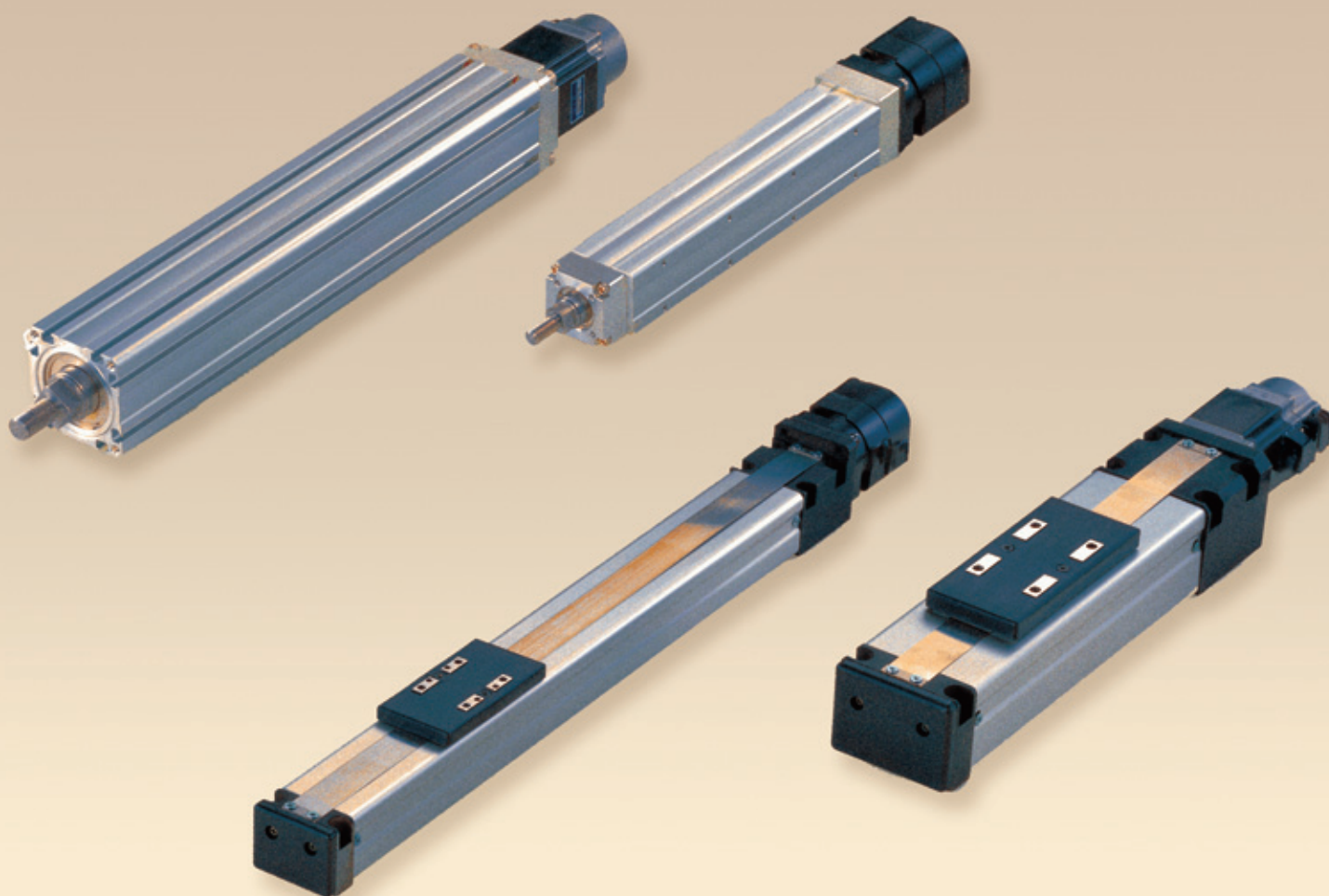


Low-cost Actuator

VLA

E-Motion Cylinder



There are two different types of actuators. Choice is based on the application.

VLA-ST / Slider Type

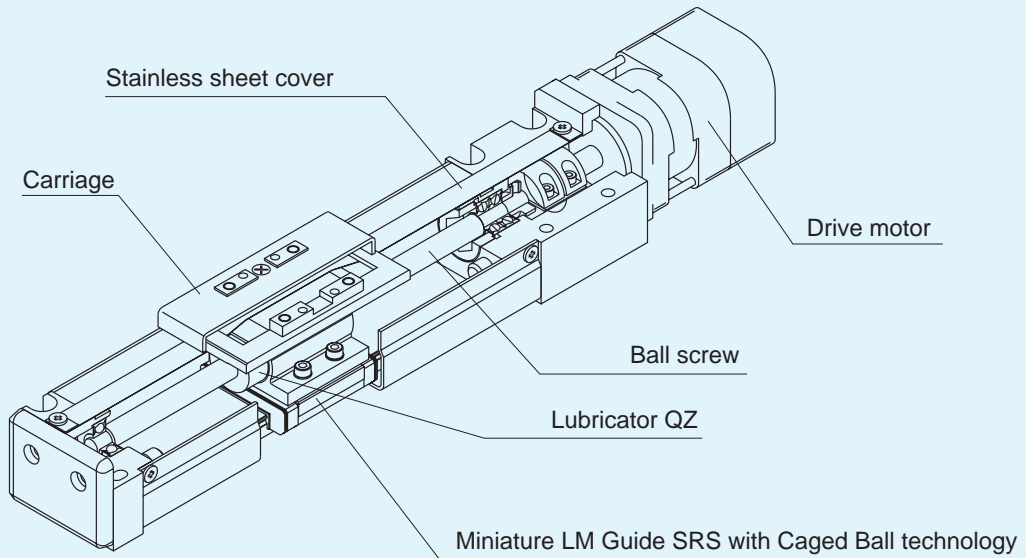


Fig. 1

VLA-CT / Cylinder Type

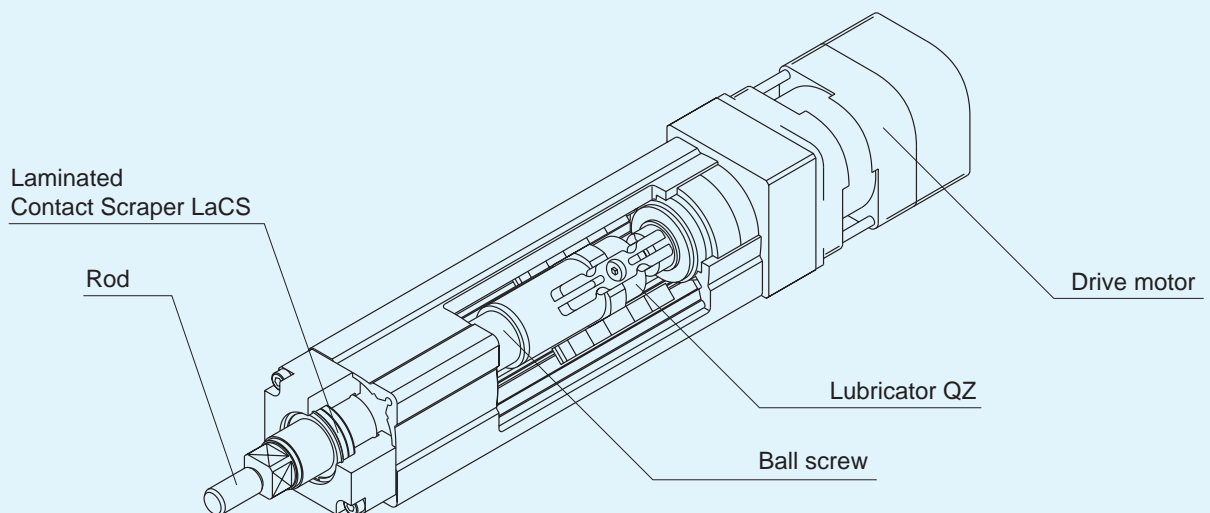


Fig. 2

Features

Simple Structure

THK achieved a simple, light weight, compact and cost effective design by using a Miniature LM Guide as the actuator's base and reducing the number of components.

Long-term Maintenance-free

By utilizing the Caged Ball Miniature LM Guide SRS and the Lubricator QZ for the ball screw, the actuator is long-term maintenance-free.

Environmentally friendly and energy efficient

By replacing pneumatic cylinders with the electric actuator VLA, oil mist lubrication is unnecessary, exhaust noise is eliminated, and efficiency is increased. Thus the system will be cleaner, quieter, and more efficient.

High Productivity

Using a high performance drive motor, ensures high speed motion, high productivity and high efficiency.

Flexibility

Various types of motors can be installed.

Contact Scraper LaCS

THK has developed Laminated Contact Scraper LaCS featuring superior foreign object removal capabilities.

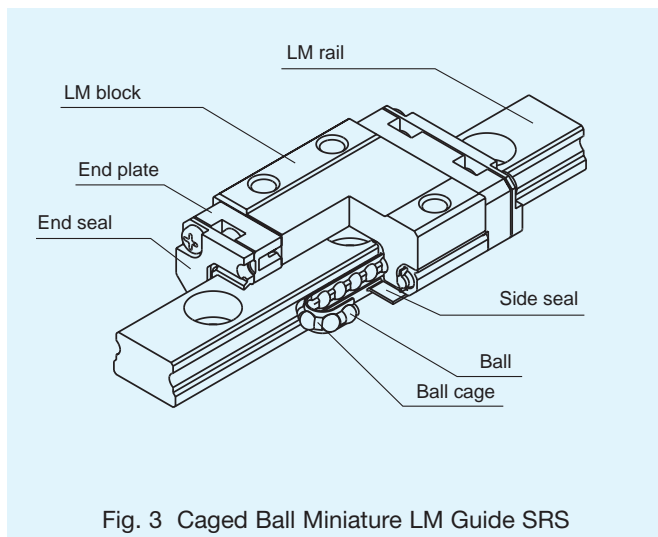


Fig. 3 Caged Ball Miniature LM Guide SRS

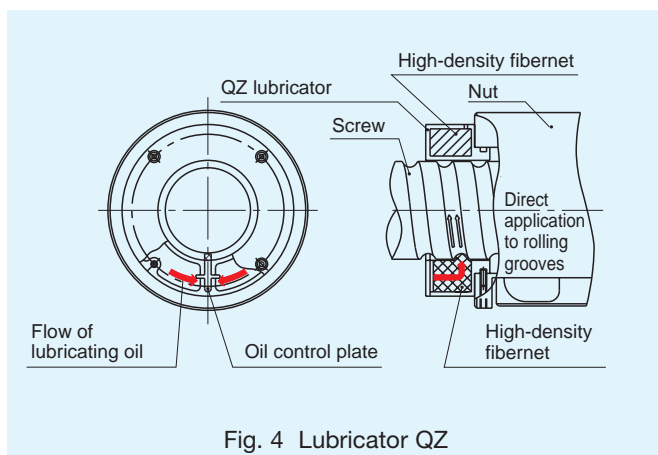


Fig. 4 Lubricator QZ

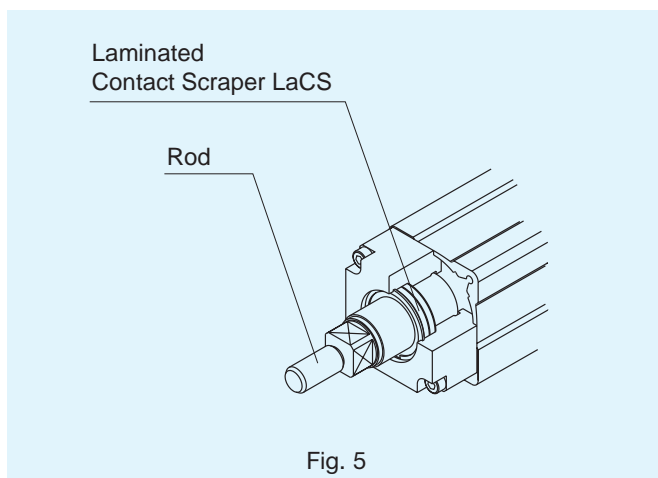


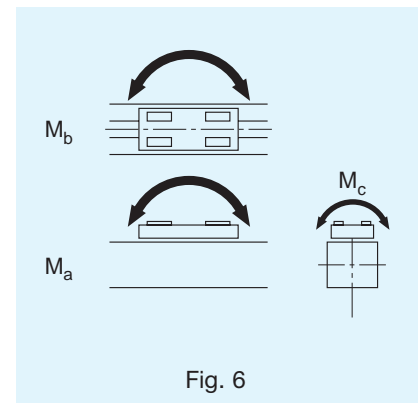
Fig. 5

VLA-ST / Model-Number Coding

VLA – ST – 45 – 06 – 0150 – N – 000 – N – N – N

1 2 3 4 5 6 7 8 9 10

- | | |
|---|--|
| 1 Actuator part number | 6 Motor
N = No Motor |
| 2 Actuator type | 7 Motor size
000 = No Motor |
| 3 Actuator height
(45 = 45 mm; 60 = 60 mm) | 8 Specification motor encoder
N = No Motor |
| 4 Ball screw lead
(06 = 6 mm; 12 = 12 mm) | 9 Motor lead line direction
N = No Motor |
| 5 Stroke
Ex) 0150 = 150 mm
or 0050 = 50 mm | 10 Option
N = No Option |



Specifications

	Unit	ST-45 (30W)		ST-60 (50 W)		ST-60 (100W)		
		High	Medium	High	Medium	High	Medium	
Continuous velocity	mm/s	600	300	600	300	600	300	
Max. velocity	mm/s	Stroke	300	1000	500	1000	500	1000
			350	1000	500	800	400	800
			400	1000	500	800	400	800
			450	840	420	800	400	800
			500	680	340	800	400	800
			550			800	400	800
			600			680	340	680
			700		500	250	500	
Continuous force	N	40	80	67	133	134	267	
Max. force	N	117	235	201	402	398	796	
Max. acceleration	m/s ²	3						
Max. payload in horizontal position	kg	5	10	8	16	16	30	
Max. payload in vertical position	kg	1.5	3	2.5	5	5	10	
Ball screw shaft dia.	mm	8		12				
Ball screw lead	mm	12	6	12	6	12	6	
Motor wattage ¹⁾	W	30		50		100		
Motor continuous torque	Nm	0.095		0.159		0.319		
Repeatability	mm	± 0.020						
Permissible moment	Nm	Ma = Mb = 12, Mc = 31		Ma = Mb = 25.7 Mc = 58				
Lifetime ²⁾	km	5000						

¹⁾ See Page 14 for recommended motors.

²⁾ Max. payload in horizontal position, acceleration= 3m/s², velocity= 600 bzw. 300 mm/s.

VLA-ST-45

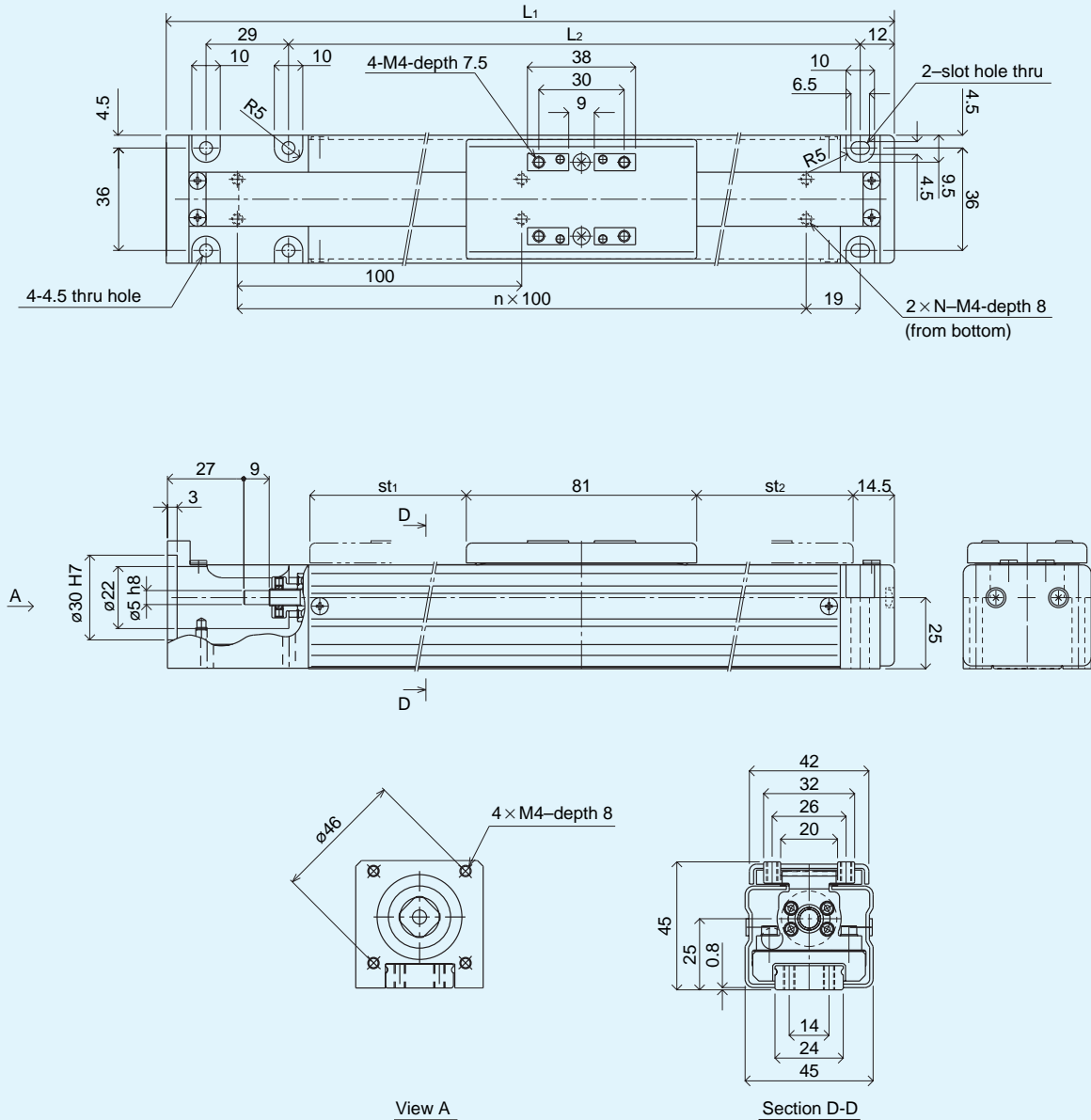


Fig. 7

Dimensions

Model No.	Stroke [mm]	Stroke between Stoppers [mm]	L_1 [mm]	L_2 [mm]	n	N	Weight [kg]
0050	50	60	206	151	1	2	0.83
0100	100	110	256	201	2	3	0.94
0150	150	160	306	251	2	3	1.05
0200	200	210	356	301	3	4	1.15
0250	250	260	406	351	3	4	1.26
0300	300	310	456	401	4	5	1.37
0350	350	360	506	451	4	5	1.48
0400	400	410	556	501	5	6	1.59
0450	450	460	606	551	5	6	1.70
0500	500	510	656	601	6	7	1.81

VLA-ST-60

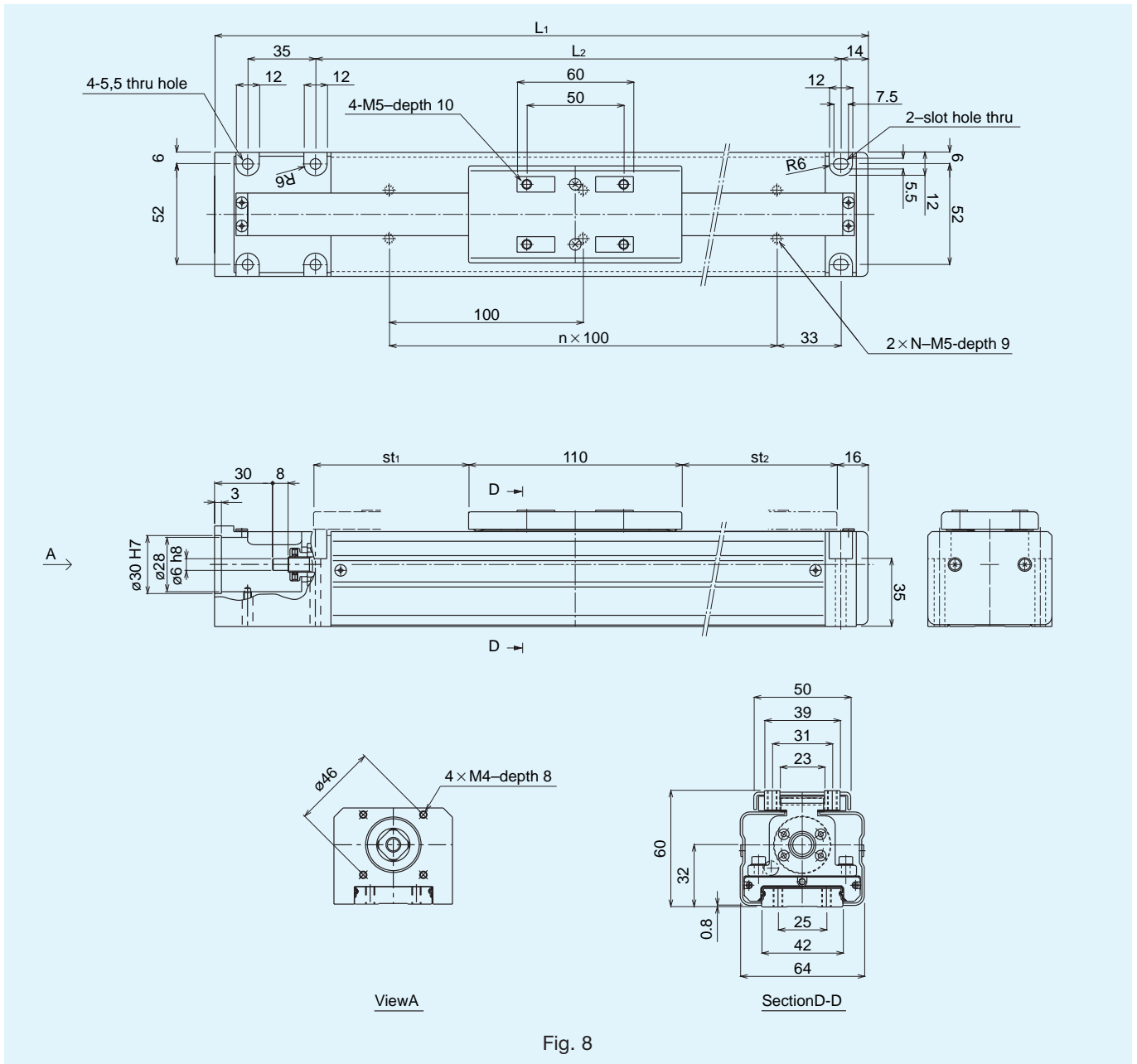


Fig. 8

Dimensions

Model No.	Stroke [mm]	Stroke between Stoppers [mm]	L_1 [mm]	L_2 [mm]	n	N	Weight [kg]
0050	50	60	237	171	1	2	1,87
0100	100	110	287	221	2	3	2,07
0150	150	160	337	271	2	3	2,28
0200	200	210	387	321	3	4	2,48
0250	250	260	437	371	3	4	2,68
0300	300	310	487	421	4	5	2,89
0350	350	360	537	471	4	5	3,09
0400	400	410	587	521	5	6	3,30
0450	450	460	637	571	5	6	3,50
0500	500	510	687	621	6	7	3,70
0550	550	560	737	671	6	7	3,91
0600	600	610	787	721	7	8	4,11
0700	700	710	887	821	8	9	4,52

VLA-CT / Model-Number Coding

VLA – CT – 35 – 12 – 0150 – N – 000 – N – N – N

1 2 3 4 5 6 7 8 9 10

1 Actuator part number

2 Actuator type

3 Actuator width
(35 = 35 mm; 45 = 45 mm; 55 = 55 mm)

4 Ball screw lead
(12 = 12 mm)

5 Stroke
Ex) 0150 = 150 mm
oder 0050 = 50 mm

6 Motor assembly
(N = No Motor)

7 Motor size
(000 = No Motor)

8 Specification motor encoder
(N = No Motor)

9 Motor cable direction
(N = No Motor)

10 Option
(A: With Bracket Base;
B: With Flange; N = No Option)

Specifications

VLA-CT ¹⁾	Unit	CT-35	CT-45	CT-55
Continuous velocity	mm/s	600	600	600 (470: For 300 mm stroke)
Continuous force	N	40	67	134
Max. force	N	120	201	402
Max. payload in horizontal position ²⁾	kg	4	7	25
Max. payload in vertical position ³⁾	kg	1.9	3.1	6.5
Ball screw shaft dia.	mm	8		12
Ball screw lead	mm	12		
Repeatability	mm	± 0.020		
Motor wattage ⁴⁾	W	30	50	100
Motor continuous torque	Nm	0.095	0.158	0.319
Rod dia.	mm	16	20	25
Stroke	mm	50 / 100 / 150	50 / 100 / 150 / 200	50 / 100 / 150 / 200 / 250 / 300
Lifetime ⁵⁾	km	5000		

¹⁾ The actuator VLA is not suitable for radial and lateral loads. In this case please use THK LM Guides.

²⁾ The maximum payload in a horizontal position is only valid when the load is shared with an additional LM Guide and no further axial load is applied. When choosing the correct size of the LM Guide take also the running resistance into consideration.

³⁾ Valid for maximal payload in vertical position, acceleration = 3 m/s², velocity = 600 mm/s

⁴⁾ See Page 14 for recommended motors.

⁵⁾ Acceleration 3 m/s²

VLA-CT-35

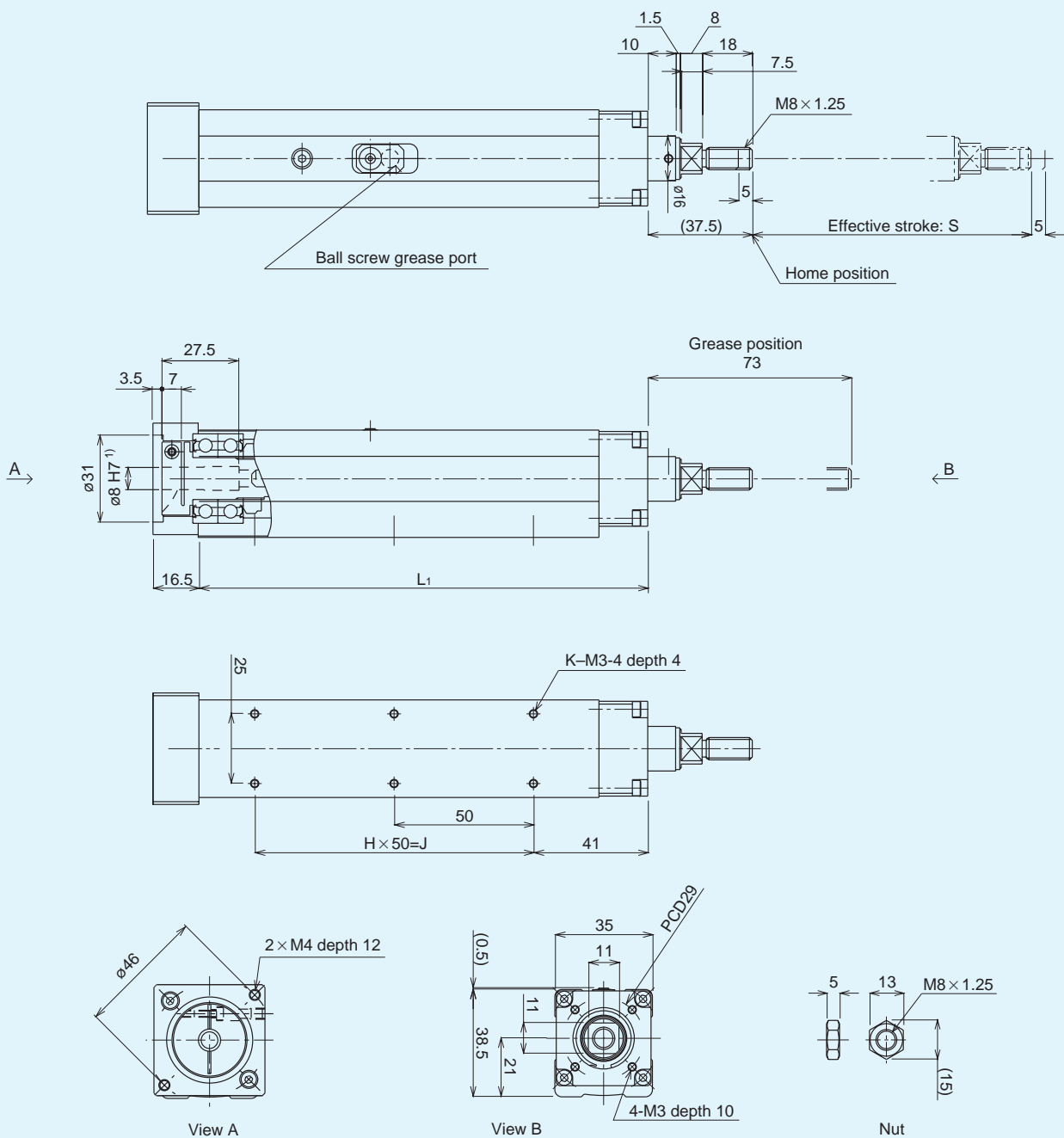


Fig. 9

Dimensions

Model No.	Stroke [mm]	L ₁ [mm]	H	J	K	Weight [kg]
0050	50	161	2	100	6	0.7
0100	100	211	3	150	8	0.9
0150	150	261	4	200	10	1.0

¹⁾ When using other motors with different shaft diameters please contact THK.

VLA-CT-45

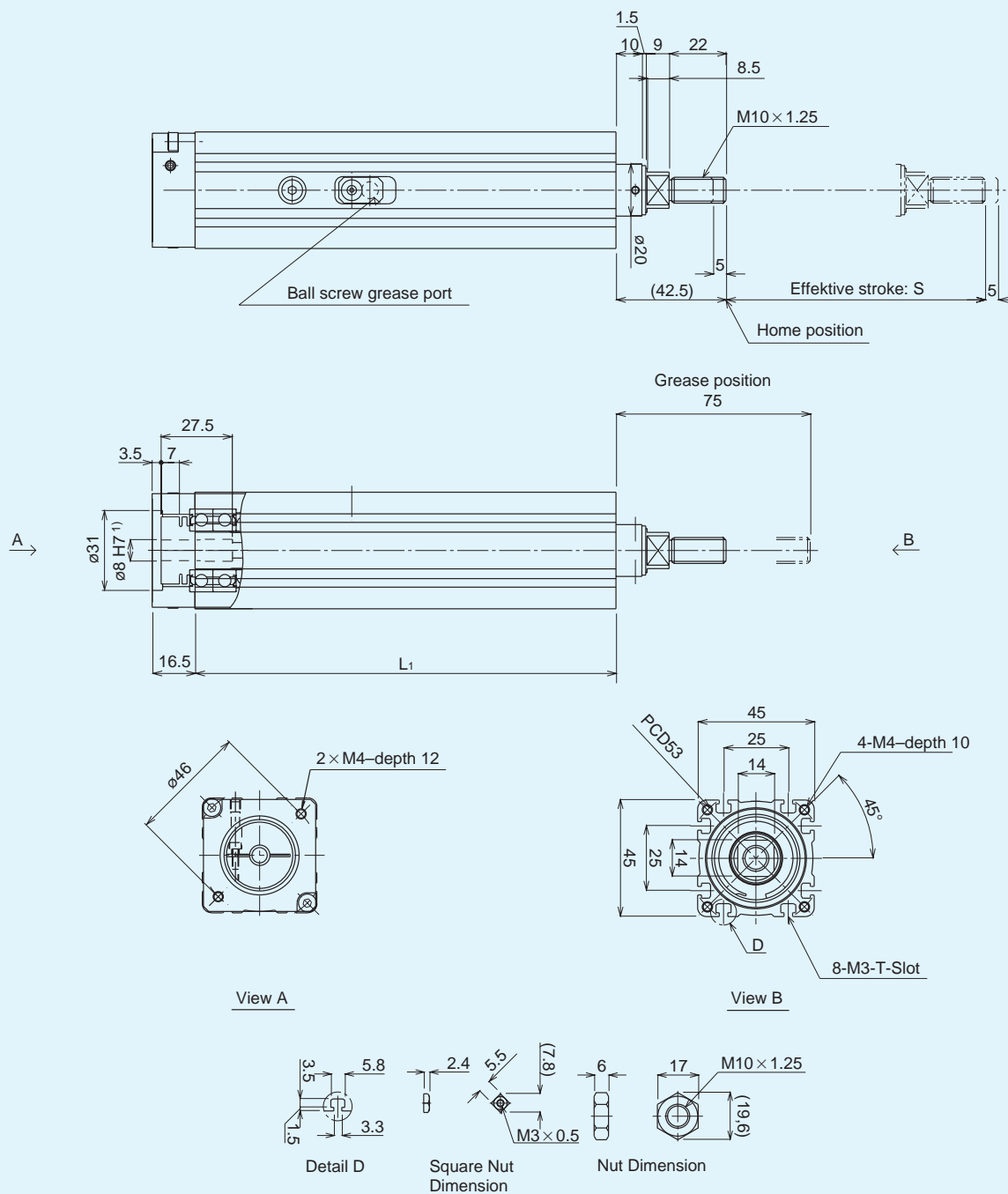


Fig. 10

Dimensions

Model No.	Stroke [mm]	L_1 [mm]	Weight [kg]
0050	50	162.5	1.1
0100	100	212.5	1.4
0150	150	262.5	1.6
0200	200	312.5	1.9

¹⁾ When using other motors with different shaft diameters please contact THK.

VLA-CT-55

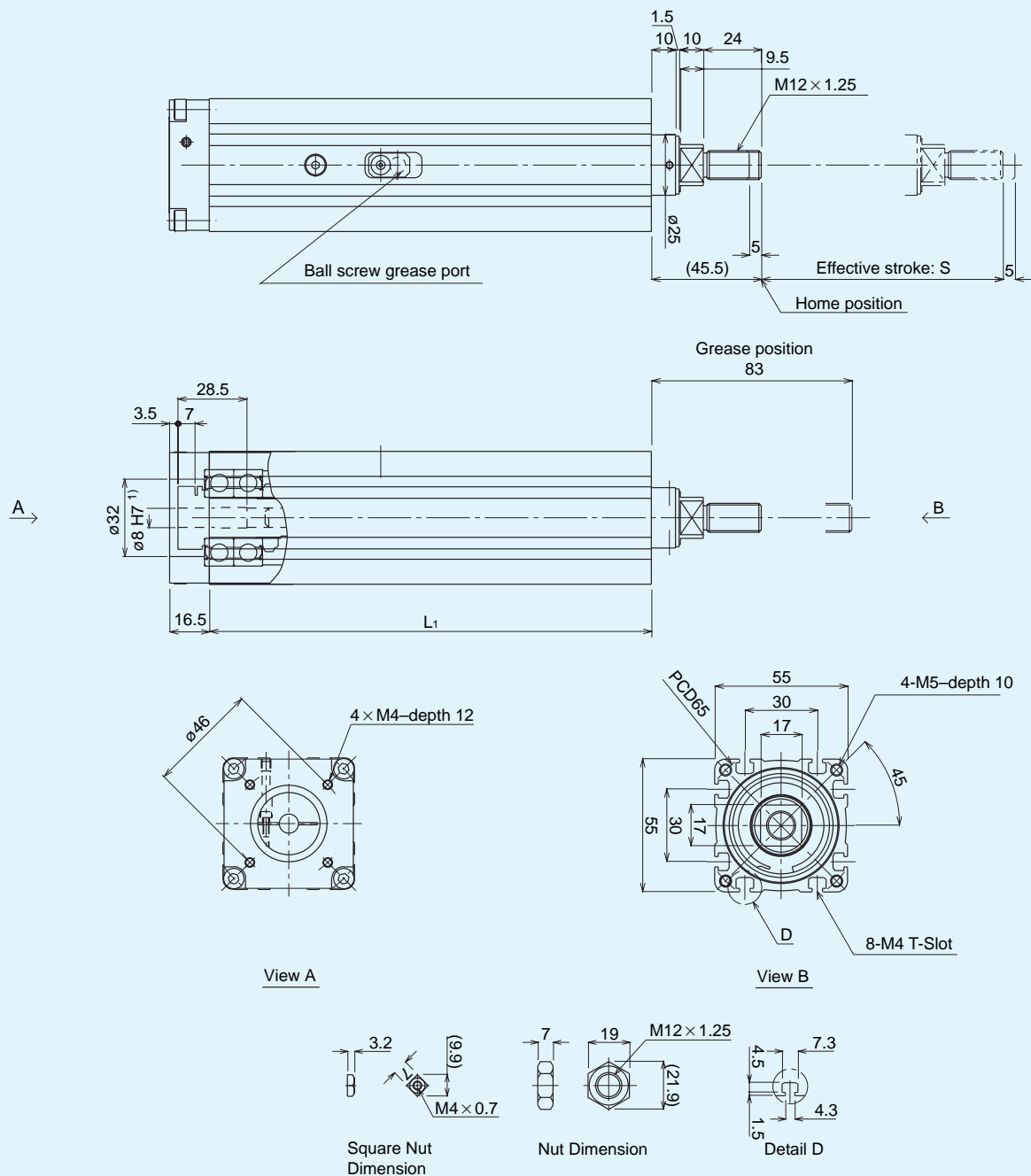


Fig. 11

Dimensions

Model No.	Stroke [mm]	L_1 [mm]	Weight [kg]
0050	50	183	1.7
0100	100	233	2.1
0150	150	283	2.5
0200	200	333	2.8
0250	250	383	3.2
0300	300	433	3.6

¹⁾ When using other motors with different shaft diameters please contact THK.

VLA-CT Option A: Base Attachment Bracket

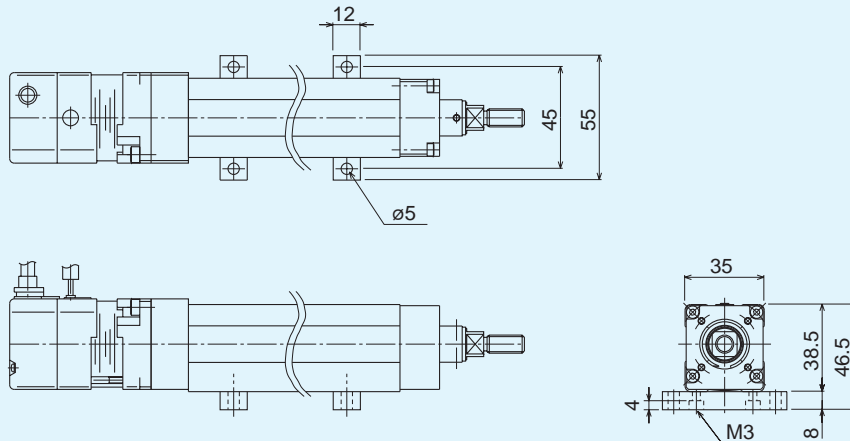


Fig. 12 Base Attachment Bracket CT 35

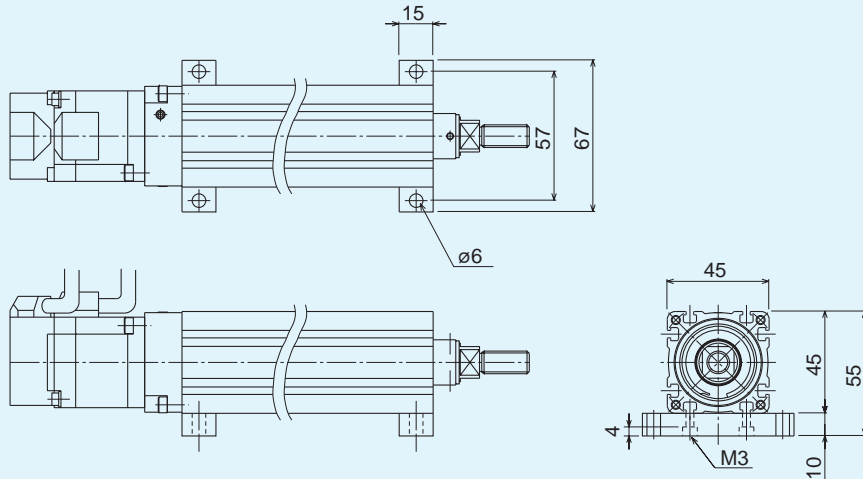


Fig. 13 Base Attachment Bracket CT 45

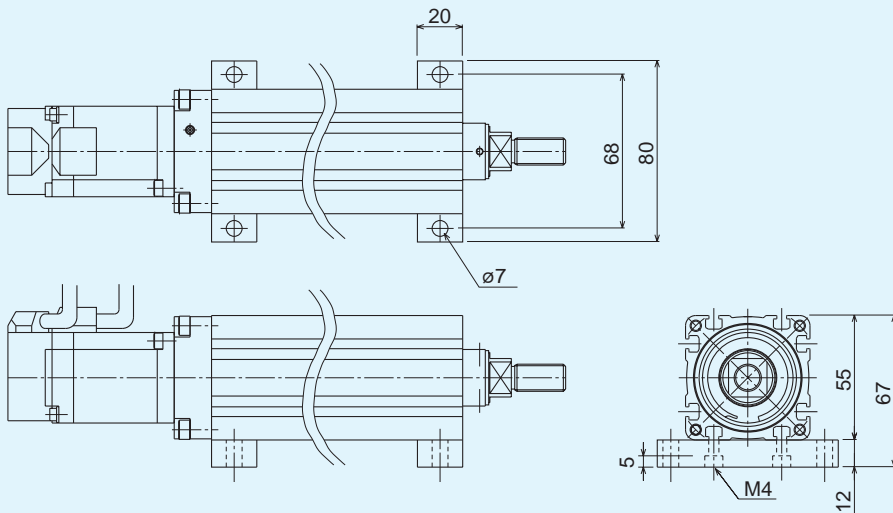


Abb. 14 Base Attachment Bracket CT 55

VLA-CT Option B: Flanges

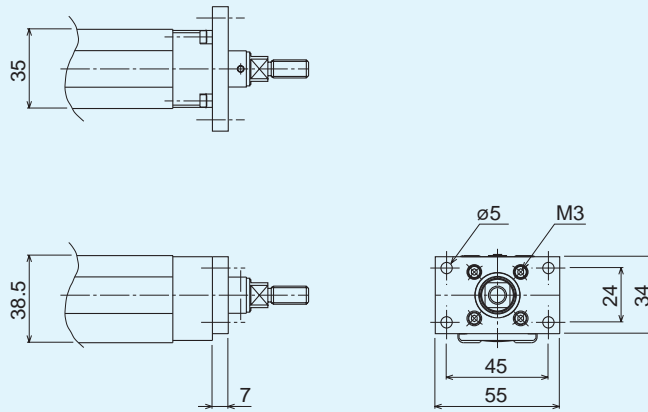


Fig. 15 Flange CT 35

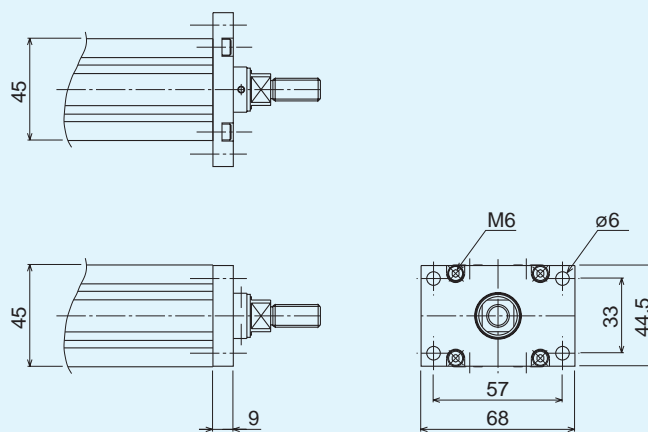


Fig. 16 Flange CT 45

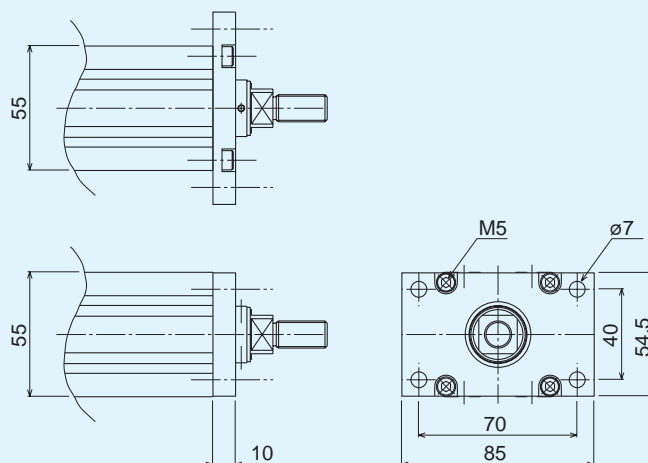
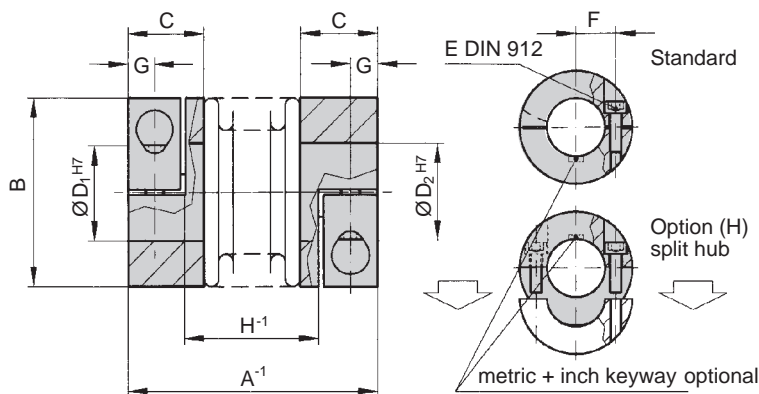


Fig. 17 Flange CT 55

Option: Couplings –Type MK 2 –



Properties

- frictional connection utilizing clamping hubs
- for high dynamic applications
- backlash-free and torsionally rigid
- low moment of inertia
- compensates for 3-axis of misalignment

Recommended Couplings

for ST45: MK2 - 10 - 30 - 5H7 - 8H7
 ST60: MK2 - 15 - 30 - 6H7 - 8H7
 referring to Mitsubishi Motors.

Note:

For the use of ST45 only model MK2-10 is possible.

Material:

Centre section is made of highly flexible high-grade stainless steel, hubs from aluminium

Design:

With a single radial clamping screw per hub DIN 912.

Technical specifications

Series	Rated torque [Nm]	Overall length [mm]	Outer diameter [mm]	Fit length of hub [mm]	Special bores from ϕ to ϕ H7 [mm]	Standard bore H7 [mm]	Screws DIN 912 [mm]	Distance between centers [mm]	Distance [mm]	Distance [mm]	Mass moment of inertia [H]	Weight [mm]	Torsional stiffness [H]	Torsional stiffness [g]	axial [Nm/rad]	lateral [mm]	angular [degrees]
	T_{KN}	A	B	C	$D_{1/2}$	$D_{1/2}$	E	F	G	H	J_{ges}		C_T	Max. values			
10	1.0	27	15	9	3-7	6	M2	4,5	3	14	3	9	510	0.4	0.15	1	
		17								3.4	10	380	0.5	0.2	1.5		
		20								3.6	11	320	0.6	0.25	2		
15	1.5	30	19	11	3-8	6	M2.5	6	3.5	14.5	8.5	22	750	0.5	0.15	1.5	
		19.5								9.5	24	700	0.7	0.2	1.5		
20	2.0	35	25	13	3-12.7	6/10	M3	8	4	17	25	36	1200	0.5	0.15	1.5	
		22								27	38	1300	0.6	0.2	1.5		
		26								29	40	1200	0.7	0.25	2		

Temperature range: -30 to +120°C (3,6 F to 237 F), peaks up to 120°C (270 F).

Speeds: Up to 10,000 rpm, in excess of 10,000 rpm with balanced version.

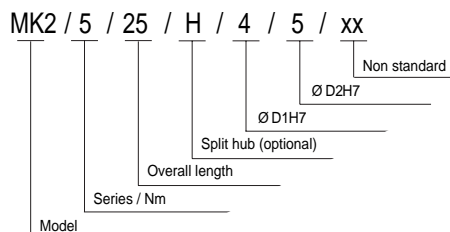
Backlash: Absolutely backlash-free due to frictional clamp connection.

Tolerance: On the hub/shaft connection 0.01 bis 0.05 mm.

Service life: These coupling have an infinite life, and are maintenance-free if the technical limits are not exceeded.

Non-standard design applications: Custom designs with varied tolerances, keyways, non-standard material and bellows are available upon request.

Ordering example:



Option: Motor Adapter

Motor

The LM Guide Actuator VLA can be provided with a motor adapter. In this case please indicate the name of the motor manufacturer together with the type number and the fitting dimensions. - Please consider the dimensions of the connecting arrangement because the dimensions of the motor can be bigger than the dimensions of the LM Guide Actuator.

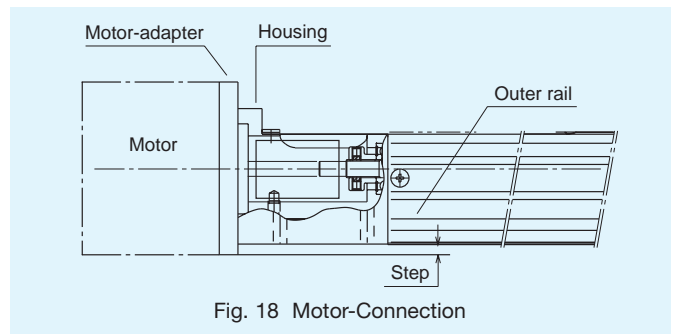


Fig. 18 Motor-Connection

Recommended Motors

The values for the motor power as well as for the motor torque, which are mentioned under the actuator specifications on page 4 and 7 respectively, are based on the following motors:

Manufacturer ¹⁾	Motor		Encoder		Actuator	
			A	I	Type ST	Type CT
FANUC	βM0.2		x		ST-60	CT-45
	βM0.3		x			CT-55
OMRON Yaskawa	Σ- III	SGMAS-A5	x	x	ST-45	CT-55
		SGMAS-01	x	x		CT-55
	Σ- II	SGMAH-A3	x	x	ST-45 ST-60	CT-55
		SGMAH-A5	x	x		CT-45
		SGMAH-01	x	x		CT-55
Mitsubishi	HC-MFS053		x		ST-45 ST-60	CT-45
	HC-MFS13		x			CT-55
	HC-KFS053		x			CT-45
	HC-KFS13		x		CT-55	
	HC-PQ033			x	ST-45	CT-35
	HC-PQ053			x	ST-60	CT-45
	HC-PQ13			x		CT-55
Sanyo Denki	P30B04003		x	x	ST-45	
	P30B04005		x	x	ST-60	CT-45
	P30B04010		x	x		CT-55

¹⁾ For confirmation of motors available please check with the appropriate European THK branch.

A = Absolute encoder
I = Incremental encoder

Important Note on Handling Precaution and Manufacturer Liability

Motor

If you want to use motors with more power or higher torque please consult THK and indicate the motor manufacturer together with the motor specifications.

Encoder

Please use a motor with an absolute encoder.

Sensor

When using a motor with an incremental encoder or a motor without encoder the end positions must have end of travel sensors. Furthermore, a reference switch is required.

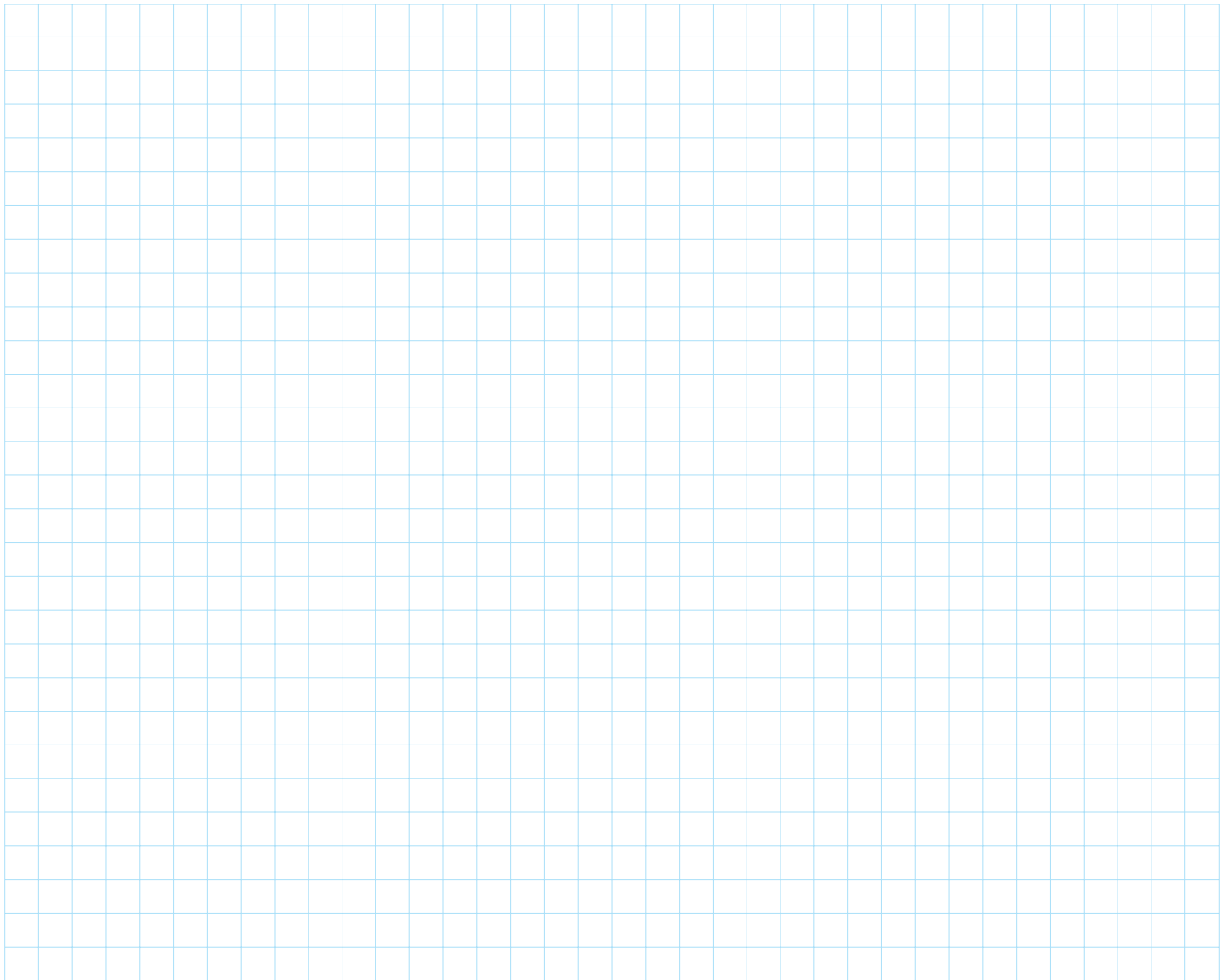
Max. Payload/Force

The cylinder actuator VLA-CT can only take loads in the radial direction. When loads are applied from different directions additional LM Guides must be used.

The slider actuator VLA-ST can bear loads in all four directions: radial, reverse-radial and lateral directions. If the loads are exceeding the permissible loads additional LM Guides must be used.

If these precautions are not adhered to, THK can't give any guarantee.

Sketches





Precautions on Use

• Handling

- Do not drop the actuator VLA or subject it to impacts, as doing so may damage it. Therefore, great care should be exercised in its handling.
- Unauthorized disassembly of the actuator could lead to contamination by foreign matter and impair the precision. Therefore, disassembly should not be performed unless it is absolutely necessary.

• Environmental Conditions

- Do not use the actuator VLA below or over 0 ~ 40 °C or at a humidity below or over 20 ~ 80 %. Otherwise, condensation water could lead to corrosion.

• Mounting Surface

- The flatness of the mounting surface must be better than 0,1 mm.

• Precautions on Use

- Do not touch moving parts during operation.
- Do not get into the working space during operation or in operable condition.
- Before opening the actuator VLA and the corresponding parts disconnect all electrical components from the power supply.

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Specifications are subject to change without notice

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