March 2014

## Description

The HCS HART Concentrator System converts a HART digital signal to a serial (RS-485 or RS-232) MODBUS RTU communication protocol. This allows HART transmitters and valves to interface directly with MODBUS-based monitoring and control systems.

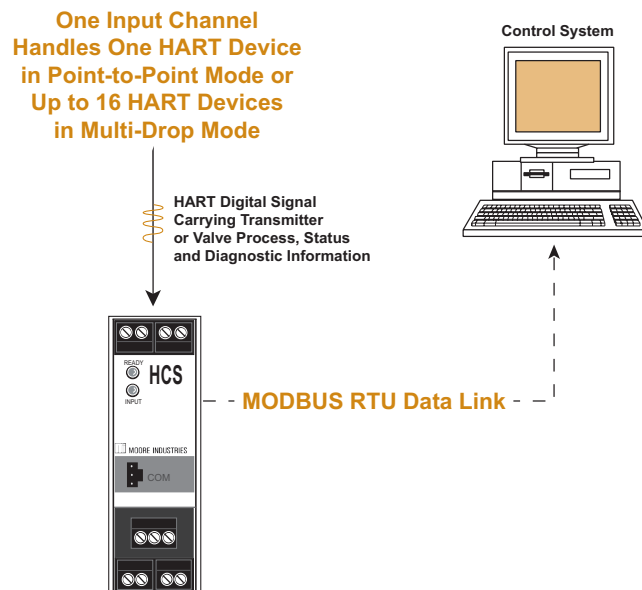### Operates in Point-to-Point and Digital Multidrop HART Networks

In point-to-point HART mode, the HCS is set to monitor a single instrument. All process and diagnostic data carried on the HART data string is converted to MODBUS RTU.

**Up to 16 HART Devices Per HCS—**In a digital multidrop HART network, up to 16 HART instruments digitally communicate on the same wires. The HCS can be set to monitor any or all instruments and/or valves within the network. Only one MODBUS address, and one communication link (such as twisted wire pair), is needed to send the process and diagnostic data from up to 16 HART devices to a MODBUS host.



*The HCS features a metal, RFI resistant* housing that snaps onto standard DIN-style rails.

**Figure 1.** *The HCS economically converts HART to serial MODBUS RTU (RS-485 or RS-232) protocol.*



**One Input Channel Handles One HART Device in Point-to-Point Mode or Up to 16 HART Devices in Multi-Drop Mode**

**Control System**

HART Digital Signal Carrying Transmitter or Valve Process, Status and Diagnostic Information

HCS

MODBUS RTU Data Link

* HART is a registered trademark of the HART Communication Foundation

## Features

- **Works with every HART-compatible device.** The HCS communicates with HART 5, 6 and 7 smart multivariable mass flow, pressure, pH and temperature transmitters; coriolis, magnetic, ultrasonic and vortex flow meters; radar and hydrostatic level transmitters; and valve positioners and damper operators.

- **Monitor primary and non-primary variables.** All HART process information, including primary, second, third and fourth process variable data is converted to MODBUS RTU and available to the MODBUS host system.

- **Monitor HART instrument diagnostics.** Using the Field Device Status Byte data that is available in HART's digital information, the HCS can transmit, via MODBUS RTU, diagnostic data including smart device configuration changed; primary and non-primary variables out of limits; primary variable analog output fixed; cold start; field device malfunction; and more HART status data available.

- **PC-programmable with Windows® software.** From a single screen, you can choose, and then view to confirm, all of your application specific operating parameters from a PC.

**Certifications**

**Factory Mutual cFMus (US/Canada), Non-Incendive**
Class I, Division 2, Groups A, B, C, D T5

**CE Conformant –** EMC Directive 2004/108/EC EN61326

# HCS

HART® Concentrator System
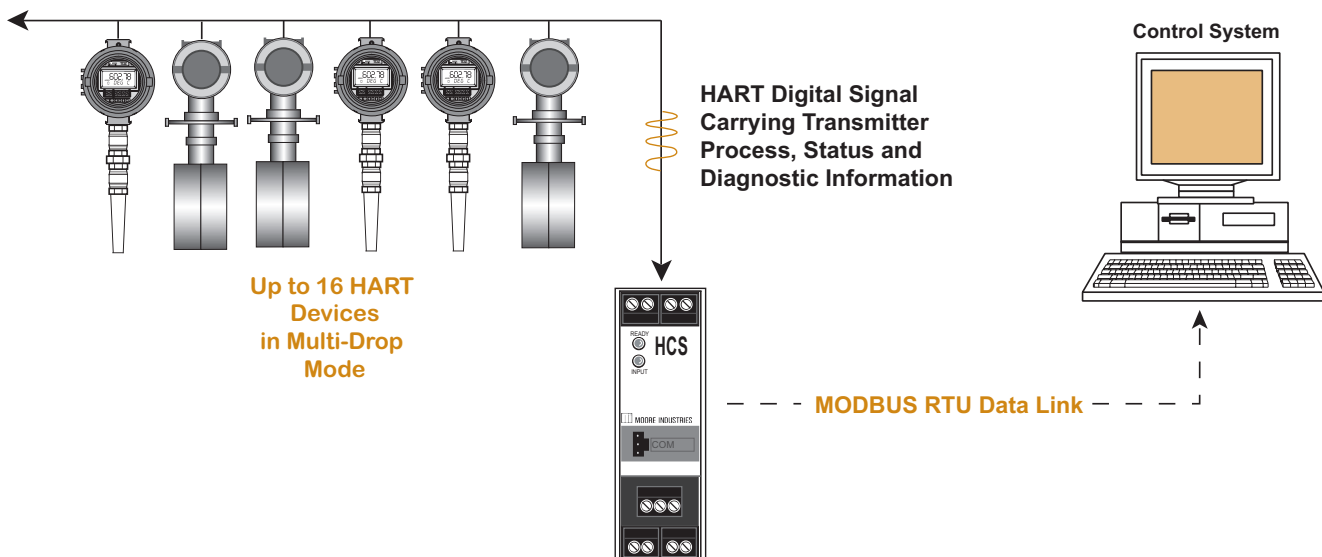HART-to-MODBUS RTU Converter

## Specifications

**Performance** — **Input Accuracy:** Reflects the accuracy of the HART field device

**Input Impedance:** Transmit Mode: 150 ohms; Receive Mode: Less than 5 kohms

**Isolation:** 1000Vrms between case, input, output and power terminals and will withstand 1500Vac dielectric strength test for one minute continuous with no breakdown

**Power Supply:** 9-30Vdc

**+TX Power Supply:** 23.2Vdc ±3%@24mA

**Digital Response Time:** Equals the combination of the HART response time and the MODBUS response time; the HART delay is defined by the HART protocol as 500msec in normal mode and 333msec in burst mode; the MODBUS response time depends on how fast and how often a MODBUS Master requests data from the HCS; the data request to response time is 50msec

**Output Type:** Standard MODBUS RTU protocol interface over RS-485 (parameters as specified in U.S. Standard EIA-RS485) or RS-232 (parameters as specified in U.S. Standard EIA-RS232)

**Performance (Continued)** — **Output Protection:** Transient protection on output

**Address Range:** Configurable from 1 to 247. Unit will assume a MODBUS address of 01 by default

**Baud Rate:** Interface supports the following: 300, 600, 1200, 2400, 4800, 9600 and 19.2k. MODBUS interface will support even, odd and no parities. Unit will assume a baud rate of 9600 and no parity by default.

**Transmission Range:** Using 24AWG twisted pair wiring and RS-485, maximum of 2 mi. (3.2km) @ 4800 baud or less; maximum of 1 mi. (1.6km) @ 9600 baud; maximum of .05 mi. (0.8km) @ 19200 baud

**Character Format:** One start bit, 8 data bits and one stop bit

**Data Format:** User-selectable Standard LSW (Least Significant Word) or Swapped MSW (Most Significant Word). Unit will assume Standard LSW by default

**Power Consumption:** 1.5W, nominal; 2W@24Vdc maximum for units using transmitter excitation to supply loop power to a 2-wire instrument

**Indicators** — **LED Type:** Dual color red/green indicate:
INPUT LED: Input is present and normal (green); input signal is not found (red)
READY LED: Instrument is ready for operation and configuration (green); instrument has encountered an internal problem (red)

**Ambient Conditions** — **Operating & Storage Range:** –40°C to +85°C (–40°F to +185°F)

**Relative Humidity:** 0-95%, non-condensing

**RFI/EMI Immunity (Standard):** 10V/m@80-1000MHz, 1kHz AM, when tested according to IEC61326

**RFI/EMI Immunity (with -RF Option):** 20V/m@80-1000MHz, 1kHz, when tested according to IEC61326

**Noise Rejection:** Common Mode: 100dB@50/60Hz

**Weight** 290 g (10.2 oz)

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*Figure 2. Only one communication link, and one MODBUS RTU address, are needed to send the process and diagnostic data from up to 16 HART devices long distances to a host computer-based system.*



Control System

HART Digital Signal Carrying Transmitter Process, Status and Diagnostic Information

Up to 16 HART Devices in Multi-Drop Mode

READY
HCS
INPUT

MOORE INDUSTRIES
COM

MODBUS RTU Data Link

Specifications and information subject to change without notice.

## Ordering Information

| Unit | Input | Output | Power | Options | Housing |
|------|-------|--------|-------|---------|---------|
| **HCS** HART Concentrator System | **HART** Accepts a HART digital protocol input directly from a smart HART transmitter or from a valve positioner | **MB485** MODBUS RTU (RS-485) serial data port<br><br>**MB232** MODBUS RTU (RS-232) serial data port | **9-30DC** ±10% | **-RF** Enhanced RFI/EMI protection (see "Specifications" for details) | **DIN** Universal DIN-style housing mounts on 32mm (EN50035) G-type and 35mm (EN50022) Top Hat DIN-rails |

**To order, specify:** Unit / Input / Output / Power / Options [Housing]
**Model Number Example:**
HCS / HART / MB485 / 9-30DC / -RF [DIN]

## Accessories

Each HCS order comes with one copy of our Intelligent PC Configuration Software (Windows® 98, 2000, NT and XP compatible). Use the chart below to order additional parts.

| Part Number **750-75E05-01** | **HCS Intelligent PC Configuration Software** (One copy provided free with each order) |
|---|---|
| Part Number **803-053-26** | **HCS Configuration Cable** for use in connecting the HCS to the PC comm port |
| Part Number **804-030-26** | **Fuse Protected, Non-Isolated USB Communication Cable** |
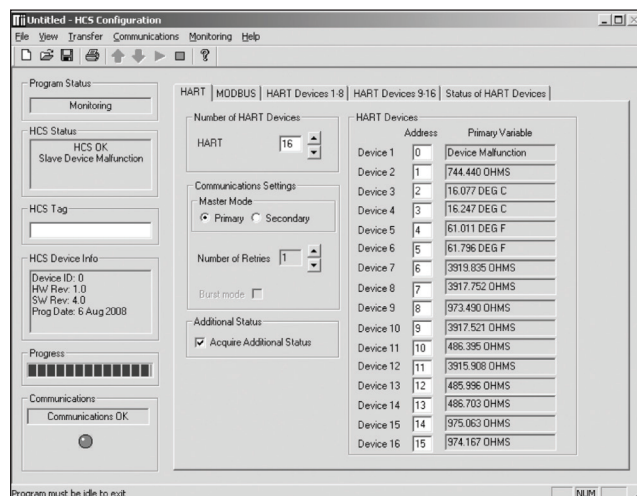
### Powers a 2-Wire Transmitter
The HCS can provide transmitter excitation (24Vdc loop power) to one 2-wire transmitter it is monitoring. This saves the cost of specifying and installing an additional instrument power supply.



**Figure 3.** In just minutes, you can set up the HCS using our single window Intelligent PC Configuration Software.
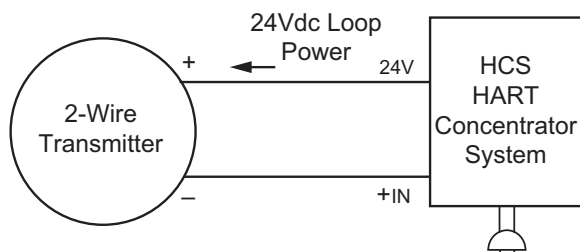


## PC-Programmable in Minutes

All operating parameters configure quickly and easily using our Intelligent PC Configuration Software. Configurations can be saved, and quickly downloaded to other HART Concentrator modules.

**Programmable functions include:**

• **HART Parameters—**Instrument (HART) address to monitor, Normal or Burst mode, and Primary/Secondary Master.

• **MODBUS Parameters—**MODBUS address, baud rate, parity, floating point word order and register grouping.

# HCS
## HART® Concentrator System
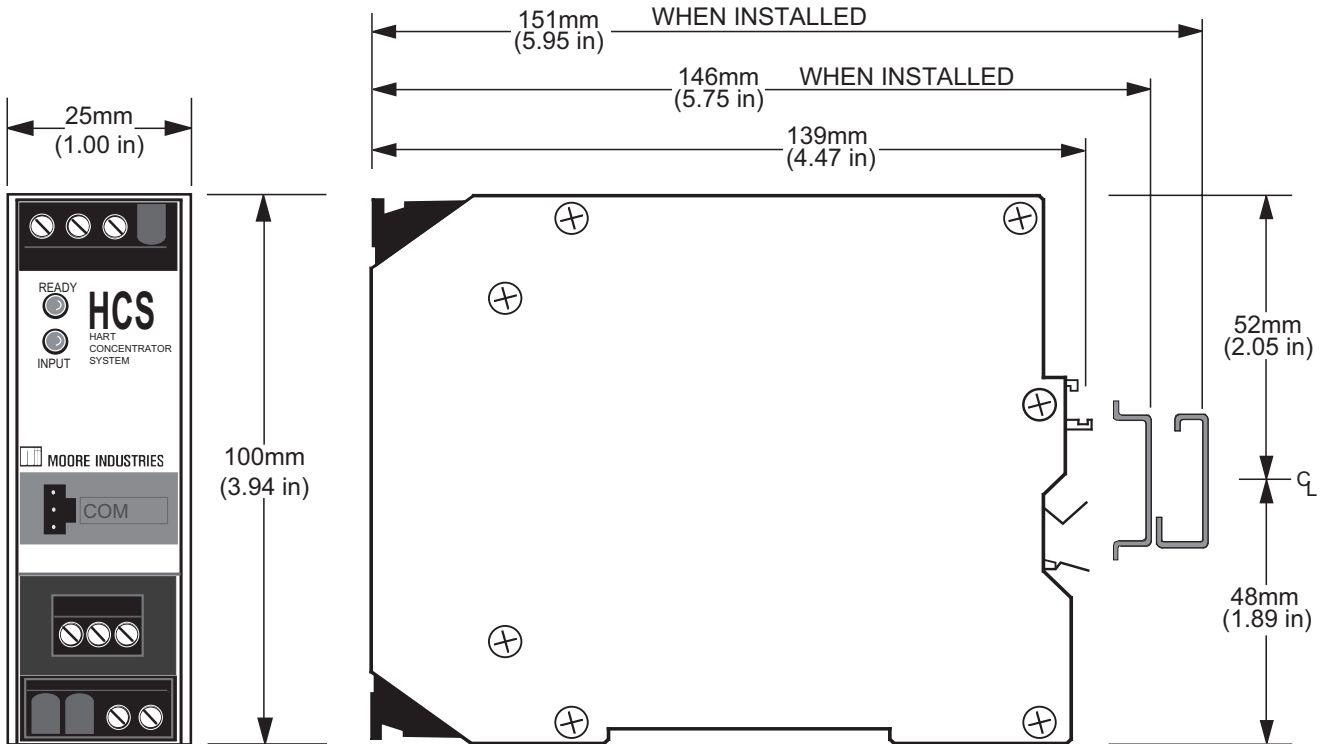## HART-to-MODBUS RTU Converter

***Figure 4.*** *Installation Dimensions*



***Table 1.*** *Terminal Designations*

| Input | Top Terminals (Left to Right) | | | |
|---|---|---|---|---|
| | **T1** | **T2** | **T3** | **T4** |
| | +TX | +IN | –IN | Not Used |

| MODBUS Output | Middle Terminals (Left to Right) | | |
|---|---|---|---|
| | **M1** | **M2** | **M3** |
| RS-485 | A | B | S |
| RS-232 | TX | RX | GND |

| Power | Bottom Terminals (Left to Right) | | | |
|---|---|---|---|---|
| | **B1** | **B2** | **B3** | **B4** |
| | Not Used | Not Used | (+) DC | (–) DCC |

**KEY:**

| +TX = Power for 2-Wire transmitter | A = A MODBUS |
|---|---|
| +IN = Positive input | B = B MODBUS |
| –IN = Negative input | S = S MODBUS |
| | (+)DC = Positive power input |
| | (–)DCC = Negative power input |

**NOTE:**
1. Terminal blocks can accommodate 14-22 AWG solid wiring.
2. Tighten terminals to four inch-pounds (maximum).