

# User's guide

## XAC77 MT

ATEX certification category 2  
for use in zones 1, 21, 2, 22  
and temperature class T6 (T85°C)



II2 GD, Ex d IIC T6 Gb, Ex tb IIIC T85°C Db, IP65  
II2 GD, Ex d IIB T6 Gb, Ex tb IIIC T85°C Db, IP65

- 18-bit singleturn encoder version for high precision demands
- 30-bit multiturn encoder version for high end applications
- Complies with the "Modbus over TCP/IP" protocol

### Suitable for the following models:

- XAC77-18-00-MT2-...
- XAC77-16-14-MT2-...

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The logo for Lika Electronic s.r.l. features the word "lika" in a bold, lowercase, sans-serif typeface. The letters are black and have a modern, clean appearance.

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# Typographic and iconographic conventions

In this guide, to make it easier to understand and read the text the following typographic and iconographic conventions are used:

- parameters and objects both of the device and the interface are coloured in **GREEN**;
- alarms are coloured in **RED**;
- states are coloured in **FUCSIA**.

When scrolling through the text some icons can be found on the side of the page: they are expressly designed to highlight the parts of the text which are of great interest and significance for the user. Sometimes they are used to warn against dangers or potential sources of danger arising from the use of the device. You are advised to follow strictly the instructions given in this guide in order to guarantee the safety of the user and ensure the performance of the device. In this guide the following symbols are used:

	This icon, followed by the word <b>WARNING</b> , is meant to highlight the parts of the text where information of great significance for the user can be found: user must pay the greatest attention to them! Instructions must be followed strictly in order to guarantee the safety of the user and a correct use of the device. Failure to heed a warning or comply with instructions could lead to personal injury and/or damage to the unit or other equipment.
	This icon, followed by the word <b>NOTE</b> , is meant to highlight the parts of the text where important notes needful for a correct and reliable use of the device can be found. User must pay attention to them! Failure to comply with instructions could cause the equipment to be set wrongly: hence a faulty and improper working of the device could be the consequence.
	This icon is meant to highlight the parts of the text where suggestions useful for making it easier to set the device and optimize performance and reliability can be found. Sometimes this symbol is followed by the word <b>EXAMPLE</b> when instructions for setting parameters are accompanied by examples to clarify the explanation.

# Preliminary information

This guide is designed to provide the most complete information the operator needs to correctly and safely install and operate the following rotary encoders **equipped with MODBUS TCP/IP interface**:

- **XAC77-18-00-MT2-...**                      **ATEX 18 bit singleturn encoder**
- **XAC77-16-14-MT2-...**                      **ATEX 16+14 bit multiturn encoder**

XAC77 encoders with MODBUS TCP/IP interface comply with the "Modbus over TCP/IP" protocol. **Modbus over TCP/IP is an extension of the popular Modbus RTU protocol** to replace the serial connection with Ethernet technology. MODBUS TCP/IP encoders implement advanced functions such as full scaling, preset, code sequence, position and velocity readout, diagnostic information. MODBUS TCP/IP is user-friendly and basic and can be implemented fast and uncomplicated. Among the reasons behind its popularity are simplicity and ease of interface, low-cost development, minimum hardware requirement and high reliability.

XAC77 ATEX encoders are category 2 "high level of protection" devices with airtight, explosion- and flameproof enclosure for use in Zones 1, 2, 21 and 22 and in the temperature class T6 (T85°C). For complete information on ATEX certification please refer to the enclosed documentation.

For technical specifications please [refer to the product datasheet](#).

To make it easier to read the text, this guide can be divided into two main sections.

In the first section general information concerning the safety, the mechanical installation and the electrical connection as well as tips for setting up and running properly and efficiently the unit are provided.

While in the second section, entitled **MODBUS TCP/IP Interface**, both general and specific information is given on the MODBUS interface. In this section the interface features and the registers implemented in the unit are fully described.



# Glossary of MODBUS TCP/IP terms

MODBUS TCP/IP, like many other networking systems, has a set of unique terminology. Table below contains a few of the technical terms used in this guide to describe the MODBUS TCP/IP interface. They are listed in alphabetical order.

<b>ADU</b>	Application Data Unit, it is the data frame of the MODBUS protocol. It takes the form of a 7 byte header (MBAP Header: transaction identifier + protocol identifier + length field + unit identifier), and the Protocol Data Unit (PDU: function code + data). The MODBUS TCP/IP ADU is inserted into the data field of a standard TCP frame and sent via TCP on registered port 502, which is specifically reserved for MODBUS applications. Thus, this packet is encapsulated by the data frames imposed by the TCP/IP stack of protocols (TCP/IP/MAC) before being transmitted onto the network. Refer to page 38.
<b>Application Process</b>	The Application Process is the task on the Application Layer.
<b>Application protocol</b>	MODBUS is an application protocol or messaging structure that defines rules for organizing and interpreting data independent of the data transmission medium. TCP/IP only guarantees that application messages are transferred between the devices over the Ethernet Local-Area Network (LAN), it does not guaranty that the devices actually understand or interoperate with one another. For MODBUS TCP/IP, this capability is provided by the application layer protocol MODBUS.
<b>Broadcast address</b>	An IP address with a host portion that is all ones.
<b>Bus</b>	A bus is a communication medium connecting several nodes. Data can be transferred via serial or parallel circuits, that is, via electrical conductors or fiber optic.
<b>Client</b>	A Client is any network device that sends data requests to servers. MODBUS TCP/IP follows the Client/Server model. MODBUS Masters are referred to as Clients, while MODBUS Slaves are Servers.
<b>Data encoding</b>	MODBUS uses a 'big-Endian' representation for addresses and data items. This means that when a numerical quantity larger than a single byte is transmitted, the most significant byte is sent first. Refer to page 38.
<b>Determinism</b>	It is the ability of the communication protocol to guaranty that a message is sent or received in a finite and predictable amount of time.
<b>Deterministic Communication</b>	It describes a communication process whose timing behaviour can be predicted exactly. I.e. the time when a message reaches

	the recipient is predictable.
<b>DHCP</b>	DHCP (Dynamic Host Configuration Protocol) is a standardized network protocol used on Internet Protocol (IP) networks for dynamically distributing network configuration parameters, such as IP addresses for interfaces and services. A DHCP server assigns dynamic IP addresses at startup, and the addresses might change over time. DHCP servers on the network acknowledge the request by offering the client an IP address. The client acknowledges the first offer it receives, and the DHCP server in turn tells the client that it has succeeded in leasing the IP address for a specified amount of time.
<b>DNS</b>	DNS (Domain Name System) is a hierarchical distributed naming system for computers, services, or any resource connected to the Internet or a private network. DNS is a host name resolution service that you can use to determine the IP address of a computer from its host name. This lets users work with host names, such as www.example.com, rather than an IP address, such as 192.168.5.102 or 192.168.12.68.
<b>Encapsulation</b>	The term "encapsulation" refers to the action of packing (embedding) the MODBUS message into the TCP container, the IP container, and the MAC container.
<b>Exception code</b>	Code to be returned by Slaves in the event of problems. All exceptions are signalled by adding 0x80 to the function code of the request. Refer to page 74.
<b>Exception response</b>	MODBUS operates according to the common client/server (Master/Slave) model: the Client (Master) sends a request telegram (service request) to the Server (Slave), and the Server replies with a response telegram. If the Server cannot process a request, it will instead return a error function code (exception response) that is the original function code plus 80H (i.e. with its most significant bit set to 1). Refer to pages 40 and 74.
<b>Function code</b>	MODBUS is a request/reply protocol and offers services specified by function codes. The function code is sent from a Client to the Server and indicates which kind of action the Server must perform. MODBUS function codes are elements of MODBUS request/reply PDUs. The function code field of a MODBUS data unit is coded in one byte. Valid codes are in the range of 1 ... 255 decimal (the range 128 – 255 is reserved and used for exception responses). Function code "0" is not valid. Lika encoders only implement public function codes. Refer to page 41.
<b>Holding register</b>	In the MODBUS data model, a Holding register is the output data. A Holding register has a 16-bit quantity, is alterable by an application program, and allows either read-write or read-only access. Refer to page 54.
<b>Host</b>	A computer or other device on a TCP/IP network.

<b>IEEE 1588</b>	This standard defines a protocol enabling synchronisation of clocks in distributed networked devices (e.g. connected via Ethernet).
<b>Input register</b>	In the MODBUS data model, an Input register is the input data. An Input register has a 16-bit quantity, is provided by an I/O system, and allows read-only access. Refer to page 71.
<b>Internet</b>	The global collection of networks that are connected together and share a common range of IP addresses.
<b>InterNIC</b>	The organization responsible for administration of IP addresses on the Internet.
<b>IP</b>	The network protocol used for sending network packets over a TCP/IP network or the Internet.
<b>IP Address</b>	The IP Address is a 32-bit number that uniquely identifies a host (computer or other device, such as a printer or router) on a TCP/IP network. IP addresses are normally expressed in dotted-decimal format, with four numbers separated by periods, such as 192.168.123.132. An IP address has two parts. The first part of an IP address is used as a network address, the last part as a host address. If you take the example 192.168.123.132 and divide it into these two parts you get the following: 192.168.123. = Network; .132 = Host. Or: 192.168.123.0 = network address; 0.0.0.132 = host address. Refer to page 34.
<b>Isochronous</b>	Pertains to processes that require timing coordination to be successful. Isochronous data transfer ensures that data flows continuously and at a steady rate in close timing with the ability of connected devices.
<b>Legacy Ethernet</b>	Ethernet as standardised in IEEE 802.3 (non-deterministic operation in non-time-critical environments).
<b>MAC address</b>	The MAC address is an identifier unique worldwide consisting of two parts: the first 3 bytes are the manufacturer ID and are provided by IEE standard authority; the last three bytes represent a consecutive number of the manufacturer. Refer to page 34.
<b>Master</b>	A Master is any network device that sends data requests to Slaves.
<b>MBAP Header</b>	<p>The MBAP header (MODBUS Application Header) is a 7-byte header added to the start of the message and is used on TCP/IP to identify the MODBUS Application Data Unit. It has the following data:</p> <ul style="list-style-type: none"> <li>• Transaction Identifier: 2 bytes set by the Client to uniquely identify each request. These bytes are echoed by the Server since its responses may not be received in the same order as the requests.</li> <li>• Protocol Identifier: 2 bytes set by the Client, always = 00 00</li> <li>• Length: 2 bytes identifying the number of bytes in the</li> </ul>

	<p>message to follow.</p> <ul style="list-style-type: none"> <li>Unit Identifier: 1 byte set by the Client and echoed by the Server for identification of a remote slave connected on a serial line or on other buses.</li> </ul> <p>Refer to page 38.</p>
<b>Media Access Control (MAC)</b>	One of the sub-layers of the Data Link Layer that controls who gets access to the medium to send a message.
<b>Message</b>	<p>The MODBUS messaging service provides a Client/Server communication between devices connected on the Ethernet TCP/IP network. The Client / Server model is based on four types of messages:</p> <ul style="list-style-type: none"> <li>MODBUS Request</li> <li>MODBUS Confirmation</li> <li>MODBUS Indication</li> <li>MODBUS Response</li> </ul> <p>The MODBUS messaging services are used for information exchange.</p>
<b>MODBUS Confirmation</b>	A MODBUS Confirmation is the Response Message received on the Client side.
<b>MODBUS Indication</b>	A MODBUS Indication is the Request message received on the Server side.
<b>MODBUS Request</b>	A MODBUS Request is the message sent on the network by the Client to initiate a transaction. Refer to page 40.
<b>MODBUS Response</b>	A MODBUS Response is the Response message sent by the Server. Refer to page 40.
<b>Network</b>	Network is a group of computers on a single physical network segment; otherwise it is an IP network address range that is allocated by a system administrator.
<b>Network address</b>	An IP address with a host portion that is all zeros.
<b>Octet</b>	An 8-bit number, 4 of which comprise a 32-bit IP address. They have a range of 00000000-11111111 that correspond to the decimal values 0- 255.
<b>Packet</b>	A unit of data passed over a TCP/IP network or wide area network.
<b>PDU</b>	<p>The Protocol Data Unit (PDU) is the MODBUS function code and data field in their original form. It is packed together with the MBAP Header to form the Application Data Unit (ADU). The MODBUS protocol defines three PDUs. They are:</p> <ul style="list-style-type: none"> <li>MODBUS Request PDU, mb_req_pdu</li> <li>MODBUS Response PDU, mb_rsp_pdu</li> <li>MODBUS Exception Response PDU, mb_excep_rsp_pdu</li> </ul> <p>Refer to page 40.</p>
<b>Port</b>	It is an address that is used locally at the transport layer (on one node) and identifies the source and destination of the

	packet inside the same node. Port numbers are divided between well-known port numbers (0-1023), registered user port numbers (1024-49151) and private-dynamic port numbers (49152-65535). For TCP, port number 0 is reserved and cannot be used. Ports allow TCP/IP to multiplex and demultiplex a sequence of IP datagrams that need to go to many different (simultaneous) application processes. MODBUS TCP/IP uses well-known port 502 to listen and receive MODBUS messages over Ethernet.
<b>Read Holding Registers (03, 0003hex)</b>	This function code is used to READ the contents of a contiguous block of holding registers in a remote device; in other words, it allows to read the values set in a group of work parameters placed in order. Refer to page 42.
<b>Read Input Register (04, 0004hex)</b>	This function code is used to READ from 1 to 125 contiguous input registers in a remote device; in other words, it allows to read some result values and state / alarm messages in a remote device. Refer to page 44.
<b>Real-time</b>	Real-time means that a system processes external events within a defined time. If the reaction of a system is predictable, one speaks of a deterministic system. The general requirements for real-time are therefore: deterministic response and defined response time.
<b>Register</b>	MODBUS functions operate on memory registers to configure, monitor, and control device I/O. Refer to page 54.
<b>Router</b>	A device that passes network traffic between different IP networks.
<b>Server</b>	A Server is any program that awaits data requests to be sent to it. Servers do not initiate contacts with Clients, but only respond to them. MODBUS TCP/IP follows the Client/Server model. MODBUS Masters are referred to as clients, while MODBUS Slaves are servers.
<b>Service request</b>	It is the MODBUS Request, i.e. the message sent on the network by the Client to initiate a transaction.
<b>Slave</b>	A Slave is any program that awaits data requests to be sent to it. Slaves do not initiate contacts with Masters, but only respond to them.
<b>Subnet Mask</b>	A 32-bit number used to distinguish the network and host portions of an IP address. In other terms, it is used by the TCP/IP protocol to determine whether a host is on the local subnet or on a remote network.
<b>Subnet or Subnetwork</b>	A smaller network created by dividing a larger network into equal parts.
<b>TCP/IP</b>	Used broadly, the set of protocols, standards and utilities commonly used on the Internet and large networks. The Ethernet system is designed solely to carry data. It is comparable to a highway as a system for transporting goods

	<p>and passengers. The data is actually transported by protocols. This is comparable to cars and commercial vehicles transporting passengers and goods on the highway.</p> <p>Tasks handled by the basic Transmission Control Protocol (TCP) and Internet Protocol (IP) (abbreviated to TCP/IP):</p> <ol style="list-style-type: none"> <li>1. The sender splits the data into a sequence of packets.</li> <li>2. The packets are transported over the Ethernet to the correct recipient.</li> <li>3. The recipient reassembles the data packets in the correct order.</li> <li>4. Faulty packets are sent again until the recipient acknowledges that they have been transferred successfully.</li> </ol>
<b>Topology</b>	<p>Network structure. Commonly used structures:</p> <ul style="list-style-type: none"> <li>• Line topology;</li> <li>• Ring topology;</li> <li>• Star topology;</li> <li>• Tree topology.</li> </ul> <p>Refer to page 33.</p>
<b>Transmission rate</b>	Data transfer rate (in bps). Refer to page 33.
<b>Wide area network (WAN)</b>	A large network that is a collection of smaller networks separated by routers. The Internet is an example of a very large WAN.
<b>Write Multiple Registers (16, 0010hex)</b>	This function code is used to WRITE a block of contiguous registers (1 to 123 registers) in a remote device. Refer to page 48.
<b>Write Single Register (06, 0006hex)</b>	This function code is used to WRITE a single holding register in a remote device. Refer to page 46.

# List of abbreviations

Table below contains a list of abbreviations (in alphabetical order) which may be used in this guide to describe the MODBUS TCP/IP interface.

<b>ADU</b>	Application Data Unit
<b>HDLC</b>	High level Data Link Control
<b>HMI</b>	Human Machine Interface
<b>I/O</b>	Input/Output
<b>IETF</b>	Internet Engineering Task Force
<b>IP</b>	Internet Protocol
<b>MAC</b>	Media Access Control
<b>MB</b>	MODBUS Protocol
<b>MBAP</b>	MODBUS Application Protocol
<b>MBAP header</b>	MODBUS Application Header
<b>PDU</b>	Protocol Data Unit
<b>PLC</b>	Programmable Logic Controller
<b>TCP</b>	Transmission Control Protocol

# References

- [1] MODBUS Application Protocol Specification, Version V1.1b3
- [2] MODBUS messaging on TCP/IP implementation guide, Version V1.0b
- [3] RFC 791, Internet Protocol, Sep81 DARPA
- [4] RFC 1122 Requirements for Internet Hosts -- Communication Layers
- [5] IEC 61918 Industrial communication networks – Installation of communication networks in industrial premises
- [6] IEC 61784-5-13 Industrial communication networks – Profiles – Part 5-13: Installation of fieldbuses – Installation profiles for CPF 13



# 1 Safety summary



## 1.1 Safety

- Always comply with the information in this manual concerning the ATEX products;
- 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;
- 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 the power supply before connecting the device;
- connect according to the explanation in the "6 - Electrical connections" section on page 32;
- in classified areas the electrical connection of the device must be carried out in compliance with the methods indicated in the directive EN IEC 60079-0:2018-07 and according to EN 60079-14;
- in compliance with the 2014/30/EU norm on electromagnetic compatibility, following precautions must be taken:
  - before handling and installing, 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;
  - to guarantee a correct working of the device, avoid using strong magnets on or near by the unit;
  - minimize noise by connecting the shield and/or the frame to ground. Provide the ground connection as close as possible to the encoder. We suggest using the connection point provided in the encoder's enclosure (see the Figure 2) to connect the unit to ground. Fix the ground cable to the connection point



by means of a ring crimp terminal and a M4 bolt. The connection point to ground might be provided also on the installation side by connecting the cable shield to the earth point. It is user's duty to find the best solution to minimize the interference. Please make sure that ground is not affected by noise.



### 1.3 Mechanical safety

- Install the device following strictly the information in the "5 - Mounting instructions" section on page 29;
- mechanical installation has to be carried out with stationary mechanical parts;
- do not disassemble the encoder;
- do not tool the encoder or its shaft;
- delicate electronic equipment: handle with care; do not subject the device and the shaft to knocks or shocks;
- respect the environmental characteristics declared by manufacturer
- unit with hollow shaft: the encoder can be mounted directly on a shaft whose diameter has to respect the technical characteristics specified in the purchase order.



### 1.4 Operational safety

- The described product is category 2 certified and is designed for use in potentially explosive zones 1 and 2 (according to EN60079-15) and 21-22 (according to EN60079-31). It is suitable for a safe use and a high level of protection in areas in which explosive atmospheres caused by mixture of gases and vapours (zones 1 and 2) or of air and dust (zones 21 and 22) are likely to occur. It complies with the constructional safety requirements of the temperature class T6 (+85°C / +185°F). **It is not to be used in Zone 0;**
- the manufacturer's specifications (temperature, speed, ...) must under no circumstances be exceeded;
- use the product according to the indicated degree of IP protection;
- the maximum permissible environmental temperature is -20°C to +40°C / -4°F to +104°F (at continuous rotational speed of max. 6000 rpm).




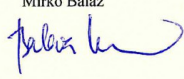


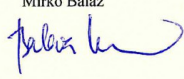


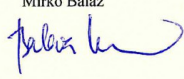

## 2 Identification

Device can be identified through the **ordering code**, the **serial number** and the **MAC address** printed on the label applied to its body. Information is listed in the delivery document too. Please always quote the ordering code, the serial number and the MAC address 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](#).



**Warning:** encoders having ordering code ending with "/Sxxx" may have mechanical and electrical characteristics different from standard and be supplied with additional documentation for special connections (Technical info).

### 3 ATEX certificate

<p><b>CESI</b></p> <p><small>CESI Centro Elettrotecnico Sperimentale Italiano Giacinto Motta SpA</small></p> <p><small>Via R. Rubattino 54 20134 Milano - Italia Telefono +39 022125.1 Fax +39 0221255440 www.cesi.it</small></p> <p><small>Capitale sociale 8 550 000 € interamente versato Codice fiscale e numero iscrizione CCIAA 00793580150</small></p> <p><small>Registro Imprese di Milano Sezione Ordinaria N. R.E.A. 429222 P.I. IT00793580150</small></p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Schema di certificazione</p> <p><b>CESI-ATEX</b></p> <p><small>Il CESI è stato autorizzato dal governo italiano ad operare quale organismo di certificazione di apparecchi e sistemi destinati a essere utilizzati in atmosfera potenzialmente esplosiva con D.M. 1/3/1983, D.M. 19/6/1990, D.M. 20/7/1998, D.M. 27/9/2000 e D.M. 02/02/2006</small></p> <p><small>ATEX E C-22 - 1</small></p>	<p style="text-align: center;"><b>CERTIFICATE</b> </p> <p style="text-align: center;"><b>EC-TYPE EXAMINATION CERTIFICATE</b></p> <p>[1] <b>Equipment or Protective System intended for use in potentially explosive atmospheres Directive 94/9/EC</b></p> <p>[2] <b>EC-Type Examination Certificate number:</b></p> <p style="text-align: center;"><b>CESI 08 ATEX 013</b></p> <p>[3] <b>Equipment:</b> <b>Incremental Encoder series XC77 and Absolute Encoder series XAC77</b></p> <p>[4] <b>Manufacturer:</b> <b>Lika Electronic s.n.c.</b></p> <p>[5] <b>Address:</b> <b>Via S. Lorenzo 25, 36010 Carrè (Vi) - Italy</b></p> <p>[6] This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.</p> <p>[7] CESI, notified body n. 0722 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.</p> <p>The examination and test results are recorded in confidential report n. A8008869</p> <p>[8] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:</p> <p style="text-align: center;"><b>EN 60079-0 :2004 EN 60079-1:2007 EN 61241-0 :2006 EN 61241-1 :2004</b></p> <p>[9] If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.</p> <p>[10] This EC-TYPE EXAMINATION CERTIFICATE relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.</p> <p>[11] The marking of the equipment or protective system shall include the following:</p> <p style="text-align: center;"> <b>II 2GD Ex d IIC T6, Ex tD A21 IP65 T 85°C</b></p> <p>This certificate may only be reproduced in its entirety and without any change, schedule included.</p> <p style="text-align: center;"><b>Date 28.04.2008 - Translation issued the 28.04.2008</b></p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"> <b>Prepared</b> Gaetano Baldini  </td> <td style="text-align: center;"> <b>Verified</b> Mirko Balaz  </td> <td style="text-align: center;"> <b>Approved</b> Fiorenzo Bregani  </td> </tr> </table> <p style="text-align: center;"><b>CESI S.p.A.</b> Energy Division "Certification Technical Department" The Manager</p> <p style="text-align: center;">Page 1/3</p>	<b>Prepared</b> Gaetano Baldini 	<b>Verified</b> Mirko Balaz 	<b>Approved</b> Fiorenzo Bregani 
<b>Prepared</b> Gaetano Baldini 	<b>Verified</b> Mirko Balaz 	<b>Approved</b> Fiorenzo Bregani 		

## CESI

### [13] Schedule

### [14] EC-TYPE EXAMINATION CERTIFICATE n. CESI 08 ATEX 013

### [15] Description of equipment

The encoder is a rotating transducer that converts an angular position of the shaft into a digital electric signal. This electro-mechanical equipment is able to detect angular displacements and to estimate rotating speeds and accelerations by dedicated electronic and/or mechanical interfaces. The translation from mechanical motion to digital signal is obtained by photo-electric reading from an infrared led joined to a light beam collimator: emitted light hits a glass disk supplied by dark and transparent marks; escaped light rays are then gathered by a phototransistor set. The obtained signal are digitalized by a comparator device.

#### **XC77 Incremental Encoder**

Position is determined by counting pulses relative to the zero track.

#### **XAC77 Absolute Encoder**

Position is evaluated by reading output code, that is unique for every shaft position. Such devices keep then effective position data in the case of power fail and they not need the zero mark search when restart is carried out, as incremental encoder has to search.

Bulk and flange of both the encoders are made of anticorodal (EN AW-6082 aluminium alloy), while shaft and ring nut are made of 1.4305 stainless steel. The flange is screwed to the bulk.

The identification mark of the encoders is detailed in the descriptive documents here enclosed.

#### **Electrical and mechanical characteristics**

##### **XC77 Encoder**

Supply voltage:	5 V dc, 5 Vdc -30 Vdc, 10 Vdc -30 Vdc
No load maximum current:	70 mA
Maximum output current for every channel	40 mA
Output:	NPN, Push-Pull, Line Driver, PP/LD

##### **XAC77 Encoder**

Supply voltage:	10Vdc - 30 Vdc
No load max current:	150 mA
Max output current for every channel	40 mA
Output/Code	NPN, Push-Pull, SSI / Binario, Gray

Max rotation speed:	6000 rpm
Electrical protection:	Polarity inversion and short circuit.
Max shaft load:	60 N (axial and radial)
Degree of protection:	IP65 (EN 60529:1997)
Temperature class:	T6
Max surface temperature:	T 85 °C
Ambient temperature:	-20 °C ≤ Ta ≤ +40 °C

#### **Cables entries**

The accessories used for cable entries and for unused holes shall be subject of separate certification: in the unit of category II 2GD shall be certified according to the Standards: EN 60079-0, EN 60079-1 and EN 61241-1 and shall guarantee a degree of protection IP65 according to EN 60529 Standard.

This certificate may only be reproduced in its entirety and without any change, schedule included.

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Prot. A8008876

P: 3 + 26

## CESI

### Schedule

[14] **EC-TYPE EXAMINATION CERTIFICATE** n. CESI 08 ATEX 013

[16] **Report n. A8008869**

#### Routine tests

Manufacturer shall carry out the routine tests and checkouts prescribed at paragraph 27 of the EN 60079-0 and at paragraph 24 of the EN 61241-0 Standards. Manufacturer is not charged of overpressure test because the equipments have passed the overpressure test carried out by the static method using four times the reference pressure (28 bar).

#### Descriptive documents (prot. A8008877)

- Encoder Technical File series XC77 - XAC77		2 sheets	19/03/2008
- Absolute Encoder series XAC77 – ROTACOD Description		2 sheets	
- LKM 1362 XA77 Bulk – Radial	rev. 3	1 sheet	26/07/2007
- LKM 1367 XA77 Bulk – Axial	rev. 3	1 sheet	26/07/2007
- Incremental Encoder XC77 – ROTAPLUS Description		2 sheets	
- LKM 1368 XC77 Bulk	rev. 3	1 sheet	25/07/2007
- Sez. 4300 XC77 + XAC77 ( radial and axial cable ) Hollow shaft $\Phi 14$			
	rev. 3	3 sheets	26/07/2007
- LKM 1363 XC77 and XAC77 Empty Axis	rev. 3	1 sheet	26/07/2007
- LKM 1361 XC77 e XAC77 Flange	rev. 3	1 sheet	25/07/2007
- LKM 1481 XC77 e XAC77 Ring nut	rev. 1	1 sheet	14/02/2006
- LKM 1364 XC77 e XAC77 Blocked Axis Ring nut	rev. 2	1 sheet	14/02/2006
- Technical data sheet FKM		1 sheet	19/05/2006
- Technical data sheet FKM 75.16-01 O-ring		2 sheets	25/10/2005
- LKM 1551 XC77-XAC77 Plate	rev. 3	1 sheet	28/04/2008
- Technical data sheet metalized polyester label (Brady)		3 sheets	
- XC77 e XAC77 Safety Instructions		2 sheets	19/03/2008
- CE Conformity Declaration	N. 4	1 sheet	19/03/2008

One copy of all documents is kept in CESI files.

[17] **Special conditions for safe use**

None.

[18] **Essential Health and Safety Requirements**

Guaranteed by the compliance to the mentioned Standards.

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**CESI**

**ISMES**
**IPH**
**EGH**
**EXTENSION n. 01/15**

to Type Examination Certificate CESI 08 ATEX 013

**Equipment:** Incremental encoder series XC77 and absolute encoder series XAC77

**Manufacturer:** Lika Electronic Srl

**Address:** Via San Lorenzo, 25  
36010 Carrè (VI)  
Italy

**Admitted variation**

➤ *Changing of the company name:*

from:	<b>Lika Electronic Snc</b>	to:	<b>Lika Electronic Srl</b>
-------	----------------------------	-----	----------------------------

➤ *Updating to the following reference standards:*

EN 60079-0: 2012+A11:2013,  
EN 60079-1: 2007,  
EN 60079-31: 2009.

➤ *Addition of the possibility to mark for gas group IIB.*

➤ *Constructive changes:*

Addition of the possibility of using stainless steel enclosures,  
Addition of the possibility of having absolute encoders with reduced length enclosures,  
Addition of external mounting kits and other small changes not influencing the type of protection.

➤ *Updating of the ATEX marking on the plate:*

II 2G Ex d IIC T6 Gb  
Or  
II 2G Ex d IIB T6 Gb  
II 2D Ex tb IIIC T85°C Db

This extension and annexed descriptive documents must be annexed to the Type Examination Certificate CESI 08 ATEX 013.

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Date 1/04/2015 - translation issued on 1<sup>st</sup> April 2015

**Prepared**  
Tiziano COLA



**Verified**  
Mirko BALAZ



**Approved**  
Roberto PICCIN



**CESI** S.p.A.  
Testing & Certification Division

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EST-CE-ING-0

**ACCREDITED**  
PRD N. 0168  
Membro degli Accordi di Mutuo  
Riconoscimento EA, IAF e ILAC  
Signatory of EA, IAF and ILAC  
Mutual Recognition Agreements

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Capitale sociale € 8.550.000 interamente versato  
C.F. e numero iscrizione Reg. Imprese di Milano 00793580150  
P.I. IT00793580150  
N. R.E.A. 429222



## EXTENSION n. 01/15

to Type Examination Certificate CESI 08 ATEX 013

### Description of equipment

With this extension it is added the possibility of making the enclosure in stainless steel besides aluminium which was foreseen in the original certificate. The apparatus, without any constructive variation, can be marked IIB in order to simplify the selection of the cable gland. It is also added the possibility, as shown in the annexed documents, of making the enclosures of the absolute encoders a little shorter than in the original certificate.

The possibility, added with this extension, of supplying together with the encoder two mounting kits, does not affect the adopted type of protection.

The equipment mounting stainless steel enclosures are identified by a code ("S613") which is appended at the end of the apparatus encoding:

<b>XC77 dddd</b>	Incremental encoder having an aluminium enclosure
<b>XC77 dddd /S613</b>	Incremental encoder having a stainless steel enclosure
<b>XAC77 dddd</b>	Absolute encoder having an aluminium enclosure
<b>XAC77 dddd /S613</b>	Absolute encoder having a stainless steel enclosure

The fields identified by the characters "dddd" locate the part of the code containing information useful for the type of application but irrelevant for the protection of the apparatus.

### Electrical characteristics

Electrical data are unchanged respect to the original certificate. According to the new reference standards the marking to be put on the plate has been modified:

ATEX marking:	II 2GD
Marking for the gas protection:	Ex d IIC T6 Gb or Ex d IIB T6 Gb
Marking for the combustible dusts:	Ex tb IIIC T85°C Db

### Cable entries

Accessories used for the cables entry shall be subject of independent certification according to the standard EN 60079-0, EN 60079-1 and EN 60079-31 and guarantee a minimum protection level IP65 according to the standard EN 60529. For the selection of the cable gland follow the prescription of the standard EN 60079-14 and keep into account the marking of the encoder (gas group IIB or IIC).

### Warning labels

None.

Report n. EX-B5006802

### Routine tests

The manufacturer is exempted from carrying out the routine overpressure tests on the enclosures as they have overcome the type tests carried out with the static method at 28 bar, equal to 4 times the reference pressure.

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Prot. B5006806

P: 3 + 30

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## EXTENSION n. 01/15

to Type Examination Certificate CESI 08 ATEX 013

### *Descriptive documents* (prot. EX-B5006808)

Technical note encoder series XC77-XAC77 (2 pages)	dated 2015/03/30
Safety instructions encoder series XC77-XAC77 (2 pages)	dated 2015/03/30
Drawing n. KIT_LKM1520 rev. A (mounting kit 1: flange)	dated 2014/12/15
Drawing n. KIT_LKM-1758 rev. A (mounting kit 2: shaft)	dated 2014/12/15
Drawing n. LKM_001363 rev. A	dated 2014/12/01
Drawing n. LKM_001363_MO rev. A	dated 2014/12/02
Drawing plate n. LKM_1551 rev. 5	dated 2015/03/30
Drawing n. SEZ_4300 rev. A (3 pages)	dated 2014/03/03
Drawing n. PF_4300 rev. A	dated 2014/12/10
Drawing n. PF_4301 rev. A	dated 2014/12/10
Drawing n. PF_4302 rev. A	dated 2014/12/10
Data sheet ROTACOD absolute encoder XAC77 (3 pages)	
Data sheet ROTAPULS incremental encoder XC77 (2 pages)	
Data sheets shaft sealing ring (9 pages)	
Facsimile EC declaration of conformity	

One copy of all the descriptive documents mentioned above is kept in CESI files.

### *Special conditions for safe use*

None.


### *Essential Health and Safety Requirements*

Essential health and safety requirements are covered by compliance to the following standards:

- EN 60079-0: 2012 + A11: 2013 Explosive atmospheres  
Part 0: Equipment - General requirements;
- EN 60079-1 : 2007 Explosive atmospheres  
Part 1: Equipment protection by flameproof enclosures "d";
- EN 60079-31 : 2009 Explosive atmospheres  
Part 31: Equipment dust ignition protection by enclosure "t".

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<p><b>CESI</b></p> <p><b>ISMES</b></p> <p><b>IPH</b></p> <p><b>FGH</b></p> <p>CESI S.p.A. Via Rubattino 54 I-20134 Milano - Italy Tel: +39 02 21251 Fax: +39 02 2125440 e-mail: info@cesi.it www.cesi.it</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Schema di certificazione</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>CESI-ATEX</b></p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">ATEX 003481-0-EN</p> <p><b>ACCREDIA</b></p> <p>PRD N. 018B Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC Signatory of EA, IAF and ILAC Mutual Recognition Agreements</p>	<h1 style="text-align: center;">NOTIFICATION</h1> <div style="text-align: right;">  </div> <p>[1] <b>PRODUCT QUALITY ASSURANCE NOTIFICATION</b></p> <p>[2] <b>Equipment or Protective System or Component intended for use in potentially explosive atmospheres</b> Directive 2014/34/EU</p> <p>[3] Notification number:  <b>CESI 16 ATEX 005 Q</b></p> <p>[4] Equipment or component type: Shaft encoders</p> <p>Protection concepts: Flameproof enclosures "d" Dust ignition protection by enclosure "t"</p> <p>[5] Applicant: LIKA Electronic s.r.l. via San Lorenzo n° 25 36010 Carrè - VI</p> <p>[6] Manufacturer: LIKA Electronic s.r.l. via San Lorenzo n° 25 36010 Carrè - VI</p> <p>[7] CESI, notified body n. 0722 in accordance with Articles 19 and 21 of the Directive 2014/34/EU of the European Parliament and of the Council of the 26 March 2014, notifies to the applicant that the actual manufacturer has a product quality system which complies to Annex VII of the Directive.</p> <p>[8] This notification is based on the audit report n. EX-B9002583 issued the 6/02/2019. This notification can be withdrawn if the manufacturer no longer satisfies the requirement of Annex VII. <b>Results of periodical re-assessment of the quality system are a part of this notification.</b></p> <p>[9] This notification is valid until 17/02/2022 and can be withdrawn if the Manufacturer does not satisfy the product quality assurance re-assessment.</p> <p>[10] According to Article 16 [3] of the Directive 2014/34/EU the CE marking shall be followed by the identification n. 0722 identifying the notified body involved in the production control stage.</p> <p style="text-align: center;">This notification may only be reproduced in its entirety and without any change.</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> <p><b>Date of first issue</b> 17th February 2016</p> <p><b>Prepared</b> Sergio G. Giugno</p> </td> <td style="width: 50%;"> <p><b>Current issue</b> 17th February 2019</p> <p><b>Verified</b> Mirko Balaž</p> </td> </tr> </table> <p style="text-align: center;">Translation issued on 17th February 2019</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%; text-align: center;"> <p><b>Approved</b> Roberto Piccin</p> </td> <td style="width: 33%; text-align: center;"> <p><b>Page 1/1</b></p> </td> <td style="width: 33%; text-align: center;"> <p><b>CESI S.p.A.</b> Testing &amp; Certification Division Business Area Certification Responsible (Roberto Piccin)</p> </td> </tr> </table> <p style="font-size: small;">Prot. B9002587      P: 1      Issue: 1 (R: 1)</p>	<p><b>Date of first issue</b> 17th February 2016</p> <p><b>Prepared</b> Sergio G. Giugno</p>	<p><b>Current issue</b> 17th February 2019</p> <p><b>Verified</b> Mirko Balaž</p>	<p><b>Approved</b> Roberto Piccin</p>	<p><b>Page 1/1</b></p>	<p><b>CESI S.p.A.</b> Testing &amp; Certification Division Business Area Certification Responsible (Roberto Piccin)</p>
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<p><b>Approved</b> Roberto Piccin</p>	<p><b>Page 1/1</b></p>	<p><b>CESI S.p.A.</b> Testing &amp; Certification Division Business Area Certification Responsible (Roberto Piccin)</p>				

## 4 Safety instructions



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

Smart encoders & actuators

### SAFETY INSTRUCTIONS encoders series XC77-XAC77

1) Marking:

 II2 GD, Ex d IIC T6 Gb, Ex tb IIIC T 85°C Db, IP65

or

 II2 GD, Ex d IIB T6 Gb, Ex tb IIIC T 85°C Db, IP65

Nr. of certificate: **CESI 08 ATEX 013**

Explosion-proof encoder manufactured in compliance with the following regulations:

**EN IEC 60079-0:2018-07**

**EN 60079-1:2014-10**

**EN 60079-31:2014-07**

**EN 61000-6-4, EN 61000-6-2**

Compliance with directives listed above does not comprise marking which is certified by compliance with the following directives: **EN 60079-0:2012 + A11:2013, EN 60079-1:2007, EN 60079-31:2009.**

- **II:** Equipment intended for use in potentially explosive atmospheres other than mines
- **2 GD:** Category 2 equipment with high level protection for use in areas in which explosive atmospheres caused by gases, vapours, mists or air/dust mixtures are likely to occur.
- **Ex:** Equipment for use in potentially explosive atmospheres
- **d:** Protection by explosion-proof housing
- **IIB-IIC:** Electrical apparatus for use in potentially explosive atmospheres caused by gasses of the group IIB (e.g. C<sub>2</sub>H<sub>4</sub>) or group IIC (e.g. H<sub>2</sub>, C<sub>2</sub>H<sub>2</sub>).
- **T6:** Temperature class for gasses T6 = 85°C
- **Gb:** Level of protection (EPL). The equipment can be used in Zones 1 and 2.
- **tb:** Electrical apparatus with protective housing for use in the presence of combustible dust.
- **IIIC:** Equipment or protective housing intended for use in potentially explosive atmospheres with presence of combustible (including conductive dust).
- **T 85°C:** Maximum surface temperature.
- **Db:** Level of protection (EPL). The equipment can be used in Zones 21 and 22.
- **IP65:** Degree of IP protection for dust-proof housing.

Equipment intended for use in the following Zones:

**Zone 1, Zone 2:** Mixture of gas/air, vapour/air, mist/air

**Zone 21, Zone 22:** Mixture of dust/air

**ATTENTION:** Equipment not to be used in Zone 0

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- 2) The equipment must be installed only by qualified personnel and according to the applicable regulations.
- 3) Do not tool or drill the equipment.
- 4) Do not open the equipment.
- 5) Do not loosen or unscrew the cable gland.
- 6) Use the encoder's fixing plate for installation and against rotation.
- 7) Protect the device against shock and mechanical damages.
- 8) Use the product according to the indicated degree of IP protection.
- 9) Maximum permissible environmental temperature -20°C to +40°C / -4°F to +104°F (at continuous rotational speed of max. 6000 rpm).
- 10) In classified areas the electrical connection of the device must be carried out in compliance with the methods indicated in the directive EN IEC 60079-0:2018-07 and according to EN 60079-14.
- 11) Connect the device according to the electrical connections scheme on the user's guide.
- 12) Provide a ground connection (GND) using the ground screw on the housing.

LIKA ELECTRONIC SRL  
Carrè, 17.05.2021

Lika Electronic Srl  
Smart encoders & actuators



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## 5 Mounting instructions



### WARNING

Installation and maintenance operations have to be carried out by qualified personnel only, with power supply disconnected and mechanical parts absolutely in stop.

For any information on the mechanical data and the electrical characteristics of the encoder please refer to the technical catalogue.

### 5.1 Encumbrance sizes

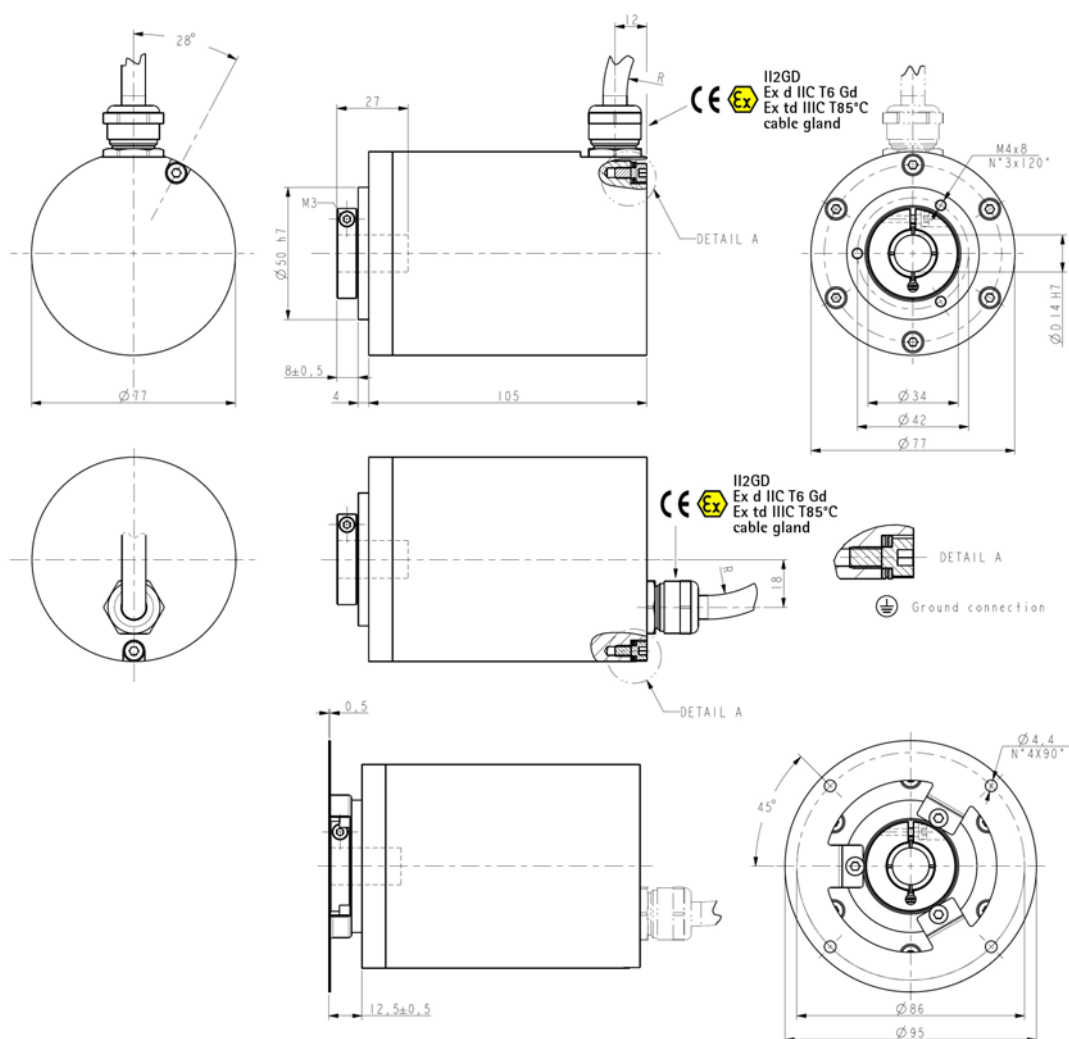
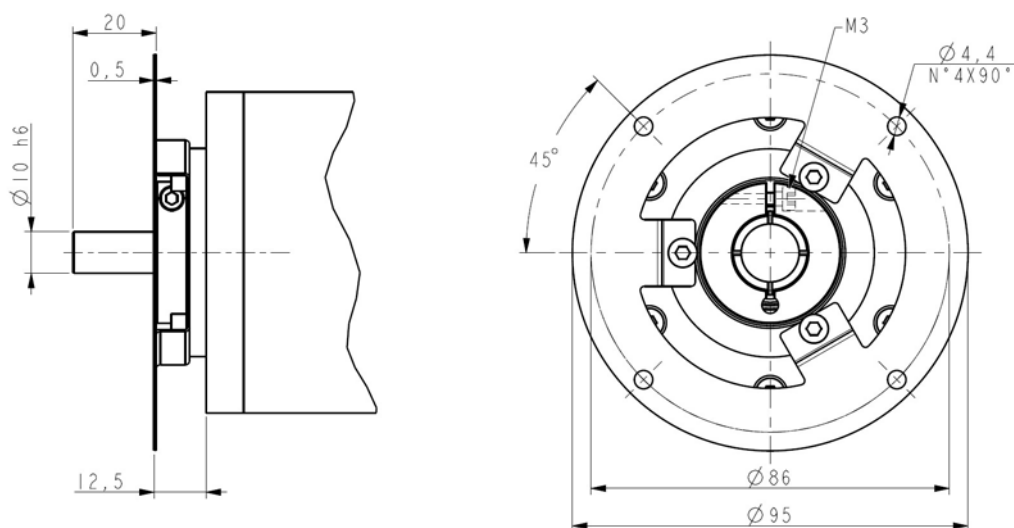


Figure 1 - Encumbrance sizes

## 5.2 Solid shaft (LKM1758) and Fixing plate (KIT-LKM1520)

LKM1758 is an optional feature thus it has to be ordered separately.



### WARNING

Unit with solid shaft: in order to guarantee maximum reliability over time of the mechanical parts, we recommend a flexible coupling to be installed to connect the encoder and the installation shaft; make sure the misalignment tolerances of the flexible coupling are respected.

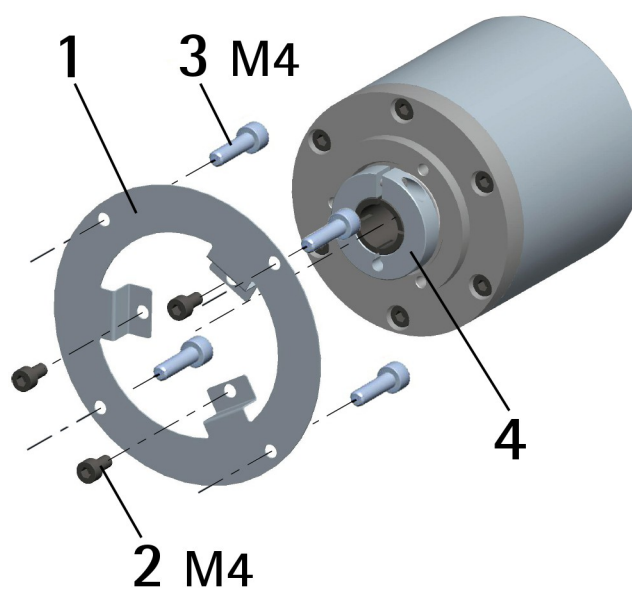
## 5.3 Mounting instructions



### WARNING

Installation and maintenance operations have to be carried out by qualified personnel only, with power supply disconnected and mechanical parts absolutely in stop.

- Fasten the fixing plate **1** to the encoder using the three M4 screws **2** provided with the device;
- mount the encoder on the motor shaft using the reducing sleeve (if supplied); avoid forcing the encoder shaft;
- fasten the fixing plate **1** to the rear of the motor using four M4 cylindrical head screws **3**;
- fix the collar **4** to the encoder shaft by means of the M3 screw.



## 6 Electrical connections

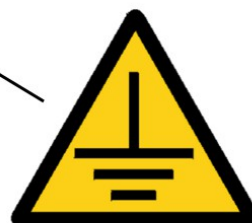


### WARNING

Power supply must be turned off before performing any electrical connection! Installation, electrical connection and maintenance operations must be carried out by qualified personnel only, with power supply disconnected. Mechanical components must be in stop. Do not open the encoder.



No user serviceable parts inside the encoder!



Grounding point

Figure 2 - Electrical connection and grounding point



### 6.1 PWR power supply and Ethernet connection

A T8 type cable is used for power supply and Ethernet connection of the MODBUS TCP/IP encoder. Connection is according to PoE IEEE 802.3af mode B standard for max. 30Vdc power supply.

Function	T8 cable
Tx Data +	White
Tx Data -	Red
+10Vdc +30Vdc power supply	White
	Blue
Rx Data +	White
Rx Data -	Green
0Vdc power supply	White
	Yellow
Shield	Case

PORT 1 and PORT 2 are interchangeable - if only one connection is required, either port can be used. The Ethernet interface supports 10/100 Mbit/s, full/half duplex operation.

#### 6.1.1 Cable specifications

Model:	LIKA cable type T8
Cross section:	4 x 2 x 0.25 mm <sup>2</sup> (AWG24)
Jacket:	Polyurethane, abrasion resistant
Shield:	Tinned copper braid, coverage 85% ±5%
Outer diameter:	9.6 mm ±0.3 mm (0.378" ±0.012")
Min. bend radius:	Outer diameter x 5, fixed application Outer diameter x 7, dynamic application
Work temperature:	-40°C +90°C / -40°F +194°F, fixed application -30°C +90°C / -22°F +194°F, dynamic application
Travel speed:	300 m/min.
Acceleration, deceleration:	Up to 50 m/sec <sup>2</sup> / 164.042 ft/sec <sup>2</sup>
Cable length inside chain:	25 m / 82.021 ft (horizontal only)
Bending:	Up to 5 millions of motions

#### 6.1.2 Network configuration: topologies, cables, hubs, switches - Recommendations

Using Ethernet several topologies of connection are supported by MODBUS TCP/IP networks: line, tree, daisy-chain, star, ... Furthermore MODBUS TCP/IP networks can be configured in almost any topology in the same structure.

The connection of the encoder can be made directly with a network card or indirectly with a switch, hub or company network.

Cables and connectors comply with the IEEE 802.3 Ethernet specifications.

If you use a direct connection to a computer/controller without network components in between, you need to use a standard, "straight" network cable (not a crossover cable).

You need at least a CAT-5 cable (category 5) to get a data transfer rate up to 100 Mbit/s. If there is a network component in the network which does not provide fast Ethernet, the encoder will automatically switch down to 10 Mbit/s. Standard Ethernet cables commercially available can be used.

For complete information please refer to IEC 61918, IEC 61784-5-13 and IEC 61076-2-101.

To increase noise immunity only S/FTP or SF/FTP cables must be used (CAT-5).

The maximum cable length (100 meters) predefined by Ethernet 100Base-TX must be compulsorily fulfilled.

Regarding wiring and EMC measures, the IEC 61918 and IEC 61784-5-13 must be considered.

For a complete list of the available cordsets and connection kits please refer to the product datasheet ("Accessories" list).

## 6.2 Ground connection

To minimize noise connect properly the shield and/or the frame to ground. Connect properly the cable shield to ground on user's side. Make sure that ground is not affected by noise. It is recommended to provide the ground connection as close as possible to the device. We suggest using the ground point provided in the enclosure (see Figure 2).

## 6.3 Line Termination

MODBUS TCP/IP network needs no line termination because the line is terminated automatically; in fact every Slave is able to detect the presence of the downstream Slaves.

## 6.4 MAC address and IP address

The unit can be identified in the network through the **MAC address** and the **IP address**.

The MAC address is an identifier unique worldwide and has to be intended as a permanent and globally unique identifier assigned to the unit for communication on the physical layer; while the IP address is the name of the unit in a network using the Internet protocol. The MAC address is 6-byte long and cannot be modified. It consists of two parts, numbers are expressed in hexadecimal notation: the first three bytes are used to identify the manufacturer (OUI, namely Organizationally Unique Identifier) and are provided by IEE standard authority; while the last three bytes represent a consecutive number of the manufacturer and are the specific identifier of the unit. The MAC address can be found for commissioning purposes on the label applied to the encoder and is displayed in the **Encoder Information** page of the web server.

The MAC address has the following structure:

Bit value 47 ... 24			Bit value 23 ... 0		
10	B9	FE	X	X	X
Company code (OUI)			Consecutive number		

The IP address must be assigned by the user to each interface of the unit to be connected in the network, the default IP address assigned by Lika Electronic is 192.168.1.10, while the default subnet mask is 255.255.255.0.

To set the network configuration parameters refer to the next section.

## 6.5 Setting the IP address and the network configuration parameters



### WARNING

Only competent technicians, who are properly trained, have adequate experience and are familiar with computer architecture, network design and operating systems should configure the network communication parameters. The inappropriate setting of the network parameters results in an incorrect operation of the system.



### WARNING

The MODBUS TCP/IP address and communication parameters can be set only via software.

The following table summarises the default IP address and the network configuration parameters.

IP Parameter	Value
IP address	192.168.1.10
Subnet mask	255.255.255.0
Default Gateway	0.0.0.0

To configure the network and set specific communication parameters, the operator must enter the **Network IP Configuration** page of the Web server. Any change is valid in the range: 0.0.0.0 ... 255.255.255.255 in compliance with the Internet Protocol rules.

For any information on the **Network IP Configuration** page refer to the "10.8 Network configuration" section on page 94.

## 7 Quick reference

### 7.1 Getting started

The following instructions are provided to allow the operator to set up the device for standard operation in a quick and safe mode.

- Mechanically install the device;
- execute the electrical connections;
- if required, set the communication parameters to allow the unit to access the MODBUS TCP/IP network, see the "6.5 Setting the IP address and the network configuration parameters" section on page 35; the default network configuration parameters are as follows:

IP Parameter	Value
IP address	192.168.1.10
Subnet mask	255.255.255.0
Default Gateway	0.0.0.0

- switch on the +10Vdc +30Vdc power supply;
- if you need to use the physical resolution of the unit, please check that the **Scaling function** item is disabled (the bit 0 in the **Operating parameters [109-110]** registers = 0; see on page 61); the encoder will use the **Singleturn resolution [113-114]** and the **Number of revolutions [115-116]** register values to arrange the absolute position information;
- otherwise if you need a specific resolution, please enable the **Scaling function** item (the bit 0 in the **Operating parameters [109-110]** registers = 1; see on page 61);
- then set the value you need for the singleturn resolution next to the **Counts per revolution [101-102]** registers, see on page 56;
- set the value you need for the overall resolution next to the **Total Resolution [103-104]** registers, see on page 57;
- now, if you need you can set a Preset value next to the **Preset value [105-106]** registers and then activate it by executing the **Perform counting preset** command available in the **Control Word [111-112]** registers, see on page 59;
- save the new setting values (use the **Save parameters** command available in the **Control Word [111-112]** registers, see on page 63).



#### NOTE

MODBUS TCP/IP protocol does not require any configuration file.

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Document release	Release date	Description	HW	SW	Interface
1.0	10.09.2020	First issue	1.0	3.0	-
1.1	04.06.2021	Safety instructions updated	2.0	3.0	-
1.2	14.05.2025	Information about T8 cable updated, new ordering codes	2.0	3.0	-



Dispose separately

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