

Modular SeGMo-Box

Interface for controlling the SeGMo components

GEL 65M

Technical information

Version 2023-06-06

General

The modular SeGMo-Box GEL 65M is the decentral control unit of the system. The modular design allows application-specific combinations. SeGMo components such as SeGMo-Motion, SeGMo-Positioning or SeGMo-Assist can be connected directly to the SeGMo-Box. This enables the SeGMo components to be grouped together and switched at the same time. Installation of the SeGMo system is cost-optimized and very compact. Industrial Ethernet interfaces are available to communicate with the central higher level control system. Using the SeGMo-Box, the SeGMo components can also be commissioned without any higher level control system.

Features

- Maximum connection: 17 positioning drives or 48 position displays/nominal value displays
- Central supply voltage: 24 to 30 V DC
- Industrial Ethernet interfaces: PROFINET IO / RT, EtherCAT, EtherNet/IP, POWERLINK, Modbus/TCP
- Degree of protection: IP 20

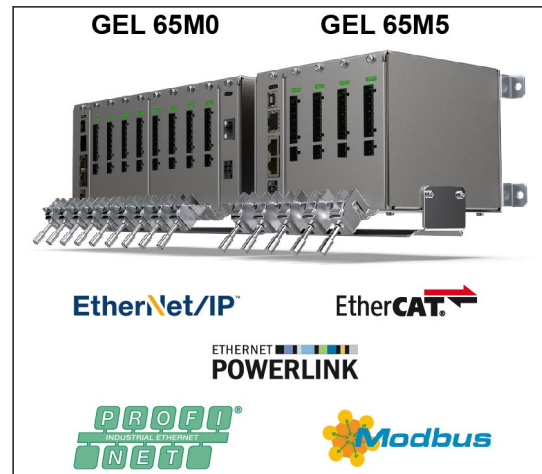
Advantages

- Individual combinations possible
- Compact connection technology
- Electronic breakers
- Integrated power management
- Easy commissioning of the positioning drives by automatic parameterization and configuration
- Integrated SeGMo Support Tool (browser application) for extended commissioning and configuration
- Optional web server for real time monitoring via a separate network connection
- Ready for Industry 4.0
- Remote service

Fields of application

- Packaging machines
- Food and bottling lines
- Wood and plastic processing machines
- Printing and bookbinding machines
- Large production facilities

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GEL 65M0 and 65M5

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SeGMo-System

SeGMo-System

The SeGMo-System is suitable for efficient integration of several positioning drives and positioning displays in a machine or a system. The system comprises the following components:

- SeGMo-Positioning:
Positioning drive for fully automatic format setting
- SeGMo-Motion:
Positioning drive for cyclic operation
- SeGMo-Box:
Decentral control unit for up to 5 positioning drives
- Modular SeGMo-Box:
decentral control unit for up to 17 positioning drives or up to 48 positioning displays
- SeGMo-Assist:
Position display for manual adjustment procedures
- SeGMo-Connect:
Single cable concept (hybrid cable suitable for drag chain)
- SeGMo-Lib:
Prefabricated function blocks for integration in the higher level control system
- SeGMo-Support Tool:
Software for extended commissioning and configuration
- SeGMo-Web:
Software for real-time transmission of the modular SeGMo-Box
- SeGMo-ImgConv Tool:
Tool for converting image files into pictograms for SeGMo-Assist

SeGMo-Positioning:

The positioning drives are complete mechatronic systems with a batteryless multiturn encoder, gear and motor as well as integrated power and control electronics. We also offer these items for standalone use. With nominal torques of up to 15 Nm, they cover the typical power range for secondary axes.

SeGMo-Motion:

The positioning drives are complete mechatronic systems with gear and motor as well as integrated power and control electronics for cyclic operation.

SeGMo-Box:

Up to 5 positioning drives can be connected to the SeGMo-Box. The connection of position displays is not provided. The SeGMo-Box supports all common fieldbus and Industrial Ethernet communication interfaces.

Modular SeGMo-Box:

Every modular SeGMo-Box comprises a basic housing with individually equippable plug-in modules. By combining basic housings, up to 17 positioning drives or up to 48 position displays can be connected. A combination of positioning drives and position displays on a modular SeGMo-Box is possible. The power supply can be provided separately for each equipped plug-in module. The modular SeGMo-Box supports all common Industrial Ethernet communication interfaces.

SeGMo-Assist:

The position displays facilitate manual adjustment procedures by displaying nominal and actual positions. Variants are available for rotary and linear applications. Another variant without a measuring system supports the operator, for example, when changing format parts or tools.

SeGMo-Connect:

By using the positioning drives with a SeGMo-Box the cabling effort is considerably reduced by SeGMo-Connect. Instead of the usual two separate cables for internal bus communication and a third cable for power supply to the positioning drives, only **ONE** hybrid cable is connected. In combination with the SeGMo-Box and 5 connected positioning drives, the SeGMo-Connect typically reduces the number of cables from 15 to 5.

The hybrid cable is designed for moveable use in drag chains. Its variants are food grade quality, halogen-free and available as a cULus recognized component.

SeGMo-Motion

6108



6109



SeGMo-Positioning

6110



6113



6129



SEPODR



SeGMo-Assist

SEPODL



SEHMI



SELIN



SeGMo-Box

6505B

6505A



Modular(e) SeGMo-Box

65M0

65M5



Overview SeGMo-Boxes

The SeGMo-Boxes enable the SeGMo components to be grouped together and switched at the same time.

Property	SeGMo-Box	Modular SeGMo-Box	
	GEL 6505	GEL 65M5	GEL 65M0
Communication interfaces	<ul style="list-style-type: none"> Industrial Ethernet Fieldbuses 	<ul style="list-style-type: none"> Industrial Ethernet 	<ul style="list-style-type: none"> Industrial Ethernet
Ready for Industry 4.0	No	Yes	Yes
Remote service	No	Yes	Yes
Connection: <ul style="list-style-type: none"> SeGMo-Motion with communication interface CO and connection technology H1, H2, H3, Hx, xx SeGMo-Positioning with communication interface CO and connection technology HS, HW, H1, H2, H3, S1, S2, S3, xx 			
Suitable for positioning drives	<ul style="list-style-type: none"> GEL 6108 GEL 6109 GEL 6110 GEL 6113 	<ul style="list-style-type: none"> GEL 6108 GEL 6109 GEL 6110 GEL 6113 	<ul style="list-style-type: none"> GEL 6108 GEL 6109 GEL 6110 GEL 6113
Number of positioning drives to be connected	5	4	9/17 ⁽¹⁾
Separate power supply possible per positioning drive?	No	Yes	Yes
The motor power of the connected positioning drives is monitored and switched by the power management.	Yes	Yes	Yes
Integrated SeGMo Support Tool (browser application) for extended commissioning and configuration	Yes	Yes	Yes
Connection of SeGMo-Assist with CO communication interface			
Suitable for position displays/nominal value displays	No	<ul style="list-style-type: none"> GEL SEPODR GEL SEPODL GEL SEHMI 	<ul style="list-style-type: none"> GEL SEPODR GEL SEPODL GEL SEHMI
Number of position displays/nominal value displays to be connected	—	16 ⁽²⁾	36 ⁽²⁾ / 48 ⁽³⁾

(1) Two 10-box GEL 65M0 are connected in series

(2) 4 position displays/nominal value displays per PORT module

(3) One 5-box GEL 65M5 and one 10-box GEL 65M0 are connected in series

GEL 65M: Description and system components

Description

Every modular SeGMo-Box comprises a basic housing, mounted plug-in modules and connection accessories. It can be operated as an individual device or with a second modular SeGMo-Box connected in series. The SeGMo-Boxes are supplied fully ready for use and can be installed directly.

The central element of each individual device or devices connected in series is a CPU module. The CPU module communicates with the higher level control system and manages the connected plug-in modules. Power supply for single devices is central via the CPU module. The power management system integrated in the CPU module supplies all connected plug-in modules of the single device with voltage.

The PORT module serves to connect the positioning drives or position displays/nominal value displays. If position displays/nominal value displays are to be connected, a CPU module C2 must be used.

If two modular SeGMo-Boxes are to be operated connected in series, the SeGMo-Boxes must be connected to each other. This is done using an EXT OUT module, an EXT IN module and a connection line. When connected in series, each SeGMo-Box is supplied with voltage separately. This is done at the first basic housing using the CPU module and at the second basic housing using the EXT IN module.

Each box is supplied with the following connection accessories:

- 1 × Screen connection terminal
(functional ground connection for integration into the screening concept of the system)
- 1 × 2-pin female connector, item number FK1256
(see connection accessories ZB65MX02 / supply voltage logic circuit CPU module or EXT IN module)

System components

The modular SeGMo-Box enables the SeGMo components to be grouped together and switched at the same time. Every SeGMo-Box comprises a basic housing, mounted plug-in modules and connection accessories. The SeGMo-Boxes are supplied fully ready for use.

Basic housing

Type code option "Number of slots"	Description
M5	5 slots
M0	10 slots

Different SeGMo components can be connected to a modular SeGMo-Box.

Plug-in modules

Type code option "Slot X"	Plug-in module	Description
C1	CPU module	The plug-in module manages the connected SeGMo components and communicates with the higher level control system. i This module is not intended for use with position displays/nominal value displays.
C2 (with web server)	CPU module	The plug-in module manages the connected SeGMo components and communicates with the higher level control system.
A	PORT module	The plug-in module connects the connected SeGMo components to the SeGMo-Box. i This module allows the connection of one positioning drive or 4 position displays/nominal value displays. Connecting different SeGMo components to one PORT module is not permitted.
X	EXT OUT module	These plug-in modules allow the SeGMo-Box to be expanded in a targeted manner (connection in series).
X1	EXT IN module	

GEL 65M: Accessories and spare parts

Accessories

General connection accessories

Designation	Item number
Screen connection terminal for plug-in modules	
▪ 5 × screen connection terminal, item number: VS2115	ZB65MX05
CPU module or EXT IN module: Supply voltage logic circuit (LOG IN)	
▪ 5 × 2-pin female connector with 4 contacts, item number: FK1256	ZB65MX02
PORT module: Input voltage (IN)	
▪ 5 × 2-pin female connector with 4 contacts, item number: FK1263	ZB65MX03
PORT module: SeGMo components (LOG/OUT/CAN) for positioning drives with connection technology xx (flying lead) SeGMo-Assist	
▪ 5 × 7-pin female connector, item number: FK1264	ZB65MX04

PORT module: Connection accessories for SeGMo-Motion/SeGMo-Positioning

Designation	Item number
SeGMo component (LOG/OUT/CAN) for positioning drives with H1, H2, H3, HS, HW, S1, S2, S3 connection technology	
▪ SeGMo-Connect	BZK__S0__M
Input voltage (IN) and SeGMo components (LOG/OUT/CAN) for positioning drives with connection technology xx (flying lead)	
SeGMo component (LOG/OUT/CAN): Cable fabrication for hybrid cable	ZB65MX01
▪ 0.05 m copper screening strap 19 mm, item number: W11070	
▪ 0.09 m heatshrink sleeve, item number: LZ1231	
▪ 1 × 7-pin female connector, item number: FK1264	
Input voltage (IN)	
▪ 1 × 2-pin female connector with 4 contacts, item number: FK1263	

PORT module: Connection accessories for SeGMo-Assist

Designation	Item number
CAN bus components for connecting the SeGMo-Assist and the SeGMo-Box	
ZB cable CAN bus 2 m M12 open	ZBSGX04
ZB cable CAN bus 10 m M12 open	ZBSGX05
ZB T-distributor CAN bus M12	ZBSGX06
ZB Y-distributor CAN bus M12	ZBSGX09
ZB terminating resistor CAN bus M12	ZBSGX07

Spare parts

PORT module

Designation	Item number
Circuit breaker (fuse)	ZB65MX06
▪ 10 × circuit breaker 3.5 A, item number: SS80181	

GEL 65M: Technical data

Device variant	65M5	65M0
Electrical data individual device		
Current consumption, fully equipped with PORT modules	≈ 0.8 A	≈ 1.0 A
Mechanical data individual device		
Weight, fully equipped with PORT modules and mounting bracket	≤ 1.6 kg	≤ 2.7 kg
Ambient data		
Operating temperature range	0 °C to + 60 °C	
Storage temperature range	- 40 °C to + 85 °C	
Condensation	not permitted	
Degree of protection	IP 20, DIN EN 60529:2014-09	
Dielectric strength	√2 × 500 V DC, DIN EN 61439-1:2012-06	
EMC (electromagnetic immunity) ⁽¹⁾	DIN EN 61000-6-1:2007-10, DIN EN 61000-6-2:2006-03, DIN EN 61000-4-5:2015-03	
EMC (electromagnetic emissions) ⁽¹⁾	DIN EN 61000-6-3:2011-09, DIN EN 61000-6-4:2011-09	
Vibration resistance	20 ms ⁻² , 2 to 500 Hz, DIN EN 60068-2-6:2008-10	
Shock resistance	150 ms ⁻² , 6 ms, DIN EN 60068-2-27:2010-02	
Approvals		
European Economic Area	Conformity in accordance with ▪ EMC Directive 2014/30/EU CE	

⁽¹⁾ Use only screened cables.

GEL 65M: System component basic housing

Technical data

Device variant	65M5	65M0
General mechanical data		
Maximum tightening torque of screen connection terminal	0.6 Nm	
Mechanical data		
Material	Steel, galvanized	
Weight	≤ 1.2 kg	≤ 2.0 kg

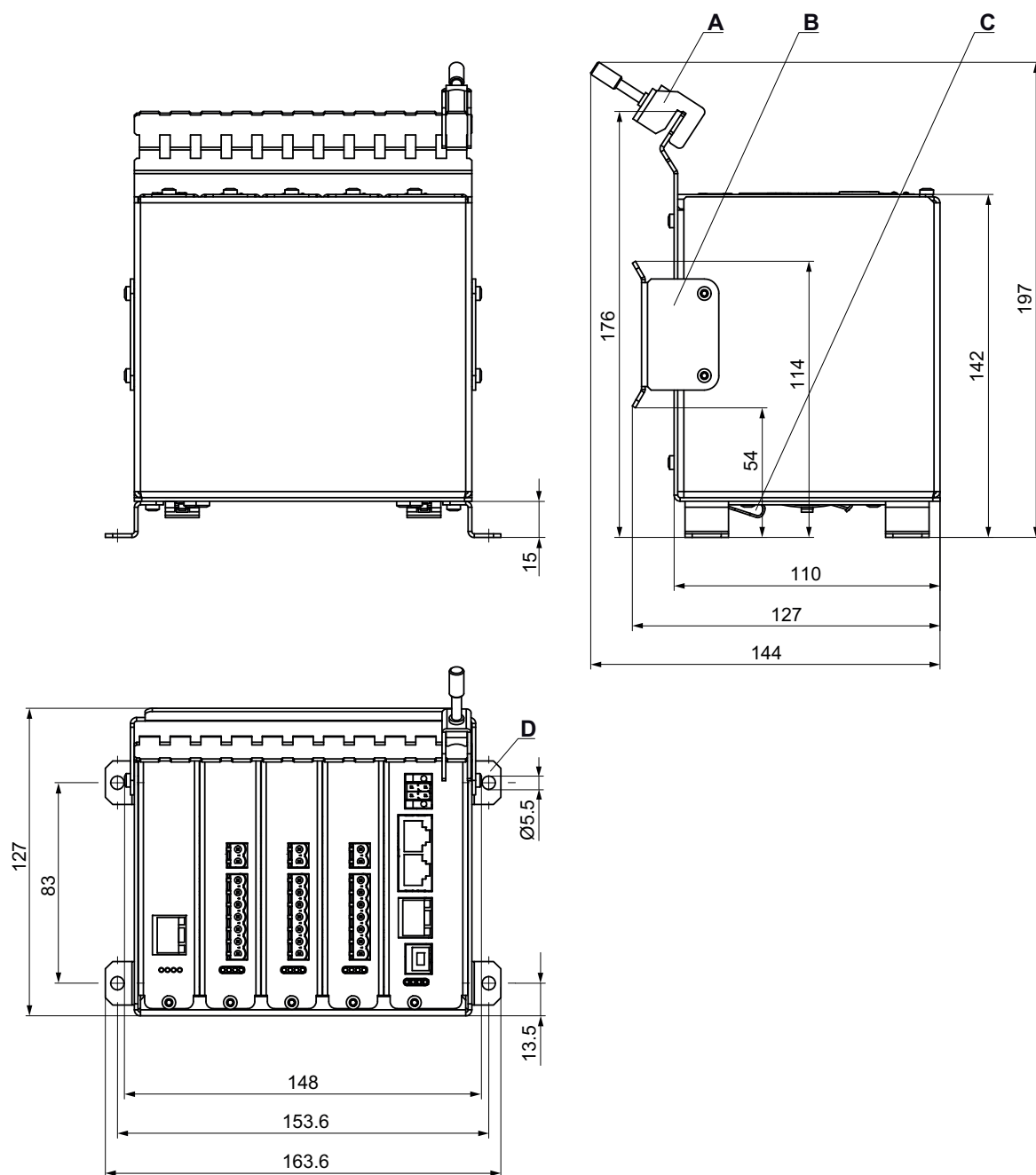
Connections

The scope of supply includes a screen connection terminal for connecting the functional ground.

GEL 65M: System component basic housing

Dimensional drawings

GEL 65M5



- A Screen connection terminal
- B Cable guide
- C Mounting method B (top hat rail adapter)
- D Mounting method A (mounting bracket)

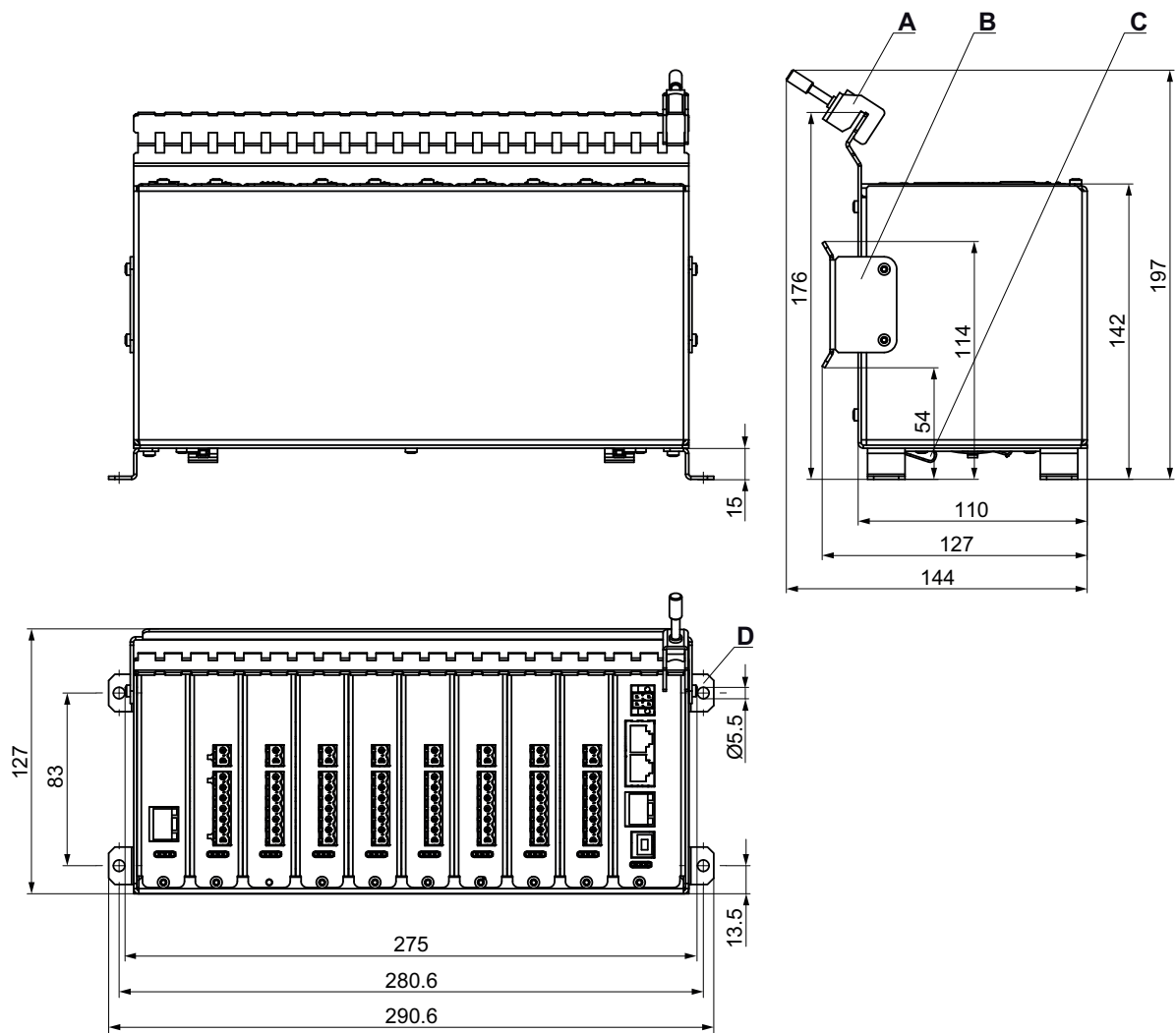
All dimensions in millimeters



Mounting method A or B can be selected in the type code. Supply with mounting method A and B is not possible.

GEL 65M: System component basic housing

GEL 65M0



- A Screen connection terminal
- B Cable guide
- C Mounting method B (top hat rail adapter)
- D Mounting method A (mounting bracket)

All dimensions in millimeters



Mounting method A or B can be selected in the type code. Supply with mounting method A and B is not possible.

GEL 65M: System component CPU module C1

Properties

- Central power supply of the SeGMo-Box and power supply of all connected plug-in modules for individual devices
- 4 status LEDs
- SD memory card (change by operator not possible)
- Integrated SeGMo-Support Tool (browser application)
- USB interface (support tool, firmware update)
- Communication interfaces: Industrial Ethernet



This CPU module is not suitable for connecting position displays/nominal value displays.

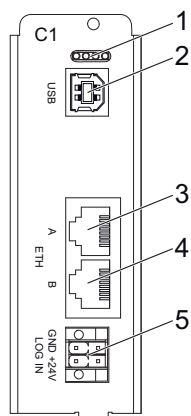
Technical data

Electrical data	
Supply voltage logic circuits ⁽¹⁾ , reverse polarity protected	24 to 30 V DC
Communication interfaces	PROFINET IO / RT, EtherCAT, EtherNet/IP, POWERLINK, Modbus/TCP
Mechanical data	
Weight without/with front panel	≈ 69 g / ≈ 97 g
Connections	
Supply voltage (LOG IN)	2-pin male connector with 4 contacts
USB port (USB)	Female connector, type B
Communication interface (ETH A/ETH B)	2× RJ45 female connector
Indicators	
Status LEDs	LED1: Status external fieldbus (NetX) LED2: Status internal communication LED3: Status COM0 (NetX port 0) LED4: Status COM1 (NetX port 1)

⁽¹⁾ The logic circuit feeds the electronics of the plug-in modules, the logic circuits of positioning drives and the electronics of the modular SeGMo-Box.

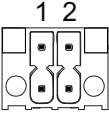
GEL 65M: System component CPU module C1

Indicators and assignments

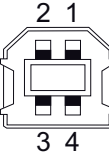


- 1 Status LED1 to LED4 (designation from left to right)
- 2 USB port (USB)
- 3 Communication interface A (ETH A)
- 4 Communication interface B (ETH B)
- 5 Supply voltage (LOG IN)

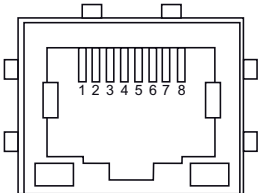
Supply voltage (LOG IN)

2-pin male connector with 4 contacts (plug-in view)	Pin designation	Signal identifier
	1	GND
	2	+ 24 V

USB port (USB)

Female connector, type B (plug-in view)	Pin designation	Signal identifier
	1	+ 5 V
	2	DM
	3	DP
	4	GND

Communication interface (ETH A/ETH B)

RJ45 female connector (plug-in view)	Pin designation	Signal identifier
	1	TX+
	2	TX-
	3	RX+
	4	TXC
	5	RXC
	6	RX-
	7	unallocated
	8	GND

GEL 65M: System component CPU module C2

Properties

- Central power supply of the SeGMo-Box and power supply of all connected plug-in modules for individual devices
- 4 status LEDs
- SD memory card (change by operator not possible)
- Integrated SeGMo-Support Tool (browser application)
- USB port (configuration of web server, support tool, firmware update)
- Communication interfaces: Industrial Ethernet
- Web server



This CPU module is suitable for connecting position displays/nominal value displays.

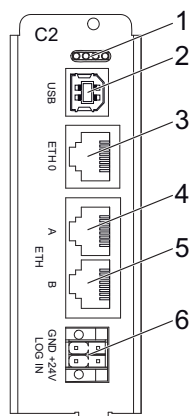
Technical data

Electrical data	
Supply voltage logic circuits ⁽¹⁾ , reverse polarity protected	24 to 30 V DC
Communication interfaces	PROFINET IO / RT, EtherCAT, EtherNet/IP, POWERLINK, Modbus/TCP
Mechanical data	
Weight without/with front panel	≈ 74 g / ≈ 101 g
Connections	
Supply voltage (LOG IN)	2-pin male connector with 4 contacts
USB port (USB)	Female connector, type B
Communication interface (ETH A/ETH B)	2× RJ45 female connector
Web server (ETH 0)	RJ45 female connector
Indicators	
Status LEDs	LED1: Status external fieldbus (NetX) LED2: Status internal communication LED3: Status COM0 (NetX port 0) LED4: Status COM1 (NetX port 1)

⁽¹⁾ The logic circuit feeds the electronics of the plug-in modules, the logic circuits of positioning drives and the electronics of the modular SeGMo-Box.

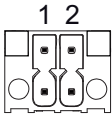
GEL 65M: System component CPU module C2

Indicators and assignments

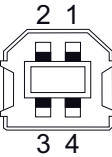


- 1 Status LED1 to LED4 (designation from left to right)
- 2 USB port (USB)
- 3 Web server (ETH0)
- 4 Communication interface A (ETH A)
- 5 Communication interface B (ETH B)
- 6 Supply voltage (LOG IN)

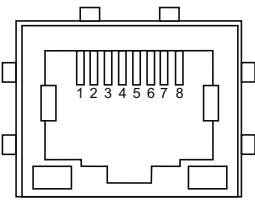
Supply voltage (LOG IN)

2-pin male connector with 4 contacts (plug-in view)	Pin designation	Signal identifier
	1	GND
	2	+ 24 V

USB port (USB)

Female connector, type B (plug-in view)	Pin designation	Signal identifier
	1	+ 5 V
	2	DM
	3	DP
	4	GND

Communication interface (ETH A/ETH B), web server (ETH 0)

RJ45 female connector (plug-in view)	Pin designation	Signal identifier
	1	TX+
	2	TX-
	3	RX+
	4	TXC
	5	RXC
	6	RX-
	7	unallocated
	8	GND

GEL 65M: System component PORT module

Either one positioning drive or up to 4 position displays/nominal value displays can be connected to one PORT module. Connecting different SeGMo components to one PORT module is not permitted.

The PORT module is supplied with voltage internally via the CPU module. The PORT module provides the "logic circuit supply voltage" at the LOG output of the male connector "SeGMo component (LOG/OUT/CAN)" when positioning drives are connected. For the power circuit, the supply voltage is fed separately per PORT module via the male connector "input voltage (IN)". The voltage applied to this input is monitored by the electronics of the PORT module and is supplied at the OUT output of the male connector "SeGMo component (LOG/OUT/CAN)" for voltage supply to the SeGMo components. A circuit breaker (fuse) protects the power circuit of the PORT module against overload. The circuit breaker can be ordered as a spare part.

"SeGMo component (LOG/OUT/CAN)": OUT output

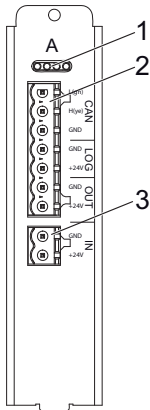
- Power circuit positioning drives: Connection "supply voltage power circuit"
- Power circuit position displays/nominal value displays Connection "supply voltage"

Technical data

Electrical data	
Input voltage (IN)	24 to 30 V DC
Current consumption (IN)	Depending on the connected SeGMo components; ≤ 5.5 A
Mechanical data	
Weight without/with front panel	≈ 52 g / ≈ 79 g
Connections	
Input voltage (IN)	2-pin male connector
SeGMo component (LOG, OUT, CA)	7-pin male connector
Indicators	
Status LEDs	LED1: Status eFuse LED2: Status CAN link LED3: Status internal communication LED4: Status internal connection (to upstream module)

GEL 65M: System component PORT module

Indicators and assignments



- 1 Status LED1 to LED4 (designation from left to right)
- 2 SeGMo component (LOG/OUT/CAN)
- 3 Input voltage (IN)

Input voltage (IN)

2-pin male connector (plug-in view)	Pin designation	Signal identifier
	1	GND power circuit IN
	2	+ 24 V power circuit IN

SeGMo component (LOG/OUT/CAN): SeGMo-Motion or SeGMo-Positioning

7-pin male connector (plug-in view)	Pin designation	Signal identifier	Marking
	1	CAN-Low	CAN
	2	CAN-High	
	3	CAN-GND	
	4	GND logic	LOG
	5	+ 24 V logic	
	6	GND power	OUT
	7	+ 24 V power	

SeGMo component (LOG/OUT/CAN): SeGMo-Assist

7-pin male connector (plug-in view)	Pin designation	Signal identifier	Signal identifier SeGMo-Assist	Core color ZBSGX04, ZBSGX05	Marking
	1	CAN-Low	CAN-Low	blue	CAN
	2	CAN-High	CAN-High	white	
	3	CAN-GND	-	-	
	4	GND logic	-	-	LOG
	5	+ 24 V logic	-	-	
	6	GND power	CAN-GND ¹⁾	black	OUT
	7	+ 24 V power	U _B ¹⁾	red	

¹⁾SeGMo-Assist: Power supply device and power supply communication interface

GEL 65M: System components EXT OUT module

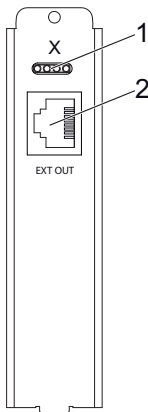
Description

The EXT OUT module is used to connect a SeGMo-Box in series with another SeGMo-Box to increase the number of SeGMo components to be connected.

Technical data

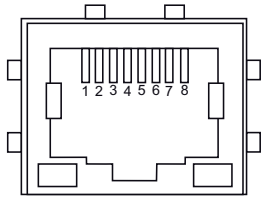
Mechanical data	
Weight without/with front panel	≈ 45 g / ≈ 72 g
Connections	
Internal communication interface (EXT OUT)	RJ45 female connector
Indicators	
Status LEDs	LED1: unallocated LED2: Status external connection (RJ45 connection in series) LED3: Status internal communication LED4: Status internal connection (to upstream module)

Indicators and assignments



- 1 Status LED1 to LED4 (designation from left to right)
- 1 Internal communication interface (EXT OUT)

Internal communication interface (EXT OUT)

RJ45 female connector (plug-in view)	Pin designation	Signal identifier
	1	LB1
	2	LB2
	3	LB3
	4	LB4
	5	LB5
	6	LB6
	7	LB7
	8	LB8

GEL 65M: System components EXT IN module

Description

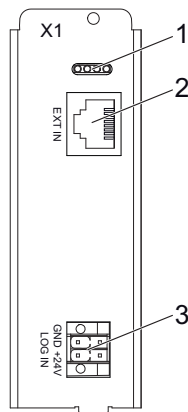
The EXT IN module is used to establish the connection with an upstream SeGMo-Box. It supplies voltage to all plug-in modules connected to the SeGMo-Box.

Technical data

Electrical data	
Supply voltage logic circuits	24 to 30 V DC
Mechanical data	
Weight without/with front panel	≈ 45 g / ≈ 72 g
Connections	
Supply voltage (LOG IN)	2-pin male connector with 4 contacts
Internal communication interface (EXT IN)	RJ45 female connector
Indicators	
Status LEDs	LED1: unallocated LED2: Status internal connection (to downstream module) LED3: Status internal communication LED4: Status external connection (RJ45 connection in series)

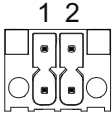
GEL 65M: System components EXT IN module

Indicators and assignments

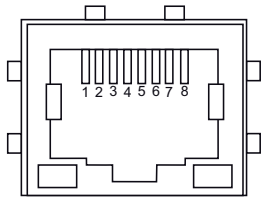


- 1 Status LED1 to LED4 (designation from left to right)
- 2 Internal communication interface (EXT IN)
- 3 Supply voltage (LOG IN)

Supply voltage (LOG IN)

2-pin male connector with 4 contacts (plug-in view)	Pin designation	Signal identifier
	1	GND
	2	+ 24 V

Internal communication interface (EXT IN)

RJ45 female connector (plug-in view)	Pin designation	Signal identifier
	1	LB1
	2	LB2
	3	LB3
	4	LB4
	5	LB5
	6	LB6
	7	LB7
	8	LB8

GEL 65M: System structure individual device

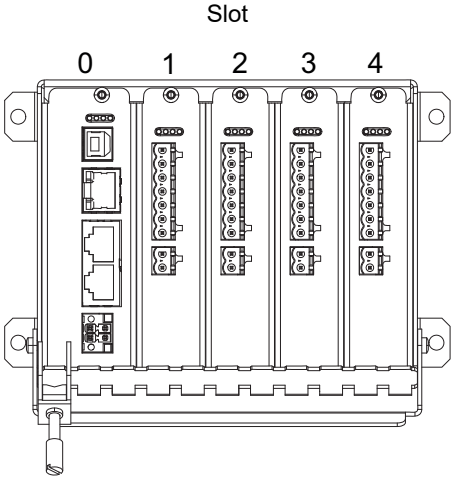
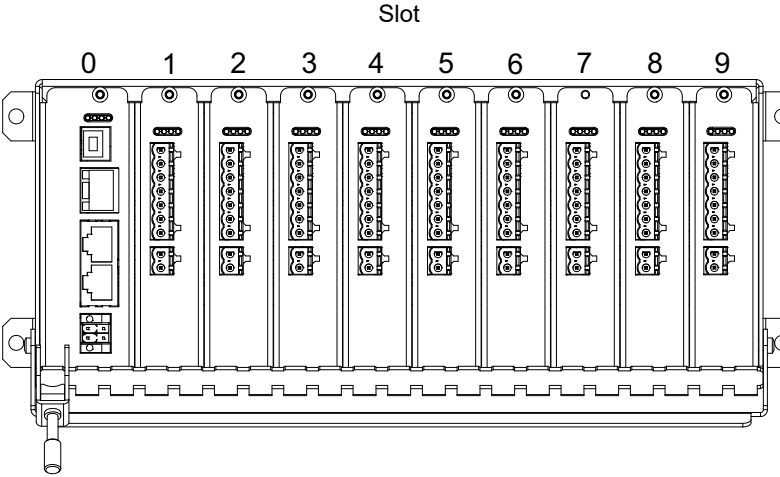
Notes

- Slot 0 must be equipped with a CPU module.
- Slot 1 must be equipped with a PORT module.
- Slots 2 to 4 (GEL 65M5) or 2 to 9 (GEL 65M0) can be equipped with further PORT modules.
Empty slots are not permitted between the PORT modules.
- We recommend arranging identical SeGMo components next to each other (see example 2 in the following table).



When connecting position displays/nominal value displays, the CPU module **C2** must be used.
This is also the case if different SeGMo components are connected.

Examples

GEL 65M5	GEL 65M0
	
Example 1: System structure with positioning drives Configuration of slots: 0 CPU module 1 PORT modul (positioning drive 1) 2 PORT modul (positioning drive 2) 3 PORT modul (positioning drive 3) 4 PORT modul (positioning drive 4)	Example 2: System structure with positioning drives and position displays Configuration of slots: 0 CPU module 1 PORT modul (positioning drive 1) 2 PORT modul (positioning drive 2) 3 PORT modul (positioning drive 3) 4 PORT modul (positioning drive 4) 5 PORT modul (positioning drive 5) 6 PORT module (position displays 1 to 4) 7 PORT module (position displays 5 to 8) 8 PORT module (position displays 9 to 12) 9 PORT module (position displays 13 to 16)

GEL 65M: Type code individual device

Type code GEL 65M

	Number of slots									
	5 Basic housing with 5 slots (maximum 4 positioning drives or 16 position displays/nominal value displays) 0 Basic housing with 10 slots (maximum 9 positioning drives or 36 position displays/nominal value displays)									
	Design									
	N Standard									
	Communication interface									
	EC EtherCAT (based on CiA 402) IP EtherNet/IP (based on CiA 402) MB Modbus/TCP (based on CiA 402) PL POWERLINK (based on CiA 402) RT PROFINET IO/RT (based on CiA 402) SC sercos III (based on CiA 402) ⁽¹⁾									
	Slot 0									
	C1 CPU module without web server (not suitable for SeGMo-Assist) C2 CPU module, fully equipped with web server									
	Slot 1									
	A PORT module									
	Slot 2									
	— Without plug-in module A PORT module									
	Slot 3									
	— Without plug-in module A PORT module									
	Slot 4									
	— Without plug-in module A PORT module									
	Slot 5 (only for basic housing with 10 slots)									
	— Without plug-in module A PORT module									
	Slot 6 (only for basic housing with 10 slots)									
	— Without plug-in module A PORT module									
	Slot 7 (only for basic housing with 10 slots)									
	— Without plug-in module A PORT module									
	Slot 8 (only for basic housing with 10 slots)									
	— Without plug-in module A PORT module									
	Slot 9 (only for basic housing with 10 slots)									
	— Without plug-in module A PORT module									
	Degree of protection/housing									
	1 IP 20/steel, galvanized									
	Mounting method									
	A Mounting bracket (horizontal/vertical) B Top hat rail, horizontal									
	Option									
	0 Without cable guide 1 With cable guide									
65M	—	—	—	—	—	—	—	—	—	—

⁽¹⁾ upon request

GEL 65M: System structure connection in series

Notes

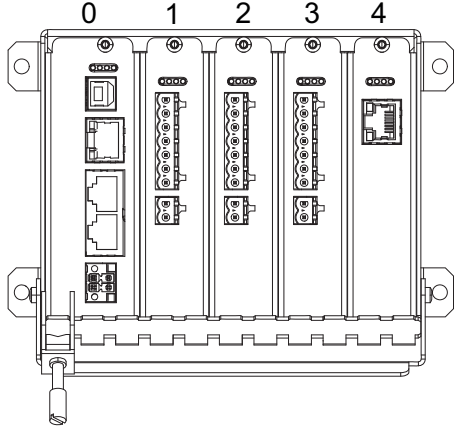
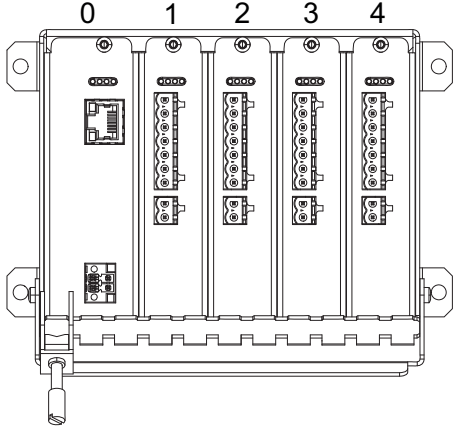
- When connecting position displays/nominal value displays, the CPU module **C2** must be used. This is also the case if different SeGMO components are connected.
- We recommend arranging identical SeGMO components next to each other within one box.

Possible combinations:

- Maximum setup when equipped with the same SeGMO components
 - Two SeGMO-Boxes with 10 slots each for a maximum of 17 positioning drives
 - One SeGMO-Box with 5 slots and one SeGMO-Box with 10 slots for a maximum of 48 position displays/nominal value displays
- Maximum setup when equipped with different SeGMO components
 - Depending on the number of process data (planning information → [page 23](#))

Example

Connection in series of two basic housings with 5 slots each for 7 positioning drives

GEL 65M5: Basic housing 1	GEL 65M5: Basic housing 2
<p>Slot</p> 	<p>Slot</p> 
<p>Configuration of slots:</p> <ul style="list-style-type: none"> 0 CPU module 1 PORT modul (positioning drive 1) 2 PORT modul (positioning drive 2) 3 PORT modul (positioning drive 3) 4 EXT OUT module 	<p>Configuration of slots:</p> <ul style="list-style-type: none"> 0 EXT IN module 1 PORT modul (positioning drive 4) 2 PORT modul (positioning drive 5) 3 PORT modul (positioning drive 6) 4 PORT modul (positioning drive 7)
<ul style="list-style-type: none"> Power supply basic housing 1: CPU module 	<ul style="list-style-type: none"> Power supply basic housing 2: EXT IN module
<p>Communication between the basic housings takes place via the EXT modules. Connection can be made using a standard RJ45 connecting cable.</p>	
<p>Notes</p> <ul style="list-style-type: none"> Slot 0 must be equipped with a CPU module. Slot 1 must be equipped with a PORT module. Slots 2 to 3 (GEL 65M5) or 2 to 8 (GEL 65M0) can be equipped with further PORT modules. Empty slots are not permitted between the PORT modules. An EXT OUT module must be equipped after the last PORT module. No further PORT module may follow the EXT OUT module. Empty slots are possible after the EXT OUT module. 	<p>Notes</p> <ul style="list-style-type: none"> Slot 0 must be equipped with an EXT IN module. Slots 1 to 4 (GEL 65M5) or 1 to 9 (GEL 65M0) can be equipped with further PORT modules. Empty slots are not permitted between the PORT modules. Empty slots are possible after the last PORT module.

GEL 65M: Type code connection in series

Type code GEL 65M with two basic housings

Number of slots												
5 Basic housing with 5 slots												
0 Basic housing with 10 slots												
Design												
N Standard												
Communication interface												
-- Basic housing connected in series 2 (without CPU module, with EXT IN module)												
EC EtherCAT (based on CiA 402)												
IP EtherNet/IP (based on CiA 402)												
MB Modbus/TCP (based on CiA 402)												
PL POWERLINK (based on CiA 402)												
RT PROFINET IO/RT (based on CiA 402)												
SC sercos III (based on CiA 402) ⁽¹⁾												
Slot 0												
C1 CPU module without web server for basic housing 1 (not suitable for SeGMo-Assist)												
C2 CPU module, fully equipped with web server for basic housing 1												
X1 EXT IN module for basic housing 2												
Slot 1												
A PORT module												
Slot 2												
— Without plug-in module												
A PORT module												
X EXT OUT module for basic housing 1												
Slot 3												
— Without plug-in module												
A PORT module												
X EXT OUT module for basic housing 1												
Slot 4												
— Without plug-in module												
A PORT module												
X EXT OUT module for basic housing 1												
Slot 5 (only for basic housing with 10 slots)												
— Without plug-in module												
A PORT module												
X EXT OUT module for basic housing 1												
Slot 6 (only for basic housing with 10 slots)												
— Without plug-in module												
A PORT module												
X EXT OUT module for basic housing 1												
Slot 7 (only for basic housing with 10 slots)												
— Without plug-in module												
A PORT module												
X EXT OUT module for basic housing 1												
Slot 8 (only for basic housing with 10 slots)												
— Without plug-in module												
A PORT module												
X EXT OUT module for basic housing 1												
Slot 9 (only for basic housing with 10 slots)												
— Without plug-in module												
A PORT module												
X EXT OUT module for basic housing 1												
Degree of protection/housing												
1 IP 20/steel, galvanized												
Mounting method												
A Mounting bracket (horizontal, vertical)												
B Top hat rail, horizontal												
Option												
0 Without cable guide												
1 With cable guide												
65M	—	—	—	—	—	—	—	—	—	—	—	—

⁽¹⁾ upon request

Cable routing and strain relief

The screen connection terminals, in combination with the cable routing, usually provide sufficient strain relief at the connector contacts. Depending on the location and application, additional strain relief may be required. This must be evaluated separately during the planning stage.

Screen connection terminal

The screen connection terminal included in the scope of supply is intended for connecting the functional ground cable.



The screen connection terminal is only intended for connecting an one core cable

Functional ground

The modular SeGMo-Box must be integrated in the screening concept of the system via the functional ground connection. The functional ground connection of the SeGMo-Box can be made via the screen connection terminal included in the scope of supply or via the mounting bracket. The functional ground cable must be designed with a cross section of at least 6 mm² [9 AWG].

PORT module

For the power circuit, the supply voltage is fed separately per PORT module via the male connector "input voltage (IN)". The mating connectors available as accessories are also suitable for the common power supply connection of all PORT modules of one SeGMo-Box.

A minimum cross-section of 1.5 mm² [16 AWG] to a maximum of 2.5 mm² [14 AWG] is recommended for connecting the power supply and the PORT modules. Using a 2.5 mm² [14 AWG] connection cable provides the best possible protection against unwanted voltage drops due to long cable lengths and unclear load scenarios. However, depending on the application and the exclusive supply of a single SeGMo component per supply cable, a cross-section of 1 mm² [17 AWG] may also be sufficient. This must be checked and assessed during plant design.

The screens of all connection cables must be connected to the functional ground via screen connection terminals.

Special features SeGMo-Motion/SeGMo-Positioning

Connecting the positioning drives is done using a hybrid cable (SeGMo-Connect). The maximum hybrid cable length is 20 m. The hybrid cable supplies voltage to the logic circuit and the power circuit of the positioning drive. The motor power of the connected positioning drive is monitored and switched by the power management system of the CPU module.

Special features of the SeGMo-Assist

The PORT module and position displays/nominal value displays connected to it form a CAN network. The connections between the PORT module and position displays/nominal value displays are made using commercially available CAN bus cables. The SeGMo-Assist is also supplied with voltage via the CAN bus cable.

CAN bus connection information:

- Topology: line structure
- Maximum main cable length: 80 m
- Maximum cable length between PORT module and SeGMo-Assist or between two SeGMo-Assists: 20 m
- Maximum stub cable length between the main cable and SeGMo-Assist: 2 m
- Male connectors on SeGMo-Assist: Y-distributors or T-distributors (M12, 5-pole)
- Termination: Terminating resistor (120 Ω) at the end of the CAN network

Total current consumption

The total current consumption of the modular SeGMo-Box depends on the type and number of plug-in modules connected and the SeGMo components connected to them.

GEL 65M: Planning information

Maximum setup when equipped with different SeGMo components

Maximum number of process data: 504 bytes

Process data table

Plug-in module	Process data
PORT module <ul style="list-style-type: none"> with 4 position displays/nominal value displays with 1 positioning drive 	8 bytes <ul style="list-style-type: none"> 40 bytes (8 bytes PORT module plus 4 × 8 bytes for 4 position displays/nominal value displays) 16 bytes (8 bytes PORT module plus 8 bytes for 1 position display)
EXT OUT module	1 byte
EXT IN module	1 byte
SeGMo components	Process data
Positioning drive	8 bytes
Position displays/nominal value displays	8 bytes

Calculation maximum setup

Configuration	Required bytes	Example:
		1 GEL 65M0 (8 freely available slots) <ul style="list-style-type: none"> 6 PORT modules with one positioning drive each 2 PORT modules with 4 position displays each 1 GEL 65M5 (4 freely available slots) <ul style="list-style-type: none"> 2 PORT modules with one positioning drive each 2 PORT modules with 4 position displays each
3 occupied slots: <ul style="list-style-type: none"> CPU module EXT OUT module (1-byte) EXT IN module (1-byte) 	2 bytes	2 bytes
Number of slots with PORT modules	Number × 8 bytes	12 × 8 bytes = 96 bytes
Number of positioning drives	Number × 8 bytes	8 × 8 bytes = 64 bytes
Number of position displays/nominal value displays	Number × 8 bytes	16 × 8 bytes = 128 bytes
Total (maximum 504 bytes)		290 bytes

Your notes

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