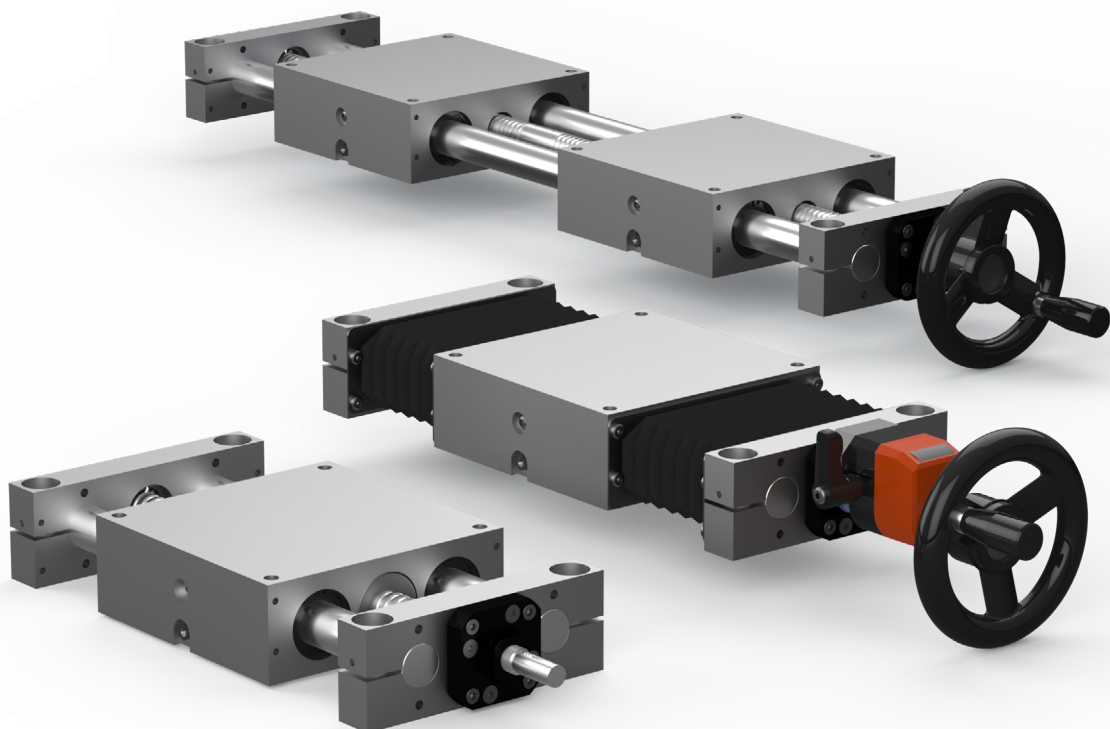


TECHNICAL INFORMATION

LINEAR UNIT QME



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Product overview

By using Linear Unit QME from Rollco you save both time and money. The units are designed to fulfil the need of an easy to mount unit for medium precision requirements. The units are ready to mount linear tables guided with linear ball bearings on hardened shafts and driven by ball- or lead-screw. There is a wide variety of executions available for quick delivery from our workshop.

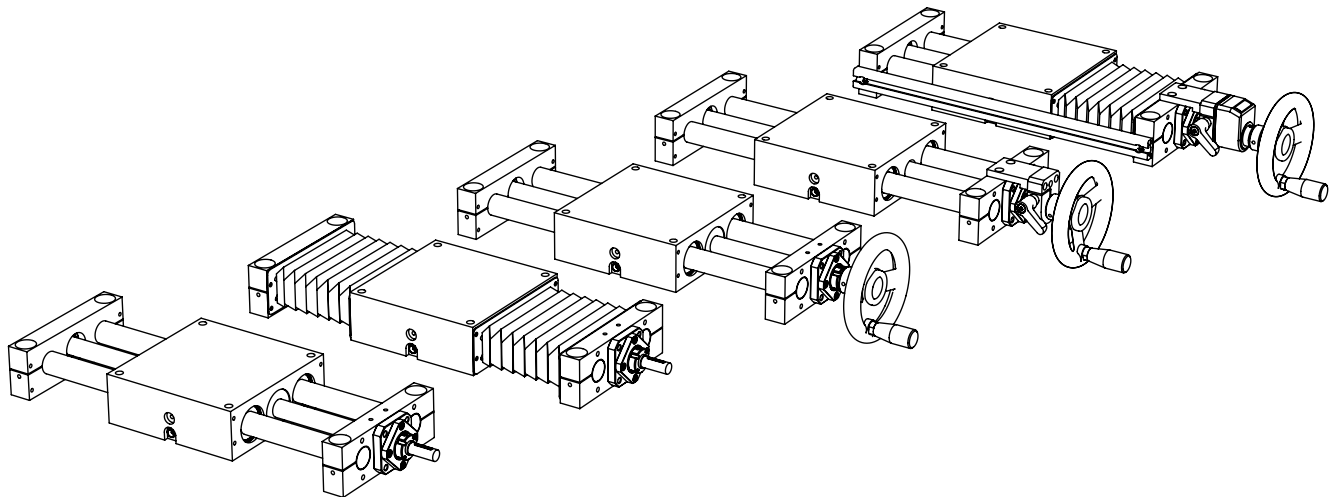
Selectable standard options are:

- Bellows
- Hand wheel
- Screw locking
- Mechanical position counter
- Left+Right drive units
- Magnetic end position switches

Ask us if you need higher level of corrosion resistance, low/high temperature versions, other screw-leads or -types, customized machining of the drive- and mounting-interfaces and so on.

Characteristics

- Linear ball bearings used for lowest friction and minimal and persistent play.
- With low backlash ball screw for motor-drive or trapeziodal screw with bronze nut for manual operation.

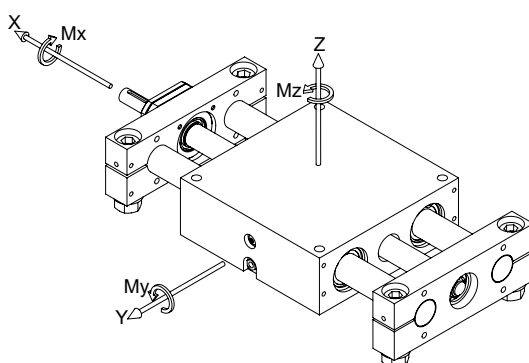


Material

Ball screw	Cf53 or similar, no surface treatment
Trapezoidal screw	Carbon steel C46, on request stainless steel AISI 304 or 316
Trapezoidal nut	Tin bronze
Shaft	Cf53 / 1.1213 / C53G, corrosion resistant versions on request
Slider body and drive ends	Aluminium alloys, EN AW-6060, EN AW-5083 or EN AW-6082

Table 1

Load and speed



Load capacity of the linear guiding

All capacity values are based on the individual ratings of the linear ball bearings used inside the QME. The usable load level depends on required service life and also the system configuration. As rule of thumb, a dynamic safety factor of at least 5 is recommended for motor driven units in high duty automation applications. See website for all capacity values.

Permissible load (Fz & Fy)

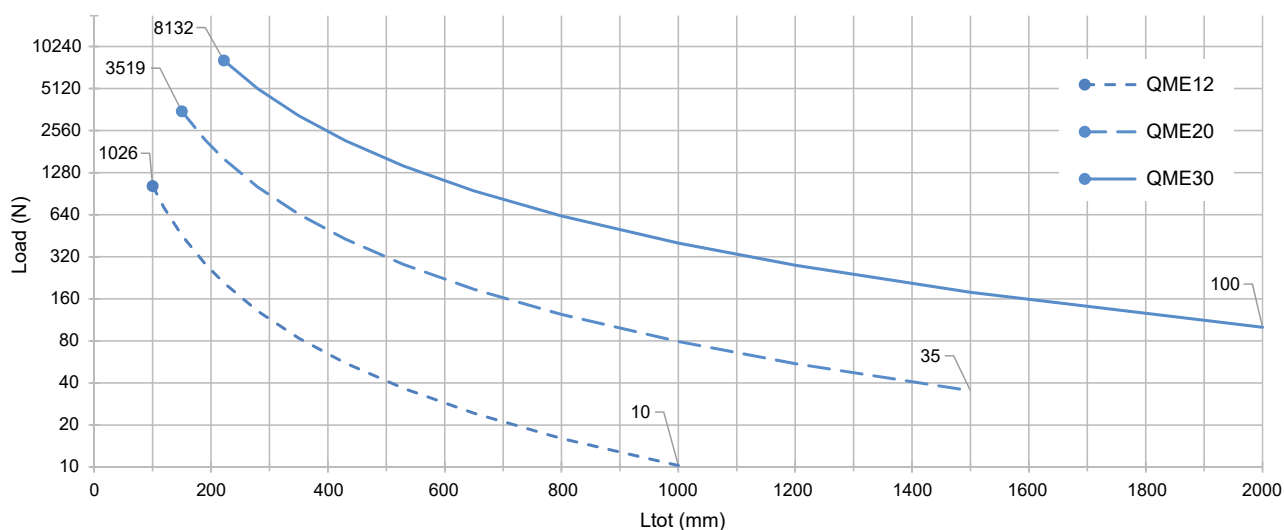


Diagram 1

Permissible load based on a shaft deflection of 1/1000 of Ltot. For long units, actual load may need to be reduced to achieve a deflection acceptable for the application.

Capacity and loads in the feed-direction (Fx)

Size	Screw type	Dynamic capacity Ca (N)	Permissible Fx (N)
QME12	SR082,5	2030	1400
QME12	TR1203	n/a	1400
QME20	SR1605	7100	2500
QME20	TR1604	n/a	2500
QME30	SR/SL3205	9500	3200
QME30	SR3210	9500	3200
QME30	SR3220	9500	3200
QME30	TR3006	n/a	3200

Table 2

The dynamic load capacity Ca (a for axial) is the rating of either the ball screw or the screw bearing unit. Ca is used to calculate the nominal lifetime based on actual Fx loads. The permissible load is the maximal real load for structural parts on a QME with relatively short total length. (Ltot).

Permissible load Fx for long units

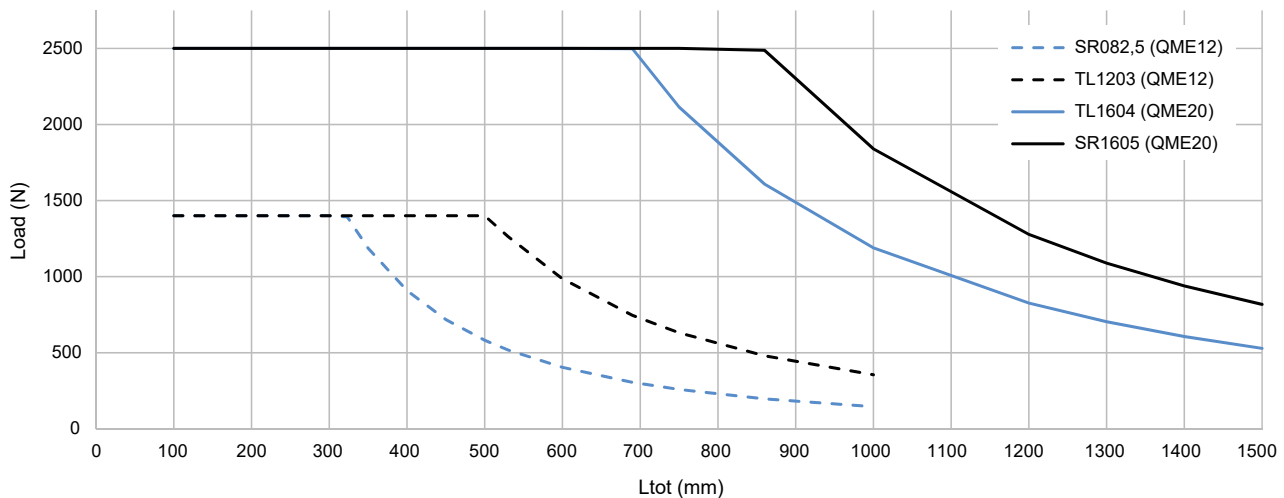


Diagram 2

Permissible load is based on the buckling limit of the drive screw. For load in only extension of the drive screw, there will not be any limitation due to length. For QME30, buckling will never occur due to the use of oversized drive screws.

Permissible linear speed

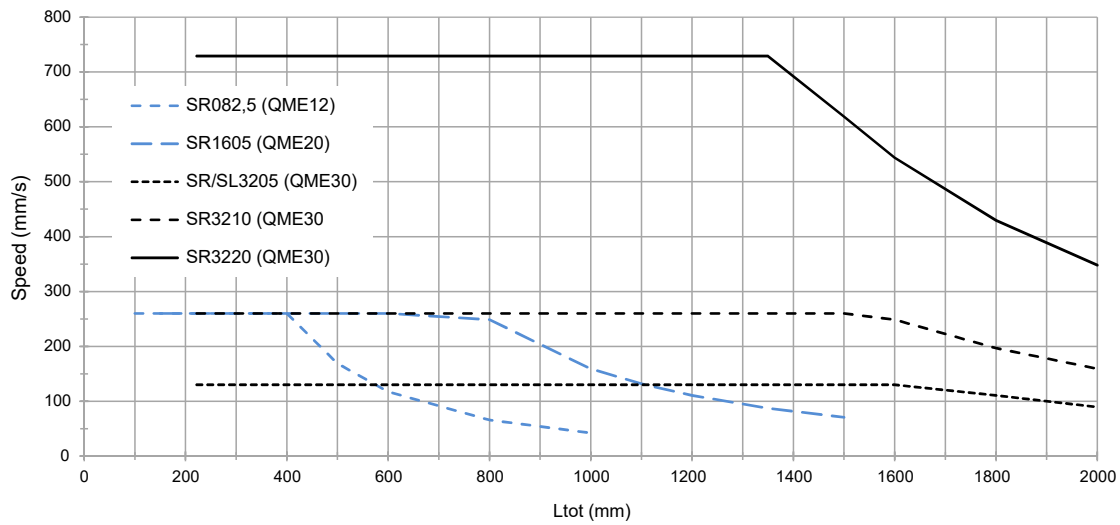


Diagram 3

The linear speed of QME is based the rpm limit if the ball nut or, at long strokes, the critical rpm of the screw shaft. Speed limit of trapezoidal screws is not included as they are only intended for manual drive.

Life time calculations

The nominal life of the linear bearings and the ball screw drive can be calculated by classical L_{10} theory.

As long as the recommended dynamic safety factor of 5 or more is used, the lifetime of the linear bearings approaches 10 000 km or more. For most applications, this is more than sufficient.

If the real loads are higher and if one or more moment-loads are involved, a full calculation is recommended.

For the ball screw drive, the lifetime may be consumed much faster and a life calculation is always recommended.

Life calculations of the ball screw drive

$$L_{10(\text{screw})} = \left[\frac{C_a}{P_x} \right]^3$$

$L_{10(\text{screw})}$ = nominal life of screw (millions of revolutions)

C_a = dynamic capacity of the screw drive (N)

P_x = equivalent load on the screw e.g. in X-direction of QME (N)

To get the nominal life expressed in kilometers:

$$L_{10d(\text{screw})} = L_{10(\text{screw})} \times p$$

$L_{10d(\text{screw})}$ = nominal life of screw (km)

p = screw lead (mm)

Life calculation linear bearings

First, the equivalent load P_{slider} needs to be calculated:

$$P_{\text{slider}} = \frac{P_z}{F_z} + \frac{P_y}{F_y} + \frac{M_{px}}{M_x} + \frac{M_{py}}{M_y} + \frac{M_{pz}}{M_z}$$

P_z = actual load in Z-direction

P_y = actual load in Y-direction

M_{pz} = actual moment load around Z-axis

M_{py} = actual moment load around Y-axis

M_{pz} = actual moment load around Z-axis

F_z , F_y , M_x , M_y and M_z are the capacity values for the chosen size of QME. See product data.

When P_{slider} is calculated, plug it into next equation:

$$L_{10(\text{slider})} = \left[\frac{F_z}{P_{\text{slider}}} \right] \times 50$$

The unit of the resulting $L_{10(\text{slider})}$ is in kilometers.

Service and maintenance

The unit is delivered ready to use lubricated with grease of NLGI 1,5 class.

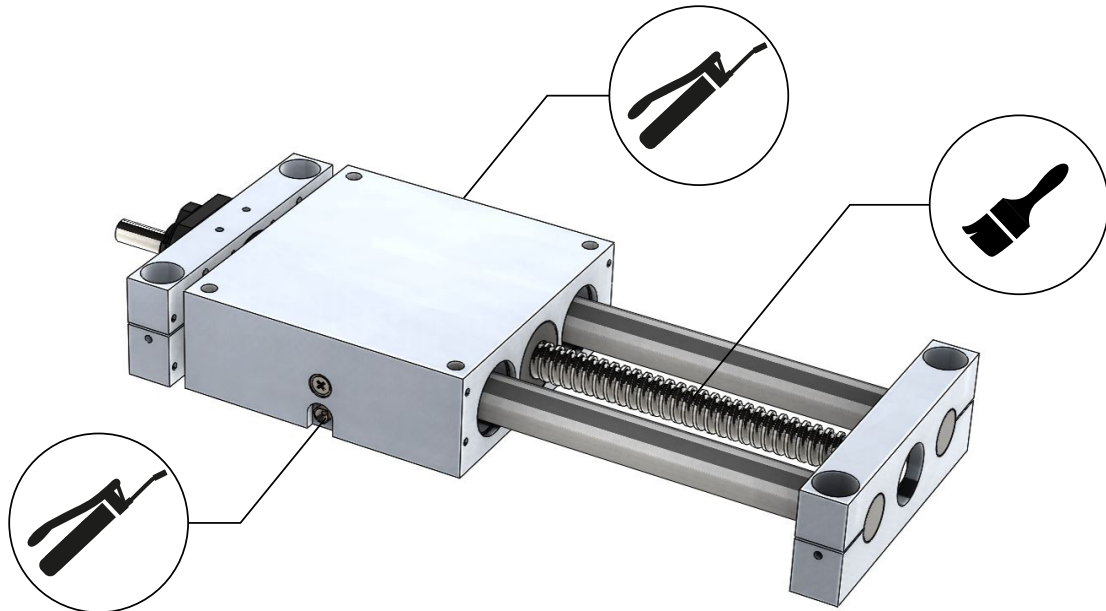
The linear bearings only need to be re-lubricated once a year with a similar grease, most mineral oil based grease using lithium thickener and having an NLGI 1,5 to 2 consistence will work fine.

The drive screw may require more intense lubrication if used at high load and intensity. To reach the calculated lifetime for a ball screw, re-lubrication is required after 50 million revolutions. (250 km travel for lead of 5 mm).

To reach a long life for a Tr-screw, very frequent lubrication is required. In general, Tr-screw is only recommended for hand-drive or very slow and low frequent use. In such use, re-lubrication once a year is sufficient.

The drive screw bearings are sealed and are not possible to re-lubricate. They have an expected grease life of 5 years.

For demanding operational conditions, please consult Rollco Technical support.



Instruction

- Clean the shafts and the drive screw from dirt and old grease with a clean cloth or paper towel.
- Pump in a single stroke of grease thru the grease nipples with a pointy nozzle, on both sides.
- Apply a thin layer of grease on the full length of the drive screw using a brush.
- Run the unit slowly a couple of strokes to spread out the grease before taking it into full operation.

Linear Unit QME

QME20 - 2x360 - 1194 - BWILM - SR/SL1605 - Z				
Product type QME12 = ø12 shaft + linear ball bearing LME12UU QME20 = ø20 shaft + linear ball bearing SBE20UU QME30 = ø30 shaft + linear ball bearing SBE30UU				
Absolute stroke Stroke between mechanical stops (mm) Prefix "2x" means 2 moving parts with left+right				
Ltot Length distance between mounting holes (mm)				
Options B = with bellows W = with hand wheel WL = hand wheel and locking device on drive screw WIL = hand wheel, locking device and position indicator M = with magnet and rail for end/position switches (switches ordered separately)				
Screw type(1) SR082,5 Ball screw lead 2,5 mm for QME12 TR1203 Tr screw lead 3 mm for QME12 TL1203 Left hand Tr screw lead 3 mm for QME12 SR1605 Ball screw lead 5 mm for QME20 TR1604 Tr screw lead 4 mm for QME20 TL1604 Left hand Tr screw lead 4 mm for QME20 SR3205 Ball screw lead 5 mm for QME30 SL3205 Left hand ball screw lead 5 mm for QME30 SR3210 Ball screw lead 10 mm for QME30 SR3220 Ball screw lead 20 mm for QME30 TR3006 Tr screw lead 6 mm for QME30				
Customisation Z = according to custom drawing/specification				

⁽¹⁾ In case of left+right unit, screws of same lead and type must be selected, for example TR1203 and TL1203.

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SOLUTION AT THE RIGHT TIME.**

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With reliability, competence and commitment Rollco rapidly delivers the right solutions and components to create safe and cost-effective automation and linear movement.

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