# EFX IO88 Input/Output Module

Input/ Output expansion module for EFX Controllers
CANopen interface
Surface electrostatically coated (cathodic immersion) 10...32V DC

| Technical Data | 8 Inputs (4 Digital / 4 Analog)<br>8 Outputs (Digital or PWM) |
|---|---|
| **Housing** | Die-cast zinc housing with 8 outputs and terminal chamber surface electrostatically coated (cathodic immersion), black |
| **Dimensions (l x w x h)** | 227 x 77 x 39 mm (without cable gland) |
| **Installation** | Screw connection by means of 3 M5 x l screws to DIN 912 or DIN 7984 |
| **Connection**<br>Operating voltage and CAN bus<br><br><br><br>Inputs/Outputs<br>CANin/CANout | 7-pole terminal strip with CAGE CLAMP ® connection technology<br>(2 x 2-pole / 1 x 3-pole) 0.08...4 mm2 (AWG 28...AWG 12), nominal current 20 A<br>Identical potentials can be linked using a jumper header<br>(GND and UB potentials linked upon delivery)<br>Cable entry via M16 cable gland<br>8 x M12 connector (socket), 5-pole<br>2 x M12 connector (plug/socket), 5-pole |
| **Weight** | 1.35 kg |
| **Inputs**<br>can be configured as | 8<br>4 digital, positive-switching (high side)<br>4 analogue, 0...10/32 V, 0/4...20 mA, ratiometric<br>or digital, positive-switching |
| **Sensor supply $I_{max}$** | 400 mA |
| **Outputs**<br>can be configured as<br>switching current per output<br>total current | 8<br>digital, positive-switching (high side), with diagnostic capability PWM channel<br>max. 2 A<br>max. 16 A |
| **Operating voltage $U_B$** | 10...32 V DC |
| **Current consumption** | ≤ 60 mA (without external load at 24 V DC) |
| **Operating temperature** | – 40...85°C |
| **Storage temperature** | – 40...85°C |
| **Protection** | IP 67 |
| **Interface** | CAN interface 2.0 B, ISO 11898 |
| **Baud rate** | 20 Kbits/s...1 Mbit/s (default setting 125 Kbits/s) (adjustable using hex-code switches in the terminal chamber or via the CANopen object directory) |
| **Communication profile** | CANopen, CiA DS 301 version 4, CiA DS 401 version 2.1 |
| **Node ID** (default) | hex 20 (= dec 32) (adjustable using 2 hex-code switches in the terminal chamber or via the CANopen object directory) |
| **Displays** | 1 LED green (PWR)<br>1 LED red (diagnosis, DIA)<br>16 LEDs yellow (status of the inputs / outputs) |

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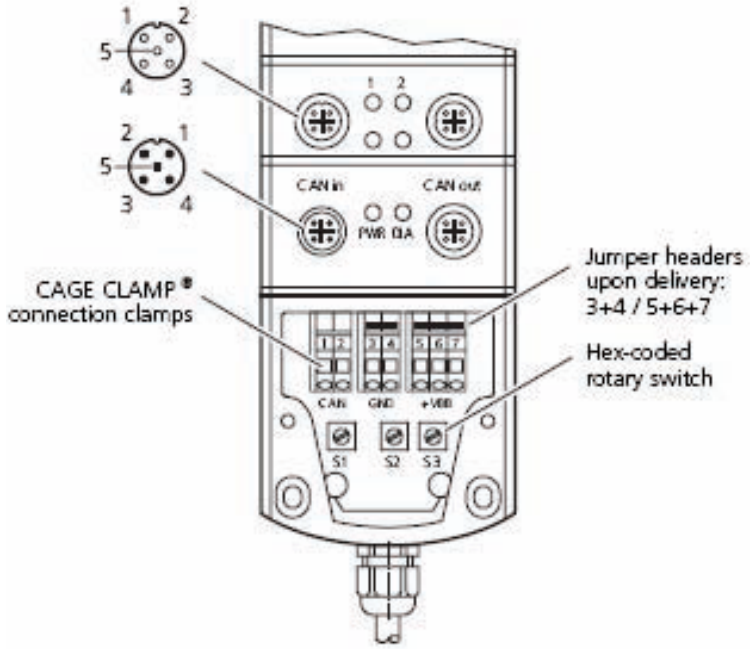
## Connecting and operating elements




## Hex-code switch coding

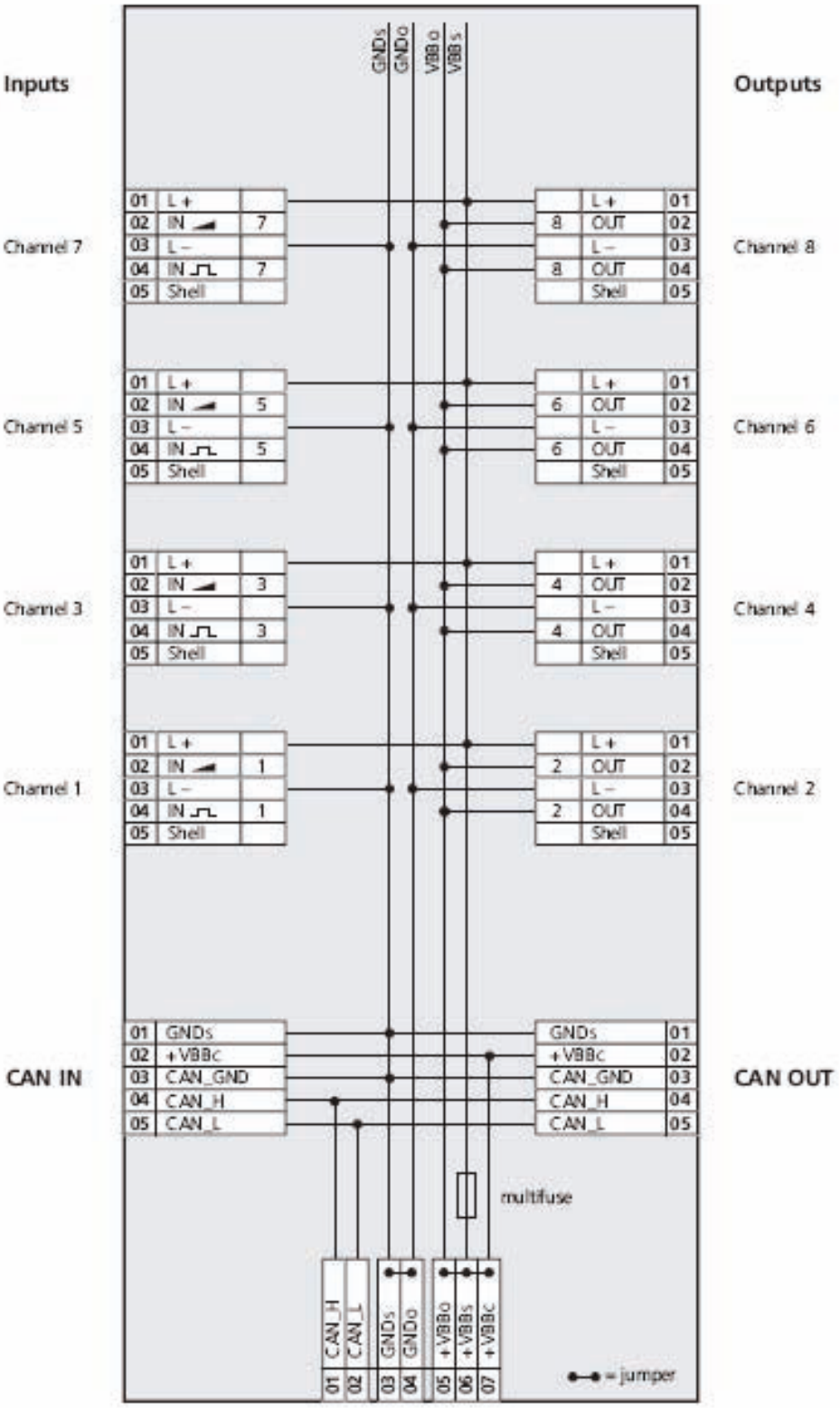
| Switch | Position | Description |
|---|---|---|
| S1 | 0 | 1000 Kbits/s |
| Baud rate | 1 | 800 Kbits/s |
| | 2 | 500 Kbits/s |
| | 3 | 250 Kbits/s |
| | 4 | 125 Kbits/s |
| | 5 | 100 Kbits/s |
| | 6 | 50 Kbits/s |
| | 7 | 20 Kbits/s |
| | 8...E | not defined |
| | F | adjustment via object directory (default) |
| S2 | 0...7 | high nibble, e.g. 20 hex (= 32 dec) |
| Node $ID_H$ | F | adjustment via object directory (default) |
| S3 | 0...E | low nibble, e.g. 20 hex (= 32 dec) |
| Node $ID_L$ | F | adjustment via object directory (default) |


## Operating states (LEDs)

| LED | Status | Description |
|---|---|---|
| PWR (green) | OFF | no supply voltage |
| | ON | module in stand-by mode<br>CANopen status: PREOPERATIONAL/PREPARED<br>outputs = OFF |
| | 2.0 Hz | module active<br>CANopen status: OPERATIONAL<br>outputs are updated |
| DIA (red) | OFF | communication OK |
| | ON | communication disturbed<br>• node guard / heartbeat error<br>(if node guarding / heartbeat is activated)<br>• no synch objects<br>(if synch monitoring is activated) |
| IN (yellow) | ON | output switched |
| | 2.0 Hz | diagnosis failure |
| OUT (yellow) ON | ON | binary output: output switched (ON)<br>analogue output: PWM preset value ≠ 0<br>current preset value > 20 |

| EFX IO84 | Characteristics of the outputs |
|---|---|
| **Inputs**<br>Channel 1, 3, 5, 7 (pin 4) | ■ Digital inputs<br>Switch-on level 0.4...0.7 UB<br>Switch-off level 0.2...0.24 UB<br>Input resistance 3 kΩ<br>Input frequency max. 1 kHz |
| **Channel 1, 3, 5, 7 (pin 2)**<br>can be configured as ... | ■ Analogue inputs<br>voltage, current, ratiometric or digital positive-switching<br><br>Voltage inputs<br>Input voltage 0...10/32 V<br>Resolution 10 bits<br>Input resistance 50/30 kΩ<br>Input frequency 50 Hz<br>Accuracy ± 1 % FS<br><br>Current inputs<br>Input current 0/4...20 mA<br>Resolution 10 bits<br>Input resistance 400 Ω<br>Input frequency 50 Hz<br>Accuracy ± 1 % FS<br><br>Ratiometric inputs for potentiometric transducers (e.g. joystick)<br>Function $((U_{IN} - ½U_B) \div ½U_B) \times 1000$ ‰<br>Value range 0...1000 ‰<br><br>Digital inputs, with diagnostic capability<br>Switch-on level 0.7 UB<br>Switch-off level 0.4 UB<br>Input resistance 30 kΩ<br>Input frequency max. 50 Hz |
| **Outputs**<br>Channel 2, 4, 6, 8 (pin 4)<br>can be configured as ... | ■ Semiconductor outputs, with diagnostic capability (wire break and short circuit) Channel 2, 4, 6, 8 (pin 4) short-circuit and overload protected can be configured as ...<br>Switching voltage 10...32 V DC<br>Switching current max. 2 A<br>Total current max. 16 A<br><br>■ PWM outputs<br>PWM frequency 20...250 Hz<br>Pulse duty factor 0...1000 ‰<br>Resolution 1 ‰<br>Switching current max. 2 A (referred to PWM value 1000 ‰.)<br>Total current max. 16 A |
| **Channel 2, 4, 6, 8 (pin 2)**<br>can be configured as ... | ■ Semiconductor outputs, with diagnostic capability (wire break and short circuit) Channel 2, 4, 6, 8 (pin 4) short-circuit and overload protected can be configured as ...<br>Switching voltage 10...32 V DC<br>Switching current max. 2 A<br>Total current max. 16 A |
| **Note** | also see wiring (following page) |

| | Test standards and regulations |
|---|---|
| **Climatic test** | Damp heat to EN 60068-2-30, test Db (≤ 95% rel. humidity, non-condensing), Salt mist test to EN 60068-2-52, test Kb, severity level 3, Protection test to EN 60529 |
| **Mechanical resistance** | Vibration to EN 60068-2-6, test Fc, Shock to EN 60068-2-27, test Ea, Bump to EN 60068-2-29, test Eb |
| **Immunity to conducted interference** | to ISO 7637-2, pulses 2, 3a, 3b,<br>severity level 4, function state A<br>to ISO 7637-2, pulse 5,<br>severity level 1, function state A<br>to ISO 7637-2,<br>pulse 1, severity level 4, function state C |
| **Immunity to interfering fields** | directive 95/54/EC at 100 V/m (e1 type approval) and DIN EN 61000-6-2 :2001 (CE) |
| **Interference emission** | directive 95/54/EC (e1 type approval) and DIN EN 61000-6-4 :2001 (CE) |




CAN Interface / Supply

**Abbreviations:**

$CAN_H$ = CAN interface (high)
$CAN_L$ = CAN interface (low)
$GND_0$= ground (output)
$GND_S$ = ground (module)
PWM = output for pulse-width modulated signals
$VBB_C$ = operating voltage (via CANin/CANout plug)
$VBB_0$ = operating voltage (output)
$VBB_S$ = operating voltage (module)

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
Hydraulic Group Asia Pacific
11th Floor Hong Kong New
World Tower
300 Huaihai Zhong Road
Shanghai 200021
China
Tel: 86-21-6387-9988
Fax: 86-21-6335-3912

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