ROC800-Series HART®-2 Module

The HART®-2 (Highway Addressable Remote Transducer) module allows a ROC800-Series Remote Operations Controller (ROC800) with Series 2 architecture to communicate with HART devices using the HART protocol. The HART-2 module receives signals from and transmits signals to HART devices.

With the addition of a HART Pass-Through license key, a HART-2 module provides the ROC800 with Plantweb® Remote Automation functionality. This includes the ability to pass HART data bi-directionally through the network to AMS™ Device Manager software.

The HART-2 module has four input/output channels. Software configurable switches on the module allow each channel to be set as an input or output channel. A channel set as an input can be configured for use in point-to-point or multi-drop mode. A channel set as an output can be configured for use in point-to-point mode only. Each channel has analog input capability intended for diagnostic and primary process variable measurement.

HART superimposes Frequency Shift Keying (FSK) signals on an analog signal. This technique allows digital information to be passed to and from the HART device on a 4 to 20 mA analog signal.

In point-to-point mode, the analog signal is still representative of the measured variable. This mode allows communications with one HART device per channel.

In multi-drop mode, as many as five HART devices can be connected (in parallel) to each channel. A module with all four channels in multi-drop mode supports a maximum of twenty HART devices. You can install multiple HART-2 modules in a single ROC800.

In multi-drop mode, like the point-to-point mode, digital communications are superimposed on the analog signal that is used for powering the HART devices. Each HART device in multi-drop mode requires 4mA and the current does not represent any measured variable value.

Performance and speed are greatly improved by a separate FSK modem for each channel. The FSK transmission is channel independent. The scan time for one channel does not affect the scan time of any other channel. Point-to-point mode supports the API 21 requirements of one second updates meets.

The HART-2 module has a software selectable 250 Ohm resistor on each channel. This ensures that the required 250 Ohm resistor is present on all channels. You can disengage the resistor through ROCLINK™ 800 Configuration Software if you are connecting to a device with a 250 Ohm resistor already present.
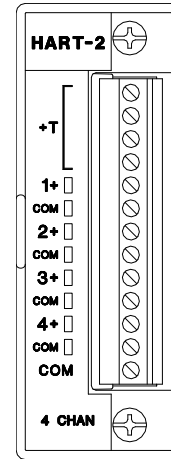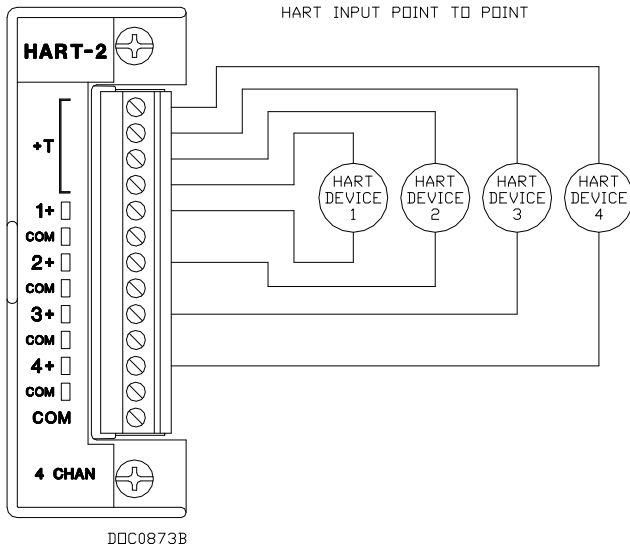

HART-2 Module

The module has a removable terminal block for convenient wiring and servicing. The terminal blocks can accommodate from size 16 to 24 American Wire Gauge (AWG).

A ROC800 unit equipped with a HART-2 module is considered to be a HART Host (primary master) interface with a Class 1 Conformance classification. The HART-2 module can also be configured with ROCLINK 800 Configuration Software for use as a secondary master in redundant applications.
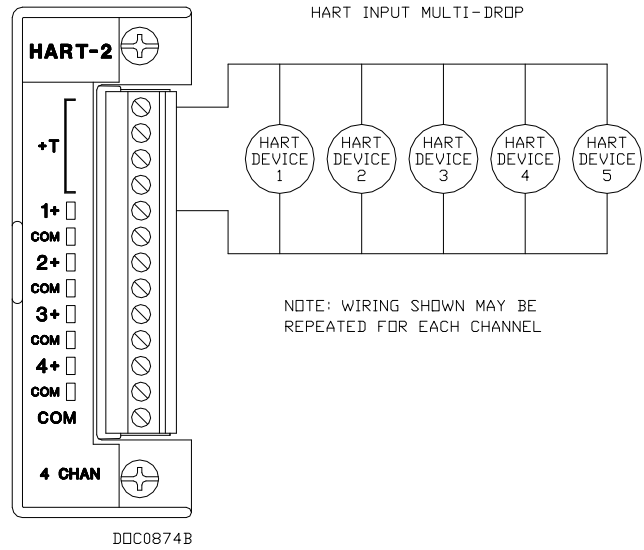
Most Universal and some Common Practice commands are supported. For a list of the commands, refer to the specifications tables starting on page 3. The supported commands conform to HART Universal Command Specification Revision 5.1 and Common Practice Command Specification Revision 7 (HCF SPEC 127 & 151). Refer to *www.hartcomm.org* for more information on the specifications.

HART-2 modules can be installed in any slot on a ROC800 with Series 2 architecture. Modules can easily be installed or removed from the module slots at any time by removing the two captive screws accessible from the front of the unit.
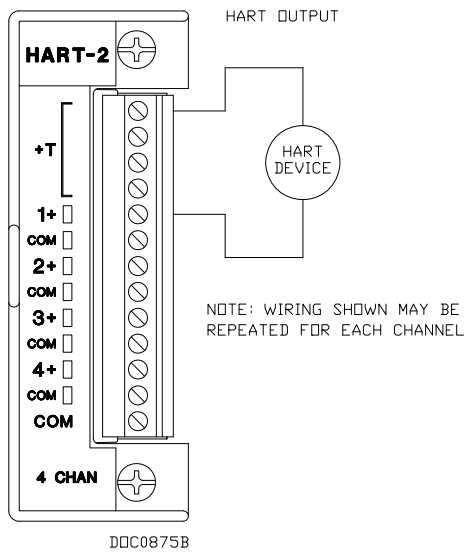
HART-2 modules are hot-swappable, meaning the module can be removed and another module of the same kind can be installed under power. Series 2 HART modules are hot-pluggable, meaning they may be installed directly into unused module slots under power.

Remote Automation Solutions

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Process Management

HART INPUT POINT TO POINT

HART-2 Module
Input Point-to-Point Wiring Diagram

DOC0873B

HART INPUT MULTI-DROP

NOTE: WIRING SHOWN MAY BE
REPEATED FOR EACH CHANNEL

HART-2 Module
Input Multi-Drop Wiring Diagram

DOC0874B

HART OUTPUT

NOTE: WIRING SHOWN MAY BE
REPEATED FOR EACH CHANNEL

HART-2 Module
Output Wiring Diagram

DOC0875B

ROC800-Series HART-2 Module

Field Wiring Terminals

DOC0872B
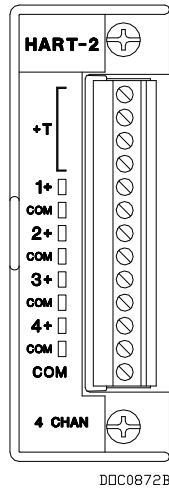
Terminal	Label	Definition
1	+T	Loop Power
2	+T	Loop Power
3	+T	Loop Power
4	+T	Loop Power
5	1+	Channel 1 input or output
6	COM	Common
7	2+	Channel 2 input or output
8	COM	Common
9	3+	Channel 3 input or output
10	COM	Common
11	4+	Channel 4 input or output
12	COM	Common
13	COM	Common

Inputs/Outputs

Quantity	4 total channels, software selectable as inputs or outputs

HART Channels

Mode	Half-duplex
Max. Number of Devices	Multi-drop up to 5 HART device per channel
Data Rate	1200 bps
Parity	Odd
Modulation	Phase coherent, Frequency Shift Keyed (FSK) per Bell 202
Carrier Frequencies	Mark 1200 Hz, Space 2200 Hz, +0.1%
Update Rate	1 second update per primary device (point to point mode)

Supported Commands

Universal	Read unique identifier; read primary variable; read primary variable and current; read dynamic variable and current; write polling addresses; read unique identifier associated with tag; read message; read tag; descriptor and date; read primary variable sensor information; read device information; write message; write tag, descriptor and date.
Common Practice	Read transmitter variables

Analog Inputs

Type	Internally or externally sourced 4 to 20 mA current loop
Accuracy[1]	1.5% of span at 25°C (77°F)
	3.0% of span -40°C to 75°C (-40°F to 167°F)
	(1) Accuracy Includes: Linearity, Hysteresis, Repeatability, Stability, Gain, and Offset error.
Resolution	12-bit

Analog Outputs		
Type	4 to 20 mA current sink	
Accuracy[1]	0.2% of span at 25°C (77°F)	
	1.5% of span -40°C to 75°C (-40°F to 167°F)	
	(1) Accuracy Includes: Linearity, Hysteresis, Repeatability, Stability, Gain, and Offset error.	
Resolution	16-bit	
Power		
Consumption	500 mW (idle) with no HART devices connected	
Additional loading applies for each device connected	31.25 mW/mA from +T terminal	
Loop Power	+T Sensor Supply Voltage	24 Vdc (isolated from ROC power)
	+T Sensor Supply Current	100 mA maximum at 24 Vdc (each HART device typically uses 4 mA in multi-drop mode and 4 to 20 mA in point-to-point mode)
Over-Voltage Protection	±30 Vdc, surge on any channel	
Isolation	1500 Vdc channel to bus	
Physical		
LED Indicators	One transmit and one receive per channel	
	1+	Channel 1 transmit
	COM	Channel 1 receive
	2+	Channel 2 transmit
	COM	Channel 2 receive
	3+	Channel 3 transmit
	COM	Channel 3 receive
	4+	Channel 4 transmit
	COM	Channel 4 receive
Dimensions	26 mm W by 75 mm H by 133 mm D (1.03 in. W by 2.96 in. H by 5.24 in. D)	
Weight	68 g (2.4 oz)	
Wiring	Size 16 to 24 AWG at the removable terminal block	
Dimensions	26 mm W by 75 mm H by 133 mm D (1.03 in. W by 2.96 in. H by 5.24 in. D)	
Environmental		
Same as the ROC800 in which it is installed		
Approvals		
Same as the ROC800 in which it is installed		

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