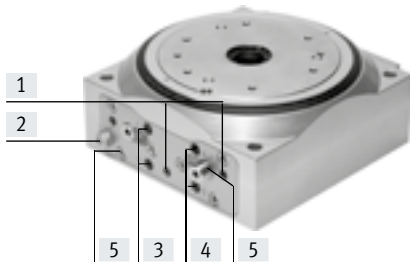# Rotary indexing tables DHTG

FESTO

Key features

At a glance

- Sturdy mechanical system
- Easy project planning and commissioning
- Indexing stations: 2, 3, 4, 6, 8, 12, 24

- Integrated functions:
  - Overload protection
  - Sensor function
  - Cushioning adjustment
  - Speed setting
  - Changing the direction of rotation
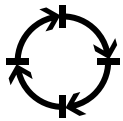
The technology in detail

[1]   Thread for position sensing
[2]   One-way flow control valve for regulating speed
[3]   Compressed air supply port for reciprocating motion
[4]   Compressed air supply port for clockwise or anticlockwise rotation
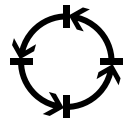[5]   Adjusting screw for cushioning adjustment

Operating modes

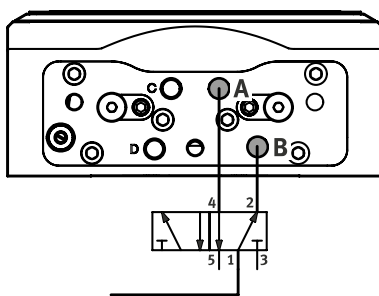| Clockwise	Anticlockwise	Reciprocating motion	Variable actuation: Left, right, reciprocating motion
• Just one valve required	• Just one valve required	• After conversion with a reciprocating motion kit • Two valves required	• After conversion with a reciprocating motion kit • Two valves required
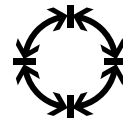
Examples of easy connections

Clockwise/anticlockwise

Reciprocating motion/flexible control
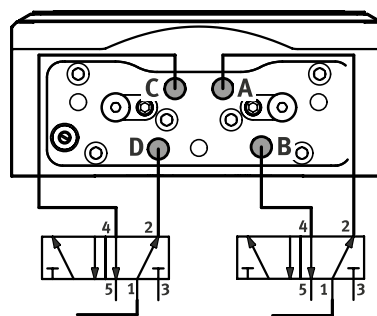
Key features

The technology in detail
Overload protection

To prevent the rotary indexing table from being damaged by an excessive mass moment of inertia, e.g. during setting operation or in the event of shock absorber failure, sizes 140 and 220 feature overload protection.

If the mass moment of inertia is too large, the securing pin is pressed against the spring force by the resulting radial force. It then slides forward on the toothed segment.

This shift in position between the index plate and toothed segment means that the securing pin can no longer engage and the rotary indexing table does not move. The table can be made ready for use again by turning it back.

Mounting options

Direct mounting from above
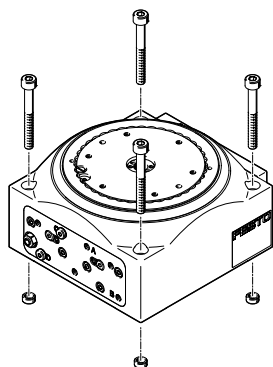
Direct mounting from below
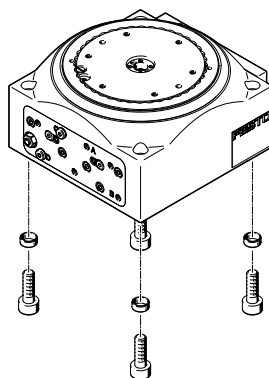
- - Note

The rotary indexing tables are not designed for the following or similar application examples.

- Machining
- Aggressive media

- Grinding dust
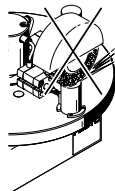
- Welding spatter
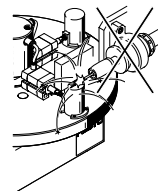
Key features

Sample application
Rotating plate with stationary centre section
For mounting handling units or other devices in the centre of the rotary indexing table

→ **Internet: www.festo.com/catalogue/...** Subject to change – 2023/11

Type codes

001	Series	
DHTG	Rotary indexing table	

002	Size	
65	65	
90	90	
140	140	
220	220	

003	Indexing	
2	2 indexing stations	
3	3 indexing stations	
4	4 indexing stations	
6	6 indexing stations	
8	8 indexing stations	
12	12 indexing stations	
24	24 indexing stations	

004	Position sensing	
A	For proximity sensor	

Peripherals overview
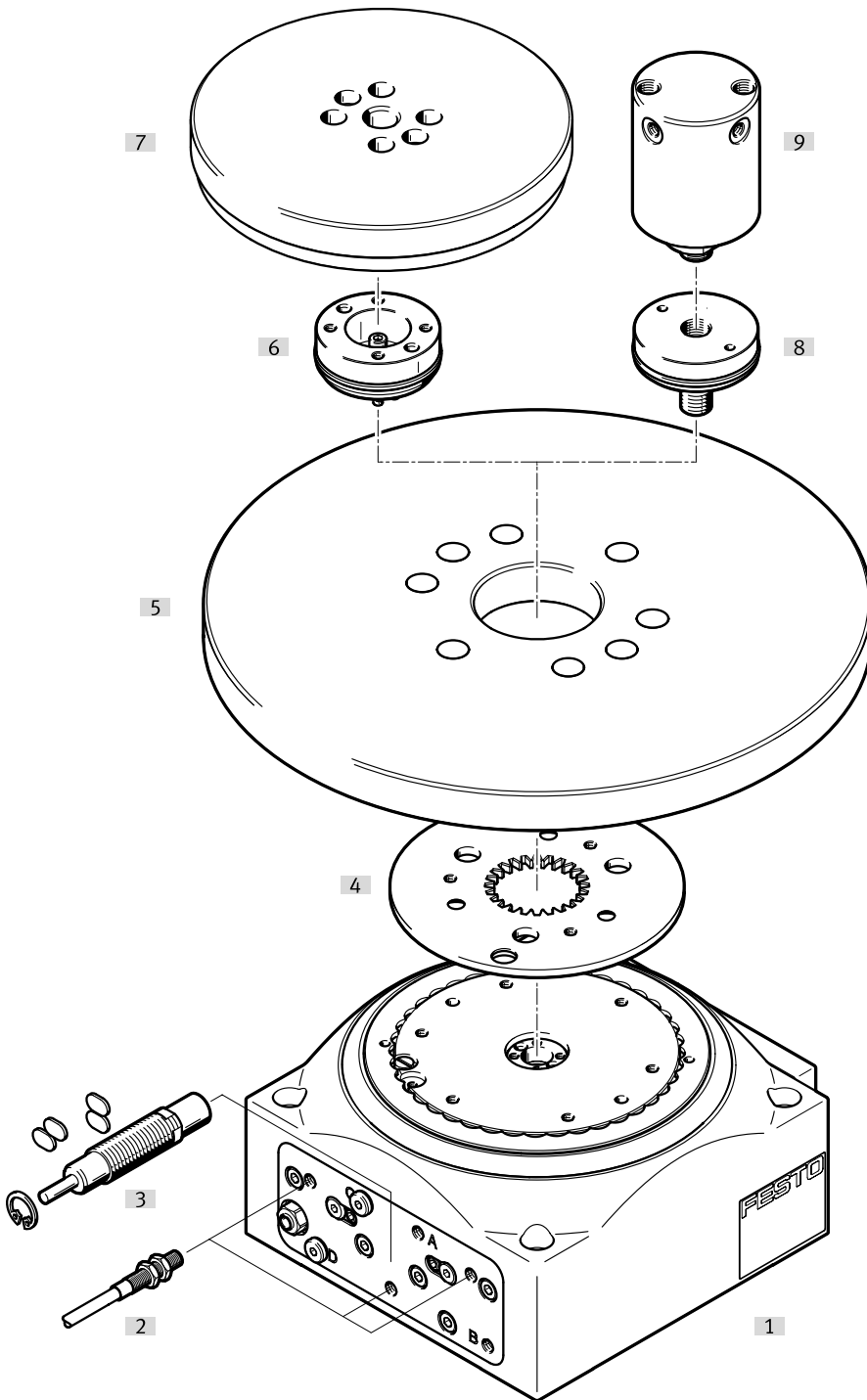
Peripherals overview

Variants and accessories

	Type	Description	➔ Page/Internet
[1]	Rotary indexing table DHTG	Flexible application range: anticlockwise rotation, clockwise rotation or reciprocating motion	8
[2]	Proximity switch SIEN	For sensing the switching position of the rotary indexing table	21
[3]	Reciprocating motion kit DADM-TK	Allows conversion from movement in one direction to reciprocating movement	21
[4]	Indexing conversion kit DADM-CK	The indexing steps can be adjusted at any time using the kit	21
[5]	Plate, rotary	Sample image (plates not available from Festo)	–
[6]	Adapter kit DADG-AK	For mounting an unmachined plate on the rotary indexing table	19
[7]	Plate, fixed	Sample image (plates not available from Festo)	–
[8]	Adapter kit DADG-AK-…-…G…	For mounting the rotary distributor on the rotary indexing table	20
[9]	Rotary distributor GF	Distributes the compressed air fed through the centre of the rotary indexing table to the actuators on the rotating blank plate. Cannot be used in combination with a fixed unmachined plate	20

Datasheet

- ⊘ - Size
65, 90, 140, 220

Indexing stations
2, 3, 4, 6, 8, 12, 24

General technical data

Size		65	90	140	220
Pneumatic connection		M5		G1/8	
Design		Gear coupling			
		Rack and pinion			
		Force-guided motion sequence			
Operating mode		Double-acting			
Type of mounting		Via through-hole and centring sleeve			
Mounting position		Any			
Cushioning		Adjustable shock absorber stroke, hard characteristic curve			
Indexing stations		2, 3, 4, 6, 8, 12, 24		3, 4, 6, 8, 12, 24	
Theoretical torque at 6 bar	[Nm]	2.1	4.4	18.1	58.9
Parallelism of plate[1]	[mm]	≤0.04			
Axial eccentricity of plate[2]	[mm]	≤0.02			
Concentricity of plate[3]	[mm]	≤0.02			
Repetition accuracy of swivel angle	[°]	≤0.03			
Max. mass moment of inertia without flow control[4]	[kgm^2]	0.016	0.03	0.3	2.5
Cycle time without flow control		→ Page 10			
Position sensing		For inductive proximity switches			
Weight	[kg]	2.0	4.5	10	24

1) Parallelism of the plate surface relative to the housing support
2) Measured on the surface and at the edge of the plate in relation to the housing support
3) Measured on the inner diameter of the plate in relation to the housing
4) Operation with flow control can increase the mass moment of inertia by 50%. The service life of the shock absorber is reduced in this case. The mass moment of inertia depends on the number of indexing stations and the switching frequency (→ page 11)

- 🗲 - **Note**

The "clockwise" rotation of the plate can be controlled via an internal flow control valve in combination with the reciprocating motion kit. For "anticlockwise" rotation, external actuation via an additional one-way flow control valve GRLA is needed.

Datasheet

**Operating and environmental conditions**

Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)
Operating pressure	[bar]	4 … 8
Ambient temperature	[°C]	5 … 60
Storage temperature	[°C]	−20 … +80
Degree of protection		IP54[2]
Corrosion resistance class CRC[1]		2 - Moderate corrosion stress

1) More information: www.festo.com/x/topic/crc
2) The specified degree of protection applies to the top side of the rotary indexing table. The underside must be provided with appropriate external protection for the environment.
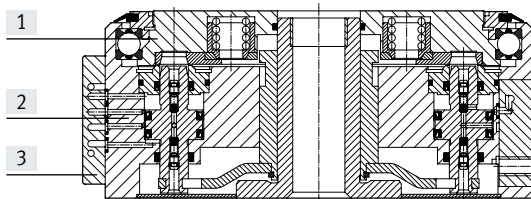
Static characteristic load values

The indicated forces and torques refer to the locked table and can also act on the table plate.
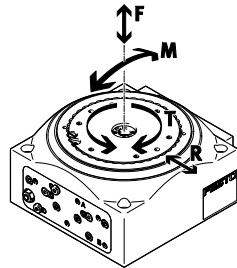
Size		65	90	140	220
Forces					
Max. axial force F	[N]	1000	2000	4000	5000
Max. radial force R	[N]	2000	5000	6000	8000
Torque					
Max. tilting torque M	[Nm]	100	150	300	500
Max. tangential torque T	[Nm]	100	150	200	500

Materials

Sectional view

Rotary indexing table		
[1]	Plate	Galvanised steel
[2]	Cover	Wrought aluminium alloy
[3]	Housing	Wrought aluminium alloy
–	Stops	Galvanised steel
	Seals	NBR, TPE-U (PU)

Datasheet

Calculating the cycle time

The rotary indexing tables are equipped with a hydraulic shock absorber, which means that the max. frequency of the shock absorber must also be taken into account when calculating the cycle time.

The switching time comprises:

Switching time = Unlock, rotate, lock and return stroke of the working piston.

The cycle time is calculated as follows:

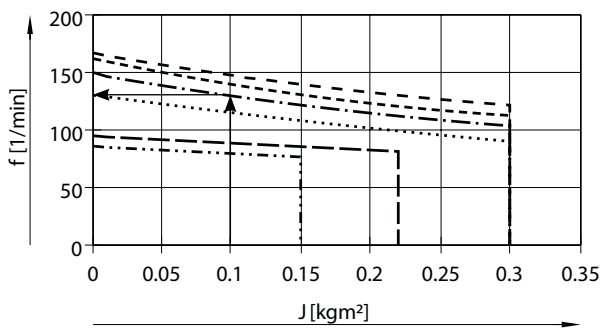Cycle time = Switching time + Processing time + Dwell time.

The max. achievable switching frequency in relation to the mass moment of inertia can be read off from the switching frequency graph. The switching time can be calculated from this based on $T = 60/f$. The processing time is calculated based on the time required for the customer application (e.g. time for component removal, press-in time, etc.). A dwell time may be necessary if the cycle time is shorter than the min. possible cycle time.

Calculation example

DHTG-140 with 8 stations and a mass moment of inertia of $0.1 kgm^2$.

The customer application requires 300 ms per step for inserting and removing parts.

Switching frequency

Max. permissible cycle frequency

$T_{switching time} = 1/f = 60\ s/130 = 0.461\ s = 461\ ms$

Dwell time = Min. permissible cycle time - Switching time - Processing time
Dwell time = 1017 ms - 461 ms - 300 ms = 256 ms.

Given the fact that the switching time + processing time is shorter than the min. permissible cycle time, the rotary indexing table must stay in the end position before the next step is performed. In other words, an additional dwell time of 256 ms between the switching operations must be allowed for in the control sequence.
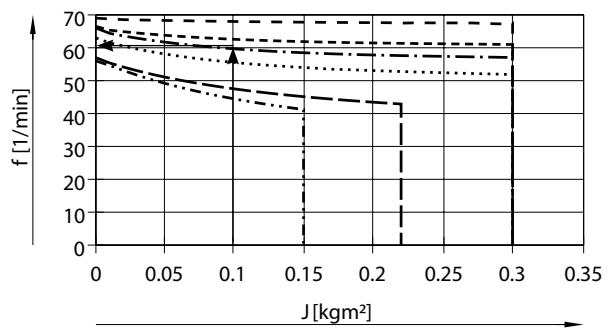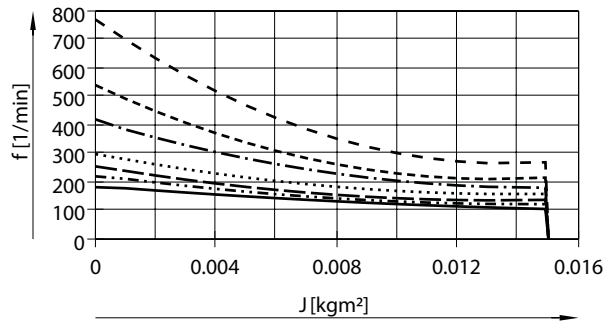
$T_{min.\ perm.\ cycle\ time} = 60\ s/59 = 1.017\ s = 1017\ ms$

Datasheet

Mass moment of inertia J as a function of switching frequency f and number of indexing stations

Size 65

Size 90
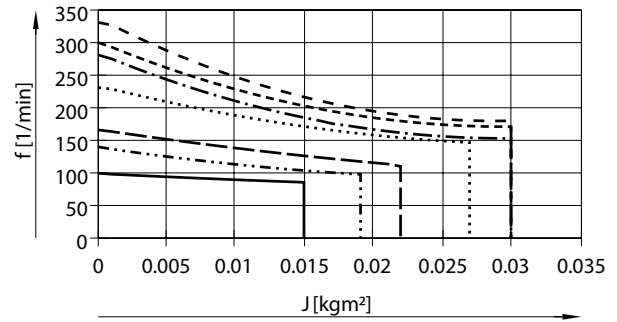
Size 140
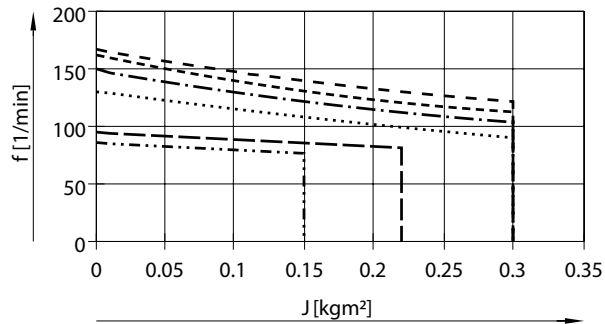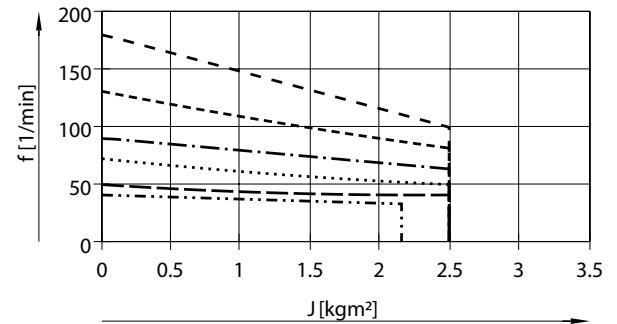
Size 220

Max. permissible cycle frequency f as a function of mass moment of inertia J

Size 65

Size 90
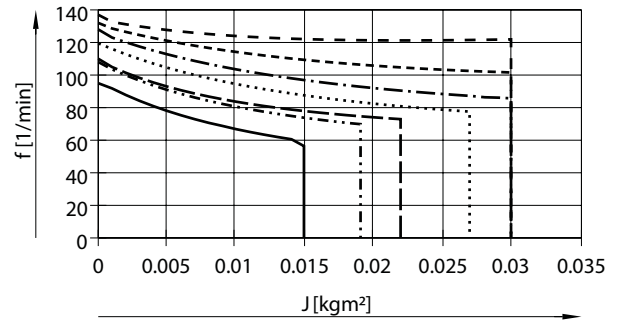
Size 140
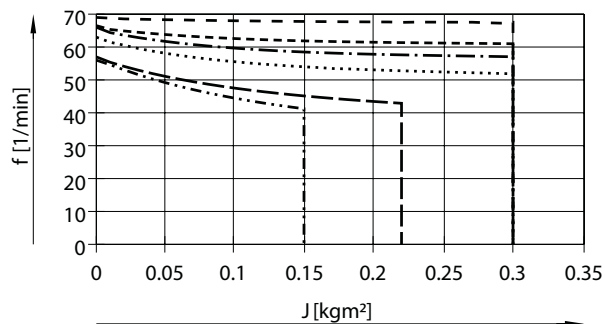
Size 220
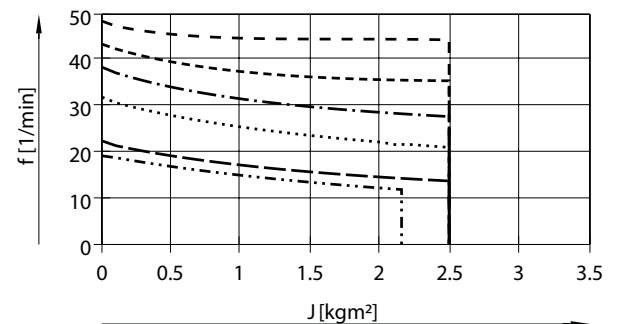
—— 2 indexing stations	·········· 6 indexing stations	- - - - - 12 indexing stations
-··-··-··- 3 indexing stations	-·-·-·- 8 indexing stations	– – – – 24 indexing stations
– – – 4 indexing stations		

Datasheet

Dimensions

Size 65

[1] Compressed air supply port: un-
 lock and rotate
 (reciprocating motion: unlock)

[2] Compressed air supply port:
 lock and return stroke
 (reciprocating motion: lock)

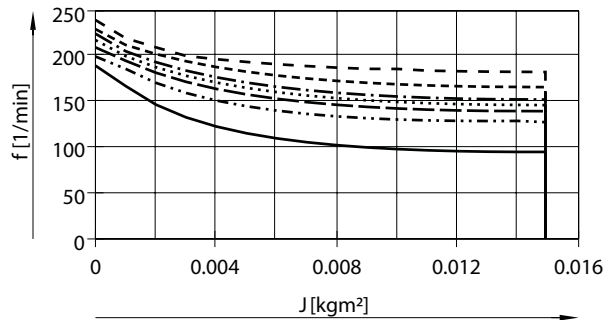[3] Sealing plug (for reciprocating
 motion: turn compressed air
 supply port clockwise)

[4] Sealing plug (for reciprocating
 motion: turn compressed air
 supply port anticlockwise)

[5] Sensor turned for clockwise ro-
 tation (sensor initial position for
 anticlockwise rotation)

[6] Sensor initial position for clock-
 wise rotation (sensor turned for
 anticlockwise rotation)

[7] Lock sensing

[8] One-way flow control valve

[9] Adjustment of the end-position cushioning for anticlockwise rotation and
 reciprocating motion (not applicable for clockwise rotation)

[10] Adjustment of the end-position cushioning for clockwise rotation and re-
 ciprocating motion (not applicable for anticlockwise rotation)

[11] Lock nut for end-position cushioning

Datasheet

Size	B1[3] ±2	B2	B3	B4	B5 +0.1	D1 Ø	D2 Ø	D3[1] Ø	D4 Ø	D5	D6 Ø H8	D7
65	63	80	79.5	47.5	3	80	65	55	11	G1/8	10	M5

Size	D8 Ø H8	D9 Ø	D10 Ø	D13	D14 Ø H8	D15	D16 Ø H8	EE	H1 ±0.5	H2	H3	H4
65	7	8	4.3	M4	4	M5x0.5	14	M5	55	49	41	39

Size	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	L1 ±0.1	L2[1] ™
65	1	9	15.5	26	26	13	33.5	24.5	38.5	3.5	103	85

Size	L3	L4 +1	L5[2] max	L6	L7	L8	L9	L11	L12 ±0.1	L13 +0.1	T1 ±1	T2 min
65	9.5	7.5	11	9.75	19	28	6.75	32.75	95	3.5	2	14

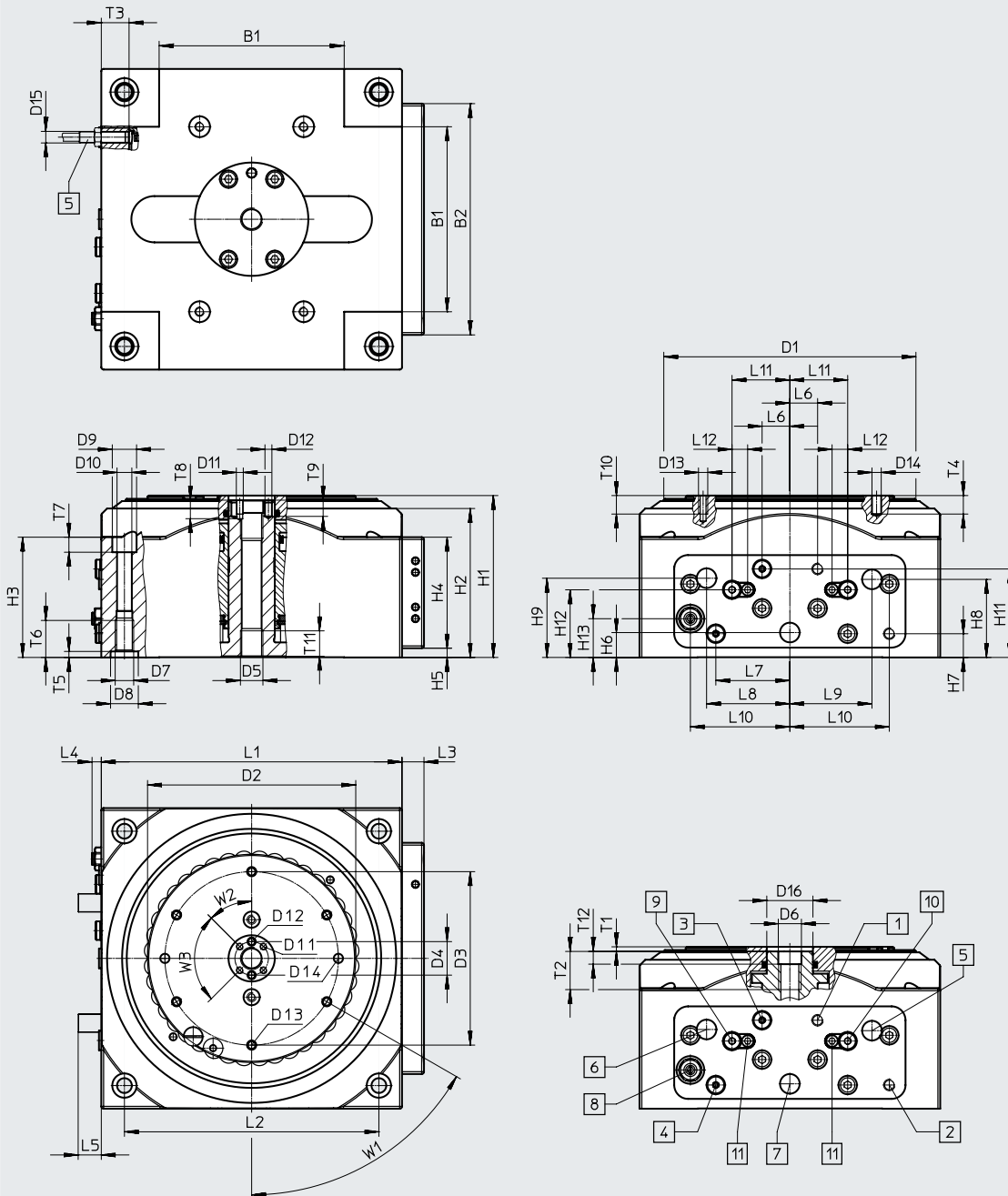| Size	T3 min	T4 min	T5 +0.1	T6 min	T7	T8	T9	T10 min	T11 min	T12	W1
65	12	5	1.6	10	4	0.5	2	6	5	7	60°

1) Tolerance between the centring holes: ±0.02
   Tolerance between the threaded holes and countersinks: ±0.2
2) Max. projection of shock absorber adjustment
3) 0.1 +0.05 recessed

Datasheet

Dimensions   Download CAD data ➔ www.festo.com

Size 90

[1]   Compressed air supply port: un-
      lock and rotate
      (reciprocating motion: unlock)
[2]   Compressed air supply port:
      lock and return stroke
      (reciprocating motion: lock)
[3]   Sealing plug (for reciprocating
      motion: turn compressed air
      supply port clockwise)

[4]   Sealing plug (for reciprocating
      motion: turn compressed air
      supply port anticlockwise)
[5]   Sensor turned for clockwise ro-
      tation (sensor initial position for
      anticlockwise rotation)
[6]   Sensor initial position for clock-
      wise rotation (sensor turned for
      anticlockwise rotation)

[7]   Lock sensing
[8]   One-way flow control valve
[9]   Adjustment of the end-position cushioning for anticlockwise rotation and
      reciprocating motion (not applicable for clockwise rotation)
[10] Adjustment of the end-position cushioning for clockwise rotation and re-
      ciprocating motion (not applicable for anticlockwise rotation)
[11] Lock nut for end-position cushioning

Datasheet

Size	B1[3] ±2	B2	D1 Ø	D2 Ø	D3[1] Ø	D4[1] Ø	D5	D6 Ø H8	D7	D8 Ø H8	D9 Ø	D10 Ø
90	80	100	109	90	75	14.5	G1/8	10	M8	12	10.5	6.4

Size	D11	D12 Ø H8	D13	D14 Ø H8	D15	D16 Ø H8	EE	H1 ±0.5	H2	H3	H4	H5
90	M3	3	M4	4	M5x0.5	20	M5	70	64.4	52	48	4

Size	H6	H7	H8	H9	H11	H12	H13	L1 ™ ±0.1	L2[1] ™	L3	L4	L5[2] max
90	10.75	10.25	33.75	34.25	38.25	29.25	16.75	130	110	9.5	4	10

Size	L6	L7	L8	L9	L10	L11	L12	T1 ±1	T2 min	T3	T4 min
90	12	32	36	35.5	43	25	6.7	2	16.5	12	8

Size	T5 +0.1	T6 min	T7	T8	T9 min	T10 min	T11 min	T12	W1	W2	W3
90	2.6	16	6.5	6	5	8	11	5.5	60°	45°	90°

1) Tolerance for centring hole ±0.02 mm
Tolerance for thread ±0.1 mm
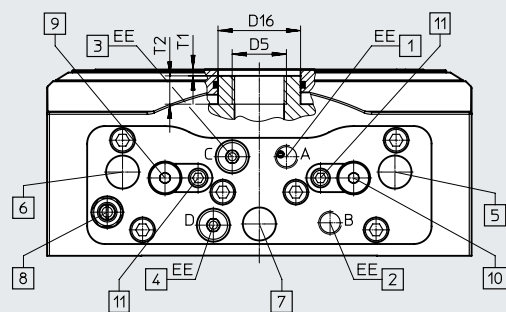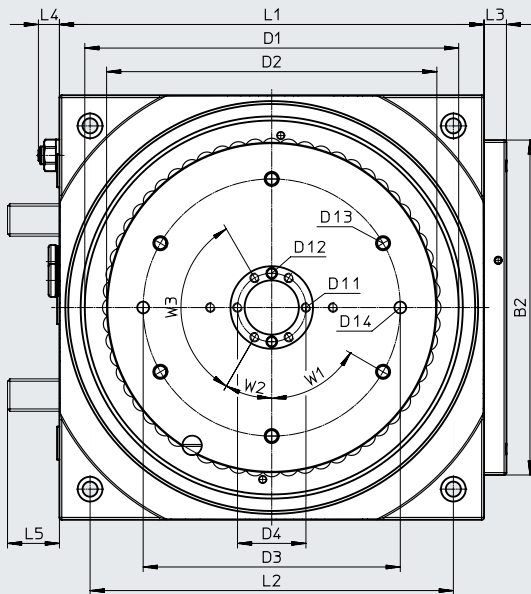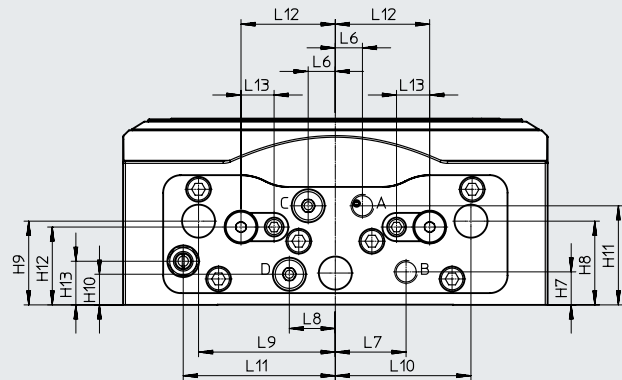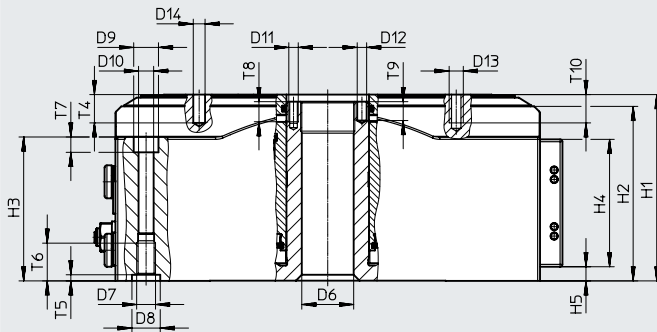2) Max. projection of shock absorber adjustment
3) 0.1 +0.05 recessed

Datasheet

Dimensions
Size 140, 220

Download CAD data ➔ www.festo.com

[1] Compressed air supply port: un-
lock and rotate
(reciprocating motion: unlock)

[2] Compressed air supply port:
lock and return stroke
(reciprocating motion: lock)

[3] Sealing plug (for reciprocating
motion: turn compressed air
supply port clockwise)

[4] Sealing plug (for reciprocating
motion: turn compressed air
supply port anticlockwise)

[5] Sensor turned for clockwise ro-
tation (sensor initial position for
anticlockwise rotation)

[6] Sensor initial position for clock-
wise rotation (sensor turned for
anticlockwise rotation)

[7] Lock sensing

[8] One-way flow control valve

[9] Adjustment of the end-position cushioning for anticlockwise rotation and
reciprocating motion (not applicable for clockwise rotation)

[10] Adjustment of the end-position cushioning for clockwise rotation and re-
ciprocating motion (not applicable for anticlockwise rotation)

[11] Lock nut for end-position cushioning

Datasheet

Size	B1[3] ±2	B2	D1 Ø	D2 Ø	D3[1] Ø	D4[1] Ø	D5	D6 Ø	D7	D8 Ø H8	D9 Ø	D10 Ø	D11	D12 Ø H8
140	100	142	159	140	109	29	M23x1	22	M8	12	10.5	6.4	M4	4
220	150	212	239	220	165	67	–	58.4	M10	15	13.5	8.4	M5	5
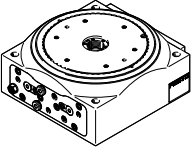
Size	D13	D14 Ø H8	D15	D16 Ø H8	EE	H1 ±0.5	H2	H3	H4	H5	H6	H7	H8	H9
140	M6	5	M8x1	35	G1/8	79	74	61	54	6	13.5	14	35.5	35.5
220	M8	6	M8x1	75	G1/8	89	83.5	68.5	64	4.5	13.5	24.5	15	15

Size	H10	H11	H12	H13	L1 TM ±0.1	L2[1] TM	L3	L4 +1	L5[2] max	L6	L7	L8	L9	L10	L11
140	13	42	33	18.5	180	154	9.5	8.9	22	11.5	30	19.5	58	57.5	64.5
220	24.5	50.5	36.5	24	270	228	12	4.6	22	41	41	41	61	61	99.5

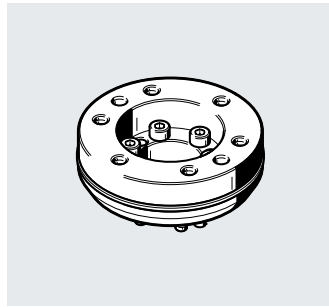| Size	L12	L13	T1 ±1	T2 min	T3 min	T4 min	T5 +0.1	T6 min	T7	T8 min	T9 min	T10 min	W1	W2	W3
140	40	14	3	12	14	8	2.6	16	6.5	8	8	11	60°	30°	120°
220	68	14	4	–	19	8	3.1	20	8.5	10	10	11	60°	30°	120°

1) Tolerance between the centring holes: ±0.02
   Tolerance between the threaded holes and countersinks: ±0.2
2) Max. projection of shock absorber adjustment
3) 0.1 +0.05 recessed

Datasheet

Ordering data

	Size	Indexing stations	Part no.	Type
	65	2	**548076**	**DHTG-65-2-A**
		3	**555448**	**DHTG-65-3-A**
		4	**548077**	**DHTG-65-4-A**
		6	**548078**	**DHTG-65-6-A**
		8	**548079**	**DHTG-65-8-A**
		12	**548080**	**DHTG-65-12-A**
		24	**548081**	**DHTG-65-24-A**
	90	2	**548082**	**DHTG-90-2-A**
		3	**555449**	**DHTG-90-3-A**
		4	**548083**	**DHTG-90-4-A**
		6	**548084**	**DHTG-90-6-A**
		8	**548085**	**DHTG-90-8-A**
		12	**548086**	**DHTG-90-12-A**
		24	**548087**	**DHTG-90-24-A**
	140	3	**555450**	**DHTG-140-3-A**
		4	**548088**	**DHTG-140-4-A**
		6	**548089**	**DHTG-140-6-A**
		8	**548090**	**DHTG-140-8-A**
		12	**548091**	**DHTG-140-12-A**
		24	**548092**	**DHTG-140-24-A**
	220	3	**555451**	**DHTG-220-3-A**
		4	**548093**	**DHTG-220-4-A**
		6	**548094**	**DHTG-220-6-A**
		8	**548095**	**DHTG-220-8-A**
		12	**548096**	**DHTG-220-12-A**
		24	**548097**	**DHTG-220-24-A**

Accessories

**Adapter kit
DADG-AK**

Dimensions

With rotary table and adapter kit DADG-AK for mounting a fixed plate
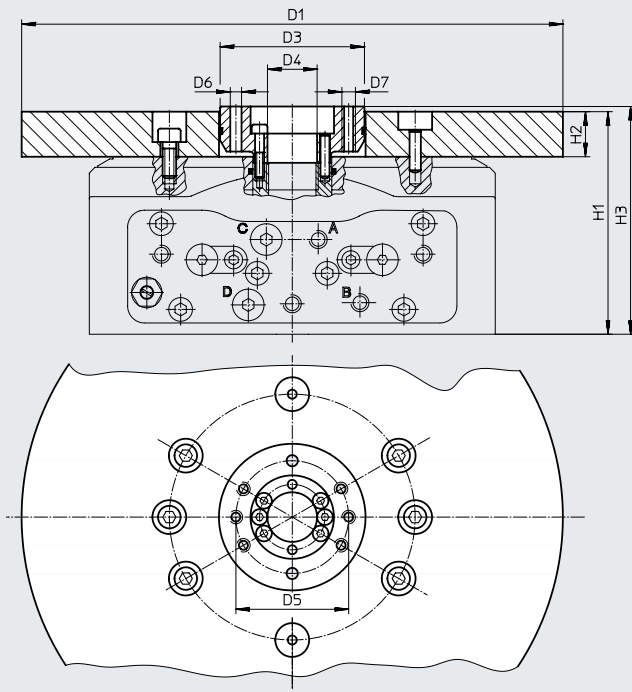
Size	D3 ⌀ +0.2	D4 ⌀ +0.2	D5 ⌀	D6 ⌀ H7	D7	H2 max.	H3 ±0.5
DADG-AK-65	29	5	20	4	M4	15	72
DADG-AK-90	39	9	30	4	M4	15	87
DADG-AK-140	64	22	50	5	M6	20	101
DADG-AK-220	104	58.4	90	6	M8	20	111

Ordering data – Adapter kit DADG-AK

	For size	Part no.	Type
	65	**555424**	**DADG-AK-65**
	90	**555425**	**DADG-AK-90**
	140	**555426**	**DADG-AK-140**
	220	**555427**	**DADG-AK-220**

Accessories

Rotary distributor
GF-..., single
GF-...-2, multiple

Dimensions
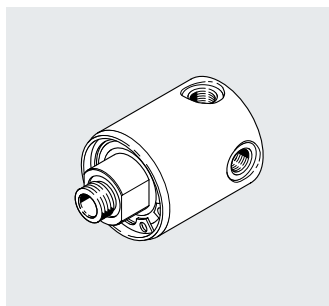
Download CAD data ➔ www.festo.com

With rotary distributor GF-... (single) and adapter kit DADG-AK-...

With rotary distributor GF-1/8-2 (multiple) and adapter kit DADG-AK-220-2G18 –
for size 220
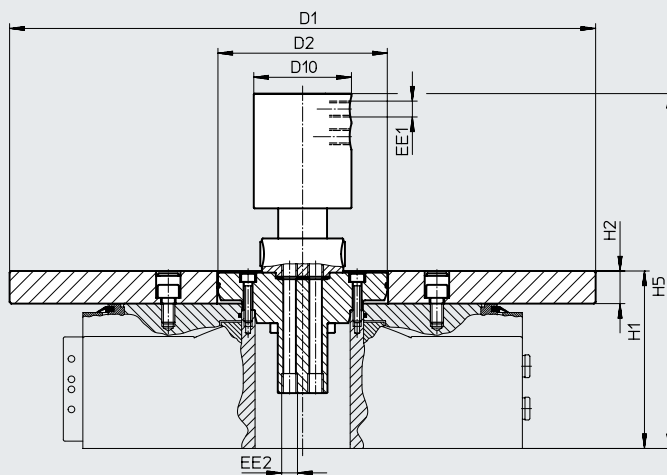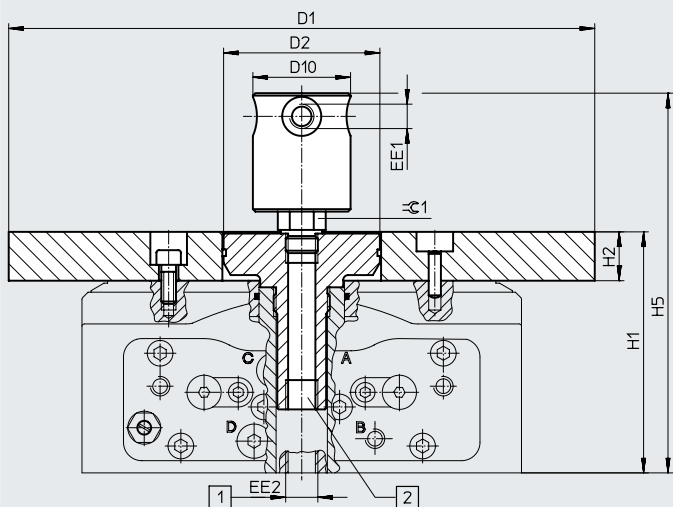
Size	D2	D10 Ø +0.2	EE1	EE2	H2 max.	H5 ±1	⌀1
DADG-AK-65-1G18 GF-1/8-M5	29	40	M5	G1/8	15	127.5	17
DADG-AK-90-1G18 GF-1/8-M5	39	40	M5	G1/8	15	142.5	17
DADG-AK-140-1G14 GF-1/4-1/8	64	40	G1/8	G1/4	20	155.5	17
DADG-AK-220-1G12 GF-1/2-1/4	104	60	G1/4	G1/2	20	187.5	27

Ordering data
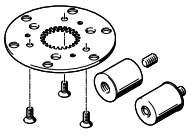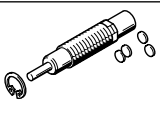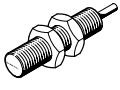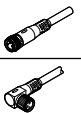
Rotary distributor GF

	For size	Part no.	Type
	Simple		
	65, 90	**539290**	**GF-1/8-M5**
	140	**539291**	**GF-1/4-1/8**
	220	**539292**	**GF-1/2-1/4**
	Multiple		
	220	**539287**	**GF-1/8-2**

Adapter kit DADG-AK

	For size	Part no.	Type
	Simple		
	65	**555428**	**DADG-AK-65-1G18**
	90	**555429**	**DADG-AK-90-1G18**
	140	**555430**	**DADG-AK-140-1G14**
	220	**555431**	**DADG-AK-220-1G12**
	Multiple		
	220	**555432**	**DADG-AK-220-2G18**

Accessories

Ordering data

	For size	Indexing stations		Part no.	Type
Indexing conversion kit DADM-CK					
	65	2		**548098**	**DADM-CK-65-2**
		3		**554389**	**DADM-CK-65-3**
		4		**548099**	**DADM-CK-65-4**
		6		**548100**	**DADM-CK-65-6**
		8		**548101**	**DADM-CK-65-8**
		12		**548102**	**DADM-CK-65-12**
		24		**548103**	**DADM-CK-65-24**
	90	2		**548104**	**DADM-CK-90-2**
		3		**555445**	**DADM-CK-90-3**
		4		**548105**	**DADM-CK-90-4**
		6		**548106**	**DADM-CK-90-6**
		8		**548107**	**DADM-CK-90-8**
		12		**548108**	**DADM-CK-90-12**
		24		**548109**	**DADM-CK-90-24**
	140	3		**555446**	**DADM-CK-140-3**
		4		**548110**	**DADM-CK-140-4**
		6		**548111**	**DADM-CK-140-6**
		8		**548112**	**DADM-CK-140-8**
		12		**548113**	**DADM-CK-140-12**
		24		**548114**	**DADM-CK-140-24**
	220	3		**555447**	**DADM-CK-220-3**
		4		**548115**	**DADM-CK-220-4**
		6		**548116**	**DADM-CK-220-6**
		8		**548117**	**DADM-CK-220-8**
		12		**548118**	**DADM-CK-220-12**
		24		**548119**	**DADM-CK-220-24**
Reciprocating motion kit DADM-TK					
	65	–		**548120**	**DADM-TK-65**
	90			**548121**	**DADM-TK-90**
	140			**563304**	**DADM-TK-140**
	220			**563305**	**DADM-TK-220**

Ordering data – Proximity switches, inductive   Datasheets ➔ Internet: sien

	For size	Contact	Connection	Part no.	Type
	65, 90	N/O	Plug	**150371**	**SIEN-M5B-PS-S-L**
		N/C	Plug	**150375**	**SIEN-M5B-PO-S-L**
	140, 220	N/O	Cable	**150386**	**SIEN-M8B-PS-K-L**
			Plug	**150387**	**SIEN-M8B-PS-S-L**
		N/C	Cable	**150390**	**SIEN-M8B-PO-K-L**
			Plug	**150391**	**SIEN-M8B-PO-S-L**

Ordering data – Connecting cables   Datasheets ➔ Internet: nebu

	Electrical connection, left	Electrical connection, right	Cable length [m]	Part no.	Type
	Straight socket, M8x1, 3-pin	Cable, open end, 3-core	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-core	2.5	**541338**	**NEBU-M8W3-K-2.5-LE3**
			5	**541341**	**NEBU-M8W3-K-5-LE3**