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PUBLICLY AVAILABLE SPECIFICATION

colour inside

Conductive charging of electric vehicles – DC vehicle coupler configuration GG

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CONDUCTIVE CHARGING OF ELECTRIC VEHICLES – DC VEHICLE COUPLER CONFIGURATION GG

FOREWORD

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IEC PAS 63454 has been processed by subcommittee 23H: Plugs, Socket-outlets and Couplers for industrial and similar applications, and for Electric Vehicles, of IEC technical committee TC 23: Electrical accessories.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document:

Draft PAS	Report on voting
23H/509/DPAS	23H/514A/RVDPAS

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 2 years starting from the publication date. The validity may be extended for a single period up to a maximum of 2 years, at the end of which it shall be transformed, with or without changes, into another type of normative document, or shall be withdrawn.

This PAS is to be read in conjunction with IEC 62196-1:2022 and IEC 62196-3:2022.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

A total of four widely used DC charging interfaces is defined in IEC 62196-3:2022 as follows:

- configuration AA proposed by Japan,
- configuration BB proposed by China,
- configuration EE proposed by North America, and
- configuration FF proposed by Europe.

This PAS introduces the charging interface (configuration GG), a new electric vehicle DC charging system jointly developed by some Chinese, Japanese and European companies. This interface is currently included in the Chinese draft national standard and in the Japanese standard and has considerable potential for future applications.

After consideration within SC 23H/MT 8 (in charge of the maintenance of the IEC 62196 series) and noting that the next revision of IEC 62196-3:2022 will come up after a longer period, it was agreed to issue configuration GG in a first stage in the form of an IEC PAS. The addition of configuration GG into IEC 62196-3 will be considered in the frame of the next revision of IEC 62196-3.

CONDUCTIVE CHARGING OF ELECTRIC VEHICLES – DC VEHICLE COUPLER CONFIGURATION GG

1 Scope

This document is applicable to vehicle couplers with pins and contact-tubes of standardized configuration (GG), herein also referred to as "accessories", intended for use in electric vehicle conductive charging systems which incorporate control means, with rated operating voltage and current in accordance with IEC 62196-1:2022.

The DC vehicle connectors and inlets covered by this document are used only in charging mode 4, according to IEC 61851-1:2017, 6.2.4, and case C, as shown in IEC 61851-1:2017, Figure 3.

These vehicle couplers are intended to be used for circuits specified in IEC 61851-23 which operate at different voltages and which can include extra-low voltage (ELV) and communication signals.

This document applies to the vehicle couplers to be used in an ambient temperature of between −30 °C and +40 °C.

NOTE 1 In some countries, other requirements may apply.

NOTE 2 In the following country, −35 °C applies: SE.

These vehicle couplers are intended to be connected only to cables with copper or copper-alloy conductors.

2 Normative references

Clause 2 of IEC 62196-3:2022 applies.

3 Terms and definitions

Clause 3 of IEC 62196-1:2022 applies.

4 General

Clause 4 of IEC 62196-3:2022 applies.

5 Ratings

Clause 5 of IEC 62196-3:2022 applies, except as follows:

5.1 *Replacement:*

The preferred rated operation voltage ranges are:

0 V to 60 V (signal or control purposes only)
480 V DC
600 V DC
750 V DC
1 000 V DC
1 500 V DC

6 Connection between the power supply and the electric vehicle

Clause 6 of IEC 62196-3:2022 applies, except as follows:

6.3 DC interface

Replacement:

Replace the existing text of IEC 62196-3:2022, 6.3 with the following:

The DC interface may contain up to 12 power or signal contacts, with only one physical configuration of contact positions. The electrical ratings and contact functions are described in Table 201.

Table 201 – Overview of the DC vehicle interface

Position Number [a]	Configuration						Symbol	Function
	AA		BB		GG			
	U_{max}	I_{max}	U_{max}	I_{max}	U_{max}	I_{max}		
	V	A	V	A	V	A		
1	1 000	400	950	250	1 500	-	DC+	DC+
2	1 000	400	950	250	1 500	-	DC−	DC-
3	30	10	30	2	60	2	CP	Control Pilot 1
4	30	10	30	2	60	2	CP2	Control Pilot 2
5	30	10	-	-	-	-	CP3	Control Pilot 3
6	30	2	30	2	60	2	COM1	Communication1(+)
7	30	2	30	2	60	2	COM2	Communication1(−)
8	30	2	-	-	-	-	IM	Isolation Monitor
9	-	-	950	Rated for fault [b]	-	-	PE	Protective earth
10	30	2	-	-	-	-	PP or CS	Proximity detection or connection switch
11	30[c]	10[c]	30	20	-	-	AUX1	Auxiliary Power Supply 1(+)
12	-	-	30	20	-	-	AUX2	Auxiliary Power Supply 1(-)

[a] Position number does not refer to the location and/or identification of the contact in the accessory.

[b] "Rated for fault" means "rated for the highest fault current".

[c] For configuration AA, position 11 is optional.

For use with non-isolated DC EV supply equipment, the interface shall be provided with a contact for protective earthing conductors.

For use with isolated DC EV supply equipment, the interface may be provided with a contact for protective earthing conductors.

7 Classification of accessories

Clause 7 of IEC 62196-3:2022 applies, except as follows:

7.301 *Replacement:*

According to the Standard Sheet used:

– Configuration AA
– Configuration BB
– Configuration EE and AC corresponding to Type 1 in IEC 62196-2:2022
– Configuration FF and AC corresponding to Type 2 in IEC 62196-2:2022
– Configuration GG.

8 Marking

Clause 8 of IEC 62196-1:2022 applies.

9 Dimensions

Clause 9 of IEC 62196-3:2022 applies, except as follows:

9.1 *Replacement:*

The vehicle connector and vehicle inlet shall comply with the relevant configuration shown in Table 202:

Table 202 – Interface overview

Configuration	Dimensions described in:	Max. rated voltage V DC	Max. rated current A DC	Shall only be used with DC charging station according to the following annexes in IEC 61851-23:—[1]
AA	IEC 62196-3:2022, Standard Sheets 3-I	1 000	400	Annex AA
BB	IEC 62196-3:2022, Standard Sheets 3-II	950	250	Annex BB
EE[a]	IEC 62196-3:2022, Standard Sheets 3-III	1 000	400	Annex CC
FF[b]	IEC 62196-3:2022, Standard Sheets 3-IV	1 000	400	Annex CC
GG	Standard Sheets 3-V	1 500	/	/[c]

[a] AC ratings are in accordance with IEC 62196-2:2022, 6.5, type 1

[b] AC ratings are in accordance with IEC 62196-2:2022, 6.5, type 2

[c] To be proposed in the future third edition of IEC 61851-23.

[1] Edition 2 under preparation. Stage at the time of publication: IEC CDV 61851-23:2022.

10 Protection against electric shock

Clause 10 of IEC 62196-3:2022 applies.

11 Size and colour of earthing conductors

Clause 11 of IEC 62196-3:2022 applies.

12 Provisions for earthing

Clause 12 of IEC 62196-1:2022 applies.

13 Terminals

Clause 13 of IEC 62196-1:2022 applies.

14 Interlocks

Clause 14 of IEC 62196-3:2022 applies.

15 Resistance to ageing of rubber and thermoplastic material

Clause 15 of IEC 62196-1:2022 applies.

16 General construction

Clause 16 of IEC 62196-3:2022 applies.

17 Construction of socket-outlets

Clause 17 of IEC 62196-1:2022 does not apply.

18 Construction of plugs and vehicle connectors

Clause 18 of IEC 62196-3:2022 applies.

19 Construction of vehicle inlets

Clause 19 of IEC 62196-3:2022 applies.

20 Degrees of protection

Clause 20 of IEC 62196-1:2022 applies.

21 Insulation resistance and dielectric strength

Clause 21 of IEC 62196-1:2022 applies.

22 Breaking capacity

Clause 22 of IEC 62196-1:2022 does not apply.

23 Normal operation

Clause 23 of IEC 62196-1:2022 applies, except as follows:

23.2 *Addition:*

In case the vehicle inlet assembly contains an AC part, the AC part shall be tested in accordance with the load endurance test set out in this Subclause 23.2.

24 Temperature rise

Clause 24 of IEC 62196-3:2022 applies.

25 Flexible cables and their connection

Clause 25 of IEC 62196-3:2022 applies.

26 Mechanical strength

Clause 26 of IEC 62196-1:2022 applies.

27 Screws, current-carrying parts and connections

Clause 27 of IEC 62196-1:2022 applies.

28 Creepage distances, clearances and distances through sealing compound

Clause 28 of IEC 62196-1:2022 applies.

29 Resistance to heat, to fire and to tracking

Clause 29 of IEC 62196-1:2022 applies.

30 Corrosion and resistance to rusting

Clause 30 of IEC 62196-1:2022 applies.

31 Conditional short-circuit current

Clause 31 of IEC 62196-1:2022 does not apply.

32 Electromagnetic compatibility

Clause 32 of IEC 62196-1:2022 applies.

33 Vehicle driveover

Clause 33 of IEC 62196-1:2022 applies, except as follows:

33.3 *Not applicable*.

33.4 *Not applicable*.

34 Thermal cycling

Clause 34 of IEC 62196-1:2022 applies.

35 Humidity exposure

Clause 35 of IEC 62196-1:2022 applies.

36 Misalignment test

Clause 36 of IEC 62196-1:2022 applies.

37 Contact endurance test

Clause 37 of IEC 62196-1:2022 applies.

STANDARD SHEETS

CONFIGERATION GG

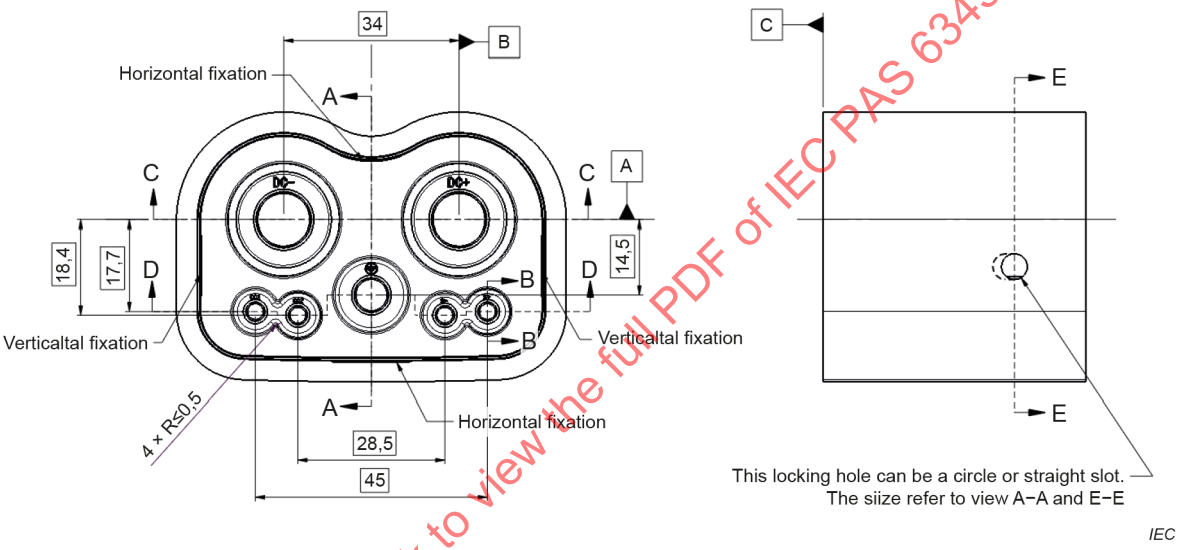
VEHICLE COUPLER 1 500 V DC

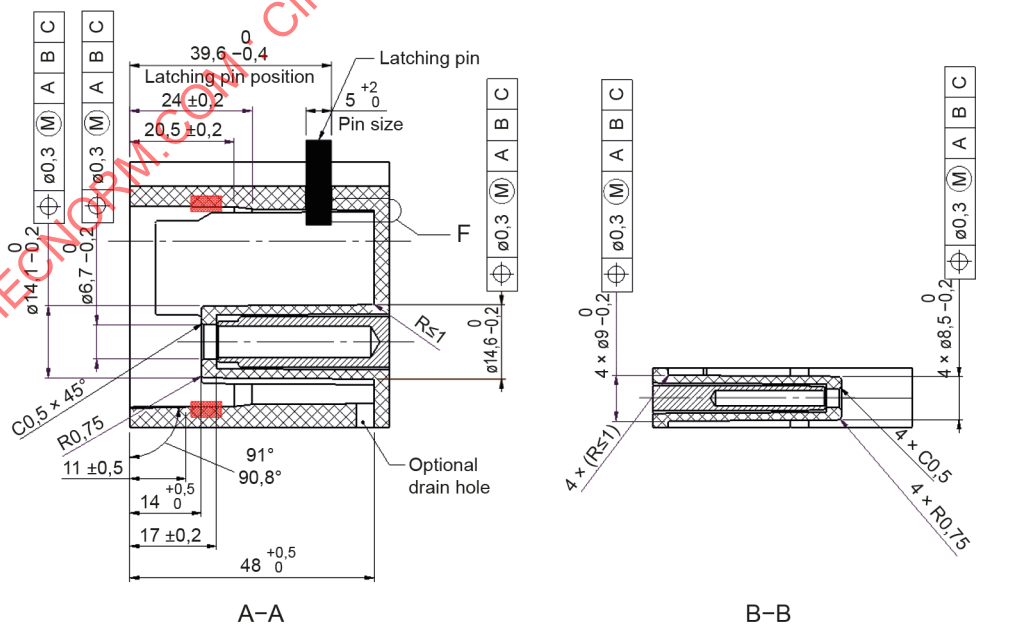
STANDARD SHEET 3-Va

VEHICLE INLET

(*Sheet 1*)

Dimensions in millimetres

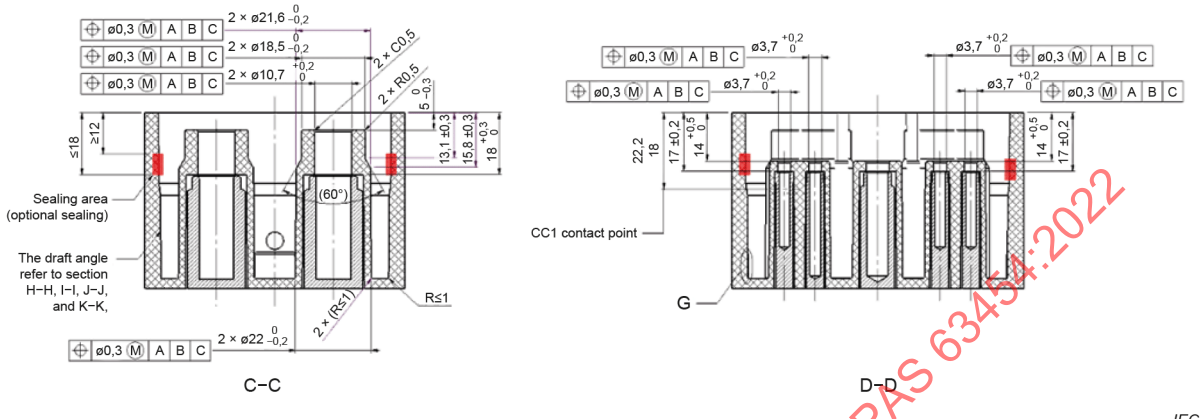




STANDARD SHEET 3-Va

VEHICLE INLET

Sheet 2 (continuation of Sheet 1)



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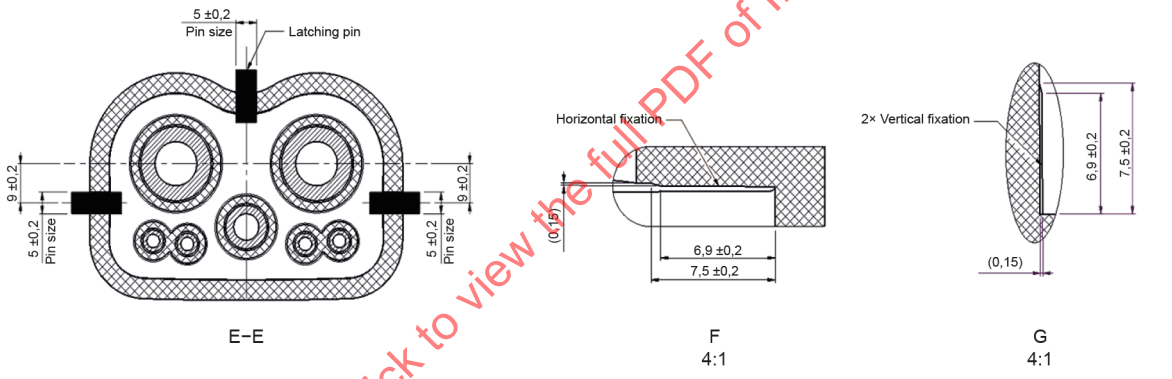
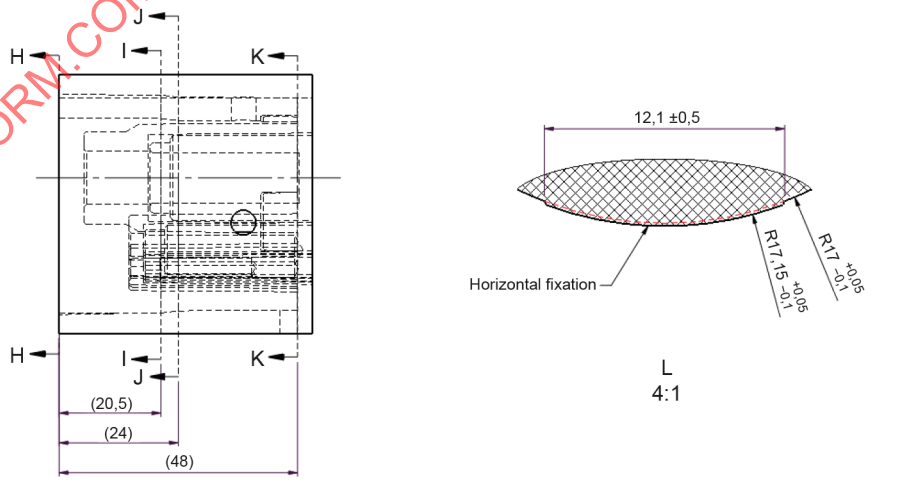


IEC



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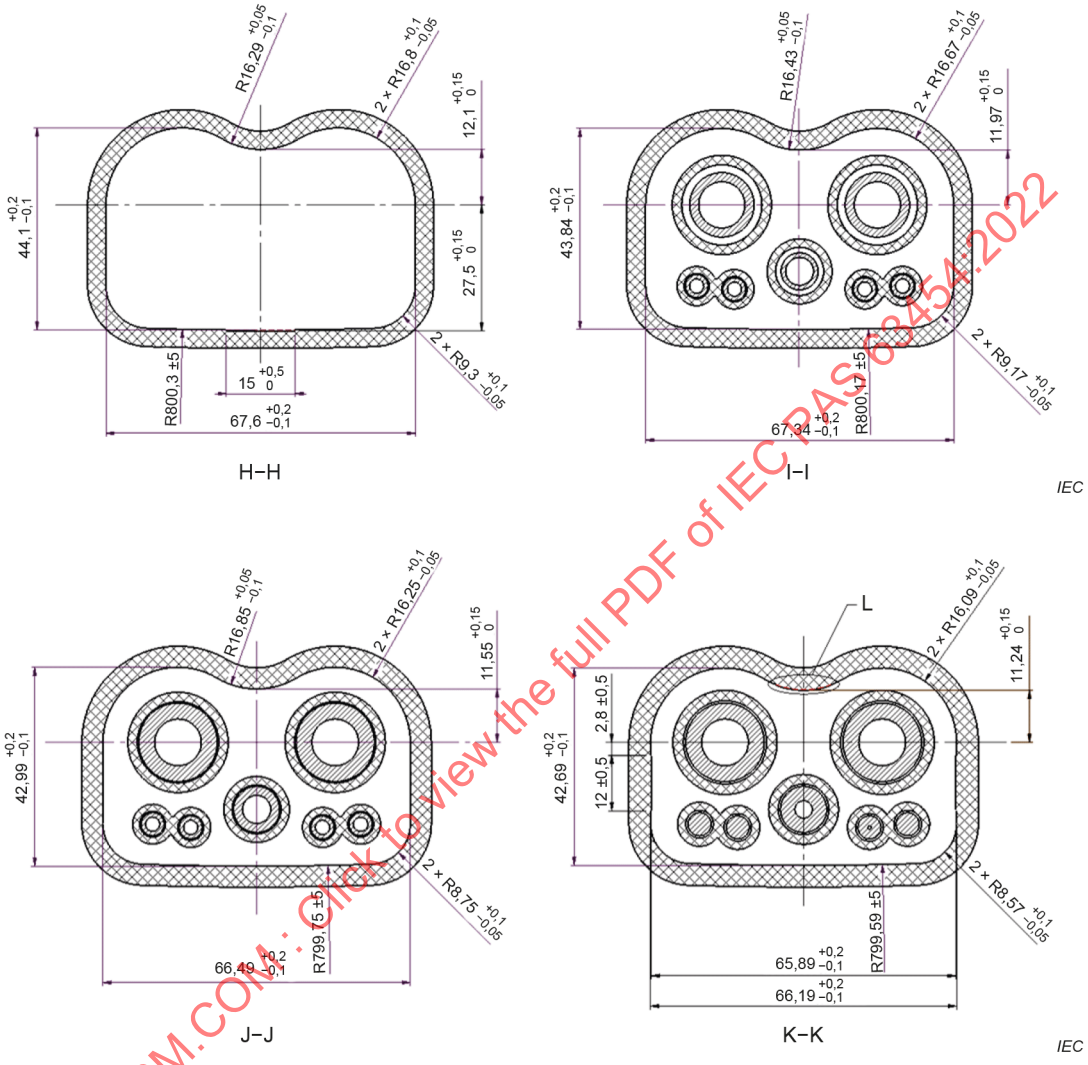
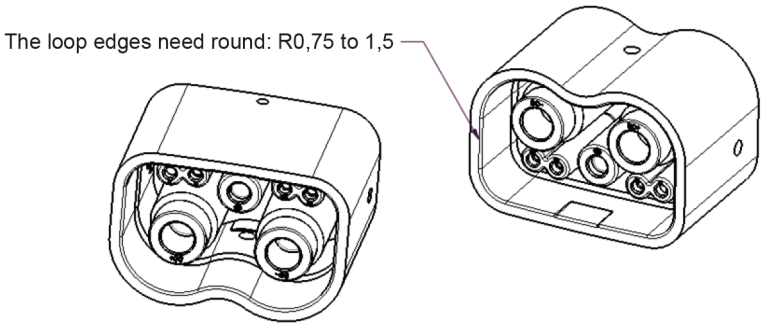
STANDARD SHEET 3-Va

VEHICLE INLET

Sheet 3 (continuation of Sheet 2)





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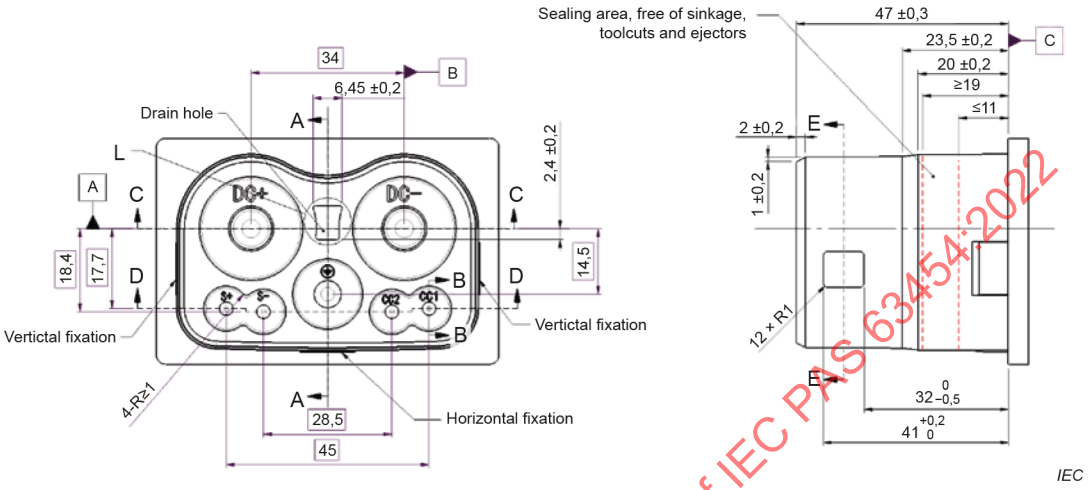
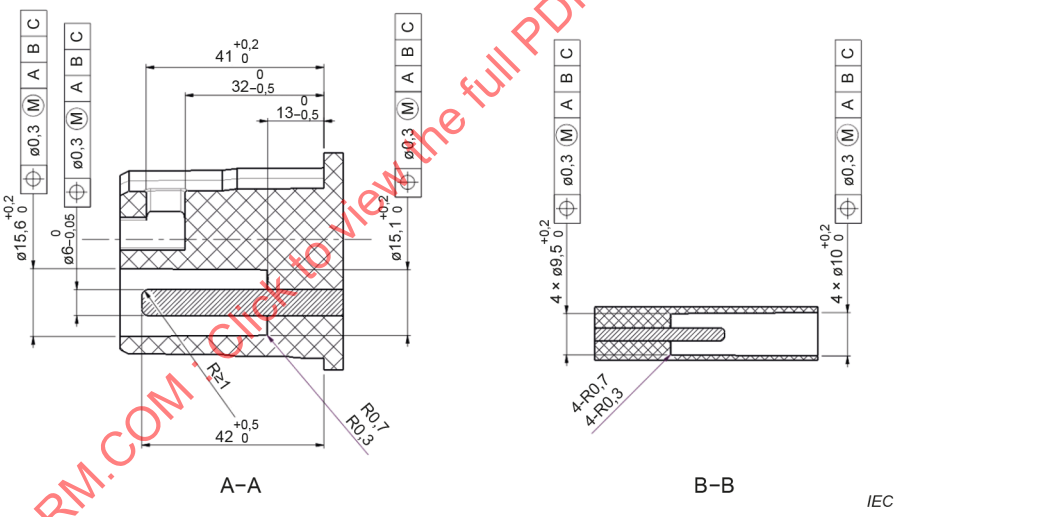
1) Undimensioned radii are R0,3-0,5;
2) The drain hole size not defined (if necessary);
3) Sealing area free of sinkage, toolcuts and ejectors;
4) Surface roughness in sealing area: Ra = 0,7;
5) Shape of the latching pin according to manufacturer's specification.
6) General tolerance refer to ISO 2768-mH;

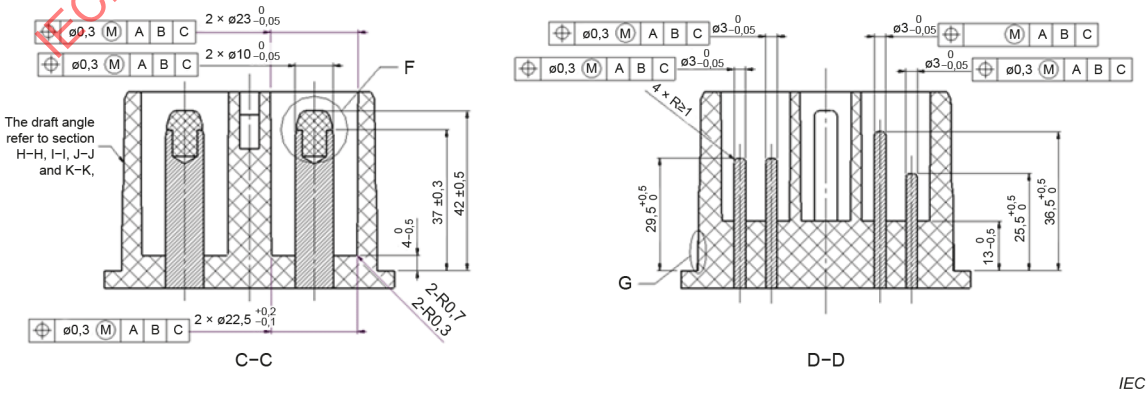
STANDARD SHEET 3-Vb

VEHICLE CONNECTOR

Sheet 1







STANDARD SHEET 3-Vb

VEHICLE CONNECTOR

Sheet 2 (continuation of Sheet 1)