Section 14. HART Analog Output Module

14-1. Description

The Ovation HART Analog Output Module consists of an electronic module and a personality mode. The Ovation HART Analog Output Module is designed to interface with eight HART compliant output devices utilizing a 4-20 mA control loop signal. A HART compliant output device will exchange digital information with the Ovation control system in addition to the standard 4-20 mA control loop signal. The digital information is imposed on the 4-20 mA signal according to the guidelines of the HART Protocol Specification. HART uses a low-level frequency shift-keyed sine-wave signal that is superimposed on the 4-20 mA signal. The average value of the HART signal is zero. Therefore, the HART signal does not interfere with the 4-20 mA control signal.

The HART Analog Output module is applicable for CE Mark certified systems.

Note

See **Section 3. I/O Modules** for environmental, installation, wiring, and fuse information.

14-2. Module Groups

14-2.1. Electronics Module

There is one Electronics module group for the HART Analog Output Module:

- 5X00062G01 contains eight multiplexed, 4-20 mA output channels that interface with 8 HART output devices.

14-2.2. Personality Module

There is one Personality Module group for the HART Analog Output Module:

- 5X00063G01 contains passive circuitry for each of the eight channels. There is a user serviceable fuse located on the personality module. This fuses the auxiliary power supplying the field side circuitry of the eight output channels.

Table 14-1. HART Analog Output Subsystem (14 Bit)

Range	Channels	Electronic Module	Personality Module
4-20 mA	8	5X00062G01	5X00063G01

This configuration is CE Mark Certified.

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14-3. Module Block Diagrams

The Ovation HART analog output module assembly consists of two modules inserted into an Ovation base unit. The electronics module contains a logic printed circuit board (LHA) and a field printed circuit board (FHO). The simplified block diagram for the HART analog output electronics modules FHO board is shown below in Figure 14-1. The electronics module is used in conjunction with a personalty module, which contains a single printed circuit board (PHAO).

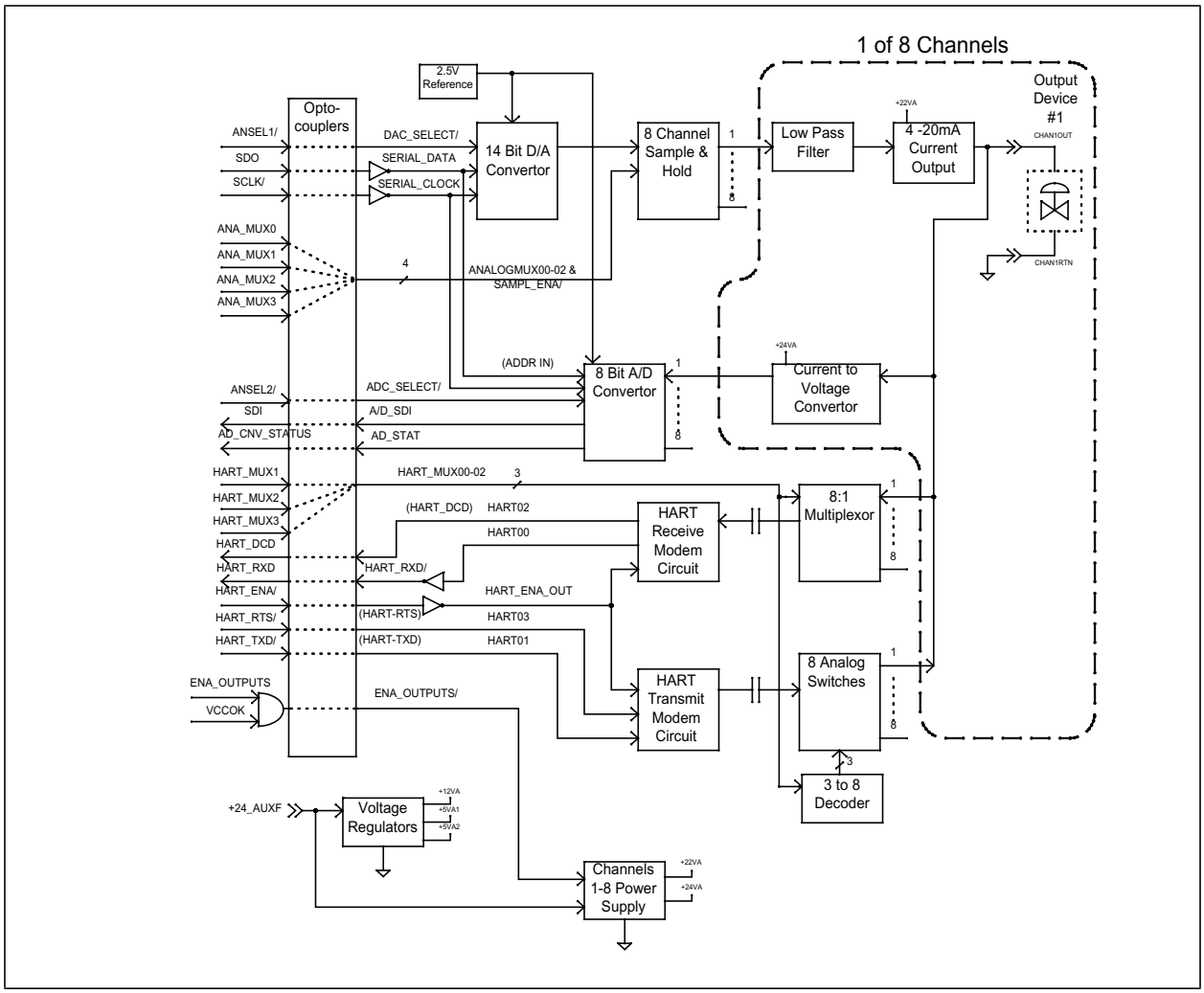


Figure 14-1. HART Analog Output Field Board Block Diagram

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14-4. Power Supply Requirements

Note

Module power specifications (main and auxiliary) refer to the actual power drawn by the module from the 24 VDC main power supply and from the +24 VDC auxiliary power supply and **NOT** from the AC or DC mains.

The HART Analog Output Module utilizes the standard +24V Ovation main power supply to provide the power required for the logic circuitry.

The HART Analog Output Module utilizes a +24 auxiliary power supply to provide the power required for the field circuitry. This includes all 4-20 mA loop power, D/A conversion, and the remaining output channel components.

It is recommended that the HART Analog Output module utilize the Ovation cabinet's Auxiliary +24V DC power that is obtained from the standard Ovation DIN Rail power supply auxiliary output.

However, if an external auxiliary power supply is utilized by the HART Analog Output module, the power supply noise output must meet the following requirements.

Table 14-2. Power Supply Noise Output

Noise	All Rated Loads (500 HZ to 10 kHZ)	2.2 mV RMS Max.

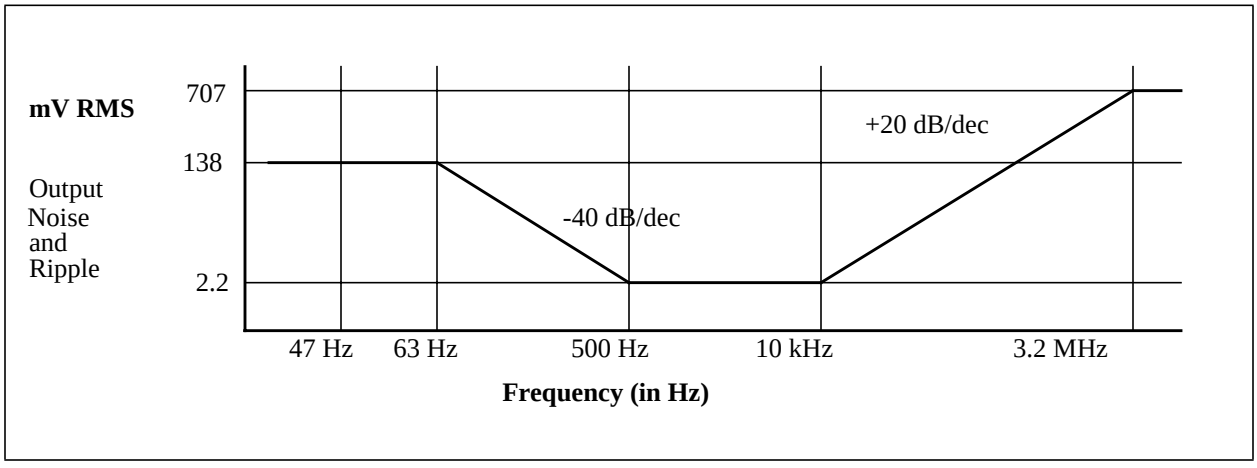


Figure 14-2. Power Supply Output Noise Requirements

If an external supply is utilized to provide auxiliary power, see Appendix D for the steps to be taken before connecting the external power supply to the Ovation I/O base unit terminal block.

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In addition, all modules utilizing the auxiliary power supplies, including the HART modules, **MUST** utilize shielded I/O cables in order to suppress coupled noise and transients into the HART modules. This includes modules on the same branch utilizing the auxiliary power, or modules on other branches utilizing the same auxiliary power. This recommendation applies regardless of the type of power supply chosen by the user.

14-5. Specifications

Electronics Module (5X00062)
Personality Module (5X00063)

Table 14-3. HART Analog Output Channel Specifications

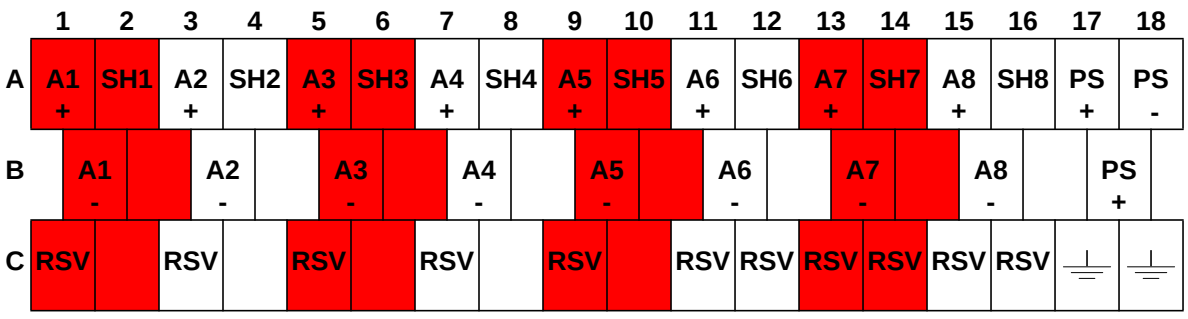
Description	Value
Number of channels	8
Channel Update Rate	24 mS (Each channel is updated once every 24 mS by the on-board microcontroller, 14 Bit resolution typ.).
Output Range	4 to 20 mA
D/A Resolution	14 Bits
Accuracy over Temperature Range	0.25% of Span
User Loop Voltage	Power for loop current is supplied through the module by an auxiliary power supply.
Diagnostics	Open loop feedback detection. 8 Pass/Fail bits are stored in data register 0xC in Hex.
Dielectric isolation: Channel to Channel Channel to logic	 None 1000 VAC/VDC for 1 minute.
Output Loading	4-20 mA into 700 ohm load maximum (230 ohm minimum to 600 ohm maximum).[1]
Output Compliance	20 mA@21.6 VDC Supply into 700 ohm load.
Operating Temperature Range	0^{o} to 60^{o} C
Humidity (non-condensing)	0% to 95%
Module Power	Main: 24 VDC 1.2 W typical, 2.5W maximum Aux: 24 VDC (-5%,+6.25%) 6W typical, 7.2W maximum
[1] Per the HART Physical Layer Specification (HCF_SPEC - 54).	

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14-6. HART Analog Output Terminal Block Wiring Information

Each personality module has a simplified wiring diagram label on its side which appears above the terminal block. This diagram indicates how the wiring from the field is to be connected to the terminal block in the base unit. The diagrams for the HART Analog Output Personality Modules are illustrated in Figure 14-3. The following table lists and defines the abbreviations used in those diagrams.

Abbreviation	Definition
A1 - A8 +	Analog Output positive terminal connection (connected to the positive terminal of a HART analog output device).
A1 - A8 -	Analog Output negative terminal connection (connected to the negative terminal of a HART analog output device)
SH1 - SH8	Shield terminal connection
⏚	Earth ground terminals
PS+, PS-	External Auxiliary power supply terminals



Do not make connections to RSV or unlabeled terminals.

Figure 14-3. HART Analog Output Terminal Block Pin Assignments

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14-7. HART Analog Output Field Connection Wiring Diagrams

Non-CE Mark Certified Systems

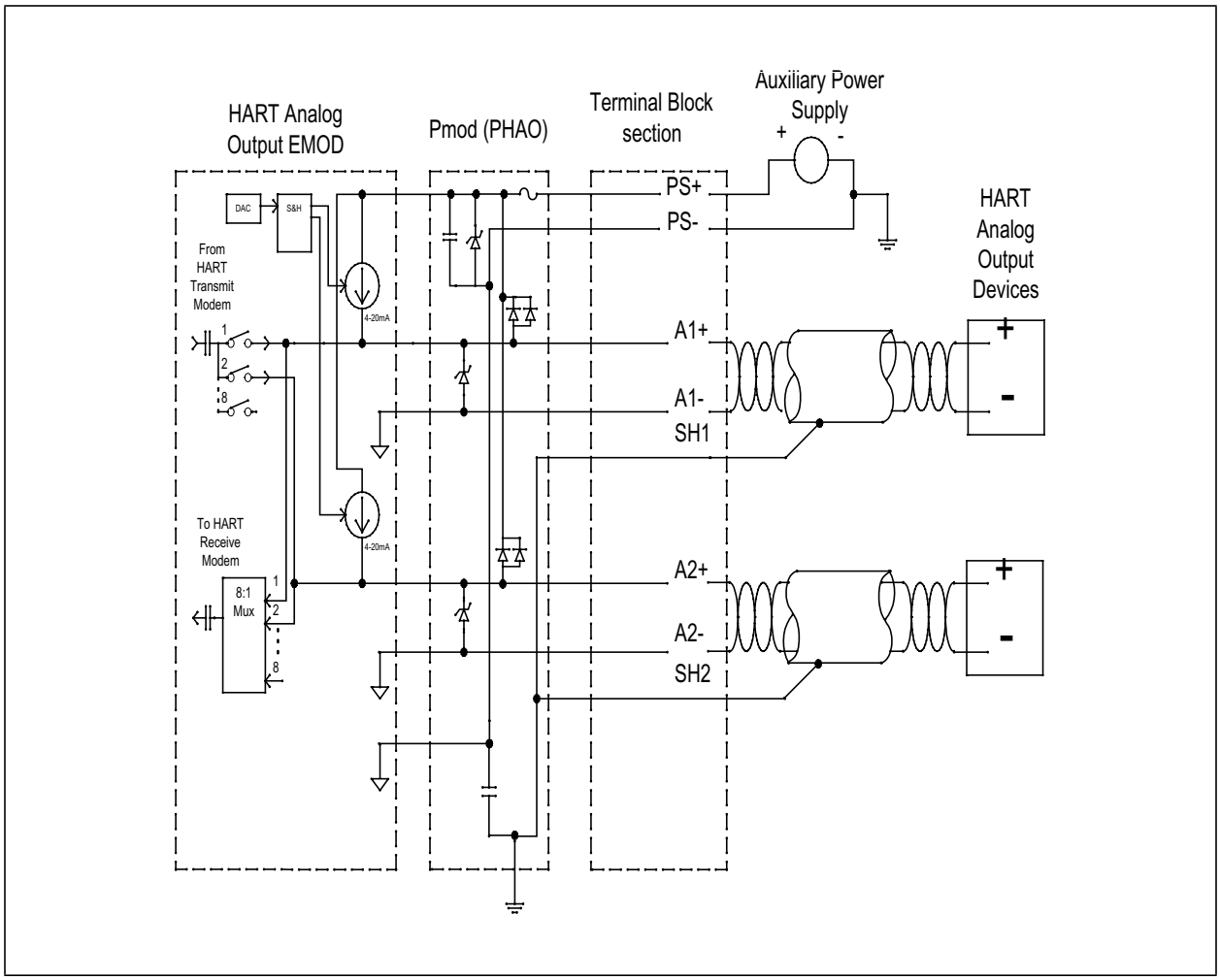


Figure 14-4. HART Analog Output Module Field Wiring (Non-CE Mark) (2 of 8 channels depicted)

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