

Interpolator Module

MJ100/110 Series MJ500/600/700 Series



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The MJ100/110 Series and MJ500/600/700 Series are 1-axis compact interpolators with a modular design that are designed for use in industrial machines. The MJ100/110 Series is intended only for use with Sony's Digiruler, while the general-purpose analog input type MJ500/600/700 Series is intended for use with any linear/rotary encoder.

- Compact, lightweight, easily installed rack-mounted type
- Output interface
 - MJ100/500/600/700: Line driver (RS-422)
 - MJ110: Open collector (IoL = 50 mA max.)
- Number of divisions
 - MJ100/110: Capable of 40 to 1000 divisions.
 - MJ500/600/700: Capable of 80 to 4000 divisions.

MJ100/110 for Digiruler Only



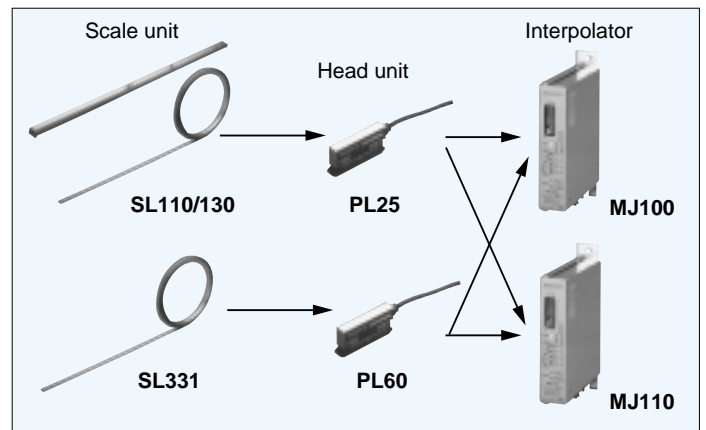
- Permit 40 to 1000 divisions.
- Produces quadrature A/B signals with a resolution from 2 μm to 125 μm, when used in combination with the optionally available Digiruler PL25 head unit and the SL110/130 scale unit (base frequency: 5 mm), or with the PL60 and the SL331 scale unit (base frequency: 2 mm).
- MJ100: Supply voltage 5 V input
line driver (RS-422) output
- MJ110: Supply voltage 12 to 30 V input
open collector (I_{OL} = 50 mA) output
- The MJ100 also outputs U/V/W phase signals that have a period of Digiruler's reproduction wavelength (5 mm with PL25, 2 mm with PL60).

Major specifications

Model	MJ100	MJ110
Power supply	5 V (4.5 V to 6 V)	12 V to 30 V (11 V to 31 V)
Power consumption	4 W	3 W
Output interface	Line driver (RS-422)	Open collector (I _{OL} = 50 mA max.)
Outputs	A/B phases, Z phase, U/V/W phases, alarms	A/B phases, Z phase, alarms
Number of divisions	1000, 960, 800, 512, 500, 480, 400, 256, 240, 200, 128, 120, 100, 80, 64, 40 and 1/2 of each of these (which does not satisfy the synchronized reference point specifications.)	
Maximum response frequency	1000 divisions	6 KHz (1800 m/min when connected to PL25; 720 m/min when connected to PL60)
	500 divisions	15 KHz (4500 m/min when connected to PL25; 1800 m/min when connected to PL60)
	200 divisions	42 KHz (12600 m/min when connected to PL25; 5000 m/min when connected to PL60)
	120 divisions	70 KHz (21000 m/min when connected to PL25; 8400 m/min when connected to PL60)
Minimum phase difference	100 ns	1 μs
Alarms ²	Speed alarm (minimum phase difference time or maximum response frequency) Level alarm (0.4 V _{p-p} or less) Minimum alarm time: approximately 400 ms	
System startup time	Within 0.5 seconds after the power comes on line	
External dimensions	138 × 93 × 26 (mm)/5.43" × 3.66" × 1.024" including protrusions	
Compatible scales	PL25 or PL60	
Operating temperature	0 to 45°C/32 to 114°F	
Storage temperature	-20 to 60°C/-4 to 140°F	
Mass	350 g/771.6 lbs	
Supplied accessories	Manual, output connector, connector cap, mounting screws	
Options	SET-P16-1 (for external reference point) Scale extension cable, external reference point extension cable Output connector with cable	
Safety standards and other regulations	FCC: FCC Part 15 Subpart B Class A CE marking: Document management, EMC directive (EN55011 Group 1 Class A, EN55082-2)	

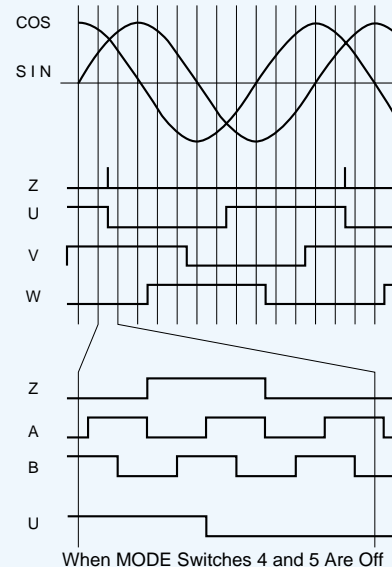
*1: These values for a minimum phase difference of 1μs may vary depending on the output cable length.
*2: The alarm function may not operate when an abnormal offset is generated due to a broken wire, etc.
* Contact us directly if you have special requirements for the specifications.

System Configuration



Phase Relation between MJ100 Input Signals, U/V/W Phases and A/B Phases

The following diagrams show the MJ100's scale input signal phases with respect to the output signal phases.

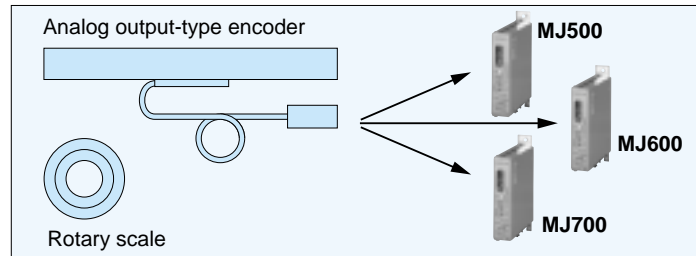


MJ500/600/700 of General-Purpose Analog Input-Type for Linear/Rotary Encoders



- Permit 80 to 4000 divisions.
- Because this Series receives 1 Vp-p differential inputs with an input impedance of 120Ω, this Series can be connected to any general-purpose analog output-type encoder.
- Number of divisions
MJ500: 80 to 400 divisions MJ600: 500 to 1024 divisions
MJ700: 1200 to 4000 divisions
- The MJ500/600/700 also permit DC offset compensation, gain compensation and phase difference compensation.

System Configuration



Major specifications

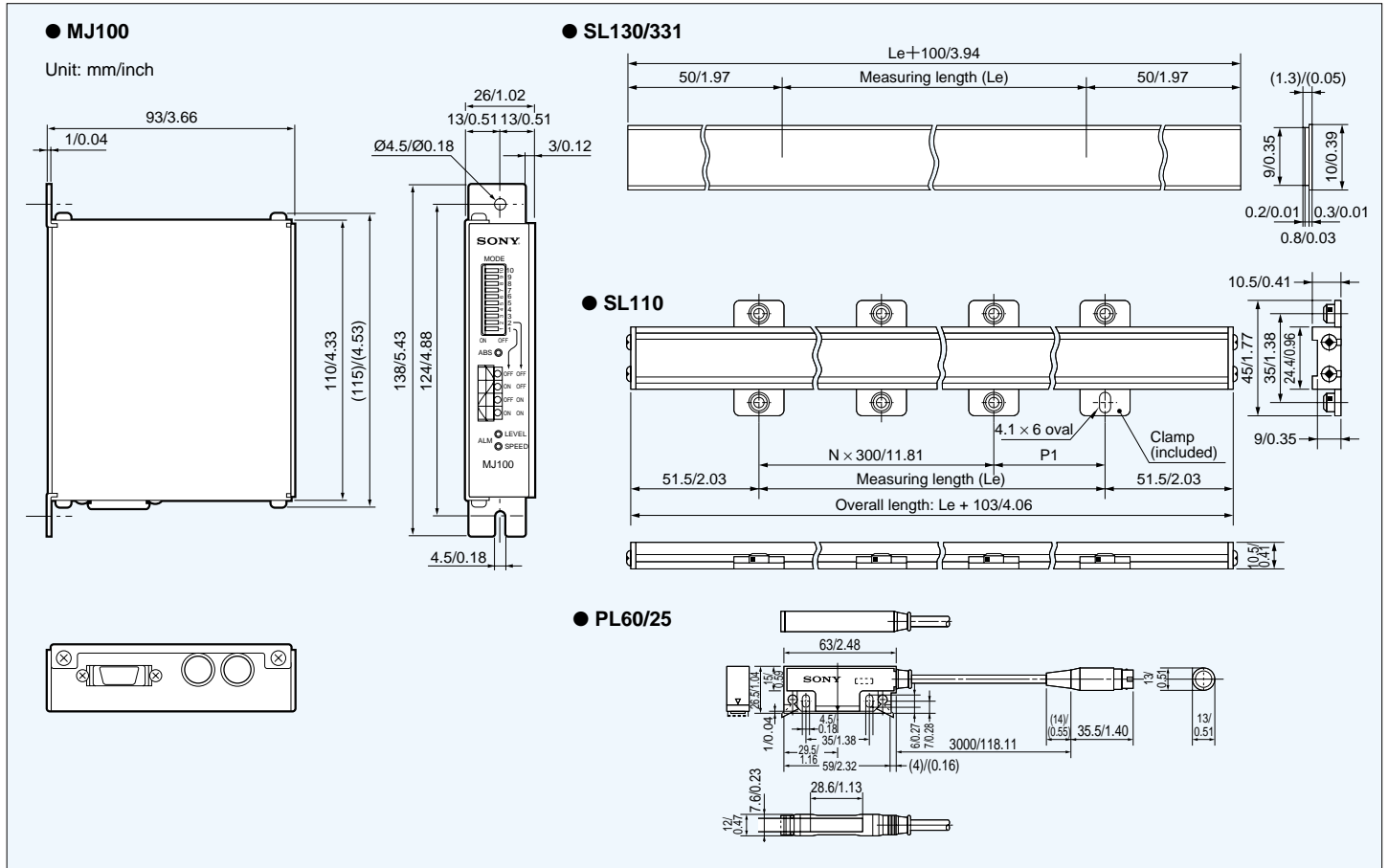
Model	MJ500		MJ600		MJ700	
Power supply	5 V (4.5 V to 8 V)					
Power consumption	4 W					
Output interface	Line driver (RS-422)					
Outputs	A/B phases, Z phase, alarms					
Number of divisions	400, 360, 300, 240, 200, 120, 100, 80 and 1/2 of each of these (which does not satisfy the synchronized reference point specifications.)		1024, 1000, 960, 800, 720, 640, 512, 500 and 1/2 of each of these (which does not satisfy the synchronized reference point specifications.)		4000, 3600, 2560, 2400, 2000, 1800, 1280, 1200 and 1/2 of each of these (which does not satisfy the synchronized reference point specifications.)	
Maximum response frequency	400 divisions	20 KHz (24.0 m/min on a scale where $\lambda = 20 \mu\text{m}$)	1024 divisions	6 KHz (7.2 m/min on a scale where $\lambda = 20 \mu\text{m}$)	4000 divisions	1 KHz (1.2 m/min on a scale where $\lambda = 20 \mu\text{m}$)
	300 divisions	28 KHz (33.6 m/min on a scale where $\lambda = 20 \mu\text{m}$)	800 divisions	8 KHz (9.6 m/min on a scale where $\lambda = 20 \mu\text{m}$)	3600 divisions	1.1 KHz (1.3 m/min on a scale where $\lambda = 20 \mu\text{m}$)
	200 divisions	42 KHz (50 m/min on a scale where $\lambda = 20 \mu\text{m}$)	640 divisions	10 KHz (12.0 m/min on a scale where $\lambda = 20 \mu\text{m}$)	2400 divisions	1.8 KHz (2.1 m/min on a scale where $\lambda = 20 \mu\text{m}$)
	120 divisions or less	70 KHz (84 m/min on a scale where $\lambda = 20 \mu\text{m}$)	500 divisions	15 KHz (18.0 m/min on a scale where $\lambda = 20 \mu\text{m}$)	1200 divisions	4.7 KHz (5.6 m/min on a scale where $\lambda = 20 \mu\text{m}$)
Minimum phase difference	100 ns					
Input level	Sin, cos signal		0.6 Vp-p to 1.2 Vp-p with 120Ω load			0.8 Vp-p to 1.2 Vp-p with 120Ω load
	Compensation range		0.75 Vp-p to 1.2 Vp-p			0.9 Vp-p to 1.2 Vp-p
	Reference point signal		0.2 V to 1 V with 120Ω load			0.2 V to 1 Vp-p with 120Ω load
Alarms *1	Speed alarm (minimum phase difference time or maximum response frequency) Level alarm (0.6 Vp-p or less) Minimum alarm time: approximately 400 ms				Speed alarm (minimum phase difference time or maximum response frequency) Level alarm (0.7 Vp-p or less) Minimum alarm time: approximately 400 ms	
Hysteresis	$\lambda/2048$					
Linearity	$\pm\lambda/1024$ *2					
System startup time	Within 0.5 seconds after the power comes on line					
External dimensions	138 × 93 × 26 (mm)/5.43" × 3.66" × 1.024" including protrusions					
Operating temperature	0 to 45°C/32 to 114°F					
Storage temperature	-20 to 60°C/-4 to 140°F					
Mass	350 g/771.6 lbs.					
Supplied accessories	Manual, output connector, connector cap, mounting screws, Input connector					
Options	SET-P15-1 (for external reference point) Scale extension cable, external reference point extension cable Output connector with cable					
Safety standards and other regulations	FCC: FCC Part 15 Subpart B Class A CE marking: Document management, EMC directive (EN55011 Group 1 Class A, EN50082-2)					

*1: The alarm function may not operate when an abnormal offset is generated due to a broken wire, etc.

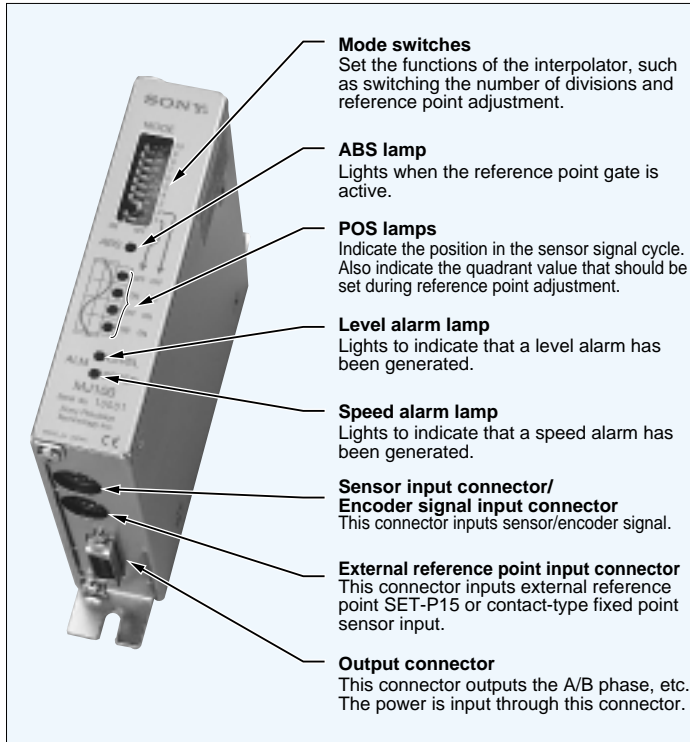
*2: Only applies under ideal signal conditions.

* Contact us directly if you have special requirements for the specifications.

External Dimensions



Description of Parts



Optional accessories for the MJ Series

- MZ2 Output connector for the MJ Series**
20-pin plug and plug case for A/B phase output and power supply input
Plug: PCR-E20FS (Honda Tsushin Kogyo)
Plug case: PCR-E20LC (Honda Tsushin Kogyo)
- MZ3 Encoder signal input connector for the MJ Series**
8-pin mini DIN plug for encoder signal input
Plug: TCP6180-01-1120 (Hoshiden)
- MZ4 External contact reference point gate input connector for the MJ Series**
6-pin mini DIN plug for external contact reference point gate input
Plug: TCP6160-01-1120 (Hoshiden)
- CE15-3 3 m extension cable for external reference point (4 wires)**
Includes 6-pin mini DIN male and female connectors
- CE15-5 5 m extension cable for external reference point (4 wires)**
Includes 6-pin mini DIN male and female connectors
- CE15-10 10 m extension cable for external reference point (4 wires)**
Includes 6-pin mini DIN male and female connectors
- CE15-15 15 m extension cable for external reference point (4 wires)**
Includes 6-pin mini DIN male and female connectors
- CE16-3 3 m connector prepared cable end with cable (20 wires)**
20-pin connector
- CE16-6 6 m connector prepared cable end with cable (20 wires)**
20-pin connector
- CE17-3 3 m connector prepared cable end with cable (8 wires)**
For 8-pin mini DIN scale signal input
- CE18-3 3 m connector prepared cable end with cable (8 wires)**
For 6-pin mini DIN external reference point input

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