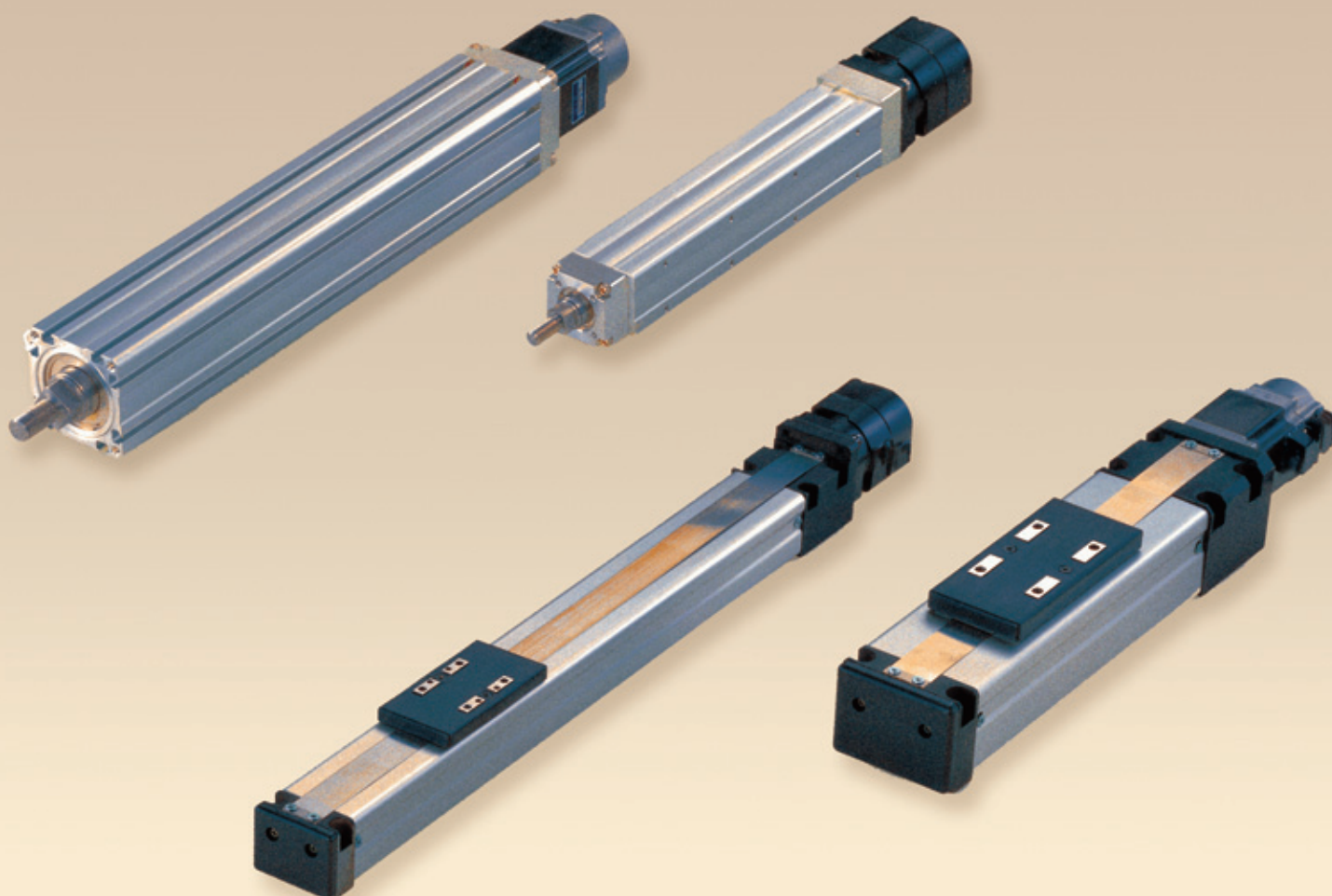


# Low-cost Actuator

# VLA

## E-Motion Cylinder



## How to contact your authorised distributor

### Distribution Centres

#### Rotherham CDC

**T** 0845 602 9946

**F** 01709 789 988

**E** [sales@acorn-ind.co.uk](mailto:sales@acorn-ind.co.uk)

**W** [www.acorn-ind.co.uk](http://www.acorn-ind.co.uk)

#### Midlands RDC

**T** 0121 521 5999

**F** 0121 521 5888

**E** [midlands@acorn-ind.co.uk](mailto:midlands@acorn-ind.co.uk)

**W** [www.acorn-ind.co.uk/midlands](http://www.acorn-ind.co.uk/midlands)

#### North East RDC

**T** 0191 417 8899

**F** 0191 419 0001

**E** [northeast@acorn-ind.co.uk](mailto:northeast@acorn-ind.co.uk)

**W** [www.acorn-ind.co.uk/northeast](http://www.acorn-ind.co.uk/northeast)

#### South West RDC

**T** 01179 820 414

**F** 01179 823 222

**E** [southwest@acorn-ind.co.uk](mailto:southwest@acorn-ind.co.uk)

**W** [www.acorn-ind.co.uk/southwest](http://www.acorn-ind.co.uk/southwest)

### Regional Branches

#### North West Branch

**T** 0845 602 3568

**F** 01229 833 510

**E** [northwest@acorn-ind.co.uk](mailto:northwest@acorn-ind.co.uk)

**W** [www.acorn-ind.co.uk/northwest](http://www.acorn-ind.co.uk/northwest)

#### Scotland Branch

**T** 01506 476 199

**F** 01506 462 655

**E** [scotland@acorn-ind.co.uk](mailto:scotland@acorn-ind.co.uk)

**W** [www.acorn-ind.co.uk/scotland](http://www.acorn-ind.co.uk/scotland)

### Divisions

#### Export Division

**T** +44 1709 789 933

**F** +44 1709 789 966

**E** [export@acorn-ind.co.uk](mailto:export@acorn-ind.co.uk)

**W** [www.acorn-ind.co.uk/export](http://www.acorn-ind.co.uk/export)

#### Linear Division

**T** 01709 789 949

**E** [linear@acorn-ind.co.uk](mailto:linear@acorn-ind.co.uk)

**W** [www.acorn-ind.co.uk/linear](http://www.acorn-ind.co.uk/linear)

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

## VLA-ST / Slider Type

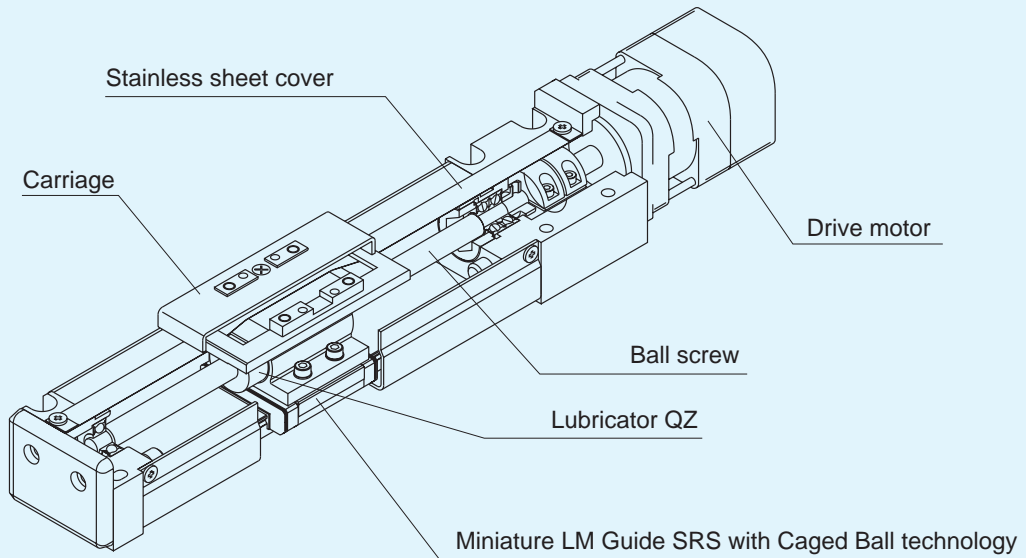


Fig. 1

## VLA-CT / Cylinder Type

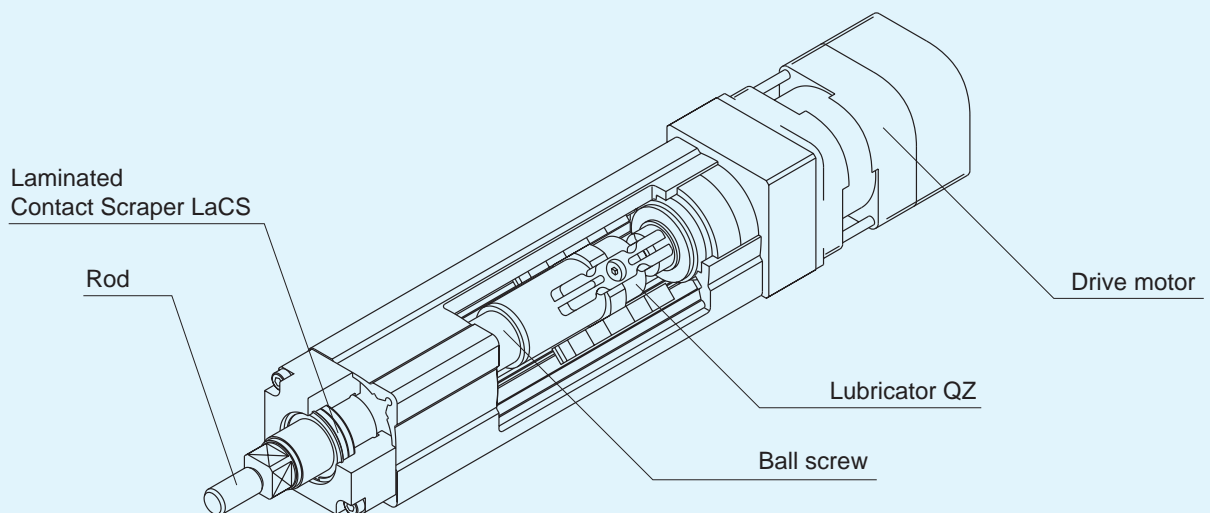


Fig. 2

## 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.

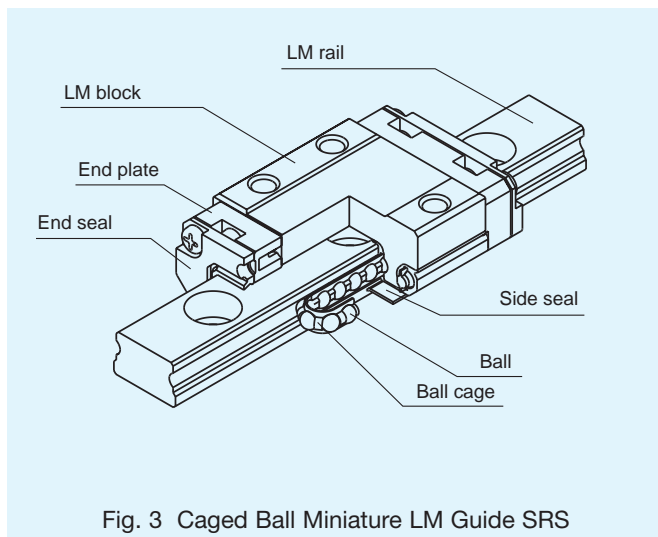


Fig. 3 Caged Ball Miniature LM Guide SRS

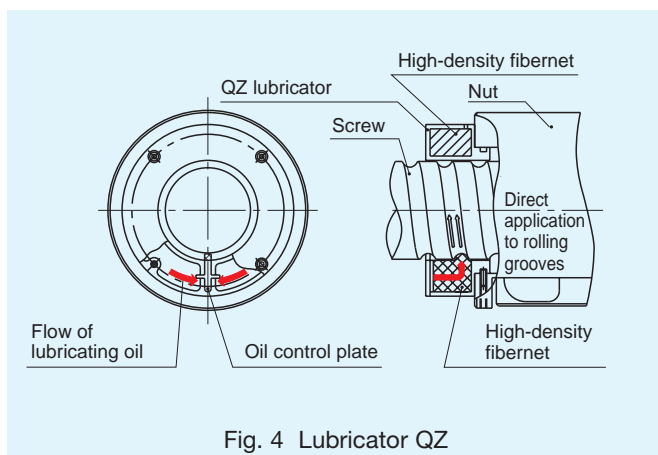


Fig. 4 Lubricator QZ

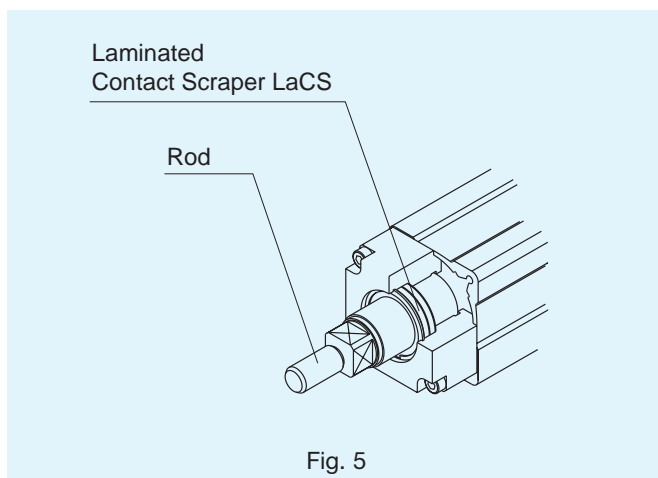


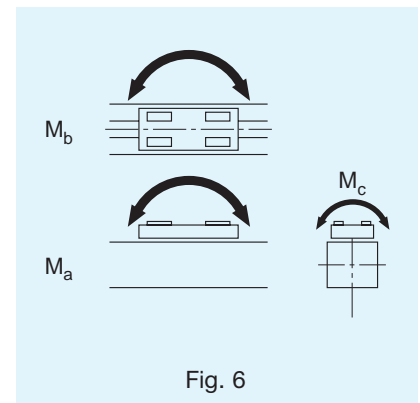
Fig. 5

## 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

- |   |  |
|---|--|
| <b>1</b> Actuator part number                           | <b>6</b> Motor<br>N = No Motor                       |
| <b>2</b> Actuator type                                  | <b>7</b> Motor size<br>000 = No Motor                |
| <b>3</b> Actuator height<br>(45 = 45 mm; 60 = 60 mm)    | <b>8</b> Specification motor encoder<br>N = No Motor |
| <b>4</b> Ball screw lead<br>(06 = 6 mm; 12 = 12 mm)     | <b>9</b> Motor lead line direction<br>N = No Motor   |
| <b>5</b> Stroke<br>Ex) 0150 = 150 mm<br>or 0050 = 50 mm | <b>10</b> Option<br>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 <sup>2</sup>	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 <sup>1)</sup>	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 <sup>2)</sup>	km	5000						

<sup>1)</sup> See Page 14 for recommended motors.

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

## VLA-ST-45

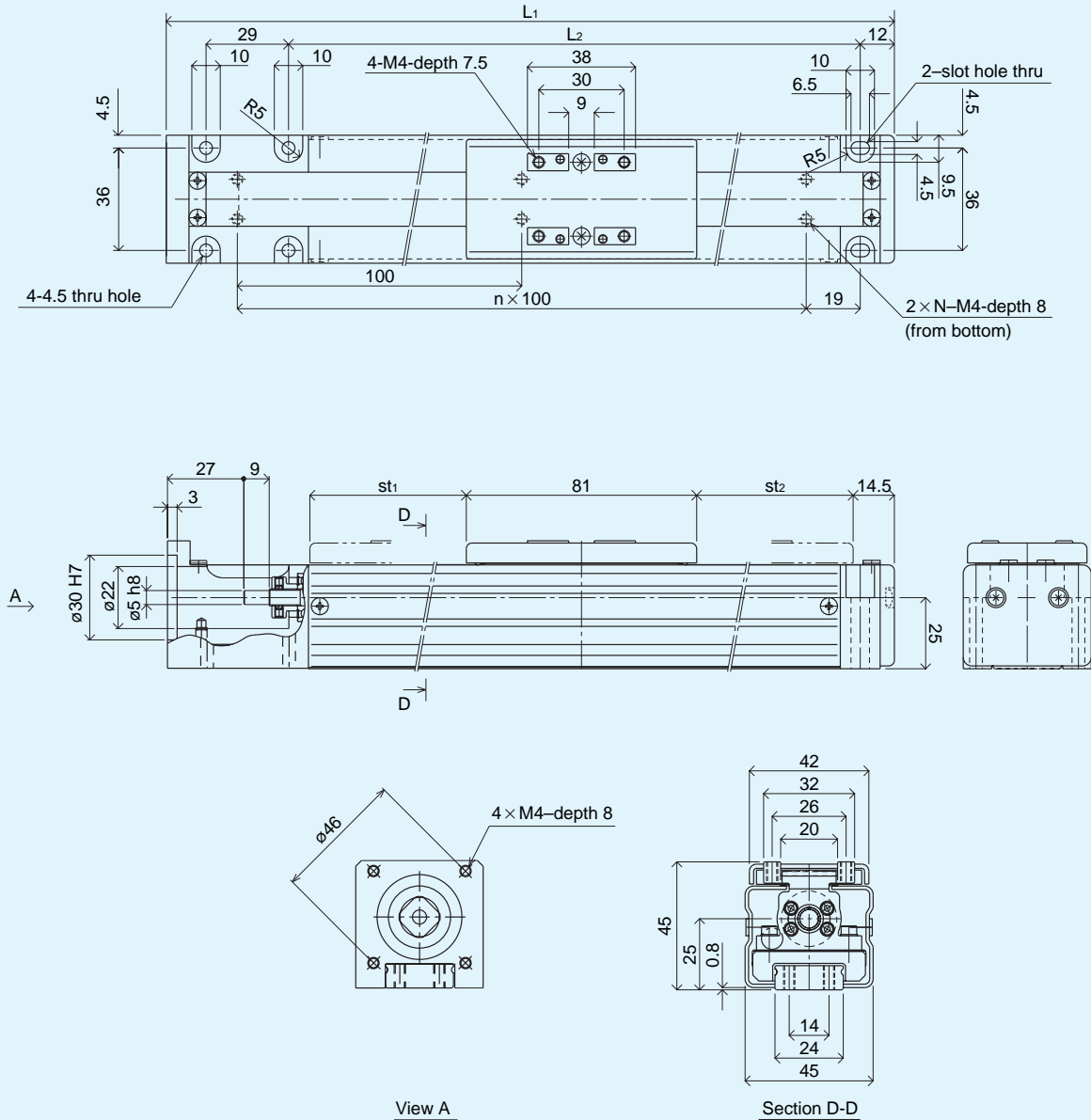


Fig. 7

### 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

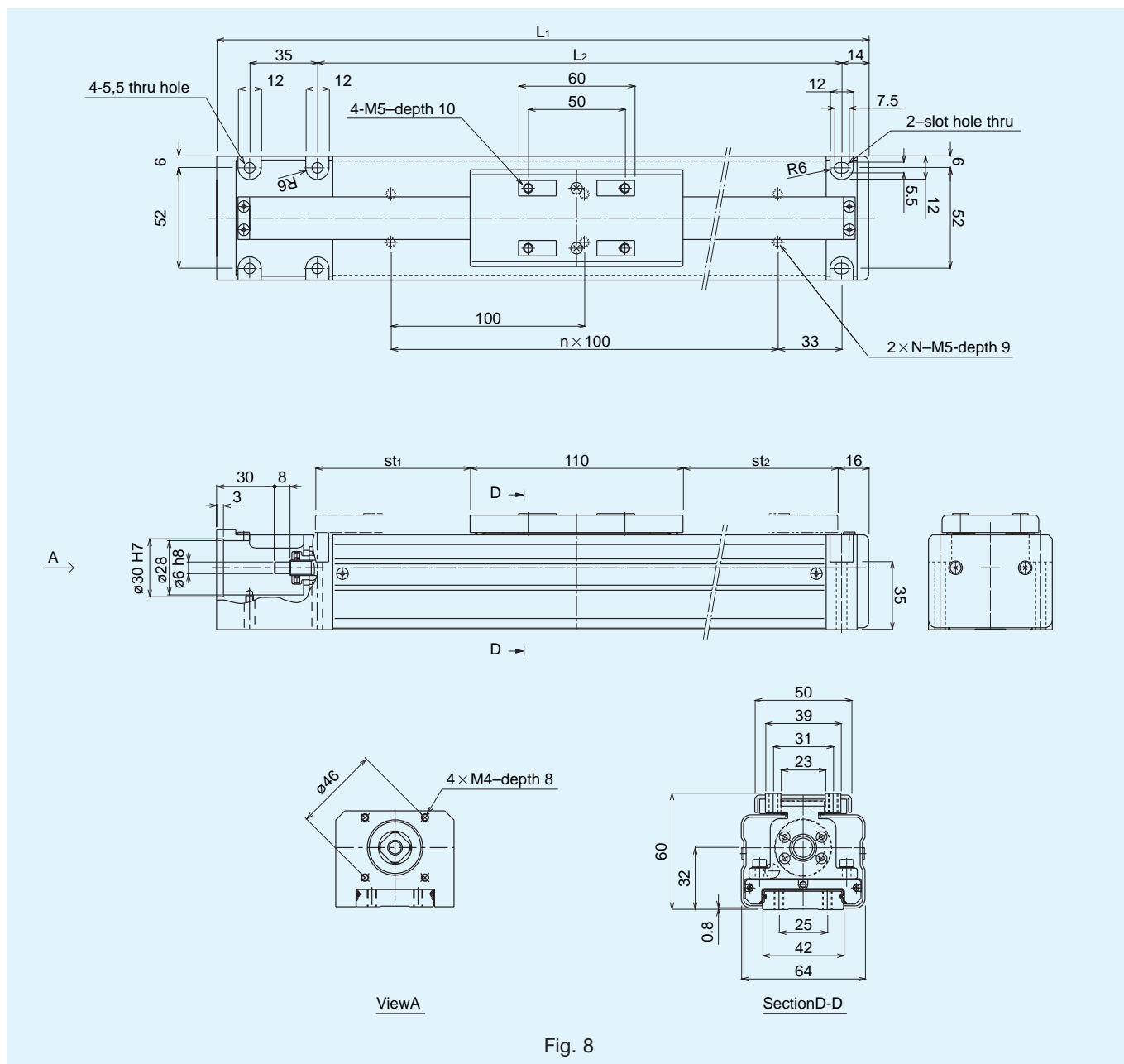


Fig. 8

### 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

- |   |  |
|---|--|
| <b>1</b> Actuator part number                                   | <b>6</b> Motor assembly<br>(N = No Motor)                                    |
| <b>2</b> Actuator type  | <b>7</b> Motor size<br>(000 = No Motor)                                      |
| <b>3</b> Actuator width<br>(35 = 35 mm; 45 = 45 mm; 55 = 55 mm) | <b>8</b> Specification motor encoder<br>(N = No Motor)                       |
| <b>4</b> Ball screw lead<br>(12 = 12 mm)                        | <b>9</b> Motor cable direction<br>(N = No Motor)                             |
| <b>5</b> Stroke<br>Ex) 0150 = 150 mm<br>oder 0050 = 50 mm       | <b>10</b> Option<br>(A: With Bracket Base;<br>B: With Flange; N = No Option) |

## Specifications

VLA-CT <sup>1)</sup>	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 <sup>2)</sup>	kg	4	7	25
Max. payload in vertical position <sup>3)</sup>	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 <sup>4)</sup>	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 <sup>5)</sup>	km	5000		

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

<sup>2)</sup> 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.

<sup>3)</sup> Valid for maximal payload in vertical position, acceleration = 3 m/s<sup>2</sup>, velocity = 600 mm/s

<sup>4)</sup> See Page 14 for recommended motors.

<sup>5)</sup> Acceleration 3 m/s<sup>2</sup>

## VLA-CT-35

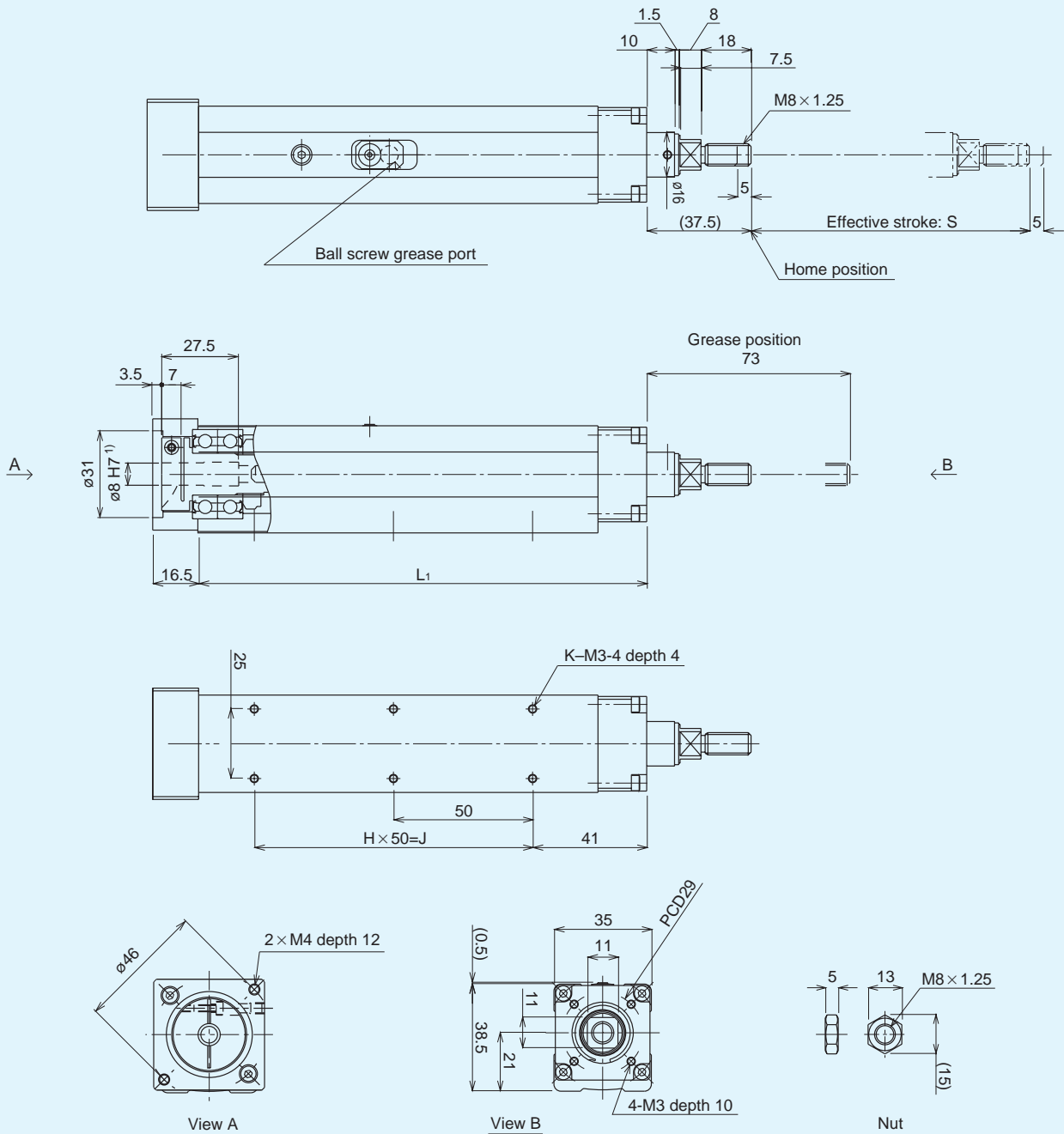


Fig. 9

### Dimensions

Model No.	Stroke [mm]	L <sub>1</sub> [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

<sup>1)</sup> When using other motors with different shaft diameters please contact THK.

## VLA-CT-45

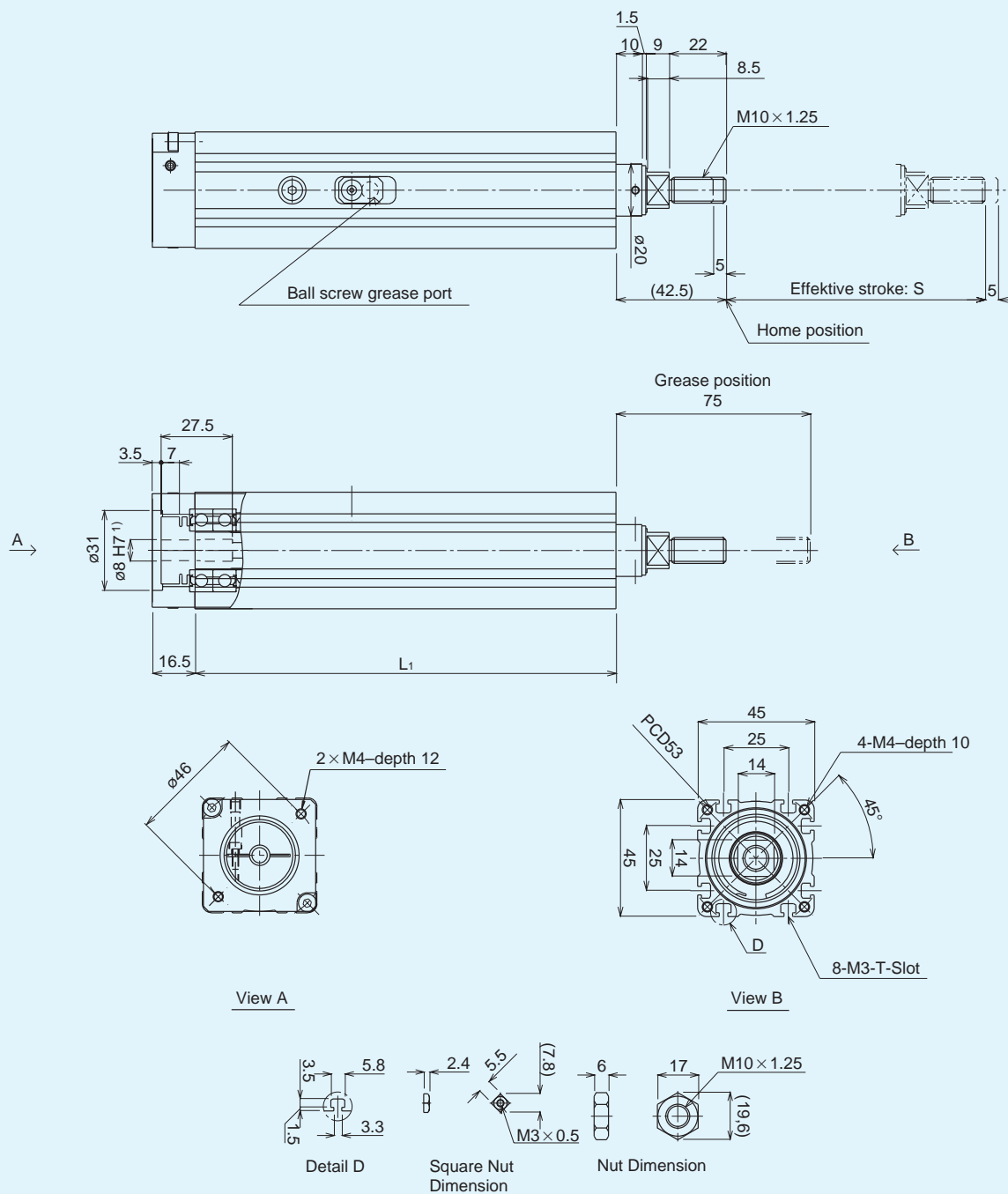


Fig. 10

### 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

<sup>1)</sup> When using other motors with different shaft diameters please contact THK.

## VLA-CT-55

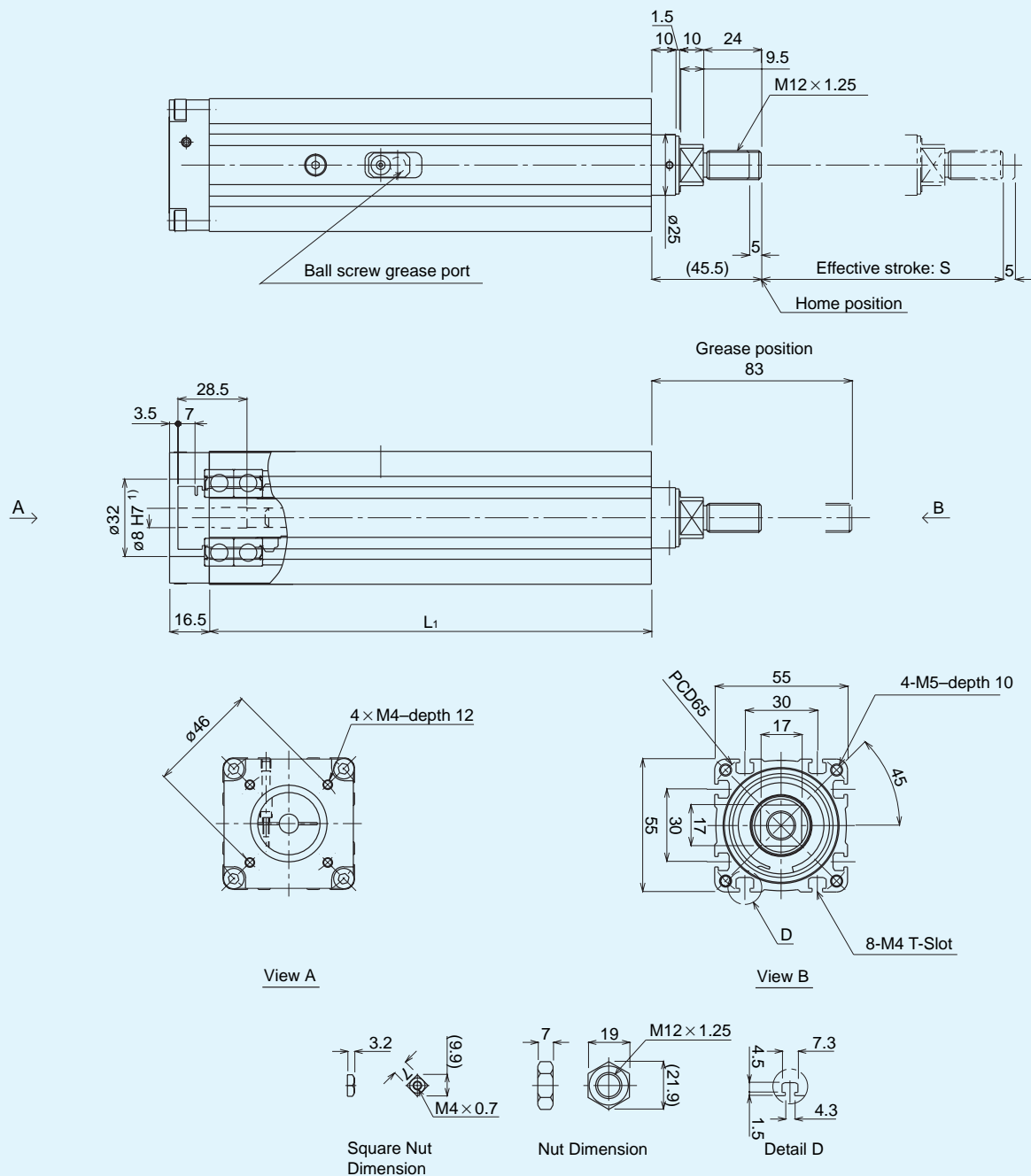


Fig. 11

### 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

<sup>1)</sup> When using other motors with different shaft diameters please contact THK.

VLA-CT Option A: Base Attachment Bracket

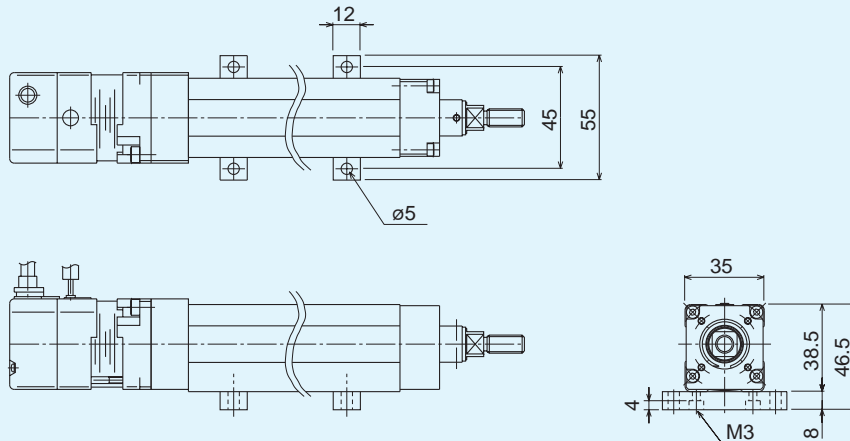


Fig. 12 Base Attachment Bracket CT 35

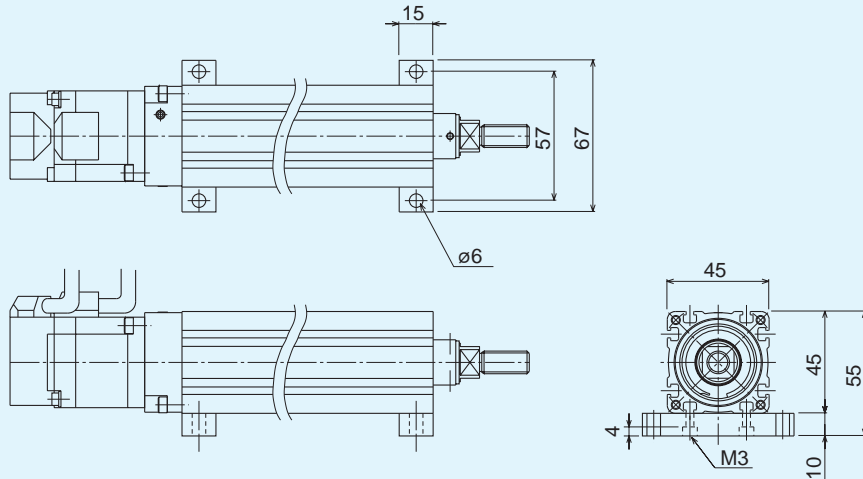


Fig. 13 Base Attachment Bracket CT 45

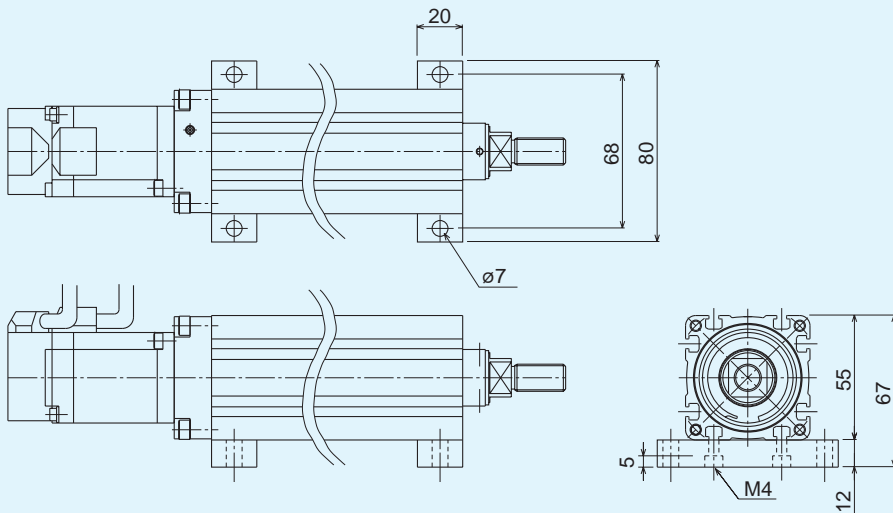


Abb. 14 Base Attachment Bracket CT 55

## VLA-CT Option B: Flanges

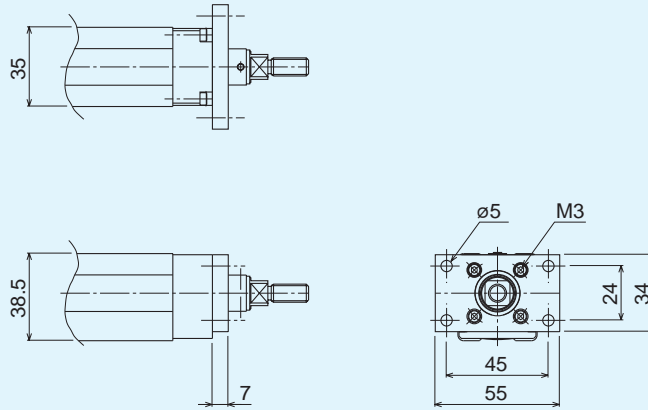


Fig. 15 Flange CT 35

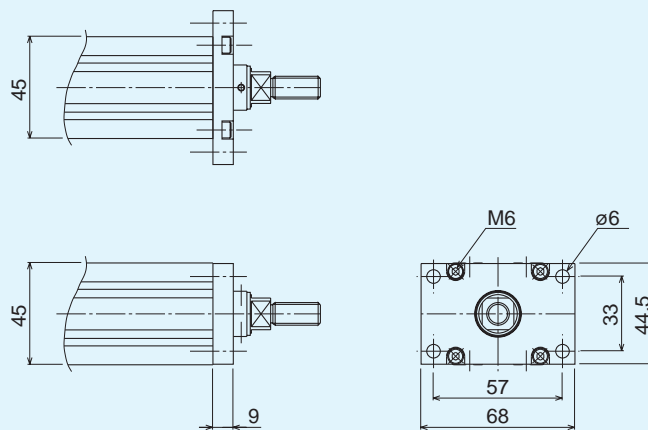


Fig. 16 Flange CT 45

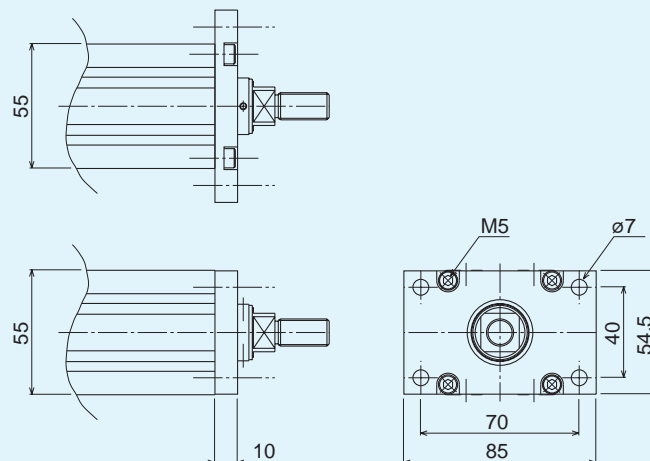
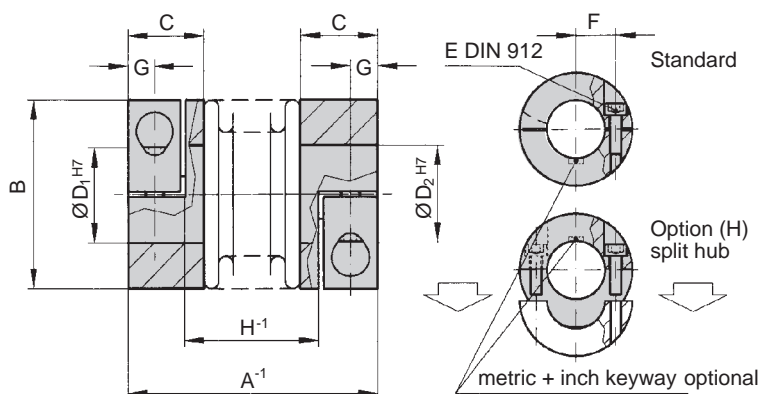


Fig. 17 Flange CT 55

## 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	Rates torque [Nm]	Overall length [mm]	Outer diameter [mm]	Fit length of hub [mm]	Special bores from $\phi$ to $\phi$ 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.

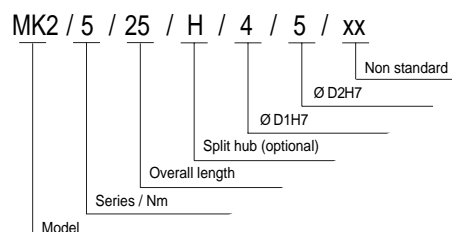
**Backlash:** Absolutely backlash-free due to frictional clamp connection.

**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.

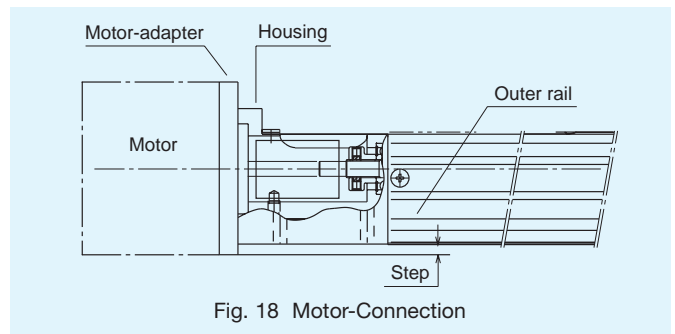


Fig. 18 Motor-Connection

## 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 <sup>1)</sup>	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

<sup>1)</sup> 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.

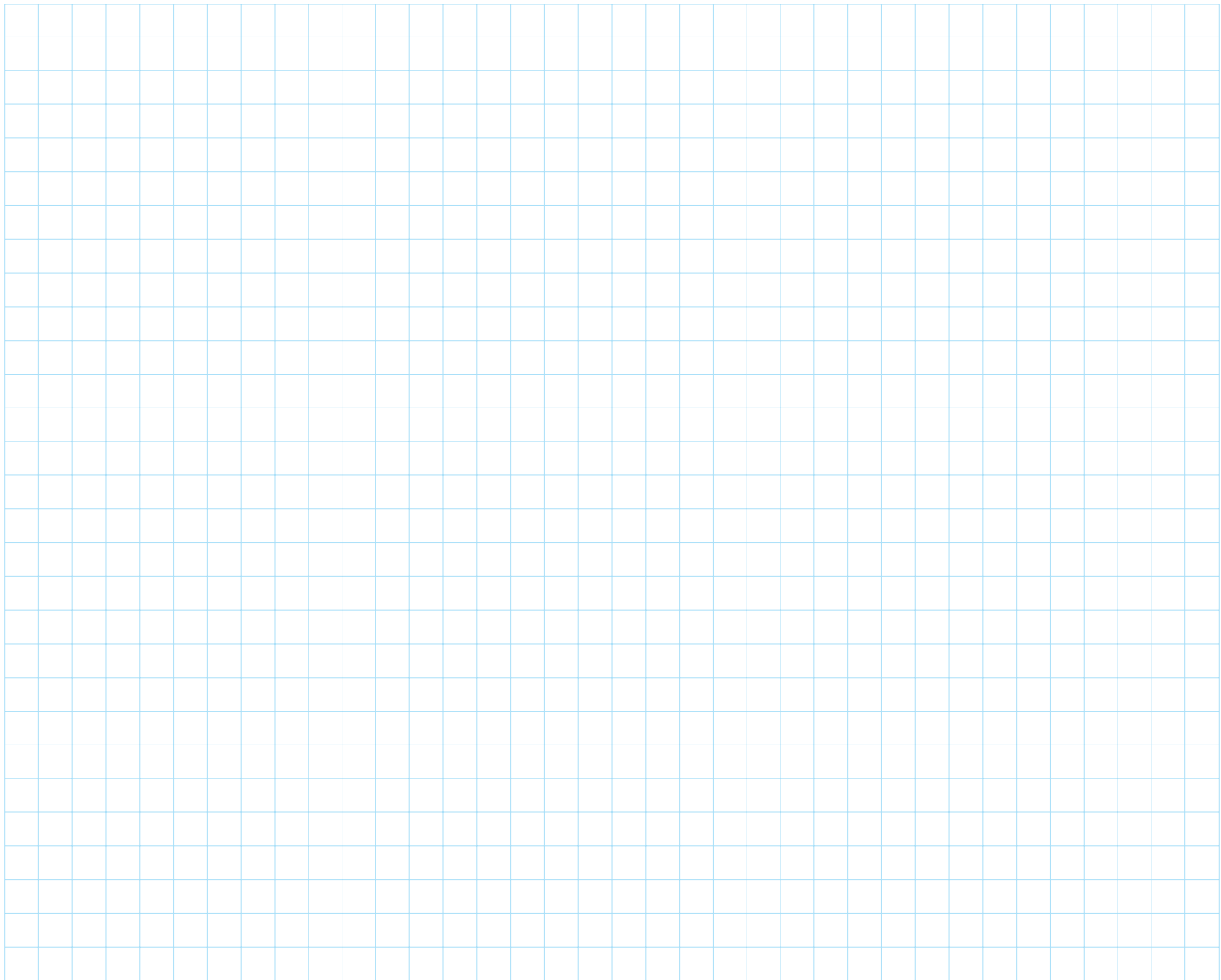
### Max. Payload/Force

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.

**www.thk.com**

Specifications are subject to change without notice

06/2006 Printed in Belgium

## Sales Offices

### U.K.

**THK U.K.**  
1 Harrison Close  
Knowlhill  
Milton Keynes  
MK5 8PA  
Tel. (01908) 303050  
Fax. (01908) 303070  
info.mks@thk.co.uk

### Austria

**THK Austria**  
Edelmüllerstraße 2  
4061 Pasching  
Tel. (0 72 29) 5 14 00-0  
Fax (0 72 29) 5 14 00-79  
info.lnz@thk.at

### France

**THK France S.A.S.**  
Les Carrés du Parc  
10 Rue des Rosiéristes -  
Immeuble A  
69410 Champagne au  
Mont d'or  
Tel. (04) 37 49 14 00  
Fax (04) 37 49 14 01  
info.lys@thk-france.fr

### Italy

**THK Italy**  
Via Buonarroti, 182  
20052 Monza (MI)  
Tel. (0 39) 2 84 20 79  
Fax (0 39) 2 84 25 27  
info.mil@thk-italia.it

### THK Bologna

Via della Salute 16/2  
40132 Bologna  
Tel. (0 51) 6 41 22 11  
Fax (0 51) 6 41 22 30  
info.blq@thk-italia.it

### Germany

**THK GmbH**  
**European Headquarters**  
**Düsseldorf Office**  
Hubert-Wollenberg-Str. 15  
40878 Ratingen  
Tel. (0 21 02) 74 25-0  
Fax (0 21 02) 74 25-29 9  
www.thk.de  
info.dus@thk.de

### Stuttgart Office

Heinrich-Lanz-Str. 3  
70825 Korntal-Münchingen  
Tel. (0 71 50) 91 99-0  
Fax (0 71 50) 91 99-8 88  
info.str@thk.de

### Munich Office

Max-Planck-Straße 13  
85716 Unterschleißheim  
Tel. (0 89) 37 06 16-0  
Fax (0 89) 37 06 16-26  
info.muc@thk.de

### Spain

**THK Spain**  
C/Andorra 19 A  
08830 San Boi de Llobregat  
Tel. (93) 652 5740  
Fax (93) 652 5746  
info.bcn@thk.de

### Sweden

**THK Sweden**  
Veddestavägen 15B  
17562 Järfälla  
Tel. (8) 44 57 63 0  
Fax (8) 44 57 63 9  
info.sto@thk.se

### Switzerland

**Distributor:**  
**Bachofen-AG**  
Ackerstraße 42  
8610 Uster  
Tel. (01) 9 44 11 11  
Fax (01) 9 44 12 33  
www.bachofen.ch  
info@bachofen.ch

### USA

**THK America, Inc.**  
**THK Chicago**  
200 East Commerce Drive  
Schaumburg, IL. 60173  
Tel. (8 47) 3 10-11 11  
Fax (8 47) 3 10-12 71  
www.thk.com  
chicago@thk.com

### Canada

**THK Canada**  
130 Matheson Blvd. E., U. 1  
Mississauga, Ontario  
Canada L4Z 1Y6  
Tel. (9 05) 7 12-29 22  
Fax (9 05) 7 12-29 25  
canada@thk.com

### Brasil

**THK Brasil Ltda.**  
Indústria e Comércio Ltda.  
Av. Corifeu de Azevedo  
Marques, 4077  
Butantã - São Paulo - SP  
05339-002  
Tel. (55-11) 37 67-01 00  
Fax (55-11) 37 67-01 01  
thk@thk.com.br

### China

**THK Beijing**  
Kunlun Hotel  
Room No. 417  
2 Xin Yuan Lu  
Chaoyang District Beijing  
Tel. (10) 65 90-32 59  
Fax (10) 65 90-35 57

### Hong Kong

**THK Shouzan Co., Ltd.**  
4/FI., Hanyee Bldg., Flat C  
19-21 Hankow Road  
Tsimshatsui, Kowloon  
Tel. (8 52) 37 61 09 1  
Fax (8 52) 37 60 74 9

### Taiwan

**THK Taiwan**  
Suite A, 7FI., No. 152,  
Sec 4  
Chengde Rd.  
Shrlin Chiu, Taipei  
Taiwan 112, R.O.C.  
Tel. (02) 28 88-38 18  
Fax (02) 28 88-38 19

### Malaysia

**THK Malaysia**  
B-10-11 Block B (Level 12)  
Menara Uncang Emas 85  
Jalan Loke Yew  
55200 Kuala Lumpur  
Tel. (03) 92 87-11 37  
Fax (03) 92 87-80 71

### India

**THK India**  
1050, 11th Main r.p.c.  
Layout Bangalore 560040  
Tel. (0 80) 3 30-15 24  
Fax (0 80) 3 30-15 24  
thk@satyam.net.in

### South Africa

**THK U.K. South Africa**  
P.O. Box 13033  
Witfield  
Johannesburg 1467  
Tel. (0 44) 2 72 00 20  
Fax (0 44) 2 72 00 20  
sales.sa@thk.co.uk

## Plants

### Europe

**THK Manufacturing of Europe, S.A.S.**  
Parc d' Activités la  
Passerelle  
68190 Ensisheim  
Tel. (03) 89 83 44 00  
Fax (03) 89 83 44 09

### PGM Ireland Ltd.

Tallaght Business  
Park, Whitetown,  
Industrial Estate  
Tallaght, Dublin 24  
Tel. (01) 4 62-81 01  
Fax (01) 4 62-90 80

### USA

**THK Manufacturing of America, Inc.**  
471 North High Street  
Hebron, OH. 43025  
Tel. (7 40) 9 28-14 15  
Fax (7 40) 9 28-14 18

### China

**DALIAN THK CO., LTD.**  
No.29 Huo Ju Road  
Qi xian Ling  
Gan Jing Zi District  
Dalian City, Liao Ning  
Sheng 116023  
Tel. (04 11) 84 79 09 99  
Fax (04 11) 84 79 01 11

### THK MANUFACTURING OF CHINA (WUXI) CO., LTD.

No. 76, WND WUXI,  
Jiangsu 214028  
Tel. (05 10) 5 34-43 33  
Fax (05 10) 5 34-46 66

### Korea

**Samick LMS CO., LTD.**  
100-76, Kalsan-Don.  
Talseo-ku, Taegu  
Tel. (0 53) 5 81-99 31  
Fax (0 53) 5 81-82 72

### Japan

**Head Office:**  
3-11-6 Nishi-Gotanda  
Shinagawa-Ku  
Tokyo 141  
Tel. (03) 54 34-03 41  
Fax (03) 54 34-03 45  
www.thk.co.jp  
thk001@thk.co.jp

### Plants in:

Kofu, Yamaguchi,  
Yamagata, Mie, Gifu,  
Niigata, Shizuoka,  
Miyagi