

1.5 Product range

1.5.1 Standard carriages and rails

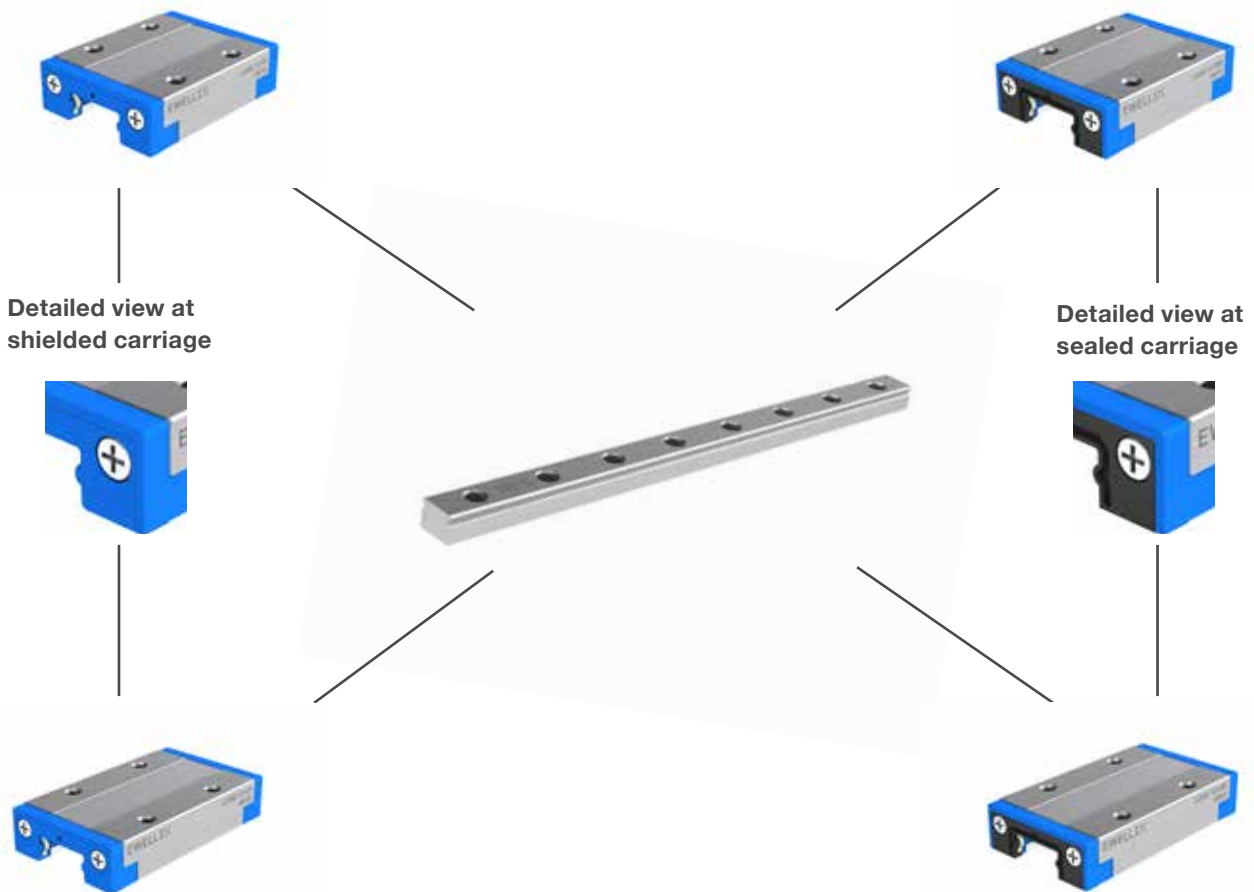
Range with standard rail width for most compact applications, type LLSH, contains two variants of carriage length each in a shielded version with only rolling friction and a sealed version with very low friction. For more technical dimensions and details, please have a look at **chapter 3**.

Carriage LLSHC ... TA

Standard length - TA
Shielded with only rolling friction (no code)

Carriage LLSHC ... TA R

Standard length - TA
Sealed with very low friction - R



Detailed view at shielded carriage

Detailed view at sealed carriage

Carriage LLSHC ... LA

Extended length - LA
Shielded with only rolling friction (no code)

Carriage LLSHC ... LA R

Extended length - LA
Sealed with very low friction - R

1.5.2 Wide carriages and rails

Range with wide rail width for highest performance on one rail solutions, type LLSW, contains two variants of carriage length each in a shielded version with only rolling friction and a sealed version with very low friction. For more technical dimensions and details, please have a look at **chapter 3**.

Carriage LLSWC ... TA

Standard length - TA
Shielded with only rolling friction (no code)



Detailed view at shielded carriage

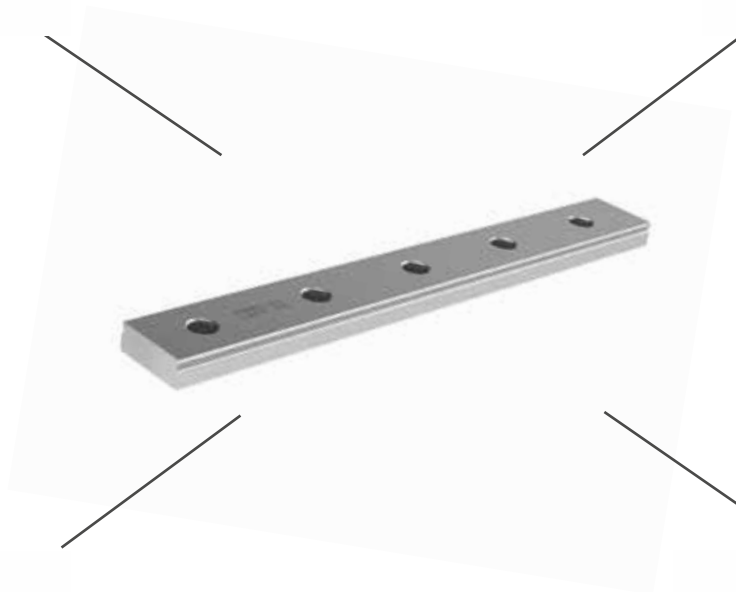


Carriage LLSWC ... TA R

Standard length - TA
Sealed with very low friction - R



Detailed view at sealed carriage



Carriage LLSWC ... LA

Extended length - LA
Shielded with only rolling friction (no code)



Carriage LLSWC ... LA R

Extended length - LA
Sealed with very low friction - R



2.1.5 Performance data

The function of LLS miniature profile rail guides can be ensured if they are used inside the limits of the below performance parameters. The dimensioning and calculations of miniature profile rails are valid when operating within these conditions.

Table 4

| Performance | |
|------------------------|----------------------|
| Speed | 5 m/s |
| Acceleration | 140 m/s ² |
| Preload class | T0, T1, T2 |
| Accuracy class | P5, P1 |
| Temperature (shielded) | -20° to + 100° C |
| Temperature (sealed) | -20° to + 80° C |
| Maximum load | < 0,5 C |
| Minimum load | > 0,001 C |

Table 5

| Material | |
|--------------------------|---------------------------|
| Rail | Stainless steel, hardened |
| Carriage body | Stainless steel, hardened |
| Balls | Stainless steel, hardened |
| Ball recirculation | POM |
| Ball retention | Stainless steel |
| Seal | Elastomer, POM |
| Shield | POM |
| Lubrication reservoir | Foamed material |
| Factory lubrication with | Klüber Paraliq P 460 |
| Compliance with | RoHS, REACH |

Speed and acceleration

LLS miniature profile rail guides can be used up to a maximum speed of

$$v_{max} = 5 \text{ m/s}$$

and a maximum acceleration of

$$a_{max} = 140 \text{ m/s}^2$$

For applications with high acceleration, Ewellix is recommending a higher load than the minimum requested load or the use of preloaded carriages. Otherwise, the service life might be shorter than expected.

Minimum load

To ensure the slip-free running of profile rail guides, they must be subjected to a certain minimum load. The general guideline is a minimum value of $P = 0,001 \text{ C}$. The minimum load is of special importance in profile rail guides which operate at high speed or with high acceleration. In such cases, the inertia forces of the balls as well as the rolling friction in the lubricant can have an adverse effect on the rolling conditions in the guide and can lead to damaging slip conditions between the balls and raceways

Maximum load

According to ISO 14728, Part 1, the calculation of bearing life is correct only when the equivalent dynamic load of a profile rail guide does not exceed 50% of the dynamic load rating C . In addition, the maximum load should never exceed 50% of the static load rating C_0 , as stated in ISO 14728, Part 2.

Higher loads lead to an imbalance of stress distribution which can have a negative effect on bearing life. In case such conditions occur, please seek advice from your local Ewellix support team.

Operating temperature

The permissible temperature range for LLS miniature profile rail guides is:



Carriages with protection shields

-20 to 100 °C for continuous operation



Carriages with low friction front seals

-20 to +80 °C for continuous operation

In case you use your own choice of lubricant, be sure to check prior to use that the temperature limits of the lubricant can withstand elevated temperatures.

When planning to use the linear guide carriages outside the given temperature range, please get in contact with the Ewellix support team.

2.1.6 Friction

The friction in a guidance system is determined by a number of factors. For example, the preload class, external loads, speed of travel and viscosity of the lubricant should be taken into consideration.

Another factor is the sliding friction of the front seals in contact with the profile rail. The friction generated by the seals will, however, decrease after the running-in phase. The friction can be reduced to a minimum when shielded carriages are used. Due to the gap sealing ability, shielded carriages should only be considered for applications in clean environments.

Moreover, the mounting precision of the rails relative to each other plays an important part, just like the flatness of the carriage mounting plate or the evenness of the rail mounting surface.

The coefficient of friction for lubricated profile rail guides is typically between $\mu = 0,003$ and $0,005$. Lower values are valid for higher loads, and higher values for lower loads. The different friction forces for miniature profile rails are shown in **tables 6 and 7**.

Table 6

Friction force of a **shielded** carriage with standard grease, precision class P5 or P1

| Range | Size | Carriage type | Running friction force (N) max. per preload class | | |
|----------------|--------------------|--------------------|---|-----|-----|
| | | | T0 | T1 | T2 |
| Standard LLSHS | 7 | Standard length TA | 0,7 | 1,4 | 2,7 |
| | | Extended length LA | 0,7 | 1,4 | 2,7 |
| | 9 | Standard length TA | 0,7 | 1,4 | 2,7 |
| | | Extended length LA | 0,7 | 1,4 | 2,7 |
| | 12 | Standard length TA | 0,8 | 1,5 | 2,8 |
| | | Extended length LA | 0,8 | 1,5 | 2,8 |
| 15 | Standard length TA | 0,9 | 1,5 | 2,8 | |
| | Extended length LA | 0,9 | 1,5 | 2,8 | |
| | Standard length TA | 0,9 | 1,5 | 2,8 | |
| Wide LLSWS | 7 | Standard length TA | 0,7 | 1,7 | 3,2 |
| | | Extended length LA | 0,7 | 1,7 | 3,2 |
| | 9 | Standard length TA | 0,7 | 1,7 | 3,2 |
| | | Extended length LA | 0,7 | 1,7 | 3,2 |
| | 12 | Standard length TA | 0,8 | 2,2 | 4,3 |
| | | Extended length LA | 0,8 | 2,2 | 4,3 |
| | 15 | Standard length TA | 0,9 | 3,0 | 4,3 |
| | | Extended length LA | 0,9 | 3,0 | 4,3 |
| | | Standard length TA | 0,9 | 3,0 | 4,3 |

Table 7

Friction force of a **sealed** carriage with standard grease, precision class P5 or P1

| Range | Size | Carriage type | Running friction force (N) max. per preload class | | |
|----------------|--------------------|--------------------|---|-----|-----|
| | | | T0 | T1 | T2 |
| Standard LLSHS | 7 | Standard length TA | 1,0 | 1,7 | 3,0 |
| | | Extended length LA | 1,0 | 1,7 | 3,0 |
| | 9 | Standard length TA | 1,0 | 1,7 | 3,0 |
| | | Extended length LA | 1,0 | 1,7 | 3,0 |
| | 12 | Standard length TA | 1,1 | 1,8 | 3,1 |
| | | Extended length LA | 1,1 | 1,8 | 3,1 |
| 15 | Standard length TA | 1,2 | 1,8 | 3,1 | |
| | Extended length LA | 1,2 | 1,8 | 3,1 | |
| | Standard length TA | 1,2 | 1,8 | 3,1 | |
| Wide LLSWS | 7 | Standard length TA | 1,0 | 2,0 | 3,5 |
| | | Extended length LA | 1,0 | 2,0 | 3,5 |
| | 9 | Standard length TA | 1,0 | 2,0 | 3,5 |
| | | Extended length LA | 1,0 | 2,0 | 3,5 |
| | 12 | Standard length TA | 1,1 | 2,5 | 4,6 |
| | | Extended length LA | 1,1 | 2,5 | 4,6 |
| | 15 | Standard length TA | 1,2 | 3,3 | 4,6 |
| | | Extended length LA | 1,2 | 3,3 | 4,6 |
| | | Standard length TA | 1,2 | 3,3 | 4,6 |

NOTE: All information presented by Ewellix with regard to running friction force is based on the validation result without load with lubricant viscosity grade 460 under room temperature..

3.1.1 Standard carriage

LLSHC .. TA

- **Shielded** version with only rolling friction
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- Highest safety, with robust metal plate ball retention



LLSHC .. TA R

- **Sealed** version with very low friction seal
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- Highest safety, with robust metal plate ball retention



Range overview ¹⁾

| Series | Range | Type | Size | Carriage length | Shielded or Sealed | Preload class | Rail length ²⁾ | Precision class | Parallel mounted rails | Zero Rail Concept |
|--------------------------|---------------------|----------|--------------|-----------------|--------------------|---------------|---------------------------|-----------------|------------------------|-------------------|
| LLS | H | C, R, S | 7, 9, 12, 15 | TA | No code, R | T0, T1, T2 | mm | P5, P1 | No code ,W2,Wx | ZRC |
| Zero Rail concept series | Standard rail width | Carriage | 7 | Standard | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 9 | Standard | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 12 | Standard | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 15 | Standard | No code, R | T0, T1 | – | P5 | – | ZRC |
| | Rail | 7 | – | – | – | max. 1000 | P5 | – | ZRC | |
| | | 9 | – | – | – | max. 2000 | P5 | – | ZRC | |
| | | 12 | – | – | – | max. 2000 | P5 | – | ZRC | |
| | | 15 | – | – | – | max. 2000 | P5 | – | ZRC | |
| System series | Standard rail width | System | 7 | Standard | No code, R | T0, T1, T2 | max. 1000 | P5, P1 | No code ,W2,Wx | – |
| | | | 9 | Standard | No code, R | T0, T1, T2 | max. 2000 | P5, P1 | No code ,W2,Wx | – |
| | | | 12 | Standard | No code, R | T0, T1, T2 | max. 2000 | P5, P1 | No code ,W2,Wx | – |
| | | | 15 | Standard | No code, R | T0, T1, T2 | max. 2000 | P5, P1 | No code ,W2,Wx | – |

¹⁾ For detailed information about the complete ordering key and explanations, please have a look at **chapter 5**.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension.

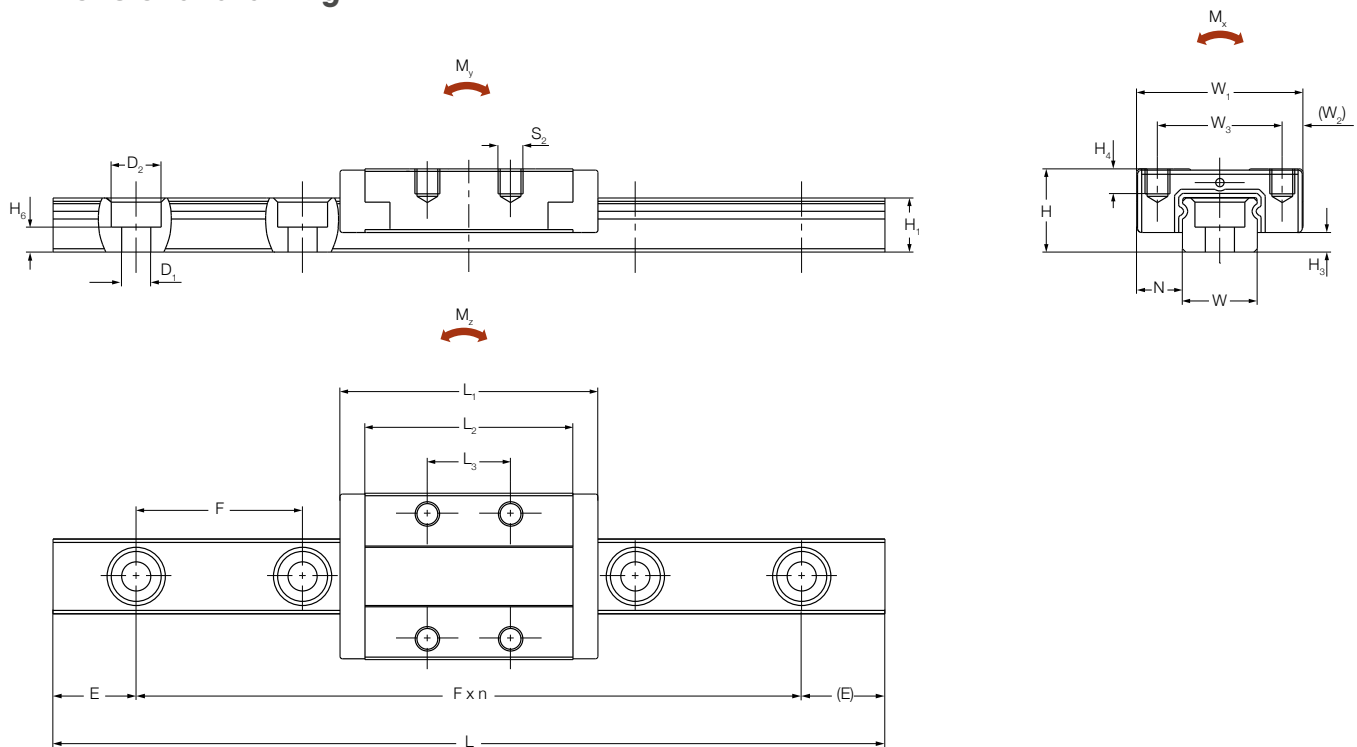
Ordering and designation example:

Carriage: LLSHC 12 TA T0 P5 ZRC

Rail: LLSHR 12-550 P5 E0 ZRC

System : LLSHS9TA2T0-260P1/E0

Dimensional drawing



Technical data

| Size | Assembly dimensions | | | Rail dimensions | | | | | | | | | |
|------|---------------------|----|-----|-----------------|----|-------|-------|----|-------|-------|----------------|----------------|----------------|
| | W_1 | H | N | H_3 | W | H_1 | H_6 | F | D_1 | D_2 | $E_{min}^{1)}$ | $E_{max}^{1)}$ | $L_{max}^{2)}$ |
| - | mm | | | | | | | | | | | | |
| 7 | 17 | 8 | 5 | 1,5 | 7 | 4,8 | 2,3 | 15 | 2,5 | 4,5 | 4 | 11 | 1000 |
| 9 | 20 | 10 | 5,5 | 2,35 | 9 | 6,5 | 3 | 20 | 3,5 | 6 | 5 | 15 | 2000 |
| 12 | 27 | 13 | 7,5 | 3,35 | 12 | 8,8 | 4,3 | 25 | 3,5 | 6 | 5 | 20 | 2000 |
| 15 | 32 | 16 | 8,5 | 4 | 15 | 9,5 | 5 | 40 | 3,5 | 6 | 5 | 35 | 2000 |

| Size | Carriage dimensions | | | | | | | Weight | | Load ratings ³⁾ | | Moments ³⁾ | | | | |
|------|---------------------|-------|-------|-------|-------|-------|-------|----------|-------|----------------------------|--------|-----------------------|--------|---------|--------|--|
| | L_1 | L_2 | L_3 | W_2 | W_3 | S_2 | H_4 | carriage | rail | dynamic | static | dynamic | static | dynamic | static | |
| - | mm | | | | | | | kg | kg/m | N | | | | | | |
| 7 | 23,5 | 18 | 8 | 2,5 | 12 | M2 | 2,5 | 0,012 | 0,230 | 915 | 1460 | 3 | 4,6 | 1,7 | 2,6 | |
| 9 | 31 | 25 | 10 | 2,5 | 15 | M3 | 3 | 0,021 | 0,395 | 1700 | 2800 | 7,1 | 11,5 | 4,6 | 7,5 | |
| 12 | 35 | 29 | 15 | 3,5 | 20 | M3 | 3,5 | 0,041 | 0,745 | 2500 | 3900 | 14 | 21,5 | 7,5 | 11,7 | |
| 15 | 44 | 37 | 20 | 3,5 | 25 | M3 | 4 | 0,080 | 1,035 | 3900 | 5850 | 23,6 | 38,9 | 14,3 | 23,9 | |

¹⁾ Tolerance of E dimension is $\pm 0,5$ mm. One of the E dimension will be produced within the given tolerance. The second (E) dimension is for reference only. Pls contact your Ewellix representative in case the tolerance of the (E) dimensions is relevant for your application.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension. Tolerance for rail cut to length is $\pm 1,5$ mm while the tolerance for standard rail length is on request.

³⁾ Dynamic load capacities and moments are based on a travel life of 100 km. Please refer to **chapter 2** for further details.

3.1.2 Standard carriage extended length

LLSHC .. LA

- Standard **long** carriage with higher performance
- **Shielded** version with only rolling friction
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- Highest safety, with robust metal plate ball retention



LLSHC .. LA R

- Standard **long** carriage with higher performance
- **Sealed** version with very low friction seal
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- Highest safety, with robust metal plate ball retention



Range overview ¹⁾

| Series | Range | Type | Size | Carriage length | Shielded or Sealed | Preload class | Rail length ²⁾ | Precision class | Parallel mounted rails | Zero Rail Concept |
|--------------------------|---------------------|----------|--------------|-----------------|--------------------|---------------|---------------------------|-----------------|------------------------|-------------------|
| LLS | H | C, R, S | 7, 9, 12, 15 | LA | No code, R | T0, T1, T2 | mm | P5, P1 | No code, W2, Wx | ZRC |
| Zero Rail concept series | Standard rail width | Carriage | 7 | Extended | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 9 | Extended | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 12 | Extended | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 15 | Extended | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | Rail | 7 | – | – | – | max. 1 000 | P5 | – | ZRC |
| | | | 9 | – | – | – | max. 2 000 | P5 | – | ZRC |
| | | | 12 | – | – | – | max. 2 000 | P5 | – | ZRC |
| | | | 15 | – | – | – | max. 2 000 | P5 | – | ZRC |
| System series | Standard rail width | System | 7 | Extended | No code, R | T0, T1, T2 | max. 1 000 | P5, P1 | No code, W2, Wx | – |
| | | | 9 | Extended | No code, R | T0, T1, T2 | max. 2 000 | P5, P1 | No code, W2, Wx | – |
| | | | 12 | Extended | No code, R | T0, T1, T2 | max. 2 000 | P5, P1 | No code, W2, Wx | – |
| | | | 15 | Extended | No code, R | T0, T1, T2 | max. 2 000 | P5, P1 | No code, W2, Wx | – |

¹⁾ For detailed information about the complete ordering key and explanations, please have a look at **chapter 5**.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension.

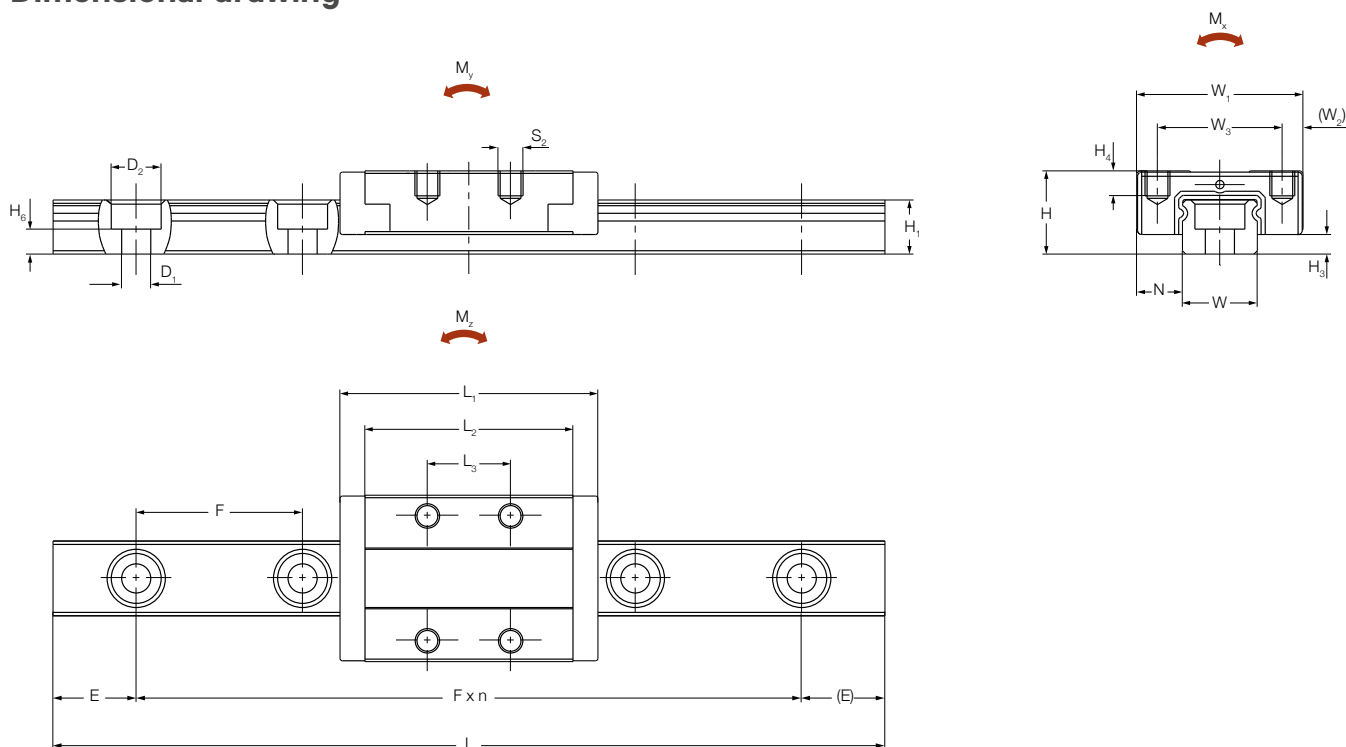
Ordering and designation example:

Carriage: LLSHC 12 LAR T0 P5 ZRC

Rail: LLSHR 12-550 P5 E0 ZRC

System : LLSHS9LA2T0-260P1/E0

Dimensional drawing



Technical data

| Size | Assembly dimensions | | | Rail dimensions | | | | | | | | | |
|------|---------------------|----|-----|-----------------|----|-------|-------|----|-------|-------|----------------|----------------|----------------|
| | W_1 | H | N | H_3 | W | H_1 | H_6 | F | D_1 | D_2 | $E_{min}^{1)}$ | $E_{max}^{1)}$ | $L_{max}^{2)}$ |
| - | mm | | | | | | | | | | | | |
| 7 | 17 | 8 | 5 | 1,5 | 7 | 4,8 | 2,3 | 15 | 2,5 | 4,5 | 4 | 11 | 1000 |
| 9 | 20 | 10 | 5,5 | 2,35 | 9 | 6,5 | 3 | 20 | 3,5 | 6 | 5 | 15 | 2000 |
| 12 | 27 | 13 | 7,5 | 3,35 | 12 | 8,8 | 4,3 | 25 | 3,5 | 6 | 5 | 20 | 2000 |
| 15 | 32 | 16 | 8,5 | 4 | 15 | 9,5 | 5 | 40 | 3,5 | 6 | 5 | 35 | 2000 |

| Size | Carriage dimensions | | | | | | | Weight | | Load ratings ³⁾ | | Moments ³⁾ | | | |
|------|---------------------|-------|-------|-------|-------|-------|-------|----------|-------|----------------------------|--------|-----------------------|--------|---------|--------|
| | L_1 | L_2 | L_3 | W_2 | W_3 | S_2 | H_4 | carriage | rail | dynamic | static | dynamic | static | dynamic | static |
| - | mm | | | | | | | kg | kg/m | N | | | | | |
| 7 | 31,5 | 26 | 13 | 2,5 | 12 | M2 | 2,5 | 0,017 | 0,230 | 1270 | 2400 | 3,9 | 7,9 | 4,2 | 8,7 |
| 9 | 40,5 | 34,5 | 16 | 2,5 | 15 | M3 | 3 | 0,028 | 0,395 | 2280 | 4300 | 8,8 | 18,5 | 9,3 | 20,0 |
| 12 | 46,5 | 40,5 | 20 | 3,5 | 20 | M3 | 3,5 | 0,057 | 0,745 | 3550 | 6300 | 18,5 | 35,9 | 17,0 | 33,4 |
| 15 | 62 | 55 | 25 | 3,5 | 25 | M3 | 4 | 0,119 | 1,035 | 5500 | 9800 | 34,0 | 64,1 | 33,0 | 63,3 |

¹⁾ Tolerance of E dimension is $\pm 0,5$ mm. One of the E dimension will be produced within the given tolerance. The second (E) dimension is for reference only. Pls contact your Ewellix representative in case the tolerance of the (E) dimensions is relevant for your application.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension. Tolerance for rail cut to length is $\pm 1,5$ mm while the tolerance for standard rail length is on request.

³⁾ Dynamic load capacities and moments are based on a travel life of 100 km. Please refer to **chapter 2** for further details.

3.1.3 Wide carriage

LLSWC .. TA

- **Wide** carriage for higher moment load
- **Shielded** version with only rolling friction
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- Highest safety, with robust metal plate ball retention



LLSWC .. TA R

- **Wide** carriage for higher moment load
- **Sealed** version with very low friction seal
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- Highest safety, with robust metal plate ball retention



Range overview ¹⁾

| Series | Range | Type | Size | Carriage length | Shielded or Sealed | Preload class | Rail length ²⁾ | Precision class | Parallel mounted rails | Zero Rail Concept |
|--------------------------|-----------------|----------|--------------|-----------------|--------------------|---------------|---------------------------|-----------------|------------------------|-------------------|
| LLS | W | C, R, S | 7, 9, 12, 15 | TA | No code, R | T0, T1, T2 | mm | P5, P1 | No code, W2, Wx | ZRC |
| Zero Rail concept series | Wide rail width | Carriage | 7 | Standard | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 9 | Standard | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 12 | Standard | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 15 | Standard | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | Rail | 7 | – | – | – | max. 2000 | P5 | – | ZRC |
| | | | 9 | – | – | – | max. 2000 | P5 | – | ZRC |
| | | | 12 | – | – | – | max. 2000 | P5 | – | ZRC |
| | | | 15 | – | – | – | max. 2000 | P5 | – | ZRC |
| System series | Wide rail width | System | 7 | Standard | No code, R | T0, T1, T2 | max. 2000 | P5, P1 | No code, W2, Wx | – |
| | | | 9 | Standard | No code, R | T0, T1, T2 | max. 2000 | P5, P1 | No code, W2, Wx | – |
| | | | 12 | Standard | No code, R | T0, T1, T2 | max. 2000 | P5, P1 | No code, W2, Wx | – |
| | | | 15 | Standard | No code, R | T0, T1, T2 | max. 2000 | P5, P1 | No code, W2, Wx | – |

¹⁾ For detailed information about the complete ordering key and explanations, please have a look at **chapter 5**.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension.

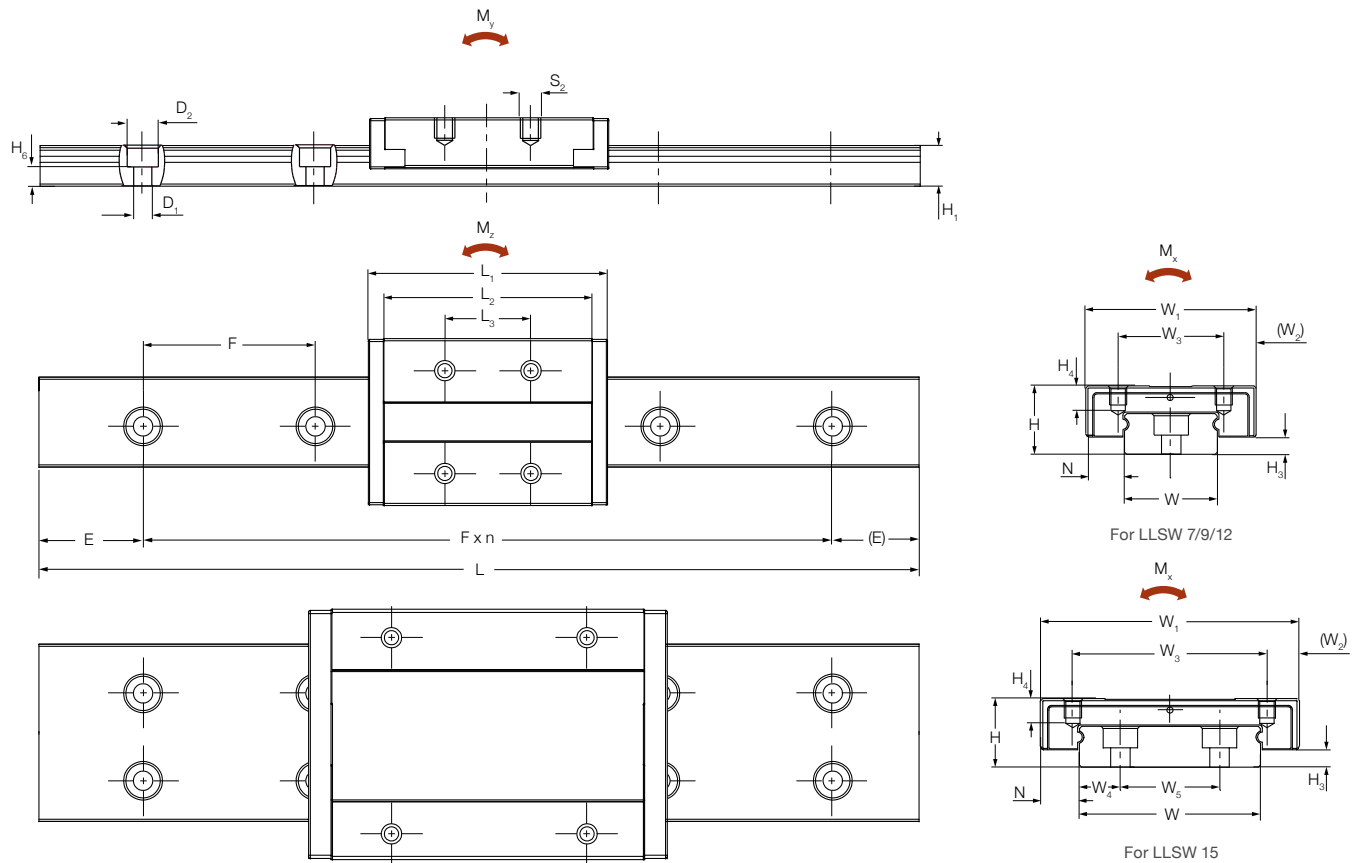
Ordering and designation example:

Carriage: LLSWC 12 TAR T0 P5 ZRC

Rail: LLSWR 12-550 P5 E0 ZRC

System: LLSWS9TA2T0-260P1/E0

Dimensional drawing



Technical data

| Size | Assembly dimensions | | | | Rail dimensions | | | | | | | $E_{min}^{1)}$ | $E_{max}^{1)}$ | $L_{max}^{2)}$ | |
|------|---------------------|-----|-----|-------|-----------------|-------|-------|-------|-------|-----|-------|----------------|----------------|----------------|-------|
| | W_1 | H | N | H_3 | W | W_4 | W_5 | H_1 | H_6 | F | D_1 | | | | D_2 |
| - | mm | | | | | | | | | | | | | | |
| 7 | 25 | 9 | 5,5 | 2 | 14 | - | - | 5,2 | 1,7 | 30 | 3,5 | 6 | 5 | 25 | 2000 |
| 9 | 30 | 12 | 6 | 2,5 | 18 | - | - | 7 | 2,5 | 30 | 3,5 | 6 | 5 | 25 | 2000 |
| 12 | 40 | 14 | 8 | 3 | 24 | - | - | 8,5 | 4 | 40 | 4,5 | 8 | 6 | 34 | 2000 |
| 15 | 60 | 16 | 9 | 4 | 42 | 9,5 | 23 | 9,5 | 5 | 40 | 4,5 | 8 | 6 | 34 | 2000 |

| Size | Carriage dimensions | | | | | | | Weight | | Load ratings ³⁾ | | Moments ³⁾ | | | |
|------|---------------------|-------|-------|-------|-------|-------|-------|----------|-------|----------------------------|--------|-----------------------|--------|---------|--------|
| | L_1 | L_2 | L_3 | W_2 | W_3 | S_2 | H_4 | carriage | rail | dynamic | static | dynamic | static | dynamic | static |
| - | mm | | | | | | | kg | kg/m | N | | Nm | | | |
| 7 | 31 | 25,5 | 10 | 3 | 19 | M3 | 3 | 0,024 | 0,540 | 1220 | 2200 | 8,2 | 14,7 | 3,6 | 6,4 |
| 9 | 39 | 33 | 12 | 4,5 | 21 | M3 | 3 | 0,051 | 0,940 | 2160 | 4050 | 17,4 | 36,2 | 8,2 | 17,3 |
| 12 | 43,5 | 37,5 | 15 | 6 | 28 | M3 | 3,5 | 0,085 | 1,525 | 3100 | 5300 | 36,0 | 69,1 | 14,7 | 28,5 |
| 15 | 55,5 | 48,5 | 20 | 7,5 | 45 | M4 | 4,5 | 0,169 | 2,960 | 5000 | 8500 | 94 | 178,8 | 28,4 | 54,3 |

¹⁾ Tolerance of E dimension is $\pm 0,5$ mm. One of the E dimension will be produced within the given tolerance. The second (E) dimension is for reference only. Pls contact your Ewellix representative in case the tolerance of the (E) dimensions is relevant for your application.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension. Tolerance for rail cut to length is $\pm 1,5$ mm while the tolerance for standard rail length is on request.

³⁾ Dynamic load capacities and moments are based on a travel life of 100 km. Please refer to **chapter 2** for further details.

3.1.4 Wide carriage extended length

LLSWC .. LA

- **Wide long** carriage with higher performance
- **Shielded** version with only rolling friction
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- Highest safety, with robust metal plate ball retention



LLSWC .. LA R

- **Wide long** carriage with higher performance
- **Sealed** version with very low friction seal
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- Highest safety, with robust metal plate ball retention



Range overview ¹⁾

| Series | Range | Type | Size | Carriage length | Shielded or Sealed | Preload class | Rail length ²⁾ | Precision class | Parallel mounted rails | Zero Rail Concept |
|--------------------------|-----------------|----------|--------------|-----------------|--------------------|---------------|---------------------------|-----------------|------------------------|-------------------|
| LLS | W | C, R, S | 7, 9, 12, 15 | LA | No code, R | T0, T1, T2 | mm | P5, P1 | No code, W2, Wx | ZRC |
| Zero Rail concept series | Wide rail width | Carriage | 7 | Extended | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 9 | Extended | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 12 | Extended | No code, R | T0, T1 | – | P5 | – | ZRC |
| | | | 15 | Extended | No code, R | T0, T1 | – | P5 | – | ZRC |
| | Rail | 7 | – | – | – | max. 2 000 | P5 | – | ZRC | |
| | | 9 | – | – | – | max. 2 000 | P5 | – | ZRC | |
| | | 12 | – | – | – | max. 2 000 | P5 | – | ZRC | |
| | | 15 | – | – | – | max. 2 000 | P5 | – | ZRC | |
| System series | Wide rail width | System | 7 | Extended | No code, R | T0, T1, T2 | max. 2 000 | P5, P1 | No code, W2, Wx | – |
| | | | 9 | Extended | No code, R | T0, T1, T2 | max. 2 000 | P5, P1 | No code, W2, Wx | – |
| | | | 12 | Extended | No code, R | T0, T1, T2 | max. 2 000 | P5, P1 | No code, W2, Wx | – |
| | | | 15 | Extended | No code, R | T0, T1, T2 | max. 2 000 | P5, P1 | No code, W2, Wx | – |

¹⁾ For detailed information about the complete ordering key and explanation, please have a look at **chapter 5**.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension.

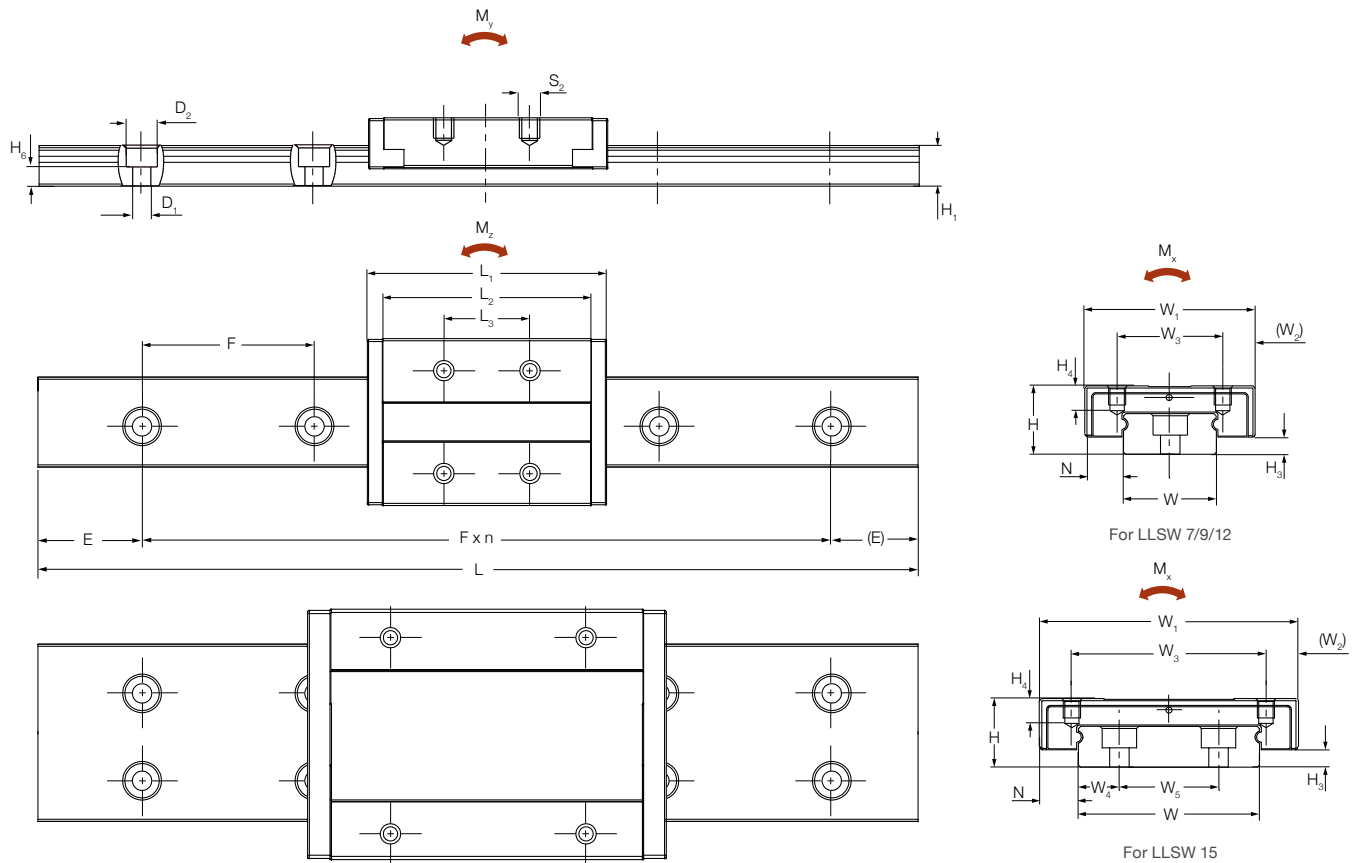
Ordering and designation example:

Carriage: LLSWC 12 LAR T0 P5 ZRC

Rail: LLSWR 12-550 P5 E0 ZRC

System : LLSWS9LA2T0-260P1/E0

Dimensional drawing



Technical data

| Size | Assembly dimensions | | | | Rail dimensions | | | | | | | $E_{\min}^{1)}$ | $E_{\max}^{1)}$ | $L_{\max}^{2)}$ | |
|------|---------------------|-----|-----|-------|-----------------|-------|-------|-------|-------|-----|-------|-----------------|-----------------|-----------------|-------|
| | W_1 | H | N | H_3 | W | W_4 | W_5 | H_1 | H_6 | F | D_1 | | | | D_2 |
| – | mm | | | | | | | | | | | | | | |
| 7 | 25 | 9 | 5,5 | 2 | 14 | – | – | 5,2 | 1,7 | 30 | 3,5 | 6 | 5 | 25 | 2000 |
| 9 | 30 | 12 | 6 | 2,5 | 18 | – | – | 7 | 2,5 | 30 | 3,5 | 6 | 5 | 25 | 2000 |
| 12 | 40 | 14 | 8 | 3 | 24 | – | – | 8,5 | 4 | 40 | 4,5 | 8 | 6 | 34 | 2000 |
| 15 | 60 | 16 | 9 | 4 | 42 | 9,5 | 23 | 9,5 | 5 | 40 | 4,5 | 8 | 6 | 34 | 2000 |

| Size | Carriage dimensions | | | | | | | Weight | | Load ratings ³⁾ | | Moments ³⁾ | | | |
|------|---------------------|-------|-------|-------|-------|-------|-------|----------|-------|----------------------------|--------|-----------------------|--------|---------|--------|
| | L_1 | L_2 | L_3 | W_2 | W_3 | S_2 | H_4 | carriage | rail | dynamic | static | dynamic | static | dynamic | static |
| – | mm | | | | | | | kg | kg/m | N | | Nm | | | |
| 7 | 41,5 | 36 | 19 | 3 | 19 | M3 | 3 | 0,034 | 0,540 | 1660 | 3450 | 11,2 | 23,0 | 7,6 | 15,8 |
| 9 | 50,5 | 44,5 | 24 | 3,5 | 23 | M3 | 3 | 0,068 | 0,940 | 2850 | 5850 | 22,6 | 51,7 | 15,6 | 36,1 |
| 12 | 58 | 52 | 28 | 6 | 28 | M3 | 3,5 | 0,118 | 1,525 | 4250 | 8300 | 45,3 | 96,8 | 26,9 | 57,9 |
| 15 | 74,5 | 67,5 | 35 | 7,5 | 45 | M4 | 4,5 | 0,236 | 2,960 | 6550 | 12500 | 116,5 | 241,8 | 50,5 | 105,5 |

¹⁾ Tolerance of E dimension is $\pm 0,5$ mm. One of the E dimension will be produced within the given tolerance. The second (E) dimension is for reference only. Pls contact your Ewellix representative in case the tolerance of the (E) dimensions is relevant for your application.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension. Tolerance for rail cut to length is $\pm 1,5$ mm while the tolerance for standard rail length is on request.

³⁾ Dynamic load capacities and moments are based on a travel life of 100 km. Please refer to **chapter 2** for further details.

3.2 Rail data

3.2.1 Standard rails

LLSHR

- Standard rail width for standard carriages
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- With two reference sides for flexible mounting



Range overview ¹⁾

| Series | Range | Type | Size | Rail length ²⁾ | Precision class | Parallel mounted rails | Zero Rail Concept |
|--------------------------|---------------------|---------|--------------|---------------------------|-----------------|------------------------|-------------------|
| LLS | H | C, R, S | 7, 9, 12, 15 | mm | P5, P1 | No code, W2, Wx | ZRC |
| Zero Rail concept series | Standard rail width | Rail | 7 | max. 1 000 | P5 | – | ZRC |
| | | | 9 | max. 2 000 | P5 | – | ZRC |
| | | | 12 | max. 2 000 | P5 | – | ZRC |
| | | | 15 | max. 2 000 | P5 | – | ZRC |
| System series | Standard rail width | System | 7 | max. 1 000 | P5, P1 | No code, W2, Wx | – |
| | | | 9 | max. 2 000 | P5, P1 | No code, W2, Wx | – |
| | | | 12 | max. 2 000 | P5, P1 | No code, W2, Wx | – |
| | | | 15 | max. 2 000 | P5, P1 | No code, W2, Wx | – |

¹⁾ For detailed information about the complete ordering key and explanation, please have a look at **chapter 5**.

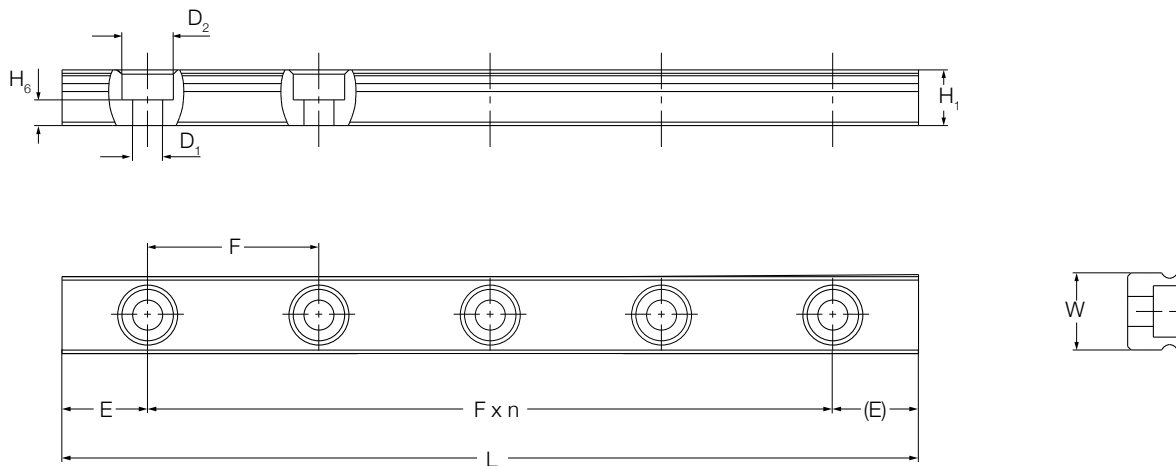
²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension.

Ordering and designation example:

Rail 1: LLSHR 12-550 P5 D E0 ZRC

Rail 2: LLSHR 12-1050 P5 E0 ZRC

Dimensional drawing

Technical data ¹⁾

| Size | Rail dimensions | | | | | | | | | Weight rail kg/m |
|------|-----------------|----------------|----------------|----|----------------|----------------|--------------------------------|--------------------------------|--------------------------------|---------------------|
| | W mm | H ₁ | H ₆ | F | D ₁ | D ₂ | E _{min} ²⁾ | E _{max} ²⁾ | L _{max} ³⁾ | |
| 7 | 7 | 4,8 | 2,3 | 15 | 2,5 | 4,5 | 4 | 11 | 1 000 | 0,230 |
| 9 | 9 | 6,5 | 3 | 20 | 3,5 | 6 | 5 | 15 | 2 000 | 0,395 |
| 12 | 12 | 8,8 | 4,3 | 25 | 3,5 | 6 | 5 | 20 | 2 000 | 0,745 |
| 15 | 15 | 9,5 | 5 | 40 | 3,5 | 6 | 5 | 35 | 2 000 | 1,035 |

¹⁾ Suitable mounting screws and recommended tightening torques are listed in **chapter 4.1.3**.

²⁾ Tolerance of E dimension is $\pm 0,5$ mm. One of the E dimension will be produced within the given tolerance. The second (E) dimension is for reference only. Pls contact your Ewellix representative in case the tolerance of the (E) dimensions is relevant for your application.

³⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension. Tolerance for rail cut to length is $\pm 1,5$ mm while the tolerance for standard rail length is on request.

3.2.2 Wide rails

LLSWR ..

- Wide rail width for wide carriages
- Available from size 7 to 15
- Available as system or separate as Zero Rail Concept type
- Made from stainless steel for corrosion protection
- With two reference sides for flexible mounting



Range overview ¹⁾

| Series | Range | Type | Size | Rail length ²⁾ | Precision class | Parallel mounted rails | Zero Rail Concept |
|--------------------------|-----------------|---------|--------------|---------------------------|-----------------|------------------------|-------------------|
| LLS | W | C, R, S | 7, 9, 12, 15 | mm | P5, P1 | No code, W2, Wx | ZRC |
| Zero Rail concept series | Wide rail width | Rail | 7 | max. 2000 | P5 | – | ZRC |
| | | | 9 | max. 2000 | P5 | – | ZRC |
| | | | 12 | max. 2000 | P5 | – | ZRC |
| | | | 15 | max. 2000 | P5 | – | ZRC |
| System series | Wide rail width | System | 7 | max. 2000 | P5, P1 | No code, W2, Wx | – |
| | | | 9 | max. 2000 | P5, P1 | No code, W2, Wx | – |
| | | | 12 | max. 2000 | P5, P1 | No code, W2, Wx | – |
| | | | 15 | max. 2000 | P5, P1 | No code, W2, Wx | – |

¹⁾ For detailed information about the complete ordering key and explanation, please have a look at **chapter 5**.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension.

Ordering and designation example:

Rail 1: LLSWR 12-550 P5 D E0 ZRC

Rail 2: LLSWR 12-1050 P5 E0 ZRC

3.2.3 Number of holes and E-dimension

The "E" dimension is the distance from the rail end to centre of the first attachment hole. If no specific "E" dimension is requested, the rails are produced with similar "E" dimensions at both ends. The Number of rail attachment holes z and the "E" dimensions can be calculated as follows:

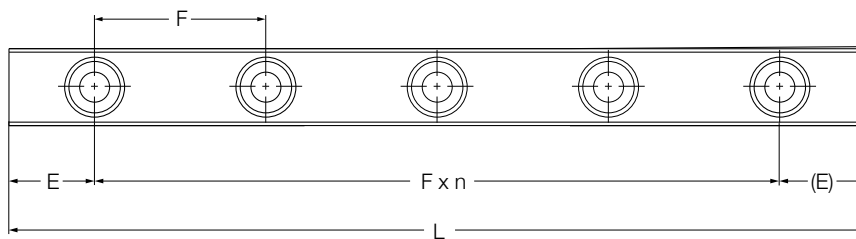
$$z = 1 + \text{TRUNC} \left(\frac{L - 2 \cdot E_{\min}}{F} \right)$$

$$E = \left(\frac{L - F(z-1)}{2} \right)$$

- z = Number of attachment holes in rail
- F = Distance of attachment holes
- L = Rail length
- E_{min} = Minimum E-dimension according to catalogue
- E = E-dimension

NOTE: "TRUNC" is the mathematical function that truncates a number to an integer by removing the fractional part of the number.

Dimension scheme on rails



| Range | Size | F | E _{min} ¹⁾ | E _{max} ¹⁾ | L _{max} ²⁾ |
|--------------------|------|----|--------------------------------|--------------------------------|--------------------------------|
| | | mm | | | |
| Standard type rail | 7 | 15 | 4 | 11 | 1 000 |
| | 9 | 20 | 5 | 15 | 2 000 |
| | 12 | 25 | 5 | 20 | 2 000 |
| | 15 | 40 | 5 | 35 | 2 000 |
| Wide type rail | 7 | 30 | 5 | 25 | 2 000 |
| | 9 | 30 | 5 | 25 | 2 000 |
| | 12 | 40 | 6 | 34 | 2 000 |
| | 15 | 40 | 6 | 34 | 2 000 |

¹⁾ Tolerance of E dimension is ±0,5 mm. One of the E dimension will be produced within the given tolerance. The second (E) dimension is for reference only. Pls contact your Ewellix representative in case the tolerance of the (E) dimensions is relevant for your application.

²⁾ Rails manufactured as cut to length might not be able to be delivered to the full length due to the E dimension. Tolerance for rail cut to length is ±1,5 mm while the tolerance for standard rail length is on request.



4

Mounting and maintenance

Ordering key systems

LLS H S 12 TA R 2 T0 - 500 P5 / W2 E10

LLS Miniature profile rail guide series

Range code

- H Standard range
- W Wide range

Type code

- S System, mounted carriage on rail

Size

- 7, 9, 12, 15

Carriage type

- TA Standard or Wide carriage, standard length
- LA Standard or Wide carriage, extended length

Seal options

- no code Shielded carriage
- R Low friction sealed carriage

Number of carriages per rail

- 1, 2, 3, 4, 6

Preload Class

- T0 Light clearance
- T1 Light preload
- T2 Medium preload

Rail Length

Up to 2 000 mm length in 1 mm steps, exception LLSH 7 with up to 1 000 mm length

Precision Class

- P5 Standard precision
- P1 High precision

Rail arrangement (Number of parallel mounted rails)

- no code Arrangement of single rail as standard
- W2 Arrangement of two parallel mounted rails
- Wx Arrangement of x number of parallel mounted rails

Rail type

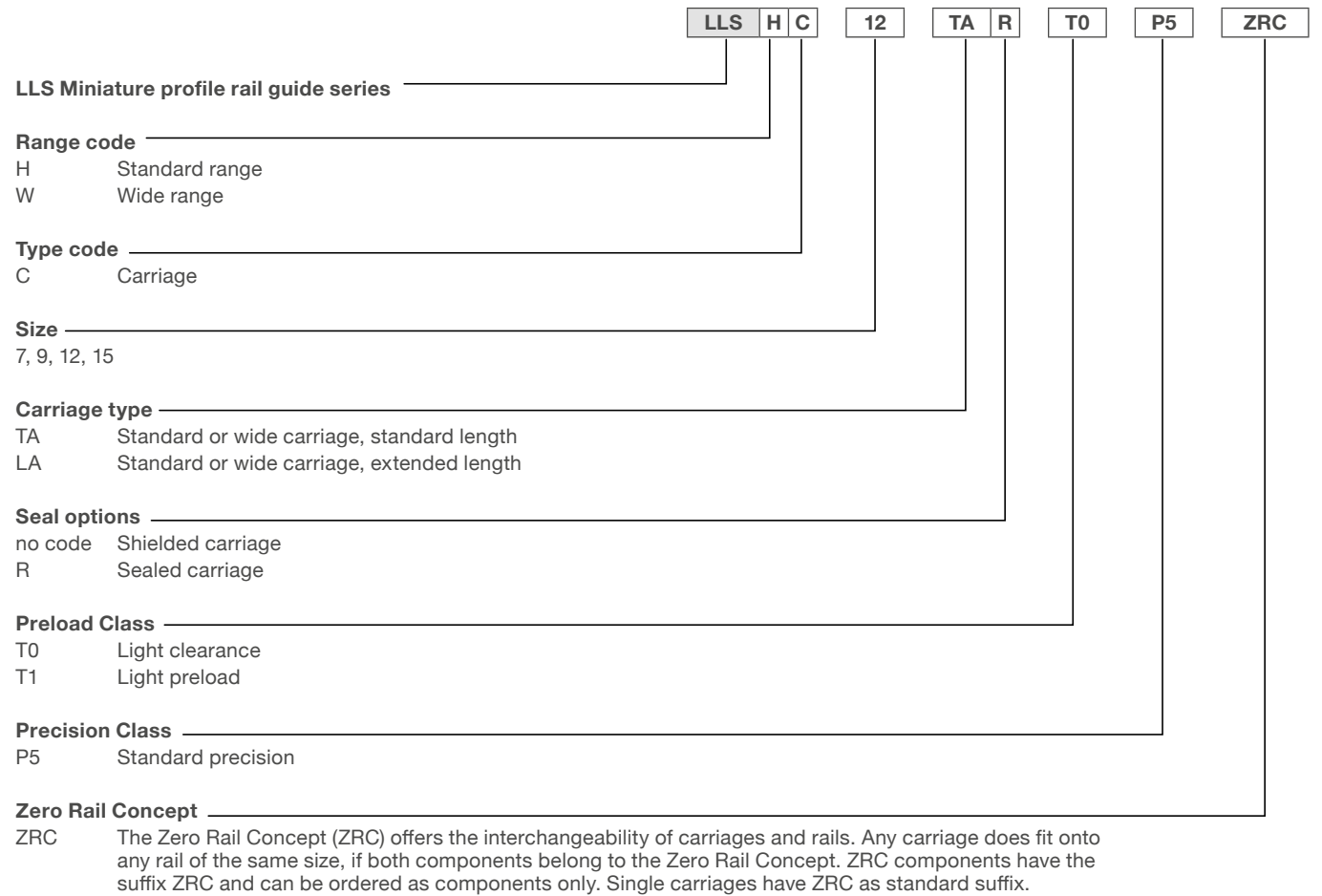
- no code Standard rail
- D Customized rail

Distance between end face and the center of the first mounting hole of the rail

- E0 Standard "E" dimension, even when not selected. The holes at both rails end will be positioned equidistantly from either end of the rails with shortest possible distance
- Exx Specified "E" dimension for one rail end with the dimension range per size as described in **chapter 3.2**



Ordering key ZRC carriages



Ordering key ZRC rails

