SFX12m SIL2 Programmable Controller

Part number: 110EC20300A

Better. Smarter. Safer.

Dual 32-bit processors, 12 I/O (6 inputs & 6 outputs), 3 CAN interfaces
supply voltage 6-32 VDC

The high performance SFX12m control unit is optimized for electronic control of functional safety functions in on and off-highway mobile equipment. This IEC 61508 SIL2 certified programmable control unit features a proven functional safety architecture employing dual processors, configurable CAN channels and a flexible I/O system to meet the needs of demanding functional safety applications.

Technical data	Main CPU	Safety CPU
Dimensions	L: 5.3 in (134.2 mm) x W: 5.8 in (146.2 mm) x H: 2.3 in (58.6 mm)	
Weight	1.85 lbs (0.84 kg)	
Storage temperature range	-40 - +125°C	
Operating temperature range	-40 - +105°C	
IP rating	IP67, IP69k	
Operating altitude	0-4000 m	
Supply voltage	6-32 VDC, nominal operation @ 12 /24 VDC	
Peak supply voltage	36 VDC	
Maximum load current	16A @ 105°C (16A @ 85°C)	
Standby current 12/24 VDC	<3.5 mA@12 V, <2.5 mA@24 V	
Processor	32 bit, 200 MHz, Renesas Super H 72546	32 bit, 160 MHz, Renesas RH850
Floating point unit	Integrated on chip	Integrated on chip
MRAM (additional to CPU)	32 Kbyte approx. 1 trillion writes	NA
Flash (ROM program & data combined)	3.75 Mbyte	2 Mbyte
SRAM	256 Kbyte	128 Kbyte
EEPROM	128 Kbyte (system use only)	64 Kbyte

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Technical data

Communications	Main CPU	Safety CPU
CAN 1 interface		
Baud rates	10,20,50,100,125,250,500,800 & 1000 Kb/s	250 Kb/s
Protocol	CAN 2.0 A/B, CCP, J1939	CAN 2.0 A/B, CCP, J1939
Default node address	0	2
Default baud rate	250 Kb/s	250 Kb/s
CAN 2 interface		
Baud rates	10,20,50,100,125,250,500,800 & 1000 Kb/s	10,20,50,100,125,250,500,800 & 1000 Kb/s
Protocol	CAN 2.0 A/B, J1939	CAN 2.0 A/B, J1939
Default baud rate	500 Kb/s	500 Kb/s
CAN 3 interface		
Baud rates	10,20,50,100,125,250,500,800 & 1000 Kb/s	10,20,50,100,125,250,500,800 & 1000 Kb/s
Protocol	CAN 2.0 A/B, J1939	CAN 2.0 A/B, J1939
Default baud rate	500 Kb/s	500 Kb/s

Sensor supply	
Number of sensor supplies	1
Sensor supply output voltage	5/10 VDC (software configurable)
Sensor supply maximum current	200 mA @ 5 VDC, 100 mA @ 10 VDC per supply (Note: sensor supply is de-rated to 50 mA @ 10 VDC on 24 VDC systems with ambient temperatures at or above 85°C)

Technical data

Inputs	
Digital input	Digital low/high side (software configurable)
Input frequency	200 Hz
Switch-on level	Software configurable
Switch-off level	Software configurable
Frequency input	Digital low/high side (software configurable)
Input frequency	0 Hz - 50 kHz Note: maximum aggregate is 200 kHz, minimum detectable pulse duration is 20 µsec
Switch-on level	3.0 V
Switch-off level	2.0 V
Frequency input	Variable reluctance (software configurable)
Input frequency	0 Hz - 25 kHz Note: maximum aggregate is 200 kHz, minimum detectable pulse duration is 20 µsec
Switch-on level	Selectable as 2.2 V or adaptive
Switch-off level	Selectable as 0.0 V or 1.0 V
Analog input	0 - 5 V (absolute & ratiometric), 0 - 10 V, 0 - 32 V , 0 - 20 mA, thermistor (software configurable)
Resolution	12 bits
Accuracy	+/- 0.2 % FS (0-5 VDC mode), +/- 1 % FS (all other modes)
Short circuit protection	Integrated
Voltage input	0 - 5 V
Sample frequency	1 kHz
Voltage input	0 - 10 V
Sample frequency	1 kHz
Voltage input	0 - 32 V
Sample frequency	1 kHz
Thermistor input	
Input resistance	22 kOhm pull-up
Sample frequency	1 kHz
Accuracy	+/-1%
Current input	0 - 20 mA
Input resistance	200 Ohm
Sample frequency	1 kHz

Technical data

Outputs	
Digital output – 2A	High side
Max amperage	2A
Diagnostics	Open/short circuit protection
PWM output current feedback – 2A	High side (software configurable)
Max amperage	2A
Diagnostics	Open/short circuit protection
PWM frequency	50 Hz – 2 kHz
Dither frequency	Configurable
Dither amplitude	Configurable
Control range	0.05 - 2A
Control resolution	1 mA
Fly back protection	Integrated
Duty cycle resolution	.01% @ 250 Hz
Digital output – 4A	Low or high side, H-bridge (software configurable)
Max amperage	4A
Diagnostics	Open/short circuit protection
PWM output current feedback – 4A	Low or high side, H-bridge (software configurable) in PWM mode, high side (software configurable) in current control mode
Max amperage	4A
Diagnostics	Open/short circuit protection
PWM frequency	50 - 500 Hz
Dither frequency	Configurable
Dither amplitude	Configurable
Control range	0.05 - 4A
Control resolution	1.5 mA
Fly back protection	Integrated
Duty cycle resolution	.01% @ 250 Hz

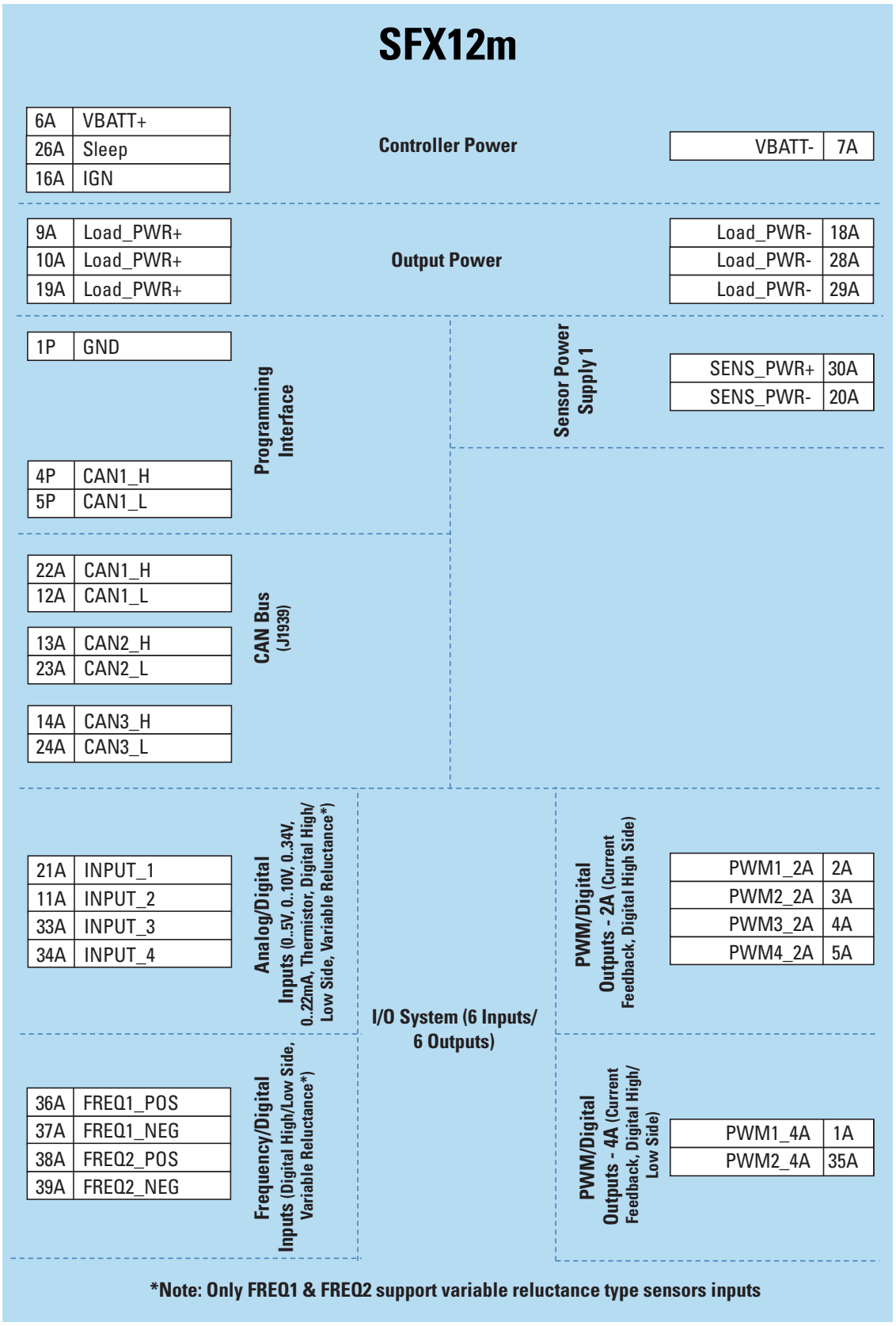
Connections	
Connector – 6 Pin	Deutsch Inc.
Model	DT04-6P
Contact surface	Nickel plated
Connector – 40 Pin	Deutsch Inc.
Model	DRC23-40PA
Contact surface	Nickel plated
Torque specification	25-28 in-lbs (2.82 - 3.16 N-m)

Technical data

Standards	
Temperature environment	SAE J1455
Environmental	SAE J1455
Salt spray	J1455 Section 4.3.3
Vibration	J1455 Section 4.10.4.1
Drop	J1455 Section 4.11.3.1
Shock	J1455 Section 4.10.4
Quality	ISO 9001
2004/104/EU	EU automotive EMC directive
2014/30/EU	E-Mark
EN 61326-1 2013	Industrial CE-Mark
EN ISO 14982 2009	Ag Forestry
EN 13766-2 2016	Earth Moving Machines
EM 50581 2012	ROHS
CISPR 25	Conducted emissions (EU broadband & narowband limits)
CISPR 25	Radiated emissions (EU broadband & narowband limits)

Certifications
CE Mark
E-Mark
e-Mark
IEC 61508:2010 Ed.2 SIL2

Block diagram



Pin list

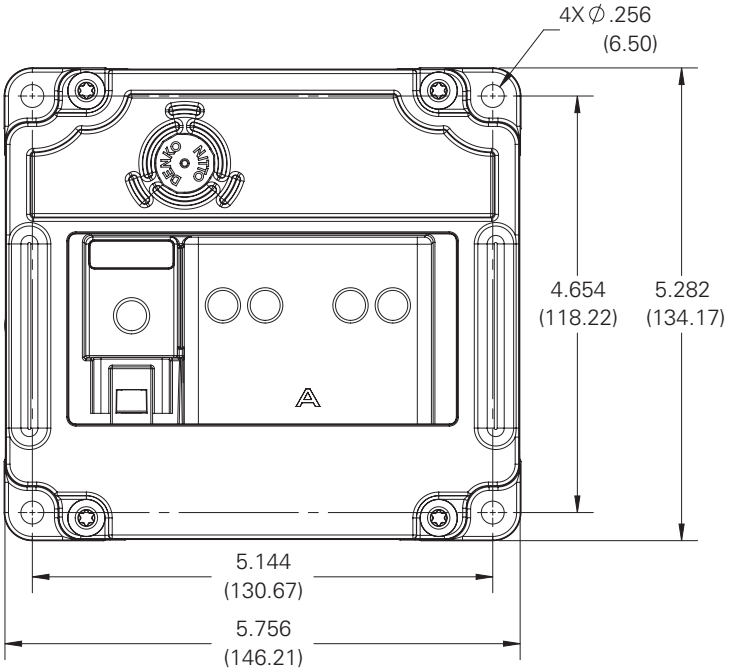
Communications connector

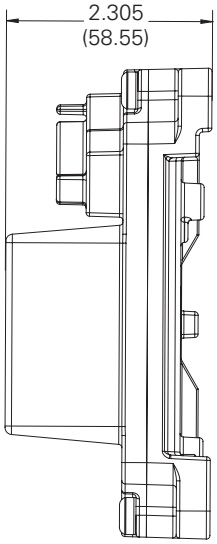
Type	Deutsch	DT04-6P
Pin	Function	
1	Ground	
2	Reserved	
3	Reserved	
4	CAN 1 high	
5	CAN 1 low	
6	Reserved	

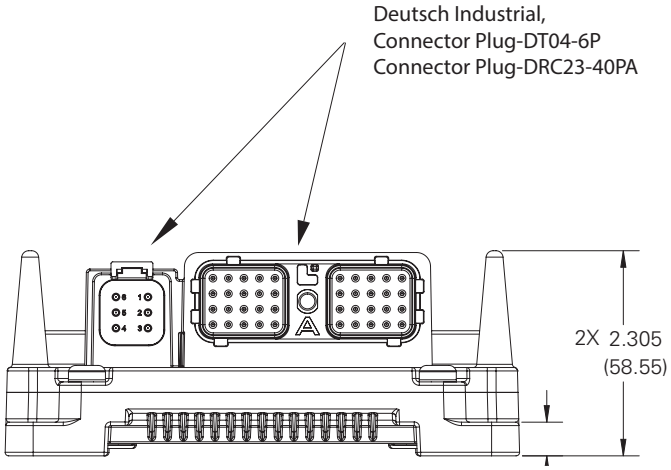
Connector A

Type	Deutsch	DRC23-40PA
Pin	Function	
1	Output PWM1 4A	
2	Output PWM1 2A	
3	Output PWM2 2A	
4	Output PWM3 2A	
5	Output PWM4 2A	
6	System power positive	
7	System power negative	
8	Not connected	
9	Load power positive	
10	Load power positive	
11	Input 2	
12	CAN 1 low	
13	CAN 2 high	
14	CAN 3 high	
15	Not connected	
16	Ignition	
17	Not connected	
18	Load power negative	
19	Load power positive	
20	Sensor power 1 negative	
21	Input 1	
22	CAN 1 high	
23	CAN 2 low	
24	CAN 3 low	
25	Not connected	
26	Sleep	
27	Not connected	
28	Load power negative	
29	Load power negative	
30	Sensor power 1 positive	
31	Not connected	
32	Not connected	
33	Input 3	
34	Input 4	
35	Output PWM2 4A	
36	Input frequency 1 positive	
37	Input frequency 1 negative	
38	Input frequency 2 positive	
39	Input frequency 2 negative	
40	Not connected	

Mounting diagram







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