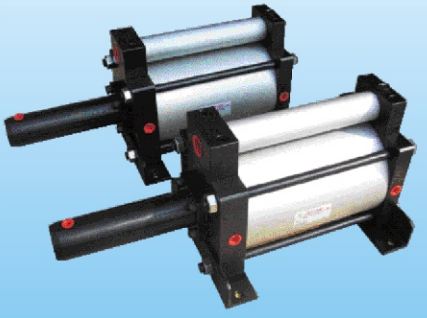
# 10 : BR Boosters

TÜV *ISO-9001 : 2000 quality certified*

| BR1 direct boosters | BR2 pre-setting boosters |
|---|---|
|  |  |



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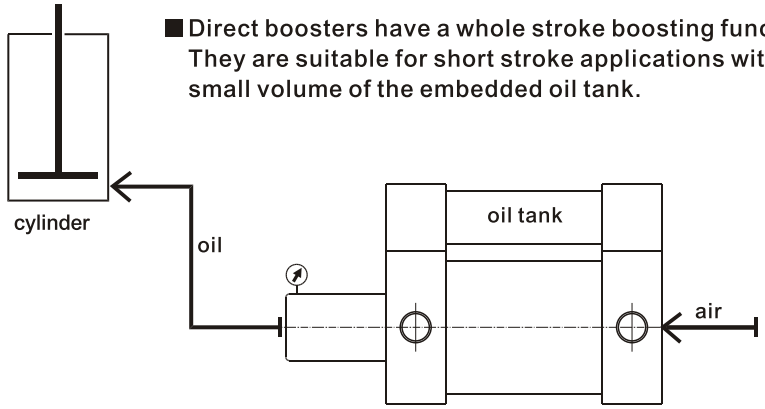
## BR Features

- By utilizing the difference of area ratio between two sides of a piston, the air inputed to a cylinder pushs the piston to press the other side with full of oil that boosts up the pressure of oil. The pressed oil can be used externally as the input of hydraulic power. A heavy and expensive oil unit is thus not needed.
- This product line is suitable for industries such as pressing, revolving, forging, cutting, bending and printing.

## BR Kinds

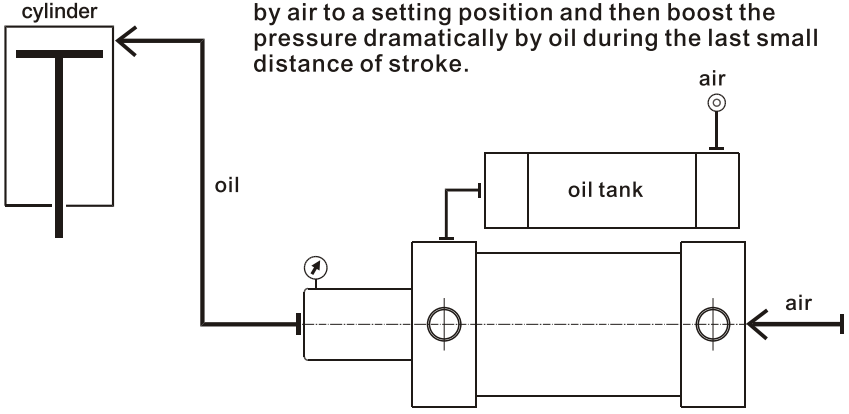
### BR1 direct boosters

■ Direct boosters have a whole stroke boosting function. They are suitable for short stroke applications with small volume of the embedded oil tank.




### BR2 pre-setting boosters

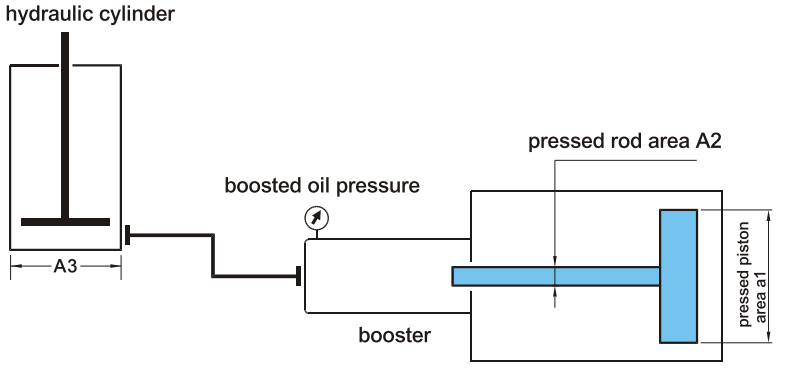
■ Pre-setting boosters move the cylinder stroke by air to a setting position and then boost the pressure dramatically by oil during the last small distance of stroke.



## Boosting ratio and output force

$$\text{boosting ratio} = \frac{\text{pressed piston area}(A_1)}{\text{pressed rod area}(A_2)}$$

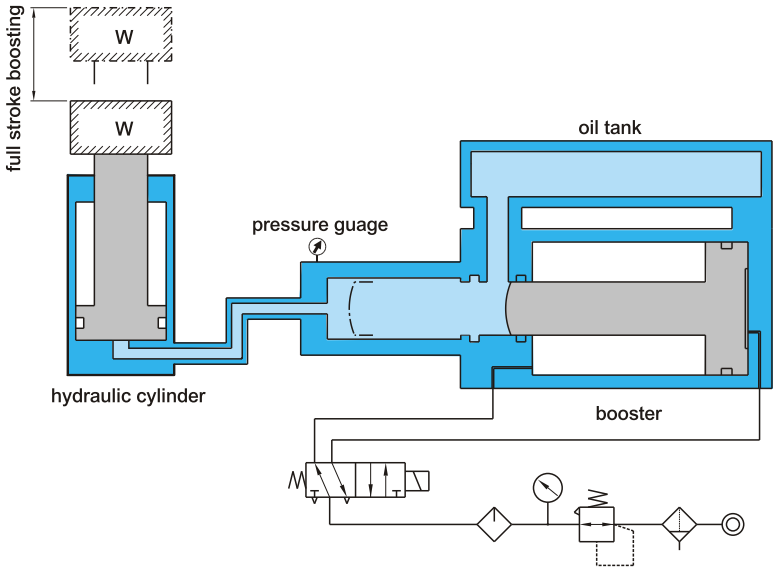
boosted oil pressure=air input pressure× boosting ratio
boosted oil then can be applied to a hydraulic cylinder as a working pressure on piston area(A3)



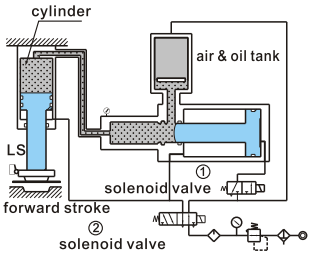
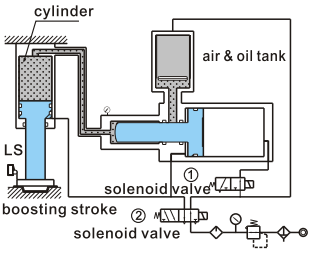
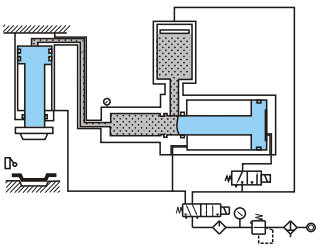

| model | | boosting ratio | input air pressure (kgf/cm$^2$) | | boosted oil pressure (kgf/cm$^2$) | | output oil volume (cc) |
|---|---|---|---|---|---|---|---|
| direct | BR1-100 | 11 | 3/33 | 4/44 | 5/55 | 6/66 | 77 |
| | BR1-150 | 25 | 3/75 | 4/100 | 5/125 | 6/150 | 77 |
| | BR1-150×130 | 25 | | | | | 130 |
| | BR1-200 | 25 | | | | | 176 |
| pre-set | BR2-100 | 11 | 3/33 | 4/44 | 5/55 | 6/66 | 77 |
| | BR2-150 | 25 | 3/75 | 4/100 | 5/125 | 6/150 | 77 |
| | BR2-200 | 25 | | | | | 176 |

## Theory

### BR1 direct boosters (for short stroke application)

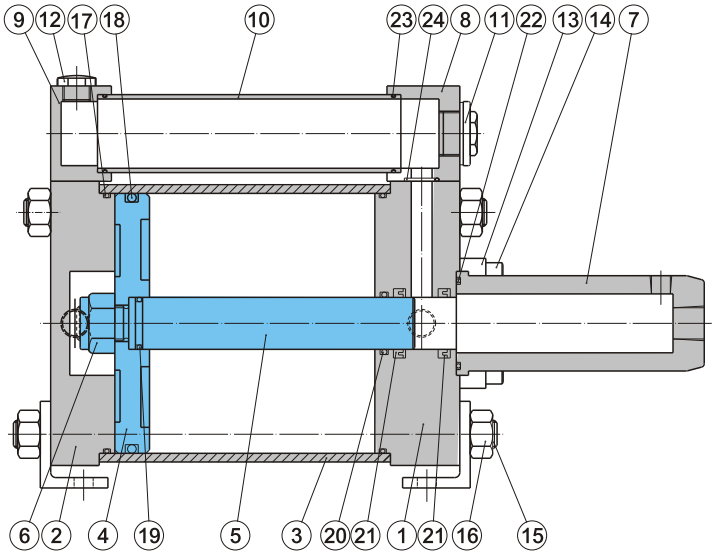



### BR2 pre-setting boosters (for long stroke application)

| before boosting | during boosting | after boosting |
|---|---|---|
|  |  |  |
| Solenoid ② is actuated that let air input to air & oil tank to boost oil out for pushing external cylinder rod to move forward to the setted position. | When the limit switch (LS) is touched by the cylinder rod end, solenoid valve ① actuated to push booster's piston forward for boosting oil pressure. | After boosting, solenoid valve ② & ① are de-actuated to go back the initiated state. |

## Structure, part names, and seals spec(direct boosters)

### BR1 structure(direct type)




### part names

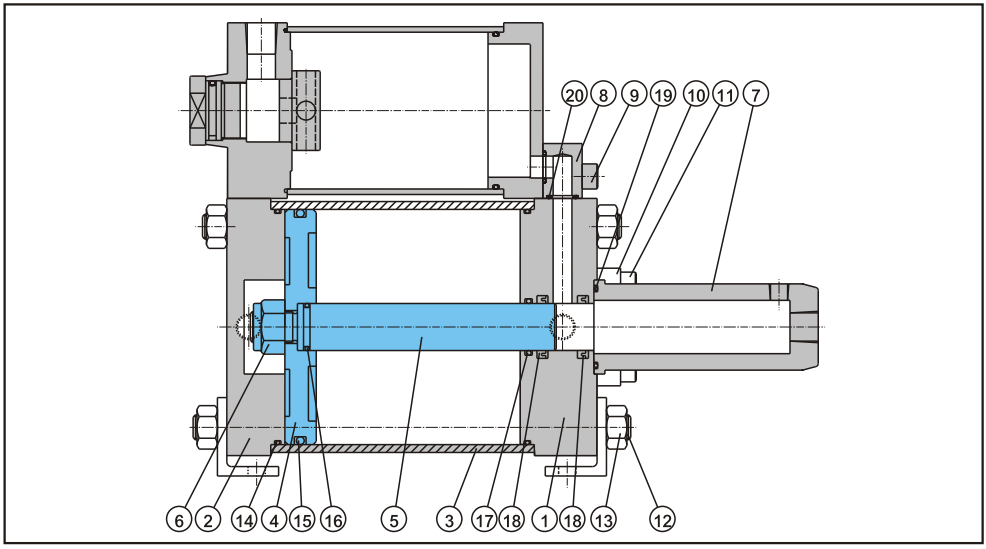
| item | name | q'ty | item | name | q'ty | item | name | q'ty |
|---|---|---|---|---|---|---|---|---|
| ① | rod cover | 1 | ⑨ | tank cover | 1 | ⑰ | o-ring | 2 |
| ② | head cover | 1 | ⑩ | tank tube | 1 | ⑱ | packing | 1 |
| ③ | tube | 1 | ⑪ | guage | 1 | ⑲ | o-ring | 1 |
| ④ | piston | 1 | ⑫ | cover | 1 | ⑳ | o-ring | 1 |
| ⑤ | rod | 1 | ⑬ | plate | 1 | ㉑ | packing | 2 |
| ⑥ | nut | 1 | ⑭ | bolt | 4 | ㉒ | o-ring | 1 |
| ⑦ | boosting chamber | 1 | ⑮ | tie rod | 4 | ㉓ | o-ring | 2 |
| ⑧ | tank cover | 1 | ⑯ | nut | 8 | ㉔ | o-ring | 1 |

### seals & spec.

| spec. | ⑰ o-ring | ⑱ packing | ⑲ o-ring | ⑳ o-ring | ㉑ packing | ㉒ o-ring | ㉓ o-ring | ㉔ o-ring |
|---|---|---|---|---|---|---|---|---|
| q'ty | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| BR1-100 | G95 | APA100 | P21 | P30 | UHS30 | G45 | SM40 | P16 |
| BR1-150 | G145 | P140 | G25 | P30 | UHS30 | G45 | SM40 | P16 |
| BR1-150×130 | | | | | | | | |
| BR1-200 | G200 | P185 | G25 | P40 | UHS40 | G55 | G50 | P16 |

## Structure, part names, and seals spec(pre-setting)

### BR2 structure(pre-setting)




### part names

| item | name | q'ty | item | name | q'ty |
|---|---|---|---|---|---|
| ① | rod cover | 1 | ⑪ | bolt | 4 |
| ② | head cover | 1 | ⑫ | tie rod | 4 |
| ③ | tube | 1 | ⑬ | nut | 8 |
| ④ | piston | 1 | ⑭ | o-ring | 2 |
| ⑤ | rod | 1 | ⑮ | packing | 1 |
| ⑥ | nut | 1 | ⑯ | o-ring | 1 |
| ⑦ | boosting chamber | 1 | ⑰ | o-ring | 1 |
| ⑧ | tank block | 1 | ⑱ | packing | 2 |
| ⑨ | bolt | 2 | ⑲ | o-ring | 1 |
| ⑩ | plate | 1 | ⑳ | o-ring | 2 |

### seals & spec.

| spec. | ⑭ o-ring | ⑮ packing | ⑯ o-ring | ⑰ o-ring | ⑱ packing | ⑲ o-ring | ⑳ o-ring |
|---|---|---|---|---|---|---|---|
| q'ty | 2 | 1 | 1 | 1 | 2 | 1 | 2 |
| BR2-100 | G95 | APA100 | P21 | P30 | UHS30 | G45 | P16 |
| BR2-150 | G145 | P140 | G25 | P30 | UHS30 | G45 | P16 |
| BR1-200 | G200 | P185 | G25 | P40 | UHS40 | G55 | P16 |

## Order forms

### BR1 direct boosters

BR 1 — 100
①

| | | |
|---|---|---|
| ① | bore size of air cylinder(mm) | 100,150,150+,200 (refer to the following table) |

note:The order will automatically include a pressure switch and an indicator.

| model | cylinder bore(mm) | oil boosting volume(cc) | boosting ratio | input pressure(kgf/cm$^2$)/ output pressure(kgf/cm$^2$) | | | | booster chamber bore(mm) |
|---|---|---|---|---|---|---|---|---|
| BR1- | 100 | 77 | 11 | 3/33 | 4/44 | 5/55 | 6/66 | 30 |
| | 150 | 77 | 25 | 3/75 | 4/100 | 5/125 | 6/150 | 30 |
| | 150+ | 130 | 25 | | | | | 30 |
| | 200 | 176 | 25 | | | | | 40 |

### BR2 Pre-setting boosters

BR 2 — 100 — A2
① ②

| | | |
|---|---|---|
| ① | bore size of air cylinder(mm) | 100,150,200, x(a customer specific need) |
| ② | -oil output volume(c.c.) | A1,A2,A3,A4((A1~A4)are standard volumes defined in the following table for selection) or a customer defined specific volume based on the formula on P10.12 such as 3500cc. |

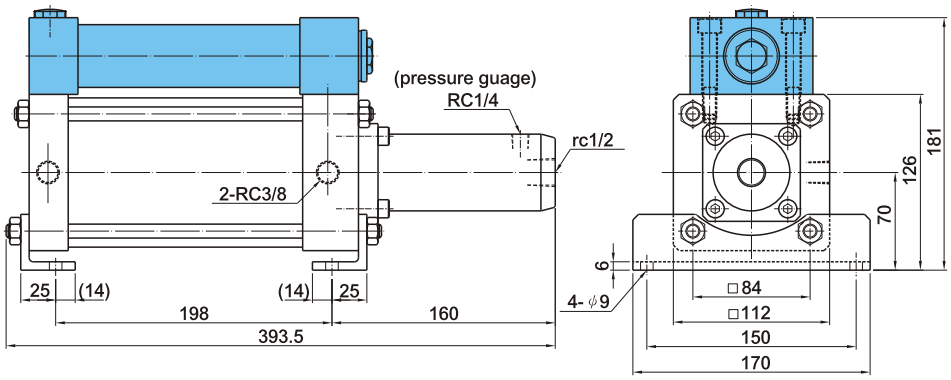
note:The order-will automatically include a pressure switch and an indicator.

| model | cylinder bore(mm) | oil forwarding volume (cc) | oil boosting volume | tank bore (mm) | boosting ratio | input pressure(kgf/cm$^2$)/ output pressure(kgf/cm$^2$) | | | | booster chamber bore(mm) |
|---|---|---|---|---|---|---|---|---|---|---|
| BR2- | 100 | A1(405c.c.) | 77 | 63 | 11 | 3/33 | 4/44 | 5/55 | 6/66 | 30 |
| | | A2(981c.c.) | 77 | 100 | | | | | | |
| | 150 | A2(981c.c.) | 77 | 100 | 25 | 3/75 | 4/100 | 5/125 | 6/150 | 30 |
| | | A3(222c.c.) | 77 | 150 | | | | | | |
| | 200 | A4(3000c.c.) | 176 | 150 | 25 | | | | | 40 |
| | X | a specific volume | a maker design size | X | X | a maker design ratio | | | | X |

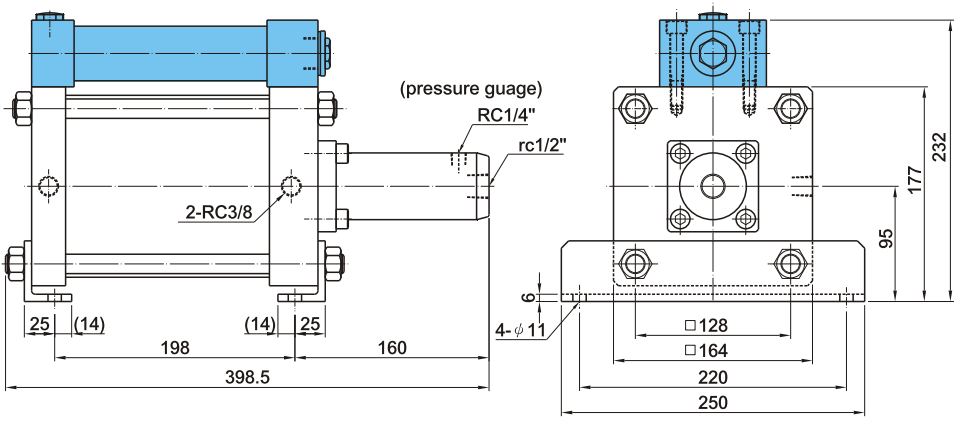
## External dimensions

### BR1 direct type

| BR1-100 | ratio 11 : 1 | boosting volume : 77cc |
|---|---|---|



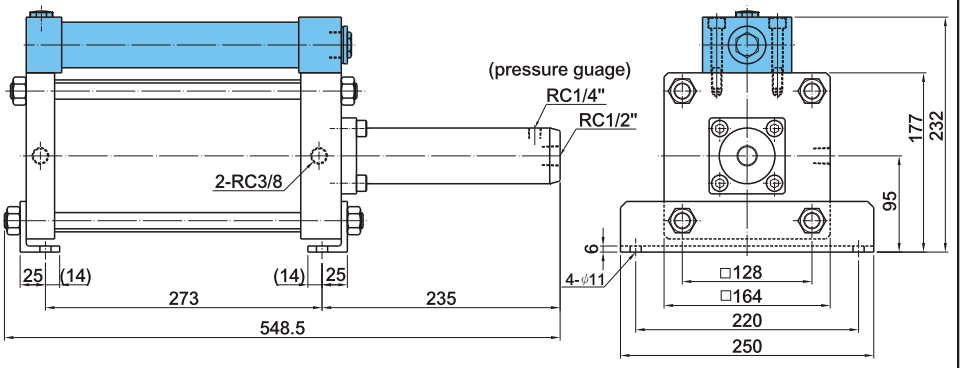

| BR1-150 | ratio 25 : 1 | boosting volume : 77cc |
|---|---|---|



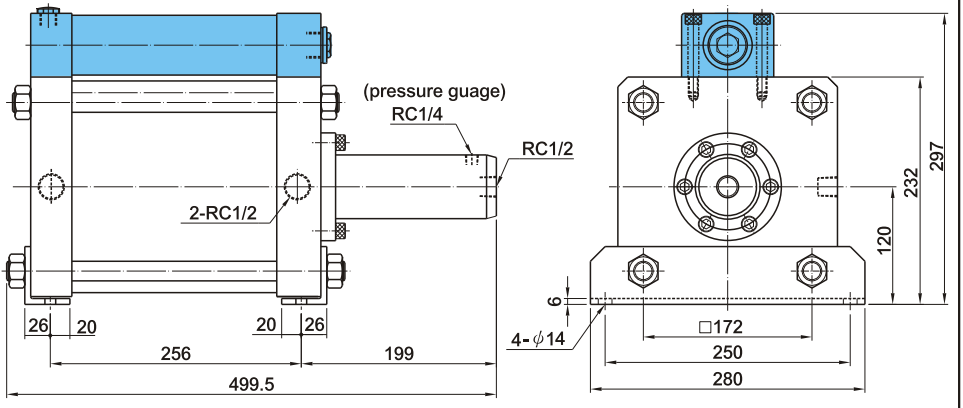
## External dimensions

### BR1 direct type

| BR1-150+ | ratio 25 : 1 | boosting volume : 130cc |
|---|---|---|



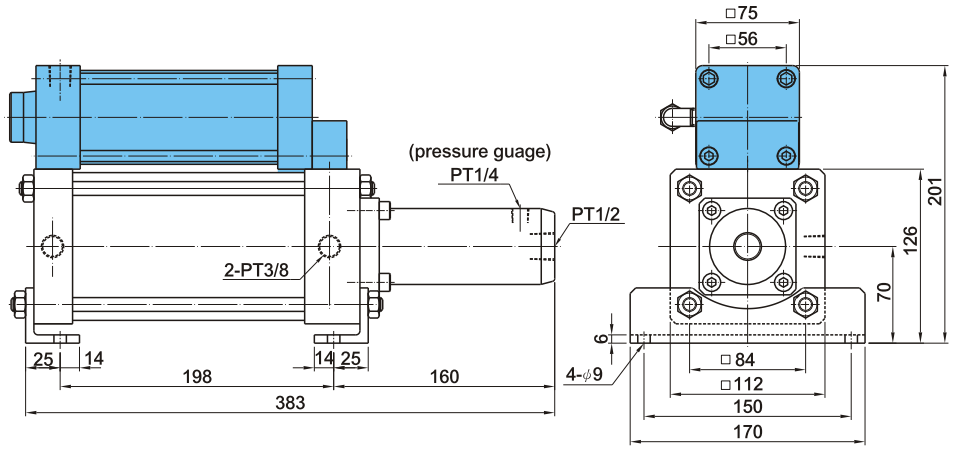

| BR1-200 | ratio 25 : 1 | boosting volume : 176cc |
|---|---|---|



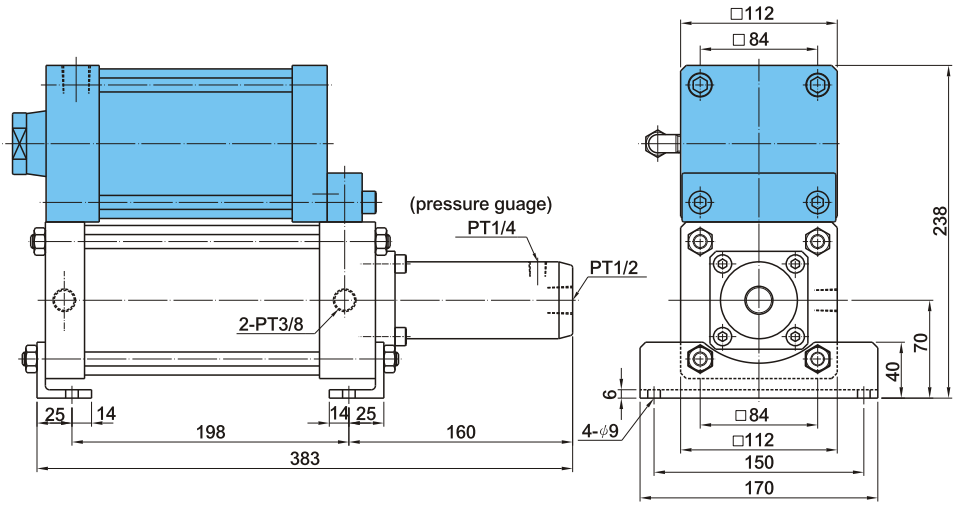
## External dimensions

### BR2 pre-setting type

| BR2-100-A1 | ratio11 : 1 | boosting volume : 77cc | tank forwarding volume : 405cc |
|---|---|---|---|




| BR2-100-A2 | ratio11 : 1 | boosting volume : 77cc | tank forwarding volume : 981cc |
|---|---|---|---|

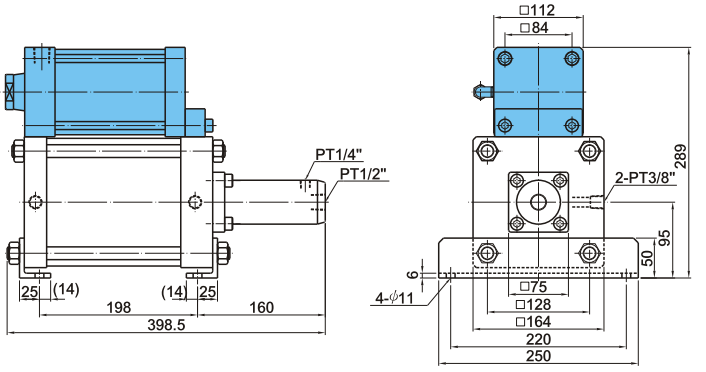


## External dimensions

### BR2 pre-setting type

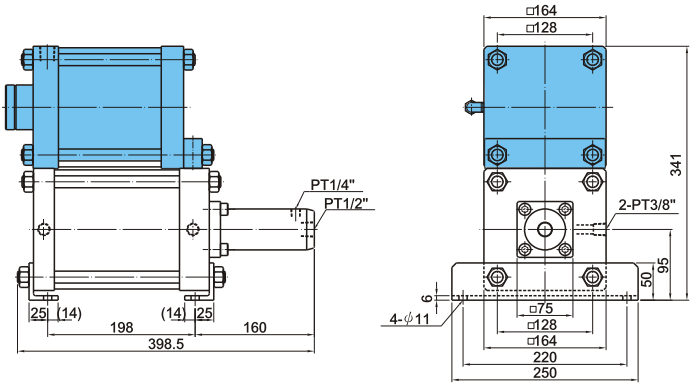
#### BR2-150-A2

ratio 25:1
boosting volume : 77cc
tank forward volume : 981cc



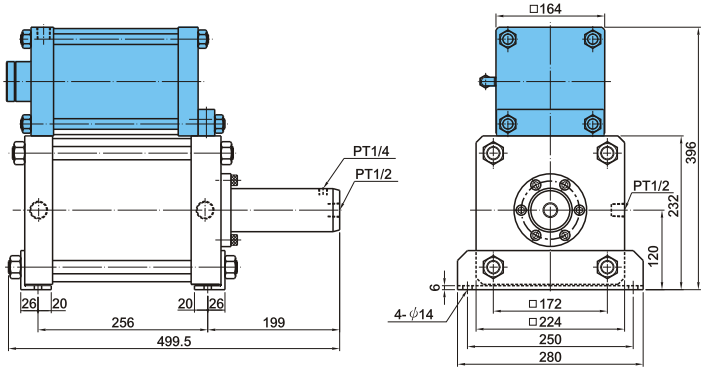

#### BR2-150-A3

ratio 25:1
boosting volume : 77cc
tank forward volume : 2220cc

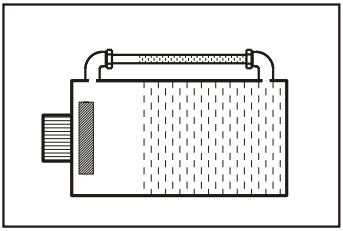



#### BR2-200-A3

ratio 25:1
boosting volume : 176cc
tank forward volume : 3000cc

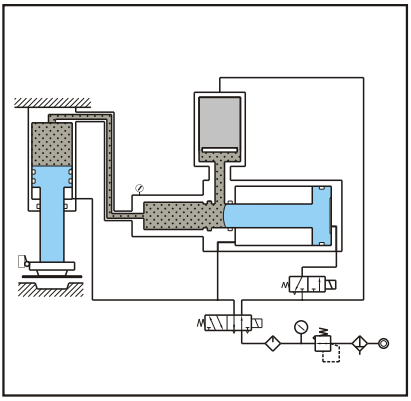


## BR2 Air & oil tank for pre-setting boosters



An air & oil tank can be selected for pre-setting boosters.

## Calaulation of air & oil tank volume



(1)cylinder volume(cc)=

area($\frac{\pi D^2}{4}$)$cm^2$ × customer need full stroke(cm) of the hydraulic cylinder

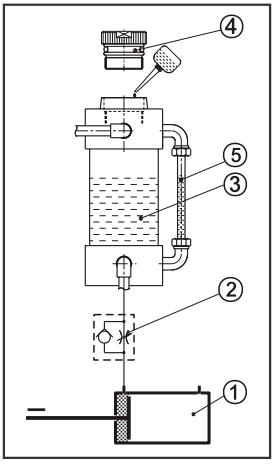
note：D=tube inner bore(cm)

(2)tank volume(cc)≧2×cylinder volume(cc)

(3)tank length：

tank length(cm)= $\frac{\text{volume (cc)}(cm^3)}{\text{area}(cm^2)}$

## Steps of putting oil into air & oil tank




1. Push hydraulic cylinder ① forward
2. Open regulator ② to the max.
3. Loosen up the nut on air & oil tank.
4. Put oil into the tank.
5. Based on level indicator ⑤ oil should be less than 80% of the tank volume.
6. Tie up nut ④
7. Actuate the hydraulic cylinder three to five times back and forward to vent out air inside the cylinder and flow regulator.

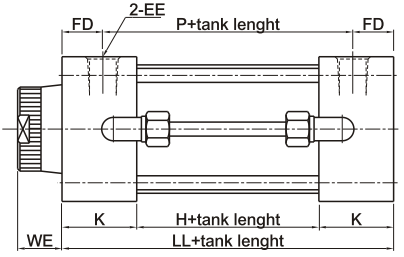
## Order form

ALL — SD ❶ — 63 ❷ × 100 ❸

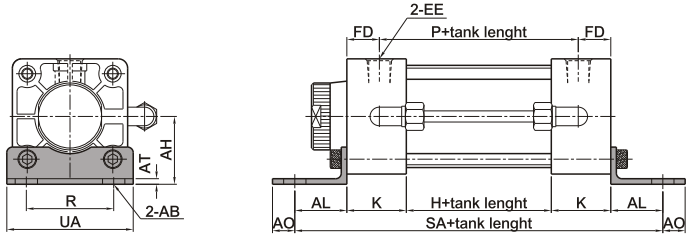
| ALL：air & oil tank | | |
|---|---|---|
| ❶ | mounting | SD：standard　LB：foot　FB：flange |
| ❷ | bore(mm) | 63、80、100、150 |
| ❸ | stroke(mm) | based on the customer need to calculate(refer to P10.12) |

## External dimensions

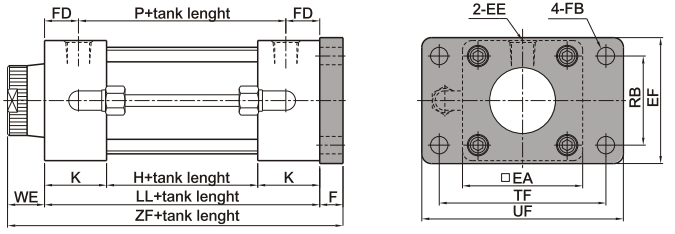
### SD




### LB




### FA




| Symbol / bore | H | K | P | WE | LL | EE | FD | R | EA | AB | AH | AT | AL | AO | UA | SA | F | FB | RB | EF | TF | UF | ZF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63 | 31 | 32 | 60 | 19 | 95 | RC3/8 | 17.5 | 56 | 75 | 12 | 41.5 | 3 | 31 | 14 | 80 | 157 | 10 | 9 | 56 | 76 | 98 | 116 | 124 |
| 80 | 31 | 38 | 64 | 24 | 107 | RC3/8 | 21.5 | 70 | 94 | 14 | 49 | 4 | 30 | 15 | 97 | 167 | 16 | 12 | 70 | 95 | 119 | 146 | 147 |
| 100 | 39 | 38 | 72 | 24 | 115 | RC1/2 | 21.5 | 84 | 112 | 14 | 57 | 4 | 30 | 15 | 112 | 175 | 16 | 12 | 84 | 115 | 138 | 165 | 155 |
| 150 | 40 | 34 | 70 | 37 | 108 | RC1/2 | 19 | 128 | 164 | 18 | 98 | 6 | 45 | 15 | 164 | 198 | 20 | 18 | 128 | 164 | 200 | 236 | 165 |