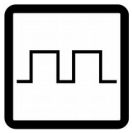
User's manual

IF60 - IF61

Description

IF60 and IF61 are optical fiber modules specifically designed for transmission of signals output by an incremental encoder or sensor type RS-422, 5V TTL or 10-30V HTL. These modules consist of a transmitter (IF60) and a receiver (IF61) that are coupled to form an incremental signal transmission system through optical fibers. They are available in a variety of wavelengths, levels and supply voltage variants for transmissions up to 2,000 m (approx. 6,550 ft). Optical fiber cables are suitable to be routed through explosive areas.



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1 - Safety summary

1.1 Safety

- Always adhere to the professional safety and accident prevention regulations applicable to your country during device installation and operation;
- installation and maintenance operations have to be carried out by qualified personnel only, with power supply disconnected and stationary mechanical parts;
- device must be used only for the purpose appropriate to its design: use for purposes other than those for which it has been designed could result in serious personal and/or the environment damage;
- high current, voltage and moving mechanical parts can cause serious or fatal injury;
- warning ! Do not use in explosive or flammable areas;
- failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment;
- Lika Electronic assumes no liability for the customer's failure to comply with these requirements.

1.2 Electrical safety

- Turn OFF power supply before connecting the device;
- connect according to explanation in the "5 - Electrical connections" section;
- in compliance with 2014/30/EU norm on electromagnetic compatibility, following precautions must be taken:

- before handling and installing the equipment, discharge electrical charge from your body and tools which may come in touch with the device;
- power supply must be stabilized without noise; install EMC filters on device power supply if needed;
- always use shielded cables (twisted pair cables whenever possible);
- avoid cables runs longer than necessary;
- avoid running the signal cable near high voltage power cables;
- mount the device as far as possible from any capacitive or inductive noise source; shield the device from noise source if needed;
- minimize noise by connecting the unit to ground (GND). Make sure that ground (GND) is not affected by noise. The connection point to ground can be situated both on the device side and on user's side. The best solution to minimize the interference must be carried out by the user.

1.3 Mechanical safety

- Install the device following strictly the information in the "4 - Mounting instructions" section;
- do not disassemble the unit;

- do not tool the unit;
- delicate electronic equipment: handle with care; do not subject the device and the shaft to knocks or shocks;
- respect the environmental characteristics of the device.

2 - Identification

Device can be identified through the **order code** and the **serial number** printed on the label applied to its body. Information is listed in the delivery document too. Please always quote the order code and the serial number when reaching Lika Electronic for purchasing spare parts or needing assistance. For any information on the technical characteristics of the product, refer to the technical catalogue.

3 – Introduction

IF60 and IF61 are optical fiber modules specifically designed for transmission of signals delivered by an incremental encoder or sensor type RS-422, Line Driver 5V TTL or Push-Pull 10-30V HTL. These modules consist of a transmitter (IF60) and a receiver (IF61) that are coupled to form an incremental signal transmission system through optical fibers.
Both transmitter and receiver modules provide four channels which are completely independent of each other, with differential inputs and outputs. All four channels allow the transmission of signals at a maximum data rate of 2 Mbit/s. As previously stated, according to their technical features, the optical fiber modules are intended for the transmission of signals delivered by incremental encoders and sensors.
Differential signals having RS-422 or Push-Pull HTL levels provided by other sources may also be connected to these devices.
The modules are available in a variety of wavelengths, levels and supply voltage variants.
The optical fiber modules are mainly used for signal transmission in environments with strong electromagnetic interference or when a potential separation is necessary due to high ground potential differences between signal source and signal processing equipment.
High ground potential differences generally appear in applications with long distances between the encoder/sensor and the PLC or any other processing electronics.
The optical fiber cable is failure-safe: it does not pose any danger in case of damage. Since the used light-emitting component is not a laser, but a light-emitting diode, the transmission line is totally safe, even when gazing into the open connector or into the broken glass fiber.

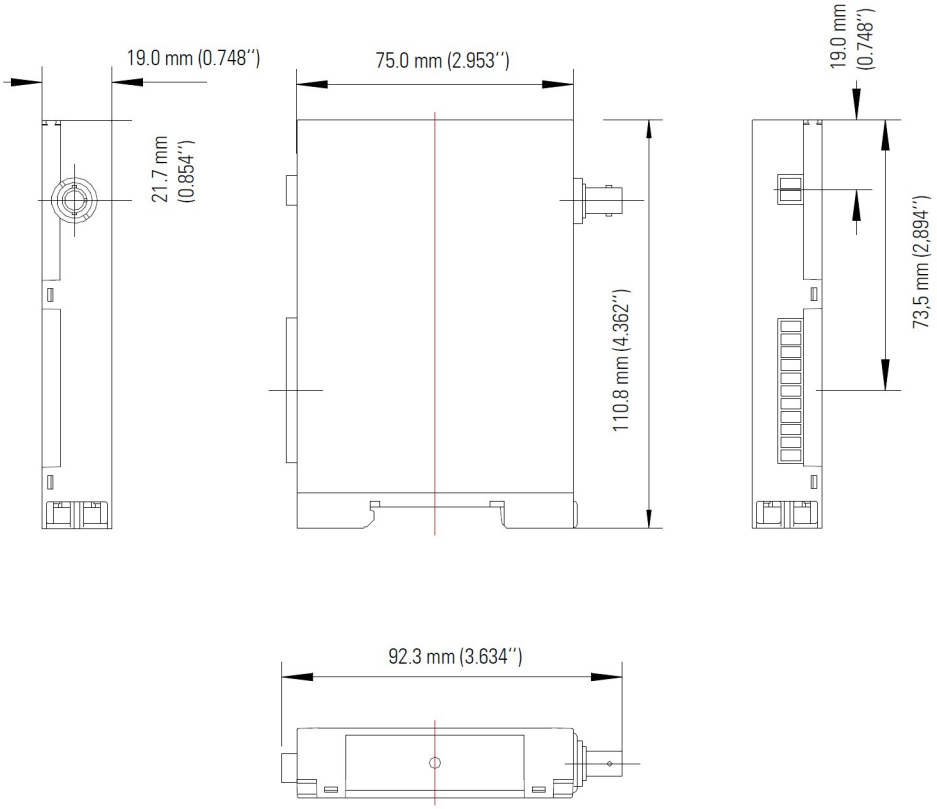
If necessary, a level conversion can be linked with the potential separation without problem.
Since all devices use the same signal transmission protocol on the optical fiber cable, any transmitter can be combined with any receiver.

NOTE
The optical fiber cable can be routed through explosive areas.
The transmission distance limits are 2,000 m (approx. 6,550 ft) at 850 nm wavelength.

4 - Mounting instructions

WARNING
Mount the unit with power supply disconnected.

IF60 - IF61 transmitter – receiver modules must be installed and protected inside the electric panel. They provide 35 mm top hat rail mounting according to EN 60715.



4.1 Installation notes

The device is only allowed to be installed and operated within the permissible temperature range (-10°C +70°C / +14°F +158°F). Please ensure an adequate ventilation and avoid all direct contact between the device and hot or aggressive gases and liquids.
Before installation or maintenance, the unit must be disconnected from all voltage sources. Furthermore it must be ensured that no danger can arise by touching the disconnected voltage sources.
Devices which are supplied by AC voltages must be connected exclusively by switches or circuit breakers with the low voltage network. The switch or circuit breaker must be placed as near as possible to the device and further indicated as separator.

Incoming as well as outgoing wires and wires for extra low voltages (ELV) must be separated from dangerous electrical cables (SELV circuits) by using a double or reinforced insulation.
All selected wires and insulations must comply with the provided voltage and temperature ranges. In addition all country and application-specific standards, which are relevant for structure, form and quality of the wires, must be ensured.
Before first start-up it must be ensured that all connections and wires are firmly in place and secured to the screw terminals. All (inclusive unused) terminals must be fastened by turning the relevant screws clockwise up to the stop.
Overvoltages at the connections must be limited to values in accordance to the overvoltage category II.

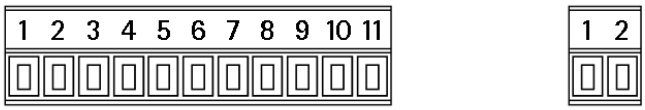
4.2 Cleaning, maintenance and service notes

To clean the front of the unit please use only a slightly damp (not wet!), soft cloth. For the rear no cleaning is necessary. For an unscheduled, individual cleaning of the rear the maintenance staff or assembler is self-responsible.
During normal operation no maintenance is necessary. In case of unexpected problems, failures or malfunctions the device must be shipped back to the manufacturer for maintenance check, adjustment and repair (if necessary). Unauthorized opening and repair can have negative effects or failures to the measures of protection of the unit.

5 - Electrical connections

WARNING
Turn OFF the power supply before connecting the device.

5.1 Pin assignment



11-pin terminal

Pin	Description
1	0Vdc (GND), encoder supply output (transmitter only)
2	+Vdc [1], encoder supply output (transmitter only)
3	Channel A
4	Channel /A [2]
5	Channel B
6	Channel /B [2]
7	Channel 0 or C
8	Channel /0 or /C [2]
9	Channel D
10	Channel /D [2]
11	Cable shield connector

2-pin terminal

Pin	Description
1	0Vdc (GND), power supply input
2	+Vdc [1], power supply input

1 See the order code.
IF60-**L-1**: +Vdc = +5Vdc ±5%
IF60-**L-2**: +Vdc = +10Vdc +30Vdc

2 With dual-channel transmitter versions all inverted signals must be necessarily connected. If inverted signal are not connected, then this will cause malfunction.

NOTE
If the encoder does not have a separate power supply, pins 1 and 2 of the transmitter's 11-pin terminal can be used to supply the encoder, provided that the encoder has the same voltage class as the module.
On the receiver module the power supply can be applied to either the 2-pin terminal or to pins 1 and 2 of the 11-pin terminal.

NOTE
All pin assignments are identical for the transmitter and receiver modules.

5.2 Electrical connections

As a principle, the input and output lines must always be routed in pairs, i.e. both wires of a differential signal must be routed in a twisted pair of cables. The use of bundle wires (called control cables) is not allowed, since this will not guarantee correct signal transmission or EMC compliance.
The cable shield must be connected at both ends, at the encoder and the optical fiber transmitter side as well as at the optical fiber receiver and the signal processing device side. The optical fiber transmitter and receiver are equipped with the additional ground pin 11 especially intended for this purpose.

WARNING
In case of modules with RS-422 output (IF61-L-1 and IF61-L-2), please make sure that the signal receiver provides a differential input with an input resistance of 100 – 120 ohms.
For receiver modules IF61-YC-2, this value must be 2 Kohms.

If there are no specific requirements for the output signals of the receiver modules (e.g. low transmission frequencies in the lower kHz range), the outputs may be operated as single-pole TTL or HTL outputs. However, the correct operation of this application must be evaluated on a case-by-case basis and it is not supported by the manufacturer.
All modules are protected against reversed polarity, in order to avoid damage in case of wrong polarity of the power supply.
The outputs of the modules are only conditionally short-circuit proof; therefore please avoid compulsorily short-circuits between modules or with the earth.
Exceeding the supply voltage of the modules IF60-L-1 and IF61-L-1 above a value of **about 6V** causes the fuse located inside the device to break and thus this must be avoided.
For the modules IF60-L-2, IF60-YC-2, IF60-Y-2, IF61-L-2 and IF61-YC-2, the limit value is **33V**.

WARNING
The fuse can be replaced only at the manufacturer's premises. Any attempt to repair the device will cause the product warranty to be cancelled.

5.3 Optical connections

To connect the modules a cord set of **multimode optical fiber cables** assembled and supplied by Lika Electronic can be used. Alternatively any multimode optical fiber cable having either 50/125 µm or 62.5/125 µm core diameter will be suitable for such use.

WARNING
Single-mode optical fiber cables cannot be used.

Please keep the dust protection covers of the optical transmitters and receivers. Put them back in place when no optical fiber cable is connected to the modules, in order to avoid any soil by dust or other substances.

WARNING
Please make sure that the connector of the optical fiber cable is correctly in place and that the bayonets catch is locked.
Please also note that the ST connector is indexed and uses a plug and socket which is locked in place with a half-twist bayonet lock. The ST connector has a bayonet swell and a lengthy cylindrical ferrule to grip the fiber. They are spring-loaded; hence, you have to be certain that they are fixed correctly. Please never force the connector!

6 – Function of the LED

The green control LED of the transmitter must be ON when the modules are connected correctly by means of a proper cable. The green LED of the receiver must be ON too.

If the LED of the module is OFF, make sure that it is connected with the right polarity and the supply voltage is applied.

If the LED of the receiving module blinks green, the optical fiber cable is not connected or is broken.

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Document release	Release date	Description	HW	SW	Interface
1.0	26.11.2012	First issue	-	-	-
1.1	22.11.2016	General review	-	-	-

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