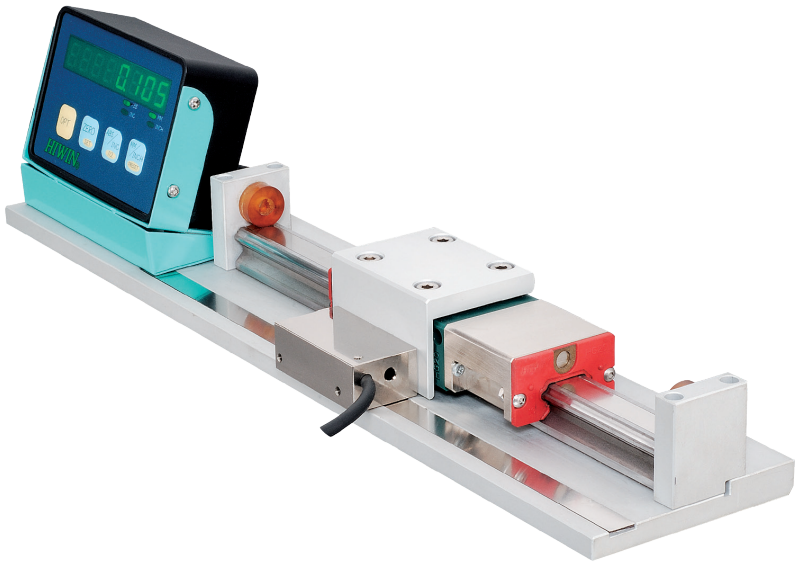
HIWIN®
Motion Control and System Technology



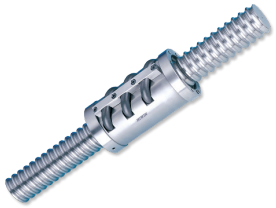
Positioning Measurement System

Technical Information

HIWIN®

Motion Control and System Technology

High speed | High precision | Multifunctional integration | Ecology first | Humanistic technology



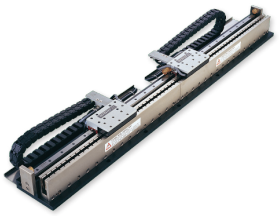
TAIWAN EXCELLENCE
GOLD AWARD 2005

Ballscrew

- For Heavy-Load Drive

TAIWAN EXCELLENCE
2004

Positioning Guideway



TAIWAN EXCELLENCE
GOLD AWARD 2004

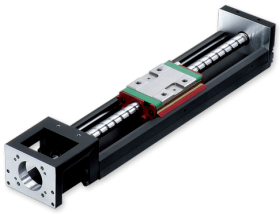
Linear Synchronous Motor

- Coreless Type (LMC)
- Iron-core Type (LMS)

TAIWAN EXCELLENCE
2002

Linear Actuator

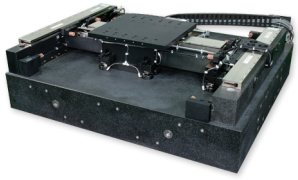
- LAN for Hospital
- LAM for Industrial
- LAS Compact Size
- LAK Controller



TAIWAN EXCELLENCE
GOLD AWARD 2010, 2003

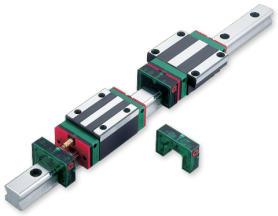
Industrial Robot

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



TAIWAN EXCELLENCE
SILVER AWARD 2009

Linear Motor Air Bearing Platform



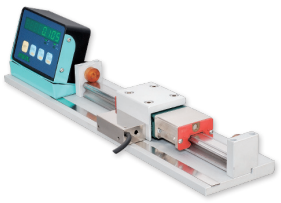
TAIWAN EXCELLENCE
GOLD AWARD 2008

TAIWAN EXCELLENCE
SILVER AWARD 2007, 2002

Linear Guideway

HG/EG/RG/MG Type

- Self-Lubricating (E2)
- Low Noise (Q1)
- Air Jet (A1)



Positioning Measurement System

TAIWAN EXCELLENCE
GOLD AWARD 2011, 2009, 2008

TAIWAN EXCELLENCE
SILVER AWARD 2006, 2001, 1993

Ballscrews

Ground/Rolled

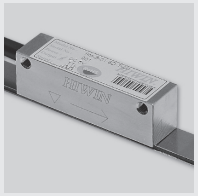
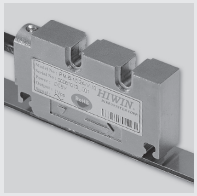
- High Speed (High Dm-N Value/Super S Series)
- Heavy Load (Cool type II)
- Self-Lubricanting (E2)
- Rotating Nut (R1)

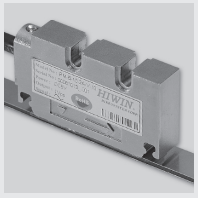
Linear Motor X-Y Robot

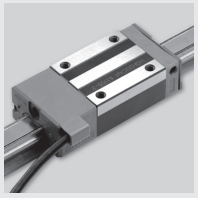
TAIWAN EXCELLENCE
SILVER AWARD 2006

TMS Torque Motor Rotary Table

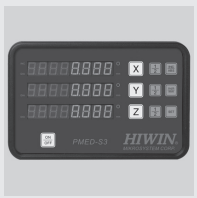
Linear Motor Gantry








I. 1mm High Resolution Position Measurement System

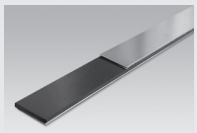
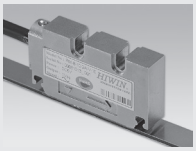
II. 5mm High Resolution Position Measurement System

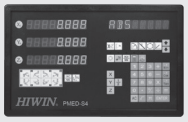
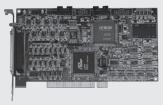
III. Display and Counter

IV. Accessories

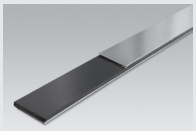
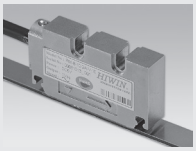
V. Customer's Requirements(PM)

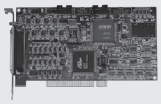
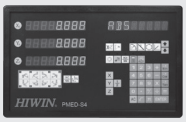
The Component Breakdown of the Positioning Measurement System - 1mm Placement Figure (Analog)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	Refer Page
1mm PS-B-□□□□□ 	Page 1	1μm	T Type PM-B-□□-□A-T-□□ 	Page 2	Analog	Flying Lead  D-sub VGA 15 Pin 	Page 12
			Standard Type PM-B-□□-□A-S-□□ 	Page 4		D-sub 15 Pin  17 Pin Circular Plug 	
			Vertical Type PM-B-□□-□A-V-□□ 	Page 6		SCSI 14 Pin  SCSI 14 Pin (with screw) 	
			PG Type PM-B-□□-□A-G-□□-□□ 	Page 8		SCSI 20 Pin 	

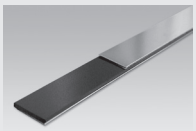
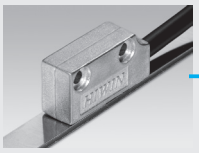
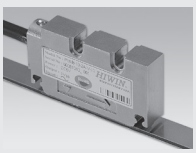
Translator	Refer Page	Trunk Connector	Refer Page	Counter/Display Application	Refer Page
Translator ST-B-□□ 	Page 10	D-sub 9 Pin to D-sub VGA 15 Pin STC-□□-00-□ 	Page 25	High Efficiency Single Axis Counter PMED-H1-1-00-□ 	Page 28
				High Efficiency Multi-axis Counter PMED-S4-□-□ 	Page 33
		D-sub 9 Pin to D-sub 15 Pin STC-□□-01-□ 		Multi-axis Counter PMED-S3-□-□ 	Page 31
				For M Company 3 Axis Counter 	
				PLC or Driver 	
		Hiwin Drive 		Linear Motors (HIWIN LM) 	

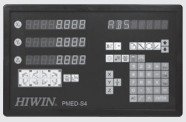
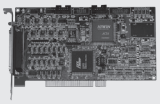
The Component Breakdown of the Positioning Measurement System - 1mm Placement Figure (Digital)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	Refer Page
1mm PS-B-□□□□□ 	Page 1	1μm	T Type PM-B-□□-□D-T-□□ 	Page 2	Digital	Flying Lead 	Page 12
						D-sub VGA 15 Pin 	
			Standard Type PM-B-□□-□D-S-□□ 	Page 4		D-sub 15 Pin 	
			Vertical Type PM-B-□□-□D-V-□□ 	Page 6		17 Pin Circular Plug 	
			PG Type PM-B-□□-□D-G-□□-□□ 	Page 8		SCSI 14 Pin  SCSI 14 Pin (with screw)  SCSI 20 Pin 	

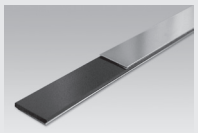
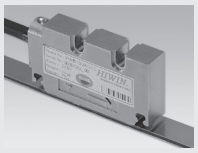
	Counter/Display Application	Refer Page
	PLC or Driver 	
	High Efficiency Single Axis Counter PMED-H1-1-00-□ 	Page 28
	High Efficiency Multi-axis Counter PMED-S4-□-□ 	Page 33
	Multi-axis Counter PMED-S3-□-□ 	Page 31
Hiwin Drive 	Linear Motors (HIWIN LM) 	

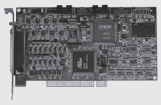
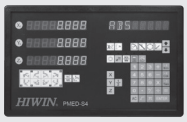
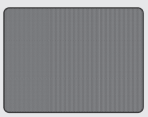
The Component Breakdown of the Positioning Measurement System - 5mm Placement Figure (Analog)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	Refer Page
5mm PS-A-□□□□□ 	Page 16	5μm	E Type PM-A-□□-□A-E-00 	Page 20	Analog	D-sub VGA 15 Pin 	Page 12
						SCSI 14 Pin 	
			H Type PM-A-□□-□A-H-□□ 	Page 22		SCSI 14 Pin (with screw) 	
			Vertical Type PM-A-□□-□A-V-□□ 	Page 17		D-sub VGA 15 Pin 	

Translator	Refer Page	Trunk Connector	Refer Page	Counter/Display Application	Refer Page
				LCD Counter System PMLD-A-□□-□-□□ 	Page 26
				High Efficiency Single Axis Counter PMED-H1-1-A1-□ 	Page 28
Translator ST-A-□□ 	Page 23	D-sub 9 Pin to D-sub VGA 15 Pin STC-□□-00-□ 	Page 25	High Efficiency Multi-axis Counter PMED-S4-□-□ 	Page 33
				Multi-axis Counter PMED-S3-□-□ 	Page 31
		D-sub 9 Pin to D-sub 15 Pin STC-□□-01-□ 		For M Company 3 Axis Counter 	
Translator ST-A-□□B 	Page 23			PLC or Driver 	
				High Efficiency Single Axis Counter PMED-H1-1-A0-□ 	Page 28

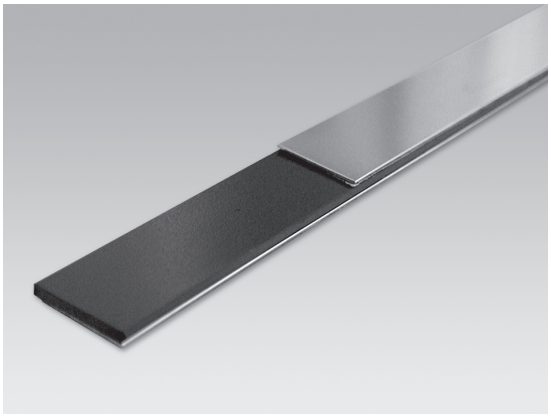
The Component Breakdown of the Positioning Measurement System - 5mm Placement Figure (Digital)

Pole Pitch	Refer Page	Resolution	Encoder Type	Refer Page	Signal	Type of Connector	Refer Page
5mm PS-A-□□□□□ 	Page 16	5μm	Vertical Type PM-A-□□-□D-V-□□ 	Page 17	Digital	Flying Lead 	Page 12
						D-sub VGA 15 Pin 	
						D-sub 15 Pin 	
						SCSI 20 Pin 	

Counter/Display Application		Refer Page
PLC or Driver		
High Efficiency Multi-axis Counter PMED-S4-□-□		Page 33
Multi-axis Counter PMED-S3-□-□		Page 31
High Efficiency Single Axis Counter PMED-H1-1-00-□		Page 28
For M Company 3 Axis Counter		
HIWIN Drive		

I. 1mm High Resolution Position Measurement System

1. 1mm 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:

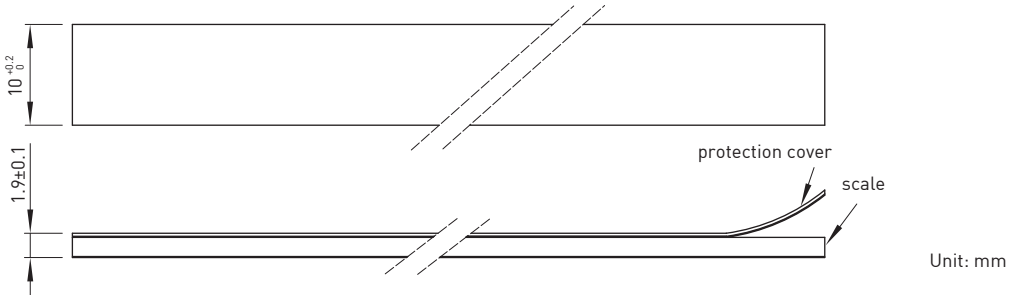
Accuracy	±20μm/m
Pitch	1mm
Width	10mm (+0.2mm~0mm)
Thickness	1.9mm±0.1mm
Max scale length	30m
Linear expansion coefficient	(11±1)×10^{-6}m/K
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67

1.2 Ordering Code:

PS - B - XXXXX

PS: Positioning Scale
XXXXX: Scale length (Unit: mm)
B: Pole pitch (1mm)

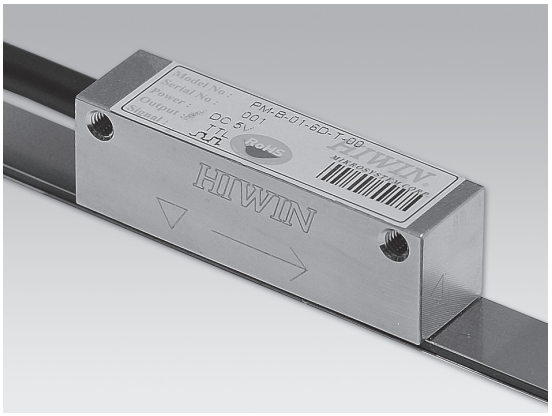
1.3 Dimensions:



Caution!

1. Magnetic scale consists of magnetic substance and should be kept away from strong magnetic filed during installation to prevent a malfunction.
2. Please leave the magnetic field strength 5000 gauss at least 4 cm away, 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

2.1 Specifications:

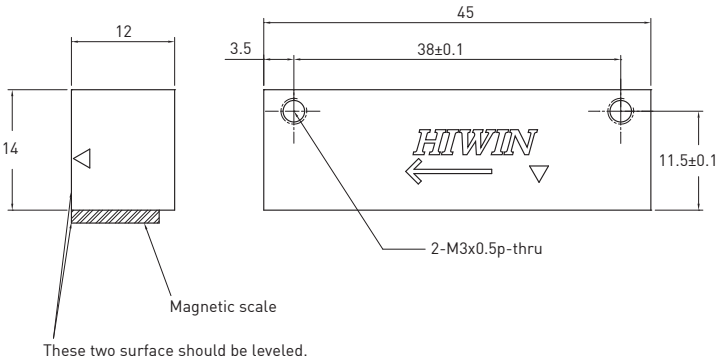
Signal resolution	analog: 1mm digital: 1μm
Repeatability	analog: ±3μm digital: ±2μm
Reference signal	1mm/pulse
Output signal	analog: SIN/COS 1Vp-p digital: 5V RS422/TTL
Max travel speed	analog: 10m/sec digital: 5m/sec
Input power	5VDC ±5%
Operating temperature	0˚C~50˚C
Storage temperature	-5˚C~70˚C
Protection class	IP67

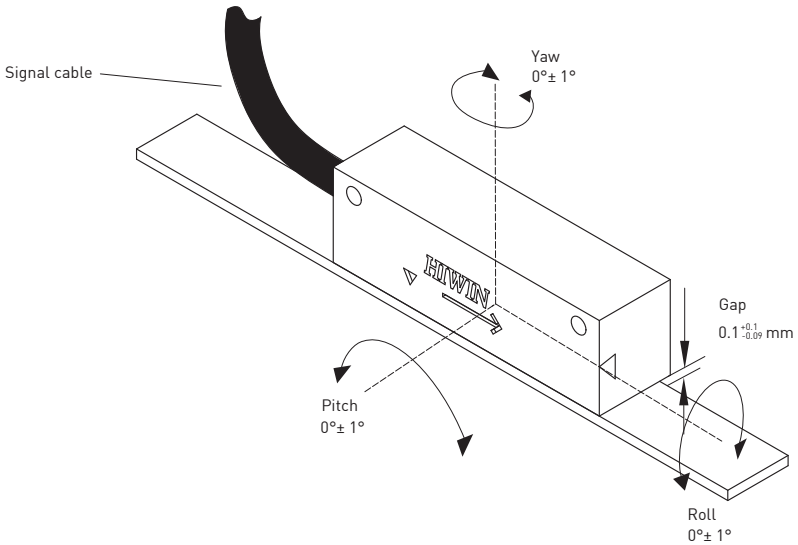
2.2 Ordering Code:

PM - B - XX - XX - T - XX

PM : Positioning Measurement
10 : Standard
T : Tiny type
A : Analog SIN/COS 1Vp-p
D : Digital 5V RS422/TTL
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 (with screw)
6 : D-sub VGA 15 Pin
Note: Refer to Page 12 for wiring
XX : Cable length (Unit: m ; Max 10m)
B : Pole pitch (1mm)

2.3 Dimensions:





Unit: mm

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

3.1 Specifications:

Signal resolution	analog: 1mm digital: 1μm
Repeatability	analog: ±3μm digital: ±2μm
Reference signal	1mm/pulse
Output signal	analog: SIN/COS 1Vp-p digital: 5V RS422/TTL
Max travel speed	analog: 10m/sec digital: 5m/sec
Input power	5VDC ±5%
Operating temperature	0˚C~50˚C
Storage temperature	-5˚C~70˚C
Protection class	IP67

3.2 Ordering Code:

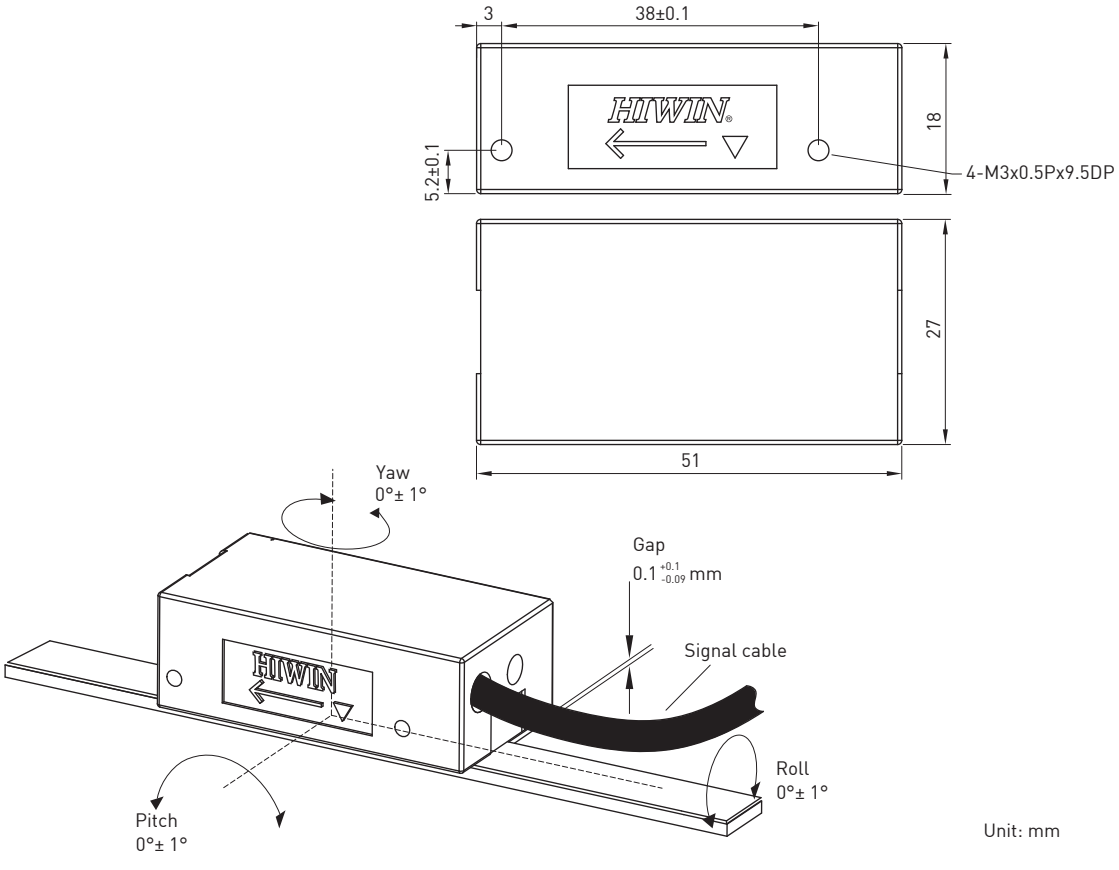
PM - B - XX - XX - S - XX

- PM : Positioning Measurement
- 10 : Standard
- 11 : with metal tube
- S : Standard type
- A : Analog SIN/COS 1Vp-p
- D : Digital 5V RS422/TTL
- 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 (with screw)
- 6 : D-sub VGA 15 Pin

Note: Refer to Page 12 for wiring

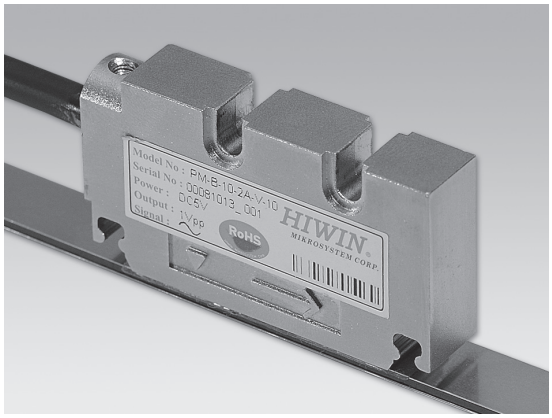
- XX : Cable length (Unit: m ; Max 10m)
- B : Pole pitch (1mm)

3.3 Dimensions:



Unit: mm

4. Positioning Measurement - Vertical Type



Features:

- Digital or Analog signal output available
- Vertical shape, optimal for space-saving applications
- Optional metal protection tube

4.1 Specifications:

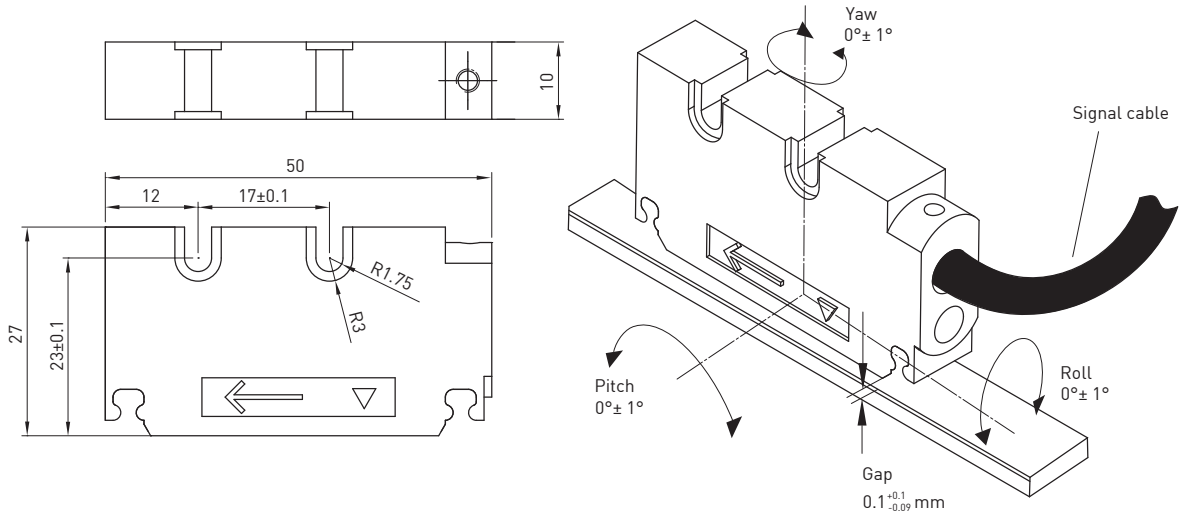
Signal resolution	analog: 1mm digital: 1μm
Repeatability	analog: ±3μm digital: ±2μm
Reference signal	analog: 2mm/pulse digital: 1mm/pulse
Output signal	analog: SIN/COS 1Vp-p digital: 5V RS422/TTL
Max travel speed	analog: 10m/sec digital: 5m/sec
Input power	5VDC ±5%
Operating temperature	0˚C~50˚C
Storage temperature	-5˚C~70˚C
Protection class	IP67

4.2 Ordering Code:

PM - B - XX - XX - V - XX

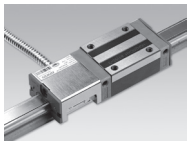
PM : Positioning Measurement
10 : Standard
11 : with metal tube
V : Vertical type
A : Analog SIN/COS 1Vp-p
D : Digital 5V RS422/TTL
0 : Flying Lead
1 : SCSI 20 Pin
2 : SCSI 14 Pin
3 : D-sub 15 Pin
4 : 17 Pin Circular Plug (M17)
5 : SCSI 14 Pin (with screw)
6 : D-sub VGA 15 Pin
Note: Refer to Page 12 for wiring
XX : Cable length (Unit: m ; Max 10m)
B : Pole pitch (1mm)

4.3 Dimensions:



Unit: mm

5. 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

5.1 Specifications:

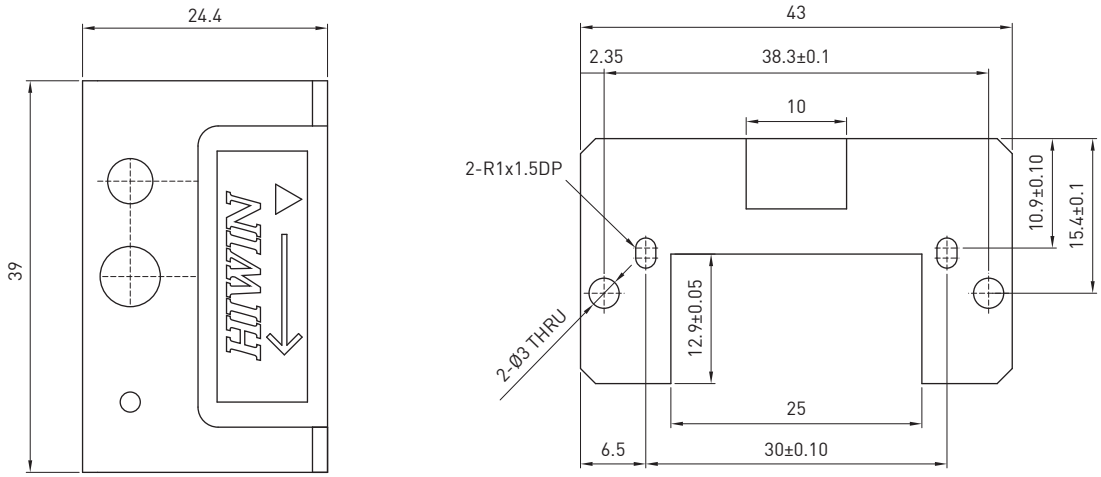
Signal resolution	analog: 1mm digital: 1μm
Repeatability	analog: ±3μm digital: ±2μm
Reference signal	1mm/pulse
Output signal	analog: SIN/COS 1Vp-p digital: 5V RS422/TTL
Max travel speed	analog: 10m/sec digital: 5m/sec
Input power	5VDC ±5%
Operating temperature	0˚C~50˚C
Storage temperature	-5˚C~70˚C
Protection class	IP67

5.2 Ordering Code:

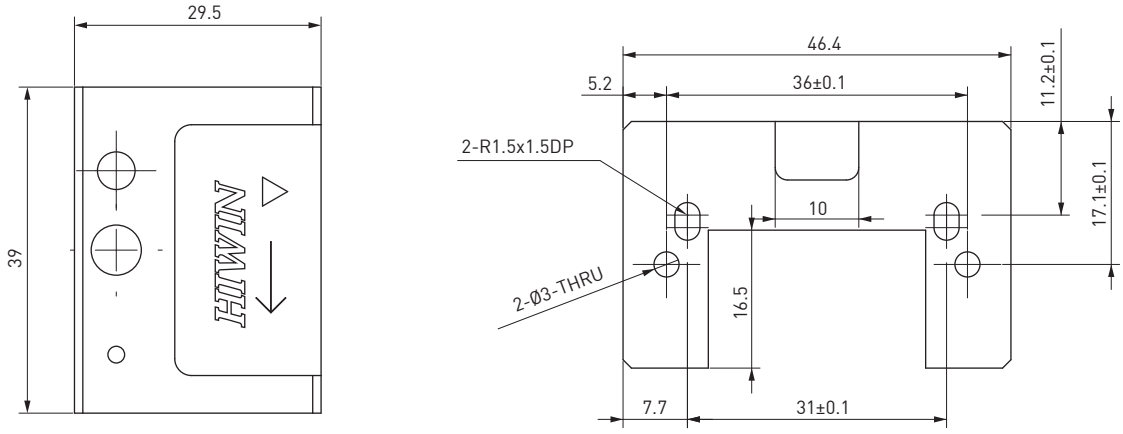
PM - B - XX - XX - G - XX - XX

- PM : Positioning Measurement
- B : Pole pitch (1mm)
- XX : Cable length (Unit: m ; Max 10m)
- Note: Refer to Page 12 for wiring
- 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 (with screw)
- 6 : D-sub VGA 15 Pin
- A : Analog SIN/COS 1Vp-p
- D : Digital 5V RS422/TTL
- G : PG type
- XX : for Hxx type (H20, H25 available)
- 10 : standard
- 11 : with metal tube

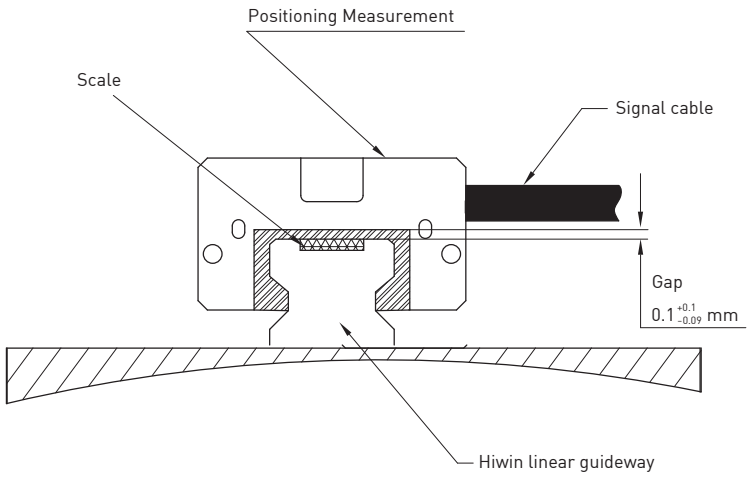
5.3 Dimensions:



Note: These dimensions are applicable for the Hiwin PGH20 linear guideway



Note: These dimensions are applicable for the Hiwin PGH25 linear guideway



Unit: mm

6. 1mm Signal Translator

Features:

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

6.1 Specifications:

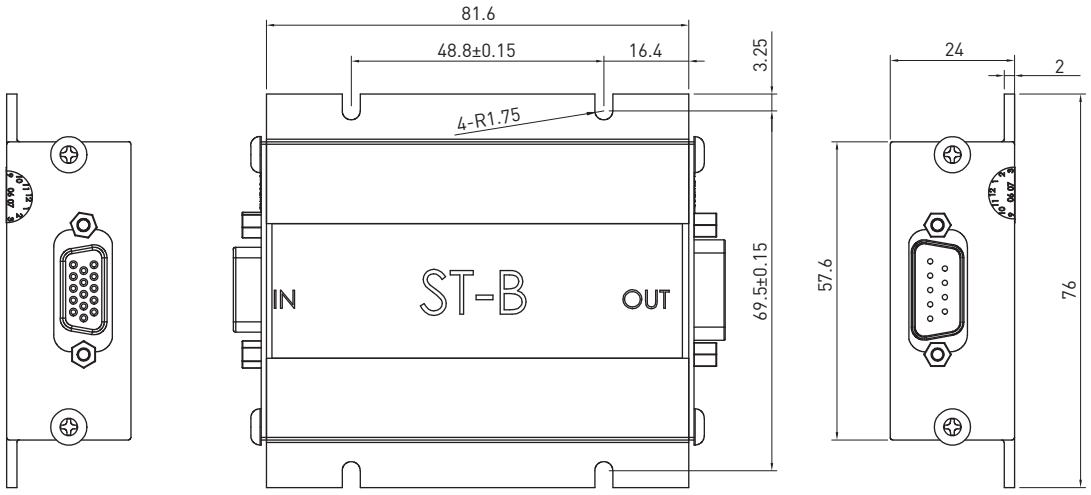
Repeatability	±3μm
Resolution	1μm, 2μm, 5μm, 10μm
Input signal	analog: SIN/COS 1Vp-p
Output signal	digital: 5V RS422/TTL
Max output frequency	1.25MHz (Resolution: 1μm mode)
Power input	5VDC ±5%/0.5A
Max travel speed	5m/sec
Operating temperature	0˚C~50˚C
Storage temperature	-5˚C~70˚C
Protection class	IP43

6.2 Ordering Code:

ST - B - XX

ST : Signal Translator
1 : 5V RS422 / TTL
1 : Resolution 1μm
2 : Resolution 2μm
3 : Resolution 5μm
4 : Resolution 10μm
B : Pole pitch (1mm)

6.3 Dimensions:



Unit: mm

7. Cable Color and Pin Assignment

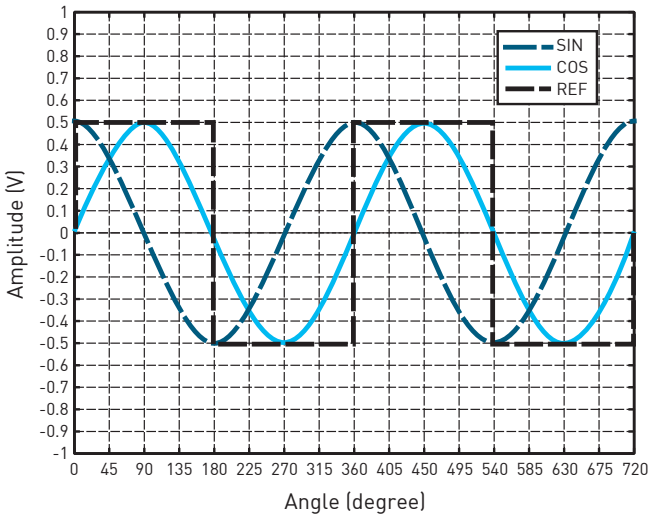
Function	Signal		Color	Connector (male) (SCSI 14 Pin)	Connector (male) (SCSI 20 Pin)		Connector (male) (D-sub 15 Pin)		Connector (male) (17 Pin Circular Plug)	Connector (male) (D-sub VGA 15 Pin)		Connector (male) (D-sub 9 Pin)	Flying Lead
	Analog	Digital		Analog	Analog	Digital	Analog	Digital		Analog	Digital	Digital	
Power	5V		Brown	1	3	3	4	7	4/5	1	1	2	Brown
	0V		White	8	2	2	12	2	12/13	2	2	1	White
Incremental signals	SIN+	A+	Green	10	16	4	9	14	9	11	3	3	Green
	SIN-	A-	Yellow	11	17	5	1	6	1	12	9	8	Yellow
	COS+	B+	Blue	3	18	6	10	13	10	13	4	4	Blue
	COS-	B-	Red	4	19	7	2	5	2	14	10	7	Red
Reference mark	REF+	Z+	Violet	5	8	8	3	12	3	7	7	5	Violet
	REF-	Z-	Gray	6	9	9	11	4	11	8	8	9	Gray
Shield				case	1/case		case		case	case		case	

Note: 17 pin circular plug
Brand: Intercontec Corp.
P/N: AKUA874MR1087004A000

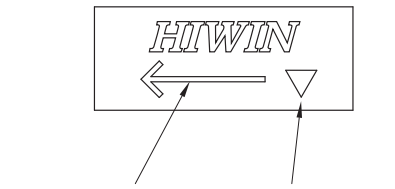
Function	Signal	Color	Connector(male) (D-sub 9 Pin)	Flying Lead
	Digital		Digital	
Power	24V	Brown	2	Brown
	0V	White	1	White
Incremental signals	A(TTL)	Green	3	Green
	A(O.C.)	Yellow	8	Yellow
	B(TTL)	Blue	4	Blue
	B(O.C.)	Red	7	Red
Reference mark	Z+	Violet	5	Violet
	Z-	Gray	9	Gray
Shield			case	

8. Output Signal Definition

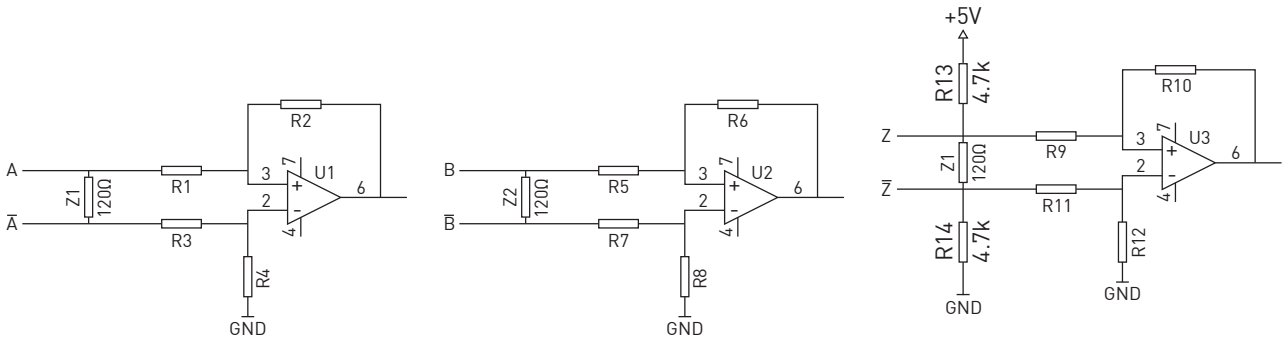
8.1 Analog Signal Definition:



Analog output : Sin/Cos 0.9~1.1Vp-p



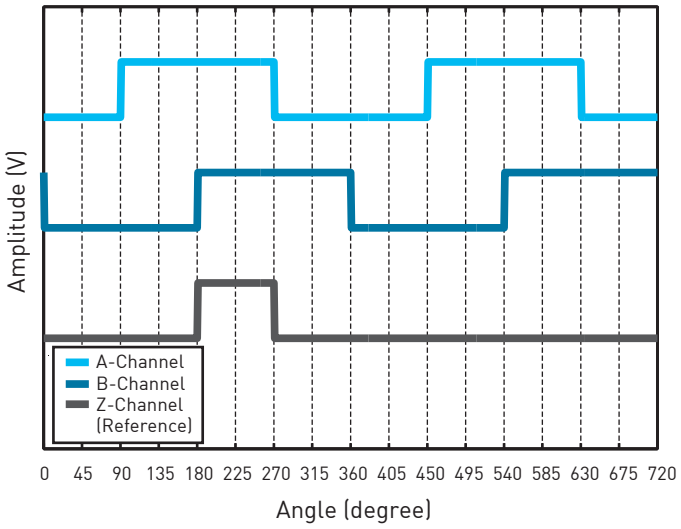
Recommended input circuit of the following electronic device:



A-channel B-channel Reference-channel

Analog Output

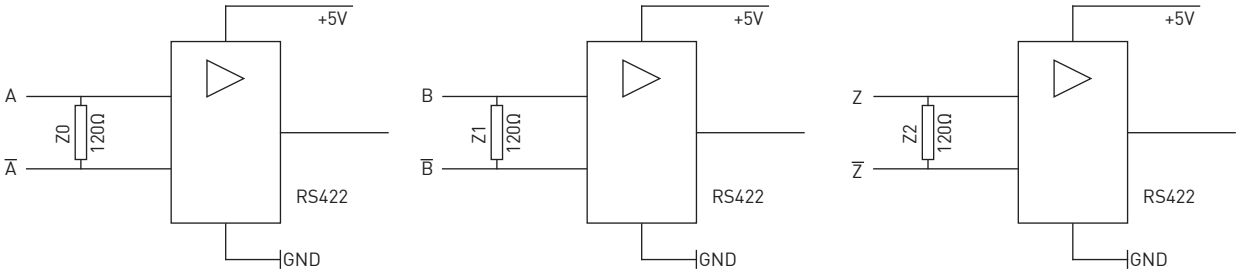
8.2 Digital Signal Definition:



Digital TTL Output

Digital TTL output according to RS422:
- 90° Phase shifted square signal in compliance with RS422 specification
- Recommended termination Z=120 Ohm
- Differential output signal A,$\overline{A}$,B,$\overline{B}$,Z,$\overline{Z}$

Recommended input circuit of the following electronic device:



A-channel B-channel Reference-channel

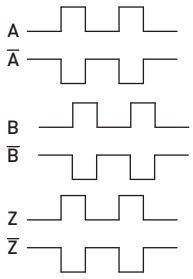
Digital Output

9. Signal Translator Pin Assignment

Output Signal and Application:

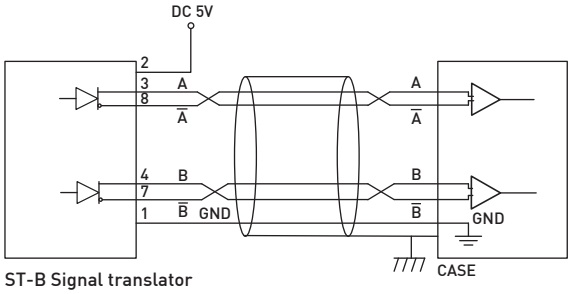
ST-B-□1: D-sub 9 pin definition for signal output connector

Pin No.	Signal	I/O
1	GND	I
2	DC5V	I
3	A	O
8	$\overline{A}$	O
4	B	O
7	$\overline{B}$	O
5	Z	O
9	$\overline{Z}$	O
6	SGND	I



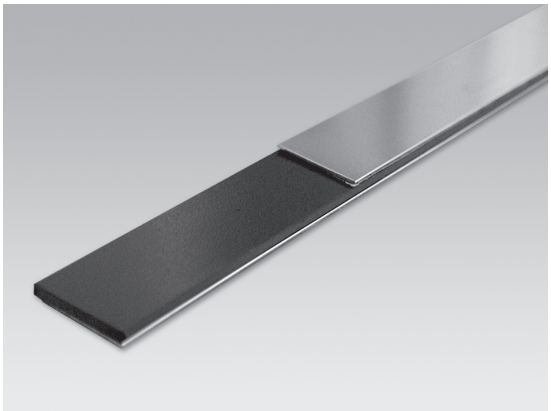
Application Example:

ST-B-□1(5V RS422/TTL) Wiring



II. 5mm High Resolution Position Measurement System

10. 5mm 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.

10.1 Specifications:

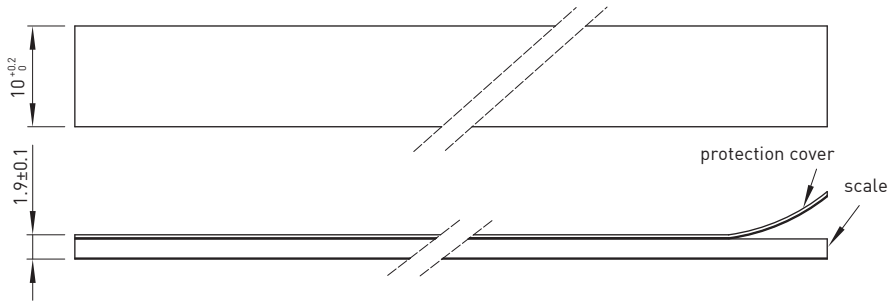
Accuracy	± (80μm+15μm/mxL) L: Length (unit: m)
Pitch	5mm
Width	10mm (+0.2mm~0mm)
Thickness	1.9mm±0.1mm
Max scale length	30m
Linear expansion coefficient	(11±1) x10^{-6} m/K
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67

10.2 Ordering Code:

PS - A - XXXXX

PS : Positioning Scale
XXXXX : Scale length (Unit: mm)
A : Pole pitch (5mm)

10.3 Dimensions:

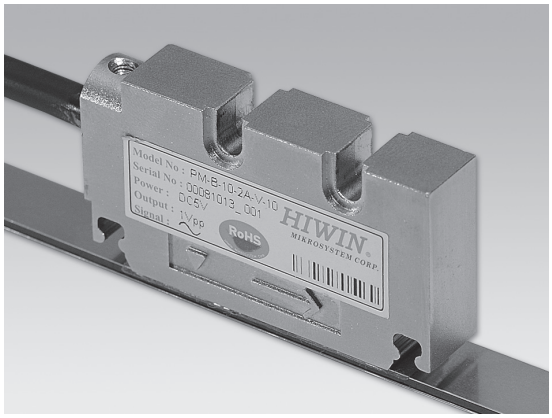


Unit: mm

Caution!

1. Magnetic scale consists of magnetic substance and should be kept away from strong magnetic filed during installation to prevent a malfunction.
2. Please leave the magnetic field strength 5000 gauss at least 4 cm away, to prevent the position measurement system from disruption.

11. Positioning Measurement - Vertical Type



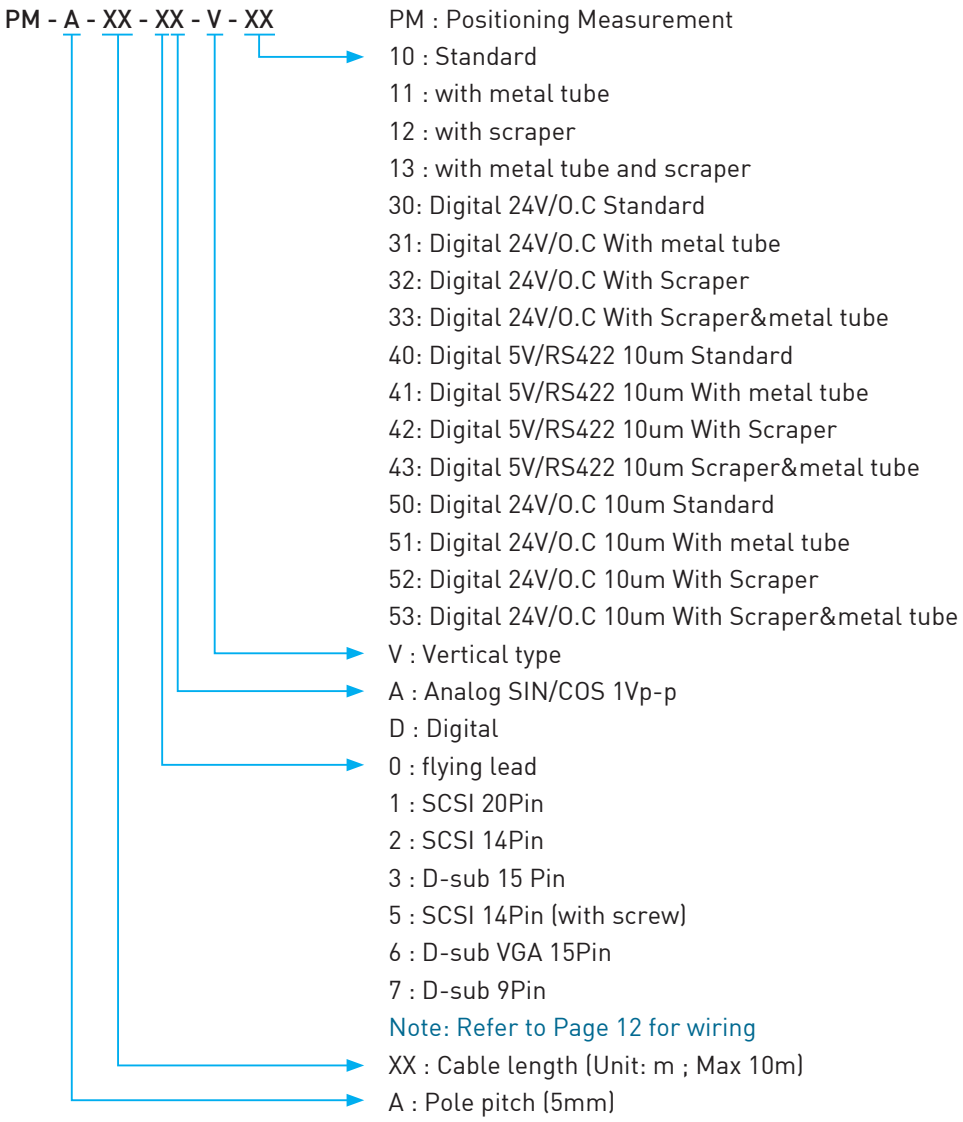
Features:

- Digital or Analog signal output available
- Vertical shape, optimal for space-saving applications
- Optional metal protection tube and scraper available

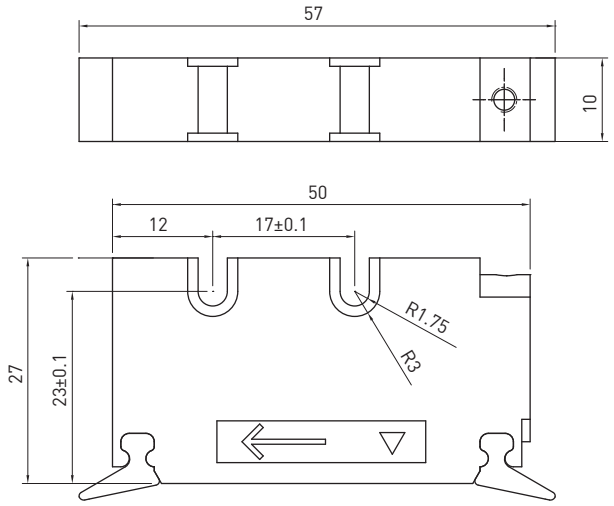
11.1 Specifications:

Signal resolution	analog: 5mm digital: 5μm/10μm
Repeatability	analog: ±15mm digital: ±10μm/±20μm
Reference signal	analog: 10mm/pulse digital: 5mm/pulse
Output signal	analog: SIN/COS 1Vp-p digital: 5V RS422/TTL
Max travel speed	analog: 10m/sec digital: 5m/sec
Input power	5VDC ±5%
Operating temperature	0˚C~50˚C
Storage temperature	-5˚C~70˚C
Protection class	IP67

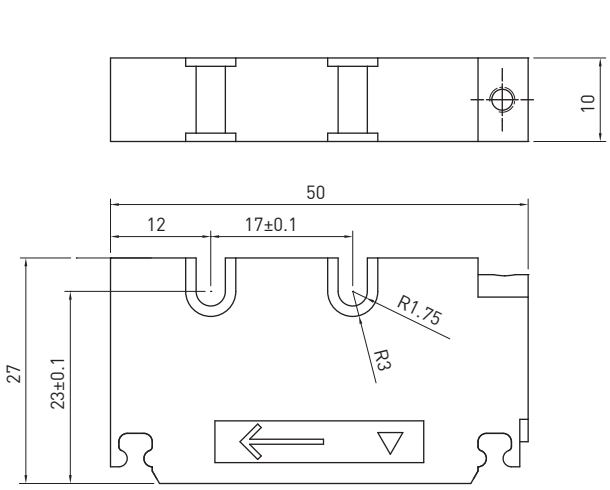
11.2 Ordering code:



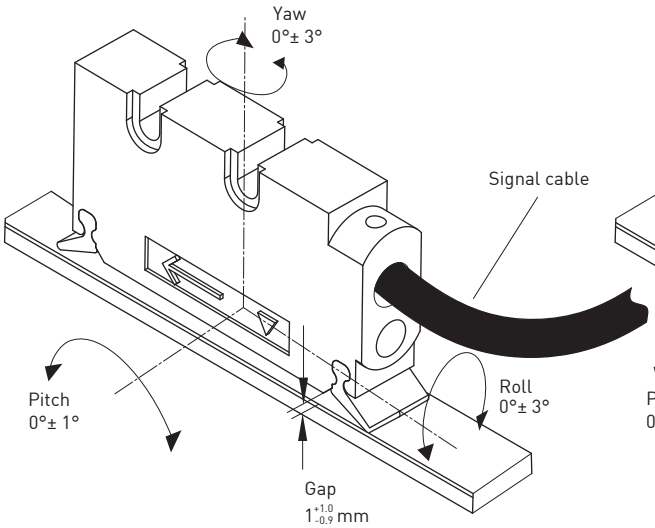
11.3 Dimensions:

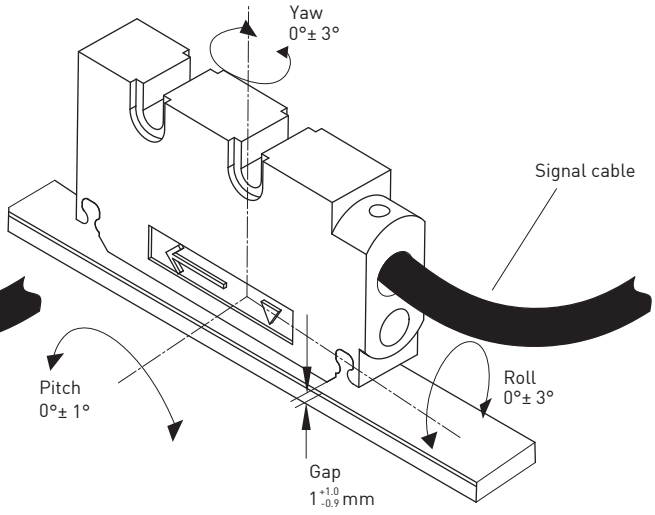


Read head with scraper



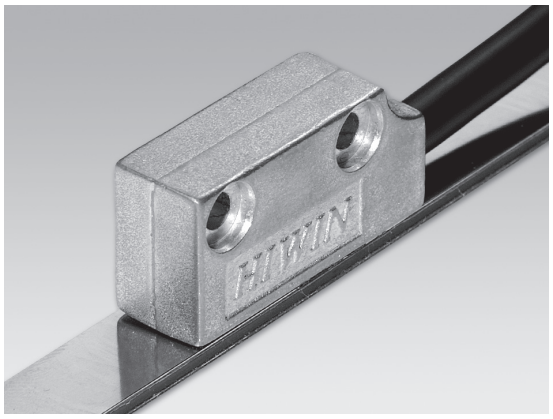
Standard read head





Unit: mm

12. Positioning Measurement - E Type



Features:

- Analog signal output
- Optimal for space-saving applications
- Dustproof and waterproof, up to IP67 protection class

12.1 Specifications:

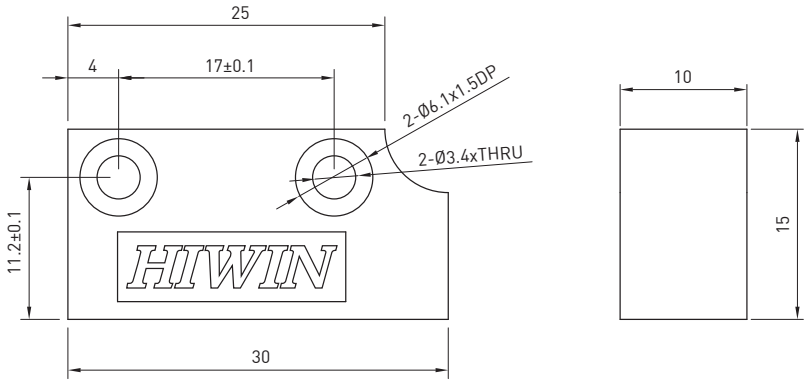
Signal resolution	analog :5mm
Repeatability	±10μm
Output signal	analog: SIN/COS 50mVp-p
Max travel speed	10m/sec
Input power	3.3VDC ±5%
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67

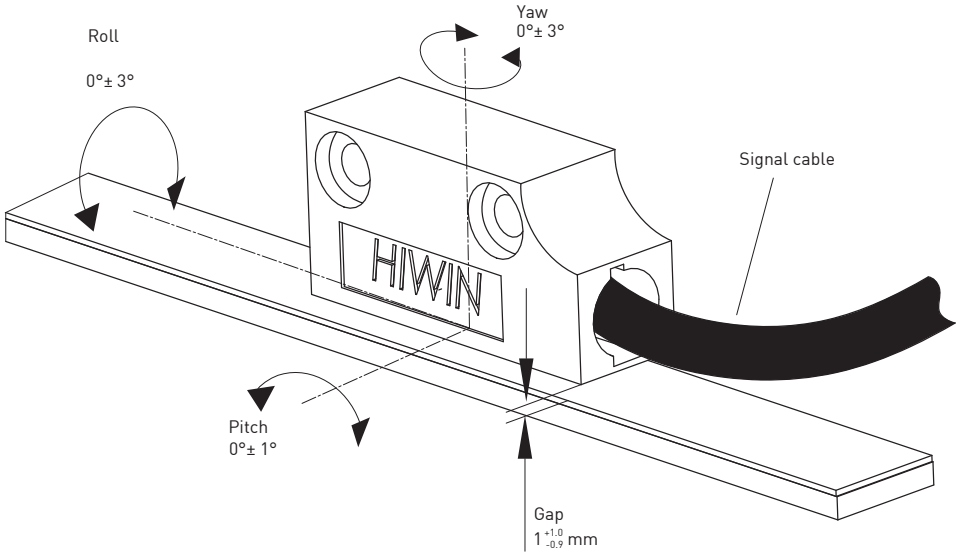
12.2 Ordering Code:

PM - A - XX - XX - E - XX

- PM : Positioning Measurement
- 00 : Standard
- E : E type
- A : Analog SIN/COS 50mVp-p
- 2 : SCSI 14 Pin
- 5 : SCSI 14 Pin (with screw)
- 6 : D-sub VGA 15 Pin
- Note: Refer to Page 12 for wiring
- XX : Cable length (Unit: m ; Max 10m)
- A : Pole pitch (5mm)

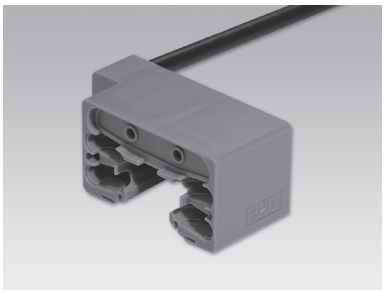
12.3 Dimensions:

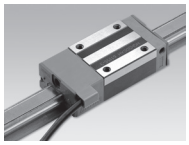




Unit: mm

13. Positioning Measurement - H Type





Features:

- Analog signal output
- Compact design used with Hiwin linear guideways
- Optimal for space-saving applications
- Easy installation

13.1 Specifications:

Signal resolution	analog: 5mm
Repeatability	±10μm
Output signal	analog: SIN/COS 50mVp-p
Max travel speed	10m/sec
Input power	3.3VDC ± 5%
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP67

13.2 Ordering Code:

PM - A - XX - XX - H - XX

- PM : Positioning Measurement
- XX : for Hxx type (H20, H25, H30, H35, H45...available)
- H : H type
- A : Analog SIN/COS 50mVp-p
- 2 : SCSI 14 Pin
- 5 : SCSI 14 Pin (with screw)
- 6 : D-sub VGA 15 Pin
- Note: Refer to Page 12 for wiring
- XX : Cable length (Unit: m ; Max 10m)
- A : Pole pitch (5mm)

14. 5mm Signal Translator

ST-A-□□

ST-A-□□B

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

14.1 Specifications:

Type	ST-A-□□	ST-A-□□B
Repeatability	±10μm	±10μm
Signal resolution	5 or 10μm	5 or 10μm
Output pulse signal	5V RS422/TTL 24V open collector	5V RS422/TTL 24V open collector
Max output frequency	64KHz/32KHz (Resolution: 5/10μm mode)	0.25MHz/0.125MHz (Resolution: 5/10μm mode)
Power input	5VDC ± 5% / 0.5A	5VDC ± 5% / 0.5A
Max travel speed	1.2m/sec	5m/sec
Operating temperature	0°C~50°C	0°C~50°C
Storage temperature	-5°C~70°C	-5°C~70°C
Protection class	IP43	IP43

14.2 Ordering Code:

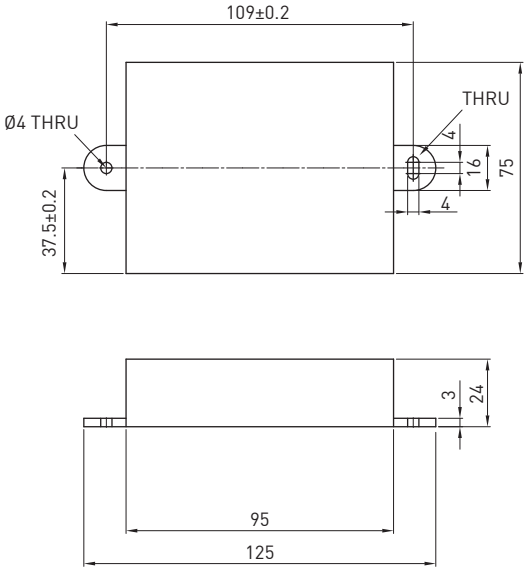
ST - A - XX

- ST : Signal Translator
- 1 : 5V RS422/TTL
- 2 : 24V/Open collector
- 1 : Resolution 5μm
- 2 : Resolution 10μm
- A : Pole pitch (5mm)

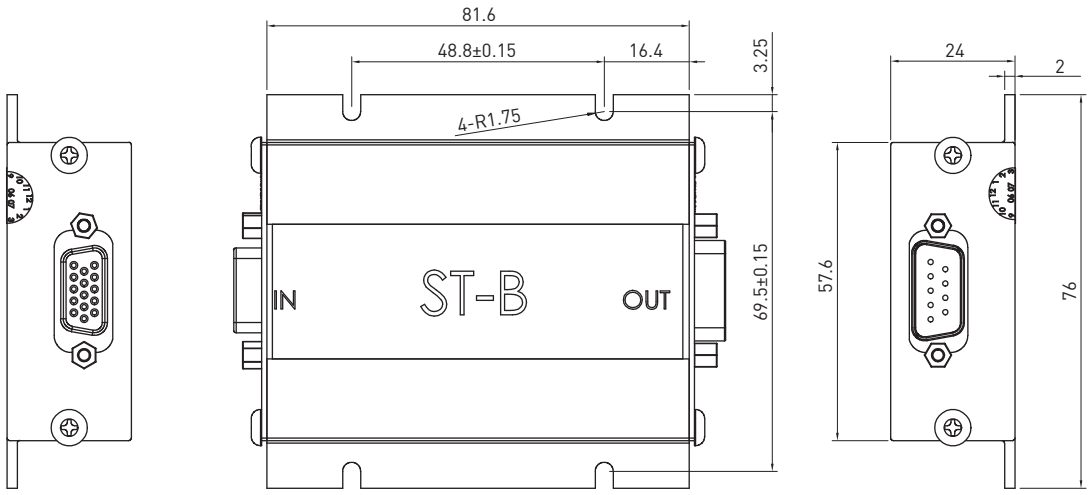
ST - A - XXB

- ST : Signal Translator
- B : For V type and 1Vp-p signal
- 1 : 5V RS422/TTL
- 2 : 24V/Open collector
- 1 : Resolution 5μm
- 2 : Resolution 10μm
- A : Pole pitch (5mm)

14.3 Dimensions:



Note: These dimensions are applicable for ST-A-□□



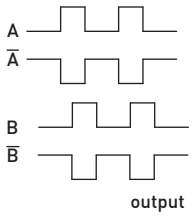
Note: These dimensions are applicable for ST-A-□□B

Unit: mm

15. Output Signal and Application

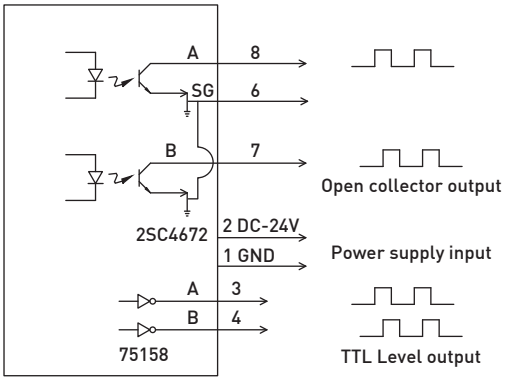
ST-A-□1 and ST-A-□1B: D-sub 9 pin definition for signal output connector

Pin No.	Signal	I/O
1	GND	I
2	DC5V	I
3	A	O
8	$\overline{A}$	O
4	B	O
7	$\overline{B}$	O
6	SGND	I



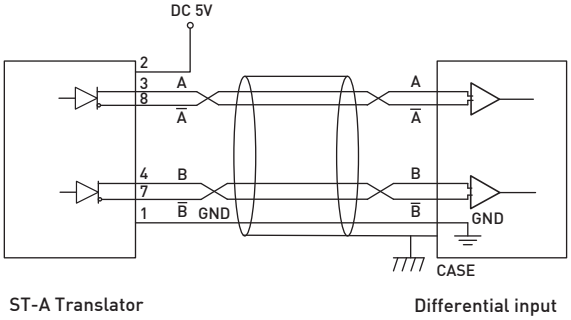
ST-A-□2 and ST-A-□2B: D-sub 9 pin definition for signal output connector

Pin No.	Signal	I/O
1	GND	I
2	DC24V	I
8	A (open collector)	O
7	B (open collector)	O
3	A (TTL level)	O
4	B (TTL level)	O
6	SGND	I

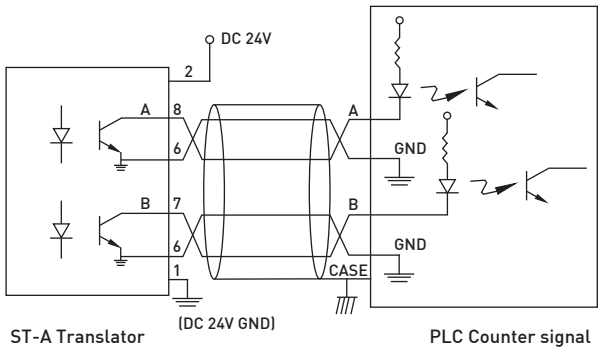


Application:

ST-A-□1 and ST-A-□1B (5V RS422/TTL) Wiring



ST-A-□2 and ST-A-□2B (24V/O.C.) Wiring



III. Display and Counter

16. LCD Counter System

Features:

- LCD display using 2 AA batteries
- Embedded read head, suitable for cutting and wood-processing machines
- Memory mode available
- Compact and cost-effective

16.1 Specifications:

Display	8 digit LCD display with +/- sign
Resolution	5μm
Accuracy	±(80μm+15μm/mxL) L: Length (unit: m)
Repeatability	±10μm
Operation speed	3m/sec (max 2G acceleration)
Input power	commercial AA No. 3 battery x 2
Battery life	1 year by setting it at 1.5m/s
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	positioning measurement IP67 display IP43

16.2 Functions:

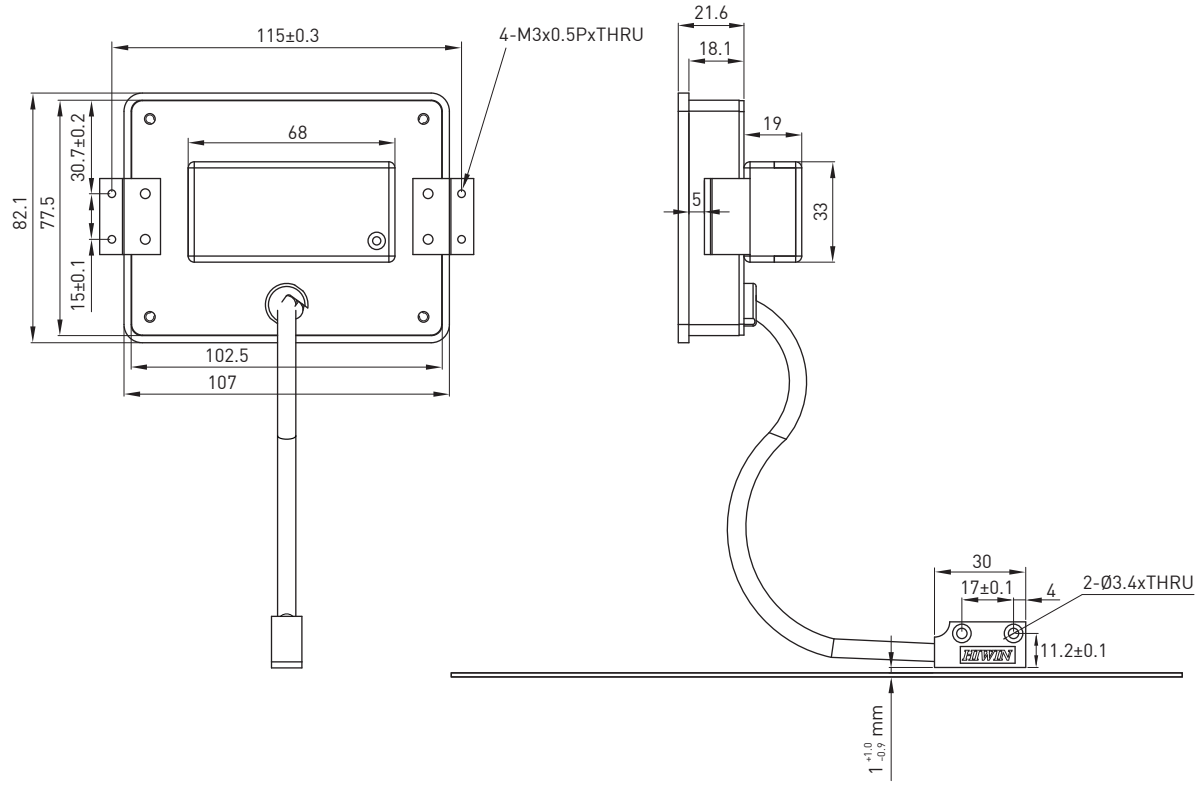
- Set reading direction
- Metric/English measurment
- Angle measurement (the smallest radius is 50mm)
- Set resolution
- 5 sets of independent incremental counters for relative positioning
- Set reference point
- Indicate gap of adjustment
- Save parameter-setting
- Lock keypad
- Indicate location of decimal point
- Measure absolute and relative position
- Programmable reference point compensation; 5 sets
- Maximal velocity setting (default : 1.5 m/s); 5 sets
- Set programmable coefficient ratio
- Indicate and monitor available power capacity
- Set programmable radius

16.3 Ordering Code:

PMLD - A - XX - X - XX

- 00 : standard
- XX : For HXX type (H20, H25, H30, H35, H45...available)
- E : for E type positioning Measurement
- H : for H type positioning Measurement
- XX : Cable length (Unit: m ; Max 3m)
- A : Pole pitch (5mm)

16.4 Dimensions:



Unit: mm

17. 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

17.1 Specifications:

Display	8 digit LED display
Resolution	1μm, 2μm, 5μm, 10μm
Input signal	analog : SIN/COS 1Vp-p; speed 2m/sec, 2KHz digital : 5V RS422/TTL; speed 2m/sec, 0.5MHz
Input power	DC 5V ±5% / 1A
Relay contact rating	DC 24V/2A
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP43

17.2 Functions:

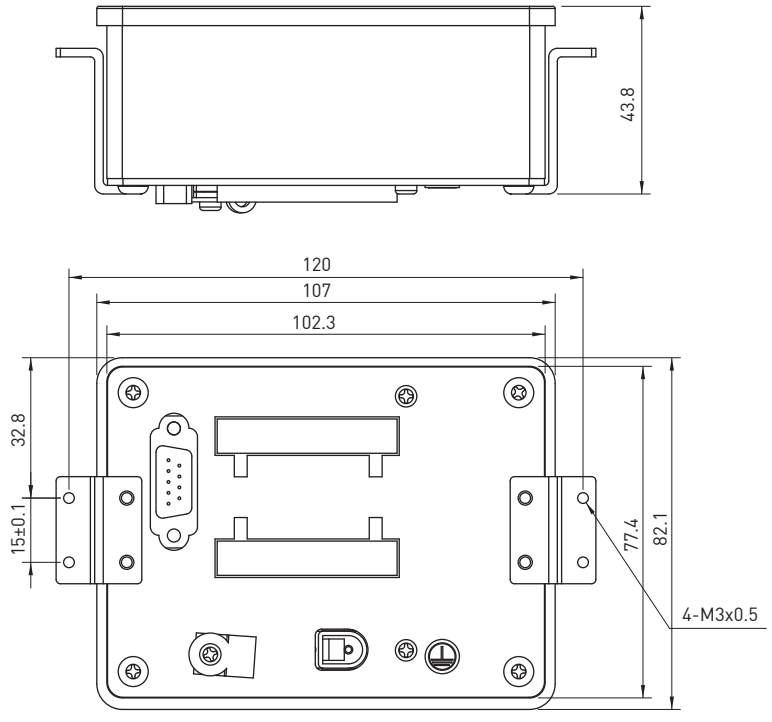
- Zero and auto-center (1/2) function
- Incremental / absolute switch over
- mm / inch switch over
- Optional resolution: 1μm, 2μm, 5μm, 10μm
- Preset function; 8 sets
- Relay output function; 4 sets
- Current value read will be automaically saved during a temporary power failure
- RS-232 output (optional)

17.3 Ordering Code:

PMED - H1 - 1 - XX - X

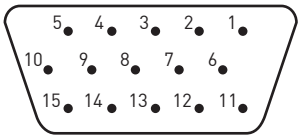
- 0 : with I/O without RS-232
- 1 : with I/O with RS-232
- 2 : without I/O without RS-232 (Standard)
- 3 : without I/O with RS-232
- 00 : for HIWIN 1mm positioning measurement system (analog/digital)
- A0 : for HIWIN 5mm positioning measurement system (analog)
- A1 : for HIWIN 5mm E type or H type positioning measurement
- 1 : 1 axis display
- H1 : H1 display

17.4 Dimensions:



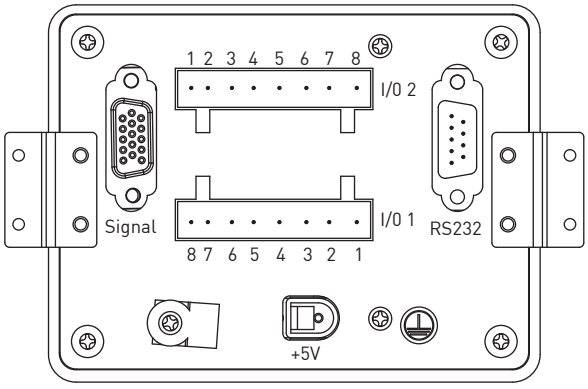
Unit: mm

17.5 Description of Input Signal:



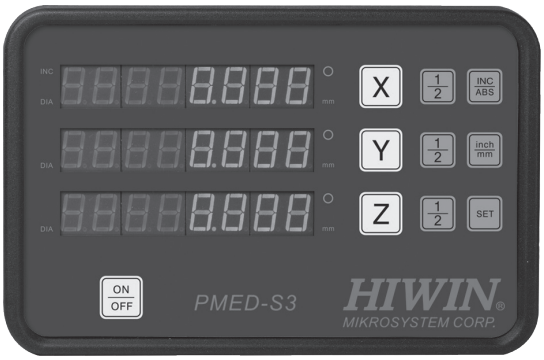
Pin	Designation	Pin	Designation	Pin	Designation
1	+5V	6	NC	11	SIN+
2	GND	7	Z+	12	SIN-
3	A+(Digital)	8	Z-	13	COS+
4	B+(Digital)	9	A-(Digital)	14	COS-
5	NC	10	B-(Digital)	15	NC

17.6 Description of Relay Output Signal:



I/O 1		I/O 2	
Pin	Designation	Pin	Designation
1	NC	1	NC
2		2	
3	NC	3	NC
4		4	
5	Relay 0(CH-0)	5	Relay 2(CH-2)
6		6	
7	Relay 1(CH-1)	7	Relay 3(CH-3)
8		8	

18. 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

18.1 Specifications:

Display	8 digit LED display
Resolution	0.1μm, 0.2μm, 0.5μm, 1μm, 2μm, 5μm, 10μm, 20μm, 50μm
Frequency	< 1.5MHz
Input signal	digital: 5V/TTL
Input power	DC 8V~30V / 0.08A
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP43

18.2 Functions:

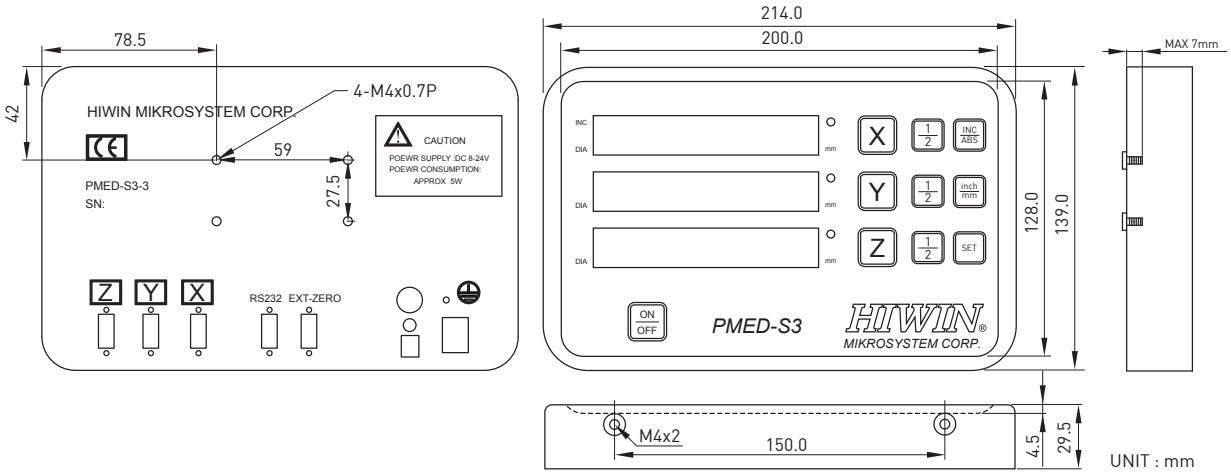
- Zero and auto-center (1/2) function
- mm / inch switch over
- Radius / diameter switch over
- Encoder (ENCODE): 1°~ 0.0001°
- Linear and non-linear mechanical error compensation
- Current value read will be automaically saved during a temporary power failure
- RS232 output (optional)
- Optional resolution : 0.1μm, 0.2μm, 0.5μm, 1μm, 2μm, 5μm, 10μm, 20μm, 50μm,100μm, 200μm, 500μm, 1mm, 5mm, 10mm

18.3 Ordering Code:

PMED - S3 - X - X

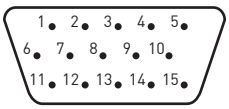
- X: 0 : without RS-232 (Standard); 1 : with RS-232
- X: 2 : 2 axis display; 3 : 3 axis display
- S3 : S3 display

18.4 Dimensions:



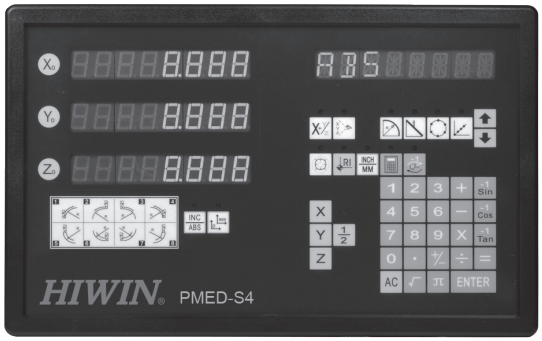
STANDARD 15 PIN D-TYPE ASSIGNMENTS(F)
15 pin D-Sub signal (female)

NC : No Connection
FG : Frame Ground



1	2	3	4	5	6	7	8
+5V	0V	A	B	RI	FG	NC	NC
9	10	11	12	13	14	15	
NC	NC	NC	NC	NC	NC	NC	

19. 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

19.1 Specifications:

Display	8 digit LED display
Resolution	0.1μm, 0.2μm, 0.5μm, 1μm, 2μm, 5μm,10μm, 20μm, 50μm
Frequency	< 2MHz
Input signal	digital: 5V/TTL
Input power	AC 90V~240V
Operating temperature	0°C~50°C
Storage temperature	-5°C~70°C
Protection class	IP43

19.2 Functions:

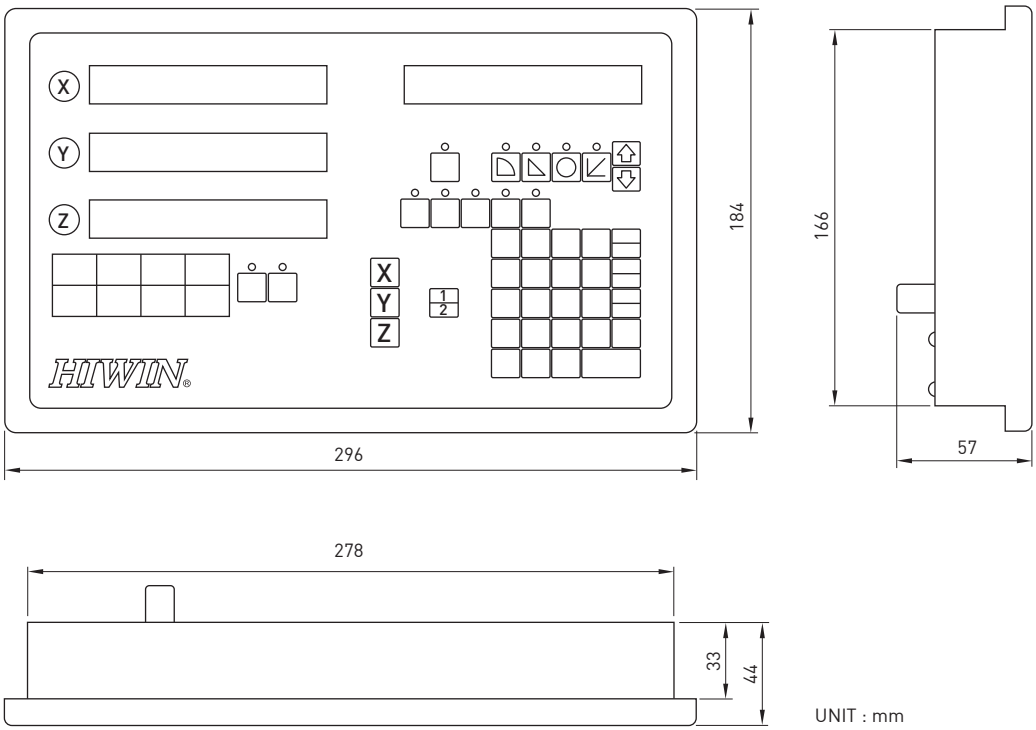
- Zero and auto-center (1/2) function
- Radius / diameter switch over
- Incremental / absolute switch over
- 1000 sets of coordinate storage
- Peak rate and numeration
- Linear error compensation
- Slope manipulation
- Circular-arc manipulation
- Optional resolution: 0.1μm, 0.2μm, 0.5μm, 1μm, 2μm, 5μm, 10μm, 20μm, 50μm,100μm, 200μm, 500μm, 1mm, 5mm, 10mm
- Multiple machining functions: Bolt circle machining, R-angle, divide holes on an oblique line, machining on an oblique line
- RS232 output (optional)

19.3 Ordering Code:

PMED - S4 - X - X

- 0 : without RS-232 (Standard)
- 1 : with RS-232
- 2 : 2 axis display
- 3 : 3 axis display
- S4 : S4 display

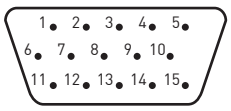
29.4 Dimensions:



UNIT : mm

STANDARD 15 PIN D-TYPE ASSIGNMENTS(F)
15 pin D-Sub signal (female)

NC : No Connection
FG : Frame Ground

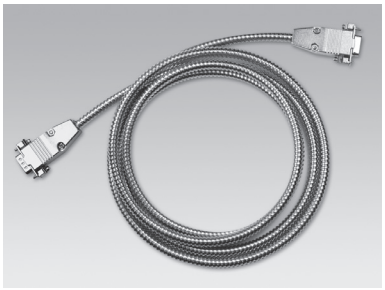


1	2	3	4	5	6	7	8
+5V	0V	A	B	RI	FG	NC	NC
9	10	11	12	13	14	15	
NC	NC	NC	NC	NC	NC	NC	

IV. Accessories

20. Signal Transfer Cable

Signal transfer cable for alternative display devices



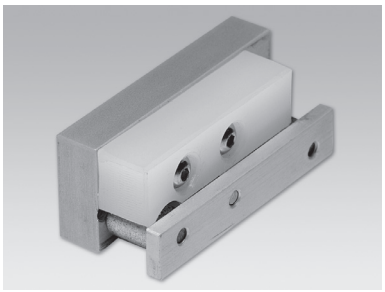
21.1 Ordering Code:

STC - XX - XX - X

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

21. Positioning Scale Installation Fixture

Allows for easy installation and ensures that the scale is parallel to the measurement sensor throughout the entire stroke



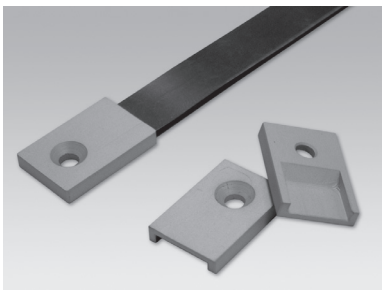
22.1 Ordering Code:

PST - 01

- PST : Positioning Scale Installation Fixture
- 01: for standard type positioning measurement

22. Lateral Fixture

Used to mark the end of the scale



23.1 Ordering Code:

PSF - 01

- PSF : Positioning Scale Fixture
- 01 : standard type

V. Customer's Requirements(PM)

Date:

<table>
<tr><td>Company name</td><td colspan="3"></td><td>Contact person</td><td></td></tr>
<tr><td>Tel</td><td></td><td>Fax</td><td></td><td>Title</td><td></td></tr>
<tr><td rowspan="8">Specifications Requirements for positioning measurement encoders</td><td>Accuracy (μm)</td><td></td><td colspan="3" rowspan="15">Notes</td></tr>
<tr><td>Resolution (μm)</td><td></td></tr>
<tr><td>Repeatability (μm)</td><td></td></tr>
<tr><td>Max. speed (m/min)</td><td></td></tr>
<tr><td>Input voltage (V)</td><td></td></tr>
<tr><td>Output signal</td><td></td></tr>
<tr><td>Operating Temperature (˚C)</td><td></td></tr>
<tr><td>Protection level</td><td></td></tr>
<tr><td rowspan="2">Specifications Requirements for signal transistors</td><td>Input voltage (V)</td><td></td></tr>
<tr><td>Output format</td><td></td></tr>
<tr><td rowspan="4">Specifications Requirements for displays</td><td>Display axes</td><td></td></tr>
<tr><td>Display digits</td><td></td></tr>
<tr><td>Input voltage (V)</td><td></td></tr>
<tr><td>Operating speed (m/min)</td><td></td></tr>
<tr><td colspan="2">Budget</td><td></td></tr>
<tr><td colspan="2">Quantity</td><td></td></tr>
<tr><td colspan="6">Recommended specification :

Proponent :</td></tr>
</table>

Manager : Head : Applicant :

FME 015-02

MEMO

MEMO

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Motion Control and System Technology

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Motion Control and System Technology

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