

■How to specify when ordering

SES - 10 -	MA - 36 -
SE - 17 -	MA - 50 -
ME - -	

Series name

Shaft type※1

Slit plate diameter

Resolution

Output (Pulses per revolution)

Output Code※2

Supply voltage※3

Blank: Voltage, C: Open collector, E: Line driver output

※1	Single end	Hollow shaft	Double end
	S	H	D

※2	Gray	Pure binary	BCD
	G	N	B

※3	DC5V	DC12V	DC5~12V	24V
	1	2	3	4

Series name

Slit plate diameter

Resolution/Minimal reading unit

Measurement range (mm)

MLS - - -

■Contents

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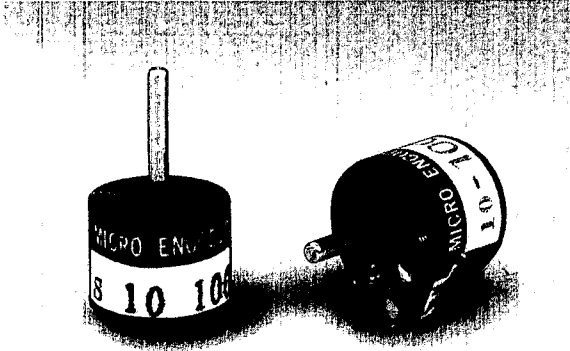
SUNSTAR MTL

SE series

— Approx. Sine wave —
(Incremental)

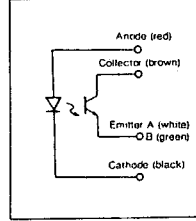
■ Features

- SE series encoders serve as multi-function sensors for detecting angular deflection and movement in such small systems as office automation equipment, automatic vending machines and card readers.
- Their small size (shaft diameters of 2mm and 4mm) permits a high degree of design freedom for the OEM engineer.
- The low current consumption (10-12mA) of the SE series, along with their sine wave output, allows them to be connected directly to existing circuits.

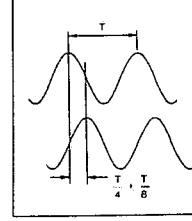


SES-10 series

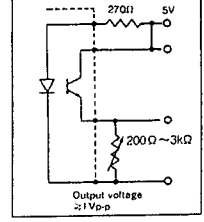
■ Output circuit



■ Output waveform

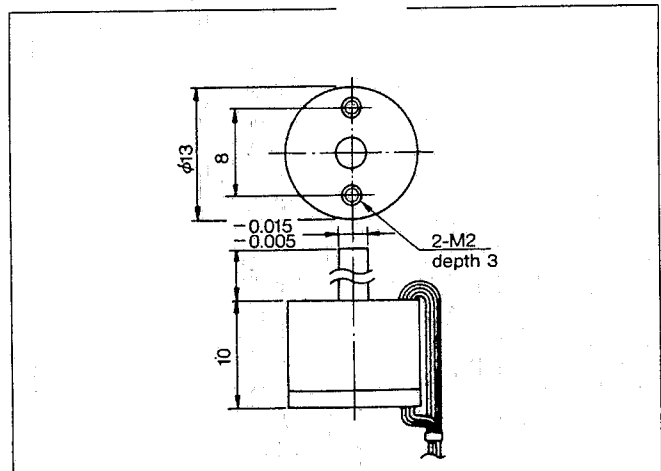


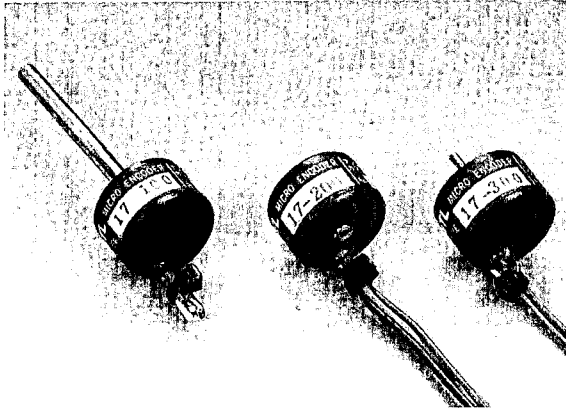
■ Connection example



Item	Type	SES-10 $\square$ (A/AB)
Supply voltage		DC5V
Current consumption		LED: maximum 20mA
Detection system		Incremental
Output	Pulses/revolution (standard)	100 200
	Output phase	A phase / A, B phase
	Output type	Approximate sine wave
	Output capacity	—
	Maximum frequency response	20kHz
	Output phase difference	A/B phase difference $90^\circ \pm 45^\circ$
Waveform rise/fall time		—
Starting torque		$\leq 0.3 \times 10^{-3} \text{N} \cdot \text{m} (3 \text{gf} \cdot \text{cm})$
Allowable shaft loading	Radial	1.9N (200g)
	Axial	1.9N (200g)
Maximum rotational speed		6000min^{-1}
Operating range temperature / humidity		$0^\circ \text{C} \sim 50^\circ \text{C}$
Storage ambient temperature		$-20^\circ \text{C} \sim 80^\circ \text{C}$
Vibration resistance		Equivalent to ME series
Impact resistance		Equivalent to ME series
Cable		Vinyl cable 130mm
Weight		10g

■ Dimensions, mm



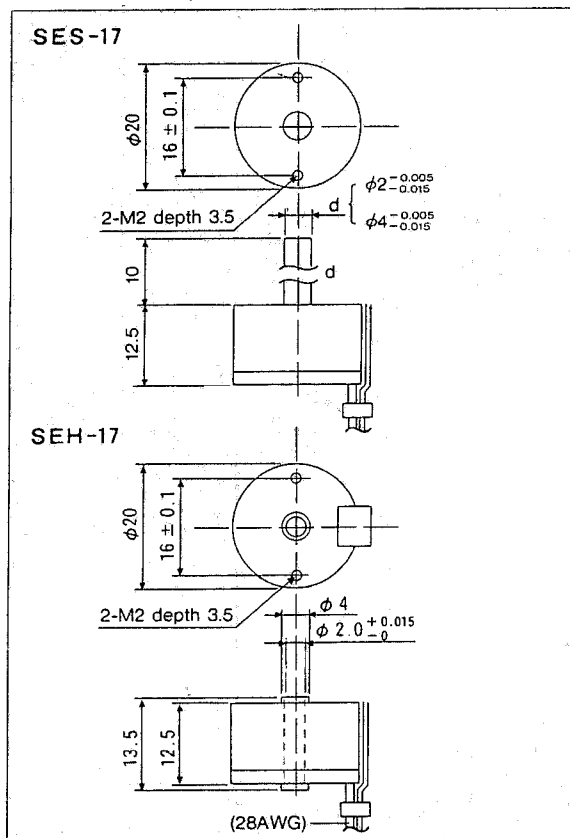


SE-17 series

Typical applications

- Printers
- Money (Bill) counters
- Vending machines
- Card readers
- Pen recorders
- Office products

Dimensions, mm



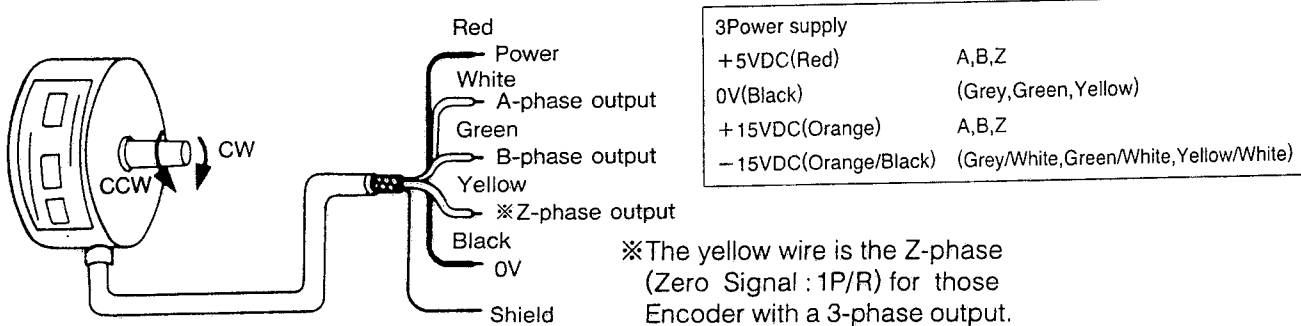
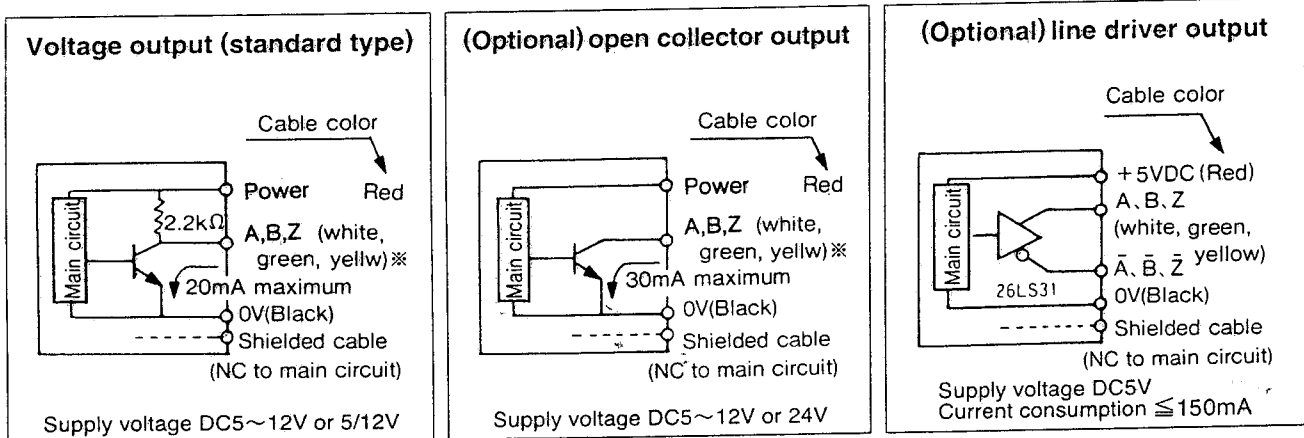
Item	Type	SE $\square$ $\left(\frac{2}{4}\right)$ -17- $\square$ $\left(\frac{A}{AB}\right)$
Supply voltage		DC5V
Current consumption		LED: maximum 20mA
Detection system		Incremental
Output	Pulses/revolution (standard)	100 200 300
	Output phase	A phase / A, B phase
	Output type	Approximate sine wave
	Output capacity	—
	Maximum frequency response	20kHz
	Output phase difference	A/B phase difference $90^\circ \pm 45^\circ$
	Waveform rise/fall time	—
Starting torque		$\leq 0.3 \times 10^{-3} \text{N} \cdot \text{m}$ (3gf-cm)
Allowable shaft loading	Radial	1.9N (200g) ※4.9N (500g)
	Axial	1.9N (200g) ※4.9N (500g)
Maximum rotational speed		6000min^{-1}
Operating range temperature /humidity		$0^\circ\text{C} \sim 50^\circ\text{C}$
Storage ambient temperature		$-20^\circ\text{C} \sim 80^\circ\text{C}$
Vibration resistance		Equivalent to ME series
Impact resistance		Equivalent to ME series
Cable		Vinyl cable 130mm
Weight		23g

ME series — Square wave — (Incremental)

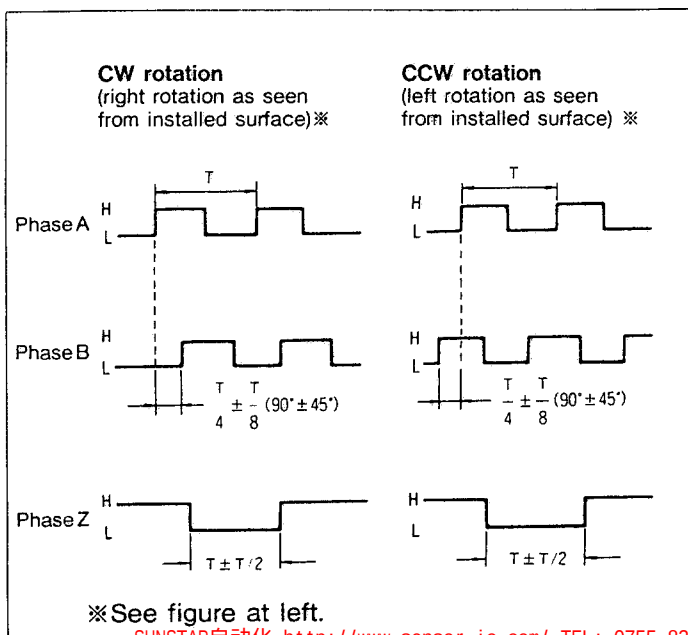
■Features

- The ME series includes encoders covering a wide range of pulses per revolution. In addition, we can custom fabricate encoders with non-standard pulse counts.
- This series encompasses a range of sizes from very small to large. The specific encoder should be chosen based on the shaft diameter and the number of pulses per revolution.
- All of the encoders have a thin cross section. The hole type is especially suited for installation where space is limited.
- Depending on the application, we can select encoders to optimize such specific characteristics as high signal-to-noise ratio or low power consumption.

■Output Circuit Diagram



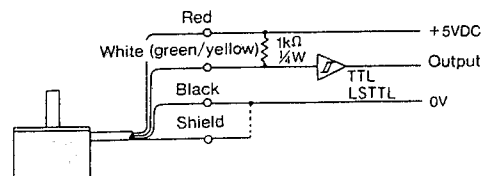
■Output waveform



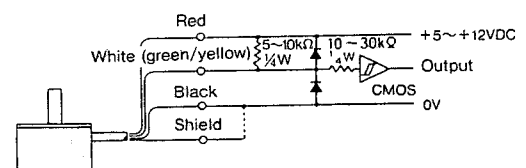
■Typical Wiring Diagrams

Connection with IC circuit
(cable length should be as short as possible)

(1) Connection to TTL/LSTTL



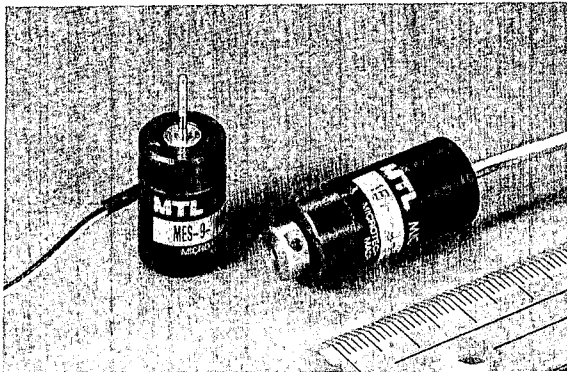
(2) Connection to CMOS





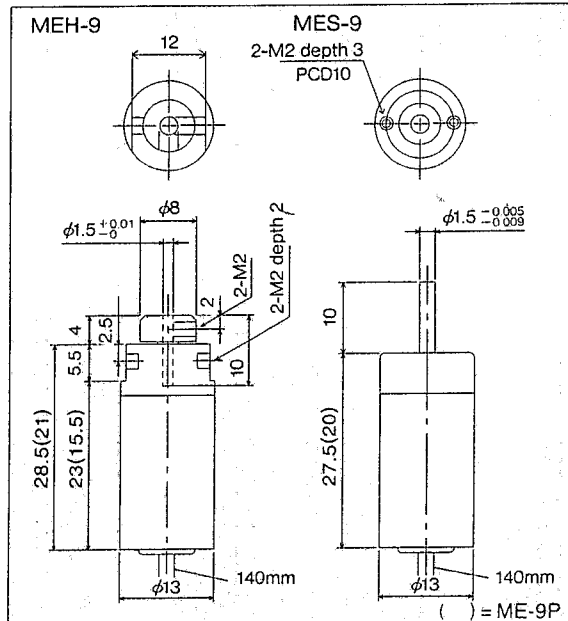
■Features

- Smallest, digital output encoder
- Resolution to 1000P/R
- 3channels
- Easy to install on miniature motors (Hollow shaft)
- Special P/R can be made upon request



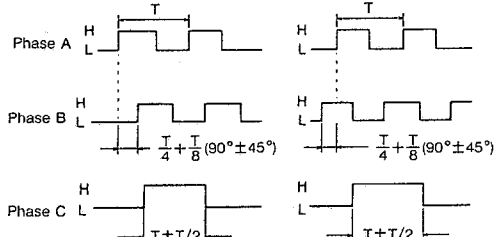
ME-9 series ME-9-P series **NEW**

■Dimensions, mm



■Outputwave forms(ME-9, ME-9P only)

CW rotation(right rotation as seen from installed surface) ※ CCW rotation(right rotation as seen from installed surface) ※



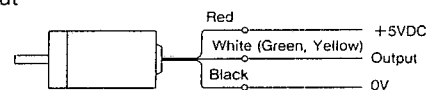
■Typical applications

- Motor Drives, DC servo motors
- X-Y tables
- Medical diagnostic equipment
- Small robotics
- Office products
- Welding Machines

Item \ Type	ME□-9-□	ME□-9-□P
Supply voltage	DC +5V ± 5%	5V ± 10%
Current consumption	60mA	40mA
Detection system	Incremental	
Pulses/revolution (standard)	32 100 200	300 360 ※1000
Output phase	A, B, Z output	
Output type	Square wave Voltage output only	Square wave Line driver N/A
Output capacity	Sink current 8mA max Residual voltage 0.8V or less(at 5mA)	Sink current 20mA max Residual voltage 0.5V or less(at 10mA)
Maximum frequency response	50kHz	100kHz
Output phase difference	A/B phase difference 90° ± 45° T/4 ± T/8 Z phase T ± T/2(see output waveform diagram)	
Waveform rise/fall time	2μs or less(output cable 140mm or less)	
Starting torque	≤ 1 × 10 ⁻³ N · m (10gf · cm)	
Allowable shaft loading	Radial	1.9N(200g) ※0.9N(100g)
	Axial	1.9N(200g) ※0.9N(100g)
Maximum rotational speed	6000min ⁻¹	
Operating range temperature /humidity	0°C ~ +60°C RH35% to 90%(above the dew point)	
Storage ambient temperature	-20°C ~ 80°C	
Vibration resistance	Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions	
Impact resistance	Endurance 500m/S ² (about 50G) 3 times each in X, Y and Z directions	
Cable	Φ3mm Vinyl cable 5-core 1m long Insulated shielded cable	
Weight	12g	10g

■Typical Wiring Diagrams(ME-9 only)

① Voltage output



② Connection to the outside transistor





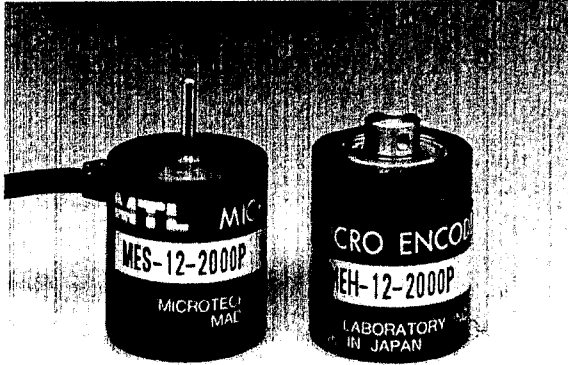
(ME-12-P series only)

■ Features

- Smallest, digital output encoder
- Resolution to 2000 P/R
- 3channels
- Easy to install on miniature motors
(Hollow shaft)
- Special P/R can be made upon request

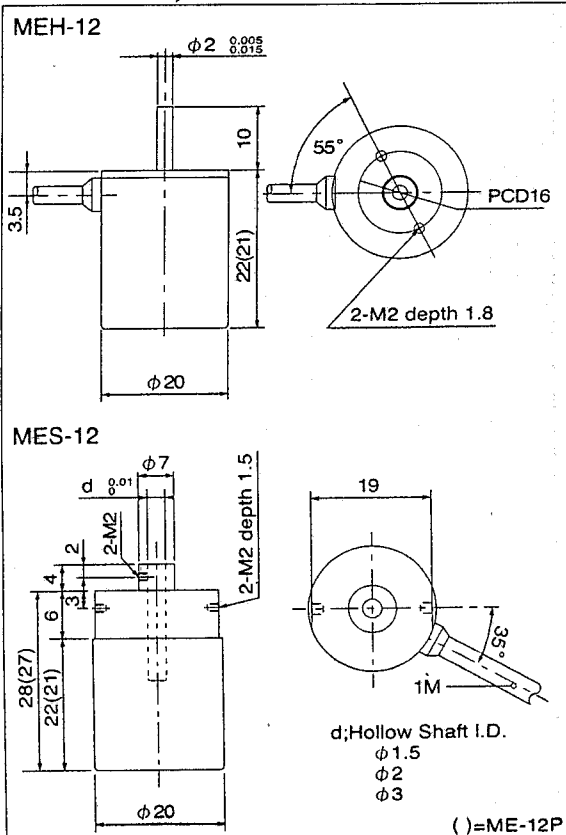
■ Typical applications

- Motor Drives, DC servo motors
- X-Y tables
- Medical diagnostic equipment
- Small robotics
- Office products
- Welding Machines



ME-12 series ME-12-P series **NEW**

■ Dimension, mm



Type		ME□-12-□	ME□-12-□P
Item			
Supply voltage		DC5V±5%	±10%
Current consumption		60mA	40mA
Detection system		Incremental	
Output	Pulses/revolution (stander)	100 200 256 300 360 500 900	500 1000 ※2000
	Output phase	A,B,Z output	
	Output type	Square wave	
	Output capacity	Sink current:20mA Residual voltage:0.5V or less(at 10mA)	
	Maximum frequency response	100kHz	
	Output phase difference	A/B phase difference 90°±45° T/4±T/8 Z phase T±T/2(see output waveform diagram).	
	Waveform rise/fall time	2μs or less(output cable 1m or less)	
Starting torque		1×10N·m(10gf-cm)	
Allowable shaft loading	Radial	1.9N(200g)	※0.9N(100g)
	Axial	1.9N(200g)	※0.9N(100g)
Maximum rotational speed		6000min ⁻¹	
Operating range temperature /humidity		0°C~+60°C RH35% to 90%(above the dew point)	
Storage ambient temperature		-20°C~80°C	
Vibration resistance		Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions	
Impact resistance		Endurance 500m/S ² (about 50G) 3 times each in X, Y and Z directions	
Cable		Φ3mm Vinyl cable 5-core 1m long Insulated shielded cable	
Weight		40g	

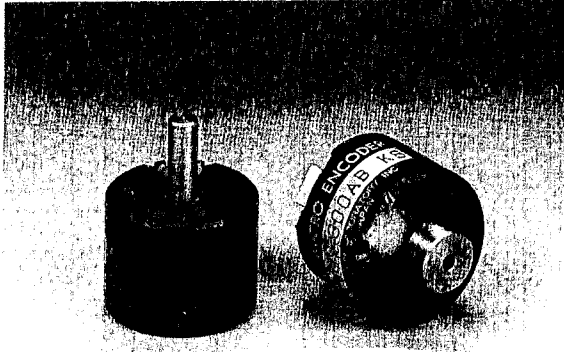


■ Features

- Smallest & digital output encoder
- Resolution to 500P/R
- 3channels
- Special P/R can be made upon request
- Low cost
- Short delivery lead time

■ Typical applications

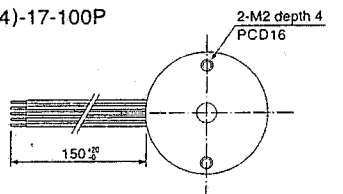
- Motor Drives DC servo motors
- X-Y tables
- Medical diagnostic equipment
- Small robotics
- Office products
- Welding Machines



ME-17-P series

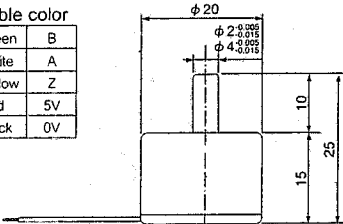
■ Dimension, mm

MES(4)-17-100P

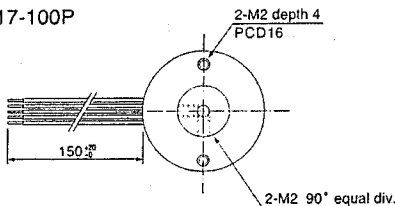


cable color

Green	B
White	A
Yellow	Z
Red	5V
Black	0V



MEH-17-100P

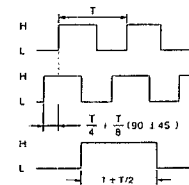
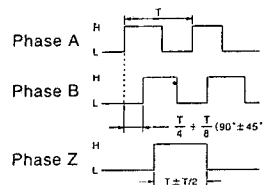


Item	Type	ME $\square$ $\left(\frac{2}{4}\right)$ -17- $\square$
Supply voltage		DC5V $\pm$ 10%
Current consumption		$\leq$ 30mA
Detection system		Incremental
Output	Pulses/revolution (stander)	100 300 400 200 360 500
	Output phase	A.B.Z phase (Z="H")
	Output type	Square wave, Voltage output only pull-up resistor 10K Ω
	Output capacity	Sink current : 20mA Residual voltage : 0.4V or less
	Maximum frequency response	50kHz
	Output phase difference	A/Bphase difference $90^\circ \pm 45^\circ$ T/4 $\pm$ T/8 Z phase $T \pm T/2$ (see output waveform diagram).
	Waveform rise/fall time	2 μ s or less (output cable 1m or less)
	Starting torque	$\leq 1 \times 10^{-3}$ N $\cdot$ m (10gf-cm)
Allowable shaft loading	Radial	1.9N (200g)
	Axial	1.9N (200g)
	Maximum rotational speed	6000min $^{-1}$
	Operating range temperature /humidity	0 $^\circ$ C $\sim$ 50 $^\circ$ C RH35 to 90% (above the dew point)
	Storage ambient temperature	-20 $^\circ$ C $\sim$ 80 $^\circ$ C
	Vibration resistance	Endurance 55Hz double amplitude 1.5mm 2 hours each in X,Y and Z directions
	Impact resistance	Endurance 500m/s 2 (about 50G) 3 times each in X,Y and Z directions
	Cable	150mm long cable vinyl cable (AWG28)
	Weight	20g

■ Outputwave forms (ME-17 onry)

CW rotation (right rotation as seen from installed surface)※

CCW rotation (right rotation as seen from installed surface)※





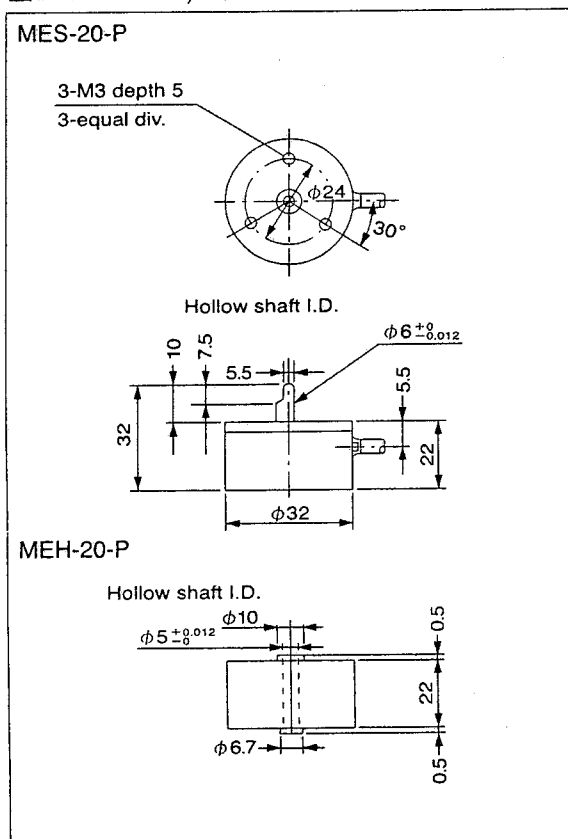
■Features

- Resolution to 2500 P/R, digital output
- Thin, compact and light weight ($\phi 32$ mm diameter, 22mm height)
- Economical
- Single, hollow or double shaft available
- Custom-made (Special shaft or P/R, etc.) is available by request
- Short delivery lead time



ME-20-P series

■Dimensions, mm



■Typical applications

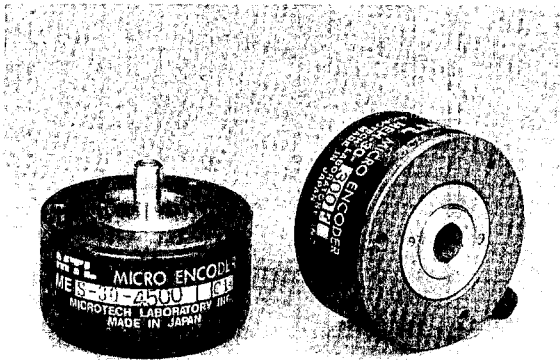
- Servo motors
- Robots
- NC machines (lathe, etc.)
- Digital plotters
- X-Y tables
- Plotters
- Injection machines
- Rotary tables
- Cutting machines
- IC bonders
- Medical equipments
- Valve controls
- Tape speed control
- Pulse generators
- Coil winders

Item	Type	ME ☐ -20- ☐ P			
Supply voltage		DC5~12V $\pm 10\%$ DC24V $\pm 10\%$ (Open collector only)			
Current consumption		≤ 50 mA			
Detection system		Incremental			
Output	Pulses/revolution (standard)	50	400	600	1800
		60	500	800	2000
		100		1000	2048
		200		1024	2500
		250		1200	
		256			
		300			
		360			
Output	Output phase	A,B,Z phase			
	Output type	Square wave			
	Output capacity	Sink current: 20mA Residual voltage: 0.5V or less (at 10mA)			
	Maximum frequency response	100kHz			
	Output phase difference	A/B phase difference $90^\circ \pm 45^\circ T/4 \pm T/8$ Z phase $T \pm T/2$ (see output waveform diagram).			
Output	Waveform rise/fall time	2 μ s or less (output cable 1m or less)			
	Starting torque	$\leq 2 \times 10^{-3}$ N·m (20gf·cm)			
Allowable shaft loading	Radial	19.6N (2kg)	14.7N (1.5kg)		
	Axial	9.8N (1kg)	4.9N (0.5kg)		
Maximum rotational speed		6000min ⁻¹			
Operating range temperature /humidity		-10°C~70°C RH35 to 90%(above the dew point)			
Storage ambient temperature		-20°C~80°C			
Vibration resistance		Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions			
Impact resistance		Endurance 500m/S ² (about 50G) 3 times each in X, Y and Z directions			
Cable		$\phi 4.2$ mm 4-core(5-core) Insulated Shielded vinyl, 1m long			
Weight		70g			



■ Features

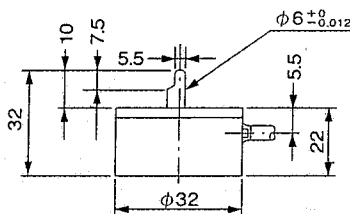
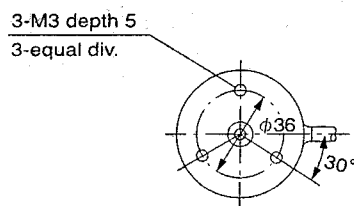
- Resolution to 4500 P/R, digital output
- A, B and Z 3 channels
- Thin, compact and light weight
($\phi 44\text{mm}$ diameter, 22mm height)
- Economical
- Single, hollow or double shaft available
- Custom-made (Special shaft or P/R, etc.) is available by request
- Short delivery lead time



ME-30-P series

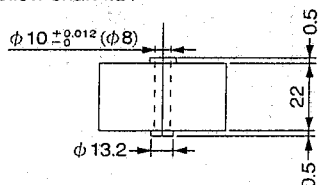
■ Dimensions, mm

MES-30-P



MEH-30-P

Hollow shaft I.D.



■ Typical applications

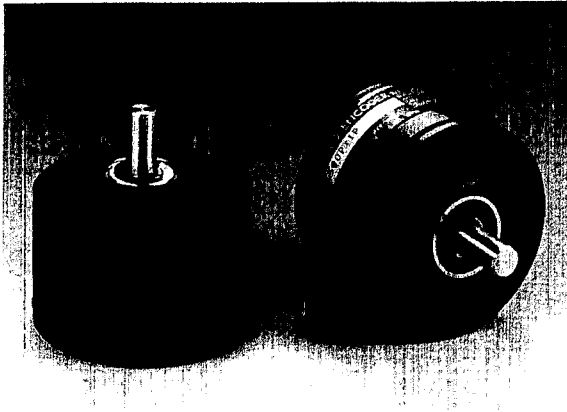
- Servo motors
- Robots
- NC machines (lathe, etc.)
- X-Y tables
- Rotary tables
- Overhead cranes
- Plotters
- Automatic storage and retrieval systems
- Elevators
- IC bonders
- Semiconductor chip mounters
- Coil winders
- Conveyors
- Cutting machines

Item		Type	ME -30- P			
Supply voltage			DC5~12V ± 10% DC24V ± 10%(Open collector only)			
Current consumption			≤50mA			
Detection system			Incremental			
Output	Pulses/revolution (standard)		100	500	800	2500
			200	600	1000	3600
			250		1024	4500
			300		1200	
			360		1500	
			400		1800	
			450		2000	
					2048	
Output phase		A,B,Z phase				
Output type		Square wave				
Output capacity		Sink current: 20mA Residual voltage:0.5V or less (at 10mA)				
Maximum frequency response		100kHz				
Output phase difference		A/B phase difference 90°±45°T/4±T/8 Z phase T±T/2 (see output waveform diagram).				
Waveform rise/fall time		2μs or less (output cable 1m or less)				
Starting torque			≤3×10 ⁻³ N·m(30gf·cm)			
Allowable shaft loading	Radial	19.6N (2kg)		9.8N (1kg)		
	Axial	9.8N (1kg)		4.9N (0.5kg)		
Maximum rotational speed			6000min ⁻¹			
Operating range temperature /humidity			-10℃~70℃ RH35 to 90%(above the dew point)			
Storage ambient temperature			-20℃~80℃			
Vibration resistance			Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions			
Impact resistance			Endurance 500m/S ² (about 50G) 3 times each in X,Y and Z directions			
Cable			φ4.2mm 5-core Insulated Shielded vinyl, 1m long			
Weight			140g			



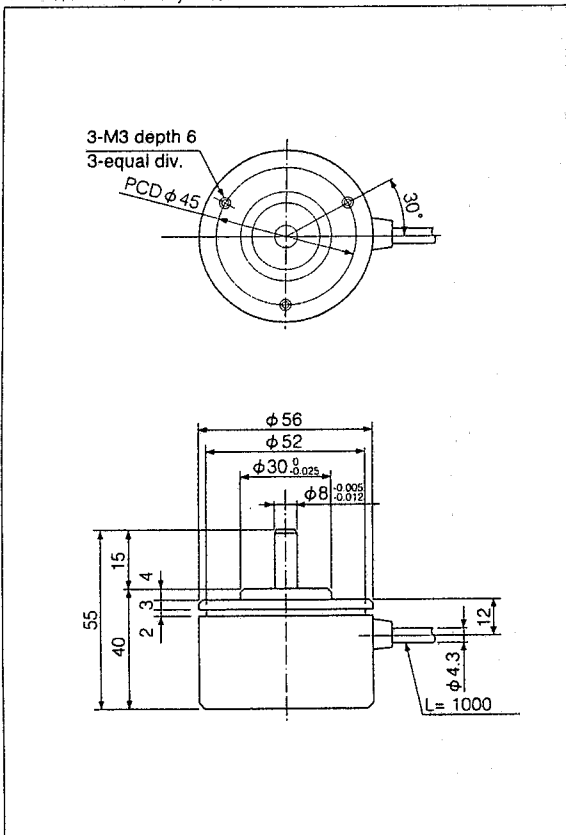
■ Features

- Resolution to 10000P/R digital output
- 3channels
- Heavy-Duty Type
- Custom-made (special P/R, Dripping proof) is available by request
- Short delivery lead time



MES-40-P series

■ Dimension, mm



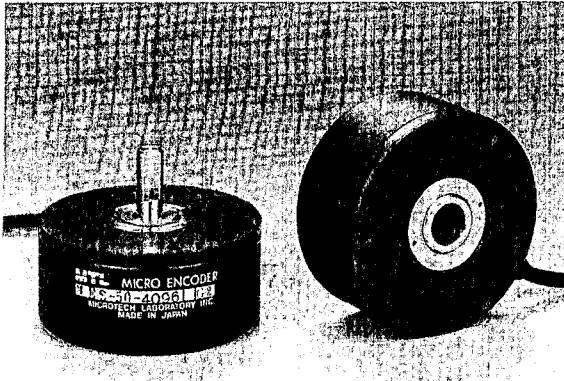
■ Typical applications

- Machine tools
- Industrial robots
- IC bonders
- Rotary tables
- Test and measurement equipment
- Semiconductor chip mounters
- Laboratory use
- Elevators
- Injection machines
- Bending machines
- Conveyor systems
- X-Y tables

Item	Type	MES-40-□P
Supply voltage		DC5~12±10% DC24±10% (Open collector only)
Current consumption		≤40mA
Detection system		Incremental
Output	Pulses/revolution (standard)	100 1000 200 1024 300 2000 360 3600 400 4000 500 5000 600 10000
	Output phase	A.B.Z phase
	Output type	Square wave
	Output capacity	Sink current : 20mA Residual voltage : 0.5V or less (at 10mA)
	Maximum frequency response	100kHz
	Output phase difference	A/Bphase difference 90°±45° T/4±T/8 Z phase T±T/2(see output waveform diagram)
	Wave rise/fall time	2μs or less (output cable 1m or less)
	Starting torque	≤2×10 ⁻³ N·m(20gf·cm) ≤5×10 ⁻³ N·m(50gf·cm) [Dripping proof]
	Allowable shaft loading	Radial 49N (5kg) Axial 29.4N (3kg)
	Maximum rotational speed	6000min ⁻¹
Operating range temperature /humidity		-10℃~70℃ RH35% to 90%(above the dew point)
Storage ambient temperature		-20℃~80℃
Vibration resistance		Endurance 55Hz double amplitude 1.5mm 2 hours each in X,Y and Z directions
Impact resistance		Endurance 500m/s ² (about 50G) 3 times each in X,Y and Z directions
Cable		φ4.2mm 5-core insulated Shielded vinyl, 1m long
Weight		200g

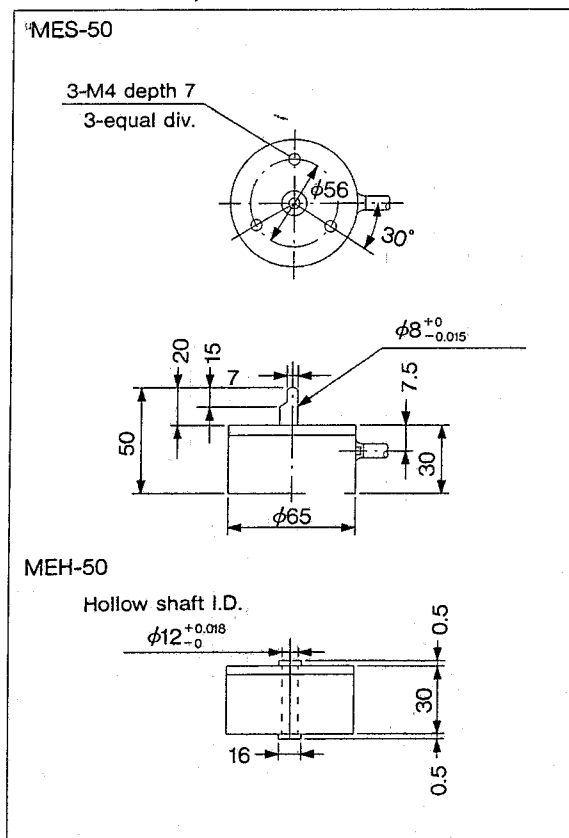
■Features

- Resolution to 10800 P/R, digital output
- A, B and Z 3 channels
- Thin and compact body ($\phi 65$ mm diameter, 30mm height)
- Single, hollow on double shaft available
- Custom-made models (Special shaft or P/R, etc.) are available by request
- Short delivery lead time



ME-50 series

■Dimensions, mm



■Typical applications

- Machine tools
- Industrial robots
- IC bonders
- Rotary tables
- Test and measurement equipment
- Semiconductor chip mounters
- Laboratory use
- Elevators
- Injection machines
- Bending machines
- Conveyor systems
- X-Y tables
- Antenna

Item \ Type		ME -50-	
Supply voltage		DC5~12V $\pm 10\%$ DC24V $\pm 10\%$ (Open collector only)	
Current consumption		≤ 60 mA	
Detection system		Incremental	
Output	Pulses/revolution (standard)	500 1000 1024 2000	3000 3600 4096 5000 5400 6000 10000 10800
	Output phase	A,B,Z phase	
	Output type	Square wave	
	Output capacity	Sink current: 20mA Residual voltage: 0.5V or less (at 10mA)	
	Maximum frequency response	100kHz	
	Output phase difference	A/B phase difference $90^\circ \pm 45^\circ$ T/4 $\pm$ T/8 Z phase T $\pm$ T/2 (see output waveform diagram).	
Waveform rise/fall time		2 μ s or less (output cable 1m or less)	
Starting torque		$\leq 10 \times 10^{-3}$ N·m (100gf·cm)	
Allowable shaft loading	Radial	19.6N (2kg)	9.8N (1kg)
	Axial	9.8N (1kg)	4.7N (0.5kg)
Maximum rotational speed		6000min ⁻¹	
Operating range temperature / humidity		0°C~60°C RH35 to 90% (above the dew point)	
Storage ambient temperature		-20°C~80°C	
Vibration resistance		Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions	
Impact resistance		Endurance 500m/S ² (about 50G) 3 times each in X, Y and Z directions	
Cable		$\phi 4.2$ mm 5-core Insulated Shielded vinyl, 1m long	
Weight		220g	

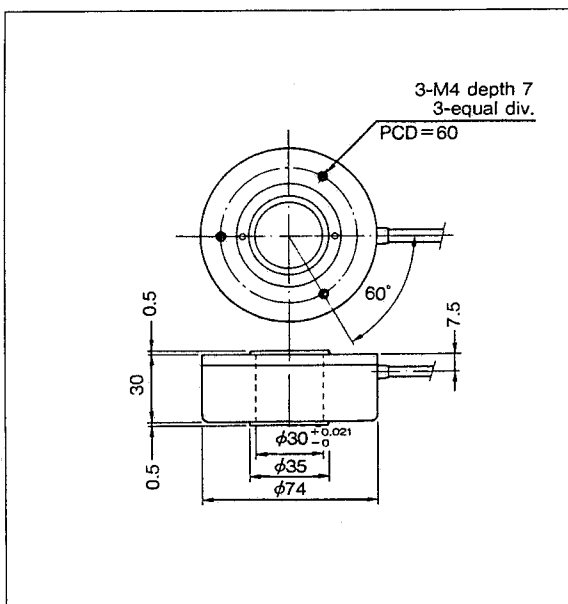
■ Features

- Resolution to 9000 P/R, digital output (possible to 21600 P/R)
- Wide hollow diameter 30mm, thickness 30mm
- Custom-made models (Special hollow dia. or P/R) are available by request
- Short delivery lead time



MEH-60 series

■ Dimensions, mm



■ Typical applications

- Lathes
- Index tables
- Wire, die bonders
- Steering torque/angle sensing
- Valve controls
- Robotics
- Testing and measuring systems
- Semiconductor chip mounters
- Balance machines
- Telescopes
- Laboratory use
- Radar
- X-Y tables

Item		Type	ME -60-	
Supply voltage			DC5~12V 10%(※5V only) DC24V 10%(Open collector only)	
Current consumption			≤60mA ※≤120mA	
Detection system			Incremental	
Output	Pulses/revolution (standard)		180 600 200 1000 360 400 500	1800 2000 4000 5000 5400 9000 10000 10800 ※21600
	Output phase		A,B,Z phase	
	Output type		Square wave	
	Output capacity		Sink current: 20mA Residual voltage:0.5V or less (at 10mA)	
	Maximum frequency response		100kHz	
	Output phase difference		A/B phase difference 90°±45°T/4±T/8 Z phase T±T/2 (see output waveform diagram).	
	Waveform rise/fall time		2μs or less (output cable 1m or less)	
	Starting torque			≤20×10 ⁻³ N·m(200gf·cm)
Allowable shaft loading	Radial	19.6N (2kg)	9.8N (1kg)	
	Axial	9.8N (1kg)	4.9N (0.5kg)	
Maximum rotational speed			1000min ⁻¹	
Operating range temperature /humidity			0°C~60°C ※0°C~50°C RH35 to 90% (above the dew point)	
Storage ambient temperature			- 20°~80°C	
Vibration resistance			Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions	
Impact resistance			Endurance 500m/S ² (about 50G) 3 times each in X, Y and Z directions	
Cable			φ4.2mm 5-core Insulated Shielded vinyl, 1m long	
Weight			320g ※430g	

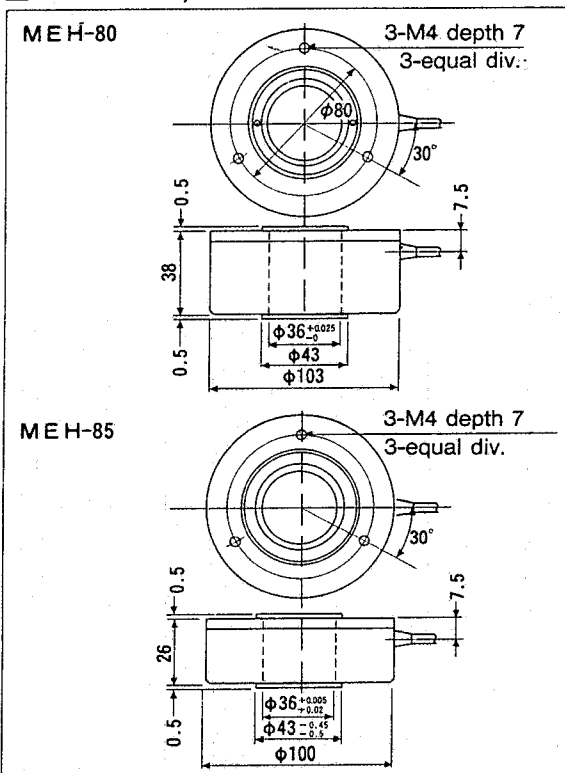
■Features

- Resolution to 21600 P/R, digital output
- Wide hollow diameter 36mm
- High resolution and accuracy
- Possible to 0.01°, 0.005° or 15sec reading



MEH-80 series MEH-85 series

■Dimensions, mm



■Typical applications

- Index tables
- Testing equipments
- High performance measuring equipments
- Laboratory use
- Gyroscopes
- Telescopes
- Wire, die bonders
- NC machines
- Robots
- Precise position controls
- Radar

Item \ Type		MEH-80- ☐	MEH-85- ☐	
Supply voltage		DC5~12V±10% DC24V±10%(Open collector only)		
Current consumption		≤60mA		
Detection system		Incremental		
Output	Pulses/revolution (standard)	600 1000 1500 18000 ※21600	500 1000 1024 3600 4500 5400	7200 11250 18000 20250 21600
	Output phase	A,B,Z phase ※A,B phase		
	Output type	Square wave		
	Output capacity	Sink current: 20mA Residual voltage: 0.5V or less (at 10mA)		
	Maximum frequency response	100kHz		
	Output phase difference	A/B phase difference 90 °±45 °T/4±T/8 Z phase T±T/2 (see output waveform diagram).		
	Waveform rise/fall time	2μs or less (output cable 1m or less)		
	Starting torque		≤40×10 ⁻³ N·m(400gf·cm)	
Allowable shaft loading	Radial	14.7N (1.5kg)	9.8N (1kg)	
	Axial	4.7N (0.5kg)	4.7N (0.5kg)	
Maximum rotational speed		1000min ⁻¹		
Operating range temperature /humidity		0℃~60℃ RH35 to 90% (above the dew point)		
Storage ambient temperature		-20℃~80℃		
Vibration resistance		Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions		
Impact resistance		Endurance 500m/S ² (about 50G) 3 times each in X, Y and Z directions		
Cable		φ4.2mm 5-core Insulated Shielded vinyl, 1m long		
Weight		630g	520g	

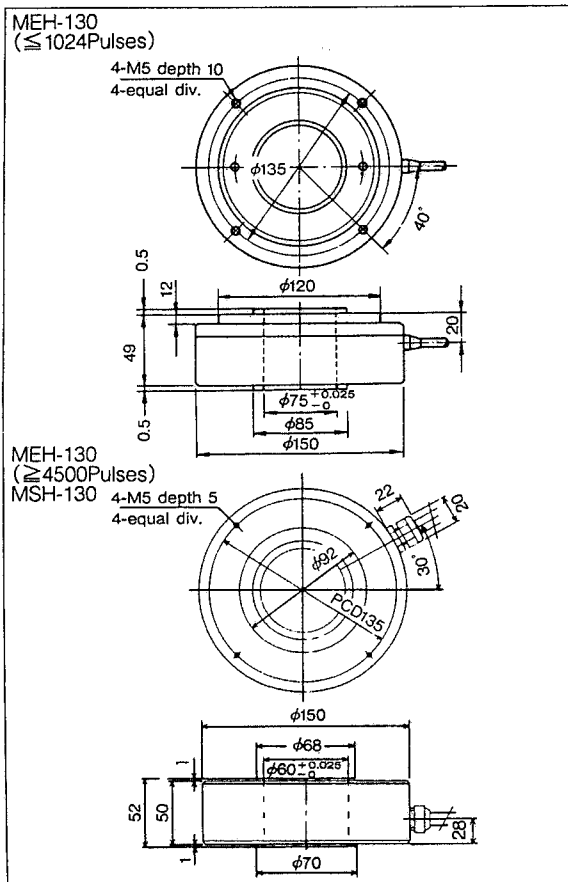
■Features

- Resolution to 32400 P/R, digital output
- Wide hollow diameter 60mm or 75mm
- High resolution and accuracy
- The sine wave models work with MT series



MEH-130 series MSH-130 series

■Dimensions, mm



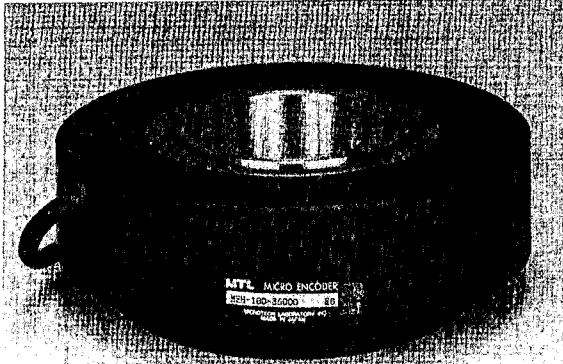
■Typical applications

- High performance measuring equipments
- Testing equipments.
- Index tables
- Precise position controls
- Laboratory use
- Telescopes

Item	Type	MEH-130-□	MSH-130-□
Supply voltage/ Current consumption		DC5V~12V ±10% ※DC24V ±10% (Open collector only) 60mA~150mA	3 power supply ±DC15V ±10% ≤0.3A +DC5V ±10% ≤0.6A
Detection system		Incremental	
Output	Pulses/revolution (standard)	360 600 1024 4500 20250 25000 28125	4500 5000 11250 20250 25000 28125 ※32400
	Output phase	A,B,Z phase	※A,B phase
	Output type	Square wave	Sine wave
	Output capacity	Sink current: 20mA Residual voltage: 0.5V or less (at 10mA)	10Vp-p ±10mA
	Maximum frequency response	100kHz	30kHz
	Output phase difference	A/B phase difference 90° ±45° T/4 ± T/8 Z phase T ± T/2 (see output waveform diagram).	
	Waveform rise/fall time	2μs or less (output cable 1m or less)	—
Starting torque		≤50 × 10 ⁻³ N·m (500gf·cm)	
Allowable shaft loading	Radial	19.6N (2kg)	
	Axial	9.8N (1kg)	
Maximum rotational speed		1000min ⁻¹	
Operating range temperature /humidity		0°C~60°C RH35 to 90% (above the dew point)	
Storage ambient temperature		-20°C~80°C	
Vibration resistance		Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions	
Impact resistance		Endurance 500m/S ² (about 50G) 3 times each in X, Y and Z directions	
Cable		φ4.2mm 5-core Insulated Shielded vinyl, 1m long	φ8 7-core vinyl Insulated Shielded cable, 1m long
Weight		3kg	

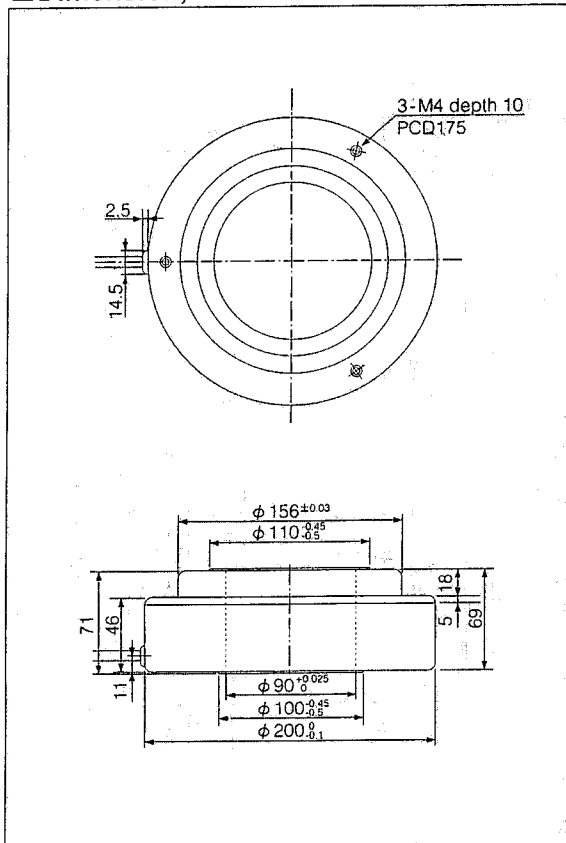
■ Features

- Resolution to 54000P/R digital output
- Wide hollow diameter 90mm
- High resolution and accuracy



MEH-180 series

■ Dimension, mm



■ Typical applications

- High performance measuring equipments
- Testing equipments
- Index tables
- Precise position controls
- Laboratory use
- Telescopes
- Gyroscopes

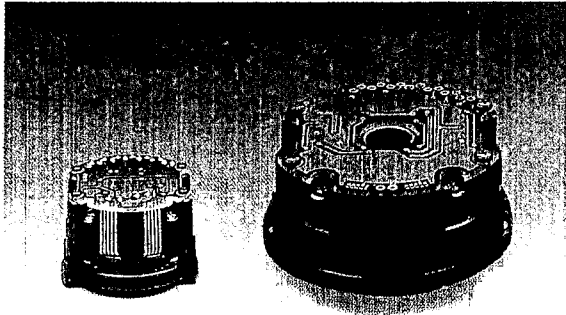
Item	Type	MEH-180-
Supply voltage/ Current consumption	3 power supply	
	DC±15V ±10% ≤0.2A	
	DC+5V ±10% ≤0.2A	
Detection system		Incremental
Output	Pulses/revolution (standard)	36,000 54,000
	Output phase	A.B.Z phase
	Output type	Square wave Line driver
	Output capacity	V _{OL} =0.5Vmax V _{OH} =2.5Vmin I _o =±20mA
	Maximum frequency response	300kHz
	Output phase difference	A/B phase difference 90°±45° T/4±T/8 Z phase T±T/2(see output waveform diagram).
	Waveform rise/fall time	0.5μs or less (output cable 1m or less)
Starting torque		≤80×10 ⁻³ N·m(800gf·cm)
Allowable shaft loading	Radial	29.4N (3kg)
	Axial	19.6N (2kg)
Maximum rotational speed		300min ⁻¹
Operating range temperature /humidity		0°C~50°C RH35 to 90%(above the dew point)
Storage ambient temperature		-20°C~80°C
Vibration resistance		Endurance 55Hz double amplitude 1.5mm 2 hours each in X,Y and Z directions
Impact resistance		Endurance 500m/s ² (about 50G) 3 times each in X,Y and Z directions
Cable		φ 8mm Shielded vinyl 1m long
Weight		5kg

MG series (MODULAR TYPE)

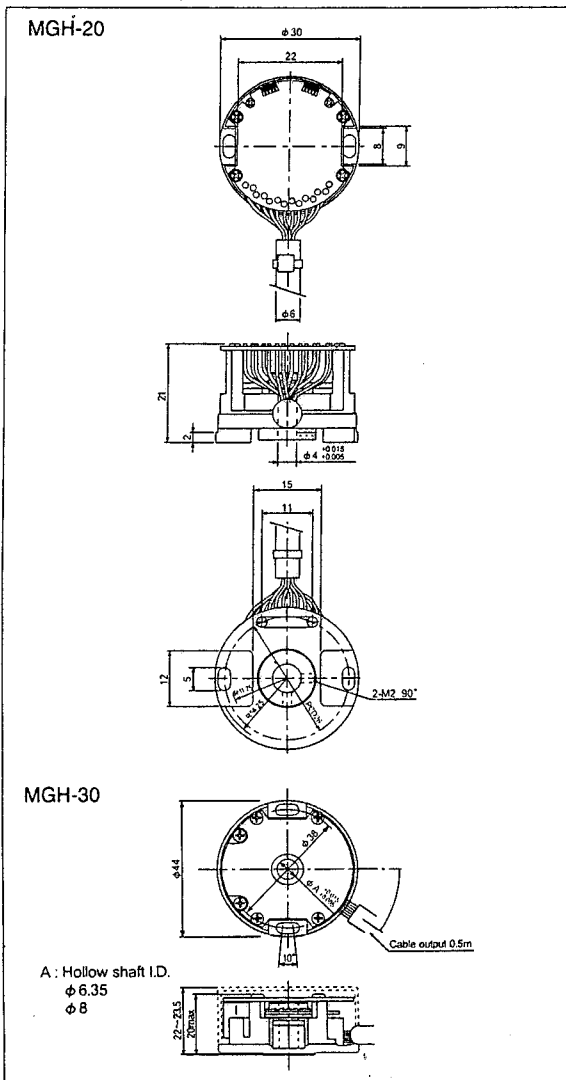


■ Features

- Compact and highperformance
- Easy to install on motors
- Commutation tracks available on MGH-20 on 500, 1000 and 1024 Pulse/rev.
- Commutation tracks available on MGH-30 on 1000, 1024 and 2000 Pulse/rev.



■ Dimension, mm



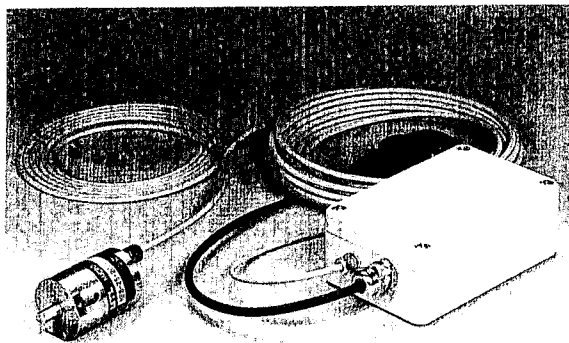
Item	Type	MGH-20-□-E	MGH-30-□-E
Supply voltage		DC5V $\pm$ 10%	
Current consumption		$\leq 60\text{mA}$ (at no load)	
Detection system		Incremental	
Output	Pulses/revolution (standerd.)	100 450 1024 200 500 *1024 250 *500 1200 256 600 300 800 360 1000 400 *1000	100 500 1200 200 600 1500 250 800 1800 300 *1000 2000 360 1000 *2000 400 1024 450 *1024
	Output phase	A. $\bar{A}$. B. $\bar{B}$. Z. $\bar{Z}$ * Commutation signals (U. $\bar{U}$. V. $\bar{V}$. W. $\bar{W}$)	
	Output type	Square wave Line driver	
	Output capacity	V _{OL} = 0.5Vmax V _{OH} = 2.5Vmin I _O = $\pm 20\text{mA}$	
	Maximum frequency response	150kHz	
	Output phase difference	A/B phase difference 90° $\pm 45^\circ$ (T/4 $\pm$ T/8) Z phase T $\pm$ T/2 (U.V.W. 4hole 120° phase difference 3 signals)	
	Waveform rise/fall time	$\leq 2\mu\text{s}$	
	Maximum rotational speed	6000min ⁻¹	
Operating range temperature /humidity		0°C ~ 60°C RH35% ~ 90% (above the dew point)	
Storage ambient temperature		-20°C ~ 80°C	
Vibration resistance		Equivalent to ME series	
Impact resistance		Equivalent to ME series	
Cable		$\phi 6.8\text{mm}$ 19-core Insulate shielded vinyl, 0.5m long	
Weight		60g	100g

■ Dimension, mm

MGH-20	Pulse	100~200	250~600	800~1200
MGH-30	Pulse	100~300	400~1024	1200~2000
Allowable eccentricity	Radial	$\pm 0.05\text{mm}$		$\pm 0.02\text{mm}$
	Axial	$\pm 0.2\text{mm}$	$\pm 0.1\text{mm}$	$\pm 0.05\text{mm}$

SUNSTAR传感与控制 <http://www.sensor-ic.com/> TEL:0755-83376549 FAX:0755-83376182 E-MAIL:szss20@163.com

- Compact encoder with 8-core fiber cable.
- $\phi 3$ mm fiber cables connect 'Encoder' and 'Photoelectric transfer'.
- The fiber cables are thin and light weight.
- Easy to install the micro fiber encoder.
- $\phi 12$ mm middle connector can easily be attached or removed.
- Optical fiber cables are insulation, so they are not influenced by explosion-proof, high voltage, and noise.
- There are 'Shaft type' and 'Hollow shaft type' models.
- Easy to install on miniature motors. (Hollow shaft)
- Protection from environment Encoder:IP55, Photoelectric transfer:IP65
- Optical fiber cable extension:70m max.
- Special P/R can be made upon request.



3-M3 depth 4 equal div.

2-M2- depth 4

$\phi 24$

28

$\phi 7 \begin{smallmatrix} -0.005 \\ -0.015 \end{smallmatrix}$

$\phi 3 \begin{smallmatrix} +0.005 \\ +0.015 \end{smallmatrix}$

2-M2 Thru

5

2.5

40

10

20

45

$\phi 30$

9

5.5

$\phi 6 \begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$

10

7.5

25

50

10

40

$\phi 30$

9

Type		MF ☐ -25- ☐	
		Encoder	Photoelectric transfer
Supply voltage		—	DC5V~12V ±10%
Current consumption		—	≤300mA
Detection system		Incremental	—
Output	Pulses/revolution	100,500,900,1000,2000	—
	Output phase	A,B,Z phase	—
	Output type	—	Square wave
	Output capacity	—	Sink current:20mA Residual voltage:0.5V or less(at 10mA)
	Maximum frequency response	—	100KHz
	Output phase difference	—	A/B phase difference 90°±45° T/4±T/8 Z phase T±T/2
	Waveform rise/fall time	—	2μs or less (output cable 1m or less)
Starting torque		≤3×10 ⁻³ N·m(30gf·cm)	—
Allowable shaft loading	Radical	19.6N (2kg)	—
	Axial	9.8N (1kg)	—
Maximum rotational speed		6000min ⁻¹	—
Operating range temperature/humidity		-10℃~+70℃ RH35 to 95%	
Storage ambient temperature		-20℃~+80℃	
Vibration resistance		Endurance 55Hz double amplitude 1.5mm 2 hours each in X, Y and Z directions	
Impact resistance		Endurance 500m/s ² (about 50G) X, Y and Z directions	
Fiber cable		Diameter φ3mm 2m	Diameter φ3mm 5m
		8-core fiber cable jacketed PVC	
Cable		—	Diameter φ4.2mm 5-core vinyl cable Insulated shielded cable
Weight		145g	345g

Encoder

Optical fiber cable

2m

5m

11

100

65

9

15.5

17

photoelectric transfer box

Output cable

Red +5~12V DC

White A-phase output

Green B-phase output

Yellow Z-phase output

Black OV

Shield

φ12

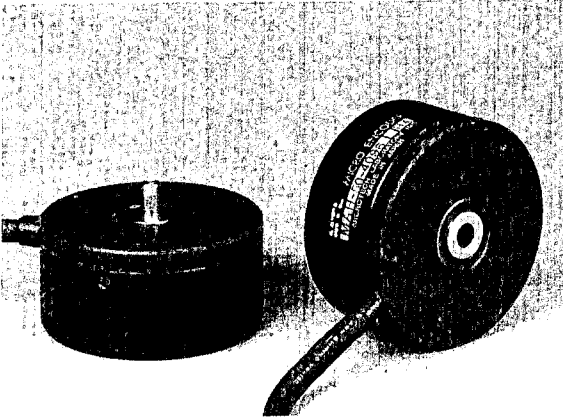
90

mid connector

※ In order to better serve our customers, MTL provides fiber protection tubes (Additional Option).

Typical applications of MA series

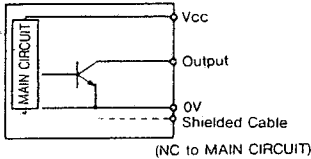
- Textile machines
- Level control systems
- Radars
- Press controls
- Printing machines
- Robots
- Packaging machines
- Antennas
- Medical equipments
- Dynamic balancing testers
- Testing equipment



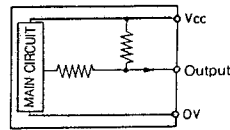
MA-50 series

Input/output circuit

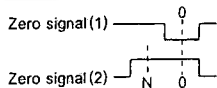
Output circuit



Directional control input circuit

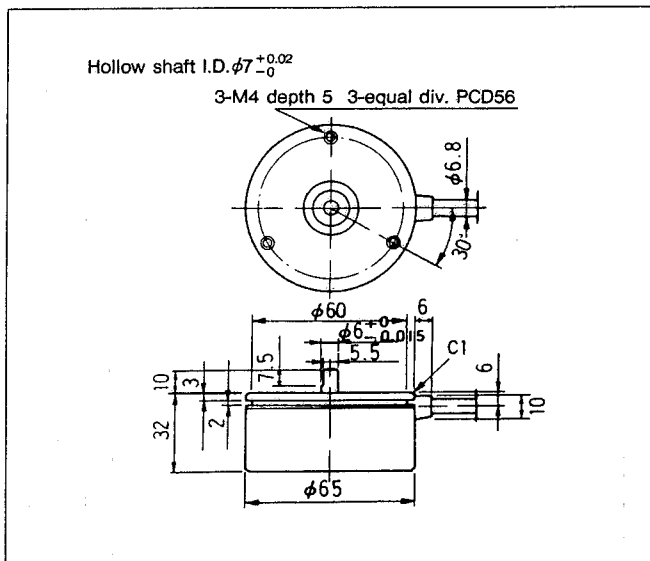
**Cable assignment**

Type	MA□-50-4096G	MA□-50-3600B	MA□-50-1000B
Cables	MA□-50-4096N		
Black	0V (COMMON)		
Red	Power supply		
Red/Black	CW or CCW directional control		
Brown	Output2 ⁰		
Brown/Black	Output2 ¹		
Orange	Output2 ²		
Orange/Black	Output2 ³		
Yellow	Output2 ⁴	Output2 ⁴ × 10	
Yellow/Black	Output2 ⁵	Output2 ⁵ × 10	
Green	Output2 ⁶	Output2 ⁶ × 10	
Green/Black	Output2 ⁷	Output2 ⁷ × 10	
Blue	Output2 ⁸	Output2 ⁸ × 100	
Blue/Black	Output2 ⁹	Output2 ⁹ × 100	
Purple	Output2 ¹⁰	Output2 ¹⁰ × 100	
Purple/Black	Output2 ¹¹	Output2 ¹¹ × 100	
Grey	Odd parity	Output2 ⁰ × 1000	NC
Grey/Black	NC	Output2 ¹ × 1000	NC
White	Origin point(2) output		
White/Black	Origin point(1) output		



N is last address (4095, 3559, 999)

Item	Type	MA□-50-□□□
Supply voltage	1:DC+5V±10% 2:DC+12V±10% 4:DC+24V±10%	
Current consumption	Less than 100mA	
Output code	G: Gray code N: Pure binary code	B: BCD code
Logic	Negative logic (H=0, L=1)	
Resolution	4096	3600, 1000
Output circuit	NPN open collector	
Allowable shaft loading	Radial	19.6N (2kg)
	Axial	9.8N (1kg)
Maximum rotational speed	6000min ⁻¹	
Max. frequency response	10KHz	
Operating temperature	0°C~+60°C	
Storage temperature	-20°C~+80°C	
Vibration resistance	Endurance 55Hz double amplitude 1.5mm/2 hours in X, Y and Z directions	
Shock resistance	Endurance 500m/S ² (50G) 3 times each in X, Y and Z directions	
Cables	Diameter φ6.8mm 19-core vinyl Shielded 1meter	
Weight	300g	

Dimensions, mm

MLS series (micro linear scale)

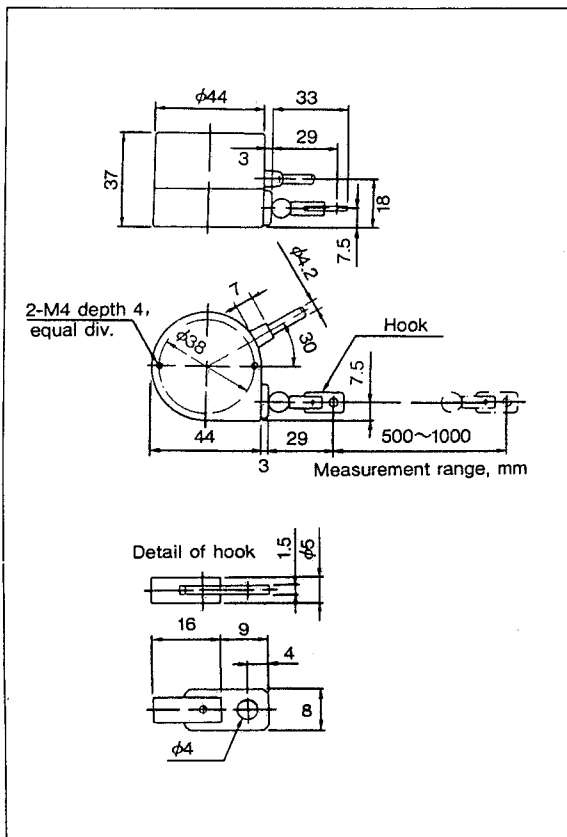
■Features

- The micro linear scale encoder combines a rotary encoder with a wire-reel mechanism and outputs pulses in accordance with the wire movements, suitable to measure a linear motion. This can be read on the display(in mm) when the encoder is configured with the counter DC series.
- Compact, light-weight, high resolution and wide measurement range.
- Wire length of 500 1000 2000 3000 4000 5000 6500~15000mm.
- Minimal reading unit of 0.01, 0.1, 1mm(on the counter).
- Resolution of linear scale encoder 0.02 or 0.2mm on the MLS-30. (0.005 or 0.05mm by 4-dividing.) 0.4mm for the MLS-50. (0.1mm by 4-dividing.) 1mm on the MLS-80.
- Their compactness allows easy installation, operation and versatility.



MLS-30 series

■Dimensions, mm



■Specifications Micro linear scale(encoder + counter)

Type	MLS 30-01-500	MLS 30-01-1000	MLS 30-001-500	MLS 30-001-1000
Wire length(mm)	500	1000	500	1000
Output pulses/ 1mm	10	10	100	100
Stroke speed mm/sec.	1000	1000	1000	1000
Counting accuracy(pulses)	±1	±1	±1	±1
Absolute accuracy mm	±0.05/100mm			
Minimal reading unit	0.1	0.1	0.01	0.01
Power	AC100V 50/60kHz 180mA max.			
Count-mode	Decimal			
Display	0~±999999.9/0~±99999.99			
Input frequency	500kHz max			
Input signals	Square wave, two-phase(H4.0~5.0V, LO~0.5V)			
Reset	Reset switch provided. ※External reset acceptable.			
Output	※BCD parallel output			
Operating temperature	0~60 °C			
Weight	700g			
Power cord	2m with a plug			

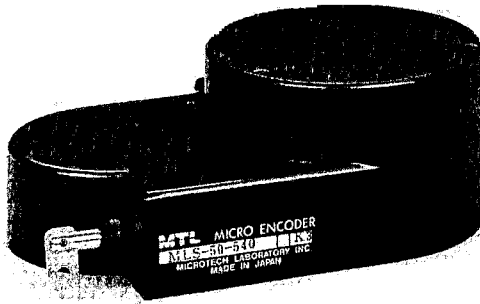
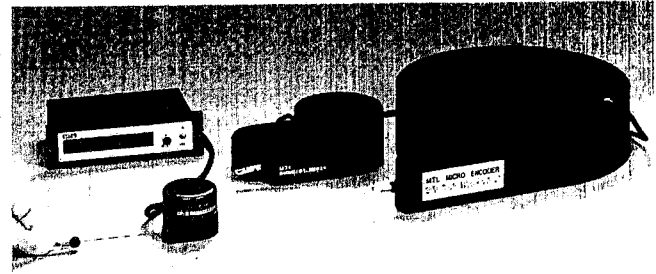
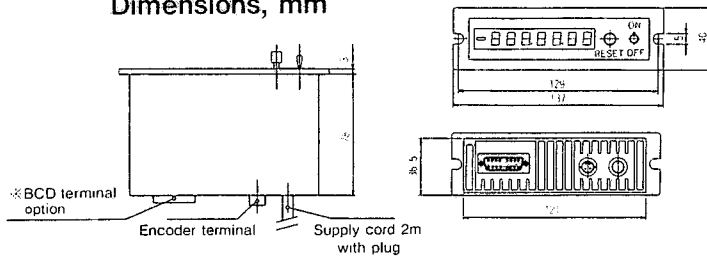
※Optional

■Linear scale encoder

Type	MLS 30-450-500	MLS 30-450-1000	MLS 30-4500-500	MLS 30-4500-1000
Wire length(mm)	500	1000	500	1000
Output pulses/ 1 mm	5(20)	5(20)	50(200)	50(200)
Stroke speed mm/sec.	1000	1000	1000	1000
Absolute accuracy mm	±0.05/100mm			
Resolution (mm)	0.2(0.05)	0.2(0.05)	0.02(0.005)	0.02(0.005)
Supply voltage	DC5~12V±10% DC24V±10% (open collector)		DC5~12V±10%	
Current consumption	60mA max.			
Output phases	A and B phase			
Output form	Square wave, voltage or open collector output			
Output capacity	Sink current: 20mA max. Residual voltage: 0.5V or max.(at 10mA)			
Max. frequency response	50KHz		100KHz	
Output phase	AB phase difference 90°±45°			
Output rise/fall time	2μs or less			
Starting torque	1.4N~2.9N (150~300g)			
Operating temp./Humidity	0°C~50°C/RH35%~90%			
Storage temperature	-20°C~80°C			
Vibration resistance	Endurance 10~55Hz double amplitude/ 2 hours in X, Y and Z directions			
Shock resistance	50G			
Cable	Diameter φ4.2mm 4-core shielded vinyl			
Weight	185g			

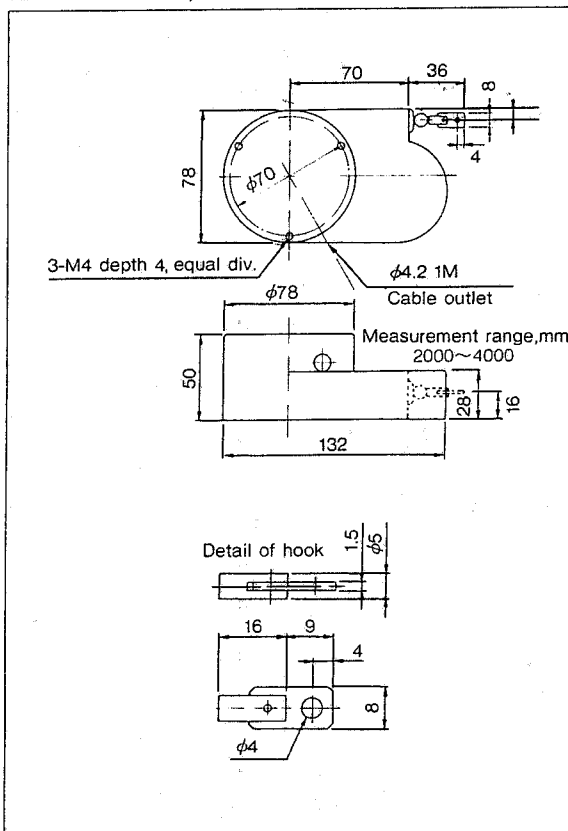
() 4 divided value

Counter Dimensions, mm



MLS-50 series

Dimensions, mm



Specifications Micro linear scale(encoder+counter)

Type	MLS 50-01-2000	MLS 50-01-4000
Wire length(mm)	2000	4000
Output pulses/1 mm	10	10
Stroke speed mm/sec.	1000	1000
Counting accuracy(pulses)	±1	±1
Absolute accuracy mm	±0.1/1000mm	
Minimal reading unit	0.1	0.1
Power	AC100V 50/60kHz 180mA max	
Count-mode	Decimal	
Display	0~±999999.9	
Input frequency	500kHz max	
Input signals	Square wave, two-phase (H4.0~5.0V, LO~0.5V)	
Reset	Reset switch provided. ※External reset acceptable.	
Output	※BCD parallel output	
Operating temperature	0~60°C	
Weight	1350g	
Power cord	2m with a plug	

※Optional

Linear scale encoder

Type	MLS 50-540-2000	MLS 50-540-4000
Wire length(mm)	2000	4000
Output pulses/1 mm	2.5(10)	2.5(10)
Stroke speed mm/sec.	1000	1000
Absolute accuracy mm	±0.1/100mm	
Resolution (mm)	0.4(0.1)	0.4(0.1)
Supply voltage	DC5~12V±10%, DC24V±10% (Open collector only)	
Current consumption	60mA max.	
Output phases	A and B phase	
Output form	Square wave, voltage or ※open collector output	
Output capacity	Sink current: 20mA max. Residual voltage: 0.5V or max.(at 10mA)	
Max. frequency response	100kHz	
Output phase	AB phase difference 90°±45°	
Output rise/fall time	2μs or less	
Starting torque	3.9N~6.8N (400~700g)	
Operating temp./Humidity	0°C~50°C/RH35%~90%	
Storage temperature	-20°C~80°C	
Vibration resistance	Endurance 10~55Hz double amplitude/ 2 hours each in X, Y and Z directions	
Shock resistance	50G	
Cable	Diameter φ4.2mm 4-core shielded vinyl	
Weight	850g	

() 4 divided value

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