Radial grippers HGRC

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New

Radial grippers HGRC

Key features

At a glance

General information

The compact and cost-optimised radial gripper consists of a two-part mirror-symmetrical housing made of die-cast zinc. The force generated by the linear motion of the piston is translated into the gripper jaw movement via a pneumatic piston, which acts directly on the gripper jaws

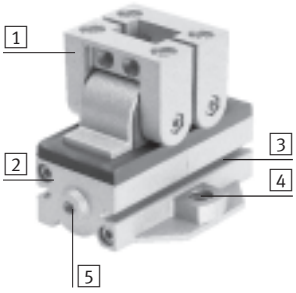
installed in the housing by means of a moment compensator in accordance with the rack and pinion principle. To ensure a low-backlash plain-bearing guide for the gripper jaws, appropriate guide elements are fitted in the housing and pretensioned by means of socket head screws.

- Double-acting gripper
- Internal fixed flow control, does away with the need for external flow control in 90% of applications
- High force with minimal volume
- Suitable for external and internal gripping
- Opening angle of 180°
- Repetition accuracy of 0.05 mm
- Slot for proximity sensor SME/SMT-10
- Wide range of options for mounting on drives

Note

Sizing software for gripper selection
➔ www.festo.com

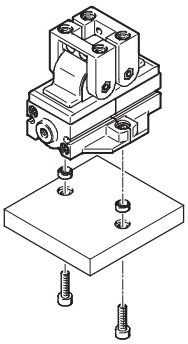
Details



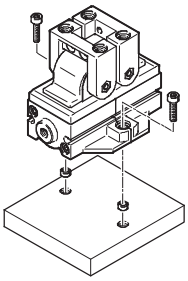
1 Gripper jaw
2 Housing based on half-shell principle
3 Slot for proximity sensor, for sensing the piston position
4 Mounting option
5 Supply port

Mounting option

from underneath

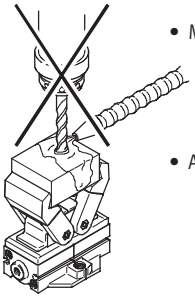


from above

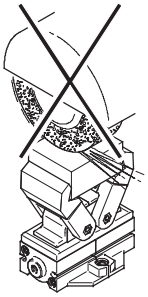


Note

Radial grippers are not designed for the following sample applications:

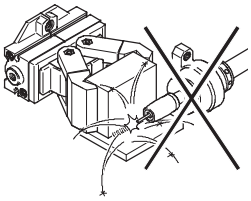


- Machining
- Aggressive media



- Grinding dust

- Welding spatter



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Peripherals overview and type codes

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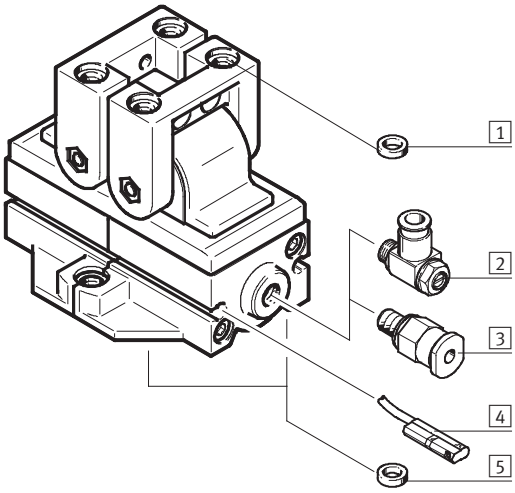
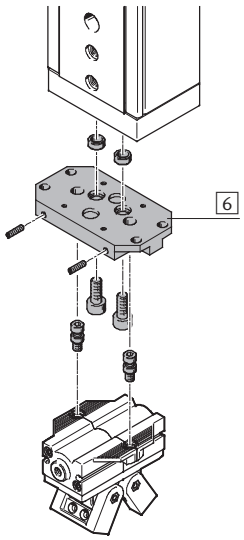
Peripherals overview



System product for handling and assembly technology



Accessories

	Type	Brief description	➔ Page/Internet
1	Centring sleeve ZBH	• For centring when attaching gripper fingers • 4 included in the scope of delivery of the gripper	10
2	One-way flow control valve GRLA	For regulating speed	grla
3	Push-in fitting QS	For connecting compressed air tubing with standard O.D.	quick star
4	Proximity sensor SME/SMT-10	For sensing the piston position	10
5	Centring sleeve ZBH	• For centring when attaching to a drive or plate • 2 included in the scope of delivery of the gripper	10
6	–	Drive/gripper connections	adapter kit

Type codes

HGRC	–	12	–	A

Type

HGRC	Radial gripper

Size

Position sensing

A	Via proximity sensor

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Technical data

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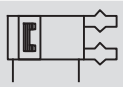
Function
Double-acting
HGRC-...-A



Size
12, 16, 20 mm

Opening angle
180°

General technical data				
Size		12	16	20
Design		Rack and pinion		
		Force-guided motion sequence		
Mode of operation		Double-acting		
Gripper function		Radial		
Number of gripper jaws		2		
Max. opening angle	[°]	180		
Pneumatic connection		M5		
Repetition accuracy[1]	[mm]	≤ 0.05		
Max. interchangeability	[mm]	≤ 0.2		
Max. gripper jaw backlash[2]	[mm]	≤ 0.1		
Max. gripper jaw angular backlash[3]	[°]	≤ 0.5		
Max. operating frequency	[Hz]	≤ 4		
Rotational symmetry	[mm]	≤ ∅ 0.2		
Position sensing		Via proximity sensor		
Type of mounting		Via female thread and centring sleeve		
Mounting position		Any		
Product weight	[g]	200	350	700

1) End-position drift under constant operating conditions with 100 consecutive strokes in the direction of movement of the gripper jaws
2) Perpendicular to the direction of motion of the gripper jaws
3) Pretensioned, backlash-free ball bearing guide

Operating and environmental conditions		
Operating pressure	[bar]	2 ... 8
Operating medium		Filtered compressed air, lubricated or unlubricated
Ambient temperature[1]	[°C]	+5 ... +60
Corrosion resistance class CRC[2]		2

1) Note operating range of proximity sensors
2) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

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Technical data

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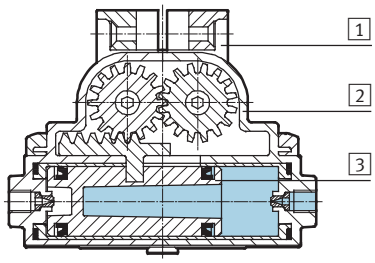
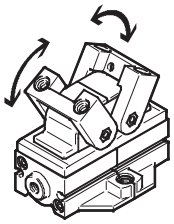
Materials

Sectional view



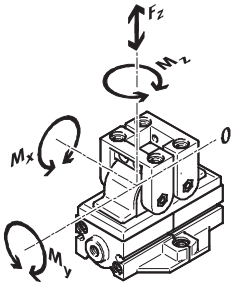
Radial gripper		
1	Gripper jaw	Die-cast zinc, painted
2	Housing	Die-cast zinc, painted
3	Piston	Polyamide
–	Seals	Polyurethane, nitrile rubber
–	Note on materials	Free of copper, PTFE and silicone
		RoHS-compliant

Total gripping torque at 6 bar



Size		12	16	20
Opening	[Ncm]	22	72	144
Closing	[Ncm]	22	72	144

Static characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. The indicated values include the lever arm, additional applied loads caused by the workpiece or external gripper fingers, as well as forces which occur during movement.

The zero co-ordinate line (gripper jaw guide) must be taken into consideration for the calculation of torques.

Size		12	16	20
Max. permissible force F_z	[N]	40	60	80
Max. permissible torque M_x	[Nm]	2.5	4	8
Max. permissible torque M_y	[Nm]	0.6	1	1.9
Max. permissible torque M_z	[Nm]	2	3.2	6.7

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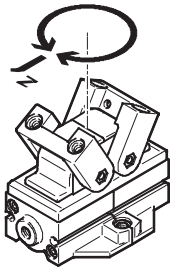
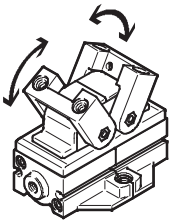
Mass moment of inertia



Mass moment of inertia [kgm^2x10^{-4}] of the radial gripper in relation to the central axis with no load.

Size		12	16	20
HGRC-...-A	[kgm^2x10^{-4}]	0.52	1.35	4.31

Opening and closing times [ms] at 6 bar



The indicated opening and closing times [ms] have been measured at room temperature and an operating pressure of 6 bar with vertically mounted gripper and without additional gripper fingers.

The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted accordingly.

Size		12	16	20
Without external gripper fingers				
HGRC-...-A	Opening	120	160	170
	Closing	100	150	160

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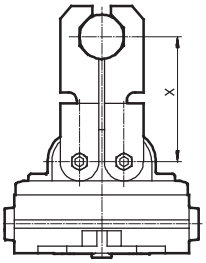
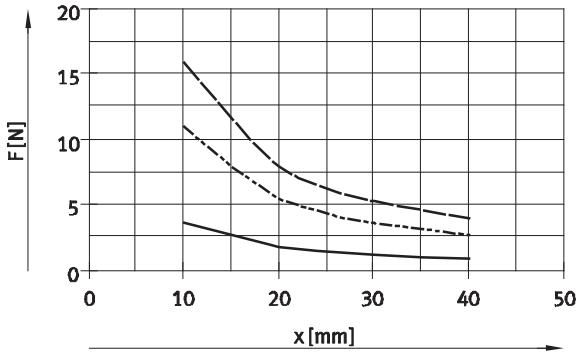
Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x

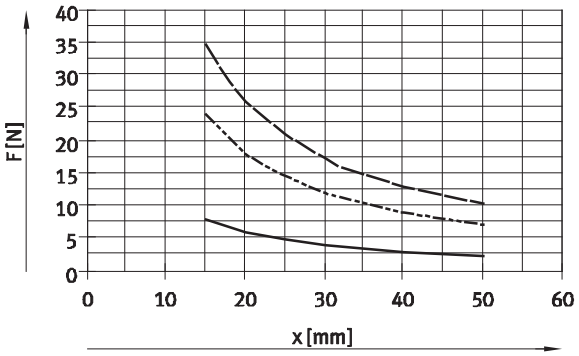
Gripping forces as a function of the operating pressure and the lever arm can be determined for the size using the following graph.



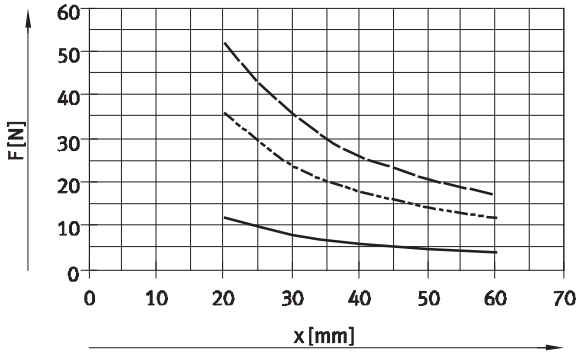
HGRC-12-A

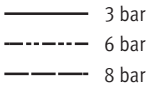


HGRC-16-A



HGRC-20-A





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Technical data

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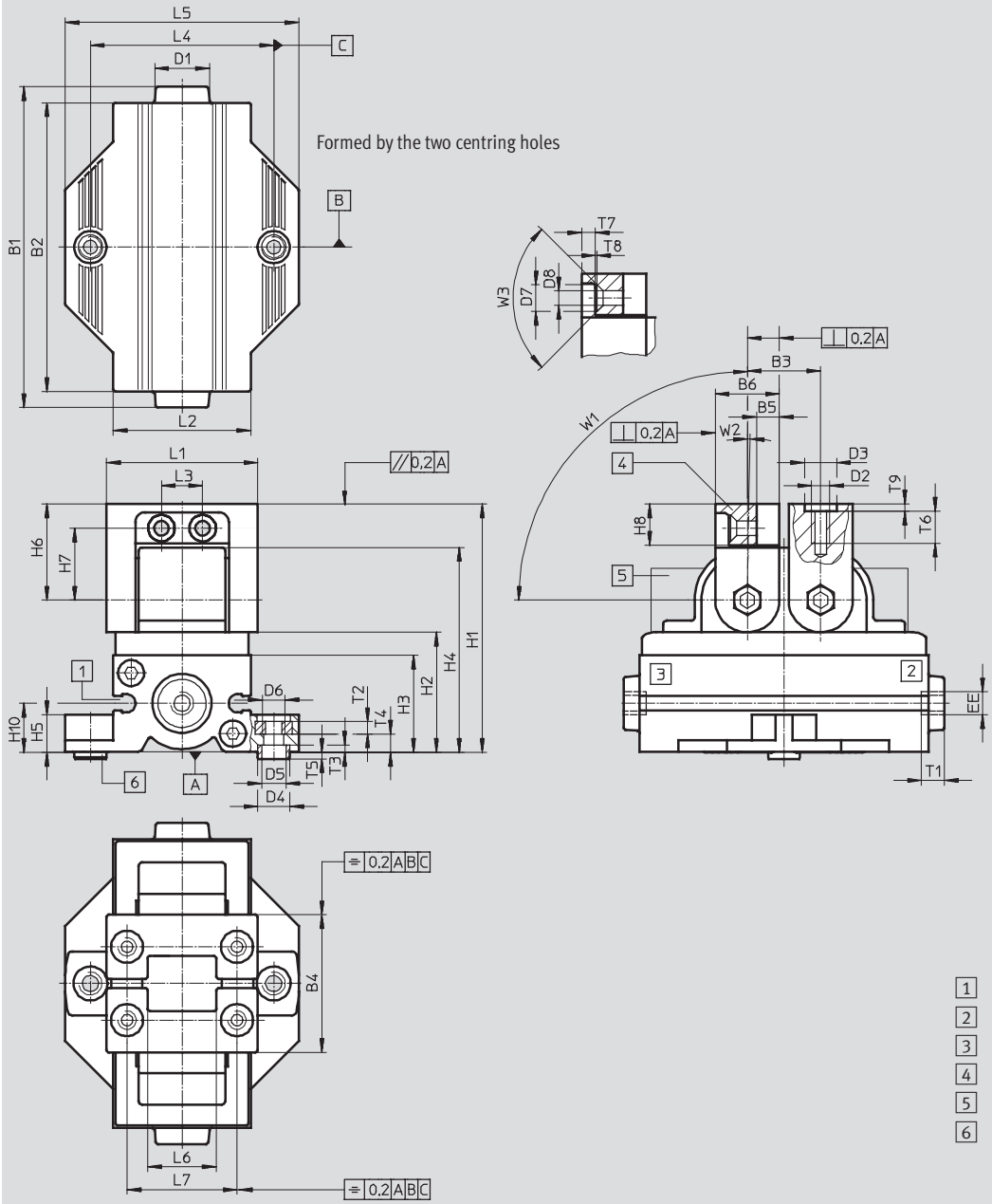
Dimensions Download CAD data ➔ **www.festo.com**



1 Sensor slot for proximity sensor
2 Supply port, opening
3 Supply port, closing
4 Gripper jaw closed
5 Gripper jaw open
6 Centring sleeves ZBH (2 included in the scope of delivery)

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Technical data

Type	B1	B2	B3 ±0.05	B4 +0.25 −0.05	B5 +0.5	B6 +0.1	D1	D2	D3 +0.05 −0.02	D4 F10/h7	D5
HGRC-12	57	52	12	23	4	11	12	M3	5	7	5.3
HGRC-16	70	63	16	30	5.5	14	12	M4	7	7	5.3
HGRC-20	86	79	20	38	6	18	12	M5	9	9	6.4

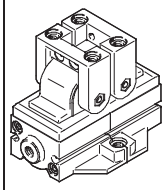
Type	D6	D7	D8	EE	H1 ±0.5	H2	H3	H4	H5	H6 ±0.2	H7
HGRC-12	M4	4.8	2.6	M5	43.2	20.7	18.2	35.2	6.9	17	12.5
HGRC-16	M5	5.8	3.2	M5	54.2	26.2	21.2	44.7	8.2	21	15.7
HGRC-20	M6	8.1	4.4	M5	68.2	32.7	27	55.7	10.2	26.5	19.5

Type	H8	H10	L1 ±0.2	L2	L3 ±0.1	L4[1)]	L5	L6 +0.25 −0.05	L7[1)]	T1 min.
HGRC-12	7.5	9.2	27.5	25.5	6	33	42	12	20	4.5
HGRC-16	9	10.7	33	30	9	40	51	15	24	5
HGRC-20	12	13.7	45	38	12	50	65	21	33	5

Type	T2	T3 ±0.1	T4 +0.4 −0.3	T5 +0.1 −0.3	T6 min.	T7 +0.2	T8	T9 +0.1	W1 ±2	W2 ±3	W3
HGRC-12	2.2	1.7	3.1	1.3	6	1.7	0.5	1.3	90°	1°	90°
HGRC-16	2.7	1.8	3.8	1.2	7	3	0.3	1.6	90°	1°	90°
HGRC-20	3.2	2.3	5.2	1.7	9	3.5	0.5	2.1	90°	1°	90°

1) Tolerance for centring hole ±0.03
Tolerance for thread ±0.2

Ordering data

	Size [mm]	Double-acting Part No.	Type
	12	**565129**	**HGRC-12-A**
	16	**565131**	**HGRC-16-A**
	20	**565133**	**HGRC-20-A**

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Accessories

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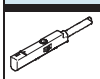
Ordering data – Centring sleeves — Technical data ➔ Internet: zbh

	For size [mm]	Part No.	Type	PU[1]
	For attaching to a drive or plate			
	12, 16	**186717**	**ZBH-7**	10
	20	**150927**	**ZBH-9**	10
	For attaching gripper fingers			
	12	**189652**	**ZBH-5**	10
	16	**186717**	**ZBH-7**	10
	20	**150927**	**ZBH-9**	10

1) Packaging unit quantity

Ordering data – Proximity sensors for C-slot, in-line connecting cable

	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	Plug M8			
	N/O contact, magneto-resistive					Technical data ➔ Internet: smt
	Insertable in the slot from above	3-wire	–	2.5	**551373**	**SMT-10M-PS-24V-E-2,5-L-OE**
		–	3-pin	0.3	**551375**	**SMT-10M-PS-24V-E-0,3-L-M8D**
	N/O contact, magnetic reed					Technical data ➔ Internet: sme
	Insertable from end	3-wire	–	2.5	**173210**	**SME-10-KL-LED-24**
		–	3-pin	0.3	**173212**	**SME-10-SL-LED-24**

Ordering data – Proximity sensors for C-slot, lateral connecting cable

	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	Plug M8			
	N/O contact, magneto-resistive					Technical data ➔ Internet: smt
	Insertable in the slot from above	3-wire	–	2.5	**551374**	**SMT-10M-PS-24V-E-2,5-Q-OE**
		–	3-pin	0.3	**551376**	**SMT-10M-PS-24V-E-0,3-Q-M8D**
	N/O contact, magnetic reed					Technical data ➔ Internet: sme
	Insertable from end	3-wire	–	2.5	**173211**	**SME-10-KQ-LED-24**
		–	3-pin	0.3	**173213**	**SME-10-SQ-LED-24**

Ordering data – Proximity sensors for C-slot, short design

	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	Plug M8			
	N/O contact, magneto-resistive					Technical data ➔ Internet: smt
	Insertable from end	3-wire	–	2.5	**547862**	**SMT-10G-PS-24V-E-2,5Q-OE**
		–	3-pin	0.3	**547863**	**SMT-10G-PS-24V-E-0,3Q-M8D**

Ordering data – Connecting cables — Technical data ➔ Internet: nebu

	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type
	Straight socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	**541333**	**NEBU-M8G3-K-2.5-LE3**
			5	**541334**	**NEBU-M8G3-K-5-LE3**
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	**541338**	**NEBU-M8W3-K-2.5-LE3**
			5	**541341**	**NEBU-M8W3-K-5-LE3**