## UPS Uninterruptable AC/DC Power Supply

### **TSPC-UPS Series**

- Compact universal power supply for uniterruptable 24 VDC output voltage
- Battery protection for over voltage, deep discharge, short circuit and reverse connection
- Alarm outputs for input, output and battery condition
- Remote On/Off for UPS function and power supply
- Controlled end of charge voltage by battery temperature sensor
- International safety approval package
- Suitable for various external 12 VDC lead acid batteries







This power supply provides an integrated professional battery management system to charge and monitor an external lead-acid battery. The result is a complete DC-UPS system in a compact housing with no additional parts needed. The external connected 12 V battery will be charged and held in charged mode by the power supply. In the event of a mains power failure the battery will supply the output power until the battery is discharged. To avoid overcharging the battery, an external temperature sensor adjusts the battery voltage automatically to the required end of charge voltage. This can extend the battery life. The battery is protected against deep discharge. Mains power and battery status are monitored regularly and failures indicated by corresponding LED's and alarm outputs. The module also provides an external On/Off input to switch-off the battery.

Models				
Order code	Input voltage range	Output current max.*	Output Power max.	Back up battery
TSPC 240-124 UPS	Low Line : 85 – 132 VAC High Line: 187 – 264 VAC	24 VDC / 12 A	240 W	12V lead acid battery (to purchase on local market)

\* Maximum current at nominal Vout

## **TSPC-UPS Series**

Input Specifications	5			
Input voltage	– nominal ranges	100 – 120 / 220 – 240 VAC by selection switch		
	– effective ranges	85 – 132 / 187 – 264 VAC		
Input voltago fraguency		(output current derating at low input voltage see page 6 47 – 63 Hz		
Input voltage frequency		EN 61000-3-2		
Harmonic limits				
Holdup time		10 ms min.		
Inrush current				
Recommended circuit bre	•	16.0 A max. characteristic B or C or slow blow fuse		
Output Specificatio				
Output voltage / current	– normal mode – buffer mode – output power derating above 24 VDC	24.0 – 26.0 VDC; 10 A (12 A in boost mode) 23.4 – 23.8 VDC; 10 A (12 A in boost mode) 5 %/V		
Efficiency (load >50 % of lout max.)	– normal mode – buffer mode	88 – 91 % (battery charged) 90 – 92 %		
Regulation	– Input variation – Load variation (0–100 %)	1 % max. 1 % max.		
Ripple and Noise (20MH	z bandwidth)	100 mVp-p max.		
Overload protection		120 – 140 % of lout nom., constant current		
Short circuit current		90 % of lout nom. (typ.), foldback		
Output overvoltage protection		45 V		
Overtemperature protecti	on	switch off at overtemperature, automatic restart		
Power back immunity		<b>35 V</b> (40 V for 1 sec.)		
Max. capacitive load		unlimited		
<b>General Specificati</b>	ons			
Operating temperature	– operation in normal & buffer mode	–25°C to +70°C max.		
	– normal mode boost output	derating above +60°C : 2.5%/K –25°C to +60°C max.		
		derating above +50°C : 1.67 %/K		
<b>C</b> 1	– buffer mode boost output	-25°C to +40°C max. -25°C to +85°C max.		
Storage temperature Temperature coefficient				
•		0.02 %/K		
Cooling Pollution degree		convection cooling, no internal fan		
•		2		
Humidity (non condensing)		95 % rel. H max.		
Reliability, calculated MTBF at +25°C acc. to IEC 61709		> 1.1 Mio. h against over voltage, deep discharge, overcharge,		
Battery protection		short circuit and reverse connection (built-in fuse)		
Signals	— Status	DC IN OK, DC OUT OK, BAT OK		
		all relay contact closed and LED on at status OK		
	– Trigger threshold: – Contact rating	21.0 – 22.5 V 30 VDC / 1.0 A max. 60 VDC / 0.5 A max.		

All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

## **TSPC-UPS Series**

Battery charging current         0.8 – 1.2 A           Nominal battery valtage (cit 25°C)         13.6 VDC [factory setting]           Battery veltage adjustment range         13.0 – 14.4 VDC           Battery veltage adjustment range         13.0 – 14.4 VDC           Battery veltage adjustment range         13.0 – 14.4 VDC           Battery veltage adjustment range         10.4 – 11.4 VDC [buffer mode of 25°C]           Battery test interval (acc. to jumper setting)         15.5 or 10min           Battery test interval (acc. to jumper setting)         10.4 – 11.4 VDC [buffer mode only]           Battery disconnection         9.3 – 10.2 VDC [buffer mode only]           Battery test interval (acc. to jumper setting)         2000 m           Safety standards         - Information technology equipment           - Electronic equipment for power installation         - according to IEC/EN 60950-1, UL 60950-1, UL 60950-1, 02           Safety standards         - Information technology equipment         EIEC/EN 60950-1, UL 60950-1, 02           - Electronic equipment for power installation         - Safety of transformers         EIA 60007-61 SE X-8 LIC 14           - Control equipment for power installation         - Conducted Ri suppression on input         EIEC/EN 60052-9           Electronic equipment for bacadous location         - Conducted Ri suppression on input         EIEC/EN 6000-42 & 4V RV RV reiteria B	General Specificatio	<b>ns</b> (continued)			
Battery voltage adjustment range         13.0 - 14.4 VDC           Battery restistance test         100mOhm min. (normal mode at 25°C)           Battery test current         2.5A / 60ms typ. [normal mode at 25°C]           Battery test interval (acc. to jumper setting)         15s or 10min           Battery test interval (acc. to jumper setting)         15s or 10min           Battery test current         9.3 - 10.2 VDC (buffer mode only)           Battery remote Off         disconnects battery in buffer mode (see page 6 - connector)           Automatic battery temperature compensation range         -15°C - 50°C           Altivude during operation         2000 m           Sofety standards         - Information technology equipment - Electrical equipment for mochines - Electrical equipment for power installand - Sofety of transformes         EEC/EN 40950-1, UL 60950-1, CSA 22.2 No 60950-1-07           UL S08, CSA-C22.2 No.107         EN 80079-15 10.4TEX 1.269 X         www.tracapower.com/overview/tspc-ups           Class of protection         Sofety of transformes         EN 50178         EN 50178           Class of protection         Electronagenetic composition documents         EN 50074-0336         EN 50074-0336           Electromagnetic compatibility (EMC), Emissions         EN 5000-4-2, EN 5120-435         EN 5000-4-2, EN 5120-435           Electromagnetic compatibility (EMC), Emissions         ELEC/EN 61000-4-2, EN 5120-43	-		0.8 – 1.2 A		
Battery residence test         100mOhm min. (normal mode at 23°C)           Battery test current         2.5A / 60ms typ. [normal mode at 23°C]           Battery test current         2.5A / 60ms typ. [normal mode at 23°C]           Battery test current         2.5A / 60ms typ. [normal mode at 23°C]           Battery test current         2.5A / 60ms typ. [normal mode at 23°C]           Battery test interval (acc. to jumper setting)         10.4 – 11.4 VDC (buffer mode only)           Battery test interval (acc. to jumper setting)         10.4 – 11.4 VDC (buffer mode only)           Battery isonnection         9.3 – 10.2 VDC (buffer mode only)           Battery isonnection         9.3 – 10.2 VDC (buffer mode only)           Battery isonnection         9.3 – 10.2 VDC (buffer mode only)           Battery isonnection         2000 m           Control equipment for mode isonnecting         – 15°C – 50°C           Altitude during operation         cocritic equipment for nozover installation           - Electrical equipment for nozardous location         – Safety of transformers           - Control equipment for nozardous location         – Cartification documents           - Conducted It suppression on input         – N 5000 - 40 × N 12 C9 X           - Conducted It suppression on input         – Rodiated It suppression on input           - Rodiated R suppression         EIC/EN 61000 - 42 4 kV / 8 kV <td colspan="2">Nominal battery voltage (at 25°C)</td> <td colspan="3">13.6 VDC (factory setting)</td>	Nominal battery voltage (at 25°C)		13.6 VDC (factory setting)		
Battery test current         2.5A / 60ms typ. [normal mode at 25°C]           Battery test interval (acc. to jumper setting)         15s or 10min           Battery warning         10.4 – 11.4 VDC [buffer mode only]           Battery monte Off         disconnects battery in buffer mode (see page 6 - connector)           Automatic battery temperature compensation range         -15°C - 50°C           Altitude during operation         2000 m           Isolation         according to IEC/EN 60950-1, UL 60950-1, UL 60950-1, UL 508           Safety standards         - Information technology equipment - Industrial control equipment - Bectrical equipment for mochines - Safety of transformes - Control equipment for mochines - Control equipment for bacardous location - AIEX for 15 54 enclosure) - Centification documents         EN 60029-15 I3G EX nA IIC T4 certificate no.EFX 10 ATEX 1 269 X www.tracopower.com/overview/tspc-ups           Class of protection         JP 20 (IEC/EN 60550-1)         DATEX 1 269 X www.tracopower.com/overview/tspc-ups           Electronic equipment for protection         IP 20 (IEC/EN 60520-1)         EN 50102 class 8, EN 55022 class 8, Electromagnetic compatibility (EMC), Emission - Conducted RI suppression on input - Bectricol equipment / burst immunity - Electrostatic discharge (ESD) - Radiated RF field immunity - Bectrosolic discharge (ESD) - Radiated RF field immunity - Surge immunity - Electric A Eff field immunity - Bectrosolic discharge (ESD) - Radiated RF field immunity - Surge immunity - Bectrosolic discharge (ESD) - Radiated RF field immunity - Surge immunity - Bectrosolic discharge (ESD) - Radiated RF field immunity -	Battery voltage adjustment	range	13.0 - 14.4 VDC		
Battery test interval (acc. to jumper setting)         15s or 10min           Battery warning         10.4 – 11.4 VDC (buffer mode only)           Battery remote Off         disconnection           Automatic battery temperature compensation range         -15°C - 50°C           Althude during operation         2000 m           Isolation         according to IEC/EN 60950-1, UL 60950-1, UL 508           Safety standards         - Information technology equipment           - Electrical capipment for machines         - Electrical capipment for machines           - Electrical capipment for machines         - Control equipment for hazardous location           - Safety of transformers         - Control equipment for hazardous location           - ATEX [for IP 54 enclosure]         - Control equipment for hazardous location           - Control equipment for hazardous location         - Cantrol equipment for hazardous location           - Cantrol equipment for hazardous location         - Cantrol equipment for hazardous location           - Cantrol equipment for hazardous location         - Cantrol equipment for hazardous location           - Cantrol equipment for hazardous location         - Cantrol equipment for hazardous location           - Cantrol equipment for hazardous location         - Cantrol equipment for hazardous location           - Cantrol equipment for hazardous location         EN 650124243           <			100mOhm min. (normal mode at 25°C)		
Battery warning       10.4 - 11.4 VDC (buffer mode only)         Battery disconnection       9.3 - 10.2 VDC (buffer mode only)         Battery remote Off       disconnects battery in buffer mode (see page 6 - connector)         Automatic battery temperature compensation range       -15°C - 50°C         Altidude during operation       2000 m         Isolation       according to IEC/EN 60950-1, UL 60950-1, UL 508         Safety standards       - Information technology equipment - Industrial control equipment for machines - Electricic equipment for machines - Electronic equipment for bacardous location - ATEX [for IP 54 enclosure]       EN 60029-1, UL 60950-1, CSA 22.2 No 60950-1-07         UL 508, CSA-C22.2 No.107       EN 61558-2-16       EN 60079-15 II3G FX nA IIC T4 certification documents         Class of protection       - Cardid equipment for hazardous location - ATEX [for IP 54 enclosure]       ertificate no. EPS 10 ATEX 1 269 X www.tracopower.com/overiew/tspc-ups         Class of protection       IP 20 (IEC/EN 60529)       EN 61000-6-3; EN 61204-3 EN 50011 class B; EN 55022 class B, EN 55011 class B; EN 55022 class B, EN 55011 class B; EN 55022 class B, EN 61000-4-4       EN 61000-4-4       2 K//// criteria B IEC/EN 61000-4-4       2 K//// criteria B         Electrical discharge (ESD)       - Redicted RF field immunity - Redicted RF field immunity       EC/EN 61000-4-4       2 K//// criteria B         EC/EN 61000-4-4       1 V// a k// criteria B       IEC/EN 61000-4-4       1 V// a k/// crit	Battery test current		<b>2.5A / 60ms typ.</b> (normal mode at 25°C)		
Battery disconnection       9.3 – 10.2 VDC (buffer mode only)         Battery remote Off       disconnects battery in buffer mode (see page 6 - connector)         Automatic battery temperature compensation range       -15°C – 50°C         Althud during operation       2000 m         Isolation       according to IEC/EN 60950-1, UL 60950-1, UL 508         Safety standards       - Information technology equipment - Electrical equipment for machines - Electronic equipment for hozardous location - Safety of transformers - Certification documents       EIC/EN 60950-1, UL 60950-1, CSA 22.2 No 60950-1-07 UL 508, CSA-C22.2 No.107         EN 60204-1       EN 60204-1       EN 60204-1       EN 60204-1         EN 60204-1       EN 60204-1       EN 60204-1       EN 60204-1         EN 60204-1       EN 60079-15 II3G EX A IIC T4 certification documents       en 60209-15 II3G EX A IIC T4 certification documents         Class of protection       IP 20 (IEC/EN 60529)       Electronic equipment for hozardous location - Radiated RI suppression on input - Electrotical casharge (ESD)       EN 61000-6-2, EN 61204-3 EIC/EN 61000-4-4       EIC/EN 61000-4-4 S IIC V criteria B         Electronagnetic compatibility (EMC), Immunity - Surge immunity - Electrotical casharge (ESD)       EIC/EN 61000-4-4 S IIC V criteria A       EIC/EN 61000-4-4 S IIC V criteria A         Electronagnetic compatibility (EMC)       Surge immunity - Electrot	Battery test interval (acc. to	jumper setting)	15s or 10min		
Battery remote Off         disconnects battery in buffer mode [see page 6 - connected]           Automatic battery temperature compensation range         -15°C - 50°C           Altitude during operation         2000 m           Isolation         according to IEC/EN 60950-1, UL 60950-1, UL 508           Safety standards         - Information technology equipment           - Industrial control equipment         - IEC/EN 60950-1, UL 60950-1, UL 508           - Electronic equipment for machines         EN 60204-1           - Safety of transformers         EN 60204-1           - Control equipment for hazardous location         - ATEX (for IP 54 enclosure]           - ATEX (for IP 54 enclosure]         EN 60079-15 II36 EX nA IIC 14           - Control equipment for hazardous location         - ATEX (for IP 54 enclosure]           - Conducted RI suppression on input         - Radiated RI suppression on input           - Radiated RI suppression         EN 50011 class B, EN 55022 class B,           Electromagnetic compatibility (EMC), Emissions         EN 61000-6-2, EN 61204-3           - Bectrostatic discharge (ESD)         - Bectrostatic discharge (ESD)           - Radiated RI suppression on input         - Surge immunity           - Surge immunity         - Bectrostatic discharge (ESD)           - Rodiated RF field immunity         EC/EN 61000-4-2         4 KV / 8 kV			10.4 – 11.4 VDC (buffer mode only)		
Automatic battery temperature compensation range       -15°C - 50°C         Altitude during operation       2000 m         Isolation       according to IEC/EN 60950-1, UL 60950-1, UL 508         Safety standards       - Information technology equipment         - Idustrial control equipment for machines       - Electrical equipment for power installation         - Safety of transformes       - Safety of transformes         - Control equipment for hazardous location       - ATEX (for IP 54 enclosure)         - Control equipment for hazardous location       - ATEX (for IP 54 enclosure)         - Conducted R suppression on input       - Bactrod transformes         - Conducted R suppression on input       - Conducted R suppression on input         - Radiated RF field immunity       EN 61000-4-3, EN 61204-3         Electrostic discharge (ESD)       - Bactrostatic discharge (ESD)         - Radiated RF field immunity       EC/EN 61000-4-2, 4 kV / 8 kV       criteria B         - Bactrostatic discharge (ESD)       - Bactrostatic discharge (ESD)       IEC/EN 61000-4-3, 10 V / m criteria A         - Bactrostatic discharge (ESD)       - Bactria transient / bust immunity       - Bactrostatic discharge (ESD)       IEC/EN 61000-4-4, 10 V / m criteria B         - Rower frequency field immunity       - Mains voltage dips and interruptions       IEC/EN 61000-4-4, 10 V / m criteria A         Environment <td colspan="2"></td> <td colspan="3">9.3 – 10.2 VDC (buffer mode only)</td>			9.3 – 10.2 VDC (buffer mode only)		
Altitude during operation       2000 m         Isolation       according to IEC/EN 60950-1, UL 60950-1, UL 508         Safety standards       - Information technology equipment       IEC/EN 60950-1, UL 60950-1, CSA 22.2 No 60950-1-07         UL 508, CSA-C22.2 No.107       Electrical equipment for machines       EN 60204-1         - Electrical equipment for machines       EN 60204-1       EN 60204-1         - Electrical equipment for hzaardous location       - ATEX (for IP 54 enclosure)       EN 61558-2-16         - Control equipment for hazardous location       - ATEX (for IP 54 enclosure)       errificate no.EPS 10 ATEX 1 269 X         - Control equipment for hazardous location       - ATEX (for IP 54 enclosure)       www.tracopower.com/overview/tspc-ups         Class of protection       IP 20 (IEC/EN 40529)       Electromagnetic compatibility (EMC), Emissions       EN 61000-6-3, EN 61204-3         - Conducted RI suppression on input       - Radiated RF field immunity       EN 55011 class B, EN 55022 class B,         - Radiated RF field immunity       ELectrostatic discharge (ESD)       IEC/EN 61000-4-3 10 V / m criteria B         - Rodiated RF field immunity       ELEC/EN 61000-4-3 10 V / m criteria A         - Rower frequency field immunity       IEC/EN 61000-4-4 2 4 kV / 8 kV criteria B         - Rower frequency field immunity       - Electrical fast transient / bust immunity         - Electrical fast transi	Battery remote Off		disconnects battery in buffer mode (see page 6 - connector		
Isolation       according to IEC/EN 60950-1, UL 60950-1, UL 508         Safety standards       - Information technology equipment       IEC/EN 60950-1, UL 60950-1, CSA 22.2 No 60950-1-07         Industrial control equipment for machines       ELEctronic equipment for power installation       EN 60204-1         Electronic equipment for power installation       Sofety of transformers       EN 60204-1         Electronic equipment for power installation       EN 61558-2-6, EN 61558-2-16         EO control equipment for hazardous location       EN 60079-15 IIG EX nA IIC T4         ATEX (For IP 54 enclosure)       certificate no. EPS 10 ATEX 1 269 X         Very       Class of protection       IP 20 (IEC/EN 60529)         Electromagnetic compatibility (EMC), Emissions       EN 61000-6-3, EN 61204-3         Electromagnetic compatibility (EMC), Immunity       EN 61000-6-2, EN 61204-3         Electrostic discharge (ESD)       EIC/EN 61000-42       4 kV / 8 kV         Adiated RI suppression       IEC/EN 61000-43       IV / 2 kV       criteria B         Radiated RF field immunity       EIC/EN 61000-44       2 kV       criteria A         IEC/EN 61000-45       IO V / an       criteria A         Power frequency field immunity       EIC/EN 61000-45       IN V / 2 kV       criteria A         IEctrostatic discharge (ESD)       IEC/EN 61000-45       IN V / 2 k	Automatic battery temperate	ure compensation range	−15°C − 50°C		
Safety standards       - Information technology equipment       IEC/EN 60950-1, UL 60950-1, CSA 22.2 No 60950-1-07         Safety standards       - Information technology equipment       EC/EN 60950-1, UL 60950-1, CSA 22.2 No 60950-1-07         UL 508, CSA-C22.2 No.107       EN 60204-1         Electronic equipment for machines       EN 50078         - Control equipment for hazardous location       - ATEX (for IP 54 enclosure)         - Certification documents       www.tracopower.com/overview/tspc-ups         Class of protection       IP 20 (IEC/EN 60529)         Electromagnetic compatibility (EMC), Emissions       EN 61000-6-3, EN 61204-3         - Conducted RI suppression on input       EN 61000-6-2, EN 61204-3         - Radiated RI suppression       EIC/EN 61000-4-2         - Radiated RF field immunity       EIC/EN 61000-4-3         - Surge immunity       - Electrostatic discharge (ESD)         - Radiated RF field immunity       EIC/EN 61000-4-3         - Surge immunity       - Electrical fast transient / burst immunity         - Surge immunity       - Electroid interruptions         - Rowis voltage dips and interruptions       EC/EN 61000-4-3       10 V / m criteria B         - Rodiated RF field immunity       - Electrical fast transient / burst immunity       EC/EN 61000-4-5       1 kV / 2 kV criteria B         - Immunity to conducted RF disturbanc	Altitude during operation		2000 m		
<ul> <li>Industrial control equipment</li> <li>Electrical equipment for machines</li> <li>Electrical equipment for power installation</li> <li>Safety of transformers</li> <li>Control equipment for hazardous location</li> <li>ATEX (for IP 54 enclosure)</li> <li>Certification documents</li> <li>EN 60204-1</li> <li>EN 60729-75 Ili3G EX AN IIC T4</li> <li>Certification documents</li> <li>EN 60729-75 Ili3G EX AN IIC T4</li> <li>Certification documents</li> <li>Safety dass I (IEC 536)</li> <li>Degree of protection</li> <li>Electronagnetic compatibility (EMC), Emissions</li> <li>Conducted RI suppression on input</li> <li>Radiated RI suppression on input</li> <li>Electrostatic discharge (ESD)</li> <li>Elec/EN 61000-4-3</li> <li>10 V / m criteria B</li> <li>Elc/EN 61000-4-5</li> <li>1k V / 2 kV criteria B</li> <li>Elc/EN 61000-4-5</li> <li>1k V / 2 kV criteria B</li> <li>Elec/EN 61000-4-6</li> <li>10 V criteria B</li> <li>Elec/EN 61000-4-6</li> <li>10 V criteria A</li> <li>Ervironment</li> <li>Vibration acc. IEC 60068-2-27</li> <li>3 axis, sine sweep, 10 - 55 Hz, 1 g, 1 oct/min</li> <li>Shack acc. IEC 60068-2-27</li> <li>3 axis, sine sweep, 10 - 55 Hz, 1 g, 1 oct/min</li> <li>Shack acc. IEC 60068-2-27</li> <li>3 axis, sine sweep, 10 - 55 Hz, 1 g, 1 oct/min</li> <li>Shack acc. IEC 60068-2-27</li> <li>3 axis, sine sweep, 10 - 55 Hz, 1 g, 1 oct/min</li> <li>Shack acc. IEC 60068-2-27</li> <li>3 axis, sine sweep, 10 - 55 Hz, 1 g, 1 oct/min</li> <li>Shack acc. IEC 60068-2-27</li> <li>Shack acc. IEC 60068-2-27</li> <li>Shack</li></ul>	Isolation		according to IEC/EN 60950-1, UL 60950-1, UL 508		
Degree of protection       IP 20 (IEC/EN 60529)         Electromagnetic compatibility (EMC), Emissions       EN 61000-6-3, EN 61204-3         - Conducted RI suppression       EN 55011 class B, EN 55022 class B,         - Radiated RI suppression       EN 55011 class B, EN 55022 class B,         Electromagnetic compatibility (EMC), Immunity       EN 61000-6-2, EN 61204-3         - Radiated RF field immunity       EN 61000-4-2       4 kV / 8 kV         - Radiated RF field immunity       EN 61000-4-3       10 V / m         - Electrical fast transient / burst immunity       IEC/EN 61000-4-4       2 kV         - Surge immunity       - Surge immunity       IEC/EN 61000-4-5       1 kV / 2 kV         - Nower frequency field immunity       IEC/EN 61000-4-5       1 kV / 2 kV       criteria B         - Nower frequency field immunity       IEC/EN 61000-4-5       1 kV / 2 kV       criteria A         - Nains voltage dips and interruptions       IEC/EN 61000-4-8       30 A / m       criteria A         Environment       - Vibration acc. IEC 60068-2-6;       3 axis, sine sweep, 10 – 55 Hz, 1 g, 1 oct/min       3 axis, sine sweep, 10 – 55 Hz, 1 g, 1 oct/min         Sock acc. IEC 60068-2-27       3 axis, sine smeep, 10 – 55 Hz, 1 g, 1 oct/min       3 axis, 15 g half sine, 11 ms         Enclosure material       - DIN-rail mounting       for DIN-rails as per EN 50022-35x15/7.5 <th>Safety standards</th> <th><ul> <li>Industrial control equipment</li> <li>Electrical equipment for machines</li> <li>Electronic equipment for power installation</li> <li>Safety of transformers</li> <li>Control equipment for hazardous location</li> <li>ATEX (for IP 54 enclosure)</li> </ul></th> <th colspan="2">UL 508, CSA-C22.2 No.107 EN 60204-1 EN 50178 EN 61558-2-6, EN 61558-2-16 EN 60079-15 II3G EX nA IIC T4 certificate no. EPS 10 ATEX 1 269 X</th>	Safety standards	<ul> <li>Industrial control equipment</li> <li>Electrical equipment for machines</li> <li>Electronic equipment for power installation</li> <li>Safety of transformers</li> <li>Control equipment for hazardous location</li> <li>ATEX (for IP 54 enclosure)</li> </ul>	UL 508, CSA-C22.2 No.107 EN 60204-1 EN 50178 EN 61558-2-6, EN 61558-2-16 EN 60079-15 II3G EX nA IIC T4 certificate no. EPS 10 ATEX 1 269 X		
Electromagnetic compatibility (EMC), Emissions       EN 61000-6-3, EN 61204-3         - Conducted RI suppression       EN 55011 class B, EN 55022 class B,         Electromagnetic compatibility (EMC), Immunity       EN 61000-6-2, EN 61204-3         - Electrostatic discharge (ESD)       - Electrostatic discharge (ESD)         - Radiated RF field immunity       IEC/EN 61000-4-2       4 kV / 8 kV         - Electrical fast transient / burst immunity       IEC/EN 61000-4-3       10 V / m         - Surge immunity       - Surge immunity       IEC/EN 61000-4-4       2 kV         - Nower frequency field immunity       - Immunity to conducted RF disturbances       IEC/EN 61000-4-5       1 kV / 2 kV         - Power frequency field immunity       - Nains voltage dips and interruptions       IEC/EN 61000-4-8       30 A / m       criteria A         Environment       - Vibration acc. IEC 60068-2-6;       3 axis, sine sweep, 10 - 55 Hz, 1 g, 1 oct/min       3 axis, 15 g half sine, 11 ms         Enclosure material       - DIN-rail mounting       for DIN-rails as per EN 50022-35x15/7.5       (snap-on with self-locking spring)         Environmental compliance       - Reach       www.tracopower.com/overview/tspc-ups         - RoHS       - RohHS       RoHS       RoHS directive 2011/65/EU	Class of protection		safety class I (IEC 536)		
- Conducted RI suppression on input - Radiated RI suppression       EN 55011 class B, EN 55022 class B, EN 55011 class B, EN 55022 class B,         Electromagnetic compatibility (EMC), Immunity - Electrostatic discharge (ESD) - Radiated RF field immunity - Electrical fast transient / burst immunity - Surge immunity - Surge immunity - Surge immunity - Immunity to conducted RF disturbances - Rower frequency field immunity - Mains voltage dips and interruptions       EN 61000-6-2, EN 61204-3 IEC/EN 61000-4-2 4 kV / 8 kV criteria B         EC/EN 61000-4-3 IEC/EN 61000-4-3 - Surge immunity - Surge immunity - Surge immunity - Surge immunity - Surge immunity - Surge immunity - Surge dips and interruptions       IEC/EN 61000-4-5 I kV / 2 kV criteria B         Environment       - Vibration acc. IEC 60068-2-6; - Shock acc. IEC 60068-2-7       3 axis, sine sweep, 10 - 55 Hz, 1 g, 1 oct/min 3 axis, 15 g half sine, 11 ms         Enclosure material       - DIN-rail mounting       for DIN-rails as per EN 50022-35x15/7.5 (snap-on with self-locking spring)         Environment       - DIN-rail mounting       for DIN-rails as per EN 50022-35x15/7.5 (snap-on with self-locking spring)         Environmental compliance       - Reach - RoHS       www.tracopower.com/overview/tspc-ups RoHS directive 2011/65/EU	Degree of protection		IP 20 (IEC/EN 60529)		
- Electrostatic discharge (ESD)IEC/EN 61000-4-24 kV / 8 kVcriteria B- Radiated RF field immunityIEC/EN 61000-4-310 V / mcriteria A- Electrical fast transient / burst immunityIEC/EN 61000-4-42 kVcriteria B- Surge immunity- Surge immunityIEC/EN 61000-4-51 kV / 2 kVcriteria A- Immunity to conducted RF disturbances- Power frequency field immunityIEC/EN 61000-4-610 Vcriteria A- Nains voltage dips and interruptionsIEC/EN 61000-4-830 A / mcriteria AEnvironment- Vibration acc. IEC 60068-2-6; - Shock acc. IEC 60068-2-273 axis, sine sweep, 10 - 55 Hz, 1 g, 1 oct/min 3 axis, 15 g half sine, 11 ms1 msEnclosure material- DIN-rail mountingfor DIN-rails as per EN 50022-35x15/7.5 (snap-on with self-locking spring)stainless steel (cover)Mounting- Reach - RoHSwww.tracopower.com/overview/tspc-ups RoHS directive 2011/65/EUScrew terminal (plug included)	Electromagnetic compatibility (EMC), Emissions – Conducted RI suppression on input		EN 55011 class B, EN 55022 class B,		
- Shock acc. IEC 60068-2-27       3 axis, 15 g half sine, 11 ms         Enclosure material       aluminium (chassis) / stainless steel (cover)         Mounting       - DIN-rail mounting         for DIN-rails as per EN 50022-35x15/7.5 (snap-on with self-locking spring)         Environmental compliance       - Reach - RoHS         RoHS directive 2011/65/EU         Connection       - Input output battery	Electromagnetic compatibili	<ul> <li>Electrostatic discharge (ESD)</li> <li>Radiated RF field immunity</li> <li>Electrical fast transient / burst immunity</li> <li>Surge immunity</li> <li>Immunity to conducted RF disturbances</li> <li>Power frequency field immunity</li> </ul>	IEC/EN 61000-4-2         4 kV / 8 kV         criteria B           IEC/EN 61000-4-3         10 V / m         criteria A           IEC/EN 61000-4-4         2 kV         criteria B           IEC/EN 61000-4-5         1 kV / 2 kV         criteria B           IEC/EN 61000-4-6         10 V         criteria A           IEC/EN 61000-4-6         30 A / m         criteria A		
Mounting       - DIN-rail mounting       for DIN-rails as per EN 50022-35x15/7.5 (snap-on with self-locking spring)         Environmental compliance       - Reach       www.tracopower.com/overview/tspc-ups         - RoHS       RoHS directive 2011/65/EU         Connection       - Input output battery       screw terminal (plug included)	Environment				
Environmental compliance     - Reach     www.tracopower.com/overview/tspc-ups       - RoHS     RoHS directive 2011/65/EU       Connection     - Input output battery	Enclosure material		aluminium (chassis) / stainless steel (cover)		
- RoHS     RoHS directive 2011/65/EU       Connection     - Input output battery     screw terminal (plug included)	Mounting	– DIN-rail mounting			
	Environmental compliance				
	Connection				

All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

### **Function Specification**

#### **Function Diagram:**



#### **General Description**

This power supply is supplied by mains voltage and contains an integrated DC uninterruptible power supply feed by an external battery. It is designed to supply the applied load continuously and without interruption, even when the mains power fails. In this case, the energy is supplied from an external 12V battery to provide the required output voltage. The unit is designed to operate with lead-acid batteries

#### Operation

Before the first use, the AC input range should be set by the slide switch. During the normal operation, when the input AC voltage is present, the output DC voltage is delivered by internal AC/DC power supply.

In case of power failure the internal battery discharge regulator is activated. The output voltage will be still maintained at the reduced level of 23.6V (typically at Vnom) without any interruptions. The battery discharge operation will continue until AC input voltage recovers.

If the input AC voltage does not recover, the battery voltage will continue to drop, while continuously delivering the output power at required voltage level. In order to prevent the deep discharge of the battery, which can lead to battery failure, the battery is disconnected at the deep discharge threshold. The BAT OK signal will be OFF when the battery voltage is approaching the disconnection voltage level. This can enable early warning of the system.

If the input AC is present at the right level, the battery is automatically charged to the set voltage level. This level is factory set for 25°C for lead-acid batteries. The user can change this voltage by using the built-in potentiometer. The adjustment can be made only if the battery is disconnected (after initial operation) to prevent from adjustments errors. The battery test interval should be set to 10 minutes (factory settings). If the battery is operating at a different ambient temperature (not 25°C), the user can adjust the set battery voltage to the required ambient temperature, as recommended by the battery manufacturer.

After adjustments – the battery should be re-connected. It is also possible to use the temperature compensation probe to automatically compensate the end battery charge voltage for any temperature changes. In this case, there is no need to change the potentiometer to compensate for a new ambient temperature.

The internal state of charge of the battery is tested at regular intervals with internal current pulse. The interval is factory set to 10 minutes. It can be changed to 15s for test purposes by changing the slide switch position on the front of the unit as indicated on the label. If the battery OK signal is OFF, even after prolonged charging, the battery pack needs replacement. The buffer function (during input power failure) can be disabled remotely, and the battery is disconnected. It can be achieved by pulling the Remote ON/OFF pin to GND (with contact relay or transistor).

### Function Specification (continued)

#### Signals

Following signals are made available as LED indicators and corresponding isolated relay contacts:

AC-OK Indicates if the input AC voltage is present. During operation outside the DC specification (overload), at low input AC levels (below nominal range) it can be OFF. It will indicate that the battery operation has started in order to maintain the output voltage at 24V level.
 BAIT-OK: Indicates if the battery is charged properly and has low internal resistance. During battery discharge operation this signal monitors the battery voltage. If the battery voltage approaches the disconnection voltage – it is OFF. This ena bles early warnings of the system. The threshold of this signal is about 1V higher than the battery disconnection voltage. Note that if the battery signal was OFF during the normal operation (when input voltage is present) – it will stay OFF during the battery discharge operation as well.
 DC-OUT-OK: Indicates that the output voltage is higher than 82–90% of the nominal output voltage.

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#### Battery

When the input AC voltage is present, the TSPC-240UPS unit will automatically charge the connected battery to a set end of battery charge voltage level, factory set for  $25^{\circ}$ C for lead-acid batteries, using a constant current charging method of 1A (typical). As the battery voltage approaches the end of battery charge voltage level, the current will decrease proportionally; this characteristic is shown in Fig 1. The user can adjust the set end of battery charge voltage level by means of the "Battery Voltage Adjust" potentiometer. The module also provides an input connector for a temperature compensation probe. If this probe is connected, the unit will automatically compensate the end of battery charge voltage level depending on the measured temperature. The connection of the temperature probe also negates the need to change the potentiometer to compensate for a new temperature. The battery end voltage compensation curve is shown in Fig. 2. (Applicable to factory setting of 13.6V/  $25^{\circ}$ C)



#### **Battery Protection**

The module protects the connected battery against short circuit and overload by the means of a built in 30A fuse. This fuse is a standard 30A blade type fuse, which is accessible from the front panel of the unit for ease of replacement should the fuse be damaged during operation.

It also prevents deep discharge of the battery by disconnecting the battery from the load once the voltage level of battery has dropped below a defined threshold. An early warning of this disconnection is given to the user by means of the BATT-OK signal (see chapter 2.6.2). The BATT-OK signal will switch off when the battery voltage is roughly 1V above the deep discharge threshold.

### Function Specification (continued)

#### Remote On/Off

The TSPC-240UPS module provides a Battery Remote on/off input (2 pins on signalconnector); if this input is short circuited (switch closed in Fig. 3) the battery will be disconnected from the unit by means of an internal relay. A voltage of 0.5V or less across the Battery Remote on/off terminals will disconnect the battery from the unit. If the Battery Remote On/Off signal is set to off (short between pins) this will not affect the output of the unit in normal mode, however the battery will be disconnected, hence it will not charge. If the unit enters buffer mode while the Battery Remote On/Off signal is off, the battery will remain disconnected, hence no energy will be supplied to the load.

Battery State Battery Remote On/Off Pins		Voltage
Connected	Open Circuit	5V
Disconnected	Short Circuit	< 0.5V



#### Ambient temperature and power rating

The module operates at temperatures between  $-10^{\circ}$ C and  $+60^{\circ}$ C, with a minimum start-up temperature of  $-25^{\circ}$ C. In normal mode the module can deliver full power up to  $60^{\circ}$ C. The boost current of 12A is available at ambient temperatures up to  $50^{\circ}$ C with a derating of  $1.67\%/^{\circ}$ C for temperatures above  $50^{\circ}$ C, as shown in Fig. 4. In buffer mode the module can deliver full power up to  $60^{\circ}$ C with the boost current of 12A available at ambient temperatures up to  $40^{\circ}$ C as shown in Fig. 5.









### **Connector Position**



### **Outline Dimensions**



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