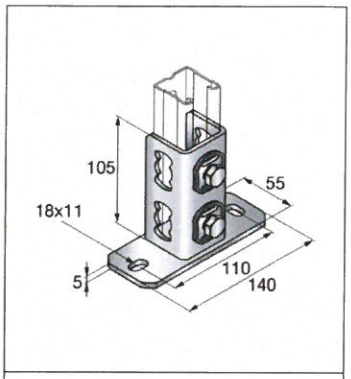
MQP-41-CP Rail Support

Designation	Item number
MQP-41-CP	**2184852**



Package content

Corrosion protection:
Electro galvanized

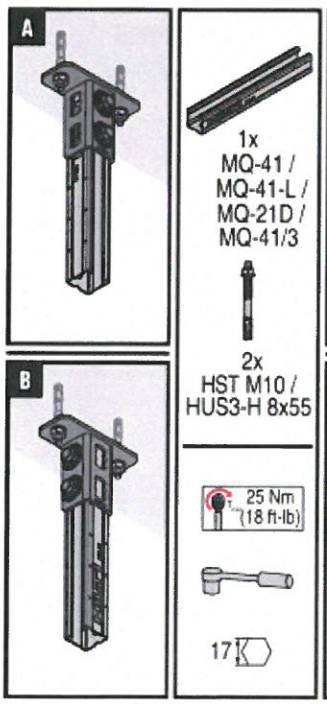
Weight:
726g

Submittal text:
Base connector for installation channels at 90° including two MQN-CP channel connectors. Welded base plate gives stiffness and bending load capacity. Two anchor holes with dimensions 18x11mm.

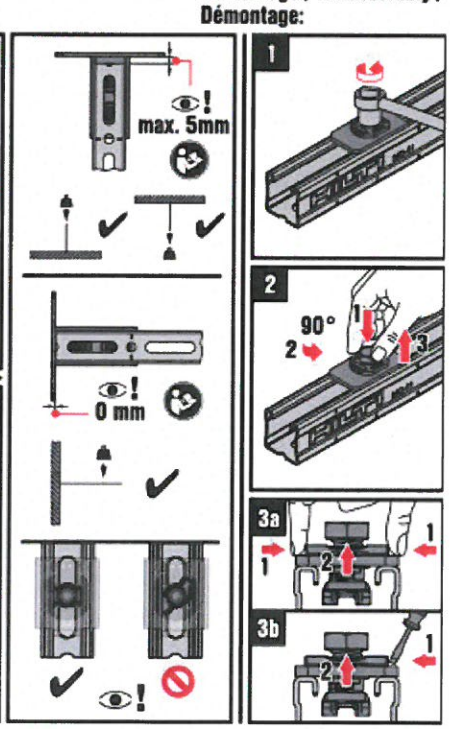
Material properties

Material	Yield strength	Ultimate strength	E-modulus	Shear modulus
Connector: S235JR - DIN EN 10025	$F_y = 235 \frac{N}{mm^2}$	$F_u = 360 \frac{N}{mm^2}$	$E = 210000 \frac{N}{mm^2}$	$G = 80769 \frac{N}{mm^2}$
Plate: steel S355J2 DIN EN 10025-2	$F_y = 355 \frac{N}{mm^2}$	$F_u = 510 \frac{N}{mm^2}$	$E = 210000 \frac{N}{mm^2}$	$G = 80769 \frac{N}{mm^2}$
Nut: S355MC - DIN EN 10149-2	$F_y = 355 \frac{N}{mm^2}$	$F_u = 430 \frac{N}{mm^2}$	$E = 210000 \frac{N}{mm^2}$	$G = 80769 \frac{N}{mm^2}$
Bolt: grade 8.8 - DIN EN ISO 898	$F_y = 640 \frac{N}{mm^2}$	$F_u = 800 \frac{N}{mm^2}$	$E = 210000 \frac{N}{mm^2}$	$G = 80769 \frac{N}{mm^2}$
Plastic: PA 6.6				

Montage / Assembly / Montage:



Demontage / Disassembly / Démontage:



MQP-41-CP Rail Support

Possible loading cases		
Centric	Eccentric	
		

Design criteria used for loading capacity

Methodology:
- Finite element analysis
- Hardware tests

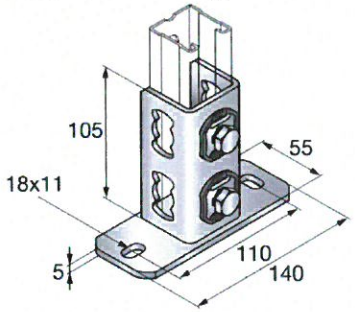
Standards and codes:

• EN 1990	Basics of structural design	03.2003
• EN 1991-1-1	Eurocode 1: Actions on structures – Part 1-1: General actions – densities, self-weight, imposed loads for buildings	09.2011
• EN 1993-1-1	Eurocode 3: Design of steel structures – Part 1-1: General rules and rules for buildings	03.2012
• EN 1993-1-3	Eurocode 3: Design of steel structures – Part 1-3: General rules- Supplementary rules for cold-formed members and sheeting	03.2012
• EN 1993-1-5	Eurocode 3: Design of steel structures – Part 1-5: Plated structural elements	03.2012
• EN 1993-1-8	Eurocode 3: Design of steel structures – Part 1-8: Design of joints	03.2012
EN 10025-2	Hot rolled products of structural steels- Part 2: technical delivery conditions for non-alloy structural steels	02.2005
• RAL-GZ 655	Pipe Supports	04.2008

Software:
- Ansys 16.0
- Microsoft Excel

Environmental conditions:
- static loads
- no fatigue loads

Simplified drawing:



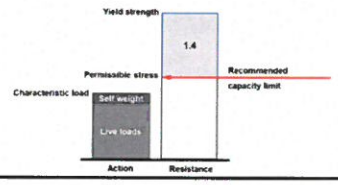
MQP-41-CP Rail Support

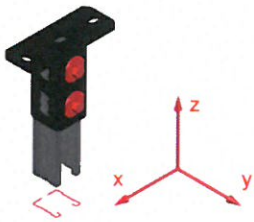
Centric	Eccentric	
		

Loading case: Standard	Combinations covered by loading case
BOM: **1x MQP-41-CP** **2184852** 2x Push buttons included and pre-assembled	Rail support connecting perpendicularly channel to base material 

Recommended loading capacity - simplified for most common applications

Method





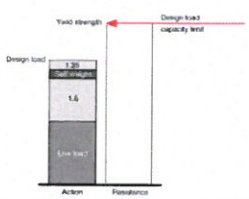
±Fx,rec. [kN]	±Fy,rec. [kN]	±Fz,rec. [kN]
2.14 / 3.21*	2.14	5.00

*For MQ-41 - 2mm thick channel profile

These values are individual one directional maximal capacity limits. For any combinations of multiple directions, use design values and their corresponding interaction formulas.

Design loading capacity - 3D 1/3

Method



Limiting components of capacity evaluated in following tables:

1. Steel connector 

2. Push buttons 

3. Welds 

MQP-41-CP Rail Support

Conditions of the loading capacity tables:

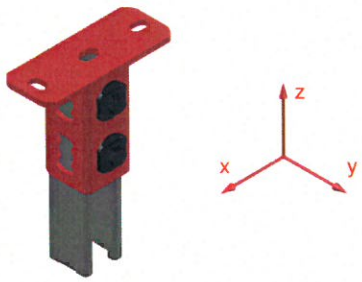
- Just for static loads
- No fatigue loads
- No low (< -10° C), no high (> +100° C) temperatures

Centric	Eccentric	
		

Design loading capacity - 3D 2/3

Summary of design loads*
NOTE: all values in interaction formulas should be used in absolute values! The values below are referred to the coordinate system shown in the drawing.

1. Steel connectorconnector



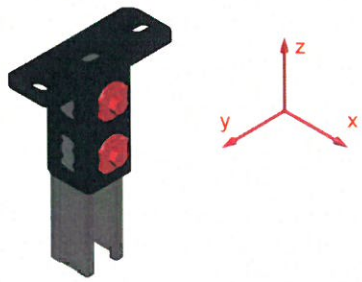
For MQ-41 - 1.5mm thick channel profile

+Fx,Rd [kN]	-Fx,Rd [kN]	+Fy,Rd [kN]	-Fy,Rd [kN]	+Fz,Rd [kN]	-Fz,Rd [kN]
3.00 / 4.50*	3.00 / 4.50*	3.00	3.00	7.00	7.00
+Mx,Rd [kNcm]	-Mx,Rd [kNcm]	+My,Rd [kNcm]	-My,Rd [kNcm]	+Mz,Rd [kNcm]	-Mz,Rd [kNcm]
14.00	14.00	20.00	20.00	6.00	6.00

*** For MQ-41 - 2mm thick channel profile**

$$\frac{F_{x,Ed}}{F_{x,Rd}} + \frac{F_{y,Ed}}{F_{y,Rd}} + \frac{F_{z,Ed}}{F_{z,Rd}} + \frac{M_{x,Ed}}{M_{x,Rd}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} \le 1$$

2. 2. Push buttons



For MQ-41 - 1.5mm thick channel profile

+Fx,Rd [kN]	-Fx,Rd [kN]	+Fy,Rd [kN]	-Fy,Rd [kN]	+Fz,Rd [kN]	-Fz,Rd [kN]
Not decisive	Not decisive	7.00	7.00	11.86	11.86
+Mx,Rd [kNcm]	-Mx,Rd [kNcm]	+My,Rd [kNcm]	-My,Rd [kNcm]	+Mz,Rd [kNcm]	-Mz,Rd [kNcm]
24.50	24.50	Not decisive	Not decisive	11.20	11.20

Interaction:
For local normal resistance

$$\frac{F_{z,Ed}}{F_{z,Rd}} + \frac{F_{y,Ed}}{F_{y,Rd}} + \frac{M_{x,Ed}}{M_{x,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} \le 1$$

For local shear resistance parallel to channel

$$\frac{F_{z,Ed}}{F_{z,Rd}} \le 1$$

MQP-41-CP Rail Support

Design loading capacity - 3D 3/3

Summary of design loads*
NOTE: all values in interaction formulas should be used in absolute values! The values below are referred to the coordinate system shown in the drawing.

3. Welds

+Fx,Rd [kN]	-Fx,Rd [kN]	+Fy,Rd [kN]	-Fy,Rd [kN]	+Fz,Rd [kN]	-Fz,Rd [kN]
10.12	10.12	5.14	5.14	13.00	13.00
+Mx,Rd [kNcm]	-Mx,Rd [kNcm]	+My,Rd [kNcm]	-My,Rd [kNcm]	+Mz,Rd [kNcm]	-Mz,Rd [kNcm]
28.45	28.45	38.00	38.00	8.89	8.89

Interaction:

$$\frac{F_{x,Ed}}{F_{x,Rd}} + \frac{F_{y,Ed}}{F_{y,Rd}} + \frac{F_{z,Ed}}{F_{z,Rd}} + \frac{M_{x,Ed}}{M_{x,Rd}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} \leq 1$$

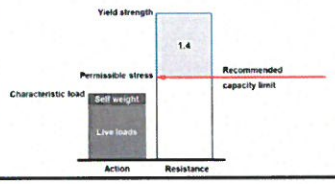
MQP-41-CP Rail Support

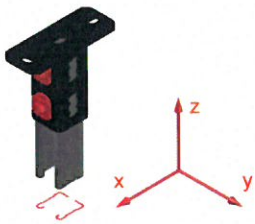
Centric	Eccentric	
		

Loading case: Standard	Combinations covered by loading case
BOM: **1x MQP-41-CP** **2184852** 2x Push buttons included and pre-assembled	Rail support connecting perpendicularly channel to base material 

Recommended loading capacity - simplified for most common applications

Method



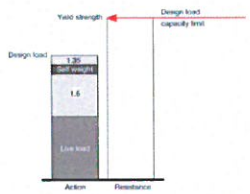


±Fx,rec. [kN]	±Fy,rec. [kN]	±Fz,rec. [kN]
3.93	1.21	5.00

These values are individual one directional maximal capacity limits. For any combinations of multiple directions, use design values and their corresponding interaction formulas.

Design loading capacity - 3D 1/3

Method



Limiting components of capacity evaluated in following tables:

1. Steel connector	2. Push buttons	3. Welds
		

MQP-41-CP Rail Support

Conditions of the loading capacity tables:

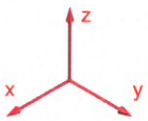
- Just for static loads
- No fatigue loads
- No low (< -10° C), no high (> +100° C) temperatures

Centric	Eccentric	
		

Design loading capacity - 3D 2/3

Summary of design loads*
NOTE: all values in interaction formulas should be used in absolute values! The values below are referred to the coordinate system shown in the drawing.

1. Steel connectorconnector



For MQ-41 - 1.5mm thick channel profile

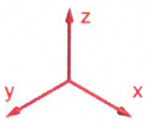
+Fx,Rd [kN]	-Fx,Rd [kN]	+Fy,Rd [kN]	-Fy,Rd [kN]	+Fz,Rd [kN]	-Fz,Rd [kN]
5.50	5.50	1.70	1.70	7.00	7.00
+Mx,Rd [kNcm]	-Mx,Rd [kNcm]	+My,Rd [kNcm]	-My,Rd [kNcm]	+Mz,Rd [kNcm]	-Mz,Rd [kNcm]
9.00	9.00	35.00	35.00	6.00	6.00

*** For MQ-41 - 2mm thick channel profile**

Interaction:

$$\frac{F_{x,Ed}}{F_{x,Rd}} + \frac{F_{y,Ed}}{F_{y,Rd}} + \frac{F_{z,Ed}}{F_{z,Rd}} + \frac{M_{x,Ed}}{M_{x,Rd}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} \le 1$$

2. 2. Push buttons



For MQ-41 - 1.5mm thick channel profile

+Fx,Rd [kN]	-Fx,Rd [kN]	+Fy,Rd [kN]	-Fy,Rd [kN]	+Fz,Rd [kN]	-Fz,Rd [kN]
7.00	7.00	1.70	1.70	11.86	11.86
+Mx,Rd [kNcm]	-Mx,Rd [kNcm]	+My,Rd [kNcm]	-My,Rd [kNcm]	+Mz,Rd [kNcm]	-Mz,Rd [kNcm]
5.95	5.95	35.52	35.52	11.20	11.20

Interaction:

For local normal resistance

$$\frac{F_{x,Ed}}{F_{x,Rd}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} \le 1$$

For local shear resistance parallel to channel

$$\frac{F_{z,Ed}}{F_{z,Rd}} \le 1$$

For local shear resistance perpendicular to channel

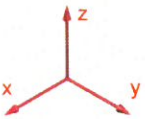
$$\frac{F_{y,Ed}}{F_{y,Rd}} + \frac{M_{x,Ed}}{M_{x,Rd}} \le 1$$

MQP-41-CP Rail Support

Design loading capacity - 3D 3/3

Summary of design loads*
NOTE: all values in interaction formulas should be used in absolute values! The values below are referred to the coordinate system shown in the drawing.

3. Welds



+Fx,Rd [kN]	-Fx,Rd [kN]	+Fy,Rd [kN]	-Fy,Rd [kN]	+Fz,Rd [kN]	-Fz,Rd [kN]
12.92	12.92	5.03	5.03	16.60	16.60
+Mx,Rd [kNcm]	-Mx,Rd [kNcm]	+My,Rd [kNcm]	-My,Rd [kNcm]	+Mz,Rd [kNcm]	-Mz,Rd [kNcm]
14.23	14.23	38.00	38.00	8.89	8.89

Interaction:

$$\frac{F_{x,Ed}}{F_{x,Rd}} + \frac{F_{y,Ed}}{F_{y,Rd}} + \frac{F_{z,Ed}}{F_{z,Rd}} + \frac{M_{x,Ed}}{M_{x,Rd}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} \leq 1$$