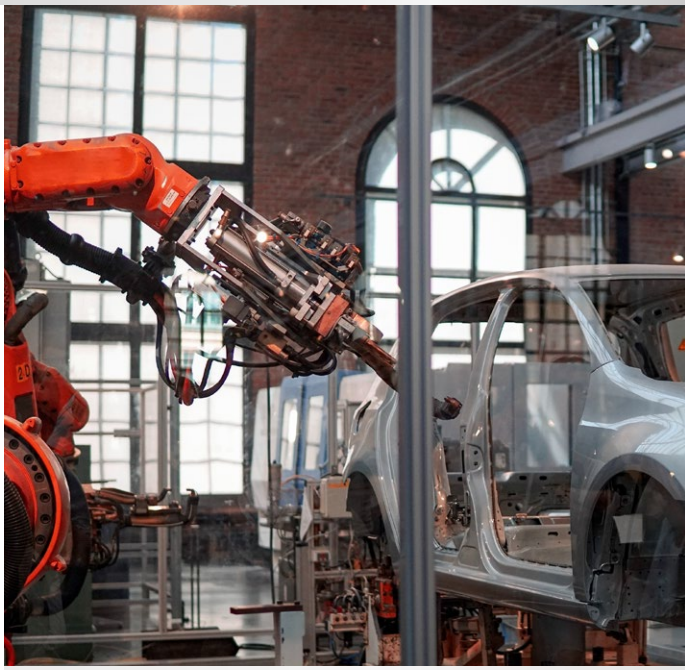
Energizing Productivity

Assembly Robot Automotive Industry



Situation:

The production of cars by a car manufacturer must become more energy-efficient and thus more environmentally friendly.

Problem:

The current assembly does not meet the CO_2 requirements of the car manufacturer. The CO_2 footprint must be as low as possible.

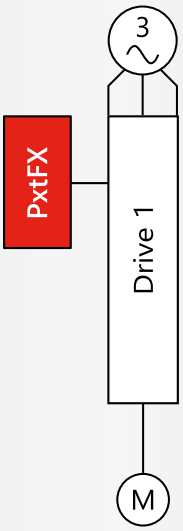
Intention:

Increasing the energy efficiency of the assembly,

thereby reducing the CO_2 footprint and thus achieving a more environmentally friendly production.

Solution:

> 1 active energy management device PxtFX per robot. The energy manager PxtFX stores the braking energy of the robot and returns it directly to the robot the next time it starts up. The recuperation reduces the energy required by up to 1.6 kWh per PxtFX per operating hour.



Benefits:

1. Energy savings of up to 3.5 t CO_2 per PxtFX and year
2. Climate-friendly production of cars due to lower CO_2 footprint

- Increase productivity
- Increase energy efficiency
- Recuperation of braking energy

Further information:

Assembly robot Automotive Industry

We look forward to hearing from you!

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Technical data PxTFX

Version April 20, 2020

Criteria	PxTFX
Weight	6.0 kg (stand-alone) 9.6 kg (stand-alone plus 1 x Energy module) 13.2 kg (stand-alone plus 2 x Energy module)
Dimensions H x W x D	297 x 100 x 167 mm (stand-alone) 297 x 100 x 276 mm (stand-alone plus 1 x Energy module) 297 x 100 x 385 mm (stand-alone plus 2 x Energy module)
Storage temperature	-10 up to +65°C
Ambient temperature for operation	0°C up to +40°C: Without limitation
Relative humidity	<95%: Condensation has to be avoided
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	<1000 m: No limitations
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 $U_{DC\ Link\ min}$	180 VDC
Max. Operating voltage level $U_{DC\ Link\ max}$	848 (UL) / 1000 VDC (IEC)
Operation conditions	$U_{DC\ Link}$ > 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[1]	0 kWs (stand-alone) 2 kWs (stand-alone plus 1 x Energy module) 4 kWs (stand-alone plus 2 x Energy module)
Expansion of capacities	No limitation, expandable with PxTEX or EM in steps of 2kWs
Max. Energy Storage current I_C	20 A continuous 40 A peak for 60s

[1] Data refer to connection to a DC link of a drive controller with 400 V AC supply voltage. Other data on request.

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Criteria	PxTFX
Max. Power P_{max}[1] (for U_C = 450 VDC)	9 kW continuous 18 kW peak for 60s
Ground rule for power flow	$P_C = P_{DC\ Link}$
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 x Energy module 1.2 kWh/hour of operation 2 x Energy module 2.4 kWh/hour of operation
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) With SD-Card at customers site 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
Charging protection switch LSS	Connection of charged Energy storage modules interference-free possible (But: No protection against connecting with reverse polarity!)

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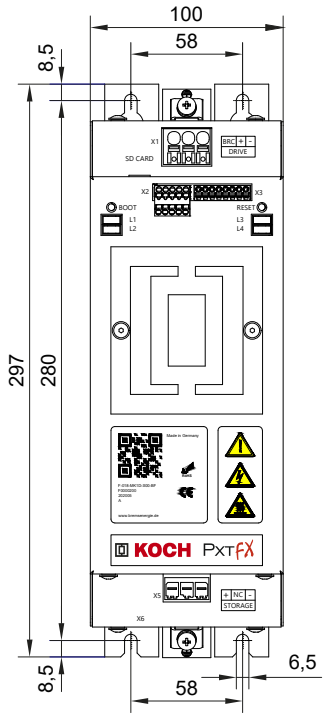
Criteria	PxTFX
Max. cable length to DC link	2 m
Max. cable length to energy storage modules	20 m
Parallel operation	Theoretically unlimited number of devices Self-adjusting Automated Master-/Slave-setting for communication
Retrofit	Can be retrofitted into existing systems
Typeplate/Device information	Electronic via QR-Code and App (Android and iOS): Further device specific information Management-features
Internal digital storage	Operation hours meter

Installation dimensions



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