

# SEC 3500 HMI Operator Interface

## Hardware Manual



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### **Commitment**

Our quality and service are uncompromising. We back each of our products with a two-year warranty on all materials and workmanship. We offer technical support, user training and on-site service and maintenance of equipment to meet the needs of our customers.

### **Gas Detection Service**

Individually designed maintenance packages are available for specific customer needs. Service begins with verification of the system installation that includes an initial system check and calibration. We then offer customer training programs (on-site and at factory) to insure that technical personnel fully understand operation and maintenance procedures. When on-the-spot assistance is required, service representatives are available to handle any questions or problems immediately.

### **Warranty**

Sensor Electronics Corporation (SEC) warrants products manufactured by SEC to be free from defects in workmanship and materials for a period of two (2) years from date of shipment from the factory. Any parts returned freight pre-paid to the factory and found defective within the warranty would be repaired or replaced, at SEC's option. SEC will return repaired or replaced equipment pre-paid lowest cost freight. This warranty does not apply to items, which by their nature are subject to deterioration or consumption in normal service. Such items may include:

Fuses and Batteries.

Warranty is voided by abuse including rough handling, mechanical damage, alteration or repair. This warranty covers the full extent of SEC liability and SEC is not responsible for removal, replacement costs, local repair costs, transportation costs or contingent expenses incurred without prior written approval. Sensor Electronics Corporation's obligation under this warranty shall be limited to repair or replacement of any product that has been returned to Sensor Electronics Corporation for warranty consideration. This warranty is expressly in lieu of any and all other warranties expressed or implied, and all other obligations or liabilities on the part of Sensor Electronics Corporation including but not limited to, the fitness for a particular purpose. In no event shall Sensor Electronics Corporation be liable for direct, incidental, or consequential loss or damage of any kind connected with the use of its products or failure to function or operate properly.

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## Revision History

Rev	Date	ECO	Description of Change	Page
032113	03/21/13	-	Initial Release	
1	9/20/2016	-	Update to Current P/N Scheme Update Specifications Add Installation Steps Add Testing Add Maintenance Add UL2017 Information	All
2	10/26/2016	-	Change model to SEC3500 HMI Add all Components Inside Enclosure to Specs Add Recommended Power Supply Add Earth Ground Callout to Page 9 Add Note about ISO Comm on Repeaters Add Part about SEC3500 HMI Being the System	All
A		000209	UL2017 Approved	All
B		000298	Add configuration for SEC3500 HMI CR UL2017 Approval for new configuration	All

## I. SPECIFICATIONS

**Model:** SEC3500 HMI/SEC3500 HMI-CR

**Interface**

RS485 Port: Interactive "Modbus" (expandable to two)  
RS232 Port: "Statcast" System parameter broadcast  
Ethernet Port: Remote Screen Access  
16 Programmable Relays (expandable to 40)

**Construction:** Powder Coated Steel

**Dimensions:** 16" X 16" X 10"

**Weight:** 45lbs

**Operating Temperature Rating:**

0° to +50°C at 0 to 99% RH (non-condensing)

**Operating Voltage:** 19 to 29 VDC 

**Power Consumption:** 40 Watt Max. (Not including relay contact current or 24VDC power supplied to external devices)

**Relay Contacts:** 1 NO, 1 NC per Relay.

Contact Rating: 8A @ 30VDC, 8A @ 250VAC

Type AM System

**System Components:**

SEC 3500 Operator Interface (Red Lion HMI)  
SEC 3100 Gas Transmitter (Not UL 2017 Approved)  
SEC 3500 - XX Relay Controller  
SEC 3100 AIM Interface Module (Not UL 2017 Approved)  
SEC 3100 LIM Interface Module (Not UL 2017 Approved)  
SEC 3100 ISO Repeater  
SEC 3500 Enclosure  
Circuit Breaker  
DC to DC Converter 12-24V to 24V 1A

**Approvals:** CSA: C22.2 No 0, No 0.4-04, No 14-05, No 142  
UL 508

**ETL:** 5002065 UL 2017 (SEC3500 HMI, whole system)

**Installation Category:** Cat. I, Pollution Degree 2

**RS485 Max Line Impedance:** ~100-140Ω

**Recommended Power Supply:** IDEC PS5R-SD24

Input: 100 to 240VAC Output: 24V 2.5A Power Supply

Other supplies may be used as long as they are class 2 power supplies

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## II. GENERAL DESCRIPTION

### CONVENTIONS

The following conventions are used in this manual.



Warning Statement



VDC (DC Voltage)

### SEC 3500 HMI

The SEC3500 HMI Operator Interface, an Attendant-Monitored system, continuously interrogates up to 254 system devices over the 9600 baud RS485 Modbus Interface. The OI, operating as the Modbus Master, can communicate with any SEC3XXX Device and any 4-20 transmitter via the SEC3100AIM.

There is a power indicator LED located on the front panel of the 3500.

Network devices can be interrogated, configured, and calibrated using the password protected touchscreen user interface.

16 embedded programmable relays provide external device control/interface based on network events. Additional relays can be located anywhere on the network (groups of 8).

The Statcast RS232 interface continuously scrolls through system operating status. (Read only for the user)

An Ethernet port allows remote access to system screens.

The SEC3500 HMI refers to the system as a whole, not just the SEC3500 (what is inside the metal enclosure).



**WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR SAFETY**

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### III. OPERATION

The SEC3500 HMI Operator Interface is an intuitive operator interface. For the individual page operations please refer to the following individual instruction manuals on the SEC website:

3500 OI Basic Operators Guide.pdf

3500 OI Startup Basics Guide.pdf

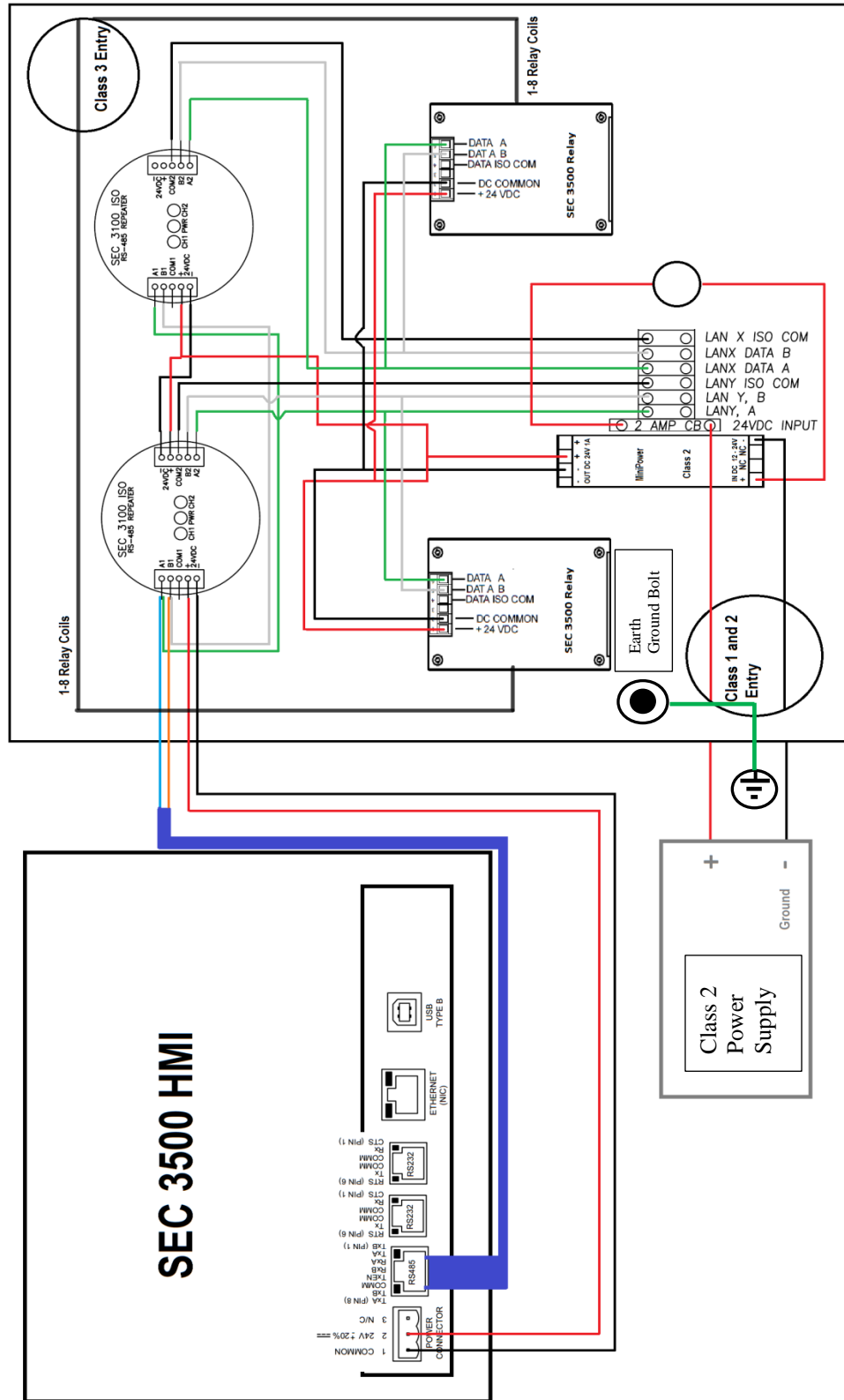
StatCast.pdf

## IV. INSTALLATION

1. Mounting Instructions:
  - a. Find an accessible spot for the SEC 3500 to be mounted. This spot should have enough room for incoming/outgoing wires to be easily routed around. The SEC 3500 should be accessible at a regular height so the monitor can be easily accessed at all time alarms. Make sure the monitor is in a safe location in case of alarm.
  - b. The SEC 3500 needs to be mounted on a solid wall
  - c. Recommended Hardware:
    - i. Use all 4 mounting brackets when mounting the SEC 3500
    - ii. Bolts: minimum of ¼" – 20 thread, 1 ½" long
    - iii. Nuts: ¼" – 20 Thread ½" Wide
    - iv. Washers: Minimum 0.260" ID, 0.750" OD for washers between the bolt head and the SEC 3500. Maximum 0.375" ID, Minimum 1.50" OD for washers between mounting wall and bolt
2. The SEC 3500 requires an 18-29V DC power supply. **This power supply must cover Class 2 requirements as well as be UL 1310 approved.** Then run the power through the bottom-left hole of the SEC 3500 unit. Then connect the power supply to the DC-to-DC converter.
3. Run the RS485 (Data Highway) through the bottom-left side hole of the SEC 3500. Then attach to the data highway to the proper terminals on the terminal block.
4. When connecting 120 VAC (Class 1) circuits to the SEC 3500, wires should be routed through the top-right opening. Then all class 2 and 3 power circuits going to the relay switches should go through the bottom-left opening. Class 1 wires must be kept at least 1/4" inches away from class 2/3 circuits.
5. Relay controller labeled 253 in the SEC3500 HMI housing has relay 1 designated for the alarm horn.
  - a. The horn needs to be supplied with +24VDC.
6. Sensor Electronics recommends not connecting earth ground and DC common together. Instead connect earth ground to the bolt inside the enclosure. It is located inside the enclosure on the bottom left and is connected to the panel door.
7. **For the UL2017 approval, all wiring that interconnects equipment must be located within the same room.**



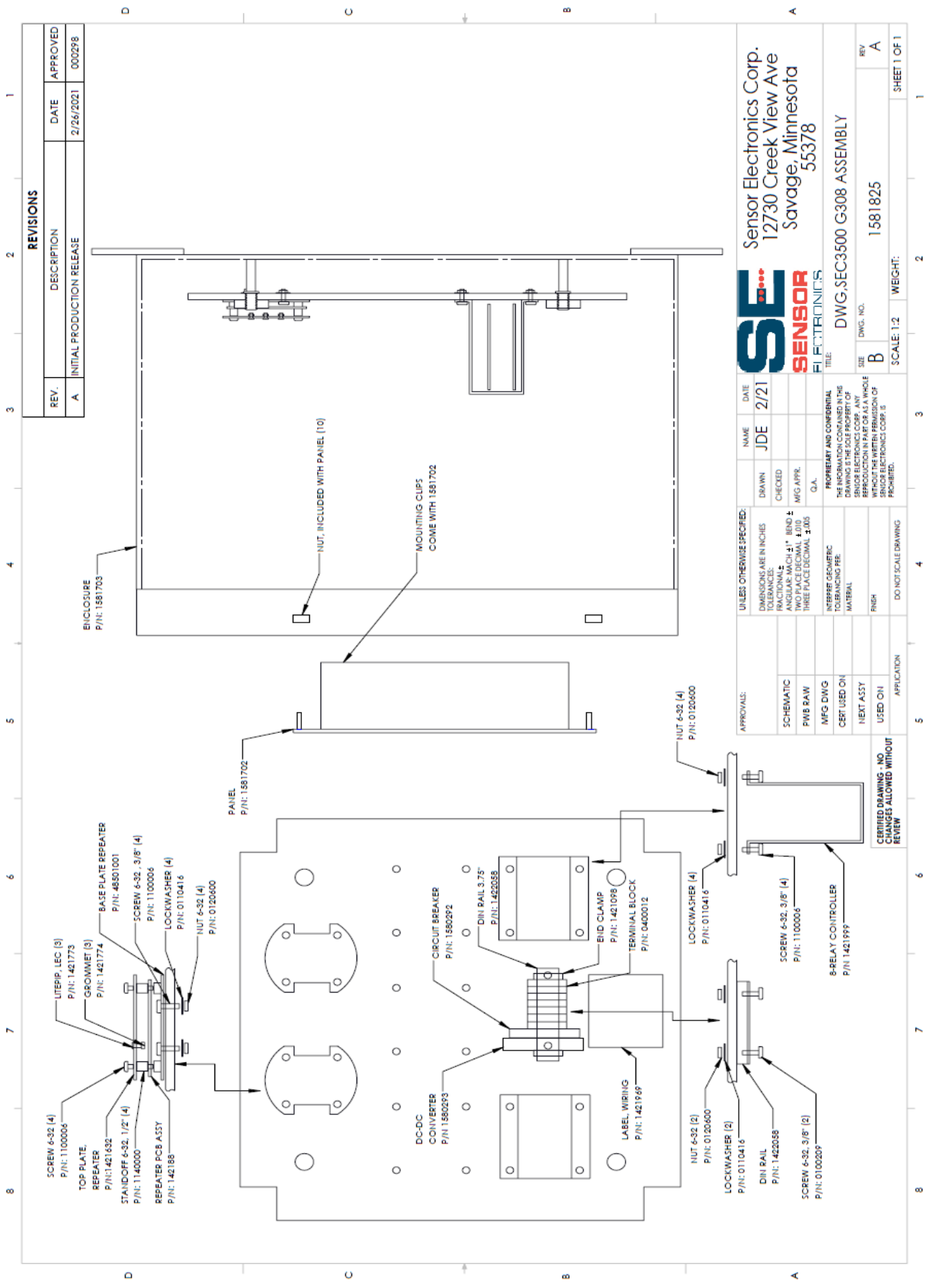
**\*NOTE: COM ON THE SEC 3100 ISO REFERS TO THE ISO COMMON, NOT DC COMMON**



## V. DRAWINGS

Part Number	Description
1421901	Mounting and Dimensional Drawing
1581703	Mounting and Dimensional Drawing for CR3000 Red Lion Model
350000016X16X10	Internal Component Layout
1581824	Internal Component Layout for CR3000 Red Lion Model
1460015 (separate document)	Overall Wiring Diagram
-	Wiring Examples





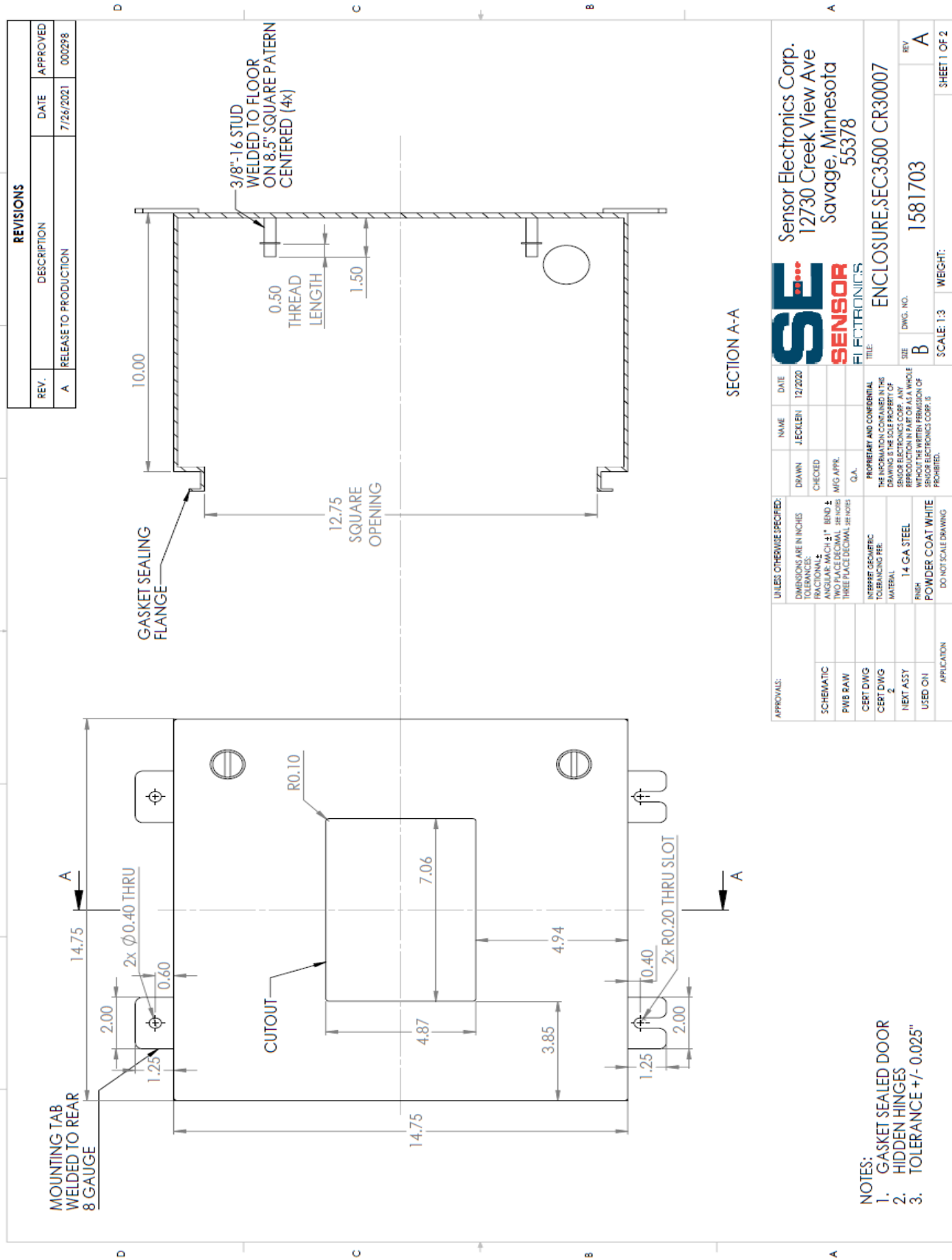
REVISIONS		
REV.	DESCRIPTION	DATE
A	INITIAL PRODUCTION RELEASE	2/26/2021
		000298

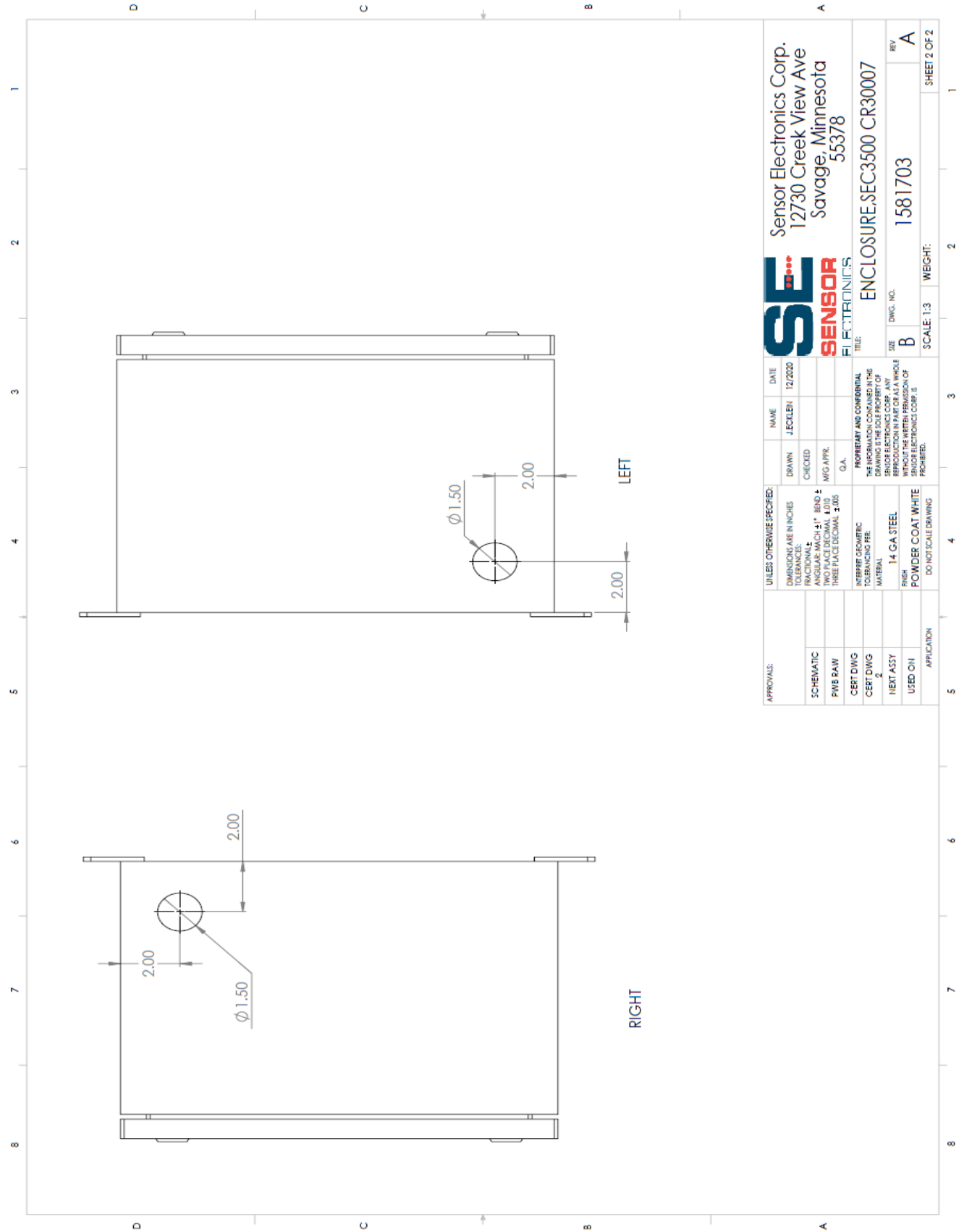
**Sensor Electronics Corp.**  
12730 Creek View Ave  
Savage, Minnesota 55378

NAME	JDE	DATE	2/21
DRAWN	CHECKED	MFG APPR.	G.A.
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES FRACTIONAL TOLERANCES: ANGULAR: MAX ±1° BEND ±1° HOLE POSITION: DECIMAL ±.010 HOLE SIZE: DECIMAL ±.005			
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SENSOR ELECTRONICS CORP. ANY REPRODUCTION OR TRANSMISSION OF THIS DRAWING WITHOUT THE WRITTEN PERMISSION OF SENSOR ELECTRONICS CORP. IS PROHIBITED.			
TITLE		SIZE	DWG. NO.
DWG, SEC3500 G308 ASSEMBLY		B	1581825
REV		SHEET 1 OF 1	
A			

SCALE: 1:2 WEIGHT: 1







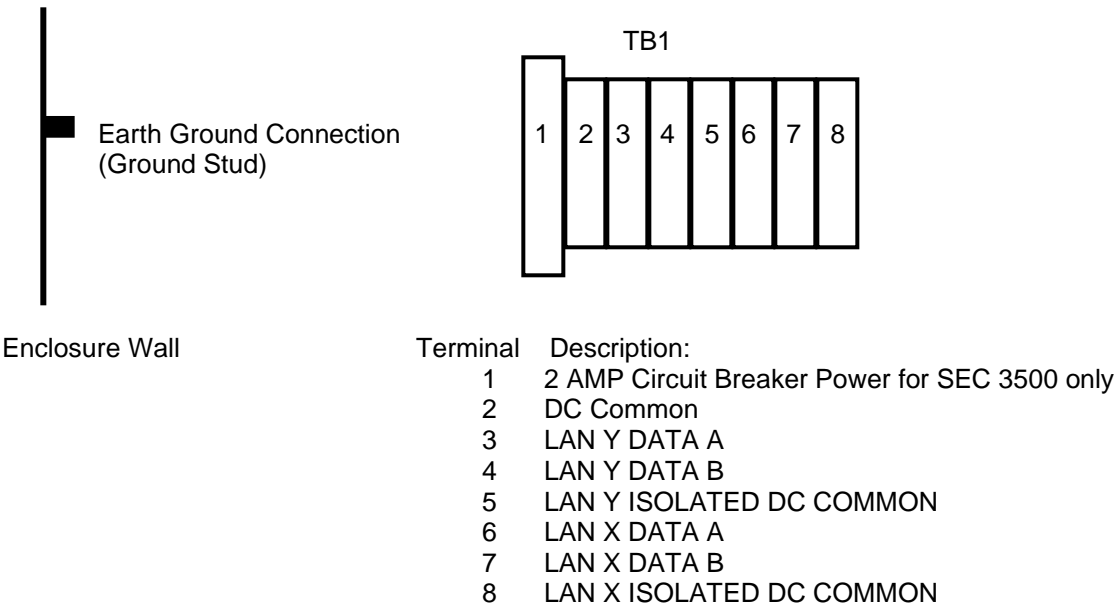
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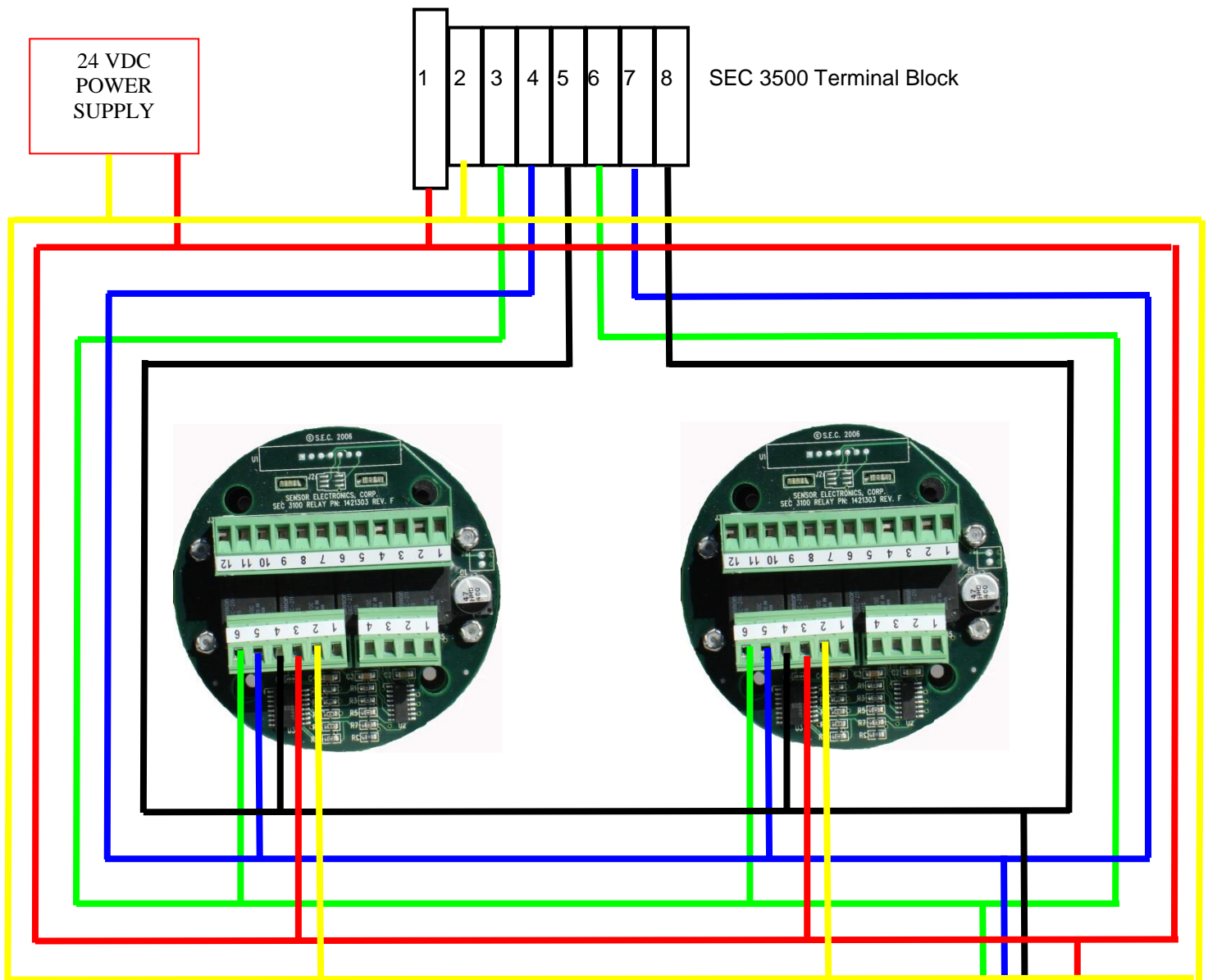
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WIRING TERMINATION

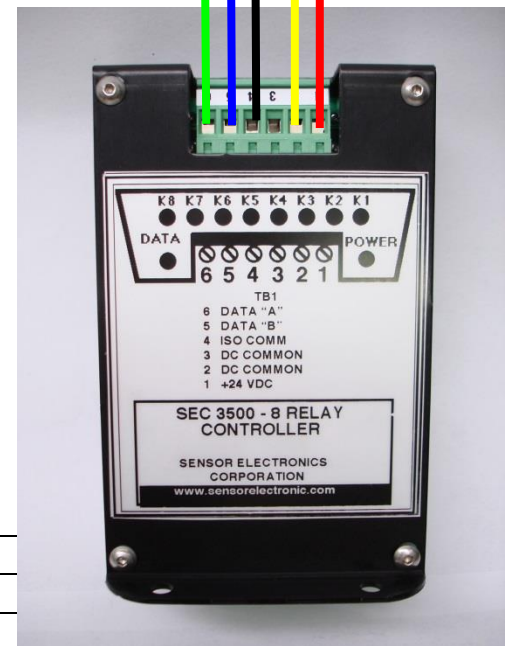
The wiring diagram is for the input power to the SEC 3500 and RS485 Data Highway Connection.



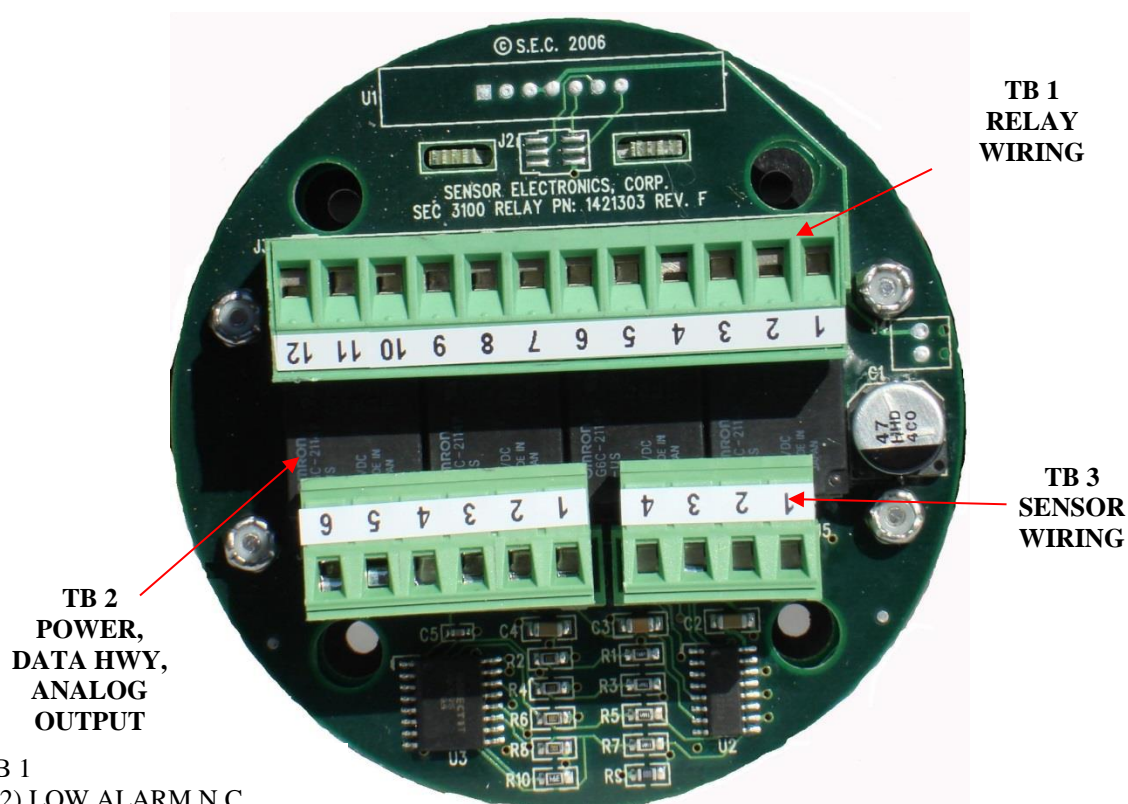




**WIRING EXAMPLE:  
SEC 3500 TO SEC 3100  
TRANSMITTERS AND SEC 3500 – 8  
RELAY CONTROLLER**



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- TB 1**
- (12) LOW ALARM N.C.
  - (11) LOW ALARM COMMON
  - (10) LOW ALARM N.O.
  - (9) MID ALARM N.C.
  - (8) MID ALARM COMMON
  - (7) MID ALARM N.O.
  - (6) HIGH ALARM N.C.
  - (5) HIGH ALARM COMMON
  - (4) HIGH ALARM N.O.
  - (3) FAULT (N.E.) N.C.
  - (2) FAULT (N.E.) COMMON
  - (1) FAULT (N.E.) N.O.

- TB 2**
- (1) 4-20 mA ANALOG OUTPUT
  - (2) DC COMMON
  - (3) +24 VDC
  - (4) DATA ISO COMMON
  - (5) RS485 DATA B
  - (6) RS485 DATA A

- TB 3**
- (1) WHITE (DATA/CAL)
  - (2) BLUE OR GREEN (4-20 mA)
  - (3) RED (+24 VDC)
  - (4) BLACK (DC COMMON)

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BACK VIEW OF SEC 3100  
**SEC 3100 WIRING**

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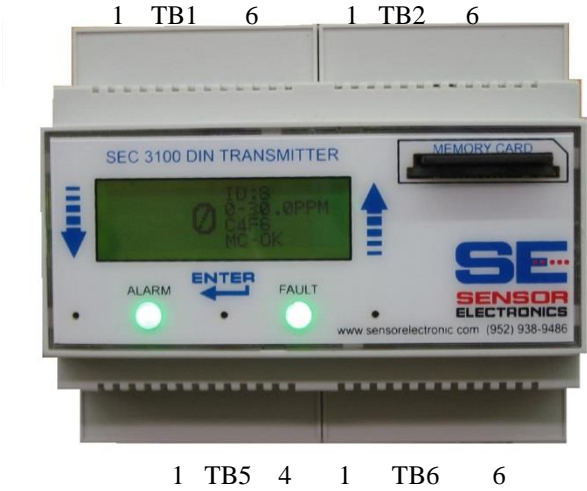
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**TB 1 Relay**

- 1 High Alarm N.C.
- 2 High Alarm
- 3 High Alarm N.O.
- 4 Fault N.O.
- 5 Fault
- 6 Fault N.C.

**Wiring TB 2 Relay Wiring**

- 1 Low Alarm N.C.
- 2 Low Alarm Common
- 3 Low Alarm N.O.
- 4 Mid Alarm N.C.
- 5 Mid Alarm Common
- 6 Mid Alarm N.O.



**TB 5 Sensor**

- 1 DC Common (Black)
- 2 + 24 VDC (Red)
- 3 4-
- 4 Communication (White)

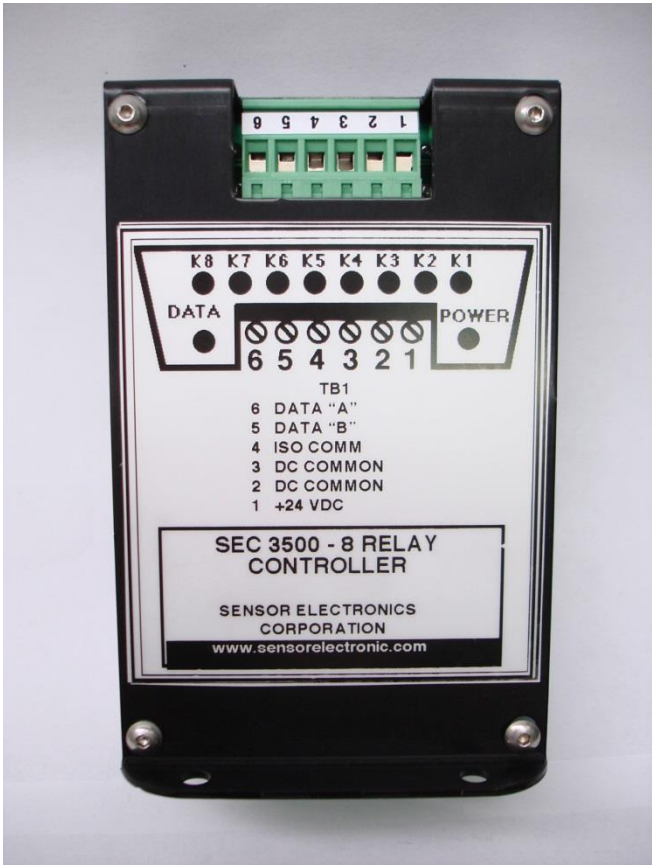
**Wiring TB 6 Power / Data Wiring**

- 1 Data A
- 2 Data B
- 20 mA (Blue or Green) 3 Iso-Common
- 4 + 24 VDC Input Power
- 5 DC Common
- 6 4-20 mA Output

**Housing Dimensions**

3.54 (W) x 4.17 (L) x 2.28 (H) inches  
{90 (W) x 106 (L) x 58 (H) mm}

# SEC 3500-8 RELAY CONTROLLER



TB 1 (WIRING CONNECTION FOR POWER AND RS485)



TB 2 AND TB 3 (RELAY CONTACT WIRING)

## SPECIFICATIONS

**INPUT POWER:** 10-30 VDC

**RELAY CONTACT RATING:** 8 AMPS @ 250 VAC OR 8 AMPS @ 30 VDC

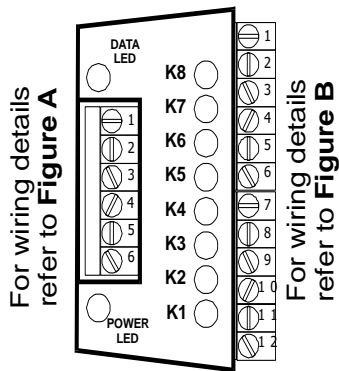
**COMMUNICATION:** ISOLATED RS485 (MODBUS)

**WEIGHT:** SEC 3500 – 8 RELAY CONTROLLER (PN 1421999) 2 LBS  
SEC 3500 – 16 RELAY CONTROLLER (PN 1422182) 3 LBS

**POWER:** SEC 3500 – 8 RELAY CONTROLLER 4 WATTS @ 24 VDC  
SEC 3500 – 16 RELAY CONTROLLER 6 WATTS @ 24 VDC

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# TOP VIEW OF SEC 3500 - 8 RELAY CONTROLLER



# TOP VIEW OF SEC 3500 -16 RELAY CONTROLLER

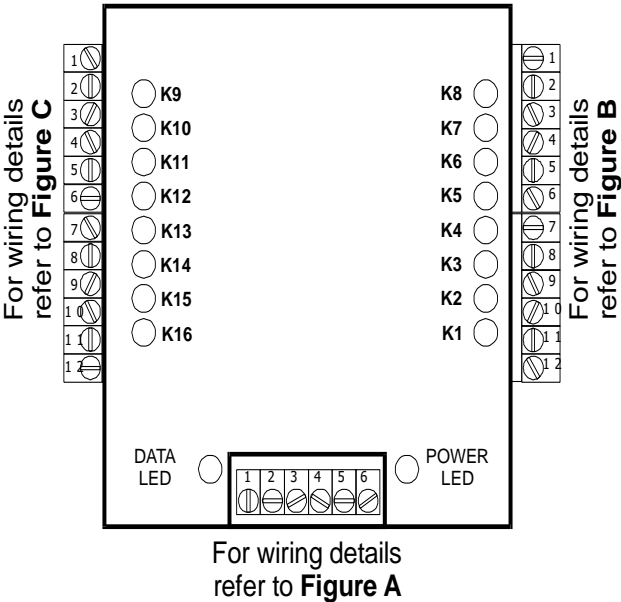


Figure A  
(TB 1)

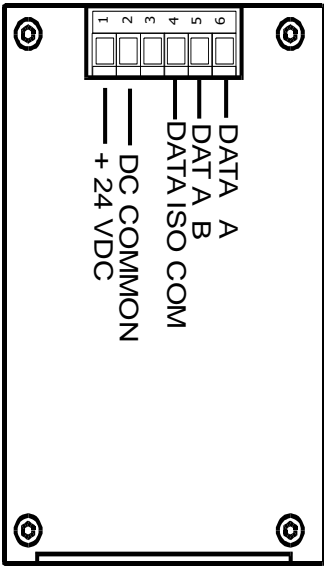


Figure B  
TB 2 (K1-K4)  
TB 3 (K5-K8)

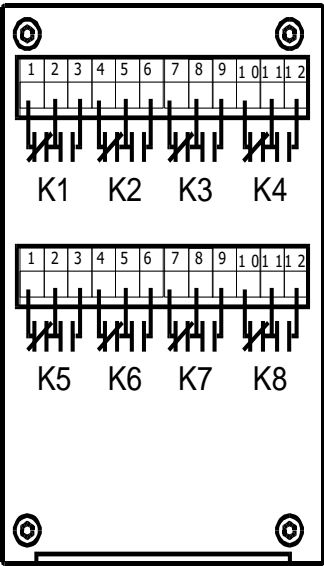
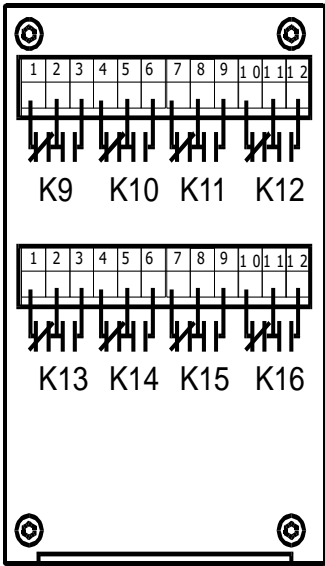
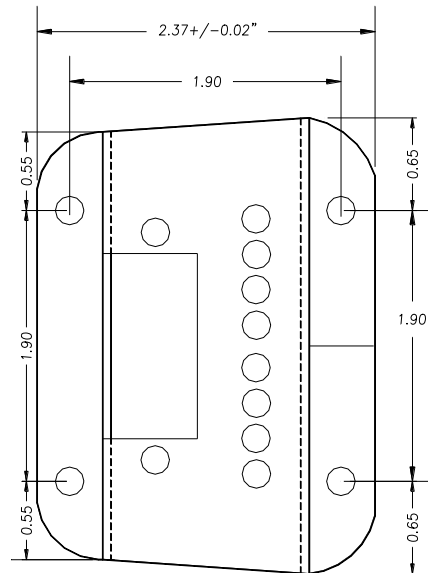


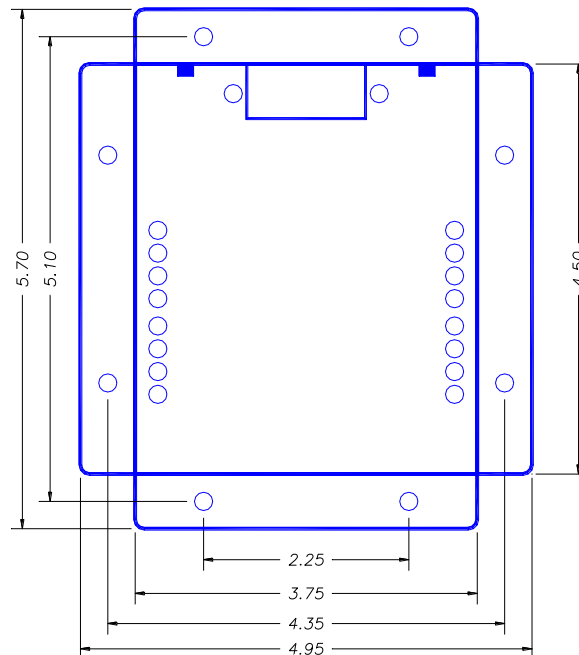
Figure C  
TB 4 (K9-K12)  
TB 5 (K13-K16)



## SEC 3500-8 RELAY CONTROLLER DIMENSIONS



## SEC 3500 – 16 RELAY CONTROLLER DIMENSIONS

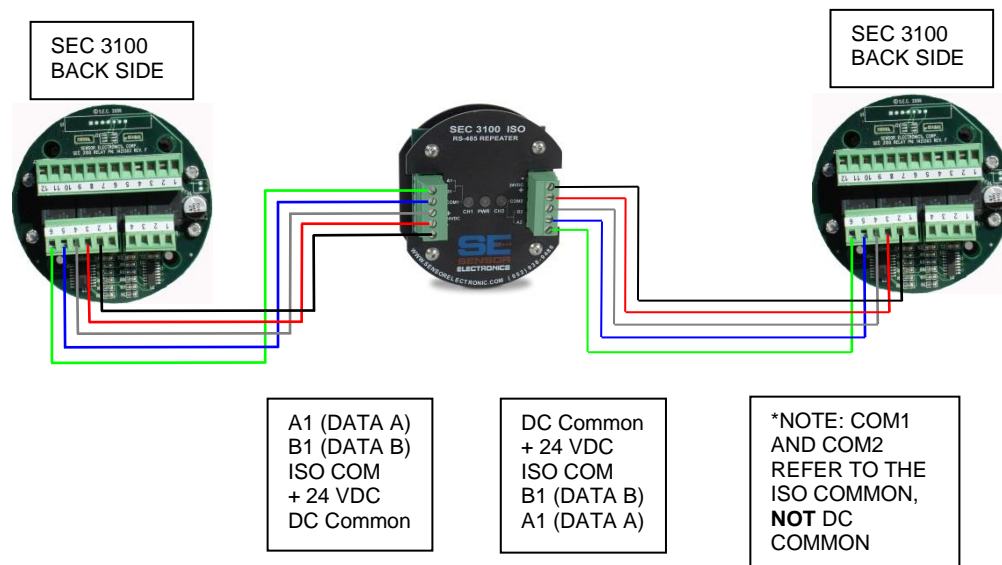




## SEC 3100 ISO RS-485 Repeater Module

### Operation

The SEC 3100 ISO RS-485 Repeater Module is used in conjunction with the SEC 3100 transmitters and the SEC 3500 HMI Operator Interface or other MODBUS RS-485 data highway systems. The SEC 3100 ISO RS-485 Repeater Module is used to extend the distance of the RS-485 network and increase the number of devices on the RS-485 network. The SEC 3100 ISO RS-485 Repeater Module provides 1500 volt isolation bidirectional data flow and transient suppression on the RS-485 data lines. An SEC 3100 ISO RS-485 Repeater Module should be installed for every 1000 feet of data highway cable or 32 network devices. The SEC 3100 ISO RS-485 Repeater Module is powered by 24 VDC and wired in line with the SEC RS-485 network devices. A typical wiring diagram is shown below:



### SPECIFICATIONS

**Operating Voltage**  
18-32 VDC

**Temperature Rating**  
-40° to + 70°C

**Humidity**  
0-99% RH (non-condensing)

**Operating Current**  
50mA @ 24VDC

**Input / Output (digital)**  
MODBUS RTU

**Part Number**  
3100-000-REPEAT

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## SEC 3100 AIM Analog Input Module

### Operation

The SEC 3100 AIM is used in conjunction with the SEC 3100 explosion proof transmitter or SEC 3100 DIN transmitter. A non-SEC device with a conventional analog 4 - 20 mA output is wired to the SEC 3100 AIM. The SEC 3100 AIM receives a sourced 4 - 20 mA signal from the device, converts the analog signal into a digital signal compatible with the SEC 3100 transmitter. The SEC 3100 AIM is factory programmed with the following customer supplied variables:

**Device Name**  
**Range**  
**Unit of Measure**  
**Calibration Value**

The SEC 3100 visually displays the variables on the LCD the same as if the SEC 3100 had an SEC gas detector connected. The SEC 3100 transmitter reports the foreign device status bidirectional to the SEC 3500 HMI Operator Interface via the MODBUS RS485 communication network. The SEC 3100 AIM can be installed in the SEC 3100 explosion proof transmitter housing using a taller window dome.

The SEC 3100 AIM accepts one device input. Examples of 4 - 20 mA devices that can be used with the SEC 3100 AIM are:

- Open Path Gas Detectors
- Fire Detectors
- Temperature Transmitter
- Pressure Transmitter
- Pvrolvzers

### SPECIFICATIONS

**Operating Voltage**  
18-32 VDC

**Temperature Rating**  
-40° to + 70°C

**Device Variable Characters**

Device Name: 8  
Range: 4  
Unit of Measure: 4  
Calibration Value: 4

**Operating Current (No Sensor)**  
50mA @ 24VDC

**Humidity**  
0-99% RH (non-condensing)

(Standard ASCII Characters)

**Output (digital)**  
SEC SSP (Smart Sensor Protocol)

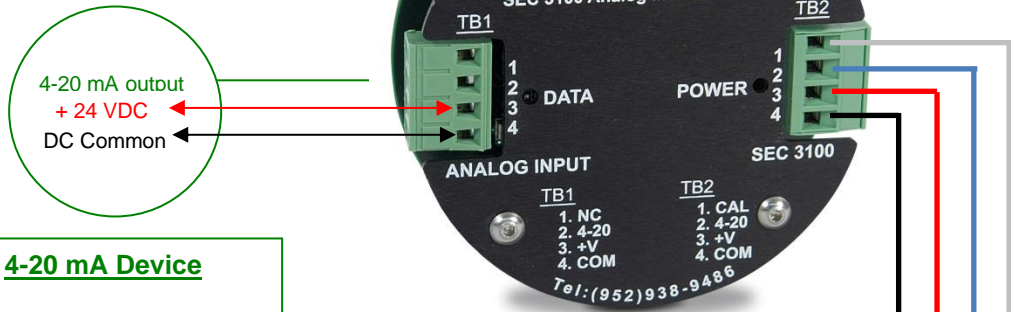
**Input**  
Low Alarm  
High Alarm

**Part Number**  
3100-000-000-LIM

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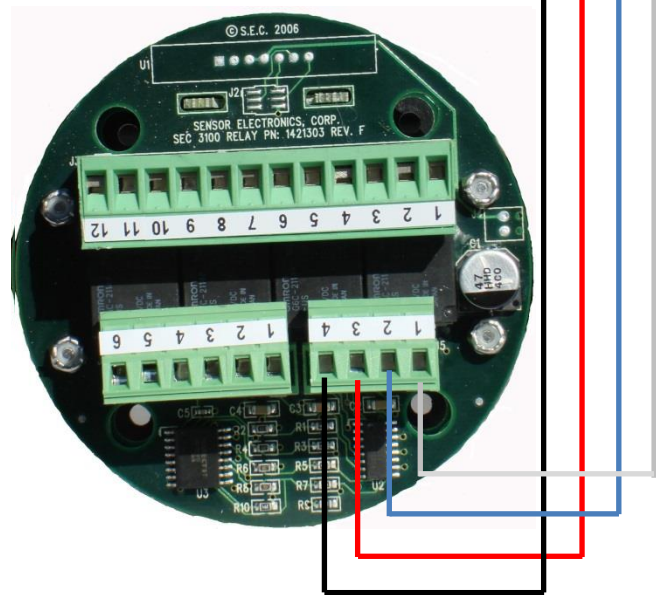
## SEC 3100 AIM



### 4-20 mA Device

Pressure Transmitter  
Open Path Gas Detector  
Pyrolyzer  
Temperature Transmitter  
Fire Detector

## SEC 3100 Transmitter (back side)



## SEC 3100 Explosion Proof Transmitter

NOTE: Refer to the SEC 3100 Transmitter Instruction Manual for additional wiring connections.



## SEC 3100 LIM Logic Input Module

### Operation

The SEC 3100 LIM is used in conjunction with the SEC 3100 explosion proof transmitter or SEC 3100 DIN transmitter. A non-SEC device with normally open contacts is wired to the SEC 3100 LIM. The SEC 3100 LIM receives a Low and High contact closure from the device, converts the input signal into a digital signal compatible with the SEC 3100 transmitter. The SEC 3100 LIM is factory programmed with the following customer supplied variables:

**Device Name**  
**Range**  
**Unit of Measure**  
**Calibration Value**

The SEC 3100 visually displays the variables on the LCD the same as if the SEC 3100 had an SEC gas detector connected. The SEC 3100 transmitter reports the foreign device status bidirectional to the SEC 3500 HMI Operator Interface via the MODBUS RS485 communication network. The SEC 3100 LIM can be installed in the SEC 3100 explosion proof transmitter housing using a taller window dome.

The SEC 3100 LIM accepts one device input for Low Alarm and High Alarm. Examples of switch contact devices that can be used with the SEC 3100 LIM are:

Open Path Gas Detectors  
Fire Detectors  
Temperature Switch  
Pressure Switch

### Specifications

**Operating Voltage**  
18-32 VDC

**Operating Current (No Sensor)**  
50mA @ 24VDC

**Output (digital)**  
SEC SSP (Smart Sensor Protocol)

**Temperature Rating**  
-40° to + 70°C

**Humidity**  
0-99% RH (non-condensing)

**Input (analog)**  
Impedance: 200 Ω  
Max applied voltage: 32 VDC

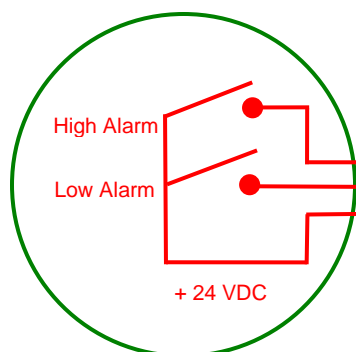
**Device Variable Characters**  
Device Name: 8  
Range: 4  
Unit of Measure: 4  
Calibration Value: 4

(Standard ASCII Characters)

**Part Number**  
3100-000-000-AIM

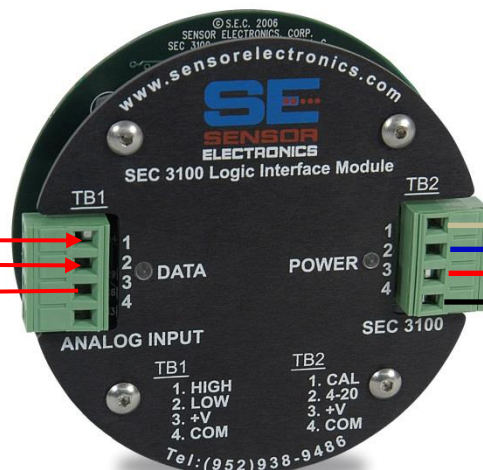
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## SEC 3100 LIM



### Switch Device

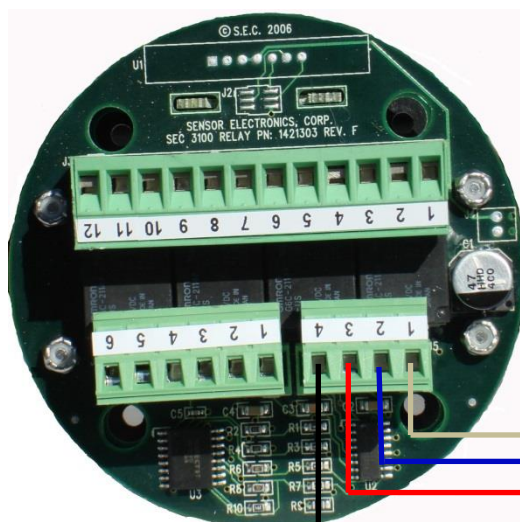
Pressure Switch  
Open Path Gas Detector  
Air Flow Switch  
Temperature Switch  
Fire Detector



## SEC 3100 Transmitter (back side)



## SEC 3100 Explosion Proof Transmitter



NOTE: Refer to the SEC 3100 Transmitter Instruction Manual for additional wiring connections.

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## VI. TESTING

In order to test the system and its functions, Navigate to the 3100 Manual Control page and begin a device Self-Test. This will simulate the sensor going into Low, Mid then High alarm. As the sensor goes through these alarms the 3500 screen should show the sensor going into alarm and respond accordingly (turn fan on/siren/lights/etc....) depending on the user's system settings and what the response to those alarms.

To keep an alarm on longer than the Self-Test runs or to leave an alarm on indefinitely, this can be done through the SEC 3500 OI. Navigate to the Relay Assignment page and set the desired relay to On. This will keep the alarm active until this is changed back.

## VII. MAINTENANCE

Maintenance will need to be done by SEC personal. The maintenance needed is minimal. If issues arise and maintenance is needed, please contact Sensor Electronics at 952-938-9486.

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