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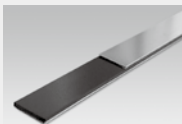
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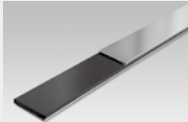
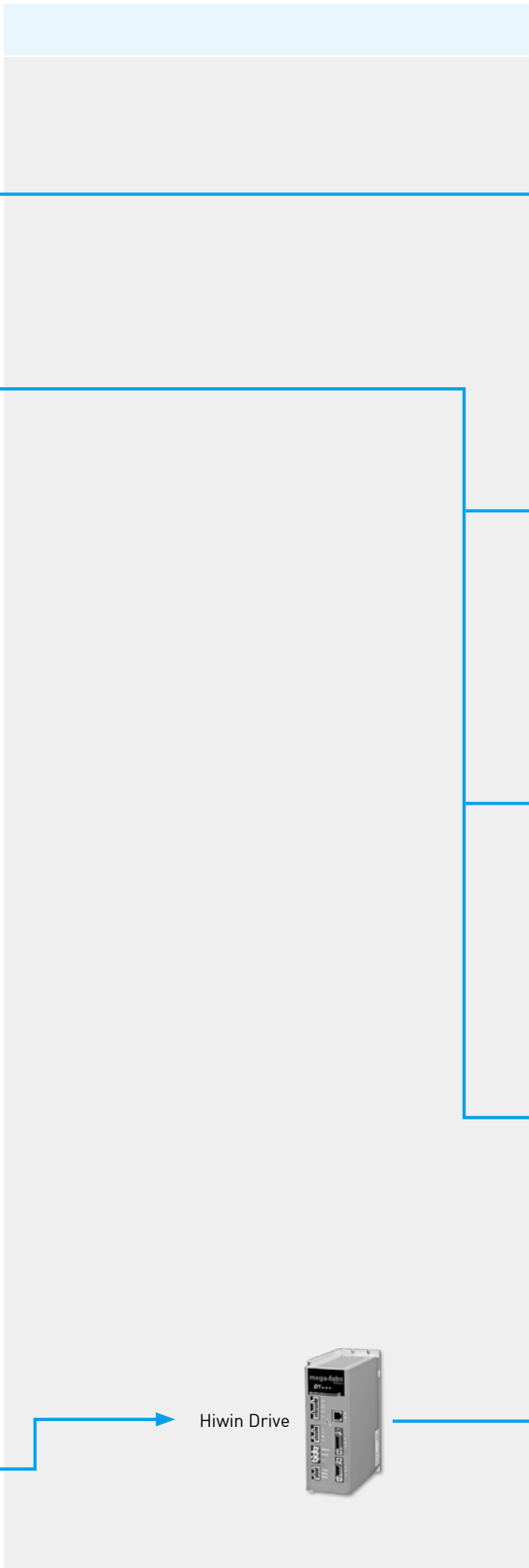
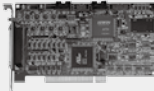
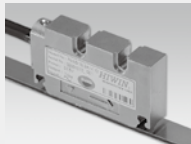
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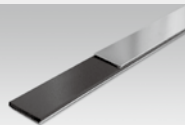
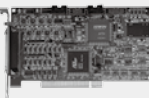
The Component Breakdown of the Positioning Measurement System - 1mm Placement Figure (Analog)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	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 									
			D-sub VGA 15 Pin 								High Efficiency Single Axis Counter PMED-H1-1-00-□ 	Page 29			
			D-sub 15 Pin 												
			17 Pin Circular Plug 												
Vertical Type PM-B-□□-□A-V-□□ 	Page 11					SCSI 14 Pin 									
						SCSI 14 Pin(with screw) 						Hiwin Drive 		Linear Motors (HIWIN LM) 	
						PG Type PM-B-□□-□A-G-□□-□□ 	Page 8	SCSI 20 Pin 							

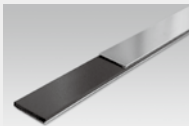
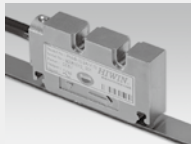
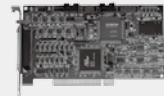
The Component Breakdown of the Positioning Measurement System - 1mm Placement Figure (Digital)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector		Counter/Display Application	Refer Page
1mm PS-B-□□□□□ 	Page 1	1μm	T Type PM-B-□□-□D-T-□□ 	Page 2	Digital	Flying Lead 	 Diagram illustrating the component breakdown of the positioning measurement system. Blue arrows show the signal flow from various encoder types and connectors to the Hiwin Drive and Counter/Display Applications.	PLC 、 Drive 、 Controller 	
			Standard Type PM-B-□□-□D-S-□□ 	Page 5		D-sub VGA 15 Pin 		High Efficiency Single Axis Counter PMED-H1-1-00-□ 	Page 29
			Vertical Type PM-B-□□-□D-V-□□ 	Page 11		D-sub 15 Pin 		High Efficiency Multi-axis Counter PMED-S4-□-□ 	Page 34
			PG Type PM-B-□□-□D-G-□□-□□ 	Page 8		17 Pin Circular Plug 		Multi-axis Counter PMED-S3-□-□ 	Page 32
						SCSI 14 Pin 			
						SCSI 14 Pin(with screw) 			
						SCSI 20 Pin 	Hiwin Drive 	Linear Motors (HIWIN LM) 	

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

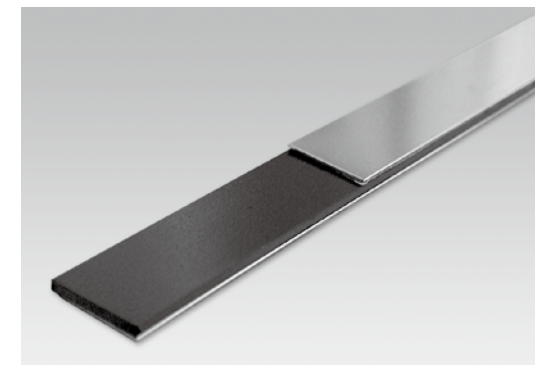
Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	Translator	Refer Page	Trunk Connector	Refer Page	Counter/Display Application	Refer Page
5mm PS-A-□□□□ 	Page 1	5μm	E Type PM-A-□□-□A-E-00 	Page 16	Analog	D-sub VGA 15 Pin 		Page 20		Page 21	Micro LCD Counter UPLD-A-□□-□-□□ 	Page 27
			LCD Counter System PMLD-A-□□-□-□□ 			Page 29						
			High Efficiency Single Axis Counter PMED-H1-1-A1-□ 			Page 31						
			High Efficiency Multi-axis Counter PMED-S4-□-□ 			Page 36						
H Type PM-A-□□-□A-H-□□ 	Page 18		SCSI 14 Pin 								Multi-axis Counter PMED-S3-□-□ 	Page 34
			SCSI 14 Pin (with screw) 								PLC 、 Drive 、 Controller 	

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		Counter/Display Application	Refer Page
5mm PS-A-□□□□□ 	Page 1	5μm	Vertical Type PM-A-□□-□D-V-□□ 	Page 11	Digital	Flying Lead 	PLC 、 Drive 、 Controller 		
						D-sub VGA 15 Pin 	High Efficiency Multi-axis Counter PMED-S4-□-□ 	Page 34	
						D-sub 15 Pin 	Multi-axis Counter PMED-S3-□-□ 	Page 32	
						SCSI 20 Pin 	High Efficiency Single Axis Counter PMED-H1-1-00-□ 	Page 29	
						Hiwin Drive 	Linear Motors (HIWIN LM) 		

I. High Resolution Positioning Measurement System

1. Positioning Scale



Features:

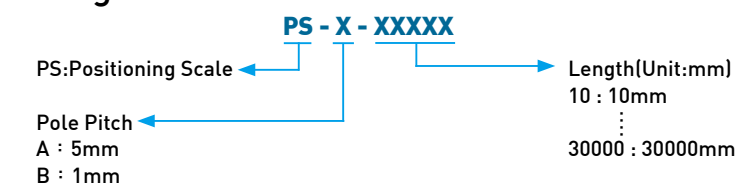
- Compatible with various measurement instruments to achieve different accuracy requirements.
- Magnetic scale can maintain performance under severe ambient conditions caused by oil, water or dust to gain required accuracy and signal feedback.



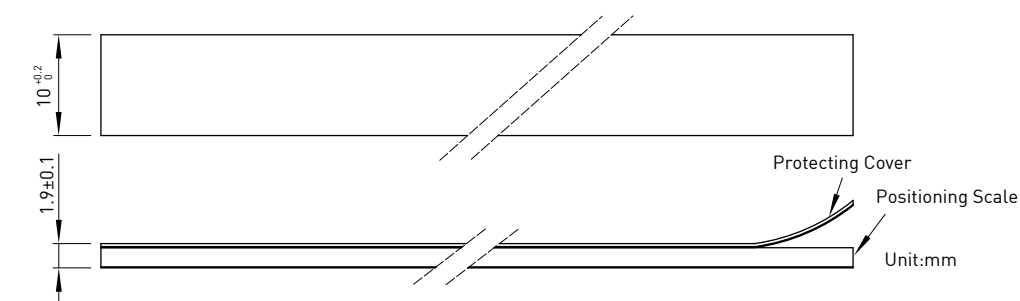
1.1 Specifications:

Pole pitch	1mm	5mm
Accuracy@20°C	$\pm 20 \mu\text{m/m}$	$\pm (80+15 \times L) \mu\text{m}$ (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:



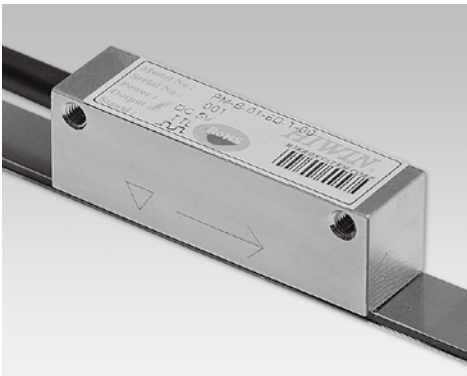
1.3 Dimensions:



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.

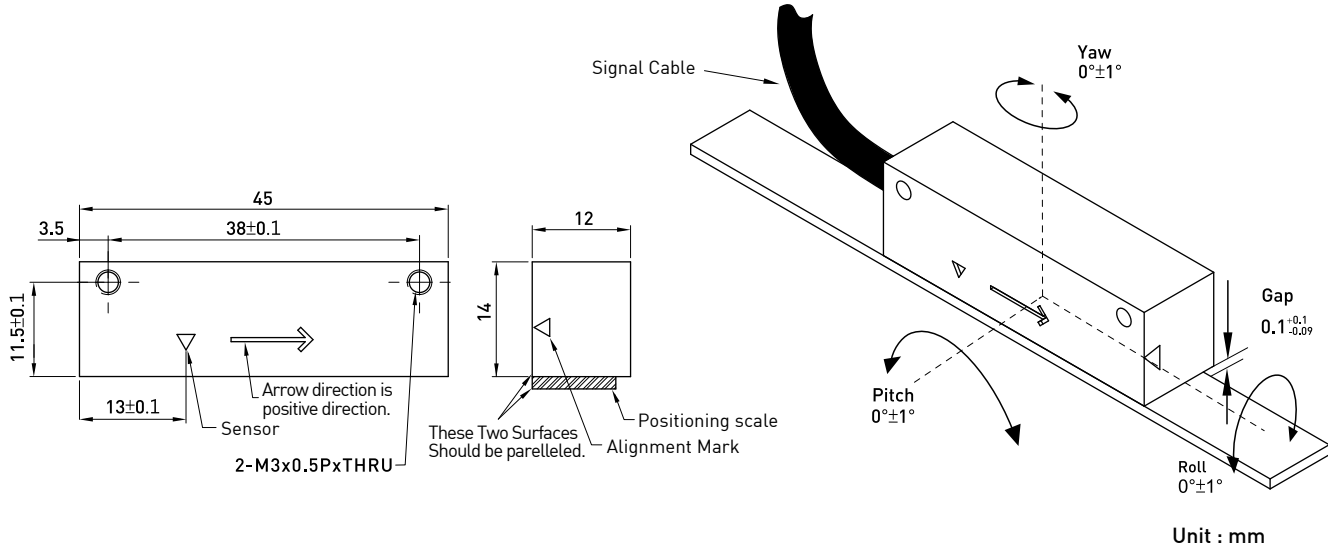
2. Positioning Measurement- Tiny Type



- 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 is up to 1 μ m.
 - Repeatability is up to ±2 μ m.
 - Available gap is up to 0.4mm.



2.3 Dimensions:



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	

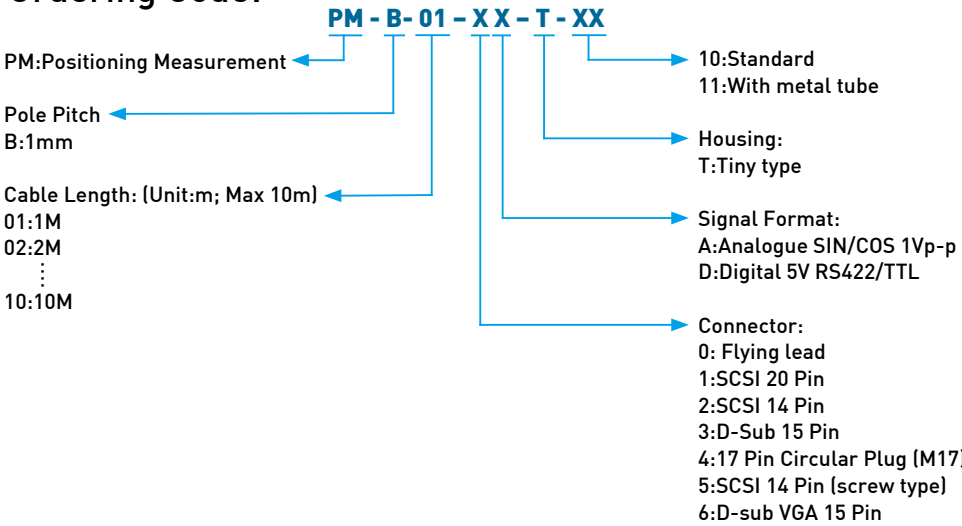
Note: (1) Please refer Chap 2.7 for Gap-Repeatability relationship.
(2) The data were measured while gap is 0.1mm.

2.4 Pin Assignment:

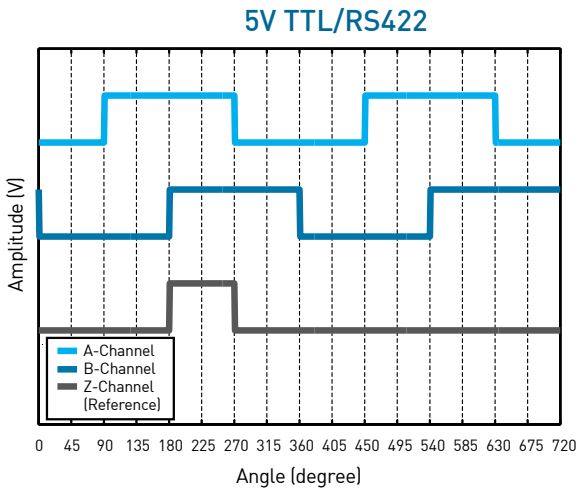
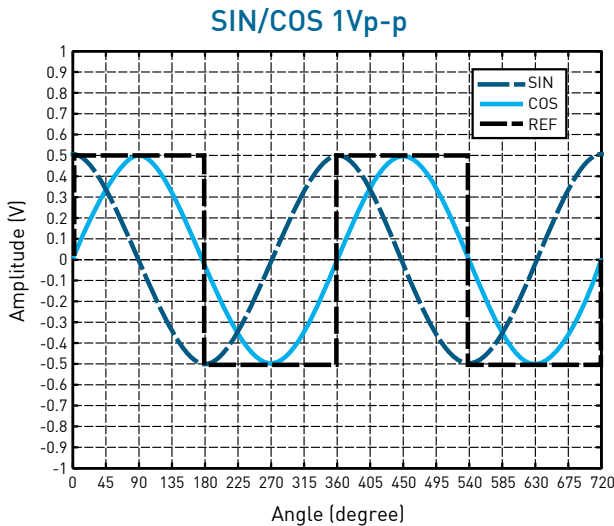
Function	Signal		Color	Connector (male) (SCSI 14 Pin) Analogue	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) ⁽¹⁾ (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Flying Lead
	Analogue	Digital			Analogue	Digital	Analogue	Digital		Analogue	Digital	
Power	5VDC		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		

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

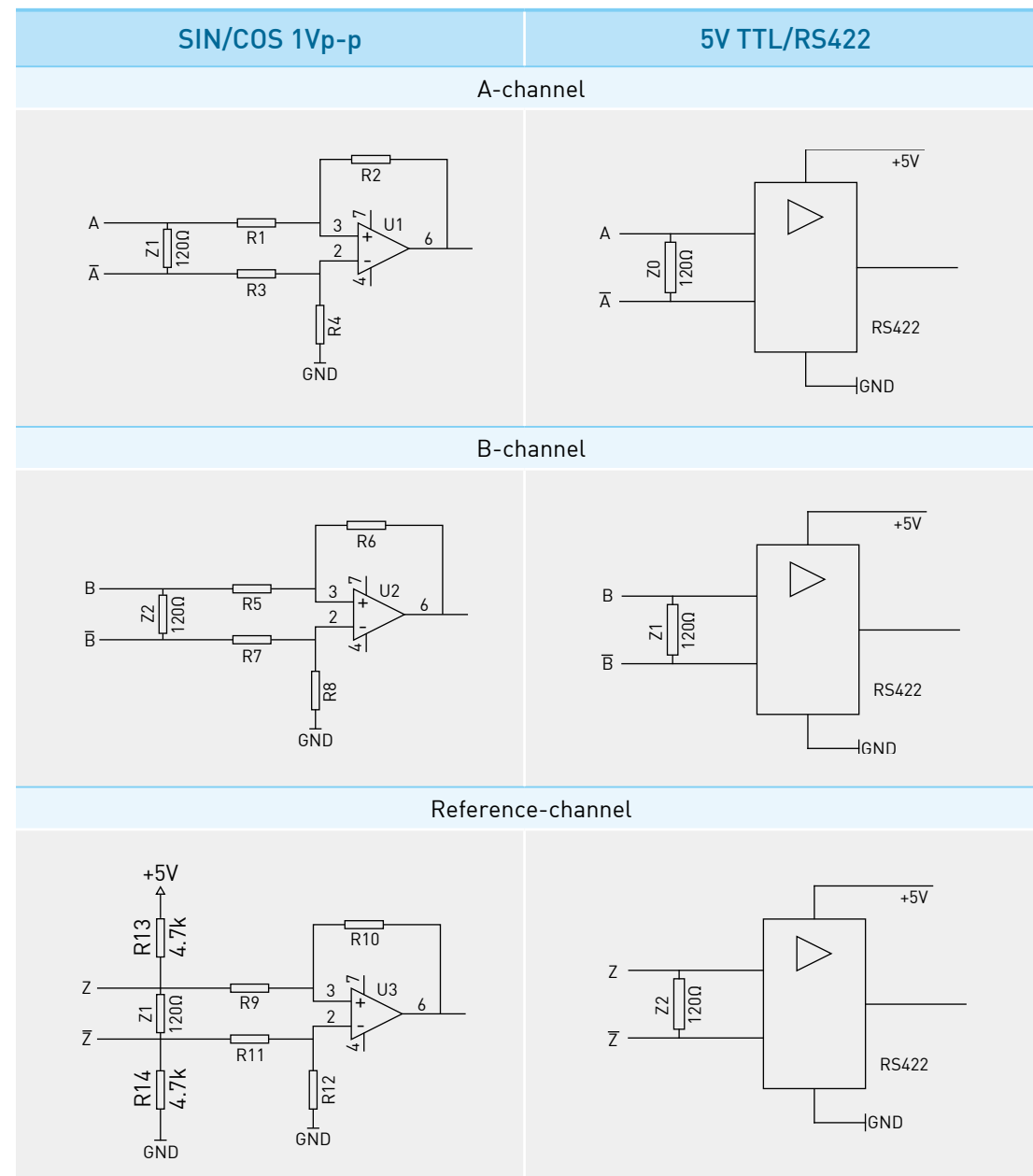
2.2 Ordering Code:



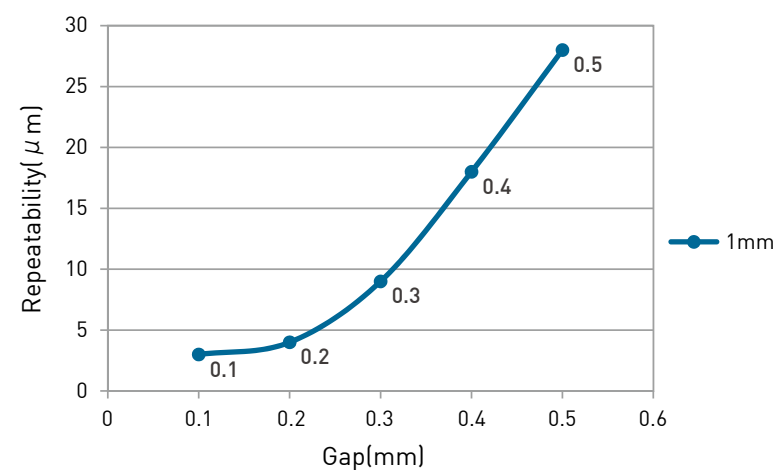
2.5 Signal Format:



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 is up to 1 μm.
- Repeatability is up to ±2 μm.
- Available gap is up to 0.4mm.



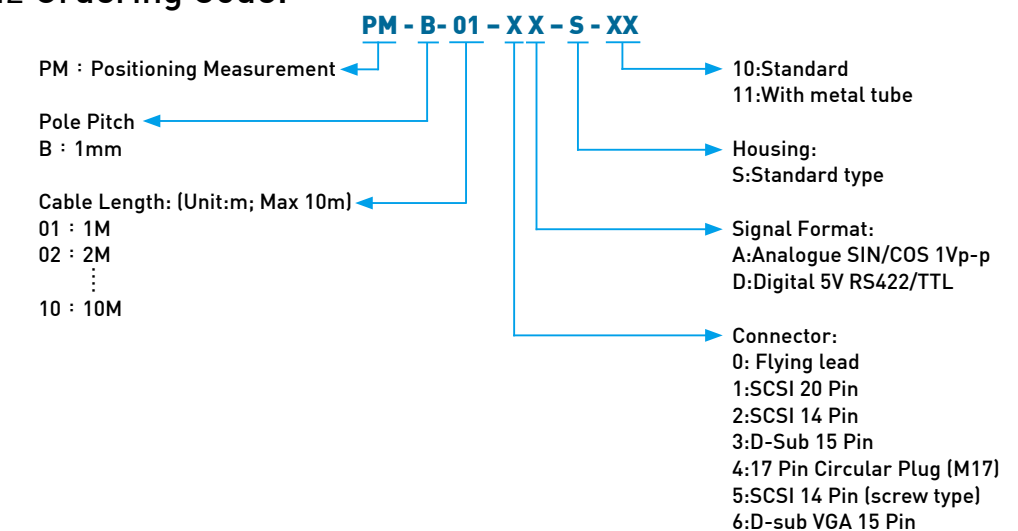
3.1 Specifications:

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	

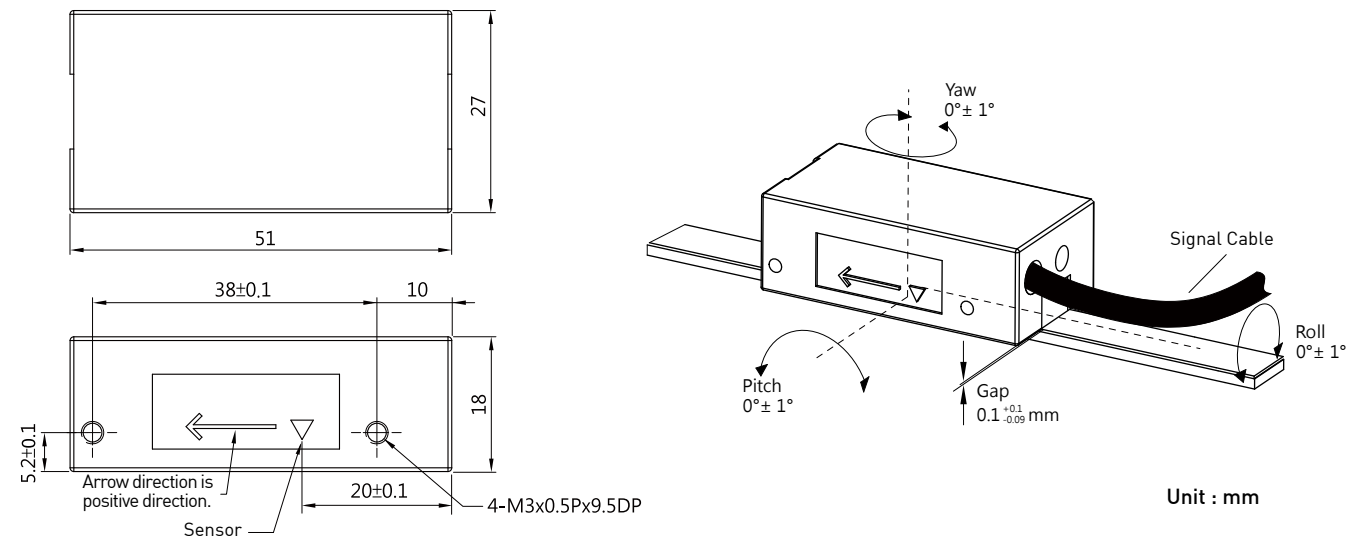
Note: (1) Please refer Chap 3.7 for Gap-Repeatability relationship.

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

3.2 Ordering Code:



3.3 Dimensions:

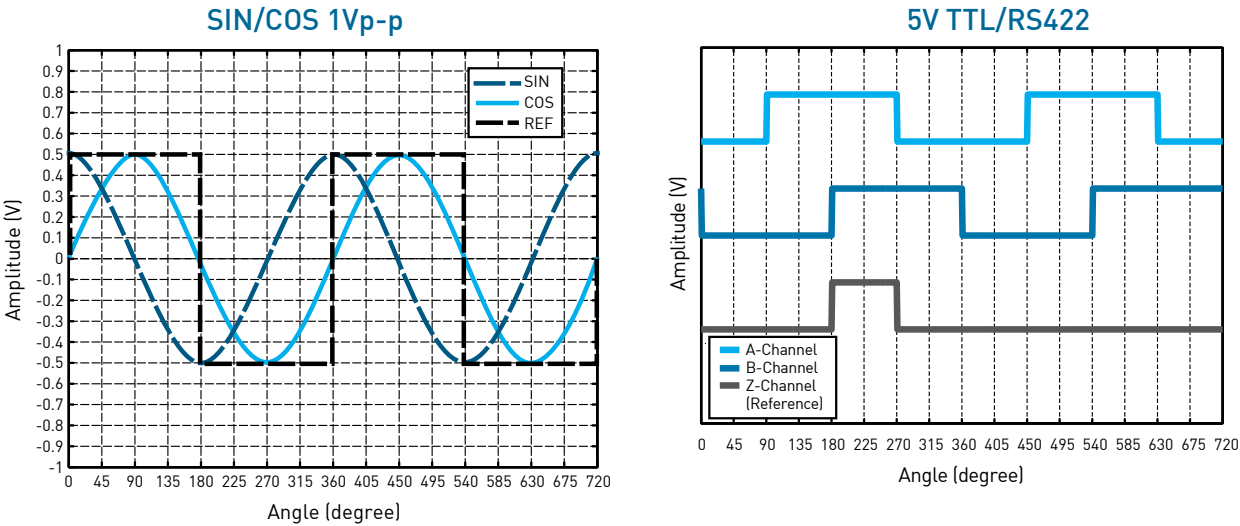


3.4 Pin Assignment:

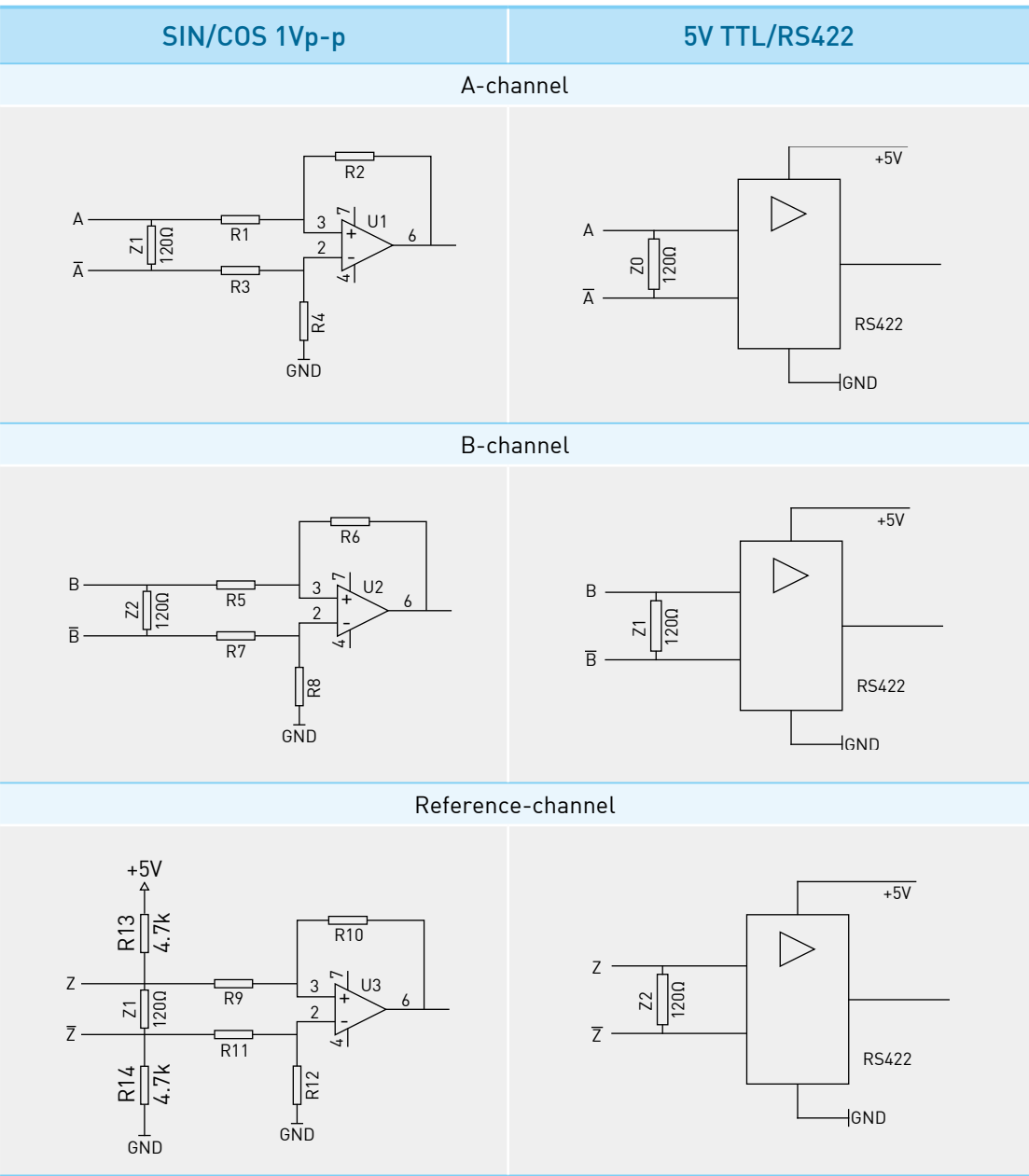
Function	Signal		Color	Connector (male) (SCSI 14 Pin) Analogue	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) ⁽¹⁾ (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Flying Lead
	Analogue	Digital			Analogue	Digital	Analogue	Digital			Analogue	
Power	5VDC		Brown	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

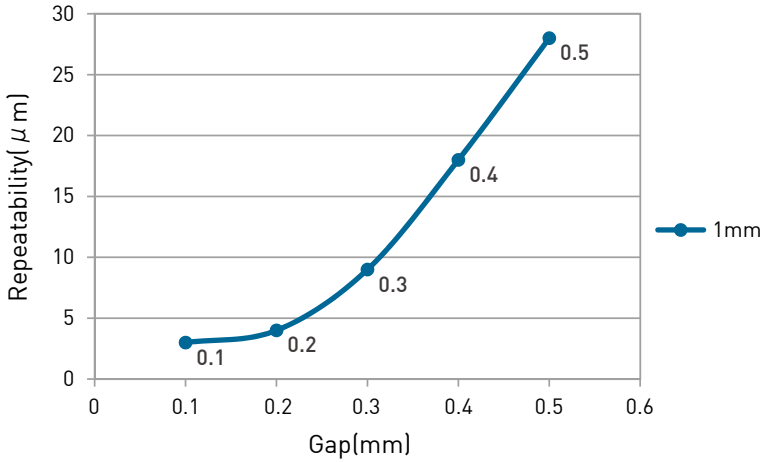
3.5 Signal Format:



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 is up to 1 μ m.
- Repeatability is up to $\pm 2 \mu$ m.
- Available gap is 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	1 μ m
Repeatability ⁽²⁾	$\pm 3\mu$ m	$\pm 2\mu$ m
Reference signal	1 mm/pulse	
Maximum travel speed	10m/sec	5m/sec
Input voltage	5VDC $\pm$ 5%	
Operating temperature	0°C~50°C	
Storage temperature	-5°C~70°C	
Protection class	IP67	

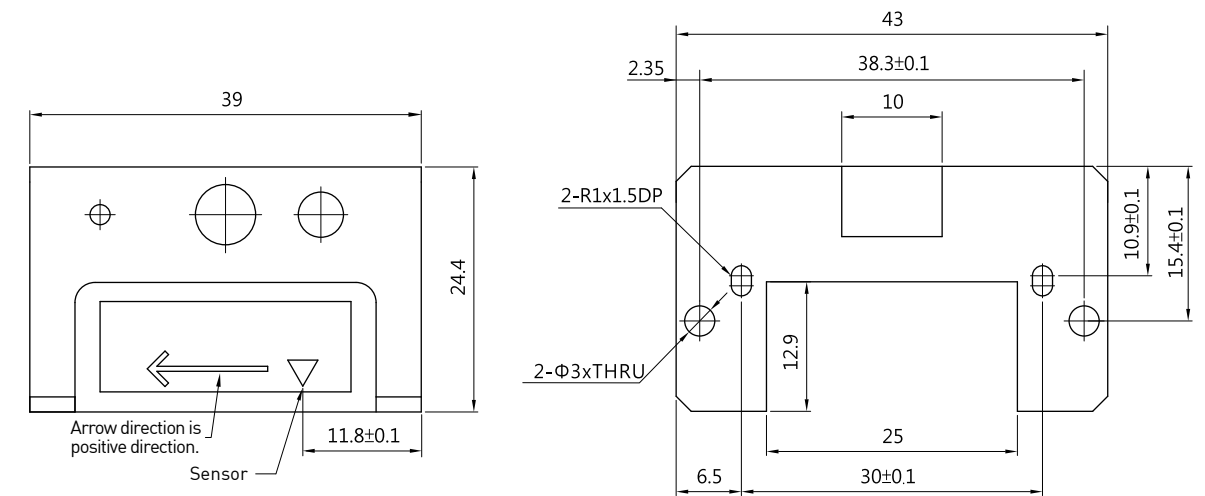
Note: (1) Please refer Chap 4.7 for Gap-Repeatability relationship.

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

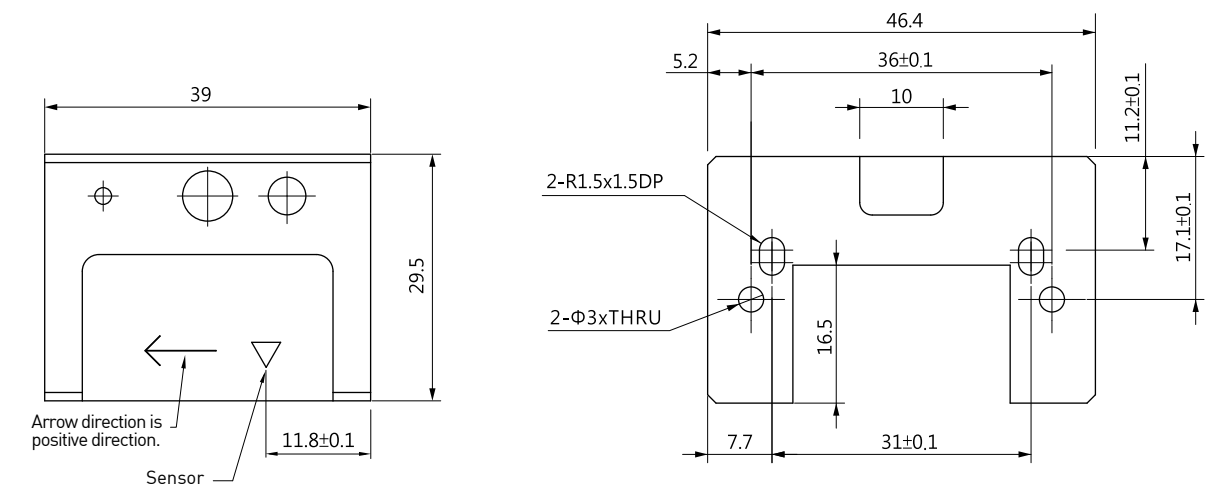
4.2 Ordering Code:

PM - B - 01 - XX - G - XX - XX		
PM : Positioning Measurement	10:Standard 11:With metal tube	
Pole Pitch B : 1mm	20: for PGH20 guideway system 25: for PGH25 guideway system	
Cable Length: (Unit:m; Max 10m)	Housing: G:PG type	
01 : 1M 02 : 2M ... 10 : 10M	Signal Format: A:Analogue SIN/COS 1Vp-p D:Digital 5V RS422/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	

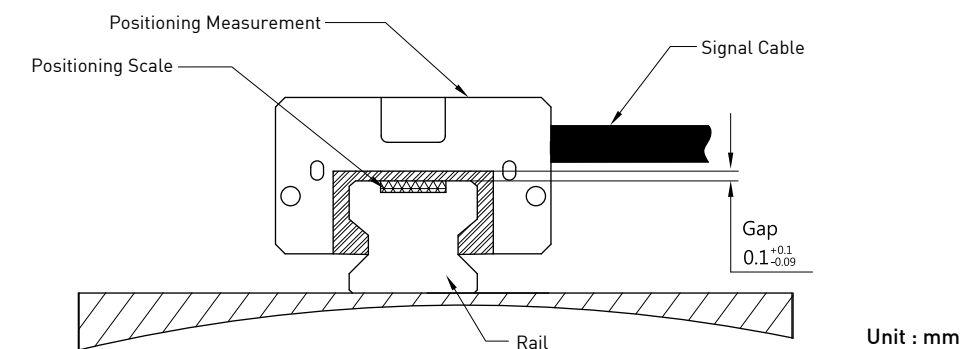
4.3 Dimensions:



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



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



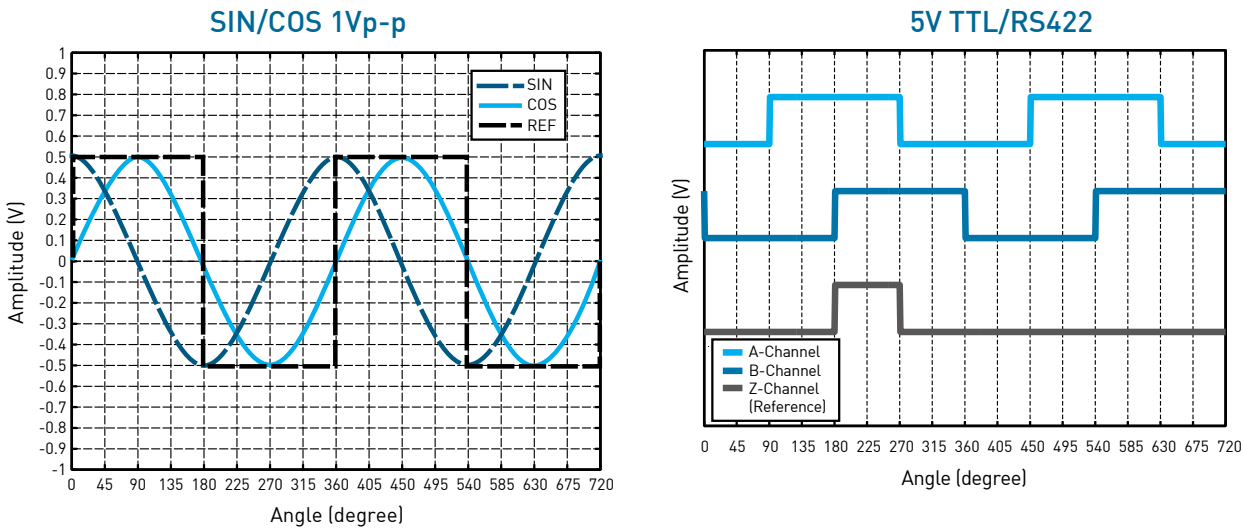
Unit : mm

4.4 Pin Assignment:

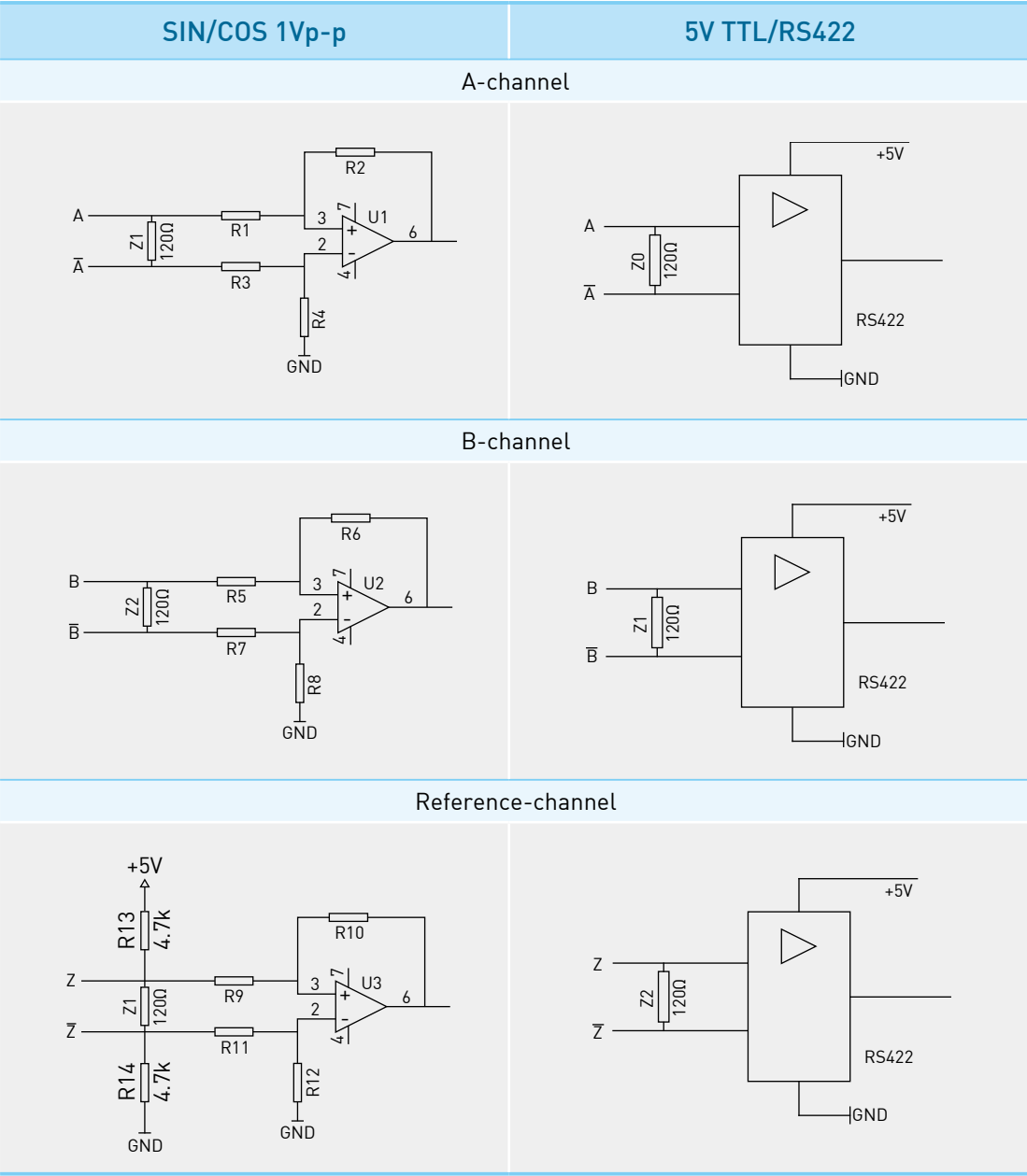
Function	Signal		Color	Connector (male) (SCSI 14 Pin) Analogue	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) ⁽¹⁾ (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Flying Lead
	Analogue	Digital			Analogue	Digital	Analogue	Digital		Analogue	Digital	
Power	5VDC		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		

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

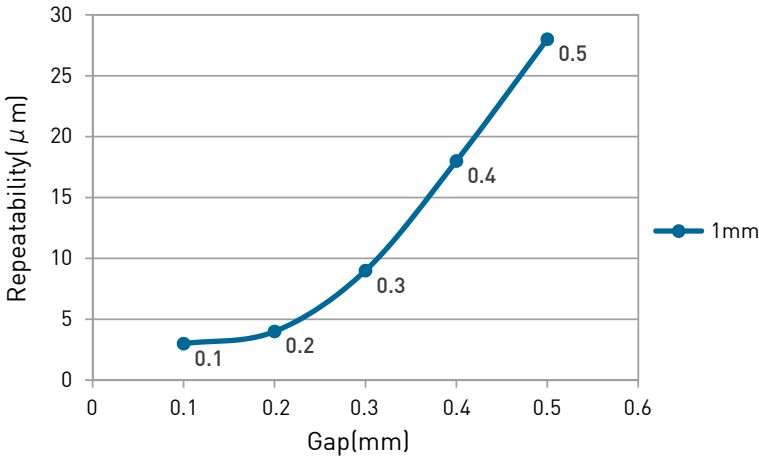
4.5 Signal Format:



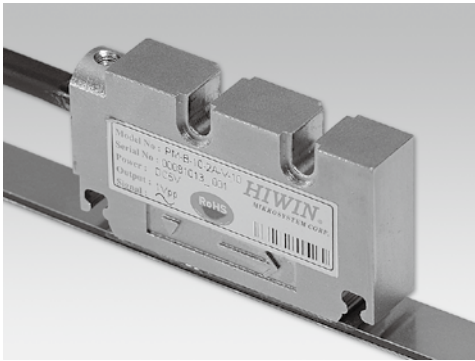
4.6 Recommended Input Circuit:



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 is up to 1 μm.
 - Repeatability is up to ±2 μm.
 - Available gap is 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	1μm	5μm	5μm
Repeatability ⁽²⁾	±3μm	±2μm	±10μm	±10μm
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 ± 5%			24VDC ± 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:

PM - B - 01 - XX - V - XX

PM: Positioning Measurement

Pole Pitch
A : 5mm
B : 1mm

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

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

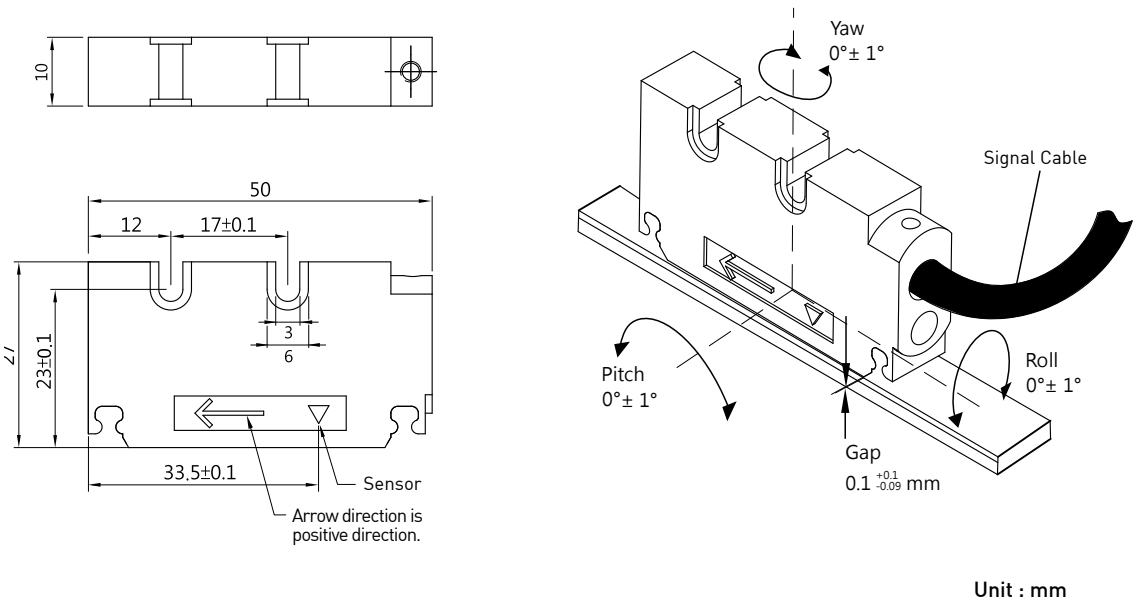
	PM-B	PM-A
1	Analogue: 1Vp-p 1mm	Digital: 5V RS422/TTL 5μm
	Digital: 5V RS422/TTL 1μm	Digital: 24V/PP 5μm
3	Digital: 24V/PP 1μm	Digital: 5V RS422/TTL 10μm
4		Digital: 24V/PP 10μm
5		Digital: 24V/PP 25μm
7		Digital: 24V/PP 100μm
8		Digital: 24V/PP 100μm

Housing:
V:Vertical type

Signal Format:
A:Analogue SIN/COS 1Vp-p
D:Digital

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

5.3 Dimensions:



5.4 Pin Assignment:

5V TTL/RS422

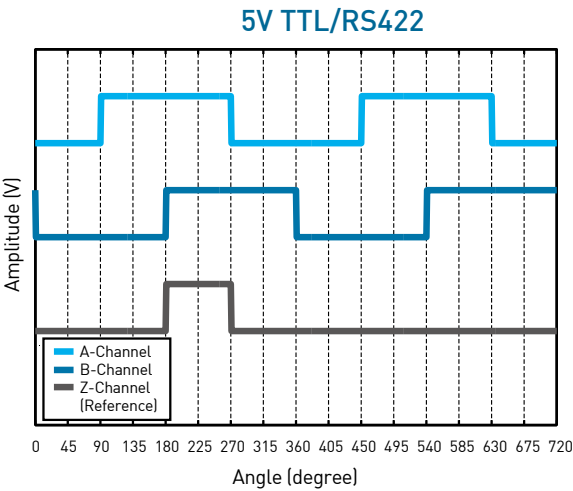
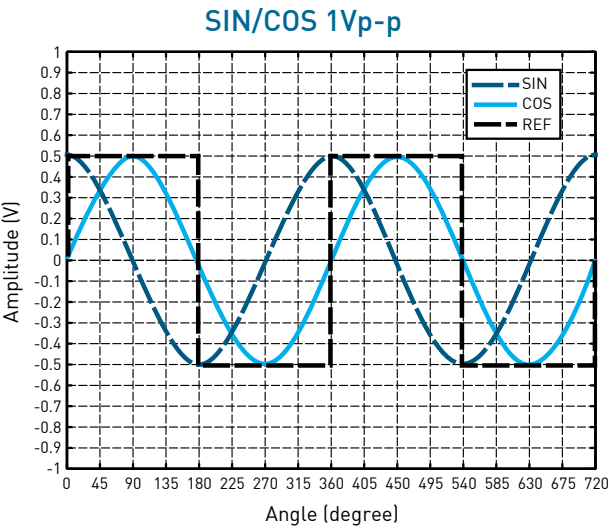
Function	Signal		Color	Connector (male) (SCSI 14 Pin) Analogue	Connector (male) (SCSI 20 Pin)		Connector (male) (D-Sub 15 Pin)		Connector (male) ⁽¹⁾ (17 Pin Circular Plug)	Connector (male) (D-Sub VGA 15 Pin)		Flying Lead
	Analogue	Digital			Analogue	Digital	Analogue	Digital		Analogue	Digital	
Power	5VDC		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

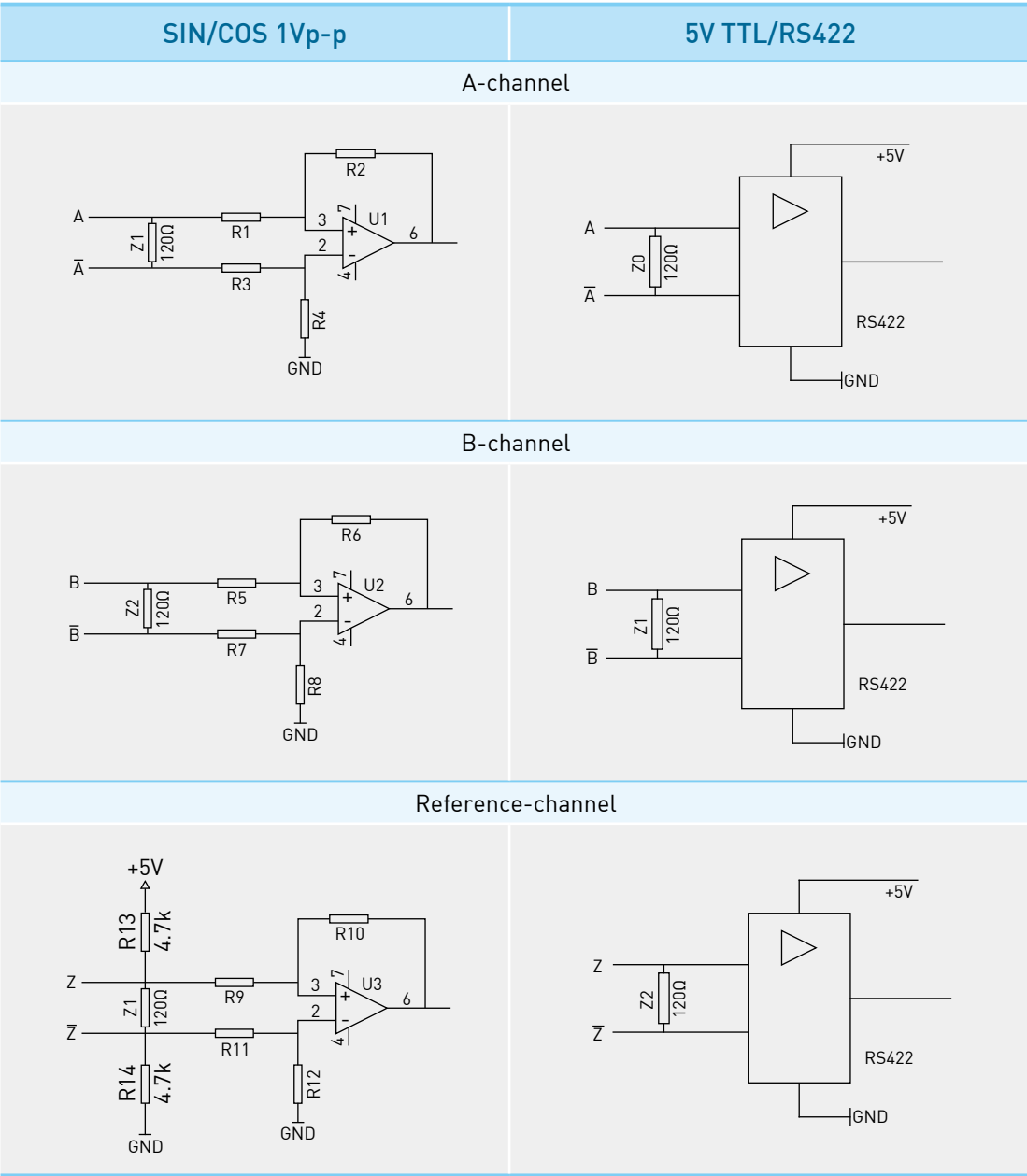
24V/PP

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

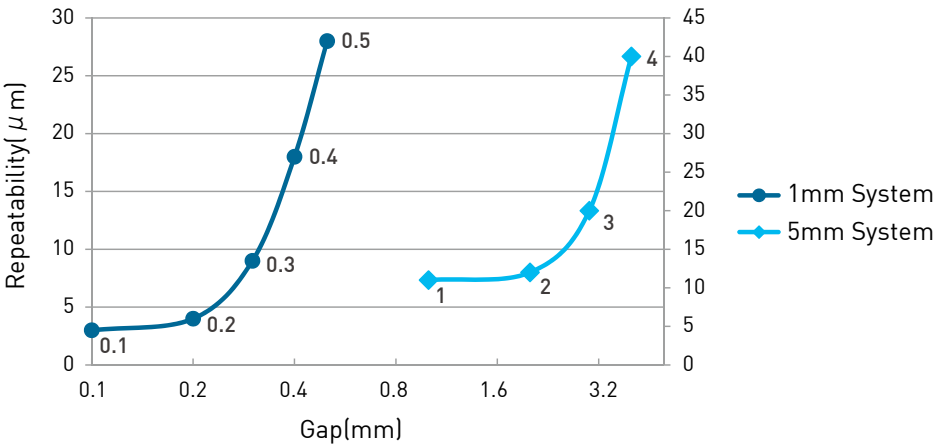
5.5 Signal Format:



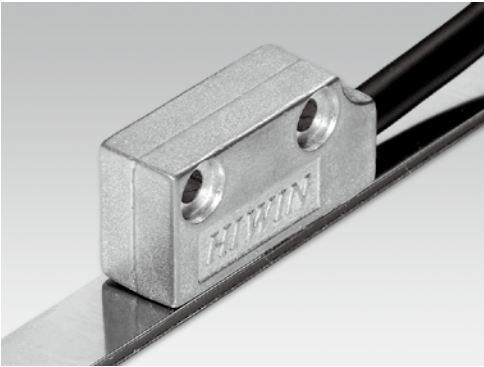
5.6 Recommended Input Circuit:



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 μ m while integrating with ST-A.
 - Repeatability is up to ± 10 μ m.
 - Available gap is up to 4mm.

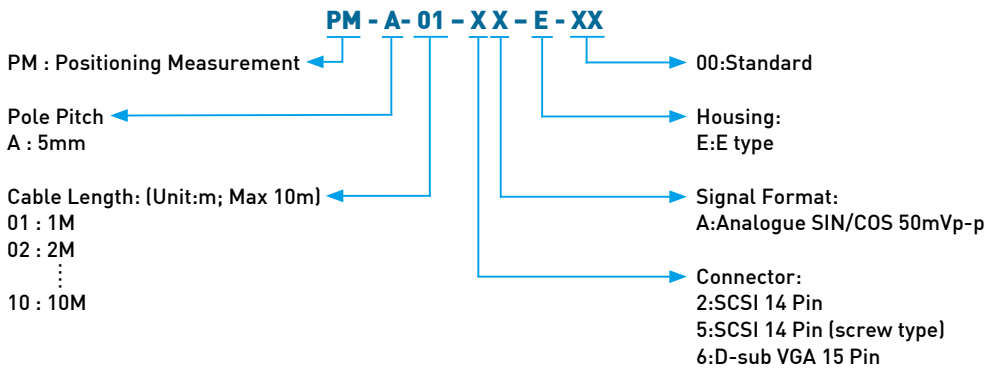


6.1 Specifications:

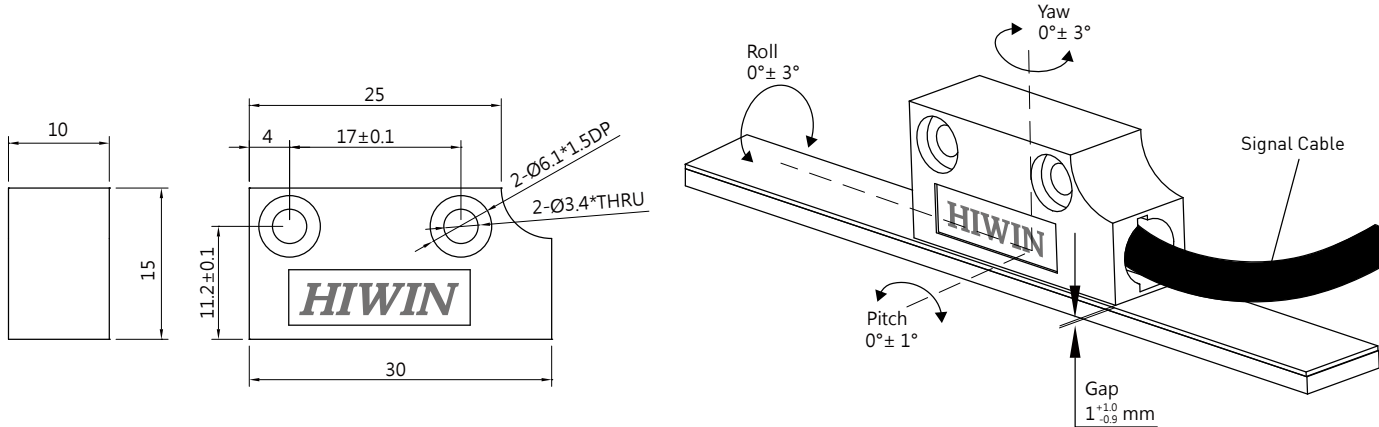
Pole Pitch	5mm
Available gap ⁽¹⁾	4mm
Signal format	Analogue
Output signal	SIN/COS 50mVp-p
Resolution	5mm
Repeatability ⁽²⁾	± 10μm
Reference signal	
Maximum travel speed	10m/sec
Input voltage	5VDC ± 5%
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67

Note: (1) Please refer Chap 6.5 for Gap-Repeatability relationship.
(2) The data were measured while gap is 1mm.

6.2 Ordering Code:



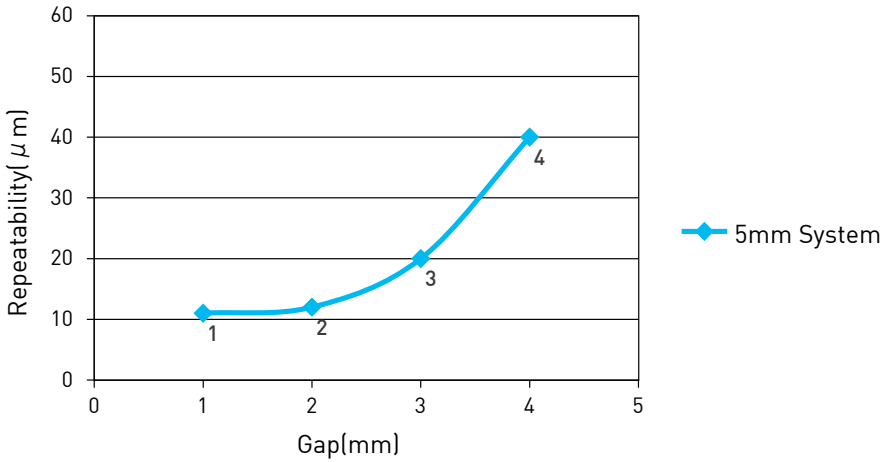
6.3 Dimensions:



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 μm when integrating with ST-A.
 - Repeatability is up to ±10 μm.
 - Available gap is up to 4mm.

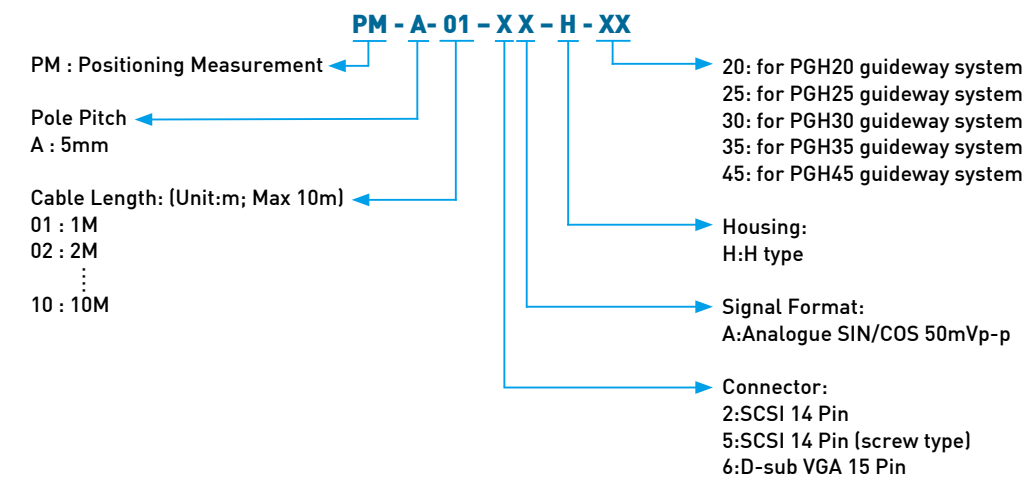


7.1 規格 :

Pole Pitch	5mm
Available gap ^[1]	4mm
Signal format	Analogue
Output signal	SIN/COS 50mVp-p
Resolution	5mm
Repeatability ^[2]	±10μm
Reference signal	
Maximum travel speed	10m/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 7.5 for Gap-Repeatability relationship.
[2] The data were measured while gap is 1mm.

7.2 Ordering Code:



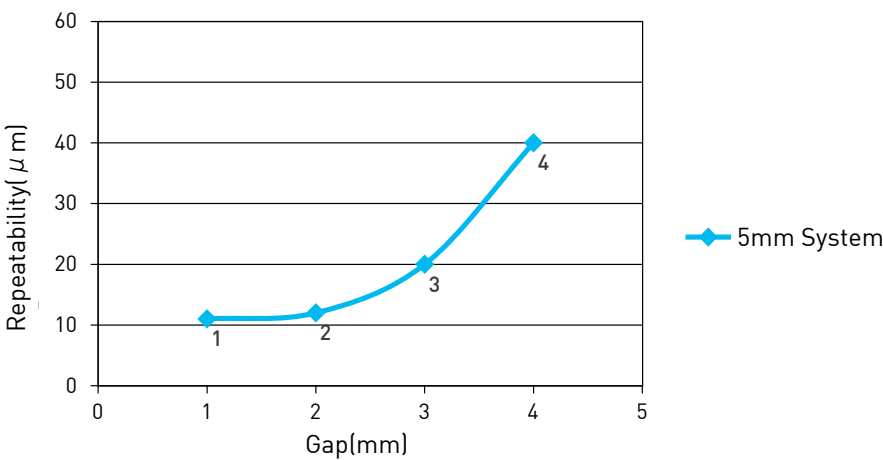
7.3 Dimensions:

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:

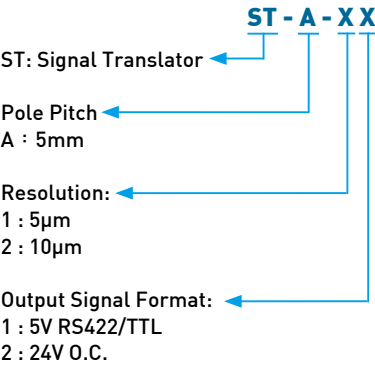
- Converting an analog signal input into a digital signal output
- Output signal 5V RS422/TTL or open collector
- Suitable for precise position feedback to a PC or PLC connection



1. Specifications:

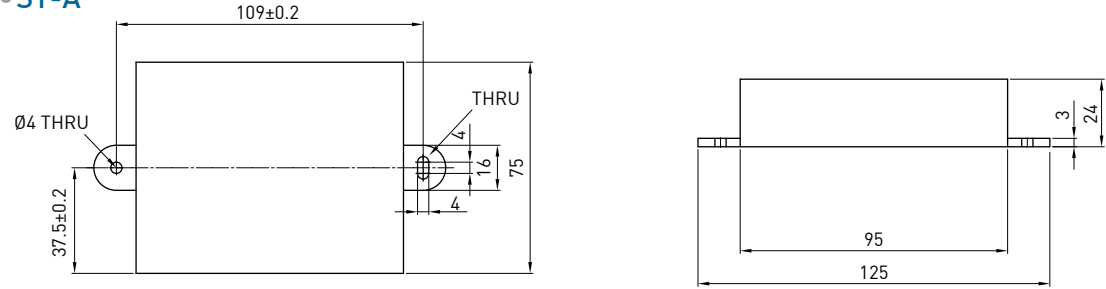
Type	ST-A			
Pole Pitch	5mm			
Input signal	SIN/COS 50mVp-p			
Output signal	5V RS422/TTL		24V O.C.	
Resolution	5μm	10μm	5μm	10μm
Repeatability	±10μm	±20μm	±10μm	±20μm
Maximum output frequency	64KHz	32KHz	64KHz	32KHz
Maximum travel speed	1.5m/sec			
Input voltage	5VDC ±5% /0.5A			
Operating temperature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

2. Ordering Code:



3. Dimensions:

•ST-A

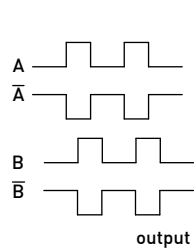


4. Pin Assignment:

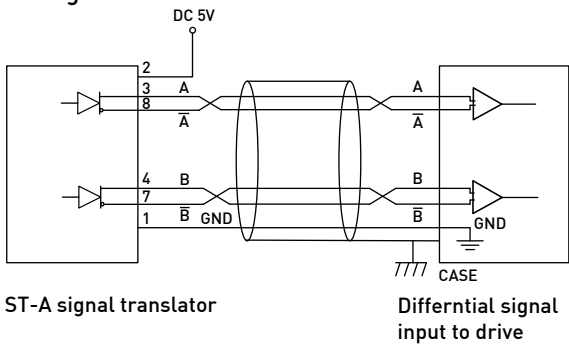
•ST-A-□1(5V RS422/TTL)

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	



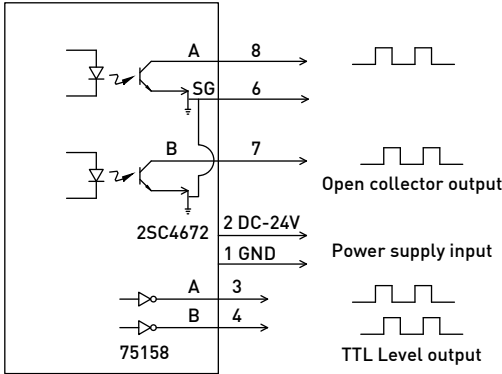
Wiring



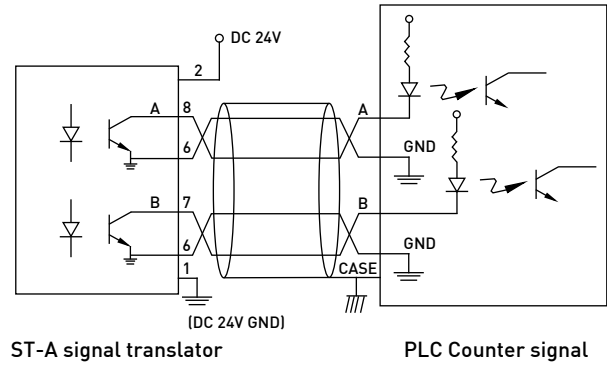
•ST-A-□2(24V O.C.)

D-sub 9 pin definition for signal output connector

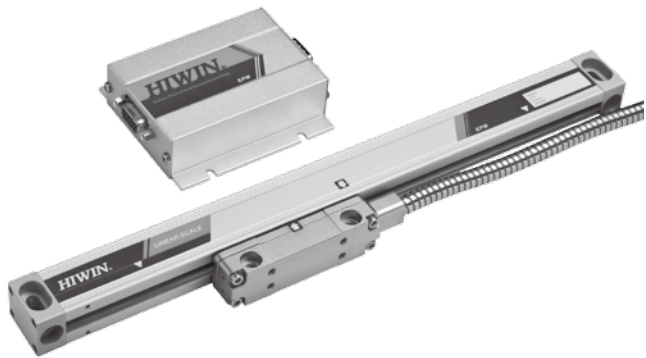
Function	Signal	Connector(male) (D-sub 9 pin)	I/O
Power	GND	1	I
	DC24V	2	
	SGND	6	
Output Signal	A(open collector)	8	O
	B(open collector)	7	
	A(TTL level)	3	
	B(TTL level)	4	



Wiring



III. High-precision Enclosed Positioning Measurement System



Features:

- Magnetic sensing mechanism
- Accuracy: (5+5ML/1000) μ m
- Resolution is up to 1 μ m
- With single index signal
- Simple design and easy-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℃	(5+5ML/1000) μ m	
	Within Measuring Length is 30 μ m	
Resolution	1μm	
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	±0.1mm	
Input voltage	5VDC±5% / 0.23A	
Coefficient of linear thermal expansion	$(11.8\pm0.6)\times10^{-6}\text{m/K}$	
Operating temperature	0℃~50℃	
Storage temperature	-20℃~60℃	
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:

EPM - 1050 - M - H1 - 7 - 1

EPM:
Enclosed Positioning Measurement

Measuring Length
0050 : 50mm
0100 : 100mm
0150 : 150mm
0200 : 200mm
0250 : 250mm
0350 : 350mm
0400 : 400mm
0450 : 450mm
0500 : 500mm
0550 : 550mm
0600 : 600mm
0650 : 650mm
0750 : 750mm
0850 : 850mm
0950 : 950mm
1050 : 1050mm

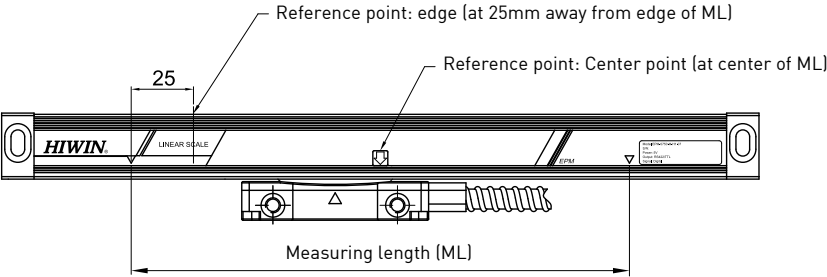
Reference Point: (Note1)
M: Center point
S: Edge(at 25 mm away from edge of ML)
C: User-selected point

Cable Outlet (Note2)
1:With interconnected cable, round waterproof connector (IP68)
2:With interconnected cable, D-sub VGA 15 pin
3:Directly connected cable, D-sub VGA 15 pin

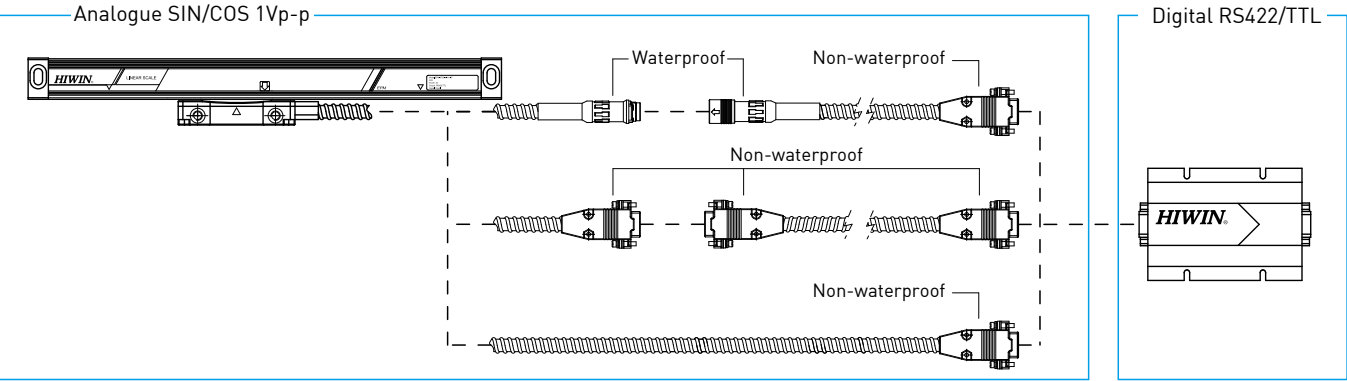
Cable Length (Unit:m)
3 : 3m
5 : 5m
7 : 7m

Accuracy-Resolution-Output signal:
H1:(5+5ML/1000) μ m-1 μ m-5V TTL/RS422
D1:Within measuring length is 30 μ m-1 μ m-5V TTL/RS422
※ML:Measuring Length

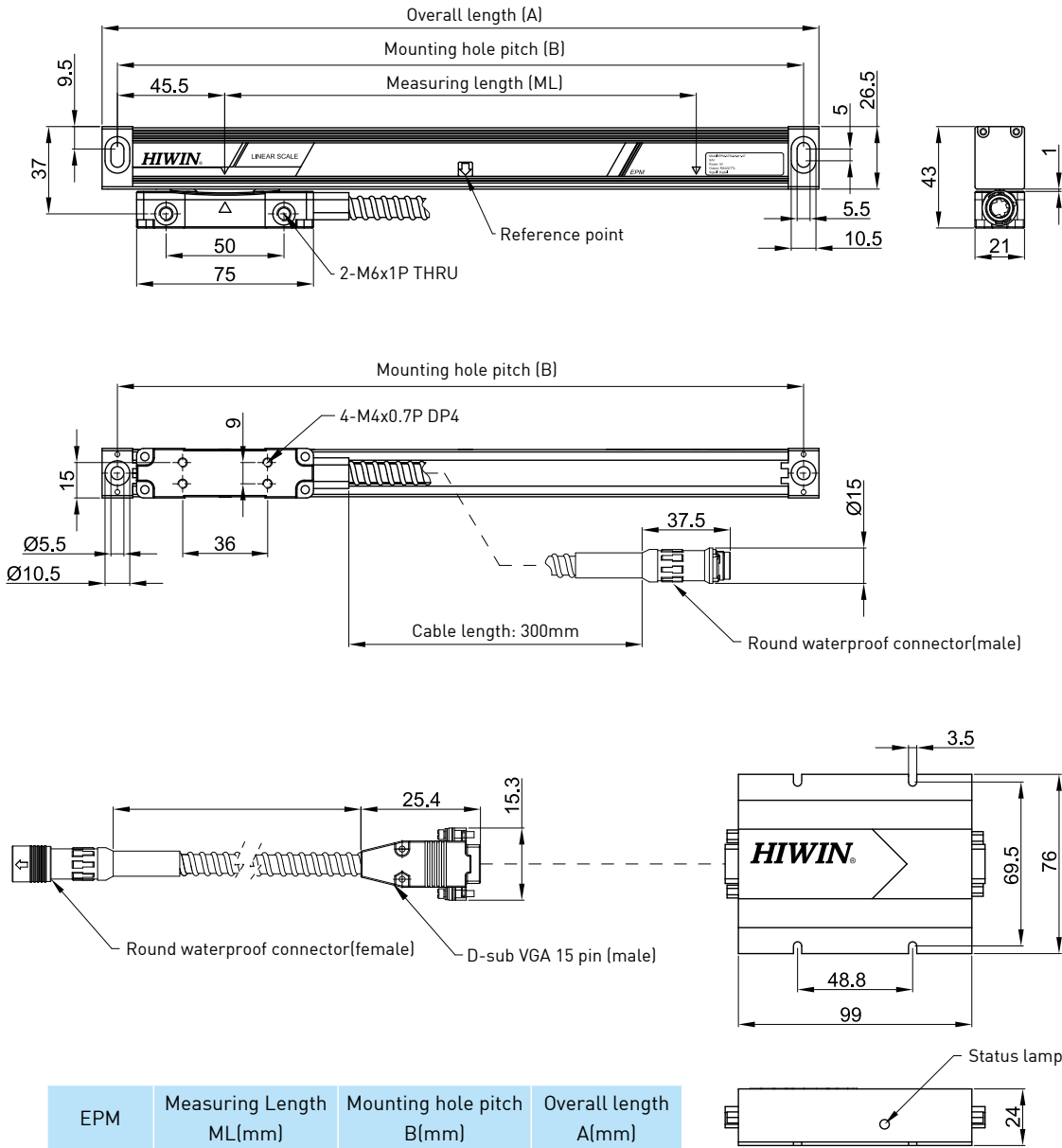
※ Note1: Reference point



※ 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, easy-mounted, and cost-effective.

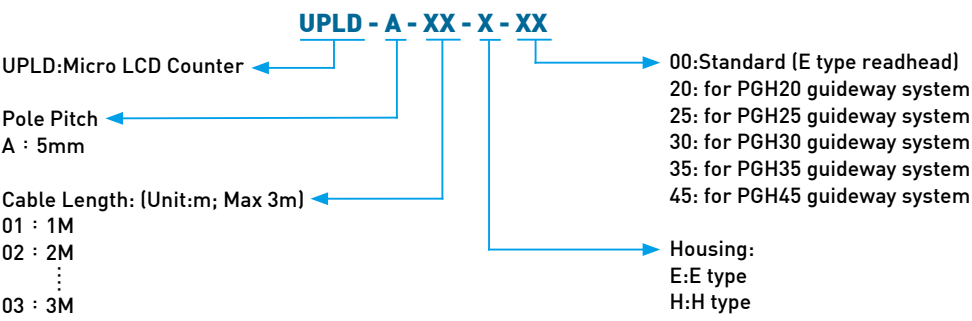


1.1 Specifications:

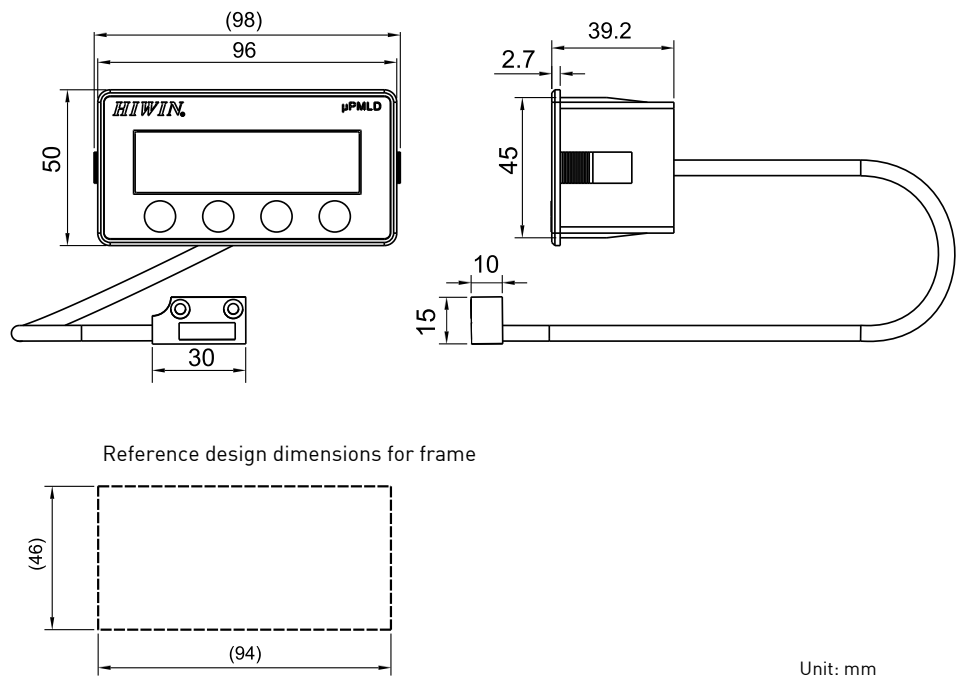
Display		8 digits LCD display with +/- sign
Accuracy@20℃		± (80+15xL) μm (L: Length (unit: m))
Resolution		5μm
Repeatability ⁽¹⁾		± 10μm
Operating speed		3m/sec (maximum 2G acceleration)
Input voltage		commercial AA No.3 batteries × 2
Battery life ⁽²⁾		1 year by setting speed at 1.5m/s
Operating Temperature		0℃~50℃
Storage Temperature		-5℃~55℃
Protection class	Scale/Readhead	IP67
	Counter	IP43
Function	General	Set reading direction
		Unit conversion (mm/inch/°)
		Absolute/Incremental position(INC/ABS) selection
		Set display digits
		Set reference points
		5 sets of maximum velocity settings (default: 1.5m/s)
	Programmable	Angular measurement radius setting (minimum: 50mm)
		5 sets of programmably compensable reference points
		set programmable coefficient ratio
	Display	Indicate installed condition
		Power monitor and display
	Other	Keypad lock
		Parameter save function
5 sets of individually incremental counters for relative measurement.		

Note: (1) The data were measured while gap is 1mm.
(2) Battery capacity is 2200mAh(ambient temperature: 20+/-5℃).
Capacity will have different performance while using under different environmental temperature.

1.2 Ordering Code:



1.3 Dimensions:



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, easy-mounted, and cost-effective.

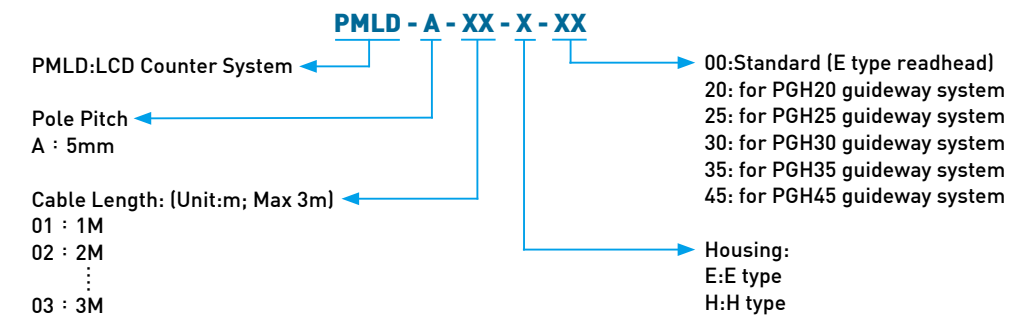


2.1 Specifications:

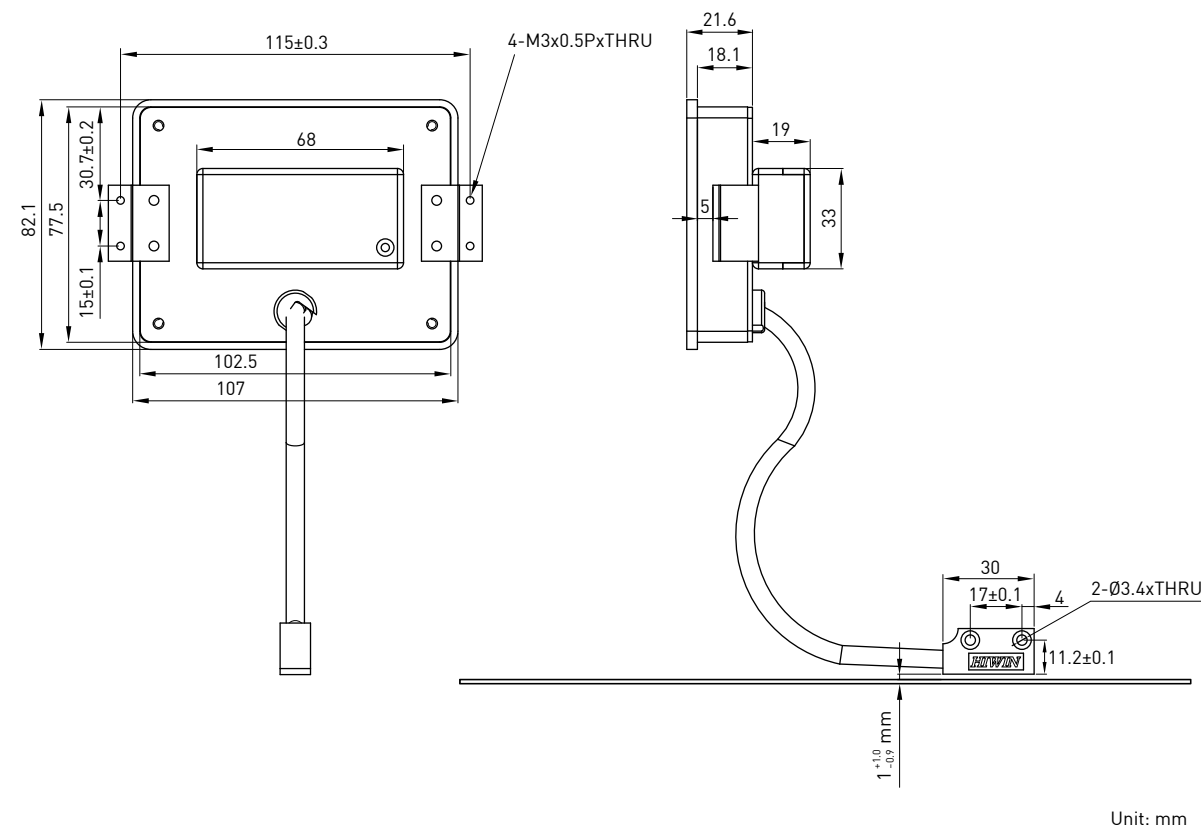
Display		8 digits LCD display with +/- sign
Accuracy@20°C		± (80+15xL) μm (L: Length (unit: m))
Resolution		5μm
Repeatability ⁽¹⁾		± 10μm
Operating speed		3m/sec (maximum 2G acceleration)
Input voltage		commercial AA No.3 batteries × 2
Battery life ⁽²⁾		1 year by setting speed at 1.5m/s
Operating Temperature		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
		5 sets of maximum velocity settings (default: 1.5m/s)
	Programmable	Angular measurement radius setting (minimum: 50mm)
		5 sets of programmably compensable reference points
		set programmable coefficient ratio
	Display	Indicate installed condition
		Power monitor and display
	Other	Keypad lock
		Parameter save function
5 sets of individually 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 will have different performance while using under different environmental temperature.

2.2 Ordering Code:



2.3 Dimensions:



3. High Efficiency Single Axis Counter



Features:

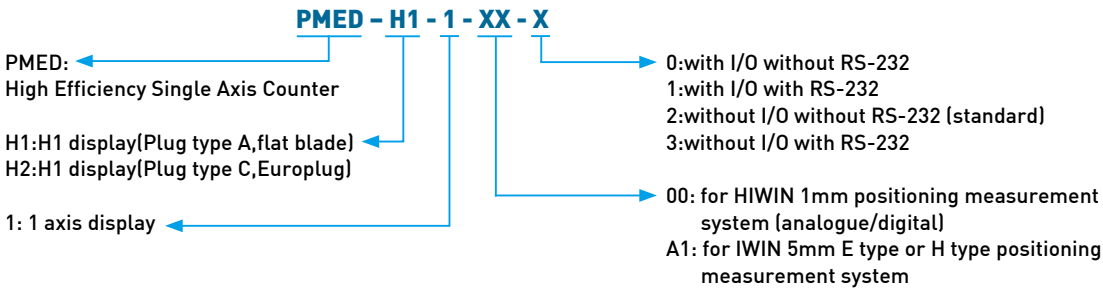
- LED display
- Can be used with other digital optical encoders
- Consists of multiple output interfaces
- Suitable for cutting and wood-processing machines
- Compact design and easy installation



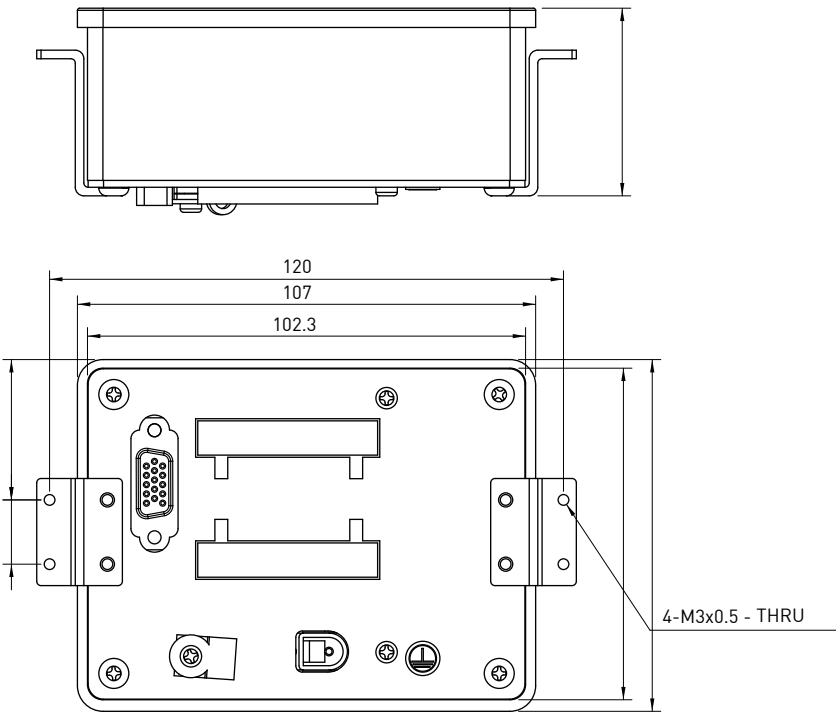
3.1 Specifications:

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:

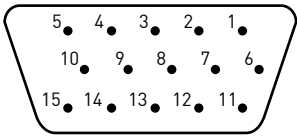


3.3 Dimensions:



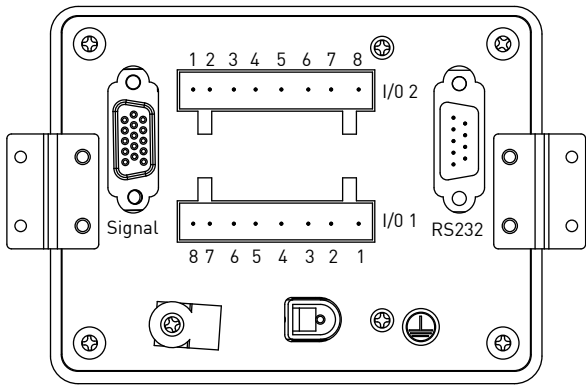
Unit: mm

3.4 Input signal descriptions:



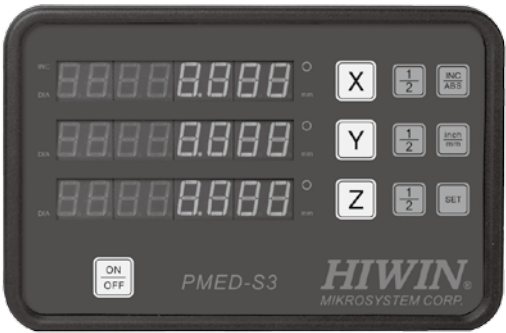
PIN	Definition	PIN	Definition	PIN	Definition
1	+5V	6	NC	11	SIN+(Analogue)
2	GND	7	Z+	12	SIN-(Analogue)
3	A+(Digital)	8	Z-	13	COS+(Analogue)
4	B+(Digital)	9	A-(Digital)	14	COS-(Analogue)
5	NC	10	B-(Digital)	15	NC

3.5 Relay output signal descriptions:



PIN	I/O 1	I/O 2
1	N.C.	N.C.
2		
3		
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:

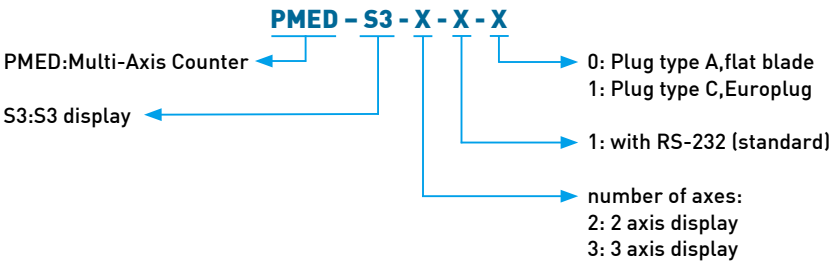
- LED display, high brightness
- Easy operation, suitable for cutting machines, traditional gantry milling machines, and programmable drilling machines
- Compact design and easy installation



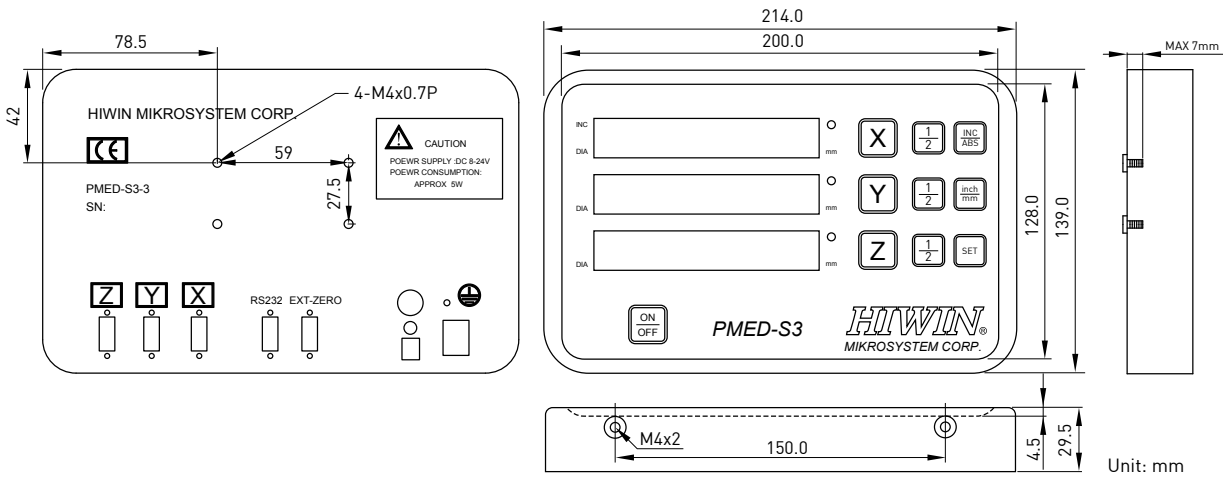
4.1 Specifications:

Display		8 digit LED display
Resolution		0.1μm 、0.2μm 、0.5μm 、1μm 、2μm 、5μm 、10μm 、20μm 、50μm
Input signal		Digital : 5V RS422/TTL
Input voltage		8~30VDC ± 5% / 0.08A
Operating Frequency		< 1.5MHz
Operating Temperature		0℃~50℃
Storage Temperature		-5℃~70℃
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)
		auto-center (1/2) function
	Other	Linear error compensation
		Instant power failure memory
		RS-232 output

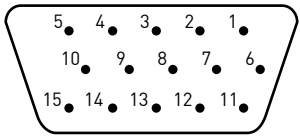
4.2 Ordering Code:



4.3 Dimensions:



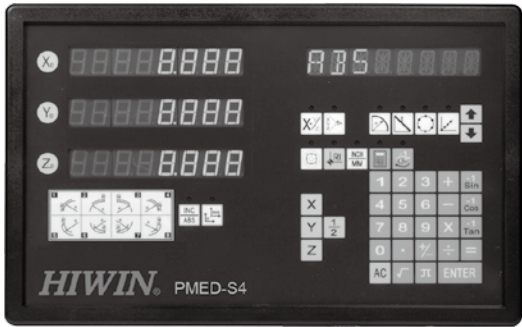
4.4 Input signal descriptions:



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

LED

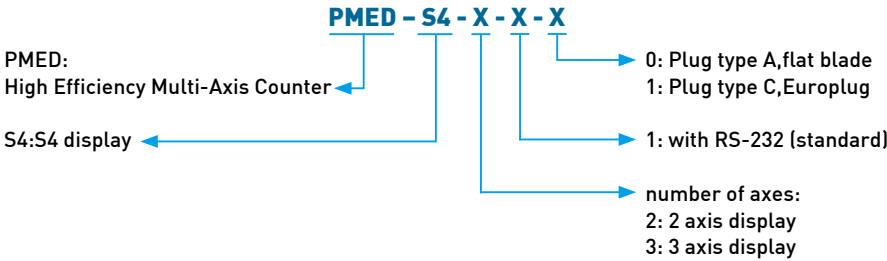
CE

RoHS

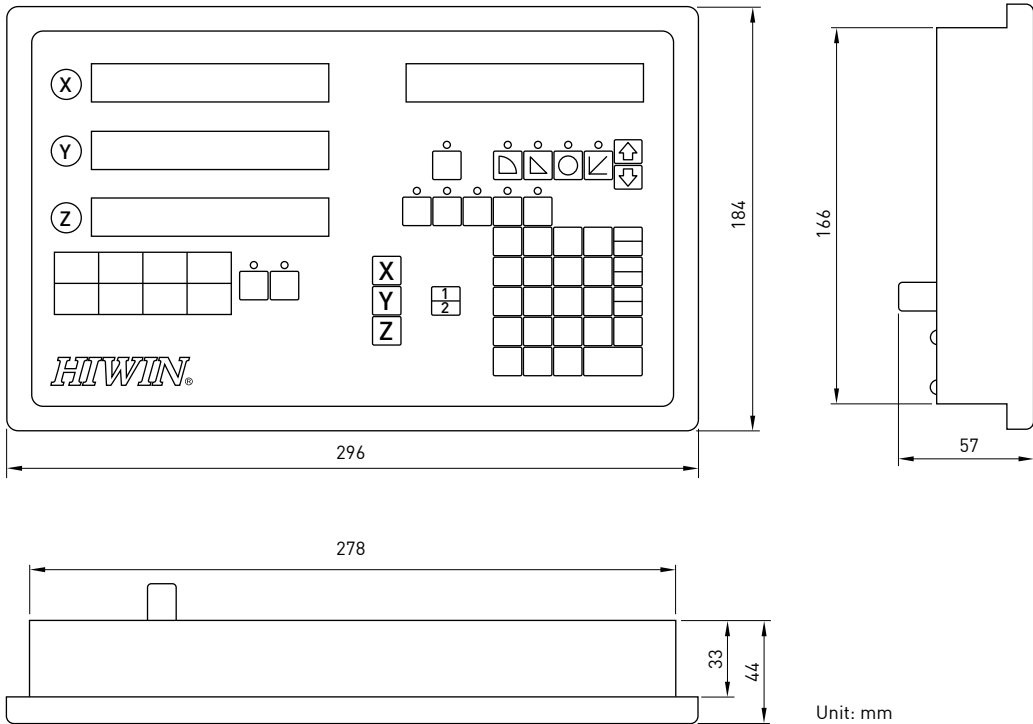
5.1 Specifications:

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℃~50℃
Storage Temperature		-5℃~70℃
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
		Linear error compensation
	Other	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

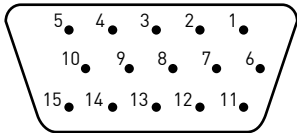
5.2 Ordering Code:



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

MEMO

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