

Installation & Operation Manual

Modbus RTU

**Modbus RTU is designed to work with
NFB700-500C/600C/800C/1000C boilers ONLY.**



WARNING

All Installations should be done only by a qualified expert and in accordance with the appropriate Navien manual. Installing an electric appliance with improper methods or materials may result in serious injury or death due to fire.

ELECTRICAL SHOCK HAZARD. Disconnect power before installing or servicing. Otherwise, severe personal injury, death, or substantial property damage may result.

All wiring must be installed in accordance with local regulations of the installation site.

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1. About the Modbus RTU

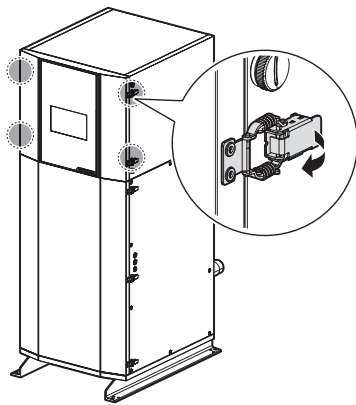
The Modbus RTU Implementation is designed to provide a popular data exchange format which connects these instruments to Navien devices. The Modbus RTU allows the instrument to be a slave on a data link shared with other devices that subscribe to the Modbus RTU RS-485 specification.

Boilers and water heaters are slaves in Modbus networks. The building automation system (BAS) that can communicate with slaves using the RS-485 communication is the master in the Modbus network.

BACnet communication can be performed via the BACnet gateways supplied by Navien. For more information, refer to the BACnet gateway manual.

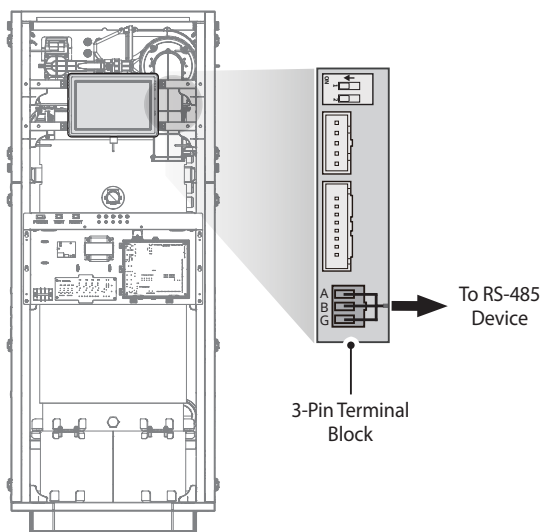
2. Installing the Modbus RTU

1. Turn off the power supply to the boiler.
2. Unfasten the 4 latches on the upper sides of the boiler to remove the upper-front cover and gain access to the internal components.



3. Connect the 3-pin terminal block located on the right side of the front panel to an RS-485 device.

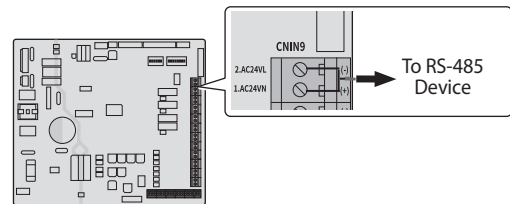
Note When connecting the 3-pin terminal block to a BACnet gateway or a LonWorks gateway, refer to the BACnet or LonWorks Installation manuals.



Front Panel	Pin Assignment
A	RS-485 +
B	RS-485 -
G	RS-485 GND

Note

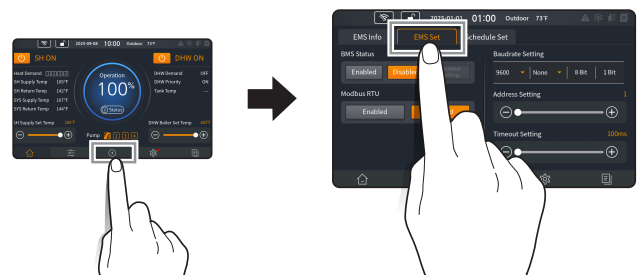
- The boiler controller can provide a 24VAC power supply. If a RS-485 device that connects to a boiler requires a power supply, connect the **1. AC24VN** and **2. AC24VL** ports of the **CN19** terminal block to a RS-485 device.



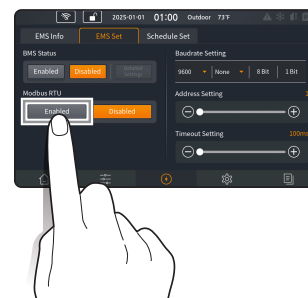
- If the baud rate is 57600, the maximum communication distance for RS-485 devices is 3,000 ft. However, if the rate becomes higher than 57600, the communication length may become shorter. Also, to provide sufficient communication quality and sensitivity, use twisted pair cables such as UTP or CAT5 cables.
- When connecting RS-485 devices for Modbus communication to the boilers or water heaters used in the cascade systems, connect the RS-485 device to the front panel of the main unit.

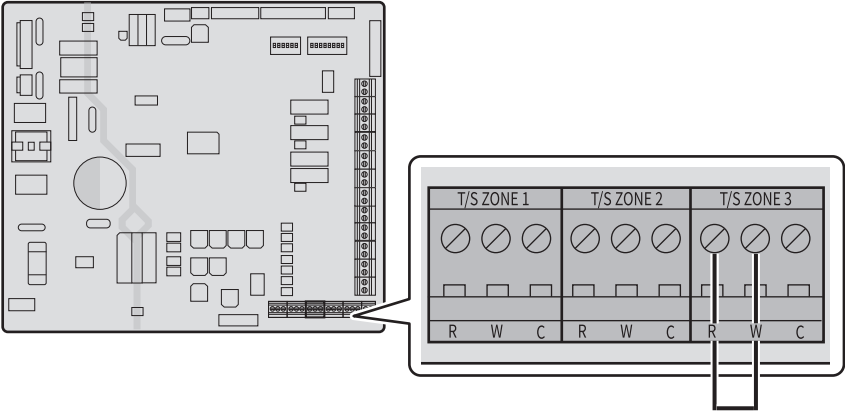
3. Setting the Modbus Communication (EMS)

1. To set the Modbus communication (EMS), tap the EMS button (⚡), and then tap **EMS Set**.



2. Tap **Enabled** on the Modbus RTU menu.



Item	Description																						
Modbus RTU	Enable or disable the Modbus RTU function. - Default: Disabled - If Enabled is selected, you can use Modbus communication. - To turn the boilers used in the building automation system on or off when Enabled is selected, set main DIP switch 7 to ON (Space Heating Thermostat-Unused) or short the T/S ZONE3 port. 																						
Baud Rate Setting	Set the baud rate and parity type. <table border="1"> <thead> <tr> <th>Items</th><th>Description</th></tr> </thead> <tbody> <tr> <td>Baud Rate</td><td> - Setting range: 9600, 19200, 34800, 57600, 115200 - Default: 9600 </td></tr> <tr> <td>Parity</td><td> - Setting range: None, Even, Odd - Default: None </td></tr> <tr> <td>Data Bits</td><td>8bit</td></tr> <tr> <td>Stop Bits</td><td>1bit</td></tr> <tr> <td>Duplex</td><td>Half duplex Transceiver or TX/RX</td></tr> <tr> <td>Error checking</td><td>CRC (cyclic redundancy check)</td></tr> <tr> <td>Polynomial</td><td>(CRC-16 1010000000000001)</td></tr> <tr> <td>Bit transfer order</td><td>LSB first</td></tr> <tr> <td>Byte transfer order</td><td>Big-endian</td></tr> <tr> <td>End of message</td><td>Idle line for 3.5 or more characters (>1.82 ms for 19200)</td></tr> </tbody> </table>	Items	Description	Baud Rate	- Setting range: 9600, 19200, 34800, 57600, 115200 - Default: 9600	Parity	- Setting range: None, Even, Odd - Default: None	Data Bits	8bit	Stop Bits	1bit	Duplex	Half duplex Transceiver or TX/RX	Error checking	CRC (cyclic redundancy check)	Polynomial	(CRC-16 1010000000000001)	Bit transfer order	LSB first	Byte transfer order	Big-endian	End of message	Idle line for 3.5 or more characters (>1.82 ms for 19200)
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Byte transfer order	Big-endian																						
End of message	Idle line for 3.5 or more characters (>1.82 ms for 19200)																						
Address Setting	Set the Modbus address. 0: Broadcast messages 1–100: Available address numbers for each unit - Default: 1																						
Time out Setting	Set the timeout after transmission. - Setting range: 100 ms–1000 ms - Default: 100 ms																						

4. Modbus Memory Map

4.1. Data Model

The Modbus RTU Implementation is designed to provide a popular data exchange format which connects these instruments to Navien devices.

Primary Table	Data Type	Read / Write
Discrete Input	Single bit	Read-Only
Coils	Single bit	Read-Write
Input Registers	16-bit word	Read-Only
Holding Registers	16-bit word	Read-Write

4.2. Memory Map

Coil

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
0	0001	Bit	SH operation on/off control	SH operation on/off decision of single mode	1=ON/0=OFF	0	1	1
0	0002	Bit	Outdoor reset curve usage enable	Outdoor reset curve usage setting of single and cascade mode	1=ON/0=OFF	0	1	1
0	0003	Bit	WWSD enable	WWSD usage setting of single and cascade mode	1=ON/0=OFF	0	1	1
0	0004	Bit	DHW operation ON/OFF control	DHW operation ON/OFF decision of single mode	1=ON/0=OFF	0	1	1
0	0006	Bit	Touch lock ON/OFF control	Touch lock ON/OFF	1=ON/0=OFF	0	1	1
0	0008	Bit	Temperature display type	Celsius or fahrenheit decision	1=Fah/0=Cel	0	1	1
0	0009	Bit	Reset Duration Data	Duration Data: CH/DHW Operation Time, Gas Consumption, etc. - Setting the value of 00009 to 1 resets the duration data and returns the value from 00009 to 0.	1=ON/0=OFF	0	1	1

Discretes Input - Single (Individual) Boiler

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
1	0011	Bit	Boiler operation	Boiler operation status	1=ON/0=OFF	0	1	1
1	0012	Bit	SH operation	SH operation status	1=ON/0=OFF	0	1	1
1	0014	Bit	DHW tank mode operation	DHW tank mode operation status	1=ON/0=OFF	0	1	1
1	0015	Bit	Error	Error status	1=ON/0=OFF	0	1	1
1	0017	Bit	Boiler enable	Boiler enable/stop status	1=ON/0=OFF	0	1	1

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
1	0018	Bit	Boiler pump	Boiler pump operation Status	1=ON/0=OFF	0	1	1
1	0019	Bit	DHW/Zone1 pump	DHW/Zone1 pump operation Status	1=ON/0=OFF	0	1	1
1	0020	Bit	Zone2 pump	Zone2 pump status operation status	1=ON/0=OFF	0	1	1
1	0021	Bit	System/Zone3 pump	System/Zone3 pump operation status	1=ON/0=OFF	0	1	1
1	0022	Bit	SH1 Thermostat	SH1 Thermostat input Status	1=ON/0=OFF	0	1	1
1	0023	Bit	SH2 Thermostat	SH2 Thermostat input Status	1=ON/0=OFF	0	1	1
1	0024	Bit	SH3 Thermostat	SH3 Thermostat input Status	1=ON/0=OFF	0	1	1
1	0025	Bit	DHW call signal	thermostat, tank sensor select status	1=sensor/0=TS	0	1	1
1	0026	Bit	DHW Thermostat	DHW Thermostat input Status	1=ON/0=OFF	0	1	1
1	0027	Bit	LWCO input	LWCO input status	1=ON/0=OFF	0	1	1
1	0029	Bit	Louver switch	Louver switch input status	1=ON/0=OFF	0	1	1
1	0030	Bit	SH4 Thermostat	SH4 Thermostat input status	1=ON/0=OFF	0	1	1
1	0031	Bit	Zone4 pump	Zone4 pump operation status	1=ON/0=OFF	0	1	1
1	0032	Bit	Louver output	Louver output status	1=ON/0=OFF	0	1	1
1	0033	Bit	Air damper output	Air damper output status	1=ON/0=OFF	0	1	1
1	0035	Bit	Frozen protection mode	Frozen protection mode	1=ON/0=OFF	0	1	1

Discretes Input - Cascade Total Status Data by Main Unit

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
1	0045	Bit	Cascade system enable	"1" if even one Cascade is On	1=ON/0=OFF	0	1	1
1	0046	Bit	Cascade burning	Cascade burning status	1=ON/0=OFF	0	1	1
1	0047	Bit	Cascade SH operation	Cascade SH operation status	1=ON/0=OFF	0	1	1
1	0050	Bit	Cascade DHW tank mode operation state	DHW tank mode operation status	1=ON/0=OFF	0	1	1
1	0051	Bit	DHW call signal	thermostat, tank sensor select status	1=ON/0=OFF	0	1	1
1	0052	Bit	DHW Thermostat	DHW Thermostat input status	1=ON/0=OFF	0	1	1

Discretes Input - Cascade Individual's Units Information: Tables Based on Individual Data's

Address	Contents
10073-10200	Address for 4 data in cascade mode

Address	Data Type	Point Name	Description	Units	Min	Max	Resolution
1 0073	Bit	Main Boiler enable	Main Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0074	Bit	Sub 1 Boiler enable	Sub 1 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0075	Bit	Sub 2 Boiler enable	Sub 2 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0076	Bit	Sub 3 Boiler enable	Sub 3 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0077	Bit	Sub 4 Boiler enable	Sub 4 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0078	Bit	Sub 5 Boiler enable	Sub 5 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0079	Bit	Sub 6 Boiler enable	Sub 6 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0080	Bit	Sub 7 Boiler enable	Sub 7 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0105	Bit	Main Boiler Error	Main Boiler Error status	1=ON/0=OFF	0	1	1
1 0106	Bit	Sub 1 Boiler Error	Sub 1 Boiler Error status	1=ON/0=OFF	0	1	1
1 0107	Bit	Sub 2 Boiler Error	Sub 2 Boiler Error status	1=ON/0=OFF	0	1	1
1 0108	Bit	Sub 3 Boiler Error	Sub 3 Boiler Error status	1=ON/0=OFF	0	1	1
1 0109	Bit	Sub 4 Boiler Error	Sub 4 Boiler Error status	1=ON/0=OFF	0	1	1
1 0110	Bit	Sub 5 Boiler Error	Sub 5 Boiler Error status	1=ON/0=OFF	0	1	1
1 0111	Bit	Sub 6 Boiler Error	Sub 6 Boiler Error status	1=ON/0=OFF	0	1	1
1 0112	Bit	Sub 7 Boiler Error	Sub 7 Boiler Error status	1=ON/0=OFF	0	1	1
1 0137	Bit	Main Boiler operation	Main Boiler operation status	1=ON/0=OFF	0	1	1
1 0138	Bit	Sub 1 Boiler operation	Sub 1 Boiler operation status	1=ON/0=OFF	0	1	1
1 0139	Bit	Sub 2 Boiler operation	Sub 2 Boiler operation status	1=ON/0=OFF	0	1	1
1 0140	Bit	Sub 3 Boiler operation	Sub 3 Boiler operation status	1=ON/0=OFF	0	1	1
1 0141	Bit	Sub 4 Boiler operation	Sub 4 Boiler operation status	1=ON/0=OFF	0	1	1
1 0142	Bit	Sub 5 Boiler operation	Sub 5 Boiler operation status	1=ON/0=OFF	0	1	1
1 0143	Bit	Sub 6 Boiler operation	Sub 6 Boiler operation status	1=ON/0=OFF	0	1	1
1 0144	Bit	Sub 7 Boiler operation	Sub 7 Boiler operation status	1=ON/0=OFF	0	1	1
1 0169	Bit	Main Boiler pump	Main Boiler pump status	1=ON/0=OFF	0	1	1
1 0170	Bit	Sub 1 Boiler pump	Sub 1 Boiler pump status	1=ON/0=OFF	0	1	1
1 0171	Bit	Sub 2 Boiler pump	Sub 2 Boiler pump status	1=ON/0=OFF	0	1	1
1 0172	Bit	Sub 3 Boiler pump	Sub 3 Boiler pump status	1=ON/0=OFF	0	1	1
1 0173	Bit	Sub 4 Boiler pump	Sub 4 Boiler pump status	1=ON/0=OFF	0	1	1
1 0174	Bit	Sub 5 Boiler pump	Sub 5 Boiler pump status	1=ON/0=OFF	0	1	1
1 0175	Bit	Sub 6 Boiler pump	Sub 6 Boiler pump status	1=ON/0=OFF	0	1	1
1 0176	Bit	Sub 7 Boiler pump	Sub 7 Boiler pump status	1=ON/0=OFF	0	1	1

Discretes Input - Cascade Individual's Units Information: Tables Based on Individual Units

Address	Contents
10201–10216	use same data as Main, change only the Address
10217–10232	
10233–10248	
.....	
10681–10696	
10697–10712	

Address	Data Type	Point Name	Description	Units	Min	Max	Resolution
1 0201	Bit	Main Boiler operation	Main Boiler operation status	1=ON/0=OFF	0	1	1
1 0202	Bit	Main Boiler Frozen protection mode	Main Boiler Frozen protection mode	1=ON/0=OFF	0	1	1
1 0206	Bit	Main Boiler Error	Main Boiler Error status	1=ON/0=OFF	0	1	1
1 0207	Bit	Main Boiler enable	Main Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0208	Bit	Main Boiler pump	Main Boiler pump status	1=ON/0=OFF	0	1	1
1 0217	Bit	Sub 1 Boiler operation	Sub 1 Boiler operation status	1=ON/0=OFF	0	1	1
1 0218	Bit	Sub 1 Boiler Frozen protection mode	Sub 1 Boiler Frozen protection mode	1=ON/0=OFF	0	1	1
1 0222	Bit	Sub 1 Boiler Error	Sub 1 Boiler Error status	1=ON/0=OFF	0	1	1
1 0223	Bit	Sub 1 Boiler enable	Sub 1 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0224	Bit	Sub 1 Boiler pump	Sub 1 Boiler pump status	1=ON/0=OFF	0	1	1
1 0233	Bit	Sub 2 Boiler operation	Sub 2 Boiler operation status	1=ON/0=OFF	0	1	1
1 0234	Bit	Sub 2 Boiler Frozen protection mode	Sub 2 Boiler Frozen protection mode	1=ON/0=OFF	0	1	1
1 0238	Bit	Sub 2 Boiler Error	Sub 2 Boiler Error status	1=ON/0=OFF	0	1	1
1 0239	Bit	Sub 2 Boiler enable	Sub 2 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0240	Bit	Sub 2 Boiler pump	Sub 2 Boiler pump status	1=ON/0=OFF	0	1	1
1 0249	Bit	Sub 3 Boiler operation	Sub 3 Boiler operation status	1=ON/0=OFF	0	1	1
1 0250	Bit	Sub 3 Boiler Frozen protection mode	Sub 3 Boiler Frozen protection mode	1=ON/0=OFF	0	1	1
1 0254	Bit	Sub 3 Boiler Error	Sub 3 Boiler Error status	1=ON/0=OFF	0	1	1
1 0255	Bit	Sub 3 Boiler enable	Sub 3 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1 0256	Bit	Sub 3 Boiler pump	Sub 3 Boiler pump status	1=ON/0=OFF	0	1	1
1 0265	Bit	Sub 4 Boiler operation	Sub 4 Boiler operation status	1=ON/0=OFF	0	1	1
1 0266	Bit	Sub 4 Boiler Frozen protection mode	Sub 4 Boiler Frozen protection mode	1=ON/0=OFF	0	1	1
1 0270	Bit	Sub 4 Boiler Error	Sub 4 Boiler Error status	1=ON/0=OFF	0	1	1
1 0271	Bit	Sub 4 Boiler enable	Sub 4 Boiler enable/stop status	1=ON/0=OFF	0	1	1

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
1	0272	Bit	Sub 4 Boiler pump	Sub 4 Boiler pump status	1=ON/0=OFF	0	1	1
1	0281	Bit	Sub 5 Boiler operation	Sub 5 Boiler operation status	1=ON/0=OFF	0	1	1
1	0282	Bit	Sub 5 Boiler Frozen protection mode	Sub 5 Boiler Frozen protection mode	1=ON/0=OFF	0	1	1
1	0286	Bit	Sub 5 Boiler Error	Sub 5 Boiler Error status	1=ON/0=OFF	0	1	1
1	0287	Bit	Sub 5 Boiler enable	Sub 5 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1	0288	Bit	Sub 5 Boiler pump	Sub 5 Boiler pump status	1=ON/0=OFF	0	1	1
1	0297	Bit	Sub 6 Boiler operation	Sub 6 Boiler operation status	1=ON/0=OFF	0	1	1
1	0298	Bit	Sub 6 Boiler Frozen protection mode	Sub 6 Boiler Frozen protection mode	1=ON/0=OFF	0	1	1
1	0302	Bit	Sub 6 Boiler Error	Sub 6 Boiler Error status	1=ON/0=OFF	0	1	1
1	0303	Bit	Sub 6 Boiler enable	Sub 6 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1	0304	Bit	Sub 6 Boiler pump	Sub 6 Boiler pump status	1=ON/0=OFF	0	1	1
1	0313	Bit	Sub 7 Boiler operation	Sub 7 Boiler operation status	1=ON/0=OFF	0	1	1
1	0314	Bit	Sub 7 Boiler Frozen protection mode	Sub 7 Boiler Frozen protection mode	1=ON/0=OFF	0	1	1
1	0318	Bit	Sub 7 Boiler Error	Sub 7 Boiler Error status	1=ON/0=OFF	0	1	1
1	0319	Bit	Sub 7 Boiler enable	Sub 7 Boiler enable/stop status	1=ON/0=OFF	0	1	1
1	0320	Bit	Sub 7 Boiler pump	Sub 7 Boiler pump status	1=ON/0=OFF	0	1	1

Input Registers - Single (Individual) Boiler

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0001	Word	Main Error code	Main Error code	None	0	999	1
3	0002	Word	Sub Error code	Sub Error code	None	0	99	1
3	0003	Word	Current Heat capacity	Heat capacity	%	0	100	0.1
3	0004	Word	Supply temperature	Supply temperature	°C	0	120	0.1
3	0005	Word	Return temperature	Return temperature	°C	0	120	0.1
3	0006	Word	System Supply temperature	System Supply temperature	°C	0	120	0.1
3	0007	Word	System Return temperature	System Return temperature	°C	0	120	0.1
3	0008	Word	Water pressure	Water pressure	PSI	0	80	1
3	0009	Word	Exhaust temperature	Exhaust temperature	°C	0	200	0.1
3	0010	Word	DHW Tank temperature	DHW Tank temperature	°C	0	100	0.1
3	0011	Word	Outdoor temperature	Outdoor temperature	°C	-20	40	0.1
3	0012	Word	Boiler operation	Boiler operation status	1=ON/0=OFF	0	1	1
3	0013	Word	Maximum Heat capacity	Maximum Heat capacity	BTU	0	65535	100
3	0014	Word	Total time of SH operation	Total time of SH operation	hours	0	65535	1

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0015	Word	Number of SH operation	Number of times SH operation was used	None	0	65535	10
3	0016	Word	Total time after installation	Total amount of time passed after installation	days	0	65535	1
3	0031	Word	Maximum outdoor temperature	Maximum Outdoor temperature in outdoor reset curve	°C	-20	40	0.5
3	0032	Word	Minimum outdoor temperature	Minimum Outdoor temperature in outdoor reset curve	°C	-20	40	0.5
3	0033	Word	SH supply minimum temperature	SH supply minimum temperature	°C	20	90	0.5
3	0034	Word	SH supply maximum temperature	SH supply maximum temperature	°C	20	90	0.5
3	0035	Word	SH return minimum temperature	SH return minimum temperature	°C	20	70	0.5
3	0036	Word	SH return maximum temperature	SH return maximum temperature	°C	20	70	0.5
3	0037	Word	DHW minimum temperature	DHW minimum temperature	°C	30	70	0.5
3	0038	Word	DHW maximum temperature	DHW maximum temperature	°C	30	70	0.5
3	0039	Word	SH control method	SH control method 0 : supply control 1 : return control 2 ; system supply control 3 : system return control	None	0	3	1
3	0040	Word	DHW control method	DHW control method 0 : supply control 1 : system supply control	None	0	1	1
3	0042	Word	Gas type	Gas type 0 : NG 1 : LPG	None	0	99	1
3	0045	Word	Current amount of gas	Current amount of gas used	BTU	0	65535	100
3	0046	Dword	Total amount of gas	Total amount of gas used - high word	Liter	0	max	100
3	0047			Total amount of gas used - low word				

Input Registers - Cascade Mode's Total Information by Main Unit

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0066	Word	Cascade total units	Cascade total units	None	0	32	1
3	0067	Word	Cascade Operating units	Cascade Operating units	None	0	32	1
3	0068	Dword	Cascade On/Off state	Cascade On/Off state - high word	None	0	max	1
3	0069			Cascade On/Off state - low word				
3	0070	Word	Cascade Average Heating capacity	Cascade Average Heating capacity	%	0	100	0.5

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0071	Word	Cascade Maximum Heating capacity	cascade Maximum Heating capacity	BTU	0	65535	1000
3	0072	Word	Primary total flow	Primary total flow	Liter	0	65535	1
3	0073	Word	Average primary Supply temperature	Average primary Supply temperature	°C	0	120	0.1
3	0074	Word	Average primary return temperature	Average primary return temperature	°C	0	120	0.1
3	0075	Word	System Supply temperature	System Supply temperature	°C	0	120	0.1
3	0076	Word	System Return temperature	System Return temperature	°C	0	120	0.1
3	0077	Word	Error occurrence unit number	Error occurrence unit number	None	0	32	1
3	0078	Word	Error code	Error code	None	0	999	1
3	0086	Word	DHW Tank temperature	DHW Tank temperature	°C	0	100	0.1

Discretes Input - Cascade Individual's Units Information: Tables Based on Individual Data's

Address	Contents
30101-30356	Address for 8 data in cascade mode

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0133	Word	Main Boiler Error Code	Main Boiler Error Code	None	0	999	1
3	0134	Word	Sub 1 Boiler Error Code	Sub 1 Boiler Error Code	None	0	999	1
3	0135	Word	Sub 2 Boiler Error Code	Sub 2 Boiler Error Code	None	0	999	1
3	0136	Word	Sub 3 Boiler Error Code	Sub 3 Boiler Error Code	None	0	999	1
3	0137	Word	Sub 4 Boiler Error Code	Sub 4 Boiler Error Code	None	0	999	1
3	0138	Word	Sub 5 Boiler Error Code	Sub 5 Boiler Error Code	None	0	999	1
3	0139	Word	Sub 6 Boiler Error Code	Sub 6 Boiler Error Code	None	0	999	1
3	0140	Word	Sub 7 Boiler Error Code	Sub 7 Boiler Error Code	None	0	999	1
3	0165	Word	Main Boiler Current Heat Capacity	Main Boiler Current Heat Capacity	%	0	100	0.1
3	0166	Word	Sub 1 Boiler Current Heat Capacity	Sub 1 Boiler Current Heat Capacity	%	0	100	0.1
3	0167	Word	Sub 2 Boiler Current Heat Capacity	Sub 2 Boiler Current Heat Capacity	%	0	100	0.1
3	0168	Word	Sub 3 Boiler Current Heat Capacity	Sub 3 Boiler Current Heat Capacity	%	0	100	0.1
3	0169	Word	Sub 4 Boiler Current Heat Capacity	Sub 4 Boiler Current Heat Capacity	%	0	100	0.1
3	0170	Word	Sub 5 Boiler Current Heat Capacity	Sub 5 Boiler Current Heat Capacity	%	0	100	0.1

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0171	Word	Sub 6 Boiler Current Heat Capacity	Sub 6 Boiler Current Heat Capacity	%	0	100	0.1
3	0172	Word	Sub 7 Boiler Current Heat Capacity	Sub 7 Boiler Current Heat Capacity	%	0	100	0.1
3	0197	Word	Main Boiler supply temperature	Main Boiler supply temperature	°C	0	120	0.1
3	0198	Word	Sub 1 Boiler supply temperature	Sub 1 Boiler supply temperature	°C	0	120	0.1
3	0199	Word	Sub 2 Boiler supply temperature	Sub 2 Boiler supply temperature	°C	0	120	0.1
3	0200	Word	Sub 3 Boiler supply temperature	Sub 3 Boiler supply temperature	°C	0	120	0.1
3	0201	Word	Sub 4 Boiler supply temperature	Sub 4 Boiler supply temperature	°C	0	120	0.1
3	0202	Word	Sub 5 Boiler supply temperature	Sub 5 Boiler supply temperature	°C	0	120	0.1
3	0203	Word	Sub 6 Boiler supply temperature	Sub 6 Boiler supply temperature	°C	0	120	0.1
3	0204	Word	Sub 7 Boiler supply temperature	Sub 7 Boiler supply temperature	°C	0	120	0.1
3	0229	Word	Main Boiler return temperature	Main Boiler return temperature	°C	0	120	0.1
3	0230	Word	Sub 1 Boiler return temperature	Sub 1 Boiler return temperature	°C	0	120	0.1
3	0231	Word	Sub 2 Boiler return temperature	Sub 2 Boiler return temperature	°C	0	120	0.1
3	0232	Word	Sub 3 Boiler return temperature	Sub 3 Boiler return temperature	°C	0	120	0.1
3	0233	Word	Sub 4 Boiler return temperature	Sub 4 Boiler return temperature	°C	0	120	0.1
3	0234	Word	Sub 5 Boiler return temperature	Sub 5 Boiler return temperature	°C	0	120	0.1
3	0235	Word	Sub 6 Boiler return temperature	Sub 6 Boiler return temperature	°C	0	120	0.1
3	0236	Word	Sub 7 Boiler return temperature	Sub 7 Boiler return temperature	°C	0	120	0.1
3	0293	Word	Main Boiler Total time of SH operation	Main Boiler Total time of SH operation	hours	0	65535	1
3	0294	Word	Sub 1 Boiler Total time of SH operation	Sub 1 Boiler Total time of SH operation	hours	0	65535	1
3	0295	Word	Sub 2 Boiler Total time of SH operation	Sub 2 Boiler Total time of SH operation	hours	0	65535	1
3	0296	Word	Sub 3 Boiler Total time of SH operation	Sub 3 Boiler Total time of SH operation	hours	0	65535	1

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0297	Word	Sub 4 Boiler Total time of SH operation	Sub 4 Boiler Total time of SH operation	hours	0	65535	1
3	0298	Word	Sub 5 Boiler Total time of SH operation	Sub 5 Boiler Total time of SH operation	hours	0	65535	1
3	0299	Word	Sub 6 Boiler Total time of SH operation	Sub 6 Boiler Total time of SH operation	hours	0	65535	1
3	0300	Word	Sub 7 Boiler Total time of SH operation	Sub 7 Boiler Total time of SH operation	hours	0	65535	1

Input Registers - Cascade Mode Individual's Units Information: Tables Based on Individual Units

Address	Contents
30401–30422	use same data as Main, change only the Address
30423–30444	
30445–30466	
.....	
31061–31082	
31083–31104	

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0401	Word	Main Boiler operation	Main Boiler operation status	1=ON/0=OFF	0	1	1
3	0402	Word	Main Boiler Error code	Main Boiler Error code	None	0	999	1
3	0404	Word	Main Boiler Current Heat capacity	Main Boiler Heat capacity	%	0	100	0.1
3	0405	Word	Main Boiler Supply temperature	Main Boiler Supply temperature	°C	0	120	0.1
3	0406	Word	Main Boiler Return temperature	Main Boiler Return temperature	°C	0	120	0.1
3	0407	Word	Main Boiler Water pressure	Main Boiler Water pressure	PSI	0	80	1
3	0408	Word	Main Boiler Maximum Heat capacity	Main Boiler Maximum Heat capacity	BTU	0	65535	100
3	0409	Word	Main Boiler Exhaust temperature	Main Boiler Exhaust temperature	°C	0	200	0.1
3	0410	Word	Main Boiler Total time after installation	Main Boiler Total amount of time passed after installation	days	0	65535	1
3	0411	Word	Main Boiler Number of SH operation	Main Boiler Number of times SH operation was used	None	0	65535	10
3	0412	Word	Main Boiler Total time of SH operation	Main Boiler Total time of SH operation	hours	0	65535	1
3	0413	Word	Main Boiler Current amount of gas	Main Boiler Current amount of gas used	BTU	0	65535	100

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0414	Dword	Main Boiler Total amount of gas	Main Boiler Total amount of gas used - high word	Liter	0	max	100
3	0415			Main Boiler Total amount of gas used - low word				
3	0423	Word	Sub 1 Boiler operation	Sub 1 Boiler operation status	1=ON/0=OFF	0	1	1
3	0424	Word	Sub 1 Boiler Error code	Sub 1 Boiler Error code	None	0	999	1
3	0426	Word	Sub 1 Boiler Current Heat capacity	Sub 1 Boiler Heat capacity	%	0	100	0.1
3	0427	Word	Sub 1 Boiler Supply temperature	Sub 1 Boiler Supply temperature	°C	0	120	0.1
3	0428	Word	Sub 1 Boiler Return temperature	Sub 1 Boiler Return temperature	°C	0	120	0.1
3	0430	Word	Sub 1 Boiler Maximum Heat capacity	Sub 1 Boiler Maximum Heat capacity	BTU	0	65535	100
3	0431	Word	Sub 1 Boiler Exhaust temperature	Sub 1 Boiler Exhaust temperature	°C	0	200	0.1
3	0432	Word	Sub 1 Boiler Total time after installation	Sub 1 Boiler Total amount of time passed after installation	days	0	65535	1
3	0433	Word	Sub 1 Boiler Number of SH operation	Sub 1 Boiler Number of times SH operation was used	None	0	65535	10
3	0434	Word	Sub 1 Boiler Total time of SH operation	Sub 1 Boiler Total time of SH operation	hours	0	65535	1
3	0435	Word	Sub 1 Boiler Current amount of gas	Sub 1 Boiler Current amount of gas used	BTU	0	65535	100
3	0436	Dword	Sub 1 Boiler Total amount of gas	Sub 1 Boiler Total amount of gas used - high word	Liter	0	max	100
3	0437			Sub 1 Boiler Total amount of gas used - low word				
3	0445	Word	Sub 2 Boiler operation	Sub 2 Boiler operation status	1=ON/0=OFF	0	1	1
3	0446	Word	Sub 2 Boiler Error code	Sub 2 Boiler Error code	None	0	999	1
3	0448	Word	Sub 2 Boiler Current Heat capacity	Sub 2 Boiler Heat capacity	%	0	100	0.1
3	0449	Word	Sub 2 Boiler Supply temperature	Sub 2 Boiler Supply temperature	°C	0	120	0.1
3	0450	Word	Sub 2 Boiler Return temperature	Sub 2 Boiler Return temperature	°C	0	120	0.1
3	0452	Word	Sub 2 Boiler Maximum Heat capacity	Sub 2 Boiler Maximum Heat capacity	BTU	0	65535	100
3	0453	Word	Sub 2 Boiler Exhaust temperature	Sub 2 Boiler Exhaust temperature	°C	0	200	0.1
3	0454	Word	Sub 2 Boiler Total time after installation	Sub 2 Boiler Total amount of time passed after installation	days	0	65535	1
3	0455	Word	Sub 2 Boiler Number of SH operation	Sub 2 Boiler Number of times SH operation was used	None	0	65535	10

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0456	Word	Sub 2 Boiler Total time of SH operation	Sub 2 Boiler Total time of SH operation	hours	0	65535	1
3	0457	Word	Sub 2 Boiler Current amount of gas	Sub 2 Boiler Current amount of gas used	BTU	0	65535	1
3	0458	Dword	Sub 2 Boiler Total amount of gas	Sub 2 Boiler Total amount of gas used - high word	Liter	0	max	100
3	0459			Sub 2 Boiler Total amount of gas used - low word				
3	0467	Word	Sub 3 Boiler operation	Sub 3 Boiler operation status	1=ON/0=OFF	0	1	1
3	0468	Word	Sub 3 Boiler Error code	Sub 3 Boiler Error code	None	0	999	1
3	0470	Word	Sub 3 Boiler Current Heat capacity	Sub 3 Boiler Heat capacity	%	0	100	0.1
3	0471	Word	Sub 3 Boiler Supply temperature	Sub 3 Boiler Supply temperature	°C	0	120	0.1
3	0472	Word	Sub 3 Boiler Return temperature	Sub 3 Boiler Return temperature	°C	0	120	0.1
3	0474	Word	Sub 3 Boiler Maximum Heat capacity	Sub 3 Boiler Maximum Heat capacity	BTU	0	65535	100
3	0475	Word	Sub 3 Boiler Exhaust temperature	Sub 3 Boiler Exhaust temperature	°C	0	200	0.1
3	0476	Word	Sub 3 Boiler Total time after installation	Sub 3 Boiler Total amount of time passed after installation	days	0	65535	1
3	0477	Word	Sub 3 Boiler Number of SH operation	Sub 3 Boiler Number of times SH operation was used	None	0	65535	10
3	0478	Word	Sub 3 Boiler Total time of SH operation	Sub 3 Boiler Total time of SH operation	hours	0	65535	1
3	0479	Word	Sub 3 Boiler Current amount of gas	Sub 3 Boiler Current amount of gas used	BTU	0	65535	1
3	0480	Dword	Sub 3 Boiler Total amount of gas	Sub 3 Boiler Total amount of gas used - high word	Liter	0	max	100
3	0481			Sub 3 Boiler Total amount of gas used - low word				
3	0489	Word	Sub 4 Boiler operation	Sub 4 Boiler operation status	1=ON/0=OFF	0	1	1
3	0490	Word	Sub 4 Boiler Error code	Sub 4 Boiler Error code	None	0	999	1
3	0492	Word	Sub 4 Boiler Current Heat capacity	Sub 4 Boiler Heat capacity	%	0	100	0.1
3	0493	Word	Sub 4 Boiler Supply temperature	Sub 4 Boiler Supply temperature	°C	0	120	0.1
3	0494	Word	Sub 4 Boiler Return temperature	Sub 4 Boiler Return temperature	°C	0	120	0.1
3	0496	Word	Sub 4 Boiler Maximum Heat capacity	Sub 4 Boiler Maximum Heat capacity	BTU	0	65535	100
3	0497	Word	Sub 4 Boiler Exhaust temperature	Sub 4 Boiler Exhaust temperature	°C	0	200	0.1

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0498	Word	Sub 4 Boiler Total time after installation	Sub 4 Boiler Total amount of time passed after installation	days	0	65535	1
3	0499	Word	Sub 4 Boiler Number of SH operation	Sub 4 Boiler Number of times SH operation was used	None	0	65535	10
3	0500	Word	Sub 4 Boiler Total time of SH operation	Sub 4 Boiler Total time of SH operation	hours	0	65535	1
3	0501	Word	Sub 4 Boiler Current amount of gas	Sub 4 Boiler Current amount of gas used	BTU	0	65535	1
3	0502	Dword	Sub 4 Boiler Total amount of gas	Sub 4 Boiler Total amount of gas used - high word	Liter	0	max	100
3	0503			Sub 4 Boiler Total amount of gas used - low word				
3	0511	Word	Sub 5 Boiler operation	Sub 5 Boiler operation status	1=ON/0=OFF	0	1	1
3	0512	Word	Sub 5 Boiler Error code	Sub 5 Boiler Error code	None	0	999	1
3	0514	Word	Sub 5 Boiler Current Heat capacity	Sub 5 Boiler Heat capacity	%	0	100	0.1
3	0515	Word	Sub 5 Boiler Supply temperature	Sub 5 Boiler Supply temperature	°C	0	120	0.1
3	0516	Word	Sub 5 Boiler Return temperature	Sub 5 Boiler Return temperature	°C	0	120	0.1
3	0518	Word	Sub 5 Boiler Maximum Heat capacity	Sub 5 Boiler Maximum Heat capacity	BTU	0	65535	100
3	0519	Word	Sub 5 Boiler Exhaust temperature	Sub 5 Boiler Exhaust temperature	°C	0	200	0.1
3	0520	Word	Sub 5 Boiler Total time after installation	Sub 5 Boiler Total amount of time passed after installation	days	0	65535	1
3	0521	Word	Sub 5 Boiler Number of SH operation	Sub 5 Boiler Number of times SH operation was used	None	0	65535	10
3	0522	Word	Sub 5 Boiler Total time of SH operation	Sub 5 Boiler Total time of SH operation	hours	0	65535	1
3	0523	Word	Sub 5 Boiler Current amount of gas	Sub 5 Boiler Current amount of gas used	BTU	0	65535	1
3	0524	Dword	Sub 5 Boiler Total amount of gas	Sub 5 Boiler Total amount of gas used - high word	Liter	0	max	100
3	0525			Sub 5 Boiler Total amount of gas used - low word				
3	0533	Word	Sub 6 Boiler operation	Sub 6 Boiler operation status	1=ON/0=OFF	0	1	1
3	0534	Word	Sub 6 Boiler Error code	Sub 6 Boiler Error code	None	0	999	1
3	0536	Word	Sub 6 Boiler Current Heat capacity	Sub 6 Boiler Heat capacity	%	0	100	0.1
3	0537	Word	Sub 6 Boiler Supply temperature	Sub 6 Boiler Supply temperature	°C	0	120	0.1
3	0538	Word	Sub 6 Boiler Return temperature	Sub 6 Boiler Return temperature	°C	0	120	0.1

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
3	0540	Word	Sub 6 Boiler Maximum Heat capacity	Sub 6 Boiler Maximum Heat capacity	BTU	0	65535	100
3	0541	Word	Sub 6 Boiler Exhaust temperature	Sub 6 Boiler Exhaust temperature	°C	0	200	0.1
3	0542	Word	Sub 6 Boiler Total time after installation	Sub 6 Boiler Total amount of time passed after installation	days	0	65535	1
3	0543	Word	Sub 6 Boiler Number of SH operation	Sub 6 Boiler Number of times SH operation was used	None	0	65535	10
3	0544	Word	Sub 6 Boiler Total time of SH operation	Sub 6 Boiler Total time of SH operation	hours	0	65535	1
3	0545	Word	Sub 6 Boiler Current amount of gas	Sub 6 Boiler Current amount of gas used	BTU	0	65535	1
3	0546	Word	Sub 6 Boiler Total amount of gas	Sub 6 Boiler Total amount of gas used - high word	Liter	0	max	100
3	0547	Word		Sub 6 Boiler Total amount of gas used - low word				
3	0555	Word	Sub 7 Boiler operation	Sub 7 Boiler operation status	1=ON/0=OFF	0	1	1
3	0556	Word	Sub 7 Boiler Error code	Sub 7 Boiler Error code	None	0	999	1
3	0558	Word	Sub 7 Boiler Current Heat capacity	Sub 7 Boiler Heat capacity	%	0	100	0.1
3	0559	Word	Sub 7 Boiler Supply temperature	Sub 7 Boiler Supply temperature	°C	0	120	0.1
3	0560	Word	Sub 7 Boiler Return temperature	Sub 7 Boiler Return temperature	°C	0	120	0.1
3	0562	Word	Sub 7 Boiler Maximum Heat capacity	Sub 7 Boiler Maximum Heat capacity	BTU	0	65535	100
3	0563	Word	Sub 7 Boiler Exhaust temperature	Sub 7 Boiler Exhaust temperature	°C	0	200	0.1
3	0564	Word	Sub 7 Boiler Total time after installation	Sub 7 Boiler Total amount of time passed after installation	days	0	65535	1
3	0565	Word	Sub 7 Boiler Number of SH operation	Sub 7 Boiler Number of times SH operation was used	None	0	65535	10
3	0566	Word	Sub 7 Boiler Total time of SH operation	Sub 7 Boiler Total time of SH operation	hours	0	65535	1
3	0567	Word	Sub 7 Boiler Current amount of gas	Sub 7 Boiler Current amount of gas used	BTU	0	65535	1
3	0568	Dword	Sub 7 Boiler Total amount of gas	Sub 7 Boiler Total amount of gas used - high word	Liter	0	max	100
3	0569			Sub 7 Boiler Total amount of gas used - low word				

Holding Registers - Boiler Control (Single/Cascade Mode)

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
4	0001	Word	Boiler On/Off command	Boiler operation On/Off command (single/Cascade common use)	1=ON/0=OFF	0	1	1
4	0002	Word	SH supply setpoint setting	Boiler Space heating supply setpoint setting (single/Cascade common use). - Applied when SH control method(address 30039) data is 0(supply control) or 2(system supply control). - Used in set temperature for cascade mode.	°C	20	90	0.5
4	0003	Word	SH return setpoint setting	Boiler Space heating return setpoint setting (single/Cascade common use). Applied when SH control method(address 30039) data is 1(return control) or 3(system return control).	°C	20	90	0.5
4	0004	Word	DHW setpoint setting	DHW setpoint setting	°C	30	85	0.1
4	0005	Word	Error reset command	Error reset command (single/Cascade common use)	1=ON/0=OFF	0	1	1
4	0007	Word	Boiler setpoint in DHW operation	Boiler setpoint setting in DHW operation	°C	20	90	1
4	0009	Word	Outdoor reset curve heatload setting	Outdoor reset curve heatload decision 1 : Finned Tube Baseboard 2 : Fan Coil 3 : Cast Iron Baseboard 4 : Low Mass Radiant 5 : High Mass Radiant 6 : Radiators 7 : Custom	None	1	7	1
4	0010	Word	Maximum outdoor temperature setting	Maximum Outdoor temperature in outdoor reset curve The difference between the minimum value and 5°C should be maintained.	°C	-20	40	0.5
4	0011	Word	Minimum outdoor temperature setting	Minimum Outdoor temperature in outdoor reset curve The difference between the maximum value and 5°C should be maintained.	°C	-20	40	0.5
4	0012	Word	WWSD temperature setting	Warm weather shutdown temperature	°C	10	20	1
4	0013	Word	WWSD On differential setting	WWSD On differential setting	°C	0	20	1
4	0014	Word	Boost interval time setting	Boost interval time status	minute	0	120	1

Address		Data Type	Point Name	Description	Units	Min	Max	Resolution
4	0015	Word	Cascade Initial operation units setting	when using Cascade, number of initial operation units setting	None	0	32	1
4	0016	Word	SH supply minimum temperature setting	SH supply minimum temperature setting - This is the minimum setting range of the SH supply setpoint setting(address 40002). - The difference between the maximum value and 20°C should be maintained.	°C	20	90	0.5
4	0017	Word	SH supply maximum temperature setting	SH supply maximum temperature setting - This is the maximum setting range of the SH supply setpoint setting(address 40002). - The difference between the minimum value and 20°C should be maintained.	°C	20	90	0.5
4	0018	Word	SH return minimum temperature setting	SH return minimum temperature setting - This is the minimum setting range of the SH return setpoint setting(address 40003). - The difference between the maximum value and 10°C should be maintained.	°C	20	70	0.5
4	0019	Word	SH return maximum temperature setting	SH return maximum temperature setting - This is the maximum setting range of the SH return setpoint setting(address 40003). - The difference between the minimum value and 10°C should be maintained.	°C	20	70	0.5
4	0020	Word	System date (Year)	System date (Year)	year	2018	2099	1
4	0021	Word	System date (Month)	System date (Month)	month	1	12	1
4	0022	Word	System date (Day)	System date (Day)	day	1	31	1
4	0023	Word	System time (Hours)	System time (Hours)	hour	0	24	1
4	0024	Word	System time (Minutes)	System time (Minutes)	minute	0	60	1

Installation & Operation Manual

Modbus RTU

Getting Service

If your product requires service, you have several options for getting service:

- Contact Technical Support at 1-800-519-8794 or on the website: www.navien.com.
- For warranty service, always contact Technical Support first.
- Contact the technician or professional who installed your boiler.
- Contact a licensed professional for the affected system (for example, a plumber or electrician).

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