

## Characteristic features

- same size of double and single acting actuators
- excellent resistance to wear due to excellent bearing quality of all moving parts, absolutely maintenance free
- very anticorrosive because of anodized casing, hard nickel plated shaft and circlips plus screws and nuts made of special steel
- easy, harmless and cost-saving reconditioning with fastened springs
- universal mounting possibilities of all signal units on normend interface points
- for special tasks: 3-position actuators
- optional limit adjustment for both rotating directions (opened and closed position)

	standard version	special version
<b>system design</b>	pneumatic twin-piston actuator, type: D = double acting type: DF = single acting (with spring return)	multi-position actuators with two extra pistons
<b>construction features</b>	rack and pinion technique with self-centering piston guidance in casing; single acting: with bar safety springs	
<b>fitting pos.</b>	optional	
<b>norms</b>	<b>interface actuator:</b> four or eight female threads in the casing acc. to DIN/ISO 5211, part 1 + 2, shafts acc. to DIN 3337 <b>interface actuator/control valve:</b> from type: D/DF 110 acc. to NAMUR or VDI/VDE 3845. (D/DF 66 to 96 with adapter type van) <b>interface actuator/signal units:</b> acc. to VDI/VDE 3845 (NAMUR)	alternative fastening and fitting dimensions possible. optional shaft with inner double „D“.
<b>materials</b>	<b>casing:</b> anodized aluminium alloy; (type D/DF 46: plastics) <b>cap:</b> aluminium alloy, epoxy-treated; (type D/DF 46 + 56: plastics) <b>pistons/toothed racks:</b> aluminium alloy; (type D/DF 46 + 56: plastics) <b>shaft:</b> steel, hard nickel plated <b>gaskets:</b> nitrile rubber = NBR (buna N) <b>bearing:</b> easy sliding plastic	<b>casing and cap:</b> epoxy-treated or hard-coated+teflonized or hard-coated PTFE-impregnated or stainless steel: D/DF 76 to 96 <b>shaft:</b> stainless steel <b>gaskets:</b> FKM (Viton)
<b>ambient temperature</b>	- 20 to + 95°C	- 40 to + 160°C
<b>rotating angle</b>	double acting: 90°, 120°, 180°, 240° single acting: 90° standard rotation end adjustment from +6 to -10° adjustable	limit adjustment for both rotation directions, type: EST 3-position actuators: 0-45-90°, 0-60-90°, 0-90-180°, 0-120-240° 3-position actuators with spring-centered central position
<b>torque</b>	3 to 6000 Nm	
<b>control press.</b>	2 - 10 bar	on request 1 - 16 bar
<b>medium/quality</b>	filtered air (residual oil, dust PNEUROP/ISO-class 4	on request also operateable with other non-aggressive, gaseous and liquid mediums.
<b>accessories</b>	centerings, reductions for shafts, mounting-kits, manual actuated gears, adapters, throttles, control valves, indicators, positioners, limit switches.	hydraulic end-position-damping, circulating air valves, special versions for manual actuated gears / adapters / throttles / control valves / indicators, reductions for shafts, mounting kits, control valves, positioner.

# Twin piston pneumatic actuators

type: **D / DF**

## Function

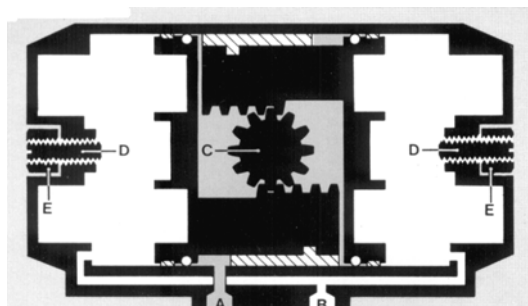


## Mounting variations

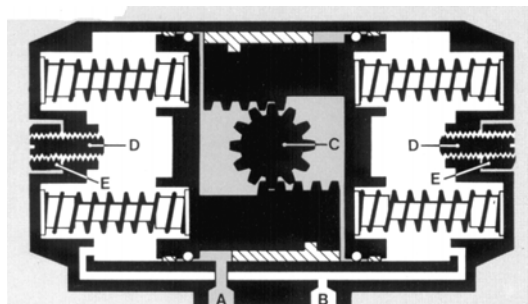


## Torque table, double acting

double-acting



single-acting

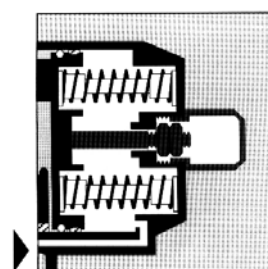


### Function double acting

By connection „A“ the space between the two pistons gets pressurized. The pistons move apart. The force of both pistons gets transferred to the shaft „C“ by the tooth-racks. When connection „B“ gets admitted and „A“ exhausts, the two outer chambers get pressurized and the move together. With the adjustment-screws „D“ the rotation angle can be adjusted. The adjustment can be fixed by the locknut „E“, shaft and pistons are normally mounted as shown. Further mounting variations such as different shaft position, reverse direction of operation see display mounting variations.

### Function single acting

In the single acting version the pistons are pushed back by springs in the basic position when connection „A“ is exhausted. The amount of springs can be adapted according to the working conditions (4 to 12 pcs.)



#### On request:

End adjustment for both rotation directions

## Mounting variations (MV)



View from the top piston and shaft position

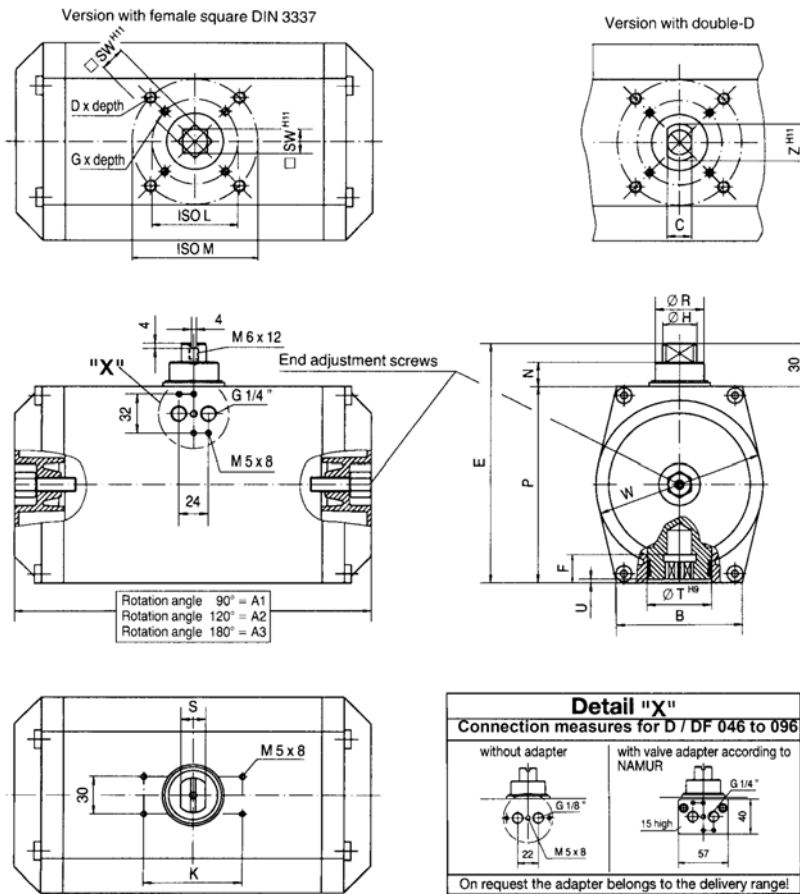
Basic position ... of the pistons; shaft position from the top		Rotating direction	Switched position ... of the pistons; shaft position from the top		MV
	lower shaft version			lower shaft version	
					A
					F
					B
					E
					C
					G
					D
					H

## Torques of double acting actuators type: D [ Nm ]

Actuator type	Operating pressure [ bar ]											
	3	3,5	4	4,5	5	5,5	6	6,5	7	8	9	10
D 66	17	20	23	26	29	32	35	38	41	46	52	58
D 76	30	35	40	45	50	55	60	65	70	80	90	100
D 86	42	49	56	63	70	77	84	91	98	112	126	140
D 96	58	68	78	87,3	97	107	116	126	136	155	175	194
D 110	85	99	113	127	141	155	169	183	198	226	254	282
D 115	126	147	168	189	210	231	252	273	294	336	378	420
<b>D 127</b>	<b>165</b>	<b>193</b>	<b>220</b>	<b>248</b>	<b>275</b>	<b>303</b>	<b>320</b>	<b>358</b>	<b>385</b>	<b>440</b>	<b>495</b>	<b>550</b>
D 143	225	298	340	383	425	468	510	553	595	680	765	850
D 163	330	385	440	495	550	605	660	715	770	880	990	1100
D 210	711	830	948	1067	1185	1304	1422	1540	1659	1896	2133	2370
D 250	1305	1523	1740	1958	2175	2393	2610	2828	3045	3480	3915	4350
D 254	1629	1900	2172	2444	2715	2987	3258	3530	3801	4344	4887	5430

# Twin piston pneumatic actuators

type: **D / DF**



Weights [kg]					
Type: D	90°	120°	180°	Type DF with 12 springs	90°
66	1,35	1,48	1,8	66	1,55
76	2,03	2,23	2,78	76	2,38
86	2,58	2,78	3,68	86	2,98
96	3,35	3,70	5,10	96	3,80
110	4,94	5,34	6,29	110	5,94
115	7,05	7,95	9,65	115	8,35
127	8,85	9,75	12,15	127	10,55
143	12,00	14,40	21,70	143	15,60
163	16,10	18,50	25,80	163	19,90
210	31,20	36,80	48,50	210	39,30
250	61,50	68,00	80,40	250	83,50
254	74,50	82,30	97,90	254	96,50

Air consumption [ litres ]					
Type: D	90°	120°	180°	Type DF with 12 springs	90°
66	0,36	0,40	0,68	66	0,15
76	0,64	0,74	1,16	76	0,27
86	0,92	1,06	1,71	86	0,39
96	1,10	1,35	2,15	96	0,45
110	1,97	2,37	3,22	110	0,74
115	2,70	3,10	5,80	115	1,20
127	3,84	4,25	7,04	127	1,55
143	5,00	6,00	11,00	143	2,60
163	7,30	8,28	13,43	163	3,10
210	14,30	16,60	21,20	210	5,90
250	28,00	32,50	42,50	250	12,50
254	33,50	39,50	51,50	254	18,00

Actuator type	A1	A2	A3	B	C x depth	D x depth	E	F	G x depth
D / DF 066	139	158	203	60	10x13	M8x13	118	18	M6x10
D / DF 076	160	182	236	65	10x15	M8x13	130	19	M6x10
D / DF 086	182	207	270	65	10x15	M8x13	138	19	M6x10
D / DF 096	215	244	315	70	14x22	M8x13	147	19	M6x10
D / DF 110	222	252	323	90	14x22	M10x16	170	24,5	M8x13
D / DF 115	294	328	428	90	20x24	M10x16	170	24,5	M8x13
D / DF 127	300	350	451	103	20x24	M10x16	190	25	M8x13
D / DF 143	350	395	495	110	20x24	M12x16	228	29	M10x16
D / DF 163	380	442	558	110	28x30	M12x16	228	29	M10x16
D / DF 210	478	556	692	135	32x34	M16x24	285	40	M16x24
D / DF 250	603	705	905	159	40x40	M20x24	332	50	M20x24
D / DF 254	683	813	1073	159	40x40	M20x24	332	50	M20x24

Actuator type	Ø H	K	L	M	N	P	Ø R	S	SW	T	U	W	Z
D / DF 066	12	80	F05	F07	16	88	12	10	14	23,8	2	70	16
D / DF 076	14	80	F05	F07	16	100	18	10	17	29,3	2	83	16
D / DF 086	14	80	F05	F07	16	108	18	10	17	32,3	2	91	16
D / DF 096	19,5	80	F05	F07	16	117	25	14	17	37,3	2	100	22
D / DF 110	19,5	80	F07	F10	16	140	25	14	22	37,3	2,5	120	22
D / DF 115	28	80	F07	F10	16	140	40	20	22	53,3	3	120	30
D / DF 127	28	80	F07	F10	16	160	40	20	22	53,3	3	137	30
D / DF 143	28	130	F10	F12	16	198	40	20	27	53,3	3	172	30
D / DF 163	36	130	F10	F12	11	198	40	28	27	66,3	3,5	172	42
D / DF 210	40	130	F14	-	11	255	60	32	36	79,3	4	224	48
D / DF 250	40	130	F16	-	11	302	75	32	46	105,3	4	272	84
D / DF 254	40	130	F16	-	11	302	75	32	46	134	3	272	102

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**HERBERHOLZ**

# Twin piston pneumatic actuators

type: **D / DF**

## Torques of single acting actuators type: DF [Nm]

Actuator type No. of springs	Spring resistance Md <sub>F</sub> [Nm]		Usable pneumatic torque Md <sub>N</sub> [Nm] at minimum operating pressure Pst min [bar]															
			3,5 bar		4 bar		5 bar		6 bar		7 bar		8 bar		9 bar		10 bar	
	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
DF 066 - 04	6,4	8,4	11,1	14,0														
- 06	9,6	12,6	6,5	10,9	9,4	13,8												
- 08	12,8	16,8			4,8	10,6	10,6	16,4	16,4	22,2								
- 10	16,0	21,0					6,0	13,3	11,8	19,1	17,6	24,9	23,4	30,7				
- 12	19,2	25,2									13,0	21,7	18,8	27,5	24,6	33,3	30,4	39,1
DF 076 - 04	9,6	14,5	17,3	24,3														
- 06	14,4	21,8	8,5	19,0	13,5	24,0	23,5	34,0										
- 08	19,2	29,0			4,6	18,6	14,6	28,6	24,6	38,6	34,6	48,6						
- 10	24,0	36,3					5,8	23,3	15,8	33,3	25,8	43,3	35,8	53,3				
- 12	28,8	43,5									16,9	37,9	26,9	47,9	36,9	57,9	46,9	67,9
DF 086 - 04	12,8	20,9	27,8	36,2														
- 06	19,2	31,4	17,2	29,8	24,2	36,8												
- 08	25,6	41,8			13,6	30,4	27,6	44,4	41,6	58,4								
- 10	32,0	52,3					17,0	38,0	31,0	52,0	45,0	66,0	59,0	80,0				
- 12	38,4	62,7							20,4	45,6	34,4	59,6	48,4	73,6	62,4	87,6	76	102
DF 096 - 04	18,4	30,0	37	48														
- 06	27,6	45,0	22	37	32	47	51	67										
- 08	36,8	60,0			16	37	35	56	55	76	74	95						
- 10	46,0	75,0					20	46	39	66	59	85	78	104				
- 12	55,2	90,0									43	75	63	94	82	114	102	133
DF 110 - 04	30,5	44,5	51	68														
- 06	45,7	66,7	28	52	42	66	70	95										
- 08	61,0	89,0			18	51	46	79	74	107								
- 10	76,0	111,0					22,4	64	51	92	79	120	107	148				
- 12	91,5	133,5									55	105	83	133	111	161	140	189
DF 115 - 04	42	71	76	106														
- 06	63	107	41	86	62	107	104	149										
- 08	84	142			27	87	69	129	111	171								
- 10	105	178							77	151	118	193	160	235				
- 12	126	213									82	172	124	214	166	256	208	298
DF 127 - 04	50	86	109	143														
- 06	75	129	67	118	94	146	149	201										
- 08	100	172			52	121	107	176	162	231								
- 10	125	21					65	151	120	206	175	261	230	316				
- 12	150	258									133	237	188	292	243	347	298	402
DF 143 - 04	77	128	170	221														
- 06	116	192	106	182	148	225	233	310										
- 08	154	256			84	186	169	271	254	356								
- 10	193	320					105	233	190	318	275	403	360	488				
- 12	231	384							126	279	211	364	296	449	381	534	466	619
DF 163 - 04	104	155	230	285														
- 06	156	232	152	235	207	290												
- 08	208	310			129	240	239	350	349	460								
- 10	260	388					161	300	271	410	381	520	491	630				
- 12	312	465							194	360	304	470	414	580	524	690	634	800
DF 210 - 04	213	285	522	621														
- 06	319	427	368	517	487	635												
- 08	426	569	214	412	333	531	570	768	807	1005								
- 10	532	712					416	664	653	901	890	1138	1127	1375				
- 12	638	853							500	796	736	1033	973	1270	1210	1507	1447	1744
DF 250 - 04	452	675	785	1020														
- 06	678	1013	416	768	633	986	1068	1421										
- 08	904	1350			264	734	699	1169	1134	1604								
- 10	1130	1688							765	1353	1200	1788	1635	2222				
- 12	1356	2025									831	1536	1266	1971	1701	2406	2136	2841
DF 254 - 04	472	832	1026	1406														
- 06	708	1249	587	1157	859	1429	1403	1973										
- 08	944	1665			420	1180	964	1724										
- 10	1180	2081					525	1475	1069	2019	1613	2563	2156	3106				
- 12	1416	2498							630	1770	1173	2313	1717	2857	2261	3401	2805	3945

Date: 03.2005

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