



Macurco™ BRS-485

Multi-protocol RS-485 Adapter

User Instructions



IMPORTANT: Keep these user instructions for reference.

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1 General Safety Information

The Macurco BRS-485 Adapter is an accessory used to convert the 4-20mA analog signal from Macurco 6-Series type detectors to a digital signal for use with multipoint addressable systems. The Macurco BRS-485 simply connects to the back of the detector and a single screw fastens it in place. The BRS-485 accepts the 4-20mA output and is powered from the same connection as the detector. The BRS-485 can interface with Building Automation Systems, Control Panels or other Control Devices that accept Modbus, BACnet, Metasys and Siemens communication protocol.

1.1 List of warnings

|  WARNING |
|---|
| Each person using this equipment must read and understand the information in this user manual before use. Use of this equipment by untrained or unqualified persons or use that is not in accordance with this user manual, may adversely affect product performance. |
| This equipment may not function effectively below 0°F or above 125°F (-18°C or above 52°C). Using the detector outside of this temperature range may adversely affect product performance. |
| Do not disassemble unit or attempt to repair or modify any component of this instrument. This instrument contains no user serviceable parts, and substitution of components may impair product performance and void product warranty. |



2 Use Instructions and Limitations

WARNING

Each person using this equipment must read and understand the information in this user manual before use. Use of this equipment by untrained or unqualified persons or use that is not in accordance with this user manual, may adversely affect product performance.

2.1 Use For

The Macurco BRS-485 Adapter converts the Macurco 6-Series 4-20mA analog output to a digital output for use with addressable network systems. The Macurco 6-Series is a family of fully programmable, low voltage, dual relay gas detectors, controllers and transducers for BAS, HVAC and Fire & Security applications. The 6-Series detectors are used to measure the concentration of various gases and provide feedback and automatic control to help ensure a safe environment: Carbon Monoxide, Methane, Propane, Hydrogen, Nitrogen Dioxide and other gases.

2.2 Do NOT use for

The BRS-485 is not intended for use in hazardous locations or industrial applications such as refineries, chemical plants, etc. Do not mount the BRS-485 where the normal ambient temperature is below 0°F or exceeds 125°F (-18°C or above 52°C). The BRS-485 mounts to a Macurco 6-Series detector installed on a 4" x 4" electrical box electrical box supplied by the contractor.



2.3 Features

- The Macurco BRS-485 interfaces the detector power and 4-20mA output lines with a mounted connector
- The BRS-485 monitors sensor type, gas level and trouble status communications from any of the Macurco 6-Series detectors
- Supports Modbus, BACnet, Metasys and Siemens communication protocol.
- Communication is on a serial line with a "Two-Wire" electrical interface in accordance with EIA/TIA-485 standard using RTU Transmission Mode
- Commercial type enclosure to protect and support the electronics
- Tricolor LED indicates power, test and communication status
- Mounts behind the detector inside of a standard 4" x 4" electrical box
- Held in place on the back of the 6-Series detector with a single screw
- USB connection to configure address and communication protocol and settings.
- RS-485 termination uses 3 pin connectors with jumper to select termination: The user selects no termination or 120 Ohm termination.
- Communications connections include signal (A and B), Common and shield terminals
- Intended for use in non-hazardous areas such as parking garages, warehouses, or other commercial facilities



2.4 Specifications

- Power & Current (without detector): 1.5W (max) from 12 to 24 VAC or VDC.
- Shipping Weight: 0.25 lb (0.11 kg)
- Size: 3 1/2 x 2 x 1 3/4 in. (8.9 X 5.1 X 4.4 cm)
- Operating Environment: 14°F to 122° F (-10°C to +50°C), 20 to 90% RH non-condensing
- Connections: plugs/terminals
- Color: Blue
- Mounting screw and screwdriver included
- BRS-485 operates as Modbus RTU Slave, BACnet MSTP Server, Metasys N2 Slave or Siemens FLN Slave
- Baud Rate:
 - Modbus: 2400, 4800, 9600, 19200 (default), 38400, 57600, 115200 bps
 - BACnet: 9600, 19200, 38400 (default), 57600, 76800, 115200 bps
 - Metasys N2 Slave: 9600
 - Siemens FLN Slave: 2400, 4800, 9600, 19200 (default), 38400, 57600, 115200 bps
- Parity:
 - Modbus: Odd, Even (default) and None
 - BACnet: No Parity
 - Metasys: No Parity
 - Siemens: No Parity



3 Installation Instructions

The following instructions are intended to serve as a guideline for the use of the Macurco BRS-485 Adapter. It is not to be considered all-inclusive, nor is it intended to replace the policy and procedures for each facility. If you have any doubts about the applicability of the equipment to your situation, call Technical Support at 844-325-3050.

WARNING

This equipment may not function effectively below 0°F or above 125°F (-18°C or above 52°C). Using the detector outside of this temperature range may adversely affect product performance.

3.1 Location

Refer to the user instructions of the specific Macurco 6-Series gas detector to which the BRS-485 will be connected.

3.2 Installation

The Macurco BRS-485 Adapter converts the Macurco 6-Series 4-20mA analog output to a digital output for use with addressable network systems. The Macurco 6-Series is a family of fully programmable, low voltage, dual relay gas detectors, controllers and transducers for BAS, HVAC and Fire & Security applications. The 6-Series detectors are used to measure the concentration of various gas and provide feedback and automatic control to help ensure a safe environment: Carbon Monoxide, Methane, Propane, Hydrogen, Nitrogen Dioxide and other gases.

1. Remove the 4-20mA/Power connector from the Macurco 6-Series gas detector.
2. Plug the BRS-485 adapter into the empty 4-pin socket.
3. Install the provided BRS-485 screw.
4. See the wiring diagram for wire connection.



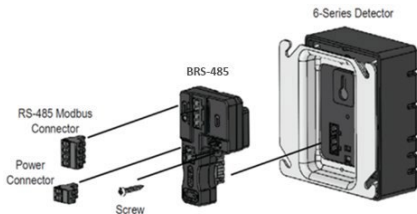


Figure 3-1 BRS-485 Installation Expanded

5. The 6-Series detector mounts on a 4" x 4" electrical box supplied by the contractor.
6. Connect the detector to the control cables with terminal plugs. When making connections, make sure the power is off.
7. There are two terminals for the dry alarm relay contacts, again with no polarity preference. The alarm relay can switch up to 0.5 A 120 V, or 60 VA. The alarm relay is activated if gas reaches or exceeds the alarm settings. See Operation of the detector User Instructions for details on relay settings.
8. The alarm relay can be configured to normally open (default) (N.O.) or normally closed (N.C.) and will activate if the gas concentration exceeds alarm set point. It will deactivate once the gas concentration drops below the alarm set point. Note that the "disable" setting will cause the alarm relay not to engage at all.
9. The dry contact, SPDT fan relay has three terminals: The Common (COM), normally open (N.O.) and the normally closed (N.C.) contact. The fan relay can switch up to 5.0 A up to 240 VAC. See Operation section of the detector User Instructions for details on relay settings.



3.3 Connection

The Macurco BRS-485 output is connected via a four-terminal screw type connector. The BRS-485 adapter is wired in the standard 2W-Modbus circuits definition with selectable built-in terminating resistors at the ends of the RS-485 bus. The power for the BRS-485 adapter is connected via a two-terminal screw type connector, 12 to 24 VAC or 12 to 24 VDC and no polarity.

Note: Running the Modbus cable adjacent to or in the same conduit with high voltage wires is not recommended as there may be interference from the high voltages. Line polarization should not be required for the BRS-485 but may be required for other devices on the RS-485 line - see manufacturer's directions.

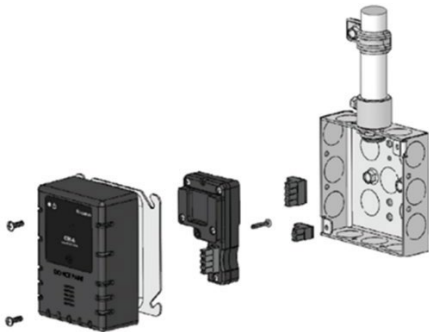


Figure 3-2 Connection Expanded

3.4 Wiring

3.4.1 Signal Wire

A serial Line Cable should be shielded for best performance. The shield should be connected on each detector at SHD terminal and connected to a ground terminal or chassis only at one end of the bus. An RS-485 must use a balanced pair (for A & B) and a third wire (for the Common). For RS-485, Wire Gauge must be chosen sufficiently wide to permit the maximum length (1,000m or 3,281ft). AWG 24 is always sufficient for the Data. Category 5 cables may operate for RS-485, to a maximum length of 600 m 1968.5 ft. For the balanced pairs used in an RS-485-system, wire with a characteristic impedance of higher than 100 Ohms may be preferred, especially for 19200 and higher baud rates.

Note: It is recommended to always use twisted wires to reduce noise and allow for reliable data communication over greater distances. Use at least 3-conductor wire with one twisted pair providing a pair for signal (A & B) and Common (COM) connections.

For best performance use shielded 3-conductor wire with one twisted pair providing a pair for signal (A & B), Common (COM) and shield ground (SHD) connections.

3.4.2 Topology

An RS-485 configuration without repeater has one trunk cable, along which devices are connected, directly (daisy chaining) or by short derivation cables. The trunk cable, also named "Bus", can be long. Its two ends must be connected on Line Terminations. (see Line Termination - End of Line Resistor section). The use of repeaters between several RS-485 is also possible.



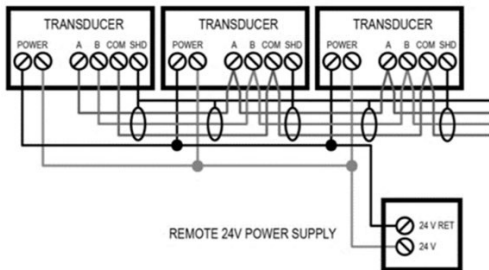


Figure 3-3 Modbus Wiring

3.4.3 Length

The end to end length of the trunk cable must be limited. The maximum length depends on the baud rate, the cable (Gauge, Capacitance or Characteristic Impedance), the number of loads on the daisy chain, and the network configuration (2-wire). For a maximum 9600 Baud Rate and AWG26 (or wider) gauge, the maximum length is 1000m 3281ft. The derivations must be short, never more than 20m 65.5ft. If a multi-port tap is used with n derivations, each one must respect a maximum length of 40m 131ft divided by n .

3.4.4 Grounding

The Common circuit (COM) must be connected directly to protective ground, preferably at one point only for the entire bus.



3.4.5 Power Wire

All field wiring is completed via modular connectors (provided). After wiring, simply plug the modular connectors into the matching connectors on the BRS-485. The power connections to the remote mounted detectors should be size AWG18 (minimum) for short runs. Since Macurco detectors are rated for operation between 12 and 24 VDC or VAC, the voltage drop between the power supply and the BRS-485 should not be an issue if the recommended power wire gauge guidelines below are followed. The terminals will accept wire from 16 to 28 AWG. To install a wire, strip back approximately 0.25 in. (6 mm) of insulation and insert the bare wire into the terminal. Tighten the screw clamp and ensure that the wire cannot be easily pulled from the connector.

| Wire gauge | Feet | Meters |
|------------|------|--------|
| 18 | 500 | 152 |
| 16 | 800 | 244 |
| 14 | 1250 | 381 |

Table 3-1 Power Wire lengths



4 Configuration

Macurco Network Parameter Utility

File Tools About

MACURCO
GAS DETECTION

BRS-485
Multi-Protocol V1.00S

Firmware Version

Device Status

Run Mode

Protocol

Address

Baud Rate

Parity

Response Delay (ms)

Ready

Macurco Network Parameter Utility

File Tools About

MACURCO
GAS DETECTION

BRS-485
Multi-Protocol V1.00S

Firmware Version

Device Status

Run Mode

Protocol

MAC Address

Baud Rate

Parity

APDU Timeout (ms)

Number of APDU Retries

Device Name

Device Instance

Max Master

Ready

Figure 4-1 NPU Program

4.1 Macurco NPU Software

Macurco Network Parameter Utility software can be used to set the BRS-485 to desired address, change the communication protocol and communication settings. This software can also be used to update BRS-485 with any latest firmware release from Macurco. Figure 4.1 shows the screen of NPU software when a device is connected. As shown in the Figure, it displays the device name (BRS-485) with device configuration version (V1.0DS) under it. Fields greyed out are read-only.

Protocol- Factory default for this field is BACnet. Click on drop down list to select appropriate communication protocol. Modbus, BACnet, Metasys and Siemens are protocol supported by BRS-485.

Address - The address of the device in the network. This setting is not available for BACnet.

MAC Address: Defines the address (0-127) that the BRS-485 (node) will reside on the network. This setting is available for BACnet only.

Baud Rate - Baud rate of the network.

Parity - Parity for the communication.

Response Delay: Time in milliseconds that the driver waits before responding to master requests. If no delay is required, setting this field to 0 instructs the driver to send its response as soon as possible. This setting is not available for BACnet.

APDU Timeout - The time in milliseconds that the driver will wait for a response from a device after sending a request. This setting is available for BACnet only.

A number of APDU Retries - The number of times the driver will retry a request when a response is not received. This setting is available for BACnet only.



Device Name: Device name that will appear for BRS-485 in BACnet network. The device name must be unique across the entire BACnet network. Enter a string of between 1 and 16 characters long. This setting is available for BACnet only.

Device Instance: Object Instance for BRS-485 device BACnet object. The instance number must be unique across the entire BACnet network. Valid entries are between 0-4194302. This setting is available for BACnet only.

Max Master: Defines the highest allowable address (0-127) for MS/TP master nodes on the network. Any address higher than this will not receive the token from the unit. Note that this value must be greater than or equal to the configured MAC Address(es). If the highest address on the network is unknown, set this field to 127. This setting is available for BACnet only.

4.2 Addressing and Communication Settings

Connect BRS-485 to PC using mini USB to USB adapter, and open Macurco NPU software. Macurco NPU software will display the current settings of the BRS-485. Update the settings in Macurco NPU software and hit Submit to load the updated settings into BRS-485. Footer of the NPU software displays the status of the settings update.

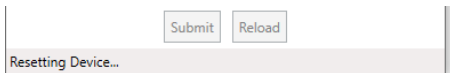


Figure 4-2

NOTE: After any configuration change, disconnect the USB cable from BRS-485 and perform power reset for BRS-485.

Following table shows the valid addresses for different protocols.

| Communication Protocol | Valid Address |
|------------------------|---------------|
| Modbus RTU | 1...247 |
| BACnet MS/TP | 0...127 |
| Metasys N2 | 1...255 |
| Siemens FLN | 1...98 |

Table 4-1



4.3 Firmware and Configuration Update

To receive the latest version of Macurco NPU, as well as firmware and configurations, download the Macurco NPU from our website <http://www.macurco.com/downloads.html>. If a newer version of firmware is available in the NPU you will be prompted to update when connected to the BRS-485.

Macurco NPU Folder downloaded from website contains a file "BRS-485_VXXX.DUF" where VXX is the version number. This file is the configuration file for different communication protocol supported by BRS-485. This configuration file can be uploaded to BRS-485 using following procedure.

- a. Open the Macurco Network Parameter Utility Software.
- b. If BRS-485 is connected to PC via USB, the software will display home screen like one in Figure 5-1. If Software does not detect the BRS-485 it will display "No Device Connected". Make sure software detects the panel before proceeding.
- c. Go to File (on the top left corner of the software) and select "Update Device...".
- d. A new window will pop up to select the file. Select the DUF file and hit Open.
- e. Now the DUF file will be loaded into the panel. The progress of the file update is displayed at the bottom.

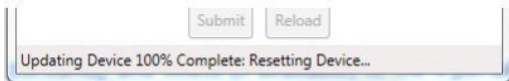


Figure 4-3

- f. Once the update is complete it will reset the device and it will return to home screen. Verify the correct version of the device configuration file is updated. Device configuration version is displayed alongside the product image displayed in NPU software. It has format "Multi-Protocol VX.XX" where X.XX corresponds to the device configuration version.



Place the EOL jumper on one of the following positions:

Y = 120 ohm

N = No termination (default)

If Line Termination requirements are different than those provided, then the line termination will need to be provided by the installer.



Figure 4-4 BRS-485 Front view

5 Operations

5.1 Power up

The Macurco 6-Series detector cycles through an internal self-test cycle for the first minute that it is powered. The unit will execute the test cycle any time power is dropped and reapplied (i.e. power failure). During the self-test cycle the unit will display the firmware version number, then count down from 60 to 0 (if the display setting is “On”) and finally go into normal operation. The alarm relay will be activated for 10 seconds and the fan relay for 60 seconds during the power-up cycle unless the “Power Up Test” (PUT) option is OFF. The indicator light (LED) will flash green during the self-test cycle. At the end of the 1-minute cycle, the unit will take its first sample of the air and the indicator light will turn solid green.

The BRS-485 is an adapter which allows the reading of a 6-Series gas detector over a RS-485 interface. To achieve this, the BRS-485 will monitor the 4-20 mA current output of the detector. At power up and during its warm-up period, the 6-Series detector will communicate its sensor type over the 4-20 current output using a custom protocol. The BRS-485 will automatically register each 6-Series detector as it is programmed with information about all the detectors to which it can be connected. The BRS-485 will use this information to determine the gas level sensed by the 6-Series detector by measuring the 4-20 mA current-loop output during normal operation of the detector.

5.2 4-20mA Loop

The 4-20mA Loop must be enabled “ON”, the 6-Series detector. If the 4-20mA loop has been disabled “OFF” the 6-series detector will not be able to send the signal information to the BRS-485.

5.3 Normal Operation

When the LED is solid GREEN, operation is normal, the BRS-485 knows the detector type, no errors are detected, and no data are being received or transmitted over the RS-485 line.

When the LED is GREEN with random bursts of AMBER, operation is normal and now data are being received or transmitted over the RS-485 line. The AMBER LED will come on anytime that there is data traffic.



6 Troubleshooting

6.1 On-Board Diagnostics

6.1.1 Unknown Sensor Code

GREEN/OFF Alternating every 500 milliseconds - The BRS-485 does not know the detector type, no Modbus communications are in progress and no errors are detected.

To correct this condition:

1. Disconnect the power line from the BRS-485.
2. Disconnect the communication line from the BRS-485.
3. Re-connect the communication line to the BRS-485.
4. Re-connect the power line to the BRS-485.

6.1.2 Error Codes

Solid RED - The BRS-485 detected an error and no Modbus communications are in progress.

RED with random bursts of AMBER - The BRS-485 detected an error and AMBER is displayed when data are received or transmitted over the RS-485 line

There are a number of conditions which are signaled in this way:

- Current EEPROM Settings not initialized
- Current EEPROM Settings have bad checksum
- Factory EEPROM Settings not initialized
- Factory EEPROM Settings have bad checksum
- Unknown Sensor exponent value
- Watchdog reset
- Loaded Factory EEPROM Settings in EEPROM Current Settings
- Latched sensor type different than registered sensor type



- Unknown sensor type because registration failed

6.2 Status LED States

| LED State | Description |
|-----------------------------------|---|
| Solid Green | Operation is normal, the BRS-485 knows the detector type, no errors are detected, and no data is being received or transmitted over the RS-485 line. |
| Solid Green with Bursts of Amber | Operation is normal and data is being received or transmitted over the RS-485 line. |
| Green/Off Alternating every 500ms | The BRS-485 doesn't know the detector type, no errors are detected, and no data is being received or transmitted over the RS-485 line. |
| Green/Red Alternating every 200ms | Operation is normal and a USB connection has been made to a PC. |
| Solid Red | The BRS-485 detected an error (BRS-485 Status is non-zero) and no RS-485 communications are in progress. |
| Red with Bursts of Amber | The BRS-485 detected an error (BRS-485 Status is non-zero) and Amber is displayed when data is received or transmitted over the RS-485 line. |
| Flashing Red | <p>A fatal error has occurred. The number of flashes indicates the error code, followed by 2 seconds of off time.</p> <p>1 – 5 = For internal use: contact Macurco for assistance</p> <p>6 = USB to Serial Pass-Through mode</p> <p>7 = Invalid or corrupt configuration. Use NPU to modify settings, recover configuration, or download a DUF file.</p> <p>8 – 10 = For internal use: contact Macurco for assistance</p> |



7 Maintenance

The BRS-485 does not require regular maintenance. All maintenance and repair of products manufactured by Macurco are to be performed at the appropriate Macurco manufacturing facility. Macurco does not sanction any third-party repair facilities.

WARNING

Do not disassemble unit or attempt to repair or modify any component of this instrument. This instrument contains no user serviceable parts, and substitution of components may impair product performance and void product warranty.

CAUTION

Avoid the use of harsh cleaning materials, abrasives, and other organic solvents. Such materials may permanently scratch the surfaces and damage the LEDs, labels, or instrument housing.

7.1 Cleaning

Cleaning of the external surfaces is best carried out using a damp cloth with a mild detergent or soap. Use a vacuum cleaner with soft brush to remove dust or contamination. Do not blow out the sensor with compressed air.



8 Testing

The Macurco BRS-485 adapter converts the 4-20mA analog signal from Macurco 6-Series type detectors to a digital signal for use with multipoint addressable systems. The 6-Series test procedures may be used to ensure that the BRS-485 accepts the 4-20mA output for communications. All 6-Series detectors are factory calibrated and 100% tested for proper operation. The units also perform a regular automatic self-test during normal operation. If the unit detects an improper voltage or inoperable component, it will default into Error mode. In this error mode, the Fan and Alarm relays will be activated, the 4-20 mA output will go to 24 mA, the unit will display the error code and the buzzer will chirp intermittently.

8.1 Operation Test

Normally this will be the only test required for the 6-Series detectors and is the recommended way to test the unit or units after installation. Check that the detector operating LED light is illuminated Green continuously. If not, do not proceed with the tests. If the unit is in error mode, contact your local representative or Macurco technical service representative for information on resolving the problem.

1. Remove the single screw in the middle of the front cover of the 6-Series detector.
2. Remove the front cover.
3. Observe the LED light on the front of the 6-Series detectors.
4. If the light is solid green, proceed to step 6.
5. If the light is off or flashing Green, refer to the Section 5.3 Normal Operation above.
6. Locate the switch labeled ENTER/TEST on the left side of the printed circuit board. Press the Test switch once.
7. The 6-Series detector will step through a cycle test:
 - a. The display progresses through the bUZ (buzzer Test) Art (alarm relay test), Frt (fan relay test) then 42t (4-20 mA output test).
 - b. Make sure that the settings are “on” and not disabled “diS”.
 - c. During the first 10 seconds of the test cycle, the display will show “bUZ” and set off the audible buzzer.
 - d. The alarm relay will be closed, so any devices connected to that relay will be tested.



- e. The Fan relay will be activated for the next 1 minute of the test, so if the fan circuits are wired in the typical manner, the fan should run.
 - f. The 4-20mA output will then ramp up from 4 to 16 mA over the next 130 seconds of the test, so if the circuit is wired in the normal manner, the control panel or building automation system should respond.
 - g. At the end of the test cycle, the light will turn green and be on steady (Normal Operation), the fan and alarm relays will be in standby mode and the 4-20 mA output will return to 4 mA in clean air (Exception for Oxygen with OX-6).
8. When testing is completed, reassemble the unit or units

8.2 Manual Operation Test

This option gives the user the opportunity to manually initiate an individual test for the audible buzzer, each relay, the analog output and the sensor response to gas. From normal operation mode, press the Next button 2 times to get to the Test Mode (tSt). Press the Enter button once to get into the Test Menu. Press the Next button to scroll through the Four test options and press Enter to initiate the selected test. Note that if the relay or 4–20 mA output has been disabled, the test selection will not be displayed in the test menu.

bUZ – Buzzer Test, 4 seconds

Art – Alarm Relay Test, 6 seconds

FrT – Fan Relay Test, 60 seconds

42t – 420 Loop Test, 135 seconds

gSt – gas test, xxx seconds (available on select detectors)



9 Appendix A

Please refer to BRS-485 product page in www.macurco.com for details on Modbus Registers, BACnet Objects, Metasys N2 Objects, and Siemens FLN points.

NOTE: BRS-485 dynamically adjusts which objects/registers are exposed on the network based on whether a single-sensor detector or dual-sensor detector is detected by the BRS-485. So, please refer to corresponding object mapping available on the BRS-485 product page in www.macurco.com. For dual sensor (CX-6), S1 refers to carbon monoxide sensor and S2 refers to nitrogen dioxide sensor.

BRS-485's network driver does not start up until a valid Macurco detector is recognized and hence objects/registers are not exposed until after successful registration with valid Macurco detector. Following table list valid detector type for BRS-485 along with other detector details.

| Detector | Sensor Type | Sensor Range | Sensor Resolution |
|----------|-------------|---------------|-------------------|
| CM-6 | 1 | 200ppm | 1ppm |
| TX-6-ND | 2 | 20.0ppm | 0.1ppm |
| GD-6 | 3 | 50% LEL | 1% LEL |
| TX-6-AM | 4 | 100ppm | 1ppm |
| TX-6-HS | 5 | 50ppm | 1ppm |
| RD-6 | 6 | 1000ppm | 10ppm |
| OX-6 | 8 | 25.0% v/v | 0.1% v/v |
| CD-6H | 9 | 5000ppm | 50ppm |
| CD-6MC | 9 | 5000ppm | 50ppm |
| CD-6G | 10 | 5.00% v/v | 0.01% v/v |
| CX-6 | 1 (CO) | 200ppm (CO) | 1ppm (CO) |
| | 2 (NO2) | 20.0ppm (NO2) | 0.1ppm (NO2) |



Information related to detector/sensor such as sensor reading, sensor type, sensor resolution, and sensor range are accessible via Modbus, BACnet, Metasys and Siemens communication protocol.

NOTE: Value of Sensor reading object/register is not reliable when trouble object is set or sensor type is anything other than listed in table above. In such case other objects such as Sensor Type, No Signal, Calibration Overdue, Trouble, Warm Up etc. must be monitored to validate sensor reading and get current state of the detector.

NOTE: Due to limitation of Siemen FLN protocol, readings for CD-6H and CD-6MC might not be communicated correctly if FLN master interprets 16-bit values as signed integers. So, BRS-485 for use with CD-6H and CD-6MC is not recommended for Siemen FLN protocol if FLN master interprets 16-bit values as signed integer.

NOTE: Due to limitation of Siemens FLN protocol and variation in range and resolution of Macurco detectors, BRS-485 when used with CD-6G for Siemens FLN protocol will round readings for CD-6G to one decimal place instead of two decimal place readings displayed on CD-6G detector. Due to same reason, resolution for CD-6G will be displayed as 0.0 instead of 0.01.

In addition to this, BRS-485 also provides following additional information about BRS-485 and detector connected to BRS-485.

a. Last Sensor Type

It is the last sensor id detected by BRS-485 at last power on.

b. Cal Due Days

It represents the number of days until the detector connected indicates calibration overdue. Refer to product manual to verify if the detector used supports calibration period or not. Following table represents some possible values for this field.

| Cal Due Days | Description |
|--------------|-------------|
|--------------|-------------|



| | |
|--------|--|
| 65535 | Calibration Due feature is disabled. |
| 65534 | Unknown value (not transmitted by detector yet) |
| 65533 | Calibration Period feature not supported by detector |
| 31 | There are more than 30 days until calibration due |
| 1 - 30 | Indicates number of days left before calibration overdue |
| 0 | Calibration Overdue |

b. UntilCalDue

Like Cal Due Days it also consists of information related to time left until the detector connected indicates calibration overdue. But, value represented is the intervals of 3 hours until calibration overdue.

| Cal Due Days | Description |
|--------------|--|
| 255 | Calibration Due feature is disabled. |
| 254 | Unknown value (not transmitted by detector yet) |
| 253 | Calibration Period feature not supported by detector |
| 241 | There are more than 30 days until calibration due |
| 1 - 240 | Indicates number of days left before calibration overdue |
| 0 | Calibration Overdue |

c. No Signal

When there is no signal on the 4-20mA output of the detector connected to BRS-485, the corresponding bit of Modbus register or corresponding object is set.

d. Cal Overdue



When the detector connected goes into calibration overdue, then the corresponding bit of Modbus register or corresponding object is set. Please refer to product manual to check if detector supports this feature and refer to the manual for detail on Calibration Overdue.

e. BRS485 Status

When the BRS-485 status is not zero, then it will set this object. Following are possible reasons for non-zero BRS-485 status.

- When calibration data cannot be loaded. This is related to factory operation and should not occur in the field.
- When incompatible/unknown detector is connected to BRS-485.

f. Warm up

This is set during the first 60 seconds after power is applied to BRS-485. Since objects are not exposed until successful registration by BRS-485, this object might not appear for the first 30 seconds of power up.

g. Over Range

This is set when there is over range signal on the current loop.

h. Trouble

This is set when there is trouble signal (24mA) on the current loop. This is also set when No Signal or Calibration overdue is set.

i. Cal Error

This is set when the calibration data cannot be loaded and BRS-485 is not calibrated. This is related to factory operation and should be 0 when used in the field. Do not use BRS-485 if this object is set.



j. Unknown Sensor

This is set when BRS-485 is connected to unknown/incompatible detector.

10 Appendix B – Table of Figures

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11 Macurco Gas Detection Product Limited Warranty

Macurco warrants the BRS-485 Adapter will be free from defective materials and workmanship for a period of two (2) years from date of manufacture (indicated on the cover of the BRS-485), provided it is maintained and used in accordance with Macurco instructions and/or recommendations. If any component becomes defective during the warranty period, it will be replaced or repaired free of charge, if the unit is returned in accordance with the instructions below. This warranty does not apply to units that have been altered or had repair attempted, or that have been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other express warranties, obligations or liabilities. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED TO A PERIOD OF TWO (2) YEARS FROM THE PURCHASE DATE. Macurco shall not be liable for any incidental or consequential damages for breach of this or any other warranty, express or implied, arising out of or related to the use of said gas detector. Manufacturer or its agent's liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts.



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