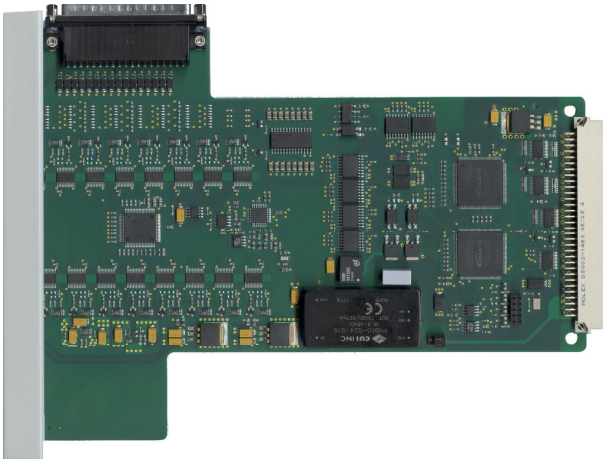
SIL-3 16-Channel Analog Output Card

3144/3145/3146

PRODUCT HIGHLIGHTS

- **SIL-3 Approved**
- **4 to 20 mA Output with HART**
- **0 to 20 mA Output**
- **±10V, 0-10V Output**
- **16-Bit Digital to Analog Conversion**
- **Single, Dual, or Triple Redundancy**
- **Channel Readback Validation**



3145 16-Channel HART Enabled
Analog Output Card

Product Overview

The 16-Channel Analog Output Card has been designed to provide 16 channels of high resolution, precision analog output signals. The Analog Output card can be installed into any 3000TAS N+ family chassis to control actuators, valves, solenoids, or other suitable analog devices.

Built-in advanced diagnostics test each output signal to verify proper operation. Readback of outputs verifies output levels. To test for stuck output values, the card will periodically change the commanded value of the analog output by a small amount (< 1%) for one scan cycle. The output is verified to have changed via the analog channel readback circuitry. Additional diagnostics are performed extensively on all backplane communications to ensure the validity of commands, slot addressing, card ID and data. If an error is detected, an error bit is set and the outputs are not transferred. Watchdog timers allow the output to de-energize to a zero state in case of loss of communication to the card.

Configurable redundancy reduces costs as the redundant outputs are configured to your availability, integrity and system cost requirements. The flexible architecture allows redundant output cards to be in the same chassis or in different chassis.

When used for HART communications, the output channels of the card are configured to provide a sourcing current signal of 4-20 mA and can be used to perform partial stroke testing of valves.

Determinations can then be made regarding whether a valve is stuck or can be operated if required. This error recognition means you will better know when your field devices are likely to fail. You receive constant feedback about the health of every control valve so you can replace the device before it malfunctions, and you won't waste money by changing it too often. Plus instant error recognition eliminates human error and false readings.

RTP is the Best Technology for Your Investment,
Here's why:
This product is compatible with the 3000 TAS and N+ systems. It is a multi-processor architecture that delivers exceptional Performance and Comprehensive Diagnostics. The results speak for themselves: A reaction time of 7 msec, true 1 msec SOE (Analog and Digital), an MBTF of greater than 50,000 years an MTTFS of greater than 60,000 years, and a PFDavg of $5x10^{-5}$. ***Compare these numbers to any other system.***
Built-in proof test diagnostics means it will never be necessary to shut down at the proof test interval. Unlimited online downloads of logic and configuration changes do not require a periodic shut down like other systems. ***Compare this functionality to any other system.***
NetSuite Software: One-time price includes unlimited use of Logic Development, Alarm Manager, Data Archive and Historian and HMI without hardware or software keys. ***Compare this functionality and price to all other systems.***
Finally, a Safety Instrumented System (SIS) should always take the process it protects to a safe state when it is required to do so, and it should never interfere with the operation of the process at the time. ***The 3000 TAS does this better than any other system.***

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Replacing the card can be done while the system is running. Simply disable the card from within NetArrays, remove the cable attached to the card, replace the card, attach the cable to the card, and enable the card within NetArrays. A front panel LED indicates if the card is online or offline.

Three versions of the card are available:

3144 - 0 to 20 mA Current Output
3145 - 4 to 20 mA Current Output, HART Enabled
3146 - ± 10V Voltage Output

Specifications

Number of Channels	16
Output Signals	Sourcing: 0 to +20 mA Sourcing: 4 to +20 mA with HART 0-10 VDC or ±10 VDC
Full Scale Value	Current: 20 mA Voltage: 10V
Analog output error (maximum error at 25 ºC)	Current: ±0.125% of full scale value (±25 µA) Voltage: ±0.050% of full scale value (±5.0 mV)
Analog output error (temperature coefficient)	Current: ±0.001% of full scale value/ºC (±0.2 µA/ºC) Voltage: ±0.001% of full scale value/ºC (±0.1 mV/ºC)
Maximum error over full temperature range	Current: ±0.160% of full scale value (±32 µA) Voltage: ±0.085% of full scale value (±8.5 mV)
Digital resolution	16 bits
Settling time to within maximum error for full-range change	Current: Less than 1 msec Voltage: Less than 1 msec
Slew Rate	Current: 0.2 mA/µsec (typical) Voltage: 0.050 V/µsec (typical, resistive load)
Type of protection	Digital isolators (galvanic)
Isolation	Channel to RTP ground and external power supply 500VDC max No channel to channel isolation.
Voltage Compliance Range For Current Output	+13 Volts
Common points between channels	All channels share an isolated common ground.
Load resistance range	Current: 100 Ω minimum, 600 Ω maximum Voltage: 4.75 kΩ minimum reference to Signal Return
Maximum inductive load - Current Output	50 mH
Maximum Capacitive Load	Voltage: 0.01uF
Output Impedance - Voltage Output	< 2.3 Ω (output on) > 10 MΩ (output off)
Crosstalk between channels at 50 Hz	DC -71 dB AC -71 dB
Non-linearity	Current: ±0.125% of full scale value (±25 µA) Voltage: ±0.050% of full scale value (±5.0 mV)
Output Protection	Outputs may be shorted to 0 V indefinitely.
Hardware Watchdog timer	.6 to 1.5 seconds
Programmable Watchdog timer	150 msec
Backplane Power	5 VDC @ 400 mA 24 VDC @ 450 mA

*The Analog Output cards with HART capabilities are only available with the N+ Series Systems

Environmental Specification

Operating Temperature Range	–20 ºC to +60 ºC
Storage Temperature Range	–25 ºC to +85 ºC
Relative Humidity Range	10% to 95%, non-condensing

Termination Module

3299-09S/D/T	Termination Module - 16 Channel Analog Output
3199-11S	Universal Termination Module

*Represents (S)ingle, (D)ual, or (T)riple card redundancy