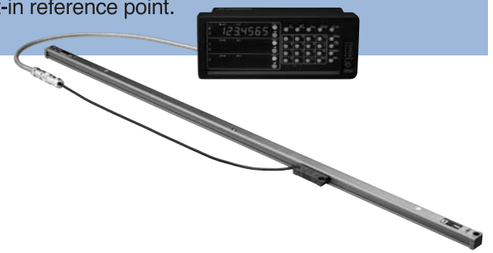
GB

GB-ER SERIES (SR138R)

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

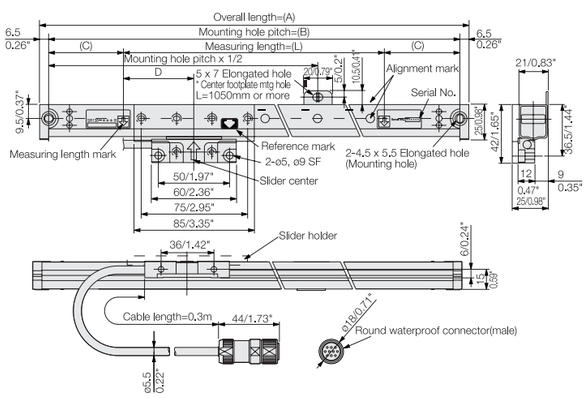


- Excellent durability against workshop conditions - resistant to oil, dirt, shock and vibration.
- Compact design for a space-saving installation.
- Accuracy: (5+5L/1000)µm
- Resolution: 0.5µm

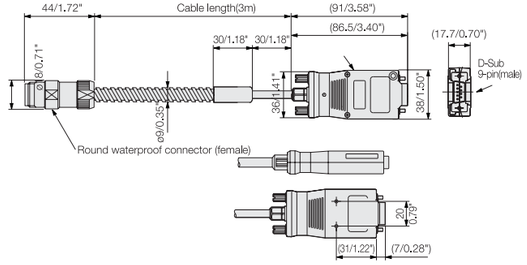
MAGNESCALE®

Dimensions

SR138R (Model name of the scale itself)



CH04 (Model name of accessory cable)



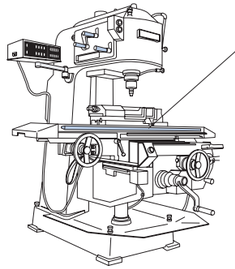
Unit : mm/inch

Specifications

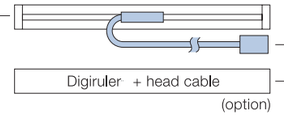
Model		GB-ER
Effective length(L)		50/100/150/200/250/300/350/400/450/500/550/600/650/750/850/950/1050/1250/1400/1600/1850/2050/2200 mm
Scale length	Overall length(A)	L + 104mm (50 to 200mm) L + 120mm (250 to 2200mm)
	Max.travel	L + 14mm (50 to 200mm) L + 30mm (250 to 2200mm)
	With or without Centerfootplate	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℃		(5 + 5L / 1000) µm
Reference point		Standard:Center of scale, User-defined position also available
Mounting parallelism		± 0.1mm
Expansion coefficient		(11±1) x 10^{-6}/℃
Operating temperature		0 to 40℃
Storage temperature		-20 to 50℃
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

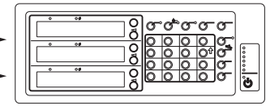
Milling machine



Scale unit GB-ER series

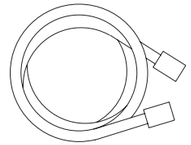


Counter LH70/71 series

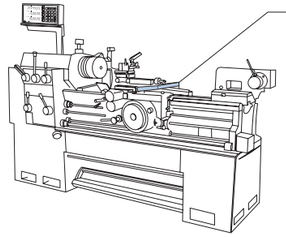


Extension cable (option)
Used by connecting to the cable part of the scale unit.

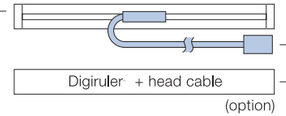
CE10-01C (1m)
-03C (3m)
-05C (5m)
-10C (10m)



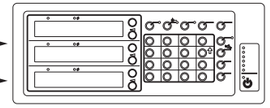
Lathe



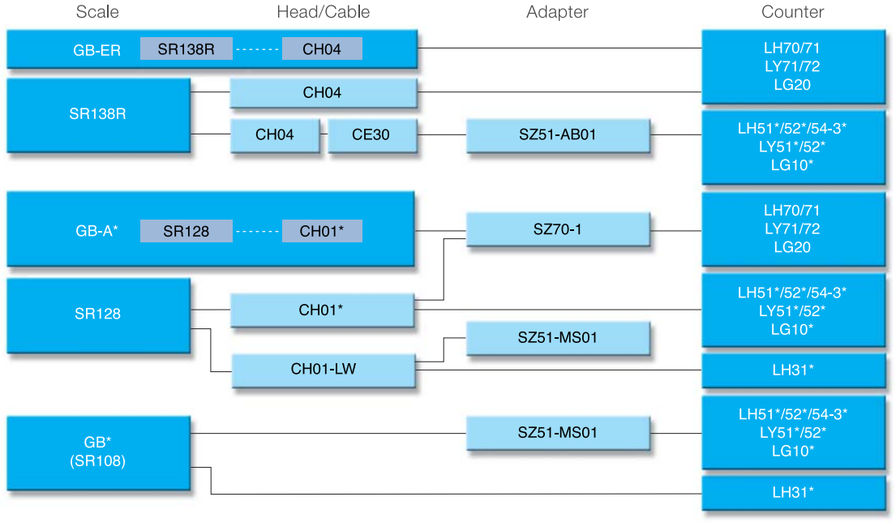
Scale unit GB-ER series



Counter LH70/71 series



GB series connection example

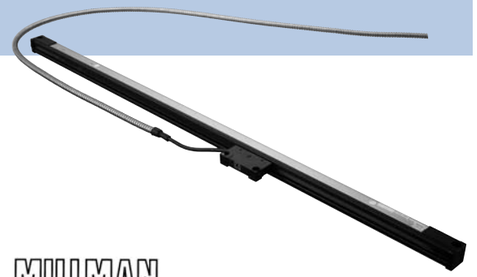


Products marked ⋆ are to be discontinued

SJ

SJ700A SERIES

Cost-effective scale for Digital readout.

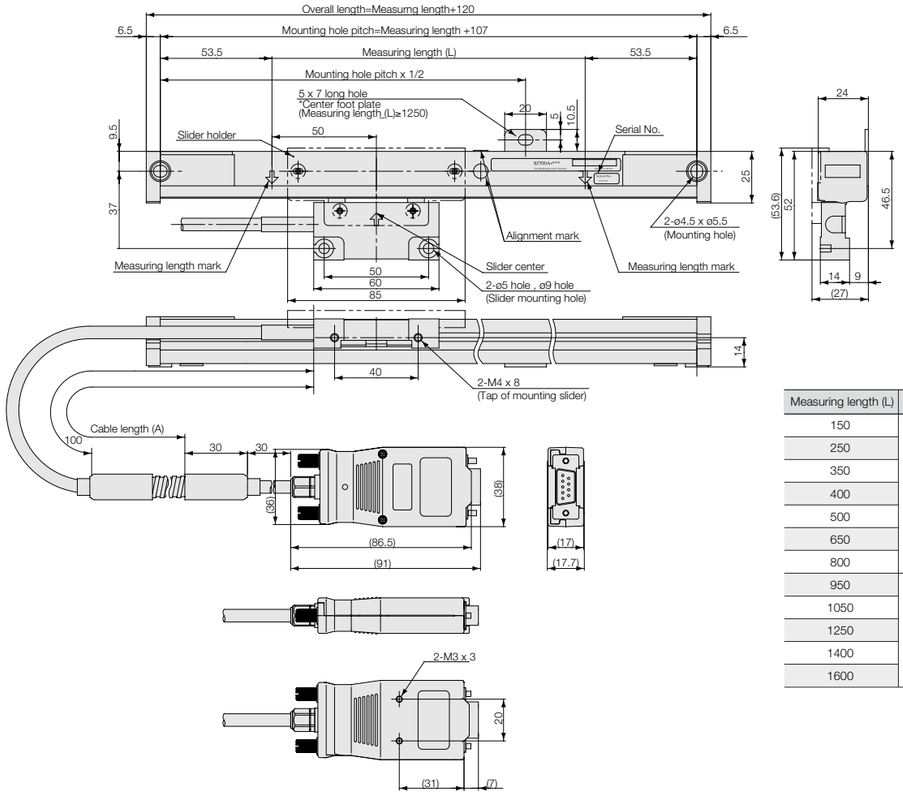


- Magnetic based encoder
- Excellent resistance to workshop conditions
- Same coefficient of expansion as that of machine tools
- Measuring length: 150 mm to 1600 mm / 5.9" to 62.9"
- Accuracy: ± 10 μm, ± 15 μm
- Resolution: 5 μm

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

MILLMAN®

Dimensions



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

Unit : mm/inch

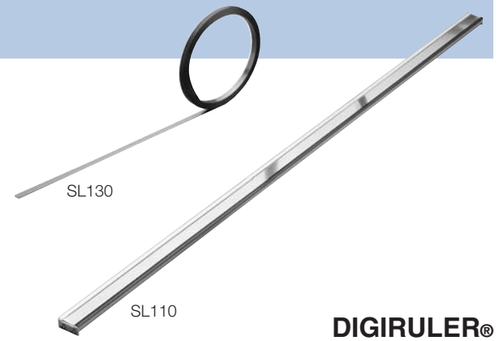
Specifications

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")(10 (0.39") each at right and left)
Accuracy (at 20℃/68℉)	±10 μm (Measuring length 1250 (49.21") or less) ±15 μm (Measuring length 1400 (55.12") or more)
Thermal expansion coefficient	(12 ±1) x 10^{-6}/℃
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℃ (+ 32 to + 104℉)
Storage temperature	-20 to + 60℃ (4 to + 140℉)
Operating humidity	Condensation allowed
Storage humidity	90 %

SL

SL110/SL130

Non-contact detection and a long measuring range



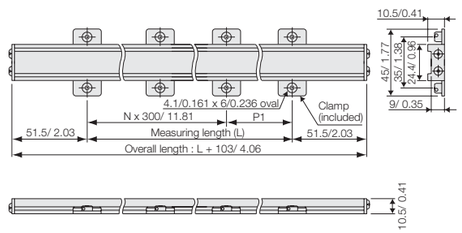
- Magnetic principle
- Excellent resistance to workshop conditions (PL20C equivalent to IP65). Resistant to oil, dirt, vibration, and shock.
- Resolution: 10 μm
- Max. response speed: 300 m/ min (varies with the read head and settings).
- Available in lengths up to 30 m (SL130)
- High cost efficiency. 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

DIGIRULER®

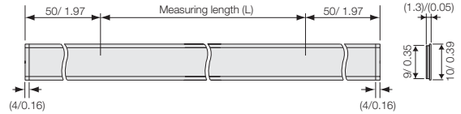
Dimensions

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 ℃ /68 ℉)	± (25 + 5L/ 1000) μm		± (25 + 5L/ 1000 + 10N) μm N=1when 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^{-6}/ ℃	(10.4 ± 1) x 10^{-6}/ ℃	
Operating temperature	-5 ℃ to 45 ℃ / 23 ℉ to 113 ℉		
Storage temperature	-10 ℃ to 50 ℃ / 14 ℉ to 122 ℉		
Compatible read head	PL20C		

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

Specifications

Model name	SQ47	SQ57
Effective length	90 to 6,240mm	70 to 6,270mm
Accuracy	±(1.5+1.5L/1000)μm	
Resolution	Selectable from 0.005/0.05/0.1/0.5/1μm	
Maximum response speed	200m/min(with serial communication)	
Vibration resistance	250m/s²	
Impact resistance	980m/s²	
Protective design grade	IP67	
Maximum consumption current	1.3W	
Power supply voltage	DC5V±5%	
Operating temperature	0 to 50°C	
Output signal	Compatible with each serial interface	
Option	Connection cable: CH23 series	

SQ37 : coming soon

Model name : SQ◆◆-×××★S△▼□□□

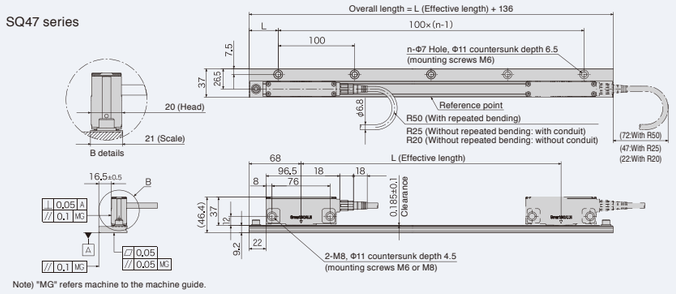
- [□]Reference point
  Fixed to 0mm from left end of effective length
- [▼]Communication protocol
  A:FANUC α/αi interface
  B:Mitsubishi Electric Half duplex
  D:Mitsubishi Electric Full duplex
  F:Yaskawa Electric
  Z:SIEMENS AG
- [△]Resolution and direction*See Table 1
- [S]Accuracy grade
  ±(1.5+1.5L/1000)μm
- Effective length (L:mm)
- [★]Cable lead-out direction
  R:Right
  L:Left
- [×]Effective length
- [◆]Type

Table1

Model name	Direction	Resolution	Model name	Direction	Resolution
S	+	0.005μm	T	−	0.005μm
A		0.01μm	F		0.01μm
B		0.05μm	G		0.05μm
C		0.1μm	H		0.1μm
D		0.5μm	J		0.5μm
E		1μm	K		1μm

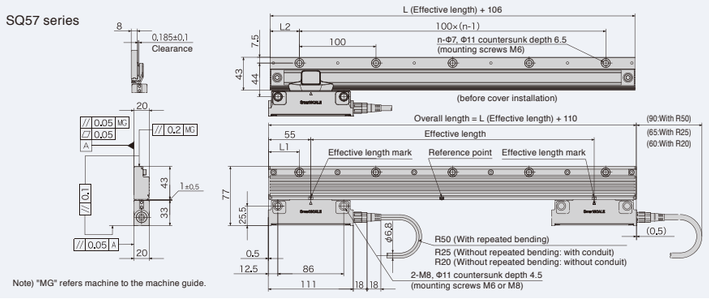
Dimensions

SQ47 series



Note) "MG" refers machine to the machine guide.

SQ57 series



Note) "MG" refers machine to the machine guide.

Lineup

With base

With cover

Absolute type

SmartSCALE

Stronger resistance to harsh environments

⚠ To use this product safely, please read the instruction manual carefully and thoroughly prior to usage. •Magnescale reserves the right to change products and specifications without prior notice.

Magnescale Co., Ltd.

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http://www.magnescale.com

The contents of this literature are as of June.2018

Magnescale Co., Ltd.

Stronger resistance to harsh environments

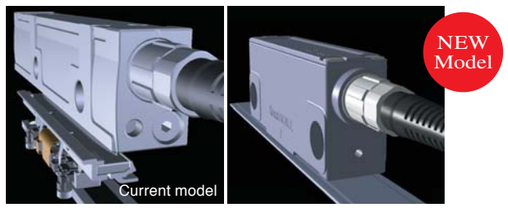
Air purging not necessary

Wide gap and clearance tolerance

Gap between scale and head : 2 times greater than current model.
Clearance tolerance between scale and head : 5 times greater than current model.

Separate type simple architecture

Space saving design by bearingless and miniaturization enables encoders to install near works and multiple encoders in one axis.



5nm high-resolution

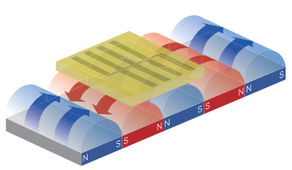
Achieves best in class 5nm resolution by utilizing the latest interpolation technology with a newly developed algorithm.

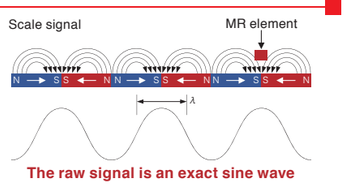
Sealed structure with IP67 grade

The magnetic encoder and detection device are fully protected by a 50μm thin metal cover.
High resistance to coolant/water splashing and to sludge/metal chips provides stable operation under harsh environments.

Principle

Detection Principle
A thin-film MR element with a high-precision, low-distortion pattern arrangement is used as the detecting element. The resistance value of the MR element changes when the magnetic field acting on the element changes due to an alteration in the relative position between the element and the magnetic media. This change in resistance value is read electronically to detect the amount of positional change.



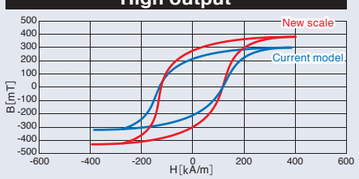


New technology

Development of a new magnetic medium

The output detection signal has improved 30% by changing the composition and consistency of the magnetic medium of the scale, and by improving the production method.

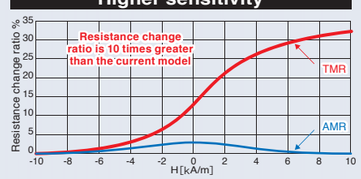
High output



The development of a high sensitivity sensor using a new TMR device

Utilizes a low strain sensor enabling 10 times higher sensitivity compared to the current model by the development of a TMR element based on the Spin-Valve method.

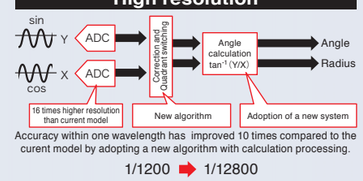
Higher sensitivity



New interpolation calculation method

Achieves 5nm resolution and improves interpolation accuracy by utilizing a new interpolation calculation method.

High resolution



Accuracy within one wavelength has improved 10 times compared to the curent model by adopting a new algorithm with calculation processing.

1/1200 ➡ 1/12800

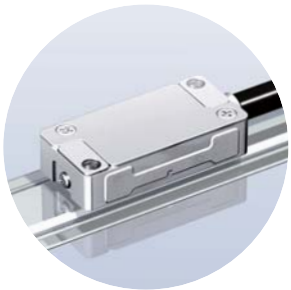
Magnescale

SPEED X PRECISION

Maximum response speed 3m/s
Maximum resolution 50nm and
±5μm accuracy

Incremental type

SmartSCALE



Separate type
simple architecture
IP65 protection against
dust and water

Space-saving small head
W33×D16×H8[mm](Actual size)

Easy to check signal
with LED display

Magnescale Co., Ltd.

Specifications

Model name	SQ10 scale unit	PQ10 head unit	MQ10 interpolator unit
		PQ11 head unit with interpolator	
Effective length	100～1,000 mm		
Accuracy (at 20°C)	±5μm		
Resolution	0.05/0.1/0.5/1μm/0.048828μm (Only Yaskawa Electric Serial interface)		
Maximum response speed: Serial interface	3m/s		

Maximum response speed: A/B phase output

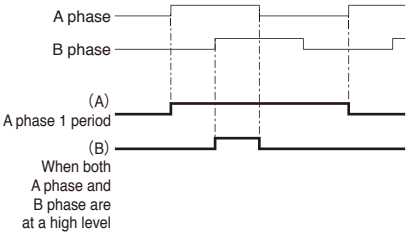
Resolution(μm)	[m/min]	Minimum phase difference(ns) 50	100	150	200	250	300	400	500	650	1,000	1,250	2,500	3,000
0.05		36	18	12	9	7	6	4.5	3.6	2.7	1.6	1.3	0.6	0.4
0.1		72	36	24	18	14	12	9	7	6	3.6	2.8	1.4	0.9
0.5		180	180	150	114	90	72	54	42	3	19	15	7	6
1.0		180	180	180	180	180	156	120	96	72	48	36	18	12

Operating temperature	0 to 50°C		
Vibration resistance	196m/s² (50Hz ~ 2000Hz)(Head only)		
Impact resistance	980m/s² (11ms)(Head and Scale)		
Protective design grade	IP67	IP65/IP60	IP60
Power supply voltage range	-	DC5V±5%	
Maximum consumption current	-	250mA	
Mass	(Effective length:mm×0.22)+8g	8g (excludes cable)	120g (excludes cable)
Output signal	Various serial interface or A/B phase output		

○ LED display

Items	color	Lighting conditions
ORIGIN	Orange	When passing reference point
ALARM	Red	When an alarm occurs
HIGH	Yellow	Excessive level
FINE	Green	Appropriate level
LOW	Orange	Shortage level

○ A/B phase output Reference point output format



Model name:

SQ10-A ××× □□□□ A(scale unit)

- Reference point position Distance from left end (mm)
- Effective length (cm)

PQ10-×× ☆ A (head unit)

- A: IP60, B: IP65
- Type / Cable length

Type	Cable length
07	700mm
17	1,700mm
27	2,700mm
32	3,200mm
37	3,700mm

MQ10-△ □ A ◆ ○ (interpolator unit)

- Type / Reference point output format

Type	Reference point output format
A	A phase 1 period
B	When both A phase and B phase are at a high level

- Minimum phase difference See Table 1
- Resolution A:0.05, B:0.1, C:0.5, D:1μm L:0.048828μm (Only Yaskawa Electric)
- Communication protocol See Table 2

PQ11-×× △ □ ☆ ◆ ○ (head unit with interpolator)

- Reference point output format(Only A/B phase)
- Minimum phase difference See Table 1
- A: IP60, B: IP65
- Resolution A:0.05, B:0.1, C:0.5, D:1μm L:0.048828μm (Only Yaskawa Electric)
- Communication protocol See Table 2
- Type / Cable length

Type	Cable length
10	1,000mm
20	2,000mm
30	3,000mm
40	4,000mm

Table 1: Minimum phase difference (ns)

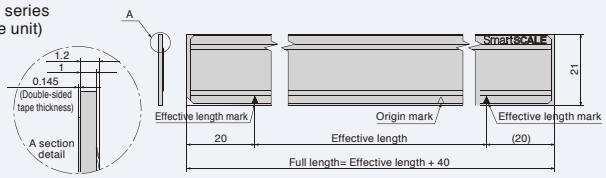
Model name	Phase difference
A	50
B	100
C	150
D	200
E	250
F	300
G	400
H	500
J	650
K	1000
L	1250
M	2500
N	3000

Table 2 : Communication protocol

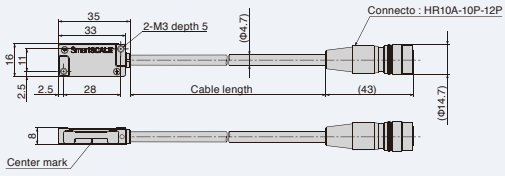
B	Mitsubishi Electric/ 2-wire
D	Mitsubishi Electric/ 4-wire
F	Yaskawa Electric/ Without hall sensor
G	Yaskawa Electric/ With hall sensor
H	Panasonic
P	A/B phase output
M	Magnescale protocol

Dimensions

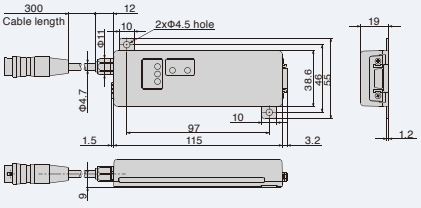
SQ10 series
(Scale unit)



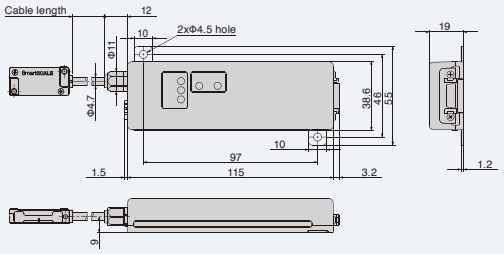
PQ10 series
(Head unit)



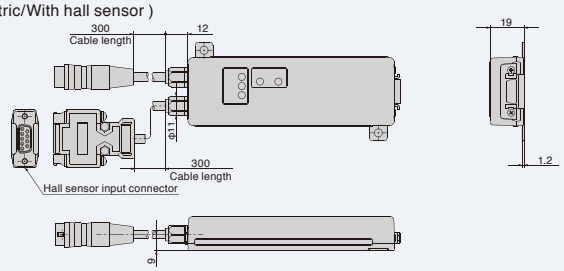
MQ10 series
(Interpolator unit)



PQ11 series
(Head unit with interpolator)



MQ10-GLA
(Yaskawa Electric/With hall sensor)



⚠ To use this product safely, please read the instruction manual carefully and thoroughly prior to usage. •Magnescale reserves the right to change products and specifications without prior notice.

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