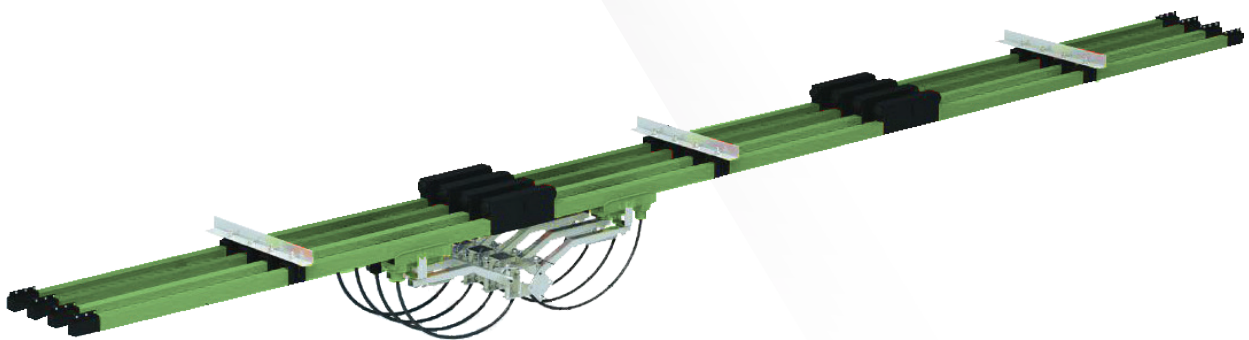




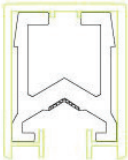
INSULATED CONDUCTOR  
SYSTEMS

# PCSPI1





## Contents

- POWERAIL ENCLOSED CONDUCTOR SYSTEMS PCSPI1
- VIEWS OF OIL TO ELECTRICITY FOR RTG
-  **PCSP24** - INSULATED CONDUCTOR
-  **PCSP32** - INSULATED CONDUCTOR
-  **PCSP52** - INSULATED CONDUCTOR
- EXPANSION JOINT
- INSTALLATION

## General

The PCPSP1 conductor rail system is a modern power supply system using single-pole insulated conductor rails. It complies with the latest regulations and provide electric energy for mobile consumers. The conductor rail material is copper (200A-500A), aluminium (150A-300A). The aluminium conductor rail is provided with proven and patented stainless steel contact surface. Any numbers of poles can be installed vertically or horizontally, on straight or curved systems.

The conductor rail system can be installed indoor or outdoor. For high temperature conditions, a high temperature insulation cover up to +115°C is available, also for low temperature conditions, it could be up to -40°C.

The entire conductor rail system is insulated to current Safety Regulations, it is entirely protected against direct contact.

Ground insulation cover is marked yellow-green on one side over the entire length of the rail.

Type -R: Curves for  $R > 120\text{mm}$ .

Approved and listed by: CCC, ISO9001 and CE.

## Insulation

Generally, the phase line is Color green, the ground line is yellow-green plastic housing. Standard length is 6.0m long. Other sections are available.

## Jointing material

Snap-in joint splices provide mechanical end electrical continuity. They include insulated protection covers.

## Feed Sets

Line feeds ( any joints) or end feeds.

## End caps

The open ends of the conductor are closed by end caps.

## Hangers

Standard brackets for conductor attachment to crane girders are available. Conductor with sliding and fixpoint hangers. Standard distance between suspension points for indoor and outdoor installations : 1500 mm to 2000 mm.

## Expansion

The Expansion sections are required to compensate the different expansions between copper conductors and steel or concrete structures , in varying temperatures without interrupting electrical power. Expansion joints are used when the Powerail length between feeds, curves, switches or other fix points is exceeding 200 m. Install one expansion joint according to actually installation.

## Isolating section

Isolating sections are required if parts of the system or individual rails are to be de-energized within a conductor rail system. To prevent a voltage bridging by current collector two air gap isolating sections should be installed.

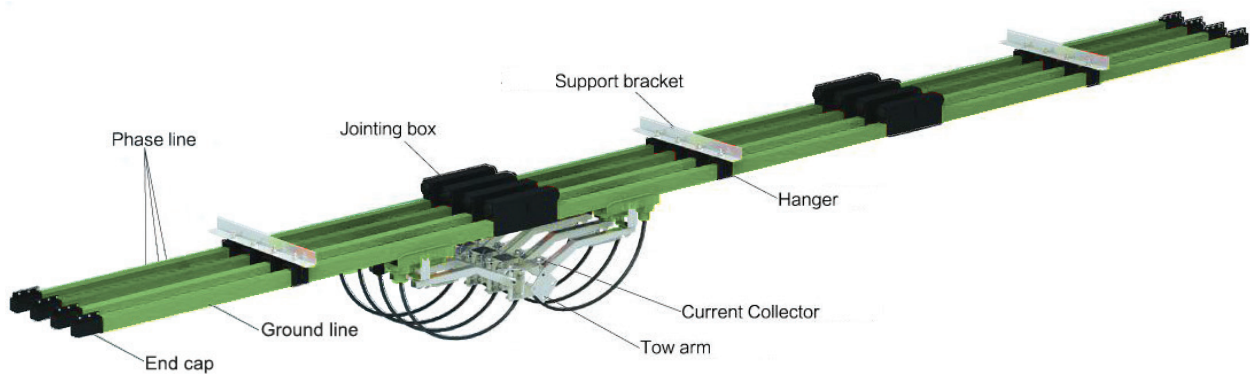
## Collectors

The current collectors are made of carbon brush, re-inforced nylon and galvanized or spray-paint metal material Spring loaded carbon brushes maintain uniform contact. Connecting cables and hinged or flexible towing arms included. Double collectors for transfer applications and higher amperage.

## Technical data

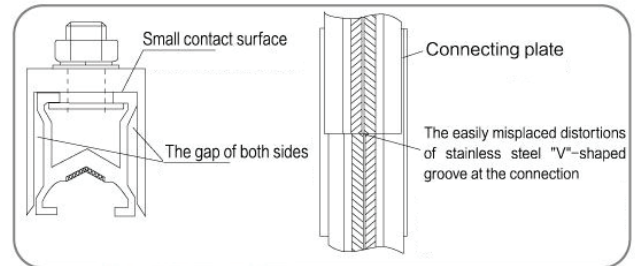
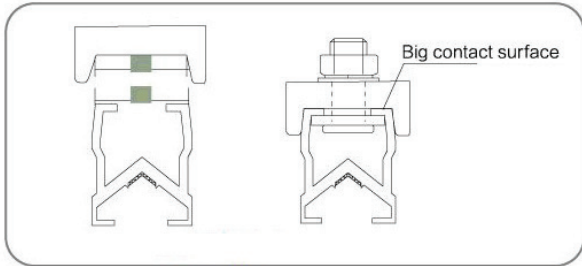
Program PCSP11						
Conductor rail	Aluminium			Copper		
Type	PCSP24	PCSP32	PCSP52	PCSP24	PCSP32	PCSP52
Nominal Current at 100% DC and 35°C (A)	250-300	230-800	1250-3000	500-800	800-1600	1250-5000
D.C. resistance at 35°C (Ω/km)	0.203-0.187	0.153-0.067	0.043-0.015	0.116-0.067	0.067-0.039	0.036-0.007
Impedance at 35°C (Ω/km)	0.209-0.195	0.155-0.069	0.044-0.017	0.118-0.069	0.069-0.040	0.038-0.008
Support spacing (m)	1.5	1.8	2.0	1.5	1.8	2.0
Rail length (m)	6.0	6.0	6.0	6.0	6.0	6.0
Housing length (m)	5.88	5.83	5.75	5.88	5.83	5.75
Max. voltage (V)	690V (380V)	Dielectric strength (KV/mm)			30-40	
Traveling speed	<690V	standard		GB7251.2-2006		
Expansion joint	not required up to 200m installation length					
Flame retardant	Class B1-no flaming particles, self-extinguishing					
Permissible ambient temperature	Standard insulatio High temperature insulation Low temperature insulation	-20°C- +70°C -10°C- +115°C -40°C- +85°C				

## System photo



## Characteristic

Made the following improvements at the connection of the Conductor Bar, effectively reduce contact resistance of the connector, increase the area of contact surface to reduce the joint temperature to prevent excessive heating, In addition, connectors are cleaning treatment (degreasing, deburring) in the process, in order to improve the effect of the use of the Conductor Bar for instance.

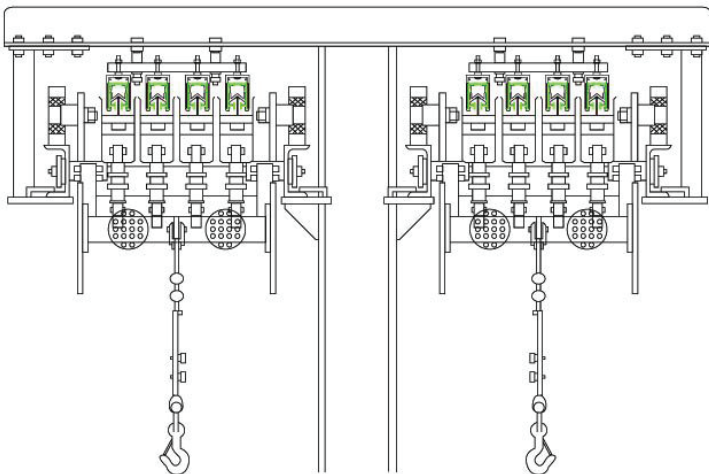


Using the new conductor structure, the top of the cross section of the Conductor Bar is slightly larger than the bottom of the connecting plate, the original structure of wedge-shaped cross-section, in connection bolt, close contact with the comprehensive, large effective conductive area, low impedance, temperature rise of connector is small, do not distort, to ensure the stability of the Conductor Bar running.

Ordinary W-shaped connecting plate seemingly with large contact surface, the actual there is the gap at both sides, effective conductive surface is small, the gap of both sides lead conductor which on the connection distorted easily, the collector carbon brush wear and tear which in the joints increase by several times, spark phenomenon should appear, the normal life of the Conductor Bar and the Collector Brush will greatly reduce.

## CODIGO Views of Oil to electricity RTG\*

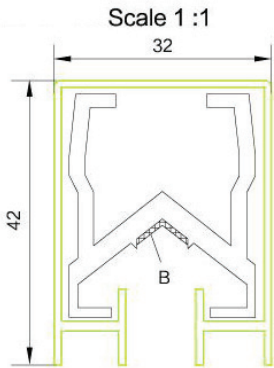
To provide a recommendation of that the crane change the track.



\*For further details, please contact us.

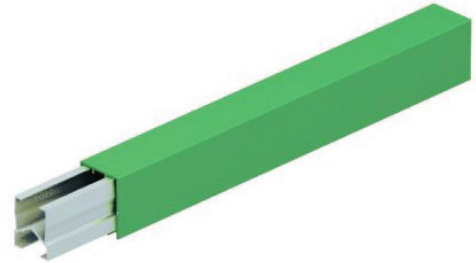
## Parts of the conductor rail system

### PCSP32 System

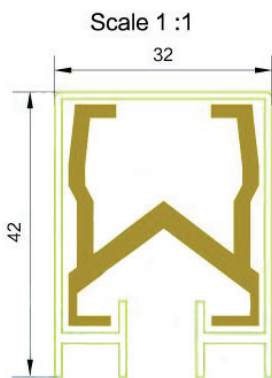


Aluminium conductor  
Standard Length: 6.0m  
other lengths on request  
Support spacing: 1.8m or 2.0m

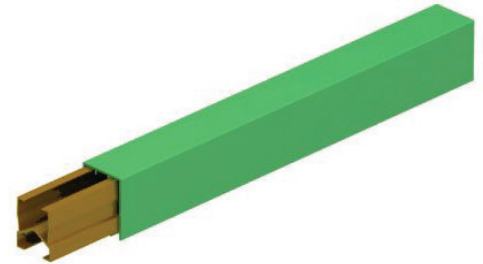
Stainless steel belt  
B=9.8mm



Type	Conductor material	Cross section (mm <sup>2</sup> )	Nominal current (A)	Leakage-distance (mm)	Resistance (Ω/Km)	Weight kg
PCSP13201I6PA	Aluminium	230	320	80	0.153	0.96
PCSP15001I6PA	Aluminium	285	500	80	0.116	1.13
PCSP16301I6PA	Aluminium	360	630	80	0.087	1.38
PCSP18001I6PA	Aluminium	450	800	80	0.067	1.50
PCSP110001I6PA	Aluminium	550	1000	80	0.058	1.83
PCSP112501I6PA	Aluminium	600	1250	80	0.046	2.01



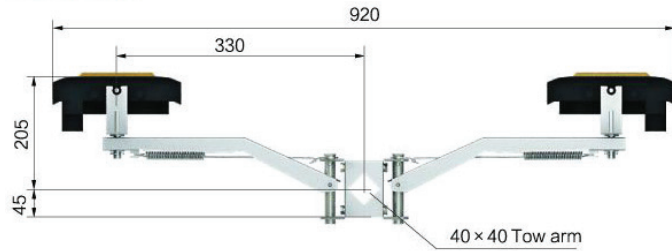
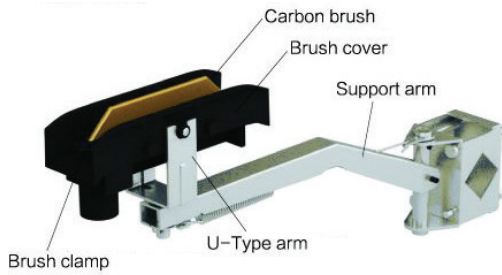
Copper conductor  
Support spacing: 1.8m or 2.0m  
Standard Length: 6.0m  
other lengths on request



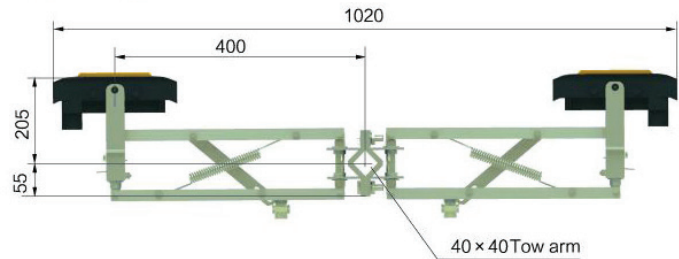
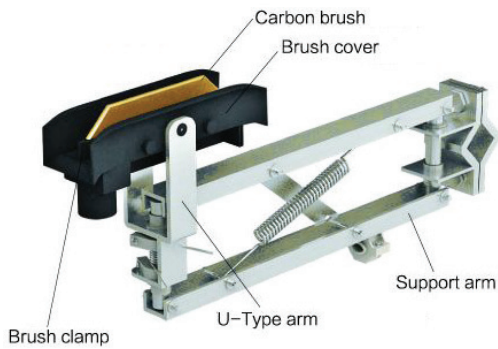
Type	Conductor material	Cross section (mm <sup>2</sup> )	Nominal current (A)	Leakage-distance (mm)	Resistance (Ω/Km)	Weight kg
PCSP18002I6PA	Copper	230	800	80	0.067	2.43
PCSP110002I6PA	Copper	300	1000	80	0.058	3.05
PCSP112502I6PA	Copper	360	1250	80	0.046	3.56
PCSP116002I6PA	Copper	450	1600	80	0.039	4.37

The neutral insulation cover is marked yellow-green on one side.  
Standard insulation suitable from -20°C to +70°C ambient temperature.  
High temperature insulation suitable from -10°C to +115°C ambient temperature.  
Low temperature insulation suitable from -40°C to +85°C ambient temperature.

## Parts of the conductor rail system

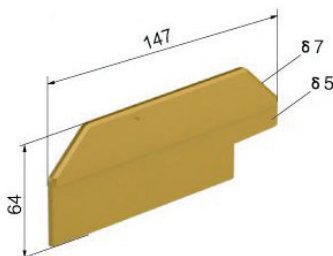


Type	Weight Kg	Hardware	Nominal current
PCSP1SSCC400	1.75	Steel	400Amp
PCSP1SDCC800	3.45	Steel	800Amp



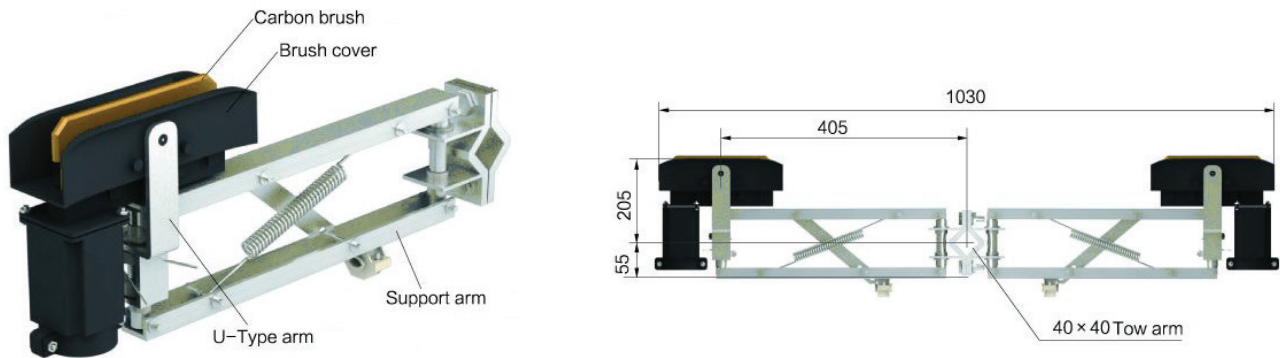
Type	Weight Kg	Hardware	Nominal current
PCSP1ASCC400	2.35	Aluminum	400Amp
PCSP1ADCC800	4.61	Aluminum	800Amp

## Carbon brush & Spare parts of Collector



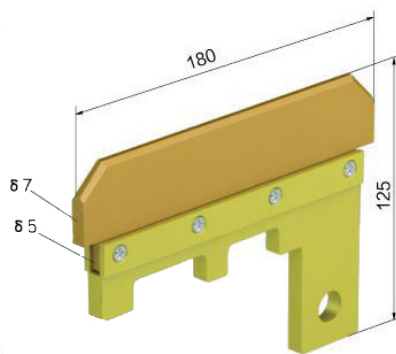
Type	Description	Weight Kg	Material
PCSPCB400	Carbon brush	0.27	Copper-graphite brush
PCSPBCO400	Brush cover	0.18	Plastic
PCSPBCL400	Brush clamp	0.025	Plastic
PCSPSTA200	U-Type arm	0.15	Steel
PCSPSSA200	Support arm	1.20	Steel
PCSPDTA200	U-Type-arm	0.20	Steel
PCSPDSA200	Support arm	1.60	Steel

## Parts of the conductor rail system



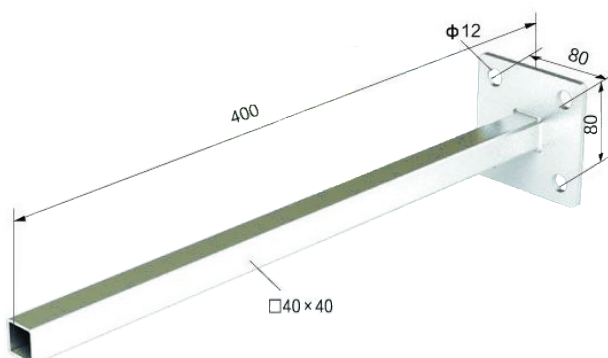
Type	Weight Kg	Hardware	Nominal current
PCSP1ASCC500	3.05	Aluminum	500Amp
PCSP1ADCC1000	6.01	Aluminum	1000Amp

## Carbon brush & Spare parts of Collector



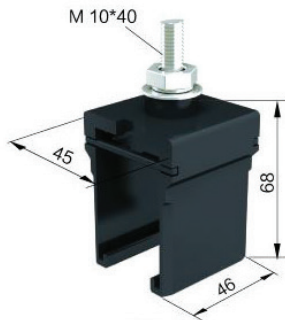
Type	Name	Wight Kg	Material
PCSP1CB500	Carbon brush	0.73	Cooper-graphite brush
PCSP1BC0500	Brush cover	0.30	Plastic

## Tow arm



Type	Weight Kg	Material	Length (mm)
PCSP1TA350A	1.00	Steel	400
PCSP1TA400A	0.85	Steel	350
PCSP1TA500A	>1.00	Steel	400

## Hanger



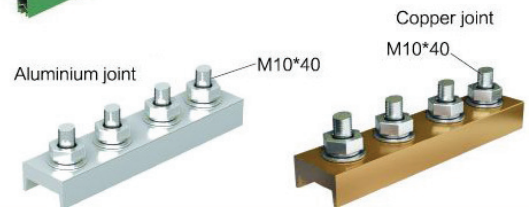
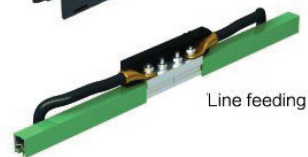
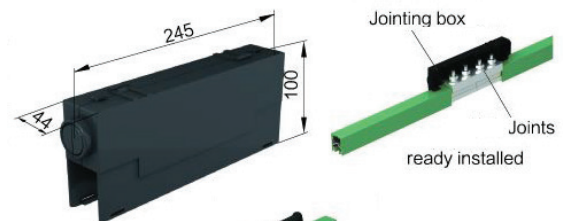
Type	Weight Kg	Material
PCSP1AH68	0.085	Plastic

be used for high temperature

## Joint Cap

Type	Weight Kg	Material
PCSP1JC44	0.21	Plastic

be used for high temperature



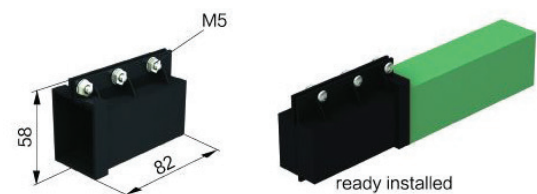
## Joints

Every joint could be use for feeding joint.

Type	Weight Kg	Material
PCSP1AJ500	0.32	Aluminium
PCSP1CJ800	0.41	Copper
PCSP1AJ1000	0.40	Aluminium
PCSP1CJ1250	0.66	Copper
PCSP1CJ1600	0.82	Copper

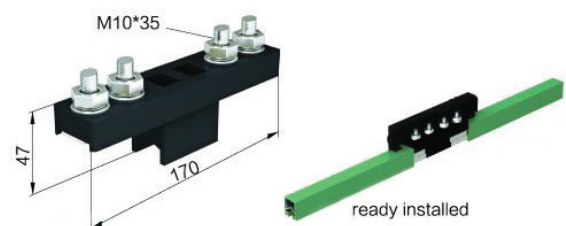
## End cap

Type	Weight Kg	Material
PCSP1EC35	0.04	Plastic



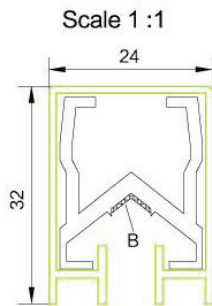
## Isolating Section

Type	Weight Kg	Material
PCSP1IS47	0.13	Plastic

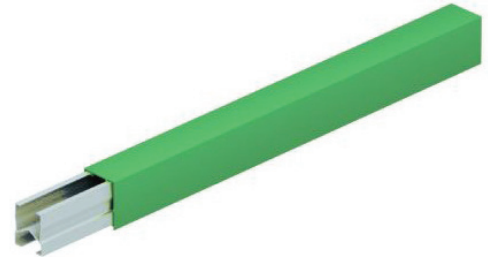


## Parts of the conductor rail system

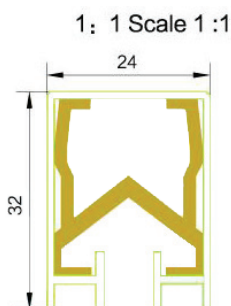
### PCSP24 System



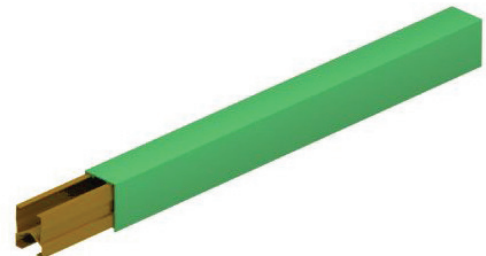
Aluminium conductor  
 Standard Length: 6.0m  
 other lengths on request  
 Support spacing: 1.5m  
 Curves  
 120mm.min.R=1.2m  
 Stainless steel belt  
 B=8.5mm



Type	Conductor material	Cross section (mm <sup>2</sup> )	Nominal current (A)	Leakage-distance (mm)	Resistance (Ω/Km)	Weight kg
PCSP12501I6PA	Aluminium	160	250	45 or 80	0.203	0.63
PCSP13001I6PA	Aluminium	180	300	45 or 80	0.187	0.71



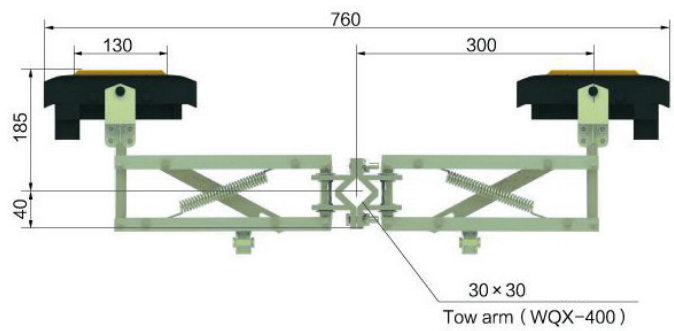
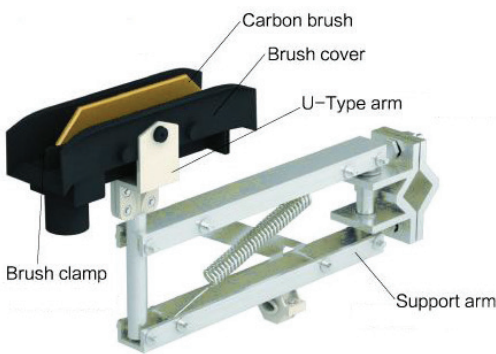
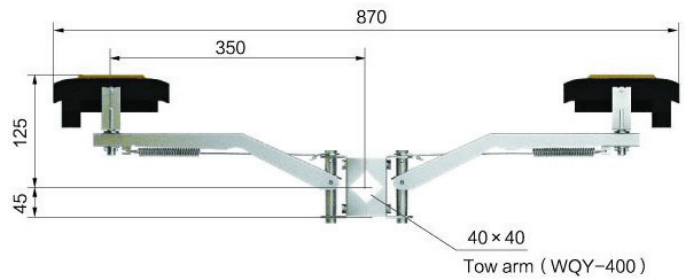
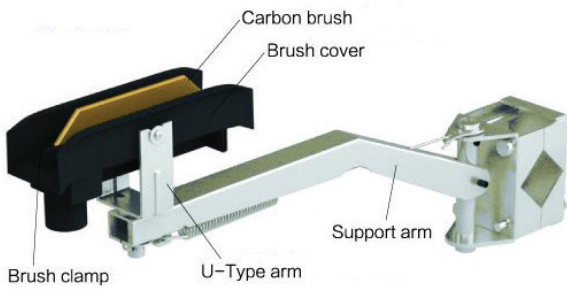
Copper conductor  
 Standard Length: 6.0m  
 Support spacing: 1.5m  
 other lengths on request



Type	Conductor material	Cross section (mm <sup>2</sup> )	Nominal current (A)	Leakage-distance (mm)	Resistance (Ω/Km)	Weight kg
PCSP15002I6PA	Copper	160	500	45 or 80	0.112	1.68
PCSP16002I6PA	Copper	180	600	45 or 80	0.098	1.86
PCSP17002I6PA	Copper	200	700	45 or 80	0.087	2.04
PCSP18002I6PA	Copper	230	800	45 or 80	0.076	2.30

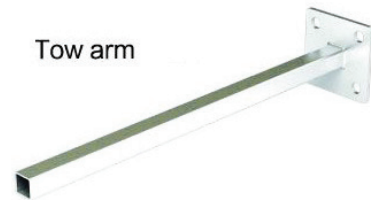
The neutral insulation cover is marked yellow-green on one side.  
 Standard insulation suitable from -20°C to +70°C ambient temperature.  
 High temperature insulation suitable from -10°C to +115°C ambient temperature.  
 Low temperature insulation suitable from -40°C to +85°C ambient temperature.

## Parts of the conductor rail system

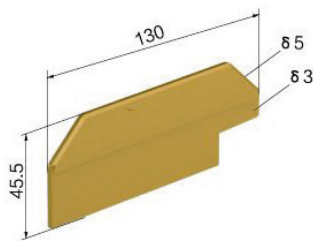


Be used for Conductor rail Codigo System

Type	Weight Kg	Hardware	Nominal current
PCSP1SSCC200	1.45	Galvanized	200Amp
PCSP1SDCC400	2.72	Galvanized	400Amp
PCSP1ASCC200	1.18	Aluminum	200Amp
PCSP1ADCC400	2.25	Aluminum	400Amp

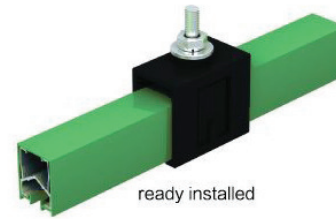
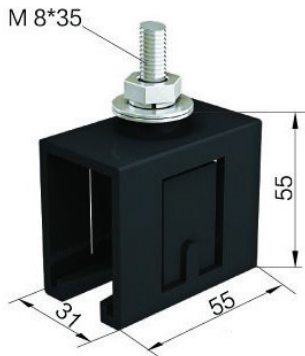


## Carbon brush & Spare parts of Collector



Type	Name	Weight Kg	Material
PCSPCB200	Carbon brush	0.12	Cooper-graphite brush
PCSPBCO200	Brush cover	0.09	Plastic
PCSPBCL200	Brush clamp	0.015	Plastic
PCSPSTA200	U-Type arm	0.095	Steel
PCSPSSA200	Support arm	1.20	Steel
PCSPDTA200	U-Type arm	0.13	Steel
PCSPDSA200	Support arm	1.10	Steel

## Hanger



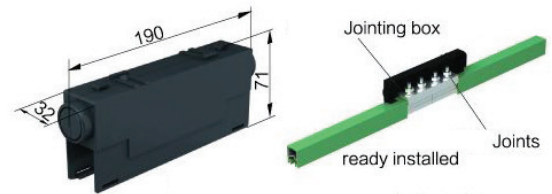
Type	Weight Kg	Material
PCSP1AH55	0.04	Plastic

be used for high temperature

## Jointing Cap

Type	Weight Kg	Material
PCSP1JC32	0.12	Plastic

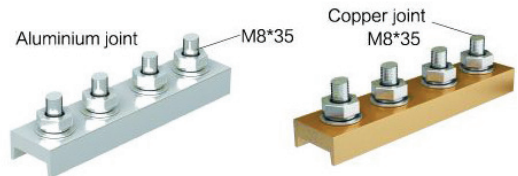
be used for high temperature



## Joints

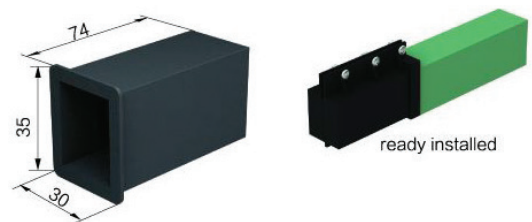
Every joint could be use for feeding joint.

Type	Weight Kg	Material
PCSP1AJ250	0.15	Aluminium
PCSP1CJ500	0.23	Copper
PCSP1CJ800	0.31	Copper



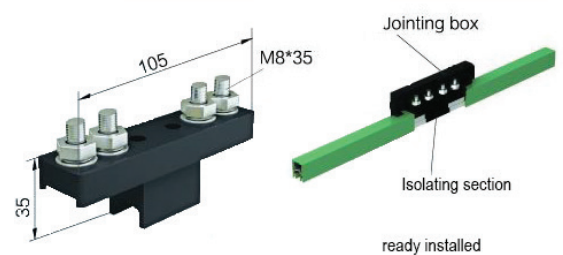
## End cap

Type	Weight Kg	Material
PCSP1EC30	0.02	Plastic



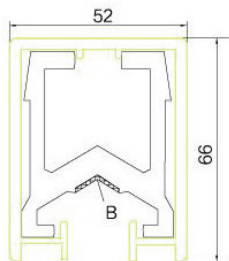
## Isolating Section

Type	Weight Kg	Material
PCSP1IS35	0.04	Plastic

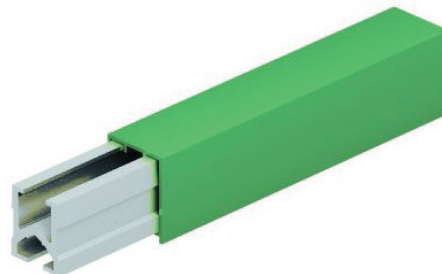


## Parts of the conductor rail system

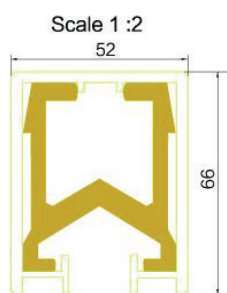
### PCSP52 system



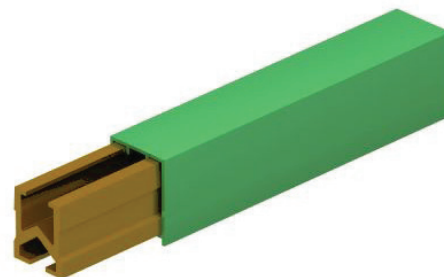
Aluminium conductor  
Stainless steel belt  
B=16mm  
Standard Length:6.0m.  
Other lengths on request



Type	Conductor material	Cross section (mm <sup>2</sup> )	Nominal current (A)	Leakage-distance (mm)	Resistance (Ω/Km)	Weight kg
PCSP15001I6PA	Aluminium	900	1500	100	0.039	2.85
PCSP16001I6PA	Aluminium	1000	1600	100	0.037	3.25
PCSP20001I6PA	Aluminium	1350	2000	100	0.028	4.32
PCSP25001I6PA	Aluminium	1600	2500	100	0.018	4.99
PCSP30001I6PA	Aluminium	2000	3000	100	0.015	6.07



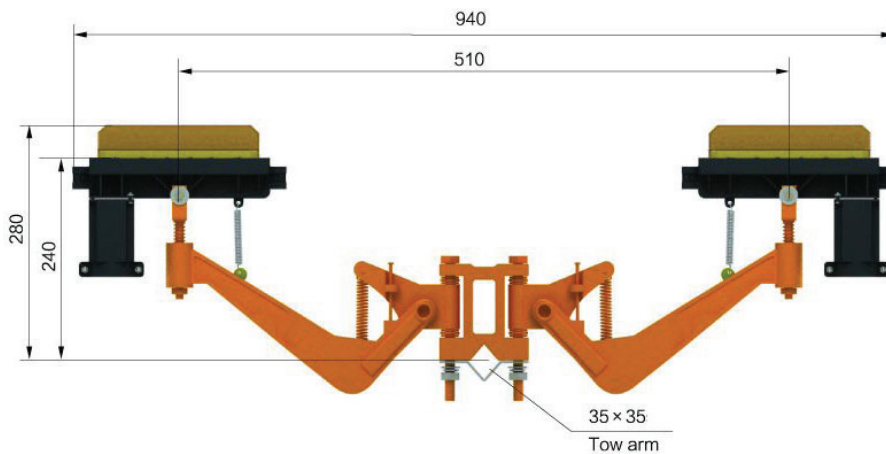
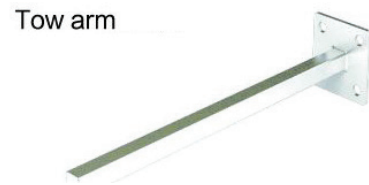
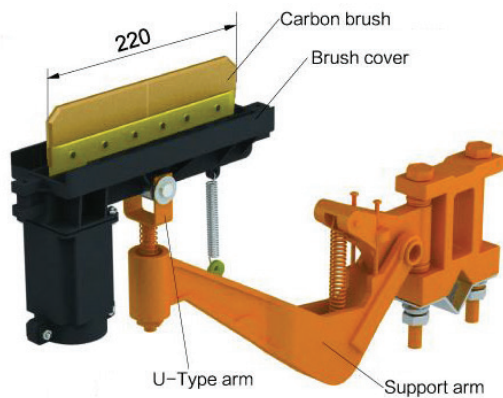
Copper conductor  
Standard Length: 6.0m  
Other lengths on request



Type	Conductor material	Cross section (mm <sup>2</sup> )	Nominal current (A)	Leakage-distance (mm)	Resistance (Ω/Km)	Weight kg
PCSP16002I6PA	Copper	500	1600	100	0.036	5.12
PCSP120002I6PA	Copper	700	2000	100	0.026	6.91
PCSP125002I6PA	Copper	850	2500	100	0.018	8.25
PCSP130002I6PA	Copper	1000	3000	100	0.011	9.65
PCSP135002I6PA	Copper	1200	3500	100	0.009	11.42
PCSP145002I6PA	Copper	1600	4500	100	0.008	14.99
PCSP150002I6PA	Copper	1800	5000	100	0.007	16.75

The neutral insulation cover is marked yellow-green on one side.  
Standard insulation suitable from -20°C to +70°C ambient temperature.  
High temperature insulation suitable from -10°C to +115°C ambient temperature.  
Low temperature insulation suitable from -40°C to +85°C ambient temperature.

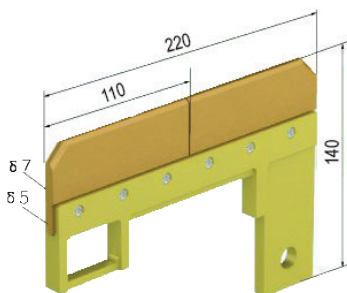
## Parts of the conductor rail system



Be used Conductor rail W52 System

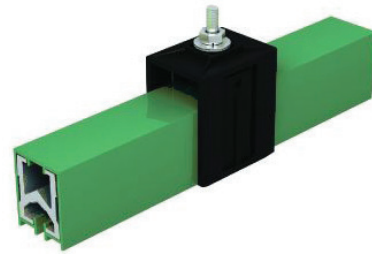
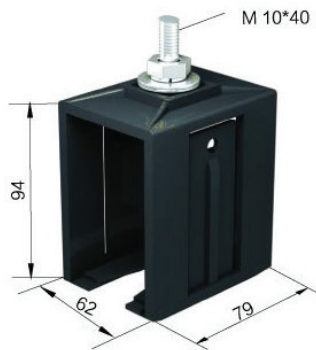
Type	Weight Kg	Hardware	Nominal current
PCSP15SCC800	5.10	Steel	800Amp
PCSP15DCC1600	10.20	Steel	1600Amp

## Carbon brush & Spare parts of current Collector



Type	Name	Weight kg	Material
PCSPCB800	Carbon brush	1.20	Carbon brush & Brass
PCSPBCO800	Brush cover	0.50	Plastic
PCSPSTA800	U-Type am	0.50	Steel
PCSPSSA800	Support am	3.00	Steel
PCSPDSA800	Support am	1.50	Aluminium

## Hanger

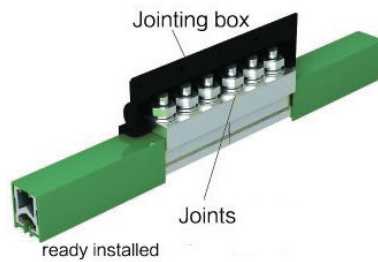
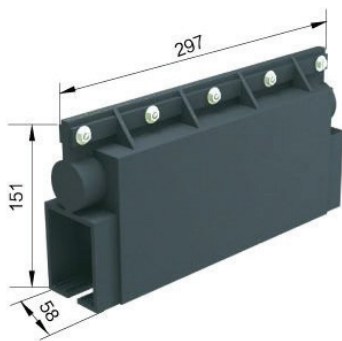


Type	Weight Kg	Material
PCSP1AH94	0.13	Plastic

be used for high temperature

## Jointing box

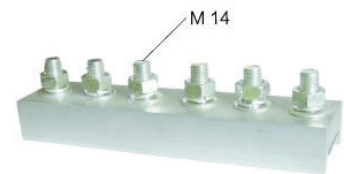
Every joint could be use for feeding joint.



Type	Weight Kg	Material
PCSP1JCS8	0.23	Plastic

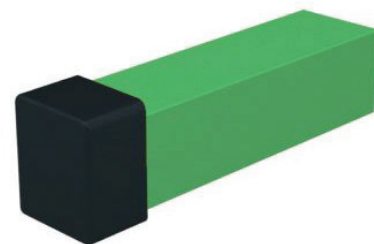
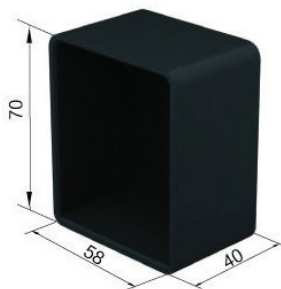
Be used for high temperature

## Joints



Type	Weight Kg	Material
PCSP1AJ1500	1.70	Aluminium
PCSP1AJ2000	2.95	Aluminium
PCSP1AJ3000	2.35	Aluminium
PCSP1CJ4000	4.95	Copper
PCSP1CJ5000	5.35	Copper

## End cap



Type	Weight Kg	Material
PCSP1EC58	0.04	Plastic

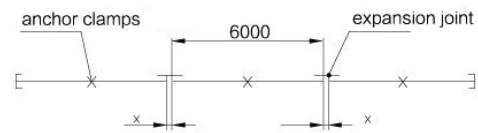
## Expansion joint



Type	Conductor material
PCSP1AEJ250	Al
PCSP1CEJ800	Cu
PCSP1AEJ1000	Al
PCSP1CEJ1600	Cu
PCSP1AEJ3000	Al
PCSP1CEJ5000	Cu

## Solution about expansion section

Installation hint: The expansion joint section is supplied fully assembled in a 6 m length (W19 is 4.5 in length). With the exception of the rail connector installation no extra work is required on site. Please note, however, that the two air gaps in the expansion joint must be adjusted as per diagram 1 corresponding to the ambient temperature during assembly. The air gaps must be rechecked after fitting the anchor clamps. Both air gaps in an expansion joint must be identical.



## Expansion joint

Expansions joints are installed at certain distance on conductor rail installations over 200m in length

Numbers of expansions joints	1		2		3		4		5		Intermediate length a		
	Total length of conductor rail installation (m)											m	
material	Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu	Al	Cu	
t°C	10	400	400	600	600	800	800	1000	1000	1200	1200	200	200
	20	387	400	575	600	762	800	950	1000	1138	1200	187	200
	30	325	376	450	553	575	729	700	905	825	1082	125	176
	40	293	332	387	464	481	597	575	729	669	862	93	132
	50	275	306	350	412	425	517	500	623	575	729	75	106
	60	262	288	325	376	387	464	450	553	512	641	62	88
	70	253	275	307	351	360	427	414	502	468	578	53	75
	80	247	266	294	332	340	398	387	464	434	531	47	66
	90	242	259	283	317	325	375	366	435	408	494	42	59
	100	237	253	275	306	312	359	350	412	387	464	37	53

$$t = t_a + t_h$$

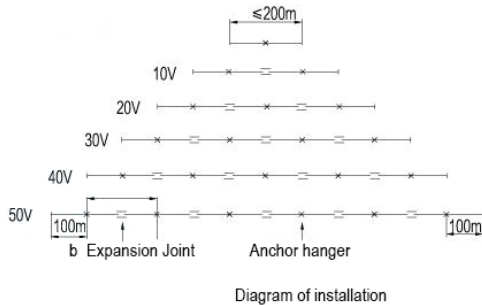
t<sub>a</sub>: Ambient temperature range °C

t<sub>h</sub>: Temperature rise due current heating °C

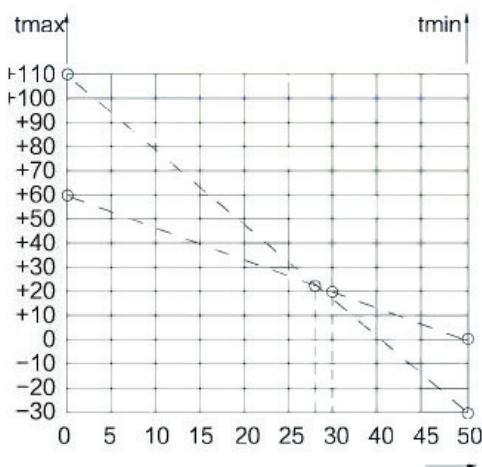
DV: expansion joint

For longer installations than shown in our table:

$$n = (L - 200) / a$$



Duty cycle	t <sub>h</sub> °C
40%	10
60%	20
100%	30



Examples:

T<sub>max</sub>=60°C

Lowest temperature that occurs in the application area

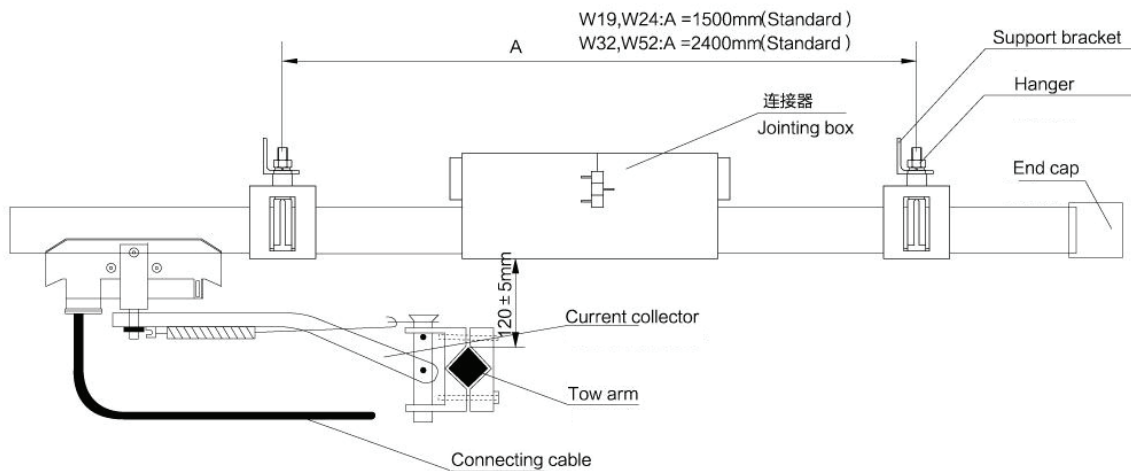
T<sub>min</sub>= 0°C

Highest operational temperature that occurs in the application area

T= 20°C

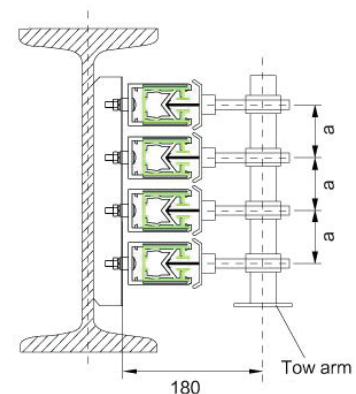
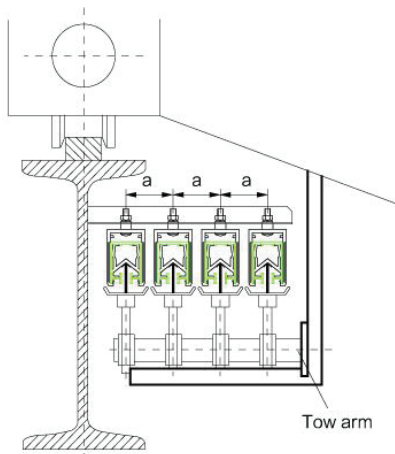
x=30mm

## System arrangement



### Installation Manual:

- Support Installation:** Fix the two supports of both sides of the track (welding or bolt) and adjust to the horizontal state (add 1 or 2 points to meet the length of the wiring route). Take the wiring between the two supports as the benchmark, the rest supports should be installed according to the standard distance (1800 mm for bolt and 2000 mm for welding), to ensure the depth of parallelism of the conductor rail between the height of the track less than 10 mm.
- The connection part of the conductor and the connector** should be polished with abrasive cloth to remove the oxide layer, apply the electrical conductive pastes and screw the bolt, double check if the seam of the guides is in minimum.
- The installation of the current collector:** Define the length of the tow arm unit according to the poles of electrode and installation space.  $120 \pm 5\text{mm}$  distance should be ensured in distance between the upper end and down end of the conductor rail (refer to the installation drawing of the conductor rail for more details)
- End cap:** Install the end caps on both sides and tighten them with rubberized fabric.
- Inspection:** Inspect the depth of parallelism between the conductor rail and operation track of the hoisting unit and Control the depth within 20mm, make a test run and check the running state of the flake passing through each nodal point, tighten all the fastening piece if some problems occurs, dry run one month without interval and tighten all fastening pieces again.



Vertical operation of power rail (welding on Angle steel bracket)    Horizontal operation of power rail (welding on Angle steel bracket)

The logo features the letters 'EMS' in a bold, white, sans-serif font with a modern, slightly rounded appearance. Below the letters, the words 'Electro Mechanical Solutions' are written in a smaller, white, sans-serif font. The entire logo is centered within a horizontal green gradient bar that transitions from a light lime green on the left to a darker green on the right.

**EMS**  
Electro Mechanical Solutions

A solid dark grey rectangular box is positioned in the bottom right corner of the page. It contains the website address 'www.ems-sl.com' in a white, sans-serif font.

[www.ems-sl.com](http://www.ems-sl.com)