

MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

Product feature

CHELIC

Feature

- Stainless steel cylinder tube design, light weight and strong rigidity.
- Magnetic design. The radial magnetic force transmits power to drives the loading by the built-in magnetic ring on the piston and the external magnet inside the body.
- With the integrated design of the actuator and double guide rods, it can directly bear the load.
- Sensor bracket is required when sensor switch is needed.



Specification

| Item | Bore size (mm) | Ø15 | Ø20 | Ø25 | Ø32 |
|-------------------------------|-------------------------------|-------------------------|-------|-----|-----|
| Type of operation | | Double acting | | | |
| Fluid | | Air | | | |
| Pressure range | kgf / cm ² (KPa) | 1.5 ~ 6.0 (150 ~ 600) | | | |
| Max. operating pressure | kgf / cm ² (KPa) | 6.5 (650) | | | |
| Ambient and fluid temperature | °C | 0 ~ 60 | | | |
| Piston speed | mm / s | 50 ~ 500 | | | |
| Lubrication | | Lubrication free type | | | |
| Stroke adjustment | | -10 ~ 0 | | | |
| Main connection port | | M5 | PT1/8 | | |
| Cushion device | | With magnet | | | |
| Hold force(N) | Magnetic force - Enhancer (H) | 137 | 220 | 340 | 560 |
| | Magnetic force - Standard | 81.4 | 154 | 221 | 358 |

Standard stroke

Unit: mm

| Bore | Standard stroke (mm) | Max stroke |
|------|--|------------|
| Ø15 | 100, 200, 250, 300, 350, 400, 450, 500 | 700 |
| Ø20 | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | 1000 |
| Ø25 | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | 1200 |
| Ø32 | 200, 250, 300, 350, 400, 450, 500, 600, 700, 800 | 1200 |

Theoretical output

Unit: kgf

| Bore size (mm) | Shaft size (mm) | Operating | Piston area (cm ²) | Air pressure (kgf / cm ²) | | | | | |
|----------------|-----------------|-----------|--------------------------------|---------------------------------------|----|----|----|----|----|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| Ø15 | Ø12 | Push | 1.76 | — | 3 | 5 | 7 | 8 | 10 |
| Ø20 | Ø16 | Push | 3.14 | — | 6 | 9 | 12 | 15 | 18 |
| Ø25 | Ø16 | Push | 4.90 | — | 9 | 14 | 19 | 24 | 29 |
| Ø32 | Ø20 | Push | 8.04 | — | 16 | 24 | 32 | 40 | 48 |

Note: All of above are theoretical data. Before actual adoption, the frictional resistance and mechanical efficiency shall be taken into consideration (about 70% ~ 80%)

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Code of order

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Code of order

MRH 15 x 100 - H - A2 - 9D 2



1

| Mark | Bore size (mm) |
|------|----------------|
| 15 | Ø15 |
| 20 | Ø20 |
| 25 | Ø25 |
| 32 | Ø32 |

2

| Bore size (mm) | Stroke(mm) |
|----------------|------------|
| Ø15 | 100~500 |
| Ø20 | 200~800 |
| Ø25 | |
| Ø32 | |

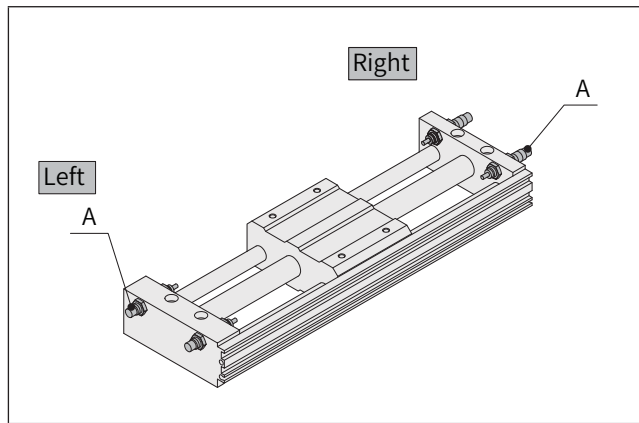
3

| Mark | Magnet |
|------|--------------------|
| None | Standard magnetism |
| H | With strong magnet |

4

| Mark | Cushion option |
|------|--|
| None | Without shock absorber |
| A1 | Left side with shock absorber, total 2 pcs. |
| A2 | Both sides with shock absorber, total 4 pcs. |
| A3 | Right side with shock absorber, total 2 pcs. |

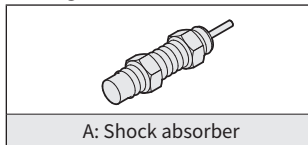
● Assembly example and direction



● Shock absorber

| Bore size (mm) | Shock absorber model | Maximum absorption (N · m) |
|----------------|----------------------|----------------------------|
| Ø15 | SAT-0806N | 3 |
| Ø20 | SAT-1007N | 6 |
| Ø25 | SAT-1412N | 20 |
| Ø32 | SAT-2015N | 59 |

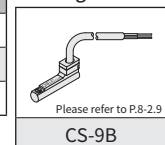
● Image



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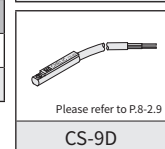
| Mark | Sensor switch |
|------|-----------------------|
| None | Without sensor switch |
| 9B | CS-9B |
| 9D | CS-9D |

● Image



6

| Mark | Sensor quantity |
|------|-----------------|
| 1 | 1 pc |
| 2 | 2 pcs |



PRE

PRET(P)

PRU(F)2

PRUT2

MRD

MRB

MRBT

MRX

MRU

MRH

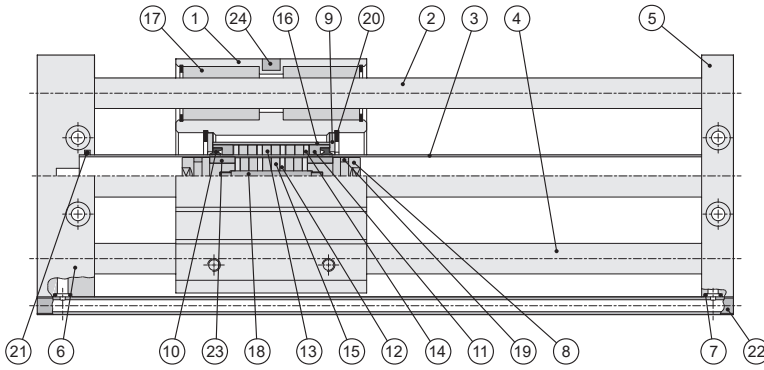
MRV

MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

Product feature

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Internal structure



Product weight

Unit: kg

| Bore size(mm) | Stroke = 0mm | Additional weight |
|---------------|--------------|-------------------|
| Ø15 | 1.0 | 0.30 |
| Ø20 | 2.0 | 0.38 |
| Ø25 | 3.1 | 0.45 |
| Ø32 | 4.2 | 0.55 |

Note: Additional weight per each 100 mm in $\pm 5\%$ difference

Components and material list

| NO. | Item | Material | NO. | Item | Material |
|-----|--------------------|-----------------|-----|-------------------|-----------------|
| 01 | Body | Aluminum alloy | 13 | Magnet | Rare earth |
| 02 | Air guide rod | Bearing steel | 14 | spacer | Pig iron |
| 03 | Shaft | Stainless steel | 15 | Piston magnet | Rare earth |
| 04 | Guide rod | Bearing steel | 16 | Magnet bush | Aluminum alloy |
| 05 | Front slider | Aluminum alloy | 17 | Linear bearing | - |
| 06 | Rear slider | Aluminum alloy | 18 | Piston rod joiner | Stainless steel |
| 07 | O-ring | NBR | 19 | Piston packing | NBR |
| 08 | Piston | Stainless steel | 20 | Clip | Alloy steel |
| 09 | Fixing plate | Pig iron | 21 | O-ring | NBR |
| 10 | Shaft packing | NBR | 22 | Air path strip | Aluminum alloy |
| 11 | Shaft packing base | POM | 23 | Wear ring | Teflon |
| 12 | Spacer | Pig iron | 24 | Magnet | Rare earth |

Packing and O-ring material list

Unit: mm

| Item | Piston packing | Air path strip O-ring | Shaft packing | Cushion O-ring |
|----------------------|----------------|-----------------------|-------------------|----------------|
| Bore size \ Quantity | 2 | 2 | 2 | 2 |
| Ø15 | DYP - 15 | Ø6.5 × Ø1.5 | PDU - 17 x 22.4 | Ø16 x Ø2 |
| Ø20 | DYP - 20 | Ø6.5 × Ø1.5 | PDU - 21 x 28.3 | Ø20.8 x Ø2 |
| Ø25 | PPY - 25 | Ø6.5 × Ø1.5 | PDU - 26 x 34.4 | Ø26 x Ø2 |
| Ø32 | PPY - 32 | Ø6.5 × Ø1.5 | PDU - 33.2 x 45.4 | Ø33 x Ø2 |

Note: The piston packing and shaft packing are from MITSUBISHI, SAKAGAMI or the same good level of quality material.

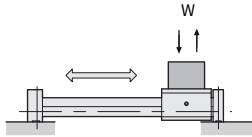
MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

Installation

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Load and moment allowable

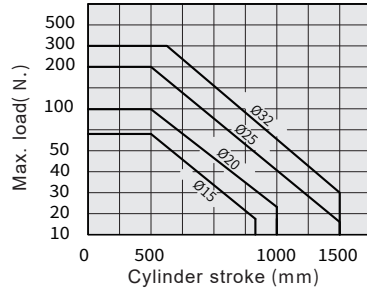
● Horizontal load



Unit: N. [kgf]

| Bore size (mm) | Horizontal load, W |
|----------------|--------------------|
| Ø15 | 65 [6.5] |
| Ø20 | 112 [11.2] |
| Ø25 | 182 [18.2] |
| Ø32 | 290 [29.0] |

Load and Stroke characteristic

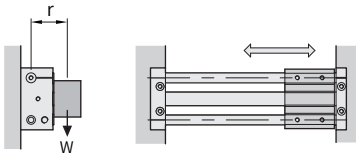


Load coefficient(E): From stroke Ø15 < 500, Ø20 < 500, Ø25 < 500, Ø32 < 600 exceed, E < 1

| Bore size (mm) | Ø15 | Ø20 | Ø25 | Ø32 |
|-------------------------------|---|---|---|---|
| Load coefficient (E) E < 1 | $\frac{10 \cdot (1.5 - 1.4 \times 10^{-3} \times ST)}{7}$ | $\frac{10 \cdot (1.71 - 1.4 \times 10^{-3} \times ST)}{12}$ | $\frac{10 \cdot (1.98 - 1.4 \times 10^{-3} \times ST)}{20}$ | $\frac{10 \cdot (2.26 - 1.4 \times 10^{-3} \times ST)}{30}$ |

Note: ST: Stroke(mm)

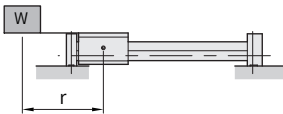
● Horizontal slide load



| Bore size (mm) | Ø15 | Ø20 | Ø25 | Ø32 |
|------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|
| Load allowable (W) kgf | $\frac{E \cdot 43}{11 + 2r}$ | $\frac{E \cdot 98}{14 + 2r}$ | $\frac{E \cdot 170}{15 + 2r}$ | $\frac{E \cdot 320}{18 + 2r}$ |

Note: r: The distance between guide center to pay load center (cm)

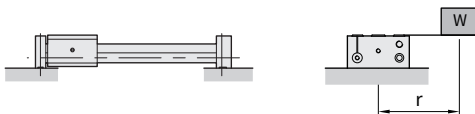
● Load center offset in operating direction



| Bore size (mm) | Ø15 | Ø20 | Ø25 | Ø32 |
|------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|
| Load allowable (W) kgf | $\frac{E \cdot 12}{2.45 + r}$ | $\frac{E \cdot 42}{6.2 + r}$ | $\frac{E \cdot 43}{3.4 + r}$ | $\frac{E \cdot 77}{3.7 + r}$ |

Note: r: The distance between guide center to pay load center (cm)

● Load center offset in operating direction



| Bore size (mm) | Ø15 | Ø20 | Ø25 | Ø32 |
|------------------------|------------------------------|----------------------------|-------------------------------|--------------------------------|
| Load allowable (W) kgf | $\frac{E \cdot 43}{6.4 + r}$ | $\frac{E \cdot 77}{8 + r}$ | $\frac{E \cdot 140}{9.3 + r}$ | $\frac{E \cdot 270}{10.8 + r}$ |

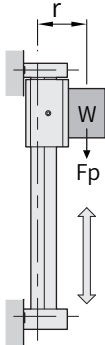
Note: r: The distance between guide center to pay load center (cm)

MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

Installation

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Vertical load

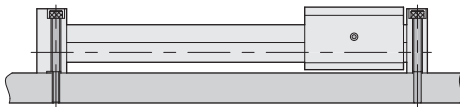


| Bore size (mm) | Ø15 | Ø20 | Ø25 | Ø32 |
|------------------------|----------------------------------|--------------------------------|--------------------------------|-------------------------------|
| Load allowable (W) kgf | $\frac{E \cdot 15.5}{2.6 + r^2}$ | $\frac{E \cdot 30}{2.9 + r^2}$ | $\frac{E \cdot 53}{3.3 + r^2}$ | $\frac{E \cdot 112}{4 + r^2}$ |

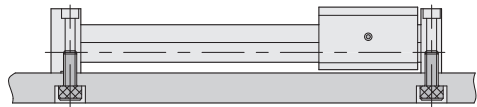
Note: r: The distance between guide center to pay load center (cm)

Mounting type

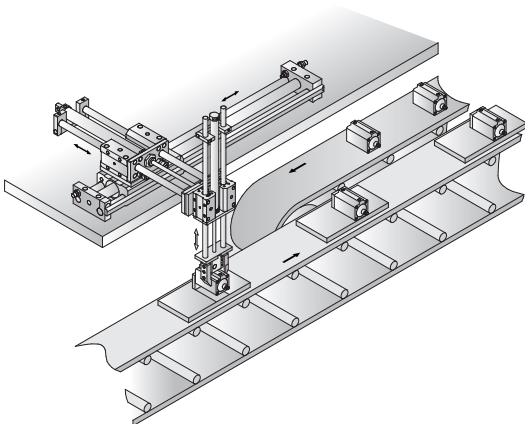
● Top mounting type



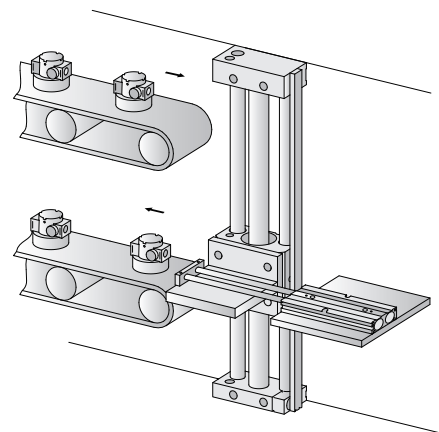
● Base mounting type



Multi - purpose



● Transport operation



● Moving operation

MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

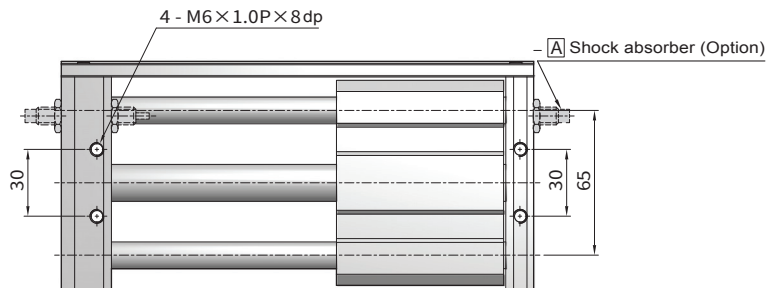
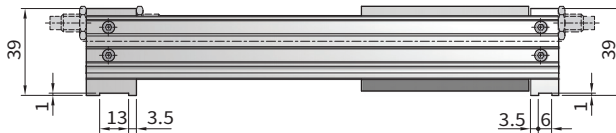
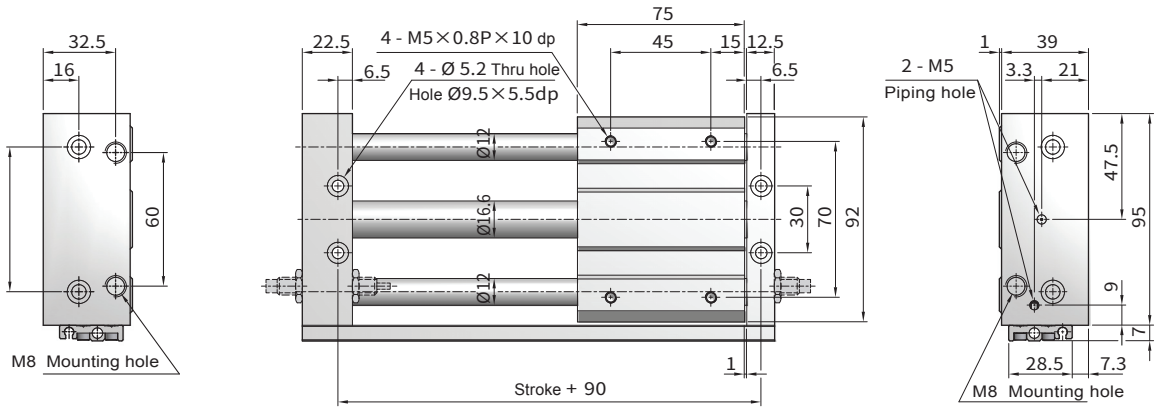
Dimensions

CHELIC

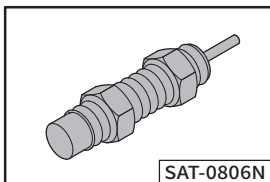
MRH Ø15 x -



MRH x ST



Shock absorber (Option)



PRE

PRET(P)

PRU(F)2

PRUT2

MRD

MRB

MRBT

MRX

MRU

MRH

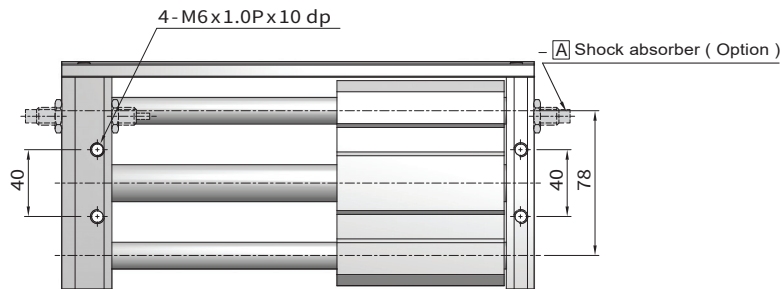
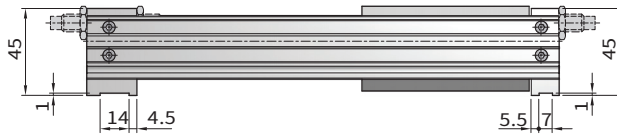
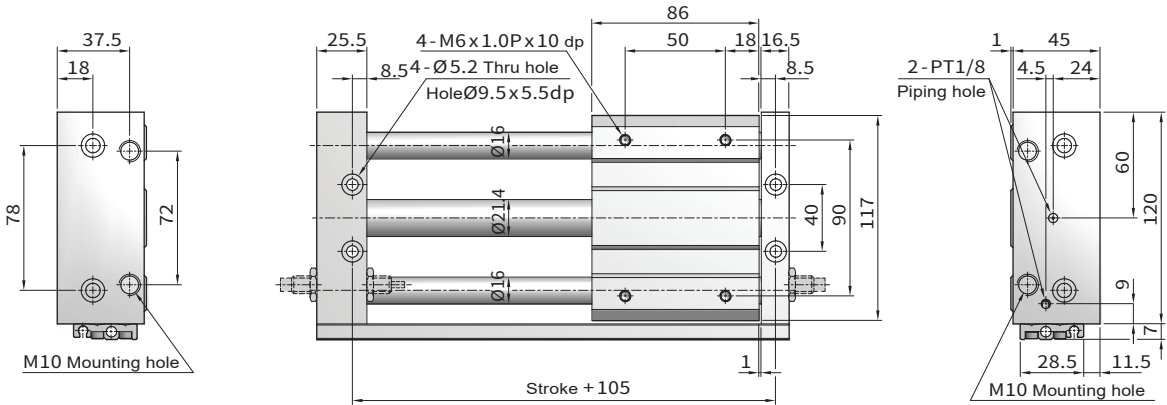
MRV

MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

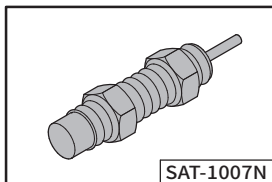
Dimensions

CHELIC

MRH $\varnothing 20$ x



Shock absorber (Option)



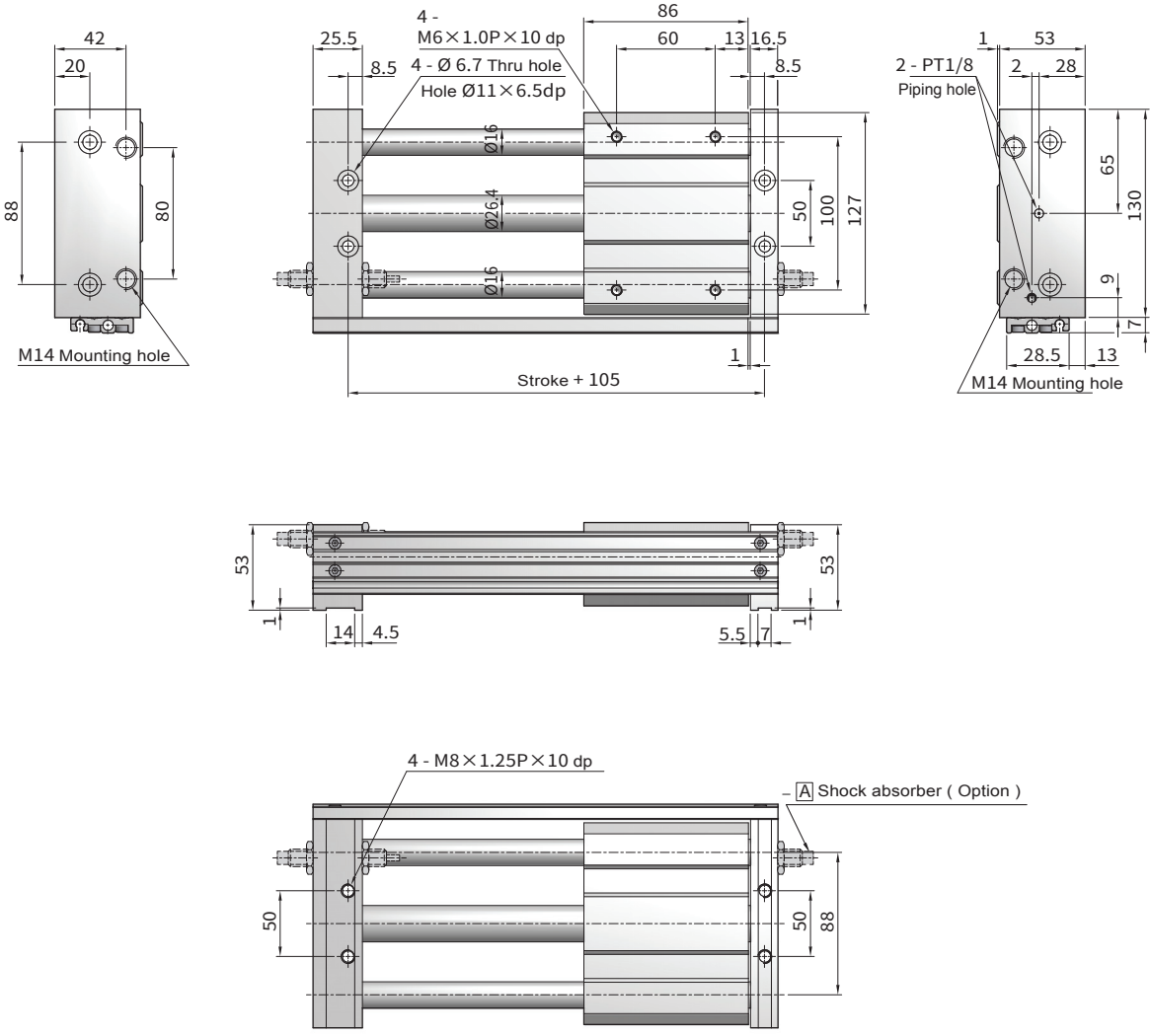
MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

Dimensions

CHELIC

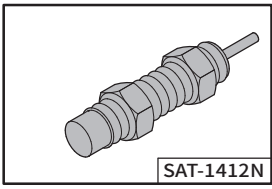
MRH Ø25 x -

 MRH x ST



- PRE
- PRET(P)
- PRU(F)2
- PRUT2
- MRD
- MRB
- MRBT
- MRX
- MRU
- MRH
- MRV

Shock absorber (Option)

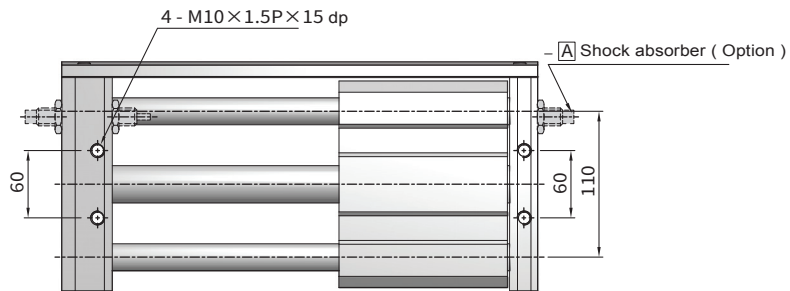
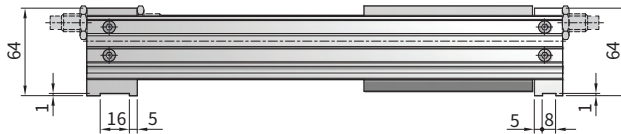
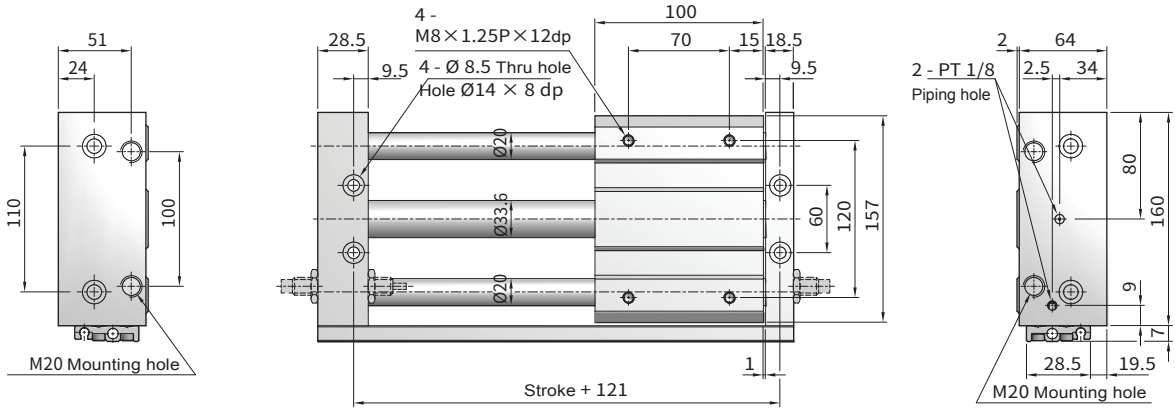


MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

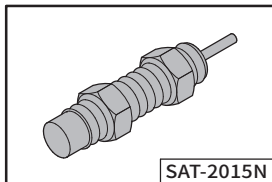
Dimensions

CHELIC

MRH Ø32 x -



Shock absorber (Option)



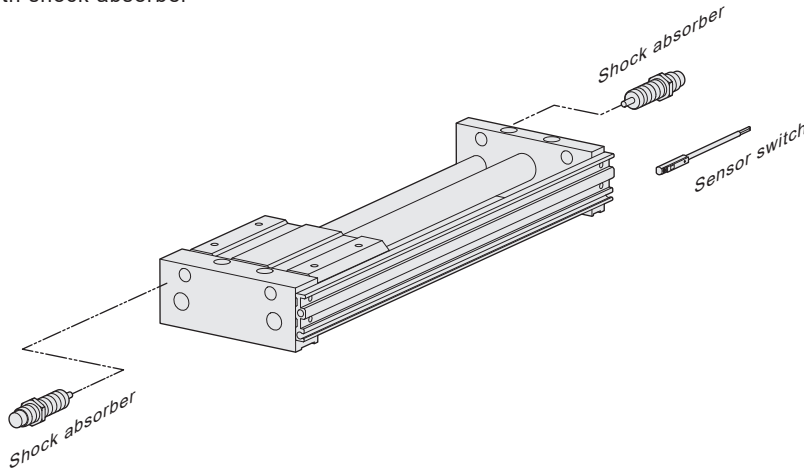
MRH series Magnetically Coupled Rodless Cylinder (Linear guide)

Mounting type and operation of sensor switch

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■ Sensor switch mounting type

- **A** With shock absorber



■ Sensing range

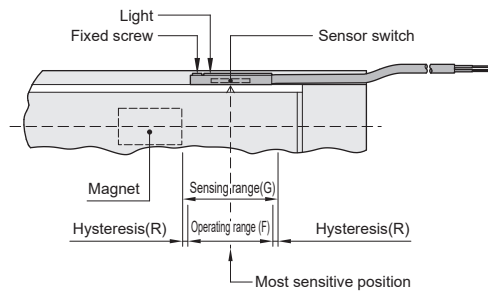
Sensor switch is fixed on the cylinder body. The magnetic piston head will activate the sensor switch when it enters the operating range. It has 0.5mm differential.

■ Operating range

When piston head moves the switch setting and adjustment will be based on the responding range generated by the magnetic field and the switch. (Please refer to the below table)

■ Sensor switch setting and operating range

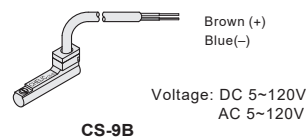
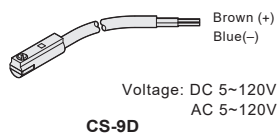
● CS - 9D (B)



Unit: mm

| Model | CS - 9D(B) | |
|-----------|---------------------|---------------|
| Bore size | Operating range (F) | Hysteresis(R) |
| Ø15 | 8 | 1 |
| Ø20 | 8 | 1.2 |
| Ø25 | 11 | 1.2 |
| Ø32 | 9 | 1.5 |

■ Sensor switch introduction



PRE

PRET(P)

PRU(F)2

PRUT2

MRD

MRB

MRBT

MRX

MRU

MRH

MRY