

PWR

300V CAT IV power supply instructions



PWR 1 A 60W 24V

Power supply model

PWR 1 = single phase supply
PWR 3 = three phase supply

Configuration

N = without battery backup
A = with input for external PB accumulator

Total nominal power

60W = nominal output power in Watt

Nominal output voltage

24V = nominal output voltage

Please note that this manual may not always contain the latest information. In this case, please contact us or use the latest version of the operating instructions available on our website <http://www.kmb.cz>.

Scope of delivery:

- PWR unit including connector
- Operating Instructions
- Warranty card
- Certificates

Optional accessories:

- external battery: CTL 7-12, (12V / 7Ah, lifetime 10 years)
- circuit breaker: fuse switch OPVP10, OEZ: 41013
- Fuses: PVA10 2A aM, Ø10x38mm, OEZ: 40761
- battery disconnecter: PC4-HE, DEGSON
- Battery fuse: glass, fast, F3,15A, Ø5x20mm

Used symbols:

 Notes for device operation

  Alert, Danger, Indicates Risk of Injury or Death, Danger Measures

1. Basic features

Main advantage of PWR power supplies are high over-voltage category (300V/CAT IV) and wide range of supply voltage. PWR 1 unit can be powered using single phase AC or DC voltage and PWR 3 using three phase AC voltage.

Power supply features indication of input voltage and protection against over-voltage. Even under over-voltage conditions power supply can be operated with limited output power. (see chapters below)

PWR have galvanically isolated SELV output. Multiple power supplies can be connected as follows:

- parallel: 2× higher output current, more then 2 of same type can be connected (consult with KMB)
- parallel: redundant connection with benefit of higher reliability
- serial: 2× higher output voltage
- serial with central tap: result is power supply with symmetrical output voltage (+/-)

Power supplies have U-I characteristic – from voltage stabilisation smoothly transfers to current limitation (limitation of maximal output current).

Internal over-voltage protection of input and output is implemented. Short-circuit protection, overload and load disconnection protection is matter of course.

Operation of the PWR unit and status of external accu. is signalled by LED and SSR output.

Supplies with external accu. Have protection against wrong connection of the accumulator and against total discharge of accumulator.

Cooling is provided by natural flow of the air. Fan-less.

2. Safety instructions

 Danger of electric shock! Do not open the device.

 Follow the operating instructions.

- Keep the operating instructions together with the device.
- Ensure that the device works only in perfect and original condition, in the upright position.
- Leave enough space (at least 50mm) for airflow below and above the device.
- Do not place heat sources under the unit!
- Do not use the device in an explosive areas.
- Ensure that only qualified persons operate the unit
- Only connections in this manual is permitted
- Only connect recommended external batteries or contact the manufacturer.
- Ensure that the device is not operating outside the limits. See technical data.
- Clean the machine only with a dry cloth or brush so that air vents remain clean.

 If the device is used in a manner other than that specified by the manufacturer, the device protection may be compromised.

 Device may be repaired only by the manufacturer or its authorized service organization.

3. Risk assessment (ČSN EN 61010-1)

Requirements:

The dielectric strength to be met is 300V CAT IV. This corresponds to a test voltage of 5.4 kV ~ (5 s) resp. 3kV ~ (1min) for reinforced insulation according to ČSN EN 61010-1.

Power Module Features:

Insulation voltage is 3kV ~ (1min), overvoltage category is 300V CAT II.

Operational risk without further action:

The insulation voltage and the certified overvoltage class are not sufficient for the required overvoltage category. This concerns the isolation of the power circuit compared to the output terminals (DC output voltage, external backup source and signalling).

Additional measures:

The input voltage of the power module is limited to 300V CAT II with an additional voltage limiter while the device is operated in a 300V CAT IV environment.

The voltage limiter is designed with two varistors that are connected in parallel to the input terminals (terminals L and N or L1, L2, L3 and N against PE). The required test 6kV / 3kA—1.2 / 50µs was performed and the varistors are suitable for use in a 300V CAT IV environment. The supply voltage is protected by an external fuse with the specified value and breaking capacity, type: aM 2A 500V / 120kA Ø10x38mm.

When using two varistors in parallel, it is ensured that the limit value of the overvoltage category is observed even if one varistor is defective (in case of one fault).

Operational risk with additional measures:

As a consequence of the protective measures taken, no operational risk arises.

4. Used symbols

 Warning! Electric shock hazard!

 Danger! Read the instructions!

 The CE marking guarantees compliance with European directives and EMC regulations.

IP20 Anti-touch protection, anti-ingress of objects larger than Ø12.5mm, without water protection.

 This product must not be disposed of in a household waste bin but must be disposed of in such a way as to ensure its environmentally friendly recycling.

~ / = Alternating voltage, AC / direct voltage, DC.

5. Installation

 The person installing the system is responsible for safety of whole system containing the PWR.

Installation:

PWR is installed on DIN 35 rail in standard manner. Natural circulation of the air in the cubicle should be ensured. Clearance of 50mm above and below PWR should be maintained.

 No heat sources should be located below PWR.

Supply voltage:

 Supply voltage have to be connected to L, N terminals resp. L1, L2, L3, N terminals through circuit breaker. CB should be located in close distance to PWR on accessible place for operator. Circuit breaker should be properly marked. Proper fuse and disconnecter housing should be used (i.e. OPVP10 and fuse PVA10 2A aM, 500V/120kA, Ø10x38mm, see accessories), Alternative fuses should be consulted with producer.

Terminals accepts 0,2÷4mm² (24÷12AWG) wires, tightening torque 0,5÷0,6Nm.

 Protection Earth, PE terminal,  have to be connected with 4mm² (12AWG) wire directly without circuit breaker. Tightening torque 0,5÷0,6Nm.

 Supply inputs are polarity free.

Output voltage:

Output voltage is on terminals + and -. Terminals are doubled for easier wiring. Terminals accepts 0,2÷2,5mm² (24÷14AWG) wires, tightening torque 0,5÷0,6Nm.

 Conductors of proper cross-section have to be used depending on current and voltage loss.

Terminals for external accumulator

Accumulator is connection on terminals +B and -B. Terminals accepts $0,2 \div 2,5 \text{mm}^2$ (24÷14AWG) wires, tightening torque $0,5 \div 0,6 \text{Nm}$. Accumulator should be placed as close as possible to power supply.

i Accumulator is protected by fuse F5A inside of PWR. Replacement is possible only by producer or authorized service centre.

i Gel type, 12V, Pb accumulators of same age are recommended

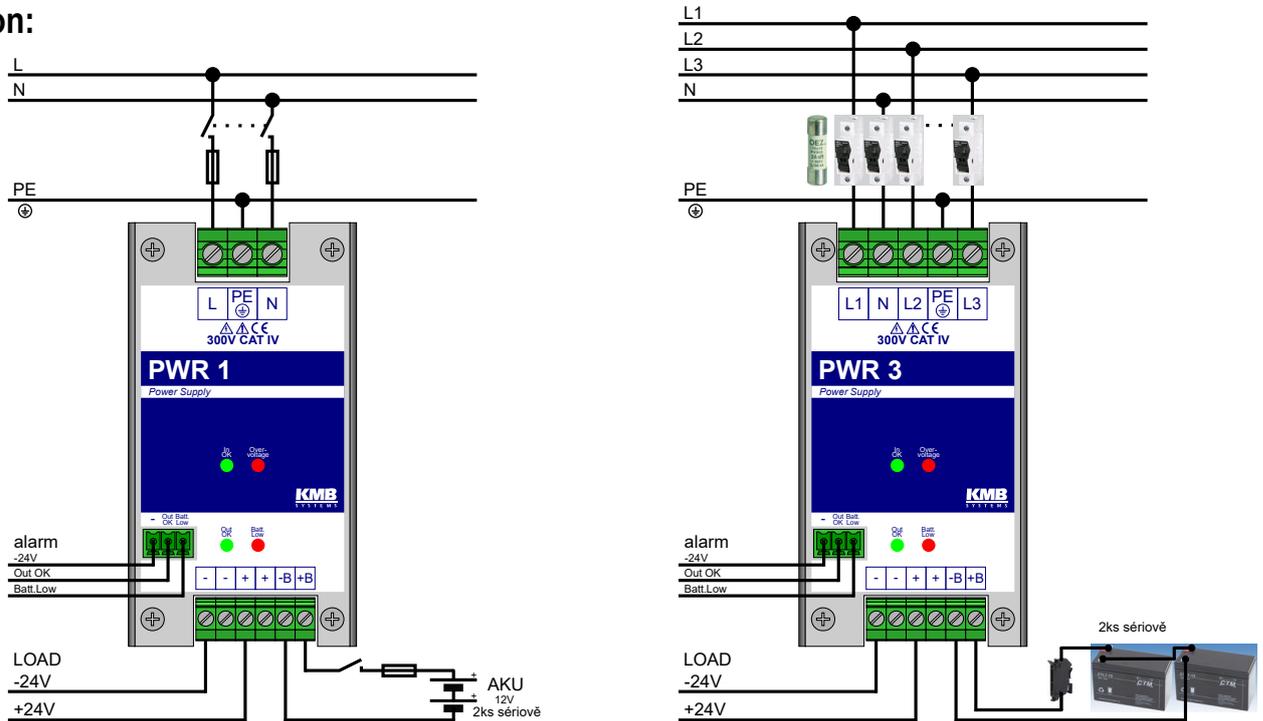
i It's advised to use external circuit breaker on front of accumulator. Suitable type PC4-HE, DEGSON, with F3,15A $\varnothing 5 \times 20 \text{mm}$ fast fuse.

Alarm, signal outputs:

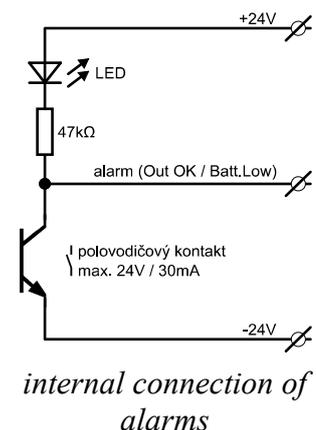
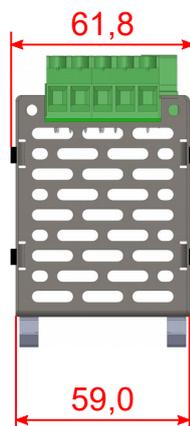
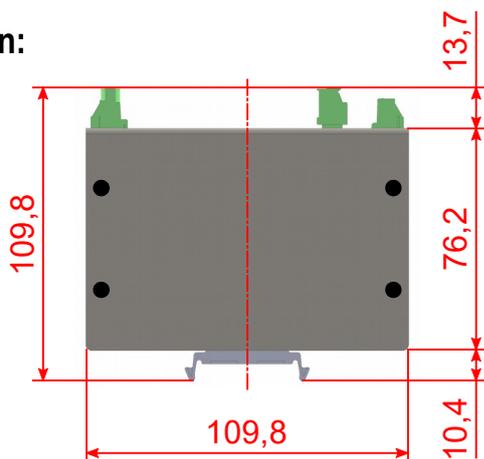
Digital outputs and SSR are wired to pluggable terminal.. First terminal switches „Out OK“ to „-“ (common terminal with „-“ terminal of output voltage) while supply voltage is in stated levels. Second contact switches „Batt. Low“ against „-“ common terminal., while voltage on accu. Is too low.

Terminals supports $0,2 \div 1,5 \text{mm}^2$ (24÷16AWG) wires, tightening torque $0,2 \div 0,25 \text{Nm}$.

Connection:



Dimension:



6. Operation

Signal LED:

In OK: Supply voltage over 90V~ or 127V=

Overvoltage: Supply voltage over 246V~ or 350V=

Out OK: Output voltage over 22,8V= (PWR xN 60W 24V) or 20V= (PWR xA 60W 24V)

Batt. Low: Voltage on accumulator bellow 22V= (only PWR xA 60W 24V)

Alarm, signal output – active state is closed

Out OK: Output voltage is over 22,8V= (PWR xN 60W 24V) or 20V= (PWR xA 60W 24V)

Batt. Low: Voltage on accumulator bellow 22V= (only PWR xA 60W 24V)

Operation of the PWR without accumulator

While supply voltage is in stated range (see charts), output voltage level depends on load its function is presented in output chart. Operator have to Operator must ensure that drawn power don' t cross limits stated in thermal chart.

Operation of PWR with accumulator

In case of loss of power supply PWR will smoothly switch to supply from accumulator. Output voltage is equal to voltage of the accumulator. Accumulator is permanently disconnected from load in case it is discharged bellow limit. For further operation power supply have to be restored. At same time accumulator will be charged – charging current is based on other loads to prevent overload of PWR. Maximal charging current is limited to 0,75A. Output voltage is based on charge level of accumulator (see charts).

Operator have to Operator must ensure that drawn power don' t cross limits stated in thermal chart.

This model can be operated also without accumulator. In such a case output voltage will be equal to maximal voltage of the output (see specifications).

i Operation of PWR from line-to-line voltage in 3~400/230V networks (only PWR 1x xx):

One line is connected to L terminal and other line to N terminal. „In OK“and also „Overvoltage“ LED will be lit. Operator have to ensure that drawn power follows values defined by voltage and thermal chart

⚠ This operation is allowed only in networks with grounded centre TN-C, TN-S, TN-C-S, TT and DC networks TN-C (DC) and TN-S (DC). Voltage of any conductor against ground should not exceed 300V~/=.

Operation in isolated networks.:

⚠ Operation in isolated networks is generally allowed when line-line voltage don' t exceed 300V~.

⚠ Operation in 400/230V isolated network is allowed only with insulation monitoring device which disconnects network at first failure.

⚠ Operation in 690/400V isolated network is prohibited.

i Operation of PWR with 3-phase supply voltage(PWR 3x xx)

At least one line have to be live for operation. Operator have to ensure that drawn power follows values defined by voltage and thermal chart

i Other application have to be consulted with producer.

7. Technical parameters

	type: PWR 1N 60W 24V	type: PWR 1A 60W 24V
input		
Terminals	0,2÷4mm ² (24÷12AWG), 32A, 0,5÷0,6Nm	
Nominal supply voltage	~120÷400V, 50÷60Hz	
Supply voltage range	~90÷460V, 47÷63Hz, =127÷340V (see charts)	
efficiency (typical)	85% @ ~230V, 60W	83% @ ~230V, 60W
power, PF (typical)	140VA, 0,51 @ ~230V, 60W	125VA, 0,58 @ ~230V, 60W
Consumption with no load (typical)	<30mA, 7VA, 2W @ ~230V (without accu)	
Inrush current (typical)	60A @ ~230V	60A @ ~230V
Mains failure immunity (typical)	80ms @ ~230V	Based on accu and load
over-voltage category, safety	300V CAT IV do 2000m.n.m. / 300V CAT III do 5000m.n.m. ČSN EN 61010-1, ČSN EN 60950-1, protection class I, CE ,	
isolating voltage & resistance (in / out)	3kV~/1min, reinforced insulation, >100MΩ/500V=	
output and accumulator		
terminals	0,2÷2,5mm ² (24÷14AWG), 24A, 0,5÷0,6Nm	
insulation, safety	SELV , galvanically insulated from supply voltage	
Nominal output voltage	24V	24V
Nominal output power	60W	60W
Nominal output current / range	2,5A / 0÷3,75A	1,4A / 0÷2,2A charging current 0,75A total current 3,0A
accuracy of output voltage / range	±1%	21÷27,6V
ripple and noise(max.)	240mV _{p-p}	---
over-voltage protection	27,6V	29V
accu. protection (disconnection)	---	21±1V
overload protection (max.)	150%	150%
alarm, signal output		
terminals	0,2÷1,5mm ² (24÷16AWG), 12A, 0,2÷0,25Nm	
Insulation, safety	SELV , galvanically insulated from supply voltage	
SSR output	⌋ 30mA/24V=, against ⊖ pole	
general		
protection, pollution degree	IP20, 2, (for 3 contact manufacturer)	
operating temperature	-30÷70°C (see chart)	-20÷70°C (see chart)
storage temperature	-40°C÷85°C	
Operating and storage humidity	0÷95% RH, non-condensing	
EMC – emission	ČSN EN 55011, ČSN EN 61000-3-2/-3 – class B	
EMC – immunity (61000-4-2/3/4/5/6/8/11)	ČSN EN 61326-1, ČSN EN 61000-6-2, ČSN EN 61000-6-5	
dimension	W 58,6mm x H 109,4mm x D 104,9mm, see drawing	
weight, nett	0,25kg (without accu.)	

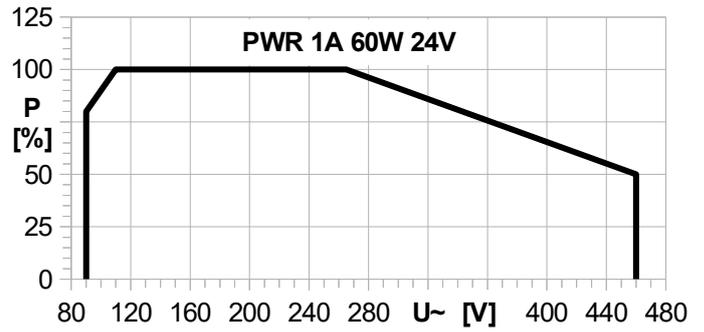
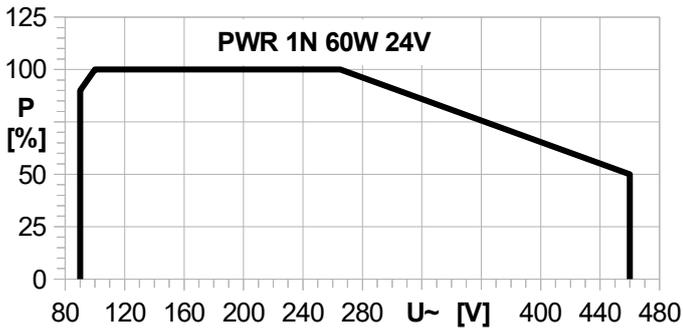
	type: PWR 3N 60W 24V	type: PWR 3A 60W 24V
Input		
Terminals	0,2÷4mm ² (24÷12AWG), 32A, 0,5÷0,6Nm	
Nominal supply voltage	3~, 208/120÷400/230V, 50÷60Hz	
Supply voltage range	1÷3~, 155/90÷460/265V, 47÷63Hz, (see charts)	
efficiency (typical)	85% @ 3~400V, 60W	83% @ 3~400V, 60W
power, PF (typical)	140VA, 0,51 @ 3~400V, 60W	125VA, 0,58 @ 3~400V, 60W
Consumption with no load (typical)	<30mA @ 3~400V, 7VA, 2W (without accu)	
Inrush current (typical)	60A @ 3~400V	60A @ 3~400V
Mains failure immunity (typical)	80ms @ 3~400V	Based on accu and load
over-voltage category, safety	300V CAT IV do 2000m.n.m. / 300V CAT III do 5000m.n.m. ČSN EN 61010-1, ČSN EN 60950-1, protection class I, CE ,	
isolating voltage & resistance (in / out)	3kV~/1min, reinforced insulation, >100MΩ/500V=	
output and accumulator		
terminals	0,2÷2,5mm ² (24÷14AWG), 24A, 0,5÷0,6Nm	
insulation, safety	SELV , galvanically insulated from supply voltage	
Nominal output voltage	24V	24V
Nominal output power	60W	60W
Nominal output current / range	1,45A / 0÷3A	0,4A / 0÷1,1A charging current 0,75A
accuracy of output voltage / range	±1%	21÷27,6V
ripple and noise(max.)	240mV _{P-P}	---
over-voltage protection	27,6V	29V
accu. protection (disconnection)	---	21±1V
overload protection (max.)	300%	300%
alarm, signal output		
Terminals	0,2÷1,5mm ² (24÷16AWG), 12A, 0,2÷0,25Nm	
Insulation, safety	SELV , galvanically insulated from supply voltage	
SSR output	↘ 30mA/24V=, against ⊖ pole	
general		
protection, pollution degree	IP20, 2, (for 3 contact manufacturer)	
operating temperature	-30÷70°C (see chart)	-20÷70°C (see chart)
storage temperature	-40°C÷85°C	
Operating and storage humidity	0÷95% RH, non-condensing	
EMC – emission	ČSN EN 55011, ČSN EN 61000-3-2/-3 – class B	
EMC – immunity (61000-4-2/3/4/5/6/8/11)	ČSN EN 61326-1, ČSN EN 61000-6-2, ČSN EN 61000-6-5	
dimension	W 58,6mm x H 109,4mm x D 104,9mm, see drawing	
weight, nett	0,25kg (without accu.)	

i For more information contact producer

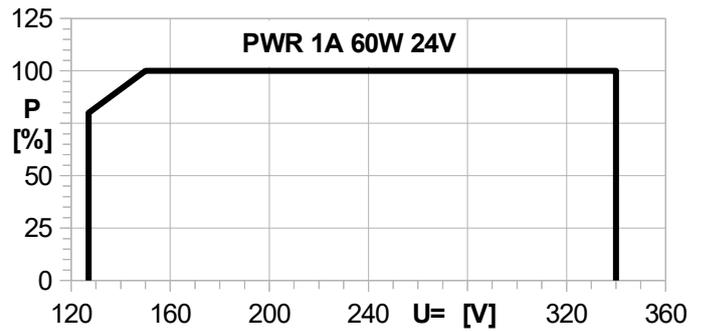
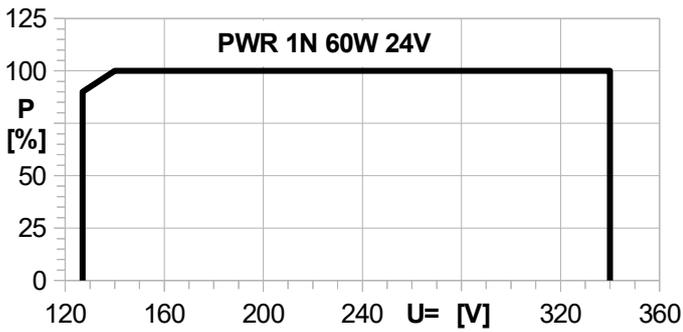
i Other powers and output voltages have to be consulted with producer.

8. Charts

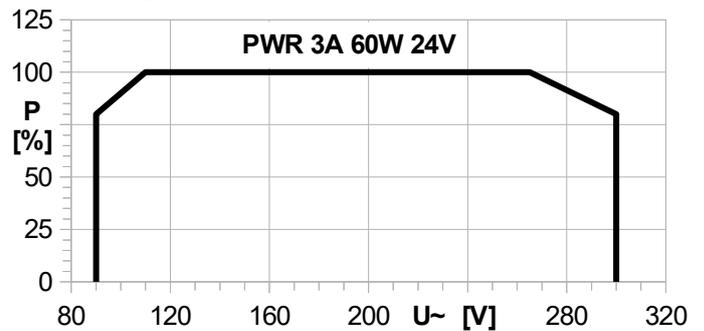
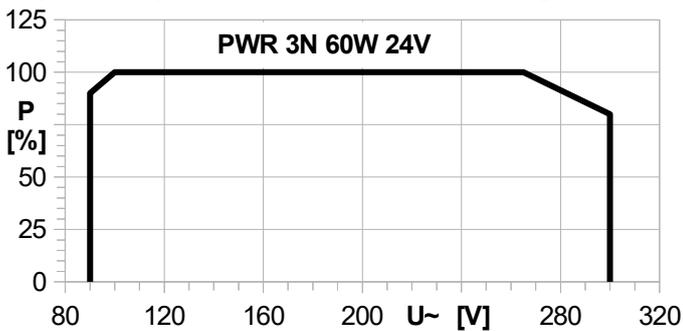
Dependency of maximal power on voltage (for 1-phase AC voltage):



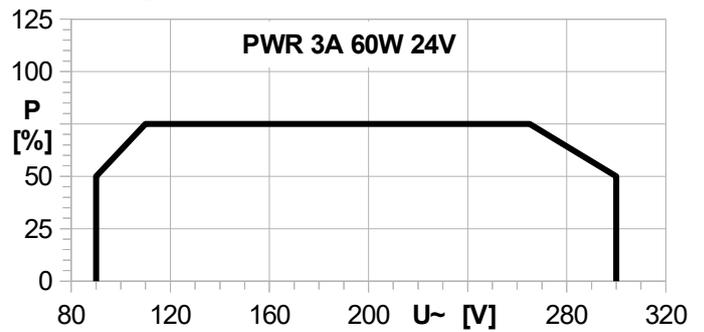
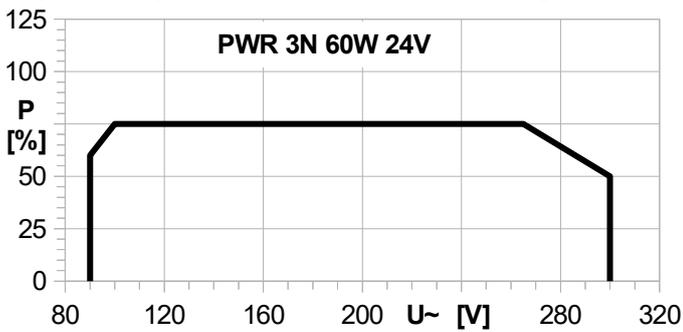
Dependency of maximal power on voltage (DC voltage):



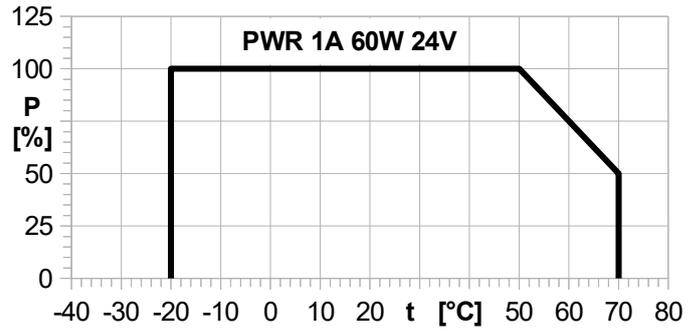
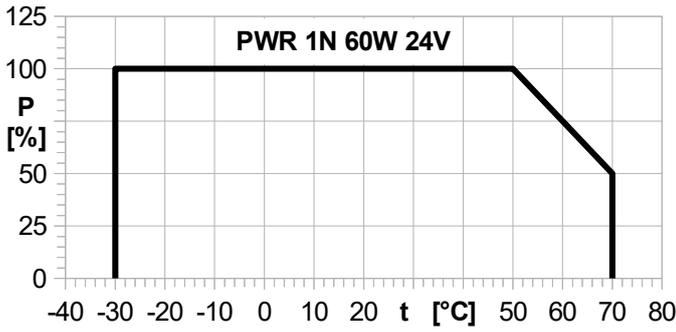
Dependency of maximal power on voltage (for 3-phase AC voltage):



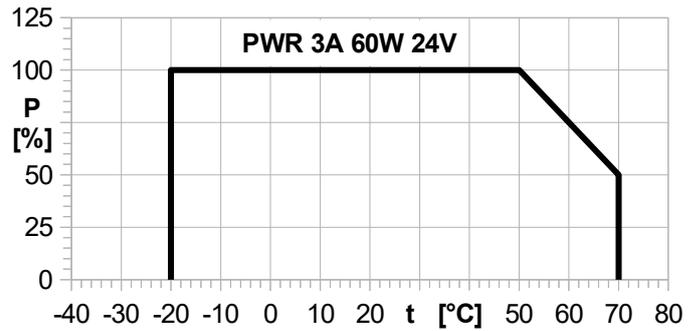
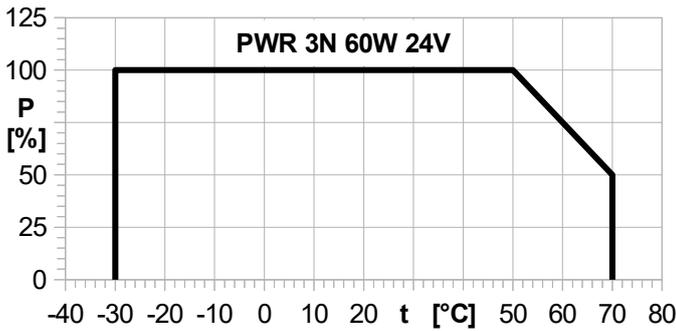
Dependency of maximal power on voltage (for 3-phase AC voltage in case of 1 or 2 lines failure):



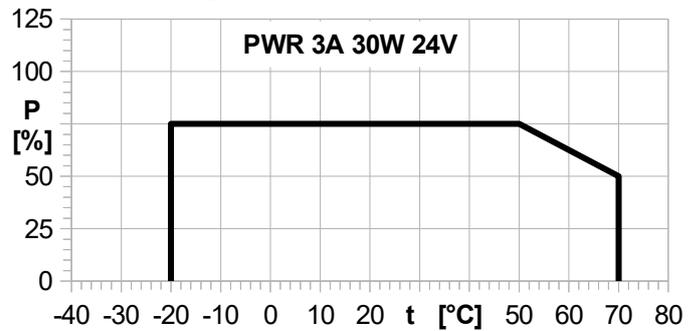
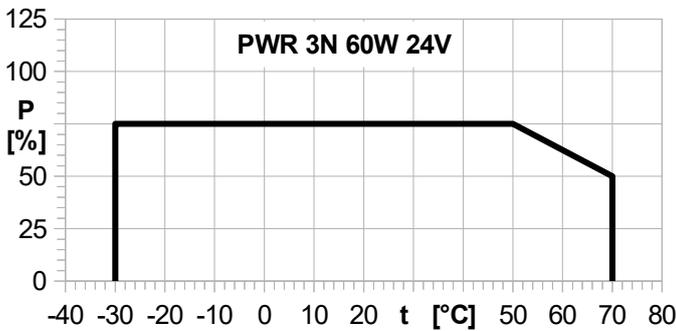
Dependency of maximal load on temperature (for 1-phase AC and DC voltage):



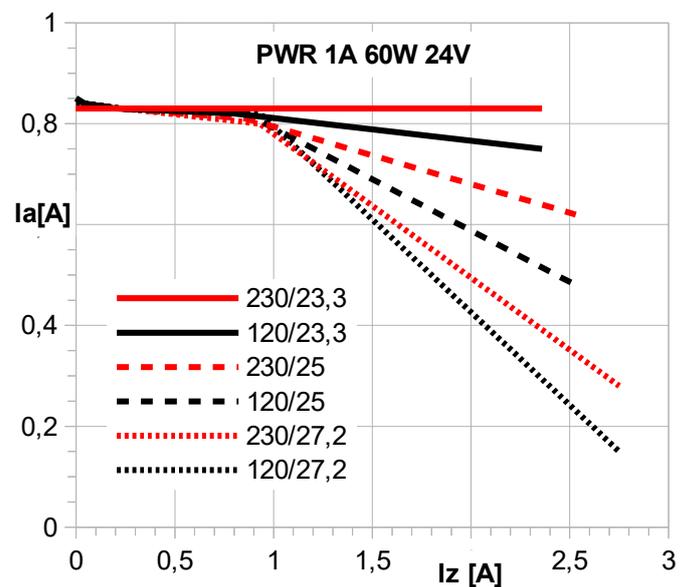
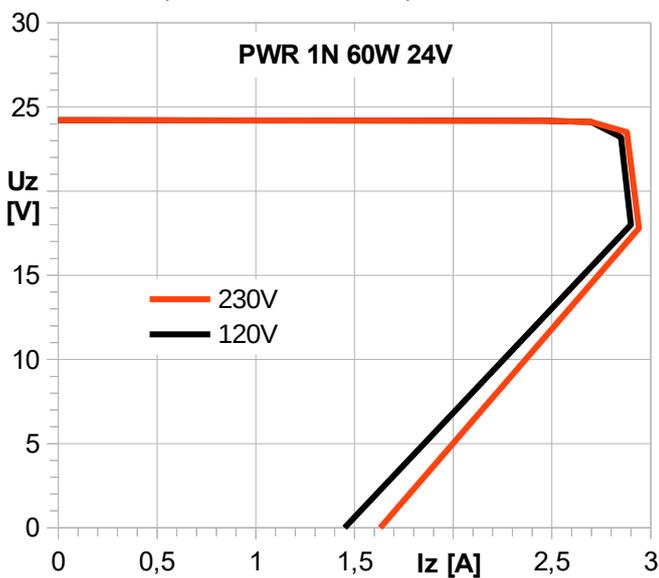
Dependency of maximal load on temperature (for 3-phase AC voltage):



Dependency of maximal power on temperature (for 3-phase AC voltage in case of 1 or 2 lines failure):



Load charts (measured results):



9. Maintenance and service

Instruments do not require any maintenance in their operation. For reliable operation it is only necessary to meet the operating conditions specified and not expose the instrument to violent handling and contact with water or chemicals which could cause mechanical damage.

The product is not equipped with fuses, ensuring disconnection due to improper connection, supply voltage and failure.

The product has been properly inspected before shipment. In the event of a product failure, a claim must be made with the supplier or the manufacturer at:

KMB systems, s.r.o.

Dr. M. Horákové 559

460 06 Liberec 7

tel. +420 485 130 314, fax. +420 482 736 896

e-mail: kmb@kmb.cz, internet: www.kmb.cz

The product must be properly packed in such a way as to avoid damage during transport. The product must be provided with a description of the defect, her speech.

Entitlement to warranty service will not be recognized if the fault has been caused by improper connection, overload or mechanical damage. If a warranty claim is claimed, a duly warranted warranty card must also be sent. If an overhaul is required, you must attach an order for this repair.

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