



# U-LINE

# 10

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### 10.1 PRODUCT DESCRIPTION

- LM system
- Auto-aligning system
- LML system

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### 10.2 LM SYSTEM

For light-medium loads

- Guide rails LM
- Guide rollers RCL, RCP, PFV
- Guide rollers RAL
- Guide wheels GLA
- Carriage C3 RCL, C3 RAL, C3 RYL
- Carriage C4 RCL, C4 RAL, C4 RYL
- Carriage T4 RCL, T4 RCP, T4 PFV, T4 RAL, T4 RYL
- Lubricator LUBM

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### 10.3 LML SYSTEM

For light-medium loads

- Guide rails LML
- Carriage C3 RCL 16 NX
- Carriage C4 RCL 16 NX

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### 10.4 MOUNTING EXAMPLE

# U-LINE – PRODUCT DESCRIPTION

## LM SYSTEM

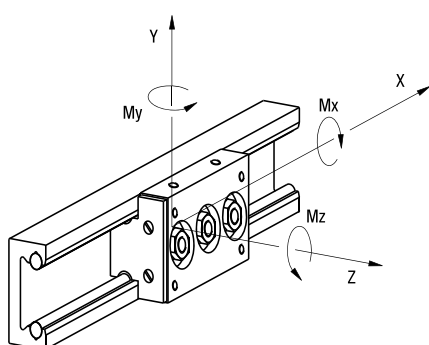
### KEY BENEFITS

- For light and medium loads
- Compact design of U-Line guides with inside carriage
- Guide rails with stainless steel shafts
- Carriages with stainless steel guide rollers



LM system is based on rail, guide rollers and carriages to provide a complete guiding system. Guide rails and rollers can be used as single elements. In most cases the application is based on standard carriages and cursors.

Referring to the axis system below, the load capacities are tabulated as follows:



### MAX. LOAD ON SINGLE CARRIAGE

The following table shows the maximum load that can be applied on a single carriage.

| Guide  | Carriage         | Fy<br>(N)          | Fz<br>(N) | Mx<br>(Nm) | My<br>(Nm) | Mz<br>(Nm) |
|--------|------------------|--------------------|-----------|------------|------------|------------|
| LM 30  | C3 RCL 17 06 065 | 1000 <sup>1)</sup> | 300       | 3.3        | 5.8        | 10         |
|        | C4 RCL 17 06 085 | 1000               | 600       | 6.4        | 10         | 20         |
| LM 40  | C3 RCL 24 06 085 | 1810 <sup>1)</sup> | 520       | 7.6        | 15         | 26         |
|        | C4 RCL 24 06 114 | 1810               | 1040      | 15         | 25         | 52         |
| LM 65  | C3 RCL 35 10 115 | 4160 <sup>1)</sup> | 1200      | 26         | 45         | 78         |
|        | C4 RCL 35 10 152 | 4160               | 2400      | 50         | 75         | 155        |
| LM 90  | C4 RCL 35 10 180 | 4160               | 2400      | 75         | 95         | 200        |
| LM 120 | T4 RCL 35 10 150 | 4160               | 2400      | 110        | 120        | 200        |
|        | T4 RCL 35 10 220 | 4160               | 2400      | 110        | 200        | 350        |
|        | T4 RCP 42 10 150 | 5250               | 3030      | 140        | 150        | 260        |
|        | T4 RCP 42 10 220 | 5250               | 3030      | 140        | 250        | 440        |
| LM 180 | T4 PFV 43 22 180 | 6300               | 3120      | 185        | 200        | 400        |
|        | T4 PFV 43 22 280 | 6300               | 3120      | 185        | 350        | 715        |

1) Fy directed to load the two concentric guide rollers

The maximum load is based on the guide roller data (stud and bearing strength) and on maximum contact pressure between rail and roller of 1250 N/mm<sup>2</sup>. Loading is considered to be acting in a single plane or axis only.

### BASIC DYNAMIC LOAD OF SINGLE CARRIAGE

The following table shows the nominal load that corresponds to a nominal life of the bearing at 100 km.

The nominal carriage life can be estimated from the standard bearing formula.

$$L_{10} = (C_i / P_i)^3 \times 100 \text{ km}$$

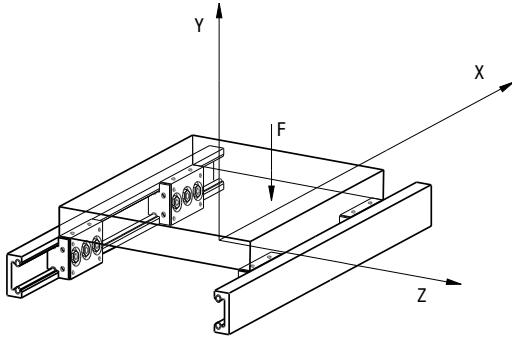
C<sub>i</sub> and P<sub>i</sub> are the basic capacity and load applied for a specific direction.

| Guide  | Carriage         | Cy<br>(N)           | Cz<br>(N) | CMx<br>(Nm) | CMy<br>(Nm) | CMz<br>(Nm) |
|--------|------------------|---------------------|-----------|-------------|-------------|-------------|
| LM 30  | C3 RCL 17 06 065 | 2800 <sup>2)</sup>  | 550       | 6           | 11          | 28          |
|        | C4 RCL 17 06 085 | 2800                | 1100      | 12          | 19          | 56          |
| LM 40  | C3 RCL 24 06 085 | 7200 <sup>2)</sup>  | 1700      | 24          | 50          | 105         |
|        | C4 RCL 24 06 114 | 7200                | 3400      | 48          | 83          | 210         |
| LM 65  | C3 RCL 35 10 115 | 15800 <sup>2)</sup> | 3350      | 70          | 125         | 300         |
|        | C4 RCL 35 10 152 | 15800               | 6700      | 140         | 210         | 600         |
| LM 90  | C4 RCL 35 10 180 | 15800               | 6700      | 220         | 250         | 700         |
| LM 120 | T4 RCL 35 10 150 | 15800               | 6700      | 300         | 330         | 780         |
|        | T4 RCL 35 10 220 | 15800               | 6700      | 300         | 560         | 1335        |
|        | T4 RCP 42 10 150 | 24000               | 11000     | 500         | 530         | 1190        |
|        | T4 RCP 42 10 220 | 24000               | 11000     | 500         | 900         | 2030        |
| LM 180 | T4 PFV 43 22 180 | 15190               | 5300      | 320         | 335         | 965         |
|        | T4 PFV 43 22 280 | 15190               | 5300      | 320         | 600         | 1725        |

2) Cy directed to load the two concentric guide rollers

**CALCULATION EXAMPLE:****FOUR CARRIAGES C3 RCL 35 10 115 PLATFORM**

The common configuration is shown in the here following sketch:



The platform moves along the two guide rails and has a load of “F” acting at 100 mm and 50 mm from the carriage centre.

Data: guide LM 65 and carriages C3 RCL 35 10 115

$$I_x = 400 \text{ mm}$$

$$F = 6000 \text{ N}$$

$$Z_F = 50 \text{ mm}$$

$$I_z = 300 \text{ mm}$$

$$X_F = 100 \text{ mm}$$

In this configuration the load on the most heavily loaded carriage is  $P_y$  and can be calculated using the following formula:

$$P = \frac{F}{4} + \frac{F \cdot X_F}{2 \cdot I_x} + \frac{F \cdot Z_F}{2 \cdot I_z} = 2750 \text{ N}$$

The load  $F_y$  shown in the “max. loads” table is 4160N (carriages mounted with eccentric roller on top), so that the system is protected against breakage.

To estimate the system life we proceed as follows:  
from the nominal life table  $C_y = 15800 \text{ N}$

$$L_{10} = (15800 / 2750)^3 \times 100 = 18900 \text{ km}$$

**IMPORTANT REMARK**

To reach this value it is important to lubricate the rail, otherwise fretting corrosion between rail and roller can reduce the expected life.

# U-LINE – PRODUCT DESCRIPTION

## AUTO-ALIGNING SYSTEM

Auto-aligning systems are assembled with guide rollers RAL type on LM system carriages tables. The guide rollers RAL type allows axial displacement of the roller on the pin. An “O” ring retains the roller in position during the mounting. Auto-aligning systems compensate for opposite rail misalignment errors. They are useful for mounting inaccurately aligned structures or those structures subject to flexure.

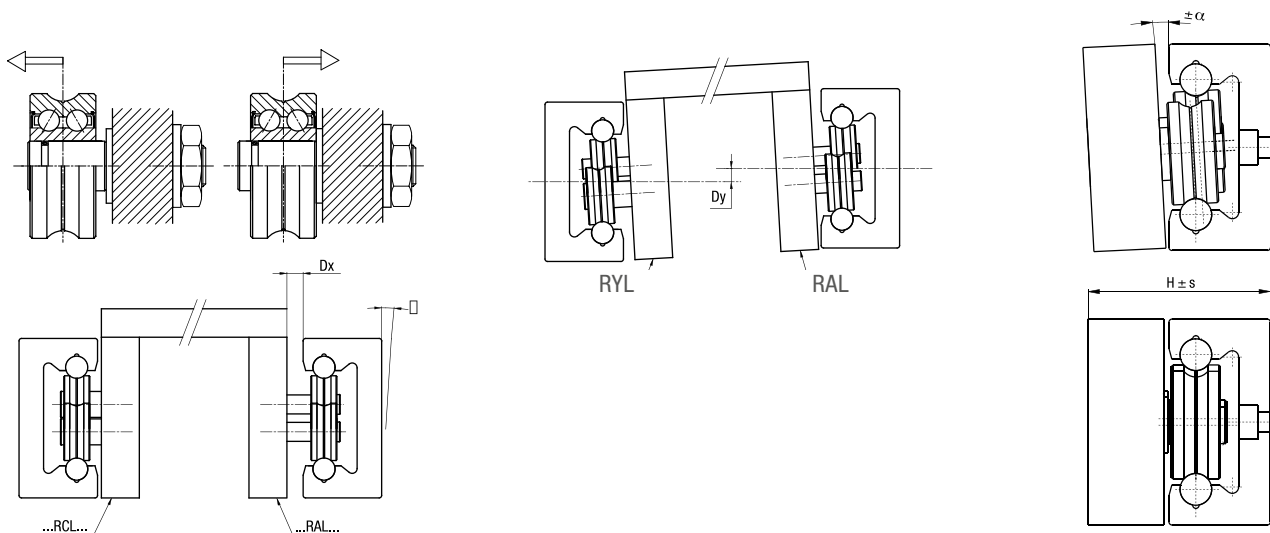
### CARRIAGES C3 RAL, C4 RAL, T4 RAL

Is used to compensate for Dx misalignment between opposite rails. The table or carriage with all guide rollers RAL / RALR type can be moved back and forth axially in the direction of the rail. Type RAL provides radial support only. Axial load, transverse to the direction of travel, is reacted by carriage type RCL on the opposite rail.

### CARRIAGES C3 RYL, C4 RYL, T4 RYL

Rail misalignment Dy requires the ability for both carriages to rotate. The table or carriage RYL type, with guide rollers RCL / RCP in contact with a steel shaft of the LM rail and guide rollers RALR type in contact with the opposite shaft, allows carriage rotation ensuring at the same time the transverse direction control. The maximum Dy value is dependent on the distance between the rails and the tabulated maximum angle ‘α’ for that carriage.

NOTE: RYL carriage axial load capability is lower than the same size RCL / RCP carriage.



MAX TRANSVERSE MOVING ALLOWED BY AUTO-ALIGNING TABLES AND CARRIAGES

| Rail   | Carriage code <sup>1)</sup> |                  | α max. (°) | S max. (mm) | H nominal (mm) |
|--------|-----------------------------|------------------|------------|-------------|----------------|
| LM 30  | C3 RAL 17 06 065            | C4 RAL 17 06 085 | 1          | 0.8         | 27.5           |
|        | C3 RYL 17 06 065            | C4 RYL 17 06 085 | 1          | —           | 27.5           |
| LM 40  | C3 RAL 24 06 085            | C4 RAL 24 06 114 | 1          | 1           | 35.7           |
|        | C3 RYL 24 06 085            | C4 RYL 24 06 114 | 1          | —           | 35.7           |
| LM 65  | C3 RAL 35 10 115            | C4 RAL 35 10 152 | 1          | 1           | 58.0           |
|        | C3 RYL 35 10 115            | C4 RYL 35 10 152 | 1          | —           | 58.0           |
| LM 90  | —                           | C4 RAL 35 10 180 | 1          | 1           | 60.5           |
|        | —                           | C4 RYL 35 10 180 | 1          | —           | 60.5           |
| LM 120 | T4 RAL 35 10 150            | T4 RAL 35 10 220 | 0.3        | 1           | 58.5           |
|        | T4 RYL 35 10 150            | T4 RYL 35 10 220 | 0.3        | —           | 58.5           |
|        | T4 RAL 42 10 150            | T4 RAL 42 10 220 | 0.75       | 1.5         | 65.5           |
|        | T4 RYL 42 10 150            | T4 RYL 42 10 220 | 0.75       | —           | 65.5           |

1) See chapter „carriages“ for table and carriage dimensions

Variations of dimension H exceeding ± s can compromise bearing axial moving and decrease the roller limit load, Fr

# LML SYSTEM

Aluminium guide rails LML as well as RCL guide rollers with a plastic-coated outer ring are the components of this line. LML can be used whenever extremely compact dimensions, simple linear motion and an economic solution are required. LML system is suitable for manual and low precision movements, for safety doors, for the adjustment of cameras and sensors and many other products. Applications can be found amongst others in mechanical engineering, medical and food engineering or object monitoring.

## MATERIALS, SURFACES, RUNNING CHARACTERISTICS

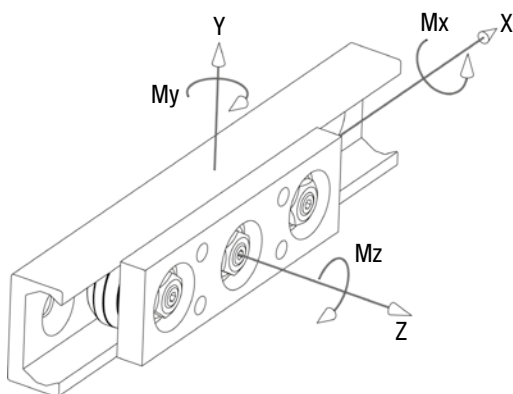
The guide rail, made of extruded aluminium, has a hard anodised surface. This grey-coloured protective coating ensures a significant protection against wear and corrosion. In addition, it has good tribological characteristics. The guide rollers are made of corrosionresistant bearing steel and their outer rings are coated with a special polyamide material. This material combination contributes to a further improvement of the already known good running characteristics of NADELLA roller guides and makes possible an absolutely low-noise linear motion without any stick-slip.

In contrast to steel to steel combinations, the plastic coating of the guide rollers is slightly flexible and allows higher production tolerances and thus a cost-efficient production.

## LOAD RATING AND WORKING LIFE

The carrying capacity of the system is determined by the surface pressure between the plastic coating and the aluminium guide rail. The working life is not calculated.

The following graph applies to the loads indicated in the tables:



## MAXIMUM LOAD ON INDIVIDUAL CARRIAGES

The table below shows the maximum static load that can be applied to an individual carriage for up to 100 hours without leading to permanent deformation of the outer rings. For short stress (< 2 s) and under dynamic load the values can be doubled.

| Carriage     | F <sub>y</sub><br>(N) | F <sub>z</sub><br>(N) | M <sub>x</sub><br>(Ncm) | M <sub>y</sub><br>(Ncm) | M <sub>z</sub><br>(Ncm) |
|--------------|-----------------------|-----------------------|-------------------------|-------------------------|-------------------------|
| C3 RCL 16 NX | 150 <sup>2)</sup>     | 30                    | 12.5                    | 60                      | 150                     |
| C4 RCL 16 NX | 150                   | 60                    | 25                      | 95                      | 300                     |

2) F<sub>y</sub> with effect on the two concentric rollers

## OPTION SLIDING GUIDE

For mostly static applications such as adjusting devices or for non-critical linear movements a suitable polyamide slide with incorporated lubricant is available.

Please contact our application engineers.

# U-LINE – LM SYSTEM

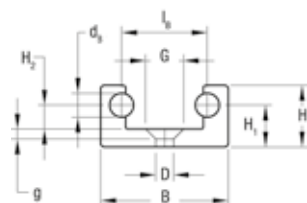
## GUIDE RAILS LM

Rail composed by an aluminium body and two shafts in steel, with two internal raceways.

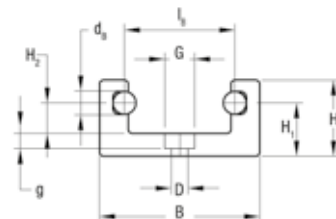
Available in stainless steel version.



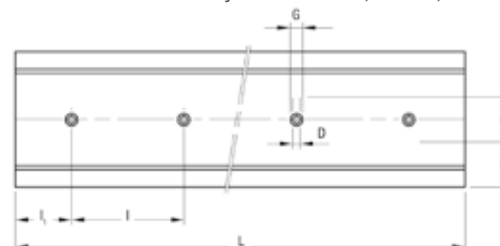
LM 30



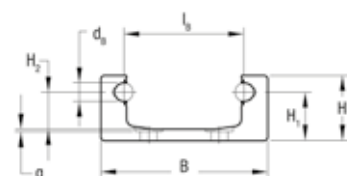
LM 40 / LM 65



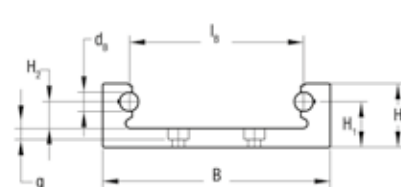
Hole layout for LM 30, LM 40, LM 65



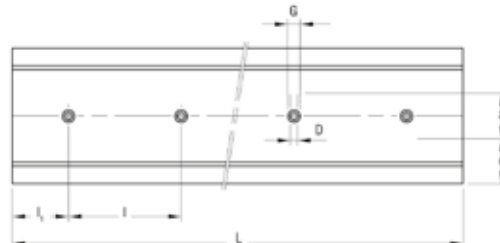
LM 90



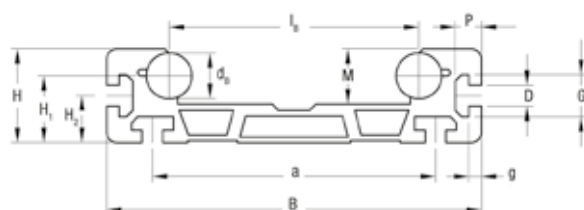
LM 120



Hole layout for LM 90, LM 120



LM 180



| Guide rail          | Hole layout |
|---------------------|-------------|
| LM 30, LM 40, LM 65 | Linear      |
| LM 90, LM 120       | Chevron     |
| LM 120              | No holes    |

| Type                 | Dimensions (mm) |                |     |      |                |                |      |                  |                    |     |     |      |      |     |                | Moments of inertia <sup>3)</sup> (cm <sup>4</sup> ) |                | Weight (kg/m) | L max. <sup>4)</sup> (mm) |
|----------------------|-----------------|----------------|-----|------|----------------|----------------|------|------------------|--------------------|-----|-----|------|------|-----|----------------|-----------------------------------------------------|----------------|---------------|---------------------------|
|                      | d <sub>B</sub>  | l <sub>B</sub> | B   | H    | H <sub>1</sub> | H <sub>2</sub> | M    | D                | G                  | g   | a   | e    | P    | l   | l <sub>1</sub> | J <sub>x</sub>                                      | J <sub>y</sub> |               |                           |
| LM 30 <sup>1)</sup>  | 6               | 21.5           | 32  | 15.5 | 10.5           | 6              | 11   | 4.5              | 9.5                | 2.5 | —   | 16   | —    | 80  | 40             | 0.5                                                 | 3              | 1.1           | 6000                      |
| LM 40 <sup>1)</sup>  | 6               | 29             | 42  | 20   | 14             | 8              | 14   | 4.5              | 8                  | 4   | —   | 21   | —    | 100 | 50             | 1.2                                                 | 8.8            | 1.5           | 6000                      |
| LM 65 <sup>1)</sup>  | 10              | 42.5           | 65  | 32   | 23.5           | 13.5           | 22   | 6.5              | 11                 | 6   | —   | 32.5 | —    | 100 | 50             | 8.8                                                 | 54.9           | 4.1           | 6000                      |
| LM 90 <sup>1)</sup>  | 10              | 65             | 90  | 35   | 26             | 20             | 29   | 9                | 15                 | 0.5 | 38  | 26   | —    | 100 | 50             | 16.4                                                | 160.2          | 4.7           | 6000                      |
| LM 120 <sup>1)</sup> | 10              | 92             | 120 | 33.5 | 24             | 14             | 23.5 | 6.5              | 11                 | 6   | 40  | 40   | —    | 100 | 50             | 14.8                                                | 311.6          | 6             | 6000                      |
| LM 180               | 22              | 120            | 180 | 45   | 32             | 22.5           | 26.5 | 10 <sup>2)</sup> | 20.1 <sup>2)</sup> | 6   | 136 | —    | 12.5 | —   | —              | 53.3                                                | 1096.6         | 13.1          | 6000                      |

1) Available with stainless steel shafts (suffix NX)

2) Slot for nut DIN 508

3) Inertia value based on equivalent aluminium yield 70000 N/mm<sup>2</sup> complete with guide rod

4) Longer rails are supplied in sections with ground butt joints and, on request, with pin connection

### HOLE LAYOUT

- Holes according to catalogue (SB)
- Finishes to drawing (NZ)
- Without holes (NF)

### OPTIONAL FEATURES

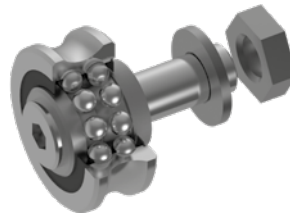
- Ground one end: side of the first hole (1R), side of the last hole (2R)
- Ground both ends (RR)
- Chromium plated shafts (CH)
- Stainless steel shafts (NX)
- Pin based shaft connection (G)

Example of standard designation: LM 40 1720 NF

## GUIDE ROLLERS RCL, RCP, PFV

PFV: Guide roller with gothic arch profile, based on ball bearing.

RCL / RCP: Guide roller with gothic arch profile, based on angular contact ball bearing.

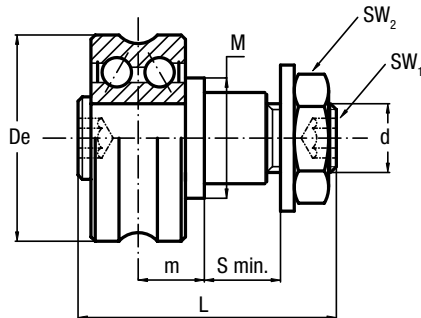


Available in stainless steel version.

**NX**

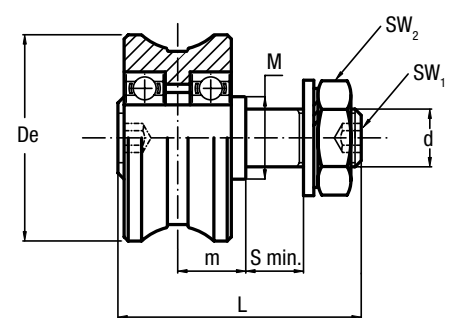
RCL / RCP

**CONCENTRIC**

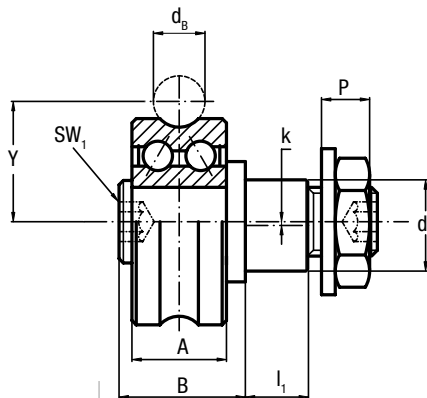


PFV

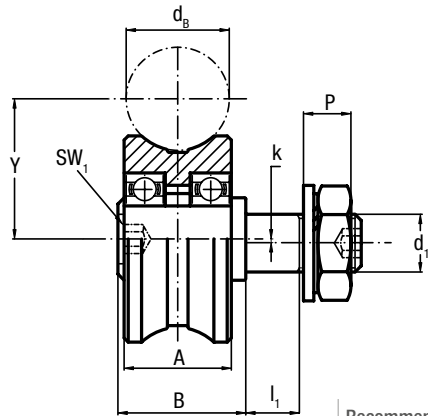
**CONCENTRIC**



**ECCENTRIC**



**ECCENTRIC**



Type

Dimensions (mm)

Recommended pairings

| concentric              | eccentric                | De | d <sub>B</sub> | d <sub>1</sub> <sup>2)</sup><br>conc. | d <sub>1</sub> <sup>2)</sup><br>ecc. | d        | Y     | m    | S<br>min. | P    | L    | A    | B    | l <sub>i</sub> | M  | SW <sub>1</sub> | SW <sub>2</sub> | k    |        |
|-------------------------|--------------------------|----|----------------|---------------------------------------|--------------------------------------|----------|-------|------|-----------|------|------|------|------|----------------|----|-----------------|-----------------|------|--------|
| RCL 17.06 <sup>1)</sup> | RCLR 17.06 <sup>1)</sup> | 17 | 6              | 5                                     | 6.5                                  | M5x0.8   | 10.5  | 6    | 6         | 3.7  | 21   | 7    | 11   | 5.2            | 9  | 2.5             | 8               | 0.25 | LM 30  |
| RCL 24.06 <sup>1)</sup> | RCLR 24.06 <sup>1)</sup> | 24 | 6              | 8                                     | 11                                   | M8x1.25  | 14    | 7.7  | 7         | 5.6  | 28.2 | 11   | 14.7 | 6.5            | 14 | 4               | 13              | 0.5  | LM 40  |
| RCL 35.10 <sup>1)</sup> | RCLR 35.10 <sup>1)</sup> | 35 | 10             | 10                                    | 10                                   | M10x1.25 | 20.65 | 10.5 | 14        | 7    | 43   | 15.9 | 20.5 | 13             | 18 | 5               | 17              | 0.75 | LM 65  |
| RCP 42.10               | RCPR 42.10               | 42 | 10             | 17                                    | 17                                   | M12x1.25 | 24    | 12.5 | 12        | 9.5  | 50   | 19   | 24.5 | 11             | 25 | 6               | 19              | 0.75 | LM 120 |
| PFV 43.22 <sup>1)</sup> | PFVR 43.22 <sup>1)</sup> | 43 | 22             | 12                                    | 12                                   | M12x1.5  | 29    | 14   | 13        | 12.5 | 52   | 23   | 27   | 12             | 18 | 5               | 19              | 1    | LM 180 |

1) Available in stainless steel (suffix NX)

2) Housing bore tolerance: H7

| Type       |            | Dynamic load<br>(N)          | Limit loads<br>(N)    |                      | Life coefficients |      | Torque wrench<br>settings <sup>4)</sup> (Nm) | Weight<br>(g) |
|------------|------------|------------------------------|-----------------------|----------------------|-------------------|------|----------------------------------------------|---------------|
| concentric | eccentric  | C <sub>w</sub> <sup>3)</sup> | Radial F <sub>r</sub> | Axial F <sub>a</sub> | X                 | Y    |                                              |               |
| RCL 17.06  | RCLR 17.06 | 1400                         | 530                   | 150                  | 1                 | 3.28 | 3                                            | 20            |
| RCL 24.06  | RCLR 24.06 | 3600                         | 1600                  | 460                  | 1                 | 2.52 | 8                                            | 40            |
| RCL 35.10  | RCLR 35.10 | 7800                         | 2400                  | 650                  | 1                 | 2.93 | 20                                           | 130           |
| RCP 42.10  | RCPR 42.10 | 12000                        | 4300                  | 1100                 | 1                 | 2.73 | 24                                           | 185           |
| PFV 43.22  | PFVR 43.22 | 7600                         | 3150                  | 750                  | 1                 | 4    | 26                                           | 205           |

3) C<sub>w</sub> basic load for 100 km

4) The torque wrench settings are given for non-lubricated threads; for lubricated threads, multiply figure by 0.8

- The guide rollers are complete with self-locking washers and hexagonal nut (DIN 439B) for fitting

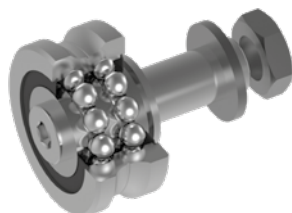
- Pressure angle  $\alpha$  for load calculation: 60°
- Standard shields ZZ type for RCL and RCP; NBR seals type RS for PFV

# U-LINE – LM SYSTEM

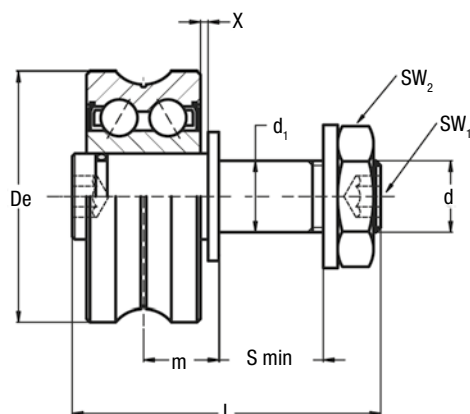
## GUIDE ROLLERS RAL

Floating guide rollers with “gothic arch” profile, with a double row of balls with oblique contact.

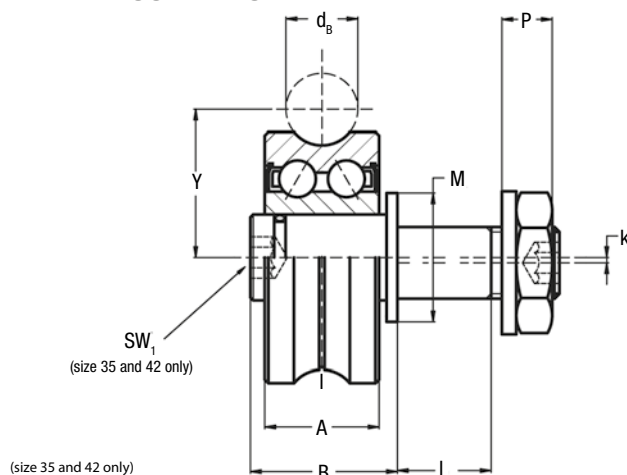
Available in stainless steel version.



### CONCENTRIC



### ECCENTRIC



| Type                    |                          | Dimensions (mm) |    |                           |                          |          |       |                         |                         |           |     |      |      |      |     |    |     |     |      | Suggested combinations |
|-------------------------|--------------------------|-----------------|----|---------------------------|--------------------------|----------|-------|-------------------------|-------------------------|-----------|-----|------|------|------|-----|----|-----|-----|------|------------------------|
| concentric              | eccentric                | De              | db | d1 <sup>2)</sup><br>conc. | d1 <sup>2)</sup><br>ecc. | d        | Y     | m<br>min. <sup>3)</sup> | m<br>max. <sup>3)</sup> | S<br>min. | P   | L    | A    | B    | I1  | M  | SW1 | SW2 | k    |                        |
| RAL 17.06 <sup>1)</sup> | RALR 17.06 <sup>1)</sup> | 17              | 6  | 5                         | 6.5                      | M5x0.8   | 10.5  | 6                       | 7.6                     | 6         | 3.7 | 20.5 | 7    | 10.5 | 5.2 | 9  | 2.5 | 8   | 0.25 | LM 30                  |
| RAL 24.06 <sup>1)</sup> | RALR 24.06 <sup>1)</sup> | 24              | 6  | 8                         | 11                       | M8x1.25  | 14    | 7.7                     | 9.7                     | 7         | 5.6 | 27.5 | 11   | 14   | 6.5 | 14 | 4   | 13  | 0.5  | LM 40                  |
| RAL 35.10 <sup>1)</sup> | RALR 35.10 <sup>1)</sup> | 35              | 10 | 10                        | 10                       | M10x1.25 | 20.65 | 10.5                    | 12.5                    | 14        | 7   | 43   | 15.9 | 20.5 | 13  | 18 | 5   | 17  | 0.75 | LM 65                  |
| RAL 42.10               | RALR 42.10               | 42              | 10 | 17                        | 17                       | M12x1.25 | 24    | 12.5                    | 15.5                    | 12        | 9.5 | 49   | 19   | 23.5 | 11  | 25 | 6   | 19  | 0.75 | LM 120                 |

1) Available in stainless steel (suffix NX), seals in nitrile rubber type RS

2) Housing bore tolerance: H7

3) To ensure a safe and proper functioning the dimension m must not be higher than m max

| Type       |            | Dynamic load<br>(N)          | Limit load<br>(N)     | Torque wrench<br>settings <sup>5)</sup> (Nm) | Weight<br>(g) |
|------------|------------|------------------------------|-----------------------|----------------------------------------------|---------------|
| concentric | eccentric  | C <sub>w</sub> <sup>4)</sup> | Radial F <sub>r</sub> |                                              |               |
| RAL 17.06  | RALR 17.06 | 1400                         | 450                   | 3                                            | 20            |
| RAL 24.06  | RALR 24.06 | 3600                         | 1400                  | 8                                            | 40            |
| RAL 35.10  | RALR 35.10 | 7800                         | 2100                  | 20                                           | 130           |
| RAL 42.10  | RALR 42.10 | 12000                        | 3400                  | 24                                           | 185           |

4) C<sub>w</sub> basic load for 100 km

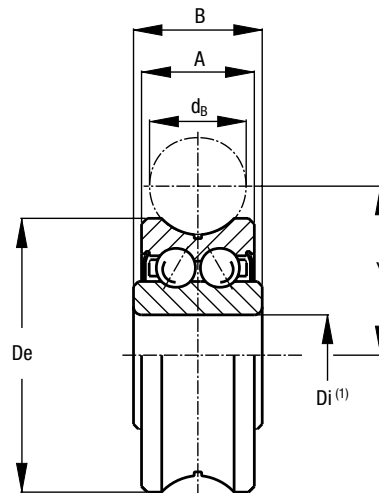
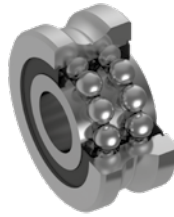
5) The torque wrench settings are given for non-lubricated threads; for lubricated threads, multiply figure by 0.8

- The guide rollers are complete with self-locking washers and hexagonal nut for fitting
- Standard shields ZZ type

# GUIDE WHEELS GLA

Guide wheel with double row of balls with oblique contact, with "gothic arch".

Available in stainless steel version.



| Type                    | Dimensions (mm) |                |                              |       |      |      |
|-------------------------|-----------------|----------------|------------------------------|-------|------|------|
|                         | De              | d <sub>B</sub> | D <sub>i</sub> <sup>2)</sup> | Y     | A    | B    |
| GLA 17.06 <sup>1)</sup> | 17              | 6              | 5                            | 10.5  | 7    | 8    |
| GLA 24.06 <sup>1)</sup> | 24              | 6              | 8                            | 14    | 11   | 11   |
| GLA 35.10 <sup>1)</sup> | 35              | 10             | 12                           | 20.65 | 15.9 | 15.9 |
| GLA 35.12               | 35              | 12             | 12                           | 21.75 | 15.9 | 15.9 |
| GLA 42.10               | 42              | 10             | 12                           | 24    | 19   | 19   |
| GLA 47.10               | 47              | 10             | 15                           | 26.65 | 19   | 19   |
| GLA 52.16               | 52              | 16             | 20                           | 31.5  | 20.6 | 22.6 |

1) Available in stainless steel (suffix NX)

2) Tolerance of diameter D<sub>i</sub>: +0 / -0.008 mm

| Type      | Dynamic load (N)             | Limit loads (N)        |                       | Life coefficients |      | Weight (g) |
|-----------|------------------------------|------------------------|-----------------------|-------------------|------|------------|
|           | C <sub>w</sub> <sup>3)</sup> | Radial C <sub>or</sub> | Axial C <sub>oa</sub> | X                 | Y    |            |
| GLA 17.06 | 1400                         | 840                    | 200                   | 1                 | 3.28 | 10         |
| GLA 24.06 | 3600                         | 2300                   | 600                   | 1                 | 2.52 | 20         |
| GLA 35.10 | 7800                         | 4600                   | 1200                  | 1                 | 2.93 | 80         |
| GLA 35.12 | 7800                         | 4600                   | 1200                  | 1                 | 2.93 | 80         |
| GLA 42.10 | 12000                        | 6900                   | 2100                  | 1                 | 2.73 | 100        |
| GLA 47.10 | 14000                        | 7900                   | 2500                  | 1                 | 2.61 | 170        |
| GLA 52.16 | 19000                        | 10500                  | 3300                  | 1                 | 2.73 | 230        |

3) C<sub>w</sub> basic load for 100 km

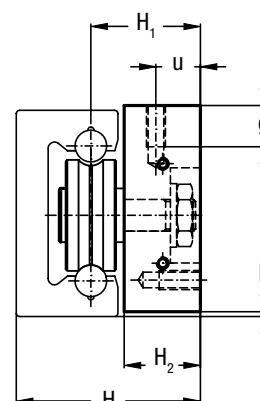
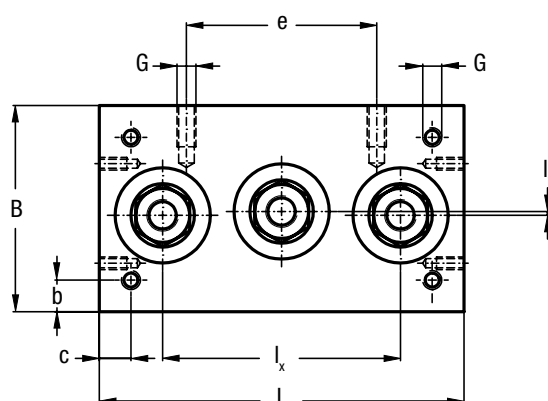
- Pressure angle  $\alpha$  for load calculation: 60°
- Standard shields ZZ type (GLA 52.16 with RS seals type)

# U-LINE – LM SYSTEM

## CARRIAGE C3 RCL, C3 RAL, C3 RYL

Carriage with body in anodised aluminium with 3 guide rollers.

Available in stainless steel version.



| Type             | Dimensions (mm) |    |                |                |      |                |                |    |    |    |    |     |    |     | Weight (kg) | Recommended pairings |
|------------------|-----------------|----|----------------|----------------|------|----------------|----------------|----|----|----|----|-----|----|-----|-------------|----------------------|
|                  | L               | B  | I <sub>x</sub> | I <sub>y</sub> | H    | H <sub>1</sub> | H <sub>2</sub> | G  | g  | b  | c  | u   | e  | k   |             |                      |
| C3 RCL 17 06 065 | 65              | 32 | 40             | 0.5            | 27.5 | 17             | 11             | M4 | 6  | 4  | 6  | 5.5 | 24 | 0.5 | 0.1         | LM 30                |
| C3 RCL 24 06 085 | 85              | 42 | 58             | 1              | 35.7 | 21.7           | 14             | M5 | 8  | 6  | 6  | 7   | 35 | 1   | 0.2         | LM 40                |
| C3 RCL 35 10 115 | 115             | 65 | 75             | 1.2            | 58   | 34.5           | 24             | M6 | 10 | 10 | 10 | 14  | 60 | 1.5 | 0.8         | LM 65                |

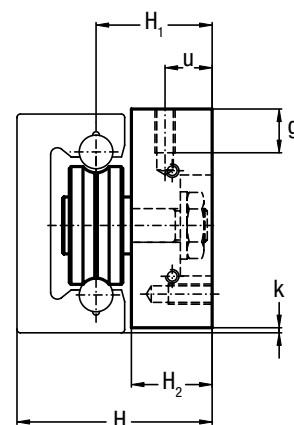
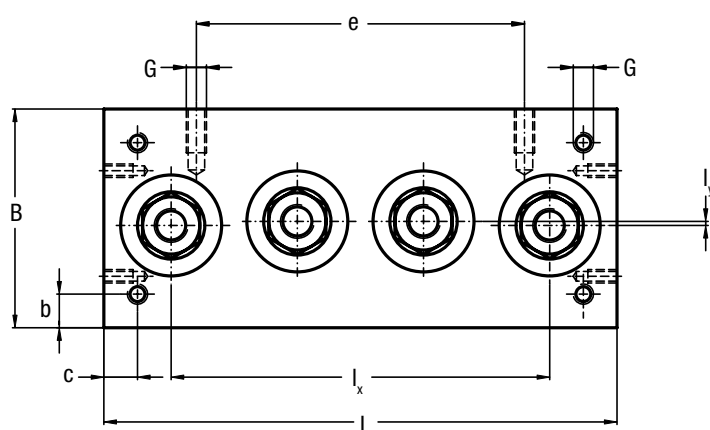
- Dimensions in the table are correct also for carriages C3 RAL, C3 RYL
- Available with stainless steel guide rollers (suffix NX)

# CARRIAGE C4 RCL, C4 RAL, C4 RYL

Carriage with body in anodised aluminium with 4 guide rollers.

Available in stainless steel version.

**NX**



| Type             | Dimensions (mm) |    |                |                |      |                |                |    |    |    |    |     |     |     | Weight (kg) | Recommended pairings |
|------------------|-----------------|----|----------------|----------------|------|----------------|----------------|----|----|----|----|-----|-----|-----|-------------|----------------------|
|                  | L               | B  | I <sub>x</sub> | I <sub>y</sub> | H    | H <sub>1</sub> | H <sub>2</sub> | G  | g  | b  | c  | u   | e   | k   |             |                      |
| C4 RCL 17 06 085 | 85              | 32 | 60             | 0.5            | 27.5 | 17             | 11             | M4 | 6  | 4  | 6  | 5.5 | 44  | 0.5 | 0.15        | LM 30                |
| C4 RCL 24 06 114 | 114             | 42 | 87             | 1              | 35.7 | 21.7           | 14             | M5 | 8  | 6  | 6  | 7   | 60  | 1   | 0.25        | LM 40                |
| C4 RCL 35 10 152 | 152             | 65 | 112.5          | 1.2            | 58   | 34.5           | 24             | M6 | 10 | 10 | 10 | 14  | 90  | 1.5 | 1           | LM 65                |
| C4 RCL 35 10 180 | 180             | 90 | 135            | 23.7           | 60.5 | 34.5           | 24             | M6 | 10 | 10 | 10 | 14  | 120 | 2   | 1.5         | LM 90                |

- Dimensions in the table are correct also for carriages C4 RAL and C4 RYL
- Available with stainless steel guide rollers (suffix NX)

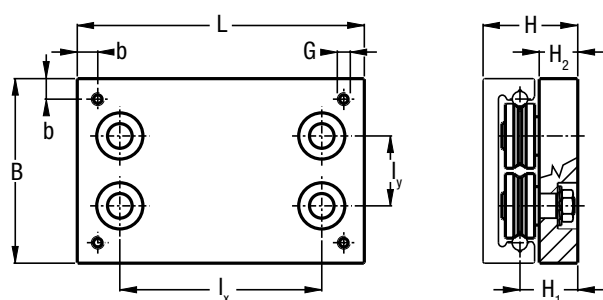
# U-LINE – LM SYSTEM

## CARRIAGE T4 RCL, T4 RCP, T4 PFV, T4 RAL, T4 RYL

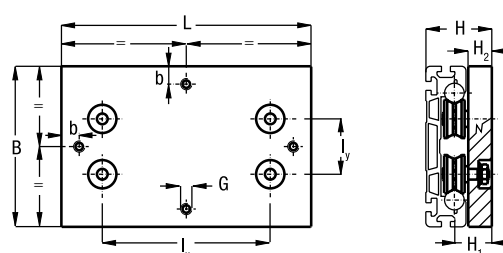
Carriages with anodised aluminium body with four guide rollers with “gothic arch” profile.



T4 RCL  
T4 RCP



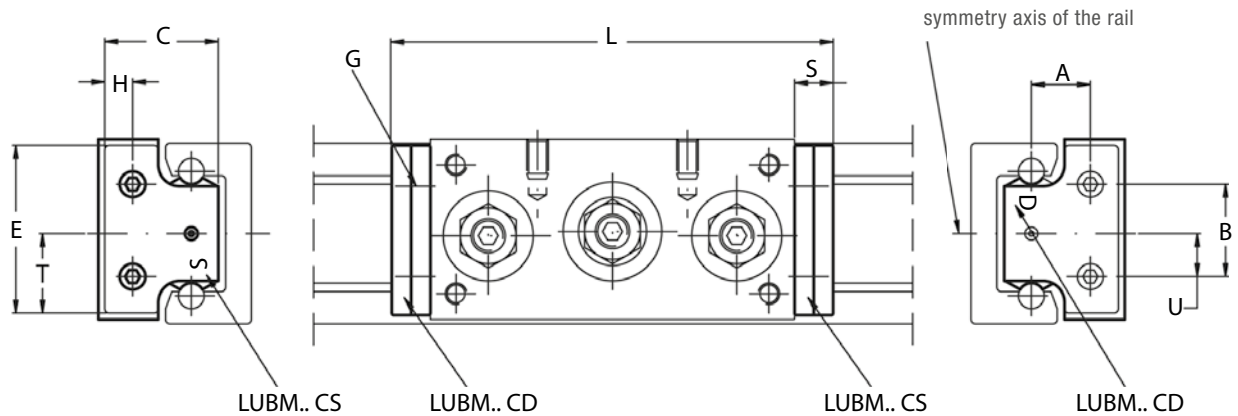
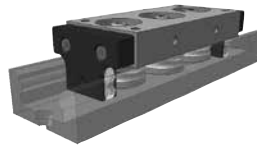
T4 PFV



| Type             | Dimensions (mm) |     |                |                |      |                |                |     |    | Weight (kg) | Recommended pairings |
|------------------|-----------------|-----|----------------|----------------|------|----------------|----------------|-----|----|-------------|----------------------|
|                  | L               | B   | I <sub>x</sub> | I <sub>y</sub> | H    | H <sub>1</sub> | H <sub>2</sub> | G   | b  |             |                      |
| T4 RCL 35 10 150 | 150             | 120 | 99             | 50.7           | 58.5 | 34.5           | 24             | M8  | 10 | 1.6         | LM 120               |
| T4 RCL 35 10 220 | 220             | 120 | 169            | 50.7           | 58.5 | 34.5           | 24             | M8  | 10 | 2.2         | LM 120               |
| T4 RCP 42 10 150 | 150             | 120 | 99             | 44             | 65.5 | 41.5           | 29             | M8  | 15 | 2           | LM 120               |
| T4 RCP 42 10 220 | 220             | 120 | 169            | 44             | 65.5 | 41.5           | 29             | M8  | 15 | 2.7         | LM 120               |
| T4 PFV 43 22 180 | 180             | 180 | 127            | 62             | 74   | 42             | 28             | M10 | 20 | 3.1         | LM 180               |
| T4 PFV 43 22 280 | 280             | 180 | 227            | 62             | 74   | 42             | 28             | M10 | 20 | 4.5         | LM 180               |

- Dimensions valid also for T4 RAL and T4 RYL

## LUBRICATOR LUBM



| Type             | Dimensions (mm) |      |    |    |    |     |      |                 |   |             |             | Recommended pairings |
|------------------|-----------------|------|----|----|----|-----|------|-----------------|---|-------------|-------------|----------------------|
|                  | A               | B    | U  | E  | T  | H   | C    | G <sup>1)</sup> | S | L<br>C3 RCL | L<br>C4 RCL |                      |
| LUBM 030         | 9.5             | 16   | 8  | 30 | 15 | 6.5 | 20.5 | M2.5            | 9 | 83          | 103         | LM 30                |
| LUBM 040 CD / CS | 13.7            | 21.5 | 10 | 40 | 19 | 7   | 27   | M3              | 9 | 103         | 132         | LM 40                |
| LUBM 065 CD / CS | 20.5            | 30   | 15 | 63 | 30 | 13  | 44.5 | M4              | 9 | 133         | 170         | LM 65                |

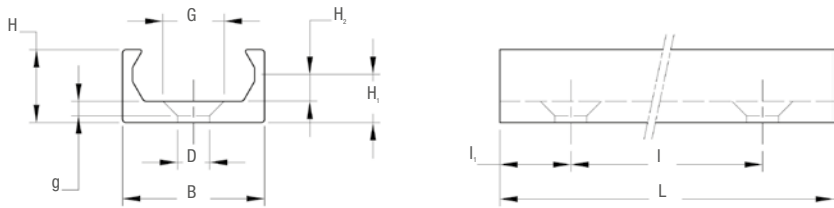
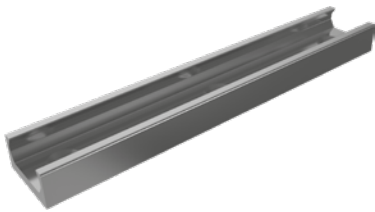
1) One lubricator for packaging. Countersunk head screws for the mounting are already in the packaging

- The lubricator is supplied with the felt already lubricated.  
The lubricant has a mineral oil base
- The lubricator can be mounted on carriages RCL, RAL and RYL
- Opzione feltro non lubrificato (D).

# U-LINE – LM SYSTEM

## GUIDE RAILS LML

Rail totally in aluminium with two internal raceways.



| Type   | Dimensions (mm) |      |                |                |     |     |     |    |                | Moments of inertia (cm) |                | Weight (kg/m) | L max. (mm) |
|--------|-----------------|------|----------------|----------------|-----|-----|-----|----|----------------|-------------------------|----------------|---------------|-------------|
|        | B               | H    | H <sub>1</sub> | H <sub>2</sub> | D   | G   | g   | I  | I <sub>1</sub> | J <sub>x</sub>          | J <sub>y</sub> |               |             |
| LML 20 | 20              | 10.3 | 6.8            | 3.8            | 4.5 | 9.5 | 2.5 | 80 | 40             | 0.068                   | 0.427          | 0.235         | 2800        |

Surface hard anodised

### HOLE LAYOUT

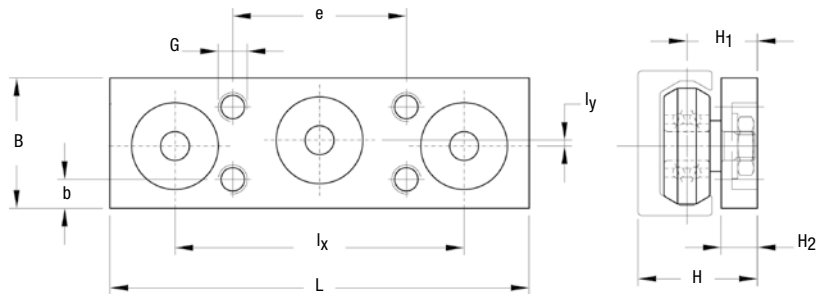
- Holes according to catalogue (SB)
- Holes according to drawing (NZ)
- Without holes (NF)

Example standard rail: LML 20 1200 SB

## CARRIAGE C3 RCL 16 NX

Carriages with 3 anti-corrosion rollers covered in plastic for guides LML 20.

Available in stainless steel version.

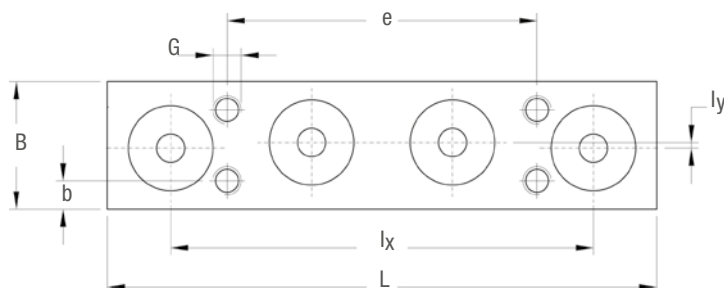
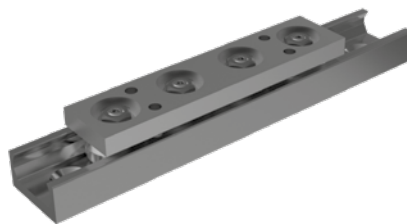


| Type         | Dimensions (mm) |    |                |                |      |                |                |    |   |    | Weight (g) |
|--------------|-----------------|----|----------------|----------------|------|----------------|----------------|----|---|----|------------|
|              | L               | B  | I <sub>x</sub> | I <sub>y</sub> | H    | H <sub>1</sub> | H <sub>2</sub> | G  | b | e  |            |
| C3 RCL 16 NX | 58              | 18 | 40             | 0.8            | 16.5 | 9.75           | 5              | M4 | 4 | 24 | 33         |

## CARRIAGE C4 RCL 16 NX

Carriages with 4 anti-corrosion rollers covered in plastic for guides LML 20.

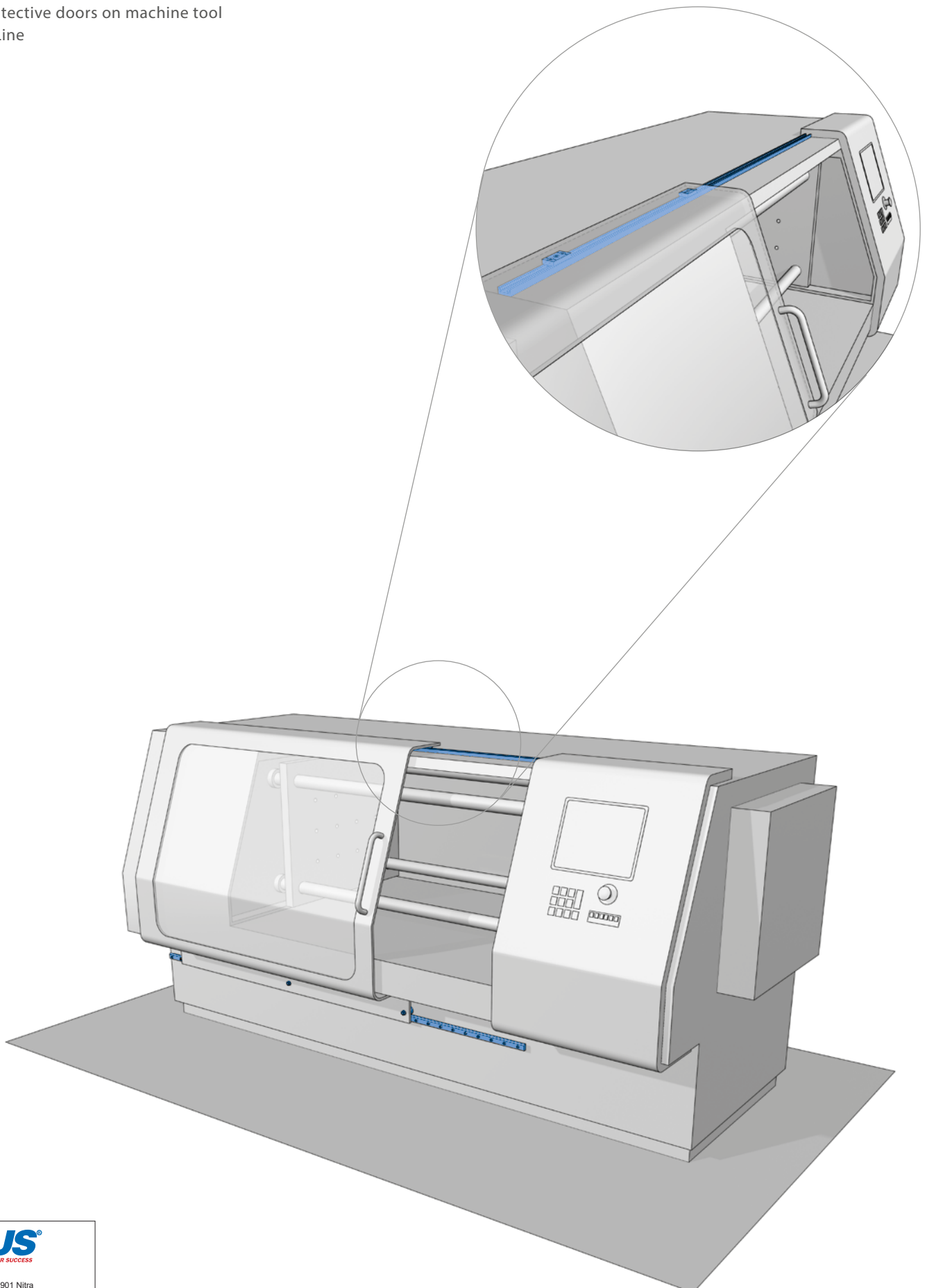
Available in stainless steel version.



| Type         | Dimensions (mm) |    |                |                |      |                |                |    |   |    | Weight (g) |
|--------------|-----------------|----|----------------|----------------|------|----------------|----------------|----|---|----|------------|
|              | L               | B  | I <sub>x</sub> | I <sub>y</sub> | H    | H <sub>1</sub> | H <sub>2</sub> | G  | b | e  |            |
| C4 RCL 16 NX | 78              | 18 | 60             | 0.8            | 16.5 | 9.75           | 5              | M4 | 4 | 44 | 44         |

# U-LINE MOUNTING EXAMPLE

Protective doors on machine tool  
U-Line



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