

Compendium of MBL Series

**Multi-mounting accessories**

LB Type

FA Type

SDB Type

**Rolling packed structure**

Front and back cover and stainless steel block adopt riveted rolling packed structure to form a reliable connection.

**Multi-type cylinder**

- MBL: Mini cylinder(Double acting)
- MBLC: Mini cylinder(Double acting with cushion)
- MSBL: Mini cylinder(Single acting\_push)
- MTBL: Mini cylinder(Single acting\_pull)
- MBLD: Mini cylinder(Double rod)
- MBLCD: Mini cylinder(Double rod with cushion)
- MBLJ: Mini cylinder(Adjustable stroke)
- MBLCJ: Mini cylinder(Adjustable stroke with cushion)

**Six bore size are available**

Bore size: 20, 25, 32, 40, 50, 63

**Two kinds of back cover type**

U: Flat-end type    CA: Pivot type

**Multi-kinds of stroke**

**Two kinds of cushion type**

Variable cushion or Bumper

Criteria for selection: Cylinder thrust

Unit: Newton(N)

| Bore size | Rod size | Acting type   | Pressure area(mm <sup>2</sup> ) | Operating pressure(MPa) |       |       |        |        |        |        |        |
|-----------|----------|---------------|---------------------------------|-------------------------|-------|-------|--------|--------|--------|--------|--------|
|           |          |               |                                 | 0.1                     | 0.2   | 0.3   | 0.4    | 0.5    | 0.6    | 0.7    |        |
| 20        | 8        | Single acting | Push side                       | 314.0                   | -     | 15.7  | 47.1   | 78.5   | 109.9  | 141.3  | 172.7  |
|           |          |               | Pull side                       | 263.8                   | -     | 5.7   | 32.0   | 58.4   | 84.8   | 111.2  | 137.5  |
|           |          | Double acting | Push side                       | 314.0                   | 31.4  | 62.8  | 94.2   | 125.6  | 157.0  | 188.4  | 219.8  |
|           |          |               | Pull side                       | 263.8                   | 26.4  | 52.8  | 79.1   | 105.5  | 131.9  | 158.3  | 184.7  |
| 25        | 10       | Single acting | Push side                       | 490.6                   | -     | 24.6  | 73.7   | 122.8  | 171.8  | 220.9  | 269.9  |
|           |          |               | Pull side                       | 412.1                   | -     | 8.9   | 50.1   | 91.4   | 132.6  | 173.8  | 215.0  |
|           |          | Double acting | Push side                       | 490.6                   | 49.1  | 98.1  | 147.2  | 196.2  | 245.3  | 294.4  | 343.4  |
|           |          |               | Pull side                       | 412.1                   | 41.2  | 82.4  | 123.6  | 164.8  | 206.1  | 247.3  | 288.5  |
| 32        | 12       | Single acting | Push side                       | 804.3                   | -     | 40.2  | 120.6  | 200.9  | 281.3  | 361.7  | 442.1  |
|           |          |               | Pull side                       | 691.2                   | -     | 17.6  | 86.6   | 155.7  | 224.8  | 293.9  | 363.0  |
|           |          | Double acting | Push side                       | 804.3                   | 80.4  | 160.9 | 241.3  | 321.7  | 402.2  | 482.6  | 563.0  |
|           |          |               | Pull side                       | 691.2                   | 69.1  | 138.2 | 207.4  | 276.5  | 345.6  | 414.7  | 483.8  |
| 40        | 16       | Single acting | Push side                       | 1256.6                  | -     | 62.8  | 188.4  | 314.0  | 439.6  | 565.2  | 690.8  |
|           |          |               | Pull side                       | 1055.6                  | -     | 22.6  | 128.1  | 233.6  | 339.1  | 444.6  | 550.1  |
|           |          | Double acting | Push side                       | 1256.6                  | 125.7 | 251.3 | 377.0  | 502.6  | 628.3  | 754.0  | 879.6  |
|           |          |               | Pull side                       | 1055.6                  | 105.6 | 211.1 | 316.7  | 422.2  | 527.8  | 633.4  | 738.9  |
| 50        | 16       | Double acting | Push side                       | 1962.5                  | 196.3 | 392.5 | 588.8  | 785.0  | 981.3  | 1177.5 | 1373.8 |
|           |          | Pull side     | 1761.5                          | 176.2                   | 352.3 | 528.5 | 704.6  | 880.8  | 1056.9 | 1233.1 |        |
| 63        | 16       | Double acting | Push side                       | 3115.7                  | 311.6 | 623.1 | 934.7  | 1246.3 | 1557.9 | 1869.4 | 2181.0 |
|           |          | Pull side     | 2914.7                          | 291.5                   | 582.9 | 874.4 | 1165.9 | 1457.4 | 1748.8 | 2040.3 |        |

Installation and application



- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- To avoid side load, otherwise, piston rod will be bent and deformed and damage the thread at the end of the rod. Single-acting type can not be added in return;
- If the cylinder is dismantled and stored for a long time, please to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.

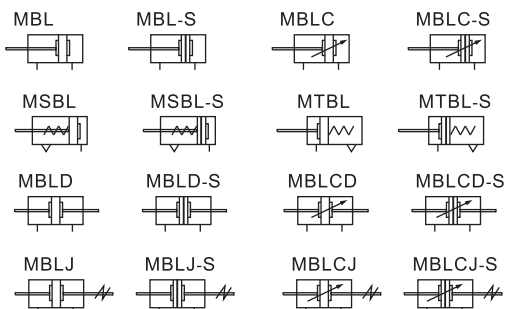


### Specification

| Bore size(mm)      |                  | 20   | 25 | 32 | 40                                | 50   | 63 |  |
|--------------------|------------------|--|----|----|-----------------------------------|------|----|--|
| Acting type        | MSBL/MTBL        | Single acting  |    |    |                                   |      | -  |  |
|                    | MBL/MBLD/MBLJ    | Double acting  |    |    |                                   |      |    |  |
|                    | MBLC/MBLCD/MBLCJ | Double acting with cushion                             |    |    |                                   |      |    |  |
| Fluid              |                  | Air(to be filtered by 40µm filter element)             |    |    |                                   |      |    |  |
| Operating pressure | Double acting    | 0.15~1.0MPa(22~145psi)(1.5~10.0bar)                    |    |    |                                   |      |    |  |
|                    | Single acting    | 0.2~1.0MPa(28~145psi)(2.0~10.0bar)                     |    |    | -                                 |      |    |  |
| Proof pressure     |                  | 1.5MPa(215psi)(15bar)                                  |    |    |                                   |      |    |  |
| Temperature °C     |                  | -20~70   |    |    |                                   |      |    |  |
| Speed range mm/s   |                  | Double acting: 30~800 Single acting: 50~800            |    |    |                                   |      |    |  |
| Stroke tolerance   |                  | 0~150 <sup>+1.0</sup> <sub>0</sub>                     |    |    | >150 <sup>+1.5</sup> <sub>0</sub> |      |    |  |
| Cushion type       |                  | MBLC, MBLCD, MBLCJ: Adjustable cushion; Others: Bumper |    |    |                                   |      |    |  |
| Port size [Note1]  |                  | 1/8"   |    |    |                                   | 1/4" |    |  |

[Note1] PT thread, G thread and NPT thread are available.  
Add) Refer to P353 for detail of sensor switch.

### Symbol



### Stroke

| Bore size (mm)                 | Standard stroke (mm) |    |    |    |    |    |    |    |    |    |    |     |     |     |     | Max.std stroke | Max. stroke |     |     |     |     |     |     |     |     |
|--------------------------------|----------------------|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|----------------|-------------|-----|-----|-----|-----|-----|-----|-----|-----|
|                                | 20/25                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | 160 |                |             | 175 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
| MBL<br>MBLC                    | 20/25                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | 160 | 175            | 200         | 250 | 300 | 350 | 400 | 450 | 500 | 500 | 800 |
|                                | 32/40                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | 160 | 175            | 200         | 250 | 300 | 350 | 400 | 450 | 500 | 500 | 800 |
|                                | 50/63                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | 160 | 175            | 200         | 250 | 300 | 350 | 400 | 450 | 500 | 500 | 800 |
| MBLD<br>MBLJ<br>MBLCD<br>MBLCJ | 20/25                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | 160 | 175            | 200         | 250 | 300 | 350 | 400 | 450 | 500 | 300 | -   |
|                                | 32/40                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | 160 | 175            | 200         | 250 | 300 | 350 | 400 | 450 | 500 | 500 | -   |
|                                | 50/63                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | 160 | 175            | 200         | 250 | 300 | 350 | 400 | 450 | 500 | 500 | -   |
| MSBL                           | 20/25                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | -   | -              | -           | -   | -   | -   | -   | -   | -   | -   | -   |
|                                | 32/40                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | 125 | 150 | -   | -              | -           | -   | -   | -   | -   | -   | -   | -   | -   |
| MTBL                           | 20/25                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | -   | -   | -   | -              | -           | -   | -   | -   | -   | -   | -   | -   | -   |
|                                | 32/40                | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 75 | 80 | 100 | -   | -   | -   | -              | -           | -   | -   | -   | -   | -   | -   | -   | -   |

[Note] Consult us for non-standard stroke.

### Product feature

1. Manufactured by our enterprise.
2. Riveted structure is adopted to connect front and back cover and cylinder tube to make it credibility.
3. Piston adopts heterogeneous two-way seal structure. It has compact size and has the function of grease reservation.
4. There are several modes of back cover, which makes the installation of cylinder more convenient.
5. There are cylinders and mounting accessories with several specifications for your choice.

### Ordering code

MBL 20 x 50 S CA

MBLD 20 x 50 S

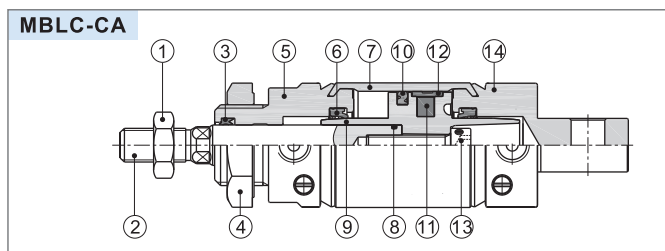
MBLJ 20 x 50-20 S

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| ① Model  | ② Bore size | ③ Stroke                          | ④ Adjustable Stroke | ⑤ Magnet                                | ⑥ Back cover                       | ⑦ Mounting type [Note1]  | ⑧ Thread type               |
|--|-------------|-----------------------------------|---------------------|---|------------------------------------|--|-----------------------------|
| MBL: Mini cylinder(Double acting)                    | 20 25 32    | Refer to stroke table for details | No this code        | Blank: Without magnet<br>S: With magnet | CA: Pivot type<br>U: Flat-end type | Blank: No accessories<br>FA: FA type<br>SDB: SDB type<br>LB: LB type | Blank: PT<br>G: G<br>T: NPT |
| MBLC: Mini cylinder(Double acting with cushion)      | 40 50 63    |                                   |                     |   |                                    |  |                             |
| MSBL: Mini cylinder(Single acting_push)              | 20 25 32 40 |                                   |                     |   |                                    |  |                             |
| MTBL: Mini cylinder(Single acting_pull)              | 20 25 32 40 |                                   |                     |   | No this code                       | Blank: No accessories<br>FA: FA type<br>LB: LB type                  |                             |
| MBLD: Mini cylinder(Double rod)                      | 20 25 32    |                                   |                     |   |                                    |  |                             |
| MBLCD: Mini cylinder(Double rod with cushion)        | 20 25 32    |                                   |                     |   |                                    |  |                             |
| MBLJ: Mini cylinder(Adjustable stroke)               | 40 50 63    |                                   | 10 20 30 40         |   |                                    |  |                             |
| MBLCJ: Mini cylinder(Adjustable stroke with cushion) | 40 50 63    |                                   | 50 75 100           |   |                                    |  |                             |

[Note1] Please refer to page 106~107 for accessory parts.

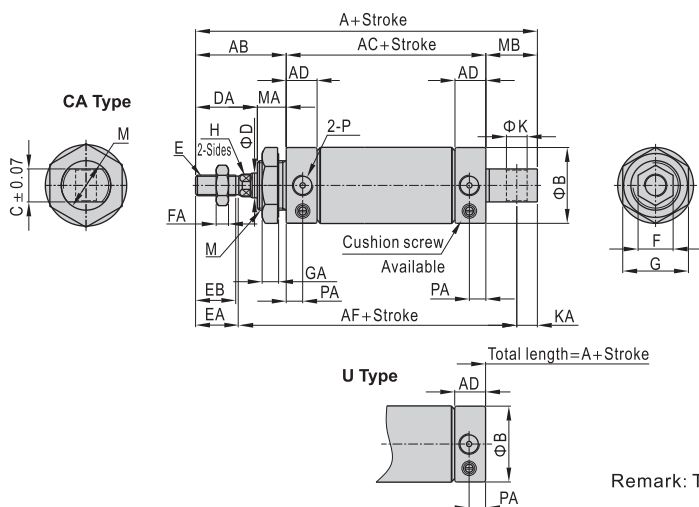
Inner structure and material of major parts



| NO. | Item                | Material                               |
|-----|---------------------|--|
| 1   | Rod nut             | Carbon steel                           |
| 2   | Piston rod          | Carbon steel with 20 μ m chrome plated |
| 3   | Front cover packing | NBR                                    |
| 4   | Front cover nut     | Carbon steel                           |
| 5   | Front cover         | Aluminum alloy                         |
| 6   | Bumper              | TPU                                    |
| 7   | Barrel              | Aluminum alloy                         |
| 8   | O- ring             | NBR                                    |
| 9   | Piston              | Aluminum alloy                         |
| 10  | Piston seal         | NBR                                    |
| 11  | Magnet              | Plastic                                |
| 12  | Wear ring           | Wear resistant material                |
| 13  | Bolt                | Carbon steel                           |
| 14  | Back cover          | Aluminum alloy                         |

Dimensions

MBL/MBLC

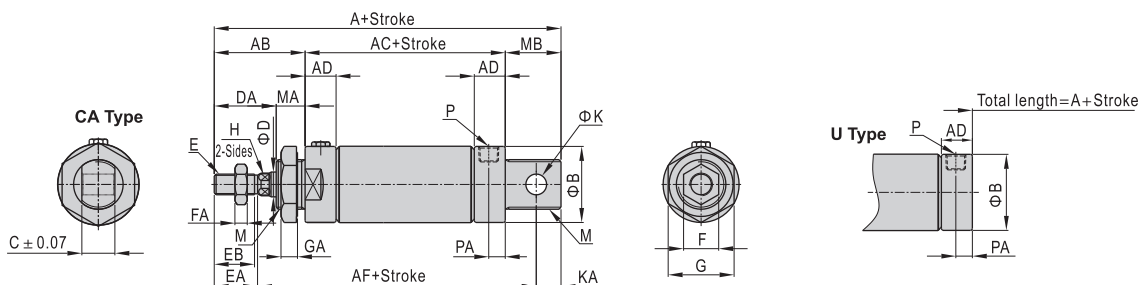


| Bore size\Item | A   |     | AB | AC | AD   | AF    | B  | C  | D  | DA | M         | MA | MB |
|----------------|-----|-----|----|----|------|-------|----|----|----|----|-----------|----|----|
|                | CA  | U   |    |    |      |       |    |    |    |    |           |    |    |
| 20             | 131 | 110 | 40 | 70 | 15.5 | 102   | 27 | 16 | 8  | 26 | M22 × 1.5 | 14 | 21 |
| 25             | 135 | 114 | 44 | 70 | 15.5 | 105   | 30 | 16 | 10 | 30 | M22 × 1.5 | 14 | 21 |
| 32             | 141 | 114 | 44 | 70 | 15.5 | 108   | 37 | 16 | 12 | 28 | M24 × 2.0 | 16 | 27 |
| 40             | 165 | 138 | 46 | 92 | 22   | 130.5 | 45 | 20 | 16 | 30 | M30 × 2.0 | 16 | 27 |
| 50             | 173 | 146 | 54 | 92 | 22   | 138   | 55 | 20 | 16 | 32 | M36 × 2.0 | 22 | 27 |
| 63             | 173 | 146 | 54 | 92 | 22   | 138   | 68 | 20 | 16 | 32 | M36 × 2.0 | 22 | 27 |

| Bore size\Item | E          | EA   | EB   | F  | FA | G  | GA | H  | P    | K  | KA | PA  |
|----------------|------------|------|------|----|----|----|----|----|------|----|----|-----|
|                |            |      |      |    |    |    |    |    |      |    |    |     |
| 25             | M10 × 1.25 | 21   | 19.5 | 17 | 6  | 29 | 7  | 8  | 1/8" | 8  | 9  | 7.5 |
| 32             | M10 × 1.25 | 21   | 19.5 | 17 | 6  | 32 | 8  | 10 | 1/8" | 10 | 12 | 7.5 |
| 40             | M12 × 1.25 | 22.5 | 21   | 17 | 7  | 41 | 8  | 14 | 1/4" | 12 | 12 | 11  |
| 50             | M14 × 1.5  | 24   | 22.5 | 19 | 8  | 46 | 11 | 14 | 1/4" | 12 | 11 | 11  |
| 63             | M14 × 1.5  | 24   | 22.5 | 19 | 8  | 46 | 11 | 14 | 1/4" | 12 | 11 | 11  |

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.

MSBL



| Item             | A   |        |      |     |     |        | AB     | AC   |     |        | AD   | AF    |       |        | B  | C  |
|------------------|-----|--------|------|-----|-----|--------|--------|------|-----|--------|------|-------|-------|--------|----|----|
|                  | CA  |        | U    |     | ≤50 | 51~100 |        | ≥101 | ≤50 | 51~100 |      | ≥101  | ≤50   | 51~100 |    |    |
| Bore size\Stroke | ≤50 | 51~100 | ≥101 | ≤50 |     |        | 51~100 |      |     |        | ≥101 |       |       |        | 40 | 95 |
| 20               | 156 | 181    | 206  | 135 | 160 | 185    | 40     | 95   | 120 | 145    | 15.5 | 127   | 152   | 177    | 27 | 16 |
| 25               | 160 | 185    | 210  | 139 | 164 | 189    | 44     | 95   | 120 | 145    | 15.5 | 130   | 155   | 180    | 30 | 16 |
| 32               | 166 | 191    | 216  | 139 | 164 | 189    | 44     | 95   | 120 | 145    | 15.5 | 133   | 158   | 183    | 37 | 16 |
| 40               | 190 | 215    | 240  | 163 | 188 | 213    | 46     | 117  | 142 | 167    | 22   | 155.5 | 180.5 | 205.5  | 45 | 20 |

| Bore size\Item | D  | DA | E          | EA   | EB   | F  | FA | G  | GA | H  | K  | KA | M         | MA | MB | P    | PA  |
|----------------|----|----|------------|------|------|----|----|----|----|----|----|----|-----------|----|----|------|-----|
|                |    |    |            |      |      |    |    |    |    |    |    |    |           |    |    |      |     |
| 25             | 10 | 30 | M10 × 1.25 | 21   | 19.5 | 17 | 6  | 29 | 7  | 8  | 8  | 9  | M22 × 1.5 | 14 | 21 | 1/8" | 7.5 |
| 32             | 12 | 28 | M10 × 1.25 | 21   | 19.5 | 17 | 6  | 32 | 8  | 10 | 10 | 12 | M24 × 2.0 | 16 | 27 | 1/8" | 7.5 |
| 40             | 16 | 30 | M12 × 1.25 | 22.5 | 21   | 17 | 7  | 41 | 8  | 14 | 12 | 12 | M30 × 2.0 | 16 | 27 | 1/4" | 11  |

Remark: The dimensions of magnet type cylinder are the same as non-magnet type cylinder.



List for ordering code of accessories

| Accessories<br>Bore size | Mounting accessories |          |           | Knuckle  |          |            |            | Sensor switch |         |            |            |            |
|--------------------------|----------------------|----------|-----------|----------|----------|------------|------------|---------------|---------|------------|------------|------------|
|                          | LB                   | FA       | SDB       | I        | Y        | F          | U          | CMSG          | DMSG(S) |            |            |            |
| 20                       | F-MA20LB             | F-MA20FA | F-MA20SDB | F-MA20I  | F-MA20Y  | F-M8X125F  | F-M8X125U  | CMSG          | DMSG(S) |            |            |            |
| 25                       |                      |          |           | F-MA25I  | F-MA25Y  | F-M10X125F | F-M10X125U |               |         |            |            |            |
| 32                       |                      |          |           | F-MA32LB | F-MA32FA | F-MA32SDB  | F-MA40I    |               |         | F-MA40Y    | F-M12X125F | F-M12X125U |
| 40                       |                      |          |           | F-MA40LB | F-MA40FA | F-MA40SDB  | F-MAC50I   |               |         | F-MAC50Y   | F-M14X150F | F-M14X150U |
| 50                       |                      |          |           | F-MA50LB | F-MA50FA |            | F-M14X150F |               |         | F-M14X150U |            |            |
| 63                       | F-MA63LB             |          |           |          |          |            |            |               |         |            |            |            |

Accessory selection

| Accessories<br>Cylinder model | Mounting accessories | Knuckle[Note1] |    |     |   |   |   |   | Sensor switch |         |
|-------------------------------|----------------------|----------------|----|-----|---|---|---|---|---------------|---------|
|                               |                      | LB             | FA | SDB | I | Y | U | F | CMSG          | DMSG(S) |
| MBL<br>MBLC                   | Standard             | ●              | ●  | ●   | ● | ● | ● | ● | ×             | ×       |
|                               | With magnet          | ●              | ●  | ●   | ● | ● | ● | ● | ●             | ●       |
| MSBL                          | Standard             | ●              | ●  | ●   | ● | ● | ● | ● | ×             | ×       |
| MTBL                          | With magnet          | ●              | ●  | ●   | ● | ● | ● | ● | ●             | ●       |
| MBLD<br>MBLCD                 | Standard             | ●              | ●  | ×   | ● | ● | ● | ● | ×             | ×       |
|                               | With magnet          | ●              | ●  | ×   | ● | ● | ● | ● | ●             | ●       |
| MBLJ<br>MBLCJ                 | Standard             | ●              | ●  | ×   | ● | ● | ● | ● | ×             | ×       |
|                               | With magnet          | ●              | ●  | ×   | ● | ● | ● | ● | ●             | ●       |

Material of accessories

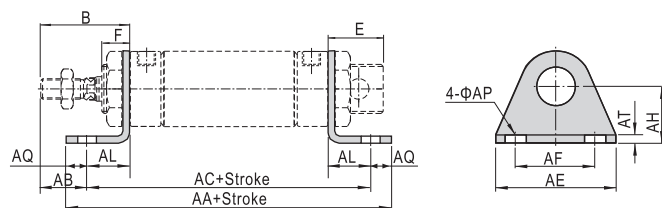
| Accessories<br>Bore size | Mounting accessories |    |     | Knuckle |   |   |   |
|--------------------------|----------------------|----|-----|---------|---|---|---|
|                          | LB                   | FA | SDB | I       | Y | F | U |
| 20-63                    | ○                    | ○  | ○   | □       | □ | □ | □ |

○—Lower carbon steel; □—Carbon steel;

[Note1] Please refer to P349-352 for knuckle detail.

Dimensions

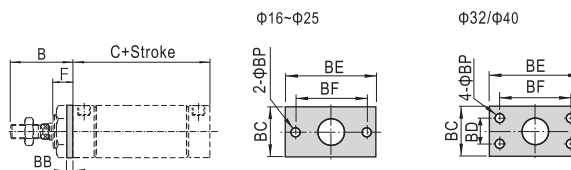
LB



| Bore size/Item<br>Stroke | AA    | AA(MSBL) |        |         | AC    | AC(MSBL) |        |         |
|--------------------------|-------|----------|--------|---------|-------|----------|--------|---------|
|                          | (MBL) | 0-50     | 51-100 | 101-150 | (MBL) | 0-50     | 51-100 | 101-150 |
| 20                       | 116   | 141      | 166    | 191     | 100   | 125      | 150    | 175     |
| 25                       | 116   | 141      | 166    | 191     | 100   | 125      | 150    | 175     |
| 32                       | 136   | 161      | 186    | 211     | 120   | 145      | 170    | 195     |
| 40                       | 158   | 183      | 208    | 233     | 142   | 167      | 192    | 217     |
| 50                       | 172   | -        | -      | -       | 148   | -        | -      | -       |
| 63                       | 180   | -        | -      | -       | 154   | -        | -      | -       |

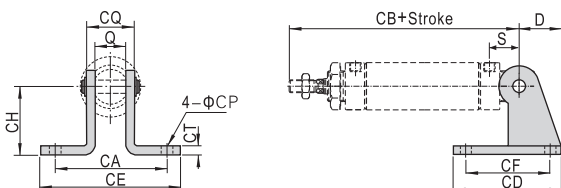
| Bore size/Item | B  | E  | F  | AB | AE  | AF | AL | AQ | AP  | AT  | AH |
|----------------|----|----|----|----|-----|----|----|----|-----|-----|----|
| 20             | 40 | 21 | 14 | 25 | 54  | 40 | 15 | 8  | 6.5 | 3   | 25 |
| 25             | 44 | 21 | 14 | 29 | 54  | 40 | 15 | 8  | 6.5 | 3   | 25 |
| 32             | 44 | 27 | 16 | 19 | 59  | 45 | 25 | 8  | 7   | 3.5 | 32 |
| 40             | 46 | 27 | 16 | 21 | 64  | 50 | 25 | 8  | 7   | 3.5 | 36 |
| 50             | 54 | 27 | 22 | 26 | 86  | 66 | 28 | 12 | 11  | 4.5 | 40 |
| 63             | 54 | 27 | 22 | 23 | 106 | 82 | 31 | 13 | 11  | 4.5 | 45 |

FA



| Bore size/Item<br>Stroke | B     | C    | C(MSBL) |         |     | BB  | BC | BD | BE  | BF | BP  | F  |
|--------------------------|-------|------|---------|---------|-----|-----|----|----|-----|----|-----|----|
|                          | (MBL) | 0-50 | 51-100  | 101-150 |     |     |    |    |     |    |     |    |
| 20                       | 40    | 70   | 95      | 120     | 145 | 3.5 | 38 | -  | 64  | 50 | 7   | 14 |
| 25                       | 44    | 70   | 95      | 120     | 145 | 3.5 | 38 | -  | 64  | 50 | 7   | 14 |
| 32                       | 44    | 70   | 95      | 120     | 145 | 4   | 47 | 33 | 72  | 58 | 6.5 | 16 |
| 40                       | 46    | 92   | 117     | 142     | 167 | 4   | 50 | 36 | 84  | 70 | 6.5 | 16 |
| 50                       | 54    | 92   | -       | -       | -   | 4.5 | 65 | 47 | 104 | 86 | 9   | 22 |
| 63                       | 54    | 92   | -       | -       | -   | 4.5 | 65 | 47 | 104 | 86 | 9   | 22 |

SDB

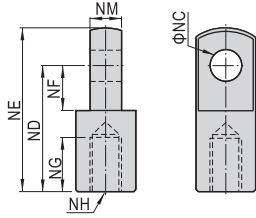


| Bore size/Item<br>Stroke | D     | S    | Q      | CA      | CB  | CB(MSBL) |     |     | CD | CE | CF | CH | CT  | CP | CQ |
|--------------------------|-------|------|--------|---------|-----|----------|-----|-----|----|----|----|----|-----|----|----|
|                          | (MBL) | 0-50 | 51-100 | 101-150 |     |          |     |     |    |    |    |    |     |    |    |
| 20                       | 21    | 12   | 16     | 51      | 122 | 147      | 172 | 197 | 48 | 67 | 32 | 32 | 2.5 | 7  | 22 |
| 25                       | 21    | 12   | 16     | 51      | 126 | 151      | 176 | 201 | 48 | 67 | 32 | 32 | 2.5 | 7  | 22 |
| 32                       | 27    | 15   | 16     | 51      | 129 | 154      | 179 | 204 | 52 | 67 | 36 | 36 | 3   | 7  | 24 |
| 40                       | 27    | 15   | 20     | 55      | 153 | 178      | 203 | 228 | 56 | 71 | 40 | 40 | 3   | 7  | 28 |

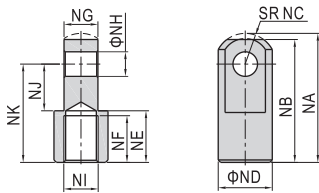
[Note] SDB is attached with relevant PIN.



### I Knuckle

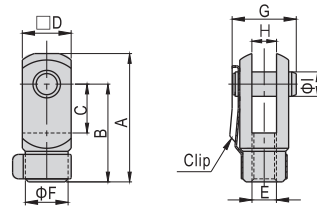


| Type\Item | NC | ND | NE | NF | NH       | NG | NM |
|-----------|----|----|----|----|----------|----|----|
| F-MA20I   | 8  | 30 | 40 | 11 | M8×1.25  | 15 | 8  |
| F-MA25I   | 10 | 40 | 50 | 15 | M10×1.25 | 20 | 10 |
| F-MA40I   | 10 | 45 | 57 | 16 | M12×1.25 | 23 | 14 |

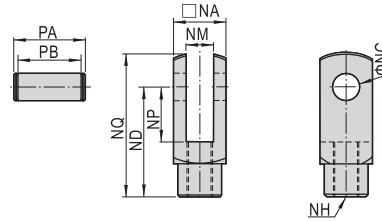


| Type\Item | NA   | NB | NC   | ND | NE | NF | NG   | NH | NJ | NK | NI      |
|-----------|------|----|------|----|----|----|------|----|----|----|---------|
| F-MAC50I  | 52.5 | 50 | 12.5 | 22 | 21 | 19 | 13.8 | 10 | 19 | 40 | M14×1.5 |

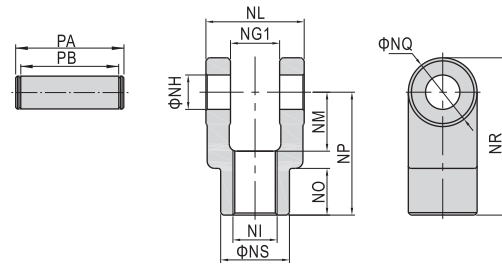
### Y Knuckle



| Type\Item | A  | B  | C  | D  | E        | F  | G  | H  | I  |
|-----------|----|----|----|----|----------|----|----|----|----|
| F-MA20Y   | 42 | 32 | 16 | 16 | M8×1.25  | 14 | 21 | 8  | 8  |
| F-MA25Y   | 52 | 40 | 20 | 19 | M10×1.25 | 18 | 25 | 10 | 10 |



| Type\Item | NA   | NC | ND | NP | NQ | NM | NH       | PA | PB   |
|-----------|------|----|----|----|----|----|----------|----|------|
| F-MA40Y   | 25.4 | 10 | 45 | 20 | 57 | 14 | M12×1.25 | 32 | 26.2 |



| Type\Item | Ng1  | NH | NI      | NL   | NM | NO | NP | NQ | NR | NS | PA   | PB   |
|-----------|------|----|---------|------|----|----|----|----|----|----|------|------|
| F-MAC50Y  | 14.2 | 10 | M14×1.5 | 27.8 | 19 | 17 | 40 | 22 | 51 | 22 | 34.6 | 28.8 |