FLEX Power Supplies 1, 2 and 3 Phase(24Vdc)

Application

The power supplies *FLEX* Series can be used in areas from extreme industrial environment, and complies with the latest technical standard. Before working with the unit, read these instructions carefully and completely. All these power supplies are single output, IP20, have Mounting DIN Rail IEC 60715/TH35. Class 1 isolation devices suitable for SELV and PELV solutions.

Safety and warning notes

WARNING – Explosion Hazard Do not disconnect Equipment unless power has been switched off or the area is known to be non-hazardous.
WARNING – Explosion Hazard. Substitution of components may impair suitability for class I, Division 2.
WARNING – Switch off the system before connecting the module. Never work on the machine when it is live. The device must be installed in according with UL508. The device must have a suitable isolating facility outside the power supply unit, via which can be switched to idle. Danger of fatal Injury!

Connection:

Cable Connection: The following cable cross-sections may be used:

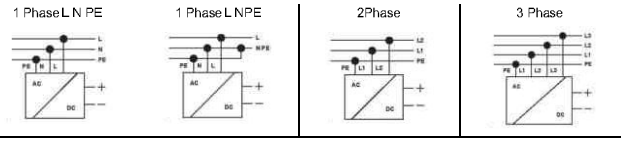
	Solid (mm^2)	Stranded (mm^2)	AWG	Torque (Nm)	Stripping Length	Power Supply
Input:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6 Nm	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0 Nm	7 mm	*RISH Flex* 500 series
Output:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6 Nm	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0 Nm	7 mm	*RISH Flex* 500 series
Signal:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6 Nm	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0 Nm	7 mm	*RISH Flex* 500 series

The connection is made by the screw type 2.5 mm^2 (*RISH FLEX* 60-90-170-280 series) or 4.0 mm^2 (*RISH FLEX* 500 series) terminal blocks. Use only copper cables that are designed for operating temperatures of > 75 °C. Wiring terminal shall be marked to indicate the proper connection for the power supply.

Input - Output power connection:

Input:		
RISH FLEX xxxxA series	1 Phase Switching Power Supplies	L, N, PE ⏚.
RISH FLEX xxxxB series	1 Phase Switching Power Supplies	L, N, PE ⏚.
RISH FLEX xxxxB series	2 Phase Switching Power Supplies	L1, L2, PE ⏚.
RISH FLEX 500xxB series	3 Phase Switching Power Supplies	L1, L2, L3, PE ⏚.
Output:	24 Vdc is made via the	(+), (-).

1 Phase L N PE | 1 Phase L NPE | 2Phase | 3 Phase

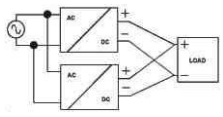


Signalling:

Red led (Dc ok) status:	**Jumper Setting**
Output voltage OK: Lights up permanently	Hiccup Mode / Manual Reset / Continuous Mode
Switch off, in overload and short circuit conditions	Manual Reset / Continuous Mode
Blink, in overload and short circuit conditions	Hiccup Mode

Parallel Connection, to Increase Output Power:

- Make parallel connection with same model of power supply to increase the output power.
- Adjust the output approximately to the same value (± 20mV) applying 1-2 A load to all devices output before connecting them in parallel.
- Easy parallel connections Jumper. In *RISH FLEX* 280xxX and *RISH FLEX* 500xxX for more power, you must change position of the jumper to enable parallel connection. In this mode you can put in parallel up to 4 power supplies.

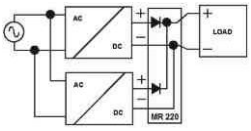


Easy Parallel connection OFF(factory selection)

Easy Parallel connection ON

Parallel connection Redundancy:

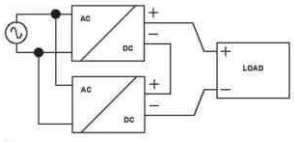
Power supplies can be paralleled for 1+1 redundancy to obtain a higher system availability. Redundant systems require a certain amount of extra power to support the load in case one power supply unit fails. The simplest way is to put two *RISH FLEX* power supplies in parallel. In case one power supply unit fails, the other one is automatically able to support the load current without any interruption. This simple way to build a redundant system has two major disadvantages:
- The faulty power supply can not be recognized. The red LED will still be ON since it is reverse-powered from the other power supply. It does not cover failures such as an internal short circuit in the secondary side of the power supply. In such a - virtually nearly impossible - case, the defective unit becomes a load for the other power supplies and the output voltage can not be maintained any more.



This can only be avoided by utilizing decoupling diodes which are included in the Redundancy Module *RISH* MR220. Recommendations for building redundant power systems:
a) Use separate input fuses for each power supply.
b) Monitor the individual power supply units. A DC-Red led and Power Good Contact are already included on *RISH FLEX* power supplies. This feature reports a faulty unit; see power Good Section for any technical detail.
c) When possible, connect each power supply to different phases or circuits.

Serial connection:

a) It is possible to connect as many units in series as needed, providing the sum of the output voltage does not exceed 150Vdc.
b) Voltages with a potential above 60Vdc are not SELV any more and can be dangerous. Such voltages must be installed with a protection against touching.
c) For serial operation use power supplies of the same type.
d) Earthing of the output is required when the sum of the output voltage is above 60Vdc.
e) Keep an installation clearance of 15mm (left/right) between two power supplies and avoid installing the power supplies on top of each other. Note: Avoid return voltage (e.g. from a decelerating motor or battery) which is applied to the output terminals.



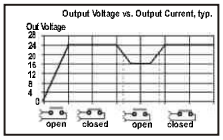
Power Good Output Function (Not for *RISH FLEX* 60xxX)

PWR Good

Output is used for preventive function monitoring of the power supply. An electrically isolated signal contact is available. The signal contact Closes when output power is OK and Opens when output voltage falls below 20Vdc ±5%. This feature is particularly useful in redundant applications.

Power Good Contact rating:

Max. DC1: 30 Vdc 1 A; AC1: 60 Vac 1A	Resistive load (EN 60947-4-1)
Min.:1mA at 5 Vdc	Min permissive load



Protection:

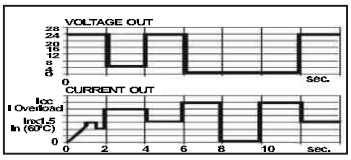
On the primary side: the device is equipped with an internal fuse; follow the next page table. If the internal fuse is blown (fails opens), it is most probable that there is a fault in the device. If this failure occurs, the device must be checked in the factory. **Caution:** in two phase Input models, Double pole / Neutral Fusing.
On the secondary side: the devices are electrically protected against: Over Load, Over Voltage Output (typ.35 Vdc), and Short circuit automatically.

Short circuit and overload Protection Modes:

Depending on the users application loads, the *RISH FLEX* Line offers three types of protection modes which are available by removing the plastic window and changing the Jumper to the desired setting as shown below:
(No Settings jumper for *RISH FLEX* 60xxA only Continuous Mode Condition)

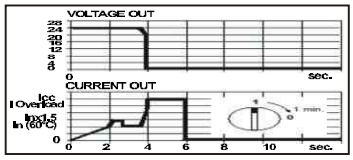
1) HICCUP MODE (default factory Jumper setting)

General purpose mode, used for normal load. In case of short-circuit or overloading, the output current is interrupted. The device tries again to re-establish output voltage and normal condition about every 2 second till the problem is cleared.



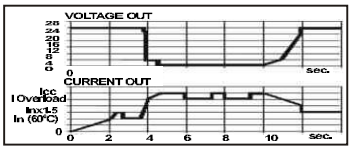
2) MANUAL RESET (manual Restart by Operator)

This protection mode is particularly suggested in applications where safety procedures require that reset be carried out only by an authorized person.
In case of short-circuit or overload, the output current is interrupted. In order to restart the output it is necessary to switch-off the input circuit for about 1 minute.



3) Continuous Output Mode

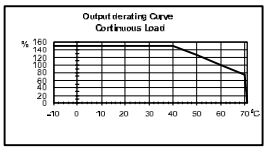
In case of short-circuit or overload, the output current is kept at high values with near zero voltage. In case of short circuit the current can reach up to 3 times the rated current at 60°C. This protection mode is used to meet the requirements of demanding loads such as motors, solenoid valves, lamps, PLC with highly capacitive input circuits and other loads with marked transient overload behavior



The output of the device is electrically protected against overload and short circuit. For the nominal voltage and nominal current at temperature condition, please see technical data. The device can supply at the nominal Current without switching off. As the overload increases, the output voltage is reduced until zero.

Temperature Ratings

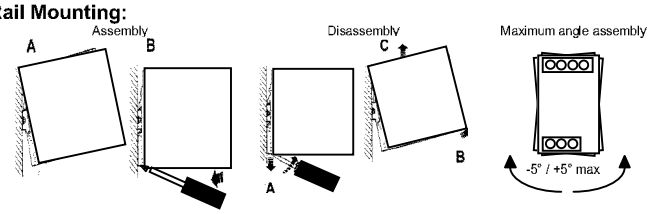
Surrounding air temperature 50 °C for *RISH FLEX* 60xxA, and for others 60°C. At the temperature of 70°C the output current will be 75% - 50% of In. The equipment does not switch off in case of ambient temperature above 70°C or thermal overload. The devices are protected for Over temperature conditions "worst case"; in this situation the device Shut-downs the output and automatically restarts when temperature inside falls.



Standards and Certification

Electrical Safety:
Assembling device: IEC/EN 60950 (VDE 0805) and EN 50178 (VDE 0160).
Installation according: IEC/EN 60950.
Input / Output separation: SELV EN 60950-1 and PELV EN 60204-1. Double or reinforced insulation.
EMC Standards Immunity:
EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5.
EMC Standards Emission:
EN 61000-6-4, EN 61000-3-2,
Standards Conformity:
Safety of Electrical Equipment Machines: EN 60204-1.
CE The CE mark in According to EMC 2004/108/EC and Low voltage directive 2006/95/EEC

Rail Mounting:



Other models / modules must have a minimum vertical and horizontal distance of 10 cm to this power supply in order to guarantee sufficient auto convection. Depending on the ambient temperature and load of the device, the temperature of the housing can become very high!

Dimension and Lay-out: