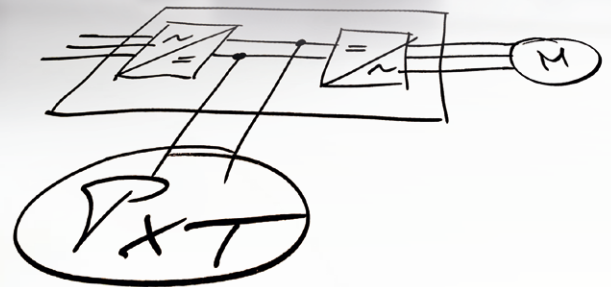
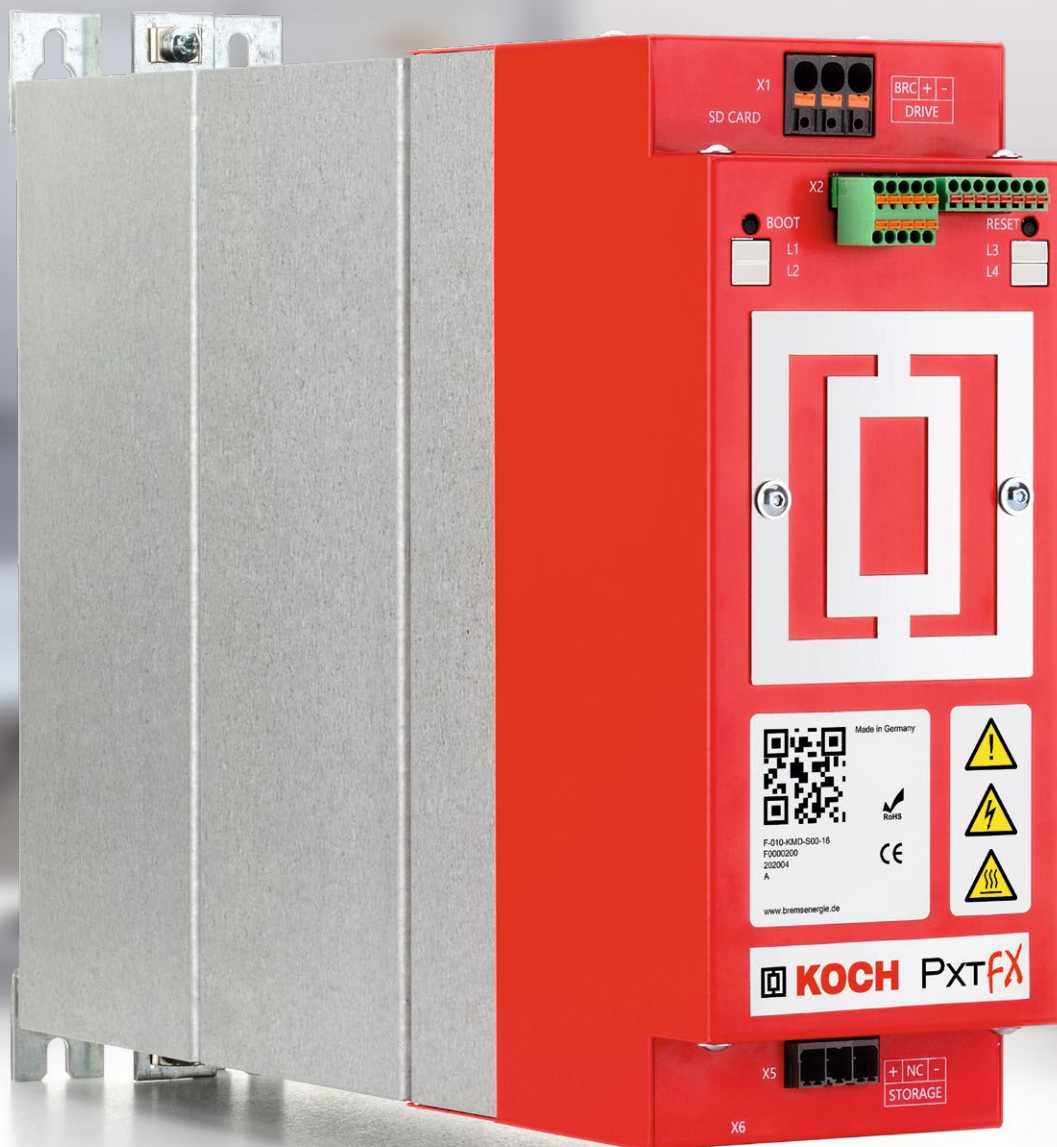


# The new generation of active energy management devices



PXT **FX**



**Device series PxtFX**

$I_N = 20\text{ A}$ ,  $I_{MAX} = 40\text{ A}$

$U_z \leq 1.000\text{ VDC}$

Storage several kJ



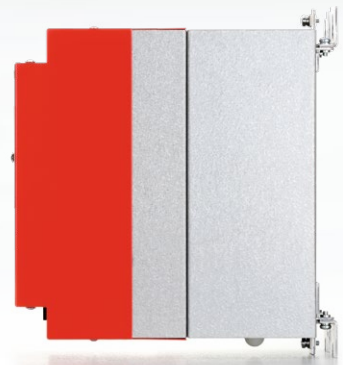
# The new generation of active energy management devices

# PXT FX



## Your benefits

- > Recovering braking energy
- > Increase productivity
- > Bypassing power failures
- > Compensate voltage dips
- > Reduce load peaks
- > Protect power quality
- > Increase energy efficiency
- > Controlled stops in case of power failure
- > Mains-independent operation
- > No heat from braking energy
- > Modular system
- > Save money



# Key features of the PXTFX devices

## Performance

- > 20 amps continuous current
- > 40 amps peak current for 60 seconds<sup>1</sup>
- > up to 18 kilowatts peak power

## Wide voltage range

- > Min. Operating voltage level 180 VDC
- > Max. Operating voltage level 848 VDC (UL) / 1000 VDC (IEC)
- > Min. starting voltage level for the system (DC link or energy storage) approx. 45 VDC

## Safety functions

- > Reverse polarity protection to DC link
- > Integrated precharge circuit
- > LSS charge protection switch: connection of charged energy storage modules possible
- > Integrated load monitoring on both sides
- > Internal fuses

## Communication

- > 3 digital inputs / 3 digital outputs
- > K-Bus for operating data output
- > 4 LEDs
- > SD card
- > Reset button for restart
- > Boot button for boot loading from SD card

<sup>1</sup> 25% duty cycle with up to 240 s cycle time



# Realize advantages!

## Increased productivity

**Goal: Raise output quantity substantially**

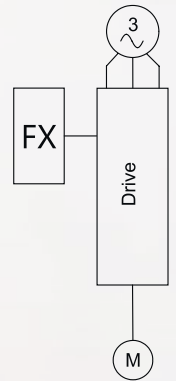


**Example:**  
Portion cutter for poultry meat

**Situation:**  
A portion cutter for poultry meat performs with maximum cutting speed 17 cuts/s. A further acceleration leads to instability of the DC link and stresses the drive electronics.

**Solution:**  
By integrating the active energy management device PxtFX with an energy module in the substructure the cutting rate can be increased to 25 cuts/s. Integrated into the existing system as a retrofit the system provides the DC bus with exactly the energy it needs.

- > 50% higher output quantity in the same time
- > Retrofit solution
- > Plug and Play
- > No failures due to stressed drive electronics



## Uninterruptible power supply

**Goal: No unplanned machine downtime in weak supply networks**

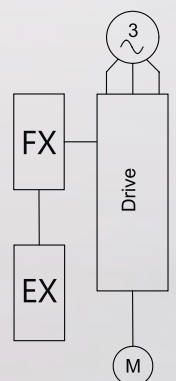


**Example:**  
Textile machines for yarn production

**Situation:**  
Highly complex spinning machines get problems as soon as the supply network stops for a moment or even breaks away completely. Yarn breaking and clewing are the result, as the drives stop uncontrolled. Restarting the machines can take hours, thus high downtime costs occur.

**Solution:**  
By using the combination of an active energy management device PxtFX with a power module in the substructure and a PxtEX with two power modules, the machines continue producing even if there are voltage dips.

- > Plug and Play through detection of the DC link voltage
- > No machine stop at brownouts
- > Controlled shutdown during blackout
- > Immediate re-start of the machine after blackout
- > Significantly increased machine availability
- > No material wear



## Managing braking energy

**Goal: Higher dynamics and longer service life of drive electronics**



**Example:**

Robots in automobile production

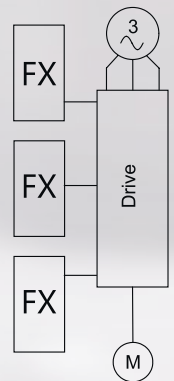
**Situation:**

The robot in the automobile production runs 12 cycles/min. at a travel distance of 6.5 m and a power consumption of 10.7 kW. Fast cycles and large masses lead to excessive demands of the drive electronics and thus to unplanned failures.

**Solution:**

Use of three active energy management devices PxTFX, and three energy modules in the substructure, store the braking energy and, in case of need, feed it back in again. This not only leads to a stabilization of the voltage curve in the DC link, but even increases the dynamics of the robot with reduced energy consumption and protects the drive electronics.

- > Increase in number of cycles from 12 to 15: Productivity increase by 25%.
- > Power consumption on the mains side reduced to 8 kW: Energy savings of over 25%.
- > Extension of the service life of the drive electronics



## Temperature reduction

**Goal: No heat through braking energy and increase of the energy efficiency**



**Example:**

Fish processing machine

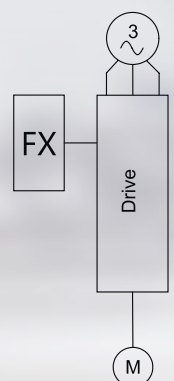
**Situation:**

In fish processing, herring are chopped and sorted in a very fast cycle of < 1s. The extremely fast start-stop- cycles generate braking energy, which is converted into heat by means of braking resistors. Since heat can lead to germination, enormous effort must be invested in cooling.

**Solution:**

Use of an active energy management system PxTFX with energy module in the substructure as intelligent and cool braking resistor. The energy storage unit buffers the braking energy without additional heat losses and uses the braking energy for the next acceleration process of the plant.

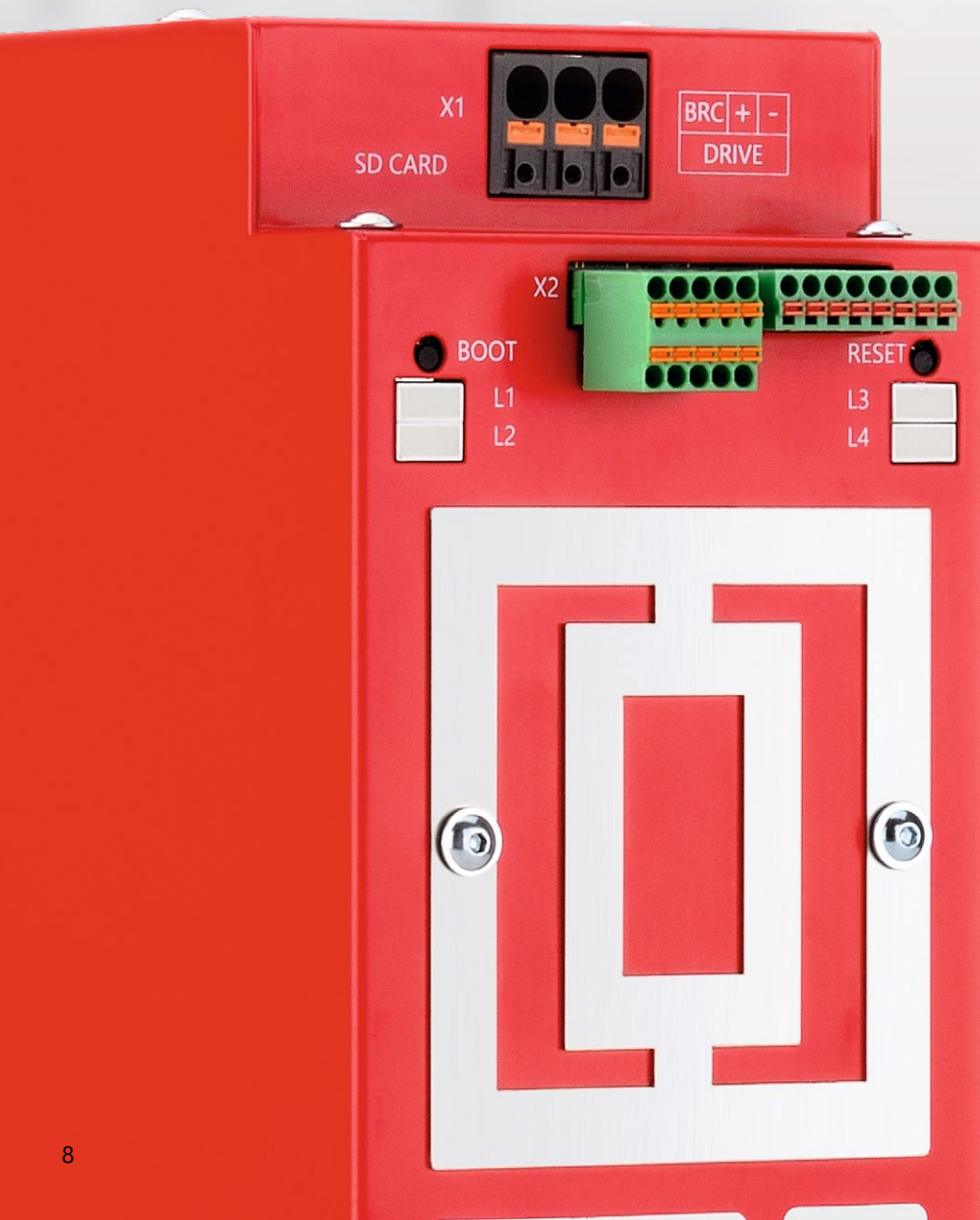
- > Reduction of power loss and heat input into the system
- > Optimal hygienic conditions -> No formation of germs and bacteria
- > No additional effort for cooling
- > Reuse of the braking energy, i.e. energy saving and thus increase the energy efficiency of the system, the energy efficiency of the plant



# Connections and variants of the PXTFX devices

## Top connections

- > DC link connections
- > 6 x digital I/Os, K-Bus (output only)
- > 24 VDC supply Input
- > Automatic BRC threshold detection: Plug & Play
- > SD Card for updates
- > Button Bootloading
- > Reset button (restart)
- > Operating states via 4 LEDs





## Key data

- > 20 A continuous, 40 A peak for 60 s<sup>1</sup>
- > Recuperation at 1s cycle:
  - 1 energy module up to 4.32 MJ/operating hour
  - 2 energy modules up to 8.64 MJ/operating hour

## Connections bottom

- > Digital nameplate
- > Connections storage expansions or NEV (24 Volt Emergency Power Supply for the periphery)



## Versions



Standalone or storage unit



with an energy module with max. 2 kJ storage unit



with two energy modules with a total of max. 4 kJ storage unit

<sup>1</sup> 25% duty cycle with up to 240 s cycle time

The new generation of storage expansions for active energy management devices for electric drives.

# PXT EX



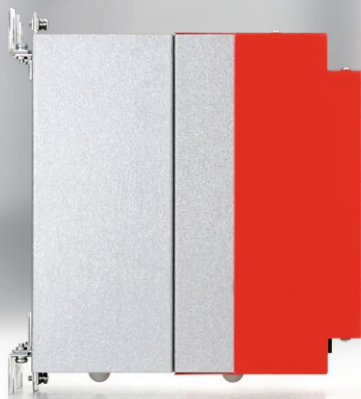
## Safety features

- > Individual protection of each energy module
- > Individual flashing LED for voltage indication for each energy module
- > Discharge possibility with internal, safe brake resistor

## Versions



Standalone max.  
2 kJ storage



with one energy module with  
a total of max. 4 kJ storage



with two energy modules with  
a total of max. 6 kJ storage

Device series PxtEX  
Storage several kJ

## Key data

- > Max. 2, 4 or 6 kJ storage
- > simply to PxtFX connectable through reverse polarity protected cable connection

## Further Features

- > Digital nameplate
- > Connections storage extensions or NEV (24 Volt Emergency Power Supply for the periphery)



# Get it done right:

Perfect sizing -  
use our support!

Any questions?

Give us a call:  
+49 7251 96 26-200.



# PXTFX - PXTTerminal

Make device and operating data visible!

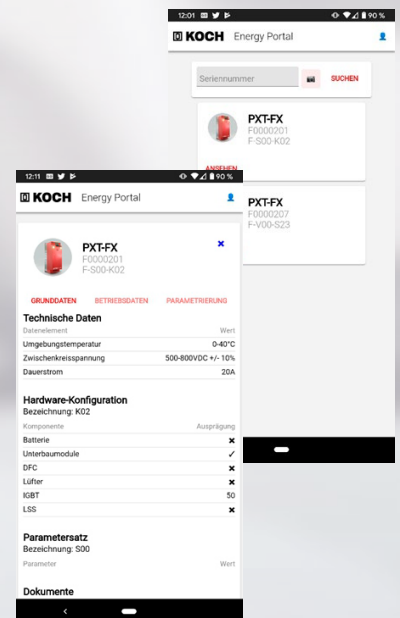
Connected to a PC via the connection cable PxtCC, the tool PxtTerminal visualizes the device parameters and in real time also the most important operating data of the application such as DC link voltage, storage voltage and the power. This operating data can be easily recorded and conveniently analyzed externally.





## Digital type plate

Via app (Android or iOS) and scan of the QR code, device-specific information is available if an Internet connection is available. For this purpose, management options for multiple devices are also available.



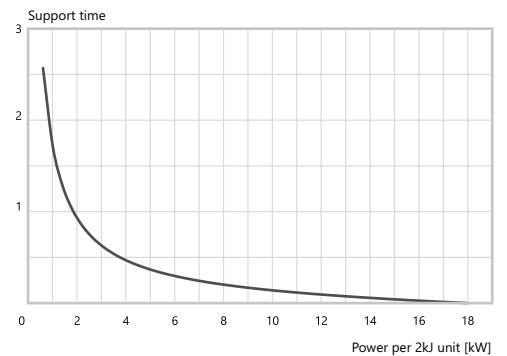
# Just try it.

## Energy saving with P<sub>xT</sub>FX



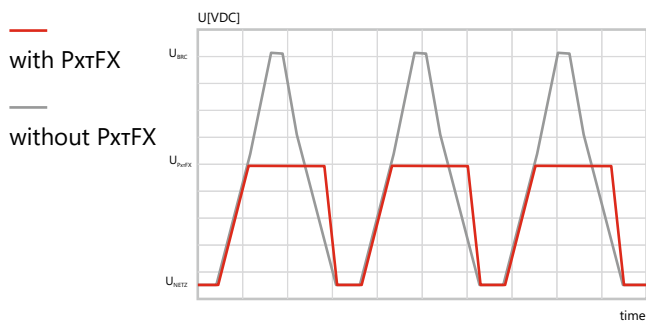
## Support time according to power

The time which a unit can support a given power with two kilojoules of energy can be read from the diagram. For x units, the support time is extended by x times.

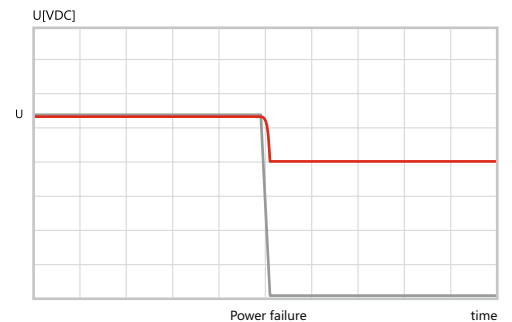


## Voltage curve of the DC Link

Managing braking energy



Power failure



## P<sub>xT</sub>FX plus P<sub>xT</sub>EX

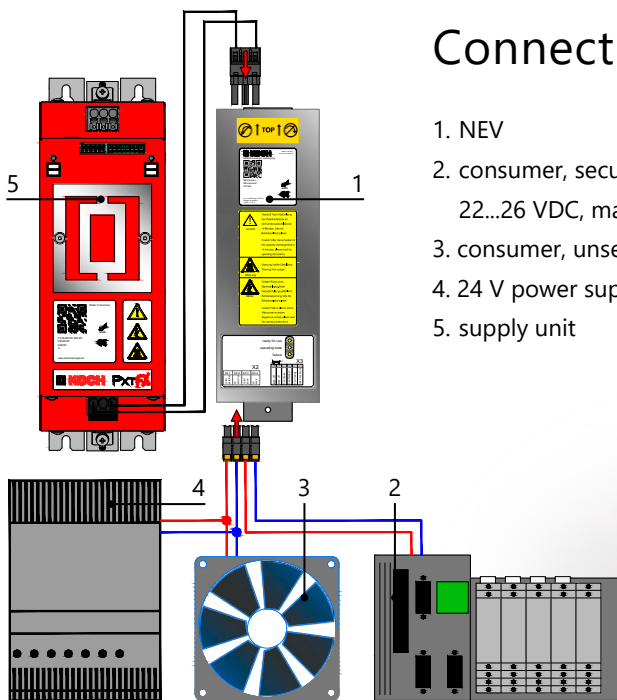
in case of „uninterruptible power supply“

Required energy (kJ)	P <sub>xT</sub> FX	P <sub>xT</sub> EX	min. Space requirement (width in mm)
< 4	1	0	100
6 - 10	1	1	202
12 - 16	1	2	306

Required energy (kJ)	P <sub>xT</sub> FX	P <sub>xT</sub> EX	min. Space requirement (width in mm)
18 - 22	1	3	408
24 - 28	1	4	510
30 - 34	1	5	612

# NEV - 24 Volt Emergency Power Supply

The NEV is used for the mains-independent supply of a 24 V DC link with electric voltage. The NEV uses the energy of a supply unit, namely the PxtFX.



## Connection diagram

1. NEV
2. consumer, secured,  
22...26 VDC, max. 6 A (150 VA)
3. consumer, unsecured
4. 24 V power supply unit
5. supply unit

More than  
6A (150 VA)  
necessary?

Simply connect further NEVs in parallel.  
Attention: NEV outputs must not be connected in parallel.



# KTS - Koch technology control cabinet

KTS refers to the standard control cabinets that we offer if the energy management systems in the control cabinet of the machine or plant no longer have any space. After all, many machine operators want to use the advantages of the Pxt device series and NEV for existing machines. Retrofitting is the keyword for this. But also as „option“ for new machines. In this case, the control cabinets can be delivered fully assembled and ready for connection. The switch cabinets are offered in several sizes.



Current data, examples, news, trade fair participation and press articles are to be found on our website [www.brakeenergy.com](http://www.brakeenergy.com)

# Technical data PxtFX

Version December 09, 2020

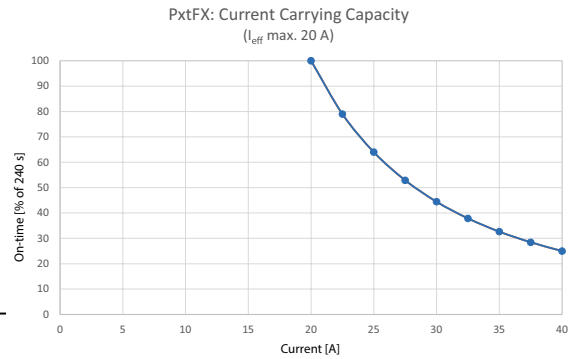
Criteria	PxtFX
Weight	6.0 kg (stand-alone) 9.6 kg (stand-alone with 1 energy module) 13.3 kg (stand-alone with 2 energy modules)
Dimensions H x W x D	297 x 100 x 167 mm (stand-alone) 297 x 100 x 276 mm (stand-alone with 1 energy module) 297 x 100 x 385 mm (stand-alone with 2 energy modules)
Ambient temperature	-10°C up to +65°C (transport, storage) 0°C up to +40°C (in operation)
Humidity	≤ 95% (transport, storage) ≤ 85% (in operation)
Cooling	Forced air cooling via fan. Operation in relation to heat sink temperature. Adjustable, e.g. for UPS application
Limitation for installations in elevated areas	<2000 m: No limitations / overvoltage category III >2000 m: reduction of performance / overvoltage category II
Recuperation of braking energy	Plug & Play due to automated detection of brake-chopper switch-on threshold $U_{BRC}$
Min. starting voltage level for the system (DC link or Energy storage)	Approx. 45 VDC
Min. Operating voltage level $U_{Zmin}$	180 VDC (Wake-up-phase: $U_{Zstart}$ 48-180 VDC)
Max. Operating voltage level $U_{Zmax}$	848 VDC (UL) / 1000 VDC (IEC)
Operation conditions	$U_z > U_c$ . Otherwise immediate stop = safe separation of DC link from energy storage
24 VDC In	Galvanically isolated For communication tasks with PxtFX without connecting it to DC link or energy storage, e.g. for setting parameters at the desk (Note: not protected against polarity reversal)
Energy of integrated capacities <sup>1</sup>	0 kJ (stand-alone) 2 kJ (stand-alone with 1 energy module) 4 kJ (stand-alone with 2 energy modules)
Expansion of capacities	No limitation, expandable with PxtEX or EM in steps of 2kJ

<sup>1</sup> Data refer to connection to a DC link of a drive controller with 400 V AC supply voltage. Other data on request.



# Technical data PxtFX

Version December 09, 2020



Criteria	PxtFX
Max. Energy Storage current $I_c$	20 A continuous 40 A peak for 60s ( $I_{eff} = 20$ A at $t_{cycle} = 240$ s)
Max. Power $P_{max}$ <sup>1</sup> (for $U_c = 450$ VDC)	9 kW continuous 18 kW peak for 60s
Ground rule for power flow	$P_c = P_z$
Operation frequency level	15 kHz, in operation load-dependent reduction down to 7.5 kHz Manually adjustable up to 18 kHz
Max. recuperation of energy	Cycle time 1s: 1 energy module up to 4,32 MJ/operating hour 2 energy modules up to 8,64 MJ/operating hour
Load monitoring	DC link side and energy storage side (in each case $I^2t$ )
Connection DC link	Front, top
Connection for PxtEX, EM or NEV	Front, bottom
Communication	3 digital In 3 digital Out K-Bus interface for operating data output 4 LEDs SD-Card Reset-button for restart Boot-button for boot loading from SD-Card
Visualization	Charging indicator for each Energy module (flashing LED according to voltage level)
Firmware-Updates	On Koch company site (Fabrikle) or With SD-Card at customers site or Via PxtCC (USB K-Bus interface) with PC
Protection	Internal fuses Individual protection of each energy module
Precharging circuit	Connection directly to DC link interference-free possible, independent from further precharging circuits
Reverse polarity protection	To DC link: In case connecting with reverse polarity PxtFX blocks and disconnects the DC link side from energy storage side
Charging protection	To DC link

<sup>1</sup> Data refer to connection to a DC link of a drive controller with 400 V AC supply voltage. Other data on request.

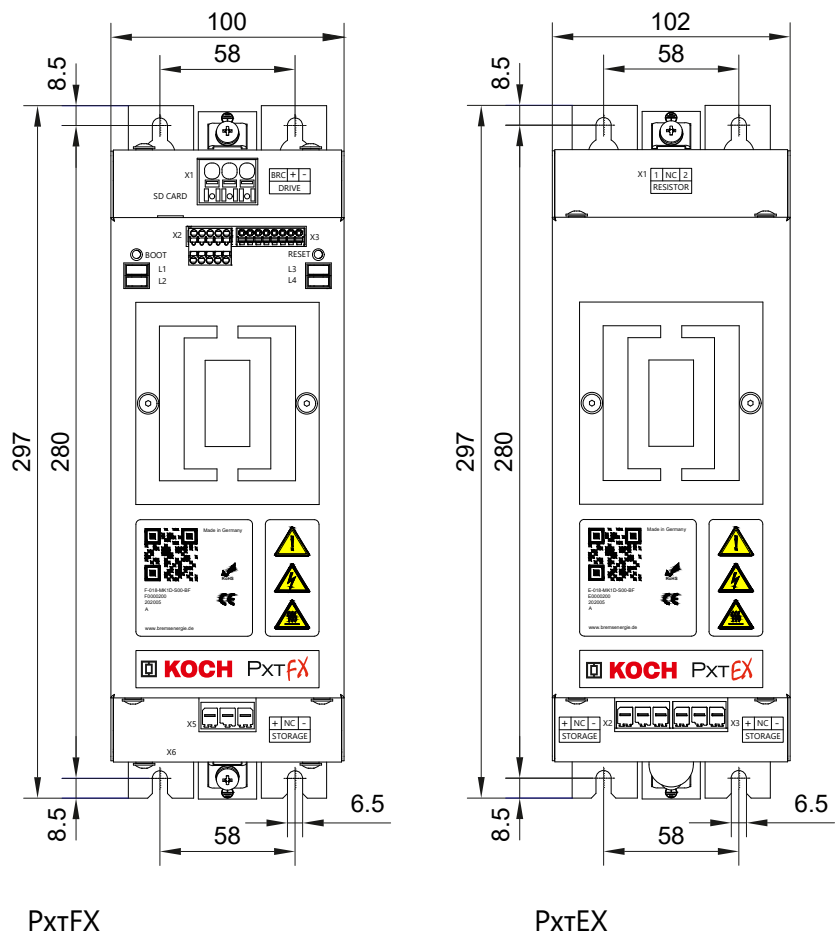
# Technical data P<sub>X</sub>T<sub>F</sub>X

Version December 09, 2020

Criteria	P <sub>X</sub> T <sub>F</sub> X
Charging protection switch LSS	Connection of charged Energy storage modules interference-free possible (But: No protection against connecting with reverse polarity!)
Max. cable length to DC link	2 m
Max. cable length to energy storage modules	20 m
Parallel operation	Theoretically unlimited number of devices Self-adjusting Automated Master-/Slave-setting for communication
Retrofit	Can be retrofitted into existing systems
Typeplate/Device information	Electronic via QR-Code and App (Android and iOS): Further device specific information Management-features
Internal digital storage	Operation hours meter

## Installation dimensions

P<sub>X</sub>T<sub>F</sub>X and P<sub>X</sub>T<sub>E</sub>X



# Technical data P<sub>xT</sub>EX

Version December 09, 2020

Criteria	P <sub>xT</sub> EX
<b>Weight</b>	5.0 kg (stand-alone) 8.7 kg (stand-alone with 1 energy module) 12.3 kg (stand-alone with 2 energy modules)
<b>Dimensions</b> H x W x D	297 x 102 x 167 mm (stand-alone) 297 x 102 x 276 mm (stand-alone with 1 energy module) 297 x 102 x 385 mm (stand-alone with 2 energy modules)
<b>Ambient temperature</b>	-10°C up to +65°C (transport, storage) 0°C up to +40°C (in operation)
<b>Humidity</b>	≤ 95% (transport, storage) ≤ 85% (in operation)
<b>Cooling</b>	Convection
<b>Limitation for installations in elevated areas</b>	<2000 m: No limitations / overvoltage category III >2000 m: reduction of performance / overvoltage category II
<b>Energy of integrated capacities<sup>2</sup></b>	2 kJ (stand-alone) 4 kJ (stand-alone with 1 energy module) 6 kJ (stand-alone with 2 energy modules)
<b>Visualization</b>	Charging indicator for each 2kJ energy module (flashing LED according to voltage level)
<b>Connection for P<sub>xT</sub>FX</b>	Front, bottom
<b>Connection for P<sub>xT</sub>EX, EM or NEV</b>	Front, bottom
<b>Connection for integrated safe discharging resistor</b>	Top
<b>Protection</b>	Internal fuses Individual protection of each energy module
<b>Max. cable length to P<sub>xT</sub>RX or storage</b>	20 m
<b>Typeplate/Device information</b>	Electronic via QR-Code and App (Android and iOS): Further device specific information Management-features

<sup>2</sup> Data refer to connection to a DC link of a drive controller with 400 V AC supply voltage. Other data on request.

## What we offer:

- Tested product quality
- Certified processes
- Individual application support
- Machine specific design and sizing
- Rapid reaction
- Quick delivery times
- On-time delivery
- Reliable partner
- Long-term business relationship
- Direct customer relations

Use our communication channels:



## Your specialist for:

- Active energy management devices and systems
- Safe brake resistors

We look forward to hearing from you!



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www.brakeenergy.com, mail@bremsenergie.de

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