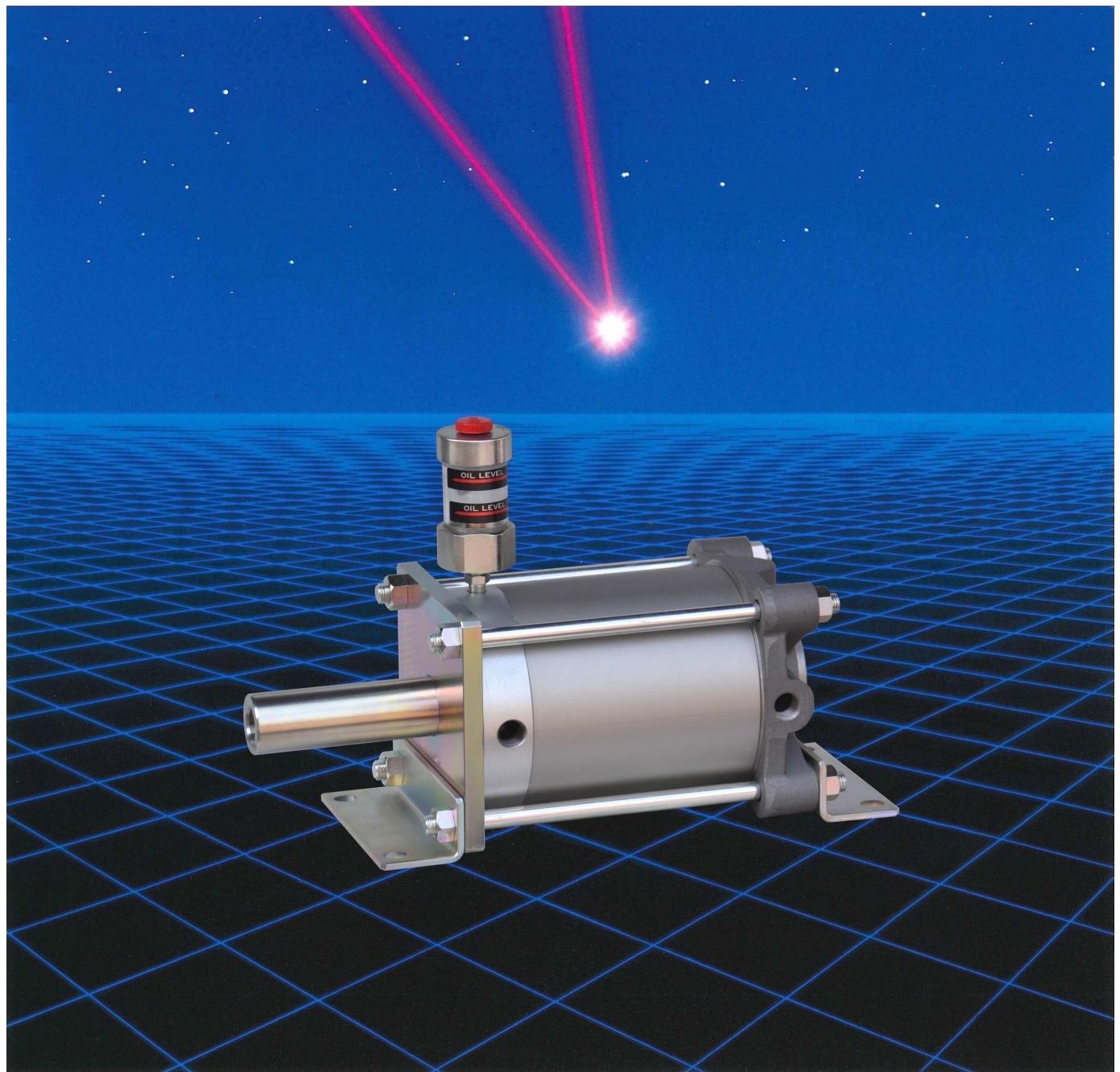




Air-hydro booster

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.

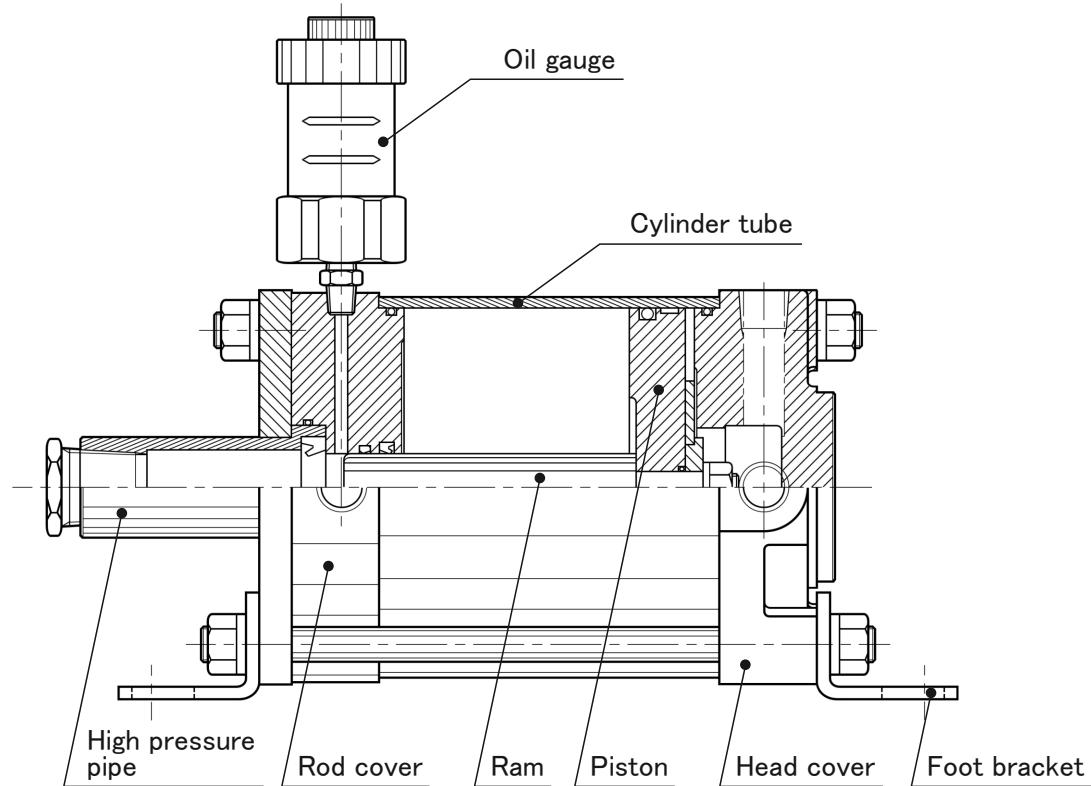
RUSH BOOSTER

Overview

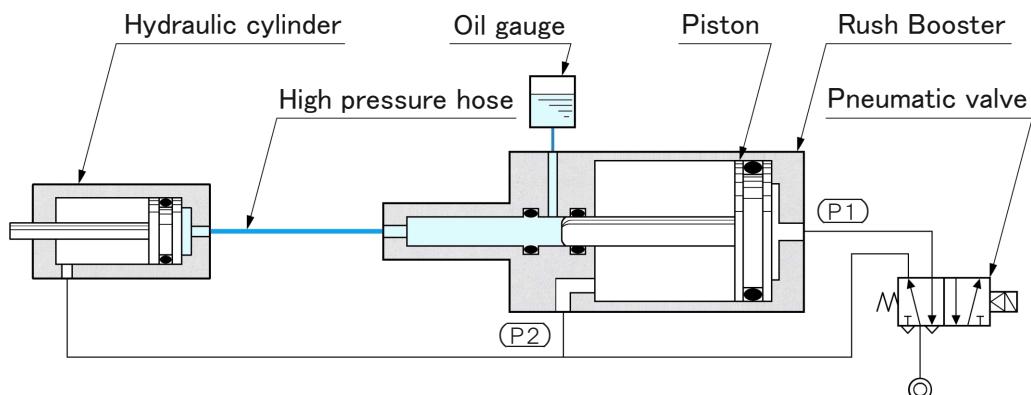
The rush booster is an air-hydro booster that can generate hydraulic pressure with compressed air. It can be operated with one pneumatic valve and converted to high hydraulic pressure equivalent to 5 to 100 times the air pressure. Use as a hydraulic source for short stroke hydraulic cylinders, automatic clamp devices, etc.

Feature

- ① Converts 0.4 MPa air pressure from 2 to 40 MPa oil pressure.
- ② 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.
- ③ The oil pressure can be changed steplessly by changing the air pressure.
- ④ Control can be done with an one pneumatic valve.
- ⑤ No surge pressure is generated and no accumulator is required.



Operating principle



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 (P2)

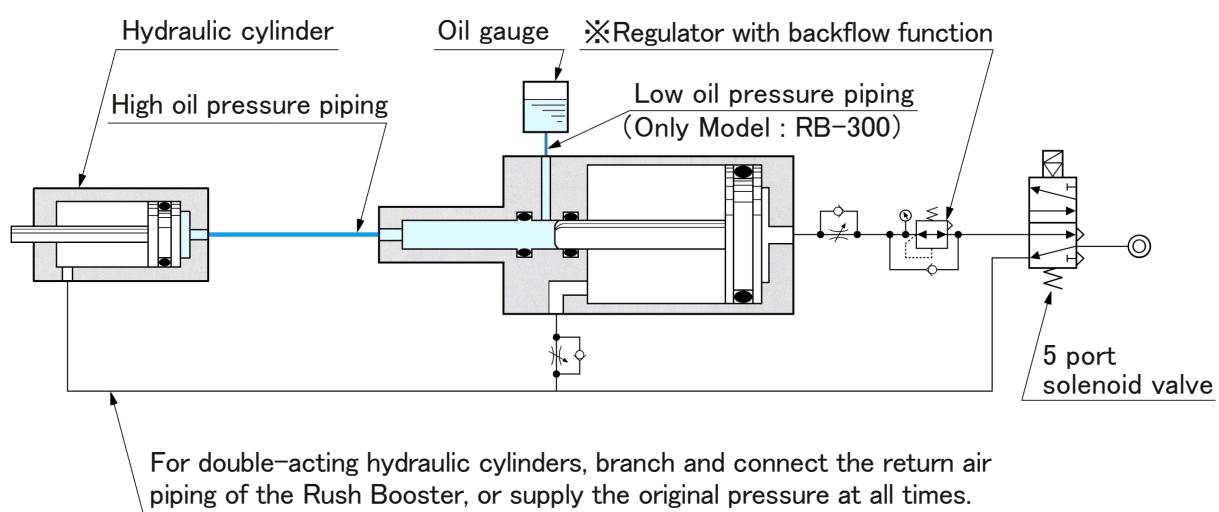
If compressed air is supplied to and the return port of the hydraulic cylinder, the hydraulic

How to use

Install actuator 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



※The regulator is used when adjusting the thrust.

Specifications											
Model number	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	φ 100	φ 100	φ 160	φ 160	φ 160	φ 160	φ 160	φ 300	φ 300	φ 300	φ 300
Ram diameter	φ 45	φ 28	φ 70	φ 40	φ 30	φ 20	φ 16	φ 75	φ 60	φ 55	φ 40
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 (cm ³)	30 200 100 250 150 300	16 130 50 200 100	100 300 150 400 200 800	30 180 100 200 130 250 250	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 800 1000	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 number	L	Model number	L	Model number	L	Model number	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 number	Weight	Model number	Weight	Model number	Weight	Model number	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 cm ³
50	50 cm ³
80	80 cm ³
100	100 cm ³
160	160 cm ³
...	...

Symbol	Boosting ratio
5	5 times
12	12 times
16	16 times
25	25 times
28	28 times
...	...

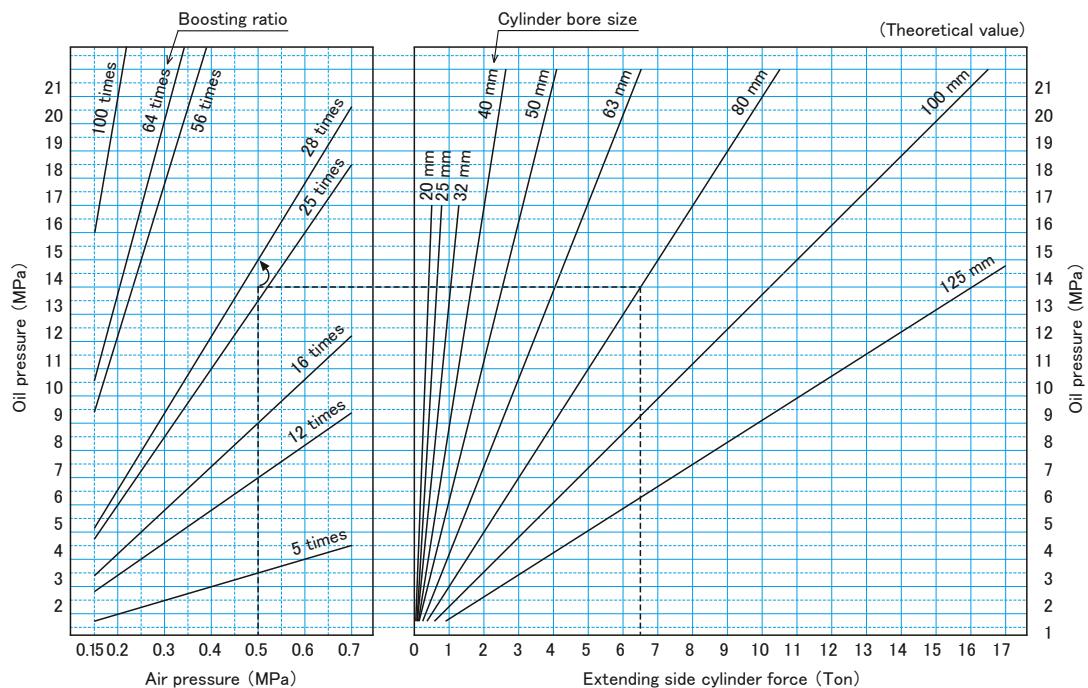
Example for the model number : RB160-30-65

Bore size : 160mm

Amount of discharged oil : 30 cm³

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

$\phi 80 \text{ area (cm}^2\text{)} \times 0.2 \text{ cm} = 100 \text{ cm}^3$.

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

$V1$ = Original volume (Inside volume of the cylinder and piping)

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

β = Compression rate

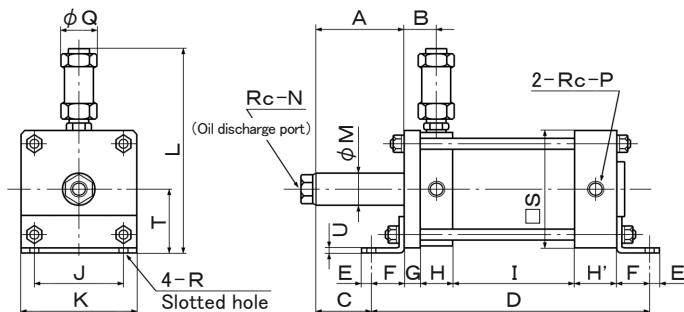
P = Oil pressure (MPa)

ΔV = Estimated amount of oil compression

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

Dimentions

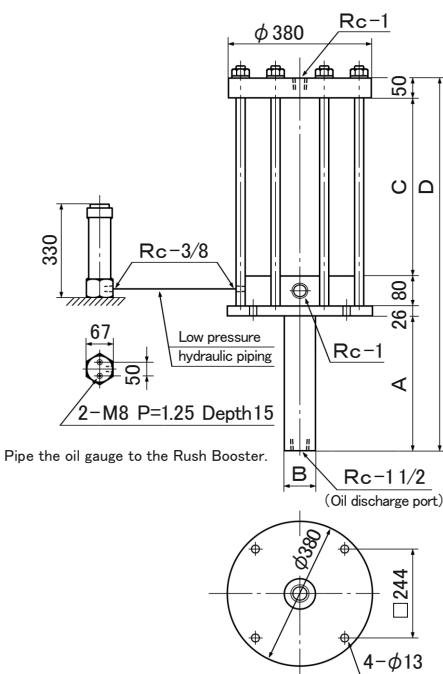
RB-100 RB-160



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 No.	Symbol	A	C	D	I	M	Model No.	Symbol	A	C	D	I	M	Model No.	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 No.	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

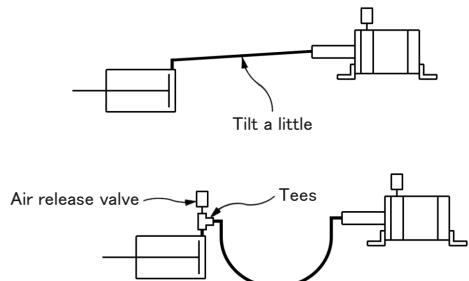
Oil piping

Take measures to prevent air from accumulating in the hydraulic piping and take measures so that air can be released when air accumulates.

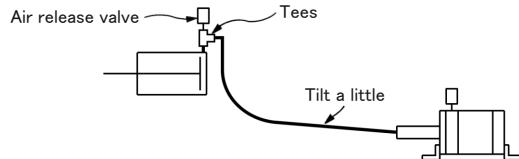
Maintainability is also improved by making one place where air collects.

The air returning to the Rush Booster side is naturally released in the oil gauge.

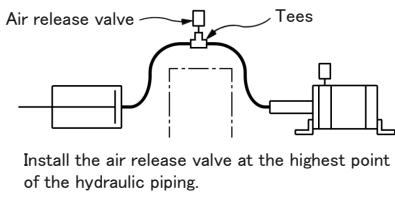
● Rush Booster is above the hydraulic cylinder.



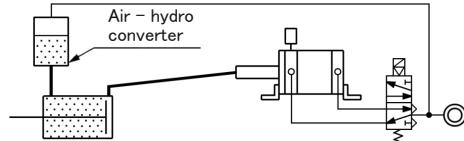
● Rush Booster is below the hydraulic cylinder.



● The hydraulic piping becomes like a mountain.



● Fast operation cycle

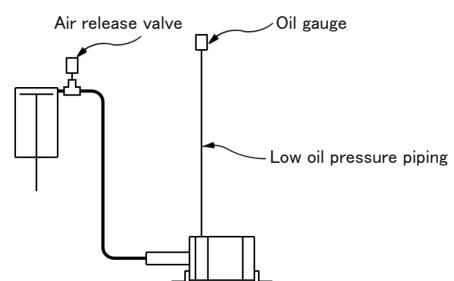


Piping

- 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 collar) 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.



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