HMI140 / HMI145 / HMI150

Interface module for Bender charge controllers

Figure depending on the variant

HMI1xx_D00481_01_D_XXEN/03.2025

BENDER

Device features (depending on the variant)

- Control via USB
- Power supply via USB or external DC power supply
- RFID reader for authorization of the charging process
- 11 full-colour RGB LEDs for static or animated visualization of different operating states
- Buzzer for acoustic signalling of states or for confirming user input
- Relay output (single-pole changeover contact)
- Integrated WiFi module (front-end module)
- Two USB host outputs
- Controllable full-colour RGB LED outputs
- Digital control input
- Ambient light sensor
- Temperature sensor

Intended use

The Human Machine Interface module, hereafter referred to as the HMI module, is a separate PCB that facilitates user interaction with the charging system. The HMI module is connected to the charge controller, which is the main component of the charging system, using a USB cable. The module must only be used in combination with charge controllers* from Bender GmbH & Co. KG that support the operation of the HMI module. Any other use than that described in this manual is regarded as improper.

*The charge controllers are designed for use in electric vehicle (EV) charging stations, such as wall boxes and street light charging points.

Product description

The HMI module enhances the charge controller of a charging system for electric vehicles by adding actuators, sensors and communication interfaces. It facilitates a user's interaction with the charging system. The HMI module is a passive unit that is subordinate to the control function of the charge controller. The response to sensor values can be configured in the charge controller or must be adapted there by means of software modifications.

Functional description

The functions depend on the charge controller in use!
The user of the charging equipment will find different operating procedures and special display and operating options for the individual components of the HMI module.

Approvals

CE UKCA

Use in the EU and other countries

The conformity with the relevant EU directives permits operation of the device exclusively in countries of the European Economic Area.

The conformity with the relevant UKCA directives permits operation of the device exclusively in the United Kingdom.

Declarations of conformity

EU Declaration of conformity

Hereby, Bender GmbH & Co. KG declares that the device covered by the Radio Directive complies with Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following Internet address:

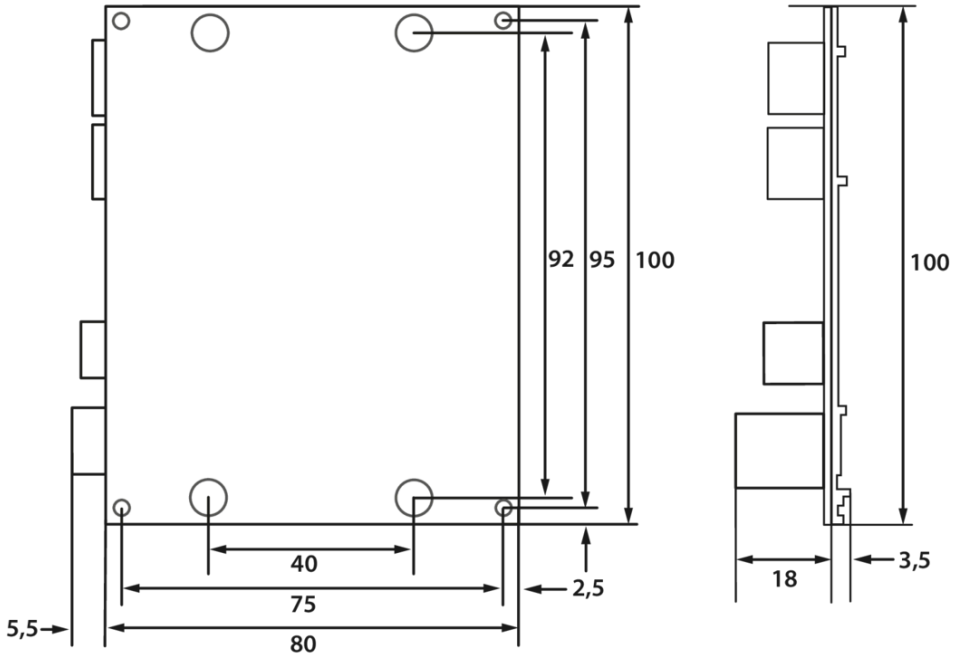
https://www.bender.de/fileadmin/content/Products/CE/CEKO_HMIxxx.pdf

UK Declaration of Conformity

Hereby, Bender GmbH & Co. KG declares that this device is in compliance with Radio Equipment Regulations 2017 (S.I. 2017/1206). The full text of the UK declaration of conformity is available at the following internet address:

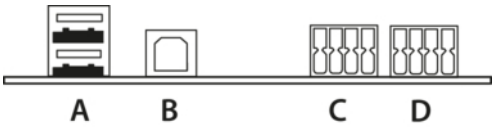
https://www.bender.de/fileadmin/content/Products/UKCA/UKCA_HMIxxx.pdf

Dimension diagram



Dimensions in mm

Connection



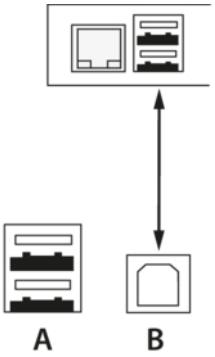
Definition of connections

Terminal	Description
A	USB type A: 2 x USB host
B	USB type B: Charge controller (controller interface, 5 V supply)
C	Phoenix Contact PCB terminal, 8-pole: Additional DC supply, FE, relay switching contacts, control input
D*	Phoenix Contact PCB terminal, 8-pole: External RGB LEDs

* LEDs can be connected without series resistors (constant current control)

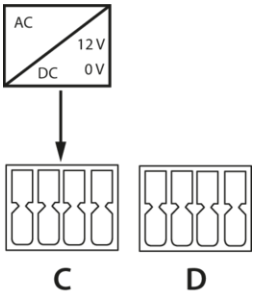
Voltage supply connection

Voltage supply connection, 5 V from the charge controller via USB



Always required for controlling the unit

Connection of additional DC supply (e.g. charge controller, external power supply unit)*

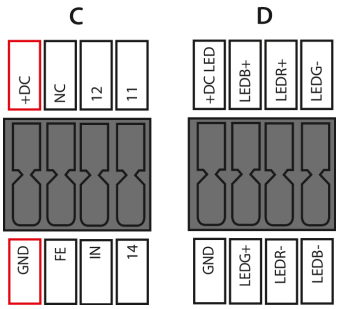


Required when using

- USB host output (type A)
- External RGB LEDs
- Relay switching output
- WiFi

* Terminal C, red marked (see chapter "Connection assignment, terminals C and D", page 4)

Connection assignment, terminals C and D



Terminal C: Phoenix Contact DMC 1.5/ 4-G1-3.5 P26THR R44 (2x4-pole)

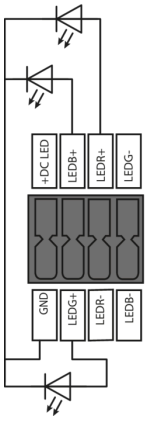
Designation	Description
+DC	DC supply voltage input
GND	Ground of the voltage supply and control signals
Function- al earthing	FE input (EMC functional earthing)
12	Relay 12: GPIO NC contact
11	Relay 11: GPIO changeover contact
14	Relay 14: GPIO N/O contact
IN	Digital control input
NC	Not connected

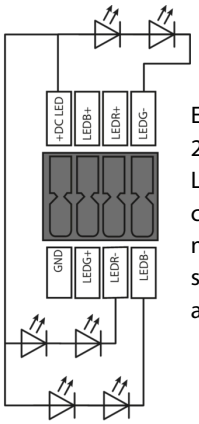
Terminal D: Phoenix Contact DMC 1.5/ 4-G1-3.5 P26THR R44 (2x4-pole)

Designation	Description
+DC LED	LED supply voltage output (shared anode)
GND	LED ground (shared cathode)
LEDR+	LED output red +
LEDR-	LED output red -
LEDG+	LED output green +
LEDG-	LED output green -
LEDB+	LED output blue +
LEDB-	LED output blue -

Examples for connecting the external RGB LED outputs

Example 1: LED with shared cathode





Example 2: Two LEDs per channel with shared anode

Tabular data

Insulation coordination according to IEC 60664-1 / IEC 60664-3

Rated voltage	15.8 V
Pollution degree	2
Operating altitude AMSL	≤ 2000 m

Supply voltage

External DC (terminal C: +DC / GND)	
Nominal voltage	DC 12 V
Voltage range	11.4…15.8 V
max. power consumption without USB load HMI140 / 145 / 150	3.5 / 7.5 / 9.5 W
max. power consumption with USB load HMI145 / 150	14.0 / 16.0 W

DC 5 V from charge controller (terminal B)	
Nominal voltage	DC 5 V
Nominal voltage tolerance	± 5 %
max. nominal current	500 mA

Interface data

USB	
Charge controller connection	USB port type B; USB 2.0, current requirement max. 500 mA
USB host 1 (terminal A1)	USB port type A; USB 2.0, load up to max. 500 mA
USB host 2 (terminal A2)	USB port type A; USB 2.0, load up to max. 500 mA
RFID reader	
Frequency	13.56 MHz
max. field strength (distance of 10 m)	42 dBµA/m
Standard	ISO/IEC 14443 type A, MIFARE
WiFi	
Standard	IEEE 802.11b/g/n
Frequency bands	2.4 GHz
Channels 1-13	2.412 GHz - 2.472 GHz
Channel bandwidth	20 MHz
Data rates	802.11b 1, 2, 5.5, 11 Mbps 802.11g 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n MCS0-MCS7 (max. 72.2 Mbps)
max. output power	19 dBm EIRP

Inputs

Control input (terminal C: IN)	
Input voltage	DC 0…15.8 V[1]
max. Input current	1.5 mA
max. switching frequency	5 Hz
EMC functional earthing (terminal C: FE)[2]	

[1] low: ≤ 1.2 V; high: ≥ 2.0 V (or not connected)

[2] as needed, for connection to metallic chassis or housing parts connected to PE for improved EMC performance.

Outputs

Relay (terminal C: 11 / 12 / 14)	
Contact layout	Changeover contact (design C)
Rated operational voltage (to GND and between open contacts)	DC 15 V
Rated operational current	DC 1 A
External LED connection (terminal D)	
Rated voltage	DC 15 V
LED current per output (constant current, controlled)	0…60 mA
Voltage, shared anode (terminal D, +DC LED)	≈ external DC - 0.3 V
Voltage, shared cathode (terminal D, GND)	0 V

Environment / EMC

Operating temperature	-30…+70 °C
Classification of climatic conditions according to IEC 60721:	
stationary use (IEC 60721-3-3)	3K23 (except condensation, water and formation of ice)
Transport (IEC 60721-3-2)	2K11
Long-term storage (IEC 60721-3-1)	1K21
Classification of mechanical conditions according to IEC 60721	
stationary use (IEC 60721-3-3)	3M11
Transport (IEC 60721-3-2)	2M4
Long-term storage (IEC 60721-3-1)	1M12
EMC environmental classes	
Emitted interference	B (residential, business or commercial areas)
Interference immunity	A (industrial environment)

Connection lengths / cable types

USB host A1 and A2	
max. cable length	1.8 m
Cable type	double shielded
Charge controller connection (terminal B)	
max. cable length	1.8 m
Cable type	double shielded
recommended connection cables	hama: 00200602 Delock: 83892, 83893 Good Connection: GC2510-2TQ
External DC supply, FE, relay, control input, external LEDs (terminals C and D)[1]	
Connection data	
rigid / flexible	0.2…1.5 mm² (AWG 24…16)
flexible with ferrule without plastic sleeve	0.25…1.5 mm² (AWG 24…16)
flexible with ferrule with plastic sleeve	0.14… 0.75 mm² (AWG 26…18)
Stripping length	10 mm
max. cable length	1.8 m

[1] FE connection as required with the lowest possible impedance, at the remaining connections, cables of the respective function groups in twisted pairs or equivalent

Ordering information

Type	RFID reader	RGB LEDs	Digital control input	USB host connection	WiFi	RGB LED output	Relay output	Sensors (light, temperature)	Buzzer	Part No.	Manual no.
HMI150	✓	✓	✓	✓	✓	✓	✓	✓	✓	B94060150	D00481
HMI145	✓	✓	✓	✓	-	✓	✓	-	✓	B94060151	D00481
HMI140	✓	✓	✓	-	-	-	✓	-	-	B94060152	D00481

Bender GmbH & Co. KG

Londorfer Straße 65
35305 Grünberg
Germany

Tel.: +49 6401 807-0
info@bender.de
www.bender.de