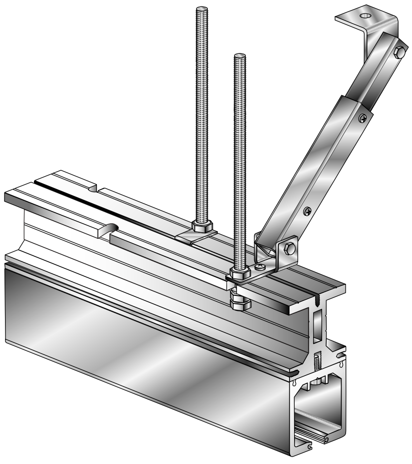


Technical manual
Substructure

DORMA HSW / FSW

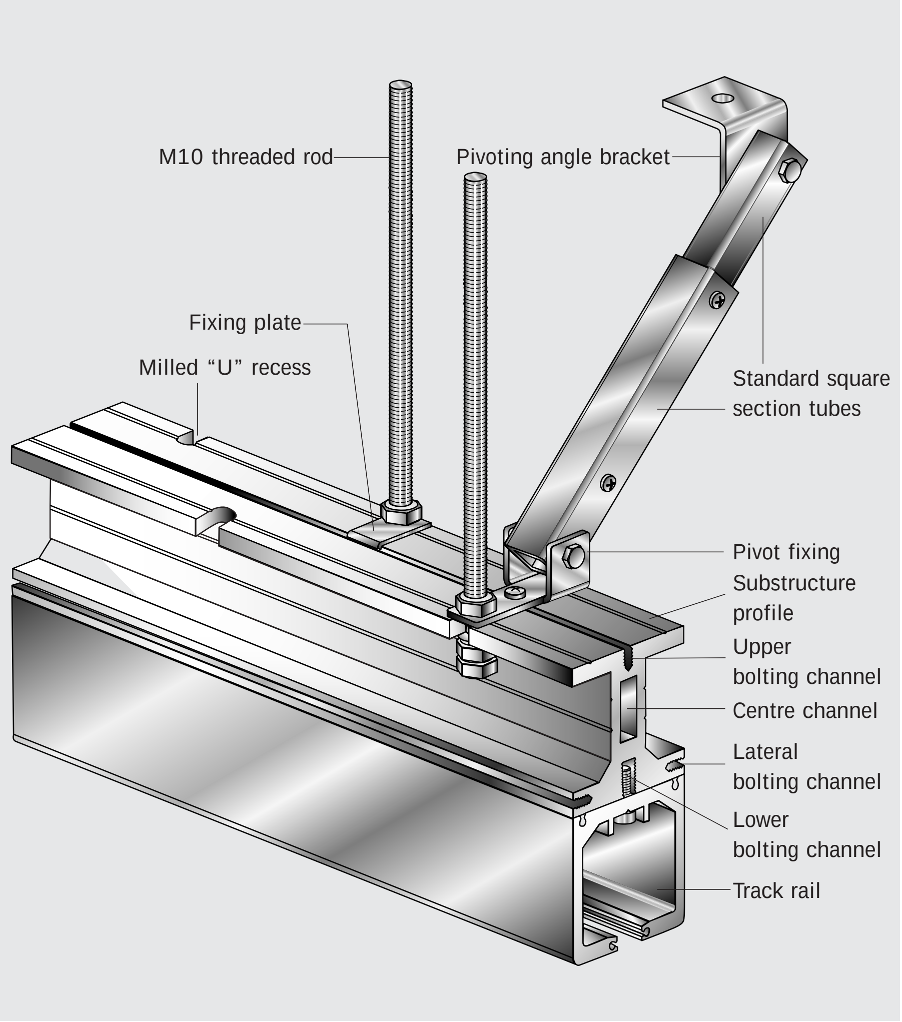
The System

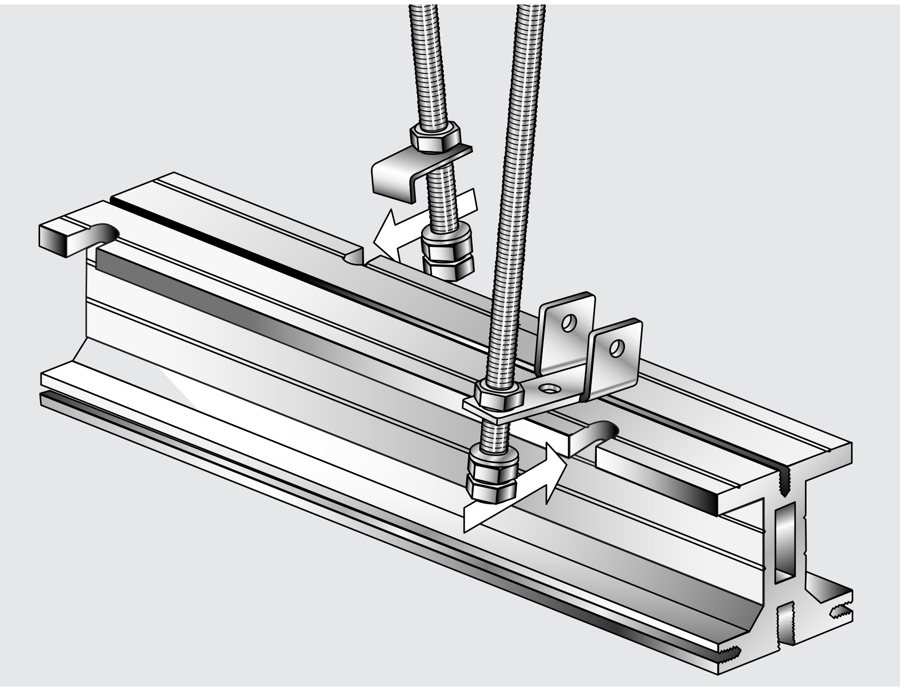
Problems and solutions

Installing a horizontal sliding wall system invariably requires a certain set of structural conditions to be established. The system will need to be precisely aligned vertically - usually subsequent to installation - as well as being exactly configured and securely located. Because DORMA HSW systems do not use floor-level supports and floor guides, the system requirements and all their technical properties must be taken into account when designing the substructure and its incorporation within the ceiling. This often very costly planning process is normally undertaken by the fabricator as the installation company, and alongside the calculations there are many individual structural and installation procedures involved. The new DORMA substructure system is of modular construction and is designed to significantly reduce on-site installation cost and time. This concept also offers the particular flexibility required to overcome structural constraints, such as the presence of air conditioning shafts or pre-existing electrical systems in the ceiling.

System design

The DORMA substructure consists primarily of the following components: substructure profile with modules for branching to the stacking area, threaded rods for suspension of the profile(s), and standard square section tubes with appropriate fixings and ceiling brackets for bracing and stiffening the construction.

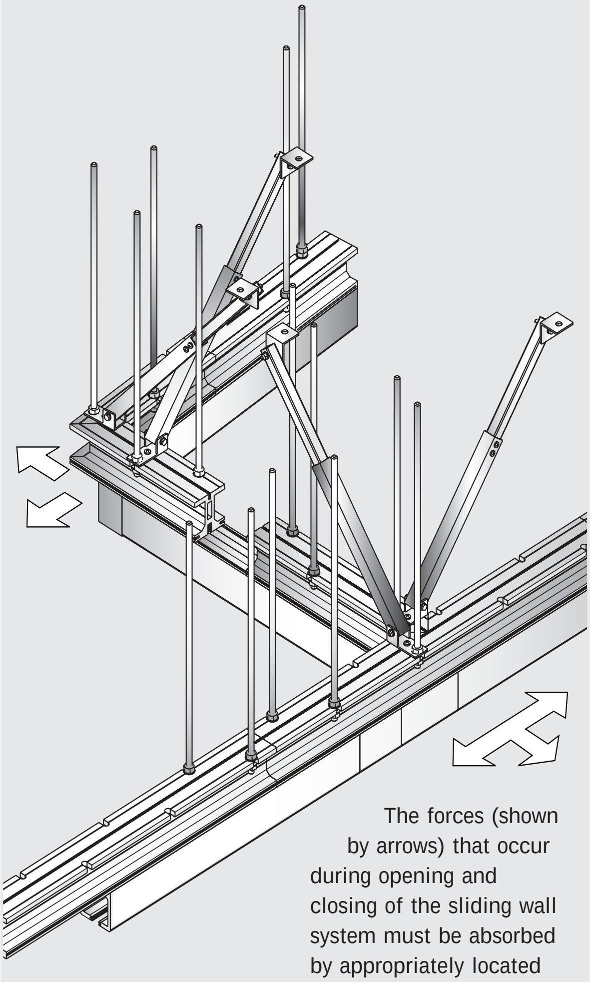




Safety and flexibility

The DORMA substructure has been developed on the basis of extensive practical experience of the requirements involved in this kind of system. Consequently, the profile incorporates features that greatly facilitate installation and ensure that pre-existing structural factors can be accommodated with maximum flexibility.
Various bolting channels run the whole length of the profile, allowing bolts to be inserted easily at any location within the system configuration. So there is no need for pre-drilling and thread cutting in order to mount the track rails onto the substructure.
Bolted connections can be made directly through the lower bolting channel. The problem of removing drillings and filings from the track rails is thus also a thing of the past.
Bolting channels on both sides of the profile can be used e.g. for fixing the brackets needed for attaching the ceiling retention elements. In addition, centering grooves on all main profile surfaces facilitate overhead drilling, e.g. for accessory attachment. Welding brackets designed for bolting onto the profile provide another option, allowing the DORMA system to be utilised for additional customer-specific applications.

The substructure profile is suspended from threaded rods. These are first placed in the U-recesses using fixing plates that lock into the upper bolting channel. Each pair of threaded rods is regarded as constituting one suspension point. Here again the system remains exceptionally flexible: the staggered U-recesses positioned at intervals of 100 mm enhance the ability of the system to accommodate structural constraints. Depending on the weight of the system and the permitted deflection, it is possible to span a distance of up to 3.5 m between two suspension points.
Standard flat steel bars can be inserted in the centre channel to further stiffen the profile, particularly in the area of the joints. This means that just one suspension point in the vicinity of the joint can be provided instead of the two - one either side of the joint - that are usually needed. So existing building installations of all types can be effectively bypassed.
Once the substructure has been installed, the HSW system is vertically aligned and fixed directly via the threaded rods. Subsequent adjustments, e.g. after the building has settled into its foundations, can also be carried out by the same means.

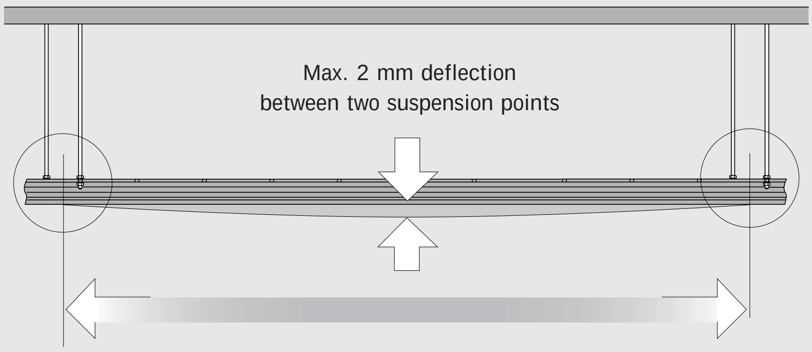


The forces (shown by arrows) that occur during opening and closing of the sliding wall system must be absorbed by appropriately located bracing elements.

The standard square section tubes offer extra safety, especially where the sliding panels deviate from a straight line. Panel sway must be effectively countered by the structural design adopted at such locations. Diagonal struts that counteract the pressure load stabilise the system in the area of the stacked panels. The telescopic square section tubes are connected as additional bracing elements (struts) to the substructure by a pivot fixing. The struts are bolted to the ceiling using the appropriate angle brackets.

The modular design of the DORMA substructure is precisely matched to the modules of the DORMA HSW track rail. The structural elements can be mixed and matched as desired with the result that a small number of component types is sufficient to create a complex, flexible system that conforms fully to all safety requirements.
A drawing of the required substructure can be requested from DORMA to supplement the HSW system drawing always supplied with the quotation.

Planning details

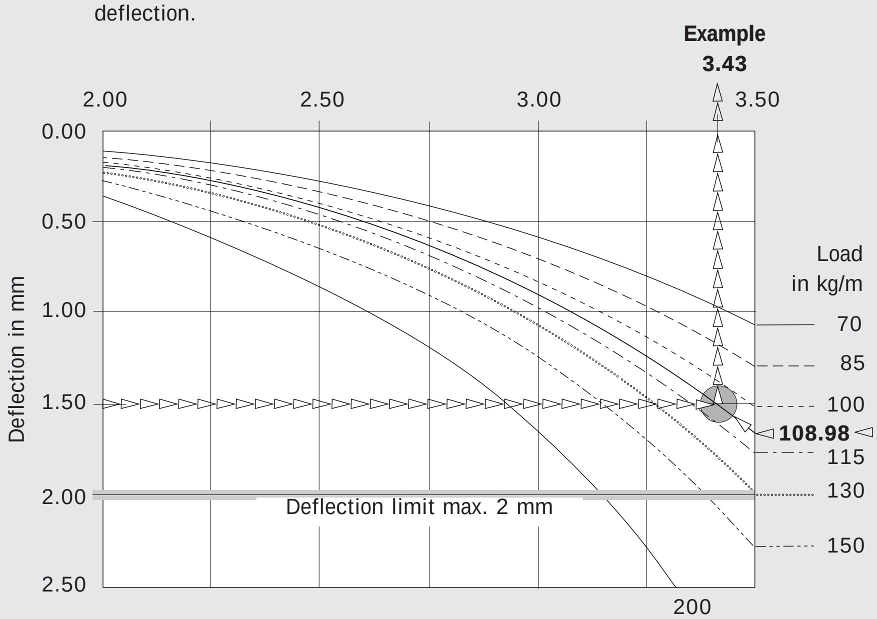


In order to prevent system sway, every second suspension point must be reinforced by a strut. The substructure profile ends (travel path and stacking area) should ideally be directly connected to the masonry or to existing structural members.

Calculating the suspension intervals

With a maximum load (panel weight) of 200 kg/m and a permitted deflection of the substructure with track rail of 2 mm, the interval between two suspension points must be no greater than 3.00 m. The diagram below shows other values for different loads.

Diagram illustrating the maximum intervals between two suspension points in metres taking into account the permitted deflection.



Illustrative example of load values

HSW-G characteristic values
Formula for calculating the:

Glazing height
= system height – 0.309 m
= panel height – 0.193 m

Glazing weight
Glass 10 mm = 25.00 kg/m²
Glass 12 mm = 30.00 kg/m²

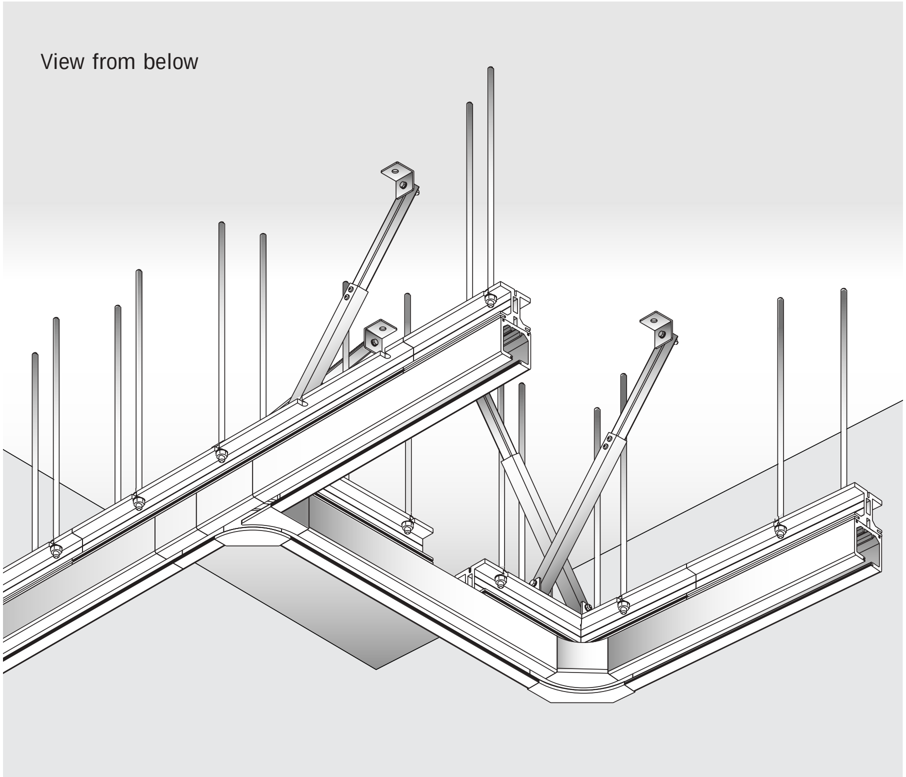
Door rail weight
Aluminium = 12.00 kg/m
Brass = 14.50 kg/m
Stainl. steel = 13.25 kg/m

Example system
HSW-G system in stainless steel

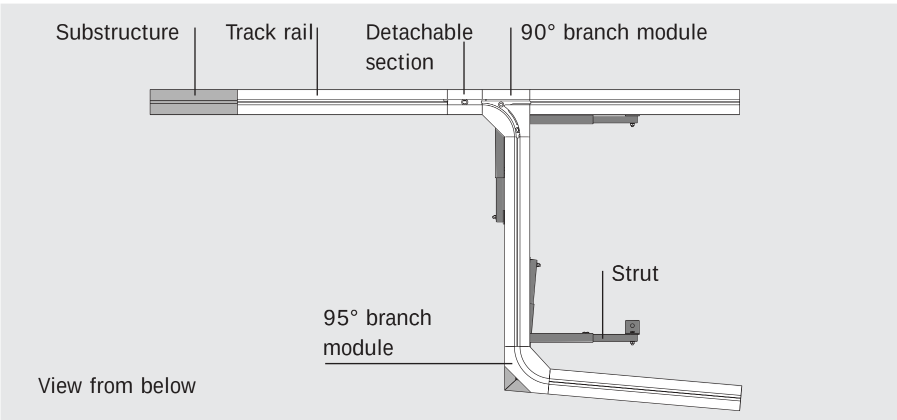
System height 3.50 m
Glazing thickness 12 mm

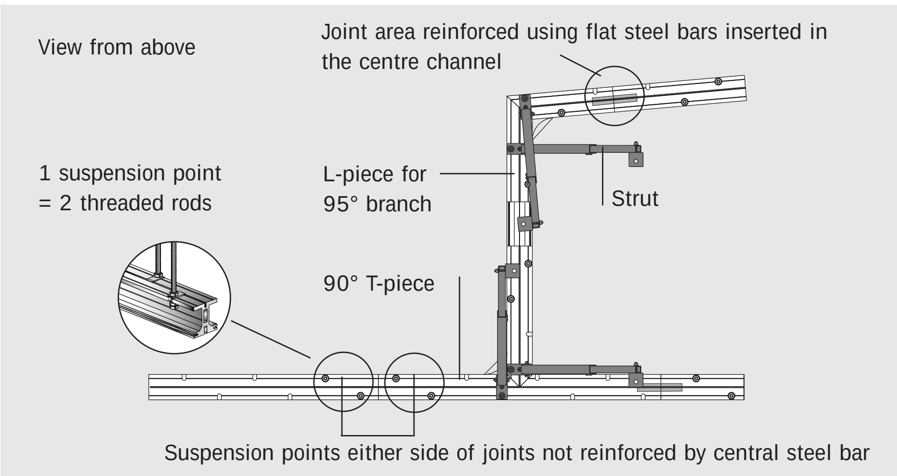
Calculation
Load
= glazing weight x glazing height + door track weight
= 30 kg/m² x (3.50 m – 0.309 m) + 13,25 kg/m
= 30 kg/m² x 3.191 m + 13.25 kg/m
= 108.98 kg/m

Stacking area design



The construction of the stacking area, assembled from substructure and track rail modules, provides a good illustration of how this well-designed system can be utilised. The individual components are coordinated to ensure safe integration.
Joints in the substructure are offset to those in the track rails so that individual joints coincide with continuous material in all cases.
Provided that the track rails are adequately bolted to the substructure, gaps of up to 40 cm measured from one suspension point to the next are permitted in the substructure.

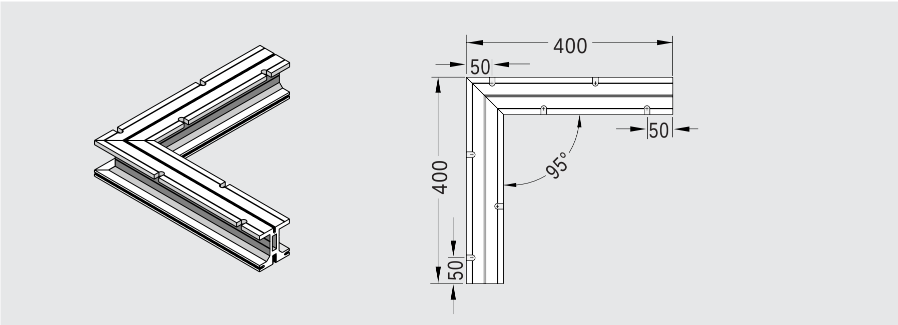




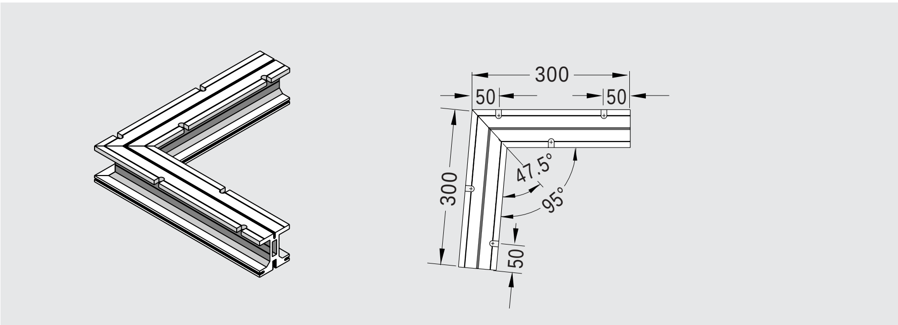
Joints reinforced by central steel bar only require one local suspension point.

Profile elements

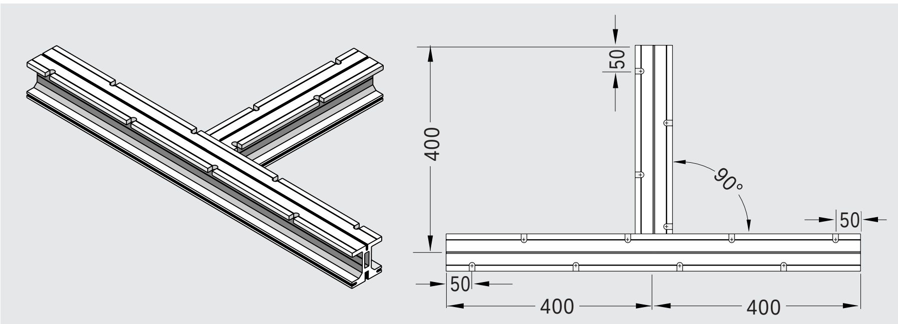
Substructure profiles



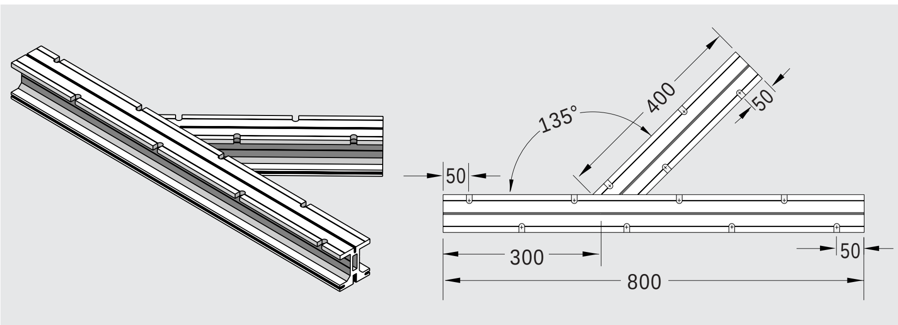
90° L-piece
Article no. 815.444.012.50



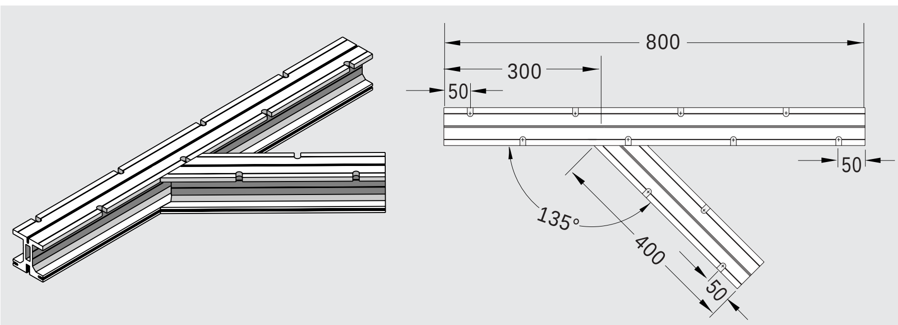
95° L-piece
Article no. 815.444.015.50



90° T-piece
Article no. 815.444.009.50

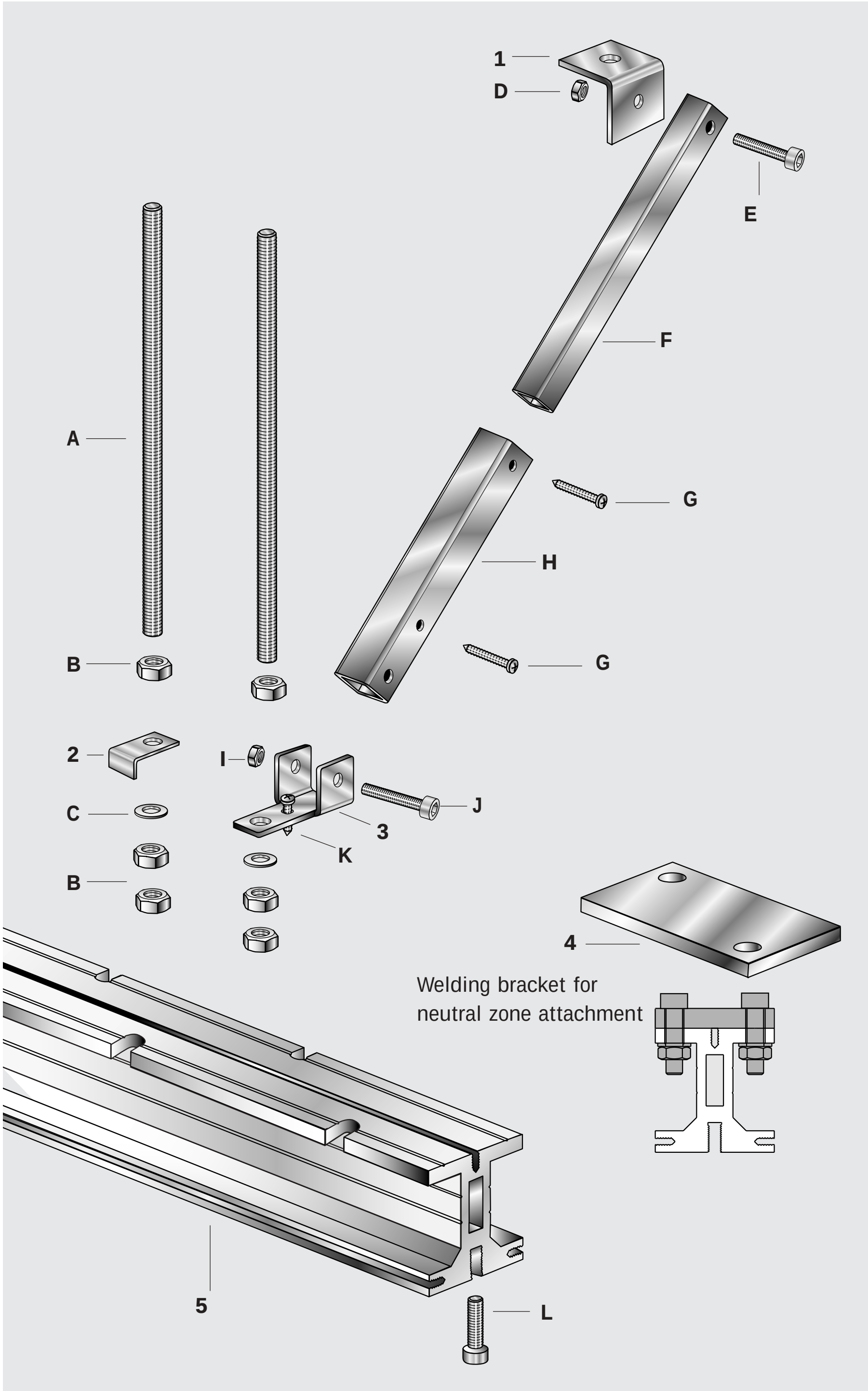


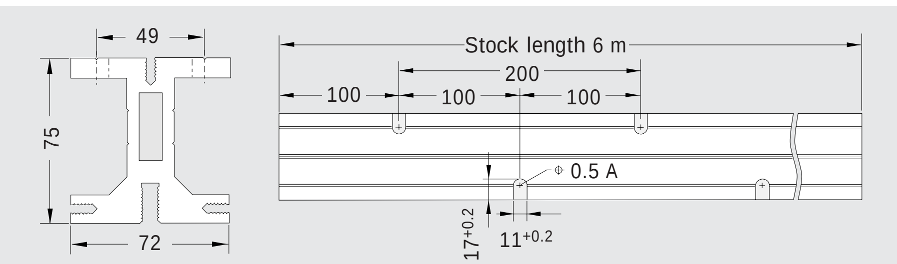
135° left-hand T-piece,
Article no. 815.444.003.50



135° right-hand T-piece,
Article no. 815.444.006.50

Component parts, accessories





Component parts

1 Pivoting angle bracket
Article no. 815.437.001.40

2 Fixing plate
Article no. 815.434.001.40

3 Pivot fixing
Article no. 815.436.001.40

4 Welding bracket
Article no. 815.435.001.40

5 Basic substructure profile,
stock length 6 m
Article no. 815.658.000.99
Fixed length
Article no. 815.659.000.99

DIN and standard parts by others or on request
CSN = Company standard no.

A Threaded rod M10 x 1000
CSN 800.01.470.3.30

B Hex nut DIN 934-M10
CSN 800.03.001.3.30

C Washer ISO 7089-10
CSN 800.04.009.3.30

D Hex nut DIN 934-M6
CSN 800.03.005.3.30

E Hex socket screw
DIN 933-M6x35
CSN 800.01.337.3.30

F Telescopic strut top section,
square section tube,
galvanised steel 20x20x2
CSN 800.16.025.4.32

G Drilling screw DIN 7504
ST4 8x16
CSN 800.01.286.3.30

H Telescopic strut bottom
section, square section tube,
galvanised steel 25x25x2
CSN 800.16.026.4.32

I Hex nut DIN 934-M6
CSN 800.03.005.3.30

J Hex socket screw
DIN 933-M6x40
CSN 800.01.319.3.30

K Self-tapping screw
ISO 7049-St4.8x9.5-C-H
CSN 800.01.341.3.30

L Cheesehead screw
for fixing track rail to
substructure profile
DIN 912-M8x25
CSN 800.01.018.3.30

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