Industrial Power Supplies

TSP Series, 90–600 Watt

RoHS compliant

CE EMC LVD

CB Scheme IEC 60950-1

GS

cULus UL 60950-1 UL 508 UL 60079-15

Ex ATEX II3G

Innovative and Powerful Features!

- True industrial Grade Design
- Rugged Metal Case for harsh industrial Environments
- For worldwide Use – Autoselect Input and International Safety Approvals
- ATEX Certification (opt. EX)
- Model TSP 090-124N meets NEC Class 2
- Industrial Operating Temperature Range: -25°C to +70°C
- Variable Output Voltage
- Indefinite Short Circuit, Overvoltage and Overtemperature Protection
- Power Good Signal
- Remote On/Off
- Shock and Vibration Proof
- Wall Mounting (Opt.)
- Redundancy Module
- Buffer Module for Power Backup
- Battery Controller Module
- 3 Year Product Warranty

The TRACOPOWER TSP series is a new generation of high performance DIN-rail power supplies designed to work reliable also under difficult factory floor conditions. A high power reserve guarantees reliable start-up of loads with high inrush currents. Excellent electrical specifications and high immunity against electrical disturbances makes these compact modules the best choice to power sensitive loads in industrial process control systems, machine tools or other demanding industrial application. Easy installation with detachable screw terminal block and snap-on mounting on DIN-rails.

For system applications all models offer a DC-OK signal and external shut down function. Redundant operation with true power sharing is available as an option. With another option these power supplies can be extended to a perfect DC-UPS system with automatic battery management.

The TSP series power supplies complies with the latest safety and EMC standards for industrial environments and are also available with ATEX certification for applications in hazardous locations (Class I, Division 2)

Models

*Model No.	**Output Voltage (Vnom)	***Output Current (Imax)	Output Power (Pmax)
TSP 070–112	12 VDC	6.5 A	78 W
TSP 090–124	24 VDC	3.75 A	90 W
TSP 090–124N	24 VDC	3.75 A	90 W
TSP 090–148	48 VDC	2.0 A	96 W
TSP 140–112	12 VDC	13.0 A	156 W
TSP 180–124	24 VDC	7.5 A	180 W
TSP 180–148	48 VDC	4.0 A	192 W
TSP 360–124	24 VDC	15.0 A	360 W
TSP 360–148	48 VDC	7.5 A	360 W
TSP 600–124	24 VDC	25.0 A	600 W
TSP 600–148	48 VDC	12.5 A	600 W

* For ATEX compliant model add order code -EX to model no. (24 VDC models only)

** Output voltage adjustable 12 - 14 VDC, 24 - 28 VDC and 48 - 56VDC

*** Max. current at nominal output voltage and operating temperature up to 40°C max.

Product Features

The Ultimate DIN - Rail Power Supply !

Remote On/Off

Control Output for true N+1 Redundancy or Battery Operation

Jumper for Parallel Operation or Battery Charge Mode selectable by Jumper

Detachable Screw Terminal Block for quick disconnect and easy Installation

Rugged, Ultracompact Metal Case, Shock and Vibration tested per IEC 60068-2 Standard

Double Output Terminals for easy wiring of multiple loads

Industrial Safety Approval Package to comply with:
IEC/EN 60950-1
UL/cUL 60950-1
UL 508, CSA-C22.2 No.107
EN/UL 60079-15
ATEX 94/9/EC (Opt. EX)
ANSI/ISA 12.12.01

Dual Color Status Indicator LED

Adjustable Output Voltage

EMC Compliance to EN 61204-3 Standard for Industrial Power Supplies SEMI F47

Remote Diagnostic via floating Relay Contact or NPN Output

Convection Cooling, no internal Fan, Thermal Overload Protection

Autorange Input for worldwide Use

Self-locking DIN-rail fixing Latch or optional Wall Mounting Brackets

Input Specifications

Input voltage range		85–132 / 187–264 VAC autoselect	
– output current derating at operation below 100 VAC		see graph B, page 5	
Input voltage frequency		47 – 63 Hz	
Harmonic limits		EN 61000-3-2, Class A (for limited output power)	
Holdup time		20 ms min. (full load 115/230 VAC)	
Inrush current		115 VAC	230 VAC
	– TSP 070/090	< 12 A	< 20 A
	– TSP 140/180	< 13 A	< 25 A
	– TSP 360	< 16 A	< 25 A
	– TSP 600	< 25 A	< 30 A
Recommended circuit breaker, characteristic C or fuse, slow blow type	– TSP 070/090	6.0 A	
	– TSP 140/180	6.0 A	
	– TSP 360	10.0 A	
	– TSP 600	15.0 A	
Efficiency		87% typ.	

Output Specifications

Output voltage adj. range	– 12 VDC models:	12 – 14 VDC	
	– 24 VDC models:	24 – 28 VDC	
	– 48 VDC models:	48 – 56 VDC	
		At output voltage higher than nominal output voltage max. output current has to be reduced accordingly, in order not to exceed max. output power.	
Regulation	– Input variation	0.5 % max.	
	– Load variation (10–100 %)	0.5 % max.	
Ripple and Noise (20MHz Bandwidth)		100 mV pk-pk typ. (200 mV pk-pk max. at Imax)	
Electronic short circuit protection		current limitation at Imax. constant current, automatic recovery	
Output overvoltage protection	– 12 VDC models:	20V	
	– 24 VDC models:	35V	
	– 48 VDC models:	60V	
Overload protection		electronic overload protection	
Overtemperature protection		switch off at overtemperature, automatic restart	
Power back immunity	– 12 VDC models:	16V	
	– 24 VDC models:	35V	
	– 48 VDC models:	63V	
Status indicator		dual color LED (green: DC ok, red: DC off)	
Power-Good signal	– trigger threshold: – 12 VDC models:	9 - 11V	
	– 24 VDC models:	18 - 22V	
	– 48 VDC models:	36 - 46V	
	– active output signal: – 12 VDC models:	11.0 V ±1.0V	
	(reference to –Vout)	(20 mA max. for TSP 070, 40 mA max. for TSP 140)	
	– 24 VDC models:	22.0 V ±2.0V / 20mA max.	
		(10 mA max. for TSP 090, 20mA max. for others)	
	– 48 VDC models:	44.0 V ±4.0V / 15mA max.	
	– relay output	DC OK = contact closed	
		rated: 30VDC / 1.0A for 12 / 24VDC models	
		rated: 48VDC / 0.5A for 48VDC models	
Max. capacitive load		unlimited	

General Specifications

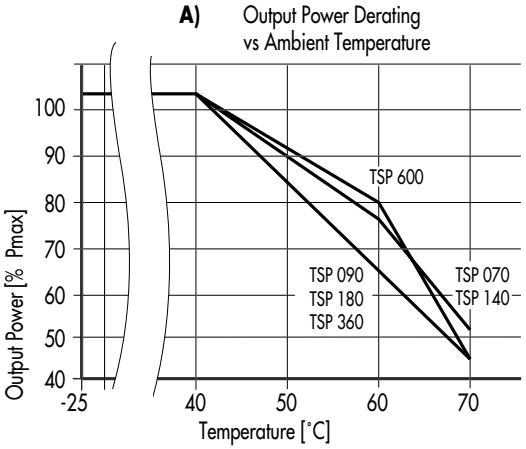
Operating temperature range		– 25°C...+70°C max. (–13°F...+158°F) (for derating see graph A on page 5)
Cooling		convection cooling, no internal fan
Storage temperature		–25 °C...+85 °C (– 13°F...+185°F)
Humidity (non condensing)		95 % rel. H max.
Pollution degree		2
Temperature coefficient		0.02 %/K
Reliability, calculated MTBF @ 25°C acc. to IEC 61709	– TSP 070/090 – TSP 140 – TSP 180/360/600	>1.8 Mio h >1.2 Mio h >0.9 Mio h
Remote On/Off		by ext. contact. DC on: -S contact open DC off: -S connectetd via 1Kohm to -Vout
Isolation		according to IEC/EN 60950-1, UL 60950-1, UL 508
Safety standards	– Information technology equipment – Industrial control equipment – Electrical equipment of machines – Electronic equipment for power installation – Safety transformers for SMPS – Limited power source (model TSP 090-124N) – Control equipment for hazardous location	IEC/EN 60950-1, UL 60950-1, CSA-C22.2 No. 60950-1-03 UL 508, CSA-C22.2 No. 107 EN 60204 EN 50178 EN 61558-2-4 EN 60950 sect. 2.5 and NEC Class 2 UL 60079-15 (Class I, Division 2, Groups A,B,C,D AEx n C II C T4 U) IEC/EN 60079-15 (Class I, Zone 2, EEx nC II C T4 U), (Ex II3G EEX nAC IIC (T4)
Safety approvals and certifications	– CB report – UL approvals – CSA certification – Ex II3G ATEX 94/9/EC – GS certification	for IEC 60950-1 www.tracopower.com/products/tsp-cb.pdf UL 60950-1 rec. File: E181381, UL 508C listed File: E210002 www.ul.com -> certifications (file no. 219759) for UL 60950-1, UL 508, UL 60079-15-02, ANSI/ISA 12.12.01, CSA-22.2 No. 60950-1-03, CSA C22.2 No. 107, CSA 60079-15-02 www.tracopower.com/products/tsp-csa.pdf certificate no. SEV 05 ATEX 0146 U (option -EX only) www.tracopower.com/products/tsp-atex.pdf for EN 60950-1, EN 60204, EN 61558-2-4 www.tracopower.com/products/tsp-gs.pdf
Class of protection		safety class I (IEC 536)
Degree of protection		IP 20 (IEC/EN 60529)
Electromagnetic compatibility (EMC), Emissions		EN 61000-6-3, EN 61204-3
	– Conducted RI suppression on input	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
	– Electrostatic discharge (ESD)	IEC / EN 61000-4-2 4 kV / 8 kV criteria B
	– Radiated RF field immunity	IEC / EN 61000-4-3 10 V / m criteria B
	– Electrical fast transient / burst immunity	IEC / EN 61000-4-4 2 kV criteria B
	– Surge immunity	IEC / EN 61000-4-5 1 kV / 2 kV criteria B
	– Immunity to conducted RF disturbances	IEC / EN 61000-4-6 10 V criteria B
	– Power frequency field immunity	IEC / EN 61000-4-8 30 A / m criteria B
	– Mains voltage dips and interruptions	IEC / EN 61000-4-11 criteria B/C
	– Voltage sag immunity	SEMI F47 www.tracopower.com/products/TSP_SemiF47.pdf

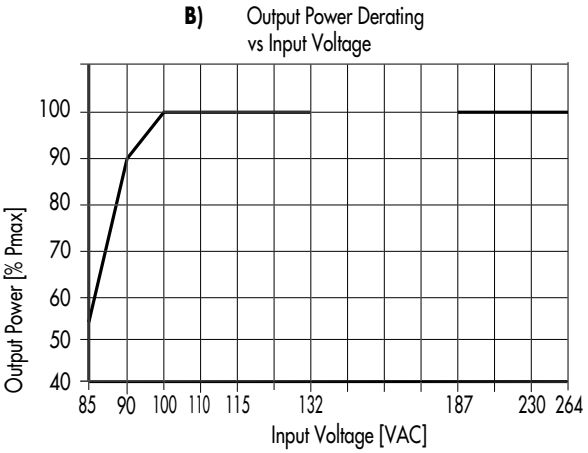
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

General Specifications

Environment	– Vibration acc. IEC 60068-2-6; – Shock acc. IEC 60068-2-27	3 axis, sine sweep, 10-55Hz, 1g, 1oct/min 3 axis, 15g half sine, 11ms
Enclosure material		aluminium (chassis) / stainless steel (cover)
Mounting	– DIN-rail mounting – Wall mounting (option)	for DIN-rails as per EN 50022-35x15/7.5 (snap-on with self-locking spring) with wall mounting bracket - see page 12
Connection		detachable screw terminals (plugs included) 2 terminals per output
Installation instructions		www.tracopower.com/products/tsp_inst.pdf

Output Power Derating





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

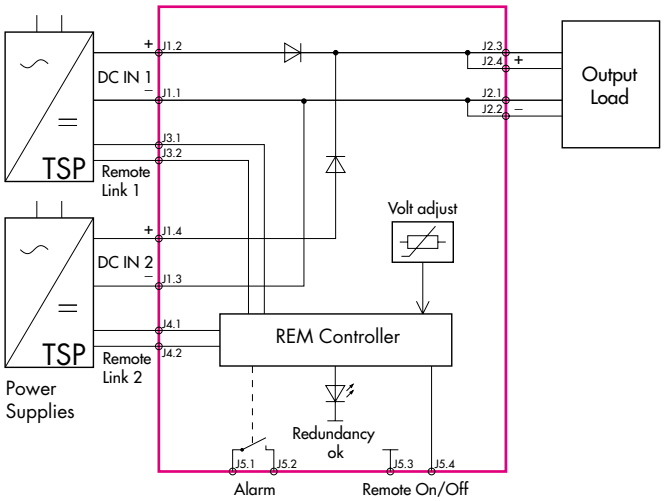
TSP–REM360 Redundancy Module

With this module and two power supplies of the TSP series (90, 180 and 360 W models) a highly reliable, true redundant power system can be configured without any additional components. This module enforces the equivalent sharing of the output current by each power supply. The system is fully redundant and provides the output power even if one power supply has completely failed e.g. by short circuit on the output. In the event of either, one power supply failing or being disconnected, the second unit will automatically supply the full current to the load. The redundancy of the system is monitored and if lost, indicated by an alarm output. The inputs are hot swappable and can be loaded up to 15A each.

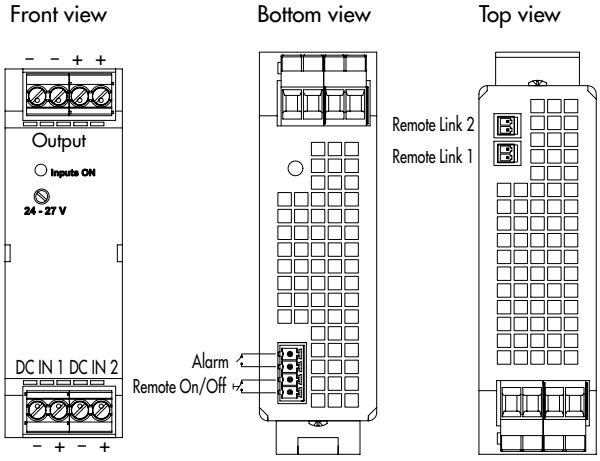
Models

Order code (includes terminal plugs)	Input	Max Power per Input	Output Voltage adjust	Output Power max.
TSP–REM360	2 x 24 VDC 2 x Control input	2 x 360 W	**24 VDC** (24 - 27 VDC)	**360 W**

Function Diagram



Connector Positions



Specifications

Operating temperature	– 25°C...+70°C max. (–13°F...+158°F) derating above 40°C (104°F): 1.5%/K
Electromagnetic compatibility	in correspondence to connected units (no internal switching device)
Redundancy OK signal (Alarm)	trigger threshold at 18...22VDC, contact open if both inputs failed
Dimensions	same as model TSP 090 (see page 10)
Remote link cable (0.5m)	2 cables included with TSP-REM360 module
Remote On/Off	by ext. contact: contact open = On, contact closed = Off
Installation instructions	www.tracopower.com/products/tsp-rem_inst.pdf

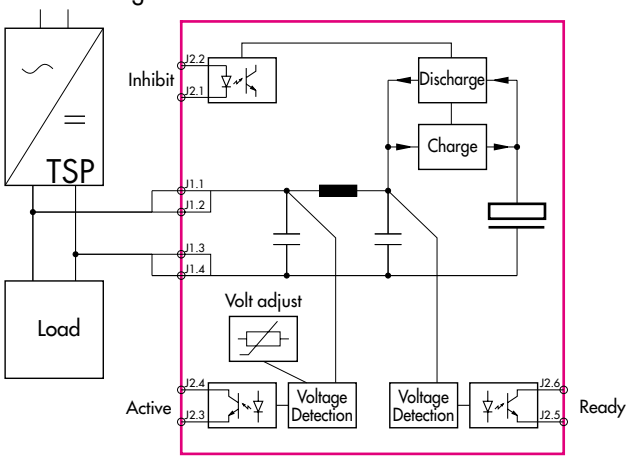
TSP–BFM24 Buffer Module

The TSP-BFM24 Buffer Module will hold the output voltage of a 24VDC power supply after brown outs or voltage dips of up to ten full 50Hz cycles. During this buffer period no deterioration of the 24VDC output voltage will occur. For many applications this buffer module is an ideal and cost effective alternative to a battery based backup system. The buffer module consists of a large bank of capacitors. When the power supply is switched on, the buffer capacitors will be charged. This will take approximately 30 second and an opto-coupler signal is indicating the „READY" condition. When a power fail occurs, the capacitor bank is discharged, maintaining the output of the buffer module at its nominal voltage. This condition is indicated by an „POWER FAIL" signal. The hold up time is typically 200ms at 25A and 4 seconds typically at 1,2A. After 4 seconds the buffer device will switch off the output voltage. The operation modes of the module are indicated by a LED on the front panel also. The big advantage of this buffer solution is, that it is fully maintenance free and its storage capability does not deteriorate over the live time of the product.

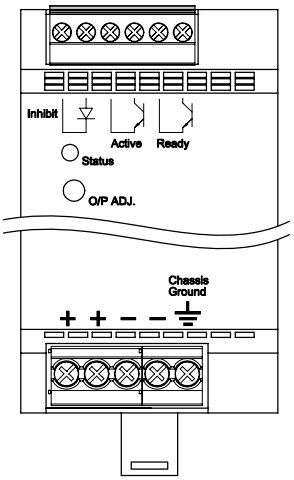
Models

Order code (includes terminal plugs)	Operating Voltage Range	Buffer Time	Output Power max.
TSP-BFM24	24...28VDC	**200ms typ. @ 25A max. 4.0 s max. @1.2A**	**600 W**

Function Diagram



Connector Positions



Specifications

Operating temperature	– 25°C...+70°C max. (–13°F...+158°F) derating above 40°C (104°F): 1.5%/K
Electromagnetic compatibility	in correspondence to connected units (no internal switching device)
Buffer voltage	adjustable, >1V below input voltage, min. 22VDC
Charging	0.6A max. / 30s max.
Status signals	Buffer Active , Buffer Ready (optocoupler output) and dual colour LED for status indication
Inhibit	optocoupler input: 35V max. <5mA
Dimensions	same as model TSP 140 (see page 10)
Installation instructions	www.tracopower.com/products/tsp-bfm_inst.pdf

TSP–BCM24 Battery Controller Module

This module provides a professional battery management system to charge and monitor an external lead-acid battery. Together with a power supply of the TSP series a perfect DC-UPS system can be configured. The connected battery will be charged and held in charged mode by the power supply. In case of a mains power failure the battery will supply the output power until the battery is discharged. As a consequence, the output voltage of the system is equivalent to the battery voltage. To avoid overcharging the battery, an external temperature sensor adjusts the battery voltage automatically to the required end of charge voltage. By this, the battery life time can be extended.

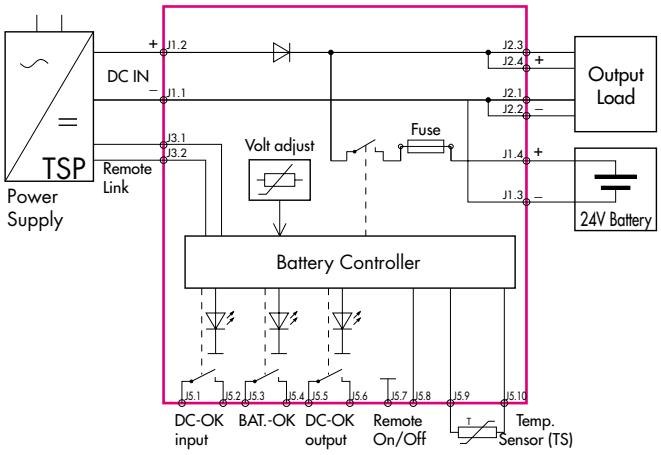
The battery is protected against deep discharge. Mains power and the battery status are checked and monitored continuously and failures are indicated by corresponding LED's and alarm outputs. The module provides also an external On/Off input to switch-off both, power supply and battery.

Models

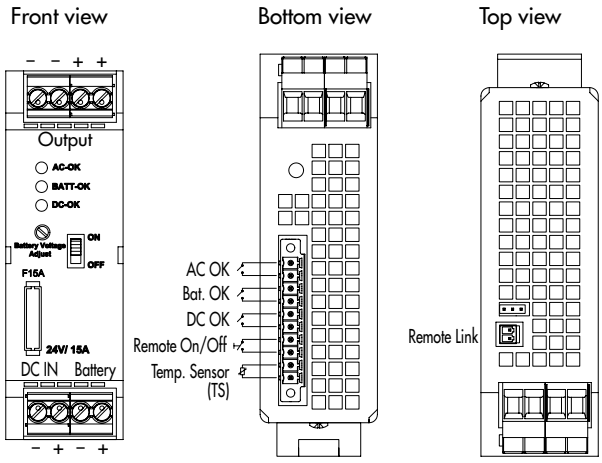
Order code (includes terminal plugs)	Inputs	Input Power max	Output Voltage nom.	*Output Power max.
TSP-BCM24	24 VDC Power Supply and 24 VDC Battery	360 W	**24 VDC**	**360 W**

*reduce max. output current by battery charging current

Function Diagram



Connector Positions



Specifications

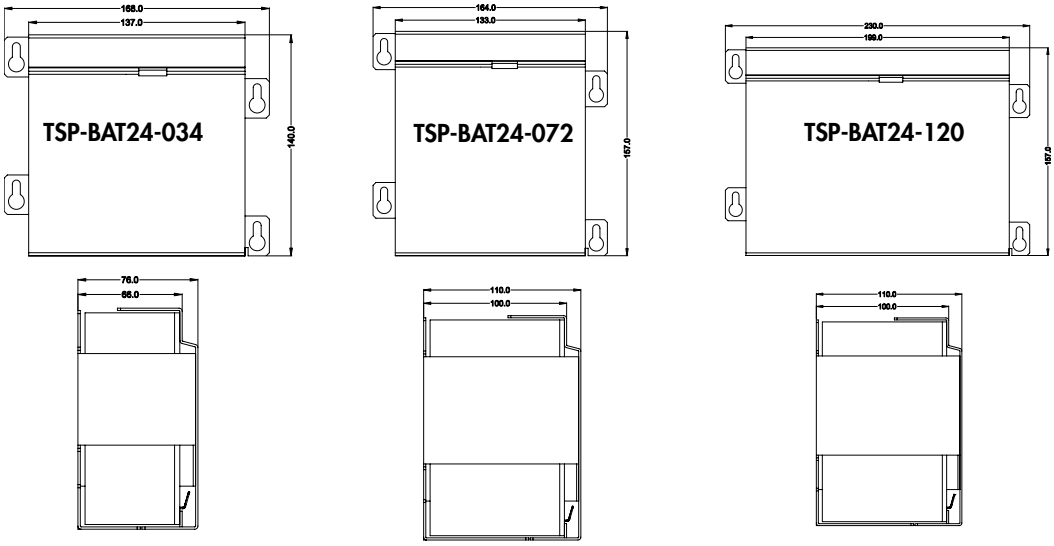
Operating temperature	– 25°C...+70°C max. (–13°F...+158°F) derating above 40°C (104°F): 1.5%/K
Electromagnetic compatibility	in correspondence to connected units (no internal switching device)
Battery protection	over voltage, deep discharge, overcharge, short circuit- and revers connection (built-in fuse)
Status signals	DC-OK input, DC-OK output, BAT OK all relay contact closed at status OK
Rating per relay contact	30 VDC / 1.0 A max.
Dimensions	same as model TSP 090 (see page 10)
Remote link cable (0.5m)	1 cable included with TSP-BCM24 module
Remote On/Off	by ext. contact: contact open = On, contact closed = Off
Installation instructions	www.tracopower.com/products/tsp-bcm_inst.pdf

TSP–BAT Battery Pack

The TSP battery packs are designed to build, in connection with the TSP-BCM battery controller module, a complete DC-UPS system. The entire range utilizes 12V maintenance free VRLA (valve regulated lead acid) batteries made by PANASONIC. These are not spillable lead gel type batteries. Two 12V batteries are connected in series and assembled into a stainless steel enclosure, with integrated connector and connection cable.

Models

Order code (includes mating connectors)	Nominal Voltage	Charge current max.	Nominal Capacity (at 25°C, 77°F)
TSP-BAT24-034	24 VDC	**0.80 A**	**3.4 Ah**
TSP-BAT24-072		**1.75 A**	**7.2 Ah**
TSP-BAT24-120		**3.00 A**	**12.0 Ah**



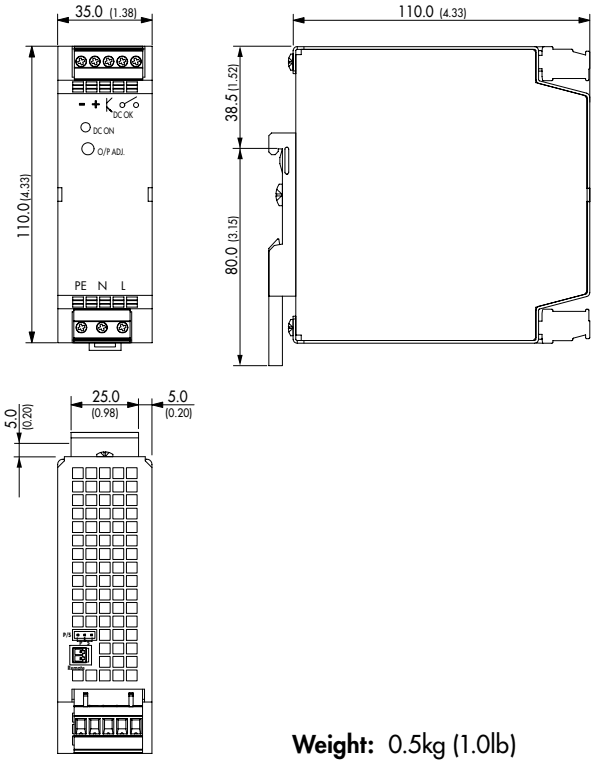
Detailed drawings in process

Specifications

Temperature ranges (max)	– during discharge	-15°C...+50°C max. (5°F...+122°F)
	– when charging / charged	0°C...+40°C max. (32°F...+104°F)
	– storage	-15°C...+40°C max. (5°F...+104°F)
Battery lifetime		3-5 years see general battery information for details: www.tracopower.com/products/tsp-panas_gen.pdf
Remote link cable		1 cable (0.5m) included
Weight	TSP-BAT24-034	3.2kg (7.1lb)
	TSP-BAT24-072	5.8kg (12.9lb)
	TSP-BAT24-120	9.0kg (20.0lb)
Battery datasheets	TSP-BAT24-034	www.tracopower.com/products/tsp-panas_034.pdf
	TSP-BAT24-072	www.tracopower.com/products/tsp-panas_072.pdf
	TSP-BAT24-120	www.tracopower.com/products/tsp-panas_120.pdf

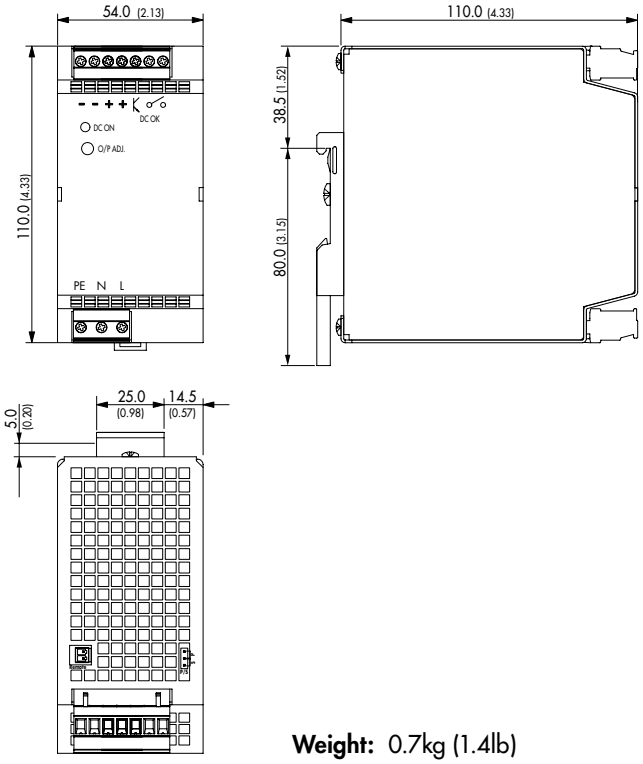
Outline Dimensions

TSP 070/090
(TSP-REM360)
(TSP-BCM24)



Weight: 0.5kg (1.0lb)

TSP 140/180
(TSP-BFM24)

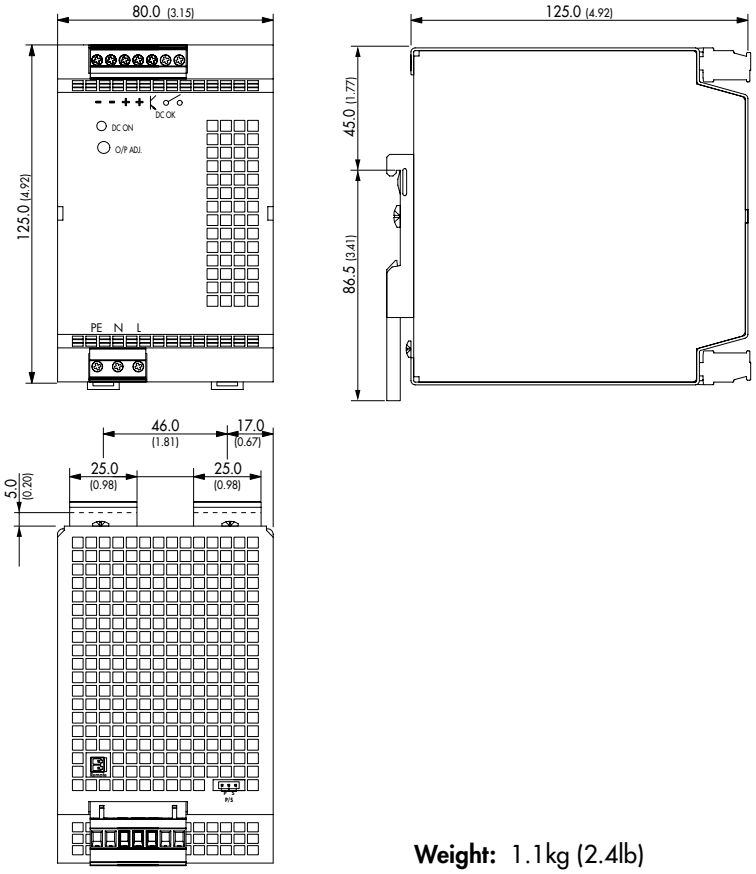


Weight: 0.7kg (1.4lb)

Tolerances: ±0.5 mm (±0.02)

Outline Dimensions

TSP 360

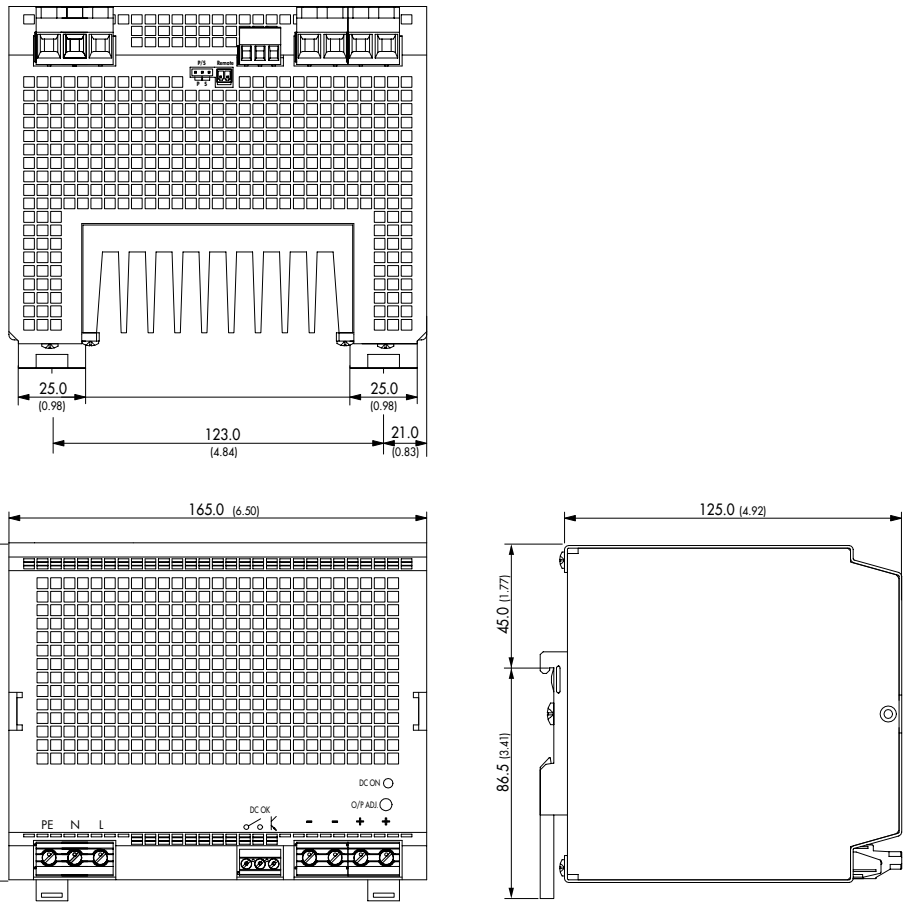


Weight: 1.1kg (2.4lb)

Dimensions in [mm], ( ) = Inch
Tolerances: ±0.5 mm (±0.02)

Outline Dimensions

TSP 600



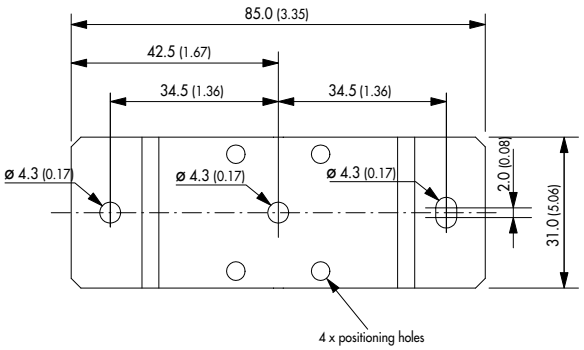
Weight: 2.8kg (6.0lb)

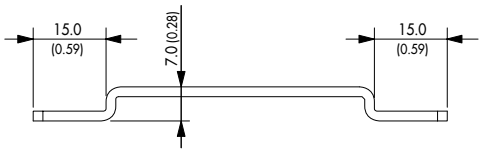
Dimensions in [mm], ( ) = Inch
Tolerances: ±0.5 mm (±0.02)

TSP–WMK Wall Mounting Bracket

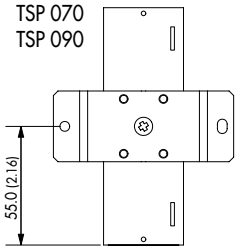
Ordercode of kit	For models	Content of kit
TSP-WMK01	TSP 070, TSP 090, TSP 140, TSP 180	1 bracket **type A** incl. M4-screw (DIN 74-Af4)
TSP-WMK02	TSP 360, TSP 600	2 brackets **type B** incl. M4-screws (DIN 74-Af4)

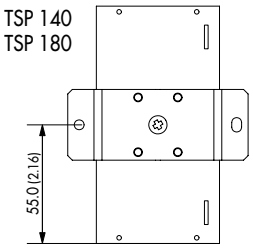
Type A:





Material: 2 mm Mild Steel
Tolerance: ±0.1mm (± 0.004)





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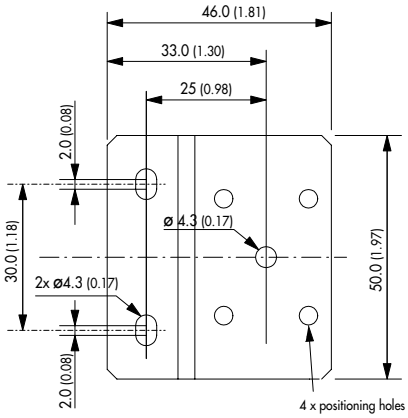
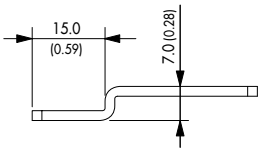
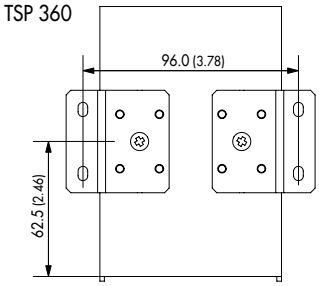
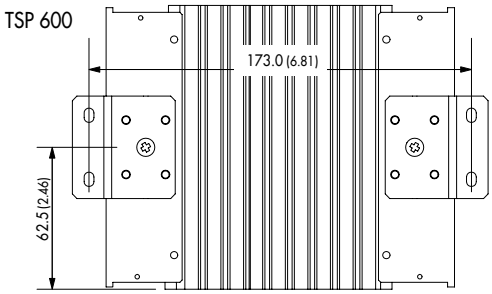




Material: 2 mm Mild Steel
Tolerance: ±0.1mm (± 0.004)





Dimensions: [mm] ( ) = Inch

Specifications can be changed any time without notice