

DR/SC

Pneumatic part-turn actuator



Product features

- Complies with requirements for use in safety-related systems to EN 61508
- Solid, corrosion-resistant housing made of aluminium
- Designed for use in Zone 2 and Zone 22
- Maintenance-free
- Wide torque range
- Operates in any position

Overview

Our pneumatic part-turn actuators are dual-piston drives based on a rack and pinion design principle. This proven principle of operation guarantees the highest levels of reliability.

Available versions include double-acting and single-acting part-turn actuators with integrated (fail-safe) spring return.

The honed surface of the cylinder bore ensures the pneumatically driven part-turn actuators achieve a long service life. Control pressures range between 2.5 bar and 8 bar. That achieves torques ranging from 5 Nm up to 10 000 Nm. The anodized

aluminium housing and powder-coated cover ensure excellent corrosion protection, including in outdoor applications. The connections comply with DIN/ISO and Namur requirements. The part-turn actuators are also suitable for deployment in hazardous areas. Exposed to hazards from gases and vapours they are suitable for deployment in Zone 2, and Zone 22 areas when exposed to dust hazards.

They are also suitable for use as actuators in protective and safety-related systems in accordance with EN 61508.



Product details

HOUSING

- Housing made from extruded, anodized aluminium
- Cover made of corrosion-resistant, powder coated die-cast aluminium
- Protection class IP67 to DIN EN 60529

OUTPUT SHAFT

- Steel, hard nickel plated (ENP)
- With square socket (position parallel and diagonal) or double square socket to ISO 5211 (adaptation through a wide programme of adapter shafts and sleeves)
- Anti-blowout output shaft (complies with tightened US regulations)

OUTPUT SHAFT BEARINGS

- Plain bearings made of high-quality plastic

OPERATING ANGLE

- Nominal operating angle: 90°

CONTROLS

- Open/closed
- Position controller

AMBIENT TEMPERATURE

- -40 °C to +80 °C
- Options:
 - -15 °C to +150 °C
 - -55 °C to +80 °C

END POSITION LIMITS

- Each end position can be set externally
- Wide setting range from +5° to -15°

ACTUATION MEDIA

- Filtered, dry or oiled air
 - Pressure dew point \leq -20 °C
 - Particle size < 30 μ m
- Non-corrosive media

ACTUATION PRESSURE

- 2.5 bar to 8 bar

TORQUE

- 6 Nm to 10 000 Nm for double-acting actuators
- 5 Nm to 7 000 Nm for single-acting actuators

INSTALLATION POSITION

- Any

PRINCIPLE OF OPERATION

- Pneumatically powered dual-piston drive based on the rack and pinion design principle
- Double-acting piston (DR) or single-acting piston with fail-safe spring return (SC)

DIRECTION OF TURN (DOUBLE- AND SINGLE-ACTING, PART-TURN ACTUATORS)

- Clockwise closing (standard, air supply to connection 4)
- It is possible to reverse the direction of turn of the part-turn actuator by turning the piston 180°.

OPERATING PRINCIPLE OF SPRING IN SINGLE-ACTING, PART-TURN ACTUATORS

- The force of the spring closes the part-turn actuator (standard, fail-safe) or the spring force opens the part-turn actuator.

PISTONS

- Aluminium, black anodized

SPRINGS

- Preloaded spring made of spring steel with plastic safety ring
- Customers are able to convert the part-turn actuators from a single-acting to double-acting actuators without the need for special jigs or tools.

SEALS

- NBR

ATTACHMENT ACTUATOR/VALVE

- Flange to ISO 5211


ATTACHMENT ACTUATOR/CONTROL VALVE

- Hole pattern to VDI/VDE 3845 (NAMUR) G1/8" and G1/4" or G3/8" and G1/2"

ATTACHMENT ACTUATOR/SIGNALLING DEVICES

- To VDI/VDE 3845 (Namur)
- Easily visible position indicator with 5° scale graduation as standard

EX PROTECTION CLASS

- CE  II 2 GD c T6 T5 T85 °C T95 °C
Deployment possible in Zone 2 areas exposed to hazards from gases and vapours.
Ambient temperature T6 = 70 °C and T5 = 80 °C
Deployment in Zone 22 possible when exposed to hazards from dust.
Ambient temperature T85 °C = 70 °C and
T95 °C = 80 °C

CERTIFIED BY TUV RHEINLAND (GERMANY) FOR USE IN SAFETY RELATED SYSTEMS TO EN 61508

- Double-acting part-turn actuator rated up to SIL 2
- Single-acting part-turn actuator rated up to SIL 3

OPTIONS

- Limit switches (force activated)
- Position controller
- Solenoid valve
- Mounting adapters to DIN EN 15081
- Adapter shafts
- Stainless steel versions
- Nominal operating angle:
120°, 135°, 145° and 180° on request
- Rapid closing/opening versions on request
- Control medium water

INSTALLATION

- Easy installation thanks to flange to ISO 5211
- Installation using mounting adapters to DIN EN 15081

ORDER DETAILS

- Actuator type (double-acting/single-acting)
- Torque
- Nominal operating angle
- Basic setting on delivery (valve closed/open)
- Direction of turn beginning at basic setting (clockwise/anti-clockwise)
- Installation position in relation to direction of flow through valve (parallel/at right angles)
- Flange size for single-acting actuator
- Number of springs each side (S/S*)
- Safety function (spring closing/spring opening)
- Desired options
- Or order number

SC	S/S*	2.5 bar		3 bar		3.5 bar		4 bar		4.2 bar		Spring torque		S/S*	4.2 bar		4.5 bar		5 bar		5.5 bar		6 bar		8 bar		Spring torque	
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
05000	2/3	1332	1014	1783	1465	2233	1915	2684	2365	2864	2546	1238	920	4	2312	1803	2582	2073	3033	2524	3483	2974	3934	3424			1981	1472
	3	1149	767	1599	1217	2049	1667	2500	2118	2680	2298	1486	1104	4/5	2128	1555	2398	1825	2849	2276	3299	2726	3750	3177	5551	4978	2229	1656
	3/4			1415	969	1865	1420	2316	1870	2496	2050	1733	1288	5			2215	1578	2665	2028	3115	2479	3566	2929	5386	4731	2476	1839
	4					1682	1172	2132	1623	2312	1803	1981	1472	5/6					2481	1781	2931	2231	3382	2682	5184	4483	2724	2023
	4/5					1948	1375	2128	1555	2229	1656	6								2748	1983	3198	2434	5000	4236	2971	2207	
10000	2/3	2474	1695	3308	2529	4142	3362	4976	4196	5310	4530	2475	1695	4	4292	3045	4793	3545	5627	4379	6461	5213	7294	6047			3960	2712
	3	2135	1200	2969	2034	3803	2867	4637	3701	4971	4035	2970	2034	4/5	3953	2550	4454	3050	5288	3884	6122	4718	6955	5552	10291	8887	4455	3051
	3/4			2630	1539	3464	2373	4298	3206	4632	3540	3465	2373	5			4115	2555	4949	3389	5783	4223	6616	5057	9952	8393	4949	3390
	4					3125	1878	3959	2711	4292	3045	3960	2712	5/6					4610	2894	5444	3728	6277	4562	9613	7898	5444	3729
	4/5					3620	2217	3953	2550	4455	3051	6								5105	3233	5938	4067	9274	7403	5939	4068	

S/S* Springs per cover in bold type → Recommended design (springs arranged symmetrically)

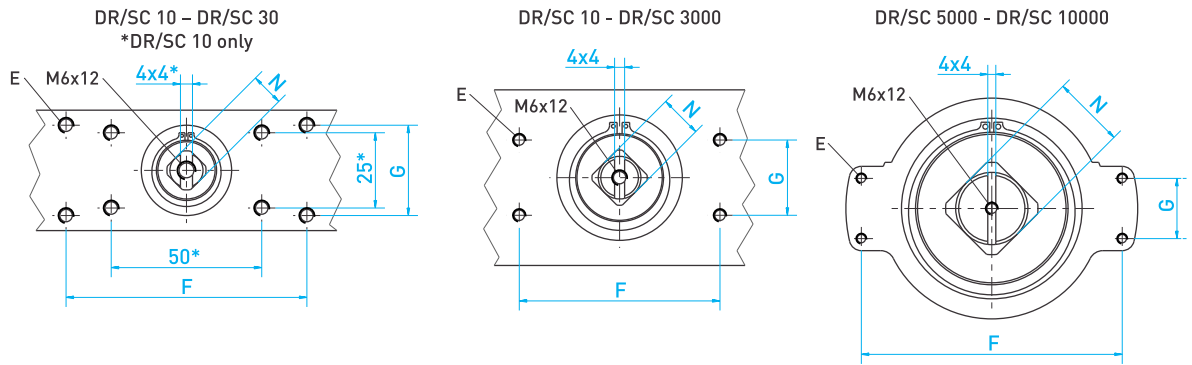
TORQUES FOR DOUBLE-ACTING ACTUATORS IN Nm

DR	2.5 bar	3 bar	3.5 bar	4 bar	4.2 bar	4.5 bar	5 bar	5.5 bar	6 bar	6.5 bar	7 bar	7.5 bar	8 bar
00010U	6	7.2	8.4	9.6	10.1	10.8	12	13.2	14.4	15.6	16.8	18	19.1
00015U	8.3	10	11.6	13.3	14	15	16.6	18.3	19.9	21.6	23.3	24.9	26.6
00030U	14.7	17.6	20.5	23.5	24.6	26.4	29.3	32	35.2	38.1	41	44	46.9
00060U	29.1	34.9	40.7	46.5	48.9	52.4	58.2	64	69.8	75.6	81.4	87.3	93.1
00100U	45.8	54.9	64.1	73.2	76.9	82.4	91.5	101	110	120	128	138	146
00150U	66.5	79.8	93.1	106	112	120	133	146	160	173	186	199	213
00220U	107	129	150	172	181	193	215	236	258	279	301	322	344
00300U	138	166	194	222	233	249	277	305	332	360	388	415	443
00450U	217	261	304	348	365	391	435	478	522	565	609	652	696
00600U	284	340	397	454	477	511	567	624	681	737	794	851	908
00900U	383	459	536	613	643	689	766	842	919	996	1072	1149	1225
01200U	532	638	745	851	893	957	1064	1170	1276	1383	1489	1595	1702
02000U	893	1072	1251	1430	1501	1608	1787	1966	2144	2318	2502	2684	2859
03000U	1297	1556	1815	2075	2179	2334	2594	2853	3112	3372	3631	3890	4150
04000U	1795	2154	2513	2872	3015	3231	3590	3949	4308	4667	5026	5400	5744
05000U	2252	2703	3153	3604	3784	4054	4504	4955	5405	5855	6306	6756	7207
10000U	4169	5003	5837	6671	7005	7505	8339	9173	10007	10841	11674	-	-

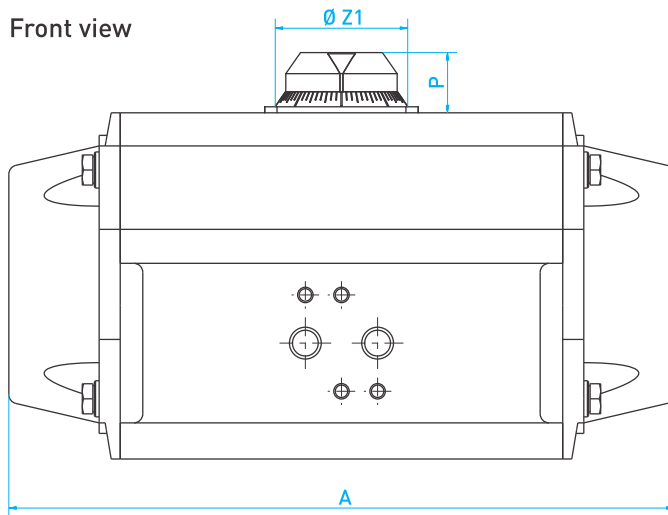


Dimensions

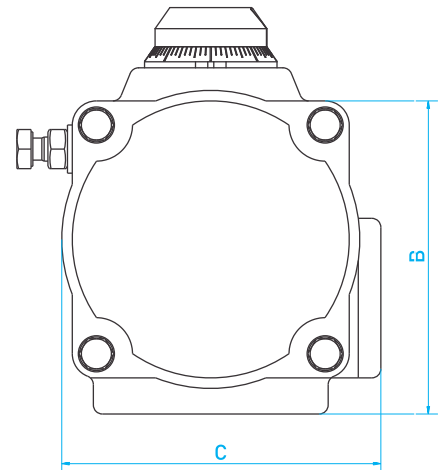
Top view



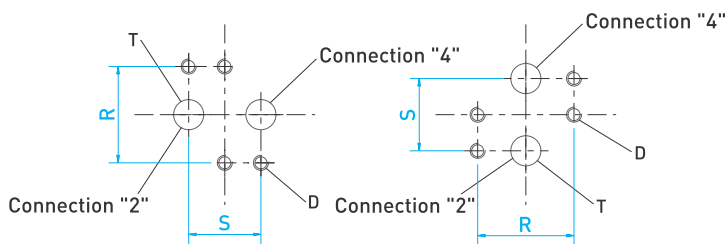
Front view



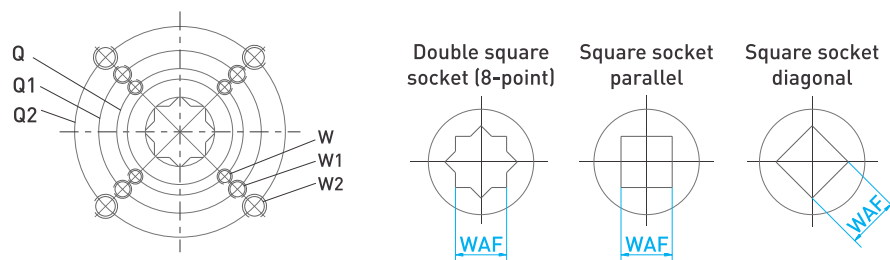
Left side view



Air connection to VDI/VDE 3845



Bottom view ISO 5211





DR/SC 10 - 450

Type	00010 DR/SC	00015 DR/SC	00030 DR/SC	00060 DR/SC	00100 DR/SC	00150 DR/SC	00220 DR/SC	00300 DR/SC	00450 DR/SC
DR Nm*	15	20	35	70	110	160	258	332	522
SC Nm**	5	8	13	27	44	61	99	126	198
ISO flange	F04	F04	F05-07	F05-07	F05-07	F07-10	F07-10	F07-10	F10-12
WAF x depth	11 x 12	11 x 12	14 x 16	14 x 18	17 x 19	17 x 24	22 x 30	22 x 34	27 x 3 9
T-ISO 228	1/8"	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	1/4"	1/4"
A	118	136	153.5	203.5	241	259	304	333	394.5
B	66	69	85	102	115	127	145	157	177
C	62	72	84.5	93	106	118.5	136	146.5	166
D	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8
E	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8
F	80	80	80	80	80	80	80	80	80
G	30	30	30	30	30	30	30	30	30
N	11	11	11	17	17	17	27	27	27
P	15	20	20	20	20	20	30	30	30
Q	42	42	50	50	50	70	70	70	102
Q1	-	-	-	70	70	102	102	102	125
Q2	-	-	-	-	-	-	-	-	-
R	32	32	32	32	32	32	32	32	32
S	24	24	24	24	24	24	24	24	24
W	M5	M5	M6	M6	M6	M8	M8	M8	M10
W1	-	-	M8	M8	M8	M10	M10	M10	M12
W2	-	-	-	-	-	-	-	-	-
Z1	42	42	42	42	42	42	58	58	67.5

*Torque at 6 bar control pressure ** Minimum spring moment (safety function) All dimensions in mm

Time OPEN ¹⁾	0.15 / 0.2	0.2 / 0.25	0.25 / 0.3	0.3 / 0.35	0.4 / 0.5	0.5 / 0.6	0.7 / 0.8	0.9 / 1.1	1.2 / 1.4
Time CLOSED ¹⁾	0.2 / 0.25	0.25 / 0.3	0.3 / 0.35	0.4 / 0.5	0.5 / 0.6	0.7 / 0.8	0.9 / 1.1	1.2 / 1.4	1.5 / 1.8
Vol. OPEN ²⁾	0.06 / 0.06	0.09 / 0.09	0.16 / 0.16	0.31 / 0.31	0.51 / 0.51	0.71 / 0.71	1.19 / 1.19	1.54 / 1.54	2.41 / 2.41
Vol. CLOSED ²⁾	0.1 / 0.1	0.15 / 0.15	0.26 / 0.26	0.49 / 0.49	0.78 / 0.78	1.11 / 1.11	1.8 / 1.8	2.34 / 2.34	3.78 / 3.78
Approx. weight ³⁾	0.75 / 0.9	1 / 1.1	1.6 / 1.7	2.7 / 3.1	3.7 / 4.3	5.2 / 6.1	8 / 9.3	9.8 / 12	14 / 17

¹⁾Seconds ²⁾Litres ³⁾kg

DR/SC 600 - 10000

Type	00600 DR/SC	00900 DR/SC	01200 DR/SC	02000 DR/SC	03000 DR/SC	04000 DR/SC	05000 DR/SC	10000 DR/SC
DR Nm*	881	919	1276	2144	3112	4 308	5 405	10 007
SC Nm**	269	379	510	865	1309	1688	2207	4067
ISO flange	F10-12	(F12)F14	(F12)F14	(F14)F16	(F14)F16	F16(F25)	F16-25	F16-25-30
WAF x depth	27 x 40	36 x 39	36 x 40	46 x 63	46 x 51	46 x 51	55 x 60	75 x 80
T-ISO 228	1/4"	1/4"	1/4"	3/8"	1/2"	1/2"	1/2"	1/2"
A	422.5	474	528	605	710	812	876	950
B	196	220.5	245	298.5	330	383	410	518
C	181	200	221.5	262	330	371	418	528
D	M5x8	M5x8	M5x8	M6x10	M6x10	M6x10	M6x10	M6x10
E	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M6x10
F	80	130	130	130	130	130	130	200
G	30	30	30	30	30	30	30	50
N	27	36	36	36	36	36	36	36
P	30	50	50	50	50	50	50	80
Q	102	140	140	165	165	165	165	165
Q1	125	-	-	-	-	-	254	254
Q2	-	-	-	-	-	-	-	298
R	32	32	32	45	45	45	45	45
S	24	24	24	40	40	40	40	40
W	M10	M16	M16	M20	M20	M20	M20	M20
W1	M12	-	-	-	-	-	M16	M16
W2	-	-	-	-	-	-	-	M20
Z1	67.5	80	80	115	115	115	115	115

*Torque at 6 bar control pressure ** Minimum spring moment (safety function) All dimensions in mm

Time OPEN ¹⁾	1.5 / 1.7	2 / 2.2	2.7 / 3.2	3.5 / 4	4 / 4.5	5 / 6	6 / 7.5	8 / 10
Time CLOSED ¹⁾	1.8 / 2.1	2.4 / 2.8	3.5 / 4	4.1 / 4.6	4.5 / 5	6 / 7	7 / 8.5	9 / 11
Vol. OPEN ²⁾	3.14 / 3.14	4.26 / 4.26	5.94 / 5.94	10 / 10	14.5 / 14.5	20 / 20	25 / 25	49 / 49
Vol. CLOSED ²⁾	4.92 / 4.92	6.89 / 6.89	9.46 / 9.46	15.2 / 15.2	21.38 / 21.38	33 / 33	40 / 40	84 / 84
Approx. weight ³⁾	18 / 22	24 / 33	34 / 42	53 / 67	74 / 93	123 / 155	127 / 169	170 / 238

¹⁾Seconds ²⁾Litres ³⁾kg

Please note:

Actuator switching times were achieved under the following test conditions:

Type DR/SC 10 - DR/SC 600: Room temperature 21 °C; angle of rotation 90°; solenoid valve with Ø4 mm and a nominal flow rate Qn 400 l/min;

inside diameter compressed-air pipe 8 mm; medium: filtered air; control pressure 5.5 bar [79.75 psi]; actuator not subjected to external load.

Type DR/SC 900 - DR/SC 10000: Room temperature 21 °C; angle of rotation 90°; solenoid valve with Ø11 mm and a nominal flow rate Qn 6000 l/min;

inside diameter compressedair pipe 11 mm; medium: filtered air; control pressure 5.5 bar [79.75 psi]; actuator not subjected to external load.

Caution! Closing times can differ if ambient operating conditions deviate.