Leading the Way in Tank Truck Equipment Innovation Worldwide
REAL WORLD. REAL SOLUTIONS

Overfill System Training
**TYPICAL TRAILER SYSTEMS**

- **Straight Systems**
  - Two Wire Optic (“Thermistor”) Straight systems
  - Five Wire Optic Straight Systems (Typ. West Coast)
    - Sensors *must match* the Rack Monitor’s signals

- **Onboard Monitor (OBM) Systems**
  - Have an “Onboard Monitor” (sensor controller) to run Sensors & Provide for Aux. Inputs
  - Has outputs that provides wet / dry “sensor signals” to *emulate* each type Rack Monitor’s needs
  - Loads at any rack with the correct matching socket
STRAIGHT “THERMISTOR” SYSTEM

2-Wire Optic
Overfill Sensors
1 per Compartment
(1 to 6 Comp. Trailers)

1920-5
Dummy
(needed if <6 Compts.)

4401-4401 API “Thermistor”
Socket (4 J-Slots)

7-Wire Cable from Sensors to Socket
API Green Label & 4 J-Slot Socket

- A “parallel wired” system – each sensor independently operated & wired
  - Sensor stands alone and is not affected by other sensors
    • An important point to remember!!!
- Can be “straight’ wired system (diagram next page)
  - If wired as straight system a “dummy” is needed in the socket for the un-used compartments
  - Loading Rack Monitors want to always see 6 (USA) or 8 (Canada) total dry sensors in order to give permit to load
- Newer Onboard Monitors typically use 2-Wire Optic Sensors
Parallel wiring of each sensor to socket (or onboard monitor)

- All 6 “channels” of rack monitor must be satisfied (8 in Canada).
- Un-used “channels” require a dummy or other means to mimic a dry sensor must match the rack’s operating signals.
- Onboard Monitors deal with “un-used” probes in different ways.
STRAIGHT API “OPTIC” SYSTEM

4100-4100 API Optic Socket (3 J-Slots)

5-Wire Optic Overfill Sensors
1 per Compartment (1 to 6 Comp. Trailers)

5-Wire Cable from Sensors to Socket
API Blue Label & 3 J-Slot Socket

- What the API Standard calls “Optic” Sensors are the 5-Wire type
- A “series wired” system – each sensor linked to previous one (gets its signal to work from it…)
  - Sensor operating signal stops at first wet sensor
    - An important point to remember!!!
- Can be “straight’ wired system (diagram next page)
  - Rack Monitor (or OBM) only sees a dry status from last sensor
- Common on West Coast (west of Rockies) & on some older Onboard Monitor Systems (Civacon “Liberty” & Scully “Load-Anywhere” Models)
Series wiring of each sensor to next sensor

- “Return” (dry) signal from last sensor satisfies rack monitor or OBM.
- Only first wet sensor is detected / displayed by a 5-wire onboard monitor.
“ONBOARD MONITOR” SYSTEM

2-Wire Optic Overfill Sensors
1 per Compartment
(1 to 6 Comp. Trailers)

7-Wire Cable from Sensors to Socket

OPTIONAL

3202-3202 Onboard Monitor
4401-4401 “Therm.” Socket
4100-4100 “Optic” Socket
4820R Dual Socket (pre-wired)
Sensor Installation Depth

- Why is sensor depth so important?
  - Overfill detection sensors are the trailer’s secondary shutdown system!
    - Set too low and they become the “primary” or become a nuisance!
    - Set too high and they won’t do their job correctly.
- What factors determine proper depth?
  - Rack’s pumping speed & time to “zero” flow condition.
- How to set the proper sensing depth.
  - Shell full volume – 60 Gal. = depth (min.) for sensor.
  - Sensor should also be set ¼” – ½” above the normal maximum capacity.
OVERFILL SENSOR INSTALLATION

Above Figure from RP-1004 (2003) used with permission from the API
• **Wire Crimping Tips**
  
  • Poor electrical connections = intermittent or non-working systems!
    - Can’t stress this enough!!!
  
  • Many non-working systems can be traced to poor crimping techniques.
    - We get back many perfectly good sensors that were “fixed” when the new one was installed!
OVERFILL SENSOR INSTALLATION

• Hand Crimp Tool versus Ratchet Crimp Tool

Typical Hand Crimp Tool - Does NOT provide a consistent, quality crimp!

Typical Ratchet Crimp Tool - Positive action = crimp not completed until proper!

About $10

Usually <$50
OVERFILL SENSOR INSTALLATION

• Protection Against Corrosion

  – Keep out moisture, the primary source of corrosion!
    NO Moisture = long, trouble-free service life!
  – Use an electrical wire compound like those shown, or a “non-acid based” Silicone Sealant.
    Beware of generic silicon sealants!!!
      – Acetic Acid based curing process
        WILL corrode the wires quickly!
        (if it smell like vinegar – don’t use)
      – Always look for “sensor-safe, safe for electronics (has an alcohol smell)
• **Cable Jacket Stripping Tips**
  – RULE #1.... Don’t Nick Inner Conductor Insulation!!!
    Don’t use utility knives!!!
    Invest in a Cable Jacket Cutter!
    Cuts only partially through the jacket & break the rest.
Basic Troubleshooting

- Get in the right frame of mind...
  - “Think like a 2-wire probe!!! (I’m \textit{parallel} wired)
  - “Think like a 5-wire probe!!! (I’m \textit{series} wired)
- Use a simple Beeper Tester like the Civacon 1391.
  - “It can “see” the pulsing probe signals (beeps)
- Use a Multi-meter for simple resistance tests.
  - Like Pin # 10 to chassis, Ground Bolt testing, etc.
- Possible Poor Connections are the first assumption!
- Moisture is your second assumption!
  - Always start with a dry system.
  - If it isn’t dry in all of the junction boxes (sensors, sockets, OBM, etc.), dry these first before looking for a problem as the moisture likely was it!
### Troubleshooting - Two Wire “Straight” Systems

- Parallel wiring of each sensor = each sensor separate!
  - Testing of each sensor individually tells problem.
  - All sensors with same problem generally means a ground problem.
  - Onboard Monitor (2-wire) Red LED pinpoints where to look.

![Diagram of two wire “straight” systems](image-url)
Troubleshooting - Five Wire “Straight” Systems

- Series wiring of each sensor = all sensors “related”!
  - Test for where the “return signal” stops.
    - Signal on Orange Sensor Wire if Sensor is “Dry” & working.
  - Remember that a sensor may seem bad, but isn’t getting a signal from the sensor before it!
Troubleshooting – Onboard Monitor Systems

- First determine the type of system (type of sensors used)
  - 5-Wire Sensor Systems (Like the Civacon Liberty or Scully LA/GA)
    - Series wired 5-wire sensors
    - Sensors operate and test just like a straight 5-wire system
  - 2-Wire Sensor Systems (Like the Civacon ROM II or Scully IntelliCheck 2)
    - Parallel wired 2-wire sensors
    - Sensors operate and test just like a straight 2-wire system
    - May have Retained Sensors as well
    - Commonly use Aux. Inputs (external permissive interlocks)
      - From Sequential Vents (all must be open)
      - From Vapor Adaptor (hose must be attached)
- If all sensors appear dry and O.K. (no red lights on), then check Aux. Input next (all must be satisfied and “green”)
- Use the OBM as a built in tester with a 3-STEP approach
  - Simple substitution / swapping (does problem follow “swap”)
  - Eliminate suspected wiring (direct connect and jumper wire)
Ground Bolt & Socket – Typical Wiring

- Ground Bolt wired to Pin # 9
  - Common industry practice versus RP1004 # 9 “Aux. Gnd.” Wire
Ground Bolt Troubleshooting

- Ground Bolt is the electrical equal of a “check valve”.
  - Current only flows one way through it (from pin # 10 to Pin # 9)
- Test with Multi-meter that has a “Diode Test” Mode.
  - Red Lead on # 9 & Black on # 10 = “open circuit”
  - Red Lead on # 10 & Black on # 9 = “voltage drop” (voltage reading)
- Problems mostly due to bad connections!

Diode Test Mode on Multimeter Dial
  (look for the diode symbol)
1. TURN VOLT OHM METER TO DIODE ICON ( )
2. RED LEAD TO PIN #9; BLACK LEAD TO PIN #10
3. READING SHOULD BE: 1.0 OR .000 OR 0L
4. RED LEAD TO PIN #10; BLACK LEAD TO PIN #9
5. READING SHOULD BE BETWEEN .500 TO .700
6. WHEN #3 AND #5 REQUIREMENTS ARE MET = GOOD GROUND
7. IF THE ABOVE REQUIREMENTS ARE NOT MET, YOU MUST VERIFY THE LOCATION OF THE LOSS OF CONTINUITY OR INSTALL A CIVACON™ SAF-T GROUND WIRE - P/N G31001
Checking the Ground Bolt Diode (forward)

- Meter set to the “diode function” will give an “open” reading in this direction

   **RED** Tester Lead Here (Pin #10)

   **BLACK** Tester Lead Here (Pin #9)

   Meter will read the diode’s “voltage drop” (typ. 0.5 - 1.0 Volt)
Checking the Ground Bolt Diode (reverse)

- Meter set to the “diode function” will give a reading in this direction

  **BLACK** Tester Lead Here (Pin #10)

  **RED** Tester Lead Here (Pin #9)

  Meter will read “open circuit” (just like leads touching nothing)
Ground Bolt Installation “cleanliness”

- Meter set to the “Resistance – Ohms function” will give check for corrosion.

**Meter will read the resistance of the mounted Ground Bolt – High Ohms = Corrosion** (should be 100 Ohms Max., but low as possible)

- **RED** Tester Lead Here (Pin #10)
- **BLACK** Tester Lead Here (body of Ground Bolt)
Some Items Worth Mentioning...

- **ROM Link Wiring System**
  - A revolutionary way to wire a trailer’s overfill system!
- **Quick-Loom Wiring Kits**
  - Another approach to saving wiring time,
- **New Model 1910A Terminator**
  - Packed for mounting inside the ROM Housing
- **ASA-1 Pressure Switch Assembly**
  - Pre-packaged, Purpose Build Air Interlock Switch
- **The NV3000 Pressure - Vacuum Vent Valve**
  - A completely new, cleanable design.
- **Other Mechanical Hardware**
  - Air Interlock & Air Control Panels
The no strip, no crimp, no mess way to go!
  • All tedious hand wiring is GONE!

New entirely “pluggable” design simplifies things.
  • No special tools, no special training needed.
  • Quick & Easy Retrofit too!

New System Tester
The Old Way meant cutting and stripping approximately 80 wires and splicing 36 connections.

The New Way means plugging in 6 connectors!
ROM Link Wiring System

Civacon Quick-Loom™ Wiring

Are your cables worn out and need to be replaced? Check out the Quick Loom for easy replacement and installation...

Civacon’s answer to tired and worn out cables is the Quick Loom, a one-piece molded cable assembly. The new cable system is a quick and easy solution for replacing all Civacon and Competitor brand 2-wire systems. No need to switchover your equipment, Quick Loom will work with your existing Civacon or Competitor brand probes and housings. Innovative molded design reduces the number of connections in the probe housings; fewer connections mean less corrosion build-up.

Features
- Quick and Easy Installation, in approximately 1 hour you can replace your 2-wire cable system
- Converts to a one-piece innovative design
- Works with Civacon and Competitor’s Probes and Housings
- Reliable one-piece molded assembly, eliminates corrosion concerns
- UV and Chemical Resistant
- Dielectric grease inserted into the sealed connector

Features
- Quick and Easy Installation, in approximately 1 hour you can replace your 2-wire cable system
- Converts to a one-piece innovative design
- Works with Civacon and Competitor’s Probes and Housings
- Reliable one-piece molded assembly, eliminates corrosion concerns
- UV and Chemical Resistant
- Dielectric grease inserted into the sealed connector

Ordering Specifications

- Quick Loom
  - CIV-C04L: 4-Compartment Loom, (8) Sealed Connectors, (1) Terminator, (4) 1/2" Plugs, (4) Strain Reliefs
  - CIV-C06L: 5-Compartment Loom, (8) Sealed Connectors, (1) Terminator, (5) 1/2" Plugs, (5) Strain Reliefs

- Ordering Specifications
  - Quick Loom
    - CIV-C04L: 4-Compartment Loom, (8) Sealed Connectors, (1) Terminator, (4) 1/2" Plugs, (4) Strain Reliefs
    - CIV-C06L: 5-Compartment Loom, (8) Sealed Connectors, (1) Terminator, (5) 1/2" Plugs, (5) Strain Reliefs

- Features
  - Quick and Easy Installation, in approximately 1 hour you can replace your 2-wire cable system
  - Converts to a one-piece innovative design
  - Works with Civacon and Competitor’s Probes and Housings
  - Reliable one-piece molded assembly, eliminates corrosion concerns
  - UV and Petro-Chemical Resistant
  - Dielectric grease inserted into the sealed connector

PHONE: (816) 741-6460 • (866) 520-5057 • Fax: (816) 741-1061
4304 Mattox Road • Kansas City, MO 64150 • www.civacon.com
Model #1910A Terminator

- Packed for mounting inside the ROM Housing
- Has 2 Red Wires (both identical – just an extra
  - maybe saves you adding a jumper
• This pre-packaged, potted assembly is ready to install.
  • Designed to be mounting inside the ROM Housing, or in a Socket
  • Pressures: 70 PSIG “On” / 45 PSIG “Off”
  • Temperature Range: -40º to 160º F (-40 º to 70º C)
  • Single Pole Single Throw (SPST) Normally-Open Switch
  • Stainless Steel, Hermetically Sealed (Welded) Snap-Action Diaphragm has a Rated Life of 100,000 Cycles (min.)
  • 1/2 inch NPT Male Thread and 1/4 inch DOT Swivel Air Fitting

ASA-1 Mounted in ROM Monitor  ASA-1 Mounted in Socket
Quick “strip in place” design
• No tools required
• Removable filter for easy quick cleaning

Die-cast aluminum, stainless steel and Delrin® parts with Viton ® GF Seals
• Yet lightweight & durable (14.8 oz.)

Can be installed in any existing 10” fill cover

Higher flow rate than competition
• 2 independent vacuum poppets means increased flow & safety

Exceeds European EN and California’s CARB specifications
Model 300 Air Interlock Valve

- **Features & Benefits:**
  - **Solid One - Piece Extruded Aluminum**
    - Lightweight Yet Strong
  - **Hard Coat Anodized Body**
    - For Extreme Durability and Wear Resistance
  - **Premium Parker Brand™ Standard Series-2 O-Rings**
    - Easy to Find & Maintain (also in 300RK Kit)
  - **Closed Loop Breather Keeps Contamination Out**
    - Rear End Cap is Completely Sealed. No Vent Holes are Required
  - **Temp. Range:** -40 to +160F (-40 to +70C)
  - A drop-in, replacement for our earlier models and for competitive brands
    - The fit and function remain identical to previous models
CivaControl II Air Control Panels

- Modular (Stackable) 3-2 Ported Valve Block Design is ideal for Emergency Valve control
  - New smaller, lighter panel design includes Pressure gauge and vents open Indicator
  - Aluminum Knobs spaced for gloved access
- Positive air reset / shut down feature ensures no valve is left open after shutting down the Master Valve
  - Master Valve can be reset remotely too!
- High air flow in small package ensures quick opening and fast shut down
- High endurance urethane seals rated at -40º F (-40º C)
- DOT air fittings pre-installed
FOR 24-HOUR TECHNICAL ASSISTANCE, CALL : 800-524-8226

Civacon
4304 Mattox
Kansas City, MO 64150

Phone: 888-526-5657  Fax: 888-634-1433
www.civacon.com