Rotary indexing tables DHTG

FESTO

Rotary indexing tables DHTG

Key features

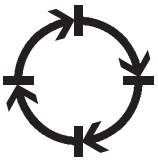
At a glance

- Sturdy mechanical system
- Simple planning and commissioning
- Number of stations: 2, 3, 4, 6, 8, 12, 24
- Integrated functions:
  - Overload protection
  - Sensor function
  - Cushioning adjustment
  - Speed setting
  - Changing the direction of rotation

Actuation options

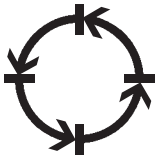
Clockwise

- Just one valve required



Anti-clockwise

- Just one valve required



Reciprocating motion

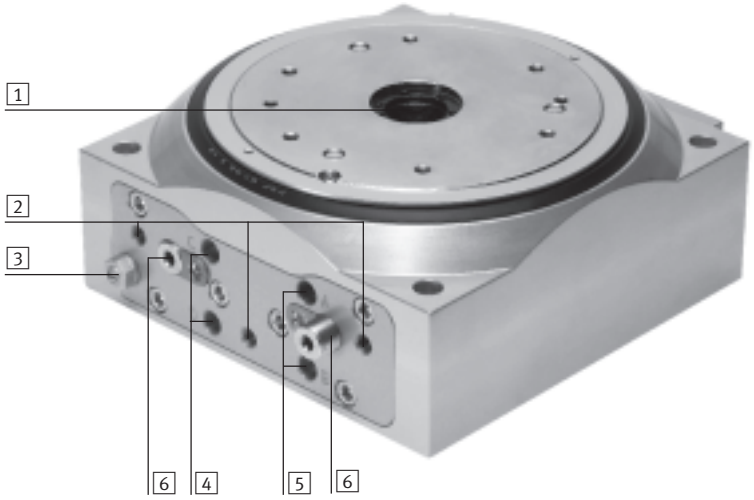
- Following conversion with reciprocating motion kit
- Two valves required

Variable actuation
Left, right, reciprocating motion

- Following conversion with reciprocating motion kit
- Two valves required

The technology in detail

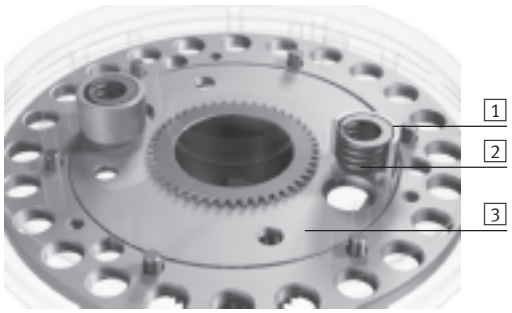
1 Through-hole for energy throughfeed
2 Thread for position sensing
3 One-way flow control valve for regulating speed
4 Supply port for reciprocating operation
5 Supply port for clockwise or anti-clockwise rotation
6 Adjusting screw for cushioning adjustment



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.

1 Securing pin
2 Spring
3 Toothed segment



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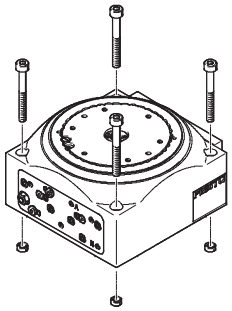
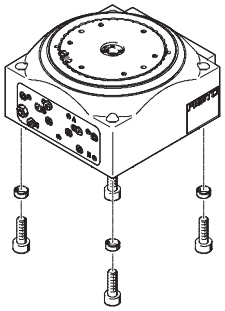
Key features

Mounting options

Direct mounting from above



Direct mounting from below



Typical applications

Basic rotary table

- Handling with minimum space requirement

Rotary table with rotary distributor

- For the transfer of compressed air and vacuum to the rotary table
- With 1 or 2 separate ducts

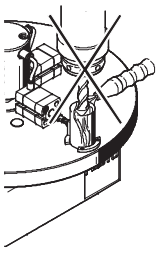
Rotary table with stationary centre section

- For the mounting of handling units or other devices in the centre of the rotary indexing table

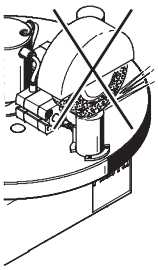
Note

The rotary indexing tables are not designed for the following or similar sample applications:

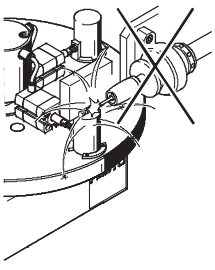
- Machining
- Aggressive media



- Grinding dust

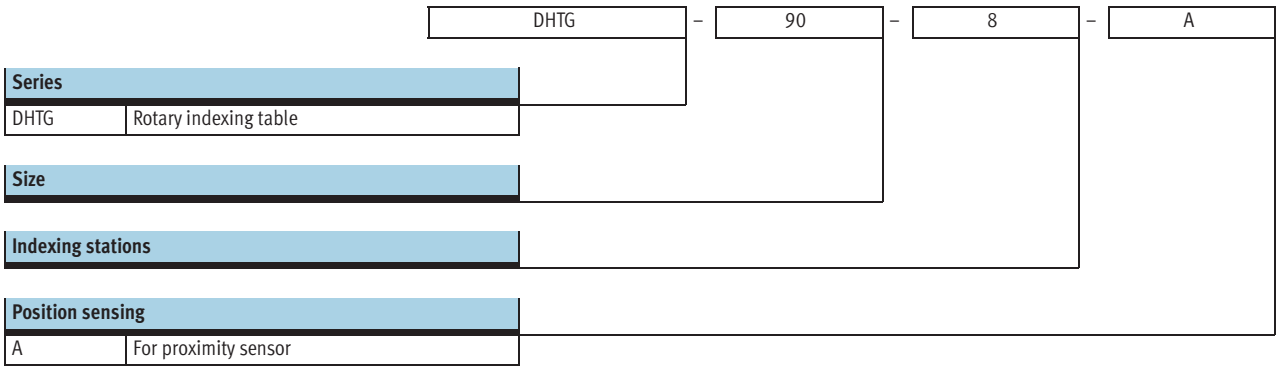


- Welding spatter



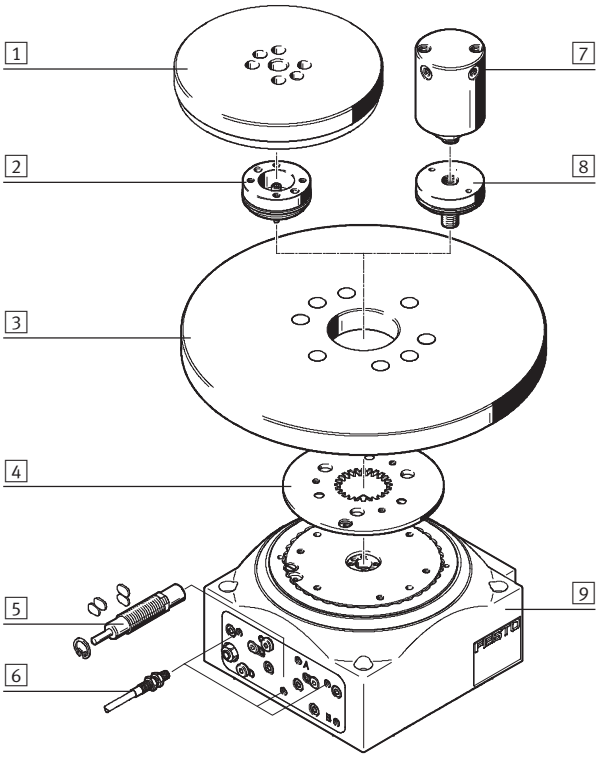
Rotary indexing tables DHTG

Type codes



Rotary indexing tables DHTG

Peripherals overview



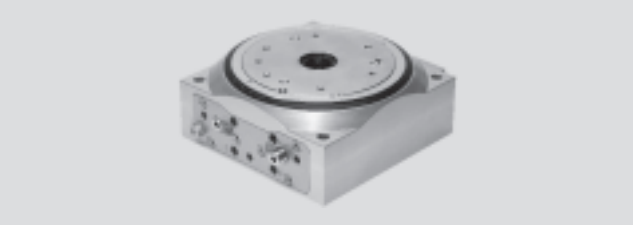
Variants and accessories			
	Type	**Brief description**	**➔ Page/Internet**
1	Unmachined plate, fixed DADG-UPF	For the mounting of handling units or other devices in the centre of the rotary indexing table	16
2	Adapter kit DADG-AK	For mounting the unmachined plate DADG-UPF on the rotary table	17
3	Unmachined plate, rotating DADG-UPT	Actuators can, depending on the application, be mounted on the unmachined rotating plate	16
4	Indexing conversion kit DADM-CK	The indexing steps can be adjusted at any time using the kit	20
5	Reciprocating motion kit DADM-TK	Allows conversion from movement in one direction to reciprocating movement	20
6	Proximity sensors SIEN	For sensing the switching position of the rotary indexing table	20
7	Rotary distributor GF	Distributes the compressed air conducted through the centre of the rotary indexing table to the actuators on the unmachined rotating plate. Cannot be used in combination with the fixed unmachined plate DADG-UPF	18
8	Adapter kit DADG-AK-...-...G...	For mounting the rotary distributor on the rotary indexing table	19
9	Rotary indexing table DHTG	Flexible range of applications: Anti-clockwise and clockwise rotation or reciprocating motion	6

Rotary indexing tables DHTG

Technical data

-N- 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			
Mode of operation		Double-acting			
Type of mounting		Via through-holes 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	
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)]	[kgm²]	0.016	0.03	0.3	2.5
Cycle time without flow control		→ 8			
Position sensing		For inductive proximity sensors			
Product weight	[kg]	2.0	4.5	10	24

1) Parallelism of the upper plate surface relative to the housing support
2) Measured on the upper surface of the plate at the plate edge relative to the housing support
3) Measured on the internal diameter of the plate relative 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 stations and the switching frequency (→ 9)

Note

The "clockwise" rotation of the table can be controlled via an internal flow control valve in combination with the reciprocating motion kit.

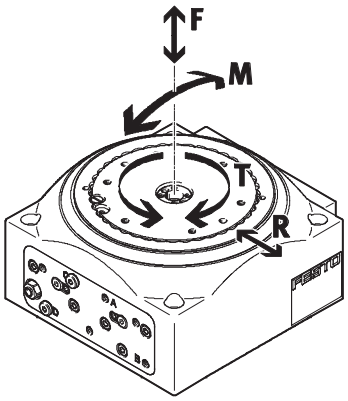
For "anti-clockwise" rotation, external actuation via an additional one-way flow control valve GRLA is needed.

Operating and environmental conditions		
Operating medium		Filtered compressed air, grade of filtration 40 µm, lubricated or unlubricated
Operating pressure	[bar]	4 ... 8
Ambient temperature	[°C]	5 ... 60
Storage temperature	[°C]	–20 ... +80
Protection class		IP54
Corrosion resistance class CRC[1)]		2

1) Corrosion resistance class 2 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

Static characteristic load values

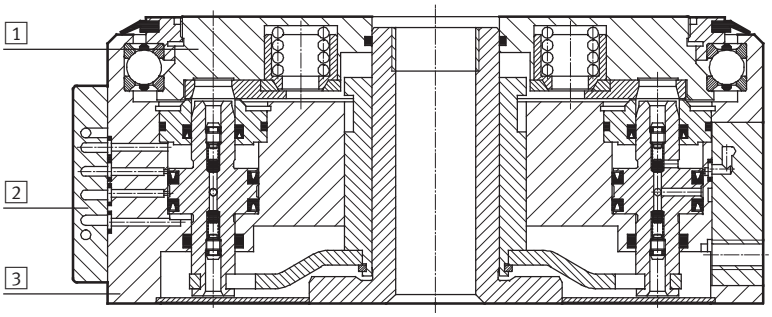
The indicated forces and torques refer to the locked table and can also act on the table plate.



Size		65	90	140	220
Forces					
Max. axial force F	[N]	1,000	2,000	4,000	5,000
Max. radial force R	[N]	2,000	5,000	6,000	8,000
Torques					
Max. tilting moment M	[Nm]	100	150	300	500
Max. tangential moment 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	Nitrile rubber, polyurethane
	Note on material	Free of copper and PTFE
		Conforms to RoHS

Calculation of 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 working piston. The cycle time is calculated as follows:
Cycle time = Switching time + Processing time + Dwell time.

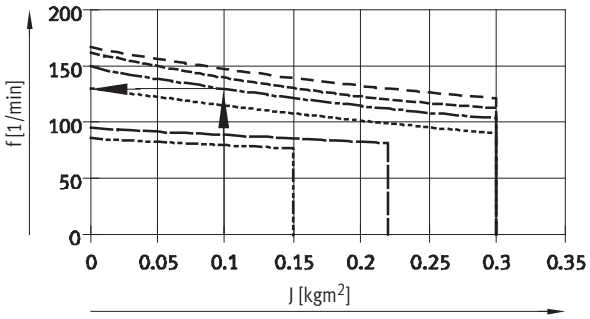
In the switching frequency graph, the max. achievable switching frequency is read in relation to the mass moment of inertia. From this the switching time can be calculated using
T = 60/f. The processing time is calculated from the time required by the respective customer application (e.g. time for component 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

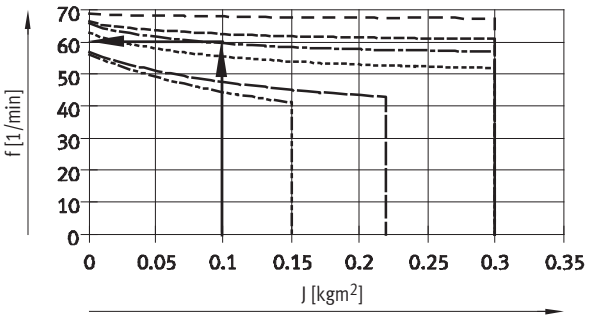
DHTG-140 with 8 stations and a mass moment of inertia of 0.1 kgm^2.

The customer application requires 300 ms per step for the insertion and removal of parts.

Switching frequency in rpm



Max. permissible cycle frequency



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

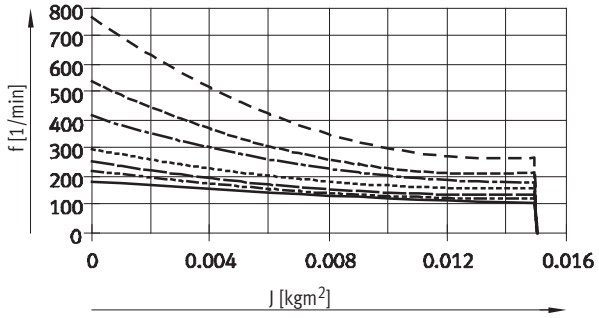
$T_{min.\ perm.\ cycle\ time} = \frac{60s}{59} = 1.017s = 1017ms$

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

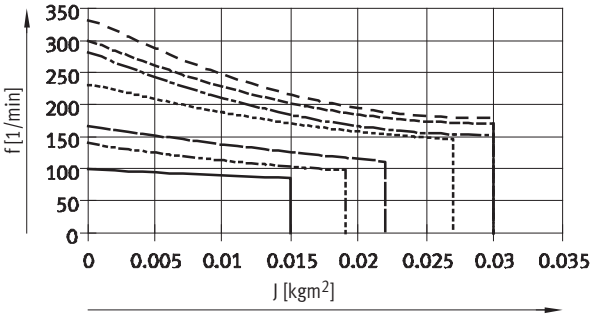
Given the fact that the switching time + processing time is smaller than the min. permissible cycle time, the rotary indexing table must stay in the end position before the next step is performed. In other words, between the switching an additional dwell time of 256 ms must be allowed for in the control sequence.

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

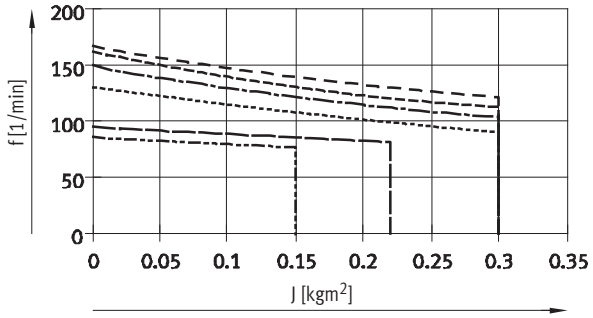
Size 65



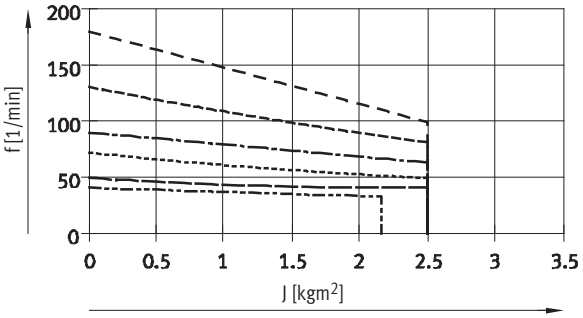
Size 90



Size 140

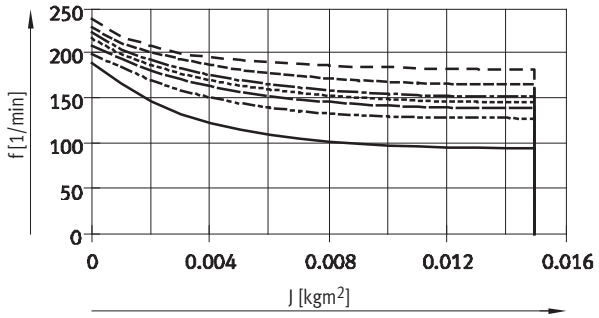


Size 220

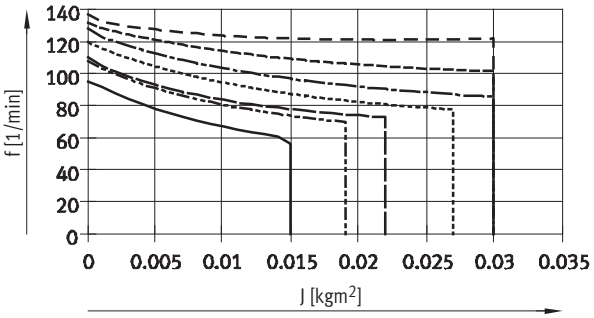


Max. permissible cycle frequency f as a function of mass moment of inertia J

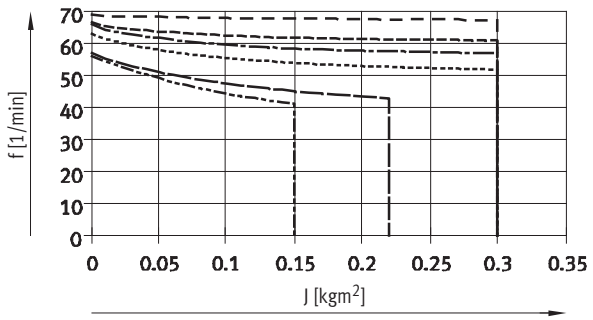
Size 65



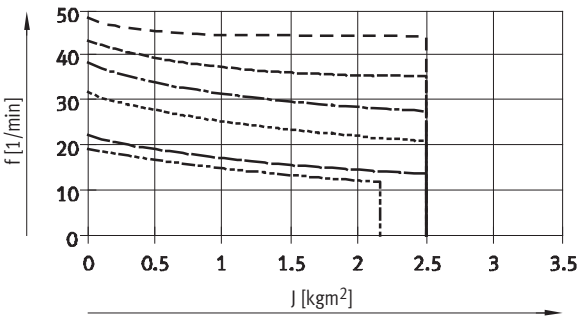
Size 90



Size 140



Size 220



- 2 indexing stations
- 3 indexing stations
- 4 indexing stations
- 6 indexing stations
- 8 indexing stations
- 12 indexing stations
- 24 indexing stations

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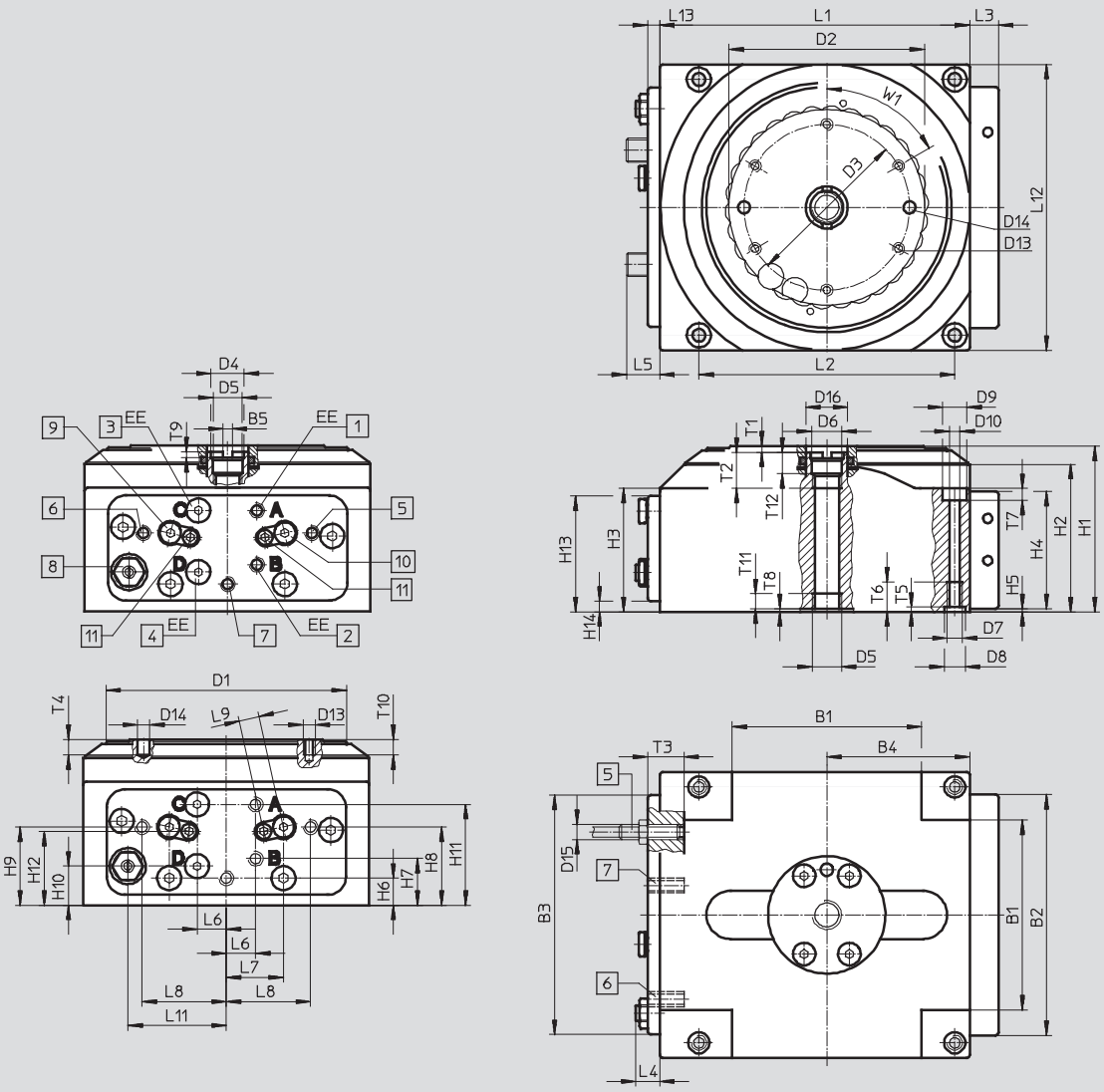
Size 65



1 Supply port: unlock and rotate (reciprocating motion: unlock)
2 Supply port: lock and return stroke (reciprocating motion: lock)
3 Blanking plug; (reciprocating motion: supply port for clockwise turning)
4 Blanking plug; (reciprocating motion: supply port for anti-clockwise turning)
5 Sensor turned for clockwise rotation (sensor basic setting for anti-clockwise rotation)
6 Sensor basic setting for clockwise rotation (sensor turned for anti-clockwise rotation)
7 Sensor lock
8 One-way flow control valve
9 Adjustment of end position cushioning for anti-clockwise operation and reciprocating operation (non-applicable for clockwise rotation)
10 Adjustment of end position cushioning for clockwise operation and reciprocating operation (non-applicable for anti-clockwise rotation)
11 Tightening of end position cushioning 2.5 Nm

Rotary indexing tables DHTG

Technical data

Size	B1[3] ±2	B2	B3	B4	B5 +0,1	D1 ∅	D2 ∅	D3[1] ∅	D4 ∅	D5	D6 ∅ H8	D7
65	63	80	79,5	47,5	3	80	65	55	11	G⅛	10	M5

Size	D8 ∅ H8	D9 ∅	D10 ∅	D13	D14 ∅ H8	D15	D16 ∅ 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

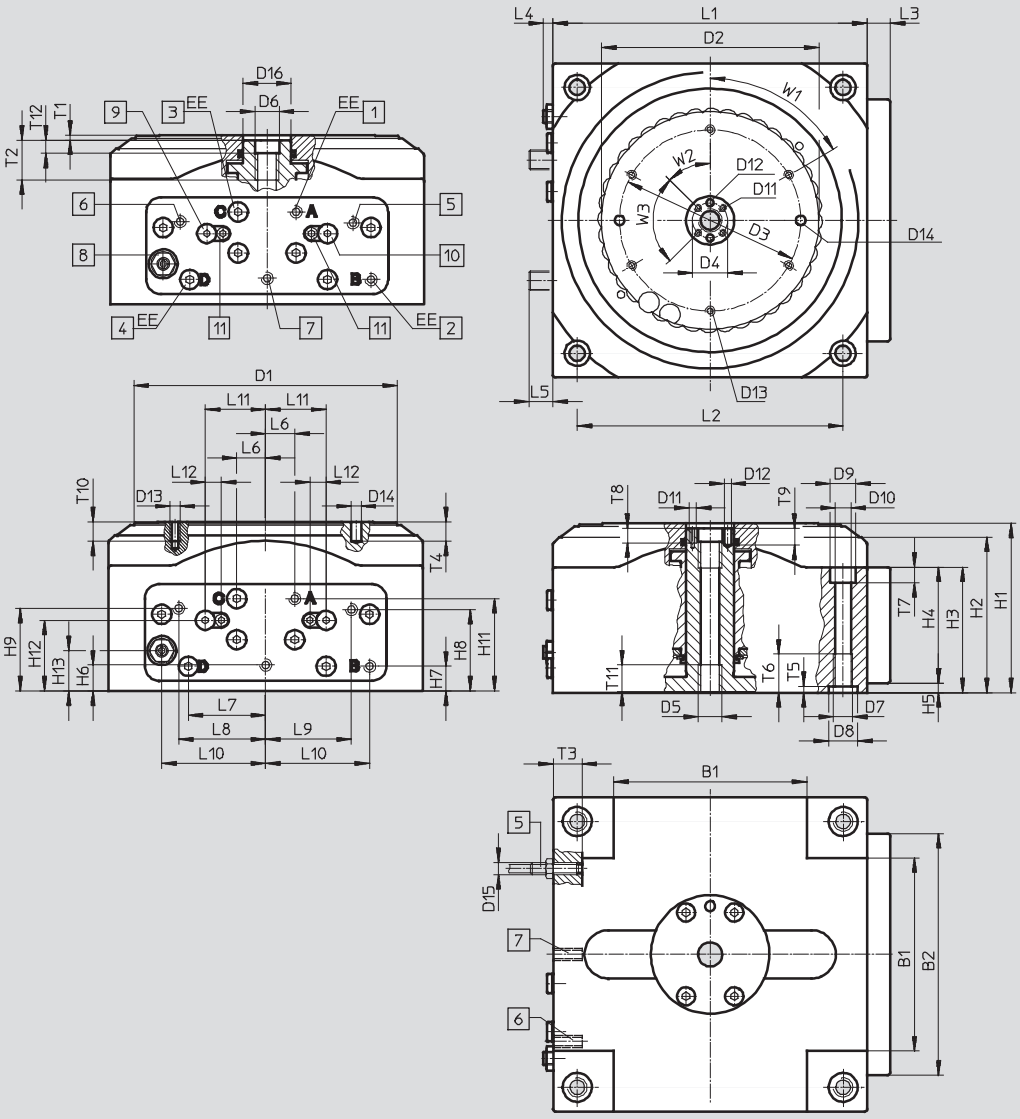
Size	L3	L4	L5[2] max	L6	L7	L8	L9	L11	L12 ±0,1	L13 +0,1	T1 ±1	T2 min
65	9,5	8	11	9,75	19	28	6,7	32,75	95	3,5	2	14

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

Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

Size 90



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Rotary indexing tables DHTG

Technical data

Size	B1[3] ±2	B2	D1 ∅	D2 ∅	D3[1] ∅	D4[1] ∅	D5	D6 ∅ H8	D7	D8 ∅ H8	D9 ∅	D10 ∅
90	80	100	109	90	75	14,5	G1⁄8	10	M8	12	10,5	6,4

Size	D11	D12 ∅ H8	D13	D14 ∅ H8	D15	D16 ∅ 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

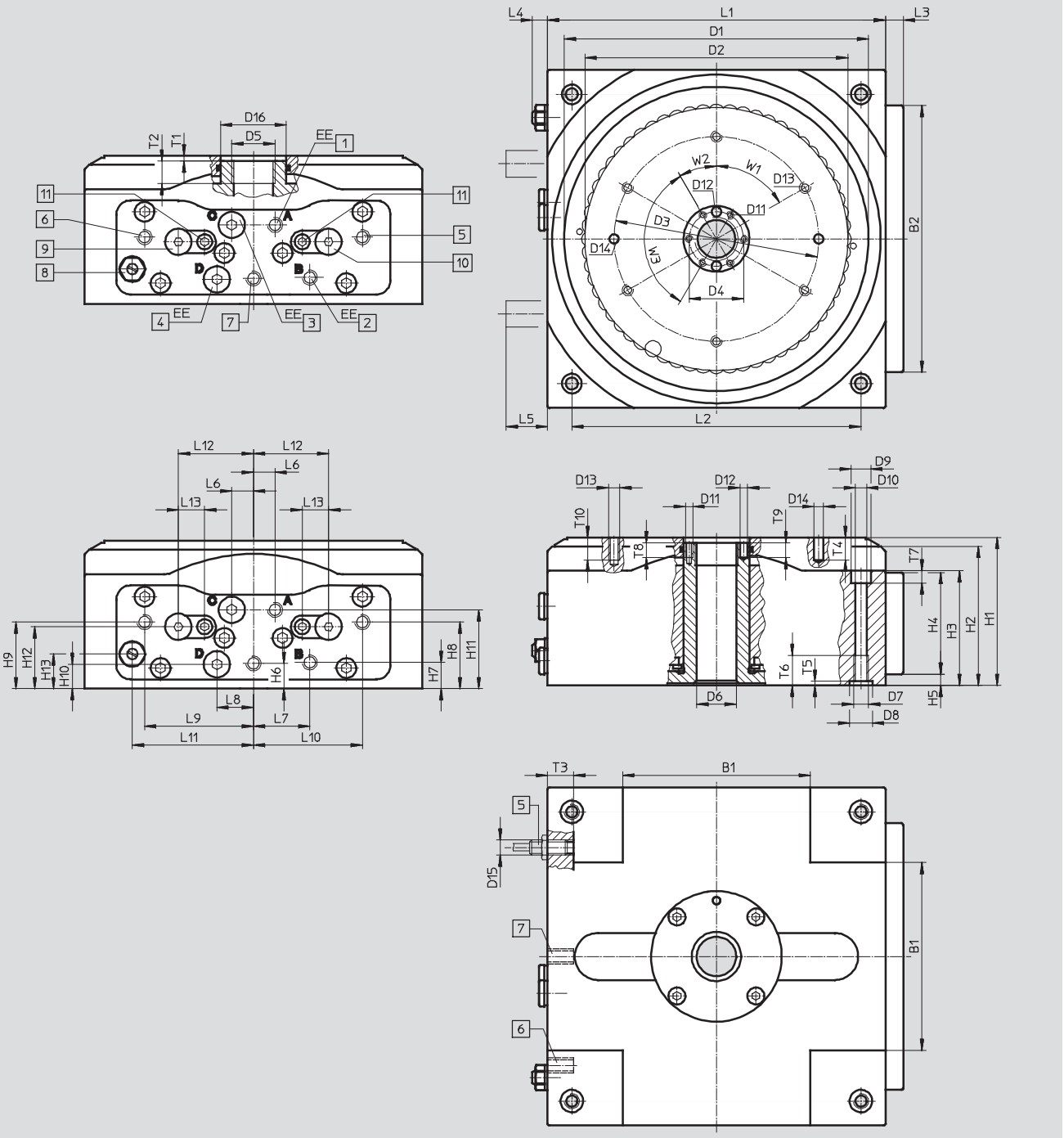
Size	L6	L7	L8	L9	L10	L11	L12	T1 ±1	T2 min	T3	T4 min
90	12	32	36	35,5	43	25	6,7	2	16,5	12	8

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 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

Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

Sizes 140, 220



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Rotary indexing tables DHTG

Technical data

Size	B1[3] ±2	B2	D1 ∅	D2 ∅	D3[1] ∅	D4[1] ∅	D5	D6 ∅	D7	D8 ∅ H8	D9 ∅	D10 ∅	D11	D12 ∅ 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

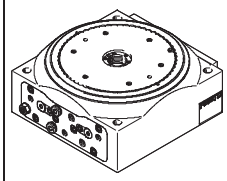
Size	D13	D14 ∅ H8	D15	D16 ∅ H8	EE	H1 ±0,5	H2	H3	H4	H5	H6	H7	H8	H9
140	M6	5	M8x1	35	G⅛	79	74	61	54	6	13,5	14	35,5	35,5
220	M8	6	M8x1	75	G⅛	89	83,5	68,5	64	4,5	13,5	24,5	15	15

Size	H10	H11	H12	H13	L1 □ ±0,1	L2[1] □	L3	L4 +1	L5[2] max	L6	L7	L8	L9	L10	L11
140	13	42	33	18,5	180	154	9,5	8,25	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

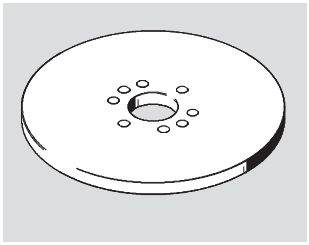
Size	L12	L13	T1 ±1	T2 min	T3 min	T4 min	T5 +0,1	T6 min	T7	T8 min	T9 min	T10 min	W1	W2	W3
140	40	14	3	12	14	8	2,6	16	6,5	8	8	11	60°	30°	120°
220	68	14	4	–	19	8	3,1	20	8,5	10	10	11	60°	30°	120°

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

Ordering data

	Size	Indexing stations	Part No.	Type
	65	2	**548 076**	**DHTG-65-2-A**
		3	**555 448**	**DHTG-65-3-A**
		4	**548 077**	**DHTG-65-4-A**
		6	**548 078**	**DHTG-65-6-A**
		8	**548 079**	**DHTG-65-8-A**
		12	**548 080**	**DHTG-65-12-A**
		24	**548 081**	**DHTG-65-24-A**
	90	2	**548 082**	**DHTG-90-2-A**
		3	**555 449**	**DHTG-90-3-A**
		4	**548 083**	**DHTG-90-4-A**
		6	**548 084**	**DHTG-90-6-A**
		8	**548 085**	**DHTG-90-8-A**
		12	**548 086**	**DHTG-90-12-A**
		24	**548 087**	**DHTG-90-24-A**
	140	3	**555 450**	**DHTG-140-3-A**
		4	**548 088**	**DHTG-140-4-A**
		6	**548 089**	**DHTG-140-6-A**
		8	**548 090**	**DHTG-140-8-A**
		12	**548 091**	**DHTG-140-12-A**
		24	**548 092**	**DHTG-140-24-A**
	220	3	**555 451**	**DHTG-220-3-A**
		4	**548 093**	**DHTG-220-4-A**
		6	**548 094**	**DHTG-220-6-A**
		8	**548 095**	**DHTG-220-8-A**
		12	**548 096**	**DHTG-220-12-A**
		24	**548 097**	**DHTG-220-24-A**

Unmachined table
DADG-UPT, rotating
DADG-UPF, fixed



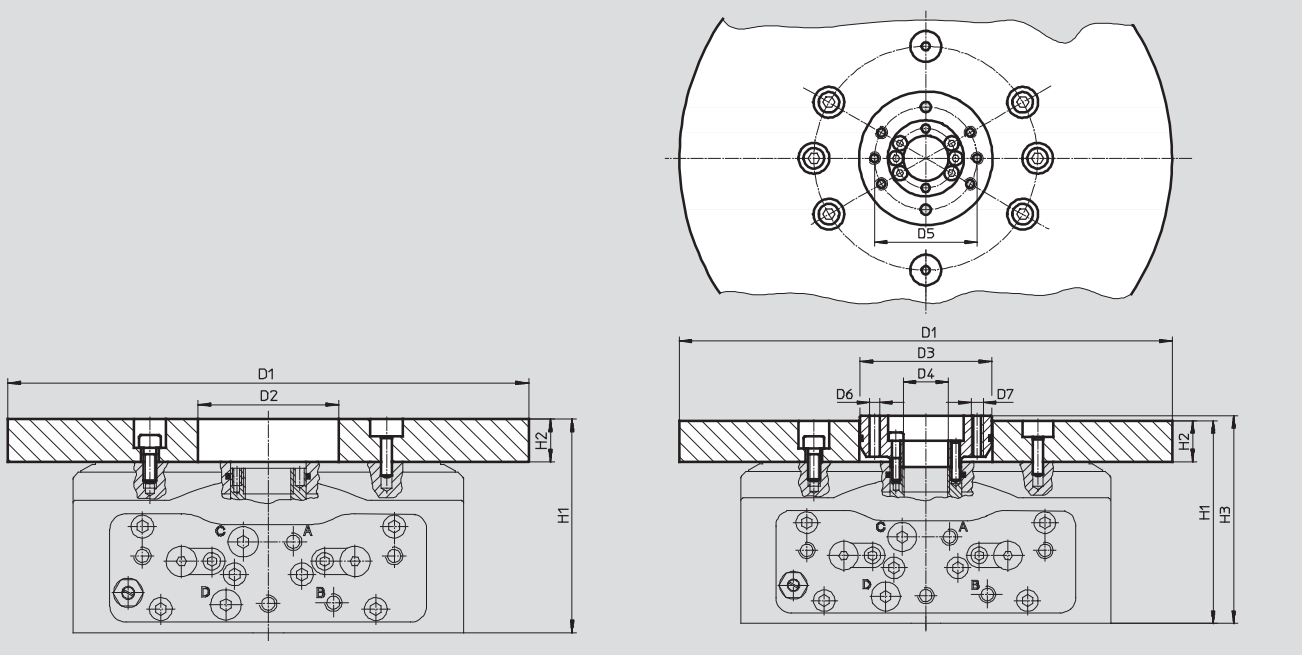
Note

You can order unmachined plates with a standard hole pattern or individual interface via your local contact.

Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

With rotating unmachined plate DADG-UPT

With rotating unmachined plate DADG-UPT and adapter kit DADG-AK for mounting the fixed unmachined plate DADG-UPF



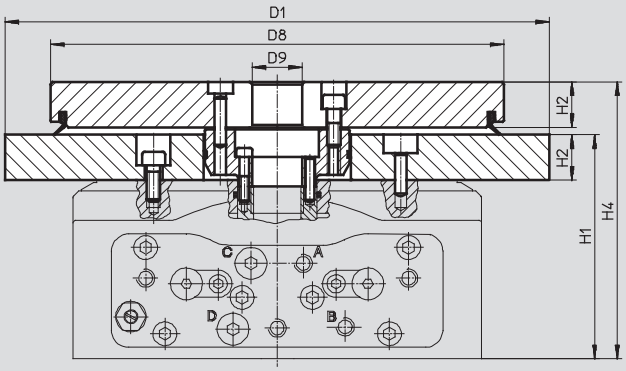
Size	D1[1] ∅ ±0.3	D2 ∅ +0.1	H1 ±0.5	H2[2] ±0.1
With rotating unmachined plate				
DADG-UPT-65	90 ... 170	30.3	70	15
DADG-UPT-90	120 ... 210	40.4	85	15
DADG-UPT-140	170 ... 350	65.3	99	20
DADG-UPT-220	250 ... 550	105.4	103	20

Size	D1[1] ∅ ±0.3	D3 ∅ +0.2	D4 ∅ +0.2	D5 ∅	D6 ∅ H7	D7	H1 ±0.5	H2[2] ±0.1	H3 ±0.5
With rotating unmachined plate and adapter kit									
DADG-UPT-65 DADG-AK-65	90 ... 170	29	5	20	4	M4	70	15	72
DADG-UPT-90 DADG-AK-90	120 ... 210	39	9	30	4	M4	85	15	87
DADG-UPT-140 DADG-AK-140	170 ... 350	64	22	50	5	M6	99	20	101
DADG-UPT-220 DADG-AK-220	250 ... 550	104	58.4	90	6	M8	109	20	111

1) Plate diameter as required
2) Plate thickness can be reduced by up to 5 mm

Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

With rotating unmachined plate DADG-UPT and fixed unmachined plate DADG-UPF



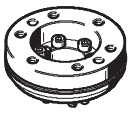
Note

The adapter kit DADG-AK is required for mounting the fixed unmachined plate DADG-UPF.

Size	D1[1] ∅ ±0.3	D8 ∅ ±0.3	D9 ∅ +0.2	H1 ±0.5	H2[2] ±0.1	H4 ±0.5
DADG-UPT-65 DADG-UPF-65 DADG-AK-65	90 ... 170	50 ... 90	5	70	15	87
DADG-UPT-90 DADG-UPF-90 DADG-AK-90	120 ... 210	60 ... 120	10	85	15	102
DADG-UPT-140 DADG-UPF-140 DADG-AK-140	170 ... 350	100 ... 200	22	99	20	121
DADG-UPT-220 DADG-UPF-220 DADG-AK-220	250 ... 550	140 ... 300	60	109	20	131

1) Plate diameter as required
2) Plate thickness can be reduced by up to 5 mm

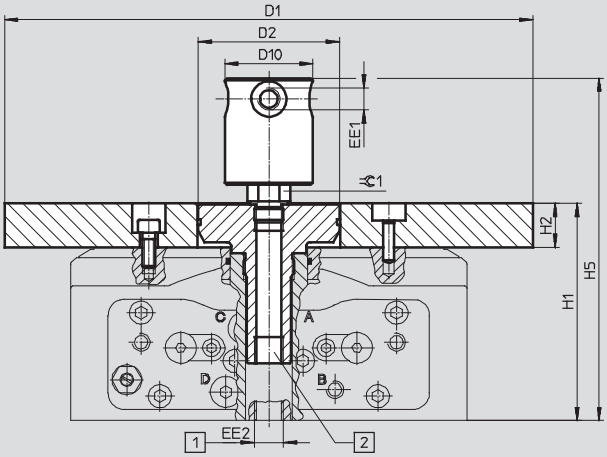
Ordering data – Adapter kit DADG-AK

	For size	Part No.	Type
	65	**555 424**	**DADG-AK-65**
	90	**555 425**	**DADG-AK-90**
	140	**555 426**	**DADG-AK-140**
	220	**555 427**	**DADG-AK-220**

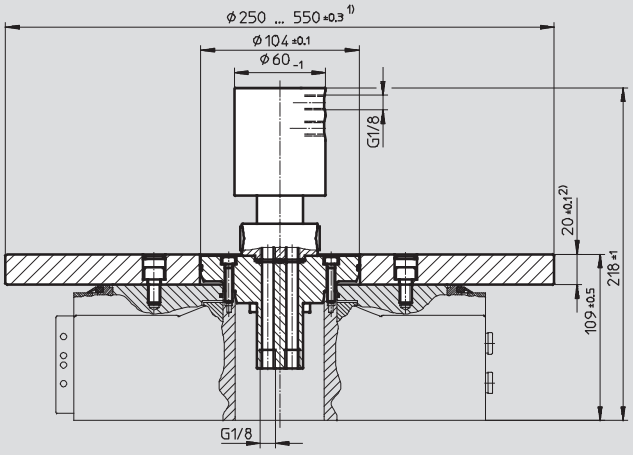
Rotary distributor
GF-..., single
GF-...-2, multiple

Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

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



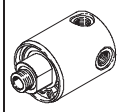
With rotary distributor GF-⅛-2 (multiple) and adapter kit DADG-AK-220-2G18 – For size 220

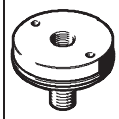


1 External supply port for DHTG-65/90
2 Internal supply port for DHTG-140/220

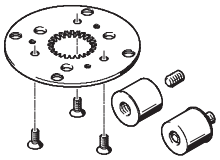
Size	D1 1) ∅ ±0.3	D2	D10 ∅ +0.2	EE1	EE2	H1 ±0.5	H2 2) ±0.1	H5 ±1	⌀1
DADG-UPT-65 DADG-AK-65-1G18 GF-⅛-M5	90 ... 170	29	40	M5	G⅛	70	15	127.5	17
DADG-UPT-90 DADG-AK-90-1G18 GF-⅛-M5	120 ... 210	39	40	M5	G⅛	85	15	142.5	17
DADG-UPT-140 DADG-AK-140-1G14 GF-¼-⅛	170 ... 350	64	40	G⅛	G¼	99	20	155.5	17
DADG-UPT-220 DADG-AK-220-1G12 GF-½-¼	250 ... 550	104	60	G¼	G½	109	20	187.5	27

1) Plate diameter as required
2) Plate thickness can be reduced by up to 5 mm

Ordering data – Rotary distributor GF			
	For size	Part No.	Type
	Single		
	65, 90	**539 290**	**GF-⅛-M5**
	140	**539 291**	**GF-¼-⅛**
	220	**539 292**	**GF-½-¼**
	Multiple		
	220	**539 287**	**GF-⅛-2**

Ordering data – Adapter kit DADG-AK			
	For size	Part No.	Type
	Single		
	65	**555 428**	**DADG-AK-65-1G18**
	90	**555 429**	**DADG-AK-90-1G18**
	140	**555 430**	**DADG-AK-140-1G14**
	220	**555 431**	**DADG-AK-220-1G12**
	Multiple		
	220	**555 432**	**DADG-AK-220-2G18**

Ordering data

	For size	Indexing stations	Part No.	Type
Indexing conversion kit DADM-CK				
	65	2	**548 098**	**DADM-CK-65-2**
		3	**554 389**	**DADM-CK-65-3**
		4	**548 099**	**DADM-CK-65-4**
		6	**548 100**	**DADM-CK-65-6**
		8	**548 101**	**DADM-CK-65-8**
		12	**548 102**	**DADM-CK-65-12**
		24	**548 103**	**DADM-CK-65-24**
	90	2	**548 104**	**DADM-CK-90-2**
		3	**555 445**	**DADM-CK-90-3**
		4	**548 105**	**DADM-CK-90-4**
		6	**548 106**	**DADM-CK-90-6**
		8	**548 107**	**DADM-CK-90-8**
		12	**548 108**	**DADM-CK-90-12**
		24	**548 109**	**DADM-CK-90-24**
	140	3	**555 446**	**DADM-CK-140-3**
		4	**548 110**	**DADM-CK-140-4**
		6	**548 111**	**DADM-CK-140-6**
		8	**548 112**	**DADM-CK-140-8**
		12	**548 113**	**DADM-CK-140-12**
		24	**548 114**	**DADM-CK-140-24**
	220	3	**555 447**	**DADM-CK-220-3**
		4	**548 115**	**DADM-CK-220-4**
		6	**548 116**	**DADM-CK-220-6**
		8	**548 117**	**DADM-CK-220-8**
		12	**548 118**	**DADM-CK-220-12**
		24	**548 119**	**DADM-CK-220-24**
Reciprocating motion kit DADM-TK				
	65	–	**548 120**	**DADM-TK-65**
	90		**548 121**	**DADM-TK-90**
	140		**563 304**	**DADM-TK-140**
	220		**563 305**	**DADM-TK-220**

Ordering data – Proximity sensors, inductive Technical data ➔ Internet: sien

	For size	Contact	Connection	Part No.	Type
	65, 90	N/O contact	Plug	**150 371**	**SIEN-M5B-PS-S-L**
		N/C contact	Plug	**150 375**	**SIEN-M5B-PO-S-L**
	140, 220	N/O contact	Cable	**150 386**	**SIEN-M8B-PS-K-L**
			Plug	**150 387**	**SIEN-M8B-PS-S-L**
		N/C contact	Cable	**150 390**	**SIEN-M8B-PO-K-L**
			Plug	**150 391**	**SIEN-M8B-PO-S-L**

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	**541 333**	**NEBU-M8G3-K-2.5-LE3**
			5	**541 334**	**NEBU-M8G3-K-5-LE3**
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	**541 338**	**NEBU-M8W3-K-2.5-LE3**
			5	**541 341**	**NEBU-M8W3-K-5-LE3**

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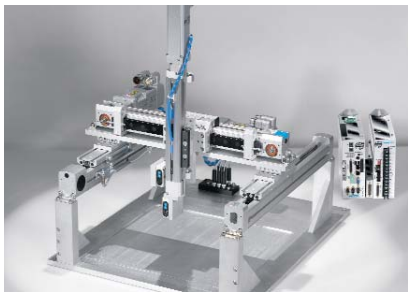

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