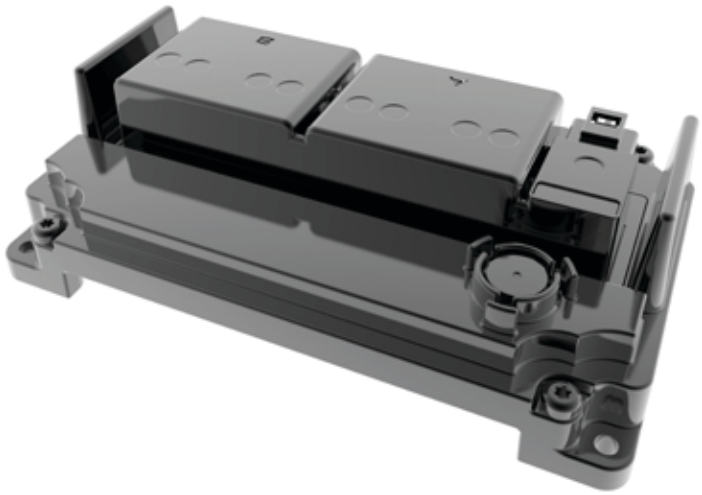
HFX48m Programmable Controller

Part number: 102EC21700A

Programmed with Eaton Pro-FX® control software

32-bit processor, 48 I/O (24 inputs & 24 outputs), 3 CAN interfaces
supply voltage 6-32 VDC

The high-performance HFX48m control unit is designed for electronic control of all system functions on and off-highway mobile equipment. This control unit features a powerful processor, configurable CAN channels and a flexible I/O system to meet the needs of a variety of demanding applications.



Technical data

Dimensions	L: 5.3 in (134.2 mm) x W: 8.4 in (212.6 mm) x H: 2.3 in (58.6 mm)
Weight	2.69 lbs (1.22 kg)
Storage temperature range	-40 - +125°C
Operating temperature range	-40 - +105°C (USB use is limited to 85°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	40A @ 105°C (48A @ 85°C)
Standby current 12/24 VDC	<3.5 mA@12 V, <2.5 mA@24 V
Processor Floating point units	32 bit, 200 MHz, Renesas Super H 72546 Integrated on chip
MRAM (additional to CPU)	32 Kbyte approx. 1 trillion writes
Flash (ROM program & data combined)	3.75 Mbyte 1000 writes
SRAM	256 Kbyte
EEPROM	128 Kbyte (system use only)

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Technical data

Communications	
CAN 1 interface	2.0A, 2.0B
Baud rates	125 kb/s, 250 kb/s, 500 kb/s, 1Mb/s
Protocol	CANopen, J1939
Default node address	0
Default baud rate	250 kb/s
CAN 2 interface	2.0A, 2.0B
Baud rates	125 kb/s, 250 kb/s, 500 kb/s, 1 Mb/s
Protocol	CANopen, J1939
CAN 3 interface	2.0A, 2.0B
Baud rates	125 kb/s, 250 kb/s, 500 kb/s, 1 Mb/s
Protocol	CANopen, J1939
USB interface	USB 2.0 (Note: 3.0 devices are compatible), used for programming
Baud rates	1.5 Mb/s

Sensor supply	
Number of sensor supplies	2
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
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
Input frequency	1 kHz
Voltage input	0 - 10 V
Input frequency	1 kHz
Voltage input	0 - 32 V
Input frequency	1 kHz
Thermistor input	
Input resistance	22 kOhm pull-up
Sample frequency	1 kHz
Accuracy	+/-1%
Current input	0 - 20 mA
Input resistance	
Input 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	.05 Hz – 2 kHz or 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/high side, H-bridge (software configurable)
Max amperage	4A
Diagnostics	Open/short circuit protection
PWM output current feedback – 4A	Low/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

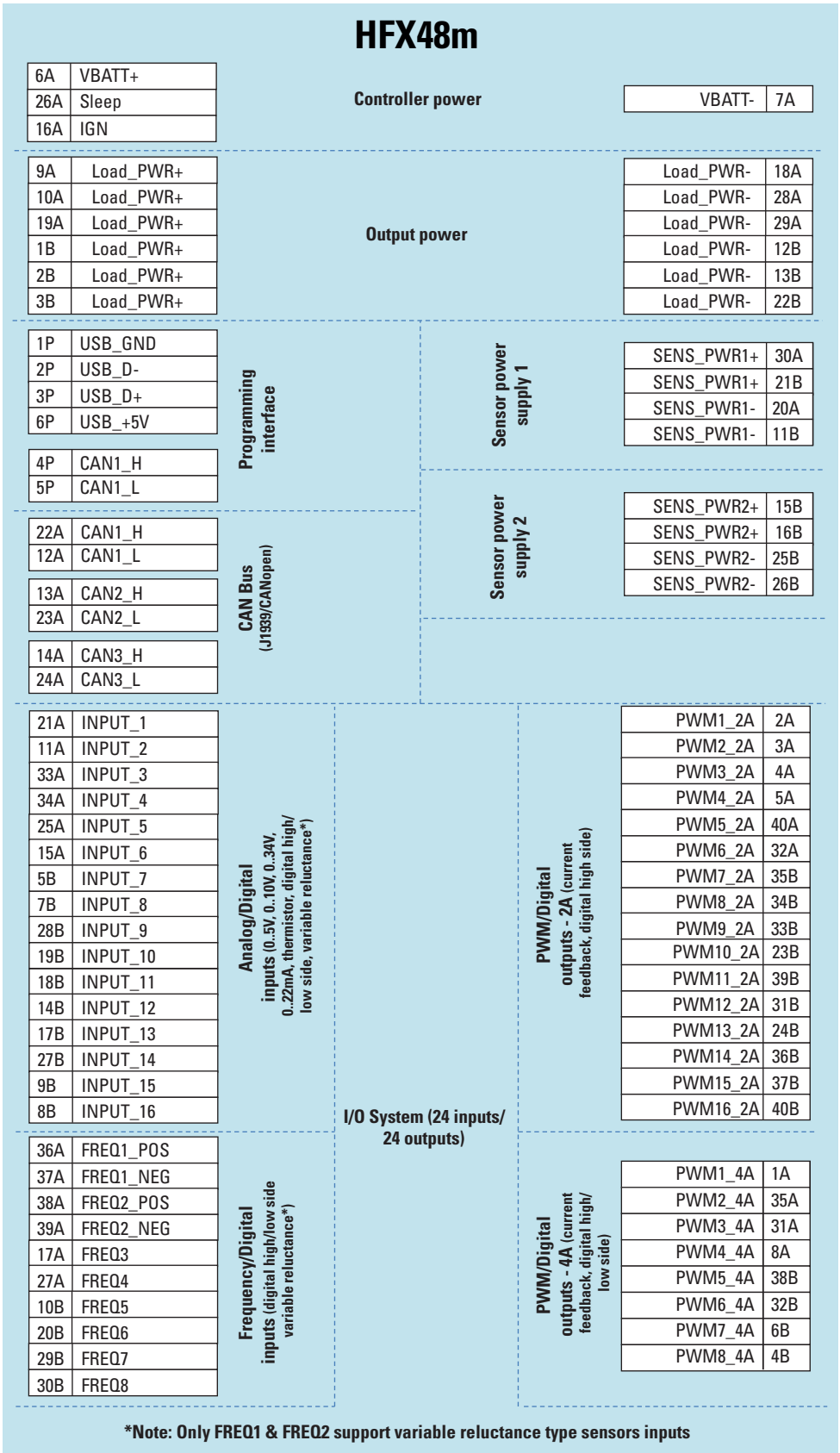
Connections	
Connector – 6 Pin	Deutsch Inc.
Model	DT04-6P
Contact surface	Nickel plated
Connector – 40 Pin	Deutsch Inc.
Model	DRC23-40PA, DRC23-40PB
Contact surface	Nickel plated
Torque specification	25-28 in-lbs (2.82 - 3.16 N-m)

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
Conducted immunity	SAE J1113, EN 61326-1, 2004/108/EC
Radiated immunity	SAE J1113, EN 61326-1, 2004/108/EC
Conducted emissions	CISPR 25, EN 60945, 2004/108/EC
Radiated emission	CISPR 25, CISPR 11, EN60945

Certifications
CE Mark
e-Mark

Block diagram



Pin list

Communications connector

Type	Deutsch	DT04-6P
Pin	Function	
1	Ground	
2	USB data low	
3	USB data high	
4	CAN 1 high	
5	CAN 1 low	
6	USB power 5V	

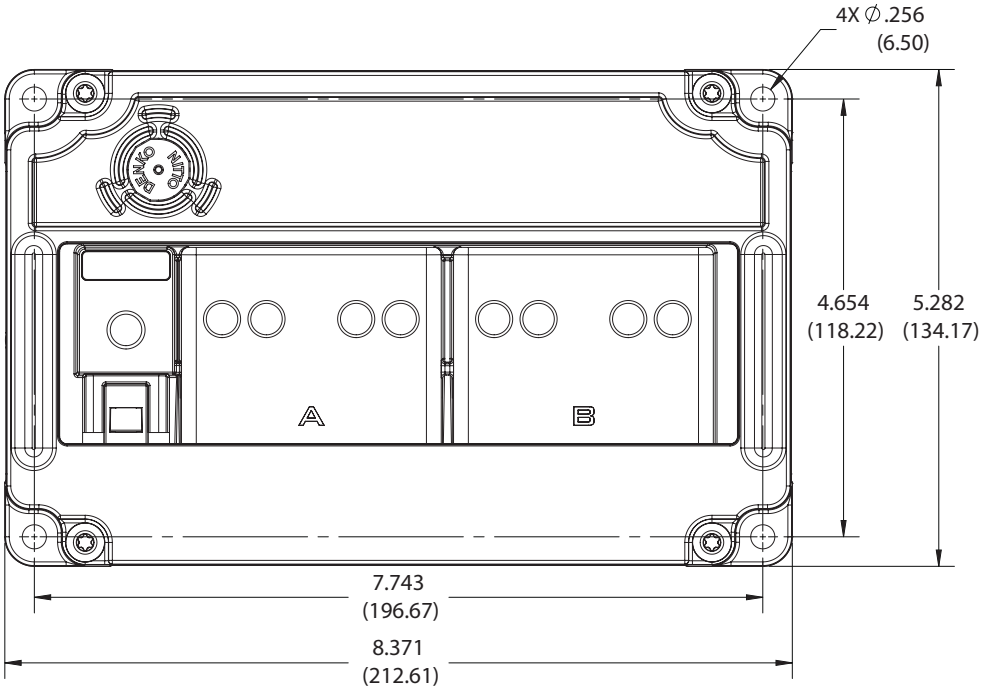
Connector A

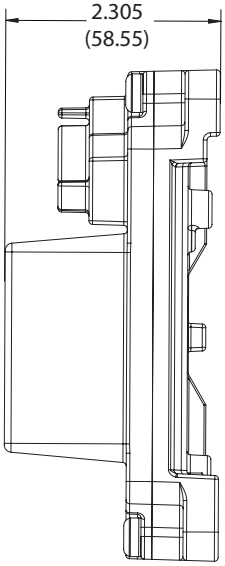
Type	Deutsch	DRC23-40PA
Pin	Function	
1	Output PWM1 4A	
2	Output PWM1 2A	
3	Output PWM2 2A	
4	Output PWM3 2A	
5	Output PWM4 2A	
6	System power positive	
7	System power negative	
8	Output PWM4 4A	
9	Load power positive	
10	Load power positive	
11	Input 2	
12	CAN 1 low	
13	CAN 2 high	
14	CAN 3 high	
15	Input 6	
16	Ignition	
17	Frequency 3	
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	Input 5	
26	Sleep	
27	Frequency 4	
28	Load power negative	
29	Load power negative	
30	Sensor power 1 positive	
31	Output PWM3 4A	
32	Output PWM6 2A	
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	Output PWM5 2A	

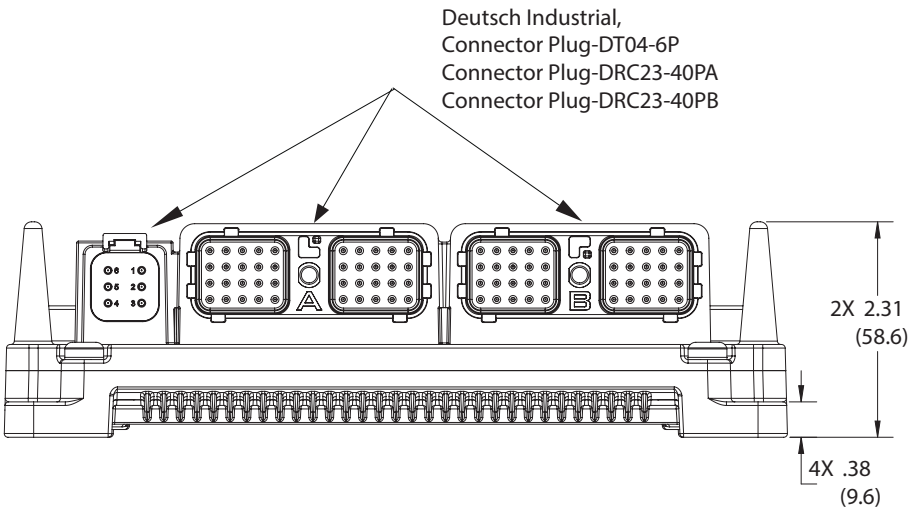
Connector B

Type	Deutsch	DRC23-40PB
Pin	Function	
1	Load power positive	
2	Load power positive	
3	Load power positive	
4	Output PWM8 4A	
5	Input 7	
6	Output PWM7 4A	
7	Input 8	
8	Input 16	
9	Input 15	
10	Frequency 5	
11	Sensor power 1 negative	
12	Load power negative	
13	Load power negative	
14	Input 12	
15	Sensor power 2 positive	
16	Sensor power 2 positive	
17	Input 13	
18	Input 11	
19	Input 10	
20	Frequency 6	
21	Sensor power 1 positive	
22	Load power negative	
23	Output PWM10 2A	
24	Output PWM13 2A	
25	Sensor power 2 negative	
26	Sensor power 2 negative	
27	Input 14	
28	Input 9	
29	Frequency 7	
30	Frequency 8	
31	Output PWM12 2A	
32	Output PWM6 4A	
33	Output PWM9 2A	
34	Output PWM8 2A	
35	Output PWM7 2A	
36	Output PWM14 2A	
37	Output PWM15 2A	
38	Output PWM5 4A	
39	Output PWM11 2A	
40	Output PWM16 2A	

Mounting diagram







Eaton
Hydraulics Group USA
14615 Lone Oak Road
Eden Prairie, MN 55344
USA
Tel: 952-937-9800
Fax: 952-294-7722
www.eaton.com/hydraulics

Eaton
Hydraulics Group Europe
Route de la Longeraie 7
1110 Morges
Switzerland
Tel: +41 (0) 21 811 4600
Fax: +41 (0) 21 811 4601

Eaton
Hydraulics Group Asia Pacific
Eaton Building
No.7 Lane 280 Linhong Road
Changning District,
Shanghai 200335
China
Tel: (+86 21) 5200 0099
Fax: (+86 21) 2230 7240

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