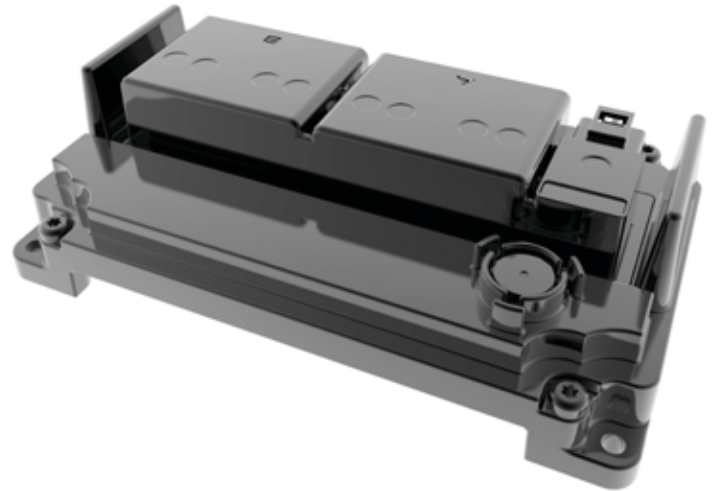


Programmed with Eaton Pro-FX® control software

32-bit processor, 32 I/O (16 Inputs & 16 Outputs), 3 CAN interfaces
supply voltage 6-32 VDC

The high-performance HFX32m 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 | 32A @ 105°C (40A @ 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 |
| Floating point units | 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) |



Powering Business Worldwide

Technical data

Communications

| | |
|-----------------------------|--------------------------------------|
| CAN 1 interface | 2.0A, 2.0B |
| Baud rates | 125 kb/s, 250 kb/s, 500 kb/s, 1 Mb/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 μ sec |
| Frequency input | Variable reluctance (software configurable) |
| Input frequency | 0 Hz - 25 kHz Note: maximum aggregate is 200 kHz, minimum detectable pulse duration is 20 μ sec |
| 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 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

HFX32m

Controller power

| | |
|-----|--------|
| 6A | VBATT+ |
| 26A | Sleep |
| 16A | IGN |

| | |
|--------|----|
| VBATT- | 7A |
|--------|----|

Output power

| | |
|-----|-----------|
| 9A | Load_PWR+ |
| 10A | Load_PWR+ |
| 19A | Load_PWR+ |
| 1B | Load_PWR+ |
| 2B | Load_PWR+ |
| 3B | Load_PWR+ |

| | |
|-----------|-----|
| Load_PWR- | 18A |
| Load_PWR- | 28A |
| Load_PWR- | 29A |
| Load_PWR- | 12B |
| Load_PWR- | 13B |
| Load_PWR- | 22B |

Programming interface

| | |
|----|---------|
| 1P | USB_GND |
| 2P | USB_D- |
| 3P | USB_D+ |
| 6P | USB_+5V |

Sensor power supply 1

| | |
|------------|-----|
| SENS_PWR1+ | 30A |
| SENS_PWR1+ | 21B |
| SENS_PWR1- | 20A |
| SENS_PWR1- | 11B |

CAN Bus (J1939/CANopen)

| | |
|----|--------|
| 4P | CAN1_H |
| 5P | CAN1_L |

Sensor power supply 2

| | |
|------------|-----|
| SENS_PWR2+ | 15B |
| SENS_PWR2+ | 16B |
| SENS_PWR2- | 25B |
| SENS_PWR2- | 26B |

| | |
|-----|--------|
| 22A | CAN1_H |
| 12A | CAN1_L |

| | |
|-----|--------|
| 13A | CAN2_H |
| 23A | CAN2_L |

| | |
|-----|--------|
| 14A | CAN3_H |
| 24A | CAN3_L |

I/O System (16 inputs/ 16 outputs)

Analog/Digital

inputs (0..5V, 0..10V, 0..34V, 0..22mA, thermistor, digital high/low side, variable reluctance*)

| | |
|-----|----------|
| 21A | INPUT_1 |
| 11A | INPUT_2 |
| 33A | INPUT_3 |
| 34A | INPUT_4 |
| 25A | INPUT_5 |
| 15A | INPUT_6 |
| 5B | INPUT_7 |
| 7B | INPUT_8 |
| 28B | INPUT_9 |
| 19B | INPUT_10 |

PWM/Digital

outputs - 2A (current feedback, digital high side)

| | |
|----------|-----|
| PWM1_2A | 2A |
| PWM2_2A | 3A |
| PWM3_2A | 4A |
| PWM4_2A | 5A |
| PWM5_2A | 40A |
| PWM6_2A | 32A |
| PWM7_2A | 35B |
| PWM8_2A | 34B |
| PWM9_2A | 33B |
| PWM10_2A | 23B |

Frequency/Digital

inputs (digital high/low side, variable reluctance*)

| | |
|-----|-----------|
| 36A | FREQ1_POS |
| 37A | FREQ1_NEG |
| 38A | FREQ2_POS |
| 39A | FREQ2_NEG |
| 17A | FREQ3 |
| 27A | FREQ4 |
| 10B | FREQ5 |
| 20B | FREQ6 |

PWM/Digital

outputs - 4A (current feedback, digital high/low side)

| | |
|---------|-----|
| PWM1_4A | 1A |
| PWM2_4A | 35A |
| PWM3_4A | 31A |
| PWM4_4A | 8A |
| PWM5_4A | 38B |
| PWM6_4A | 32B |

***Note: Only FREQ1 & FREQ2 support variable reluctance type sensors inputs**

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 | |

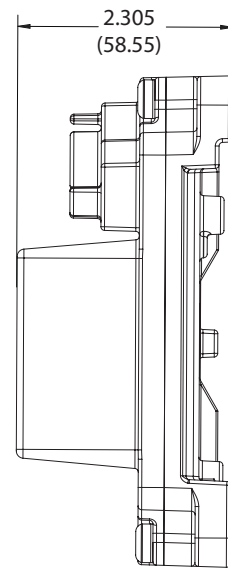
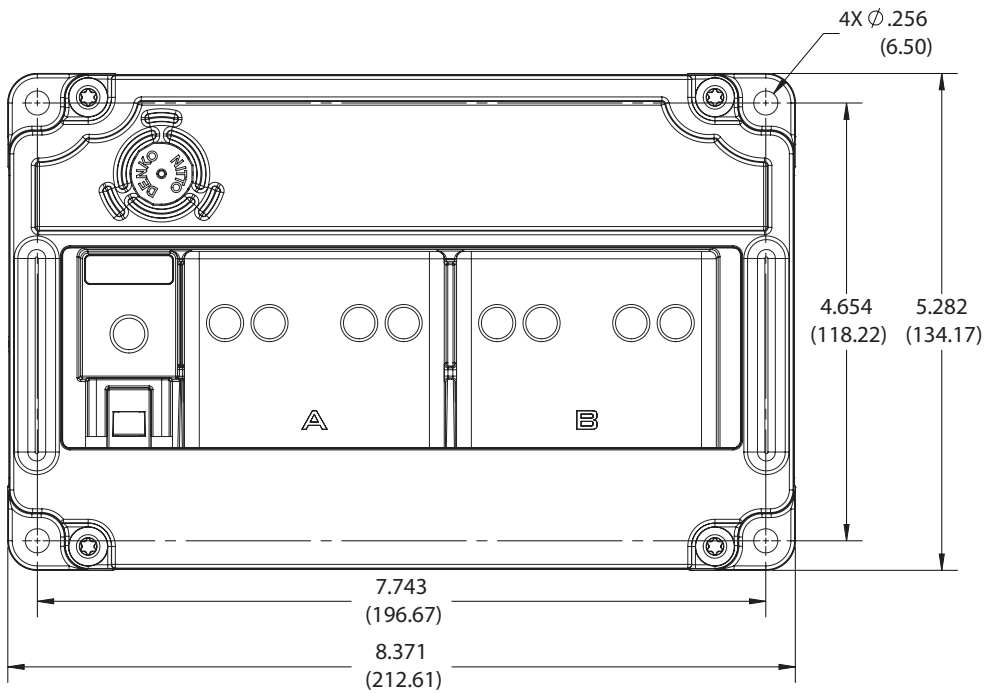
Connector A

| 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 | |

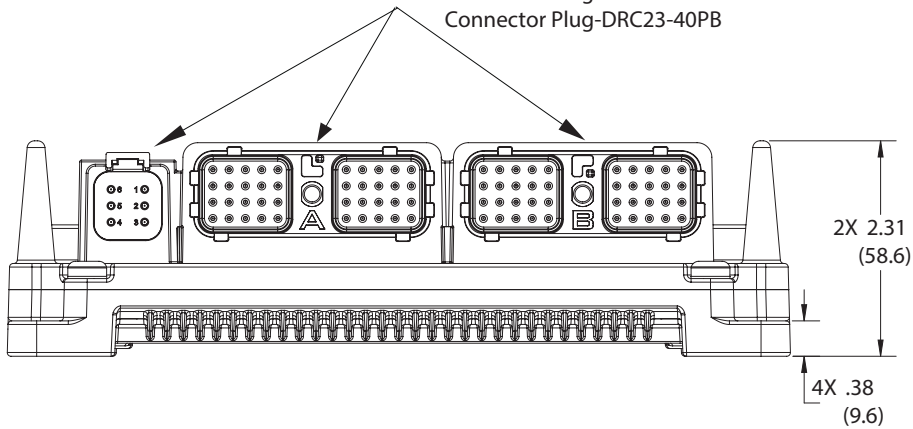
Connector B

| Type | Deutsch | DRC23-40PB |
|------|-------------------------|------------|
| Pin | Function | |
| 1 | Load power positive | |
| 2 | Load power positive | |
| 3 | Load power positive | |
| 4 | Not connected | |
| 5 | Input 7 | |
| 6 | Not connected | |
| 7 | Input 8 | |
| 8 | Not connected | |
| 9 | Not connected | |
| 10 | Frequency 5 | |
| 11 | Sensor power 1 negative | |
| 12 | Load power negative | |
| 13 | Load power negative | |
| 14 | Not Connected | |
| 15 | Sensor power 2 positive | |
| 16 | Sensor power 2 positive | |
| 17 | Not connected | |
| 18 | Not connected | |
| 19 | Input 10 | |
| 20 | Frequency 6 | |
| 21 | Sensor power 1 positive | |
| 22 | Load power negative | |
| 23 | Output PWM10 2A | |
| 24 | Not connected | |
| 25 | Sensor power 2 negative | |
| 26 | Sensor power 2 negative | |
| 27 | Not connected | |
| 28 | Input 9 | |
| 29 | Not connected | |
| 30 | Not connected | |
| 31 | Not connected | |
| 32 | Output PWM6 2A | |
| 33 | Output PWM9 2A | |
| 34 | Output PWM8 2A | |
| 35 | Output PWM7 2A | |
| 36 | Not connected | |
| 37 | Not connected | |
| 38 | Output PWM5 4A | |
| 39 | Not connected | |
| 40 | Not connected | |

Mounting diagram



Deutsch Industrial,
 Connector Plug-DT04-6P
 Connector Plug-DRC23-40PA
 Connector Plug-DRC23-40PB



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