DA70 8 Analog Output Module

Installation Guide

- High density analog output module for the DA70
- Available outputs include: 0 to 5 VDC, ±5 VDC, 0 to 10 VDC, ±10 VDC, and 0/4 to 20 mA DC
- Outputs are isolated from each other and from the backplane
- Outputs are software configured and fully scalable

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FOR USE IN HAZARDOUS LOCATIONS:
Class I, Division 2, Groups A, B, C, and D
T4

CE Ex
II 3 G Ex ec IIC T4 Gc
DEMKO 20 ATEX 2268X
IECEx UL 20.0007X

MODULE PACKAGE CHECKLIST

This product package should contain the items listed below. If any items are missing or damaged, contact Red Lion immediately.

- DIN rail mount DA 8AO Module
- Installation Guide

GENERAL DESCRIPTION

The DA 8AO is an analog output module designed for use with the DA70 products. The module provides eight isolated outputs that are independently programmable for output ranges of 0-5 V, ±5 VDC, 0-10 V, +/-10 V, 0-20 mA, or 4-20 mA. Internal scaling is provided to accommodate virtually any application.

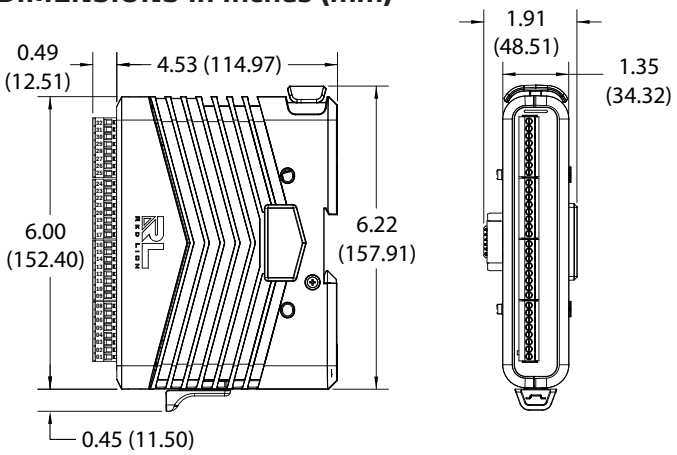
The modules connect and communicate via a proprietary connection to the DA70 host device. The DA70 equipped with serial ports as well as an Ethernet port(s), allows the system to share data with PCs, PLCs, and SCADA systems. The maximum number of modules for each DA70 device is 10.

Internal power management circuits allow the module to be replaced while power is applied, which reduces downtime in the event of a module failure. All configuration information is stored locally within the module, as well as in the Host, so replacement modules do not need to be configured.

CONFIGURATION

The DA8A0 module is configured with Windows® compatible Crimson® software. The software is an easy to use, graphical interface which provides a means of configuration and commissioning of new systems, as well as routine module re-calibration.

DIMENSIONS In Inches (mm)



SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in this document or on equipment must be observed to ensure personal safety and to prevent damage to either the device or equipment connected to it.

Do not use these products to replace proper safety interlocking. No software-based device (or any other solid-state device) should ever be designed to be responsible for the maintenance of personnel safety or consequential equipment not equipped with safeguards. Red Lion disclaims any responsibility for damages, either direct or consequential, that result from the use of this equipment in a manner not specified.

CAUTION: Risk of Danger
Read complete instructions prior to installation and operation of the unit.

ATTENTION : Risque de danger
Lire les instructions complètes avant l'installation et l'utilisation de l'appareil.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2

AVERTISSEMENT - DANGER D'EXPLOSION - LE REMPLACEMENT DE COMPOSANTS PEUT NUIRE À L'APTITUDE À LA CLASSE I, DIVISION 2

This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only.

Cet équipement est adapté à une utilisation dans des endroits de classe I, Division 2, Groupes A, B, C, D, ou dans des endroits non dangereux seulement.

WARNING - EXPLOSION HAZARD. NOT HOT SWAPPABLE. DO NOT REMOVE OR REPLACE WHILE CIRCUIT IS LIVE UNLESS THE AREA IS FREE OF IGNITIBLE CONCENTRATIONS.

AVERTISSEMENT - RISQUE D'EXPLOSION. NON ÉCHANGEABLE À CHAUD. NE PAS RETIRER OU REMPLACER SOUS TENSION SAUF SI LA ZONE EST EXEMPTE DE CONCENTRATIONS INFLAMMABLES.

SPECIFICATIONS

1. **POWER REQUIREMENTS**:
   Power is supplied by the DA host device. Modules may be hot-swapped (replaced while powered up) in non-hazardous locations only.
   Max Power: 4.6 W
2. **LEDs**: One status LED.
3. **MEMORY**: Non-volatile memory retains all programmable parameters. The Controller also stores the parameters in order to reprogram any modules that need updates.
4. **AO – ANALOG OUTPUTS**:
   Eight (8) independently configured analog outputs.
   Software programmable for 0-5 VDC, ±5 VDC, 0-10 VDC, 0-20 mA, 0-24 mA, 4-20 mA
   Effective Resolution: Full 16-bit (Signed)
   Voltage: 500 µV
   Current: 1 µA
   Accuracy: 0.2% of full scale (-40 to 75 °C)
   Isolation Level: The outputs are isolated from each other, and are isolated from the power supply. 500 Vrms @ 50/60 Hz for 1 minute between any of the outputs and the Host power supply input.
5. **COMMUNICATIONS**: Provided by the DA70 Controller
6. **ENVIRONMENTAL CONDITIONS**:
   Operating Temperature Range: -40 to 75 °C
   Storage Temperature Range: -40 to 80 °C
   Operating and Storage Humidity: 0 to 95% max. RH non-condensing
   Vibration to IEC 60068-2-6: Operational 5-500 Hz, 2 g
   Shock to IEC 60068-2-27: Operational 15 g
   Altitude: Up to 2000 meters
   Installation Category II, Pollution Degree 2 as defined in IEC/EN 60664-1.
7. **CERTIFICATIONS AND COMPLIANCES**:
   CE Approved
   EN 61326-1 Immunity to Industrial Locations
   Emission CISPR 11 Class A
   IEC/EN 61010-1
   RoHS Compliant
   ATEX Approved
   Ⓔx II 3 G Ex ec IIC T4 Gc
   DEMKO 20 ATEX 2268X
   IECEx Approved
   IECEx UL 20.0007X
   UL Hazardous: File # E317425
   Rugged IP30 enclosure
8. **CONNECTIONS**: Removable wire clamp screw terminal blocks
   Wire Strip Length: 0.3" (7.5 mm)
   Wire Gauge Capacity: 14 to 24 AWG (2.08 to 0.20 mm^2) copper wire only
   Torque: 2 inch-lbs (0.23 N-m)
9. **CONSTRUCTION**: Polycarbonate enclosure with IP30 rating. For use only in an approved enclosure.
10. **MOUNTING REQUIREMENTS**: Mounts onto standard DIN style top hat (T) profile mounting rails according to EN50022 – 35 x 7.5 mm and 35 x 15 mm.
11. **WEIGHT**: 10.2 oz (317.26 g)

EMC INSTALLATION GUIDELINES

Although Red Lion Controls products are designed with a high degree of immunity to Electromagnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into a unit may be different for various installations. Cable length, routing, and shield termination are very important and can mean the difference between a successful or troublesome installation. Listed are some EMI guidelines for a successful installation in an industrial environment.

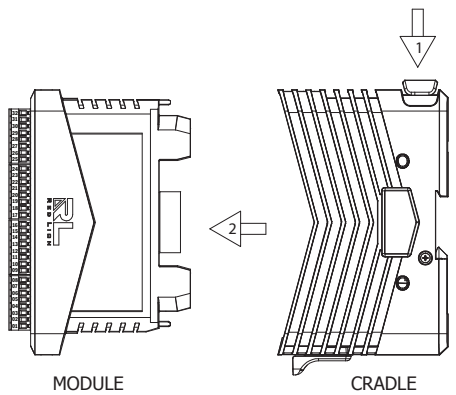
1. A unit should be mounted in a metal enclosure, which is properly connected to protective earth.
2. Use shielded cables for all Signal and Control inputs. The shield connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
   a. Connect the shield to earth ground (protective earth) at one end where the unit is mounted.
   b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is over 1 MHz.
3. Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors, feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run through metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter. Also, Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.
4. Long cable runs are more susceptible to EMI pickup than short cable runs.
5. In extremely high EMI environments, the use of external EMI suppression devices such as Ferrite Suppression Cores for signal and control cables is effective. The following EMI suppression devices (or equivalent) are recommended:
   Fair-Rite part number 0443167251 (Red Lion Controls #FCOR0000)
   Line Filters for input power cables:
   Schaffner # FN2010-1/07 (Red Lion Controls #LFIL0000)
6. To protect relay contacts that control inductive loads and to minimize radiated and conducted noise (EMI), some type of contact protection network is normally installed across the load, the contacts or both. The most effective location is across the load.
   a. Using a snubber, which is a resistor-capacitor (RC) network or metal oxide varistor (MOV) across an AC inductive load is very effective at reducing EMI and increasing relay contact life.
   b. If a DC inductive load (such as a DC relay coil) is controlled by a transistor switch, care must be taken not to exceed the breakdown voltage of the transistor when the load is switched. One of the most effective ways is to place a diode across the inductive load. Most Red Lion products with solid state outputs have internal zener diode protection. However external diode protection at the load is always a good design practice to limit EMI. Although the use of a snubber or varistor could be used.
   Red Lion part numbers: Snubber: SNUB0000
   Varistor: ILS11500 or ILS23000
7. Care should be taken when connecting input and output devices to the instrument. When a separate input and output common is provided, they should not be mixed. Therefore a sensor common should NOT be connected to an output common. This would cause EMI on the sensitive input common, which could affect the instrument's operation.

Visit https://www.redlion.net/emi for more information on EMI guidelines, Safety and CE issues as they relate to Red Lion products.

HARDWARE INSTALLATION

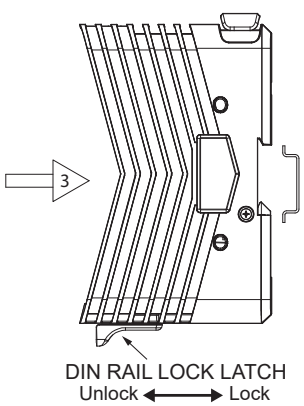
Removing Module From Cradle

To remove the module from the cradle, push in the module release button at the top of the cradle and pull the module out of the cradle.



Attaching the Module/Cradle to the DIN Rail

The DIN rail should be mounted horizontally so that the unit's ventilation holes are vertical in relation to installation orientation. A minimum clearance of 1 inch (25.4 mm) should be maintained above and below the unit to ensure proper thermal regulation.



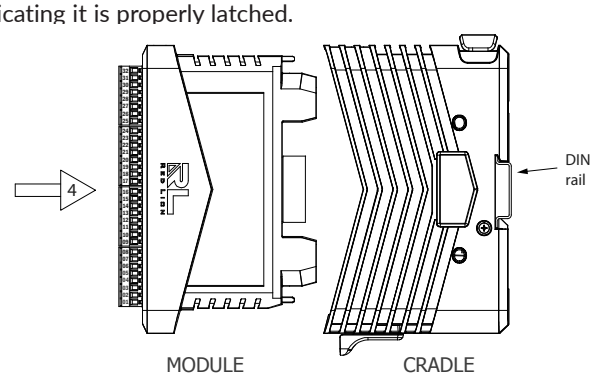
The cradle can be installed on the DIN rail with or without the module attached. Ensure the DIN rail lock latch is in the outward most position (unlocked). Hook the top back of the cradle DIN rail clip over the DIN rail. Press the cradle until flush with the rail and push the DIN rail lock latch to the latched (in) position.

For hazardous location installation, the following shall be taken into consideration:

- The equipment shall only be used in an area of at least pollution degree 2, as defined in EN/IEC 60664-1.
- The equipment shall be installed in an enclosure that provides a minimum ingress protection of IP54 in accordance with EN/IEC 60079-0. The enclosure shall be accessible only with the use of a tool.
- Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment.

Installing Module into Cradle

Push module into cradle until you hear an audible click indicating it is properly latched.



MODULE HOT SWAPPING

If the area is known to be non-hazardous (free of ignitable concentrations), then a module can be removed and/or installed into a cradle attached to the controller while power is applied. However, it is **NOT** recommended to connect to or remove from the controller, a module/cradle pair or group of modules/cradles, while power is applied. The power should be turned off anytime a cradle or group of cradles (with or without modules) is plugged into or removed from the controller.

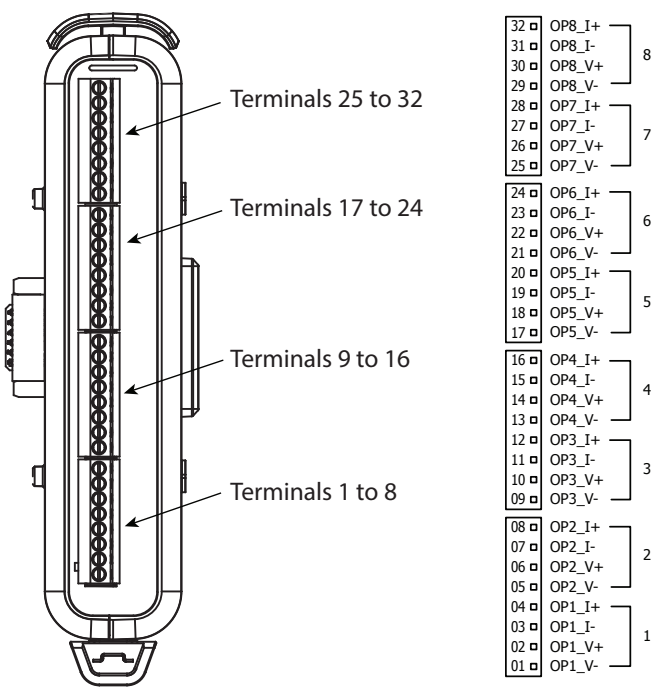
WIRING

CAUTION: Only UL listed wiring with temperature ratings greater than 90 °C permitted for Class I, Division 2, Zone 2 and ATEX/IECex installations.

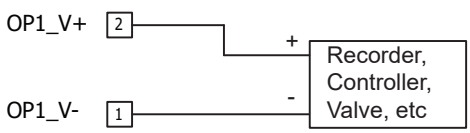
ATTENTION: Seul le câblage homologué UL avec des températures nominales supérieures à 90°C est autorisé pour les installations de classe I, Division 2 , zone 2 et ATEX/IECex.

All power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.

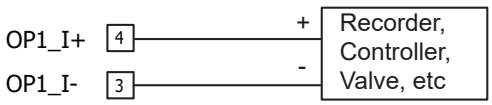
All conductors should meet voltage and current ratings for each terminal. When wiring the module, use the numbers on the label to identify the position number with the proper function. Strip the wire, leaving approximately 0.3" (7.5 mm) of bare wire exposed. Insert the wire into the terminal, and tighten.



Analog Output Wiring



Voltage Analog Output



Current Analog Output

STATUS LED

LED COLOR(S)	MEANING
Blue	Module is booting.
Green	Module is configured and running.
Green/Off	Module is running but is not configured.
Green/Purple	Module is performing calibration.
Red/Green	Module is running but communication with the controller is inactive. If status persists, contact technical support.
Red/Off	An internal error has occurred. If status persists, contact technical support.
Yellow/Off	Module position is unassigned. If status persists, contact technical support.
Off	Module application is not running or the module is not powered. If status persists, contact technical support.

FIRMWARE UPGRADE

The module's firmware is stored in flash memory so that software/hardware conflicts are avoided, and so features can be added in the future.

During a download, Crimson compares its own library of firmware files with those stored in the module. If they do not match, Crimson will download the necessary firmware.

RED LION CONTROLS TECHNICAL SUPPORT

If for any reason you have trouble operating, connecting, or simply have questions concerning your new DA8AO Module, contact Red Lion's technical support.

Support: support.redlion.net
Website: www.redlion.net
Inside US: +1 (877) 432-9908
Outside US: +1 (717) 767-6511

Red Lion Controls, Inc.
20 Willow Springs Circle York, PA 17406

ORDERING INFORMATION

DESCRIPTION	PART NUMBER
DA 8 Analog Output Module	DA M00I0 0UT8I 0000

Spaces in listed part numbers are shown to improve readability, do not include when searching for or ordering these parts.

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LIMITED WARRANTY

(a) Red Lion Controls Inc. (the "Company") warrants that all Products shall be free from defects in material and workmanship under normal use for the period of time provided in "Statement of Warranty Periods" (available at www.redlion.net) current at the time of shipment of the Products (the "Warranty Period"). **EXCEPT FOR THE ABOVE-STATED WARRANTY, COMPANY MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE PRODUCTS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (C) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.** Customer shall be responsible for determining that a Product is suitable for Customer's use and that such use complies with any applicable local, state or federal law.
(b) The Company shall not be liable for a breach of the warranty set forth in paragraph (a) if (i) the defect is a result of Customer's failure to store, install, commission or maintain the Product according to specifications; (ii) Customer alters or repairs such Product without the prior written consent of Company.
(c) Subject to paragraph (b), with respect to any such Product during the Warranty Period, Company shall, in its sole discretion, either (i) repair or replace the Product; or (ii) credit or refund the price of Product provided that, if Company so requests, Customer shall, at Company's expense, return such Product to Company.
(d) **THE REMEDIES SET FORTH IN PARAGRAPH (c) SHALL BE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH IN PARAGRAPH (a)**.