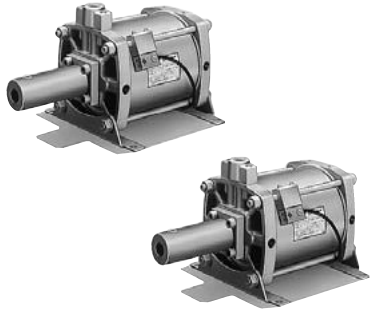
System which converts pneumatic pressure to hydraulic pressure with a booster and generates hydraulic pressure of up to 17.5 MPa to powerfully actuate small-size clamp head

- Suitable for operations for moving work with a long-stroke clamp head or hydraulic cylinder and applying pressure to the work
- Any high output can be obtained steplessly only by adjusting the pneumatic pressure with the pressure reducing valve.
- A wide range of movement, from a small stroke to a large stroke, can be obtained.
- The use of hydraulic pressure ensures constant, uniform and reliable force.



Specifications

Item \ Model number		PBH3-40·PBE3-40	PBH3-60·PBE3-60	PBH-80·PBE-80
Boosting ratio		11	25	25
Discharge oil capacity cm³		77	77	176
Theoretical output oil pressure at max. working pneumatic pressure		11 MPa	17.5 MPa	
Addaptable fluid		Cosmo New Mighty Super 10 (COSMO OIL)		
Working temperature range		+5 to +60℃		
Pneumatic block	Working fluid	Air		
	Lubrication	Unnecessary (but possible)		Required
	Working pressure range	0.2 to 1 MPa	0.2 to 0.7 MPa	
	Recommended lubricant	JIS K2213 Class 1 (non-additive turbine oil ISO VG32) or its equivalent		
Weight kg	PBH (foot type)	9	14.5	40
	PBE (cap flange)	10.5	19	48
With sensor		Provided		None
Related equipment		Pressure sensor, pressure gauge (For the part numbers, see pages ED16 and 48.)		

Actual Output Table (efficiency of 90%)

Unit: kN

Booster	Clamp head	Working pneumatic pressure MPa								
		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
PBH3-40 PBE3-40	LHA・LHA-25・LHA-40	2.7	4.1	5.5	6.9	8.2	9.6	11.0	12.4	13.5
	LHAS-2	5.1	7.8	10.4	12.9	15.5	18.1	20.7	23.3	25.6
	LHC	2.5	3.8	5.1	6.4	7.7	8.9	10.2	11.5	12.6
	LHD	1.1	1.7	2.3	2.8	3.3	3.9	4.5	5.0	5.5
	LHF-28-60	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	5.9
	LHF-40-80	2.4	3.7	4.9	6.2	7.4	8.6	9.8	11.0	12.2
	LHF-50-100	3.7	5.8	7.7	9.6	11.5	13.4	15.3	17.3	18.9
PBH3-60・PBE3-60 PBH-80・PBE-80	LHA・LHA-25・LHA-40	6.2	9.3	12.5	15.5	18.5	21.7	—	—	—
	LHAS-2	11.7	17.5	23.3	29.1	35.0	40.8	—	—	—
	LHC	5.7	8.6	11.5	14.3	17.3	20.1	—	—	—
	LHD	2.5	3.8	5.0	6.3	7.6	8.8	—	—	—
	LHF-28-60	2.7	4.0	5.4	6.8	8.0	9.4	—	—	—
	LHF-40-80	5.5	8.2	11.1	13.8	16.6	19.3	—	—	—
	LHF-50-100	8.6	12.9	17.3	21.6	25.9	30.1	—	—	—

Air Consumption

Unit: ℓ/reciprocation

Booster	Working pneumatic pressure MPa								
	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
PBH3-40・PBE3-40	6	8	10	12	14	16	18	20	21.8
PBH3-60・PBE3-60	13.5	18	22.5	27	31.5	36	—	—	—
PBH-80・PBE-80	31.5	42	52.5	63	73.5	84	—	—	—

Note) The air consumption is obtained by converting the amount of air used by one reciprocation of booster at each pneumatic pressure to its equivalent atmospheric pressure.

●How to Order

●Pre-pressure type booster

●Foot type PBH 3-60 FA 2

●Cap flange PBE 3-60 FA 2

Model / Type / Sensor quantity / Sensor symbol

●Assembly number of sensor and bracket SZZ

R 34 B L3-105

Booster type: 34 PB*3-40, 35 PB*3-60

Sensor type

- See the sensor list.
- The booster will be delivered without the sensor mounted.

●Sensor only

L3-105

Sensor type

●Bracket only

R 34 B

Booster type: 34 PB*3-40, 35 PB*3-60

Delivery conditions

- PBH(E)3-40(60) comes with 1 ℓ of addaptable fluid (Cosmo New Mighty Super 10), and PBH(E)-80 comes with 2 ℓ of the fluid.
- PBH-80 and PBE-80 provided with sensor are not available.

Sensor List/Iron proximity type

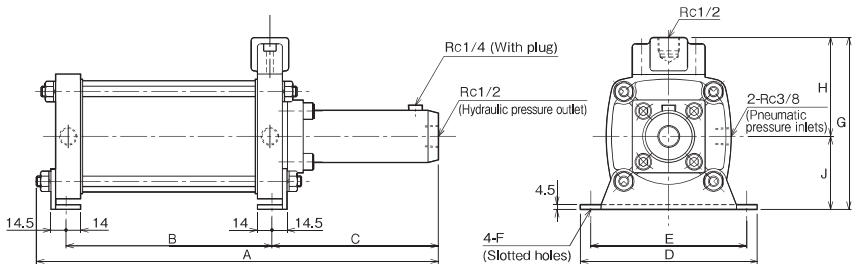
Type	Sensor symbol	Load voltage range	Load current range	Max. switching capacity	Protective circuit	Indicating lamp	Wiring method	Cord length	Applicable load
Reed sensor	FA L3-101	AC: 80 to 220 V	2 to 20 mA	2 VA	Provided	Neon lamp (Lights when not sensing)	0.3 mm², 2-core, outer dia. φ5.3 mm, rear wiring	1 m	Small relay, programmable controller
	FB L3-105							5 m	
	FC L3-241	DC: 20 to 28 V	3 to 50 mA	1.5 W	Provided	LED (Lights when sensing)		1 m	
	FD L3-245							5 m	

Note) ●For handling of sensors, be sure to see the sensor specifications at the end of this catalog.

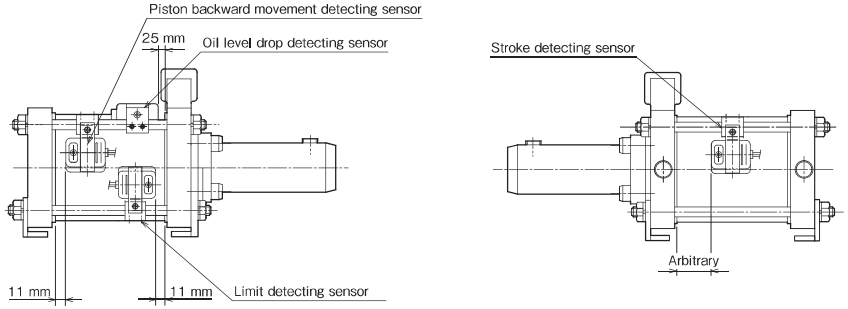
L3 type sensor

HIGHPOWER/THIGH C,D CAD/DATA is available.

PBH3-40 PBH3-60

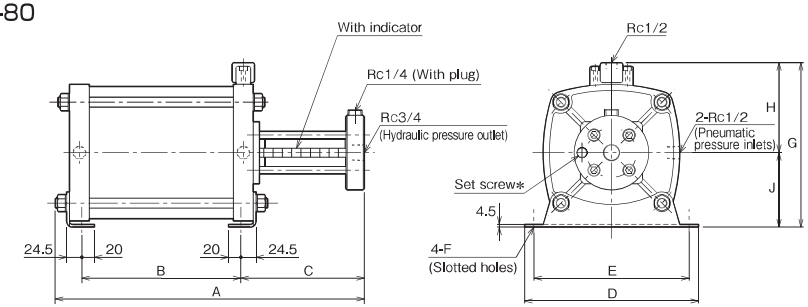


Sensor Mounting Dimension



●For the procedures for fitting the sensors, see "Sensor fitting procedures".

PBH-80



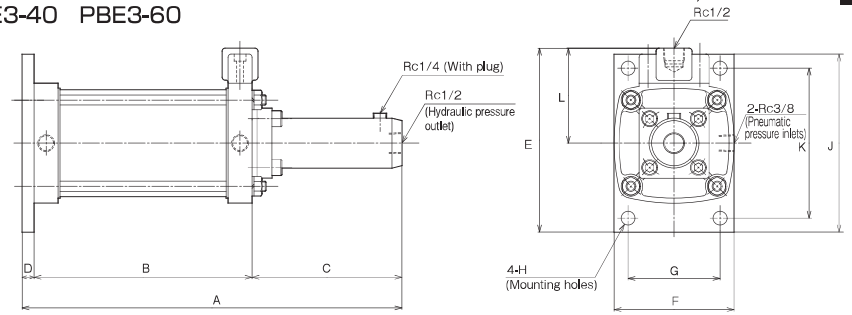
Note) Never remove the *-marked set screw at the end of the indicator. (The indicator may jump out.)

Dimensional Table

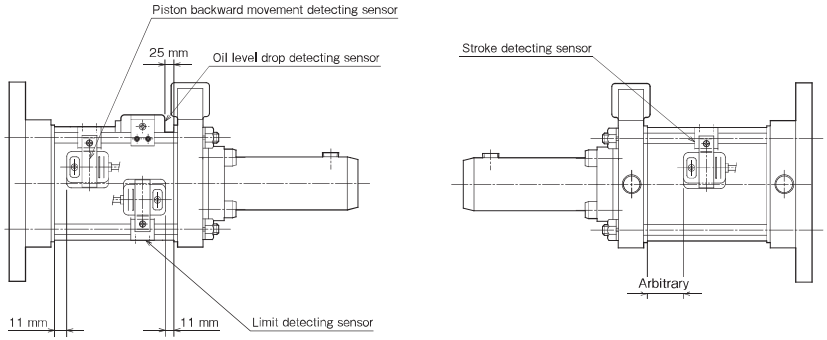
Symbol / Model number	A	B	C	D	E	F	G	H	J
PBH3-40	384	198	160	170	150	9	165	95	70
PBH3-60	387	198	160	250	220	11	215	120	95
PBH-80	498	256	199	280	250	14	265	145	120

HIGHPOWER/THIGH C,D CAD/DATA is available.

PBE3-40 PBE3-60

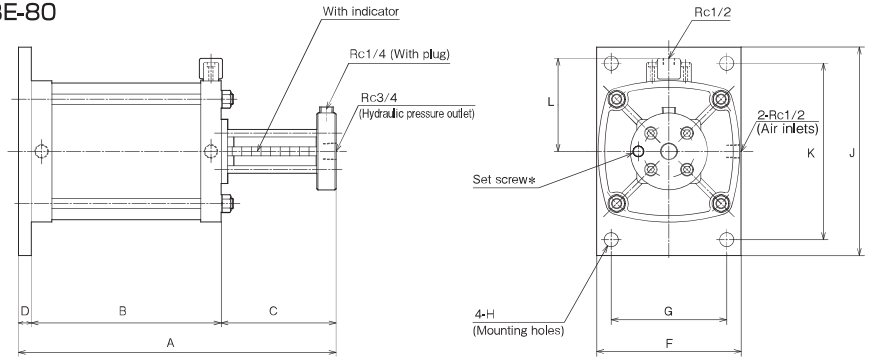


Sensor Mounting Dimension



●For the procedures for fitting the sensors, see "Sensor fitting procedures".

PBE-80

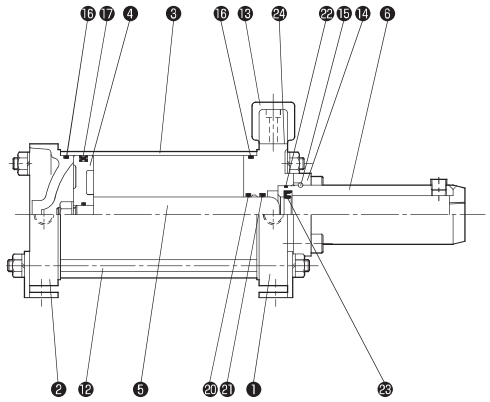


Note) Never remove the *-marked set screw at the end of the indicator. (The indicator may jump out.)

Dimensional Table

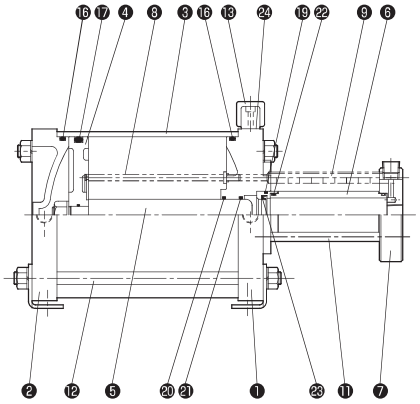
Symbol / Model number	A	B	C	D	E	F	G	H	J	K	L
PBE3-40	380	218	150	12	184	120	92	ϕ14	178	150	95
PBE3-60	382	218	150	14	254	175	134	ϕ18	270	220	120
PBE-80	495	296	179	20	—	225	180	ϕ22	325	275	145

● PBH3-40・PBE3-40
● PBH3-60・PBE3-60



● This drawing shows the sectional view of PBH model (foot type).

● PBH-80・PBE-80



● This drawing shows the sectional view of PBH model (foot type).

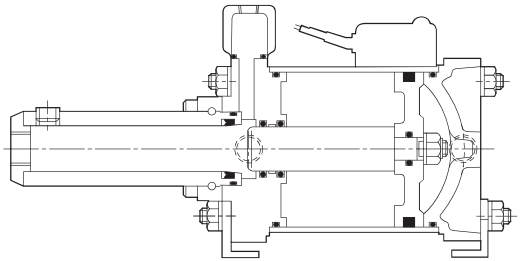
Parts List

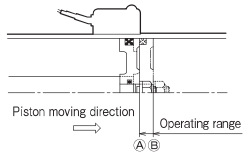
No.	Name	Material	Qty.
❶	Hydraulic cylinder mounting cover	Grey cast iron	1
❷	Pneumatic cylinder cover	Grey cast iron	1
❸	Pneumatic cylinder tube	Aluminum alloy (PB＊-40・60) Carbon steel for machine structural use (PB＊-80)	1
❹	Pneumatic piston	Grey cast iron	1
❺	Hydraulic piston	Carbon steel for machine structural use	1
❻	Hydraulic cylinder tube	Carbon steel for machine structural use	1
❼	Hydraulic cap cover	Rolled steel for general structure	1
❽	Indicator rod	Carbon steel for machine structural use	1
❾	Indicator pipe	Resin	1
⓫	Hydraulic tie rod	Chromium-molybdenum steel (PB＊-80)	4
⓬	Pneumatic tie rod	Rolled steel for general structure	4
⓭	Pre-pressure chamber joint	Aluminum alloy casting	1
⓮	Flange	Rolled steel for general structure	1
⓯	Ring	Hard steel wire	1

Seal List

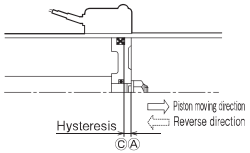
Name / Material / Qty. / Model number	⓰ Cylinder tube gasket	⓱ Pneumatic piston seal	⓳ Gland gasket	⓴ Rod seal	㉑ Rod seal	㉒ Hydraulic cylinder tube gasket	㉓ Hydraulic seal	㉔ Pre-pressure chamber joint gasket
Material	Nitrile rubber	Nitrile rubber	Nitrile rubber	Nitrile rubber	Nitrile rubber	Nitrile rubber	Nitrile rubber	Nitrile rubber
Qty.	2	1	1	1	1	1	1	2
PBH3-40・PBE3-40	G95	DXP100	—	P30	PS-30	S46	IDU-30	P15
PBH3-60・PBE3-60	G145	DXP150	—	P30	PS-30	S46	IDU-30	P15
PBH-80・PBE-80	G190	P185	G55	P40	PS-40	G50	IDU-40	P15

Explanation of operation of Switch Set





If the piston moves in the arrow ⇨ direction, the reed sensor turns on when the piston rear end reaches the position Ⓐ.
The sensor is kept on while the piston rear end is in the range between Ⓐ and Ⓑ.
This range is the operating range.



When the piston reaches the position Ⓐ, the sensor turns on. When the piston moves in the reverse direction ⇦ from the position, the sensor is kept on until the piston reaches the position Ⓒ. The distance between Ⓐ and Ⓒ is called hysteresis.

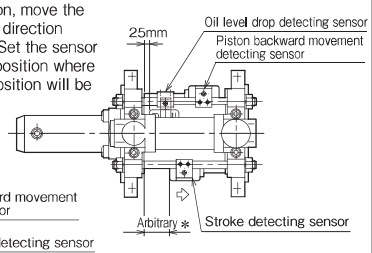
Explanation of operation

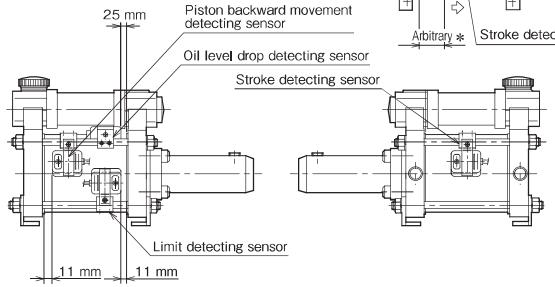
The reed sensor, permanent magnet, protective circuit and operation check lamp are contained in the case, and an iron proximity type sensor integral with a plastic structure is mounted on the periphery of the aluminum tube. When the iron piston comes under the sensor, the reed sensor is operated, and the cylinder stroke position can be detected without contact from the outside.

Usage of sensor and detection position setting

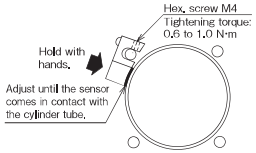
Stroke detection ····· For checking normal pressing operation
(When the clamp head does not make a stroke for any cause, the sensor does not detect a stroke—Error detection)
Piston backward movement detection ··· For checking normal returning operation
Fluid level drop detection ····· If the fluid leaks from the clamp head or hydraulic hose while pressure is held for a long time, the piston moves forward. If the discharge rate is approx. 90% of the max. discharge rate, the error is detected. Add the fluid, and check for defective parts.
Detection of limit of use ····· Output zero signal or stop of peripheral equipment
(When the booster piston moves to the stroke end, the output is reduced to zero. Therefore, the limit is detected just before it reaches the end.)

＊When the piston is at the desired position, move the sensor along the tie bolt in the arrow ⇨ direction from the hydraulic cylinder cover side. Set the sensor at a position 3 to 4 mm away from the position where the sensor turns on. Then, the piston position will be surely detected.
(Fit the sensor with the lamp toward the hydraulic cylinder cover.)





Sensor fitting procedures

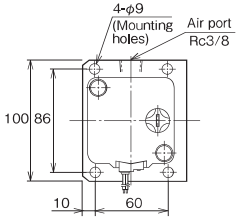


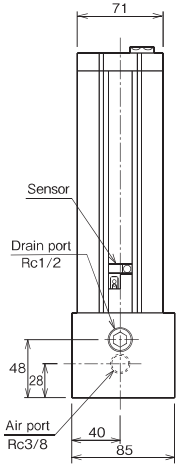
1. Loosen the two hex. screws M4 with a hex. wrench (2 mm), and fit the sensor to the tie rod.
2. Gently hold the top of the sensor at a desired position so that the cylinder tube contacts the detecting face of the sensor, and clamp the hex. screws.

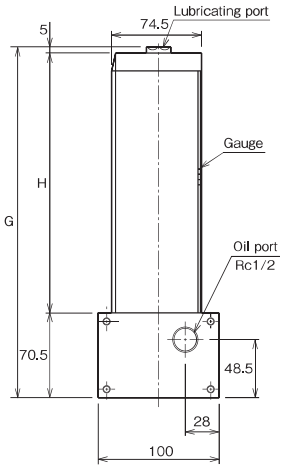
Note) Tighten the hex. screws to a proper tightening torque. Inappropriate tightening torque may cause the off-center of the sensor position.

3. The indicating lamp will go out when the sensor for AC turns on and light up when the sensor for DC turns on.

● Converter







Dimensional Table

Model number \ Symbol	G						H					
	0.16 ℓ	0.25 ℓ	0.4 ℓ	0.63 ℓ	1 ℓ	1.6 ℓ	0.16 ℓ	0.25 ℓ	0.4 ℓ	0.63 ℓ	1 ℓ	1.6 ℓ
φ63	218	245	290	358	468	648	142.5	169.5	214.5	282.5	392.5	572.5

How to Order

The item enclosed by broken line needs not to be entered, if unnecessary.

AHU2 – 063 – 001 – C 1

Model: AHU2

Converter capacity:
001 0.16 ℓ
002 0.25 ℓ
004 0.4 ℓ
006 0.63 ℓ
010 1 ℓ
016 1.6 ℓ

Sensor symbol:
C ZR3 (with lamp) 1.5 m

Sensor quantity: 1

● For the details of model numbers and specifications, see “Air-Oil System”.