Barksdale®
CONTROL PRODUCTS
CRANE Barksdale, Inc./Barksdale GmbH
A Subsidiary of Crane Co.

BiT - Barksdale Intelligent Transmitter

450X, 450E & 450 Series

HART REGISTERED

HART COMMUNICATION PROTOCOL

Installation and Operational Manual



- High Performance thin-film sensor for high pressure models
- ATEX, IECEx, UL, CSA and Single Seal approvals for use in hazardous locations
- Lightweight and compact footprint, up to 55% smaller than competitors in its class with an all stainless-steel design
- Latest HART 7 communication protocol carriers device diagnostics, field calibration and rangeability capabilities over the 2-wire 4-20mA output
- 10:1 turndown ratio (re-ranging) enabling remote span adjustability while maintaining accuracy and allowing one part number for multiple pressure ranges
- Highly accurate down to 0.1% FSO (LHR)
- Vacuum to 30,000 psi (24 standard ranges), custom ranges available
- Long term stability, reducing maintenance & calibration cost
- Multiple process & electrical connections to meet your application needs
- NACE and CE compliant with highly corrosion resistant material, environment friendly halogen free wires and superior EMI/RFI protection

Barksdale, Inc.
3211 Fruitland Avenue,
Los Angeles, CA 90058-0843
U.S.A.
Phone: (800) 835-1060
Bulletin No. 272438-C
www.barksdale.com

Contents

SAFETY INSTRUCTIONS AND WARNINGS 3
Legends: 3
1. Introduction 4
1.1 Using this manual 4
1.2 Product Recycling/ Disposal 4
2. Installation 5
2.1 HART Transmitter Installation Flowchart: 5
2.2 Mounting: 5
2.3 Wiring and Power-up: 6
3. Configuration and Diagnostics 8
3.1 Device Variables – Review configuration data 8
3.1.1 Primary Variables (PV) Measurement 9
3.1.2 Range Values and PV Status 9
3.1.3 Device Information 10
3.1.4 Loop Test 10
3.2 Device Setup 11
3.2.1 Set process variable units 12
3.2.2 Re-range 12
3.2.3 Damping 14
3.2.4 Loop Current Mode and Multi-drop communication 14
3.2.5 HART Setup 15
3.3 Diagnostics – Device Status 16
4. Operation and Maintenance 17
4.1 Calibration for HART Transmitter 17
4.2 Calibration overview for BIT 17
4.2.1 Zero Trim 17
4.2.2 Restore Factory Zero 18
5. Troubleshooting: 19
6. Product configurator – How to order 20
7. Appendix A: Installation and Maintenance Instructions (IMI) 20
8. Appendix B: Product Certifications & Downloads 20
9. Return Request / Inquiries 20

SAFETY INSTRUCTIONS AND WARNINGS

⚠ Read this manual before working with the product. The contents must be thoroughly read and understood before installing, using or maintain this product. Misuse of this product may cause explosion and personal injury.

⚠ **450X Series** EXPLOSION PROOF pressure transmitters are listed for use in Hazardous Location (Classified)

E146589
Class I, Div. I, Groups A, B, C & D
Class II, Div.I, Groups E, F & G.

II 2 G D,
Ex, db IIC T5 Gb,
Ex tb IIIC T81°C Db IP66 & IP67
-40°C≤Tamb ≤ +80°C
DEMKO 18 ATEX 2084
IECEx UL 18.0090
HART Protocol (Optional)

Consult Sales Drawing & EN/IEC 61000-4 for appropriate Electromagnetic Compatibility (EMC) requirements.

⚠ Temperature Range:
Compensated: 0 to +165°F (-18 to +74°C)
Storage: -40 to +185°F (-40 to +85°C)
Media: -40 to +176°F (-40 to +80°C)
Operating (ambient): -40 to +176°F (-40 to +80°C).

455E Series INTRINSIC SAFETY Pressure Transmitters are listed for use in Hazardous Location (Classified)
USE WITH BARKSDALE CONTROL DRAWING #272471

Class I, Div. I, Groups A, B, C & D
Class II, Div.I, Groups E, F & G
Ex ia IIC T4 Ga
Ex ia IIIC T135ºC Da
Class I, Zone 0, AEx ia IIC T4 Ga
Zone 20, AEx ia IIIC T135ºC Da
FACTORY SEALED NEMA 4X ENCLOSURE

II 1 G D,
Ex, ia IIC T4 Ga,
Ex ia IIIC T135°C Da IP66 & IP67
-40°C≤Tamb ≤ +80°C
CML 19 ATEX 2240X
IECEx CML 19.0066X

450 Series for Ordinary Locations (Non-Hazardous):
For ordinary locations:

E302981

⚠ Prior to installation, check the wetted parts material for compatibility to the process media.
⚠ This product should be installed according to local standards and codes for that area.
⚠ This product does not have any field replaceable parts. Any replacement of components will invalidate third-party issued approvals and certifications, and may impair suitability for Class I, Div. I / Zone 0 locations.
⚠ Avoid contact with the exposed leads and terminals. High voltage that may be present on leads can cause electrical shock.
⚠ Properly tighten process connections before applying pressure.
⚠ Apply and maintain pressure within the limits of markings of the device.

Legends:

BIT	Barksdale Intelligent Transmitter
HART	Highway Addressable Remote Transmitter
DCS	Distributed Control System
PLC	Programmable Logic Controller
PV	Primary Variable
DDL	Device Description
LRV	Lower Range Value
LSL	Lower Sensor Limit
URV	Upper Range Value
USL	Upper Sensor Limit
Xtr	Transfer
PC	Personal Computer
AWG	American Wire Gage

1. Introduction

1.1 Using this manual

The manual provides information on installation, configuration, operation and maintenance of the 450 & 450X series BIT Pressure Transmitter.

- **Installation** contains mechanical and electrical installation instructions.
- **Configuration** provides instruction on configuring the transmitter with a field communicator and Distributed Control System. Information on software functions and configuration parameters is also included.
- **Operation and Maintenance** contains operation and maintenance instructions.
- **Troubleshooting** provides troubleshooting techniques for the most common operating problems.
- **Appendix A:** Installation & Maintenance Instructions
- **Appendix B:** Product Certifications

1.2 Product Recycling/ Disposal

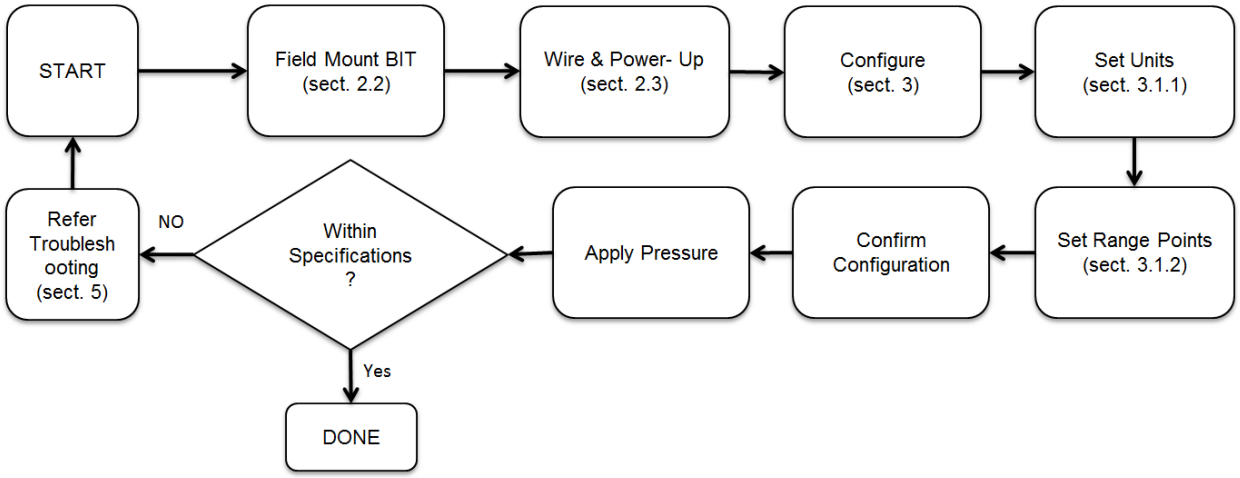
Recycling of equipment and packaging should be taken into consideration and disposed of in accordance with local and national legislation/regulations.

This product has Printed Circuit Board. So should be considered as e-waste and should be disposed accordingly.

2. Installation

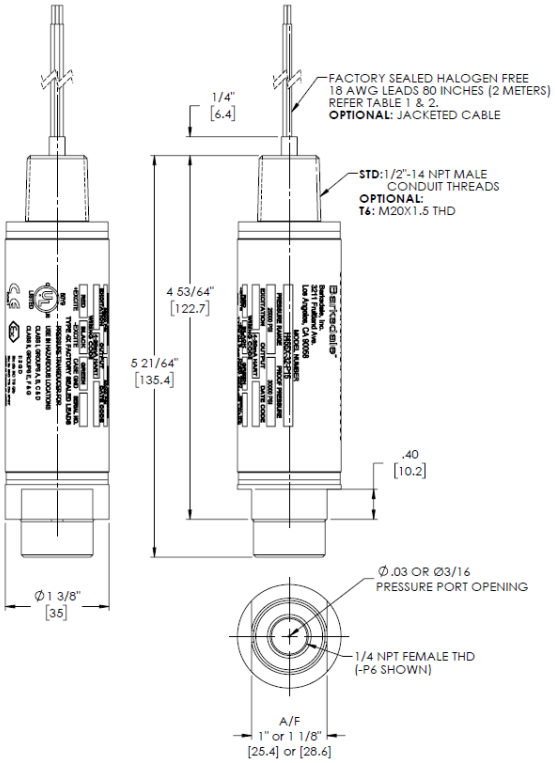
Refer to IMI #272439 (450X Series) & #272441 (450 Series) for Installation & Maintenance Instructions and Product Specifications.

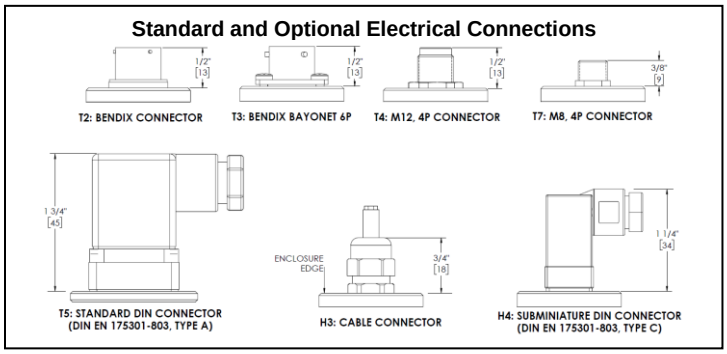
2.1 HART Transmitter Installation Flowchart:



2.2 Mounting:

Always locate the product where shock, vibration and ambient temperature fluctuations are minimal. Do not mount in ambient temperature areas exceeding 85°C (for cULus installation) or 80 °C (for ATEX installation). Apply torque 125 to 150 lb.in to the flat available at the process connection of the transmitter.
Refer below dimensional drawing while mounting of the unit.





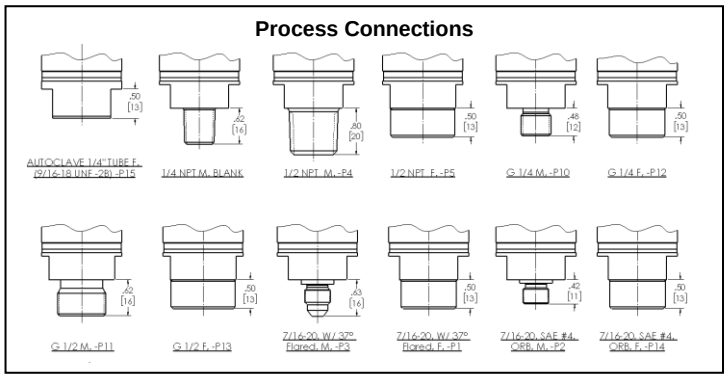


Figure 1: Dimensional Drawing

2.3 Wiring and Power-up:

Use quality low-capacitance twisted pair or shielded wire cable. Do not run wires next to power lines, electrical systems, motors, generators, or any other equipment which may generate a significant amount of electrical noise or magnetic fields. If shielded cable is used, ground only one side of the cable, typically to the negative side of the power supply.

As a general rule of thumb, if the cable length is less than 5000 ft., #24 AWG wire can be used. Any cable runs over 5000 ft. should use #20 AWG wiring. Customer can do the further wire connection to standard 18 AWG wire provided with unit.

Wire Code for connections:

TABLE 1. FREE LEAD WIRES AND CONNECTOR PIN CONNECTIONS				
MODEL No.	**RED/A/1**	**BLACK/B/2**	**GREEN/D/4**	**WHITE/C/3**
H455	+ EXCITATION	- EXCITATION	EARTH GROUND	NOT INCLUDED
455	+ EXCITATION	- EXCITATION	EARTH GROUND	NOT INCLUDED
452	+ EXCITATION	- EXCITATION	EARTH GROUND	VOLTAGE OUTPUT

TABLE 2. JACKETED CABLE WIRE CONNECTIONS (-J Option)				
MODEL No.	**WHITE**	**BROWN**	**GREEN**	**YELLOW**
H455	+ EXCITATION	- EXCITATION	EARTH GROUND	NOT INCLUDED
455	+ EXCITATION	- EXCITATION	EARTH GROUND	NOT INCLUDED
452	+ EXCITATION	- EXCITATION	EARTH GROUND	VOLTAGE OUTPUT

To set up a current loop capable of reliable HART communication, several items are needed:

- HART capable/enable device
- DC regulated power supply, set to 24 V or 9 to 30 VDC range.
- Minimum 250 ohm load resistor
- Quality twisted pair or shielded wire
- HART Master (PC or Handheld Field Communicator)

The unit should be attached to the power supply with load resistor in series as shown in the picture below to create the current loop. A current meter can be placed anywhere on the loop to measure the loop current. A voltmeter can also be used to measure the current by measuring the voltage across the 250 ohm in series as shown in the picture below.

The two HART signal wires can either encapsulate the load resistor or the HART unit under test, as shown in the picture below. Since HART allows for two masters (Primary and Secondary), the two masters can be attached at the same points.

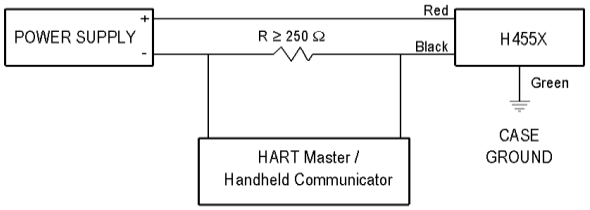


Figure 2: Wiring and Power-up diagram

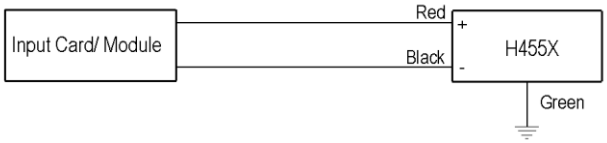


Figure 3: Wiring and Power-up diagram (Field Operation)

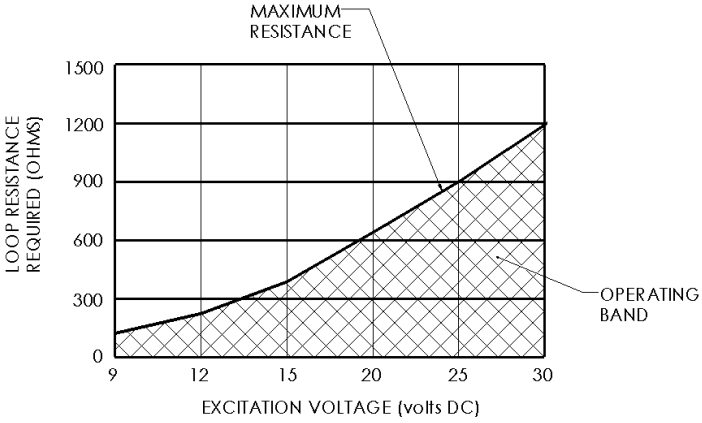


Figure 4: Power Supply Vs Load Resistance Chart

Note: Communication requires a minimum loop resistance of 250 ohms.

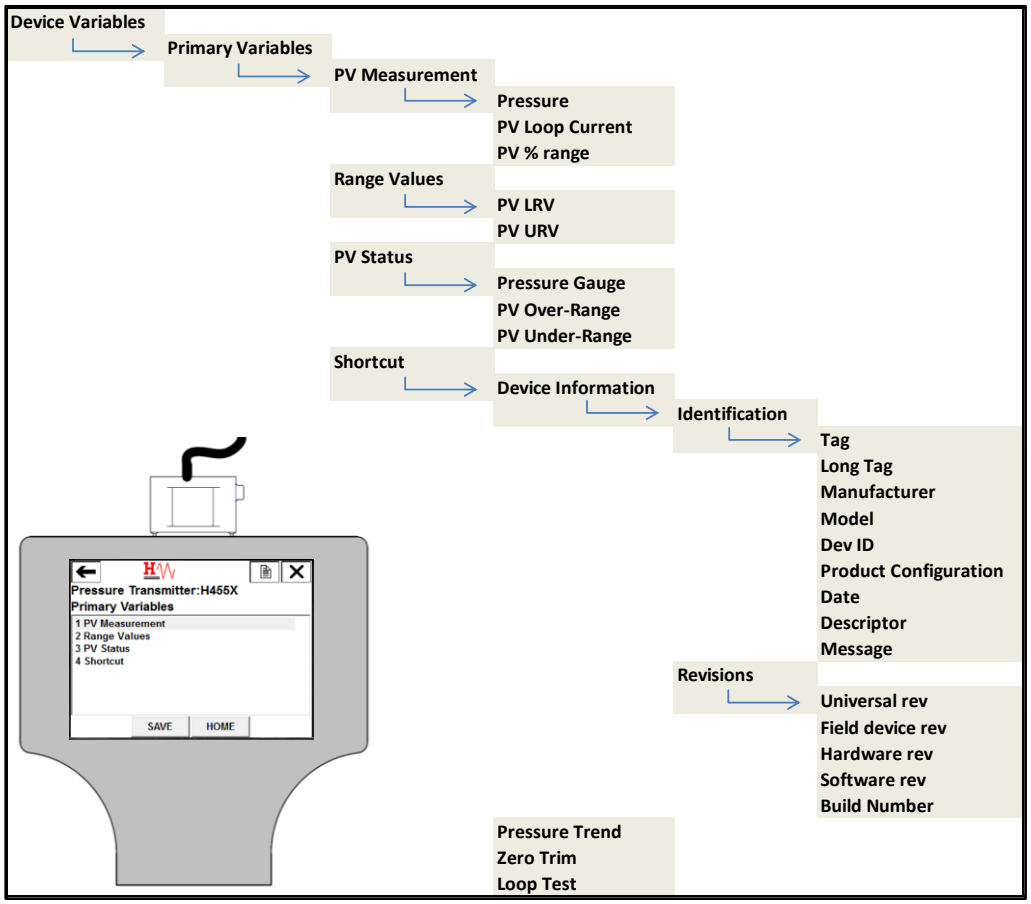
3. Configuration and Diagnostics

This section provides instruction on configuring the BIT. Information on software functions and configuration parameters is included.

The instructions can be performed using either a compatible Field communicator or a Distributed Control System. The Enhanced Device Descriptor files are required to be imported before performing any action. When using a Field Communicator, any configuration change made must be sent to the transmitter by using the Send key. Similarly, configuration changes made using a Distributed Control System are implemented when the 'Apply' button is selected.

⚠ Whenever sending or requesting data that would disrupt the loop or change the output of the transmitter, set the process application loop to manual. The user interface on either a field communicator or a DCS will prompt you to set the loop to manual when necessary. Acknowledging this prompt does not set the loop to manual. The prompt is only a reminder; set the loop to manual as a separate operation.

3.1 Device Variables – Review configuration data



The device variables provide transmitter output, range values, PV status, device identification and device revisions. This is a read-only section meant to give an overview of the process and the device. An exception is the shortcut provided to perform the essential procedures including Zero Trimming and Loop Test.

Before placing the transmitter into operation, review the transmitter configuration data and the digital output parameters to ensure the transmitter is operating properly.

3.1.1 Primary Variables (PV) Measurement

The PV measurement provides transmitter output, and is continuously updated. The pressure reading is provided in the selected engineering units along with percent of range and analog output or the PV loop current.

Host Interface - Field Communicator and DCS

The path to reach the PV measurement is as follows:
Device Variables → Primary Variables → PV Measurement

You may also refer to the Menu Tree above. PV measurement menu displays the following variables:

- Pressure
- Percent of Range
- PV Loop Current - Analog Output

3.1.2 Range Values and PV Status

The pressure reading in both engineering units and percent of range will continue to track the pressures outside of the defined range from the lower to the upper range limit.

Host Interface - Field Communicator and DCS

The path to reach the Range Values and PV Status are as follows:
Device Variables → Primary Variables → Range Values
Device Variables → Primary Variables → PV Status

You may also refer to the Menu Tree above. Range Values menu displays the following variables:

- PV LRV – Lower Range Value
- PV URV – Upper Range Value

The transmitter automatically and continuously performs self-diagnostic routines. If the self-diagnostic routines detect a failure, the transmitter reports the failure under PV Status and drives the output to configured alarm values.

- PV Over-range: The transmitter will set this alert if the applied pressure goes beyond the Upper Range Value. This will also latch the transmitter output to 20mA.

- PV Under-range: The transmitter will set this alert if the applied pressure goes below the Lower Range Value. This will also latch the transmitter output to 4mA.

3.1.3 Device Information

The Device Information provides important information regarding Device Identification and Revision numbers.

Host Interface - Field Communicator and DCS

The path to reach the Device Information is as follows:
Device Variables → Primary Variables → Shortcut → Device Information

You may also refer to the Menu Tree above. Device information menu displays the following variables:

- Identification
  - Tag
  - Long Tag
  - Manufacturer
  - Model
  - Device ID
  - Product Configuration
  - Date
  - Descriptor
  - Message
- Revisions
  - Universal Rev
  - Field Device Rev
  - Hardware Rev
  - Software Rev
  - Build Number

3.1.4 Loop Test

The Loop Test feature is designed to verify proper loop wiring and transmitter output, and should only be performed after the installation of the transmitter.

Host Interface - Field Communicator and DCS

The path to reach the enhanced method “Loop Test” are as follows:
Device Variables → Primary Variables → Shortcut → Loop Test
Device Setup → Guided Setup → Loop Test

You may also refer to the Menu Tree above. The enhanced method will guide you through the following procedure:

- Connect a reference meter to the transmitter by shunting transmitter power through the meter at some point in the loop.
- Select Next after the control loop is set to manual.

  ⚠ Whenever sending or requesting data that would disrupt the loop or change the output of the transmitter, set the process application loop to manual. The user interface on either a field communicator or a DCS will prompt you to set the loop to manual when necessary. Acknowledging this prompt does not set the loop to manual. The prompt is only a reminder; set the loop to manual as a separate operation.

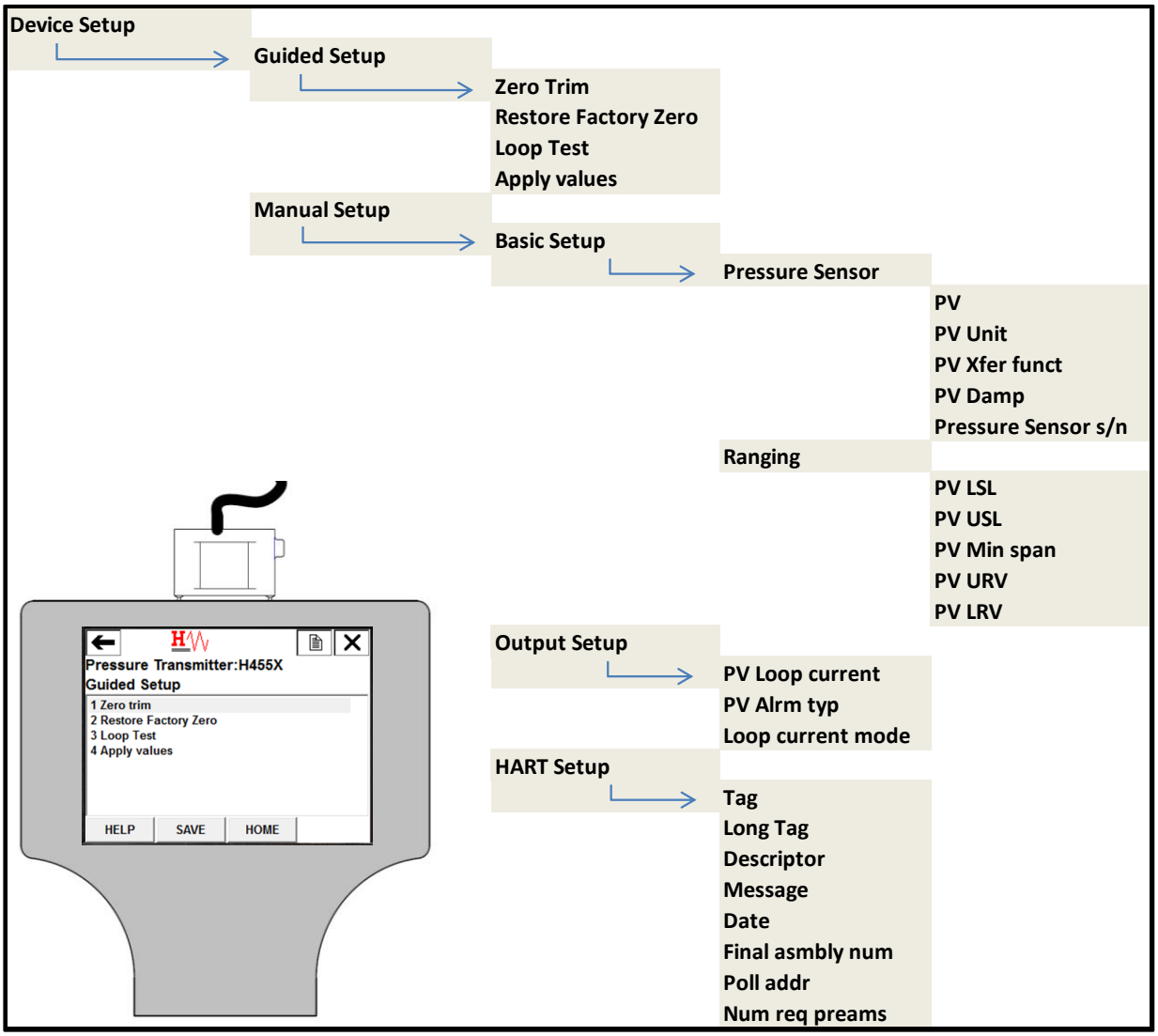
- Select a discrete milliamp level for the transmitter to output. The available options are:
  - 4mA
  - 20mA
  - Other – manually input a desired value between 4 and 20mA range
- Check the reference meter installed in the test loop to verify that it displays the commanded output value.
- If the values match, the transmitter and the loop are configured and functioning properly.

- If the values do not match, the current meter may be attached to the wrong loop, there may be a fault in the wiring, the transmitter may require re-ranging, or the reference meter may be malfunctioning.

  After completing the test procedure, the method returns to the loop test screen to select another output value or to end loop testing.

- Select End and select Next to end loop testing.
- Select Next to acknowledge the loop can be returned to automatic control.
- Select Finish acknowledging the method is complete.

3.2 Device Setup



3.2.1 Set process variable units

The PV unit command sets the process variable units to allow you to monitor your process using the appropriate units of measure.

Host Interface - Field Communicator and DCS

The path to reach the PV unit is as follows:
Device Setup → Manual Setup → Basic Setup → Pressure Sensor → PV Unit

You may also refer to the Menu Tree above. Select from the following engineering units:

- inH_2O
- bar
- psi
- KPa

3.2.2 Re-range

The Range Values command sets the 4 and 20 mA points and digital lower (LRV) and upper (URV) range values. In practice, you may reset the transmitter range values as often as necessary to reflect changing process conditions. Changing the lower or upper range point results in similar changes to the span.

Use on of the methods below to re-range the transmitter. Each method is unique; examine all options closely before deciding which method works best for your process.

- Re-range with a Field Communicator only
- Re-range with a pressure input source and a Field Communicator
- Re-range with a DCS only
- Re-range with a pressure input source and a DCS

3.2.2.1 Re-range with a Field Communicator only

The easiest and most popular way to re-range is to use the Field Communicator. This method changes the values of the analog 4 to 20 mA points independently without a pressure input.

The path to reach the PV URV and LRV are as follows:
Device Setup → Manual Setup → Basic Setup → Ranging → PV URV
Device Setup → Manual Setup → Basic Setup → Ranging → PV LRV

You may also refer to the Menu Tree above. Use the keypad to enter lower and upper range values.

NOTE: The upper range value has to be less than the upper sensor limit or the PV USL. Similarly, the lower range value has to be greater than the lower sensor limit or the PV LSL.

3.2.2.2 Re-range with a pressure input source and a Field Communicator

Re-ranging using the Field Communicator and a pressure source or process pressure is a way of re-ranging the transmitter when specific 4 and 20 mA points are unknown.

Use the enhanced method “Apply values” to achieve this functionality. This method will guide you step by step through the procedure of re-ranging. The path to reach the “Apply values” method is as follows:
Device Setup → Guided Setup → Apply values

The enhanced method will guide you through the following procedure:

- Select Next after the control loop is set to manual.
- From the Apply values menu, follow the online instructions to configure upper and lower range values.

  NOTE: The span is maintained when the 4 mA point is set. The span changes when the 20 mA point is set. The lower range value cannot be set to a value that causes the upper range value to exceed the upper sensor limit.
- Select Exit to leave the Apply values screen.
- Select Next to acknowledge the loop can be returned to automatic control.
- Select Finish and acknowledge the method is complete.

3.2.2.3 Re-range with a DCS only

This method changes the values of the analog 4 to 20 mA points independently without a pressure input.

The path to reach the PV URV and LRV are as follows:
Device Setup → Manual Setup → Basic Setup → Ranging → PV URV
Device Setup → Manual Setup → Basic Setup → Ranging → PV LRV

Enter the PV LRV and the PV URV in the fields provided under the Ranging group box. Select Apply.

NOTE: The upper range value has to be less than the upper sensor limit or the PV USL. Similarly, the lower range value has to be greater than the lower sensor limit or the PV LSL.

3.2.2.4 Re-range with a pressure input source and a DCS

Use the enhanced method “Apply values” to achieve this functionality. This method will guide you step by step through the procedure of re-ranging. The path to reach the “Apply values” method is as follows:
Device Setup → Guided Setup → Apply values

The enhanced method will guide you through the following procedure:

- Select Next after the control loop is set to manual.
- From the Apply values menu, follow the online instructions to configure upper and lower range values.

  NOTE: The span is maintained when the 4 mA point is set. The span changes when the 20 mA point is set. The lower range value cannot be set to a value that causes the upper range value to exceed the upper sensor limit.
- Select Exit to leave the Apply values screen.
- Select Next to acknowledge the loop can be returned to automatic control.
- Select Finish and acknowledge the method is complete.

3.2.3 Damping

The Damp command introduces a delay in processing which increases the response time of the transmitter; smoothing variations in output readings caused by rapid input changes. Based on the necessary response time, signal stability and other requirements of the loop dynamics of the system, the damp is determined by the transmitter.

Host Interface - Field Communicator and DCS

The path to reach the PV Damp value is as follows:
Device Setup → Manual Setup → Basic Setup → Pressure Sensor → PV Damp

You may also refer to the Menu Tree above. The transmitter has a fixed damping value of 0.05 seconds and is not user-selectable.

3.2.4 Loop Current Mode and Multi-drop communication

The Loop Current Mode indicates whether the loop current is active or fixed i.e. the device is in multi-drop mode.

Host Interface - Field Communicator and DCS

The path to reach the Loop Current Mode is as follows:
Device Setup → Manual Setup → Output Setup → Loop current mode

You may also refer to the Menu Tree above. The Loop current will reflect the Process measurement as long as it is enabled. The Loop current mode is set to 'enable' at the factory, which allows operation in the standard point-to-point manner with a 4-20mA output signal.

Multi-dropping transmitters refers to the connection of several transmitters to a single communications transmission line. Communication between the host and the transmitters takes place digitally with the analog output of the transmitters deactivated. Up to 15 transmitters can be connected on a single twisted pair of wires. Each transmitter is identified by a unique address (1-15) in this mode.

The Figure below shows a typical multi-drop network.

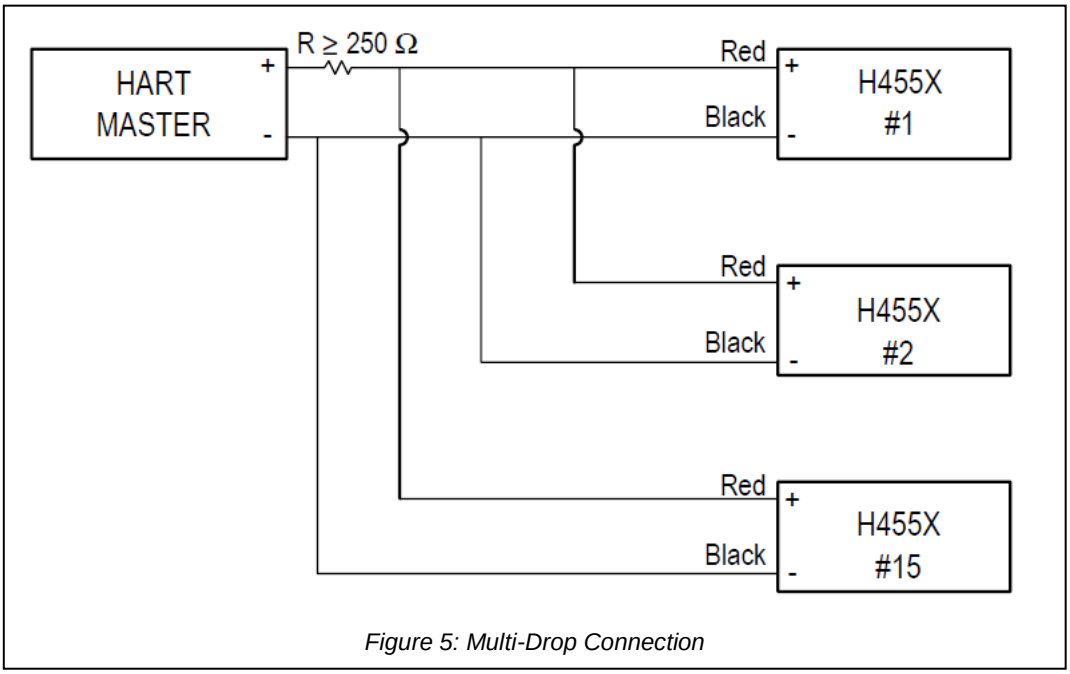


Figure 5: Multi-Drop Connection

The H455X is set to address zero at the factory. To activate multi-drop communication, the transmitter address must be changed to a number from 1 to 15.

This change will have the following affects:

- Disables the loop current mode that deactivates the 4-20mA analog output, sending it to 5mA.
- Disables the latching of analog output to 4mA in case of a PV under-range status and to 20mA in case of a PV over-range status.
- The self-diagnostic routine still remains active, thus continuing the alert reporting as per the PV measurement.
- Failure signals in multi-dropped transmitters are communicated through the HART messages.

3.2.4.1 Changing a transmitter address

To activate multi-drop communication, the transmitter poll address must be assigned a number from 1 to 15, and each transmitter in a multi-dropped loop must have a **unique** poll address.

> ⚠ **Note:** Verify the address of all the multi-dropped transmitters and ensure each transmitter has a unique poll address.

Host Interface - Field Communicator and DCS

The path to reach the Poll Address is as follows:
Device Setup → Manual Setup → HART setup → Poll Address

You may also refer to the menu tree above. To communicate with a multi-dropped transmitter, configure the Field Communicator or DCS to poll for a non-zero address. Please refer to documentation of the system you have.

3.2.5 HART Setup

The HART Setup menu provides the configuration of the Device Identification parameters.

Host Interface - Field Communicator and DCS

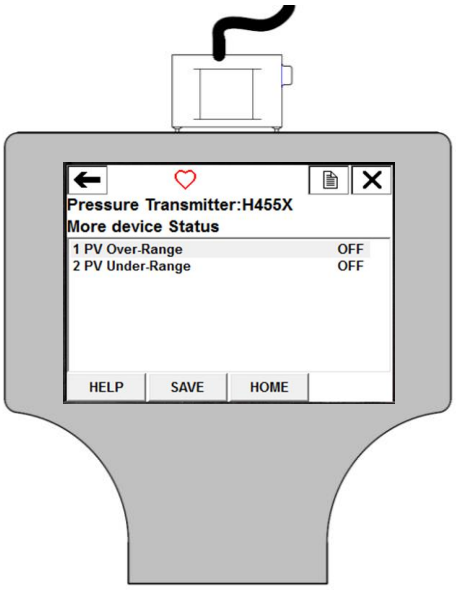
The path to reach the HART Setup is as follows:
Device Setup → Manual Setup → HART Setup

You may also refer to the Menu Tree above. HART setup menu displays the following variables:

- Tag
- Long Tag
- Descriptor
- Message
- Date
- Final Assembly Number
- Poll Address
- Number of Request Preambles

3.3 Diagnostics – Device Status

The user can access all the Device Status and Extended device status under this menu.



Diagnostics →	**Status** →	**Device Status** →
		Process applied to the primary variable is outside the operating limits of the field device
		Process applied to the non-primary variable is outside the operating limits of the field device
		PV Analog Channel Saturated
		PV Analog Channel Fixed
		Field device has more status available
		A reset or self test of the field device has occurred, or power has been removed and reapplied
		A modification has been made to the configuration of the field device
		Field device has malfunctioned due to a hardware error or failure
		More device Status →
		PV Over-Range
		PV Under-Range
		Ext Fld Device Status →
		Maintenance required
		Device variable alert
		Critical Power Failure

4. Operation and Maintenance

This section contains information on operation and maintenance of the Barksdale Intelligent Transmitter.

4.1 Calibration for HART Transmitter

Calibrating a transmitter may include the following procedures:

Re-range: Sets the 4 and 20 mA points at required pressures.

Sensor Trim: Adjusts the position of the factory characterization curve to optimize performance over a specified pressure range, or to adjust for mounting effects.

Analog Output Trim: Adjusts the analog output to match the plant standard or the control loop.

Trim and re-range functions differ significantly. Re-ranging sets analog output to the selected upper and lower range points and can be done with or without an applied pressure. Re-ranging does not change the factory settings. Sensor trimming requires an accurate pressure input and adds additional compensation that adjusts the position of the factory characterization curve to optimize performance over a specific pressure range.

Note Sensor trimming adjusts the position of the factory characterization curve. It is possible to degrade performance of the transmitter if the trim is done improperly or with inaccurate equipment.

4.2 Calibration overview for BIT

Re-range (Refer section 3.2.2)
Zero Trim
Restore Factory Zero

4.2.1 Zero Trim

Note: The transmitter must be within 5% of the span away from zero (for zero-based spans) in order to calibrate with zero trim function.
This method will calibrate the sensor input as the new zero input reference.

Host Interface - Field Communicator and DCS
The path to reach the Zero Trim is as follows:

Device Setup → Guided Setup → Zero trim

The enhanced method will guide you through the following procedure:

- Press OK after the control loop is set to manual.
- Apply zero pressure within the 5% of the span away from zero
- Follow the screen menu
- Press OK to acknowledge the loop can be returned to automatic control.

You may also refer to the Menu Tree in Section 3 – Configuration and Diagnostics

4.2.2 Restore Factory Zero

Restore factory zero is used to restore the transmitter to the default factory calibration settings.

Host Interface - Field Communicator and DCS
The path to reach the Zero Trim is as follows:

Device Setup → Guided Setup → Restore Factory Zero

The enhanced method will guide you through the following procedure:

- Press Ok after the control loop is set to manual.
- Transmitter will automatically set to factory settings
- Press Ok to acknowledge the loop can be returned to automatic control.

You may also refer to the Menu Tree in Section 3 – Configuration and Diagnostics.

5. Troubleshooting:

This section provides summarized maintenance and troubleshooting suggestions for the most common operating problems.

If you suspect malfunction despite the absence of any diagnostic messages on the Field Communicator display, follow the procedures described here to verify that transmitter hardware and process connections are in good working order.

Error	Cause
Output current reading is zero	Verify that the signal connections are powered
	Check the power cables for reversed polarity
	Verify terminal voltage is 9 to 30 VDC
Device not communicating with hand held communicator	Check that the output is between 4 and 20 mA or the saturation levels
	Verify terminal voltage is 9 to 30 VDC
	Check DC power to transmitter – maximum AC noise must be low
	Check loop resistance, 250 Ω minimum (PS voltage -transmitter voltage/loop current)
	Have Field Communicator poll for all addresses
Output current reading is low or high	Check the applied pressure
	Verify 4 and 20 mA range points
	Verify if 4–20 mA output trim is required
Analog Output does not change with respect to input Pressure	Check test equipment
	Check impulse piping or manifold for blockage
	Make sure the transmitter is not in Multi-drop mode
	Verify applied pressure is between the 4 and 20 mA set points
	Make sure the transmitter is not in loop test mode
Pressure variable reading on HART communicator is low or high	Check test equipment (verify accuracy)
	Check impulse piping for blockage or low fill in wet leg
	Check that the transmitter is correctly calibrated
	Verify pressure calculations for application
Pressure variable reading on HART communicator is erratic	Check application for faulty equipment in pressure line
	Check that the transmitter does not react directly to the equipment on / off
Output current reading is erratic	Check that the power source of the transmitter has adequate voltage and current
	Check for external electrical interference
	Check that the transmitter is properly grounded

6. Product configurator – How to order

Refer to configurator table on sales drawing or datasheet to configure the product.

- 450X Series: https://www.barksdale.com/en/products/datasheet/351/series-450x/
- 450 Series: https://www.barksdale.com/en/products/datasheet/463/series-450/
- 455E Series: Place Holder

Online product configurator and RFQ

- e-Configurator: https://configurator.barksdale.com/

7. Appendix A: Installation and Maintenance Instructions (IMI)

- 450X Series: https://www.barksdale.com/en/products/datasheet/351/series-450x/
- 450 Series: https://www.barksdale.com/en/products/datasheet/463/series-450/
- 455E Series: Place Holder

8. Appendix B: Product Certifications & Downloads

- 450X Series: https://www.barksdale.com/en/products/datasheet/351/series-450x/
- 450 Series: https://www.barksdale.com/en/products/datasheet/463/series-450/
- 455E Series: Place Holder

HART Foundation Certificate & DD:
https://fieldcommgroup.org/registered-products/099a070e-1fb2-e811-8153-e0071b66aea1

9. Return Request / Inquiries

Direct all warranty and repair requests/inquiries to Barksdale, Inc. Customer Service Department.
Call 323-589-6181, FAX: 323-589-3463
Before returning any product(s) to Barksdale, you must obtain a returned merchandise authorization from our customer service department (in order to avoid processing delays).
For warranty returns, please have the following information available BEFORE contacting Barksdale:

1. P.O. number under which the product was PURCHASED.
2. Model number of the product under warranty.
3. Repair instructions and/or specific problems you are having with the product.
4. Application information. Copyright 2018 Barksdale, Inc.

Barksdale巴士德中国签约通用机械领域经销商: 信德迈科技（北京）有限公司
北京朝阳区望京 SOHO-T1-C 座 2115 室 邮编:100102
手机: 139 1096 2635 电子邮件: sales@cnmec.biz