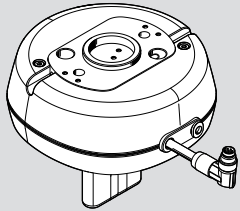



HPPH-...-N/-P-R12/-SR12
Parallel gripper



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Operating instruction
 8238130
 2025-05a
 [8238132]


 8238130

Original instructions

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IO-Link is a registered trademark of its respective trademark holder in certain countries.

1 **Applicable documents**

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

2 **Safety**

2.1 **Safety instructions**

- Only use the product in its original condition without unauthorised modifications.
- Observe the identifications on the product.
- Take into account the ambient conditions at the location of use.
- Store the product in a cool, dry environment protected from UV and corrosion. Keep storage times short.
- Before working on the product, switch off the compressed air supply and lock it to prevent it from being switched on again.
- Before working on the product: Switch off the power supply, ensure that it is off and secure it against being switched on again.
- HRC operation is only guaranteed with safe limitation of the compressed air supply to 0.25 ... 0.5 MPa (2.5 ... 5 bar; 36.25 ... 72.5 psi). The suitability for HRC operation must be verified by the commissioning engineer.
- Observe the recommended workpiece weight for HRC operation.

2.2 **Intended use**

The parallel gripper grips and holds payloads. The parallel gripper has pre-mounted gripper fingers and can be used in handling applications or in the human-robot collaboration (HRC operation).

2.3 **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 electropneumatic (open-loop) control technology.

3 **Additional information**

- Contact the regional Festo contact if you have technical problems → www.festo.com.
- Accessories and spare parts → www.festo.com/catalogue.

4 **Product overview**

4.1 **Product design**

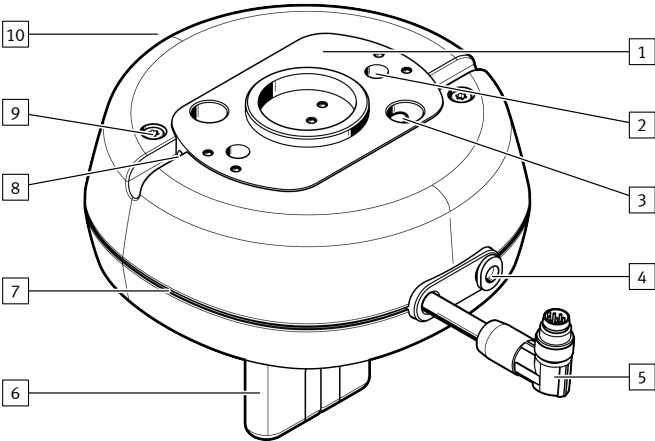




Fig. 1: Product design

- | | |
|---|---|
| 1 Mechanical interface in accordance with ISO 9409-1-50-4-M6 | 6 Gripper finger, pre-mounted (2x) |
| 2 Cylindrical pin locating hole (2x) | 7 Cover (2x) |
| 3 Threaded bolt drilled hole (2x) | 8 Threaded hole for threaded pins (2x) |
| 4 Pneumatic port | 9 Retaining screw (6x) |
| 5 Electrical connection | 10 LED [status] |

4.2 **Display components**

| LED [status] | Meaning |
|--|---|
|  Blue light | The LED can be individually configured → 6.2 Installation, electrical, NPN mode or PNP mode functional logic. |
|  Off | |

Tab. 1: Display LED [Status], NPN mode, PNP mode

4.3 **Function**

The parallel gripper is a gripper-valve combination with sensors and gripper fingers combined in one product. The parallel gripper is suitable for use in handling applications and with its ISO interface is compatible with various cobots and robots.

Pressurising the system moves two pistons in the parallel gripper. This results in a double-acting function. The flow of force is transferred from the pistons to the gripper jaws by a lever mechanism and then to the gripper fingers. The gripper jaws are mechanically connected and move synchronously with each other. If the compressed air supply is interrupted, the gripping force is secured by a spring mechanism that guarantees a safe stop of the workpiece. The opening and closing of the gripper jaws (input 1) is controlled via the 8-pin M8x1 connection. The switching points are pre-programmed. The LED [status] can be controlled via input 2. Two switching points can be programmed on the integrated position transmitter SDAS-MHS by using a workpiece. The switching points are signalled via output 1 and output 2.

5 **Mounting**

5.1 **Mounting parallel gripper**

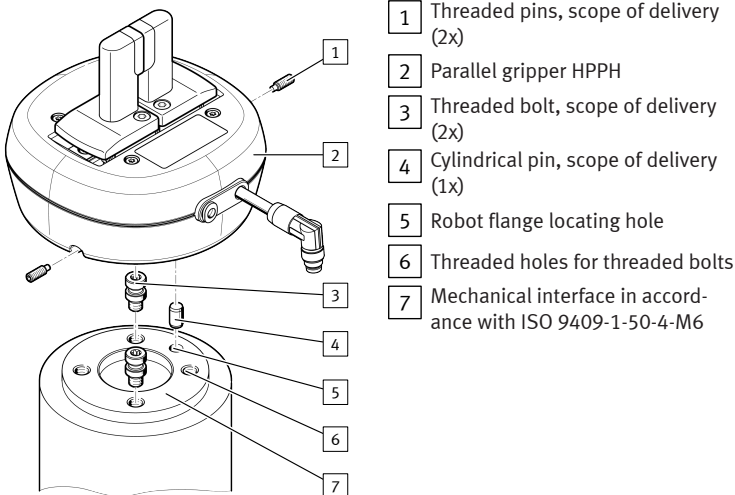


Fig. 2: Mounting parallel gripper

1. Screw the threaded pins into the threaded holes on the parallel gripper. Make sure that the threaded pins do not protrude into the drilled holes for the threaded bolt.
2. Insert the cylindrical pin into the locating hole on the mechanical interface.
3. Align the parallel gripper on the cylindrical pin and the mechanical interface. Determine the appropriate drilled holes for the 2 threaded bolts on the mechanical interface.
 - The parallel gripper can be aligned rotated 180° on the mechanical interface.
4. Tighten the threaded bolts into the threaded holes on the mechanical interface. Tightening torque: 10 Nm ± 20%
5. Position the parallel gripper on the mechanical interface with the cylindrical pin and the threaded bolts.
6. Tighten the threaded pins on the parallel gripper. Tightening torque: 3 Nm ± 20%

5.2 Preparing gripper fingers

1

The parallel gripper includes pre-mounted gripper fingers. The customer can replace the gripper fingers with customised gripping fingers.

- If gripper fingers manufactured by the customer are used, the TÜV SÜD certificate will be invalid.
- The customer can apply for a new certificate at an approved test centre.

Requirements for the customised gripper fingers:

- Observe the maximum permissible forces and maximum permissible torques at the gripper jaw.
- Observe the maximum length of the gripper fingers and the maximum weight per gripper finger.
- Manufacture gripper fingers that are suitable for the payload and gripper type.
- The gripper fingers must not touch the cover.

5.3 Mounting gripper fingers

Requirements:

- Do not apply force to the covers when mounting the gripper fingers.
- The parallel gripper is mounted on the mechanical interface or fastened with a suitable device.

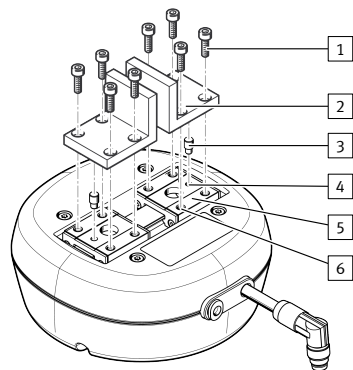


Fig. 3: Mounting gripper fingers

1. Position the customised gripper fingers and the optional centring pins on the locating holes of the gripper jaws.
2. Turn the screws clockwise to mount the gripper fingers.

HPPH-...-N/-P-R12/-SR12

| | |
|------------------------|------------|
| Thread | M4 |
| Thread depth [mm] | 4 |
| Tightening torque [Nm] | 1.5 ± 10 % |
| Locating hole [mm] | Ø 3 H9 |

6 Installation

6.1 Installation, pneumatic

1

Use only the following outside calibrated Festo tubing for installation: PAN, PEN, PLN, PUN. Observe the bending radius of the tubing.

- Connect the compressed air supply to the pneumatic port.

6.2 Installation, electrical

WARNING

Risk of injury due to electric shock.

- Use exclusively PELV circuits in accordance with IEC 60204-1/EN 60204-1 for the electrical power supply (Protective Extra-Low Voltage, PELV).
- Observe the general requirements of IEC 60204-1/EN 60204-1 for PELV circuits.
- Use exclusively voltage sources that guarantee reliable electrical isolation from mains power in accordance with IEC 60204-1/EN 60204-1.

Protect the power supply with a suitable fuse, maximum 0.5 A fast-blow.

M8x1 plug, 8-pin; A-coded

| Port | Pin | Function | Description |
|------|-----|----------|----------------------|
| | 1 | – | Not connected (n.c.) |
| | 2 | – | Not connected (n.c.) |
| | 3 | Output 2 | Gripper opened |
| | 4 | Output 1 | Gripper closed |
| | 5 | 24 V DC | Power supply |
| | 6 | Input 2 | LED [status] on/off |
| | 7 | Input 1 | Open/close gripper |
| | 8 | 0 V | – |

Tab. 2: Pin allocation, HPPH-...-N/-P-R12

M8x1 bushing, 8-pin, A-coded

| Port | Pin | Function | Description |
|------|-----|----------|----------------------|
| | 1 | – | Not connected (n.c.) |
| | 2 | – | Not connected (n.c.) |
| | 3 | Output 2 | Gripper opened |
| | 4 | Output 1 | Gripper closed |
| | 5 | 24 V DC | Power supply |
| | 6 | Input 2 | LED [status] on/off |
| | 7 | Input 1 | Open/close gripper |
| | 8 | 0 V | – |

Tab. 3: Pin allocation, HPPH-...-N/-P-SR12

Functional logic

NPN mode, negative switching

| Input 1 | Input 2 | Logical status | Electrical signal |
|--------------------|-----------------|----------------|-------------------|
| The gripper opens | The LED is blue | 1 (true) | 0 V |
| The gripper closes | The LED is off | 0 (false) | 24 V DC |

Tab. 4: NPN mode functional logic, HPPH-...-N-R12/-SR12

PNP mode, positive switching

| Input 1 | Input 2 | Logical status | Electrical signal |
|--------------------|-----------------|----------------|-------------------|
| The gripper opens | The LED is blue | 1 (true) | 24 V DC |
| The gripper closes | The LED is off | 0 (false) | 0 V |

Tab. 5: PNP mode functional logic, HPPH-...-N-R12/-SR12

Connection of the connecting cable

- Connect the connecting cable to the interface.

7 Commissioning

WARNING

Risk of injury from falling loads.

Under unsuitable operating conditions, the gripper may lose its payload and as a result injure people.

- Observe the maximum permissible gripping force.
- Avoid slippery surfaces on the gripper fingers.
- Move loads only under supervision.

CAUTION

Danger of crushing at high operating pressure

The gripper fingers may move unintentionally and at high operating pressure crush body parts.

- Do not reach into the range of motion if the product is operated outside the specification for HRC operation.

- HRC operation is only guaranteed with safe limitation of the compressed air supply to 0.25 ... 0.5 MPa (2.5 ... 5 bar; 36.25 ... 72.5 psi). The suitability for HRC operation must be verified by the commissioning engineer.
- Observe the recommended workpiece weight for HRC operation.
- Ferromagnetic materials in the immediate vicinity of the parallel gripper may cause malfunctions of the position transmitter. Safety distance of the parallel gripper to ferromagnetic materials: > 5 mm

Commissioning procedure

1

The parallel gripper is delivered in the closed state (N/C).

1. Slowly pressurise the parallel gripper.
2. With one-way flow control valve: set opening time and closing time. Close the flow control screw completely and then open it one revolution.

3. Perform a test run without payload. Check the following:
- Tubing is correctly and securely connected to the pneumatic port.
 - The safe functioning of the position transmitter.
 - Stop noise of the piston: the piston stop must be soft, not audibly hard or metallic.

| Piston stop | Detection |
|---------------|--|
| Soft | The gripper speed is set correctly or can be increased: <ul style="list-style-type: none">– Use an upstream one-way flow control valve. Open the flow control screw slightly → the speed of the gripper increases. |
| Hard/metallic | The gripper speed is set too high. <ul style="list-style-type: none">– Use an upstream one-way flow control valve. Close the flow control screw slightly → the speed of the gripper is reduced. |

4. Perform a test run with payload.
- ↳ The parallel gripper must hold the payload securely.
5. After a successful test run:
- Remove the payload or lock it to prevent it from falling.
 - Exhaust the parallel gripper.

Option 1: set position transmitter, proximity switch operating mode

- Requirements:
- The gripper fingers are not in contact with the covers.
 - The parallel gripper is mounted on the mechanical interface or fastened with a suitable device.
 - The nominal operating voltage is applied.
 - The operating pressure is applied.

1

- The PCB and the position transmitter SDAS-MHS are live.
- Program the switching points without contact to the PCB.
 - Remove the cover only during the programming.
 - Never operate the parallel gripper unless the covers are mounted.

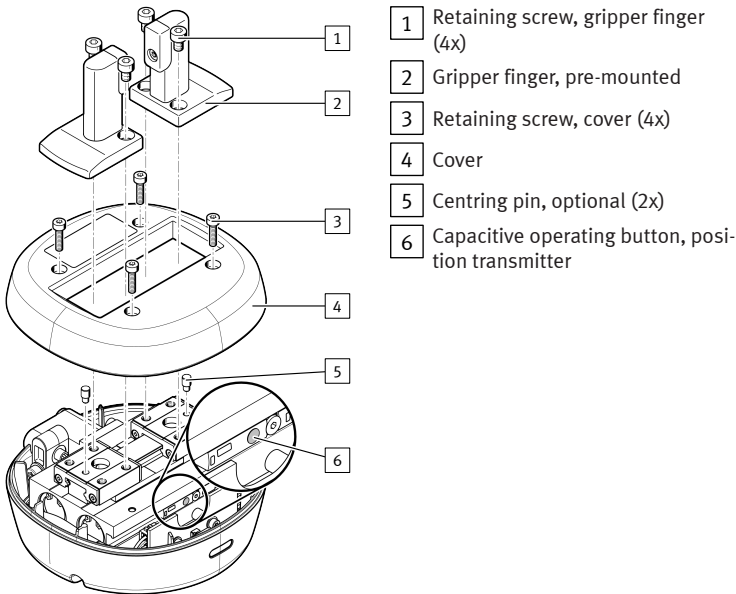


Fig. 4: Adjusting the position transmitter

1. Unscrew the retaining screws on the gripper fingers and remove the gripper fingers.
2. Unscrew the retaining screws on the cover and remove the cover.
3. Attach the gripper fingers to the gripper jaws and tighten the retaining screws. Tightening torque: 1.5 Nm ± 10%
4. Move the gripper fingers to the desired positions.
Setting the switching points → www.festo.com/sp, Operating instructions for the SDAS-MHS position transmitter.
5. Unscrew the retaining screws on the gripper fingers and remove the gripper fingers.
6. Place the cover on the parallel gripper and tighten the retaining screws. Tightening torque: 0.8 Nm ± 20%
7. Attach the gripper fingers to the gripper jaws and tighten the retaining screws. Tightening torque: 1.5 Nm ± 10%

Option 2: set position transmitter, position encoder operating mode

The switching points can also be programmed via IO-Link. This does not require removal of the cover. It is only necessary to change the pin allocation on pin 3 and pin 4 for plug or bushing.

Requirements:

- The parallel gripper is mounted on the mechanical interface or fastened with a suitable device.

| Pin | Function | Description |
|-----|----------|-----------------------|
| 1 | – | Not connected (n.c.) |
| 2 | – | Not connected (n.c.) |
| 3 | – | Not connected (n.c.) |
| 4 | IO-Link | IO-Link communication |
| 5 | 24 V DC | Power supply |
| 6 | Input 2 | LED [status] on/off |
| 7 | Input 1 | Open/close gripper |
| 8 | 0 V | – |

Tab. 6: Pin allocation, IO-Link

1. Connect the plug with the corresponding pin allocation to a IO-Link master.
2. Move the gripper fingers to the desired positions and program the switching points → www.festo.com/sp, Operating instructions for the SDAS-MHS position transmitter.
3. Change the plug back to the standard pin allocation.
↳ After programming via IO-Link and switching to the standard pin allocation, the position transmitter SDAS-MHS automatically switches back to the proximity switch operating mode, which uses digital input and output signals.

8 Cleaning

- Clean the product with a clean, soft cloth and non-abrasive cleaning agents.

9 Fault clearance

| Malfunction | Cause | Remedy |
|---|--|--|
| The parallel gripper does not hold the payload. | The payload is too heavy. | – Reduce the payload. |
| | The operating pressure is too low. | – Adjust the operating pressure. |
| | The gripping point is too far out. | – Move the gripping point inwards. |
| The parallel gripper does not open or close. | The control is faulty. | – Check the control at input 1. |
| | Compressed air not available. | – Check the pneumatic connection. |
| | The parallel gripper is defective. | – Replace the parallel gripper. |
| The switching points are not detected. | The switching points are incorrectly programmed. | – Reprogram the switching points. |
| | | – Contact Festo technical support. Send the parallel gripper to Festo. |
| | | – Replace the parallel gripper. |

Tab. 7: Fault clearance

10Technical data

10.1Technical data, general

| HPPH-...-N/-P-R12/-SR12 | | |
|---|----------|--|
| Certificates, declaration of conformity | | ➔ www.festo.com/sp |
| Certificate issuing authority | | TÜV SÜD |
| Design | | Double piston, guide, gripper finger, pinion, gear rack |
| Mode of operation | | Double-acting |
| Mounting position | | Any |
| Position sensing | | With displacement encoder, integrated |
| Ambient temperature | [°C] | -5 ... +50 |
| Degree of protection | | IP40 |
| Mass moment of inertia | [kg cm2] | 0.6 |
| Forces | | |
| Recommended workpiece weight for HRC | [kg] | 1 |
| Theoretical spring force per gripper jaw, closing | [N] | 23.3 ... 34.9 |
| Total gripping force at 0.6 MPa (6 bar; 87 psi) | [N] | 278 ... 302 |
| Gripping force per gripper jaw at 0.6 MPa (6 bar; 87 psi) | [N] | 139 ... 151 |
| HRC total gripping force, closing | [N] | 232 ... 256 |
| HRC gripping force per gripper jaw, closing | [N] | 116 ... 128 |
| Gripping force protection | | Closing |

Tab. 8: Technical data, general

10.2Technical data, pneumatic

| HPPH-...-N/-P-R12/-SR12 | | |
|-------------------------------------|-------|---|
| Operating medium | | Compressed air to ISO 8573-1:2010 [7:4:4] |
| Information on the operating medium | | Lubricated operation possible, in which case lubricated operation will always be required |
| Pneumatic port | [mm] | Plug connection, outside diameter 4 |
| Operating pressure | [MPa] | 0.25 ... 0.7 |
| | [bar] | 2.5 ... 7 |
| | [psi] | 36.25 ... 101.5 |
| HRC operating pressure | [MPa] | 0.25 ... 0.5 |
| | [bar] | 2.5 ... 5 |
| | [psi] | 36.25 ... 72.5 |

Tab. 9: Technical data, pneumatic

10.3Technical data, electrical

| HPPH-...-N/-P-R12/-SR12 | | |
|--|--------|---|
| Switching status indication | | LED blue, via signal input |
| Nominal operating voltage, general | [V DC] | 24 ± 10% |
| Max. current consumption | [A] | 0.1 |
| Electrical connection, connection technology | | M8x1, A-coded in accordance with EN 61076-2-104 |
| Electrical connection, number of poles/wires | | 8 |
| Electrical connection, cable outlet | | Angled |
| Switching input | | NPN/PNP |
| Switching output | | PNP |
| Bending radius, fixed cable installation | [mm] | > 26 |
| Bending radius, flexible cable installation | [mm] | > 52 |
| Input 1 | | |
| Nominal operating voltage | [V DC] | 24 ± 10% |
| Input current | [mA] | 45 |
| Input 2 | | |
| Nominal operating voltage | [V DC] | 24 ± 10% |
| Input current | [mA] | 5 |
| Output 1, output 2 | | |
| Max. output current | [mA] | 50 |
| No-load current | [mA] | < 12 |

Tab. 10: Technical data, electrical