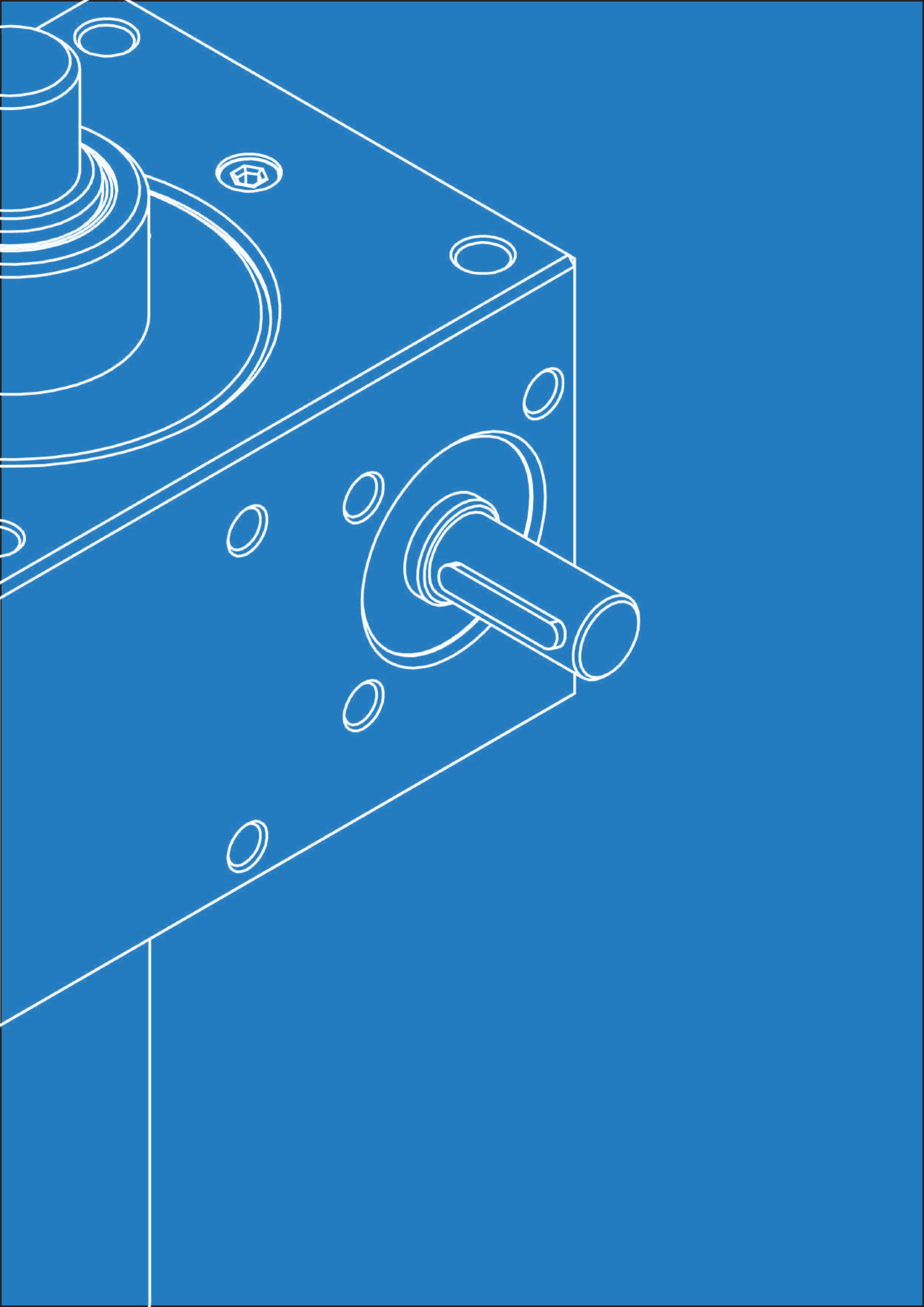
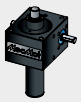
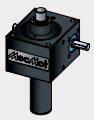
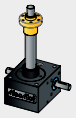


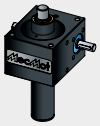
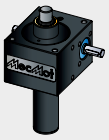
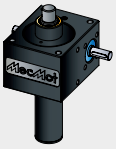
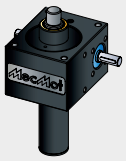
SCREW JACK

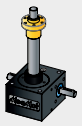
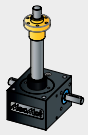
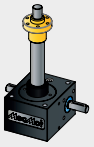
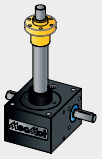
OVER VIEW SIZES/TYPES

Screw Translting (VH)				
Series	VK5	VK10	VK25	VK50
Load	5kN	10kN	25kN	50kN
Ratio	4:1 16:1	4:1 16:1	6:1 24:1	7:1 28:1
Housing Material	C45	C45	GGG-50	GGG-50
Screw	Tr18x4	Tr20x4	Tr30x6	Tr40x7

Screw Translting (SH)				
Series	VK5	VK10	VK25	VK50
Load	5kN	10kN	25kN	50kN
Ratio	4:1 16:1	4:1 16:1	6:1 24:1	7:1 28:1
Housing Material	C45	C45	GGG-50	GGG-50
Screw	Tr18x4	Tr20x4	Tr30x6	Tr40x7

OVER VIEW SIZES/TYPES

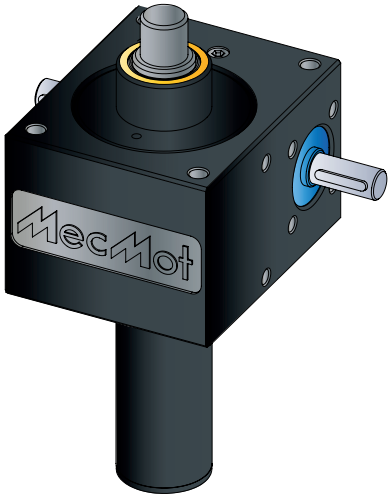
			
VK100	VK150	VK250	VK350
100kN	100kN	250kN	350kN
9:1	9:1	10:1	10:1
36:1	36:1	40:1	40:1
GGG-50	GGG-50	GGG-50	GGG-50
Tr55x9	Tr60x9	Tr80x10	Tr100x10

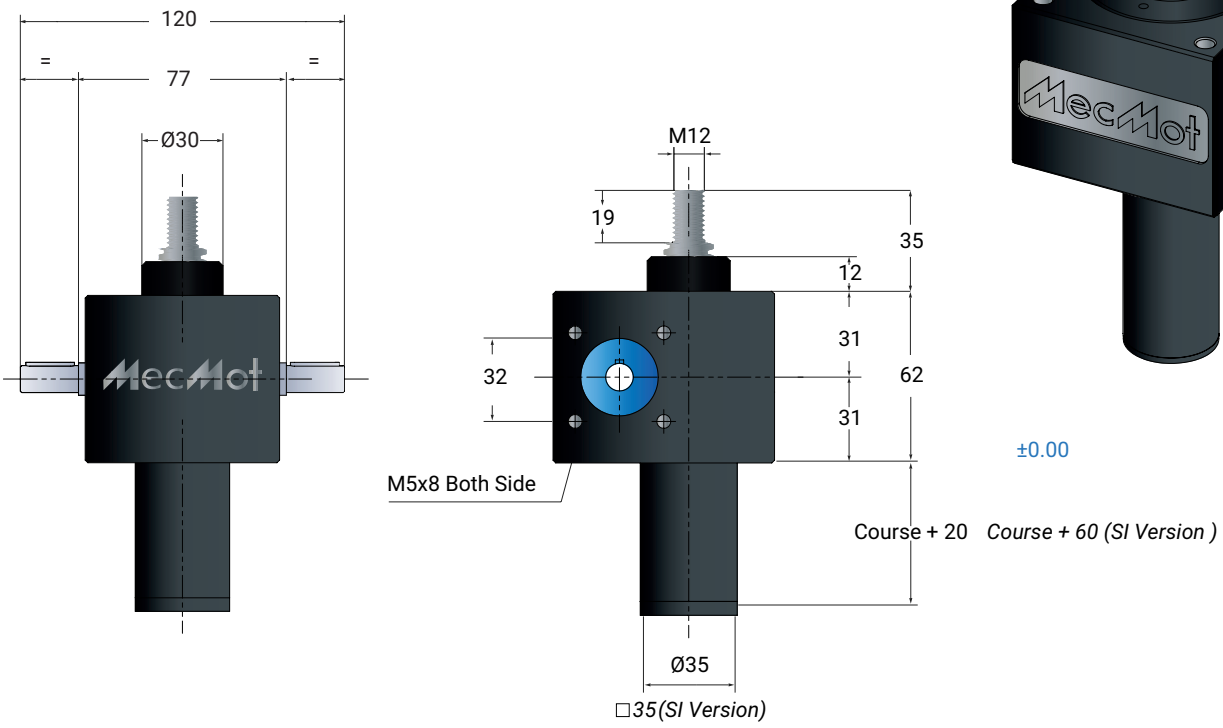
			
VK100	VK150	VK250	VK350
100kN	100kN	250kN	350kN
9:1	9:1	10:1	10:1
36:1	36:1	40:1	40:1
GGG-50	GGG-50	GGG-50	GGG-50
Tr55x9	Tr60x9	Tr80x10	Tr100x10

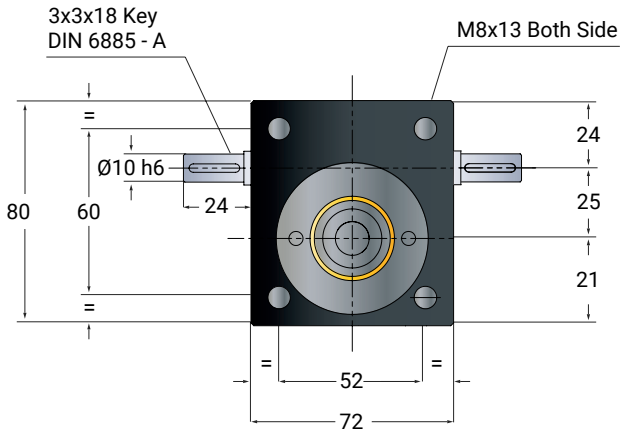
VK5-VH-S/SI

Max 5 kN

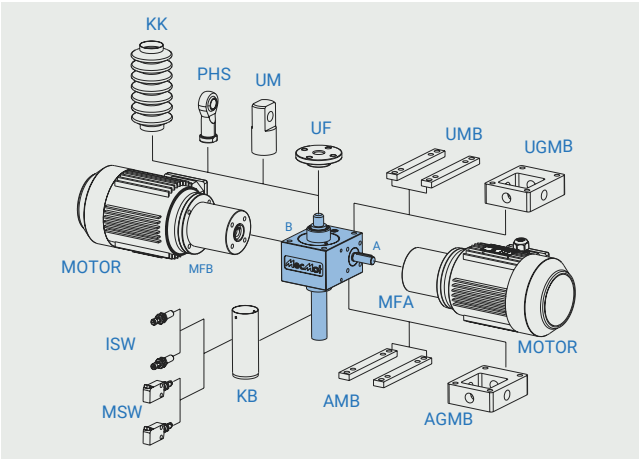
Trapeziodal Screw







VH-S/SI ACCESORIES



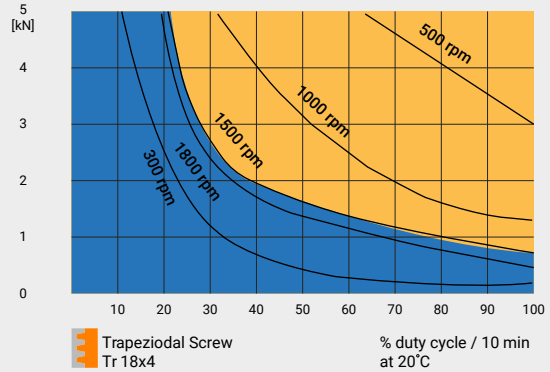
Standard Ratios

Type	Version	Speed	Standart screw	i	Stroke per drive shaft rotation
VK5-VH-A	Translating screw	Normal	Tr 18x4	4:1	1.00 mm
VK5-VH-B		Low speed		16:1	0.25 mm
VK5-SH-A	Rotating screw	Normal	Tr 18x4	4:1	1.00 mm
VK5-SH-B		Low speed		16:1	0.25 mm

General Features

Max static load: 5 kN
Max dynamic load: See duty cycle curves
Nominal speed: 1500 rpm
Max speed: 3000 rpm (depending force and duty cycle)
Screw size: Tr 18x4
Operation temperature: -10/60C
Screw lubrication: Grease lubrication
Input torque: Max 4.5 Nm (A) max 1.5 Nm (B)
Drive-through torque: Max 40 Nm

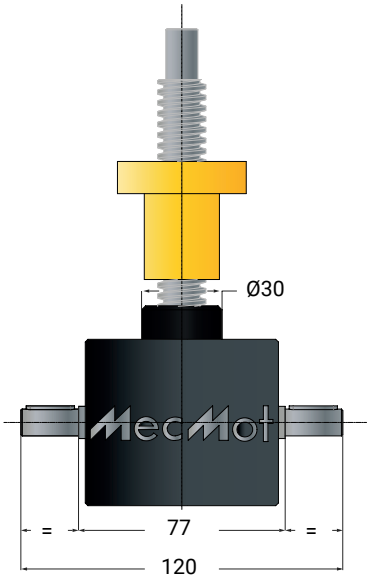
Duty cycle thermal limit, for S+R

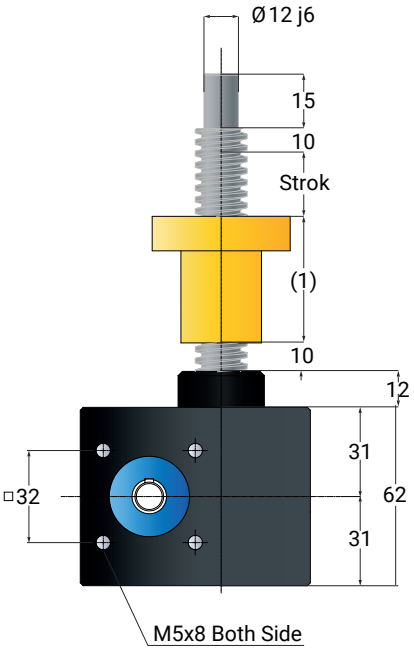


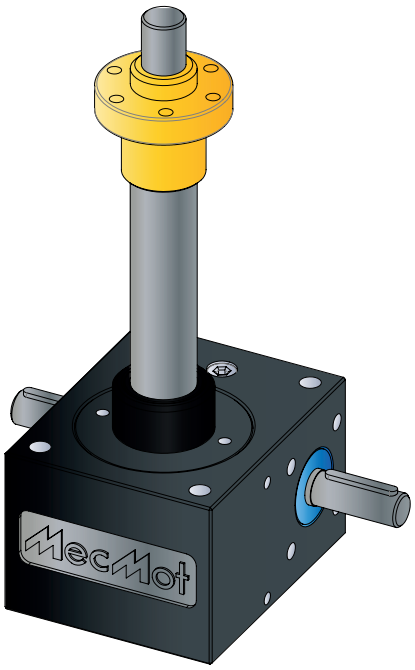
These curves above represents the thermally safe operating time of the product in percent.
These values are valid for the normal operating conditions of the system (lubrication, ambient temperature, environmental conditions, etc.). Otherwise, please contact Mecmot Engineering department.

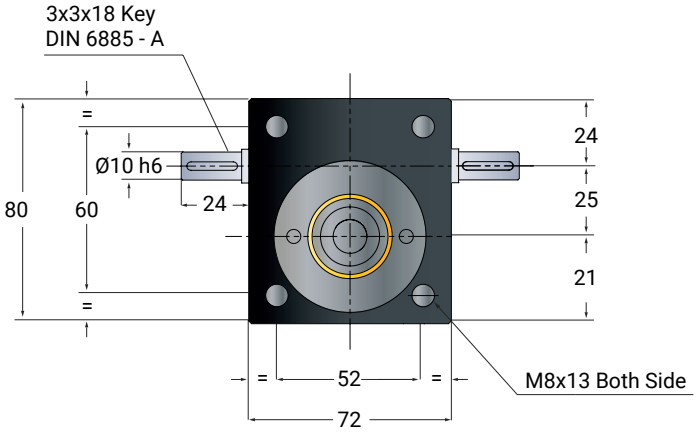
VK5-SH Max 5 kN

Trapeziodal Screw

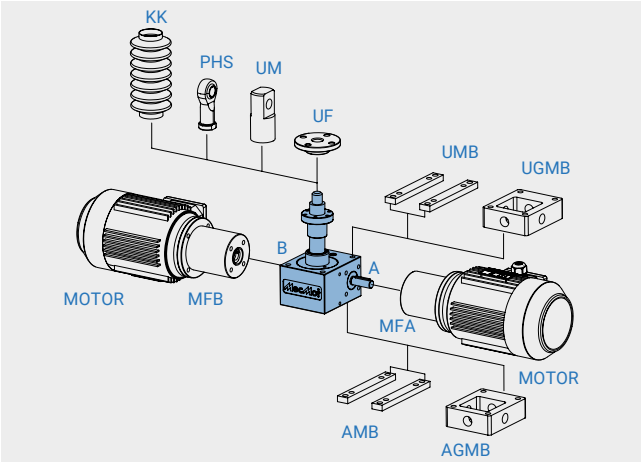




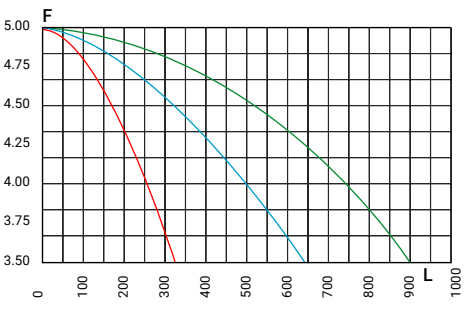


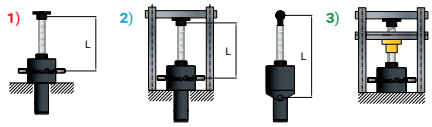


SH ACCESORIES

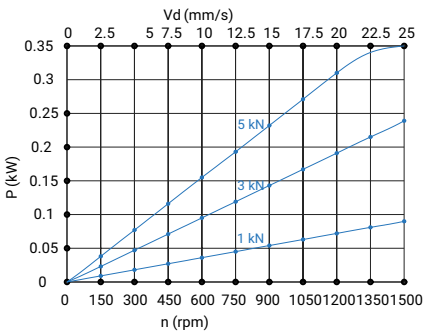


Euler's law (safety factor = 2 dynamic compression load)
Limit load 1 (red) - 2 (blue) - 3 (green)
F = Load [kN]
L = Overall trapezoidal screw lenght [mm]

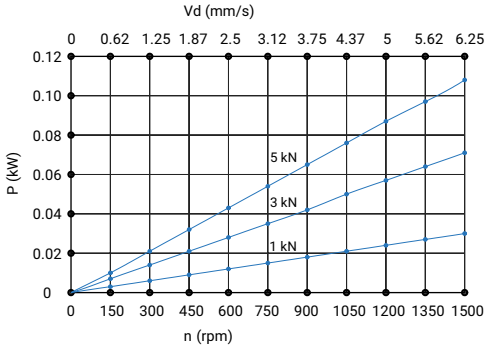




Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

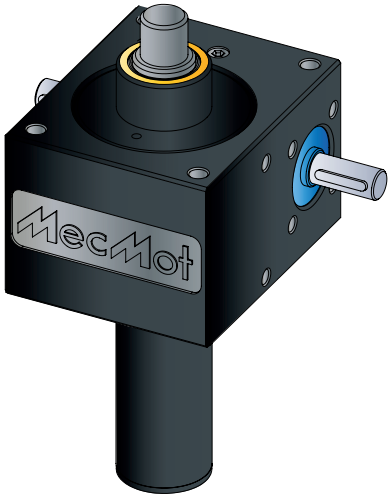


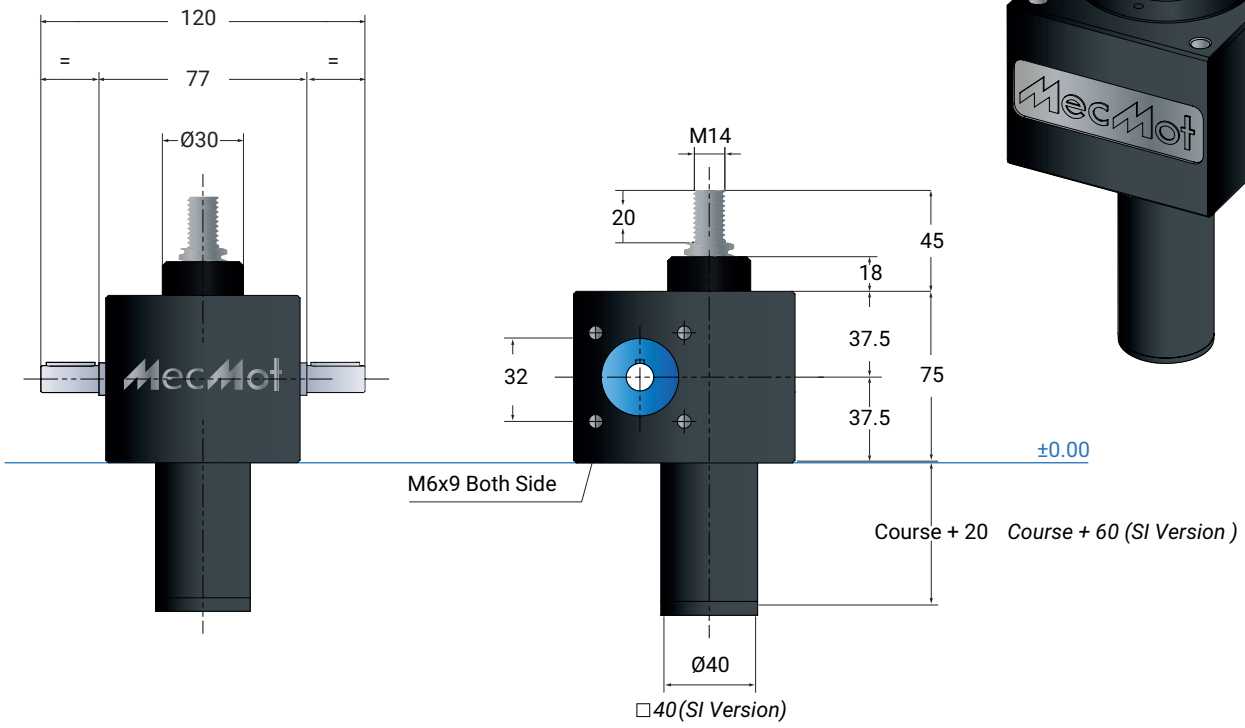
Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

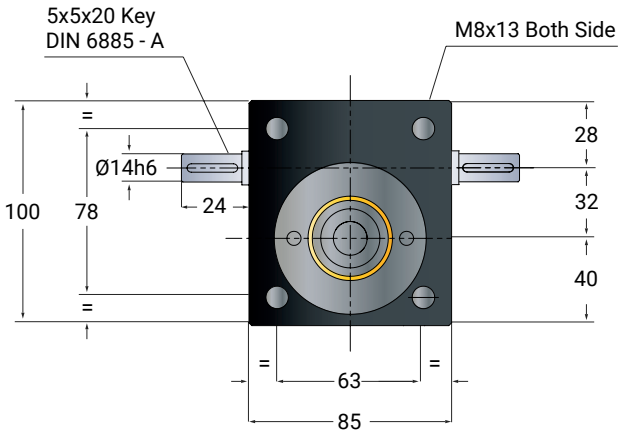


VK10-VH-S/SI Max 10 kN

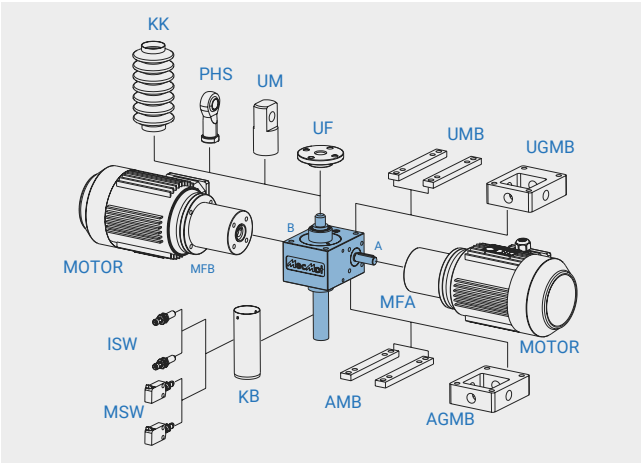
Trapeziodal Screw







VH-S/SI ACCESORIES



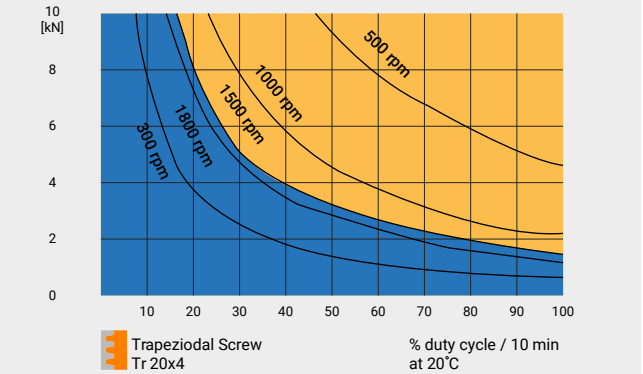
Standard Ratios

Type	Version	Speed	Standart screw	i	Stroke per drive shaft rotation
VK10-VH-A	Translating screw	Normal	Tr 20x4	4:1	1.00 mm
VK10-VH-B		Low speed		16:1	0.25 mm
VK10-SH-A	Rotating screw	Normal	Tr 20x4	4:1	1.00 mm
VK10-SH-B		Low speed		16:1	0.25 mm

General Features

Max static load: 10 kN
Max dynamic load: See duty cycle curves
Nominal speed: 1500 rpm
Max speed: 3000 rpm (depending force and duty cycle)
Screw size: Tr 20x4
Operation temperature: -10/60C
Screw lubrication: Grease lubrication
Input torque: Max 13 Nm (A) max 7 Nm (B)
Drive-through torque: Max 55 Nm

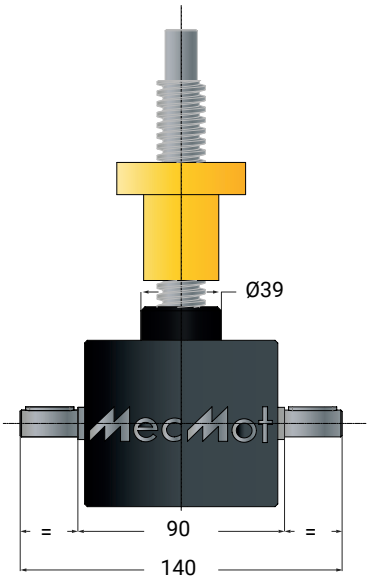
Duty cycle thermal limit, for S+R

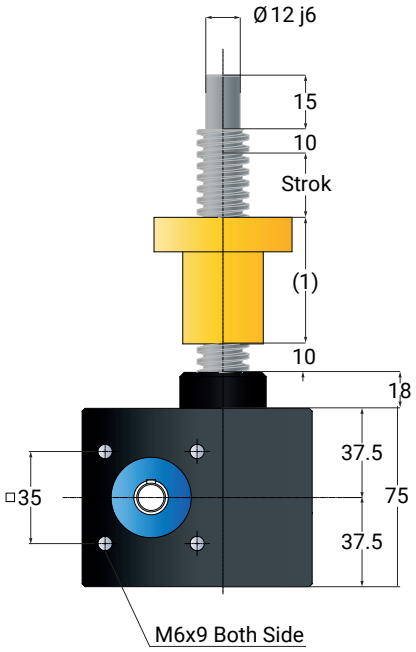


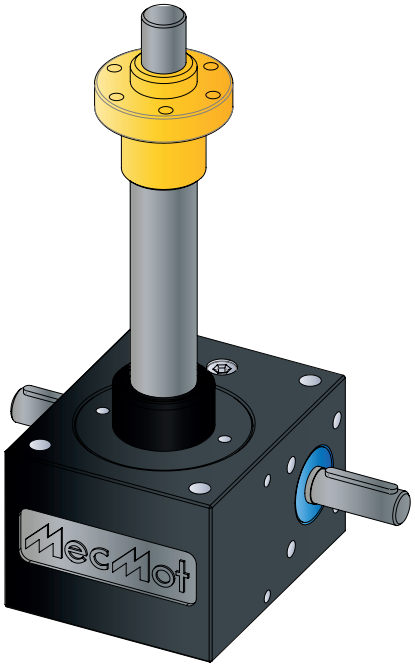
These curves above represents the thermally safe operating time of the product in percent.
These values are valid for the normal operating conditions of the system (lubrication, ambient temperature, environmental conditions, etc.). Otherwise, please contact Mecmot Engineering department.

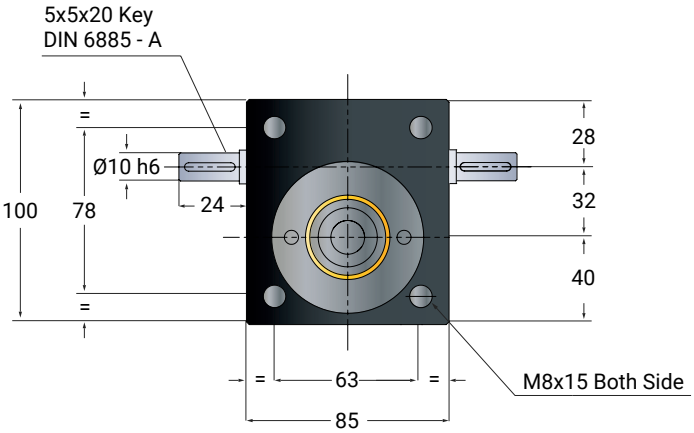
VK10-SH Max 10 kN

Trapeziodal Screw

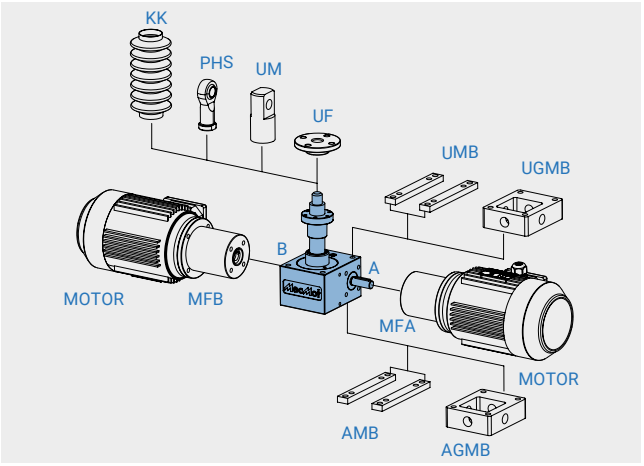




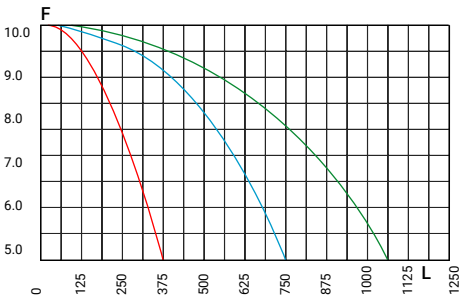


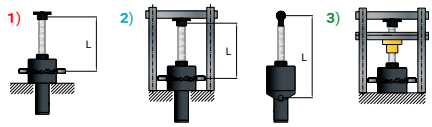


SH ACCESORIES

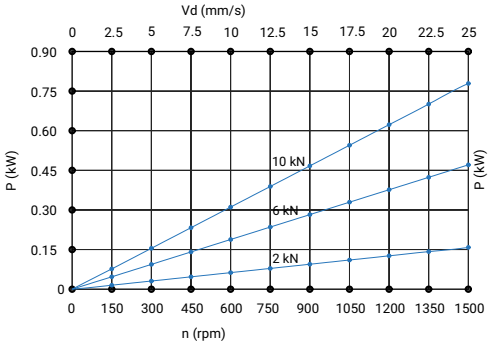


Euler's law (safety factor = 2 dynamic compression load)
Limit load 1 (red) - 2 (blue) - 3 (green)
F = Load [kN]
L = Overall trapezoidal screw lenght [mm]

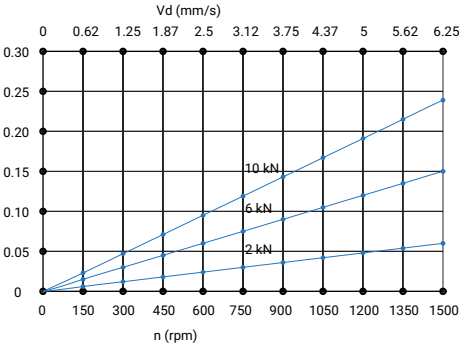




Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]



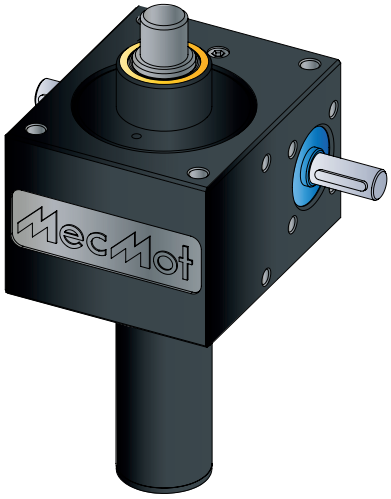
Power Curves (Reduction B Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

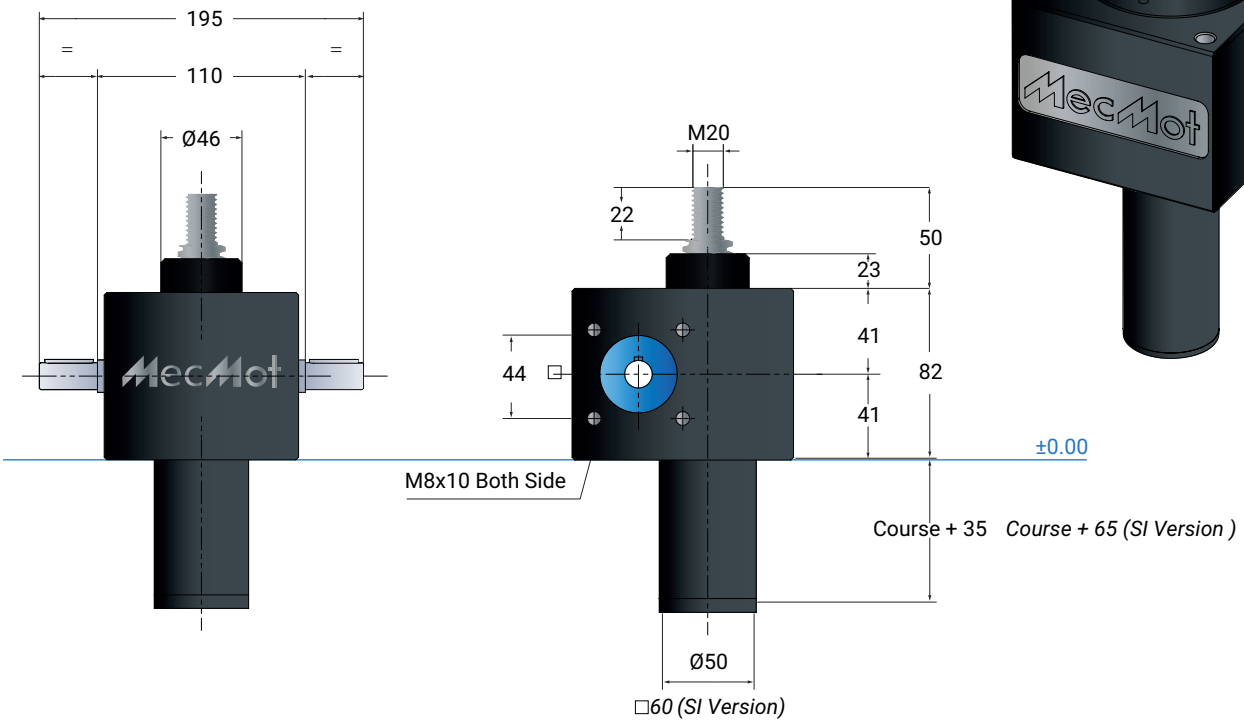


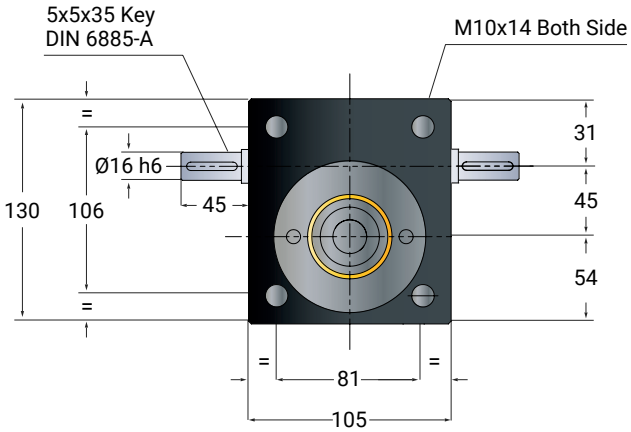
VK25-VH-S/SI

Max 25 kN

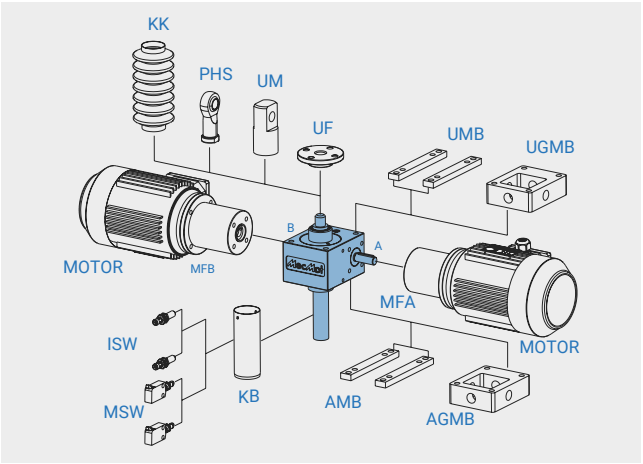
Trapeziodal Screw







VH-S/SI ACCESORIES



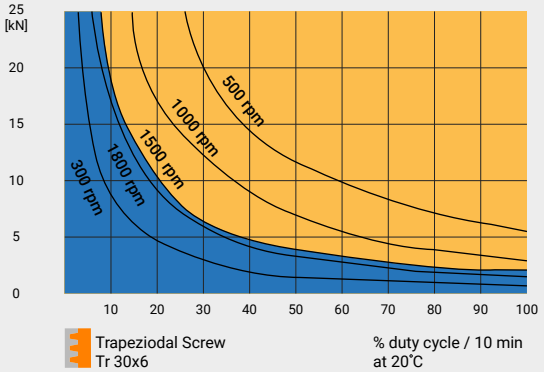
Standard Ratios

Type	Version	Speed	Standart screw	i	Stroke per drive shaft rotation
VK25-VH-A	Translating screw	Normal	Tr 30x6	6:1	1.00 mm
VK25-VH-B		Low speed		24:1	0.25 mm
VK25-SH-A	Rotating screw	Normal	Tr 30x6	6:1	1.00 mm
VK25-SH-B		Low speed		24:1	0.25 mm

General Features

Max static load: 25 kN
Max dynamic load: See duty cycle curves
Nominal speed: 1500 rpm
Max speed: 3000 rpm (depending force and duty cycle)
Screw size: Tr 30x6
Operation temperature: -10/60C
Screw lubrication: Grease lubrication
Input torque: Max 18 Nm (A) max 10 Nm (B)
Drive-through torque: Max 100 Nm

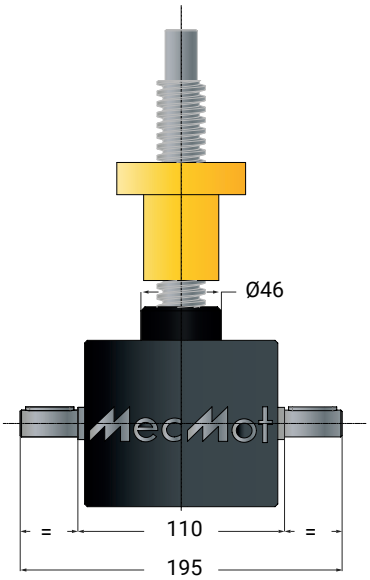
Duty cycle thermal limit, for S+R

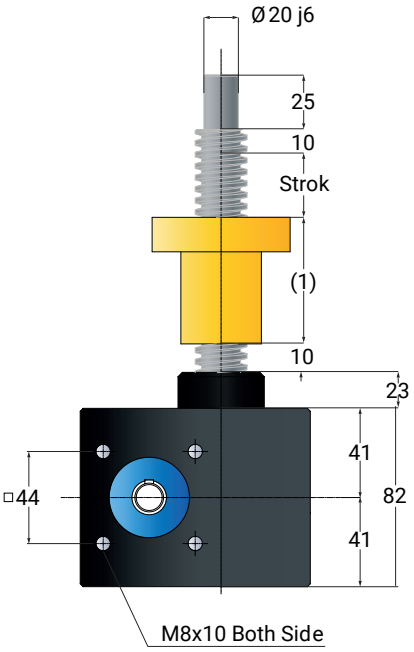


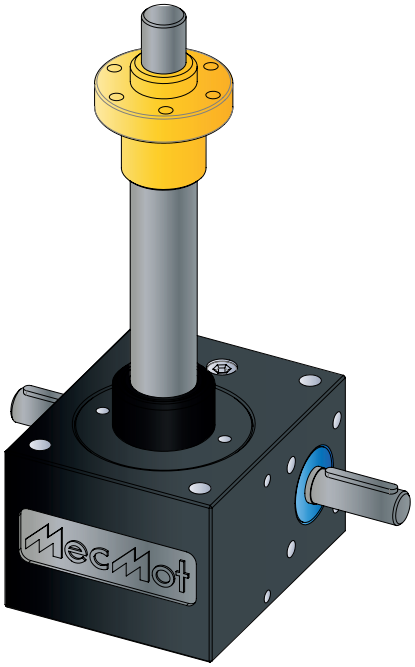
These curves above represents the thermally safe operating time of the product in percent.
These values are valid for the normal operating conditions of the system (lubrication, ambient temperature, environmental conditions, etc.). Otherwise, please contact Mecmot Engineering department.

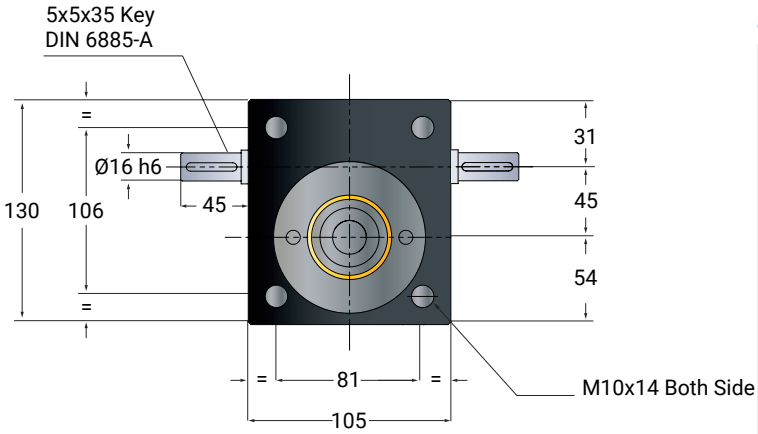
VK25-SH Max 25 kN

Trapeziodal Screw

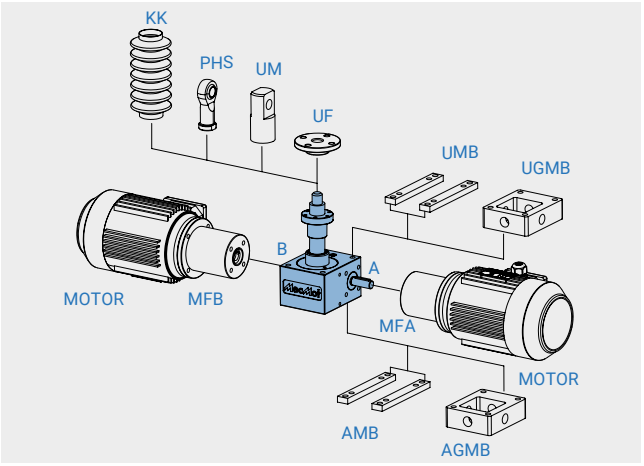




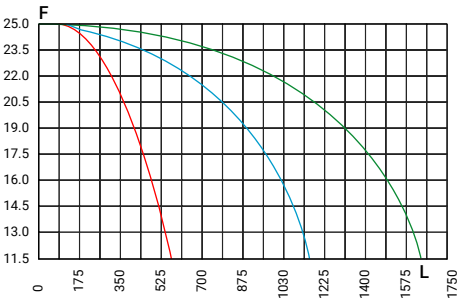


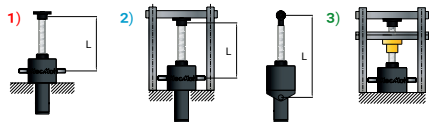


SH ACCESORIES

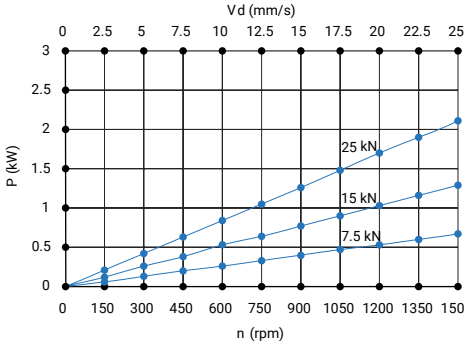


Euler's law (safety factor = 2 dynamic compression load)
Limit load 1 (red) - 2 (blue) - 3 (green)
F = Load [kN]
L = Overall trapezoidal screw lenght [mm]

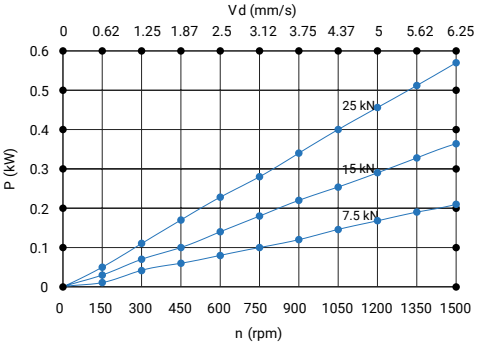




Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]



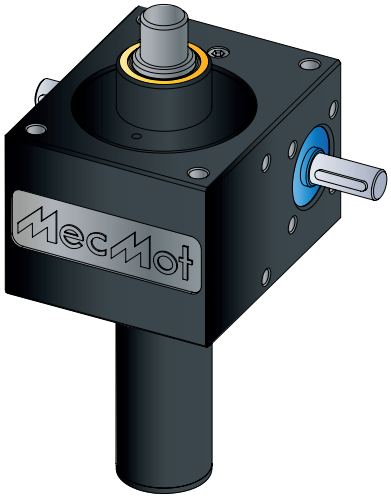
Power Curves (Reduction B Version)
P = Requested input power [kW]
n = Worm rotational speedt [rpm]
Vd = Spindle translation speed [mm/s]

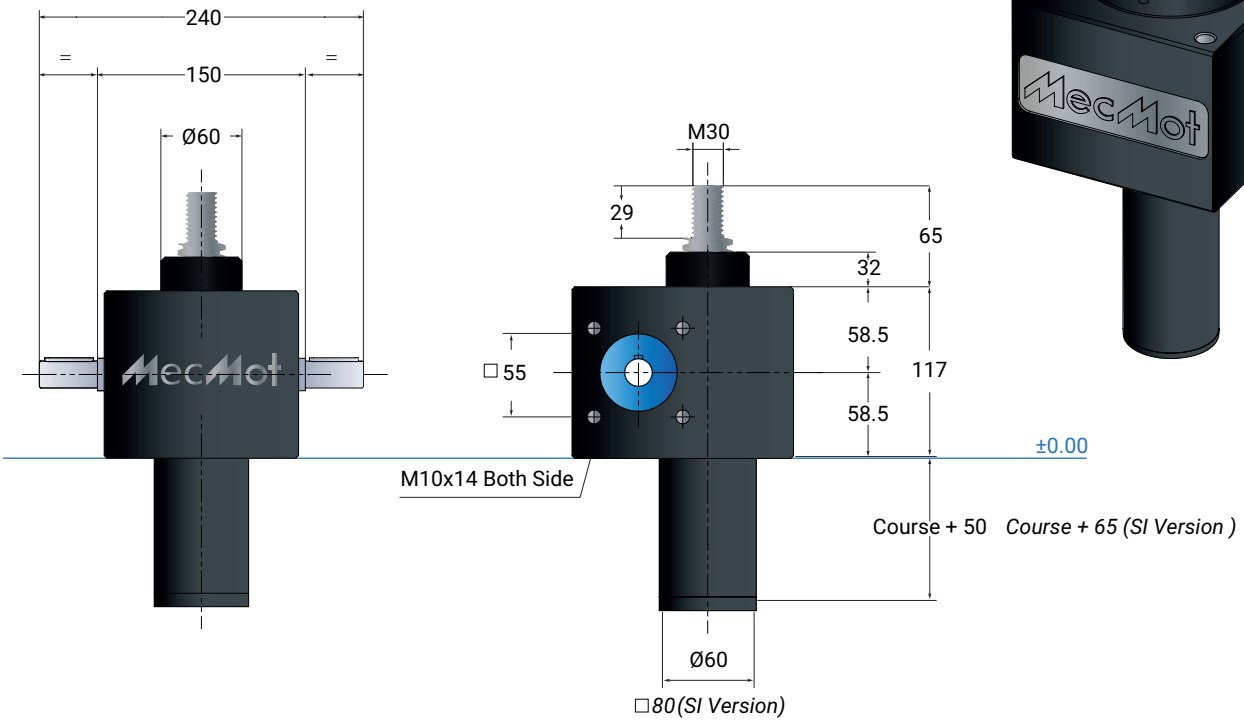


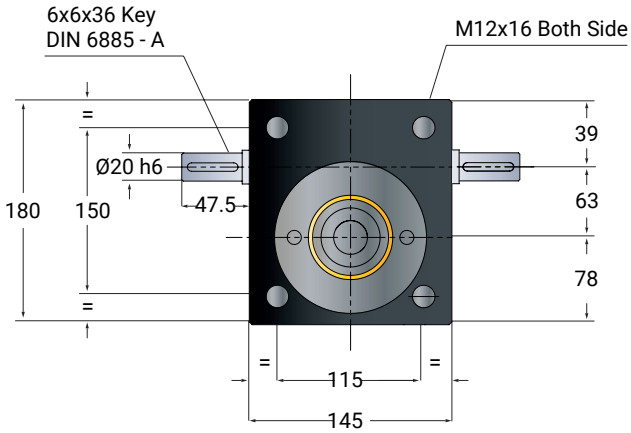
VK50-VH-S/SI

Max 50 kN

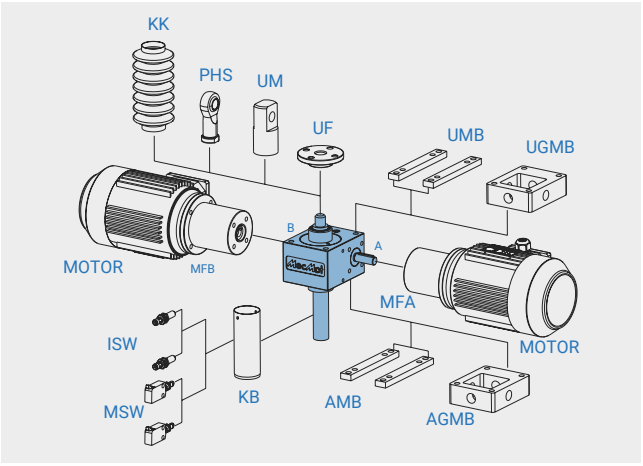
Trapeziodal Screw







VH-S/SI ACCESORIES



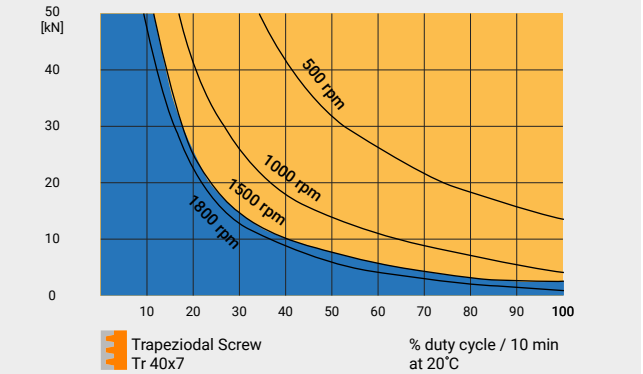
Standard Ratios

Type	Version	Speed	Standart screw	i	Stroke per drive shaft rotation
VK50-VH-A	Translating screw	Normal	Tr 40x7	7:1	1.00 mm
VK50-VH-B		Low speed		28:1	0.25 mm
VK50-SH-A	Rotating screw	Normal	Tr 40x7	7:1	1.00 mm
VK50-SH-B		Low speed		28:1	0.25 mm

General Features

Max static load: 50 kN
Max dynamic load: See duty cycle curves
Nominal speed: 1500 rpm
Max speed: 1800 rpm (depending force and duty cycle)
Screw size: Tr 40x7
Operation temperature: -10/60C
Screw lubrication: Grease lubrication
Input torque: Max 31 Nm (A) max 10.5 Nm (B)
Drive-through torque: Max 250 Nm

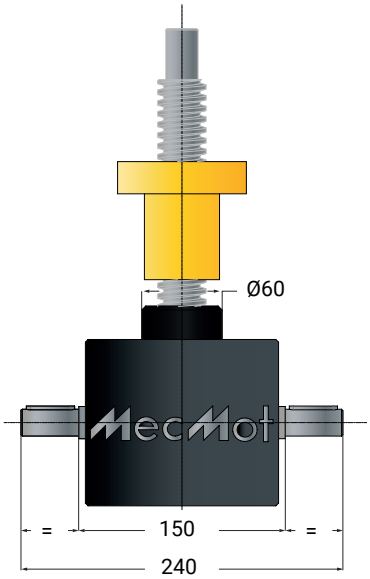
Duty cycle thermal limit, for S+R

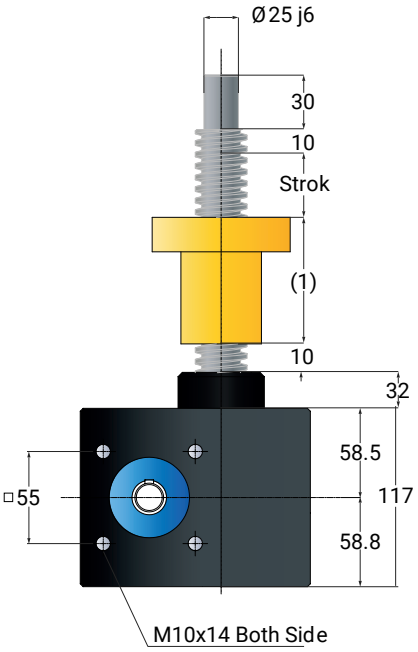


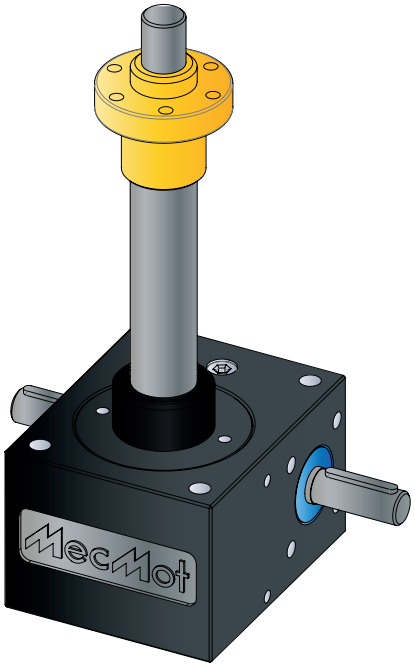
These curves above represents the thermally safe operating time of the product in percent.
These values are valid for the normal operating conditions of the system (lubrication, ambient temperature, environmental conditions, etc.). Otherwise, please contact Mecmot Engineering department.

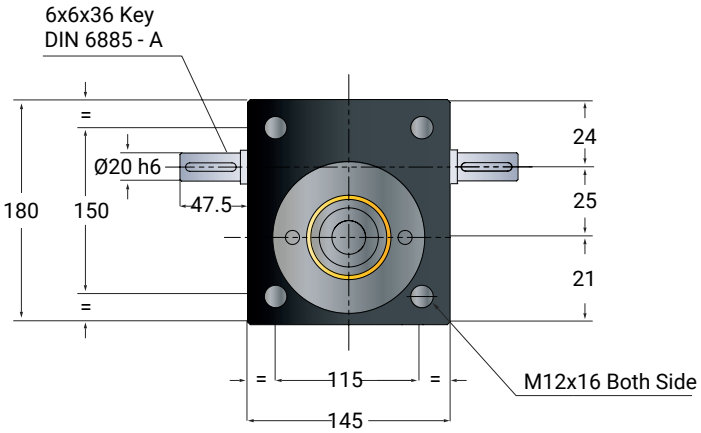
VK50-SH Max 50 kN

Trapeziodal Screw

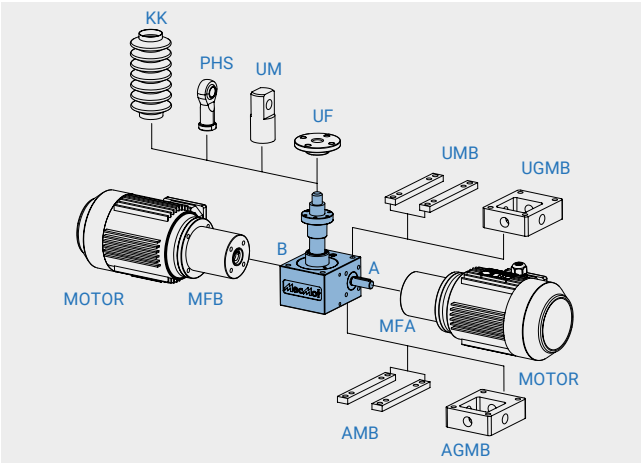




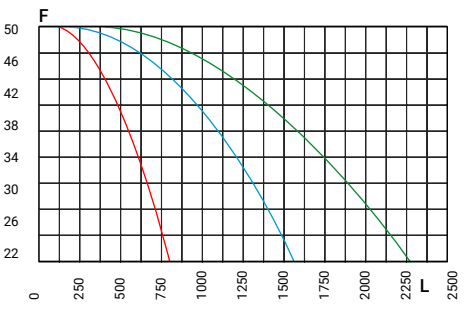


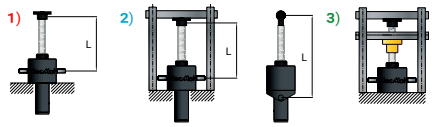


SH ACCESORIES

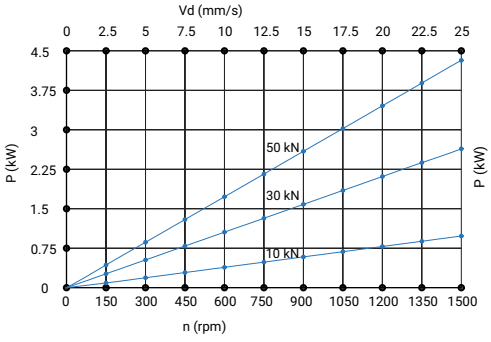


Euler's law (safety factor = 2 dynamic compression load)
Limit load 1 (red) - 2 (blue) - 3 (green)
F = Load [kN]
L = Overall trapezoidal screw lenght [mm]

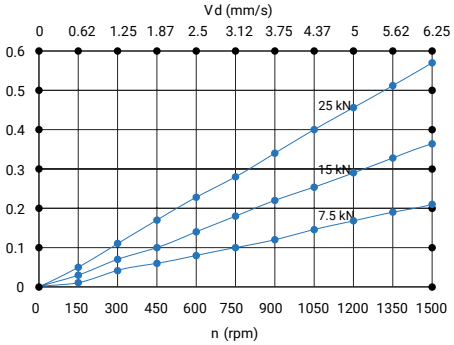




Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

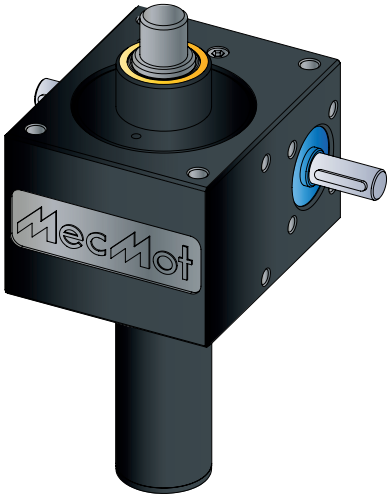


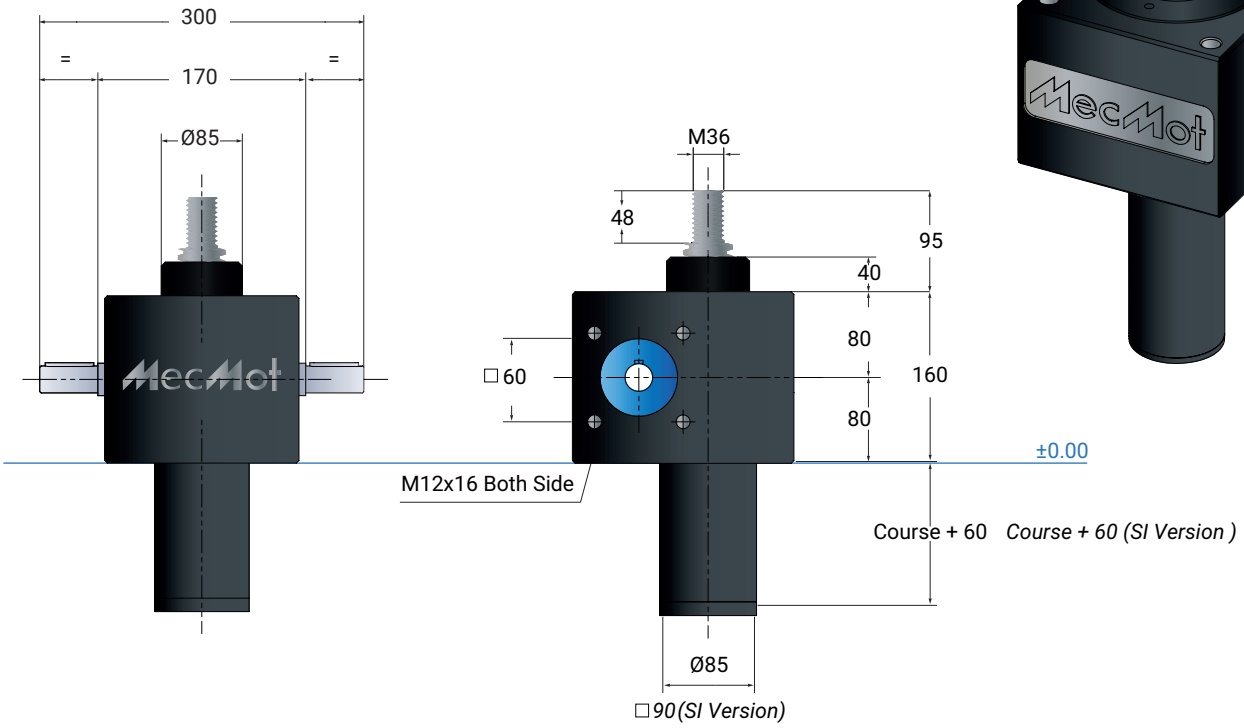
Power Curves (Reduction B Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

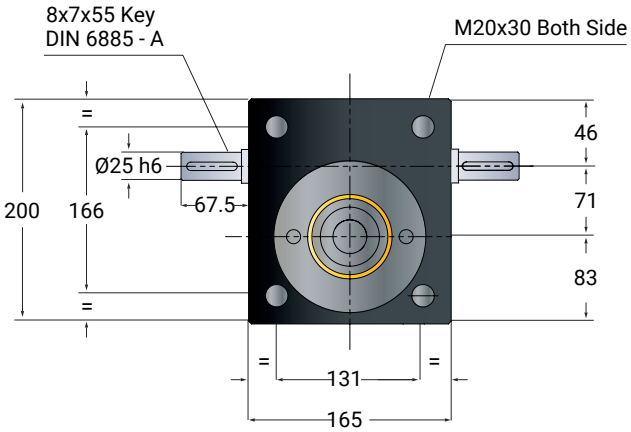


VK100-VH-S/SI Max 100 kN

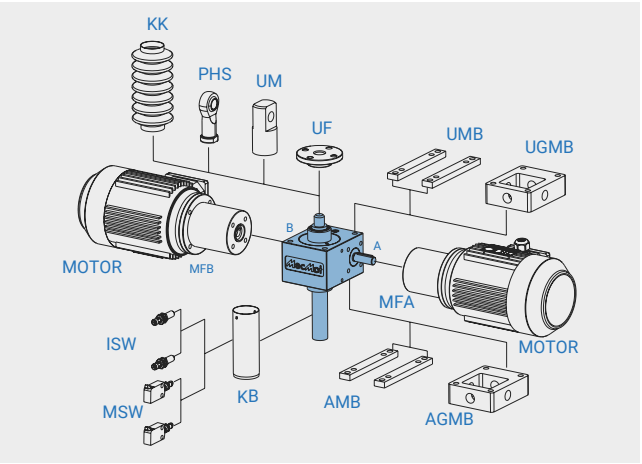
Trapeziodal Screw







VH-S/SI ACCESORIES



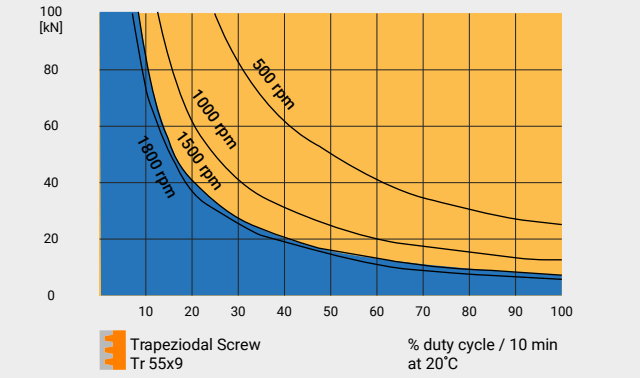
Standard Ratios

Type	Version	Speed	Standart screw	i	Stroke per drive shaft rotation
VK100-VH-A	Translating screw	Normal	Tr 55x9	9:1	1.00 mm
VK100-VH-B		Low speed		36:1	0.25 mm
VK100-SH-A	Rotating screw	Normal	Tr 55x9	9:1	1.00 mm
VK100-SH-B		Low speed		36:1	0.25 mm

General Features

Max static load: 100 kN
Max dynamic load: See duty cycle curves
Nominal speed: 1500 rpm
Max speed: 1800 rpm (depending force and duty cycle)
Screw size: Tr 55x9
Operation temperature: -10/60C
Screw lubrication: Grease lubrication
Input torque: Max 52 Nm (A) max 14 Nm (B)
Drive-through torque: Max 540 Nm

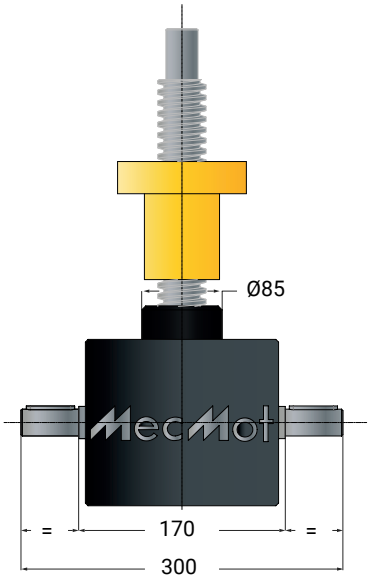
Duty cycle thermal limit, for S+R

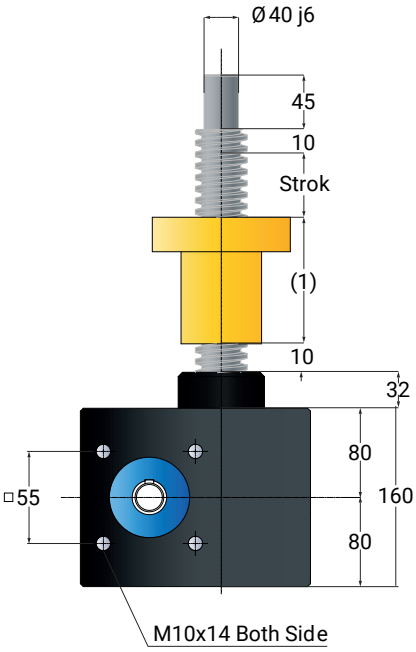


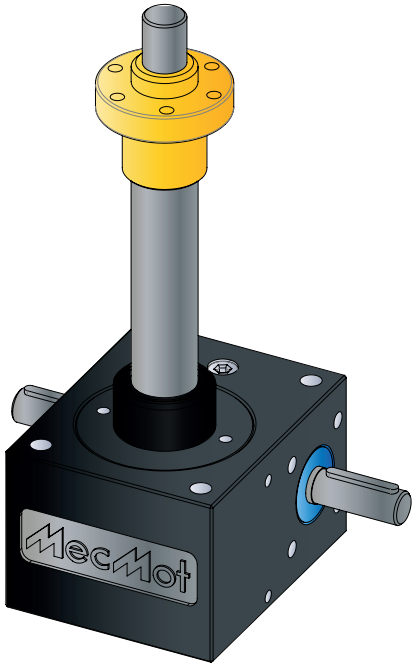
These curves above represents the thermally safe operating time of the product in percent.
These values are valid for the normal operating conditions of the system (lubrication, ambient temperature, environmental conditions, etc.). Otherwise, please contact Mecmot Engineering department.

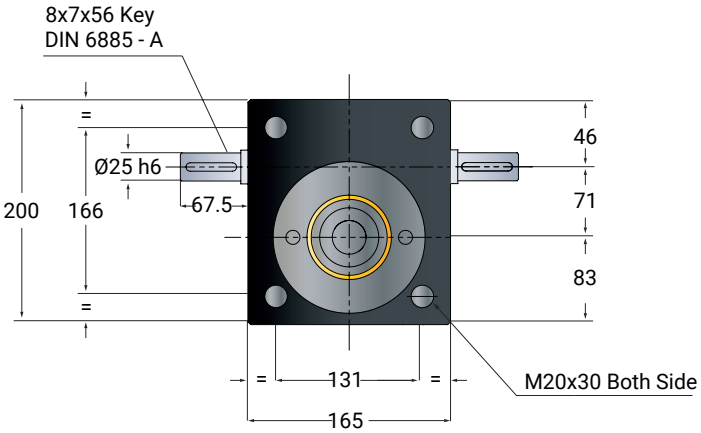
VK100-SH Max 100 kN

Trapeziodal Screw

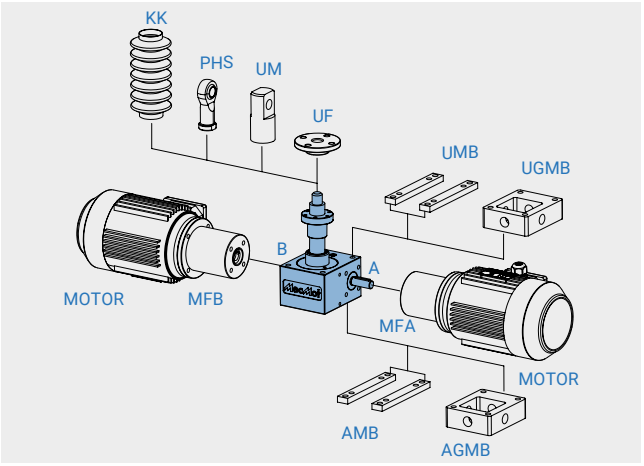




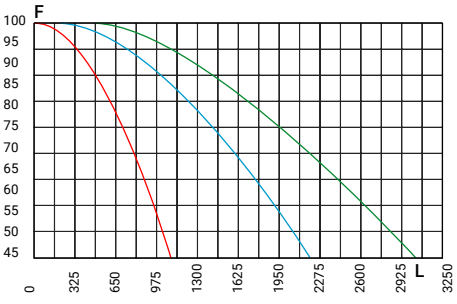


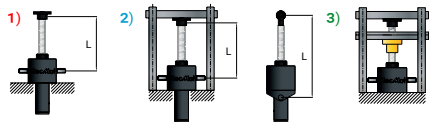


SH ACCESORIES

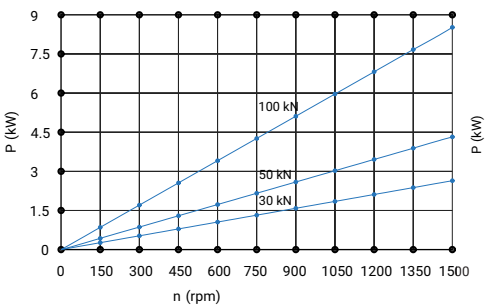


Euler's law (safety factor = 2 dynamic compression load)
Limit load 1 (red) - 2 (blue) - 3 (green)
F = Load [kN]
L = Overall trapezoidal screw lenght [mm]

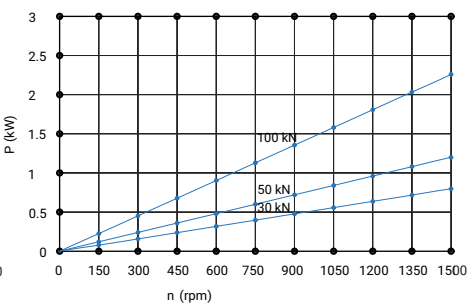




Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

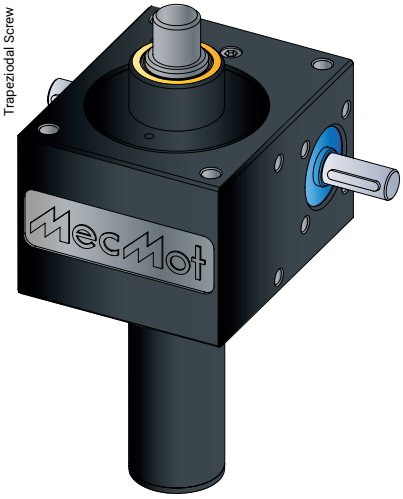


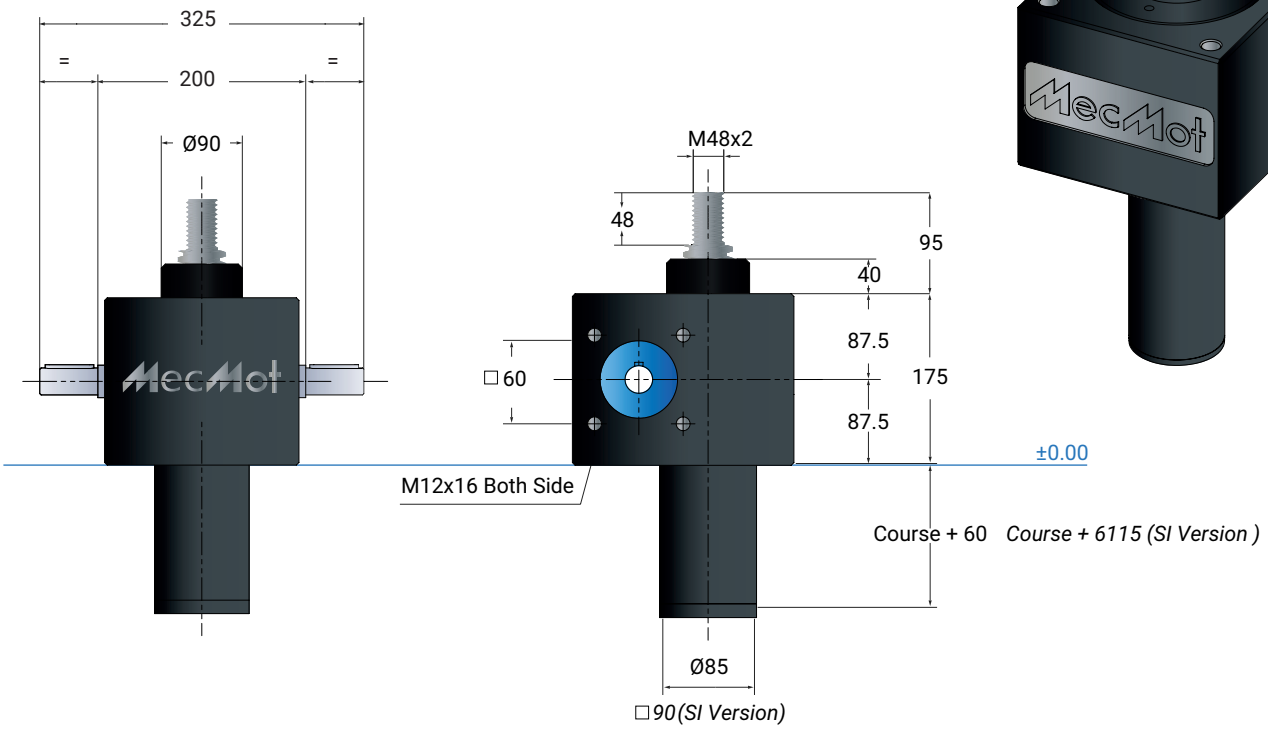
Power Curves (Reduction B Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

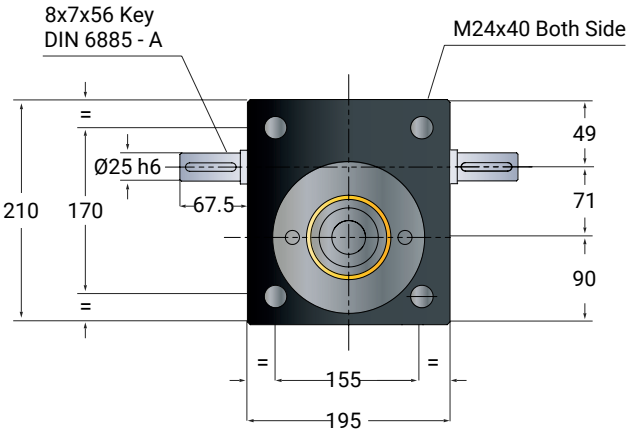


VK150-VH-S/SI Max 150 kN

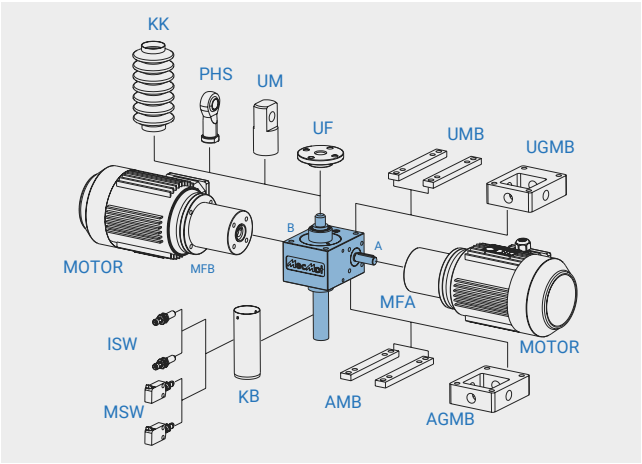
Trapeziodal Screw







VH-S/SI ACCESORIES



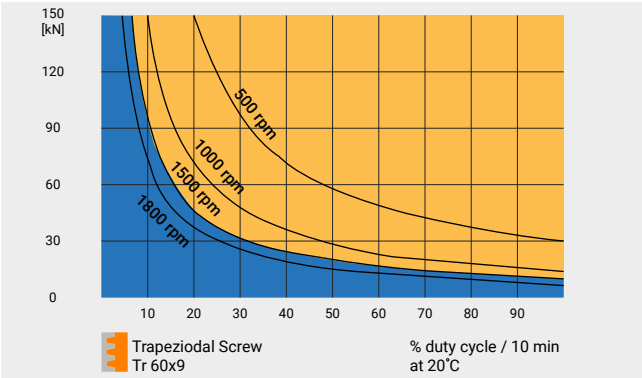
Standard Ratios

Type	Version	Speed	Standart screw	i	Stroke per drive shaft rotation
VK150-VH-A	Translating screw	Normal	Tr 60x9	9:1	1.00 mm
VK150-VH-B		Low speed		36:1	0.25 mm
VK150-SH-A	Rotating screw	Normal	Tr 60x9	9:1	1.00 mm
VK150-SH-B		Low speed		36:1	0.25 mm

General Features

Max static load: 150 kN
Max dynamic load: See duty cycle curves
Nominal speed: 1500 rpm
Max speed: 1800 rpm (depending force and duty cycle)
Screw size: Tr 60x9
Operation temperature: -10/60C
Screw lubrication: Grease lubrication
Input torque: Max 75 Nm (A) max 20 Nm (B)
Drive-through torque: Max 540 Nm

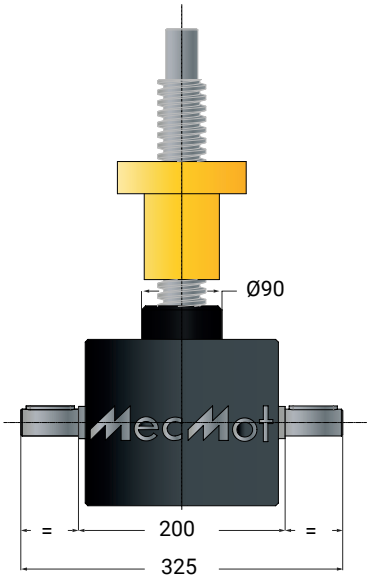
Duty cycle thermal limit, for S+R

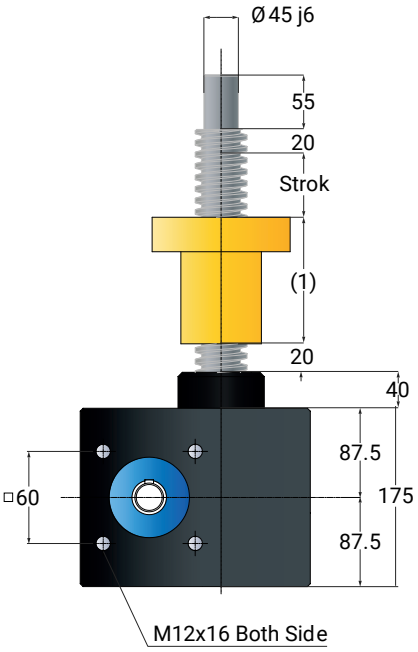


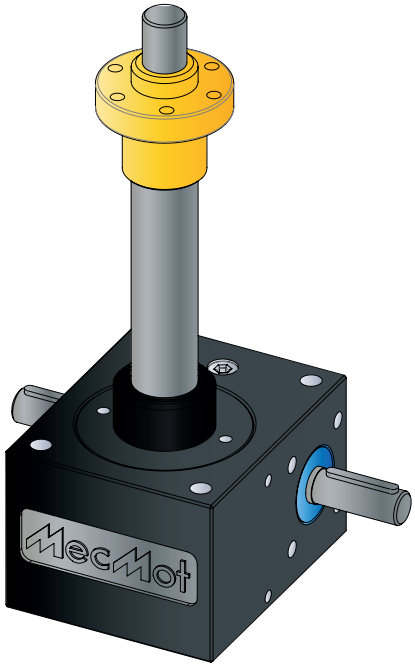
These curves above represents the thermally safe operating time of the product in percent.
These values are valid for the normal operating conditions of the system (lubrication, ambient temperature, environmental conditions, etc.). Otherwise, please contact Mecmot Engineering department.

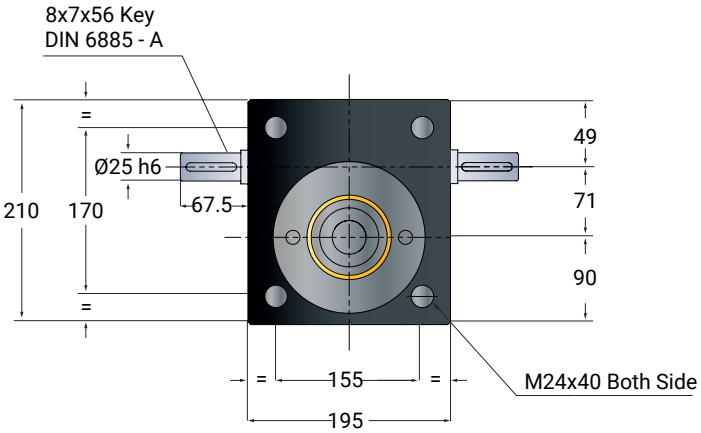
VK150-SH Max 150 kN

Trapeziodal Screw

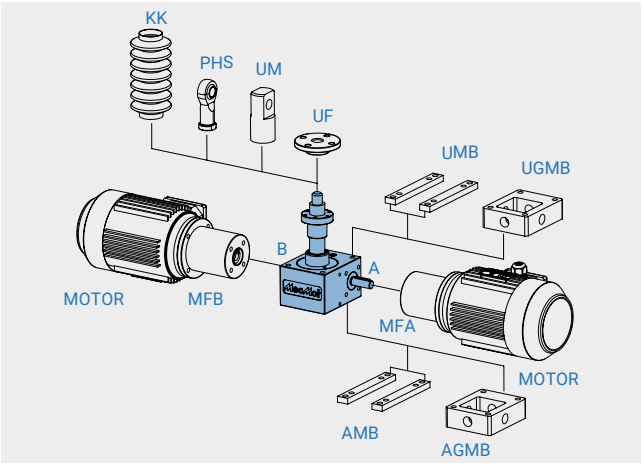




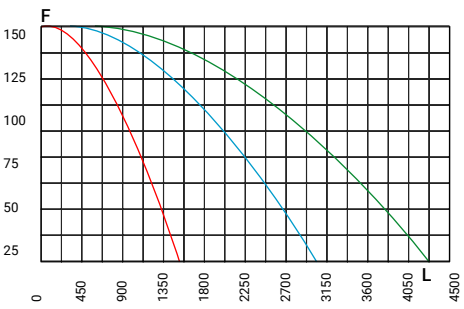


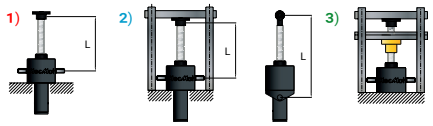


SH ACCESORIES

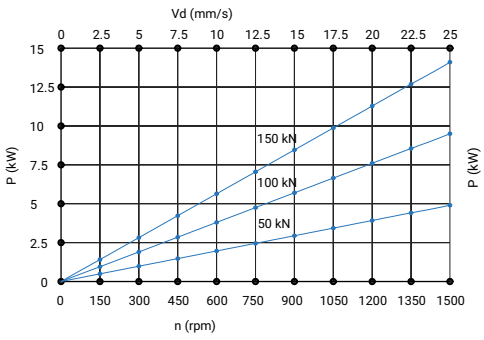


Euler's law (safety factor = 2 dynamic compression load)
Limit load 1 (red) - 2 (blue) - 3 (green)
F = Load [kN]
L = Overall trapezoidal screw lenght [mm]

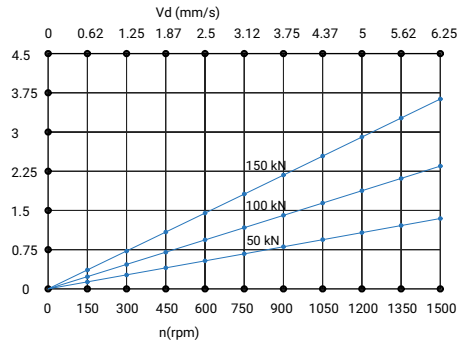




Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

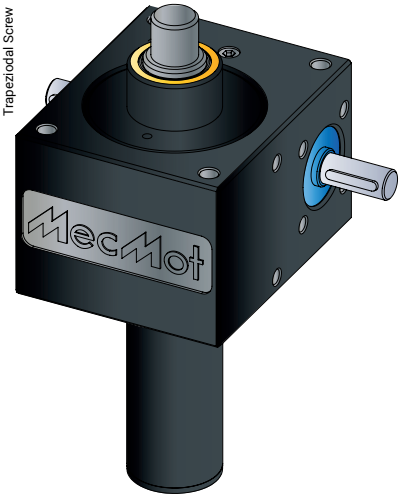


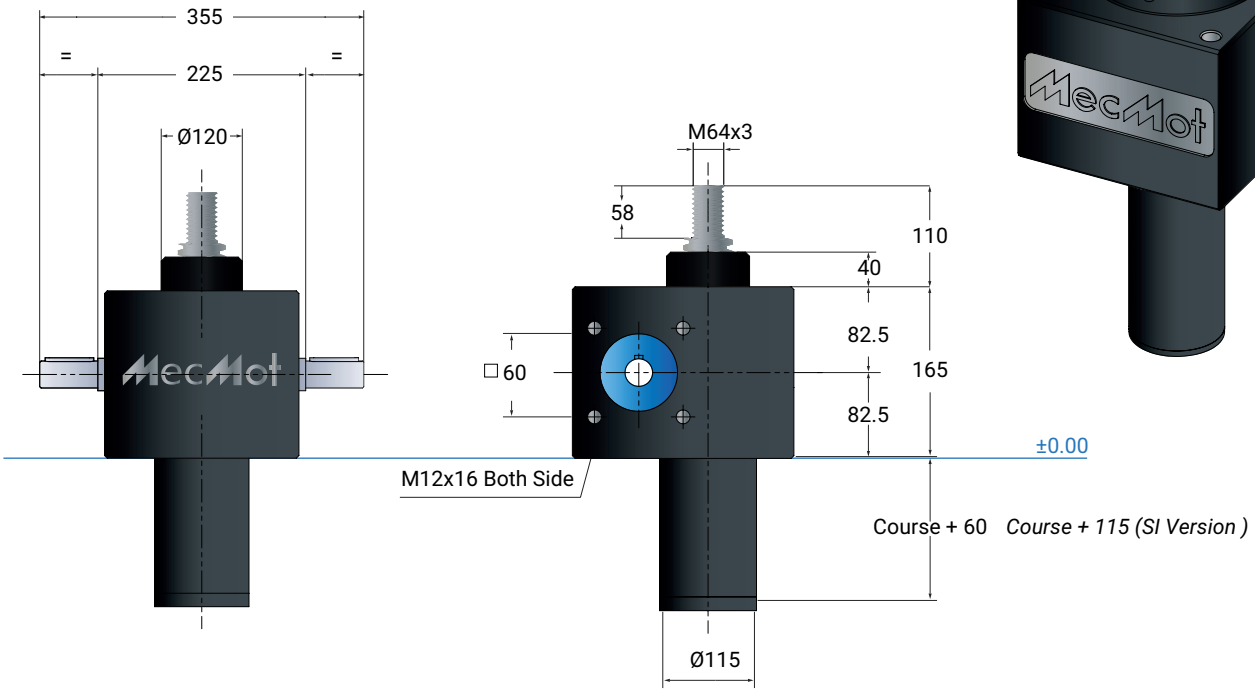
Power Curves (Reduction B Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

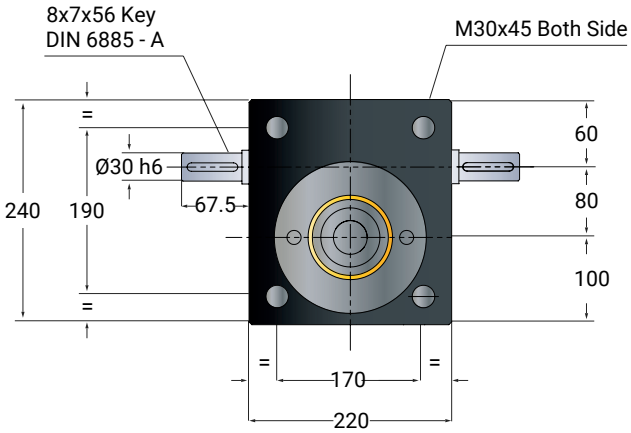


VK250-VH-S/SI Max 250 kN

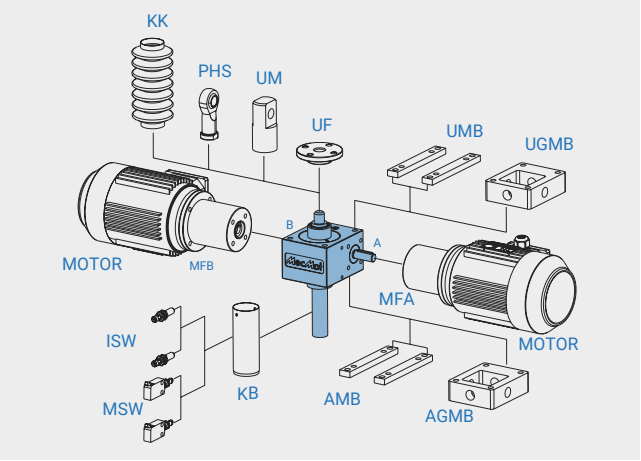
Trapeziodal Screw







VH-S/SI ACCESORIES



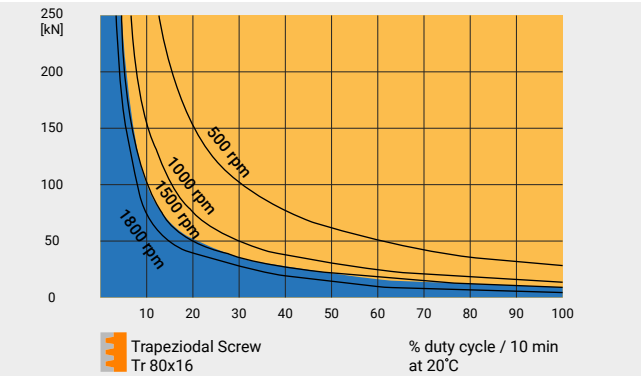
Standard Ratios

Type	Version	Speed	Standart screw	i	Stroke per drive shaft rotation
VK250-VH-A	Translating screw	Normal	Tr 80x10	10:1	1.00 mm
VK250-VH-B		Low speed		40:1	0.25 mm
VK250-SH-A	Rotating screw	Normal	Tr 80x10	10:1	1.00 mm
VK250-SH-B		Low speed		40:1	0.25 mm

General Features

Max static load: 250 kN
Max dynamic load: See duty cycle curves
Nominal speed: 1500 rpm
Max speed: 1800 rpm (depending force and duty cycle)
Screw size: Tr 80x10
Operation temperature: -10/60C
Screw lubrication: Grease lubrication
Input torque: Max 140 Nm (A) max 42 Nm (B)
Drive-through torque: Max 760 Nm

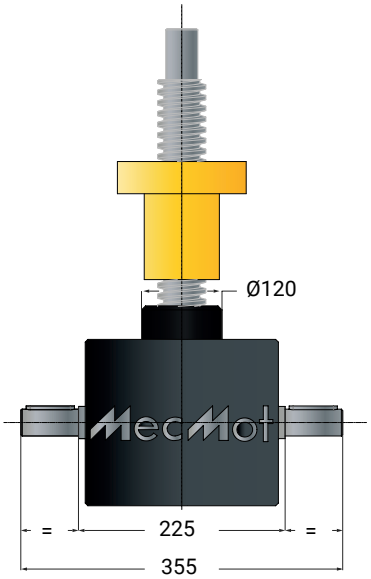
Duty cycle thermal limit, for S+R

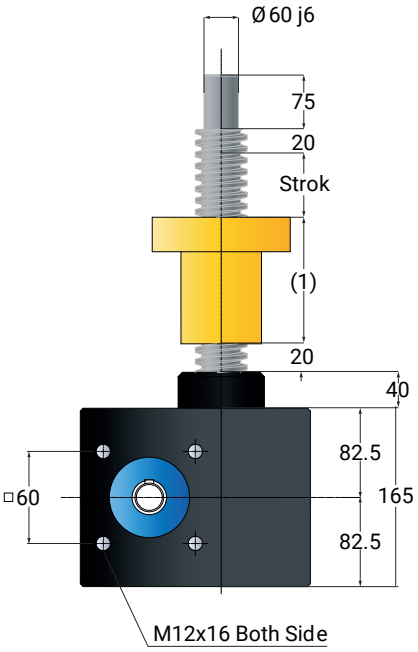


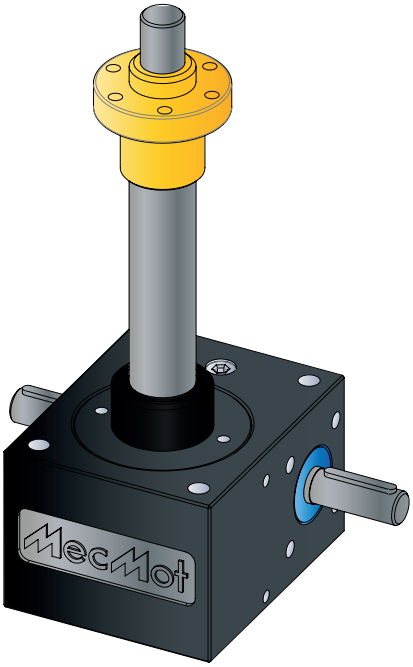
These curves above represents the thermally safe operating time of the product in percent.
These values are valid for the normal operating conditions of the system (lubrication, ambient temperature, environmental conditions, etc.). Otherwise, please contact Mecmot Engineering department.

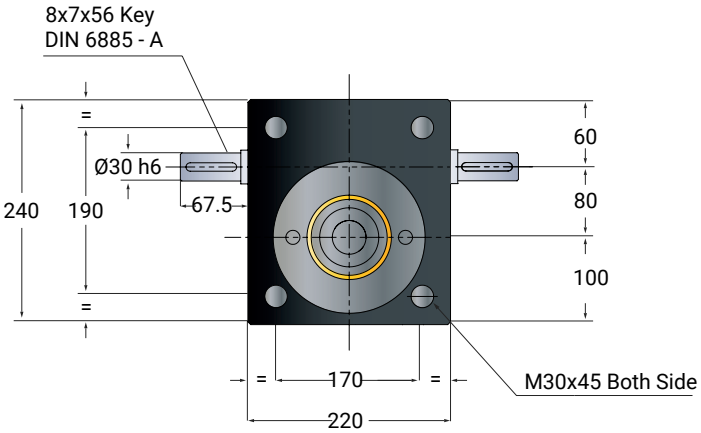
VK250-SH Max 250 kN

Trapeziodal Screw

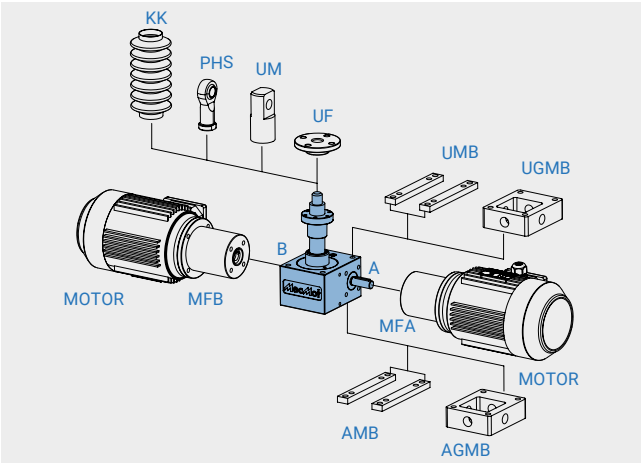




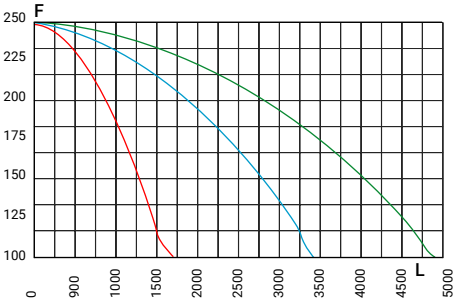


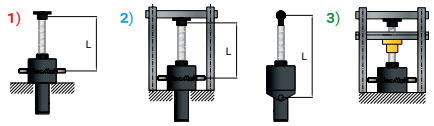


SH ACCESORIES

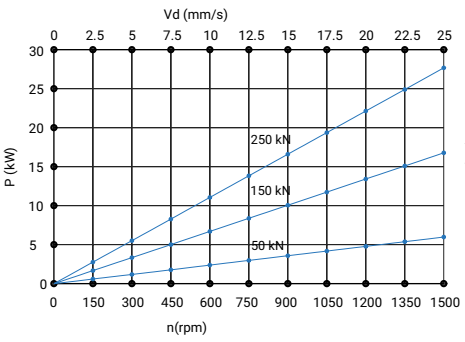


Euler's law (safety factor = 2 dynamic compression load)
Limit load 1 (red) - 2 (blue) - 3 (green)
F = Load [kN]
L = Overall trapezoidal screw lenght [mm]

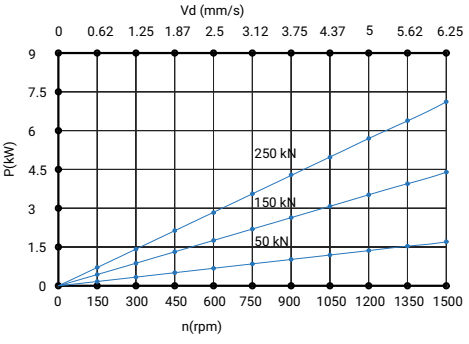




Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

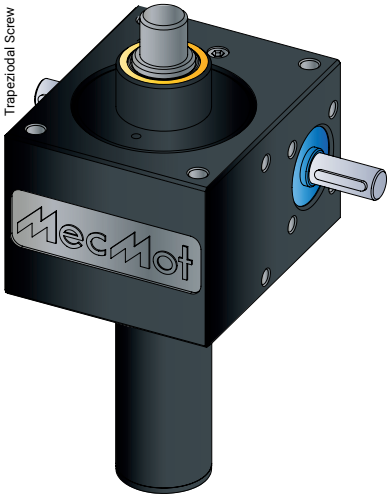


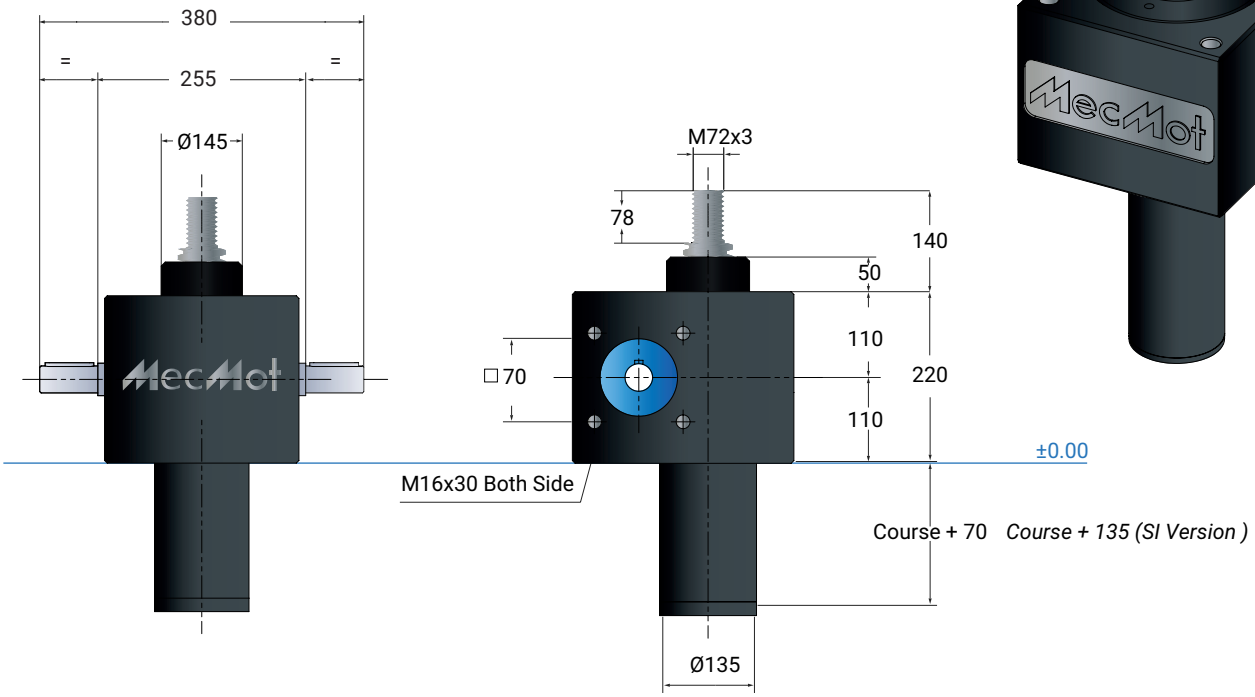
Power Curves (Reduction B Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]

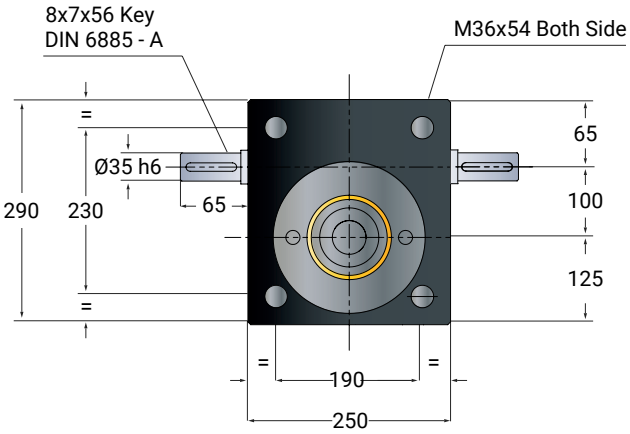


VK350-VH-S/SI Max 350 kN

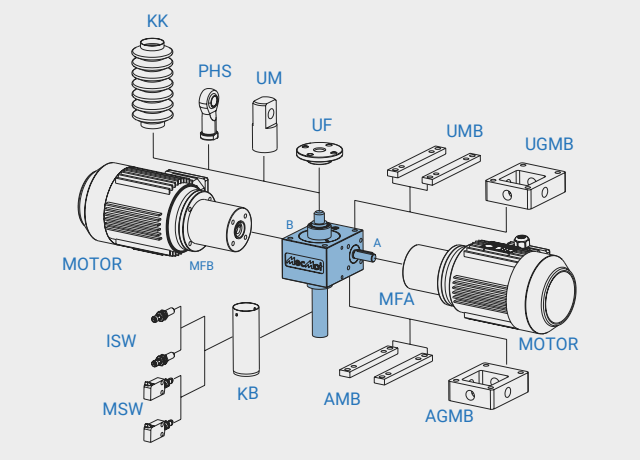
Trapeziodal Screw







VH-S/SI ACCESORIES



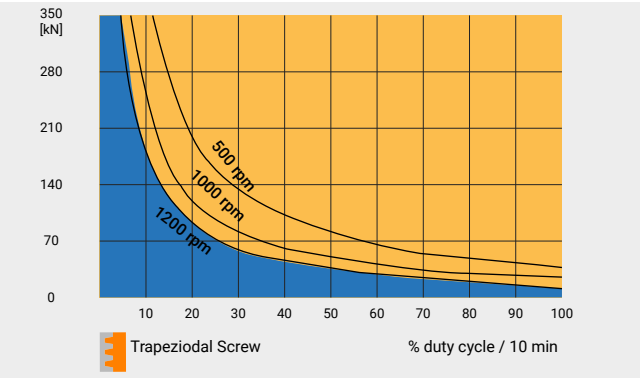
Standard Ratios

Type	Version	Speed	Standart screw	i	Stroke per drive shaft rotation
VK350-VH-A	Translating screw	Normal	Tr 100x10	10:1	1.00 mm
VK350-VH-B		Low speed		40:1	0.25 mm
VK350-SH-A	Rotating screw	Normal	Tr 100x10	10:1	1.00 mm
VK350-SH-B		Low speed		40:1	0.25 mm

General Features

Max static load: 350 kN
Max dynamic load: See duty cycle curves
Nominal speed: 1500 rpm
Max speed: 1800 rpm (depending force and duty cycle)
Screw size: Tr 100x10
Operation temperature: -10/60C
Screw lubrication: Grease lubrication
Input torque: Max 257 Nm (A) max 100 Nm (B)
Drive-through torque: Max 1600 Nm

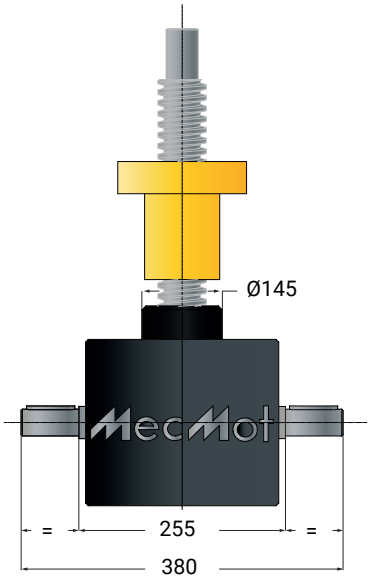
Duty cycle thermal limit, for S+R

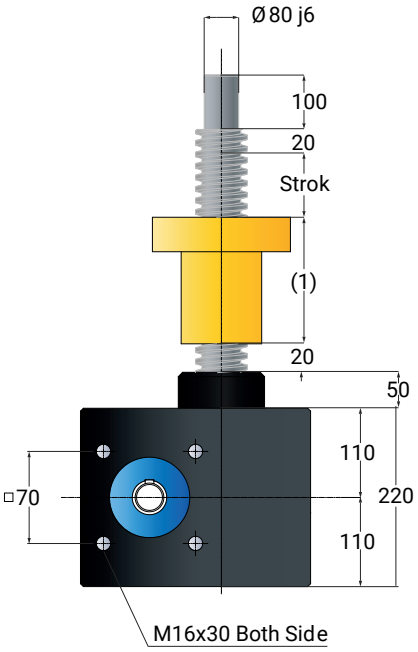


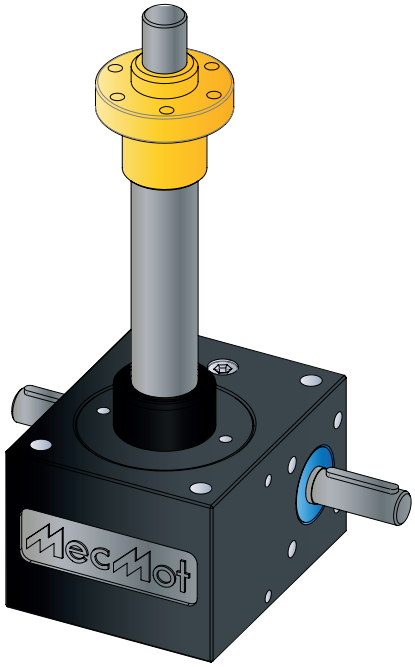
These curves above represents the thermally safe operating time of the product in percent.
These values are valid for the normal operating conditions of the system (lubrication, ambient temperature, environmental conditions, etc.). Otherwise, please contact Mecmot Engineering department.

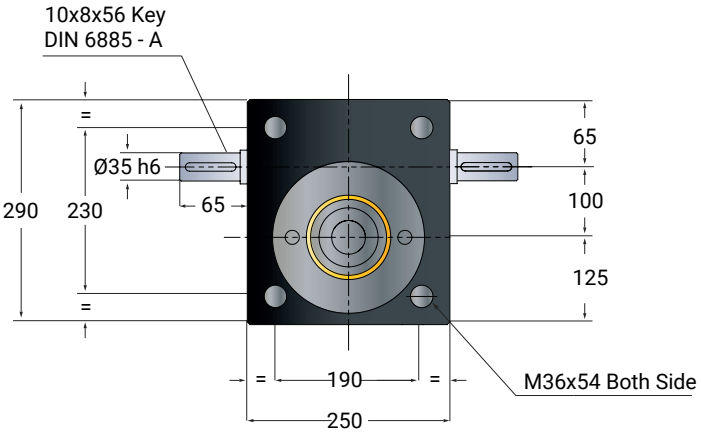
VK350-SH Max 350 kN

Trapeziodal Screw

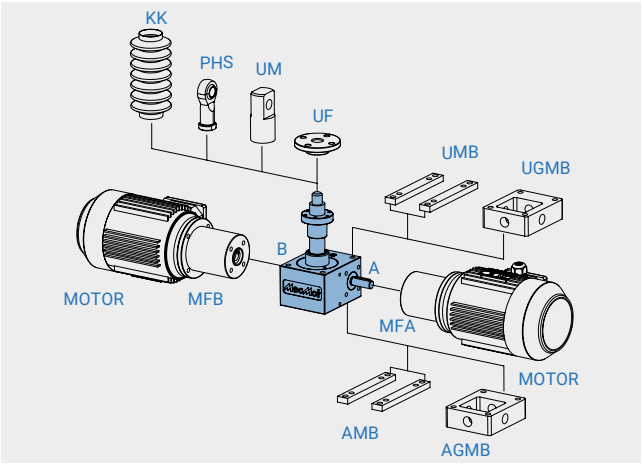




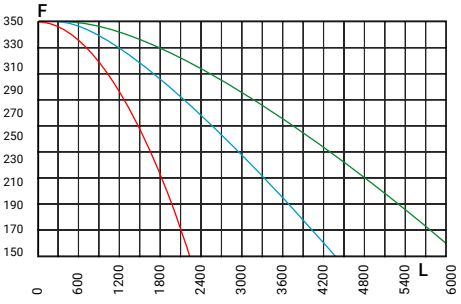


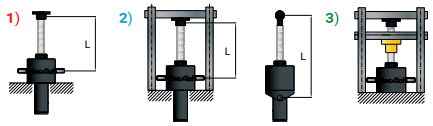


SH ACCESORIES

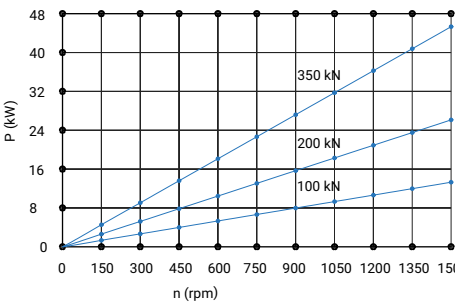


Euler's law (safety factor = 2 dynamic compression load)
Limit load 1 (red) - 2 (blue) - 3 (green)
F = Load [kN]
L = Overall trapezoidal screw lenght [mm]

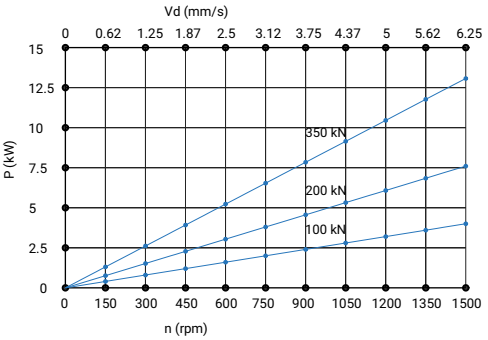




Power Curves (Reduction A Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]



Power Curves (Reduction B Version)
P = Requested input power [kW]
n = Worm rotational speed [rpm]
Vd = Spindle translation speed [mm/s]



SCREW JACK MODEL AND SIZE DEFINITION

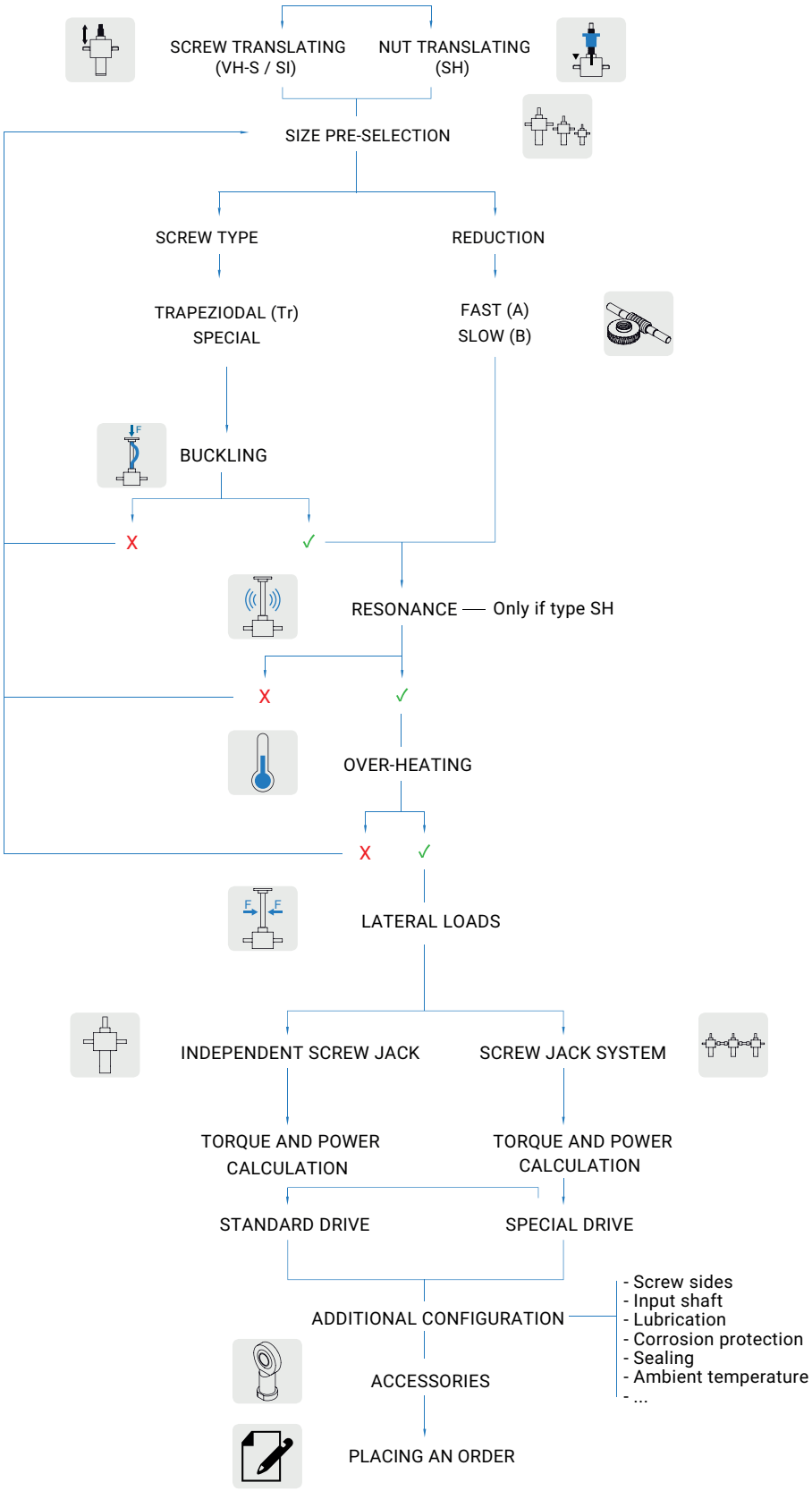
SCREW AND REDUCTION TYPE DEFINITION

SIZE VALIDATION

DRIVE TORQUE AND POWER CALCULATION

ADDITIONAL CONFIGURATION AND ACCESSORIES

PLACING AN ORDER



Critical Compression Buckling Load Of a Screw Jack

When there are compression loads on the screw, it may fail due to buckling, before reaching its static load capacity.
If the critical compression buckling load calculated is lower than the actual compression buckling load applied, a screw jack with a larger diameter screw must be selected and its suitability checked.
Check it using the following steps:

1. Compression Buckling Length and Corrector Factor

Select the length L (mm) and the factor K, to be considered in the buckling critical load calculation.
Do this based on the type of support on the sides of the screw jack, according to the figures shown on the right.

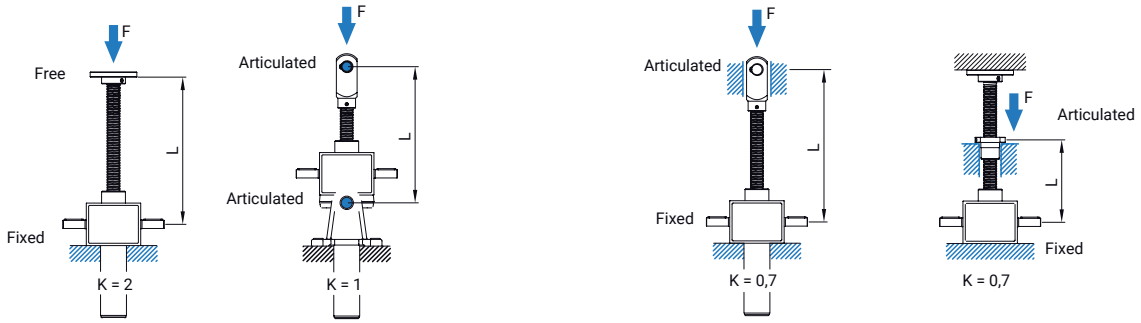
2. Buckling Critical Load

$$F_{crit}\ (kN) = 33{,}91 \times \frac{d^4}{(KxL)^2}$$

d Screw core diameter (mm)
L Buckling length (mm)
K Length corrector factor.

Important

In general, the load applied on the screw jack, including possible impacts, must not surpass the calculated value.
The safety factor considered is 3; reconsider this if so considered opportune for the specific application. As a recommendation, when a hypothetical screw jack failure may involve injuries to people, multiply the critical load calculated by an additional factor of 0.6 (final safety factor, 5).



d - Screw core diameter (mm)							
Trapezoidal screw (Tr)							
18x4	20x4	30x6	40x7	55x9	60x9	80x10	100x10
13	14,5	22,3	31,24	44	96	7,9	87,9

Critical Resonance Speed Of a Screw Jack

Applicable to the R version (the screw rotates and the nut moves).

With reduced diameter and long length screws, there is a risk of having considerable vibration on turning if this occurs at speeds close to the first vibration frequency (the second and highest correspond to very high speeds, at which the screws never work). In the worst cases, the screw may break and, additionally, the risk of collapse due to side buckling considerably increases.
For these reasons, be sure that the screw jack screw works at considerably lower rotation speeds than resonance speeds. If not, select a screw of a larger diameter and/or reduce its turning speed and/or modify the screw jack end supports.

1. Length, resonance and corrector factor

Select the length L and the correction factor M to consider. Do this based on the types of supports on the sides of the screw jack, according to the figures shown on the right.

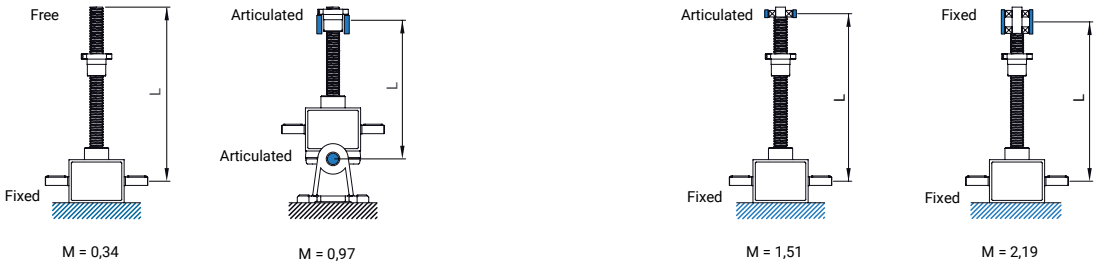
2. Maximum admissible speed

$$n_{adm}\ (rpm) = M \times \frac{d}{L^2} \times 10^8$$

d Screw core diameter (mm).
L Length between supports (mm).
M Corrector factor according to supports.

Important

The safety factor considered is 1.25 (maximum admissible speed = 80% of the critical resonance speed).



d - Screw core diameter (mm)							
Trapezoidal screw (Tr)							
18x4	20x4	30x6	40x7	55x9	60x9	80x10	100x10
13	14,5	22,3	31,24	44	96	7,9	87,9

Overheating Of a Screw Jack.

Applicable to the R version (the screw rotates and the nut moves).

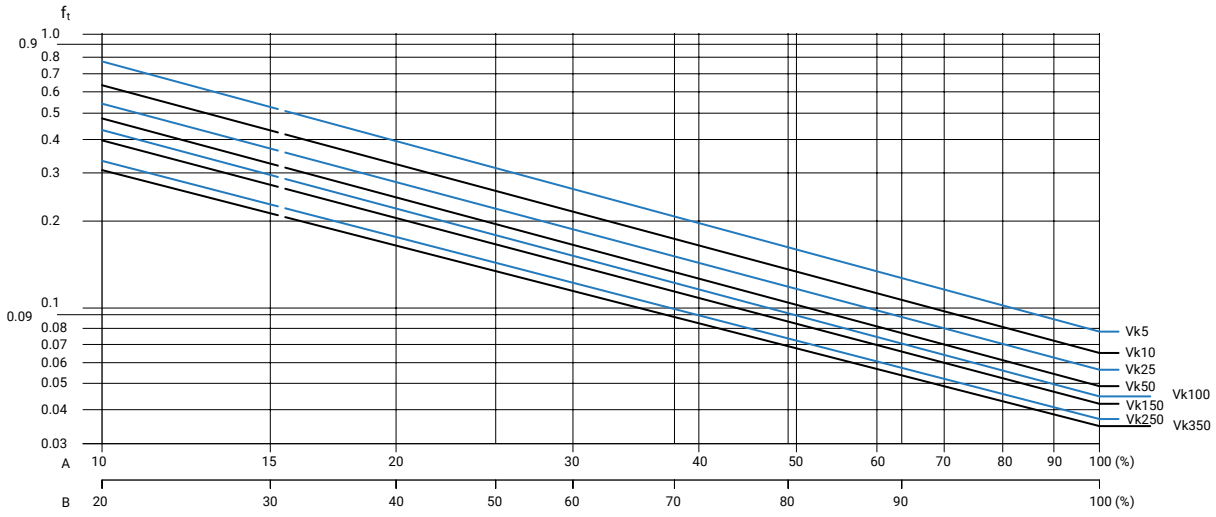
With the aim of avoiding overheating due to internal friction of the screw jacks, the axial strength and the advance speed must be controlled. To do this, check the unit selected with the following formula. If it does not comply, choose a larger screw jack and/or reduce the load and/or reduce the speed. For very small strokes, please contact the MecMot technical department.

$$F \times V \leq F_{max} \times V_{max} \times f_t$$

F Axial strength on the screw (kN).
V Advance speed of the screw (mm/min).
F_{max} Axial load capacity of the screw jack (kN).
f_t Temperature factor, according to the diagram.

$$V_{max}\ V_{max}\ \frac{(mm)}{min} = 1{,}500\ \frac{(1)}{min} \times \text{advance}\ \frac{(mm)}{rev}$$

For input speeds over 1,500 rpm, please contact the MecMot technical department.



A: Table for 60 minute intervals at 20°C .
B: Table for 10 minute intervals at 20°C .

Lateral load of a screw jack

MecMot recommends that, if they exist, the lateral loads on the screw must be supported by guide systems designed for this purpose, in addition to the guide for the gearbox, so that the screw or the nut exclusively support axial traction / compression loads. If there are side loads, the life of the screw jack will be notably reduced, as there will be premature wear of the screw and the nut, which is often the origin of faults.

Important

If it is essential that the screw jack is subject to lateral loads, please contact the MecMot design department for correct design of the unit.This includes the horizontal mountings, on which the screw can flex when subject to the action of its own weight.

Drive Torque and Power Of An İndependent Screw Jack

After pre - selecting the suitable screw jack for the application, select the drive motor, following the steps below.

1. Drive torque

$$M_D\ (Nm) = \frac{F \times P}{2 \times \pi \times \eta_{DG} \times \eta_{DS} \times i} + M_I$$

F Load to elevate in dynamic (kN)

P Screw pitch (mm)

M_I Idle torque (Nm)

i Screw jack gearbox

η_{DG} Gearbox dynamic efficiency

η_{DS} Screw dynamic efficiency

2. Power required

$$P_D\ (kW) = \frac{M_D \times n}{9550}$$

M_D Drive torque (Nm)

n Screw jack input speed (rpm)

Important

In general, it is advisable to multiply the power value calculated for a safety coefficient of 1.3 to 1.5; or for small installations, a factor of 2.

When the load to move is lower than 10% of the elevator's nominal load, consider that value for the previous calculations.

3. Start-up torque

For loads between 25% and 100% of the screw jack's nominal value, calculate the start-up torque with this formula: $M_D\ (Nm) = \frac{F \times P}{2 \times \pi \times \eta_{SA} \times i}$

η_{SA} Screw jack static efficiency (gearbox + screw)

Important

For loads under 25% of the screw jack's nominal value, select the start-up torque by multiplying the drive torque by 2.

η_{DG} Gearbox dynamic efficiency

rpm input	A version (Fast)							
	Vk5	Vk10	Vk25	Vk50	Vk100	Vk150	Vk250	Vk350
3,000	0,91	0,9	0,92					
1,500	0,88	0,89	0,9	0,9	0,9	0,9	0,9	
1.000	0,87	0,88	0,88	0,88	0,87	0,89	0,89	0,9
750	0,85	0,87	0,87	0,87	0,86	0,88	0,89	0,9
500	0,84	0,85	0,85	0,85	0,84	0,87	0,88	0,89
100	0,79	0,79	0,79	0,79	0,78	0,81	0,84	0,85

rpm input	B version (Slow)							
	Vk5	Vk10	Vk25	Vk50	Vk100	Vk150	Vk250	Vk350
3,000	0,75	0,77	0,76					
1,500	0,69	0,71	0,71	0,74	0,72	0,68	0,77	
1.000	0,67	0,69	0,68	0,69	0,67	0,67	0,76	0,77
750	0,64	0,66	0,67	0,68	0,65	0,65	0,75	0,77
500	0,61	0,64	0,63	0,64	0,62	0,64	0,74	0,76
100	0,54	0,56	0,54	0,55	0,53	0,55	0,66	0,69

η_{DS} Screw dynamic efficiency

Trapezoidal screw (Tr)							
18x4	20x4	30x6	40x7	55x9	60x9	80x10	100x10
0.41	0,38	0,38	0,35	0,33	0,31	0,27	0,23

M_I Idle torque

A version (Fast)							
Vk5	Vk10	Vk25	Vk50	Vk100	Vk150	Vk250	Vk350
0.08	0,22	0,3	0,7	1,68	1,8	2.6	3.2

B version (Slow)							
Vk5	Vk10	Vk25	Vk50	Vk100	Vk150	Vk250	Vk350
0.06	0,14	0,24	0,5	1,02	1,15	1,9	2,2

η_{SA} Screw jack static efficiency

	A version (Fast)							
	Vk5	Vk10	Vk25	Vk50	Vk100	Vk150	Vk250	Vk350
Trapeziodal	0,24	0,22	0,22	0,19	0,18	0,18	2,17	0,13

	B version (Slow)							
	Vk5	Vk10	Vk25	Vk50	Vk100	Vk150	Vk250	Vk350
Trapeziodal	0.15	0,14	0,13	0,12	0,11	0,11	0,12	0,1

Important

The values indicated in the tables correspond to the lubrication conditions established by Mecmot for gearbox and screw, and will be reached after a small period of operation.
In the case of low temperatures, these can be reduced considerably.

Planning İnstallations With Screw Jack

For the application of screw jacks in installations with several units, the following criteria must be taken into account:

1. Define the number, position and orientation of the screw jacks.
2. Select the drag components (couplings, transmission shafts, supports, bevel gearboxes, motors, etc.) taking the following recommendations into account:

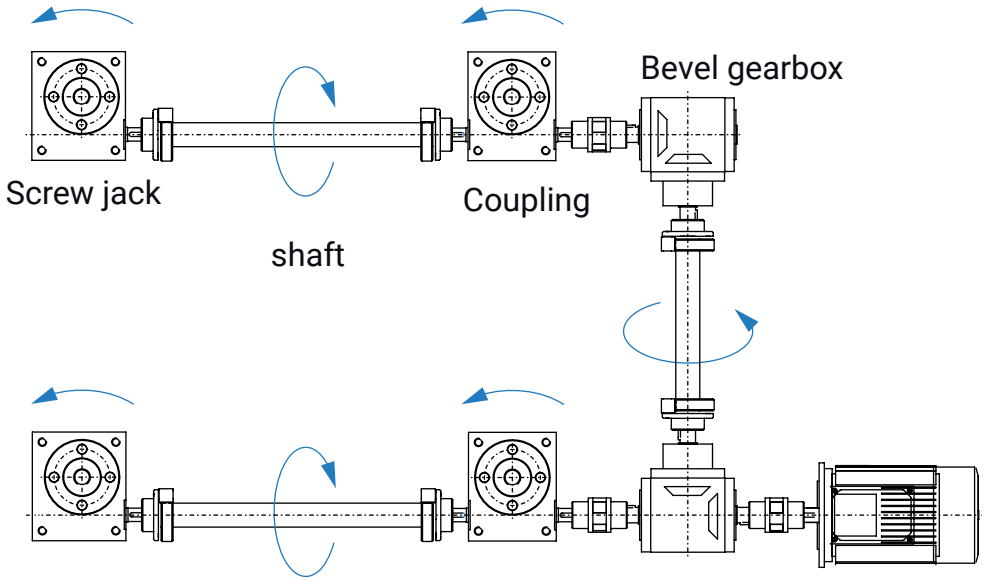
Ensure that the total load is distributed uniformly between all the installation's screw jacks.
The lowest possible number of transmission parts is recommended.
The transmission shafts should be as short as possible.
Try to protect the overall installation with a safety torque limiter.

3. If during the design of the installation a problem arises in defining the turning sense of the different elements, it is advised to apply the following method:

Indicate the orientation of the screw jack elements.
Mark the screw turning sense on each screw jack to "lift".
Show the position of the bevel gearboxes and the transmission shafts in a diagram.

Example:

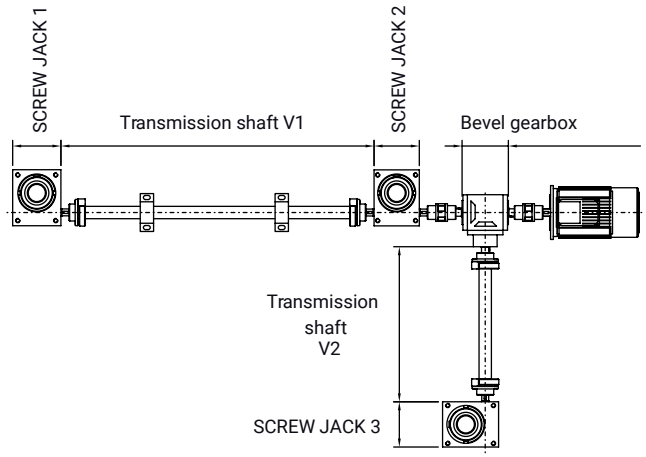
Elevation system with four screw jacks and two bevel gearboxes.



Drive Torque Of a Screw Jack System

The drive torque of a system made up of several screw jacks connected to each other depends on the torque required for the individual drive of each one and the efficiency of the transmission parts that connect them.

Example:



1. System drive torque

$$M_{DS}\ (Nm) = \frac{M_{D1}}{\eta_{v1}} + \frac{M_{D2}}{\eta_{v2}} + \frac{M_{D3}}{\eta_{v1} \cdot \eta_k} \times 1$$

M_{D1} / M_{D2} / M_{D3} Screw jack drive torque 1 / 2 / 3 (Nm)
η_{v1} / η_{v2} Gearbox efficiency V1 / V2 (0.90 - 0.95 approx.)
η_k Distribution gearbox efficiency (0.90 approx.)

Important

In general, it is advisable to multiply the value calculated for a safety coefficient of 1.3 to 1.5; or for small installations, a factor of 2.
When the load to move is lower than 10% of the elevator's nominal load, consider that value for the previous calculations.

To help the calculation, some frequent arrangements are shown for those for which the system's drive torque can be calculated approximately using the formula below.
It is assumed that the load distribution is uniform between all the units and that they are all the same size.

$$M_{DS}\ (Nm) = M_D \times f_s$$

M_D Independent screw jack drive torque
f_s Factor, depending on system (see figures next page)

2. System start-up torque

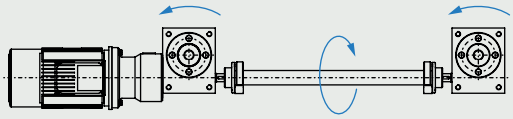
For loads by screw jack between 25% and 100% of the screw jack's nominal value, calculate the start-up torque with this formula: $MDS\ (Nm) = \frac{M_{DS}}{\eta_{SJ}}$

M_{DS} System drive torque (Nm)
η_{SJ} Elevator static efficiency

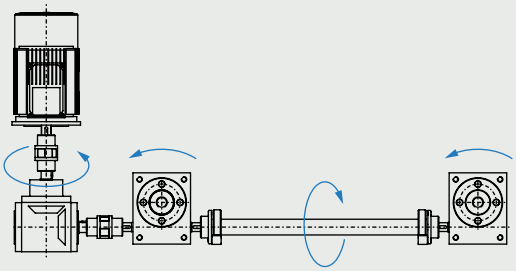
Important

For loads by elevator lower than 25% of its nominal value, multiply the system drive torque by 2.

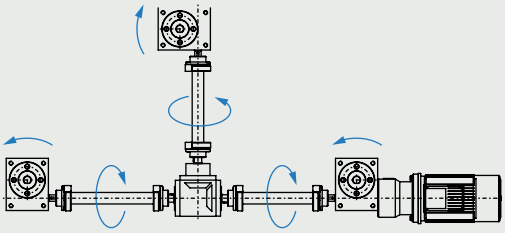
$f_s = 2,1$



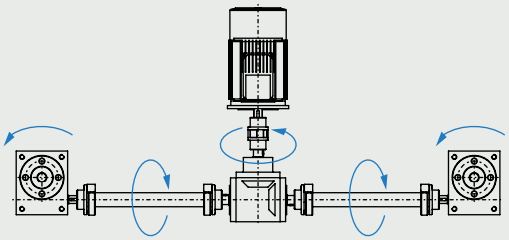
$f_s = 2,25$



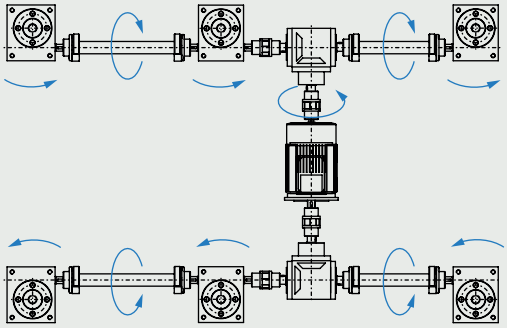
$f_s = 3,34$



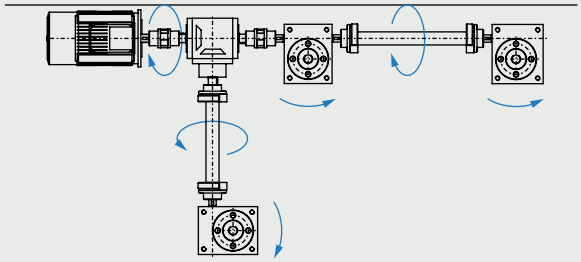
$f_s = 2,25$



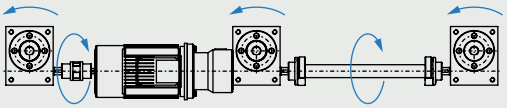
$f_s = 6,8$



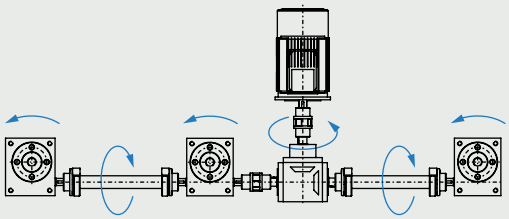
$f_s = 3,27$



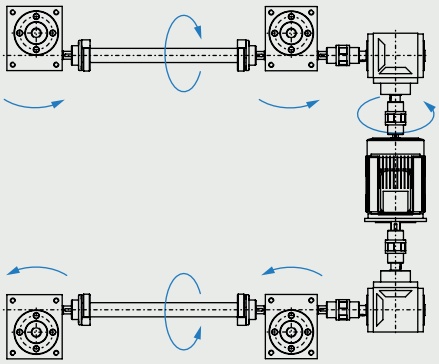
$f_s = 3,1$



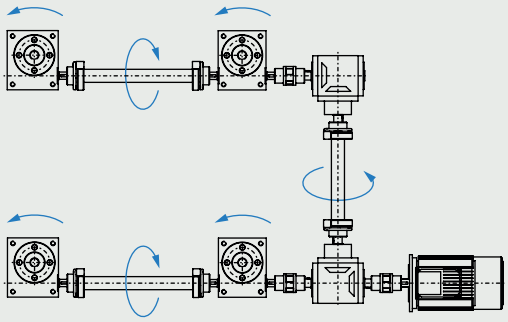
$f_s = 3,35$



$f_s = 4,4$



$f_s = 4,6$

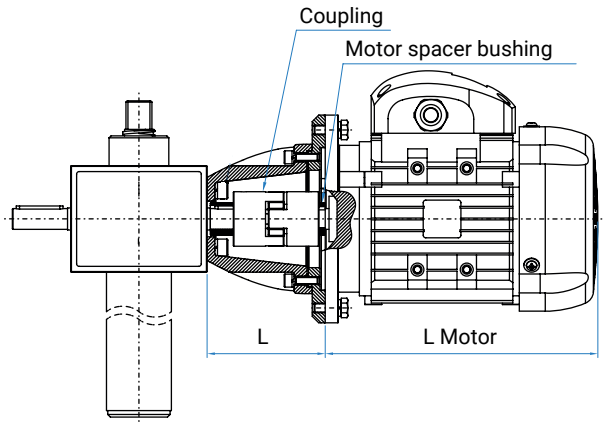


Standart Drive

The standard drive of the screw jacks is made using AC motors. The following table shows the powers available for each screw jack size and the type of flange on the motor, in addition to the length of its fastening flange to the gearbox.
For another size or different type of drive, please contact MecMot. MecMot can supply alternating or stepper motors with sensors of any type, etc.

Motor Group																			
Motor flange	56		63		71		80		90		100		112		132		160		180
	Pewer (kW)																		
	A	B	A	B	A	B	A	B	A	B	A	B	A	A	B	A	B	A	B
	0,06	0,09	0,12	0,18	0,25	0,37	0,55	0,75	1,1	1,5	2,2	3	4	5,5	7,5	11	15	18,5	22

Vk5	L	57	60	67						
	Motor flange	B14	B14	B14						
Vk10	L		63	70	83					
	Motor flange		B14	B14	B14					
Vk25	L			91	101	113	123			
	Motor flange			B5	B14	B14	B14			
Vk50	L			91	101	113	123			
	Motor flange			B5	B5	B14	B14			
Vk100	L				125	135	145	167	201	
	Motor flange				B5	B5	B14	B14	B14	
Vk150	L						145	165	199	
	Motor flange						B14	B14	B14	
Vk250	L					135	145	167	201	203
	Motor flange					B5	B5	B5	B5	B5



In general, it is always advisable that the motors incorporate a brake, standard brakes are sufficient for each motor size in most cases. This will ensure the screw does not loose position when it stops or if there are vibrations, etc.

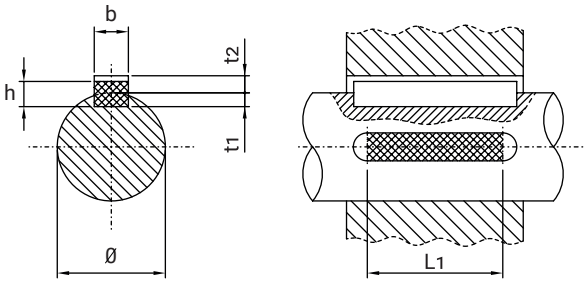
Maximum Transferable Torque Depending On Shaft / Paralel Cotter Pin (DIN 6885)

The following table shows the maximum transferable torque for a shaft and its keys. It is considered that the shaft is subject exclusively to torsional forces.

Important

Never apply to the input shaft of a screw jack torques over those indicated for its shaft and keys (see plans in the sub-chapter “sizes”).

Shaft diameter Ø (mm)	Key dimensions			Maximum transferable torque MD (Nm) Key effective length, L1 (mm)						
	b x h (mm)	t1 (mm)	t2 (mm)	10	16	20	28	40	50	70
8 - 10	3 x 3	1.8	1.4	5	9	12	-	-	-	-
10 - 12	4 x 4	2.5	1.8	9	13	17	-	-	-	-
12 - 17	5 x 5	3	2.3	15	24	30	42	-	-	-
17 - 22	6 x 6	3.5	2.8	25	40	50	70	100	-	-
22 - 30	8 x 7	4	3.3	39	63	78	109	157	195	-
30 - 38	10 x 8	5	3.3	50	82	102	143	204	255	357
38 - 44	12 x 8	5	3.3	62	98	123	173	247	308	432
44 - 50	14 x 9	5.5	3.8	82	132	164	230	330	412	575



Material: C45 (1.1191) according to EN 10083-1
Load type: Drive - Uniform / Load - Light knocks
Assembly: tight
Cycles: >1,000,000
Safety factor: 1.5 - 2.5
IMPORTANT For other conditions, please contact the MecMot technical department.

Lubrication

For further information, please contact the MecMot technical department. A complete cleaning and change of grease is recommended after five years. The greasing interval depends on the type of work and its cycle. It is advisable to lubricate from 30 to 50 hours after start-up and approximately every six months.It is important to avoid over-lubricating.

Gearbox	Total Multis Complex SHD 220 Synthetic Litium Grease
Trapeziodal Screw	Sentinel SL-OG Synthetic Open Gear Grease

Projection Against Corrosion, Sealing and Ambient Temperature

Projection against corrosion

Select the environment in which the equipment will work, using the atmospheric corrosion categories classification established in the DIN EN ISO 12944-2 standard (protection against the corrosion of steel structures using painted systems). Also establish the durability required before carrying out the first maintenance of the exterior surfaces (durability does not imply a "time" guarantee).If the corrosion category is higher than “C3” for your application and/or higher than “average” durability is required, please contact MecMot so that the technical department can select the surface protection system and select the most suitable components.

Corrosion Category		ENVIRONMENT	
		Outdoors	Indoors
C1	Very low		Buildings with heating and clean atmospheres.
C2	Low	Atmospheres with low levels of pollution. Rural areas.	Buildings with no heating and possible condensation.
C3	Medium	Urban and industrial atmospheres, with moderate SO2 pollution. Coastal areas with low salinity.	Manufacturing plants with high humidity and some pollution.
C4	High	Industrial areas and coastal areas with moderate salinity.	Chemical and swimming pool industries.
C5-I	Very hig (industrial)	Industrial areas with high humidity and aggressive atmosphere.	Buildings or areas with almost permanent condensation and high contamination.
C5-M	Very hig (maritime)	Coastal and maritime areas with high salinity.	Buildings or areas with permanent condensation and high contamination.

DURABILITY		
Low	L	2 to 5 years
Medium	M	5 to 15 years
High	H	More than 15 years

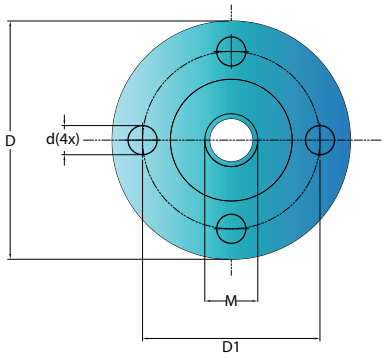
MecMot screw jacks offer, as standard, an IP54 protection index to prevent solid and liquid particles from entering the inside, which may damage them or reduce their designed service life. Use the following table, according to the DIN EN IEC 60529 standard, if the level of protection must be higher than that indicated. MecMot supplies, on request, specially designed units to withstand the most aggressive environments.The protection levels are defined with a code made up of the letters “IP“ and two numbers “XY”.

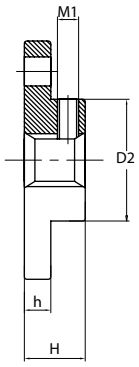
LEVEL OF PROTECTION "IP", AGAINST THE INPUT OF			
...Solid particles: "X"		...Liquids: "Y"	
	...		...
5	Protection against dust residues (the dust that may penetrate the inside does not imply incorrect operation of the equipment).	3	Protection against spray water (from angle up to 60° with vertical).
6	Total protection against the penetration of any kind of solid body (sealing).	4	Protection against water splashes (from any direction).
		5	Protection against water streams from any direction with hose.
		6	Protection against sporadic floods (example: tidal wave).
		...	...

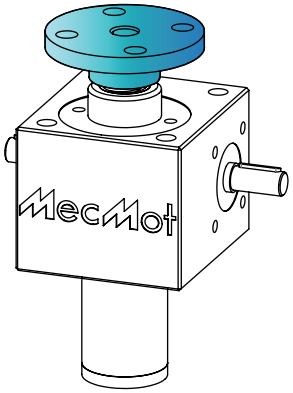
Ambient Temperature

Contact MecMot if your unit will be installed in an environment that may reach temperatures below -20°C. MecMot technical department will prescribe the most suitable materials and sealing components for the specific conditions of the application. Also do this if ambient temperatures over 40°C are expected.

UF - Fixing Flange

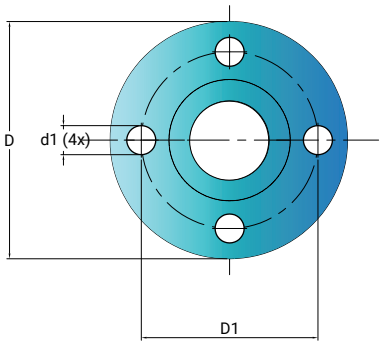


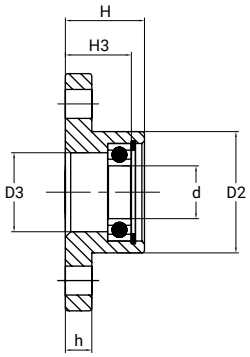


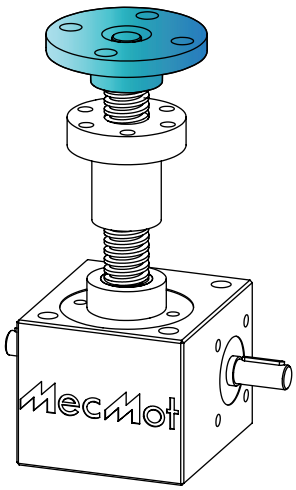


Part no.	D	D1	D2	M	d	h	H	M1	kg
UP07.03.01	65	48	29	M12	9	7	20	5	0.21
UP07.03.02	80	60	38	M14	11	8	21	6	0.38
UP07.03.03	90	67	46	M20	11	10	23	8	0.57
UP07.03.04	110	85	60	M30	13	15	30	8	1.20
UP07.03.05	150	117	85	M36	17	20	50	10	3.50
UP07.03.06	170	130	90	M42X2	21	25	50	10	4.70
UP07.03.07	210	165	120	M56X2	26	30	60	12	9.50
UP07.03.08	260	205	145	M72X3	32	40	80	16	18.4

UFS - Opposed Bearing Plate

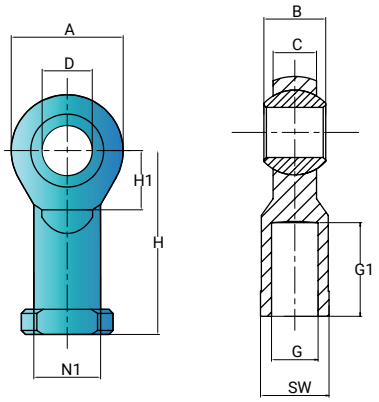


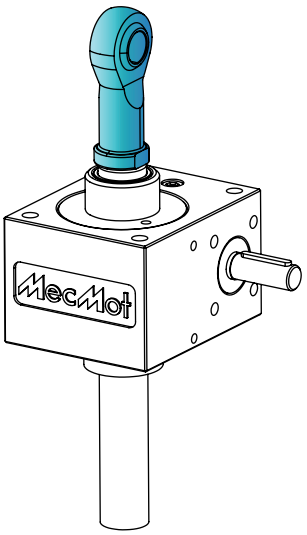




Part no.	0D	0D1	0D2	0D3	0d	0d1	h	H	H3	Larger	Si ring	kg
UP07.06.01	65	48	29	20	12	9	7	20	13	61901.2RS	J 24	0.17
UP07.06.02	80	60	39	28	15	11	8	21	17	6002.2RS	J 32	0.30
UP07.06.03	90	67	46	32	20	11	10	23	19	61904.2RS	J 37	0.48
UP07.06.04	110	85	60	42	25	13	15	30	22	6005.2RS	J 47	1.05
UP07.06.05	150	117	85	60	40	17	20	50	35	6008.2RS	J 68	3.10
UP07.06.06	170	130	90	68	45	21	25	50	31	6009.2RS	J 75	3.70
UP07.06.07	210	165	120	85	60	26	30	60	50	2x6012.2RS	J 95	6.90
UP07.06.08	265	205	145	95	80	26	32	65	54	2x6016.2RS	J 125	11.50

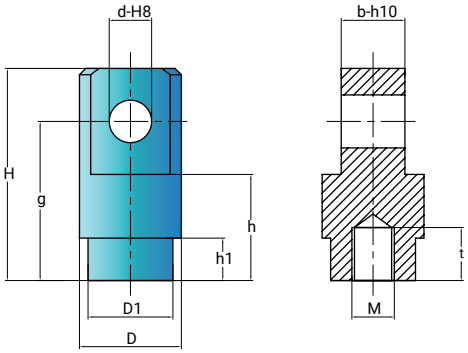
PHS - Rod

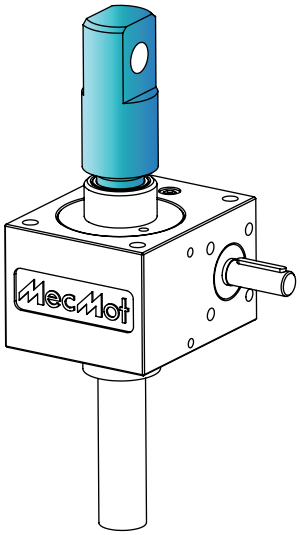




Part no.	A	B	C	D	G	G1	H	H1	SW	N1	kg
HM13.01.01	34	10	8	12	M12	23	50	17.5	18	17	0.10
HM13.01.02	40	12	10	15	M14	30	61	20	21	20	0.16
HM13.01.03	53	16	13	20	M20	40	77	27.5	30	27.5	0.32
HM13.01.04	73	22	19	30	M30	56	110	37	41	40	1.00
HM13.01.05	92	28	24	40	M36	65	142	46	60	52	1.90
HM13.01.06	112	35	31	50	M42x2	68	160	56	70	62	3.60
HM13.01.07	160	49	43	70	M56x2	80	200	80	85	80	8.30

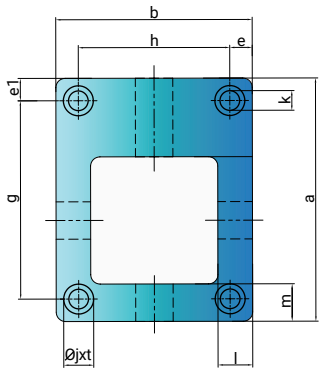
UM - Pivot Bearing

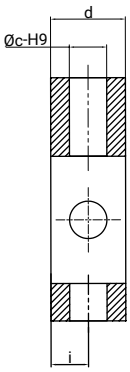


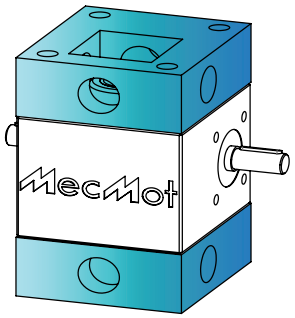


Part no.	H	D	D1	d	M	g	b	h	h1	t	kg
UP07.04.01	65	30	29	12	M12	48	18	25	20	22	0.25
UP07.04.02	80	40	39	14	M14	56	24	25	20	25	0.56
UP07.04.03	110	50	46	20	M20	80	30	45	25	25	1.20
UP07.04.04	130	65	60	30	M30	92	35	50	-	33	2.10
UP07.04.05	144	90	85	35	M36	108	40	65	-	55	4.40
UP07.04.06	210	100	90	50	M42x2	155	57	90	50	70	8.00
UP07.04.07	260	125	120	80	M56x2	180	80	85	40	63	16.00
UP07.04.08	280	145	145	95	M72x3	195	100	105	-	83	24.00

GMB - Pivot Bearing Plate

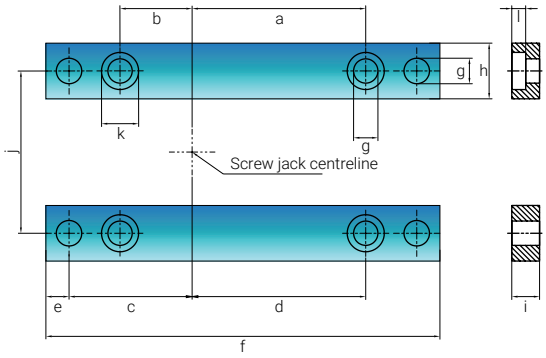


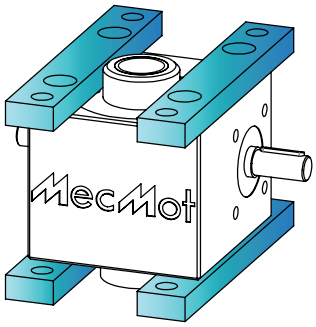




Part no.	a	b	c	d	e	e1	g	h	i	j	k	l	m	t	kg
UP07.02.01	80	72	16	30	10	10	60	52	15	15	9	18	10	9	0.80
UP07.02.02	100	85	16	30	11	11	78	63	15	15	9	16	11	9	1.15
UP07.02.03	130	105	20	40	12	12	106	81	20	18	11	25	25	11	2.80
UP07.02.04	180	145	30	50	15	15	150	115	25	20	13	24	30	13	5.30
UP07.02.05	200	175	40	70	22	17	166	131	35	26	17	40	30	18	11.1

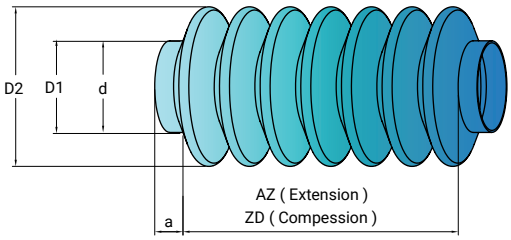
MB - Fixing Strips

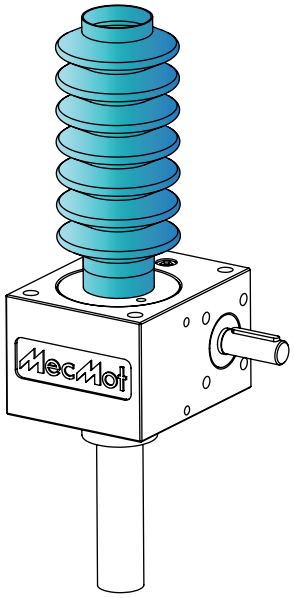




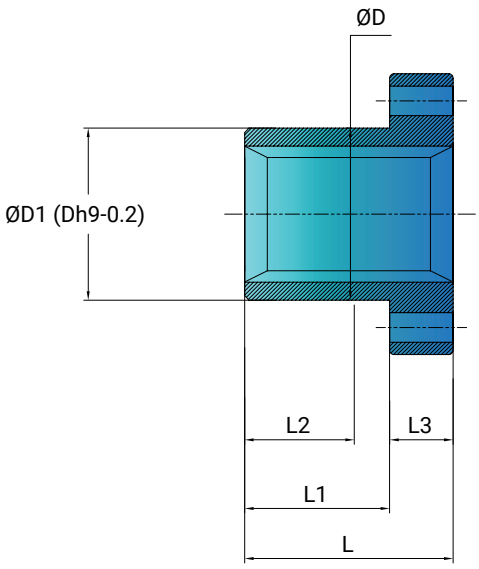
Part no.	a	b	c	d	e	f	g	h	i	j	k	l	kg
UP07.01.01	39	21	41	59	10	120	9	20	10	52	14	6	0.32
UP07.01.02	49	29	50	70	10	140	9	20	14	63	14	6	0.50
UP07.01.03	64	42	64	86	10	170	11	25	12	81	17	7.5	0.75
UP07.01.04	87	63	90	114	13	230	13	30	20	115	19	7	2.00
UP07.01.05	100	66	101	135	17	270	18	40	25	131	26	11	3.70

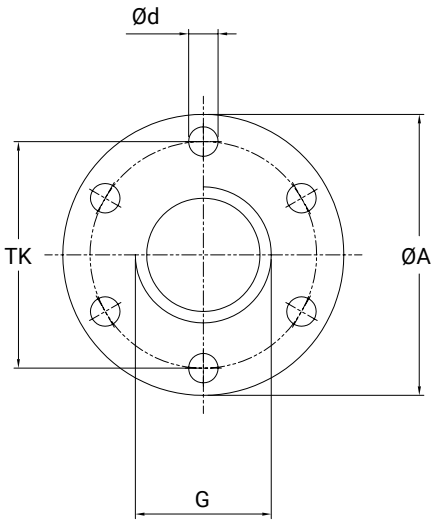
KK - Bellows





Part no.	a	d	ZD	AZ	Stroke	D1	D2	kg
HM14.01.01	10	29	35	300	265	40	76	0.15
HM14.01.02	10	39	80	420	340	40	80	0.21
HM14.01.03	15	46	70	370	300	50	83	0.25
HM14.01.04	18	60	85	475	390	66	102	0.43
HM14.01.05	15	85	75	360	285	85	118	0.29
HM14.01.06	15	90	50	400	350	92	141	0.44
HM14.01.07	15	120	90	480	390	125	166	1.10
HM14.01.08	15	145	100	700	600	172	236	2.40

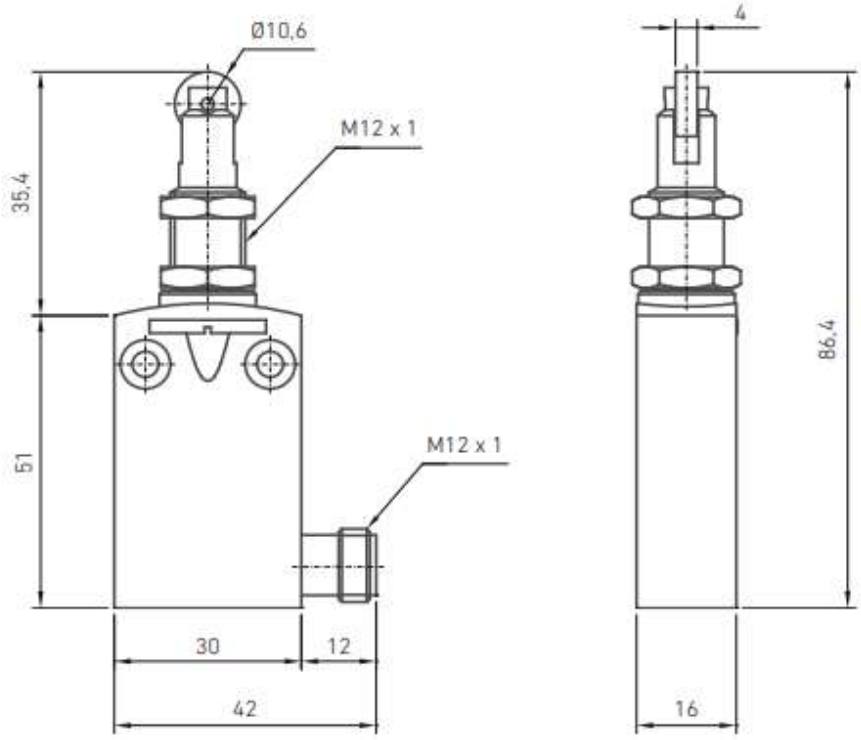




Part no	0	D1 Dh9	TK	A	d (6x1)	L	L1	L2	L3	kg
VK5-HRS	Tr 18x4	28	38	48	6	35	23	15	12	0,23
VK10-HRS	Tr 20x4	32	45	55	7	44	32	24	12	0,35
VK25-HRS	Tr 30x6	38	50	62	7	46	32	24	14	0,41
VK50-HRS	Tr 40x7	63	78	95	9	66	50	38	16	1,71

MSW - Mechanical Limit Switch

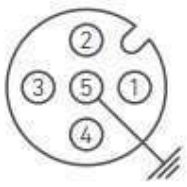
MSW with M12X1 CONTECTOR	VK5 VH-S/SI
	VK10 VH-S/SI
	VK25 VH-S/SI
	VK50 VH-S/SI
	VK100 VH-S/SI
	VK150 VH-S/SI
	VK250 VH-S/SI
	VK350 VH-S/SI

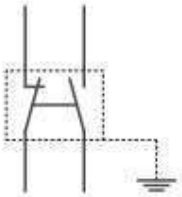


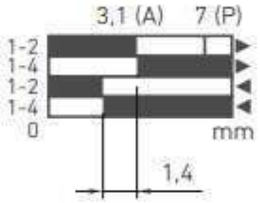
M12x1 connector specifications

5 Pin model
Snap switch PNP_NC + NA bipolar input

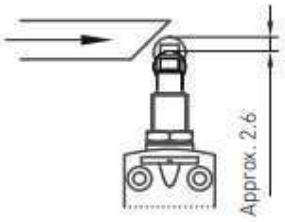
4 A - 60 V
1-2 = NC
3-4 = NA
5 = ⏚







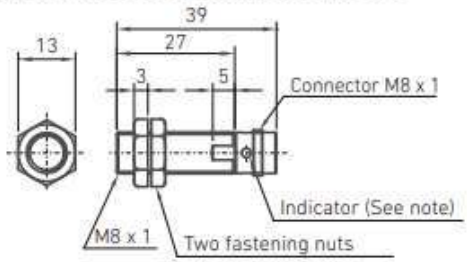
Roller-type switching end



ISW - Inductive Limit Switch

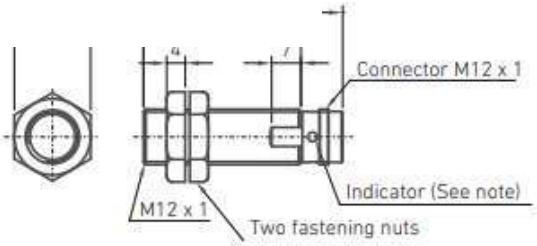
ISW M8x1 With M8x1 Connector	VK5 VH-S/SI
	VK10 VH-S/SI
	VK25 VH-S/SI
	VK50 VH-S/SI
	VK100 VH-S/SI
	VK150 VH-S/SI
	VK250 VH-S/SI
	VK350 VH-S/SI
ISW M12x1 With M812x1 Connector	VK5 VH-S/SI
	VK10 VH-S/SI
	VK25 VH-S/SI
	VK50 VH-S/SI
	VK100 VH-S/SI
	VK150 VH-S/SI
	VK250 VH-S/SI
	VK350 VH-S/SI

M8x1 inductive detector with M8x1 connector



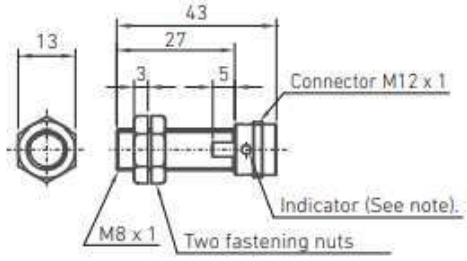
Note: Operation indicator (yellow LED, 4x90°)

nnector M12x1



Note: Operation indicator (yellow LED, 4x90°)

Inductive detector M8x1 with connector M12x1 (optional)

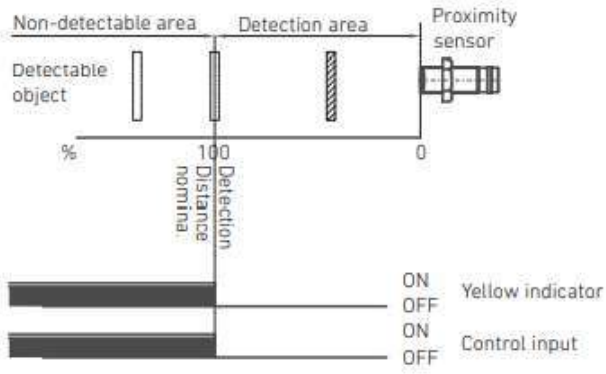


Note: Operation indicator (yellow LED, 4x90°)

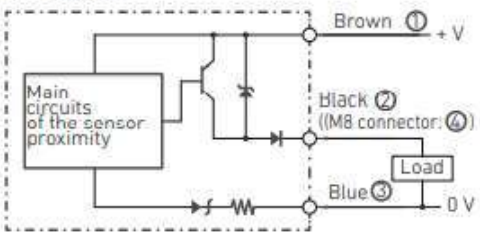
Connector specifications

CC Model 3-wire
PNP-NC input

Operating diagram



Input circuit



M8 connector

M12 connector
Pin 2 is not used