

Multi-Spring Type, Lever-Actuated Diaphragm Motors

Model HL_ _

OVERVIEW

The Multismotor Model HL is a multi-spring type, lever-actuated diaphragm motor featuring small size and light-weight. This motor, employing a lever to extend motion of the actuator stem, is used to operate control rods of dampers, cock valves, or other items.

SPECIFICATIONS

Types

Action	Model		
Direct	HL2D	HL3D	HL4D
Reverse	HL2R	HL3R	HL4R

1) Direct action

As the air pressure fed to the top chamber of the diaphragm case increases, the actuator stem moves downward.

2) Reverse action

As the air pressure fed to the bottom chamber of the diaphragm case increases, the actuator stem moves upward.

Material

- Diaphragm case
SS400
- Diaphragm
Cloth embedded ethylene propylene rubber
- Actuator stem
SUS403 stainless steel
- Yoke
FC200 or SCPH2
- Lever
S45C
- Fork
S20C
- Pin
SUS304
- Base
SS400

Spring range

20 to 98 kPa {0.2 to 1.0 kgf/cm²}

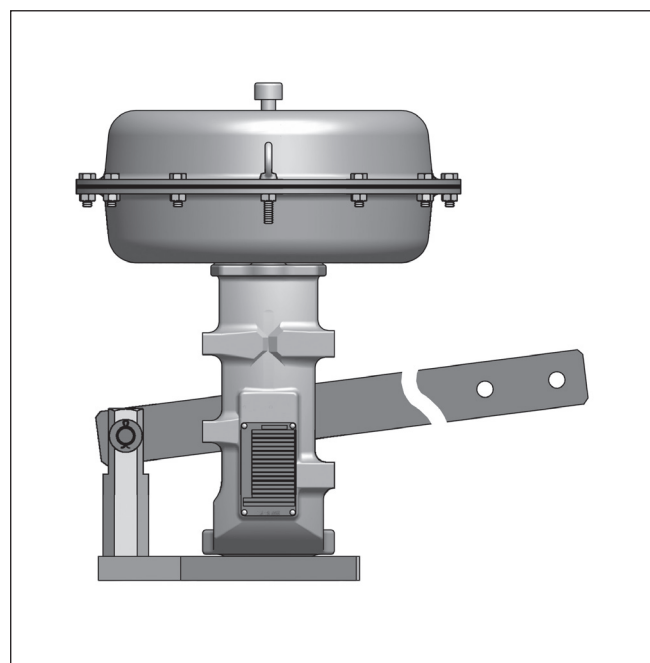
80 to 240 kPa {0.8 to 2.4 kgf/cm²}

Supply pressure

140 to 390 kPa {1.4 to 4.0 kgf/cm²}

Air connection

Rc 1/4 or 1/4NPT internal thread



Ambient temperature

-30°C to +70°C

Optional accessories

Positioner*, pressure regulator with filter, hand wheel*, limit switch, solenoid valve, motion transmitter, booster relay, lock-up valve, and others.

Note) 1) For the optional items, refer to the specification sheets and installation drawing of respective accessories.

2) Accessories with the asterisk mark (*) are selected from the following types depending on the actuators to be combined.

Actuator	Positioner		Hand wheel	
	P/P	I/P	Top	Side
HL2 to 4	HTP	AVP_ _ _	THM	-

Performance

Output

Refer to Table 2.

Accuracy

Refer to Table 1.

Dimensions and weight

Refer to Figure 1, 2 and 3 and Table 6.

Finish

Blue (Munsell 10B5/10), silver or other specified colors.

Table 1. Hysteresis error and linearity

[Within %F.S.]

Spring range			20 to 98 kPa {0.2 to 1.0 kgf/cm ² }	80 to 240 kPa {0.8 to 2.4 kgf/cm ² }
Item				
Hysteresis error	Without positioner		3	5
	With positioner		1	1
Linearity	Without positioner		±5	±10
	With positioner	HTP	±1	±1
		AVP_ _ _	±1	±1

Note) When no positioner is provided, performance varies depending on the type of packing used.

Output

Table 2. Direct action (Downward output N)

Model number	Supply pressure kPa	Spring range kPa	Positioner	Lever position						
				L1	L2	L3	L4	L5	L6	L7
HL2D	140	20 - 98	△	1280 - 420	1100 - 360	960 - 310	850 - 280	770 - 250	700 - 220	640 - 200
	160	20 - 98	○	1500 - 640	1280 - 550	1130 - 480	1000 - 420	900 - 380	810 - 340	740 - 310
	390	80 - 240	○	3440 - 1720	2950 - 1470	2580 - 1280	2290 - 1150	2060 - 1030	1870 - 930	1720 - 850
HL3D	140	20 - 98	△	2170 - 720	1800 - 600	1540 - 510	1350 - 450	1200 - 390	1080 - 350	—
	160	20 - 98	○	2520 - 1080	2100 - 900	1800 - 760	1580 - 680	1400 - 600	1260 - 540	—
	390	80 - 240	○	5780 - 2880	4820 - 2400	4120 - 2060	3614 - 1800	3210 - 1600	2880 - 1440	—
HL4D	140	20 - 98	△	3800 - 1260	3170 - 1050	2710 - 900	2370 - 780	2110 - 700	1890 - 630	—
	160	20 - 98	○	4430 - 1890	3690 - 1580	3170 - 1350	2760 - 1190	2460 - 1050	2220 - 940	—
	390	80 - 240	○	10130 - 5060	8440 - 4220	7240 - 3620	6340 - 3170	5630 - 2810	5060 - 2530	—

Table 3. Direct action (Upward output N)

Model number	Supply pressure kPa	Spring range kPa	Positioner	Lever position						
				L1	L2	L3	L4	L5	L6	L7
HL2D	140	20 - 98	△	200 - 1070	180 - 920	160 - 800	140 - 720	130 - 670	110 - 580	98 - 530
	160	20 - 98	○	200 - 1070	180 - 920	160 - 800	140 - 720	130 - 670	110 - 580	98 - 530
	390	80 - 240	○	850 - 2580	740 - 2210	640 - 1930	570 - 1720	510 - 1550	460 - 1400	420 - 1280
HL3D	140	20 - 98	△	350 - 1800	290 - 1500	250 - 1280	220 - 1130	200 - 1000	180 - 900	—
	160	20 - 98	○	350 - 1800	290 - 1500	250 - 1280	220 - 1130	200 - 1000	180 - 900	—
	390	80 - 240	○	1440 - 4330	1200 - 3610	1030 - 3090	900 - 2710	790 - 2400	720 - 2170	—
HL4D	140	20 - 98	△	630 - 3170	520 - 2640	450 - 2260	390 - 1970	340 - 1760	310 - 1580	—
	160	20 - 98	○	630 - 3170	520 - 2640	450 - 2260	390 - 1970	340 - 1760	310 - 1580	—
	390	80 - 240	○	2530 - 7600	2110 - 6340	1800 - 5420	1580 - 4750	1400 - 4220	1260 - 3800	—

Table 4. Reverse action (Downward output N)

Model number	Supply pressure kPa	Spring range kPa	Positioner	Lever position						
				L1	L2	L3	L4	L5	L6	L7
HL2R	140	20 - 98	△	1070 - 200	920 - 180	800 - 160	720 - 140	670 - 130	580 - 110	530 - 98.0
	390	80 - 240	○	2580 - 850	2210 - 740	1930 - 640	1720 - 570	1550 - 510	1400 - 460	1280 - 420
HL3R	140	20 - 98	△	1800 - 350	1500 - 290	1280 - 250	1130 - 220	1000 - 200	900 - 180	—
	270	80 - 240	○	4330 - 1440	3610 - 1200	3090 - 1030	2710 - 900	2400 - 790	2170 - 720	—
HL4R	140	20 - 98	△	3170 - 630	2640 - 520	2260 - 450	1970 - 390	1760 - 340	1580 - 310	—
	270	80 - 240	○	7600 - 2530	6340 - 2110	5420 - 1800	4750 - 1580	4220 - 1400	3800 - 1260	—

Table 5. Reverse action (Upward output N)

Model number	Supply pressure kPa	Spring range kPa	Positioner	Lever position						
				L1	L2	L3	L4	L5	L6	L7
HL2R	140	20 - 98	△	420 - 1280	360 - 1100	310 - 960	280 - 850	250 - 770	220 - 700	200 - 640
	390	80 - 240	○	1720 - 3440	1470 - 2950	1280 - 2580	1150 - 2290	1030 - 2060	930 - 1870	850 - 1720
HL3R	140	20 - 98	△	720 - 2170	600 - 1800	510 - 1540	450 - 1350	390 - 1200	350 - 1080	—
	390	80 - 240	○	2880 - 5780	2400 - 4820	2060 - 4120	1800 - 3610	1600 - 3210	1440 - 2880	—
HL4R	140	20 - 98	△	1260 - 3800	1050 - 3170	900 - 2710	780 - 2370	700 - 2110	630 - 1890	—
	390	80 - 240	○	5060 - 10130	4220 - 8440	3620 - 7240	3170 - 6340	2810 - 5630	2530 - 5060	—

Note) 1) Output denotes values from upper limits to lower limits of strokes.

2) O : Positioner is necessary. △ : Can be operated either with or without positioner.

DIMENSIONS

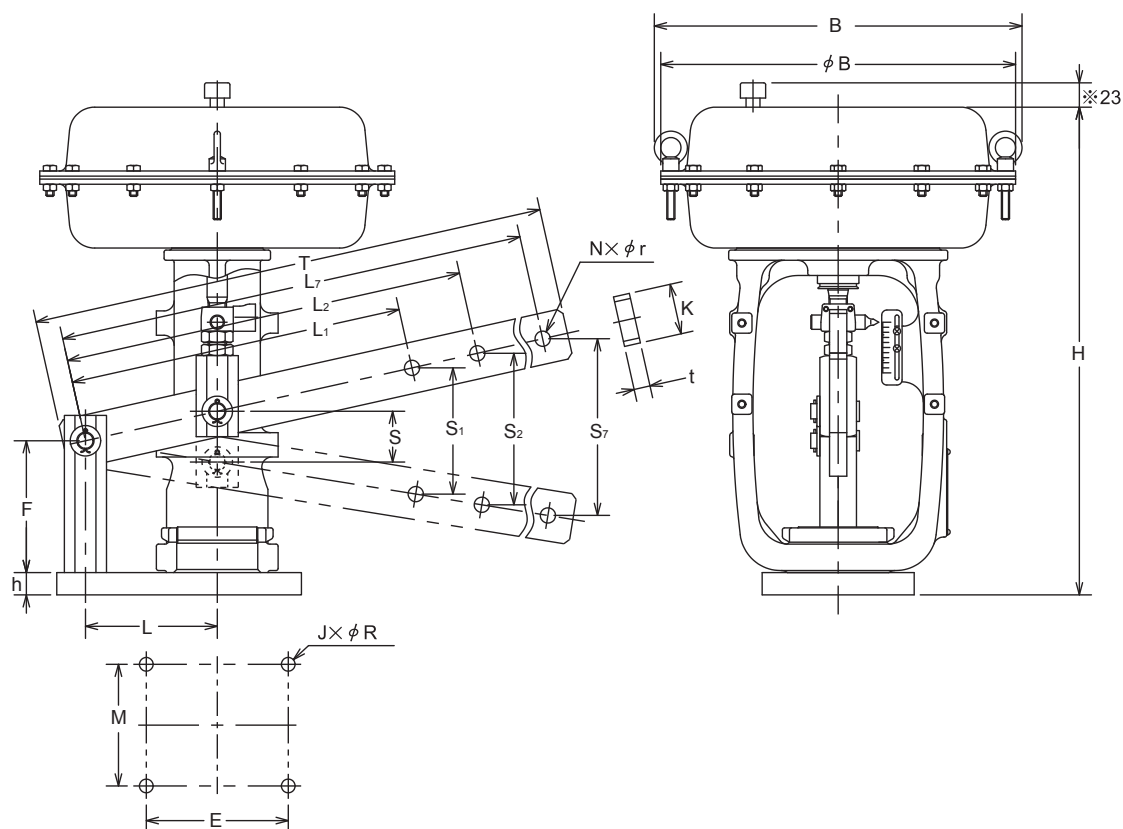


Figure 1. Dimensions of HL Multismotor

Note) In case of the reverse action actuator, the lever is moved to be position in dicated with two-dot broken lines when a pneumatic pressure signal applied is zero. The reverse action actuator provides the drop-proof cap on the upper part of the diaphragm case. (*)

Table 6. Dimentions and weight (Dimensions of HL Multismotors)

Model number	Stroke (mm)	Dimensions (mm)											
		ϕB	B	H	F	h	K	t	T	$J \times \phi R$	$N \times \phi r$	E	M
HL2D, R	25	267	281	349	80	16	38	12	520	4×13.5	7×10	120	100
HL3D, R	50	350	363	481	130	22	50	16	710	4×13.5	6×15	140	120
HL4D, R	75	470	520	637	160	25	65	19	860	4×22.0	6×20	190	160

Model number	Dimensions (mm)																Nominal diaphragm area (cm ²)	Maximum diaphragm chamber capacity (cm ³)	Weight (kg)
	S	L	S1	L1	S2	L2	S3	L3	S4	L4	S5	L5	S6	L6	S7	L7			
HL2D, R	25	100	60	240	70	280	79	320	89	360	99	400	109	440	119	480	310	1100	22
HL3D, R	50	130	125	330	150	396	175	462	200	528	224	594	249	660	-	-	550	3400	45
HL4D, R	75	160	183	400	219	480	256	560	292	640	329	720	365	800	-	-	950	10000	95

Table 7. Dimensions of HL Multismotors with top-mounted hand wheel

Model number	Stoke (mm)	Dimensions (mm)				Maximum required operating force (N{kgf})	Weight (kg)
		ϕB	B	ϕD	H max		
HL2D, R	25	267	281	280	D : 575 R : 558	140 {14}	30
HL3D, R	50	350	363	355	746	250 {26}	60
HL4D, R	75	470	520	570	1010	400 {41}	137

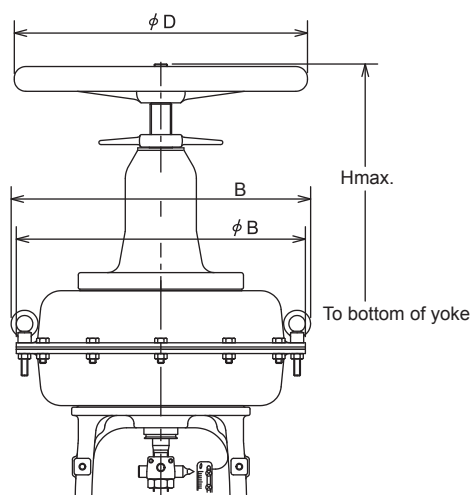


Figure 2. Dimensions of Multismotor with top-mounted hand wheel

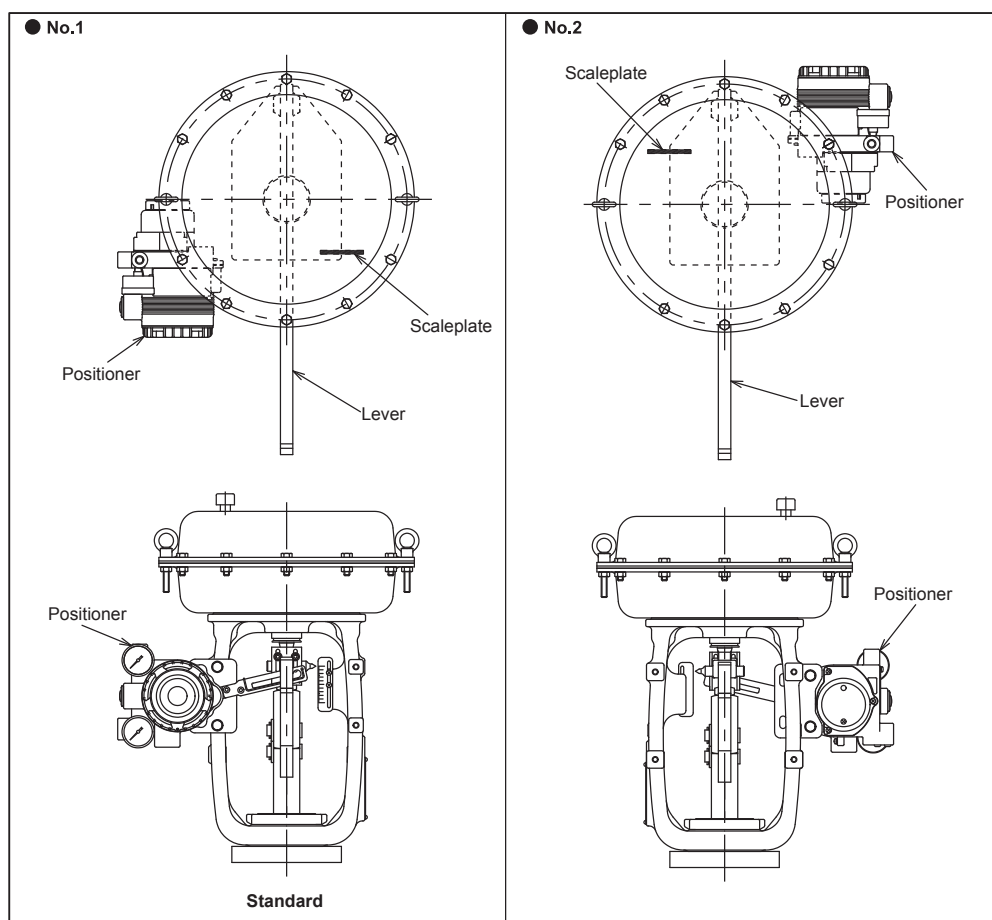


Figure 3. Actuator orientation

Note

Note

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before ordering and use.
<https://www.azbil.com/products/factory/order.html>

Specifications are subject to change without notice.

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