

A0-10 ANALOG OUTPUT

Instruction Manual

April 2001



ANALOG OUTPUT

Safety Guidelines

Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.

Qualified Personnel

This device/system may only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

Warning: This product can only function properly and safely if it is correctly transported, stored, installed, set up, operated, and maintained.

Note: Always use product in accordance with specifications.

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AO-10: Introduction

Note: The AO-10 is to be used only in the manner outlined in this instruction manual.

The AO-10 Analog Output Module is used to provide analog output for the scan points of the associated application device. The operation of the AO-10 is programmed via the application device. The only AO-10 on-board settings are for bank selection and output testing.

The AO-10 can be programmed to provide up to 10 analog outputs, each sharing a common negative buss which is electrically isolated from ground. If desired, the common negative buss and / or cable shield may be connected to ground at only one location; either at the AO-10 or at the load (e.g. customer's computer).

Specifications

Power

- 100/115/200/230 V ac $\pm 15\%$, 50/60 Hz, 15 VA

Environmental

- location: indoor / outdoor
- altitude: 2000 m max.
- ambient temperature: -20 to 50 °C (-5 to 122 °F)
- relative humidity: suitable for outdoor (Type 4X / NEMA 4X / IP65 enclosure)
- installation category: II
- pollution degree: 4

Input

- communication from application device¹
- ± 20 mA bipolar current loop
- 4800 baud rate
- non-polarized

Output

- 10 analog current outputs, programmable from application device¹
- isolated 0 or 4 to 20 mA into $750\ \Omega$ max.
- 0.1% resolution
- Accuracy: 0.25% of span

¹. Application Device: AiRanger XPL & XPL Plus process material level monitors

Display

- 1 power / communication status LED

Memory

- 10 minutes minimum data retention

Enclosure

- Type 4X / NEMA 4X / IP65
- 209 mm W x 285 mm H x 92 mm D (8.2" W x 11.2"H x 3.6"D)
- polycarbonate

Approvals

- CE², FM, CSA **NRTL/C**

Weight

- 2 kg (4.4 lb)

Cable (optional):

- Belden 8760, shielded / twisted pair, 18 ga. or equivalent

² EMC performance available upon request.

Installation

Note: Installation shall only be performed by qualified personnel and in accordance with local governing regulations.

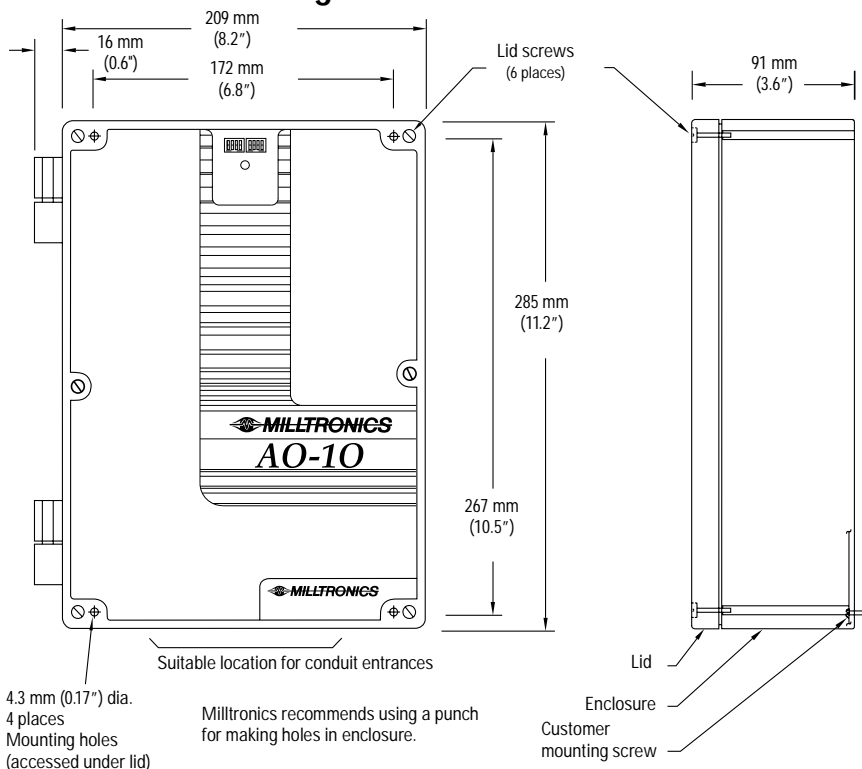
Mount the AO-10 in an area that is within the unit's ambient temperature range and suitable for the specified enclosure. The front cover should be easy to view, and should have room to swing open for access to wiring and switch-settings.

Caution:

- **Do not mount the AO-10 in direct sunlight without the use of a sun shield.**
- **This product is susceptible to electrostatic shock: follow proper grounding procedures.**

The AO-10 may be installed remotely from the associated application device to a maximum loop length of 3,000 m (10,000 ft) when using 18 ga. wire.

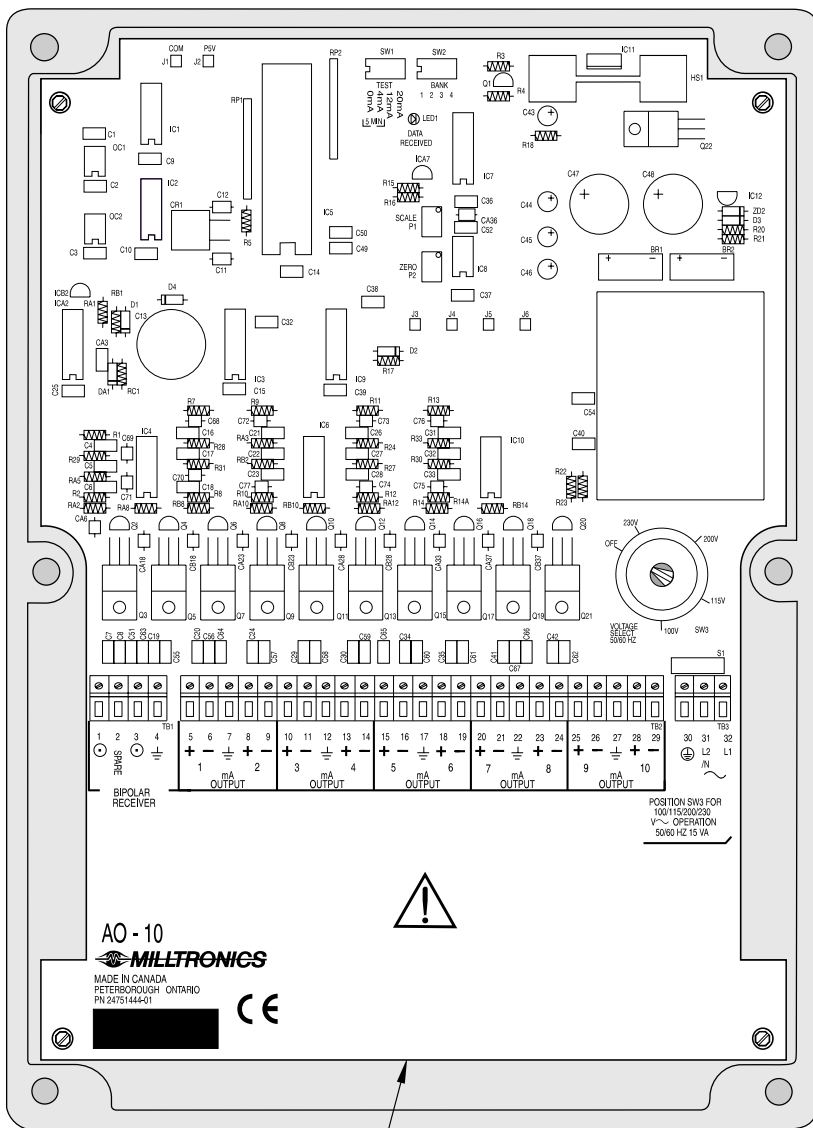
Outline and Mounting



Caution:

- **Non-metallic enclosure does not provide grounding between connections.**
- **Use grounding type bushings and jumpers.**

Layout



Board A

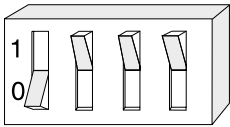


All field wiring must have insulation suitable for at least 250 V.

Switch Settings

Ensure that the BANK dip switch is set as shown below.

BANK



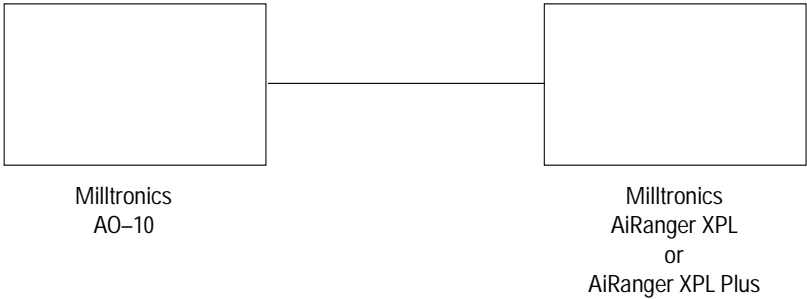
1 2 3 4

(toggles)

toggle				bank (output)
1	2	3	4	
1	0	0	0	1 (1–10)

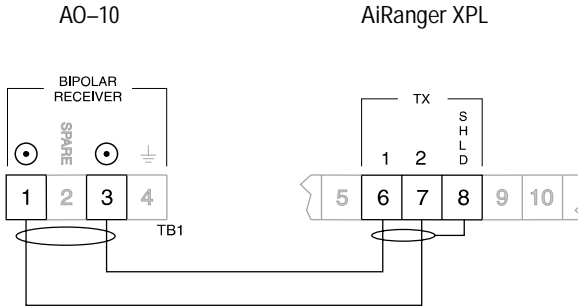
Interconnection

System Diagram

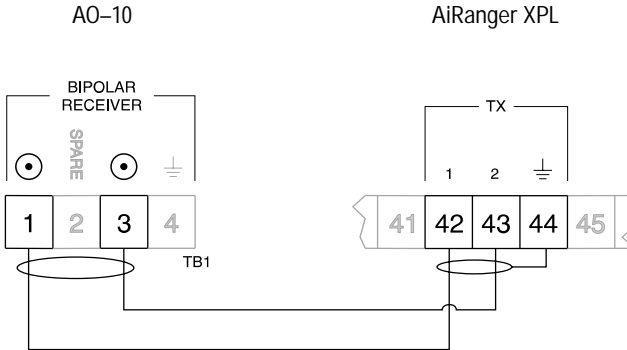


Typical system design. Refer to associated application device instruction manual.

AiRanger XPL Communication

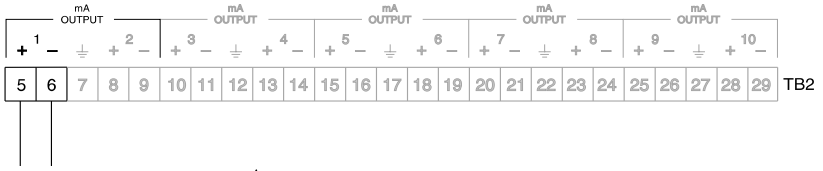


AiRanger XPL Plus Communication



1. AO-10 receiver input is non-polarized.
2. Refer to associated application device instruction manual for wiring detail. Check that the communication parameter (AiRanger XPL \ P-54 or AiRanger XPL Plus \ P740, is 'ON'.
3. AO-10 interconnecting cable shield should be grounded at AiRanger XPL or AiRanger XPL Plus only. Insulate shields at junctions to prevent inadvertent grounding. Use Belden 8760, 1 pair shielded twisted, 18 ga. or equivalent. Maximum individual loop length is 3000 m (10,000 ft).

Current Output



isolated 0 or 4 to 20 mA out,
750 Ω load max.
(typical of 10)



- mA outputs: Belden 8760, shielded / twisted pair, 18 AWG (0.75mm²) or equivalent. Maximum separation 1,500 m (5,000 ft).
- mA output to customer instrumentation: ground shield at one end only

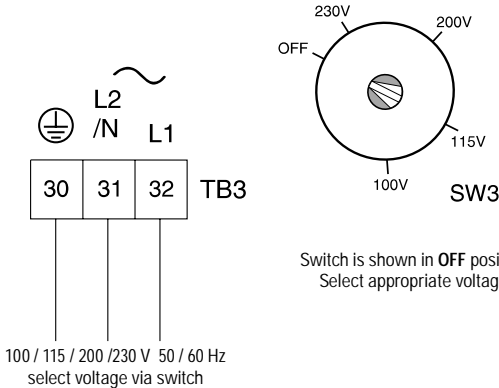


All field wiring must have insulation suitable for at least 250 V

Note: The AO-10 mA output cable must be shielded over its entire length and grounded at one point only, for maximum noise immunity.

- Ensure the application device is properly grounded.
- Connect the cable shield to the application device **shield** terminal.
- To avoid developing a ground loop, leave the cable shield **open** at the AO-10 termination and insulate any cable shield junctions from ground.

Power



Switch is shown in **OFF** position.
Select appropriate voltage.

Caution:

- The equipment must be protected by a 15 A fuse or circuit breaker in the building installation.
- A circuit breaker or switch in the building installation, marked as the disconnect switch, shall be in close proximity to the equipment and within easy reach of the operator.

Operation

Analog output span (empty to full scale) and range (0 - 20 or 4 - 20 mA, proportional or inverse) are established when programming the associated application device. Trimming and limiting of the individual analog outputs is done via the application device, where applicable.

Associated Parameters.

Function	Parameter	
	AiRanger XPL	AiRanger XPL Plus
span	P-04	P007
range	P-06	P006
trim	P-17 & 18	P212 & P213
limit	P-19 & 20	P214 & P215

Refer to the associated application device manual.

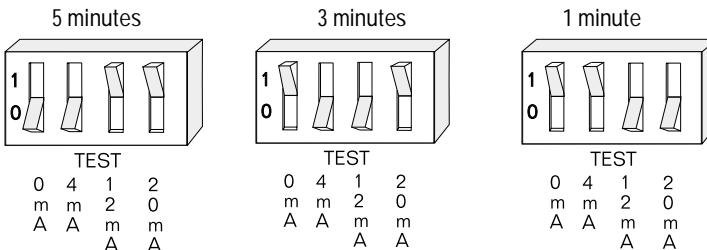
When power is applied to the AO-10, LED 1 illuminates, and all analog outputs default to 0 mA until they are updated by the associated application device.

DATA RECEIVED LED 1 also flashes whenever a valid message is received from the application device. If LED 1 does not flash and the corresponding AO-10 is functioning properly, check for faulty communication wiring.

The received data from the application device is then processed to extract only the data dedicated to the AO-10 bank selected. The buffers associated with the individual outputs hold the extracted data until it is updated, controlling the analog output level accordingly. These buffers are updated subject to the scan sequence of the application device, **but the analog outputs are independent of the application device LCD display.**

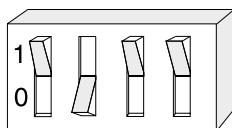
If there is a power interruption, all outputs drop to 0 mA, but the stored output values are retained in memory for ten minutes. Once power is restored, all outputs revert to their previous mA values, if the memory is intact, and normal operation resumes.

The AO-10 can be programmed to activate an alarm if communication is lost. When the toggles are set as shown below, the AO-10 forces all outputs to 0mA if communication is lost for more than the set time. When communication is resumed, the outputs revert to their normal function.



The AO-10 may be tested in two ways:

1. Via the associated application device: Refer to the associated instruction manual.
2. Via the TEST switch located at the top of the AO-10 board.



Set the toggle down at '1' for the test output desired.

Set all toggles down at '0' for normal operation.

TEST			
0	4	1	2
m	m	2	0
A	A	m	m
		A	A

Test output of 4 mA is selected.

This test overrides the normal operation and all 10 outputs on the AO-10 assume the test value selected until the toggle is reset (0) for normal operation. During test, the AO-10 buffer updates if communication has continued. Upon resumption of normal operation, the outputs assume the value found in the buffer.

Maintenance

The AO-10 requires no maintenance, but a program of periodic checks is recommended. This should include regular inspection, general cleaning and good housekeeping practices.

- Always disconnect power at the main breaker before cleaning the enclosure.
- Use a vacuum and a clean, dry paint brush to clean the enclosure and circuit boards.
- Check all electrical terminals for corrosion and arcing.

Notes

Notes

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Siemens Milltronics Process Instruments Inc.
1954 Technology Drive, P.O. Box 4225
Peterborough, ON, Canada K9J 7B1
Tel: (705) 745-2431 Fax: (705) 741-0466
www.milltronics.com

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