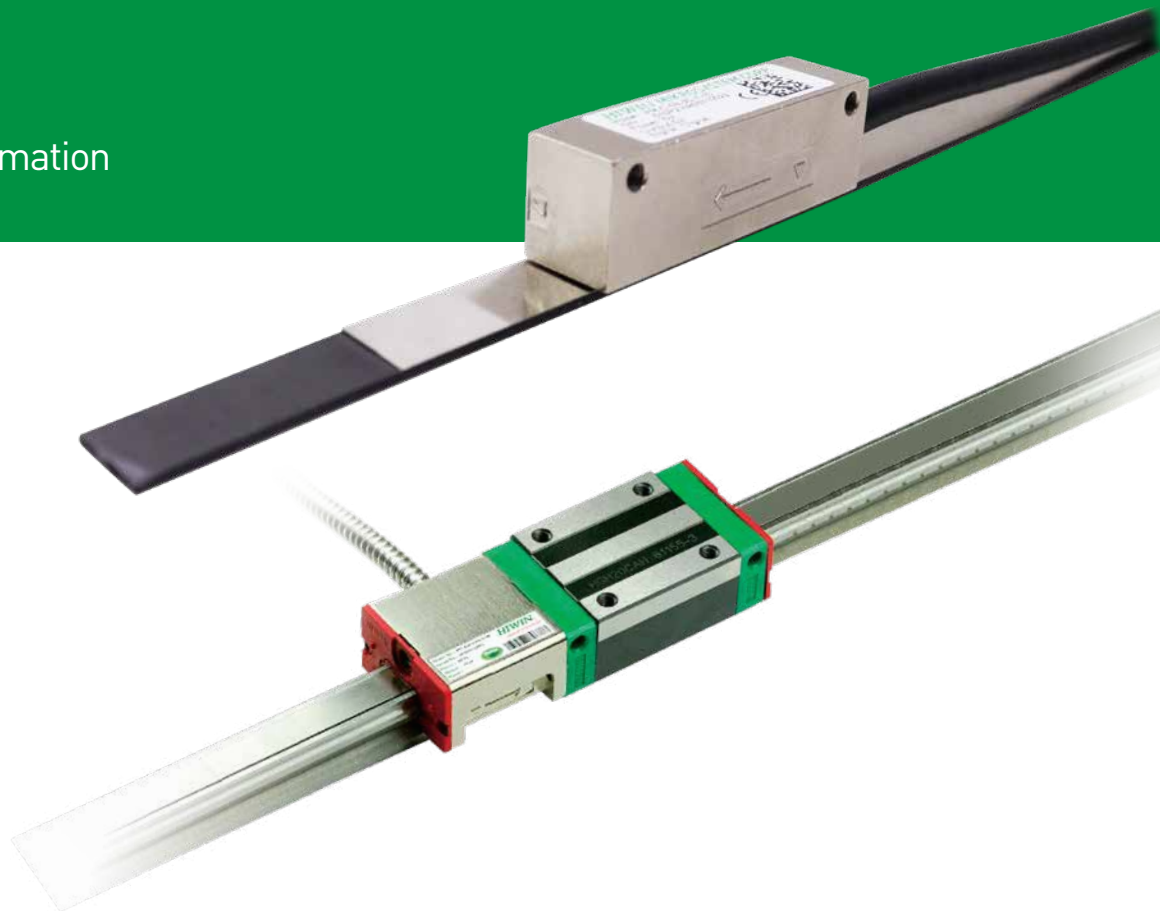




Position Measurement System

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

1. Position Scale	1
2. Position Measurement - Tiny Type	2
3. Position Measurement - Standard Type	5
4. Position Measurement - Vertical Type.....	8
5. Position Measurement - C Type.....	12
6. Position Measurement - PG Type	16
7. Position Measurement - E Type.....	20
8. Position Measurement - H Type	22

II. Signal Translator..... 24

III.High Performance Counter

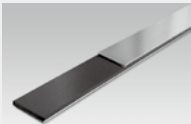














1. Micro LCD counter	26
2. LCD counter system.....	28
3. Single Axis Counter	30
4. Multi-axis Counter.....	33
5. Multi-function and Multi-axis Counter for Machine tools.....	35

IV.Accessories

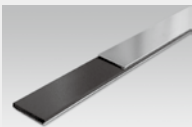


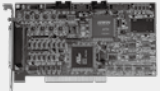



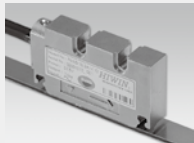









1. Signal Transfer Cable	37
2. Installation Fixture	37
3. End Clamp	37

V. Customer's Requirements(PM)..... 38

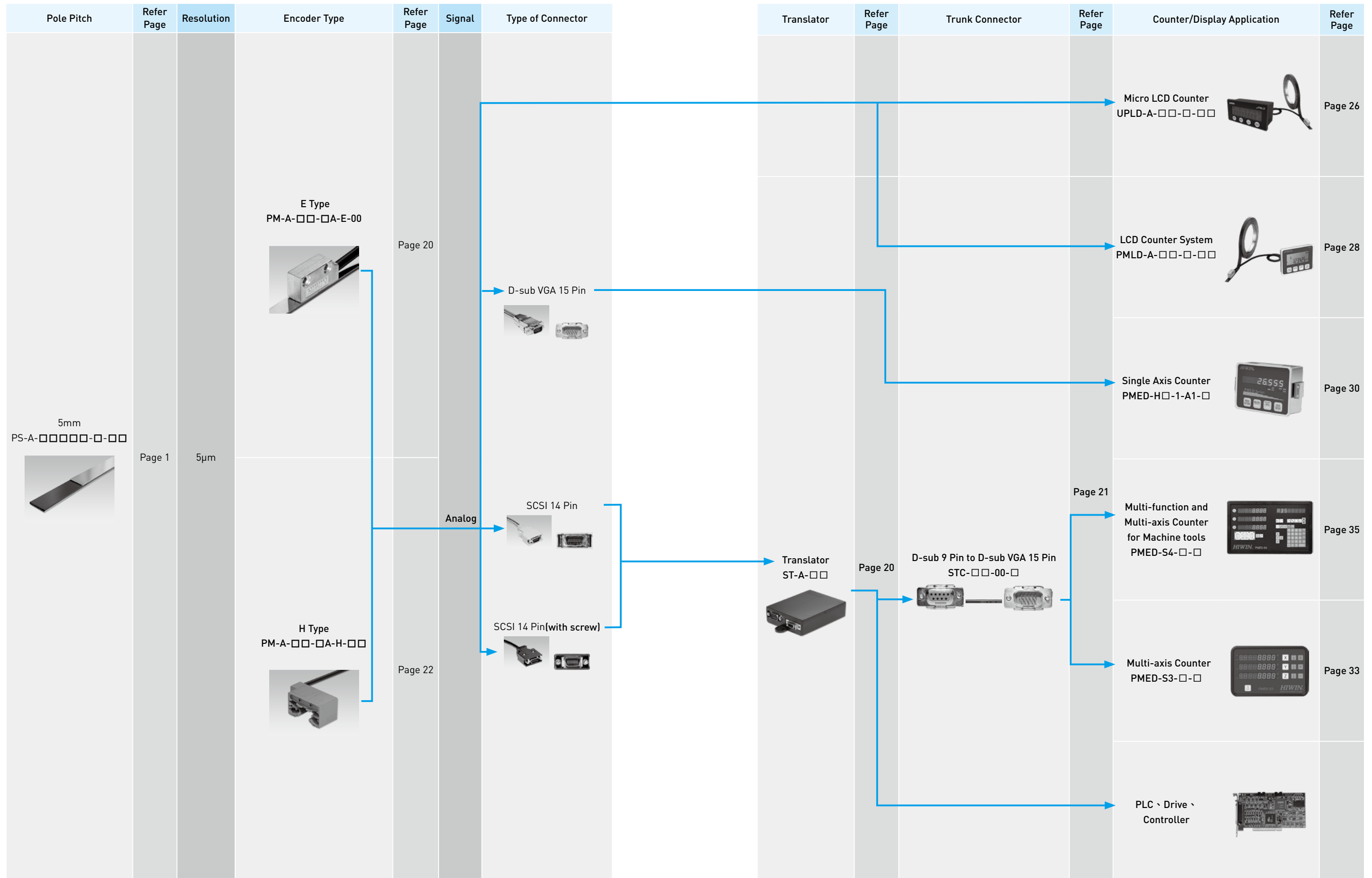
The Component Breakdown of the Position Measurement System - 1mm Placement Figure (Analog)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	Translator	Refer Page	Trunk Connector	Refer Page	Counter/Display Application	Refer Page
1mm PS-B-□□□□□-□-□□ 	Page 1	1µm	T Type PM-B-□□-□A-T-□□ 	Page 2	Analog	Flying Lead 						
			Standard Type PM-B-□□-□A-S-□□ 	Page 5		D-sub VGA 15 Pin 				Single Axis Counter PMED-H□-1-00-□ 	Page 30	
			PG Type PM-B-□□-□A-G-□□-□□ 	Page 8		D-sub 15 Pin 						
			C Type PM-B-□□-□A-C-10 	Page 12		17 Pin Circular Plug 						
						SCSI 14 Pin 						
						SCSI 14 Pin (with screw) 			HIWIN Drive 		Linear Motors (HIWIN LM) 	
						SCSI 20 Pin 						













The Component Breakdown of the Position Measurement System - 1mm and 2mm Placement Figure (Digital)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	Counter/Display Application	Refer Page	
1mm PS-B-□□□□□-□-□□ 2mm PS-C-□□□□□-□-□□ 	Page 1	1µm	T Type PM-□-□□-□□D-T-□□ 	Page 2	Digital	Flying Lead 	PLC \ Drive \ Controller 		
			Standard Type PM-B-□□-□□D-S-□□ 	Page 5		D-sub VGA 15 Pin 	Single Axis Counter PMED-H□-1-00-□ 	Page 30	
			Vertical Type PM-B-□□-□□D-V-□□ 	Page 16		D-sub 15 Pin 		Multi-function and Multi-axis Counter for Machine tools PMED-S4-□-□ 	Page 35
			PG Type PM-□-□□-□□D-G-□□-□□ 	Page 8		17 Pin Circular Plug 			Multi-axis Counter PMED-S3-□-□ 
			C Type PM-B-□□-□□D-C -10 	Page 12		SCSI 14 Pin 		SCSI 14 Pin (with screw) 	
						SCSI 20 Pin 			

The Component Breakdown of the Position Measurement System - 5mm Placement Figure (Analog)

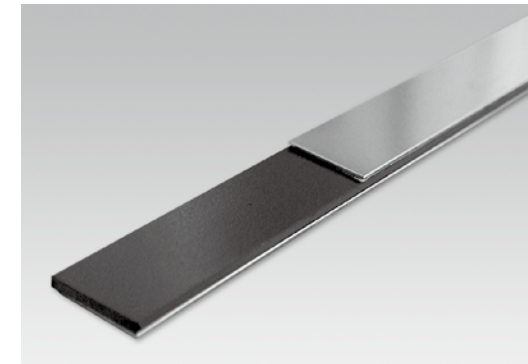


The Component Breakdown of the Position Measurement System - 5mm Placement Figure (Digital)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	Counter/Display Application	Refer Page
5mm PS-A-□□□□□-□-□□ 	Page 1	5μm	Vertical Type PM-A-□□-□□-□□-□□ 	Page 16	Digital	Flying Lead 	PLC \ Drive \ Controller 	
						D-sub VGA 15 Pin 	Multi-function and Multi-axis Counter for Machine tools PMED-S4-□-□ 	Page 35
						D-sub 15 Pin 	Multi-axis Counter PMED-S3-□-□ 	Page 33
						SCSI 20 Pin 	Single Axis Counter PMED-H□-1-00-□ 	Page 30
						HIWIN Drive 	Linear Motors (HIWIN LM) 	

I. High Accuracy Position Measurement System

1. Position Scale



Features:

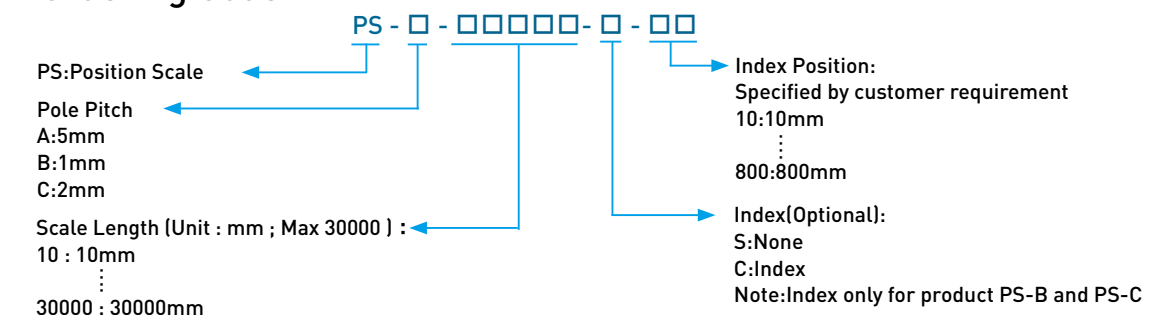
- Compatible with various measurement instruments to achieve different accuracy requirements.
- Magnetic scale can maintain performance under severe ambient conditions caused by oil, water or dust to gain required accuracy and signal feedback.



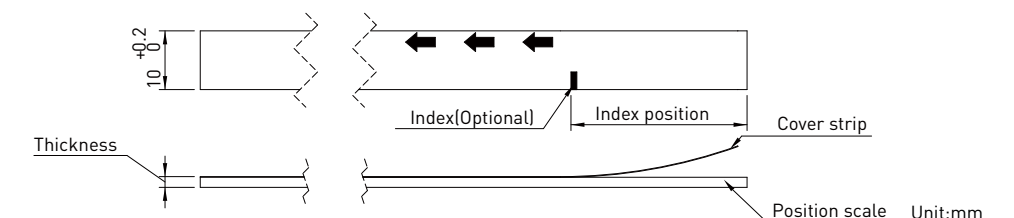
1.1 Specifications:

Product name	PS-A	PS-B	PS-C
Pole pitch	5mm	1mm	2mm
Accuracy@20°C	$\pm(80+15 \times L) \mu\text{m}$ (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:

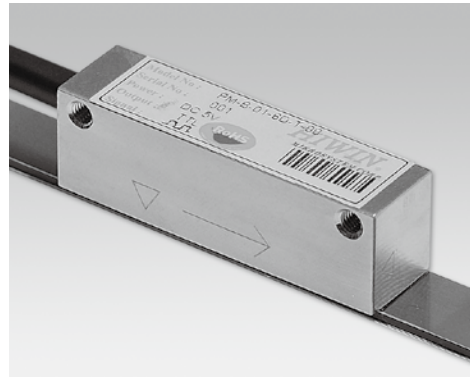


1.3 Dimensions:



- 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

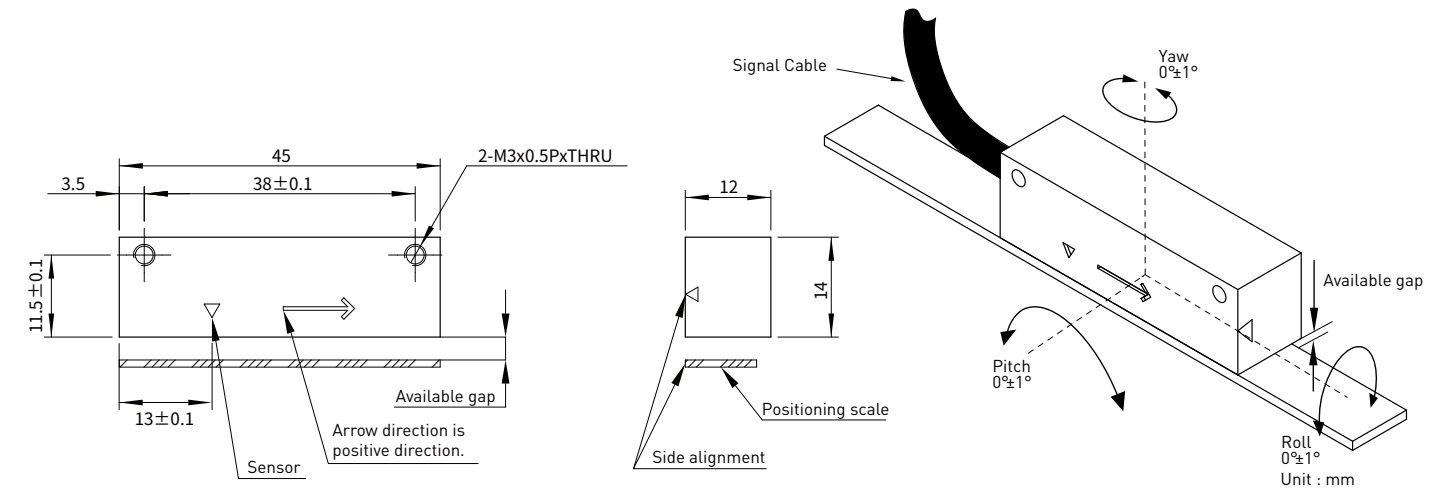
Signal Format:

	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:

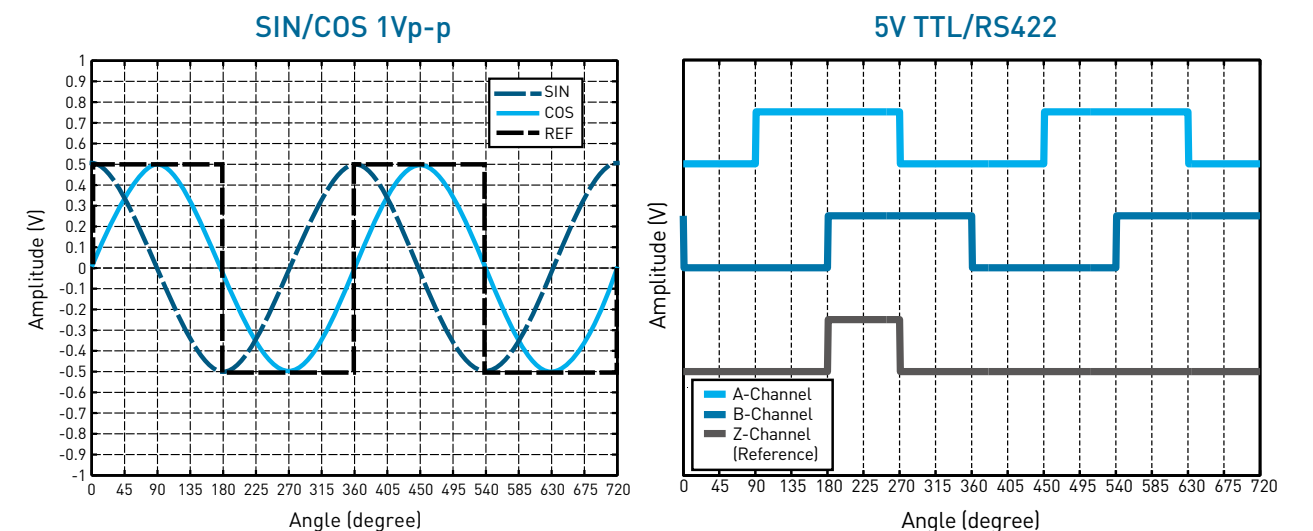


2.4 Pin Assignment:

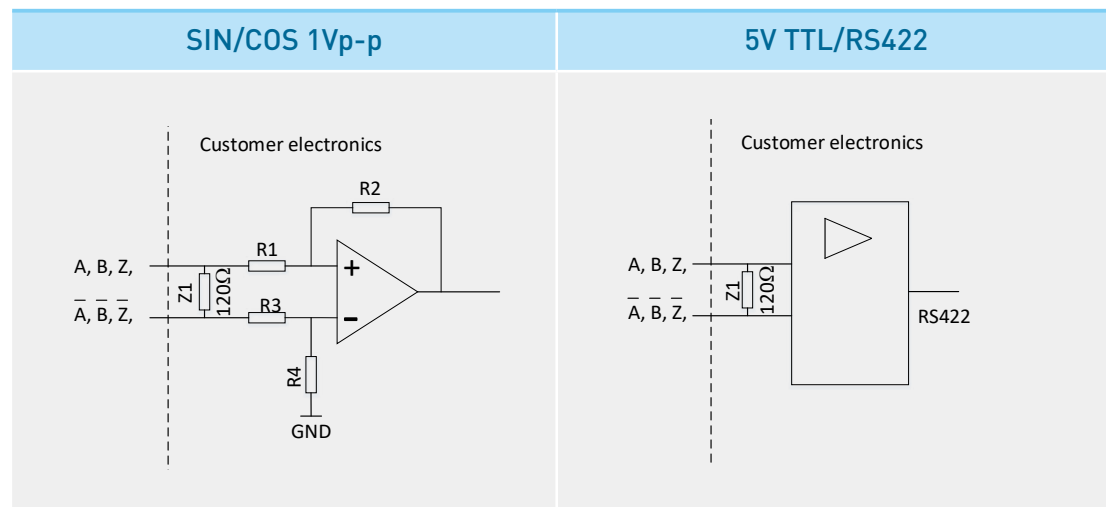
Function	Signal		Color	Connector (male) (SCSI 14 Pin)	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Connector (male) (D-sub 9Pin)	Connector (male) (SCR 10 Pin)	Flying Lead
	Analogue	Digital		Analogue	Analogue	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:

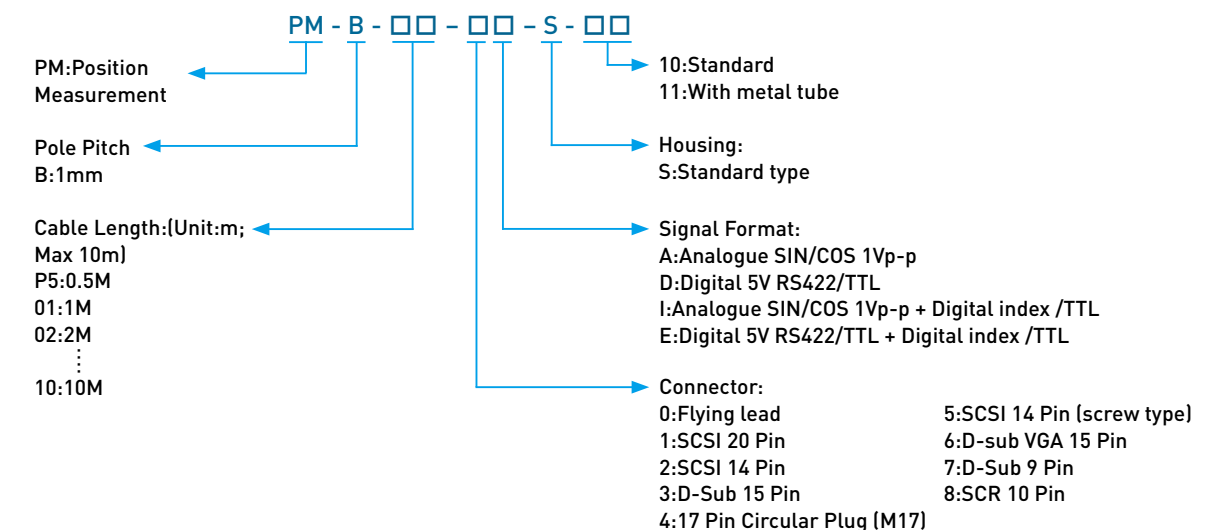
- Easy installation and replacement.
- Extra assembly, for installing rapidly and accurately in every directions
- Available for digital and analogue output
- Fulfill dustproof and waterproof by one-piece housing
- Optional metal protection tube, suitable for severe ambient conditions



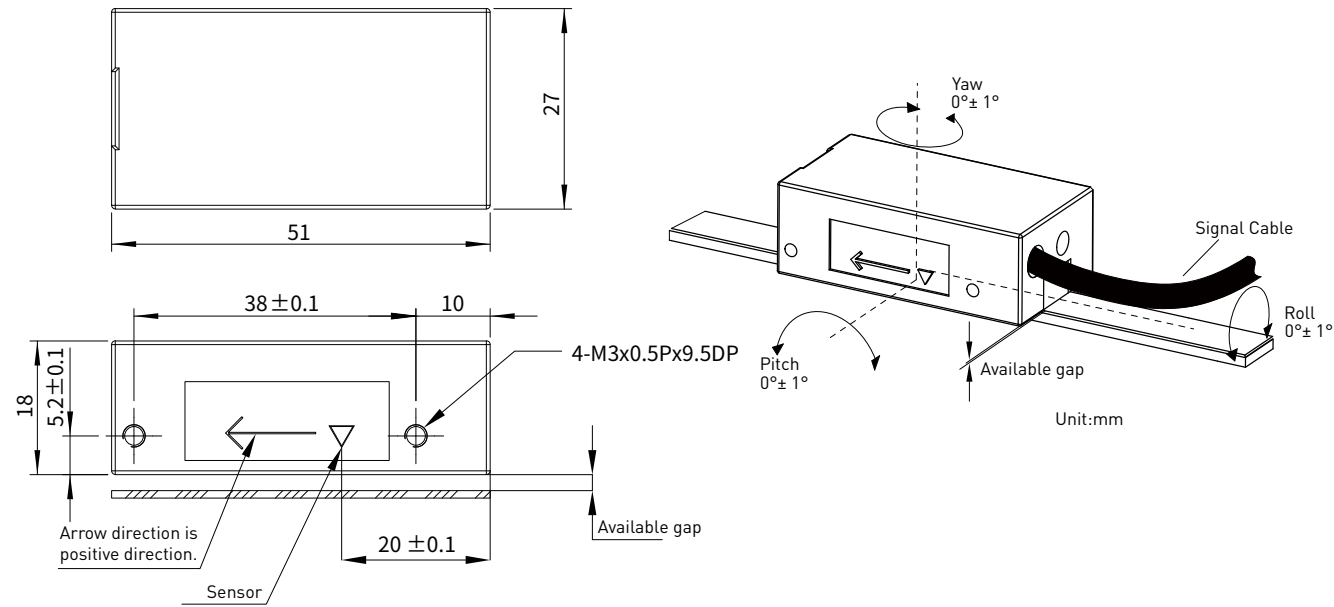
3.1 Specifications:

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:

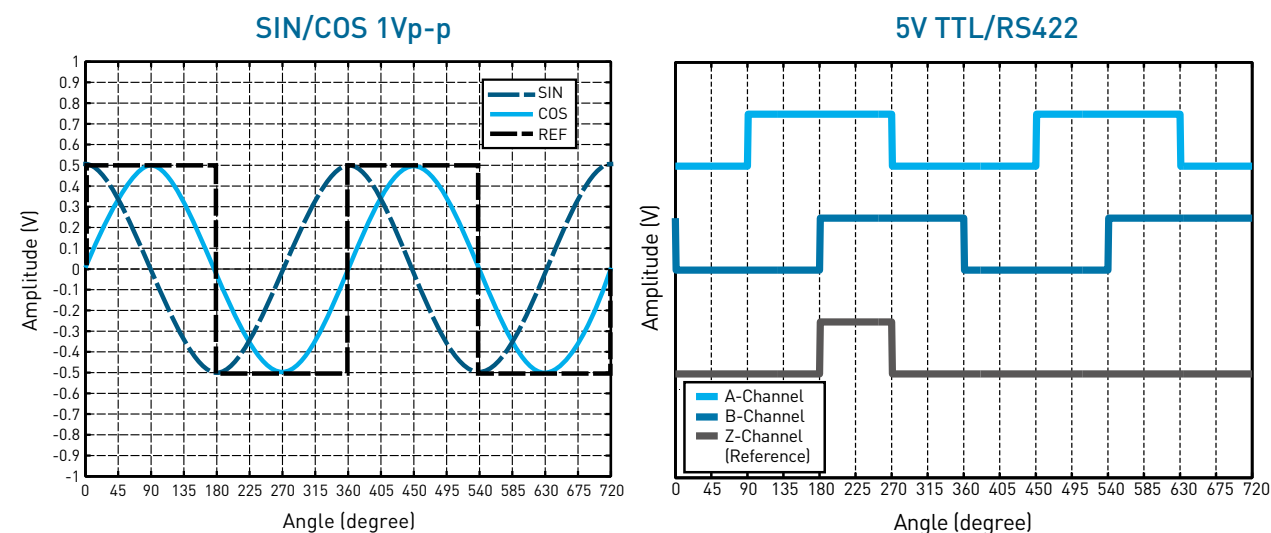


3.4 Pin Assignment:

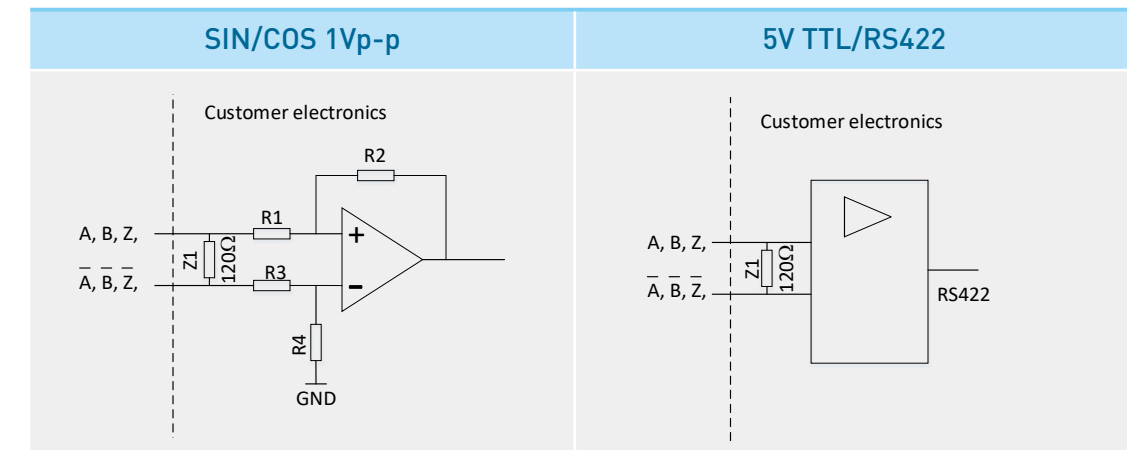
Function	Signal		Color	Connector (male) (SCSI 14 Pin)		Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) (17 Pin Circular Plug)		Connector (male) (D-Sub VGA 15 Pin)		Connector (male) (D-sub 9Pin)		Connector (male) (SCR 10 Pin)		Flying Lead
	Analogue	Digital		Analogue	Analogue	Digital	Analogue	Digital	Analogue	Digital	Analogue	Digital	Digital	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

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
Output signal	SIN/COS 1Vp-p	5V TTL/RS422
Resolution	1mm	1µm
Repeatability	±3µm	±1µm
Reference signal	1pulse/pole pitch or Specified reference	
Maximum travel speed	10m/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:

PM - □ - □ - □ - □ - G - □ - □

PM: Position Measurement

Pole Pitch
B: 1mm
C: 2mm

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

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

10: Standard
11: With metal tube

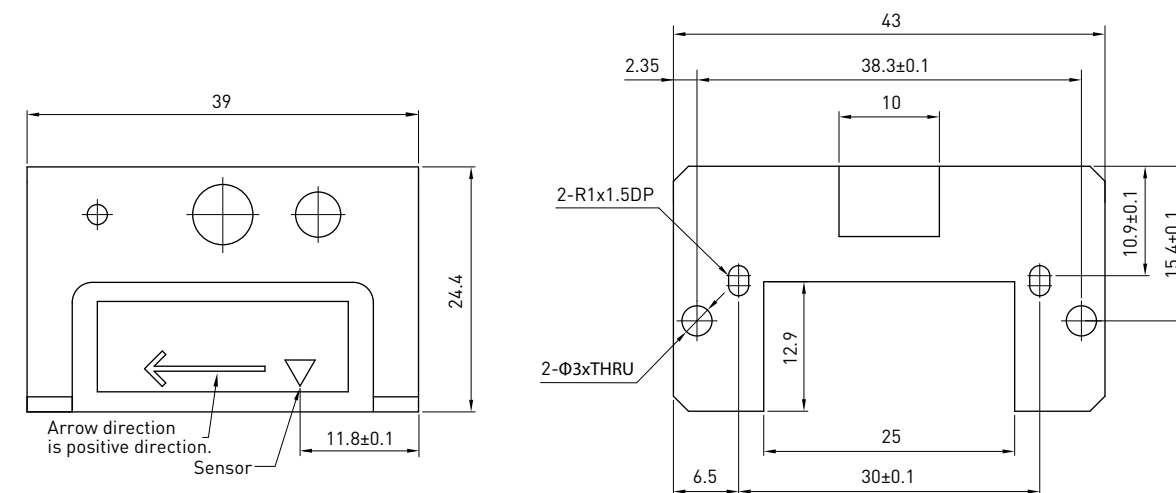
20: for PGH20 guideway system
25: for PGH25 guideway system

Housing:
G: PG type

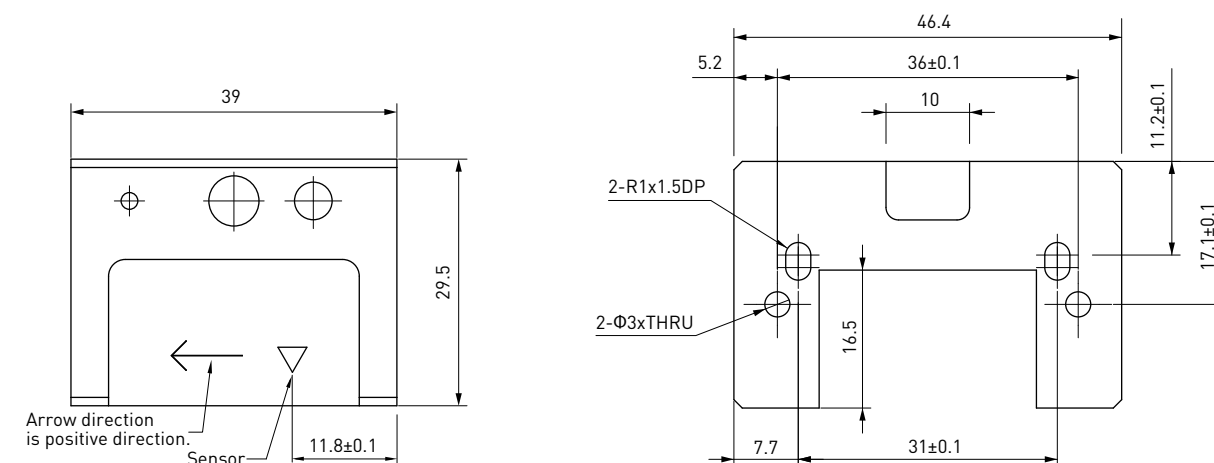
Signal Format:

	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

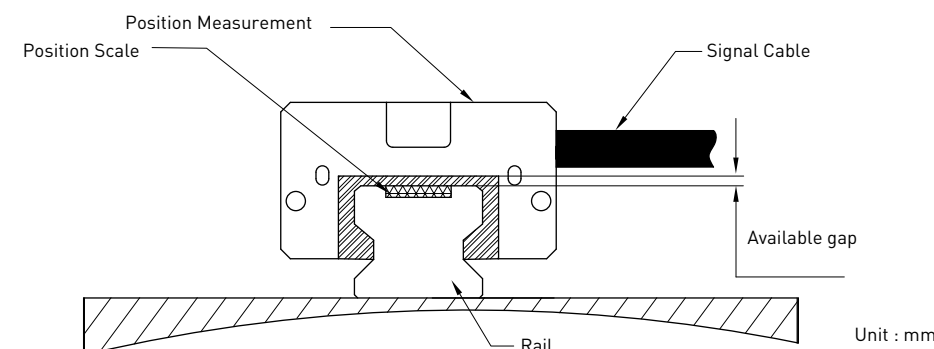
4.3 Dimensions:



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



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

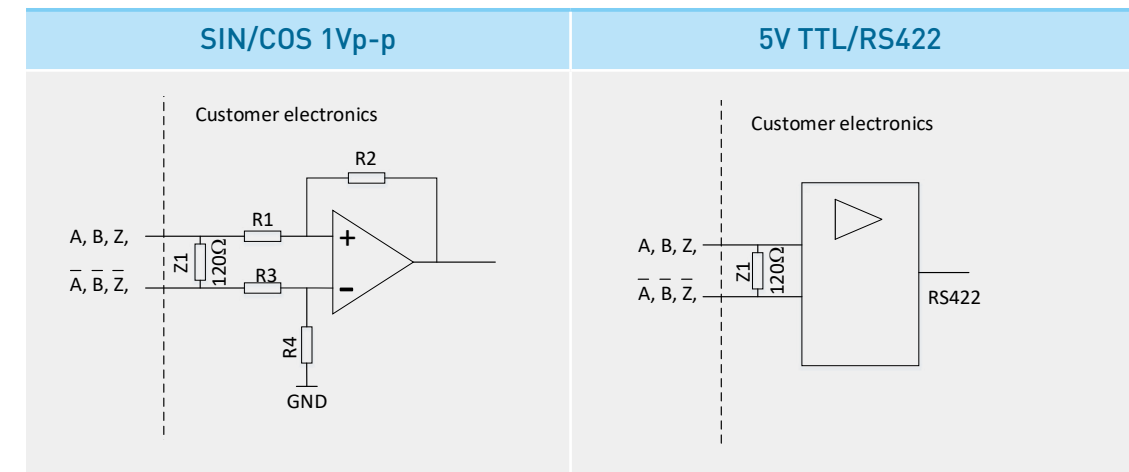


4.4 Pin Assignment:

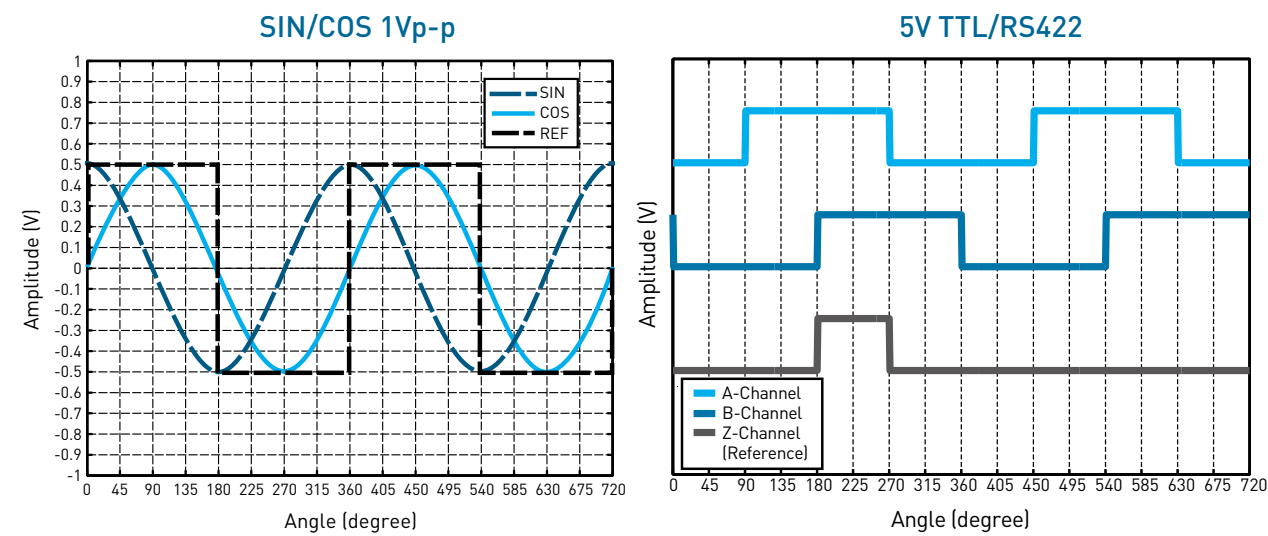
Function	Signal		Color	Connector (male) (SCSI 14 Pin)	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Connector (male) (D-sub 9Pin)	Connector (male) (SCR 10 Pin)	Flying Lead
	Analogue	Digital		Analogue	Analogue	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

4.6 Recommend circuit for receiving signal:



4.5 Signal Format:



5. Position Measurement- PG Type



Features:

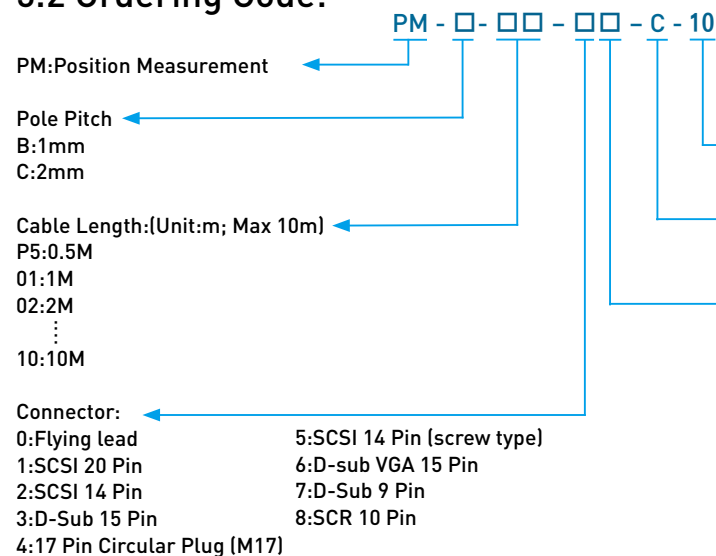
- Tiny shape, suitable for extra assembly or integrate with HIWIN linear guideway.
- Simple design and easy installation, could avoid the resonance vibration caused by high speed movement.
- Available for digital and analogue output .
- Fulfill dustproof and waterproof by one-piece housing.



5.1 Specifications:

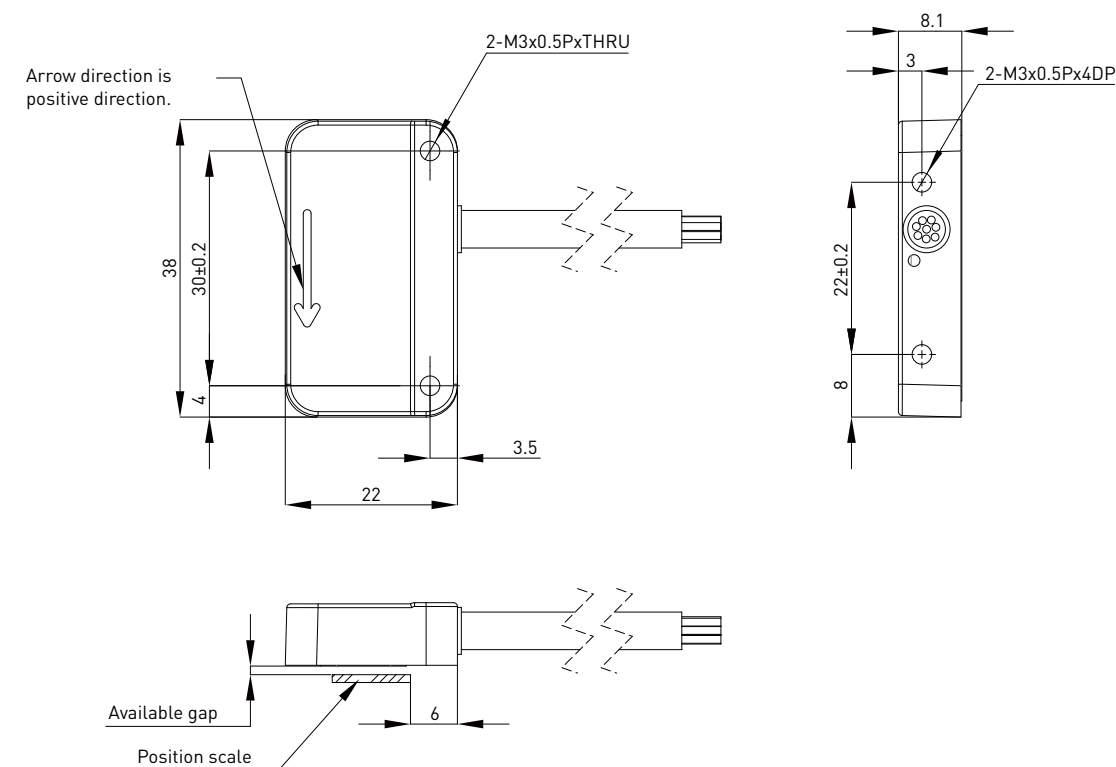
Product name	PM-B	PM-C
Pole pitch	1mm	2mm
Available gap	0.2±0.1mm	0.5±0.3mm
Signal format	Analogue	Digital
Output signal	SIN/COS 1Vp-p	5V TTL/RS422
Resolution	1mm	1µm
Repeatability	±3µm	±2µm
Reference signal	1pulse/pole pitch or Specified reference	
Maximum travel speed	10m/sec	7m/sec
Input voltage	5VDC±5%	
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:

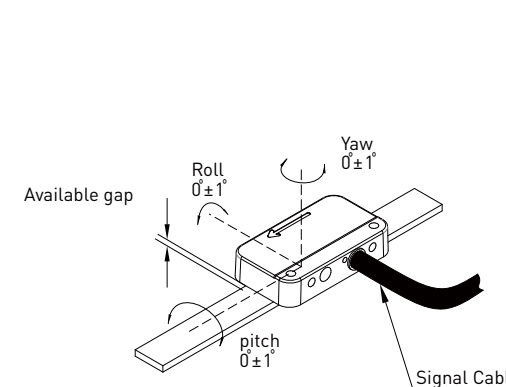


	PM-B	PM-C
A	Analogue: SIN/COS 1Vpp	
D	Digital: 5V RS422/TTL	Digital: 5V RS422/TTL
I	Analogue: SIN/COS 1Vpp Digital: index /TTL	
E	Digital: 5V RS422/TTL Digital: index /TTL	Digital: 5V RS422/TTL Digital: index /TTL

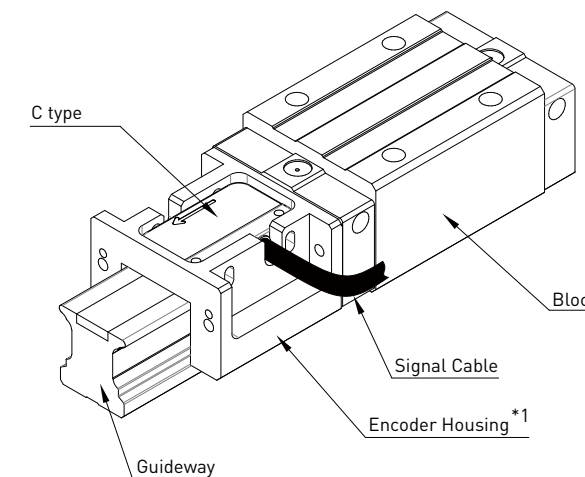
5.3 Dimensions:



Example
1. Extra assembly



2. Integrate with HIWIN linear guideway



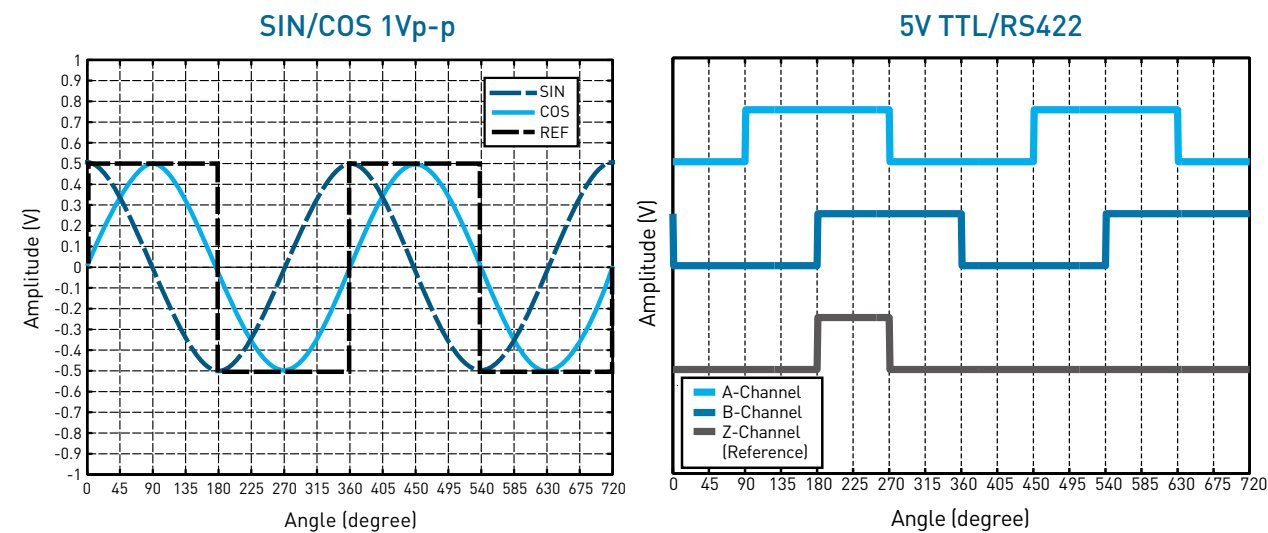
*1: HIWIN provide drawings for encoder housing.
For details, please contact HIWIN.

5.4 Pin Assignment:

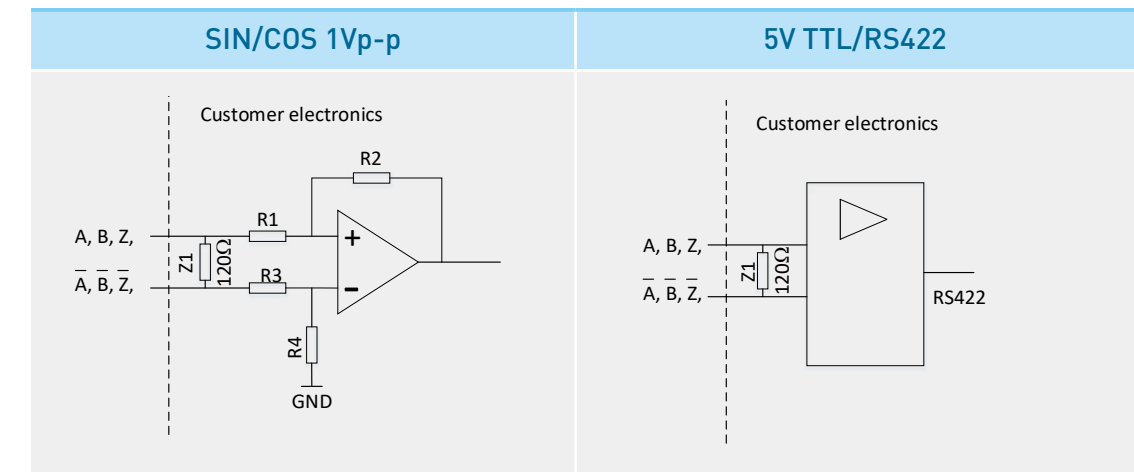
Function	Signal		Color	Connector (male) (SCSI 14 Pin)	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Connector (male) (D-sub 9Pin)	Connector (male) (SCR 10 Pin)	Flying Lead
	Analogue	Digital		Analogue	Analogue	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

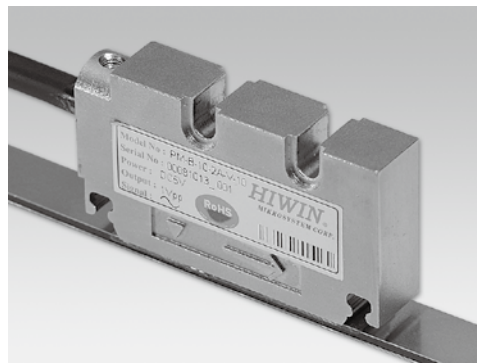
5.5 Signal Format:



5.6 Recommend circuit for receiving signal:



6. Position Measurement- Vertical Type



Features:

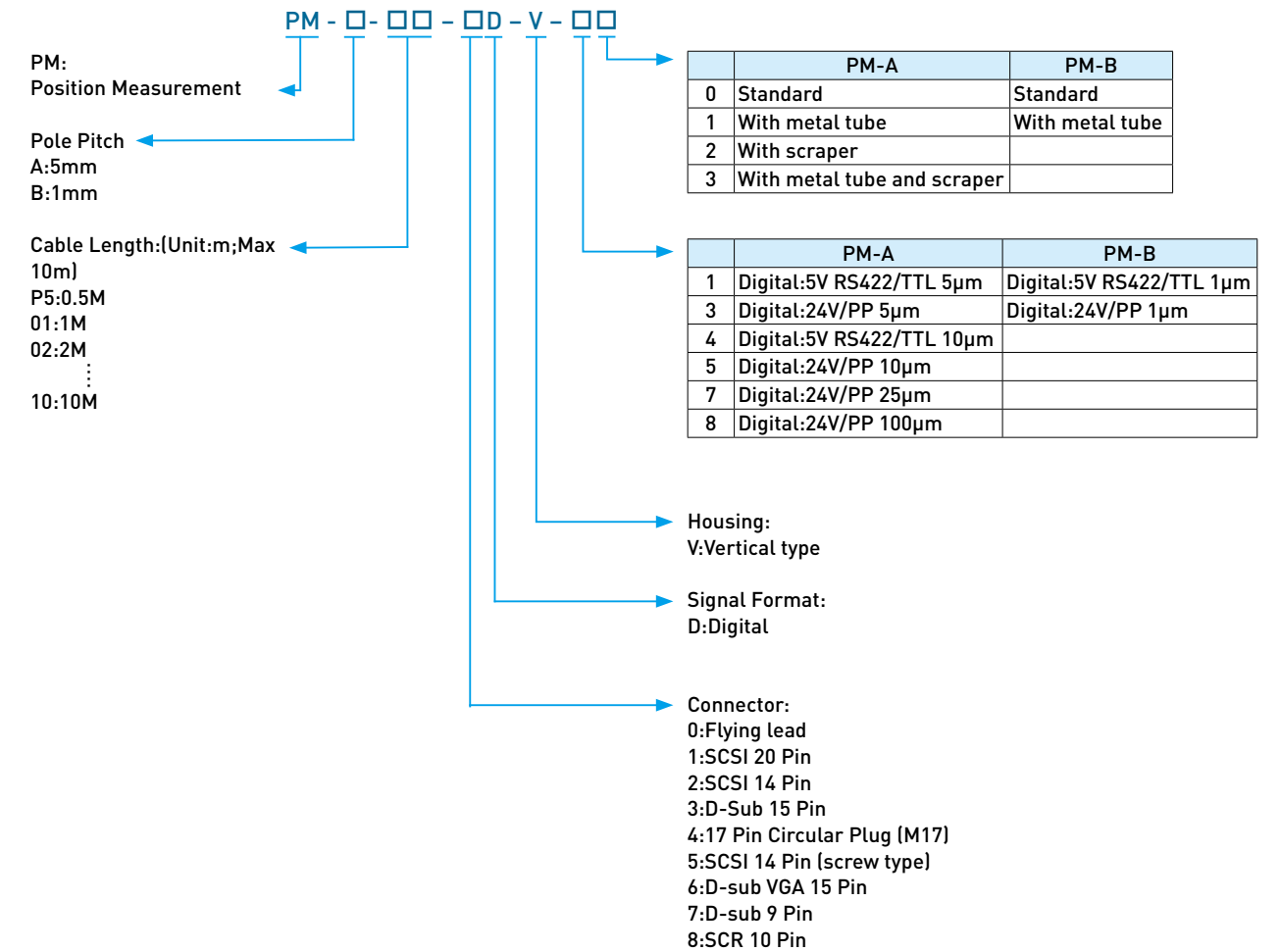
- Tiny shape, suitable for small equipment or space-saving application
- High quality mold forming housing
- Optional metal protection tube and scraper, suitable for severe ambient conditions



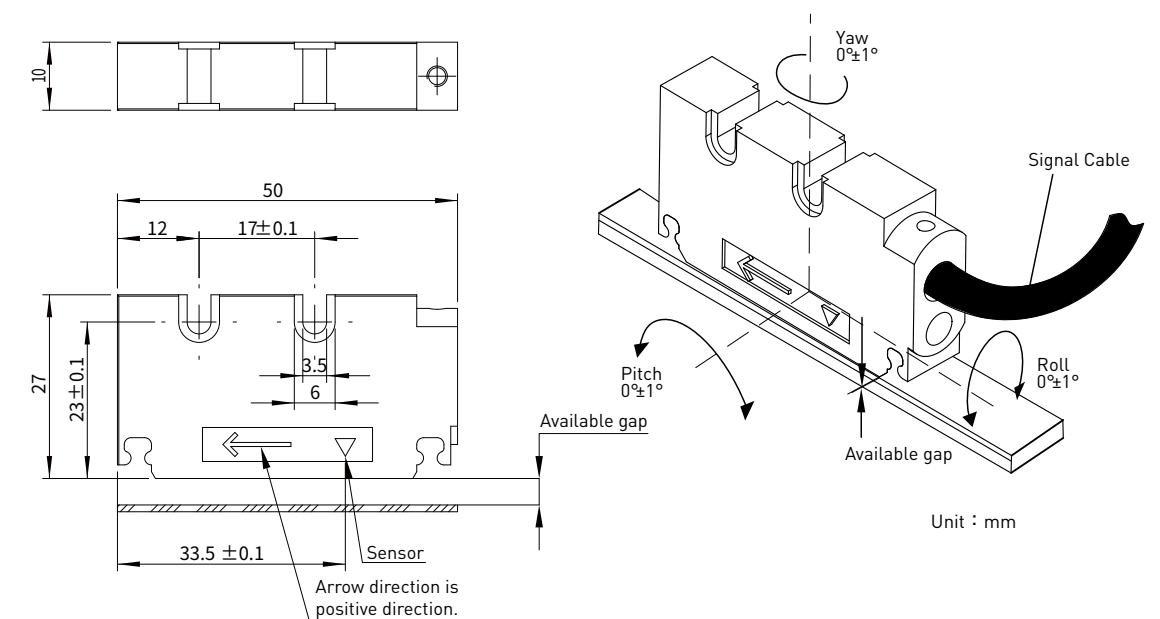
6.1 Specifications:

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:



6.3 Dimensions:



6.4 Pin Assignment:

5V TTL/RS422

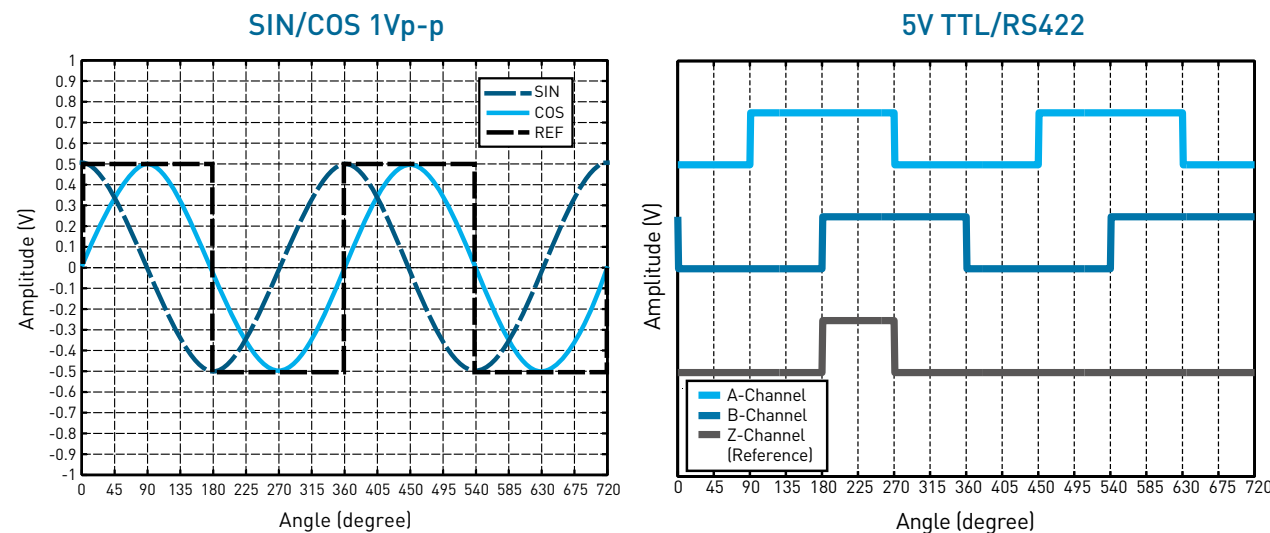
Function	Signal	Color	Connector (male) (SCSI 20 Pin)	Connector (male) (D-Sub 15 Pin)	Connector (male) (1) (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)	Connector (male) (D-sub 9Pin)	Connector (male) (SCR 10 Pin)	Flying Lead
			Digital	Digital	Digital	Digital	Digital	Digital	
Power	5VDC	Brown	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

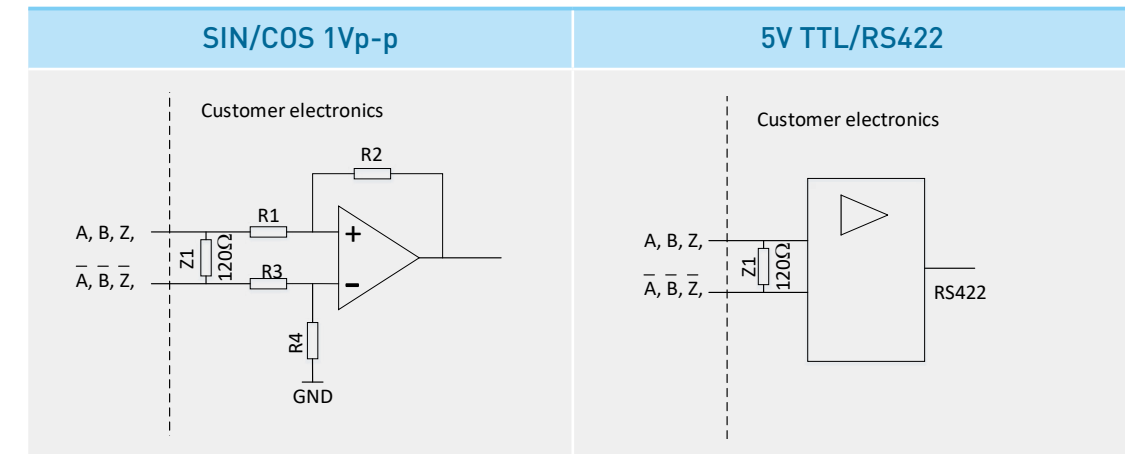
24V/PP

Function	Signal	Color	Connector (male) (D-Sub 9 Pin)	Flying Lead
			Digital	
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	

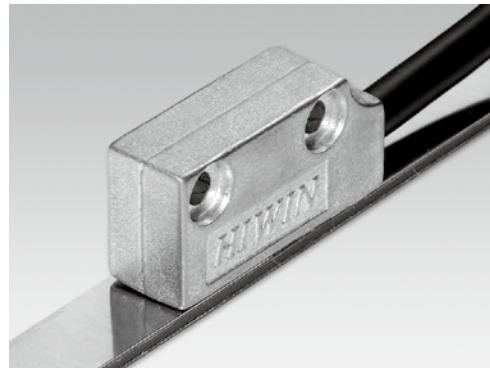
6.5 Signal Format:



6.6 Recommend circuit for receiving signal:



7. Position Measurement- E Type



Features:

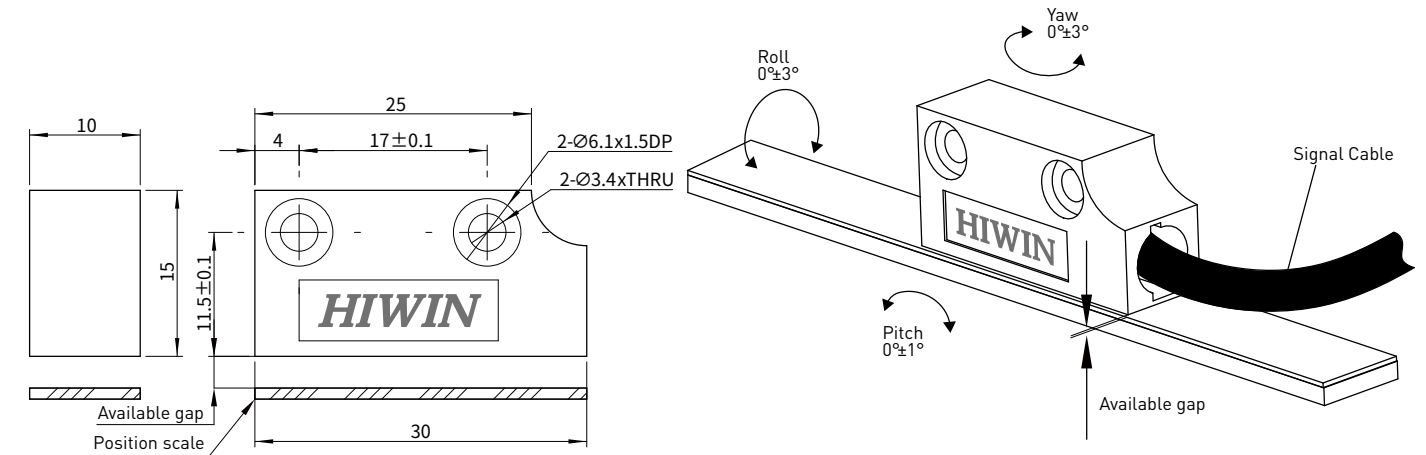
- Tiny shape, suitable for small equipment or space-saving application
- High quality mold forming housing.
- Fulfill dustproof and waterproof by onepiece housing, protection class up to IP67
- Resolution is up to 5um with ST-A signal translator



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)

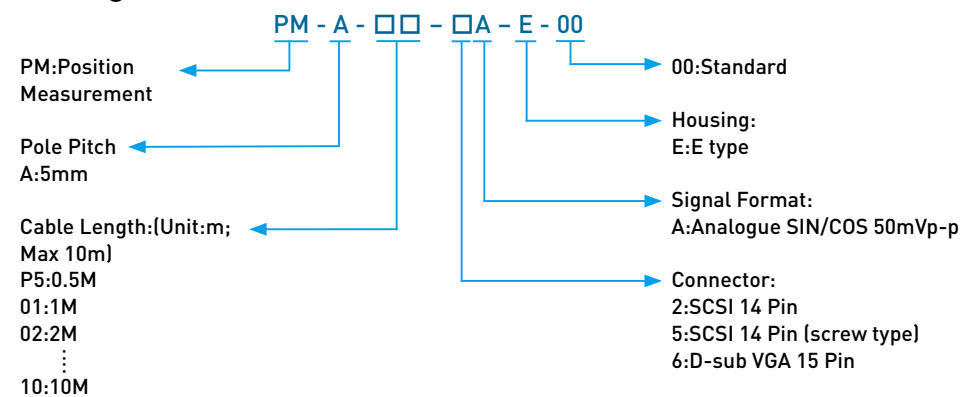
7.3 Dimensions:



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

7.2 Ordering Code:



8. Position Measurement- H Type



Features:

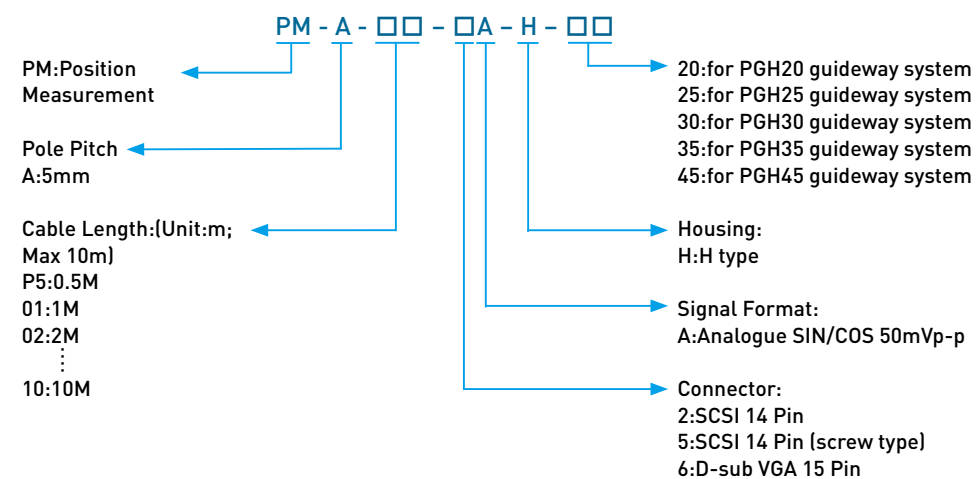
- Design with Hiwin linear guideway, cost-effective and high reliability
- Easy installation, improve work efficiency and reach accurate position feedback
- Fulfill dustproof and waterproof by one-piece housing



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:

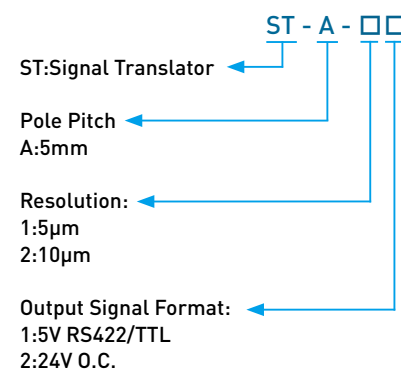
- Reach accurate position feedback by precisely converting analog signal into digital signal output
- Output signal 5V RS422/TTL or open collector
- Compact design, easy installation to various machines to measure and feedback the position



1. Specifications:

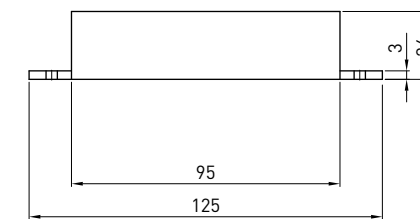
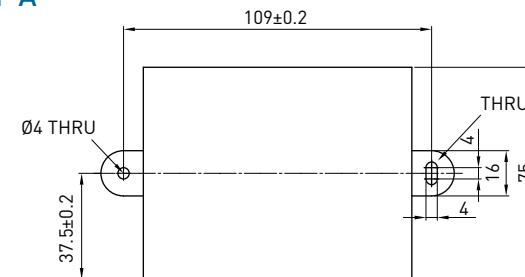
Type	ST-A			
Pole pitch	5mm			
Input signal	SIN/COS 50mVp-p			
Output signal	5V RS422/TTL		24V O.C.	
Resolution	5µm	10µm	5µm	10µm
Repeatability	±10µm	±20µm	±10µm	±20µm
Maximum output frequency	64KHz	32KHz	64KHz	32KHz
Maximum travel speed	1.5m/sec			
Input voltage	5VDC±5%			
Input current	500mA			
Operating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

2. Ordering Code:



3. Dimensions:

- ST-A



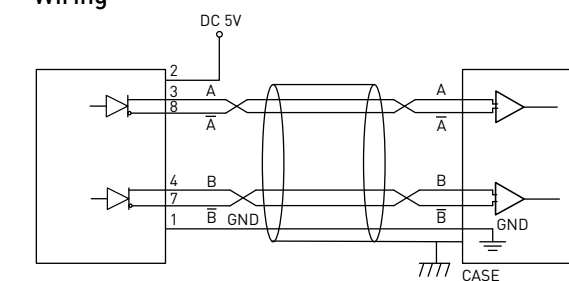
4. Pin Assignment:

- 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

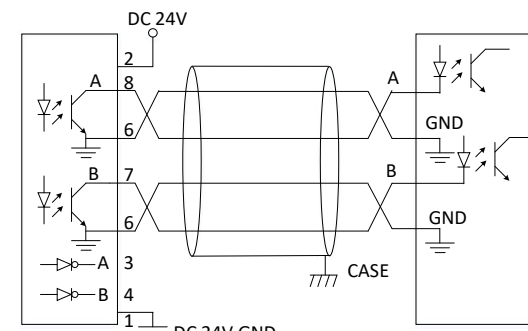
Differential signal input to drive

- 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:

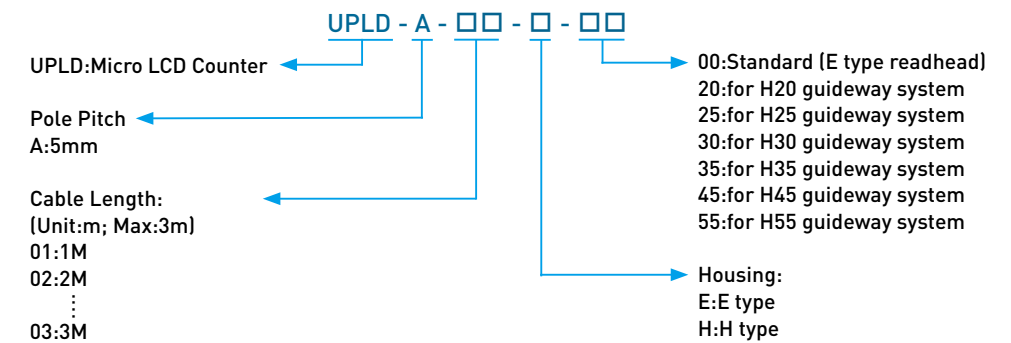
Display	8 digits LCD display with +/- sign	
Accuracy@20°C	±(80+15xL) μm (L:Length (unit:m))	
Resolution	5μm	
Repeatability ⁽¹⁾	±10μm	
Operating speed	3m/sec (maximum 2G acceleration)	
Input voltage	commercial AA batteries × 2	
Battery life ⁽²⁾	1 year by setting speed at 1.5m/s	
Operating temperature	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
	Programmable	5 sets of maximum velocity settings (default:1.5m/s)
		Angular measurement radius setting (minimum:50mm)
		5 sets of programmable compensation reference points
	Display	set programmable coefficient ratio
		Indicate installed condition
	Other	Power monitor and display
		Keypad lock
Parameter save function		
		5 sets of independent incremental counters for relative measurement.

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

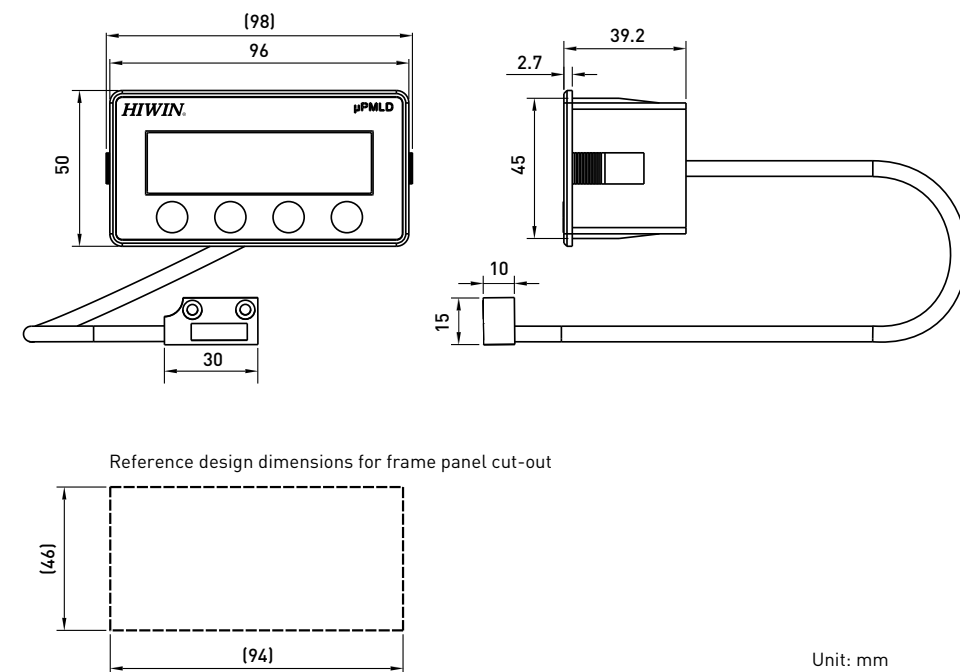
(2) Battery capacity is 2200mAh(ambient temperature: 20+/-5°C).

Capacity performance will vary under different environmental temperatures.

1.2 Ordering Code:



1.3 Dimensions:



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:

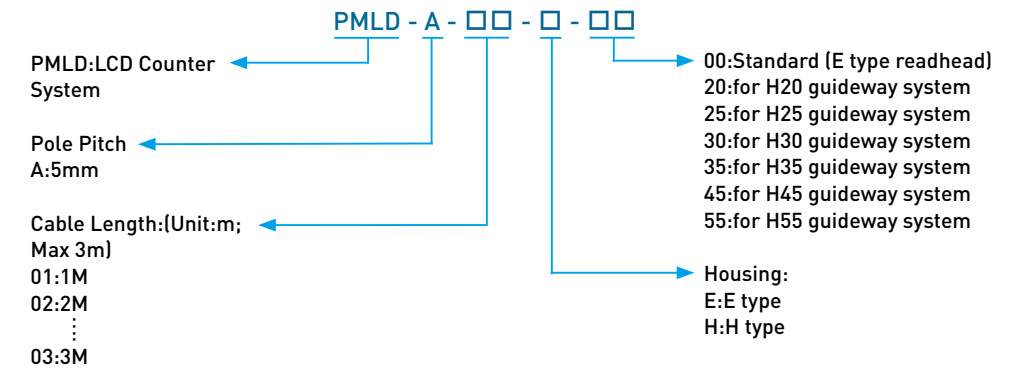
Display		8 digits LCD display with +/- sign
Accuracy@20°C		±(80+15xL) μm (L:Length (unit: m))
Resolution		5μm
Repeatability ⁽¹⁾		±10μm
Operating speed		3m/sec (maximum 2G acceleration)
Input voltage		commercial AA batteries × 2
Battery life ⁽²⁾		1 year by setting speed at 1.5m/s
Operating temperature		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
	Programmable	5 sets of maximum velocity settings (default:1.5m/s)
		Angular measurement radius setting (minimum:50mm)
		5 sets of programmable compensation reference points
	Display	set programmable coefficient ratio
		Indicate installed condition
	Other	Power monitor and display
		Keypad lock
		Parameter save function
		5 sets of independent incremental counters for relative measurement.

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

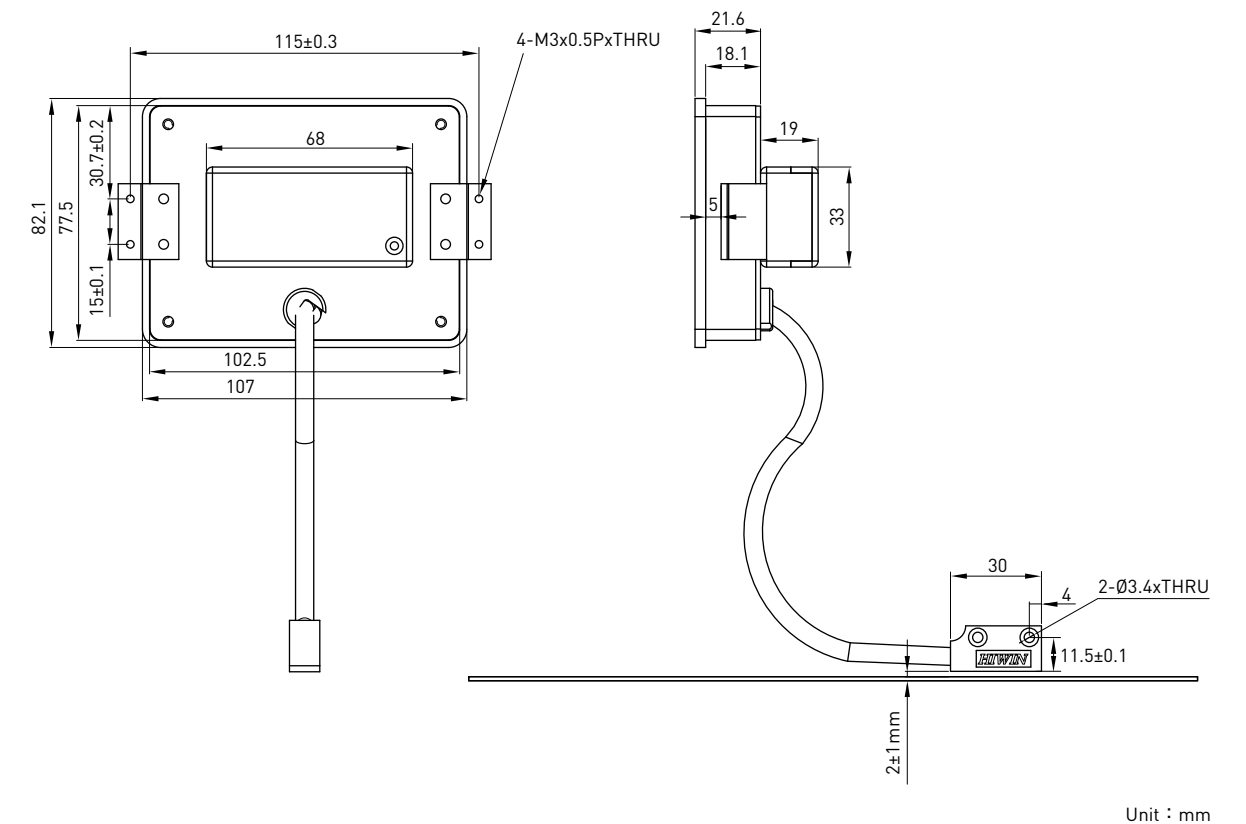
(2) Battery capacity is 2200mAh(ambient temperature: 20+/-5°C).

Capacity performance will vary under different environmental temperatures.

2.2 Ordering Code:



2.3 Dimensions:



3. Single Axis Counter



Features:

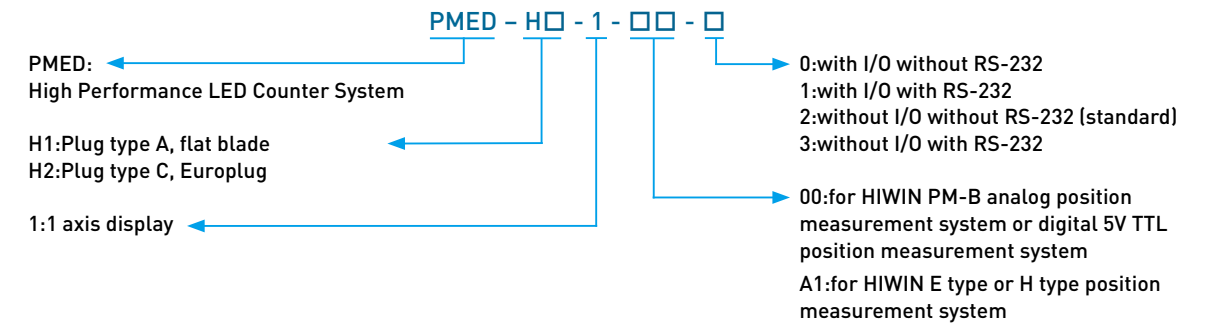
- Compact design, easy installation.
- High brightness LED display with high reliability
- With 4 sets Relay output, suitable for cutting and wood-processing machines
- With 8 sets default frequently used position, without complicated setting
- Could be used with other digital optical encoders



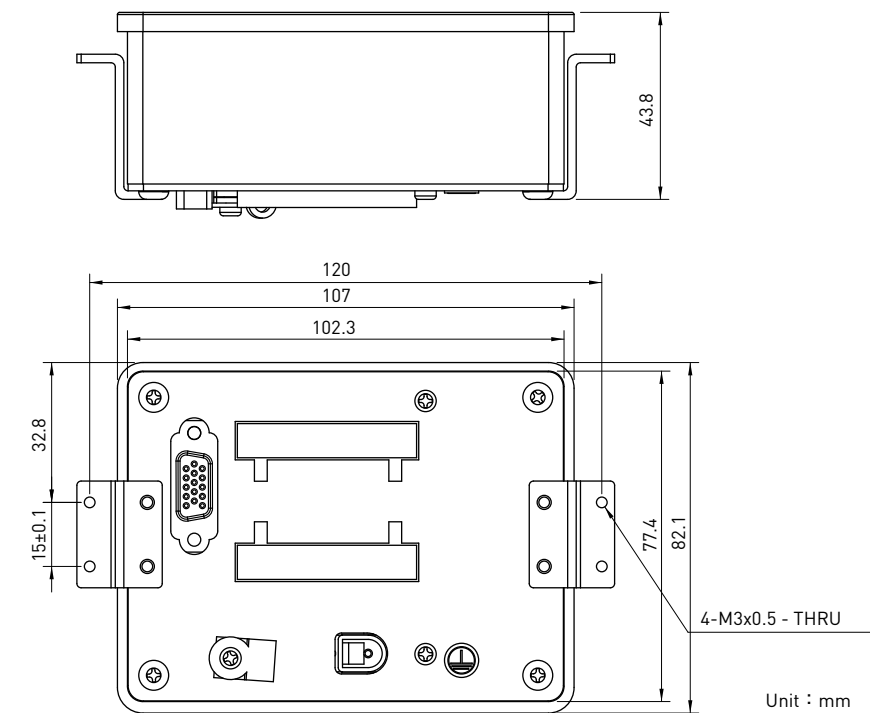
3.1 Specifications:

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)

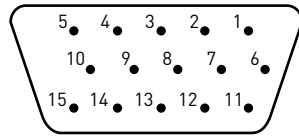
3.2 Ordering Code:



3.3 Dimensions:

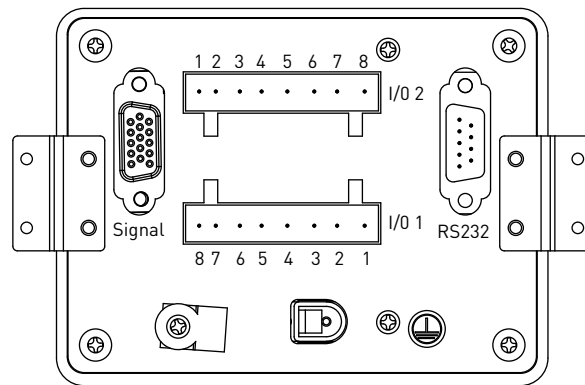


3.4 Input signal descriptions:



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

4. Multi-Axis Counter



Features:

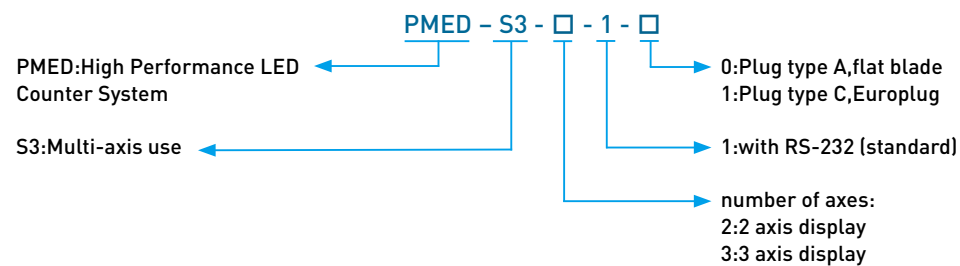
- Compact design, easy installation.
- High brightness LED display with high reliability
- Easy operation, suitable for cutting machines, traditional gantry milling machines, and programmable drilling machines



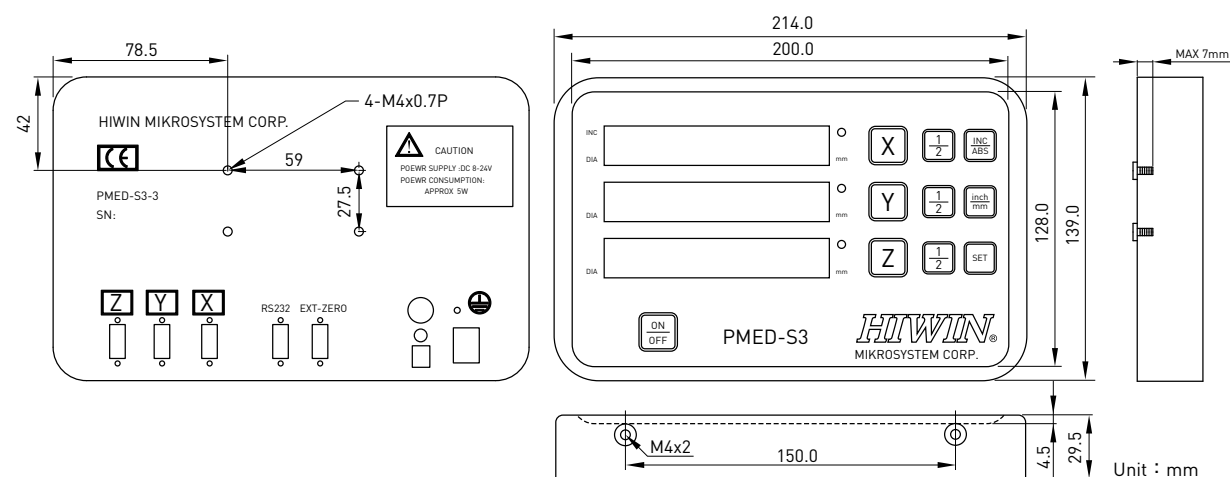
4.1 Specifications:

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

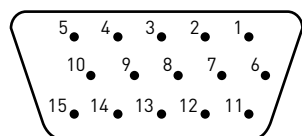
4.2 Ordering Code:



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:

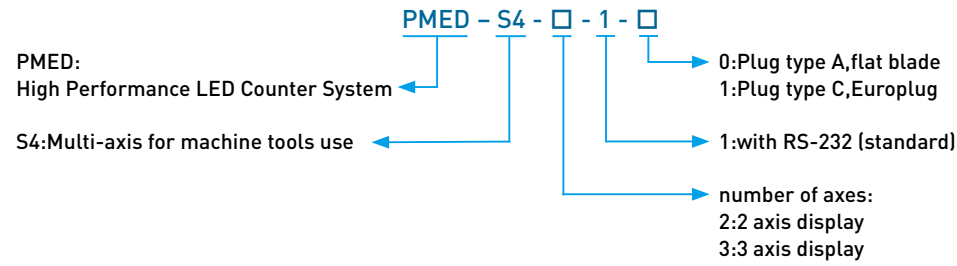
- Easy operation and easy installation.
- High brightness LED display with high reliability
- Easy operation, suitable for CNC machine centers, gantry machine centers, milling machines and drilling machines



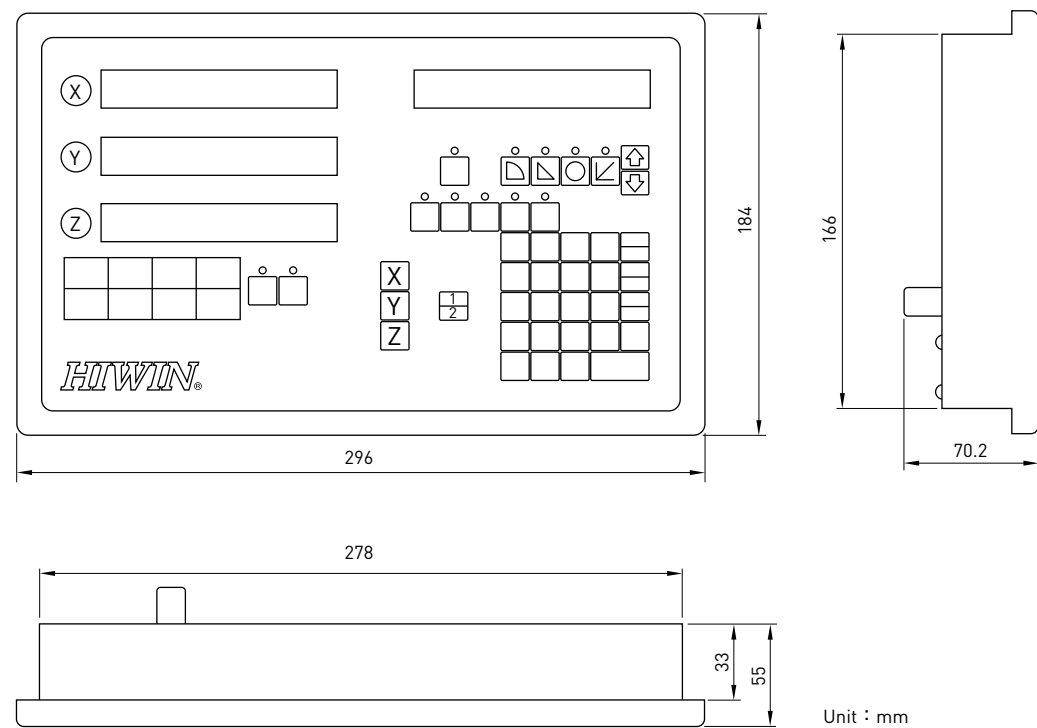
5.1 Specifications:

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)	
	auto-center (1/2) function	
Other	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

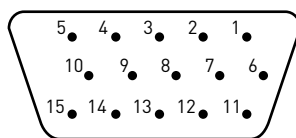
5.2 Ordering Code:



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

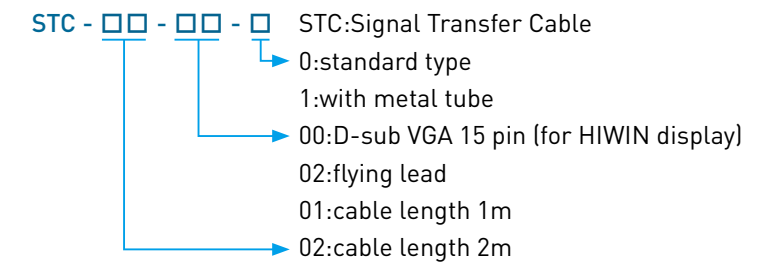
IV. Accessories

1. Signal Transfer Cable

- Signal transfer cable for alternative display devices



Ordering Code:

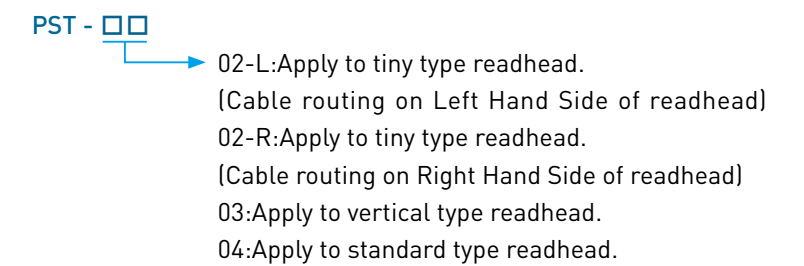


2. Installation Fixture

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

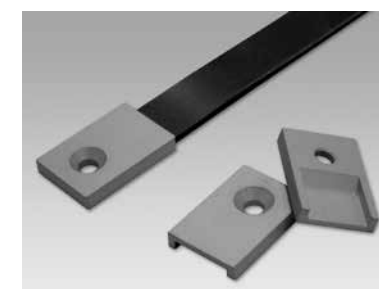


Ordering Code:



3. End Clamp

- Preventing the warpage of scale under harsh environment.



Ordering Code:

PSF - 01

Position Measurement System Technical Information

Publication Date : April 2007, first edition

Print Date : November 2022, 7th edition

1. HIWIN is the registered trademark of HIWIN Group. For your protection, avoid buying counterfeit products from unknown sources.
 2. Actual products may differ from specifications and photos provided in this catalog. These differences may be the result of various factors including product improvements.
 3. HIWIN will not sell or export products or processes restricted under the "Foreign Trade Act" or related regulations. Export of restricted products should be approved by proper authorities in accordance with relevant laws and shall not be used to manufacture or develop nuclear, biochemical, missiles or other weapons.
-



Global Sales and Customer Service Site

HIWIN GmbH

OFFENBURG, GERMANY
www.hiwin.de
www.hiwin.eu
info@hiwin.de

HIWIN Schweiz GmbH

JONA, SWITZERLAND
www.hiwin.ch
info@hiwin.ch

HIWIN KOREA

SUWON • CHANGWON, KOREA
www.hiwin.kr
info@hiwin.kr

HIWIN JAPAN

KOBE • TOKYO • NAGOYA • NAGANO •
TOHOKU • SHIZUOKA • HOKURIKU •
HIROSHIMA • FUKUOKA • KUMAMOTO,
JAPAN
www.hiwin.co.jp
info@hiwin.co.jp

HIWIN s.r.o.

BRNO, CZECH REPUBLIC
www.hiwin.cz
info@hiwin.cz

HIWIN CHINA

SUZHOU, CHINA
www.hiwin.cn
info@hiwin.cn

HIWIN USA

CHICAGO, U.S.A.
www.hiwin.us
info@hiwin.com

HIWIN FRANCE

STRASBOURG, FRANCE
www.hiwin.fr
info@hiwin.de

Mega-Fabs Motion Systems, Ltd.

HAIFA, ISRAEL
www.mega-fabs.com
info@mega-fabs.com

HIWIN Srl

BRUGHERIO, ITALY
www.hiwin.it
info@hiwin.it

HIWIN SINGAPORE

SINGAPORE
www.hiwin.sg
info@hiwin.sg

HIWIN MIKROSYSTEM CORP.

No.6, Jingke Central Rd.,
Taichung Precision Machinery Park,
Taichung 40852, Taiwan
Tel: +886-4-23550110
Fax: +886-4-23550123
www.hiwinmikro.tw
business@hiwinmikro.tw