

CHANDLER LIMITED® RS660 COMPRESSOR USER MANUAL



RS660 COMPRESSOR

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INTRODUCTION

RS660 Compressor

Thank you for purchasing the Chandler Limited RS660 Compressor, you now own a piece of EMI/Abbey Road Studios official equipment.

Rather than a reproduction of existing equipment, the RS660 Compressor stands apart and represents a path forward in the recording engineering development department. Capable of taming an array of dynamic sources, the new RS660 Compressor and limiter is at home alongside the historic units from which it was hewn and adds to the modern engineer's cache of analog signal processors.

Where form follows function, the feature set is straight forward, easily identifiable and neatly arranged. However, upon initial listen, the tone and character of the RS660 is remarkable; the engineer will find it effortless to quickly realize a sound and desired result.

Your Chandler Limited RS660 Compressor has been carefully crafted and built by hand at Chandler Limited's factory in Shell Rock IA, U.S.A., using through-hole components for the ultimate analog experience.

At Chandler Limited we are proud of our American made products and we hope you like them!

Please feel free to call our shop anytime for help or questions.

Phone: (319) 885-4200.

History

The Fairchild 660 mono valve (vacuum tube) compressor arrived at EMI's Abbey Road Studios in 1964.

The Fairchild 660 found favor with Abbey Road's engineers for vocals and drums and became a staple for The Beatles' records.

The Fairchild 660 — which has a different vibe than the stereo 670 — is highly desired for its unique tonal quality and reactivity.

The sound of the Fairchild 660 gave vocals a presence to the sound and its effect on Ringo's drums made cymbals sound backwards. It was used for a sound and it made a statement.

First designed in 1960 by Abbey Road Technical staff, the EMI RS124 compressor is one of the most coveted pieces of recording gear ever developed.

During the late 1950's, EMI acquired Altec 436B compressors, and soon realized the units were insufficient for critical recording applications. Livey, Page and Batchelor worked to modify the Altecs to meet their standards and ultimately ended up designing an entirely new compressor in the process, the EMI RS124.

The RS124 was popular with Abbey Road Studios' engineers. The RS124 added its unique character to single instruments, rhythm busses and entire mixes. So integral to the recording, mixing, and mastering process, a pair can be seen in almost every control room photo in Abbey Road during the 60s period.



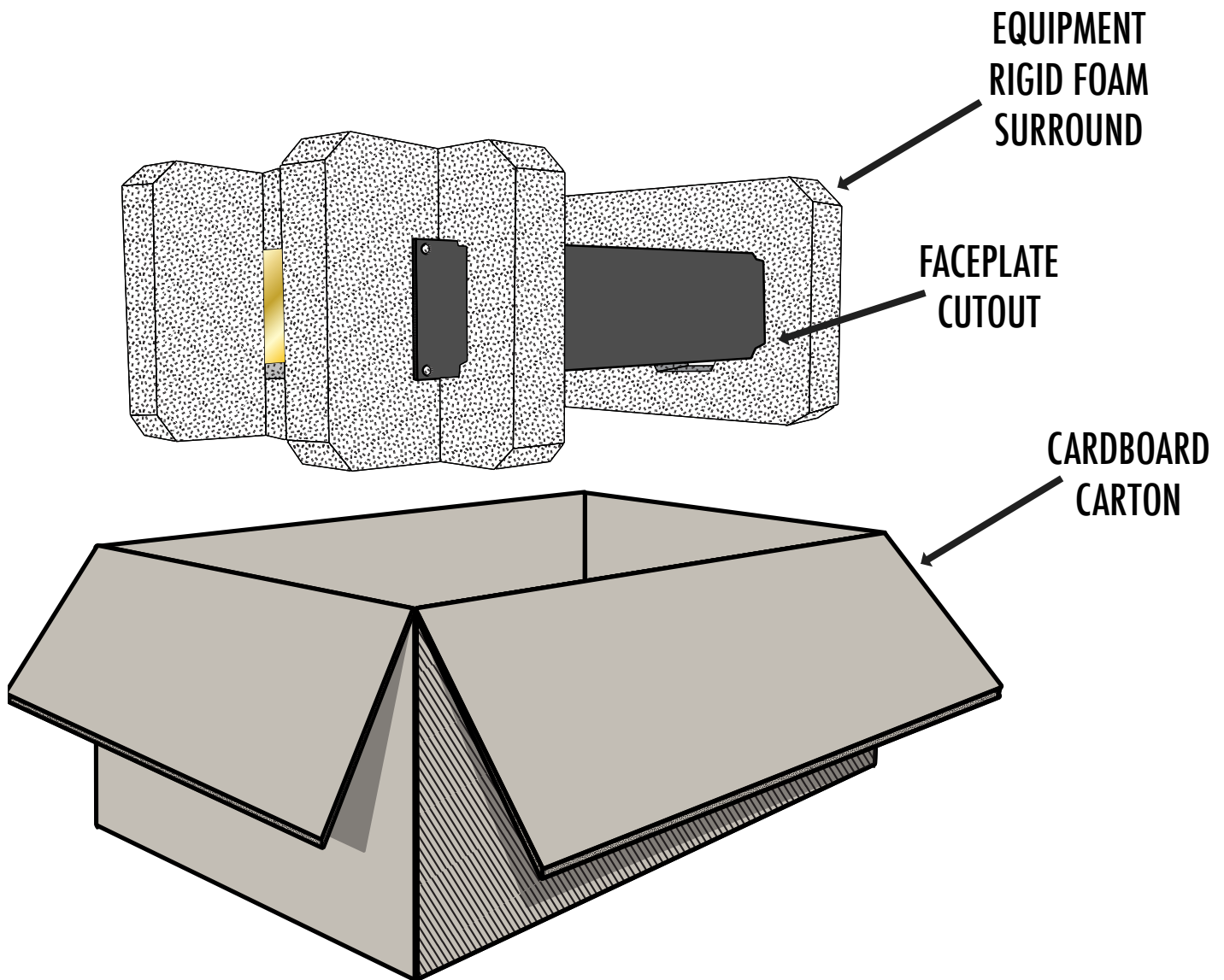
OFFICIAL

EQUIPMENT

SHIPMENT AND STORAGE

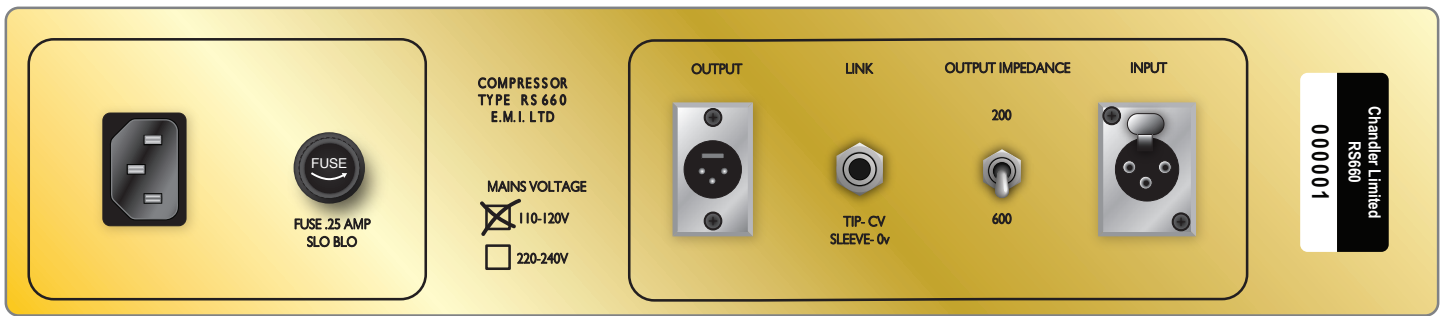
Packaging

This packaging has been designed specifically for Chandler Limited equipment. The cardboard carton and rigid foam surrounds provide protection for shipment and storage. Please retain the container and associated materials for future use.



***Note:** PSU rigid foam surrounds and sheets are not included for equipment shipped without a power supply unit inside the equipment container.

INSTALLATION



Rack Mounting

The RS660 Compressor contained in a two space, 19 inch rack-mountable chassis.

Heat in any studio environment is the enemy. For longevity and reliable service, install and maintain in a well-ventilated rack.

Power

The Chandler Limited RS660 Compressor features an internal power supply. Connection is made at the IEC receptacle using the supplied IEC power cable. Power is preset internally to operate at either 120V or 220V.

Protection of the circuit has been accounted for by way of a .25 Amp (250mA) 250V SLO-BLO fuse, which is accessible by means of a bayonet style fuse assembly.

Cycling power to the RS660 is achieved by switching the ON/OFF power switch (located far right of the front panel) for the desired condition. When the RS660 is powered on, the *pilot lamp* — located on the front — panel will illuminate.



Note: All interconnections should be made prior to powering on the unit.

Note: A ten-minute warm-up period should be observed prior to passing signal through the unit.



Audio Interconnections

On the rear panel of the RS660 Compressor exists two XLR jacks (wired pin 2 hot), one for *INPUT*, and the other for *OUTPUT*. Both input and output connections are +4, transformer balanced.



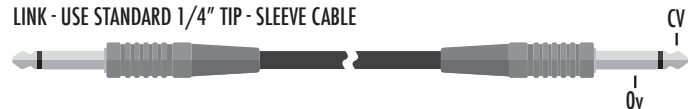
Note: Input impedance is 15k ohms.

Link

Provision has been made for stereo linking of two RS660 Compressors, by means of the female 1/4" *LINK* connector located on the rear of the unit, and using a standard 1/4" cable. For further notes on operation under linked conditions, review the "Link" section within the "Controls and Instruments" chapter of this manual.



LINK - USE STANDARD 1/4" TIP - SLEEVE CABLE



Note: Link cable purchased separately.

Output Impedance

OUTPUT IMPEDANCE is 600/200 ohms switchable. The 600 ohms setting may be more amenable to the modern studio environment. The 200 ohms impedance setting was Abbey Road Studios' historic standard. Both settings offer tonal and gain differences.



CONTROLS AND INSTRUMENTS

BAL.

The BAL. control set is a circuit re-balancing utility, and is located at the far left of the front panel.

In any *push/pull* amplifier, one side pushes waveform, while the other side pulls it in an equal fashion. Over time, the push/pull balance may become irregular, and as a result, unwanted artifacts will occur in the audio. This is common to most vacuum tube compressors, including the RS660.

When the push/pull circuit becomes unbalanced, it may exhibit subtle rumbling or distortion and modulation of the source signal; this is more noticeable at quiet sections of music, and low frequencies.

If the RS660 is suspected of having become unbalanced, simply press inwards and hold the momentary “plunger” switch. This action will induce a ticking sound heard in the monitors. Use a small flathead screw driver and slowly adjust the trim pot (located above the [BAL.] label) until the ticking sound virtually disappears in the monitors. Once the ticking sound is at its minimum audible level, rebalancing of the compression tube has been achieved; the ticking sound will never be completely inaudible, only reduced.

Historical note: The RS660 BAL. feature is inherited from the historic EMI / Abbey Road Studios RS124 Compressor. Early versions of the RS124 did not have front panel BAL. functionality. As a result, when the circuit became unbalanced, the compressor would have to be pulled during the session and rebalanced by Abbey Road technical staff. This scenario was cumbersome and the resultant session interruption was not ideal.

Abbey Road engineer Len Page had a proverbial ‘Light-Bulb’ moment when coming up with an ingenious modification.

When the momentary switch was engaged, a ticking sound was sent to both amplifiers, with one being phase reversed. If the circuit in a balanced state, the ticking would be canceled out. Otherwise, the engineer would adjust the trim pot until the audible ticking was virtually removed. This allowed for convenient in-session rebalancing of the compressor by the recording engineer in a matter of seconds.

A better way to Balance!

A better and a more accurate way to balance the RS660 Compressor! Sans audio source and using headphones, set the RS660 to limit and the I/O controls at maximum. With the headphone amp volume set fairly high, listen for the low-level hum and slowly adjust the BAL. adjustment screw — found on the front left of the faceplate — until the hum is at its lowest audible level or disappears.

Input

The *INPUT* control is variable, and allows adjustment of incoming signals applied at the XLR input connector on the rear of the compressor. The *INPUT* control is labeled — from left to right — 0 to 10.

The RS660 is a variable-mu type compression circuit. Clockwise adjustment of the *INPUT* control simultaneously raises incoming signal level, while lowering the compressor's threshold and increasing the amount of compression applied to the source material.

Counterclockwise rotation of the *INPUT* control simultaneously reduces incoming input level, while raising the threshold and lowering the amount of compression applied to the source material.



Tip: To obtain lower input levels and thus less compression and higher resultant output, run the RS660 Compressor as a send in a parallel compression scheme.

Output

The *OUTPUT* control is a variable attenuator, use this control to lower the overall output level of the RS660. Rotation in a counterclockwise motion from right to left, beginning at 0 and continuing to -10 will attenuate the output signal of the RS660 to the desired level.



Note: For an additional fee, switched I/O controls can be pre-ordered at time of purchase from an authorized Chandler Limited dealer.

Link

The RS660 Compressor may be used in stereo configuration by means of the *LINK* facility, when coupled to another unit.

For stereo operation, two RS660 Compressors must be connected using a standard ¼" cable by means of the ¼" LINK connectors at the rear of the units.

When proper connection has been made, linking may be activated when both RS660's LINK switches have been set to the forward position or towards [LINK]. If either or both units LINK switches are positioned downward, the stereo link will have been broken or bypassed.

Under linked conditions, each compressor's control set will be managed independently.

The linked units are controlled by whichever of the two control voltages is instantaneously the greater.



Note: When linked, both units should be set for the same compressor mode; reference the Compressor Modes section of this manual for more information.

Note: The LINK connector is wired: Tip – CV, Sleeve – 0v.

Note: When using the RS660 independently of a second unit or in mono, be sure to position the LINK switch downward, as to not cause undesired influence of one another.

Compressor Modes

The RS660 Compressor features three operational modes—*THD*, *LIMIT* and *COMP*, and are accessible by means of a three-position selector switch.

THD

THD (Total Harmonic Distortion) mode is influenced by the THD circuits deployed on the Chandler Limited TGI and TGI2413 Zener Limiters.

When the compressor mode selector switch is set for THD, the RS660 is able to produce overdrive and distortions, including heavy to light harmonic distortion, for signal coloration sans compression or limiting.

Limit

LIMIT is the limiter mode of the RS660.

LIMIT mode is purposely fast, colored and lively, and adds excitement to any source. LIMIT is flush with vintage tones and is comparatively more colored than COMP.

Comp

COMP is the compression mode of the RS660.

Functionally, COMP mode simultaneously changes several characteristics of gain reduction including— *threshold*, *knee* or *curve*, and *gain structure*.

In COMP mode, the *threshold* is higher and compression onset is lower, while the knee has a more smooth and less aggressive onset. The gain structure is also lower, thus pushing the compressor less. The result is a more controlled sound, while maintaining a vintage tone that is less aggressive.



Time Constant

The *TIME CONSTANT* switch is used to set the reactivity or response time of the RS660 Compressor, and features seven positions.

The seven *TIME CONSTANT* positions are labeled [1-7], with position one being fastest and seven slowest.

Positions 1-3 are fast and meant to replicate the faster — and most liked — settings of the Fairchild 660. These first three settings produce a colored and vintage tone.

Position four is moderate, a bridge between the faster and slower settings; this setting is excellent for less colored vocals and guitars.

Positions 5-7 are purposely quite slow and influenced by the gentle, uncolored and low artifact compression of many vintage valve compressors, including the EMI RS124.



Tip: The slower settings are able to yield large amounts of compression with little observable artifacts of compression. By contrast, the faster settings are the polar opposite and capable of being more audibly colored and vintage in character.

Metering

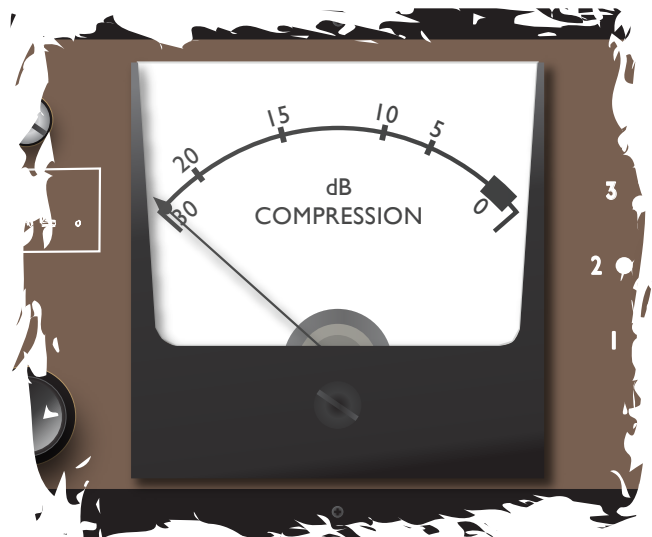
Provision has been made for monitoring of the processed signal by means of an analog *gain reduction* meter.

Meter Adjustment

Vacuum tube compressors and limiters require warm-up time for proper adjustment and optimal performance. The suggested warm-up time prior to any adjustments or use is ten minutes.

Once the RS660 Compressor has completed the warm-up cycle, the engineer may make fine adjustment of the gain reduction meter's needle. By means of the *Zero Adjust (ZA)* screw located on the meter face, and using a small flathead screwdriver, the recording engineer may place the *needle* for — or near — [0] on the indication range.

Warning: The ZA screw adjustment range is finite or narrow in scope. Over adjustment of the ZA screw may damage the gain reduction meter.



Note: The majority of vintage tube compressors and limiters are unregulated circuits and are subject to environmental power conditions. Therefore, it isn't uncommon for a gain reduction meter needle to sit higher than zero in some recording studios and fall beyond the range of the meter's ZA utility.

Reading the meter

The gain reduction meter allows the engineer to observe the amount of compression imparted on the original source material. The indication range is labeled in *decibels (dB)* — right to left — from 0 to 30.

The gain reduction meter needle deflects to the left and serves to guide the recording engineer to a value. Higher values on the gain reduction meter indication range represent more compression.

The rate of movement of the gain reduction meter needle — although much slower than the speed of electrons — roughly indicates compressor/limiter reactivity to the source signal.

MAINTENANCE INSTRUCTIONS

WARNING: HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may result if safety precautions are not observed. Disconnect any power to the equipment prior to removing the top or bottom covers for internal maintenance.

Valves

Valves (vacuum tubes) have been used in professional audio application for decades. It is the valve's ability to *clip* (signals passing above a threshold and resulting in distortion), more naturally than a transistor, and producing even ordered harmonic distortion that recording engineers, producers and artists crave.

Though valves can function for decades, no component is infallible or immune to being compromised or failing in some way; inconsistencies and or defects in manufacturing have a role in the expected functionality and life expectancy of a valve.

While Chandler Limited does not manufacture valves, we select vacuum tubes for a circuit required specification, and burn them in prior to deployment in the equipment; up to 40% of candidates are rejected for non-conformity. However, valves — akin to a lightbulb — are considered expendables and in the future, may require replacement by the equipment owner.

For maintenance and replacement, valves have been socketed.

Some indication that a valve may not be functioning optimally are— increased noise, low gain and apparent loss of compression.

If a valve is suspected of having been compromised or faulty, and maintenance or replacement is necessary, please reference the service section of this manual for support contact details.

For owner operators who are technically proficient in equipment maintenance and valve replacement, the hardware is field serviceable.

One common occurrence with valves is that they may become noisy. Valve noise isn't always an indication of component failure, and can sometimes be a sign of oxidization of vacuum tube contacts.

Only once the unit has been fully disconnected from power, by disconnection of the IEC cable from the equipment chassis, may the top cover be removed, may a valve be extracted from the socket. If a valve presents visible oxidization, steel

wool may be used to gently brush of any corrosion to the valve contacts. After the tube has been evaluated and or cleaned, re-seat the valve in the socket prior to moving on to the next one; sometimes a simple re-seating of the valve in the socket may remove any corrosion. If noise persists after the prior maintenance regiment, it may be time for a tube to be replaced.

VALVE INVENTORY	QUANTITY
6386	1
6CG7	1
6AL5	1

Pilot Lamp

A pilot lamp is provided to indicate when mains power is active. An incandescent light bulb is housed within a bayonet type lamp fixture, and like any bulb, it may need to be replaced from time to time.

BULB TYPE	SPECIFICATION
Dial Lamp #47 or equivalent LED replacement	T-3-1/4, 6.3V, .15A, Bayonet Base

Only once the unit has been fully disconnected from power, by disconnection of the IEC cable from the equipment chassis, may the bulb be replaced.

To replace the pilot lamp light bulb, first remove the lamp cover. In an anticlockwise motion, gently unscrew the cover to reveal the light bulb.

To free the light bulb from the bayonet style base, using a thumb, gently press the light bulb inwards and rotate it anticlockwise until it is released.

Once the failed light bulb has been removed, place the new bulb in to the fixture and again, using a thumb, gently apply pressure to the light bulb, and rotate it in a clockwise motion until the light bulb is fastened in place.

Warning: If the bulb is pressed inwards with too much pressure, the bayonet lamp cradle may bend and the light bulb will not illuminate when mains power is present.

If the bayonet lamp cradle is suspected of being bent, it may be easily remedied from inside the chassis — only after power has been disconnected from the unit —, by gently applying pressure to bend it back into form.

Circuit Protection

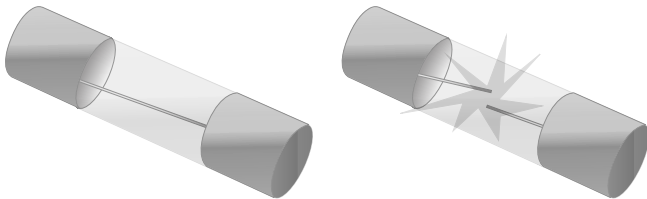
Protection of the circuit has been accounted for by way of a .25 Amp (250mA) 250V SLO-BLO fuse, which is accessible by means of a bayonet style fuse assembly, located on the rear of the chassis.



If a fuse is suspected of having been blown, first disconnect power from the unit prior to removing the fuse assembly cap.

Once power has been disconnected from the unit, rotate the fuse assembly cap anticlockwise until it is unfastened.

Remove the fuse from the cradle and visually inspect it for an unbroken path.



If the fuse path has been broken, the fuse must be replaced with a working fuse and the fuse assembly cap securely refastened prior to restoring power.

If the condition of the fuse cannot be visually verified, continuity of the fuse can be tested by means of a multimeter.

TECHNICAL SPECIFICATIONS

RS660 COMPRESSOR	
Channels	Mono (stereo linkable)
Circuit Type	Valve (6386, 6CG7, 6AL5)
INTERCONNECTIONS	
Input	XLR (pin 2 hot, transformer balanced), Impedance 15k Ohms
Output	XLR (pin 2 hot, transformer balanced), Impedance 200/600 Ohms, switchable
Link	1/4" mono (tip – CV, sleeve – 0v)
CONTROL SET	
Input	Variable potentiometer, stepped optional
Output	Variable potentiometer, stepped optional
Link	Switchable defeat/bypass
Compressor mode	THD, Limit, Comp (switched)
Time Constant	Selectable, 7 positions (stepped switch)
Output Impedance	Selectable, 200/600 Ohms, (toggle switch)
POWER	
Internal	120V/220V (preset for region)
MISC.	
Fuse Type	.25 Amp (250mA) 250V SLO-BLO
Pilot Lamp	Dial Lamp #47, T-3-1/4, 6.3V, .15A, Bayonet Base or similar spec. LED

SERVICE

United States

Prior to sending in equipment for repair, please contact our shop at the number below. We will assist you in troubleshooting, and if needed, we will issue an RMA# to return the equipment for service.

Send Repairs To:

Chandler Limited, Inc.

Attention: Repairs

222 S. Cherry St.

PO Box 38 (if sending via the postal service)

Shell Rock IA 50670

Phone: (319) 885-4200

Email: support@chandlerlimited.com

International

Repair of Chandler Limited products purchased, outside of the United States, is provided by local or regional authorized Chandler Limited distributors. To obtain service or repairs, please contact your local dealer or regional distributor for further instruction.

Visit chandlerlimited.com for a list of authorized [International Distributors](#).

CE CERTIFICATION

Chandler Limited declares under its sole responsibility that all products manufactured by them are in compliance with Electromagnetic Compatibility (EMC) Directive 2014/30/EU; Standards: EN55103-1:2009+A1:2012; EN55103-2:2009; EN55013:2013 and Low Voltage Directive (LVD) 2014/35/EU; Standards: EN60065:2002+A1:2006+A11:2008+A2:2010+A12:2011.

PRODUCT LIMITED WARRANTY

During the first year from the date of the original purchase, this product is warranted to be free from defects in materials and workmanship under normal use, service and maintenance. This warranty applies to the original purchaser and is subject to the following terms and conditions:

What Is Covered: The product's components as originally installed by the manufacturer that are defective in materials or workmanship under normal use, service and maintenance, except expendables defined as vacuum tubes and meter or badge lamps, which are covered by a lesser warranty period as set forth below.

What Is Not Covered By This Warranty: This warranty does not extend to or cover:

1. Any defect due to the negligence of others; failure to install, operate or maintain the product properly; unreasonable use; accidents; alteration; use of unauthorized or non-standardized parts; acts of God; theft; vandalism; electrical malfunctions (i.e., resulting from power surges, shorted or overloaded circuits, etc.), use of any power source other than supplied by manufacturer; repair by anyone other than an authorized Chandler Limited representative; or damage resulting from improper packing or mishandling by a shipper.
2. Normal wear and tear of parts.
3. Shipping, handling, packaging and delivery costs of the product.

Who Is Covered: The original purchaser.

Repair During The First Year for non-expendables: During the first year, all defective product components that are covered by this Limited Warranty will be repaired free of charge including parts and labor. The purchaser will pay all shipping costs AND a \$35 handling fee per unit.

Repair During The First 90 Days for expendables: During the first 90 days, all defective expendables (vacuum tubes and meter or badge lamps) that are covered by this Limited Warranty will be replaced or repaired free of charge including parts and labor. The purchaser will pay all shipping costs and a \$35.00 handling fee per unit.

What You Must Do for Warranty Service (in the United States): If you live in the United States and your product was purchased through a U.S. Dealer, please contact your dealer OR call 319-885-4200 or email support@chandlerlimited.com.

What You Must Do for Warranty Service (outside of the United States): For warranty service if you live outside of the United States, please contact the dealer where you purchased the product.

Any products returned to Chandler Limited for repair should include: (1) complete description of the problem; (2) name, address, phone number, fax number, and/or e-mail address; (3) receipt of original purchase; (4) power supply and all accessories and cables. The purchaser is responsible for the shipping costs to and from Chandler Limited. Chandler Limited is not responsible for damage resulting from improper packing and/or mishandling by a shipper.

If sent by UPS or Federal Express, ship to: Chandler Limited, 222 South Cherry Street, Shell Rock IA 50670

If sent by Postal Service, ship to: Chandler Limited, PO Box 38, Shell Rock IA 50670

The foregoing expresses Chandler Limited's obligations and liabilities with respect to the quality of the product, its components and accessories. All other warranties, express or implied, including the warranties of merchantability or fitness for a particular purpose are disclaimed. Chandler Limited shall not be liable for the loss or use of the product, its components and accessories, inconvenience, loss or any other damages, direct or consequences arising out of the use of, or inability to use the product or its components or damages resulting from or attributable to defects in the products or its components. No one other than Chandler Limited has authority to extend or modify the terms of this limited warranty in any manner whatsoever.

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EXCEPT FOR THE FOREGOING WARRANTIES, CHANDLER LIMITED HEREBY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY AND/OR ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND/OR ANY WARRANTY WITH REGARD TO ANY CLAIM OF INFRINGEMENT THAT MAY BE PROVIDED IN SECTION 2-312(3) OF THE UNIFORM COMMERCIAL CODE AND/OR IN ANY OTHER COMPARABLE STATE STATUTE.

LIMITATION OF LIABILITY

THE LIABILITY OF CHANDLER LIMITED, IF ANY, AND PURCHASER'S SOLE AND EXCLUSIVE REMEDY FOR DAMAGES FOR ANY CLAIM OF ANY KIND WHATSOEVER, REGARDLESS OF THE LEGAL THEORY AND WHETHER ARISING IN TORT OR CONTRACT, SHALL NOT BE GREATER THAN THE ACTUAL PURCHASE PRICE OF THE PRODUCT WITH RESPECT TO WHICH SUCH CLAIM IS MADE. IN NO EVENT SHALL CHANDLER LIMITED BE LIABLE TO PURCHASER FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION, REIMBURSEMENT OR DAMAGES ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS OR FOR ANY OTHER REASON WHATSOEVER.