

ehb SMARTdisplay 812

12" PROGRAMMABLE DISPLAY FOR USE
IN VEHICLES AND OFF-HIGHWAY MACHINERY

ehb5531



KEY FEATURES/SUMMARY

- Robust HMI/programmable display specifically designed for mobile applications
- Optically bonded 12.1" TFT, 1280 x 800 16:10 resolution, colour
- Capacitive touch with glove support
- Two hardware variants available, one with keys with configurable colour back light and touchscreen. One with touchscreen only (non keyed)
- iMx6 quad processor
- 16 GB flash, 2 GB RAM
- Wake-up providing fast boot functionality
- USB host connections
- 4 analogue (composite video) camera support (PAL/NTSC)
- 3 independent CAN interfaces. Each configurable as J1939, CANopen or Raw CAN
- 2 independent Ethernet interfaces, via M12 connectors (Camera support - RTP, RTSP, H264, MJPEG)
- 6 configurable outputs
- 6 inputs (digital, resistive, voltage, 0 – 20 mA, 4 – 20 mA, frequency input)
- Wi-Fi support (external antenna required)
- GPS (external antenna required)
- Flexible user programming via CODESYS 3.5 or Qt
- Built-in Web browser for communicating data over HTML

OVERVIEW

DC SUPPLY

8 V DC to 32 V DC

CURRENT CONSUMPTION

OPERATING CURRENT
< 1000 mA at 12 V and 24 V without external loads

DISPLAY

12.1 inch TFT, 1280 x 800 16:10 resolution
24 bit colour
Optically bonded

INPUTS/OUTPUTS (total)

6 inputs / 6 outputs

INPUTS

Configurable,
Digital inputs (positive / negative)
Analogue inputs (Voltage 0 V to 5 V, 0 V to 10 V, 0 V to 32 V, current 4 mA to 20 mA, Ratiometric, Resistive, Frequency)

OUTPUTS

Configurable
Digital Output High-Sided/Low-Sided/PWM

INTERFACES

CAN 1 to 3

CAN Interfaces 2.0 A/B, ISO11898
50 kbit/s... 1 Mbit/s
CANopen, SAE J1939 or Raw CAN

ETHERNET

10 Mbit/s / 100 Mbit/s, Duplex

USB

USB Host 2.0 (12 Mbit/s)

WIFI

WiFi 2.4 GHz
IEEE 801.11 a/b/g/n/ac

BLUETOOTH

Bluetooth 4.1
Supports BR, EDR and BLE
(Qt variant only)

DIMENSIONS

KEYED

330 mm x 210 mm x 63.5 mm (W x H x D)
12.99" x 8.26" x 2.5" (W x H x D)

NON KEYED

330 mm x 210 mm x 59.7 mm (W x H x D)
12.99" x 8.26" x 2.35" (W x H x D)

WEIGHT

2.12 kg

STORAGE TEMPERATURE RANGE

-30 °C to +80 °C
-22 °F to +176 °F

OPERATING TEMPERATURE RANGE

-20 °C to +70 °C
-4 °F to +158 °F

PROTECTION RATING

IP67/NEMA 6 (with mating connectors)

MOUNTING

RAM / Panel Mount

ehb electronics gmbh
Hans-Böckler-Str. 20, D-30851 Langenhagen
TELEPHONE +49 (0) 511 12 32 07-0
EMAIL info@ehb-electronics.de WEBSITE www.ehb-electronics.de

Technical Data

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Supply		Connector B
Operating voltage	8 V DC to 32 V DC	Pin 1
Unit power supply maximum current consumption, full backlight (no external loads)	< 1000 mA at 24 V	
Unit power supply current consumption after controlled shutdown has occurred due to the ignition being turned off	< 50 mA at 24 V	
Fusing		Connector B
Unit power supply external protection fuse rating	3 A	Pin 1
High current outputs supply input external fuse protection rating (i.e. sum of output currents from all outputs provided for by an individual supply to < external fuse rating in total)	8 A or 16 A	Pin 9
Housing		
PC PBT alloy plastic resin		
Dimensions		
KEYED - 330 mm x 210 mm x 63.5 mm (W x H x D) / 12.99" x 8.27" x 2.5" (W x H x D)		
NON KEYED 330 mm x 210 mm x 59.7 mm (W x H x D) / 12.99" x 8.27" x 2.35" (W x H x D)		
Weight		
2.12 kg		
Temperature		
Operating temperature	-20 ° C to +70 ° C / -4 ° F to +158 ° F	
Storage temperature	-30 ° C to +80 ° C / -22 ° F to +176 ° F	
Protection Rating		
IP rating	IP67 (with mating connectors)	
Display		
Resolution, pixel	1280 x 800	
Colour	24 bit	
Format	12.1" diagonal	
Touchscreen	Capacitive touch with glove support	
Mounting	Optically bonded	
Illumination	LED (lifetime > 50,000 hrs)	

Technical Data

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Connectors		
Connector A - TE Connectivity AMPSEAL 3 Row 23 Way	CAT-AM78-CH8172 Part Number: 770680-1	
Connector B - TE Connectivity AMPSEAL 3 Row 23 Way	CAT-AM78-CH8172 Part Number: 770680-4	
Ethernet (2)	M12, D-coded 4 pole socket	
USB	M12, B-coded 5 pole socket	
GPS	RF – SMA Female (outside thread, female centre pin) (Suits antenna with SMA Male connector (inside thread, male centre pin))	
WiFi		
Bluetooth		
Digital Inputs		Connector B
Digital inputs configured high or low		Pin 13, 14, 17, 18, 21, 22
High level voltage threshold	Configurable, Default 6 V	
Low level voltage threshold	Configurable, Default 2 V	
Analogue Voltage Inputs		Connector B
0 V to 5 V programmable voltage range	0 V to 5 V	Pin 13, 14, 17, 18, 21, 22
0 V to 10 V programmable voltage range	0 V to 10 V	
0 V to 32 V programmable voltage range	0 V to 32 V	
Voltage measurement resolution	12 bits	
Voltage measurement accuracy	± 2% FSD	
Voltage measurement input resistance	≥ 30 kΩ	
Voltage measurement sampling rate	2 ms	
<i>FSD = Full Scale Deflection</i>		

Technical Data

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Analogue Current Inputs		Connector B
Current measurement direction	Current sink only	13, 14, 17, 18, 21, 22
Current measurement ranges	0 mA to 20 mA	
	4 mA to 20 mA	
Current measurement resolution	12 bits	
Current measurement accuracy	± 1% FSD	
Current measurement input sink resistance	120 Ω ± 1%	
Current measurement sampling rate	2 ms	
<i>FSD = Full Scale Deflection</i>		
Analogue Resistive Inputs		Connector B
Resistance measurement range	0 Ω to 3400 Ω	13, 14, 17, 18, 21, 22
Resistance measurement source voltage	12 V maximum	
Resistance measurement current	1 mA	
Resistance measurement resolution	12 bits	
Resistance measurement accuracy	± 1% FSD	
Resistance measurement sampling rate	2 ms	
<i>FSD = Full Scale Deflection</i>		
Analogue Ratiometric Inputs		Connector B
Voltage ratiometric measurement voltage range		13, 14, 17, 18, 21, 22
Voltage ratiometric measurement Vref	Supply/Vref	
Voltage ratiometric measurement	Ratio of input pin to supply voltage	
Voltage ratiometric measurement accuracy	± 1% FSD	
<i>FSD = Full Scale Deflection</i>		
Frequency Inputs		Connector B
Frequency range	5 Hz to 30 kHz	13, 14, 17, 18, 21, 22
Resolution	100 Hz at max. freq	
Accuracy	400 Hz at max. freq	
Maximum space voltage	< 1.4 V	
Minimum mark voltage	> 2 V	
Digital Outputs High Side Only (2)		Connector B
Switching current	4 A	2, 3
Digital output active high 'ON' state internal voltage drop at rated current	< 2 V	
Digital output active high 'OFF' state leakage current	< 10 µA	
Digital Outputs Low Side / High Side Configurable (4)		Connector B
Switching current Low Side / High Side	4 A / 2 A	6, 7, 19, 20
Digital output active low 'ON' state maximum voltage at rated current	< 2 V	
Digital output active low 'OFF' state leakage current	< 2 mA	
PWM (High Side Only)		Connector B
PWM frequency	20 Hz to 250 Hz	2, 3
Duty cycle resolution	0.1 %	
Precision	0.1 % (<=250 Hz) 1 % (>250 Hz)	
Reference Voltage		Connector B
Reference voltage output	Programmable 5 V or 10 V, 100 mA accuracy ±5 %	10
		VRef GND Pin 16

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RTC		
Real time clock	Standard RTC, powered by super cap, backup time 100 hours	Recharge time is 30 minutes.
Camera		
4 analogue composite video (PAL/NTSC) cameras	4	Connector A Pin 4, 5, 7, 8, 13, 14, 15, 23
CAN Interfaces		
Number of CAN ports	3	Connector A Pin 10, 11, 12, 17, 18, 19, 20, 21, 22
Supported protocols	J1939, CAN open, Raw CAN	
Supported programmable baud rates	50 kbit/s, 125 kbit/s, 250 kbit/s, 500 kbit/s, 800 Mbit/s, 1 Mbit/s	
Ethernet Interface		M12, 4 pole
Number of Ethernet ports	2	D-coded 4 pole socket
Supported data rates	10/100 Mbit/s	
Supported protocols	Modbus TCP CODESYS 3.5	
USB Interface		M12, 5 pole
Number of USB host ports	1	B-coded, 5 pole socket
Supported USB version	2	
Speeds supported	Full speed (12 Mbit/s)	
Device class supported	08 (Mass Storage)	
Supported filing system	FAT32	
Processor		
iMX6 Quad Microcontroller	ARM A9	
	1 GHz	
Memory		
Flash	16 GB (12.5 GB to CODESYS)	
RAM	2 GB	
Environmental and Testing		
CE marking	Electromagnetic compatibility (EMC) noise immunity	EN61000-6-2
	Electromagnetic compatibility (EMC) emission standard	EN61000-6-4
	Safety of information technology equipment, general requirements	EN 61010: 2010 +A1: 2019
E11(pending)		UN/ECE-R10.05
Water and dust	IP67 (NEMA 6)	IEC60529
Mechanical tests	Vibration & resonance search (Freq range: 10Hz to 2 kHz, Acceleration: 5 g)	EN60068-2-6
	Vibration general resonance dwell (Freq range: 5Hz to 500 Hz, Acceleration: 5 g / 10 g TBD)	EN60068-2-6
	Vibration random (Freq range: 10 Hz to 350 Hz)	EN60068-2-64
	Mechanical shock (Operational, shock pulse shape: half sine, amplitude: 50 g, duration: 11 ms, number of shocks: 3 in each direction of each axis (9 in total of each duration)	EN60068-2-27
	Mechanical shock (Amplitude: 50 g, duration: 6 ms)	EN60068-2-27
Load dump	151 V (Ri 1 Ω) 202 V (Ri 8 Ω)	ISO16750-2

Technical Data

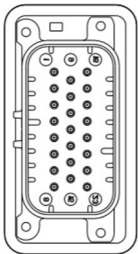
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Additional Hardware	Part No
SD812 Keyed Mount Kit	On request
SD812 Non Keyed Mount Kit	On request
SD812 Wiring Harness 1.2 m length	On request
SD812 Connector Set (includes 8 A connector pins)	On request
2.4 GHz WiFi / Bluetooth Antenna	On request
GPS Antenna SMA (M) 3 M Cable	On request
Ethernet Programming Cable	M11350
M12 to USB Cable	M11351
Relay module 2-channel 12V	ehb5535
Related Materials	Part No
SD812 Operator Manual	On request
SD812 CODESYS Manual	On request
SD812 Qt Manual	On request
Product Variants	Part No
SD812 Touchscreen Keyed - CODESYS	ehb5531-1
SD812 Touchscreen Non Keyed - CODESYS	ehb5531-2
SD812 Touchscreen Keyed - Qt	ehb5531-3
SD812 Touchscreen Non Keyed - Qt	ehb5531-4

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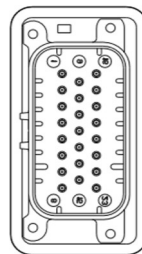
12" PROGRAMMABLE DISPLAY FOR USE IN VEHICLES AND OFF-HIGHWAY MACHINERY

Model Shown is M812-01 / M812-03.
 Dimensions same for M812-02 / M812-04 except depth which is 59.7 mm / 2.35".



Connector A

PIN	DESCRIPTION
1	Product Supply +VE/Battery
2	Wake Up
3	Ignition +VE (15)
4	Camera 1 Signal
5	Camera 1 GND
6	Program Enable
7	Camera 2 Signal
8	Camera 2 GND
9	Product Supply -VE/Battery
10	CAN1_shield/GND
11	CAN1 H
12	CAN1 L
13	Camera 3 Signal
14	Camera 3 GND
15	Camera 4 Signal
16	Product Supply -VE/Battery
17	CAN2_shield/GND
18	CAN2 H
19	CAN2 L
20	CAN3_shield/GND
21	CAN3 H
22	CAN3 L
23	Camera 4 GND



Connector B

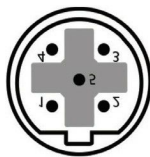
PIN	DESCRIPTION	
1	I/O Supply +ve	
2	Output 1	OUT H, PWM
3	Output 2	OUT H, PWM
4	GND	
5	GND	
6	Output 3	OUT H,L
7	Output 4	OUT H,L
8	GND	
9	I/O Supply +ve	
10	Vref Out +ve	
11	GND	
12	GND	
13	Input 1	AIN
14	Input 2	AIN
15	GND	
16	AGND	
17	Input 3	AIN
18	Input 4	AIN
19	Output 5	OUT H,L
20	Output 6	OUT H,L
21	Input 5	AIN
22	Input 6	AIN
23	GND	



Ethernet

M12 'D' coded - 4-pin female

Pin - 01	TX+
Pin - 02	RC+
Pin - 03	TX-
Pin - 04	RC-



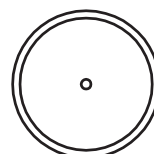
USB Host

M12 'B' coded - 5-pin female

Pin - 01	+5 V DC
Pin - 02	Data -
Pin - 03	Data +
Pin - 04	0 V
Pin - 05	Shield

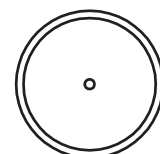
WiFi

RF – SMA Female
 (outside thread, female centre pin)
 (Suits antenna with SMA Male connector (inside thread, male centre pin))



GPS

RF – SMA Female
 (outside thread, female centre pin)
 (Suits antenna with SMA Male connector (inside thread, male centre pin))



ABBREVIATIONS
 OUT PWM, H, L
 OUT H
 AIN
 A GND

Output can be configured as a PWM, PWMi, digital high-side or digital low-side
 Output is digital high
 Input can be configured to accept signals from positive digital, negative digital, 0V to 10V, 4mA to 20mA, ratiometric or resistive
 Ground connection for the analogue input channels

