General installation information

Follow the installation information below when mounting telescopic slides. Ideally this information should have already been taking into account in the design of the extensions. Doing so ensures smooth running, quiet, and low-wear operation of the slides over a long period of time and guarantees function in the long run.

- Telescopic slides are generally installed in pairs so that the mounting surfaces of the housing and extension side are level, parallel, and perpendicular and have to be aligned with one another correctly in regard to position. Furthermore attention should be given to adequate stability of the receiving structure so as to keep geometric errors caused by elastic deformation as minimal as possible.
- Fastening holes should be applied in such a way that excludes twisting or warping of the slides during mounting. Also the slides need to be positioned in the direction of extraction in such a way that the extensions reach the end position at the same time on retraction and extraction. In this way, an equal amount of stress acts on the rubber stops and locking devices.
- The width of the respective slide installation spaces should be designed with a tolerance of +0.2 / +0.5 mm. The slides will then tension slightly in the direction of the middle of the extension. This promotes optimum performance and a long lifespan.
- Before mounting, the inner slides should be moved to the front and back stop position once to allow the ball cages to assume their intended position. Installation should also take place at room temperature.
- After mounting, check the telescopic slides and extensions for ease of movement. If something is wrong, such as sticking or warping, the cause has to be determined and eliminated through appropriate actions.

Mounting holes, fastening screws

In general use all holes intended for fastening when mounting telescopic slides. Doing so will ensure that the forces resulting from the maximum load capacity F_S (nominal load) can be transferred safely from the telescopic slides from and to the surrounding structure. Failure to use fastening screws reduces the specified load capacity accordingly.

The outer and inner slides have other openings and auxiliary holes in addition to the holes intended for mounting. The catalog drawings and the CAD data available for download do not show these holes to exclude confusion and design faults. These holes are needed, among other things, for the fastening of type-dependent component features, such as the self-retracting mechanisms.

Some slide variants have fastening options for screws of various sizes. In this case, all positions of a size or type should be used. Auxiliary holes, which ensure that all mounting holes can be reached, are found accordingly in the CAD data, but are not pictured in the catalog drawings.

The type and specification of suitable screws can be found on the respective catalog pages. It is generally recommended to use screws of tensile strength class 8.8 under consideration of the specified tightening torque.

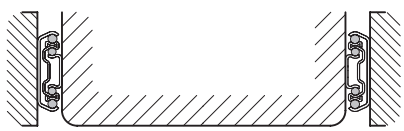
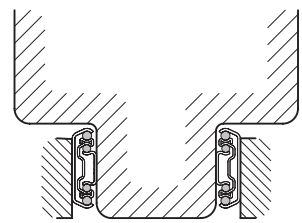
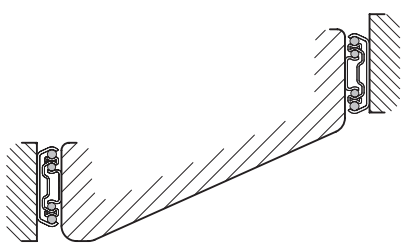
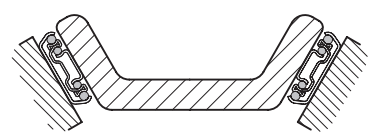
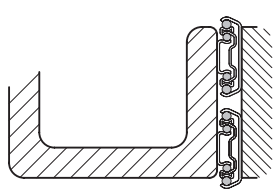
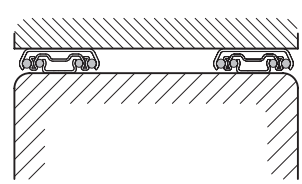
Installation position

Telescopic slides are preferably installed arranged vertically and in pairs in a horizontal position. This ensures that the highest possible stability and torsional stiffness is reached in the smallest installation spaces and allows for absorption of the maximum load (nominal load). The performance features are optimum in this installation position, and wear is reduced to a minimum.

The horizontal or lying installation of the slide is likewise possible with certain restrictions. The maximum load in this case is only about 20 % to 25 % of the specified nominal load. The less favorable slide profile results, therefore, in considerably higher bending in the extended state. As a result, the ball cages may leave streaks on the heads of the fastening screws. In case of doubt, check the function under load in a test set-up.

Installing slides in a perpendicular position to the direction of extraction is not recommended because increased cage slip occurs in this case. This means that the upper and lower end position of the slide can be reached in some circumstances only with an increased amount of force after a few cycles since the force of gravity causes the ball cage to become dislocated from its correct position.

The following examples show possible **installation positions** of telescopic slides that are considered favorable or acceptable and some that are regarded as unfavorable and should, therefore, be avoided.

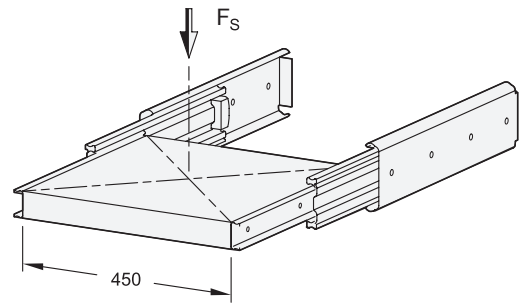
favorable	**vertically, on both sides**	
		
acceptable	**vertically shifted, on both sides**	**vertically inclined, on both sides**
		
unfavorable	**vertically, on one side**	**horizontally, on both sides**
		

Load capacity

The maximum load capacity of telescopic slides depends on the slide profile, the nominal length l_1, and the resulting stroke l_2. Furthermore, the extension width, the slide materials used, and the parts of the component options, such as the dampened self-retracting mechanism, have a considerable influence.

The information on the maximum load capacity of the telescopic slides was determined in fatigue tests under the following conditions:

- Slide arrangement vertical in pairs
- Observance of all mounting information
- Warp-resistant test set-up
- Equal distribution of the load F_S throughout the extension finish
- Standard slide spacing of 450 mm
- 10,000 or 100,000 test cycles (one extraction and retraction = one cycle)
- Gradual increasing of load



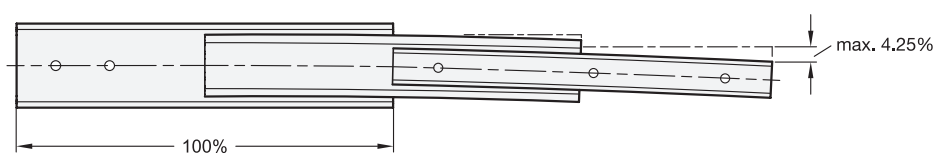
Wear, performance, and maximum bending were assessed after every test segment.

Bending

Telescopic slides demonstrate elastic bending under load in the extended state. The bending is most noticeable at the far end of the inner slide. The general rule is that the extent of deformation may not be higher than 4.25 % of the stroke path. All slides are within this value on maximum load.

Example:

A telescopic slide having a nominal length of l_1 = 500 mm is moved to the end position and stressed with the maximum load throughout the extension finish. The bending at the front-most point of the slide may now be a maximum of 21.25 mm.



Tolerances

All components of the telescopic slides are subject to manufacturing tolerances that ensure consistent quality and a long lifespan.

Since the stroke results from the interaction of all individual parts of the telescopic slides, the sum of all individual tolerances also has to be taken into account for the length tolerance of the stroke. In addition, slight deformation of any existing rubber stops should be mentioned. This results overall in proportionately large total tolerances that are listed on the respective catalog pages and can, therefore, be taken into account in the design layout of extensions.

Travel speed

The permissible extraction and retraction speeds of the telescopic slides are set at a maximum speed of 0.3 m/s. Shortly before the end of stroke, the speed should be reduced to less than 0.15 m/s so that the stops, rubber stops, dampened self-retracting mechanisms etc., do not have an excessive amount of impact stress.

Slide materials, surfaces and corrosion protection

The telescopic slides made by Ganter are manufactured out of high-quality steel or stainless steel bands.

The stainless steel telescopic slides are generally delivered with mill-finish surfaces.

The steel telescopic slides are partly made out of a pre-zinc plated steel band and are subsequently batch zinc plated and blue passivated with 5 to 7 µm. Corrosion resistance in the salt spray test for at least 72 hours against white rust is ensured in this way.

To achieve higher corrosion resistance, finish refinements can be provided on request. Two processes are available:

- Galvanically batch zinc plated 5 to 7 µm, black passivated,
  corrosion resistance in salt spray test for at least 120 hours against white rust
- Galvanically batch zinc plated 5 to 7 µm, passivated,
  electrolytically coated with T2 top coat / sealer 8 to 12 µm,
  corrosion resistance in the salt spray test for at least 96 hours against white rust /
  500 hours against red rust

All materials and finish refinements used are RoHS compliant.

Lubrication and maintenance

Telescopic slides are permanently lubricated with high-quality, mineral-oil-based and lead-free bearing lubricants.

For stainless steel telescopic slides, special FDA-compliant lubricants are used that are tasteless and odorless. The lubricants comply with lubricant class H1, which allows them to be used in areas where it is technically infeasible to prevent occasional contact with food. Generally direct contact can be prevented by taking appropriate actions, such as optimum placement of slides or the use of covers.

Re-lubrication is generally not necessary under normal conditions of use since the ball cages and bearings “push out” small amounts of obtained dirt from the slides when the slides move. In applications where there is heavy contamination, the slides should be cleaned from time to time with a clean cloth and then re-lubricated. Acceptable lubricants for the steel variants are, for example, Shell Alvania EP 1 and Klüberplex BE 31-222.

Cage slip

In the event of quick changes of direction and high acceleration forces, cage slip can occur in the worst case, especially with long ball cages. In these cases, the cage does not move synchronously at half the speed of the middle and inner slides. Instead it loses its correct position gradually due to sliding. In such cases an “idle stroke” may need to be moved in the front and back stop position of the slide, at a moderate speed and under slight load to reposition the cage.

Temperature of use

The temperature of use of telescopic slides is within the range of -20 °C to 100 °C and is determined primarily by the plastic and elastomer parts used in the slides. Depending on place of use and application, the user may have to check the function of the extensions if the temperature is at the limit.