

Positioning Measurement System



Technical Information



Multi Axis Robot

Pick-and-place / Assembly / Grinding and Polishing / Semiconductor / Light Industry / Automotive industry / Food industry

- Articulated Robot
- Delta Robot
- Movable Delta Robot
- SCARA Robot
- Wafer Robot
- Electric Gripper



Single Axis Robot

Precision / Semiconductor / Medical / FPD

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



Medical Equipment

Hospital / Rehabilitation centers / Nursing homes

- Robotic Gait Training System
- Hygiene System
- The Robotic Endoscope Holder
- Robot for Upper Limb Exercise



Ballscrew

Precision Ground / Rolled

- Super S series
- Super T series
- Mini Roller
- Ecological & Economical lubrication Module E2
- Rotating Nut (R1)
- Energy-Saving & Thermal-Controlling (C1)
- Heavy Load Series (RD)



Linear Guideway

Automation / Semiconductor / Medical

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



Direct Drive

CNC Tilting Rotary

Aerospace / Medical / Auto industry

- RAB-800
- RAB-500



Bearing

Machine tools / Robot

- Crossed Roller Bearings
- Ball Screw Bearings
- Linear Bearing
- Support Unit



AC Servo Motor & Drive

Semiconductor / Packaging machine / SMT / Food industry / LCD

- Drives-D1, D1-N, D2
- Motors-400W-2000W



Torque Motor

(Direct Drive Motor)

Inspection / Testing equipment /

Machine tools/Robot

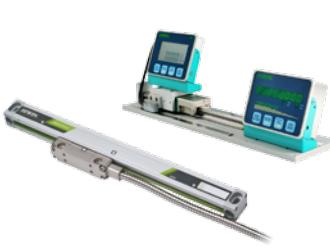
- Rotary Tables-TMS,TMY,TMN
- TMRW Series



Linear Motor

Automated transport / AOI application / Precision / Semiconductor

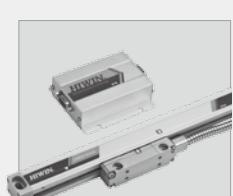
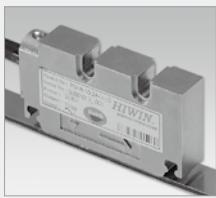
- With Iron-core
- Coreless Type
- Linear Turbo LMT
- Planar Servo Motor
- Air Bearing Platform
- X-Y Stage
- Gantry Systems



Positioning Measurement System

Cutting machines / Traditional gantry milling machines / Programmable drilling machines

- High Resolution
- Signal Translator
- High-precision Enclosed
- High Efficiency Counter



I. High Resolution Positioning Measurement System

1. Positioning Scale	1
2. Positioning Measurement - Tiny Type	2
3. Positioning Measurement - Standard Type	5
4. Positioning Measurement - Vertical Type	8
5. Positioning Measurement - PG Type	12
6. Positioning Measurement - E Type	16
7. Positioning Measurement - H Type	18

II. Signal Translator.....20

III. High-precision Enclosed Positioning Measurement System.....23

IV. High Efficiency Counter

1. Micro LCD counter	27
2. LCD counter system	29
3. High Efficiency Single Axis Counter	31
4. Multi-axis Counter.....	34
5. High Efficiency Multi-axis Counter	36

V. Accessories

1. Signal Transfer Cable.....	38
2. Positioning Scale Installation Fixture	38
3. Positioning Scale Fixture	38

VI. Customer's Requirements(PM).....39

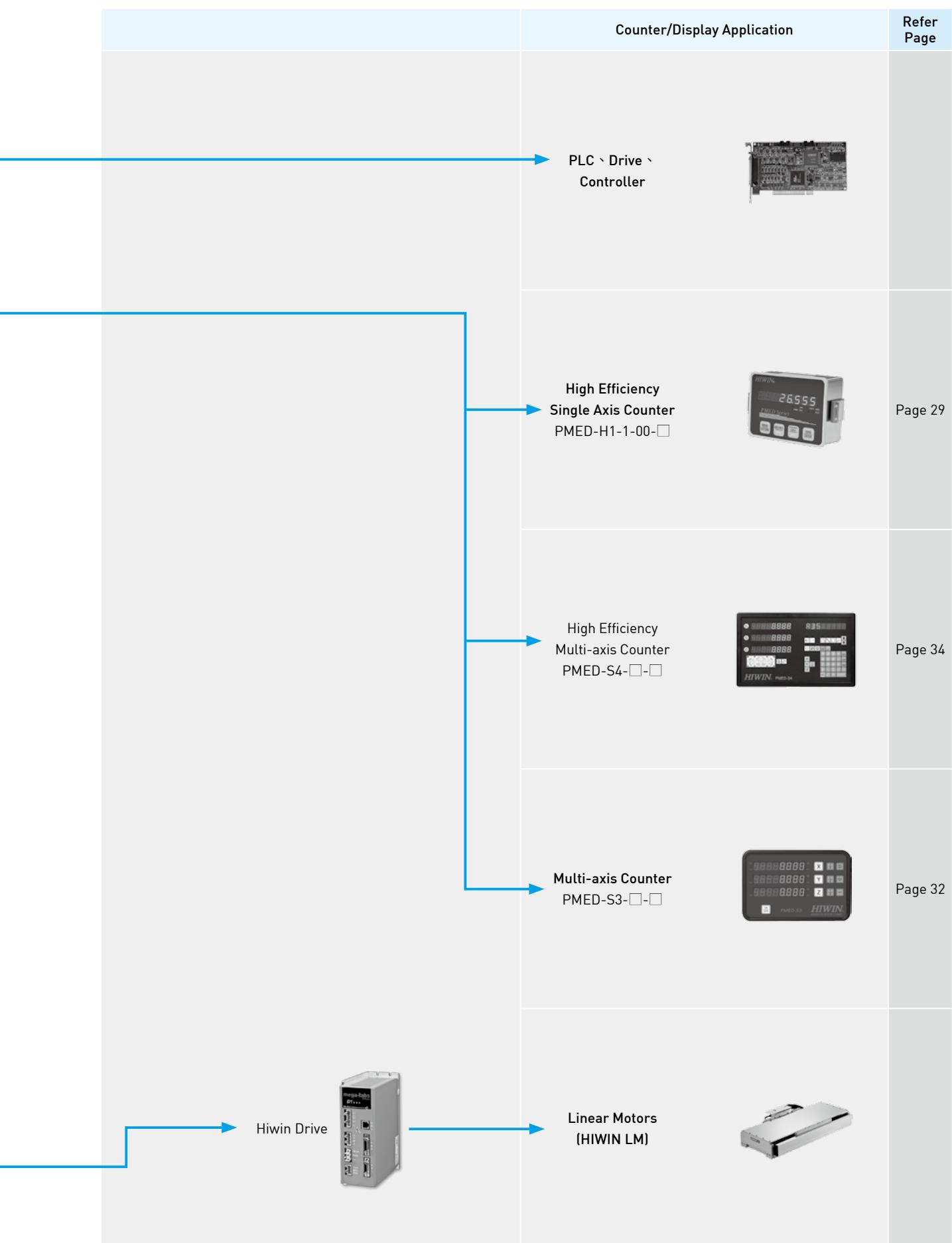
The Component Breakdown of the Positioning Measurement System - 1mm Placement Figure (Analog)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector
1mm PS-B-□□□□□	Page 1	1μm	T Type PM-B-□□-□A-T-□□	Page 2		Flying Lead 
			Standard Type PM-B-□□-□A-S-□□	Page 5		D-sub VGA 15 Pin 
			Vertical Type PM-B-□□-□A-V-□□	Page 11	Analog	D-sub 15 Pin  17 Pin Circular Plug 
			PG Type PM-B-□□-□A-G-□□-□□	Page 8		SCSI 14 Pin  SCSI 14 Pin (with screw) 
						SCSI 20 Pin 

Translator	Refer Page	Trunk Connector	Refer Page	Counter/Display Application	Refer Page
				<p>High Efficiency Single Axis Counter PMED-H1-1-00-□</p> 	Page 29
				<p>Hiwin Drive</p>  <p>Linear Motors (HIWIN LM)</p> 	

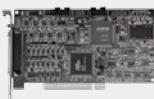
The Component Breakdown of the Positioning Measurement System - 1mm Placement Figure (Digital)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector
1mm PS-B-□□□□□	Page 1	1μm	T Type PM-B-□□-□D-T-□□	Page 2		Flying Lead
						
			Standard Type PM-B-□□-□D-S-□□	Page 5	Digital	
						
			Vertical Type PM-B-□□-□D-V-□□	Page 11		
						
			PG Type PM-B-□□-□D-G-□□-□□	Page 8		
						

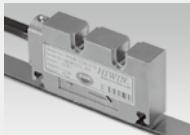
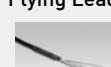


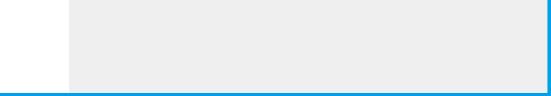
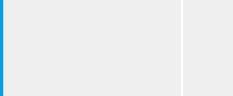
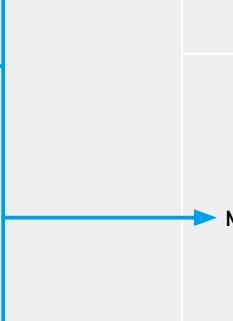
The Component Breakdown of the Positioning Measurement System - 5mm Placement Figure (Analog)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector
5mm PS-A-□□□□□	Page 1	5µm	E Type PM-A-□□-□A-E-00 	Page 16	Analog	  

Translator	Refer Page	Trunk Connector	Refer Page	Counter/Display Application	Refer Page
				Micro LCD Counter UPLD-A-□□-□-□□	Page 27
				LCD Counter System PMLD-A-□□-□-□□	Page 29
				High Efficiency Single Axis Counter PMED-H1-1-A1-□	Page 31
Translator ST-A-□□	Page 20	D-sub 9 Pin to D-sub VGA 15 Pin STC-□□-00-□	Page 21	High Efficiency Multi-axis Counter PMED-S4-□-□	Page 36
				Multi-axis Counter PMED-S3-□-□	Page 34
					

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

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector
5mm PS-A-□□□□□□	Page 1	5μm	Vertical Type PM-A-□□-□D-V-□□	Page 11	Digital	 

Counter/Display Application	Refer Page
	
	 High Efficiency Multi-axis Counter PMED-S4-□-□
	 Multi-axis Counter PMED-S3-□-□
	 High Efficiency Single Axis Counter PMED-H1-1-00-□
  Hiwin Drive	 Linear Motors (HIWIN LM)

I. High Resolution Positioning Measurement System

1. Positioning Scale



Features:

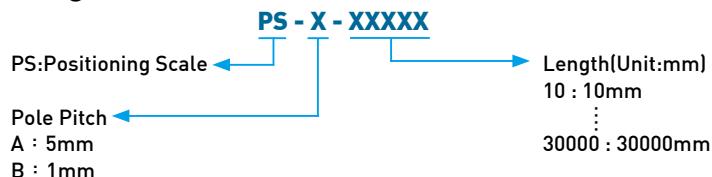
- Compatible with various measurement instruments to achieve different accuracy requirements.
- Magnetic scale can maintain performance under severe ambient conditions caused by oil, water or dust to gain required accuracy and signal feedback.



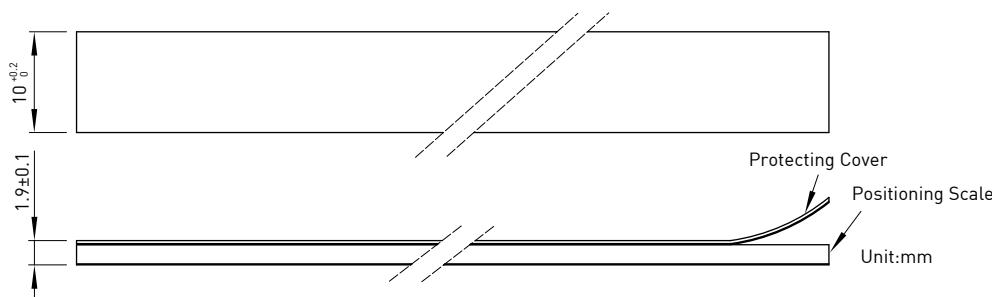
1.1 Specifications:

Pole pitch	1mm	5mm
Accuracy@20°C	$\pm 20 \mu\text{m}/\text{m}$	$\pm (80+15xL) \mu\text{m}$ (L : Length(Unit: m))
Width	10mm (0mm~+0.2mm)	
Thickness	1.9mm ($\pm 0.1\text{mm}$)	
Maximum scale length	24m	30m
Coefficient of linear thermal expansion	$(11 \pm 1) \times 10^{-6}\text{m/K}$	
Working temperature	0°C~50°C	
Storage temperature	-5°C~70°C	
Protection class	IP67	

1.2 Ordering Code:



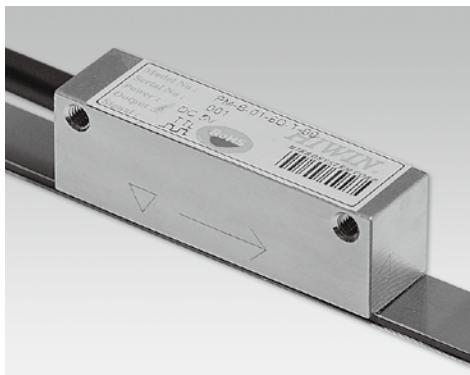
1.3 Dimensions:



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. Positioning Measurement- Tiny Type



Features:

- Tiny shape
- Digital or analog output available
- Simple design and easy-mounting
- Same installation holes as other optical encoders, easy to switch and replace
- Resolution up to 1 μ m.
- Repeatability up to ±2 μ m.
- Available gap up to 0.4mm.



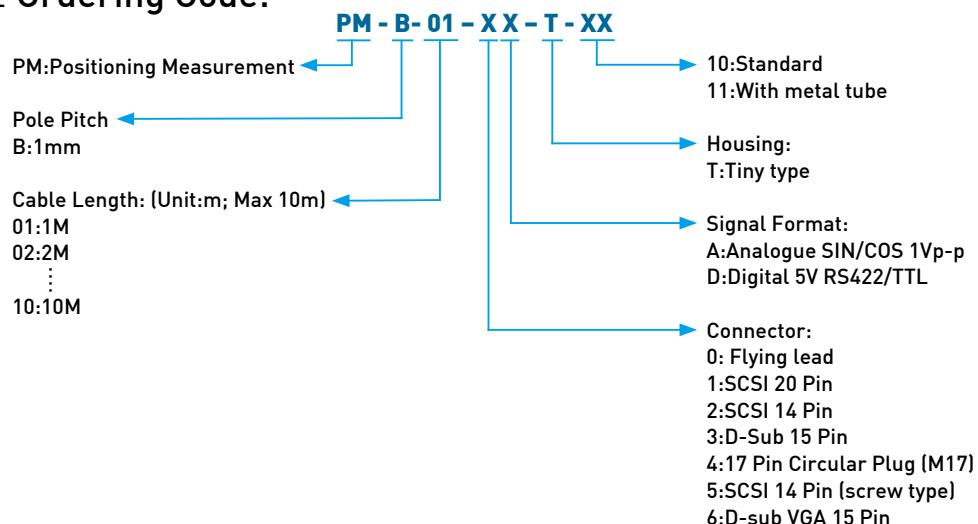
2.1 Specifications:

Pole Pitch	1mm	
Available gap ⁽¹⁾	0.4mm	
Signal format	Analogue	Digital
Output signal	SIN/COS 1Vp-p	5V TTL/RS422
Resolution	1mm	1μm
Repeatability ⁽²⁾	±3μm	±2μm
Reference signal	1 mm/pulse	
Maximum travel speed	10m/sec	5m/sec
Input voltage	5VDC ± 5%	
Operating temperature	0°C~50°C	
Storage temperature	-5°C~70°C	
Protection class	IP67	

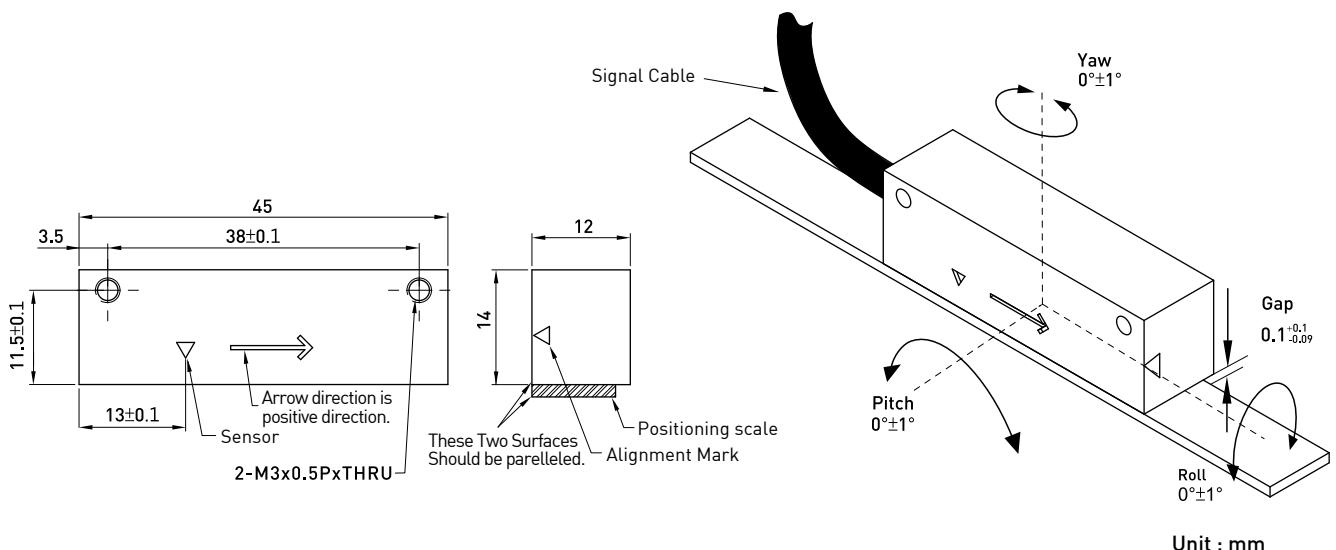
Note: (1) Please refer Chap 2.7 for Gap-Repeatability relationship.

(2) The data were measured while gap is 0.1mm.

2.2 Ordering Code:



2.3 Dimensions:



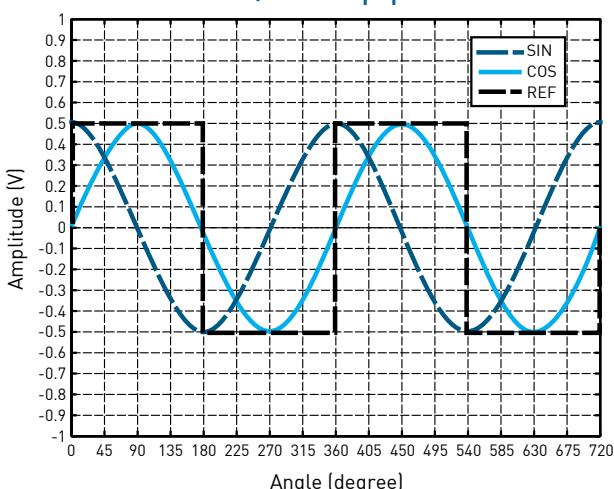
2.4 Pin Assignment:

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)		Flying Lead
	Analogue	Digital		Analogue	Digital	Analogue	Digital	Analogue	Digital	Analogue	Digital	Analogue	Digital	
Power	5VDC	Brown	Brown	1		3	3	4	7	4/5		1	1	Brown
	GND	White		8		2	2	12	2	12/13		2	2	White
Output Signal	SIN+	A+	Green	10		16	4	9	14	9		11	3	Green
	SIN-	A-	Yellow	11		17	5	1	6	1		12	9	Yellow
Reference Signal	COS+	B+	Blue	3		18	6	10	13	10		13	4	Blue
	COS-	B-	Red	4		19	7	2	5	2		14	10	Red
REF+	Z+	Purple	Purple	5		8	8	3	12	3		7	7	Purple
REF-	Z-	Gray		6		9	9	11	4	11		8	8	Gray
Shield			Case		1/Case		Case		Case		Case		Case	

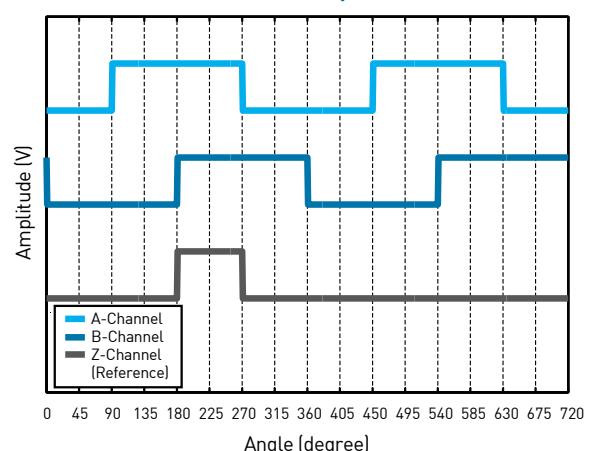
Note: (1)17 Pin Circular Plug; Brnd: INTERCONTEC; P/N:AKU874MR1087004A000

2.5 Signal Format:

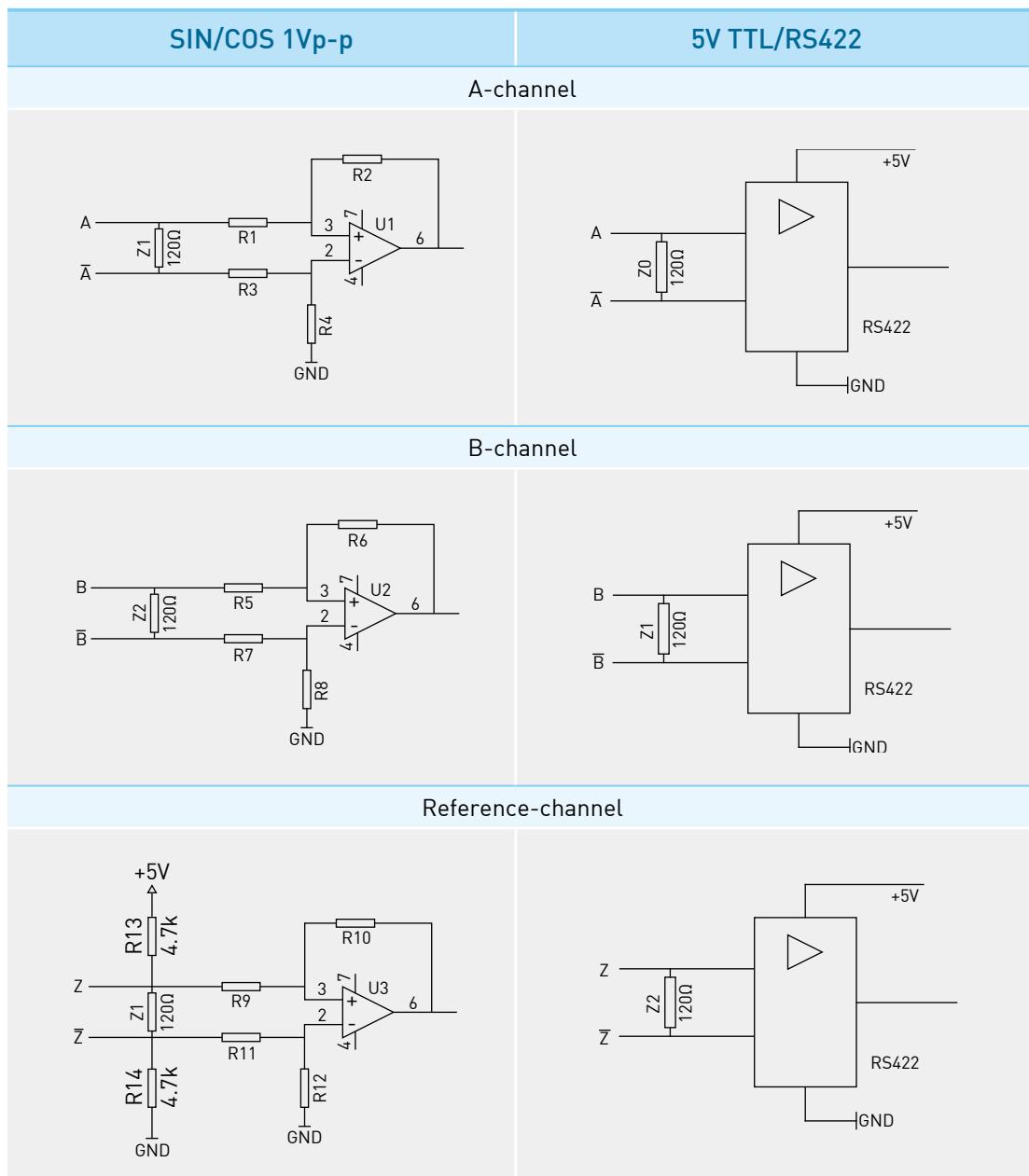
SIN/COS 1Vp-p



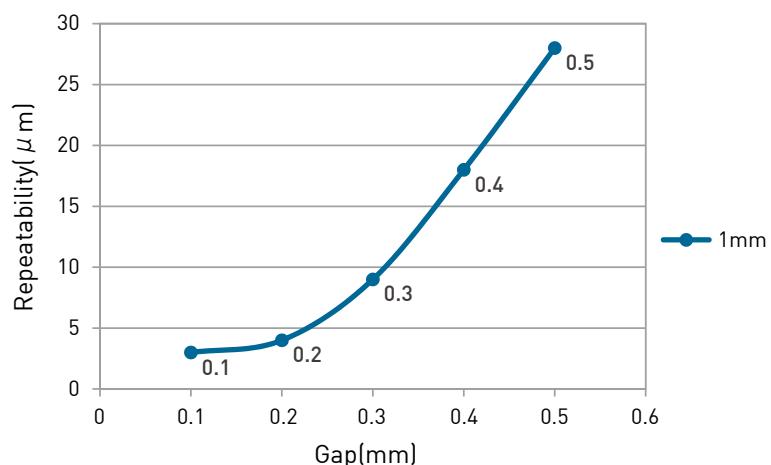
5V TTL/RS422



2.6 Recommended Input Circuit:



2.7 Gap-Repeatability Relationship:



3. Positioning Measurement- Standard Type



Features:

- Digital or analog signal output available
- Simple design and easy-mounting
- Same installation holes as other optical encoders, easy to switch and replace
- Waterproof and dustproof
- Optional metal protection tube
- Resolution up to 1 μ m.
- Repeatability up to ± 2 μ m.
- Available gap up to 0.4mm.



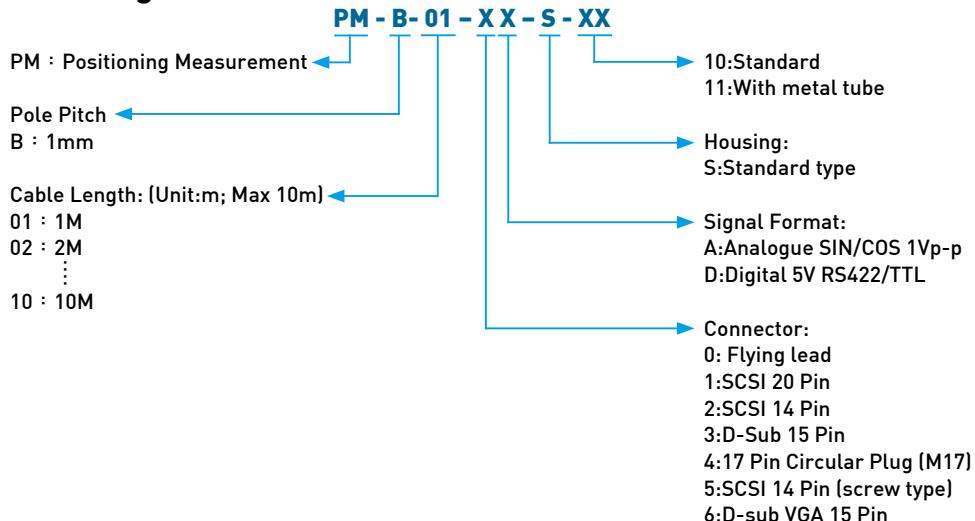
3.1 Specifications:

Pole Pitch	1mm	
Available gap ⁽¹⁾	0.4mm	
Signal format	Analogue	Digital
Output signal	SIN/COS 1Vp-p	5V TTL/RS422
Resolution	1mm	1μm
Repeatability ⁽²⁾	±3μm	±2μm
Reference signal	1 mm/pulse	
Maximum travel speed	10m/sec	5m/sec
Input voltage	5VDC ± 5%	
Operating temperature	0°C~50°C	
Storage temperature	-5°C~70°C	
Protection class	IP67	

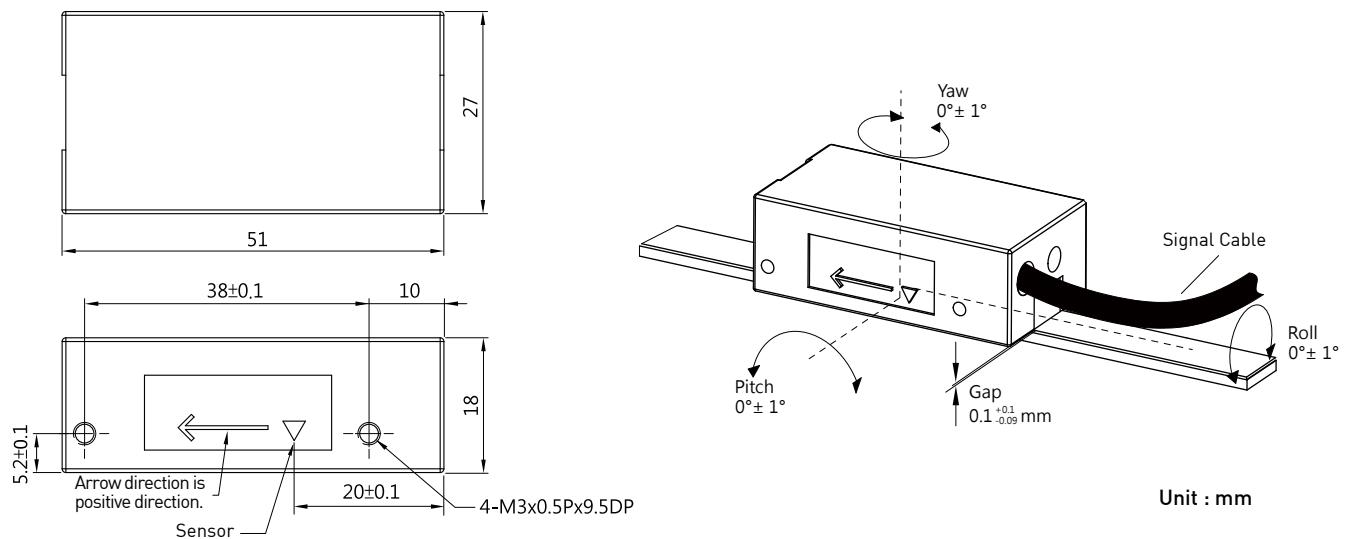
Note: (1) Please refer Chap 3.7 for Gap-Repeatability relationship.

(2) The data were measured while gap is 0.1mm.

3.2 Ordering Code:



3.3 Dimensions:

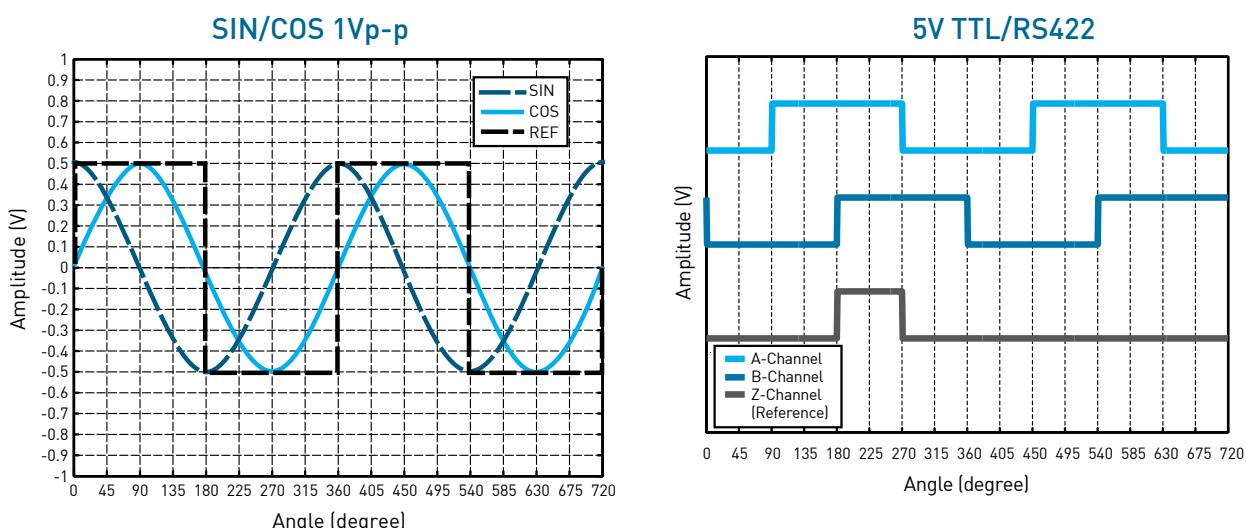


3.4 Pin Assignment:

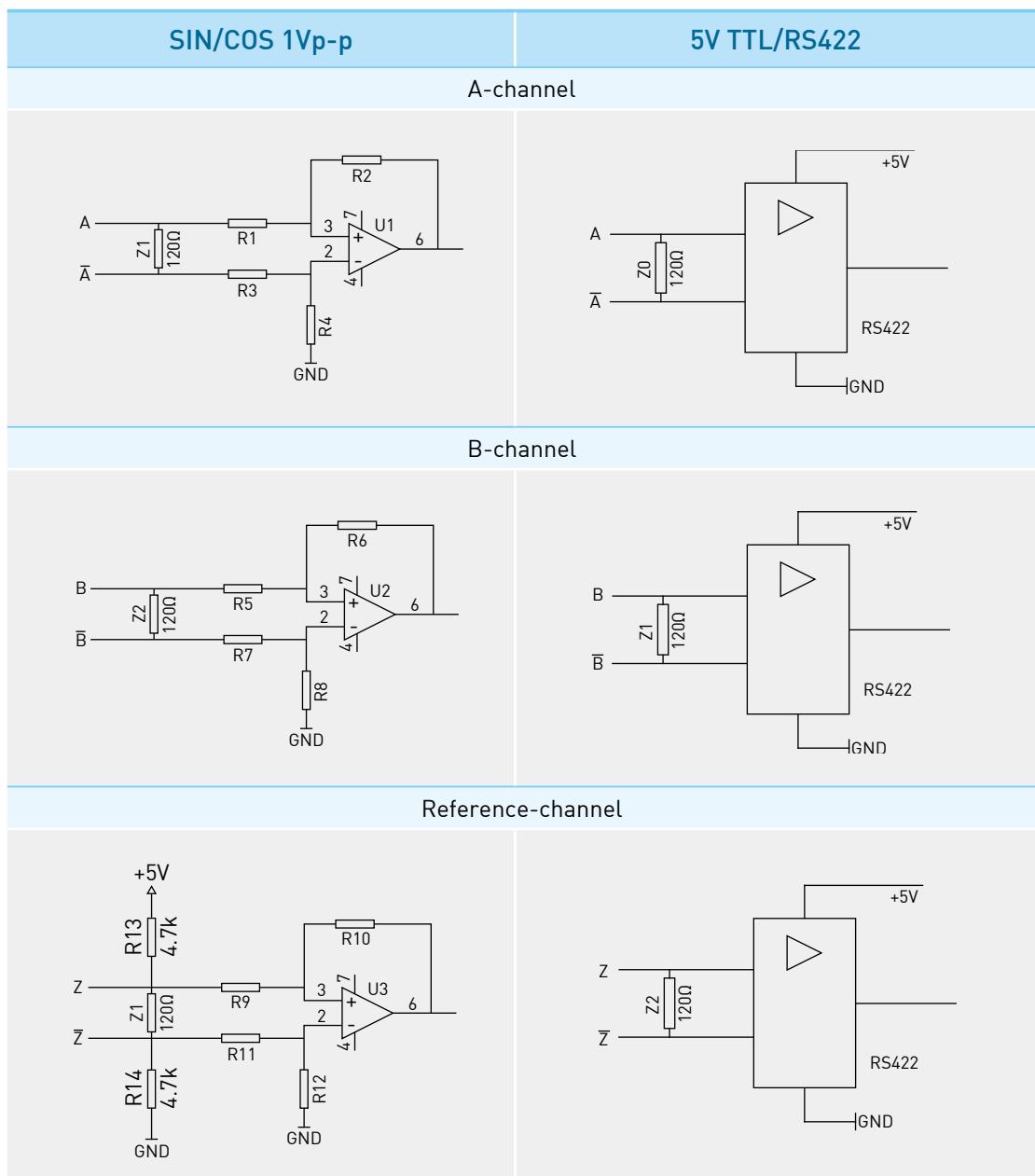
Function	Signal		Color	Connector (male) (SCSI 14 Pin) Analogue	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Flying Lead
	Analogue	Digital			Analogue	Digital	Analogue	Digital		Analogue	Digital	
Power	5VDC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

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

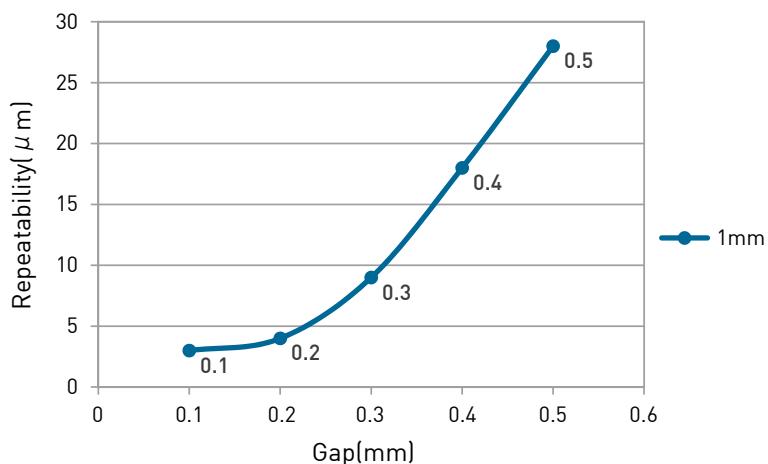
3.5 Signal Format:



3.6 Recommended Input Circuit:



3.7 Gap-Repeatability Relationship:



4. Positioning Measurement- PG Type



Features:

- Digital or analog signal output available
- Compact design and compatible with HIWIN linear guideways
- Cost-effective and reliable
- Optimal solution for automation equipment that requires precise position feedback
- Resolution up to 1 μ m.
- Repeatability up to ±2 μ m.
- Available gap up to 0.4mm.



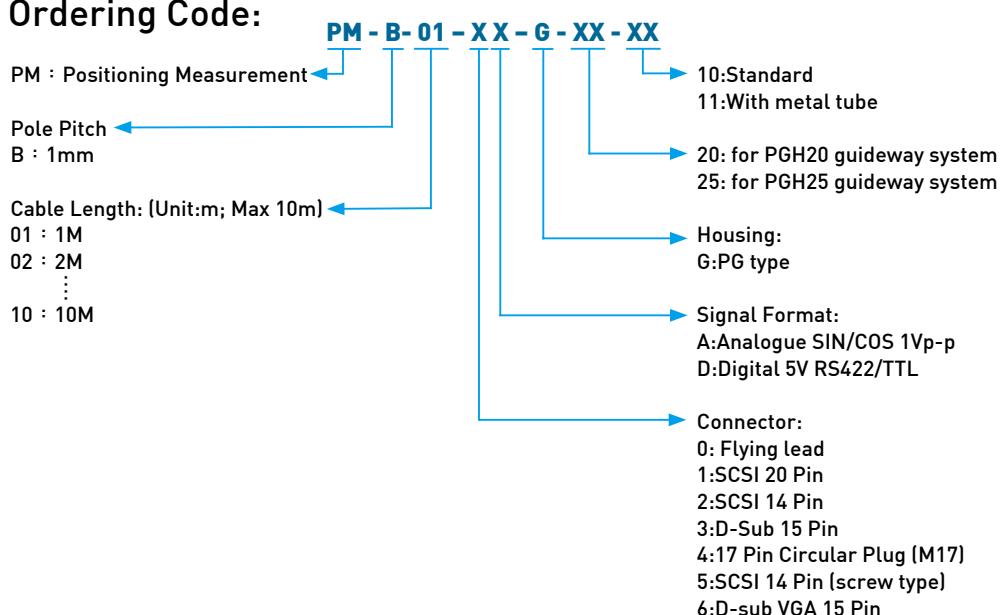
4.1 Specifications:

Pole Pitch	1mm	
Available gap ⁽¹⁾	0.4mm	
Signal format	Analogue	Digital
Output signal	SIN/COS 1Vp-p	5V TTL/RS422
Resolution	1mm	1μm
Repeatability ⁽²⁾	±3μm	±2μm
Reference signal	1 mm/pulse	
Maximum travel speed	10m/sec	5m/sec
Input voltage	5VDC ± 5%	
Operating temperature	0°C~50°C	
Storage temperature	-5°C~70°C	
Protection class	IP67	

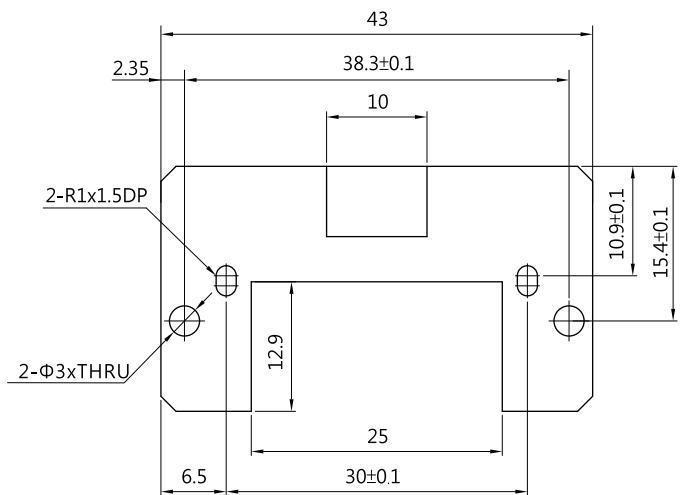
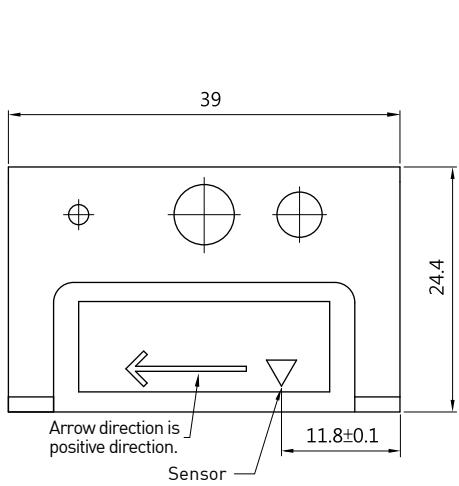
Note: (1) Please refer Chap 4.7 for Gap-Repeatability relationship.

(2) The data were measured while gap is 0.1mm.

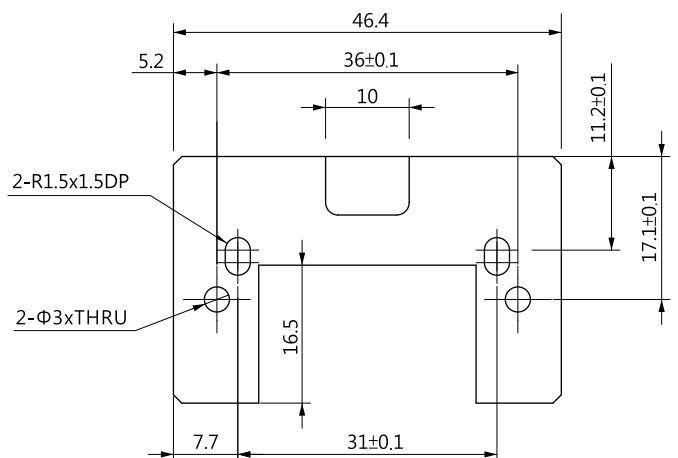
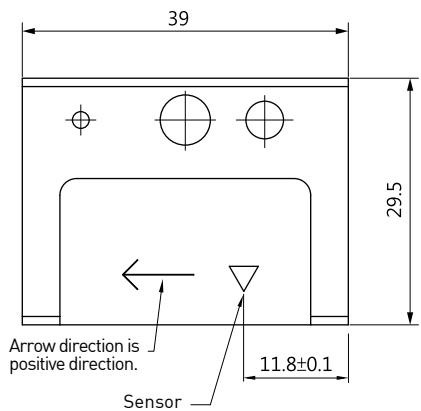
4.2 Ordering Code:



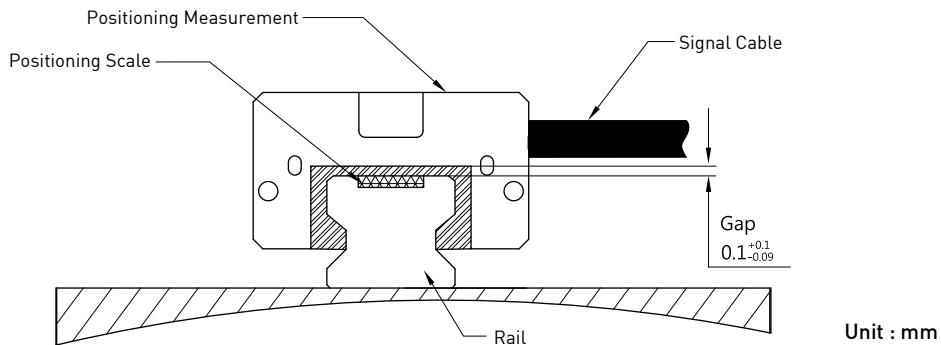
4.3 Dimensions:



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



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



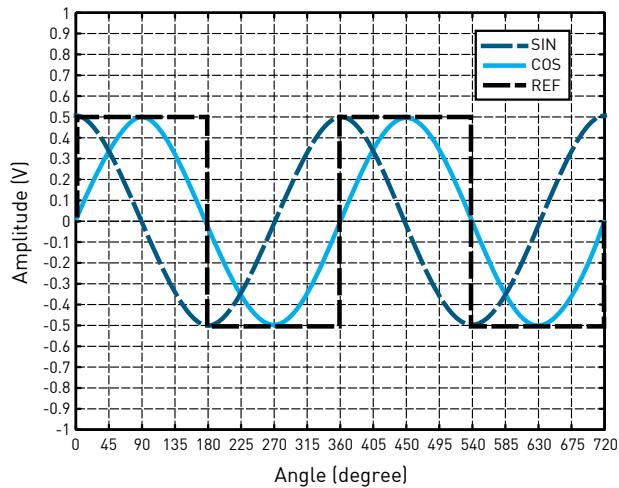
4.4 Pin Assignment:

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

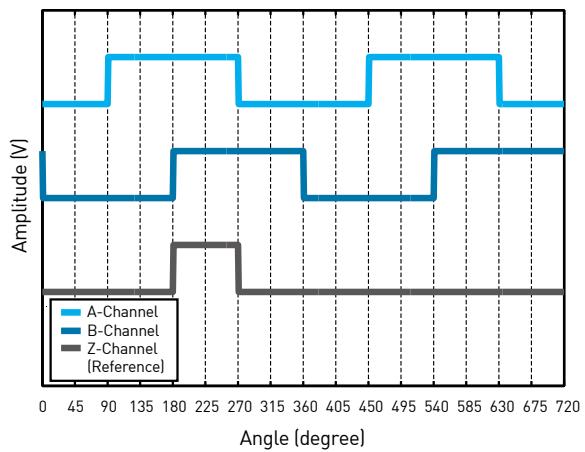
Note: [1]17 Pin Circular Plug; Brnad: INTERCONTEC; P/N:AKU874MR1087004A000

4.5 Signal Format:

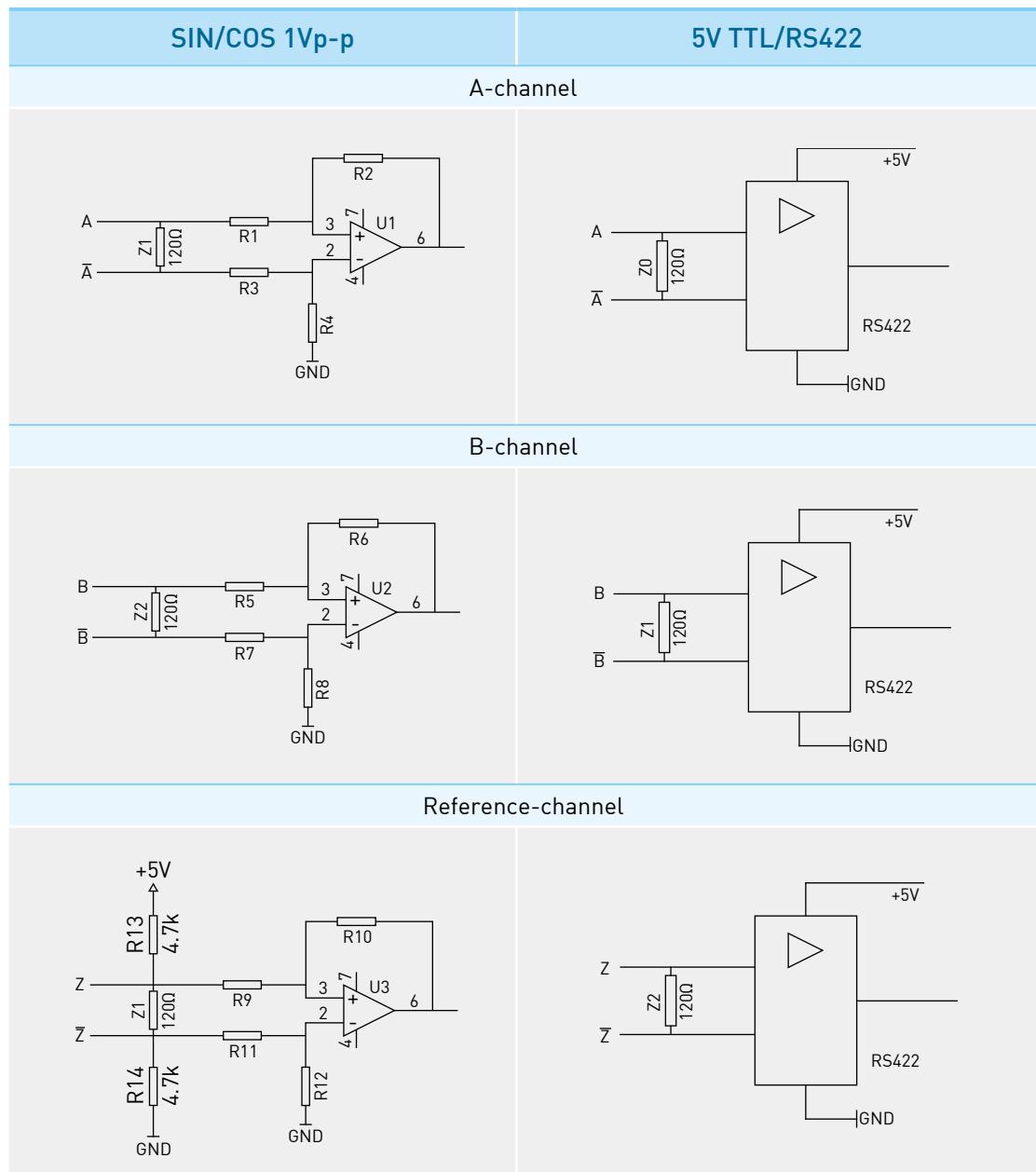
SIN/COS 1Vp-p



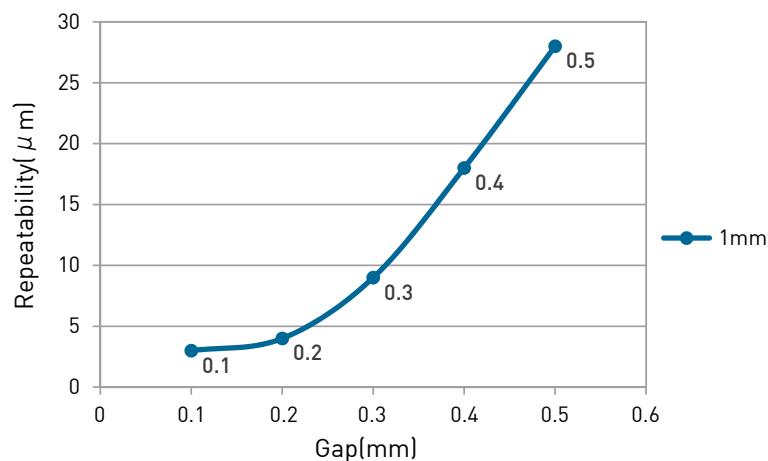
5V TTL/RS422



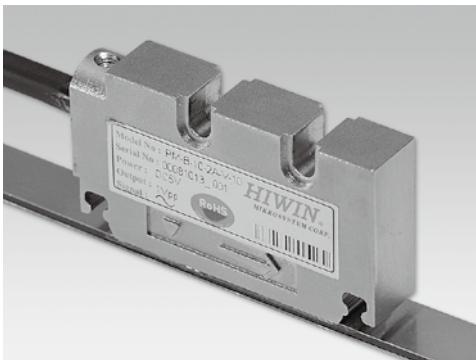
4.6 Recommended Input Circuit:



4.7 Gap-Repeatability Relationship:



5. Positioning Measurement- Vertical Type



Features:

- Digital or Analog signal output available
- Vertical shape, optimal for space-saving applications
- Optional metal protection tube
- Resolution up to 1 μ m.
- Repeatability up to $\pm 2 \mu$ m.
- Available gap up to 4mm.



5.1 Specifications:

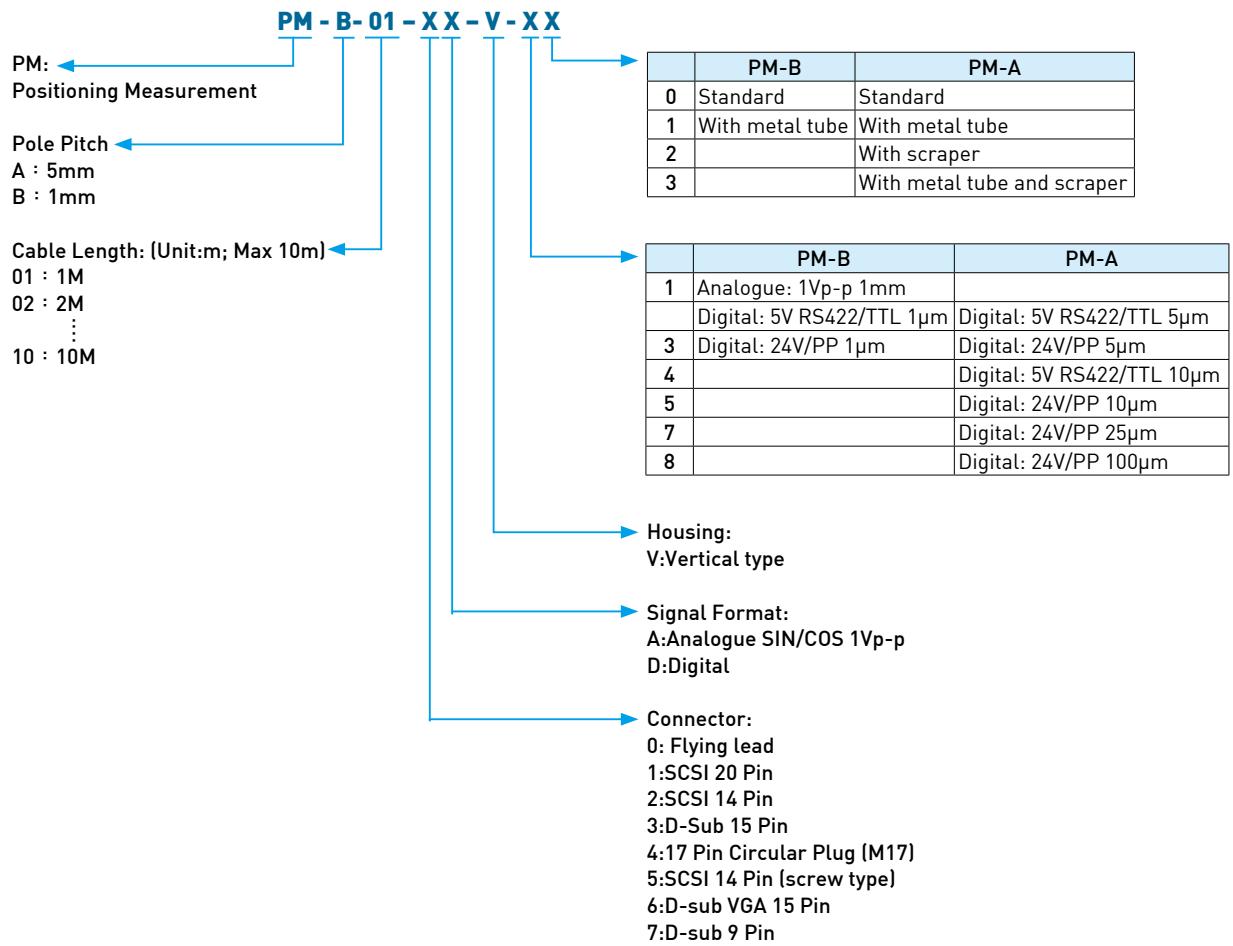
Pole Pitch	1mm		5mm	
Available gap ⁽¹⁾	0.4mm		4mm	
Signal format	Analogue	Digital	Digital	
Output signal	SIN/COS 1Vp-p	5V TTL/RS422	5V TTL/RS422	24V/PP
Resolution ⁽³⁾	1mm	1 μ m	5 μ m	5 μ m
Repeatability ⁽²⁾	$\pm 3\mu$ m	$\pm 2\mu$ m	$\pm 10\mu$ m	$\pm 10\mu$ m
Reference signal	2 mm/pulse	1 mm/pulse	5 mm/pulse	
Maximum travel speed	10m/sec	5m/sec	5m/sec	8m/sec
Input voltage	5VDC $\pm 5\%$			24VDC $\pm 10\%$
Operating temperature	0°C~50°C			
Storage temperature	-5°C~70°C			
Protection class	IP67			

Note: (1) Please refer Chap 5.7 for Gap-Repeatability relationship.

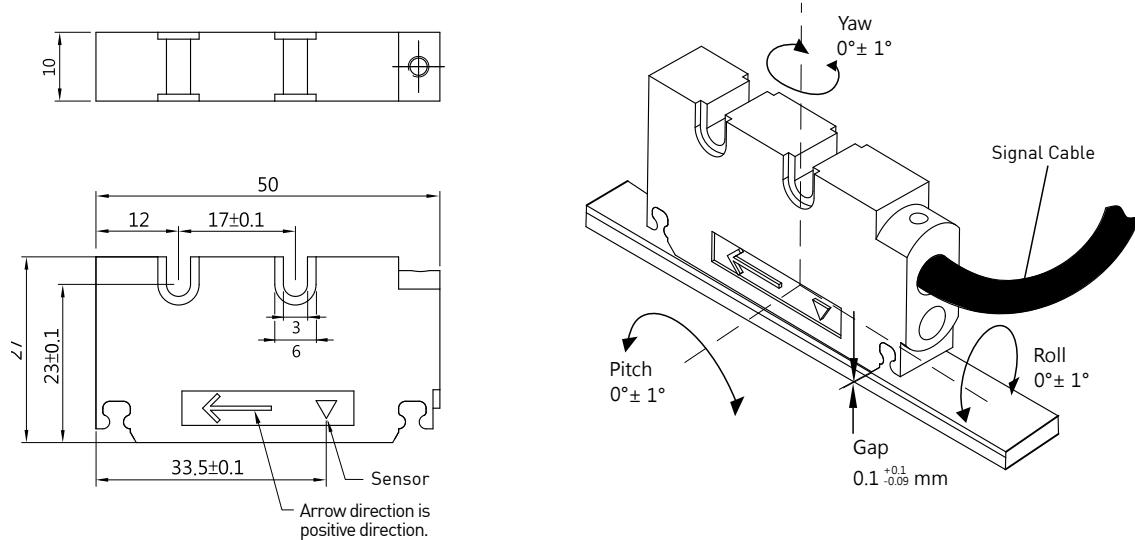
(2) The data of 1mm encoder were measured while gap is 0.1mm; And the data of 5mm encoder were measured while gap is 1mm

(3) If you have other request on resolution, please do not hesitate to contact us.

5.2 Ordering Code:



5.3 Dimensions:



Unit : mm

5.4 Pin Assignment:

5V TTL/RS422

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

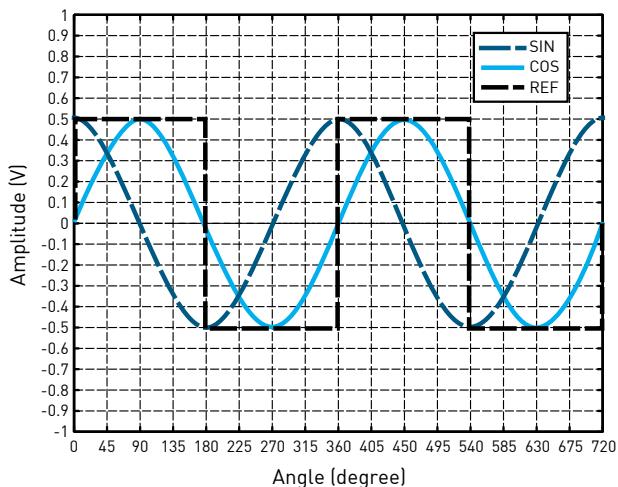
Note: (1)17 Pin Circular Plug; Brnad: INTERCONTEC; P/N:AKU874MR1087004A000

24V/PP

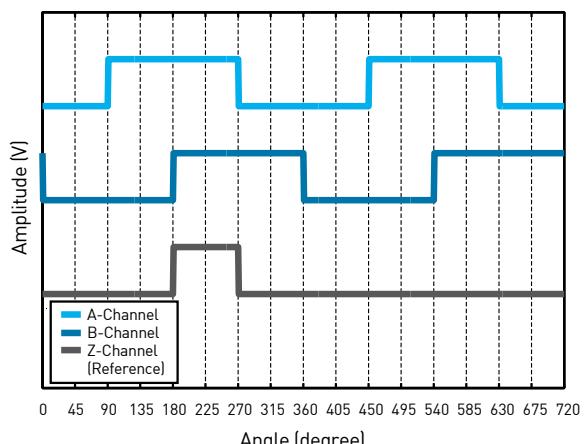
Function	Signal		Color	Connector (male) (D-Sub 9 Pin)	Flying Lead	
	Digital	Digital			Digital	
Power	24V		Brown		2	Brown
	0V		White		1	White
Output Signal	A(PP)		Green		3	Green
	/A(PP)		Yellow		8	Yellow
	B(PP)		Blue		4	Blue
	/B(PP)		Red		7	Red
Reference Signal	Z+		Purple		5	Purple
	Z-		Gray		9	Gray
Shield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

5.5 Signal Format:

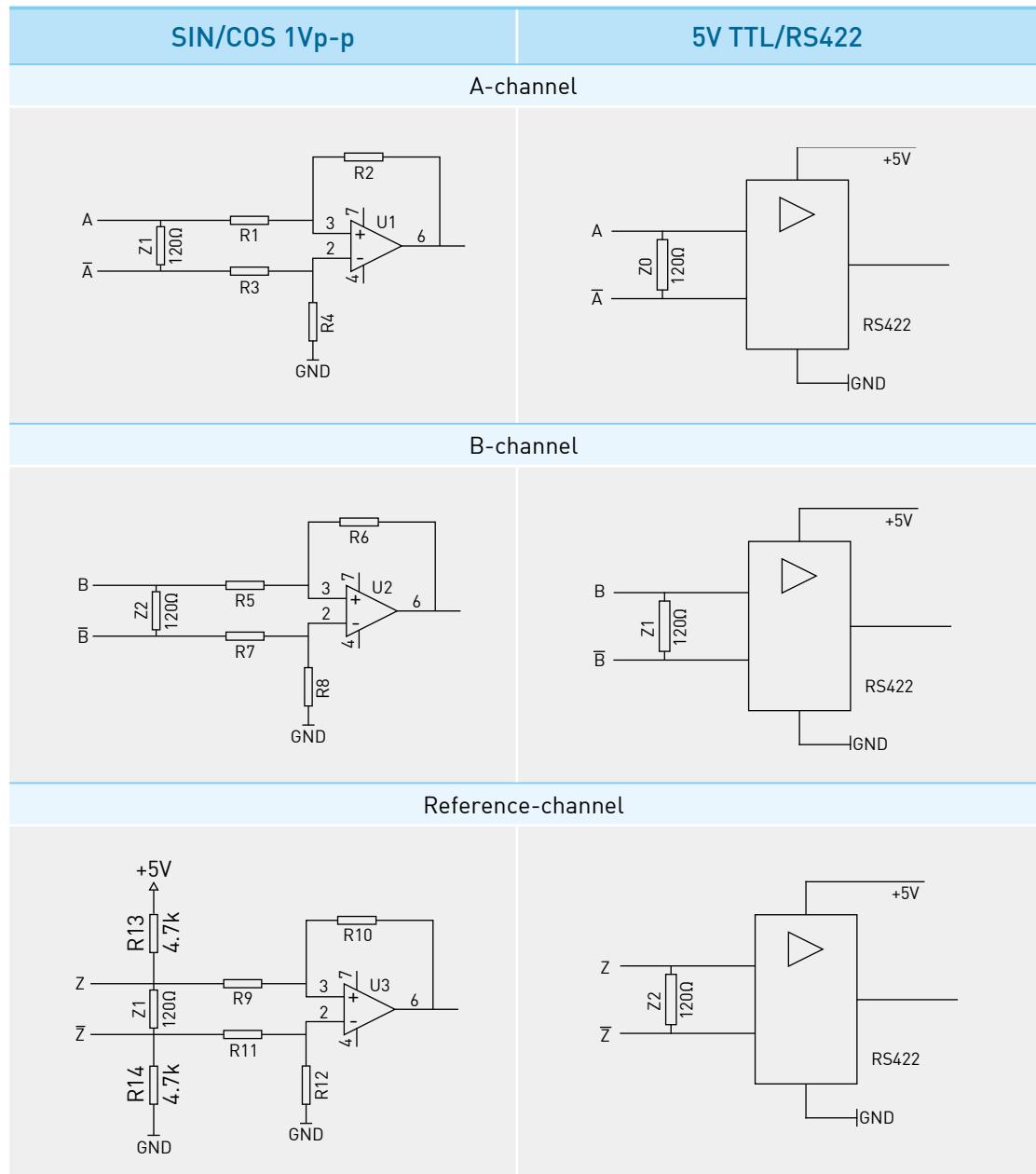
SIN/COS 1Vp-p



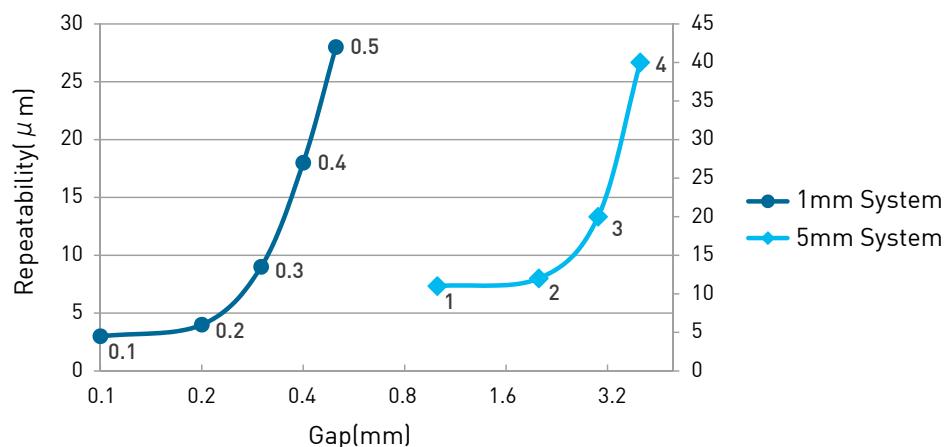
5V TTL/RS422



5.6 Recommended Input Circuit:



5.7 Gap-Repeatability Relationship:



6. Positioning Measurement- E Type



Features:

- Analog signal output
- Optimal for space-saving applications
- Dustproof and waterproof, up to IP67 protection class
- Resolution is up to $5 \mu\text{m}$ while integrating with ST-A.
- Repeatability up to $\pm 10 \mu\text{m}$.
- Available gap up to 4mm.



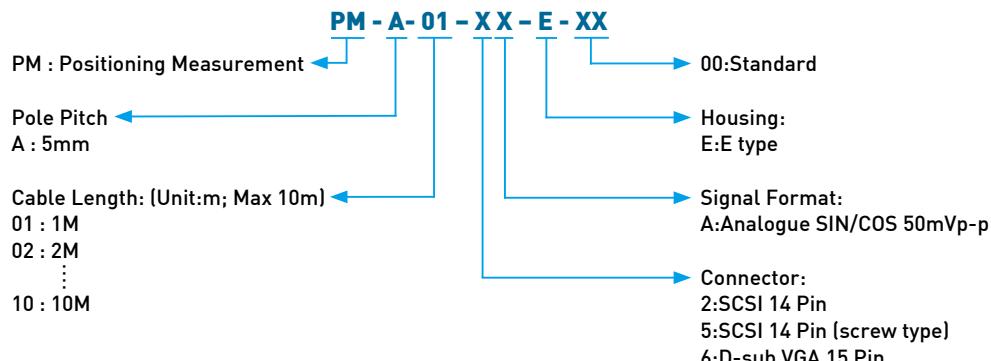
6.1 Specifications:

Pole Pitch	5mm
Available gap ⁽¹⁾	4mm
Signal format	Analogue
Output signal	SIN/COS 50mVp-p
Resolution	5mm
Repeatability ⁽²⁾	$\pm 10 \mu\text{m}$
Maximum travel speed	10m/sec
Input voltage	5VDC $\pm 5\%$
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67

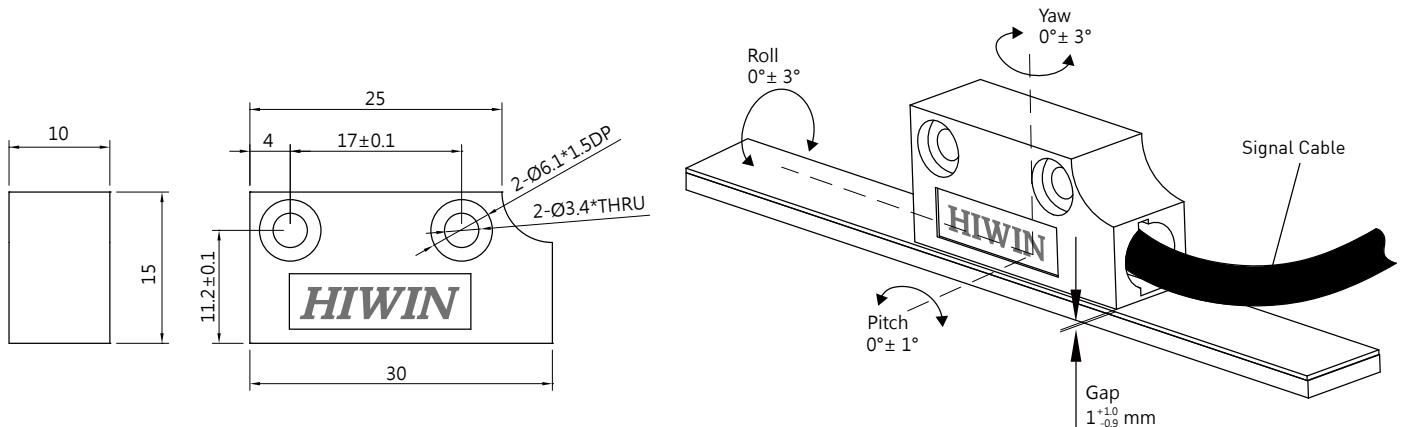
Note: (1) Please refer Chap 6.5 for Gap-Repeatability relationship.

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

6.2 Ordering Code:



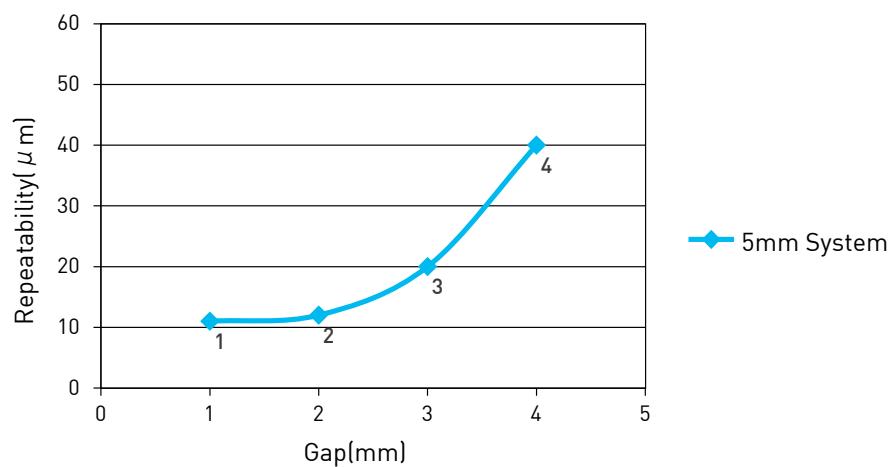
6.3 Dimensions:



6.4 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

6.5 Gap-Repeatability Relationship:



7. Positioning Measurement- H Type



Features:

- Analog signal output
- Compact design used with Hiwin linear guideways
- Optimal for space-saving applications
- Easy installation
- Resolution is up to $5 \mu m$ when integrating with ST-A.
- Repeatability up to $\pm 10 \mu m$.
- Available gap up to 4mm.



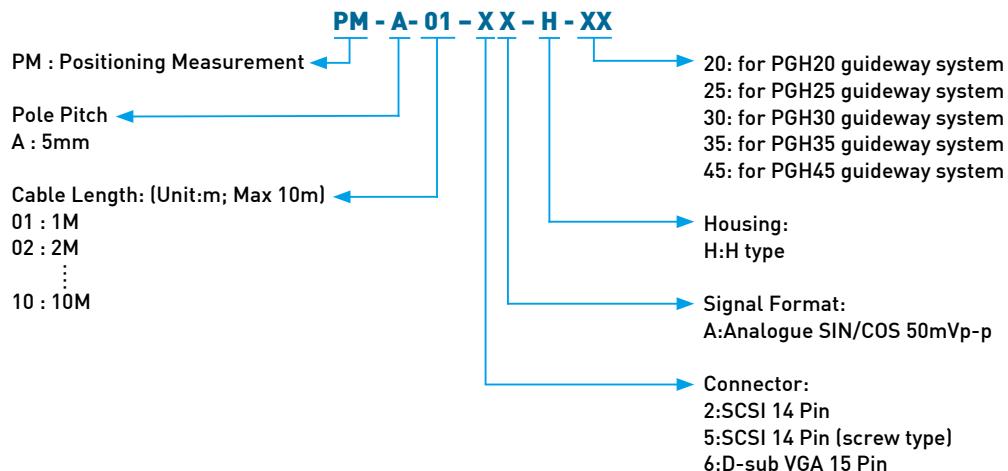
7.1 規格 :

Pole Pitch	5mm
Available gap ⁽¹⁾	4mm
Signal format	Analogue
Output signal	SIN/COS 50mVp-p
Resolution	5mm
Repeatability ⁽²⁾	$\pm 10 \mu m$
Maximum travel speed	10m/sec
Input voltage	5VDC $\pm 5\%$
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67

Note: (1) Please refer Chap 7.5 for Gap-Repeatability relationship.

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

7.2 Ordering Code:



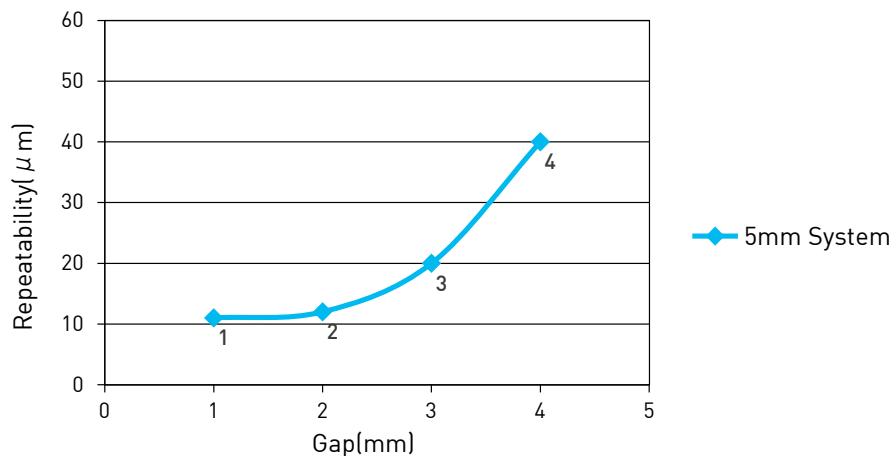
7.3 Dimensions:

This type is used with HIWIN's guideway, please refer Page 181 to 185 of HIWIN Technology's catalogue for further details :
[http://www.hiwin.tw/download/tech_doc/gw/Linear%20Guideway-\(E\).pdf](http://www.hiwin.tw/download/tech_doc/gw/Linear%20Guideway-(E).pdf)

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

7.5 Gap-Repeatability Relationship:



II. Signal Translator



ST-A

Features:

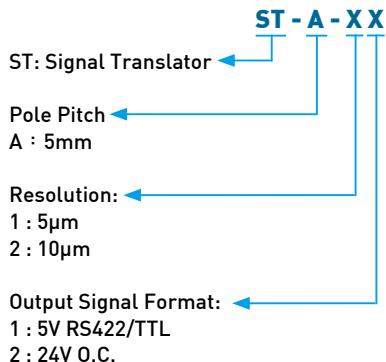
- Converting an analog signal input into a digital signal output
- Output signal 5V RS422/TTL or open collector
- Suitable for precise position feedback to a PC or PLC connection



1. Specifications:

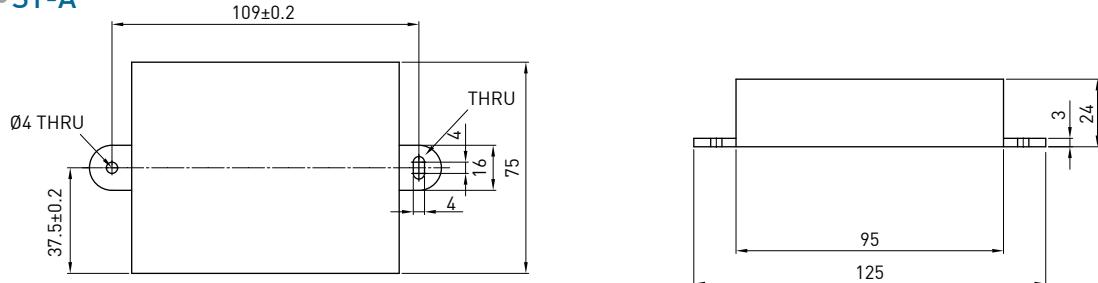
Type	ST-A			
Pole Pitch	5mm			
Input signal	SIN/COS 50mVp-p			
Output signal	5V RS422/TTL		24V O.C.	
Resolution	5µm	10µm	5µm	10µm
Repeatability	±10µm	±20um	±10µm	±20um
Maximum output frequency	64KHz	32KHz	64KHz	32KHz
Maximum travel speed	1.5m/sec			
Input voltage	5VDC ± 5% /0.5A			
Operating temperature	0°C~50°C			
Storage temperature	-5°C~70°C			
Protection class	IP43			

2. Ordering Code:



3. Dimensions:

- **ST-A**



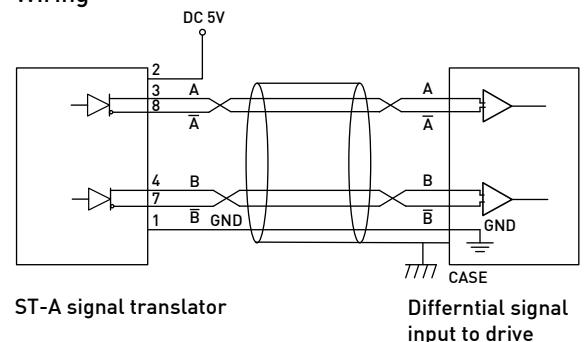
4. Pin Assignment:

- **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



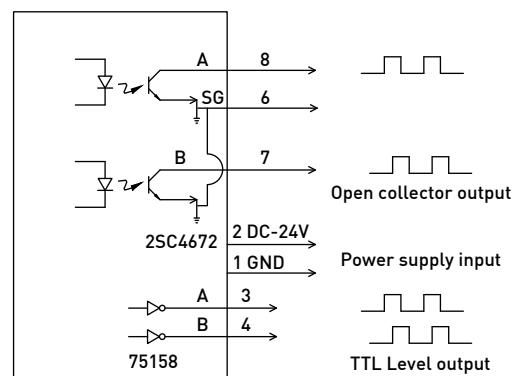
ST-A signal translator

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	

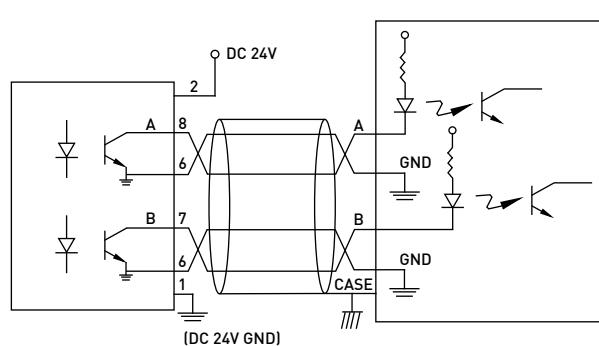


Open collector output

Power supply input

TTL Level output

Wiring

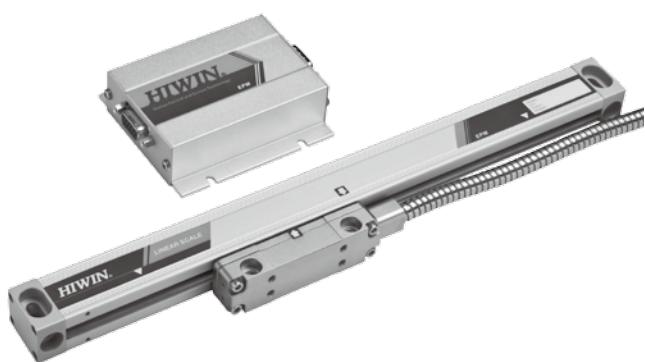


ST-A signal translator

PLC Counter signal



III. High-precision Enclosed Positioning Measurement System



Features:

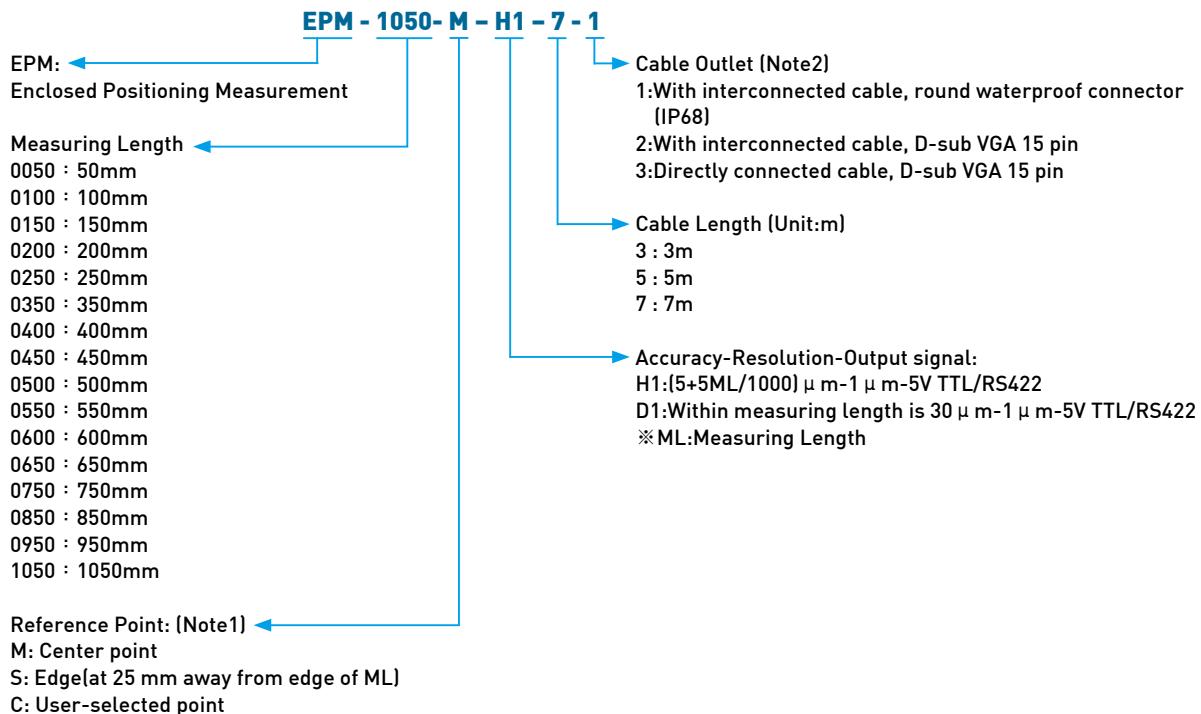
- Magnetic sensing mechanism
- Accuracy: (5+5ML/1000) μm
- Resolution up to 1 μm
- With single index signal
- Simple design and easily mounted
- Superior environmental susceptibility against oil, water and dust.
- IP65 protection class.



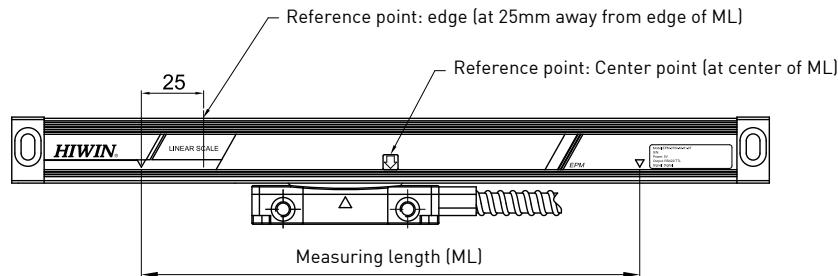
1. Specifications:

Measuring length (ML,unit:mm)	50、100、150、200	250、300、350、400、450、500、 550、600、650、750、850、950、1050
Maximum travel(Unit: mm)	ML+104	ML+120
Overall length(Unit: mm)	ML+12	ML+28
Accuracy@20°C		(5+5ML/1000) μm Within Measuring Length is 30 μm
Resolution		1 μm
Signal format		Digital
Output signal		5V TTL/RS422
Reference point		Standard: Center point/Edge(at 25 mm away from edge of ML) User-selected point
Maximum travel speed		1.2m/sec
Mounting parallelism		$\pm 0.1\text{mm}$
Input voltage		5VDC $\pm 5\%$ / 0.23A
Coefficient of linear thermal expansion		$(11.8 \pm 0.6) \times 10^{-6}\text{m/K}$
Operating temperature		0°C~50°C
Storage temperature		-20°C~60°C
Protection class	Readhead	IP67
	Translator	IP30
Vibration resistance (50Hz~2000Hz)		150m/S ² (EN60068-2-6)
Impact resistance(11ms)		1000m/S ² (EN60068-2-27)

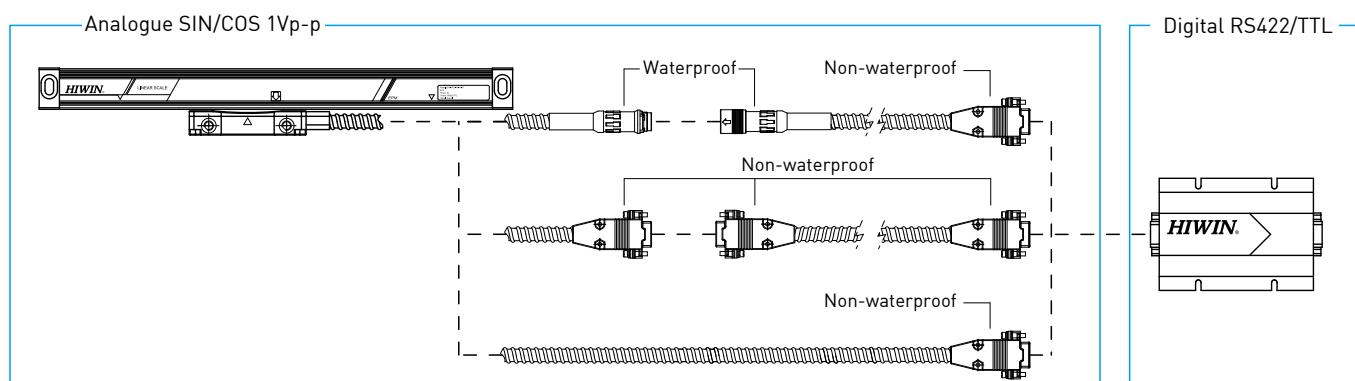
2. Ordering Code:



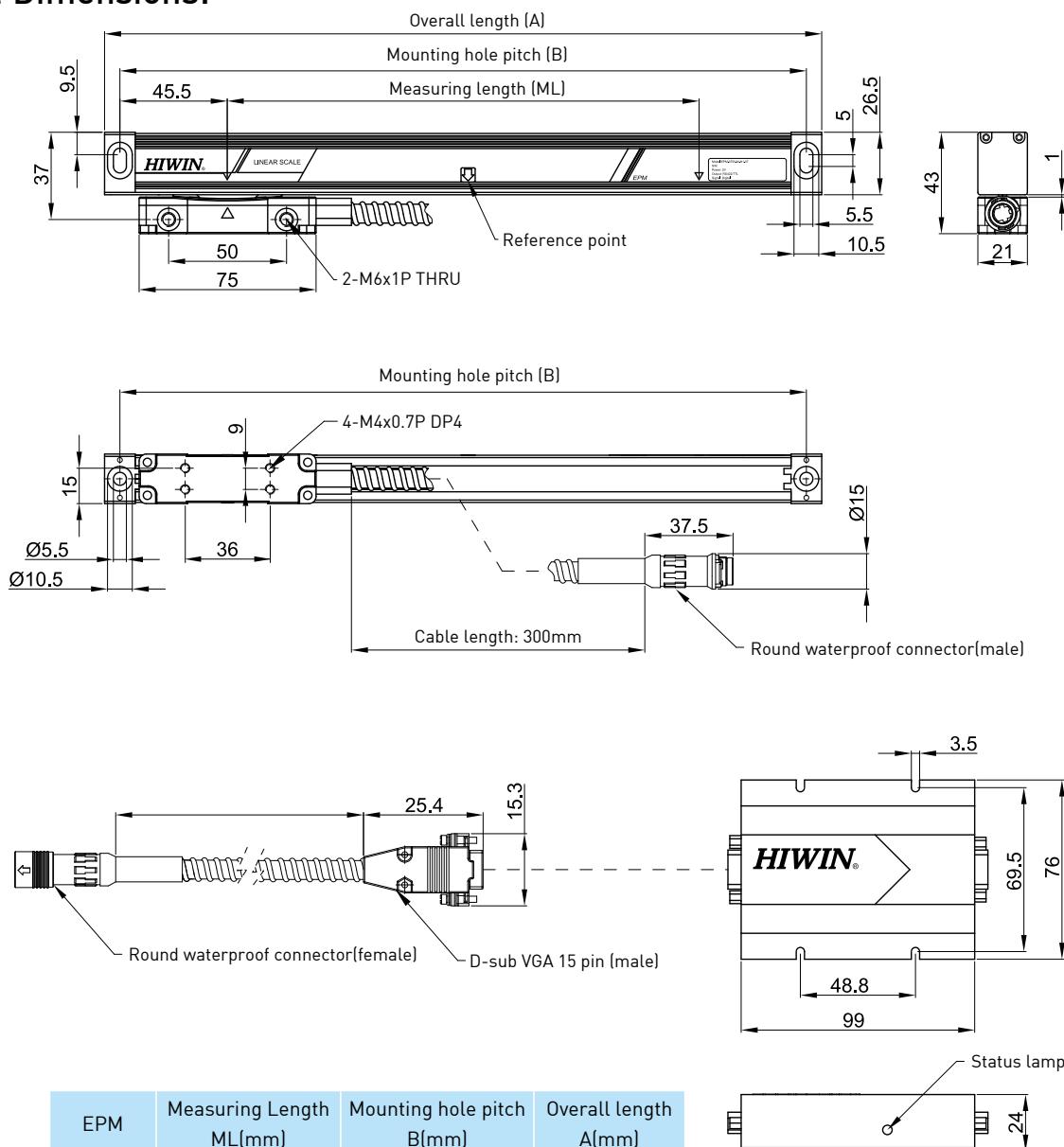
※Note1: Reference point



※Note2: Cable outlet



3. Dimensions:



EPM	Measuring Length ML(mm)	Mounting hole pitch B(mm)	Overall length A(mm)
EPM-0050	50	141	154
EPM-0100	100	191	204
EPM-0150	150	241	254
EPM-0200	200	291	304
EPM-0250	250	357	370
EPM-0300	300	407	420
EPM-0350	350	457	470
EPM-0400	400	507	520
EPM-0450	450	557	570
EPM-0500	500	607	620
EPM-0550	550	657	670
EPM-0600	600	707	720
EPM-0650	650	757	770
EPM-0750	750	857	870
EPM-0850	850	957	970
EPM-0950	950	1057	1070
EPM-1050	1050	1157	1170

4. Pin Assignment:

Function	Signal		Color	Connector (male) (D-sub VGA 15 pin)	Connector (male) (D-sub 9 pin)
	Analogue	Digital		Analogue	Digital
Power	5V		Brown	1	2
	0V		White	2	1
Output Signal	SIN+	A+	Green	11	3
	SIN-	A-	Yellow	12	8
	COS+	B+	Blue	13	4
	COS-	B-	Red	14	7
Reference Signal	REF+	Z+	Purple	7	5
	REF-	Z-	Gray	8	9
Fault Detection Signal	FLT	-	-	-	6
Shield	-	-	-	Case	Case

IV. High Efficiency Counter

1. Micro LCD Counter



Features:

- LCD display, using 2 AA batteries
- Embedded head, suitable for cutting and wood-processing machines
- Parameter save function
- Extremely compact, easily mounted, and cost-effective.



1.1 Specifications:

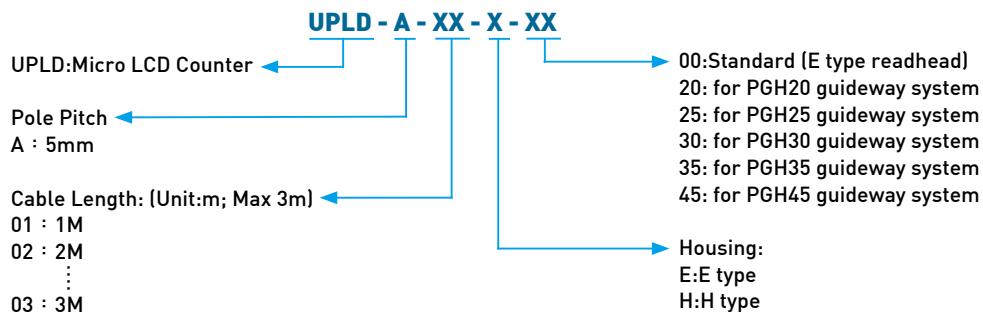
Display		8 digits LCD display with +/- sign
Accuracy@20°C		±(80+15xL) µm (L: Length (unit: m))
Resolution		5µm
Repeatability ⁽¹⁾		±10µm
Operating speed		3m/sec (maximum 2G acceleration)
Input voltage		commercial AA No.3 batteries × 2
Battery life ⁽²⁾		1 year by setting speed at 1.5m/s
Operating Temperature		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 independant incremental counters for relative measurement.		

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

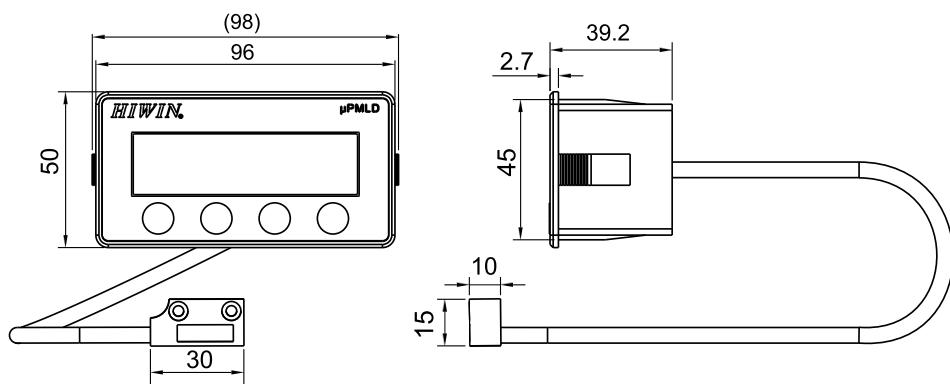
(2) Battery capacity is 2200mAh(ambient temperature: 20+/-5°C).

Capacity performance will vary under different environmental temperatures.

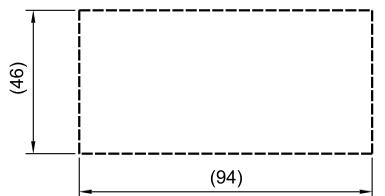
1.2 Ordering Code:



1.3 Dimensions:



Reference design dimensions for fram panel cut-out



Unit: mm

2. LCD Counter System



Features:

- LCD display, using 2 AA batteries
- Embedded head, suitable for cutting and wood-processing machines
- Parameter save function
- Extremely compact, easily mounted, and cost-effective.



2.1 Specifications:

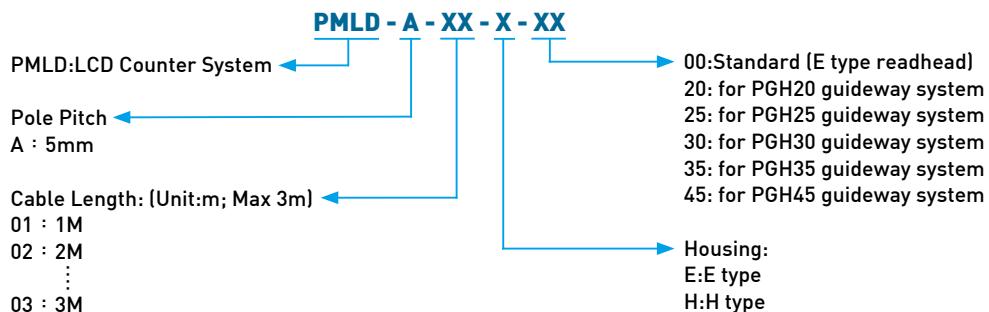
Display	8 digits LCD display with +/- sign	
Accuracy@20°C	$\pm(80+15xL) \mu\text{m}$ (L: Length (unit: m))	
Resolution	5μm	
Repeatability ⁽¹⁾	$\pm 10\mu\text{m}$	
Operating speed	3m/sec (maximum 2G acceleration)	
Input voltage	commercial AA No.3 batteries × 2	
Battery life ⁽²⁾	1 year by setting speed 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 independant incremental counters for relative measurement.		

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

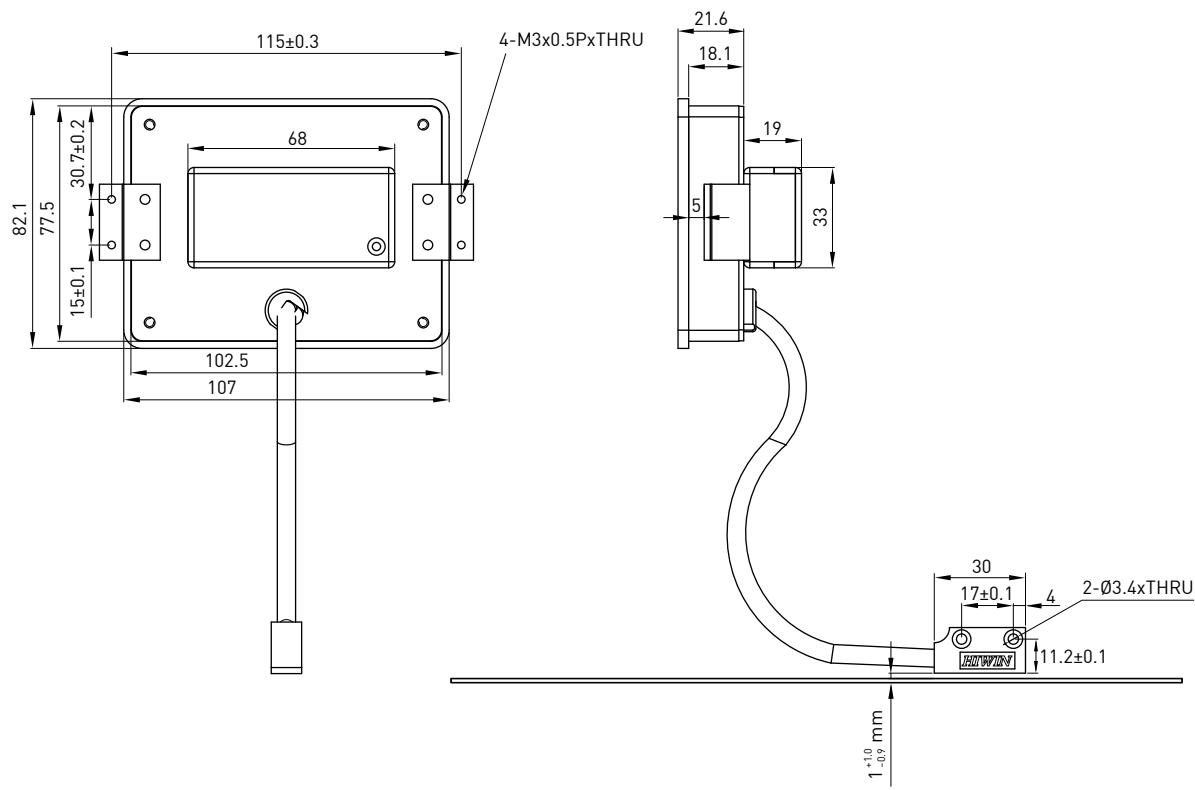
(2) Battery capacity is 2200mAh(ambient temperature: 20+/-5°C).

Capacity performance will vary under different environmental temperatures.

2.2 Ordering Code:



2.3 Dimensions:



3. High Efficiency Single Axis Counter



Features:

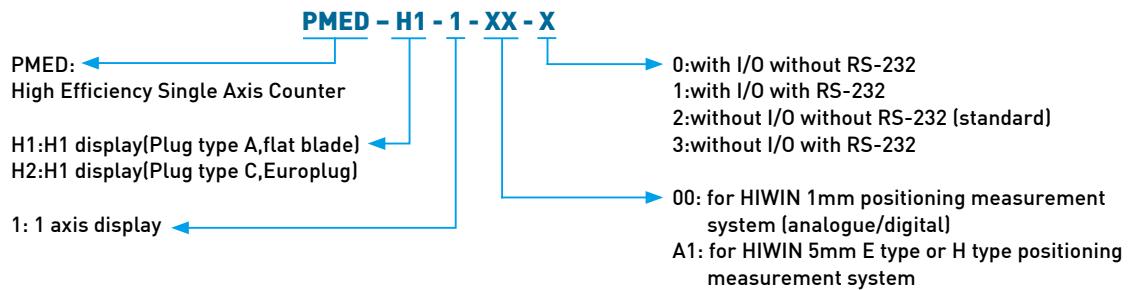
- LED display
- Can be used with other digital optical encoders
- Consists of multiple output interfaces
- Suitable for cutting and wood-processing machines
- Compact design and easy installation



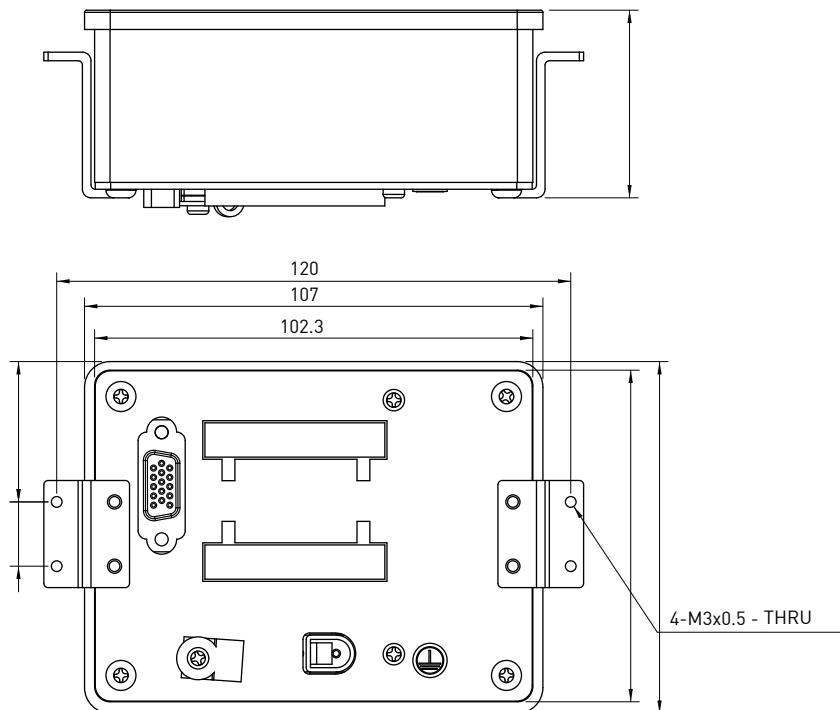
3.1 Specifications:

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% 1A (AC100~240V/ 5VDC)
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:

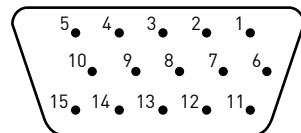


3.3 Dimensions:



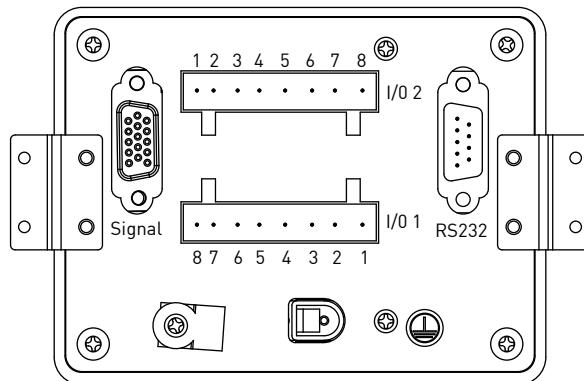
Unit: mm

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:

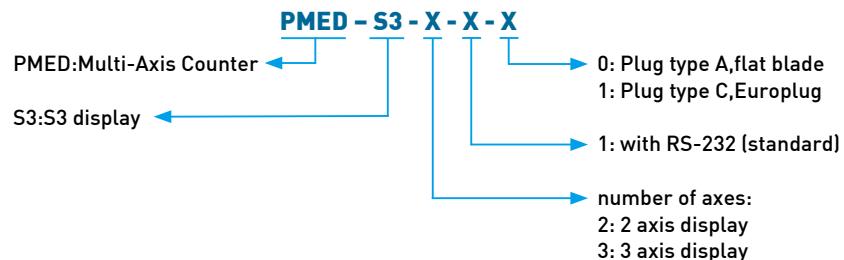
- LED display, high brightness
- Easy operation, suitable for cutting machines, traditional gantry milling machines, and programmable drilling machines
- Compact design and easy installation



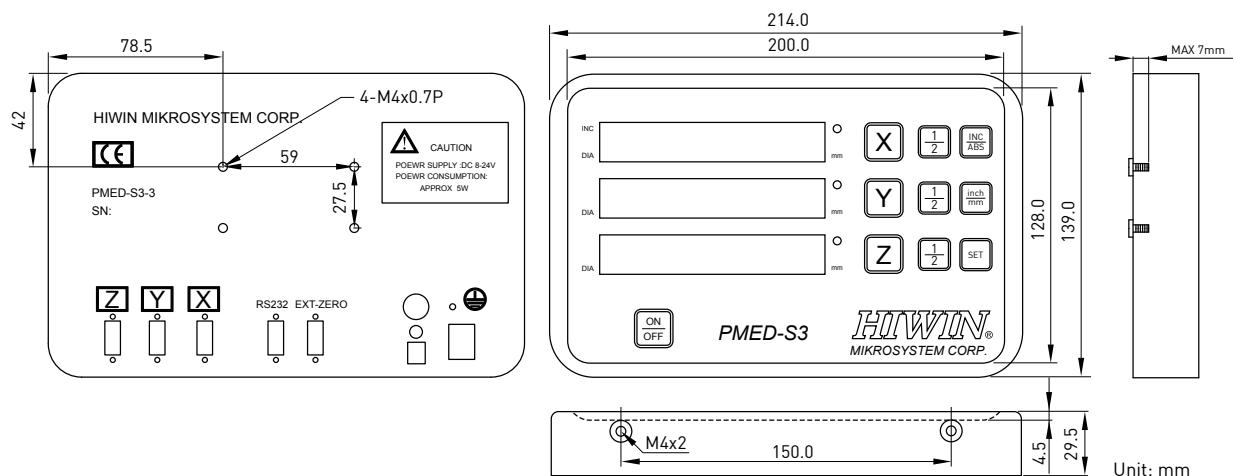
4.1 Specifications:

Display		8 digit LED display
Resolution		0.1µm ~ 50µm
Input signal		Digital : 5V RS422/TTL
Input voltage		8~30VDC ± 5% / 0.08A
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)
	Other	Radius/diameter selection (RAD/DIA)
	auto-center (1/2) function	
	Linear error compensation	
	Instant power failure memory	
	RS-232 output	

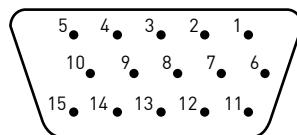
4.2 Ordering Code:



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. High Efficiency Multi-Axis Counter



Features:

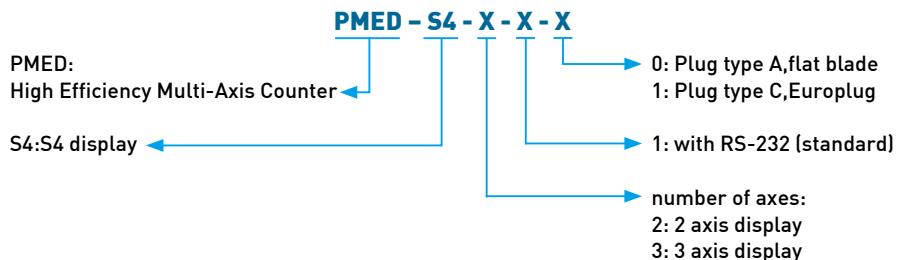
- LED display
- Suitable for CNC machine centers, gantry machine centers, milling machines and drilling machines
- Easy operation and installation



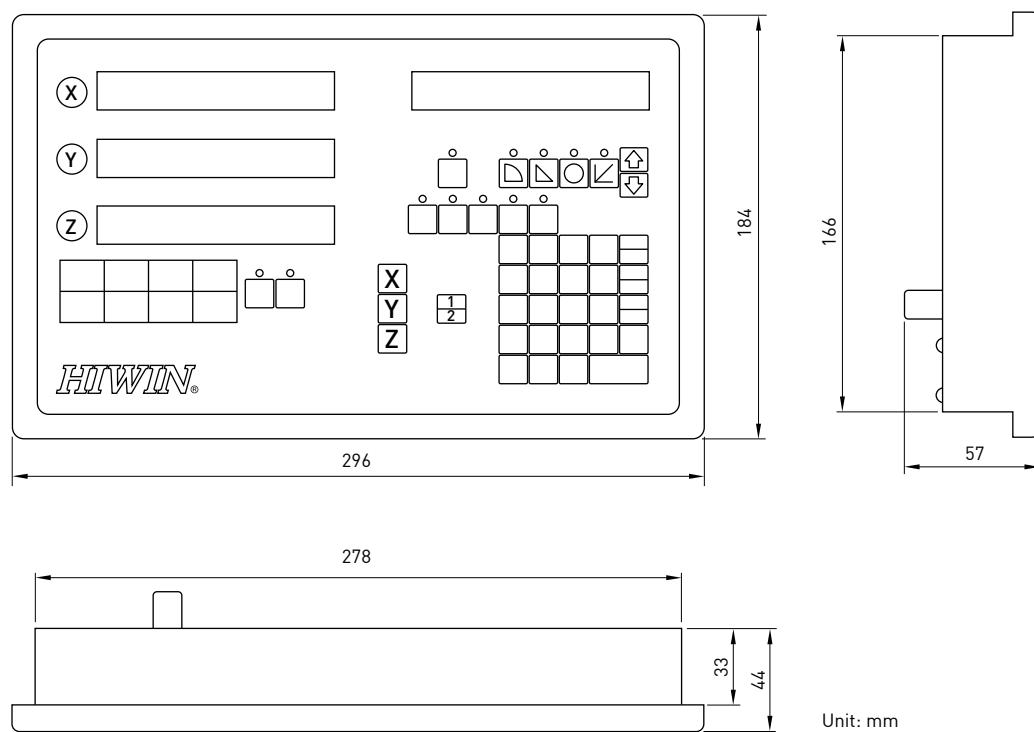
5.1 Specifications:

Display		8 digit LED display
Resolution		0.1μm ~ 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
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

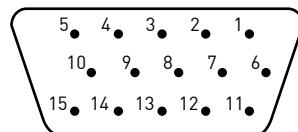
5.2 Ordering Code:



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

V. Accessories

1. Signal Transfer Cable

- Signal transfer cable for alternative display devices



Ordering Code:

STC - XX - XX - X

- 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. Positioning Scale Installation Fixture

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



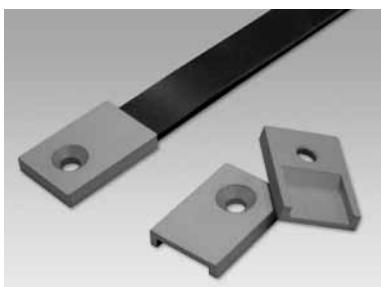
Ordering Code:

PST - 02

- PST: Positioning Scale Installation Fixture
- 02: for tiny type positioning measurement
- 03: for Vertical type positioning measurement
- 04: for Standard type positioning measurement

3. Positioning Scale Fixture

- Preventing the warpage of scale under harsh environment.



Ordering Code:

PSF - 01

- PSF:Positioning Scale Fixture
- 01: standard

VI. 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/min)				
	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/min)				
Budget					
Quantity					
Recommended specification :					
Proponent :					

Manager :

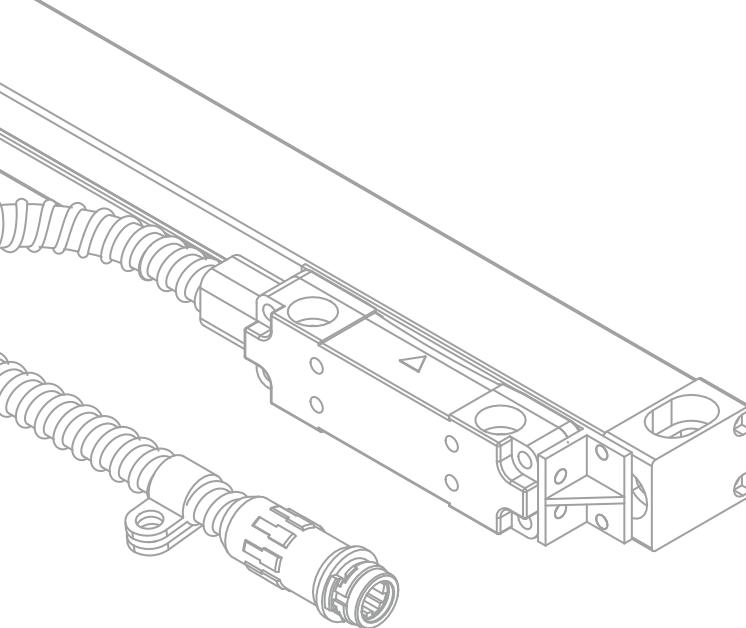
Head :

Applicant :

MEMO

MEMO

MEMO



HIWIN®

Motion Control and System Technology

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

Subsidiaries & R&D Centers

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

HIWIN JAPAN
KOBE · TOKYO · NAGOYA · NAGANO · TOHOKU ·
HOKURIKU · HIROSHIMA · KUMAMOTO, JAPAN
www.hiwin.co.jp
info@hiwin.co.jp

HIWIN USA
CHICAGO · SILICON VALLEY, U.S.A.
www.hiwin.com
info@hiwin.com

HIWIN s.r.o.
BRNO, CZECH REPUBLIC
www.hiwin.cz
info@hiwin.cz

HIWIN Schweiz GmbH
JONA, SWITZERLAND
www.hiwin.ch
info@hiwin.ch

HIWIN FRANCE
ECHAUFFOUR, FRANCE
www.hiwin.fr
info@hiwin.fr

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

HIWIN SINGAPORE
SINGAPORE
www.hiwin.sg
info@hiwin.sg

HIWIN KOREA
SOWON, KOREA
www.hiwin.kr
info@hiwin.kr

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

Mega-Fabs Motion System, Ltd.
HAIFA, ISRAEL
www.mega-fabs.com
info@mega-fabs.com

The specifications in this catalog are subject to change without notification.

1. HIWIN is the registered trademark of Hiwin Mikrosystem Corp.. Please avoid buying the counterfeit goods that are from unknown sources to protect your rights.
2. Actual products may be different from the specifications and photos in this catalog, and the differences in appearances or specifications may be caused by, among other things, product improvements.
3. Hiwin will not sell or export those techniques and products restricted under the "Foreign Trade Act" and relevant regulations. Any export of restricted products should be approved by competent authorities in accordance with relevant laws, and shall not be used to manufacture or develop the nuclear, biochemical, missile and other military weapons.

©2015 FORM ME99TE06-1501
(PRINTED IN TAIWAN)