



PRODUCT SPECIFICATION
HPS40-1 3+2
Female Connector MCC

EPS-100181



HIRSCHMANN
AUTOMOTIVE



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1 General

1.1 Introduction

This product specification is valid for the HPS40-1 3+2 female connector MCC, assembled according to the process specification listed below, 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	807-135-...00
B	Interface drawing	807-136-...00
C	Process specification	EVS-100071
D	Working committee directive LV214 (cf. TLF 0214)	Working committee test specification for motor vehicle plug-in connector – version March 2010
E	Working committee directive LV215 (cf. TLF 0214)	Electrics/ electronic requirements of HV-plug-in connectors – Feb.2009
F	German norm DIN EN 60352-2	Solderless electric connections Part 2: crimp connections
G	DIN EN 60664-1	Insulation coordination for electronic equipment in low voltage systems. Part 1: principles, requirement, and tests
H	2000/53/EG	Directive of the European Parliament and of the council on end-of life vehicles incl. attachments; European Union
I	ISO 6469-3	Electric road vehicles – safety specifications Part 3: protection of persons against electric hazards
J	ISO 26053	Road vehicles; degrees of protection (IP-Code); protection against foreign objects, water, and access; electrical equipment;

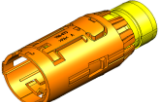






1.3 Product design

1.3.1 BOM, PN, description, weight, MOQ

The HPS40-1 3+2 female connector MCC consists of following parts. (see BOM)

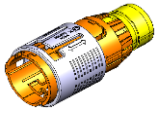





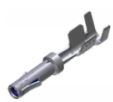
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HPS40-1 3+2 Female 2x 2.5 mm ² without CPA		807-135-...00	Weight without wire:		67,29 g
Article picture	Article description	Article number	Needed parts per system	Packaging unit / MOQ	weight per pcs.
	HPS40-1 locking sleeve without CPA	806-230-515	1	150 pcs.	41,00 g
	HPS40-1 female contact carrier (possible without HVIL bridge)	807-137-501 807-137-505	1	1000 pcs.	5,00 g
	HPS40-1 shield crimp socket	709-115-511	1	2500 pcs.	3,29 g
	HPS40-1 stress relief 2.5 mm ² MCC (Coroplast, Leoni, Kroschu)	709-107-514	1	1000 pcs.	8,00 g
	HPS40-1 cable seal 2.5 mm ² MCC (Coroplast, Leoni, Kroschu)	709-113-514	1	5000 pcs.	8,00 g
	HPS40-1 cover cap 2.5 mm ² MCC (Coroplast, Leoni, Kroschu)	705-749-514	1	1000 pcs.	2,00 g
	HCT4 terminal 2.5 mm ²	Kostal no. 2 21 24 49288 0	2	t.b.d.	0,00 g

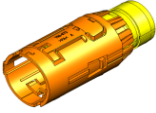






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HPS40-1 3+2 Female 2x 2.5 mm ² with CPA		807-135-...00	Weight without wire:		67,29 g
	HPS40-1 locking sleeve with CPA	806-230-516	1	150 pcs.	41,00 g
	HPS40-1 female contact carrier (possible without HVIL bridge)	807-137-501 807-137-505	1	1000 pcs.	5,00 g
	HPS40-1 shield crimp socket	709-115-511	1	2500 pcs.	3,29 g
	HPS40-1 stress relief 2.5 mm ² MCC (Coroplast, Leoni, Kroschu)	709-107-514	1	1000 pcs.	8,00 g
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	HCT4 terminal 2.5 mm ²	Kostal no. 2 21 24 49288 0	2	t.b.d.	0,00 g

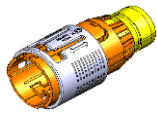






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HPS40-1 3+2 Female 3x 2.5 mm ² without CPA		807-135-...00	Weight without wire:		67,29 g
	HPS40-1 locking sleeve without CPA	806-230-515	1	150 pcs.	41,00 g
	HPS40-1 female contact carrier (possible without HVIL bridge)	807-137-501 807-137-505	1	1000 pcs.	5,00 g
	HPS40-1 shield crimp socket	709-115-511	1	2500 pcs.	3,29 g
	HPS40-1 stress relief 2.5 mm ² MCC (Coroplast, Leoni, Kroschu)	709-107-518	1	1000 pcs.	8,00 g
	HPS40-1 cable seal 2.5 mm ² MCC (Coroplast, Leoni, Kroschu)	709-113-512	1	5000 pcs.	8,00 g
	HPS40-1 cover cap 2.5 mm ² MCC (Coroplast, Leoni, Kroschu)	705-749-518	1	1000 pcs.	2,00 g
	HCT4 terminal 2.5 mm ²	Kostal no. 2 21 24 49288 0	3	t.b.d.	0,00 g

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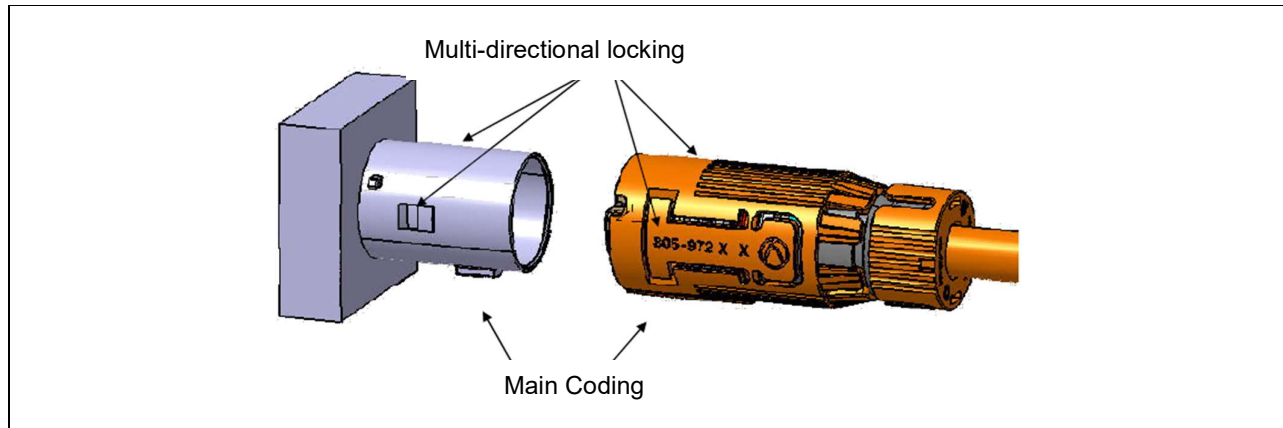


HPS40-1 3+2 Female 3x 2.5 mm ² with CPA		807-135-...00	Weight without wire:		67,29 g
	HPS40-1 locking sleeve with CPA	806-230-516	1	150 pcs.	41,00 g
	HPS40-1 female contact carrier (possible without HVIL bridge)	807-137-501 807-137-505	1	1000 pcs.	5,00 g
	HPS40-1 shield crimp socket	709-115-511	1	2500 pcs.	3,29 g
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	HCT4 terminal 2.5 mm ²	Kostal no. 2 21 24 49288 0	3	t.b.d.	0,00 g

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1.3.2 Product features



- Multi-directional locking
- Main coding/ polarisation
- HPS40-1 locking sleeve is with or without CPA
- HPS40-1 female contact carrier is with or without an integrated HVIL bridge
- HPS40-1 female contact carrier has 1 coding option (A)

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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	750 VDC
Maximum altitude	4,000 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 < U_{eff} ≤ 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

>70 dB (10 kHz to 500 MHz)

>65 dB (5 MHz to 500 MHz)

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2.6 Shield area

Shield transfer: 360° circumferential

Shielding contact resistance $R < 10 \text{ m}\Omega$ (Total from sheathed cable until the device.)

2.7 IP-Degree of protection

IPxxD (plugged female connector)

IPxxB (unplugged female connector)

2.8 HVIL system

Min. 1.00 mm leading HV Interlock contacts to HV load contact at unmating (nominal 2.00 mm).



3 Performed tests MCC

Tests acc. to LV214 / LV215 (cf. TLF 0214)

Details see DVP-Plan HPS40-1 3+2 female connector MCC released validation

1.1	PG 0 – Receiving inspection and testing (contacts + shield)	Insulation resistance $R > 200 \text{ m}\Omega$ at 1,000 VDC; Withstand voltage 2,500 VAC for 1 min. (acc. to DIN EN 1987-3 and LV215)
1.2	PG 1 - Dimension	
1.3	PG 2 – Material and surface test (contacts)	
1.4	PG 3 – Material and surface test (housing)	
1.5	PG 4 – Contact overlap	
1.6	PG 6 – Interaction between terminal and housing	
1.7	PG 7 – Unmating force housing + terminal insurance	
1.8	PG 8 – Insertion and holding force for terminals	
1.9	PG 9 – Koshiri angle safety	
1.10	PG 13 – Derating with housing	Tlimit. 180° C
1.11	PG 17 – Vibration load	Class 3 acc. to LV214 Class 2 for shielding contact $> 10 \text{ m}\Omega$
1.12	Costal environmental load (salt spray test) / salt spray test as per KLH 91.1.4.10	720 h, 35° C, salt conc. 5% weight
1.13	PG 19 – Environmental simulation PG 19.1 – Temperature shock PG 19.2 – Change of temperature PG 19.3 – Storage under dry head conditions PG 19.4 – Industrial environment PG 19.5 – Temperature change, constant humidity as per 6.1.7	Duration 14 d -10° C/ 65° C, 93% rel. humidity, 240 h
1.14	PG 20 – Climatic load	
1.15	Durability humidity, heat	85° C/ 85% r.H., 1,485 h
1.16	Low temperature endurance test 6.1.2	-50/-40° C, 120 h
1.17	PG 21 - Long term storage	1,000 h/ 130° C
1.18	PG 22 - Chem. resistance	
1.19	PG 23 – Water leak tightness	MCC: All cross sections (2.5 mm ² / 4.0 mm ² / 6.0 mm ²) SCC: 5.0 mm ²
1.20	PG 28 – Locking noise	acc. LV214-1
1.21	Fall test unpacked, with HV wiring harness as per 6.2.5	One fall from 1 m on all 6 sides
1.22	Protection against direct contact	IPxxB open / IPxxD closed (plugged in)
1.23	Proof of air and leakage distance	4.0 mm air and creepage distance

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4 Result of performed tests

4.1 Ampacity MCC (I/t) measurement results

3x 2.5 mm² with HCT4 circular contact

Ambient temperature		80	-	-	-
Current (A)	2.5 mm ²	35	-	-	-

4.2 Watertightness

IP6k9k and IPx8

PG23 as per working group inspection guideline LV214 and LV215 (cf. TLF 0214)

4.3 Vibration load

Vibration stability: PG17 acc. To working group inspection guideline LV214 and LV215 (cf. TLF 0214)

Fixing length: Free cable length between connector and first cable fixing point, where the cable is fixed with the same oscillation as the connector. The cable fixing must be designed for every operation mode.

Vibration class severity level 2

without fixation point

Vibration class severity level 3

first fixation point at < 100 mm

4.4 Amount of mating cycles

Max. 50 cycles (Ag)

4.5 Polarization/ Koshiri-safety

Failed insertion force min. 300 N

Koshiri-safety is given

4.6 Retention force of the contact in the housing

HV contacts:

Primary latching mechanism / secondary latching mechanism min. 150 N

HVIL contacts (MLK 1.2/ MCON 1.2):

$F_{\text{Primary}} \geq 60 \text{ N}$ (contact holding force for 60 sec)

4.7 Secondary locking

Activation force < 40 N

No unintentional opening is possible.

4.8 Mating/ Unmating force

Assembly force for the female plug in the plug socket with CPA:	< 75 N
Assembly force for the female plug in the plug socket without CPA:	< 100 N
Disassembly force from the female plug out of the plug socket with CPA:	< 75 N
Disassembly force from the female plug out of the plug socket with CPA:	< 100 N
Holding force for the female plug in the plug/ plug socket:	> 150 N
Contact loading force in the socket housing:	< 15 N

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5 Table of change

Change description	Change date	Editor
First edition	06/ 2023	Jussel E-M.
Adjusting data of the bottom line	08/ 2023	Jussel E-M.
Adjusting data "Ambient Condition"	10/ 2023	Jussel E-M.