

# **MAGNESCALE**

*digital magnetic scale*



## Reading head Series PL101 Magnetic tape Series SL700 Interpolator Series MJ

### Key-Features:

- Resolution up to 0.2  $\mu\text{m}$
- Accuracy  $\pm 10 \mu\text{m}$  in combination with SL700
- Analogue output signal (1V p-p), or A/B quadrature output signal (TTL, RS422)
- Reference point: none, one, multi and reference mark
- Protection class up to IP67
- Displacement speed up to 384 m/min
- Working temperature 0...+45°C
- resistant against dirt, water, oil, vibrations and shock
- Magnetic tape SL700: range up to 100 m

### Content:

## TECHNICAL DATA READING HEAD

		PL101-RH	PL101-RA	PL101-RHA
Interpolator		without	MJ632	
Compatible magnetic tapes		SL700, SL710, SL720, SL730	SL700, SL710, SL720, SL730	
Accuracy (20°C)		±10 µm (in combination with magnetic tape SL700)	depends on length magnetic tape (see table below)	
Protection class		IP67 (exclude connector)	IP50	IP67
Resolution	[µm]	In combination with Interpolator MJ500: 2 or 10	0,2, 0,5, 1,0, 2,0, 5,0, 10,0	
	[µm]	In combination with Interpolator MJ600: 1	(please specify when ordering)	
	[µm]	In combination with Interpolator MJ620: 1, 2, 5, 10		
Distance tape-Reading head	[mm]	0.35 ±0.1 mm	0.35 ±0.1 mm	
Displacement speed	[m/min]	max. 384 (at resolution 1 µm when used in combination with Interpolator MJ600/620)	dependent on the chosen phase difference and resolution (see table below)	
Reference point		SL700: without, SL710: 1 reference point, SL720: Multi- reference points, SL730: reference mark (see below)		
Working temperature	[°C]	0...+45	0...+45	
Storage temperature	[°C]	-20...+50	-20...+50	
Reading head cable length	[mm]	3000	extension cable CK-T*: 1, 3, 5, 10 m	
Output signal		in combination with tape SL700 without Interpolator: 1 Vpp analog output * in combination with tape SL700 with Interpolator MJ500/600/620: A/B quadrature signal	Interpolator MJ632: A/B quadrature signal, Linedriver, RS422, reference point signals, alarm signals	
Supply	[V]	5 VDC ±5 %		
Current consumption max.	[mA]	150	200	
Weight	[g]	150	60 (PL101-RA), 100 (Interpolator)	150 (PL101-RHA), 100 (Interpolator)

\* see page 3

### Accuracy (20°C) PL101-RA, PL101-RHA: $L \leq 3000$ mm: ±10L µm / $L > 3000$ mm: ±(10L + 2.5 N) µm

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		

L: effective length

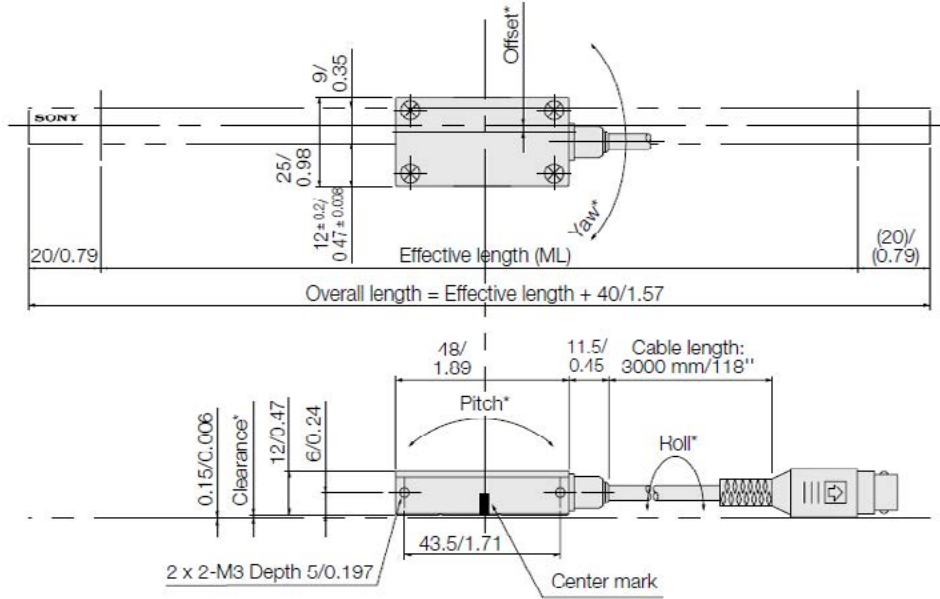
L ≤ 1000 mm: 50 mm pitch / 1100 ≤ L ≤ 3000 mm: 100 mm pitch / 3500 ≤ L ≤ 10.000 mm: 500 mm pitch / 11.000 ≤ L: 1000 mm pitch

### A/B quadrature signal: relation between phase difference, resolution and maximum displacement speed

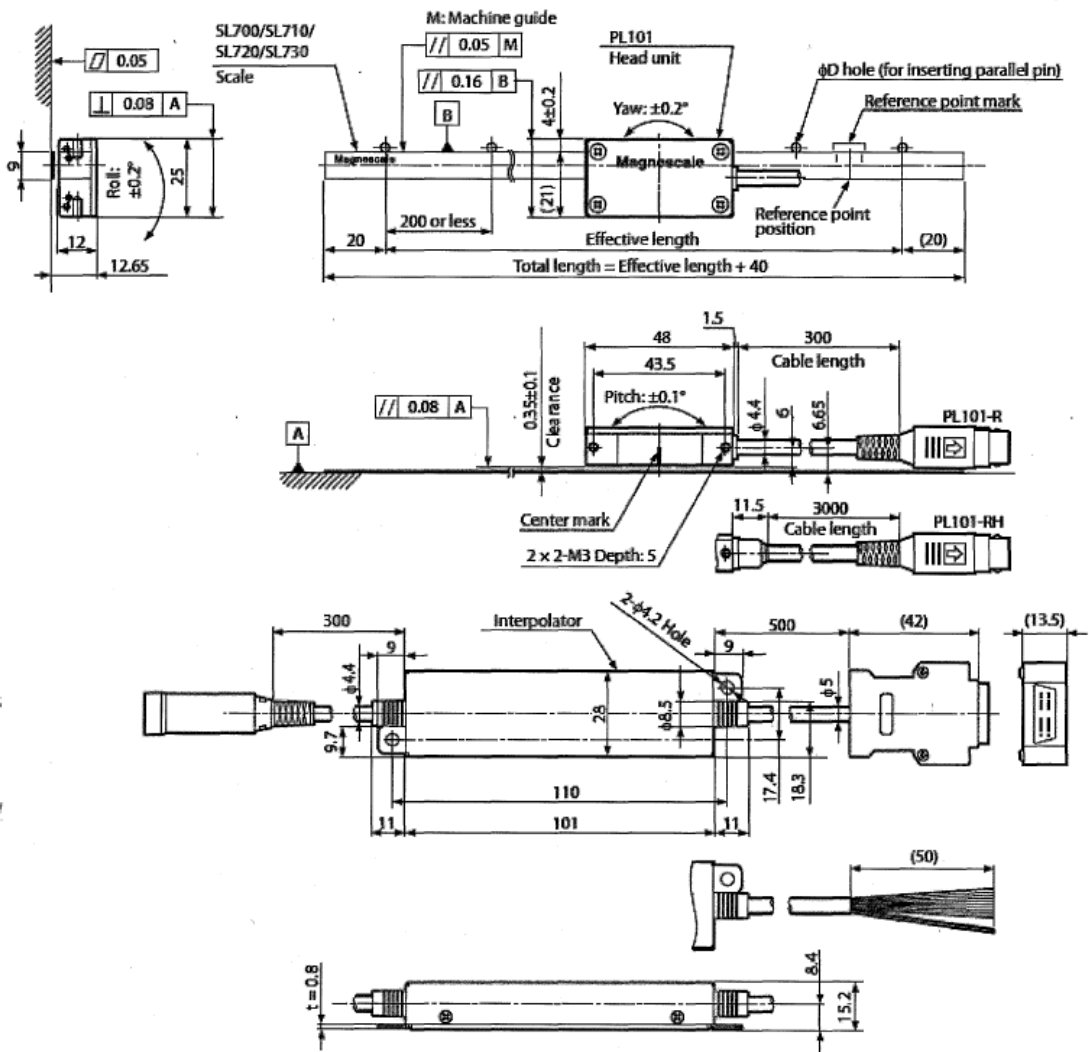
	100 ns	150 ns	200 ns	250 ns	300 ns	500 ns	2.5 µs	2.5 µs
0.2 µm	1.4 m/s	0.9 m/s	0.7 m/s	0.6 m/s	0.5 m/s	0.3 m/s	0.04 m/s	-
0.5 µm	3.5 m/s	2.3 m/s	1.8 m/s	1.5 m/s	1.2 m/s	0.7 m/s	0.15 m/s	-
1.0 µm	7 m/s	4.6 m/s	3.7 m/s	3.0 m/s	2.5 m/s	1.5 m/s	0.3 m/s	0.02 m/s
2.0 µm	14 m/s	9.3 m/s	7.5 m/s	6.0 m/s	5.0 m/s	3.0 m/s	0.6 m/s	0.06 m/s
5.0 µm	35 m/s	23 m/s	18 m/s	15 m/s	12.5 m/s	7.5 m/s	1.5 m/s	0.15 m/s
10.0 µm	70 m/s	46 m/s	37 m/s	30 m/s	25 m/s	15 m/s	3.0 m/s	0.3 m/s

# TECHNICAL DRAWING PL101

## PL101-RH



## PL101-RA, PL101-RHA (with Interpolator MJ632)

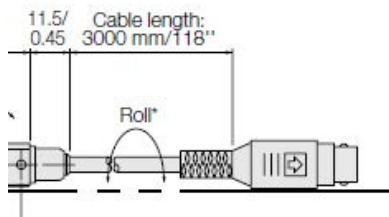


Unit: mm

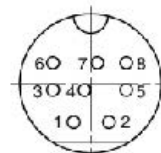
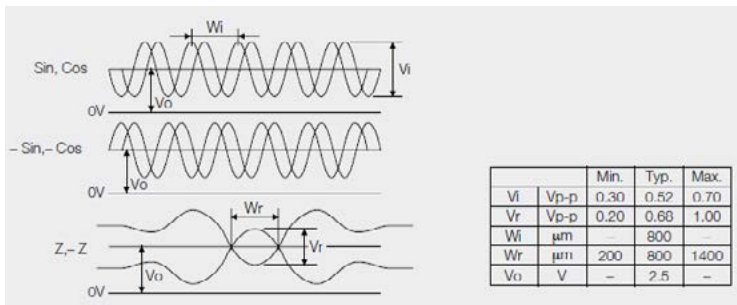
# OUTPUT SIGNAL PL101

## Output signal PL101-RH

without Interpolator:  
1 V peak-peak analog output  
differential output  
Connection, Mini DIN 8 PIN connector

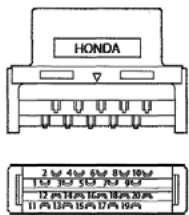


PIN No.	Signal	CVable color
1	+VCC	red
2	0 V	white
3	+SIN	blue
4	-SIN	yellow
5	+COS	orange
6	-COS	grey
7	-Z	green
8	+Z	purple

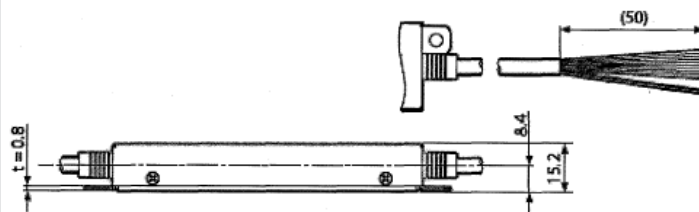


## Output signal PL101-RA, PL101-RHA with Interpolator MJ623 connector output (Honda Tushin, 20 PIN connector, PCR-E20PMRS)

2	/A	4	/B	6	/Reference point	8		10	
1	A	3	B	5	Reference point	7		9	+5 V
12	0V	14	0V	16	0V	18	+5 V	20	+5 V
11	ALARM	13	/ALARM	15		17		19	

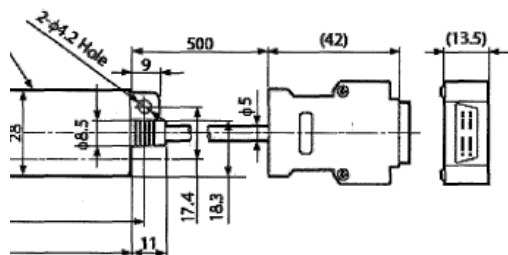


## Output signal PL101-RA, PL101-RHA with Interpolator MJ623 cable with ends



PIN No.	Signal	Pin No.	Signal
1	A	11	Alarm
2	A not	12	0 V
3	B	13	Alarm not
4	B not	14	0 V
5	Reference point	15	
6	Reference point not	16	0 V
7		17	
8		18	+5 V
9	+5 V	19	
10		20	+5 V

Signal	Cable Color
+5 V	brown
0 V	black
A	blue
A not	yellow
B	orange
B not	grey
Reference point	red
Reference point not	white
Alarm	green
alarm not	purple

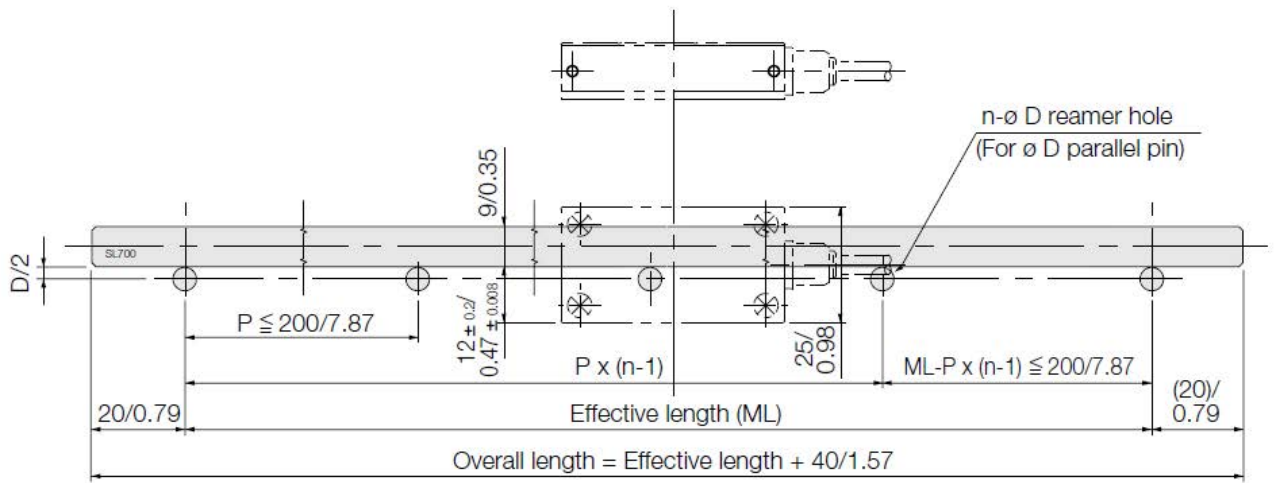


# TECHNICAL DATA MAGNETIC TAPE SERIES SL700

Model	SJ700	SL710	SL720	SL730
Reference point	without	1 (please specify position)	Multi reference points 60 mm pitch from the left end	Reference mark see graph below
Reference point accuracy	-	±1 mm	±1 mm, pitch accuracy: ±7 µm	
Accuracy (20°C)	±10L µm (L ≤ 3 m) / ±(10L + 2.5 N) µm (L > 3 m) in combination with PL101, (L: see table page 2)			
Effective length	50 to 100.000 mm		100 to 100.000 mm	200 to 100.000 mm
Total length	L + 40 mm			
Working temperature	0 to 45 °C			
Storage temperature	-20 to 50 °C			
Expansion coefficient	(14 ±1) × 10 <sup>-6</sup> /°C			

## TECHNICAL DRAWING

### SL700



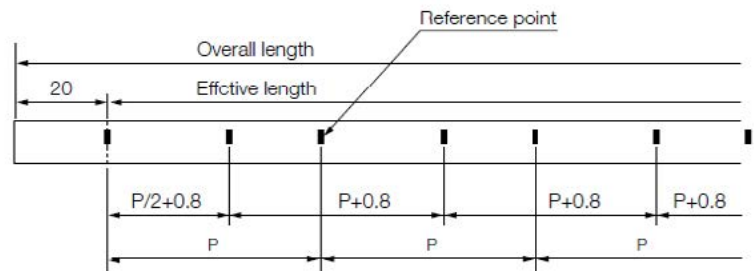
\*Scale thickness 0.3 mm max. (Include double stick tape)

\*Mount the scale on the non-magnetic material. When mounting on a magnetic material, insert a non-magnetic layer with a thickness of at least 3mm.

### Reference mark SL730

Reference mark pitch	Effective length [mm]
80 mm	$200 < ML \leq 2000$
160 mm	$2000 < ML \leq 12.000$
320 mm	$12.000 < ML \leq 56.000$
480 mm	$56.000 < ML \leq 100.000$

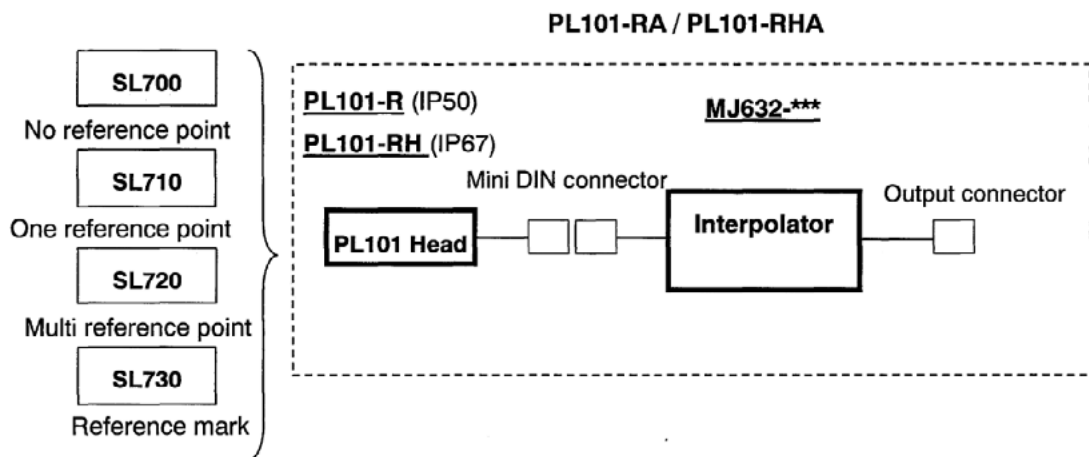
### Reference mark



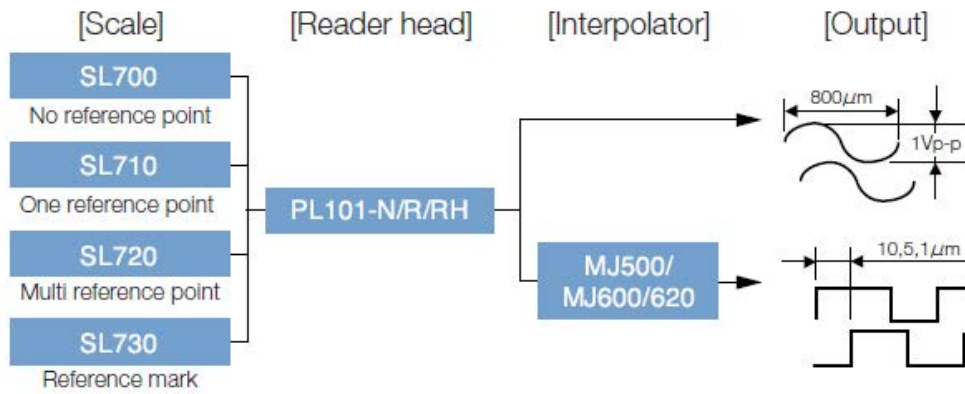
**Important note: Install this product on top of non-magnetic material. If installing on top of magnetic material insert a non-magnetic layer having a thickness of at least 3 mm between the magnetic tape and the magnetic material.**

# SYSTEM CONFIGURATION

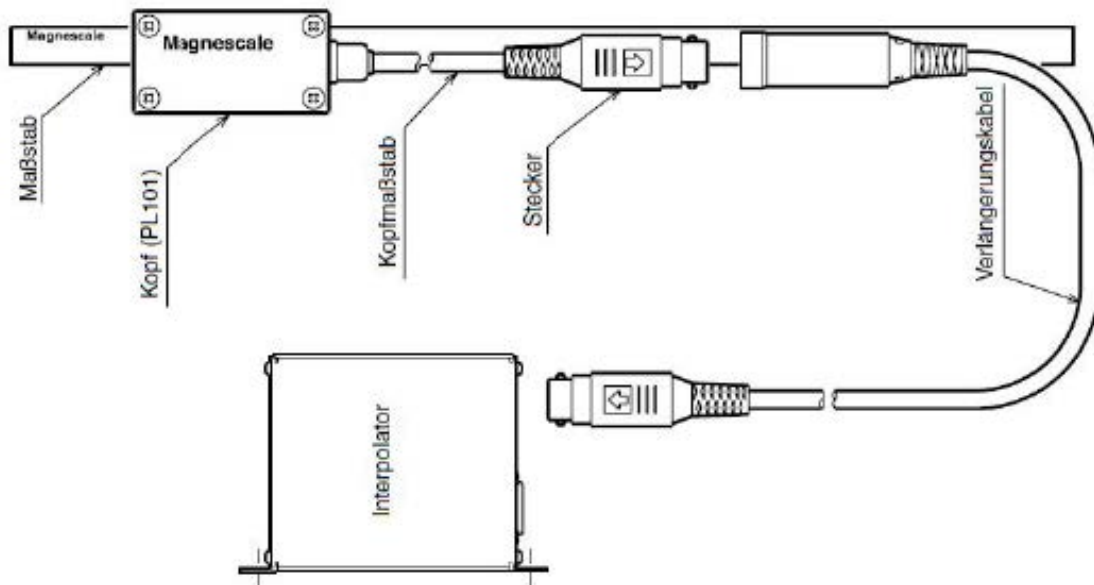
## System Configuration PL101-RA, PL101-RHA



## System Configuration PL101-RH



## Connection Diagram PL101-RH

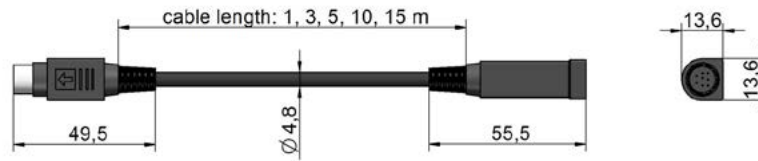


## ACCESSORIES PL101-RHA

**Extension cable between PL101-RA, PL101-RHA and Interpolator MJ632 (maximum 10 m)**

**CK-T (qualified for drag chain use):** CK-T12 (1 m), CK-T13 (3 m), CK-T14 (5 m), CK-T15 (10 m)

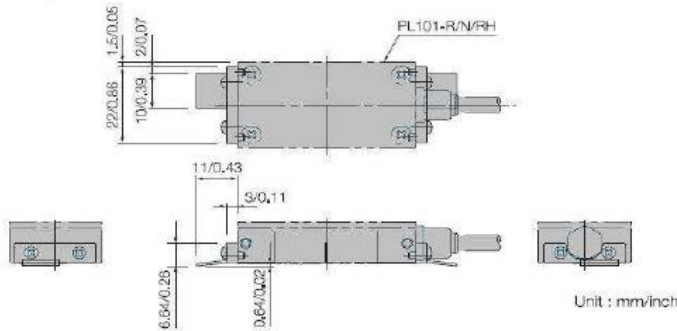
**CE08:** CE08-01 (1 m), CE08-03 (3 m), CE08-05 (5 m), CE08-10 (10 m)



### Additional accessories

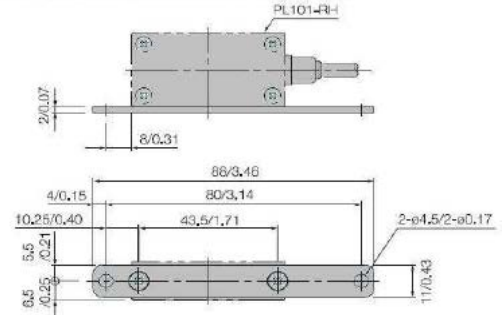
Model	Name	Function
SZ16	wiper	for cleaning the tape
SZ17	Spacer Kit for PL101 Series	for checking the distance PL101 - tape
SZ19	Mounting Plate for PL101 Series	for mounting the PL101-RH with threaded hole

• SZ16:Wiper for PL101

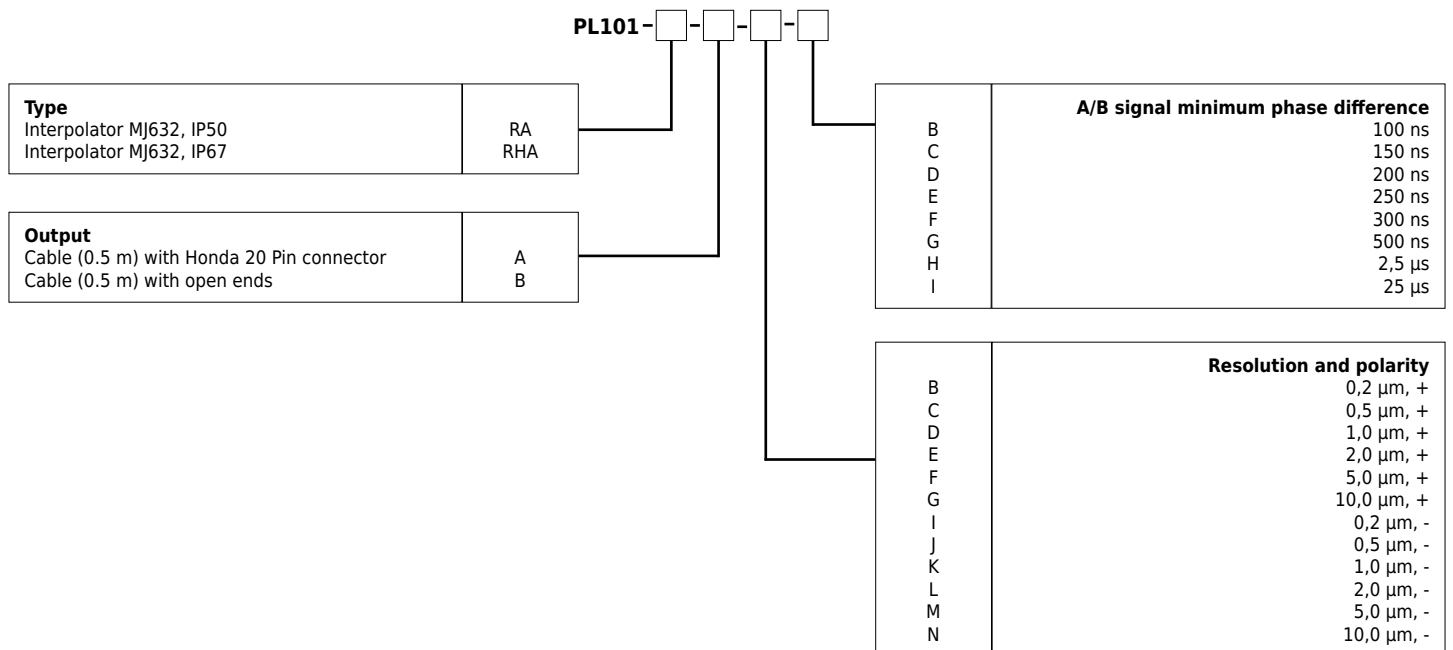


• SZ19:Attachment

(for PL101-RH to install with threaded hole on machine)



## ORDER CODE MAGNESCALE PL101-RA, PL101-RHA



## OVERVIEW MAGNESCALE MAGNETIC TAPE

SL700-/710-	0005	Measurement range 50 mm	SL700-/710-/720-/730-	0160	Measurement range 1600 mm
SL700-/710-/720-	0010	Measurement range 100 mm	SL700-/710-/720-/730-	0170	Measurement range 1700 mm
SL700-/710-/720-	0015	Measurement range 150 mm	SL700-/710-/720-/730-	0180	Measurement range 1800 mm
SL700-/710-/720-/730-	0020	Measurement range 200 mm	SL700-/710-/720-/730-	0190	Measurement range 1900 mm
SL700-/710-/720-/730-	0025	Measurement range 250 mm	SL700-/710-/720-/730-	0200	Measurement range 2000 mm
SL700-/710-/720-/730-	0030	Measurement range 300 mm	SL700-/710-/720-/730-	0210	Measurement range 2100 mm
SL700-/710-/720-/730-	0035	Measurement range 350 mm	SL700-/710-/720-/730-	0220	Measurement range 2200 mm
SL700-/710-/720-/730-	0040	Measurement range 400 mm	SL700-/710-/720-/730-	0230	Measurement range 2300 mm
SL700-/710-/720-/730-	0045	Measurement range 450 mm	SL700-/710-/720-/730-	0240	Measurement range 2400 mm
SL700-/710-/720-/730-	0050	Measurement range 500 mm	SL700-/710-/720-/730-	0250	Measurement range 2500 mm
SL700-/710-/720-/730-	0055	Measurement range 550 mm	SL700-/710-/720-/730-	0260	Measurement range 2600 mm
SL700-/710-/720-/730-	0060	Measurement range 600 mm	SL700-/710-/720-/730-	0270	Measurement range 2700 mm
SL700-/710-/720-/730-	0065	Measurement range 650 mm	SL700-/710-/720-/730-	0280	Measurement range 2800 mm
SL700-/710-/720-/730-	0070	Measurement range 700 mm	SL700-/710-/720-/730-	0290	Measurement range 2900 mm
SL700-/710-/720-/730-	0075	Measurement range 750 mm	SL700-/710-/720-/730-	0300	Measurement range 3000 mm
SL700-/710-/720-/730-	0080	Measurement range 800 mm	SL700-/710-/720-/730-	0350	Measurement range 3500 mm
SL700-/710-/720-/730-	0085	Measurement range 850 mm	SL700-/710-/720-/730-	0400	Measurement range 4000 mm
SL700-/710-/720-/730-	0090	Measurement range 900 mm	SL700-/710-/720-/730-	0450	Measurement range 4500 mm
SL700-/710-/720-/730-	0095	Measurement range 950 mm	SL700-/710-/720-/730-	0500	Measurement range 5000 mm
SL700-/710-/720-/730-	0100	Measurement range 1000 mm	SL700-/710-/720-/730-	0600	Measurement range 6000 mm
SL700-/710-/720-/730-	0110	Measurement range 1100 mm	SL700-/710-/720-/730-	0700	Measurement range 7000 mm
SL700-/710-/720-/730-	0120	Measurement range 1200 mm	SL700-/710-/720-/730-	0800	Measurement range 8000 mm
SL700-/710-/720-/730-	0130	Measurement range 1300 mm	SL700-/710-/720-/730-	0900	Measurement range 9000 mm
SL700-/710-/720-/730-	0140	Measurement range 1400 mm	SL700-/710-/720-/730-	1000	Measurement range 10.000 mm
SL700-/710-/720-/730-	0150	Measurement range 1500 mm	SL700-/710-/720-/730-	10000	Measurement range 100 m

## OVERVIEW MAGNESCALE READING HEAD

PL101-RH	without Interpolator, IP67, output 1 Vpp
PL101-RA	Interpolator MJ632, IP50, A/B, TTL output
PL101-RHA	Interpolator MJ632, I67, A/B, TTL output

## ACCESSORIES

SZ16	Wiper
SZ17	Spacer Kit for PL101 Series
SZ19	Mounting Plate for PL101 Series

Extension cables	
CE08-1	Extension cable 3m
CE08-3	Extension cable 5 m
CE08-5	Extension cable 10 m
CE08-10	Extension cable 15 m
CK-T12	Extension cable 1 m (qualified for drag chain use)
CK-T13	Extension cable 3 m (qualified for drag chain use)
CK-T14	Extension cable 5 m (qualified for drag chain use)
CK-T15	Extension cable 10 m (qualified for drag chain use)

Subject to change without prior notice.