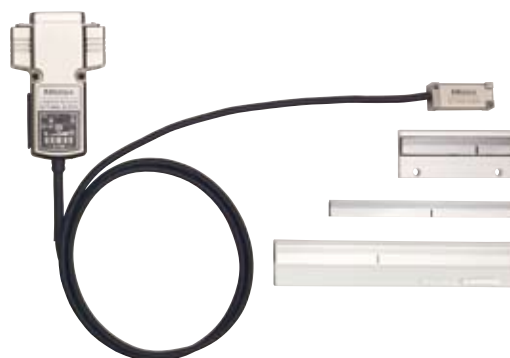


# Separate Type ST Series

## Sinusoidal signal & Square-Wave Signal Output Scale Unit (Compact Type)

# ST46-EZA Glass Scale Type



Separate Type ST Series  
ST46-EZA

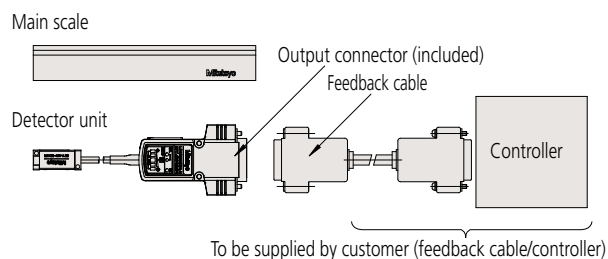
### Features

- Includes an automatic adjusting function for the signal (EZA function) at the push of a button.
- Detector head mounting and signal adjustment possible without oscilloscope or PC.
- A setup indicator for checking signal strength is included.
- I/F circuit integrated in connector shell reduces volume to 60% compared to conventional interface.
- The thickness of the detector head is only 7.5 mm. The metal tape scale type has a mounting surface area of 12.5 by 9.325 mm, allowing use in applications where a space-saving design is important.

### Specifications

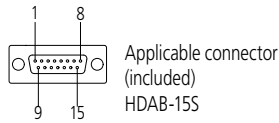
Item	Code	ST46-EZA
Detection method		Reflective photoelectric linear encoder
Scale specifications		Grating pitch: 20μm, Material: glass
Main scale grating pitch		20μm
Output signal		Type B: 2-phase square wave signals, reference point pulse, external reset input Type C: 2-phase square wave signals, reference point pulse, 2-phase sinusoidal signals
Effective range		10 to 3000mm
Accuracy (20°C)		Effective range 10 to 300mm: ±1μm Effective range 350 to 500mm: ±2μm Effective range 600 to 1000mm: ±3μm Effective range 1100 to 3000mm: ±3μm/m
Thermal expansion coefficient		≈ 8 x 10 <sup>-6</sup> / K
Scale reference point		With scale reference point (50mm pitch, 10 to 80mm: Center point)
Maximum response speed		2.6m/s (at sine wave amplitude -3dB)
Power supply voltage		5VDC±5%
Maximum current consumption		250mA
Operating temperature/humidity		0 to 40°C, 20 to 80%RH (no condensation)
Storage temperature/humidity		-20 to 60°C, 20 to 80%RH (no condensation)

### System Configuration



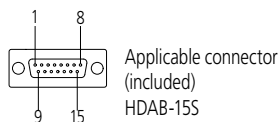
## Output specification

- Connector pin assignment (Type B)



Pin No.	Signal	Pin No.	Signal
1, 2	0V (GND)	10	PA (main signal pulse_Normal phase)
3, 4	+5V (Vcc)	11	PA (main signal pulse_Reverse phase)
5	Reset input AL (anode)	12	PB (main signal pulse_Normal phase)
6	Reset input AL (cathode)	13	PB (main signal pulse_Reverse phase)
7	NC	14	PZ (reference point pulse_Reverse phase)
8	PZ (reference point pulse_Normal phase)	15	F. G
9	ALM (alarm)		

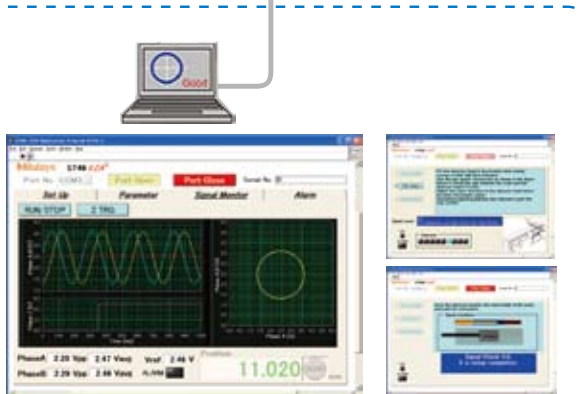
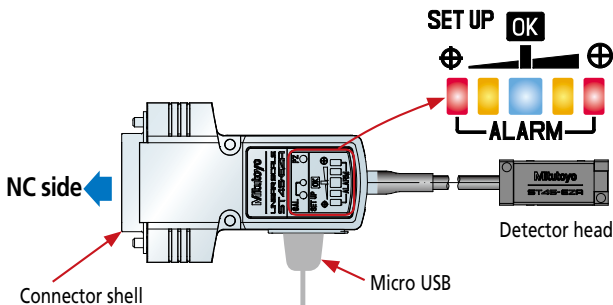
- Connector pin assignment (Type C)



Pin No.	Signal	Pin No.	Signal
1, 2	0V (GND)	10	PA (main signal pulse_Normal phase)
3, 4	+5V (Vcc)	11	PA (main signal pulse_Reverse phase)
5	Phase A (sinusoidal signal)	12	PB (main signal pulse_Normal phase)
6	Phase B (sinusoidal signal)	13	PB (main signal pulse_Reverse phase)
7	Vref ( $\approx V_{cc} / 2$ )	14	PZ (reference point pulse_Reverse phase)
8	PZ (reference point pulse_Normal phase)	15	F. G
9	ALM (alarm)		

- Application program (Option, Part No.06AEF800)

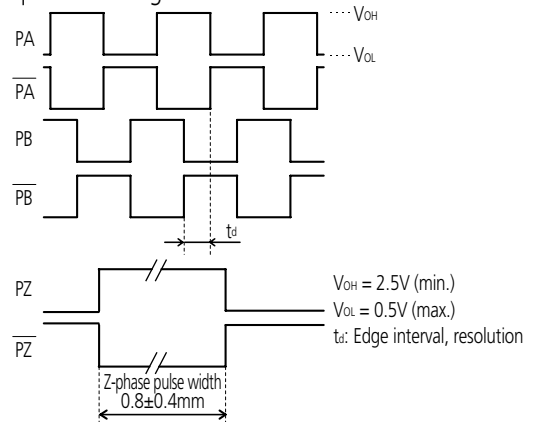
Connector control unit has setup indicator



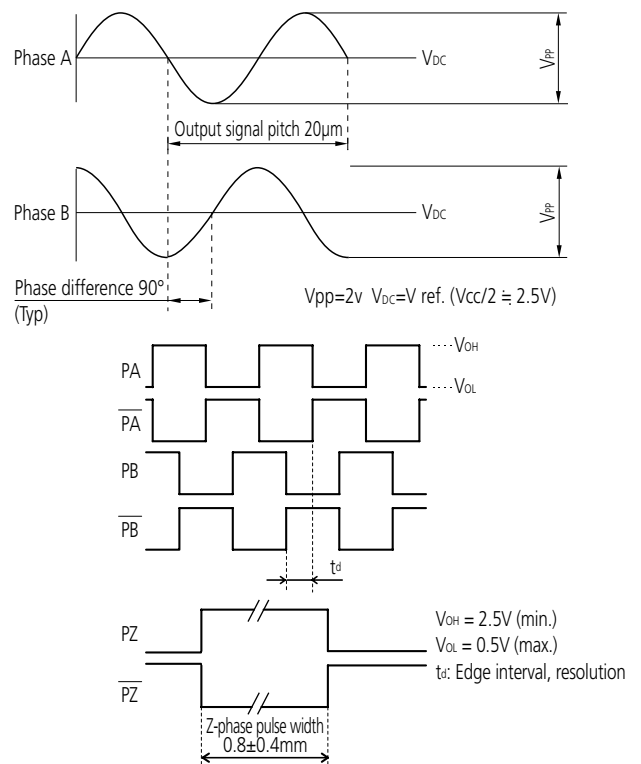
Signal strength checking and parameter setup can be performed on a PC (PC to be prepared by customer)

## Output signal waveform and specification

- 2-phase square wave signals (Type B)



- 2-phase sinusoidal signals, 2-phase square wave signals (Type C)



# Specification Selection Method

## (Glass Scale Type)

### How to read the code

ST46-EZA    -                -                  

### Signal output

Code	Details
B	Square wave signal + external reset input
C	Sinusoidal signal + Square wave signal

### Special codes

Code	Details
●None	Standard selection specification
Z	Special specification

### Effective range

Code	Effective range (mm)	Code	Effective range (mm)	Code	Effective range (mm)
0010	10	0450	450	1600	1600
0025	25	0500	500	1700	1700
0050	50	0600	600	1800	1800
0075	75	0700	700	2000	2000
0080	80	0800	800	2200	2200
0100	100	0900	900	2400	2400
0150	150	1000	1000	2500	2500
0200	200	1100	1100	2600	2600
0250	250	1200	1200	2800	2800
0300	300	1300	1300	3000	3000
0350	350	1400	1400		
0400	400	1500	1500		

### Head cable length

Code	Length
●A	1m (standard)
B	0.5m
C	2m
Z	Special length specification (max. 2.5m)

### Alarm output

Code	Details
●S	Alarm signal
H	High impedance

### Direction

Code	Details
●1	Normal
2	Reverse

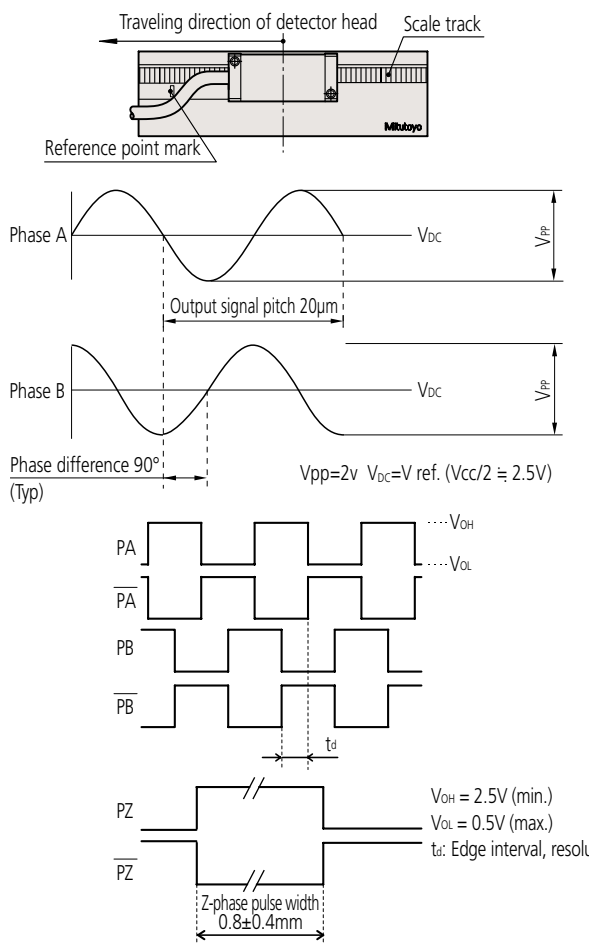
Note: For the standard specification, the indicated effective range depends on the product code.  
 Example of standard specification  
 Effective range 10mm: **ST46EZA**  **0010**  
 Effective range 250mm: **ST46EZA**  **0250**

- There is an extensive selection of specifications for the ST46-EZA.
- Choose the appropriate numbers and letters below according to specification required.  
 If standard specifications (recommended items marked with ● symbol below) meet your requirements, please order using the code numbers shown on pages 19 - 20.

### Reference point/ Scale shape

Code	Details (Effective range)	Details - Cross-section (Effective range)
●A	50mm pitch (100 to 3000mm)	Glass, separate: t4.8 x w22 (100 to 3000mm)
●B	Center point (10 to 80mm)	Glass, separate: t2.8 x w8 (10 to 80mm)
●C	Center point (10 to 80mm)	With aluminum base: t5.1 x w23 (10 to 80mm)
Z	Special position specification	Special shape

When the direction is normal, the sinusoidal signal, the 2-phase square wave output signal (Phase A, Phase B) and the reference point signal waveform are as shown below.



### Resolution / Minimum edge interval

Code	Resolution	Minimum edge interval	Maximum response speed
A	0.05 μm	100 ns	450 mm/s
B		200 ns	225 mm/s
C		400 ns	112 mm/s
D		800 ns	56 mm/s
E	0.1 μm	100 ns	900 mm/s
●F		200 ns	450 mm/s
G	0.5 μm	400 ns	225 mm/s
H		800 ns	112 mm/s
J	1 μm	100 ns	2600 mm/s
K		200 ns	2250 mm/s
L		400 ns	1125 mm/s
M		800 ns	562 mm/s
N	5 μm	100 ns	2600 mm/s
P		200 ns	2600 mm/s
Q	5 μm	400 ns	2250 mm/s
R		800 ns	1125 mm/s
S	5 μm	100 ns	2600 mm/s
T		200 ns	2600 mm/s
U	5 μm	400 ns	2600 mm/s
V		800 ns	2600 mm/s



Separate Type ST Series ST46-EZA

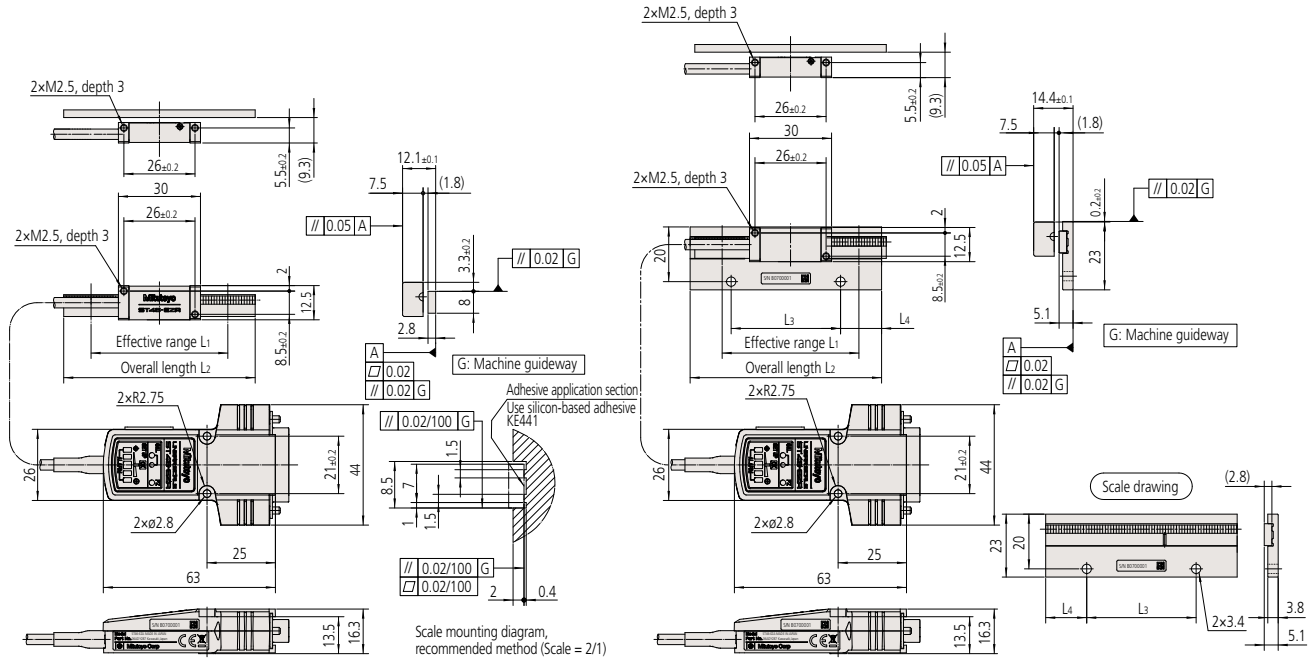
## (Glass Scale Type)

### ST46-EZA Scale unit mounting dimensions

- Effective range 10 to 80mm (No aluminum base)

- Effective range 10 to 80mm (With aluminum base)

Unit: mm



### Dimensions of scale units

- 10 to 80mm (No aluminum base)

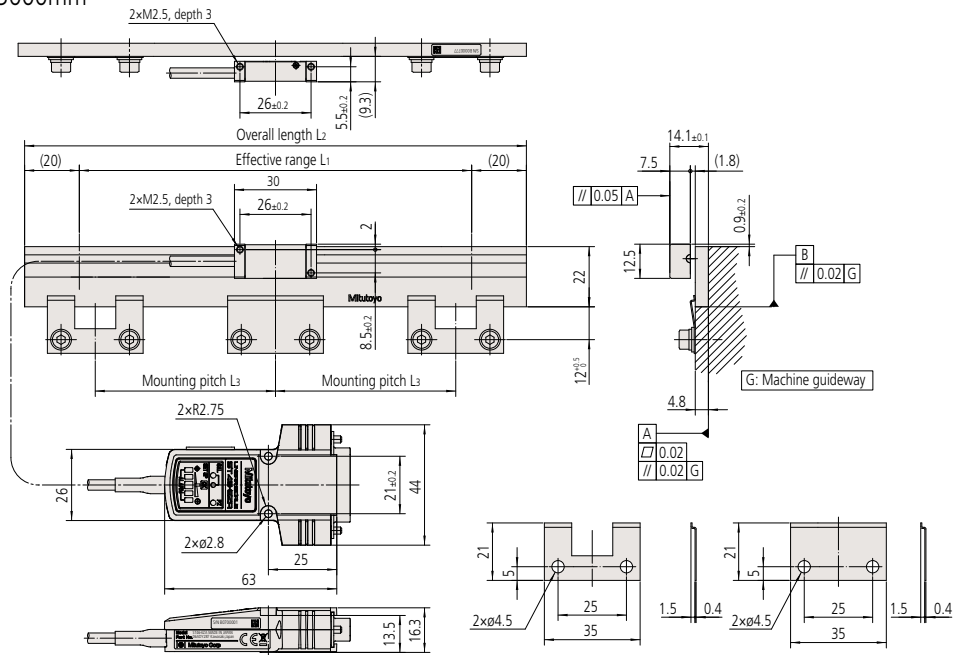
Order No.	Code	Effective range L <sub>1</sub> (mm)	Overall length L <sub>2</sub> (mm)
579-665-12	ST46EZAB-10B	10	30
579-666-12	ST46EZAB-25B	25	45
579-667-12	ST46EZAB-50B	50	70
579-668-12	ST46EZAB-75B	75	90
579-669-12	ST46EZAB-80B	80	100
579-665-22	ST46EZAC-10B	10	30
579-666-22	ST46EZAC-25B	25	45
579-667-22	ST46EZAC-50B	50	70
579-668-22	ST46EZAC-75B	75	90
579-669-22	ST46EZAC-80B	80	100

- 10 to 80 mm (With aluminum base)

Order No.	Code	Effective range L <sub>1</sub> (mm)	Overall length L <sub>2</sub> (mm)	L <sub>3</sub> (mm)	L <sub>4</sub> (mm)
579-665-13	ST46EZAB-10C	10	30	15	7.5
579-666-13	ST46EZAB-25C	25	45	25	10
579-667-13	ST46EZAB-50C	50	70	40	15
579-668-13	ST46EZAB-75C	75	90	60	15
579-669-13	ST46EZAB-80C	80	100	70	15
579-665-23	ST46EZAC-10C	10	30	15	7.5
579-666-23	ST46EZAC-25C	25	45	25	10
579-667-23	ST46EZAC-50C	50	70	40	15
579-668-23	ST46EZAC-75C	75	90	60	15
579-669-23	ST46EZAC-80C	80	100	70	15

- Effective range 100 to 3000mm

Unit: mm



## Dimensions of scale units

Order No.*	Code*	Effective range L <sub>1</sub> (mm)	Overall length L <sub>2</sub> (mm)	Scale fixing pitch L <sub>3</sub> (mm)	Scale retaining spring A (pcs.)	Scale retaining spring B (pcs.)
579-670-□1	ST46EZA◇- 100A	100	140	50	1	2
579-671-□1	ST46EZA◇- 150A	150	190	75		2
579-672-□1	ST46EZA◇- 200A	200	240	100		2
579-673-□1	ST46EZA◇- 250A	250	290	60		4
579-674-□1	ST46EZA◇- 300A	300	340	75		4
579-675-□1	ST46EZA◇- 350A	350	390	85		4
579-676-□1	ST46EZA◇- 400A	400	440	100		4
579-677-□1	ST46EZA◇- 450A	450	490	75		6
579-678-□1	ST46EZA◇- 500A	500	540	80		6
579-679-□1	ST46EZA◇- 600A	600	640	100		6
579-680-□1	ST46EZA◇- 700A	700	740	85		8
579-681-□1	ST46EZA◇- 800A	800	840	100		8
579-682-□1	ST46EZA◇- 900A	900	940	90		10
579-683-□1	ST46EZA◇-1000A	1000	1040	100		10
579-684-□1	ST46EZA◇-1100A	1100	1140	90		12
579-685-□1	ST46EZA◇-1200A	1200	1240	100		12
579-686-□1	ST46EZA◇-1300A	1300	1340	130		10
579-687-□1	ST46EZA◇-1400A	1400	1440	100		14
579-688-□1	ST46EZA◇-1500A	1500	1540	125		12
579-689-□1	ST46EZA◇-1600A	1600	1640	100		16
579-690-□1	ST46EZA◇-1700A	1700	1740	120		14
579-691-□1	ST46EZA◇-1800A	1800	1840	100		18
579-692-□1	ST46EZA◇-2000A	2000	2040	100		20
579-693-□1	ST46EZA◇-2200A	2200	2240	100		22
579-694-□1	ST46EZA◇-2400A	2400	2440	100		24
579-695-□1	ST46EZA◇-2500A	2500	2540	95		26
579-696-□1	ST46EZA◇-2600A	2600	2640	100		26
579-697-□1	ST46EZA◇-2800A	2800	2840	100		28
579-698-□1	ST46EZA◇-3000A	3000	3040	100		30

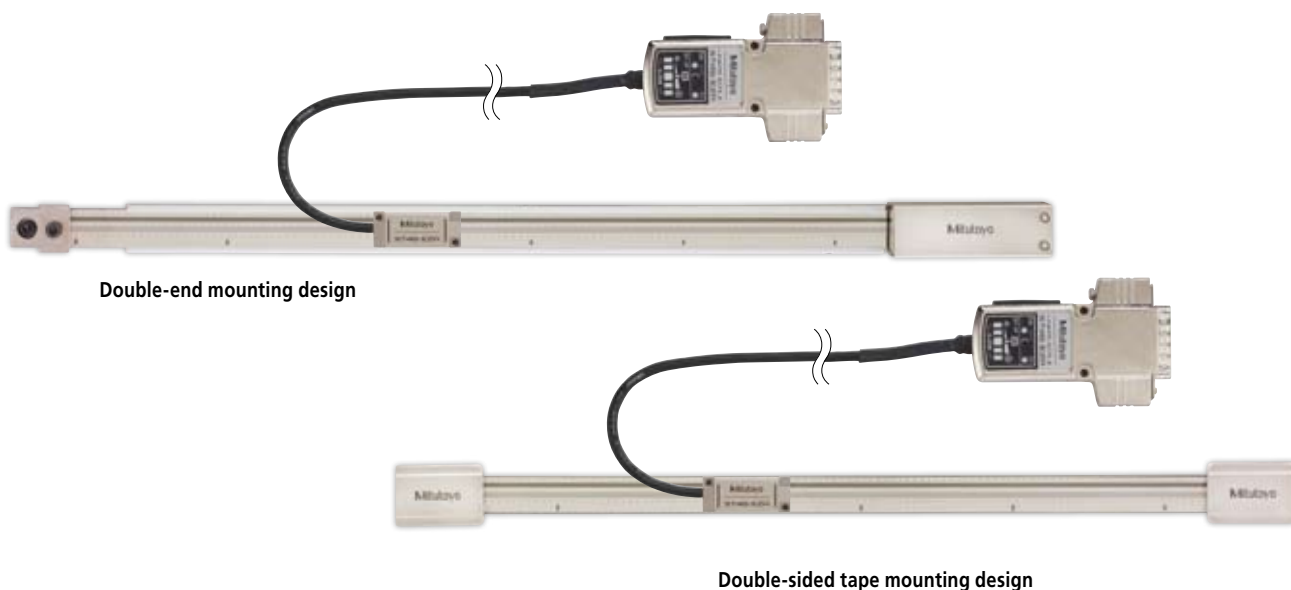
\* The above code numbers are for recommended items marked with ● symbol. If recommended specifications meet your requirements, please use these code numbers to order.

- ◇ → B (2-phase square wave signals + external reset input): □ → 1
- ◇ → C (2-phase square wave signals + 2-phase sinusoidal signals): □ → 2

## Separate Type ST Series

Sinusoidal signal & Square-Wave Signal Output  
Scale Unit (Compact Type)

# ST46-EZA Metal Tape Scale Type



Double-end mounting design

Double-sided tape mounting design

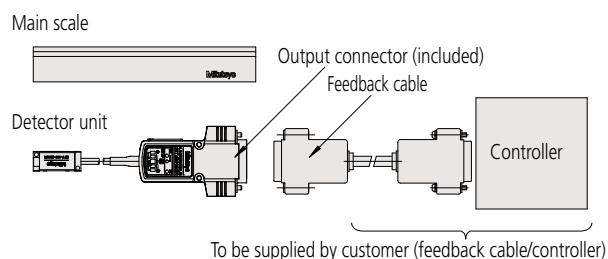
## Features

- Includes an automatic adjusting function for the signal (EZA function) at the push of a button.
- Detector head mounting and signal adjustment possible without oscilloscope or PC.
- A setup indicator for checking signal strength is included.
- I/F circuit integrated in connector shell reduces volume to 60% compared to conventional interface.
- The thickness of the detector head is only 7.5 mm. The metal tape scale type has a mounting surface area of 12.5 by 9.325 mm, allowing use in applications where a space-saving design is important.

## SPECIFICATIONS

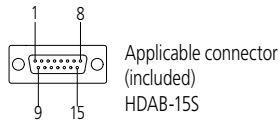
Model	ST46-EZA
Detection method	Reflective photoelectric linear encoder
Scale type	Metal tape
Main scale grating pitch	20μm
Output signal	Type B: 2-phase square wave signals, reference point pulse, external reset input. Type C: 2-phase square wave signals, reference point pulse, 2-phase sinusoidal signals.
Effective range	10 to 3000mm
Accuracy (20°C)	Effective range 10 to 1000mm: ±5μm Effective range 1100 to 3000mm: ±5μm/m (The above accuracy applies to individual scales. For double-end mounting designs, perform point-to-point correction after ensuring the metal tape is tensioned correctly.)
Maximum response speed	2.6m/s (With sinusoidal signal amplitude of -3dB)
Scale reference point	50mm pitch, 10 to 80mm: Center point
Power supply voltage	5VDC±5%
Operating temperature/ humidity range	0 to 40°C, RH 20 to 80% (no condensation)
Storage temperature/ humidity range	-20 to 60°C, RH 20 to 80% (no condensation)

## System Configuration



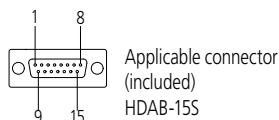
## Output specification

- Connector pin assignment (Type B)



Pin No.	Signal	Pin No.	Signal
1, 2	0V (GND)	10	PA (main signal pulse_Normal phase)
3, 4	+5V (Vcc)	11	PA (main signal pulse_Reverse phase)
5	Reset input AL (anode)	12	PB (main signal pulse_Normal phase)
6	Reset input AL (cathode)	13	PB (main signal pulse_Reverse phase)
7	NC	14	PZ (reference point pulse_Reverse phase)
8	PZ (reference point pulse_Normal phase)	15	F. G
9	ALM (alarm)		

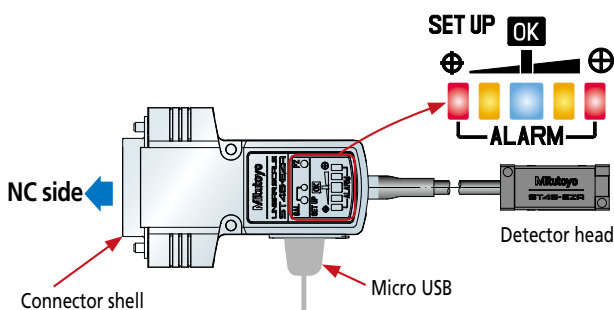
- Connector pin assignment (Type C)



Pin No.	Signal	Pin No.	Signal
1, 2	0V (GND)	10	PA (main signal pulse_Normal phase)
3, 4	+5V (Vcc)	11	PA (main signal pulse_Reverse phase)
5	Phase A (sinusoidal signal)	12	PB (main signal pulse_Normal phase)
6	Phase B (sinusoidal signal)	13	PB (main signal pulse_Reverse phase)
7	Vref ( $\approx V_{cc} / 2$ )	14	PZ (reference point pulse_Reverse phase)
8	PZ (reference point pulse_Normal phase)	15	F. G
9	ALM (alarm)		

- Application program (Option, Part No.06AEF800)

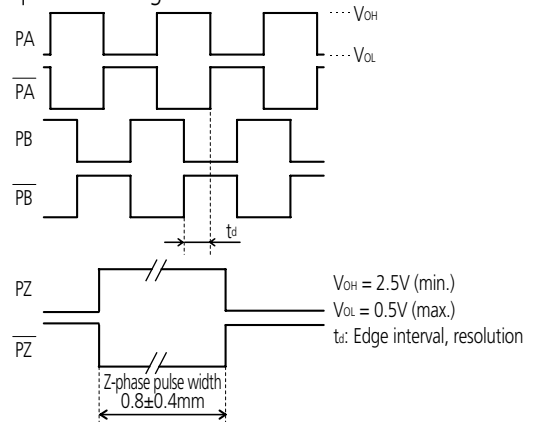
Connector control unit has setup indicator



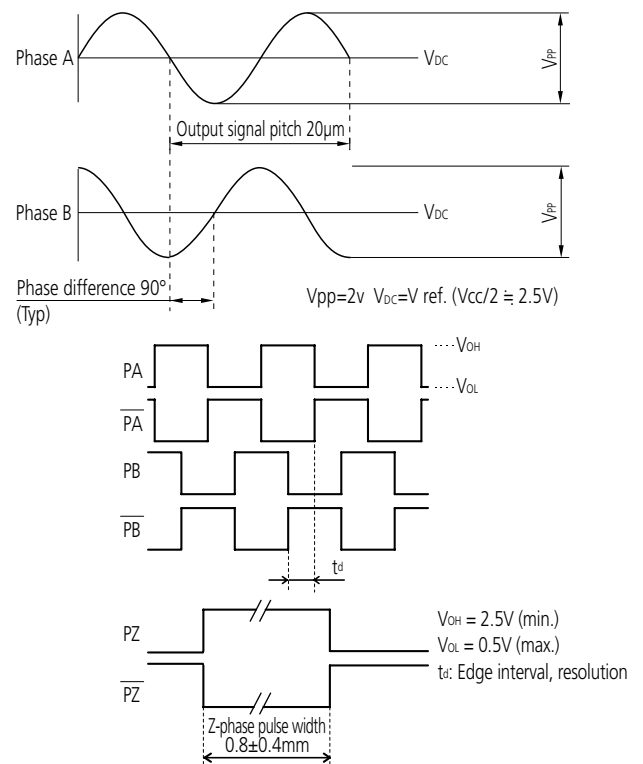
Signal strength checking and parameter setup can be performed on a PC (PC to be prepared by customer)

## Output signal waveform and specification

- 2-phase square wave signals (Type B)



- 2-phase sinusoidal signals, 2-phase square wave signals (Type C)



# Specification Selection Method

## (Metal Tape Scale Type)

### How to read the code

ST46-EZA  -      -

#### Signal output

Code	Details
B	Square wave signal + external reset input
C	Sinusoidal signal + Square wave signal

#### Effective range

Code	Effective range (mm)	Code	Effective range (mm)	Code	Effective range (mm)
0010	10	0450	450	1600	1600
0025	25	0500	500	1700	1700
0050	50	0600	600	1800	1800
0075	75	0700	700	2000	2000
0080	80	0800	800	2200	2200
0100	100	0900	900	2400	2400
0150	150	1000	1000	2500	2500
0200	200	1100	1100	2600	2600
0250	250	1200	1200	2800	2800
0300	300	1300	1300	3000	3000
0350	350	1400	1400		
0400	400	1500	1500		

Note: For the standard specification, the indicated effective range depends on the product code.

Example of standard specification

Effective range 10mm: **ST46EZA**-**0010**

Effective range 250mm: **ST46EZA**-**0250**

#### Reference point/ Scale shape

Code	Details (Effective range)	Details - Cross-section (Effective range)
D	50mm pitch (500 to 3000mm)	Metal Tape Scale double-end mounting: t0.2 x w13 (500 to 3000mm)
E	Center point (10 to 80mm) 50mm pitch (100 to 3000mm)	Metal Tape Scale Double-sided tape mounting: t0.2 x w13 (10 to 3000mm)
Z	Special position specification	Special shape

#### Resolution / Minimum edge interval

Code	Resolution	Minimum edge interval	Maximum response speed
A	0.05 $\mu$ m	100 ns	450 mm/s
B		200 ns	225 mm/s
C		400 ns	112 mm/s
D		800 ns	56 mm/s
E	0.1 $\mu$ m	100 ns	900 mm/s
F		200 ns	450 mm/s
G		400 ns	225 mm/s
H		800 ns	112 mm/s
J	0.5 $\mu$ m	100 ns	2600 mm/s
K		200 ns	2250 mm/s
L		400 ns	1125 mm/s
M		800 ns	562 mm/s
N	1 $\mu$ m	100 ns	2600 mm/s
P		200 ns	2600 mm/s
Q		400 ns	2250 mm/s
R		800 ns	1125 mm/s
S	5 $\mu$ m	100 ns	2600 mm/s
T		200 ns	2600 mm/s
U		400 ns	2600 mm/s
V		800 ns	2600 mm/s

- There is an extensive selection of specifications for the ST46-EZA.
  - Choose the appropriate numbers and letters below according to specification required.
- If standard specifications (recommended items marked with ● symbol below) meet your requirements, please order using the code numbers shown on pages 19 - 20.

#### Special codes

Code	Details
●None	Standard selection specification
Z	Special specification

#### Head cable length

Code	Length
●A	1m (standard)
B	0.5m
C	2m
Z	Special length specification (max. 2.5m)

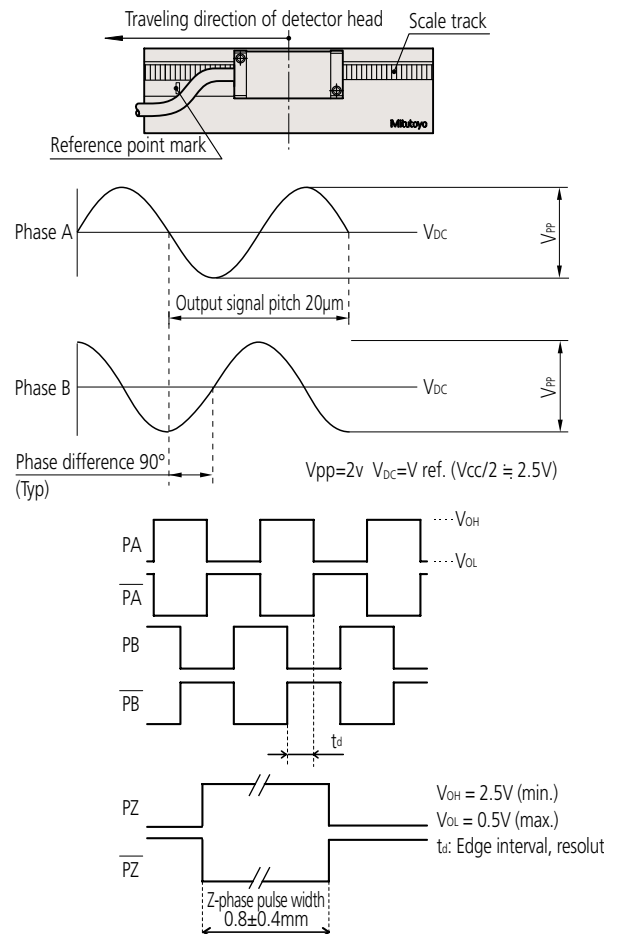
#### Alarm output

Code	Details
●S	Alarm signal
H	High impedance

#### Direction

Code	Details
●1	Normal
2	Reverse

When the direction is normal, the sinusoidal signal, the 2-phase square wave output signal (Phase A, Phase B) and the reference point signal waveform are as shown below.

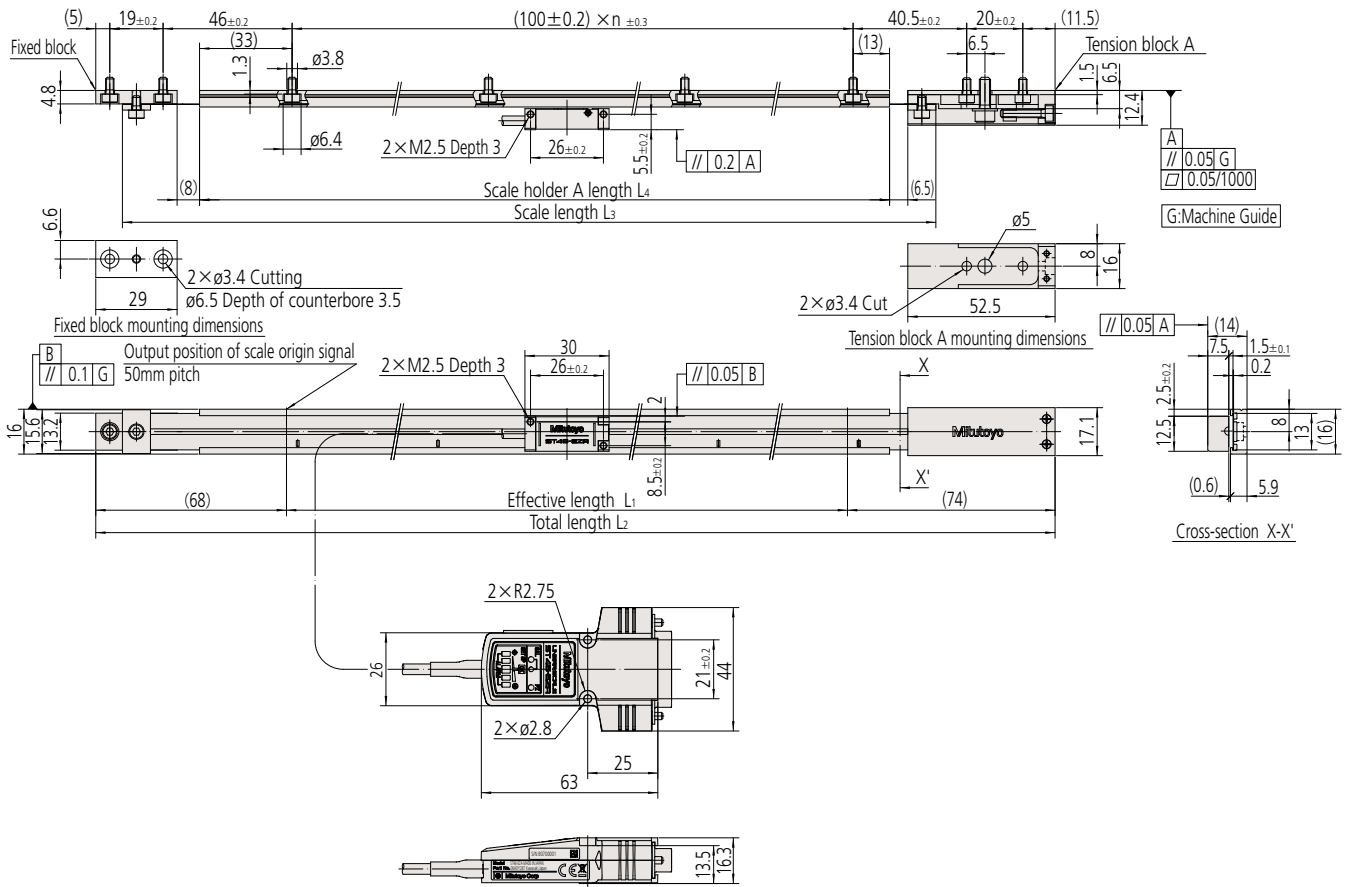




## (Metal Tape Scale Type)

- Double-end mounting design (effective range 500 to 1000mm)

Unit: mm



### Dimensions of scale units

Order No.	Code	Effective range L <sub>1</sub> (mm)	Scale Overall length L <sub>2</sub> (mm)	Scale length L <sub>3</sub> (mm)	Scale holder A length L <sub>4</sub> (mm)	n
579-678-□4	ST46EZA◇- 500D	500	642	590	546	5
579-679-□4	ST46EZA◇- 600D	600	742	690	646	6
579-680-□4	ST46EZA◇- 700D	700	842	790	746	7
579-681-□4	ST46EZA◇- 800D	800	942	890	846	8
579-682-□4	ST46EZA◇- 900D	900	1042	990	946	9
579-683-□4	ST46EZA◇-1000D	1000	1142	1090	1046	10

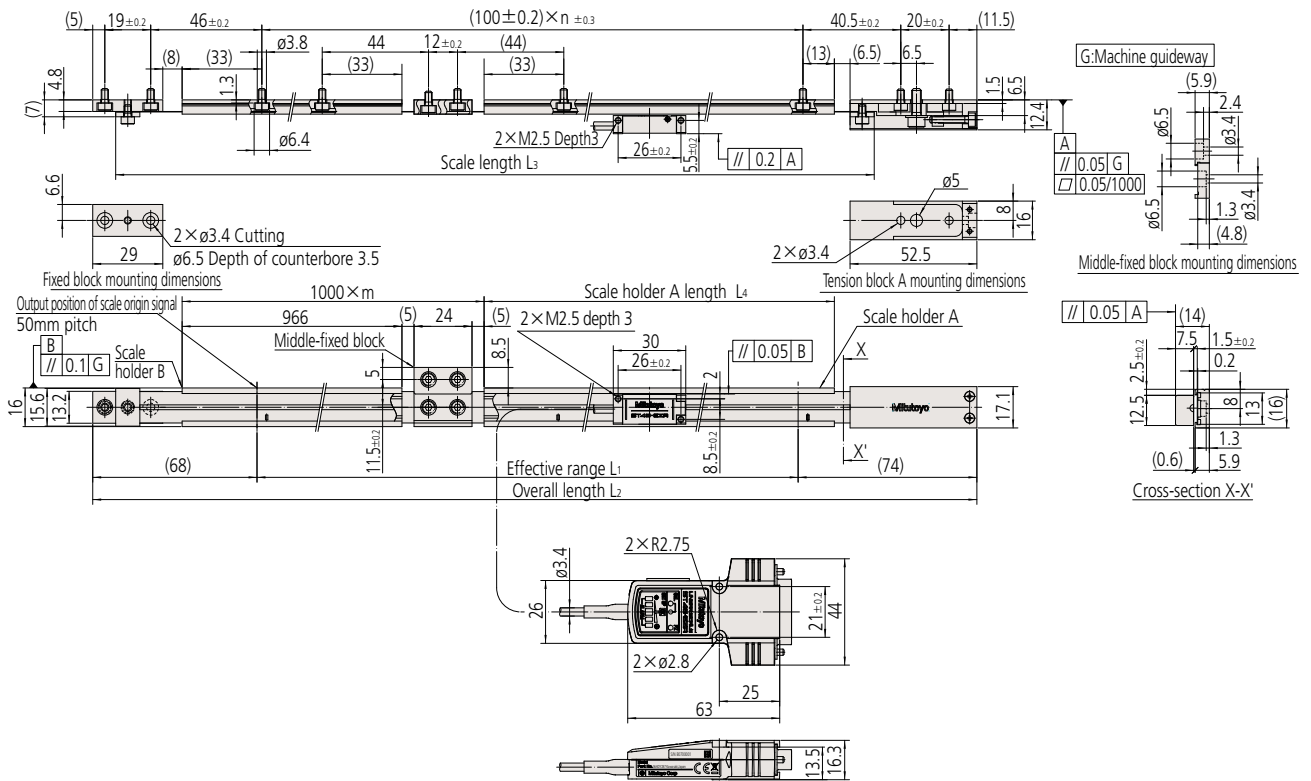
\* The above code numbers are for recommended items marked with symbol. If recommended specifications meet your requirements, please use these code numbers to order.

◇ → B (2-phase square wave signals + external reset input): □ → 1

◇ → C (2-phase square wave signals + 2-phase sinusoidal signals): □ → 2

- Double-end mounting design (effective range 1100 to 3000mm)

Unit: mm



## Dimensions of scale units

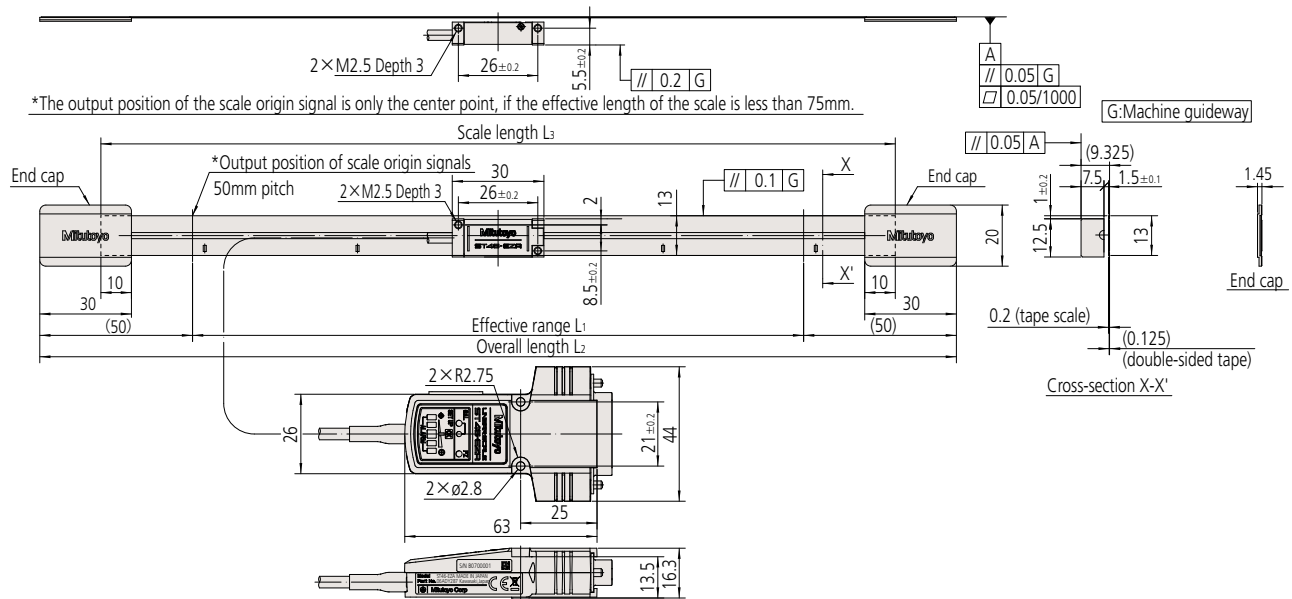
Order No.	Code	Effective range L <sub>1</sub> (mm)	Scale Overall length L <sub>2</sub> (mm)	Scale length L <sub>3</sub> (mm)	Scale holder A length L <sub>4</sub> (mm)	m	n
579-684-□4	ST46EZA◇-1100D	1100	1242	1190	146	1	11
579-685-□4	ST46EZA◇-1200D	1200	1342	1290	246	1	12
579-686-□4	ST46EZA◇-1300D	1300	1442	1390	346	1	13
579-687-□4	ST46EZA◇-1400D	1400	1542	1490	446	1	14
579-688-□4	ST46EZA◇-1500D	1500	1642	1590	546	1	15
579-689-□4	ST46EZA◇-1600D	1600	1742	1690	646	1	16
579-690-□4	ST46EZA◇-1700D	1700	1842	1790	746	1	17
579-691-□4	ST46EZA◇-1800D	1800	1942	1890	846	1	18
579-692-□4	ST46EZA◇-2000D	2000	2142	2090	1046	1	20
579-693-□4	ST46EZA◇-2200D	2200	2342	2290	246	2	22
579-694-□4	ST46EZA◇-2400D	2400	2542	2490	446	2	24
579-695-□4	ST46EZA◇-2500D	2500	2642	2590	546	2	25
579-696-□4	ST46EZA◇-2600D	2600	2742	2690	646	2	26
579-697-□4	ST46EZA◇-2800D	2800	2942	2890	846	2	28
579-698-□4	ST46EZA◇-3000D	3000	3142	3090	1046	2	30

\* The above code numbers are for recommended items marked with symbol. If recommended specifications meet your requirements, please use these code numbers to order.

- ◇ → B (2-phase square wave signals + external reset input): □ → 1
- ◇ → C (2-phase square wave signals + 2-phase sinusoidal signals): □ → 2

- Double-sided tape mounting design

Unit: mm



## Dimensions of scale units

Order No.	Code	Effective range L <sub>1</sub> (mm)	Scale Overall length L <sub>2</sub> (mm)	Scale length L <sub>3</sub> (mm)
579-665-□5	ST46EZA◇-10E	10	110	70
579-666-□5	ST46EZA◇-25E	25	125	85
579-667-□5	ST46EZA◇-50E	50	150	110
579-668-□5	ST46EZA◇-75E	75	175	135
579-670-□5	ST46EZA◇-100E	100	200	160
579-671-□5	ST46EZA◇-150E	150	250	210
579-672-□5	ST46EZA◇-200E	200	300	260
579-673-□5	ST46EZA◇-250E	250	350	310
579-674-□5	ST46EZA◇-300E	300	400	360
579-675-□5	ST46EZA◇-350E	350	450	410
579-676-□5	ST46EZA◇-400E	400	500	460
579-677-□5	ST46EZA◇-450E	450	550	510
579-678-□5	ST46EZA◇-500E	500	600	560
579-679-□5	ST46EZA◇-600E	600	700	660
579-680-□5	ST46EZA◇-700E	700	800	760
579-681-□5	ST46EZA◇-800E	800	900	860
579-682-□5	ST46EZA◇-900E	900	1000	960
579-683-□5	ST46EZA◇-1000E	1000	1100	1060
579-684-□5	ST46EZA◇-1100E	1100	1200	1160
579-685-□5	ST46EZA◇-1200E	1200	1300	1260
579-686-□5	ST46EZA◇-1300E	1300	1400	1360
579-687-□5	ST46EZA◇-1400E	1400	1500	1460
579-688-□5	ST46EZA◇-1500E	1500	1600	1560
579-689-□5	ST46EZA◇-1600E	1600	1700	1660
579-690-□5	ST46EZA◇-1700E	1700	1800	1760
579-691-□5	ST46EZA◇-1800E	1800	1900	1860
579-692-□5	ST46EZA◇-2000E	2000	2100	2060
579-693-□5	ST46EZA◇-2200E	2200	2300	2260
579-694-□5	ST46EZA◇-2400E	2400	2500	2460
579-695-□5	ST46EZA◇-2500E	2500	2600	2560
579-696-□5	ST46EZA◇-2600E	2600	2700	2660
579-697-□5	ST46EZA◇-2800E	2800	2900	2860
579-698-□5	ST46EZA◇-3000E	3000	3100	3060

\* The above code numbers are for recommended items marked with symbol. If recommended specifications meet your requirements, please use these code numbers to order.

- ◇ → B (2-phase square wave signals + external reset input): □ → 1
- ◇ → C (2-phase square wave signals + 2-phase sinusoidal signals): □ → 2