

# Scully ST-35

## Technical Manual



## Multiple Point Overfill Prevention Control Monitor



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The ST-35 Control Unit is used for overfill prevention at loading terminals. In most tank truck loading applications, volume to be loaded into each compartment is pre-set via a pre-set meter. Under normal conditions the pre-set meter shuts down the loading after the pre-set volume is loaded. The liquid does not reach the overfill sensor as it is set at a level higher than the rated capacity of each compartment. However, if the liquid level goes above the rated capacity of a compartment, Scully's ST-35 Overfill Prevention system detects this overfill condition and shuts down the loading. Thus, it acts as a secondary (emergency) shutdown system, primary shutdown control being provided by the pre-set meter.

The ST-35 Overfill prevention Control Unit interfaces with 5-wire optic sensors. It is typically used for overfill prevention on bottom loading vehicles, or top loading vehicles. It can monitor multiple sensors (i.e. multi-compartment vehicles). It is mounted at the loading rack/gantry and connects to the vehicle via a Scully plug and cable assembly.

The system incorporates Scully's unique and exclusive Dynacheck® concept. To ensure that it will always detect an overfill condition, the controller uses pulsed signals which continuously check the entire system operation including the controller, wiring connections and sensors. If a sensor comes in contact with liquid, or in the unlikely event of a system fault, the pulsed signals cease and the controller automatically signals for immediate shutdown of the loading operation.

The ST-35 uses intrinsically safe voltage and current to connect to Scully liquid level sensors and provides control for external electrical devices by opening and closing relay contacts.

Scully loading rack overfill protection monitors have been carefully engineered to provide reliable and safe performance when installed in conjunction with related Scully equipment according to the instructions in this manual. Adaptations of, and additions to this equipment such as the use of multiple cables and plugs, loading arm position indicating switches, enclosure heaters and similar peripheral devices may void warranties unless authorized in writing by Scully Signal Company. Please contact Scully prior to performing any installation or maintenance not specifically described in this manual.

### 1.1 *Description*

The ST-35 is for use with Scully 5-Wire Optic Sensors, Model SP-FU series. It can monitor up to twelve of these sensors in a "series" signal path. If any one of the connected sensors senses liquid, the ST-35 will respond to this "wet" condition; output relay contact opens and red light turns on. Although its typical application is monitoring of sensors mounted on multi-compartment vehicles, it can also be used for high level detection in storage tanks (tank farms). One relay output contact is provided, which opens if any sensor detects liquid.

ST-35 is also used with vehicles equipped with Scully's IntelliCheck® series or ONBOARD Overfill Prevention Monitors. It interfaces with 5-wire optic socket on these vehicles. The Control Unit has an explosion proof enclosure for mounting in locations that are classified as hazardous.

### 1.1.1 Model Designations

The ST-35 Controller is available in 120VAC or 240VAC models, with or without control (bypass) switch.

Model suffix (E) = Explosion-proof Enclosure, (L) = Indicator Lights, (K) = Key Lockable Bypass Switch.

<b>Model</b>	<b>Description</b>
ST-35-120 EL	Multiple-Point Controller in Explosion-proof Enclosure with Indicator Lights, 120VAC
ST-35-120 ELK	Multiple-Point Controller in Explosion-proof Enclosure with Indicator Lights and Key-lockable Bypass Switch, 120VAC
ST-35-240 EL	Multiple-Point Controller in Explosion-proof Enclosure with Indicator Lights, 240VAC
ST-35-240 ELK	Multiple-Point Controller in Explosion-proof Enclosure with Indicator Lights and Key-lockable Bypass Switch, 240VAC

### 1.1.2 Explosion Proof Enclosure

Suffix “E” in the model number indicates controller is in an explosion-proof enclosure suitable for hazardous areas. Conduit holes are provided in the enclosure for electrical access. The installer must install EExd cable glands (or conduit and seal fittings) according to local codes.

### 1.1.3 Indicator Lights

Suffix “L” in the model number indicates red and green indicator lights on the controller enclosure. These lights indicate the following conditions:

<b>GREEN</b>	<b>RED</b>	<b>Condition</b>
ON	OFF	All optic sensors are dry and the circuit is functioning properly. Controller output is in permissive state i.e. permit to load.
OFF	ON	One or more sensors are wet or faulty or no connection to sensors, or the circuit is malfunctioning. Controller output is in non-permissive state i.e. no permit to load.
OFF	OFF	No power to the unit or Bypass Control Switch is in OFF or BYPASS position.

### 1.1.4 Bypass Control Switch

Adding the suffix “K” to the model number adds a lockable three-position control switch to the enclosure. In the ‘OFF’ position, there is no power to the unit. In the ‘NORMAL’ position, the unit will operate normally, with “dry” sensors causing the output relay to become energized (i.e. closed output contact). In the “BYPASS” position, power to the unit is switched “OFF” and the normally open relay contacts are bypassed to permit emergency operation of the equipment, without overfill protection.


For normal operation, this switch should always be set in the NORMAL position. The switch is enclosed in lockable box to allow locking with a user provided padlock.

**CAUTION:** When in ‘BYPASS’ mode the controller and sensors are DISABLED and the system does not provide overfill protection.

### 1.1.5 Indicator Light on Control Module

A red LED light is provided on the control module for convenience in checking the output status when the cover is open. The light is ON when power is applied and dry and functional sensors are connected to the unit. Thus, the internal light is ON when external green light is ON.

## 1.2 Technical Specifications

<b>Temperature Range</b>	-20°C to +60°C
<b>Power Requirements</b>	120VAC Models: 100 – 130 VAC, 50/60 Hz, 20VA Max.* 240VAC Models: 200 – 250 VAC, 50/60 Hz, 20VA Max.* *20VA does not include circuits controlled by the output relay contact
<b>Sensors:</b>	Up to 12 of Scully's 5-wire optic sensors, Model SP-FU series.
<b>Output Relay:</b>	One normally open volt-free contact rated 250VAC, 5A resistive max. The output contact closes when all sensors are dry and functional.
<b>Response Time:</b>	0.5 second maximum
<b>Indicator Lights:</b>	Output status indicator lights: Red: Non-permissive Green: Permissive
<b>Output Control Fuse:</b>	Internal 5 Ampere
<b>Connections:</b>	Provided by internal terminal strips.
<b>Enclosure:</b>	Explosion-proof, weatherproof IP65.
<b>Dimensions:</b>	See Appendix 4.0 for outline drawing.
<b>Weight:</b>	12.7 Kg (28 Lbs.)
<b>Approvals:</b>	Approved by Factory Mutual (FM) for use in Class 1, Division 1, Group D hazardous locations. 

Degree of protection of enclosure IP65. The rating of the enclosure is negated if the holes in the enclosure are unplugged/unscrewed or any holes are drilled into the enclosure. Cover screws to minimum grade A2-70 stainless steel.

The ST-35 control unit has been designed to be impact-resistant. Do not subject to excessive mechanical or thermal stresses. Do not allow the unit to come in contact with aggressive substances.

The ST-35 may only be repaired by replacing the internal control module. The internal control module is non-repairable.

Do not open when an explosive gas atmosphere is present.

## General

**1.3 Accessory Equipment**

In addition to the control unit, a plug and cable assembly is needed to provide the inter-connection from the ST-35 Control Unit to the vehicle. Plug and cable assemblies are available with various plugs conforming to industry standard configurations and with coiled or straight cables in various lengths.

Scully highly recommends the use of our Sculcon® Junction Box with Plug and Cable assembly. Use of Sculcon junction box simplifies system installation and provides for easy service of the plug and cable assembly for maintenance. Wiring the plug and cable assembly directly into the bottom of the ST-35 enclosure is not recommended and will result in greatly increased maintenance time and difficulty when the plug and cable assembly requires maintenance.

**1.3.1 Sculcon Junction Box with Plug and Cable Assembly**

One of the following models is needed to make connection to a vehicle. The selection is based on the style of socket used on the vehicles. “W” style plugs connect to “W” style sockets (i.e. with 3 J-slots). “B” style plugs connect to “B” style sockets (i.e. 4 J-slots).

<b>Model</b>	<b>Description</b>
SC-6W	<p>Sculcon Junction Box with 6W Blue Poly Plug &amp; Cable. The 6W style plug has 3- bayonet pins (for attachment to truck socket) and 6 contact pins. The SC-6W is available with either a 9 meter Coiled Cable or 6 meter Straight Cable configuration.</p> <p>This plug style is the standard in countries/regions that employ 3 J-slot sockets on vehicles with 5-wire optic sensors</p>
SC-6OB	<p>Sculcon Junction Box with 6OB Blue Poly Plug &amp; Cable. The 6OB style plug has 4- bayonet pins (for attachment to truck socket) and 6 contact pins. The SC-6OB is available with either a 9 meter Coiled Cable or 6 meter Straight Cable configuration.</p> <p>This plug style is used in countries/regions that employ 4 J-slot sockets on vehicles with 5-wire optic sensors.</p>

Consult factory for additional models.



The ST-35 control system is typically installed in areas that are classified as hazardous locations due to nature of the products being loaded. Installation of the control unit and accessories must therefore be done by qualified personnel in accordance with all national and local regulations (codes) governing the installation of electrical equipment in hazardous locations.

It is essential that the ST-35 control unit and accessories be installed and used in accordance with the detailed specifications and instructions in this manual. Installations that violate national and local regulations (codes) for installation of electrical equipment in hazardous locations and/or details in this manual may lead to unsafe operation.

Intrinsically safe wiring to/from TB2 at the bottom of the control module must enter/exit the bottom opening in the control unit enclosure labeled “Intrinsically Safe Entry”. Intrinsically safe wiring must be kept physically separated from any other wiring.

### 2.1 Mechanical Installation

When choosing a location on the loading rack for the control unit, the lights on the front of the control unit should be readily visible and within easy reach of the user. The control unit should be mounted vertically, in a location where the cover can open for servicing. (See Diagram 61442 in Appendix 4.0 for installation.)

Refer to the Outline Drawing in Appendix 4.0 for physical dimensions, location of the mounting bolts, electrical cable/conduit entry locations and enclosure earth bonding stud. The enclosure earth-bonding stud is provided for proper electrical bonding (earthing) of the enclosure to earth (ground). Use only the three conduit entry holes provided for wiring. The top two holes are for power and control wiring. The bottom hole is for intrinsically safe sensor wiring only. Do not drill any additional conduit holes in the enclosure; doing so violates the enclosure’s hazardous location approval and voids the warranty.

To avoid future maintenance issues regarding water infiltration into the enclosure via the electrical cable entries, we strongly recommend the following precautions:

1. Minimize long vertical cable (or conduit) runs into the top of the enclosure as long vertical runs promote water channeling to the cable gland.
2. The cable glands at the top of the enclosure should be very carefully installed, taking extra precaution to make certain that the installation is proper and sealed (as required by code).
3. Must seal all enclosure cable gland entries to maintain IP65 rating and protect against water infiltration. Install a fiber washer between the cable gland and the enclosure.

### 2.2 Electrical Installation

Refer to the Installation Wiring Diagrams in Appendix 4.0.

All cable entry fittings, junction boxes, connections, wiring, etc. are to be provided by the installer. Explosion-proof cable glands should be employed for cable entry. If conduits are used for cable entry, seal fittings must be installed in each conduit (See Wiring Diagram 61145).



There are three holes in the enclosure for cable entry. Two holes in the top of the enclosure are for mains power and control output wiring. One hole in the bottom of the enclosure, labeled “Intrinsically Safe Entry” is for connection to sensors, via a Scully Sculcon Junction Box and Plug & Cable.

*WARNING: The electrical cable entry in the bottom of the enclosure marked “INTRINSICALLY SAFE ENTRY” must only be used for wiring to the sensors (via plug and cable assembly). To maintain intrinsic safety, this cable entry must not be used for any other wiring. DO NOT ROUTE MAINS POWER THROUGH THIS HOLE.*

### **2.2.1 Power Connections**

Route the mains power wires through the top left-hand entry hole in the top of enclosure. Connect mains power wires to appropriate terminals on terminal block (strip) on the metal bracket in the enclosure. The Power terminals are marked E, N, & L, also shown in wiring diagram.

### **2.2.2 Enclosure Earth (Ground) Connection**

Connect a wire 18AWG (1.5mm<sup>2</sup> minimum) from the enclosure-bonding stud to earthed metallic structure of the gantry (rack).

### **2.2.3 Control Output (Controlled Circuit) Connections**

Route the control output wiring through the top right hand entry hole in the enclosure and connect to output contact terminals, indicated on the terminal strip on metal bracket. The output control contact is open when no connection from the controller is made to a vehicle (idle state). The output control contact closes when all of the optic sensors connected to the control unit are dry and functional (or when optional bypass switch is in the “Bypass” position).

The contact opens if a sensor gets wet (i.e. detects liquid). The contact also opens in case of a fault in any sensor, wiring to the sensors or a fault within the control units’ circuitry.

*NOTE: An internal 5A high interrupt capacity fuse protects the output relay contact. The fuse (F1) is located on metal bracket.*

The output contact is rated 250VAC, 5A resistive maximum. It is used to close a valve or pump directly or by wiring it in series with other control contacts, such as a preset meter’s control contacts. (See diagram 61441, Typical Loading Rack Control in Appendix 4.0.) In addition it may also be connected to an input of a terminal automation system (TAS) to provide status of the controller’s output to TAS.

*Caution: A valve or pump should be directly controlled by ST-35’s relay output contact. It should not go via the logic circuits of a TAS, as that can introduce unsafe failure modes into this emergency shutdown system. TAS may also control a valve or pump based on other conditions.*

### 2.2.4 Intrinsically Safe Connections to Sculcon Plug & Cable Unit

Signals from ST-35 to Sculcon Plug & Cable Unit are intrinsically safe. The intrinsically safe connections must only be made via the entry hole in the bottom of the enclosure. The connections are made to the terminal strip TB2 at the bottom end of the printed circuit board module. The wires must be 18AWG (1.5mm<sup>2</sup>) minimum conductor size. Connect 4 wires to Sculcon as shown in the wiring diagram 61145 (see Appendix 4.0). Use wire colors as indicated (red, black, yellow and orange). If other than suggested color codes are used, this information should be so noted in the back of this manual for future reference and troubleshooting. All wiring installation should be in accordance with local wiring codes.

## 2.3 Initial System Checkout

### 2.3.1 Test Equipment

Scully suggests the use of a Scully Universal Rack Tester to perform the commissioning tests as described below. The tester will expedite the initial system check out of the ST-35C. While not required, the tester provides all of the proper overfill prevention system signals to verify the new installation without the need to secure an actual vehicle for testing.

### 2.3.2 Operational Testing

Apply power to the ST-35 control unit.

The red light should be ON, provided Bypass Control Switch is in NORMAL position.

Check status of lights with Bypass Control Switch in the following positions:

NORMAL:	Red light should be ON
BYPASS:	Both lights should be OFF

Connect Sculcon plug to socket on the tester. Follow instructions provided with the tester. As the tester simulates a vehicle equipped with 5-wire sensors, the ST-35 output will go permissive immediately with green light ON and red light OFF.

Follow instructions provided with the tester to test both permissive and non-permissive states of the ST-35 controller.

### **2.4 System Operation**

Connect the Sculcon plug to socket on the vehicle to be loaded. The ST-35 controller will go PERMISSIVE immediately (i.e. green light ON). The output relay contact closes enabling the loading to begin. If there is a fault in the sensor, wiring interconnections or the controller circuitry the controller output will stay NON-PERMISSIVE (does not allow loading to begin). If a fault develops during loading or liquid level reaches the sensor, the controller will switch to NON-PERMISSIVE (i.e. red light ON and output relay contact opens).

Disconnect Sculcon plug from the socket after the loading is complete. Hang the plug on the hook provided on the Sculcon junction box (or in Scully Plug Storage Hanger socket).

*CAUTION: BEFORE PERFORMING ANY MAINTENANCE ON THE CONTROL UNIT, DISCONNECT POWER TO THE ST-15C AND WAIT FIVE MINUTES BEFORE OPENING THE ENCLOSURE. DO NOT OPEN WHEN AN EXPLOSIVE GAS IS PRESENT.*

### 3.1 Enclosure

Considering the location where the control unit will be typically mounted, it is advisable to inspect the enclosure routinely for deterioration due to environmental corrosion. The control unit should be opened once per year for internal inspection and replacement of the corrosion (inhibitor) capsule. Cover screws used must be minimum grade A2-70 stainless steel.

### 3.2 Corrosion Protection

The control unit is shipped from the factory with a corrosion inhibitor capsule adhered to the inside of the cover. The corrosion capsule is designed to condition the atmosphere within the enclosure to resist corrosion. It is intended to last approximately 1 year in normal use. As previously mentioned, the control unit should be opened once per year for internal inspection. At this time the corrosion capsule should be replaced (see Replacement Parts Sheet in Appendix Section 4.0). It is also recommended to replace the cover O-ring at the same time.

### 3.3 Control Module (Circuit Board)

The ST-35 control unit's internal circuitry does not require any routine periodic maintenance.

The control circuitry may be repaired only by replacing the internal control module with an equivalent module. The internal module is non-repairable.

*DO NOT ATTEMPT TO SERVICE OR ADJUST THE ST-35C MODULE. ATTEMPTING TO SERVICE THE MODULE WILL NEGATE WARRANTIES, CERTIFICATION AND JEOPARDIZE INTRINSIC SAFETY ASPECTS OF THE DEVICE.*

If it is determined (after troubleshooting, see Section 3.8) that control module needs to be replaced, remove the faulty control module and install the replacement control module per the following steps: (See Figure 1 ST-35C Control Module Illustration on following page) The model label will indicate ST-35C. The module is both ATEX and FM approved and indicated by ST-35C. The module comes in 2 voltages, 115 VAC and 240 VAC.

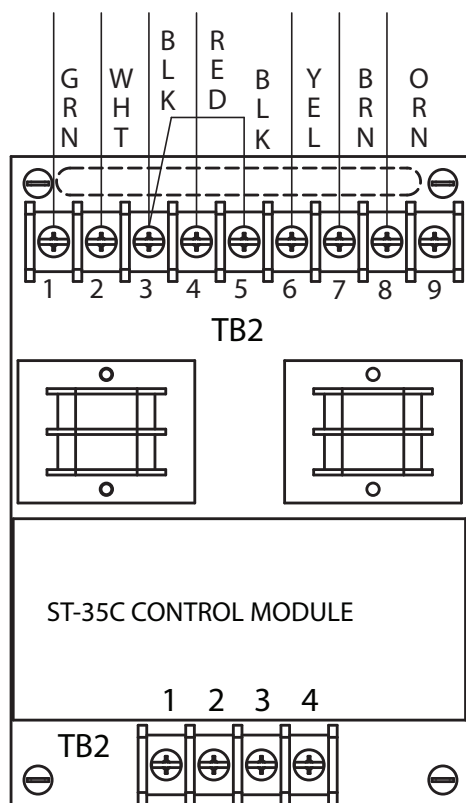
### 3.4 Module Replacement

#### REMOVING THE MODULE

1. Remove (disconnect) power from the ST-35 Control Unit. Make sure the work area is gas vapor free.
2. To open the ST-35 Control Unit cover, remove the (16) hex socket head bolts by using a 6mm hex wrench.
3. Mark/label wires connected to TB1 on printed circuit board (to be able to reconnect to the same terminal numbers on the replacement module).
4. Disconnect all wires connected to TB1.
5. Mark/label wires connected to TB2.
6. Disconnect all wires connected to TB2.
7. Remove the Control Module assembly by loosening the four-(4) mounting screws located in the four corners of the Control Module assembly.

### INSTALLING REPLACEMENT MODULE

1. Place the new Control Module onto the mounting plate and attach the (4) mounting screws.
2. Reconnect the wires to TB2.
3. Reconnect the wires to TB1.
4. Close the cover and attach the (16) cover bolts.
5. Apply power to the Control Unit.



**Figure 1: ST-35  
Control Module Illustration**

*Note: The ST-35C (ST-35) Replacement Control Module cannot be repaired in the field. A damaged or faulty module must be replaced with an equivalent Scully ST-35C Control Module. The ST-35C Replacement Control Module must only be installed in Scully's explosion-proof enclosure. The enclosures' explosionproof and weatherproof integrity must be maintained.*

*The ST-35C Control Module should not be subjected to any mechanical impact. Do not allow build-up of dust on the Control Module.*

*Caution: Do not expose the Control Module to aggressive substances that may attack the exposed materials.*

*When used properly, contact with the control module will not cause physical injury or harm and does not pose non-electrical dangers. The unit does not produce excessive surface temperatures, or emit infrared electromagnetic or ionizing radiation.*

### 3.5 **Indicator Lights**

The control unit employs explosion-proof LED style lights. These do not require any maintenance or changing of bulbs. In the event a light is faulty, it must only be replaced with parts numbers shown in Replacement parts Sheet in Appendix 4.0. Follow instructions provided with the replacement indicator lights (pilot lights).

*Note: Older ST-35 Controllers employed incandescent style lights. These require replacement of bulb if it blows. Refer to Replacement Parts Sheet in Appendix 4.0*

### 3.6 **Control (Bypass) Switch**

On those models having a lockable control (Bypass) switch the switch box may be replaced, by removing two screws inside the switch box. The switch box is replaced as a unit.

A faulty switch may also be replaced if necessary, see replacement parts sheet in Appendix 4.0 for replacement part numbers.

### 3.7 **Junction Box and Plug & Cable Unit**

The Sculcon Junction Box and Cable unit(s) require simple routine maintenance. More attention is needed in highly corrosive environments.

Although it is not required, we recommend that the exposed electrical contact of the plug be coated with a corrosion inhibiting film routinely (once per month is suggested). Corrosion inhibiting spray, ACF-50 Corrosion Block® (manufactured by Lear Chemical Research Corporation, Mississauga ON Canada [www.learchem.com](http://www.learchem.com)). Other external metal parts of these accessories may also be treated as necessary to prevent atmospheric corrosion problems.

The exterior surface of the plug should be kept clean using a mild detergent based cleaning solution and water. The cabling should be routinely wiped of foreign material and cleaned to preserve the outer jacket. To protect it from loading arm damage etc., it is important to store the plug and cable out of harms way when it is not in use. A hook is provided on Sculcon Junction Box or a Scully Storage Socket may be used.

### 3.8 **Troubleshooting**

The following troubleshooting guide should aid in an initial diagnosis of most problems encountered with installation and operation of ST-35.

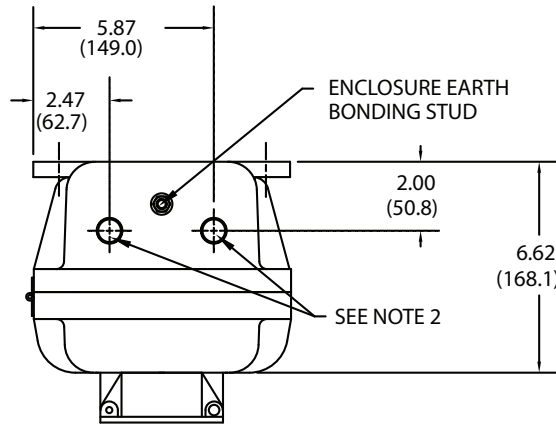
<b>Condition</b>	<b>Possible Cause</b>
No lights ON, on front cover	<ul style="list-style-type: none"> <li>• No power to control unit</li> <li>• Control (Bypass) Switch in OFF position</li> <li>• Bulb blown (on older units with incandescent lamps)</li> <li>• Control Module is defective</li> </ul>
Green (Permissive) light ON, but control contact output does not activate valve/pump	<ul style="list-style-type: none"> <li>• Control Output fuse (F1) is blown</li> <li>• Wiring defect (control output contact wiring)</li> <li>• Control Module is defective</li> </ul>
Red (Non-permissive) light stays ON when connected to vehicle with Scully 5-wire sensors (or Scully tester)	<ul style="list-style-type: none"> <li>• Fault in wiring to junction box and/or plug</li> <li>• Wet or faulty sensor on vehicle</li> <li>• Fault in wiring on vehicle</li> <li>• Bad plug to socket connection</li> <li>• Control Module is defective</li> </ul>
Red LED on Control Module (circuit board) ON but Green external light OFF	<ul style="list-style-type: none"> <li>• Internal wiring fault</li> <li>• Control Module is defective.</li> </ul>
Red LED on Control Module (circuit board) OFF	<ul style="list-style-type: none"> <li>• No power to control unit</li> <li>• Control (bypass) Switch in OFF position</li> <li>• Wet or faulty sensor</li> <li>• Fault in wiring to sensors</li> </ul>

Check voltage (DC) between pins 8 and 10 (ground) of the plug. It should be 8.7VDC minimum.

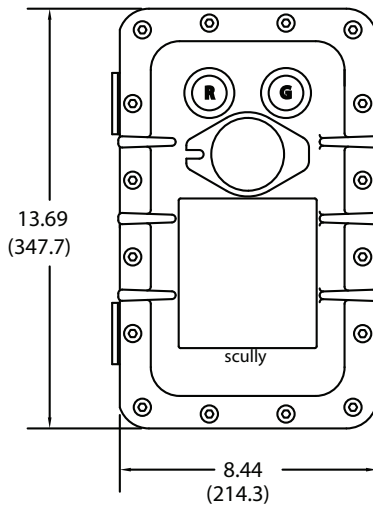


### 4.1 DWG 31412 – Outline Drawing – Control Unit Enclosure

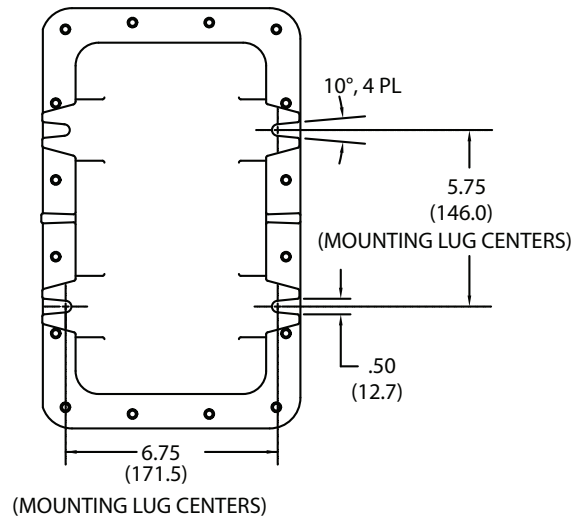
31412 RevC



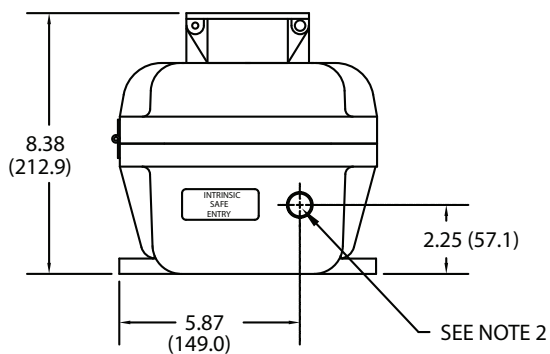
TOP VIEW



FRONT VIEW



REAR VIEW

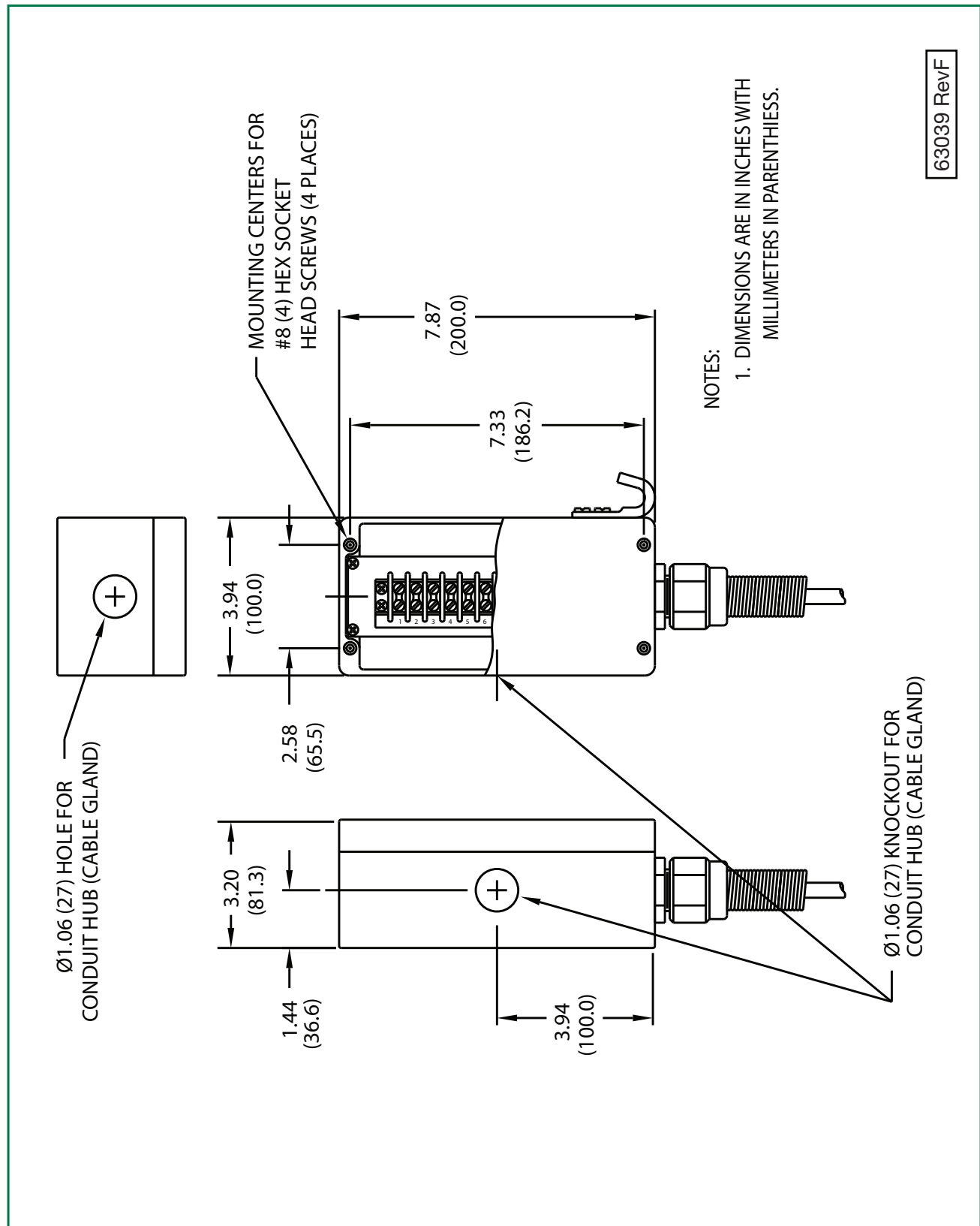


BOTTOM VIEW

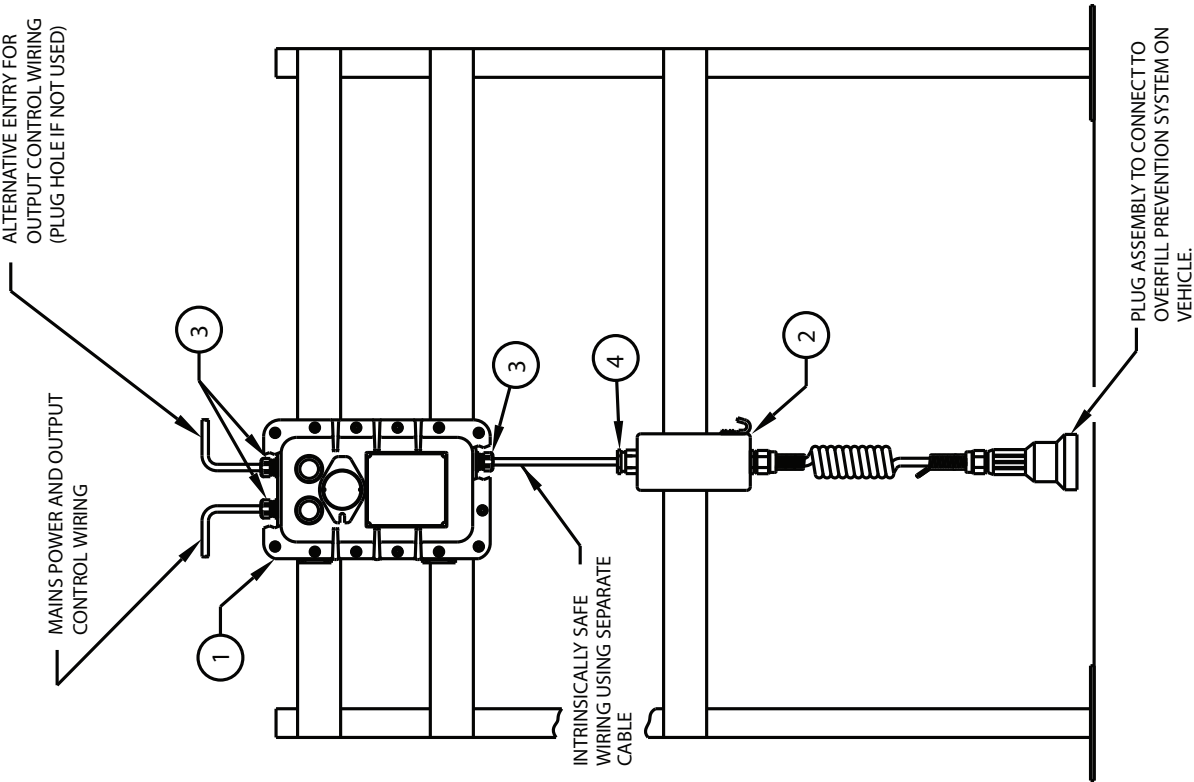
#### NOTES:

1. DIMENSIONS ARE IN INCHES WITH MILLIMETERS IN PARENTHIESS.
2. ENTRY HOLES:  
FMC APPROVED MODELS: 3/4" NPT  
ATEX APPROVED MODELS: M20 X 1.5

## 4.2 DWG 63039 – Outline Drawing – Sculcon Junction Box



4.3 DWG 61442 – Mounting Diagram – Control Unit & Junction Box



EQUIPMENT SCHEDULE (TYPICAL)

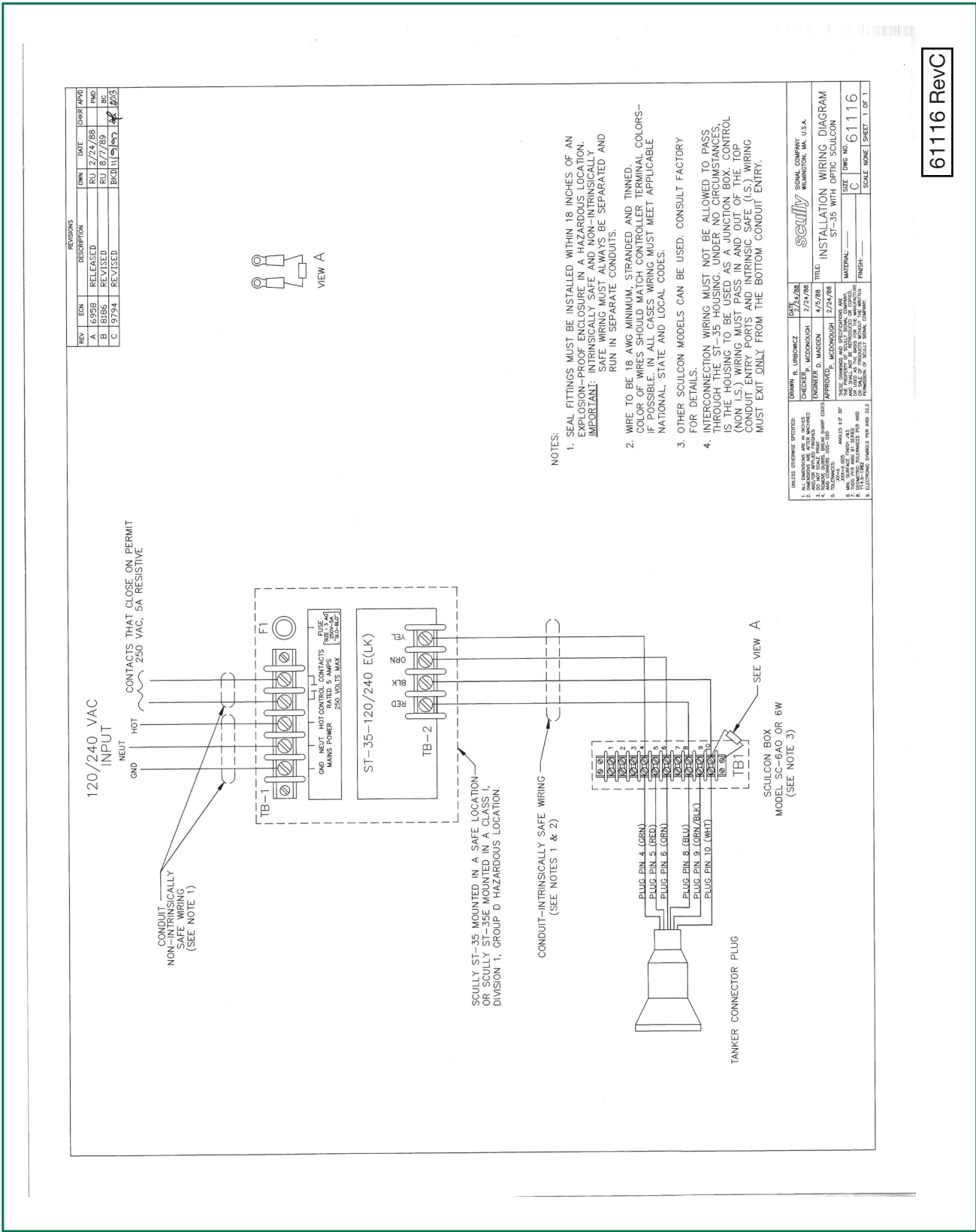
1. CONTROL UNIT
2. SCULCON JUNCTION BOX WITH PLUG AND CABLE.
3. FLAMEPROOF Exd CABLE GLAND FITTING.  
IF CONDUITS ARE USED FOR CABLE ENTRY, SEAL FITTINGS MUST BE INSTALLED WITHIN 18 INCHES OF AN EXPLOSION-PROOF ENCLOSURE IN A HAZARDOUS LOCATION, IN EACH CONDUIT (NOT SHOWN).  
IMPORTANT: INTRINSICALLY SAFE AND NON-INTRINSICALLY SAFE WIRING MUST ALWAYS BE SEPARATED AND RUN IN SEPARATE CONDUITS/CABLES.
4. INDUSTRIAL CABLE GLAND FITTING.

INSTALLATION NOTES

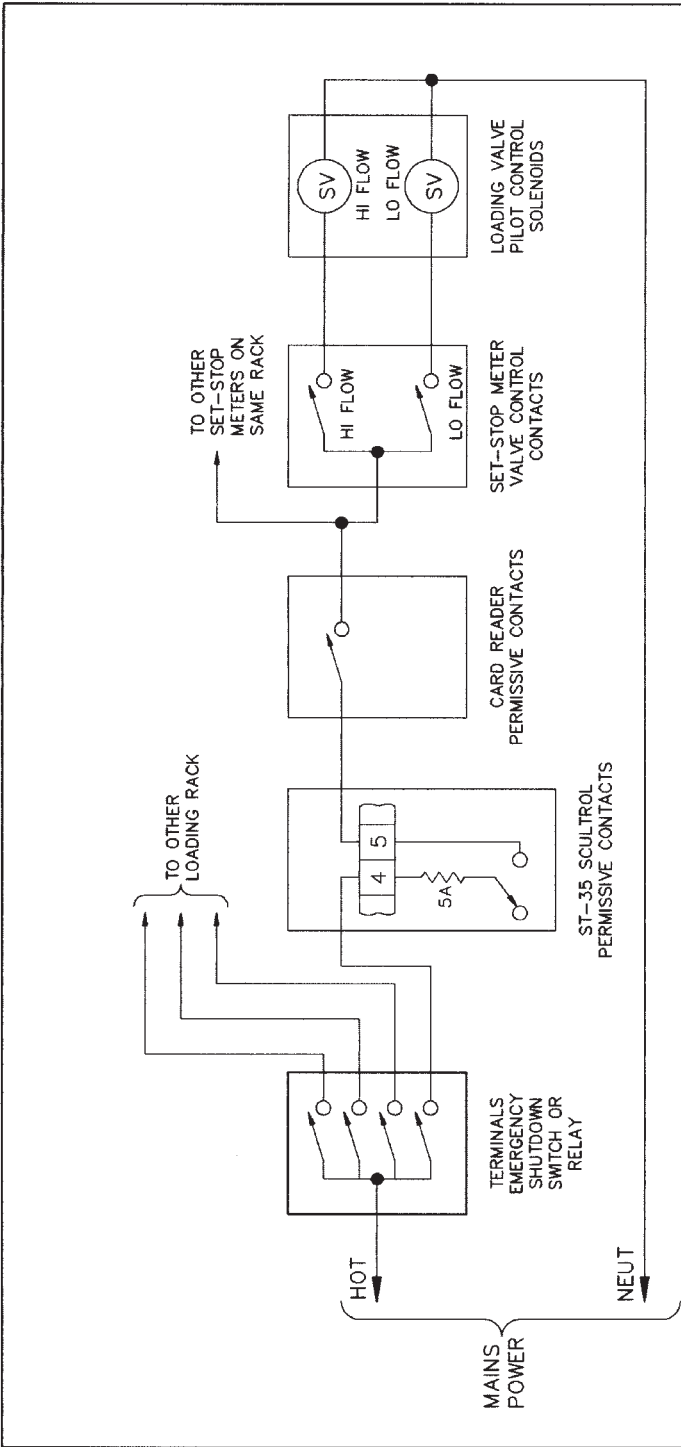
1. INSTALLATION MUST COMPLY WITH NATIONAL AND LOCAL REGULATIONS FOR INSTALLATIONS IN HAZARDOUS LOCATIONS. DETAILS SHOWN ARE FOR REFERENCE ONLY AND ARE NOT INTENDED TO REPRESENT CODE COMPLIANCE.
2. THE INTRINSICALLY SAFE WIRING BETWEEN THE BOTTOM PORT OF THE CONTROL UNIT ENCLOSURE AND THE SCULCON JUNCTION BOX MUST BE RUN USING DEDICATED CABLE OR IN A CONDUIT. NO OTHER SIGNALS ARE TO BE RUN IN THIS CABLE OR CONDUIT.
3. MINIMIZE LONG VERTICAL RUNS OF CABLE INTO THE TOP PORTS OF THE CONTROL UNIT ENCLOSURE TO AVOID CONDENSATION CHANNELING.
4. USE FIBER SEALING WASHERS BETWEEN THE CABLE GLAND FITTINGS AND THE CONTROL UNIT ENCLOSURE AT ALL CABLE PORT ENTRIES.
5. ANY UNUSED HOLES IN THE FLAMEPROOF ENCLOSURE MUST BE PLUGGED USING A CERTIFIED FLAMEPROOF STOPPER PLUG.

61442 RevC

4.4 DWG 61116 – Installation Wiring Diagram – Optic Sculcon



4.5 DWG 61441 – Wiring Diagram – Typical Loading Rack Control



TYPICAL LOADING RACK CONTROL SHOWING PERMISSIVE CONTACTS  
IN CIRCUIT TO LOADING VALVES.

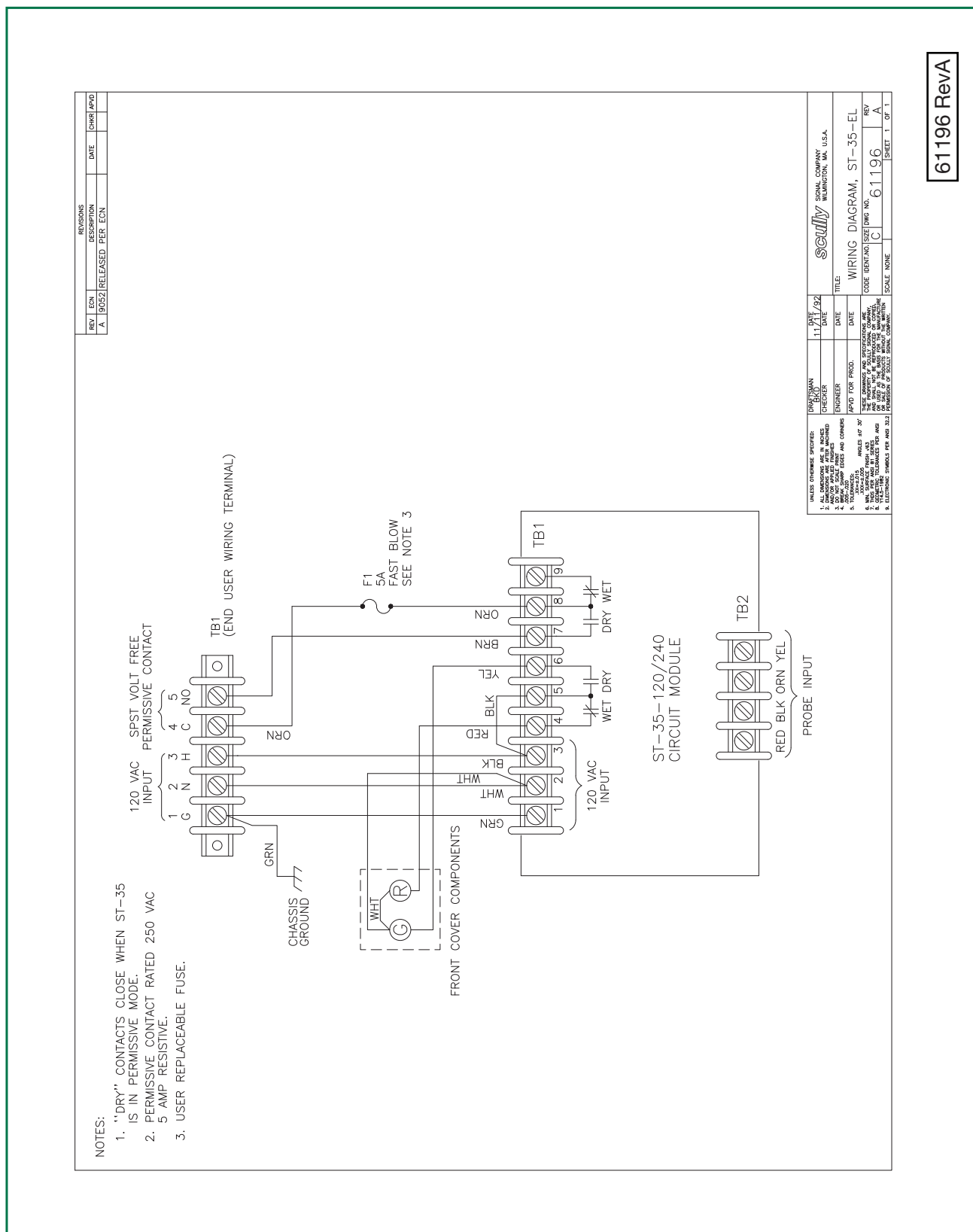
NOTE: WIRING SHOWN IS TYPICAL AND WILL VARY AS MORE OR LESS EQUIPMENT IS EMPLOYED.  
PUMP CONTROL CIRCUITS NOT SHOWN. THIS DIAGRAM IS INTENDED TO BE USED ONLY TO  
CLARIFY OF CONTROL CONTACTS. ALL CONTACTS SHOWN IN NON-PERMISSIVE STATES.

Scully SIGNAL COMPANY BIRMINGHAM, AL, U.S.A.	
TITLE	WIRING DIAG.
TYPICAL LOADING RACK CONTROL	
DWG NO.	61441
REVISION	A

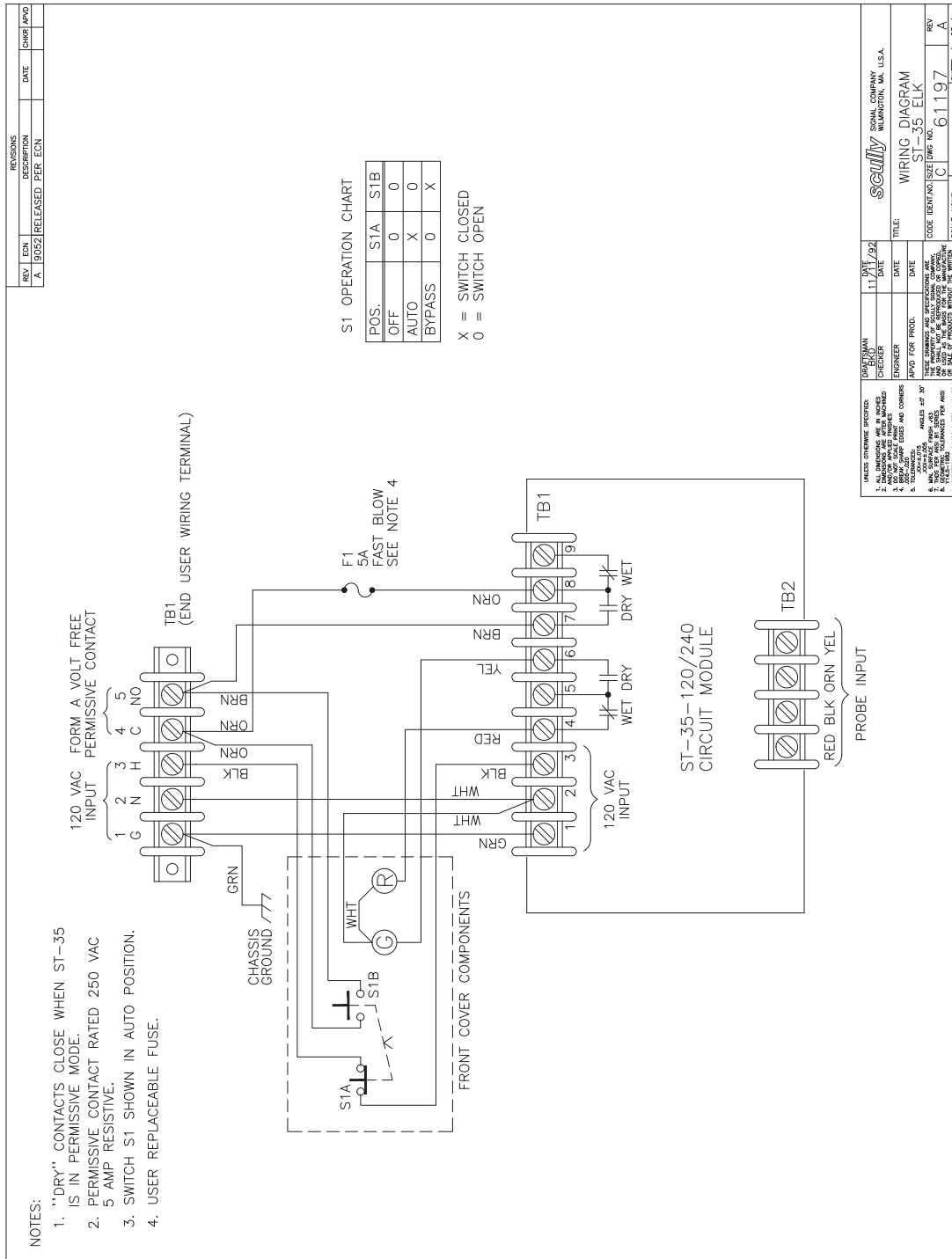
61441 RevC

## Diagram Appendix

#### 4.6 DWG 61196 A – Internal Wiring Diagram – ST-35 EL



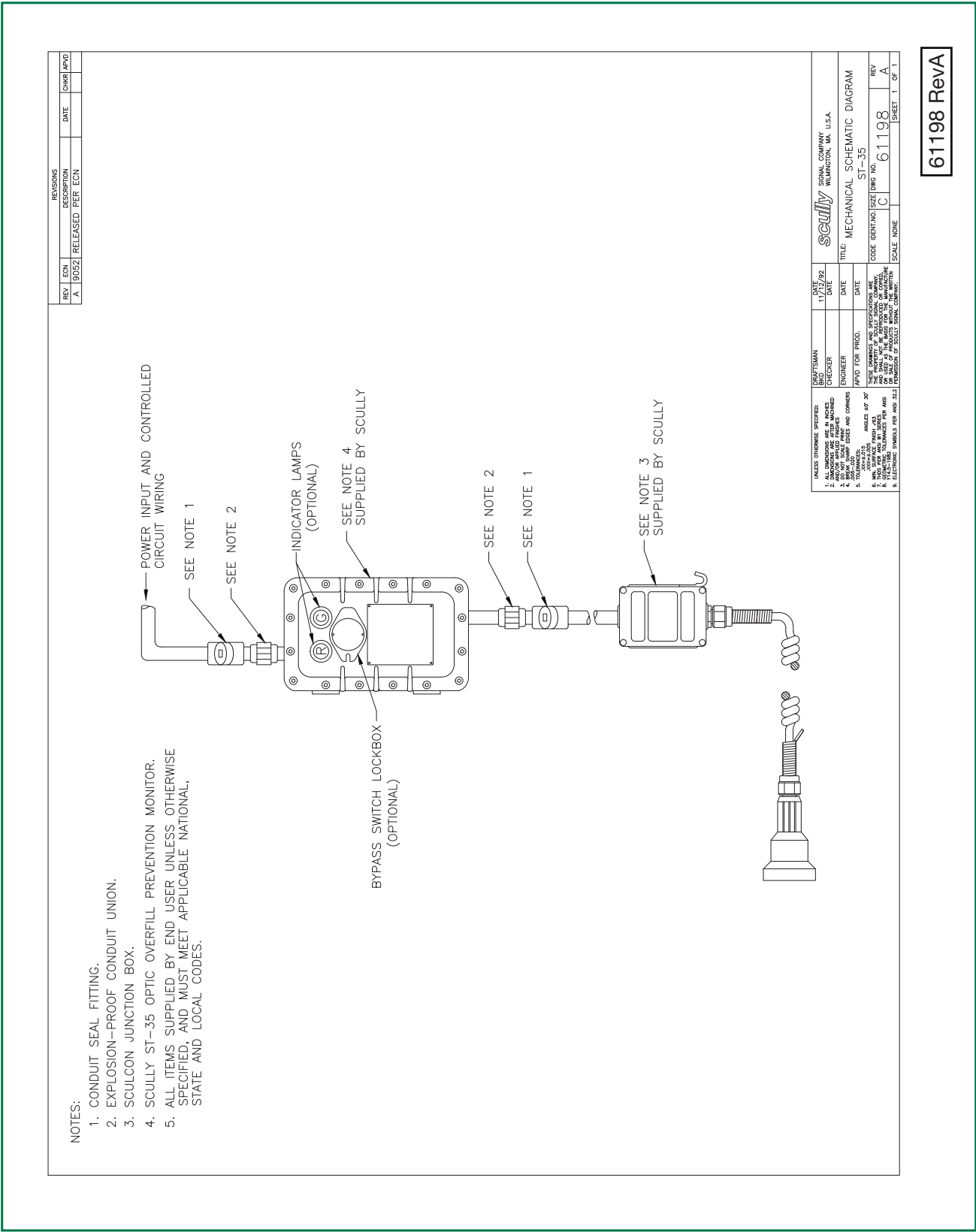
#### 4.7 DWG 61197 A – Internal Wiring Diagram – ST-35 ELK



61197 RevA



4.8 DWG 61198 A – Mechanical Schematic Diagram – ST-35



4.9 DWG 61182 D - Replacement Parts ST-35 115VAC

# ST-35 115VAC

Multiple Point Optic Controller

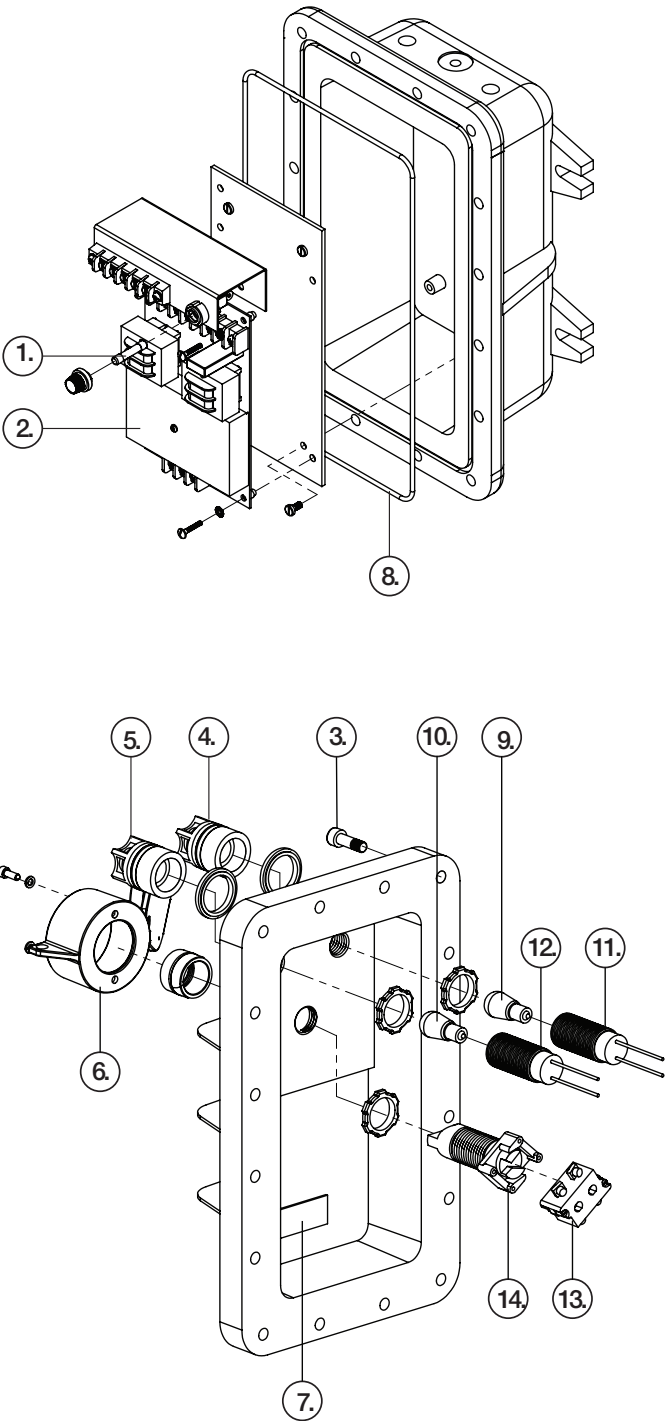
Part No.	Model
07901	ST-35-115 EL
07903	ST-35-115 ELK

Note: Controller Models Suffix:  
Explosion-proof housing (E), Indicator Lights (L),  
Key (K) Lockable Bypass Switch.

### Replacement Parts

Item	Part No.	Description	Qty.
1	26311	Control Fuse, 5 Ampere	1
2	08808	ST-35C-115 Circuit Module	1
3	50041	Screw, Hex Head	16
4	09124	Red Replacement Head and Guard Assembly	1
5	09125	Green Replacemnt Head and Guard Assembly	1
6	08360	Bypass Switch Lock Box (includes 2 mounting screws)	1
7	21733	Corrosion Capsule	1
8	31340	O-ring cover seal	1
9	09384	LED- Red	1
10	09385	LED- Green	1
11	08343	Pilot Light Replacement Kit Red (includes 4,9)	1
12	08342	Pilot Light Replacement Kit Green (includes 5,10)	1
13	26022	Bypass Switch Contact Block	1
14	26055	Bypass Switch Operator 3-Position	1

Notes:  
Item 3: Hex head screw used on models built after 10/92.  
Item 8: O-ring used on models built after 10/92



61197 RevA

## 4.10 DWG 61182 D - Replacement Parts ST-35 240VAC

# ST-35 240VAC

## Multiple Point Optic Controller

**Part No.**            **Model**  
**07931**                **ST-35-240 ELK**

Note: Controller Models Suffix:  
 Explosion-proof housing (E), Indicator Lights (L),  
 Key (K) Lockable Bypass Switch.

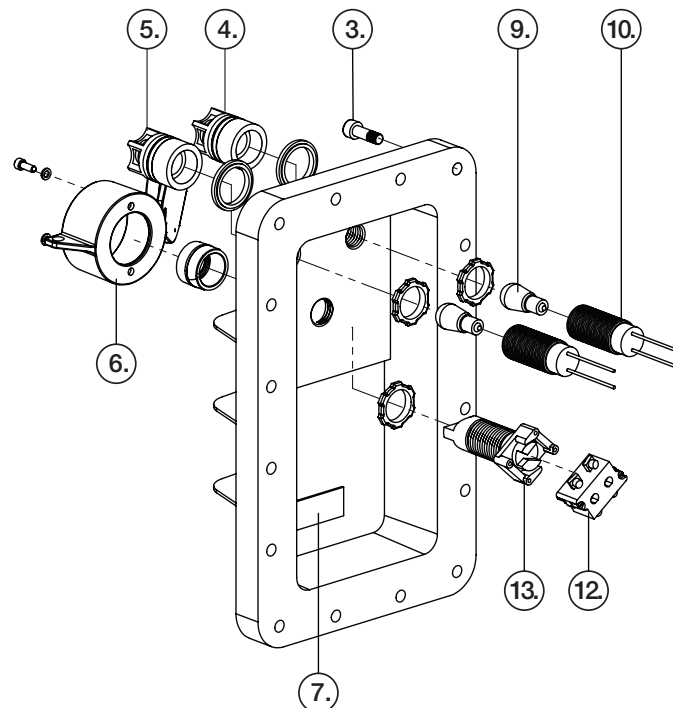
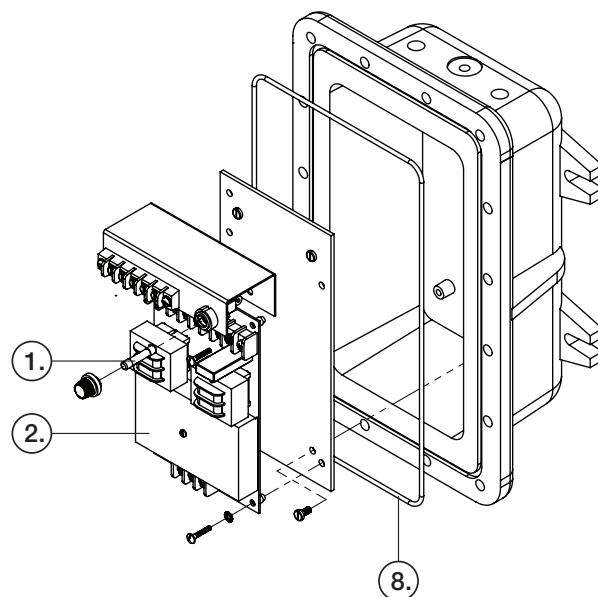
### Replacement Parts

Item	Part No.	Description	Qty.
1	26311	Control Fuse, 5 Ampere	1
2	08647	ST-15C-240H Circuit Module	1
3	50041	Screw, Hex Head	16
4	09122	Red Replacement Head and Guard Assembly	1
5	09123	Green Replacement Head and Guard Assembly	1
6	08360	Bypass Switch Lock Box (includes 2 mounting screws)	1
7	21733	Corrosion Capsule	1
8	31340	O-ring cover seal	1
9	27006	Bulb, 250V, 10W	2
10	08346	Pilot Light Replacement Kit Red (includes 4,9,10)	1
11	08345	Pilot Light Replacement Kit Green (includes 5,9,11)	1
12	26022	Bypass Switch Contact Block	1
13	26055	Bypass Switch Operator 3-Position	1

**Notes:**

Item 3: Hex head screw used on models built after 10/92.

Item 8: O-ring used on models built after 10/92



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*Notes:*



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August 2015

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