

Valve Experience.
Made in Italy.



AT SERIES



Compact Rack&Pinion Actuator
for Quarter-Turn Valve

Pressure Ranges

2 bar(29 psig) to 8 bar(116 psig) double acting
3 bar(44 psig) to 8 bar(116 psig) spring return

Temperature Ranges

*Std.: -20°C~80°C

NBR O-rings: -4° F~176° F

*Lower Temp.: -40°C~80°C

HNBR O-rings: -40° F~176° F

*High Temp.: -15°C~150°C

Viton O-rings: +5° F~300° F

Note: Special grease is required for low and high temperature service condition.

Wide Range Available

The actuator range consists of 14 sizes, with torques from 9Nm(80in.lbs) to 3,920Nm

Operating Media

Filtered dry or lubricated air for non-corrosive gas, water or light hydraulic oil. The maximum particle size must not exceed 30 microns.

Stroke Adjustment

0° and 90° with standard adjustment $\pm 5^\circ$



Lubrication

All moving parts are factory lubricated for entire life cycle of actuator.

Construction

Twin piston rack and pinion actuator design, suitable for indoor and outdoor installation.

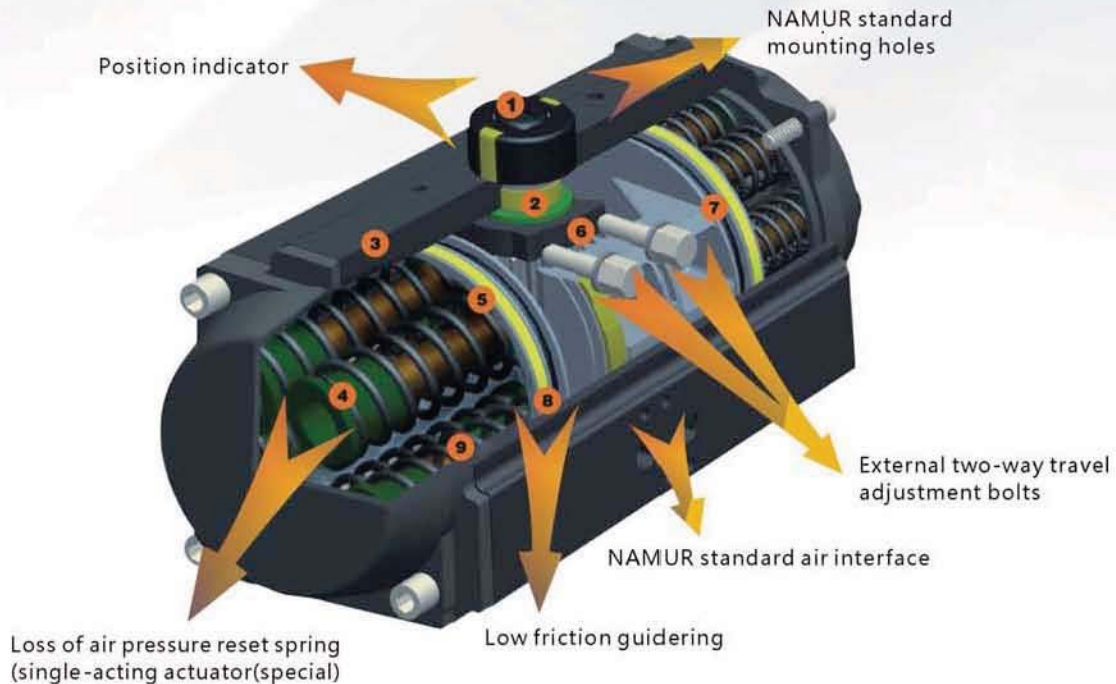
Connections

Bottom drilling complies with ISO 5211/DIN 3337 to match valve. Interface for solenoid valve, shaft top end and top drilling for assembling accessories are in accordance with VD/VDE-3845, NAMUR standard.

Inspection

Every actuator is hydraulically tested, certified and guaranteed for a minimum of 1,000,000 cycles.

Pneumatic Actuator–Features



1. Indicator

A position indicator with Namur mounting is standard on all Chemtork pneumatic actuators for mounting accessories.

2. Pinion

The hardened alloy steel pinion is precision ground and Nickel plated (over 15um) in order to reduce friction, provide maximum wear resistance. Full conformance with the newest standards of ISO5211 & DIN3337. The dimensions can be customized and as options, stainless steel and aluminium alloy are also available.

3. Actuator Body

The aluminum extrusion is hard anodized(over 30um) to protect against wear and corrosion while reducing piston friction to the absolute minimum. Other options such as Nickel, Ceramic, PTFE, Polyester coated are available.

4. End Caps

Epoxy coated(over 80um) die cast aluminum end caps provide maximum resistance against potentially corrosive elements. Other treatments such as Nickel, Ceramic, PTFE, Polyester coated are available.

5. Pistons

The precisely–balanced and hard anodized treatment (over 30um) die cast aluminum pistons are fitted with high quality rings and guides. The twin rack and piston design creates a constant torque output on all actuators.

6. Travel Adjustment

The standard adjustment is $\pm 5^\circ$ in both the open and closed positions through easily accessible external adjustment bolts.

7. O–Rings

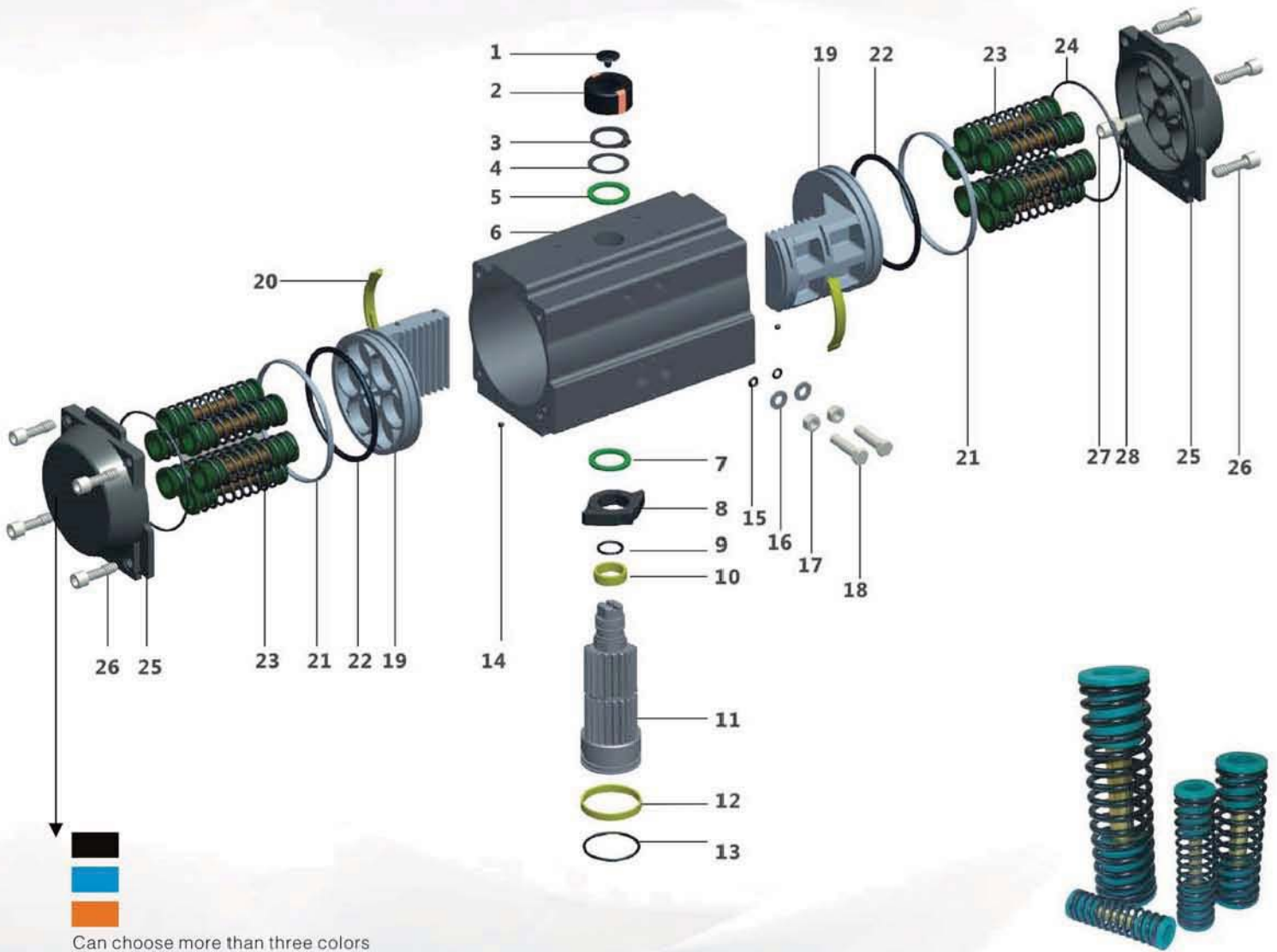
NBR O–rings provide trouble–free operation at standard temperature ranges. Viton and HNBR O–rings are available for high or low temperature applications.

8. Bearings & Guides

The highly durable compound material provides high trust stability with minimum friction and long life.

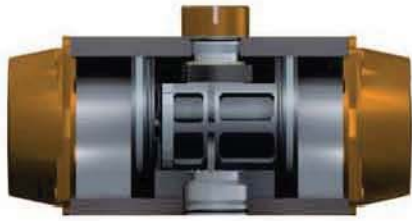
9. High Performance Springs

The high tensile steel springs are coated with epoxy coated for corrosion resistance and longer service. The pre–loaded springs can be safely & rapidly disassembled.



Parts list

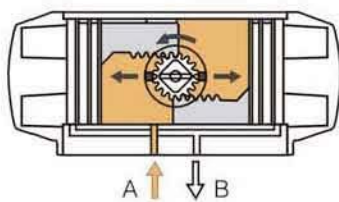
No.	Name	Number	material	Protection	Optional Material
1	Indicator screw	1	plastic	-	-
2	Indicator	1	plastic	-	-
3	Circlip	1	Stainless steel	-	-
4	Gasket	1	Stainless steel	-	-
5	Gasket	1	Engineering plastics	-	-
6	Actuator body	1	Aluminum Alloy	Hard anodized, etc.	-
7	Thrust Bearing (Pinion)	1	Nylon 66	-	-
8	Stroke Cam	1	Steel	-	-
9	O-Ring(Top Pinion)	1	NBR	-	Viton / HNBR
10	Bearing (Top Pinion)	1	Nylon 66	-	-
11	Pinion	1	H2	Nickel plating	Stainless steel
12	Bearing(Lower Pinion)	1	Nylon 66	-	-
13	O-Ring(Lower Pinion)	1	NBR	-	Viton / HNBR
14	Plug	2	NBR	-	Viton / HNBR
15	Stroke Bolt O-Ring	2	NBR	-	Viton / HNBR
16	Stroke Bolt Washer	2	Stainless steel	-	-
17	Stroke Bolt Retaining Nut	2	Stainless steel	-	-
18	Stroke Bolt	2	Stainless steel	-	-
19	Piston	2	Die Cast Aluminum Alloy	Hard Anodized(over 30um)	-
20	Piston Guide	2	Nylon 66	-	-
21	Piston Bearing	2	Nylon 66	-	-
22	Piston Seal	2	NBR	-	Viton / HNBR
23	Spring(Cartridge)	0~12	High Performance Spring steel	Epoxy Coated	-
24	End Cap Seals	2	NBR	-	Viton / HNBR
25	End Cap	2	Die Cast Aluminum	Epoxy coated(over 80um)	Nickel or PTFE coated
26	End Cap Bolts	8	Stainless steel	-	-



Sizing example of Boke double acting actuator:
 Valve torque 100Nm plus 20% safety factor=120Nm. Minimum operating pressure 6bar(87psig). By reading down the 6bar(87psig) column the figure below 120Nm is 136.4Nm. The model number shown in the left hand column is therefore BK-KD-092.

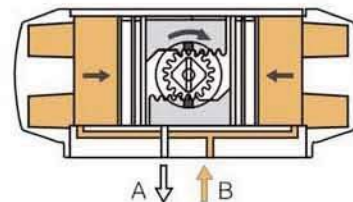
The operating principle of double acting actuator

CCW-counter-clockwise



Air to port A forces the pistons outwards, causing the piston to turn counter-clockwise while air is being exhausted from port B.

CW-clockwise

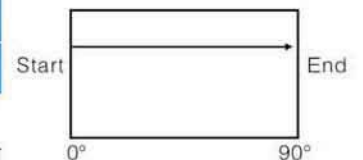


Air to port B forces the pistons inwards, causing the piston to turn clockwise while air is being exhausted from port A.

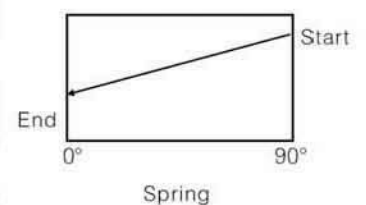
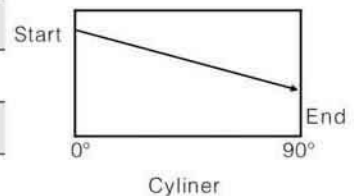
Torque Table of Double Acting Actuator

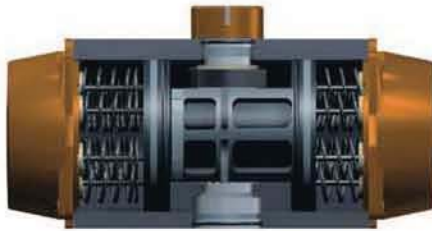
Model	Air Supply Pressure(unit:bar)					
	3.0	4.0	5.0	6.0	7.0	8.0
Air Torque Output(Nm)						
AT032	4.6	6.1	7.6	9.2	10.7	12.2
AT052	12.0	16.0	20.0	24.0	28.0	32.0
AT063	21.7	28.9	36.1	43.4	50.6	57.8
AT075	35.0	46.6	58.3	69.9	81.6	93.2
AT083	42.8	57.0	71.3	85.5	99.8	114.0
AT092	67.6	90.1	112.6	135.2	157.7	180.2
AT105	97.7	130.3	162.9	195.5	228.0	260.6
AT125	173.3	231.0	288.8	346.5	404.3	462.0
AT140	260.7	347.6	434.5	521.4	608.3	695.2
AT160	397.2	529.6	662.0	794.4	926.8	1059.2
AT190	640.2	853.6	1067.0	1280.4	1493.8	1707.2
AT210	789.8	1173.1	1466.4	1759.7	2052.9	2346.2
AT240	1379.0	1838.6	2298.3	1757.9	3217.6	3677.2
AT270	1939.2	2585.6	3232.0	3878.4	4524.8	5171.2
AT300	2289.1	3136.9	3984.7	4832.5	5086.3	6528.1
AT350	3359.7	4479.6	5599.5	6194.4	7839.3	8959.2

Torque diagram double acting actuators



Torque diagram single acting actuators





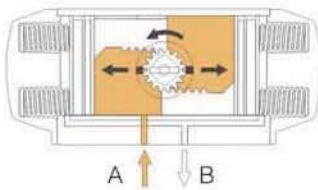
Sizing example of Boke spring return actuator:

Spring to close when air fails (air to open):

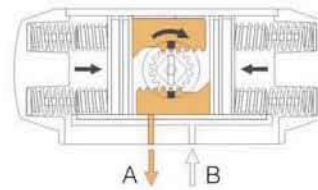
Valve torque 60Nm plus 20% safety factor= 72Nm. Minimum operating pressure: 6bar(87psig). The spring return Boke actuator selected is Bk-KS-105-12. The Bk-KS-105-12 has the following output torques:

1. air torque 0° (valve close)=124Nm > 72Nm
2. air torque 90° (valve open)=84Nm
3. spring torque 90° (valve open)=120Nm
4. spring torque 90° (valve close)=80Nm > 72Nm

The operating principle of single acting spring return actuator



Air to port A forces the pistons outwards, causing the springs to compress. The pinion turns counter-clockwise while air is being exhausted from port B.



Loss of pressure through port A allows the stored energy in the springs to force the pistons inwards. The pinion turns clockwise while air is being exhausted through port A.

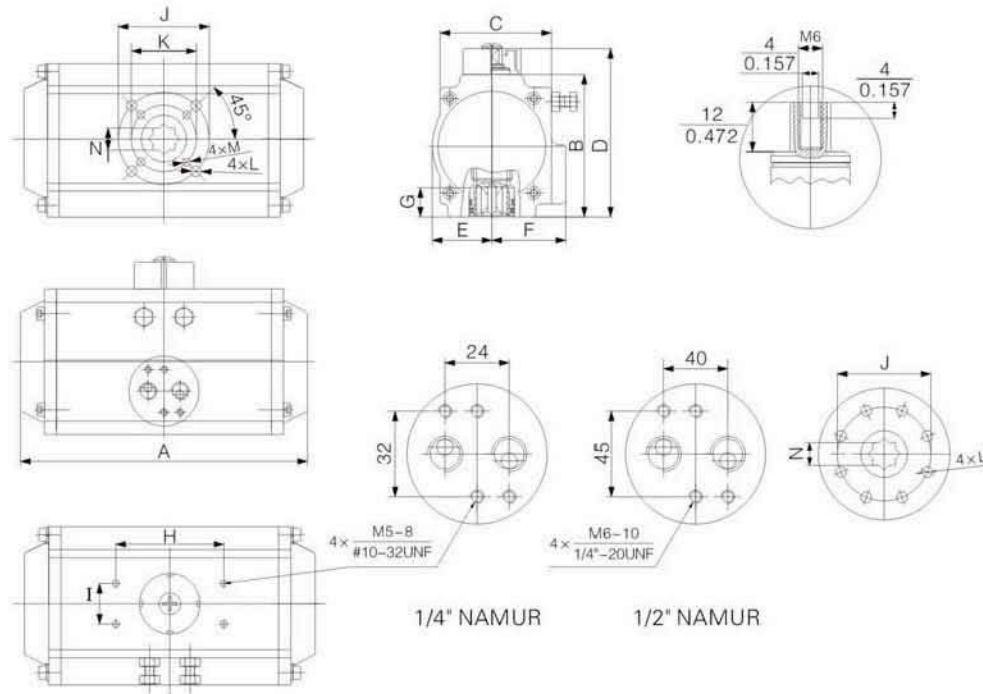
Torque Table of Spring Return Actuator

Air Supply Pressure (unit:bar)		Air Torque Output(Nm)														Output torque spring		
		2.5Bar		3Bar		4Bar		5Bar		6Bar		7Bar		8Bar				
Model	Spring number	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	
AT52SR	5	5.7	3.8	7.6	5.7											6.2	4.3	
	6	4.9	2.5	6.9	4.5	10.9	8.5	14.0	10.4							7.4	5.0	
	7	4.0	1.3	6.0	3.3	9.8	7.3	13.2	9.1	17.2	14.1					8.6	5.9	
	8			6.0	3.3	9.2	6.0	12.3	7.9	16.3	12.8	20.3	16.8				9.9	6.7
	9			5.2	2.0	8.3	4.8	11.5	6.7	15.5	11.6	19.5	15.6				11.1	7.6
	10			4.3	0.8	7.4	3.6	10.6	5.4	14.6	10.4	18.6	14.3	22.6	18.3		12.4	8.5
	11					6.6	2.3	9.7	4.2	13.8	9.1	17.8	12.2	21.8	17.1		13.6	9.3
AT63SR	5	11.4	7.7	15.0	11.4	22.3	14.9									14.8	10.2	
	6	10.1	5.7	13.6	9.3	20.9	16.6	28.3	23.9							10.4	6.8	
	7	8.6	3.6	12.5	7.2	19.5	14.5	26.8	21.9							12.5	8.2	
	8			10.9	5.1	18.2	12.4	25.5	19.8	32.8	27.0	40.1	34.3			14.6	9.6	
	9					16.8	10.4	24.1	17.7	31.4	24.9	38.7	32.2			16.7	10.9	
	10					1.4	8.2	22.8	15.6	30.0	22.8	37.3	30.1	44.7	37.4	18.8	12.3	
	11							21.5	13.5	28.7	20.7	36.0	28.0	43.8	35.3	20.9	13.7	
AT75SR	5	14.5	10.6	19.4	15.5	29.5	25.7									22.9	15.0	
	6	12.4	7.6	17.3	12.6	27.4	22.7	37.5	32.8							25.0	16.4	
	7	10.4	4.8	15.2	9.7	25.3	19.9	35.4	29.9							14.5	10.5	
	8			13.1	6.8	21.0	16.9	33.3	27.0	43.2	37.0	53.3	47.0			17.4	12.7	
	9					19.0	14.1	34.2	24.1	41.1	34.1	51.2	44.2			20.3	14.8	
	10						11.1	28.8	21.2	39.1	31.2	49.1	41.2	59.1	51.2	23.2	16.9	
	11							27.0	18.3	37.0	28.3	47.0	38.4	57.0	48.4	26.4	19.0	
AT83SR	5	23.3	16.1	31.1	24.0	46.8	39.7									31.9	23.2	
	6	20.1	11.5	28.0	19.3	43.7	35.1	59.4	50.7							34.7	25.3	
	7	17.0	6.9	24.8	14.8	40.5	30.5	56.2	46.2							23.0	15.8	
	8			21.7	10.1	37.4	25.8	53.1	41.5	68.8	57.2	84.5	72.9			27.6	19.0	
	9					34.2	21.3	49.9	37.0	65.6	52.6	81.2	68.3			32.3	22.1	
	10					31.0	16.6	46.7	32.3	62.4	48.0	78.1	63.7	93.8	79.3	36.8	25.3	
	11							43.6	27.7	59.3	43.4	75.0	59.1	90.6	74.8	41.4	28.5	
AT92SR	5	33.1	22.0	44.2	33.2	66.8	55.9									46.0	31.6	
	6	28.4	15.2	39.6	26.4	62.2	52.2	84.8	71.6							50.6	34.8	
	7	23.8	8.2	34.9	19.4	57.5	47.5	80.2	64.7							55.2	38.0	
	8			31.3	12.6	52.9	42.9	75.5	62.3	98.1	80.5	120.7	103.0			34.4	23.3	
	9					48.2	38.2	70.9	51.0	93.5	73.6	116.0	96.1			41.2	28.0	
	10					43.6	33.6	66.2	51.1	88.8	66.7	111.3	89.2	134.0	111.8	48.1	32.7	
	11							61.5	47.2	84.1	59.9	106.6	82.4	129.2	105.0	55.0	37.3	
12							56.8	42.4	79.4	53.0	101.9	75.5	124.5	98.1	61.9	42.0		

Single-acting actuator – output torque (Unit: NM)

		Air Torque Output(Nm)														Output torque spring			
Air Supply Pressure (unit:bar)		2.5Bar		3Bar		4Bar		5Bar		6Bar		7Bar		8Bar					
Model	Spring number	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end	0° start	90° end		
AT105SR	5	51.0	33.4	67.5	49.9	100.6	83.0									49.2	31.6		
	6	44.7	23.5	61.1	40.0	94.2	73.2	127.3	106.2							59.1	38.0		
	7	38.4	13.7	54.9	30.3	87.9	63.4	121.0	96.4							68.9	44.3		
	8			48.5	20.4	81.6	53.5	114.7	86.5	147.7	119.6	180.8	152.7				78.7	50.6	
	9					75.3	43.7	108.4	76.8	141.5	109.8	174.5	142.9				88.6	56.9	
	10							68.9	33.4	102.0	66.5	135.1	99.6	168.2	132.6	201.2	165.7	98.4	63.3
	11									95.7	57.0	128.7	90.1	161.8	123.1	194.8	156.2	108.3	69.6
12									89.4	47.5	122.5	80.6	155.5	113.6	188.6	146.7	118.1	75.9	
AT125SR	5	73	47	98	72	148	122									79	52		
	6	62	31	88	56	127	107	188	157							94	63		
	7	52	15	77	40	117	90	178	141							110	73		
	8			67	25	107	75	167	125	217	176	268	226			125	84		
	9					96	59	157	109	207	159	257	210			141	94		
	10							44	146	94	196	144	247	194	297	245	157	105	
	11								136	78	186	128	236	178	286	228	173	115	
12								125	63	176	113	226	163	276	213	188	125		
AT140SR	5	128	85	171	127	256	213									129	86		
	6	111	59	154	102	239	187	325	273							155	103		
	7	94	33	137	76	222	162	308	247							181	120		
	8			120	50	205	136	291	221	376	307	462	392			206	137		
	9					187	110	273	196	358	281	444	367			232	155		
	10					170	84	256	169	341	255	427	340	512	426	258	172		
	11							238	143	324	229	409	314	495	400	284	189		
12							221	118	307	203	392	289	478	374	310	206			
AT160SR	5	193	124	259	191	392	324									208	140		
	6	165	83	232	149	365	282	498	415							250	168		
	7	137	41	203	107	336	240	469	373							282	196		
	8			176	66	309	199	442	237	575	465	708	598			333	223		
	9					280	157	413	290	546	423	679	556			375	251		
	10					253	115	386	248	519	381	652	514	785	647	417	279		
	11							358	207	491	340	624	473	757	606	458	307		
12							330	165	463	298	596	431	729	564	500	335			
AT190SR	5	332	222	438	329	651	542									309	200		
	6	292	161	398	267	611	480	824	693							371	240		
	7	252	99	358	205	571	418	784	631							433	280		
	8			318	143	531	356	744	569	957	782	708	995			495	320		
	9					491	295	704	507	917	720	679	933			557	360		
	10					451	233	664	446	877	658	652	871	1302	1084	618	400		
	11							624	384	837	597	624	809	1263	1022	680	440		
12							584	322	797	535	596	748	1223	960	742	480			
AT210SR	5	390	285	523	418	789	684									380	275		
	6	335	209	468	342	734	608	1000	874							456	330		
	7	280	133	413	266	679	532	945	798							532	385		
	8			358	190	624	456	890	722	1156	988	1422	1254			608	440		
	9					569	380	835	646	1101	912	1367	1178			684	495		
	10					514	304	780	570	1046	836	1312	1102	1578	1368	760	550		
	11							725	494	991	760	1257	1025	1523	1292	836	605		
12							670	418	936	684	1202	950	1468	1216	912	660			
AT240SR	5	552	409	744	600	1129	985									554	410		
	6	470	297	662	489	1047	874	1432	1259							665	492		
	7	388	187	580	379	964	764	1349	1149							775	575		
	8			498	268	883	653	1267	1037	1652	1422	2037	1807			886	656		
	9					800	542	1185	926	1569	1311	1954	1696			998	739		
	10					718	431	1103	816	1488	1201	1872	1586	2257	1970	1108	821		
	11							1021	705	1406	1090	1791	1474	2176	1859	1219	903		
12							939	594	1323	979	1708	1363	2093	1748	1330	985			
AT270SR	5	903	675	1195	968	1779	1552									787	560		
	6	790	519	1083	811	1667	1396	2252	1981							943	672		
	7	679	361	972	654	1556	1238	2141	1823							1101	783		
	8			860	497	1444	1081	2029	1666	2614	2252	3199	2836			1258	895		
	9					1332	823	1917	1509	2502	2094	3087	2678			1416	1007		
	10					1220	767	1805	1352	2390	1937	2974	2521	3560	3107	1572	1119		
	11							1693	1194	2278	1779	2862	2364	3448	2949	1730	1231		
12							1582	1037	2167	1623	2751	2207	3336	2792	1887	1342			
AT300SR	5	1097	729													1061	730		
	6	935	494	1316	875											1273	876		
	7	772	258	1153	639	1916	1402									1485	1022		
	8			991	403	1754	1166	2517	1929							1697	1168		
	9					1592	930	2355	1693	3118	2456					1909	1314		
	10					1430	695	2193	1458	2956	2221	3719	2984	4482	3747	2122	1460		
	11							2030	1222	2793	1985	3556	2748	4319	3511	2334	1606		
12							1868	986	2631	1749	3394	2512	4157	3275	2546	1752			
AT350SR	5	1553	964													1702	1173		
	6	1292	586	1863	1157											2043	1408		
	7	1031	208	1602	779	2745	1922									2383	1642		
	8			1341	401	2484	1544	3626	2686							2724	1877		
	9					1963	1165	3336	2307	4508	3449					3064	2112		
	10							3105	1929	4247	3071	5390	4214	6532	5356	6405	2346		
	11							2844	1551	3986	2693	5129	3836	6271	4978	3745	2581		
12							2584	1172	3726	2314	4869	3457	6011	4599	4086	2816			

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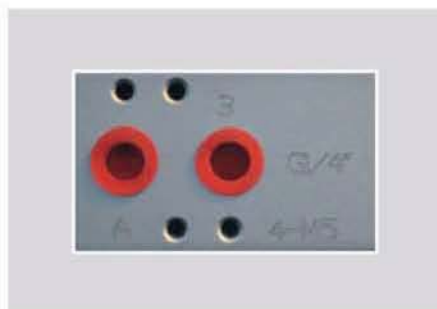


Dimension

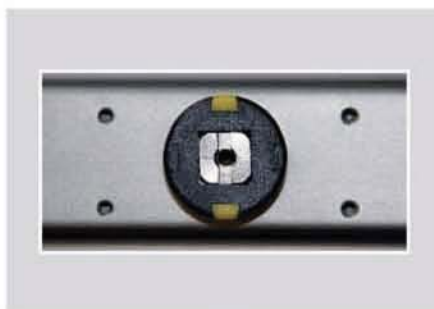
Unit: mm

Model	A	B	C	D	E	F	G	H	I	N	J	K	L	M	Air Connection
AT-032	110	45	45	65	22.5	22.5	11	50	25	9	F03	-	M5 x 7.5	-	1/8"
AT-052	147	72.8	60.5	92	26	41.5	14	80	30	11	F05	F03	M6 x 10	M5 x 7.5	1/4"
AT-063	170	90.5	70	110	33.5	47	17	80	30	14	F07	F05	M8 x 13	M6 x 10	1/4"
AT-075	186	100	78	120	39	53	17	80	30	14	F07	F05	M8 x 13	M6 x 10	1/4"
AT-083	206	109	86	129	40	57	20	80	30	14	F07	F05	M8 x 13	M6 x 10	1/4"
AT-092	262	117.6	92	137	44.5	58.5	20	80	30	17	F07	F05	M8 x 13	M6 x 10	1/4"
AT-105	268	135	104.8	155	52	64	26	80	30	17	F10	F07	M10 x 16	M8 x 13	1/4"
AT-125	298	157	120	185	60	74.5	25	80	30	22	F10	F07	M10 x 16	M8 x 13	1/4"
AT-140	398	174	125	204	65	77	30	130	30	27	F12	F10	M12 x 20	M10 x 16	1/4"
AT-160	456	198.5	143	229	74	87	30	130	30	27	F12	F10	M12 x 20	M10 x 16	1/4"
AT-190	534	232	172.8	262	86	103	40	130	30	36	F14	-	M16 x 20	-	1/4"
AT-210	536	265	194	295	97	113	43	130	30	36	F14	-	M16 x 20	-	1/4"
AT-240	620	290	223	320	115	130	50	130	30	46	F16	-	M20 x 25	-	1/4"
AT-270	722	326	252	356	126	147	50	130	30	46	F16	-	M20 x 25	-	1/2"
AT-300	784	354	335	384	162	173	50	130	30	46	F16	-	M20 x 25	-	1/2"
AT-350	845	410	385	440	190	195	50	130	30	46	F16	-	M20 x 25	-	1/2"
AT-400	956	466	520	496	260	260	60	130	30	55	F25	-	-	-	1/2"

Mounting Holes



Air interface accord with NAMUR standard, it can be easy and convenient to install solenoid valves



Pinion and actuator body follow NAMUR standards, limit switch and positioner can be installed directly



AT series actuator dimensional meets ISO5211 standard

The Table of Actuators Weight

Model	Double Acting (KG)	Spring Return Actuator (KG)	Model	Double Acting (KG)	Spring Return Actuator (KG)
AT052	1.4	1.5	AT160	20.1	24
AT063	2.0	2.1	AT190	31.3	35.3
AT075	2.7	2.9	AT210	46.8	54.8
AT083	3.1	3.6	AT240	67.3	80.2
AT092	4.6	5.2	AT270	96.9	118
AT105	6.8	6.9	AT300	110	130
AT125	9.0	10.1	AT350	186	234
AT140	13.2	15.6			

Air Consumption–Air Volume Opening & Closing

Model	Air Volume @ opening (Liter)	Air Volume @ closing (Liter)	Model	Air Volume @ opening (Liter)	Air Volume @ closing (Liter)
AT052	0.12	0.16	AT160	3.7	3.2
AT063	0.21	0.23	AT190	5.9	5.4
AT075	0.30	0.34	AT210	7.5	7.5
AT083	0.43	0.47	AT240	11.0	9.0
AT092	0.64	0.73	AT270	17.0	14.0
AT105	0.95	0.88	AT300	23.8	29.7
AT125	1.60	1.40	AT350	35.1	46.3
AT140	2.50	2.20			

The Table of Actuators Opening/Closing Time

Model	Opening time(Sec.)	Closing time(Sec.)	Model	Opening time(Sec.)	Closing time(Sec.)
AT052	0.2	0.3	AT160	1.5	1.7
AT063	0.3	0.3	AT190	2.0	2.2
AT075	0.3	0.4	AT210	2.7	3.2
AT083	0.4	0.5	AT240	3.5	4.0
AT092	0.5	0.6	AT270	4.0	4.5
AT105	0.7	0.8	AT300	5.0	5.5
AT125	0.9	1.1	AT350	6.0	7.0
AT140	1.2	1.4			

Stainless Steel Actuator



(1) The design of rack-and-pinion double-piston symmetrical structure enables fast and steady action, high precision, high output power as well as reverse rotation by simply changing the installation position of the piston.

(2) The extruded high-quality aluminum alloy cylinder, the processed inner bore by precision machining center, and hard anodized external surface of (anodic oxidation + Teflon coating under special circumstances) enable its longer service life and low friction coefficient.

(3) The integrated design enables all models of double-action actuators and single-action actuators have the same cylinder and end cap, which makes it convenient for changing action mode by assembling springs or disassembling springs.

(4) The combined preload safe spring assembly is safe and convenient for assembling or removing springs both in the installation process and on the operation site.

(5) The two separate adjusting screws on the external side, which are intended for the actuator installed on the valve, enable accurate and convenient adjustment of the OPEN or CLOSE position of the valve.

(6) The multi-functional position indicator is capable of on-site visual indication; besides, its slot, consistent with VID/VIE3845 and NAMUR standards, enables installation and output all accessories, such as the limit switch box, electric positioner and position sensor.

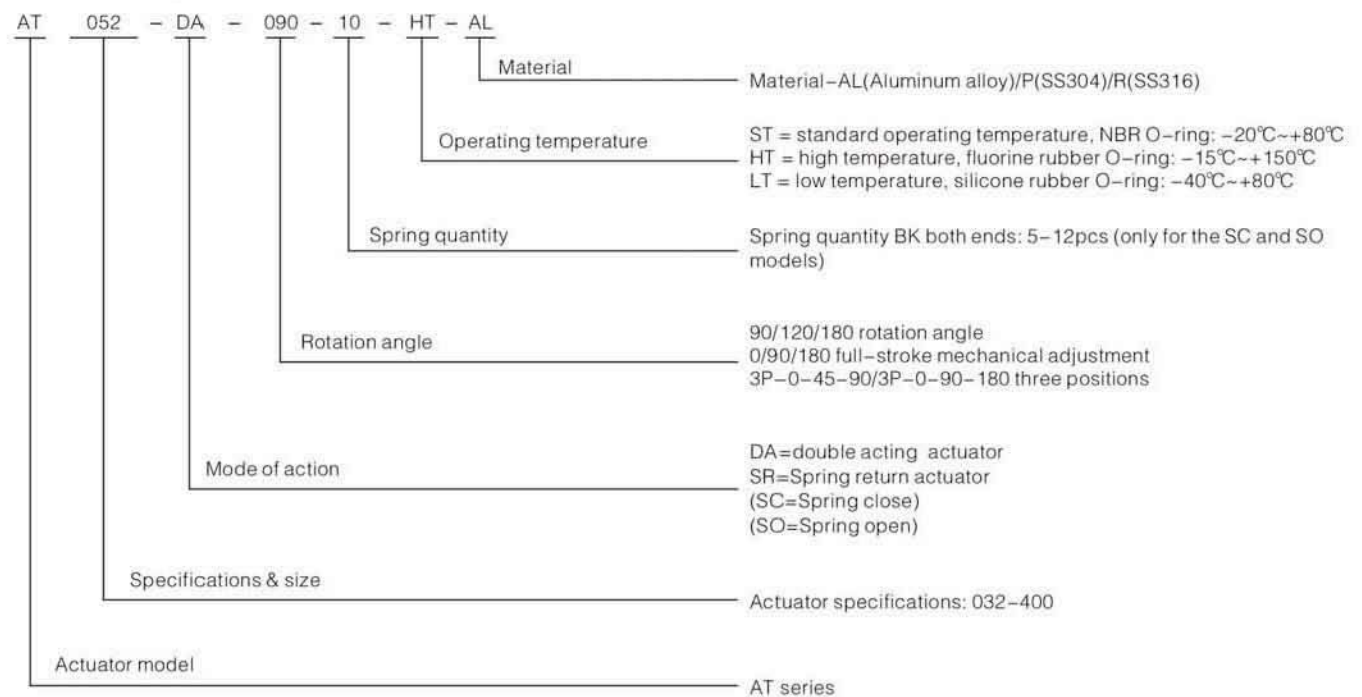
(7) The gas source interface, in line with NAMUR standard, is capable of direct installation of the NAMUR standard solenoid valve.

(8) The rack composite bushing and piston guide ring on the back of the rack as well as the bearing of the output shaft etc. Are intended for preventing metal-to-metal friction and increasing lubrication, to enable low friction and long service life.

(9) All fasteners are made of stainless steel to enable long-term corrosion resistance.

(10) The connection parts are in line with new international standards ISO5211 and DIN3337(F03-F25), to enable interchange and common use.

Model Preparation



SOLENOID VALVE

Solenoid Valve – ASCO



Features

- Compact spool valve convertible from 3/2 to 5/2.
- NAMUR Mount construction.
- Standard manual operator.
- DIN, Watertight and Explosionproof solenoids available.
- Single and dual solenoid constructions.
- Mountable in any position.
- Vents air from spring side of actuator to prevent corrosion of actuator.
- Operating temperature range: $-4^{\circ}\text{ F} \sim +140^{\circ}\text{ F}$ ($-20^{\circ}\text{ C} \sim +60^{\circ}\text{ C}$)
- For extreme environmental corrosion protection, all port threaded inserts and armature components can be supplied in stainless steel

BK-4M300 series NAMUR SOLENOID VALVE



Specification of Explosion-Proof Type

Protection	EExmIIT4
Voltage Range	+10%
Power Consumption	AC = 4.4VA, DC = 5W
Insulation Class	Class F

Specification

Model	BK-4M310-08	BK-4M320-08
Medium	Air	
Operating	Internal Piloted	
Valve Type	5 Port 2 Position	
Orifice Size	35mm ²	
Port Size	Inlet & Exhaust Port: PF1/4"	
Lubrication	Not Required	
Pressure Range	0.15 ~ 0.8Mpa	
Proof Pressure	12bar	
Temp. Range	$-5 \sim 60^{\circ}\text{ C}$ ($23 \sim 140^{\circ}\text{ F}$)	
Voltage Range	-15% ~ 10%	
Power Consumption	AC=2.0~3.5VA, DC=2.5W	
Insulation Class	Class F	
Protection	IP65(DIN40050)	
Connector	Socket with Plug	
Max Frequency	5 cycle/second	

Note: Port thread PT and NPT are also available.
Change 5/2 or 3/2 way function simply by turning the rotary O-ring Seal.

Valve Position Monitor APL-2, 3, 4, 5N Series



(IP67, IP68)

MODEL: APL-2N

- Enclosure : Weatherproof IP67/NEMA4&4X (Standard) IP68(OPTION)
- Solid and compact design
- Bolts on visual position indicator
(Re-adjustment available upon required direction)
- Dual cable entries : 2 x 1/2 NPT(Standard)
M20, PG13.5, PF1/2", PT1/2".(Option)
- Terminal Strips: 8 points(0.08-2.5mm²)
- Captive cover bolts
- Easy mounting bracket
NAMUR standard stainless steel shaft and bracket.



(IP67, IP68)

MODEL: APL-3N

- Enclosure: Weatherproof IP67/NEMA4&4X (Standard) IP68(OPTION)
- Solid and Flexible design & various options available
 - 3~4 additional switches
 - 8 ~ 16 points Terminal Strips
- Bolts on visual position indicator
- Dual cable entries : 2 x 1/2 NPT(Standard)
M20, PG13.5, PF1/2", PT1/2".(Option)
- Terminal Strips : 8 points(0.08-2.5mm²)
- Captive cover bolts
- Easy mounting bracket
NAMUR standard stainless steel shaft and stainless steel or steel bracket.



(E EX d IIB T6)

MODEL: APL-4N

- Enclosure: Weatherproof IP67/NEMA4, 4X, 7, 9 (Standard) IP68(OPTION)
Explosionproof : E EX d IIB T6
- Solid and Durable design & various options available
 - 3~4 additional switches
 - 8~20 points Terminal Strips
 - various options switches
- Bolts on visual position indicator
- Cable entries : 2 x 3/4 NPT(Standard)
M20, M25, PF3/4", PT3/4" 4Cable entries(OPTION)
- Terminal Strips : 8 points(0.08-2.5mm²)
- Captive cover bolts
- Easy mounting bracket
NAMUR standard stainless steel shaft and stainless steel or steel bracket.



(E EX d IIC T6)

MODEL: APL-5N

- Enclosure: Weatherproof IP67/NEMA4, 4X, 7, 9 (Standard) IP68(OPTION)
Explosionproof: E EX d IIC T6, E EX ia IIC T6, E EX d IIB T6
- Solid and compact design
- Shaft holder built in the cover(Dual shaft)
Easy to set the visual position indicator.
Unique design to put the visual indicator on the threaded joint type cover.
- Bolts on visual position indicator
- Dual Cable entries : 2 x 3/4 PF(Standard)
M20, M25, NPT3/4", PT3/4"(Option)
- Terminal Strips : 8 points(0.08-2.5mm²)
- Captive cover bolts & Spring loaded cover bolts
No worry to loose bolts while cover open
& Unique design to hold bolts inside cover
- Easy mounting bracket
NAMUR standard stainless steel shaft and stainless steel or steel bracket.

External parts material: Stainless steel 316
Ambient and fluid temperature: -40 ~ 80°C
NACE International Standards compliant

The JIS component standards of the external parts and the component measurement results of the certificate for materials are with in the ANSI/NACE standards.



Specifications

Fluid	Air
Ambient and fluid temperature	-40~80°C (with no freezing)
Proof pressure	3.0 MPa
Maximum operating pressure	2.0 Mpa
Set pressure range	0.05 to 0.85 MPa
Nominal filtration rating	5 μm
Drain capacity (cm ³)	AW30:20, AW40:80
Construction	Relieving type
Weight (kg)	AW30:1.19, AW40:3.40

Applicable Model

Model	AW30	AW40
Port size	1/4, 3/8	1/4, 3/8, 1/2, 3/4

Standard Specifications

Model	AW20-A	AW30-A	AW40-A	AW40-06-A
Port size	1/8, 1/4	1/4, 3/8	1/4, 3/8, 1/2	3/4
Pressure gauge port size	1/8			
Ruid	Air			
Ambient and fluid temperature	-5~60°C(with no freezing)			
Proof pressure	1.5MPa			
Maximum operating pressure	1.0MPa			
Set pressure range	0.05~0.7MPa			
Nominal filtration rating	5 μm			
Drain capacity(cm ³)	8	25	45	
Bowl material	Polycarbonate			
Bowl guard	Semi-standard(Steel)	Standard(Polycarbonate)		
Construction	Relieving type			
Weight(kg)	0.21	0.41	0.75	0.81



Standard Specifications

Model	AC20-A	AC25-A	AC30-A	AC40-A	AC40-06-A
Component	Air filter	AF20-A	AF30-A	AF30-A	AF40-06-A
	Regulstor	AR20-A	AR25-A	AR30-A	AR40-06-A
	Lubricator	AL20-A	AL30-A	AL30-A	AL40-06-A
Port size	1/8, 1/4	1/4, 3/8	1/4, 3/8	1/4, 3/8, 1/2	3/4
Pressure gauge port size	1/8				
Ruid	Air				
Ambient and fluid temperature	-5~60°C(with no freezing)				
Proof pressure	1.5MPa				
Max. Operating pressure	1.0MPa				
Set pressure range	0.05~0.7MPa				
Nominal filtrationrating	5 μm				
Recommended lubricant	Class 1 turbine oil(ISO Vg32)				
Bowl material	Polycarbonate				
Bowl guard	Semi-standard(Steel)	Standard(Polycarbonate)			
Regulator construction	Relieving type				
Weight(kg)	0.39	0.67	0.82	1.26	1.43





Description

The de-clutchable wormgear operator offers simple and reliable manual positioning of valves, dampers and other quarter-turn devices when over-riding existing pneumatic or hydraulic rotary actuators. All units are suitable for both indoor and outdoor. The modular design is to provide the most efficient and effective solution to a full range of manual overriding requirements.

Operation

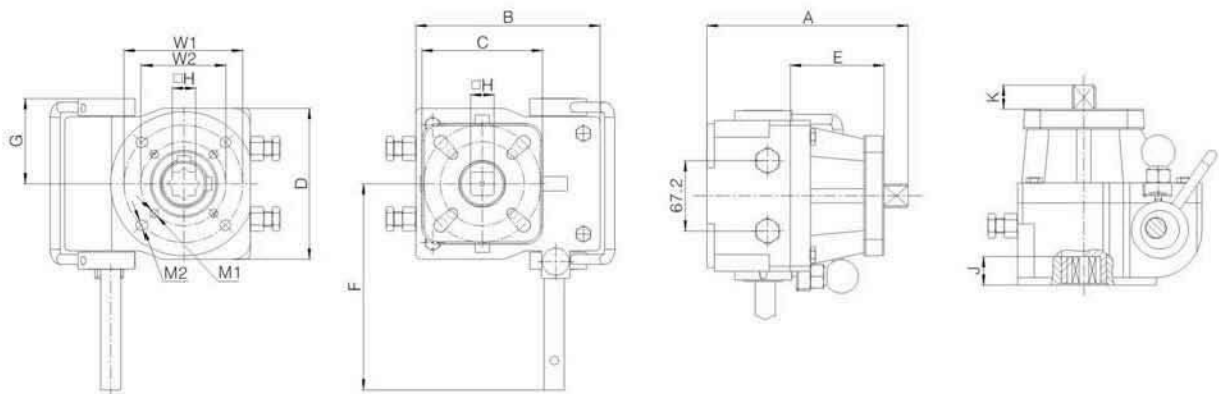
To engage manual operation, first pull out the lock handle and then rotate the clutch lever in anti-clockwise direction until engagement takes place. To return to automatic mode, first pull out the lock handle and then rotate the clutch lever in clockwise direction until engagement takes place.

Specification

- 1.Housing : Cast Iron or Aluminum Alloy
- 2.Gear Guardant : Ductile Iron
- 3.InpUt Shaft : ASTM A29M+Chrome Plated
- 4.Temperature Range : $-20^{\circ}\text{C} \sim +120^{\circ}\text{C}$
($-4^{\circ}\text{F} \sim +248^{\circ}\text{F}$)
- 5.Stroke Adjustment : $\pm 5^{\circ}$ at each end
- 6.Movement : $0^{\circ} \sim 90^{\circ}$
- 7.Finish Paint :Two Polyurethane Coated
- 8.Enclosure: Sealed to IP65
- 9.Torque Range: 300~8500Nm

Technical Data

Model	Gear Ratio	Input Torque (NM)	Output Torque (NM)	Hand Wheel Dia.	Weight (kg)
KH-1	26:1	50	100	180	2.6
KH-2	30:1	60	215	200	4.0
KH-3	38:1	90	434	280	6.5
KH-4	54:1	110	1000	300	13
KH-5	80:1	140	2000	400	32
KH-6	78:1	200	3500	500	43
KH-7	98:1	200	4200	600	65
KH-8	100:1	200	6000	600	95



Dimension Table

Unit:mm

Model	A	B	C	D	E	F	G	□H	J	K	M1	M2	W1	W2
KH-1	120	110	70	90	56	123	51	14	17	15	4-M6	4-M8	70	50
KH-2	127	132	102	122	55	157	63	17	19	18	4-M8	4-M10	102	70
KH-3	150	160	115	140	69	164	70	22	23	22	4-M12	4-M14	125	102
KH-4	194.5	201.8	130	230	83.5	240	92	27	29	28	4-M14	4-M16	140	125
KH-5	208.5	256	156	230	89.5	265	115	36	38	36	4-M16	4-M20	165	156
KH-6	233	298	160	240	94	330	120	46	50	48	4-M16	4-M20	165	160
KH-7	188	366	235	320	94	330	160	55	60	55	-	8-M16	235	200
KH-8	195	410	-	320	-	350	160	55	65	55	-	8-M16	-	254

Note: All dimensions are in mm. BigTork for reference only, subject to change.



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