

In accordance with the theory of booster, low air pressure is converted to high oil pressure, and the force is taken outside by hydraulic piston to use as power. With booster and clamp head in one unit, it is small and lightweight for easy application.

- With the cylindrical shape, both length and exterior dimension are small and it is also very compact.
- As cylinder volume is extremely small, the air consumption can be minimized.
- The mounting position can be adjusted with clamp ring, and the clamping will be performed quickly and completely with short stroke.
- It is the same as the dimensional drawing of old types but the output differs for some models.



SPECIFICATIONS

| Model code | Item | Nominal stroke (mm) | Boosting ratio | Theoretical clamping force at max. air pressure (kN) | Air pressure range | Weight (kg) |
|-------------|------|---------------------|----------------|--|--------------------|-------------|
| LE2-3603-03 | | 3 | 7.84 | 3.73 | 0.15~0.9MPa | 0.7 |
| LE2-3606-03 | | 6 | | | | 0.9 |
| LE2-3609-03 | | 9 | | | | 1.0 |
| LE2-4803-08 | | 3 | 8.16 | 8.34 | 0.15~0.9MPa | 1.3 |
| LE2-4806-08 | | 6 | | | | 1.5 |
| LE2-4809-08 | | 9 | | | | 1.7 |
| LE2-4812-08 | | 12 | | | | 2.0 |
| LE2-4803-12 | | 3 | 16 | 12.1 | 0.15~0.7MPa | 1.4 |
| LE2-6006-18 | | 6 | 11 | 18.0 | 0.15~0.9MPa | 2.6 |
| LE2-6009-18 | | 9 | | | | 3.4 |
| LE2-6012-18 | | 12 | | | | 3.8 |
| LE2-6003-21 | | 3 | 17.36 | 20.8 | 0.15~0.7MPa | 2.5 |
| LE2-6006-21 | | 6 | | | | 3.7 |

Value 1mm less than the nominal stroke shall be used as the effective stroke.

Common specifications:

- Working fluid... Air
- Lubrication..... Non-lubrication available
- Working oil..... Mobile Oil-made: Extra Hekla Super cylinder oil
- Temp. range.... +5°C ~ + 60°C

MODEL CODE

For order, specify the following code.

LE2 - 48 03 - 08
Series ① ② ③

| ① | Outer diameter screw | | ③ | Nominal clamping force | |
|----|----------------------|-----------|--------|------------------------|--------|
| | 36 | M36 X 1.5 | | 03 | 2.94kN |
| 48 | M48 X 1.5 | 08 | 7.85kN | | |
| 60 | M60 X 2 | 12 | 11.8kN | | |
| ② | Nominal stroke | | 18 | 17.7kN | |
| | 03 | 3mm | 21 | 20.6kN | |
| | 06 | 6mm | | | |
| | 09 | 9mm | | | |
| | 12 | 12mm | | | |

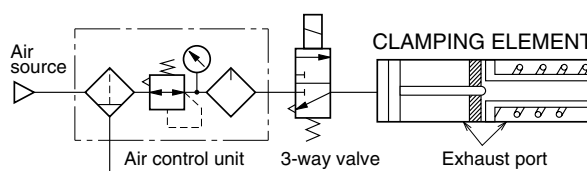
THEORETICAL CLAMPING FORCE

Unit : kN

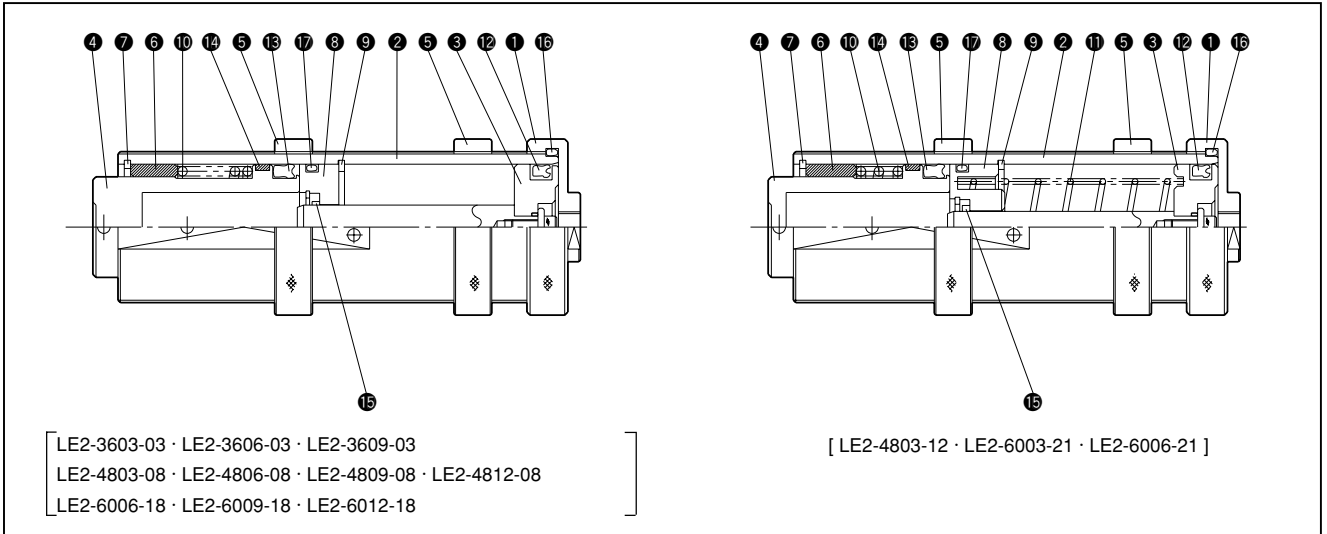
| Model code | Item | Air pressure (MPa) | | | | | | | | |
|-------------|------|--------------------|-------|------|------|------|------|------|------|------|
| | | 0.15 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
| LE2-3603-03 | | | | | | | | | | |
| LE2-3606-03 | | 0.392 | 0.637 | 1.08 | 1.52 | 1.96 | 2.40 | 2.84 | 3.29 | 3.73 |
| LE2-3609-03 | | | | | | | | | | |
| LE2-4803-08 | | | | | | | | | | |
| LE2-4806-08 | | 0.981 | 1.47 | 2.45 | 3.43 | 4.41 | 5.39 | 6.37 | 7.35 | 8.34 |
| LE2-4809-08 | | | | | | | | | | |
| LE2-4812-08 | | | | | | | | | | |
| LE2-4803-12 | | 1.67 | 2.50 | 4.41 | 6.37 | 8.24 | 10.2 | 12.1 | — | — |
| LE2-6006-18 | | | | | | | | | | |
| LE2-6009-18 | | 2.60 | 3.63 | 5.69 | 7.75 | 9.81 | 11.9 | 13.9 | 16.0 | 18.0 |
| LE2-6012-18 | | | | | | | | | | |
| LE2-6003-21 | | 3.33 | 4.9 | 7.85 | 11.3 | 14.5 | 17.7 | 20.8 | — | — |
| LE2-6006-21 | | | | | | | | | | |

STRUCTURE

The inside structure of clamping element is very simple. Power is generated for hydraulic piston after a boosting piston of pneumatic cylinder in rear part of the body is inserted in hydraulic chamber and a large oil pressure is generated with the area ratio of pneumatic and hydraulic pistons. The hydraulic piston is returned with spring when pneumatic circuit is cut off. The surface of hydraulic piston is grinded with hardening and then is inserted in non-lubricating guide bush for smooth working



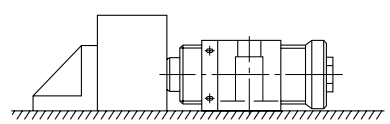
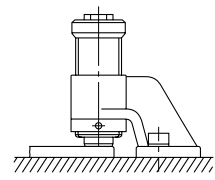
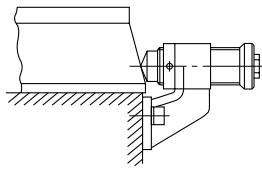
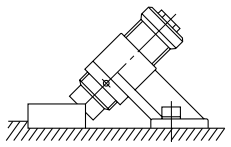
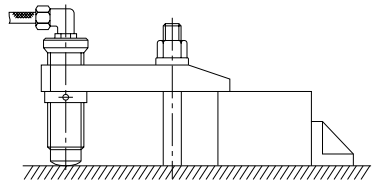
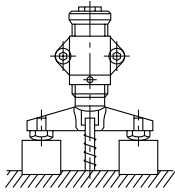
SECTIONAL DRAWINGS



PARTS LIST

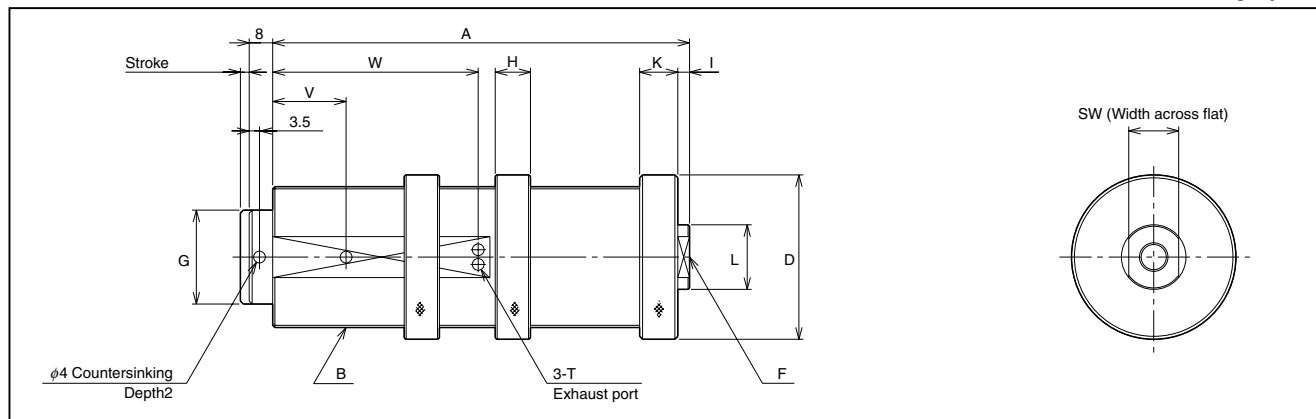
| No. | Name | Material | Q'ty |
|-----|---------------------------------|--|------|
| ① | Upper cover | Carbon steel | 1 |
| ② | Tube | Carbon steel | 1 |
| ③ | Pneumatic piston ASSY | Hardening, grinding (Hard chrome plated) | 1 |
| ④ | Output shaft (Hydraulic piston) | Carbon steel (Hard chrome plated) | 1 |
| ⑤ | Clamp ring | Carbon steel | 2 |
| ⑥ | Bush | Oilless alloy | 1 |
| ⑦ | Bush tap | Carbon tool steel | 1 |
| ⑧ | Intermediate ring | Cutting brass | 1 |
| ⑨ | Intermediate ring junk | Carbon tool steel | 1 |
| ⑩ | Return spring | Piano wire | 1 |
| ⑪ | Pneumatic piston return spring | Piano wire | 1 |
| ⑫ | Pneumatic piston seal | Nitrile rubber | 1 |
| ⑬ | Hydraulic piston seal | Nitrile rubber | 1 |
| ⑭ | Hydraulic piston wear ring | Resin | 1 |
| ⑮ | Boosting piston seal | Nitrile rubber | 1 |
| ⑯ | Tube gasket | Nitrile rubber | 1 |
| ⑰ | Intermediate ring gasket | Nitrile rubber | 1 |

APPLICATION EXAMPLES

| | | |
|---|--|---|
|  <p>Clamping element is horizontally mounted and is used to clamp the processed product for piercing, grinding, tapping and milling works.</p> |  <p>Clamping element is vertically mounted and is used to clamp the processed product of plate shape.</p> |  <p>Clamping element is used for clamping the parts of irregular shape with large size such as casting, raw materials.</p> |
|  <p>Clamping element is mounted at 45° to provide a clamping force of x-y component with the combination of V-shaped clamp tool.</p> |  <p>Clamping with the use of clamp lever. Lever ratio 1:2</p> |  <p>Two pieces of processed product are simultaneously clamped.</p> |

DIMENSIONAL DRAWINGS

Unit: mm



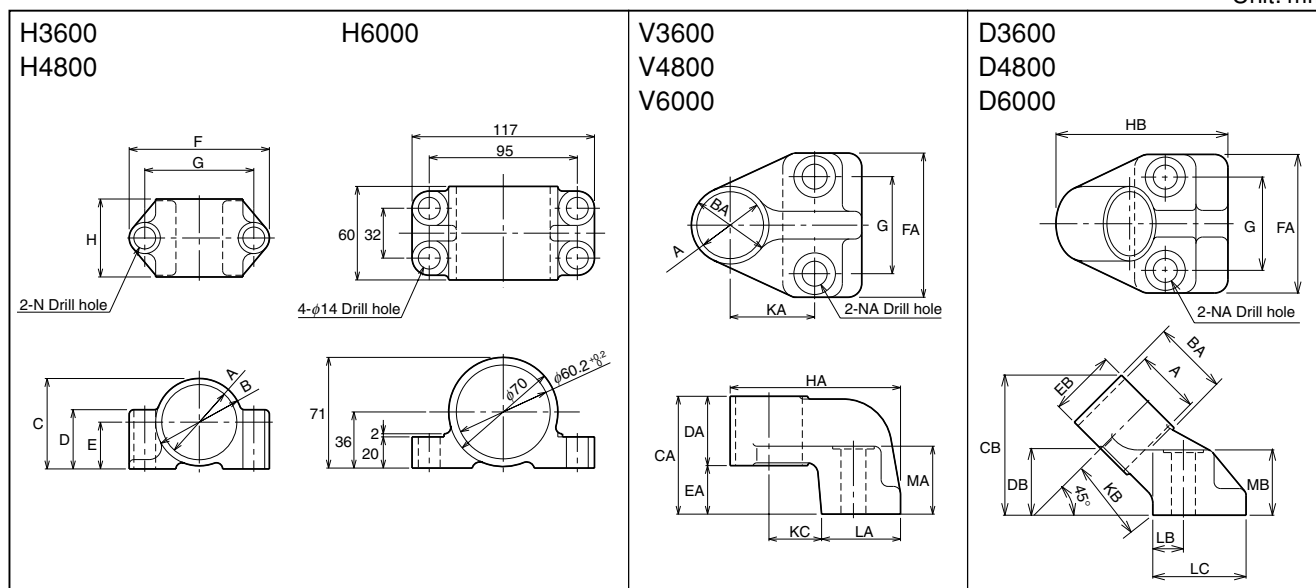
DIMENSIONAL TABLE

| Symbol Model code | Nominal stroke (mm) | A | B | D | F | G | H | I | K | L | SW | T | V | W |
|----------------------|---------------------|-----|---------|-----|------|-------|----|---|----|-----|----|----|----|-----|
| LE2-3603-03 | 3 | 100 | M36X1.5 | φ42 | G1/8 | φ22f8 | 12 | 4 | 13 | φ22 | 17 | φ3 | 25 | 56 |
| LE2-3606-03 | 6 | 142 | | | | | | | | | | | 25 | 72 |
| LE2-3609-03 | 9 | 192 | | | | | | | | | | | 46 | 96 |
| LE2-4803-08 | 3 | 112 | M48X1.5 | φ56 | G1/8 | φ32f8 | 12 | 4 | 13 | φ22 | 17 | φ4 | 26 | 66 |
| LE2-4806-08 | 6 | 147 | | | | | | | | | | | 20 | 75 |
| LE2-4809-08 | 9 | 188 | | | | | | | | | | | 34 | 90 |
| LE2-4812-08 | 12 | 236 | | | | | | | | | | | 40 | 111 |
| LE2-4803-12 | 3 | 142 | M48X1.5 | φ56 | G1/8 | φ32f8 | 12 | 4 | 13 | φ22 | 17 | φ4 | 25 | 70 |
| LE2-6006-18 | 6 | 175 | M60X2 | φ70 | G1/4 | φ40f8 | 14 | 5 | 18 | φ25 | 22 | φ4 | 30 | 85 |
| LE2-6009-18 | 9 | 245 | | | | | | | | | | | 60 | 122 |
| LE2-6012-18 | 12 | 291 | | | | | | | | | | | 60 | 134 |
| LE2-6003-21 | 3 | 168 | M60X2 | φ70 | G1/4 | φ40f8 | 14 | 5 | 18 | φ25 | 22 | φ4 | 40 | 83 |
| LE2-6006-21 | 6 | 283 | | | | | | | | | | | 70 | 133 |

The value 1mm less than the nominal stroke shall be used as the effective stroke.

MOUNTING BRACKET

Unit: mm



DIMENSIONAL TABLE

| Symbol Model code | A | B | BA | C | CA | CB | D | DA | DB | E | EA | EB | F | FA | G | H | HA | HB | MA | MB | N | NA | KA | KB | KC | LA | LB | LC |
|----------------------|------------------------------------|-----|-----|----|-----|-----|----|----|------|----|----|----|-----|-----|----|----|-----|-----|----|----|-----|-----|----|----|----|----|----|----|
| * 3600 | φ36.2 ^{+0.1} ₀ | φ42 | φ44 | 45 | 65 | 85 | 34 | 35 | 44.5 | 24 | 30 | 35 | 72 | 81 | 54 | 40 | 102 | 99 | 38 | 38 | φ11 | φ14 | 48 | 55 | 32 | 48 | 18 | 50 |
| * 4800 | φ48.2 ^{+0.1} ₀ | φ56 | φ56 | 58 | 85 | 105 | 38 | 50 | 50 | 30 | 35 | 50 | 90 | 104 | 70 | 50 | 123 | 129 | 49 | 49 | φ14 | φ18 | 61 | 63 | 38 | 57 | 23 | 70 |
| * 6000 | φ60.2 ^{+0.1} ₀ | φ70 | φ70 | 71 | 105 | 146 | - | 70 | 71.5 | 36 | 35 | 70 | 117 | 135 | 90 | 60 | 169 | 173 | 59 | 52 | φ14 | φ22 | 82 | 88 | 52 | 82 | 27 | 95 |

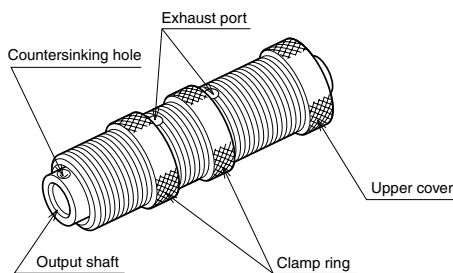
• For mounting bracket an hexagonal head cap bolt shall be used.

HANDLING INSTRUCTIONS

■ PRECAUTIONS FOR USE

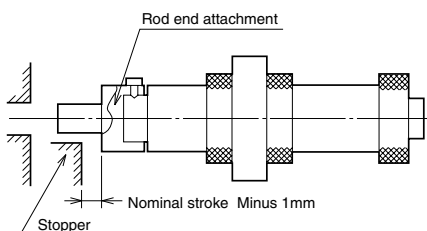
GENERAL CAUTIONS

- For pneumatic piping, it shall be properly cleaned inside with over 0.3MPa of compressed air blown in pipe.
- Air filter shall be surely mounted for piping in order that chip, rust, dirt, moisture will not enter in cylinder.
- JIS K2213-2 additive turbine oil ISO VG32 shall be used as lubricating oil for application of air lubricator.
- Drains of air filter shall be exhausted before it exceeds the upper level indicating position. Oil of air lubricator shall be regularly inspected for clean oil.
- When clamping element is mounted, precaution shall be taken so that exhaust port will not be obturated. Cautions shall also be taken that dust and foreign matters will not enter in exhaust port. If it is horizontally used, clamp ring shall be clamped and mounted after a body is rotated so that exhaust port faces the ground. (Fig. 1)



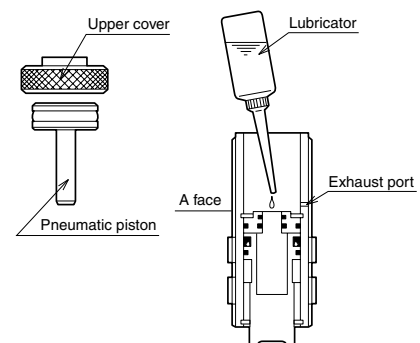
(Fig. 1)

- Countersinking hole shall be used for mounting a rod end attachment.
- Stroke shall be used surely at 1mm before the nominal stroke. If it is used for punching, an outer stopper shall be applied in order that output shaft will hit at 1mm before the nominal stroke. (Fig. 2)



(Fig. 2)

- Cautions shall be taken that output shaft shall not be splashed with cutting oil and other fluids. (When it is splashed with cutting oil, etc., contact to us.)
- For the return of output shaft, the force other than that for the return direction of output shaft shall not be applied. (In case that the external force will be applied on the return of output shaft, a speed control valve shall be mounted at port to set the return time of output shaft at 1~2 sec.)
- By inspecting regularly an applied stroke, it shall be confirmed that whether a set stroke is maintained or not.
- Lubrication method of working oil (Fig. 3) (If stroke is shortened, it shall be lubricated according to the following items.)
 - (a) When there is lack of working oil, a pneumatic piston shall be removed after a body is set up with output shaft set vertically downward, and upper cover is removed.
 - (b) Pneumatic piston is loosened by blowing a small quantity of low pressure air from exhaust port.
 - (c) By lubricating quietly the working oil with a lubricator, it shall be filled with oil until A face with no bubble caused.
 - (d) A small quantity of working oil shall be applied to the working face of pneumatic piston.
 - (e) Pneumatic piston ASSY shall be quietly assembled after no bubble is caused at A face.



(Fig. 3)

- For working oil, Mobile Oil-made Extra Hekla Super cylinder oil shall be used.