Wireless Charging System

1 kW

Datasheet

Wireless Power Transfer

Battery Charging

Industrial

DELTA

1000W 24 V & 48 V Wireless Charging System

Features

- No part wear
- Low maintenance
- Wide input range 85-265 V_{AC}
- Natural cooling - no fans mean reliable and silent operation
- Efficiency over 90% in typical conditions
- CAN bus for charge control and status
- Optional stand-alone charging using battery profiles
- Small and lightweight onboard unit
- Optimised for automated charging

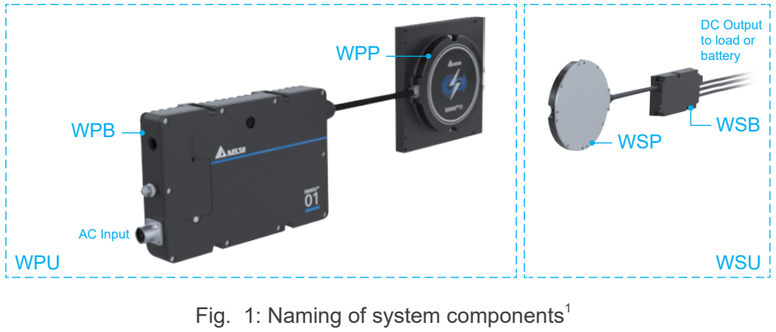

Fig. 1: Naming of system components[1]

AC input	
Connector type	C14
Nominal AC Input voltage	1-phase, 120 V_{AC} or 230 V_{AC}
AC input voltage range[2]	85 V_{AC} to 265 V_{AC}
AC Input nominal frequency	50 / 60 Hz
AC input frequency range	47 Hz to 63 Hz
Maximum AC input current	13 A
Maximum efficiency	92% (24 V version), 93% (48 V version)
Minimum power factor at 100% load	> 0.95
Maximum inrush current[3]	< 65 A and for < 10 msec
Touch current[4]	< 3.5 mA
Standby power consumption[5]	< 4 W

1 WPB = primary box, WPP = primary pad, WSB = onboard electronics, WSP = onboard pad
2 When input voltage is less than 100 V_{AC}, the output power is automatically reduced to avoid the input current exceeding 13 A.
3 At maximum AC input voltage and ambient temperature of ≤ 25 °C (< 77 °F)
4 At maximum AC input voltage
5 When WSU and WPU are not paired

DC output		
Voltage (nominal)	**24 V**	**48 V**
Voltage range	12 V_{DC} to 30 V_{DC}	24 V_{DC} to 60 V_{DC}
Voltage accuracy	±0.5 %	
Maximum current	41.7 A	20.8 A
Ripple voltage[1,2]	< 1.5 V	
Load current accuracy	±2% between 8 A and 41.7 A ±5% between 4 A and 8 A	±2% between 4 A and 20.8 A ±5% between 2 A and 4 A
Rise time (typical)	< 5 s (0-100% load)	
Ripple current		
High frequency > 1 kHz	< 4 A	
Low frequency < 360 Hz	< 6 A	
Maximum output power	1000 W	
Cable specification		
Cable length	500 mm	
Design of cable end	Terminated with insulated M10 ring terminal.	
Battery draw when not charging	< 70 mA	< 40 mA
Battery draw in Sleep mode	< 2 mA	

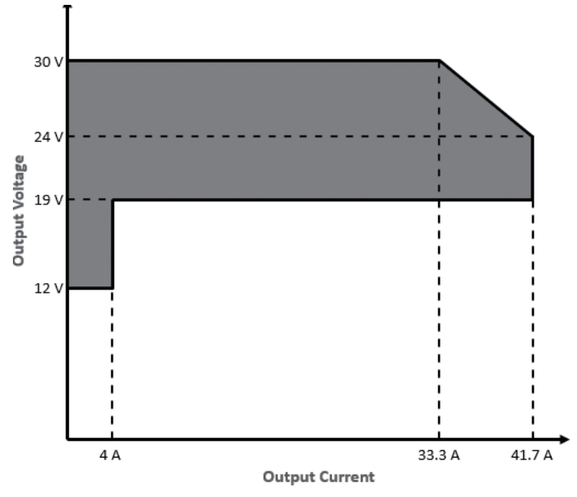

Fig. 2: 24 V output operating area

1 For output voltage >19 V (24 V version) and >38 V (48 V version)
2 Resistor & 100 mF capacitor load

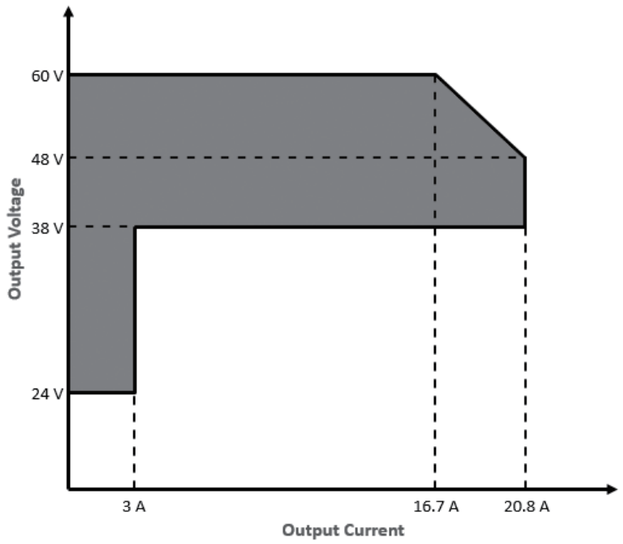

Fig. 3: 48 V output operating area

External control connector	
Functions	Sleep: Reduce current draw from the battery when not charging Enable: start and stop charging when using profile mode
Cable length	100 mm
Design of cable end	Molex MX150 series, P/N: 33471-3301

CAN bus connector	
Functions	Connection to smart rechargeable batteries, machine systems and development GUI application.
CAN bus specification	ISO 11898-1 & ISO 11898-2 (CAN 2.0A) ID Bits 11; Bit rate variable up to 1 Mbit / sec
Isolation to main DC output	500 V_{AC} or 707 V_{DC}
Cable length	100 mm
Design of cable end	Molex MX150 series P/N: 33471-0201

Temperature sensor	
Functions	Connection to battery (-VE) terminal to establish battery temperature. Gives optimal charging when used with a temperature compensated profile.
Sensor	NTC embedded into ring terminal.
Cable length	500 mm
Design of cable end	Terminated with non-insulated, M10 ring terminal.

Environmental conditions	
Operating temperature[1]	-20 ℃ to +50 ℃
Storage temperature range	-40 ℃ to +85 ℃
Relative humidity	0% to 95%, non-condensing
Maximum operating altitude	3,000 m
Shock (non-operating)	IEC 60068-2-27 compliant, 25 g, 11 msec, 3 shock per direction, 6 directions
Vibration (non-operating)	IEC 60068-2-6 compliant, 5 g, 10-500 Hz, 60 minutes per axis, 3 axes
Ingress protection[2]	
WPB, WPP, WSP	IP65
WSB	IP40

Data storage	
Charger life data	Charge delivered (Ah)
	Charge cycles
	Up time (seconds)
	Load time (seconds)
	Idle time (seconds)

Protection and reliability		
Main DC output (nominal)	24 V	48 V
Over voltage protection	32.5 V_{DC} ± 1.5 V_{DC}	65 V_{DC} ± 3 V_{DC}
Over current protection	48 A ± 2 A	24 A ± 1 A
Other protection	Short circuit, reverse battery, over temperature[3]	
MTBF (Mean Time Between Failures)	100,000 hrs[4]	

Approvals and Compliance		
	USA / Canada	Europe
Safety marks	$_{C}MET_{US}$	CE
Safety	UL 60950-1 / UL 62368-1 CAN/CSA C22.2 no. 60950-1 / no. 62368-1	EN 60950-1, EN 62368-1
EMC	FCC 15B, 18B, ICES-003, RSS-216, Class A	ETSI EN 301 489-1, ETSI EN 301 489-17, EN 55011, EN 61000-6-4, EN 61000-6-2, Class A
RF	FCC Part 15.247, FCC Part 15.209, RSS-247	ETSI EN 300 328
EMF	EN 62311, IEEE C95.3	

1 Output power derated to stop WSB case temperature exceeding 90 ℃ at higher ambient temperatures. Performance at high ambient dependant on WSB heatsinking.
2 Verified by Delta
3 WSB case limit is 90 ℃
4 Telcordia SR-332, Method I, Case III, Issue 2, 25 ℃ , 230 V_{AC}, full load, 90% confidence level, based on component stress.

Methods and Limits[1]		
Standard	Test level	Acceptance criteria
Conducted and radiated emissions CISPR11 EN 55011 FCC CFR47 Part 15.B	Class A Limits[2]	
Line harmonics EN / IEC 61000-3-2	Class A (<16 A per phase)	
Electrostatic discharge (ESD) EN / IEC 61000-4-2	EN 61000-4-2, ±4 kV Contact / ±8 kV air	Performance Criteria B
Radiated immunity EN / IEC 61000-4-3	10 V/m (80 MHz to 1,000 MHz) 3 V/m (1,000 MHz to 6,000 MHz)	Performance Criteria A
Electrical fast transient EN / IEC 61000-4-4	±2 kV	Performance Criteria B
Surge immunity EN / IEC 61000-4-5	±2 kV (asymmetrical) ±1 kV (symmetrical)	Performance Criteria B
Conducted immunity EN / IEC 61000-4-6	10 V_{RMS} (150 kHz to 80 MHz)	Performance Criteria A

Ecological characteristics	
WEEE (Waste Electrical and Electronic Equipment Directive)	2012/19/EU
RoHS (Restriction of Hazardous Substances Directive)	2011/65/EU, 2015/EU/863
REACH	1907/2006/EC

Mechanical design	
Dimensions (L x W x H)	
WPB	280 x 192 x 60 mm
WPP and WSP	Ø 160 x 19 mm
WSB	168 x 82 x 28 mm
Weight (typical)	
WPU	5.4 kg
WSU	1.5 kg
Cooling	
WPU	Natural convection
WSU	Contact
Pad orientation	Vertical[3]
Pad air gap range	0 to 20 mm
Pad misalignment range	0 to 20 mm
Status LEDs	On WPB: AC present, Charging, Fault

1 Class B available on request
2 Additional external cable filtering may be required depending on installation environment
3 If mounted horizontally the user must take full responsibility to ensure there are no metallic objects are present between the pads during charging

Status LEDs

	AC present	Charging	Fault
No input	Off	Off	Off
Ready	On	Off	Off
Charging	On	Flash	Off
Charge complete[1]	On	On	Off
Fault	On	Off	Flash

1 Profile mode only

Dimension Drawings

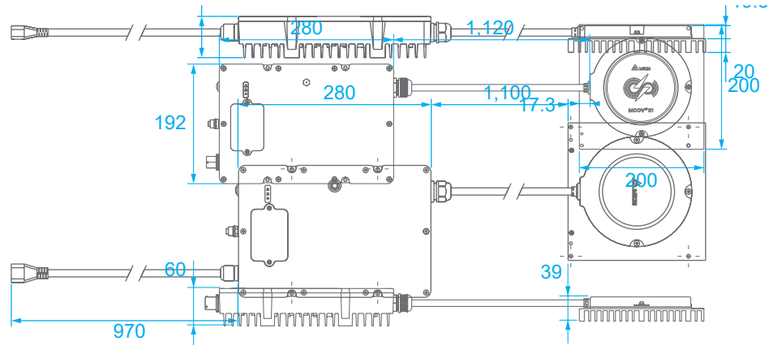

Fig. 4: WPU dimensions (mm)

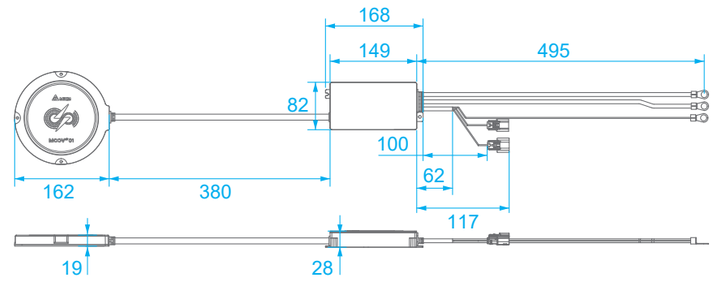

Fig. 5: WSU dimensions (mm)

Product Model Name

Model	Power	Output
EOE14010738	WPU 1 kW US	24 / 48 V
EOE14010739	WPU 1 kW EU	24 / 48 V
EOE14010740	WSU 1 kW	24 V
EOE14010803	WSU 1 kW	48 V
EOE99000823	1 kW Dev Kit	N / A

Smarter. Greener. Together.

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