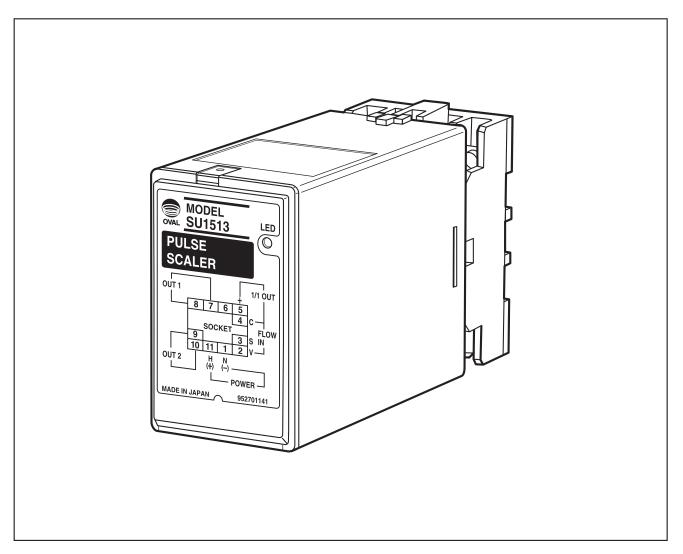


PULSE SCALER

MODEL: SU1513



Every Oval product is fabricated and shipped from our factory under stringent quality control program. In order to maintain its design performance throughout the life of this scaler, this manual offers the operator the necessary installation, operation and maintenance information.

Be well familiar with these instructions before you place the scaler in service and keep this manual for your quick reference.

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The indications **NOTE**, **CAUTION**, and **WARNING** shown throughout this manual are to draw your attention to specific items:

→ NOTE

Notes are separated from the general text to bring user's attention to important information.

⚠ CAUTION

Caution statements call attention to user about hazards or unsafe practices that could result in minor personal injury or property damage.

MARNING

Warning statements call attention to user about hazards or unsafe practices that could result in serious personal injury or death.

1. GENERAL

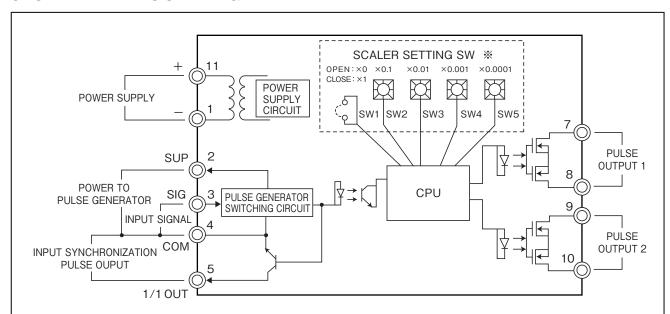
This pulse scaler is used to obtain two outputs individually insulated with a desired pulse width and devided-frequency from various kinds of flowmeters.

This is done by shaping and insulating waveforms, scaling compensation, and pulse reduction.

2. FEATURES

- 1. Accepts signals, produces outputs, and provides power isolation.
- 2. Accommodates large capacity power supply for sensor.
- 3. 0.0001 to 1.9999 scaling compensation is available.
- 4. Pulse reduction from 1/1 to 1/10000 is available.
- 5. Division ratio is selectable as desired for two outputs individually.
- 6. Discretionary power supply for users is available in the range of 85 to 264VAC (20 to 30V for DC).
- 7. Open collector, voltage pulse, and relay contact pulse input are available.
- 8. Plug-in configuration and DIN rail mount are available.

3. OVERALL BLOCK DIAGRAM



The setting on the pulse generator switching circuit is defined by the product code. Therefore, select the pulse input format corresponding to the connected pulse generator.

* The scaler setting SW is located in the opening of the front lid.

Fig. 3.1

Description of Individual Circuits (Blocks)

- Pulse Generator Selector....... Selects pulse generator signal type and shapes signal waveform.
- Power Supply Furnishes power of required voltage to individual circuits.
- CPU...... Multiplies the scaling factor by means of the rotary switch and sets the frequency division and pulse width in accordance with the parameter.

4. INSTALLATION

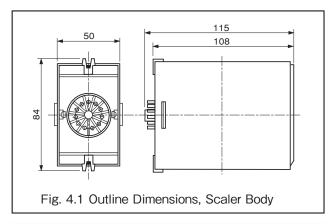
Installation Location

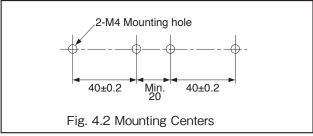
Select an installation location where

- 1. Mechanical vibration, shock and corrosive gases least exist.
- 2. Air is dry and at room temperature and stable.
- NOTE: Although the max. allowable temp. is +50 °C, use in place its temp. possibly near to ambient is recommended.
- Potential sources of inductive interference, such as electromagnetic contactors, are located sufficiently away.
- 4. A lightening arrestor is provided if incoming signals are subject to potential influence of lightening.
- 5. A sufficient working space is secured behind the instrument to facilitate wiring and maintenance.

5. WIRING

- 1. Separate field wiring from other power lines or power circuits to minimize the possibility of inductive interference.
- 2. Terminal arrangement is shown in Fig. 5.1.
- 3. M3.5 screws are used for terminals. Ensure good electrical connections.
- Upon completion of wiring connections, install the scaler body into the socket. Then engage the locking levers on the socket assembly with the scaler body.





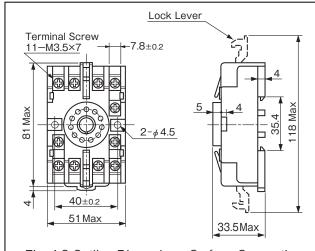
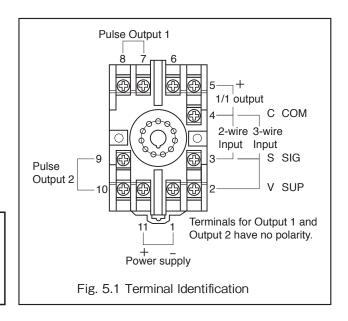


Fig. 4.3 Outline Dimensions, Surface Connection Socket Assembly (11PFA)



! CAUTION:

Please make sure that the model numbers of the flowmeter (pulse generator) and receiver are compatible before connecting.

6. PREPARATION AND OPERATION

1. Ensure that the pulse scaler and related equipment are correctly installed and wiring is thoroughly completed.

MARNING: Make sure that the power terminals are connected to a power source of the rated voltage. Improper connection of the power terminals could ruin your instrument.

- 2. Supply power to this instrument and make sure to see that the power indicator (blue LED) comes on.
- 3. Initiate operation by allowing the fluid to flow.

7. QUICK TROUBLESHOOTING

• If the trouble is suspected to be occurring inside the scaler, please contact OVAL sales office.

PROBLEM	CHECK	POSSIBLE CAUSES
Power indicator LED is not turning on.	 Inspect the power supply board. Is the type of power supply (AC/DC) in accordance with the specifications? Make sure of power source voltage. Is an 85 to 246VAC (50/60Hz) power or 20 to 30VDC power impressed across terminals 11 (+) and 1 (-)? 	 Power supply board is improper. Line voltage is improper. A fault in the internal power supply board
No pulse output	 Is the input signal line correctly wired? Is the input signal coming in? Is the input signal in accordance with the specifications? Is the output signal line correctly wired? 	 Input wiring is incorrect. Pulse generator is at fault. Input circuit setting is improper. Power supply board or CPU board or scaler board in the internal assembly is at fault.

LED Display Items

Operation mode	Normal operation	Normal operation Alarm						
	Solid blue	Blinking blue/green (yellow)	Blinking red					
LED status		For 2 sec.	For 2 sec.					
Operation	Operating properly	Normal calculation and output	Calculation and output stopped					
Counter- measure		Parameter is different from the assumed one. Verify the alarm items in the following table.	Misconversion of internal parameter or hardware error. Contact OVAL sales office or service center.					

Alarm Items

No.	Check items	Countermeasure
1	Pulse input frequency is 3.15kHz or more.	Review input frequency.
2	Duty ratio of pulse output 1 exceeds 90%.	Review input frequency/output pulse.
3	Duty ratio of pulse output 2 exceeds 90%.	Review input frequency/output pulse.
4	Input frequency is higher than the set value.	Review input frequency.

If the above items are not suspected, it is possible that the error is occurring in the hardware. Contact OVAL sales office or service center.

8. INDIVIDUAL JUMPER SETTING

• Input Setting: Configuration of input pulse mode

Short-circuit the jumper corresponding to the number marked
in the following table in accordance with the input signal indicated by a symbol shown in the Product Code.

NOTE: Refer to 10. PRODUCT CODE EXPLANATION.

9 Pulse Input	†		Jumper Setting															
(CODE ®)	Input Signal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16 *1	17
E (1) *2	8VDC 2-wire current pulse				•				•		•					•	2-3	
K (2)	2-wire, 12VDC 3-wire contact-closure pulse			•				•		•			•				2-3	
B (3)	2-wire, 12VDC 3-wire voltage pulse							•					•				1-2	
D (4)	24VDC 2-wire current pulse(4/20mADC)		•				•					•			•		2-3	
C (5)	12VDC 2-wire current pulse			•				•				•		•			2-3	
G (6)	2-wire, 12VDC 3-wire open collector pulse			•				•		•			•				2-3	
J (8)	32VDC 3-wire open collector pulse	•				•				•			•				2-3	
H (B)	24VDC 3-wire open collector pulse		•				•			•							2-3	

^{*()} is old product code.

NOTES: *1. For jumper 16, the following applies.

"1-2" refers to a short circuit at 1-2 side.

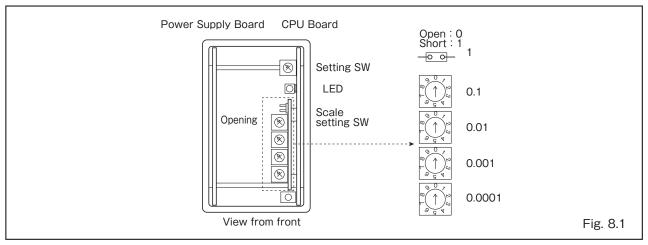
"2-3" refers to a short circuit at 2-3 side.

*2. 3kΩ is mounted on CPU board R88.

• Scaler Setting: The scaling factor is set.

The multiplication rate is set by the decimal number of rotary switch (digital switch) and a short pin. The settable range is from 0.0001 to 1.9999. The integer part is set by the short pin and the number below decimal point is set by the rotary switch (digital switch).

Туре	Code	Configuration	Value	Scaling function
Jumper	SW1	(0, 1)	× 1	Integer of scaling factor
	SW2	10 choices (0 to 9)	× 0.1	
Rotary switch	SW3	10 choices (0 to 9)	× 0.01	Scaling factor
(digital switch)	SW4	10 choices (0 to 9)	× 0.001	Scaling factor
	SW5	10 choices (0 to 9)	× 0.0001	



↑CAUTION: Be sure to turn the instrument power off before setting the scaling factor.

9. GENERAL SPECIFICATIONS

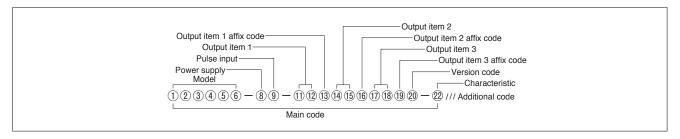
Item			Description							
	Incoming Pul	se	Companion Pulse Generator	Power to F	Pulse Generator					
	8VDC 2-wire curren	t pulse	Opto OD01, 02	8.5VDC						
	2-wire, 12VDC 3-wir contact-closure puls		PG20	13.5VDC						
	2-wire, 12VDC 3-wir voltage pulse	e	PG30, NPG60A(F)	13.5VDC	Current capacity					
lanut Cignal	24VDC 2-wire current pulse (4/20)	mADC)	PA14, 15, 25, NPG60A(E)	24.0VDC	40mA approx.					
Input Signal	12VDC 2-wire curre	nt pulse	PG30S	13.5VDC	with short-					
	2-wire, 12VDC 3-wire open collector pulse		FLOWPET-5G, NPG60A(E3), MOS-FET	13.5VDC	circuit protection (%1)					
	32VDC 3-wire open collector pulse	;	PA11	32.0VDC	(%1)					
	24VDC 3-wire open collector pulse)	Mass Flow Monitor (only at 100VAC) ※1	24.0VDC						
	Response pulse		3kHz max. (50Hz max. in case of PG20) with output 500Hz max.							
Input Frequency	Open collector Max. applied voltage 30V DC Allowable current 20mA									
Pulse Output	NPN transistor output									
	Signal Capacity	Static relay Max. applied voltage 230VAC/340VDC Allowable current 0.2A Resistance at ON: 16Ω max. Leak current at OFF: 1 μ A max.								
Pulse Output and	Output width		ole for two circuits individually from 1ms and 50ms. (*2)							
Status Output after Scaler Compensation	Scaler		01 to 1.9999 in 0.0001 steps ble with rotary switch.							
	Frequency division	1	Settable for two circuits individually from 1/1, 1/10, 1/100, 1/1000, and 1/10000.							
LED Indication	Error and alarm indicator									
Power Supply	85 to 132VAC 133 t	o 264VAC	50/60Hz or 20 to 30VDC							
Power Consumption	100VAC 15VA/200	VAC 25'	VA(Max. 10W)							
Ambient Temperature	-10 to +50°C									
Insulation Resistance	Between Power Terminal in a lump and output terminal: 10MΩ min. (500VDC)									
Withstand Voltage	Between Power Terminal in a lump and output terminal: 1500VAC × 1min. (In case of AC terminal) Between Power Terminal in a lump and output terminal: 1000VAC × 1min. (In case of DC terminal)									
Mounting										
Enclosure	Resin molding, black									
Weight	0.5kg approx., including socket									
Accessories	Front panel mount soc	ket: 1 pc.	Jumper plug: 2pc. Ferrite core o	nly in case o	f DC terminal					

NOTE **1. Current capacity up to 100mA is available only with specifications of 100VAC and pulse generator's power-supply voltage of 24VDC.

^{*2.} No setting is required for output pulse width at the time of status output.

^{* :} Please contact our sales office when modification of full scale value is required.

10. PRODUCT CODE EXPLANATION



Main code

• IV	wain code													
1	2	3	4	(5)	6	Model								
S	U	1	5	1	3	Pulse scaler								
7	-													
8	Power supply													
D	20 to 30VDC													
J	85 to 264VAC 50Hz/60Hz ※ 1													
9	Pι	Pulse input												
В	Voltage pulse 12VDC 2 wires/3 wires													
С	Сι	ırre	nt p	uls	e 12	2VDC for PG30S Exclusive Use								
D	Сι	ırre	nt p	uls	e 24	IVDC (4/20mA) for ULTRA OVAL, PA25, PA14, etc.								
Е	Сι	ırre	nt p	uls	e 8\	/DC for ME Meters (Opto OD01 and OD02) Exclusive Use								
G	Op	en	coll	ect	or p	ulse 12VDC 2 wires/3 wires								
Н	Op	en	coll	ect	or p	ulse 24VDC 3 wires								
J	Op	en	coll	ect	or p	ulse 32VDC 3 wires								
K	Co	nta	ct p	uls	e 12	2VDC 2 wires/3 wires								
Z	Sp	eci	al	_										
10	-													
11)	12	Οι	ıtpı	ıt it	em	1								
Pι	lse	ou	tpu	t 1										
В	1	Inp	out:	syn	chr	onous; pulse width 1ms								
В	5	Inp	out:	syn	chr	onous, pulse width 50ms								
В	9	Af	er o	ivib	ded	, pulse width is special								
Α	L	Ala	arm	out	put									
Z	Z	Sp	eci	al_										
13	Οι	ıtpı	ıt it	em	1 a	ffix code								
Χ	Fre	equ	enc	y 1/	/1									
1	Fre	equ	enc	y 1/	10									
2	Fre	equ	enc	y 1/	100)								
3	Fre	equ	enc	y 1/	100	00								
4	Fre	equ	enc	y 1/	100	000								
5	St	atus	ou	tpu	t									
Z		eci	_	_	_									
14)	15)	Οι	ıtpı	ıt it	em	2								
Pι	lse	ou	tpu	t 2										
В	1	Af	er o	ivib	ded	, pulse width is 1ms								
В	5	Af	er o	ivib	ded	, pulse width is 50ms								
В	9	Af	er o	divid	ded	, pulse width is special								
Α	L	Ala	arm	out	put									
Ζ	Z	Sp	eci	al										

_												
16	Output item 2 affix code											
X	Frequency 1/1											
1	Frequency 1/10											
2	Frequency 1/100											
3	Frequency 1/1000											
4	Frequency 1/10000											
5	Status output											
Z	Special											
17	® Output item 3											
N	N Non											
19	Output item 3 affix code											
N	Non											
20	Version code											
В	Version code: B											
21)	_											
22	Characteristic											
0	Standard											
Z	Special											

Additional code

Do	ocument												
D	S	J	PEC. & DWG (Approval Drawing) (Japanese)										
D	S	Е	PEC. & DWG (Approval Drawing) (English)										
D	R	0	Re-submission of SPEC. & DWG										
D	С	J	Final DWG (Japanese)										
D	С	Ε	Final DWG (English)										
D	W	J	Wiring diagram (Japanese)										
D	W	Ε	Wiring diagram (English)										
S	D	J	Inspection report of electronics (Japanese)										
S	D	J	Inspection report of electronics (English)										
D	Т	J	Inspection procedure (Japanese)										
D	Т	Ε	Inspection procedure (English)										
С	В	J	Traceability certificate: B set Only Japanese										
Wi	tne	ss ·	Test										
V	1	1	Appearance, dimensions, quantity check										
٧	1	4	Appearance, dimensions, quantity check/performance										

^{*1:} In case of 85 to 132VAC and power supply for output is 24V, power supply's current capacity for output is 100mA. Other than this, the current is 40mA at max.

^{*:} Only status output can not be chosen.

《PRODUCT CODE EXPLANATION OF THE OLD PRODUCT CODE》

The new product code has been implemented since April 2017.

Therefore, the product code explanation of the old product code will not be updated after April 2017.

Contact OVAL if you wish to order with the old product code for reasons such as type approval.

			M	od	del			Т		S	— upp	lem	enta	ary	Cod	e	
Item	(1) (2 3)	4	(5 6		-	7	8	9	10	11)	12	13	Description
Type	3	sι	J 1		5	1	1 3		-								Pulse Scaler
										6							20 to 30VDC
	7																85 to 264VAC 50/60Hz
	9																Other than above
	1																8VDC 2-wire current pulse
											2						2-wire, 12VDC 3-wire contact-closure pulse
											3						2-wire, 12VDC 3-wire voltage pulse
											4						24VDC 2-wire current pulse (4/20mADC)
Input S	ig	nal									5						12VDC 2-wire current pulse
											6						2-wire, 12VDC 3-wire open collector pulse
											8						32VDC 3-wire open collector pulse
											В						24VDC 3-wire open collector pulse
											9						Other than above
												1					1ms
												2					2ms
												3					5ms
												4					10ms
												5					20ms
.	_											6					50ms
Output	S	ign	al (P	ul	lse	· V	widtr	١)				7					100ms
												8					150ms
												Α					200ms
												В					250ms
												С					500ms
												9					Other than above
													1				Frequency division 1/1
													2				Frequency division 1/10
													3				Frequency division 1/100
Output	: 1												4				Frequency division 1/1000
													5				Frequency division 1/10000
													6				Status output
													9				Other than above
														1			Frequency division 1/1
														2			Frequency division 1/10
	3																Frequency division 1/100
Output														4			Frequency division 1/1000
	_													5			Frequency division 1/10000
														6			Status output
														9			Other than above
															0		Always "0"
Versio	n (Cod	e													Α	
v ei Si0	11		C													А	

NOTE *1. The current capacity of pulse generator's power supply is 100mA when power supply is 85 to 132V AC and power to pulse generator is 24V.

In other cases, the current capacity is 40mA.

 $[\]divideontimes$: Selecting only status output is not permitted.

All specifications are subject to change without notice for improvement.

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