

EHMD-40-RE-...
Rotary gripper module

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Instructions | Use

8108367
2019-06a
[8108369]



Translation of the original instructions

1 About this document
1.1 Applicable documents

Table with 2 columns: Identifier, Contents. Row 1: Application note, Application examples for connection and commissioning.

Tab. 1 Documentation for rotary gripper module

2 Safety

2.1 General safety instructions

- Only use the product in original status without unauthorised modifications.
- Only use the product if it is in perfect technical condition.
- Observe labelling on the product.
- Store the product in a cool, dry, UV-protected and corrosion-protected environment. Ensure that storage times are kept to a minimum.
- Prior to mounting, installation and maintenance work: Switch off power supply and secure it from being switched back on.
- Observe tightening torques. Unless otherwise specified, the tolerance is ± 20 %.

2.2 Intended use

The intended use of the product is to grip, hold and rotate payloads (workpieces).

2.3 Foreseeable misuse

Gripping where the point of application is on the inside is not intended.
EHMD-...-GE: In normal operation, hitting the stop when moving in the opening direction is not intended.

2.4 Training of qualified personnel

Only qualified personnel may perform installation, commissioning, maintenance and disassembly of the product.
The qualified personnel must be familiar with the installation and operation of electrical and pneumatic control systems.

3 Additional information

- Accessories -> www.festo.com/catalogue.

4 Service

Contact your regional Festo contact person if you have technical questions
-> www.festo.com.

5 Product overview

5.1 Functional principle

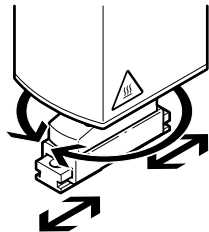


Fig. 1 Functional principle

The product is a combined rotating and gripping module. Gripping occurs in the closing direction of the gripper jaws (point of application on the outside).

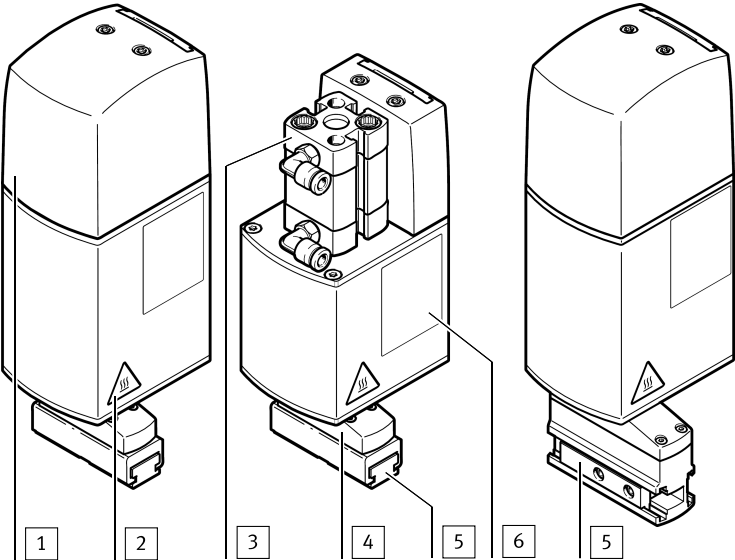
The parallel gripper can be actuated electrically (EHMD-...-GE) or pneumatically (EHMD-...-GP), depending on version.
In both versions, the parallel gripper can be continuously rotated by means of the electric axis of rotation.

Gripping force backup

EHMD-...-GP: without gripping force backup. Backup for the gripping force can only be ensured using additional measures (e.g. uninterruptible compressed air supply).
EHMD-...-GE: with gripping force backup. If the power supply is interrupted, a minimum gripping force is ensured by the mechanical design. However, the maximum gripping force cannot be maintained.

5.2 Product design

EHMD-40-RE-GE | EHMD-40-RE-GP | EHMD-40-RE-GE-16

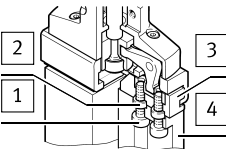


- 1 Stepper motor for the gripper function (installed in the housing)
- 2 Warning - hot surface
- 3 Pneumatic cylinder for gripper function
- 4 Rotatable gripper module
- 5 Gripper jaw
- 6 Product labelling

Fig. 2 Product design

6 Mounting

6.1 Mounting the gripper fingers (EHMD-40-RE-GE/-GP)



- 1 Screw
- 2 Centring sleeve
- 3 Gripper jaw
- 4 Gripper jaw blank (not in scope of delivery)

Fig. 3 Mounting the gripper fingers

1. Press centring sleeves [2] into locating holes in the gripper jaws [3].
2. Apply medium-strength screw locking agent to socket head screws [1].
3. Position gripper fingers [4] on the gripper jaws [3].
4. Screw in socket head screws [1]. Comply with the tightening torque.

Table with 2 columns: EHMD-40-RE-..., -GE/-GP. Rows: Centring hole, Centring sleeve, Threaded hole, Max. screw-in depth in gripper jaw, Tightening torque.

Tab. 2 Mounting the gripper fingers

6.2 Mounting the gripper fingers (EHMD-40-RE-GE-16)

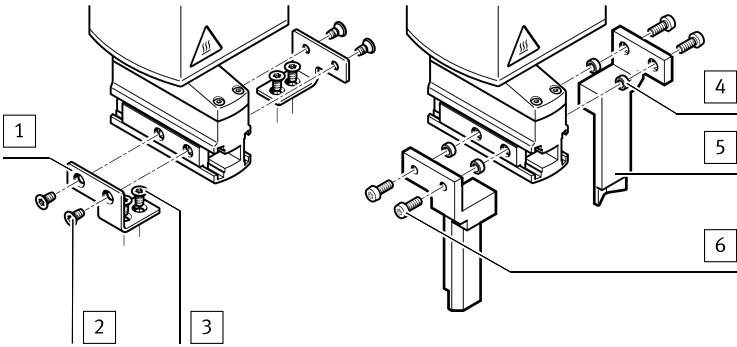


Fig. 4 Mounting the gripper fingers

Mounting with bracket

Gripper fingers should be manufactured to be as short and lightweight as possible. Observe maximum permitted forces and torques on the gripper jaws.

- 1. Apply medium-strength screw locking agent to screws [3].
- 2. Position gripper fingers on the bracket [1].
- 3. Tighten screws [3]. Comply with the tightening torque.
- 4. Apply medium-strength screw locking agent to screws [2].
- 5. Position bracket [1] on the gripper jaws.
- 6. Tighten screws [2]. Comply with the tightening torque.

Direct mounting with centring sleeves

Gripper fingers should be manufactured to be as short and lightweight as possible. Observe maximum permitted forces and torques on the gripper jaws.

- 1. Press centring sleeves [4] into the locating holes in the gripper jaws.
- 2. Apply medium-strength screw locking agent to socket head screws [6].
- 3. Position gripper fingers [5] on the gripper jaws.
- 4. Screw in socket head screws [6]. Comply with the tightening torque.

EHMD-40-RE-...		-GE-16
Centring hole	[mm]	5 <sup>H9</sup>
Centring sleeve		ZBH-5
Threaded hole		M3
Max. screw-in depth in gripper jaw	[mm]	4.6
Tightening torque	[Nm]	1.2

Tab. 3 Mounting the gripper fingers

6.3 Attachment

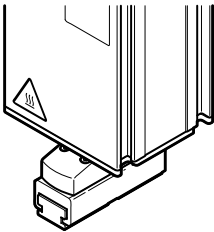


Fig. 5 Dovetail slot

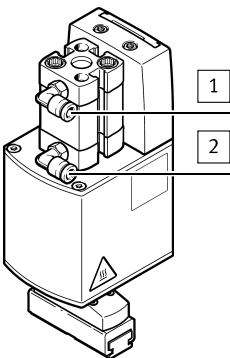
The product housing has a dovetail slot for mounting.  
Accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue).

7 Installation

7.1 Pneumatic installation

Pneumatic connections

Rotatable elbow connectors with fixed flow restrictors are provided for connecting the tubing. The product must not be operated without flow restriction. If the gripper speed needs to be reduced further, this must be executed by external means.



- 1 Tubing connection (QS-4) with integrated fixed flow restrictor "open gripper"
- 2 Tubing connection (QS-4) with integrated fixed flow restrictor "close gripper"

Fig. 6 Pneumatic connection

Adjusting the gripping force

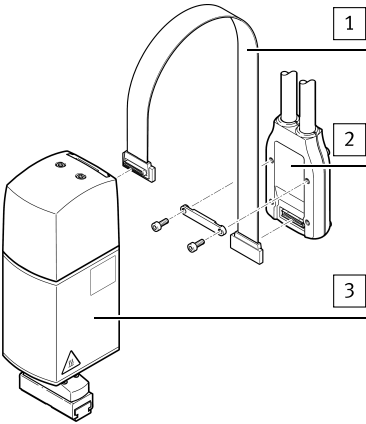
The gripping force can be adjusted by means of the external operating pressure. There is no pressure regulator within the product.

Stroke sensing

The magnet in the pneumatic cylinder can be interrogated to sense the gripper stroke. For this purpose, magnetic proximity sensors can be mounted in 2 of the T-slots on the cylinder. Owing to the tolerance in the lever mechanism, there is a hysteresis between the gripper jaw position and the cylinder magnet.  
Accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue).

7.2 Electrical installation

Electrical connection principle



- 1 Motor cable NEBM-F1W31-... (not in scope of delivery)
- 2 Motor cable NEBM-SF1W31-... (not in scope of delivery)
- 3 Rotary gripping module

Fig. 7 Electrical connection

Connection of motor cable NEBM-F1W31-... to EHMD

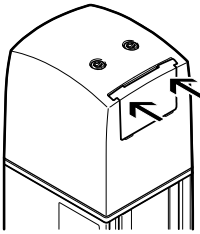


Fig. 8

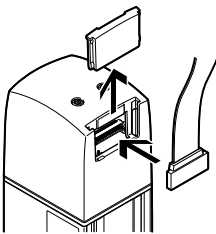


Fig. 9

- 1. Press and hold the top end of the cover EHMD. Slide upwards to remove.
- 2. The cover EHMD can also be released using a screwdriver via the two slots.
- 3. Insert the motor cable until it clicks into place.

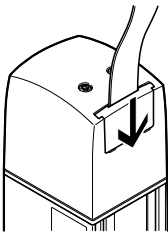



Fig. 10

- 4. Reposition the cover EHMD and slide downwards.  
↳ The push-in connector is mechanically secured in place. Movements of the cable will not be transmitted to the plug connector.



See the applicable assembly instructions for information on installing cables.

Plug connector on EHMD

Connection	Pin	EHMD- ... -GE EHMD- ... -GE-16	EHMD- ... -GP
	1	Encoder rotation I	Encoder rotation I
	2	Encoder rotation B	Encoder rotation B
	3	Encoder rotation A	Encoder rotation A
	4	Encoder gripper I	–
	5	Encoder gripper B	–
	6	Encoder gripper A	–
	7	Shield	Shield
	8	+5 V DC encoder gripper	–
	9	+5 V DC encoder rotation	+5 V DC encoder rotation
	10	Shield	Shield
	11	Motor rotation phase B	Motor rotation phase B
	12	Motor rotation phase B	Motor rotation phase B
	13	Motor rotation phase A	Motor rotation phase A
	14	Motor rotation phase A	Motor rotation phase A
	15	Motor gripper phase B	–
	16	Motor gripper phase A	–
	17	Motor gripper phase A/	–
	18	Motor gripper phase B/	–
	19	Motor rotation phase A/	Motor rotation phase A/
	20	Motor rotation phase A/	Motor rotation phase A/
	21	Motor rotation phase B/	Motor rotation phase B/
	22	Motor rotation phase B/	Motor rotation phase B/
	23	Shield	Shield
	24	GND encoder	GND encoder
	25	Shield	Shield
	26	Encoder gripper A/	–
	27	Encoder gripper B/	–
	28	Encoder gripper I/	–
	29	Encoder rotation A/	Encoder rotation A/
	30	Encoder rotation B/	Encoder rotation B/
	31	Encoder rotation I/	Encoder rotation I/

Tab. 4 Pin allocation

8 Maintenance  
8.1 Cleaning



**When cleaning: observe protection class.**

Permitted cleaning agents:

- Ethanol 70 % or 95 %
- Hydrogen peroxide 5 %

- Clean the outside of the product with a soft cloth.

8.2 Lubrication

The product is delivered with initial lubrication. Subsequent lubrication is not required.

9 Disposal

Dispose of the product and packaging at the end of its useful life through environmentally friendly recycling in accordance with applicable regulations.

10 Technical data

10.1 Technical data, general

EHMD-40-RE-...	GE	GE-16	GP
Weights			
Product weight [g]	681	724	577
Rated load <sup>1)</sup> [g]	250	250	250
Mounting position	any	any	any
Corrosion resistance			
	CRC1 <sup>2)</sup>	CRC1 <sup>2)</sup>	CRC1 <sup>2)</sup>
Noise level			
Continuous sound level LpAeq (DIN 45635-01Cl.2) [dBA]	< 60	< 60	< 60
Degree of protection			
	IP 20	IP 20	IP 20
Operating and environmental conditions			
Ambient temperature [°C]	0 ... 40	0 ... 40	0 ... 40
Relative humidity [%]	0 ... 85 (non-condensing)	0 ... 85 (non-condensing)	0 ... 85 (non-condensing)
Transport and storage conditions [°C]	–20 ... +70	–20 ... +70	–20 ... +70

EHMD-40-RE-...	GE	GE-16	GP
Materials			
Housing top part	Polymer	Polymer	Polymer
Housing bottom part	Aluminium	Aluminium	Aluminium
Gripper housing	Aluminium	Aluminium	Aluminium
Gripper jaws	Polymer	Polymer	Polymer
Severity level (SL) for vibration and shock			
	Severity level 1 <sup>3)</sup>	Severity level 1 <sup>3)</sup>	Severity level 1 <sup>3)</sup>

- 1) Rated load = tool load (gripper finger) + payload  
2) Low corrosion stress. Dry internal use or transport and storage protection. Also applies to parts behind covers in non-visible interior areas, and parts which are covered in the application (e.g. drive trunnions).  
3) Specification for vibration and shock resistance applies to the product with rigid mounting kit; mounting kit with Z-neutralisation is not included.

Tab. 5 Technical data, general

Features of severity level (SL)

Vibration load					
Frequency range [Hz]		Acceleration [m/s²]		Deflection [mm]	
SL1	SL2	SL1	SL2	SL1	SL2
2 ... 8	2 ... 8	–	–	±3.5	±3.5
8 ... 27	8 ... 27	10	10	–	–
27 ... 58	27 ... 60	–	–	±0.15	±0.35
58 ... 160	60 ... 160	20	50	–	–
160 ... 200	160 ... 200	10	10	–	–
Shock load					
Acceleration [m/s²]		Duration [ms]		Shocks per direction	
SL1	SL2	SL1	SL2	SL1	SL2
±150	±300	11	11	5	5
Continuous shock load					
Acceleration [m/s²]		Duration [ms]		Shocks per direction	
±150		6		1000	

Tab. 6 Features of severity level (SL)

10.2 Technical data, pneumatic

EHMD-40-RE-...	GE	GE-16	GP
Pneumatic gripper drive			
Mode of operation of cylinder	–	–	double-acting
Operating medium	–	–	Compressed air to ISO 8573-1:201-0 [7:4:4]
Minimum operating pressure [bar]	–	–	1.5
Nominal operating pressure [bar]	–	–	6
Max. operating pressure [bar]	–	–	8
Nominal gripping force [N]	–	–	25
Nominal stroke <sup>1)</sup> [mm]	–	–	5

- 1) Refers to movement of one gripper jaw

Tab. 7 Technical data, pneumatic

10.3 Technical data, electrical

EHMD-40-RE-...	GE	GE-16	GP
Electric rotary drive			
Functional principle	Hybrid stepper motor, 2-phase, bipolar	Hybrid stepper motor, 2-phase, bipolar	Hybrid stepper motor, 2-phase, bipolar
Nominal voltage [V DC]	24	24	24
Nominal current per phase [A]	0.9	0.9	0.9
Holding torque at nominal current [Nm]	0.3	0.3	0.3
Max. output rotational speed [rpm]	240	240	240
Resistance per phase [Ω]	5.8 ± 15%	5.8 ± 15%	5.8 ± 15%
Inductance per phase [mH]	11 ± 20%	11 ± 20%	11 ± 20%
Step angle	1.8° ± 5%	1.8° ± 5%	1.8° ± 5%
Insulation class	B	B	B
Gear ratio	Direct drive 1:1	Direct drive 1:1	Direct drive 1:1
Moment of inertia including gripper [kgm²]	1.25 x 10 <sup>–5</sup>	2.34 x 10 <sup>–5</sup>	1.25 x 10 <sup>–5</sup>
Permissible shaft load, radial [N]	5	5	5
Permissible shaft load, axial [N]	5	5	5
Encoder, rotary drive			
Operating voltage [V DC]	5 ± 10%	5 ± 10%	5 ± 10%
Pulses/rev [1/r]	500	500	500
Current consumption (typ., no load) [mA]	< 60	< 60	< 60

EHMD-40-RE-...	GE	GE-16	GP
Interface, rotor position sensor	RS422, TTL Incremental A, B + zero index	RS422, TTL Incremental A, B + zero index	RS422, TTL Incremental A, B + zero index
Electric gripper drive			
Functional principle	Hybrid stepper motor, 2-phase, bipolar	Hybrid stepper motor, 2-phase, bipolar	–
Nominal voltage [V DC]	24	24	–
Nominal current per phase [A]	0.5	0.5	–
Holding torque at nominal current [Nm]	0.043	0.043	–
Resistance per phase [Ω]	5.6 ± 15%	5.6 ± 15%	–
Inductance per phase [mH]	4.0 ± 20%	4.0 ± 20%	–
Step angle	1.8° ± 5%	1.8° ± 5%	–
Insulation class	B	B	–
Moment of inertia <sup>1)</sup> [kgm²]	9 x 10 <sup>-7</sup>	9 x 10 <sup>-7</sup>	–
Feed constant <sup>2)</sup> [mm/rev]	1.478	4.4	–
Max. speed per gripper jaw [mm/s]	25	70	–
Permissible speed for homing to stop <sup>2)</sup> [mm/s]	2	5	–
Nominal stroke <sup>2)</sup> [mm]	5	15	–
Reversing backlash <sup>2)</sup> [mm]	0.3	< 0.8	–
Max. gripping force (closed-loop operation) [N]	35	14	–
Maximum gripping force (open-loop operation) [N]	20 ... 25	6 ... 8	–
Minimum gripping force in event of power failure [N]	> 10	> 4	–
Encoder, electric gripper drive			
Operating voltage [V DC]	5 ± 10%	5 ± 10%	–
Pulses/rev [1/r]	500	500	–
Current consumption (typical, no load) [mA]	30	30	–
Interface, rotor position sensor	RS422, TTL Incremental A, B + zero index	RS422, TTL Incremental A, B + zero index	–

1) Refers to motor shaft  
2) Refers to movement of one gripper jaw

Tab. 8 Technical data, electrical