

Rhombus DC Fast Charger Wiring Guide

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Applies to the following Rhombus Products

Dispenser

- RES-D2-CS20 & RES-D2-CS20-V2G

Inverter (PCS)

- RES-DCFC60-480 & RES-DCVC60-480-V2G (60kW)
- RES-DCVC125-480 & RES-DCVC125-480-V2G (125kW)

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WIRE GUIDE QUICK REFERENCE

The following are recommended Wire Sizes, based on 35°C Ambient temperatures, and cable in conduit. Follow NEC standards and use only copper conductors.

Cable Description	Minimum Size (In Conduit)	Maximum Size (In Conduit)	# of Conductors	Notes
60kW PCS (Zone 1) (RES-DCVC60-480, AC Grid (PVC conduit, typically ~3"))				
480 VAC Grid	2 AWG	1 AWG	3	Brown, Orange, Yellow
Neutral	4 AWG	4 AWG	1	White/Grey
Ground/Earth	4 AWG	4 AWG	1	Green
125kW PCS (RES-DCVC125-480, AC Grid (PVC conduit, typically ~3"))				
480 VAC Grid	3/0	4/0	3	Brown, Orange, Yellow
Neutral	1/0	1/0	1	White/Grey
Ground/Earth	4 AWG	4 AWG	1	Green
60kW and 125kW Charger Options DC Power (PVC conduit, typically ~3" Dia)				
High Voltage DC Power	3/0 (up to 400ft) 4/0 (500ft ²)	373 MCM	2	1000V, 200A + Red/ - Black
High Voltage Sense +/-	18ga	16ga	2	1000V, + Red/ - Black
Ground/Earth	4 AWG	4 AWG	1	Green
60kW & 125kW PCS Charger Options Low Voltage / Communication (Recommend Steel conduit, typically ~ 1.25")				
15VDC (+/-)	18 ga.	10ga	2 + Shield	5A
24VDC (+/-)	20 ga.	12ga	2 + Shield	1A
CAN (H,L)	20ga.	12ga	2 + Shield	Shielded, Twisted Pair
EPO (In/Out)	20ga.	12ga	2 + Shield	1A
Modbus (Rx/Tx)	20ga.	12ga	2 + Shield	Shielded, Twisted Pair

Note: Evaluate wiring compliance w/ local rules and regulations before finalizing wire/cable selections.

Rhombus stock's limited quantities of the low voltage and communication wire recommendations below for purchase for smaller installations.

Wiring for High Voltage, High Power DC Power Connections

Note: High voltage wires must be separated from low voltage/communication wiring in 2 separate conduits a minimum of 18" apart.

High Voltage DC Power Cables

Recommended sourcing.

Distributor/Mfg	Description
Southwire	DLO cable, 2000 Volts (EPR/XL-CPE), UL RHH/RHW-2, 2000 V and C(UL) RW90 1000 V. Flexible, Oil-, Sunlight- and Ozone-Resistant, Flame-Retardant, -40C to 90C
Anixter	
General Cable	
IEWC	

These cables transfer high voltage, high current between the PCS and the dispenser.

High Voltage Sense

Recommended sourcing.

Distributor/Mfg	Model/PN	Wire Gauge	Description
Southwire	TC-ER E75755	18ga	3 + Shield & Drain wire.

These wires measure voltage at the dispenser to compensate for resistance (voltage drop) between the PCS and the dispenser.

Wiring for Low Voltage and Communication Connections

(Note: High voltage wires must be separated from low voltage/communication wiring to ensure for reliable communication. High voltage cables/wires/grounds in one conduit and low voltage/communication wires in a second conduit.)

Wire gauge depends on wire length between inverter and dispenser. See lookup table at end of this document for reference.

Wiring for Modbus Communication

Recommended sourcing.

Distributor/Mfg	Model/PN	Wire Gauge	Conductors	Description
Alpha Wire	5430/2	18	2	600V AWM/UL1015, 18 AWG, -30 to 105C

These wires provide diagnostic and supplemental information between the PCS and the dispenser.

- Communication/Control Cable
- 18 AWG, 16AWG or 14AWG, Copper Annealed Tinned
- Twisted Pair
- Shielded with tinned drain wire
- Impedance Range: 100 ohms to 200 ohms
- Capacitance between conductors: <30pF per foot
- Capacitance between conductors and shield: <60pF per foot
- Propagation Velocity: >=60%
- 300V or 600V
- Outer Jacket: PVC
- UL Min. Temp Rating: 75C Dry

Other web references: (https://ctlsys.com/support/rs-485_cables_for_bacnet_and_modbus/)

Sourcing recommendation. (Note

Wiring for CAN Communication

Recommended sourcing.

Distributor/Mfg	Model/PN	Wire Gauge	Conductors	Description
Champlain	23-00065	18	2	EXRAD EXRAD CAN-Bus Cable, 18 AWG, Twisted, Shielded Pair

These wires provide primary power control communication between the PCS and the dispenser.

Wiring for EPO, 15V, 24VDC

Recommended sourcing.

Distributor/Mfg	Model/PN	Wire Gauge	Conductors	Description
Anixter	2A-1402S	14	2	14-2C STR BC VN TRAY CBL THHN CDRS PVC-NYL FOIL SHD, PVC JKT 600V 90C UL TC E2

UL Type TC or TC-ER (TC:Tray Cable or TC-ER: Tray Cable - Extended Run).

- 90degC dry, 75degC wet
- 150V, 300V or 600V insulation rating
- 2 conductor, copper
- Shielded
- 12 AWG to 18AWG

TC-ER may be available with 2 conductors depending on manufacturer but typically has 3 or more conductors (for strength) so extra conductor would not be used.

Wiring Sizing Lookup

Modbus and CAN wires may also be used for EPO, 15V and 24V power/signal wiring to reduce # of wire types sourced. Twisted/shielded Modbus, CAN and EPO wires required to reduce possible electrical interference and improve system operational reliability. Consider pull strength of wire for longer cable runs.

Wire Length vs. Gauge (PCS to Dispenser)	Wire Gauge			
	15V	24V	Modbus or EPO	CAN or EPO
Max Resistance / V drop	1.2Ω / 3V	24Ω / 3V		
0-50 ft	12-18ga	12-20ga	12-20ga	12-20ga
50-100 ft	12-16ga	12-20ga	12-20ga	12-20ga
100-150 ft	12-14ga	12-20ga	12-20ga	12-20ga
150-200 ft	12-14ga	12-20ga	12-20ga	12-20ga
200-250 ft	12ga	12-20ga	12-20ga	12-20ga
250-300 ft	12ga	12-20ga	12-20ga	12-20ga
300-350 ft	12ga	12-20ga	12-20ga	12-20ga
350-400 ft	10ga	12-20ga	12-20ga	12-20ga
400-450 ft	10ga	12-20ga	12-20ga	12-20ga
450-500 ft	10ga	12-20ga	12-20ga	12-20ga
500- ft	10ga	12-20ga	12-20ga	12-20ga