

WS

Installation Manual Wire System



www.givimisure.it

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WS.

1 WARNINGS

To avoid damages to the product and to ensure safety, please read carefully this manual before installing the WS system.

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WS04-200:

1 = 200
(= ± 0,6 20 °C)

WS08-250:

1 = 250
(= ± 0,6 20 °C)

WS10-300:

1 = 300
(= ± 0,6 20 °C)

2 DEVELOPMENT

MODEL WS04-200:

1 SHAFT ROTATION = 200 mm OF CABLE LENGTH
(tolerance = ± 0.6 mm at 20 °C)

MODEL WS08-250:

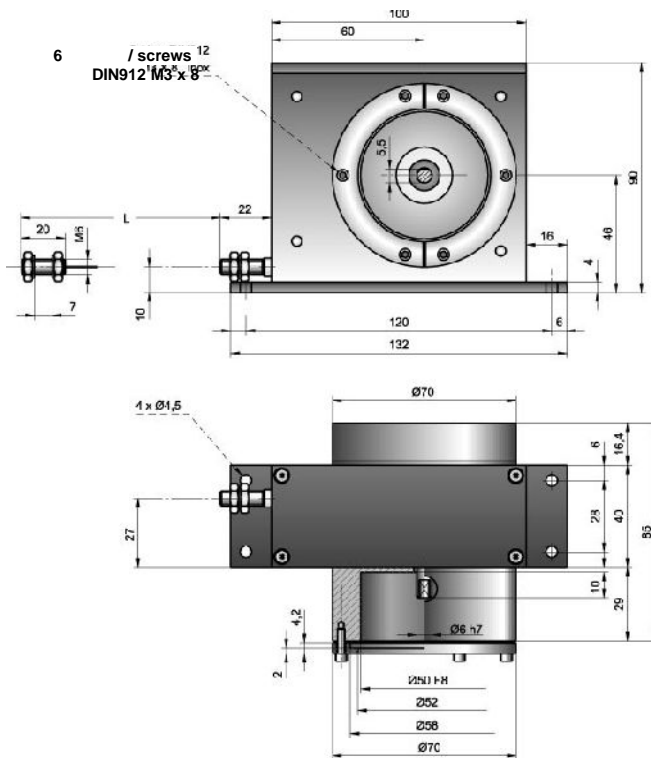
1 SHAFT ROTATION = 250 mm OF CABLE LENGTH
(tolerance = ± 0.6 mm at 20 °C)

MODEL WS10-300:

1 SHAFT ROTATION = 300 mm OF CABLE LENGTH
(tolerance = ± 0.6 mm at 20 °C)

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3 DIMENSIONS



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4 ENVIRONMENTAL AND OPERATING CONDITIONS

The internal mechanism of the WS system are exposed to environmental conditions. Humidity and abrasive substances can penetrate through the cable and damage the device.

The loss of tension of the cable can cause it to exit from the drum and the pulleys, compromising its correct working. Respect rigorously the throttle regulation and avoid sudden stops of the machine.

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WS 4 M4.
($a < 2^\circ$).

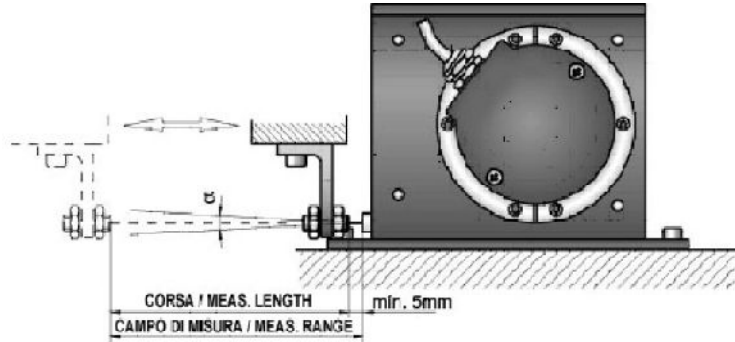
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INSTALLATION

The WS system has to be fixed on a plane surface with 4 screws M4. All the mounting positions are possible.

The cable has to be correctly aligned ($a < 2^\circ$).

Be careful while fixing the cable on the movable part of the machine. Avoid turning the steel cable, and tighten it with the nut/lock nut provided.



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WS

7x19

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CABLE MAINTENANCE

The maximum measuring length can never exceed the admitted one (measuring range).

The cable should never loosen. Make sure its recovery is slow and smooth.

The cable should never interfere with any other object.

Do not bend, twist or roll the cable.

If the cable passes through pulleys, their diameter should not be lower than 14 mm.

The regular cleaning of the cable is essential for the proper functioning of the WS system in environments characterized by humidity, dust or dirt. The daily greasing increases the cable's lifetime.

The standard cable mounted on the system is realized in covered stainless steel, with a 7x19 wires structure.

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0,5 . 2.

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COUPLING WITH A ROTARY ENCODER

If coupling with a rotary encoder is not properly realized, the system may be damaged. It is highly recommended to follow the instructions provided in this manual.

The WS system should not be coupled with rotary encoders having an inertia higher than 0.5 Kg-cm². If such encoders are to be used, we recommend to reduce the suggested maximum speed and acceleration.

The measuring system must be always coupled to the WS through an elastic coupling.

In no case it is possible to manipulate or rotate the axes of these devices, to avoid causing the loss of tension of the cable. If a rotation on the shaft axis needs to be performed, it has to be done through the manual extraction of the cable.

INCREMENTAL ENCODERS

The resolution (in mm) obtained for any pulse will be:

$$r = \frac{R_t}{n}$$

Where $R_t = 200$ for WS04-200
 $R_t = 250$ for WS08-250
 $R_t = 300$ for WS10-300
 $n =$ number of pulses

For instance, with the system WS04-200 and an encoder with 400 pulses, we will have a resolution of 0.5 mm per pulse.
 Givi Misure encoders mod. EN500 can be coupled directly to the system WS.

ABSOLUTE ENCODERS

The resolution can be calculated as for the incremental encoders.

Givi Misure absolute encoders mod. AEN500, single or multiturn, can be coupled directly with the WS system.

POTENTIOMETERS

The output obtained can be calculated as follows:

$$r = \frac{R}{R_t \times n}$$

Where $R =$ maximum value of the potentiometer
 $R_t = 200$ for WS04-200
 $R_t = 250$ for WS08-250
 $R_t = 300$ for WS10-300
 $n =$ number of turns

For instance, with a potentiometer with 10 K Ω and 10 turns, an output of 5 μ /mm will be obtained.

The potentiometer will have to be coupled with the WS system considering the measuring length limitation and the safety margin, to avoid problems with the mechanical limit.

Safety margin

To avoid reaching the limit of the measuring length of the potentiometer, a safety margin needs to be present. This fraction of turn or angle has to include the possible lengthening of the cable due to elasticity, thermal expansion or structural lengthening. For normal uses, we recommend to leave a margin of at least 40 mm per meter of cable. While coupling to the WS system, follow the procedure indicated below.

1. Fix the potentiometer and screw the dowels.
2. Turn the potentiometer axis clockwise up to the mechanical limit.
3. Turn backward (counter-clockwise), at least of the fraction of turn calculated as:

$$\theta_{seg} = 0,2 \times L$$

Where $L =$ maximum extension of the WS cable (in meters)

4. Without moving the potentiometer axis, couple it with the WS, aligning it to its plane part. Fix the lock.
5. Screw the coupling dowel through the hole present on the WS flange. Insert the plastic cap again.
6. We recommend to verify the output value with a multimeter.

$$r = \frac{R_t}{n}$$

$R_t = 200$ per WS04-200
 $R_t = 250$ per WS08-250
 $R_t = 300$ per WS10-300
 $n =$

WS04-200 400
 0,5
 Givi Misure EN500 WS

Givi Misure AEN500 (WS)

$$r = \frac{R}{R_t \times n}$$

$R =$
 $R_t = 200$ WS04-200
 $R_t = 250$ WS08-250
 $R_t = 300$ WS10-300
 $n =$

10 K Ω 10
 5 μ
 WS,

40
 WS:

$$\theta_{seg} = 0,2 \times L$$

$L =$ WS ()

4. WS,
5. WS.
- 6.

$L_{max} = (n - \theta_{seg}) \times D$

n =
 $\theta_{seg} =$, WS ()
 D = WS ()

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Limitation of the cable path

The maximum extension of the WS cable (limited to the potentiometer measuring length), is calculated as follows:

$L_{max} = (n - \theta_{seg}) \times D$

Where n = number of turns of the potentiometer
 θ_{seg} = angle related to the safety margin (turns)
 D = development of the WS (mm)

Overcoming this limit will cause the damaging of the WS system, with the breaking of the cable or of the fixing coupling of the potentiometer.

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Cod. WS	WS04	WS08	WS10
	/ /		
	AISI316 (7x19+0)		
	= 750		
	4000	8000	10000
	4010	8010	10010
	3 N	6 N	6 N
	8,9 N	13 N	13 N
	35 / ²	30 / ²	25 / ²
	(= 3)		
	10 / ²	12 / ²	12 / ²
	1 /	0,75 /	0,75 /
(EN 60529)	IP51		
	- 20 °C + 100 °C		
	99 % (.)		



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TECHNICAL CHARACTERISTICS

Cod. WS	WS04	WS08	WS10
Material	aluminium / brass / stainless steel		
Cable	stainless steel AISI316 (7x19+0 covered)		
Weight	≈ 750 g		
Measuring length	4000 mm	8000 mm	10000 mm
Max. cable extension	4010 mm	8010 mm	10010 mm
Min. cable static tension	3 N	6 N	6 N
Max. cable static tension	8.9 N	13 N	13 N
Max. acceleration of cable output	35 m/s ²	30 m/s ²	25 m/s ²
	(Safe Coeff. Cable Breaking = 3)		
Max. acceleration of cable recovery	10 m/s ²	12 m/s ²	12 m/s ²
Max. speed	1 m/s	0.75 m/s	0.75 m/s
Protection class (EN 60529)	IP51		
Operating temperature	- 20 °C ÷ 100 °C		
Max. relative humidity	99 % (not condensed)		



Without prior notice, the products may be subject to modifications that the Manufacturer reserves to introduce as deemed necessary for their improvement.

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9 WARRANTY TERMS

The WS wire system is guaranteed against manufacturing faults for a period of twelve months from the date of purchase. Any repair must take place at the Manufacturer's premises and the Customer shall arrange the delivery of the product, at its own risk and expense.

The Manufacturer is released from any claim against damages due to the non-observance of the instructions provided in this manual or on the product which causes the annulment of the warranty terms.

The warranty does not provide for repairing and/or replacement of those parts that have been damaged by negligence or misuse, improper installation or maintenance, maintenance performed by unauthorized personnel, transport or any other circumstance that excludes a manufacturing fault of the product.

Similarly, the warranty does not apply if serial numbers or any data identifying the product are cancelled or altered in any way, and if product modifications are introduced without the written authorization of the Manufacturer.

The Manufacturer declines any responsibility for damages to people or properties deriving from the use of the product, including any loss of profit or any other direct, indirect or incidental loss.

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2002/96/CE

(WEEE)

WEEE



2002/96/CE.

10 DISPOSAL

Disposal of waste electrical and electronic equipment (WEEE)
European Council Directive (2002/96/EC)



The use of the WEEE Symbol indicates that this product may not be treated as household waste.

If this product is disposed correctly, you will help to protect the environment.

For more detailed information about the recycling of this product, please contact your local authority, your household waste disposal service provider or the retailer where you purchased the product.

This information regards only European customers, according to 2002/96/EC European Parliament Directive.

For other countries, please refer to local law requirements.

All Around the World



OUR PRODUCTS ARE SOLD AND HAVE AFTER-SALE SERVICE IN ANY INDUSTRIALIZED COUNTRY



**OPTICAL
SCALES**

MAGNETIC SYSTEMS

ROTARY ENCODERS

DIGITAL READOUTS

POSITION CONTROLLERS



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COMPANY WITH QUALITY MANAGEMENT
SYSTEM CERTIFIED BY DNV
= ISO 9001:2008 =