

MCBA14C Commercial Boiler Control System

INSTALLATION INSTRUCTIONS

APPLICATION

The MCBA14C Commercial Boiler Control System provides heat control, flame supervision, circulation pump control, fan control and boiler control. It has electric ignition. It will also provide boiler status and error reporting.

FEATURES

- **NTC resistors for measuring and guarding temperatures.**
- **PWM-driven revolution controlled dc-fan for optimal modulation control.**
- **24 Vac gas valve.**
- **24 Vac is fused (Fuse F3) with a 4AT fuse.**
- **PWM-driven circulation pump for optimal energy consumption.**
- **DHW-pump.**
- **Various function-inputs.**
- **Connections for external comfort control.**
- **Connections for extra inputs/outputs.**
- **Easy modification of the parameters on three levels:**
 - **End user.**
 - **Installer/service mechanic.**
 - **Manufacturer (OEM).**

SPECIFICATIONS

Electrical Ratings

Line voltage requirement: 120 Vac (+10%/-15%).
Power Consumption: 8 W.
Gas Valve: 1.72A ac.
External load: 0.1A ac.
Fan: <35W dc.
Total 24 Vac: <75 VA.
Fan: <20W dc.
Total 24 Vac: <50 VA.

Electrical Connections:

Line Voltage: 120 Vac, 60 Hz.
Fuse (F1): 5A, fast acting.
Main Voltage Connection: X1, pins 1 and 2.
MCBA Earth Ground Connection: X1, pin 6.
Power Connection, Central Heating (CH) Pump: 120 Vac, 60Hz.; 5A maximum current; X1, pins 3 and 4.
Power Connection, Domestic Hot Water (DHW) pump; 120 Vac, 60 Hz; 1A maximum current; X1, pins 3 and 5.
Heat Request (CH), parallel shift input, X2, pins 8 and 9. Current: 2 mA, dc.
Air Pressure Switch; X2, pins 7 and 9. Requirements:
Current: 2 mA, dc.
Minimal Gas Pressure Switch: X2, pins 6 and 9. Requirements:
Current: 2 mA, dc.

Overheat Thermostat (optional): X2, pins 9 and 10.
Negative Temperature Coefficient (NTC) Inputs: X3, X4, X5.
Flow Temperature (NTC1): X3, pins 1 and 5.
Return Temperature (NTC2): X3, pins 2 and 5.
DHW Temperature (NTC3): X3, pins 3 and 5.
Outside Temperature (NTC4): X3, pins 4 and 5.
Flue Gas Temperature (NTC5): X4, pins 1 and 2.
Outside Temperature (NTC4): X5, pins 3 and 4.
Analog Input: X4, pins 2 and 3.
Used to connect a 0 to 10 volt analog input, a water pressure sensor, or an extra NTC-6.
Switch Inputs:
DHW-Thermostat: X3, pins 3 and 5.
On/Off Switch: X3, pins 4 and 5.
Flame Sensor:
Flame Current: Minimum 3 microampere dc (typical 2 micro-ampere).
Isolation Resistance: Minimum 50 megohms.
DC Fan: X2, pins 1, 2, 3, 4.
+ Connection (X2-3): Vopen maximum 45V.
PWM Control Output (X2-1):
Ri: 12 kilohms.
Fmin: 941 Hz.
Fmax: 3.3 kHz.
Tacho Input (X2-4).
Gas Valve Output: X2, pins 11 and 12:
Contact Voltage: 24 Vac, 60 Hz.
Current: 1.7A ac, maximum.
PWM-driven CH Pump (X3, pins 5 and 6):
Output VL: 0.5V maximum.
Output VH: 14V maximum (open).
High Voltage Connection (used for the ignition spark. High voltage connection must have a good connection with the earth ground contact of the MCBA.
Voltage: 15 kV.
Spark Gap: 1/8 in. (3 mm); maximum 3/16 in. (5 mm).
Communications (X5, pins 1 and 2):

Environmental Ratings:

Temperature Range:
Operating: 32°F to 150°F (0°C to 60°C).
Storage: -13°F to +167°F (-25°C to +75°C).

Humidity:

At 77°F (25°C): 85% RH.
At 150°F (60°C): 50% RH.

Approvals:

CSA
Component Approval, ANSI Z21.20 Automatic Ignition Systems.

INSTALLATION

When Installing This Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Refer to the wiring diagram provided as part of the appliance or refer to **Product Data sheet, form 65-0279**.



3. Check the ratings given in the instructions and on the product to make sure that the product is suitable for your application.
4. Installer must be a trained, experienced combustion service technician.
5. Disconnect the power supply before beginning installation to prevent electrical shock and equipment damage. More than one disconnect may be involved.
6. All wiring must comply with applicable local electrical codes, ordinances and regulations.
7. After installation is complete, check out product operation as provided in these instructions.

WARNING

Fire or Explosion Hazard.

Can cause severe injury, death, or property damage.

To prevent possible hazardous burner operation, verify safety requirements each time a control is installed on a burner.

WARNING

Electrical Shock Hazard.

Can cause serious injury, death or property damage.

Disconnect power supply before beginning installation to prevent electrical shock and equipment damage. More than one disconnect may be involved.

WIRING

WARNING

Electrical Shock Hazard.

Can cause serious injury, death or property damage.

Disconnect power supply before beginning wiring to prevent electrical shock and equipment damage. More than one disconnect may be involved.

Ground Connection

The ground connection on the controller must not be used as a central ground connection for the 120 Vac connections.

1. Use the common ground terminal next to the controller, close to connector X1.
2. Connect the central ground terminal with the connection contact of the controller.
3. Connect the ground wire of the main power connector, the CH pump, the DHW pump (if present) and the ignition wire to the central ground terminal.

Electrical Connections

Main Power Line

1. Hot (L1) to connector X1-L.
2. Neutral (L2) to connector X1-N.
3. Ground to central ground terminal, not to Ground on X1.

CH Pump; DHW Pump Power Line(s)

1. Hot to connector X1-4 (CH Pump) or X1-5 (DHW Pump).
2. Neutral to connector X1-3.
3. Ground to central ground terminal, not to Ground on X1.

Low Voltage Connections

Use 18 AWG or larger wires.

1. Wire according to specifications, following all local ordinances and requirements.
2. Do not bundle the low voltage wires with the ignition cable, 120 Vac wires, CH Pump or DHW Pump.
3. The low voltage wires for the minimal gas pressure switch, DHW thermostat, air pressure switch, and gas valve can be bundled together.
4. Bundle the wires for the fan and join them with the other 24V low-voltage wires.
5. Bundle the wires for the NTC sensors and the PWM pump control separately.
6. Do not bundle the ionization wire with the high voltage cables, but it can be joined with the other 24V wires.

High Voltage Cable

1. Always use a grommet when placing the high voltage cable.
2. Never join the high voltage cable with other wires.

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