

User's manual

IF10

Description

IF10 is an encoder distributor, cross switcher and splitter for incremental encoder signals.

This universal encoder interface is applicable as level converter, encoder splitter and encoder cross switch. It is equipped with two encoder inputs for signals A, B, 0 and /A, /B, /0, adjustable to either TTL/RS-422 level or HTL (10-30V) level; and two signal outputs A, B, 0 and /A, /B, /0, likewise adjustable to either TTL/RS-422 level or HTL (10-30V) level.

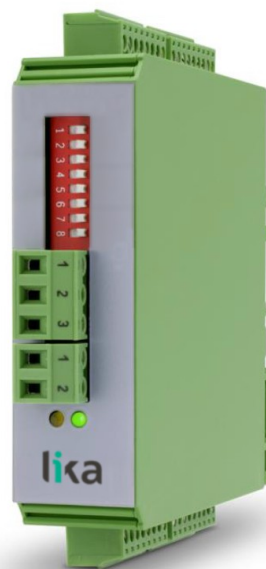


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1 - Safety summary



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 on page 20;
- 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.





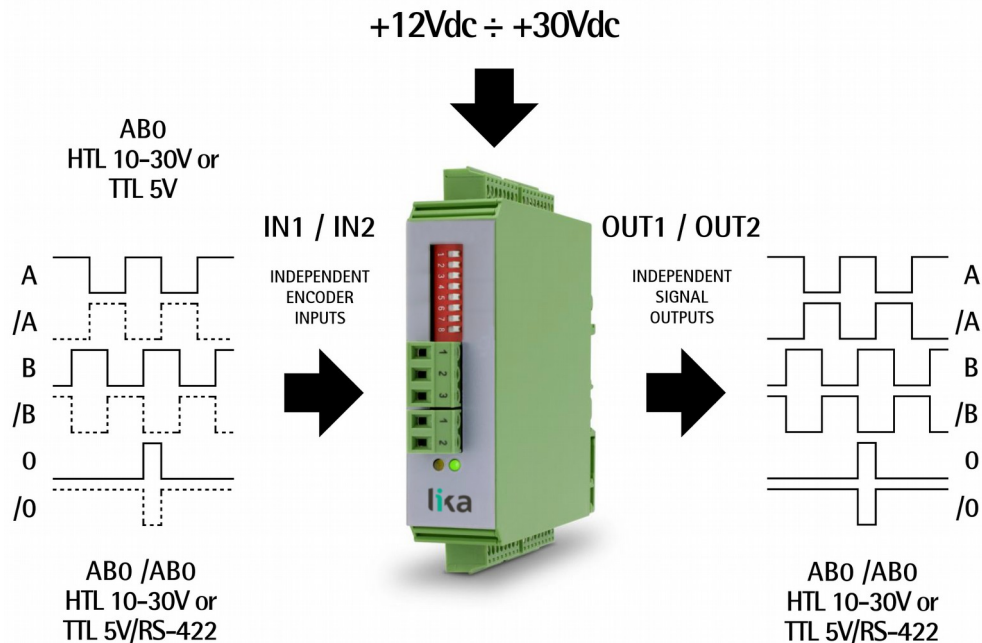
1.3 Mechanical safety

- Install the device following strictly the information in the "4 - Mounting instructions" section on page 18;
- 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

The 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 - Working principle scheme



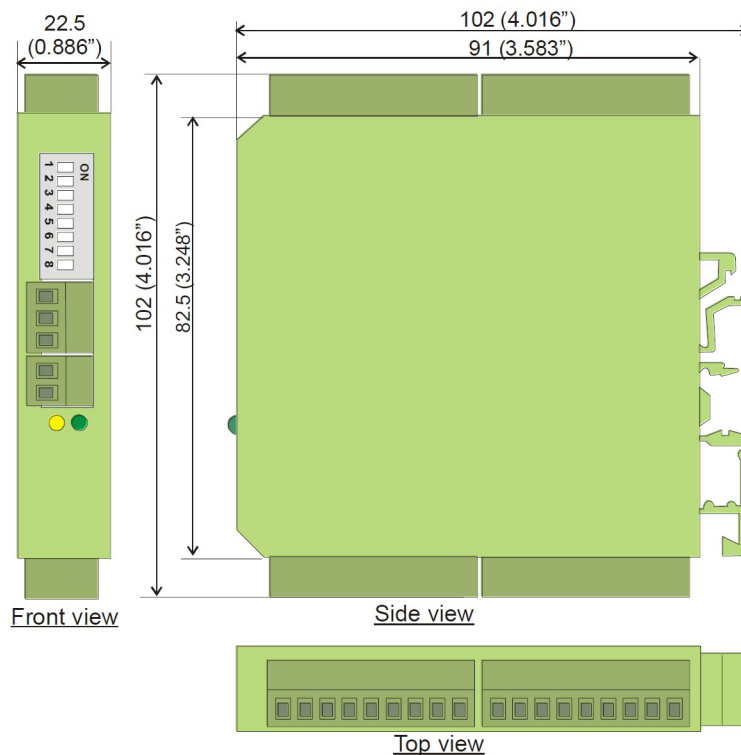
4 - Mounting instructions



WARNING

Mount the unit with power supply disconnected.

IF10 universal encoder interface must be installed and protected inside the electric panel. It provides DIN rail mounting and can quickly snap onto a DIN rail with built-in DIN rail clips that require no additional brackets or supports.



4.1 Installation notes

The device is only allowed to be installed and operated within the permissible temperature range (-20°C +60°C / -4°F +140°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.

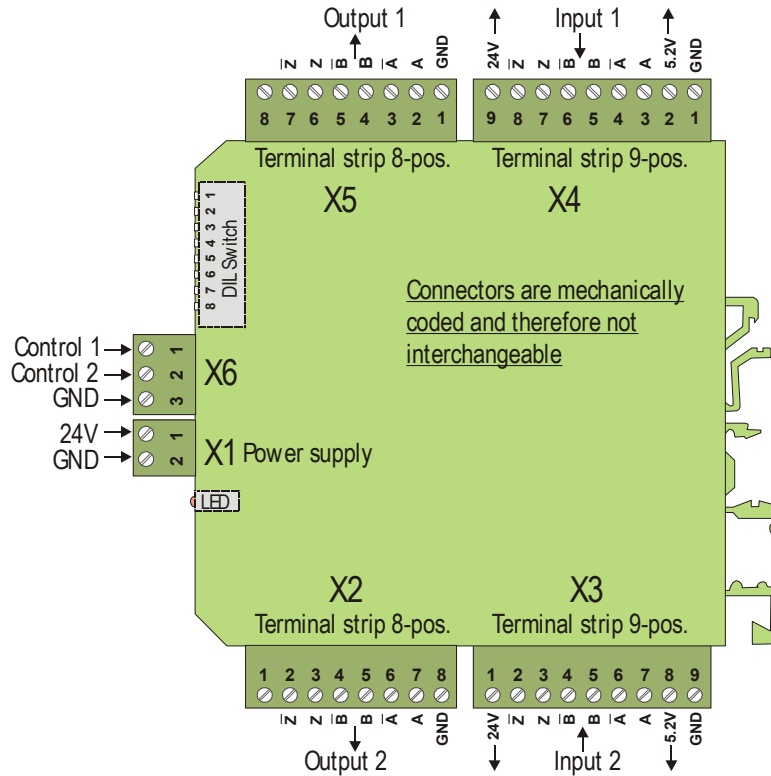
During normal operation no maintenance is necessary. In case of unexpected problems, failures or malfunctions the device must be shipped back to the manufacturer for maintenance check, adjustment and repair (if necessary). Unauthorized opening and repair can have negative effects or failures to the measures of protection of the unit.

5 - Electrical connections



WARNING

Turn OFF the power supply before connecting the device.



5.1 Power supply

The unit requires 12–30Vdc power supply via the 2-position power terminal on the front side (terminal 1 = +Vdc, terminal 2 = GND).

The current consumption is about 50 mA (aux. voltages and outputs unloaded).

5.2 Control inputs

The control inputs are accessible via the 3-position terminal strip in the front side. They are in LOW state when unconnected. To switch the inputs to HIGH state, a signal from +10 to +30V must be applied to the corresponding terminal.

5.3 Encoder inputs

The input lines can be configured according to specific requirements by setting the DIL switch. The following input formats can be used:

- Single-ended signals (asymmetric), channels A, B and 0 only without inverted inputs (level is HTL 10–30V in general, exceptionally also TTL, see the "5.4 Asymmetric TTL Inputs" section on page 21).
- Differential signals (symmetric), channels A, /A, B, /B, 0, /0 (levels either according to RS-422 standard or TTL or HTL 10–30V).

A, B and 0 can be also independent single signals, e.g. from proximities, photocells, etc. Since the level of every channel is selected individually (see the DIL switch settings on page 26), it is possible to use different levels on the inputs. Consequently it is possible, for instance, to get the position information from the A, /A, B and /B channels of a RS-422 encoder, but to add the corresponding 0 index pulse as an HTL signal from a remote photocell.

With HTL signals, the switching threshold is between 6.5V and 8V. The input uses an internal pull-down resistor of 5kOhms.

Each of the two input terminals provides two auxiliary voltage outputs for easy encoder supply: +5.2V / 125 mA and +24V* / 125 mA.

*) Output = power supply voltage – 2V

5.4 Asymmetric TTL Inputs

Only when exceptionally asymmetric TTL input signals must be processed (i.e. TTL signals without inverted signal), a 2-position DIL switch located behind the front plate must be set. This hidden switch becomes accessible by slightly lifting up the front foil in the bottom (e.g. by means of a small screwdriver).



Switch position 1 affects all channels of Input 1

Switch position 2 affects all channels of Input 2

OFF = Asymmetric operation with HTL level (10 – 30V)

ON = Asymmetric operation with TTL level

For all general applications please do not touch the DIL switch hidden under the front plate !



WARNING

Asymmetric TTL levels are most sensitive to noise and interference, therefore not suitable for cable transmission in an industrial environment!



NOTE

Ex factory both switches are OFF, i.e. any single-ended operation requires HTL levels (this is the normal case).

5.5 Outputs

The outputs provide push-pull characteristics. When set to TTL/RS-422 level, the corresponding output swing is always 5V. When set to HTL, the output swing depends on the power supply input (12 – 30V).

All outputs are short-circuit-proof.

At any time the signal and the appropriate inverted signal are both available at the output, even when no inverted signal is applied to the input.

6 - Front LEDs

The **green** LED is lit as soon as the power supply voltage is applied to the unit.

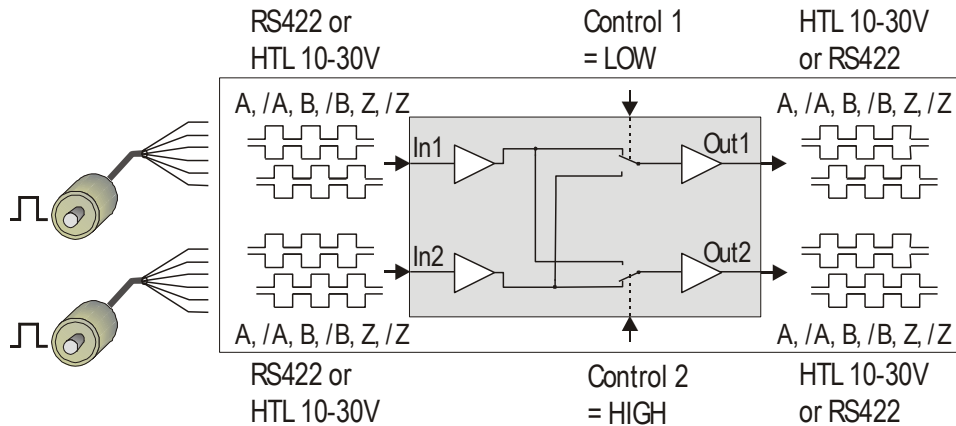
The **yellow** LED indicates the state of the control inputs and the basic function of the unit:

Yellow LED OFF: Control1 and Control2 are both LOW or both HIGH at the same time. In this case the unit operates as a splitter (both outputs are connected to the same input).

Yellow LED ON: Control1 and Control2 have different states. In this case the unit operates as a dual level converter or as a switcher (the outputs are connected to different inputs).

7 - Applications

7.1 Dual level converter



Both inputs can be individually set to either symmetric (differential) format using A, /A, B, /B, 0, /0 channels or to asymmetric (single-ended) format using A, B, 0 channels only.

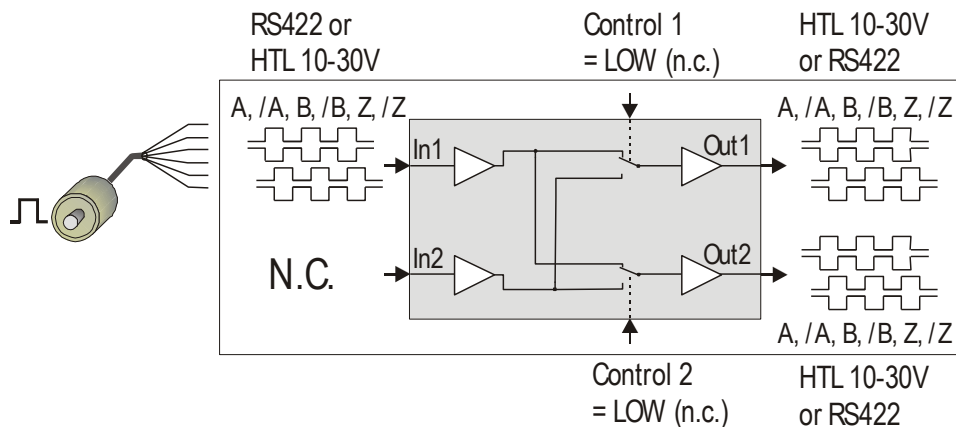
Acceptable input levels are RS-422, TTL and HTL 10-30V.

Also the output format can be selected individually for each output.

The outputs always provide all signals including the inverted channels, even when no inverted signals are applied to the input.

With Control input 1 = LOW (or unconnected) and Control input 2 = HIGH the signal ways are as shown in the drawing above, featuring two independent level converters.

7.2 Encoder splitter (dual output)

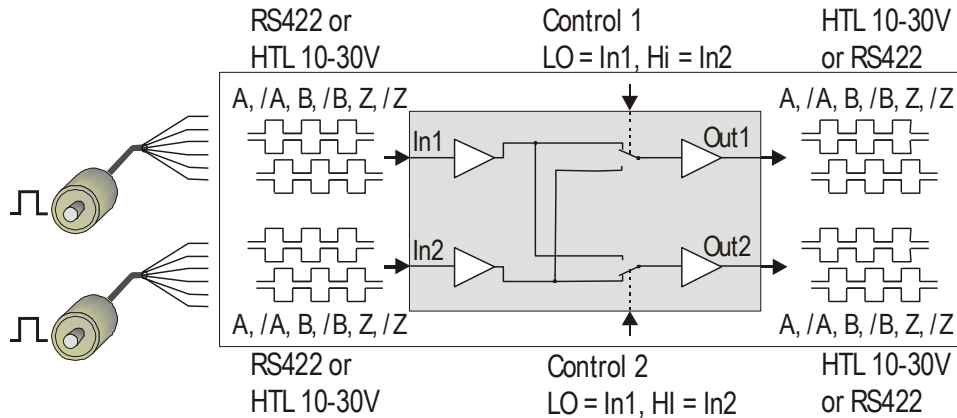


Input 1 is used as encoder input and Input 2 remains unconnected. The input can be set to either symmetric (differential) format using A, /A, B, /B, 0, /0 channels or to asymmetric (single-ended) format using A, B, 0 channels only.

Acceptable input levels are RS-422, TTL and HTL 10-30V.

Also the output standard can be selected individually for each output. The outputs always provide all signals including the inverted channels, even when no inverted signals are applied to the input. Control1 and Control2 remain unconnected in this application.

7.3 Encoder signal switcher



Both inputs can be individually set to either symmetric (differential) format using A, /A, B, /B, Z, /Z channels or to asymmetric (single-ended) format using A, B, Z channels only.

Acceptable input levels are RS-422, TTL and HTL 10-30V.

The output standard can again be selected individually for each output.

The outputs provide always all signals including the inverted channels, even when no inverted signals are applied to the input.

Inputs Control1 and Control2 select the signal ways:

LOW: the corresponding output is connected to input 1.

HIGH: the corresponding output is connected to input 2.

8 - Setting the switches

The DIL switch sets the level and characteristics of inputs and outputs.

0=OFF 1=ON								DIL switch settings	
8	7	6	5	4	3	2	1		
							0	Output 1: TTL / RS-422	The output levels are 5V with TTL setting while correspond to the power supply voltage with HTL setting.
							1	Output 1: HTL	
						0	Output 2: TTL / RS-422		
						1	Output 2: HTL		
			0 (O)	0 (B)	0 (A)			Input 1: differential (A, /A, B, /B, 0, /0)	Both input and inverted input must be used. Levels from 2 to 30V are acceptable.
			1 (O)	1 (B)	1 (A)			Input 1: single-ended (A,B,0) with HTL level *	Inverted inputs remain open, level must be HTL 10-30V.
0 (O)	0 (B)	0 (A)						Input 2: differential (A, /A, B, /B, 0, /0)	Both input and inverted input must be used. Levels from 2 to 30V are acceptable.
1 (O)	1 (B)	1 (A)						Input 2: single-ended (A, B, 0) with HTL level *	Inverted inputs remain open, level must be HTL 10-30 volts.

*) This setting can be used also with asymmetric (single-ended) TTL levels. See the "5.4 Asymmetric TTL Inputs" section on page 21.



NOTE

Please always set unused input lines to "single-ended" HTL!



NOTE

It is not mandatory to use the same level for all channels of an input. The indications (A), (B), (O) show which switch position affects which channel.

**EXAMPLE**

When positions 3 and 4 are set to "0" and position 5 is set to "1", Input1 would accept A, /A, B, /B at RS-422 standard and the 0 index as an HTL single-ended signal.

Consequently it is possible to generate, for instance, an Index from a remote photocell, whereas the impulses come from the RS-422 encoder simulation of a drive system.

Document release	Release date	Description	HW	SW	File version
1.0	03.10.2012	First issue	-	-	-
1.1	01.12.2016	General review	-	-	-



Dispose separately

lika

Lika Electronic

Via S. Lorenzo, 25 • 36010 Carrè (VI) • Italy

Tel. +39 0445 806600

Fax +39 0445 806699



info@lika.biz • www.lika.biz