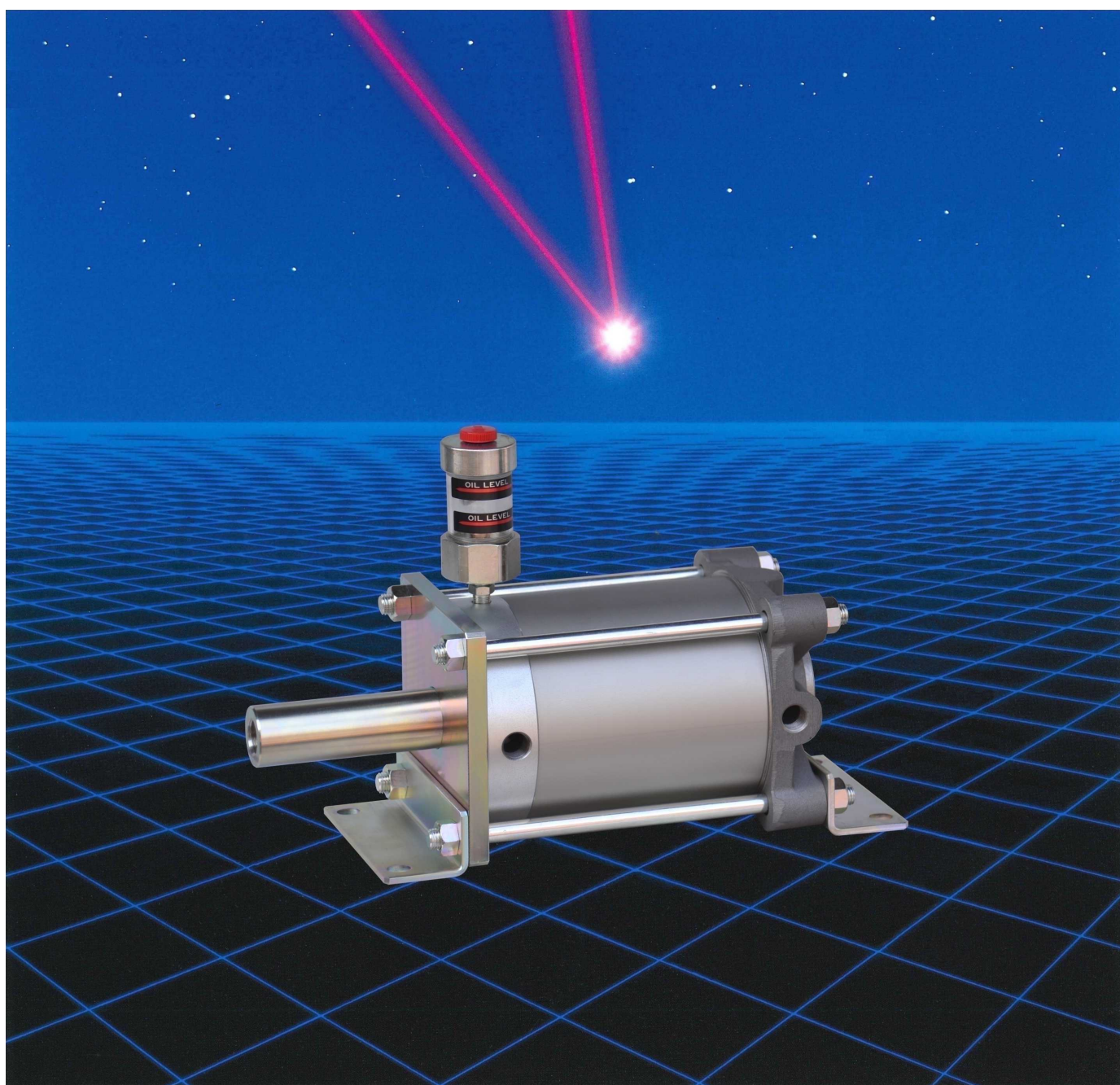Air-hydro booster

RUSH BOOSTER

Generates air pressure to hydraulic pressure.
The hydraulic system can be built with a simple pneumatic circuit.

HIROTAKA MFG. CO.,LTD.

from a pneumatic source

Easily generate hydraulic pressure!
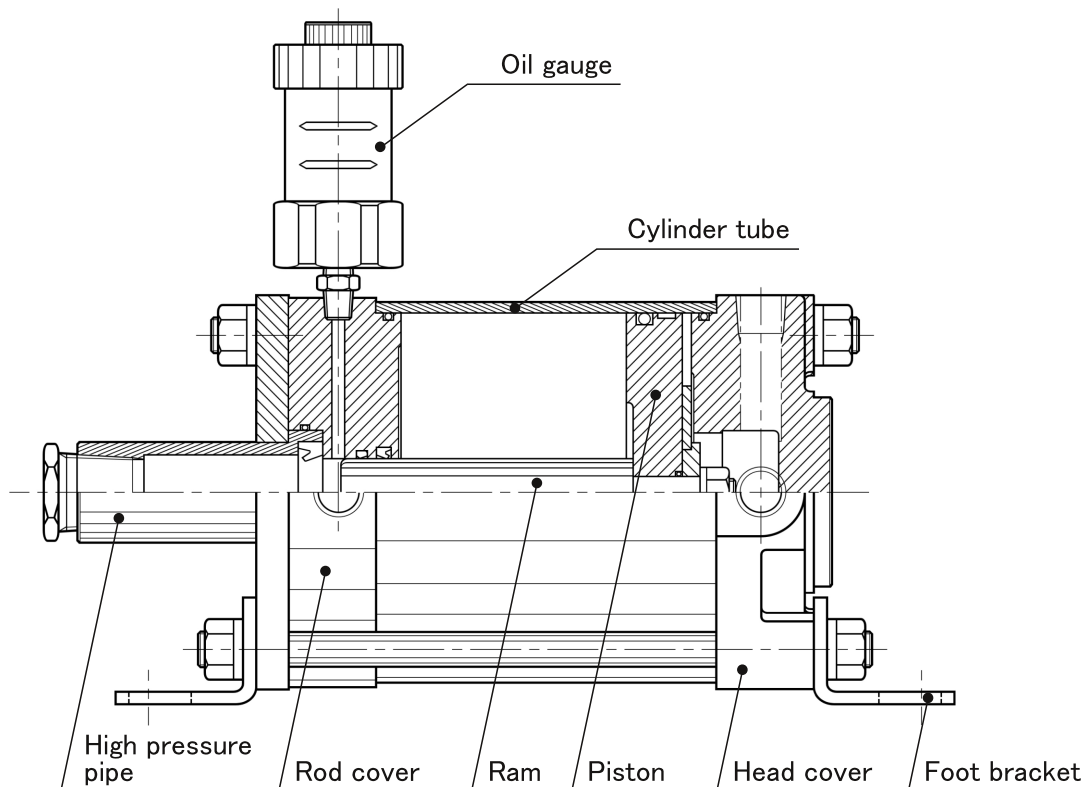
The operation is easy and it is very economical.
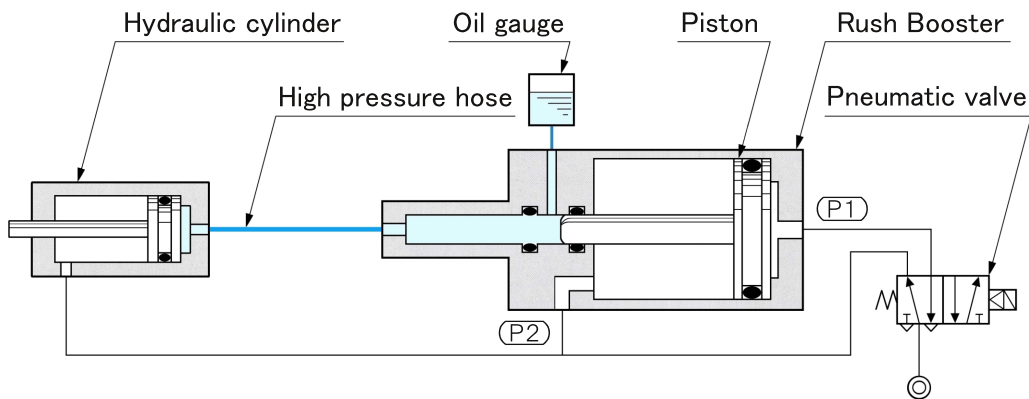
RUSH BOOSTER

Overview

The rush booster is an air-hydro booster that can generate hydraulic pressure with 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.

Use as a hydraulic source for short stroke hydraulic cylinders, automatic clamp devices, etc.

Feature

❶ Converts 0.4 MPa air pressure from 2 to 40 MPa oil pressure.

❷ Since it operates with an air pressure, there is no trouble due to oil temperature rise even in the state of continuous operation and pressure holding.

❸ The oil pressure can be changed steplessly by changing the air pressure.

❹ Control can be done with an one pneumatic valve.

❺ No surge pressure is generated and no accumulator is required.

Oil gauge

Cylinder tube

High pressure pipe Rod cover Ram Piston Head cover Foot bracket

Operating principle

Hydraulic cylinder   Oil gauge   Piston   Rush Booster

High pressure hose   Pneumatic valve

P1

P2

When compressed air is supplied to P1 of the Rush Booster, the piston moves forward and the oil becomes high pressure according to Pascal's principle, and the hydraulic cylinder moves forward with high thrust.

If compressed air is supplied to P2 and the return port of the hydraulic cylinder, the hydraulic cylinder will retract due to air pressure.
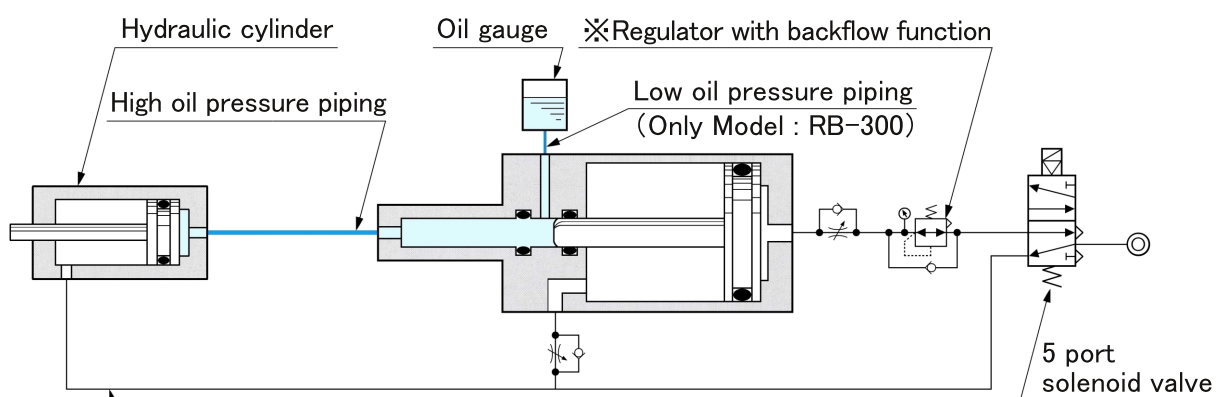
In the case of single acting cylinder, only the Rush Booster is controlled.

How to use   Install actuatore such as hydraulic cylinders and hydraulic clamps on machines and devices.
Piping the Rush Booster and actuator with a high pressure hose, inject oil and use.

Piping

Hydraulic cylinder   Oil gauge   ※Regulator with backflow function

High oil pressure piping   Low oil pressure piping
（Only Model : RB-300）

5 port
solenoid valve

For double-acting hydraulic cylinders, branch and connect the return air piping of the Rush Booster, or supply the original pressure at all times.

※The regulator is used when adjusting the thrust.

Specifications

Model	RB100×□-5	RB100×□-12	RB160×□-5	RB160×□-16	RB160×□-28	RB160×□-65	RB160×□-100	RB300×□-16	RB300×□-25	RB300×□-30	RB300×□-56
Air cylinder diameter	φ100	φ100	φ160	φ160	φ160	φ160	φ160	φ300	φ300	φ300	φ300
Ram diameter	φ45	φ28	φ70	φ40	φ30	φ20	φ16	φ75	φ60	φ55	φ40
Pressure increase 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 (cm³)	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	3.4MPa	8.4MPa	3.5MPa	11.2MPa	19.6MPa	44.8MPa	70MPa	11.2MPa	17.5MPa	20.8MPa	39.2MPa
Proof pressure	1MPa										
Operating pressure	0.15～0.7MPa										
Fluid (Air pressure)	Air										
Fluid (Oil pressure)	Standard mineral hydraulic fluid (ISO VG22)										

Air consumption volume

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 numerical value is the amount of air consumed when the total amount of oil is discharged at an air pressure of 0.5 MPa and one reciprocating operation is performed, converted to atmospheric pressure.

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	Inquire to us for RB300.	
200	13.2	180	27.6	300	31.5		

How to order

RB 160 × 30 - 65

Product name
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	Boosting ratio
5	5 times
12	12 times
16	16 times
25	25 times
28	28 times
⋮	⋮

Example for product number : RB160×30−65
Bore size : 160mm
Amount of discharged oil : 30 cm³
Boosting ratio : 65 times

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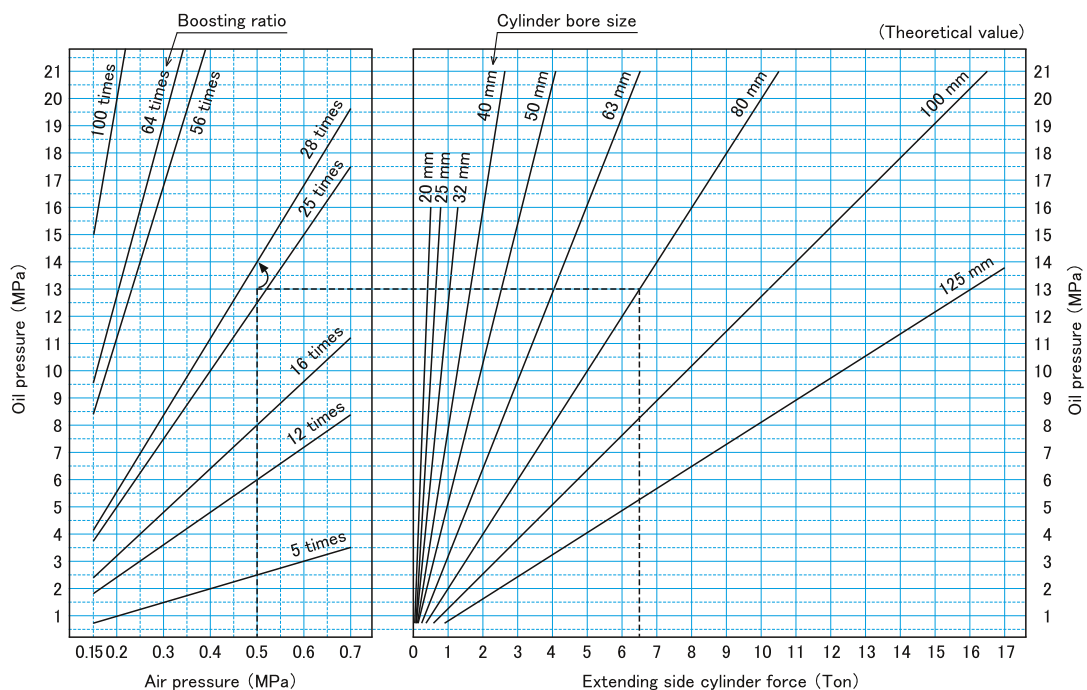
Determine the boosting ratio of Rush Booster and discharge oil amount from each of the operating air pressure, required force, and hydraulic cylinder diameter.

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 cc.
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 of the Rush Booster will be "RB160−160−28".

Estimated amount of oil compression

V1＝ Original volume (Inside volume of the cylinder and piping)
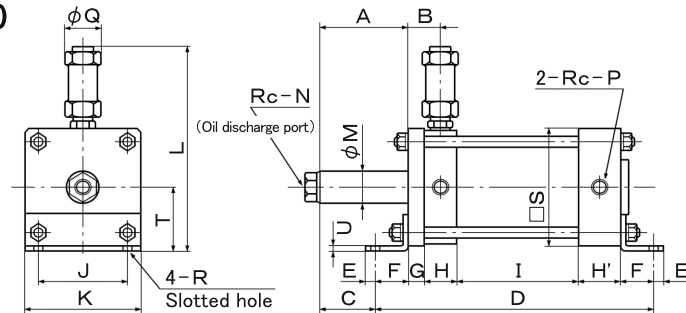
β ＝ Compression rate

P ＝ Oil pressure (MPa)

ΔV＝ 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}

Dimentions

RB-100 RB-160

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

RB-300
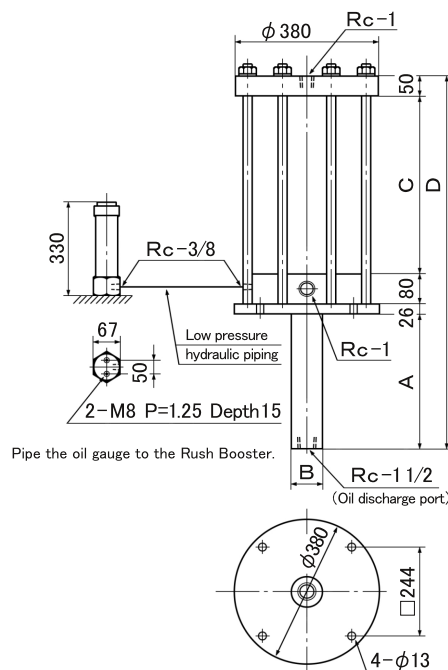
| Model \ Symbol	A	B	C	D
RB300×1200-16	355	105	474	985
1800	490	105	609	1255
2800	715	105	834	1705
RB300×1300-25	510	100	629	1295
2000	760	100	879	1795
RB300×1000-30	525	92	645	1326
1500	670	92	790	1616
2000	925	92	1045	2126
RB300×200-56	205	70	359	720
400	365	70	519	1040
600	525	70	679	1360
800	685	70	839	1680
1000	845	70	999	2000

Oil piping

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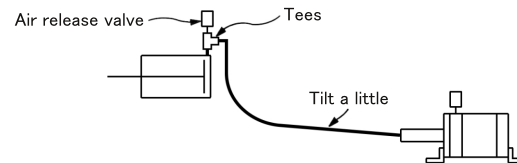Maintenability is also improved by making one place where air collects.
The air returning to the Rush Booster side is naturally released in the oil gauge.

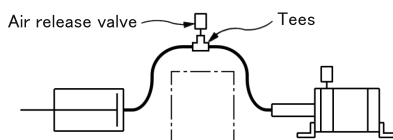● Rush Booster is above the hydraulic cylinder.

Tilt a little

Air release valve — Tees
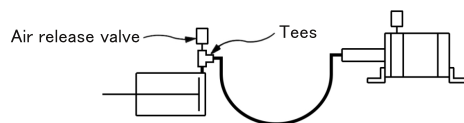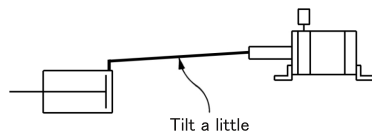
● Rush Booster is below the hydraulic cylinder.

Air release valve — Tees

Tilt a little

※ Refer to "Mounting and Adjustment" for the mounting positon of the oil gauge.

● The hydraulic piping becomes like a mountain.

Air release valve — Tees

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

● Fast operation cycle

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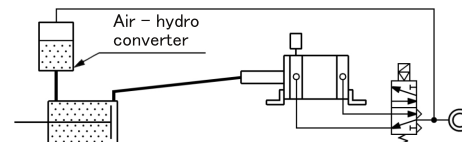
Install an air − hydro converter on the return side of the hydraulic cylinder and add oil to the return side to elimenate the air part and prevent air bubbles from entering.

Piping

· 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.

Air release valve — Oil gauge

Low oil pressure piping
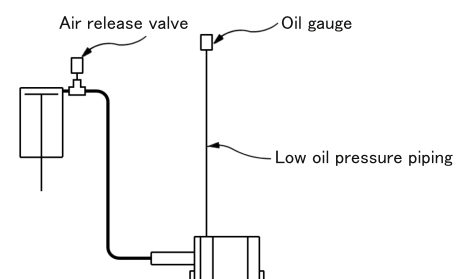
· Be sure to install a meter-out speed controller on the head side of Rush Booster.
 If the return speed of Rush Booster is too fast, the oil pressure will become negative and air bubbles will be generated, which may cause insufficient pressurization, insufficient stroke, oil leakage, etc.
 After installation, 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.

●LINE UP●

PNEUMATIC POWER CYLINDER
PNEUMATIC BOOSTER
POWER PACK CYLINDER
RUSH BOOSTER
HYDRAULIC CYLINDER
FREE LOCK PAD
SELLOCK CYLINDER
FLOATING CONNECTOR
AUTO CLAMPER
SEL NUT
LINEA BRAKE

PNEUMATIC AND HYDRAULIC
EQUIPMENT

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