LARS Technical Memorandum 052973 T-14

TECHNICAL MANUAL FOR THE MEASUREMENTS

FIELD WAVELENGTH CALIBRATER

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OPERATION AND PROCEDURE

The spectrum tube (helium gas) is supported vertically in the clamps provided on the high potential rod terminals. Power is provided by the spectrum tube power supply consisting of a powerstat transformer and a step up transformer which produces up to 18 MA at 5000 V. See Figures 1 and 2.

The exciting current of the power supply should be adjusted to the lowest value that will give a sufficiently bright spectrum. A higher current may be used for short periods, but the life of the tube will be considerably lengthened by use of the lowest possible current. Also, excessive current can cause emission of glass vapors which can obscure the intended spectrum of the tube.

The source is designed to be positioned atop the solar port of the Exotech Model 20-C Spectroradiometer. The radiation received is spectrally scanned, and the color wheel position pulse versus wavelength determined by the procedure described in the LARS Technical Memorandum describing the Data Acquisition Control Manual.

Helium generates spectral lines at: .5876, .6678, .7065, 1.0830, and 2.0581 (Reference: Amer. Inst. of Physics, Handbk, Table 7g1.).

PARTS LIST FOR
HELIUM LIGHT SOURCE

(1) Helium gas spectra tube - cenco part no. 87215

(1) Spectrum tube power supply - cenco part no. 87208 less slide wire transformer

(1) Powerstat transformer job physics stores part no. 5-17-840010 132v/2.25A

(2) Standoffs, bakelite 1 1/4" OD, 1 1/2" Long

(2) Standoffs, ceramic 1/4" OD, 1/2" Long

(2) Cable clamps, plastic 1/2"

(1) Shield, reflecting open ended cone 4" deep major dia. 6 1/2", minor dia. 1", inside lined with aluminum foil

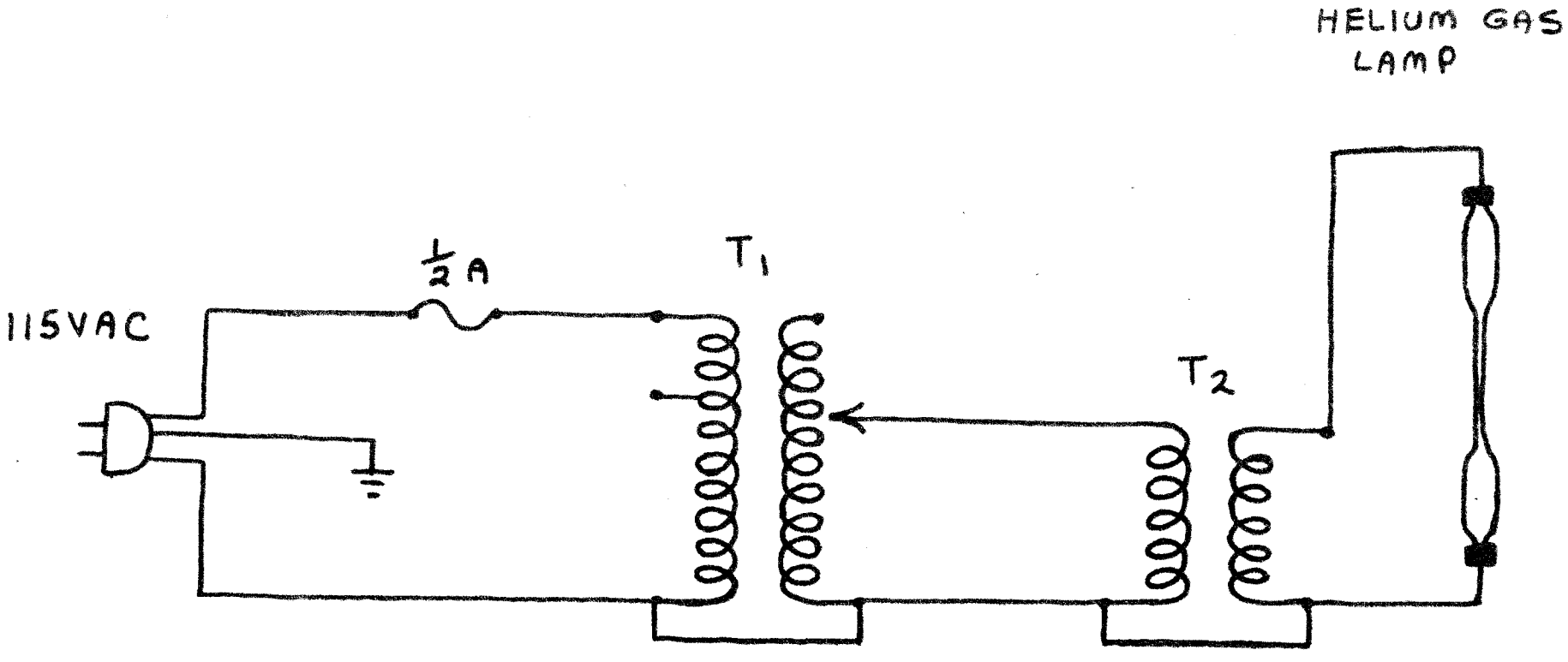
(4) legs
- (4) 8-32 x 2" screws
- (4) 8-32 nuts
- (4) aluminum tubes 1/4" OD, 1" Long
- (4) rubber feet

(1) Fuse holder Newark part no. 27F813

(1) Fuse 1/2A 125v

(1) Chassis Newark part no. 91F613 15" x 7 3/4" x 7" w/carrying handle

(1) seal, foam rubber 7" OD, 5" ID, 1" thick



T1 POWERSTAT TRANSFORMER 132V/2.5A

T2 STEP UP TRANSFORMER 5000V

FIG. 1. Circuit Diagram

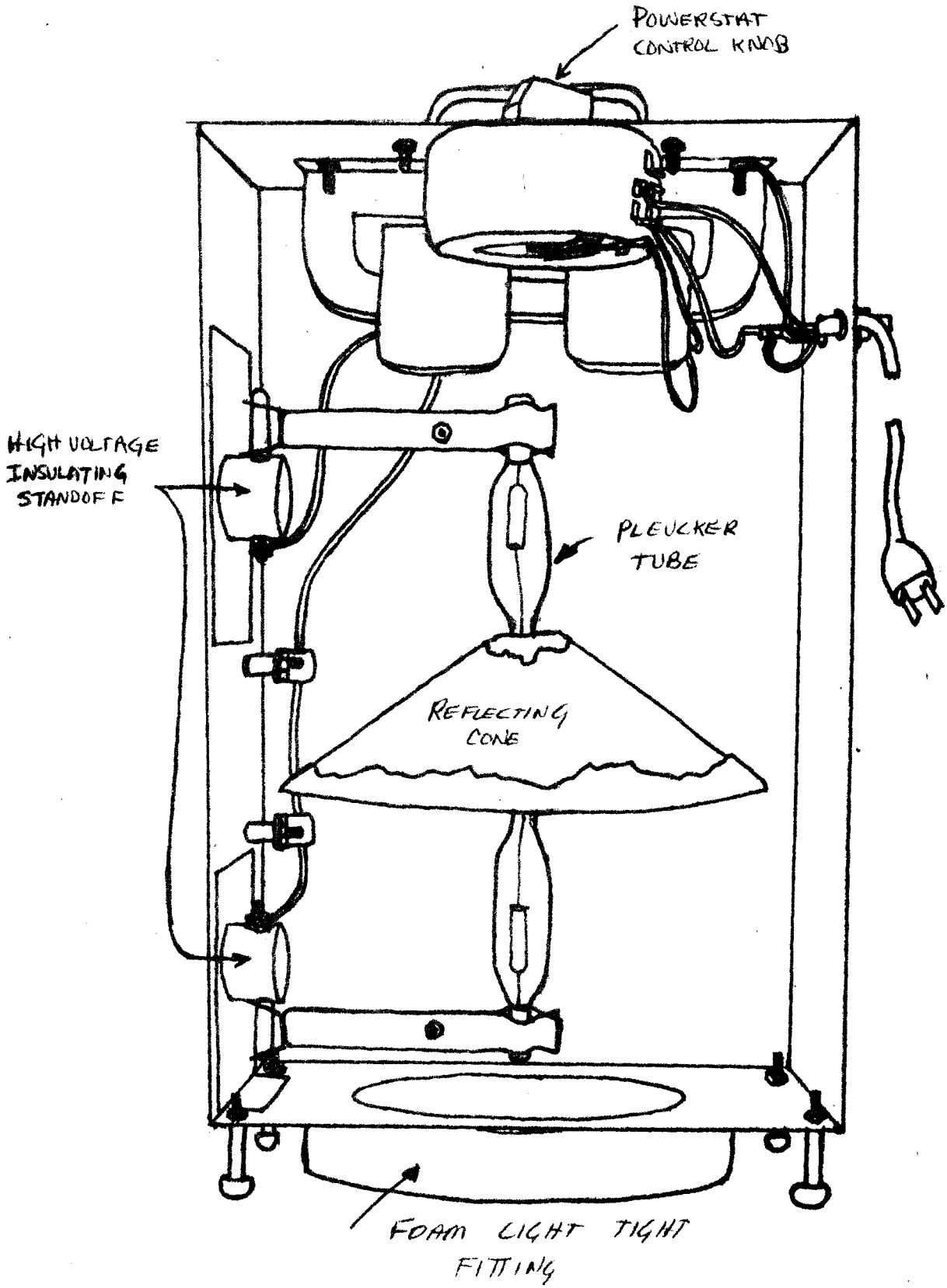


FIG. 2. HELIUM LIGHT SOURCE

OPERATING INSTRUCTIONS

SPECTRA TUBES

CENCO NOS. 87210 through 87265

1. INTRODUCTION

1.1 GENERAL: The Cenco Spectra Tubes are used as light sources for spectroscopes and wave length spectrometers. The tubes concentrate a gaseous discharge in a narrow capillary tube to produce a brilliant line source of light.

1.2 SPECIFICATIONS:

Overall length, CM	25
Capillary portion length, CM	8.5 to 10

2. DESCRIPTION

The Spectra Tubes consist of glass tubing which has a thick-walled capillary portion and is filled with highly purified gas. Firmly sealed to the ends of each tube is a platinum wire welded in a metal cap. Protruding through the metal caps is a wire loop for electrical connection. The capillary portion of the glass tube concentrates the luminescence in a narrow column for maximum intensity.

The gas contents of the spectra tubes have been highly purified to assure spectra that are free from unwanted lines.

3. SETUP AND OPERATION

Support a spectrum tube vertically in the clamps provided on the high potential rod-terminals of the Cenco No. 87208, Spectrum Tube Power Supply. The output of this power supply is 18 milliamperes at 5000 volts. To the power supply connect a rheostat, such as the Cenco No. 82910-11 or -12. The rheostat is used to adjust the power supply to a suitable operating level for the spectrum tube.

The exciting current of the power supply should be adjusted to the lowest value that will give a sufficiently bright spectrum. A higher current may be used for short periods, but the life of the tube will be considerably lengthened by use of the lowest possible current. When excessive current is used for excitation, heat is generated which may cause the release of vapors from the glass and possibly from the electrodes. Spectra produced by these vapors may obscure the spectrum of the gas with which the tube was originally filled, thus making the spectrum tube useless. Since the spectra tubes of the halogen family have a short life, they should be operated only when needed.

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These tubes may also be operated by means of a Cenco No. 79800 or 80730 Induction Coil energized by three Cenco No. 79145 Dry Batteries connected in series.

4. REPLACEMENT SPECTRA TUBES

Description	Cenco No.
Argon Gas	87210
Helium Gas	87215
Neon Gas	87220
Carbonic Acid Gas	87225
Chlorine Gas	87230
Nitrogen Gas	87240
Air	87242
Oxygen Gas	87245
Iodine Vapor	87255
Mercury Vapor	87260
Water Vapor	87265

5. ACCESSORIES

Description	Cenco No.
Power Supply	87208
Rheostat	82910-11
Rheostat	82910-12
Induction Coil	79800
Dry Battery	79145
Power Supply	79561

OPERATING INSTRUCTIONS

SPECTRUM TUBE POWER SUPPLY

CENCO NO. 87208

1. INTRODUCTION

The Cenco No. 87208 Spectrum Tube Power Supply is used for energizing spectrum tubes such as Cenco Nos. 87210 through 87265. The unit is designed to hold a spectrum tube at the proper height for illuminating the slit of the No. 86950 Spectroscope, No. 87010 Spectrometer, and No. 87102 Spectrograph.

2. DESCRIPTION

The Spectrum Tube Power Supply consists of a transformer housed within a metal cabinet on which are mounted two porcelain-insulated rods. The high-potential windings of the transformer terminate in these rods. Vertically adjustable spring clamps for supporting spectrum tubes are attached to the rods. A pair of rubber-covered leads extending from the cabinet serve for connecting a No. 82910-007 Slide Wire Rheostat to the primary circuit of the transformer. The rheostat enables the user to control intensity of the tube by varying the current to the transformer.

With an AC input of 115 volts 50/60 cps, and an output current of 18 milli-amperes at 5000 volts, the power supply makes for a steady illumination of maximum brightness. The character of such illumination is far superior to that secured with battery-operated spark coils.

Also, with this type of power supply, the possibility of tube damage caused by very heavy discharge is minimal.

3. OPERATION

IMPORTANT: To safeguard the unit from damage in transit, two double-wall cardboard pieces have been placed in its back. Prior to operation, remove these cardboard supports by turning them down and sliding them out.

Operate the power supply only on 115-volt, 60-cycle AC.

Connect a rheostat, such as Cenco No. 82910-007, to the rubber-covered leads which extend, with the connecting cord, through the side of the housing.

Support the spectrum tube vertically in the clamps provided on the high-potential rods. The intensity of illumination is controlled by the rheostat in the primary of the transformer. The lower the intensity at which the tube is operated, the longer will be its life.

CAUTION: It is strongly recommended that the power supply be operated only with a spectrum tube in place. The voltage across the terminals is 5000 volts.

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