

# Control blocks CPX-CEC



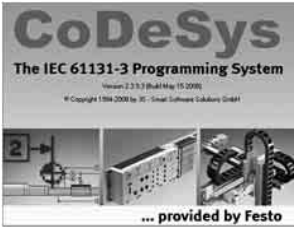
# Control blocks CPX-CEC

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-FMT

## 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:

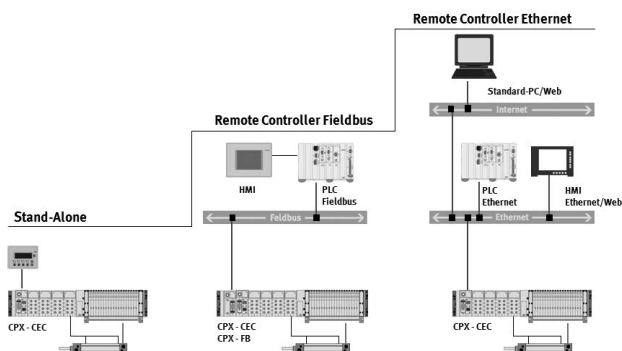
- CPX, CPV
- CMMP-AS, CMMS-ST, etc.
- AS-Interface gateway

Ethernet connects CPX-CEC with additional controllers and operator units from Festo:

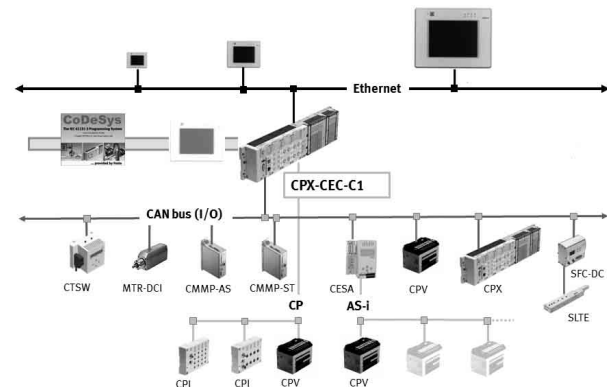
- CDPX
- Camera SBO...-Q

## 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.

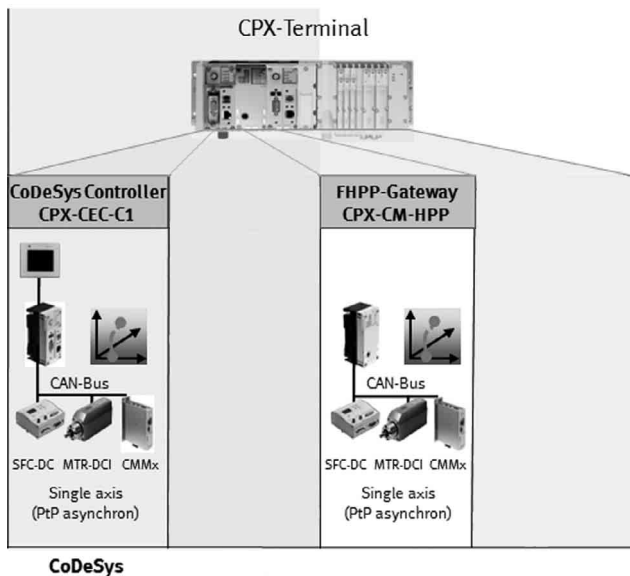
#### The only one in the world to IP65

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

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

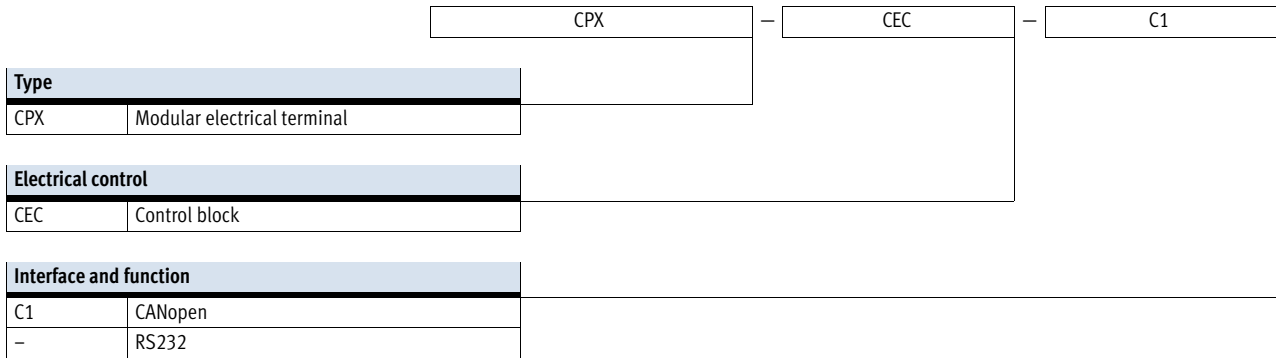


#### Embedded controller

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.

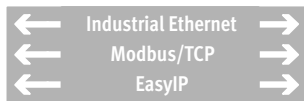
# Control blocks CPX-CEC

Type codes



# Control blocks CPX-CEC

Technical data



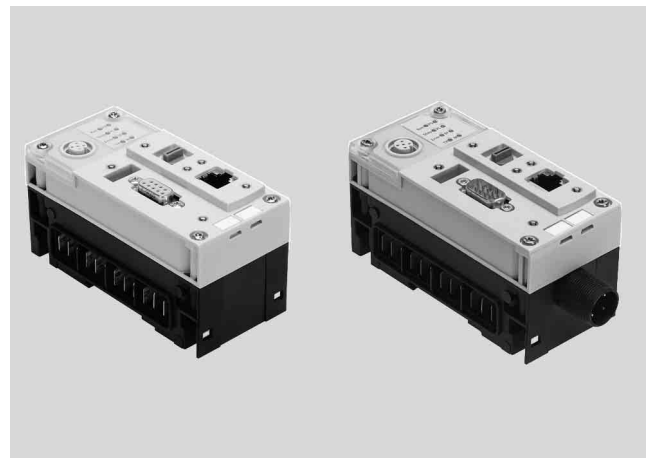
**IT services:**



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-FMT.



| Application  |   |  |   |
|--|---|--|---|
| Bus connection   |   | Communication protocols  | Operating modes   |
| 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.  | <ul style="list-style-type: none"> <li>Fieldbus via CPX bus nodes</li> <li>Modbus/TCP</li> <li>EasyIP</li> </ul>   | <ul style="list-style-type: none"> <li>Stand-alone</li> <li>Remote controller, fieldbus</li> <li>Remote controller, Ethernet</li> </ul> |
| Setting options  |   |  |   |
| The CPX-CEC has the following interfaces for monitoring, programming and commissioning:  | <ul style="list-style-type: none"> <li>For the CPX-FMT</li> <li>Ethernet interface for IT applications</li> <li>Remote diagnostics</li> </ul>   | 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   |   |  |   |
| <ul style="list-style-type: none"> <li>Easy actuation of valve terminal configurations with MPA, VTSA</li> <li>Diagnostics with flexible monitoring options for pressure, flow rate, cylinder operating time, air consumption</li> </ul> | <ul style="list-style-type: none"> <li>Actuation of decentralised installation systems based on CPI actuation of applications in proportional pneumatics</li> <li>AS-Interface actuation via gateway</li> </ul> | <ul style="list-style-type: none"> <li>Connection to all fieldbuses as a remote controller and for pre-processing</li> <li>Actuation of electric drives as individual axes via CANopen (CPX-CEC-C1)</li> </ul> | <ul style="list-style-type: none"> <li>Early warnings and visualisation options</li> <li>Closed-loop pneumatic applications</li> </ul>  |

# 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)   |                                       |
| 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 <sup>1)</sup> |      | 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

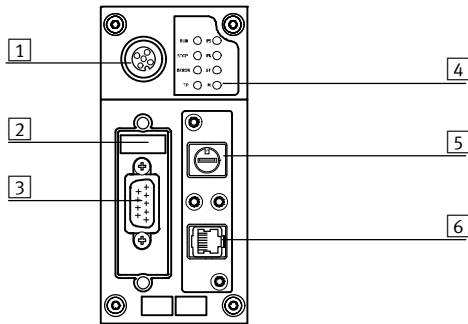
| Electrical data  |                           |        |               |
|--|---------------------------|--------|---------------|
| Nominal operating voltage                                  |                           | [V DC] | 24            |
| Load voltage   | Nominal operating voltage | [V DC] | 24            |
|  | With pneumatics type VTSA | [V DC] | 21.6 ... 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                          |                                      |

# Control blocks CPX-CEC

Technical data

## Connection and display components CPX-CEC-C1



- 1 CPX-FMT 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  |
|---|-----------|-----------|--|
| <b>Fieldbus interface, Sub-D plug connector</b> |           |           |  |
|   | 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) <sup>1)</sup>            |
|   | 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 |
| <b>Ethernet interface, RJ45 plug connector</b>  |           |           |  |
|   | 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 |  |

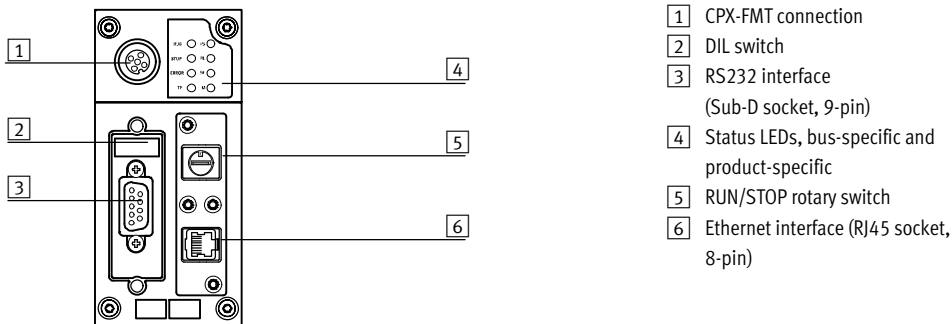
1) If a drive controller with external power supply is connected, CAN ground (optional), pin 6, on the CPX-CEC-C1, CPX-CEC-M1 must not be used.



# Control blocks CPX-CEC

Technical data

## Connection and display components CPX-CEC



- 1 CPX-FMT 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)

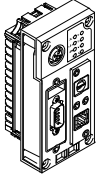
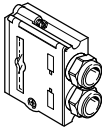
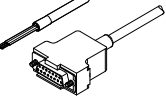
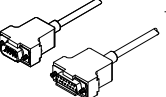







## Pin allocation – CPX-CEC

|  | Pin       | Signal    | Meaning                        |
|--|-----------|-----------|--------------------------------|
| <b>RS232 interface, Sub-D socket</b>           |           |           |                                |
|  | 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 |
| <b>Ethernet interface, RJ45 plug connector</b> |           |           |                                |
|  | 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 |                                |

# Control blocks CPX-CEC

Accessories

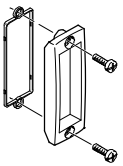
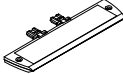
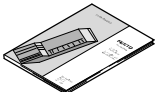
**FESTO**

| Ordering data   |  |               |                              |
|---|--|---------------|------------------------------|
| Designation   |  | Part No.      | Type                         |
| <b>Control block</b>  |  |               |                              |
|    | Motion functions for electric drives                                     | <b>567347</b> | <b>CPX-CEC-C1</b>            |
|   | RS232 communication function   | <b>567346</b> | <b>CPX-CEC</b>               |
| <b>Fieldbus interface</b>   |  |               |                              |
|    | Sub-D plug connector, 9-pin, for CANopen                                 | <b>532219</b> | <b>FBS-SUB-9-BU-2x5POL-B</b> |
|    | Connecting cable for RS232 interface                                     | <b>539642</b> | <b>FEC-KBG7</b>              |
|   | Connecting cable for RS232 interface                                     | <b>539643</b> | <b>FEC-KBG8</b>              |
|  | Micro Style bus connection, 2xM12 for DeviceNet/CANopen                  | <b>525632</b> | <b>FBA-2-M12-5POL</b>        |
|  | Socket for Micro Style connection, M12                                   | <b>18324</b>  | <b>FBSD-GD-9-5POL</b>        |
|  | Plug connector for Micro Style connection, M12                           | <b>175380</b> | <b>FBS-M12-5GS-PG9</b>       |
|  | Open Style bus connection for 5-pin terminal strip for DeviceNet/CANopen | <b>525634</b> | <b>FBA-1-SL-5POL</b>         |
|  | Terminal strip for Open Style connection, 5-pin                          | <b>525635</b> | <b>FBSD-KL-2x5POL</b>        |
| <b>Ethernet interface</b>   |  |               |                              |
|  | RJ45 plug connector  | <b>534494</b> | <b>FBS-RJ45-8-GS</b>         |
|  | Cover for RJ45 connection  | <b>534496</b> | <b>AK-Rj45</b>               |

# Control blocks CPX-CEC

Accessories

**FESTO**

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

# Festo - Your Partner in Automation



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