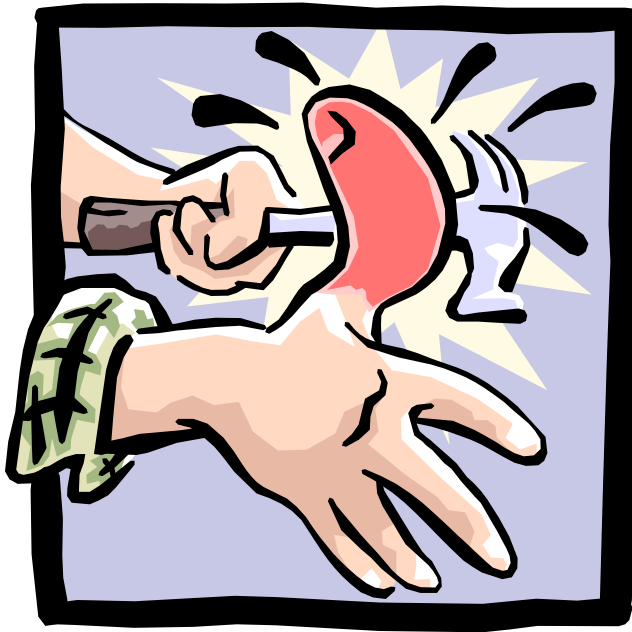


F-RAMS[®]

Installation Manual

Rev 2.0

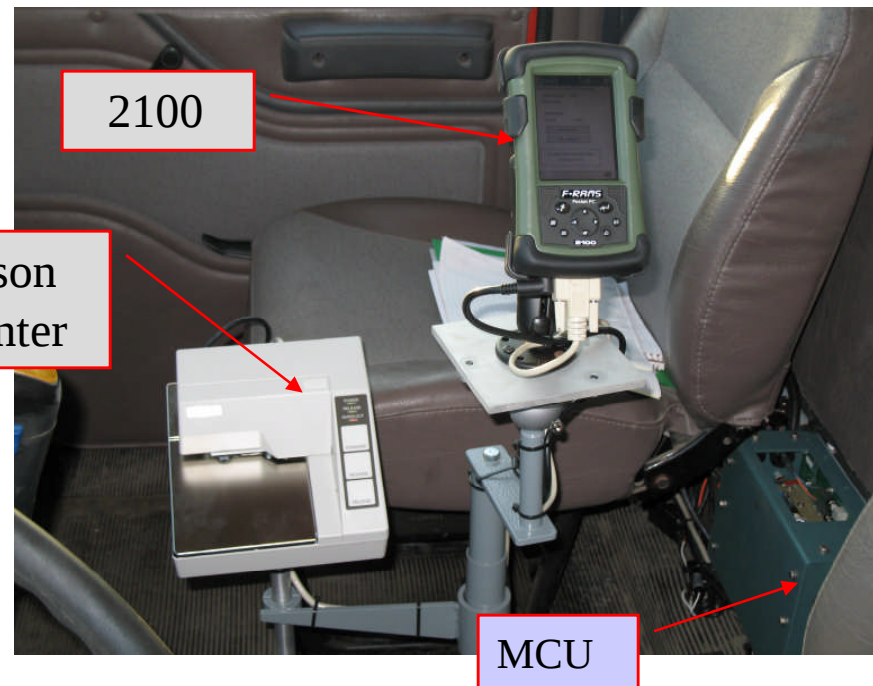


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F-RAMS® Major Components

- F-RAMS® Major Components
 - RDU (Rear Display Unit)
 - MCU (Master Control Unit)
 - 2100 Handheld
 - Epson Printer



Equipment Needed

- Equipment Needed :
 - 1/2” and 1 1/4” hole punch and rubber grommets.
 - Power drill with bits. **CAUTION! Do not use electric drill around LPG.**
 - Assorted bolts and nuts for mounting to truck cab floor - length determined by the thickness of the cab floor.
 - Digital Voltmeter.
 - Pliers
 - Screwdrivers
 - Socket and Allen wrenches
 - Wire cutters
 - Wire strippers
 - Electrical tape
 - Pipe dope
 - Wire ties
 - **Make arrangements to have the meter calibrated after installation.**

General Instructions

- **General Instructions:**

- Unpack - Immediately upon receipt
- Carefully unpack F-RAMS® & 2100 - Always handle with care. **Do Not Drop.**
- Remove and inspect the F-RAMS® unit and all of its parts , checking that no damage has occurred during shipping.
- Match the parts against the packing slip to ensure all parts have been included.

Note: For installation instructions for the meter and valve, refer to the manufacturer's meter/valve manuals.

F-RAMS® Operating Specifications

- Pre-Installation Electrical Checklist:
 - Operating Specifications:
 - Idle State (not delivering product) 1 Amp
 - Delivery Solenoids 1 Amp
 - Printer 1 Amp
 - Safety Factor 2 Amp
 - Power required with safety margin 5 Amps

(continued)

Pre-Installation Checklist

- **Pre-Installation Electrical Checklist (cont.):**

- For proper operation of the F-RAMS® system, the truck electrical system must meet the following requirements.
 - Battery terminals and cables must be in good condition with clean, corrosion free connections.
 - Battery must be charged in accordance with manufacturer's specifications.
 - Alternator output must meet total truck demand under normal use (i.e. lights,heater,radio,hose reel, lifts etc.) F-RAMS® requires a minimum of 5 Amps for proper operation. Typical alternator size should be 90 Amps. (Minimum alternator size should not be less than 70 Amps)
 - If a history of truck electrical problems has been indicated, corrective action must be taken prior to F-RAMS® installation.
 - Inspect all truck electrical/electronic (radios, etc.) equipment, including ignition and accessory lines, as well as wiring for proper installation.
 - Ensure a negative ground system exists on the truck.
 - Ensure that the radio antenna has been installed in accordance with the manufacturer's specification to prevent RF interference.

VOLTAGE CHECKS

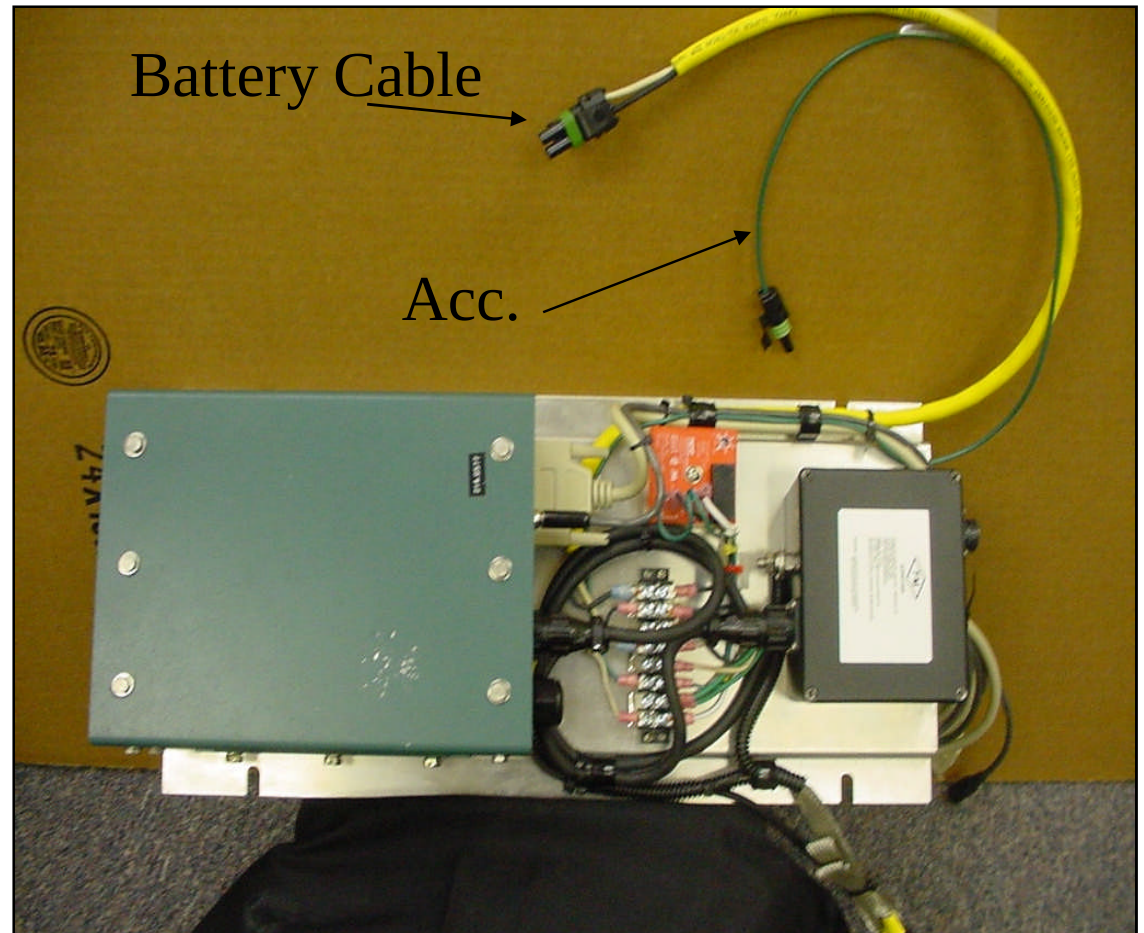
- To check the voltage requirements:
 - With the truck turned **off** - Use a Digital voltmeter and measure across the battery to determine the battery voltage - **Minimum 12.5 VDC**. (This will tell you if there is a drain on the battery). Record Voltage: _____
 - With the truck **operating** - Use a voltmeter and measure across the battery to determine the battery voltage - **Minimum of 12.67 VDC to 13.87 VDC**. (This will tell you if there is a drain on the battery.) Record Voltage: _____

CAUTION

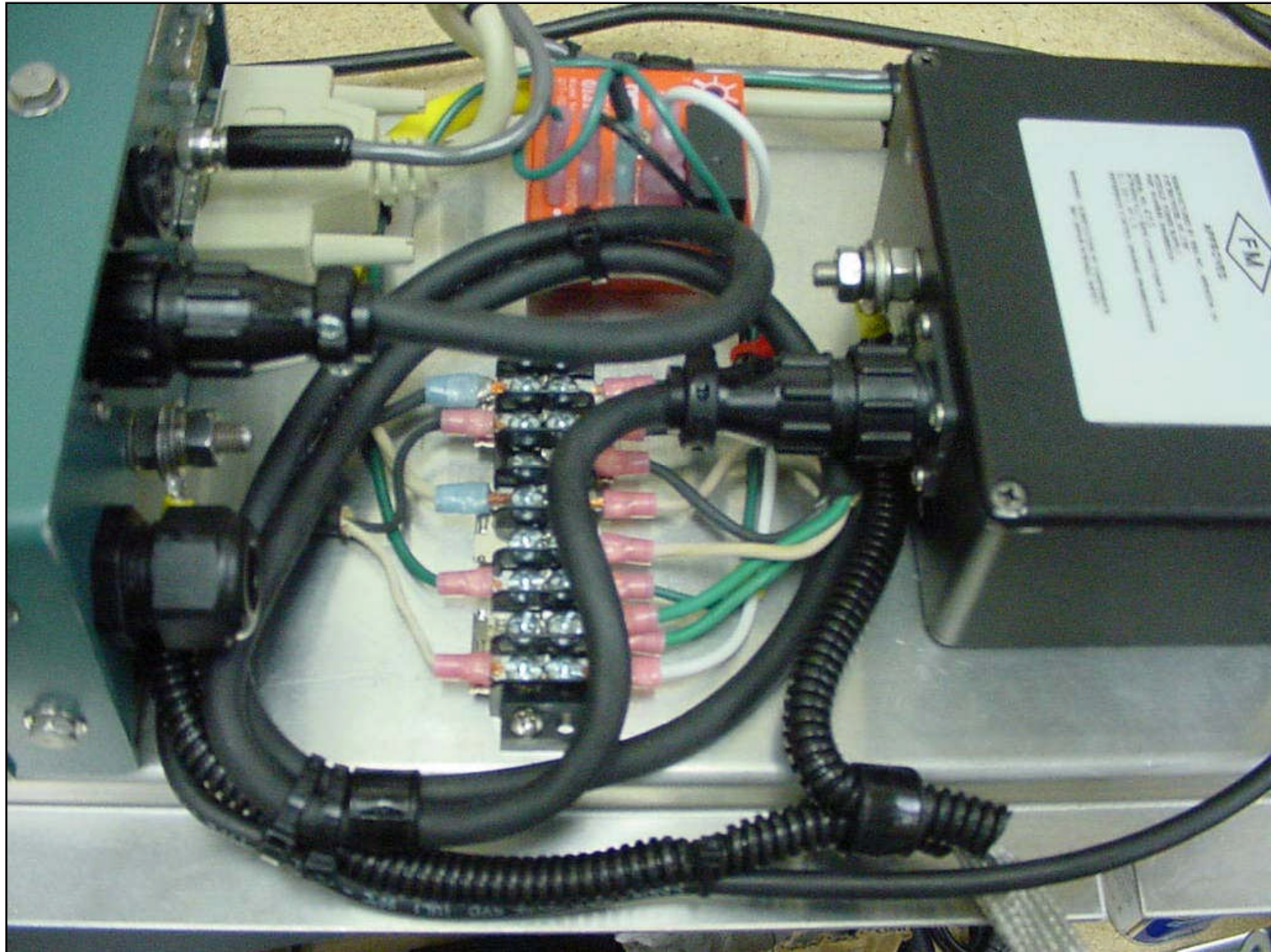
- Always disconnect the F-RAMS® system and remove the handheld computer from its cradle before any welding on the truck.
- Always disconnect the F-RAMS® system and remove the handheld computer from its cradle before any “Jump Starting” on the truck.

MOUNTING BRACKET

- **MCU Mounting Bracket - Location**
 - The MCU can be mounted either on the back wall of the cab or underneath the passenger seat. The recommended location is on the back wall of the cab.
 - When running the fiber optic cable to the back of the truck, drill a hole through the back of the cab or through the floor board. **CAUTION: Be sure to install grommets to the holes so the truck vibration does not cut through the cable.**



Mounting Bracket



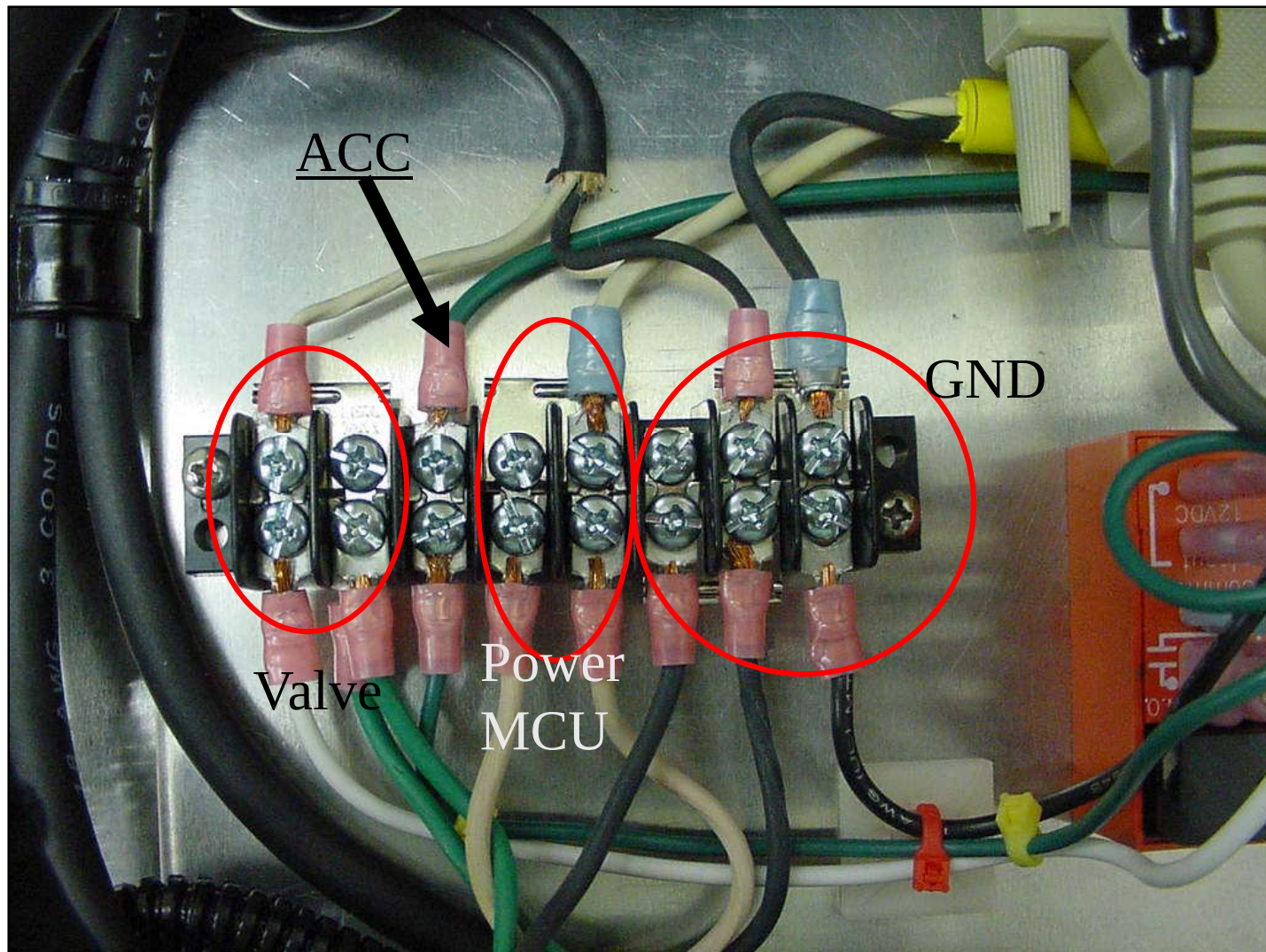
CABLES

- Wiring Cables

- To make the installation easier, each F-RAMS® is shipped with 3 quick connect wiring cables. This kit is made up of several cables.
- (1) **MCU** wiring cable ----- 3 conductor 18 gage (White --- 12VDC, Green --- ACC, and Black --- GND) Note: Runs from the fuse box and the terminal strip.
- (2) **I.S. Power Supply** wiring cable ----- 2 conductor 18 gage (Green --- ACC and Black --- GND) Note: 1 cable runs between the fuse box and the terminal strip and the Second cable between the terminal strip and the IS Power Supply.
- (1) **Pair Fiber Optic** communication cable ---- 2 conductor Blue / Orange (runs between MCU and the RDU which is located on the back of the truck)
- (1) **Single Valve Fiber Optic** cable ----- 1 conductor / Blue (runs between the Valve control box and the RDU)
- **Note : Only need if Valves are on the truck**
- (1) **Valve** cable ---- 2 conductor 18 gage (White --- 12VDC and Black --- GND) Note: runs between the truck cab and the valve control box.
- (2) Ground Straps (Braided) MCU to I.S. Barrier
- **Note : Only need if Valves are on the truck**

Installation Note: Use caution to avoid damaging the insulation on the individual wires.

Terminal Block on the 1 piece Bracket

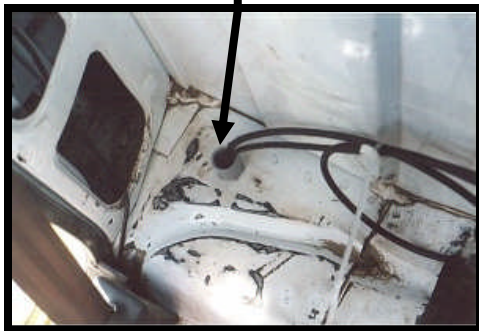


CABLE ROUTING

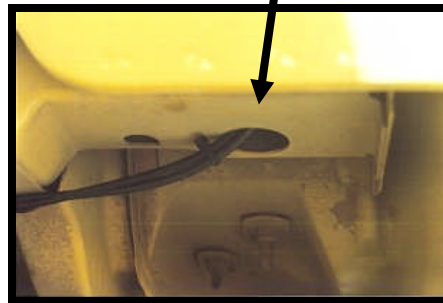
- Routing the cable

- Make sure that the fiber optic cables that exit the cab have protection over their connectors to keep them clean.
- Punch a 1/2" hole in the cab for wiring exit. On tilt-cab trucks make sure to leave enough slack in the cable for maintenance access.
- Push the connector with its protective end (covers) through the hole and route to the RDU, storing any excess cable inside the truck cab. Remove the protective covers on the fiber optic cable before installing it in the RDU. At the cable exit point from the cab, use a grommet to seal holes that were drilled in the cab. This will protect the cable from wear due to cab vibration.

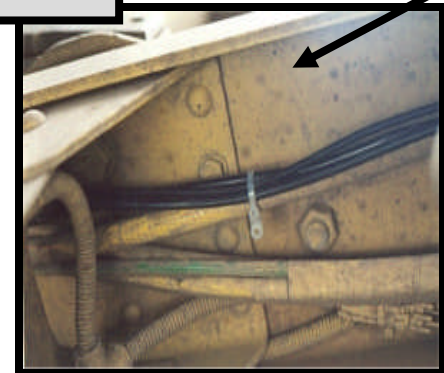
Drill 1/2
inch hole



Install grommets
in holes



Secure every 18 -
24 inches with
wire ties



FLOW METER CONNECTION

- **Flow Meter Connection**
 - Route the fiber optic cable from the back of the MCU unit to the RDU unit which is located on top of the flow meter.
 - Avoid suspension parts, i.e. shocks, springs, etc. which can crush the cable. Stay as far away from heat sources (engine exhaust manifold, mufflers, tail pipes, etc.) as possible. Running the cable down the inside edge of the frame will provide maximum protection. Secure every 18 - 24 inches with ties (or equivalent). For additional protection, split corrugated automotive wiring tubing is recommended. In exposed areas.

Neptune Meter



Liquid Controls Meter



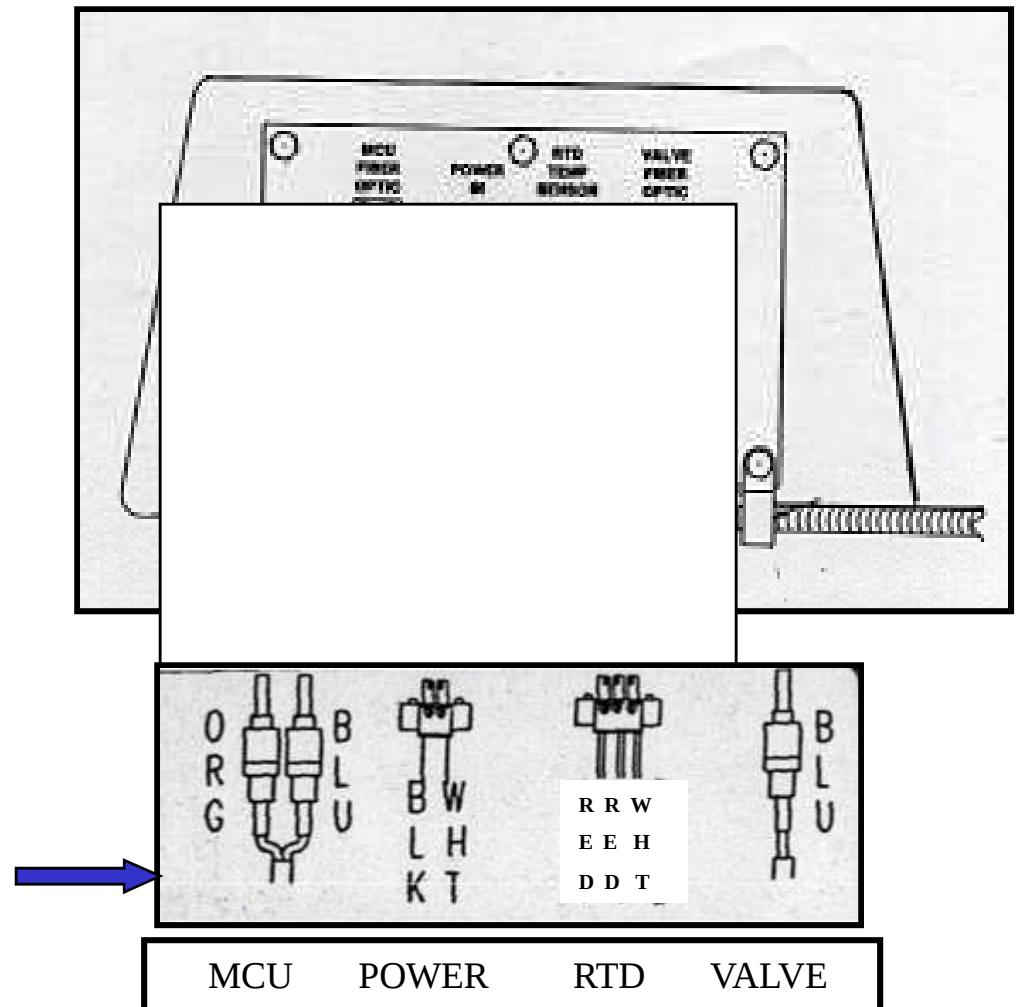
RDU Rear Connection

- RDU Rear Connection

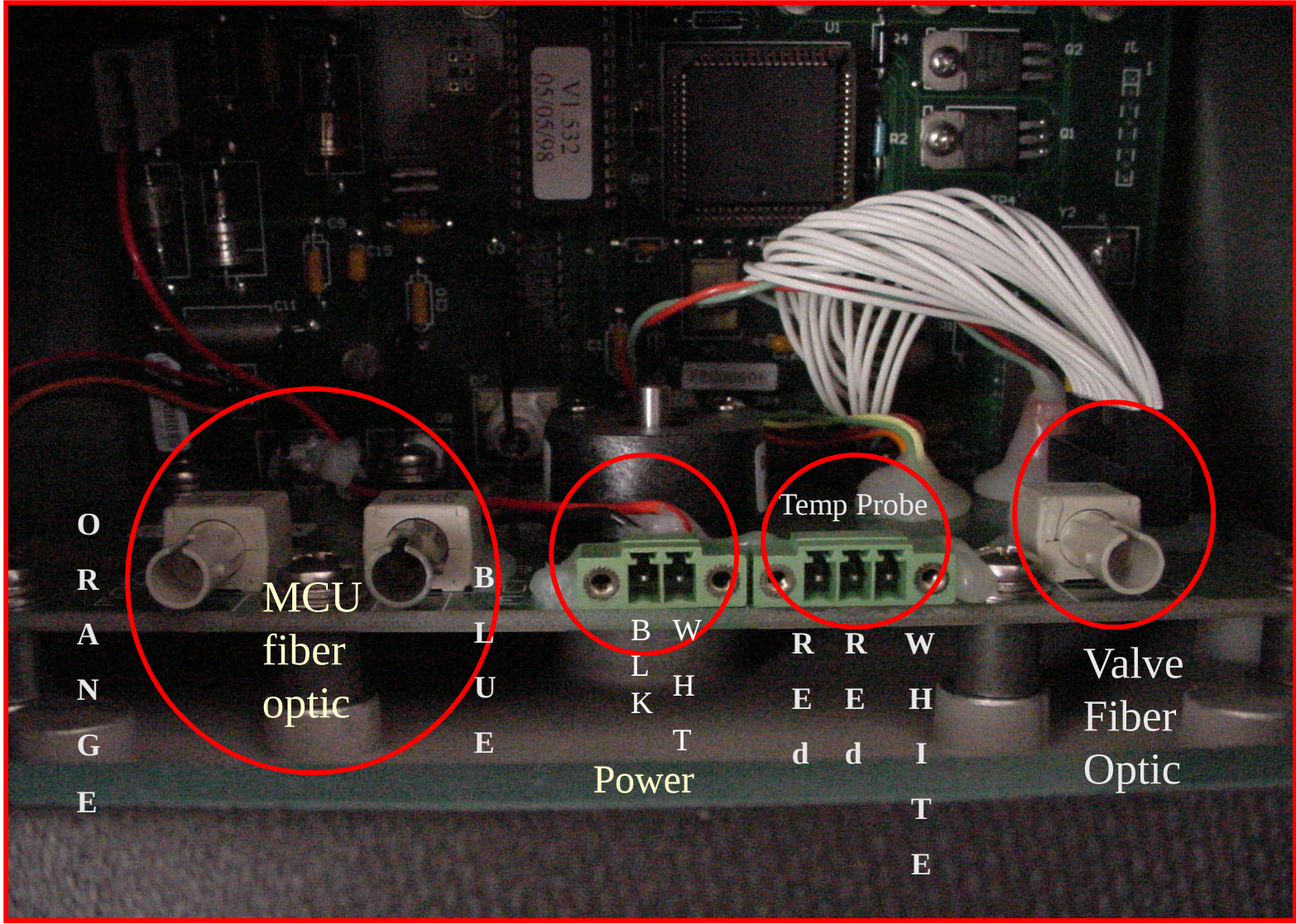
- Remove (6) Seal screws holding the back panel of the RDU. This will expose the inside of the RDU with the following connectors:
- MCU Fiber Optic communication cable (1) pair -- Orange, Blue
- I.S.Power cable (1) pair --- White 12 volts (Switch hot), Black (GND).
- [Optional] RTD Probe cable (3) wires --2 - Reds, 1 - White (Only used on temperature compensated systems.)
- [Optional] Valve Fiber Optic cable (1) Blue Fiber Optic. (Only used on systems with valves.)

See next page

INSIDE COVER



RDU Rear Connection



Tilt Cabs

- **Cab-over Trucks**
 - Be careful when locating the exit points of the fiber optic cable from the RDU. The entrance point must be as close to the pivot point of the cab as possible. A position on the line with MCU will keep the harness out of the way. Be sure to allow enough slack to accommodate **pivoting of the cab**.
 - For convenience, a 35-foot fiber optic cable along with optional lengths of 25, 20, and 15-foot cable are available.



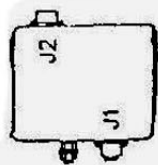
Conventional Cab



CAB HOOK-UP

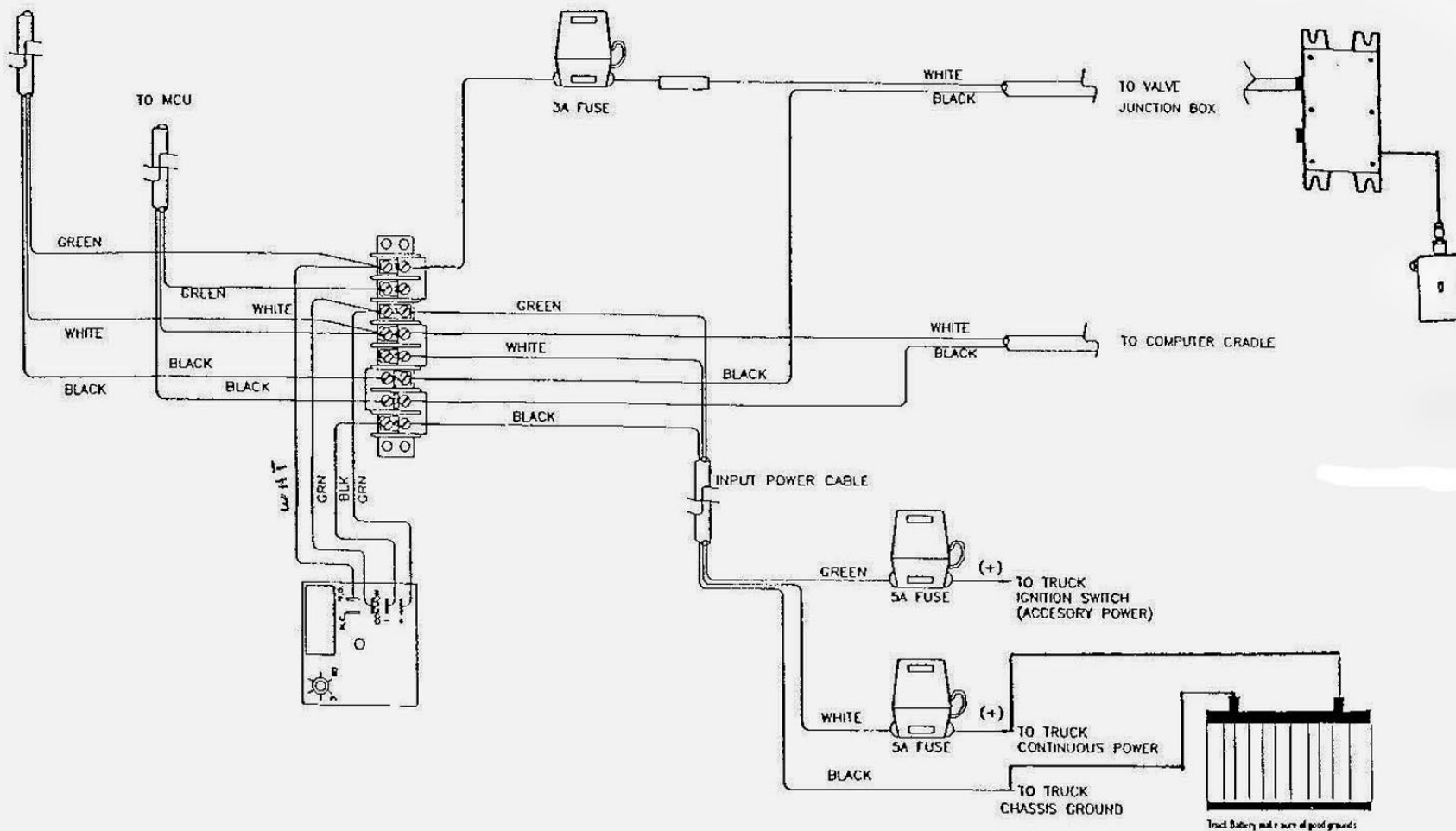
- ACC. hook-up and 12VDC hook-up
 - First locate the **ACC.** position on the fuse box by using a trouble light or a volt meter.
 - With the truck turned **OFF**, connect the test light, by connecting the alligator clip to ground. Use the other end of the test light to touch the end of the fuse.
 - Note: The test light will light when you come in contact with a 12 volt source.
 - After locating an **ACC.** line, test to ensue that it is a true **ACC.**
 - Note: If it is a **ACC.** Line the test light will go **On** and **OFF** as you turn the key from the **OFF** to **ACC.** Position, connect the **Green** wire from terminal strip the **ACC.** Fused position to the.
 - Locate **Black Cable** attach the **White** wire to the Truck Battery (**Positive**) and the **Black** wire to the (**Negative**) or chassis ground. Keep in mind that the wire should be routed out of the way of foot traffic and where it will not be cut. .

Note: When routing the cable to the fuse box, use care to keep it out of the way of foot traffic. A recommended route for the cable is under the floor mat behind the driver's seat and down through the door channel to the fuse box. The floor mat will provide protection to the cable and the channel will keep it safe from foot traffic.

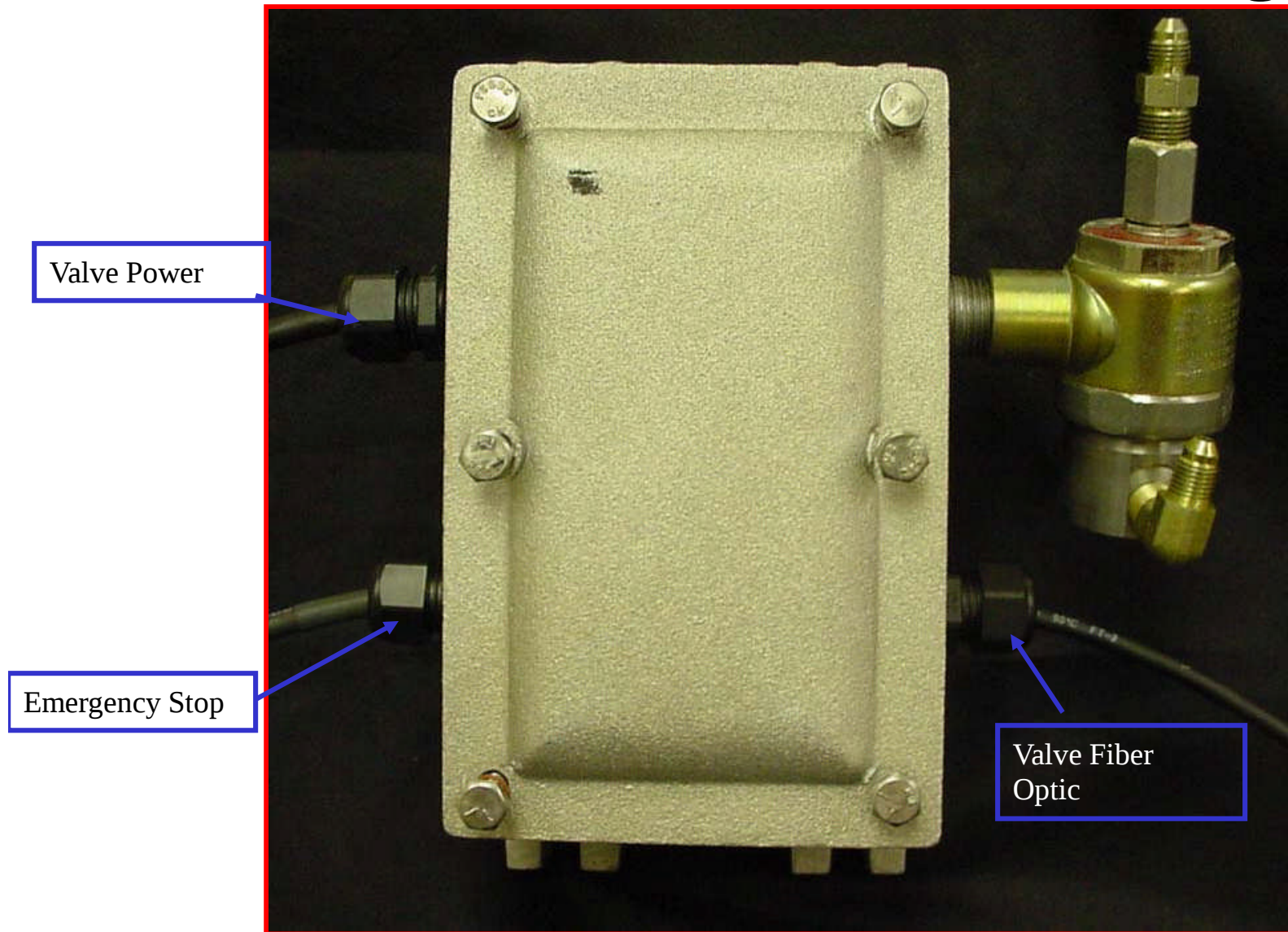


S. POWER SUPPLY

F-RAMS WIRING DIAGRAM ----LPG----



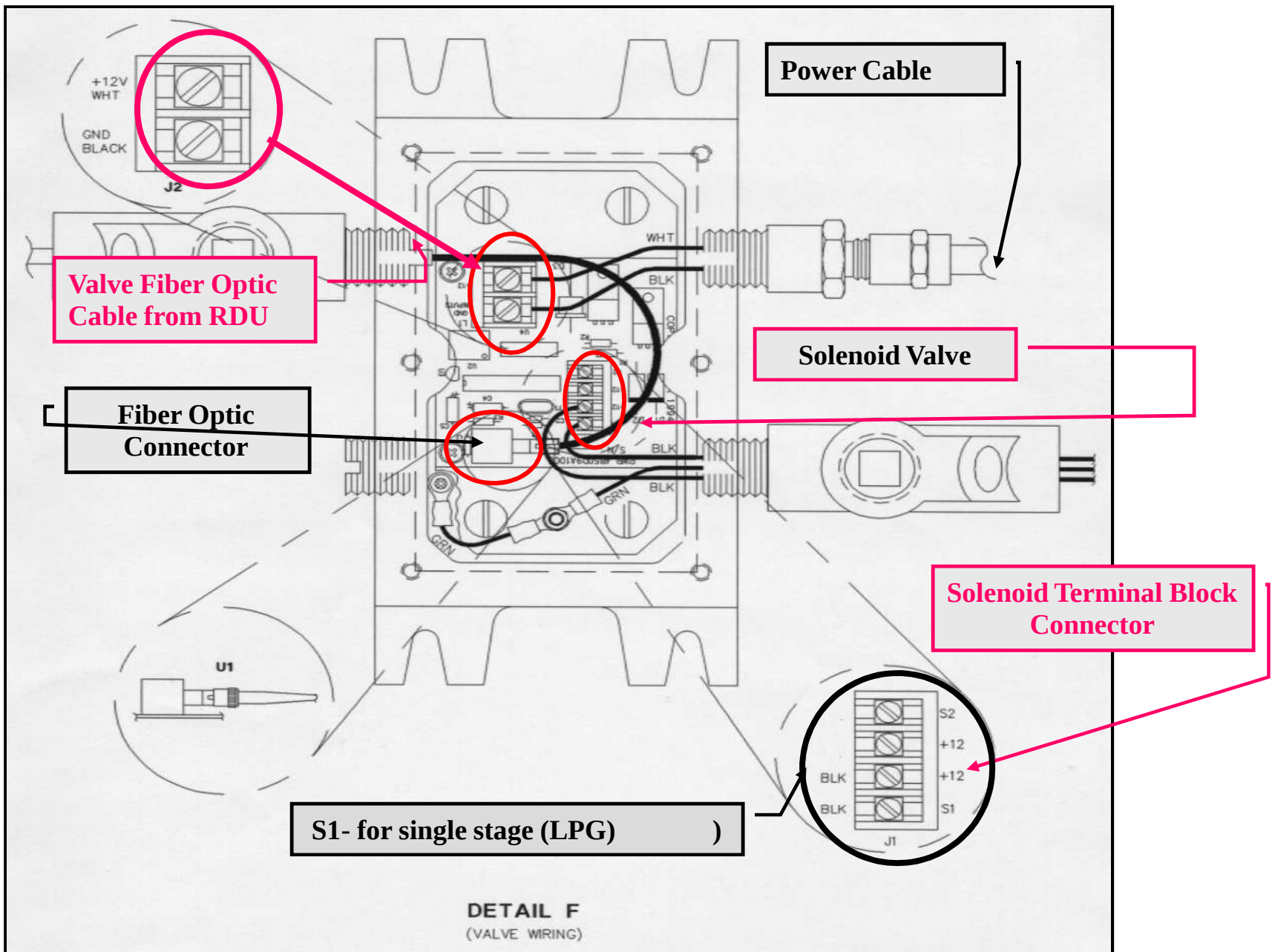
Valve & Solenoid Mounting



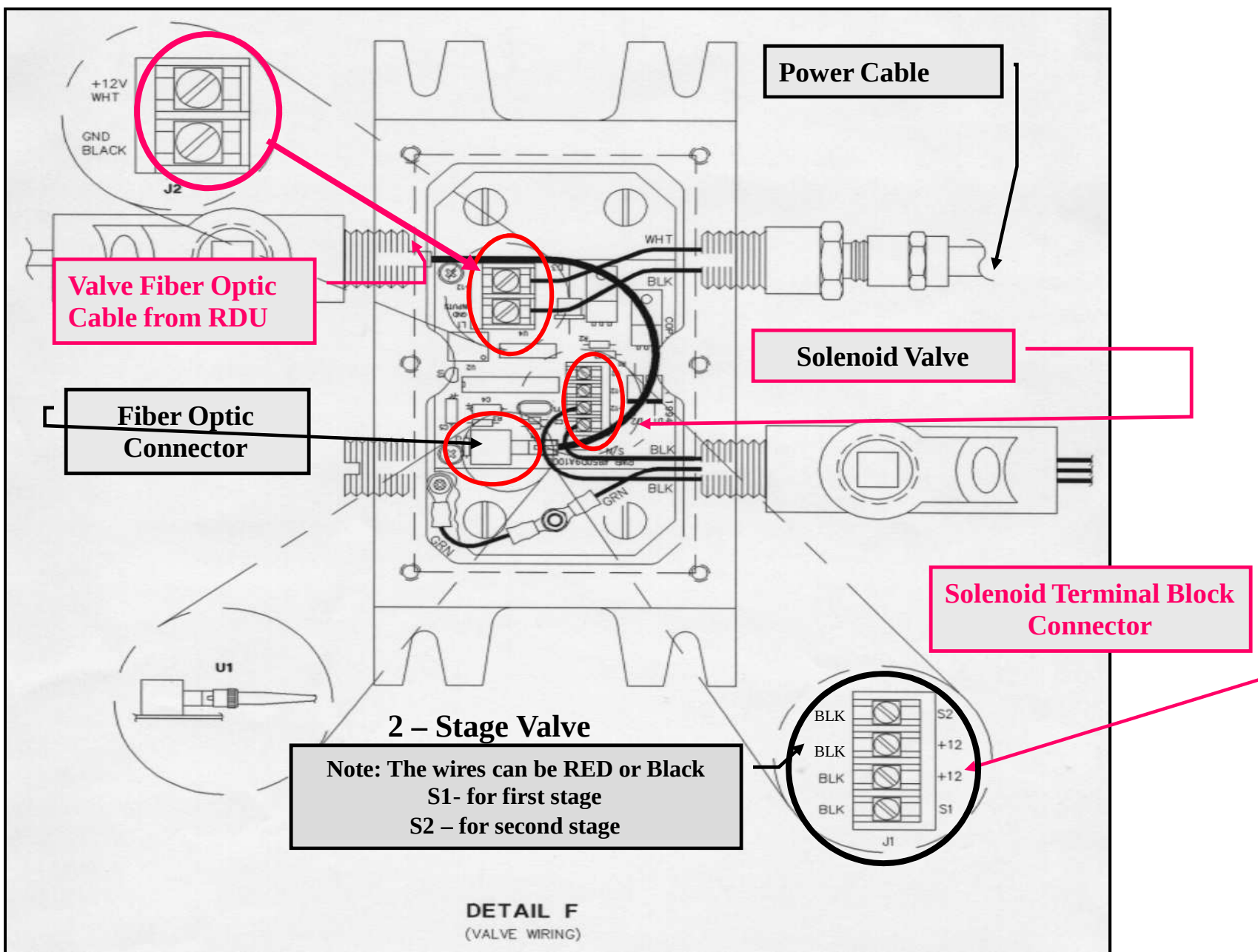
Valve BOX



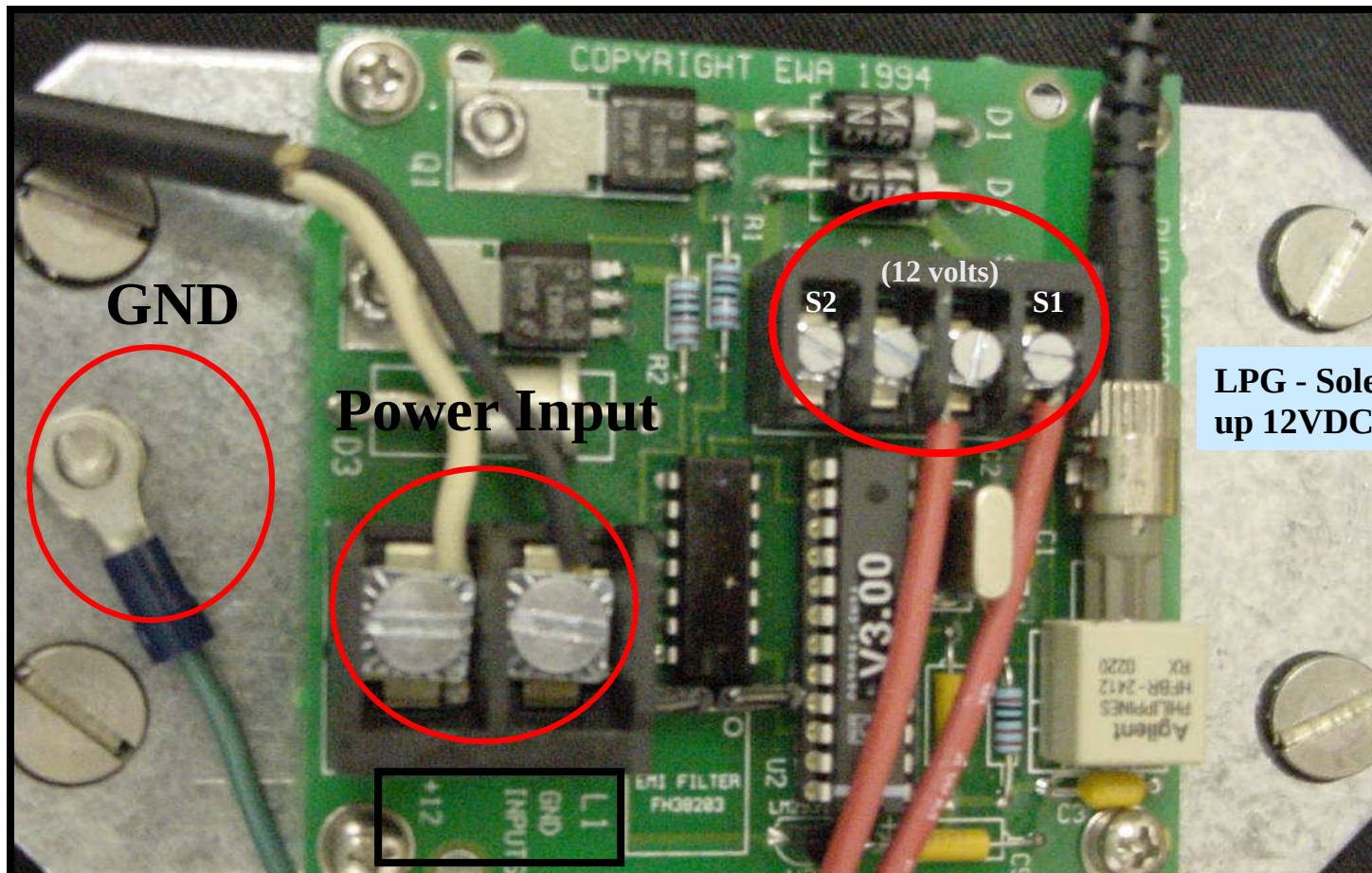
LPG Valve Wiring Diagram



Fuel Oil Valve Wiring Diagram



Valve Wiring for LPG



LPG - Solenoid hook-up 12VDC & S1

When the Solenoid is de-energized you will see 12 volts on both Red or Black wires. When it is energized you will see 12 volts on the middle wire and .7 volts on the end wire.

Note: The 2 middle screws (of the solenoid terminal) will always have 12 volts unless there is a blown fuse or the E-Stop switched is in the off position.

Fiber Optic

12 Volt Power Input

GND

S1 12 volts S2

Note: Green wires generally GND.

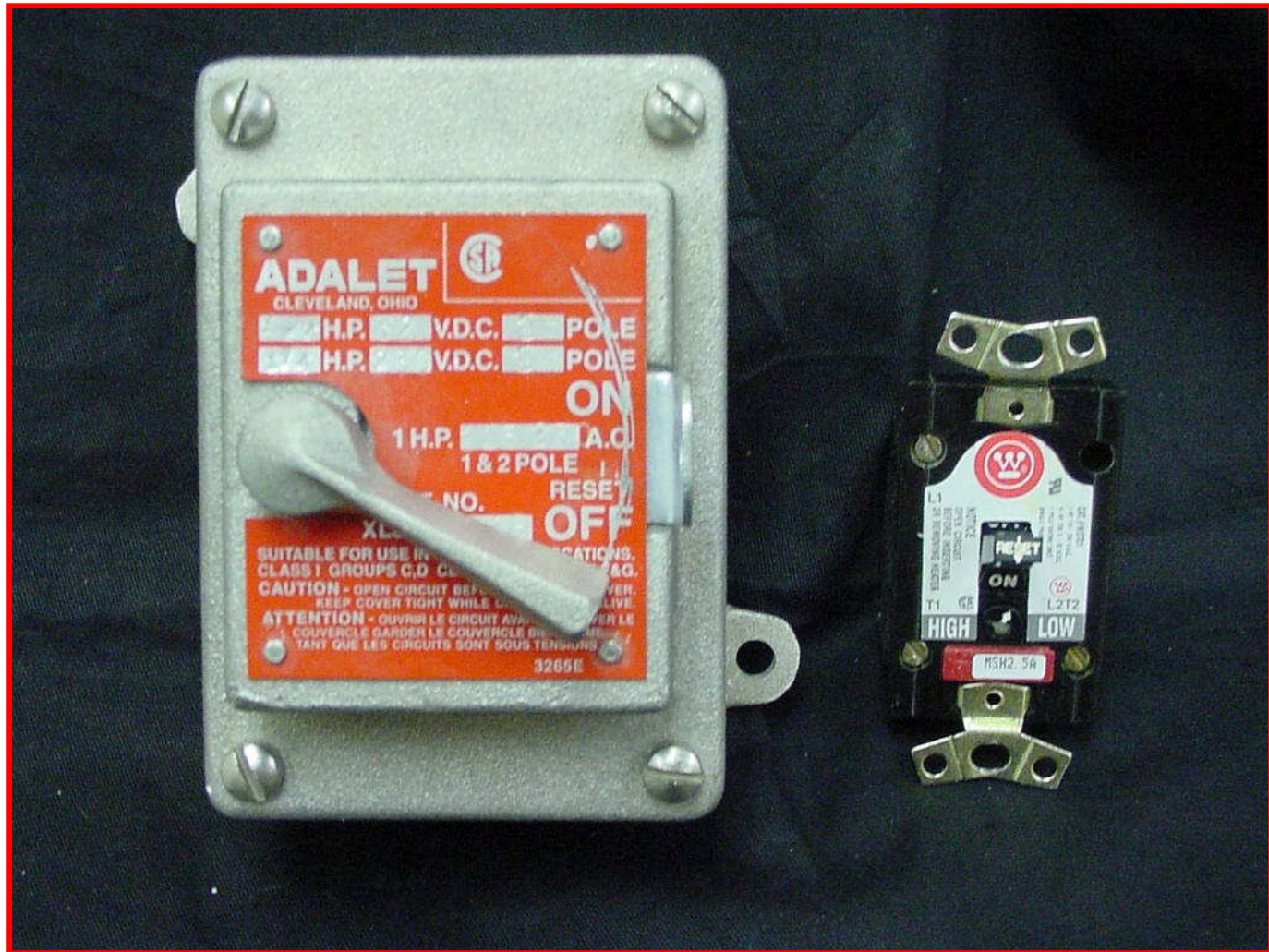
S1 is setup single stage or LPG

S2 is setup for dual stage solenoids or preset and can be adjusted in Product set-up.

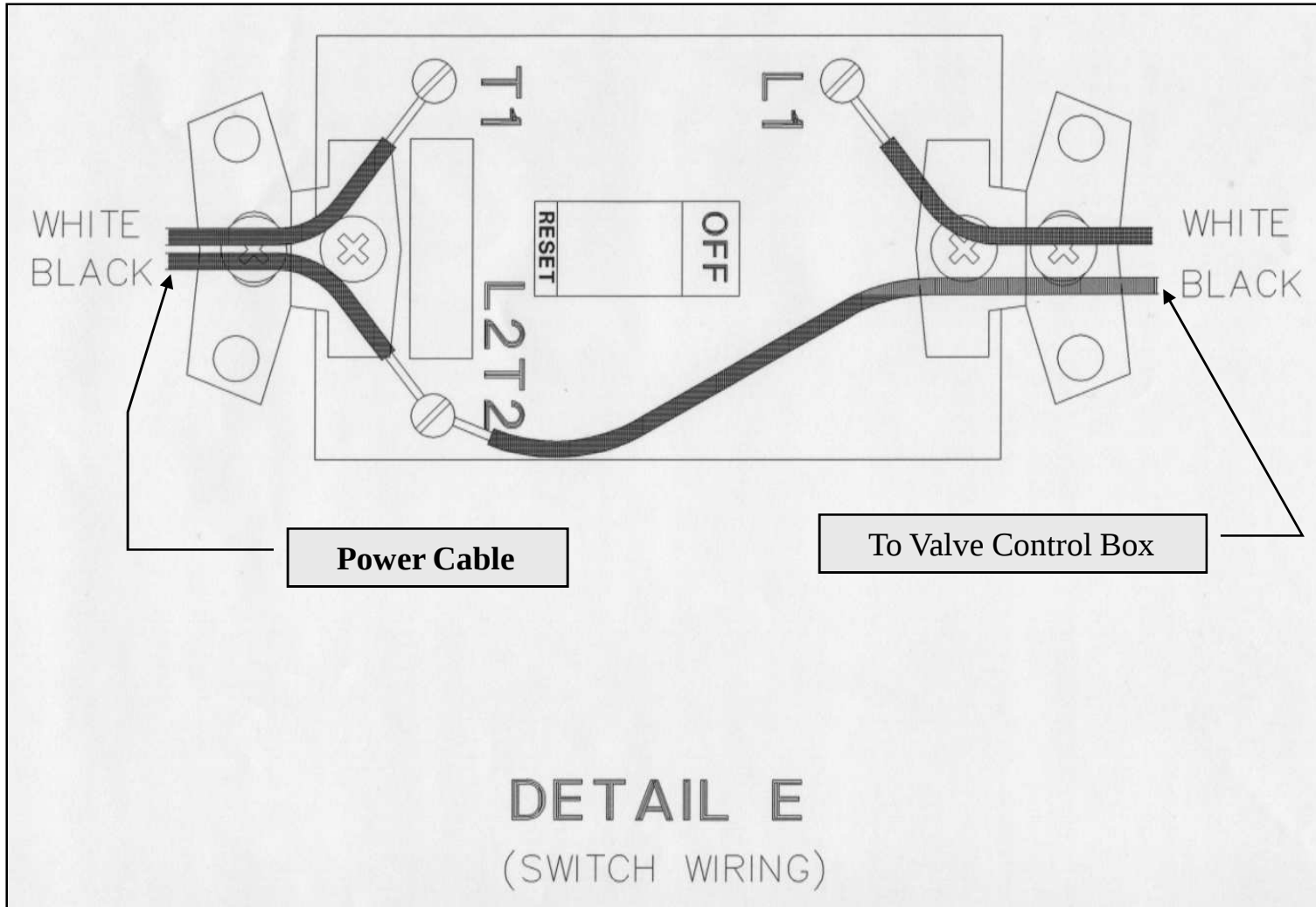
When the Solenoid is de-energized you will see 12 volts on both Red or Black wires or White and Black . When it is energized you will see 12 volts on the middle wire and .7 volts on the end wire.

Note: The 2 middle screws (of the solenoid terminal) will always have 12 volts unless there is a blown fuse or the E-Stop switched is in the off position.

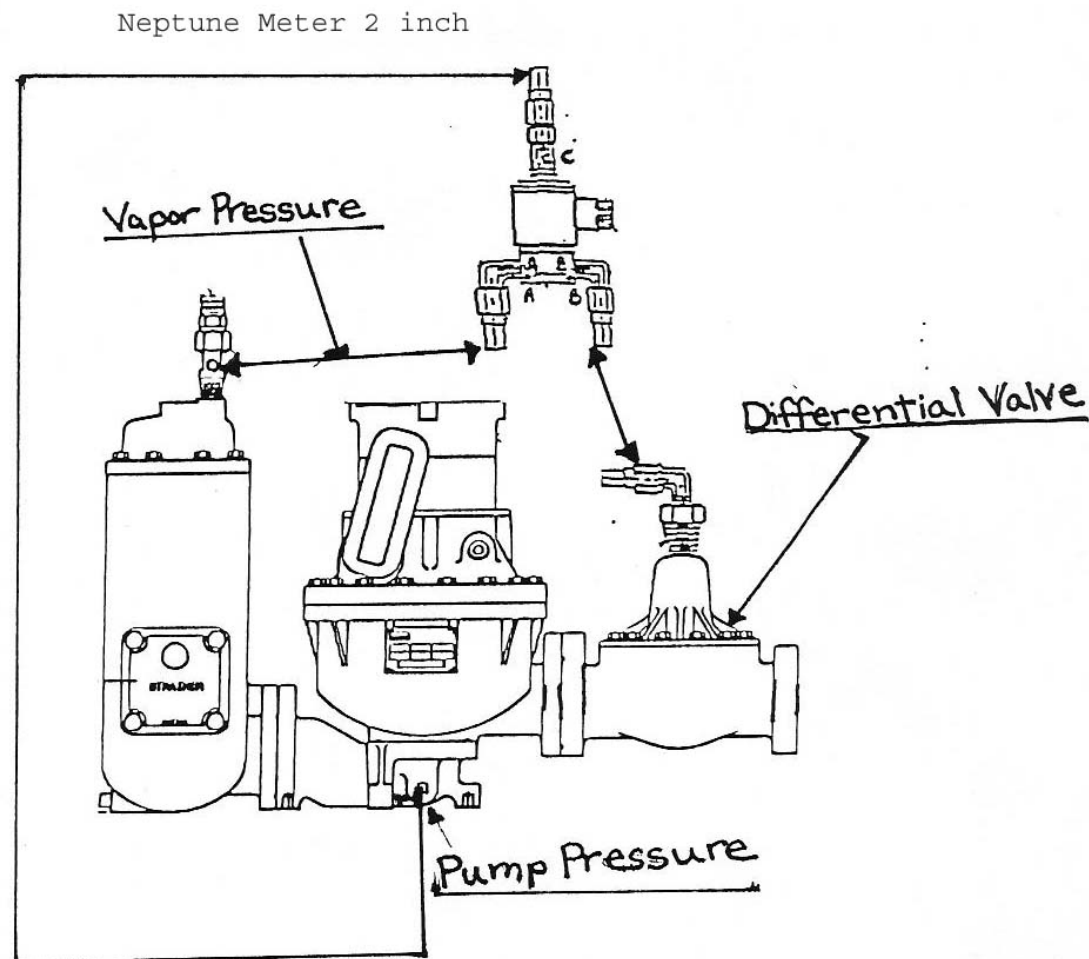
E-Stop Box



Emergency Shut-Off Switch Wiring
Diagram



Neptune Meter 2 inch



with solenoid off (N/c)
should pass (c to B)

with solenoid on (open) energized
should (B to A)

VEHICLE CRADLE

- Handheld Computer Vehicle Cradle
 - Bench Seat Mount
 - Split Seat Mount
- Vehicle Cradle Connection
 - Connect the white wire to the 12 volts (Hot) and the black wire to negative or to chassis (GND) as found in the terminal block section.

Bench Seat Mount

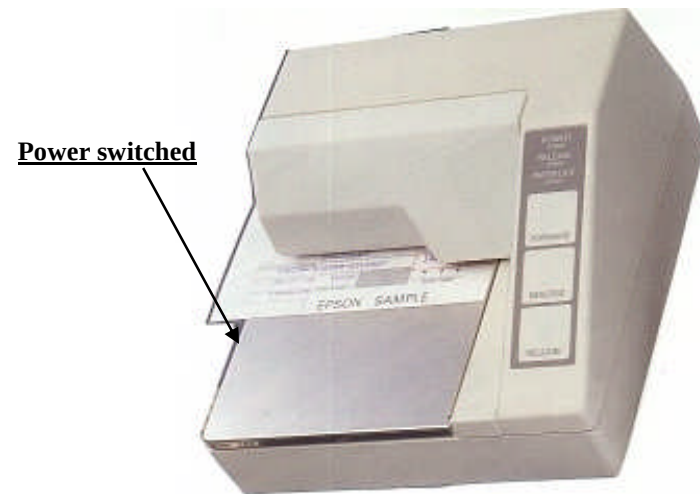
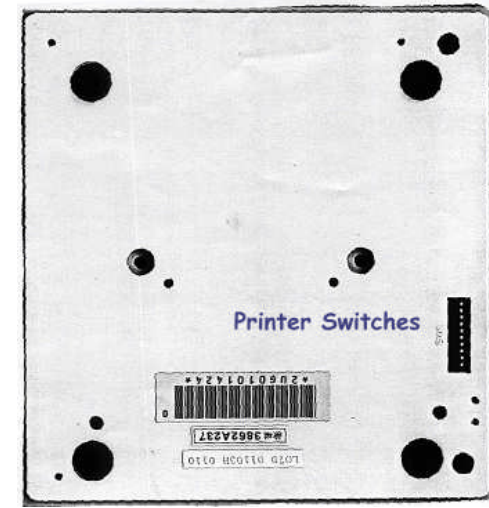


Split Seat Mount

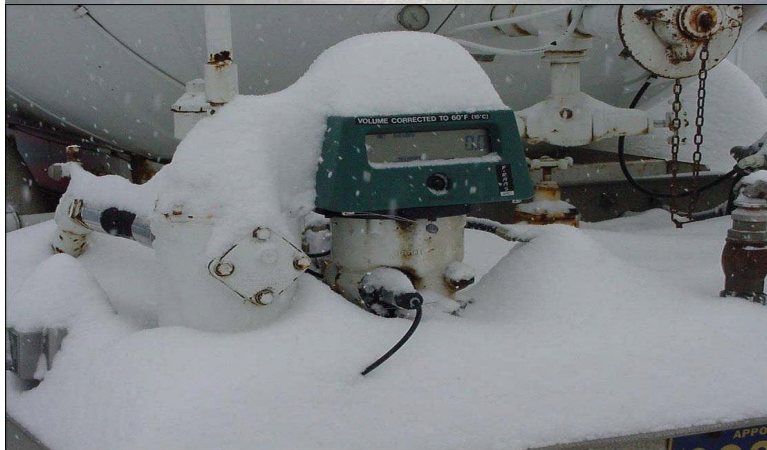
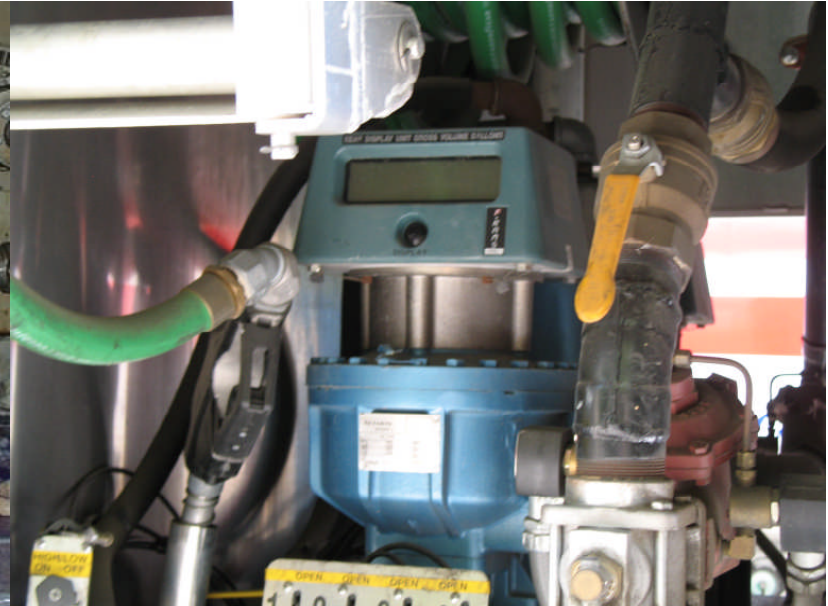


EPSON PRINTER

- Epson Printer Buttons
 - When powering up system for the first time, ensure that device prints correctly.
 - **Ensure that all switches on the bottom of the printer are set to the OFF position.**
 - **Forward Button** - Advances the ticket into the printer and locks it into place.
 - **Reverse Button** - Back the ticket out of the printer.
 - **Release Button** - Releases the ticket and allows you to remove it from the printer.
- Epson Printer Lights
 - Power light (Green) - indicates when power is on.
 - Release Light (Green) - indicates when the ticket is locked in place or **No light** when the ticket can be removed.
 - Paper Out (Red) - indicates there is No ticket in place.
- On & Off Switch
 - Make sure the power switch on the side of the printer is turn on.



F-Rams®





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