

1, 2 and 3 Phase F Power SMPS (5V,12V,24V & 48Vdc)



Application

The power supplies F Power 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 accordance 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:

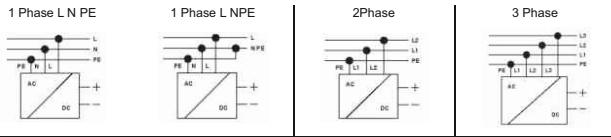
	Solid (mm ²)	Stranded (mm ²)	AWG	Torque (Nm)	Stripping Length	Power Supply
Input:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0	7 mm	F Power 480 & 500 series
Output:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0	7 mm	F Power 480 & 500 series
Signal:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6	7 mm	Others
	4.0	6.0	30 – 10	0.8 – 1.0	7 mm	F Power 480 & 500 series

The connection is made by the screw type 2.5 mm² (F Power 60-90-150-170-240-280 series) or 4.0 mm² (F Power 480 & 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:	Output:
F Power xxxxA series	1 Phase Switching Power Supplies
F Power xxxxB series	1 Phase Switching Power Supplies
F Power xxxxB series	2 Phase Switching Power Supplies
F Power 500xB series	3 Phase Switching Power Supplies

Output: Nominal Voltage (Vdc) is made via the (+), (-).

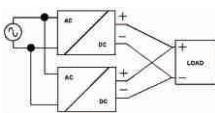


Signalling:

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:

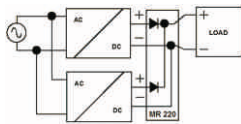
- Make parallel connection with same model of power supply to increase the output power.
- Adjust the output approximately to the same value ($\pm 20mV$) applying 1-2 A load to all devices output before connecting them in parallel.
- Easy parallel connections Jumper. In F Power 240xxX, 280xxX, 480xxX & 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.



Parallel connection Redundancy:

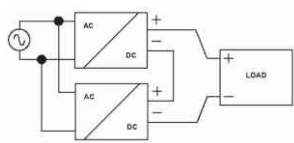
Power supplies can be paralleled for 1+1 redundancy to obtain a higher system availability. Redundant systems require a certain amount of extra power to support the load in case one power supply unit fails. The simplest way is to put two F Power SMPS in parallel. In case one power supply unit fails, 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 MR220. Recommendations for building redundant power systems:
 - Use separate input fuses for each power supply.
 - Monitor the individual power supply units. A DC-Red led and Power Good Contact are already included on F Power SMPS. This feature reports a faulty unit: see power Good Section for any technical detail.
 - When possible, connect each power supply to different phases or circuits.



Serial connection:

- It is possible to connect as many units in series as needed, providing the sum of the output voltage does not exceed 150Vdc.
- 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.
- For serial operation use power supplies of the same type.
- Earthing of the output is required when the sum of the output voltage is above 60Vdc.
- 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.

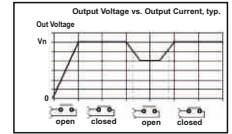


Power Good Output Function (Not for F Power 60xxX)

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 (see following table).

Nominal Voltage	Threshold Voltage
12Vdc	11Vdc $\pm 5\%$
24Vdc	20Vdc $\pm 5\%$
48Vdc	42Vdc $\pm 5\%$

This feature is particularly useful in redundant applications. Power Good Contact rating:
Max. DC1: 30 Vdc 1 A;
AC1: 60 Vac 1 A
Resistive load (EN 60947-4-1)
Min.: 1mA at 5 Vdc | Min permissible load



Protection:

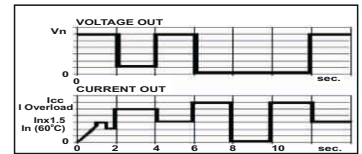
On the primary side: the device is equipped with an internal fuse; follow the next page table. If the internal fuse is blown (fails opens), it is most probable that there is a fault in the device. If this failure occurs, the device must be checked in the factory. **Caution:** in two phase input models, Double pole / Neutral Fusing.
On the secondary side: the devices are electrically protected against: Over Load, Over Voltage Output (typ.30 and Short circuit automatically).

Short circuit and overload Protection Modes:

Depending on the users application loads, the F Power Series 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 F Power 60xxA only Continuous Mode Condition)

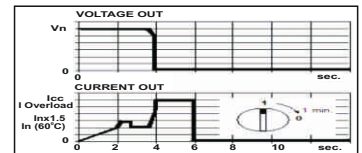
1) HICUP MODE (default factory Jumper setting)

1 General purpose mode, used for normal load.
1 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.



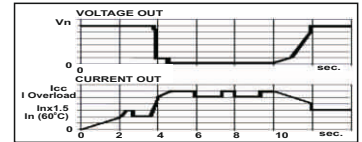
2) MANUAL RESET (manual Restart by Operator)

1 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

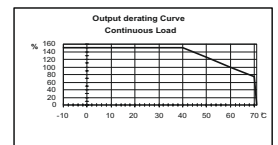
1 In case of short-circuit or overload, the output current is kept at high values with near zero voltage. In case of short circuit the current can reach up to 3 times the rated current at 60°C. This protection mode is used to meet the requirements of demanding loads such as motors, solenoid valves, lamps,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

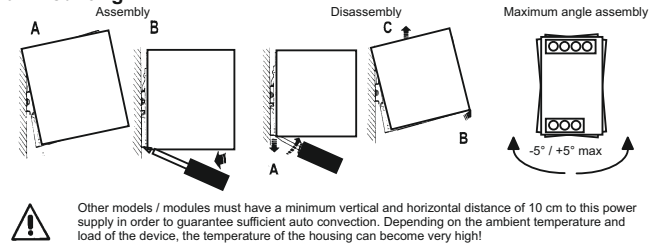
Surrounding air temperature 50 °C for F power 60xxA, and for others 60°C. At the temperature of 70°C the output current will be 75% - 50% of In. The equipment does not switch off in case of ambient temperature above 70°C or thermal overload. The devices are protected for Over temperature conditions "worst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



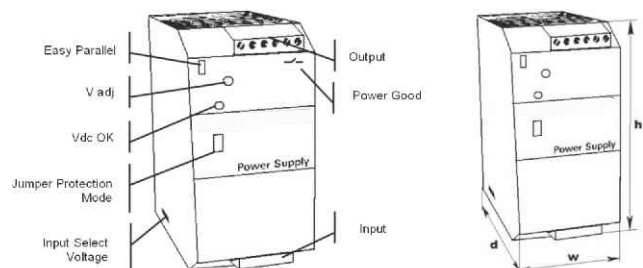
Standards and Certification

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:



Dimension and Lay-out:



Model	1Phase							
	F Power 6005A	F Power 6012A	F Power 6024A	F Power 9012A	F Power 9024A	F Power 15012A	F Power 15024A	F Power 15048A
INPUT DATA								
Nominal Input Voltage Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac
Input Voltage Range VAC (see side table on product for input selection switch position)	90 – 280Vac	90 – 280Vac	90 – 280Vac	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)
Input Voltage Range VDC (Applicable only when input selection switch is positioned at 180-280Vac for F Power xxxxA)	120 – 373Vdc #	120 – 373Vdc #	120 – 373Vdc #	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc
Inrush Current (Vn and In Load) I ² t	≤ 7 A ≤ 5msec	≤ 11 A ≤ 5msec	≤ 7 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 11 A ≤ 5msec	≤ 16 A ≤ 5msec	≤ 11 A ≤ 5msec	≤ 16 A ≤ 5msec
Frequency	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%
Input Current	0.5 – 0.25A	1.0 – 0.7A	1.0 – 0.7A	1.8-0.9A	2.8 – 0.9A	2.6-1.15A	2.6-1.15A	2.6-1.15A
Internal Fuse	T 4 A	T 4 A	T 4 A	T 4 A	T 4 A	T 4 A	T 4 A	T 4 A
External Fuse (recommended)	6A (MCB Curve B)	6A (MCB Curve B)	6A	10A (MCB Curve B)	10A (MCB Curve B)	10A (MCB Curve B)	10A (MCB Curve B)	10A (MCB Curve B)
OUTPUT DATA								
Output Voltage Factory Setting ±3% – (Vn)	5Vdc	12Vdc	24Vdc	12Vdc	24Vdc	12Vdc	24Vdc	48Vdc
Adjustment range (Vadi)	4.75 – 5.25Vdc	10 – 15.5Vdc	22 – 27Vdc	10 – 14Vdc	22 – 27Vdc	10 – 14Vdc	22 – 27Vdc	41 – 55Vdc
Start up with capacitive load	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF
Turn-On delay after applying mains voltage	1.5 sec. (max)	1.5 sec. (max)	1.5 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)
Continuous Current at 24 V < 40°C (In)	5.0A	4.0A(115) – 6.0A(230)	2.0A(115) – 3.0A(230)	10A	5.0A	12.5A	6.25A	3.13A
Continuous Current at 24 V < 50°C (In)	5.0A	3.0A(115) – 5.0A(230)	1.5A(115) – 2.5A(230)	9A	4.5A	11.25A	5.625A	2.82A
Continuous Current at 24 V < 60°C (In)	5.0A	–	–	8A	4.0A	10A	5A	2.5A
Power Boost Current (at 24Vdc 60°C ≤ 3min.)	7A at 50°C	7A at 50°C	3.5A at 50°C	10A	5.0A	12.5A	6.25A	3.13A
Current Max Oveaload approx. 4Vdc (permanent)	approx. 2Vdc, Imax=In 50°C x (1.3-1.4)	–	Imax = In 50°C x (1.8 – 2.2)	Imax=In60°Cx(1.8 - 2.2)	Imax = In 60°C x (1.8 – 2.2)	–	Imax=In60°Cx(1.8 - 2.2)	Imax = In 60°C x (1.8 – 2.2)
Short circuit current (Icc)	10A	10A	7.0A	20A	12A	20A	16 A	7.5A
Line Regulation (From low line to high line input voltage at nominal load)	0.125%	0.125%	0.125%	0.1%	0.1%	0.1%	0.1%	0.1%
Load Regulation (From 0% to 100% load)	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Hold-up Time (min. Vac) 24Vdc	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec
Residual Ripple	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp
Efficiency (50% of In)	≥ 82%	≥ 88%	≥ 88%	≥ 91%	≥ 91%	≥ 91%	≥ 91%	≥ 91%
Dissipation power load max (W)	6	6	6	11	11	13	13	13
CLIMATIC DATA								
Ambient Temperature operation	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C
De rating T* > (In)	> 60° 2.5% °C	> 50° 2.5% °C	> 50° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C
Ambient Temperature Storage	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C
Humidity at 25 °C	95%	95%	95%	95%	95%	95%	95%	95%
GENERAL DATA								
Isolation Voltage (IN / OUT)	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac
Isolation Voltage(IN / PE)	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac
Isolation Voltage(OUT / PE)	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac
Protection Class (EN/IEC 60529)	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Reliability (MTBF IEC 61709)	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h
Pollution Degree Environment	2	2	2	2	2	2	2	2
Connection Terminal Blocks Screw Type	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²
Protection class (with PE connected)	I	I	I	I	I	I	I	I
Dimension (w-h-d)	50x120x50 mm	50x120x50 mm	50x120x50 mm	55x110x105 mm	55x110x105 mm	55x110x105 mm	55x110x105 mm	55x110x105 mm
Weight	0.30 kg approx	0.30 kg approx	0.30 kg approx	0.60 kg approx	0.50 kg approx	0.60 kg approx	0.60 kg approx	0.60 kg approx

No input selection switch present VDC can be applied to the total input range.

Model	1Phase							
	F Power 17012A	F Power 17024A	F Power 17048A	F Power 24024A	F Power 28012A	F Power 28024A	F Power 28048A	F Power 48024A
INPUT DATA								
Nominal Input Voltage Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac	115 - 230Vac
Input Voltage Range VAC (see side label on product for input selection switch position)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)
Input Voltage Range VDC (Applicable only when input selection switch is positioned at 180-280Vac for F Power xxvVA)	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc	250 – 373Vdc
Inrush Current (Vn and In Load) I ¹	≤ 16 A ≤ 5msec	≤ 11 A ≤ 5msec	≤ 16 A ≤ 5 msec	≤ 16 A ≤ 5 msec	≤ 16 A ≤ 5msec	≤ 16 A ≤ 5 msec	≤ 16 A ≤ 5 msec	≤ 16 A ≤ 5 msec
Frequency	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%
Input Current	2.8 – 1.3A	2.8 – 0.9A	2.8 – 1.3 A	3.1 – 2.0 A	4.6 – 2.2A	4.6 – 2.2A	4.6 – 2.2A	6.4 – 3.4A
Internal Fuse	T 4A	T 4A	T 4A	T 6.3 A	T 6.3A	T 6.3A	T 6.3A	T 10 A
External Fuse (recommended)	10A (MCB Curve B)	10A (MCB Curve B)	10A (MCB Curve B)	16A (MCB Curve B)	16A (MCB Curve B)	16A (MCB Curve B)	16A (MCB Curve B)	16A (MCB Curve B)
OUTPUT DATA								
Output Voltage Factory Setting ±3% – (Vn)	12Vdc	24Vdc	48Vdc	24Vdc	12Vdc	24Vdc	48Vdc	24Vdc
Adjustment range (Vadi)	10 – 14Vdc	22 – 27Vdc	41 – 55Vdc	22 – 27Vdc	10 – 14Vdc	22 – 27Vdc	41 – 55Vdc	22 – 27Vdc
Start up with capacitive load	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF
Turn-On delay after applying mains voltage	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)
Continuous Current at 24 V < 40°C (In)	14A	7.5A	3.75A	10A	20A	14A	7A	20A
Continuous Current at 24 V < 50°C (In)	12A	6.0A	3.0A	9A	17A	12A	6A	18A
Continuous Current at 24 V < 60°C (In)	10A	5.0A	2.5A	8A	15A	10A	5A	16A
Power Boost Current (at 24Vdc 60°C ≤ 3min.)	14A	7.5A	3.75A	10A	20A	14A	7A	20A
Current Max Oveload approx. 4Vdc (permanent)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)
Short circuit current (I _{cc})	20A	16A	7.5A	30A	30A	30A	15A	60A
Line Regulation (From low line to high line input voltage at nominal load)	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Load Regulation (From 0% to 100% load)	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Hold-up Time (min. Vac) 24Vdc	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec
Residual Ripple	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp
Efficiency (50% of In)	≥ 91%	≥ 91%	≥ 91%	≥ 91%	≥ 92%	≥ 91%	≥ 91%	≥ 92%
Dissipation power load max (W)	17	17	17	23	28	28	28	45
CLIMATIC DATA								
Ambient Temperature operation	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C
De rating T ^a > (In)	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C
Ambient Temperature Storage	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C
Humidity at 25 °C	95%	95%	95%	95%	95%	95%	95%	95%
GENERAL DATA								
Isolation Voltage (IN / OUT)	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac
Isolation Voltage(IN / PE)	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac
Isolation Voltage(OUT / PE)	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac
Protection Class (EN/IEC 60529)	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Reliability (MTBF IEC 61709)	> 5,000,000 h	> 5,000,000 h	> 5,000,000 h	> 5,000,000 h	> 5,000,000 h	> 5,000,000 h	> 5,000,000 h	> 5,000,000 h
Pollution Degree Environment	2	2	2	2	2	2	2	2
Connection Terminal Blocks Screw Type	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²	2.5mm ²	4 mm ²
Protection class (with PE connected)	I	I	I	I	I	I	I	I
Dimension (w-h-d)	55x110x105 mm	55x110x105 mm	55x110x105 mm	72x115x135 mm	72x115x135 mm	72x115x135 mm	72x115x135 mm	85x120x140mm
Weight	0.60 kg approx	0.60 kg approx	0.60 kg approx	0.72 kg approx	0.72 kg approx	0.72 kg approx	0.72 kg approx	1.1 kg approx

Model	1 Phase		2 Phase			3 Phase	Redundancy Module	
	F Power 50024A	*F Power 50048A	F Power 9024B	F Power 17024B	F Power 28024B	F Power 50024B	MR220	
INPUT DATA								
Nominal Input Voltage Vac	115 - 230Vac	115 - 230Vac	(2 x Vac)- 230 – 400 – 500 Vac	(2 x Vac)- 230 – 400 – 500 Vac	(2 x Vac)- 230 – 400 – 500 Vac	(3 x Vac)-400 – 500	Input Voltage Range VDC	Input 1 :- 10 – 60 Vdc Input 1 :- 10 - 60 Vdc
Input Voltage Range VAC (see side table on product for input selection switch position)	90 – 135Vac (I/P selectable 170 – 280Vac by Link at Terminals)	90 – 135Vac (I/P selectable 170 – 280Vac by Switch)	187 – 264Vac (I/P selectable 330 – 550Vac by Switch)	187 – 264Vac (I/P selectable 330 – 550Vac by Switch)	187 – 264Vac (I/P selectable 330 – 550Vac by Switch)	330 – 550Vac (3 phase) 370 – 550Vac (2 phase)	Input Current	Single Input - 1 x 25 A max Dual Input - 2 x 12.5 A max
Input Voltage Range VDC (Applicable only when input selection switch is positioned at 180-280Vac for F Power xxyyA)	250 – 373Vdc	250 – 373Vdc	467 – 780Vdc	467 – 780Vdc	467 – 780Vdc	467 – 780Vdc #	Peak Current	200 A for max. 10 ms
Inrush Current (Vn and In Load) I ² t	≤ 16 A ≤ 5 msec	≤ 16 A ≤ 5 msec	≤17 A ≤ 5msec	≤17 A ≤ 5msec	≤17 A ≤ 5msec	≤17 A ≤ 5msec	Reverse Current	25 mA max. per diode
Frequency	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%	47 – 63 Hz ±6%		
Input Current	8.0 – 4.2 A	8.0 – 4.2A	1.5 – 0.5 – 0.4A	1.5 – 0.8 – 0.7 A	3.0 – 1.4 – 1.0A	0.95 – 0.85A		
Internal Fuse	T 10 A	T 10 A	T 4A	T 4A	T 4A	T 6.3A		
External Fuse (recommended)	16A (MCB Curve B)	16A (MCB Curve B)	10A (MCB Curve B)	10A (MCB Curve B)	16 A (MCB Curve B)	16A (MCB Curve B)		
OUTPUT DATA								
Output Voltage Factory Setting ±3% – (Vn)	24Vdc	48Vdc	24Vdc	24Vdc	24Vdc	24Vdc	Output Voltage "Drop Out" Vin - Vout	0.9 (.max.) 0-25 A
Adjustment range (Vadj)	22 – 27Vdc	41 – 55Vdc	22 – 27Vdc	22 – 27Vdc	22 – 27Vdc	22 – 27Vdc	Rated Current at 24 V 40°C (In)	25A
Start up with capacitive load	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	≤ 50.000µF	Rated Current at 24 V 50°C (In)	22A
Turn-On delay after applying mains voltage	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	1 sec. (max)	Rated Current at 24 V 60°C (In)	20A
Continuous Current at 24 V < 40°C (In)	25A	12A	5.0A	7.5A	14A	25A	Current Short Circuit Icc	60 A
Continuous Current at 24 V < 50°C (In)	22A	11A	4.5A	6.0A	12A	22A	Dissipation power load max (W)	12
Continuous Current at 24 V < 60°C (In)	20A	10A	4.0A	5.0A	10A	20A		
Power Boost Current (at 24Vdc 60°C ≤ 3min.)	25A	12A	5.0A	7.5A	14A	25A		
Current Max Overload approx. 4Vdc (permanent)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)	I _{max} = In 60°C x (1.8 – 2.2)		
Short circuit current (Icc)	60A	30A	12A	16A	30A	60A		
Line Regulation (From low line to high line input voltage at nominal load)	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%		
Load Regulation (From 0% to 100% load)	0.5%	0.5%	1.0%	1.0%	1.0%	1.0%		
Hold-up Time (min. Vac) 24Vdc	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec	Typ. 20 msec		
Residual Ripple	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp	≤ 80 mVpp		
Efficiency (50% of In)	≥ 92%	≥ 92%	≥ 91%	≥ 91%	≥ 91%	≥ 92%		
Dissipation power load max (W)	54	54	11	17	28	54		
CLIMATIC DATA								
Ambient Temperature operation	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	-25 – +70°C	Ambient Temperature operation	-25 to +70 °C
De rating T* > (In)	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	> 60° 2.5% °C	De rating T* > (In)	> 60° 2.5% °C
Ambient Temperature Storage	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	-40 – +85°C	Ambient Temperature Storage	-40 to +85 °C
Humidity at 25 °C	95%	95%	95%	95%	95%	95%	Humidity at 25 °C	95%
GENERAL DATA								
Isolation Voltage (IN / OUT)	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	Fuse: Input or output (recommended)	35 A (MCB curve B)
Isolation Voltage(IN / PE)	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	Protection Class (EN/IEC 60529)	IP 20
Isolation Voltage(OUT / PE)	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	Reliability (MTBF IEC 61709)	> 500,000 h
Protection Class (EN/IEC 60529)	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	Pollution Degree Environment	2
Reliability (MTBF IEC 61709)	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	> 5,00,000 h	Connection Terminal Blocks Screw Type	2.5mm ²
Pollution Degree Environment	2	2	2	2	2	2	Protection class (with PE connected)	I
Connection Terminal Blocks Screw Type	4 mm ²	4 mm ²	2.5mm ²	2.5mm ²	2.5mm ²	4 mm ²	Dimension (w-h-d)	50x120x50 mm
Protection class (with PE connected)	I	I	I	I	I	I	Weight	0.4 kg approx
Dimension (w-h-d)	85x120x140mm	85x120x140mm	55x110x105 mm	55x110x105 mm	72x115x135 mm	85x120x140mm	Cooling	Natural Cooling
Weight	1.1 kg approx	1.0 kg approx	0.50 kg approx	0.60 kg approx	0.72 kg approx	1.0 kg approx		

* F Power 500xxX needs minimum load of 500mA to work properly.

No input selection switch present VDC can be applied to the total input range.