



SURFACE VEHICLE RECOMMENDED PRACTICE

J3105™/3

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Electric Vehicle Power Transfer System
Using Conductive Automated Connection Devices
Enclosed Pin and Socket Connection

RATIONALE

The enclosed pin and socket connection interface is suitable for power transfer from >32 kW up to 1+ MW. Both the pin and socket are fully touch protected from unintentional human contact in both a mated and unmated configuration and thereby can be safely positioned at any height from the bottom to the top of the vehicle. It is hands-free, horizontally engaged, and can be positioned on the front, rear, or side of the vehicle.

INTRODUCTION

The enclosed pin and socket connection interface is fully touch-protected from unintentional human contact in both a mated and unmated configuration and can therefore be safely positioned at any height from the bottom to the top of the vehicle. It is hands-free and horizontally engaged and can be positioned on the front, rear, or side of the vehicle. The efficiency is defined as having less than 25 mV voltage drop over the electrical contacts throughout the complete life of the contact elements (see 6.1). It is configured to mechanically sequence the ground contact ("first make, last break"), power contacts, and signal contacts, including CP ("last make, first break") during both engagement and disengagement.

TABLE OF CONTENTS

1.	SCOPE.....	3
2.	REFERENCES.....	3
3.	DEFINITIONS	3
4.	ABBREVIATIONS AND SYMBOLS (ALL)	3
5.	GENERAL SYSTEM REQUIREMENTS AND INTERFACE	3
5.1	General ACD Charging System Requirements	3
5.2	Functional/Physical Requirements of VSC	4
5.2.1	Socket Details (Vehicle Part)	4
5.2.2	Socket Contact Dimensions and Spacing.....	4
5.2.3	Mounting Location.....	4
5.3	Functional/Physical Requirements of ISC.....	5
5.3.2	Keep-Out Zone.....	6
5.4	Alignment	8
5.4.1	Tolerance Acceptance	8
5.4.2	Angular Misalignment.....	8

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6.	CONNECTION CONFIGURATION.....	10
6.1	Contact Quality.....	11
6.2	Protection	11
6.3	Contact Sequencing.....	11
6.4	Contact Surface Temperature.....	11
7.	NOTES	11
7.1	Revision Indicator.....	11
Figure 1	Example of the connection.....	3
Figure 2	VSC hardware	4
Figure 3	Dimensions for locating the VSC connection.....	4
Figure 4	Contact dimensioning.....	5
Figure 5	Keep out zone socket side.....	7
Figure 6	Keep out zone pin side.....	7
Figure 7	Funnel dimensions	8
Figure 8	Sideways slope direction.....	9
Figure 9	Driving ramp angles	10
Figure 10	Maximum vehicle offset angle.....	10
Table 1	Dimensions for Figure 3	5
Table 2	Contact dimensioning.....	6
Table 3	Funnel dimensions	8
Table 4	Angular dimensions.....	9
Table 5	Contact size and electrical ratings	10

1. SCOPE

This document details one of the connections of the SAE J3105 document. The connections are referenced in the scope of the main document SAE J3105. SAE J3105/3 details the enclosed pin and sleeve connection. All the common requirements are defined in the main document; the current document provides the details of the connection.

This document covers the main safety and interoperability relevant requirements for an electric vehicle power transfer system using a conductive automated charging device based on an enclosed pin and socket design. To allow interoperability for on-road vehicles (in particular, buses and coaches), one configuration is described in this document. Other configurations may be used for non-standard applications (for example, mining trucks or port vehicles).

2. REFERENCES

Refer to the main SAE J3105 Recommended Practice.

3. DEFINITIONS

Refer to the main SAE J3105 Recommended Practice.

4. ABBREVIATIONS AND SYMBOLS (ALL)

Refer to the main SAE J3105 Recommended Practice.

5. GENERAL SYSTEM REQUIREMENTS AND INTERFACE

5.1 General ACD Charging System Requirements

According to SAE J3105, the enclosed pin and socket connection is one type of ACD charging system that transfers power between the infrastructure and the vehicle. This power transfer occurs when the correct alignment is complete and the ACD moves into place to electrically connect the infrastructure and the vehicle through conductive connection. See Figure 1.

The ISC will have the moving connection on the infrastructure and will be called the pin. The VSC will be stationary on the vehicle and will be called the socket.

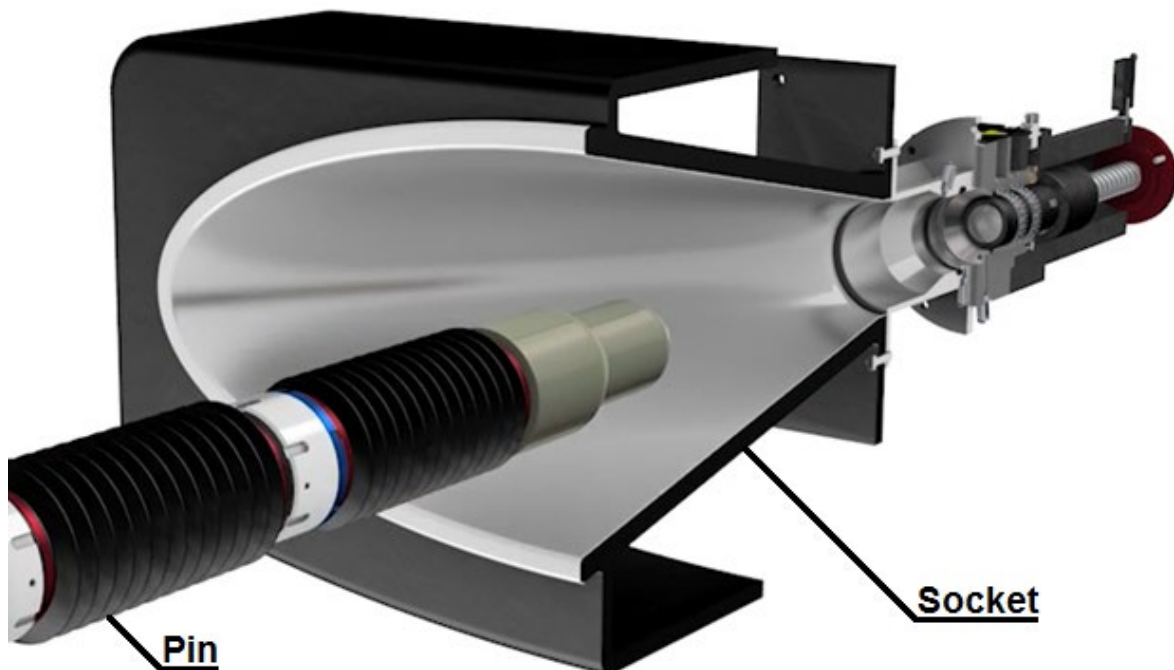


Figure 1 - Example of the connection

5.2 Functional/Physical Requirements of VSC

For most pin and socket style connections, the pin is the part that defines the required dimensions for interoperability. This allows various connector manufacturers to adapt their own contact technology and remain interoperable.

5.2.1 Socket Details (Vehicle Part)

The VSC consists of two main components: the socket “a” and the funnel “b” (with lock-in range “c”), whereas “f” shows a possible location of the mounting points on the vehicle. See Figure 2.

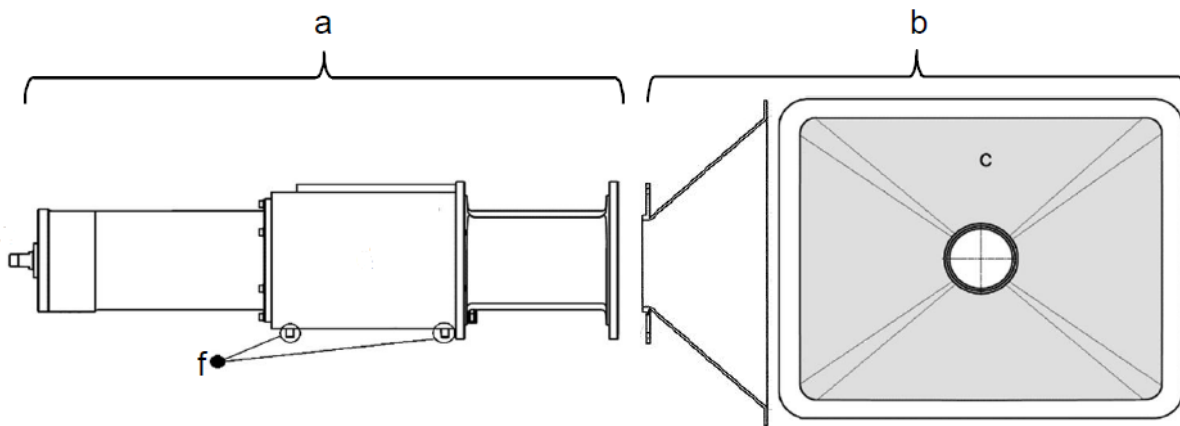


Figure 2 - VSC hardware

5.2.2 Socket Contact Dimensions and Spacing

The contacts within the socket need to mate with the contacts on the pin as referenced in 5.3.

5.2.3 Mounting Location

The shown location is defined for buses, but can be used for other vehicles as well, pending a standard location for specific types of vehicle, e.g., trucks. SAE J3105/3 is suitable for use at various positions as long as coordination between EVSE and vehicle ensures proper alignment.

To ensure full interoperability according to SAE J3105/3, the center of the funnel shall be located as shown in Figure 3 and Table 1.

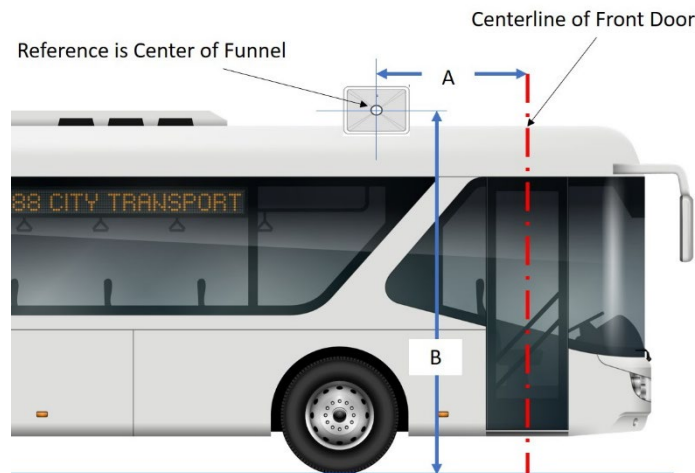


Figure 3 - Dimensions for locating the VSC connection