



BASstat221 — BACnet Communicating Thermostat for Multi-Stage Heating/Cooling

The BASstat series of BACnet-compliant wired or wireless communicating thermostats are BTL listed to ensure effortless integration into BACnet/IP (Wi-Fi) or BACnet MS/TP (EIA-485) networks. These thermostats are suited for single or multi-stage heating, cooling and ventilation binary output control applications such as RTU or AHU. Configurable control algorithm parameters allow adaptability to the specific application. Adaptive control algorithm applied to multi-stage on/off control saves energy and ensures seamless comfort for the occupants. Built in temperature sensor, input for remote temperature sensor, or temperature override network command from Building Automation System. Occupancy status can be set from thermostat buttons or over the BACnet network. Thermostat buttons are optionally lockable to prevent unauthorized control. Digital display with graphical icons is easy to read and understand.

ASHRAE **BACnet™** MS/TP



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Versatile Communication in Two Distinct Models

- Both models are BTL listed with B-ASC device profile
- BACnet MS/TP in *B2* model MS/TP baud rates 9.6kbps - 76.8kbps
- BACnet/IP in *BW2* model 802.11 b/g/n 2.4GHz Wi-Fi

Flexible Installation

- 24VAC (+/-10%) power input
- Digital Display with graphical icons of operation, °C or °F display
- Single or Multistage, Binary Outputs for RTU or AHU applications
- Manual or Auto-changeover modes as well as Heat only or Cool only modes

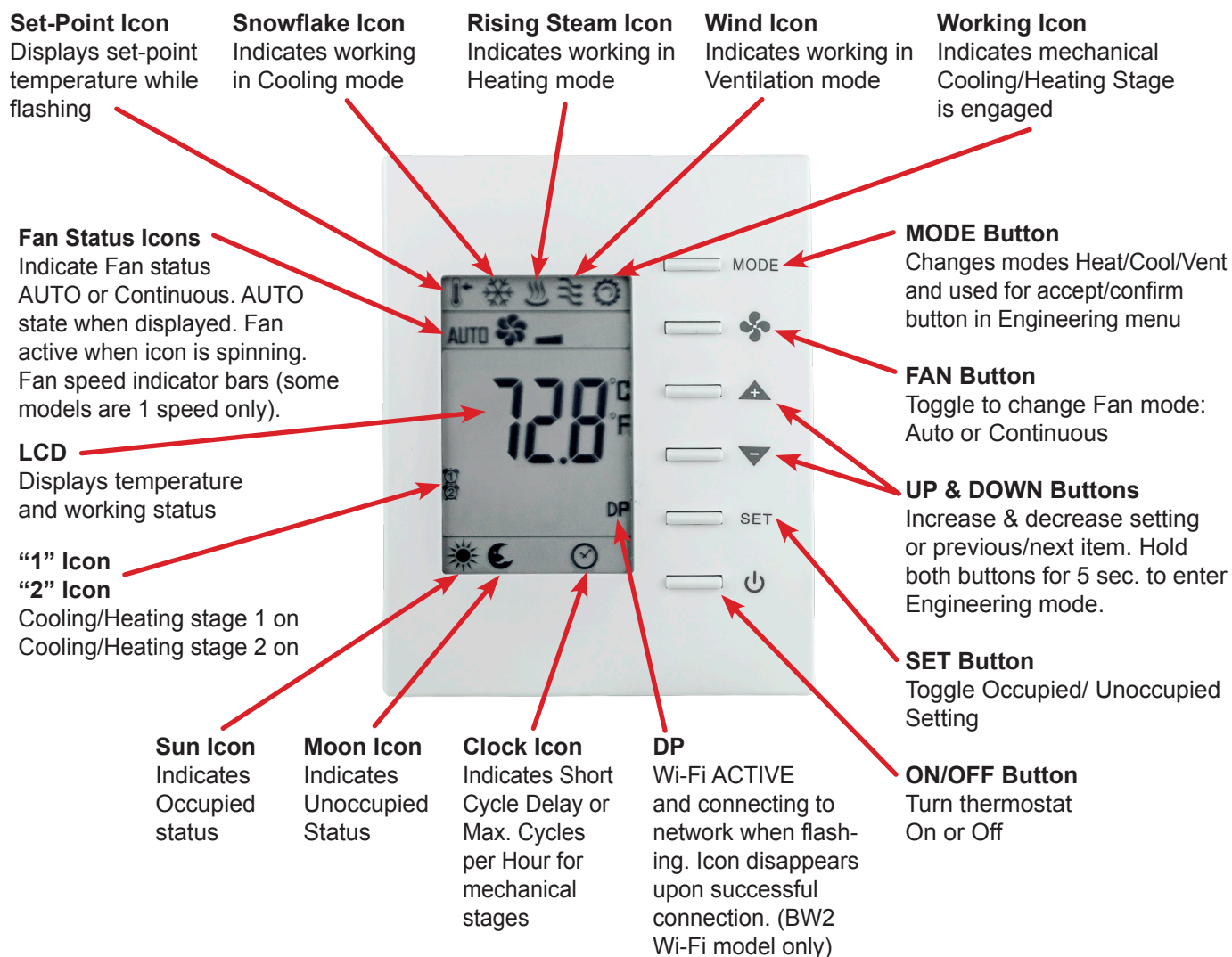
- Occupied / Unoccupied modes with 2 sets of Cool/Heat set points
- Effective run time accumulation for energy consumption calculations
- Built-in temperature sensor
- Remote temperature sensor input (NTC Thermistor 3kΩ)
- Networked current temperature override from BACnet client (BMS)
- Fully Configurable Algorithm control parameters: Deadband, Proportional Gain, Integral Rate, Stage Trip Points, Stage Widths, Short Cycle Delay, Maximum Cycles Per Hour
- Non-volatile memory (EEPROM) retains user settings during power loss
- Lockable buttons / user interface

- Operating Environment:
 - 0-50°C, 5-95% RH (non-condensing)
- Wiring: 14 to 22 AWG wires or up to 2x 1.5mm wires
- Dimensions: 94×118×34 mm (W × H × D)
- Mounts directly onto wall, panel, standard 65×65 mm junction box (hole pitch 60 mm) or standard 2×4 inch vertical junction box (hole pitch 83.5 mm)

BASstat — Overview

The BASstat's white backlit LCD display is large and easy to read, even from a distance. It incorporates graphical icons to aid visual indication of current state of operation. Several icons indicate parameters such as: Active Mode, Cooling stage 1 or 2, Heating stage 1 or 2, Ventilation Only, Fan Active, Occupied / Unoccupied state, and Clock icon to indicate Short Cycle Delay or Max Cycles per hour active waiting state. These icons are very useful in indicating the thermostat's current state of operation.

Six buttons on the BASstat allow users to manipulate temperature set point, change HVAC modes, turn the thermostat ON/OFF, and more. Pressing the Set and Up/Down buttons can manually toggle the thermostat from occupied/unoccupied modes, where BACnet occupancy command is not an option. All 6 of these buttons are lockable in a configurable manner to prevent unauthorized configuration change. Some or all buttons can be locked for application flexibility, making the stat suitable for applications where limited user control is allowed.



Configuration

Initial configuration differs depending on whether you are using the BACnet MS/TP model or BACnet/IP over Wi-Fi model. Full details can be found in the installation guide included in the product box or in the User Manual available on our website. All configuration parameters are settable through use of the buttons on thermostat and the engineer menu, or once installed on the BACnet network with unique device parameters, configuration can be altered using BACnet commands. Network command-based configuration can also be accomplished on the bench using a BACnet router (B2 MS/TP model) or Wi-Fi enabled laptop/computer (BW2 Wi-Fi model).

B2 model - MS/TP Configuration

BACnet MS/TP model configuration requires setting the baud rate or using the default baud rate of 38.4kbps. A unique MS/TP *MAC address* is required to distinguish it from other MS/TP devices on the bus (default MAC address is 1). When more than one BASstat is installed at the same time, their MAC addresses must be configured prior to installing on the MS/TP bus or communication will fail due to duplicate MAC addresses. A unique *Device Instance Number* throughout the entire BACnet internetwork is also required to distinguish the device from all other BACnet devices. The BASstat does not provide End-of-Line termination. If the BASstat is the first or last device on the MS/TP bus, a termination resistor (120Ω) must be applied across pins 16 and 17 of the input terminal. Thanks to its EEPROM, the BASstat will store configuration in the event of power loss. All settings can be reset back to default from Engineering Menu item (rSt).

BW2 model - Wi-Fi Configuration

BACnet/IP Wi-Fi model requires connecting to the thermostat as an access point for initial configuration. A Wi-Fi enabled laptop/computer can discover the BASstat initially as a Wi-Fi access point with SSID “Wi-Fi-

122B-xxxx” and no passphrase by default (simply click to connect to Access Point). The digits “xxxx” in “122B-xxxx” are the last 4 digits of the thermostat’s Wi-Fi chip MAC address found written on the back side. This can assist when multiple Wi-Fi stats are installed (outlined in blue in image below).



Once connected to the thermostat, open its web page by typing 192.168.0.1 with *admin* for username and no password. Web page pictured below will be presented for network configuration. After initial connection using laptop, the Wi-Fi mode in the thermostat can be changed to *Infrastructure* and the local Wi-Fi network configuration can be entered and stored. A reboot of the thermostat is required, and the new Infrastructure mode with new settings will be used. A unique *Device Instance Number* throughout the entire BACnet internetwork is required to distinguish the device from all other BACnet devices. When more than one BASstat is installed at the same time, their *Device Instance Number* must be configured prior to connecting to the BACnet/IP network or BACnet communication will fail due to duplicate instances. Thanks to its EEPROM, the BASstat will store configuration in the event of power loss. If configuration fails or the thermostat needs to be configured to use a different Wi-Fi access point, the thermostat must be reset and reconfigured. Reset will restore all values to default and can be selected from Engineering Menu (rSt).

Network Configuration

Device ID: Wi-Fi-122B-1a9f
MAC Address: d0ba-e414-1a9f

Network Mode : ☒ Access Point ☐ Infrastructure

Device SSID :

Device Passphrase : (None or at least 8 alphanumeric)

Channel :

IP Address :

Network Mask :

Gateway :

Save & Restart

Network Configuration

Device ID: Wi-Fi-122B-1a9f
MAC Address: d0ba-e414-1a9f

Network Mode : ☐ Access Point ☒ Infrastructure

Available AP :

AP SSID :

AP Passphrase : (None or at least 8 alphanumeric)

DHCP : ☒ Enable ☐ Disable

Save & Restart

BACnet Protocol Implementation Conformance (PIC) Statement



BASstat

BACnet MS/TP and BACnet/IP Thermostat Controller



BACnet Protocol Implementation Conformance Statement (Annex A)

Date: September 24, 2018
Vendor Name: Contemporary Controls
Product Name: BASstat
Product Model Number: BAST-221C B2 and BW2
Applications Software Version: 1.0 **Firmware Revision:** 1.40 **BACnet Protocol Revision:** Version 1, Revision 12
Product Description: These series of thermostats/controllers are suitable for a variety of applications including RTU, AHU, Unit Heaters, and other HVAC unitary equipment of on/ off, controls.

BACnet Standardized Device Profile (Annex L):

- | | |
|---|--|
| <input type="checkbox"/> BACnet Operator Workstation (B-OWS) | <input checked="" type="checkbox"/> BACnet Application Specific Controller (B-ASC) |
| <input type="checkbox"/> BACnet Building Controller (B-BC) | <input type="checkbox"/> BACnet Smart Sensor (B-SS) |
| <input type="checkbox"/> BACnet Advanced Application Controller (B-AAC) | <input type="checkbox"/> BACnet Smart Actuator (B-SA) |

List all BACnet Interoperability Building Block Supported (Annex K):

- | | |
|--|---|
| DS-RP-B Data Sharing — ReadProperty — B | DM-DDB-B Device Management — Dynamic Device Binding — B |
| DS-WP-B Data Sharing — WriteProperty — B | DM-DOB-B Device Management — Dynamic Object Binding — B |
| DS-RPM-B Data Sharing — ReadPropertyMultiple — B | DM-DCC-B Device Management — Device Communication Control — B |

Segmentation Capability:

- | | |
|--|--------------|
| <input type="checkbox"/> Able to transmit segmented messages | Window Size: |
| <input type="checkbox"/> Able to receive segmented messages | Window Size: |

Standard Object Types Supported:

Object Type Supported	Can Be Created Dynamically	Can Be Deleted Dynamically
Analog Input	No	No
Analog Value	No	No
Binary Input	No	No
Binary Value	No	No
Device	No	No
Multi-State Value	No	No

No optional properties are supported.

Data Link Layer Options:

- | | |
|---|---|
| <input checked="" type="checkbox"/> BACnet IP, (Annex J) | <input type="checkbox"/> MS/TP slave (Clause 9), baud rate(s): |
| <input type="checkbox"/> BACnet IP, (Annex J), Foreign Device | <input type="checkbox"/> Point-To-Point, EIA 232 (Clause 10), baud rate(s): |
| <input type="checkbox"/> ISO 8802-3, Ethernet (Clause 7) | <input type="checkbox"/> Point-To-Point, modem, (Clause 10), baud rate(s): |
| <input type="checkbox"/> ANSI/ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s): | <input type="checkbox"/> LonTalk, (Clause 11), medium: |
| <input checked="" type="checkbox"/> MS/TP master (Clause 9), baud rate(s): | <input type="checkbox"/> Other: |

Device Address Binding:

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) ☐ Yes ☒ No

Networking Options:

- ☐ Router, Clause 6 – List all routing configurations, e.g., ARCNET-Ethernet-MS/TP, etc.
☐ Annex H, BACnet Tunnelling Router over IP
☐ BACnet/IP Broadcast Management Device (BBMD)
 Does the BBMD support registrations by Foreign Devices? ☐ Yes ☐ No

Character Sets Supported:

- Indicating support for multiple character sets does not imply that they can all be supported simultaneously.
- | | | |
|---|---|-------------------------------------|
| <input checked="" type="checkbox"/> ISO 10646 (UTF-8) | <input type="checkbox"/> IBM™/Microsoft™ DBCS | <input type="checkbox"/> ISO 8859-1 |
| <input type="checkbox"/> ISO 10646 (UCS-2) | <input type="checkbox"/> ISO 10646 (UCS-4) | <input type="checkbox"/> JIS C 6226 |

If this product is a communication gateway, describe the types of non-BACnet equipment/network(s) that the gateway supports:
 No gateway support.

24 September 2018

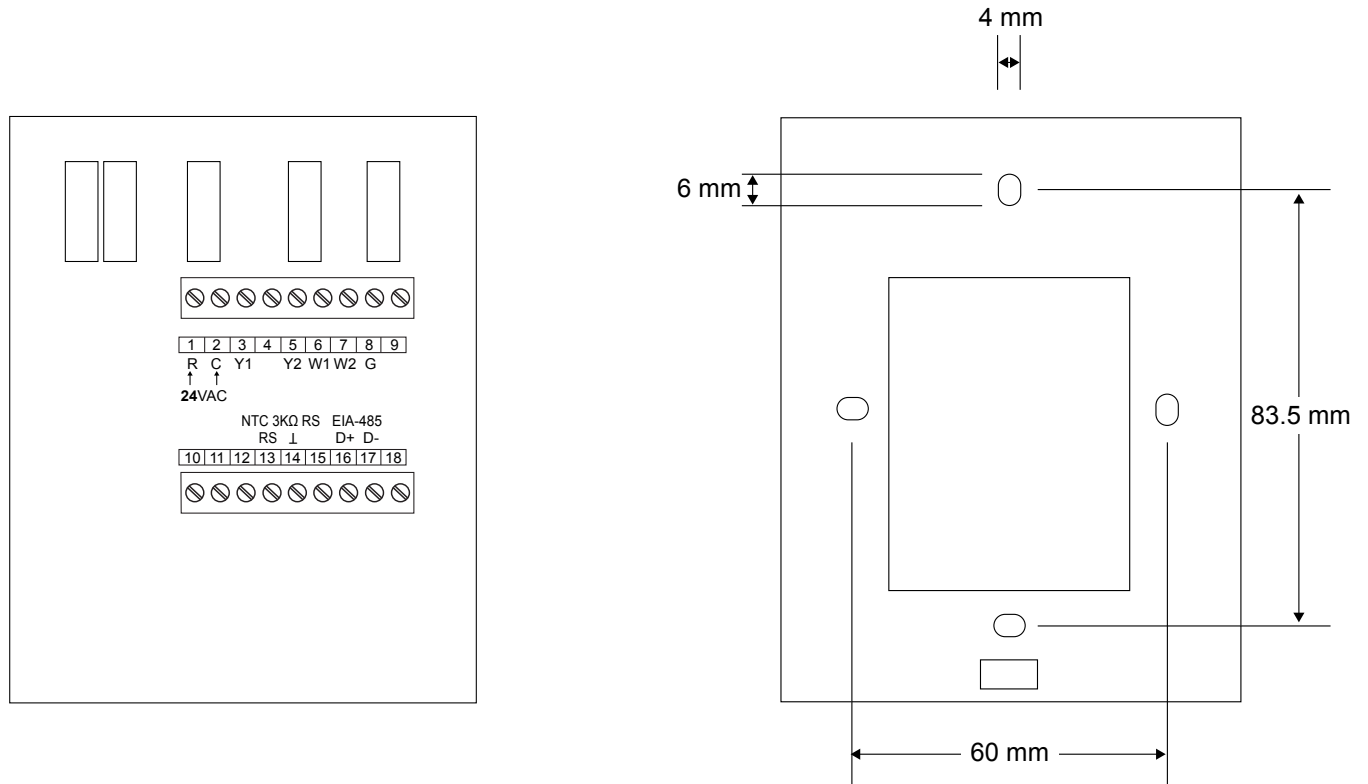
PI-BASSTAT0-AA0

Wiring Diagram

Wiring: 14 to 22 AWG wires or up to 2x 1.5mm wires

Mounts directly onto wall, panel, standard 65×65mm junction box (hole pitch 60 mm) or standard 2×4 inch vertical junction box (hole pitch 83.5 mm)

EIA-485 connection to pins 16(+) and 17(-) applicable to B2 - BACnet MS/TP model only. BW2 model uses Wi-Fi connectivity



Dimensions (all dimensions are in mm)

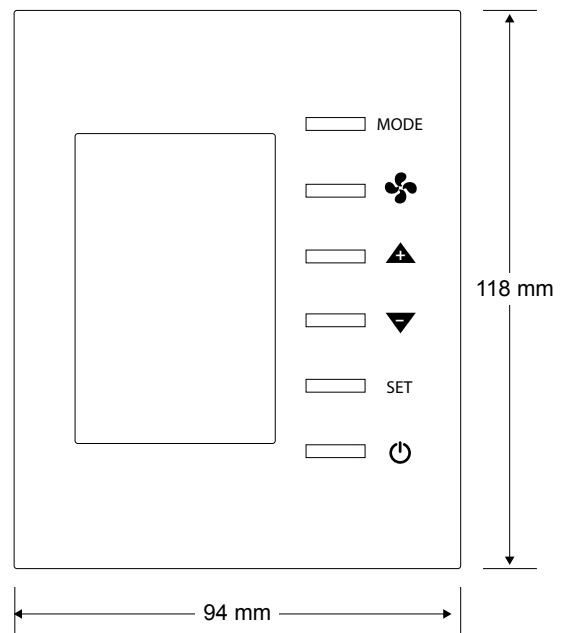
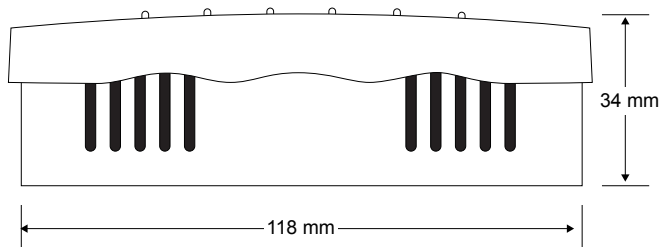
Dimensions:

Width: 94mm

Height: 118mm

Depth: 34mm

Mounts directly onto wall, panel, standard 65×65mm junction box (hole pitch 60 mm) or standard 2×4 inch vertical junction box (hole pitch 83.5 mm)



Specifications

Functional	B2 model	BW2 model
Compliance	EIA-485	IEEE 802.11b, 802.11g, 802.11n (single stream) 16.5dBm@11b, 14.5dBm@11g 13.5dBm@11n Frequency range: 2400MHz~2484MHz
Protocols supported	BACnet MS/TP	BACnet/IP
Cable length	4000 ft / 1200 m @76.8kbps (max)	N/A
Wi-Fi range	N/A	150ft. as defined by the standard (depending on obstructions) 54Mbps max data rate
Authentication	N/A	WEP, WPA/WPA2 PSK/Enterprise
Maximum Number of Devices	32 MS/TP devices (max)	N/A or depending on Wi-Fi router performance
Temperature Display Range	14 to 140°F (-10 to 60°C)	14 to 140°F (-10 to 60°C)
Temperature Display Resolution	0.1°F (0.1°C)	0.1°F (0.1°C)
Temperature Accuracy	±1.8°F (±1.0°C) with all outputs off	±1.8°F (±1.0°C) with all outputs off

Electrical

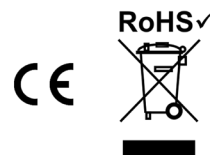
Input	AC only
Voltage (V, ± 10%)	24
Power	5 VA
Frequency	47–63 Hz

Environmental/Mechanical

Operating temperature	0°C to +50°C
Storage temperature	-40°C to +85°C
Relative humidity	5–95%, noncondensing
Protection	IP30
Weight	0.44 lbs. (.2 kg)

Regulatory Compliance

CE Mark; RoHS	
BW2 model Wi-Fi FCCID	P53-EMW3165-P



Electromagnetic Compatibility

The BAST-221C complies with the following specifications and bears the CE mark in accordance with the provisions of the Electromagnetic Compatibility (EMC) Directive 2004/108/EC based on the following specifications:

Standard	Test Method	Description
EN 61000-6-2	IEC 61000-4-2	Electrostatic Discharge Immunity
EN 61000-6-2	IEC 61000-4-3	Radiated, Radio-Frequency, Electromagnetic Field Immunity
EN 61000-6-2	IEC 61000-4-4	Electrical Fast Transit/Burst Immunity
EN 61000-6-2	IEC 61000-4-5	Voltage Surge Immunity
EN 61000-6-2	IEC 61000-4-6	Immunity to Conducted Disturbances
EN 61000-6-2	IEC 61000-4-8	Power Frequency Magnetic Field Immunity
EN 61000-6-2	IEC 61000-4-11	Voltage Dips and Interruptions
EN 61000-6-3	IEC 61000-3-2	Limits for Harmonic Current Emissions
EN 61000-6-3	IEC 61000-3-3	Limitation of Voltage Fluctuations and Flicker in Low Voltage Supply Systems

Ordering Information

Model

BAST-221C-B2
BAST-221C-BW2

Description

BACnet MS/TP Thermostat 2-Heat, 2-Cool, 1-Fan, Wired
BACnet/IP Thermostat 2-Heat, 2-Cool, 1-Fan, Wi-Fi

United States

Contemporary Control
Systems, Inc.
2431 Curtiss Street
Downers Grove, IL 60515
USA

Tel: +1 630 963 7070
Fax: +1 630 963 0109

info@ccontrols.com

China

Contemporary Controls
(Suzhou) Co. Ltd
11 Huoju Road
Science & Technology
Industrial Park
New District, Suzhou
PR China 215009

Tel: +86 512 68095866
Fax: +86 512 68093760

info@ccontrols.com.cn

United Kingdom

Contemporary Controls Ltd
14 Bow Court
Fletchworth Gate
Coventry CV5 6SP
United Kingdom

Tel: +44 (0)24 7641 3786
Fax: +44 (0)24 7641 3923

info@ccontrols.co.uk

Germany

Contemporary Controls
GmbH
Fuggerstraße 1 B
04158 Leipzig
Germany

Tel: +49 341 520359 0
Fax: +49 341 520359 16

info@ccontrols.de

www.ccontrols.com