

MOUNTING INSTRUCTION

MU27P - Plug

PRJ-14-000003352

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1. INTRODUCTION

The MU27P connector is a standard connector for the American railway especially for locomotives. This connector is completely designed according to 2 standards:

- **AAR S-512** : Manual of Standards and Recommended Practices Locomotives and Locomotive Interchange Equipment (27 point control plug and receptacle)
- **APTA RP-E-019-99** : Recommended Practice for 27-Point Jumper and Receptacle Hardware for locomotives and Locomotive-Hauled Equipment

This document is an operating instruction to mount the plug. There is also the same type of documentations for the installation of the receptacle and the dummy. The respective references are 408-157000-1 and 408-157000-3.

2. BILL OF MATERIAL

2.1 Introduction

There are 4 types of connector corresponding to 4 functions on the loco. Each connector is differentiated by colour and/or by the position of insulators. The 4 types of connectors are named as follows:

- *MU. LOCO UNIT CONTROLS* : Position insulators at 0° and black colour for the body
Commercial reference: 27P-PLU-1-01



- *COMMUNICATION INTERCITY* : Position insulators at 42° and blue colour for the body
Commercial reference: 27P-PLU-2-01



- TYPICAL AEM-7 MU : Position insulators at 77,5° and white colour for the body
Commercial reference: 27P-PLU-3-01



- COMMUNICATION COMMUTER : Position insulators at 0° and red colour for the body
Commercial reference: 27P-PLU-4-01



2.2 BOM of MU. LOCO UNIT CONTROL

Item	Part number	Quantity	Designation	Weight (g)
1	YG-UC-211290A-JG06	1	Plug body	1038.59
2	YK-UC-211276A-QK00	1	Mixed insulator	124.81
3	1504-0008A4	27	Sleeve	1.36
4	YK-UC-211288A-YU00	1	Female insulator	258.95
5	YC-UC-212072A-AA00	24	Female contact AWG 12 and 14	17.64
6	YC-UC-212073A-AA00	3	Female contact 10 AWG	17.53
7	1504-0002U4	1	Clamping cone	14.62
8	1504-0030U4	3	Spacer	1.72
9	MU-08-I	3	Washer	2.56
10	CHCM08x40-I	3	CHC screw	23.20

Customer drawing: C-E1894-212075

2.3 BOM of TYPICAL AEM-7 MU

Item	Part number	Quantity	Designation	Weight (g)
1	YF-UC-211324A-JG05	1	Plug body	1026.58
2	YK-UC-211276A-QK00	1	Mixed insulator	124.81

3	1504-0008A4	27	Sleeve	1.36
4	YK-UC-211288A-YU00	1	Female insulator	258.95
5	YC-UC-212072A-AA00	24	Female contact AWG 12 and 14	17.64
6	YC-UC-212073A-AA00	3	Female contact 10 AWG	17.53
7	1504-0002U4	1	Clamping cone	14.62
8	1504-0030U4	3	Spacer	1.72
9	MU-08-I	3	Washer	2.56
10	CHCM08x40-I	3	CHC screw	23.20

Customer drawing: C-E1894-212094

2.4 BOM of COMMUNICATION INTERCITY

Item	Part number	Quantity	Designation	Weight (g)
1	YG-UC-211290A-JG07	1	Plug body	1026.58
2	YK-UC-211276A-QK00	1	Mixed insulator	124.81
3	1504-0008A4	27	Sleeve	1.36
4	YK-UC-211288A-YU00	1	Female insulator	258.95
5	YC-UC-212072A-AA00	24	Female contact AWG 12 and 14	17.64
6	YC-UC-212073A-AA00	3	Female contact 10 AWG	17.53
7	1504-0002U4	1	Clamping cone	14.62
8	1504-0030U4	3	Spacer	1.72
9	MU-08-I	3	Washer	2.56
10	CHCM08x40-I	3	CHC screw	23.20

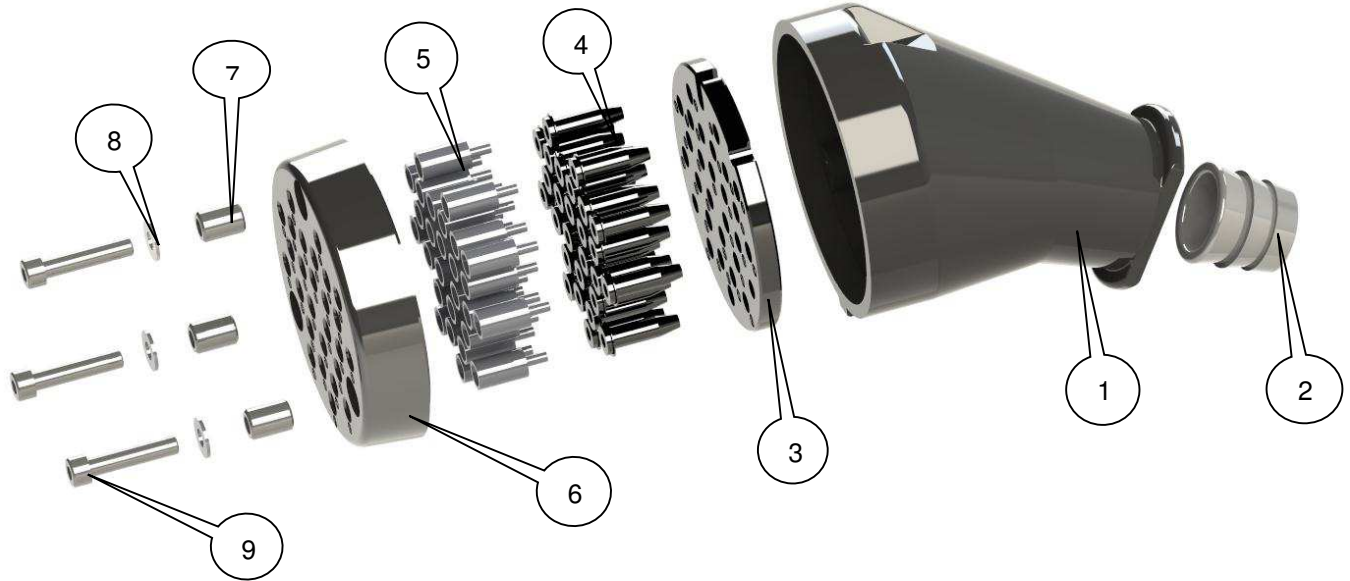
Customer drawing: C-E1894-212093

2.5 BOM of COMMUNICATION COMMUTER

Item	Part number	Quantity	Designation	Weight (g)
1	YG-UC-211290A-JG04	1	Plug body	1038.59
2	YK-UC-211276A-QK00	1	Mixed insulator	124.81
3	1504-0008A4	27	Sleeve	1.36
4	YK-UC-211288A-YU00	1	Female insulator	258.95
5	YC-UC-212072A-AA00	24	Female contact AWG 12 and 14	17.64
6	YC-UC-212073A-AA00	3	Female contact 10 AWG	17.53
7	1504-0002U4	1	Clamping cone	14.62
8	1504-0030U4	3	Spacer	1.72
9	MU-08-I	3	Washer	2.56
10	CHCM08x40-I	3	CHC screw	23.20

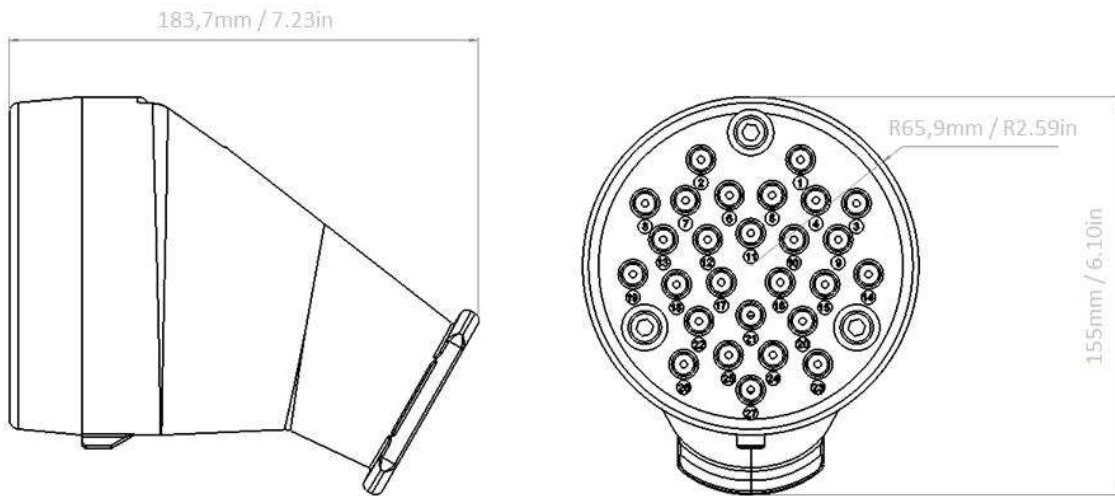
Customer drawing: C-E1894-212095

2.6 Exploded view



- 1- Plug
- 2- Clamping cone
- 3- Mixed insulator
- 4- Sleeve
- 5- Female contact
- 6- Female insulator
- 7- Spacer
- 8- Washer
- 9- Screw CHC M8x40

2.7 Overall dimensions



2.8 Materials

Designation	Materials
Plug	Aluminum
Clamping cone	Aluminum
Mixed insulator	Neoprene
Sleeve	Neoprene
Female contact	Silver plated brass
Female insulator	Neoprene
Spacer	Stainless steel
Washer	Stainless steel
CHC M8x40 screw	Stainless steel

3. TECHNICAL CHARACTERISTICS

3.1 Applicable standards and documents

- ◆ Reference standard : AAR Standard S-512
- ◆ Recommended practice for 27-points jumper and receptacle : APTA RP-E-017-99 & APTA RP-E-019-99
- ◆ Recommended practice for wiring of passenger equipment : APTA RP-E-002-98
- ◆ Standard for insulation integrity : APTA SS-E-001-98

3.2 Electrical characteristics

- ◆ Minimal creepage distance (mated connector) : 18.2 mm
- ◆ Minimal air clearance (mated connector) : 16.2 mm
- ◆ Comparative Tracking Index (CTI) of insulators : 600 Volt
- ◆ Service voltage : 600 Volts maxi
- ◆ Withstand voltage : (NF EN 50-124-1/A2) : 1500 Volt maxi
- ◆ Continuous service current : 30A

3.3 Mechanical characteristics

- ◆ Crimping pulling resistance : 180 N per contact

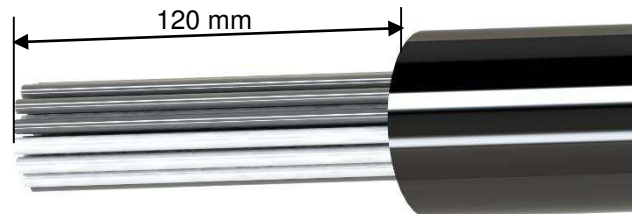
3.4 Climatic characteristics

- ◆ Temperature class : - 40°C to + 100°C
- ◆ Salt spray resistance : 48 hours

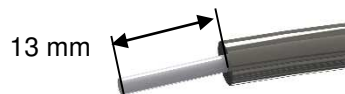
4. MOUNTING

4.1 Preparation of the cable

Strip the external sheath of about 120 mm.



Strip on 13mm the 27 cables.



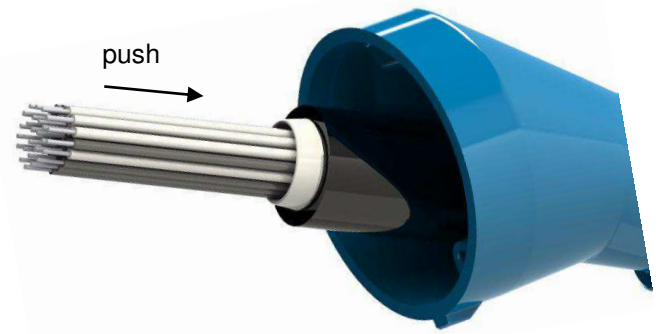
4.2 Cable implantation into the plug

Pass the cable through the plug.

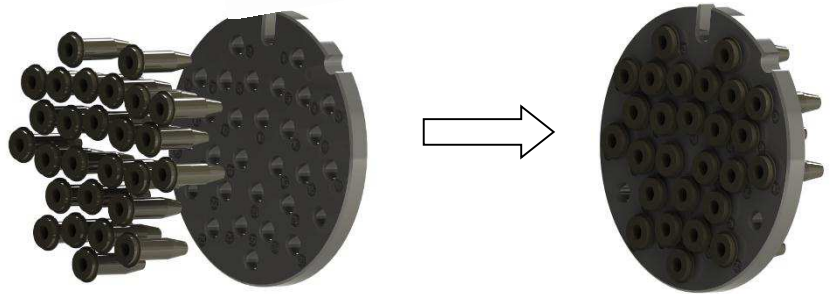


Pass the clamping cone on the cables and push the cone in the sheath.

Cone mounting direction



Insert sleeves into the mixed insert.

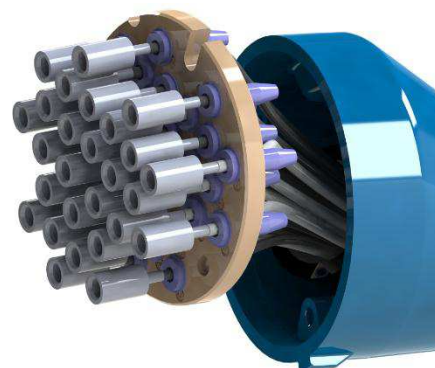


Pass the cables through the sleeves.



4.3 Contact crimping

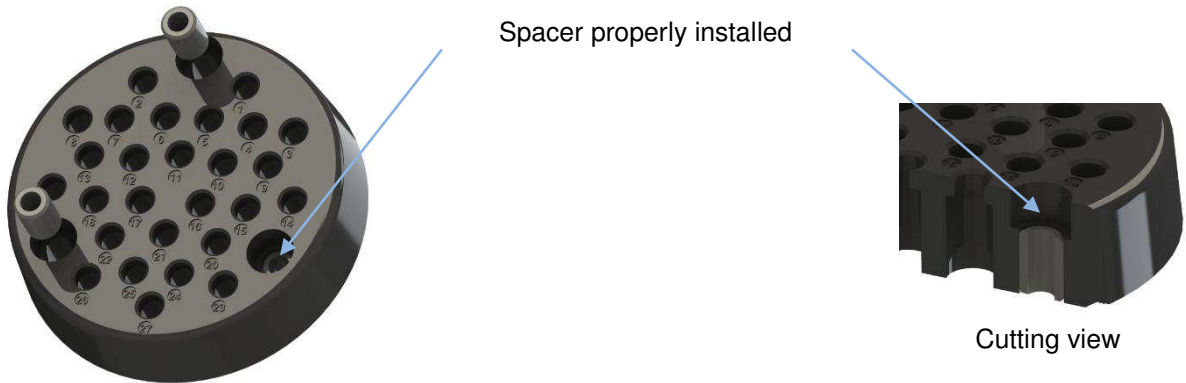
Engage the stripped cable inside the back drum of the contacts.



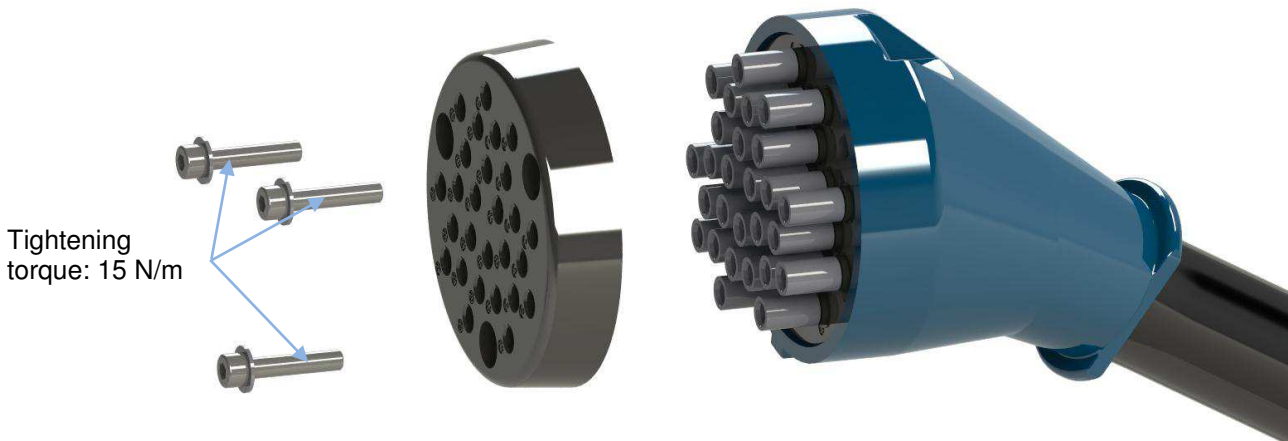
Crimp the contacts by using the tools corresponding to each cable section cross. See paragraph 5

4.4 Mounting inserts on the plug

Push the three spacers in the female insert



Mounting the female insert on the plug with the 3 screws M8 + washers



5. CONTACT CRIMPING

5.1 Manual crimping tools DMC



Cable cross sections	Manual crimping tools	
	Hand crimper	Die
Gauge 14	HX4	Y543
Gauge 12	HX4	Y543
Gauge 10	HX4	Y543

6. MAINTENANCE OPERATIONS

In case of need to dismantle the receptacles, process in the reverse way of the operations described on the chapter 4

6.1 Spare parts

Caliber	Cable cross section	Number of contacts	Commercial reference	Drawings
8	AWG12 and 14	24	27P-KITCON-24S12-3S10	C-S1894-212398
	AWG10	3		