

Positioning Measurement System

Technical Information



Gold National Award of Excellence 2005

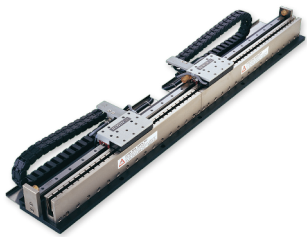
Ballscrew

- For Heavy-Load Drive



The National Award of Excellence 2004

Intelligent Linear Guideway



Gold National Award of Excellence 2004

Linear Synchronous Motor

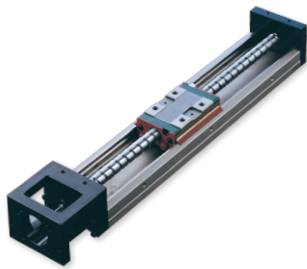
- Iron-core Type (LMS)



The National Award of Excellence 2002

Linear Actuator

- LAN for Hospital
- LAM for Industrial
- LAS Compact Size
- LAK Controller



Gold National Award of Excellence 2003

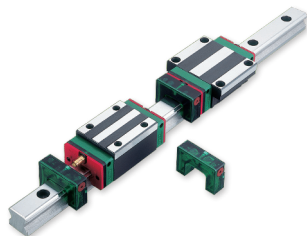
Single Axis Robot

- For Semiconductor & Electronic (KK Series)
- For Automation (KS, KA Series)



Silver National Award of Excellence 2006

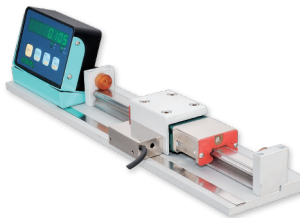
TMS Direct-Driven Positioning System



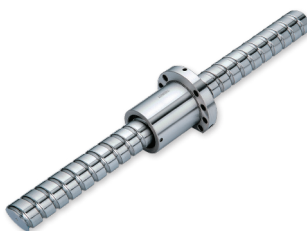
Silver National Award of Excellence 2002

Linear Guideway

- HG/EG/RG/MG Type
- Self-Lubricating (E2)
 - Low Noise (Q1)
 - Air Jet (A1)



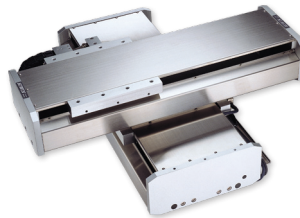
Positioning Measurement System



Silver National Award of Excellence 2006, 2001, 1993

Ballscrews

- Ground/Rolled
- High Speed (High Dm-N Value/Super S Series)
 - Heavy Load (Cool type II)
 - Self-Lubricating (E2)
 - Rotating Nut (R1)



Linear Motor X-Y Stage

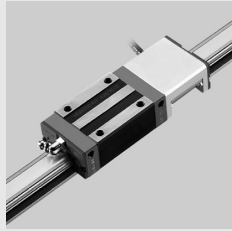


Linear Synchronous Motor

- Iron-core Type (LMS)



Linear Motor Gantry



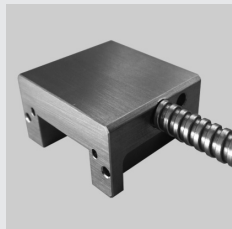
Positioning Measurement System 1mm

Starting on page 1



Positioning Measurement System 5mm

Starting on page 10

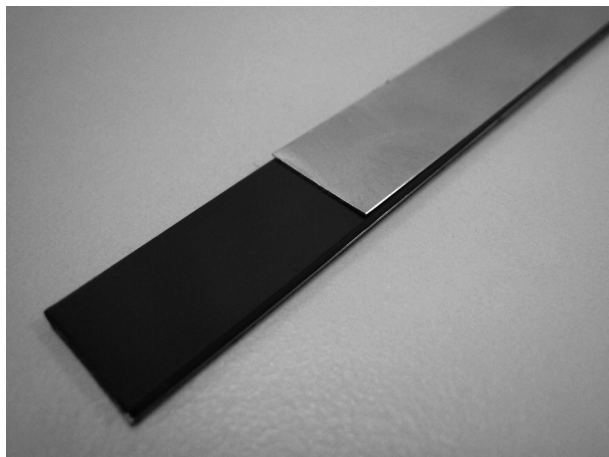


Positioning Measurement System Accessories

Starting on page 22

Positioning Measurement System 1mm

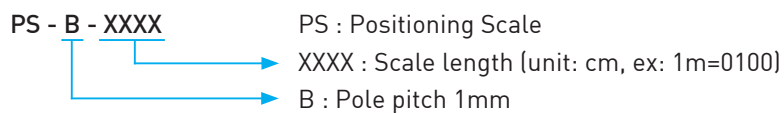
1. Positioning Scale



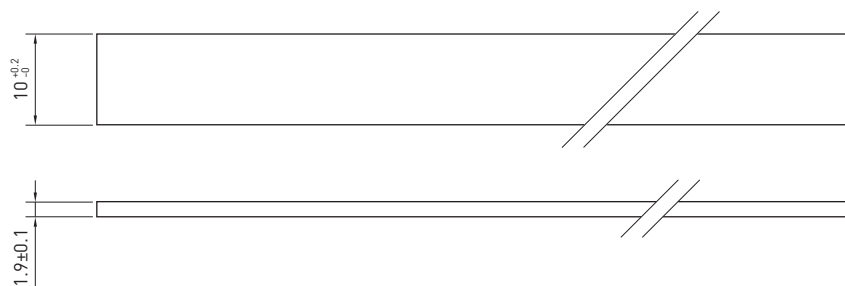
1.1 1mm Scale Technical Specification:

Item (unit)	PS-B-□□□□ (1mm scale)
Accuracy	±20μm/m
Pitch	1mm
Width	10mm (+0.2mm, -0mm)
Thickness	1.9mm (±0.1mm)
Max scale length	30m
Linear Expansion Coefficient	(11±1)×10 ⁻⁶ m/K
Operating Temp (°C)	0~50
Storage Temp (°C)	-5~70
Protection Class	IP67

1.2 Product Model Number and Specification:

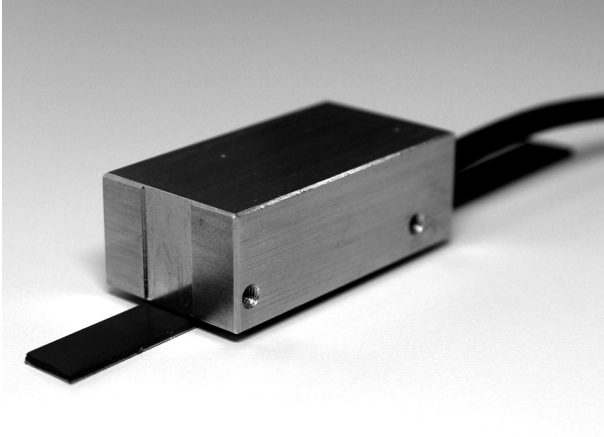


1.3 Scale Dimension:



Positioning Measurement System 1mm

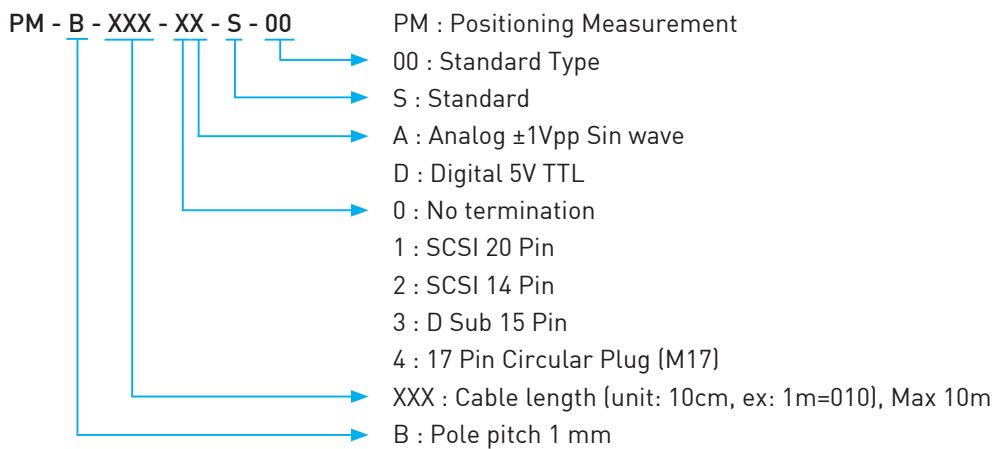
2. Positioning Measurement - Standard Type



2.1 Standard Readhead Technical Specification:

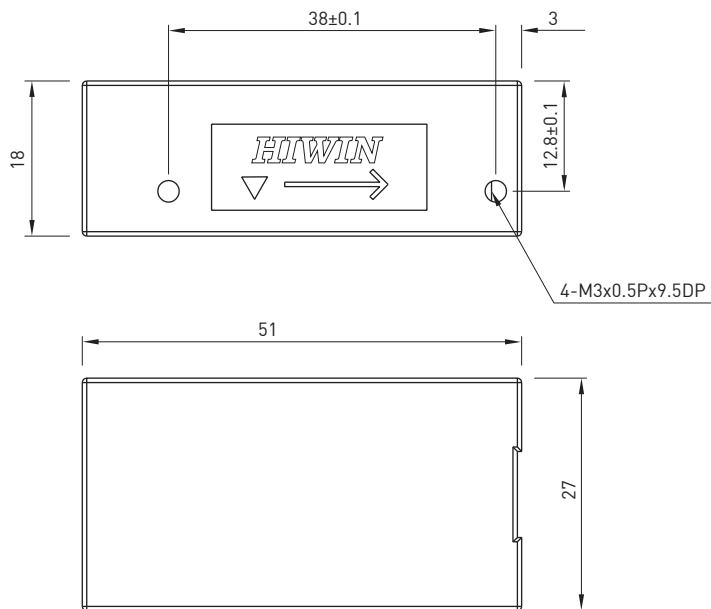
Item (unit)	PM-B-□□□-□□-00 (Standard type)
Signal resolution	Analog signal: 1mm/cycle; Digital signal: 1 pulse/μm
Reference signal	1 pulse/ 1mm
Output signal	Analog Sin/Cos±1Vpp; Digital 5V TTL
Max speed (m/sec)	10m/sec
Input power	5VDC±5%
Operating Temp (°C)	0~50
Storage Temp (°C)	-5~70
Protection Class	IP67

2.2 Product Model Number and Specification:



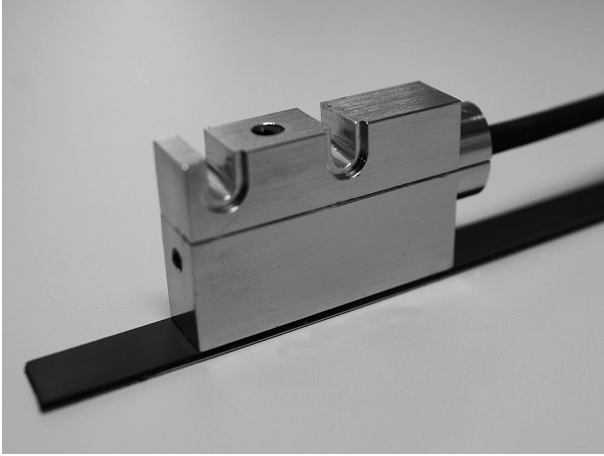
*Analog read head can be paired with ST-B to output digital signal. (5V TTL or 24V Open collector format)

2.3 Product Dimensions:



Positioning Measurement System 1mm

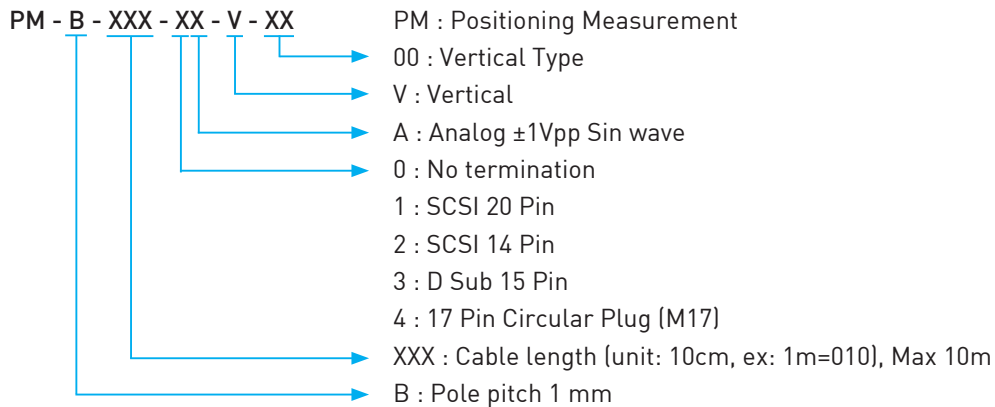
3. Positioning Measurement - Vertical Type



3.1 Vertical Readhead Technical Specification:

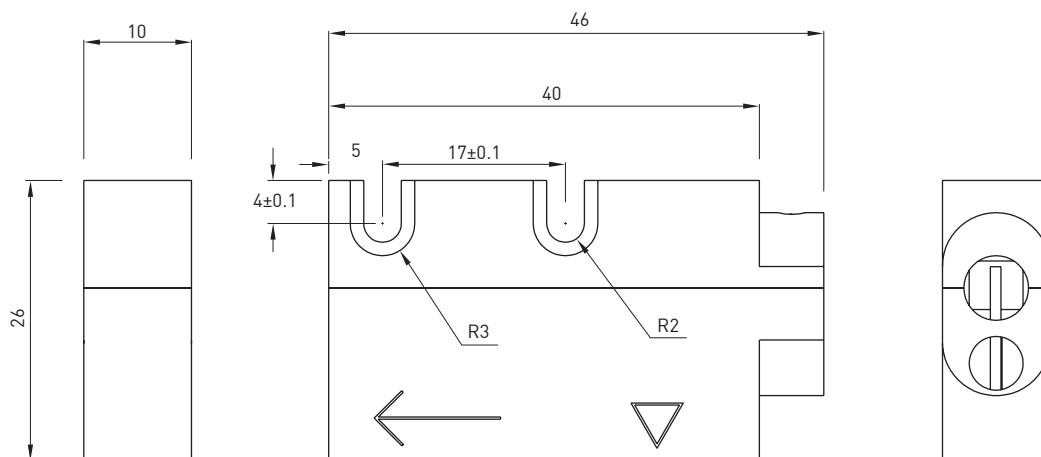
Item (unit)	PM-B-□□□-□□-V-00 (Vertical Type)
Signal resolution	Analog signal: 1mm/cycle
Reference signal	1 pulse/1mm
Output signal	Sin/Cos±1Vpp
Max speed (m/sec)	10m/sec
Input power	5VDC±5%
Operating Temp (°C)	0~50
Storage Temp (°C)	-5~70
Protection Class	IP67

3.2 Product Model Number and Specification:



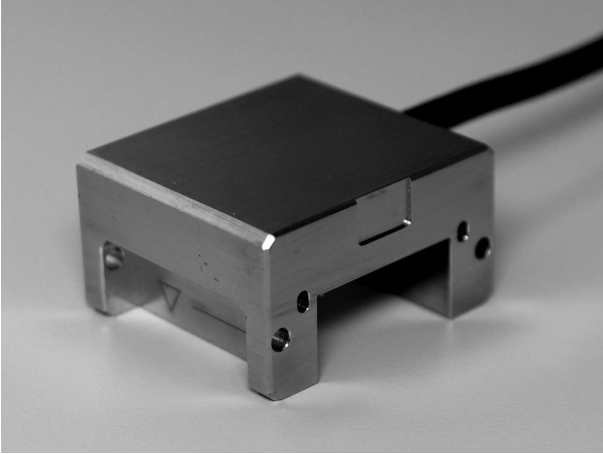
* Analog read head can be paired with ST-B to output digital signal. (5V TTL or 24V Open collector format)

3.3 Product Dimensions:



Positioning Measurement System 1mm

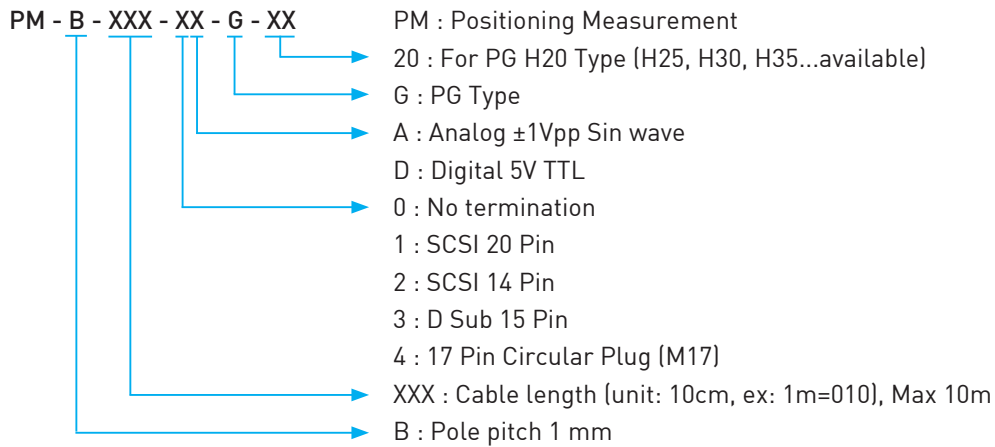
4. Positioning Measurement - PG Type



4.1 PG Readhead Technical Specification:

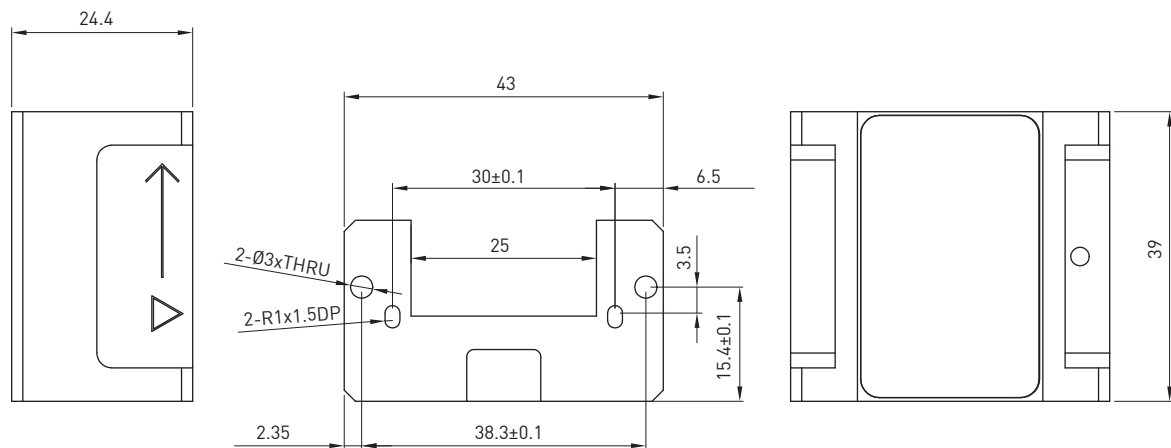
Item (unit)	PM-B-□□□-□□-G-□□ (PG Type)
Signal resolution	Analog signal: 1mm/cycle; Digital signal: 1 pulse/μm
Reference signal	1 pulse/1mm
Output signal	Analog Sin/Cos±1Vpp; Digital 5V TTL
Max speed (m/sec)	10m/sec
Input power	5VDC±5%
Operating Temp (°C)	0~50
Storage Temp (°C)	-5~70
Protection Class	IP67

4.2 Product Model Number and Specification:



* Analog read head can be paired with ST-B to output digital signal. (5V TTL or 24V Open collector format)

4.3 Product Dimension:



Positioning Measurement System 1mm

5. Cable Color and Pin Assignment

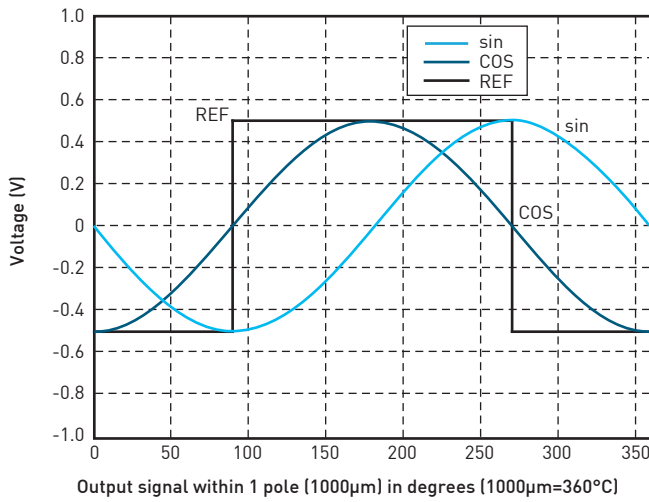
Function	Signal		Color	Connector (SCSI 14 Pin)	Connector (SCSI 20 Pin)		Connector (D-sub 15 Pin)		Connector (17-Pin Circular Plug)	No Termination
	Analog	Digital			Analog	Digital	Analog	Digital		
Power	5V		Brown	1	3	3	4	7	4/5	Brown
	0V		White	8	2	2	12	2	12/13	White
Incremental signals	SIN+	A+	Green	10	16	4	9	14	9	Green
	SIN-	A-	Yellow	11	17	5	1	6	1	Yellow
	COS+	B+	Blue	3	18	6	10	13	10	Blue
	COS-	B-	Red	4	19	7	2	5	2	Red
Reference mark	REF+	Z+	Violet	5	8	8	3	12	3	Violet
	REF-	Z-	Gray	6	9	9	11	4	11	Gray
Shield				Case	1/Case		Case		Case	

Magnetic Distance Measurement System

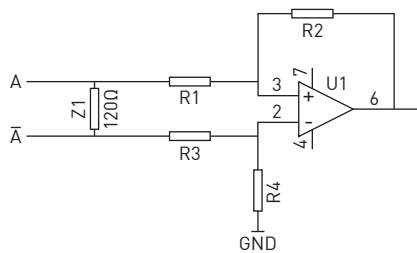
6. Output Signal Definition

Electric signals are according to the differential input of the subsequent electronics (see the graph to the right)

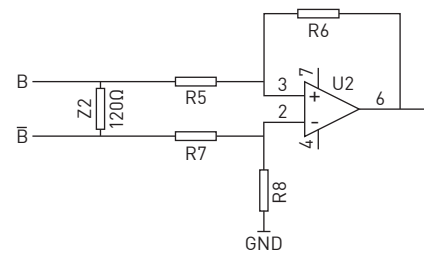
6.1 Analog Signal Definition:



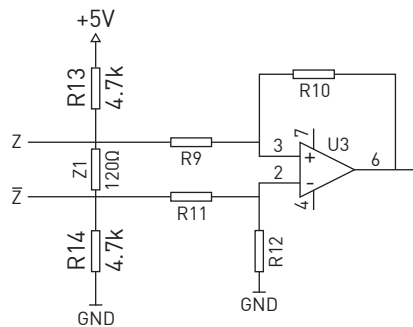
Recommend input circuit of the following electronic device



A-channel



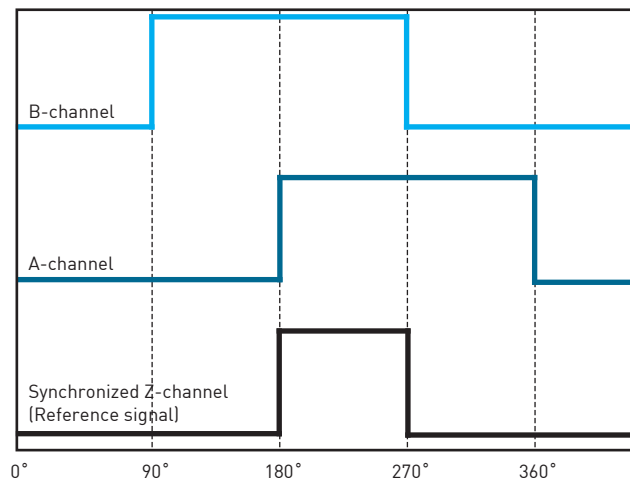
B-channel



Reference-channel

Analog Output

6.2 Digital Signal Definition:

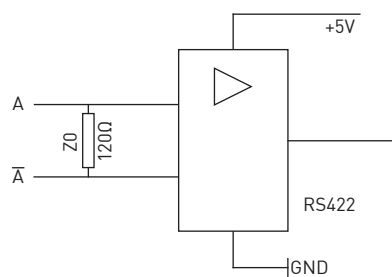


Digital TTL Output

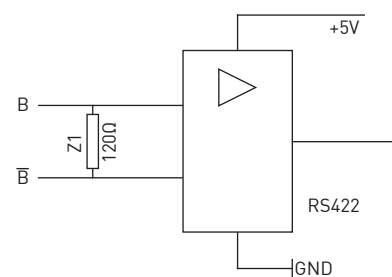
Digital TTL output according to RS422.

- 90° Phase shifted square signal in compliance with RS422 specification
- Recommended termination $Z=120\ \Omega$
- Differential output signal $A, \bar{A}, B, \bar{B}, Z, \bar{Z}$
- Single reference pulse can be displaced and/or extended (optional)
- Minimum pulse width can be limited (optional)

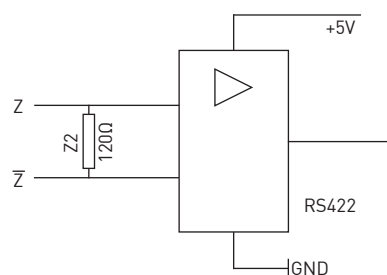
Recommend input circuit of the following electronic device



A-channel



B-channel

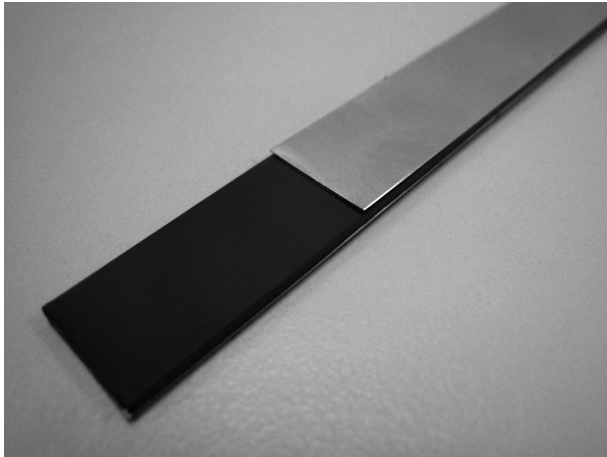


Reference-channel

Digital Output

Positioning Measurement System 5mm

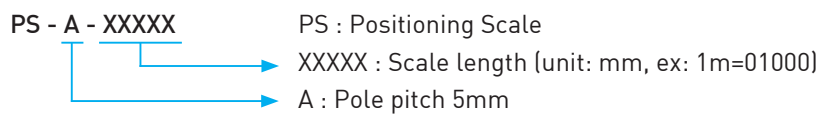
1. Positioning Scale



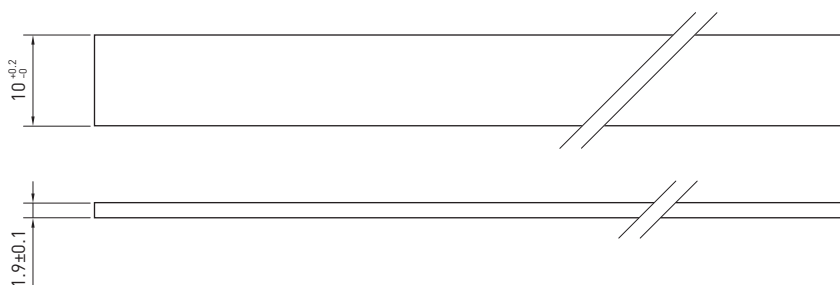
1.1 5mm Scale Technical Specification:

Item (unit)	PS-A-□□□□□ (5mm scale)
Accuracy	$\pm(80\mu\text{m}+15\mu\text{m}/\text{m})$
Pitch	5mm
Width	10mm (+0.2mm, -0mm)
Thickness	1.9mm ($\pm 0.1\text{mm}$)
Max scale length	30m
Linear Expansion Coefficient	$(11\pm 1)\times 10^{-6}\text{m}/\text{K}$
Operating Temp (°C)	0~50
Storage Temp (°C)	-5~70
Protection Class	IP67

1.2 Product Model Number and Specification:



1.3 Scale Dimensions:



Positioning Measurement System 5mm

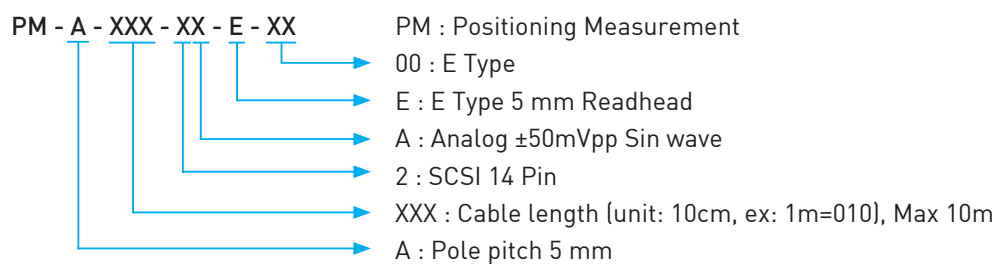
2. Positioning Measurement - E Type



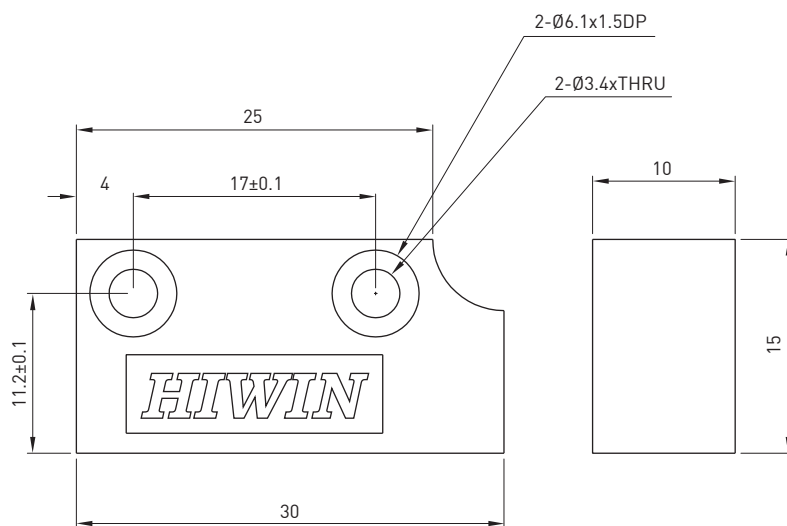
2.1 E Type Readhead Technical Specification:

Item (unit)	PM-A-□□□-□□-E-00 (E Type)
Signal resolution	Analog signal: 5mm/cycle
Output signal	Sin/Cos 50mVpp
Max speed (m/sec)	10m/sec
Input power	3.3VDC±5%
Working Temp (°C)	0~50
Storage Temp (°C)	-5~70
Protection Class	IP67

2.2 Product Model Number and Specification:

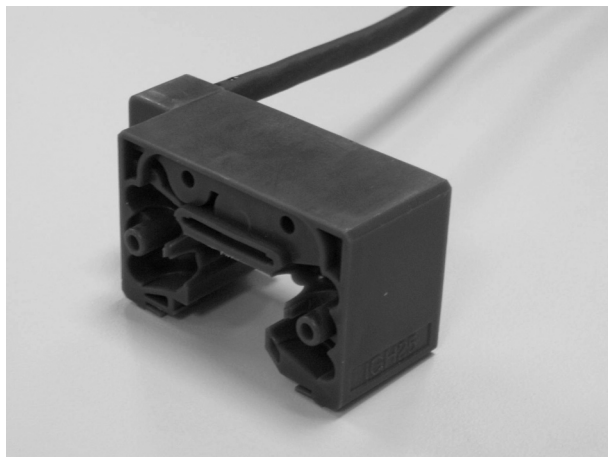


2.3 Product Dimensions:



Positioning Measurement System 5mm

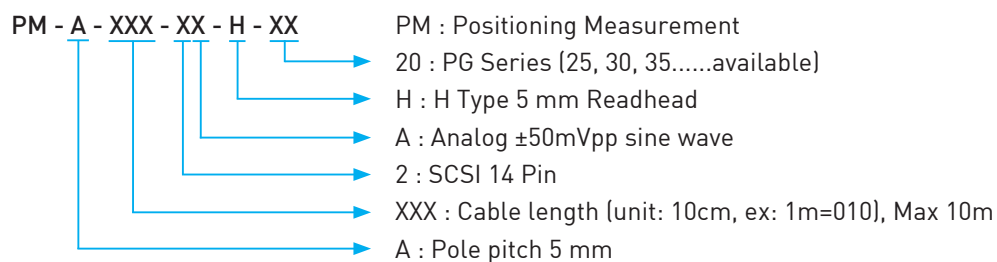
3. Positioning Measurement - H Type



3.1 H Type Readhead Technical Specification:

Item (unit)	PM-A-□□□-□□-□□-□□ (H Type)
Signal resolution	Analog signal: 5mm/cycle
Output signal	Sin/Cos 50mVpp
Max speed (m/sec)	10m/sec
Input power	3.3VDC±5%
Operating Temp (°C)	0~50
Storage Temp (°C)	-5~70
Protection Class	IP67

3.2 Product Model Number and Specification:



Positioning Measurement System 5mm

4. Linear Scale System with LCD Display

Used for mobilized application with Battery Powered Display.



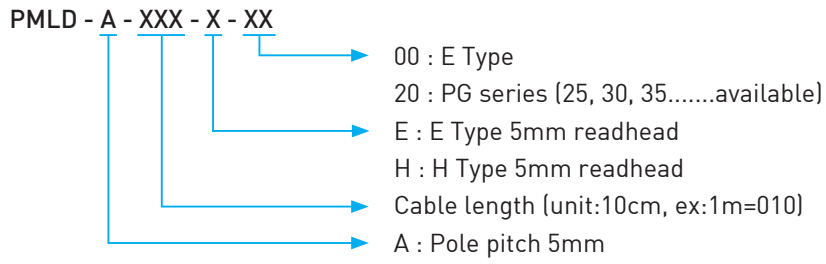
4.1 Technical Specification:

LCD Display	8 digits LCD display with +/- sign
Resolution	5 μ m
Repeatability	\pm 10 μ m
Operation Speed	3m/s (max. 2G acceleration)
Input Power	Commercial AA battery x 2
Operating Temp	0°C ~50°C
Battery Life	1 year (when set at 1.5m/s)
Storage Temp	-5°C ~70°C
Protection Class	Strip/read head: IP66 Display: IP43

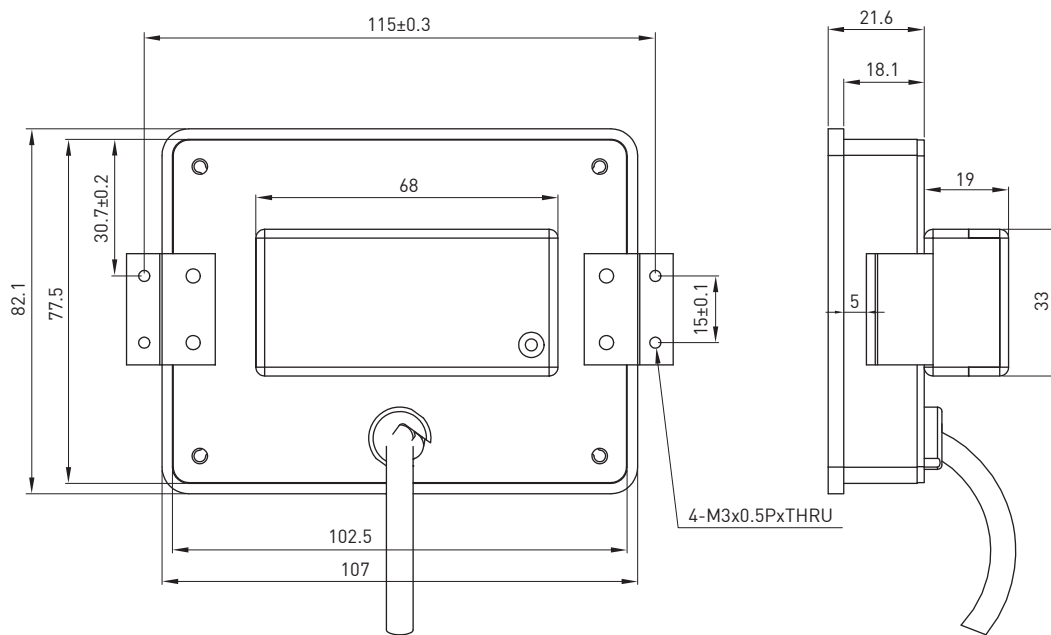
4.2 System Features:

- Motion direction
- Least significant digit
- Metric/English/Angle measurement
- Absolute/Relative position measurement
- Adjustable system resolution
- 5 sets of reference point compensation (for absolute positioning)
- 5 sets of independent counter (for relative positioning)
- 5 levels of maximum velocity setting (Default: 1.5m/sec)
- One touch zero
- Programmable scaling
- Strip/Sensor gap adjustment indication
- Battery life display and monitoring
- Parameter memorization
- Programmable radius
- Keypad lock

4.3 Product Model Number and Specification:



4.4 Product Dimensions:



Positioning Measurement System 5mm

5. Linear Scale System with LED display

Used for Length Measuring and Value Display.



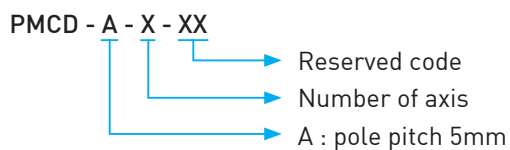
5.1 Technical Specifications:

Measuring length	Max. 10m (option:Max. 30m)
Resolution	5μm
Accuracy	±(80μm+15μm/m)
Repeatability	±10μm
Max. velocity	3m/sec
Power input	DC 5V±5%/1A
Operating temperature(°C)	0~50
Storage temperature(°C)	-5~70
IP Class	Scale / Sensor: IP66 Display: IP43

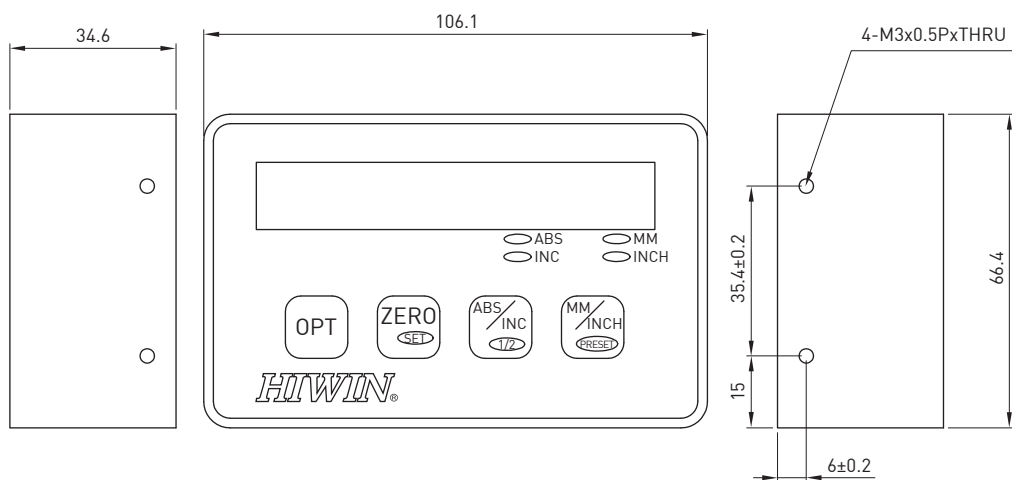
5.2 System Features:

- Up/down switch over
- Adjustable decimal point
- Inch/mm switch over
- Absolute/incremental measurement

5.3 Product Model and Specification:



5.4 Product Dimensions:



Positioning Measurement System 5mm

6. Linear Scale System with Signal Translator

Used For Length Measuring and Only AB Phase Output for User's PLC or Controller Systems.



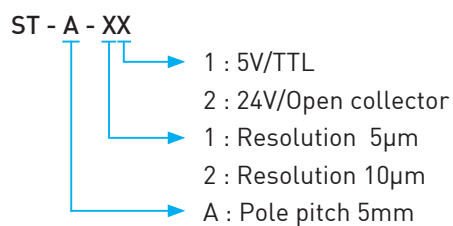
6.1 Technical Specification:

Measuring length	Max.10m (option: Max.30m)
Resolution	5/10μm
Accuracy	±(80μm+15μm/m)
Repeatability	±10μm
Max. velocity	1.2m/sec
Output pulse signals	A, B phase differential, Open collector
Max. output frequency (KHz)	64/32 (at resolution: 5 /10μm)
Power input	DC 5V±5%/1A
Operating temperature(°C)	0~50
Storage temperature(°C)	-5~70
IP Class	Scale / Sensor: IP66 Signal translator: IP43

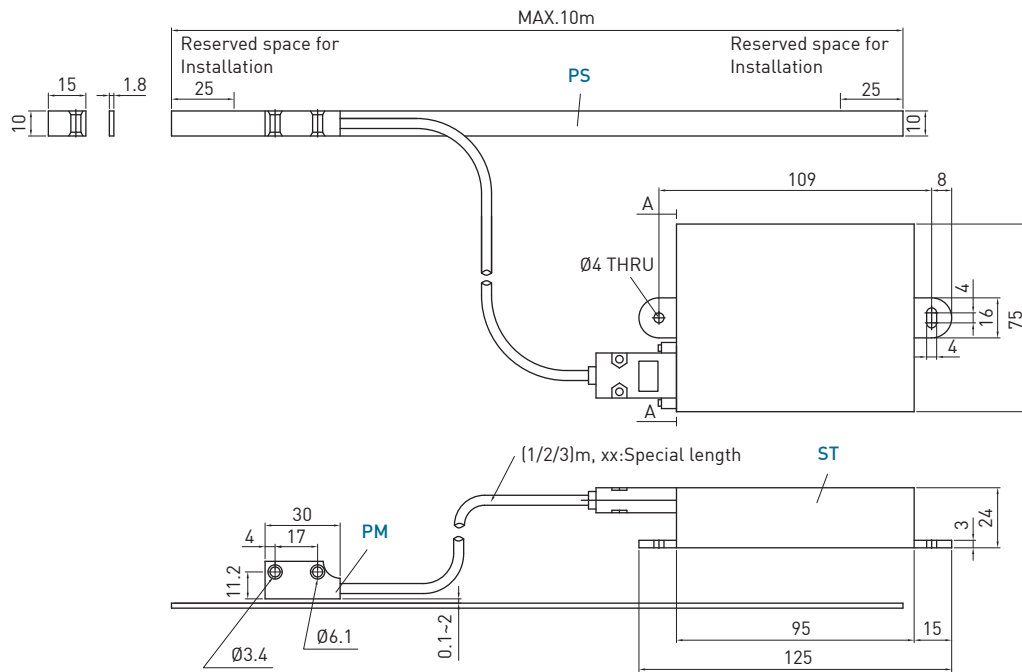
6.2 System Features:

- AB phase output
- TTL level differential output interface
- TTL level output interface
- Open collector output interface

6.3 Product Model and Specification:



6.4 Product Dimensions:



Positioning Measurement System 5mm

7. Selection Guide

① Positioning Scale

PS-A-□□□□□

② Positioning Measurement

PM-A-□□□-□□-□-□□

③ Signal Translator

ST-A-□□

④ Positioning Measurement Counter Display

PMCD-A-□-□□

⑤ Positioning Measurement LCD display

PMLD-A-□□□-□-□□

For measurement display : a.1+2+4(LED)

b.1+5(LCD)

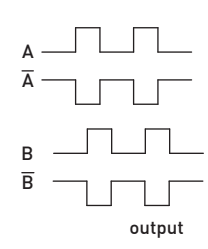
For digital signal output : 1+2+3

Positioning Measurement System 5mm

8. Output Signal and Application

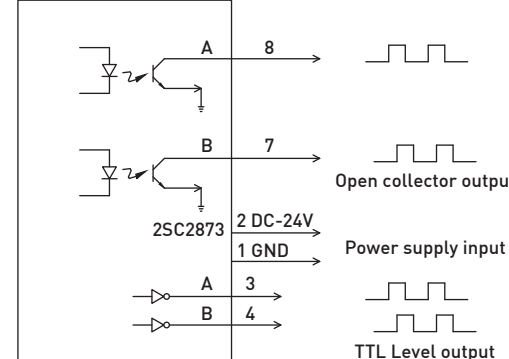
Pin definition for signal output connector on ST-A-□1 :

Pin No	Signals
1	GND
2	DC5V
3	A
8	\bar{A}
4	B
7	\bar{B}
6	SGND



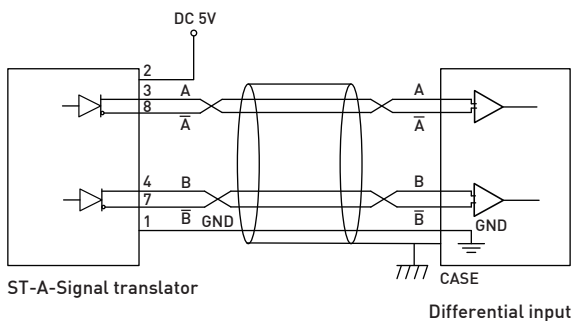
Pin definition for signal output connector on ST-A-□2 :

Pin No	Signals
1	GND
2	DC5V
3	A
8	A
4	B
7	B
6	SGND

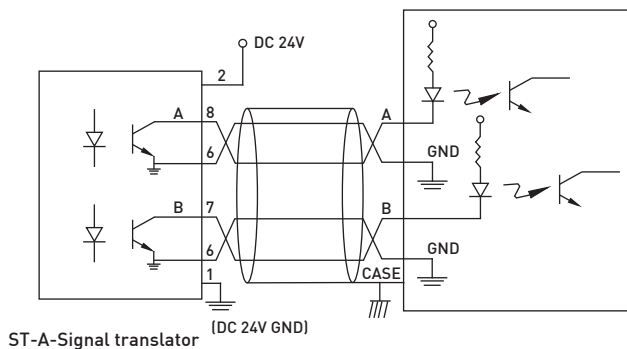


Application Example :

ST-A-(5V/TTL) Wiring



ST-A-(24V/O.C) Wiring



Positioning Measurement System Accessories

1.1 Positioning Scale Installation Fixture:

- Easy installation for Positioning Scale and ensure scale parallel to Positioning Measurement sensor through the entire stroke



1.2 Positioning Measurement Sensor Cable Protection Metal Tube:

- Prevents signal cable from being damaged by hazardous environments
- Increase signal cable life time

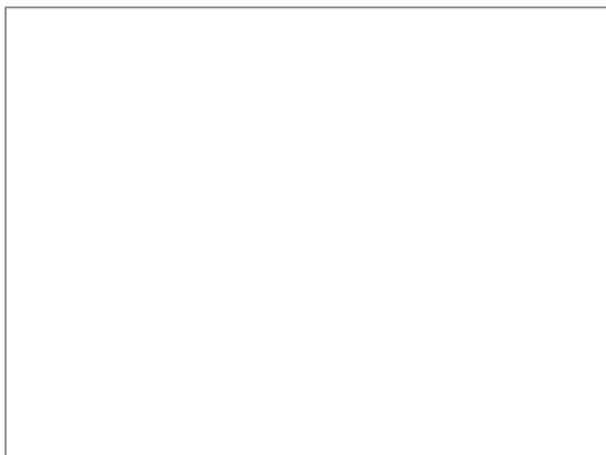


1.3 Universal Adaptor:

- Provide global customers with suitable power plug



* Please inform Hiwin sales personnel which country this product will be used in.



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