DSEControl®

DSEM812

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

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 to 3rd party devices

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 kbits/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

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Technical Data

DSE**M812**

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

DSE**M812**

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	
FSD = Full Scale Deflection		

Technical Data

DSE**M812**

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	
FSD = Full Scale Deflection		
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	
FSD = Full Scale Deflection		
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	
FSD = Full Scale Deflection		
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

Technical Data

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RTC		
Real time clock	Standard RTC, powered by super cap, backup time 100 hours	Recharge time is 30 minutes.
Camera		**Connector A**
4 analogue composite video (PAL/NTSC) cameras	4	Pin 4, 5, 7, 8, 13, 14, 15, 23
CAN Interfaces		**Connector A**
Number of CAN ports	3	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	BS 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

DSE**M812**

Additional Hardware	**Part No**
M812 Keyed Mount Kit	100-411-01
M812 Non Keyed Mount Kit	100-411-02
M812 Wiring Harness 1.2 M	016-185
M812 Connector Set (includes 8 A connector pins)	007-1073
2.4 GHz WiFi / Bluetooth Antenna	020-1080
GPS Antenna SMA (M) 3 M Cable	020-1079
Ethernet Programming Cable	016-160
M12 to USB Cable	016-161
Related Materials	**Part No**
M812 Operator Manual	057-317
M812 CODESYS Manual	057-318
M812 Qt Manual	057-319
Product Variants	**Part No**
M812 Touchscreen Keyed - CODESYS	M812-01
M812 Touchscreen Non Keyed - CODESYS	M812-02
M812 Touchscreen Keyed - Qt	M812-03
M812 Touchscreen Non Keyed - Qt	M812-04

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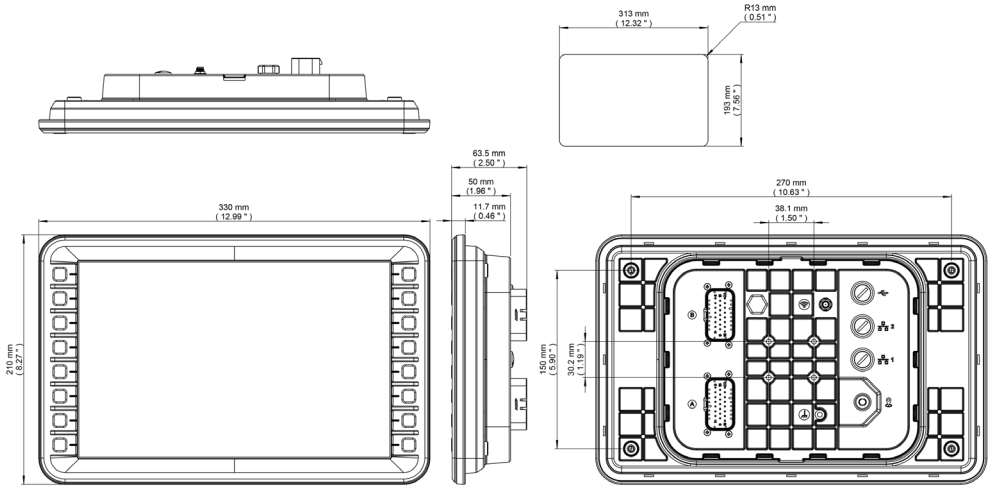
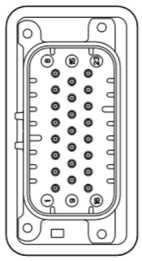
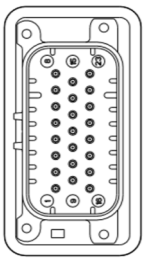


Model Shown is M812-01 / M812-03. Dimensions same for M812-02 / M812-04 except depth which is 59.7 mm / 2.35”.



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-

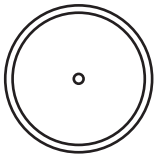
USB Host

M12 ‘B’ coded - 5 pin female

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

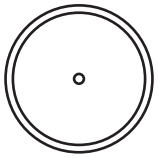
WiFi

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

CE E11 Pending

055-267/12/21 (5)