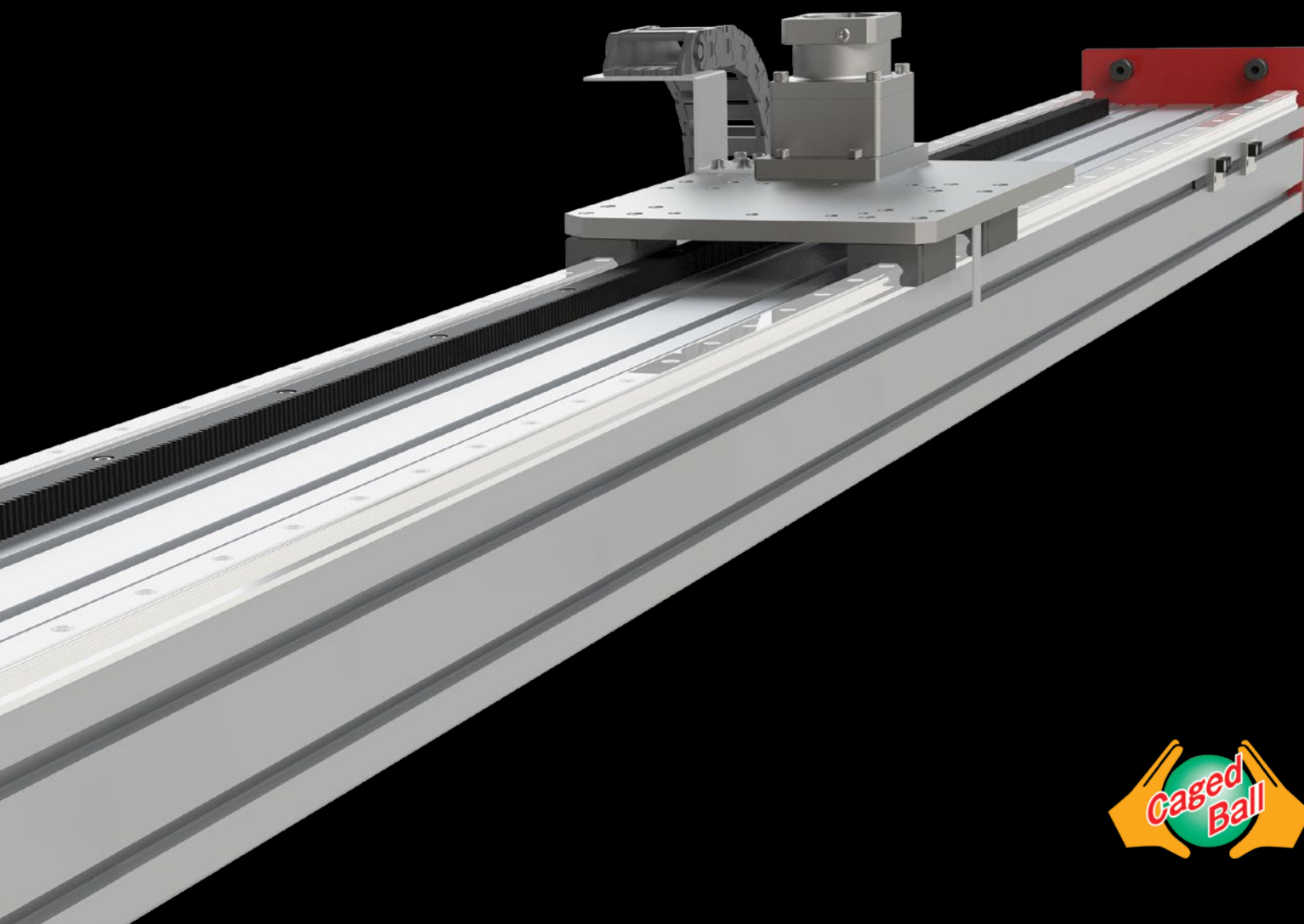


LONG STROKE ACTUATOR - Rack & Pinion Drive

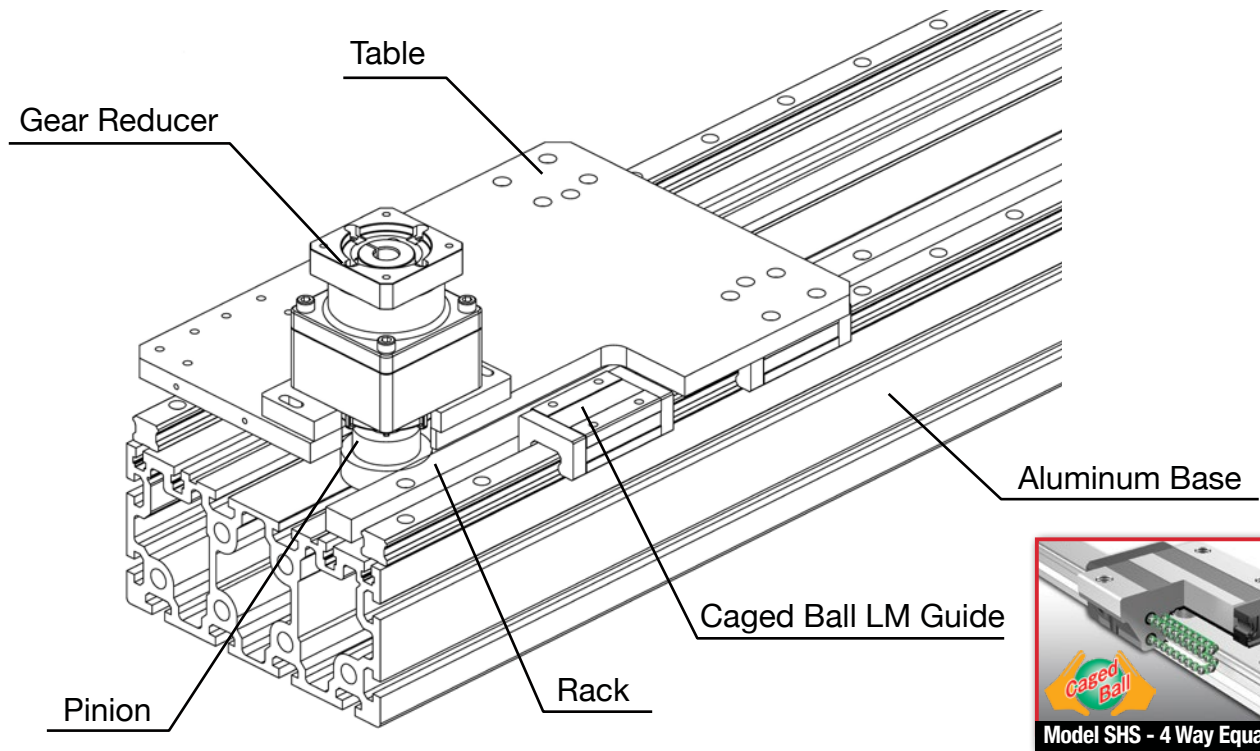
RK

High-Speed, Long-Stroke Actuator
Suitable for Robot Transfer Unit
Interfaces Available for Various Robot Types
Made in the U.S.A.

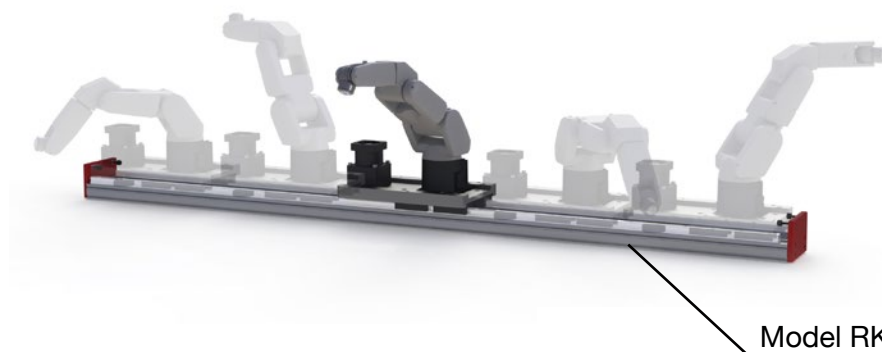


RK CONFIGURATION

Caged-ball LM guide is installed on high-rigidity aluminum extrusion body. Rack-pinion drive provides high-speed and long stroke transfer. Multiple mounting patterns are available for various types of robot installations.



Application Example

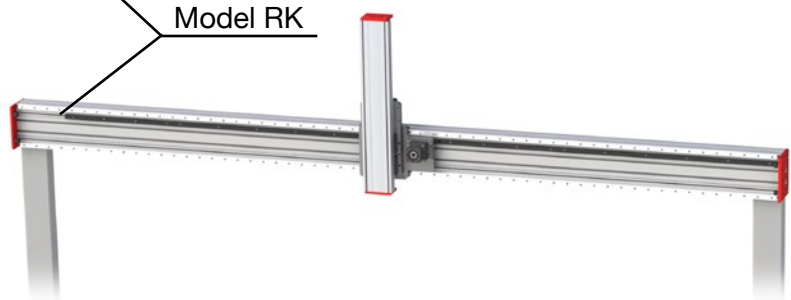


ROBOT TRANSFER UNIT

Various mounting options
Cable carrier option
Multiple slider options available

GANTRY SYSTEM

High-rigidity aluminum extrusion body is used for gantry transfer beam structure
*XY unit is available.
Contact THK for details.



RK FEATURES

Travel Speed

Unit: [mm/s]

| Gear Ratio | 1/3 | 1/5 | 1/9 |
|--|--------------------|------|------|
| Maximum Speed with motor speed 6000 rpm | 3400 ^{*1} | 3000 | 1666 |
| Rated Speed with motor speed 3000 rpm | 2500 | 1500 | 833 |

Note:

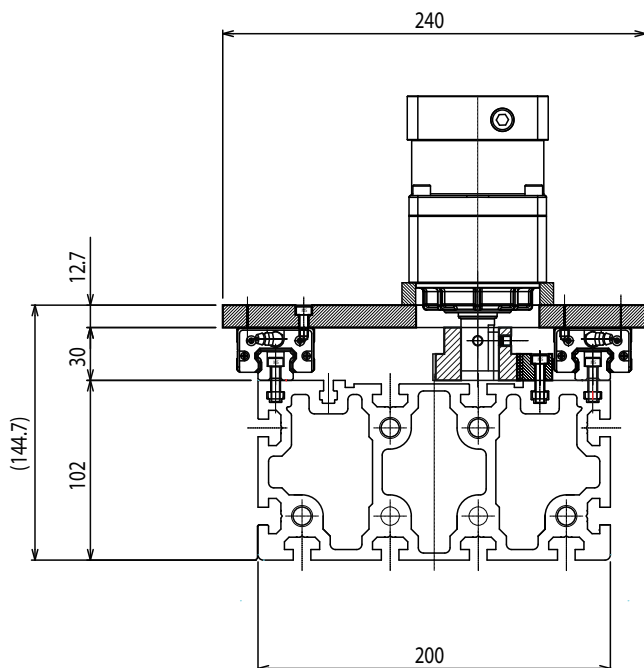
*1: Limited by LM guide max speed

Travel Distance per Motor Rotation

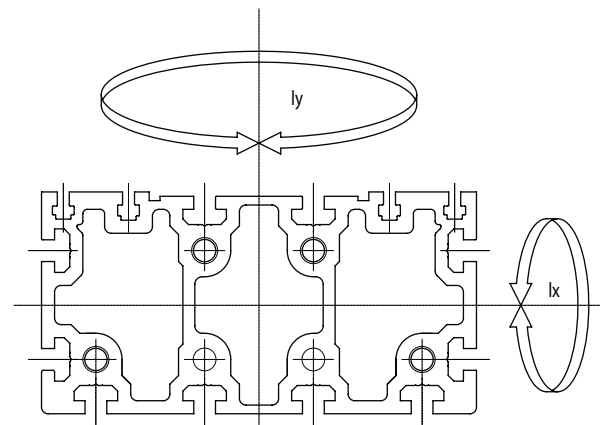
Unit: [mm]

| Gear Type | Number of Teeth | Gear PCD | Gear Ratio | | |
|-----------|-----------------|----------|------------|-----|-------|
| | | | 1/3 | 1/5 | 1/9 |
| CP5 | 30 | 47.75 | 50 | 30 | 16.67 |

RK20 Cross-Section Diagram



Base Cross-Section Property



| | | |
|----------------------------------|-----------------------|------------------------|
| Geometric Movement of Inertia | Ix [mm ⁴] | 8.86 x 10 ⁶ |
| | Iy [mm ⁴] | 2.95 x 10 ⁷ |
| Base Weight | [kg/m] | 19.9 |

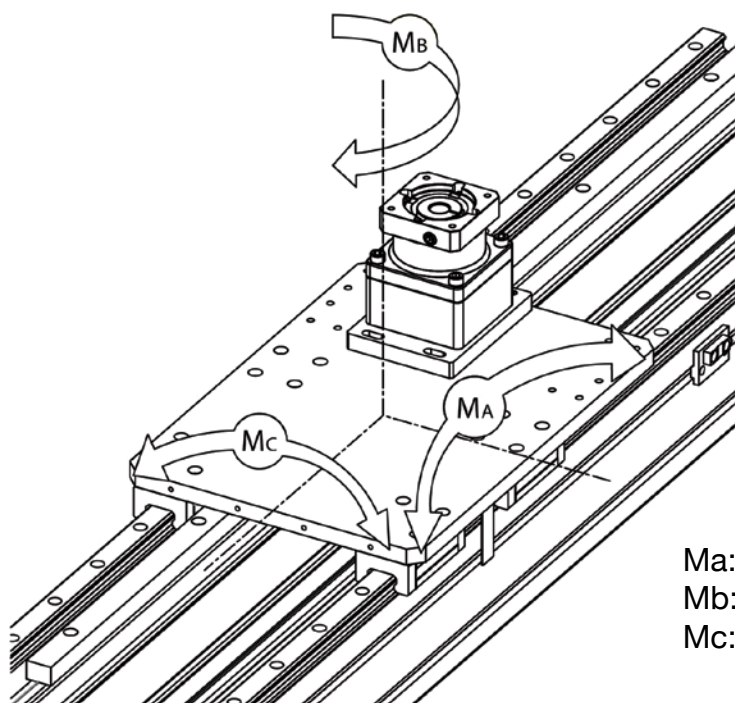
SPECIFICATIONS

Basic Specifications

| | | |
|---------------------------------------|------------|-------------|
| Model Number | | RK20 |
| Drive System | | Rack-Pinion |
| Repeatability [mm] | | 0.3 Max |
| Backlash [mm] | | 0.3 Max |
| Max Stroke [mm] | | 4350 |
| LM Guide Type | | SHS20V |
| Static Axial Force [N] | | 1040 |
| Payload ^{*1}[kg] | Ratio: 1/3 | 15 |
| | Ratio: 1/5 | 50 |
| | Ratio: 1/9 | 53 |
| Static Permissible Moment [Nm] | Ma | 2755 |
| | Mb | 2334 |
| | Mc | 3211 |

Note:

*1: Payload shows loading guide line based on 1/30 inertia ratio with common 400W motor or gear teeth strength by 2G deceleration emergency stop.



Ma: Pitching Moment
Mb: Yawing Moment
Mc: Rolling Moment

- RK actuator is designed for horizontal usage. For vertical usage, please contact THK.
- THK AFB-LF Grease is used for lubrication.

MODEL NUMBER CHART

Use the table below to help construct model number.
Gray bar below contains example model number for reference.

1

2

3

4

5

6

7

8

9

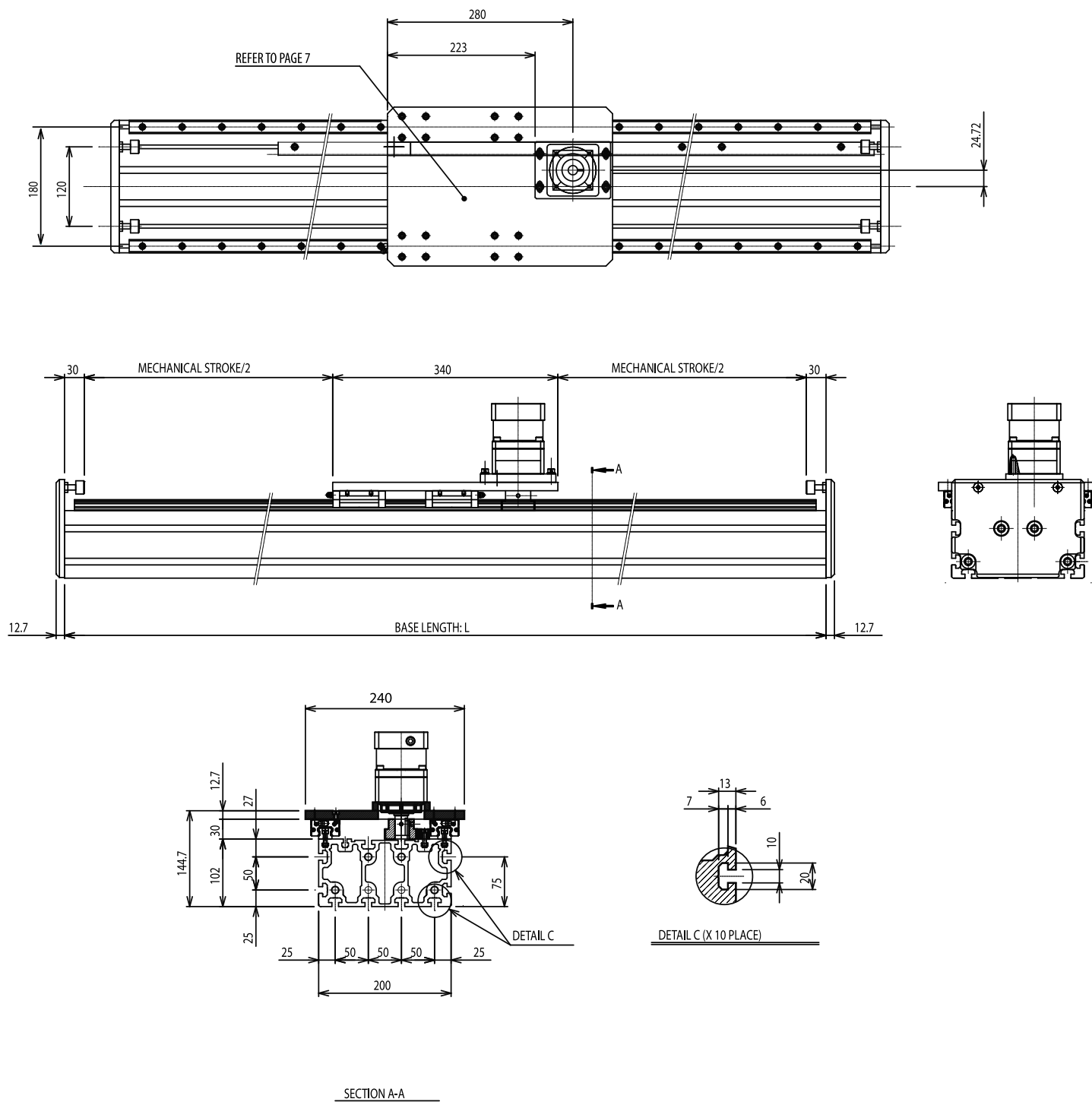
10

RK20 - 175 - B2 - G1 - 05 - H1 - N - H - K - N

| | | |
|----|---------------------------------|--|
| 1 | Model Number | RK20 |
| 2 | Base length | 125 ---- 475 Example: For 1750mm length: 175 |
| 3 | Interface size | B2: Interface for VRXF C size frame (Shimpo America) |
| 4 | Gear head type | G1 ---- G6 *Please refer to page 8 & 9 for details |
| 5 | Gear ratio | 03: 1/3 05: 1/5 09: 1/9 (selecting gear head is mandatory to install pinion) |
| 6 | Top Table Mounting Hole Pattern | *Please refer to page 7 for details |
| 7 | Cover | N: No cover J: Bellows |
| 8 | Sensor | 2: Photo micro sensor EE-SX671 (3 pcs) H: NPN output proximity sensor GX-F12A (N.O. x 3) J: NPN output proximity sensor GX-F12A (N.O. x 1), GX-F12B (N.C. x2) P: PNP output proximity sensor GX-F12A-P (N.O. x 3) M: PNP output proximity sensor GX-F12A-P (N.O. x 1), GX-F12B-P (N.C. x2) N: None *Please refer to page 9 for details |
| 9 | Cable carrier | H1: 1400-068-100, Standard horizontal mount K1: 1400-068-100, Standard wall mount H2: E6-52-075-200-0, Horizontal mount K2: E6-52-075-200-0, Wall mount N: None *Please refer to page 10 for details |
| 10 | Grade | N: Standard Grade |

RK DIMENSIONS

No Cover



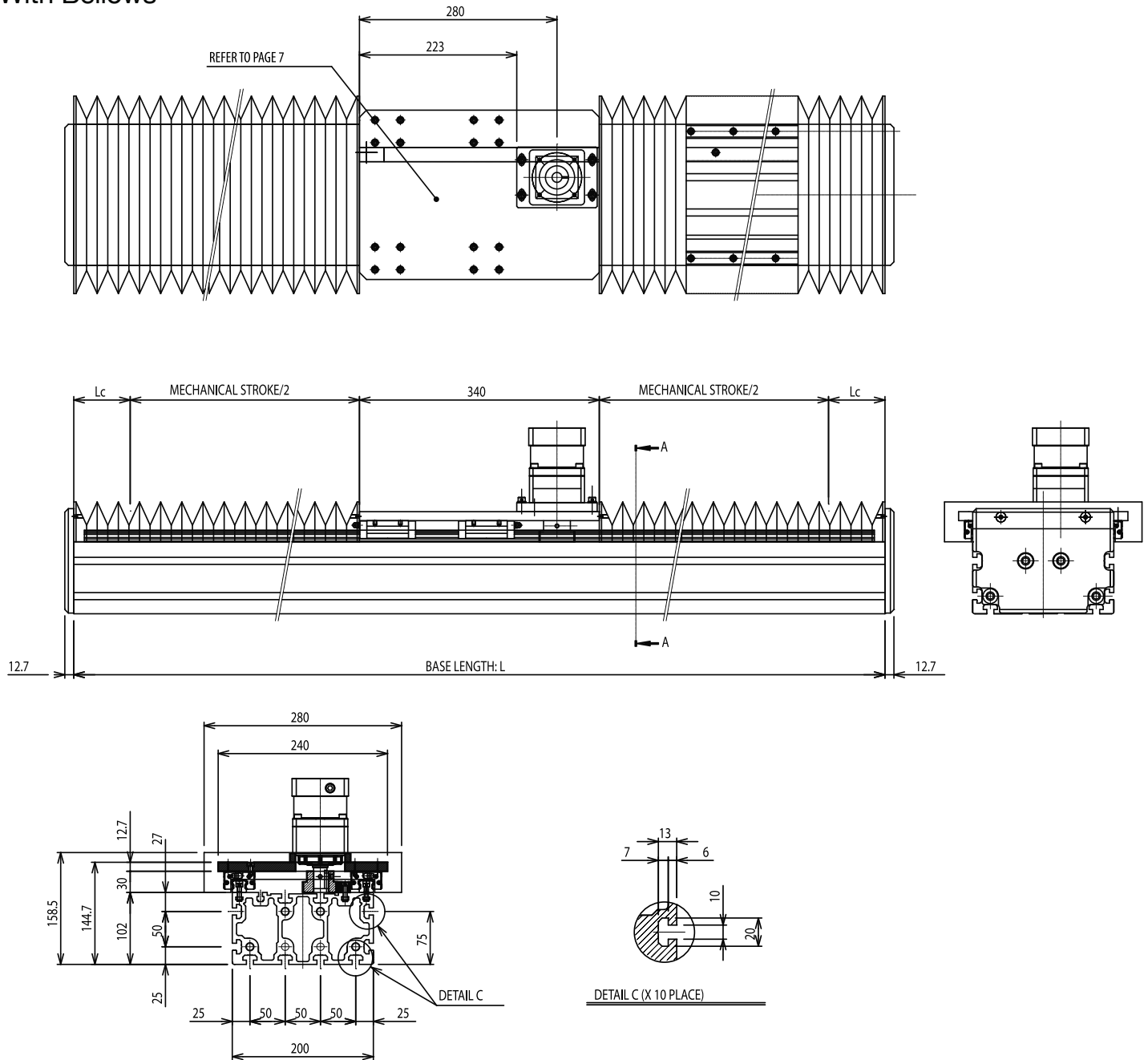
| | Unit: [mm] | | | | | | | |
|------------------------------|------------|------|------|------|------|------|------|------|
| Base length [mm] | 1250 | 1750 | 2250 | 2750 | 3250 | 3750 | 4250 | 4750 |
| Mechanical stroke [mm] | 850 | 1350 | 1850 | 2350 | 2850 | 3350 | 3850 | 4350 |
| Approximate Unit weight [kg] | 52 | 65 | 78 | 92 | 105 | 118 | 132 | 145 |

Note 1: Above diagram shows the slider in mid-stroke.

Note 2: Please use mounting cleats (page 12) for fixing RK actuator base.

RK DIMENSIONS

With Bellows



SECTION A-A

Unit: [mm]

| Base length [mm] | 1250 | 1750 | 2250 | 2750 | 3250 | 3750 | 4250 | 4750 |
|------------------------------|------|------|------|------|-------|-------|-------|-------|
| Mechanical stroke [mm] | 728 | 1128 | 1528 | 1928 | 2328 | 2728 | 3128 | 3528 |
| Compressed Length Lc [mm] | 91 | 141 | 191 | 241 | 291 | 341 | 391 | 441 |
| Approximate Unit weight [kg] | 55.4 | 70.3 | 85.1 | 101 | 115.8 | 130.7 | 146.6 | 161.4 |

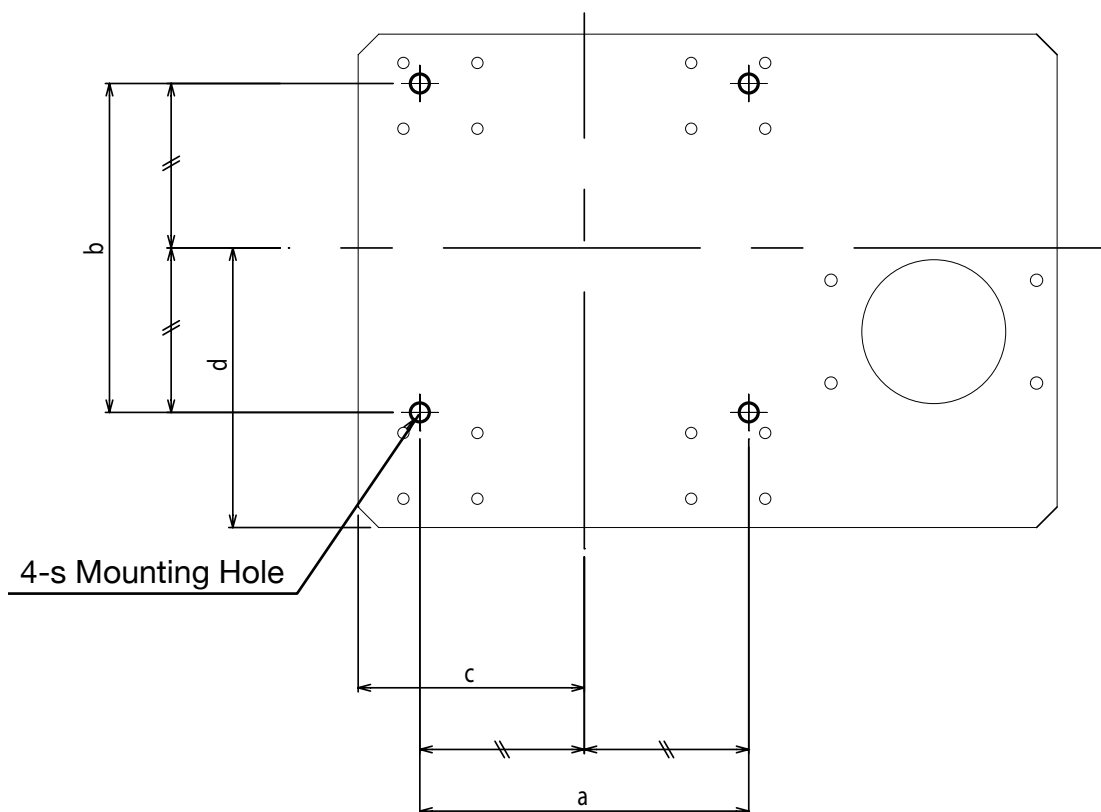
Note 1: Above diagram shows the slider in mid-stroke.

Note 2: Please use mounting cleats (page 12) for fixing RK actuator base.

TOP TABLE MOUNTING HOLE PATTERN

Mounting Hole Option

Part Numbering Sign for Mounting Interface



| Symbol | Dimensions | | | | Unit: [mm] |
|----------|------------|-----|-----|-----|------------|
| | a | b | c | d | s |
| A | 160 | 160 | 110 | 104 | M10 x 1.5 |
| B | 135 | 135 | 110 | 120 | M8 x 1.25 |
| C | 152 | 152 | 110 | 120 | M8 x 1.25 |
| D | 150 | 150 | 110 | 120 | M10 x 1.5 |
| E | 180 | 180 | 110 | 120 | M12 x 1.75 |
| F | 150 | 150 | 110 | 120 | M8 x 1.25 |
| G | 138 | 138 | 110 | 120 | M10 x 1.25 |

GEAR REDUCER PART NUMBER

Gear Head Option Per Motor Type

| Manufacturer | Motor Type | Output | Reduction Ratio | | |
|---------------------------------|--------------------------------|--------|-----------------|----------|----------|
| | | | 1/3 | 1/5 | 1/9 |
| FANUC | beta is1/5000 (straight shaft) | 400W | N/A | B2-G1-05 | B2-G1-09 |
| | beta is2/4000 (straight shaft) | 500W | B2-G2-03 | B2-G2-05 | B2-G2-09 |
| | alpha 1/5000i (straight shaft) | 500W | N/A | B2-G2-05 | B2-G2-09 |
| | alpha 2/5000i (straight shaft) | 750W | B2-G2-03 | B2-G2-05 | B2-G2-09 |
| Allen Bradley | MPL-A220T | 620W | B2-G3-03 | B2-G3-05 | B2-G3-09 |
| | MPL-A230P | 860W | B2-G3-03 | B2-G3-05 | B2-G3-09 |
| | MPL-A310F | 460W | B2-G4-03 | B2-G4-05 | B2-G4-09 |
| | MPL-A310P | 730W | B2-G4-03 | B2-G4-05 | B2-G4-09 |
| | VPL-A/B0751 | 500W | N/A | B2-G3-05 | B2-G3-09 |
| | VPL-A/B0752 | 660W | B2-G3-03 | B2-G3-05 | B2-G3-09 |
| | VPL-A/B0753 | 590W | B2-G3-03 | B2-G3-05 | B2-G3-09 |
| | VPL-A/B10001C | 560W | B2-G4-03 | B2-G4-05 | B2-G4-09 |
| Yaskawa Electric Corporation | SGM7A-04 | 400W | B2-G1-03 | B2-G1-05 | B2-G1-09 |
| | SGM7A-08 | 750W | B2-G5-03 | B2-G5-05 | B2-G5-09 |
| | SGMAV-04 | 400W | B2-G1-03 | B2-G1-05 | B2-G1-09 |
| | SGMAV-08 | 750W | B2-G5-03 | B2-G5-05 | B2-G5-09 |
| Mitsubishi Electric Corporation | HG-KR43/MR43 | 400W | B2-G6-03 | B2-G6-05 | B2-G6-09 |
| | HG-KR73/MR73 | 750W | B2-G5-03 | B2-G5-05 | B2-G5-09 |

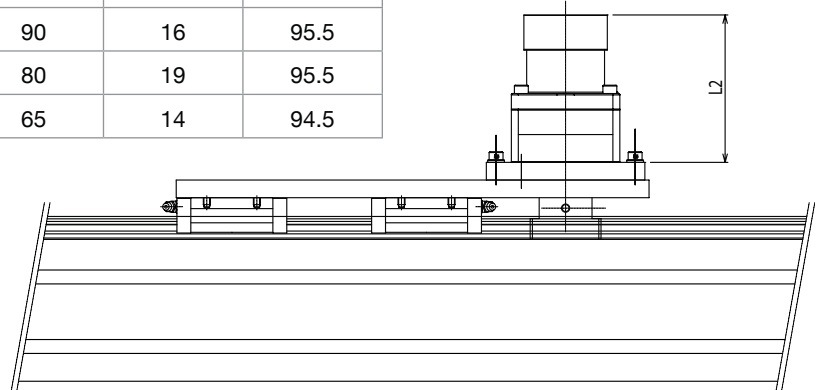
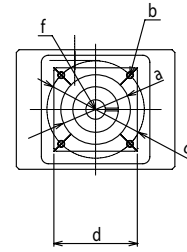
Note: VRXF-LB-□C-K (Shimpo drive) is selected as standard.

GEAR REDUCER PART NUMBER

Gear Head Option Per Motor Type

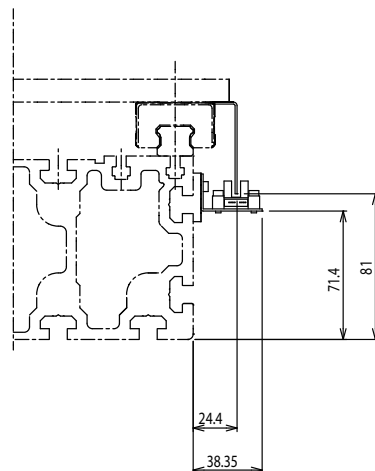
Unit: [mm]

| Gear Type | Pilot Diameter | Tap Size | PCD | Mount Size | Motor Shaft | Gear Length |
|-----------|----------------|----------|-----|------------|-------------|-------------|
| | a | b | c | d | f | L2 |
| B2-G1-XX | 50 | M5 | 70 | 65 | 14 | 89.5 |
| B2-G2-XX | 80 | M6 | 100 | 90 | 10 | 99.5 |
| B2-G3-XX | 60 | M5 | 75 | 70 | 11 | 89.5 |
| B2-G4-XX | 80 | M6 | 100 | 90 | 16 | 95.5 |
| B2-G5-XX | 70 | M6 | 90 | 80 | 19 | 95.5 |
| B2-G6-XX | 50 | M5 | 70 | 65 | 14 | 94.5 |

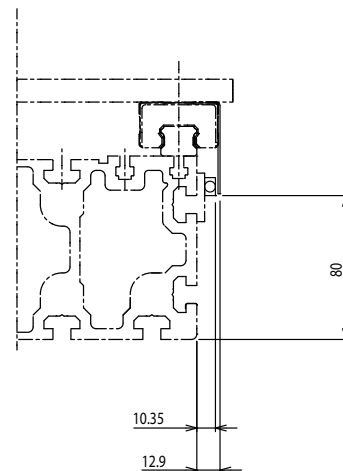


SENSOR OPTION

| Symbol | Sensor Part Number | Quantity | Type | Manufacturer |
|--------|----------------------|----------|------------------|--------------|
| 2 | EE-SX671 | 3 | Photo Sensor | Omron |
| H | GX-F12A (NPN, N.O) | 3 | Proximity Sensor | SUNX |
| J | GX-F12A (NPN, N.O) | 1 | | |
| | GX-F12B (NPN, N.C) | 2 | | |
| P | GX-F12A-P (PNP, N.O) | 3 | | |
| M | GX-F12A-P (PNP, N.O) | 1 | | |
| | GX-F12B-P (PNP, N.C) | 2 | | |



2: EE-SX671 (OMRON)



H, J, P, M: GX-F12 (SUNX)

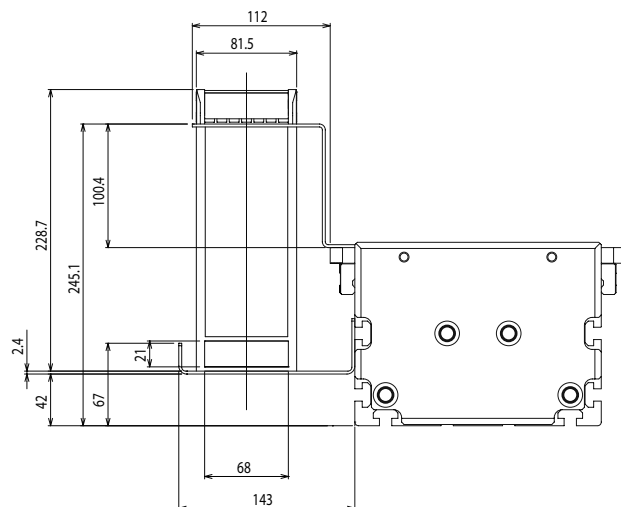
CABLE TRACK OPTION

| Symbol | Orientation | Part Number | Manufacturer |
|--------|-------------|-----------------|--------------|
| H1 | Horizontal | 1400-068-100 | Igus |
| H2 | | E6-52-075-200-0 | |
| K1 | Vertical | 1400-068-100 | |
| K2 | | E6-52-075-200-0 | |

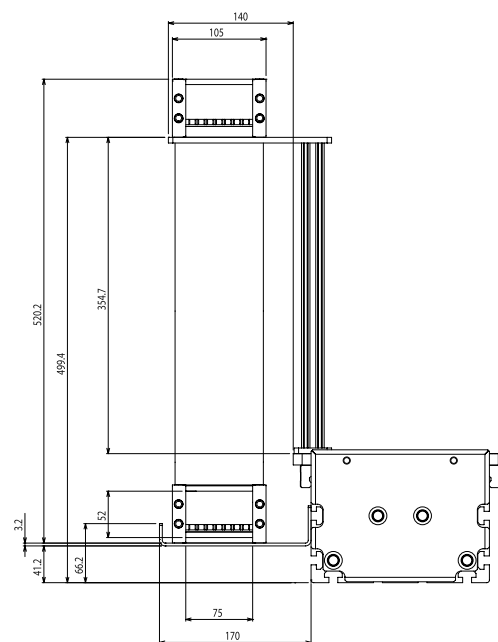
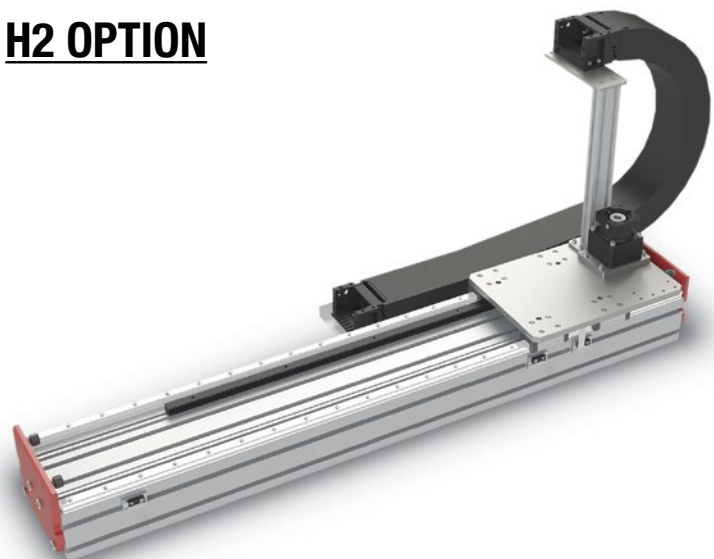
HORIZONTAL INSTALLATION TYPE

Cable track and bracket are shipped disassembled with necessary hardware included. Refer to included instruction manual for assembly.

H1 OPTION



H2 OPTION

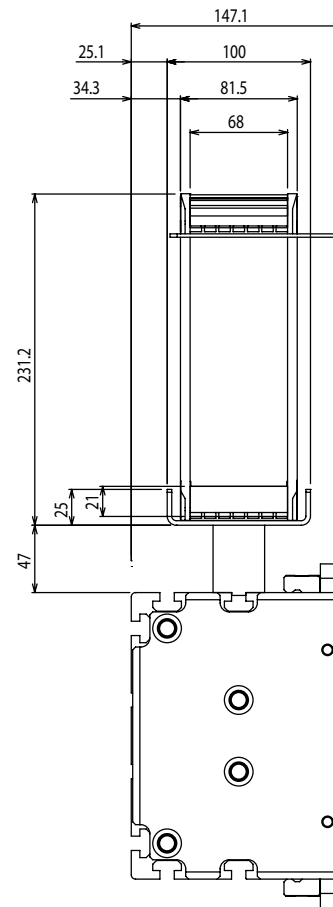


H1 option is available only up to 3250 mm base length.

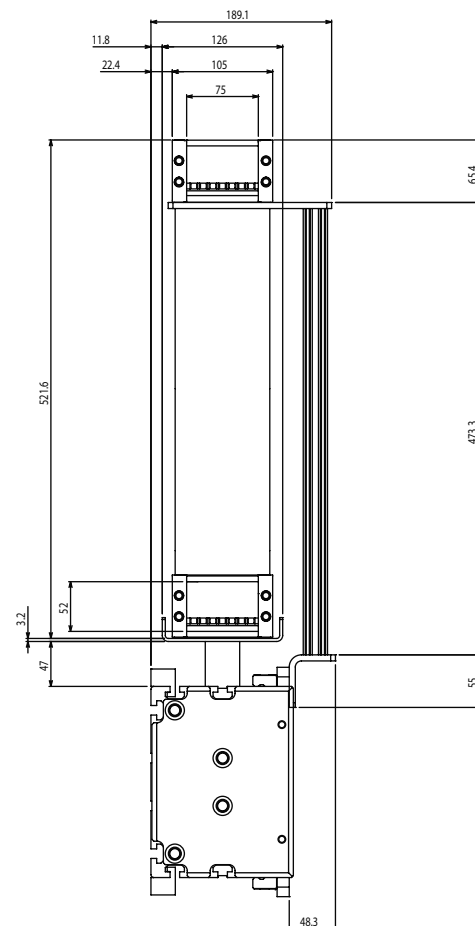
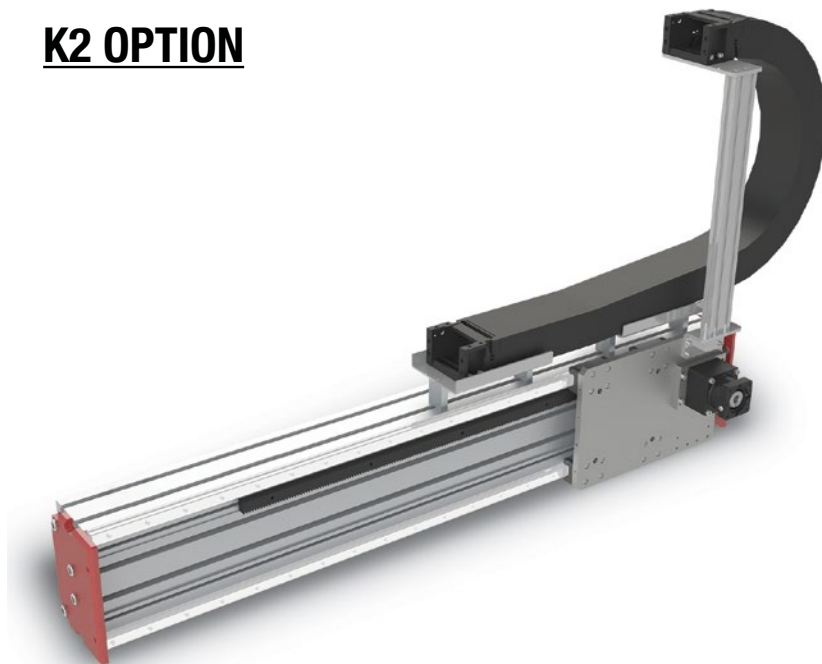
CABLE TRACK OPTION

Wall Mount Installation Type

K1 OPTION



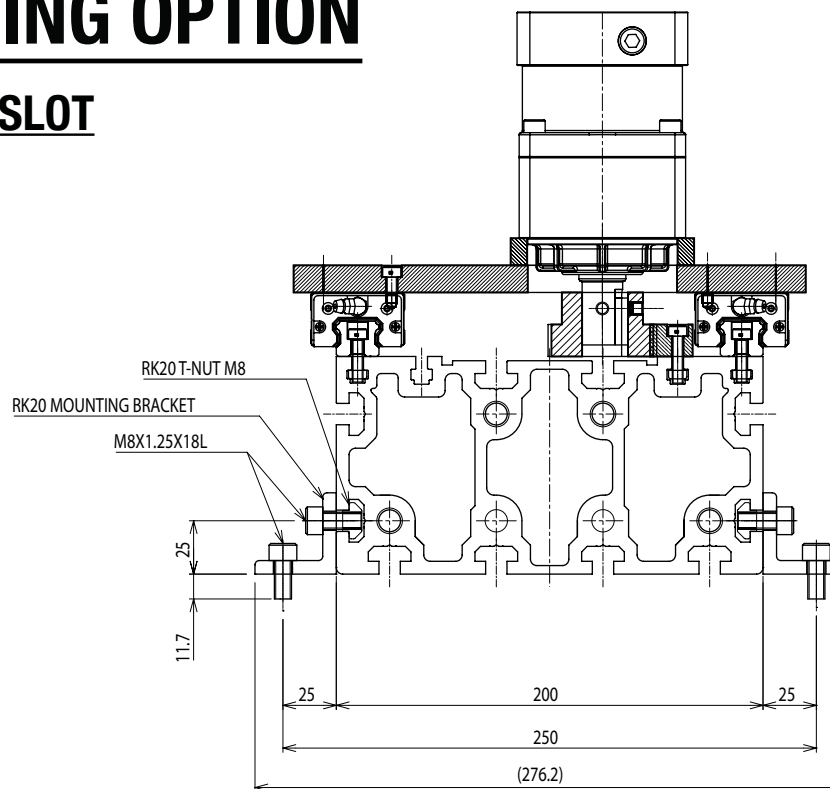
K2 OPTION



K1 option is available only up to 3250 mm base length.

MOUNTING OPTION

USING SIDE T-SLOT



Mounting Example

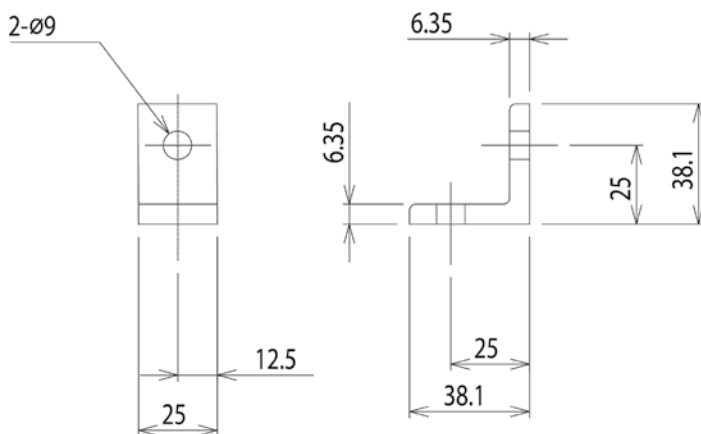
Mounting interval should be approximately 300 to 400mm.

HARDWARE SET

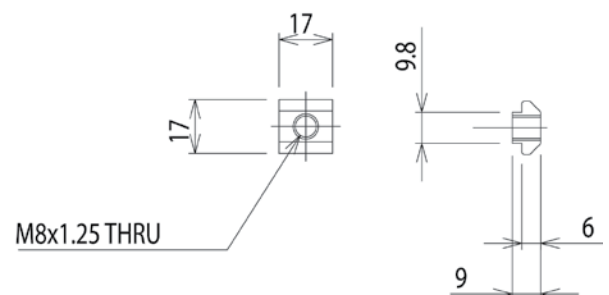
Part Number = RK20 Mount Bracket Set

Including:

- RK20 Mounting Bracket (QTY 1)
- RK20 T-Nut M8 (QTY 1)
- M8x1.25 X 18L (QTY 2)



RK20 Mounting Bracket

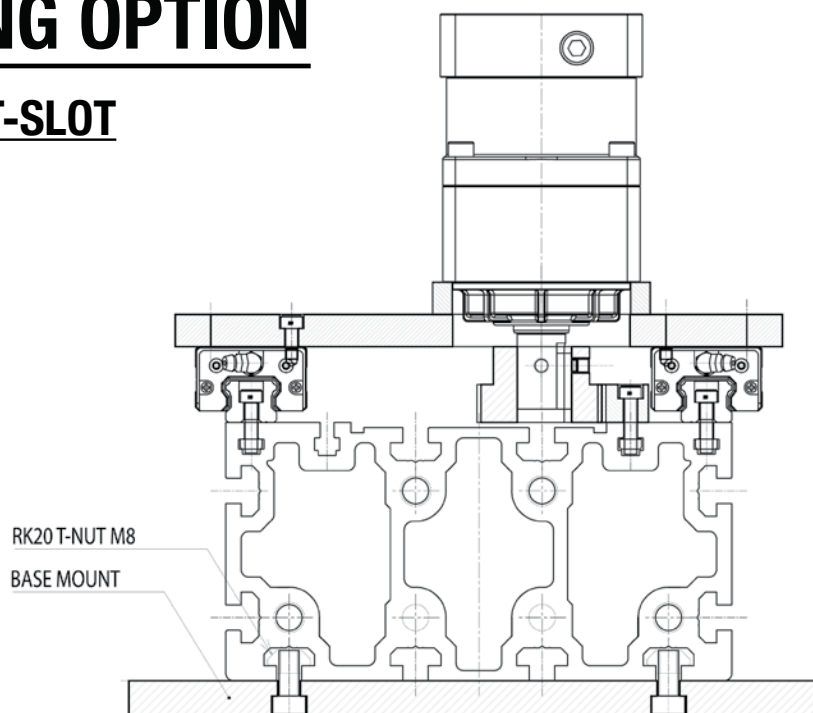


RK20 T-Nut M8

Please contact THK for alternative mounting bracket information.

■ MOUNTING OPTION

USING BOTTOM T-SLOT



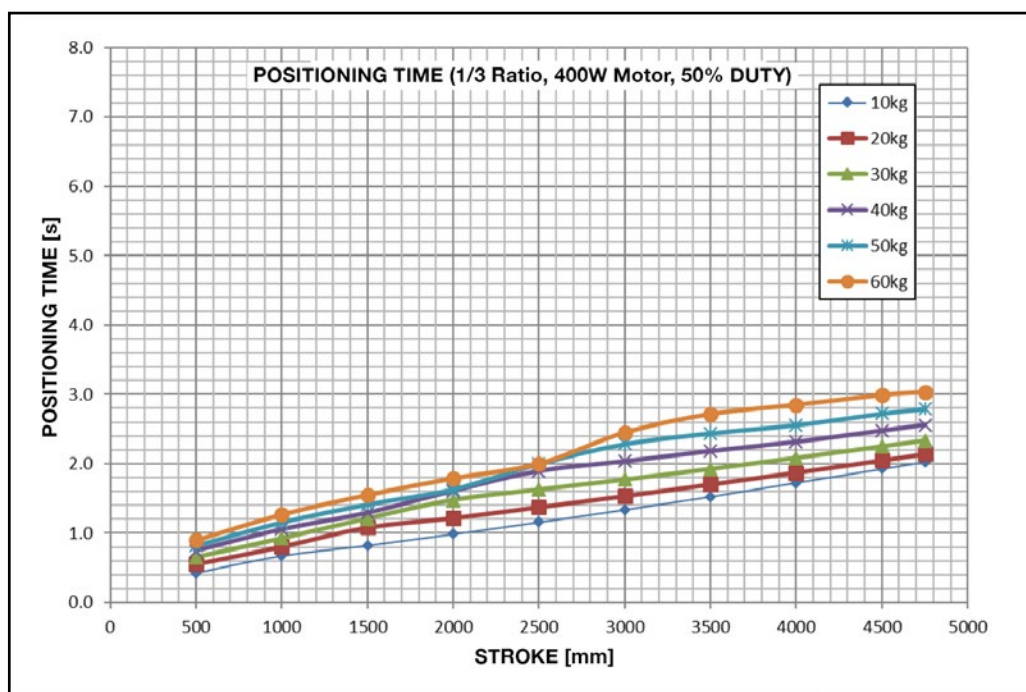
Mounting Example

Mounting interval should be approximately 300 to 400mm.

■ APPENDIX

Stroke and Positioning Time Chart

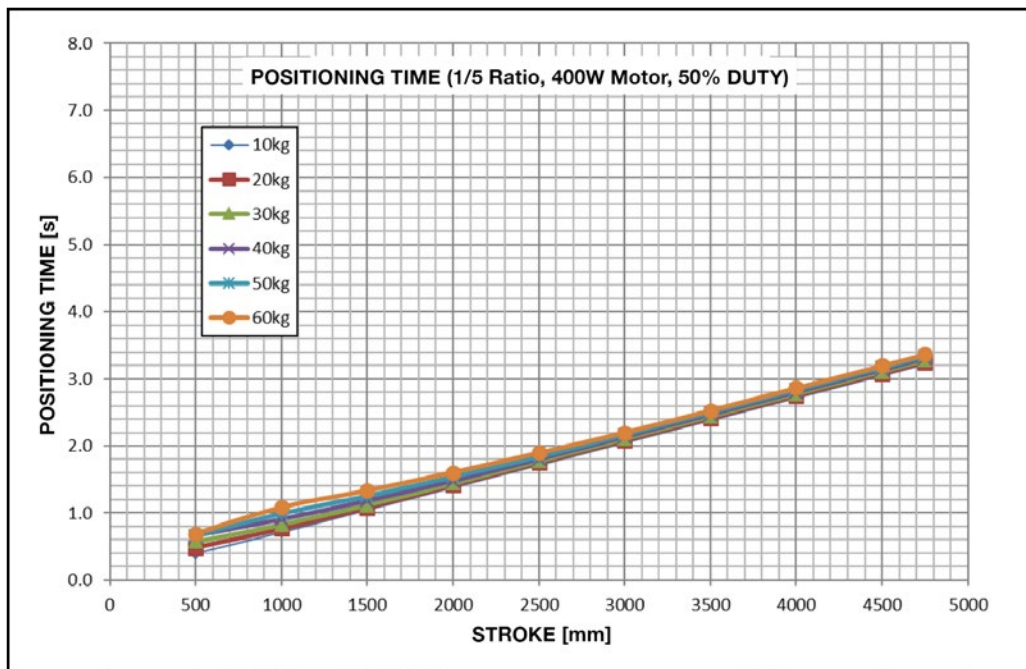
400W WITH 1/3 GEAR HEAD



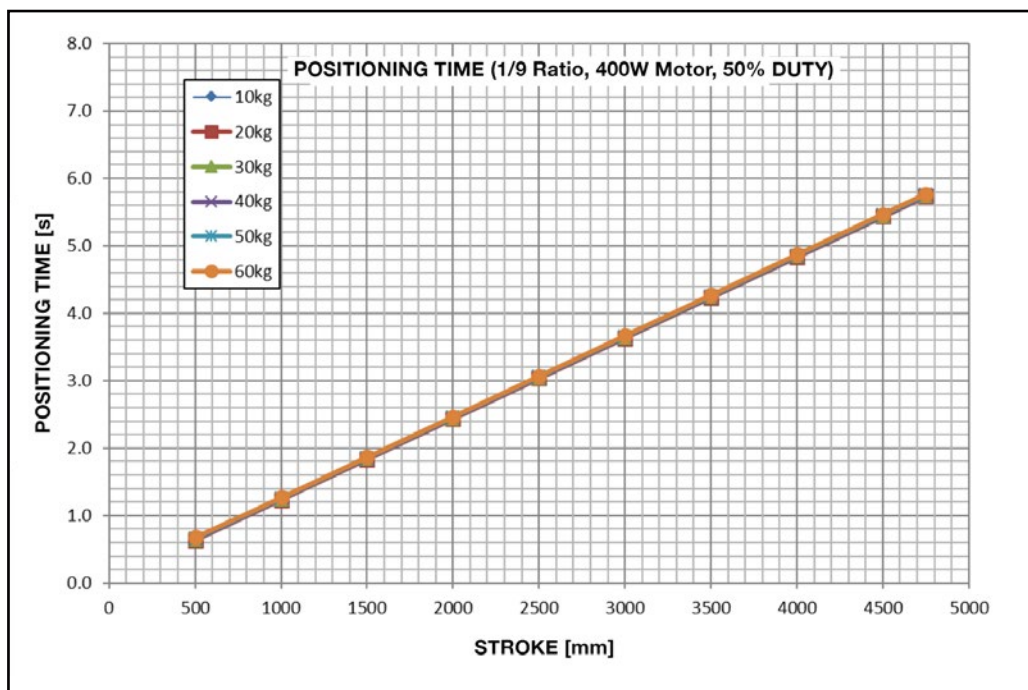
APPENDIX

Stroke and Positioning Time Chart

400W WITH 1/5 GEAR HEAD



400W WITH 1/9 GEAR HEAD



PRECAUTIONS

HANDLING

1. Do not disassemble this product. Doing so may allow foreign matter or objects to enter the product or cause reduced performance and precision.
2. Do not drop or strike this product. Doing so may damage the product. If this product is under shock, its functions may be impaired, even though it looks normal in appearance.

LUBRICANT

1. Wipe out anti-rust oil completely, then apply lubrication or lubricant.
2. Do not mix lubricants with different properties when applying lubricants.
3. Contact us in advance before using this product in places subject to constant vibration, or in special environments such as clean room, vacuum, low temperatures or high temperatures, as regular lubricants may not be used in such environments. Contact us to purchase the dedicated low-dust-raising grease, when using this product in a clean room.
4. Contact us in advance when using a special lubricant.
5. Lubrication is essential to ensure the best performance of this product. When no lubricant is applied, it can not only cause the bearings to be wear, but also reduce product life.
6. Usually, grease must be applied to this product every 100 kilometers under normal operating conditions. The interval for grease application must be determined upon initial inspection.

NOTES ON USE

1. If a foreign object or foreign matter enters this product, the ball circulation components may be damaged or its functions may be impaired.
2. Protect product from foreign matter, objects or particulates.
3. Contact us in advance when using this product is used in environments where coolants enter the interior of the product, because some types of coolant may reduce the performance of the product.
4. This product must be used within a temperature range from 0°C to 40°C. In addition, humidity must be 80% or less with no dew condensation. Contact us in advance if planning to use this product in a different range of temperature or humidity.
5. Contact us in advance when using this product in a place subject to constant vibration or in special environments such as clean room, vacuum, low temperatures or high temperatures.

STORAGE

This product must be kept level in our package or a shipment package during stock. Avoid locations with low temperature, high temperature or high humidity. If necessary, CAD data for this product may be downloaded from our technical support site.

