DSEControl®

DSEM840

PROGRAMMABLE DISPLAY FOR USE IN VEHICLES AND OFF-HIGHWAY MACHINERY

KEY FEATURES / SUMMARY

- Robust HMI/programmable display specifically designed for mobile applications
- Optically bonded 4.3” colour screen for harsh environments
- Powerful Cortex M7 400 MHz clock speed + M4 200 MHz clock speed
- 64 MB of SDRAM / 20 MB CODESYS Application / 20 MB User Data
- 8 KB retained data
- 4 configurable inputs, digital and analogue capability
- 4 configurable digital outputs (2 x PWM)
- 2 independent CAN interfaces, J1939, CAN open and Raw CAN
- 1 analogue camera interface PAL and NTSE formats
- Flexible user programming via CODESYS 3.5
- IP67 protection/NEMA 6

ADDITIONAL HARDWARE	DSE PART
Deutsch connector A, 18 way complete with pins	007-850
M840 connector harness	016-168
Ethernet programming cable	016-160
M12 to USB cable	016-161

PRODUCT VARIANT

M840-02

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
480 px x 272 px
24 bit colour
Optically bonded

INPUTS/OUTPUTS (total)
4 inputs / 4 outputs

INPUTS
Configurable,
Digital inputs (active high / active low)
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
2 x PWM

INTERFACES
CAN 1.2
CAN Interfaces 2.0 A/B, ISO11898
50 kbits/s... 1 Mbit/s
CAN Open, SAE J1939 or Raw CAN
ETHERNET
10 Mbit/s / 100 Mbit/s, Duplex

USB
USB Host 2.0 (12 Mbit/s)

DIMENSIONS
131 mm x 208 mm x 56 mm (H x W x D)
5.15” x 8.2” x 2.2” (H x W x D)

WEIGHT
< 1 kg

STORAGE TEMPERATURE RANGE
-40 ° C to +80 ° C
-40 ° F to +176 ° F

OPERATING TEMPERATURE RANGE
-30 ° C to +70 ° C
-22 ° F to +158 ° F

PROTECTION RATING
IP67/NEMA 6 (with mating connectors)

MOUNTING
4 x M5 bolts / RAM arm

RELATED MATERIALS

TITLE	PART NO.
M840 Installation Instructions	053-188
M840 Operators Manual	057-248

DEEP SEA ELECTRONICS LTD
Highfield House, Hunmanby Industrial Estate, Hunmanby YO14 0PH
TELEPHONE +44 (0) 1723 890099 **FACSIMILE** +44 (0) 1723 893303
EMAIL sales@deepseaelectronics.com **WEBSITE** www.deepseaelectronics.com

DEEP SEA ELECTRONICS INC
3230 Williams Avenue, Rockford, IL 61101-2668 USA
TELEPHONE +1 (815) 316 8706 **FACSIMILE** +1 (815) 316 8708
EMAIL usasales@deepseaelectronics.com **WEBSITE** www.deepseaelectronics.com

Registered in England & Wales No.01319649
VAT No.316923457

055–222/11/22 (11)

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Technical Data

DSE**M840**

Supply		**Connector A**
Operating voltage	8 V DC to 32 V DC	Pin 7
Unit power supply maximum current consumption, full back light (no external loads)	< 1000 mA at 12 V and 24 V	
Unit power supply current consumption after controlled shut down has occurred due to the ignition being turned off	< 5 mA at 24 V	
Fusing		**Connector A**
Unit power supply external protection fuse rating	3 A	Pin 7
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)	10 A	Pin 7
Housing		
PC PBT alloy plastic resin		
Dimensions		
131 mm x 208 mm x 56 mm (H x W x D) / 5.15” x 8.2” x 2.2” (H x W x D)		
Weight		
< 1 kg		
Temperature		
Operating temperature	-30 ˚ C to +70 ˚C / -22 ˚ F to +158 ˚ F	
Storage temperature	-40 ˚ C to +80 ˚C / -40 ˚ F to +176 ˚ F	
Protection Rating		
	IP67 (mating connectors)	
	NEMA 6 (mating connectors)	
Display		
Resolution, pixel	480 px x 272 px	
Colour	24 bit	
Format	4.3” diagonal	
Mounting	Optically bonded	
Illumination	LED (lifetime > 50,000 hrs)	
Connectors		
Connector A	18 pin TE connectivity DT16-18SA-K004	
Ethernet	M12, D-coded 4 pole socket	
USB	M12, B-coded 5 pole socket	
Digital Inputs		**Connector A**
Digital inputs configured high or low		Pin 10, 11, 16, 17
High level voltage threshold	> 6 V	
Low level voltage threshold	< 2 V	
Analogue Voltage Inputs		**Connector A**
0 V to 5 V programmable voltage range	0 V to 5 V	Pin 10, 11, 16, 17
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	± 1% FSD	
Voltage measurement input resistance	≥ 30 kΩ	
Voltage measurement sampling rate	500 Hz	
FSD = Full Scale Deflection		

DSEM840

Analogue Current Inputs		Connector A
Current measurement direction	Current sink only	Pin 10, 11, 16, 17
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	150 Ω ± 1%	
Current measurement sampling rate	500 Hz	
FSD = Full Scale Deflection		
Analogue Resistive Inputs		**Connector A**
Resistance measurement range	0 Ω to 3200 Ω	Pin 10, 11, 16, 17
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	500 Hz	
FSD = Full Scale Deflection		
Analogue Ratiometric Inputs		**Connector A**
Voltage ratiometric measurement voltage range		Pin 10, 11, 16, 17
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 A**
Frequency range	5 Hz to 30 KHz	Pin 10, 11, 16, 17
Resolution	100 Hz at max. freq	
Accuracy	400 Hz at max. freq	
Maximum space voltage	< 0.9 V	
Minimum mark voltage	> 2.4 V	
Digital Outputs High Side		**Connector A**
Switching current	1 A	Pin 2, 3, 4, 5
Digital output active high ‘ON’ state internal voltage drop at rated current	< 1500 mV	
Digital output active high ‘OFF’ state leakage current	< 10 µA at 24 V	
Digital Outputs PWM		**Connector A**
Applicable pins		Pins 2, 3
Maximum current	1 A	
P.W.M. active high ‘on’ state maximum voltage drop at rated current	< 1500 mV	
P.W.M. active high ‘off’ state leakage current	< 10 µA at 24 V output supply	
P.W.M. frequency	0 Hz to 250 Hz	
P.W.M. duty cycle range	0 % to 100 % (subject to minimum pulse width)	
P.W.M. duty cycle resolution	0.1 %	
P.W.M. minimum mark (on pulse) width	200 µs	
P.W.M. minimum space (off pulse) width	200 µs	

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Digital Outputs Low Side		**Connector A**
Switching current	1 A	Pin 2, 3, 4, 5
Digital output active low ‘ON’ state maximum voltage at rated current	< 500 mV	
Digital output active low ‘OFF’ state leakage current	< 2 mA at 24 V	
Reference Voltage		**Connector A**
Reference voltage output	Programmable 5 V or 10 V, 100 mA accuracy ±5%	6
		VRef GND Pin 18
Auxiliary Voltage		**Connector A**
8 V - 32 V ignition input	Max 150 mA	Pin 13
RTC		
Real time clock	Standard RTC, backup time ~ 5 years	
Camera		**Connector A**
Analogue video input (supported video standards: PAL and NTSC)	1	12,18
CAN Interfaces		**Connector A**
Number of CAN ports	2	Pin 8, 9, 14, 15
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	1	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		
STM32H745	M7 400 MHz + M4 200 MHz	
Memory		
Flash	20 MB CODESYS / 20 MB User Data / 2 MB CODESYS Log / 8 KB retained data	64 MB
RAM	64 MB	

DSE**M840**

LED Status			
Colour	**Description**	**Operation**	**State**
None	Device not powered	N/A	Off
Green	Unit powered up, application program loaded but not running	Static	Application stopped
	Unit powered up, application program loaded and running	1 Hz flash	Application running
	Unit powered up, but no application program loaded	5 Hz flash	No application
Amber	Bootloader functioning normally, firmware present	Static	Bootloader mode
	Firmware is at start-up	Static	Firmware start-up
	Unit stopped due to a serious fault	Static	Application exception
	Bootloader is decrypting the downloaded image	1 Hz flash	Decrypting image
	Bootloader is reading an image from the USB	5 Hz flash	Reading image from USB
Red	Fatal system/hardware fault - LEd may be driven directly by microcontroller error pin or firmware is in a fault condition	Static	Fatal error
	Unit running with a fault, see CODESYS error flags or web tool.	1 Hz flash	Faulty application running

Environmental and Testing		
CE marking	Electromagnetic compatibility (EMC) noise immunity Electromagnetic compatibility (EMC) emission standard	BS EN ISO 13766-1:2018
E11 marking	Emission standard noise immunity with 100 V/m	UN/ECE-R10
Electrical tests	Pulse 1, severity level: IV; function state C Pulse 2a, severity level: IV; function state B Pulse 2b, severity level: IV; function state C Pulse 3a, severity level: IV; function state A Pulse 3b, severity level: IV; function state A Pulse 4, severity level: IV; function state B Pulse 5a, severity level: III; function state C	ISO 7637-2
Climatic tests	Damp heat, cyclic upper temperature 55˚C, number Damp heat, steady state test temperature 40 ˚C / 93% RH Test duration: 21 days Salt spray test severity level 3 (vehicle)	EN 60068-2-30 EN 60068-2-78 EN 60068-2-53
Mechanical tests	Test VII; vibration, random mounting location: vehicle body Vibration, sinusoidal 2000 Hz: 0.73 mm / 10g: 10 cycles/axis Bumps 30 g / 6 ms; 24,000 shocks	ISO 16750-3 EN 60068-2-6 ISO 16750-3

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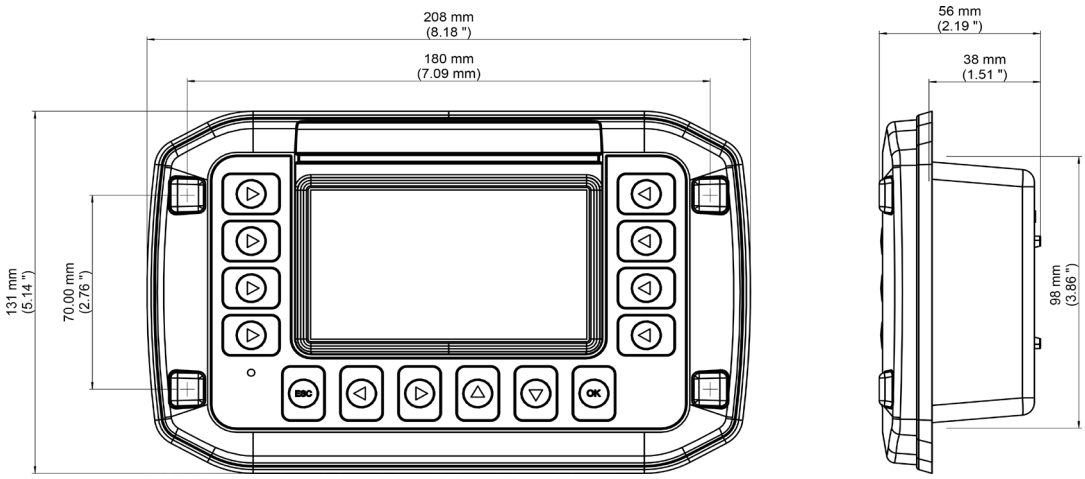

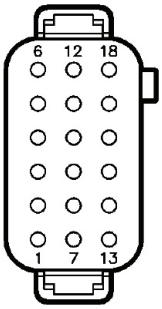

Connector A

PIN	DESCRIPTION	REF
1	ECU Supply GND	
2	OUT H, L, PWM	QA002
3	OUT H, L, PWM	QA001
4	OUT H, L	QA004
5	OUT H, L	QA003
6	VREF OUT	
7	Battery	
8	CAN1 H	
9	CAN 2 H	
10	AIN	IA001
11	AIN	IA002
12	Camera 1	
13	Ignition	
14	CAN1 L	
15	CAN2 L	
16	AIN	IA003
17	AIN	IA004
18	Camera 1 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
Pin - 02	Data -
Pin - 03	Data +
Pin - 04	0 V
Pin - 05	Shield

Abbreviations

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

055-222/11/22 (11)