Model 8000-025

RF Power Amplifier

User Manual

ETS·LINDGREN®
An ESCO Technologies Company

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Revision Record

MANUAL, 8000-025 | Part #399631, Rev. C

Revision	Description	Date
A	Initial Release	October, 2014
B	Declaration of Conformity updated to latest version Directives	April, 2016
C	Warranty Information Removed	November, 2021

Table of Contents

Notes, Cautions, and Warnings

Note: Denotes helpful information intended to provide tips for better use of the product.

CAUTION: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.

WARNING: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.

Safety Information

Warning: Avoid exceeding the stated maximum input level as this can cause a risk of damaging the equipment.

Warning: There is a significant risk of an electrical or burn hazard, to avoid this always ensure the output is terminated prior to switching on the equipment.

Protective Earth Ground (Safety Ground): Indicates protective earth terminal. You should provide uninterruptible safety earth ground from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

Waste Electrical and Electronic Equipment (WEEE) Directive: (European Union) At end of useful life, this product should be deposited at an appropriate waste disposal facility for recycling and disposal. Do not dispose of with household waste.

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1.0 Introduction

The ETS-Lindgren Model 8000-025 RF Power Amplifier is capable of supplying a minimum of 100 watts into a 50 ohm load over the frequency range 1MHz to 400MHz. The amplifier is designed with sufficient gain so that it may be used with normal output levels of signal sources.

- A safety interlock on the rear panel is also provided, which will mute the amplifier when grounded.
- The unit is powered by a switched mode power supply for high efficiency, high power factor, and a wide voltage range operation. The unit is air cooled with integral fans and is protected against faulty cooling by excess temperature sensing.
- A front panel fault indicator is provided to indicate over-temperature.

The amplifier is designed for rugged operation into a variety of loads and is primarily intended for use as an RF power source for EMC susceptibility testing, but is also applicable to other systems requiring a wide-band linear amplifier.

This amplifier is designated as Professional Equipment and should not be operated by untrained staff. As this product has the capability to generate high levels of RF energy it is not intended for use in a residential environment.

Standard Configuration

- The 8000-025 amplifier is supplied for fitting into a 19 inch rack.
- The RF connectors are N type input which are located on the rear panel of the amplifier.

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2.0 Maintenance

If you have any questions concerning maintenance or if the amplifier system is misoperating, contact ETS-Lindgren Customer Service. See *Service Procedures* for contact information.

CAUTION: Before performing any maintenance, follow the information provided in *Before You Begin* on page 13.

WARNING: There are no user serviceable parts within the RF Power Amplifier system.

To prevent electrical shock, DO NOT remove covers.

Warranty will be void if the covers are opened.

ALWAYS UNPLUG THE UNIT BEFORE CLEANING. Clean the exterior of the cabinet using a damp cloth.

Service Procedures

CONTACTING ETS-LINDGREN

Note: Please see ets-lindgren.com for a list of ETS-Lindgren offices, including phone and email contact information.

SENDING A COMPONENT FOR SERVICE

1. Contact ETS-Lindgren Customer Service to obtain a Service Request Order (SRO).
2. Briefly describe the problem in writing. Give details regarding the observed symptom(s) or error codes, and whether the problem is constant or intermittent in nature. Please include the date(s), the service representative you spoke with, and the nature of the conversation. Include the serial number of the item being returned.
3. Package the system or component carefully. If possible, use the original packing materials or carrying case to return a system or system component to ETS-Lindgren.

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3.0 Specifications

Electrical Specifications

Note: The third order intercept point is a nominal value as its calculation depends upon the power level at which distortion measurements are made.

Note: Output VSWR tolerance is specified for excitation within the permitted levels and frequency range.

Frequency Range (Instantaneous)	1MHz – 400MHz
Rated Output Power	100W Minimum
Output Power at 1dB Gain Compression	75W Minimum
Gain	51dB Minimum
Third Order Intercept Point	61dBm
Gain Variation with Frequency	+/- 2dB
Harmonics at 75W Output Power	Better than -20dBc
Output Impedance	50 Ohms
Stability	Unconditional
Output VSWR Tolerance	Infinity:1
Input VSWR	2:1
RF Connector Style	Type N Female
Safety Interlock	BNC Female, s/c and o/c to mute
USB/GPIB Interface	Optional

Physical Specifications

Case Dimensions	19 inch, 4U, 440mm deep
Weight	17 kg (37.4 lb)

Environmental

Operating Temperature Range	0-40°C
Altitude	Up to 2000m above sea level
Humidity	95% (Non-condensing)

4.0 Before You Begin

CAUTION: Before connecting any components, follow the information provided in *Safety Symbols* on page v.

Unpacking

The 8000-025 amplifier is supplied with the following contents:

- Power Cable (10A)
- Spare Fuse (T 10A H 250V 20mm)
- User Manual (This document)
- Calibration Test Report

If any signs of damage are found no attempt should be made to install or operate the amplifier system. Contact ETS-Lindgren Customer Service immediately to report the problem.

If the shipping carton has been damaged, retain the shipping carton and packing material for the carrier's inspection. Check that the equipment is complete and is in an undamaged condition, and then contact ETS-Lindgren Customer Service for further advice.

Safety Information

- This RF amplifier has been designed and tested in accordance with BS EN61010-1 and has been supplied in a safe condition. This manual contains warning information which must be followed to ensure safe operation and to retain the apparatus in a safe condition.
- This apparatus does not incorporate components liable to explode or implode during normal operating conditions.
- In normal operating conditions this apparatus does not liberate injurious or poisonous gases.
- Sound levels of this apparatus in a rack are below 85dBA as required by EN61010-1.

- If local regulations have a lower limit, appropriate action should be taken in line with the local regulations so as to comply.
- This apparatus is of Installation Category 2.

Warnings

WARNING: This apparatus is capable of delivering harmful levels of radio frequency power. Ensure at all times during operation that the RF output is properly terminated with an adequately rated termination or transducer and that the cables and connectors attached to the apparatus are in good condition.

The use of suitably rated mains cords must only be used as specified within this document, see Rear Panel, Mains Input on Page 15.

The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord without a protective conductor.

The opening of covers or removal of parts is likely to expose live parts.

This apparatus must only be serviced by qualified service personnel and must be disconnected from all voltage sources before it is opened for adjustment, replacement, maintenance, or repair.

Make sure that only fuses of the required rated current and of the specified type are used for replacement. The use of makeshift fuses and the short-circuiting of fuse holders are prohibited.

5.0 Installation

CAUTION: Before connecting any components, follow the information provided in *Before You Begin* on page 13.

Mains Input

- Mains input is via a 10A power cable (supplied).
- Access for mains disconnection must be maintained at all times.

Amplifier Protection

- The amplifier is protected by a fuse of the following rating, T 10A H 250V 20mm.
- This instrument must be earthed.

WARNING: If the rack mounting option has been selected, the unit must be installed in the rack using a suitable tray or runners.

The amplifier must not be supported only by the front panels.

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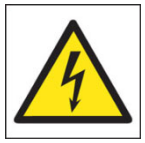
6.0 Operation

CAUTION: Before placing into operation, follow the information provided in *Before You Begin* on page 13.

Note: Make sure you are satisfied with the contents and condition of your amplifier prior to placing it into operation.

Warning: Avoid exceeding the stated maximum input level as this can cause a risk of damaging the equipment.



Warning: There is a significant risk of an electrical or burn hazard; to avoid this, always ensure the output is terminated into a suitable load prior to switching on the equipment.

Equipment Use

- The equipment must only be used for its intended purpose.
- All parts of the equipment must remain connected to ensure that protective circuits operate. Disconnecting parts of the equipment may impair operation and safety.

Mains Switch

The amplifier is switched on or off by pressing the mains switch on the rear panel of the amplifier.

Standby/Operate Switch

Pressing the standby/operate switch toggles the state of the amplifier between Standby and Operate modes. The blue halo indicator flashes in Standby mode, whereas steady blue indicates Operate mode.

Fault Indicator (Red LED)

Should a fault be detected, the red LED on the amplifier front panel will be illuminated. The amplifier will be forced into standby mode and the unit will cease to function. This action is latching, therefore only when the fault has been cleared can the amplifier be reset; this is done by pressing the standby/operate switch.

The reasons for the system fault light to illuminate are as follows:

- Excess module temperature
- Air cooling failure (fans failing to operate)

Interlock Indicator (Orange LED)

When the rear panel interlock is activated the interlock indicator will illuminate and the amplifier gain stages will all be turned off. This action is latching; therefore, the amplifier will return to Standby mode when the interlock is released.

Local Lockout Indicator

This indicator is used when the USB/GPIB option is fitted. Refer to the separate Remote Control Interface manual supplied.

RF Input (Rear Panel Mounted)

The RF input will accept a signal from an RF generator. This input must be within the operating frequency range of the 8000-025 amplifier. An amplitude of up to 0dBm will be sufficient to saturate the amplifier. Operation outside the specified frequency range should not be attempted as it may subject the amplifier to undue internal stress.

RF Output (Rear Panel Mounted)

WARNING: The centre conductor of the RF output represents a severe burn hazard to personnel.

Never operate the amplifier without a proper termination or with defective cables or connectors.

This connector must be suitably terminated at all times during operation. Ensure that the cable is capable of handling the power available, which may be as much as 200 watts.

Air Inlet

This amplifier requires a free air supply for cooling; the front air inlet must not be restricted.

Safety Interlock

- A dual interlock system can be operated by applying either short circuit (S/C) or open circuit (O/C) to mute the amplifier.

  In order for the amplifier to operate, the **Interlock** BNC connector must be S/C and the Interlock must be O/C. If the **Interlock** is O/C or the Interlock is S/C the amplifier will be muted.

- The amplifier is delivered without the interlock applied and will be ready to operate.

- The interlock function is latching so when the interlock is removed the amplifier will be in standby mode. Press the standby/operate switch to return to normal operation.

- Current drawn from the interlock BNC connectors under short circuit conditions will typically be 2.8mA.

Fan Outlet

This amplifier requires a free air supply for cooling; the rear air outlets must not be restricted.

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Appendix A: EC Declaration of Conformity

ETS-Lindgren Inc. declares these products to be in conformity with the following standards, following the provisions of EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU:

Model 8000-025, RF Power Amplifier

Emission:	EN 61326-1:2013, Class A Electrical equipment for measurement, control, and laboratory use.
Immunity:	EN 61326-1:2013, Industrial level, performance criteria A Electrical equipment for measurement, control, and laboratory use.
Safety:	EN 61010-1:2010, AMD1:2016 Safety requirements for electrical equipment for measurement, control, and laboratory use.

Technical Construction Files are available upon request.