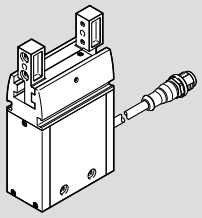
EHPS-...-A-LK
Parallel gripper



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Operating instructions

8188901
2025-09b
[8188903]

8188901

Original instructions

1 Applicable documents

All available documents for the product ➔ www.festo.com/sp.

2 Product labelling

Warning symbols on the product	
⚠	If the housing is damaged, protection against dangerous voltages is no longer guaranteed.

Tab. 1: Warning symbols on the product

3 Safety

3.1 Safety instructions

- Observe labelling on the product.
- Before working on the product: Switch off the power supply, ensure that it is off and secure it against being switched on again.
- The occurrence of a failure could lead to unforeseeable movements if the product is connected with the power supply. Only operate the product once protective measures have been taken against mechanical hazards to body parts.
- Observe tightening torques. Unless otherwise specified, the tolerance is ± 20 %.
- Store the product in a cool, dry environment protected from UV and corrosion. Keep storage times short.
- Contrary to the IO-Link port class B specification without galvanic isolation between primary and secondary power supply. This can lead to malfunction or damage to the IO-Link Master and the connected IO-Link devices and must be observed during wiring.

3.2 Intended use

The parallel gripper grips and holds payloads. The gripper fingers are custom-designed and attached by the customer.

3.3 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers. The qualified personnel have skills and experience in dealing with electrical (open-loop) control technology.

4 Additional information

- Contact the regional Festo contact if you have technical problems ➔ www.festo.com.
- Accessories ➔ www.festo.com/catalogue.

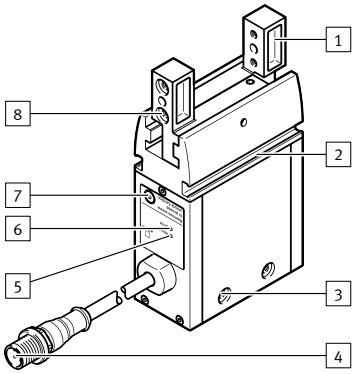
5 Product overview

5.1 Function

The gripper has an integrated servo motor. The gripper mechanism converts the rotary motion of the servo motor into a linear motion of the gripper jaws.
The gripper jaws move towards one another (closing) or apart (opening). Gripper fingers are fastened to the gripper jaws.
The payload can be gripped in 2 ways:
- on the external contour (external gripping) when closing
- on the internal contour (internal gripping) when opening

The parallel gripper is controlled via an IO-Link interface.

5.2 Design



1 Gripper jaw
2 Slot for proximity switch
3 Locating hole and thread for mounting
4 electrical connection
5 LED ready
6 LED Error
7 Plug screw
8 Locating hole and thread for gripper finger mounting

Fig. 1: Product design

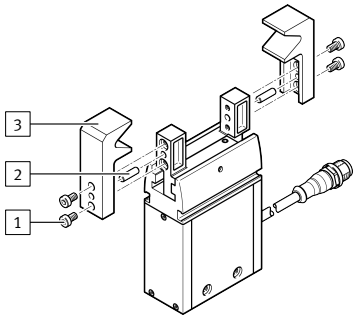
6 Mounting

6.1 Preparing the gripper fingers

The gripper fingers are not included in the delivery.

Requirements for the gripper fingers ➔ 12 Technical data:
- Observe the maximum permissible forces and maximum permissible torques at the gripper jaw.
- Observe the maximum length and weight.
- Use gripper fingers that are as short and light as possible.
- Manufacture gripper fingers that are suitable for the payload and type of gripping action.

6.2 Mounting the gripper fingers



1 Screw
2 Centring pin
3 Gripper finger

Fig. 2: Gripper finger mounting

1. Press centring pin [2] or centring sleeve into the locating holes in the gripper jaws.
2. Position the prepared gripper fingers [3] on the gripper jaws and secure with 2 screws [1] on each. Fix gripper jaws in place during mounting and use the specified tightening torque.

EHPS		-16	-20	-25
Screw		M4	M4	M5
Centring hole for centring sleeve [H8]	[mm]	7	7	9
Centring hole for centring pin [H8]	[mm]	3	4	4
Jaw width	[mm]	10 ± 0.05	12 ± 0.05	15 ± 0.05
Tightening torque (brace at gripper jaws)	[Nm]	2.9	2.9	5.9

6.3 Mounting the gripper

6.3.1 Through-hole mounting and direct mounting

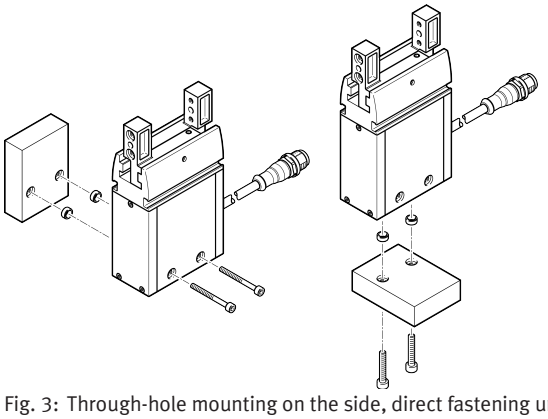


Fig. 3: Through-hole mounting on the side, direct fastening underneath

EHPS		-16	-20	-25
Direct fastening				
Screw		M4	M4	M6
Max. screw-in depth	[mm]	8	8	12
Centring hole	[mm]	7	7	9
Tightening torque	[Nm]	2.9	2.9	10
Through-hole mounting				
Screw		M3	M3	M4
Centring hole	[mm]	7	7	9
Tightening torque	[Nm]	1.2	1.2	2.9

Tab. 2: Mounting attachments and tightening torque

6.3.2 Mounting with adapter kit

Adapter kits ➔ www.festo.com/catalogue.

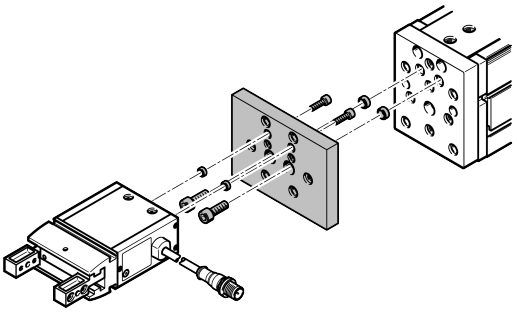


Fig. 4: Mounting with adapter kit from below

NOTICE

Accumulation of heat results from cramped installation situation.
Material damage or malfunction.
- Mount the product with sufficient space for heat dissipation.

1. Press 2 centring sleeves into the locating holes of the gripper.
2. Use the centring sleeves to position the gripper on the connecting surface.
3. Select screws in accordance with the type of mounting.
4. Tighten screws with the associated tightening torque.

6.4 Mounting proximity switches

If required: use proximity switch to sense the position of the gripper jaws in the slot. Use only proximity sensors approved for the product.

7 Installation

7.1 Electrical installation

⚠ WARNING

Risk of Injury due to electric shock.
- For the electric power supply, use SELV or PELV circuits that guarantee a reinforced isolation from the mains network.

⚠ WARNING

Risk of injury due to electric shock or burns.
The gripper does not offer any additional protection against unintended high currents in the supply cables.
- The cross section of the supply cables should be designed to meet the maximum current value that could occur in the event of a failure.

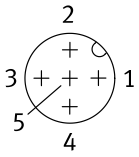
⚠ WARNING

Danger of crushing.
The gripper fingers could move unintentionally and crush body parts.
- Do not reach into the movement range.

⚠ DANGER

Danger of crushing due to unexpectedly moving loads and unintentional movements.
Contrary to specification IO-Link port class B without galvanic isolation between primary and secondary power supply. This can lead to malfunction or damage of the IO-Link Master and the connected IO-Link devices.
- Connect pin 3 (L-) and pin 5 (N24) externally to avoid compensating currents via the gripper.
- When installing further IO-Link devices on the master, note that the actuator supply can only be switched off via pin 2 (P24).

1. Switch off power to the controller and lock it to prevent it from being switched on again unintentionally.
2. Use permissible connecting cable ➔ www.festo.com/catalogue.
3. Connect the parallel gripper to the controller at the connection plug.

M12 plug (5-pin, A-coded)	Pin[1)]	Connection	Designation
	1 (BN) brown	+18 V DC ... +30 V DC	Sensor: Supply voltage for IO-Linkcommunication
	2 (WH) white	+24 V DC (± 10 %)	Actuator: supply voltage
	3 (BU) blue	0 V DC	Sensor: supply voltage IO-Link communication
	4 (BK) black	C/Q	IO-Link communication
	5 (GY) grey	0 V DC	Actuator: supply voltage

1) Wire colour with use of connecting cables according to accessories ➔ www.festo.com/catalogue

Tab. 3: Pin allocation

8 Commissioning

8.1 Procedure

Behaviour in emergency off
- In the event of an emergency off, the gripper jaws stop moving.
- When the gripper grips a component, the position and force achieved are maintained by the self-locking function of the jaws.
- If the gripper jaws are in motion at the time the current is switched off, the gripping process is no longer fully completed. A force cannot or can only be partially dynamically applied.

⚠ DANGER

Danger of crushing due to unexpectedly moving loads and unintentional movements.
Contrary to specification IO-Link port class B without galvanic isolation between primary and secondary power supply. This can lead to malfunction or damage of the IO-Link Master and the connected IO-Link devices.
- Connect pin 3 (L-) and pin 5 (N24) externally to avoid compensating currents via the gripper.
- When installing further IO-Link devices on the master, note that the actuator supply can only be switched off via pin 2 (P24).

⚠ WARNING

Danger of crushing.
The gripper fingers could move unintentionally and crush body parts.
- Do not reach into the movement range.

NOTICE

Material damage due to incorrect or incomplete installation.
The following conditions must be fulfilled for commissioning:
- The system must be fully assembled.
- The electrical installation must be complete and checked.

9 IO-Link interface description

- The related device description file (IODD) ➔ www.festo.com/sp
- Detailed information on the IO-Link specification www.io-link.com

9.1 General information on the IO-Link

Data exchange

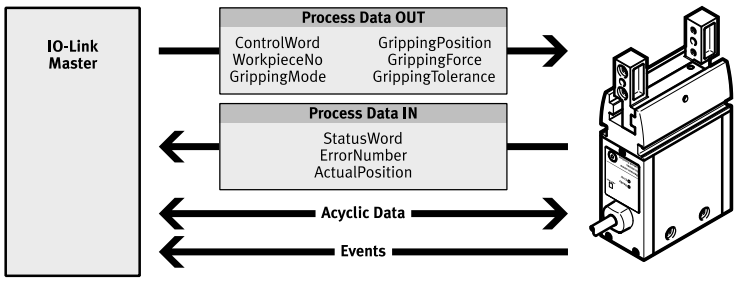


Fig. 5: Data exchange

Handshake

Data must be transferred between controller and gripper using the Handshake protocol. The data receiver confirms data reception by setting a bit. Another command can be sent if the previous data transfer has been completed

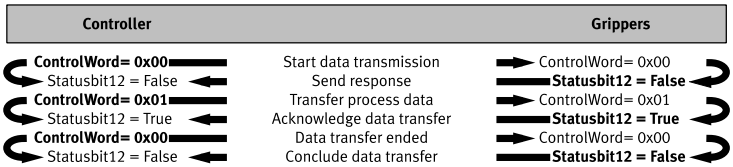


Fig. 6: Handshake

9.2 General specification

Characteristics	Specification
Protocol	IO-Link
Protocol version	Device V 1.1

Characteristics		Specification
Device profile		Firmware update[1]
Communication mode		COM3 (230.4 kbaud)
SIO mode support		no
Port class		Device B
Number of ports		Device 1
Process data width OUT	[Byte]	8
Process data content OUT	[Bit]	16 'ControlWord' 8 'GrippingMode' 8 'WorkpieceNo' 16 'GrippingPosition' 8 'GrippingForce' 8 'GrippingTolerance'
Process data width IN	[Byte]	6
Process data content IN	[Bit]	16 'StatusWord' 16 'ErrorNumber' 16 'ActualPosition'
Service data contents IN	[Byte]	32 'ApplicationSpecificTag'
	[Bit]	16 'StatusWord'[2] 16 'ErrorNumber'[2] 32 'CycleCounter' 16 'Temperature' 16 'ControlWord'[2]
	[Byte]	64 'ErrorMessage'
	[Bit]	16 'ErrorCount' 16 'ActualPosition'[2] 16 'GrippingPosition'[3] 8 'WorkpieceNo'[3] 8 'GrippingMode'[3] 8 'GrippingTolerance'[3] 8 'GrippingForce'[3] 40 'WorkpieceSet'
Min. cycle time	[ms]	5
Data memory required	[Kbyte]	< 0.5

1) The IO-Link firmware update is supported from firmware revision 1.2.0.
2) Copy of the process data
3) Currently used data

Tab. 4: General specification

9.3 Communication functions

Characteristics	Specification
Preoperate	M-sequence type _1_V, (8 Byte On-request Data)
Operate	M-sequence type _2_V, (8 Byte OUT; 6 Byte IN; 2 Byte On-request Data)
ISDU	supported
Data Storage	supported
Block Parameterization	supported

Tab. 5: Communication functions

9.4 Identification parameters

EHPS-...-A-LK	-16	-20	-25
Device ID [dec]	49	50	51
Device ID [hex]	0x000031	0x000032	0x000033
Vendor ID [dec]	333		
Vendor ID [hex]	0x014D		

Tab. 6: Identification parameters

9.5 Service parameters

Index	Subindex	Name	Value (example)	Length [byte]	Format
0x0010	0	'Vendor Name'	Festo	64	String
0x0011	0	'Vendor Text'	➔ www.festo.com	64	String
0x0012	0	'Product Name'	EHPS-16-A-LK EHPS-20-A-LK EHPS-25-A-LK	64	String
0x0013	0	'Product ID'	8103809 8103810 8103811	64	String
0x0014	0	'Product Text'	parallel gripper	64	String
0x0015	0	'Serial Number'	KNP00002	16	String
0x0016	0	'Hardware Revision'	REV01	64	String
0x0017	0	'Firmware Revision'	V1.0.0	64	String

Tab. 7: Service parameters

9.6 Default parameters and commands

Index	Subindex	Name	Description	Value (example)	Length [byte]	Format
0x0020	0	'ErrorCount'	Counter of error messages ➔ 9.13 Fault clearance IO-Link	123456	2	UIntegerT16

Tab. 8: Default parameters and commands

9.7 Process Data OUT

The gripper can only be controlled with the cyclically transmitted process data. A maximum of 1 bit only may be set in the 'ControlWord'.

Bit	63	62	61	60	59	58	57	56
Process data	'ControlWord'							
Data content	'ResetError'	–	–	–	–	–	'Close'	'Open'
Decimal	32768	–	–	–	–	–	512	256
Index	0x0029							
Data type	UIntegerT16							

Tab. 9: Process data OUT

Bit	55	54	53	52	51	50	49	48
Process data	'ControlWord'							
Data content	'FindNewEndPositions'	–	–	–	'TeachGrippingPosition'	'ResetDirectionFlag'	'Store'	'LatchData'
Decimal	128	–	–	–	8	4	2	1
Index	0x0029							
Data type	UIntegerT16							

Tab. 10: Process data OUT

Bit	47 ... 40	39 ... 32	31 ... 16	15 ... 8	7 ... 0
Meaning	MSB ... LSB	MSB ... LSB	MSB ... LSB	MSB ... LSB	MSB ... LSB
Process data	'GrippingMode'	'WorkpieceNo'	'GrippingPosition'	'GrippingForce'	'GrippingTolerance'
Index	0x0029				
Data type	UIntegerT8		UIntegerT16	UIntegerT8	

Tab. 11: Process data OUT

9.7.1 Use cases

'LatchData' (bit 48)
- 'WorkpieceNo = 0'
  With this command, the transferred process data are accepted as an active data set.
- 'WorkpieceNo > 0'
  This command accepts the data stored in the 'WorkpieceSet' as an active data set.

'Store' (bit 49)
- 'WorkpieceNo = 0'
  This command is not possible for the 'WorkpieceSet= 0' ➔ 'ErrorNumber': 776
- 'WorkpieceNo > 0'
  Specific data, e.g. 'GrippingMode', 'GrippingPosition', 'GrippingTolerance', 'GrippingForce' for different workpieces can be stored in the 'WorkpieceSet'. The data set accepted with 'LatchData'is transferred to the corresponding parameters during execution by 'Store'.

'ResetDirectionFlag' (bit 50)
The gripper stores the last travelled direction. After the 'Close' command, the 'Open' command must follow and vice versa. If, for example, it is necessary to move the jaws in the same direction when changing a workpiece, the direction flag 'DirectionOpenFlag' or 'DirectionCloseFlag' can be reset via the 'ResetDirectionFlag' command. Then a movement in the previous direction is possible again.

'TeachGrippingPosition' (bit 51)
- 'WorkpieceNo = 0'
  This command is not possible for the 'WorkpieceSet= 0'.
- 'WorkpieceNo > 0'
  The stored parameter'GrippingPosition' in the 'WorkpieceSet' can be written by this command. The 'ActualPosition' value on execution of 'TeachGrippingPosition' is transferred to the 'GrippingPosition' parameter of the selected 'WorkpieceSet'.
  Reaching of this gripping position can be checked in the 'StatusWord' with the 'GrippedPositionFlag' marker.

‘FindNewEndPositions’ (bit 55)
If required (for example in the case of reduced installation space), the end positions can be redefined with this command so that the desired layers are returned with the ‘ClosedPositionFlag’ and ‘OpenedPositionFlag’ flags in the ‘StatusWord’. This command ‘FindNewEndPositions’ moves the gripper open-close and open again. From the open position, the gripper moves exclusively closed-open. The minimum and maximum values approached in this way are transferred to the internal memory as new end positions.
The positions are reset by executing the command again, whereby the gripper can again move its maximum stroke without a previous stop.

‘Open’ (bit 56)
With this command, the gripper moves the jaws to the outer position (opening).

‘Close’ (bit 57)
With this command, the gripper moves the jaws to the inner position (closing).

‘ResetError’ (bit 63)
With this command, safety-relevant errors can be acknowledged and the gripper can be switched back to operational status.

ⓘ

Individual errors cannot be reset by the user. The reset is performed automatically as soon as the specified operating conditions are met again.

9.8 Process Data IN

The gripper transmits data cyclically. This allows the gripping process to be monitored.

Bit	47	46	45	44	43	42	41	40
Process data	‘StatusWord’							
Data content	‘Error’	‘DirectionCloseFlag’	‘DirectionOpenFlag’	‘LatchDataOk’	‘UndefinedPositionFlag’	‘ClosedPositionFlag’	‘GrippedPositionFlag’	‘OpenedPositionFlag’
Value range	0 … 65535							
Index	0x0028							
Data type	UIntegerT16							

Tab. 12: Process data IN

Bit	39	38	37	36	35	34	33	32
Process data	‘StatusWord’							
Data content	–	‘Ready’	–	–	–	–	–	–
Value range	0 … 65535							
Index	0x0028							
Data type	UIntegerT16							

Tab. 13: Process data IN

Bit	31 … 16	15 … 0
Meaning	MSB … LSB	MSB … LSB
Process data	‘ErrorNumber’	‘ActualPosition’
Value range	0 … 65535	0 … max. jaw stroke – EHPS-16: 0 … 2150 – EHPS-20: 0 … 2750 – EHPS-25: 0 … 3350
Index	0x0028	
Data type	UIntegerT16	

Tab. 14: Process data IN

9.8.1 Description ‘StatusWord’

‘Ready’ (bit 38)
Active as soon as the gripper is raised. It can also be used to check a byte swap.

‘OpenedPositionFlag’ (bit 40)
Active when the open position is reached. In the case of a previous redefinition of the end position, the bit always becomes active when the gripper has reached this stored position or is further opened.

‘GrippedPositionFlag’ (bit 41)
Active, if the gripper is in the taught-in or predefined gripper position, taking into account the predefined tolerances.

‘ClosedPositionFlag’ (bit 42)
Active when the gripper has reached the closed position. In the case of a previous redefinition of the end position, the bit always becomes active when the gripper has reached this stored position or is further closed.

‘UndefinedPositionFlag’ (bit 43)
Active if the gripper is in an undefined position.

‘LatchDataOk’ (bit 44)
Active as soon as the transmitted data has been transferred from the gripper.

‘DirectionOpenFlag’ (bit 45)
This bit is a direction flag and becomes active if the last run command was from the ‘Open’ master.

‘DirectionCloseFlag’ (bit 46)
This bit is a direction flag and becomes active if the last run command was from the ‘Close’ master.

‘Error’ (bit 47)
Active if there is an error. The present errors can be viewed in the ‘ErrorNumber’ and ‘ErrorMessage’ parameters.

9.9 Device-specific parameters

Index	Subindex	Name	Description	Value (example)	Length [byte]	Format
0x0018	0	‘ApplicationSpecificTag’	Text to be defined by the user	***	32	StringT
0x0040	0	‘StatusWord’[1)]	➔ 9.8 Process Data IN			
0x0041	0	‘ErrorNumber’[1)]	➔ 9.8 Process Data IN			
0x0042	0	‘CycleCounter’	Counter for gripping cycles	0 … 4,294,967,295	4	UIntegerT32
0x0043	0	‘Temperature’	Gripper temperature in °C If the gripper temperature is < 0 °C, 0 is output.	0 … 65535	2	UIntegerT16
0x0044	0	‘ControlWord’[1)]	➔ 9.7 Process Data OUT			
0x0045	0	‘ErrorMessage’	Outputs an error description.		64	StringT
0x0100	0	‘ActualPosition’[1)]	➔ 9.8 Process Data IN			
0x0101	0	‘GrippingPosition’[2)]	Gripper position e.g. for checking the workpiece dimensions	0 … nominal stroke (+tolerance) – EHPS-16: 0 … 2150 – EHPS-20: 0 … 2750 – EHPS-25: 0 … 3350	2	UIntegerT16
0x0102	0	‘WorkpieceNo’[1)]	Workpiece number of a workpiece set	0 … 32	1	UIntegerT8
0x0103	0	‘GrippingMode’[2)]	Driving mode	– Invalid: 0 – Universal: 100 – External gripping: 60 – Internal gripping: 70	1	UIntegerT8
0x0104	0	‘GrippingTolerance’[2)]	Tolerance of the ‘GrippingPosition’	0 … 255	1	UIntegerT8
0x0105	0	‘GrippingForce’[2)]	– Invalid – Gripping force class 1: approx. 50% – Gripping force class 2: approx. 70% – Gripping force class 3: approx. 85% – Gripping force class 4: 100%	– 0 – 1 – 2 – 3 – 4	1	UIntegerT8
0x0800 - 0x081F	0	‘WorkpieceSet’	Workpiece sets with 4 parameters each		5	RecordT40
	1	‘GrippingMode’	Description see Index: 0x0103			
	2	‘GrippingForce’	Description see Index: 0x0105			

Index	Subindex	Name	Description	Value (example)	Length [byte]	Format
0x0800 - 0x081F	3	'GrippingPosition'	Description see Index: 0x0101			
	4	'GrippingTolerance'	Description see Index: 0x0104			

1) Copy of the process data
2) Currently used data

Tab. 15: Device-specific parameters

'GrippingPosition' parameter

The gripping position is the value that can either be entered manually in the workpiece or described with the 'TeachGrippingPosition' command. As soon as the position is reached within the 'GrippingTolerance', it is returned in the 'GrippedPositionFlag' with 'StatusWord'.

Since the different sizes have different strokes, the permissible values for the parameter depend on the size. The value range goes from 0 to the total stroke of the gripper in [mm x 100]. The value "0" is the open state and the maximum value is the closed state.

EHPS-...-A-LK		-16	-20	-25
Permissible value range for total stroke	[mm x 100]	0 ... 2150	0 ... 2750	0 ... 3350
Values in open state	[mm x 100]	0	0	0
Theoretical values in closed state	[mm x 100]	2000	2600	3200

Tab. 16: "GrippingPosition" parameter

'WorkpieceNo' parameter

The number to select a workpiece set.
- 0: current process data are used.
- 1-32: data from the corresponding 'WorkpieceSet' are used.

'GrippingMode' parameter

A movement mode can be set with this parameter.
3 modes are possible:
- Universal mode: 'universal'
- External gripping: 'external gripping'
- Internal gripping: 'internal gripping'

Gripping mode	Decimal value	Description
'universal'	100	Opening and closing movements are carried out with the force ('GrippingForce') set and thus at the same speed.
'internal gripping'	70	The opening movement takes place with the force set in 'GrippingForce' and the (resulting) speed. The closing movement takes place at maximum speed.
'external gripping'	60	The closing movement takes place with the force specified in 'GrippingForce' and the (resulting) speed. The opening movement takes place at maximum speed.
'Invalid'	0	–

Tab. 17: Gripping modes

'GrippingForce' parameter

The gripping force can be adjusted at 4 different force classes. Since the gripping force is built up dynamically via the speed, a change in the gripping force setting also results in a change in speed.

Force class	Decimal value	Force value
Invalid	0	–
Class 1	1	approx. 50%
Class 2	2	approx. 70%
Class 3	3	approx. 85%
Class 4	4	approx. 100%

Tab. 18: "GrippingForce" parameter

- The speed has an effect on the gripping force. The gripping force is not linearly adjustable.
- The gripping position and gripping force are not readjusted.
- The design of the gripper jaws has a major influence on the required gripping force.

'GrippingTolerance' parameter

This parameter can be used to set a tolerance for the gripper exclusively for the 'GrippingPosition' parameter. This functionality is helpful, for example, when checking the correct workpiece.

The entered value is effective in both directions of the 'GrippingPosition'. The total tolerance field width is therefore twice the tolerance value.

Parameter	Decimal value	Resolution	Detectable tolerance
'GrippingTolerance'	0 ... 255	0.01 mm	0 ... ±2.55 mm

Tab. 19: "GrippingTolerance" parameter

The following repetition accuracy can be achieved:

EHPS-...-A-LK		-16	-20	-25
Repetition accuracy	[mm]	± 0.02	± 0.02	± 0.02

Tab. 20: Repetition accuracy

The linearity of the displacement measuring system over the entire stroke is included:

EHPS-...-A-LK		-16	-20	-25
Linearity	[mm]	± 0.05	± 0.1	± 0.15

Tab. 21: Linearity

If a gripper is replaced, the taught-in positions of the workpieces that are stored in IO-Link Data Storage can be returned by the displacement encoder with the following accuracy (plus tolerance of the gripper fingers):

EHPS-...-A-LK		-16	-20	-25
External gripping interchangeability	[mm]	± 0.1	± 0.1	± 0.2
Internal gripping interchangeability	[mm]	± 0.5	± 0.5	± 0.7

Tab. 22: Interchangeability

'WorkpieceSet' parameter

Four parameters can be defined in the gripper for each of 32 different workpieces
- 'GrippingMode'
- 'GrippingForce'
- 'GrippingPosition'
- 'GrippingTolerance'

The 'WorkpieceSet' is described exclusively by the process data with the 'LatchData' and 'Store' commands. It is not necessary to specify a value for the 'GrippingPosition' parameter; this parameter can also be taught-in with 'TeachGrippingPosition'.

9.10 Commissioning

Byte-Swap

The correct data mapping can be recognised by the bit 'Ready' . The bit 'Ready' is the only one set after switching on.

9.11 Data Storage

The following data can be transferred in the Data Storage:
- 'ApplicationSpecificTag'
- Data from the 'WorkpieceSet':
  - 'GrippingMode'
  - 'GrippingForce'
  - 'GrippingPosition'
  - 'GrippingTolerance'

9.12 System Commands

The gripper can be operated without prior input of valid process data via the System Commands 160, 161 and 162.

The following parameters are stored via the System Commands for operation:
- 'GrippingForce': 1
- 'GrippingMode': Universal

Name	Description	Index	Value
[Restore Factory Settings]	Reset of all parameters to the factory values	0x0002	130
[Enable Gripper]	Activation of system commands for easy triggering of movement commands. A standard configuration is thus loaded into the parameters and the movement commands are released.	0x0002	160
[Close Gripper]	With previous release, this command can initiate a movement of the gripper jaws in the direction of "closing".	0x0002	161
[Open Gripper]	With previous release, this command can initiate a movement of the gripper jaws in the direction of "opening".	0x0002	162

Tab. 23: System Commands

9.13 Fault clearance IO-Link

'ErrorNumber' parameter

Diagnostic message Hex (Dec)	Device status	Error	Possible cause	Remedy	'Error-Count'[1]
0x0 (0)		'Status ok, device is ready'			No
0x100 (256)	Outside specification	'Power supply error'	– Actuator power supply not connected – Cable break – Actuator power supply not sufficient	Test the actuator supply voltage	Yes
0x101 (257)	Outside specification (drive can no longer be moved)	'Temperature too high'	– Ambient temperature too high – Gripper has overload	Ensure adequate pressurisation/cooling/connection	Yes
0x102 (258)	Outside specification (drive can no longer be moved)	'Temperature too low'	Ambient temperature too low	ensure sufficient operating temperature	Yes
0x010A (266)[3]	Outside specification	'Actuator undervoltage during movement'	– Actuator power supply unstable – Line resistance increased (faulty supply cable) – Power supply not sufficiently configured for peak loads, faulty supply cables	– Check gripping force, check power supply and peak load – Manual acknowledgement of error message necessary	No
0x300 (768)	Outside specification	'ControlWord not plausible'	incorrect value in 'ControlWord'	Check the value in the 'ControlWord'	No
0x301 (769)	Outside specification	'GrippingPosition not plausible'	incorrect value in parameter 'GrippingPosition'	Check the 'GrippingPosition' parameter	No
0x302 (770)	Outside specification	'GrippingForce not plausible'	incorrect value in parameter 'GrippingForce'	Check the 'GrippingForce' parameter	No
0x304 (772)	Outside specification	'GrippingTolerance not plausible'	incorrect value in parameter 'GrippingTolerance'	Check the 'GrippingTolerance' parameter	No
0x305 (773)[2]	Failure	'Reference position error'	Gripper does not have reference position	Service Festo SE & Co. KG	Yes
0x306 (774)	Outside specification	'GrippingMode not plausible'	incorrect value in parameter 'GrippingMode'	Check the 'GrippingMode' parameter	No
0x307 (775)	Motion task cannot be executed	'Drive command cannot be executed'	Multiple travel commands in the same direction	Reset 'ResetDirectionFlag' direction flag or send motion command in the other direction	No
0x308 (776)	Outside specification	'WorkpieceNo not plausible'	incorrect value in parameter 'WorkpieceNo'	Check the 'WorkpieceNo' parameter	No
0x309 (777)	Outside specification	'GrippingPosition not latched'	Process data sent by the master have been changed	Transfer of the changed parameters by 'LatchData.'	No
0x30D (781)	Outside specification	'GrippingForce not latched'	Process data sent by the master have been changed	Transfer of the changed parameters by 'LatchData.'	No
0x30F (783)	Outside specification	'GrippingTolerance not latched'	Process data sent by the master have been changed	Transfer of the changed parameters by 'LatchData.'	No
0x310 (784)	Outside specification	'GrippingMode not latched'	Process data sent by the master have been changed	Transfer of the changed parameters by 'LatchData.'	No
0x311 (785)	Outside specification	'WorkpieceNo not latched'	Process data sent by the master have been changed	Transfer of the changed parameters by 'LatchData.'	No
0x312 (786)	Outside specification	'Initial handshake missing'	After a cold start, a single data migration by 'LatchData'('ControlWord' = 1) is required.	Transfer of the changed parameters by 'LatchData.'	No
0x400 (1024)[3]	Failure	'Gripper blocked'	– Gripper is difficult to move – The travel path of the gripper is impaired	– Restore free movement of the gripper – Service Festo SE & Co. KG	Yes
0x406 (1030)	Failure	'System error / internal error'	Internal system error	Service Festo SE & Co. KG	Yes

1) Incrementing the "ErrorCount" parameter for these messages
2) Homing not required
3) Acknowledge error with "ResetError"

Tab. 24: "ErrorNumber" parameter

10 Maintenance

10.1 Safety

⚠ WARNING

Danger of crushing due to unexpectedly fast-moving loads and unintentional movements.

- Remove the payload.
- Switch off power to the product.
- Safeguard the power supply from being switched on again unintentionally.

10.2 Lubrication

Interval	Maintenance work
After 5 million switching cycles	Grease the guide of the gripper jaws. Permissible lubricating grease ➔ www.festo.com/spareparts.

Tab. 25

ⓘ

Cut the lubrication interval by half if one of the following applies:

- High thermal stress
- Heavy contamination
- Proximity of grease-dissolving liquids or vapours

11 Malfunctions

11.1 Diagnostics

LED 'Error'	LED 'Ready'	Meaning
off	off	– IO-Link supply voltage is not connected ➔ IO-Link communication not active.
off	green light	Actuator ready for operation (Fallback, SIO Mode) – IO-Link supply voltage: connected – IO-Link communication: not active – Actuator supply voltage: connected
flashing red	green light	– IO-Link supply voltage: connected – IO-Link communication: not active – Actuator supply voltage: not connected
flashing red	flashing green	– IO-Link supply voltage: connected – IO-Link communication: active – Actuator supply voltage: not connected
red light	flashing green	– IO-Link supply voltage: connected – IO-Link communication: active – Actuator supply voltage: connected – 'ErrorNumber' and 'ErrorCode' is output
off	flashing green	– IO-Link supply voltage: connected – IO-Link communication: active – Actuator supply voltage: connected

Tab. 26: LED indicator

11.2 Fault clearance

⚠ WARNING

Danger of crushing due to unexpectedly fast-moving loads and unintentional movements.

- Remove the payload.
- Switch off power to the product.
- Safeguard the power supply from being switched on again unintentionally.

⚠ WARNING

Danger of crushing.

The gripper fingers could move unintentionally and crush body parts.

- Do not reach into the movement range.

Malfunction	Cause	Remedy
Gripper does not hold the payload securely.	Gripping point of gripper fingers is too far outwards.	Move gripping point inwards.
	Sufficient force cannot be applied.	Increase travel path. Minimum travel ➔ 12.1 Technical data, general.
	Payload is too heavy.	Select a larger gripper.
Gripper fingers do not move uniformly.	Slots are dirty.	Clean and grease the slots.
	Gripper jaws are distorted.	Rectify distortion.
Gripper fingers do not open/close.	Jamming due to excessive speed of the gripper fingers.	Resolve jamming ➔ Procedure instructions.
	Interruption of communication between gripper and control unit.	Check connecting cable.
	Gripper is faulty.	Replace gripper.
Squeaking noises	Lack of lubrication	Lubricate gripper ➔ 10.2 Lubrication.
	Payload is too great.	Observe permissible values ➔ 12.1 Technical data, general.

Tab. 27: Fault clearance

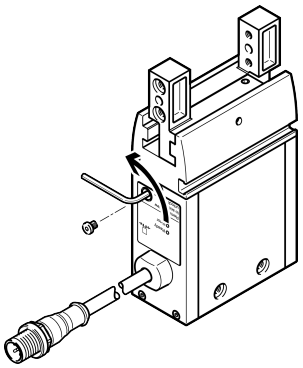


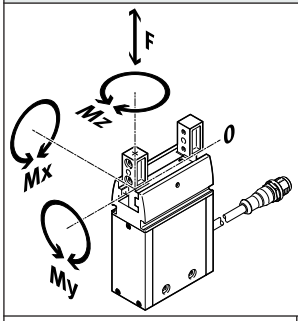
Fig. 7: Release jammed gripper jaws

1. Remove the plug screw.
2. Rotate the worm shaft underneath with the hex wrench until the jam is released:
   - anticlockwise (external gripping)
   - clockwise (internal gripping)
3. Retighten plug screw. Observe the tightening torque.

EHPS-...-A-LK		-16	-20	-25
Hex wrench		⌀ 1.5	⌀ 1.5	⌀ 2
Tightening torque	[Nm]	0.6 ± 20%	0.6 ± 20%	2.8 ± 20%

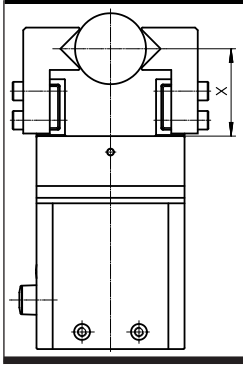
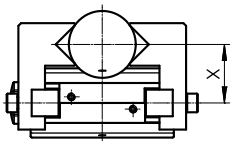
12 Technical data

12.1 Technical data, general

EHPS-...-A-LK		-16	-20	-25
Design		Electric parallel gripper		
Mounting position		Any		
Minimum travel per jaw for max. gripping force	[mm]	0.5		
Mass moment of inertia	[kg/cm²]	0.78	2.02	5.24
Max. mass per gripper finger	[g]	100	150	230
Max. permissible length of gripper finger	[mm]	80	100	120
Max. repetition accuracy	[mm]	0.03	0.01	0.01
Max. interchangeability	[mm]	0.02		
Nominal operating voltage DC	[V DC]	Sensor IO-Link: 18 ... 30 Actuator: 24 ± 10%		
Max. current consumption	[A]	1	2	
Max. cable length including gripper cable	[m]	20		
Min. wire cross section	[mm²]	0.34		
Degree of protection		IP40		
Relative humidity	[%]	0 ... 95 (at 25 C non-condensing)		
Ambient temperature	[°C]	+5 ... +60		
Max. housing temperature	[°C]	Ambient temperature + 35 K		
Storage temperature	[°C]	–20 ... +60		
EMC information		Only when using the Festo connecting cable		
Max. force (static) and max. torque (static)				
				
F_z	[N]	200	325	450
M_x	[Nm]	7	13	28
M_y	[Nm]	4.4	8	16
M_z	[Nm]	7	13	28

Tab. 28: Technical data

12.2 Characteristic curves

Lever arm x	
Vertical	Horizontal
	

Tab. 29: Alignment of lever arm x

The forces refer exclusively to centric gripping of non-elastic components.

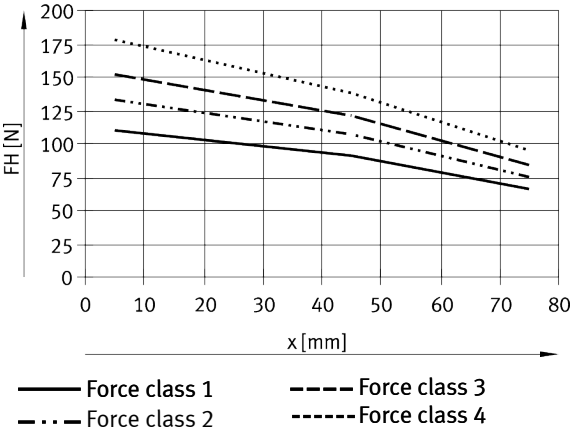


Fig. 8: EHPS-16 internal gripping, lever arm vertical

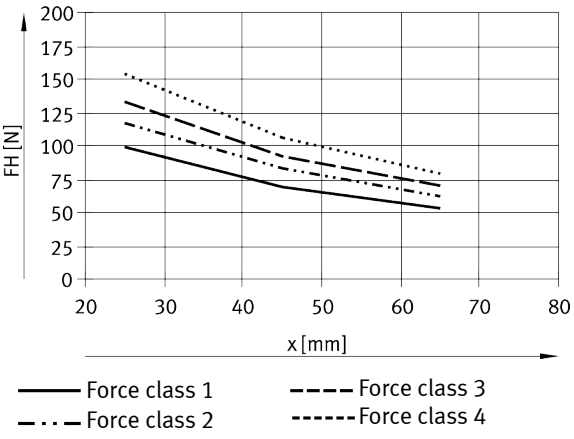


Fig. 9: EHPS-16 external gripping, lever arm horizontal

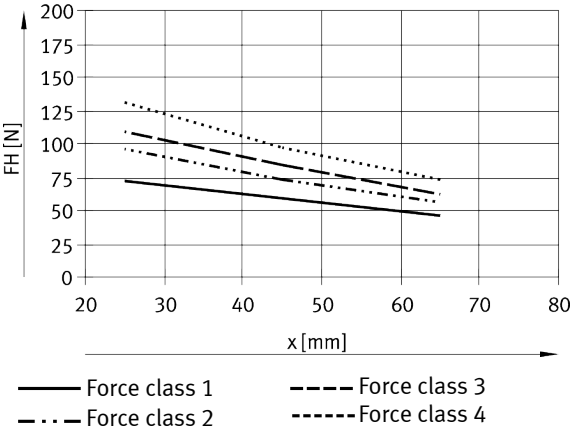


Fig. 10: EHPS-16 internal gripping, lever arm horizontal

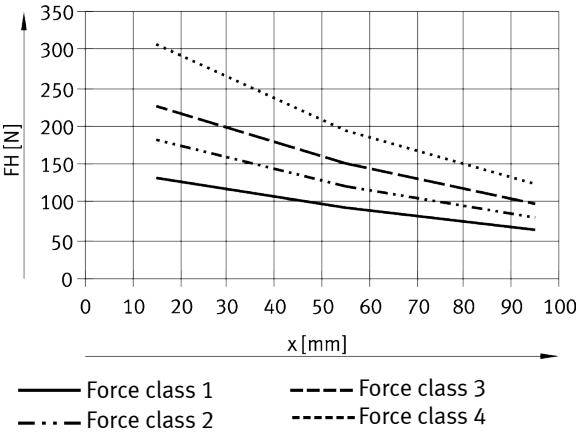


Fig. 11: EHPS-20 external gripping, lever arm vertical

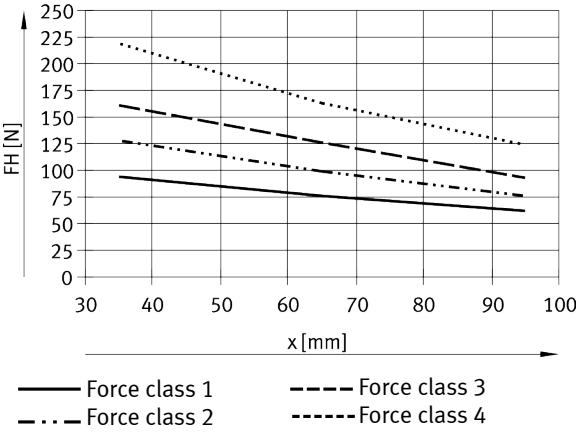


Fig. 12: EHPS-20 internal gripping, lever arm vertical

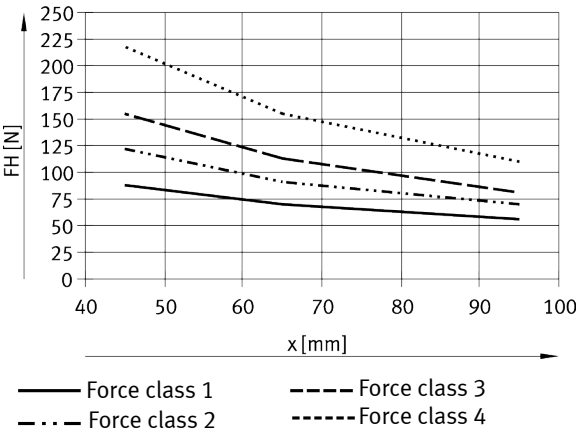


Fig. 13: EHPS-20 external gripping, lever arm horizontal

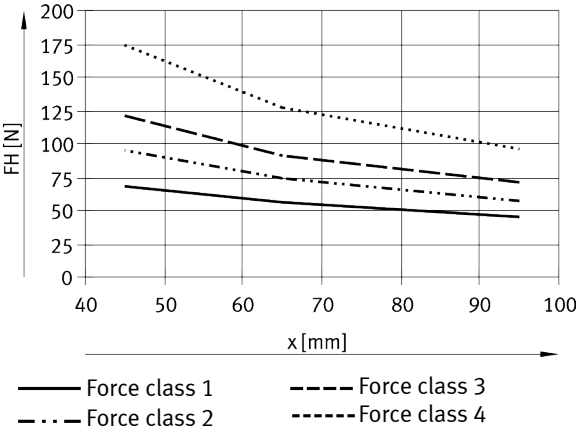


Fig. 14: EHPS-20 internal gripping, lever arm horizontal

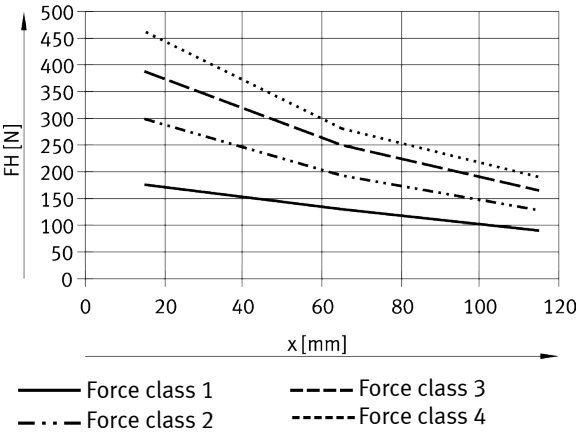


Fig. 15: EHPS-25 external gripping, lever arm vertical

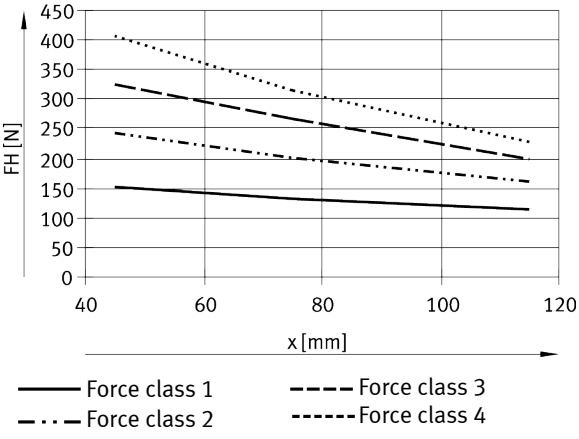


Fig. 16: EHPS-25 internal gripping, lever arm vertical

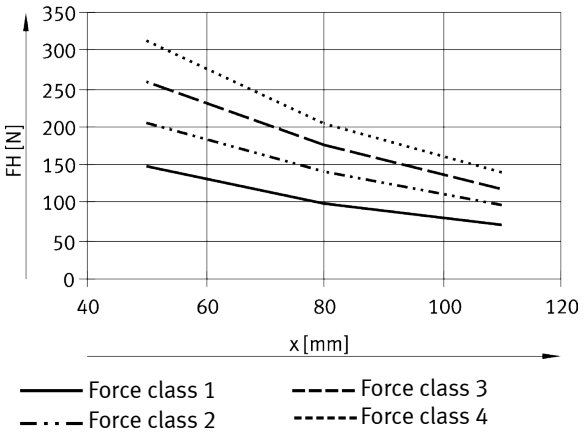


Fig. 17: EHPS-25 external gripping, lever arm horizontal

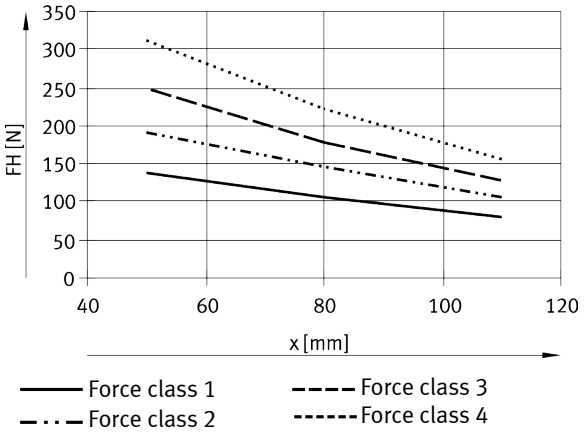


Fig. 18: EHPS-25 internal gripping, lever arm horizontal