

Communication

DDR Part Number:

704501

DDR OT/BACIP Gateway

Communication Gateway
for OpenTherm to BACnet IP

Document Applicable to:

DIN Rail Mount 704501

Applicable Controls:

DDR Boiler Controls for MCA Pro /
C230 ECO-A and Gas 310 ECO Series



Technical, Installation and Configuration Information

Cautionary Statement

The information presented in this document is
only to be used by those familiar with its
application and use.



C US LR 102874

IMPORTANT

Read and save these instructions for
future reference

About these instructions

Warning

Before you operate this boiler, read this manual carefully and take extra precautions to all safety and warning symbols or important items. The operating manual is part of the documentation along with the boiler. The installer is required to explain your heating system and boiler operating instructions.

Notice

Please read this manual and retain for future reference. Improper installation, adjustment, alteration, service or maintenance can cause injury, loss of life or property damage. Refer to this manual for assistance or additional information or consult a qualified installer, service agency or the gas supplier.

Caution danger

Risk of injury and damage to equipment. Attention must be paid to the warnings on safety of persons and equipment.



Reference

Refer to another manual or other pages in this instruction manual.

Specific information

Information must be kept in mind to maintain comfort.

Trademark Information

OpenTherm® is a trademark of the OpenTherm Association.

For more information, please visit:
www.opentherm.eu



BACnet® is a registered trademark of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle NE, Atlanta, GA 30329.

For more information please visit:
www.bacnet.org
www.ashrae.org

Important Regulatory and Installation Requirements

Codes

The installation of this unit must be in accordance with local codes.

→ Please carefully read this manual prior to attempting installation. Any warranty is null and void if these instructions are not followed.

All electrical wiring is to be done in accordance with the latest edition of CSA C22.1 Part 1 and/or local codes. In the U.S. use the National Electrical Code ANSI/NFPA 70.

→ The completeness and functionality of field supplied electrical controls and components must be verified by those installing the device

The installing contractor must comply with the Standard of Controls and Safety Devices for Automatically fired Boilers, ANSI/ASME CSD-1 where required by the authority having jurisdiction.



Warning

More than one live circuit. See wiring diagram in this manual. Turn off power supply to control and damper/blower before servicing. Contact with live electrical components can result in serious injury or death.

Working on the equipment

The installation, adjustment, service and maintenance of this unit must be done by a licensed professional heating contractor or persons who are qualified and experienced in the installation, service, and maintenance of similar products. There are no user serviceable parts on this control.

Power supply

Install power supply in accordance with the regulation of the authorities having jurisdiction or in absence of such requirements, in accordance with National Codes.

Purpose of Device and Operation

The DDR OT/BACIP Gateway provides a communication translation between OT enabled boilers and BACnet enabled BMS systems.

The DDR OT/BACIP Gateway may be either part of a control panel or stand-alone control device.

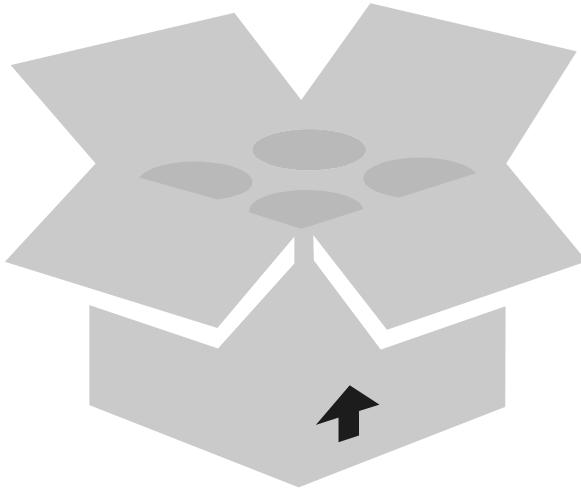
DDR OT/BACIP Gateway505

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Control Information**Section 2.0**

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C230 ECO-A Gateway Installation Steps	9
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What's in the box**Unboxing the Control**

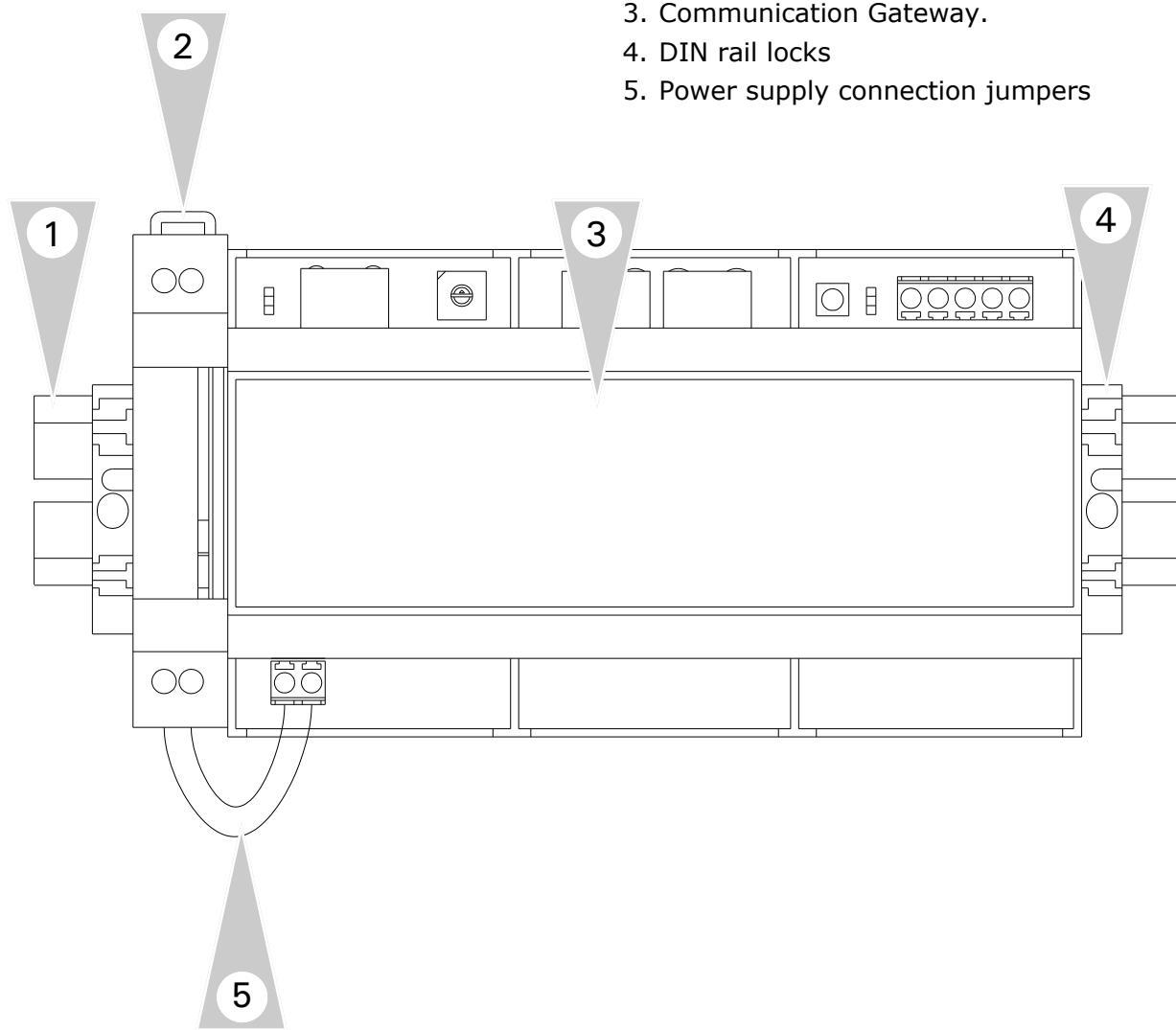
In the box, you will find the following:

Qty.	Description
1	Communication Gateway (on DIN rail)
1	Gateway power supply (on DIN rail)
2	End stops (on DIN rail)
1	OT Interconnection cable
1	Gas C230 wiring harness
1	Gas C310 wiring harness
2	M5x8 Machine screws (DIN Rail)
2	M5 Lock nut (DIN Rail)
2	Power supply interconnection wires
1	DIN Rail (Gateway and Power supply mounted)
1	Installation manual

Installation

Information

1. DIN rail for mounting of gateway and power supply.
2. Gateway power supply.
3. Communication Gateway.
4. DIN rail locks
5. Power supply connection jumpers

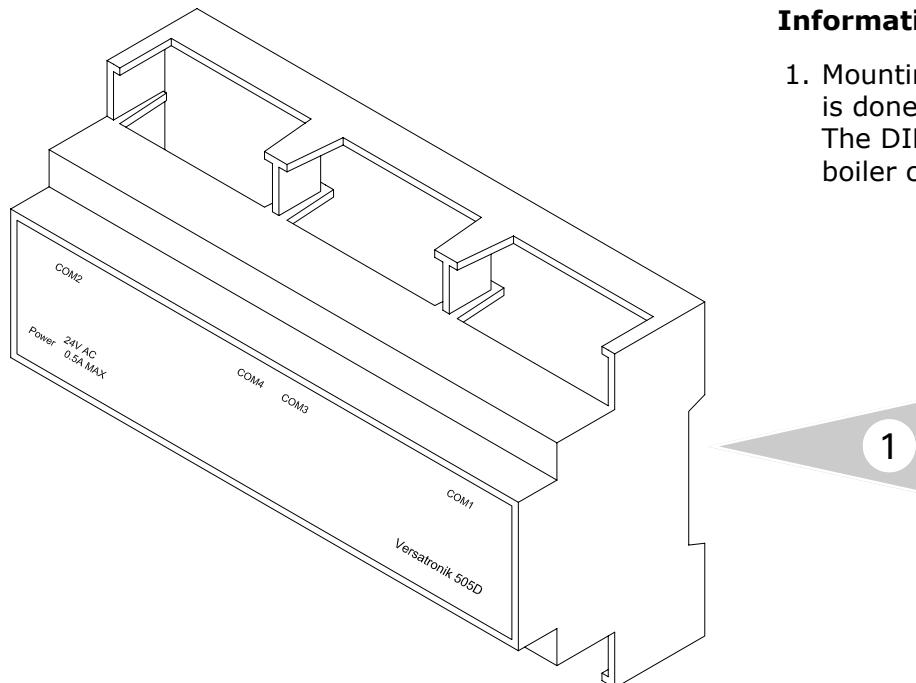


Warning

When extending wire there is the possibility of exposure to electromagnetic interference. Avoid running wires beside or near high voltage 120/240 VAC conductors. If proximity to high voltage conductors cannot be avoided, use stranded, twisted pair of shield design wire. Ensure that only one end of the shielding is grounded.

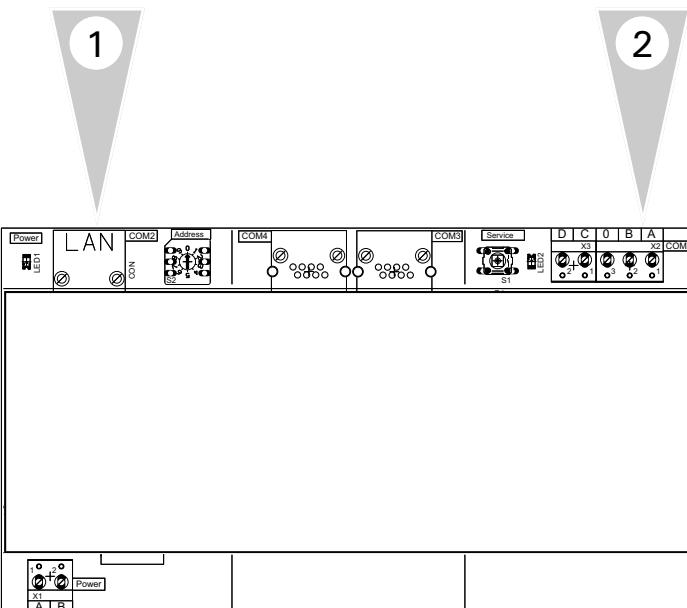
Installation (Applicable to Field Retrofit Only)

DDR OT/BACIP Gateway Overview—24VAC DIN Rail Unit



Information

1. Mounting of the DDR OT/BACIP Gateway is done by utilizing the supplied DIN rail. The DIN rail is mounted inside of the boiler control specific to the application.



Connection Overview

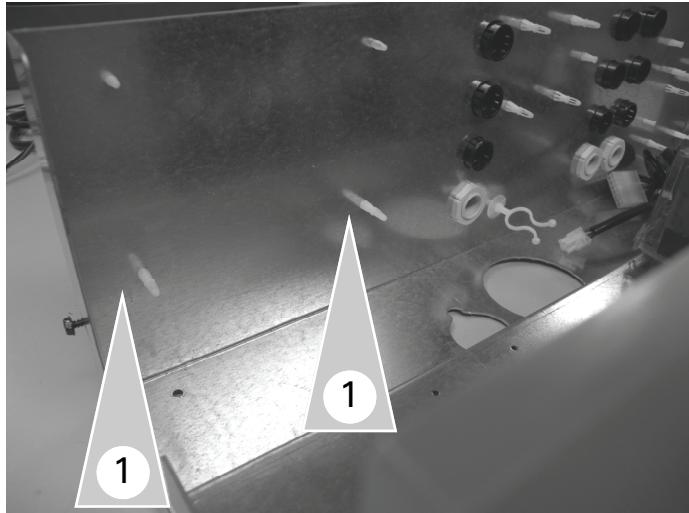
1. BACnet IP RJ45 connection
2. OT connection terminals A and B
3. Power Connections to power supply



Warning

When extending wire there is the possibility of exposure to electromagnetic interference. Avoid running wires beside or near high voltage 120/240 VAC conductors. If proximity to high voltage conductors cannot be avoided, use stranded, twisted pair of shield design wire. Ensure that only one end of the shielding is grounded.

Installation Overview C230 ECO-A



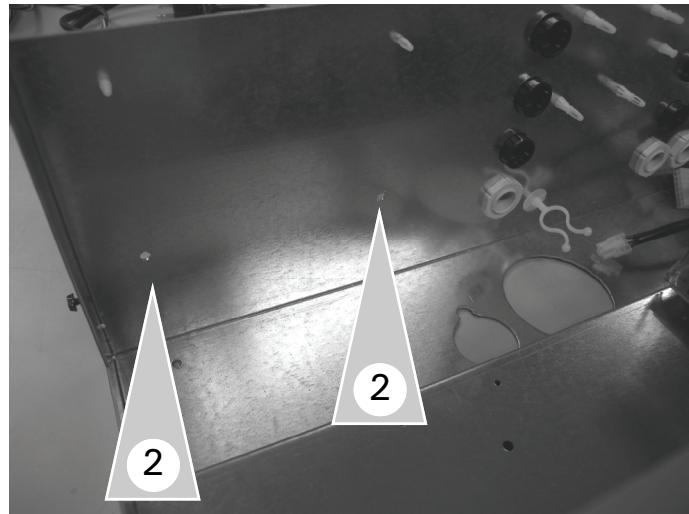
Information

With the cover removed from the boiler control and the power turned off, follow the proceeding steps.

1. On the rear wall of the boiler control, locate lower nylon stand-offs. Remove these two stand-offs by either pressing out towards the back of the control or cut with side-cutters.
2. With the two stand-offs removed, enlarge the holes with 3/16" drill bit to allow for the M5 screws which fasten the DIN rail to the control housing. WATCH FOR METAL SHAVINGS.

Note:

Remove gateway and power supply from DIN rail. Release the fastening tabs to allow DIN rail to be separated from housings. The end sections do not need to be removed from DIN rail.

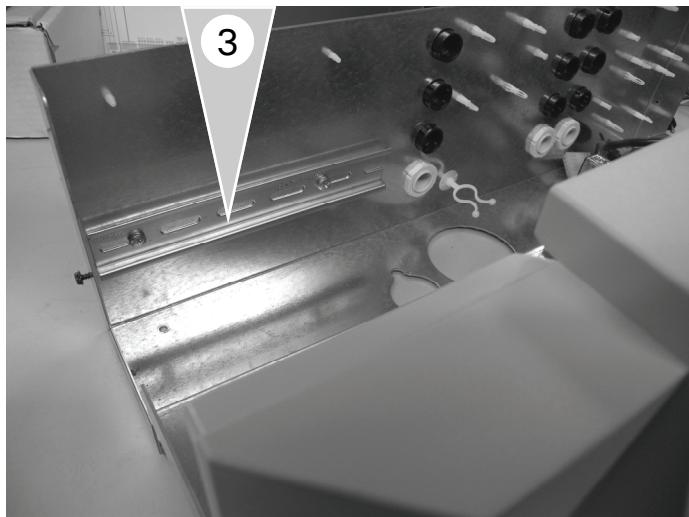


3. With the holes enlarged, insert the M5 screws through the DIN rail out towards the back of the control and tighten with supplied M5 lock nut.

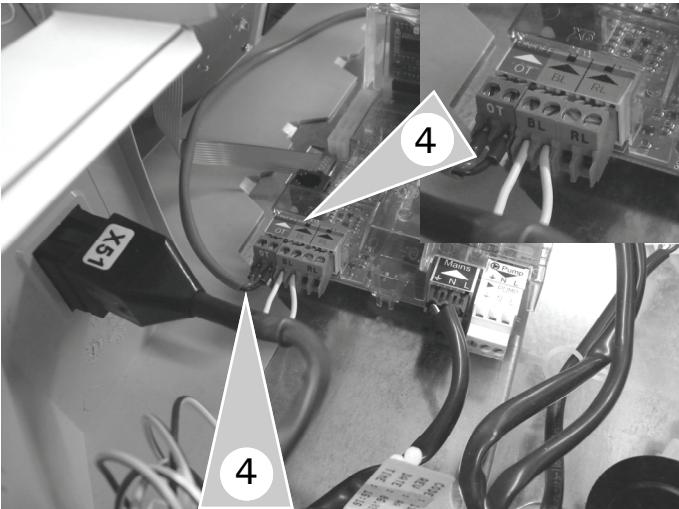
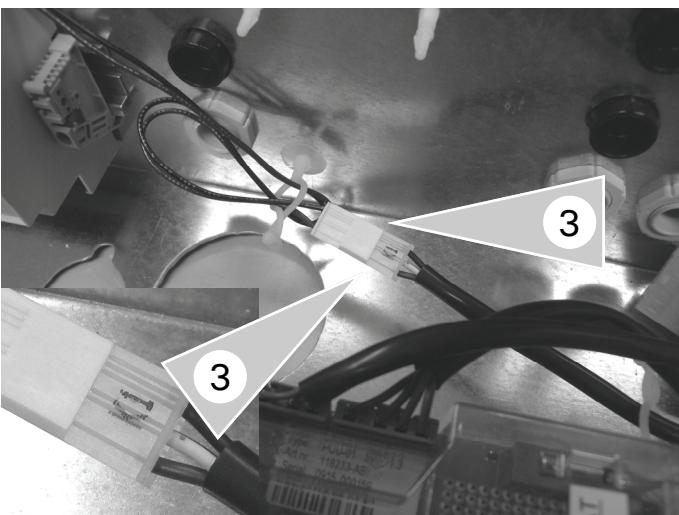
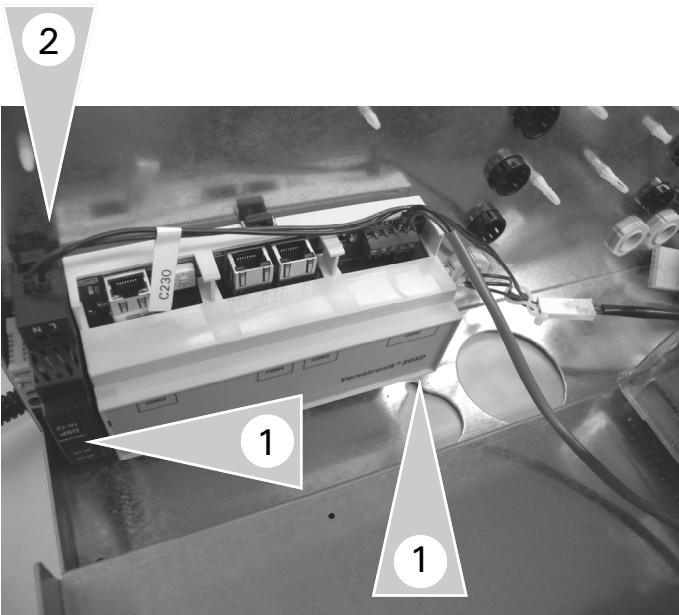


Caution

Ensure that boiler control power is turned off before performing any work inside of control.



Installation Overview C230 ECO-A



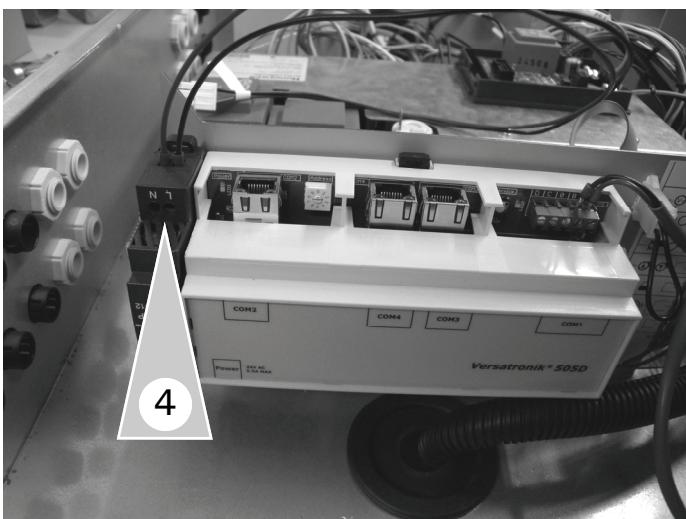
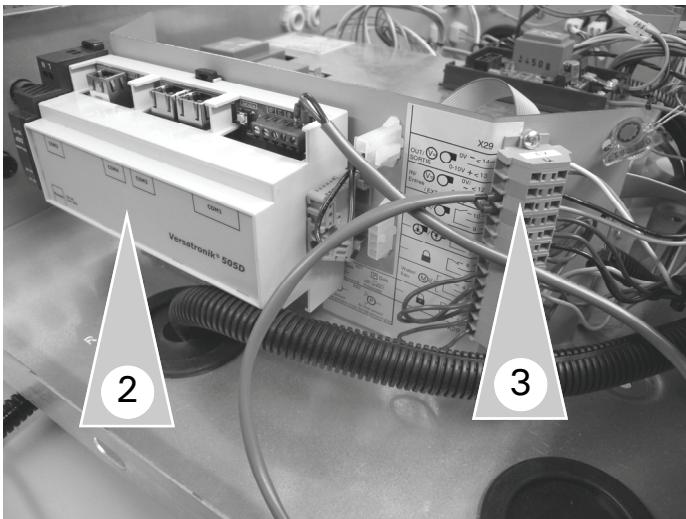
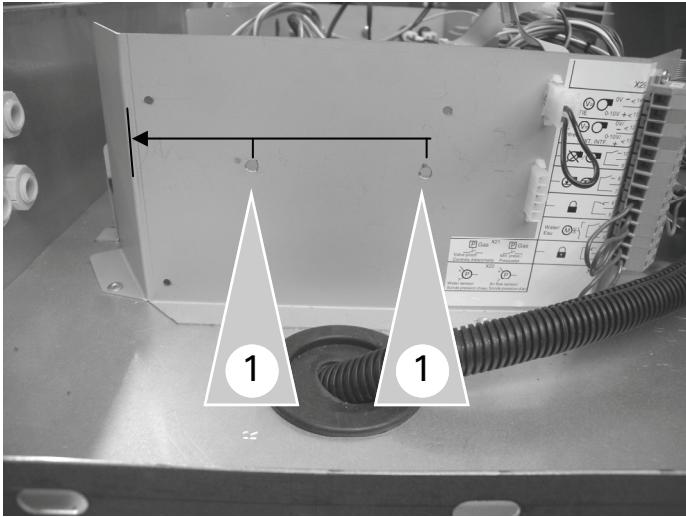
Information

With the DIN rail mounted on the rear wall of the boiler control, follow the proceeding steps.

1. Mount the gateway and power supply onto the mounted DIN rail by positioning the bottom DIN rail hooks at the bottom of the DIN rail. Tilt both units upwards and ensure upper clip hold devices to DIN rail.
2. Locate the harness with the 230 label. Insert black wire into the L terminal of the power supply. Insert the blue wire into the N terminal of the power supply. Tighten both terminals of the power supply.
3. Locate the K1 plug harness from within the control. Plug in the harness installed in the previous step to the K1 plug.
4. Wire the OT communications harness into the green OT plug. Plug can be removed by unplugging from control. Insert wires and tighten terminal screws. Not polarity sensitive.

Once all of the connections have been verified, the power switch of the control can now be turned on to perform the communication testing of the gateway. With the BMS plug-in connection to the gateway complete, it should be possible to start reading information from the boiler control.

Installation Overview Gas 310 ECO



Information

With the cover removed from the boiler control and the power turned off, follow the proceeding steps.

1. Using a 3/16 drill bit, make two mounting holes approximately 5.5cm (2 1/8") from the bottom of the control. We recommend making a drill template. **WATCH FOR METAL SHAVINGS.**

Drill one hole approximately 5.5cm (2 1/8") from the bend and the other hole 13.5cm (5 1/4") from the bend. The two holes must correspond to the oval openings on the DIN rail.

2. Mount the gateway and power supply onto the mounted DIN rail by positioning the bottom DIN rail hooks at the bottom of the DIN rail. Tilt both units upwards and ensure upper clip hold devices to DIN rail.
3. Connect the OT cable connected to terminals A and B of the gateway to terminal block X29, terminals 11 and 12.

Using a small flat blade screwdriver apply pressure into the terminal block and insert the wires. Remove screwdriver and tug on wire to ensure correctly inserted into terminal.

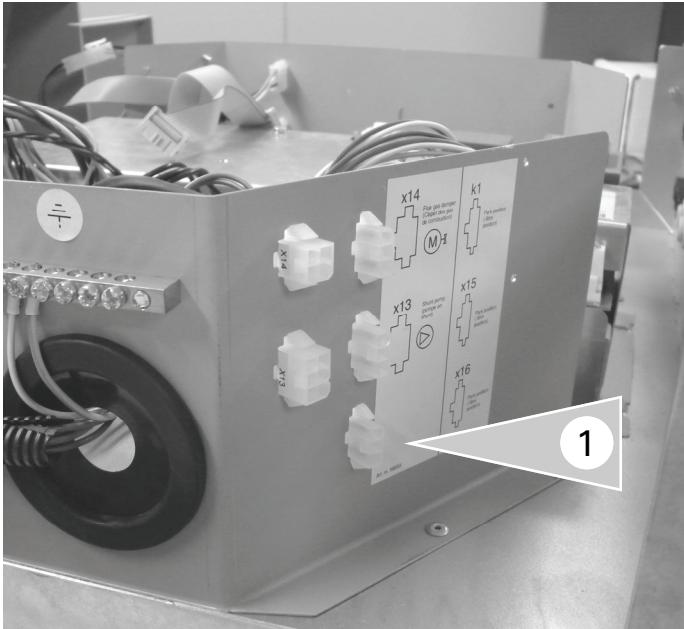
4. Locate the harness with the 310 label. Insert black wire into the L terminal of the power supply. Insert the blue wire into the N terminal of the power supply. Tighten both terminals of the power supply.



Caution

Ensure that boiler control power is turned off before performing any work inside of control.

Installation Overview Gas 310 ECO



Information

1. Locate the X16 plug at the back of the control. Press on the sides of the plug and remove from the metal wall.

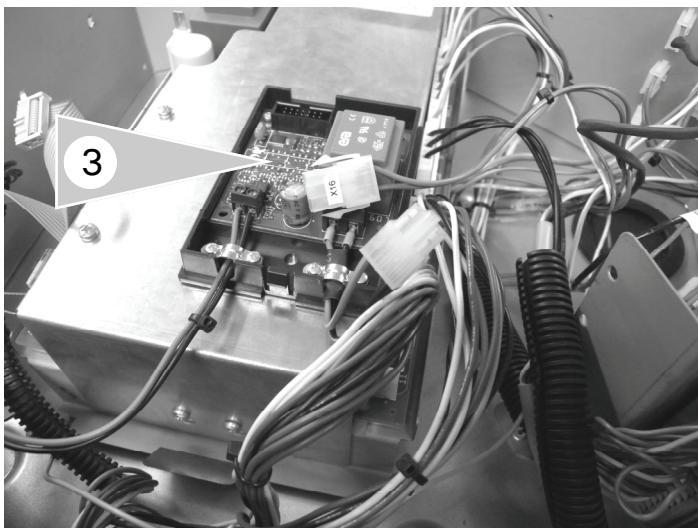
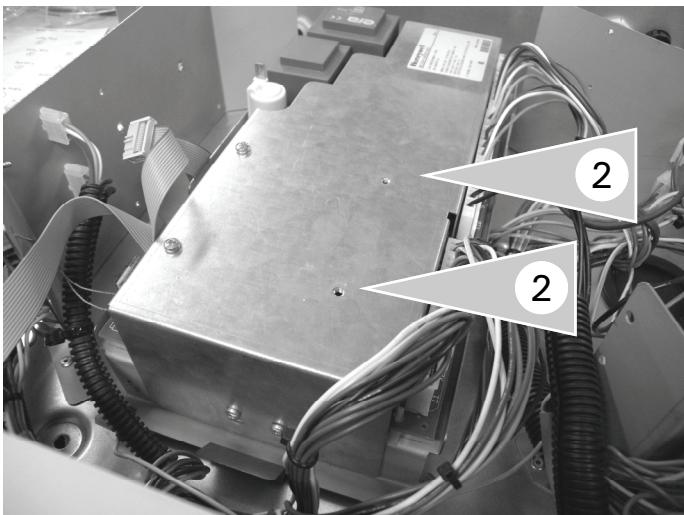
Bring plug towards the front of the control.

2. Remove two screws from upper section of control. One screw will be used to secure OT module to control.

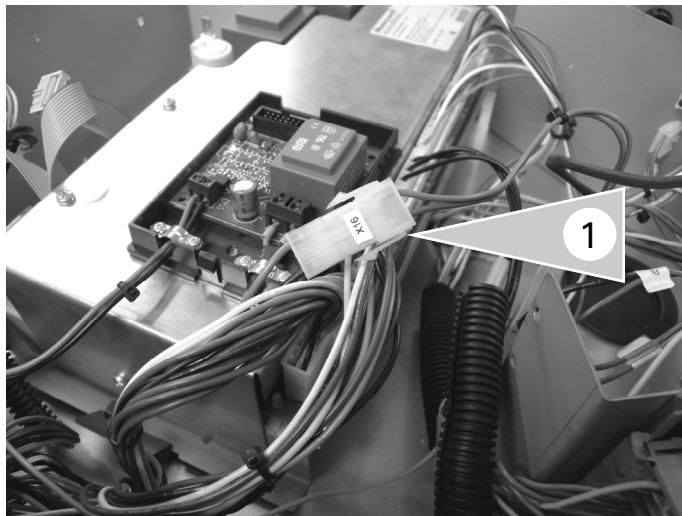
3. Position OT module on top of control with two wire harnesses towards the front of the control.

Secure module with screw from previous steps.

Locate the X16A male plug of the OT module and plug it into the X16 female socket from previous steps.

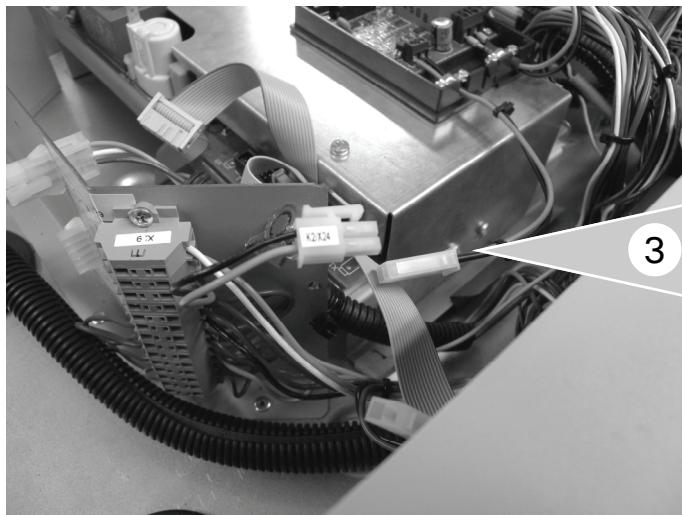
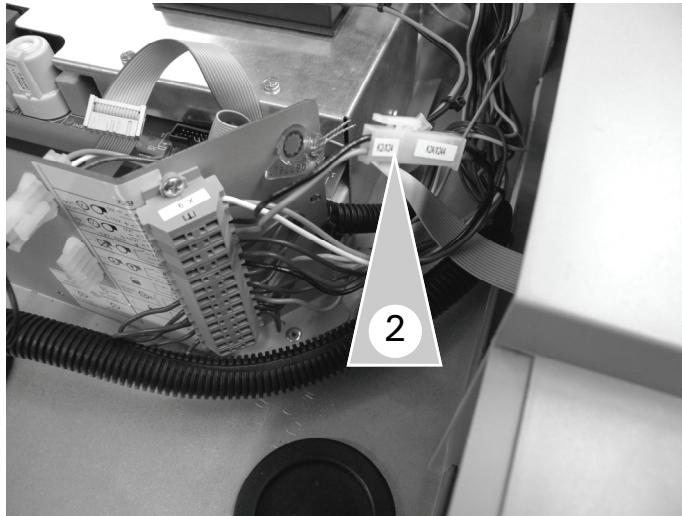


Installation Overview Gas 310 ECO

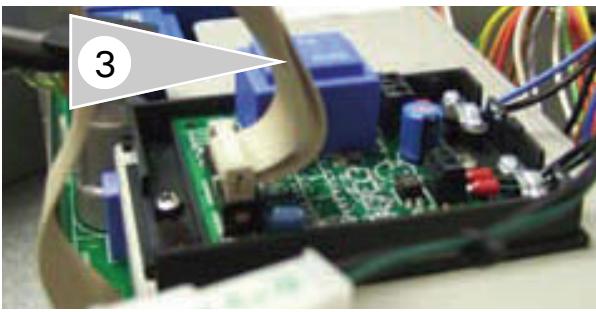
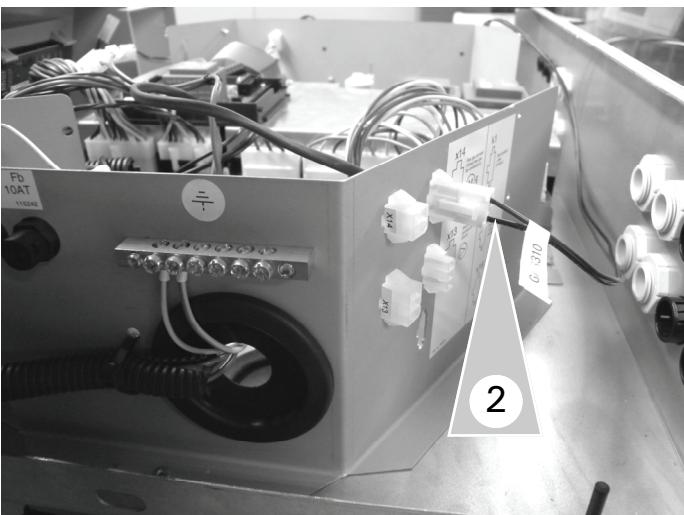
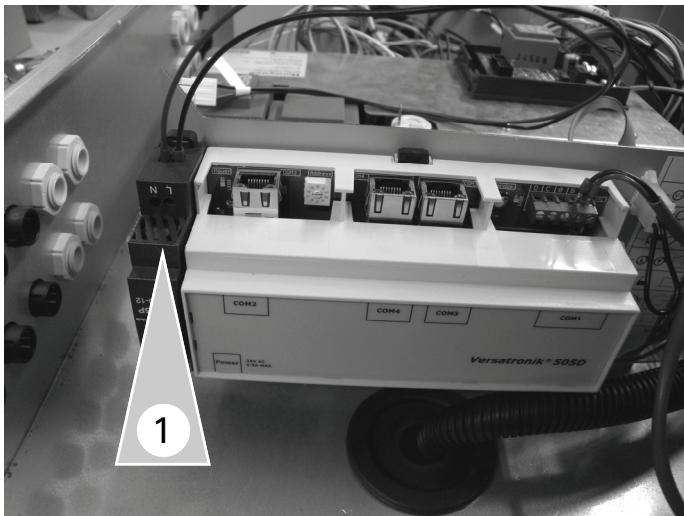


Information

1. Showing the X16 plugged into the OT module.
2. Locate the K2/X24 and K2A/X24A connectors on the boiler control. Press the release tab on the K2/X24 connector and unplug from the socket.
3. Locate the left harness connector X24A socket on the previously installed OT module and connect the K2/X24 plug into the X24A socket.



Installation Overview Gas 310 ECO



Information

1. With the 310 harness installed into the power supply from previous steps, route wiring across back of control.
2. Locate the K1 plug and press in the connector of the power supply harness into the K1 plug of the control.
3. Find the flat ribbon cable in the boiler wiring harness and connect one of the multi plugs into the mating socket on the interface. Note that the ribbon cable will have many plugs attached that can be connected to other accessory boards. Use nearest plug without straining the cable against any other plug.

Once all of the connections have been verified, the power switch of the control can now be turned on to perform the communication testing of the gateway. With the BMS plug-in connection to the gateway complete, it should be possible to start reading information from the boiler control.

Configuration of Gateway Overview

Configuration Information

Section 3.0

Information	Page
Configuring BACnet IP Settings	16
BACnet Device Settings	17
BACnet Objects	18
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Configuration of Gateway

Configuring BACnet/IP Settings

Connect your computer DIRECTLY to the BACnet interface of the gateway device. With no other devices attached (an isolated network). Either set your computer's network connection to automatic IP Address (DHCP), or set your computer's IP address to 192.168.88.90 (subnet mask 255.255.255.0)

Restart the Gateway by cycling the power off and then on again.

Open a browser window and insert the following

URL: <http://192.168.88.89/admin>

The default user name / password is "**admin**" and "**admin**" (without the quotes). This can be renamed in the Change Password screen. At this point you will see the Configuration pages.

DDR OT/BACIP Gateway505 NR2/BACIP

<ul style="list-style-type: none">- Home- BACnet/IP Settings- BACnet Device Settings- Advanced Settings- Restore Defaults- Change Password- Activate Configuration	<p>BACnet/IP Settings</p> <p>This page allows you to view current BACnet/IP settings, to change them or to restore them to factory defaults.</p> <table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="text-align: center;">Parameter</th><th style="text-align: center;">Value</th><th>Description</th></tr></thead><tbody><tr><td style="text-align: center;">IP</td><td style="text-align: center;">192.168.0.22</td><td>IP address of the BACnet device.</td></tr><tr><td style="text-align: center;">Network Mask</td><td style="text-align: center;">255.255.255.0</td><td>IP subnet mask.</td></tr><tr><td style="text-align: center;">Default Gateway</td><td style="text-align: center;">192.168.0.1</td><td>IP address of the default gateway.</td></tr><tr><td style="text-align: center;">UDP Port</td><td style="text-align: center;">47808</td><td>BACnet/IP UDP port number.</td></tr></tbody></table> <p style="text-align: center;">Save Reset Defaults</p>	Parameter	Value	Description	IP	192.168.0.22	IP address of the BACnet device.	Network Mask	255.255.255.0	IP subnet mask.	Default Gateway	192.168.0.1	IP address of the default gateway.	UDP Port	47808	BACnet/IP UDP port number.
Parameter	Value	Description														
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Default Gateway	192.168.0.1	IP address of the default gateway.														
UDP Port	47808	BACnet/IP UDP port number.														

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IMPORTANT: Make sure that you remember any changes made here.

Configuration of Gateway Continued

BACnet Device Settings

You can now reconfigure these settings according to your network requirements. Make sure that you press SAVE on every screen where you make changes. The new setting will not take effect until the Activate Configuration screen has been confirmed. These configuration pages can now be accessed through both the 192.168.88.89 Address, as well as the one you have selected.

The BACnet Device Settings screen looks like this:

DDR OT/BACIP Gateway/BACIP

<ul style="list-style-type: none">▪ Home▪ BACnet/IP Settings▪ BACnet Device Settings▪ Advanced Settings▪ Restore Defaults▪ Change Password▪ Activate Configuration	<p>BACnet Device Settings</p> <p>This page allows you to view current BACnet Device settings, to change them or to restore them to factory defaults.</p> <table border="1"><thead><tr><th>Parameter</th><th>Value</th><th>Description</th></tr></thead><tbody><tr><td>Device ID:</td><td><input type="text" value="1"/></td><td>BACnet Device Instance Number.</td></tr><tr><td>Object Name:</td><td><input type="text"/></td><td>Value of the Device's Object_Name property.</td></tr><tr><td>Description:</td><td><input type="text"/></td><td>Value of the Device's Device_Description property.</td></tr><tr><td>Location:</td><td><input type="text"/></td><td>Value of the Device's Device_Location property.</td></tr></tbody></table> <p>Save Reset Defaults</p>	Parameter	Value	Description	Device ID:	<input type="text" value="1"/>	BACnet Device Instance Number.	Object Name:	<input type="text"/>	Value of the Device's Object_Name property.	Description:	<input type="text"/>	Value of the Device's Device_Description property.	Location:	<input type="text"/>	Value of the Device's Device_Location property.
Parameter	Value	Description														
Device ID:	<input type="text" value="1"/>	BACnet Device Instance Number.														
Object Name:	<input type="text"/>	Value of the Device's Object_Name property.														
Description:	<input type="text"/>	Value of the Device's Device_Description property.														
Location:	<input type="text"/>	Value of the Device's Device_Location property.														

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NOTE: The **Device ID** must be unique on the entire BACnet internetwork.

The Restore Defaults and Change Password screens are very simplistic. When you select Activate Configuration, it will ask you if you want to SAVE your settings. This will then store your new settings and reboot automatically.

You can now join the Gateway to the rest of your network, provided you have not specified a duplicate IP Address. Any Computer on the network should now be able to access these configuration screens.

Analogue Input Overview

BACnet Objects

BACnet Object	Description	Units	Source
Analog Input 1	Boiler Set-point	°C / °F	T / M
Analog Input 2	Boiler water temperature	°C / °F	B
Analog Input 3	Maximum Modulation level	%	T
Analog Input 4	Current Modulation level (boiler modulation)	%	B
Analog Input 5	Room Temperature	°C / °F	T
Analog Input 6	Room Set-point temperature	°C / °F	T
Analog Input 7	Outside Temperature	°C / °F	T
Analog Input 8	Return Water Temperature	°C / °F	B
Analog Input 9	Flue Gas Temperature	°C / °F	B
Analog Input 10	Boiler Heat Exchanger Temperature	°C / °F	B
Analog Input 11	Boiler Fan Speed	Hertz	B
Analog Input 12	Water Pressure	Bar / PSI	B
Analog Input 13	OEM Fault Code	0-255	B
Analog Input 14	OEM Diagnostic Code	0 - 65535	B
Binary Input 1	Boiler Fault (no fault / fault)	0/1	B
Binary Input 2	Flame Status (no flame / flame)	0/1	B
Binary Input 3	Fault - Service Required (not req'd / req'd)	0/1	B
Binary Input 4	Fault - Lockout Reset	0/1	B
Binary Input 5	Fault - Low Water Pressure	0/1	B
Binary Input 6	Fault - Gas / Flame	0/1	B
Binary Input 7	Fault - Air Pressure	0/1	B
Binary Input 8	Fault - Water Over-Temperature	0/1	B
Analog Output 1	Control source (Setpoint from Thermostat or Manual)	0/1	
Analog Output 2	Temperature Units (°C / °F)	0/1	
Analog Output 3	Control Set-point (only if control source is Manual)	°C / °F	
Analog Output 4	Control Method (Setpoint / Modulation Controlled)	0/1	
T=Thermostat B=boiler M=Manual (BACnet) Temperature units displayed / Set-point units, is determined by Analog Output 2			

BACnet control mode (Manual)

This feature is enabled when AO-1 is set to 1 (BACnet control), the gateway will ignore the thermostat (if connected) and communicate directly with the boiler. The Control Set-point will now determine the boiler target temperature. The gateway no longer retrieves any values from the thermostat, these object will change to a value of -99.

Temperature Units

You have the ability to control whether temperatures are displayed in Celsius or Fahrenheit by setting AO-2 (Analog Output 2). This will also determine whether the Control Set-point (AO-3) is provided in °C or °F.

Communication Points for MCA PRO /C230 ECO-A/310 Control

Variable	Read/ Write	Units	Gas 310 ECO	C230/ MCAPRO
Boiler water temperature	R	°C / °F	✓	✓
Current Modulation level (boiler modulation)	R	%	✓	✓
Outside Temperature	R	°C / °F	✓	✓
Return Water Temperature	R	°C / °F	✓	✓
Flue Gas Temperature	R	°C / °F	✓	
Boiler Heat Exchanger Temperature	R	°C / °F	✓	
Boiler Fan Speed	R	Hertz	✓	
Water Pressure	R	Bar / PSI	✓	✓
Boiler Fault (no fault / fault)	R	0/1	✓	✓
Flame Status (no flame / flame)	R	0/1	✓	✓
Service Required (not req'd / req'd)	R	0/1	✓	✓
Lockout - Reset	R	0/1	✓	✓
Low Water Pressure	R	0/1	✓	✓
Gas/Flame Fault	R	0/1	✓	✓
Air Pressure Fault	R	0/1	✓	✓
Water Over-Temperature	R	0/1	✓	✓
Units (Metric/Imperial, °C /°F, Bar/PSI)	W	0/1	✓	✓
Set-point (Either Boiler Temp. or Modulation, see Control Method)	W	°C / °F	✓	✓
Control Method (Setpoint - Boiler Temp / Modulation Controlled)	W	0/1	✓	✓

Technical Information

Trouble-Shooting

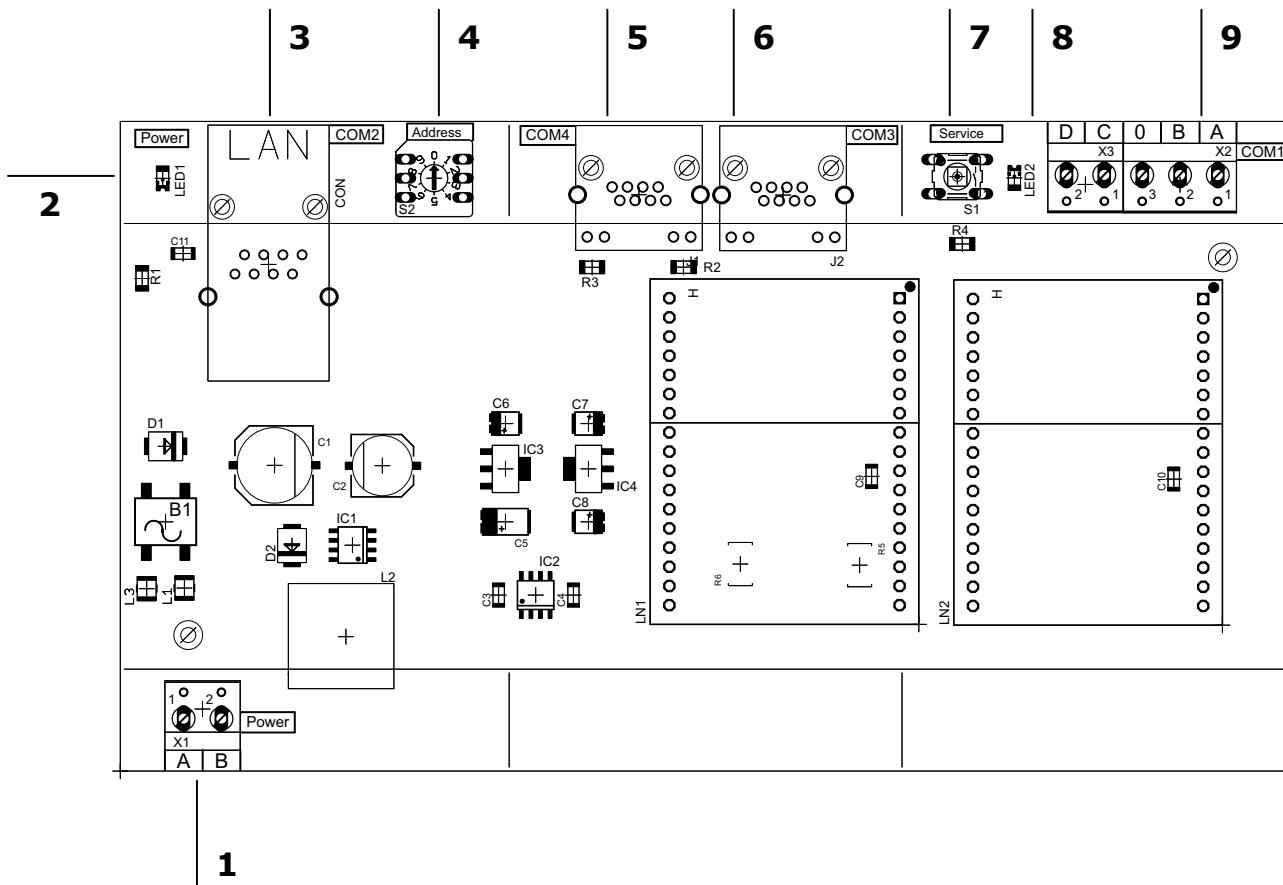
Problem: LED2 is flashing

Control/BMS Mode

LED 1 flash per second—OK

LED 4 flash per second—No Communication

Technical Information



PCB Identifiers

1	24VAC Power Supply Connections
2	Power LED indicator
3	BACnet RJ45 BMS Connection
4	N/A
5	N/A
6	N/A
7	N/A
8	OT Status LED
9	OT connection to boiler control A and B

Specifications

Voltage Requirements	12VAC
Fuse Rating	N/A
Power	4VA
Communication Connections	Supplied cable between devices



Caution

Static sensitive components may be damaged by improper handling or work within the control. Ensure all possible measures are taken to eliminate build-up of static electricity.

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