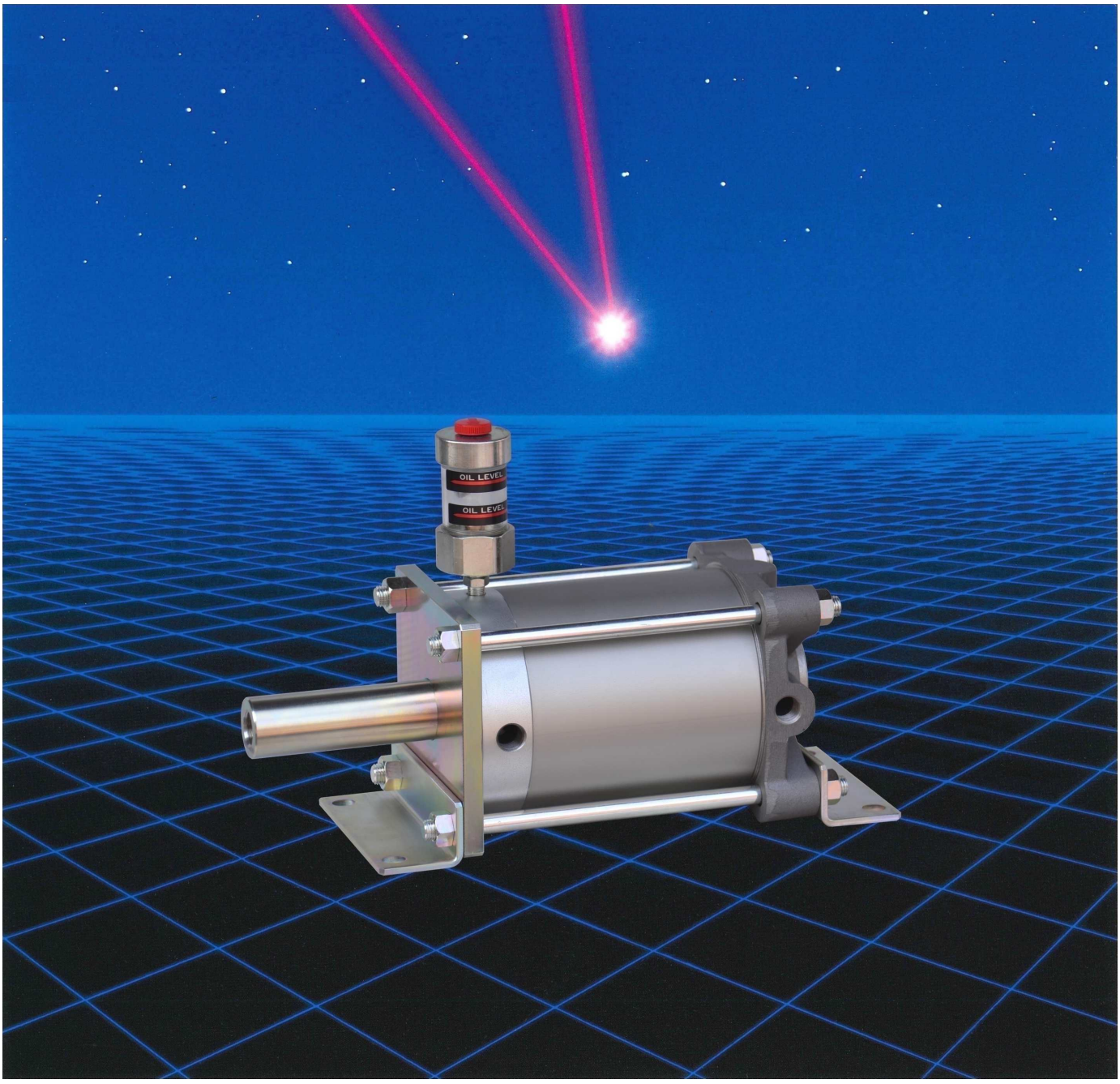
Air－hydro booster

RUSH BOOSTER

Generates high hydraulic pressure using only pneumatic power.
Build a hydraulic system with a simple pneumatic circuit.



HIROTAKA MFG. CO.,LTD.

from a pneumatic power

Easily generate hydraulic pressure!

The operation is easy and it is very economical.

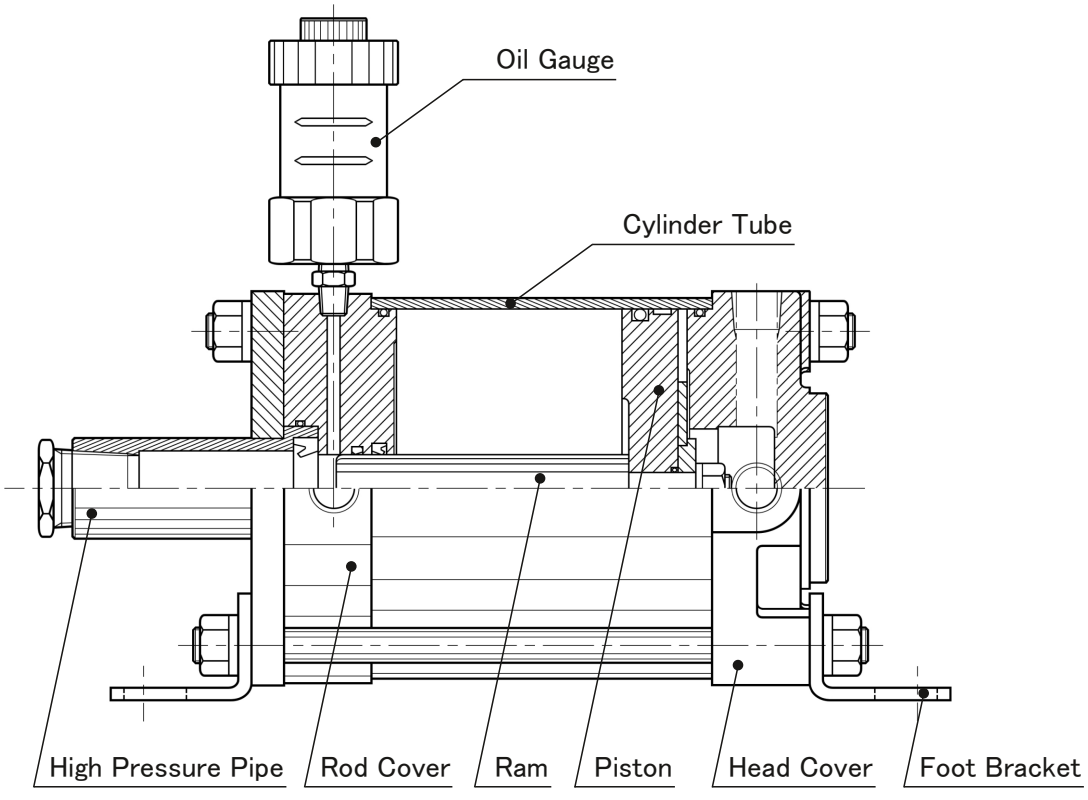
RUSH BOOSTER

Overview

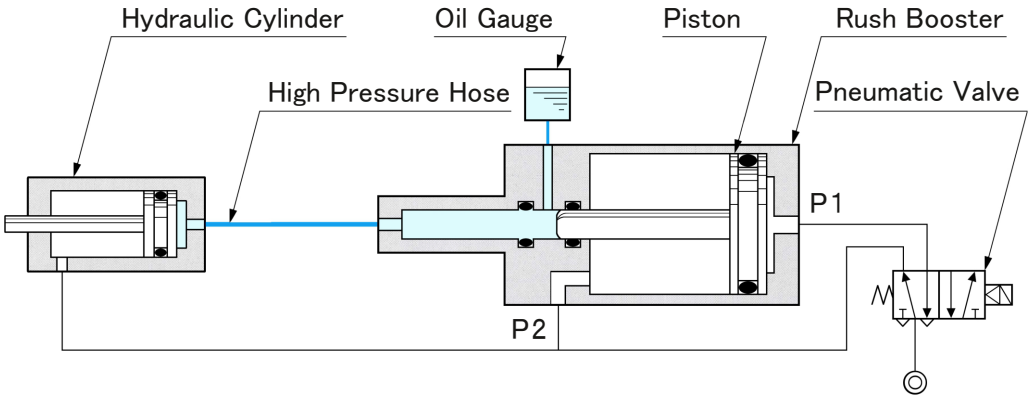
Rush Booster is a hydraulic generation unit capable of producing high hydraulic pressure using only compressed air.
It can be operated with one pneumatic valve and converted to high hydraulic pressure equivalent to 5 to 100 times the air pressure.
Ideal as a hydraulic source for short stroke cylinders, automatic clamping devices, and more.

Feature

1. Converts 0.4 MPa air pressure into 2 to 40 MPa hydraulic pressure.
2. Since it operates on pneumatic power, there is no risk of rising oil temperatures during continuous use or while maintaining pressure.
3. Steplessly adjust hydraulic output simply by changing the air pressure.
4. Control can be performed using a single pneumatic valve.
5. No surge pressure is generated, eliminating the need for an accumulator.



Operating Principle

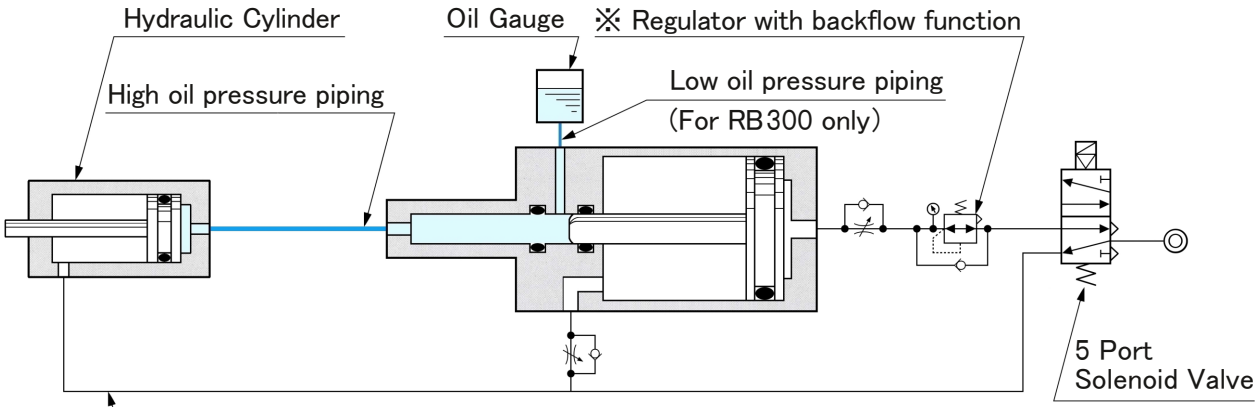


When air is supplied to P1 of the Rush Booster, the piston moves forward.
Based on Pascal's principle, this generates high hydraulic pressure, allowing the hydraulic cylinder to advance with high thrust.
By supplying air to P2 and the return port of the hydraulic cylinder, the cylinder retracts with air pressure.
For single acting cylinders, air control is applied only to the Rush Booster.

How to Operate

Install the actuators, such as hydraulic cylinders or hydraulic clamps, onto the machine or equipment.
Connect the Rush Booster and the actuator using high pressure hoses, then fill the system with oil before operation.

Pneumatic and Hydraulic Piping



For double acting hydraulic cylinders, either branch the return side air piping of the Rush Booster or supply primary pressure at all times.

※ Regulator with backflow function is used to adjust the hydraulic pressure.

Specifications

Model	RB100		RB160					RB300			
	□-5	□-12	□-5	□-16	□-28	□-65	□-100	□-16	□-25	□-30	□-56
Pneumatic cylinder diameter	φ100		φ160					φ300			
Booster ram diameter	φ45	φ28	φ70	φ40	φ30	φ20	φ16	φ75	φ60	φ55	φ40
Pressure boosting ratio	1:4.9	1:12	1:5	1:16	1:28	1:64	1:100	1:16	1:25	1:29.7	1:56
□ Amount of discharged oil (㎤)	30 200 100 250 150 300	16 130 50 200 100	100 300 150 400 200 800 250	30 180 100 200 130 250	30 160 50 200 85 250 100 300 130	30 130 50 160 80 200 100 250	50	1200 1800 2800	1300 2000	1000 1500 2000	200 400 600 800 1000
Maximum generated oil pressure (MPa)	3.4	8.4	3.5	11.2	19.6	44.8	70	11.2	17.5	20.8	39.2
Proof pressure (Air)	1 MPa										
Operating pressure (Air)	0.15～0.7 MPa										
Fluid (Air pressure)	Air										
Fluid (Oil pressure)	Standard mineral hydraulic fluid (ISO VG22)										

Air Consumption

Unit:L(ANR)

Model	L	Model	L	Model	L	Model	L
RB100- 30-5	3.7	RB160-250-5	20.2	RB160-130-28	51.3	RB300-1200-16	316.7
100	7.9	300	22.4	160	60.7	1800	422.4
150	10.4	400	28.9	200	74.7	2800	609.4
200	13.7	800	52.6	250	91.1	RB300-1300-25	443.7
250	16.2	RB160- 30-16	14.7	300	107.6	2000	649.3
300	18.7	100	26.3	RB160- 30-65	30.5	RB300-1000-30	458.3
RB100- 16-12	5.7	130	33.2	50	44.7	1500	577.9
50	11.5	180	42.5	80	68.4	2000	788.3
100	18.7	200	44.8	100	82.6	RB300- 200-56	224.1
130	23.2	250	54.0	130	106.3	400	357.1
200	33.0	RB160- 30-28	18.4	160	127.6	600	490.2
RB160-100-5	11.6	50	25.5	200	158.4	800	623.3
150	13.8	85	37.2	250	196.2	1000	756.4
200	18.1	100	41.9	RB160- 50-100	68.3		

The values represent the air consumption converted to atmospheric pressure for one cycle of total oil volume discharge at an air pressure of 0.5 MPa.

Mass

Unit:kg

Model	Weight	Model	Weight	Model	Weight	Model	Weight
RB100- 30-5	10.5	RB160-100-5	26.0	RB160-200-16	28.2	RB160- 30-65	23.5
100	11.5	150	27.1	250	29.7	50	24.7
150	12.0	200	28.0	RB160- 30-28	22.0	80	26.5
200	12.5	250	29.5	50	22.5	100	28.5
250	13.5	300	30.2	85	23.6	130	31.5
300	14.0	400	33.3	100	24.5	160	33.5
RB100- 16-12	10.3	800	41.5	130	25.5	200	36.5
50	10.6	RB160- 30-16	23.1	160	26.3	250	40.0
100	11.4	100	25.1	200	28.0	RB160- 50-100	36.0
130	12.0	130	26.1	250	29.5	RB300 : Inquire for info.	
200	13.2	180	27.6	300	31.5		

How to Order

RB 160 – 30 – 65

Rush Booster

Symbol	Bore size
100	100 mm
160	160 mm
300	300 mm

Symbol	Amount of discharged oil
30	30 cm³
50	50 cm³
80	80 cm³
100	100 cm³
160	160 cm³
⋮	⋮

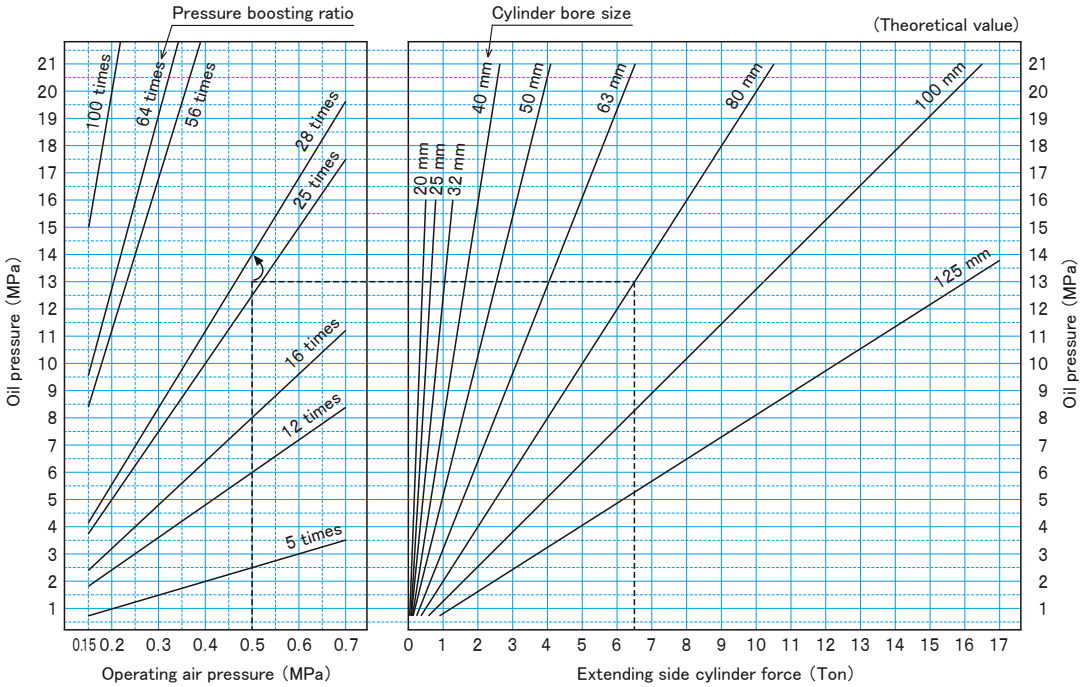
Symbol	Pressure boosting ratio
5	5 times
12	12 times
16	16 times
25	25 times
28	28 times
⋮	⋮

Example

RB160-30-65

Bore size : 160 mm
Amount of discharged oil : 30 cm³
Pressure boosting ratio : 65 times

Selection Method for the Model Number



Determine the boosting ratio of Rush Booster and discharge oil amount from each of the operating air pressure, required force, and hydraulic cylinder diameter.

Example) Operating air pressure : 0.5 MPa, required cylinder force : 6.5 ton
In the graph, raise the position of air pressure 0. 5 MPa and cylinder force 6. 5 ton upward, and select the boosting ratio above the position where each cylinder diameter and horizontal line.
If a cylinder diameter of 80 mm is selected, the boosting ratio of Rush Booster is 28 times. (There are other combinations.)

Next, determine the discharged oil amount from the Rush Booster.
If the total stroke of the hydraulic cylinder is 20 mm, the volume inside the hydraulic cylinder is
ϕ80 area (cm²) × 0.2 cm = 100 cm³.
Considering the expansion of the hydraulic hose, the compression of oil, etc., the amount of oil discharged from the Rush Booster should be 1.5 times or more.
As a result, the model number of the Rush Booster will be "RB160-160-28".

Estimated Amount of Oil Compression

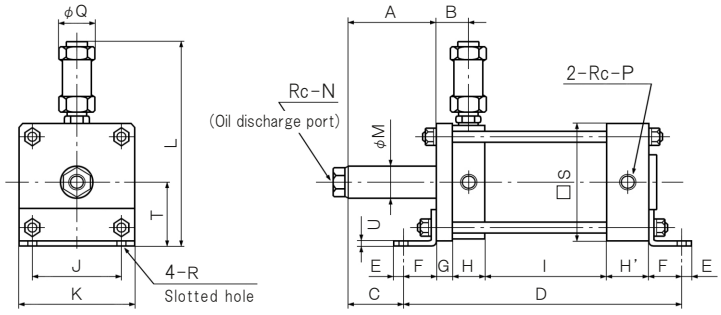
$$\Delta V = 10 \beta P V1$$

Oil temperature	20℃	40℃	60℃
β	6.8×10^{-5}	7.7×10^{-5}	8.6×10^{-5}

V1 = Original volume (Inside volume of the hydraulic cylinder and piping)
β = Compression rate
P = Oil pressure (MPa)
ΔV = Estimated amount of oil compression

Dimentions

RB100 RB160

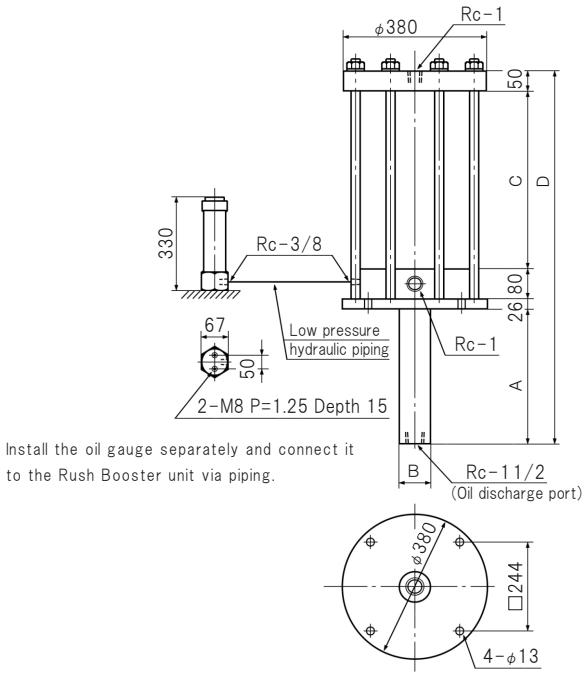


(Unit : mm)

Model \ Symbol	B	E	F	G	H	H'	J	K	L	N	P	Q	R	S	T	U
RB100	35	10	38	15	35	30	92	116	253	3/8	3/8	58	11	116	67	4.5
RB160	37	15	48	15	39	44	140	176	313	3/8	1/2	58	15	176	95	6

Model \ Symbol	A	C	D	I	M	Model \ Symbol	A	C	D	I	M	Model \ Symbol	A	C	D	I	M
RB100- 30-5	35	-3	246	90	60	RB160-250-5	92	44	330	136	85	RB160-130-28	225	177	460	266	45
100	85	47	296	140	60	300	102	54	340	146	85	160	265	217	500	306	45
150	115	77	326	170	60	400	132	84	370	176	85	200	325	277	560	366	45
200	150	112	361	205	60	800	237	189	475	281	85	250	395	347	630	436	45
250	185	147	396	240	60	RB160- 30-16	65	17	300	106	66	300	465	417	700	506	45
300	215	177	426	270	60	100	120	72	355	161	66	RB160- 30-65	135	87	370	176	45
RB100- 16-12	40	2	266	110	43	130	145	97	380	186	66	50	195	147	430	236	45
50	100	62	326	170	43	180	185	137	420	226	66	80	295	247	530	336	45
100	180	142	406	250	43	200	200	152	435	241	66	100	355	307	590	396	45
130	230	192	456	300	43	250	240	192	475	281	66	130	450	402	685	491	45
200	345	307	571	415	43	RB160- 30-28	80	32	315	121	45	160	545	497	780	586	45
RB160-100-5	52	4	290	96	85	50	110	62	345	151	45	200	675	627	910	716	45
150	62	14	300	106	85	85	155	107	390	196	45	250	835	787	1070	876	45
200	77	29	315	121	85	100	185	137	420	226	45	RB160-50-100	280	232	529	330	36

RB300



Install the oil gauge separately and connect it to the Rush Booster unit via piping.

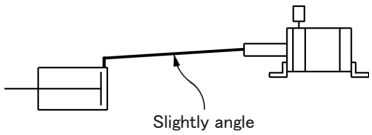
(Unit : mm)

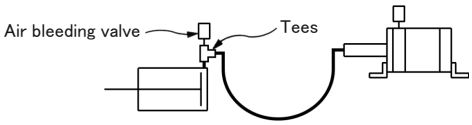
Model \ Symbol	A	B	C	D
RB300-1200-16	355	105	474	985
1800	490	105	609	1255
2800	715	105	834	1705
RB300-1300-25	510	100	629	1295
2000	760	100	879	1795
RB300-1000-30	525	92	645	1326
1500	670	92	790	1616
2000	925	92	1045	2126
RB300- 200-56	205	70	359	720
400	365	70	519	1040
600	525	70	679	1360
800	685	70	839	1680
1000	845	70	999	2000

Hydraulic Piping

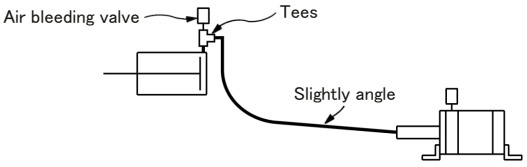
Take measures to prevent air from accumulating in the hydraulic pping and take measures so that air can be released when air accumulates.
Maintenability is also improved by making one place where air collects.
The air returning to the Rush Booster side is naturally released in the oil gauge.

● Rush Booster is positioned above the hydraulic cylinder.



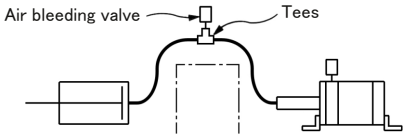


● Rush Booster is positioned below the hydraulic cylinder.



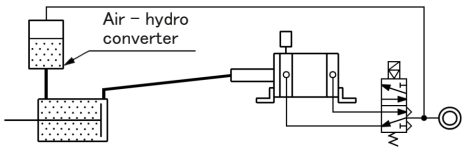
※ Refer to “Mounting and Adjustment” section for the mounting positon of the oil gauge.

● The layout of hydraulic piping becomes arched piping.



Install the air bleeding valve at the highest point of the hydraulic piping.

● Fast operation cycle

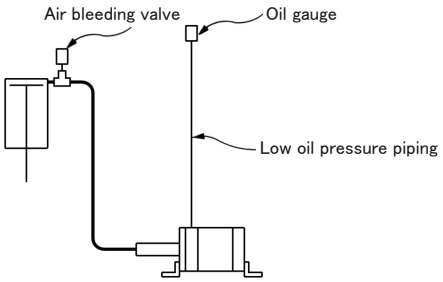


Install an air – hydro converter on the return side of the hydraulic cylinder and add oil to the return side to elimenate the air part and prevent air bubbles from entering.

Mounting and Adjustment

- RB100 and RB160 can be installed downward or upward at the oil discharge port in addition to horizontal installation. In that case, attach the oil gauge with elbow fitting etc. so that the oiling cap (red collor) is on the upper surface. (Rush Booster side oil gauge connecting port size : Rc1/4, Oiling port size : PF3/8)

- If the position of the oil gauge is lower than the installation position of the hydraulic cylinder,the oil in the hydraulic piping may return to the oil gauge and overflow from the oiling cap. In that case, use the low oil pressure piping and install the oil gauge at a position higher than the hydraulic cylinder.
  Also, by installing the oil gauge at a position higher than the hydraulic cylinder, it becomes easier to release air from the air release valve on the hydraulic cylinder side.
  ※The oil pressure in the low oil pressure piping is always close to no pressure.



- Be sure to install a meter-out speed controller on the head side of Rush Booster.
  If the return speed of Rush Booster is too fast, the oil pressure will become negative and air bubbles will be generated, which may cause insufficient pressurization, insufficient stroke, oil leakage, etc.
  After installation, slow down the return speed of Rush Booster as much as possible when air release, gradually increase the return speed after air release, and do not open the speed controller any more when there is no change in the return speed of the hydraulic cylinder.

HIROTAKA MFG. CO.,LTD.

HEAD OFFICE 5-89, Ikoma-cho, Kita-ku, Nagoya City, Aichi 462-0832, JAPAN Phone +81-52-991-6111 Fax +81-52-991-6115

●LINE UP●

PNEUMATIC POWER CYLINDER
PNEUMATIC BOOSTER
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RUSH BOOSTER
HYDRAULIC CYLINDER
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SELLOCK CYLINDER
FLOATING CONNECTOR
AUTO CLAMPER
SEL NUT
LINEA BRAKE

PNEUMATIC AND HYDRAULIC
EQUIPMENT