



Electrifying a Sustainable Future

WAYSIDE POWER

WHAT IS WAYSIDE POWER ?

Wayside power refers to the electric power infrastructure that provides energy to vehicles when they are stationary or moving along a specific path, usually in rail or transit applications. It is an alternative to on-board power sources, and it generally supports rail systems, trams, and other forms of mass transit.

Today's discussion will focus on trains...





Wayside Power Cabinets are generally custom-built units.

Standards:

- APTA PR-E-RP-018-99 (American Public Transportation Association)
- Amtrak 800 “Standard”

Basics:

- Disconnect Means (breaker and/or contactor)
- Head End Power (HEP) receptacles. Can be 1, 2 or 4. Typically 2
- Controls – Let’s explore further on the following slides







SAFETY FEATURES TO BE CONSIDERED:

- Prevent energizing the train from the wayside cabinet:
 - Unless trainline loop is complete.
 - If power is detected on the train.
 - Utility power source has a phase loss, phase unbalance, over voltage, under voltage.
- Automatically shut off power if:
 - A ground current greater than the preset limit is detected for a duration greater than the preset limit is exceeded.
 - A phase loss
 - Phase unbalance
 - Under voltage
 - Over voltage
- Detect stuck closed contacts in a contactor (if applicable) and sends an alert.



TYPICAL WAYSIDE POWER CABINET



800A Wayside Control Cabinet with
HEP receptacles on right side.



FRONT DOOR CONTROLS



CONTACTOR, MAIN BREAKER, CONTROL TRANSFORMER, CT, HEP RECEPTACLES

PENDANT LIGHT

CONTACTOR

HEATER

CONTROL TRANSFORMER

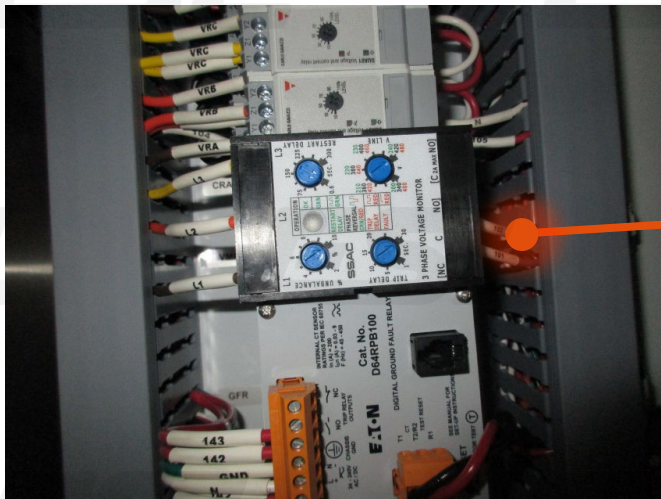
MAIN BREAKER

CT

HEP RECEPTACLES



3-PHASE VOLTAGE MONITOR RELAY



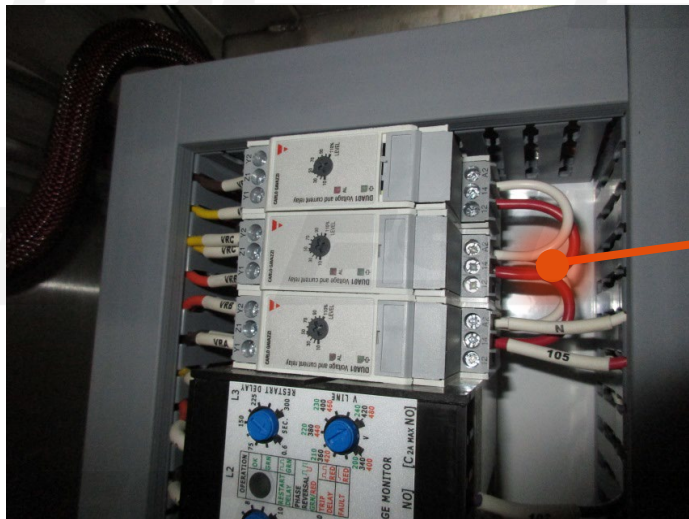
Detects under voltage, phase loss, phase unbalance, phase reversal

Factory setting:

- 480VAC
- 0.6 second restart delay
- 10% unbalance
- 10 second trip delay



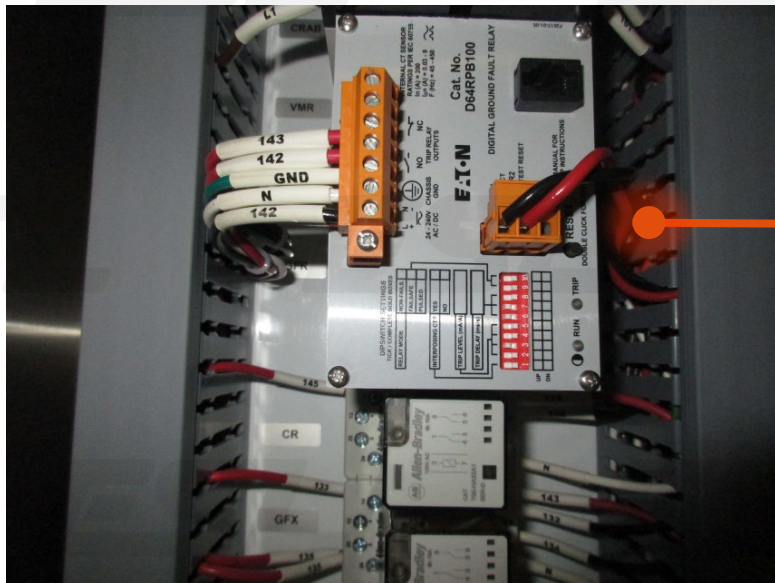
VOLTAGE SENSING RELAYS



- Detects power on the locomotive before wayside power is energized.
- Factory setting: 85% Voltage



GROUND FAULT RELAY



Factory setting:

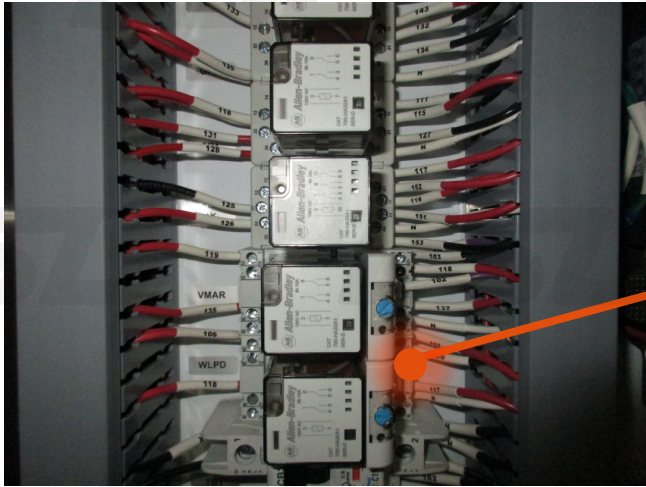
- 0.15 amp
- 2 second delay
- Continuous operation



CONTROL RELAYS



TIME DELAY RELAYS



Factory setting VMAR:

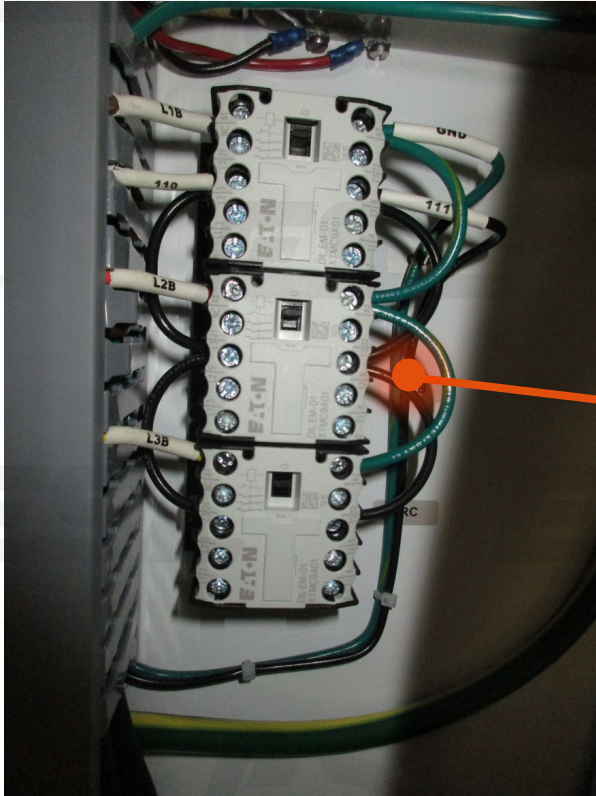
- Signal OFF delay
- 1 second delay

Factory setting WLPD:

- Power ON delay
- 1 second delay



“Stuck” CONTACTOR RELAYS



INTERIOR LIGHT



NORMAL OPERATION – START UP

1. **TURN MAIN POWER BREAKER HANDLE TO "OFF" POSITION**
2. **CONNECT CABLES BETWEEN LOCOMOTIVE AND CABINET**
3. **TURN CONTROL POWER "ON"**
 - WHITE "CONTROL POWER AVAILABLE" SHOULD BE LIT
 - BLUE "BREAKER OPEN" SHOULD BE LIT
 - GREEN "NO VOLTAGE PRESENT ON LOAD SIDE OF CONTACTOR" SHOULD BE LIT
4. **INSERT KEY AND TURN "ENERGIZE TRAINLINE LOOP" SWITCH TO THE RIGHT AND RELEASE**
 - WHITE "TRAINLINE LOOP CLOSED" SHOULD BE LIT
5. **TURN MAIN CIRCUIT BREAKER "ON"**
 - BLUE "BREAKER OPEN" LIGHT SHOULD NOT BE LIT
6. **DEPRESS "ACTIVATE RECEPTACLES" PUSH BUTTON AND RELEASE**
 - RED PENDANT LIGHT ON TOP OF ENCLOSURE SHOULD BE LIT



NORMAL OPERATION – START UP



1. TURN MAIN POWER BREAKER HANDLE TO "OFF" POSITION

2. CONNECT CABLES BETWEEN LOCOMOTIVE AND CABINET



NORMAL OPERATION – START UP

3. TURN CONTROL POWER "ON"

- WHITE "CONTROL POWER AVAILABLE" SHOULD BE LIT
- BLUE "BREAKER OPEN" SHOULD BE LIT
- GREEN "NO VOLTAGE PRESENT ON LOAD SIDE OF CONTACTOR" SHOULD BE LIT



NORMAL OPERATION – START UP

4. INSERT KEY AND TURN "ENERGIZE TRAINLINE LOOP" SWITCH TO THE RIGHT AND RELEASE

- WHITE "TRAINLINE LOOP CLOSED" SHOULD BE LIT



NORMAL OPERATION – START UP



5. TURN MAIN CIRCUIT BREAKER "ON"

- BLUE "BREAKER OPEN" LIGHT SHOULD NOT BE LIT



NORMAL OPERATION – START UP



6. DEPRESS "ACTIVATE RECEPTACLES" PUSH BUTTON AND RELEASE



RED PENDANT LIGHT ON TOP OF ENCLOSURE SHOULD BE LIT

NORMAL OPERATION – SHUT DOWN



1. DEPRESS "DEACTIVATE RECEPTACLES" PUSHBUTTON AND RELEASE

- GREEN "NO VOLTAGE PRESENT ON LOAD SIDE OF CONTACTOR" SHOULD BE LIT

- RED PENDANT LIGHT ON TOP OF ENCLOSURE SHOULD NO LONGER BE LIT



NORMAL OPERATION – SHUT DOWN



2. **TURN OFF MAIN BREAKER**
 - BLUE "BREAKER OPEN" SHOULD BE LIT
3. **TURN "CONTROL POWER" SWITCH "OFF"**
 - ALL LIGHTS SHOULD BE OFF
4. **DISCONNECT CABLES BETWEEN LOCOMOTIVE AND CABINET**



NORMAL OPERATION – SHUT DOWN



2. **TURN OFF MAIN BREAKER**
 - BLUE "BREAKER OPEN" SHOULD BE LIT

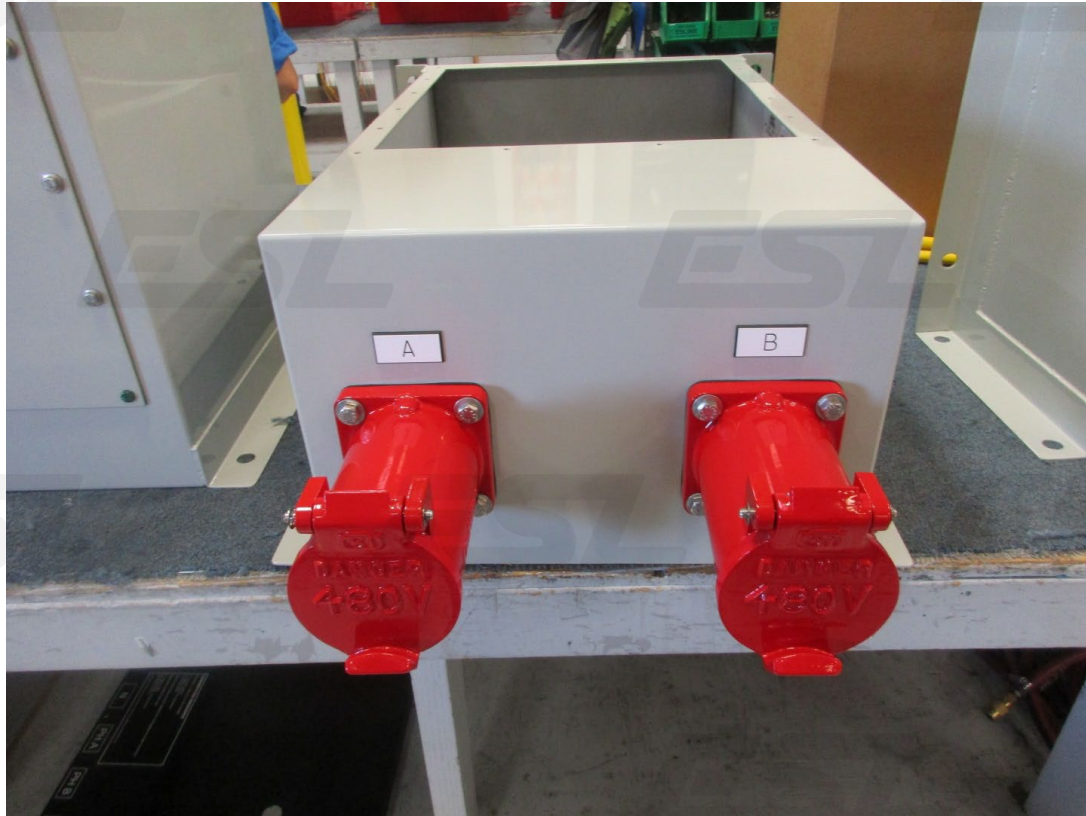
3. **TURN "CONTROL POWER" SWITCH "OFF"**

- ALL LIGHTS SHOULD BE OFF

4. **DISCONNECT CABLES BETWEEN LOCOMOTIVE AND CABINET**



6500-13-US



5100-57A-US

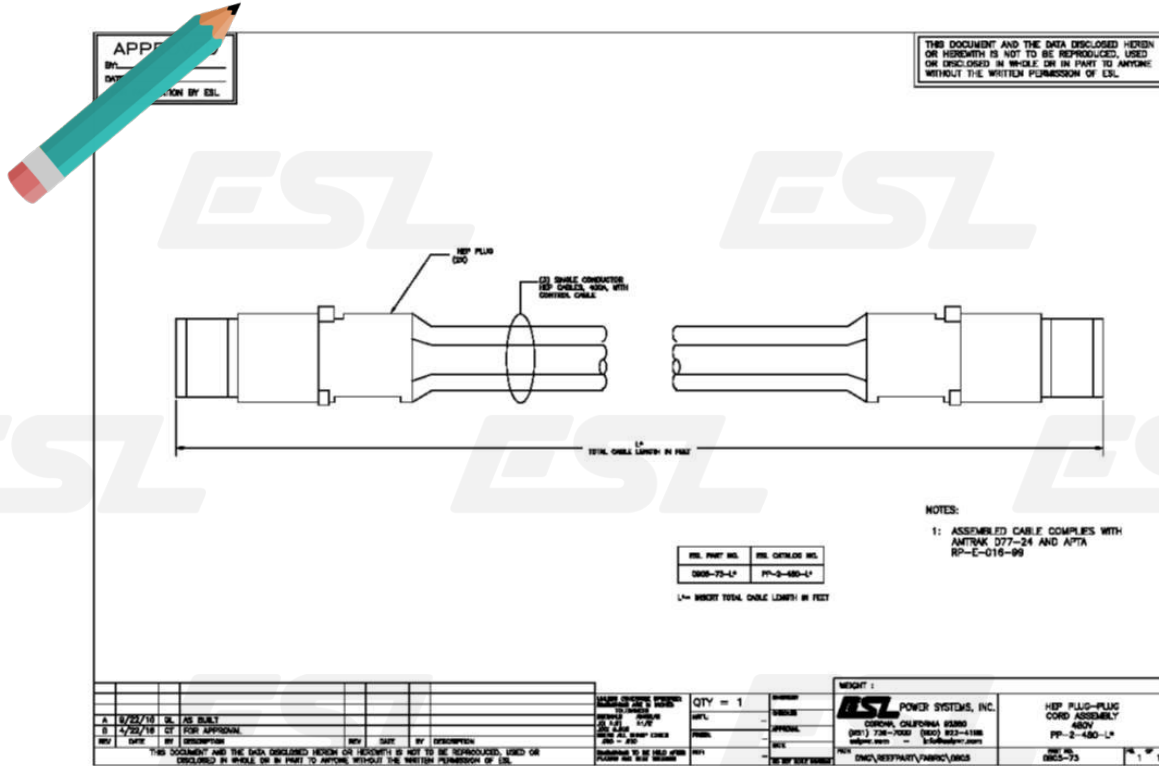


800A Inlet Connection Box with HEP receptacles on front.



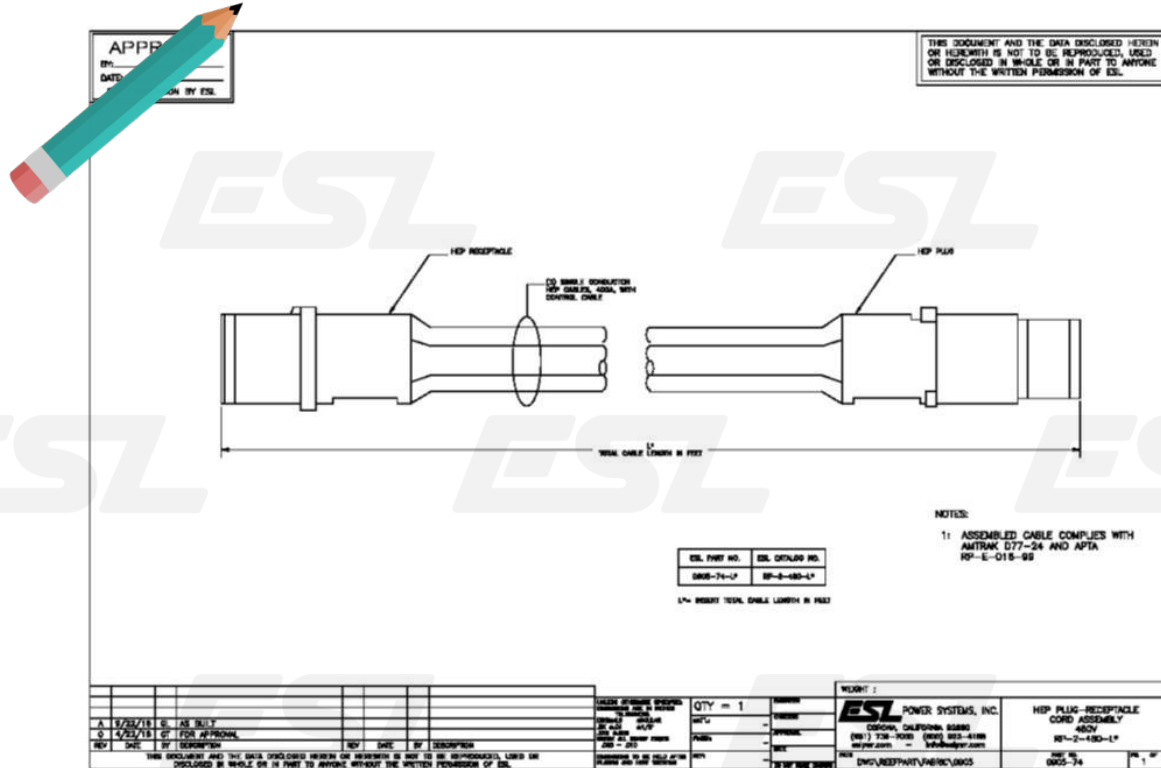
0905-73-12; 0905-73-32

Cable set with male plugs on both ends



0905-74-12; 0905-74-32; 0905-74-45

Cable set with male plugs on one end, Receptacle on the other end.



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