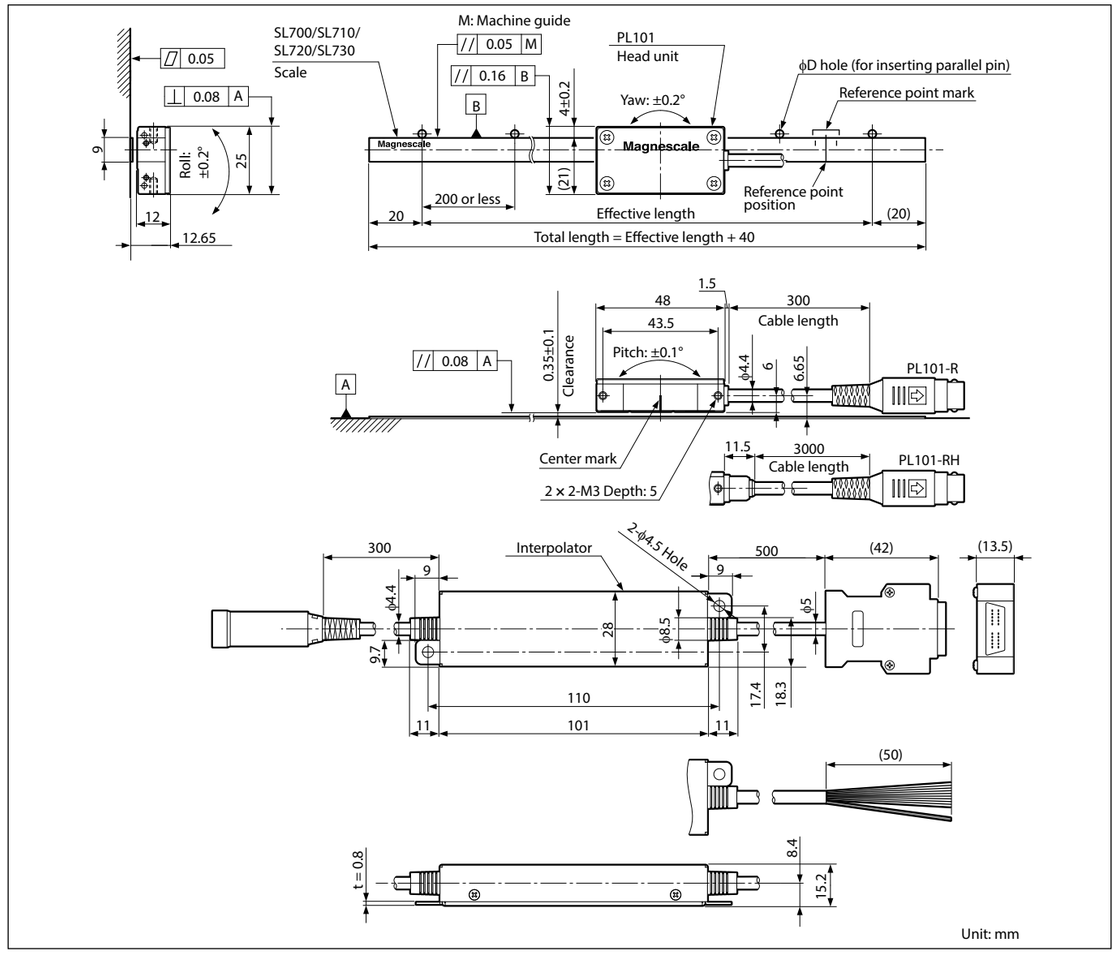

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PL101-RA / PL101-RHA
4-170-200-1C

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Magnescale

Head with Interpolator

PL101-RA / PL101-RHA

Instruction Manual

Read all the instructions in the manual carefully before use and strictly follow them.
Keep the manual for future references.

Safety Precautions

Magnescale Co., Ltd. products are designed in full consideration of safety. However, improper handling during operation or installation is dangerous and may lead to fire, electric shock or other accidents resulting in serious injury or death. In addition, these actions may also worsen machine performance.
Therefore, be sure to observe the following safety precautions in order to prevent these types of accidents, and to read these "Safety Precautions" before operating, installing, maintaining, inspecting, repairing or otherwise working on this unit.

Warning Indication Meanings

The following indications are used throughout this manual, and their contents should be understood before reading the text.

⚠ Warning
Failure to observe these precautions may lead to fire, electric shock or other accidents resulting in serious injury or death.

⚠ Caution
Failure to observe these precautions may lead to electric shock or other accidents resulting in injury or damage to surrounding objects.

⚠ Warning

- Do not use this unit with voltages other than the specified supply voltage as this may result in fire or electric shock.
- Do not perform installation work with wet hands as this may result in electric shock.
- Do not disassemble or modify the unit as this may result in injury or damage the internal circuits.

⚠ Caution

- Be sure to check the machine and device conditions to ensure work safety before working on the machine.
- Be sure to cut off the power supply, air and other sources of drive power before working on the machine. Failure to do so may result in fire or accidents.
- When turning on the power supply, etc. to operate the machine, take care not to catch your fingers in peripheral machines and devices.

Operating Cautions

- Do not open the cover of this device or put your hand inside. Otherwise the internal circuit may be broken by static electricity.
- This device is not explosion-proof. Do not use it in the atmosphere of flammable gas.
- This device is not vibration resistant. Do not use it in place where it is subject to shocks. (Excluding the head unit)

■ General precautions

When using Magnescale Co., Ltd. products, observe the following general precautions along with those given specifically in this manual to ensure proper use of the products.

- Before and during operations, be sure to check that our products function properly.
- Provide adequate safety measures to prevent damages in case our products should develop malfunctions.
- Use outside indicated specifications or purposes and modification of our products will void any warranty of the functions and performance as specified of our products.
- When using our products in combination with other equipment, the functions and performances as noted in this manual may not be attained, depending on operating and environmental conditions.

[For U.S.A. and Canada]

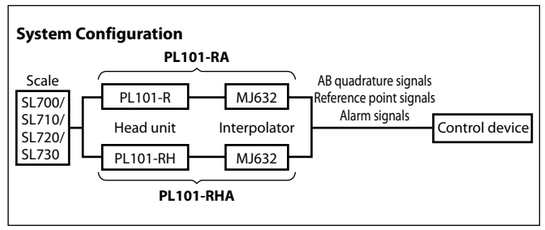
THIS CLASS A DIGITAL DEVICE COMPLIES WITH PART15 OF THE FCC RULES AND THE CANADIAN ICES-003. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS.

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDERSIGNED OPERATION.

CET APPAREIL NUMÉRIQUE DE LA CLASSE A EST CONFORME À LA NORME NMB-003 DU CANADA.

Introduction

The product set consists of the PL101-R/PL101-RH head unit and the MJ632 interpolator, which outputs AB quadrature signals. This set is used in combination with the SL700/SL710/SL720/SL730 scale (sold separately).



Model name

Head unit

PL101-RA □○△
PL101-RHA □○△

<Output connector>
C : Honda Tsushin 20-pin
B : Flying leads

<Resolution and Polarity>

B	0.2 µm	+
C	0.5 µm	+
D	1.0 µm	+
E	2.0 µm	+
F	5.0 µm	+
G	10.0 µm	+
I	0.2 µm	–
J	0.5 µm	–
K	1.0 µm	–
L	2.0 µm	–
M	5.0 µm	–
N	10.0 µm	–

<AB quadrature signal minimum phase difference time>

B	100 ns
C	150 ns
D	200 ns
E	250 ns
F	300 ns
G	500 ns
H	2.5 µs
I	25 µs

Interpolator

See the MJ632 Interpolator Instruction Manual.

Usage Notes

- Do not place objects that generate strong magnetic fields in the vicinity of this product. This could harm the accuracy of the scale.
- This product should be used within an ambient temperature range of 0 to +45 °C, and should not be exposed to direct sunlight or heat sources.
- During operation, be sure to keep the unit 0.5 m or more away from large power relays, high voltage or large current switches, or other sources of noise.
- Wire the head cable and output cable separately from power lines.
- When coupling relays, solenoids, motors or other devices to this unit, be sure to take measures to prevent noise.
- Although the connection cable (for extension, sold separately) has been designed with sufficient durability for normal operating conditions, be careful not to apply excessive stress to the cable. This could severely harm the durability of the cable.
- Make sure that the external magnetic field does not exceed 0.5 mT.

Head unit

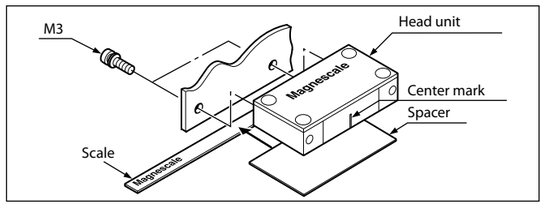
Head Unit Installation Procedure

Preparation

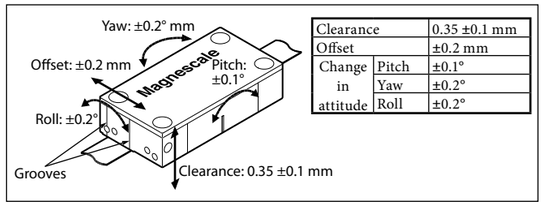
- First, install the scale. For the installation procedure, refer to the instruction manual for the scale.
- Check the range and surface accuracy of the installation surface.
- Check the accuracy of the mounting screw coordinates.
- The M3 tap screws mounted on the case have a depth of 5 mm. Obtain screws with a suitable length according to the thickness of the mounting brackets. The fitting length of the screws should be 4 to 5 mm.

Installation

1. Align the unit Magnescale marks on the scale and head unit so that they are facing the same direction.
2. The head unit is inscribed with a center mark that serves as a guide to the signal detection position.
   Install so that the center mark is always within the effective length.
3. Set the origin so that the center mark matches up with the center of the reference point mark on the scale.



4. Insert the supplied spacer between the head unit detection surface and the scale, and then mount the head unit and secure in place using M3 screws.
   The tightening torque should be 0.6 to 0.8 N·m.
5. After mounting the head unit, remove the spacer.
6. Check the relative positions of the scale and head unit. (See the figure below.)
   * Grooves on the side of the head unit indicate the offset position.



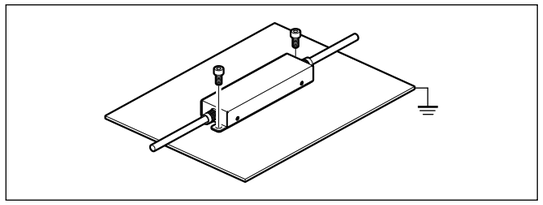
Clearance		0.35 ±0.1 mm
Offset		±0.2 mm
Change in attitude	Pitch	±0.1°
	Yaw	±0.2°
	Roll	±0.2°

Interpolator

The MJ632 interpolator is used to output AB quadrature signals, reference point signals, and an alarm signals.
The signals are output by a voltage-differential line driver (compliant with EIA-422).
For details, see the MJ632 Instruction Manual.

Note

- Connect a ground wire to the surface on which the interpolator will be installed. Failure to make a ground connection may result in worsened noise resistance.



Specifications

	PL101-RA***	PL101-RHA***
Head unit	PL101-R	PL101-RH
Interpolator	MJ632-***	
Output signal	AB quadrature signals, reference point signals, alarm signals.	
Supported scales	SL700, SL710, SL720, SL730	
Accuracy (at 20 °C)	Differs according to the scale length*1	
Reference point detection function	Included	
Reference point detection conditions	Bidirectional	
External magnetic field strength	0.5 mT max.	
Vibration resistance	20 m/s² (50 Hz to 2 kHz)	
Impact resistance	980 m/s² (11 ms)	

	PL101-RA***	PL101-RHA***
Protection class (Excluding the connector and interpolator)	IP50 or equivalent	IP67 or equivalent
Mass (Head unit)	60 g	150 g
Mass (Interpolator)	100 g	
Operating temperature and humidity range	0 to 45 °C (No condensation)	
Storage temperature and humidity range	−20 to 50 °C (90% RH max.)	
Accessories	Spacer, instruction manual Output connector (Except flying leads type) MJ632 instruction manual	

For the electrical specifications, see the MJ632 Instruction Manual.

*1 Accuracy (at 20 °C)

L ≦ 3000 mm	L > 3000 mm See Table 1
Accuracy: ±10L µm	Accuracy : ± (10L + 2.5N) µm

※ According to the combination with the SL700 series
※ Accuracy measured at 20 °C at the time of manufacturing
※ L : Effective length (1 m unit integer)
N: Integer corresponding to the length

Table 1: Relationship between Effective Length (L) and N

L (m)	N	L (m)	N	L (m)	N	L (m)	N
3 < L ≦ 5.5	1	28 < L ≦ 30.5	11	53 < L ≦ 55.5	21	78 < L ≦ 80.5	31
5.5 < L ≦ 8	2	30.5 < L ≦ 33	12	55.5 < L ≦ 58	22	80.5 < L ≦ 83	32
8 < L ≦ 10.5	3	33 < L ≦ 35.5	13	58 < L ≦ 60.5	23	83 < L ≦ 85.5	33
10.5 < L ≦ 13	4	35.5 < L ≦ 38	14	60.5 < L ≦ 63	24	85.5 < L ≦ 88	34
13 < L ≦ 15.5	5	38 < L ≦ 40.5	15	63 < L ≦ 65.5	25	88 < L ≦ 90.5	35
15.5 < L ≦ 18	6	40.5 < L ≦ 43	16	65.5 < L ≦ 68	26	90.5 < L ≦ 93	36
18 < L ≦ 20.5	7	43 < L ≦ 45.5	17	68 < L ≦ 70.5	27	93 < L ≦ 95.5	37
20.5 < L ≦ 23	8	45.5 < L ≦ 48	18	70.5 < L ≦ 73	28	95.5 < L ≦ 98	38
23 < L ≦ 25.5	9	48 < L ≦ 50.5	19	73 < L ≦ 75.5	29	98 < L ≦ 100	39
25.5 < L ≦ 28	10	50.5 < L ≦ 53	20	75.5 < L ≦ 78	30		