Hardened Ethernet media converter

Version 1.1 – April 10

FOCD-H-TX-FX ETHERNET COPPER/FIBER
FOCD-H-GX-GSX/GLX GIGABIT ETHERNET COPPER/FIBER
FOCD-H-TGX-GSFP GIGABIT ETHERNET COPPER/FIBER SFP

Feature

- **Automatic Ethernet Gigabit Ethernet media converter/switch**
- **Hardened IP30 DIN-rail format**
- **–40°C to +75°C**
- **Supports –40°C to +85°C**
- **CEM IEC61000-6-2**

Versions:

- **FOCD-H-TX-FX...** copper/fiber from 10/100Baset to 100FX
- **FOCD-H-GX-GSX/GLX..** copper/fiber from 1000Baset to 1000SX or LX
- **FOCD-H-TGX-GSFP** copper/fiber from 10/100/1000Baset to 1000SX/LX/ZX with SFP

Optical interfaces:

- 100FX: MM 2km, SM 20 or 40Km
- 1000SX fix fiber: MM 0,5 or 2km
- 1000LX fix fiber: SM 10 or 20km
- Standard GX SFP MM 0,5 or 2km SM 10/30/50/80/120km
- Single core fiber WDM 20 or 40km

Lambda SFP for CWDM and DWDM

Automatic functions

- Enable/disable by DIP switch
- « Link Alarm » support
- Auto-rate negotiation
- MDI/MDIX

Others

- Dual power supply 12Vcc to 48Vcc on terminal block
- Option AC converter
- Relay Contact alarm on power and port link failure
- Supplied DIN rail fixing
- Option 19'' 2,5U with DIN-rail: RACK-19-DIN

CONVERTION OF ETHERNET COPPER/FIBER LAN EXTENSION OVER FIBER

The FOCD-H is a performing automatic media converter with hardened concept for industries that support –40°C to +75°C working temperature. It is use to interconnect the Ethernet PLC, RTU... in industries, Wind/Solar/Hydro Power or transportation infrastructure to extend the the LAN or WAN over fiber in hardened environment. The FOCD-H series interconnect any copper to fiber Ethernet or Gigabit Ethernet equipment from any vendor, or provide a transparent Ethernet/Gigabit Ethernet extension over single or double optical fiber. It particularly easy to use with the automatic rate and copper pair inversion functions and the "Link Alarm". These DIN-Rail equipment are complying to industrial regulations for CEM :EN61000-6-2, vibration and shock IEC60068-2-6/27/32.

The ***FOCD-H Series*** is provided in aluminum case IP30 with DIN-rail fixing.

The ***FOCD-H-TTX-..*** Is an Ethernet version Copper 10/100Baset to optical Ethernet 100FX.

The ***FOCD-H-GX-G.*** is a 1000BaseTCopper to fiber 1000SX version up to 500m (850nm) or 2K (1310nm) or Single mode up to 10 or 20km.

The ***FOCD-H-TGX-SFP*** is 10/100/1000Baset to Gigabit Ethernet fiber with a SFP module.

The ***FOCD-H-TTX and FOC-H-TGTX*** peuvent can be use as pure media converter (100Baset to 100FX or 1000Baset to 1000FX) or as two port switch with rate and flow control. It supports 9KB Jumbo frame.

The ***FOCD-H*** series supports the « Link Alarm or Link Pass Through» function, in case one side of the converter is cut or disconnected the other side is automatically down; this function is particularly interesting when connected to router or switch using the port management.

Top terminal block provide the connection of redundant 12v to 48V power supplies and an alarm relay output to inform the loss of power or of the port link failure.

SIMPLE CONVERTION OR LAN EXTENTION OVER OPTICAL FIBER

The ***FOCD-H*** provides the interconnection of 2 copper or fiber equipments according to IEEE 802.3/.3u/3ab/3z standards. The LED show the traffic, the rate and the Link Pass Trough status .

The ***FOCD-H*** are also use to extend a LAN or WAN connection over a double core fiber or single core fiber in WDM.

Ethernet hardened

	FOCD-H-TX-FX	FOCD-H-GX-GSX/GLX	FOCD-H-TGX-GSFP
STANDARDS			
IEEE 802.3 10BaseT	YES		YES
IEEE 802.3u 100BaseTX & 100FX	YES		YES
IEEE 802.3ab 1000BaseT		YES	YES
IEEE 803.3z 1000BaseX		YES	YES
COPPER PORT	1 x 10/100Baset	1 x 1000Baset	1 x 10/100/1000Baset
FIBER PORT	1 x 100FX fixed fiber	1 x 1000SX, LX ou ZX fixed fiber	1 x 1000SX, LX ou ZX with SFP module (not included)
- Multimode	1310nm - 2km	850 nm - 500m 1310nm - 2km	850 nm - 500m 1310 nm - 2km
- Single-mode	1310/1550 nm 30 to 100km	1310/1550 nm 10, 20 and 50 km	1310/1550 nm 10 to 200km
- Other	WDM simple fiber MM 1310/1550nm 2km SM1310/1550nm 20/40km	WDM simple core fiber SM1310/1550nm 20km	WDM, CWDM with SFP
- Connectors	SC (ou ST en MM)	SC (ou ST)	LC
FUNCTIONS	Pur Convertiseur or Convertisseur Switch	Pur Convertiseur	Pur Convertiseur or Convertisseur Switch
PURE CONVERTER			
Maximum rate	200Mbps full duplex	2000Mbps full duplex	2000Mbps full duplex
Transported frame MTU	1600 bytes	9Kbytes	9Kbytes
CONVERTER/SWICH			
Rate-negociation (Auto/Selection)	10/100BaseT, auto/manuel	1000BaseT	10/100/1000BaseT, auto
Flow control (Auto/Selection)	Half/Full duplex	Half/Full duplex	Half/Full duplex
Auto-sence (Auto/Selection)	MDI-MDIX	MDI-MDIX	MDI-MDIX
Store & forward, filtering	100M: 148 800/148 800pps		
	-	1000M: 1 488 000/1 488 000pps	
Memory of MAC address	1Ko	1Ko	1Ko
Buffer	768Ko	2,75 Mb	2,75 Mb
FONCTIUN fiber/Copper			
LINK FAULT PASS THROUGH (Eneable/disable)	Unactive the copper port with fiber port is cuted Unactive the fiber port when the copper port is down		
SETTING			
Auto or Manual	DIP-switch	DIP-switch	DIP-switch
POWER SUPPLY	dual power supply 12Vdc to 48Vdc with terminal block		
Consomation	4,3W/12Vdc to 0,1W/48vdc	11W/12Vdc to 0,23W/48vdc	
PHYSICAL	DIN-Rail case, in option 19" fixing		
Dimentions and Weight	50 x 110 x135mm (WxDxH) - 800g		
Working temperature	-40°C to +75°C, can work up to 85°C		
Storage temperature	-40 to 85°C		
Non-condensed humidity	5 to 95%		
MTBF at 25°C	96 years	29 years	27 years
APPROVALS	CE and FCC 15 Class A		
EMI	EN61000-6-3		
EMS	EN61000-6-2		
	EN61000-4-2 (ESD Standards):Contact: + / - 4KV; Crit. B,Air: + / - 8KV; Crit. B		
	EN61000-4-3 (Radiated RFI Standards):10V/m, 80 to 2.7GHz; 80% AM Crit. A		
	EN61000-4-4 (Burst Standards):Signal Ports: + / - 4KV; Crit. B, DC. Power Ports: + / - 4KV; Crit. B		
	EN61000-4-5 (Surge Standards) Signal Ports: + / - 1KV; Line-to-Line; Crit. B, Power Ports: + / - 0.5KV; Line-to-earth; Crit. B, Signal Ports: 10Vrms @ 0.15~80MHz; 80% AM Crit. A; Power Ports: 10Vrms @ 0.15~80MHz; 80% AM Crit. A		
	EN61000-4-8 (Magnetic Field Standards): 30A/m @ 50, 60Hz; Crit. A		
Shocks and Vibrations	IEC60068-2-6 Fc (Vibration Resistance): 5g @ 10~150KHz, Amplitude 0.35mm (Operation/Storage/Transport)		
	IEC60068-2-27 Ea (shock):25g @ 11ms (Half-Sine Shock Pulse; Operation), 50g @ 11ms (Half-Sine Shock Pulse; Storage/Transport)		
	IEC60068-2-32 Ed (Free Fall) 1m		

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PARTS ORDERS

FOCD-H-TX-FM-ST	Hardened Rail DIN media converter, switch 10/100BT to 100FX, multimode 1310nm budget 15dB for distance 2km,full duplex ST, -40 to +75°C, IEC61000-6-2, IP30 aluminium case, dual DC power w terminal block 12 to 48v
FOCD-H-TX-FS20	Hardened Rail DIN media converter, switch 10/100BT to 100FX, singlemode 1310nm budget 19dB for distance 20km, full duplex SC,-40 to +75°C, IEC61000-6-2, IP30 aluminium case, dual DC power w terminal block 12 to 48v
FOCD-H-TX-FS20W3	Hardened Rail DIN media converter, switch 10/100BT to 100FX, WDM mono fibre, singlemode 1310nm budget 17dB for distance 20km, full duplex ST,-40 to +75°C, IEC61000-6-2, IP30 aluminium case, dual DC power w terminal block 12 to 48v, fonctionne obligatoirement avec un FOCD-H-TX-FS20-W5 ou WDM 1550
FOCD-H-TX-FS20W5	Hardened Rail DIN media converter, switch 10/100BT to 100FX, WDM mono fibre, singlemode 1550 nm budget 17dB for distance 20km, full duplex ST,-40 to +75°C, IEC61000-6-2, IP30 aluminium case, dual DC power w terminal block 12 to 48v, fonctionne obligatoirement avec un FOCD-H-TX-FS20-W3 ou WDM 1310
FOCD-H-GX-GS	Hardened Rail DIN media converter, 1000BT to 1000SX, multimode 850nm budget 15dB for distance 850m, full duplex SC, -40 to +75°C, IEC61000-6-2, IP30 aluminium case, dual DC power w terminal block 12 to 48v
FOCD-H-GX-GS2	Hardened Rail DIN media converter, 1000BT to 1000SX, multimode 1310nm budget 14dB for distance 2km, full duplex SC, -40 to +75°C, IEC61000-6-2, IP30 aluminium case, dual DC power w terminal block 12 to 48v
FOCD-H-GX-GL10	Hardened Rail DIN media converter, 1000BT to 1000LX, singlemode 1310nm budget 14,5dB for distance 10km, full duplex SC, -40 to +75°C, IEC61000-6-2, IP30 aluminium case, dual DC power w terminal block 12 to 48v
FOCD-H-TGX-GSFP	Hardened Rail DIN media converter, switch 10/100/1000BT to 1000X en SFP (sans module), -40 to +75°C, IEC61000-6-2, IP30 aluminium case, dual DC power w terminal block 12 to 48v

Rue from l'Ornette
28410 Abondant
France

Tel. : +33 (0) 237.628.790
Fax : +33 (0) 237.628.801
Email: trans@cxr.fr