ControlWave® HART Device Interface

The HART Device Interface (HDI) is a communication option for ControlWave PAC, ControlWave Micro, and ControlWave Express that allows networking with field devices employing the HART (Highway Addressable Remote Transducer) protocol. The HDI also allows network communications with 3508 and 3808 multi-variable transmitters using BSAP protocol. Each HDI can interface to up to fifteen HART devices or five 3508/3808 transmitters with multi-dropping of up to 16 HDI boards per RS-485 serial communication port.

The HDI can significantly increase the effective I/O point count capability of the ControlWave RTU at the expense of a single communication port. The HDI is a convenient DIN rail mountable package.

Features

- Improved measurement accuracy
- Compatible with all ControlWave series RTUs
- Supports HART protocol field devices and 3508 and 3808 multivariable transmitters
- External DIN rail mount interface board
- Accepts RS 232 and RS 485 serial communication
- Up to 15 HART devices / 5-3508s/3808s per HDI
- Up to 16 HDIs per RS 485 port
- Transformer-coupled isolated loop circuit
- On-board jumpers for RS 485 line termination and biasing

Physical Link

The HDI allows communication in a master/slave environment, with the master originating each transaction and the slaves generate replies when prompted by the master.

The HDI provides an RS-232/485 interface to the ControlWave RTU serial communication port and a two-wire voltage or current sourced connection to the HART device or 3508/3808 multi-variable transmitter. The HDI accepts signals in either RS-232 (point-to-point) or RS-485 (multi-drop) configurations from the ControlWave RTU.

The HART protocol is commonly used throughout the measurement and control industry and serves as a standard message structure among many manufacturers of transducers and remote field devices. The HDI provides a common physical interface between these devices and ControlWave RTUs.

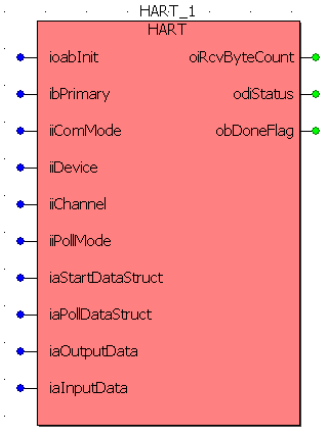
The actual HART communication protocol is a standard feature of the ACCOL3 firmware/flashware in each RTU.

- Most universal and some common practice commands are supported. Universal commands are implemented in all HART field devices.
- Common practice commands are implemented in most, but not necessarily all, HART field devices.

Interfacing to HART devices

ControlWave Designer includes an ACCOL3 HART Function Block as the interface for accessing data from HART devices. The HART function block operates as a master to the remote HART devices and can be used to provide communications through a serial communication port or through a HART/BTI module. The HART communications provided by this function block are based on Revision 7 of the HART Protocol Specification.

ControlWave HART Device



Preconfigured HART Function Block

The ControlWave Designer application uses the HART Function Block to collect the following information:

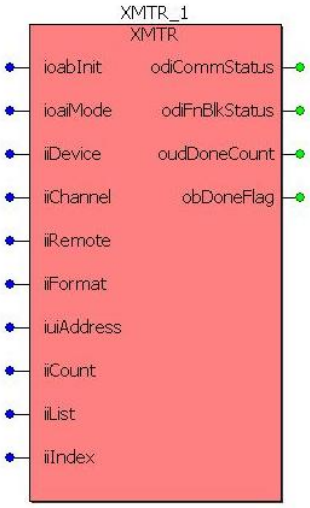
- Device type
- ID
- Write and read Tagname
- Serial number
- Write and read User message
- Write and read Descriptor
- Four process variables
- Transducer limits and span
- Units
- Variable limits and ranges
- Loop current
- Damping value
- Update interval
- Communication status

User-defined messages can be configured to read and write additional parameters beyond what is pre-configured in the data structure.

Interfacing to 3508 and 3808 Multi-variable Transmitters

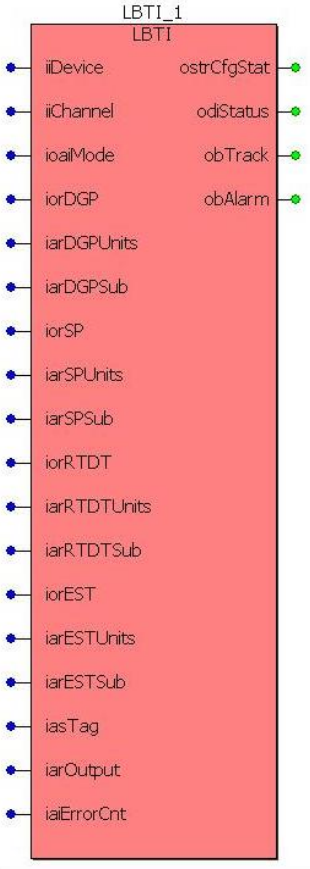
ControlWave Micro, ControlWave PAC, and the ControlWave Express can communicate in point-to-point mode to 3508 and 3808 transmitters through a serial communication port connected to the HDI. In both cases, there are two ControlWave Designer Function Blocks available to read and write to the transmitters.

The XMTR_Interface ACCOL3 module also provides read/write access to additional transmitter parameters such as DP and static pressure ranges, zeros and spans, local address, tag name, units, and more.



Preconfigured XMTR Function Block

The LBTI function block provides peer-to-peer list data transfer allowing access to the DP, P, T, sensor temperature, and status signal variables in the transmitters.

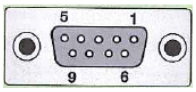


Preconfigured LBTI Function Block

ControlWave HART Device Interface

Field Wiring Terminals

J1



TB1

TB2

Terminal	Label	Definition (RS-232)
(J1) 1	1	(DCD) Data Carrier Detect
(J1) 2	1	(TXD) Transmit Data Not
(J1) 3	1	(RXD) Receive Data Not
(J1) 4	1	Not used
(J1) 5	1	Ground
(J1) 6	1	(CTS) Clear To Send
(J1) 7	1	(RTS) Request to Send
(J1) 8	1	Not used
(J1) 9	1	Not used
Terminal	**Label**	**Definition (RS-485)**
(TB1) 1	VIN	Input Power 9 V to 28 V
(TB1) 2	GND	Ground
(TB1) 3	-RX	(-RX) Receive -
(TB1) 4	+RX	(+RX) Receive +
(TB1) 5	- TX	(-TX) Transmit Data-
(TB1) 6	+TX	(+TX) Transmit Data +
Terminal	**Label**	**Definition (RS-485)**
(TB2) 1	1	Field loop (no polarity)
(TB2) 2	2	Field loop (no polarity)

HART		
Modem	Bell 202 compatibility (1200 Hz/2200 Hz) with 460.08 KHz clock.	
Protocol	Serial HART, BSAP, and FSK	
Connection	Multi-drop for up to 16 HDI boards per RS-485 serial communication port Point-to-point using RS-232 communication port	
Baud Rate	1200 baud.	
Polling Rate	One transmitter per second	
Update Rate	1 second update per primary device.	
Power Consumption		
RS-232	9 V	35.57 mA
	28 V	17.9 mA
RS-485	9V	42.66mA
	28V	20.09 mA
Physical		
Dimension	5.75 in. x 4.37 in. x 1.06 in. (146.05 mm x 111.0 mm x 26.92 mm)	
Mounting	DIN Rail mounting	

LED Indicators	CR14	Transmit Data
	CR15	Receive Data
	CR16	Carrier Detect
	CR17	Request to Send
Environmental		
Operating Temperature	-40 °C to 70 °C (-40 °F to 158 °F)	
Storage Temperature	-40 °C to 85 °C (-40 °F to 185 °F)	
Relative Humidity	5 to 95% non-condensing	
Vibration	1G for 10 to 150 Hz or 5G for 150 – 2000 Hz	
RFI Susceptibility	10 V/m – 20 to 500 MHz	
Approvals		
Product Markings for Hazardous Locations	UL CUS	Class I, Division 2, Groups A, B, C, and D, T4A
	CE	CE 0081
Certification Standard	UL/CSA	CSA C22.2 No. 142 and No. 213 UL/CSA E60079-0-02 and E60079-15-02 UL 1604 — 3rd Edition UL 508 — 17th Edition
	EMC	EN55011 (Emissions) EN61000-4-2 (Electrostatic Discharge Immunity) EN61000-4-4 (Electrical Fast Transients Immunity) EN61000-4-6 (Conducted Immunity) EN61000-4-8 (Power Frequency Magnetic Field Immunity) EN61000-6-2 (Radiated RF Immunity)
Miscellaneous Approvals	RoHS2	RoHS (2) EU Directive 2011/65/EU: This product may be considered out-of-scope when used for the intended design purpose in a Large Scale Fixed Installation (LSFI). Consult https://www.emerson.com/compliance for up-to-date product information.
	RoHS (China)	

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visit *www.EmersonProcess.com/Remote/Support*.

Global Headquarters,
North America, and Latin America:
Emerson Process Management
Remote Automation Solutions
6005 Rogerdale Road
Houston, TX 77072 U.S.A.
T +1 281 879 2699 | F +1 281 988 4445
www.EmersonProcess.com/Remote

Europe:
Emerson Process Management
Remote Automation Solutions
Unit 8, Waterfront Business Park
Dudley Road, Brierley Hill
Dudley UK DY5 1LX
T +44 1384 487200 | F +44 1384 487258

Middle East/Africa:
Emerson Process Management
Remote Automation Solutions
Emerson FZE
P.O. Box 17033
Jebel Ali Free Zone – South 2
Dubai U.A.E.
T +971 4 8118100 | F +971 4 8865465

Asia-Pacific:
Emerson Process Management
Remote Automation Solutions
1 Pandan Crescent
Singapore 128461
T +65 6777 8211| F +65 6777 0947