Incremental linear encoder

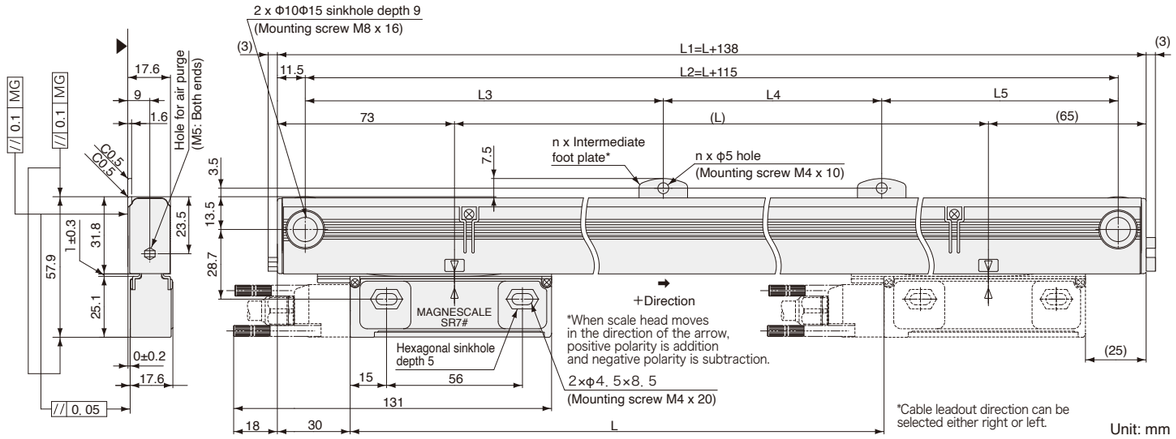
# Slim type

# 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

A/B/Reference point

## Dimensions (cable left-lead out direction)




Unit: mm

| Effective length | Total length | Mounting pitch | | | | Number of intermediate foot plates |
|---|---|---|---|---|---|---|
| L | L1 | 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 |
| 720 | 858 | 835 | 417.5 | – | 417.5 | 1 |

| Effective length | Total length | Mounting pitch | | | | Number of intermediate foot plates |
|---|---|---|---|---|---|---|
| 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 |

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

Unit: mm

Notes
- The surface indicated by the ▲ 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 | SR74 |
| Effective length (L: mm) | 70-2,040 |
| Thermal expansion coefficient | 12±1 × $10^{-6}$ /°C |
| Accuracy(at 20°C) | (3+3L/1,000) µmp-p or (5+5L/1,000) µmp-p<br>L: Effective length (mm) |
| Reference point | Center point, Multi point (40 mm pitch), Signed-type (standard pitch 20 mm), User-selected point (1 mm pitch) |
| Output signal | A/B/Reference point line driver signal, compliant with EIA-422 |
| Resolution | Selectable from 0.05, 0.1, 0.5, and 1 µm (Set at factory shipping) |
| Maximum response speed | 50m/ min (Resolution: 0.1 µm, Minimum phase difference: at 50 ns) |
| Product Safety | FCC Part15 Subpart B Class A<br>ICES-003 Class A Digital Device<br>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 | 150 $m/s^2$ (50 Hz to 3,000Hz) |
| Impact resistance | 350 $m/s^2$ (11 ms) |
| Protective design grade | IP54 (Air purge not included), IP65 (Air purge included) |
| Power supply voltage range | DC+4.75 to +5.25 V |
| Maximum consumption current | 1.0W or less (4.75V or 5.25V) |
| Consumption current | 200mA (5V) (when the controller is connected) |
| Mass | Approx. 0.27kg+ 1.36kg/m or less |
| Standard compatible cable | CH33-***CP/CE |
| Maximum cable length | 15 m |

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

## Details of model designation

Scale

SR74 - ××× ★ ○ □ ◆ ### 

[×××]Effective length (L): cm units

[★]Cable lead-out direction

| Type | Lead-out direction |
|---|---|
| R | Right |
| L | Left |

[○]Accuracy grade

| Type | Accuracy grade |
|---|---|
| A | (5+5L/1,000) µmp-p |
| S | (3+3L/1,000) µmp-p |

L: Effective length(mm)

[□]Resolution and direction (µm)

| Type | Direction | Resolution | Type | Direction | Resolution |
|---|---|---|---|---|---|
| B | + | 0.05 | G | – | 0.05 |
| C | | 0.1 | H | | 0.1 |
| D | | 0.5 | J | | 0.5 |
| E | | 1.0 | K | | 1 |

[◆]Minimum phase difference

| Type | Phase difference (ns) | Type | Phase difference (ns) | Type | Phase difference (ns) |
|---|---|---|---|---|---|
| A | 50 | F | 300 | L | 1,250 |
| B | 100 | G | 400 | M | 2,500 |
| C | 150 | H | 500 | N | 3,000 |
| D | 200 | J | 650 | | |
| E | 250 | K | 1,000 | | |

[###]Reference point position
(Distance from left end of effective length:Unit mm)

| Reference point position | Indication method |
|---|---|
| Less than 1,000 | Number (850 mm → 850) |
| 1,000−1,099 mm | A + lower 2 digits(1,050 mm → 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 | X |
| Multi | Y |
| Signed-type | Z |

Cable

CH33 - □ □ ○ ▽ ※ #

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

| Type | Cable length |
|---|---|
| 07 | 7m |
| 26 | 26m |

[○]Conduit

| Type | Conduit |
|---|---|
| C | With conduit (standard) |
| N | Without conduit |

【▽】Cable seath (covering)

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

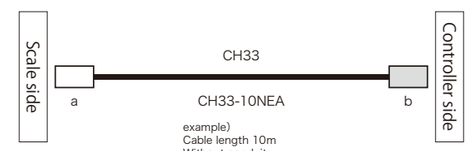
【※】Controller side connector

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

【#】Scale side connector

| Type | Specification | Remarks |
|---|---|---|
| None | Original of Magnescale | Standard |

*Relay type cannot be used for A/B Phase type of SR74 and SR84



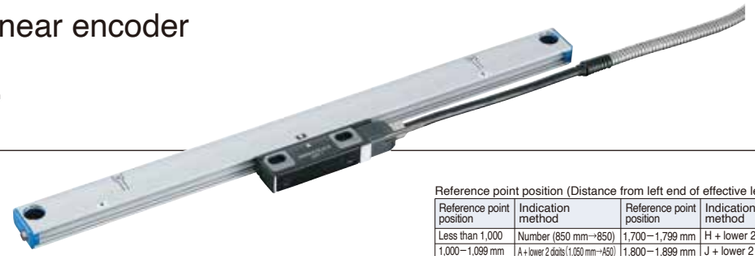

example)
Cable length 10m
Without conduit
PU sheath
Scale side connector
Original of Magnescale

# Other Models

## Absolute linear encoder slim type

# SR77

FANUC
Mitsubishi Electric
Panasonic
Yaskawa Electric



- 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: 0.01µm
- 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 (Mitsubishi Electric, Panasonic, Yaskawa Electric)
CH33A (FANUC)

※ Please refer to page 29 for cable specifications.

SR77-×××★○△♦□□□

Effective length (L): cm units

Reference point position (Distance from left end of effective length)

| Reference point position | Indication method | Reference point position | Indication method | Reference point position | Indication method |
|---|---|---|---|---|---|
| Less than 1,000 | Number (850 mm→850) | 1,700–1,799 mm | H + lower 2 digits | Center | X |
| 1,000–1,099 mm | A + lower 2 digits (1,050 mm→A50) | 1,800–1,899 mm | J + lower 2 digits | | |
| 1,100–1,199 mm | B + lower 2 digits | 1,900–1,999 mm | K + lower 2 digits | | |
| 1,200–1,299 mm | C + lower 2 digits | 2,000–2,040 mm | L + 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 | | | | |

Communication protocol

| Type | NC manufacturer | Number of wires |
|---|---|---|
| A | FANUC α interface | 4-wire |
| B | Mitsubishi Electric | 2-wire |
| D | Mitsubishi Electric | 4-wire |
| H | Panasonic | 2-wire |
| F | Yaskawa Electric | 2-wire |

Resolution and direction

FANUC, Mitsubishi Electric, Panasonic

| Type | Direction | Resolution | Type | Direction | Resolution |
|---|---|---|---|---|---|
| A | (plus) | 0.01 | F | (minus) | 0.01 |
| B | | 0.05 | G | | 0.05 |
| C | | 0.1 | H | | 0.1 |
| D | | 0.5 | J | | 0.5 |
| E | | 1 | K | | 1 |

Yaskawa Electric

| Type | Direction | Number of partitions |
|---|---|---|
| L | (plus) | 1/8,192 |
| M | | 1/1,024 |

Mitsubishi Electric is only A, B, C
Panasonic can be used with A~E*
*Contact our sales directly for detail model name

Cable lead-out direction

| Type | Lead-out direction |
|---|---|
| R | Right |
| L | Left |

Accuracy grade

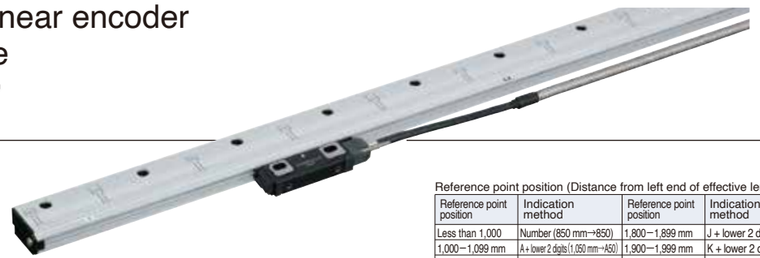
| Type | Accuracy grade |
|---|---|
| A | (5+5L/1,000) µm |
| S | (3+3L/1,000) µm |

L: Effective length(mm)

## Absolute linear encoder robust type

# SR87

FANUC
Mitsubishi Electric
Panasonic
Yaskawa Electric



- Effective length:
  140,240,340,440,540,640,740,840,940,1040,
  1140,1240,1340,1440,1540,1640,1740,1840,
  2040,2240,2440,2640,2840,3040 mm
- Maximum resolution: 0.01µm
- 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 (Mitsubishi Electric, Panasonic, Yaskawa Electric)
CH33A (FANUC)

※ Please refer to page 29 for cable specifications.

SR87-×××★○△♦□□□

Effective length (L): cm units

Reference point position (Distance from left end of effective length)

| Reference point position | Indication method | Reference point position | Indication method | Reference point position | Indication method |
|---|---|---|---|---|---|
| Less than 1,000 | Number (850 mm→850) | 1,800–1,899 mm | J + lower 2 digits | 2,700–2,799 mm | T + lower 2 digits |
| 1,000–1,099 mm | A + lower 2 digits (1,050 mm→A50) | 1,900–1,999 mm | K + lower 2 digits | 2,800–2,899 mm | U + lower 2 digits |
| 1,100–1,199 mm | B + lower 2 digits | 2,000–2,040 mm | L + lower 2 digits | 2,900–2,999 mm | V + lower 2 digits |
| 1,200–1,299 mm | C + lower 2 digits | 2,100–2,199 mm | M + lower 2 digits | 3,000–3,040 mm | W + lower 2 digits |
| 1,300–1,399 mm | D + lower 2 digits | 2,200–2,299 mm | N + lower 2 digits | Center | X |
| 1,400–1,499 mm | E + lower 2 digits | 2,300–2,399 mm | P + lower 2 digits | | |
| 1,500–1,599 mm | F + lower 2 digits | 2,400–2,499 mm | Q + lower 2 digits | | |
| 1,600–1,699 mm | G + lower 2 digits | 2,500–2,599 mm | R + lower 2 digits | | |
| 1,700–1,799 mm | H + lower 2 digits | 2,600–2,699 mm | S + lower 2 digits | | |

Communication protocol

| Type | NC manufacturer | Number of wires |
|---|---|---|
| A | FANUC α interface | 4-wire |
| B | Mitsubishi Electric | 2-wire |
| D | Mitsubishi Electric | 4-wire |
| H | Panasonic | 2-wire |
| F | Yaskawa Electric | 2-wire |

Resolution and direction

FANUC, Mitsubishi Electric, Panasonic

| Type | Direction | Resolution | Type | Direction | Resolution |
|---|---|---|---|---|---|
| A | (plus) | 0.01 | F | (minus) | 0.01 |
| B | | 0.05 | G | | 0.05 |
| C | | 0.1 | H | | 0.1 |
| D | | 0.5 | J | | 0.5 |
| E | | 1 | K | | 1 |

Yaskawa Electric

| Type | Direction | Number of partitions |
|---|---|---|
| L | (plus) | 1/8,192 |
| M | | 1/1,024 |

Mitsubishi Electric is only A, B, C
Panasonic can be used with A~E*
*Contact our sales directly for detail model name

Cable lead-out direction

| Type | Lead-out direction |
|---|---|
| R | Right |
| L | Left |

Accuracy grade

| Type | Accuracy grade |
|---|---|
| A | (5+5L/1,000) µm |
| S | (3+3L/1,000) µm |

L: Effective length(mm)

## Incremental linear encoder slim type

# SR75

Mitsubishi Electric
Panasonic
Yaskawa Electric

- 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: 0.01µm
- 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.

SR75-×××★○△♦□□□

Effective length (L): cm units

Reference point position (Distance from left end of effective length)

| Reference point position | Indication method | Reference point position | Indication method |
|---|---|---|---|
| Less than 1,000 | Number (850 mm→850) | 1,700–1,799 mm | H + lower 2 digits |
| 1,000–1,099 mm | A + lower 2 digits (1,050 mm→A50) | 1,800–1,899 mm | J + lower 2 digits |
| 1,100–1,199 mm | B + lower 2 digits | 1,900–1,999 mm | K + lower 2 digits |
| 1,200–1,299 mm | C + lower 2 digits | 2,000–2,040 mm | L + lower 2 digits |
| 1,300–1,399 mm | D + lower 2 digits | Center | X |
| 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 | | |

Communication protocol

| Type | NC manufacturer | Number of wires |
|---|---|---|
| B | Mitsubishi Electric | 2-wire |
| D | Mitsubishi Electric | 4-wire |
| H | Panasonic | 2-wire |
| F | Yaskawa Electric | 2-wire |

Resolution and direction

Mitsubishi Electric, Panasonic

| Type | Direction | Resolution |
|---|---|---|
| A | (plus) | 0.01 |
| B | | 0.05 |
| C | | 0.1 |
| D | | 0.5 |
| E | | 1 |

Yaskawa Electric

| Type | Direction | Number of partitions |
|---|---|---|
| L | (plus) | 1/8,192 |
| M | | 1/1,024 |

Mitsubishi Electric is only A, B, C
Panasonic can be used with A~E*
*Contact our sales directly for detail model name

Cable lead-out direction

| Type | Lead-out direction |
|---|---|
| R | Right |
| L | Left |

Accuracy grade

| Type | Accuracy grade |
|---|---|
| A | 5+5L/1,000 µm |
| S | 3+3L/1,000 µm |

L: Effective length(mm)

## 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

RU74-4096A□■

Minimum phase difference

| Type | Minimum phase difference | Response revolutions (min.) Approx.1°/1,000 | Response revolutions (min.) Approx.1°/10,000 | Type | Minimum phase difference | Response revolutions (min.) Approx.1°/1,000 |
|---|---|---|---|---|---|---|
| A | 50 | 2,000 | 267 | E | 250 | 533 |
| B | 100 | 1,332 | 133 | F | 300 | 444 |
| C | 150 | 888 | 89 | G | 400 | 333 |
| D | 200 | 666 | 67 | H | 500 | 266 |
| | | | | J | 650 | 205 |
| | | | | K | 1,000 | 133 |

Resolution, rotation direction and polarity

| Type | Resolution | Rotation direction and polarity | Number of pulses/revolution |
|---|---|---|---|
| A | Approx. 1 °/1,000 | CW/ + | 360,448 |
| B | Approx.1°/1,000 | CCW/ + | 360,448 |
| C | Approx.1°/10,000 | CW/ + | 3,600,384 |
| D | Approx.1°/10,000 | CCW/ + | 3,600,384 |

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 length