



BTA-100 Operation Manual



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A Repair Authorization Number (RA) must be obtained from Pyxis Technical Support before any product can be returned to the factory. Pyxis will pay freight charges to ship replacement or repaired products to the customer. The customer shall pay freight charges for returning products to Pyxis. Any product returned to the factory without an RA number will be returned to the customer.

Pyxis Technical Support

Contact Pyxis Technical Support at service@pyxis-lab.com or 1-866-203-8397

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1. Introduction

The Pyxis BTA-100 is a Bluetooth to 4-20 mA conversion device. It receives a digital Bluetooth wireless signal and converts the signal to a 4-20 mA analog signal output. It can be operated in three modes: connectable peripheral (pairing or P mode), observer (beacon reader or O mode), and central (C mode). In these modes, the BTA-100 can be a host to acquire data from other Pyxis Bluetooth devices or a client to be connected to a phone or computer for setup and firmware upgrade. The operational mode and received sensor value are shown in the OLED display.

2. Specification

Item	Parameter
Power	24V, 1W
Bluetooth Distance	32-50 ft. (10-16 meters), line of sight
Operation Temperature	14 - 122 °F (-10 - 50 °C)
Storage Temperature	-4 - 158 °F (-20 - 70 °C)
Display	240 x 160 DPI, OLED display
Output	1 X 4-20 mA
Dimension	3.15 inch (80 mm) diameter, 2 inch (51 mm) height
Weight	0.5 pounds (230 grams)
Cable Length	5 feet, terminated with IP67 connectors
Regulatory	CE, Class I Div II

3. Unpackaging the Instrument

Remove the instrument and find the standard accessories from the shipping container as listed below. Inspect each item for any damage that may have occurred during shipping. Verify that all accessory items are included. If any item is missing or damaged, please contact Pyxis Lab Customer Service at service@pyxis-lab.com.

1.1 Standard Accessories

- The BTA-100 adapter
- An open-ended cable
- The Instrument Manual is also available from <http://www.pyxis-lab.com/support-2>

1.2 Optional Accessories

- 10, 20, 50, 100-foot extension cables (P/N: MA-10CR, MA-20CR, MA-50CR, and MA-100CR)
- Optional accessories need to be purchased separately

4. Wiring Guide

Wire the BTA-100 to a 24 VDC power supplier and a controller for the 4-20 mA output according to the following wiring instruction. Follow the wiring table below to connect the BTA-100 to a controller.

Wire Color	Designation
Red	24V +
Black	Power ground
White	4-20 mA+
Green	4-20 mA-
Blue	RS-485 A
Yellow	RS-485 B
Clear	Shield, solution ground

5. Function Buttons

The following is the description of the four function buttons. These buttons are used to select one of three Bluetooth modes, and to discover and pair with a Pyxis Bluetooth device.



Figure 1. Four function buttons and two indicator lights



Power Button:

- Power On: Hold the power button for 1 second.
- Power Off: Hold the power button until the OLED screen is off.
- Display wakeup: Hold the power button for 1 second to relight OLED display (Only power button has this function)



Selection Button: Hold the button to cycle through the selectable items on the OLED screen.



Enter Button: Confirm the selection.



Bluetooth Mode Button: Hold the button to cycle through three Bluetooth modes: connectable peripheral mode (P), beacon observer mode (O), and central mode (C). In the O and C modes, the BTA-100 can be paired with a Pyxis Bluetooth device, display the value and unit measured by the device, and output the corresponding 4-20 mA analog signal to a controller.

6. Observer Mode

Set the BTA-100 to the observer (O) mode to connect to a Pyxis sensors or probe that is in its beacon mode. In this mode, the BTA-100 reads the beacon message from the beacon device and displays the measurement value and unit of the connected device on the screen. If multiple beacon devices in the field are present, the BTA-100 needs to be configured to read from the target device. The Pyxis probe or sensor beacon signal can still be read and processed by other Pyxis Bluetooth devices such as smart phones even after being paired with the BTA-100.

If the BTA-100 has never been connected to any device, it will scan for any Pyxis sensors or probes that are running in the beacon mode. The O icon is displayed in the upper-right corner to indicate that the observer mode is activated. The Mac address list of discovered and connectable devices will be displayed on the screen after 5 seconds (figure 2). The last four digits of the Bluetooth Mac address is printed on the device label and laser marked on the body of the device.

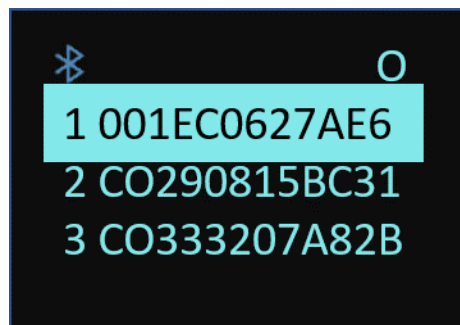



Figure 2. Mac address list of the discovered devices

Press the enter button  to select the target device to connect to. If the connection is successful, the value and unit of the target sensor/probe will be displayed. Figure 3 is an example of the BTA-100 connected to the Pyxis corrosion sensor CR-200.

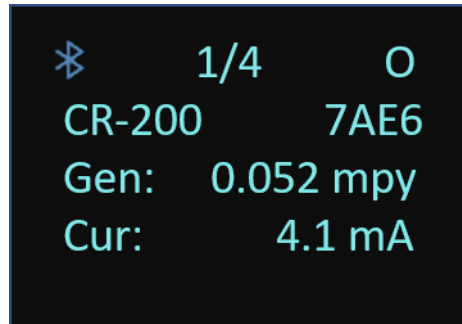


Figure 3. Observe a Pyxis level sensor and display the sensor value

If the connection failed, the menu shown in figure 4 will be displayed. Press **Reconnect** to connect to the previously connected device again. Press **Search Again** to search again any Pyxis sensors or probes that are running in the beacon mode. Press **To C Mode** to switch the BTA-100 to the central mode.

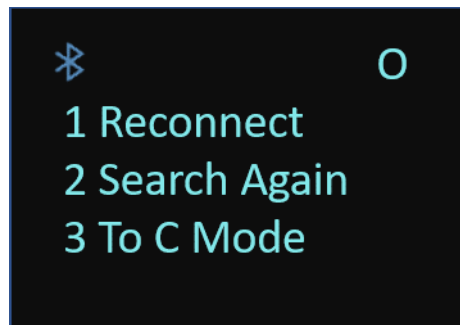



Figure 4. Options after failing to connect to the previously connected device

If the BTA-100 has already been paired with any Pyxis sensor/probe, it will attempt to connect to the previously connected device after being powered on.

7. Central Mode

Set the BTA-100 to central mode to connect to a Pyxis sensor or probe that is in the peripheral mode. After being connected to the BTA-100, the Pyxis sensor or probe is not able to connect to other Bluetooth devices such as smart phones.

Select **To C Mode** after O mode being failed as shown in figure 4 or press the Bluetooth mode button . The BTA-100 will search any pyxis devices or probes that are running in the peripheral mode. The C icon is displayed in the upper-right corner to indicate the central mode being activated. The Mac address list of discovered and connectable devices will be displayed on screen as shown in figure 5.

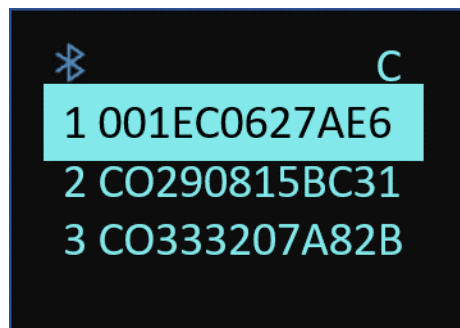



Figure 5. The Mac address list of the discovered devices

Press on the enter button  to select the target device to connect to. If the connection is successful, the value and unit of the target sensor/probe will be displayed, similar to that shown in figure 3.

If the connection failed, the menu shown in figure 6 will be displayed. Press **Reconnect** to connect to the previously paired device again. Press on **Search Again** to search any Pyxis sensors or probes that are running in the peripheral mode. Press **To O Mode** to switch the BTA-100 to the observer mode.

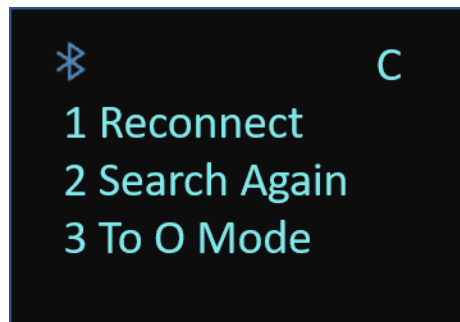


Figure 6. Options after failing to connect to the previously connected device

NOTE - Please note that the working mode is preserved even if BTA-100 is rebooted. If the BTA-100 is setup to the observer mode, the BTA-100 will remain in the observer mode after a power-off and power-on cycle.

8. Connect with LS202 (Pyxis Ultrasonic Level Sensor – Bluetooth)

The LS-202 sensor can be wirelessly connected to the BTA-100 in two ways as listed in the following table. The 4-20 mA output from the **BTA-100** adapter can be wired to a controller.

LS-202 to BTA-100	LS-202 Mode	BTA-100	Comment
Peripheral to Central	Peripheral	Central	LS-202 can be only read by BTA-100 and cannot be discovered by other Bluetooth devices. The Bluetooth mode indicator “P” on LS-202’s OLED screen and “C” on BTA-100.
Beacon to Observer	Beacon	Observer	LS-202 can be read by other Bluetooth devices while being read by BTA-100. Bluetooth mode indicator “B” are displayed on LS-202’s OLED screen and “O” on BTA-100.


The user does not need to do any configuration before using the BTA-100. The BTA-100 can read the related parameters from the level sensor and automatically outputs a 4-20 mA signal accordingly.



8.1. Peripheral to Central Mode (LS-202)



Figure 7. Connect with LS202 in central mode

Follow the following steps to pair the LS-202 sensor with the BTA-100 adapter.

- Turn on the LS-202 and switch to the peripheral mode (Bluetooth mode indicator “P” on the LS-202 screen)
- Use the Bluetooth button  to switch the BTA-100 to the central mode (Bluetooth mode indicator “C” on the BTA-100 screen)




- The BTA-100 will search Pyxis Bluetooth devices that are in the peripheral mode and display the Mac addresses of the discovered devices (figure 5).
- Use the selection button  to scroll to the MAC address that belongs to the LS-202 sensor and press the enter button  to establish the peripheral-to-central connection.

8.2. Beacon to Observer Mode (LS-202)



Figure 8. Connect with LS202 in the observer mode

The advantage of using the BTA-100 adapter reading the LS-202 in the beacon mode is that multiple Bluetooth enabled devices including a phone app can read the LS-202 beacon messages at the same time. Follow the steps to establish the LS-202 to the BTA-100 connection in the beacon-to-observer mode.




- Switch LS-202 to the beacon mode (Bluetooth mode indicator “B” on the LS-202 screen)
- Use the Bluetooth button  to switch the BTA-100 to the observer mode (Bluetooth mode indicator “O” on the BTA-100 screen).
- The BTA-100 will search Pyxis Bluetooth devices that are in the beacon mode and display the Mac addresses of the discovered devices (figure 2).
- Use the selection button  to scroll to the MAC address that belongs to the LS-202 sensor and press the enter button  to establish the beacon-to-observer connection.

9. Connect with CR-200 (Pyxis LPR Corrosion Sensor Bluetooth)

9.1. Beacon to Observer Mode (CR-200)



Figure 9. Connect with CR-200 in Observed Mode

- Turn on the CR-200. The CR-200 will be in the default beacon mode. Please refer to the CR-200 manual for details.
- Turn on the BTA-100. The BTA-100 will be in the default observer mode if it has not been previously paired with any Pyxis devices. If the BTA-100 is not in the observer mode, use the Bluetooth mode button  to switch to the observer mode.
- The BTA-100 will search Pyxis Bluetooth devices that are in the beacon mode and display the Mac addresses of the discovered devices.
- Use the selection button  to scroll to the MAC address that belongs to the CR-200 sensor and press the enter button  to establish the beacon-to-observer connection.

10. Peripheral Mode (CR-200)

This mode is designed for upgrading BTA-100 firmware. Special applications of using the BTA-100 to wirelessly connect to the Pyxis online or handheld devices and other non-Pyxis Bluetooth devices can be developed. Please contact the Pyxis technical support by email service@pyxis-lab.com for details.

11. FCC Statement

The BTA-100 has been tested and comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

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