TRAM BRIDGE SECTION DISCONNECTOR WITH FUSE

USER GUIDE
Edition 2015/03

Applies to product no.: 227790



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1 Introduction

This guide is intended for qualified technicians and overhead contact lines installers. The **bridge section disconnector** (**BSD**) was developed especially for Amsterdam Transport Authority GVB. It does not contain routine procedures and general principles of the installation works.

2 Application

BSD is destined for movable bridges in Amsterdam and presents new generation of obsolete BSD previously installed. BSD includes two rotational contact wire (cw) clamps where the rear one is equipped with copper contact area. Unlike the previous type, the area of contacts was doubled and rounded on the ends. Attached springs secure the optimal pressure and electric contact.

The BSD is a non-bridging type so the tram is passing through the non-fed area. After passage, the tram is fed thought the fuse hidden under the plastic shelter. Fuse's contacts are connected with cw clamps by doubled 35mm^2 (70mm^2) copper wire on rear side and by 50mm^2 single copper wire on front side. Inner body is made of insulated fibre-glass composite (paint in blue colour). Suspension eyes are connected together with M12 stainless steel screws A2 so the inner body is not in transverse tension!

During the bridge opening, the rear cw clamp is push down by weight of cw above the bridge area and copper contacts are disconnected. Saggy section of the cw is then without presence of the voltage and safe to **accidental** touch although **it is forbidden to approach** or even **touch** the contact wire!

3 Technical data

Nominal voltage	600 - 750 VDC
Length	750 mm
Height	240 mm
Width	176 mm
Mass	14,8 kg
Fuse	P40U10, 315A, 600 VDC, 1000VAC

Basic technical parameters of the fuse:

Type	I_n [A]	Losses [W]	Heating [K]	I^2t_a [A^2s]	Mass [kg]
P40U10 315 aR	315	76,5	94	210 000	0,55

This type of fuse is designed for protection of semiconductor devices and for devices sensitive for short-circuits.

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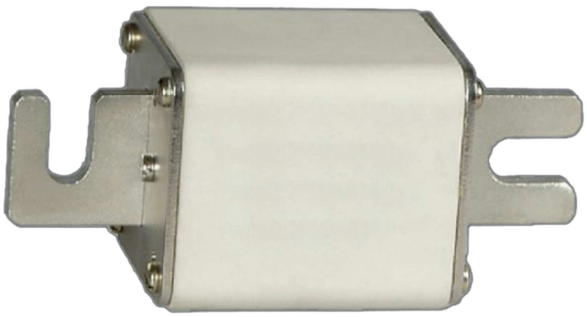


fig 1: Illustrative picture of the fuse

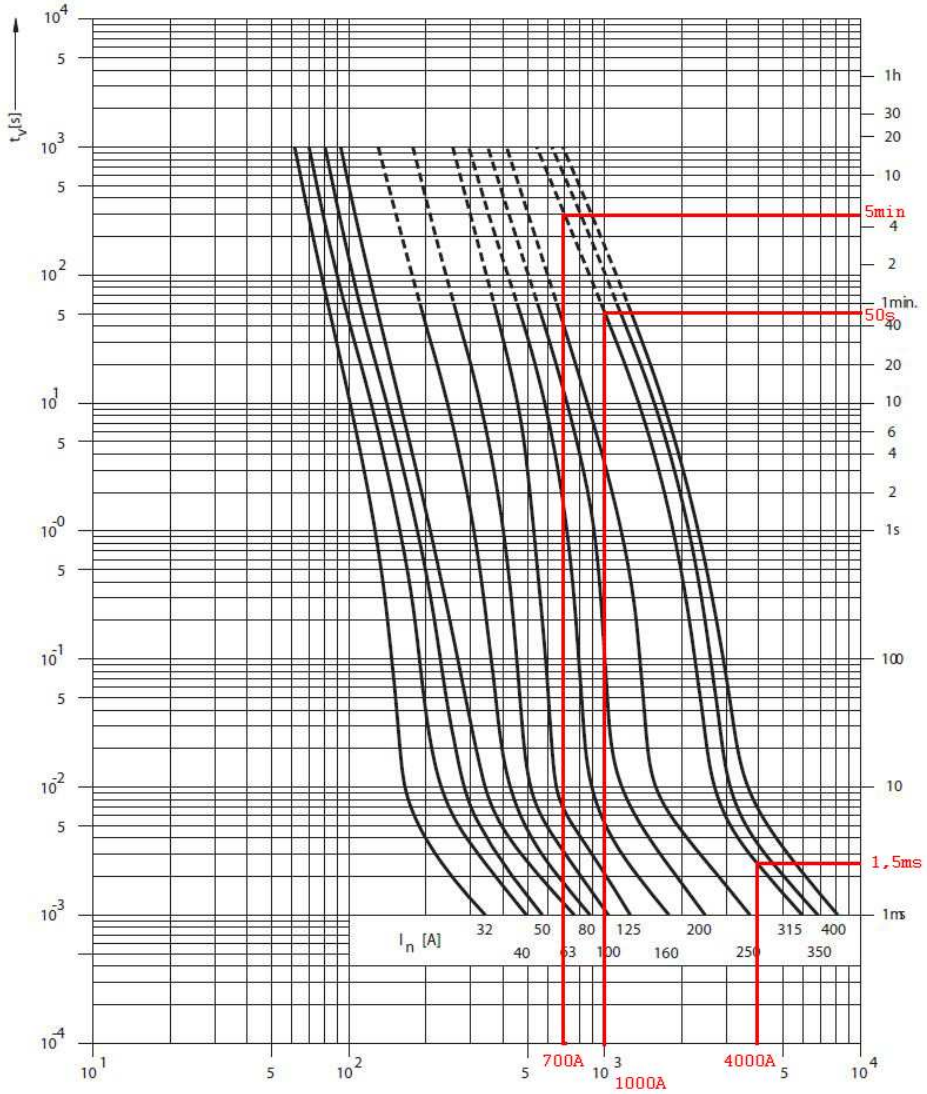


fig 2: Volt-Ampere (melting) characteristic

From the Volt-Ampere (melting) characteristic, it is visible, that 1000 A should not be exceeded. One single tram only should be presented at the BDS section at the same time for every direction. Also, full acceleration should be avoided to secure longest possible life of the fuse.

Concerning type of trams operating in Amsterdam (Siemens Combino) with 6 engines of power 100 kW/unit, with nominal voltage 750 VDC, the 1 kA threshold should not be exceeded. In case of tram fleet renewal, fuse exchange should be considered!

4 Installation

Detailed guide how to install BSD is limited to hints and tips only. The guide supposes that the installation is handled by authorized workers who are familiar with previous version of BSD.

- moving parts (contact with springs) should be lubricated every 6 months to ensure smooth movement without friction and declared contact pressure

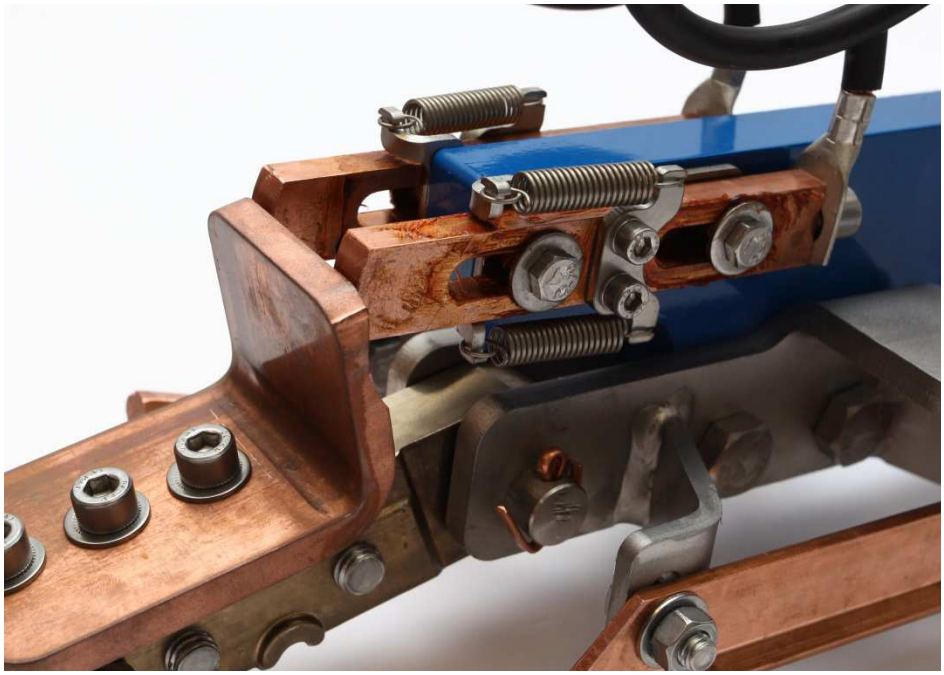


fig 3: Properly lubricated copper contacts with springs

- after the installation, smooth passage of pantograph should be checked. If necessary slight adjustment has to be carried out. Side skids together with cw clamps has to be controlled.

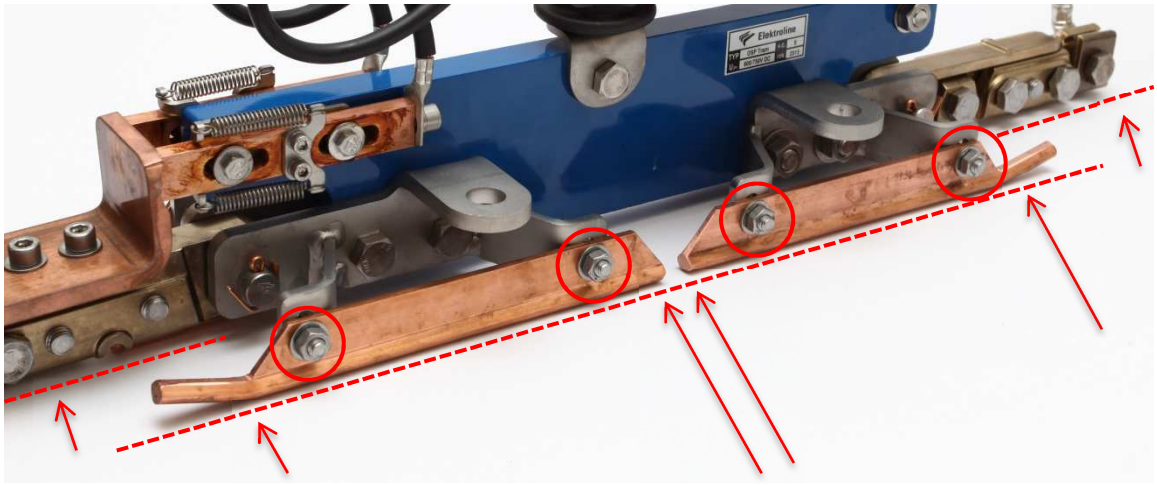


fig 4: Check the parallelism of skids and smooth passage with ruler or pantograph

- both ends of cw clamps has to be reinforced with extra cw rod with two or three groove clamps on a distance at least 750mm. Otherwise fatigue of cw may occur.

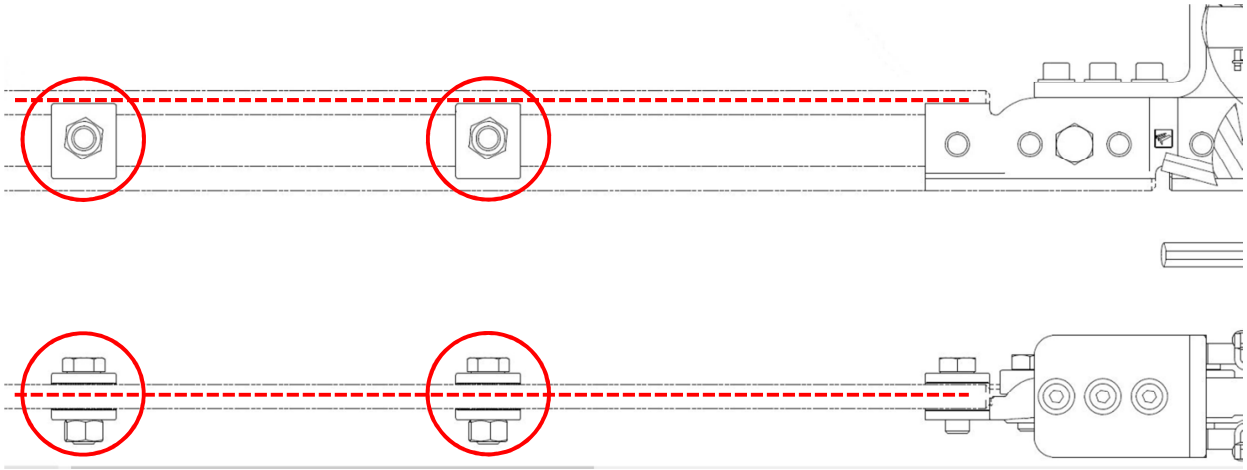


fig 5: Reinforced cw clamps with extra cw and groove clamps

5 Spare parts

List of spare parts

As a result of technological developments and responds to customer requirements the composition of the insulator may change. These changes will be published in time on www.elektroline.cz, where you can find present-day information or the client will be inform directly by email/phone/fax.

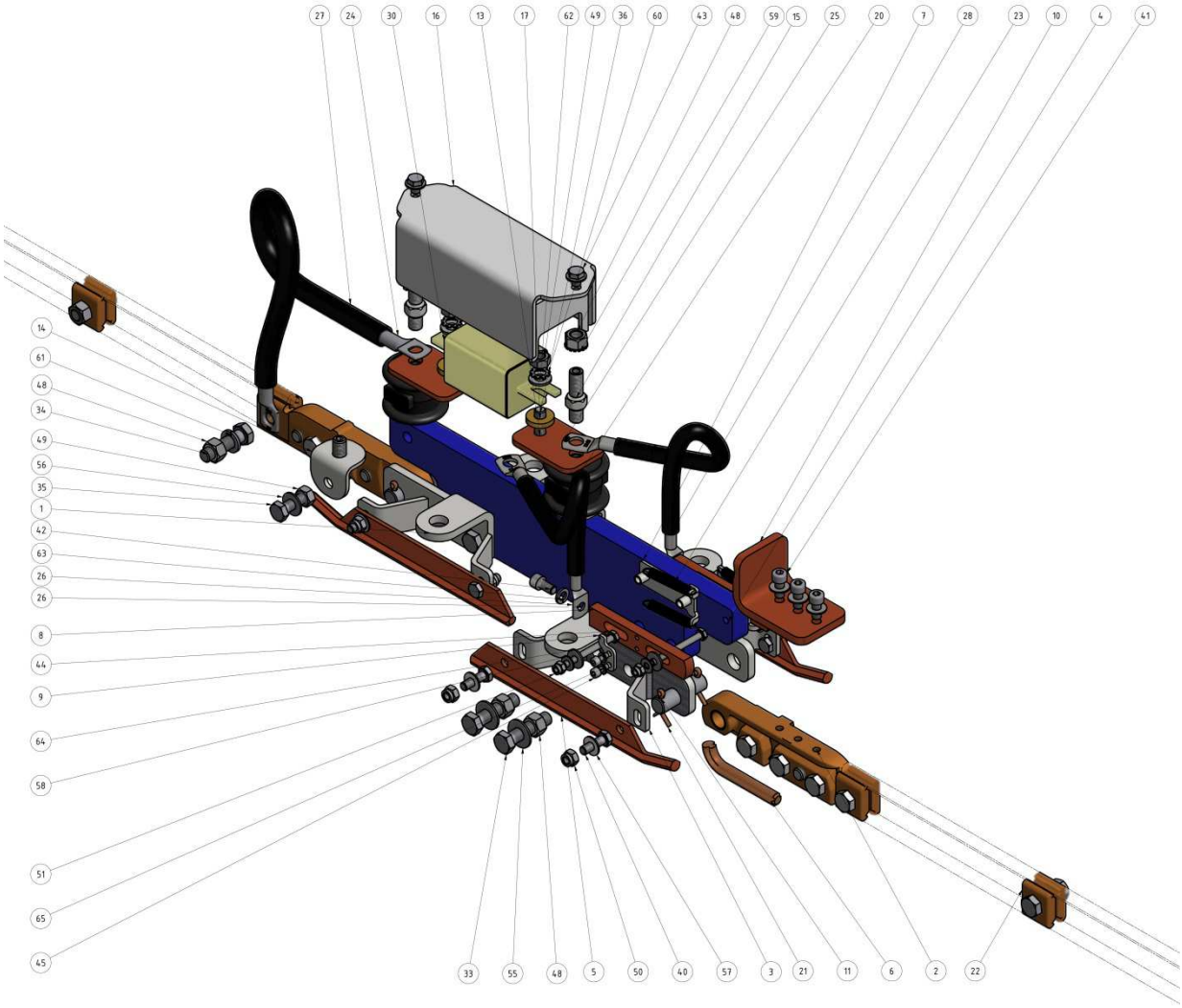


fig 6: Spare parts list

Item	Catalogue number	Name	Units	Quantity
1	227790.01	Side board right	pcs	2
2	227790.02	Contact wire clamp with 3xM8 complete	pcs	1
3	227790.03	Side board left	pcs	2
4	227790.04	Insulator with disconnector	pcs	1
5	227790.05	Passing skid	pcs	4
6	227790.06	Contact wire ramp	pcs	2
7	227790.07	Contact base	pcs	2

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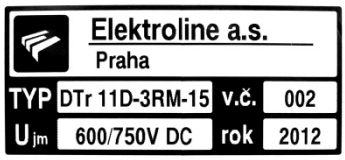
Item	Catalogue number	Name	Units	Quantity
8	227790.08	Knife	pcs	2
9	227790.09	Spring holder	pcs	2
10	227790.10	Contact	pcs	1
11	980216	Bolt	pcs	2
12	703100	Tram contact wire clamp	pcs	1
13	227790.13	Fuse contact	pcs	2
14	227790.14	Fuse holder	pcs	2
15	227790.15	Contact screw	pcs	2
16	227790.16	Shelter	pcs	1
17	227790.17	Fuse washer	pcs	2
20	224122	Cylindrical insulator M12 black, 1 kV	pcs	2
21	980804	Split-pin 4x30	pcs	4
22	243136	Parallel clamp for TRAM section insulator	pcs	6
23	-	Spring H 11/8/1	pcs	4
24	431124	Cable eye M12/50mm2	pcs	2
25	431123	Cable eye GPH M12/35	pcs	2
26	432072	Cable eye GPH 25x8 KU-L	pcs	2
27	428100	Cable CYA 50mm^2 – 580mm	pcs	1
28	428090	Cable CHBU 1x35mm2 L=330	pcs	1
29	634040	Elektroline label 80x35	pcs	1
30	-	Fuse OEZ P40U10 315A	pcs	1
33	902420	Screw M12x50	pcs	4
34	902411	Screw M12x45	pcs	1
35	902160	Screw M10x35	pcs	2
36	902130	Screw M10x30	pcs	2
40	901890	Screw M18x25	pcs	8

Item	Catalogue number	Name	Units	Quantity
41	901830	Screw M8x18	pcs	3
42	901810	Screw M8x16	pcs	2
43	901780	Screw M8x10	pcs	2
44	-	Screw M6x60	pcs	2
45	901350	Screw M5x12	pcs	4
48	940110 A4	Nut M12	pcs	7
49	940080 A4	Nut M10	pcs	4
50	940070	Lock-nut M8	pcs	8
51	940042	Lock-nut M6	pcs	2
55	970234	Washer 12 Contact	pcs	4
56	970232	Washer 10 Contact	pcs	2
57	970230	Washer 8 Contact	pcs	13
58	970228	Washer 6 Contact	pcs	2
59	960270	Washer 12	pcs	2
60	960221	Washer 10, special	pcs	2
61	960250	Washer 12	pcs	1
62	960190	Washer 10	pcs	2
63	960160	Washer 8	pcs	2
64	960130	Washer 6	pcs	4
65	960070	Washer 5	pcs	4

Table 1: Items, catalogue numbers and names of spare parts and their quantities in the assembly

Methods of ordering

When ordering spare parts, please indicate the name, number and ideally the serial number of the product you are ordering spare parts for, and then the number, name and quantity of the ordered parts.



The spare parts can be ordered in several ways:

By electronic means: www.elektroline.cz,

By a letter sent to: ELEKTROLINE, a. s.
MTZ - Logistika
K Ládví 1805/20
184 00 PRAHA 8,
Czech Republic

By fax sent to number: +420 284 021 123,

By phone to number: +420 284 021 122.

The enquiry and ordering instructions are specified on the www.elektroline.cz website, bookmark „ENQUIRY“.

6 Maintenance

Every 6 months carry out regular checks of insulators. Check it for planarity and wear out of the passable parts and tightening of all bolted joints. Replace parts when they are considerably or unevenly worn out so that it is not possible to adjust them properly. The side insulators (2) keep clean. Replace the worn out or by electric arc damaged contacts (8 and 16).

7 Disposal

Dismantle the insulator and separate the parts according to material, metal components pass for recycling. Methods of disposal of non-metallic parts will provide the local government authorities.