



HART: Highway Addressable Remote Transducer

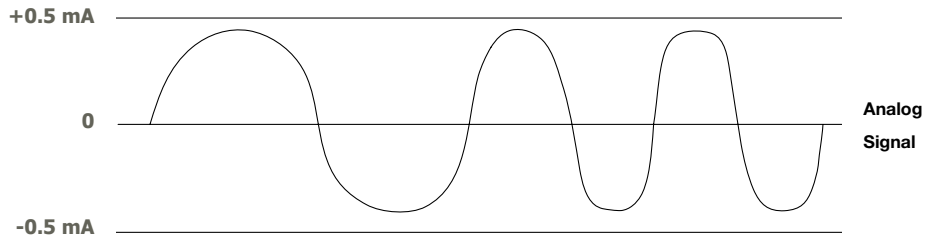
Introduced as a protocol in 1989, HART utilizes Master/Slave methodology.

Specifications

Minimum Cable Size	24 AWG (0.51 mm diameter)
Cable Type	Single pair shielded or multiple pair with overall shield
Maximum Transmittal Distance	3,000 m/10,000 ft

The HART protocol uses the Frequency Shift Keying (FSK) technique based on the Bell 202 communication standard. Digital communication is accomplished by superimposing a frequency signal over the 4-20 mA current. The signal uses two individual frequencies of 1200 and 2200 Hz, which represent the digits 1 and 0. The two frequency levels form a sine wave that is superimposed over the 4-20 mA current loop. Since the average value of the sine wave is zero, no dc component is added to the 4-20 mA signal. True simultaneous communication takes place without process signal interruption.

HART



HART supports up to 256 process variables in a device. However, only four of them can be transmitted in a single HART message. These four values are comprised of the primary process variable and up to three additional secondary variables, for a total of four.

There are 35 to 40 data values available depending on the type of HART device. These data values provide 8 to 16 diagnostic status bits. The role of these bits is to provide an early warning of device problems.

Real Time Predictive Diagnostics

Measurement	Primary Variable	Secondary Variable 1	Secondary Variable 2
pH	0-14	Glass Impedance	Reference Impedance
Dissolved Oxygen	0-999%	Nanoamps	Temperature