

PRODUCT SPECIFICATION

HPS40-2 2+2
Male Connector 180° / 90° Wire

EPS-100132

HIRSCHMANN
AUTOMOTIVE

TABLE

1 General 2
1.1 Introduction 2
1.2 Other valid documents 2
1.3 Product design 2
1.3.1 Description 2
2 Technical product information 3
2.1 Current class 3
2.2 Operating condition 3
2.3 Voltage class 3
2.4 Ambient condition 3
2.5 EMC performance 4
2.6 Shield area 4
2.7 IP-Degree of protection 4
2.8 HVIL system 4
2.9 Technical cleanliness 4
2.10 Ampacity MCC (derating) 4
2.11 Assembling/ Disassembling (male plug to device) 4
3 Performed tests MCC 5
4 Result of performed tests 5
4.1 Insulation resistance 5
4.2 Contact resistance HV and HVIL 5
4.3 Watertightness 5
4.4 Vibration load 5
4.5 Amount of mating cycles 6
4.6 Polarization/ Coding/ Koshiri-safety 6
4.7 Retention force of the contact in the housing 6
5 Table of change 7

1 General

1.1 Introduction

This product specification is valid for the HPS40-2 2+2 male connector 180°/ 90° and contains the product design and the condition upon delivery, the technical characteristics as well as the qualification inspections performed. In the case of improper application or deviation from specification that results in quality issues, the right of complaint is void.

1.2 Other valid documents

A	Hirschmann product drawing	807-652-…00 / 809-366-…00
B	Interface drawing	807-655-…00
C	Working committee directive LV214 (cf. TLF 0214)	Working committee test specification for motor vehicle plug-in connectors – version March 2010
D	Working committee directive LV215 (cf. TLF 0214)	Electrics/ electronic requirements of HV-plug-in connectors – version February 2016
E	German norm DIN EN 60352-2	Solderless electric connections Part 2: crimp connections
F	DIN EN 60664-1	Insulation coordination for electronic equipment in low voltage systems. Part 1: principles, requirement, and tests
G	2000/53/EG	Directive of the European Parliament and of the council on end-of life vehicles incl. attachments; European Union
H	ISO 6469-3	Electric road vehicles – safety specifications Part 3: protection of persons against electric hazards
I	ISO 26053	Road vehicles; degrees of protection (IP-Code); protection against foreign objects, water, and access; electrical equipment;

1.3 Product design

1.3.1 Description

The HPS40-2 2+2 MALE CONNECTOR can only be ordered assembled.

2 Technical product information

The connector can be placed in the entire vehicle if the specified characteristics will not be exceeded. The characteristics are determined by tests (see verification plan) and material datasheets.

2.1 Current class

The connector system fulfills the class 1 and 2.

2.2 Operating condition

Nominal voltage	1,000 VDC
Maximum altitude	5,600 m
Insulating material group:	1
Degree of contamination:	2
Overvoltage category:	1
Rated impulse voltage:	4,000 VDC
Test voltage for electric strength:	4,242 VDC (3,000 VAC)

2.3 Voltage class

class B according to ISO 6469-3
60 VDC < U ≤ 1,000 VDC
25 VAC < Ueff ≤ 707 VAC (15-150 Hz)

2.4 Ambient condition

Permissible temperature range for the plastic used:
-40° C to +140° C according to “temperature collective 4” for 8,000 h
The details of the changes in the properties of the plastics can be found in the plastics data sheets.

“Temperature collective 4” of MBN 10306, 2020-06 or GS 95024-3-1, 2013-07)

Temperature in ° C	Distribution in %
-40	6
23	20
85	65
135	8
140	1

2.5 EMC performance

Delta transfer impedance of the HV connector system.

2.5 mm²	**4.0 mm²**	**6.0 mm²**
Until 2 MHz: < 2.5 mΩ/ m Until 30 MHz: < 5 mΩ/ m	Until 30 MHz: < 1 mΩ	Until 30 MHz: < 1 mΩ
Shielding attenuation:		
2.5 mm²	**4.0 mm²**	**6.0 mm²**
> 70 dB (10 kHz to 100 MHz) > 65 dB (100 MHz to 1,000 MHz)	> 70 dB (10 kHz to 1,000 MHz)	> 75 dB (10 kHz to 500 MHz) > 65 dB (500 MHz to 1,000 MHz)

2.6 Shield area

Shield transfer: 360° circumferential

Shield contact resistance R < 2 mΩ (Total from sheathed cable until the aggregate housing.)

2.7 IP-Degree of protection

IPxxD (mated)

IPxxB (unmated)

min. air distance HV contacts to shock-proof protection finger male connector interface at IPxxB: 0.8 mm

2.8 HVIL system

Min. 1 mm leading HV Interlock contacts to HV load contact at unmating (nominal 2.00 mm).

2.9 Technical cleanliness

Inside the connector and on the connector, there are no metallic particles *> 1,000 µm allowed*
For metallic particles at each connector: CCC = *N (J4/ K0) acc. to VDA Band 19*
For all other particles at each connector: CCC = *N (J10/ K0) acc. to VDA Band 19*

2.10 Ampacity MCC (derating)

For the detail derating see the product specification of the HPS40-2 2+2 female connector MCC/SCC EPS-100096.

2.11 Assembling/ Disassembling (male plug to device)

The HPS40-2 2+2 plug socket is designed to mount it for one time to the device. At multiple unmating of the plug socket from the device, the sealing must be substituted. Before re-assembling, the plug socket must be checked for functionality and damages from the unmating.

3 Performed tests MCC

Tests acc. to LV214 / LV215 (cf. TLF 0214)
For the details of performed tests see the product specification of the HPS40-2 2+2 female connector MCC/SCC EPS-100096.

4 Result of performed tests

4.1 Insulation resistance

Over complete lifetime: >200 MΩ
Lowering during humidity load: >25 MΩ
In plugged condition between HV contacts, HV contacts and HV interlock contacts, HV contacts and shield as well as HV interlock contacts and shield.

4.2 Contact resistance HV and HVIL

Acc. to LV215-1: 2013-02 (cf. TLF 0214)

wire cross section mm²	contact resistance (total resistance incl. Crimp)	
	new condition mΩ	after aging mΩ
2,5	1,17	2,34
4	0,72	1,44
6	0,68	1,36
acc. to LV215		

	group 1					
wire cross section mm²/ contact sice mm	0,13	0,22	0,35	0,5	0,75	1
0,63	30	30	15	15	15	-
1,2	20	20	15	15	15	15
1,5	-	15	15	15	15	15
2,8	-	15	15	15	15	10
4,8-6,3	-	10	10	8	8	8
8	-	-	-	-	-	-
9,5-12	-	-	-	-	-	-
acc. to LV214						

4.3 Watertightness

IP6K9K and IPx8
PG23 acc. to working group inspection guideline LV214 and LV215 (cf. TLF 0214)

4.4 Vibration load

For the details of vibration load see the product specification of the HPS40-2 2+2 female connector MCC/SCC EPS-100096.

4.5 Amount of mating cycles

Max. 50 cycles (Ag)

4.6 Polarization/ Coding/ Koshiri-safety

Polarizsation efficiency	min. 3x mating force
Coding efficiency	min. 3x mating force
Max. mating force test devices	1x mating force (max. 65 N)
Koshiri-safety	is given

4.7 Retention force of the contact in the housing

HV contacts: Primary locking/ secondary locking min. 120 N
IL contacts: Primary locking/ secondary locking min. 50 N

5 Table of change

Version	Change description	Change date	Editor
1	First edition	03/ 2020	Rümmele M.
2	Complete new set up of EPS-100132	03/ 2023	Natter T.
3	Update design specification	06/ 2023	Jussel E-M.
4	Adjusting data of the bottom line	08/ 2023	Jussel E-M.
5	Adjusting data “Ambient Condition”	10/ 2023	Jussel E-M.
6	Adjusting topic 4.6	12/ 2023	Jussel E-M.
7	Topic 2.9 – update wording VDA	04/ 2024	Jussel E-M.