

Update : RP 185

**ELECTRICAL INFRASTRUCTURE, SAFETY,
AND INTEROPERABILITY FOR
TRANSPORT REFRIGERATION
SHOREPOWER**





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- Technology & Maintenance Council

... Turning Experience Into Practice

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Constructive Comments Are Always Appreciated!

- TMC welcomes your comments, but please make certain that they are constructive and appropriate before you turn in your evaluation sheet!
- *Thank You for Your Cooperation!*

RP 185 Transport Refrigeration Connections

This RP identifies electrical power and connection systems typically associated with transport refrigeration equipment. This Task Force will review recommendations to update the Purpose and Scope statements, provide clarification on connection systems and consider adding SAE and CharIN standards-following battery charging connections for emerging battery powered refrigeration systems.

Update Steps:

- Post current RP in draft form to TMC Connect
- Those interested should review / read RP 185 and sign up for the Task Force online or on Task Force Day
- Chairperson presents to S.1 on Task Force Day with initial recommendations on changes and updates at this meeting
- Task Force members input requested
- Draft updated with changes and comments
- Draft WIP shared at Fall 2024 Meeting
- Goal for approval Spring or Fall 2025

RP 185 Purpose & Scope (current)

Purpose (current) : *Disparate and outdated connection systems are sometimes a barrier to power eTRUs. This Recommended Practice (RP) defines the terminology and specifications for high-voltage, temporarily tethered (or "shorepower") truck, tractor or eTRU systems (high-voltage being defined as greater than 60 volts up to 600 volts AC root mean square (RMS) or 1000 volts DC.) Fleets should review their procedures and safety policies for use and handling of high voltages.*

Scope : This RP will identify electrical power and connection systems commonly used for eTRUs. It will cover the following topics associated with eTRU operation:

- Operating Voltage
- Wire and Cable
- Cord Management
- Mobile Equipment Connection Procedures
- Connector Types
- Dock and Pedestal Connections
- Safety Agency Listing
- Signage and Labeling
- Specialized Options and Features

TRU & Equipment Definitions

- TRU : Transport Refrigeration Unit
- Hybrid TRU : TRU capable of being powered by diesel or by electric energy sources.
- eTRU : Same as Hybrid TRU but typically used with TRUs that are shore power connection-capable and primarily used for stationary storage or used to describe diesel generator-powered electric compressor systems.
- Battery-Electric Hybrid TRU: Hybrid TRU with onboard battery and engine options
- Battery-Electric TRU: TRU with onboard battery and no engine
- Shore Power : Electrical connection between the grid and mobile equipment directly powered by the grid – not for EV-style battery charging
- EVSE : Electrical Vehicle Supply Equipment – for AC or DC battery charging, same standards for EV Truck battery charging

Updates to Purpose - Discussion

*Diesel-electric and battery powered electric transport refrigeration equipment require grid connectivity for optimum utilization. This Recommended Practice (RP) defines the terminology, specifications and connection equipment recommendations for **grid-connection and battery charging supply equipment for van, truck, container and trailer** transport refrigeration systems.*

Suggested Changes :

- Re-phrase purpose for wider applications and simplify
- Remove Voltage specs from Purpose
- Include both grid-connection and charging supply equipment descriptions
- Update eTRU and Hybrid TRU definition alignment
- Align/Update RP 175 Conductive Charging with new standards

Updates to Scope - Discussion

This RP will identify electrical power and connection systems commonly used for diesel-electric and battery powered electric transport refrigeration equipment . It may cover the following topics:

- Electrical Safety
- TRU Types
- Diesel-Electric Equipment
- Battery Powered Equipment
- NFPA 70 Section 625 compared to Section 626
- Operating Voltage and Current Ratings by Equipment type
- Wire and Cable
- Cord Management
- Equipment inlet/charging port location standardization
- Connector Types
 - Shore Power – Recommend moving away from all twist lock and use pin and sleeve
 - EVSE for Charging – SAE J3068 Type II Three Phase, SAE J3400, NACS, CCS, MCS
- Mobile Equipment Connection Procedures
- Shore Power Dock and Pedestal Connection Systems vs basic switch and cord
- EVSE Equipment Standards for charging
- Safety Agency Listing & Utility Make Ready Programs
- Signage and Labeling
- Cable Management
- Conspicuity markings for cords and connectors
- Specialized Options and Features

TRU Types by Shore Power Voltage

TRU Type	Recommended Shore Power
Van	120VAC or 208-240VAC Single Phase
Small Truck	208-240VAC Single Phase, 208-240 Three Phase
Large Truck	480VAC, 30A Three Phase, 3P+G (some 208-240VAC Three Phase)
Trailer	480VAC, 30A Three Phase, 3P+G (some 208 and 240VAC Three Phase)
Domestic Rail Container	480VAC, 30A Three Phase, 3P+G
Marine Container (ISO 1496)	480VAC, 32A Three Phase, 3P+G



- Transport Refrigeration Energy Connections are key to carbon reduction programs in refrigerated operations
- AC Shore Power (NEC Section 626) utilizes today's technologies and equipment you may already have
- AC and DC Charging (NEC Section 625) will be needed for battery powered equipment
- Shore Power circuits can be converted to EVSE charging equipment connection standards using SAE Standard SAE J3400 and SAE J3068, CCS and MCS

AC Connector Types

Shore Power
Twist Lock -
Legacy



Shore Power
Pin and Sleeve



SAE J1772 Type 1



SAE J3400
"NACS" AC



SAE J3068
Type 2 – Three
Phase



AC Charging EVSE, up to 20kW



Socket-Outlet
EVSE now part of
North American
Charging
Standard



DC Charging

- CCS 1
(North America)
- SAE J3400 NACS DC
(North America)
- MCS, MegaWatt Charging
(Global)



NFPA 70 Section 625 vs 626

- Section 625, Electric Vehicle Power Transfer System (battery charging)
- Section 626, Electrified Truck Parking Spaces, Part IV, Transport Refrigeration Units

The National Electrical Code (NEC) separates the requirements for Electric Vehicle Power Transfer Systems (625) and Electrified Truck Parking Systems (626) into 2 articles. There is a distinct difference between an electric vehicle power transfer system and an electrified truck parking space.

The electric vehicle supply equipment (EVSE) for an electric vehicle power transfer system (625) must be listed for the specified use as EVSE by an organization acceptable to the authority having jurisdiction. EVSE systems include the electrical conductors, related equipment, software, and communications protocols that deliver energy efficiently and safely to the vehicle. This equipment is specific to an EVSE system. It has specific ratings and requirements.

Equipment that is utilized in electrified truck parking spaces (626) is not specific and is commonly found in other types of installations. There is typically no software and no communications between the source and the load of electrified truck parking space equipment.

Discussion, Participation & Next Steps

- Questions ?
- Participation : You can have input !
 - Download and review/comment offline / email
 - Comment in TMC Connect
 - Set up 1:1 call
- Next steps
 - Receive feedback
 - Make updates to draft / hold a few meetings
 - Present at TMC Fall 2024

Contact Information:

Matt Srnec

Principal Electrification Engineer

Thermo King

Minneapolis, Minnesota

matt.srnec@tranetechnologies.com

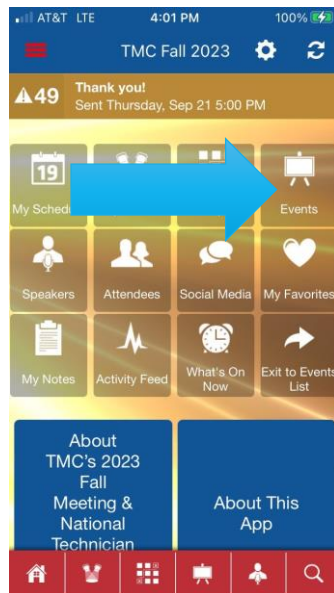
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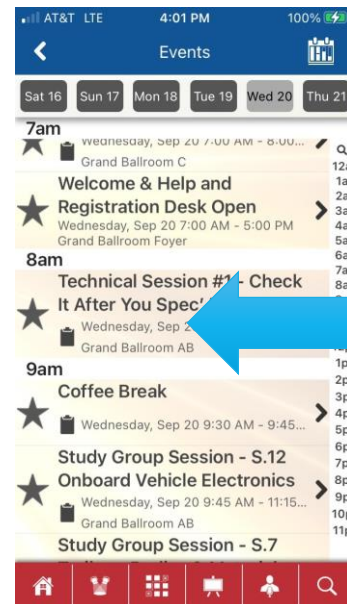
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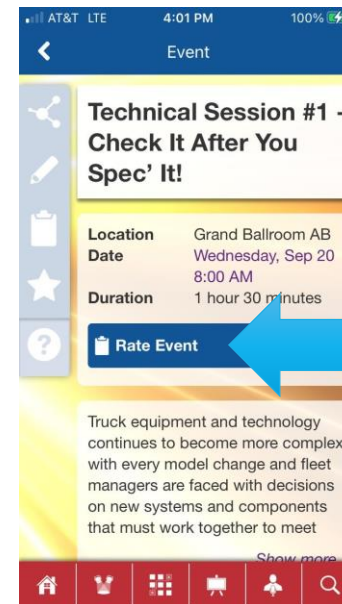
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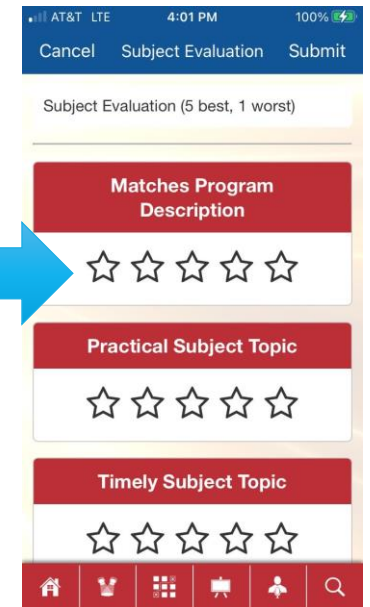
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