



## lika SFP-1000-5-L2 Smart Encoders and Actuators User Guide

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**lika SFP-1000-5-L2 Smart Encoders and Actuators**



## Product Information: Smart Encoders & Actuators

### User's Guide: SFPS1 Miniature Potentiometer Draw-Wire Encoder

The SFPS1 Miniature Potentiometer Draw-Wire Encoder is a compact and versatile device suitable for various models. The product user manual contains important information regarding the installation, electrical connection, output signals, and maintenance of the encoder. The device is the property of Lika Electronic s.r.l., and any reproduction or modification of the document without prior written approval is strictly prohibited.

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## Safety Summary

The SFPS1 encoder must be handled with caution to prevent any harm to the user and the device. The electrical safety of the product is vital, and certain precautions must be taken while handling and installing the equipment. The following guidelines must be followed:

- Discharge any electrical charge from your body and tools that may come in contact with the device before handling it.
- The power supply must be stabilized without noise, and EMC filters must be installed on-device power supply if needed.
- Always use shielded cables, twisted pair cables whenever possible, and avoid cable runs longer than necessary.
- Avoid running the signal cable near high voltage power cables and capacitive or inductive noise sources.
- Mount the device as far as possible from any noise sources, and shield the device from noise sources if necessary.
- Avoid using strong magnets on or near the unit to ensure the device's correct working.

## Product Usage Instructions

The user manual is divided into two main sections for ease of understanding. The first section contains general information regarding the mechanical installation, electrical connection, and tips for setting up and running the SFPS1 encoder efficiently. The second section, titled Output Signals, provides detailed information on both the potentiometer and analogue output signals.

While setting up the device, it is essential to follow the guidelines mentioned in the manual strictly. The device must be installed in a noise-free environment and must be kept away from any possible noise sources. Shielding the device from noise sources may also be necessary. Shielded cables must be used while connecting the device to ensure proper functioning.

The SFPS1 encoder is suitable for various models, and the user manual contains detailed information on output signals. The user must refer to this section to obtain information on potentiometer and analogue output signals for efficient usage of the device.

Maintenance of the SFPS1 encoder is crucial to ensure its long-term performance. The user manual contains information on maintaining the device and must be followed carefully.

## 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 are coloured in GREEN;
- alarms are coloured in RED;
- states are coloured in FUCSIA.

Some icons in the pages 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 WARNING, 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 NOTE, 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 EXAMPLE when instructions for setting parameters are accompanied by examples to clarify the explanation.

## Preliminary information

This guide is designed to provide the most complete and exhaustive information the operator needs to correctly and safely install and operate the SFPS1-... potentiometer draw-wire encoders.

SFPS1-... cable-pulling encoder is aimed at speed and position measurements and controls in a variety of industrial applications through the movement of a 300 mm (11.811") to 2,000 mm (78.74") stainless steel wire. The typical back and forth travel of the moving equipment causes the wire to reel and unreel and thus the linear movement to be converted into a rotative motion detected by the encoder which is coupled to the drum.

SFPS1-... potentiometer encoder provides the following output signals:

- SFPS1-xxxxx-AI12-... = 4-20mA current output
- SFPS1-xxxxx-AV22-... = 0-10V voltage output
- SFPS1-xxxxx-001-... = 1k $\Omega$  resistance output
- SFPS1-xxxxx-005-... = 5k $\Omega$  resistance output
- SFPS1-xxxxx-010-... = 10k $\Omega$  resistance output
- SFPS1-xxxxx-020-... = 20k $\Omega$  resistance output

To make it easier to read and understand the text, this guide is divided into two main sections.

In the first section some 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 SFPS1-... cable-actuated encoder are provided.

In the second section, entitled Output signals, you can find detailed information on both the potentiometer and analogue output signals.

## Safety summary

- 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.

## Electrical safety

- Turn OFF the power supply before connecting the device;
- connect according to the explanation in the "Electrical connection" section on page 13;
- the wires of unused output signals must be cut at different lengths and insulated singularly;
- 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;
- 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 the frame to ground. Make sure that ground 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.

## **Mechanical safety**

- Install the device following strictly the information in the “Mechanical installation” section on page 9;
- mechanical installation has to be carried out with stationary mechanical parts;
- do not disassemble the unit;
- do not tool the unit;
- delicate electronic equipment: handle with care; do not subject the device to knocks or shocks;
- respect the environmental characteristics of the product;
- we suggest installing the unit providing protection means against waste, especially swarf as turnings, chips, or filings; should this not be possible, please make sure that adequate cleaning measures are in place in order to prevent the wire from jamming;
- to avoid failures, never exceed the maximum measuring length and prevent the wire from tangling up;
- never release the wire freely, always help the wire wind properly: risk of personal injury and/or equipment damage;
- always keep the wire aligned not to damage the equipment;
- do not lubricate the wire;
- the stroke per turn of the draw-wire unit is 100 mm (3.937”).

## **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 any information on the technical characteristics of the product refer to the technical catalogue.

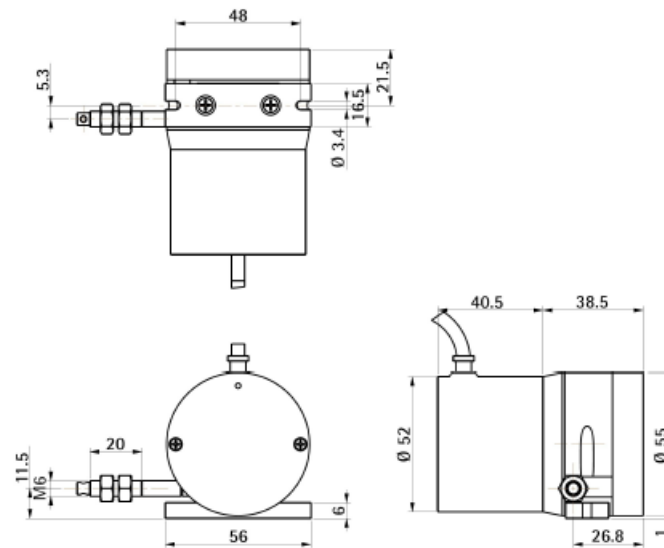
**Warning:** encoders having order code ending with “/Sxxx” may have mechanical and electrical characteristics different from standard and be supplied with additional documentation for special connections (Technical Info).

## **Mechanical installation**

### **WARNING**

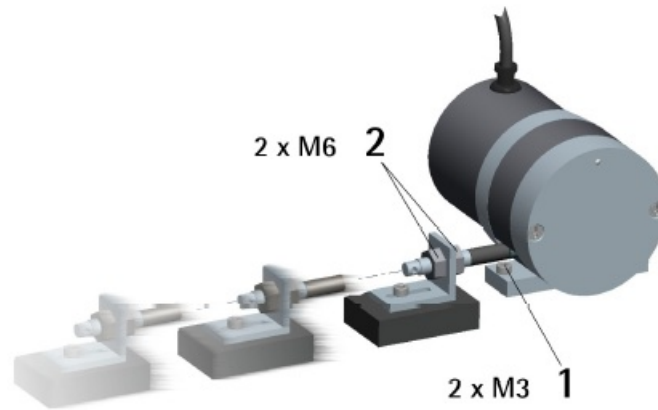
Installation has to be carried out by qualified personnel only, with power supply disconnected and mechanical parts compulsorily in stop.

## **Overall dimensions**



Values are expressed in mm

## Mounting instructions

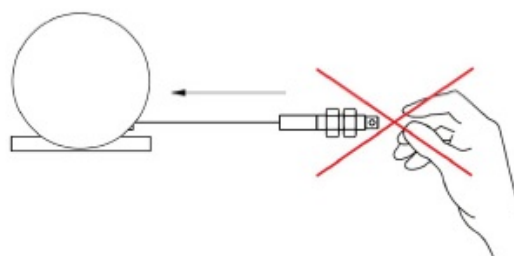


- Fasten the draw-wire unit onto a fixed support using two M3 screws 1;
- remove the transport safety wire that pins the end of the measuring wire;
- fix the end of the measuring wire to the moving element using the provided M6 nuts 2.

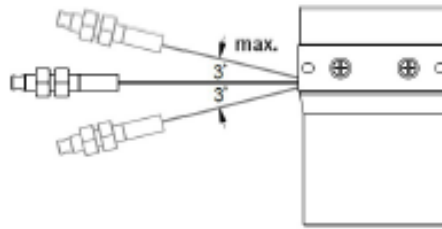
## WARNING

We suggest installing the unit providing protection means against waste, especially swarf as turnings, chips, or filings; should this not be possible, please make sure that adequate cleaning measures are in place in order to prevent the wire from jamming.

To avoid irreparable failures, never exceed the maximum measuring length and prevent the wire from tangling up. Never release the wire freely, always help the wire wind properly: risk of personal injury and/or equipment damage.



Always keep the wire aligned not to damage the equipment (maximum deviation: 3°).



### Useful information

If you want to know the maximum measuring length (max. stroke) of the draw-wire encoder and the output type please refer to the order code. The stroke per turn is always 100 mm (3.937"); while the maximum number of turns is between 3 for SFPS1-00300-... and 20 for SFPS1-02000-... .

### EXAMPLE 1

SFPS1-00500-005-L020

Stroke per turn = 100 mm (3.937")

Max. number of turns = 5

Max. measuring length = 500 mm (19.685")

Output = 5k $\Omega$  resistance potentiometer

### EXAMPLE 2

SFPS1-01500-AV22-L010

Stroke per turn = 100 mm (3.937")

Max. number of turns = 15

Max. measuring length = 1,500 mm (59.055")

Output = 0-10V voltage analogue output

### Maintenance

The measuring system does not need any particular maintenance; anyway it has to be handled with the utmost care as any delicate electronic equipment. From time to time we recommend the following operations:

- the unit and the wire have to be cleaned regularly using a soft and clean cloth to remove dust, chips, moisture etc.; do not use oil to clean the wire.

### Electrical connection

#### WARNING

Electrical connection must be carried out by qualified personnel only, with power supply disconnected and mechanical parts compulsorily in stop.

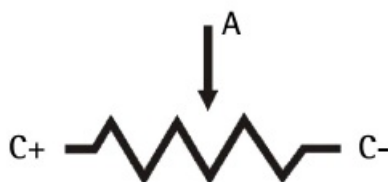
#### WARNING

If wires of unused signals come in contact, irreparable damage could be caused to the device. Thus they must be cut at different lengths and insulated singularly.

### Potentiometer versions connection

(order codes: SFP1-xxxxx-001-..., SFP1-xxxxx-005-..., SFP1-xxxxx-010-..., SFP1-xxxxx-020-...)

Function	I3 cable
A (slider)	Green
C +	Red
C –	Black
Shielding	Shield



### Analogue versions connection

(order codes: SFP1-xxxxx-AI12-..., SFP1-xxxxx-AV22-...)

Function		I3 cable
AI12	AV22	
+10Vdc +30Vdc	+15Vdc +30Vdc	Red
n.c.	0Vdc	Black
Iout	Vout	Green
Shielding		Shield

n.c. = not connected

### cable specifications

Model:	LIKA encoder cable type I3
Cross section:	3 x 0.22 mm <sup>2</sup> (24 AWG)
Jacket:	PVC, oil and flame resistant
Shield:	Tinned copper braid, coverage 65%
Outer diameter:	4.0 mm ± 0.15 mm / 0.157" ± 0.006"
Min. bend radius:	Outer diameter x 10, static application Outer diameter x 15, dynamic application
Work temperature:	-20°C +80°C / -4°F +176°F, static application -5°C +70°C / +23°F +158°F, dynamic application, not for continuous use
Conductor resistance:	< 92.5 W/km (IEC60344)



## Ground connection

Minimize noise by connecting the shield and the frame to ground. Make sure that ground 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. You are advised to provide the ground connection as close as possible to the encoder.

## Output value

The analogue output values increase when pulling out the cable.

For potentiometer values see the "4.1 Potentiometer versions connection" section on page 13.

For more information please refer also to the "Output signals" section on page 16.



## Output signals

### Potentiometer signals

Signals	Condition	Value
between A and C –	wire fully wound on the drum (0 m m)	0 W <sup>1</sup>
between A and C +		max. value <sup>2</sup>

1. Approx. 0.03 % of the max. value

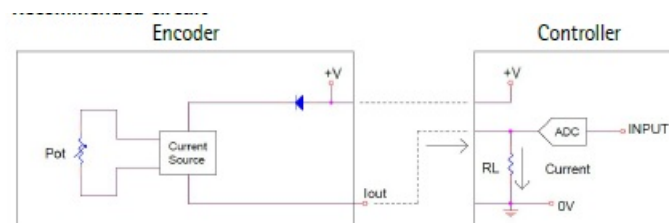
2. For SFPS1-01500-005-L020, max. value = 5 KW

### Analogue signals

Current output (order code SFPS1-xxxxx-AI12-...) = 4-20mA

0 position = 4 mA max. position = 20 mA

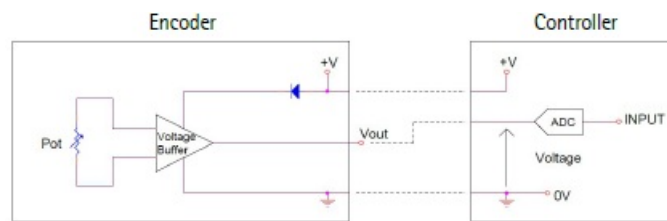
Recommended circuit



Voltage output (order code SFPS1-xxxxx-AV22) = 0-10V

0 position = 0 V max. position = 10 V

Recommended circuit



## Maintenance

The measuring system does not need any particular maintenance; anyway it has to be handled with the utmost care as any delicate electronic equipment. From time to time we recommend the following operations:

- the unit and the wire have to be regularly cleaned using a soft and clean cloth to remove dust, chips, moisture etc.; do not use oil to clean the wire.

## Order code

SFPS1	-01000	-010	-L020
SFPS1	-02000	-A112	-L010
Series			Length of the cable [dm]
Max measuring length [m m]		Output circuit	

## EXAMPLES

