

Operating instructions Festo SE & Co. KG
Postfach
D-73726 Esslingen
Phone:
+49/711/347-0

Original: de 741 013
0809b

Warning

Fitting and commissioning to be carried out only by qualified personnel in accordance with the operating instructions. These products are designed to be operated with compressed air only. They are not suitable for use with other media (liquids or gases).

Commissioning and operation
Use a protective screen to ensure that:
– nobody can place his/her hand between the gripper fingers
– there are no objects within the positioning range of the gripper fingers (e.g. by means of a protective screen).

Exhausting:
Make sure that the gripper is not holding a load. In this way you can prevent a work load from falling down suddenly.

When dismantling the piston cap:
High spring forces cause the piston cap on the HGDT-...-G... to fly outwards (Fig. 2, right). Please ensure that the piston cap is pretensioned to 1300 N.

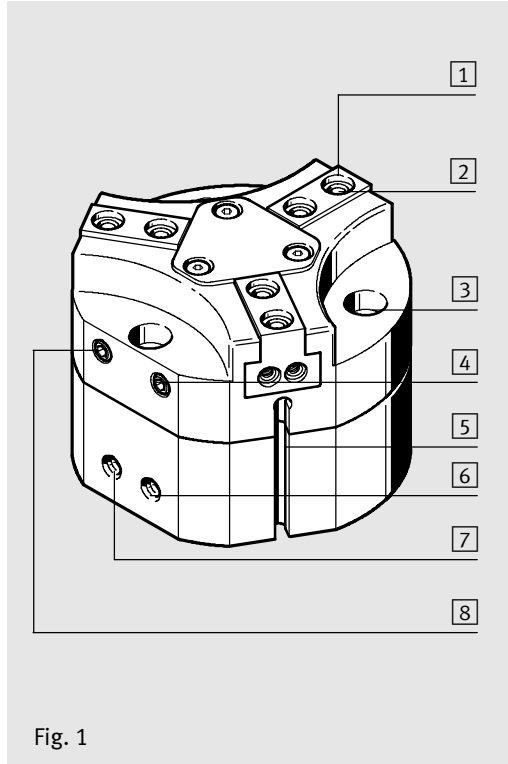


Fig. 1

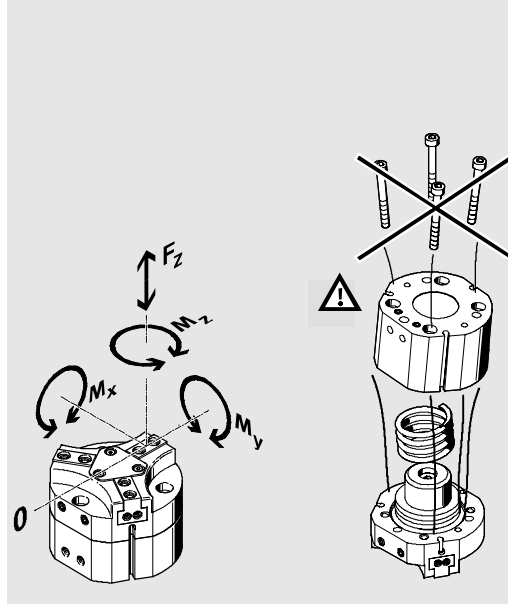


Fig. 2

Three-point gripper, sturdy en type HGDT-...

1 Function and application

When the compressed air connections [6] and [7] are pressurized alternately, an internal piston is moved backwards and forwards. A mechanical device converts the longitudinal movement of the piston into a horizontal movement. This is transferred to the gripper jaws [1], to which gripper fingers are attached. The opening and closing action of the gripper fingers enables them to grasp loads by their outer or inner contour (double-acting). In conjunction with the integrated reset spring, the HGDT-...-G... can also be operated in single-acting mode and for locking the gripping force. The following gripper types have a reset spring: When the gripper is exhausted, this spring returns the gripper jaws and pistons to their initial positions:
– gripper fingers opened: with HGDT-...-G1
– gripper fingers closed: with HGDT-...-G2
The sturdy three-point gripper type HGPL-... is intended for use in gripping and holding work loads.

2 Conditions of use

- Compare the maximum values specified in these operating instructions with your actual application (e.g. pressures, forces, torques, temperatures, masses, speeds). The product can only be operated in compliance with the relevant safety regulations if the maximum loading limits are observed.
- Please ensure that there is a supply of correctly prepared compressed air.
- Observe the regulations applicable at your location. Comply also with national and local laws and institutions.
- Remove the packaging. It is intended that the packaging be recycled on the basis of its constituent materials (exception: oiled paper = other waste).
- Please observe the prevailing ambient conditions.
- Slowly pressurize the complete system. In order to do this use switch-on valve type HEL-...
- Please observe the warnings and instructions:
 - on the product and
 - in these operating instructions.
- Use the product in its original state. Unauthorised modification is not permitted.

3 Transport and storage

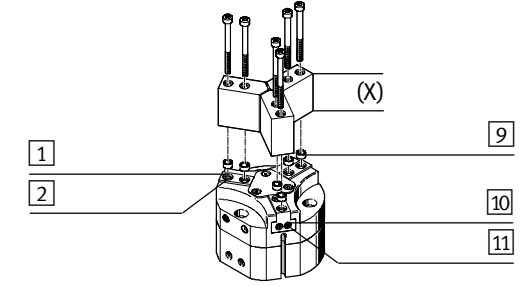
- Take the weight of the HGDT-... into consideration. It weighs up to 2.5 kg.

4 Mechanical installation

Fitting the gripper fingers:
• If possible, use short lightweight gripper fingers.
• Please observe the following maximum permitted values (see the chapter "Technical specifications" for more information):
– Force Fz
– Torques Mx, My and Mz (see Fig. 2, left)
– Gripper finger length (X).

HGDT-...		25	35	40	50	63
Fitting hole Ø [H7]	[1] [11]	5 mm	5 mm	7 mm	9 mm	9 mm
Fitting hole Ø [H7]		–	5 mm	5 mm	7 mm	7 mm
Thread	[2] [10]	M3	M3	M4	M6	M6
Thread		M2	M3	M3	M5	M5
Max. perm. tightening torque [Nm]	[2] [10]	1.2	1.2	2.9	9.9	9.9
		0.6	1.2	1.2	5.9	5.9

- Press a centring sleeve [9] into the fitting hole of the gripper finger.



- Position the gripper fingers with the centering sleeves [9] on the gripper jaws.

Please note

Excessive tightening torques during fitting will damage the gripper mechanism.
• Make sure that the maximum permitted tightening torques are not exceeded.

- Insert two fastening screws into each of the threaded holes of the gripper jaws (see above table).

If proximity sensors are used:

- Please check the following points:
 - the limited fastening possibility of the gripper (e.g. by providing projecting proximity sensors)
 - slide proximity sensors into separate slots [5] (when sensing both piston end positions)
 - the direction of the cable exit of the proximity sensors
 - interference caused by ferritic parts
 - sufficient space for the connection elements.
- Please observe the contents of the accessories section when using proximity sensors for end-position sensing.

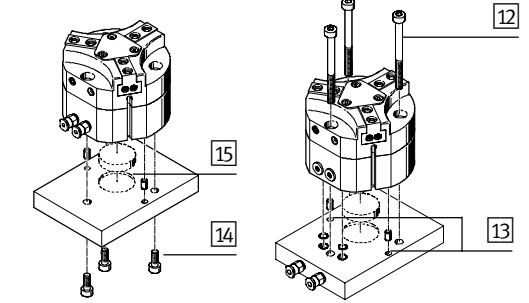
Fitting the enclosed lubricating nipple:

- Screw the lubricating nipple into the threaded hole [4] (alternatively, [8]).
The tightening torque is: 1.5 Nm

- Position the HGDT-... as near as possible to the compressed air supply (short tubing). This will result in shorter pressurization times.

The following methods can be used to fasten the grippers:

- Fitting on the base surface from above or below (first insert the proximity sensors in slot [5]) (Fig. 1).
 - Fastening user adapter plates type HAPG-... (observe enclosed installation instruction).
1. Push two centering pins / one centering washer into the fitting holes on the gripper.
 2. Position the gripper in the fitting holes [13] / [15] of the flange facing.
 3. Screw in three screws [12] / [14] for fastening.



Please refer to the following table for the variable values:

HGDT-...		25	35	40	50	63
Fitting hole ø [H8]	[13]	3 mm	3 mm	4 mm	5 mm	5 mm
Fitting hole ø [H8]	[15]	14 mm	25 mm	25 mm	25 mm	25 mm
Thread	[14] [12]	M4	M4	M6	M8	M8
Thread		(M3)	(M3)	(M5)	(M6)	(M6)
Max. perm. tightening torque [Nm]	[14] [12]	2.9	2.9	9.9	24	24
		(1.2)	(1.2)	(5.9)	(9.9)	(9.9)

Pneumatic fitting

Please note

- Ensure that there are no dust particles or objects in the connections and tubing of the HGDT-...

- Check whether the following are necessary:
 - pressure accumulator type VZS-...
 - return valve type HGL-...
 This will reduce pressure fluctuations. If there is a sudden drop in pressure, this will prevent the load from suddenly falling.

If the distance between compressed air connections is short (e.g. HGDT-25-...):

- Use only straight screw connectors from Festo (e.g. type QS-...).
- Other products may block the grippers' exhaust holes.
- Connect the tubing of the HGDT-... to the compressed air connections (see "Technical specifications").

	Gripper type: ↔ Extern. gripping	Gripper type: ↔ Intern. gripping
Connection [6] (Fig. 1)	Close	Open
Connection [7] (Fig. 1)	Open	Close
Connection [8] (Fig. 1)	Seal air (M5, optionally [4])	

If using long and heavy gripper fingers:

- Use a one-way flow control valve GRLZ-... or GRLA-... directly at the compressed air connections. These determine the closing time (and therefore the bearing loading) of the gripper fingers.

The fixed restrictor on the HGDT-... eliminates the need for an additional, external restrictor if short and light gripper fingers are used.

5 Commissioning

Warning

- Use a protective screen to make sure that:
 - nobody can place his/her hand between the gripper fingers
 - there are no foreign objects (e.g. by providing a protective screen).

Please note

- Please observe the permitted values for:
 - the maximum gripping force (depending on the holding force, the holding point, eccentricity and spring force; permitted values see catalogue specifications)
 - the max. permitted weight force of the gripper fingers as a function of the closing time (see "Technical specifications").

Setting the closing time for heavy and long gripper fingers:

- Screw in the restrictors of the series-connected GRLA-.../GRLZ-...
 - first completely,
 - then loosen again one turn.
- Start a test run using the specified sequence:

Test run	Tests
Without work load	– Check the correct assignment of the compressed air connections – Gripping speed – Function of the proximity switches
With load	– Check that the work load is gripped firmly

Piston stop: soft	Piston stop: metallic
–	Screw the flow control screw in one turn. The max. gripper speed has been reached.
Continue test run with points 2 and 3	Finish the test run

1. Listen to the knocking of the piston:
 2. Unscrew the flow control screws of the series-connected GRLA-.../GRLZ-... one turn.
 3. Repeat points 1 and 2 until the desired gripper speed has been reached.
- Finish the test run. The status must then be "Gripper exhausted".

- Observe the permitted gripper loads.
- Observe also the maximum permitted gripping force.

7 Care and maintenance

- Grease the HGDT-... at the lubricating nipple [4] / [8] after 5 million switching cycles. Permitted greases see "Accessories".
- If the HGDT-... is dirty, clean the exterior with a soft cloth. The permitted cleaning agent is: soap suds, max. +60 °C.

8 Dismantling and repairs

Warning

When the HGDT-...-G... is dismantled, high spring forces cause the bottom section of the housing to fly outwards (see Fig. 2, right).

- Please ensure that the piston cap is pretensioned to 1300 N.

- Exhaust the system and the device.
- Always send defective grippers back to Festo.

9 Accessories

Designation	Type
Grease	Molycotec BR 2 plus
Proximity sensor	SMT-10-...

10 Eliminating faults

Fault	Possible cause	Remedy
Gripper cannot hold load firmly	Mass too large	Select larger gripper
	Input pressure too low	Increase input pressure (up to max. permitted value)
Proximity switch does not show gripping status	Centre of pressure of gripper fingers too far outwards	Shift centre of pressure inwards
	Proximity switch incorrectly adjusted	Check position and calibration of proximity switch
Gripper does not open/close	Cable fracture	Replacing connecting cables / proximity sensors
	No compressed air	Check the compressed air connections
	Gripper defective	Return HGDT-... to Festo

11 Technical specifications

HGDT-...	25	35	40	50	63
Method of operation	Double-acting				
Operating medium	Filtered compressed air, lubricated or unlubricated				
Installation position	As desired				
Operating pressure	3 ... 8 bar 4 ... 8 bar (with HGDT-...-G...) 0 ... 0.5 bar (seal air)				
Pneumatic connection (tightening torque [Nm])	M5 5.9	M5 5.9	M5 5.9	G½ 7	G½ 7
Max. gripper finger length (X) [mm] *	35	50	70	100	110
Ambient temperature	+5... +60 °C				
Max. force Fz (stat.) [kN]	0.35	0.4	0.8	1.5	2.5
Max. torque M (stat.)					
Mx [Nm]	7	15	30	50	80
My [Nm]	10	10	20	30	50
Mz [Nm]	5	10	25	40	60
Max. gripper finger weight force [N]:					
– Unrestricted	0.1	0.3	0.7	1.6	2.5
– Closing time 0.2 s	1.25	0.7	2.0	2.2	3.0
– Closing time 0.3 s	–	1.6	4.7	5.0	6.7
Approx. mass moment of inertia (gripper only) [10 ⁻⁴ kgm ²]	0.5	1.37	5.59	15.33	42.44
Closing time *) (w/o load) [ms]	25	45	59	75	142
Max. permitted operating frequency ***)	< 4 Hz (240/min)				
Repetition accuracy	< 0.03 mm				
Max. replacem. accuracy	< 0.2 mm				
Materials	Housing: Coated aluminium Guide, jaws: Hardened steel Seals: NBR Piston: Aluminium Cover: High-alloy steel, stainless				
Weight (approx.**) [kg]	0.2	0.3 ... 0.4	0.7 ... 0.9	1.1 ... 1.6	1.9 ... 2.5

*) HGDT-... at 6 bar
**) Depending on version, without proximity sensors
***) A high operating frequency reduces the service life