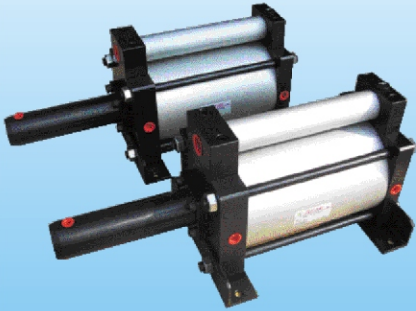


# 10 : BR Boosters

**tuv** ISO-9001 : 2000 quality certified

BR1 direct boosters



BR2 pre-setting boosters



BR Boosters

## ■■■ Index ■■■

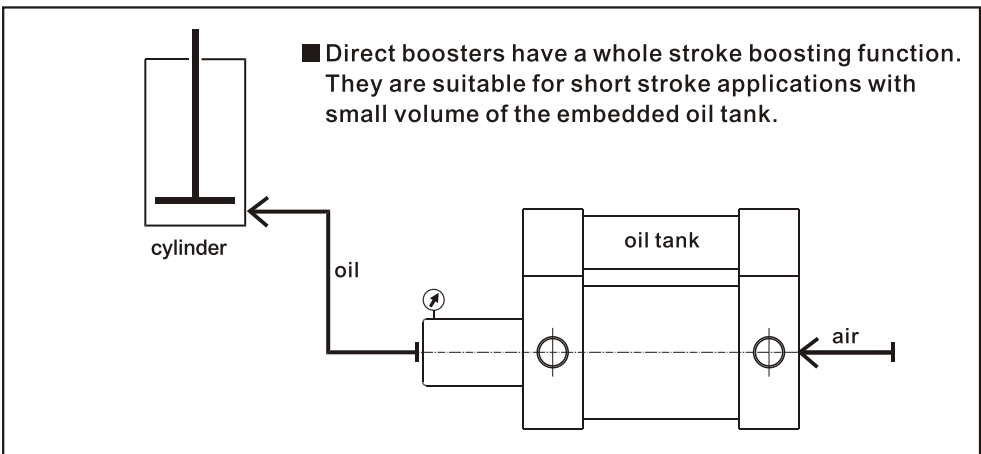
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## BR Features

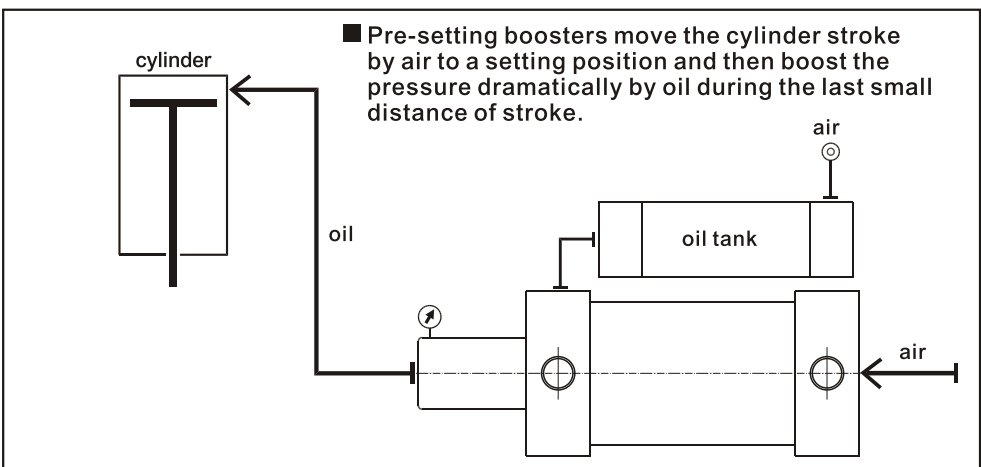
- By utilizing the difference of area ratio between two sides of a piston, the air input to a cylinder pushes the piston to press the other side with full of oil that boosts up the pressure of oil. The pressed oil can be used externally as the input of hydraulic power. A heavy and expensive oil unit 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



### BR2 pre-setting boosters

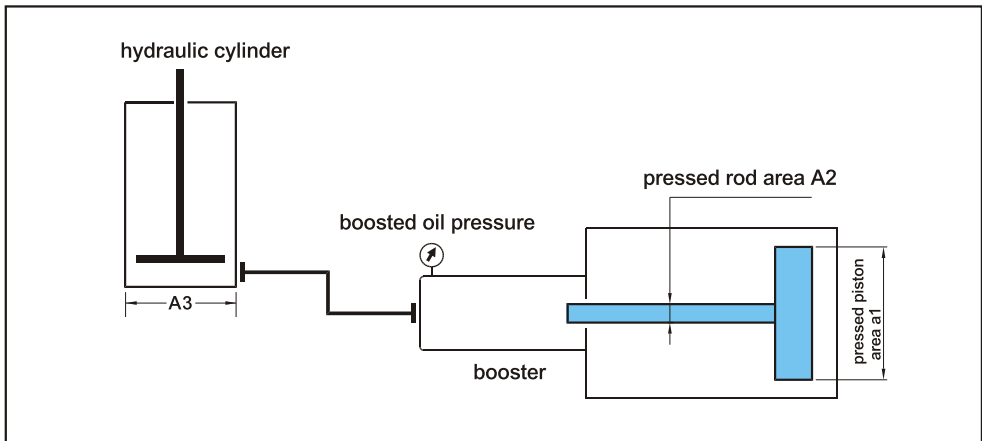


**Boosting ratio and output force**

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

boosted oil pressure = air input pressure × boosting ratio

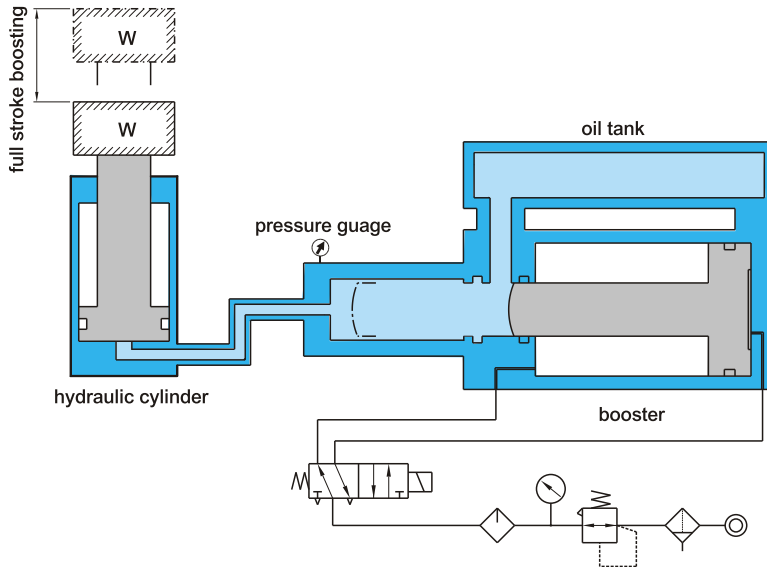
boosted oil then can be applied to a hydraulic cylinder as a working pressure on piston area(A3)



| model   |             | boosting ratio | input air pressure (kgf/cm <sup>2</sup> ) |       | boosted oil pressure (kgf/cm <sup>2</sup> ) |       | 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)



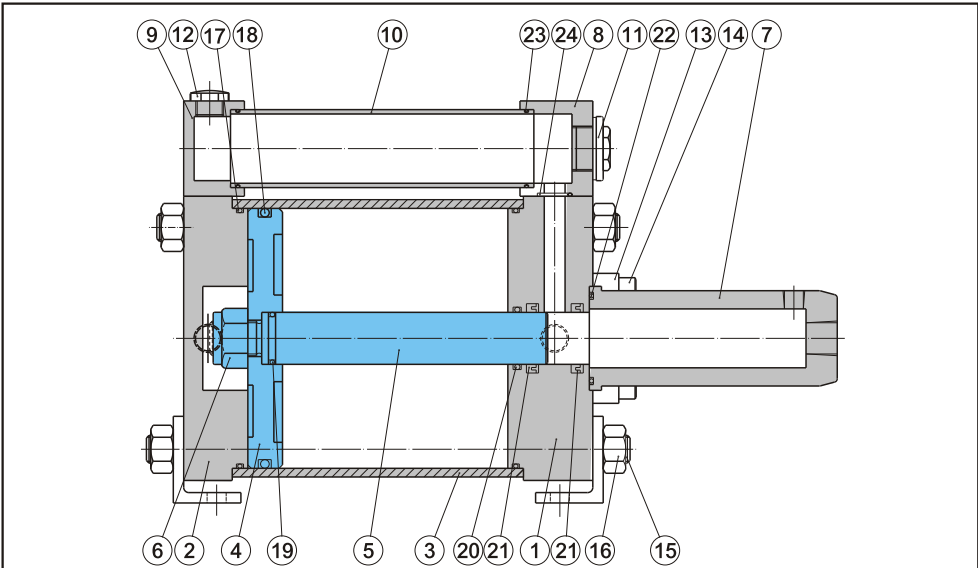
BR2 pre-setting boosters (for long stroke application)

| before boosting   | during boosting   | after boosting  |
|---|---|---|
| <p>forward stroke</p>   | <p>boosting stroke</p>  |   |
| <p>Solenoid ② is actuated that let air input to air &amp; oil tank to boost oil out for pushing external cylinder rod to move forward to the setted position.</p> | <p>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.</p> | <p>After boosting, solenoid valve ② &amp; ① are de-actuated to go back the initiated state.</p> |

BR Boosters

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

## ■ BR1 structure(direct type)



## ■ part names

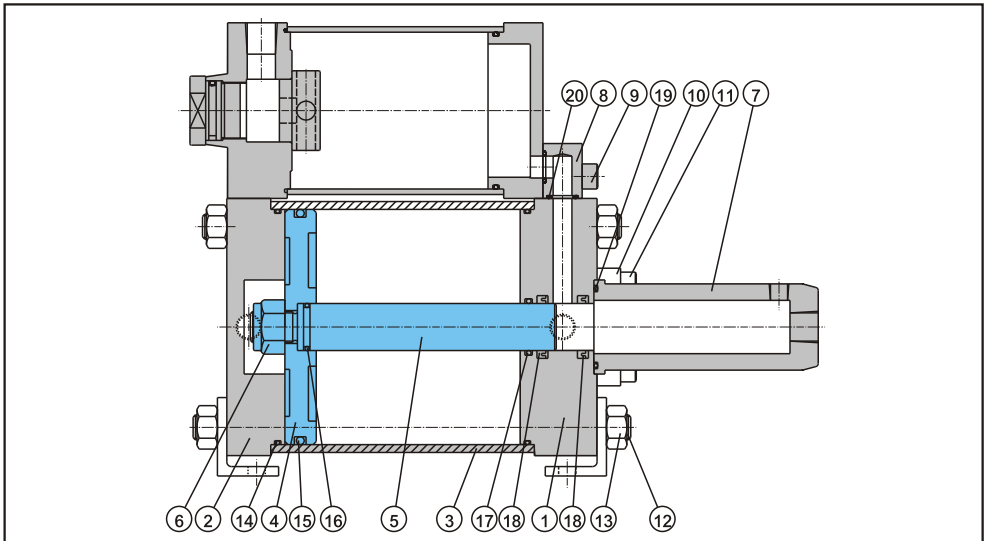
| item | name             | q'ty | item | name       | q'ty | item | name    | q'ty |
|------|------------------|------|------|------------|------|------|---------|------|
| ①    | rod cover        | 1    | ⑨    | tank cover | 1    | ⑰    | o-ring  | 2    |
| ②    | head cover       | 1    | ⑩    | tank 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 &amp; spec.

| spec.       | ⑰<br>o-ring | ⑱<br>packing | ⑲<br>o-ring | ⑳<br>o-ring | ㉑<br>packing | ㉒<br>o-ring | ㉓<br>o-ring | ㉔<br>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 &amp; spec.

| spec.   | ⑭<br>o-ring | ⑮<br>packing | ⑯<br>o-ring | ⑰<br>o-ring | ⑱<br>packing | ⑲<br>o-ring | ⑳<br>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 <sup>2</sup> )/ output pressure(kgf/cm <sup>2</sup> ) |       |       |       | booster chamber bore(mm) |
|-------|-------------------|-------------------------|----------------|---|-------|-------|-------|--------------------------|
|       |                   |                         |                | 3/33  | 4/44  | 5/55  | 6/66  |                          |
| BR1-  | 100               | 77                      | 11             | 3/75  | 4/100 | 5/125 | 6/150 | 30                       |
|       | 150               | 77                      | 25             |   |       |       |       | 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. |

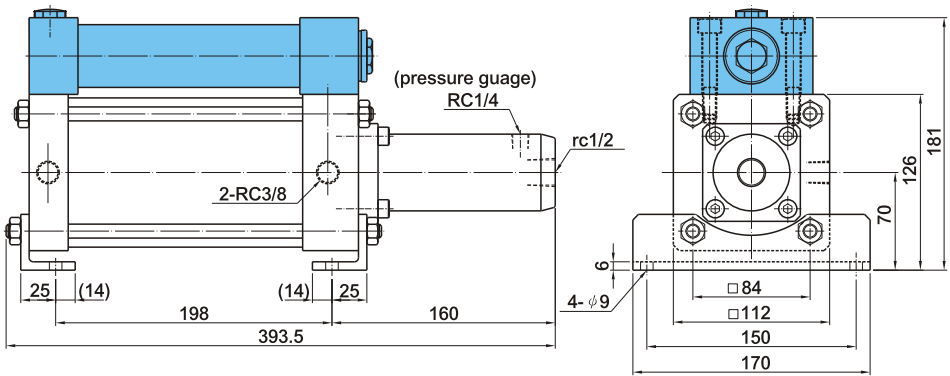
note:The order-will automatically include a pressure switch and an indicator.

| model | cylinder bore(mm) | oil forwarding volume (cc) | oil boosting volume | tank bore (mm) | boosting ratio | input pressure(kgf/cm <sup>2</sup> )/ output pressure(kgf/cm <sup>2</sup> ) |       |       |       | booster chamber bore(mm) |
|-------|-------------------|----------------------------|---------------------|----------------|----------------|---|-------|-------|-------|--------------------------|
|       |                   |                            |                     |                |                | 3/33  | 4/44  | 5/55  | 6/66  |                          |
| 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                        |

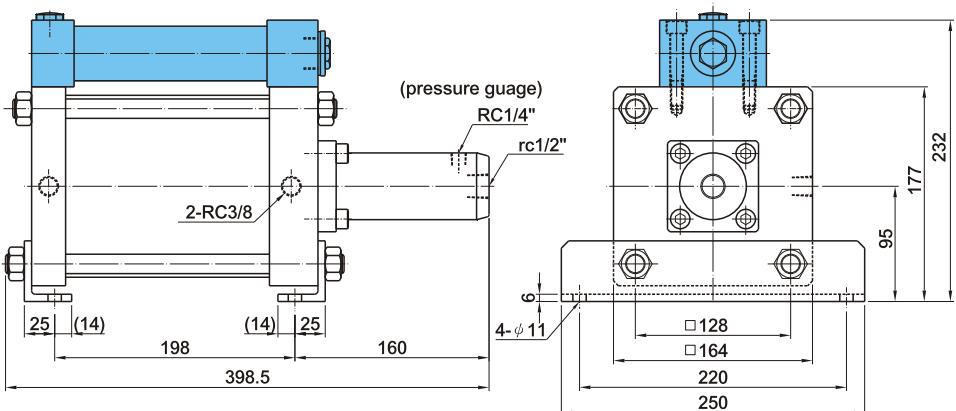
External dimensions

■ BR1 direct type

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



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

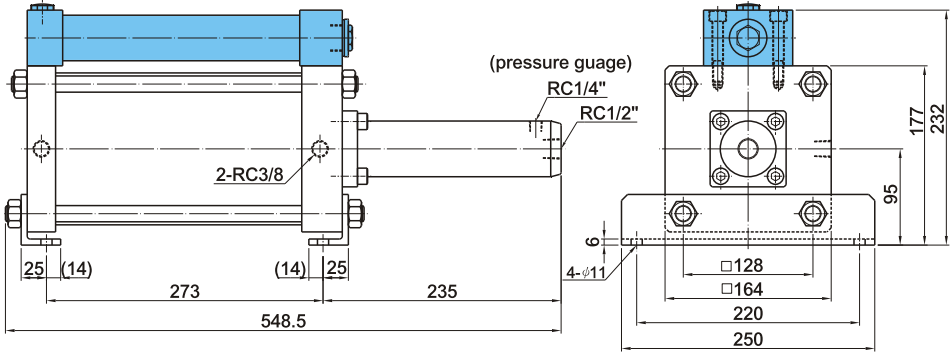
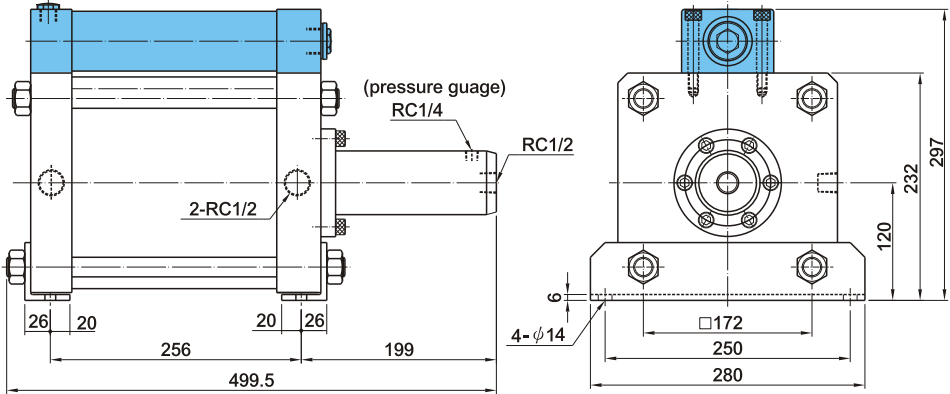


BR Boosters



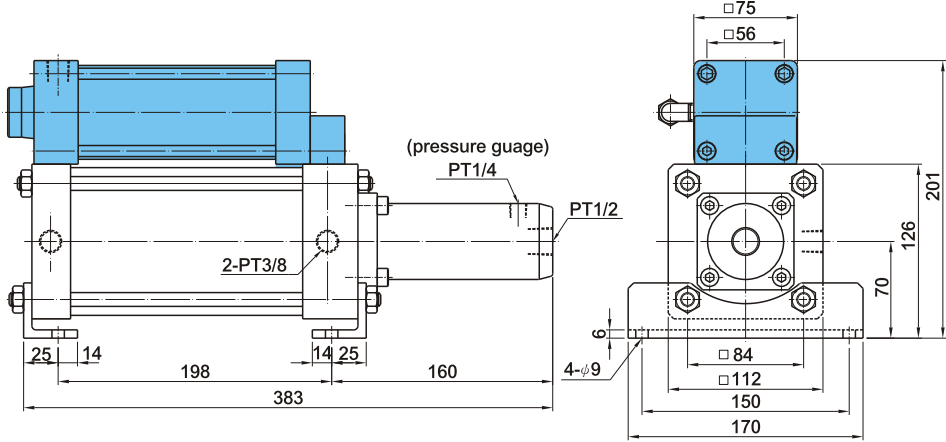
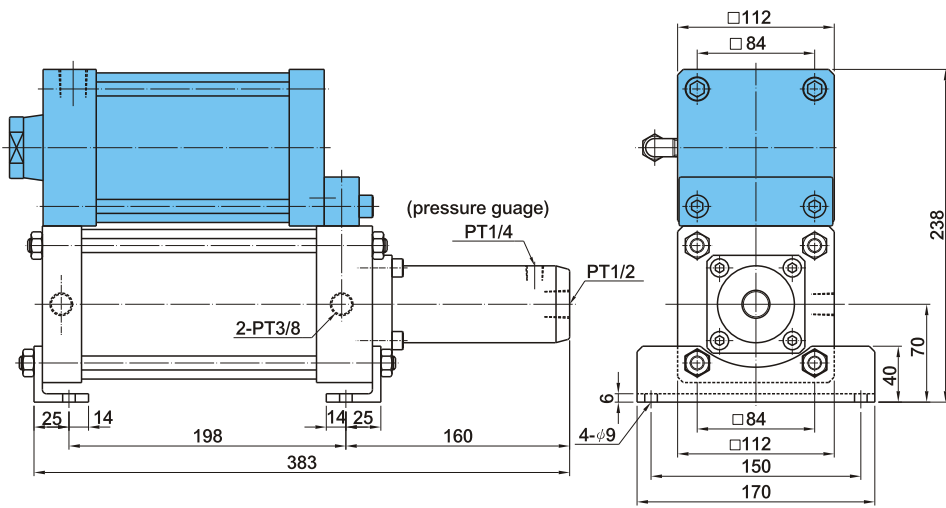
## External dimensions

## ■ BR1 direct type

| BR1-150+  | ratio 25 : 1 | boosting volume : 130cc |
|---|--------------|-------------------------|
|  <p>Technical drawing of the BR1-150+ booster. The side view shows a total length of 548.5 mm, with a main body length of 273 mm and a mounting bracket length of 235 mm. Port specifications include 2-RC3/8 and RC1/4" (pressure gauge). The front view shows a mounting bracket with a width of 250 mm and a height of 232 mm. The main body has a width of 220 mm and a height of 177 mm. The mounting bracket has a width of 250 mm and a height of 95 mm. The main body has a width of 164 mm and a height of 128 mm. The mounting bracket has a width of 128 mm and a height of 95 mm. The mounting bracket has 4-φ11 holes.</p>   |              |                         |
| BR1-200   | ratio 25 : 1 | boosting volume : 176cc |
|  <p>Technical drawing of the BR1-200 booster. The side view shows a total length of 499.5 mm, with a main body length of 256 mm and a mounting bracket length of 199 mm. Port specifications include 2-RC1/2 and RC1/4" (pressure gauge). The front view shows a mounting bracket with a width of 280 mm and a height of 297 mm. The main body has a width of 250 mm and a height of 232 mm. The mounting bracket has a width of 280 mm and a height of 120 mm. The main body has a width of 172 mm and a height of 120 mm. The mounting bracket has a width of 172 mm and a height of 120 mm. The mounting bracket has 4-φ14 holes.</p> |              |                         |

External dimensions

■ BR2 pre-setting type

| BR2-100-A1  | ratio 11 : 1 | boosting volume : 77cc | tank forwarding volume : 405cc |
|---|--------------|------------------------|--------------------------------|
|  <p>Technical drawing of the BR2-100-A1 booster. The side view shows a total length of 383 mm, with a central section of 198 mm and end sections of 25 mm and 14 mm. A pressure gauge port (PT1/4) is located 160 mm from the right end, and two PT3/8 ports are spaced 14 mm apart. The front view shows a total height of 201 mm, with a mounting flange diameter of 170 mm and a central port diameter of 84 mm. Other dimensions include 75 mm and 56 mm for the top flange, 126 mm for the main body height, and 70 mm for the bottom section height.</p>  |              |                        |                                |
| BR2-100-A2  | ratio 11 : 1 | boosting volume : 77cc | tank forwarding volume : 981cc |
|  <p>Technical drawing of the BR2-100-A2 booster. The side view shows a total length of 383 mm, with a central section of 198 mm and end sections of 25 mm and 14 mm. A pressure gauge port (PT1/4) is located 160 mm from the right end, and two PT3/8 ports are spaced 14 mm apart. The front view shows a total height of 238 mm, with a mounting flange diameter of 170 mm and a central port diameter of 84 mm. Other dimensions include 112 mm and 84 mm for the top flange, 70 mm for the main body height, and 40 mm for the bottom section height.</p> |              |                        |                                |

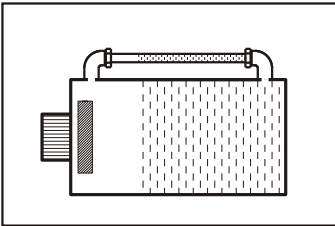
BR Boosters

External dimensions

BR2 pre-setting type

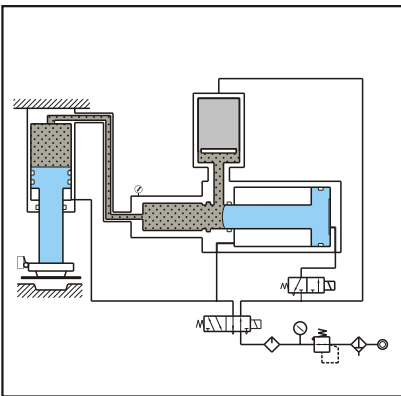
|   |  |
|---|--|
| <p><b>BR2-150-A2</b></p> <p>ratio 25:1<br/>boosting volume : 77cc<br/>tank forward volume : 981cc</p>   | <p>Side view dimensions: 25 (14) 198 (14) 25 160 398.5. Port labels: PT1/4", PT1/2".</p> <p>Front view dimensions: <math>\square 112</math>, <math>\square 84</math>, 289, 2-PT3/8", 95, 50, <math>\square 75</math>, <math>\square 128</math>, <math>\square 164</math>, 220, 250, 4-<math>\phi 11</math>.</p>  |
| <p><b>BR2-150-A3</b></p> <p>ratio 25:1<br/>boosting volume : 77cc<br/>tank forward volume : 2220cc</p>  | <p>Side view dimensions: 25 (14) 198 (14) 25 160 398.5. Port labels: PT1/4", PT1/2".</p> <p>Front view dimensions: <math>\square 164</math>, <math>\square 128</math>, 341, 2-PT3/8", 95, 50, <math>\square 75</math>, <math>\square 128</math>, <math>\square 164</math>, 220, 250, 4-<math>\phi 11</math>.</p> |
| <p><b>BR2-200-A3</b></p> <p>ratio 25:1<br/>boosting volume : 176cc<br/>tank forward volume : 3000cc</p> | <p>Side view dimensions: 26 20 256 20 26 199 499.5. Port labels: PT1/4", PT1/2".</p> <p>Front view dimensions: <math>\square 164</math>, 396, PT1/2", 232, 120, 4-<math>\phi 14</math>, <math>\square 172</math>, <math>\square 224</math>, 250, 280.</p>  |

## 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)=

$$\text{area} \left( \frac{\pi D^2}{4} \right) \text{cm}^2 \times \text{customer need full stroke (cm)}$$

of the hydraulic cylinder

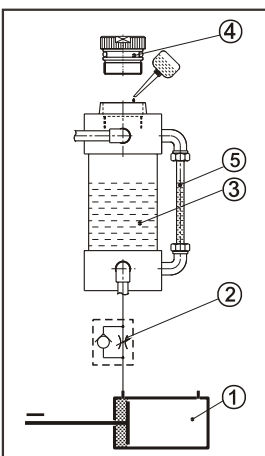
note : D=tube inner bore(cm)

(2)tank volume(cc)  $\geq$  2  $\times$  cylinder volume(cc)

(3)tank length :

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

## 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.

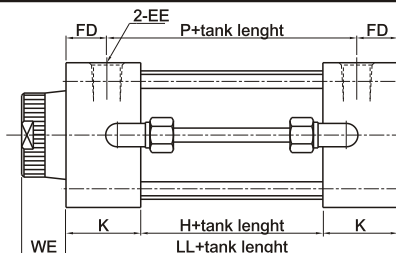
Order form

ALL — SD — 63 × 100  
 ①      ②      ③

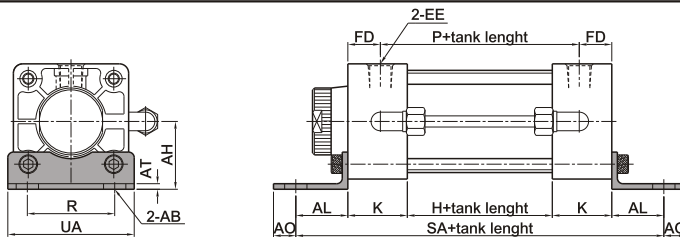
| ALL : air & oil tank |            |  |
|----------------------|------------|--|
| ①                    | mounting   | SD : standard    LB : foot    FB : flange                |
| ②                    | bore(mm)   | 63、80、100、150  |
| ③                    | stroke(mm) | based on the customer need to calculate(refer to P10.12) |

External dimensions

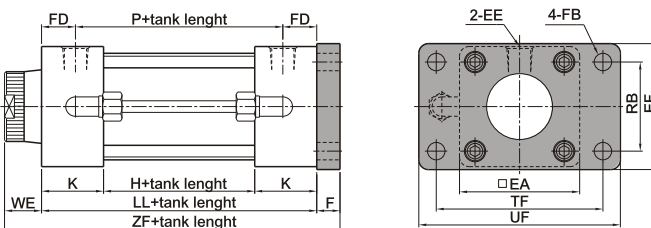
SD



LB



FA



| Stroke<br>bore | H  | K  | P  | WE | LL  | EE    | FD   | R   | EA  | AB | AH   | AT | AL | AO | UA  | SA  | F  | FB | RB  | EB  | 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 |    |