





Magnescale Co., Ltd.

Magnescale Americas Inc. Magnescale Europe GmbH Service & Parts

International Sales Department 3-1-4 Edagawa, Koto-ku, Tokyo 135-0051, Japan 1 Technology Drive, Suite F217, Irvine, CA 92618, USA TEL.+1(949)727-4017 FAX.+1(949)727-4047 E-mail : info-am@magnescale.com Antoniusstrasse 14, 73249 Wernau, Germany 45 Suzukawa, Isehara-shi, Kanagawa 259-1146, Japan

TEL.+81(0)3-6632-7924 FAX.+81(0)3-6632-7928 E-mail : info-mgs-eng@magnescale.com TEL.+49(0)7153-934-291 FAX.+49(0)7153-934-299 E-mail : info-eu@magnescale.com TEL.+81(0)463-92-2132 FAX.+81(0)463-92-3090 E-mail : info-css@magnescale.com

www.magnescale.com

MAGNESCALE is a trademark or registered trademark of Magnescale Co., Ltd., Japan. The contents of this literature are as of Sep. 2022. Magnescale reserves the right to change product specifications without prior notice. This catalog is printed with soy ink. FB-EA03C C.2209.CB

### Feedback Scale General Catalog

Magnescale Co., Ltd.

## Blessing of the Earth



A compass using geomagnetism will guide you across the sea even during conditions of zero visibility in dense fog or in a storm with giant waves. Similarly, Magnescale uses magnetic technology to provide precise positioning even in severely harsh environments such as oil, coolant, and condensation in machine tools. Magnescale is jam-packed with state-of-the-art technologies, from precise magnetic recording and detection technology to advanced arithmetic process-ing technology and beyond. And, it's these cutting-edge technologies that are supporting the next generation of global m a n u f a c t u r i n g

Beyond to Next Stage

Advanced technology supports the evolution of high precision and resistance to harsh environments. Magnescale continues its endless evolution to develop scales with the high precision and durability demanded by machine tool applications.

Born from advanced magnetic technology, Magnescale scales utilize a magnetic based operating principle which makes them resistant to oil and condensation inherent to machine tools. thus enabling consistently stable and precise position detection.

# 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 positions between the element and the magnetic media. This change in resistance value is read electronically to detect the amount of positional change.



Adopts the 2-track M-code system. Number of M-code bits: Up to 18 bits (Left figure: Example of 4-bit codes)

### **MR** element

The MR element uses a special pattern to enable stable signal detection with high precision.

The patented detecting head pattern incorporates various technologies that help to achieve a high-precision signal, such as the following:

1) Harmonic distortion components are removed from the detected signal.

- 2) Stable signal output can be obtained over the entire effective length.
- 3) Stable signal output can be obtained with respect to temperature variation.

Beyond to Next Stage

# Stability





# **Resistance to Harsh Environments**



### Protective structure

A diamond-like carbon (DLC) film is formed on the surface of the detecting head (the surface facing the magnetic scale) as a protective film. The detecting head is securely protected against both mechanical and environmental factors by multiple layers of protective film, which includes the DLC film (the world's first patent pending protective DLC film to be used on a MR element surface).

# Impact resistance of 450 m/s<sup>2</sup>, vibration resistance of 250 m/s<sup>2</sup>

Magnescale primarily uses ferrous materials to protect the detector, thereby realizing high vibration and impact resistance characteristics. Furthermore, the SR67A series employs multi-point connection construction and a highly rigid case to achieve top class vibration and impact resistance.



### Thermal expansion

Magnescales' have the same linear expansion coefficient as that of cast iron used for the structure of general machine tools. Therefore, the scales exhibit the same thermal behavior as the equipment in which they are installed. This is evident in maintaining extremely stable positioning even in environments where the temperature is constantly changing. Due to the design structure of the SR series scales, they can be installed in close contact with the equipment while still achieving high positioning accuracy despite large temperature fluctuations.



### Resistance to condensation and oil

Magnescale employs a magnetic detection principle that is resistant to the effects of condensation and oil inherent to machine tools. This principle allows for the achievement of high positioning accuracy even in severe environments.



# High resolution

### Scale recording method

00



\*For resolution of 1nm(0.001µm), please contact our sales department

Beyond to Next Stage

# **High Precision**

### Advanced arithmetic processing technology

Use of an arithmetic processing circuit, based on original technology, achieves a higher interpolation accuracy.

Example of multi-arithmetic processing circuit.



High performance processing allows for resolutions down to 5nm and 1nm.\*

# Lineup

	Communication system	Type/model name		Output signal	Compatible controllers	Effective length	Maximum resolution	Accuracy	Maximum response speed	Protective design grade	Page
	ABS	Slim type SR27A	•	Absolute serial bidirectional signal Compliant with EIA-485 / DRIVE-CLiQ	FANUC Mitsubishi Electric SIEMENS	70 to 2,040 mm	0.01µm	(3+3L/1,000) μmp-p or (5+5L/1,000) μmp-p L:Effective length(mm)	200m/min	IP54 (Air purge not included) IP65 (Air purge included)	P10·11
Linear encoder	(Absolute)	Robust type SR67A		Absolute serial bidirectional signal Compliant with EIA-485 / DRIVE-CLiQ	FANUC Mitsubishi Electric SIEMENS	140 to 3,640 mm	0.01µm	(3+3L/1,000) μmp-p or (5+5L/1,000) μmp-p L:Effective length(mm)	200m/min	IP54 (Air purge not included) IP65 (Air purge included)	P12·13
	INC	Slim type SR74	e d'est	A/B/Reference point Line driver signal Compliant with EIA-422	-	70 to 2,040 mm	0.05µm	(3+3L/1,000) μmp-p or (5+5L/1,000) μmp-p L:Effective length(mm)	50m/min (Resolution: 0.1 μm, Minimum phase difference: at 50 ns)	IP54 (Air purge not included) IP65 (Air purge included)	P14·15
	(Incremental)	Robust type SR84	1 · · · · · ·	A/B/Reference point Line driver signal Compliant with EIA-422	-	140 to 3,040 mm	0.05µm	(3+3L/1,000) μmp-p or (5+5L/1,000) μmp-p L:Effective length(mm)	50m/min (Resolution: 0.1 μm, Minimum phase difference: at 50 ns)	IP54 (Air purge not included) IP65 (Air purge included)	P16·17

		Communication system	Type/model name		Output signal	Compatible controllers	Through hole diameter	Maximum resolution	Accuracy	
	Angle encoder		Exposed type RS97-1024E	6	Absolute serial bidirectional signal Compliant with EIA-485 / DRIVE-CLiQ	FANUC Mitsubishi Electric SIEMENS	ф96mm	23 bit (8,388,608 pulse/ revolution)	±2.5"	
		ABS	ABS	Exposed type RS97-1024N		Absolute serial bidirectional signal Compliant with EIA-485 / DRIVE-CLiQ		φ180mm	23 bit (8,388,608 pulse/ revolution)	±2.5"
		(Absolute)	Enclosed type RU97-2048		Compliant with DRIVE-CLiQ		A∶φ20mm B∶φ22mm	25 bit (33,554,432 pulse/ revolution)	±2.5"	
			Enclosed type RU77-4096		Absolute serial bidirectional signal Compliant with EIA-485	FANUC Mitsubishi Electric Yaskawa Electric	φ20mm	25 bit (33,554,432 pulse/ revolution)	±2.5"	

\*Magnescale reserves the right to change product specifications without prior notice.

Maximum response speed	Protective design grade	Page
5,000min-1	IP65	P18•19
5,000min-1	IP65	P20•21
2,000min <sup>-1</sup> (Maximum mechanical revolutions: 3,000min <sup>-1</sup> )	IP65	P 22•23
2,000min-1 (Maximum mechanical revolutions: 3,000min-1)	IP65	P 24•25

# Absolute linear encoder Slim type SR27A

- · Slim type allows installation in narrow spaces
- Magnetic system enables use even in environments with condensation, oil, and other adverse coditions
- · Supports the communication protocol of each supporting manufacturer
- · Same thermal expansion as iron

H Porto

Mitsubishi Electric



FANUC Mitsubishi Electric R25 (without repeated with conduit) R20 (without repeated:without conduit) SIEMENS AG | R40 (without repeated bending) R35 (without repeated bending)

\*Cable leadout direction can be selected either right or left.

Effective length	Total length		Mountir	ng pitch		Number of intermediate foot plates	Effective length	Total length		Mountir	ng pitch		Number of intermediate foot plates
L	L1	L2	L3	L4	L5	n	L	L1	L2	L3	L4	L5	n
70	208	185	-	-	-	0	770	908	885	442.5	-	442.5	1
120	258	235	-	_	-	0	820	958	935	467.5	-	467.5	1
170	308	285	-	_	-	0	920	1,058	1,035	517.5	-	517.5	1
220	358	335	-	_	-	0	1,020	1,158	1,135	567.5	-	567.5	1
270	408	385	-	_	-	0	1,140	1,278	1,255	627.5	-	627.5	1
320	458	435	-	_	-	0	1,240	1,378	1,355	677.5	-	677.5	1
370	508	485	-	_	-	0	1,340	1,478	1,455	727.5	-	727.5	1
420	558	535	_	_	-	0	1,440	1,578	1,555	520	520	515	2
470	608	585	-	_	-	0	1,540	1,678	1,655	550	550	555	2
520	658	635	-	_	-	0	1,640	1,778	1,755	585	585	585	2
570	708	685	-	_	-	0	1,740	1,878	1,855	620	620	615	2
620	758	735	-	_	-	0	1,840	1,978	1,955	650	650	655	2
670	808	785	392.5	_	392.5	1	2,040	2,178	2,155	720	720	715	2
720	858	835	417.5	_	417.5	1							Unit: mm

MG: Machine guide \* Intermediate foot plate: One location when L ≥ 670 mm, two locations when L ≥ 1440 mm

Notes • The surface indicated by the **A** marks is the installation surface.

10

· Screws indicated in the diagram are supplied as standard accessories.

• Movement outside the effective length (L) will damage the scale head. It is recommended that the mechanical movable length (stroke) be set to 10 mm or more to the inside of both ends of the effective length (L).

#### Specifications

Specifications							
Model name	SR27A-xxx〇□AX	SR27A-×××○□BX SR27A-×××○□DX	SR27A-xxx〇AZY				
Effective length (L: mm)		70 - 2,040					
hermal expansion coefficient		12±1 × 10 <sup>-6</sup> /°C					
Accuracy(at 20°C)	(3+3L/1,000)	) μmp-p or (5+5L/1,000) μmp-p, L: Effective	length (mm)				
Reference point	Center, or user-selected position (Set at factory shipping)	Fixed to center	Fixed to 10 mm from left end of effective length				
Output signal	Absolute serial bidirectional s	ignal, compliant with EIA-485	Compliant with DRIVE-CLiQ				
compatible controllers	FANUC a/ai interface compatible	Mitsubishi Electric	SIEMENS AG				
Resolution	Selectable from 0.005*, 0.01, 0.05, 0.1, 0.5 and 1 µm (Factory set)	Selectable from 0.005*, 0.01, 0.05 and 0.1 µm (Factory set)	0.01μm (Factory set)				
laximum response speed		200 m/min					
unctional safety							
Product Safety	FCC Part15 Subpart B Class A ICE	S-003 Class A Digital Device EN/BS 6	1000-6-2, EN/BS 61000-6-4				
Product Environment		EN/BS 63000					
perating temperature range		0 to +50°C					
torage temperature range		-20 to +55°C					
ibration resistance		150 m/s <sup>2</sup> (50 Hz to 3,000 Hz)					
mpact resistance		350 m/s² (11 ms)					
Protective design grade	ID54 (/	Air purge not included), IP65 (Air purge inc	bludad				
00			•				
ower supply voltage range	DC+4.751	0 +5.25 V	DC+17 to +30.8 V				
Naximum power consumption	1.3W or less (4	1.75W or less (17V) 1.9W or less (30.8V)					
Consumption current	250mA (5V) (when the	75mA (24V) (when the controller is connected)					
lass		Approx. 0.39kg+ 1.53kg/m or less					
compatible cables types without relay connectors) flaximum cable length	CH23A-***NVF CH23-***NVM 13 m 13 m		CH22-***NSMY 30 m				
Compatible cables types with relay connectors)	CH23A-***NVK + CH23A-***NPFA 30 m						
Maximum cable length	tact our sales department. *Magnescale reserves the ri		30 m				
Details of model desig cale SR27A - <u>×××○□△</u> :	[×××]Effective length (cm) [□]Resolution	Direction         Resolution         Type         Direction         Resolution           0.005         T         0.005         0.005         A         FANL           0.01         F         0.01         B         Mitsul           0.05         G         -         0.05         D         Mitsul					
ables H 2 2 - Cable length itten by flush right, ication in "n" units, to 30 m, 0.5 m pitch cample) C]Conduit specification Type Conduit specification C With conduit (stand N Without conduit (stand	FANUC: S, A, I  Type Cable seath (covering)  Type Cable specification S PU (Polyurethane, Siemens Motion connect (*)Scale side connector  Type Specification M Scale head connector F M12 connector (Female) with panel mount E M12 connector (Female) with panel mount F M12 connector (*)Controller side connector  (*)Controller side connector Type Specification None Open-end Y R45 connector (water proof, made by Phoenix Cont Z R45 connector (Water proof, made by Phoenix Cont F M12 connector (Male) made by Phoenix Cont Context	tric: S, A, B, C 3, C, D, E, T, F, G, H, J, K t 800+) Remarks Standard act Relay/Waterproofing/ Attached connector Remarks	* Plesse consult our representat separately for arbitrary positio CH22 b a CH22-050NSFY b CH22 H22-100NSMY b 2-100NSMY CH22-050NSFY				
H 2 3 - H23 A- (CH23A: FANUC model o (CH23A: FANUC model o (CH	(*) Controller side connector     Type Specification Remarks     Without With Earth wire     Z - Open-end Aviation Electronics Industry or 2P made     None - Standard     M - 10P made by Sumitornon 3M Mitsubi	(Female) made by Japan         by TAIJME LECTRONCS         shi NC, J3 (ABS)         (ABS)         (ABS)         (ABS)         (CH23-050NVK         CH23-050NVK	CH23 CH23A b a CH23-050NPMA b CH23 CH23A-050NPFA CH23A-050				

Scale	[xxx]	]Eff	ective lengt	h (cm)	[[]Re	solution ar	nd direc
					Туре	Direction	Resolutior
SR27A- <u>×××○□△♯</u>	[O]A	ccu	racy grade		S		0.005
	Type	A	ccuracy gra	ide	A		0.01
	A		5+5L/1,000		В	+	0.05
	S		3+3L/1,000		С	1 1	0.1
					D		0.5
	L: Eff	ecti	ve length(m	m)	E		1
					Mitsub	NS AG: S, ishi Electri :: S, A, B, C	c: S, A,
Cables	[▽]Ca	able	seath (coveri	ng)			
	Тур	e	Cable specifi	cation			
CH22-□□□○▽※#	S		PU (Polyureth	nane, Siemen	s Motion	connect 80	)(+0
	[※]So	ale :	side connecto	or			
	Тур	e !	Specification				Remar
□□□]Cable length	M	4	Scale head co	nnector			Standa
/ritten by flush right,	F	1	M12 connector	r (Female) mad	e by Phoe	enix Contact	Relay/Wa
dication in "m" units,		- h	M12 connect	or (Female) w	ith pane	mount	Relay/
p to 30 m, 0.5 m pitch Example) [O]Conduit specification	E		relay made by			mount	Waterp Attatche
Type Cable length Type Conduit specification	[#]Co	ontro	oller side conr	nector			
015         1.5m         C         With conduit           070         7m         N         Without conduit (standard)	Тур	e (	Specification				Remar
260 26m	Non		Open-end				
200 2011	Y	F	RJ45 connector ma	ade by YAMAICHI E	ELECTRONIC	S	Adopts NO
	Z		RJ45 connector (w				
	F		M12 connecto	r (Male) made	by Phoe	nix Contact	Relay/W
$\begin{array}{c} CH23 - \square \square \square \square \bigcirc \bigtriangledown \overset{\times}{\times} \overset{\#}{=} \\ CH23A - \square \square \square \bigcirc \bigtriangledown \bigtriangledown \overset{\times}{\times} \overset{\#}{=} \end{array}$	[※]Co	ontro	oller side conr	nector			
(CH23A : FANUC model only)	Ty	ре	Specification		F	Remarks	
	Without	Wit	h Earth wire				
able length	z			Scale side connect	ctor should l	pe 10P JN2 (Fer	nale) made
Example) [O]Conduit specification			Open-end	Aviation Electroni	cs Industry	or 2P made by	rajimi elec
Type Cable length Type Conduit specification	None	-		Standard			
010 1m C With conduit (standard)	M	-		oy Sumitomo		Mitsubishi	
005 0.5m N Without conduit	F	-		e made by Honda Ts			
065 6.5m	J	-		ig case made by HIR			BS)
100 10m	K	-		e by Japan Aviation Elect			-0
	N	-	12P R04 (Male)	made by TAJIMI ELI	CIRONICS	Relay (fixe	d)
7]Cable sheath	_		side conne	ctor			
Type Cable specification	Тур		Specification				Remar

[#]Scal	e side connector	
Туре	Specification	Rema
None	Original of Magnescale	Stand
A	10P JN2 (Female) made by Japan Aviation Electronics Industry	Relay
C	12P P04-9125 JE8 5 made by TA JIMI ELECTRONICS	Rolay

# Absolute linear encoder Robust type **SR67A**

· High rigidity provides resistance to shock and vibration

 Magnetic system allows use even in environments with condensation, oil, and other adverse conditions · Enables direct communication using the protocol of each supporting manufacturer without the

requirement of an amplifier

Same thermal expansion as iron



Effective length	th Total length L2		<b>n</b>	
L	L1	LZ	n	
140	280	200	3	
240	380	300	4	
340	480	400	5	
440	580	500	6	
540	680	600	7	
640	780	700	8	
740	880	800	9	
840	980	900	10	
940	1,080	1,000	11	
1,040	1,180	1,100	12	
1,140	1,280	1,200	13	
1,240	1,380	1,300	14	
1,340	1,480	1,400	15	
1,440	1,580	1,500	16	

2	L2	Total length	Effective length
n	LZ	L1	L
17	1,600	1,680	1,540
18	1,700	1,780	1,640
19	1,800	1,880	1,740
20	1,900	1,980	1,840
22	2,100	2,180	2,040
24	2,300	2,380	2,240
26	2,500	2,580	2,440
28	2,700	2,780	2,640
30	2,900	2,980	2,840
32	3,100	3,180	3,040
34	3,300	3,380	3,240
36	3,500	3,580	3,440
38	3,700	3,780	3,640

#### MG: Machine guide

Notes • The surface indicated by the **A** marks is the installation surface.

• Movement outside the effective length (L) will damage the scale head. It is recommended that the mechanical movable length (stroke) be set to 10 mm or more to the inside of both ends of the effective length (L).

### Specifications

Specifications								
Model name	SR67A-×××〇□AX	SR67A-×××○□BX SR67A-×××○□DX	SR67A-×××○AZY					
Effective length (L: mm)		140 - 3,640						
Thermal expansion coefficient		12±1 × 10 <sup>-6</sup> /°C						
Accuracy(at 20°C)	(3+3L/1,000) µmp-p (effective length 140 to 3	,040 mm) or (5+5L/1,000) μmp-p (effective leng	gth 140 to 3,640 mm), L: Effective length (mm)					
Reference point	Center, or user-selected position (Set at factory shipping)	Fixed to center	Fixed to 10 mm from left end of effective length					
Output signal	Absolute serial bidirectional s	ignal, compliant with EIA-485	Compliant with DRIVE-CLiQ					
Compatible controllers	FANUC α/αi interface compatible	Mitsubishi Electric	SIEMENS AG					
Resolution	Selectable from 0.005*, 0.01, 0.05, 0.1, 0.5 and 1 $\mu\text{m}$ (Factory set)	Selectable from 0.005*, 0.01, 0.05 and 0.1 $\mu\text{m}$ (Factory set)	0.01µm (Factory set)					
Maximum response speed		200 m/min						
Functional safety	-	IEC 61508, EN/BS 62061 SIL 2 EN/BS/ISO 13849-1 Cat. 3 / PL d EN/BS 61800-5-2						
Product Safety	FCC Part15 Subpart B Class A	ICES-003 Class A Digital Device EN/	'BS 61000-6-2, EN/BS 61000-6-4					
Product Environment		EN/BS 63000						
Operating temperature range		0 to +50°C						
Storage temperature range		-20 to +55°C						
Vibration resistance		250 m/s <sup>2</sup> (50 Hz to 2,000 Hz)						
Impact resistance		450 m/s² (11 ms)						
Protective design grade	IP54 (A	Air purge not included), IP65 (Air purge in	cluded)					
Power supply voltage range	DC+4.75 t	to +5.25 V	DC+17 to +30.8 V					
Maximum consumption current	1.3W or less (4	1.75W or less (17V) 1.9W or less (30.8V)						
Consumption current	250mA (5V) (when the	75mA (24V) (when the controller is connected)						
Mass		Approx. 0.9kg+ 5.2kg/m or less						
Compatible cables	CH23A-***NVF							
(types without relay connectors) Maximum cable length Compatible cables	13 m	13 m	CH22-***NSMY 30 m					
(types with relay connectors) Maximum cable length	CH23A-***NVK + CH23A-***NPFA 30 m	CH23-***NVK + CH23-***NPMA 30 m	CH22-***NSMF + CH22-*** NSFY 30 m					
Details of model desig Scale SR67A - <u>×××○□△</u>	[×××]Effective length (cm) [□]Resolution Type Accuracy grade A (5+5L/1,000)µmp-p L: Effective length(mm) L: Effective length(mm)	Image: Constraint of the section of the sec	UC         α/αi interface           Jbishi Electric         2-wire           Jbishi Electric         4-wire           VENS AG         DRIVE-CLIQ           SI EMENS AG: Y only           Mitsubishi Electric: X only           *Please consult our representative					
Cables CH22 - □□□○▽※	FANUC: S, A, E	ctric: S, A, B, C B, C, D, E, T, F, G, H, J, K <u>t 800+)</u> a CH22-050NSMF	CH22 CH22 b a CH22-050NSFY b					
□□□]Cable length       Written by flush right,       ndication in 'm' units,       pto 30 m, 0.5 m pitch       Example)     [○]Conduit specification       Type     Cable length       015     1.5m       070     7m       260     26m	[#]Controller side connector	Networks       Standard         act       Relay/         Relay/       Materproofing/         Waterproofing/       CH22-050NSMF         CH22-050NSMF       CH2         Cable length 5m       Cable         Cable length 5m       Cable         Cable side connector       Scale side connector         Scale side connector       Scale side connector         ICS       Relay         ICS       Relay	b a CH22-050NSFY b CH22 CH22 CH22 CH22-050NSFY b CH22-050NSFY b CH22-050NSFY b CH22-050NSFY example) le length 10m Cable length 5m rout conduit Without conduit Without conduit Without conduit Sheath Toller side connector Smade by State Troller side connector RJ45 made by MICHIELECTRONICS					
CH23 - CH	[*]Controller side connector     Type Specification Remarks     Without With Earth wire     Z - Open-end Aviation Electronics Industry or 2P made     None - Standard     Mone - URP made by Sumitoron 3M Mitsubi	CH23A CH	CH23 CH23A					

cale	[×××]E	ffe	ctive lengt	h (cm)	[□]Re	solution a	nd dire
					Туре	Direction	Resolutio
$R67A - \times \times \times \bigcirc \Box \bigtriangleup \#$		cur	acy grade		S	Dirootion	0.00
			, ,	al a	A		0.00
			curacy gra		B	+	0.0
	A		+5L/1,000		C	'	
	S	(3-	+3L/1,000	)µmp-p			0.
	L: Effe	ctiv	e length(m	m)	D		0.
					E		
					SIEMEN	VS AG: S,	A
						ishi Electr	
					FANUC	: S, A, B, (	C, D, E,
ables	[▽]Cab	le s	eath (coveri	ng)			
	Туре	C	able specifi	cation			
H22-□□□○▽※#	S	P	U (Polyuret	nane, Siemen	s Motion	connect 8	00+)
	[%]Scal	le si	de connecto	or			
	Type	S	pecification				Rema
□□]Cable length	M		cale head co	nnector			Stand
itten by flush right,	F	M	12 connector	r (Female) mad	le by Phoe	enix Contact	Relay/ V
lication in "m" units,			112 connect	or (Female) v	with nane	mount	Relay
to 30 m, 0.5 m pitch	E			/ Phoenix Co		mount	Water
(ample) [O]Conduit specification		1	ady made by		inder		Attatch
ype Cable length Type Conduit specification	[#]Con	troll	er side conr	nector			
D15 1.5m C With conduit	Type	S	pecification				Rema
070 7m N Without conduit (standard)	None		pen-end				
260   26m	Y	RJ	, 45 connector ma	de by YAMAICHI E	LECTRONIC	S	Adopts I
	Z	RJ	45 connector (wa	ater proof) made b	y YAMAICHI	ELECTRONICS	Relay
	F	M	112 connecto	or (Male) made	e by Phoe	nix Contact	Relay/
H23-□□□○▽※#							
H23A-□□□○▽※#	[%]Con	troll	ler side conr	nector			
	Type	e	Specification		F	Remarks	
(CH23A : FANUC model only)	Without V	Vith	Earth wire				
	z			Scale side conne	ctor should l	pe 10P JN2 (Fe	male) mad
ble length (ample) [O]Conduit specification	<u> </u>	-	Open-end	Aviation Electron	ics Industry	or 2P made by	TAJIMI ELI
	None	-		Standard			
ype         Cable length         Type         Conduit specification           010         1 m         C         With conduit (standard)	M	-		oy Sumitomo		Mitsubishi	
D10         1 m         C         With conduit(standard)           D05         0.5m         N         Without conduit	F	-	20P straight case	e made by Honda Ts	ushin Kogyo	FANUC (A	ABS)
065 6.5m	J	-		ig case made by HIF			ABS)
100 10m	К	-		e by Japan Aviation Elec			
			120 D04 (Male)	made by TA IIM EI	ECTRONICS	Dolou (five	nd)

:	mm	

ole sheath					
	Cable specification				
	PVC(Φ6.8)[Scale side]				
	PU(Φ6.8)[Scale side]				
	PVC(Φ8)[Controller side]				
	PU(Φ8)[Controller side]				



### Incremental linear encoder Slim type

# **SR74**

- · Slim type allows installation in narrow spaces
- Magnetic system allows use even in environments with condensation, oil, and other adverse conditions
- · Same thermal expansion coefficient as iron

#### Dimensions (cable left-lead out direction)



Effective length	Total length		Mounting pitch					Effective length	Total length	
L	L1	L2	L3	L4	L5	n		L	L1	
70	208	185	-	-	-	0		770	908	
120	258	235	-	-	-	0		820	958	
170	308	285	-	-	-	0		920	1,058	
220	358	335	-	-	-	0		1,020	1,158	
270	408	385	-	-	-	0		1,140	1,278	
320	458	435	-	-	-	0		1,240	1,378	
370	508	485	-	-	-	0		1,340	1,478	
420	558	535	-	_	-	0		1,440	1,578	Γ
470	608	585	-	-	-	0		1,540	1,678	
520	658	635	-	-	-	0		1,640	1,778	
570	708	685	-	-	-	0		1,740	1,878	
620	758	735	_	_	_	0		1,840	1,978	
720	858	835	417.5	_	417.5	1		2,040	2,178	
	length L 70 120 220 270 320 320 320 320 320 320 320 32	length         length           L         L1           70         208           120         258           170         308           220         358           270         408           320         458           370         508           420         558           470         608           520         658           570         708           620         758	length         length           L         L1         L2           70         208         185           120         258         235           170         308         285           220         358         335           270         408         385           320         458         435           370         508         485           420         558         535           570         608         585           570         708         685           620         758         735	length         length         L         L2         L3           70         208         185         -           120         258         235         -           170         308         285         -           220         358         335         -           270         408         385         -           320         458         435         -           370         508         485         -           420         558         535         -           470         608         585         -           520         658         635         -           570         708         685         -           620         758         735         -	length         length         L2         L3         L4           70         208         185         -         -           120         258         235         -         -           170         308         285         -         -           220         358         335         -         -           270         408         385         -         -           370         508         485         -         -           370         508         485         -         -           420         558         535         -         -           520         658         635         -         -           570         708         685         -         -           620         758         735         -         -	length         Length         L2         L3         L4         L5           70         208         185         -         -         -           120         258         235         -         -         -           170         308         285         -         -         -           220         358         335         -         -         -           270         408         385         -         -         -           370         508         485         -         -         -           370         508         485         -         -         -           420         558         535         -         -         -           520         658         635         -         -         -           570         708         685         -         -         -           620         758         735         -         -         -	length         length         L2         L3         L4         L5         n           70         208         185         -         -         -         0           120         258         235         -         -         -         0           170         308         285         -         -         0           220         358         335         -         -         0           270         408         385         -         -         0           320         458         435         -         -         0           370         508         485         -         -         0           420         558         535         -         -         0           470         608         585         -         -         0           520         658         635         -         -         0           570         708         685         -         -         0           620         758         735         -         -         0	Intermediate lengthLL1L2L3L4L5n70208185012025823501703082850170308285022035833502704083850370508485037055853504205585350470608585057070868506207587350	Intermediate lengthMounting pitchintermediate foot platesIntermediate foot platesIntermediate foot platesIntermediate lengthLL1L2L3L4L5NL7020818507701202582350820170308285092022035833501,02027040838501,14032045843501,34042055853501,34042055853501,54052065863501,64057070868501,74062075873501,840	Interclive         Iolar         Mounting pitch         intermediate foot plates         Intermediate foot plates         Intermediate length         Interm

of ate es	Effective length	Total length		Mounting pitch					
	L	L1	L2	L3	L4	L5	n		
	770	908	885	442.5	_	442.5	1		
	820	958	935	467.5	-	467.5	1		
	920	1,058	1,035	517.5	-	517.5	1		
	1,020	1,158	1,135	567.5	-	567.5	1		
	1,140	1,278	1,255	627.5	-	627.5	1		
	1,240	1,378	1,355	677.5	-	677.5	1		
	1,340	1,478	1,455	727.5	-	727.5	1		
	1,440	1,578	1,555	520	520	515	2		
	1,540	1,678	1,655	550	550	555	2		
	1,640	1,778	1,755	585	585	585	2		
	1,740	1,878	1,855	620	620	615	2		
	1,840	1,978	1,955	650	650	655	2		
	2,040	2,178	2,155	720	720	715	2		

Number of

Unit: mm

- All - Contract - Con

MG: Machine guide \* Intermediate foot plate: One location when  $L \ge 720$  mm, two locations when  $L \ge 1440$  mm

Notes • The surface indicated by the **A** marks is the installation surface.

· Screws indicated in the diagram are supplied as standard accessories.

• Movement outside the effective length (L) will damage the scale head. It is recommended that the mechanical movable length (stroke) be set to 10 mm or more to the inside of both ends of the effective length (L).

Specifications	
Model name	
Effective length (L: mm)	
Thermal expansion coefficient	
Accuracy(at 20°C)	(3+3L/1,00 I
Reference point	Center point, Multi point (40 mm pitch), Sigr
Output signal	A/B/Reference poin
Resolution	Selectable from 0.05
Maximum response speed	50m/ min (Resolution:
Product Safety	FCC ICES EN/BS
Product Environment	
Operating temperature range	
Storage temperature range	
Vibration resistance	15
Impact resistance	
Protective design grade	IP54 (Air purge
Power supply voltage range	
Maximum consumption current	1.0
Consumption current	200mA (5V)
Mass	Appro
Standard compatible cable	
Maximum cable length	

\*Magnescale reserves the right to change product specifications without prior notice.

Scale	[xxx]Effective length (L): cm units	; [□]F	Resolution a	nd dire	эс
SR74-×××★○□♦###		Тур	e Direction	Resoluti	_
	[★]Cable lead-out direction	В		0.0	_
	Type Lead-out direction	С	+	0.	_
	R Right	D		0.	.5
	L Left	E		1.	.0
	[O]Accuracy grade	[♠]	vinimum ph	ase dif	fe
	Type Accuracy grade A (5+5L/1,000) µmp-p	Туре	Phase difference (ns)	Туре	P
	S (3+3L/1,000) µmp-p	A	50	F	Г
	L: Effective length(mm)	В	100	G	Γ
	2. Encouro longen(inn)	С	150	н	Γ
		D	200	J	Г
		E	250	K	Γ
Cable	[∇]Cable seath (covering)				
	Туре				
CH33-□□○▽※#	P PVC (Polyvinyl chloride	)			
	E PU (Polyurethane)				

•···•• — — • ····	Тур	e					
CH33-□□○▽※#		P	PVC (Polyvinyl chloride)				
	E	P	U (Polyurethane)				
[□□]Cable length Written by flush right, indication in "m" units, up to 30 m, 1 m pitch	Ty Without None	ontrollo pe With	er side connector Specification Earth wire Open-end	Remarks Standard			
(Example) [O]Conduit	A	-	D-sub 15P				
	D	-	D-sub 9P				
Type Cable length Type Conduit	L	-	10P made by Sumitomo 3M	Mitsubishi NC, J3 (A/			
07 7m C With conduit (standard)	E	Ρ	20P straight case made by Honda Tsushin Kogyo	FANUC (A/B Phase)			
26 26m N Without conduit	Н	R	Horizontal drawing case made by HIROSE Electric	FANUC (A/B Phase)			

I	[#]Scale	side connector
	Туре	Specification

None Original of Magnescale \*Relay type cannot be used for A/B Phase type of SR74 and SR84

14

SR74
------

70-2.040

12±1 × 10<sup>-6</sup> /°C

000) μmp-p or (5+5L/1,000) μmp-p

L: Effective length (mm)

ned-type (standard pitch 20 mm), User-selected point (1 mm pitch)

nt line driver signal, compliant with EIA-422

5, 0.1, 0.5, and 1 µm (Set at factory shipping)

: 0.1 µm, Minimum phase difference: at 50 ns)

C Part15 Subpart B Class A S-003 Class A Digital Device S 61000-6-2, EN/BS 61000-6-4

EN/BS 63000

0 to +50°C

-20 to +55°C

50 m/s<sup>2</sup> (50 Hz to 3,000Hz)

350 m/s<sup>2</sup> (11 ms)

not included), IP65 (Air purge included)

DC+4.75 to +5.25 V

W or less (4.75V or 5.25V)

) (when the controller is connected)

ox. 0.27kg+ 1.36kg/m or less

CH33-\*\*\*CP/CE

15 m

direction (µm)

4 <i>i</i>						
ion	Туре	Direction	Resolution			
)5	G		0.05			
.1	Н		0.1			
.5	J		0.5			
.0	K		1			

difference						
pe	Phase difference (ns)	Туре	Phase difference (ns)			
-	300	L	1,250			
3	400	Μ	2,500			
1	500	Ν	3,000			
J	650					
$\langle \rangle$	1,000					

[###]Reference point position (Distance from left end of effective length: Unit mm) Reference point position Indication method Less than 1,000Number (850 mm  $\rightarrow$  850)1,000-1,099 mmA + lower 2 digits (1,050 mm  $\rightarrow$  A50) 
 1,100-1,199 mm
 B + lower 2 digits

 1,200-1,299 mm
 C + lower 2 digits

 1,300-1,399 mm
 D + lower 2 digits
 1,400-1,499 mm E+ lower 2 digits 
 1,500-1,599 mm
 F + lower 2 digits

 1,600-1,699 mm
 G+ lower 2 digits
 1,700-1,799 mm H + lower 2 digits 1,800-1,899 mm | J + lower 2 digits 1,900—1,999 mm K + lower 2 digits 2,000-2,040 mm L+ lower 2 digits Center





CH33

Multi

Signed-type

### CH33-10NEA

example) Cable length 10m Without conduit PU sheath Scale side connector Original of Magnescale

Remarks Standard

SR74

# Incremental linear encoder Robust type

· High rigidity provides resistance to shock and vibration · Magnetic system allows use even in environments with condensation, oil, and other adverse conditions Same thermal expansion as iron

# -

#### Dimensions (cable left-lead out direction)



\*Cable leadout direction can be selected either right or left.

Effective length	Total length	L2	n
L	L1		
140	278	200	3
240	378	300	4
340	478	400	5
440	578	500	6
540	678	600	7
640	778	700	8
740	878	800	9
840	978	900	10
940	1,078	1,000	11
1,040	1,178	1,100	12
1,140	1,278	1,200	13
1,240	1,378	1,300	14

Effective length	Total length	L2	n
L	L1		
1,340	1,478	1,400	15
1,440	1,578	1,500	16
1,540	1,678	1,600	17
1,640	1,778	1,700	18
1,740	1,878	1,800	19
1,840	1,978	1,900	20
2,040	2,178	2,100	22
2,240	2,378	2,300	24
2,440	2,578	2,500	26
2,640	2,778	2,700	28
2,840	2,978	2,900	30
3,040	3,178	3,100	32

#### Unit: mm

Cable	
СНЗЗ-Ц	<u> </u>

	[LL]Cable length					
Written	Written by flush right,					
indicati	indication in "m" units,					
up to 3	0 m, 1 m pi	tc	:h			
(Examp	(Example) [O]Conduit					
Туре	Cable length		Туре	Conduit		
07	7m		C	With conduit (standard)		
26	26m		N	Without conduit		

Type	
P	PVC (Polyvinyl chloride)
E	PU (Polyurethane)

Туре		Specification	Remarks	
Without	With	Earth wire		
None	-	Open-end	Standard	
Α	-	D-sub 15P		
D	-	D-sub 9P		
L	-	10P made by Sumitomo 3M	Mitsubishi NC, J3 (	
E	Ρ	20P straight case made by Honda Tsushin Kogyo	FANUC (A/B Phas	
Н	R	Horizontal drawing case made by HIROSE Electric	FANUC (A/B Phas	

[#]Scale	side connector	
Туре	Specification	Rema
None	Original of Magnescale	Stand
*Relay ty	pe cannot be used for A/B Phase type of SR74	and Si

#### MG: Machine guide

Notes  $\bullet$  The surface indicated by the  $\blacktriangle$  marks is the installation surface. · Screws indicated in the diagram are supplied as standard accessories.

• Movement outside the effective length (L) will damage the scale head. It is recommended that the mechanical movable length (stroke) be set to 10 mm or more to the inside of both ends of the effective length (L).

Model name	
Effective length (L: mm)	
Thermal expansion coefficient	
Accuracy(at 20°C)	(3+3L/1,000) μ L: Et
Reference point	None, Center point, Multi po
Output signal	A/B/Reference poir
Resolution	Selectable from 0.05
Maximum response speed	50m/ min (Resolution:
Product Safety	FCC ICES EN/BS
Product Environment	
Operating temperature range	
Storage temperature range	
Vibration resistance	25
Impact resistance	
Protective design grade	IP54 (Air purge
Power supply voltage range	
Maximum consumption current	1.0
Consumption current	200mA (5V)
Mass	Арр
Standard compatible cable	
Maximum cable length	

#### Details of model designation

Scale	[×××]Effective length (L): cm units	[□]R	esolution ar	nd d
		Туре	e Direction	Resol
SR84- <u>×××</u> ★○□◆###	[★]Cable lead-out direction	В		0
	Type Lead-out direction	С	]+	
	R Right	D	_ · _ [	
	L Left	E		
	[O]Accuracy grade	[ <b>♦</b> ]N	1inimum pha	ase (
	Type Accuracy grade		-	1
	A (5+5L/1,000) µmp-p	Туре	Phase difference (ns)	Тур
		Type A		Typ F
	A (5+5L/1,000) μmp-p S (3+3L/1,000) μmp-p		difference (ns)	
	A (5+5L/1,000) μmp-p	A	difference (ns) 50	F
	A (5+5L/1,000) μmp-p S (3+3L/1,000) μmp-p	AB	difference (ns) 50 100 150 200	F
	A (5+5L/1,000) μmp-p S (3+3L/1,000) μmp-p	A B C	difference (ns) 50 100 150	F G H
	A (5+5L/1,000) μmp-p S (3+3L/1,000) μmp-p	A B C D	difference (ns) 50 100 150 200	F G H J

[□]Resolution and direction (µm)							[###]Reference point position		
Туре	Direction	Resoluti	on Type	Directio	n Resolution	(Distance from left end of effective length:Unit mm)			
В		0.0	5 G		0.05	1	Reference point position	Indication method	
С	]+	0.	1 H	_	0.1		Less than 1,000	Number (850 mm $\rightarrow$ 850)	
D	ו יך	0.	5 J		0.5		1,000-1,099 mm	A + lower 2 digits(1,050 mm→A50)	
E		1.	0 K		1	]	1,100-1,199 mm	B + lower 2 digits	
							1,200-1,299 mm	C + lower 2 digits	
[♠]M	inimum pha	ase dif	ference				1,300-1,399 mm	D + lower 2 digits	
Туре	Phase	Туре	Phase	Туре	Phase	]	1,400-1,499 mm	E + lower 2 digits	
	difference (ns)		difference (ns	/	difference (ris)		1,500-1,599 mm	F + lower 2 digits	
Α	50	F	300		1,250		1,600-1,699 mm	G + lower 2 digits	
В	100	G	400		2,500		1,700-1,799 mm	H + lower 2 digits	
С	150	Н	500	N	3,000		1,800-1,899 mm	J + lower 2 digits	
D	200	J	650				1,900-1,999 mm	K + lower 2 digits	
E	250	K	1,000	1			2,000-2,099 mm	L + lower 2 digits	
							2,100-2,199 mm	M + lower 2 digits	
							2,200-2,299 mm	N + lower 2 digits	
							2,300-2,399 mm	P + lower 2 digits	
							2,400-2,499 mm	Q + lower 2 digits	
							2,500-2,599 mm	R + lower 2 digits	
							2,600-2,699 mm	S + lower 2 digits	
							2,700-2,799 mm	T + lower 2 digits	
							2,800-2,899 mm	U + lower 2 digits	
							2,900-2,999 mm	V + lower 2 digits	
							3,000-3,040 mm	W + lower 2 digits	
							Center	Х	
							Multi	Y	
							Signed-type	Z	

CH33

CH33-10NEA

example) Cable length 10m Without conduit PU sheath Scale side connector Original of Magnescale

140-3,040

12±1 × 10<sup>-6</sup> /°C

μmp-p or (5+5L/1,000) μmp-p

Effective length (mm)

point, Signed-type, User-selected point (1 mm pitch)

int line driver signal, compliant with EIA-422

5, 0.1, 0.5, and 1 µm (Set at factory shipping)

: 0.1 μm, Minimum phase difference: at 50 ns)

C Part15 Subpart B Class A S-003 Class A Digital Device 3S 61000-6-2, EN/BS 61000-6-4

EN/BS 63000

0 to +50°C

-20 to +55°C

50 m/s<sup>2</sup> (50 Hz to 2,000Hz)

450 m/s<sup>2</sup> (11 ms)

e not included), IP65 (Air purge included)

DC+4.75 to +5.25 V

0W or less (4.75V or 5.25V)

/) (when the controller is connected)

prox. 1.24kg+ 4kg/m or less

CH33-\*\*\*CP/CE

15 m

	ocion (pin)							
on	Туре	Direction	Resolution					
)5	G		0.05					
.1	Н	_	0.1					
.5	J		0.5					
$\cap$	K		1					



side

а

marks indard





### Absolute angle encoder Exposed type RS97-1024 Enables direct communication using the protocol of each supporting manufacturer without the requirement of an amplifier · Magnetic system allows use even in environments with condensation, oil, and

- other adverse conditions
- 96mm diameter through-hole allows for design and mounting flexibility
- · Dual head configuration reduces the effect of axial runout



Specifications		
Model name	RS97-1024EGA	
Output wave number		
Through hole diameter		
Accuracy(at 20°C)		
Output signal	Absolute serial bidirectional s	ignal, com
Compatible controllers	FANUC	
Resolution		23 bits
Maximum response revolutions		
Functional safety	-	_
Product Safety	FCC Part15 Subpart B Class A	ICES-00
Product Environment		
Operating temperature range		
Storage temperature range		
Vibration resistance		150
Impact resistance		
Protective design grade		
Power supply voltage range	DC+4.75	to +5.25 V
Maximum consumption current	1.25W or le 1.2W or le	
Consumption current	330mA (5V) (when the	controller
Output connector	JN1HS10PL4S made by Japa	an Aviatior
Moment of inertia		
Mass	Ap	prox. 2kg
Compatible cables (types without relay connectors) Maximum cable length	CH23A-***NPFA 30 m	
Compatible cables (types with relay connectors) Maximum cable length	CH23A-***NPKA + CH23A-***NPFA 30 m	CH23

\*Magnescale reserves the right to change product specifications without prior notice.

L)otau		mod		001	anatu	<u>nn</u>
Detail	501	mou	EI U	631	ynaii	

065 6.5m 100 10m

[▽]Cable sheath

 Type
 Cable specification

 P
 PVC(Φ8) [Controller side]

 E
 PU(Φ8) [Controller side]

Scale	[E]Rotor inner diameter	[∆]Co	mmunication protoco	ol
RS97-1024 <u>EG</u> △ <b>■</b> ■	96 mm [G]Resolution	Type A	NC manufacturer FANUC	R a
	23 bit	D	Mitsubishi Electric	4
		L	SIEMENS AG	ΙD

Cables	[▽]Ca	able s	eath (coveri	ng)		
	Typ	e C	able specifi	cation		
CH22-□□□○▽※#	S		U (Polyuret	hane, Siemens Motion	connect 80	)0+)
	[※]Sc	ale si	de connecto	or		
	Туре	e Si	pecification			Re
[□□□]Cable length	M	S	cale head co	onnector		St
Written by flush right,	F	M	12 connector	r (Female) made by Phoe	nix Contact	Reli
indication in "m" units, up to 30 m, 0.5 m pitch (Example) [O]Conduit specification	E		M12 connector (Female) made			Re Wa Att
Type Cable length Type Conduit specification	[#]Co	ntroll	er side conr	nector		
070 7m N Without conduit (standard)	Туре	e S	pecification			Re
260 26m	Non	e O	Open-end			
200 2011	Y			nade by YAMAICHI ELECTRON		Add
	Z	RJ	46 connector (w	ater proof) made by YAMAICHI	ELECTRONICS	
	F	M	12 connecto	or (Male) made by Phoer	nix Contact	Rel
CH23- <u>□□□</u> ○▽ <u>※</u> #						
CH23A-□□□○▽※#	[※]Co	ontroll	er side con	nector		
(CH23A : FANUC model only)	Typ	ре	Specification	R	emarks	
	Without	With	Earth wire			
Cable length	Z	-	Open-end	Scale side connector should b Aviation Electronics Industry of		
(Example) [O]Conduit specification	None	-		Standard		
Type Cable length Type Conduit specification	M	-	10P made	by Sumitomo 3M	Mitsubishi N	NC.
010 1m C With conduit (standard)	F	-		e made by Honda Tsushin Koqyo	FANUC (AE	
005 0.5m N Without conduit	J	-	Horizontal drawir	ng case made by HIROSE Electric	FANUC (AF	BS)
065 6.5m			200 BIT BLUE	hand the second state of t	Deles	

K	-	10P JN1 (Male) made by Japan Aviation Electronics Industry	Relay			
N	-	12P R04 (Male) made by TAJIMI ELECTRONICS	Relay (fixe	d)		
[#]S	[#]Scale side connector					
Type Specification				Remark		
A 10P JN2 (Female) made by Japan Aviation Electronics Industry				Relay		



### Absolute angle encoder Exposed type RS97-1024 · Enables direct communication using the protocol of each supporting manufacturer without the requirement of an amplifier Magnetic system enables use even in environments with condensation, oil, and other adverse conditions

• 180mm diameter through-hole allows for design and mounting flexibility • Dual head configuration reduces the effect of axial runout



Functional Safety	_				
Product Safety	FCC Part15 Subpart B Class A ICES-00				
Product Environment					
Operating temperature range					
Storage temperature range					
Vibration resistance	15				
Impact resistance					
Protective design grade					
Power supply voltage range	DC+4.75 to +5.25 V				
Maximum consumption current	1.35W or less (4.75V) 1.3W or less (5.25V)				
Consumption current	300mA (5V) (when the controller is connect				
Output connector	JN1HS10PL2 made by Japan Aviation Elecronic				
Moment of inertia					
Mass	Approx. 3.4k				
Compatible cables (types without relay connectors) Maximum cable length	CH23A-***NPFA 30 m				
Compatible cables (types with relay connectors)	CH23A-***NPKA + CH23A-***NPFA 30 m				

Maximum cable length \*Magnescale reserves the right to change product specifications without prior notice.

0		<b>-</b> f	mo	- d		do		- ti	0.0	
(a)	еп	OT		то	ρı.		ાશા	аш	ON	

Specifications

Output wave number

Through hole diameter Accuracy(at 20°C)

Compatible controllers

Maximum response revolutions

Model name

Output signal

Resolution

Scale	[N]Rotor inner diameter	[∆]Co	mmunication protocol	1
RS97-1024 <u>NG</u> △	180 mm	Туре	NC manufacturer	R
	5010 · · ·	A	FANUC	0
	[G]Resolution	Z	SIEMENS AG	E
	23 bit			

Cables CH22 - □	□□□○▽※#	[▽]Cable Type S					
		[%]Scale	[%] Scale side connector				
		Туре	Specification	Remarks			
[□□□]Cable length		M	Scale head connector	Standard			
Written by flush right		F	M12 connector (Female) made by Phoenix Contact	Relay/Waterproofing			
indication in "m" units, up to 30 m, 0.5 m pitch (Example) [O]Conduit specification		E	M12 connector (Female) made by Phoenix Contact	Relay/ Waterproofing/ Attatched connector			
Type Cable length 015 1.5m	Type Conduit specification C With conduit	[#]Conti	roller side connector				
070 7m	N Without conduit (standard)	Туре	Specification	Remarks			
260 26m	IN WEIGHT CONDUCTION	None	Open-end				
200 2011		Y	RJ45 connector made by YAMAICHI ELECTRONICS	Adopts NC machine tool			
		Z	RJ45 connector (water proof) made by YAMAICHI ELECTRONICS	Relay			
		F	M12 connector (Male) made by Phoenix Contact	Relay/Waterproofing			

**30** m

CH23	3 A- 🗆		]○▽※#			ler side con		Remarks	
				Without	pe		r	ternarks	
				Without	vvitn	Eartri wire		100 000 /5	
Cable ler	ngth			Z	-		Scale side connector should		
(Example	2)	[O]Cor	nduit specification			Open-end	Aviation Electronics Industry	or 2P made by	IAJIN
<u> </u>	Cable length	Type	Conduit specification	None	-		Standard		
	×	Type		F	-	20P straight cas	e made by Honda Tsushin Kogyo	FANUC (AE	BS)
010	1m	C	With conduit (standard)	J	-	Horizontal drawir	ng case made by HIROSE Electric	FANUC (AE	BS)
	0.5m	N	Without conduit	К	-	10P JN1 (Male) mad	le by Japan Aviation Electronics Industry	Relav	-
	6.5m			N	-	12P R04 (Male)	made by TAJIMI ELECTRONICS	Relay (fixe	d)
100	10m								,
				[#]S	cale :	side conne	ctor		
[▽]Cable	e sheath			Тур	e S	pecification			Re
Туре	Cable sp	pecificatio	n	A	10	DP JN2 (Female)	made by Japan Aviation Elect	ronics Industry	Re
P	PVC(Φ8	3) [Control	ler sidel						
E	PU(Φ8)	[Controlle	er sidel						

Outer diameter Φ5.6mm

RS97-1024NGA	RS97-1024NGZ				
1,024 waves	s/revolution				
φ180	mm				
±2.	5"				
Absolute serial bidirectional signal, compliant with EIA-485	Compliant with DRIVE-CLiQ				
FANUC	SIEMENS AG				
23 bits (8,388,608	pulses/revolution)				
5,000 min <sup>-1</sup>					
_	IEC 61508, EN/BS 62061 SIL 2 EN/BS/ISO 13849-1 Cat. 3 / PL d EN/BS 61800-5-2				
FCC Part15 Subpart B Class A ICES-003 Class A Digital Device EN/BS 61000-6-2, EN/BS 61000-6-4					
EN/BS	63000				
0 to +	60°C				
-10 to -	+60°C				
150 m/s² (50 H	z to 2,000 Hz)				
1,000 m/s	² (11 ms)				
IPe	·•				
DC+4.75 to +5.25 V	DC+17 to +30.8 V				
1.35W or less (4.75V) 1.3W or less (5.25V)	2.5W or less (17V) 3.2W or less (30.8V)				
300mA (5V) (when the controller is connected)	150mA (24V) (when the controller is connected)				
JN1HS10PL2 made by Japan Aviation Elecronics Industry	SACC-M12MS-8Q H made by Phoenix Contact				
8.8× 10 <sup>-3</sup> kg	jm² or less				
Approx. 3.4kg (rotor: 0.6l	kg/ stator: 2.8kg) or less				
CH23A-***NPFA	CH22-***NSFY				

CH22-***NSFF + CH22-***NSFY
30 m



RS97-102

# Absolute angle encoder Enclosed type RU97-2048

- Enables direct communication using the SIEMENS DRIVE-CLiQ protocol without the requirement of an amplifier
- Magnetic system enables use even in environments with condensation, oil, and other adverse conditions
- · Internal coupling allows for design and mounting flexibility



A Bearing rotation center





Model name	RU97-2048AJZ RU97-2048BJZ					
Output wave number	2,048 waves/revolution					
Through hole diameter	A:φ20 mm、B:φ22 mm					
Accuracy(at 20°C)	±2.5"					
Output signal	Compliant with DRIVE-CLiQ, single turn absolute type					
Compatible controllers SIEMENS AG						
Resolution 25 bit (33,554,432 pulses/revolution)						
Maximum response revolutions	2,000 min <sup>-1</sup>					
Maximum mechanical revolutions	3,000 min <sup>-1</sup>					
Functional safety	IEC 61508, EN/BS 62061 SIL 2 EN/BS/ISO 13849-1 Cat. 3 / PL d EN/BS 61800-5-2					
Product Safety FCC Part15 Subpart B Class A ICES-003 Class A Digital Device EN/BS 61000-6-2, EN/BS 61000-6-4						
Product Environment	EN/BS 63000					
Operating temperature range	0 to +60°C					
Storage temperature range	-10 to +60°C					
Vibration resistance	150 m/s² (50 Hz to 2,000 Hz)					
Impact resistance	1,000 m/s² (11 ms)					
Protective design grade	IP65					
Power supply voltage range	DC+17 to +30.8 V					
Maximum consumption current	1.6 W or less (17 V or 30.8 V)					
Consumption current	65 mA (24 V) (when the controller is connected)					
Moment of inertia	9.4×10 <sup>-5</sup> kgm <sup>2</sup> or less					
Starting torque (at 20°C)	0.08 Nm or less					
Mass	Approx. 1.2kg or less					
Compatible cables (types without relay connectors) Maximum cable length	CH22-***NSFY 30 m					
Compatible cables (types with relay connectors) Maximum cable length	CH22-***NSFF + CH22-***NSFY 30 m					

\*Magnescale reserves the right to change product specifications without prior notice.

#### Details of model designation

Scale	[☆]Dru	um inner diameter	[J]Resolution 25 bit
RU97-2048☆JZ∎∎	Туре	Drum inner diameter	
RU97-2048 <u>¥JZ</u>	A	Ф20 mm	[Z]SIEMENS AG DRIVE
	В	Φ22 mm	

Cables CH22 - □□□○▽※#	Type S	e seath (covering) Cable specification PU (Polyurethane, Siemens Motion connect 80 side connector	)0+)
[ C C C C C C C C C C C C C C C C C C C	Type M F E	Specification Scale head connector M12 connector (Female) made by Phoenix Contact M12 connector (Female) made by Phoenix Contact	Remarks Standard Relay/Wate Relay/ Waterpro Attatched of
Type         Cable length           015         1.5m           070         7m           260         26m	[#]Contr Type None Y Z F	oller side connector Specification Open-end R45 connector made by YAMAICH ELECTRONCS R45 connector (Water prof) made by YAMAICH ELECTRONCS M12 connector (Water made by Phoenix Contact	Remarks Adopts NC n Relay Relay/Wate

22





RU97-2048

# Absolute angle encoder Enclosed type RU77-4096

· Magnetic system enables use even in environments with condensation, oil, and other adverse conditions

· Enables direct communication using the protocol of each supporting manufacturer without the requirement of an amplifier

· Internal coupling allows for design and mounting flexibility

Yaskawa Electric







Model name	RU77-4096A A	RU77 - 4096A□B RU77 - 4096A□D	RU77-4096A□F			
Output wave number	4,096 waves/revolution					
Through hole diameter		φ20 mm				
Accuracy(at 20°C)		±2.5"				
Output signal	Absolute	Absolute serial bidirectional signal, compliant with EIA-485				
Compatible controllers	FANUC	Mitsubishi Electric	Yaskawa Electric			
Maximum resolution	25bit (33,554,432	2 pulse/revolution)	21bit (2,097,152 pulse/revolution)			
Maximum response revolutions		2,000 min <sup>-1</sup>				
Maximum mechanical revolutions		3,000 min <sup>-1</sup>				
Product Safety	FCC Part15 Subpart B Class A ICES-003 Class A Digital Device EN/BS 61000-6-2, EN/BS 61000-6-4					
Product Environment	EN/BS 63000					
Operating temperature range	0 to +60°C					
Storage temperature range		-10 to +60°C				
Vibration resistance		150 m/s <sup>2</sup> (50 Hz to 2000 Hz)				
Impact resistance		1,000 m/s² (11 ms)				
Protective design grade		IP65				
Power supply voltage range		DC4.75-5.25 V (with connecting terminal)				
Consumption current		200mA (at 120Ω termination)				
Moment of inertia	9.4×10 <sup>-5</sup> kgm <sup>2</sup> or less					
Starting torque (at 20°C)		0.1 Nm or less				
Mass		Approx. 1.2kg or less				
Standard compatible cable	CH33A-***,CE28A-***	CH33-***,	CE28-***			
Maximum cable length	CH33A-*** : 30 m, CE28A-*** : 15 m CH33-*** : 30 m, CE28A-*** : 15 m					

Details of model designation

Scale RU77-4096A□△★○○

□]Res	solution			[	[∆]Cor	mmunication protoc	ol
Туре	Resolution	Number of pulses/revolution	Number of partitions	ſ	Туре	Number of wires	NC manufacturer
А	Approx. 2.5°/1,000	131,072	1/32		А	4-wire	FANUC $\alpha$ interface
В	Approx. 1°/1,000	262,144	1/64	Γ	В	2-wire	Mitsubishi Electric
С	Approx. 7°/10,000	524,288	1/128	Γ	D	4-wire	Mitsubishi Electric
D	Approx. 3.5°/10,000	1,048,576	1/256		F	2-wire	Yaskawa Electric
E	Approx. 2°/10,000	2,097,152	1/512				
F	Approx. 1°/10,000	4,194,304	1/1,024	[	[00]C	able length	
G	Approx. 4.5°/100,000	8,388,608	1/2,048		Туре	Cable length	
Н	Approx. 2°/100,000	16,777,216	1/4,096		10	lm	
J	Approx. 1°/100,000	33,554,432	1/8,192				

#### [+10

[▽]Cable seath (covering)

E PU (Polyuret

Type P PVC (Polyvinyl chloride)

Connector	Description	Remarks
Metal water proofing	G	main cable leng
Plastic water proofing	J	main cable leng

### Cable

CH33- $\Box$  $\Box$  $\bigcirc$  $\heartsuit$ \*# CH33 A-  $\Box \Box \bigcirc \bigtriangledown$  # (CH33A : FANUC model only)

[DD]Cable length Written by flush right, indication in "m" units, up to 30 m, 1 m pitch

CE28-000%

CE28A- 
CE28A-

[DDD]Cable length Written by flush right,

up to 14m,1m pitch

090 9m 130 13m

indication in "10cm" units.

(CE28A : FANUC m

[O] Conduit Type Cable length 070 7m 090 9m 10 0 12m N Without conduit

nduit

(Example)			[O]Co	nduit
Туре	Cable length		Туре	Conduit
07	7m		С	With conduit
26	26m		N	Without conduit

[※]C	ontro	ller side connector	
Туре		Specification	Remarks
Without With Earth wire		Earth wire	
None	-	Open-end	Standard
Μ	M - 10P made by Sumitomo 3M		Mitsubishi NC, J3, J
F	F - 20P straight case made by Honda Tsushin Kogyo		FANUC (ABS)
G - 6P made by molex <sup>®</sup>		6P made by molex <sup>®</sup>	YASKAWA Electric
J	-	Horizontal drawing case made by HIROSE Electric	FANUC (ABS)
Κ	-	10P JN1 (Male) made by Japan Aviation Electronics Industry	Relay

Ty	pe	Specification	Remarks
Without	With	Earth wire	
Without	-	Open-end	Standard
Μ	-	10P made by Sumitomo 3M	Mitsubishi NC, J3, J4 (AB
F	-	20P made by Honda Tsushin Kogyo	FANUC (ABS)
G	-	6P made by molex®	YASKAWA Electric (ABS)
J	-	10P (JB1) made by Japan Aviation Electronics Industry	RU77 cable extention (s
Κ	-	10P (JN1) made by Japan Aviation Electronics Industry	RU77 cable extention (s

Unit: mm

RU77-4096A B	

gth Max.9m, extension cable : CE28/CE28A Max cable length(main+extension) : 15m gth Max.1m, extension cable : CH33/CH33A Max cable length(main+extension) : 30m



5) (standard) (standard)

# Other Models



### Absolute linear encoder robust type



### Incremental linear encoder slim type

**SR75** 

#### · Effective length: 70,120,170,220,270,320,370,420,470,520, 570,620,720,770,820,920,1020,1140,1240, 1340,1440,1540,1640,1740,1840,2040 mm Maximum resolution: 0.01 um

• Accuracy: (3+3L/1,000) μmp-p L:mm

(5+5L/1,000) µmp-p L:mm

 Maximum response speed: 200m/min • Protective design grade: IP65

Cable: CH33

% Please refer to page 29 for cable specifications.

# Effective length (L): cm units

RU74-4096A 🗆 🔳

SR75-×××★○△♦

### Incremental angle encoder enclosed type

**RU74** 

### A/B/Reference point

- Hollow diameter: φ20
- Resolution: Approx.1/1,000°, Approx.1/10,000°
- · Accuracy: ±2.5"
- Maximum response revolution: As the table on the right
- Protective design grade: IP65

#### Cable CE28-\*\*\*()# Controller side connector Conduit Type Conduit C With conduit N Without conduit - Cable length Written by flush right, indication in "10 cm" units, up to 14 m, 1 m pitch Note: 15 m or less including RU74 main unit head cable lengt

-	and how many second	

	Refer	ence point p	osition (	Distance from	left e	end	of effe	ctive	length	)	
	Refe posit	rence point ion	Indicati method		Ret	ferer	nce poir I	nt	Indicati method		
	Less t	han 1,000	Number	(850 mm→850)	1,70	0-1	,799 mr	n H	+ lowe	ər 2 digits	1
	1,000	-1,099 mm	A + lower 2 c	digits(1,050 mm→A50)	1,80	0-1	,899 mr	n J	+ lowe	er 2 digits	1
	1,100	-1,199 mm	B + lowe	er 2 digits	1,90	0-1	,999 mr	n k	( + lowe	er 2 digits	1
	1,200	-1,299 mm	C + lowe	er 2 digits	2,00	0-2	,040 mr	n L	+ lowe	er 2 digits	1
	1,300	-1,399 mm	D + lowe	er 2 digits	Cer	nter			<		1
	1,400	-1,499 mm	E + lowe	er 2 digits							-
	1,500	-1,599 mm	F + lowe	er 2 digits	1						
	1,600	-1,699 mm	G + lowe	er 2 digits	1						
	Comr	nunication p	rotocol		-						
	Type	NC manufa	cturer	Number of wire	s						
	B	Mitsubishi I	Electric	2-wire							
	D	Mitsubishi I	Electric	4-wire							
	Н	Panasonic		2-wire							
	F	Yaskawa E	lectric	2-wire							
	Reso	ution and di	rection								
	Mitsul	bishi Electric	Panaso	nic			Yaskav	wa El	ectric		
	Type	Direction		Resolutio	n	- 1	Type	Dire	ection	Number of	of partitions
	Α			0.0	1	- [	L	(		1/8,19	2
	В			0.0	5		М	(plu	is)	1/1,02	4
	С	(plus	)	0.	1	Mits	uhishi	Elect	ric is or	nlv A. B. C	
	D			0.	5					d with A~E	
	E				1	*Cor	tact our	sales d	lirectly for	r detail model	name
						Acc	uracy	grade	э		
	Cable	lead-out dir	ection			Тур	e Acci	uracy	/ grade	)	
	Туре	Lead-out dir	ection		1	A	5+5	L/1,0	00 µm		
(L): cm units	R	Right				S	3+3	L/1,0	00 µm		
	L	Left				L: E	ffective	leng	th(mm)		



Minimum phase difference							
Turno	Minimum phase	Response re	volutions (min.)	Turno	Minimum phase	Response revolutions (min.)	
Туре	difference	Approx.1°/1,000	Approx.1°/10,000	Туре	difference	Approx.1°/1,000	
Α	50	2,000	267	E	250	533	
В	100	1,332	133	F	300	444	
С	150	888	89	G	400	333	
D	200	666	67	н	500	266	
				J	650	205	
				ĸ	1 000	133	

#### Resolution, rotation direction and polarity

Туре	Resolution	Rotation direction and polarity	Number of pulses/revolution
A	Approx. 1 °/1,000	CW/ +	360,448
В	Approx.1°/1,000	CCW/+	360,448
С	Approx.1°/10,000	CW/ +	3,600,384
D	Approx.1°/10,000	CCW/ +	3,600,384

# List of Adapter Cables

		<b>I</b>				
Scale	Connected equipment	Controller side Connector	List of Adapter Cables	Scale side Connector	Maximum cable length	Cable bending radius
	General- purpose cable	Open end	CH23-***〇□	Scale side Original of Magnescale	13 m	20 mm(Fixed, without conduit) 25 mm(Fixed, with conduit) 50 mm(Elbow-shaped bend)
		Controller side Honda Tsushin	CH23A-***O□F	Scale side Original of	13 m	
	FANUC	Kogyo 빅드빌J PCR-S20FS+	CH23A-***O=FA CH23A-***O=K	Magnescale	Combined total 30 m	
		Relay connector JAE JIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	CH23A-***〇□KA	Relay connector JAE	Combined total 30 m	20 mm(Fixed, without conduit) 25 mm(Fixed, with conduit)
SR27A	Mitsubishi Electric	Controller side	CH23-***〇□M	Scale side	13 m	50 mm(Elbow-shaped bend)
SR67A		36210-0100PL	CH23-***〇□MA CH23-***〇□K	Original of Agnescale	Combined total 30 m	
		Relay connector JAE JN1HS10PL2	СН23-***○□КА	Relay connector JAE	Combined total 30 m	
	SIEMENS	Controller side YAMAICHI	CH22-***OSMY	Scale side Original of	30 m	
		ELECTRONICS CN078P-061-0001	CH22-*** OSFY CH22-*** OSMF	Original of Agnescale	Combined total 30 m	35 mm(Fixed) 75 mm(Elbow-shaped bend)
		Relay connector Phoenix Contact SACC-M12MS-8Q SH	CH22-*** () SFF	Relay connector Phoenix Contact SACC-M12MS-8Q SH	Combined total 30 m	
	General- purpose cable	Open end	CH33-**○▽	Scale side Original of Magnescale	30 m	20 mm(Fixed, without conduit) 25 mm(Fixed, with conduit) 50 mm(Elbow-shaped bend)
SR74 SR84	FANUC	Controller side Honda Tsushin Kogyo PCR-S20FS+	CH33-**⊖⊽E/P	Scale side Original of Magnescale	30 m	20 mm(Fixed, without conduit) 25 mm(Fixed, with conduit) 50 mm(Elbow-shaped bend)
	Mitsubishi Electric	Controller side Sumitomo 3M 36210-0100PL	CH33-**⊖⊽L	Scale side Original of Magnescale	30 m	Relay type cannot be used for A/B Phase of SR74/84.

P PVC(Φ8)[Controller side]

E PU(Φ8)[Controller side]

#### Controller side CH22-\*\*\* OSFY CN078P-061-0001 RU97 Relay connector CH22-\*\*\*OSFF Phoenix Contact Contact SACC-M12MS-8Q SH Controller side Ē CE28A-\*\*\* Honda Tsushin Koavo PCR-S20FS+ Relay connector CE28A-\*\*\* ()J -Controller side CE28-\*\*\*〇M Sumitomo 3M 36210-0100PL RU77 Relay connector CE28-\*\*\*〇J JAE JB1D10PL2 Controller side CE28-\*\*\*〇G ÷ Molex 6P | 55100-0670 Relay connector CE28-\*\*\* JB1D10PL2 Controller side Ð CH23A-\*\*\* Honda Tsushin Kogyo PCR-S20FS+ CH23A-\*\*\*〇□KA Relay connector JAE JN1HS10PL2 \_ Controller side CH23-\*\*\* Sumitomo 3M 36210-0100PL **RS97** Relay connector CH23-\*\*\* JAE JN1HS10PL2 Controller side CH22-\*\*\* OSFY CN078P-061-0001 Relay connector Relay connector Phoenix Contact CH22-\*\*\*OSFF SACC-M12MS-8Q SH

Controller side Connector

List of Adapter Cables

Connected equipment

Scale

#### Cables

#### $\mathsf{C}\mathsf{H}\mathsf{2}\mathsf{2}\mathsf{-}\Box\Box\Box\heartsuit\heartsuit\, {}^{}_{\!\!\!\!\!}^{\!\!\!\!\!}^{\!\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!}}^{\!\!\!}^{\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!}^{\!\!\!\!}^{\!\!\!}^{\!\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!\!}^{\!\!\!\!}^{\!\!\!\!}^{\!\!\!}^{\!\!\!}^{\!\!\!\!}^{\!\!\!\!$

[DD]Cable length Written by flush right, indication in "m" units, up to 30 m, 0.5 m pitch

[O]Conduit specification (Example) 
 Type
 Cable length
 Type
 Conduit specification

 015
 1.5m
 C
 With conduit specification

 070
 7m
 N
 Without conduit (standard)
 260 26m

Туре	Cable specification						
S	PU (Polyurethane, Siemens Motion connect	PU (Polyurethane, Siemens Motion connect 800+)					
%]Scal	e side connector						
Туре	Specification	Remarks					
М	Scale head connector	Standard					
F	M12 connector (Female) made by Phoenix Contact	Relay/ Waterproofing					
E	M12 connector (Female) made by Phoenix Contact	Relay/ Waterproofing/ Attatched connecto					
#]Cont	roller side connector						
Туре	Specification	Remarks					
None	Open-end						
	RJ45 connector made by YAMAICHI ELECTRONICS	Adopts NC machine too					
Y							
Y Z	RJ45 connector (water proof) made by YAMAICHI ELECTRONICS	Relay					

CH23-□□□○▽※#						[%]C	ontro	ller side cor	nector			
						Ту	ре	Specification	Remarks			
CH23A-□□□○▽※#						Without	With	Earth wire				
(CH23A ; FANUC model only)					7			Scale side connector should	be 10P JN2 (Fe	nale) made by Japan		
	[□□□]Cable length					-	-	Open-end	Aviation Electronics Industry or 2P made by TAJIMI ELECTRONICS			
(Examp	(Example) [O]Conduit specification		None	-	1	Standard						
Туре	Cable length	1	Type Conduit specification		М	-	10P made	by Sumitomo 3M Mitsubishi NC, J		NC, J3 (ABS)		
010	1m	Г	С	With conduit(standard)		F	-	20P straight case	20P straight case made by Honda Tsushin Kogyo FAN		ANUC (ABS)	
005	0.5m	Г	Ν	Without conduit		J	-	Horizontal drawin	Horizontal drawing case made by HIROSE Electric FAN		BS)	
065	6.5m	· · · · · · · · · · · · · · · · · · ·		К	-	10P JN1 (Male) mad	e by Japan Aviation Electronics Industry	Relay				
100	10m	)m		Ν	-	12P R04 (Male)	made by TAJIMI ELECTRONICS	Relay (fixe	d)			
[▽]Cat	[▽]Cable sheath(covering)					[#]So	cale s	ide connect	or			
Туре	pe Cable specification			Тур	Type Specification		Remarks					
V	PVC(Φ6	PVC(Φ6.8) [Scale side]			Non	ie C	Driginal of Magnescale Stan		Standard			
С	PU(Φ6.8	PU(Φ6.8)[Scale side]			A	1	10P JN2 (Female) made by Japan Aviation Electronics Industry Relay		Relay			

C 12P R04-9125JF8.5 made by TAJIMI ELECTRONICS

Relay (fixed)

CE2	28 - 🗆 🗆 🗆	$\bigcirc$	*				
CE2			_				
[□□□] Written up to 14	tion in			its, Iller side connector			
(Examp	le)		Туре		Specification	Remarks	
Туре	Cable length		Without With		Earth wire		
070	7m		Without -		Open-end	Standard	
090	9m		L	-	100	Mitsubishi NC, J3 (A/B Phase)	
130	13m		М	-	10P made by Sumitomo 3M	Mitsubishi NC, J3 (INC serial, ABS)	
			E	Ρ	00D mode had been de Terrebie Karren	FANUC (A/B Phase)	
[O]Cor	[O]Conduit		F	-	20P made by Honda Tsushin Kogyo	FANUC (INC serial, ABS)	
Туре	Conduit	G -		-	6P made by molex <sup>®</sup>	YASKAWA Electric (INC serial, ABS)	
С	With conduit		J -		10P (JB1) made by Japan Aviation Electronics Industry	RU77 cable extention (standard)	
N Without conduit		К	-	10P (JN1) made by Japan Aviation Electronics Industry	RU77 cable extention (standard)		

(Example Type 07 26



	Scale side Connector	Maximum cable length	Cable bending radius
_	Relay connector Phoenix Contact SACC-M12MS-8Q SH	30 m	35 mm(Fixed)
	Relay connector Phoenix Contact SACC-M12MS-8Q SH	Combined total 30 m	75 mm(Elbow-shaped bend)
_	Scale side JAE JB1HB10SL2		
	Relay connector JAE JB1HB10SL2		
_	Scale side JAE JB1HB10SL2	14 m	10 mm(Fixed, without conduit) 25 mm(Fixed, with conduit)
	Relay connector JAE JB1HB10SL2		50 mm(Elbow-shaped bend)
_	Scale side JAE JB1HB10SL2		
	Relay connector JAE JB1HB10SL2		
	Scale side JAE JN2DS10SL-R	30 m	
	Relay connector JAE JN2DS10SL-R	Combined total 30 m	20 mm(Fixed, without conduit)
	Scale side JAE JN2DS10SL-R	30 m	25 mm(Fixed, with conduit) 50 mm(Elbow-shaped bend)
	Relay connector JAE JN2DS10SL-R	Combined total 30 m	
	Scale side Phoenix Contact	30 m	35 mm(Fixed)
	Relay connector Phoenix Contact SACC-M12MS-8Q SH	Combined total 30 m	75 mm(Elbow-shaped bend)

### CH33- $\Box$ $\Box$ $\bigcirc$ $\heartsuit$ #

### [□□]Cable length Written by flush right, indication in "m" units, up to 30 m, 1 m pitch

le)	[O]Cor	nduit	
Cable length	Туре	Conduit	
7m	С	With conduit (standard)	
26m	N	Without conduit	

#### [▽]Cable seath (covering)

10100	Die	se	atri (covering)					
Тур	е							
P		P	VC (Polyvinyl chloride)					
E	PU (Polyurethane)							
[%]Co	[%]Controller side connector							
Ty	ре		Specification	Remarks				
Without	Wit	th	Earth wire					
None	-		Open-end	Standard				
Α	-		D-sub 15P					
D	-		D-sub 9P					
L			10P made by Sumitomo 3M		J3,J4 (A/B Phase) J3,J4 (INC serial, ABS)			
-	P		20P straight case made by Honda Tsushin Kogyo	straight case made by Honda Tsushin Kogyo FANUC (A) FANUC (IN				
G	-		6P made by molex®		Panasonic (INC serial, ABS)			
-	R		Horizontal drawing case made by HIROSE Electric	FANUC (A/ FANUC (INC	B Phase) C serial, ABS)			
K	-		10P JN1 (Male) made by Japan Aviation Electronics Industry	Relay				
N	-		12P R04 (Male) made by TAJIMI ELECTRONICS	Relay(fixed	)			
[#]Sc	[#]Scale side connector							
Тур	Type Specification				Remarks			
Nor	None Or		riginal of Magnescale	Standard				
A	A		P JN2(Female)made by Japan Aviation Elec	Relay				
С	C 12P R04-9125JF8.5 made by TAJIMI ELECTRONIC				Relay(fixed)			
*Relay	*Relay type cannot be used for A/B/Reference type of SR74 and SR84							

# Technology

### Air purging

If scale is used in a dusty or misty environment, it is recommended that air is introduced into the scale to alleviate any unwanted effects. Attach air nipples to M5 holes for air introduction that are provided at both ends of the scale to supply air into the scale. When introducing air into the scale, supply air via an air filter (nominal filtration rating: 5 μm), mist separator (nominal filtration rating: 0.3 µm), and a regulator to remove dust, dirt, and mist. As a guide, the amount of air supplied to the scale is  $10-20\ell/min$ .



# Traceability

Traceability Flow Chart (Length)

National Primary Standards	National Institute of Advanced Industrial Science and Technology (AIST)				
	Magnescale Corporation				
National Secondary Standards	Iodine saturation absorption stabilized He-Ne laser at 633nm				
Manufacturing Reference Standard	Stabilized He-Ne Laser (633nm)				
	Products				

# Quality

### No compromise for high-accuracy products

The total guality 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. In addition, we have introduced the highest level EMC (Electromagnetic Compatibility) testing equipment to address the noise problem that is becoming increasingly regulated around the world, and we are taking all possible measures to control quality.

### Our products comply with CE/UKCA Marking requirements, have acquired UL certifications and meet other regulations, ensuring safe use the world over. We have met:

- · CE/UKCA Marking (EMC Directives) EMI : EN/BS 61000-6-4, EMS : EN/BS 61000-6-2
- CE/UKCA Marking (RoHS Directives) EN/BS 63000
- FCC regulation FCC Part 15 Subpart B Class A
- ICES regulation ICES-003 Class A

for Products with built-in AC power supply: • UL/cUL 61010-1 • EN/BS 61010-1

\* When using our devices with machines to which the European Machinery Drirective (EN60204-1) applies, please make sure that the devices when installed on the machines fulfil the applicable requirements of the Directive \* Standards or regulations to be complied with may vary by product.

# **Functional Safety**

Recently, great importance has been placed on human safety around industrial machines and machine tools. In 2010, the European Machinery Directive mandated compliance with functional safety for electrical equipment used in the safety systems of machines subject to the Machinery Directory. These safety demands are anticipated to spread across many additional regions and industries in the future. Magnescale leads the competition with its lineup of feedback scale that have acquired third-party functional safety certification in order to meet global demands for safety.

IEC 61508, EN/BS 62061 SIL 2 Certification EN/BS/ISO 13849-1 Cat. 3 / PL d standards EN/BS 61800-5-2 Angle encoders RS97-1024EGZ series RS97-1024NGZ series Models that RU97-2048 Z series have acquired certification Linear encoders SR27A-AZ series SR67A-AZ series \* Consult our sales representative for details





