

Series 3900 Features

General

The Series 3900 Rotary piston actuator are designed to operate rotating valves, such as Ball valves, Butterfly valves and Plug valves for throttling or on-off service. This actuators are unique linkage type which converts linear motion torque at beginning which usually corresponds to the closed position of valves, and another peak of torque is produced at 60 degree of valves which correspond to the dynamic torque.

Performance :

- Ideal high torque.
- Reliability.
- Low hysteresis.
- Light weight.
- Easy maintenance.

Design Flexibility :

- Double acting and spring return acting.
- Single piston and double piston.
- Wide selection of optional accessories available.
- Wide adjustable range (maximum rotating angle – 110°).

Design Integrity :

- maximum torque at beginning and another peak torque is produced at 60 – 80 degree in respond to torque of rotating valves.
- Mounting flange dimensions in accordance with ISO 5211.

Kind of Actuators :

- Double Acting – DS(Single Cylinder), DT(Twin Cylinder)
- Single Acting – SS(Single Cylinder), ST(Twin Cylinder)

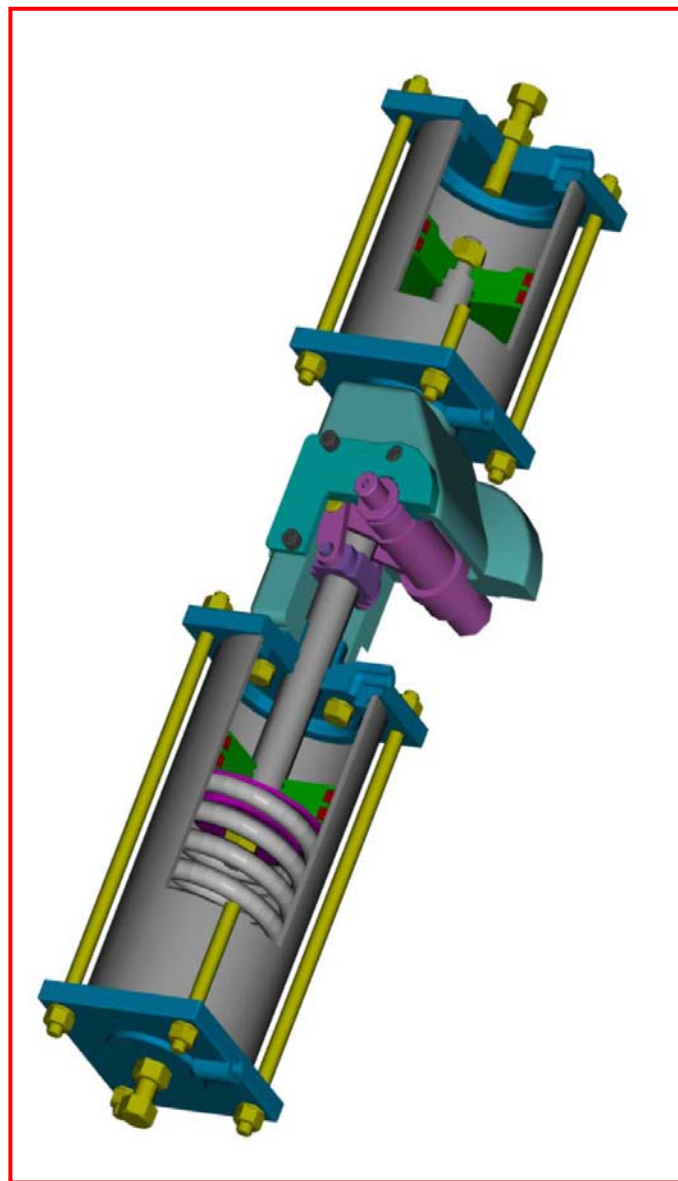


Figure 1. Series 3900 Single Acting Cylinder actuator

Scope of Design

Maximum output torque : 6 to 1437 Kgf-m

Cylinder bore : 80 to 400 mm

Actuation :

- Double acting.
- Single acting (Spring return; Spring opposed acting)

Working conditions :

Maximum working pressure : 8 Kgf/Cm²G

Maximum working temperature : 90 °C

Minimum working temperature : - 40 °C

Table 1. Standard material of condition

Parts description	Material
Cylinder	Aluminum honing tube
Piston	Cast aluminum
Piston rod	Stainless steel
Housing	Cast iron
End cover	Cast iron
Spring	Carbon steel
Piston ring	NBR / EPDM
Seals	NBR

- Alternative material combinations suitable for offshore and Extremely corrosive duties are available. Please consult factory for details.

Air consumption

Required air consumption is calculated from flowing equation.

Where :

V = Air consumption (NI)

P = Supply air pressure (Kgf/Cm²G)

A+B = Cylinder volume (liter)

N = Operation times

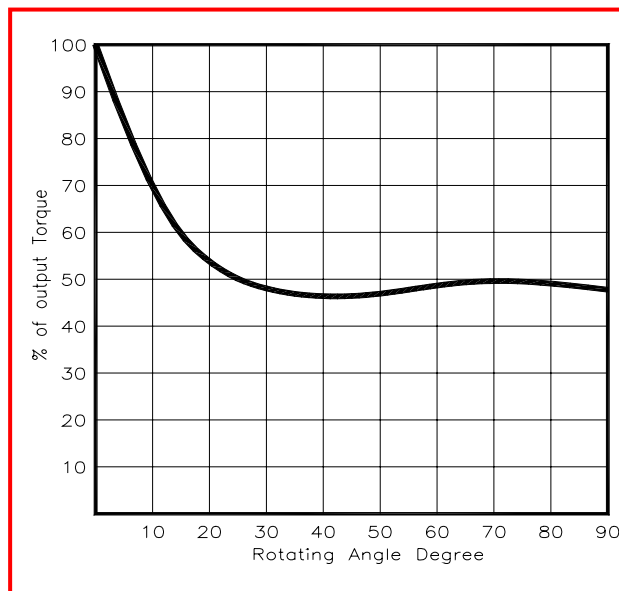


Figure 2. Torque of Design

Table 2. Cylinder Actuator Volume

SIZE	Cylinder Volume(liter)		
	A	B	A+B
AC08	0.40	0.35	0.75
AC10	0.70	0.53	1.23
AC13	1.70	1.30	3.00
AC15	2.30	1.80	4.10
AC17	3.20	3.00	6.20
AC20	5.00	4.70	9.70
AC25	7.53	7.29	14.82
AC30	15.26	14.65	29.91
AC35	19.6	18.99	38.59
AC40	37.48	38.90	76.38

- **Double acting cylinder**

$$V = B \times \left(\frac{P+1}{1} \right) \times N(NI)$$

- **Single acting cylinder**

$$V = (A + B) \times \left(\frac{P+1}{1} \right) \times N(NI)$$

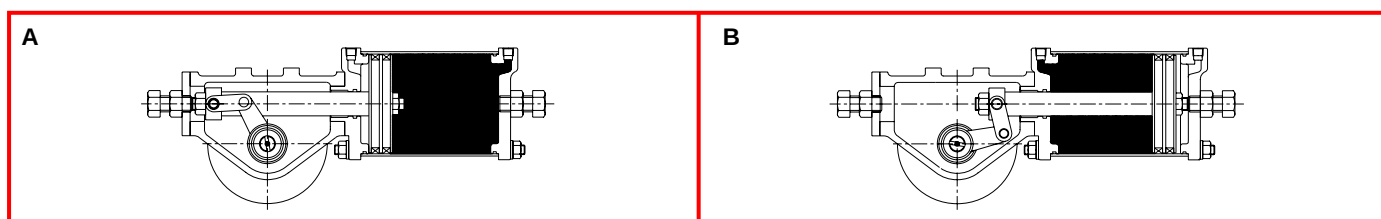


Figure 3.

TORQUE TABLE

MODEL AO-3800 Scotch Yoke Type Cylinder Actuator

Supply Air : 5.0 kgf/cm²G.

1) DOUBLE ACTING

kgf•m

SIZE	TORQUE	ISO. BASE	0°
AC05D	8	F05	8
AC06D	19	F05 / F07	19
AC08D	36	F07	36
AC10D	68	F07 / F10	68
AC14D	193	F12	193

2) SPRING RETURN (AIR TO OPEN)

SPRINGRANGE : 2~3 kgf/cm²g.

kgf•m

SIZE	TORQUE	ISO. BASE	0°
AC05S	4	F05	4
AC06S	10	F05 / F07	10
AC08S	19	F07	19
AC10S	36	F07 / F10	36
AC14S	104	F12	104

3) SPRING RETURN (AIR TO CLOSE)

SPRING RANGE : 2~3 kgf/cm²g.

kgf•m

SIZE	TORQUE	ISO. BASE	0°
AC05S	3	F05	3
AC06S	6	F05 / F07	6
AC08S	13	F07	13
AC10S	24	F07 / F10	24
AC14S	69	F12	69

MODEL AO-3900 Linkage Type Cylinder Actuator

Supply Air : 5.0 kgf/cm²G.

1) DOUBLE ACTING

kgf•m

SIZE	TORQUE	ISO. BASE	0°
AC08D	13	F07	13
AC10D	21	F07	21
AC13D	48	F10	48
AC15D	70	F12	70
*AC15DD	140	F14	140
AC17D	137	F14	137
AC17DD	274	F14	274
AC20DD	428	F16	428
AC25DD	740	F25	740
AC30DD	1543	F30	1543
AC35DD	2101	F35	2101
AC40DD	4032	F40	

2) SPRING RETURN (AIR TO OPEN)

SPRINGRANGE : 2~3 kgf/cm²g.

SIZE	TORQUE	ISO. BASE	0°
AC08S	5	F07	5
AC10S	8	F07	8
AC13S	19	F10	19
AC15S	28	F12	28
*AC15SD	42	F14	42
AC17S	54	F14	54
AC17SD	87	F14	87
AC20SD	128	F16	128
AC25SD	222	F25	222
AC30SD	463	F30	463

Air to open (NC) – NON AIR

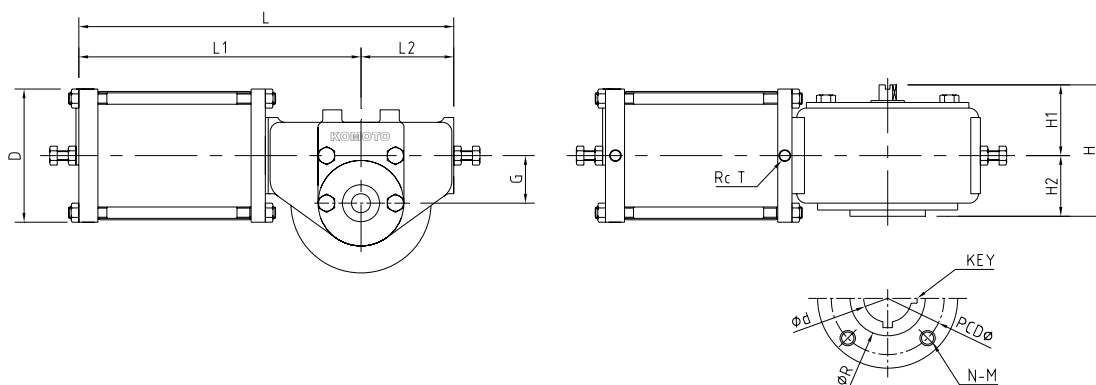
* Special size (AC15SD, 55DD)

AC 15SD, 17SD, 20SD, 25SD, 30SD : SPRING RANGE 1.5~2.5kgf/cm²G.

DIMENSION TABLE

AO-3900 CYLINDER ACTUATOR SINGLE CYLINDER TYPE

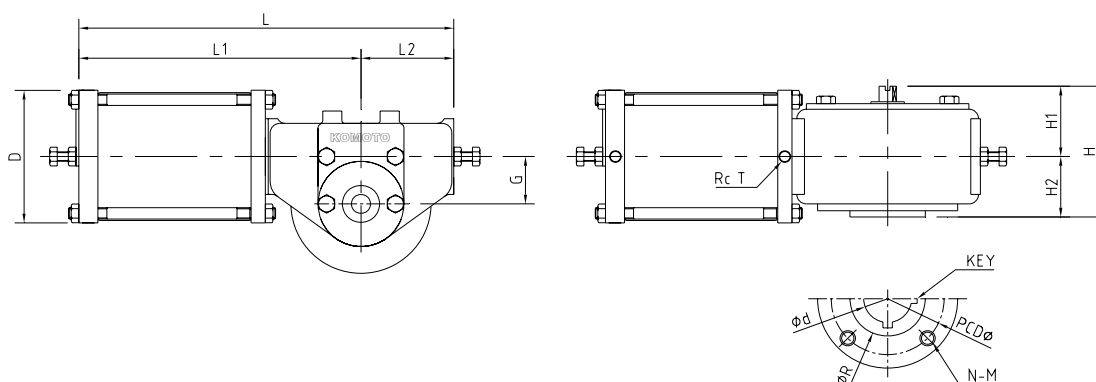
1. SPRING RETURN (AC08S, 10S, 13S, 15S, 17S)



Unit : mm

SIZE	ISO. BASE	L	L1	L2	D	G	H	H1	H2	ØR	PCDØ	KEY	Ød	N-M	Rc T
AC08S	F07	392	321	71	110	34	133	82	51	55	70	6x6	20	4-M8	1/4"
AC10S	F07	402	331	71	120	34	133	82	51	55	70	8x7	25	4-M8	1/4"
AC13S	F10	525	429	96	150	50	164.5	94.5	70	70	102	10x8	35	4-M10	1/4"
AC15S	F12	581	485	96	182	50	162	92	70	85	125	12x8	40	4-M12	1/4"
AC17S	F14	748	608	140	194	71	228	124	104	100	140	14x9	45	4-M16	1/4"

2. DOUBLE ACTING (AC08D, 10D, 13D, 15D, 17D)



Unit : mm

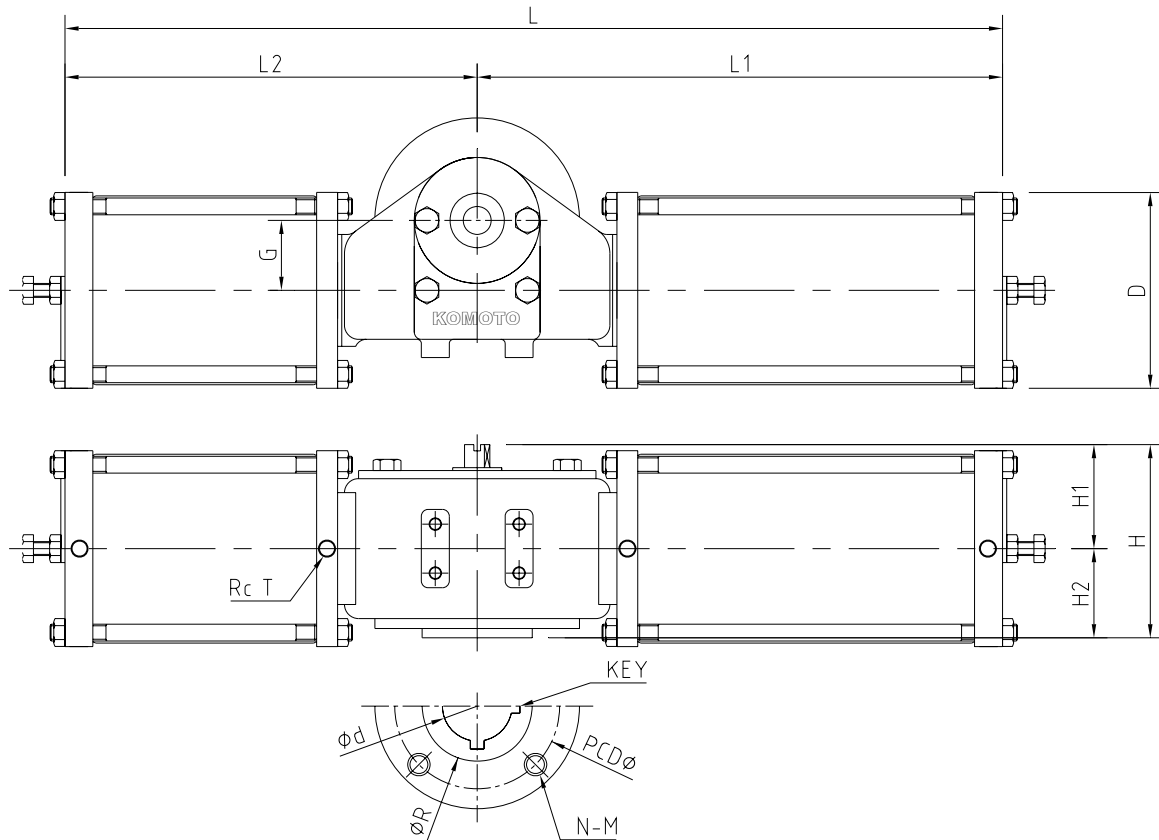
SIZE	ISO. BASE	L	L1	L2	D	G	H	H1	H2	ØR	PCDØ	KEY	Ød	N-M	Rc T
AC08D	F07	307	236	71	110	34	133	82	51	55	70	6x6	20	4-M8	1/4"
AC10D	F07	308	237	71	120	34	133	82	51	55	70	8x7	25	4-M8	1/4"
AC13D	F10	392	296	96	150	50	164.5	94.5	70	70	102	10x8	35	4-M10	1/4"
AC15D	F12	392	296	96	182	50	162	92	70	85	125	12x8	40	4-M12	1/4"
AC17D	F14	538	398	140	194	71	228	124	104	100	140	14x9	45	4-M16	1/4"

DIMENSION TABLE

AO-3900 CYLINDER ACTUATOR

DOUBLE CYLINDER TYPE

1. SPRING RETURN DOUBLE CYLINDER (AC17SD, 20SD, 25SD, 30SD)



Unit : mm

SIZE	ISO BASE	L	L1	L2	D	G	H	H1	H2	ØR	PCDØ	KEY	Ød	N-M	Rc T
AC15SD	F12	781	485	296	182	50	162	92	70	85	125	12x8	40	4-M12	1/4"
AC17SD	F14	1033	608	425	194	71	228	124	104	100	140	14x9	45	4-M16	1/4"
AC20SD	F16	1049	620	429	250	71	228	124	104	130	165	18x11	65	4-M20	3/8"
AC25SD	F25	1348	839	509	300	88	295	161	134	200	254	22x14	75	8-M16	3/8"
AC30SD	F25	1746	1069	677	356	116	295	161	134	200	254	25x14	90	8-M16	3/8"

TORQUE CURVE

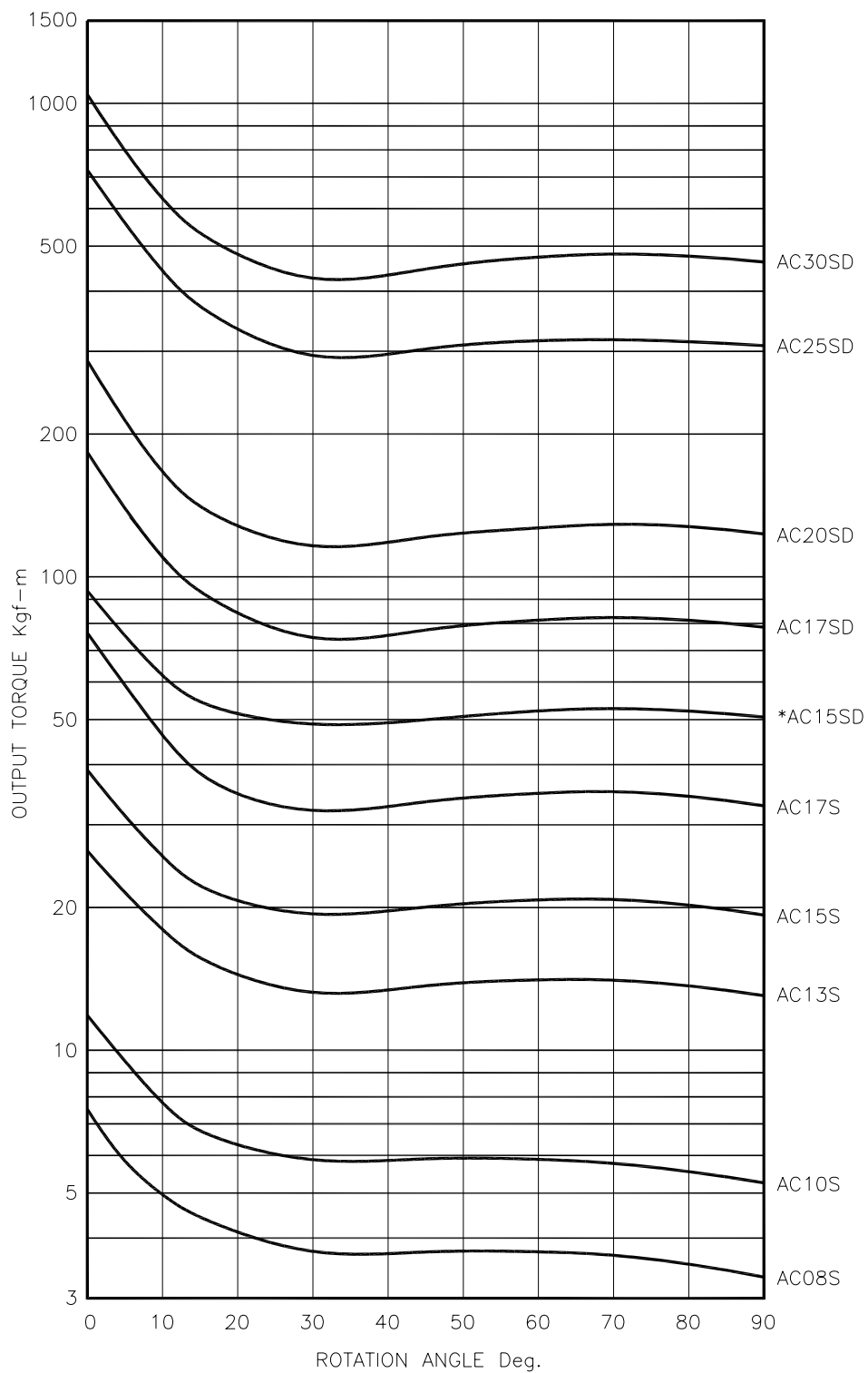
AO-3900 LINKAGE TYPE CYLINDER ACTUATOR

SPRING RETURN

SUPPLY AIR : 5.0 kgf/cm²g.

SPRING RANGE : S -> 2.0 ~ 3.0 kgf/cm²g.

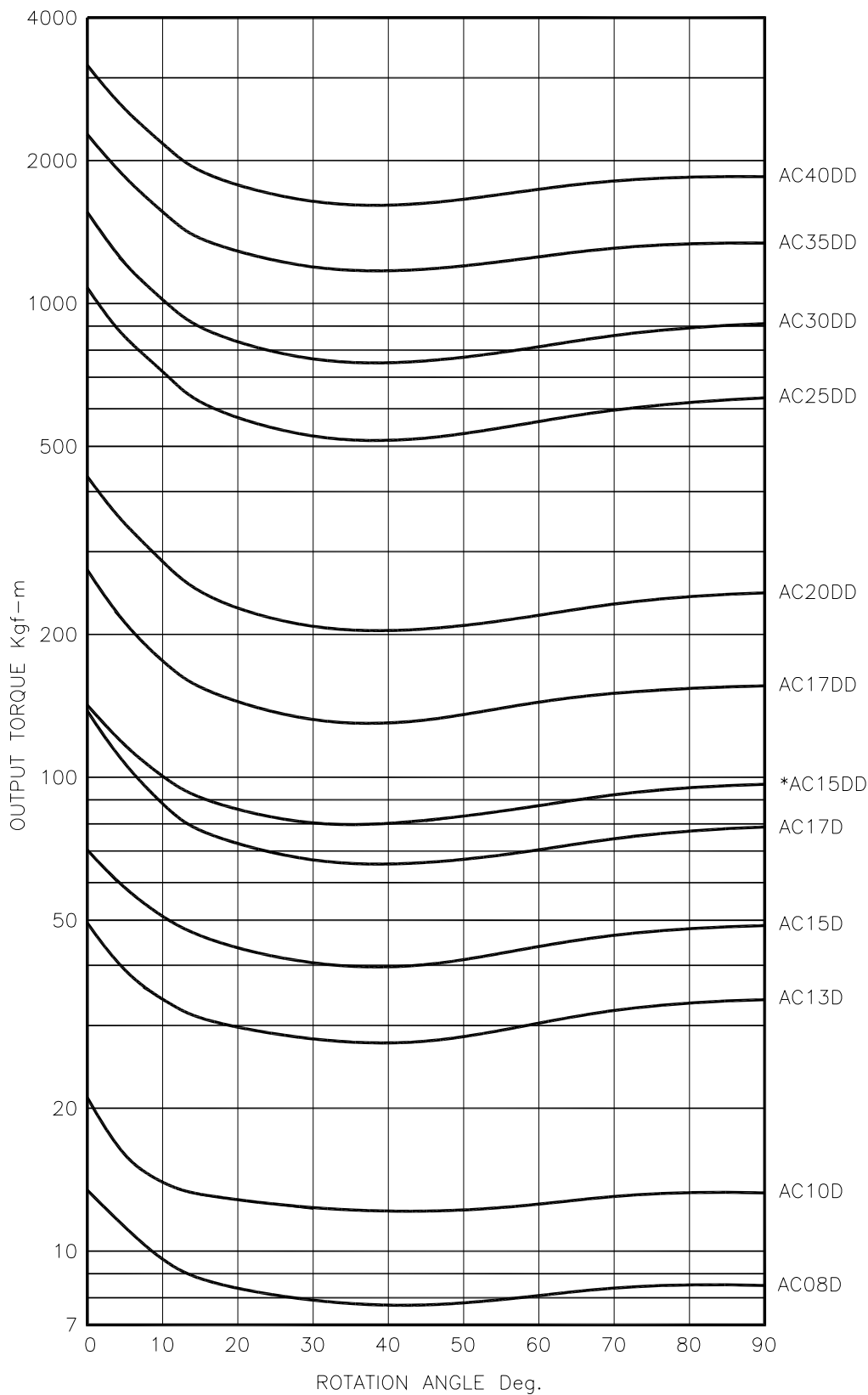
SD -> 1.5 ~ 2.5 kgf/cm²g.



TORQUE CURVE

AO-3900 LINKAGE TYPE CYLINDER ACTUATOR DOUBLE ACTING

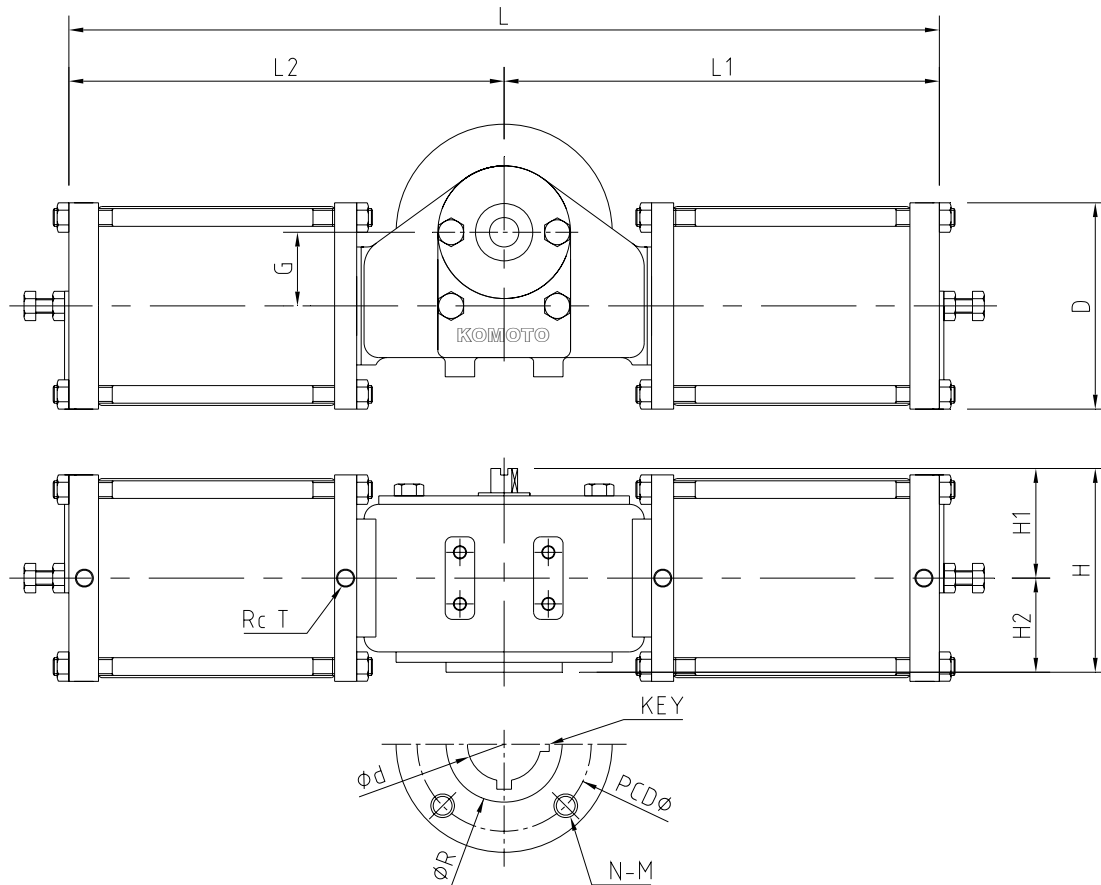
SUPPLY AIR : 5.0 kgf/cm²g.



DIMENSION TABLE

AO-3900 CYLINDER ACTUATOR DOUBLE CYLINDER TYPE

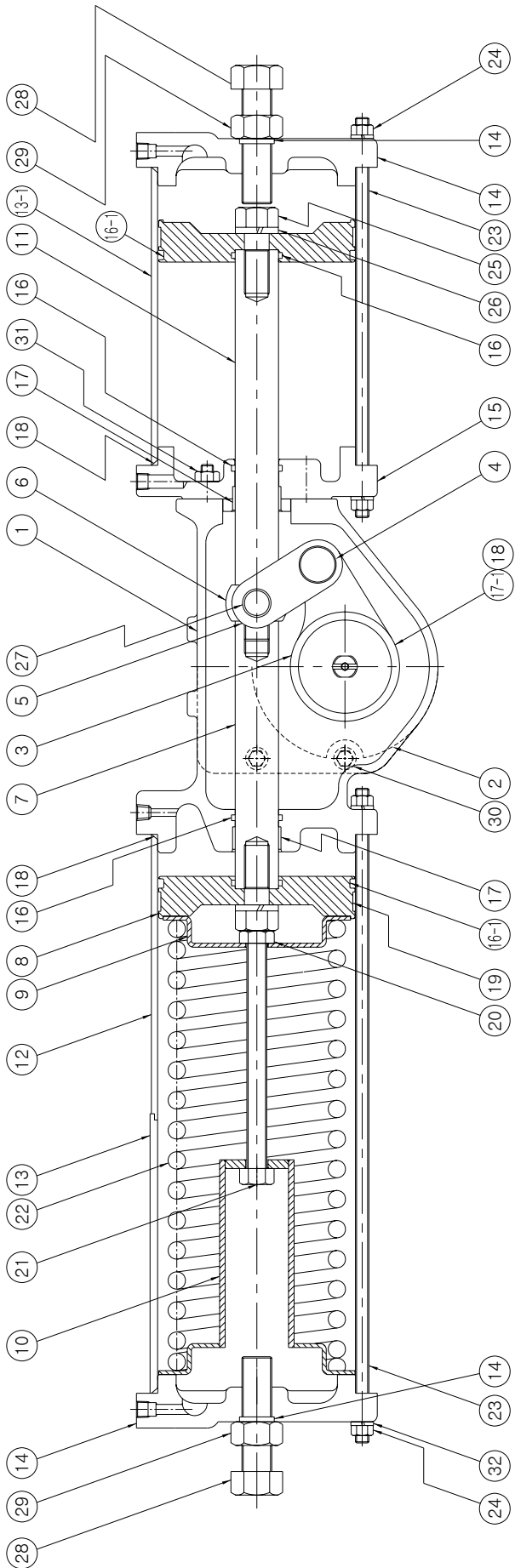
2. DOUBLE ACTING DOUBLE CYLINDER (AC17DD, 20DD, 25DD, 30DD, 35DD, 40DD)



Unit : mm

SIZE	ISO BASE	L	L1	L2	D	G	H	H1	H2	ØR	PCDØ	KEY	Ød	N-M	Rc T
AC15DD	F12	586	290	296	182	50	162	92	70	85	125	12x8	40	4-M12	1/4"
AC17DD	F14	823	398	425	194	71	228	124	104	100	140	14x9	45	4-M16	1/4"
AC20DD	F16	858	429	429	250	71	228	124	104	130	165	18x11	65	4-M20	3/8"
AC25DD	F25	1018	509	509	300	88	295	161	134	200	254	22x14	75	8-M16	3/8"
AC30DD	F25	1354	677	677	356	116	295	161	134	200	254	25x14	90	8-M16	3/8"
AC35DD	F30	1558	773	785	430	144	364	195	169	230	298	28x16	105	8-M20	3/8"
AC40DD	F30	1522	755	767	490	144	364	195	169	230	298	32x18	120	8-M20	3/8"

AO-3900 CYLINDER ACTUATOR ASSEMBLY DRAWING



32	WASHER	24		20	SPRING ASS'Y NUT	1		11	DOUBLE SPINDLE	1	
31	FLANGE BOLT	6		19	WEARING	1		10	SPRING ASS'Y SEAT	1	
30	COVER BOLT	4		18	O-RING	5		9	SPRING SEAT	1	
29	STOPPER NUT	2		17-1	DU-BUSH	1		8	PISTON	1	
28	STOPPER BOLT	2		17	DU-BUSH	2		7	SPINDLE	1	
27	SNAP RING	2		16-1	O-RING	2		6	BEARING UNIT	1	
26	SPRING WASHER	2		16	O-RING	4		5	LINKAGE	2	
25	SPINDLE ASS'Y BOLT	2		15	CYLINDER FLANGE	1		4	LEVER ARM BOLT	2	
24	NUT	24		14	CYLINDER COVER	2		3	LEVER ARM	1	
23	LONG BOLT	12		13-1	DOUBLE CYLINDER	1		2	HOUSING COVER	1	
22	SPRING	1		13	EXTEND CYLINDER	1		1	HOUSING	1	
21	SPRING ASS'Y BOLT	1		12	SPRING CYLINDER	1		No.	NAME OF PARTS	Q'TY	REMARKS