

# AO02ev

## ABB Ability™ Symphony® Plus Hardware Selector



The AO02ev Analog Output module processes up to sixteen (16) high-level, group-isolated, analog output field signals. Each channel is independently configurable for either 4 to 20 mA or 1 to +5 VDC ranges.

The AO02ev Analog Output module is a Form/Fit/Function replacement for the ASO1I Analog Slave Output HR I/O module.

FC 149 (Analog Output Slave) sets AO module and output channel operating parameters. Each FC 149 configures the settings of seven (7) channels. Two (2) instances of FC 149 are required to configure all fourteen (14) output channels of the I/O module

D/A resolution of each channel is 12 bits. The AO02ev module has one D/A converter for each output channel.

The AO02ev module provides short-circuit protection by limiting current to a maximum of 26 mA. The AO02ev module will also detect an open circuit in less than 5 seconds.

## Features and benefits

- Sixteen (16) independently configurable Analog Output channels supporting:
- 4 to 20 mADC, or 1 to +5 VDC
- Up to 64 HART v5.4 secondary variables Total, max 4 sec vars per analog output CH
- Secondary HART variable update 2.5 typical, 8 max seconds
- 12-Bit D/A converter resolution
- Current mode load up to 750
- Accuracy is  $\pm 0.1\%$  of Full Scale Range where FSR = 25 mA or 6.25 VDC
- AO02e supports optional module redundancy seconds

General info	
Article number	7PAA004003R11
Type	Analog Output
Signal specification	4...20 mA, 1...+5 VDC
Life cycle status	ACTIVE
Number of channels	16
Signal type	High Level AO
HART	No
SOE	No
Redundancy	No
Form factor	HR MMU
Mounting	MMU (1-Slot)
MTBF (per MIL-HDBK-217-FN2)	PR: A = 141,385 Hours @ 30 °C, 107,666 Hours @ 40 °C, 44,605 Hours @ 70 °C
MTTR (Hours)	8 Hours

Detailed data	
Module power requirements	400 mA (typical) @ 5 VDC ± 10%, 155 mA (typical) @ 24 VDC ± 10%
Module power connection	+ 5V connection on MMU
Field IO power	20 mA per CH @ 24 VDC ± 10%
Overvoltage category	Category I for power, inputs or outputs. Tested according to EN 61010-1
Max field cable length	600 meters (1968 feet)
Number of Channels	14 independently configurable channels
Signal ranges and types	Analog Outputs: 4...20 mA, or 1...+5 VDC
Output load	Current Mode: 0 to 750 Ω, Voltage Mode: 22 kΩ to 1 MΩ
D/A Conversion	16 D/A converters Total, each CH has a dedicated converter
D/A Resolution	12-Bit
Accuracy, FSR	±0.1% FSR, FSR = 25 mA or 6.25 VDC
Field signal to Logic isolation	Galvanically isolated, 1500 V up to 1 minute
Channel isolation	1x16 group isolated, 1500 V up to 1 minute
Open circuit detection time	Less than 5 sec, when in current mode
Short circuit protection	Max 26 mA (in current mode only)

Diagnostics	
Front plate LED's	R (Run), F (Fault), P (Primary), and B (Backup) + 8 Diagnostic & Status LEDs
Local availability	S+ Menu from Module Front Plate
Remote availability	Using SPE

Environment and certification	
Temperature, Operating	-40 to +70 °C Tested according to IEC/EN 60068-2-1, IEC/EN 60068-2-2
Temperature, Storage	-40 to +85 °C Tested according to MIL-STD-810G
Relative humidity	20% to 95% @ 40°C non-condensing. Tested according to IEC/EN 60068-2-78, IEC/EN 61298-3
Vibration (operational sinusoidal)	5 to 60 Hz 0.137 mm (0.0054 in.), 60 to 150 Hz 1.0 G. Tested according to IEC/EN 60068-2-6
Vibration (transportation)	10 to 500 Hz. Tested according to MIL-STD-810G
Shock (storage)	15 G, 11 msec. Tested according to IEC/EN 60068-2-27
Drop	100 mm. Tested according to IEC/EN 60068-2-31
Protection class	IP20 according to EN 60529
Altitude (operational)	Sea level to 3,048 meters (10,000 ft.) Tested according to MIL-STD-810G
Altitude (storage)	Sea level to 12,192 meters (40,000 ft.) Tested according to MIL-STD-810G
Air quality	ISA S71.04 G3 compliant
ESD immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-2, Severity level 3
Surge immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-5, Severity level 3
Electrical fast transient immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-4, Severity level 3
Radiated RFI immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-3, Severity level 3
Conducted Immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-6, Severity level 3
Magnetic field immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-8, Severity level 4
Radiated emission	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-6, Severity level 3
Conducted emission	Tested according to IEC/EN 61000-6-4, CISPR 11 + A1, CISPR 16-1-1, Group 1, Class A, ISM equipment
Voltage dips and interruption immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-11
CSA non-hazardous locations	Certified for use as process control equipment in an ordinary (non-hazardous) location
CSA hazardous, nonincendive locations	Class I, Division 2, Groups A, B, C, D
CE Mark	CE Mark EMC directive 2004/108/EC & Low Voltage Directive 2006/95/EC
RoHS compliance	RoHS Directive 2015/863
WEEE compliance	DIRECTIVE/2012/19/EU

Compatibility	
Use with MTU	NTDI02, NIDI01
Module keying code for base	n/a

Dimensions	
Width	35.6 mm
Depth	177.8 mm
Height	298.5 mm
Weight	412 g

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