



*Sinpo*

Digital Readout  
System

## OVERVIEW



## Overview of Guiyang Xintian Oetech Co., Ltd.

Guiyang Xintian Oetech Co., Ltd. is a large-scale high-tech enterprise, integrating development, manufacture and sales of optical, machinery, electric and computation into an organic whole. It has over 40 years' experiences of research and manufacture focusing on optical measuring instruments. Xintian Oetech belongs to the national grade-1 measuring unit. It professionally majors in the development, manufacture and sales of nearly 100 of precision optical measuring instruments of various profile projectors, tool-maker's microscopes, video measuring machines, length measuring machines, coordinate measuring machines, angle measuring instruments, physical analyses apparatuses, linear scales and DRO, etc. As one of the council members of China Digital Display Association and one of the enterprises that work out relevant standards in this field, so far, Xintian Oetech has had over 20 years' history and experiences in producing digital display products. It is one of the earliest enterprises that produce and develop linear scales in China. Xintian Oetech, relying on the advantages of the high-tech development zone and the enterprise itself in its intensive intelligence, a galaxy of talents and leading role in technology, positively aims at the advanced development trend in the DRO system in the world. The DRO sytem products provided by Xintian Oetech, with high precision, reliable stability, strong anti-interference and excellent performance, are not only widely used in the displacement measurement and real-time measurement for machinery

industry, national defense industry and scientific research institutes at home, but are also sold to many oversea countries and regions around the world. They have won very good reputation in this field.

Xintian Oetech can provide a full range of digital readout products including various series of linear scales, linear glass scales, digital display meter, photodetectors, magnetic scale, etc. These products are of high quality, strong functions and with good cost performance. And they're very easy to install and operate.

With the company's concept of "Setting up a good model in professional services and being a star in professional services" and with the enterprise's development objectives of "Creating the first-class enterprise at home and Build up a famous brand oversea", Xintian Oetech is ready to offer you high quality of products and excellent services. Let you "once choose our products, always free from all anxieties"!

Xintian Oetech is a professional manufacturer that has over 20 years' of production experience in the digital readout system field

CE Certificate of JCX、DRO Series



- ①
- ②
- ③
- ④

CE Certificate of JCX、DRO Series ①

EMC Certificate of JCX、DRO Series ②

ISO9001:2000 QMS Certificate ③

Inspection Report of IP53 Water-proof and Dust-proof ④



## Linear Scale and DRO System

The linear displacement digital display system is mainly used in the linear motion slide-guide mechanism. It may realize the precision display and auto-control of the motion amount. It has been widely used in machine tool processing and the precision measurement for instruments. Currently, the digital display system has formed several series, with complete types, of exquisite manufacture and of excellent workmanship. It can be chosen for the use of various machine tools, rebuild of measuring instruments. And special fabrications can be made according to user's special requests.

The linear scales produced by Xintian Oetech are classified into two categories: enclosed type and open type. Of which, the open type are of the high-precision type, mainly used for the rebuild of precision instruments. Its maximum resolution ratio may be up to 0.1 $\mu$ m. While the enclosed ones are mainly used for various machine tools and the rebuild of measuring instruments, with the square wave as the output signal. According to their size, they may be divided into three categories: small type, standard type and large type. Of which, the maximum length of the large type scale (JCXG-Type) may be up to 3100mm. Besides, according to the user's demand, various mounting accessories may be provided for the installation of the system.

- ◇ Used for measuring instruments: JCXFS , JCXF, JCXE Series
- ◇ Used for various machine tools: JCXFS , JCXF, JCXE, JCXEX, JCXG, JCXGL Series
- ◇ JCXEP draw-type scales are mainly used for injector equipment
- ◇ For such equipment with great interference as electric spark machine, orifice machine, linear cutting machine, etc., it is required to choose the linear scales that specialized used on EDM

## Characteristics of Linear Scales

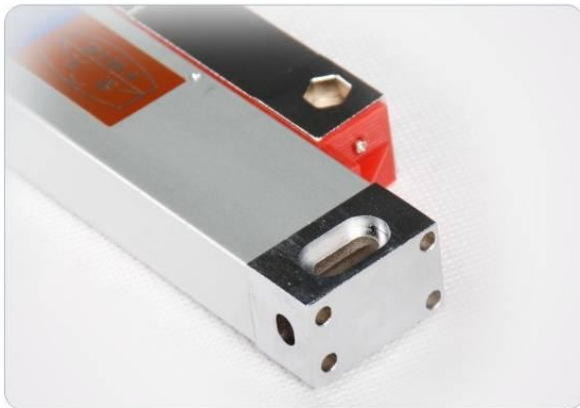
The linear scales are characterized with single and double layer of sealing strips. The special oil-proof, corrosion resistance, long-range elasticity and antiaging plastics are adopted for them. They have high waterproof and dustproof performance and long working life. Its protective degree is up to grade-IP53.

The linear scales are characterized with the advanced reliable optical measuring system. Their sliding parts are designed with the high-precision 5-bearing system that has been proven to be the most reliable and durable ones to guarantee the stability of the optical machinery system. Thus they have fine resetting property and high-grade measuring accuracy.

The advanced grating manufacturing technology is used for the grating glass scale. Xintian Oetech can make various high-precision grating glass scales of different specifications. The maximum ones may be up to 3100mm (without length joined together).

Since it is unnecessary for the linear scale to use extra mechanically-driven parts to affirm the axial moving position, a series of error sources can be excluded. Thus the position-locating precision of the equipment can be upgraded to avoid the following errors:

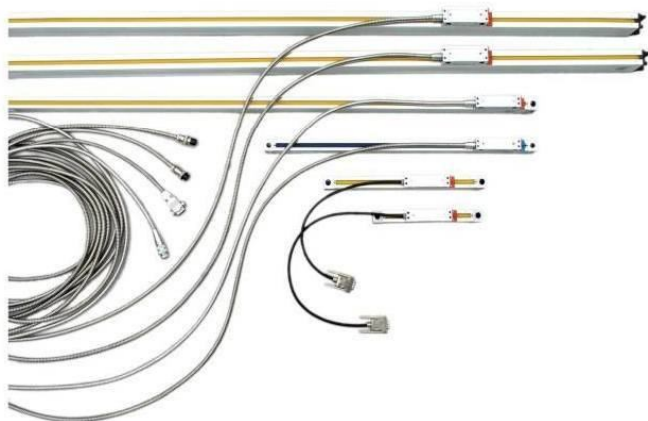
- ◇ Position errors caused by being heated of roller guide screw
- ◇ Reverse position errors by guide screw gaps
- ◇ Dynamic errors by pitch errors of guide screws



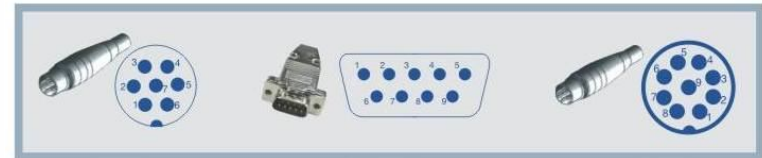
## Application of Enclosed Linear Scales

The enclosed linear scale is mainly used for position-locating measurement of machine tool equipment, e.g.:

- ◇ Milling machine
- ◇ Drilling machine
- ◇ Lathe machine
- ◇ Grinding machine
- ◇ Processing center
- ◇ Electrospark processing Grinding machine tool
- ◇ Injection molding machine



### Plug types:

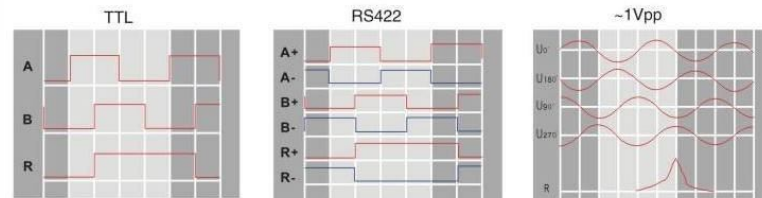


DIN7

D-Sub9

DIN9

### Output Signal Types



D-Sub9 Plug	
Pin Number	Signal
1	NC
2	0V
3	NC
4	GND
5	NC
6	A+
7	+5V
8	B+
9	R+

TTL Plug Diagram

D-Sub9 Plug	
Pin Number	Signal
1	A-
2	0V
3	B-
4	GND
5	R-
6	A+
7	+5V
8	B+
9	R+

RS422 Plug Diagram

D-Sub9 Plug	
Pin Number	Signal
1	0°
2	0V
3	+5V
4	270°
5	NC
6	180°
7	GND
8	90°
9	R+

~1Vpp Plug Diagram

Technical Specification for Closed Type of Linear Scales

Model	JCXF1 JCXFS1	JCXF5 JCXFS5	JCXE1	JCXE5	JCXG1	JCXG5	JCXGL5
Optical grating pitch	20um(0.020mm), 10um(0.010mm)						
Optical grating measurement system	Transmission infrared optical measurement system, infrared wave length: 880nm						
Numerical reading head rolling system	Vertical five bearing roller system			45° five bearing roller system			
Resolution	1um	5um	1um	5um	1um	5um	5um
Effective range	50-600mm 50-400mm (FS type)		50-1000mm		50-3000mm		3000-6000mm
Repeatability accuracy	±1um	±5um	±1um	±5um	±1um	±5um	±40um
Maximum working speed	20m/min(1um) , 60m/min(5um)						
Output signal	TTL, RS422, ~1V <sub>r</sub>						
Power supply	5V ± 5% DC						
Environment	Temperature: -10-45°C, Humidity ≤ 90%						

Technical Specification for JCXFS -Type of Linear Scale

Model	Resolution	Effective range	Maximum working speed	Accuracy	
				Standard	High-Precision
JCXFS1	1um	50-400mm	20m/min	± 5um	± 3um
JCXFS5	5um	50-400mm	60m/min	± 5um	± 3um

Technical Specification for JCXF-Type of Linear Scale

Model	Resolution	Effective range	Maximum working speed	Accuracy			
				50-500mm		510-600mm	
				Standard	High-Precision	Standard	High-Precision
JCXF1	1um	50-600mm	20m/min	± 5um	± 3um	± 8um	± 5um
JCXF5	5um	50-600mm	60m/min	± 5um	± 3um	± 8um	± 5um
JCXF0.5	0.5um	50-600mm	10m/min	± 5um	± 3um	± 8um	± 5um
★JCXF0.2	0.2um	50-600mm	10m/min	± 5um	± 3um	± 8um	± 5um
★JCXF0.1	0.1um	50-600mm	10m/min	± 5um	± 3um	± 8um	± 5um

Technical Specification for JCXE -Type of Linear Scales

Model	Resolution	Effective range	Maximum working speed	Accuracy			
				50-500mm		510-1000mm	
				Standard	High-Precision	Standard	High-Precision
JCXE1	1um	50-1000mm	20m/min	± 5um	± 3um	± 8um	± 5um
JCXE5	5um	50-1000mm	60m/min	± 5um	± 3um	± 8um	± 5um
JCXE0.5	0.5um	50-1000mm	10m/min	± 5um	± 3um	± 8um	± 5um
★JCXE0.2	0.2um	50-1000mm	10m/min	± 5um	± 3um	± 8um	± 5um
★JCXE0.1	0.1um	50-1000mm	10m/min	± 5um	± 3um	± 8um	± 5um

Technical Specification for JCXG -Type of Linear Scale

Model	Resolution	Effective range	Maximum working speed	Accuracy							
				50-500mm		510-1000mm		1010-2000mm		2010-3100mm	
				Standard	High-Precision	Standard	High-Precision	Standard	High-Precision	Standard	High-Precision
JCXG1	1um	50-3100mm	20m/min	± 5um	± 3um	± 8um	± 5um	± 30um	± 20um	± 50um	± 34um
JCXG5	5um	50-3100mm	60m/min	± 5um	± 3um	± 8um	± 5um	± 30um	± 20um	± 50um	± 34um

Technical Specification for JCXGL -Type of Linear Scale

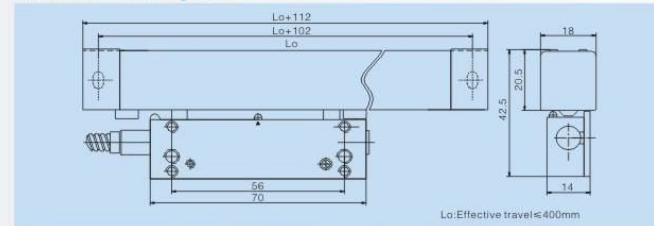
Model	Resolution	Effective range	Maximum working speed	Accuracy					
				3100-4000mm		4010-5000mm			
				Standard	High-Precision	Standard	High-Precision		
JCXGL5	5um	3100-6000mm	60m/min	± 80um	± 70um	± 100um	± 80um	± 120um	± 80um

Technical Specification for JCXEP -Type of Draw-bar Linear Scale

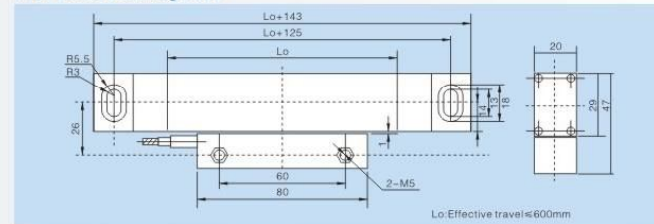
Model	Resolution	Effective range	Maximum working speed	Accuracy	
				50-500mm	510-800mm
JCXEP5	5um	50-800mm	60m/min	± 30um	± 40um
JCXEP10	10um	50-800mm	60m/min	± 30um	± 40um

NOTE: The base measuring temperature of accuracy is 20±1°C. In the tables for the specifications of JCXE-Type and JCXF-Type, where the item marked with a "★", it shows that their output wave is sine-wave, with which a digital display with 100 frequency multiplication subdivision circuit can realize the resolution ratio. For those without the mark, a digital display with 4 frequency multiplication subdivision circuit can realize the corresponding resolution ratio.

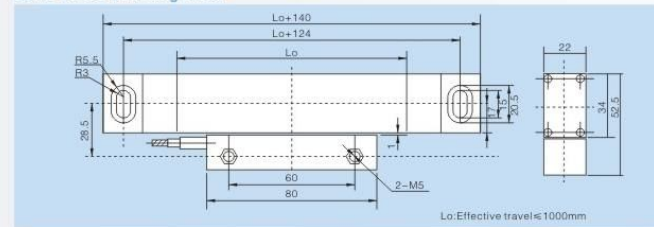
JCXFS Series Mounting Sizes



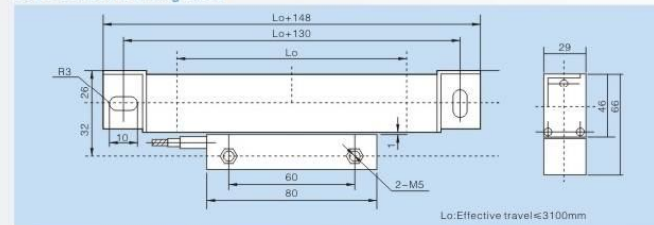
JCXF Series Mounting Sizes



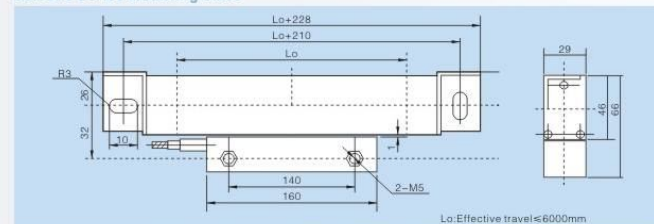
JCXE Series Mounting Sizes



JCXG Series Mounting Sizes



JCXGL5 Series Mounting Sizes







## Characteristics of Products

- ◇ Noncontact-type design
- ◇ Dustproof, waterproof, oilproof, shockproof and shatterproof
- ◇ High speed
- ◇ Easy to mount
- ◇ Maximum length up to 30000mm (30m)

## Application:

- ◇ Machine tool equipment
- ◇ Wood processing equipment
- ◇ Packaging equipment
- ◇ Automation fields
- ◇ Other fields

## Technical Parameters

Model number	Magnetic grid pitch	Resolution	Accuracy	Maximum length
MRA1	1mm	1 μm	± 10 μm/m	2m
MRB5	2mm	5 μm	± 15 μm/m	20m

Output Signal: TTL or RS422 square-wave signal in A and B phases

Maximum Speed: 10m/s

Power supply: 5V DC ± 5%

Protection grade: IP67

Current: Typical 150mA

## Open magnetic scale

Model number	MRO5	MRO10
Resolution	5 μm	10 μm
Accuracy	± 20 μm/m	
Output signal	5V-TTL square-wave	
Maximum length	10m	
Digital readout system	used and erected with the application of DRO-Series numeroscope	
Application	suitable for rough and oily surface	

Model number	MRD10	MRD100
Resolution	5 μm	10 μm
Accuracy	± 20 μm/m	
Structure	design in integration	
Maximum length	10m	
Digital readout system	equipped with MB100-LCD digital display system	
Application	suitable for rough and oily surface	

Model number	MRC50	MRC100
Magnetic grid pitch	2.5mm	2.5mm
Resolution	50 μm	100 μm
Accuracy	± 100 μm/m	± 200 μm/m
Maximum length	20m	20m
Digital readout system	equipped with MB100-LCD digital display system	
Application	wood machinery stone-working equipment	

Model number	MB100
Functions	zero reset inch/mm diameter/radius
	absolutely/relatively angle display
	battery-powered
	error compensation



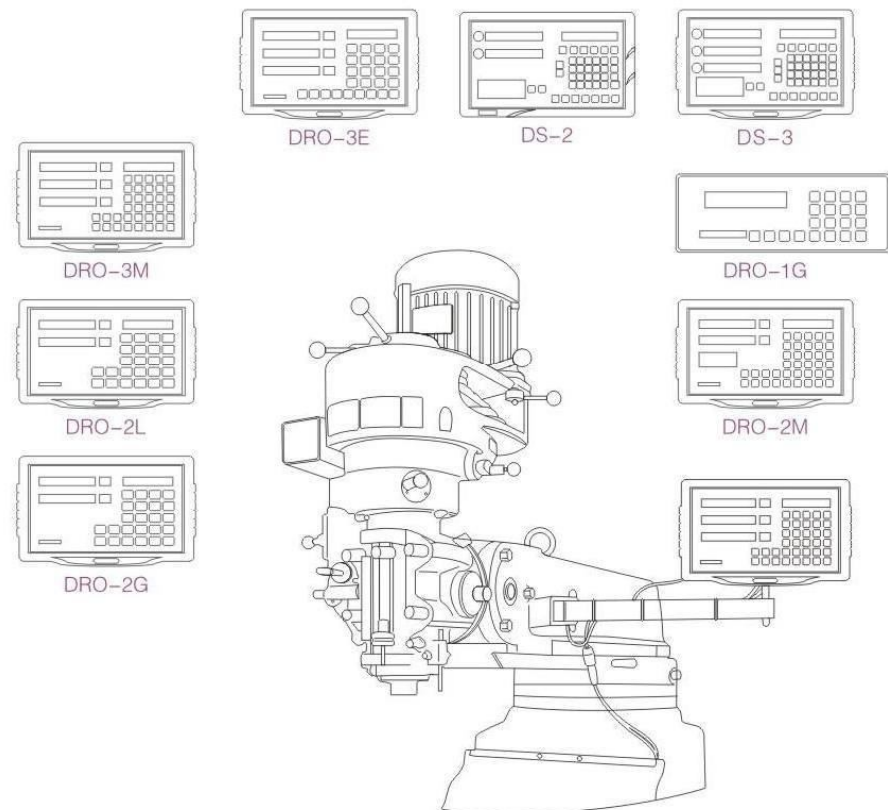
## Multifunction DRO

The DROs produced by Xintian Oetech include two categories: machine tool DROs and measuring instrument DROs. The products are reliable and durable. They reduce maintenance to realize real low-cost operation. Apart from adopting advanced and reliable electronic and assembling technologies, the most important thing should be to adopt high-quality and durable materials. The products are of complete range and with strong applicability.

### Characteristics of Products

- ◇ High performance of power supply with strong anti-interference is choosed, matched with advanced interference circuit, thus greatly improving anti-interference capability of the power supply.
- ◇ High quality of elements and components are choosed. The products have been passed the CE Certification and EMC Certification.
- ◇ Advanced electronic technology and wide-range of voltage are adopted for the design. The single chip processor technology with advanced and stable performance would make the products have higher cost performance. The wide-range voltage is adopted for the design that would be suitable for different power-supply systems and can work normally under unstable power-supply environment.
- ◇ The outer shell of die-casting alloys is durable, with good shielding property. The surface is under injection processing, dust proof and wearable.
- ◇ There are abundant interfaces; convenient for the connection to the outer equipment (e. g. the printer, etc.).

### DRO for Machine Tools



## Machine Tool DRO

The machine tool DRO, matched with the linear scale, can be widely used for various machine tool equipments, e.g., milling machine, boring machine, lathe, grinder, injector, orifice machine, linear cutter, spark machine, etc. It can provide interface cards and signal converters matched with the computer and 12V and 24V signal converting boxes matched with machine tools and PLC cabinets. And various special DRO can be designed according to the user's requests.

## Machine Tool Special DRO

DRO-2M / 3M 2 axis / 3 axis milling DRO

DRO-2L 2 axis special lathe DRO

DRO-2G 2 axis special grinding DRO

DRO-3E 2 axis special EDM DRO

## Multi-functional Machine Tool DRO

DS-2 and DS-3 2 axis / 3 axis multi-functional DRO may be used for various machine tool equipments of lathes, milling machines, grinding machines, etc. They have linear and non-linear (sector compensation) correction functions. The non-linear correction is mainly used for the occasions required for high precision compensation and for metering and testing instruments.



DRO-3M



DRO-2G



DS-2



DRO-1G



DRO-2L



DRO-3E



DS-3



DRO-2M



## Technical Parameters

Input Voltage & HZ	AC80V~260V、50HZ~60HZ
Power consumption	25VA
Number of axes	One Two and three
Display	7 digit display with plus/minus sign and decimal point together with Information window
Input signal	TTL or RS422
Input signal Hz	>100 KHz
Resolution of length	10um 5um 2um 1um 0.5um
Operating keyboard	Pressure sensitive key pad
Linear scale	Pitch is 0.02mm, supply power is +5V. Output is two TTL waves with difference of 90° (with zero signal) and current is 50mA(Precision with $\pm 1\mu\text{m}$ 、 $\pm 5\mu\text{m}$ 、 $\pm 10\mu\text{m}$ )

## Special Functions of DRO Meter

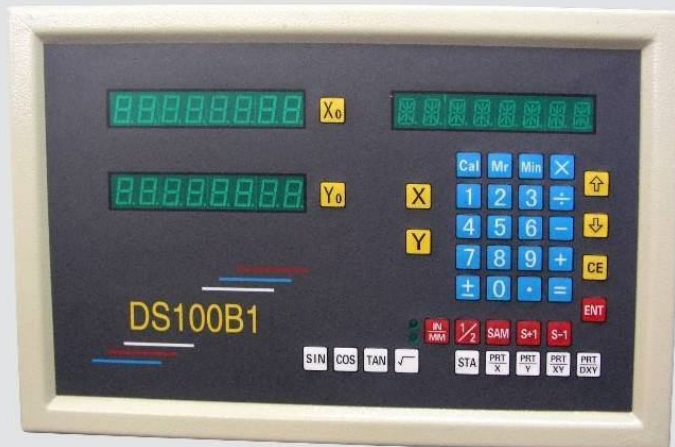
Model	DRO2M	DRO3M	DRO2L/DRO2L2	DRO2G/DRO1G	DRO3E	DS-2/DS-3
Smooth 'R' function	●	●				●
Simple 'R' function	●					●
Bore in oblique line	●	●				●
Bore PCD circle	●	●				●
Corner chamfer calculation Inside/outside profile function	●	●				●
Simple calculator	●	●				●
Tool diameter compensation		●				●
Digital filter				●		●
EDM output function					●	●
Chamfer on Zaxis function	●					●
200 tool memory			●			●
Concentricity measurement			●			●
Radius and diameter display			●			●
RS232(option)	●	●	●	●	●	●
Printers(option)			●	●		●

## Measuring Instrument DRO

Matched with the linear scale system, the measuring instrument DRO is suitable for various instruments and meters that use the linear scale as the measuring unit and used for the digital display, analysis and processing of the measuring data.

### Functions of Measuring Instrument DRO:

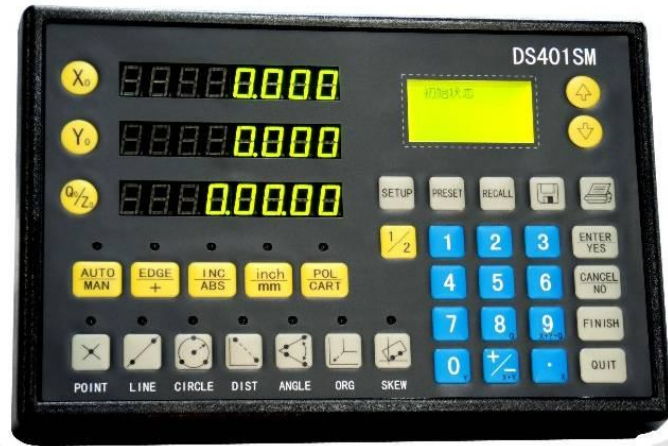
- ◇ Angle readout of the encoder
- ◇ Computing function for geometric measurement
- ◇ Data printing output
- ◇ RS232 Interface



### DS100B1

DS100B1 Multi-function DRO is a linear scale digital readout meter with high resolution ratio controlled by the microprocessor. The products are divided into 20, 50 and 100 frequency multiplication. The different displaying equivalents may be got while they are connected with different linear scales. The highest displaying equivalent for the 20 subdivision should be  $0.5\mu\text{m}$ ; that for the 50 subdivision type should be  $0.2\mu\text{m}$  and that for the 100 subdivision type should be  $0.1\mu\text{m}$ .

- ◇ Input signals: 4-split phase raster original signal
- ◇ Metric/ British systems conversion, preset data, with calculator's function
- ◇ RS232 Output Functions
- ◇ Numbers of input axis: Two axes of X- and Y-axis
- ◇ Voltage: AC110~240V, 50Hz/60Hz, power < 25W
- ◇ Overall size:  $308 \times 194 \times 80$  (mm)
- ◇ Weight: < 2.7kg



## DS401SM

DS401SM is suitable for the digital linear measuring system and the video measuring system, for conducting analysis and processing on two-dimensional data; widely used in the application of projectors, toolmaker's microscope and two-dimensional measuring instruments.

- ◇ It is used for the measurement, setup and structure of graphic elements of points, lines, circles, angles, distances, etc.
- ◇ DS401SM can put the coordinate right and coordinate horizontal movement. Thus it is convenient for putting the workpiece right and reducing the adjustment time.
- ◇ RS232 output function, conducting communications with the computer by way of the compressed BCD code.
- ◇ Multiple coordinate display forms: Display of polar coordinates, rectangular coordinates, INC coordinates and ABS coordinates; display of Metric and Inch Systems.
- ◇ Linear compensation or sector compensation may be made for the linear scale.
- ◇ Z-axis may be connected with the linear scale or the rotary encoder (angle display).
- ◇ 100 temporary storage elements and 100 permanent storage elements.
- ◇ Number of input axes: Three axes of X, Y and Z/Q, with minimum resolution of 0.001mm.
- ◇ Input waveforms: TTL square waves.
- ◇ Input voltage: AC 110V~240V, 50Hz/60Hz.
- ◇ Overall Size: 290×195×80 (mm).
- ◇ Weight: < 2.5kg.

## Characteristics of 10CWT Precision Grating Micrometric Heads

The 10CWT Precision grating micrometric heads, adopting 50-line (with grating pitch of  $0.02\mu\text{m}$ ) grating as the measuring basis, through photoelectric conversion, outputting TTL square wave signals and coordinately using the DRO, can meet the requirements of the linear movement digital display of various small-sized machine tools and other precision measurements. They are widely used in on-line detection, precision positioning, etc. during the course of production.

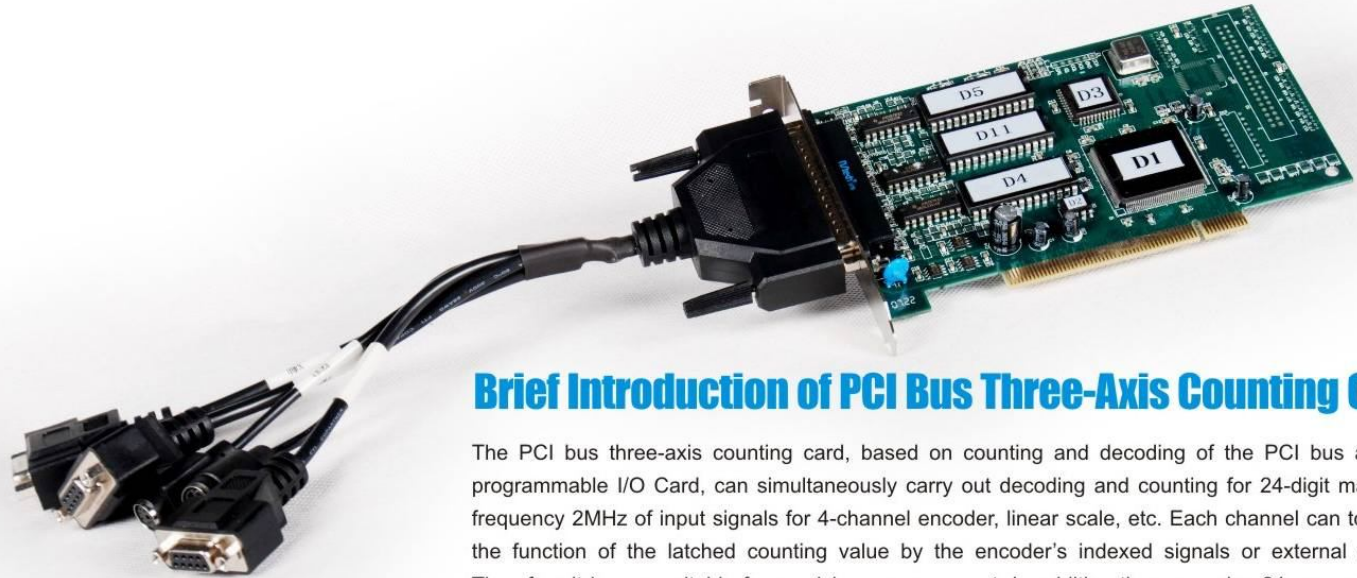
The micrometric heads, with the draw-bar positioning and guiding, has many advantages as high measurement precision, good stability, nice appearance, small friction force, high sensitivity, long service life, easy to operate, etc.



## Parameters for 10CWT precision raster micrometric heads

Model	CWT1/5~10	
Overall Size	34 × 87 × 21	
Grating Pitch	20 $\mu\text{m}$ (0.02mm)	
Grating Measuring System	Injection Infrared Optical Measuring System	
Sliding Form	Parallel Draw-bar Sliding System	
Effective Travel	0~10mm	
Accuracy ( $\mu$ )	$\leq 2 \mu\text{m}$	
Resolution	0.001mm, 0.005mm	
Working Speed	20m/min, 60m/min	
Distance ofounting Holes	20mm	
Output Signals	TTL Square Waves	
Operate Voltage	5v $\pm$ 5%	
Operation Temperature	Temperature 10~40°C	Humidity $\leq$ 90%
Cable Length	2m	





## Brief Introduction of PCI Bus Three-Axis Counting Card

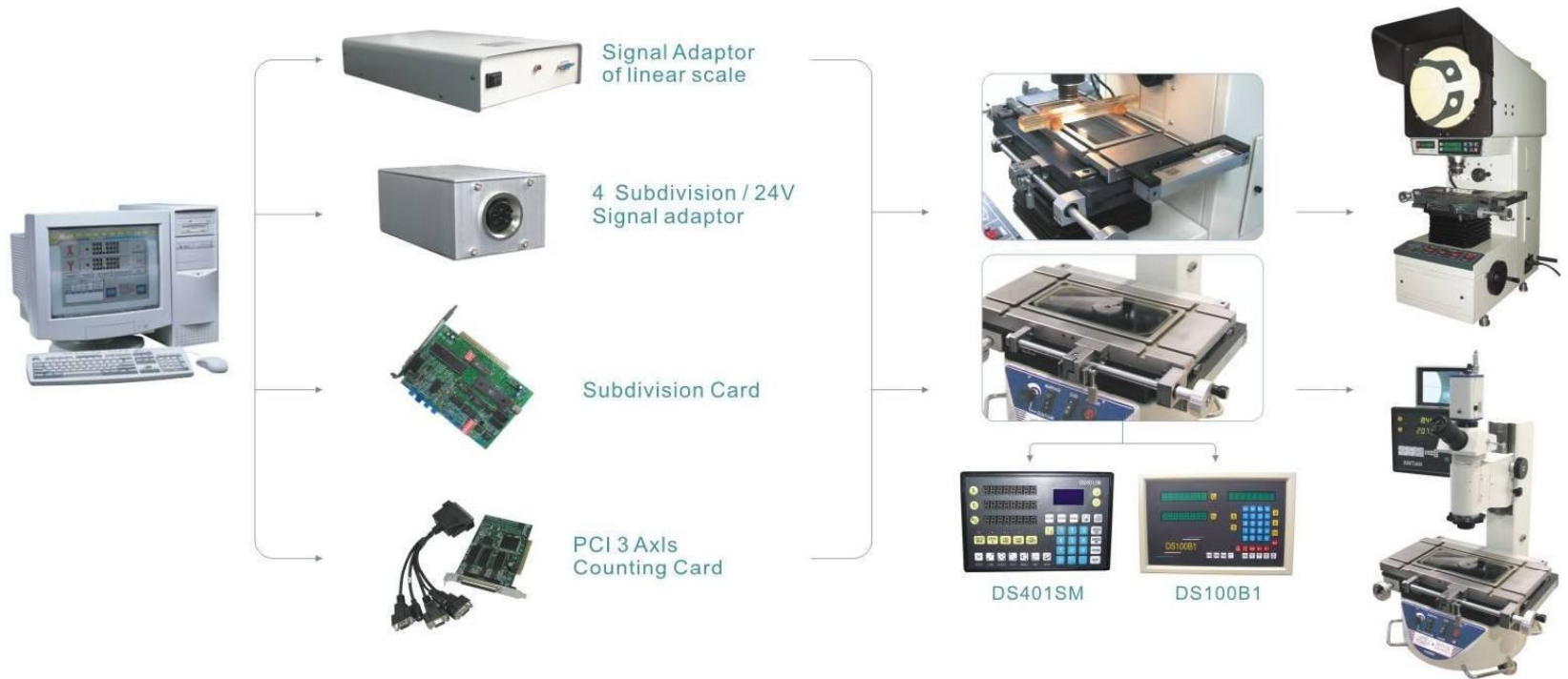
The PCI bus three-axis counting card, based on counting and decoding of the PCI bus and the programmable I/O Card, can simultaneously carry out decoding and counting for 24-digit maximum frequency 2MHz of input signals for 4-channel encoder, linear scale, etc. Each channel can touch off the function of the latched counting value by the encoder's indexed signals or external signals. Therefore it is very suitable for precision measurement. In addition there are also 24 programmable I/O digital interfaces. The users can self-define them as the I/O interfaces, so as to meet various I/O extending requirement. The 8-digit carrying and borrowing output interface can monitor the overflow mode of the counter and provide the function base under Windows 9X/2000. Through simple function call, we can carry out read and write operation on this card. The self-carrying demonstration procedure can let the user conveniently debug and test the hardware. The granted programmed example can greatly speed up the development speed for the user.

## Technical Parameters and Characteristics

- ◇ 32-digit PCI bus, plug and play
- ◇ Signals input by 3-axis difference or single-end synchronization or asynchronous touch-off
- ◇ A/B Signals' maximum input frequency 2MHZ, 3-axis difference or single-end A/B or non-A/B signal input
- ◇ The programmable 24-digit I/O and 8-digit programmable output mode
- ◇ Maximum input frequency: 2MHZ
- ◇ Counting pulse range: -8,388, 607~8, 388, 607 pulses (24 digits)
- ◇ Logic level for the programmable 24-digit I/O and 8-digit programmable output mode: TTL
- ◇ I/O Signals:
  - programmable 24-digit I/O interface
  - 8-digit programmable output mode
  - Connecting the periphery with two 37-pin DB connectors

## Signal Adaptor of Linear Scale

in order to expand the uses of linear scales ,we can provide various signal adaptors,which will help our linear scales use in more fields.



The linear scale displacement can be transmitted to computer system by counting card, EXE signal adaptor (sine output of linear scale, adaptor can be adjusted by 20,50 and 100 frequency multiplication), RS232 port of DRO and DS series of counters to realize the controlling and locating function (customer can realize the function according to program for the back-end computer).

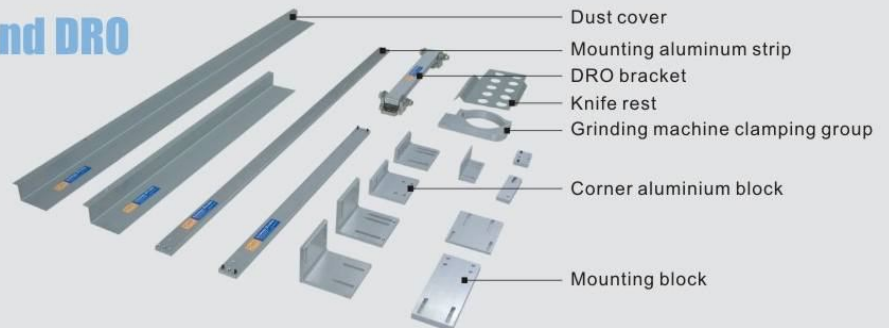
## DRO System Usages



Note: Red arrow shows the installation direction of linear scale

## Mounting Accessories of Linear Scale and DRO

Since various machine tools work under various environment, the mounting methods of linear scales have no uniform standards. In order to meet the different mounting requirements of machine tools, our company developed a full set of mounting accessories for customer to choose. Please check our accessory handbook to get more details about their types and sizes.



DISTRIBUTOR :

Energy Power Save CO.,LTD.

442/2 Chan Road, Thung Watdon Sathon Bangkok Thailand 10120

[www.siamenergysaving.com](http://www.siamenergysaving.com), [www.7-mars.com](http://www.7-mars.com)

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