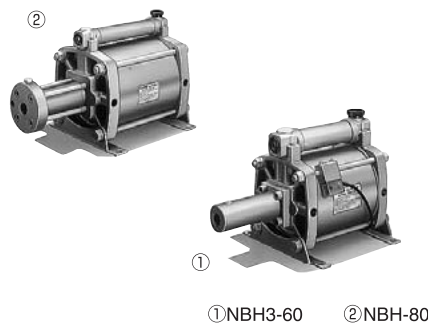


System which converts pneumatic pressure to hydraulic pressure with a booster and generates hydraulic pressure of up to 17.5 MPa to powerfully actuate small-size clamp head

- Suitable for lifting work or operations requiring high output for clamp head throughout the stroke
- The use of hydraulic pressure ensures constant, uniform and reliable force.



Specifications

Model number	NBH3-40	NBH3-60	NBH3-60-130	NBH-80	NBH-100
Item					
Boosting ratio	11	25	25	25	25
Discharge oil capacity cm ³	77	77	130	176	304
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°C				
Pneumatic block	Air				
	Unnecessary (but possible)			Required	
	Working fluid				
	Lubrication				
	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	9.5	15	17	41	92
With sensor	Provided			None	
Related equipment	Pressure sensor, pressure gauge (For the part numbers, see pages ED16 and 48.)				

Actual Output Table

Booster	Clamp head	Working pneumatic pressure MPa									
		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
NBH3-40	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	
NBH3-60	LHA · LHA-25 · LHA-40	6.2	9.3	12.3	15.5	18.5	21.7	—	—	—	
NBH3-60-130	LHAS-2	11.7	17.5	23.3	29.1	35.0	40.8	—	—	—	
NBH-80	LHC	5.7	8.6	11.5	14.3	17.3	20.1	—	—	—	
NBH-100	LHD	2.5	3.8	5.0	6.3	7.6	8.8	—	—	—	

Air Consumption

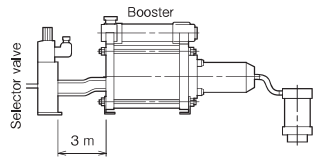
Booster	Working pneumatic pressure MPa									
	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
NBH3-40	6	8	10	12	14	16	18	20	21.8	
NBH3-60	13.5	18	22.5	27	31.5	36	—	—	—	
NBH3-60-130	21.5	29	36	43	50	57	—	—	—	
NBH-80	31.5	42	52.5	63	73.5	84	—	—	—	
NBH-100	60	80	100	120	140	160	—	—	—	

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.

Clamp Head Working Speed

Unit: s

Booster	Common to all clamp heads	
	Extending stroke time	Retracting stroke time
NBH3-40	1	1
NBH3-60	1.5	1.5
NBH3-60-130	1.8	1.8
NBH-80	2	2
NBH-100	3.5	3.5



The clamp head working speed varies depending on the booster used. The left table shows the extending stroke time and retracting stroke time when the piping between booster and switching valve is approx. 3 m. Determine the cycle time, etc. based on these times. Also when using a direct pressure type booster set (order made), determine the parameters based on these times.

Note) If the booster is used at a speed exceeding the speed shown left, the seals will wear earlier and drop, output may be reduced due to entry of air, and oil may enter the pneumatic circuit. Particularly, if the clamp head returns the pneumatic piston of the booster faster than the returning time, negative hydraulic pressure may be caused in the circuit, resulting in entry of air.

How to Order

Direct pressure type booster **NBH** **3-60** **FA** **2**
Model Type Sensor symbol Sensor quantity

Direct pressure type booster set (order made)

• With solenoid valve **NBH** **3-60** **-S-** **1** **FA** **2**
Model Type Solenoid valve voltage

• With manual valve **NBH** **3-60** **-H** **FA** **2**
Model Type

1 100 V AC (50/60 Hz)
2 200 V AC (50/60 Hz)
8 24 V DC

Assembly number of sensor and bracket **SZZ** Sensor only Bracket only

R **34** B **L3-105** R **34** B **L3-105**

Booster type **34** NBH3-40
35 NBH3-60 · NBH3-60-130

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

Booster type **34** NBH3-40
35 NBH3-60 · NBH3-60-130

L3 type sensor

Delivery conditions

- NBH3-40, NBH3-60 and NBH3-60-130 come with 1 ℓ of addaptable fluid (Cosmo New Mighty Super 10), and NBH-80 and NBH-100 come with 2 ℓ and 3 ℓ of the fluid, respectively.
- NBH-80 and NBH-100 provided with sensor are not available.



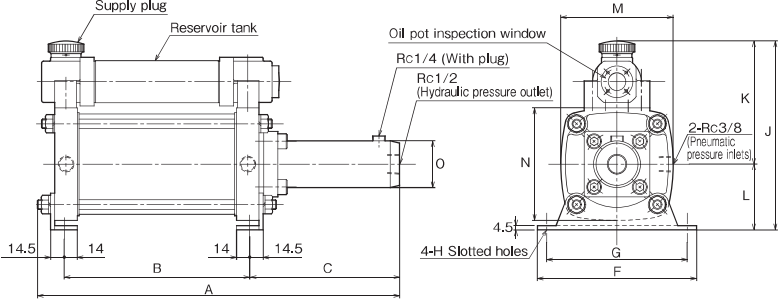
Sensor List/Iron proximity type

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 mm ² , 2-core, outer dia. ϕ5.3 mm, rear wiring	1 m	Small relay, programmable controller
	 FB L3-105								
	 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	

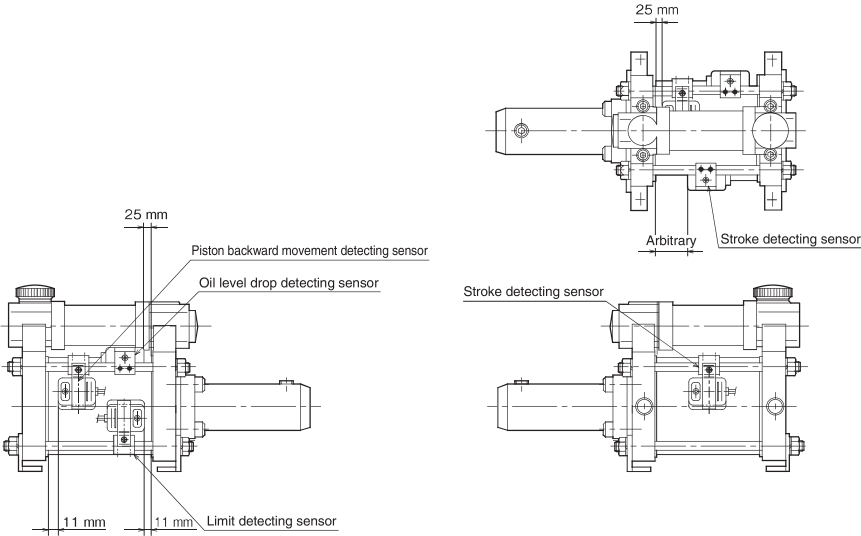
Note) • For handling of sensors, be sure to see the sensor specifications at the end of this catalog.

NBH3-40
NBH3-60
NBH3-60-130

CAD/DATA
HIGHPOWER/THIGH A,B is available.



Sensor Mounting Dimension

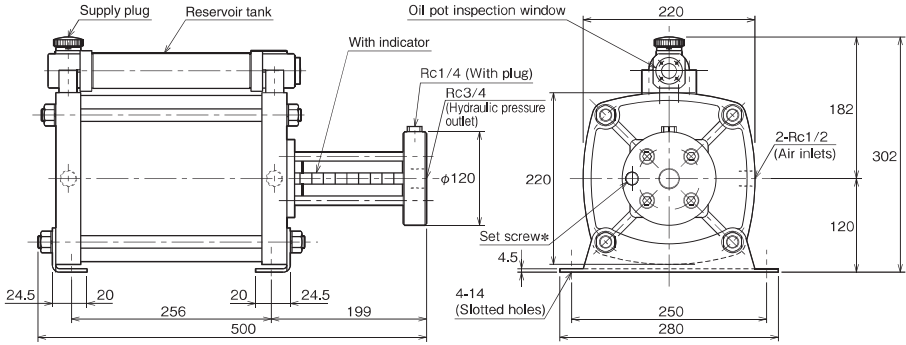


Dimensional Table

Symbol Model number	A	B	C	F	G	H	J	K	L	M	N	O
NBH3-40	389	198	160	170	150	9	202	132	70	120	120	φ50
NBH3-60	387	198	160	250	220	11	252	157	95	170	170	φ50
NBH3-60-130	537	273	235	250	220	11	252	157	95	170	170	φ50

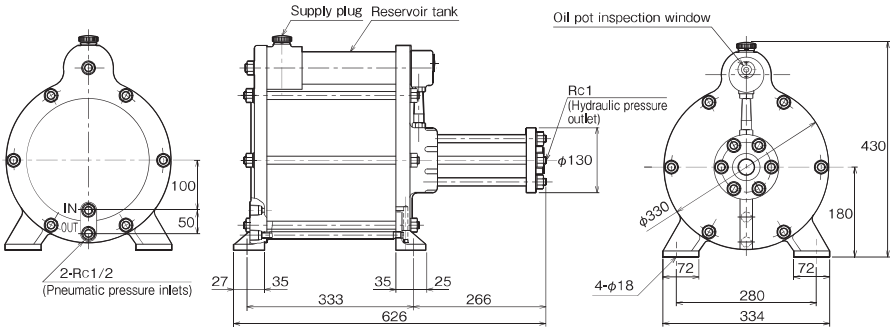
NBH-80

CAD/DATA
HIGHPOWER/THIGH A,B is available.



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

NBH-100

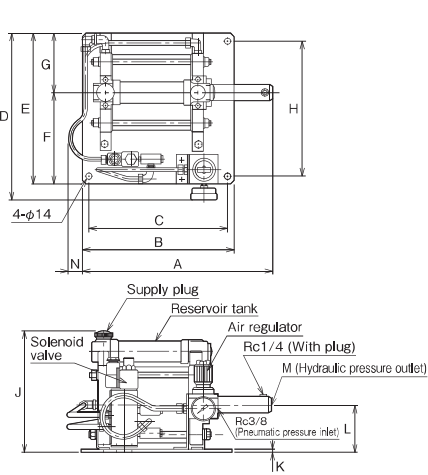


The booster, regulator and solenoid valve or manual valve located on one bed as an integral unit can be made to order,

Specifications

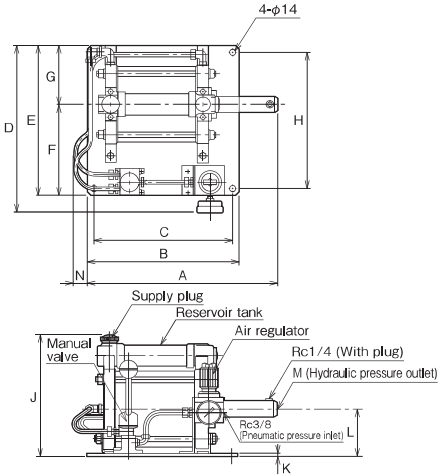
Model number	NBH3-40-S	NBH3-60-S	NBH3-60-130-S	NBH-80-S	NBH3-40-H	NBH3-60-H	NBH3-60-130-H
Item							
Boosting ratio	11	25	25	25	11	25	25
Discharge oil capacity cm ³	77	77	130	176	77	77	130
Theoretical output oil pressure at max. working pneumatic pressure	11 MPa	17.5 MPa			11 MPa	17.5 MPa	
Addaptable fluid	Cosmo New Mighty Super 10 (COSMO OIL)						
Working temperature range	+5 to +60℃						
Pneumatic block	Working fluid			Air			
	Lubrication			Unnecessary (but possible)			
	Working pressure range			Required			
	Recommended lubricant			Unnecessary (but possible)			
	0.2 to 1 MPa	0.2 to 0.7 MPa			0.2 to 1 MPa	0.2 to 0.7 MPa	
	JIS K2213 Class 1 (non-additive turbine oil ISO VG32) or its equivalent						
Weight kg	15	22	25	54	15	22	25
With sensor	Provided			None			
Applicable valve	Solenoid valve 5ER-08E	5-port 2-position air return type	Rated power supply type	5ER-8E-10S4(100 V AC/DC · 50/60 Hz) 5ER-8E-20S4(200 V AC · 50/60 Hz) 5ER-8E-24S4(24 V DC)		Manual valve type: 4PN-20	
Related equipment	Pressure sensor, pressure gauge (For the part numbers, see pages ED16 and 48.)						

With Solenoid Valve
NBH3-40-S NBH3-60-130-S
NBH3-60-S NBH-80-S



- NBH3-40-S, NBH3-60-S, NBH3-60-130-S and NBH-80-S are the model numbers of sets assembled on the bed shown above.
- NBH-80-S uses a booster having a different appearance.

With Manual Valve
NBH3-40-H NBH3-60-130-H
NBH3-60-H

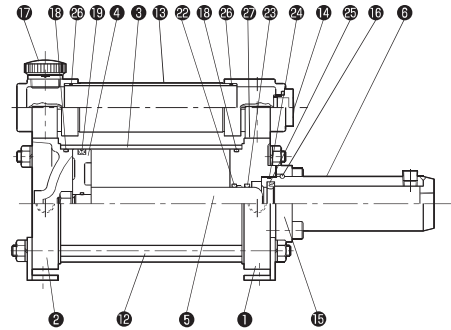


- NBH3-40-H, NBH3-60-H and NBH3-60-130H are the model numbers of sets assembled on the bed shown above.

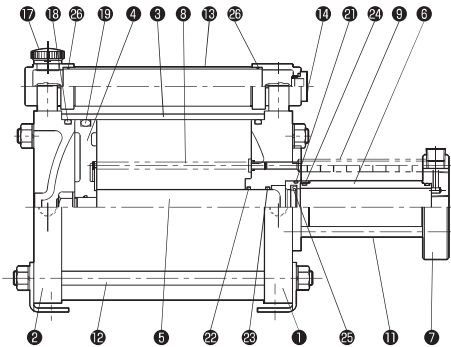
Dimensional Table

Symbol Model number	A	B	C	D	E	F	G	H	J	K	L	M	N
NBH3-40-S	404	300	270	286	250	165	85	220	208	6	76	Rc ¹ / ₂	35
NBH3-60-S	404	320	290	356	320	195	125	290	261	6	101	Rc ¹ / ₂	30
NBH3-60-130-S	553	400	370	356	320	195	125	290	261	6	101	Rc ¹ / ₂	—
NBH-80-S	520	400	370	430	440	275	165	410	313	8	128	Rc ³ / ₄	—
NBH3-40-H	404	300	270	286	250	165	85	220	221	6	76	Rc ¹ / ₂	35
NBH3-60-H	404	320	290	356	320	195	125	290	261	6	101	Rc ¹ / ₂	30
NBH3-60-130-H	553	400	370	356	320	195	125	290	261	6	101	Rc ¹ / ₂	—

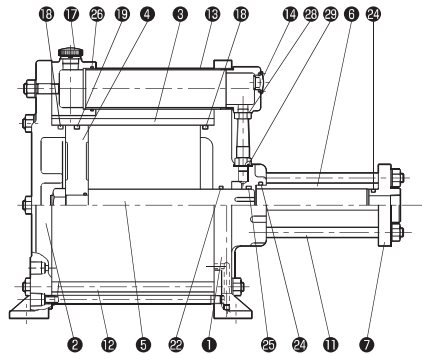
●NBH3-40/NBH3-60/NBH3-60-130



●NBH-80



●NBH-100



Parts List

No.	Name	Material	Qty.
①	Hydraulic cylinder mounting cover	Grey cast iron	1
②	Pneumatic cylinder cover	Grey cast iron	1
③	Pneumatic cylinder tube	Aluminum alloy (NBH3-40·60) Carbon steel for machine structural use (NBH-80·100)	1
④	Pneumatic piston	Grey cast iron	1
⑤	Hydraulic piston	Carbon steel for machine structural use	1
⑥	Hydraulic cylinder tube	Carbon steel for machine structural use	1
⑦	Hydraulic cap cover	Rolled steel for general structure	1
⑧	Indicator rod	Carbon steel for machine structural use	1
⑨	Indicator pipe	Resin	1
⑩	Hydraulic tie rod	Chromium-molybdenum steel	4
⑪	Pneumatic tie rod	Rolled steel for general structure	4
⑫	Reservoir tube	Aluminum alloy (NBH3-40·60·NBH-80) Carbon steel for machine structural use (NBH-100)	1
⑬	Oil pot	Resin	1
⑭	Flange	Rolled steel for general structure	1
⑮	Ring	Hard steel wire	1
⑯	Supply plug	Resin	1

Seal List

Name Material Qty	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕
	Cylinder tube gasket	Pneumatic piston seal	Gland gasket	Rod seal	Rod seal	Hydraulic cylinder tube gasket	Hydraulic seal	Reservoir tube gasket	Reservoir tube gasket	Lubricating pipe nut gasket	Lubricating pipe gasket
Model number	2	1	1	1	1	1(2)* ¹	1	2(1)* ²	2	1	1
NBH3-40	G95	DXP100	—	P30	PS-30	S46	IDU-30	AS568 030	P15	—	—
NBH3-60 · NBH3-60-130	G145	DXP150	—	P30	PS-30	S46	IDU-30	AS568 030	P15	—	—
NBH-80	G190	P185	G55	P40	PS-40	G50	IDU-40	AS568 030	P15	—	—
NBH-100	AS568 448	AS568 448	—	AS568 329	—	AS568 ³²⁶ ₃₃₃	AS568 329	G65	—	P14	P14

- The parenthesized values marked with*¹ apply to NBH-80.
- The parenthesized values marked with*² apply to NBH-100.