

Magnescale

Magnescale

Digital Readout General Catalog



Digital Readout

Magnescale Co., Ltd.

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<http://www.mgscale.com>

The contents of this literature are as of Mar. 2010

This catalog is printed with soy ink.

MGS-DR-1004-EN-C

Magnescale Co., Ltd.

# GB

## GB-ER SERIES (SR138R)

The GB-ER series combines original Magnescale technology and legendary durability with a built-in reference point.

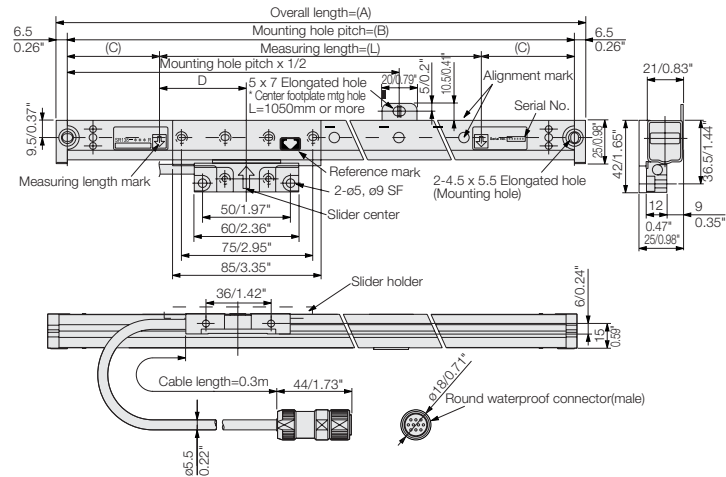
- Excellent durability against workshop conditions - resistant to oil, dirt, shock and vibration.
- Compact design for a space-saving installation.
- Accuracy: (5+5L/1000)μm
- Resolution: 0.5μm
- Simple structure should be conducive to long life.



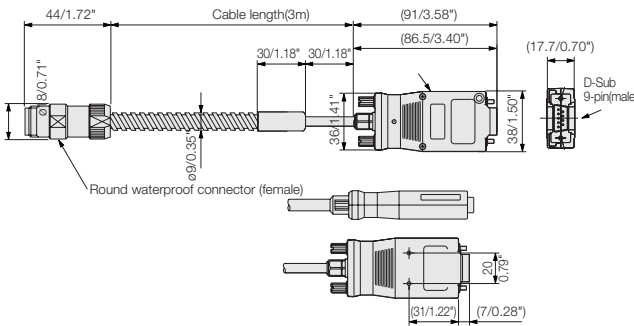
MAGNESCALE®

### Dimensions

SR138R (Model name of the scale itself)



CH04 (Model name of accessory cable)

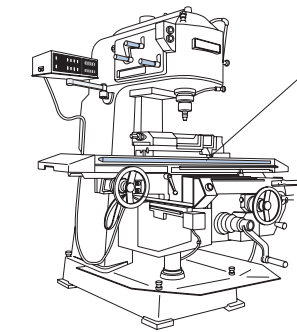


Unit : mm/inch

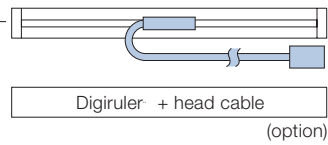
Specifications		
Model		GB-ER
Effective length(L)		50/100/150/200/250/300/350/400/450/500/550/600/650/750/850/950/1050/1250/1400/1600/1850/2050/2200 mm
Scale length	Overall length(A)	L + 104mm (50 to 200mm) L + 120mm (250 to 2200mm)
	Max.travel	L + 14mm (50 to 200mm) L + 30mm (250 to 2200mm)
	With or without Centerfootplate	Without (50 to 950mm) With (1050 to 2200mm)
	Mounting hole pitch(B)	L + 91mm(50 to 200mm) L + 107mm (250 to 2200mm)
	(C)	45.5mm (50 to 200mm) 53.5mm (250 to 2200mm)
(D)		L + 1/2 (50 to 250mm) 50mm (300 to 2200mm)
Accuracy at 20°C		(5 + 5L / 1000) μm
Reference point		Standard:Center point, User-selected point (AB quadrature)
Mounting parallelism		± 0.1mm
Expansion coefficient		(11±1) × 10 <sup>-6</sup> /°C
Operating temperature		0 to 40°C
Storage temperature		-20 to 50°C
Head cable length		0.3m
Cable length		3m
Protective design grade		Scale:IP65 Interface unit:IP30
Input/Output signal	Output signal	AB/ quadrature signal, Z signal
	Power supply	DC + 5V ± 5%
	Connector	D-sub 9 pin
Resolution		0.5 μm
Response speed	Scale signal	60m/min
	Reference signal	60m/min
Power consumption		Max. 200mA

### System configuration

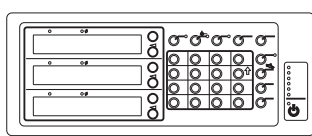
Milling machine



Scale unit GB-ER series

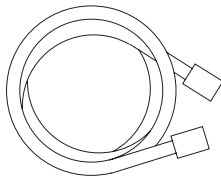


Counter LH70/71 series

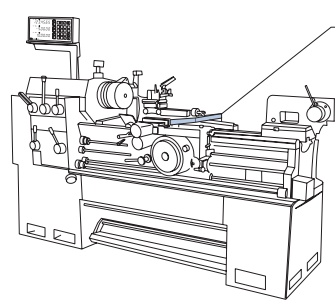


Extension cable (option)  
Used by connecting to the cable part of the scale unit.

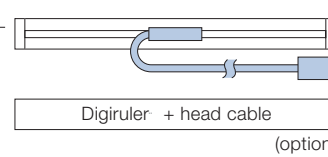
CE10-01C (1m)  
-03C (3m)  
-05C (5m)  
-10C (10m)



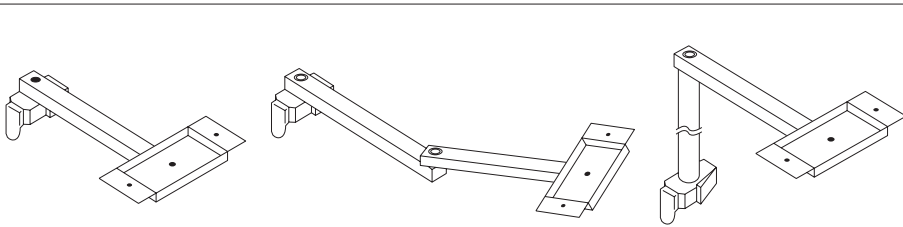
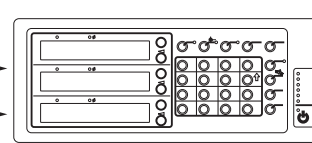
Lathe



Scale unit GB-ER series



Counter LH70/71 series

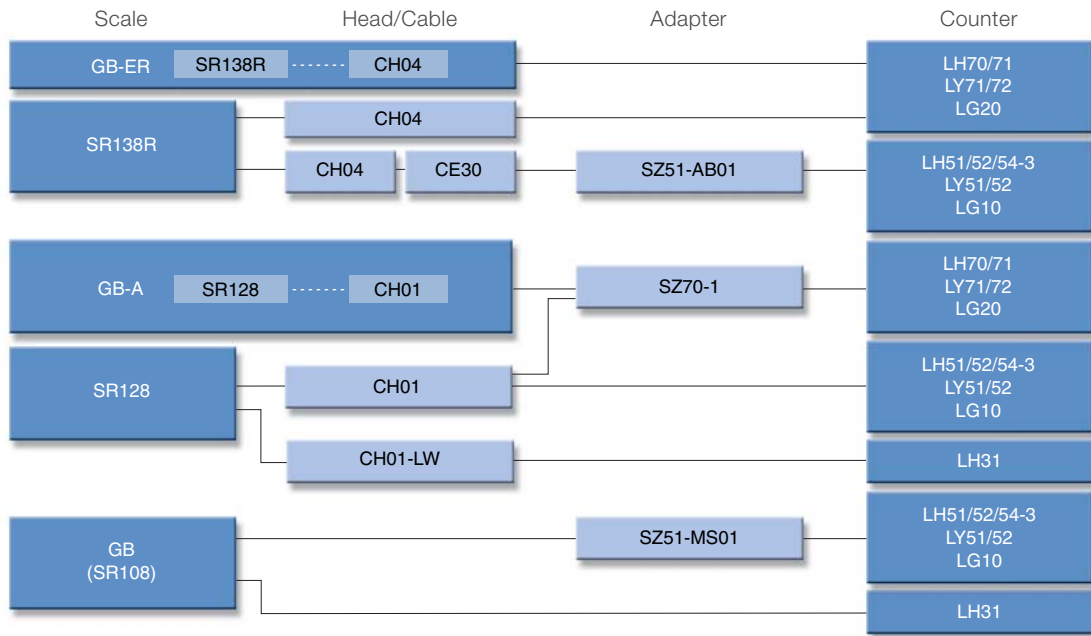


Counter table LZ7 (option)

LZ8 (option)

LZ9 (for lathe) (option)

### GB series connection example



SJ

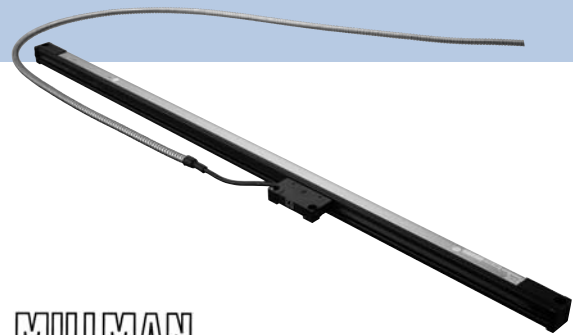
## SJ700A SERIES

Cost-effective scale for  
Digital readout.

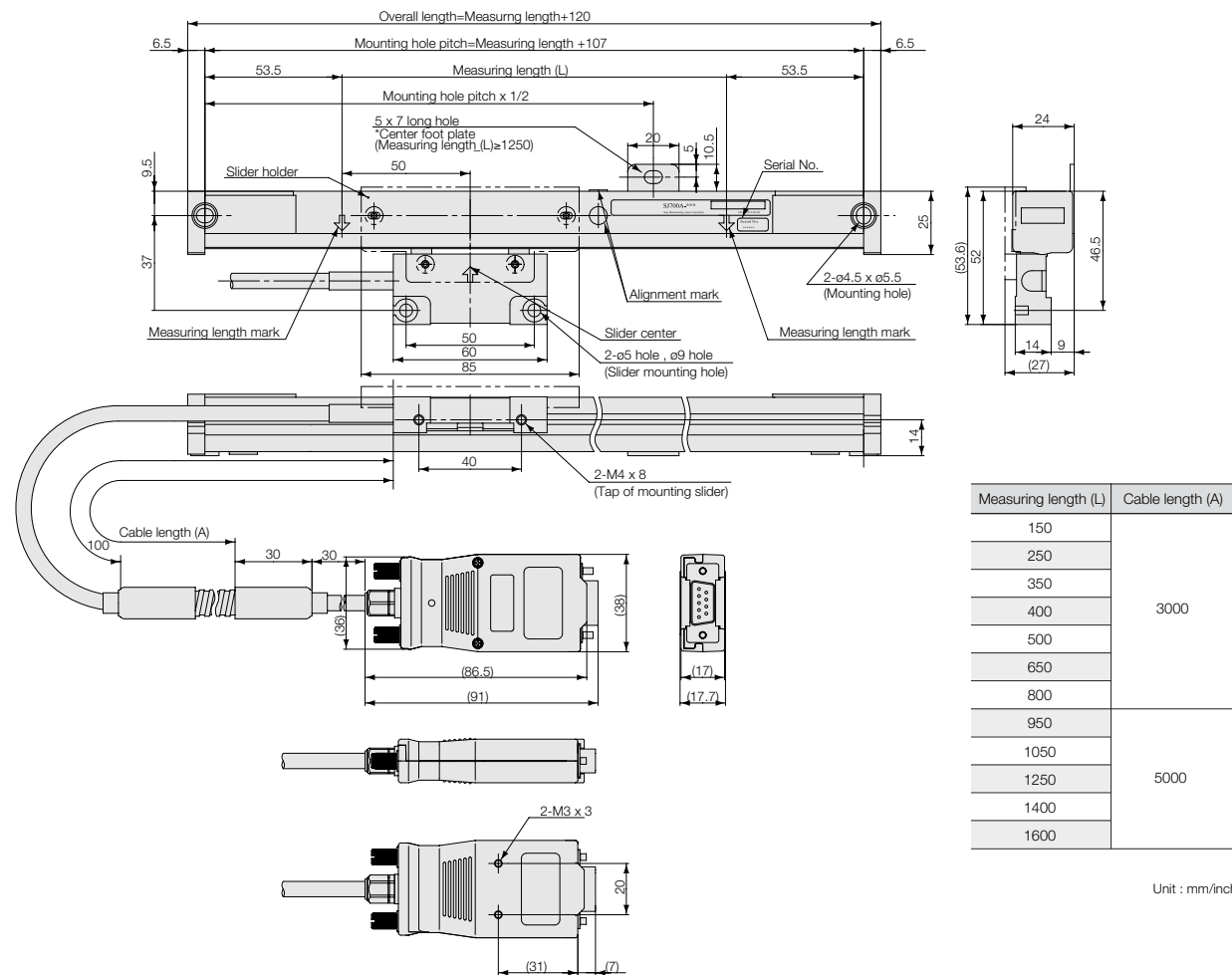
- Magnetic based encoder
- Excellent resistance to workshop conditions
- Same coefficient of expansion as that of machine tools
- Measuring length: 150 mm to 1600 mm / 5.9" to 62.9"
- Accuracy:  $\pm 10 \mu\text{m}$ ,  $\pm 15 \mu\text{m}$
- Resolution:  $5 \mu\text{m}$

Scale	Counter
SJ700A	LH70/71, LH72 LY71, LY72, LG20

MILLMAN®



## Dimensions



Measuring length (L)	Cable length (A)
150	3000
250	
350	
400	
500	
650	5000
800	
950	
1050	
1250	
1400	5000
1600	

Unit : mm/inch

Specifications	
Model	SJ700A
Effective length L:mm(inch)	150 (5.9"), 250 (9.8"), 350 (13.7"), 400 (15.7"), 500 (19.6"), 650 (25.5"), 800 (31.5"), 950 (37.4"), 1050 (41.3"), 1250 (49.2"), 1400 (55.1"), 1600 (62.9")
Overall length	Measuring length + 120 (4.73")
Maximum travel	Measuring length + 20 (0.78") (0.39") each at right and left
Accuracy (at 20°C/68°F)	$\pm 10 \mu\text{m}$ (Measuring length 1250 (49.21") or less) $\pm 15 \mu\text{m}$ (Measuring length 1400 (55.12") or more)
Thermal expansion coefficient	$(12 \pm 1) \times 10^{-6}/^{\circ}\text{C}$
Cable length	3 m (9.8 ft) (SJ700A-015 to 080), 5 m (16.4 ft) (SJ700A-095 to 160)
Operating temperature	0 to + 40°C (+ 32 to + 104°F)
Storage temperature	-20 to + 60°C (4 to + 140°F)
Operating humidity	Condensation allowed
Storage humidity	90 %

SJ

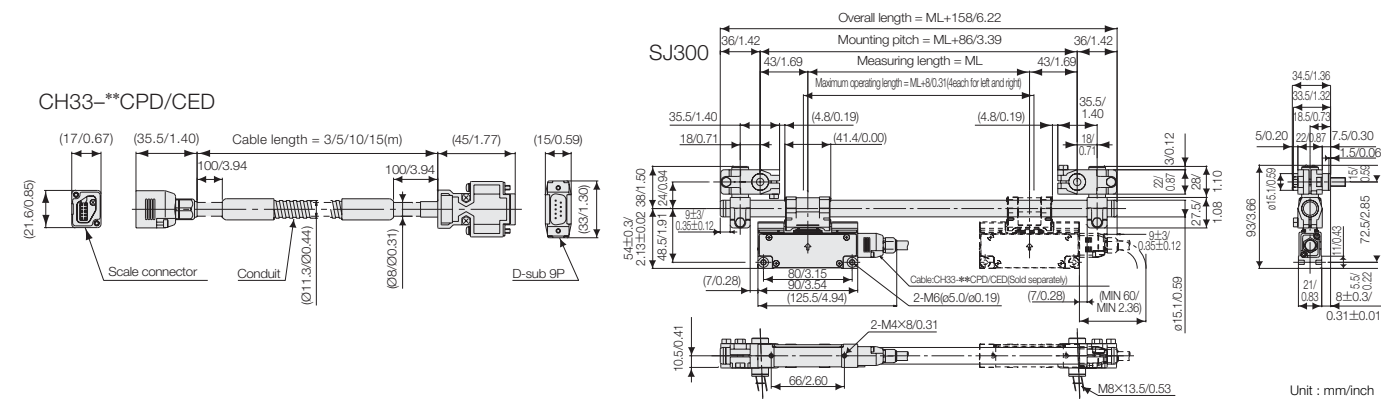
## SJ300 SERIES

legendary Magnescale technology has been improved!

- Flexible Reader Head mounting provides wider installation tolerances and less installation time.
- Excellent resistance to workshop conditions (IP64)
- Classic Magnescale benefits: No cleaning or maintenance, and no scratched or broken glass.
- No machined surface or backer bar required.
- Reader Head Status lamp provides visual signal status.
- Scale mounting brackets slide and rotate to accommodate a wide range of installation configurations.
- Removable cable for easy replacement.

Scale	Cable	Counter
SJ300	CH33	LH70/71, LH72 LY71, LY72, LG20

## Dimensions



## Specifications

Model	SJ300-005 to SJ300-220
Effective length L:mm	50,100,150,200,250,300,350,400,450,500,550,600,650,750,800, 850,950,1050,1250,1400,1600,1850,2050,2200
Overall length	L+158mm
Accuracy(20°C)	$\pm 10 \mu\text{m}/\text{m}$
Resolution	$1 \mu\text{m}$
Max. response speed	60m/min
Output signal	AB quadrature (compliant with EIA-422)
Min. output phase difference	200ns
Expansion coefficient	$(17 \pm 1) \times 10^{-7}/^{\circ}\text{C}$
Status lamp functions	Low Scale signal / Low power supply voltage
Max. cable length	15m
Power supply voltage	5V $\pm$ 5%
Power consumption	2.5W or less(With load)
Operating temperature	0 to 45°C
Storage temperature	-20 to 60°C
Vibration resistance	20m/s <sup>2</sup> , 50Hz to 2kHz
Shock resistance	600m/s <sup>2</sup> , 11mm/s
Protective design grade	IP65(Or equivalent)

## Specifications

Model	CH33-							
	03CPD	05CPD	10CPD	15CPD	03CED	05CED	10CED	15CED
Cable length L(m)	3	5	10	15	3	5	10	15
Cable sheath	PVC				Polyurethane			
Cable armor	Yes							
Protective design grade	IP65(Scale Side Connector)							

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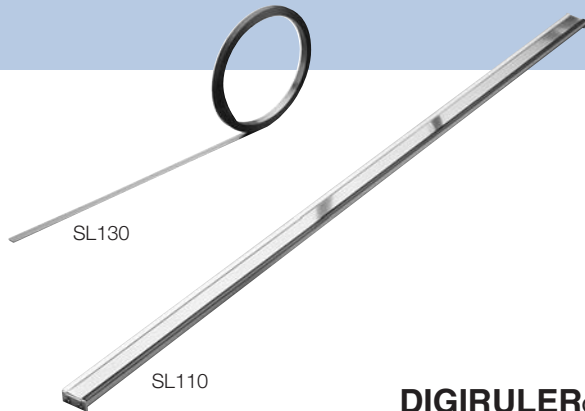
# SL

# SL110/SL130

Non-contact detection and a long measuring range

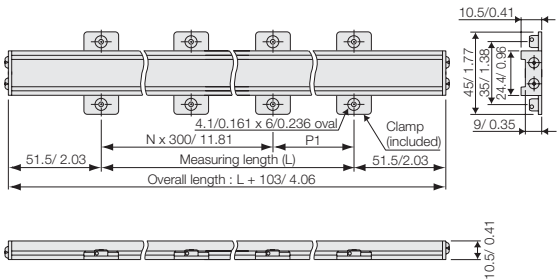
- Magnetic principle
- Excellent resistance to workshop conditions (PL20C equivalent to IP65).  
Resistant to oil, dirt, vibration, and shock.
- Resolution: 10 μm
- Max. response speed: 300 m/ min (varies with the read head and settings).
- Available in lengths up to 30 m (SL130)
- High cost efficiency. Easy installation on all types  
of machines from wood working to metal cutting.

Scale	Head/Cable	Counter
SL110/130	PL20C	LH70/71, LH72 LY71, LY72, LG20



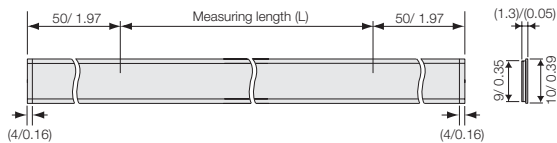
### Dimensions

SL110



Model name	Effective length	N	P1	Number of Clamps
SL110-20	200	0	200	4
SL110-30	300	1	0	4
SL110-40	400	1	100	6
SL110-50	500	1	200	6
SL110-60	600	2	0	6
SL110-70	700	2	100	8
SL110-80	800	2	200	8
SL110-100	1000	3	100	10
SL110-120	1200	4	0	10
SL110-150	1500	5	0	12
SL110-160	1600	5	100	14
SL110-170	1700	5	200	14
SL110-180	1800	6	0	14
SL110-200	2000	6	200	16

SL130



Model name	Effective length	Movable length	Overall length
SL130-20	200	230	300
SL130-30	300	330	400
SL130-40	400	430	500
SL130-50	500	530	600
SL130-60	600	630	700
SL130-70	700	730	800
SL130-80	800	830	900
SL130-100	1000	1030	1100
SL130-120	1200	1230	1300
SL130-150	1500	1530	1600
SL130-160	1600	1630	1700
SL130-170	1700	1730	1800
SL130-180	1800	1830	1900
SL130-200	2000	2030	2100
SL130-250	2500	2530	2600
SL130-300	3000	3030	3100
SL130-400	4000	4030	4100
SL130-500	5000	5030	5100
SL130-600	6000	6030	6100
SL130-700	7000	7030	7100
SL130-800	8000	8030	8100

Unit : mm/inch

SL110/130 Specifications			
Model	SL110	SL130	
	-20 to -200	-20 to -700	-800 to -3000
Effective length L mm (inch)	200/300/400/500/600/700/800/1000/1200/ 1500/1600/1700/1800/2000 (7.8/11.8/15.7/19.6/23.6/27.5/31.4/39.3/47.2/ 59.0/62.9/66.9/70.8/78.7)	200/300/400/500/600/700/800/1000/1200/ 1500/1600/1700/1800/2000/2500/3000/ 4000/5000/6000/7000 (7.8/11.8/15.7/19.6/23.6/27.5/31.4/39.3/ 47.2/59.0/62.9/66.9/70.8/78.7/98.4/118.1/ 157.4/196.8/236.2/275.5)	8000/9000/10000/20000/30000 (314.9/354.3/393.7/787.4/1181.1)
Overall length	L+103 mm/ 4.1"	L+100 mm/ 3.9"	
Accuracy (at 20 °C /68 °F)	± (25 + 5L/ 1000) μm		± (25 + 5L/ 1000 + 10N) μm N=1 when L=8000 /9000/10000 , N=2 when L=20000 , N=3 when L=30000
Resolution	10 μm		
Max. response speed	300 m/ min		
Expansion coefficient	(11.1 ± 1) x 10 <sup>-6</sup> /°C	(10.4 ± 1) x 10 <sup>-6</sup> /°C	
Operating temperature	-5 °C to 45 °C / 23 °F to 113 °F		
Storage temperature	-10 °C to 50 °C / 14 °F to 122 °F		
Compatible read head	PL20C		

\*Accuracy shows the value when used with PL20C read head.

# PL

# PL20C

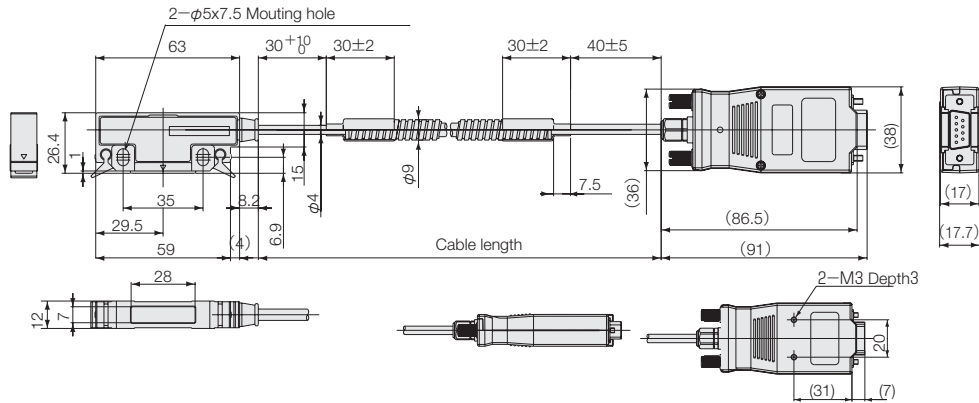
Head cable unit

- Output signal: AB quadrature signal
- Resolution:10 μm
- Max. response speed: 300 m/min (varies with the read head and settings).
- Excellent resistance to workshop conditions (IP65).
- Resistant to oil, dirt, vibration, and shock.

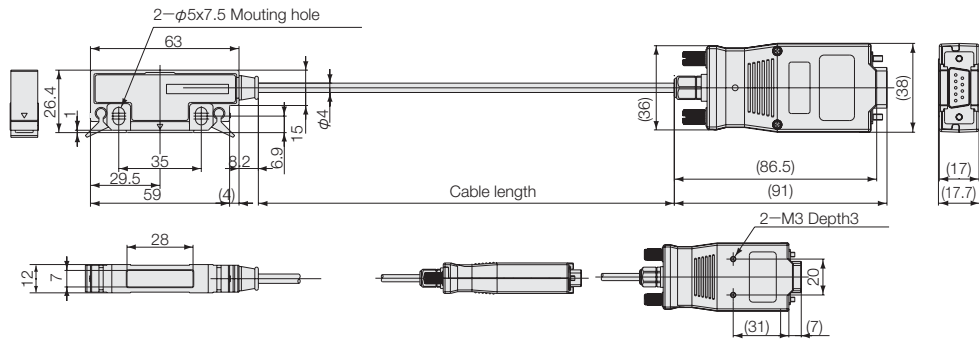
Scale	Head/Cable	Counter
SL110/130	PL20C	LH70/71, LH72 LY71, LY72, LG20

### Dimensions

PL20C-\*\*(Metal arm added)



PL20C-\*\*



Unit : mm

Specifications						
Model	PL20C-3/-3C	PL20C-5/-5C	PL20C-10/-10C	PL20C-15/-15C	PL20C-20/-20C	PL20C-30
Cable length	3 m	5 m	10 m	15 m	20 m	30 m
Output signal	AB quadrature signal					
Resolution	10 μm					
Max. response speed	300m/min					
Head mtg. screw tightening torque	0.7~1.1N·m					
Operating temperature	0 to 45 °C/32 to 113°C					
Storage temperature	-10 to 50 °C/-14 to 122 °F					



LH

# LH70/71 SERIES

High performance counter for Mille and Lathe applications.

- Counter for Milling machine (LH70/71) and Lathe (LH70-3/LH71-3)
- Display Resolution Switching
- Machine error compensation
- Data Storage. ● Reset/Preset
- Detecting Reference Point of Measurement Unit
- Program function ● Multi datum point ● Scaling
- Milling function (Bolt hole circle / Easy R cutting / Line hole)
- Lathe function (Tool coordinating / Adding function)



## Specifications

Common Specifications			
Model	LH70/71-1	LH70/71-2	LH70/71-3
Display	7 digits and minus display, Color amber		
Connectable measuring unit	GB-ER, SJ300 series, SJ700A, PL20C series (Direct) DG-B (Necessary to use the conversion adaptor which is sold separately.)		
Measuring unit input resolution	Standard: 0.1 μm, 0.5 μm, 1 μm, 5 μm, 10 μm, 1 s, 10 s, 1 min, 10 min Expanded: 100 μm, 50 μm, 25 μm, 20 μm, 2 μm, 0.05 μm and 1 degree can be added.		
Display resolution	Measuring unit input resolution or higher and diameter display (except for angle display)		
Input signal	A/B quadrature signal, Z signal (Conforms to EIA-422.)		
Minimum input phase difference	100 ns		
Quantization error	±1 count		
Alarm display	Measuring unit disconnected, Excess speed, Maximum display amount exceeded, Power failure, Error in stored data		
Reset	Resettable by key switch		
Preset	It is possible to store/call 3 kinds of numbers.		
Reference point detection	The reference point of the measuring unit can be detected, and the datum point can be relocated (during connection of measuring unit with a reference point)		
Data storage	The value displayed before the power was turned off and setting values are stored		
Linear error compensation	A fixed compensation is applied to the measuring unit's count value. Compensation amount Standard: ±600 μm/m (Expanded: ±1000 μm/m)		
Segmented error compensation	The movement range of the measuring unit with a reference point can be divided into amaximum of 32 sections, and error compensation is performed for each of these sections. Compensation amount: ±600 μm (at each section)(LH71 only)		
Scaling	Scaling factor: 0.100000 to 9.999999(LH71 only)		
Program	Machining coordinates can be programmed (number of program steps: 850 max.) 1. Manual programming by key switch 2. Automatic programming by playback 3. Mirror image during program execution 4. A canned cycle (bolt hole, line hole, simple R cutting) can be inserted in the program. (LH71 only)		
Angle display	Can be displayed as an angle value when the Digiruler is pasted to the arc surface, and the diameter and Digiruler resolution are entered		
Sleep	The display is turned off when no operations are made for a preset time. (The time can be set.)		
Power supply	DC 12 V Rating 0.75 A Max. 1 A AC 100 V to 240 V ±10 % When using the AC adaptor PSC-22 (For U.S. only) or PSC-23 (For Europe and other countries) *Option		
Power consumption	MAX. 32 VA connected at the AC adaptor.		
Operating temperature range	0 to 40°C (no condensation)		
Storage temperature range	-20 to 60°C (no condensation)		
Mass	Approx. 1.5 kg		

When the LH70/71 general-purpose applications or milling machine function are selected (General setting in the model type selection mode of the basic settings)

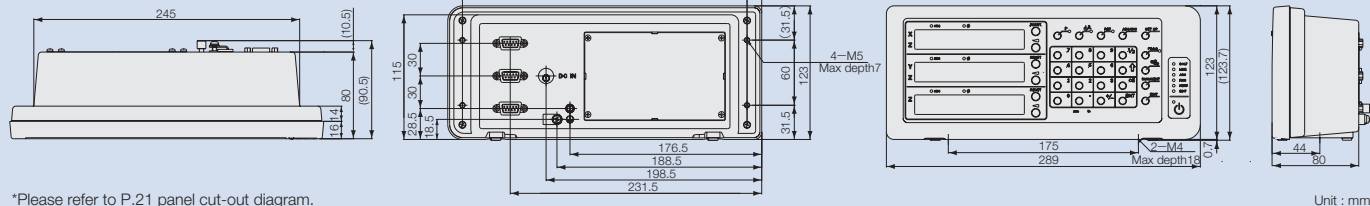
Model	LH70-1	LH71-1	LH70-2	LH71-2	LH70-3	LH71-3
Display	1-axis		2-axis		3-axis	
Multi datum point	10	150	10	150	10	150
Bolt hole circle	—		Displays coordinates for opening equidistant holes along the perimeter of a designated diameter			
Simple R cutting	—		Display coordinates for simple R cutting			
Line hole	—		Displays coordinates for opening equidistant holes along a designated straight line(LH71 only)			

When the LH70/71 lathe function is selected (Lathe setting in the model type selection mode of the basic settings)

Model	LH70-3	LH71-3
Display axes	2-axis display (2-axis or 3-axis input)	
Tool offset	12	99
Measuring unit input addition	2-axis addition display is available	
Display hold	The displayed value can be held and the tool coordinate entered.	

## Dimensions

LH70/71, LH72



\*Please refer to P.21 panel cut-out diagram.

LH

# LH72

High performance Lathe specific counter.

- Counter for Lathe (LH72-3)
- Display Resolution Switching
- Machine error compensation
- Data Storage.
- Reset/Preset
- Detecting Reference Point of Measurement Unit
- Program function ● Scaling
- Lathe function (Tool coordinating / Adding function)



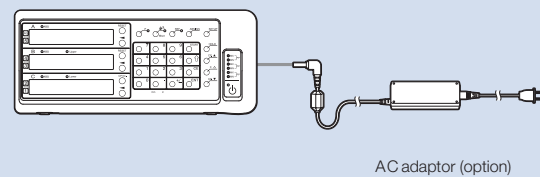
## Specifications

Common Specifications	
Model	LH72-3
Display	7 digits and minus display, Color amber
Connectable measuring unit	GB-ER, SJ300 series, SJ700A, PL20C series (Direct) DG-B (Necessary to use the conversion adaptor which is sold separately.)
Measuring unit input resolution	Standard: 0.1 μm, 0.5 μm, 1 μm, 5 μm, 10 μm, 1 s, 10 s, 1 min, 10 min Expanded: 100 μm, 50 μm, 25 μm, 20 μm, 2 μm, 0.05 μm and 1 degree can be added.
Display resolution	Measuring unit input resolution or higher and diameter display (except for angle display)
Input signal	A/B quadrature signal, Z signal (Conforms to EIA-422.)
Minimum input phase difference	100 ns
Quantization error	±1 count
Alarm display	Measuring unit disconnected, Excess speed, Maximum display amount exceeded, Power failure, Error in stored data
Reset	Resettable by key switch or remote reset.
Preset	It is possible to store/recall 3 kinds of numbers.
Reference point detection	The reference point of the measuring unit can be detected, and the datum point can be relocated (during connection of measuring unit with a reference point)
Data storage	The value displayed before the power was turned off and setting values are stored
Linear error compensation	A fixed compensation is applied to the measuring unit's count value. Compensation amount Standard: ±600 μm/m (Expanded: ±1000 μm/m)
Segmented error compensation	The movement range of the measuring unit with a reference point can be divided into amaximum of 32 sections, and error compensation is performed for each of these sections. Compensation amount: ±600 μm (at each section)
Scaling	Scaling factor: 0.100000 to 9.999999
Program	Machining coordinates can be programmed (number of program steps: 850 max.) 1. Manual programming by key switch 2. Automatic programming by playback 3. Mirror image during program execution
Angle display	Can be displayed as an angle value when the Digiruler is pasted to the arc surface, and the diameter and Digiruler resolution are entered
Sleep	The display is turned off when no operations are made for a preset time. (The time can be set.)
Display axes	2-axis display (2-axis or 3-axis input)
Tool offset	99
Measuring unit input addition	2-axis addition display is available
Display hold	The displayed value can be held and the tool coordinate entered.
Power supply	DC 12 V Rating 0.75 A Max. 1 A AC 100 V to 240 V ±10 % When using the AC adaptor PSC-22 (For U.S. only) or PSC-23 (For Europe and other countries) *Option
Power consumption	MAX. 32 VA connected at the AC adaptor.
Operating temperature range	0 to 40°C (no condensation)
Storage temperature range	-20 to 60°C (no condensation)
Mass	Approx. 1.5 kg

## Power supply AC adapter

The AC adapter for LH70/71, LH72 and LG20 counter unit.

- PSC-21 (For Japan only)
- PSC-22 (For U.S. only)
- PSC-23 (For Europe and other country.)



AC adaptor (option)

# LG

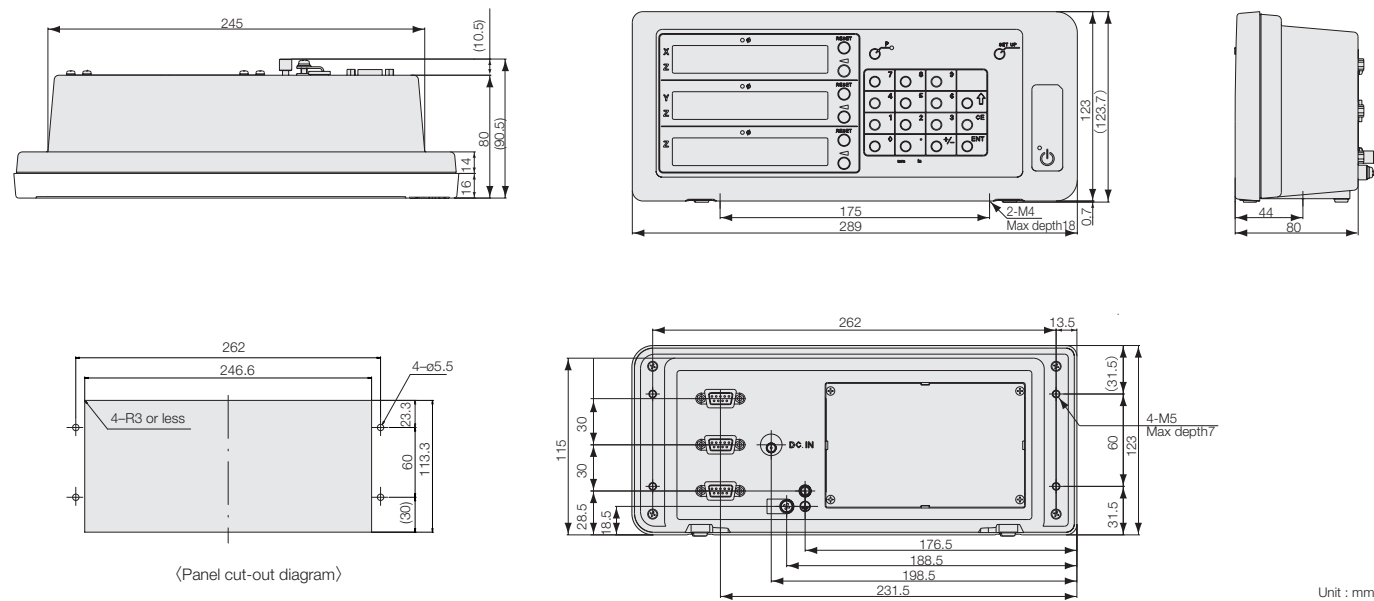
## LG20 SERIES

Counter of standard function.

- Selectable display resolution
- Scale input signal : A/B quadrature signal
- Machine Error Compensation
- Data Storage
- Preset / Recall
- Flicker Control



### Dimensions



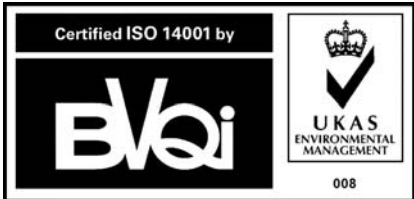
Specifications			
Model	LG20-1	LG20-2	LG20-3
Display axes	1-axis	2-axis	3-axis
Display	7 digits and minus display, Color amber		
Connectable measuring unit	GB-ER, SJ300, SJ700A, PL20C Series (Direct), unit DG-B (Requires a conversion adaptor which is sold separately.)		
Measuring unit input resolution	0.1 μm, 0.5 μm, 1 μm, 2 μm, 5 μm, 10 μm, 20 μm, 25 μm, 50 μm, 100 μm		
Display resolution	Measuring unit input resolution or higher and diameter display		
Input signal	A/B quadrature signal (Conforms to EIA-422.)		
Minimum input phase difference	100 ns		
Quantization error	±1 count		
Alarm display	Measuring unit disconnected, Excess speed, Maximum display amount exceeded, Power failure, Error in stored data		
Preset	It is possible to store/recall 3 kinds of numbers.		
Data storage	The value displayed before the power was turned off and setting values are stored		
Linear error compensation	A fixed compensation is applied to the measuring unit's count value. Compensation amount: ±600 μm/m)		
Sleep	The display is turned off when no operations are made for a preset time. (The time can be set.)		
Power supply	DC 12 V Rating 0.75 A Max. 1 A AC 100 V to 240 V ±10 % When ssusing the AC adaptor PSC-22 (For U.S. only) or PSC-23 (For Europe and other countries) *Option		
Power consumption	MAX. 32 VA connected at the AC adaptor.		
Operating temperature range	0 to 40°C (no condensation)		
Storage temperature range	-20 to 60°C (no condensation)		
Mass	Approx. 1.5 kg		

# Safety

No compromise for high-accuracy products



The total quality control system that operates throughout the entire design and production process ensures products with enhanced safety, high quality, and high reliability that match our customers' requirements. The company is certified for length calibration in compliance with the traceability system required by the “Weights and Measures Act,” and has been granted ISO 9001 certification, which is the international standard for quality assurance.



Isehara plant is registered to ISO 9001 (Quality)

Our products comply with CE Marking requirements, have acquired UL certifications and meet other regulations, ensuring safe use the world over.

We have met:

- EMC Directives(CE)
  - EMI: EN 55011 Group 1 Class A / 91
  - EMS: EN 61000-6-2
- FCC regulation
  - FCC Part 15 Subpart B Class A

for Products with built-in AC power supply:

- UL 61010-1

for Products with Laser:

- DHHS Class 1 (21CFR1040.10)

\* When using our devices with machines to which the European Machinery Directive applies, please make sure that the devices when installed on the machines fulfill the applicable requirements of the Directive.  
 \* Standards or regulations to be complied with may vary by product.

# Traceability

Traceability Flow Chart (Length)

