

# LW215 – LW216

Optical fibre modules for transmission of incremental encoder or sensor signals



Transmitter-Module	Module type	Input level	Power Supply
LW215	Transmitter	RS422	5 Vdc ( $\pm 5\%$ )
LW215-1	Transmitter	RS422	10 – 30 Vdc
LW215-2	Transmitter	HTL (Push-pull)	10 – 30 Vdc
LW215-3	Transmitter	HTL (Push-pull/Single-ended)	10 – 30 Vdc

Receiver Module	Module type	Output level	Power supply
LW216	Receiver	RS422	5 Vdc ( $\pm 5\%$ )
LW216-1	Receiver	RS422	10 – 30 Vdc
LW216-2	Receiver	HTL (Push-pull)	10 – 30 Vdc

## Operating instructions



## Safety Instructions

- This manual is an essential part of the unit and contains important hints about function, correct handling and commissioning. Non-observance can result in damage to the unit or the machine or even in injury to persons using the equipment!
- The unit must only be installed, connected and activated by a qualified electrician
- It is a must to observe all general and also all country-specific and application-specific safety standards
- When this unit is used with applications where failure or maloperation could cause damage to a machine or hazard to the operating staff, it is indispensable to meet effective precautions in order to avoid such consequences
- Regarding installation, wiring, environmental conditions, screening of cables and earthing, you must follow the general standards of industrial automation industry
- - Errors and omissions excepted –



General instructions for cabling, screening and grounding can be found in the SUPPORT section of our website <http://www.motrona.com>

Version:	Description
LW21501a/pp/01_2012	First edition

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# 1. Description

The optical fibre modules LW215 and LW216 form together a transmission system for data transmission of industrial signals by means of optical fibres.

Both transmitter and receiver modules have four channels, which are completely independent of each other, with differential inputs and outputs. All four channels allow the transmission of signals with a maximum data rate of 800 kBit/s. With their technical features, the optical fibre modules are intended for the transmission of signals from incremental encoders and sensors. Differential signals with RS-422 or Push-pull HTL levels from other sources may also be connected to these devices.

The modules are available in various level and supply voltage variants.

The optical fibre modules are mainly used when signals have to be transmitted in environments with strong electromagnetic interferences or when, due to high ground potential differences between the signal source and the signal processing equipment, a potential separation is necessary.

High ground potential differences generally appear also in case of large distances between the encoder/sensors and the PLC or any other processing electronics.

The optical fibre cable is failure-safe: it does not constitute any danger in case of damage. Since the light-emitting component used is not a laser, but a light-emitting diode, the transmission line is totally safe, even when looking directly into the opened connector or into the broken glass fibre.

If necessary, a level conversion can be linked with the potential separation without problem. Since all devices use the same signal transmission protocol on the optical fibre cable, any transmitter can be combined with any receiver.



The optical fibre cable can be routed through explosive areas.

## 2. Electrical and optical connections

### 2.1. Pin assignment

Pin	Description
1	Channel /A
2	Channel /B
3	Channel /0 (C/)
4	Channel A
5	Channel B
6	Channel 0 (C)
7	Channel D
8	+ Hub
10	Channel /D
9, 11, 12	0 V (GND), the contacts are connected together internally.



The pin assignment is identical for the transmitter and receiver modules.

### 2.2. Electrical connections

As a principle, the input and output lines always must be routed as a pair, i.e. both wires of a signal must be routed in twisted pair cables. The use of bundle wires (called control cables) is not allowed, since this could not guarantee the correct transmission of the signal, nor the EMC features.

The cable shield must be connected at both ends, at the encoder and at the optical fibre transmitter, and at the optical fibre receiver and at the signal processing device. To that purpose, the optical fibre transmitter and receiver are equipped with the additional ground contacts 11 and 12.



For the modules with RS-422 output (LW216 and LW216-1), make sure that the signal receiver has a differential input with an input resistance of 100 – 120 Ohm.

For the module LW216-2, this value must be 2 k.

If there are no specific requirements for the output signals of the receiver modules (i.e. low transmission frequencies in the low kHz range), the outputs may be operated as single-pole TTL or HTL outputs. However, the correct operation of this application must be checked on a case-by-case basis, and it is not supported by the manufacturer.

All modules are protected against reversed polarity, which avoids any damage in case of wrong polarity of the power supply.

The outputs of the modules are only short-circuit proof in certain conditions; avoid imperatively short-circuits between modules or with the earth.

Exceeding the supply voltage of the modules LW215 and LW216 above a value of about 6 V leads to the destruction of the fuse located inside of the device and must thus be avoided.

For the modules LW215-1, LW215-2, LW215-3, LW216-1 and LW216-2, this value is 33 V.



The fuse must be replaced in the manufacturer's factory. Any attempt to repair the device will void the guarantee.

## 2.3. Optical connections

Connecting the modules together may be carried out using a cord set multimode optical fibre cables of motrona or alternatively any multimode optical fibre cable 50/125 µm or 62.5/125 µm.



Single-mode optical fibre cables cannot be used.

Please keep the dust protection covers of the optical transmitters and receivers, and put them back in place when no optical fibre cable is connected to the modules, in order to avoid any soiling by dust or any other substance.



Make sure here that the connector of the optical fibre cable is correctly in place and that the bayonets catch is locked.

It must also be noted that the used ST connector is indexed and has an orientation spigot which must engage the slots of the optical emitter and of the optical receiver. Please never force!

## 3. LED-function

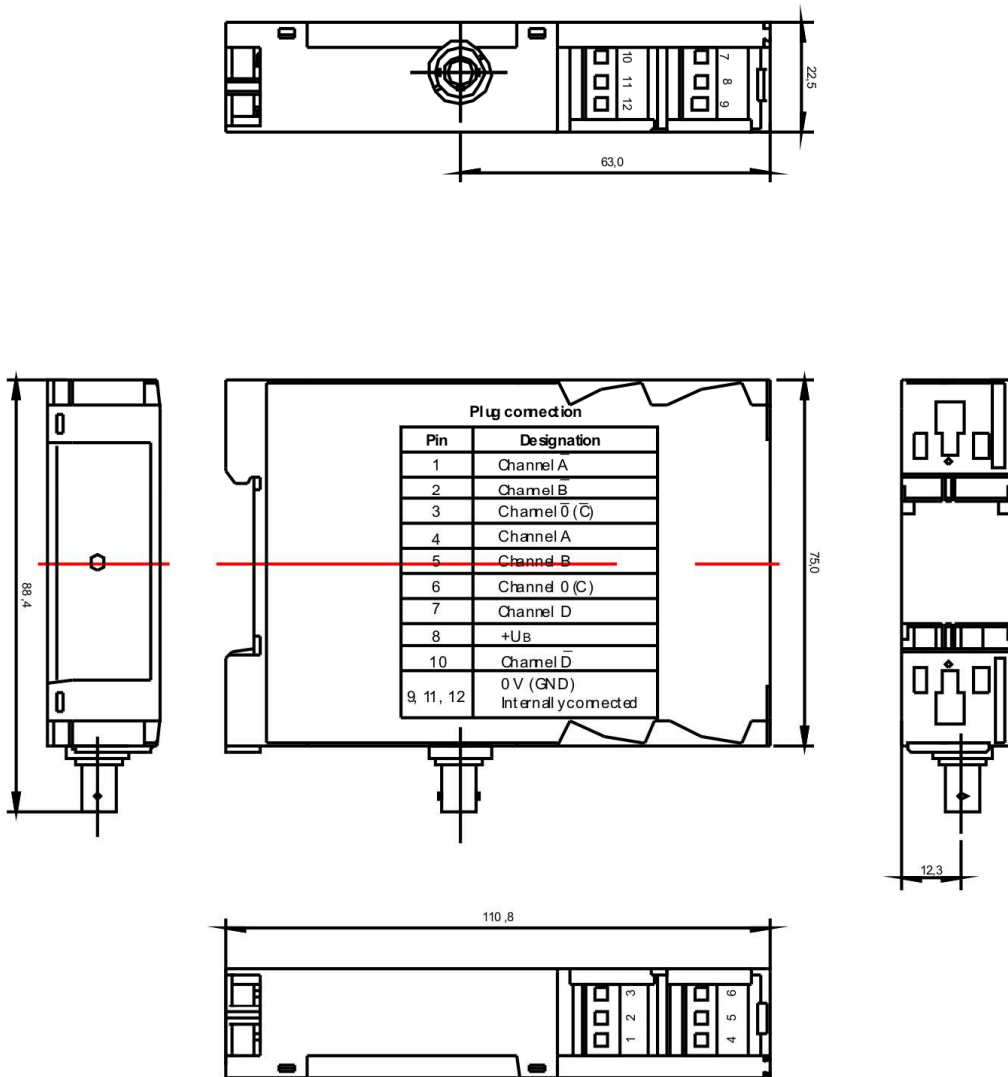
The green control LED of the transmitter must be on when the modules are correctly connected. The green LED of the receiver must also be on or blinking.

If the LED of the module is not on, make sure that the supply voltage is applied and that it is connected with the right polarity.

If the LED of the receiver module blinks, the optical fibre cable is not connected or broken.

# 4. Dimensions and technical characteristics

## 4.1. Dimension drawing:



Gehäusematerial: Polyamid PA6.6, UL 94 V0  
 Gehäusefarbe: hellgrau, RAL 7035  
 Druckfarbe: schwarz  
 Schutzart Gehäuse: IP 40/EN 60529  
 Schutzart Klappen: IP 20/EN 60529



## 4.2. Technical characteristics

Designation	Characteristic
Construction	Housing for DIN rail mounting acc. to EN 50 022
Dimensions (W x L H)	22.5 x 110.8 x 88.4 mm
Housing Colour:	Light grey, RAL 7035
Protection:	IP 40, terminals IP 20
Optical fibre connection	ST connector, 13 mm, Ø 9 mm, on the bottom side of the housing
Terminals:	Protected against contact, max. conductor diameter: 2.5 mm <sup>2</sup>
Glass fibre	Multimode fibre, 50/125 µm, 62.5/125 µm
Max. optical transmission distance	1000 m
Optical fibre synchronisation display	LED is on when the synchronisation is set and blinks when the synchronisation is lost or the optical fibre cable is broken
Input signals sampling rate	10 MSamples/s
Supply voltage	10 – 30 V or 5 V ± 5%
Power consumption per module	< 2 W
Operating voltage reverse connection protection	available
Electrical inputs of the transmitter and electrical outputs of the receiver	Channels A, B, C, D with inputs and outputs A, /A, B, /B, C, /C and D, /D
Max. input frequency - optical fibre transmitter and output frequency - optical fibre receiver	400 kHz
Input level - optical fibre transmitter	10 - 30 V or RS 422
Optical wavelength	840 nm (infrared)
Optical transmission rate	120 MBit/s
Operating temperature range	-10 °C to +60 °C
Noise immunity:	EN 61000-6-2 : 2006
Noise emission:	EN 55011 Class B