Control blocks CPX-CEC

FESTO

Control blocks CPX-CEC

Key features

Application

Controller

The CODESYS controllers are modern control systems for CPX terminals that enable programming with CODESYS to IEC 61131-3.

Programming in a global language

CODESYS provided by Festo offers a convenient user interface with the following functions:
- Integrated module libraries
- Library Manager for integrating further libraries
- Visualisation editor

- Simulation mode
- Integrated project documentation
- Debugging functions for fault finding
- Configuration and parameterisation of the controller using the control configuration

Basic functions

The CODESYS controllers offer the following basic functions:
- Programming with CODESYS to IEC 61131-3
- Communication via Ethernet (Modbus/TCP, EasyIP, TCP/IP)
- Process visualisation using operator unit CDPX or OPC server

- Communication via fieldbus in combination with a fieldbus node in the CPX terminal
- Diagnostics and quick commissioning of CPX modules via handheld CPX-MMI

CPX-CEC-C1 offers
- All basic functions
- CANopen master for controlling up to 127 CANopen stations. Electric axes can be controlled in point-to-point mode

CPX-CEC offers
- All basic functions
- RS232 interface for operating external devices

- Note

When using external devices, data communication must be programmed by the user.

Bus connection

The CODESYS controllers are remote controllers that can be connected to a higher-order PLC via the fieldbus nodes of the CPX terminal or via Ethernet, for example:
- PROFINET
- EtherNet/IP
- EtherCAT
- PROFIBUS
- DeviceNet

Operating modes
- Stand-alone
- Remote controller on the fieldbus
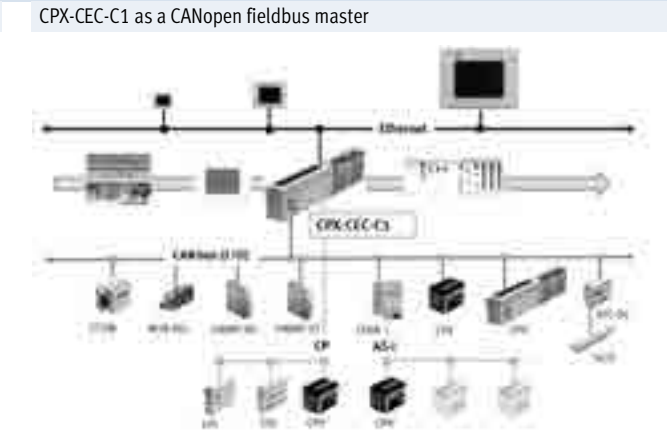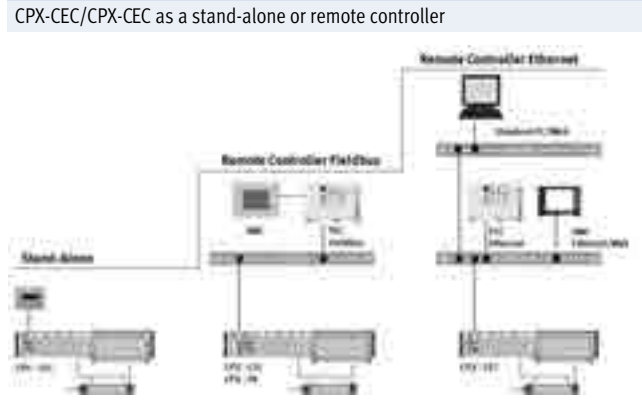- Remote controller on Ethernet

System expansion

CANopen connects CPX-CEC with valve terminals and electric drive controllers from Festo:
- CPX, CPV
- CMMP-AS, CMMS-ST, etc.
- AS-Interface gateway

Ethernet connects CPX-CEC with additional controllers and operator units from Festo:
- CECX
- CDPX
- Camera SBO…-Q

System expansion (examples)

CPX-CEC/CPX-CEC as a stand-alone or remote controller

CPX-CEC-C1 as a CANopen fieldbus master

Control blocks CPX-CEC

Key features

Advantages for users

Increased performance

Improved cycle times – more connectable actuators. Compatibility with almost all control systems on the market is ensured via the CPX terminal.

The extensive CODESYS function library provides diagnostics and condition monitoring options.

Reduced costs

For standardised pre-processing: reduces installation costs as an intelligent remote I/O terminal to IP65/IP67 directly at the machine.

CPX-CEC is ideally adapted to CPX and motion applications with up to 31 axes.

Simple, yet efficient: decentralised structures

The modular I/O system with up to 512 I/Os and CAN master functionality (CPX-CEC) offers complete flexibility, whether for open-loop or closed-

loop control.
Stand-alone for low-cost automation of manual workstations, for example, or remote control with pre-processing.

The only one in the world to IP65

The fully integrated automation platform for standard, proportional and servopneumatic, sensor and motion control to IP65.

Included: simple commissioning.

Classification of CPX-CEC in the portfolio for multi-axis controllers for electric drive technology

Embedded controller

The controller FED-CEC for insertion in the display and operator units from Festo facilitates compact solutions for small control tasks in combination with electric drive technology.

CPX-CEC permits the flexible connection of valve actuators and electric drives on the terminal - programmable in CODESYS and can, if necessary, be directly installed at the machine to IP65. The ideal complement to the gateway module CPX-CM-HPP.

Modular controller

The modular controllers complete the upper end of the range for actuating electric drives.
The CECX-X-C1 is the ideal expansion option for a control cabinet in combination with electric drive technology and general control technology.
The CECX-X-M1 executes advanced

tasks such as cam disks, multi-axis function modules to PLCopen and simple NC functions up to 2.5D.
The robotic controller CMXR provides interpolating control for different kinematic systems (e.g. parallel kinematic system) with up to six axes.

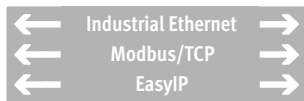## CPX-CEC in the world of electric drive technology
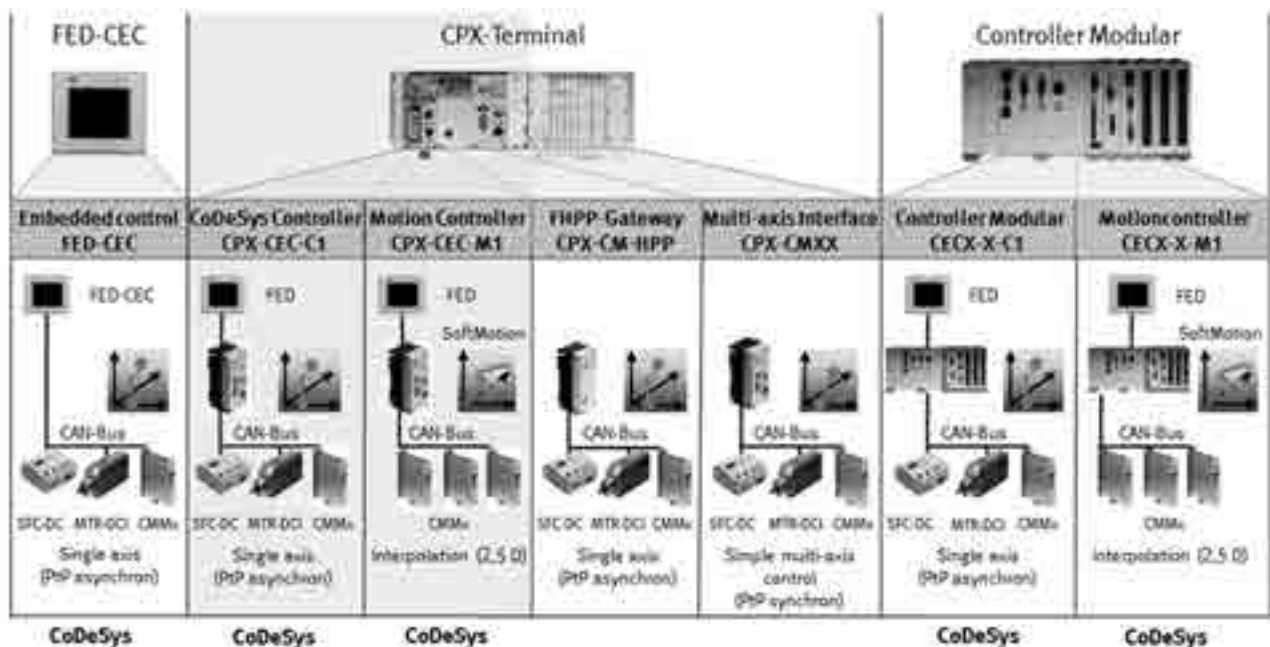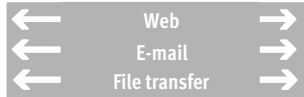
Control blocks CPX-CEC

Type codes
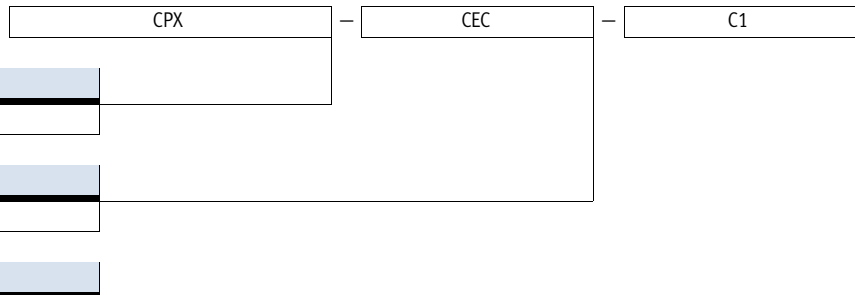
CPX	–	CEC	–	C1

Type	
CPX	Modular electrical terminal

Electrical control	
CEC	Control block

Interface and function	
C1	CANopen
–	RS232

➔ **Internet: www.festo.com/catalog/…** Subject to change – 2016/03

Control blocks CPX-CEC

Technical data

← Industrial Ethernet →	
← Modbus/TCP →	
← EasyIP →	

IT services:

← Web →	
← E-mail →	
← File transfer →	

The CODESYS controller is a modern control system for CPX terminals that enables programming with CODESYS to IEC 61131-3.

The power supply to and communication with other modules takes place via the interlinking block.

In addition to network connections, LEDs are also provided for the bus status, operating status of the PLC and CPX peripherals information, as are switching elements and a diagnostic interface for CPX-MMI and CPX-FMT.

Application

Bus connection

The CPX-CEC is a remote controller that can be connected to a master PLC via the fieldbus nodes of the CPX terminal or via Ethernet. At the same time, it is possible to operate the CPX-CEC as a compact stand-alone controller directly on the machine.

Communication protocols

- Fieldbus via CPX bus nodes
- Modbus/TCP
- EasyIP

Operating modes

- Stand-alone
- Remote controller, fieldbus
- Remote controller, Ethernet

Setting options

The CPX-CEC has the following interfaces for monitoring, programming and commissioning:

- For the CPX-MMI/-FMT
- Ethernet interface for IT applications
- Remote diagnostics

The operating mode and fieldbus protocol are set using the DIL switch on the CPX-CEC.

The integrated web server offers a convenient means of querying data saved in the CPX-CEC.

Features

- Easy actuation of valve terminal configurations with MPA, VTSA
- Diagnostics with flexible monitoring options for pressure, flow rate, cylinder operating time, air consumption

- Actuation of decentralised installation systems based on CPI actuation of applications in proportional pneumatics
- AS-Interface actuation via gateway

- Connection to all fieldbuses as a remote controller and for pre-processing
- Actuation of electric drives as individual axes via CANopen (CPX-CEC-C1)

- Early warnings and visualisation options
- Closed-loop pneumatic applications

Control blocks CPX-CEC

Technical data

General technical data		
Protocol		CODESYS Level 2
		EasyIP
		Modbus TCP
		TCP/IP
Processing time		Approx. 200 µs/1 k instruction
Programming software		CODESYS provided by Festo V2.3
Programming language		To IEC 61131-3
		Sequential function chart (SFC)
		Instruction list (IL)
		Function chart (FCH), additional continuous function chart (CFC)
		Ladder diagram (LD)
		Structured text (ST)
Programming	Operating language	German, English
	Support for file handling	Yes
Device-specific diagnostics		Diagnostic memory
		Channel and module-oriented diagnostics
		Undervoltage/short circuit of modules
LED displays	Bus-specific	TP: Link/traffic
	Product-specific	RUN: PLC status
		STOP: PLC status
		ERR: PLC runtime error
		PS: Electronics supply, sensor supply
		PL: Load supply
		SF: System fault
		M: Modify/forcing active
IP address setting		DHCP
		Via CODESYS
		Via MMI
Function blocks		CPX diagnostic status, copy CPX diagnostic trace, read CPX module diagnostics, etc.
Product weight	[g]	155
Dimensions (incl. interlinking block) W x L x H	[mm]	50 x 107 x 55

Materials	
Housing	Reinforced PA
	PC
Note on materials	RoHS-compliant

Operating and environmental conditions		
Ambient temperature	[°C]	−5 … +50
Storage temperature	[°C]	−20 … +70
Relative air humidity	[%]	95, non-condensing
Corrosion resistance class CRC[1]		2

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
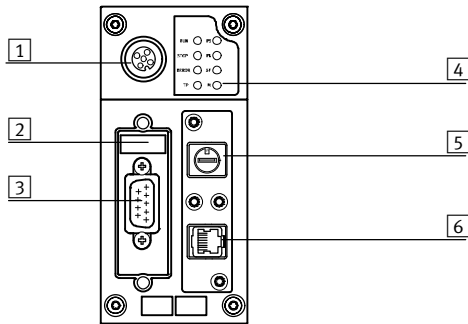
Control blocks CPX-CEC

Technical data

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Electrical data			
Nominal operating voltage		[V DC]	24
Load voltage	Nominal operating voltage	[V DC]	24
	With pneumatics type CPA	[V DC]	20.4 … 26.4
	With pneumatics type MPA	[V DC]	18 … 30
	Without pneumatics	[V DC]	18 … 30
Power failure buffering		[ms]	10
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 85
Degree of protection to EN 60529			IP65, IP67

Technical data				
Type			CPX-CEC	CPX-CEC-C1
Additional functions			RS232 communication function	Motion functions for electric drives
CPU data	Flash	[MB]	32	32
	RAM	[MB]	32	32
	Processor	[MHz]	400	400
Control interface			–	CAN bus
Parameterisation			CODESYS V2.3	
Configuration support			CODESYS V2.3	
Program memory, user program		[MB]	4	
Flags			CODESYS variable concept	
	Remanent data	[kB]	30	30
	Global data memory	[MB]	8	8
Control elements			–	DIL switch for CAN termination
			Rotary switch for RUN/STOP	Rotary switch for RUN/STOP
Total number of axes			–	31
Ethernet	Number		1	
	Connection technology		RJ45 socket, 8-pin	
	Data transmission speed	[Mbps]	10/100	
	Supported protocols		TCP/IP, EasyIP, Modbus TCP	
Fieldbus interface	Number		–	1
	Connection technology		–	Sub-D plug connector, 9-pin
	Data transmission speed, can be set via software	[kbps]	–	125, 250, 500, 800, 1000
	Supported protocols		–	CAN bus
	Galvanic isolation		–	Yes
Data interface	Number		1	–
	Connection technology		Sub-D socket, 9-pin	–
	Data transmission speed, can be set via software	[kbps]	9.6 … 230.4	–
	Supported protocols		RS232 interface	–
	Galvanic isolation		Yes	–

Connection and display components CPX-CEC-C1

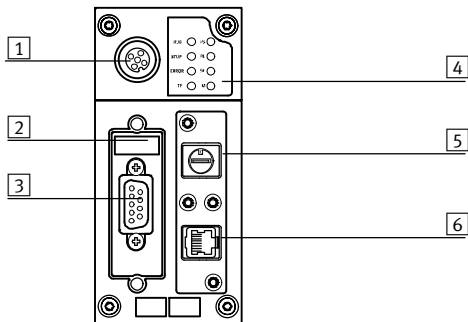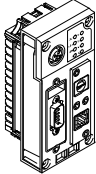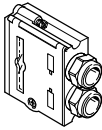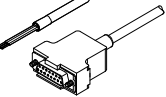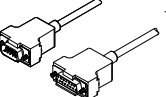|	
1	CPX-MMI connection
2	DIL switch
3	Fieldbus interface (Sub-D plug connector, 9-pin)
4	Status LEDs, bus-specific and product-specific
5	RUN/STOP rotary switch
6	Ethernet interface (RJ45 socket, 8-pin)

Pin allocation – CPX-CEC-C1

	Pin	Signal	Meaning
Fieldbus interface, Sub-D plug connector			
	1	n.c.	Not connected
	2	CAN_L	CAN low
	3	CAN_GND	CAN ground
	4	n.c.	Not connected
	5	CAN_SHLD	Connection to functional earth FE
	6	CAN_GND	CAN ground (optional) [1]
	7	CAN_H	CAN high
	8	n.c.	Not connected
	9	n.c.	Not connected
	Housing	Screening	Plug connector housing must be connected to FE
Ethernet interface, RJ45 plug connector			
	1	TD+	Transmitted data+
	2	TD-	Transmitted data-
	3	RD+	Received data+
	4	n.c.	Not connected
	5	n.c.	Not connected
	6	RD-	Received data-
	7	n.c.	Not connected
	8	n.c.	Not connected
	Housing	Screening	Screening

1)   If a drive controller with external power supply is connected, CAN ground (optional), pin 6, on the CPX-CEC-C1, CPX-CEC-M1 must not be used.

Control blocks CPX-CEC

Technical data

Connection and display components CPX-CEC

1	CPX-MMI connection
2	DIL switch
3	RS232 interface (Sub-D socket, 9-pin)
4	Status LEDs, bus-specific and product-specific
5	RUN/STOP rotary switch
6	Ethernet interface (RJ45 socket, 8-pin)

Pin allocation – CPX-CEC

	Pin	Signal	Meaning
Fieldbus interface, Sub-D socket			
	1	n.c.	Not connected
	2	RXD	Received data
	3	TXD	Transmitted data
	4	n.c.	Not connected
	5	GND	Data reference potential
	6	n.c.	Not connected
	7	n.c.	Not connected
	8	n.c.	Not connected
	9	n.c.	Not connected
	Screening	Screening	Connection to functional earth
Ethernet interface, RJ45 plug connector			
	1	TD+	Transmitted data+
	2	TD-	Transmitted data-
	3	RD+	Received data+
	4	n.c.	Not connected
	5	n.c.	Not connected
	6	RD-	Received data-
	7	n.c.	Not connected
	8	n.c.	Not connected
	Housing	Screening	Screening

Ordering data			
Designation		Part No.	Type
Control block			
	Motion functions for electric drives	**567347**	**CPX-CEC-C1**
	RS232 communication function	**567346**	**CPX-CEC**
Fieldbus interface			
	Sub-D plug connector, 9-pin, for CANopen	**532219**	**FBS-SUB-9-BU-2x5POL-B**
	Connecting cable FED	**539642**	**FEC-KBG7**
	Connecting cable FED	**539643**	**FEC-KBG8**
	Micro Style bus connection, 2xM12 for DeviceNet/CANopen	**525632**	**FBA-2-M12-5POL**
	Socket for Micro Style connection, M12	**18324**	**FBSD-GD-9-5POL**
	Plug connector for Micro Style connection, M12	**175380**	**FBS-M12-5GS-PG9**
	Open Style bus connection for 5-pin terminal strip for DeviceNet/CANopen	**525634**	**FBA-1-SL-5POL**
	Terminal strip for Open Style connection, 5-pin	**525635**	**FBSD-KL-2x5POL**
Ethernet interface			
	RJ45 plug connector	**534494**	**FBS-RJ45-8-GS**
	Cover for RJ45 connection	**534496**	**AK-RJ45**

Control blocks CPX-CEC

Accessories

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Ordering data				
Designation			Part No.	Type
Covers and attachments				
	Inspection cover, transparent, for Sub-D connection		**533334**	**AK-SUB-9/15-B**
	Inscription label holder for manifold block		**536593**	**CPX-ST-1**
User documentation				
	Manual for control block CPX-CEC	German	**569121**	**P.BE-CPX-CEC-DE**
		English	**569122**	**P.BE-CPX-CEC-EN**

Product Range and Company Overview

A Complete Suite and Company Overview

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Complete custom engineered solutions

Custom Control Cabinets
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Electromechanical
Electromechanical actuators, motors, controllers & drivers

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Pneumatic linear and rotary actuators, valves, and air supply

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Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 16,000 employees in 60 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

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Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.
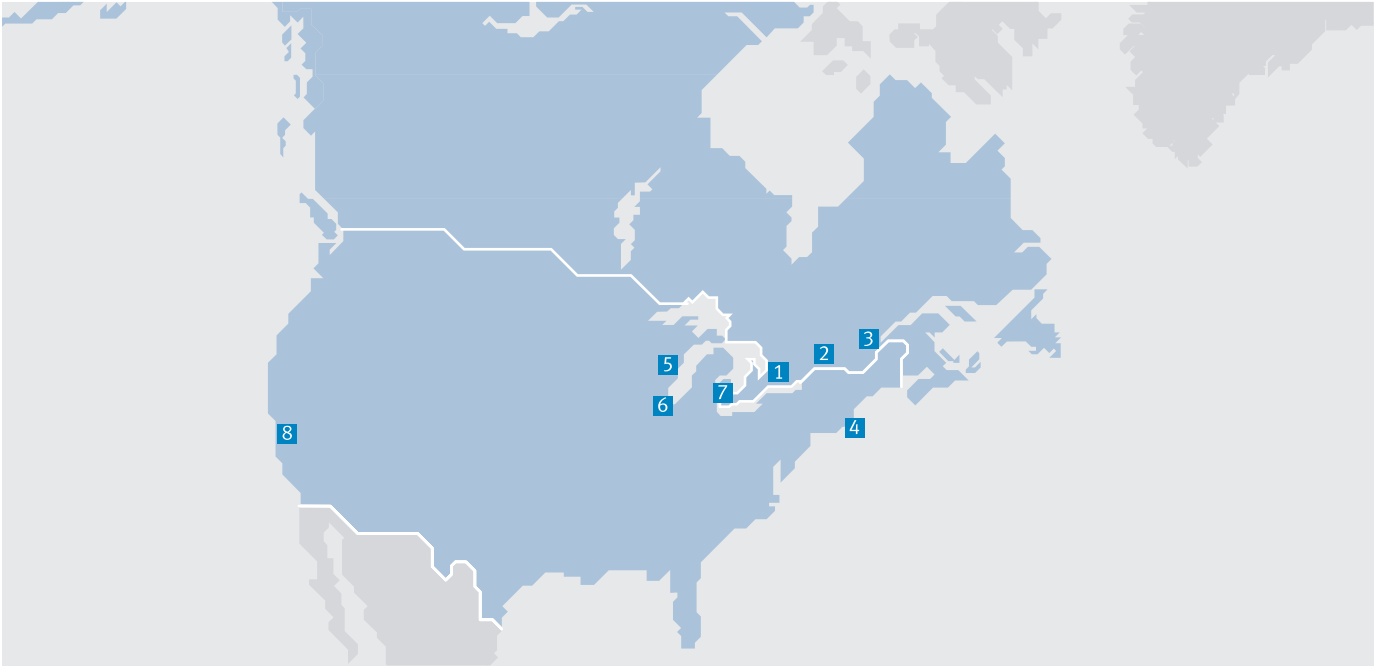
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