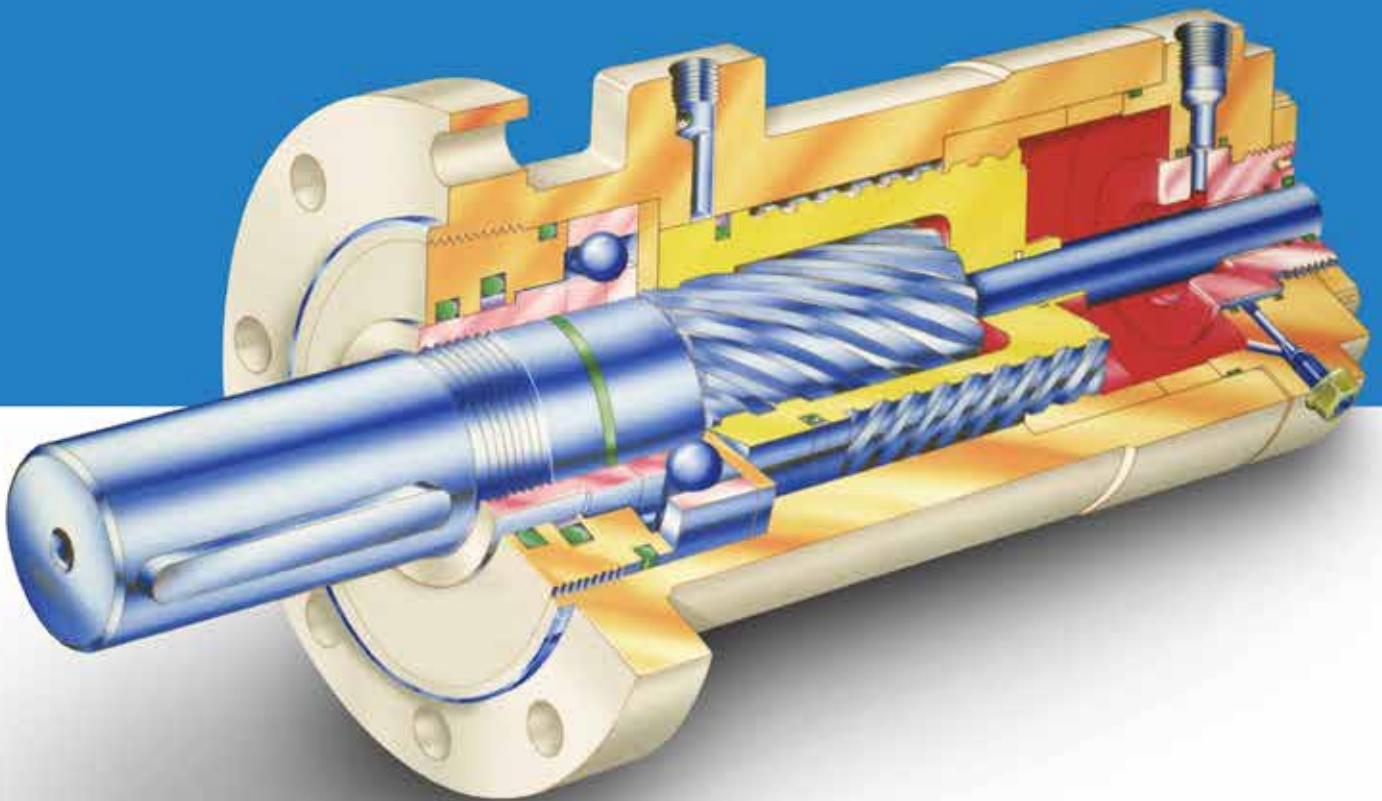


# Rotary Actuators

HDZ ZD DHZ DZ ASM



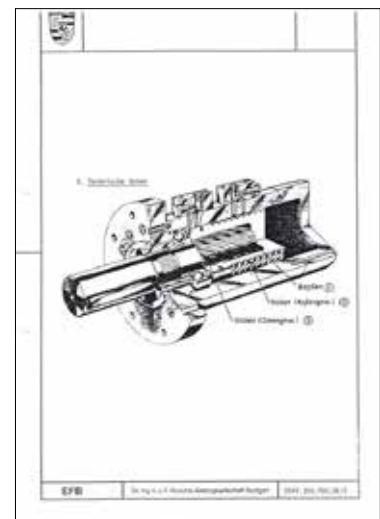


## Rotating and swivelling since 30 years

Our company is engaged in production and distribution of high-helix swivel motors and rotary actuators. The company Voss Antriebstechnik GmbH has made the rotating to our passion. We are a reliable partner if you want to rotate things efficiently and precisely. Our rotary actuators have a 30 years long history. The original product rotary piston cylinder (original name: Drehkolbenzylinder") was developed, produced and distributed by the the company Rudolf Hausherr from Sprockhövel(Germany). The company Hausherr was for a long time a known market leader in oil hydraulics, machines and drilling technology. After the collapse of the most important customer - the mining industry in the Ruhr area, the company Hausherr slid also into financial difficulties. In the 90s the company WALTER VOSS took over the the rotary actuators from the Rudolf Hausherr & Söhne GmbH & Co. KG and developed them continuously further.

WALTER VOSS Fluidtechnik GmbH is a reliable manufacturer of water hydraulic products, which also has produced high quality swivel motors until now. To be able to react to the dynamic and growing market of the swivel drives - we have created an separate swivel drives department. The new department allows us to concentrate on our innovative product - high-helix swivel drives. So we decided to create a new brand for the rotary actuators- the rotary actuators are now produced and distributed under the name of VOSS Antriebstechnik GmbH.

Customer satisfaction and the quality of our products are of paramount importance for us. As a result are our products subject to highest quality requirements. We also perform 100 % quality tests. The company Dr. Ing. h. c. F. Porsche AG Stuttgart analyzed and calculated the rotation involved parts to increase the efficiency of the product. We owe to this fact that our customers can benefit from very efficient force transmission of our rotary actuators.



## Voss Antriebstechnik means to our customers:

- ✓ customized solutions for your application
- ✓ Highest quality for a reasonable price
- ✓ process reliability thanks to decades of experience
- ✓ short reaction times
- ✓ Customer friendliness

## Voss Antriebstechnik GmbH Rotating and swivelling with passion

## Product portfolio

Voss Antriebstechnik GmbH provides in the product range of high-helix swivel motors 3 different product groups. This are a series of swivel motors for an operating pressure up to 210 bar (Serie HDZ) and a series for an operating pressure up to 100 bar (Serie ZD). Both series can be offered as swivel/lifting units additionally combined with linear cylinders

## Areas of application

Areas of application are for example: the general machine construction, special machine construction, machine tools construction, automatic machine construction, robotics, shipbuilding, vehicle construction, apparatus construction, woodworking machinery, plastics processing, injection moulding machines, defence technology, butchering machines, packing machines or wind turbines.

## Principle of operation

Das Prinzip der Übertragung hydraulischer Energie auf, konzentrisch zur Rotationsachse angeordnete Steilgewinde liegt allen, in diesem Prospekt beschriebenen Baureihen von Steilgewinde-Schwenkmotoren zu Grunde. Dadurch ist die Realisierung sehr kompakter zylindrischer Abmessungen möglich, die dem beengten Platzangebot moderner Industrieanlagen zu Gute kommen. Auf engstem Einbauraum können Schwenk-, bzw. Hub/Schwenkbewegungen mit hohen Drehmomenten in allen Bereichen der Industrie, in denen Lasten bewegt oder zugestellt werden müssen, realisiert werden.

## Swivel motor

In order to create technically and economically balanced solutions - the swivel motors are used for new applications.

The self contained, compact, reliable and powerful swivel motors justify the use of a hydraulic system in series which usually don't include hydraulic actuators. The threads which are running in opposite directions between the particular components, allow to convert the axial movement of the piston (created with the hydraulic energy) into a accumulated rotation of the drive shaft.

For the deceleration of the rotation there are end position dampers (HDZ standard equipment, ZD additional equipment) The damping effect can be adjusted by appropriate damper elements. For the fine adjustment of the nominal angle of rotation (only HDZ series) - it is possible to compensate the manufacturing and mounting tolerances by means of an adjusting screw in the cylinder base.

## Lifting/swivelling unit

Lifting/swivelling units are compact drive elements, which make it possible to transmit high torques and loads on smallest possible mounting spaces in a reliable and cost-efficient way. The transmission can be as well synchronous, as asynchronous. The swivel motors of the series HDZ and ZD can be adopted according to customer constraints.





## HDZ series

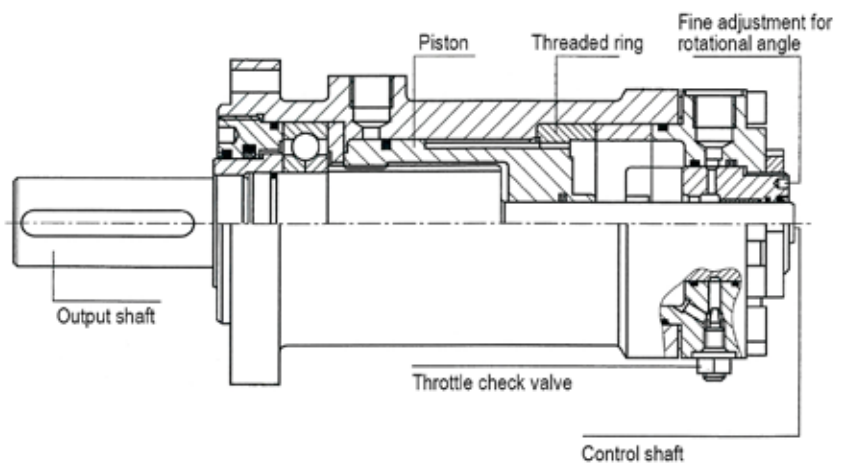
The high-helix swivel motors of the HDZ series are designed for operating pressures up to 210 bar. They are characterized by their compact cylindrical design and can be used in all industrial areas, where high torque swivelling motions must be realized in extremely narrow mounting space

### Design

The main components of a rotary actuators is their compact cylindrical design. They can be used in any industrial field where rotary movements with high torque are required in extremely restricted spaces. Their wide range of applications includes machine tools, special machines, construction equipment, the automobile sector, shipbuilding, etc.

### Function

The helical threads provided between the cylinder tube, piston output shaft are matched to work in opposing directions, which means that the reciprocating motion of the piston is converted to a purely rotary motion at the output shaft. The results are relatively high torque values combined with small dimensions and low hydraulic fluid capacities. With hydraulic fluid fed to the front input connection, the direction of rotation will be anti clockwise (with the output shaft viewed from the front).



#### Design data

**Operating pressure:** Up to 210 bar

**Torque** Up to 20,200 Nm

**Rotational angle:** 0 - 360°  
(up to 720° on request)  
fine adjustment +/- 5

**Standard design:**

- End position cushioning on both sides
- Control shaft
- Fine angle adjustment
- Output shaft with two feather keys
- Flange connection

**Options:**

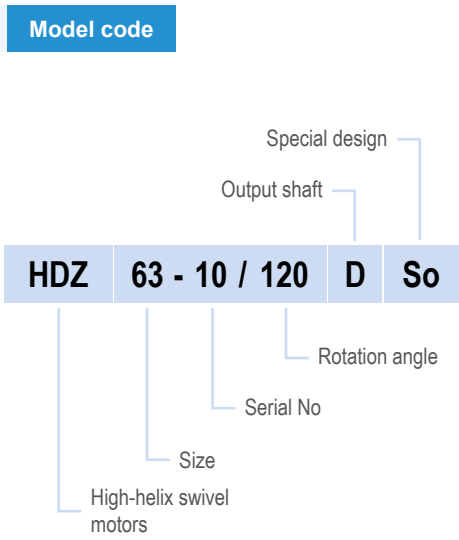
- Toothed shaft connection
- Special rotational angles

**Fluid:**

- HLP mineral oil according to DIN 51525
- Water-based or synthetic operating fluids upon request

## End-position cushioning

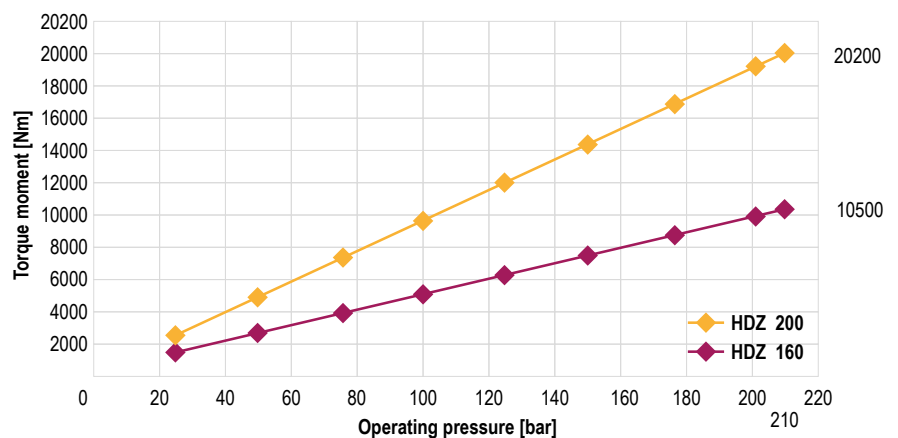
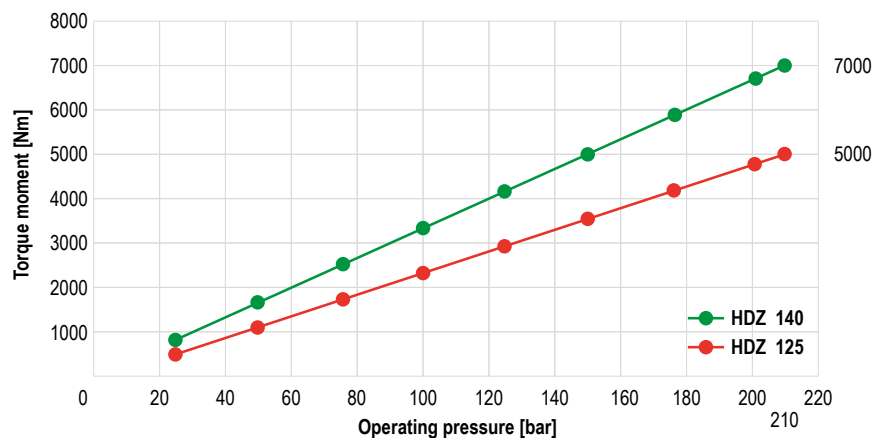
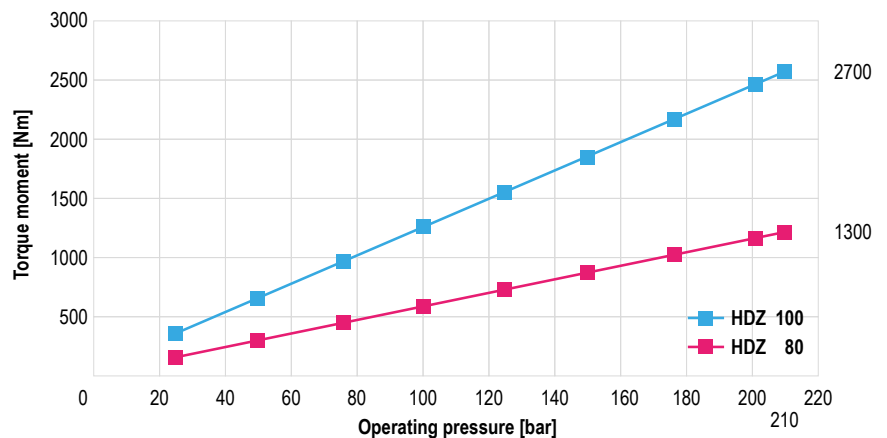
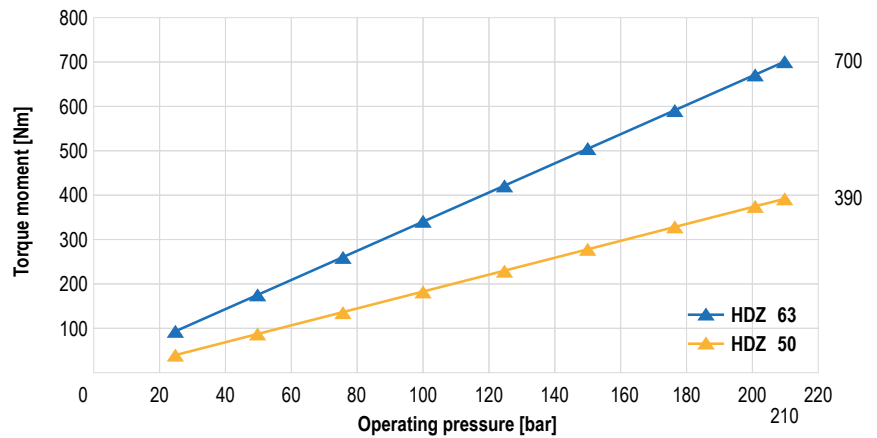
The rotary actuators are equipped with an end positioning cushion device. The cushioning effect can be adjusted via throttle check valves. Incoming oil flow can pass the valve unrestricted allowing the required operating speed to be obtained immediately. Please note that during deceleration the maximum allowable torque for the actuator must not be exceeded.



### Ordering example:

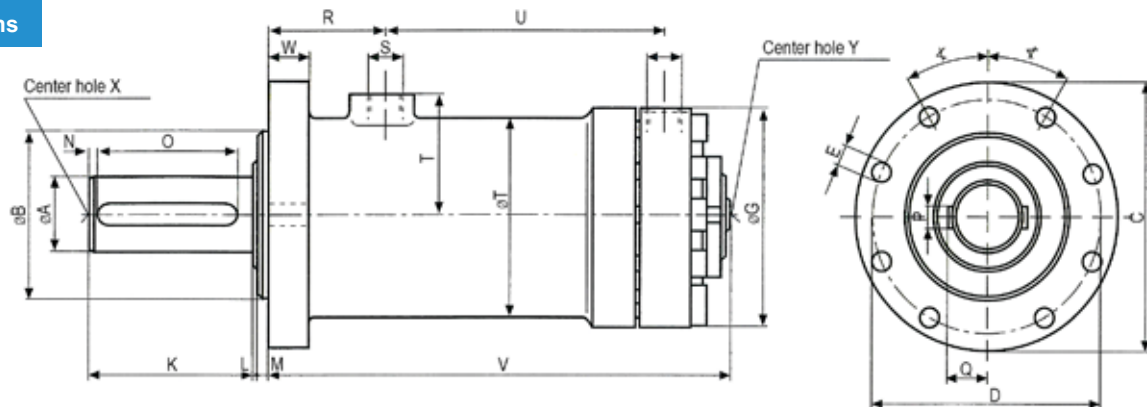
High-helix swivel motors size 63, 120° rotation angle, Standard

**HDZ 63 - 10 / 120 D**





**Dimensions**



Typ		HDZ 50	HDZ 63	HDZ 80	HDZ 100	HDZ 125	HDZ 140	HDZ 160	HDZ 200
Ø A	k6	28	35	wv45					
	m6				55	70	80	95	115
Ø Bf7		68	80	100	125	155	165	200	245
Ø C		112	128	155	182	224	245	285	330
Ø D		97	112	135	160	196	215	250	295
Ø E		9	9	11	13	17	17	22	22
Anzahl E		4	6	6	6	6	8	8	12
∠		45°	30°	30°	30°	30°	22.5°	22.5°	20°
Ø F		81	96	114	138	168	186	216	260
Ø G		87	105	125	147	178	194	235	285
K		60	80	110	110	140	140	170	210
L		2	2	2	2	2	2	3	3
M		5	5	5	5	8	8	10	12
N		1.5	3	3	3	5	5	5	5
O		56	70	100	100	125	125	160	200
P DIN 6885		8	10	12	16	20	22	25	32
Q DIN 6885		15.9	19.8	24.6	31.5	39.5	45	52.5	64.5
R		44	56	62.5	72	84	89	102	117
S		G 1/4	G 3/8	G 1/2	G 1/2	G 3/4	G 3/4	G 3/4	G1
T		49	56	70	83	100	119	129	153
U	90°	86.5	93	124.5	136	175.5	178	212	252
	180°	123	137	180	206	260	274	325	392
	360°	196	226	291	346	429	466	552	673
V	90°	164.5	181	231	250	310.5	319	376	450
	180°	201	225	286	320	395	415	489	590
	360°	274	314	397	460	564	607	716	870
W		15	20	25	30	32	35	38	43
X		DM 8	DM 8	DM 12	DM 16	DM 20	DM 20	DM 24	DM 24
Y		DM 5	DM 5	DM 8	DM 8	DM 12	DM 12	DM 16	DM 16

**Technical data**

Typ		HDZ 50	HDZ 63	HDZ 80	HDZ 100	HDZ 125	HDZ 140	HDZ 160	HDZ 200
Swept volume (dm³)	90°	0.043	0.074	0.139	0.274	0.518	0.737	1.139	2.203
	180°	0.086	0.148	0.278	0.548	1.036	1.474	2.278	4.406
	360°	0.172	0.296	0.556	1.096	2.072	2.948	4.556	8.812
Weight (kg)	90°	6.5	10.4	17.0	25.0	47.5	60.0	115.0	198.0
	180°	7.4	11.8	20.5	31.5	57.0	73.0	141.0	245.0
	360°	9.0	14.6	26.0	40.0	76.0	99.0	192.0	340.0
Max. radial load applied at K/2 (N)		2200	2800	4500	5000	13500	16000	21000	38000

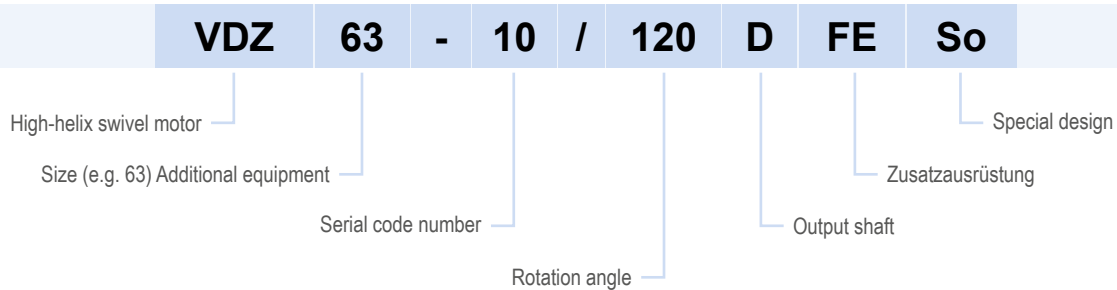
# VDZ series

The VDZ type is the **basic configuration of the HDZ**. VDZ allows the user to decide which options are required for his special application case. Possible options are:

Option	Purpose
DB – Damping boring	End position damping
SW – Control shaft	End position sensing of the rotary position
FE – Fine adjustment	A fine adjustment of the end position and/or the initial position +/- 5°

The HDZ series already contains these options.

## Model code



## Specifications

<b>Connection dimensions:</b>	as for the HDZ series
<b>Interlocking:</b>	as for the HDZ series
<b>Torque:</b>	as for the HDZ series
<b>Operating pressure:</b>	210 bar
<b>Hydraulic connectors:</b>	both connectors are on the connecting block on the cylinder tube
<b>Standard rotation angles:</b>	90°, 180°, 270°, 360°, Toleranz: +3° / -0° Different rotation angles are available.
<b>Standard version:</b> (Does not contain additional equipment)	→ <u>Without:</u> DB = double-sided end position damping SW = Control shaft FE = Fine angle adjustment
<b>Additional equipment:</b>	DB = double-sided end position damping SW = Control shaft FE = Fine angle adjustment
<b>Special rotation angle:</b>	The motor with the next larger standard rotation angle is provided with additional equipment (dimensioned according to the special rotation angle)  The position of the rear hydraulic connector will change, if the motor will be equipped with an end position damper (DB).



# ZD series

The high-helix swivel motors of the HDZ series are designed for operating pressures up to 100 bar. They are characterized by their compact cylindrical design and can be used in all industrial areas, where high torque swivelling motions must be realized in extremely narrow mounting space.

## Structure

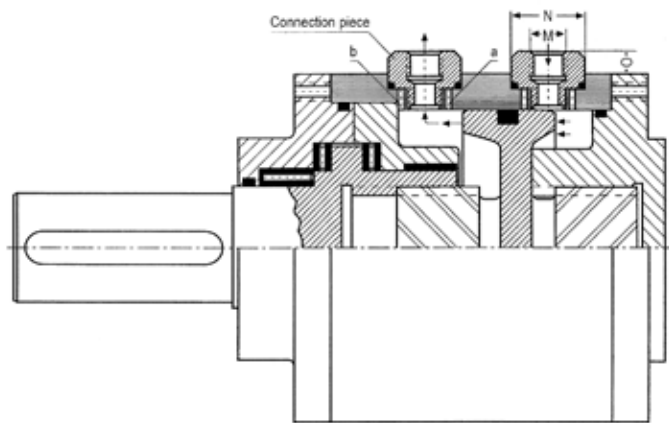
Drive shaft, piston and cylinder are the main parts of the high-helix swivel motors. The actuator parts have (inside or outside) contrary - multi-start threads. The sliding parts are made of high-strength, hardened material. Rotationally symmetric seals guarantee a leakage-free operation and the stop valves allows to avoid leaks under load and in any position. The ZD series is characterised its compact design. It can be used in extremely narrow mounting spaces.

## Mode of action

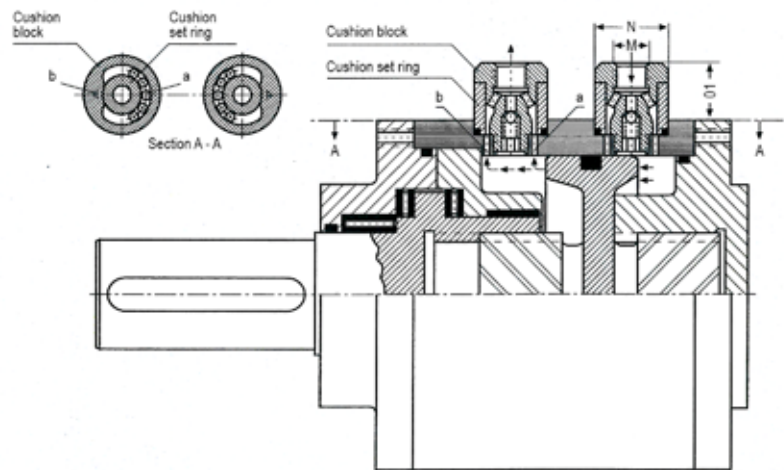
The threads which are running in opposite directions between the bottom of the cylinder, the piston and the drive shaft allow to convert the axial movement of the piston into the accumulated rotation of the drive shaft. If you look at the drive shaft - the direction of the rotation will be to the left, if the pressure fluid will be injected over the front connection.



### Non cushion actuator



### End positon cushion



### Version

Operating pressure:	Max. 100 bar
Design sizes: (Corresponds to the piston diameter)	40 - 200

Torque:	Up to 100 bar at 34 - 4.4464 Nm
---------	------------------------------------

Rotation angle ranges:	0 - 45° 0 - 90° 0 - 180° 0 - 360°
------------------------	--

**Serial version:**  
End position dampers on both sides,  
control shaft,  
output shaft with feather keys on both sides.

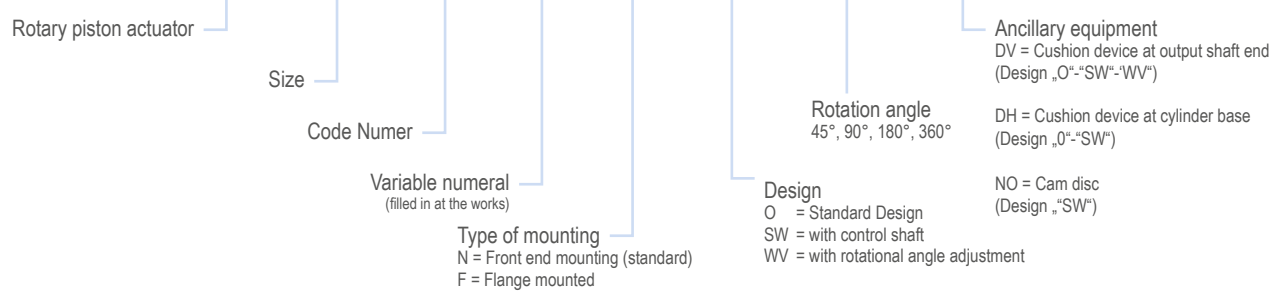
### Options

These actuators can be provided with special equipment like: stepless angle adjustment, control shaft or with an end position damper.

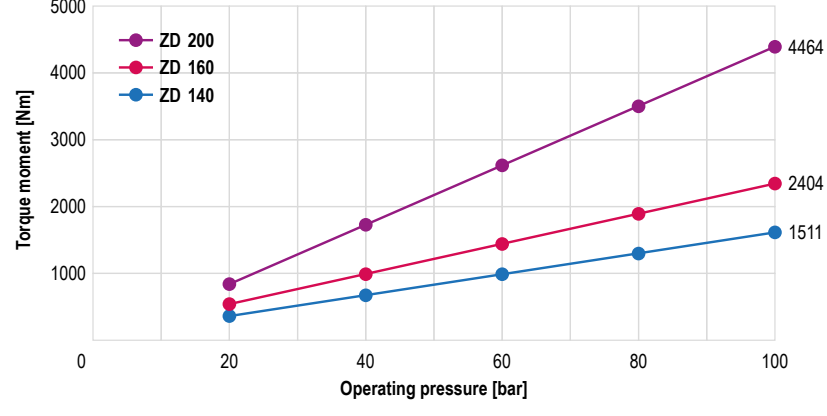
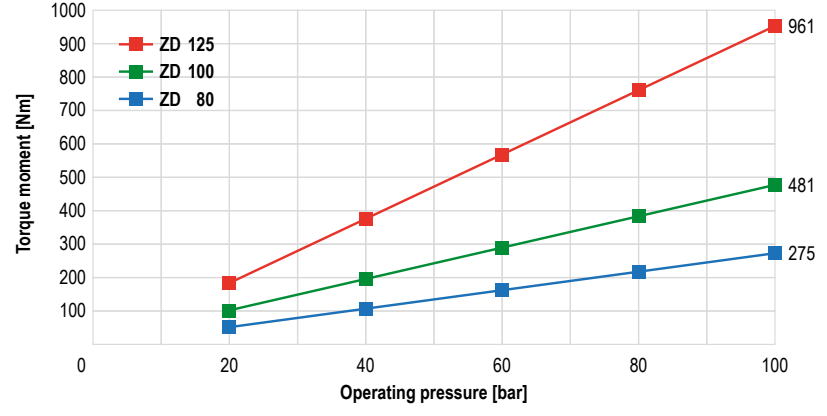
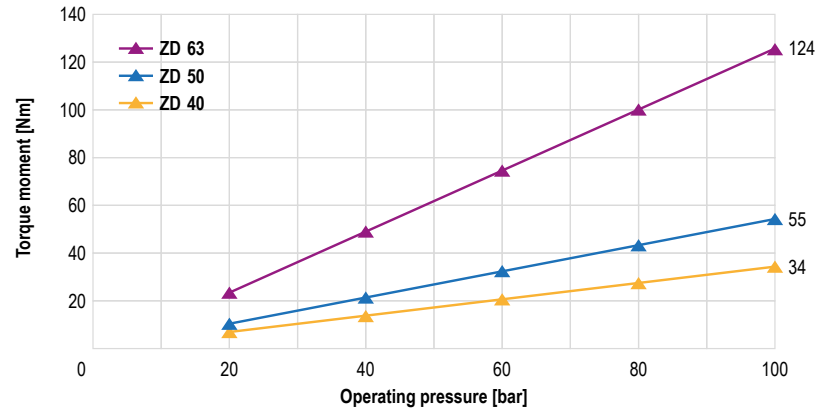


Type code

ZD 100 /1. 0/ N WV 180 DV



Torque = f(operating pressure)



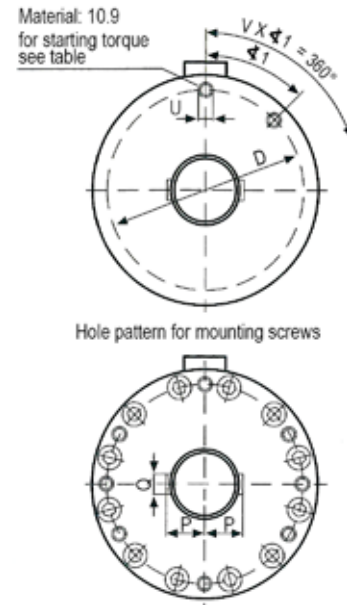
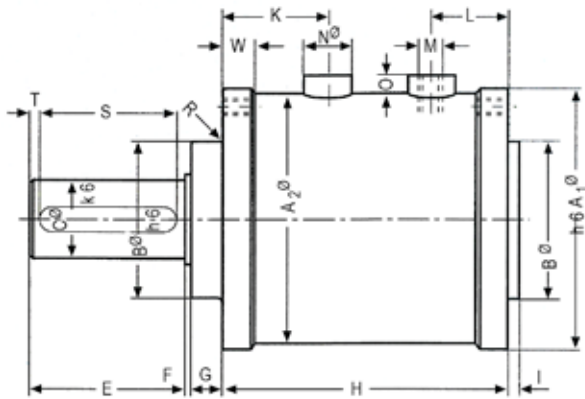
End position damper

The high-helix swivel motors can be equipped with an end position damper. The flow control valve can be used for the fine adjustment of the optimal damping effect.

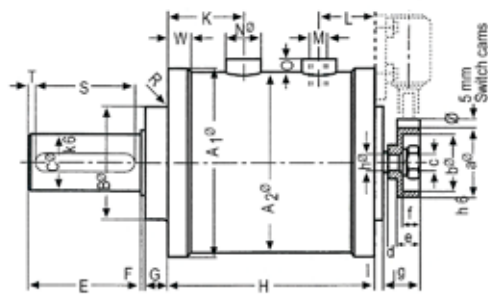
The incoming pressure fluid opens the valve and has an immediate and direct effect on the piston surface.



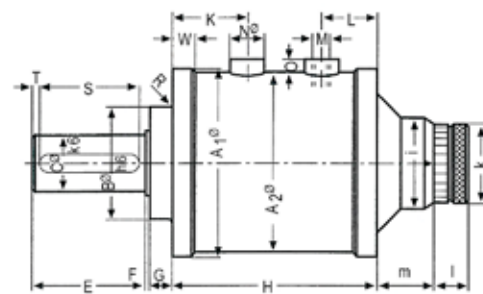
**Standard Design „O“**  
with front end mounting



**Control shaft and cam disc „SW“**



**Infinitely variable angle adjustment „WV“**



**Flange mounting „F“**

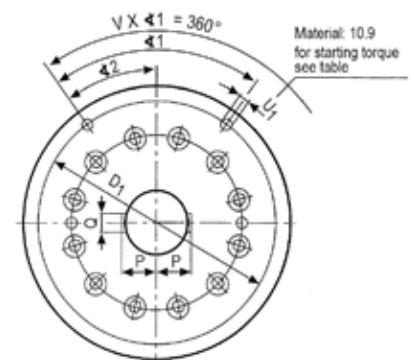
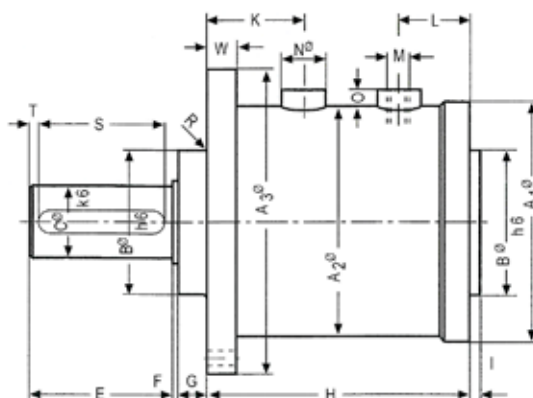





Table of dimensions

Typ	ZD 40	ZDv 50	ZD 63	ZD 80	ZD 100	ZD 125	ZD 140	ZD 160	ZD 200	
A <sub>1</sub>	63	73	88	113	133	164	180	209	245	
A <sub>2</sub>	63	73	88	108	128	158	180	209	245	
A <sub>3</sub>	90	100	120	150	170	210	235	270	310	
B	35	45	50	70	80	100	110	130	160	
C	15	20	25	35	40	50	60	70	90	
D	51	61	75	96	116	144	160	185	223	
D <sub>1</sub>	78	88	106	132	152	188	210	244	280	
E	30	40	50	70	80	100	120	140	180	
F	1	1	1	1	2	2	2	2	2	
G	9	11	17	17	21	27	37	45	51	
H	45°	79	82	94	133	144	168	192	218	303
	90°	79	82	94	133	144	168	192	218	303
	180°	88	106	124	175	192	228	264	302	411
	360°	124	154	184	259	288	348	408	470	627
I		4	4	4	5	6	8	10	10	12
	45°	27	31	33	49	54	62	65	77	116
K	90°	27	31	33	49	54	62	65	77	116
	180°	31.5	39.5	41	63	70	82	89	105	152
	360°	34.5	55.5	61	91	102	122	137	161	224
	45°	22	22	26	42.5	18	58	65.5	77.5	100
L	90°	22	22	26	35.5	40	48	53.5	63.5	82
	180°	22.5	3.5	34.5	49.5	56	68	77.5	91.5	118
	360°	34.5	46.5	54.5	77.5	88	108	125.5	147.5	190
M	standard	R 1/8"	R 1/8"	R 1/8"	R 1/4"	R 1/4"	R 3/8"	R 3/8"	R 1/2"	R 1/2"
	on request	M 10 x 1	M 10 x 1	M 10 x 1	M 12 x 1.5	M 12 x 1.5	M 16 x 1.5	M 16 x 1.5	M 22 x 1.5	M 22 x 1.5
N		22	22	22	25	25	32	32	42	42
	0 <sub>1</sub>	15.5	15.5	15.5	19.5	19.5	26	26	33	33
	0	9	9	9	10	10	11	11	12	12
P	DIN 6885	8.6	11.5	14.5	19.8	22.1	37	32.2	37.6	47.8
Q	Sheet 3	5	6	8	10	12	14	18	20	25
R		1	1	1.5	2	2	2	3	3	4
S		25	35	45	60	70	90	110	130	170
T		2.5	2.5	2.5	5	5	5	5	5	5
U		M 5	M 5	M 6	M 8	M 8	M 10	M 10	M 12	M 12
U <sub>1</sub>		5.5	5.5	6.6	9	9	11	11	14	14
	Number V	4	4	4	4	5	5	6	5	8
	Angle $\alpha$ 1	90°	90°	90°	90°	72°	72°	60°	72°	45°
	$\alpha$ 2	45°	45°	45°	45°	36°	36°	30°	36°	22.5°
Starting torque da Nm		0.85	0.85	1.6	3.5	3.5	6.9	6.9	12	12
W		10	10	12	16	16	20	20	24	24
a		30	35	40	45	50	60	70	80	90
b		20	25	30	35	40	50	60	70	80
c		M 5	M 6	M 8	M 10	M 12	M 16	M 18	M 20	M 24
d		3	3	5	6	8	11	13	13	14
e		8	8	11	13	15	18	22	24	28
f		6.5	6.5	9	10.5	13	16	19	20	23
g		12	13	18	21	26	32	38	40	46
h		5	6	8	10	12	16	18	20	24
i		30	36	45	60	65	80	90	100	130
k		25	32	40	50	55	70	80	80	100
l		13	15	18	20	25	30	34	34	43
	45°	17	24	24.5	35	43.5	53	65	74	91
	90°	20	28	38.5	42	51.5	63	77	88	109
	180°	26	36	38.5	56	67.5	83	101	116	145
	360°	38	52	59.5	84	99.5	123	149	172	217
Damping poss. from angle of rotation		180°	135°	135°	45°	45°	45°	45°	45°	45°

Rotation angle tolerance for all versions 0° ... + 2°

Technical Data

Typ	ZD 40	ZD 50	ZD 63	ZD 80	ZD 100	ZD 125	ZD 140	ZD 160	ZD 200	
Displaced Swept (dm <sup>3</sup> )	45°	0,0033	0,0079	0,0156	0,0355	0,063	0,123	0,186	0,283	0,565
	90°	0,0078	0,0158	0,0312	0,0710	0,126	0,246	0,372	0,566	1,130
	180°	0,0152	0,0316	0,0624	0,1420	0,252	0,492	0,744	1,132	2,260
	360°	0,0304	0,0632	0,1248	0,2840	0,504	0,984	1,488	2,264	4,520
Weight (kg)	45°	1,4	1,9	3,0	6,8	10,6	19,0	28,0	44,0	87,0
	90°	1,6	2,3	3,5	7,8	12,2	22,0	32,0	50,0	100,0
	180°	2,0	3,1	4,5	9,8	15,4	28,0	40,0	62,0	126,0
	360°	2,8	4,7	6,5	13,8	21,8	40,0	56,0	86,0	178,0
Max. permissible radial forces at output stub shaft end		1500	2800	4300	5800	6700	11000	13000	17000	20000



## ASM series

The ASM series was designed to actuate fittings, butterfly valves and ball valves. The main characteristic of the fitting actuator is the pressure piston with contrary threads (internal and external). That hydraulic piston slides on an appropriate drive shaft. At the same time the thread of the piston is engaged with a high-helix thread which is connected to the housing - because of it the translational motion of the piston is converted into the accumulated rotation of the drive shaft. The drive shaft on the fitting side is available in following versions: inside square, inside dihedron or as a hollow shaft with a keyway. The standard version of the actuator is designed for swivel angles of 90° and a fine adjustment of ± 5°. Other swivel angles and spigot profiles are available on request.

### Further options:

- ✓ automatic spring reset
- ✓ double-sided adjustable end position damping
- ✓ rotation angle request using limit switch,
- ✓ inductive proximity switch, potentiometer



### Mounting dimensions to DIN ISO 5211

Flange	Bolt circle [mm]	Number of the threaded holes	Torque [Nm]
F 04	42	4 x M 5	63
F 05	50	4 x M 6	125
F 07	50	4 x M 8	250
F 10	70	4 x M 10	500
F 12	102	4 x M 12	1000
F 14	125	4 x M 16	2000
F 16	140	4 x M 20	4000
F 25	165	4 x M 16	8000
F 30	254	4 x M 20	16000

### Type code

**ASM**

- **F**

**So**

Hydraulic Valve Actuators Series

Design size:

Flange size:

Version  
Take off peg:

Size

Special design

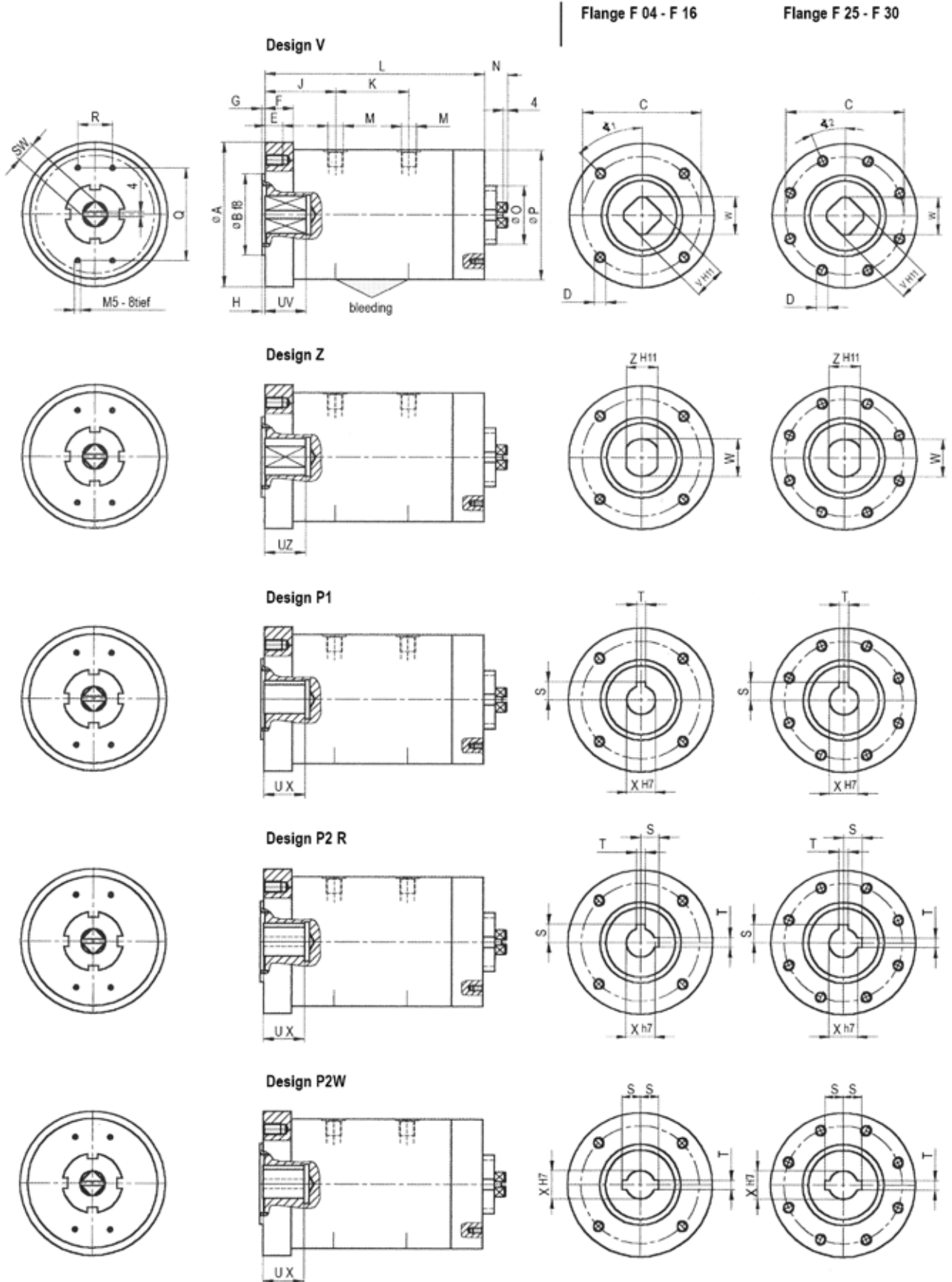
40  
50  
63  
80  
100  
125  
140  
160

F 04  
F 05  
F 07  
F 10  
F 12  
F 14  
F 16  
F 25  
F 30

V = Square  
Z = dual  
P1 = cylindrical 1 feather key  
P2R = cylindrical 2 feather keys  
P2W = cylindrical 2 feather keys



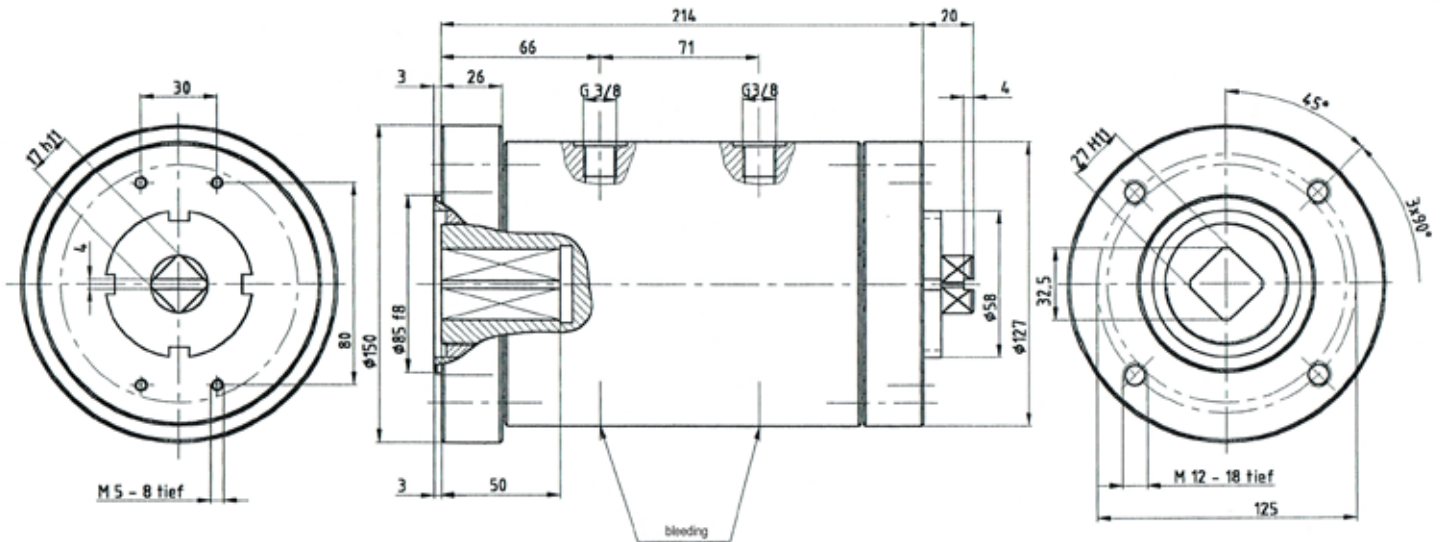
Installation drawing





**Technical data and dimensions**

Typ	ASM 40			ASM 50			ASM 63			ASM 80			ASM 100			ASM 125			ASM 140			ASM 160		
Torque Nm/bar	0.87			1.73			3.14			6.69			12.88			25.48			34.8			50		
Torque Nm bei 210 bar	182			363			659			1404			2705			5350			7308			10500		
Torque Nm bei 160 bar	139			276			502			1070			2060			4076			5568			8000		
Torque Nm bei 105 bar	91			181			330			702			1352			2675			3654			5250		
Stroke Volume dm3	0.04			0.045			0.07			0.144			0.277			0.546			0.741			1.139		
Weight kg	6.8			8.8			14.5			21			38			66			96			135		
Flange ISO 5211	F 04	F 05	F 07	F 05	F 07	F 10	F 07	F 10	F 12	F 10	F 12	F 14	F 12	F 14	F 16	F 14	F 16	F 25	F 16	F 25	F 30	F 16	F 25	F 30
A	86	<b>86</b>	86	95	<b>95</b>	125	112	<b>125</b>	150	127	<b>150</b>	175	160	<b>175</b>	210	194	<b>210</b>	300	216	<b>300</b>	350	245	<b>300</b>	350
B f8	30	<b>35</b>	55	35	<b>55</b>	70	55	<b>70</b>	85	70	<b>85</b>	100	85	<b>100</b>	130	100	<b>130</b>	200	130	<b>200</b>	230	130	<b>200</b>	230
C	42	<b>50</b>	70	50	<b>70</b>	102	70	<b>102</b>	125	102	<b>125</b>	140	125	<b>140</b>	165	140	<b>165</b>	254	165	<b>254</b>	298	165	<b>254</b>	298
D	M5	<b>M6</b>	M8	M6	<b>M8</b>	M10	M8	<b>M10</b>	M12	M10	<b>M12</b>	M16	M12	<b>M16</b>	M20	M16	<b>M20</b>	M16	M20	<b>M16</b>	M20	M20	<b>M16</b>	M20
Numbers D	4	<b>4</b>	4	4	<b>4</b>	4	4	<b>4</b>	4	4	<b>4</b>	4	4	<b>4</b>	4	4	<b>4</b>	8	4	<b>8</b>	8	4	<b>8</b>	8
∠ 1	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°		45°		8	45°		
∠ 2																		22.5°		22.5°	22.5°		22.5°	22.5°
E	9	<b>9</b>	12	9	<b>12</b>	15	12	<b>15</b>	18	15	<b>18</b>	24	18	<b>24</b>	30	24	<b>30</b>	24	30	<b>24</b>	30	30	<b>24</b>	30
F	22	<b>22</b>	22	24	<b>18</b>	18	29	<b>24</b>	24	33	<b>26</b>	26	30	<b>30</b>	30	35	<b>35</b>	35	40	<b>40</b>	40	45	<b>45</b>	45
G	2	<b>3</b>	3	3	<b>3</b>	3	3	<b>3</b>	3	3	<b>3</b>	4	3	<b>4</b>	5	4	<b>5</b>	5	5	<b>5</b>	5	5	<b>5</b>	5
H	5	<b>3</b>	3	8	<b>3</b>	3	8	<b>3</b>	3	11	<b>3</b>	4	3	<b>4</b>	5	4	<b>5</b>	5	5	<b>5</b>	5	5	<b>5</b>	5
J	51	<b>51</b>	51	55	<b>49</b>	49	68	<b>63</b>	63	73	<b>66</b>	66	76	<b>76</b>	76	87	<b>87</b>	87	97	<b>97</b>	97	107	<b>107</b>	107
K	52			55.5			63			67			88			105			121			130		
L	160			163			191			214			259			300			354			379		
M	G 1/4			G 1/4			G 1/4			G 3/8			G 3/8			G 1/2			G 1/2			G 1/2		
N	20			20			20			20			30			30			30			30		
O	45			58			58			58			70			70			85			85		
P	95			95			112			127			160			194			216			245		
Q	80			80			80			80			130			130			130			130		
R	30			30			30			30			30			30			30			30		
S Din 6885	10.8			12.3			15.8			19.3			23.3			28.8			34.4			39.9		
T Din 6885	5			6			8			10			12			14			18			20		
UV	30			35			45			50			55			65			76			83		
UZ	30			35			45			50			55			65			76			83		
UX	35			55			70			80			95			110			120			140		
V <sup>H11</sup> max	17			19			27			32			36			46			55			60		
W max	20.5			24			32.5			39			46			60			66			80		
X <sup>H7</sup> max	17			19			25			32			40			50			60			70		
Z <sup>H11</sup> max	17			19			27			32			36			46			55			60		
SW	11			17			17			17			24			24			32			32		



#### Technical data

Operating pressure max. 210 bar

Design sizes:  
(Piston diameter) 40 - 160 mm

Torque up to 10500 Nm at 210 bar  
up to 8000 Nm at 160 bar

Rotational angle: 90°

Fine adjustment:  $\pm 5^\circ$

Fluid: HLP-Mineralöl nach DIN 51525

Filtration: 10 - 25  $\mu$

Operating temperature: 10°C - 75°C



## DHZ series

Series HDZ rotary/linear actuators are the ideal solution whenever rotating and linear motions need to be effected synchronously or separately. They combine both the rotary actuator and linear cylinder components to form a compact unit which permits angles of rotation between 0° and 360° and stroke lengths of 0 to 1200 mm, according to size.

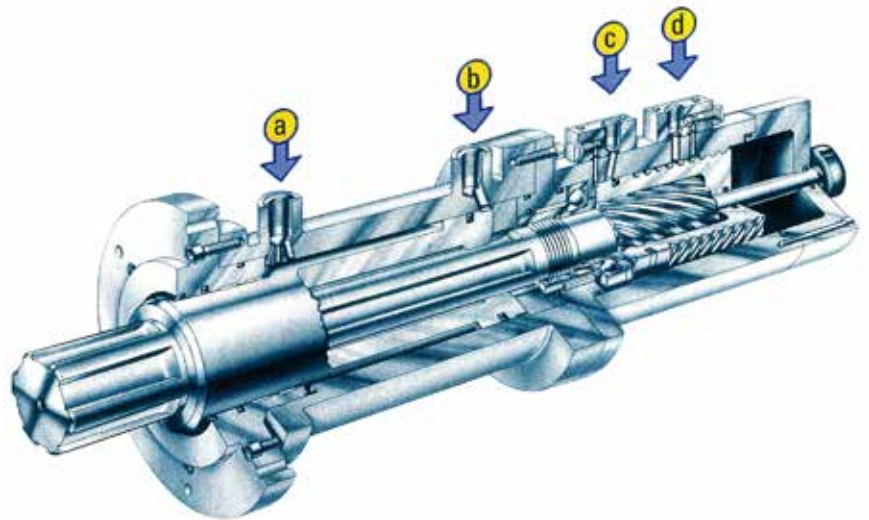
### Function

As the hydraulic fluid flows through port „a“ or „b“ into the linear cylinder, the piston rod moves respectively inwards or outwards. If the fluid is applied to the rotary actuator via port „c“ or „d“, the piston rod rotates counter-clockwise or clockwise.

### Design

Series HDZ rotary actuators and linear cylinders are connected together by flanges. The multiple splines of the rotary actuator output stub are keyed into the internal bore of the linear cylinder piston rod. Depending on the length of stroke, stub length and bore depth are designed accordingly. In order to transmit the torque, the piston rod end is equipped with two feather keys. Other piston rod ends are available upon request

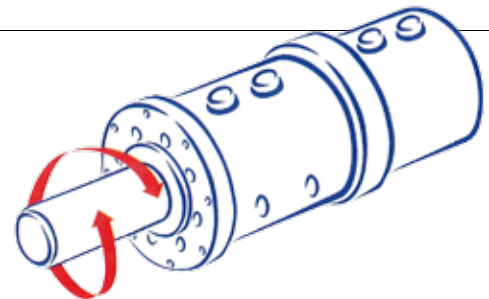
Linear and rotary motion can be effected synchronously or separately and are freely selectable. With the aid of electronic systems, both motions can be controlled precisely. Position indicators are available as an option



### Possible rotary and linear motions

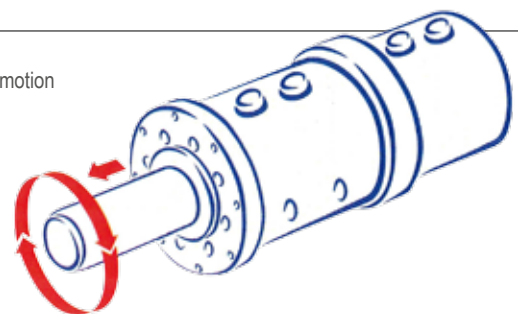
#### Rotary and lifting motion

Rotary and linear motion synchronous



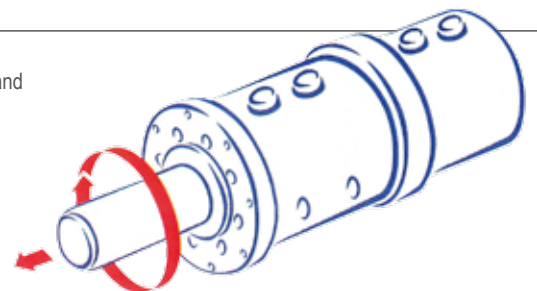
#### Lifting motion

With subsequent rotary motion counter-clockwise



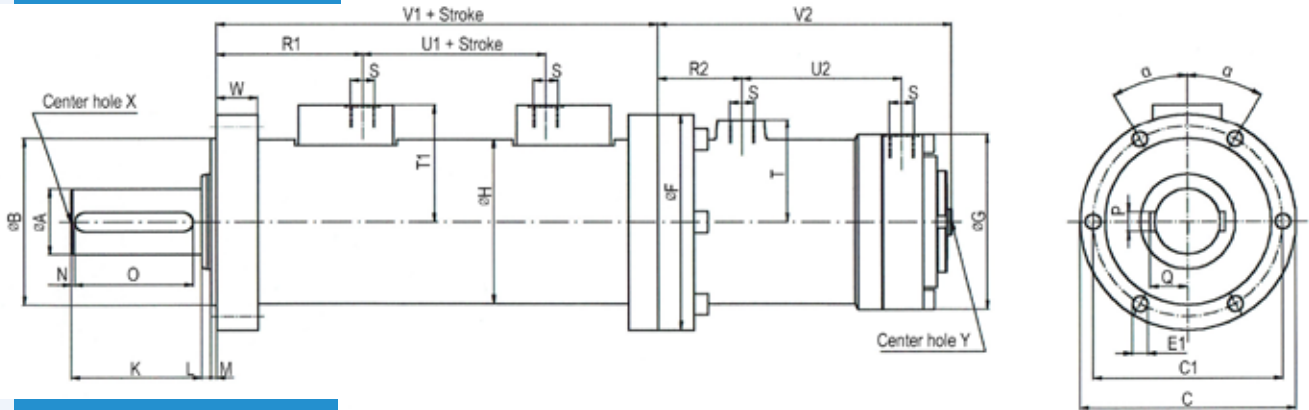
#### Rotary motion

Rotary motion clockwise and anti-clockwise

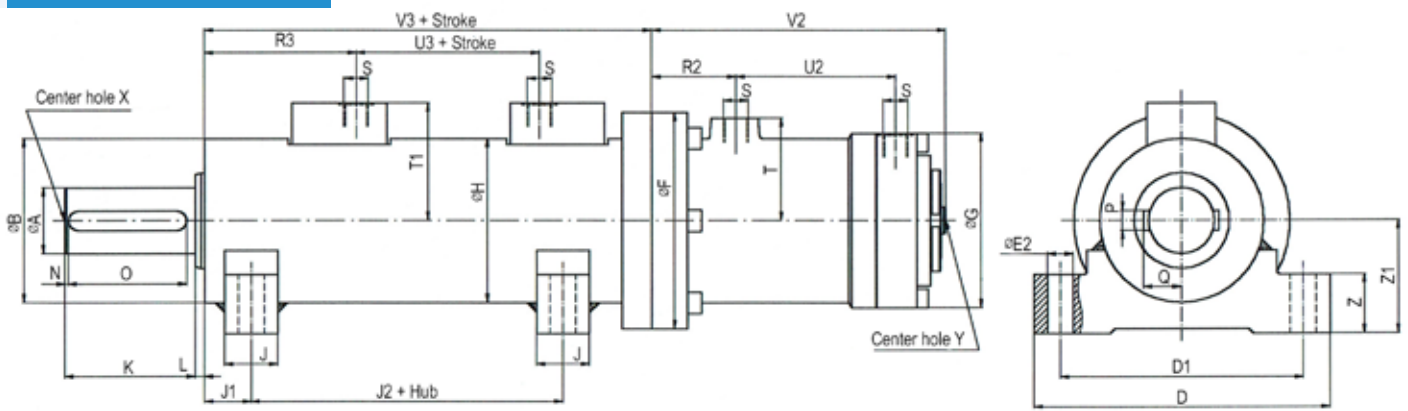




**Foot flange mounting C**



**Foot bracket mounting F**



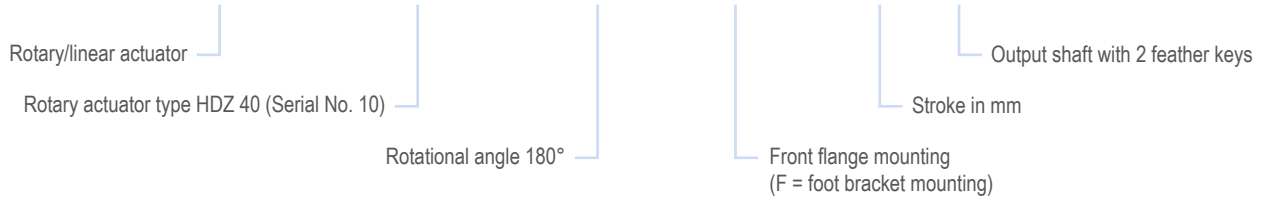
**Dimensions**

Modell	DHZ 40	DHZ 50	DHZ 63	DHZ 80	DHZ 100	DHZ 125	DHZ 140	
Ø A	22 k6	28 k6	26 k6	45 k6	55 m6	70 m6	80 m6	
Ø B f1	56	60	80	100	125	155	170	
Ø C	112	120	160	185	215	245	260	
Ø C1	95	100	135	160	185	215	230	
D	120	140	175	195	250	295	305	
D1	95	115	150	160	205	245	255	
Ø E1	9	9	11	13	17	17	17	
Number E1 / α	6 / 30°	6 / 30°	6 / 30°	6 / 30°	6 / 30°	6 / 30°	8 / 22.5°	
Ø E2	11	11	13	18	22	26	26	
Ø F	110	112	128	155	182	224	245	
Ø G	78	87	105	125	147	178	194	
Ø H	70	82	102	121	140	165	180	
J	25	25	30	40	45	60	60	
J1	35	40	45	55	60	65	70	
J2	47	57	77	110	110	113	115	
K	50	60	80	110	110	140	140	
L	5	7	7	10	10	10	10	
M	5	5	5	5	5	8	8	
N	2	2	3	3	3	5	5	
O	45	56	70	100	100	125	125	
P DIN 332	8	8	10	12	16	20	22	
Q DIN 332	12.9	15.9	19.8	24.6	21.5	39.5	45	
R1	51	53.5	80	115	124	141	150	
R2	49	44	56	67.5	77	92	97	
R3	56	58.5	85	120	129	149	158	
S	G 1/4	G 1/4	G 3/8	G 1/2	G 1/2	G 3/4	G 3/4	
T	55	49	56	70	86	100	119	
T1	52	59	71	89	99	113	120	
U1	29	40.5	20	20	21	30	25	
U2	90°	34.9	86.5	93	129.5	142	183.5	186
	180°	50.7	123	137	185	211	268	282
	360°	82.2	196	226	296	353	437	474
U3	29	40.5	20	20	21	30	25	
V1	90°	122	138	172	230	240	270	277
	180°	164.5	164.5	181	231	250	310.5	319
	360°	196	201	225	286	321	395	415
V2	90°	259	274	314	397	461	564	607
	180°	127	143	177	235	245	278	285
	360°	127	143	177	235	245	278	285
W	20	20	25	30	35	40	45	
X DIN 332	8	8	8	12	16	20	20	
Y DIN 332	4	5	5	8	8	12	12	
Z	25	25	35	40	50	55	60	
Z1	56	58	65	80	95	115	125	



**Type Code**

**DHZ - 40 - 10 / 180 - C x 200 D**



**Technical data**

Modell	DHZ 40	DHZ 50	DHZ 63	DHZ 80	DHZ 100	DHZ 125	DHZ 140	DHZ 160	DHZ 200
Max. torque [Nm] at max. operating pressure	210	390	700	1300	2700	5000	7000	10500	20200
Nominal torque [Nm/bar]	1	1.86	3.33	6.19	12.86	23.81	33.33	50	96.19
Max. thrust [kN]	26.3	41.2	65.4	105.5	164.9	257.7	323.2	422.2	659.7
Max. tensile force [kN]	13.4	19.8	32	53.8	84.1	124.1	158.3	164.5	237.5
<b>Stroke volume</b>									
Rotational motion	90°	0.022	0.043	0.074	0.139	0.274	0.518	0.737	
	180°	0.044	0.086	0.148	0.278	0.548	1.036	1.474	
	360°	0.087	0.172	0.296	0.556	1.096	2.072	2.948	
Linear motion - Piston side	0.126	0.196	0.312	0.503	0.785	1.227	1.539		
dm <sup>3</sup> / 100mm Stroke - Piston rod side	0.064	0.095	0.153	0.256	0.401	0.591	0.754		
<b>Weight</b>									
W1	90°	6.4	6.5	10.4	17.0	25.0	47.5	60.0	
	180°	7.2	7.4	11.8	20.5	31.5	57.0	73.0	
	360°	8.7	9.0	14.6	26.0	40.0	76.0	99.0	
	W2	5.5	7.4	14.3	26.1	37.7	59.1	72.8	
	W3	2.5	3.4	5.2	7.0	8.9	12.1	14.1	
Total weight in kg	= W1 + W2 + $\left( \frac{W3 \cdot \text{Stroke [mm]}}{100} \right)$								

# Reihe **DZ**

## 20 MPa series

Our hydraulic rotary pistons of the DZ series, available in 7 sizes are designed for torques up to 7582 Nm with 20 MPa operating pressure. The standard actuator version support following nominal angles of rotation: 90°, 180°, 270° and 360°. Other rotating angles, also such over 360°, rotary pistons with control shaft and adjustable rotation angles are also available.

The rotary pistons can be used in almost every industrial area. The rotary pistons are characterized by their compact cylindrical design. They are used in machine tools, mining machines, construction machines, agricultural machines, transfer lines, packing machines, polymer processing machines, testing machines, armatures and in machines and facilities for the shipbuilding and hydraulic engineering. Other areas of application are ventilation systems, handling technology etc. and in hazardous areas.

The rotary actuators of the DZ series are equipped with reinforced bearings and are very well suited for applications with big radial load.

The combination of special materials and design allow trouble-free application. The active forces are absorbed by the bearing of the actuator.

### Standard design

- ✓ 7 sizes up to 7582 Nm at 20 MPa
- ✓ rotation angles: 90°, 180°, 270°, 360°
- ✓ Adjustment of the rotation angle  $\pm 3^\circ$  from the nominal angle
- ✓ End position dampers on both sides
- ✓ Drive shaft with 2 feather keys

Rotation angles which differ from the standard angles, also over 360°, can also be realized. Moreover, it is possible to install a control shaft in the bottom of the rotary cylinder. In that case, it would be possible to adjust the angle over the entire moving range.

### Special design

- ✓ Torques up to 20000 Nm
- ✓ Drive shaft with polygon and spline shaft profile
- ✓ additional bearing in the basis of the cylinder
- ✓ Through drive shaft
- ✓ Downsized mounting flange with threaded holes
- ✓ Slab connection for the direct valve mounting
- ✓ Cylinder for combined rotating and lifting movements

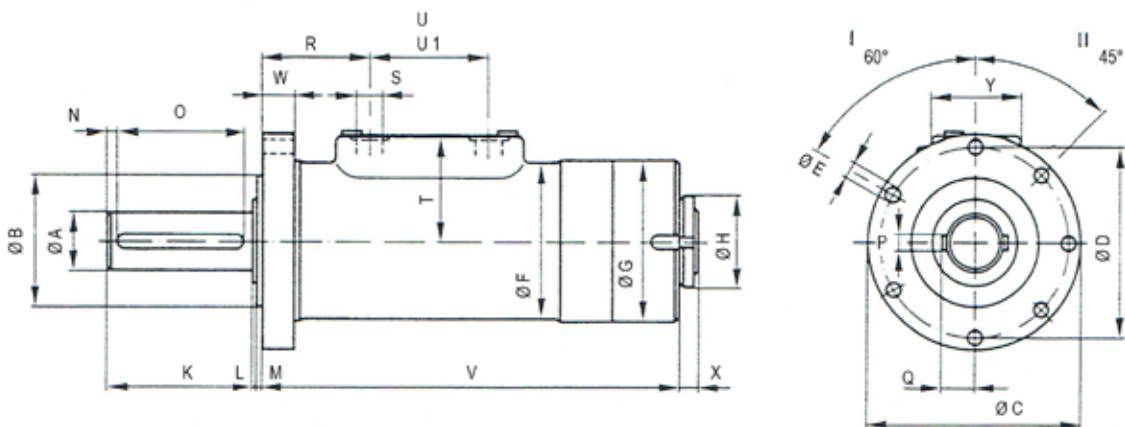




**Technical data**

Type	DZ 40	DZ 50	DZ 63	DZ 80	DZ 100	DZ 125	DHZ 140
Max. nominal torque at p = 20 MPa (Nm)	204	399	747	1450	2830	5407	7582
* Min. recommended rotating time in s at 360°(t)	1	1	1,4	1,8	2	2,5	3
Capacity (dm <sup>3</sup> )	90°	0,022	0,043	0,081	0,156	0,304	0,818
	180°	0,044	0,086	0,161	0,312	0,609	1,633
	270°	0,066	0,129	0,242	0,469	0,914	2,423
	360°	0,087	0,172	0,322	0,625	1,213	3,267
Max shear force(N)	1570	2453	3924	6377	10791	13244	16677
Weight m (kg)	90°	6,5	7,8	14,0	24,0	40	98
	180°	7,4	9,2	17,0	28,5	48	118
	270°	8,3	10,6	20,0	33,0	56	138
	360°	9,2	12,0	23,0	37,5	64	158

\*The min. rotating time depends also on the negative accelerated mass (consult the factory for further information).



**Technical data**

Type	DZ 40	DZ 50	DZ 63	DZ 80	DZ 100	DZ 125	DHZ 140	
Ø A <sub>k6</sub>	22	28	35	45				
Ø A <sub>m6</sub>					55	70	80	
Ø B <sub>f7</sub>	48	68	80	100	125	155	165	
Ø C	110	120	145	165	195	245	260	
Ø D	94	104	125	145	172	215	230	
Ø E	9	9	11	11	13	17	17	
Number according to fig.	I	I	I	II	II	II	II	
Ø F	75	85	100	120	145	180	195	
Ø G	78	88	104	124	150	185	200	
Ø H	45	45	52	70	70	85	85	
K	50	60	80	110	110	140	140	
L	2	2	2	2	2	2	2	
M	5	5	5	5	5	8	8	
N	1,5	1,5	2	3	3	5	5	
O	45	56	70	100	100	125	125	
P DIN 6885	8	8	10	12	16	20	22	
Q DIN 6855	12,9	15,9	19,8	24,6	31,5	39,5	45	
R	48,9	51,7	74,6	83	100,8	115,2	130	
S	R 1/4"	R 1/4"	R 3/8"	R 1/2"	R 1/2"	R 3/4"	R 3/4"	
T	55	57	70	80	90	120	126	
U	90°	34,9	40,3	46,8	58,1	65,2	81,6	93,2
	180°	50,7	59,8	71,8	89,2	104	129,1	146,2
	270°	66,5	79,2	96,8	120,3	142,8	177	199,2
	360°	82,2	98,7	121,4	151,4	181,6	224	252,2
<b>Ø U<sub>1</sub> refer to footnote</b>								
V	Z	0,175	0,216	0,278	0,345	0,431	0,527	0,590
	90°	153,5	171	215	258	294	353	392
	180°	185	210	265	320	372	448	498
	270°	216,5	249	315	382	449	543	604
	360°	248	288	365	444	527	638	710
X	9	9	10	15	15	18	18	
Y	48	54	62	70	70	70	70	

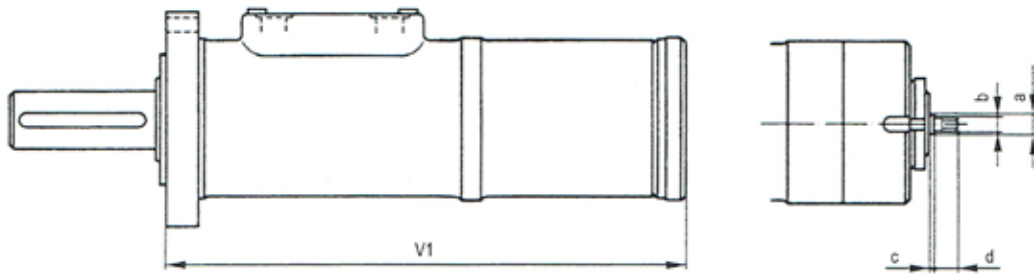


The »U« measure is only valid for the standard sizes of the rotation angles 90°, 180°, 270° and 360°. Rotation angles between the standard angles - the »U« measure becomes »U<sub>1</sub>« measure.

U<sub>1</sub> is calculated as follows: The U measure of the next larger standard rotation angle minus Z multiplied (series rotation angle minus intermediate rotation angle)  
 Beispiel: ZD 63. 100° intermediate rotation angle  
 $U_1 = 71,8 - 0,278 (180 - 100) = 49,56 \text{ mm}$

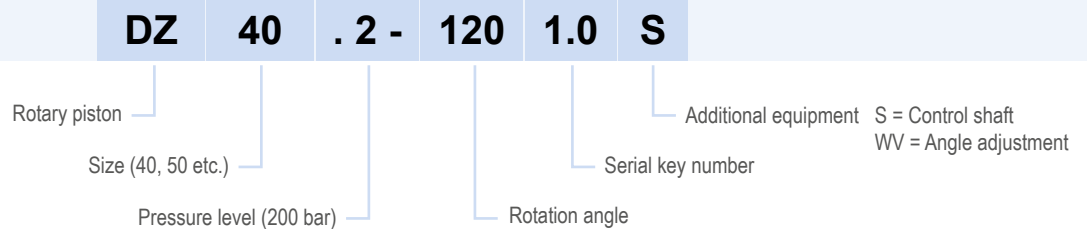


Technical data



Type	DZ 40	DZ 50	DZ 63	DZ 80	DZ 100	DZ 125	DHZ 140		
<b>Additional equipment WV - Angle adjustment</b>									
V <sub>1</sub>	Serial rotation angle, Angle adjustment range	90°	232	254	300	346	391	465	511
		180°	279	311	376	439	506	608	670
		270°	329	371	451	532	623	750	829
		360°	376	429	525	625	740	893	988
<b>Additional equipment SW - control shaft</b>									
Ø a	910	10	12	14	14	14	14		
Ø b	M 6	M 6	M 8	M 10	M 10	M 10	M 10		
c	2	2	2	2	2	2	2		
d	16	16	18	20	20	20	20		

Model code



Ordering example:

Rotary piston			
Required torque:	900 Nm	Rotation angle: 120°	DZ 80.2 · 120/1.0/S
Operating pressure:	16 MPa	Control shaft	Md = 1160 Nm bei 16 MPa

Application: Concrete Spraying Machine

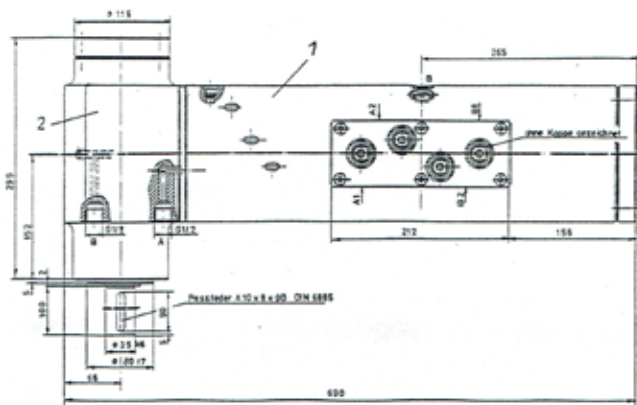
## Hydraulic Manipulator

(rotary motion in two axis)

To clad tunnel walls with concrete, a telescope arm with a hydraulic driven manipulator is used. The remote controlled manipulator carries the concrete spray nozzle and realizes motions in two axis as a hand hinge in order to render equal thickness of the concrete cladding.

The manipulator consists of two rotary actuators, which are combined to a compact unit. Each actuator can be driven separately. The pressure supply of the 2. actuator is ensured by internal oil channels. Therefore flexible pressure hoses are not necessary. The manipulator is driven by mineral oil and provides the following main advantages:

- ✓ very high torque moments combined with extremely small space requirements
- ✓ compact, pollution resistant design
- ✓ torque moment and rotational speed can be adjusted easily by operating pressure and volume flow control
- ✓ leakage free operation is ensured by rotationally symmetrical sealing
- ✓ positive lock holding function under pressure
- ✓ safe operation (direct flanged check valves)



Application: Landing Gear Optimization

## Hydraulic Drive Concept SAC

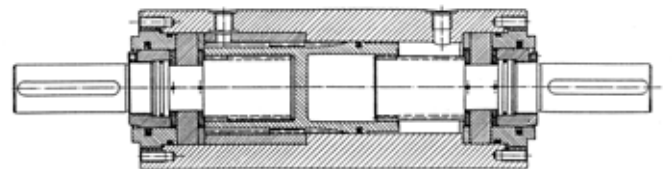
(hydraulik coupled take off peg)

The SAC concept was initiated by the intention of a well known automobile manufacturer to optimize the landing gear system of passenger cars. The developed unit converts the ratio of two external torque moments into a proportional hydraulic pressure difference.

The Drive Concept SAC introduced herein is equipped with a toothed piston connected to the casing via a multiple splining.

Driven on specific customer requirements

- ✓ equal or divergent rotational angles
- ✓ equal or divergent rotational speeds
- ✓ equal or divergent torque moments



### Technical Data

Operation pressure:	210 bar
Hydraulic fluid:	mineral oil in acc. with DIN 52525
Torque moment:	1374 Nm (actuator 1) 700 Nm (actuator 2)
Rotational angle:	360° (actuator 1) 270° (actuator 2)

### Technical Data

Operation pressure:	up to 210 bar
Hydraulic fluid:	mineral oil in acc. with DIN 52525
Torque moment:	up to 20200 Nm
Rotational angle:	up to 360°



**VOSS Antriebstechnik GmbH**

**Kastanienweg 18  
D-33178 Borcheln**

**Phone1: + 49 (0) 5251 3987 833**

**Phone2: + 49 (0) 2324 9704 35**

**Fax: + 49 (0) 5251 8707 047**

**Email: [info@voss-antriebstechnik.de](mailto:info@voss-antriebstechnik.de)**

**Web: [www.voss-antriebstechnik.de](http://www.voss-antriebstechnik.de)**

Design & Layout by Tobias Wedel - [www.webnut.de](http://www.webnut.de)