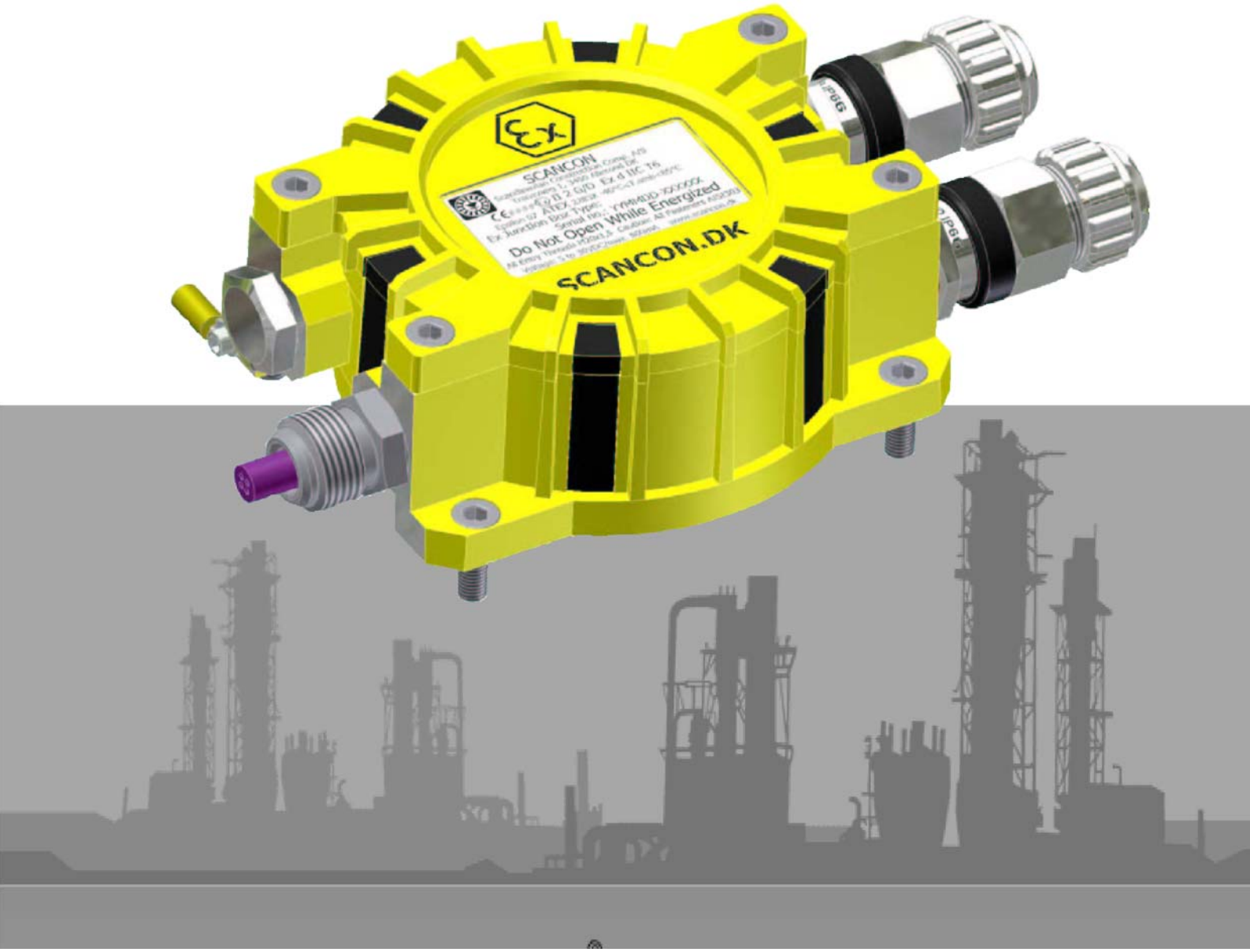
Installation manual
for
Fiber Optic Junction Box
(Preliminary)



Fiber Optic Junction Box
Technical Description

(Preliminary)

1: Introduction

The Fiber Optic Junction Box system is designed to prevent, as much as possible, encoder signal degradation over distance. This is accomplished by connecting an encoder to the Transmitter Box which converts the digital signals to fiber optic signals. The signals are transmitted over fiber optic cable to the Receiver Box which converts the signals back to digital format. The Receiver Box, which is connected to the customer's controller/counter/PLC, then transmits the data for processing.

This technical description of the Fiber Optic Junction Box system is preliminary. It only covers installation and connection of the Transmitter and Receiver Boxes.

Furthermore, it only covers Version 1 of the system and will automatically be obsolete with the advent of new versions. The Version 1 boxes are not clearly marked as being Version 1. However, since future versions will be labelled by version number, they can be distinguished from Version 1.

2: Transmitter Connection

Supply

Terminal no.	Name	Type	Connect to
1	Vcc	Supply input	Positive supply for Transmitter
2	0-Volt	Supply input	0V (gnd) for Transmitter
3	Shield	Shield	Cable shield – Internally connected to case

Encoder

Terminal no.	Name	Type	Connect to
1	ChA	Input	Channel A from Encoder
2	ChA inv	Input	Channel A inverted from Encoder
3	ChB	Input	Channel B from Encoder
4	ChB inv	Input	Channel B inverted from Encoder
5	ChZ	Input	Channel Z from Encoder
6	ChZ inv	Input	Channel Z inverted from Encoder
7	Vcc	Supply output	Positive supply for Encoder (10 - 30V)*
8	5-Volt	Supply output	Positive supply for Encoder (5V)*
9	0-Volt	Supply output	0V (gnd) for Encoder
10	Shield	Shield	Cable shield – Internally connected to case

*) The positive supply for the encoder should either be connected to Vcc or 5-Volt depending on the requirements of the encoder. If connected to Vcc, the encoder supply voltage will be the same as the transmitter supply voltage. If connected to 5-Volt, it will be 5V regardless of the transmitter supply voltage.

3: Receiver Connection

Encoder

Terminal no.	Name	Type	Connect to
1	ChA	Output	Channel A to Counter/Controller
2	ChA inv	Output	Channel A inverted to Counter/Controller
3	ChB	Output	Channel B to Counter/Controller
4	ChB inv	Output	Channel B inverted to Counter/Controller
5	ChZ	Output	Channel Z to Counter/Controller
6	ChZ inv	Output	Channel Z inverted to Counter/Controller
7	Connect	Output	High for data valid – Low for error
8	Vcc	Supply input	Positive supply for Receiver (4.75 - 30V)
9	0-Volt	Supply input	0V (gnd) for Receiver
10	Shield	Shield	Cable shield – Internally connected to case

4: Optical Fiber

It is recommended that the cable placement as shown below (Photo 1) is used to avoid sharp bends of the optical fiber. The fiber connectors are situated in the box in such a way that both fibers will have an internal length of 400 mm (15.7”)

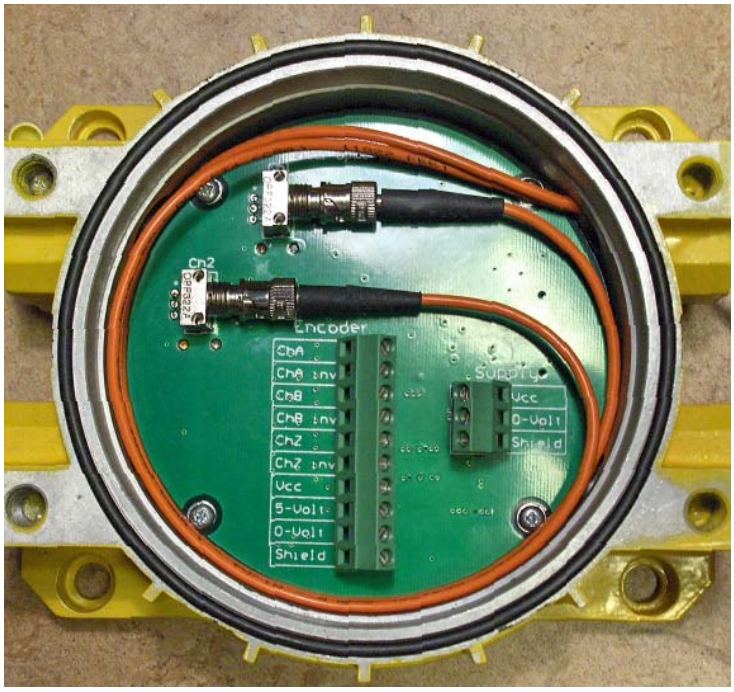


Photo 1
Placement of optical fiber

5: Installation Examples - Transmitter

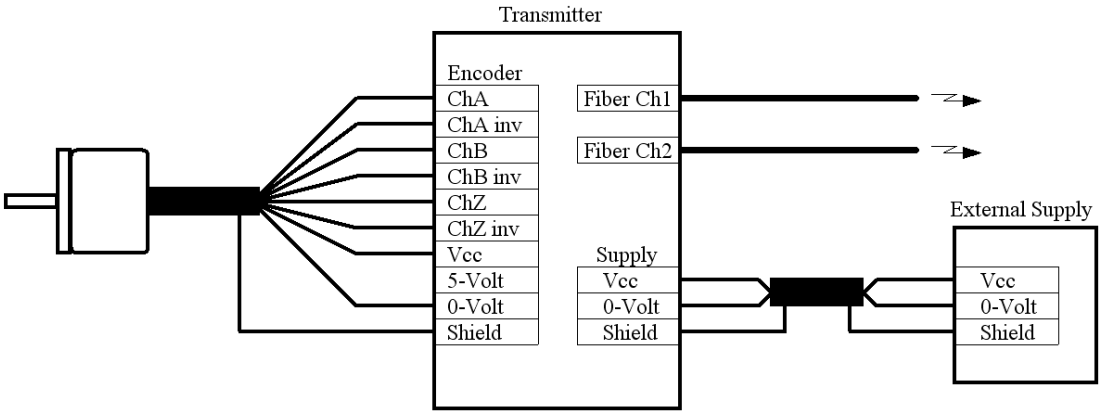


Figure 1
Encoder power supply equal to transmitter power supply

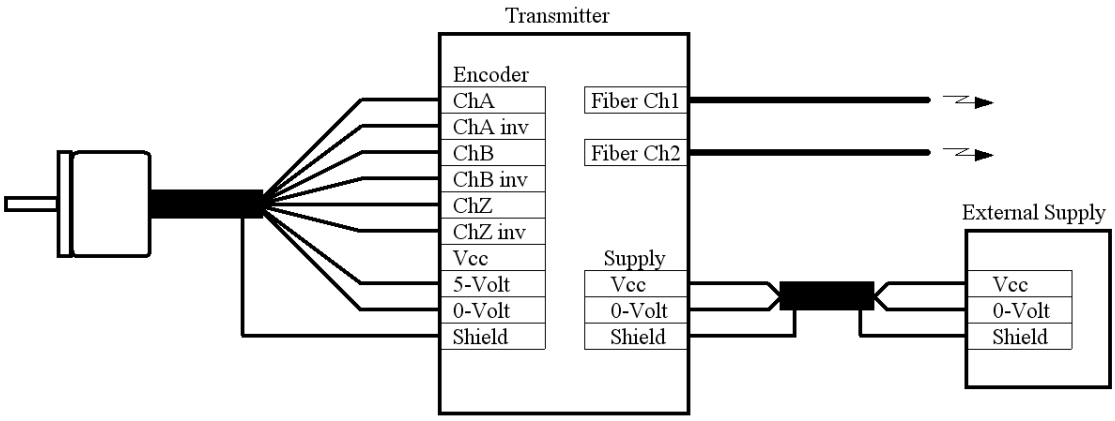


Figure 2
Encoder power supply equal to 5V

6: Installation Examples - Receiver

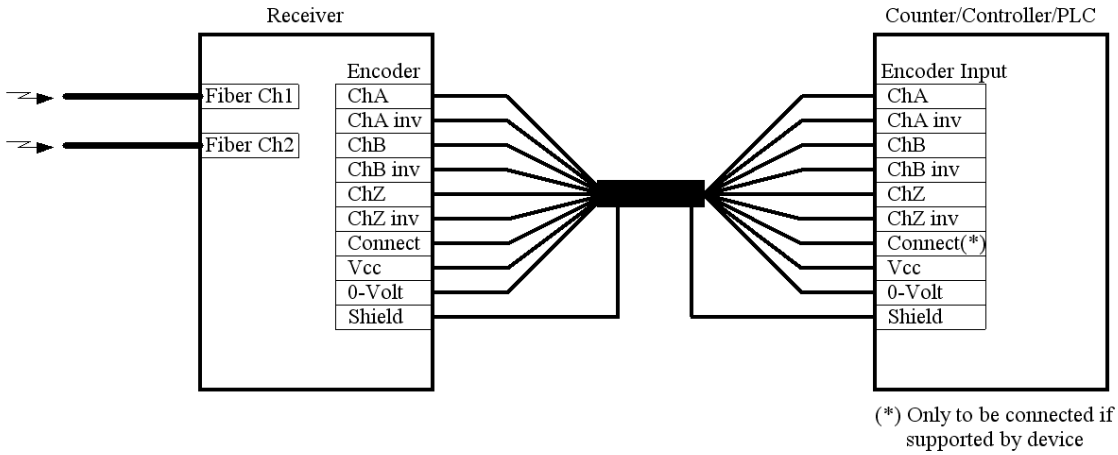


Figure 3
Receiver powered from connected device (counter/controller/PLC)

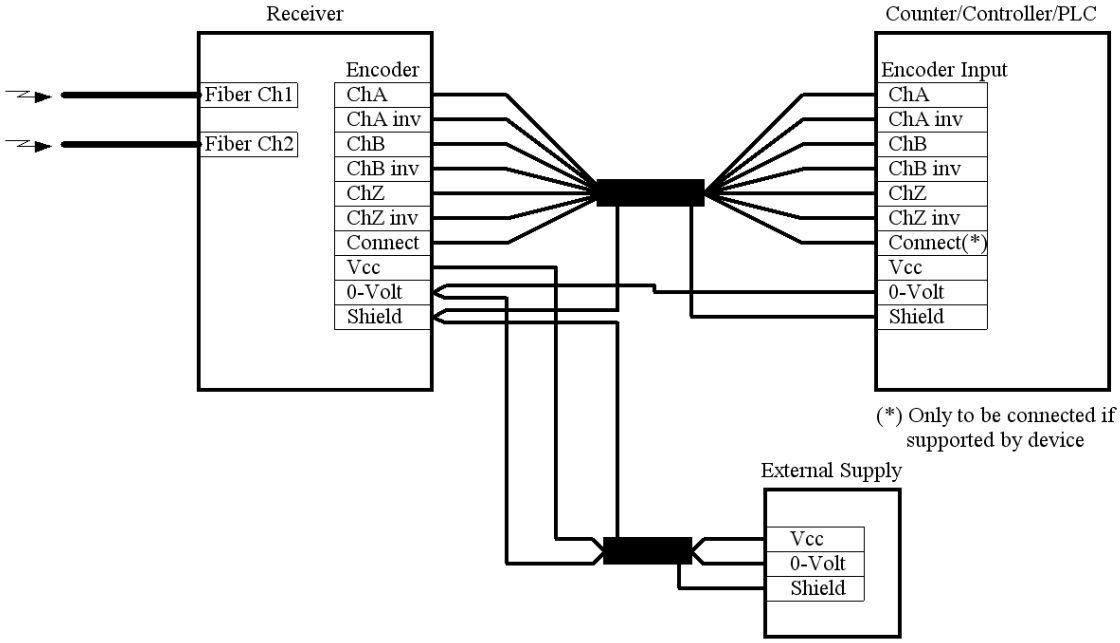


Figure 4
Receiver powered from separate supply

7: Technical Data.

Supply voltage - Transmitter	10 to 30 Vdc
Supply voltage - Receiver	4.75 to 30 Vdc
Current consumption - Transmitter (typical)	200 mA @ Vcc = 10 Vdc (excluding encoder) 130 mA @ Vcc = 20 Vdc (excluding encoder) 100 mA @ Vcc = 30 Vdc (excluding encoder)
Current consumption - Receiver (typical)	180 mA @ Vcc = 5 Vdc 70 mA @ Vcc = 15 Vdc 45 mA @ Vcc = 30 Vdc
Encoder supply (from Transmitter)	Identical to Transmitter Supply voltage or 5Vdc [1]
Encoder inputs (Transmitter)	Differential inputs, $V_{DIF} \geq 0.3$ x Supply voltage Maximum input voltage equal to Supply voltage Signals A, A-, B, B-, Z, Z-
Encoder outputs (Receiver)	Differential outputs. $V_{LOW} \leq 0.8V$ $V_{HIGH} \geq$ Supply voltage – 1.2V [2] Signals A, A-, B, B-, Z, Z-, Connect
Encoder frequency	Max. 100 kHz (recommended) [3]
Update / Sampling rate	1.04 million updates / second ~ 0.96 µsec. / update
Maximum transmission delay	≤ 3 µsec. [4]
Optical fiber connectors	Standard ST Insertion loss ≤ 0.7 dB (≤ 0.4 dB recommended)
Recommended optical fiber	62.5 / 125 µm, multimode (TUG 651)
Wavelength	850 nm
Transmission distance	1,000 meters 2,000 meters (option)
Temperature - operating	-40 to +70° C
Temperature - storage	-40 to +85° C
Humidity	98% ; not condensing
Environmental protection	IP 67
Certifications	CE 1217 Ex II 2 G/D Ex d IIC T6 Epsilon 07 ATEX 2283X ***Certifications apply to the Junction Box only.*** ***Cable glands & blinds are not covered by this certification.***

[1] 5V terminal on terminal block is used for encoders with a supply voltage of 5Vdc

[2] Measured for I_{LOAD} = 25 mA.

[3] Due to tolerances on encoder duty cycle and phase relationship, it is recommended not to exceed 100 kHz.

[4] The delay is defined as the time when a channel changes state on the inputs of the Transmitter to when the same change is observed on the corresponding output of the Receiver.
An additional delay of approx. 1 µsec / 200 meters of fiber optic cable must be added.

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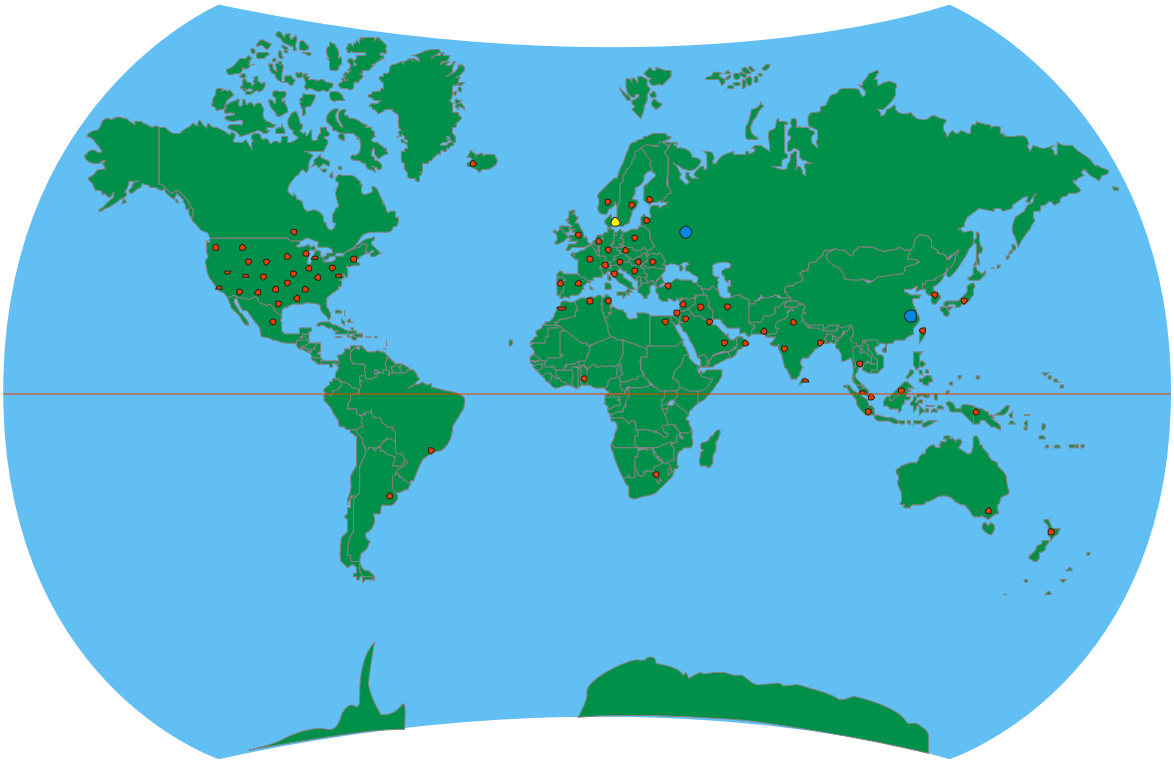

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