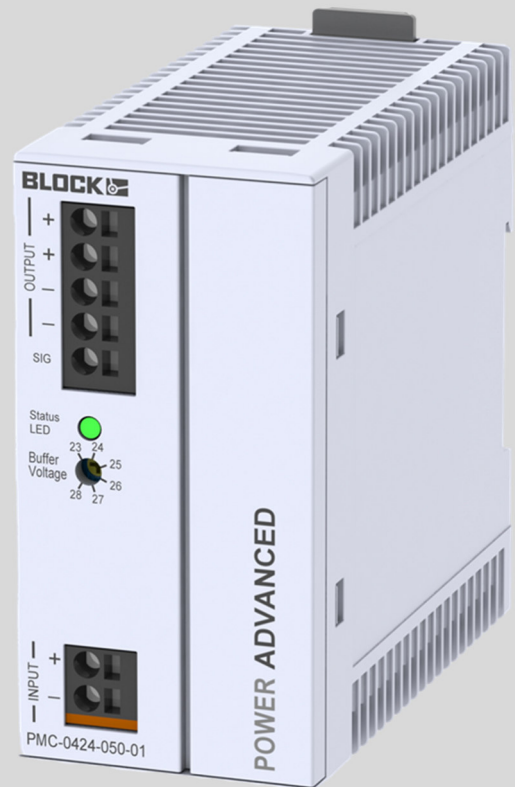


MANUAL

UNINTERRUPTIBLE POWER SUPPLY



Capacitive UPS **PMC-0424-050-0x**

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1. ORDER DATA

The following table shows the ordering data for the capacitive UPSs.

Table 1: Order data

Capacity UPS			
Variant	Input voltage	Output current	Interface
PEL-0424-050-01	24 Vdc	5 A	No
PMC-0424-050-01	24 Vdc	5 A	No
PMC-0424-050-02	24 Vdc	5 A	No
PMC-0424-050-03	24 Vdc	5 A	No

2. GENERAL NOTES

2.1 Safety instructions

Please read these warnings and safety instructions carefully before operating the appliance. The appliance may only be installed by skilled and qualified personnel. In the event of malfunctions or damage, switch off the supply voltage immediately and send the device to BLOCK Transformatoren-Elektronik GmbH for inspection. The device does not contain any service parts. If an internal fuse blows, there is most likely an internal defect in the appliance. The data provided is for product description purposes only and should not be construed as guaranteed characteristics in the legal sense.

2.2 Qualified Personnel

The product associated with this documentation may only be handled by qualified personnel in compliance with the documentation associated with the respective task, in particular the safety instructions and warnings contained therein. Qualified personnel can ensure, on the basis of their training and experience, that the use of the described product complies with all safety requirements and the applicable provisions, regulations, standards and laws.

2.3 Intended use

This device is designed for installation in an enclosure and is suitable for use in general electronic devices such as industrial control systems, office equipment, communication devices or measuring devices. Do not use this device in control systems of airplanes, trains or nuclear facilities where a malfunction could lead to serious injury or danger to life.

2.4 Disclaimer

The contents of this publication have been checked with the utmost care to ensure that they correspond to the hardware and software described. Nevertheless, there may be discrepancies between the product and the documentation. Deviations may also arise due to the continuous further development of the product. For this reason, we cannot guarantee complete conformity. Should this documentation contain errors, we reserve the right to make any necessary corrections without prior notice.



ATTENTION

Switch off the input voltage before carrying out installation, maintenance or modification work and secure it against unintentional reconnection.



ATTENTION

Do not make any changes or attempts to repair the device. Do not open the device!



ATTENTION

Prevent the ingress of foreign objects such as paper clips and metal parts.



ATTENTION

Do not operate the appliance in a damp environment or in an environment where condensation or condensation is to be expected.



ATTENTION

Do not touch the housing during operation or shortly after switching off. Hot surfaces can cause injuries.

3. PRODUCT DESCRIPTION

The **PMC-0424-050-0x** is a compact capacitive UPS based on supercapacitors, developed for reliable bridging of short-term voltage dips in 24V DC supply systems. With a buffer storage capacity of **980, 1960 or 3920Ws depending on the variant** and a **maximum buffer current of 5A**, it protects sensitive loads from data loss or system downtime.

The module also has a **boost function** that can provide **currents of up to 12A** at short notice - ideal for absorbing dynamic load peaks.

The module offers active decoupling between input and output, which means that it immediately switches to buffer mode in the event of a voltage dip, without feeding back into the supply system. This separation ensures a stable output voltage and protects the source at the same time.

Thanks to robust electronics, the UPSs are designed for ambient temperatures of up to **+70°C** - ideal for use in demanding industrial environments.

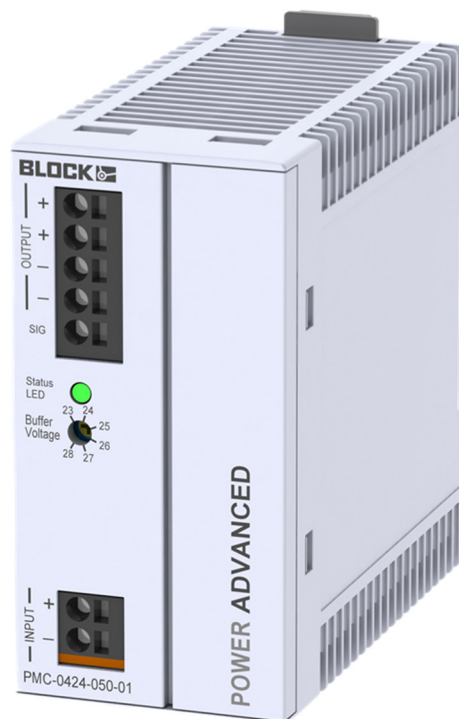


Figure 1: PMC-0424-050-01

3.1 Technical data

deutsch	english			
Technische Daten	Technical data			
		PMC-0424-050-01	PMC-0424-050-02	PMC-0424-050-03
Eingangsdaten	Input data			
Eingangsnennspannung	Rated input voltage	24 Vdc		
Eingangsspannungsbereich	Input voltage range	23-28,5 Vdc		
Eingangsstrom	Input current	max. 5,2 A		
Ausgangsdaten	Output data			
Ausgangsspannung	Rated output voltage	24 Vdc		
Ausgangsspannungsbereich	Output voltage range	23-28,5 Vdc entsprechend der Eingangsspannung according to input voltage		
Ausgangsstrom	Rated output current	5 A (12A Boost, 2s)	5 A (12A Boost, 4s)	5 A (12A Boost, 6s)
Parallelschaltbar	Parallel operation			
Serienschaltbar	Serial operation			
Eingang + Ausgang entkoppelt	Input + Output decoupled			
Wirkungsgrad (Nennlast)	Efficiency (nominal load)	97,57 %		
Verlustleistung (Nennlast)	Power loss (nominal load)	3 W		
Integrierte Pufferung	Integrated buffering			
Pufferzeit (28V - 18V)	Backup time (28V - 18V)	4,5s (5A)	9s (5A)	18s (5A)
Pufferschwelle	Buffer threshold	<22 Vdc		
Ausgangsspannung im Pufferbetrieb	Output voltage in buffer mode	23V, 24V, 25V, 26V, 27V, 28V Einstellbar über Potentiometer Adjustable via potentiometer		
Ladezeit beim Neustart	Loading time at restart	< 600s	< 1200s	< 2400s
Ladestrom Superkondensator/en	Charging current super capacitors	200 mA		
Verhalten bei leerem Speicher:	Behavior when storage is empty:	Abschaltung Uout < 18V Shutdown Uout < 18V		
Speichertechnologie	Storage technology	Superkondensator Super capacitor		
Signalisierung	Signaling			
Betriebsanzeige	Power indicator	Zustände LED States LED	Langsames Blinken: Laden slow blinking: charging Schnelles Blinken: Puffern fast blinking: buffering Dauer Leuchten: Sollspannung erreicht light up continuously: Target voltage reached	
Aktiver „SIG“ Signalkontakt (Signalspannung entsprechend der Eingangsspannung oder Puffer spannung)	Active „SIG“ Signal contact (signal voltage according to the input voltage or buffer voltage)	18...28,5Vdc max. 25mA (24Vdc) Zustände siehe Fig. 3 States see Fig. 3		
Umwelt	Environment			
Lagertemperatur	Storage temperature	-25 °C ... +80 °C		
Umgebungstemperatur	Operational temperature	-25 °C ... +70 °C		
Derating	Derating	23V Puffer spannung > 50°C 23V Buffer voltage > 50 °C		
Einbaulage	Mounting position	waagrecht für Tragschiene TH 35, horizontal for Rail TH 35		
Zulässige Luftfeuchtigkeit	Allowable humidity	5 bis 96 % relative Feuchte, keine Bet auung zulässig 5 to 96 % relative humidity with no dew		
Kühlung (Abstand zu benachbarten Teilen)	Cooling (spacing to vicinal components)	kein Mindestabstand rechts/links erforderlich, 50 mm oben/unten No minimum spacing right/left required, 50 mm over/under		
Sicherheit und Schutz	Safety and protection			
Schutzart	Protection index	IP 20		
Schutzklasse	Safety class	II (im geschlossenen Schaltschrank) II (in the closed Cabinet)		
Anschlusskabel	Conductors	Zum Anschluss Kupferkabel mit min. 75 °C verwenden Use Copper Conductors only, rated min. 75 °C		
Einsatzbereich	Installation	Einsatz in Bereichen mit Verschmutzungsgrad 2 For installation in Pollution Degree 2 environment		
Rückspeisungsfestigkeit	Feedback voltage	max. 35 Vdc		
Normen	Safety standards			
Sicherheit	Safety	EN 61010-1, EN 61010-2-201		
EMV	EMC	EN 61000-6-2, EN 61000-6-3		
Mechanische Daten	Mechanical data			
Gewicht	Weight	190g	255g	365g
Maße (B x H x T)*	Dimensions (W x H x D)*	45 x 90 x 90,5 mm	52 x 90 x 111 mm	72 x 90 x 111 mm
Anschlüsse Eingang (+, -)	Terminals input (+, -)	Push-In, max. 2,5 mm²		
Anschlüsse Ausgang (+, +, -, -)	Terminals output (+, +, -, -)	Push-In, max. 2,5 mm²		
Anschluss Signalisierung (SIG)	Terminal signaling (SIG)	Push-In, max. 2,5 mm²		
Bestellnummern	Order Numbers			
Bestellnummer	Order Number	PMC-0424-050-01	PMC-0424-050-02	PMC-0424-050-03

* Tiefe T ab Oberkante Tragschiene.
* depth from upper edge of DIN rail.

Figure 2: Technical Data

3.2 Functional diagramm

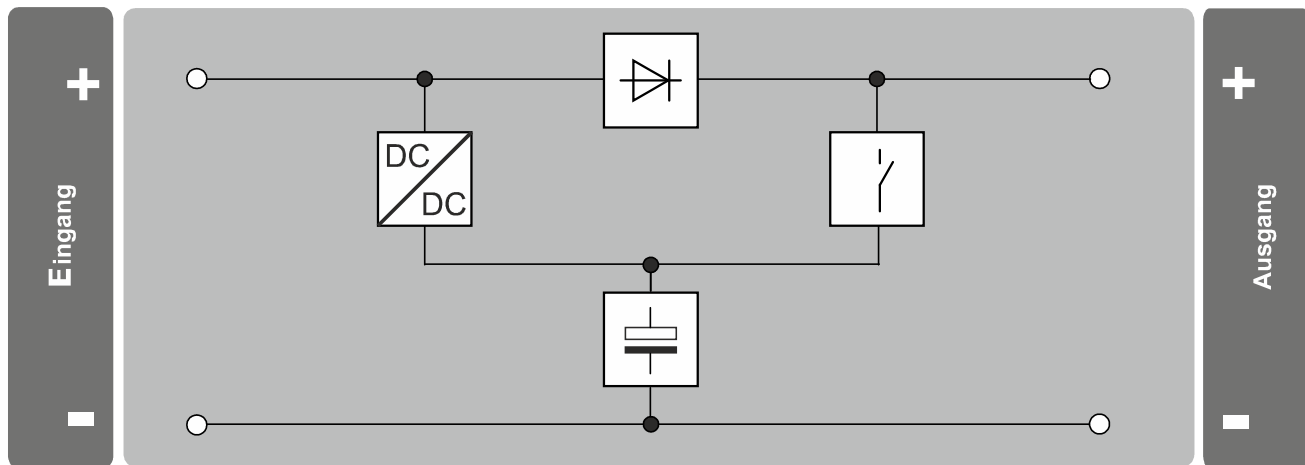


Figure 3: Functional diagramm PMC-0424-050-01

3.3 Dimensioning

3.3.1 PMC-0424-050-01

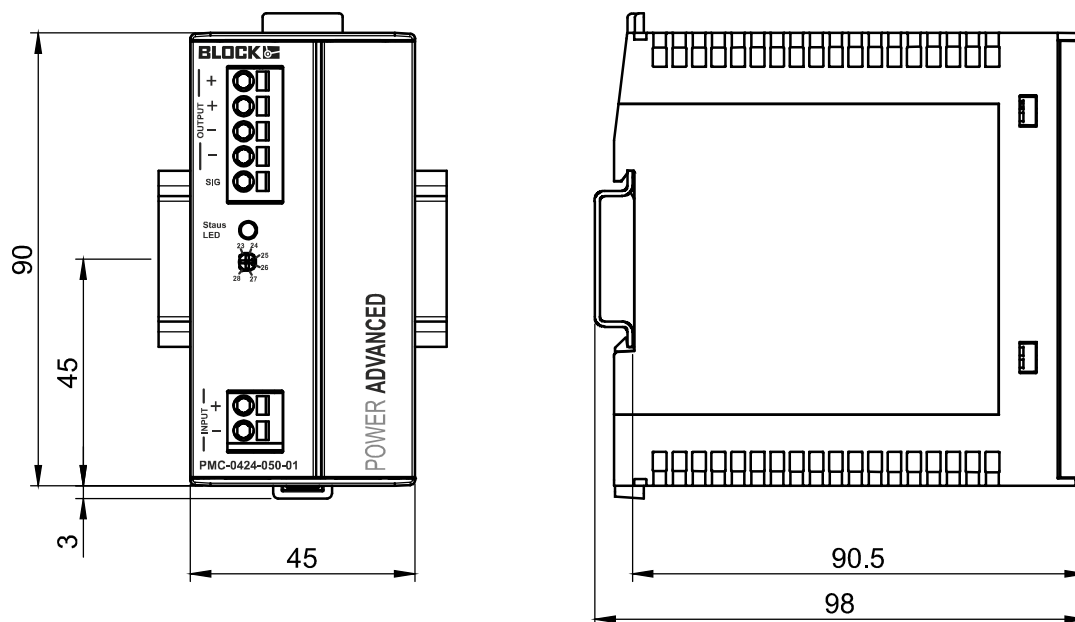


Figure 4: Dimensioning PMC-0424-050-01

3.3.2 PMC-0424-050-02

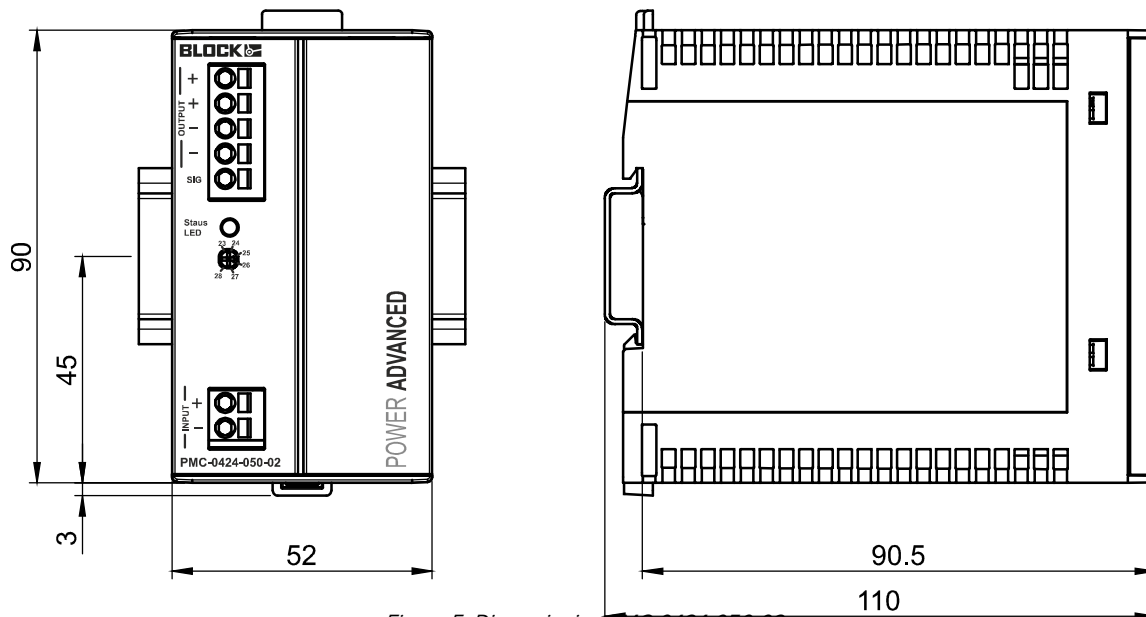


Figure 5: Dimensioning PMC-0424-050-02

3.3.3 PMC-0424-050-03

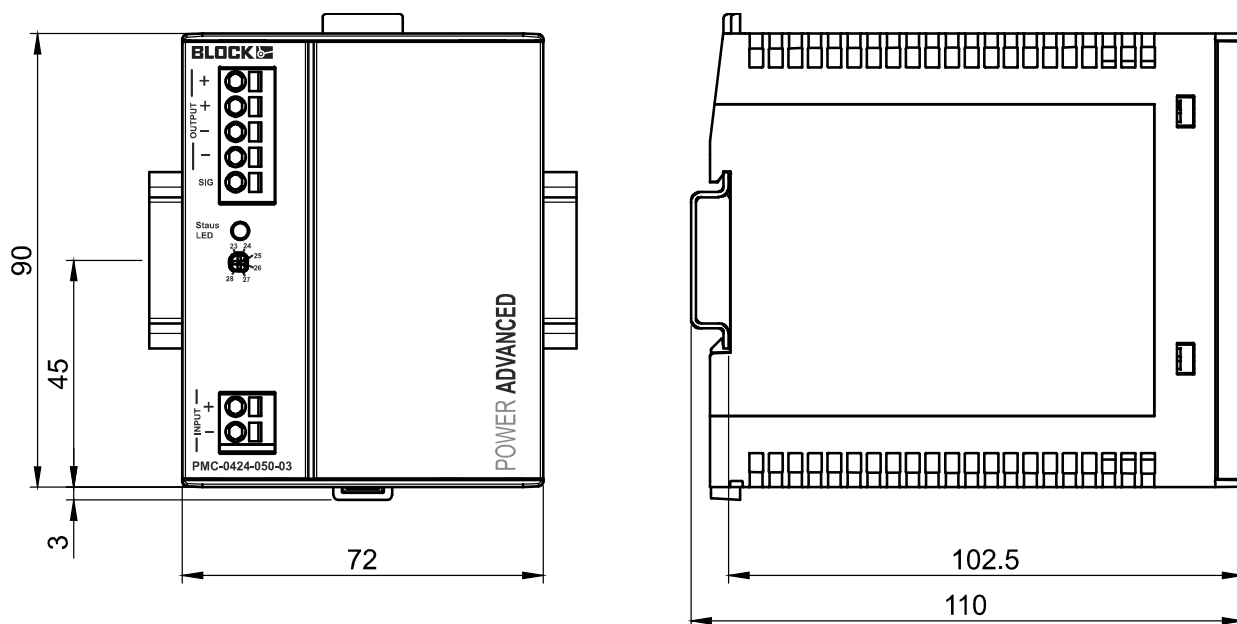


Figure 6: Dimensioning PMC-0424-050-03

3.4 Assembly

The capacitive UPSs (PMC-0424-050-01/02/03) can be mounted on the mounting rails without tools.

To do this, the front of the device is first turned slightly upwards and placed on the DIN rail. Make sure that the device is pushed down as far as it will go. When the device is seated on the top-hat rail, the underside is pressed against the mounting rail until it locks into the top-hat rail (followed by a "click" sound). To check, gently shake the device again to ensure that it is properly locked.

A standard tool, such as a slotted screwdriver, is required for removal. The device can be detached from the top-hat rail by lifting the underside of the device and pressing down on the fastening.

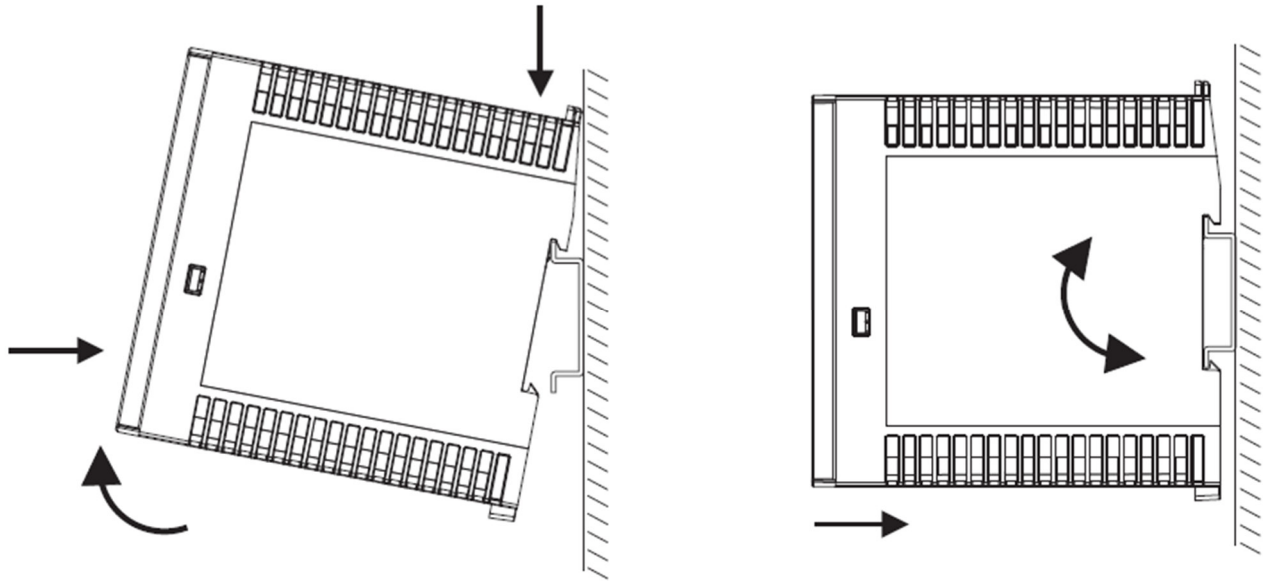


Figure 7: Assembly

To ensure cooling by natural convection, the distances to neighboring appliances must be observed (right/left 0mm, top/bottom 50mm).



Attention:

Overhead installation of capacitive UPSs is **not** permitted.



Attention:

Do not touch the housing during operation or shortly after switching off. Hot surfaces can cause injuries.



Attention:

Any other installation is not permitted.

3.5 Connections and Signalling

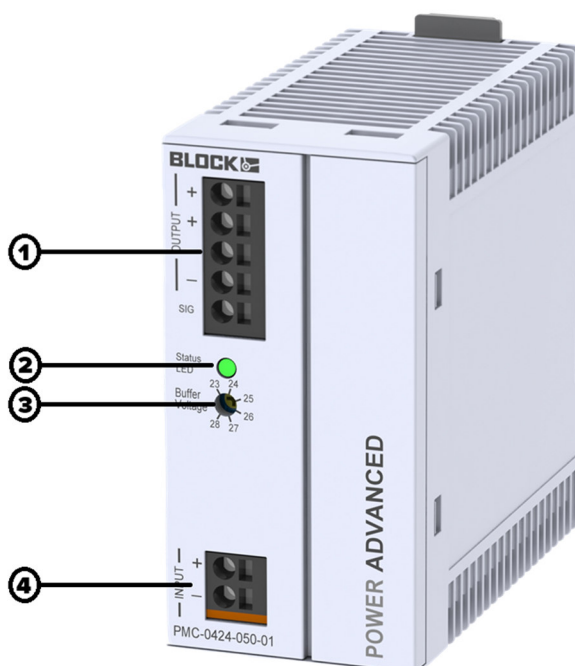


Table 1: Connections

Nr.	Function	Notes
1	DC outputs (+, +, -, -) and active "DC OK" signal contact	Spring terminals. Max. 2.5mm ² (-, -, +, +)
2	Operating display	LED green (charging, buffering, target voltage buffer reached)
3	Setting the buffer voltage	Adjustable to 23,24,25,26,27 and 28 Vdc
4	DC-Input (+, -)	Spring terminals Max. 2,5mm ² (+, -)

4. Commissioning

1. Assembly

Mount the UPS on a standard 35 mm DIN rail in the control cabinet. Ensure adequate ventilation and that the permissible ambient temperature of **+70 °C** is not exceeded.

2. Connecting the input voltage (24V DC)

Connect the 24 V DC supply to the "Input" terminals of the module (**plus (+) and minus (-)**). Ensure the correct polarity. The input current should be at least **0.2A higher** than the connected load to ensure safe recharging of the supercapacitors.

3. Connecting the load

Connect the consumer load to the module's "output" terminals (**plus (+) / minus (-)**). The maximum output current is **5 A**. Thanks to **active decoupling**, there is no feedback to the source in the event of a voltage dip - the output voltage remains stable.

4. Switch on the power supply

After correct connection, the input voltage can be switched on. The module automatically starts charging the integrated **supercapacitors** (capacity: **980Ws, 1960Ws or 3920Ws**).

5. Observe LED status display

During the charging process, the green LED flashes slowly and continuously. As soon as the supercapacitors are fully charged, the LED changes to a **steady light** - the module is now ready for operation. When the UPS starts to buffer, the LED changes to a fast flashing until the memory is empty, or the UPS is recharged, then the LED changes back to a slow flashing until the memory is full.

The internal capacitor voltage can be set in the range from **23V to 28V**. **The voltage is preset to 28V at the factory**. The permanently lit LED indicates that the set charging setpoint has been reached.

6. Operating behavior in the buffer case

In the event of a voltage dip at the input, the module immediately takes over the supply of the connected load (up to max. 5A). The decoupling ensures an uninterrupted switchover to buffer mode.

7. Temperature behavior

The module is designed for use up to an ambient temperature of **+70 °C**. Above this threshold, the internal charging voltage is automatically limited to **23V** in order to maximize the service life of the supercapacitors.

4.1 Buffer operation

If the mains voltage fails, the system switches to buffer mode without interruption. The energy required to maintain the DC 24 V supply voltage is provided from the internal memory of the buffer module. This is possible up to a maximum of 5 A for a short time, e.g. to shut down an IPC.

4.2 Life expectancy

The service life of the supercapacitors - and therefore of the entire device - depends on two factors: the ambient temperature and the voltage that is permanently applied to the capacitors. As a general rule, **the higher the voltage, the shorter the service life**.

- At an ambient temperature of **25°C** and a minimum charging voltage of **23V**, the service life is approx. **192,000 hours**.
- At a maximum charging voltage of **28V**, the service life is reduced to approx. **32,000 hours**.

At the end of the respective service life, the remaining capacity of the supercapacitors is typically still approx. **70%**.

The capacity drops by around **15%** in the first **200 hours of operation**. After that, the decrease is **almost linear** up to the stated value of 70%.

From an ambient temperature of **+50°C**, the internal charging voltage is automatically limited to **23V**. This protects the supercapacitors and makes a decisive contribution to extending the service life of the module.

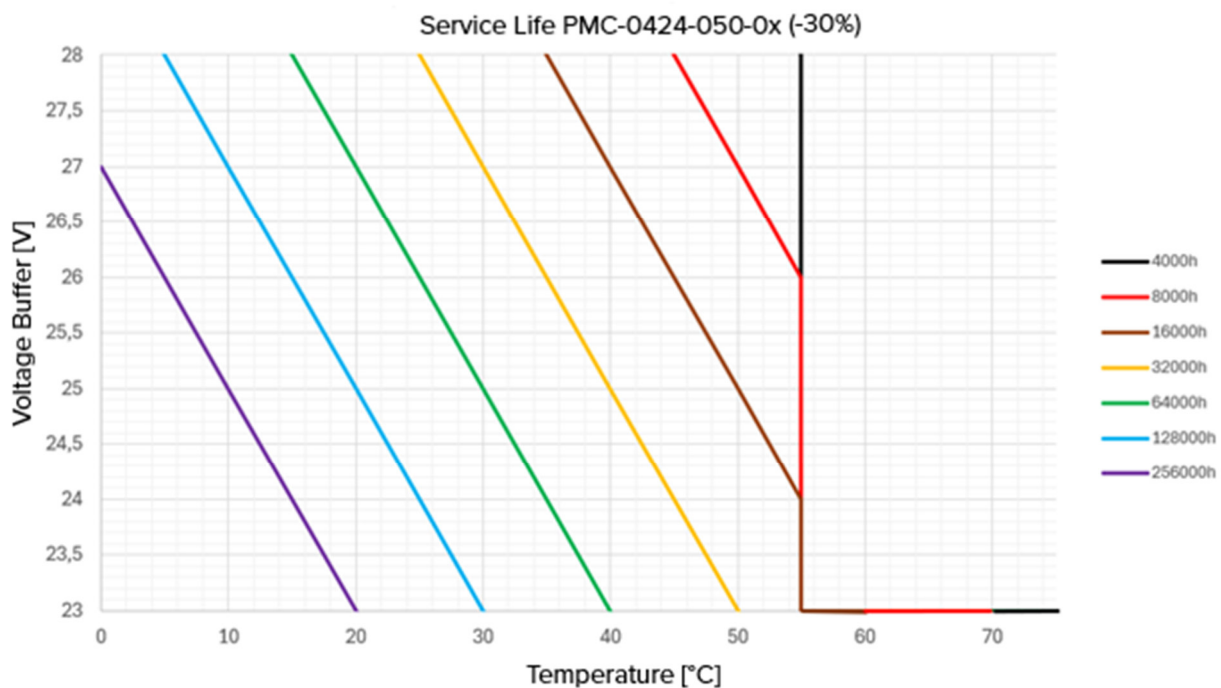


Figure 8: Service Life

4.3 Buffertimes (PMC-0424-050-01)

The **PMC-0424-050-0x** capacitive UPS secures the 24V DC power supply in the event of brief mains interruptions by using integrated, maintenance-free supercapacitors. In the event of a voltage dip, the device automatically takes over the supply to the connected loads and thus protects your application from downtime or data loss. The actual achievable buffer time depends on the respective load current. The following table shows the typical buffer times as a function of the connected load and serves as a basis for system-compatible design.

4.3.1 PMC-0424-050-01 (23V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime	2,11 Sec.	3,95 Sec.	6,22 Sec.	12,8 Sec.	25,4 Sec.	94,9 Sec.

4.3.2 PMC-0424-050-01 (24V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime	2,64 Sec.	4,79 Sec.	7,4 Sec.	15,3 Sec.	30,4 Sec.	111 Sec.

4.3.3 PMC-0424-050-01 (25V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime	3,05 Sec.	5,46 Sec.	8,44 Sec.	17,4 Sec.	34,6 Sec.	138 Sec.

4.3.4 PMC-0424-050-01 (26V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime	3,56 Sec.	6,4 Sec.	9,7 Sec.	20 Sec.	39,9 Sec.	156 Sec.

4.3.5 PMC-0424-050-01 (27V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime	4,14 Sec.	7,4 Sec.	11,36 Sec.	22,92 Sec.	45,6 Sec.	183 Sec.

4.3.6 PMC-0424-050-01 (28V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime	4,96 Sec.	8,64 Sec.	13,24 Sec.	26,7 Sec.	52,3 Sec.	219 Sec.

4.4 Buffertimes (PMC-0424-050-02)

4.4.1 PMC-0424-050-02 (23V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.4.2 PMC-0424-050-02 (24V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.4.3 PMC-0424-050-02 (25V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.4.4 PMC-0424-050-02 (26V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.4.5 PMC-0424-050-02 (27V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.4.6 PMC-0424-050-02 (28V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.5 Buffertimes (PMC-0424-050-03)

4.5.1 PMC-0424-050-03 (23V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.5.2 PMC-0424-050-03 (24V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.5.3 PMC-0424-050-03 (25V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.5.4 PMC-0424-050-03 (26V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.5.5 PMC-0424-050-03 (27V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.5.6 PMC-0424-050-03 (28V)

Current	5 A	3 A	2 A	1 A	0,5 A	0,1 A
Buffertime						

4.6 Derating

To maintain a long service life of the supercapacitors, the buffer module has integrated derating behavior depending on the ambient temperature.

As soon as the ambient temperature exceeds **50°C**, the internal buffer voltage is **automatically reduced to 23V**. This voltage drop serves to thermally protect the capacitors and prevents premature ageing at high ambient temperatures.

The derating starts dynamically and ensures that safe and long-lasting operation of the module is guaranteed even at temperatures of up to **+50 °C**.

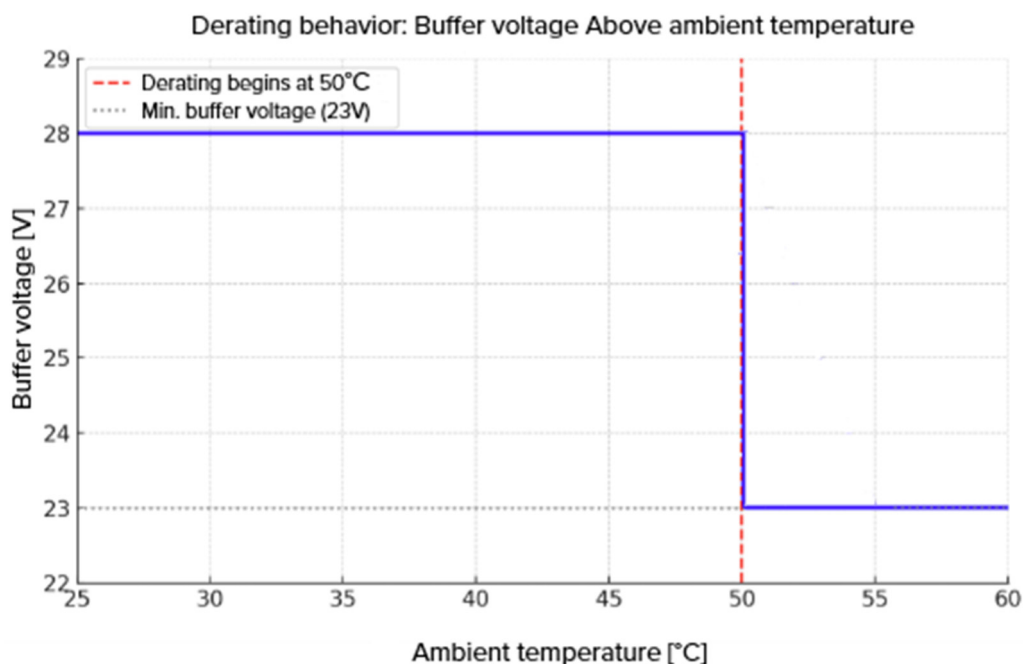


Figure 9: Derating

5. Maintenance

5.1 Storage of the buffer module

The buffer module is supplied uncharged. In this state, it should not be stored above +80°C or below -25°C.

6. Disposal and recycling



Ensure proper disposal of electronic components

Do not dispose of the power supply with household waste.

Observe the applicable national regulations.



Ensure proper disposal or recycling

Dispose of or recycle packaging material that is no longer required with household waste.

Observe the applicable national regulations.