

What is HART

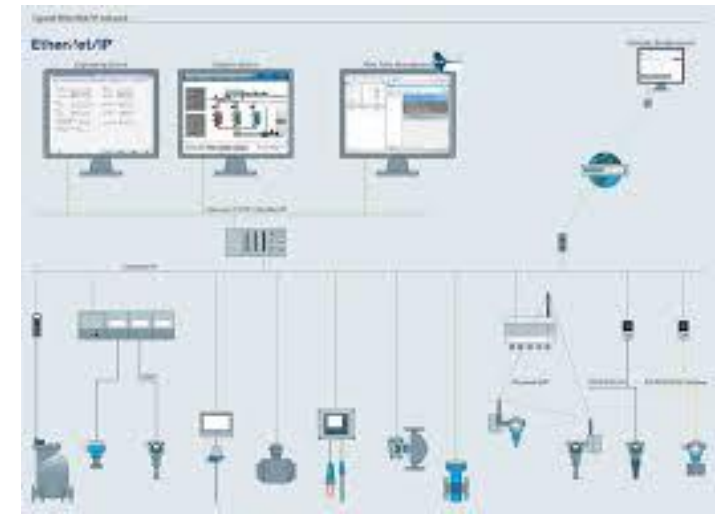
HIGHWAY ADDRESSABLE REMOTE TRANSDUCER

It is a globally recognized standard used for sending and receiving digital information across analog wires between smart field devices and control or monitoring systems, like PLC and DCS systems.

Digital networking of HART facilitate to access any instrument, field device or controller for configuration and diagnostics from any point of the network.

It is an open source process control network that supports Hybrid Communication.

It provides additional bidirectional digital communication channel over the same 4-20mA signal wiring.



How does HART work?

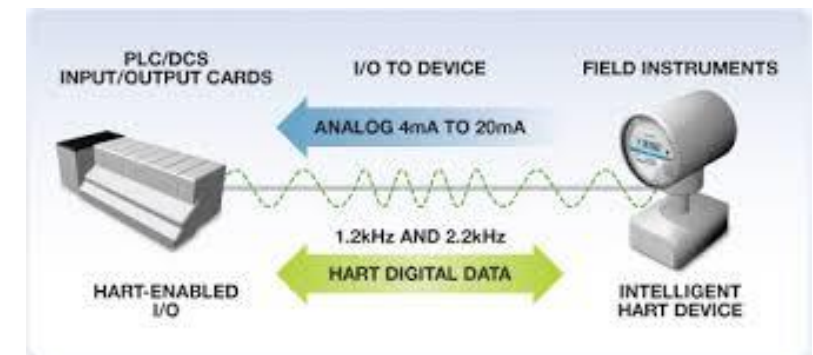
HART protocol extends existing 4-20 mA current loop with intelligent measurement and control.

It uses FSK(Frequency Shift Keying) technique to superimpose digital signal on 4-20mA current signal.

Frequency Shift Keying: • It is based on the Bell 202 telephone communication standard and operates using the frequency shift keying (FSK) principle.

The digital signal is made up of two frequencies— 1,200 Hz and 2,200 Hz representing bits 1 and 0, respectively.

Sine wave of these two frequencies is superimposed on the direct current (dc) analog signal cables to provide simultaneous analog and digital communications.



FLEX 5000™ HART I/O modules

Isolated HART analog input and output modules

Features and benefits

- 8-channel to channel isolated input and output modules
- Each channel can be configured as current, voltage or HART individually
- HART V7, V6 and V5 support
- Current sourcing of isolated loop power
- Readback functionality for outputs
- Per channel diagnostics with time stamp and protection
- New Logix feature – highly integrated HART (HIH)*
 - Visible access to HART devices
 - HART bus in Studio 5000 Logix Designer® application I/O configuration tree
 - Device connection fault status representation in I/O tree
 - Add and replace HART devices online
 - Integrated device information view
- Works with Studio 5000 Logix Designer® application, version 32 or later
- [Documentation in Literature Library](#) and Add-on Profile (AOP) in [Product Compatibility and Download Center \(PCDC\)](#)

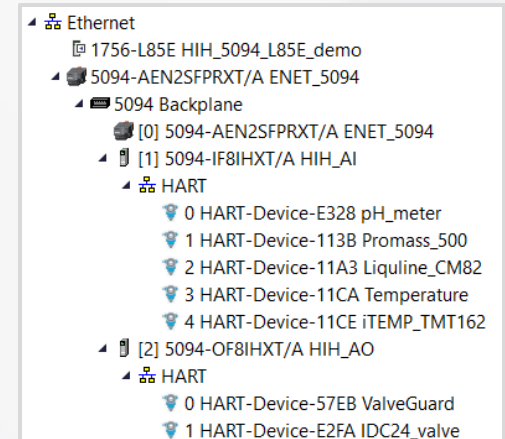
See [FLEX 5000™ modules technical data \(5094-TD001\)](#) for more details.

*Learn more about HART I/O at [FLEX 5000™ Analog Isolated Current/Voltage/HART Input and Output Modules \(5094-UM007\)](#).

Catalog 5094-IF8IH
Catalog 5094-IF8IHXT



Catalog 5094-OF8IH
Catalog 5094-OF8IHXT



Premier Integration

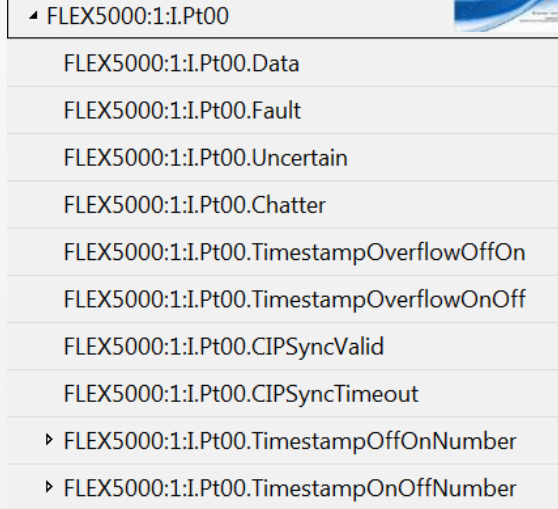
Control and configure at the channel level

- Studio 5000 Logix Designer® application, version 31 or later for standard I/O
- Studio 5000 Logix Designer® application, version 32 or later for safety or HART I/O

Time stamp with Precision Time Protocol (PTP)

- I/O change of state (COS)
- Diagnostics
- Events

Standard data structures

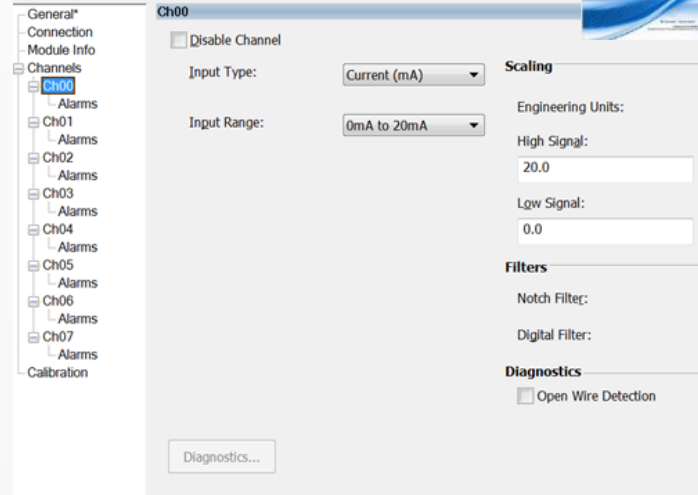


Standard data structures for FLEX5000:1:I.Pt00:

- FLEX5000:1:I.Pt00.Data
- FLEX5000:1:I.Pt00.Fault
- FLEX5000:1:I.Pt00.Uncertain
- FLEX5000:1:I.Pt00.Chatter
- FLEX5000:1:I.Pt00.TimestampOverflowOffOn
- FLEX5000:1:I.Pt00.TimestampOverflowOnOff
- FLEX5000:1:I.Pt00.CIPSyncValid
- FLEX5000:1:I.Pt00.CIPSyncTimeout
- FLEX5000:1:I.Pt00.TimestampOffOnNumber
- FLEX5000:1:I.Pt00.TimestampOnOffNumber

Per channel structure

Per channel selection

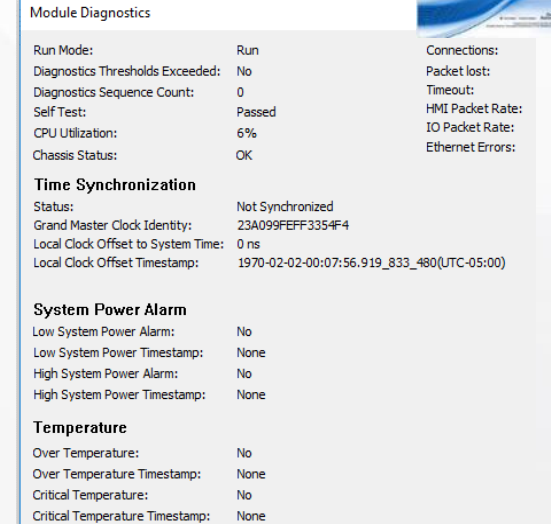


Per channel selection for Ch00:

- Disable Channel
- Input Type: Current (mA)
- Input Range: 0mA to 20mA
- Scaling:
 - Engineering Units: []
 - High Signal: 20.0
 - Low Signal: 0.0
- Filters:
 - Notch Filter: []
 - Digital Filter: []
- Diagnostics:
 - Open Wire Detection

Scaling and alarms

Module and channel level diagnostics



Module Diagnostics:

Run Mode:	Run	Connections:
Diagnostics Thresholds Exceeded:	No	Packet lost:
Diagnostics Sequence Count:	0	Timeout:
Self Test:	Passed	HMI Packet Rate:
CPU Utilization:	6%	IO Packet Rate:
Chassis Status:	OK	Ethernet Errors:

Time Synchronization

Status:	Not Synchronized
Grand Master Clock Identity:	23A099FEFF3354F4
Local Clock Offset to System Time:	0 ns
Local Clock Offset Timestamp:	1970-02-02-00:07:56.919_833_480(UTC-05:00)

System Power Alarm

Low System Power Alarm:	No
Low System Power Timestamp:	None
High System Power Alarm:	No
High System Power Timestamp:	None

Temperature

Over Temperature:	No
Over Temperature Timestamp:	None
Critical Temperature:	No
Critical Temperature Timestamp:	None

HART Premier Integration

FLEX 5000™ HART integration in Studio 5000 Logix Designer® application

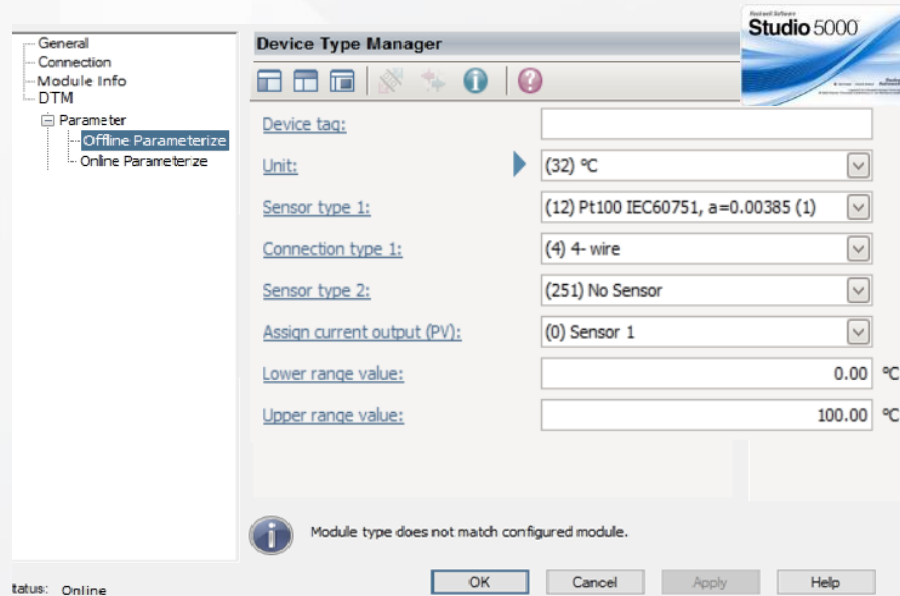
Highly integrated HART Process device integration with version 32



HART device in I/O tree

- Ethernet
 - 1756-L85E HIH_5094_L85E_demo
 - 5094-AEN2SFPRXT/A ENET_5094
 - 5094 Backplane
 - [0] 5094-AEN2SFPRXT/A ENET_5094
 - [1] 5094-IF8IHXT/A HIH_AI
 - HART
 - 0 HART-Device-E328 pH_meter
 - 1 HART-Device-113B Promass_500
 - 2 HART-Device-11A3 Liquline_CM82
 - 3 HART-Device-11CA Temperature
 - 4 HART-Device-11CE iTEMP_TMT162
 - [2] 5094-OF8IHXT/A HIH_AO
 - HART
 - 0 HART-Device-57EB ValveGuard
 - 1 HART-Device-E2FA IDC24_valve

Adding Process devices online



Process device input and output tags

- iTEMP_TMT162:I
 - iTEMP_TMT162:I.RunMode
 - iTEMP_TMT162:I.ConnectionFaulted
 - iTEMP_TMT162:I.DiagnosticActive
 - iTEMP_TMT162:I.DiagnosticSequenceCount
 - iTEMP_TMT162:I.FieldDeviceStatus
 - iTEMP_TMT162:I.PVOutOfLimits
 - iTEMP_TMT162:I.VariableOutOfLimits
 - iTEMP_TMT162:I.CurrentSaturated
 - iTEMP_TMT162:I.CurrentFixed
 - iTEMP_TMT162:I.MoreStatus
 - iTEMP_TMT162:I.ColdStart
 - iTEMP_TMT162:I.Changed
 - iTEMP_TMT162:I.Malfunction

Device validation via electronic keying

Configuration of Process devices via Add-on Profiles (AOP) embedded device type managers (DTMs)*

Device-specific tags from Device Description (DD) files