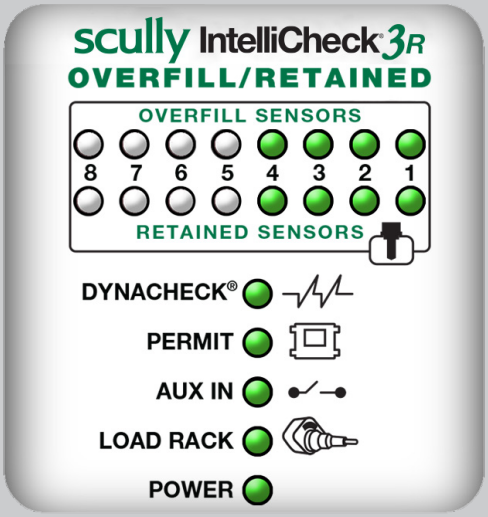


scully

IntelliCheck® 3

Technical Manual for Overfill / Retained

Overfill Prevention & Retained Product Detection for up to 8 Compartments Monitoring System for Tank Truck Loading

Featuring Dynamic Self-Checking®

www.scully.com

Intellicheck®3R Overfill/Retained Technical Manual

Table of Contents

Table of Contents

1. General Information

IntelliCheck®3R Family Description
The IntelliCheck®3R System is a family of point level detection systems designed to prevent overfill and spillage of product.

The product list includes:

Overfill 8	Detects overfilling for up to 8 compartments.
Overfill/Retained	Detects overfilling and retained product for up to 8 compartments.
Dual - Level	Detects two levels of filling in 1 compartment.

The IntelliCheck®3R System is an ideal secondary overfill protection system for a wide range of environments and product types.

Overfill / Retained Features:
The IntelliCheck®3R Overfill/Retained offers a range of features including:
- Overfill prevention on up to 8 compartments.
- Retained product detection on up to 8 compartments.
- Can be configured for tankers with Retain Sensors only.
- Restart switch for retained timer (retained product acknowledgement).
- Auxiliary input.
- Supports Scully's Dynacheck® automatic and continuous self-checking circuitry.
- Bicolor LEDs providing complete system diagnostics, includes sensors, power, and rack connection.
- Corrosion-resistant housing.
- Scratch-resistant window.
- Overfill connections are Compatible with Scully's SP-TO Two-Wire and SP-FU Five Wire Optic Sensors.
- Retain connections are compatible with Scully's SP-TO Two-Wire Optic sensors.
- Intrinsically safe and non-intrinsically safe relay outputs.

The IntelliCheck®3R Overfill/Retained is suitable for use on single and multi-compartment vehicles (8 compartments maximum).
The IntelliCheck®3R System is user-configured for the number of vehicle compartments to ensure maximum safety for proper sensor response

1. General Information

should a high level (overfill) condition occur.

Installation does NOT require dummy loads or “terminators” which may be used to bypass failed sensors or imitate sensors that are not installed.

The IntelliCheck®3R System offers compatible outputs for connection to either a Two-Wire Optical (Thermistor) or Five-Wire Optics-equipped loading terminal rack controls.

Relay output provisions are included for intrinsically safe and non-intrinsically safe relay connections, for control of vehicle mounted devices. A typical device would be an air/electrically operated bottom loading valve commonly used in the aviation industry.

All IntelliCheck®3R Systems include superior diagnostics for sensor status as well as bicolor LED indication of monitor operation, indication of proper loading rack connection and self-checking Dynacheck® operation.

The IntelliCheck®3R System module is installed in a corrosion resistant housing that features ample wiring room, allowing for easy installation and serviceability. It also features a scratch-resistant window for viewing of the unit’s diagnostic indicators. For indicator light explanations refer to the Quick Start Guide, the Troubleshooting guide, or the operation section of this manual for fast problem-solving. The IntelliCheck®3R System provides the user Faylsafe® operation when loading at terminals requiring secondary overfill prevention. Faylsafe® operation is incorporated into the Scully design technology by utilizing Dynacheck®, Scully’s unique automatic and continuous self-checking feature. This feature ensures the IntelliCheck®3R monitor and sensors are being continuously checked for proper operation including wiring and connections. Should a sensor become wet or a fault develops due to component failure or wiring, the outputs to the loading rack controllers are disabled (non-permit condition). All control outputs also operate in a Faylsafe® manner.

1. General Information

Retained Product Monitoring

Product retention warning and prevention alerts the operator of existing product in a compartment. This feature prevents miscalculation of loading volumes leading to overfills. If existing product is on board the vehicle prior to loading, the retained feature is configured to “lock-out” product transfer operation. Operator acknowledgments of retained product on board the vehicle is required to continue loading, and is done by activating the retained acknowledge override push button. Retained product indication also verifies that a complete delivery (drop) had been made at a service station (Retail site) and that the compartment is completely emptied of its cargo. This feature can also prevent accidental mixing of different products due to incomplete off-loading of a previous shipment.

When a retained sensor becomes wet, an internal timer automatically activates allowing the operator to load for a period of 90 minutes. After the 90-minute “grace” period has expired, the IntelliCheck®3R monitor becomes non-permissive and shuts down product loading. To reset the system, retained product must be completely drained from the vehicle or the retained acknowledge override push button must be activated. Pushing the button re-initializes the 90-minute grace period timer.

Note: All operation and/or fault indicators function constantly during IntelliCheck®3R System operation. Activating the retained product acknowledge override does not eliminate visual indication of retained product sensor status.

1. General Information

1.1 Technical Specifications

Temperature Range

Operating: -40 to +60 Degrees C (-40 to +140 Degrees F)
Storage: -45 to +85 Degrees C (-50 to +185 Degrees F)

Power Requirement:

Nominal Voltage: 12 to 24 VDC (-0.5, +8 VDC)
Consumption: 9.6 Watts maximum at 24 VDC
4.8 Watts maximum at 12 VDC

Outside Dimensions: 9.26” wide X 6.81” high X 2.54” deep

Weight: 2.7 kg (6.lb)

Interfaces

Inputs:
- TB4 & TB5 Sensor Inputs: EN 13922 compliant
- TB3 Auxiliary: I.S. input switch closure less than 100 ohms

Outputs:
- TB7: 2.0A at 32 VDC maximum Non-intrinsically safe relay
- TB6 Rack interface: EN 13922 compliant I.S. interface for 2/5- wire sensors
- TB6: Intrinsially safe relay output. 200mA at 32 VDC maximum or 500mA at 16 VDC maximum

1.2 Approvals

IntelliCheck®3 has safety approvals as an intrinsically safe monitoring device for use in:

- Canada and the United States:
  Class I, Division 2, Group CD, or Class I, Zone 2, IIB,
  With intrinsically safe outputs for Class I, Division 1,
  Group CD or Class 1, Zone 0, IIB Locations
  Ambient temperature (Ta < -40°C to +60°C)
  Canada: [Ex ia IIB Ga]

1. General Information

- Europe:

  IECEx ETL 15.0004
  ITS15ATEX58179
  ITS22UKEX0559

  Ex eb mb [ia Ga] IIB T4 Gb -40°C < Ta < +60°C

WARNING: *Exposure to some chemicals may degrade the sealing properties of materials used in the sealed module device.*
WARNING: *Explosion hazard- do not remove or replace lamps, fuses or plug-in modules unless power has been disconnected or the area is known to be free of ignitable concentrations of flammable gases or vapors.*
WARNING: *Explosion hazard– substitution of components may impair suitability for Class 1, Division 2.*
WARNING: *Cable glands, cables, and conduit at cable entry points must be rated to an operating temperature of 67.6°C or higher.*

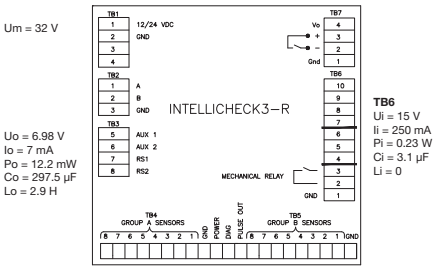
AVERTISSEMENT: *L'exposition à certains produits chimiques peut dégrader les propriétés d'étanchéité des matériaux utilisés dans les module étanche périphérique.*
AVERTISSEMENT: *Risque d'explosion – ne pas debrancher tant que le circuit est sous tension, a moins qu'il ne s'agisse d'un emplacement non dangereux.*
AVERTISSEMENT: *Risque d'explosion – ne débranchez pas l'équipement pendant que le circuit est direct ou à moins que l'environnement soit connu pour être libre de concentrations in ammables.*
AVERTISSEMENT: *Risque d'explosion- la substitution de composants peut rendre ce materiel inacceptable pour les emplacements de classe 1, division 2.*
AVERTISSEMENT: *Les presse-étoupes, les câbles et conduits aux points d'entrée des câbles doivent être prévus pour une température de service nominale de 67.6 C ou plus.*

1. General Information

Additional important information:

- It is recommended that the vehicle not be running during the use of the IntelliCheck®3R.
- It has an enclosure rating Type 4/IP65. The design provides protection against windblown dust and rain, splashing water, hose directed water and is undamaged by the formation of ice on the enclosure.
- The IntelliCheck®3R power wiring should contain a switch and an inline fuse (included) that is installed in a safe area.
- The switch allows the IntelliCheck®3R to be turned off when not needed. It is recommended that the IntelliCheck®3R be turned off when not in use.
- The IntelliCheck®3R has been designed to be impact-resistant and is designed to withstand typical vibrations encountered in road transport. It should not be subjected to excessive mechanical or thermal stresses.
- Do not allow the unit to come in contact with aggressive substances.
- Do not allow build-up of dust on the monitor.
- Electrical repair is limited to replacing the internal module with an equivalent Scully IntelliCheck®3R module.
- Wiring to and from the Intellicheck®3R must conform to wiring techniques specified for its area classification.

1.3 Intrinsic Safety Entity Parameters:



TB4, TB5:
Uo = 12.86 V
Io = 344 mA
Po = 1.11 W
Co = 1.99 µF
Lo = 1.2 mH

1. General Information

1.4 Standards

U.S.A.

• Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations [UL 913:2013 Ed.8+R:16Oct2015]

• Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations [UL 121201:2017 Ed.9 +R:01Apr2021]

• Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements [UL 61010-1:2012 Ed.3+R:21Nov2018]

• Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use - Part 2-201: Particular Requirements For Control Equipment [UL 61010-2-201:2018 Ed.2]

• FCC 47CFR PT 15 SPT B Issued: 2013/01/28 Title 47 CFR Part 15 Subpart B: Unintentional Radiators

Canada

• Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations [CSA C22.2#213:2017 Ed.3 +U1;U2;U3]

• Explosive Atmospheres - Part 0: Equipment - General Requirements [CSA C22.2#60079-0:2019 Ed.4]

• Explosive Atmospheres - Part 11: Equipment Protection By Intrinsic Safety "i" [CSA C22.2#60079-11:2014 Ed.2]
vSafety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1: General Requirements [CSA C22.2#61010-1-12:2012 Ed.3 +U1;U2;A1]

• Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-201: Particular Requirements for Control Equipment [CSA C22.2#61010-2-201:2018 Ed.2]

1. General Information

EMC Compatible:

• **IEC 61000-4-2** issue:2008/12/09 ed:2 Electromagnetic compatibility (emc) - part 4-2:testing and measurement techniques - Electrostatic discharge immunity test

• **IEC 61000-4-3** Issue:2010/04/27 Ed:3.2 (EMC) - Part 4-3: Testing and Measurement Techniques - Radiated, Radio-Frequency,Electromagnetic Field Immunity Test

• **IEC 61000-4-4**, issue:2011/03/30 ed:2.1 Electromagnetic Compatibility (emc) – part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

• **IEC 61000-4-6**, issue:2008/10/31 ed:3 Electromagnetic compatibility (emc) - part 4-6:testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency elds

• **IEC 61000-2-3** 30 A/m, 50Hz and 60 Hz, Power Frequency Magnetic Field Immunity

Europe:

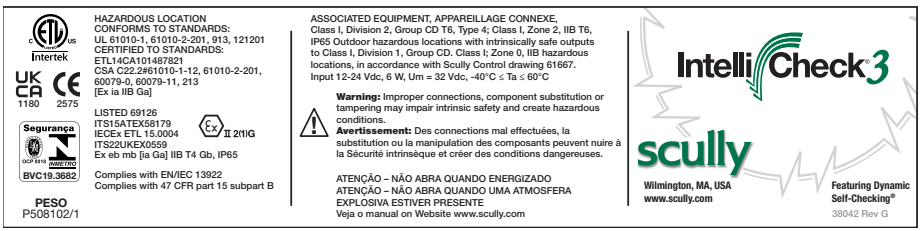
• **IEC 60079-0:2018 Explosive atmospheres** Incorporating corrigendum January 2020 General requirements

• **IEC 60079-7:2015 Explosive atmospheres** +A1:2018 Incorporating corrigendum July 2019: Equipment protection by increased safety "e"

• **IEC 60079-11:2012 Explosive atmospheres** Incorporating corrigenda Jan 2012 and Nov 2014: Equipment protection by intrinsic safety

• **IEC 60079-18:2015/AC2018-09 Explosive atmospheres**
- Part 18: Equipment protection by encapsulation “m”

1.5 Compliance Label



2. Mechanical Installation

Locating and mounting the IntelliCheck®3R monitor, sockets and overfill sensors.

Pre-Installation Requirements

When choosing a location to install the IntelliCheck®3R System, these guidelines must be followed:

- Appropriate industry, national, state and local codes.
- The National Fire Protection Agency (NFPA) Code (USA).
- Practical considerations within the jurisdiction of this code.

⚠ ***Warning:***

Before beginning installation, the tank compartments must be completely drained of liquid and be vapor-free.

⚠ ***Warning:***

The metal enclosure must be connected to the metallic chassis, which ultimately connects to the negative terminal of the battery of the vehicle to establish proper electrical grounding.

2.1 IntelliCheck®3R and Socket Installation

The IntelliCheck®3R housing and the socket housings should be mounted to clean, bare surfaces on a metal bracket mounted to the vehicle frame (chassis).

- The use of a bracket welded to the frame is recommended.
- The area where the mounting bracket and frame connect should be free of all paint, dirt and oils. This will allow a solid bond between the frame and the IntelliCheck®3R and the socket housings.
- The mounting plate surface area under the lock washers and the nuts used for the mounting plate (for IntelliCheck®3R and the socket housings) should be clean and free of paint so that a good electrical contact is made to the housings.
- The IntelliCheck®3R and the socket housings should be mounted in an area that is centrally located to accommodate the plug connection from the loading rack.

2. Mechanical Installation

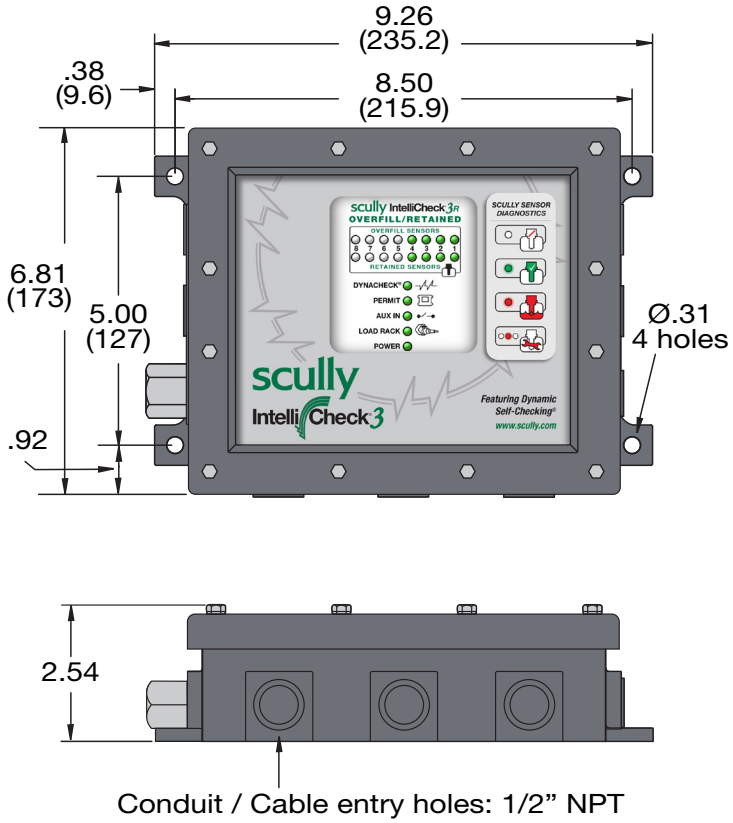
- The IntelliCheck®3R can be installed inside a tool cabinet on the side of the truck.
- The IntelliCheck®3R does not necessarily have to be located beside the socket housings, but mounted in an area that is visible to the operator as well as accessible to service personnel.
- Clearance around the module is needed for the installation of conduit entrance compression fittings used to secure the power and signal cables.
- It is important to remember that the connection of the socket housing to the frame should be a solid bond, less than 0.25 Ohm.

⚠ ***Warning:***

No drilling or welding to the tank's frame should take place without first consulting the tank manufacturer.

- The use of stainless steel mounting bolts and hardware is recommended (5/16" or M8).
- The housing should be placed over the area where the IntelliCheck®3R will be mounted and the mounting hole locations should be marked, aligning the drilled mounting holes for proper installation.

2. Mechanical Installation



2.2 Overfill Sensors Mounting

The SP-TO sensors should be mounted in each compartment to permit accessible, in-place testing after the initial installation is complete.

- Make sure that the sensor's sensing level is properly located in relationship to the Weights and Measures marker (if installed) in each compartment.
- Refer to the Sensor's installation instruction for guidance.

2.3 Retained Sensors Mounting

The SP-IR retained sensors should be mounted in each compartment.

- Refer to the sensor's installation instruction for guidance.

3. Electrical Installation

Note:
We strongly suggest the use of a Scully IntelliCheck®3R wiring installation kit. Wire installation kits include conductor cable, cable compression fittings, on/off switch, and crimp-on connectors. Depending on the number of vehicle compartments and sensor type, the conductor cable included in the installation kit will be either 100' 7-conductor or 200' 11-conductor.

Refer to the Appendix for detailed electrical connections. The diagrams illustrate wiring for a maximum of eight (8) compartments and IntelliCheck®3R output connections for both Two-Wire Optic (green) (called Thermistor) and Five-Wire Optic (blue) vehicle-mounted sockets.

- **Make sure to program the unit before connecting any sensors. See section 4 for programming.**
- Sensor connections to TB4 & TB5 need only consist of the actual number of compartment sensors installed.
- All wire splices should be made in the watertight sensor holder junction boxes to facilitate service replacement of sensors and to prevent premature wiring failures due to corrosion.
- Continuity of the compartment sensor wiring to the appropriate compartment designation at TB4 & TB5 must be maintained to aid in the ease of diagnosing system faults. The best way to do this is to use color-coded wires matching the wiring diagrams in the Appendix of this manual.
- To make wiring easier, remove the IntelliCheck®3R Electrical Module. Make note of the electrical GND wire to the mounting stud at the top of the electrical module. Remove the screws and the electrical module from the outside metal enclosure during this part of the installation and place it and the hardware in a safe place until needed.

⚠ ***Warning:***
Do not, under any circumstances, mix Intrinsically Safe (I.S.) with Non-Intrinsically Safe (Non I.S) wiring in the same cable/conduit entrance. Refer to Control Drawing 61667.

3. Electrical Installation

1. Remove all the plastic pipe plugs on the conduit entry ports of the IntelliCheck®3R. Seal plugs must be reinstalled for unused ports after wiring is completed. IntelliCheck®3R is designed to use a compression fitting for each port. After running the electrical cable/conduits pull all the necessary wires for the installation into the enclosure from the installed sensors, power, and any auxiliary devices such as hose interlock and valve shutoff connections to the appropriate ports. Leave about 5 inches (12.7cm) of wire in the enclosure. Do not strip or attach any wires at this time. If not using colored wires make sure to number each wire accordingly from each place and device as pulled.

On NPT threads, Gap is OK.

2. When all the wires are secure in the appropriate port, pack the fitting with an approved weather sealant or silicone RTV and tighten the compression fitting. This will fill air space that may allow condensation to enter the housing and corrode the wire contacts.

⚠ ***Warning:***
Do not gather and splice wires in the IntelliCheck®3R enclosure housing. Wire splices should be made in external watertight junction boxes.

Water Proofing:
To avoid future maintenance issues regarding water infiltration into the housing via the electrical cable/conduit entries, Scully strongly recommends the following precautions:

1. Long vertical cable/conduit runs into the sides of the enclosure should be minimized as they promote water channeling to the cable/conduit gland/seal fitting packing.

3. Electrical Installation

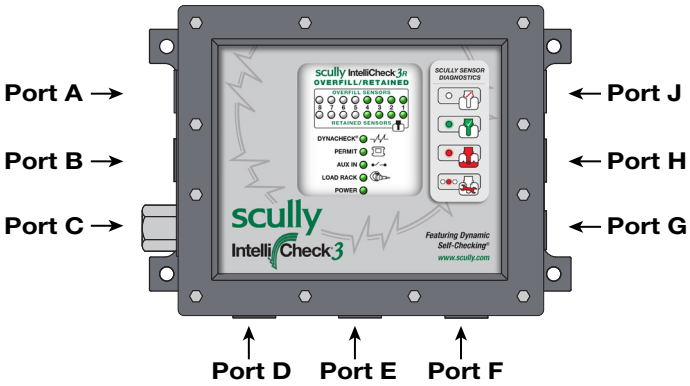
2. The cable/conduit glands on the sides of the enclosure should be very carefully installed, taking extra precaution to make certain that the installation is properly sealed (as required by code).

Note:
Most of the failures seen are because of water ingress into the earlier IntelliChecks®. The cause of this is poor or insufficient sealing of conduit openings. Scully provides wire cable and gland/seals parts and kits, which are matched to assure a seal.

A. North American Installations
To maintain NEMA 4 rating, all NPT threaded joints of Cable glands or conduit should be wrench tight.

B. European Installations
To maintain the IP65 ingress rating of the enclosure, the cable gland fittings at all entries to the enclosure should be equipped with a fiber washer or O-ring between the cable gland and the enclosure.

Note:
To prevent corrosion from making it difficult to remove a plug or cable gland, use a copper based or petroleum based anti-seize/sealant (2g tube included). Future changes, maintenance or upgrades to the equipment can be made easier if this step is performed.



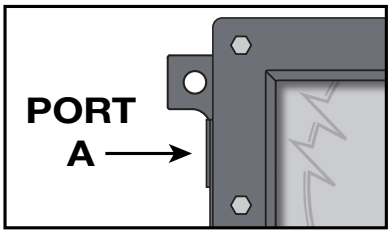
3. Electrical Installation

3.1 IntelliCheck®3 Power Wiring

Warning:

To ensure proper voltage and grounding, it is strongly recommended that the power and ground wires run directly from where the power and ground enter the trailer/vehicle. Do not rely, only, on mounting the Intellicheck®3R to the chassis to get a ground connection. If a fuse and or an optional power on/off switch is installed, they should be located in the truck Cab or close to where the power wire enters the trailer/vehicle and not in the hazardous area where the Intellicheck®3R is installed.

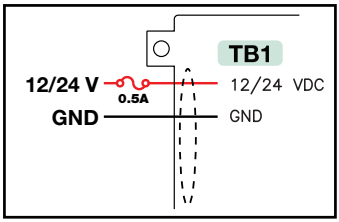
- Connect power to the module. We recommend the use of 1mm^2 (18-AWG) gauge wire or the Scully cable using only the red and black wires. (The Scully cable in 5, 7, and 11 conductors, all use the same cable gland.)
- Feed the cable through a compression fitting and insert through Port A on the IntelliCheck®3.



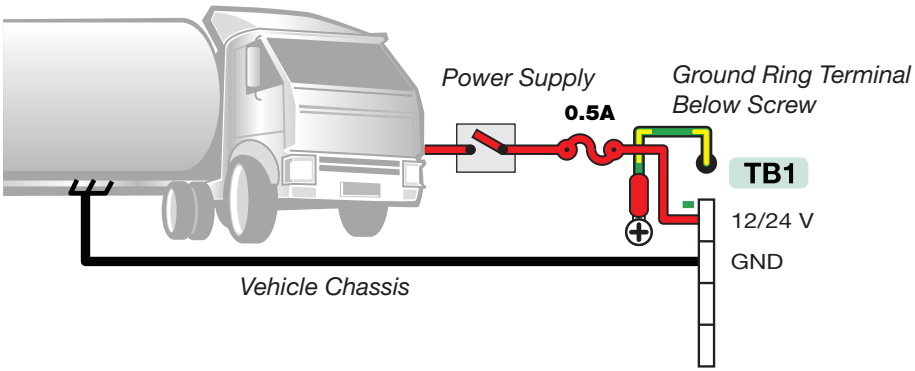
- Strip about 6mm (1/4”)off each end of the black and red wires.
- Insert the the stripped ends wires into TB1 as follows:

- Insert a small flat-blade screwdriver into the slot alongside the wire terminal port to open the retention spring.
- Insert the wire into the port.
- Remove the screwdriver and gently tug on the wire to ensure good retention.
- The Red wire must be connected to TB1-1, and the Black wire must be connected to TB1-2.

3. Electrical Installation



- On the IntelliCheck®3R, check that the Green with yellow stripe wire's ring terminal from TB1-3 is placed under the potted module's mounting screw.



- The use of an in-line fuse (supplied with the IntelliCheck®3R) between the vehicle power and the TB1 12/24 V is highly recommended.

Note:
The fuse should be located in a non-hazardous area or zone on the vehicle. This provides protection against a short in the wiring to the IntelliCheck®3.

- A 1/2-AMP fuse is recommended for the fuse connections. After making this connection, it is a good idea to use an Ohmmeter to make sure no short exists between 12/24V and GND of TB1.

3. Electrical Installation

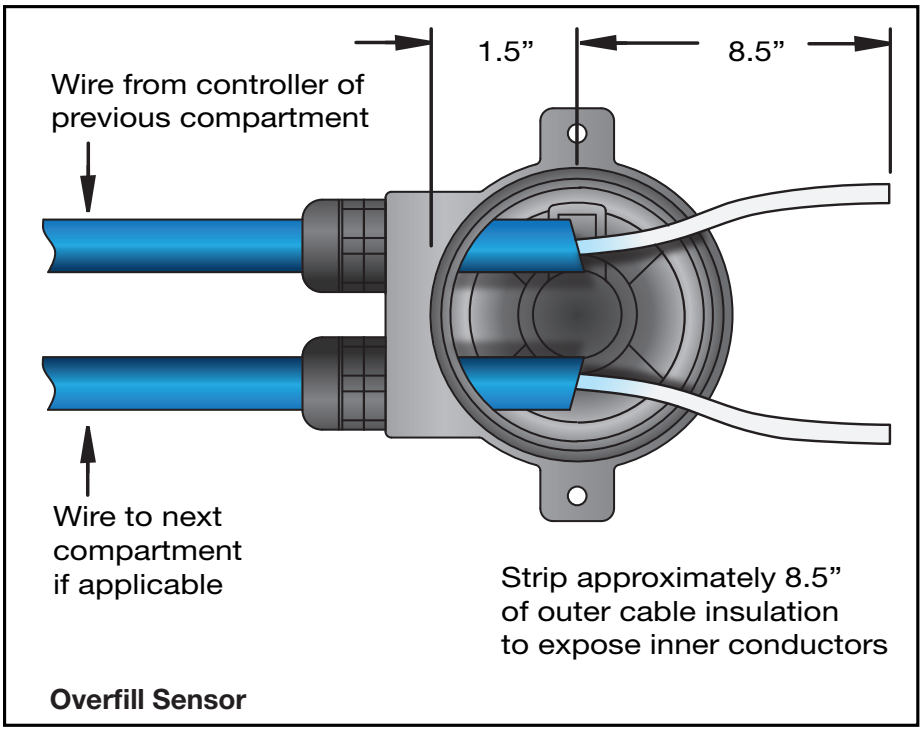
3.2 Truck Sensor Wiring - General

General wiring guidelines are presented here, for specific instructions please refer to the installation manual shipped with the sensors.

1. Connect a compression fitting to each conduit entrance hole on each sensor holder compartment, except compartment number 1. The compartment number 1 holder will only need a single compression fitting in one of the entrance holes, the other should be blocked-off with the supplied plug M20 x 1.5 plug (or 1/2" NPT). Measure the cable from holder-to-holder, taking into consideration that enough cable should be left at each end (approximately 25 cm (10")) for wiring.

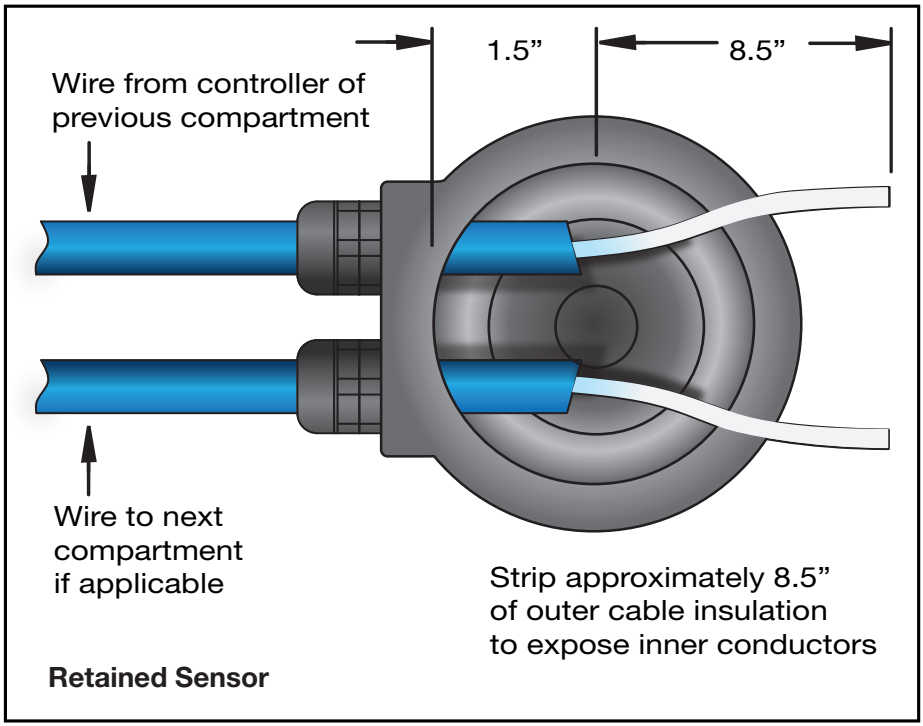
   Cables should be measured, to allow them to be brought out at right angles to the rollover rails.

Overfill Sensor Wiring Diagram



3. Electrical Installation

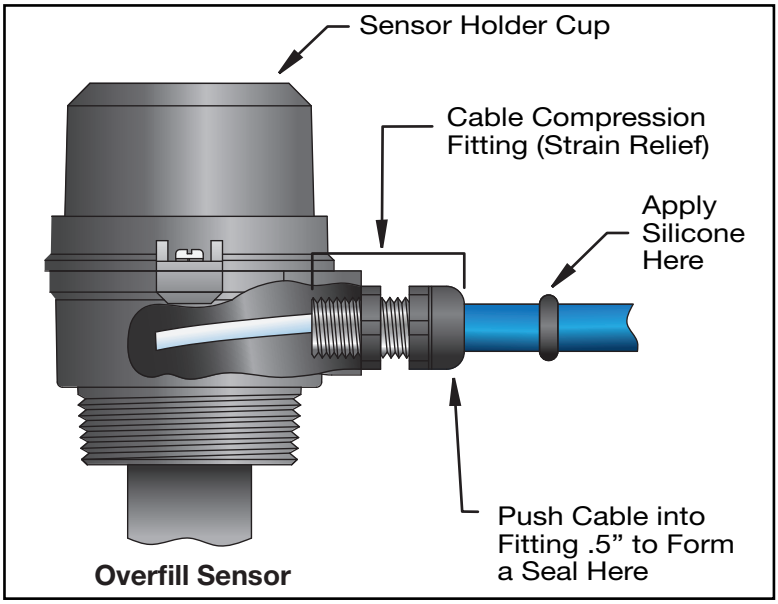
Retained Sensor Wiring Diagram

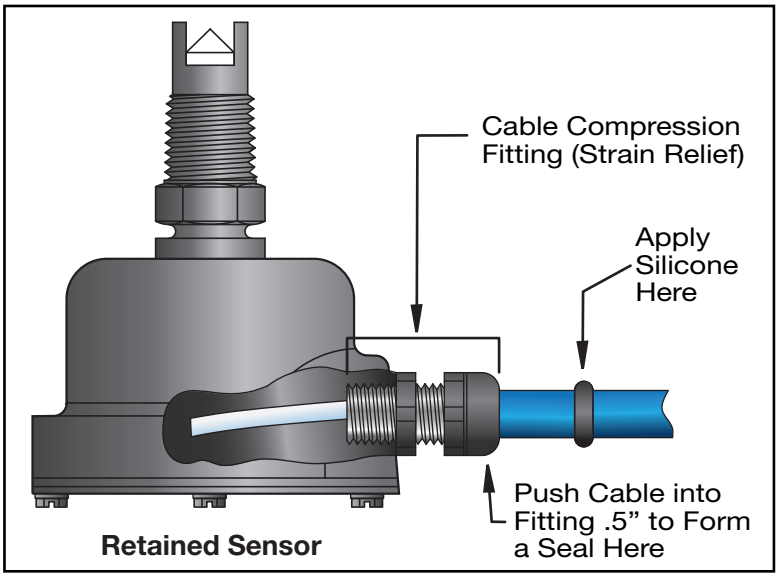


2. After the cable has been measured and cut for each run, strip back approximately 22 cm (8.5 inches) of the outer cable insulation, exposing the inner conductors, and feed the cable through the compression fittings and tighten. It is a good idea to apply a small amount of silicone RTV sealant to the outside of the cable before pushing it through the compression fitting. This will fill any small air space that may be left after tightening the compression fitting around the cable. This will also prevent condensation from seeping through. At the last compartment sensor, feed a length of the Scully cable down the back of the vehicle. Be sure to neatly anchor the cable as you go to the IntelliCheck®3R monitor.

3. Electrical Installation

Cable Sealing Diagram





4. On-Vehicle Programming

The IntelliCheck®3R Overfill / Retained Product Monitoring Unit is used when there are sensors installed in the top and bottom of the compartments. This unit will indicate prior to loading if there is product remaining in any of the compartments and will not let the loading begin until all compartments are empty or the Retained Timer switch is pressed. There must be one overfill and one retained sensor per compartment when wiring the Overfill / Retained system unless the installation is a Retain Only configuration.

The IntelliCheck®3R unit MUST be programmed for the number of sensors installed before it can be properly used. This must be done before the sensor wires are attached.

Note:
The IntelliCheck®3R Overfill / Retained unit is pre-programmed at the factory for operation with 8 Scully SP-TO Two-Wire Optic Overfill Sensors and 8 Scully SP-IR Retained Sensors.

This following procedure assumes that you have installed the IntelliCheck®3R System on the tanker or trailer and are ready to apply power to the unit. For safety reasons, the IntelliCheck®3R can only be OVP (On-Vehicle Programming) programmed a limited number of times in the field (maximum of 7 times). Be careful to follow the programming steps. Once the unit reaches the maximum program limit (7) it will be locked to that setting and can not be reprogrammed again. In order to reset it back to default it will need to be returned to Scully Signal Company.
Call Scully's Technical Service Department at 1-800-272-8559 or 617-692-8600 for details.

⚠ ***Caution:***
Before applying DC battery power to the unit, ensure that the polarity of the Voltage supplied to TB1 is correct.

4. On-Vehicle Programming

To check the Voltage:

1. Remove the power leads from TB1. Ensure that neither wire is in contact with the chassis.

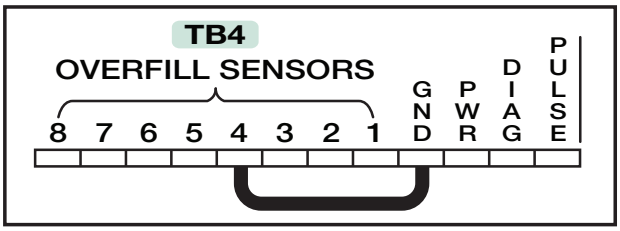
2. Turn on the DC power. Use a multi-meter and select a scale to read up to 40 Volts DC. Touch the negative test lead to the chassis. Connect the other test lead to the wire which will connect to the TB1 12/24 V terminal. If the meter reads +11.5 to +32 Volts DC, turn off the power and re-connect the wires to TB1.

4.1 Two-Wire Overfill and Retain Sensor Programming

Example of programming a 4 compartment, Two-Wire Sensors system.

1. Turn off power to the unit. Ensure no sensors are wired to TB4 or TB5.

2. Attach a jumper wire from TB4-GND to the overfill sensor TB4 terminal which equals the number of compartments in the tanker (black wire using the programming jumper).
   For instance, when programming for a 4 compartment tanker, install a jumper wire from TB4-GND to TB4 Terminal 4.



Example of programming for a 4 compartment Overfill / Retained vehicle using Scully's Two-Wire Optic Sensors.

3. Apply power to the IntelliCheck®3R.

4. On-Vehicle Programming

4. For this example, the indicator lights representing both Overfill / Retained configured sensors (1,2 and 3) will be flashing synchronously, alternating between red and green, with the indicator light representing the highest configured sensor (4) flashing at twice the rate of the other configured sensors. All remaining sensor indicator lights (5 through 8) will be off. The Dynacheck, Permit, Aux In, and Power indicator lights will be steady green. The Load Rack light will be red.

Note:
The fast flashing LED should match whatever sensor has the program jumper attached.

5. Leave the unit powered up for approximately 10 seconds. Then remove power from the IntelliCheck®3R and remove the programming jumper.

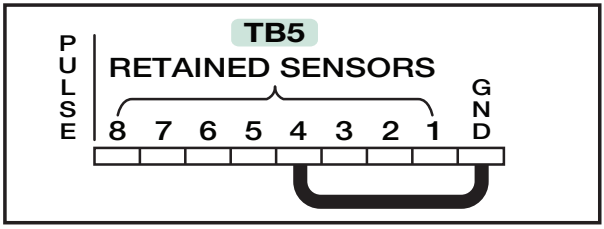
6. Continue to the Two Wire Sensor Wiring Installation per section 5.1.

After all the connections to the module are made, apply a small amount of white lube or non-conductive grease to all of the connections at TB1, TB2, TB3, TB4, TB5, TB6 and TB7 (if used) to prevent corrosion.

4.2 Two-Wire Retain Only Sensor Programming
Example of programming a 4 compartment, Two-Wire Sensors system.

1. Turn off power to the unit. Ensure no sensors are wired to TB4 or TB5.
2. Attach a jumper wire from TB5-GND to the retain sensor TB5 terminal which equals the number of compartments in the tanker (black wire using the programming jumper).
   For instance, when programming for a 4 compartment tanker, install a jumper wire from TB5-GND to TB5 Terminal 4.

4. On-Vehicle Programming



Example of programming for a 4 compartment vehicle using Scully's Two-Wire Optic Sensors in PARALLEL

3. Apply power to the IntelliCheck®3R.

4. For this example, The the retained indicator lights representing configured sensors (1,2 and 3) will be flashing synchronously, alternating between red and green, with the indicator light representing the highest configured sensor (4) flashing at twice the rate of the other configured sensors. All remaining sensor indicator lights (5 through 8) will be off. The Dynacheck, Permit, Aux In, and Power indicator lights will be steady green. The Load Rack light will be red.

Note:
The fast flashing LED should match whatever sensor has the program jumper attached.

5. Leave the unit powered up for approximately 10 seconds. Then remove power from the IntelliCheck®3R and remove the programming jumper.

6. Continue the electrical installation per section 5.2.

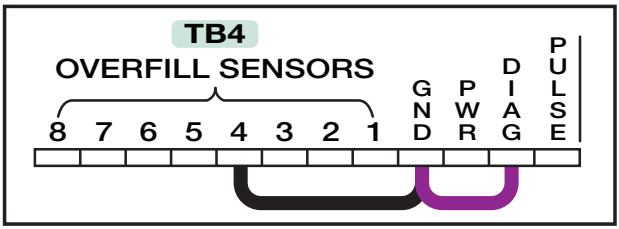
After all the connections to the module are made, apply a small amount of white lube or non-conductive grease to all of the connections at TB1, TB2, TB3, TB4, TB5, TB6 and TB7 (if used) to prevent corrosion.

4. On-Vehicle Programming

4.3 Five-Wire Overfill / Two-Wire Retain Sensor Programming

Example of a 4 compartment Five-Wire series Overfill and Two-Wire Retain sensors

1. Turn off power to the unit. Ensure no sensors are wired to TB4 or TB5
2. Install a jumper from TB4-GND terminal to the DIAG terminal (purple wire using the programming jumper).
3. Attach a jumper wire from TB4-GND to the overfill sensor TB4 terminal which equals the number of compartments in the tanker. For instance, when programming for a 4-compartment tanker, install a jumper wire from TB4-GND to TB4 Terminal 4 (black wire using the programming jumper), and the jumper wire from TB4-GND to TB4-DIAG (purple wire using program jumper.)



Example of programming for a 4 compartment vehicle using Scully's Five-Wire Optic Sensors wired in SERIES with Two-Wire Optic Retain sensors wired in PARALLEL

4. Apply power to the IntelliCheck®3R.
5. For this example, the indicator lights representing both Overfill / Retained configured sensors (1,2 and 3) will be flashing synchronously, alternating between red and green, with the indicator light representing the highest configured sensor (4) flashing at twice the rate of the other configured sensors. All remaining sensor indicator lights (5 through 8) will be off. The Dynacheck, Permit, Aux In,and Power indicator lights will be steady green. The Load Rack light will be red.

4. On-Vehicle Programming

Note:
The fast flashing LED should match whatever sensor has the program jumper attached.

6. Leave the unit powered up for approximately 10 seconds. Then remove power from the IntelliCheck®3R and remove the programming jumper.
7. Continue the electrical installation per section 5.2.

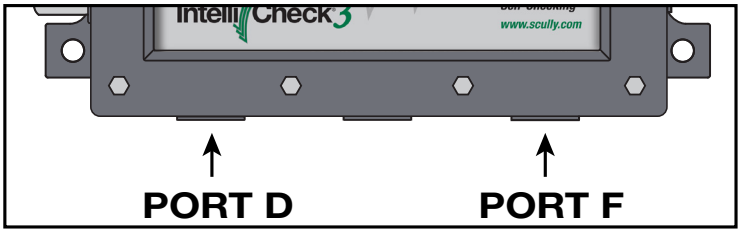
After all the connections to the module are made, apply a small amount of white lube or non-conductive grease to all of the connections at TB1, TB2, TB3, TB4, TB5, TB6 and TB7 (if used) to prevent corrosion.

4.4 On-Vehicle Programming Jumper Summary Table

Sensor	Jumper 1	Jumper 2
Two-Wire Overfill / Retain	GND to TB4 Highest Compartment Number	None
Two-Wire Retain Only	GND to TB5 Highest Compartment Number	None
Five-Wire Overfill / Two-Wire Retain	GND to TB4 Highest Compartment Number	GND to DIAG

5. Sensor Wiring

- Feed the cable through the bottom left-hand corner compression fitting (Port D & F) to allow approximately 12.5 cm (5 inches) of cable into the IntelliCheck®3R housing.

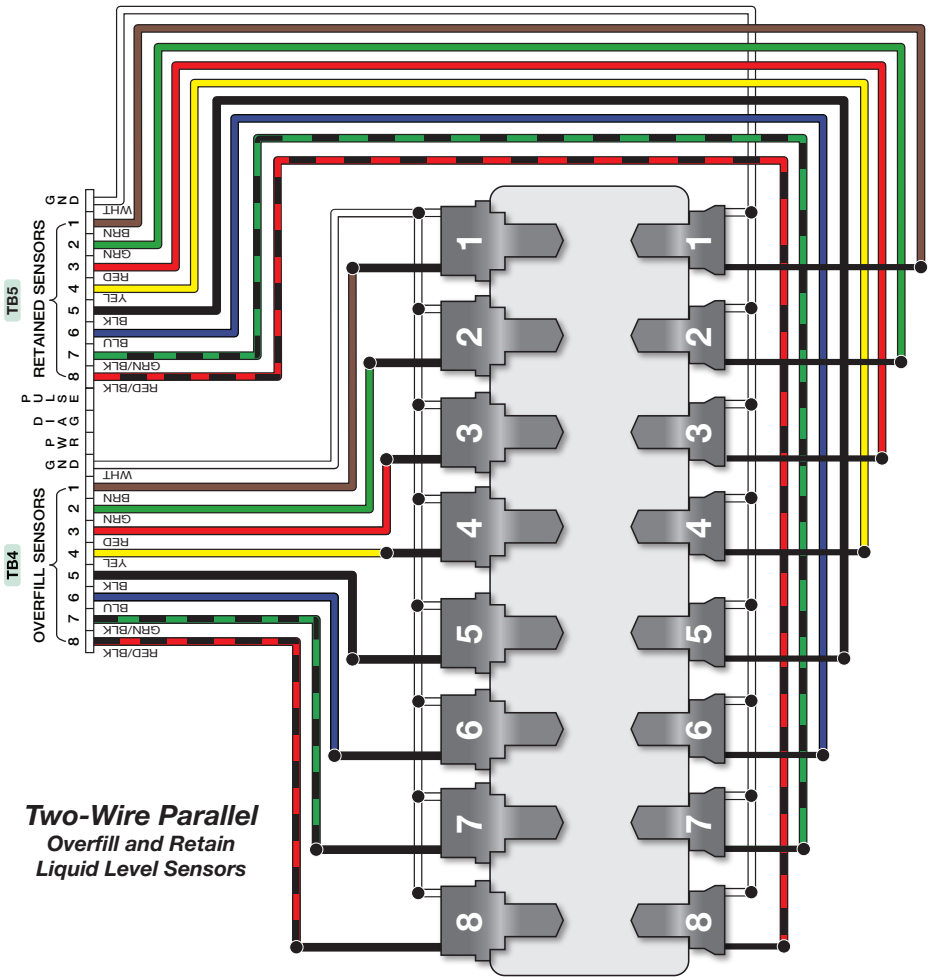


- Strip back 10 cm (4 inches) of the outer insulation, exposing the color-coded wires inside.
- Do not tighten down the compression fittings until you have made the appropriate wiring connections as detailed in the wiring diagram at the end of this manual.

5. Sensor Wiring

5.1 Two-Wire Overfill and Retain Sensor Wiring

1. Connect all configured sensors to TB4 and TB5 per drawing below (Full configuration of 8 compartments is shown for reference).
2. Turn on Power.
3. If necessary, correct any sensor wiring problems or faults shown by the compartment indicators.
   (refer to Operations Section)

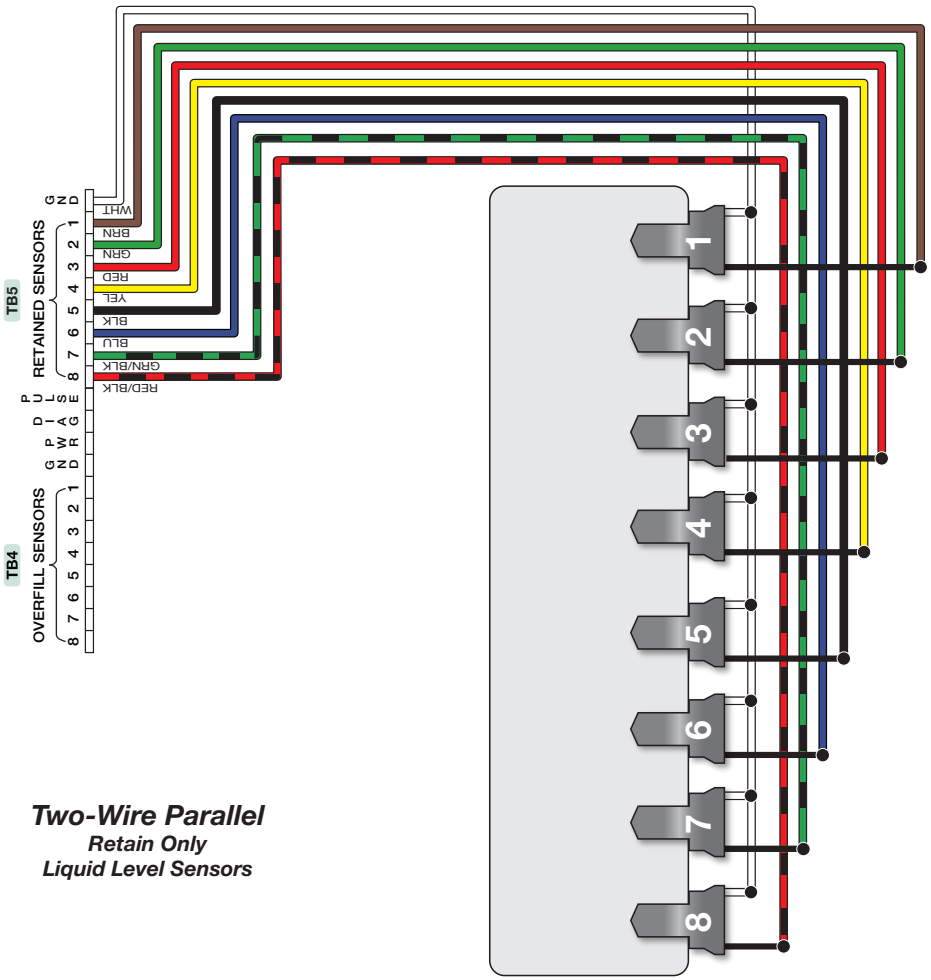


Two-Wire Parallel
Overfill and Retain
Liquid Level Sensors

5. Sensor Wiring

5.2 Two-Wire Retain Only Sensor Wiring

1. Connect all configured sensors to TB5 per drawing below (Full configuration of 8 compartments is shown for reference).
2. Turn on Power.
3. If necessary, correct any sensor wiring problems or faults shown by the compartment indicators. (refer to Operations Section)

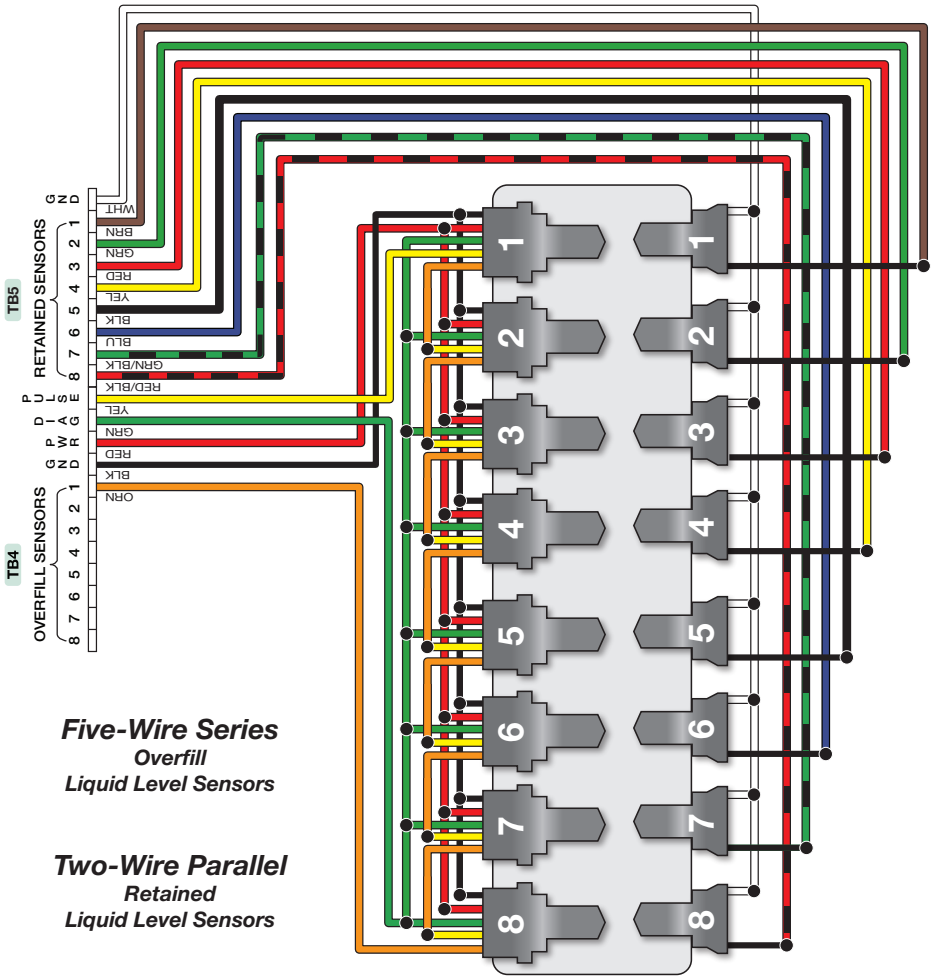


Two-Wire Parallel
Retain Only
Liquid Level Sensors

5. Sensor Wiring

5.3 Five-Wire Series Overfill / Two-Wire Parallel Retained Sensor Wiring

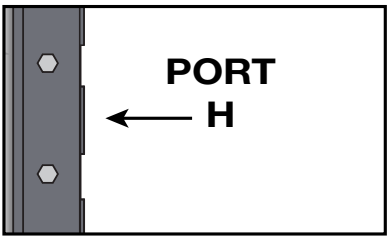
1. Connect all configured sensors to TB4 and TB5 per drawing below (Full configuration of 8 compartments is shown for reference).
2. Turn on Power.
3. If necessary, correct any sensor wiring problems or faults shown by the compartment indicators.
   (refer to Operations Section)



6. Socket & Switch Wiring

Refer to the Appendix for the wiring diagram and for wiring port location. Port H is for the Five-Wire Optic and Two-Wire Optic socket connection.

- Remove all the pipe plug(s) along the right side conduit entry ports of the IntelliCheck®3.
- Install compression fitting in Port H.

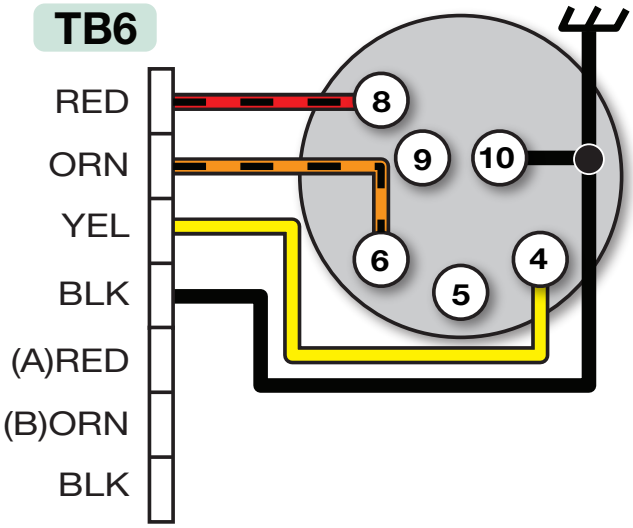


- Feed the Scully cable through a compression fitting for each socket into Port H. Leave about 3 inches of extra cable inside the IntelliCheck®3R housing for connection and future service.
- Run the cable(s) to the socket(s), anchoring the cable in a neat fashion where needed.
- Install a compression fitting into one of the conduit entrance holes that will best suit the installation.
- Feed the cable through a compression fitting approximately 5 inches (12.7cm) into the socket housing.
- Strip back the cable insulation cover to expose the color-coded wires.

6. Socket & Switch Wiring

6.1 Five-Wire Optic Connection

Rear View SJ-6SO or SJ-6W

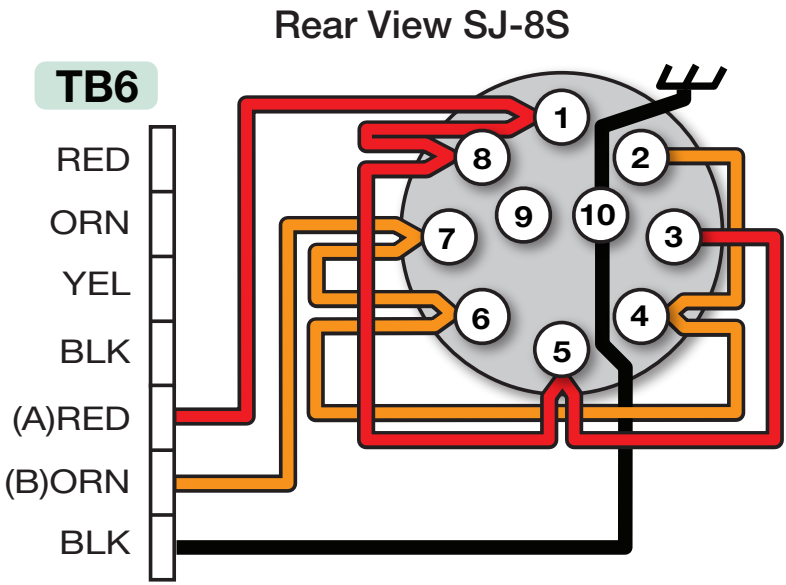


Pin 9 for both sockets is for Ground Bolt if so equipped

- Connect the cable wires by their appropriate color to the corresponding pin numbers of the socket according to the socket style and type, Five-Wire Optic or Two-Wire Optic (Thermistor).
- To make pin connections, strip about 6mm (1/4") off each cable lead exposing the wire inside.

6. Socket & Switch Wiring

6.2 Two Wire Optic (Thermistor) Connection



Pin 9 for both sockets is for Ground Bolt if so equipped

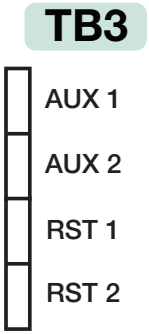
- Loosen the pin set screw. Slip the exposed wire into the pin and tighten the set screw.
- As previously recommended, apply a small amount of silicone RTV sealant around the outside of the cable before pulling it through all the way. This will fill air space that may allow condensation to enter the housing and corrode the wire contacts.
- Tighten all compression fittings.
- At the IntelliCheck®3, connect the socket leads by their appropriate color.
- To make the connection, strip about a 6mm (1/4") off each cable lead.
- Slip the exposed wire into the corresponding number pin of TB6.

Note:
Refer to Appendix for additional wiring diagrams.

6. Socket & Switch Wiring

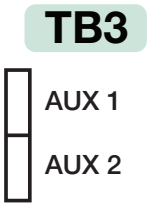
6.3 Reset Switch (Retain Acknowledge Override Button)

For retained operations, a reset switch is connected via Port C to TB3 pins 3 & 4. This is used to acknowledge and override any compartment retain indicator. This ishould only done when the operator is sure there is no product in the compartment or the operator will not be filling that compartment. (See General Information about the retain operations).



6.4 Auxiliary Switch Input

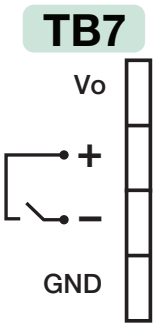
There is an Intrinsically Safe (I.S.) auxiliary switch input available. A new factory unit includes a factory-installed jumper across the two terminals. If the jumper is removed, the AUX IN indicator illuminates and the IntelliCheck®3R system will not permit loading. This switch input can be used for end-user supplied switch inputs. For instance, a normally-open vapor recovery hose interlock switch could be connected to the terminals. Using this input, the IntelliCheck®3R unit will not permit until the vapor recovery hose is connected to the vehicle. The Auxiliary Input can connect to multiple inputs by simply connecting all of these devices in series.



6.5 Non Intrinsically Safe (Non I.S.) Relay Output

⚠ *Do NOT under any circumstances mix Intrinsically Safe (I.S.) with non-Intrinsically Safe (non-I.S.wiring).*

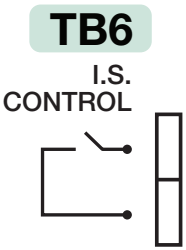
The IntelliCheck®3R provides a relay contact output on TB7 that can be used to drive a non-Intrinsically Safe load. The output can be used to switch a sole-noid valve or another external relay (limit of 2 AMPs). Contact the factory for specifc applications.



6. Socket & Switch Wiring

6.6 Intrinsically Safe (I.S.) Relay Output

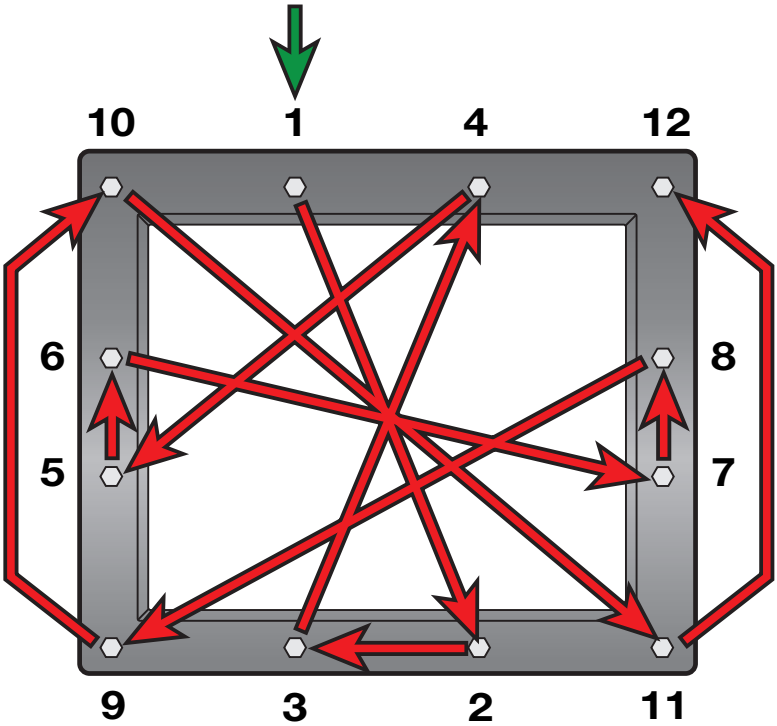
⚠ *Do NOT under any circumstances mix Intrinsically Safe (I.S.) with non-Intrinsically Safe (non-I.S.wiring).*



The IntelliCheck®3R provides a relay contact output on TB6 that can be used to drive a Intrinsically Safe load. The output can be used to switch a solenoid valve or another external relay (limit of 2 AMPs). Contact the factory for specifc applications.

7. Cover Tightening

After all the connections to the module are made, apply a small amount of white lube or non-conductive grease to all of the connections at TB1, TB2, TB3, TB4, TB5, TB6 and TB7 (if used) to prevent corrosion.



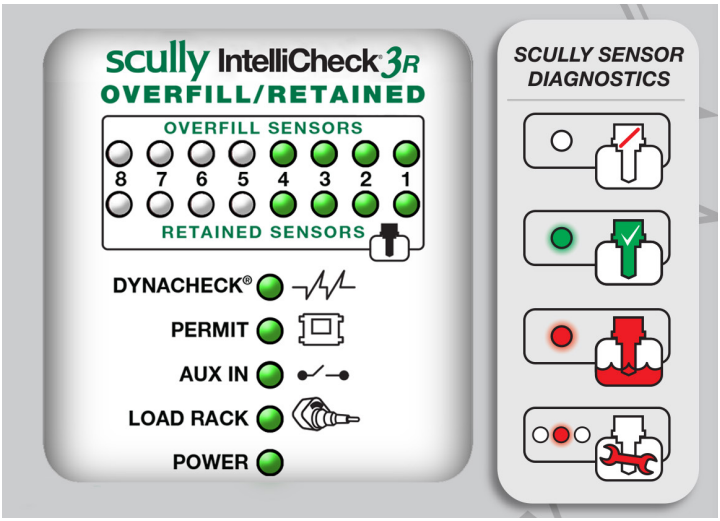
Torque Sequence

Place the gasket, window and cover onto the enclosure housing and lightly tighten all twelve stainless steel hex bolts with lock washer. Repeat by firmly and evenly tightening to approximately 1.6 N-m (14 inch lbs) per bolt.
Do not over tighten. Do not use an impact wrench.

8. Operations

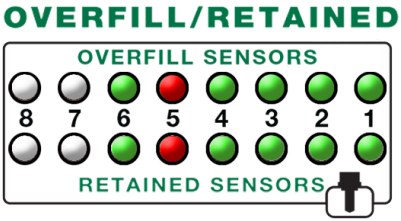
8.1 Sensor Diagnostics

Each sensor has an indicator light for its status located horizontally across the top of the module, behind the clear window of the housing. A quick reference for sensor diagnosis is listed on the outside cover. (Not only does the indicator show the status of a sensor condition, wet or dry, it also gives the sensor connection fault status and sensor operation fault indication as well.) The diagnostic indicators allow the user to diagnose any IntelliCheck®3R System problem quickly and efficiently without having to take Voltage or resistance readings to locate a fault.



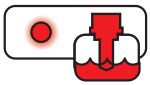
8. Operations

The OVERFILL / RETAINED SENSOR indicator light conditions are as follows: *(programmed for 6 compartments)*

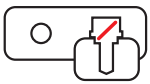


• **Green Light On** - Sensor is operating normally. (In this state, the **GREEN** permit indicator is on and the **DYNACHECK®** indicator is flashing.)

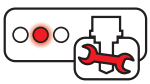
• **Red Light On** - Sensor is immersed in product. (In this state, the permit indicator is **RED** and the **DYNACHECK®** indicator is flashing.)



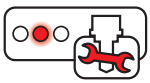
• **Light is OFF** - Sensor was not programmed to exist during OVP (On Vehicle Programming). (In this state, the **GREEN** permit indicator is on and the **DYNACHECK®** indicator is flashing.)



• **Red Light Is Flashing Slowly** (as compared to the **DYNCHECK®** Indicator) -The sensor return line connection is open. (In this state, the permit indicator is ***R*ED** and the **DYNACHECK®** indicator is flashing.)

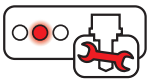


• **Red Light Is Flashing At Medium Speed** (equal to the **DYNACHECK®** Indicator) -The sensor circuitry is faulty. (In this state, the permit indicator is **RED** and the **DYNACHECK®** indicator is flashing.)



8. Operations

• **Red Light Is Flashing Fast** (as compared to the **DYNACHECK®** Indicator) -The sensor return line is shorted to ground or another return signal line. (In this state, the permit indicator is **RED** and the **DYNACHECK®** indicator is flashing.)

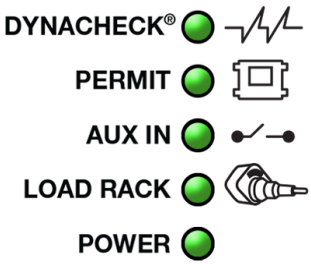


LED Status	Indication	Permission
○○○○○○○○○○○○	No Sensor Present	-
●●●●●●●●●●●●	Dry Sensor	Permit
●●●●●●●●●●●●	Wet Sensor	No Permit
●○○●○○●○○●○○	DYNACHECK® *(Constant Blink Rate)*	-
●○○●○○●○○●○○	Sensor Circuit Faulty *(Equal to DYNACHECK® Blink Rate)*	No Permit
●○○○○○●○○○○○	Sensor Return Line Open *(Slower than DYNACHECK® Blink Rate)*	No Permit
●○●○●○●○●○●○	Sensor Return Line Shorted to Ground *(Faster than DYNACHECK® Blink Rate)*	No Permit

(time ⟶)

Flashing = DYNACHECK® rate
Flashing Slow = ½ Dynacheck® rate
Flashing Fast = 2x Dynacheck® rate

8.2 IntelliCheck®3R System Diagnostics



8. Operations

The IntelliCheck®3R controller has diagnostic indicators that report on several aspects of system operation. These diagnostics are:

• **DYNACHECK®**- When this **GREEN** indicator is pulsing, the IntelliCheck®3R module is functioning. The pulsed indication signifies the IntelliCheck®3R System and its module are self-checking. Should the module indicate a faulty sensor, the **DYNACHECK®** indicator will continue to pulse as it constantly self-checks all other system components for proper operation. If not pulsing, than a fault exists or LED is burned out.

• **PERMIT -** When this indicator is **GREEN** the IntelliCheck®3R System is indicating a permissive state to the loading rack terminal equipment.

When this indicator is **RED** loading of the truck is not permitted.

• **AUX IN** - This indicator gives status of auxiliary switches or connections made to the IntelliCheck®3R System to satisfy loading operation requirements. When this indicator is **GREEN** it indicates that there is a closed circuit between the AUX terminals.

If this light is **RED**, an external switch connected between these terminals is open, and Permit will not be allowed (Non-Permit).

9. Control Drawing

• **RACK** - This indicator gives the status of connection to the loading rack controllers. The indicator is **GREEN** when connected to a loading rack controller.

The indicator is **RED** when not connected to a loading rack controller.

• **POWER -** This indicator gives status of power to the IntelliCheck®3R. If this light is **GREEN**, it indicates a proper IntelliCheck®3R internal Voltage for proper sensor operation,

if trhis indicator is **RED**, all sensors are turned off and IntelliCheck®3R goes non-permit.

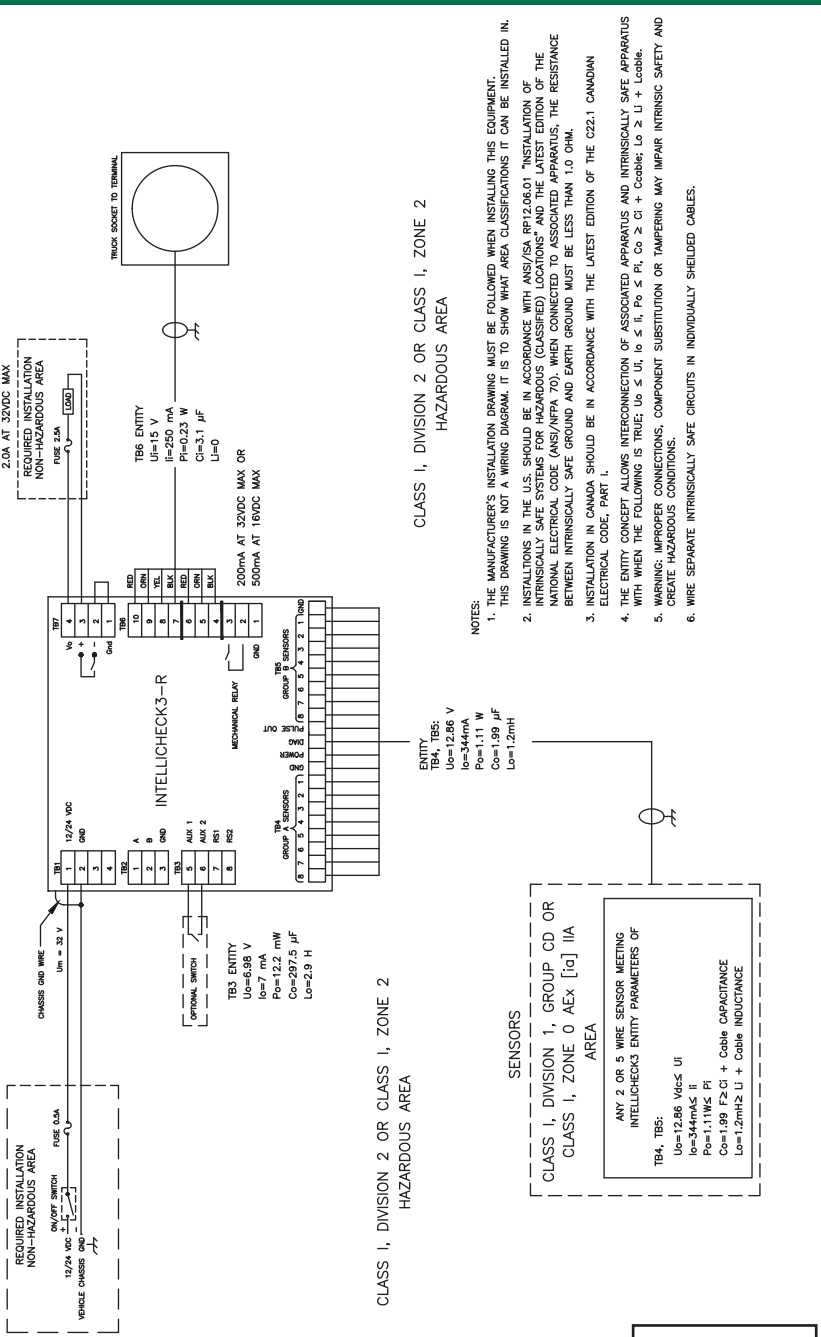
Note:

Failures such as broken or shorted wires, electronic component failures or intermittent connections, on the sensors will not allow the system to operate (non-permit) properly when connected to the loading rack controller. Steps should be taken using the previous information or the troubleshooting guide to determine the area of fault and to take corrective action.

8.3 Technical Service

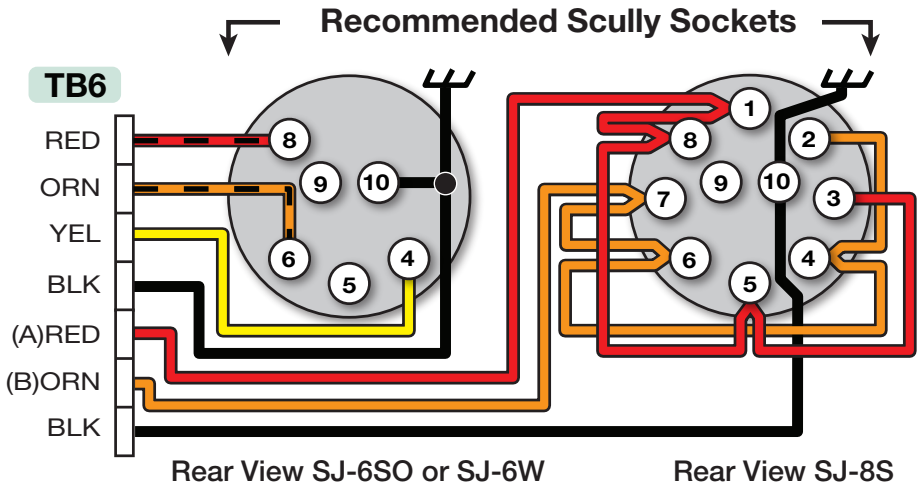
If for any reason a fault is not detected, but the vehicle still has problems loading, call Scully's Technical Service Department in the United States and Canada, at **1-800-272-8559**, 24 hours per day. Be sure to have the results of the tests you have conducted when you call for assistance.

9. Control Drawing

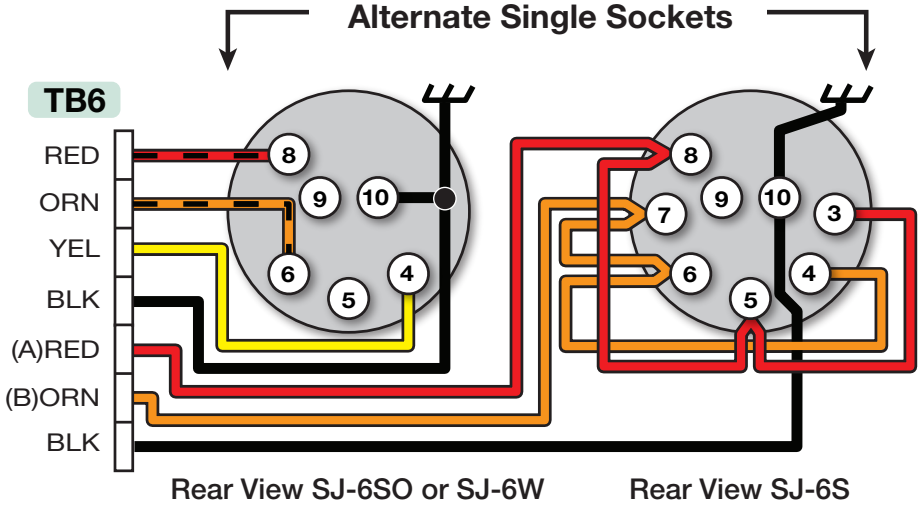


61667 Rev E

10. Appendix

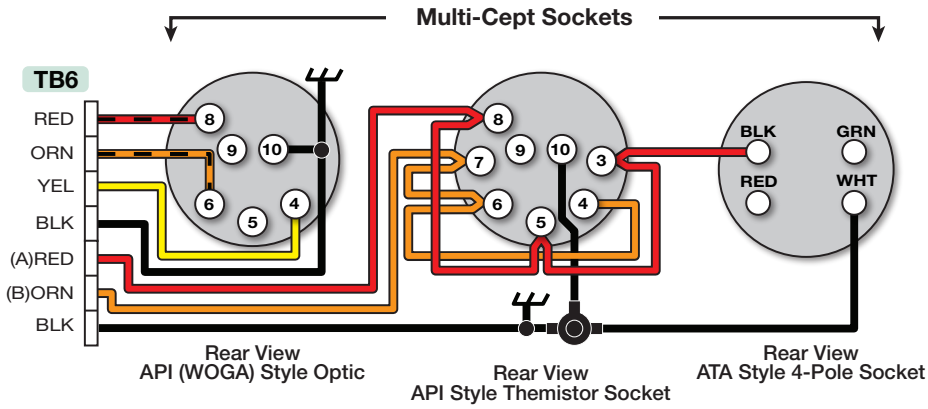


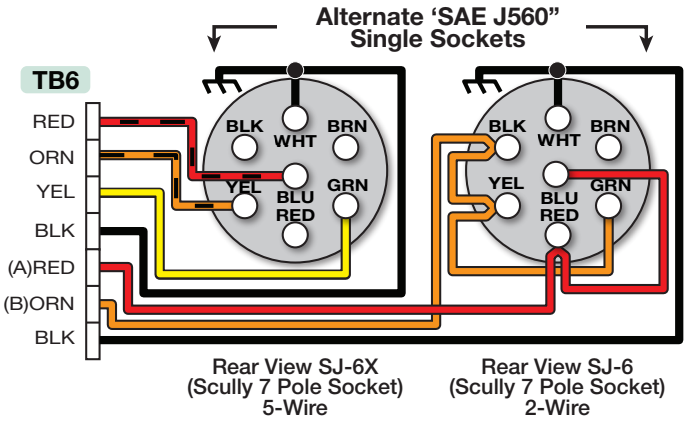
Pin 9 for both sockets is for Ground Bolt if so equipped



Pin 9 for both sockets is for Ground Bolt if so equipped

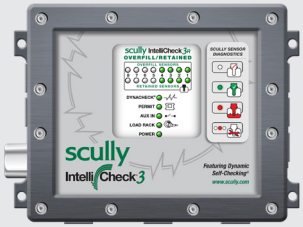
10. Appendix


Multi-Cept Sockets
TB6
RED
ORN
YEL
BLK
(A)RED
(B)ORN
BLK
8
9
10
6
5
4
7
3
BLK
GRN
RED
WHT
Rear View
API (WOGA) Style Optic
Rear View
API Style Themistor Socket
Rear View
ATA Style 4-Pole Socket


Alternate 'SAE J560"
Single Sockets
TB6
RED
ORN
YEL
BLK
(A)RED
(B)ORN
BLK
BLK
WHT
BRN
YEL
BLU
RED
GRN
Rear View SJ-6X
(Scully 7 Pole Socket)
5-Wire
Rear View SJ-6
(Scully 7 Pole Socket)
2-Wire

11. Parts List

COMPLETE ASSEMBLY

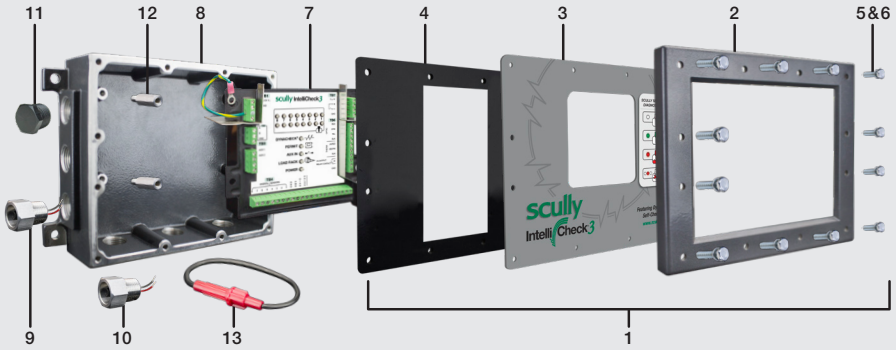


Part Number	Description
09566	Intellicheck®3 Overfill / Retained Monitor

UPGRADE KIT

Part Number	Description
09585	Intellicheck®3-R Upgrade Kit, Overfill / Retained

REPLACEMENT PARTS



Item	Part Number	Description	Qty
1	09575	Cover Assembly (includes items 2 through 6)	1
2	32600	Cover	1
3	38041	Window	1
4	92000	Gasket, Cover	1
5	50151	Screw, Hex Head, 10-24 x 3/4", Stainless Steel	12
6	51122	Lockwasher, Split, #10, Stainless Steel	12
7	09567	Replacement Module, Overfill & Retained	1
8	32599	Base, 1/2” NPT Conduit Entries	1
9	31820	Switch Assembly N.O.	1
10	32365	Test Switch N.C.	1
11	50796	Pipe Plug, 1/2" NPT	8
12	31842	Standoff, Male-Female, 5/16" Hex, 10-32 x 7/8" Lg., Aluminum	4
13	26425	Fuse and Holder, In-Line, 1/2 AMP	1
	26427	Fuse Only	1

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For over eighty-five years Scully has been engineering and building products to the highest safety and reliability standards. We design and manufacture all of our systems under one roof to ensure complete quality control over our manufacturing and testing operations.

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