: 15 to 250 seconds, Value x 1 (e.g. 20 secs = 20)	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
102	40103	Timing of floating motor TO3-TO4 in seconds.	Unsigned Scale 1	Unit: seconds, Range: 15 to 250 seconds, <i>Value x 1 (e.g. 20 secs = 20)</i>	W
103	40104	Ramp to control TRIAC output 1.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat	W
104	40105	Signal output configuration for TRIAC output 1.	Unsigned	1= Pulsing mode 2= On/Off mode 3= Floating mode	W
105	40106	TRIAC output 1 when set to close.	Unsigned Scale 1	Unit: %, Range: 15 to 80%, <i>Value x 1 (e.g. 20% = 20)</i>	W
106	40107	TRIAC output 1 when set to open.	Unsigned Scale 1	Unit: %, Range: 0 to TO1closepos-4%, <i>Value x 1 (e.g. 20% = 20)</i>	W
107	40108	Ramp to control TRIAC output 2.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat	W
108	40109	Signal output configuration for TRIAC output 2.	Unsigned	1= Pulsing mode 2= On/Off mode 3= Floating mode	W
109	40110	TRIAC output 2 when set to close.	Unsigned Scale 1	Unit: %, Range: 15 to 80%, <i>Value x 1 (e.g. 20% = 20)</i>	W
110	40111	TRIAC output 2 when set to open.	Unsigned Scale 1	Unit: %, Range: 0 to TO2closepos-4%, <i>Value x 1 (e.g. 20% = 20)</i>	W
111	40112	Ramp to control TRIAC output 3.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat	W
112	40113	Signal output configuration for TRIAC output 3.	Unsigned Scale 1	1= Pulsing mode 2= On/Off mode 3= Floating mode	W
113	40114	TRIAC output 3 when set to close.	Unsigned Scale 1	Unit: %, Range: 15 to 80%, <i>Value x 1 (e.g. 20% = 20)</i>	W
114	40115	TRIAC output 3 when set to open.	Unsigned Scale 1	Unit: %, Range: 0 to TO3closepos-4%, <i>Value x 1 (e.g. 20% = 20)</i>	W
115	40116	Ramp to control TRIAC output 4.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat	W
116	40117	Signal output configuration for TRIAC output 4.	Unsigned	1= Pulsing mode 2= On/Off mode 3= Floating mode	W
117	40118	TRIAC output 4 when set to close.	Unsigned Scale 1	Unit: %, Range: 15 to 80%, <i>Value x 1 (e.g. 20% = 20)</i>	W
118	40119	TRIAC output 4 when set to open.	Unsigned Scale 1	Unit: %, Range: 0 to TO4closepos-4%, <i>Value x 1 (e.g. 20% = 20)</i>	W
119	40120	Configuration of DO1 mode.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat 8= HumidifyWithFan (<i>with TFLHxx/TDF digital room sensor with humidity only</i>)	W

Protocol Address	Convention Notation	Description	Data Type	Range	Writable
120	40121	Delay before activation of DO1 in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 15 minutes, <i>Value x 1 (e.g. 5 = 5 mins)</i>	W
121	40122	Close position percentage for contact DO1.	Unsigned Scale 1	Unit: %, Range: 15% to 80%, <i>Value x 1 (e.g. 20% = 20)</i>	W
122	40123	Open position percentage for contact DO1.	Unsigned Scale 1	Unit: %, Range: 0 to DO1closepos-4%, <i>Value x 1 (e.g. 20% = 20)</i>	W
123	40124	Configuration of DO2 mode.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat 8= HumidifyWithFan (<i>with TFLHxx/TDF digital room sensor with humidity only</i>)	W
124	40125	Activation delay for contact DO2 in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 15 minutes, <i>Value x 1 (e.g. 5 = 5 mins)</i>	W
125	40126	Close position percentage for contact DO2.	Unsigned Scale 1	Unit: %, Range: 15% to 80%, <i>Value x 1 (e.g. 20% = 20)</i>	W
126	40127	Open position percentage for contact DO2.	Unsigned Scale 1	Unit: %, Range: 0 to DO2closepos-4%, <i>Value/1 (e.g. 20% = 20)</i>	W
127	40128	Configuration of DO3 mode.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat 8= HumidifyWithFan (<i>with TFLHxx/TDF digital room sensor with humidity only</i>)	W
128	40129	Activation delay for contact DO3 in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 15 minutes, <i>Value x 1 (e.g. 5 = 5 mins)</i>	W
129	40130	Close position percentage for contact DO3.	Unsigned Scale 1	Unit: %, Range: 15% to 80%, <i>Value x 1 (e.g. 20% = 20)</i>	W
130	40131	Open position percentage for contact DO3.	Unsigned Scale 1	Unit: %, Range: 0 to DO3closepos-4%, <i>Value x 1 (e.g. 20% = 20)</i>	W
131	40132	Configuration of DO4 mode.	Unsigned	1= Off 2= Alarm 3= Change Over with fan 4= Cooling with fan 5= Heating with fan 6= Local Reheat with fan 7= Local Reheat 8= HumidifyWithFan (<i>with TFLHxx/TDF digital room sensor with humidity only</i>)	W
132	40133	Activation delay for contact DO4 in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 15 minutes, <i>Value/1 (e.g. 5 = 5 mins)</i>	W
133	40134	Close position percentage for contact DO4.	Unsigned Scale 1	Unit: %, Range: 15% to 80%, <i>Value x 1 (e.g. 20% = 20)</i>	W
134	40135	Open position percentage for contact DO4.	Unsigned Scale 1	Unit: %, Range: 0 to DO4closepos-4%, <i>Value x 1 (e.g. 20% = 20)</i>	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
135	40136	Digital input contact of DI1 to DI4.	Bit String	[B3, B5-B15]: Reserved B0: Digital input 1 <i>0 = Normally Open, 1 = Normally Close</i> B1: Digital input 2 <i>0 = Normally Open, 1 = Normally Close</i> B2: Digital input 3 <i>0 = Normally Open, 1 = Normally Close</i> B4: Digital input 4 <i>0 = Normally Open, 1 = Normally Close</i>	W
136	40137	Configuration of DI1 mode.	Unsigned	1= OFF 2= Override 3= Window 4= Door 5= DirtyFilter 6= FlowSwitch 7= OverHeat	W
137	40138	Delay before activation of DI1 in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 65,535 minutes, <i>Value x 1 (e.g. 5 = 5 mins)</i>	W
138	40139	Configuration of DI2 mode.	Unsigned	1= OFF 2= Override 3= Window 4= Door 5= DirtyFilter 6= FlowSwitch 7= OverHeat	W
139	40140	Delay before activation of DI2 in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 65,535 minutes, <i>Value x 1 (e.g. 5 = 5 mins)</i>	W
140	40141	Configuration of DI4 mode.	Unsigned	1= OFF 2= Override 3= Window 4= Door 5= DirtyFilter 6= FlowSwitch 7= OverHeat	W
141	40142	Delay before activation of DI4 in minutes.	Unsigned Scale 1	Unit: Minutes, Range: 0 to 65,535 minutes, <i>Value x 1 (e.g. 5 = 5 mins)</i>	W
142	40143	Humidity control mode status. Not available on all models.	Unsigned	1= Auto 2= Dehumidification 3= Humidification 4= Off	W
143	40144	Humidity setpoint (%RH) in occupancy or day mode. Not available on all models.	Unsigned Scale 10	Unit: %RH, Limited by min/max humidity setpoint, <i>Value x 10 (e.g. 20%RH = 200)</i>	W
144	40145	Dehumidification setpoint (%RH) in unoccupied or night mode. Not available on all models.	Unsigned Scale 10	Unit: %RH, Range: 10% to 65%, <i>Value x 10 (e.g. 20%RH = 200)</i>	W
145	40146	Humidification setpoint (%RH) in unoccupied or night mode. Not available on all models.	Unsigned Scale 10	Unit: %RH, Range: 10% to 65%, <i>Value x 10 (e.g. 20%RH = 200)</i>	W
146	40147	Minimum user setpoint. Not available on all models.	Unsigned Scale 10	Unit: %RH, Range: 10% to max, <i>Value x 10 (e.g. 20%RH = 200)</i>	W
147	40148	Maximum user setpoint. Not available on all models.	Unsigned Scale 10	Unit: %RH, Range: min to 65%, <i>Value x 10 (e.g. 20%RH = 200)</i>	W

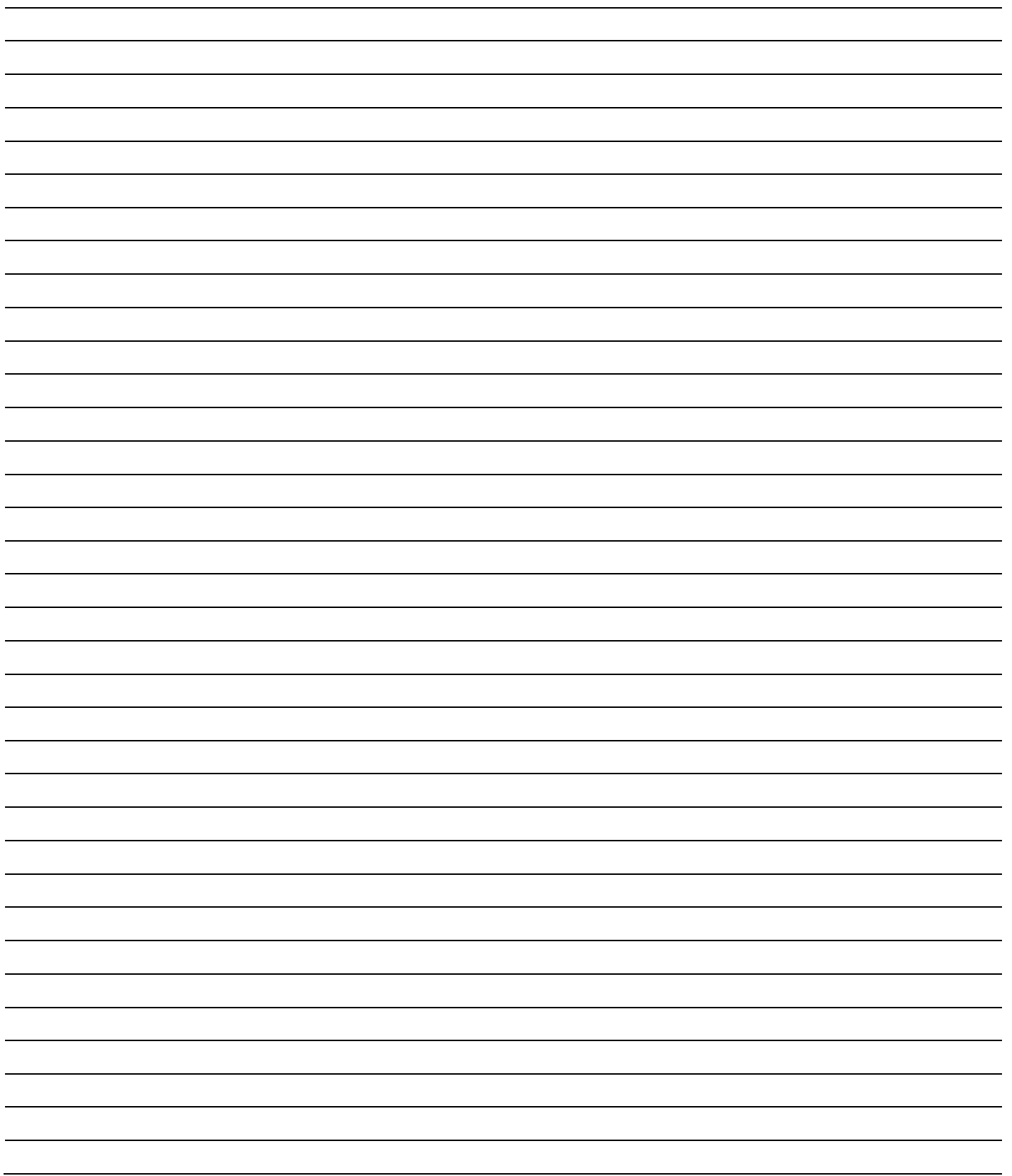


Protocol Address	Convention Notation	Description	Data Type	Range	Writable
148	40149	Humidity proportional band. Not available on all models.	Unsigned Scale 10	Unit: %RH, Range: 3%RH to 10%RH, <i>Value x 10 (e.g. 4%RH = 40)</i>	W
149	40150	Cfg_HumDeadBand. Not available on all models.	Unsigned Scale 10	Unit: %RH, Range: 0% to 5%, <i>Value x 10 (e.g. 4%RH = 40)</i>	W
150	40151	Humidity deadband. Not available on all models.	Signed Scale 10	Unit: %RH, Range: $\pm 5\%$ RH, <i>Value x 10 (e.g. 2%RH = 20)</i>	W
151	40152	Internal humidity sensor offset correction.	Signed Scale 10	Unit: %RH, Range: $\pm 5\%$ RH, <i>Value x 10 (e.g. 2%RH = 20)</i>	W
152	40153	External humidity sensor offset correction.	Signed Scale 10	Unit: %RH, Range: $\pm 5\%$ RH, <i>Value x 10 (e.g. 2%RH = 20)</i>	W
153	40154	Internal CO ₂ sensor reading. Not available on all models.	Unsigned Scale 1	Unit: PPM, Range: 0 to 2000 PPM, <i>Value x 1 (e.g. 20PPM = 20)</i>	RO
154	40155	Maximum limit of CO ₂ concentration. Not available on all models.	Unsigned Scale 10	Unit: PPM, Range 100 to CO2rangePPM, <i>Value x 10 (e.g. 200PPM = 2000)</i>	W
155	40156	System status 3.	Unsigned	[B1-B15]: Reserved B0: CO₂ Alarm <i>0 = Off, 1 = On</i>	RO
156	40157	Maximum range for the CO ₂ sensor. Not available on all models.	Unsigned Scale 50	Unit: PPM, Range 0 to 2000 PPM, <i>Value x 50 (e.g. 20PPM = 1000)</i>	W
157	40158	External CO ₂ sensor reading. Not available on all models.	Unsigned Scale 1	Unit: PPM, Range 1 to CO2rangePPM, <i>Value x 1 (e.g. 20PPM = 20)</i>	RO
158	40159	Internal light sensor reading in Luxes. Not available on all models.	Unsigned Scale 1	Unit: Luxes, Range 0 to 16000 Luxes, <i>Value x 1 (e.g. 20Luxes = 20)</i>	RO
159	40160	Internal PIR sensor reading. Not available on all models.	Unsigned	0 = No Occupancy 1 = Occupancy	RO
160	40161	Internal VOC sensor reading in ppb. Not available on all models.	Unsigned Scale 1	Unit: ppb, Range 1 to 60000 ppb, <i>Value x 1 (e.g. 20ppb = 20)</i>	RO
161	40162	Configuration of AI3 mode.	Unsigned	1 = Off 2 = Temperature 3 = CO ₂ 4 = Humidity	W
162	40163	Configuration of AI4 mode.	Unsigned	1 = Off 2 = Temperature 3 = CO ₂ 4 = Humidity	W
163	40164	Configuration of AI5 mode.	Unsigned	1 = Off 2 = Temperature 3 = CO ₂ 4 = Humidity	W
164	40165	Configuration of AI6 mode.	Unsigned	1 = Off 2 = Temperature 3 = CO ₂ 4 = Humidity	W



Protocol Address	Convention Notation	Description	Data Type	Range	Writable
165	40166	Configuration of TO1 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
166	40167	Configuration of TO2 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
167	40168	Configuration of TO3 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
168	40169	Configuration of TO4 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
169	40170	Configuration of AO1 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
170	40171	Configuration of AO2 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
171	40172	Configuration of AO3 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
172	40173	Configuration of AO4 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
173	40174	Configuration of DO1 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
174	40175	Configuration of DO2 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
175	40176	Configuration of DO3 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W
176	40177	Configuration of DO4 alarm source.	Unsigned	1 = Alarm Override 2 = Alarm Overheat 3 = Alarm Door 4 = Alarm Window Contact 5 = Alarm FlowSwitch 6 = Alarm CO2	W

Notes





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