

BENTEK SYSTEMS LTD
SCADA and Telemetry Solutions

SCADALink IO900



Modular Wireless I/O System

User Manual

Version V1.3 for SCADALink IO900

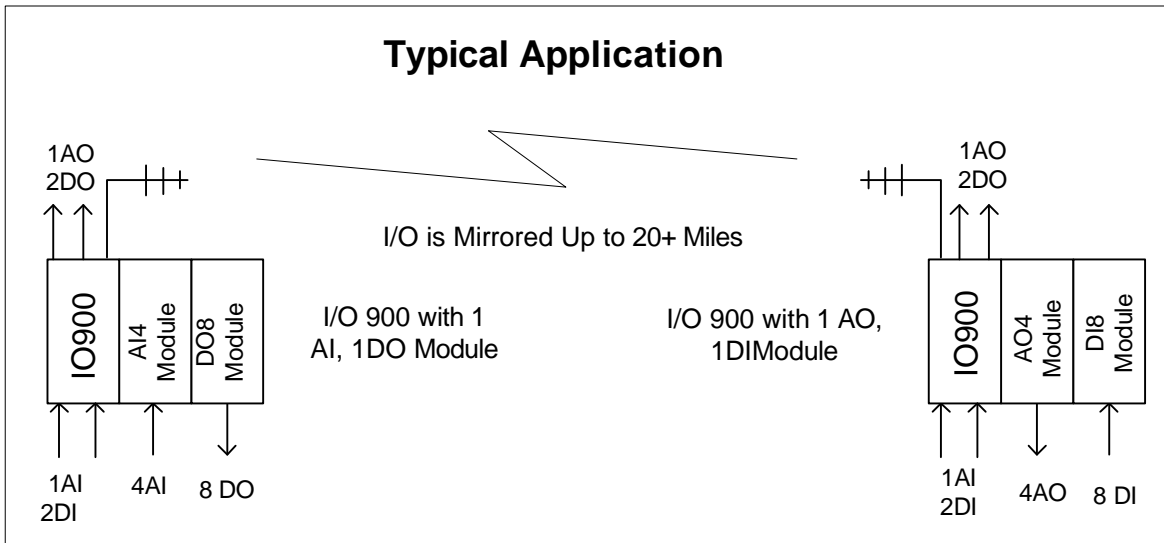
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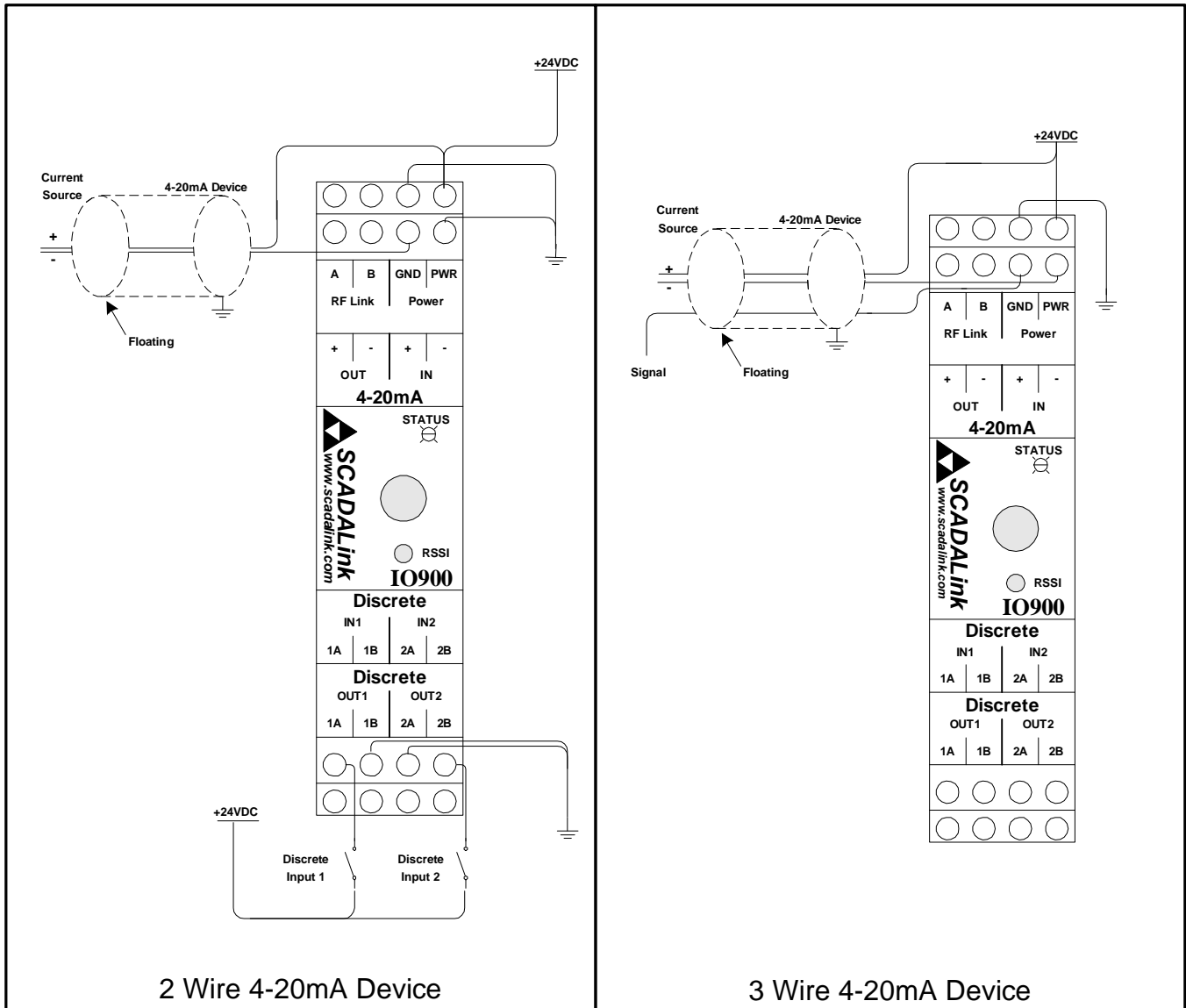
The SCADALink IO900 is a Modular Wireless I/O System that allow license free bi-directional transmission of digital and analog process signals at distances of up to 20+ miles. The IO900 System is a simple to use modular system that allows addition of up to 8 I/O Expansion Modules to the base IO900 Controller which has 1 AI, 1 AO, 2 DI, and 2 DO points.

- License Free 900MHz
- 20+ Mile Range
- Secure Factory Set RF Configuration
- 12-30VDC Operation
- Class I Div II
- DIN Rail Mounted Modules
- Modular Expansion to 8 I/O Modules
- Modules
 - IO900 Controller 1 AI, 1 AO, 2 DI, 2 DO
 - AI4 Module - 4 Pt 4-20ma Input Module
 - AO4 Module 4 Pt 4-20ma Output Module
 - DI8 Module - 8 Pt Digital Input Module
 - DO8 Module - 8 Pt Digital Output Module



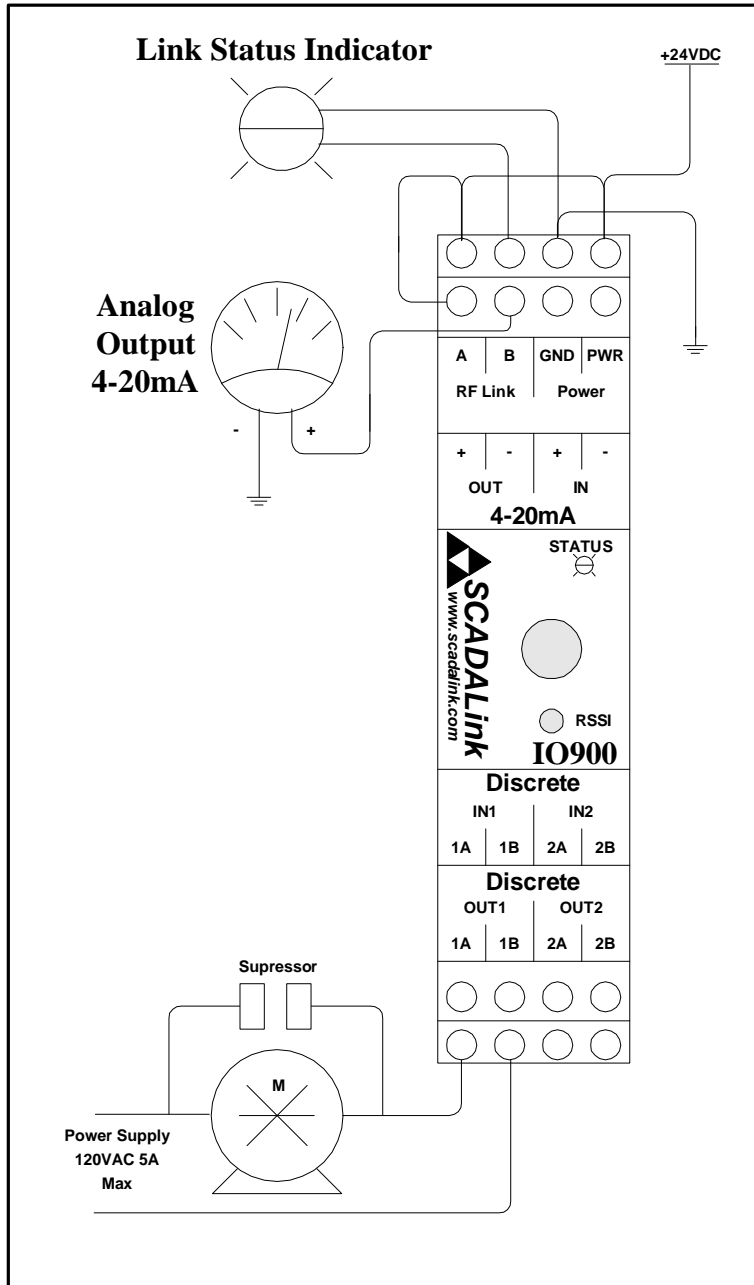


IO900 Transceiver Analog and Discrete Input Wiring





IO900 Transceiver Analog and Discrete Output Wiring



RF Link Output

The Link Status contact on the IO900 is Normally Open and closes when the radio establishes an RF Link. It can be used to switch either a STATUS light or a FAULT indicator.

Selecting State of Outputs upon Loss of RF Link

The default state upon loss of RF signal for the Analog and Discrete Outputs is MAINTAIN LAST STATE. They may be wired in series with the RF Link contact to provide a FAULT OFF when RF Link is terminated.



IO900 Transceiver	
General	
Range	600 to 1000 feet (180 to 305m) in-plant [obstructed]; 4-5 miles (6-8km) LOS with Omni antenna; 20+ miles (32+km) LOS with Yagi antenna
Inputs	One (1) 4-20mA analog input 16-bit, 125 ohms impedance) Two (2) discrete inputs (5-36VDC)
Outputs	One (1) 4-20mA analog output (16-bit, short-circuit protected) Two (2) discrete outputs (dry contact, NO, contact rating: 120VAC/2A; 12VDC/2A; 24VDC/2A)
I/O Expansion Capability	Eight (8) analog and/or discrete I/O cards
Repeatability	Current loop: 0.02%
Accuracy	Current loop: 0.2% of full-scale @ 77°F (25°C)
Wiring Connections	12-24 AWG screw-type terminals; removable terminal blocks
Mounting	DIN rail mount
Primary Power	
Input Voltage	9 to 30VDC
Reverse Polarity Protection	Yes
Surge Protection	Yes
Power Consumption	110mA (average) / 170mA (peak) @ 24VDC during transmission (plus I/O modules)
Transceiver	
Frequency	902 to 928MHz - ISM band
Transmit Power	1 Watt (30dBm)
RX Sensitivity	-105dBm
Unit ID	16 bit unique (factory configured); Allows multiple units in same area
Antenna Connector	MCX female
Antenna Impedance	50 ohms
Environmental	
Humidity	20% - 90% (non-condensing)
Temperature	Operating: -40°F to 158°F (-40°C to 70°C)
Size	4.5" x 3.9" x 0.9" (114mm x 99mm x 23mm)
Weight	5.3 oz (150 g)
Enclosure	NEMA 1 (equivalent to IP30)
Agency Approvals	
FCC	Part 15.247
ISC	RSS 210

FCC Rules and Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

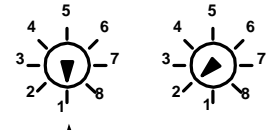
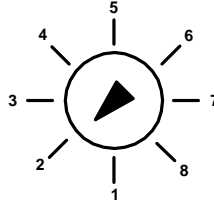
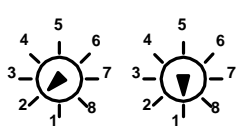
Changes or modifications not expressly approved by BENTEK SYSTEMS LTD will void the user's authority to operate the equipment.

This product is intended for fixed installation applications. In order to comply with FCC/ISC adopted RF exposure requirements, installation of this transmitter system's antennas must be performed in a manner that will provide at least 6 foot(2m) clearance from the front radiating aperture to any user or member of the public.

FCC	Part 15.247	Approval# IA9FHOEM900
ISC	RSS 210	Approval# 1338104550A
CSA/C & US	Class 1 Div 2 (Groups A,B, C,D)	



Configuring I/O Module Addresses



Module Address Selection Switch

Each pair of I/O modules, such as the AI4 and the AO4, must share a unique module address. Once a module address has been assigned to a pair of I/O modules, that module address may not be used on any other pair of I/O modules or the same radio pair. Available addresses are numbers 1 through 8. If module addresses conflict, or are improperly set within a connected group, an indication will be given by the STATUS LED (see section below).

The IO900 Transceivers are designed to operate as matched pairs, and are factory programmed. Manual address configuration is not required for the transceiver units.



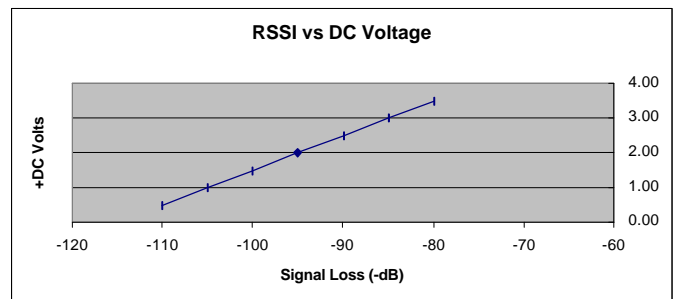
Status LED's

- Power LED** Power LED indicates presence of power to the device. It is ON when power is present and OFF when there is no power.
- Status LED** When flashing rapidly it indicates an "Internal Error" or a "Module Type Mismatch"
A Module Type Mismatch occurs when the Module Address Selection for two different modules (i.e. one (1) discrete module and one (1) analog module) are set to the same address, or two (2) pairs of modules are sharing the same address. When Status LED is ON steady, Module Address settings are OK.
- RF LED**
 - Flashes once every two seconds when there is no RF Link
 - Flashes rapidly when signal strength is marginal (see RSSI Table)
 - ON steady indicates an exceptionally strong RF Link.
 - Most systems will flash occasionally indicating the presence of intermittent interference in the area
- Discrete Input / Output** OFF means that the discrete input or output is Open
ON means that the discrete input or output is Closed

RSSI Troubleshooting

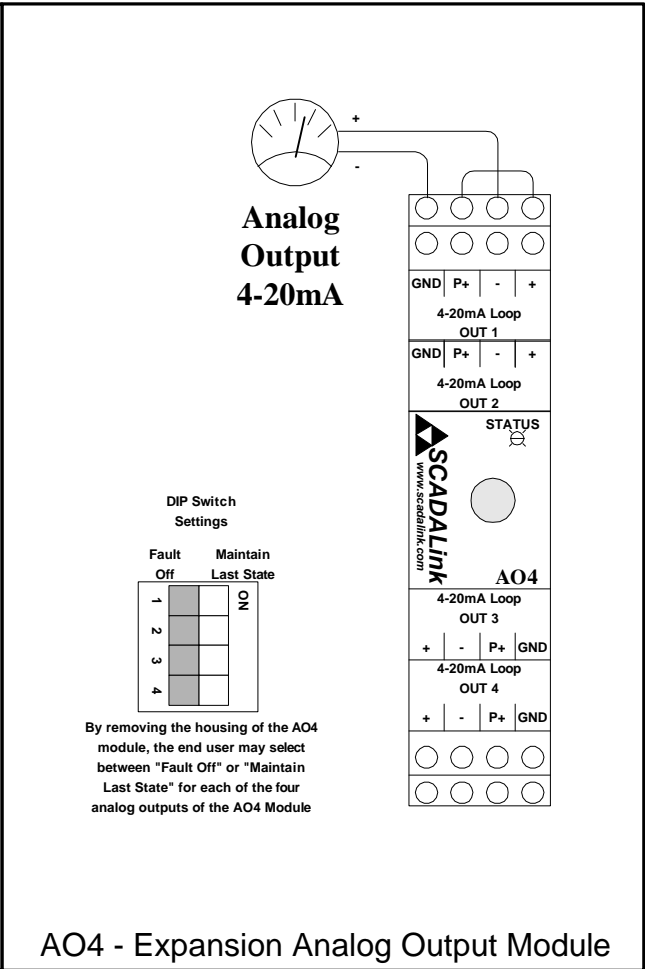
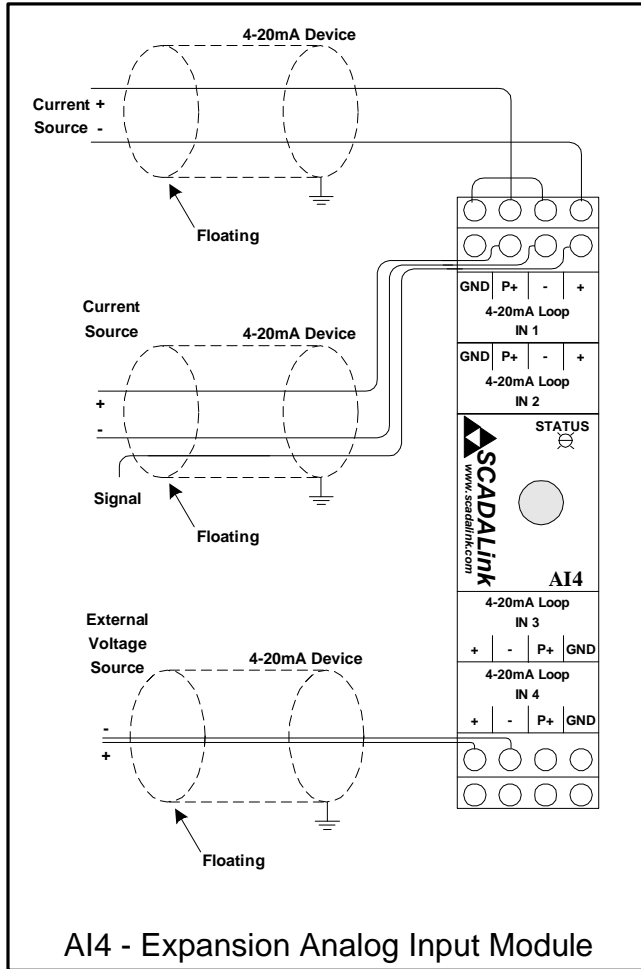
RSSI (Received Signal Strength Indicator) is measured using a DC Voltmeter between the test point and power supply ground. Test point is accessed by inserting positive meter probe into the RSSI hole on the face of the IO900.

The following RSSI table may be used to test the Receive Signal Strength of the IO900. The ideal voltage that should be read from the RSSI test point is 2.5VDC. This represents a -90dB signal loss and typically indicates that the radio has 20dB fade margin left until loss of link. It is recommended that the radios be set up with no less than 20dB margin.



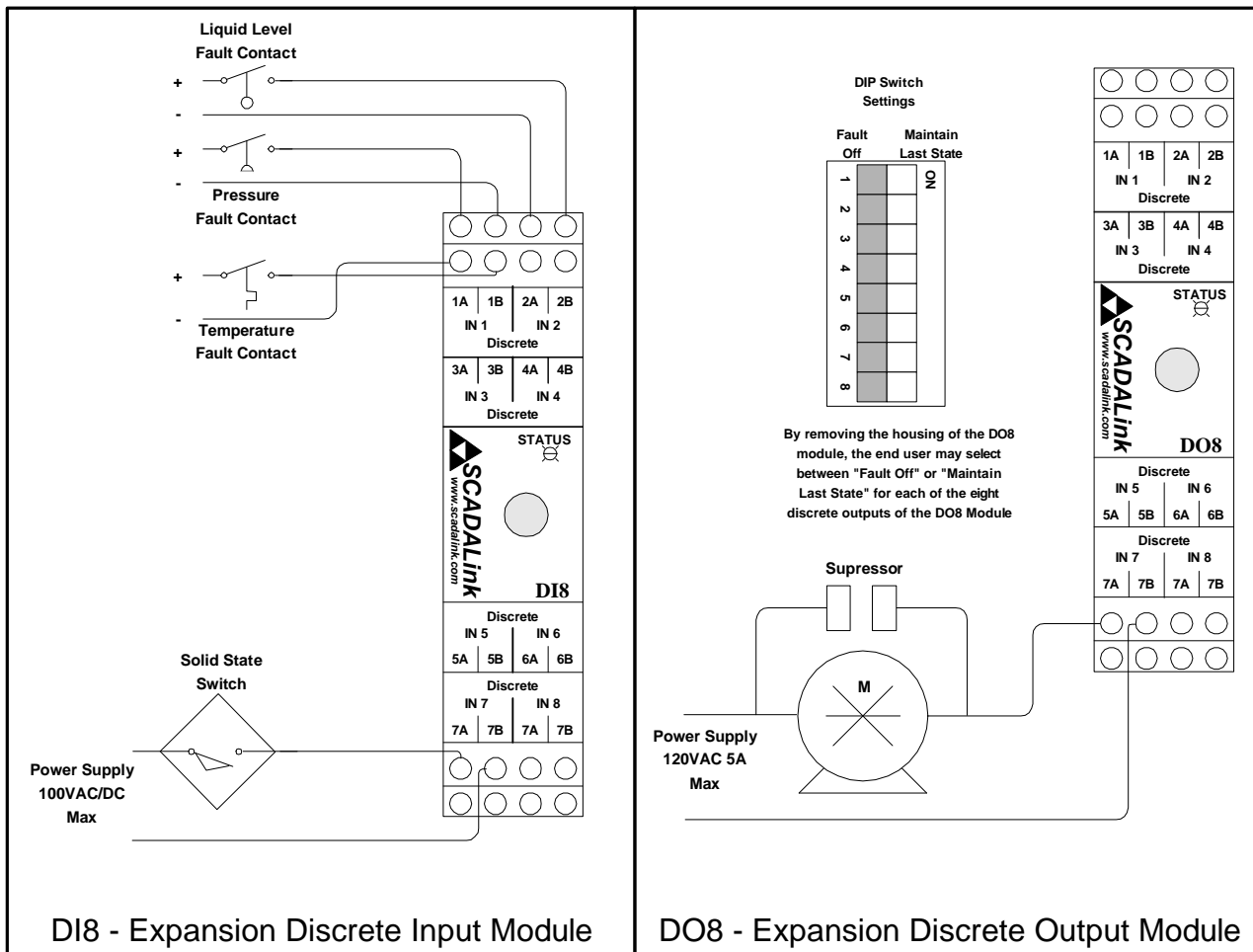


Expansion I/O Modules Analog Input/Output Wiring





Expansion I/O Modules Discrete Input/Output Wiring





Specifications

I/O Expansion Modules	
DI8 - Discrete Input Module – Low Volt	
Channels	Eight (8)
Input Voltage Range	5 to 36VAC/DC
Input Impedance	5K ohms
Optically Isolated	Yes
Reverse Polarity Protected	Yes
Over-Voltage Rating	100VAC/DC max.
Power Consumption	26mA
DO8 - Discrete Output Module – 8 Ch, Relay	
Channels	Eight (8)
Output Terminals	Dry contact (NO)
Contact Ratings	120VAC/2A 220VAC/2A 12VDC/2A 24VDC/2A
Power Consumption	10mA @ 24VDC (outputs OFF); 60mA @ 24VDC (outputs ON)
AI4 - 4-20mA Analog Input Module – 4 Ch	
Channels	Four (4)
Resolution	16-bit
Input Impedance	125 ohms
Reverse Polarity Protected	Yes
Over-Voltage Rating	42VDC max.
Accuracy	0.2%
Power Consumption	30mA (inputs disconnected)
AO4 - 4-20mA Analog Output Module – 4 Ch, ISOL	
Channels	Four (4)
Resolution	16-bit
Short-Circuit Protection	Yes
Optically Isolated	Yes
Accuracy	0.12%
Power Consumption	25mA (outputs disconnected)

Warranty

BENTEK SYSTEMS LTD warrants to the original purchaser that the BENTEK products are free from defects in materials and workmanship under normal use and service for a period of ONE YEAR, parts (EXCLUDING: SWITCHES, CRYSTALS, OR PARTS SUBJECT TO UNAUTHORIZED REPAIR OR MODIFICATION) and labor from the date of delivery as evidenced by a copy of the receipt.

BENTEK's entire liability and your exclusive remedy shall be, at BENTEK's option, either the (a) repair or (b) the replacement of the BENTEK product which is returned within the warranty period to BENTEK, freight collect by a BENTEK APPROVED carrier with a copy of the purchase receipt and with the return authorization of BENTEK.

If failure has resulted from accident, abuse or misapplication, BENTEK shall have no responsibility to repair or replace the product under warranty.

In no event shall BENTEK be responsible for incidental or consequential damage caused by defects in its products, whether such damage occurs or is discovered before or after replacement or repair and whether or not such damage is caused by the negligence of BENTEK SYSTEMS LTD.