

MODEL 441-.01SS
PLUG-IN OSCILLATORS

MODEL 441-.01SS-101

SERIAL NO 107

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ADDENDUM

For The

441-0155-101

Portion of the Digital Programmer System

The Digital Programmer feeds a 4VRMS, 400Hz signal to the primary of isolation transformer T-2, which is located on the plug-in. The secondary of T-2 is a load-lag phase adjust circuit, to allow the outputs of the 201 and the 501 to be adjusted through zero degrees.

The primary of sensing transformer T-1, is tied across the output of the 201. Variations felt by the primary of T-2 are rectified in the secondary by CR-4 and CR-5. The temperature coefficient of the diode voltage drop is compensated for by diode CR-6. R-21 is a calibrate set. The signal is then compared at the summing junction with the zener voltage. The resultant is fed to the input of operational integrator Z-1. The DC output sets the conduction level of L.L.D. driver Q-1. The amount of light that impinges on photocell V-1, controls the input signal to the 201.

SECTION I

INTRODUCTION AND GENERAL DESCRIPTION

SCOPE OF MANUAL

This manual describes the Model 441-.01SS plug-in oscillator manufactured by Elgar Corporation for use with the Elgar AC Power Sources. The manual contains installation; operation and maintenance instructions; circuit descriptions; circuit diagrams; and parts lists.

INTRODUCTION

The Model 441-.01SS oscillator provides a stable frequency, low distortion 400 Hz signal for any of the Elgar AC Power Sources. The amplitude of this signal is controlled by an electronic servo to stabilize the load voltage delivered by the AC Power Source. The nominal output voltage must be specified when ordering the Model 441-.01SS. A screwdriver adjustment on the front panel of the oscillator provides a narrow range adjustment of the output voltage. The front-panel amplitude control of the AC Power Source is inactive when the Model 441-.01SS is installed.

GENERAL DESCRIPTION

The Model 441-.01SS oscillator is a plug-in module which is inserted into the front-panel opening of any Elgar single-phase AC Power Source. The module contains a horizontally mounted printed circuit board with an integral edge connector which mates with a corresponding connector in the power source.

FREQUENCY	400 Hz \pm .01%	
FREQUENCY STABILITY	.01%/year	
TEMPERATURE COEFFICIENT OF FREQUENCY	.01%, 0 - 50° C	
HARMONIC DISTORTION (Oscillator only)	.15% max.	
OUTPUT VOLTAGE	115V standard	*
TEMPERATURE COEFFICIENT OF OUTPUT VOLTAGE	\pm .005%/°C	*
STABILITY OF OUTPUT VOLTAGE	\pm .1%/1000 hrs.	*
LINE REGULATION, 105-125 V AV	\pm .01%	*
LOAD REGULATION	\pm .01%	*

* - Applies to the Output of the associated AC Power Source.

TABLE I-1. SPECIFICATIONS

SECTION II

PRELIMINARY INSPECTION, INSTALLATION AND OPERATION

INSPECTION UPON RECEIPT

The oscillator is aligned, calibrated and tested prior to shipment, and is ready for immediate use upon receipt. The following checks should be made, however, to assure that the instrument has suffered no damage during shipment.

1. Visually inspect the shipping container prior to accepting the package from the carrier. If extensive damage to the container is evident, a description of the damage should be noted on the carrier's receipt and signed by the driver or carrier agent. If damage is not apparent until the instrument is unpacked, a claim for concealed damage should be placed with the carrier, and all shipping containers and filler material saved for inspection. Forward a report of damage to the Elgar Service Department which will provide instructions for repair or replacement of the instrument.
2. Visually inspect the instrument when it is removed from the shipping container.

INSTALLATION AND OPERATION

Installing and operating the plug-in oscillator is accomplished as follows:

1. Set the power switch on the front panel of the power source to OFF.
2. Insert the plug-in module in the power source through the front panel opening. The oscillator plug-in is completely seated when the oscillator front panel and the power source front panel form a smooth plane.
3. Connect remote sensing leads from pins 11 and 12 of the 12-pin rear panel connector on the power source to the load terminals. DO NOT OPERATE THE POWER SOURCE WITH THE REMOTE SENSING LEADS NOT CONNECTED.

OUTPUT VOLTAGE ADJUSTMENT

The output voltage may be varied over a narrow range around 115V by the screwdriver adjustment output voltage control on the front panel of the plug-in unit. When using the Model 441-.01SS oscillator the Amplitude control on the front panel of the power source is inoperative.

SECTION III

THEORY OF OPERATION

GENERAL

This section of the handbook discusses principles of operation for the Model 441-.01SS oscillator. Figure 3-1 is a block diagram and figure 3-2 a schematic diagram of the circuitry.

OSCILLATOR CIRCUITRY

The oscillator output frequency is generated by a crystal oscillator Q101 and Q102, operating at a frequency of 102.4 KHz, and a chain of flip-flops which divide the oscillator frequency by 256 to generate the output frequency of 400 Hz.

FILTER CIRCUITS

Transistor Q103 is a saturated switch which is driven by the 400 Hz output from the flip-flop chain. It generates a 400 Hz square wave, the amplitude of which is determined by the collector voltage fed through R107 from the voltage control servo Z101. This square wave is passed through a two-section transistor active filter to remove the harmonics and generate a low-distortion sine-wave output. The first section of the active filter consists of transistors Q104, Q105 and Q106 and is tuned by resistors R108, R109, R110 and capacitors C102 and C103. The second section of the active filter consists of transistors Q107, Q108 and Q109 and is tuned by resistors R118, R119, R120 and capacitors C107 and C108. The signal from the second filter is connected to the power amplifier input in the associated AC Power Source.

VOLTAGE CONTROL SERVO

The output of the power source is connected to the primary of sensing transformer T101. The load voltage sensed by T101 is rectified in diodes CR110 and CR113. The temperature coefficient of the diode voltage drop is compensated by CR112. The rectifier voltage is compared to the precision DC reference voltage from CR126 at the summing junction of operational integrator Z101. The DC output of Z101 is applied to square wave clipper Q103 to correct any error in the load voltage.

REGULATED POWER SUPPLIES

Power for the plug-in oscillator is taken from the plus and minus 40V unregulated power supplies in the associated AC Power Source. Series regulators are used to develop plus and minus 10V regulated for the oscillator circuitry. The plus 10V supply is regulated by series pass transistor Q111 which is driven by comparator amplifier Q110. Q110 compares the output of the supply, divided by R132 and R133, to the voltage of CR107, a 2N3638 transistor operated as a zener diode. The collector load for Q110 is bootstrapped to the regulated output by CR108, another 2N3638 operated as a zener diode.

The minus 10V supply is regulated by pass transistor Q112. This transistor is driven by comparator amplifier Q113 and Q114 which compares the minus 10V output to the plus 10V output. CR109 bootstraps the collector load of Q114.

CR126, a temperature-compensated reference diode, derives a precision -6.2V reference voltage from the -10V supply. Plus 3.6V DC for the integrated circuit flip-flops is obtained from CR101 through CR105 operated as forward-biased regulators.

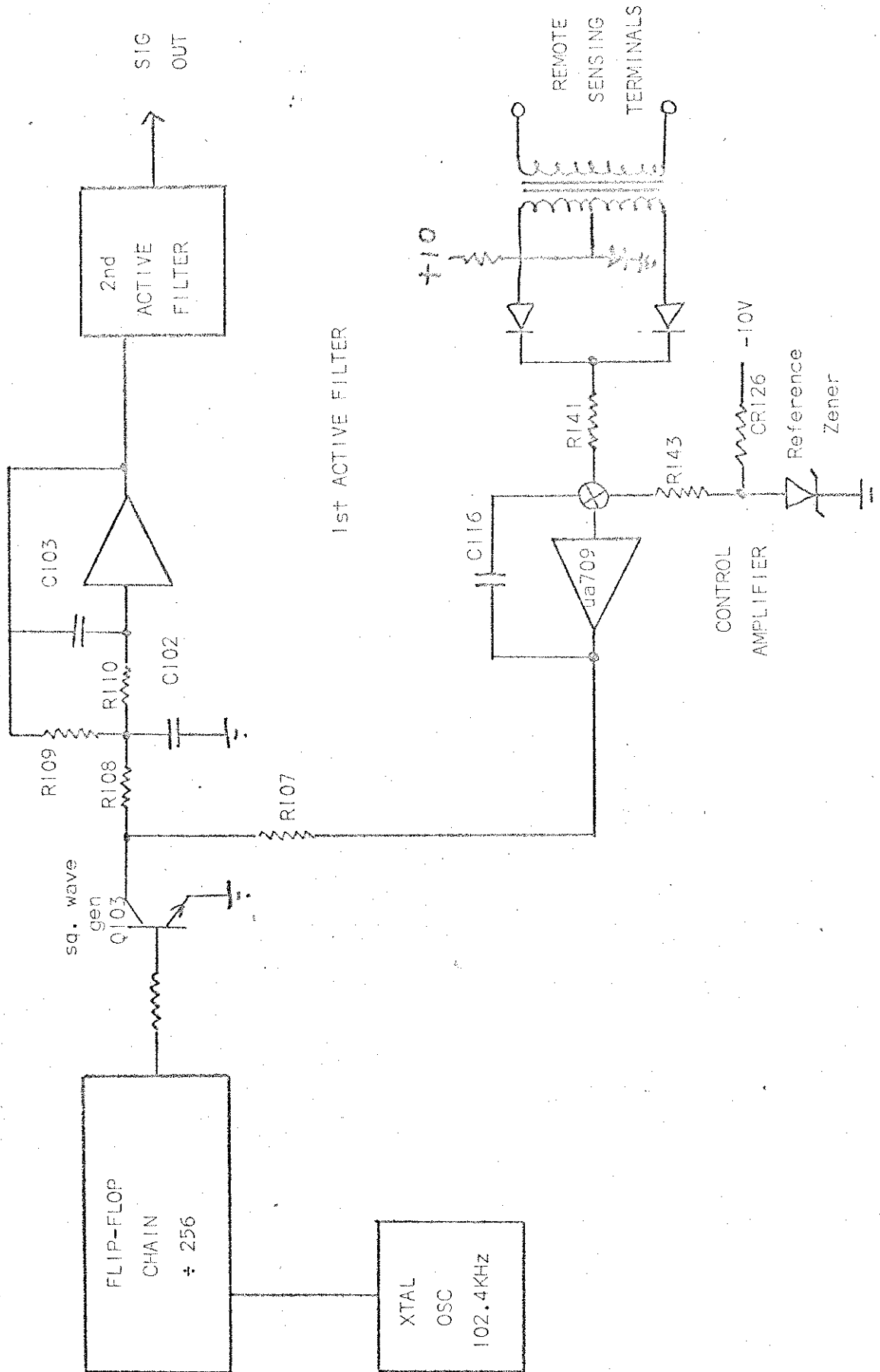


Fig. 3-1
BLOCK DIAGRAM
MODEL 441-.01SS

SECTION IV

MAINTENANCE

SERVICE INFORMATION

Questions concerned with operation, repair, or servicing of this instrument should be directed to the nearest Elgar representative or to the Service Department, Elgar Corporation, 8046 Engineer Road, San Diego, California 92111. INCLUDE THE MODEL NUMBER AND SERIAL NUMBER in any correspondence concerning the instrument.

FACTORY REPAIR

It is possible for equipment to be damaged in shipment. Therefore, it is imperative that the instrument be tested and inspected as soon as it is received. If the instrument shows signs of damage, notify the carrier immediately. The carrier's claim agent will prepare a report of damage to be forwarded to the Elgar Service Department. You will be advised as to the action necessary to have the instrument repaired or replaced.

SHIPPING DAMAGE

Should it be necessary to return an instrument to the factory for repair, please contact the Elgar Corporation Service Department for authorization to make shipment. DO NOT RETURN THE UNIT FOR REPAIR WITHOUT AUTHORIZATION.

CALIBRATION.

The only calibration adjustment in the Model 441-.01SS is the output voltage adjustment, R142, on the front panel of the oscillator. This adjustment is made by connecting a precision voltmeter to the load and adjusting R142 until the desired output voltage is obtained.

TROUBLESHOOTING

Whenever trouble is suspected in the plug-in unit, substitution of a unit known to be good will provide a quick check.

In case of excessively high output voltage, check to see that remote sensing leads are connected.

MODEL 441-.01SS

SECTION V

SECTION V
PARTS LIST

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER NAME	PART NO.
CAPACITORS					
C101, C106, C112, C114	.01uf	CER DISC		ERIE	81125V103P
C102, C107	.33uf	POLY CARB	100V 5%	IMB	BA2A334J
C103, C108	.012uf	POLY CARB	100V 5%	IMB	BA2A123J
C104, C105, C109, C110	.0015uf	CER DISC		ERIE	81125V152P
C113, C115	100uf	ALUM ELECT	25V	SPRAGUE	TE1211
C116	1uf	MYLAR	200V 5%	IMB	ZA2C105J
C117	22pf	DIP MICA	500V 5%	ARCO	DM15-220J
C118	510pf	DIP MICA	500V 5%	ARCO	DM15-511J
RESISTORS					
R101	250	WW	10W 5%	DALE	CW10
R102	33K	CARB COMP	1/2W 5%	OHMITE	
R103	3.3K	CARB COMP	1/2W 5%	OHMITE	
R104, R138, R139	10K	CARB COMP	1/2W 5%	OHMITE	
R105, R115, R125, R113, R123	470	CARB COMP	1/2W 5%	OHMITE	
R106	270	CARB COMP	1/2W 5%	OHMITE	
R107, R116, R126	1K	CARB COMP	1/2W 5%	OHMITE	
R108, R118	14.3K	MET FILM	1/8W 1%	TEXAS INST	RN60C1432F
R109, R119	7.15K	MET FILM	1/8W 1%	TEXAS INST	RN60C7151F
R110, R120	4.75K	MET FILM	1/8W 1%	TEXAS INST	RN60C4751F
R111, R114, R117, R121, R124, R131	2.2K	CARB COMP	1/2W 5%	OHMITE	
R112, R122	100K	CARB COMP	1/2W 5%	OHMITE	
R128, R135	47	CARB COMP	2W 5%	OHMITE	
R129, R130, R134, R137, R140	4.7K	CARB COMP	1/2W 5%	OHMITE	
R132, R144	1.5K	CARB COMP	1/2W 5%	OHMITE	
R133	1.2K	CARB COMP	1/2W 5%	OHMITE	
R136	220	CARB COMP	1/2W 5%	OHMITE	
R141	110K	MET FILM	1/8W 1%	TEXAS INST	RN60C1103F
R142	10K	TRIMPOT		HELI POT	78PR10K
R143	6.34	MET FILM	1/8W 1%	TEXAS INST	RN60C6341F
R166	FSV	WW	2W 1%	DALE	CW2
SEMICONDUCTORS					
CR101 thru CR105		RECTIFIER	200V 1a	WESTINGHOUSE	1N4818
CR107, CR108, CR109		ZENER	6.2V	FAIRCHILD	2N3638
CR110, CR113		RECTIFIER	600V 400ma	TEXAS INST	1N649
CR111, CR112, CR114, CR115		DIODE	70V 50ma	SYLVANIA	1N457

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER NAME	PART NO.
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SEMICONDUCTORS - cont.

Q101, Q102, Q103		TRANSISTOR		FAIRCHILD	2N3643
Q104, Q105, Q107, Q108, Q110		TRANSISTOR		FAIRCHILD	2N3565
Q106, Q109, Q114		TRANSISTOR		FAIRCHILD	2N3638
Q111, Q112		TRANSISTOR		RCA	40250V1
Q113		TRANSISTOR		FAIRCHILD	2N4356
Z101		IC OP AMP		FAIRCHILD	ua 709
Z102 - Z109		IC FLIP-FLOP		FAIRCHILD	uL 923

MISCELLANEOUS

XI		CRYSTAL	102.4KC	MONITOR	MC6-A
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WARRANTY

Elgar Corporation warrants each instrument it manufactures to be free from defects in material and workmanship. The corporation's obligation under this warranty is limited to servicing the instrument and replacing defective parts, when the instrument is returned to the factory and transportation charges pre-paid. This warranty is effective for one year after delivery of the instrument to the original purchaser. Defects caused by improper operating conditions, misuse, negligence, or the alteration or removal of the nameplate, will void the warranty. Elgar Corporation shall in no circumstance be liable for any direct or consequential loss or damage of any nature resulting from the malfunction of the instrument. This warranty is effective in lieu of any or all other obligations or liabilities on the part of Elgar Corporation, its agents, or representatives.

