

REDUNDANCY MODULE TSP-REM360 AND TSP-REM600

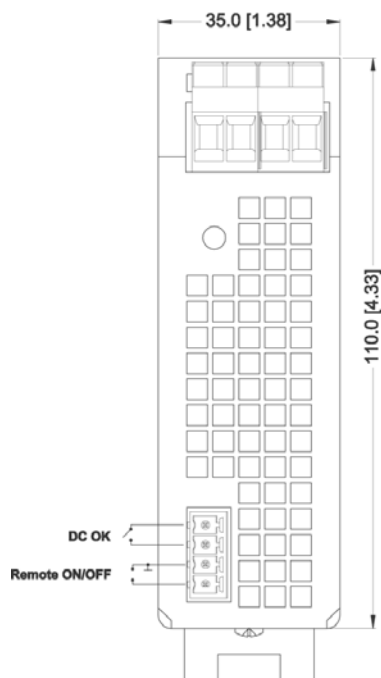
Operating Instructions



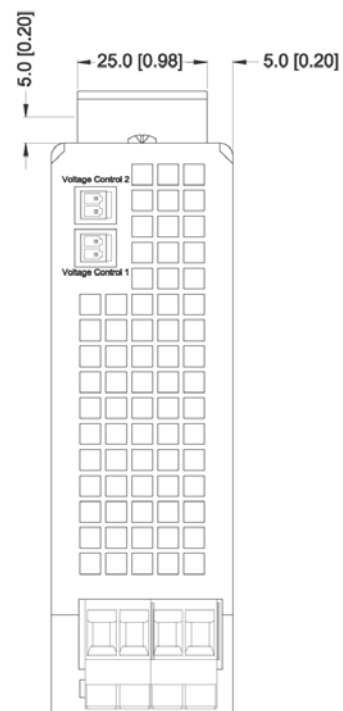
Dimensions drawings:

TSP-REM360

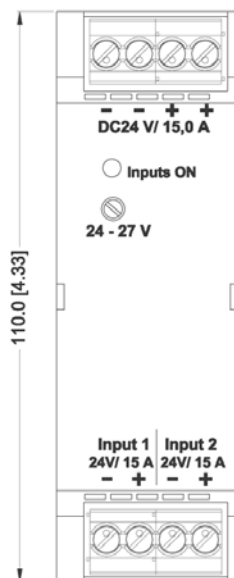
Bottom view



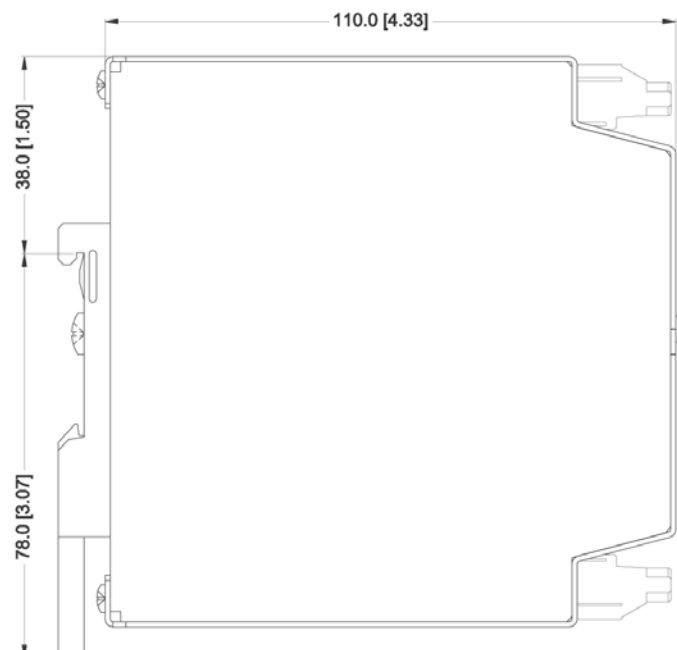
Top view



Front view



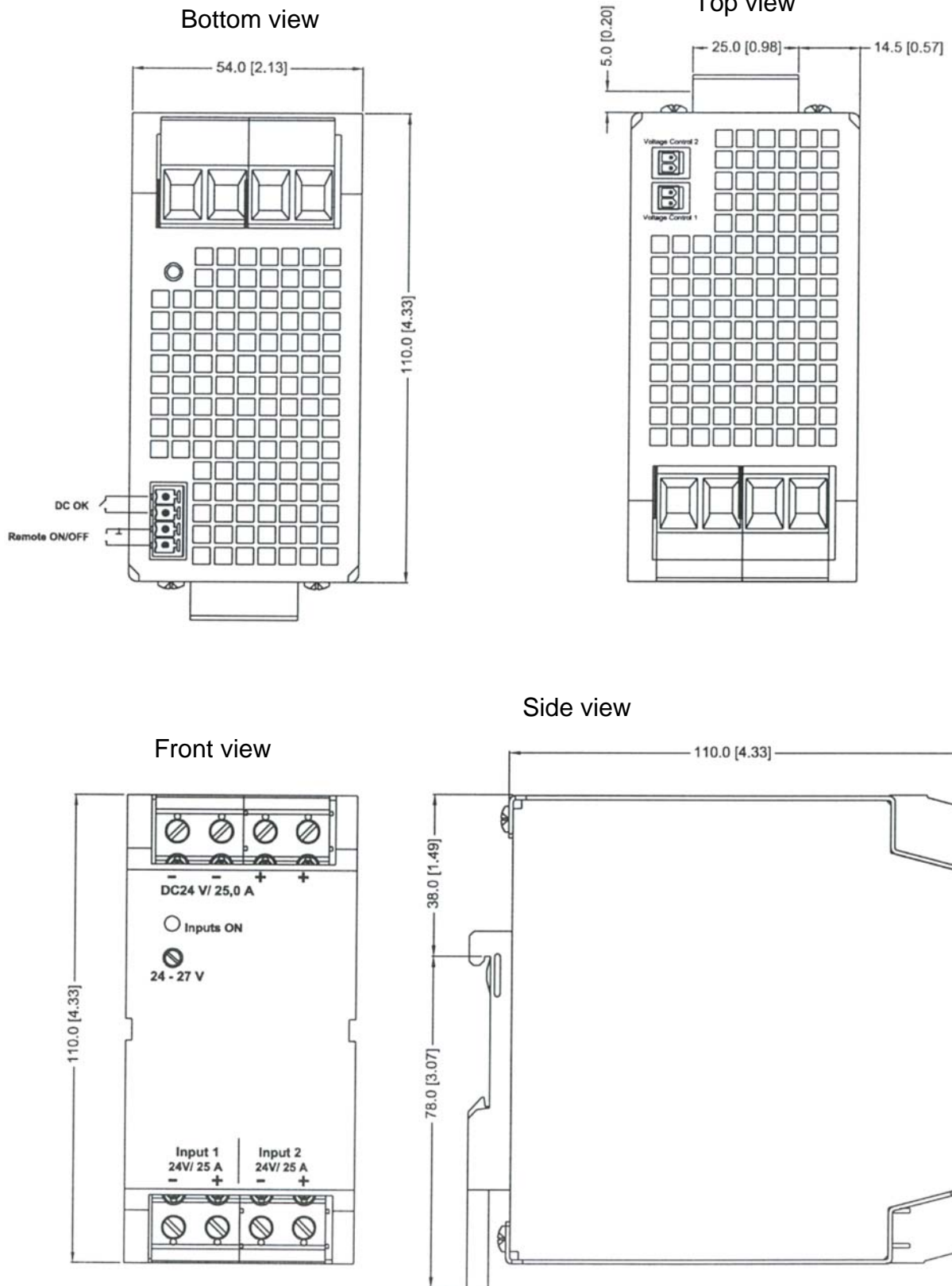
Side view



Weight: 0.882lb
Gewicht: 0.40kg

Dimensions drawings:

TSP-REM600



Weight: 0.992lb
Gewicht: 0.45kg

Note

This instruction cannot claim all details of possible equipment variations, nor in particular can they provide for every possible example of installation, operation or maintenance. Further information is available from your local distributor office or from the TSP industrial power supply data sheet. Subject to change without prior notice.

In order to guarantee safe operation of the TSP-REM360 or TSP-REM600 in combination with the TSP power supplies and to be able to make use of all the functions, please read these instructions thoroughly!

Warning**– POTENTIAL ELECTROSTATIC CHARGING HAZARD –****Prevent unintentional contact with a dry cloth.****Do NOT clean surfaces with a dry cloth!****Clean ONLY with a damp cloth**

The TSP-REM360 and TSP-REM600 is designed and constructed in accordance with the safety requirements of IEC 60950-1, EN 60950-1, UL 60950-1, Edition and is certified to IEC/EN/UL 60079-15 (protection type "n" Class I, Zone 2, AEx nA nC IIC T4 Gc and Class I, Division 2, Group A,B,C,D).

The TSP-REM360 as well as the TSP-REM600 built-in modules are designed especially for use in process automation and other industrial applications.

The power supply units are Unit Group II Category 3G components. They must be installed in an enclosure or cabinet rated min. IP54. The enclosure / cabinet must comply with the requirements of EN60079-15:2005.

Components with dangerously high voltage and high stored energy are located in the device. However, these are inaccessible. Failure to properly maintain the TSP-REM360 or TSP-REM600 can result in death, severe personal injury or substantial property damage. **The TSP-REM360 or TSP-REM600 may only be installed and put into operation by qualified personnel.** The corresponding national regulations (e.g. UL, ANSI, VDE, DIN) must be observed. The successful and safe operation of this module is dependent on proper storage, handling, installation and operation.

The potentiometer to adjust the output voltage is only allowed to be actuated using an insulated screwdriver, because accidental contact may be made with parts inside the power supply carrying dangerous voltages.

Please observe following points before putting the device into operation:

- Read operating instructions thoroughly.
- That the input wiring is sufficiently dimensioned!
- That the output wiring is dimensioned according to the maximum output current or separately protected!
- Sufficient cooling is guaranteed!
- The temperature of the housing can become very high, depending on the ambient temperature and load.

Caution:

Risk of electrical shock and electrical discharge. The TSP-REM360 nor TSP-REM600 nor the power supply must not be opened until at least 5 minutes after complete disconnection of the mains.

Electrostatic sensitive device. **Qualified and trained personnel only may open the TSP-REM360 or TSP-REM600 or the power supply.**



Attention: In case of non-observance or exceeding the mentioned limiting value of the data sheet, the function and electrical safety can be impaired and can destroy the TSP-REM360 or TSP-REM600 and/or the power supply.

Before installation ensure that the main switch is switched off and prevented from being switched on again. In case of non-observance, touching of any live components or improper dealing with this TSP-REM360 or TSP-REM600 or power supply can result in death or fatal injury.



Danger: Never work on the TSP-REM360 or TSP-REM600 or power supplies if power is applied!



1. Description and construction

With this TSP-REM modules and two power supplies of the TSP series (70, 90, 140, 180, 360 and 600 watt 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 device 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 (TSP-REM360) or 25A (TSP-REM600) each. The output of the TSP-REM360 or TSP-REM600 should not be overloaded to provide a proper n+1 redundancy system. The max output current is 15A (TSP-REM360) or 25A (TSP-REM600) as well.

Both TSP power supplies have to be adjusted to $V_{out} = 24.00 - 24.05V_{dc}$ before connecting them to the TSP-REM360 or TSP-REM600. Afterwards the connection between the TSP (TSP xxx-124) and Input 1 (see Fig 3.1; +Vin and -Vin; J1 pin 1 & pin 2 and chapter 2.2.1) as well as Input 2 (see Fig 3.1; +Vin and -Vin; J1 pin 3 & pin 4 and chapter 2.2.1) and the remote sensing (see Fig. 3.1; J3 & J4) between these two devices and the TSP-REM360 or TSP-REM600 using the wire supplied with the TSP-REM360 or TSP-REM600 modules can be made (see Fig. 2.1 and Fig. 3.1, J4). Now the load can be connected to DC-Out (see Fig. 3.1, J2 pin 1, pin 2, pin 3 & pin 4 & chapter 2.2.2). The output voltage on the TSP-REM360 or TSP-REM600 can be adjusted between 24 and 27Vdc using the potentiometer on the TSP-REM360 or TSP-REM600 (see Fig 3.1).

The TSP-REM360 and TSP-REM600 are built-in devices. The mounting position has to fulfil the requirements for fireproof case according to UL60950-1, IEC/EN 60950-1 or other appropriate national standard. The relevant UL regulations or equivalent national regulations must be observed during installation.

The TSP-REM360 and TSP-REM600 are designed for mounting on a DIN rail TS35 (DIN EN 50022-35x15/7.5).

The output voltage of the TSP-REM360 as well as of the TSP-REM600 is protected against short circuit and open circuit conditions.

2. Installation

A sufficiently strong DIN-rail has to be provided. The correct mounting position for optimal cooling performance must be observed. Above and below the TSP-REMxxx modules a minimum free space of 80mm [3.15in] is required and on each side of the TSP-REMxxx modules a minimum space of 50mm [1.97in] is required which allows air convection. The air temperature measured 10mm [0.39in] below the device must not exceed the specified values in the data sheet. Observe same power derating above ambient temperatures of 40°C as specified for the TSP power supplies.

2.1 Assembly

To fix device on the DIN-rail, hook top part of clip on DIN-rail, push down and inward until you hear a clipping sound.

To remove the device, pull the latch of the clip with the aid of an insulated flat head screwdriver. When clip has cleared bottom DIN rail remove the screwdriver from recess. Lift the device off DIN-rail.

Wall mounting or chassis mounting can be achieved by use of optional mounting bracket TSP-WMK01 (1 bracket, see Fig. 4.1). Remove the DIN-clips by removing the screw and place the mounting brackets in the same place as the DIN-clips. Use the countersink screws, which are included with the wall mounting kit (1 countersink screw with TSP-WMK01) to fix the mounting brackets on the TSP-REM360 or TSP-REM600 (tightening torque 0.8-0.9Nm).

2.2 Connecting cable

Only qualified personnel may carry out the installation. The device is equipped with COMBICON connector. This reliable and easy-to-assemble connection method enables a fast connection of the device.

2.2.1 Input 1 and Input 2 (Fig. 3.1 → Connector J1, pin 1, pin 2, pin 3 & pin 4):

The connection is made by using the –Vin and +Vin connections at Input 1 as well as at Input 2 and has to be carried out in accordance with the local regulations. Sufficiently dimensioned wiring has to be ensured (see 2.2.1.1).

To achieve a reliable and shockproof connection strip the connecting ends according 2.2.1.1. If flexible wires are used the wires have to be terminated. (e.g. by using ferrules)

2.2.1.1 Connections and terminal assignment

Device	Terminals	Function	Solid or stranded wires		Torque	Stripping length
			[mm ²]	[AWG]	[Nm]	[mm]
TSP 090-124 TSP 180-124	–Vin & +Vin	Input 1 Input Voltage (24Vdc)	0.5 ... 2.5	24 ... 12	0.5 – 0.6	7.0
	–Vin & +Vin	Input 2 Input Voltage (24Vdc)	0.5 ... 2.5	24 ... 12	0.5 – 0.6	7.0
	+Vout & -Vout	Output Voltage (24Vdc)	0.5 ... 2.5	24 ... 12	0.5 – 0.6	7.0
	Signal	Relay inputs and relay outputs	0.2 ... 2.5	32 ... 12	0.5 – 0.6	7.0
TSP 360-124	–Vin & +Vin	Input 1 Input Voltage (24Vdc)	1.0 ... 2.5	18 ... 12	0.5 – 0.6	7.0
	–Vin & +Vin	Input 2 Input Voltage (24Vdc)	1.0 ... 2.5	18 ... 12	0.5 – 0.6	7.0
	+Vout & -Vout	Output Voltage (24Vdc)	1.0 ... 2.5	18 ... 12	0.5 – 0.6	7.0
	Signal	Relay inputs and relay outputs	0.2 ... 2.5	32 ... 12	0.5 – 0.6	7.0
TSP 600-124	–Vin & +Vin	Input 1 Input Voltage (24Vdc)	1.0 ... 4.0	18 ... 10	0.5 – 0.6	7.0
	–Vin & +Vin	Input 2 Input Voltage (24Vdc)	1.0 ... 4.0	18 ... 10	0.5 – 0.6	7.0
	+Vout & -Vout	Output Voltage (24Vdc)	1.0 ... 4.0	18 ... 10	0.5 – 0.6	7.0
	Signal	Relay inputs and relay outputs	0.2 ... 2.5	32 ... 12	0.5 – 0.6	7.0

2.2.2 Output (Fig. 3.1 → Connector J2, pin 1, pin 2, pin 3 & pin 4):

The 24VDC connection is made using the “+Vout” and “-Vout” connections. All output terminals should be connected to the load. Make sure that all output lines are dimensioned according to the maximum output current (see 2.2.1.1) or are separately protected! The wires on the secondary side should have large cross sections in order to keep the voltage drops on these lines as low as possible.

To achieve a reliable and shockproof connection strip the connecting ends according 2.2.1.1. If flexible wires are used the wires have to be terminated. (e.g. by using ferrules)

At the time of delivery, the output voltage is 24VDC. The output voltage can be set (using an insulated screwdriver) from 24 to 27VDC on the potentiometer (see Fig. 3.1).

The device is protected against overload and short circuit.

2.2.3 Signalling (Fig. 3.1 → Connector J5, pin 1 & pin 2):

The DC OK outputs are for enabling monitoring of the functions of the two TSP power supplies. The floating DC OK signal contacts (see Fig. 3.1 → Connector J5, pin 1 & pin 2) is monitoring if the output voltage of the TSP power supplies, which are connected to the TSP-REM360 Input 1 and Input 2 or TSP-REM600 Input 1 and Input 2, is present. If one of the devices is disconnected or damaged, e.g. in the event of a power supplies internal short circuit, the alarm is generated. The contact on the relay will switch off (relay contact → open). If both TSP power supplies provide at least an output voltage of 21.5Vdc the relay contact is closed and signalise that both power supplies are in operation. If the output voltage of the TSP-REM360 or TSP-REM600 is present the relay contact (30Vdc / 1A) is closed. It is detected by measuring the TSP-REM360 or TSP-REM600 input voltage at Input 1 as well as at Input 2.

2.2.4.1 Inputs-ON LED:

The Inputs-ON LED is a green colour LED that indicates the status of the TSP-REM360 or TSP-REM600 inputs and enables visual evaluation of the function locally in the control cabinet. Inputs-ON LED green on – both TSP power supplies are supplying the TSP-REM360 or TSP-REM600 with 24Vdc. Inputs-ON LED green off – one of the two or even both power supplies failed.

3. Function

3.1 Remote ON/OFF:

The TSP-REM360 as well as the TSP-REM600 devices provides an external remote on/off function by use of pin 3 & pin 4 at connector J5 (see Fig. 3.1). To switch off the power supply and TSP-REM360 or power supply and TSP-REM600 a connection between Connector J5 pin 3 and Connector J5, pin 4 by use of a switch or similar has to be made. At open connection between J5 pin 3 and J5 pin 4 the device is providing the adjusted output voltage.

4. Compliance to UL508C

The TSP-REM360 is a built-in device and to comply with UL508C the device must be installed in a cabinet with minimum dimensions of: 400mm (Width) x 500mm (Height) x 200mm (Depth)

4.1 Operating Temperature Ranges and load derating:

Depends on the TSP connected to the TSP-REM360. Please see operating temperature range and load derating at the TSP power supplies datasheet or TSP operating instructions.

5. Technical Specifications

4.1 Input Specifications

Order code Model	Input	max. Input Power	* Output Voltage	max. Output Current
TSP-REM360	2 x 24 Vdc 2 x Control Input	2 x 360 Watt	24 Vdc	15.0 A
TSP-REM600	2 x 24 Vdc 2 x Control Input	2 x 600 Watt	24 Vdc	25.0 A

* Output voltage adjustable

** Maximum current at Vout nom.

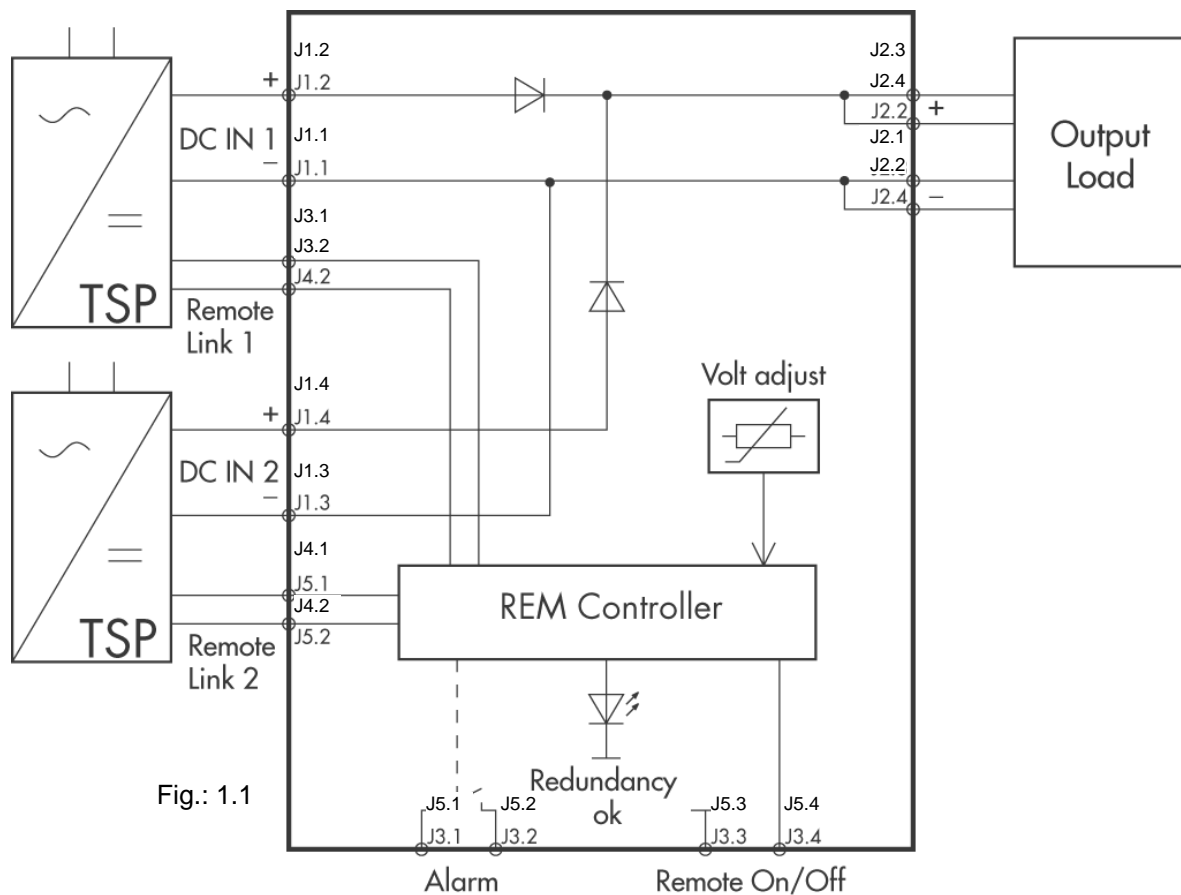
5.2 Output Specifications

Output Voltage adjustable Range with Potentiometer		24 - 27 Vdc
Ripple and Noise (20MHz Bandwidth)	at $V_{in nom}$ und $I_{out max}$	230mV pk-pk max
Max. Capacitive Load		unlimited

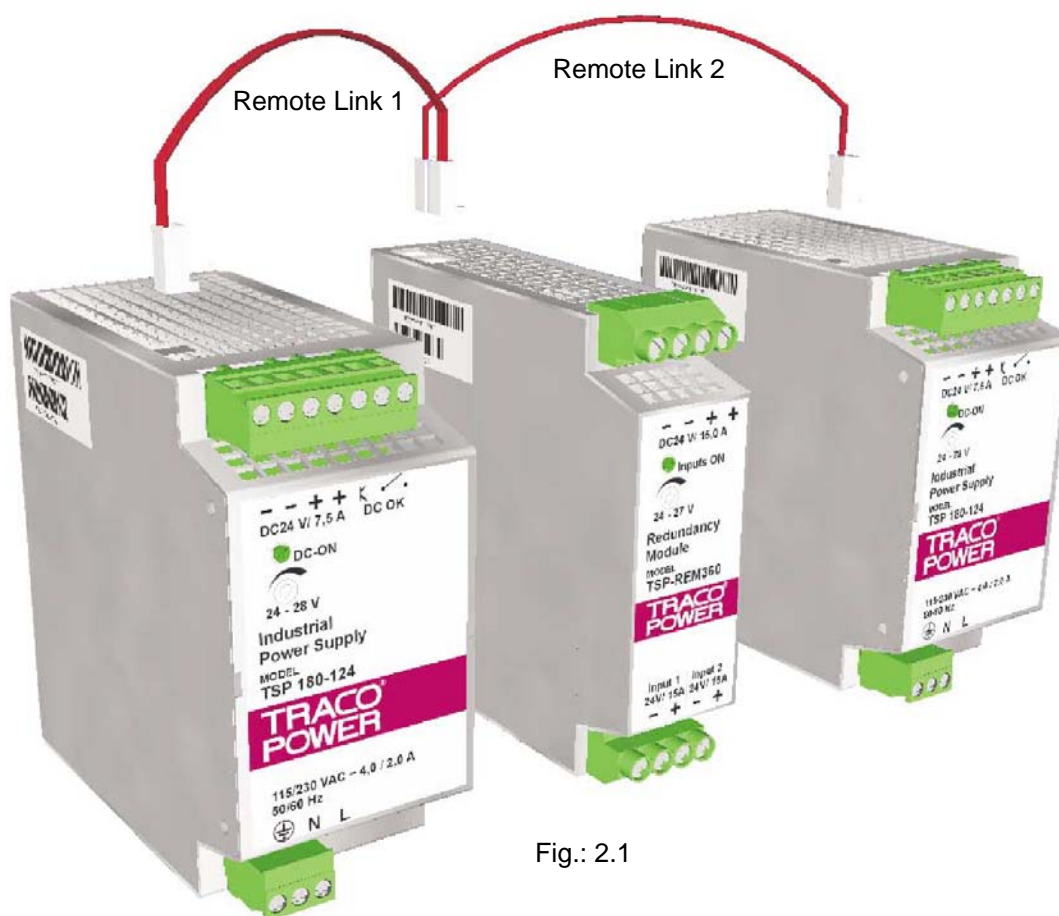
5.3 General Specifications

Operating Temperature Range	-25°C ... +70°C -13°F ... +158°F
Cooling	Convection cooling; no internal fan
Storage Temperature Range	-25°C ... +85°C -13°F ... +185°F
Load Derating above +40°C (104°F)	According the load derating of TSP xxx-124 used
Humidity (non condensing)	95% rel H max.
Pollution Degree	2
Temperature Coefficient	0.02%/K
Reliability, calculated MTBF	in accordance to IEC 61709 >350'000 hours
Remote ON/OFF	see Fig. 3.1 2 pin connector (see Fig. 3.1; J5 pin 3 & pin 4) connect via a switch → Contact closed = Device off
Alarm Relay Contact	30Vdc / 1A
Redundancy OK signal (Alarm)	Trigger threshold at 18 - 22VDC, Contact open if both inputs failed
Remote link cable (0.5m)	2 cables included with TSP-REM360 module
Case protection	in accordance to IEC 529 IP20
Isolation	See Safety Standards
Safety Standards	- Information Technology Equipment according to - Industrial Control Equipment IEC / UL / EN 60950-1 UL 508
Electromagnetic compatibility (EMC) Emissions	in correspondence to connected units (no internal switching device)
Electromagnetic compatibility (EMC) Immunity	in correspondence to connected units (no internal switching device)
Environment	Vibration Shock IEC 60068-2-6 3 axis, sine sweep, 10 ... 55Hz, 1g, 1oct/min. IEC 60068-2-27 3 axis, 15g, half sine, 11ms
Enclosure Material	Aluminium (Chassis) / Zinc plated Steel (Cover)
Mounting	DIN-Rail mounting Wall mounting For DIN-Rails as per EN 50022-35 x 15 / 7.5 (snap-on self-locking spring) With wall mounting bracket option TSP-WMK01 (see datasheet page 8)
Connection	Screw terminals

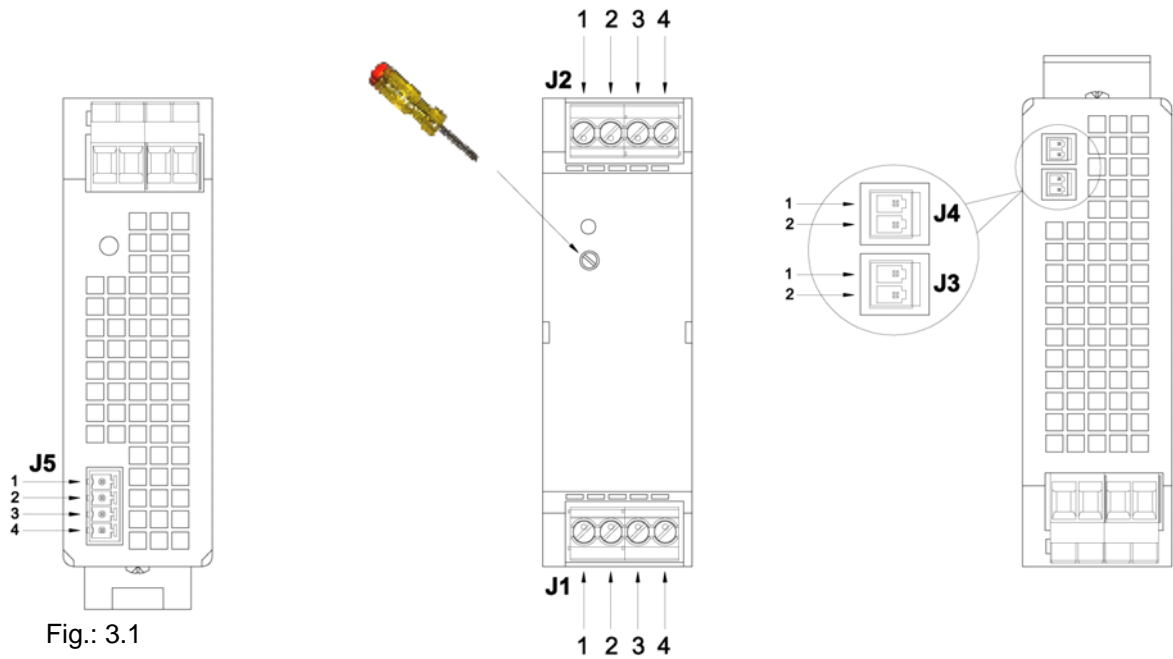
Block diagram TSP-REM360 and TSP-REM600



Connection of TSP-REM360 or TSP-REM600



Connectors of TSP-REM360 and TSP-REM600



	J1	J2	J3 Voltage control 1 for Input 1	J4 Voltage control 2 for Input 2	J5
Pin 1	Input 1 -Vin	GND (-)	S+	S+	DC-OK Signal
Pin 2	Input 1 +Vin	GND (-)	S-	S-	DC-OK Relay contact
Pin 3	Input 2 -Vin	Vout (+)	-	-	Remote ON/OFF
Pin 4	Input 2 +Vin	Vout (+)	-	-	Remote ON/OFF

Wall mounting brackets (TSP-WMK01) for TSP-REM360

