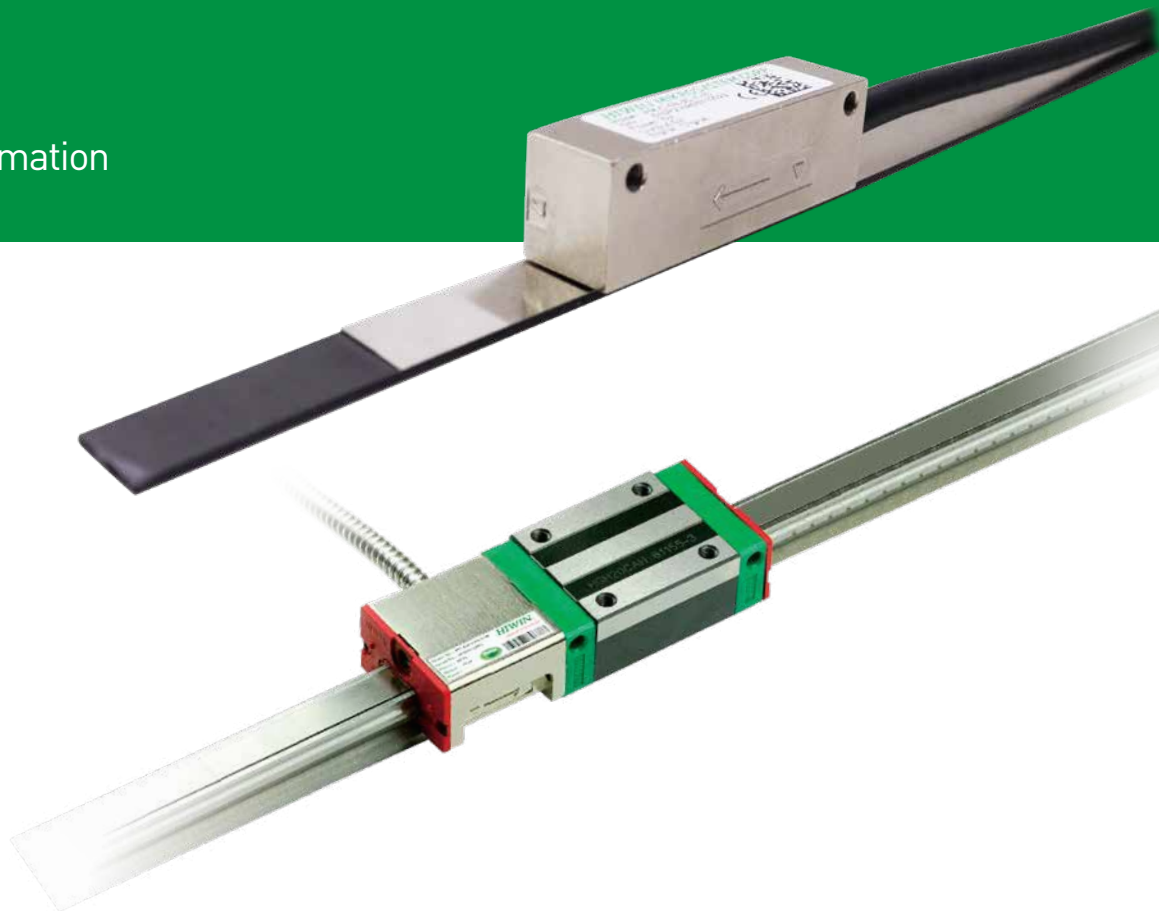




Position Measurement Systems

Technical Information





Linear Motor Stage

Semiconductor / Precision / Automated Transport / Automated Optical Inspection (AOI)

- Planar Servo Motor
- Air Bearing Platform
- X-Y Stage
- Gantry Systems
- Single-Axis Linear Motor Stage



Linear Motor

Machine Tool / Semiconductor / Touch Panel / Laser Manufacturing Machine / Glass Cutting Machine

- Iron Core Linear Motor--LMSA, LMSA-Z, LMFA, LMFC, LMFP Series
- Ironless Linear Motor--LMC Series
- Tubular Motor--LMT Series



Torque Motor & Direct Drive Motor

Machine Tools / Semiconductor / Lithium-ion Battery / Laser Marking / Wafer Dicing

- Torque Motor-- TM-2 / IM-2, TMRW Series
- Display / Automation / Semiconductor / Lithium-ion Battery / Robot / Laser Marking / Automated Optical Inspection (AOI) Industry
- Direct Drive Motor-- DMS, DMY, DMN, DMT Series



Controller / Drive / AC Servo Motor

PCB / Display / Machine Tools / Semiconductor / Automated / Food / Automated Optical Inspection (AOI) Industry

- Controller--HIMC
- Drive--E1, E2, D1, D2T Series
- AC Servo Motor-- E1 Series, FR Series, abi Series



Linear Actuator / Servo Actuator

Medical / Automation / Electric Servo Press / Barrier-free Equipment Industry

- Servo Actuator--LAA Series
- Linear Actuator--LAM, LAS, LAN, LAC Series



Position Measurement System

PCB / Woodworking / Automation / Warehouse Automation Programmable Industry

- High Resolution--PM-A, PM-B, PM-C
- Signal Translator
- High Performance Counter



Semiconductor Subsystem

Semiconductor / LED / Panel EFEM (Equipment Front End Module)

- Wafer Robot
- Loadport
- Wafer Aligner



Multi-Axis Robot

Pick-and-Place / Assembly / Array and Packaging / Semiconductor / Electro-Optical Industry / Automotive Industry / Food Industry

- Articulated Robot
- SCARA Robot
- Electric Gripper
- Integrated Electric Gripper



Single-Axis Robot

Precision / Semiconductor / Medical / FPD

- KK, SK
- KS, KA
- KU, KE, KC



Torque Motor Rotary Table

Medical / Automotive Industry / Machine Tools / Machinery Industry

- RAB Series
- RAS Series
- RCV Series
- RCH Series



Ball Screw

Precision Ground / Rolled

- Super S Series
- Super T Series
- Mini Roller
- Ecological & Economical Lubrication Module E2
- Rotating Nut (R1)
- Energy-Saving & Thermal-Controlling (Cool Type)
- Heavy Load Series (RD)
- Ball Spline

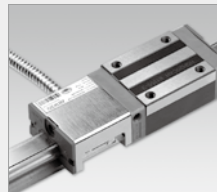
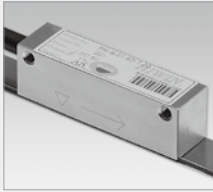
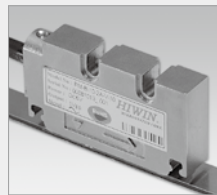
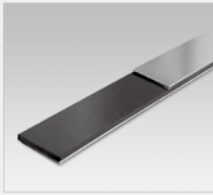


Linear Guideway

Automation / Semiconductor / Medical

- Ball Type--HG, EG, WE, MG, CG
- Quiet Type--QH, QE, QW, QR
- Other--RG, E2, PG, SE, RC

HIWIN® MIKROSYSTEM



I. High Accuracy Position Measurement System

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II. Signal Translator

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III.High Performance Counter

1. Micro LCD counter	26
2. LCD counter system.....	28
3. Single Axis Counter	30
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IV.Accessories

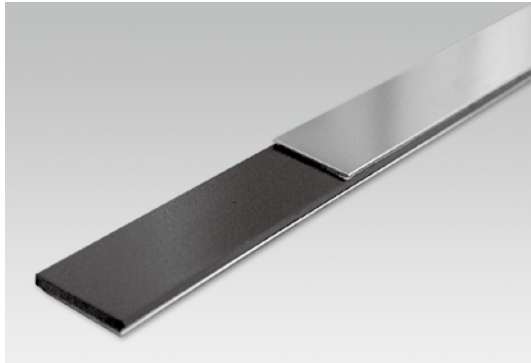
1. Signal Transfer Cable	37
2. Installation Fixture	37
3. End Clamp	37

V. Customer's Requirements(PM)

38

I. High Accuracy Position Measurement System

1. Position Scale



Features:

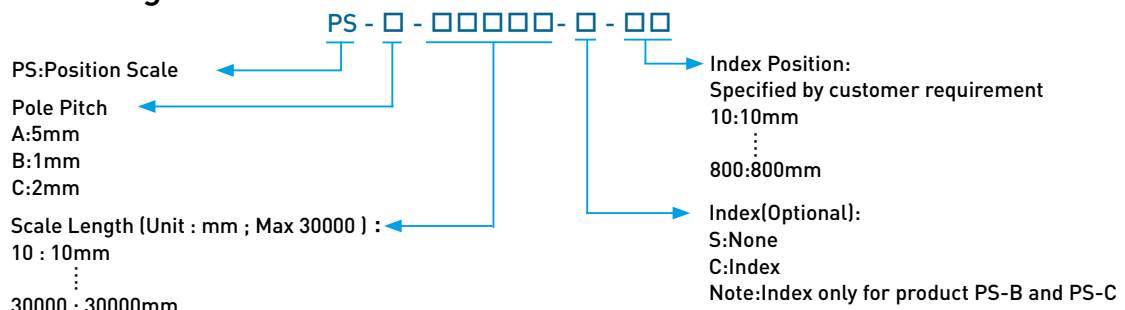
- Compatible with various measurement instruments to achieve different accuracy requirements.
- Magnetic scale can maintain performance under severe ambient conditions caused by oil, water or dust to gain required accuracy and signal feedback.



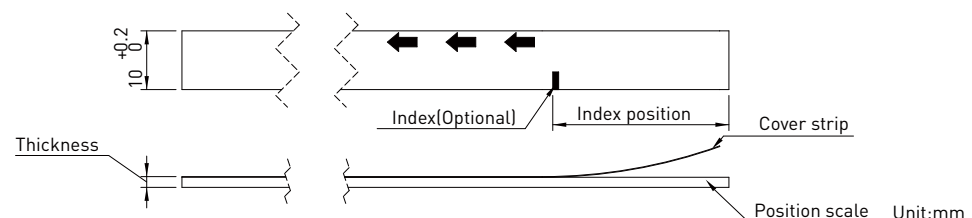
1.1 Specifications:

Product name	PS-A	PS-B	PS-C
Pole pitch	5mm	1mm	2mm
Accuracy@20°C	$\pm(80+15xL) \mu\text{m}$ (L : Length(Unit: m))	$\pm 20 \mu\text{m/m}$	
Width	10mm~10.2mm		
Thickness	1.9mm ($\pm 0.1\text{mm}$)	1.83mm ($\pm 0.1\text{mm}$)	
Maximum scale length	30m		
Coefficient of linear thermal expansion	$(11\pm 1)\times 10^{-6}/\text{K}$		
Working temperature	0°C~50°C		
Storage temperature	-5°C~70°C		
Protection class	IP67		

1.2 Ordering Code:



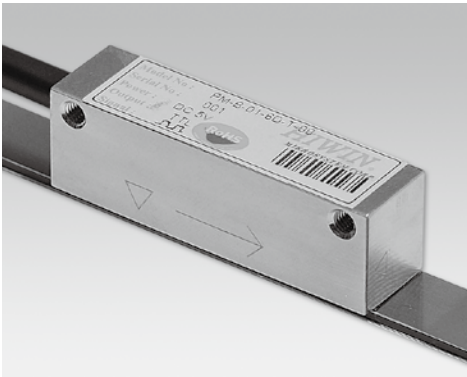
1.3 Dimensions:



Caution!

1. Magnetic scale consists of magnetic substance and should be kept away from strong magnetic field during installation to prevent a malfunction.
2. Please leave the magnetic field strength 5000 gauss at least 5cm, to prevent the position measurement system from disruption.

2. Position Measurement- Tiny Type



Features:

- Tiny shape, suitable for small equipment or space-saving application
- Simple design and easy installation, could avoid the resonance vibration caused by high speed movement
- Extra assembly, for installing rapidly and accurately in every directions
- Available for digital and analogue output
- Fulfill dustproof and waterproof by one-piece housing



2.1 Specifications:

Product name	PM-B		PM-C
Pole pitch	1mm		2mm
Available gap	0.2±0.1mm		0.5±0.3mm
Signal format	Analogue	Digital	Digital
Output signal	SIN/COS 1Vp-p	5V TTL/RS422	5V TTL/RS422
Resolution	1mm	1µm	1µm
Repeatability	±3µm	±2µm	±1µm
Reference signal	1 pulse/pole pitch or Specified reference		
Maximum travel speed	10m/sec	5m/sec	7m/sec
Input voltage	5VDC±5%		
Input current	35mA		
Operating temperature	0°C~50°C		
Storage temperature	-5°C~70°C		
Protection class	IP67		
Vibration (50~2000Hz)	145m/s ² (EN 60068-2-6)		
Shock (6ms)	1000m/s ² (EN 60068-2-27)		

2.2 Ordering Code:

PM - □ - □□ - □□ - T - □□

PM: Position Measurement

Pole Pitch
B: 1mm
C: 2mm

Cable Length: (Unit: m; Max 10m)
P5: 0.5M
01: 1M
02: 2M
⋮
10: 10M

10: Standard
11: With metal tube

Housing:
T: Tiny type

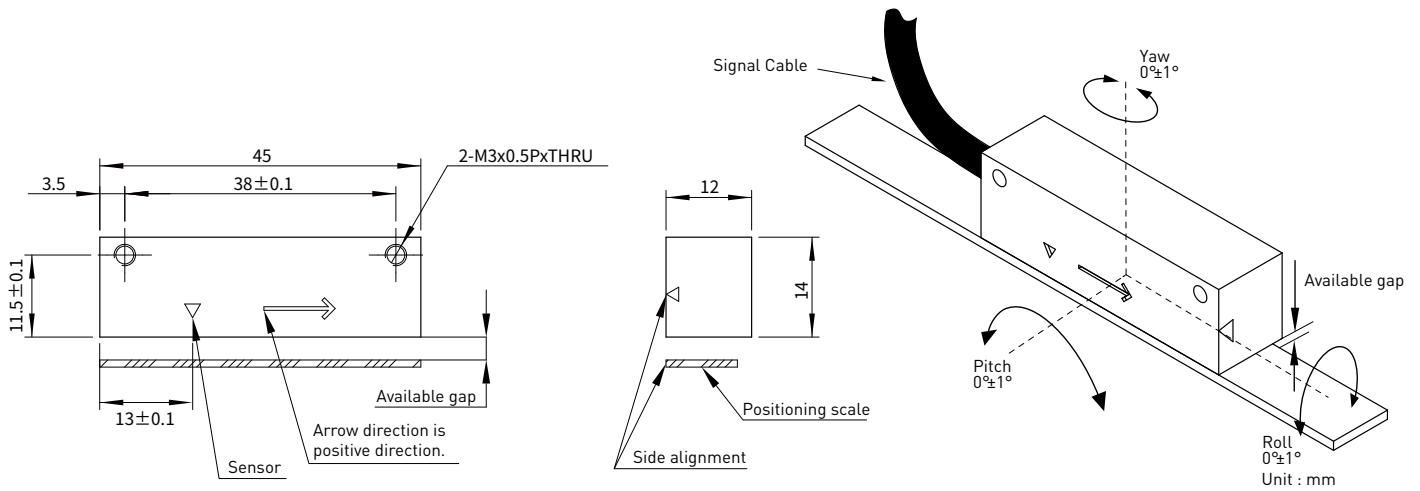
Signal Format:

	PM-B	PM-C
A	Analogue: SIN/COS 1Vpp	
D	Digital: 5V RS422/TTL	Digital: 5V RS422/TTL
I	Analogue: SIN/COS 1Vpp Digital: index /TTL	
E	Digital: 5V RS422/TTL Digital: index /TTL	Digital: 5V RS422/TTL Digital: index /TTL

Connector:
0: Flying lead
1: SCSI 20 Pin
2: SCSI 14 Pin
3: D-Sub 15 Pin
4: 17 Pin Circular Plug (M17)

5: SCSI 14 Pin (screw type)
6: D-sub VGA 15 Pin
7: D-Sub 9 Pin
8: SCR 10 Pin

2.3 Dimensions:

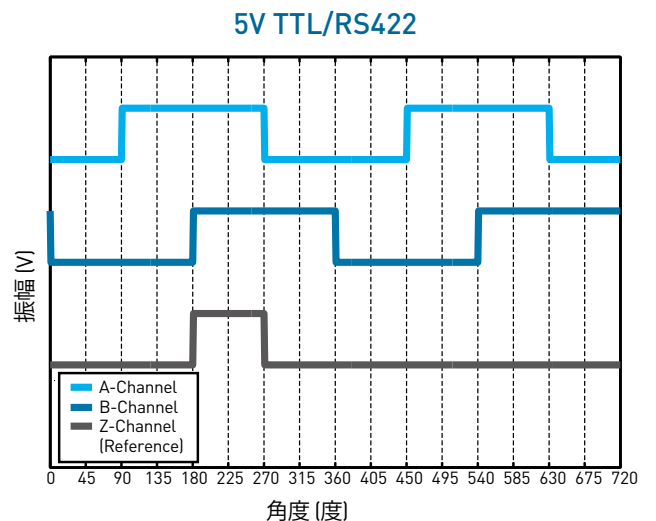
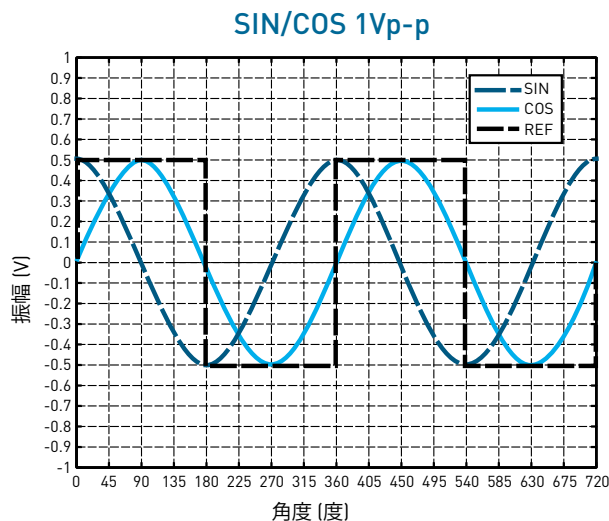


2.4 Pin Assignment:

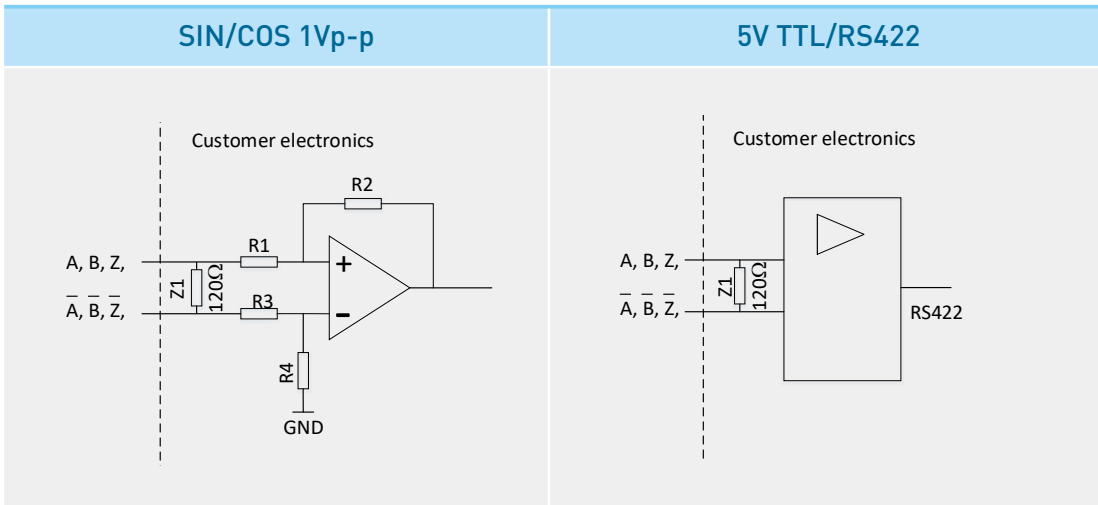
Function	Signal		Color	Connector (male) (SCSI 14 Pin)		Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) ⁽¹⁾ (17 Pin Circular Plug)		Connector (male) (D-Sub VGA 15 Pin)		Connector (male) (D-sub 9Pin)	Connector (male) (SCR 10 Pin)	Flying Lead
	Analogue	Digital		Analogue	Analogue	Digital	Analogue	Digital		Analogue	Digital	Digital	Digital			
Power	5VDC		Brown	1	3	3	4	7	4/5	1	1	2	1		Brown	
	GND		White	8	2	2	12	2	12/13	2	2	1	2		White	
Output Signal	SIN+	A+	Green	10	16	4	9	14	9	11	3	3	5		Green	
	SIN-	A-	Yellow	11	17	5	1	6	1	12	9	8	6		Yellow	
	COS+	B+	Blue	3	18	6	10	13	10	13	4	4	7		Blue	
	COS-	B-	Red	4	19	7	2	5	2	14	10	7	8		Red	
Reference Signal	REF+	Z+	Purple	5	8	8	3	12	3	7	7	5	9		Purple	
	REF-	Z-	Gray	6	9	9	11	4	11	8	8	9	10		Gray	
Shield				Case	Case	Case	Case	Case	Case	Case	Case	Case	Case			

Note: (1)17 Pin Circular Plug; Brnad: INTERCONTEC; P/N:AKU874MR1087004A000

2.5 Signal Format:



2.6 Recommend circuit for receiving signal



3. Position Measurement- Standard Type



Features:

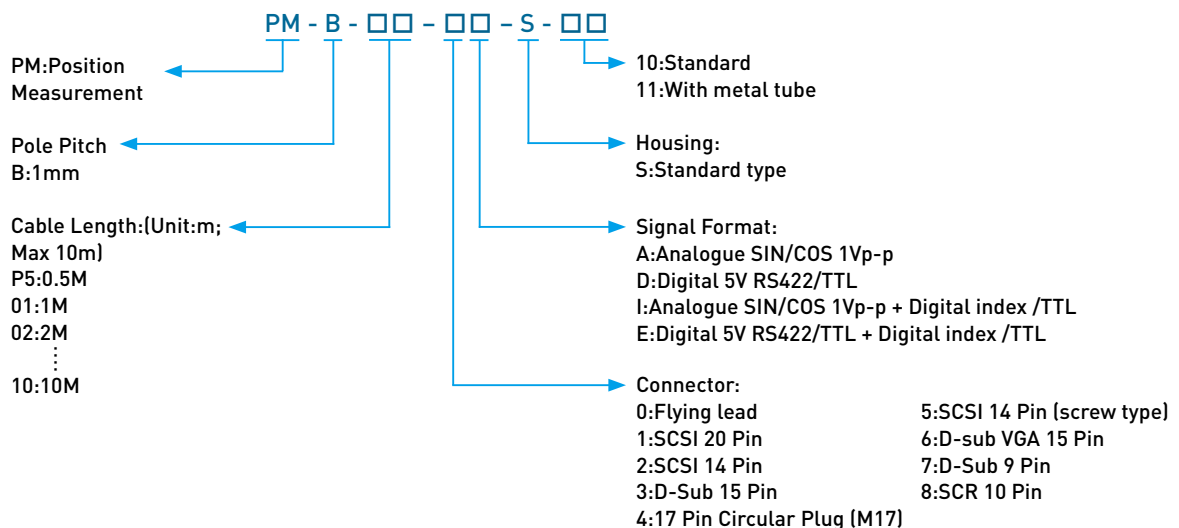
- Easy installation and replacement.
- Extra assembly, for installing rapidly and accurately in every directions
- Available for digital and analogue output
- Fulfill dustproof and waterproof by one-piece housing
- Optional metal protection tube, suitable for severe ambient conditions



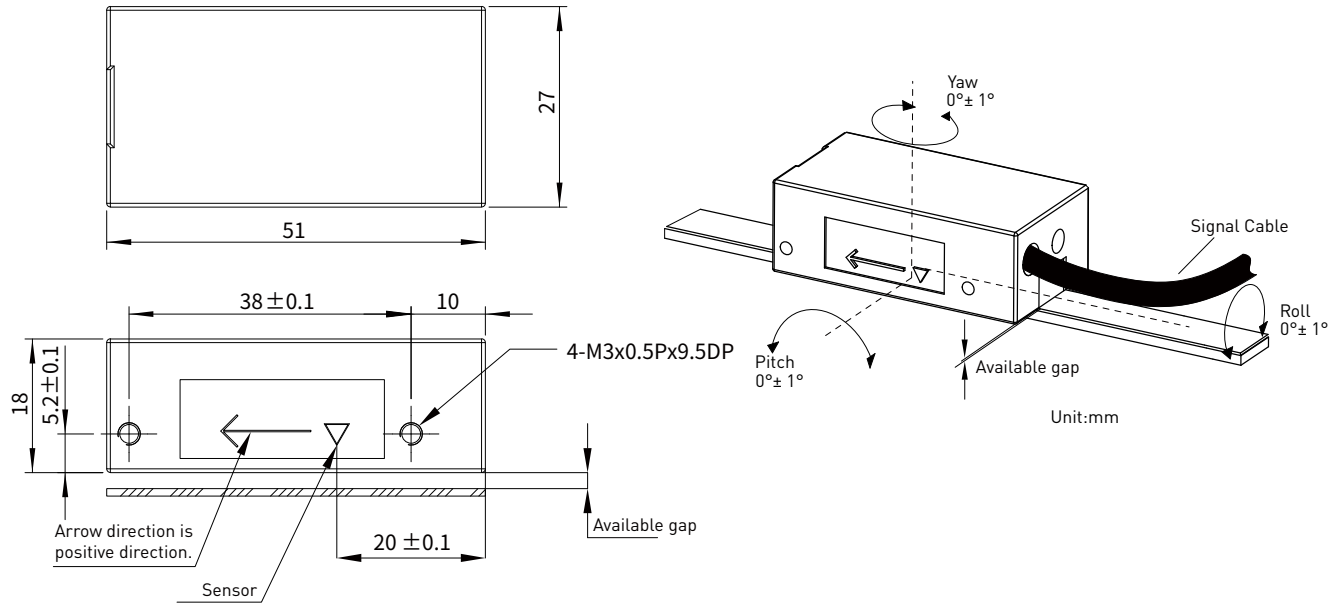
3.1 Specifications:

Product name	PM-B	
Pole pitch	1mm	
Available gap	0.2mm±0.1mm	
Signal format	Analogue	Digital
Output signal	SIN/COS 1Vp-p	5V TTL/RS422
Resolution	1mm	1µm
Repeatability	±3µm	±2µm
Reference signal	1 pulse/pole pitch or Specified reference	
Maximum travel speed	10m/sec	5m/sec
Input voltage	5VDC±5%	
Input current	35mA	
Operating temperature	0°C~50°C	
Storage temperature	-5°C~70°C	
Protection class	IP67	
Vibration (50~2000Hz)	145m/s ² (EN 60068-2-6)	
Shock (6ms)	1000m/s ² (EN 60068-2-27)	

3.2 Ordering Code:



3.3 Dimensions:

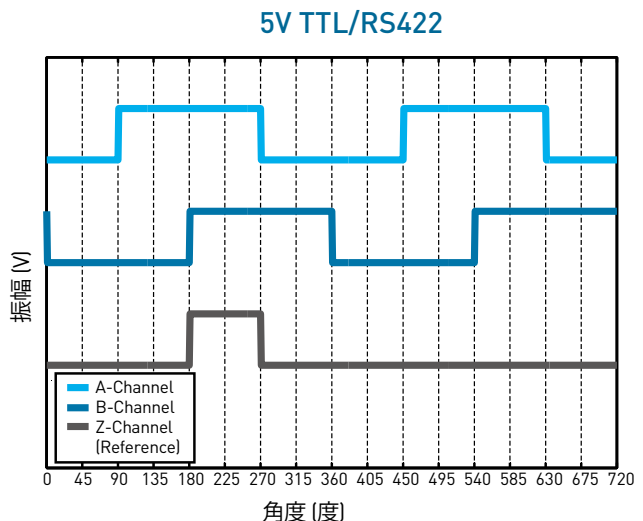
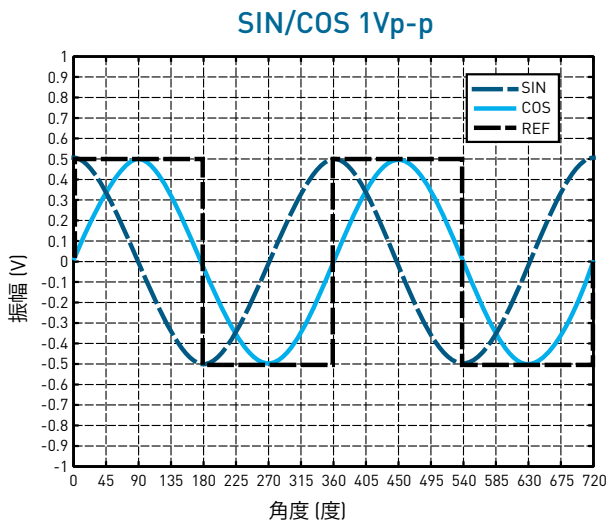


3.4 Pin Assignment:

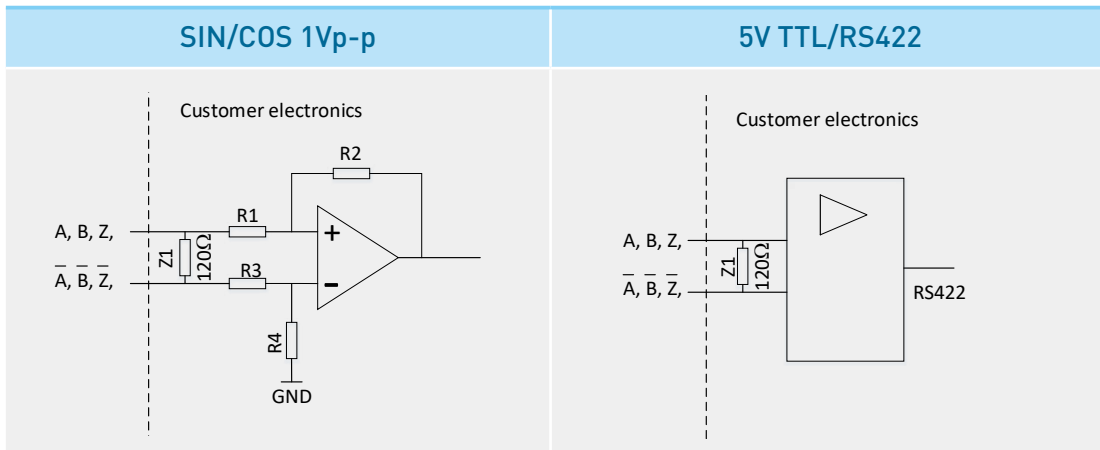
Function	Signal		Color	Connector (male) (SCSI 14 Pin)			Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) ⁽¹⁾ (17 Pin Circular Plug)		Connector (male) (D-Sub VGA 15 Pin)		Connector (male) (D-sub 9Pin)		Connector (male) (SCR 10 Pin)		Flying Lead
	Analogue	Digital		Analogue	Analogue	Digital	Analogue	Digital		Analogue	Digital	Digital	Digital	Digital	Digital				
Power	5VDC		Brown	1	3	3	4	7	4/5	1	1	2	1	1	2	1	Brown		
	GND		White	8	2	2	12	2	12/13	2	2	1	2	1	2	2	White		
Output Signal	SIN+	A+	Green	10	16	4	9	14	9	11	3	3	5	3	3	5	Green		
	SIN-	A-	Yellow	11	17	5	1	6	1	12	9	8	6	9	8	6	Yellow		
	COS+	B+	Blue	3	18	6	10	13	10	13	4	4	7	4	4	7	Blue		
	COS-	B-	Red	4	19	7	2	5	2	14	10	7	8	10	7	8	Red		
Reference Signal	REF+	Z+	Purple	5	8	8	3	12	3	7	7	5	9	7	5	9	Purple		
	REF-	Z-	Gray	6	9	9	11	4	11	8	8	9	10	8	8	10	Gray		
Shield				Case	Case		Case		Case	Case	Case	Case	Case	Case	Case	Case			

Note: (1)17 Pin Circular Plug; Brnad: INTERCONTEC; P/N:AKU874MR1087004A000

3.5 Signal Format:



3.6 Recommend circuit for receiving signal:



4. Position Measurement- PG Type



Features:

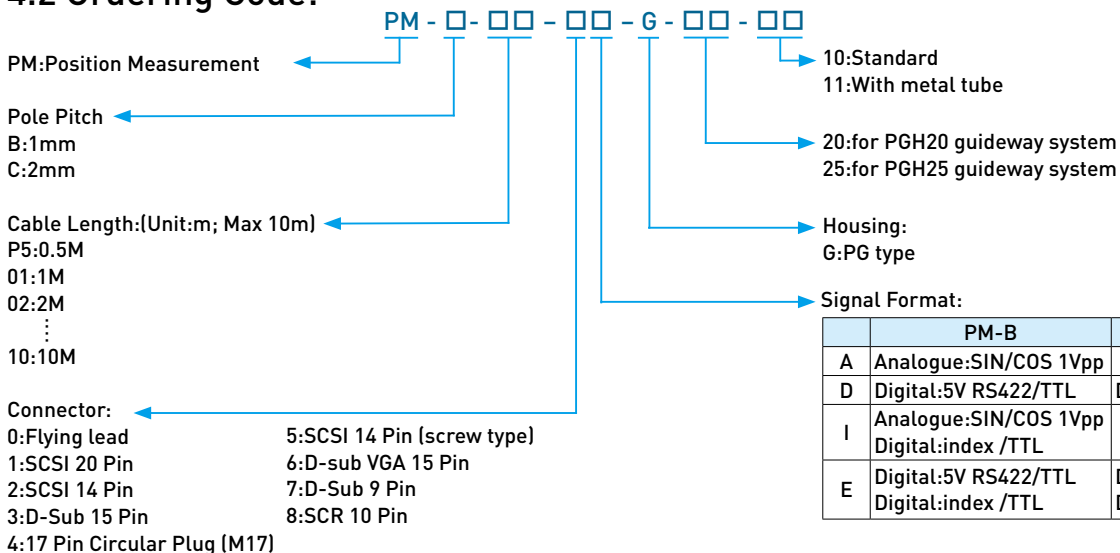
- Easy installation and replacement.
- Extra assembly, for installing rapidly and accurately in every directions
- Available for digital and analogue output
- Fulfill dustproof and waterproof by one-piece housing
- Optional metal protection tube, suitable for severe ambient conditions



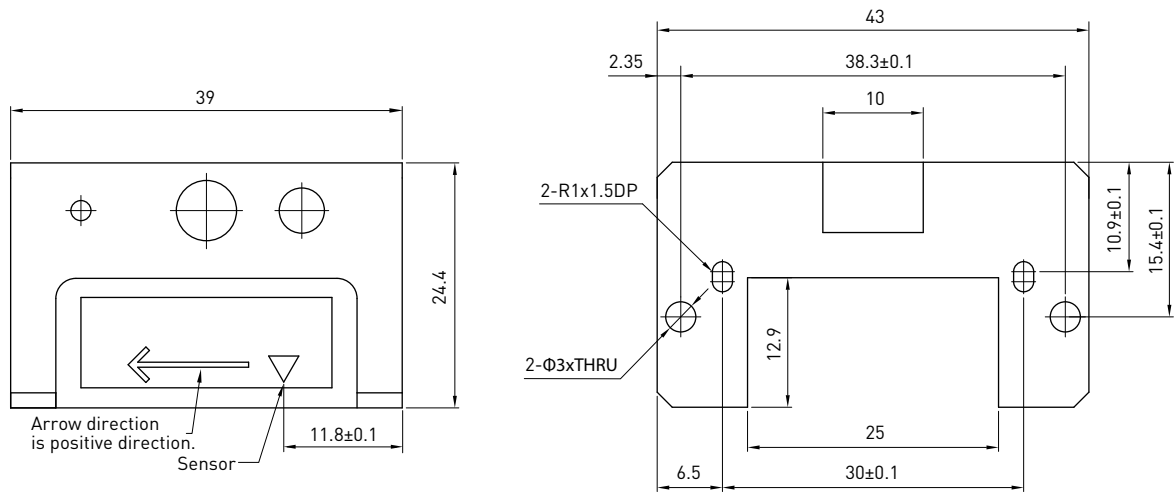
4.1 Specifications:

Product name	PM-B		PM-C
Pole pitch	1mm		2mm
Available gap	0.2±0.1mm		0.5±0.3mm
Signal format	Analogue	Digital	Digital
Output signal	SIN/COS 1Vp-p	5V TTL/RS422	5V TTL/RS422
Resolution	1mm	1µm	1µm
Repeatability	±3µm	±2µm	±1µm
Reference signal	1pulse/pole pitch or Specified reference		
Maximum travel speed	10m/sec	5m/sec	7m/sec
Input voltage	5VDC±5%		
Input current	35mA		
Operating temperature	0°C~50°C		
Storage temperature	-5°C~70°C		
Protection class	IP67		
Vibration (50~2000Hz)	145m/s ² (EN 60068-2-6)		
Shock (6ms)	1000m/s ² (EN 60068-2-27)		

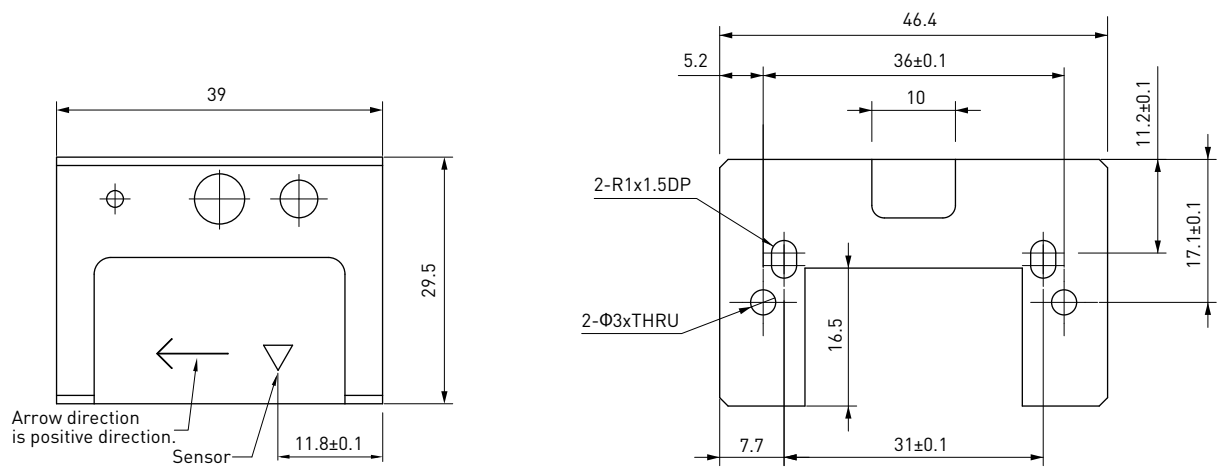
4.2 Ordering Code:



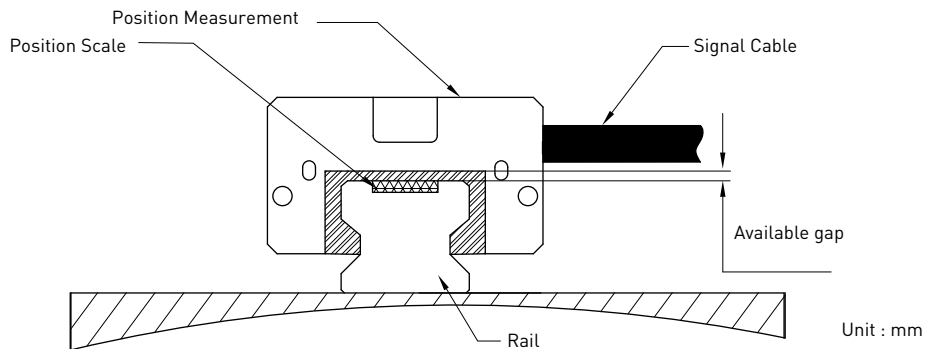
4.3 Dimensions:



※Note: These dimensions are suitable for HIWIN PGH20 linear guideway.



※Note: These dimensions are suitable for HIWIN PGH25 linear guideway.



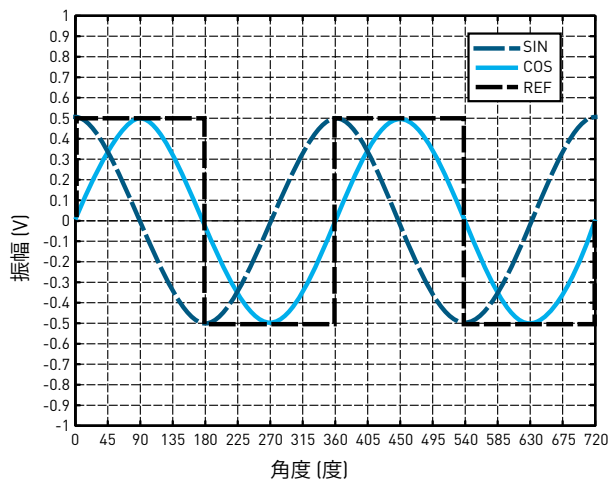
4.4 Pin Assignment:

Function	Signal		Color	Connector (male) (SCSI 14 Pin)	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) ⁽¹⁾ (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Connector (male) (D-sub 9Pin)	Connector (male) (SCR 10 Pin)	Flying Lead
	Analogue	Digital		Analogue	Analogue	Digital	Analogue	Digital		Analogue	Digital	Digital	Digital	
Power	5VDC		Brown	1	3	3	4	7	4/5	1	1	2	1	Brown
	GND		White	8	2	2	12	2	12/13	2	2	1	2	White
Output Signal	SIN+	A+	Green	10	16	4	9	14	9	11	3	3	5	Green
	SIN-	A-	Yellow	11	17	5	1	6	1	12	9	8	6	Yellow
	COS+	B+	Blue	3	18	6	10	13	10	13	4	4	7	Blue
	COS-	B-	Red	4	19	7	2	5	2	14	10	7	8	Red
Reference Signal	REF+	Z+	Purple	5	8	8	3	12	3	7	7	5	9	Purple
	REF-	Z-	Gray	6	9	9	11	4	11	8	8	9	10	Gray
Shield				Case	Case		Case		Case	Case		Case	Case	

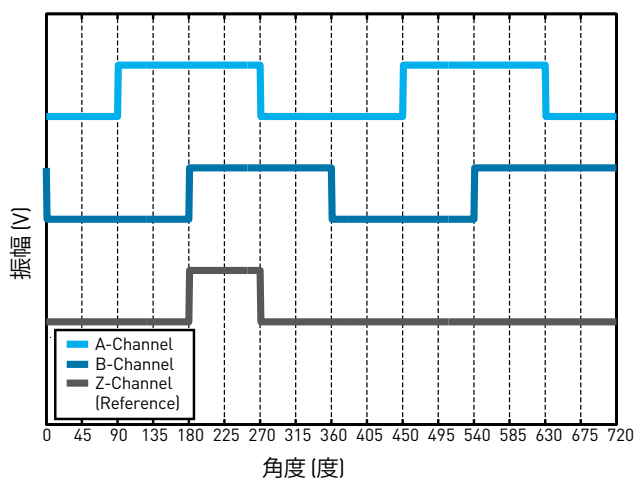
Note: (1)17 Pin Circular Plug; Brnad: INTERCONTEC; P/N:AKU874MR1087004A000

4.5 Signal Format:

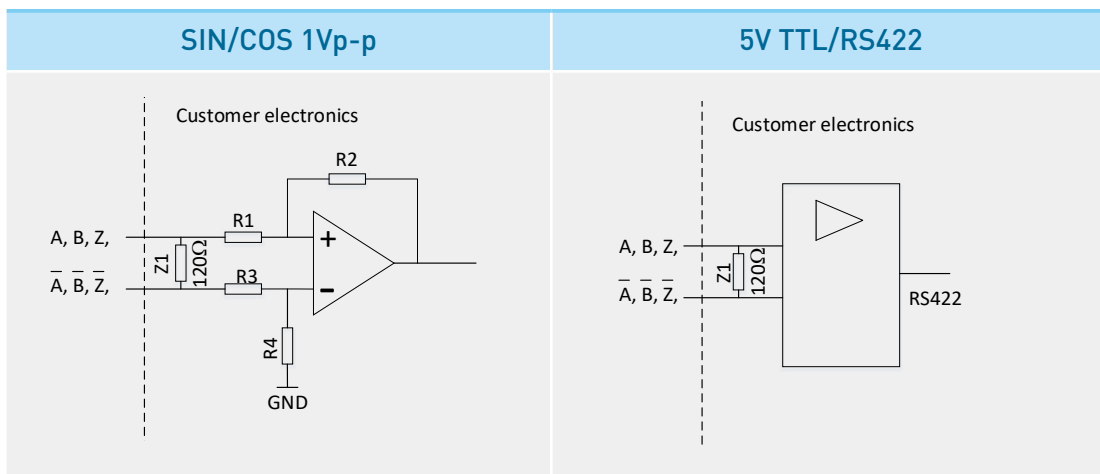
SIN/COS 1Vp-p



5V TTL/RS422



4.6 Recommend circuit for receiving signal:



5. Position Measurement- PG Type



Features:

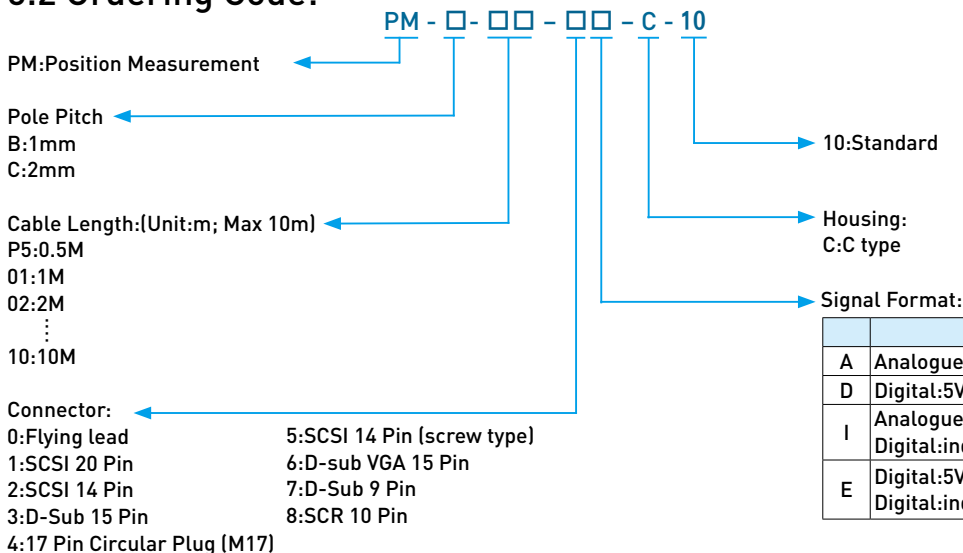
- Tiny shape, suitable for extra assembly or integrate with HIWIN linear guideway.
- Simple design and easy installation, could avoid the resonance vibration caused by high speed movement.
- Available for digital and analogue output .
- Fulfill dustproof and waterproof by one-piece housing.



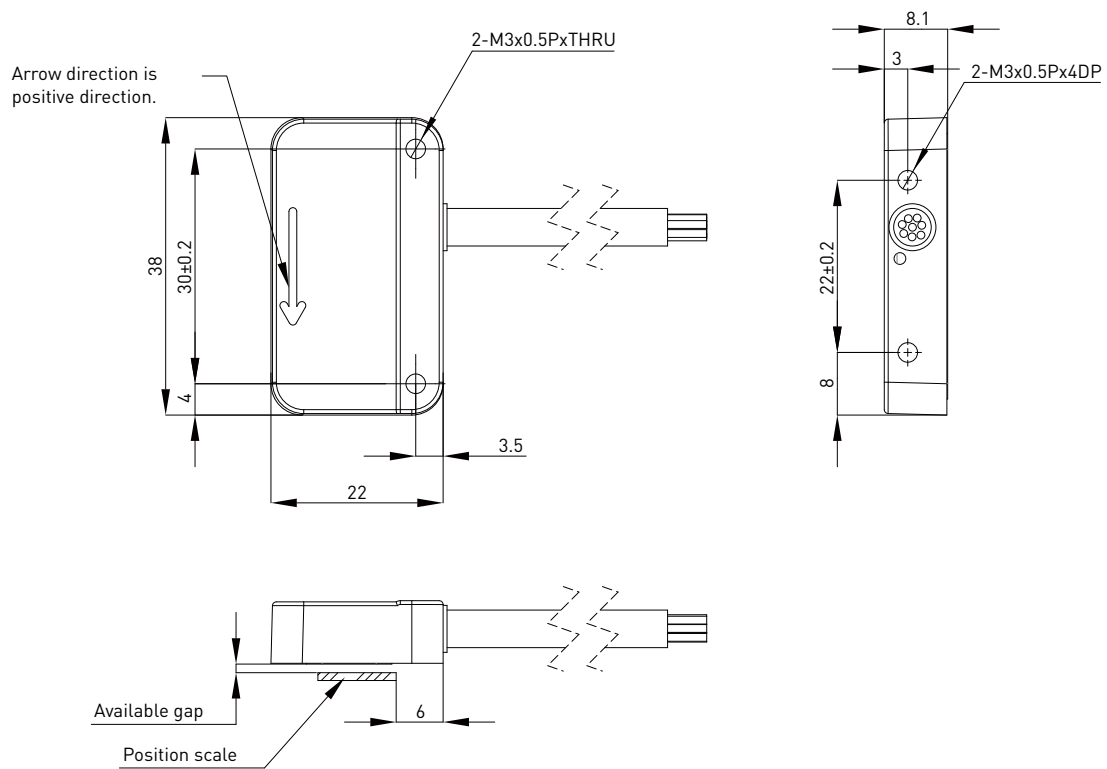
5.1 Specifications:

Product name	PM-B		PM-C
Pole pitch	1mm		2mm
Available gap	0.2±0.1mm		0.5±0.3mm
Signal format	Analogue	Digital	Digital
Output signal	SIN/COS 1Vp-p	5V TTL/RS422	5V TTL/RS422
Resolution	1mm	1µm	1µm
Repeatability	±3µm	±2µm	±1µm
Reference signal	1pulse/pole pitch or Specified reference		
Maximum travel speed	10m/sec	5m/sec	7m/sec
Input voltage	5VDC±5%		
Input current	35mA		
Operating temperature	0°C~50°C		
Storage temperature	-5°C~70°C		
Protection class	IP67		
Vibration (50~2000Hz)	145m/s ² (EN 60068-2-6)		
Shock (6ms)	1000m/s ² (EN 60068-2-27)		

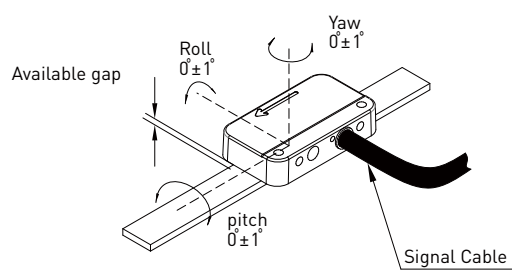
5.2 Ordering Code:



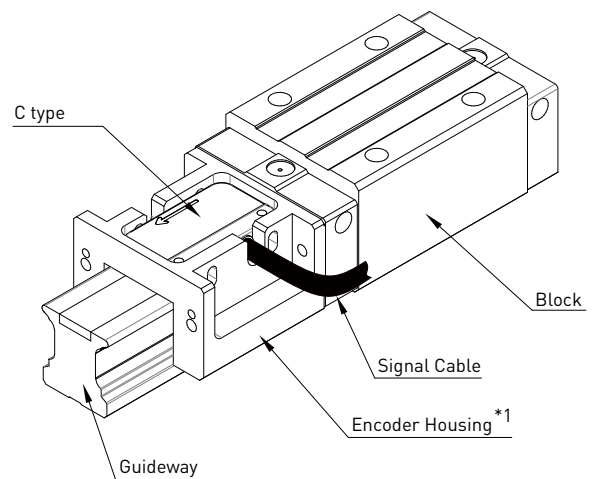
5.3 Dimensions:



Example
1.Extra assembly



2.Integrate with HIWIN linear guideway



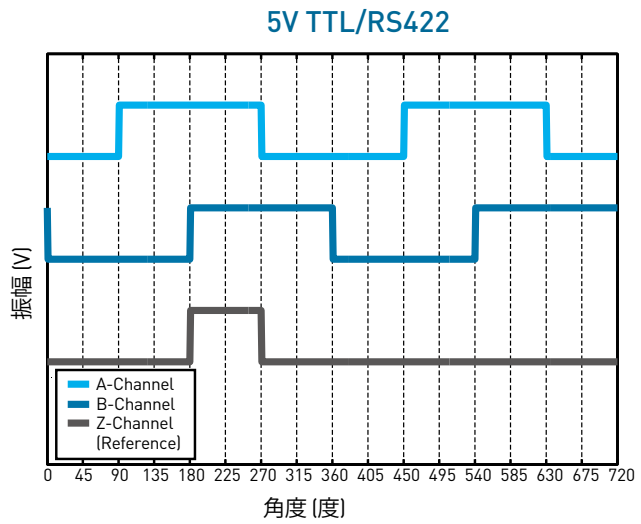
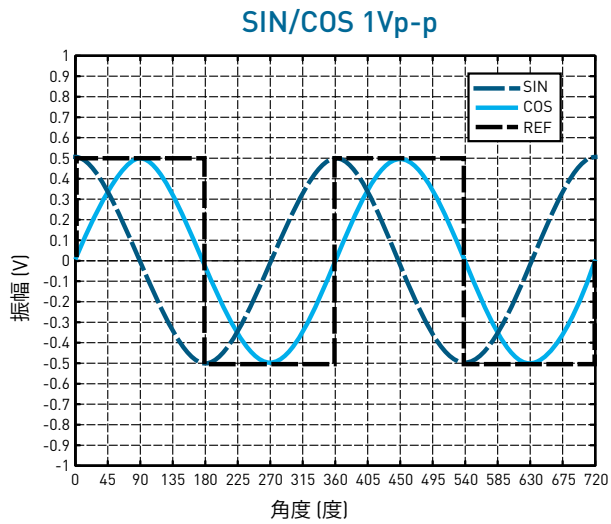
*1: HIWIN provide drawings for encoder housing.
For details, please contact HIWIN.

5.4 Pin Assignment:

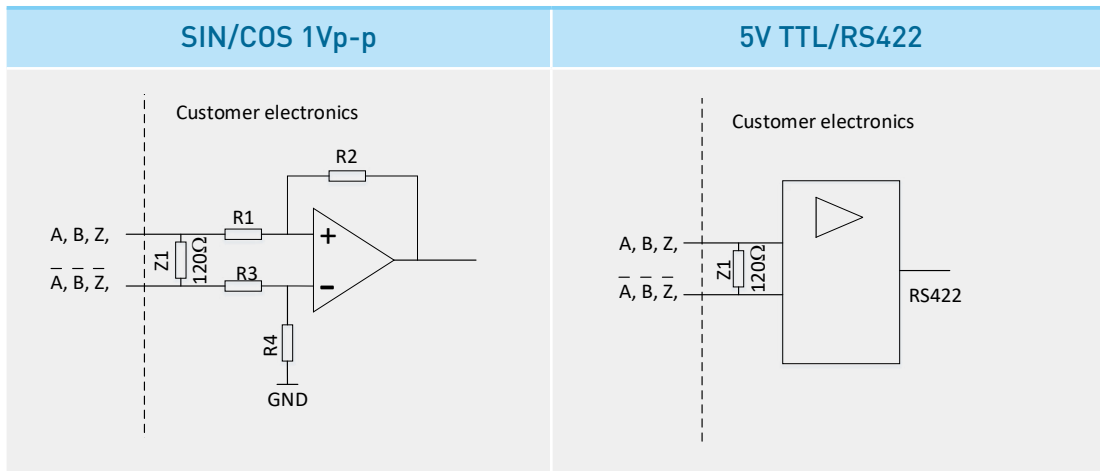
Function	Signal		Color	Connector (male) (SCSI 14 Pin)	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) ⁽¹⁾ (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Connector (male) (D-sub 9Pin)	Connector (male) (SCR 10 Pin)	Flying Lead
	Analogue	Digital		Analogue	Analogue	Digital	Analogue	Digital		Analogue	Digital	Digital	Digital	
Power	5VDC		Brown	1	3	3	4	7	4/5	1	1	2	1	Brown
	GND		White	8	2	2	12	2	12/13	2	2	1	2	White
Output Signal	SIN+	A+	Green	10	16	4	9	14	9	11	3	3	5	Green
	SIN-	A-	Yellow	11	17	5	1	6	1	12	9	8	6	Yellow
	COS+	B+	Blue	3	18	6	10	13	10	13	4	4	7	Blue
	COS-	B-	Red	4	19	7	2	5	2	14	10	7	8	Red
Reference Signal	REF+	Z+	Purple	5	8	8	3	12	3	7	7	5	9	Purple
	REF-	Z-	Gray	6	9	9	11	4	11	8	8	9	10	Gray
Shield				Case	Case		Case		Case	Case		Case	Case	

Note: (1)17 Pin Circular Plug; Brnad: INTERCONTEC; P/N:AKU874MR1087004A000

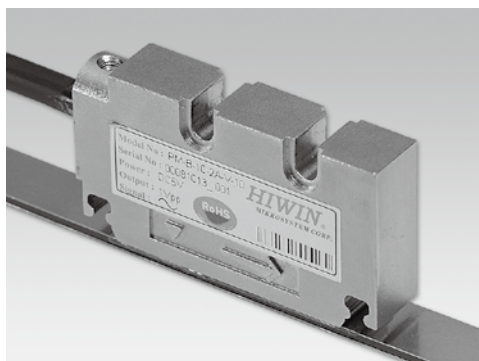
5.5 Signal Format:



5.6 Recommend circuit for receiving signal:



6. Position Measurement- Vertical Type



Features:

- Tiny shape, suitable for small equipment or space-saving application
- High quality mold forming housing
- Optional metal protection tube and scraper, suitable for severe ambient conditions



6.1 Specifications:

Product name	PM-A		PM-B
Pole pitch	5mm		1mm
Available gap	2±1mm		0.2±0.1mm
Signal format	Digital		Digital
Output signal	5V TTL/RS422	24V/PP	5V TTL/RS422
Resolution	5µm	5µm	1µm
Repeatability	±10µm	±10µm	±2µm
Reference signal	1 pulse / pole pitch		
Maximum travel speed	5m/sec	8m/sec	5m/sec
Input voltage	5VDC±5%	24VDC±10%	5VDC±5%
Input current	50mA		
Operating temperature	0°C~50°C		
Storage temperature	-5°C~70°C		
Protection class	IP67		
Vibration (50~2000Hz)	145m/s ² (EN 60068-2-6)		
Shock (6ms)	1000m/s ² (EN 60068-2-27)		

6.2 Ordering Code:

PM: Position Measurement

Pole Pitch
A:5mm
B:1mm

Cable Length:(Unit:m;Max 10m)
P5:0.5M
01:1M
02:2M
.....
10:10M

PM - □ - □□ - □□ - V - □□

	PM-A	PM-B
0	Standard	Standard
1	With metal tube	With metal tube
2	With scraper	
3	With metal tube and scraper	

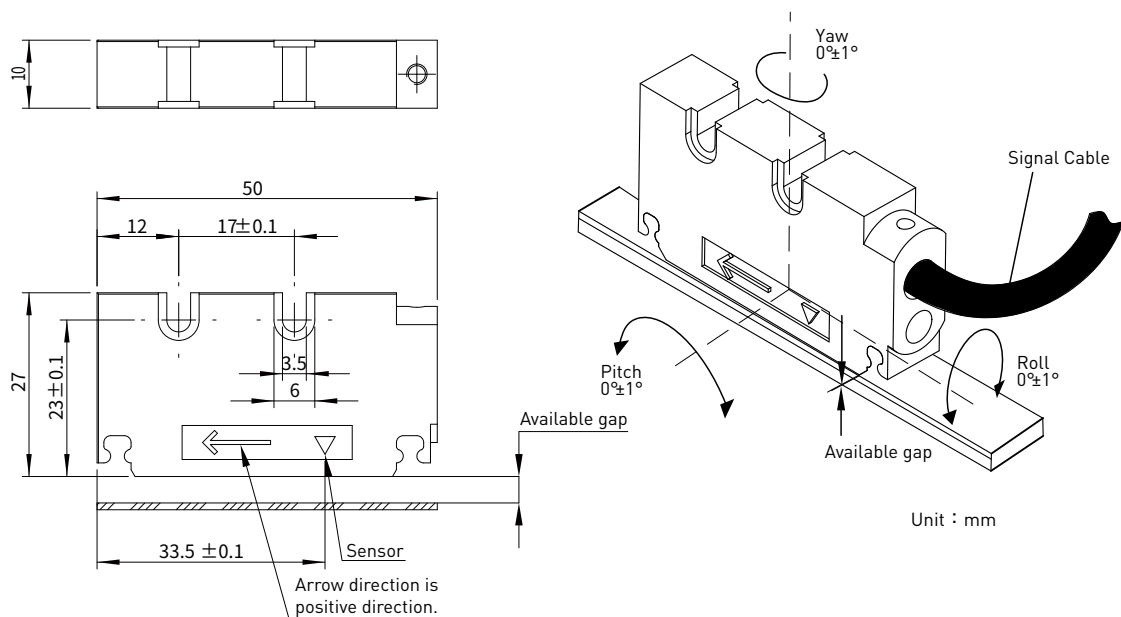
	PM-A	PM-B
1	Digital:5V RS422/TTL 5μm	Digital:5V RS422/TTL 1μm
3	Digital:24V/PP 5μm	Digital:24V/PP 1μm
4	Digital:5V RS422/TTL 10μm	
5	Digital:24V/PP 10μm	
7	Digital:24V/PP 25μm	
8	Digital:24V/PP 100μm	

Housing:
V:Vertical type

Signal Format:
D:Digital

Connector:
0:Flying lead
1:SCSI 20 Pin
2:SCSI 14 Pin
3:D-Sub 15 Pin
4:17 Pin Circular Plug (M17)
5:SCSI 14 Pin (screw type)
6:D-sub VGA 15 Pin
7:D-sub 9 Pin
8:SCR 10 Pin

6.3 Dimensions:



6.4 Pin Assignment:

5V TTL/RS422

Function	Signal	Color	Connector (male) (SCSI 20 Pin)	Connector (male) (D-Sub 15 Pin)	Connector (male) ⁽¹⁾ (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)	Connector (male) (D-sub 9Pin)	Connector (male) (SCR 10 Pin)	Flying Lead
	Digital		Digital	Digital	Digital	Digital	Digital	Digital	
Power	5VDC	Brown	3	7	4/5	1	2	1	Brown
	GND	White	2	2	12/13	2	1	2	White
Output Signal	A+	Green	4	14	9	3	3	5	Green
	A-	Yellow	5	6	1	9	8	6	Yellow
	B+	Blue	6	13	10	4	4	7	Blue
	B-	Red	7	5	2	10	7	8	Red
Reference Signal	Z+	Purple	8	12	3	7	5	9	Purple
	Z-	Gray	9	4	11	8	9	10	Gray
Shield			Case	Case	Case	Case	Case	Case	

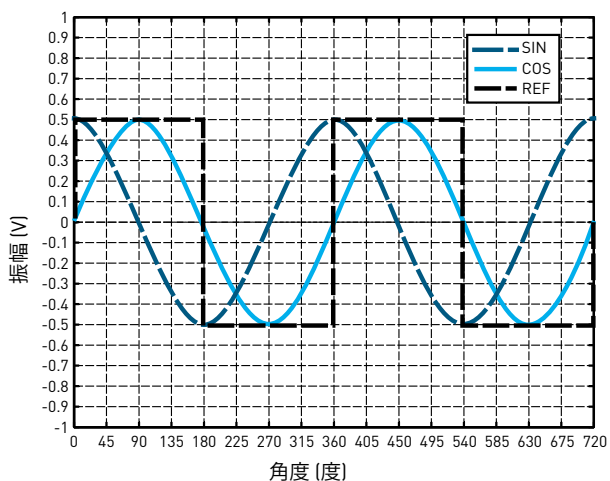
Note: (1)17 Pin Circular Plug; Brnad: INTERCONTEC; P/N:AKU874MR1087004A000

24V/PP

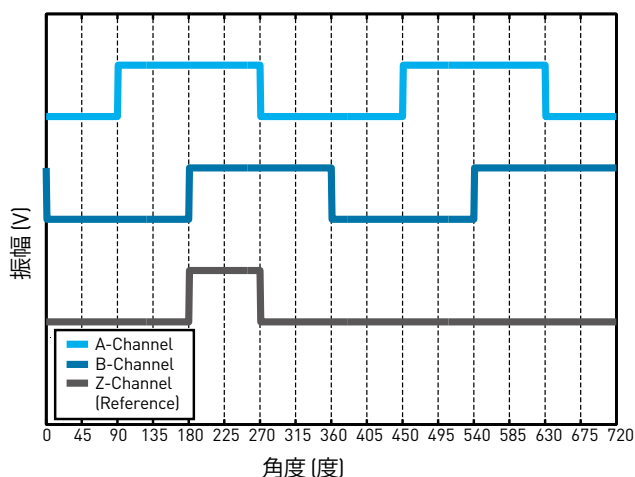
Function	Signal	Color	Connector (male) (D-Sub 9 Pin)	Flying Lead
	Digital		Digital	
Power	24V	Brown	2	Brown
	0V	White	1	White
Output Signal	A(PP)	Green	3	Green
	/A(PP)	Yellow	8	Yellow
	B(PP)	Blue	4	Blue
	/B(PP)	Red	7	Red
Reference Signal	Z+	Purple	5	Purple
	Z-	Gray	9	Gray
Shield			Case	

6.5 Signal Format:

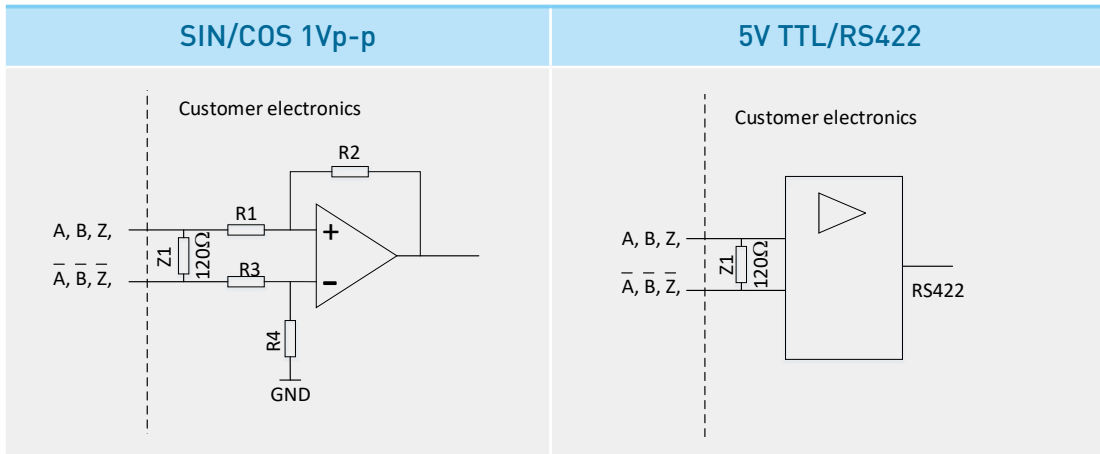
SIN/COS 1Vp-p



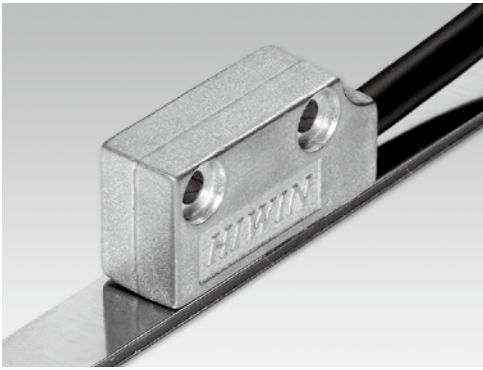
5V TTL/RS422



6.6 Recommend circuit for receiving signal:



7. Position Measurement- E Type



Features:

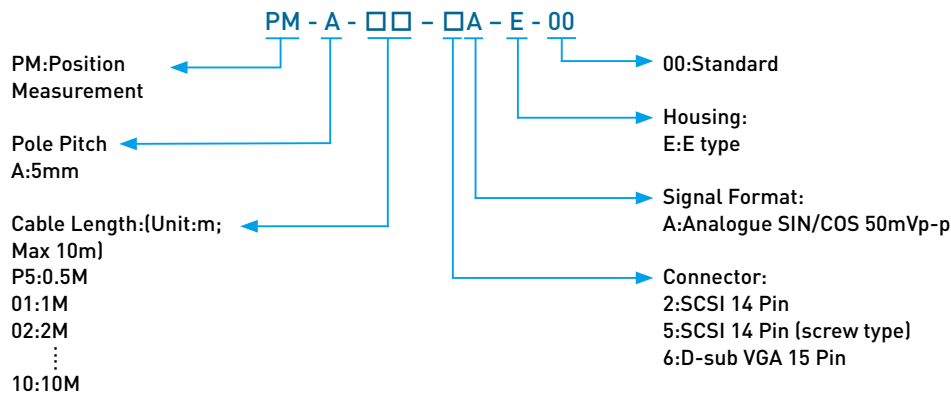
- Tiny shape, suitable for small equipment or space-saving application
- High quality mold forming housing.
- Fulfill dustproof and waterproof by onepiece housing, protection class up to IP67
- Resolution is up to 5um with ST-A signal translator



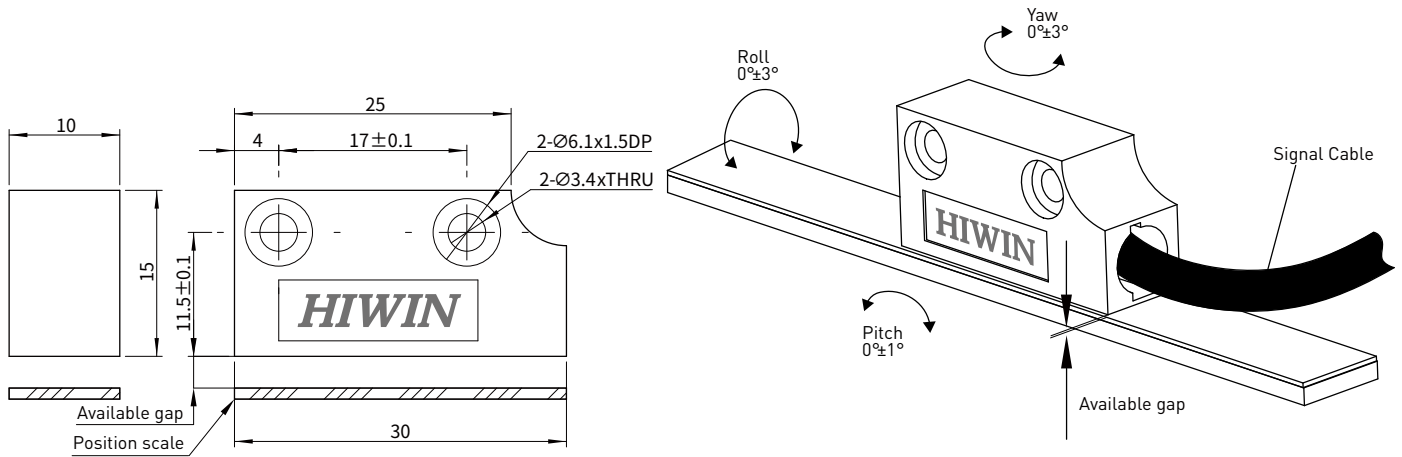
7.1 Specifications:

Product Name	PM-A
Pole pitch	5mm
Available gap	2±1mm
Signal format	Analogue
Output signal	SIN/COS 50mVp-p
Resolution	5mm
Repeatability	±10µm
Maximum travel speed	10m/sec
Input voltage	5VDC±5%
Input current	20mA
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67
Vibration (50~2000Hz)	145m/s ² (EN 60068-2-6)
Shock (6ms)	1000m/s ² (EN 60068-2-27)

7.2 Ordering Code:



7.3 Dimensions:



7.4 Pin Assignment:

Function	Signal	Color	Connector (male) (SCSI 14 Pin)	Connector (male) (D-Sub VGA 15 Pin)
	Analogue		Analogue	Analogue
Power	5V	Brown	1	1
	0V	White	8	2
Output Signal	SIN+	Green	10	11
	SIN-	Yellow	11	12
	COS+	Blue	3	13
	COS-	Red	4	14
Shield			Case	Case

8. Position Measurement- H Type



Features:

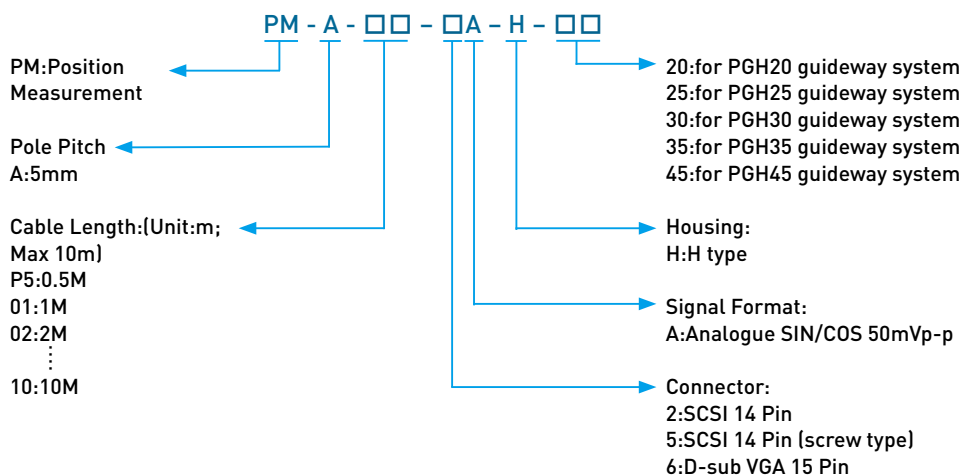
- Design with Hiwin linear guideway, cost-effective and high reliability
- Easy installation, improve work efficiency and reach accurate position feedback
- Fulfill dustproof and waterproof by one-piece housing



8.1 Specifications:

Product Name	PM-A
Pole pitch	5mm
Available gap	2±1mm
Signal format	Analogue
Output signal	SIN/COS 50mVp-p
Resolution	5mm
Repeatability	±10µm
Maximum travel speed	10m/sec
Input voltage	5VDC±5%
Input current	20mA
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67
Vibration (50~2000Hz)	145m/s ² (EN 60068-2-6)
Shock (6ms)	1000m/s ² (EN 60068-2-27)

8.2 Ordering Code:



8.3 Dimensions:

This type is used with HIWIN's guideway, please refer HIWIN Technology's catalogue for further details.

8.4 Pin Assignment:

Function	Signal	Color	Connector (male) (SCSI 14 Pin)	Connector (male) (D-Sub VGA 15 Pin)
	Analogue		Analogue	Analogue
Power	5V	Brown	1	1
	0V	White	8	2
Output Signal	SIN+	Green	10	11
	SIN-	Yellow	11	12
	COS+	Blue	3	13
	COS-	Red	4	14
Shield			Case	Case

II. Signal Translator



ST-A

Features:

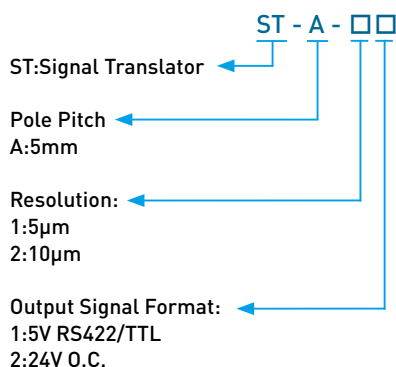
- Reach accurate position feedback by precisely converting analog signal into digital signal output
- Output signal 5V RS422/TTL or open collector
- Compact design, easy installation to various machines to measure and feedback the position



1. Specifications:

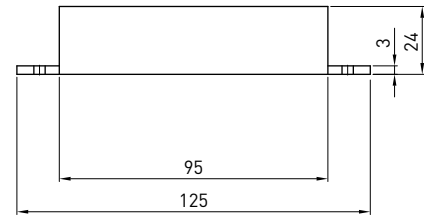
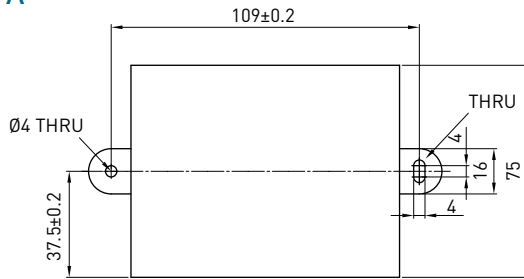
Type	ST-A			
Pole pitch	5mm			
Input signal	SIN/COS 50mVp-p			
Output signal	5V RS422/TTL		24V O.C.	
Resolution	5μm	10μm	5μm	10μm
Repeatability	±10μm	±20μm	±10μm	±20μm
Maximum output frequency	64KHz	32KHz	64KHz	32KHz
Maximum travel speed	1.5m/sec			
Input voltage	5VDC±5%			
Input current	500mA			
Operating temperature	0°C~50°C			
Storage temperature	-5°C~70°C			
Protection class	IP43			

2. Ordering Code:



3. Dimensions:

•ST-A



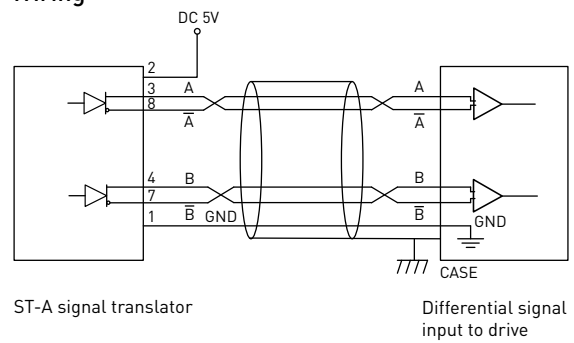
4. Pin Assignment:

•ST-A-□1(5V RS422/TTL)

D-sub 9 pin definition for signal output connector

Function	Signal	Connector(male) (D-sub 9 pin)	I/O
Power	GND	1	I
	DC5V	2	
	SGND	6	
Output Signal	A+	3	O
	A-	8	
	B+	4	
	B-	7	

Wiring



ST-A signal translator

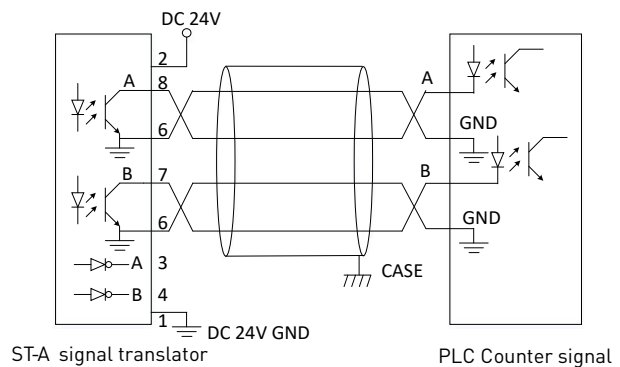
Differential signal input to drive

•ST-A-□2(24V O.C.)

D-sub 9 pin definition for signal output connector

Function	Signal	Connector(male) (D-sub 9 pin)	I/O
Power	GND	1	I
	DC24V	2	
	SGND	6	
Output Signal	A(open collector)	8	O
	B(open collector)	7	
	A(TTL level)	3	
	B(TTL level)	4	

Wiring



ST-A signal translator

PLC Counter signal

III. High Performance Counter

1. Micro LCD Counter



Features:

- Compact design, easy installation and cost-effective
- LED display, using with standard AA battery, long life time
- One-piece design together with position measurement, suitable for cutting and wood-processing machines
- With parameter save function, without complicated setting



1.1 Specifications:

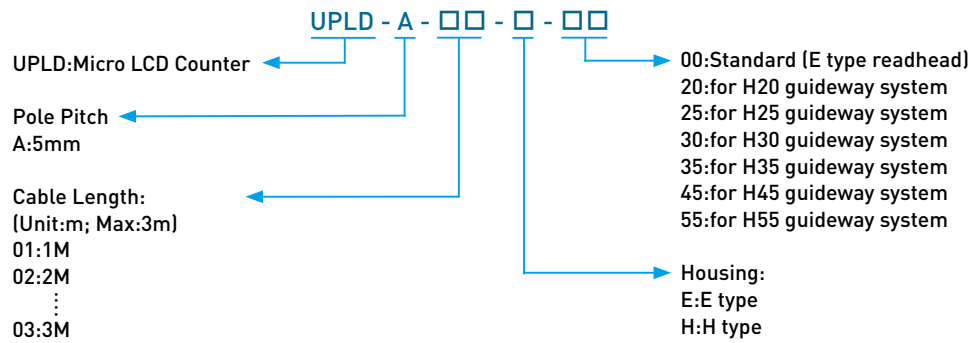
Display		8 digits LCD display with +/- sign
Accuracy@20°C		±(80+15xL) μm (L:Length (unit:m))
Resolution		5μm
Repeatability ⁽¹⁾		±10μm
Operating speed		3m/sec (maximum 2G acceleration)
Input voltage		commercial AA batteries × 2
Battery life ⁽²⁾		1 year by setting speed at 1.5m/s
Operating temperature		0°C~50°C
Storage temperature		-5°C~55°C
Protection class	Scale/Readhead	IP67
	Counter	IP43
Function	General	Set reading direction
		Unit conversion (mm/inch/°)
		Absolute/Incremental position(INC/ABS) selection
		Set display digits
		Set reference points
		5 sets of maximum velocity settings (default:1.5m/s)
	Programmable	Angular measurement radius setting (minimum:50mm)
		5 sets of programmable compensation reference points
		set programmable coefficient ratio
	Display	Indicate installed condition
		Power monitor and display
	Other	Keypad lock
		Parameter save function
5 sets of independent incremental counters for relative measurement.		

Note: (1) The data were measured while gap is 1mm.

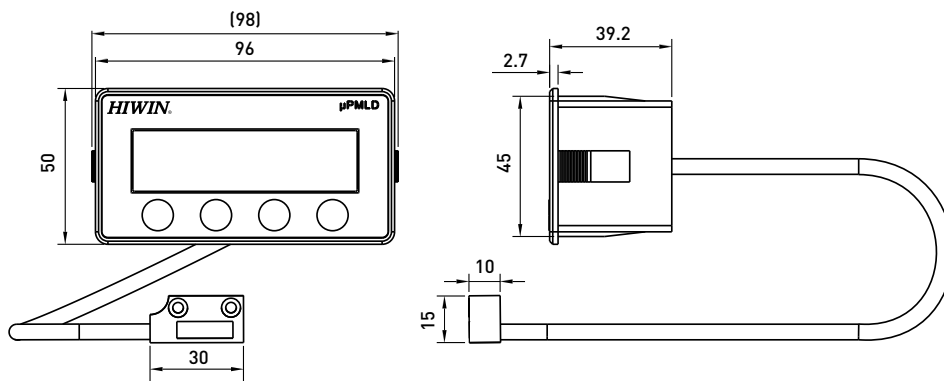
(2) Battery capacity is 2200mAh(ambient temperature: 20+/-5°C).

Capacity performance will vary under different environmental temperatures.

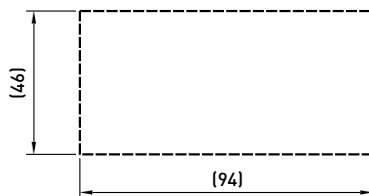
1.2 Ordering Code:



1.3 Dimensions:



Reference design dimensions for frame panel cut-out



Unit: mm

2. LCD Counter System



Features:

- Compact design, easy installation and cost-effective
- LED display, using with standard AA battery, long life time
- One-piece design together with position measurement, suitable for cutting and wood-processing machines
- With parameter save function, without complicated setting



2.1 Specifications:

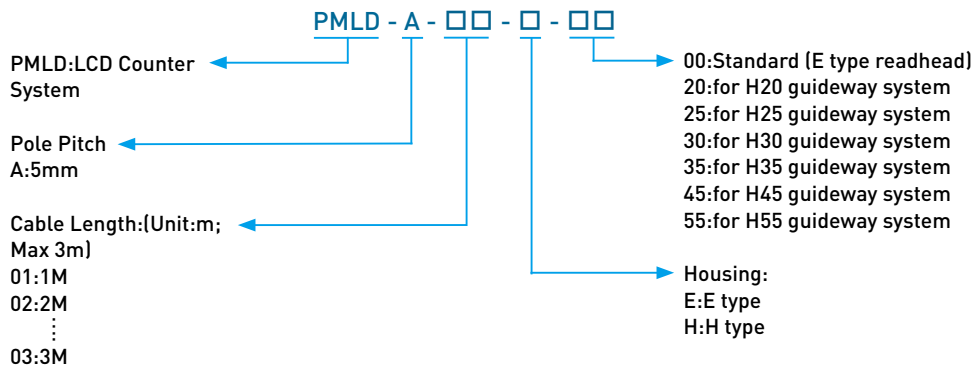
Display		8 digits LCD display with +/- sign
Accuracy@20°C		±(80+15xL) μm (L:Length (unit: m))
Resolution		5μm
Repeatability ⁽¹⁾		±10μm
Operating speed		3m/sec (maximum 2G acceleration)
Input voltage		commercial AA batteries × 2
Battery life ⁽²⁾		1 year by setting speed at 1.5m/s
Operating temperature		0°C~50°C
Storage temperature		-5°C~70°C
Protection class	Scale/Readhead	IP67
	Counter	IP43
Function	General	Set reading direction
		Unit conversion (mm/inch/°)
		Absolute/Incremental position(INC/ABS) selection
		Set display digits
		Set reference points
		5 sets of maximum velocity settings (default:1.5m/s)
	Programmable	Angular measurement radius setting (minimum:50mm)
		5 sets of programmable compensation reference points
		set programmable coefficient ratio
	Display	Indicate installed condition
		Power monitor and display
	Other	Keypad lock
		Parameter save function
5 sets of independent incremental counters for relative measurement.		

Note: (1) The data were measured while gap is 1mm.

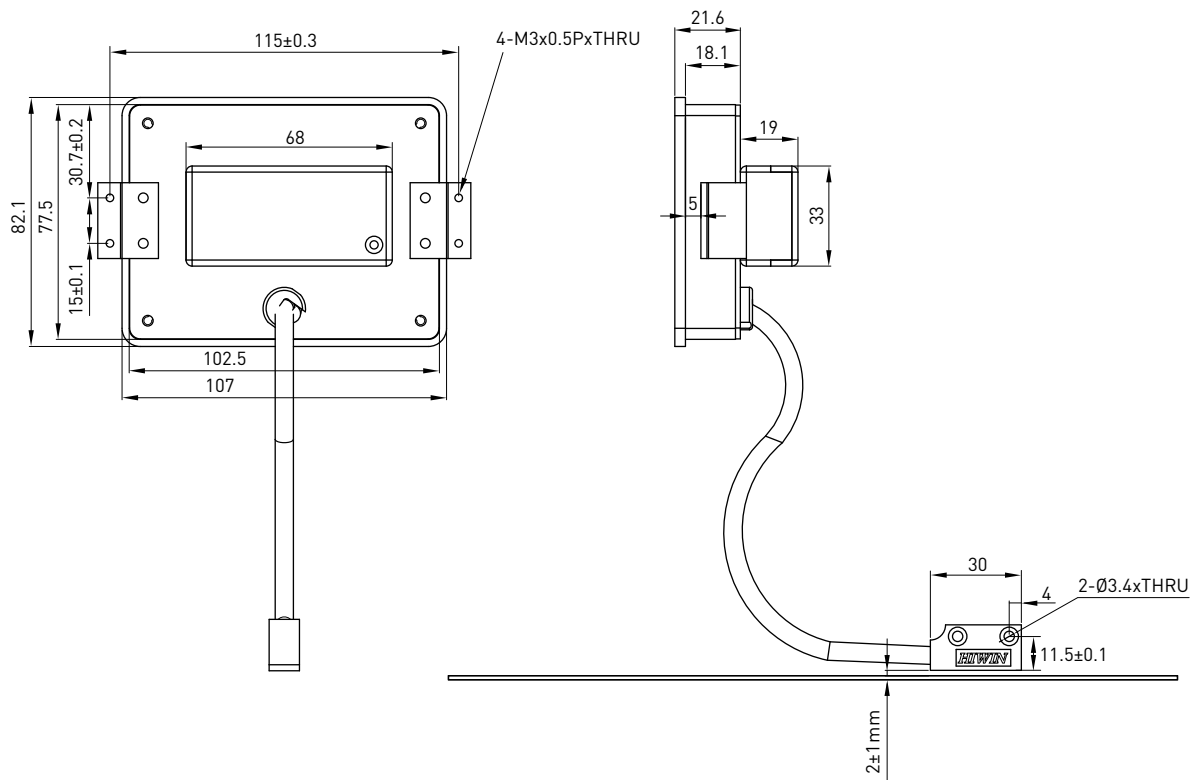
(2) Battery capacity is 2200mAh(ambient temperature: 20+/-5°C).

Capacity performance will vary under different environmental temperatures.

2.2 Ordering Code:



2.3 Dimensions:



Unit : mm

3. Single Axis Counter



Features:

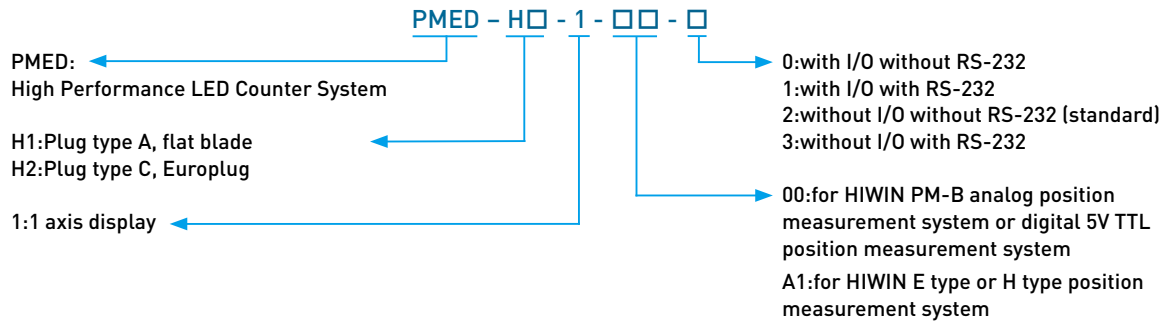
- Compact design, easy installation.
- High brightness LED display with high reliability
- With 4 sets Relay output, suitable for cutting and wood-processing machines
- With 8 sets default frequently used position, without complicated setting
- Could be used with other digital optical encoders



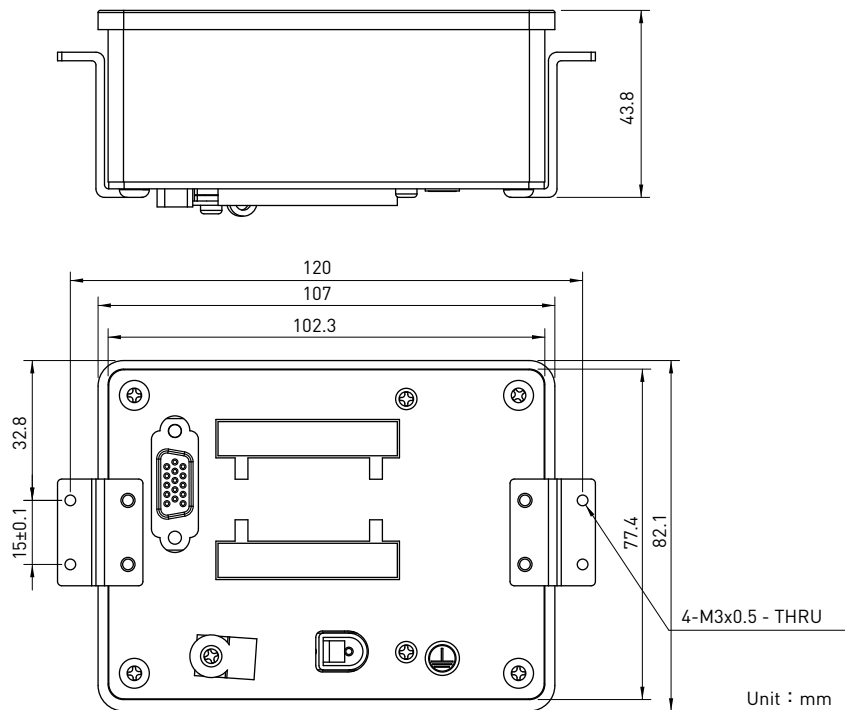
3.1 Specifications:

Display		8 digit LED display
Resolution		1µm、2µm、5µm、10µm
Input signal		analogue: SIN/COS 1Vp-p; speed 2m/s, 2kHz digital: 5V TTL/RS422; speed 2m/s, 0.5MHz
Input voltage		5VDC±5% (AC100~240V/ 5VDC)
Input current		1A
Relay contact rating		24VDC/2A
Operating temperature		0°C~50°C
Storage temperature		-5°C~70°C
Protection class	Display	IP43
Function	General	Set reading direction
		Unit conversion (mm/inch)
		Absolute/Incremental position(INC/ABS) selection
		Set display digits (mm : 0.001, 0.01, 0.1, inch : 0.000001, 0.00001, 0.0001, 0.001)
		Input signal conversion (Digital/Analogue)
		Coordinate zero setting and auto-center (1/2) function
	Other	8 sets of preset function
		4 sets of relay output function
		Instant power failure memory
		RS-232 output (optional)

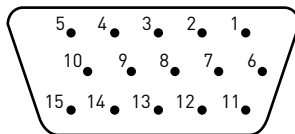
3.2 Ordering Code:



3.3 Dimensions:

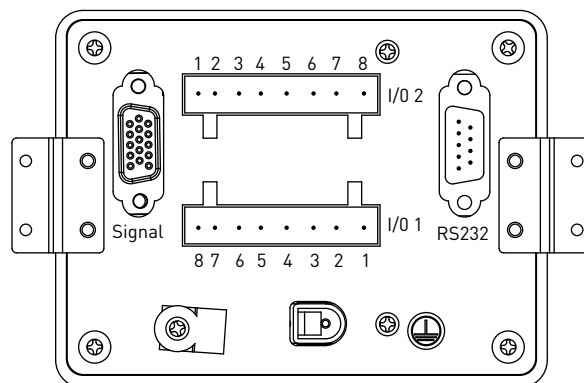


3.4 Input signal descriptions:



PIN	Definition	PIN	Definition	PIN	Definition
1	+5V	6	NC	11	SIN+(Analogue)
2	GND	7	Z+	12	SIN-(Analogue)
3	A+(Digital)	8	Z-	13	COS+(Analogue)
4	B+(Digital)	9	A-(Digital)	14	COS-(Analogue)
5	NC	10	B-(Digital)	15	NC

3.5 Relay output signal descriptions:



PIN	I/O 1	I/O 2
1	N.C.	N.C.
2		
3	N.C.	N.C.
4		
5	Relay 0(CH-0)	Relay 2(CH-2)
6		
7	Relay 1(CH-1)	Relay 3(CH-3)
8		

4. Multi-Axis Counter



Features:

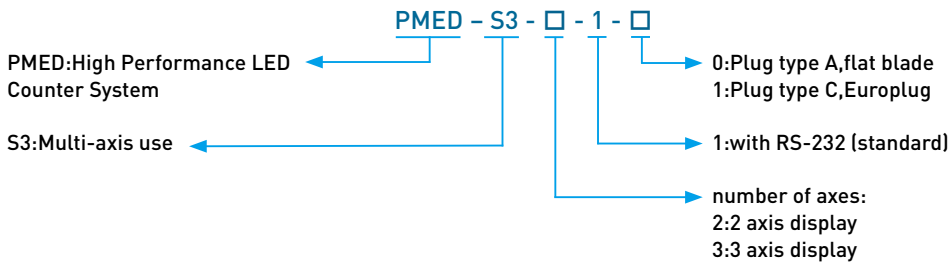
- Compact design, easy installation.
- High brightness LED display with high reliability
- Easy operation, suitable for cutting machines, traditional gantry milling machines, and programmable drilling machines



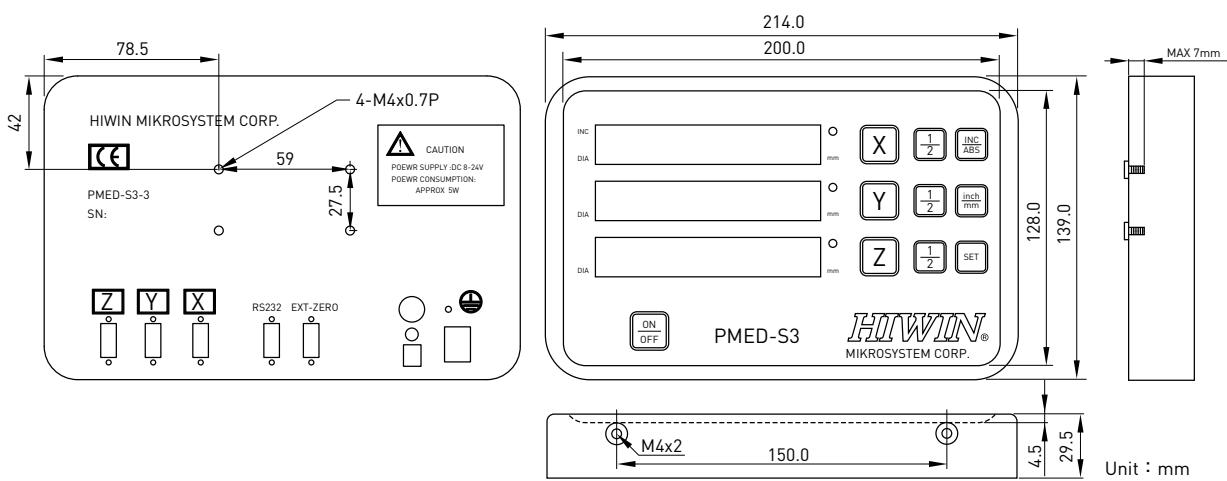
4.1 Specifications:

Display		8 digit LED display
Resolution		0.1μm、0.2μm、0.5μm、1μm、2μm、5μm、10μm、20μm、50μm
Input signal		Digital : 5V RS422/TTL
Input voltage		8~30VDC±5%
Input current		80mA
Operating frequency		<1.5MHz
Operating temperature		0°C~50°C
Storage temperature		-5°C~70°C
Protection class	Display	IP43
Function	General	ON/OFF function
		Coordinate Zero setting
		Unit conversion (mm/inch)
		Absolute/Incremental position(INC/ABS) selection
		Set display digits (0.0001, 0.0002, 0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 5, 10)
		Radius/diameter selection (RAD/DIA)
	Other	auto-center (1/2) function
		Linear error compensation
		Instant power failure memory
		RS-232 output

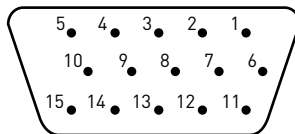
4.2 Ordering Code:



4.3 Dimensions:



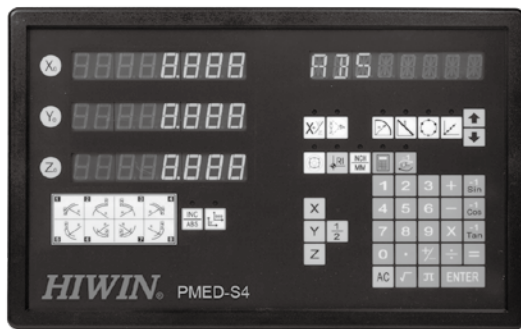
4.4 Input signal descriptions:



PIN	Definition	PIN	Definition	PIN	Definition
1	+5V	6	FG	11	NC
2	GND	7	NC	12	NC
3	A+	8	NC	13	NC
4	B+	9	NC	14	NC
5	ABS-	10	NC	15	NC

Note: NC: No Connection
FG: Frame Ground

5. Multi-function and Multi-axis Counter for Machine tools



Features:

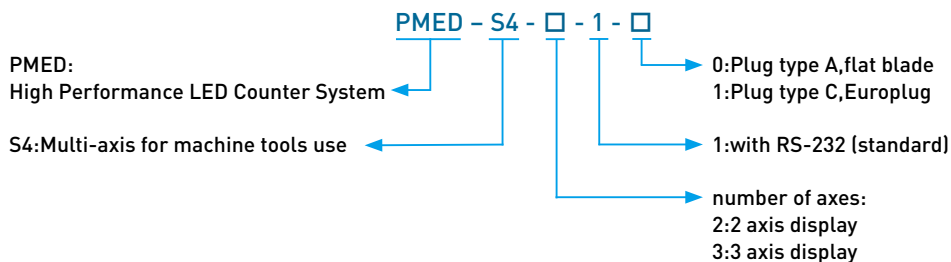
- Easy operation and easy installation.
- High brightness LED display with high reliability
- Easy operation, suitable for CNC machine centers, gantry machine centers, milling machines and drilling machines



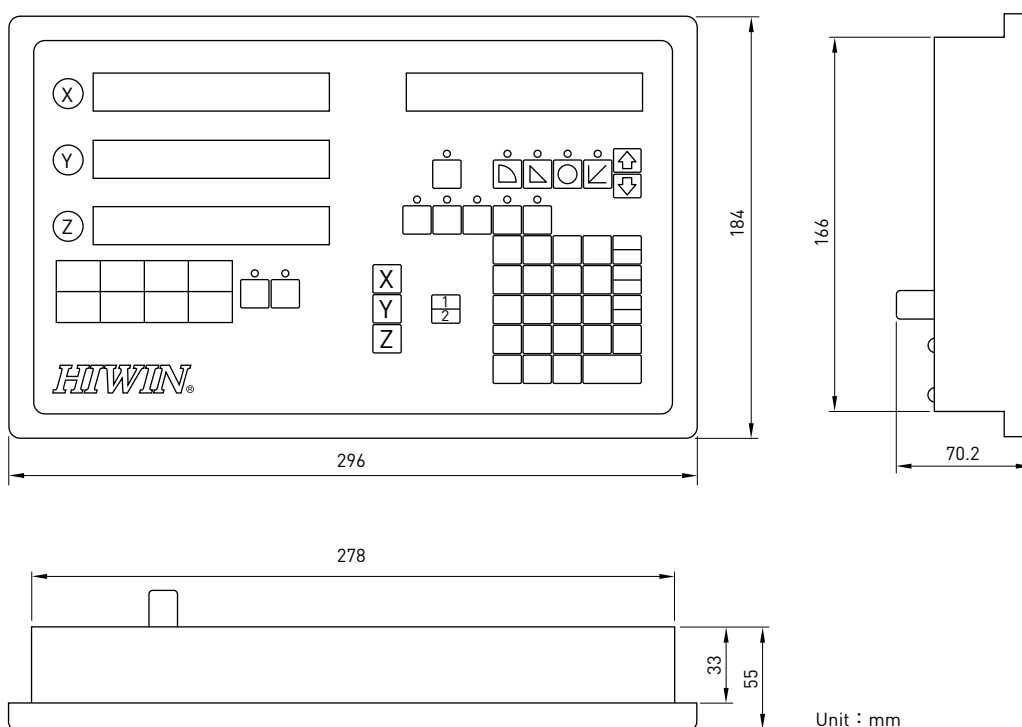
5.1 Specifications:

Display		8 digit LED display
Resolution		0.1μm、0.2μm、0.5μm、1μm、2μm、5μm、10μm、20μm、50μm
Input signal		digital: 5V TTL/RS422
Input voltage		90~240VAC
Operating frequency		<2MHz
Operating temperature		0°C~50°C
Storage temperature		-5°C~70°C
Protection class	Display	IP43
Function	General	Coordinate Zero setting
		Unit conversion (mm/inch)
		Absolute/Incremental position(INC/ABS) selection
		Set display digits (0.0001, 0.0002, 0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 5, 10)
		Radius/diameter selection (RAD/DIA)
	Other	auto-center (1/2) function
		Linear error compensation
		Instant power failure memory
		Shrink function, Calculator, RI detection, Bolt Circle machining, R-angle, Divide holes on an oblique line, Machining on an oblique line
		Arc surface machining, inclined plane machining

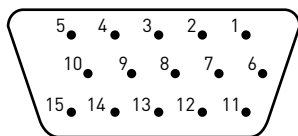
5.2 Ordering Code:



5.3 Dimensions:



5.4 Input signal descriptions:



PIN	Definition	PIN	Definition	PIN	Definition
1	+5V	6	FG	11	NC
2	GND	7	NC	12	NC
3	A+	8	NC	13	NC
4	B+	9	NC	14	NC
5	ABS-	10	NC	15	NC

Note: NC:No Connection
FG:Frame Ground

IV. Accessories

1. Signal Transfer Cable

- Signal transfer cable for alternative display devices



Ordering Code:

STC - □□ - □□ - □

- STC:Signal Transfer Cable
- 0:standard type
- 1:with metal tube
- 00:D-sub VGA 15 pin (for HIWIN display)
- 02:flying lead
- 01:cable length 1m
- 02:cable length 2m

2. Installation Fixture

- For easy scale installation and parallelism of scale with respect to axis is guaranteed.



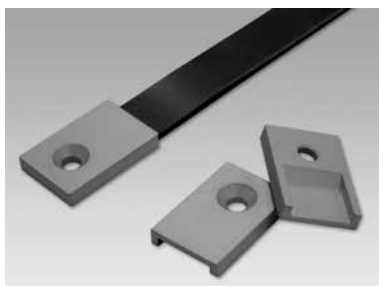
Ordering Code:

PST - □□

- 02-L:Apply to tiny type readhead.
(Cable routing on Left Hand Side of readhead)
- 02-R:Apply to tiny type readhead.
(Cable routing on Right Hand Side of readhead)
- 03:Apply to vertical type readhead.
- 04:Apply to standard type readhead.

3. End Clamp

- Preventing the warpage of scale under harsh environment.



Ordering Code:

PSF - 01

V. Customer's Requirements(PM)

Date:

Company name			Contact person	
Tel		Fax	Title	
Specifications Requirements for positioning measurement encoders	Accuracy (µm)		Notes	
	Resolution (µm)			
	Repeatability (µm)			
	Max. speed [m/sec]			
	Input voltage (V)			
	Output signal			
	Operating temperature (°C)			
	Protection level			
Specifications Requirements for signal transistors	Input voltage (V)			
	Output format			
Specifications Requirements for displays	Display axes			
	Display digits			
	Input voltage (V)			
	Operating speed (m/sec)			
Budget				
Quantity				
Recommended specification :				
Proponent :				

Manager :

Head :

Applicant :

MEMO

A series of horizontal dotted lines for writing.

MEMO

A series of horizontal dotted lines for writing.

Position Measurement System Technical Information

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