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OTHER SAI™ EQUIPMENT

We appreciate your current purchase of our equipment very much. The following material describes other equipment which may greatly enhance the capability of what you have bought.

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DESCRIPTION OF

SAI™ AUXILIARY AIR AND HELIUM SUPPLY SYSTEM

May 1997

The SAI™ Auxiliary Air And Helium Supply System provides a compact way to operate the Model 5 Bubble Generator in any location where air and helium are not conveniently available. Weighing 58 lbs, the unit is compact and portable. This makes it ideal for the study of ventilation patterns, cleanroom airflows and similar applications.

The air is supplied by a Thomas industrial duty oil-less piston compressor that generates 2.62 cfm at 50 psi. This unit has its own regulator to provide the required flow rate and pressure for the Model 5 Console with one or two Plug-In Heads. The compressor is powered by a 3/4 hp, direct drive motor with an on/off switch and thermal overload protection that operates on 115 Vac/60Hz supplied by an electrical cord 6 ft long.

The helium is stored in a rechargeable Luxfer aluminum cylinder. A Harris multi-stage regulator maintains the necessary working pressure of 20 psi. This combination is capable of delivering 15 hrs of continuous running time with both Heads, or 30 hrs with one Head. The inlet port of the regulator is equipped with a CGA 580 bullet shaped nipple fitting. Since this fitting is the same fitting that is commonly used on larger bottles, it can be used interchangeably.

The air compressor, helium cylinder and regulator are all packaged in a heavy duty Platt polyethylene case with recessed handles and lock, approximately 20"L x 14"W x 13"H. All components can be removed from the case to recharge the helium cylinder. This also allows for easy maintenance and/or repair.

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sai[™] AUXILIARY AIR & HELIUM SUPPLY

DESCRIPTION OF

SAI™ 300W MODULATED ARC LAMP

March 1997

The SAI™ Modulated Arc Lamp has been developed as part of a system for the visualization and measurement of complex airflows with small, neutrally-buoyant soap bubbles. It provides an intense, collimated light beam of uniform intensity which affords maximum contrast between the bubbles and the background. This allows the motion of the bubbles to be studied at speeds as high as 150 fps. Of particular importance, the cross-section or shape of the light beam can be changed as necessary for 2-D or 3-D analysis.

There are two principal parts to the SAI™ Modulated Arc Lamp, the SAI™ Optical Shroud and the SAI™ Modulated Power Supply. The Optical Shroud uses the LX300F Xenon Illuminator manufactured by ILC Technology. They also manufacture the basic Power Supply, the ILC Model PS 300-1, but this is modified by the SAI™ VMC-2 Arc Lamp Modulator.

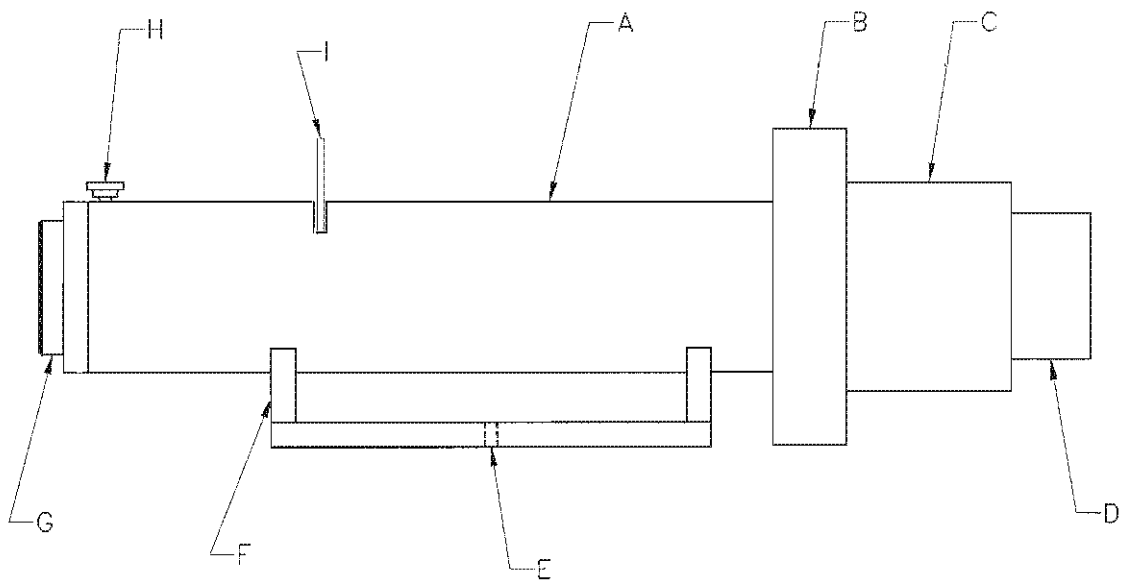
The LX300F Illuminator is a unique xenon-filled, short-arc lamp containing an integral parabolic reflector. It is housed in a special holder attached to the Optical Shroud. The Shroud, itself, has three principal elements: A condensing lens assembly, a special aperture and a projection lens. The 2" diameter condensing lens serves to redistribute the light emitted by the Illuminator more uniformly with the special aperture positioned at the point of maximum beam uniformity. This aperture can be adjusted for different situations. The projection lens, then, focuses an image of the aperture at the desired distance from the system. A handle on the aperture extends outside the Optical Shroud for insertion, removal and adjustment.

To support the Optical Shroud, a rugged flat plate has been fastened to the base for easy adaptation to any mounting scheme, including use of a sturdy camera tripod.



saitm MODULATED ARC LAMP

GENERAL LAYOUT OF THE SAI™ OPTICAL SHROUD



- | | |
|----------------------------|---------------------------------|
| A Optical Shroud | F Base |
| B Light Shield | G Projection Lens Assembly |
| C Lamp Housing | H Projection Lens Focusing Knob |
| D Fan | I Aperture Handle |
| E 1/4-20 UNC Mounting Hole | |

The ILC Technology Model PS300-1 Power Supply is a solid state, 300 Watt, current regulated unit designed specifically for reliable operation of the ILC LX300F Xenon Illuminator. It is continuously adjustable over a current range from 10 to 22 Amperes. A constant current regulator maintains constant Illuminator arc current despite changes in line voltage and Illuminator arc voltage. The PS300-1 Power Supply also has automatic short circuit and overload protection, as well as a fast magnetic circuit breaker to protect the unit in the event of a component failure in the low voltage rectifier circuit.

The SAI™ VMC-2 Arc Lamp Modulator effectively "chops" the light output from the Arc Lamp so that the bubble streaks appear as dashed lines. Since the length of the dashed lines is proportional to the local velocity, this enables a comprehensive picture of the instantaneous velocities throughout the entire flowfield to be obtained. Nominally, the Modulator is designed for measurements in two velocity ranges, "5 - 50 fps" and "20 - 150 fps".

To chop the light, the Modulator generates a periodic square wave variation of the lamp current between the maximum value set by the Power Supply and a lower value determined by the setting of a "MODULATION DEPTH" control. The Modulation Depth can be varied from 0 - 85%. Two other controls, "ON TIME" and "OFF TIME", permit independent adjustment for the period of the maximum and minimum currents, respectively. The modulation frequency is essentially set by these two knobs. All of the controls are continuously variable.

The actual lamp current waveform is available for monitoring purposes at the BNC jack on the front panel of the Power Supply. This helps to select a good OFF-TIME for clear separation and definition of the bubble dashes. More important, the ON-TIME or length of the dash can be set quite easily to a nominal velocity at some reference point.

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OPTICAL SHROUD SPECIFICATIONS

Circular Beam Spread: 2" - 25" Diameter @ 6'

Iris Diaphragm Diameter: 1/8" - 1 1/2"

Rectangular Beam Spread: 19" x 0" - 19" x 6 1/2" @ 6'

Adjustable Slit Width: 0" - 7/16 "

Focusing Range: 24" - Infinity

Projection Lens Focal Length (Each): 220 mm

Lamp: ILC LX300F Xenon Illuminator

Cooling: Forced Convection

Average Bulb Life: 1000 Hours

Overall Dimensions: 22 1/2" Long, 6 3/4" Diameter

Base Mounting Plate: 9" x 3 1/2" x 1/2" Aluminum stock with
Female 1/4-20 UNC Thread

Total Unit Weight: 10 lbs

Holder Cable Length: 11'

ARC LAMP SPECIFICATIONS

Beam Half Angle @ 0 hrs: 5°

Beam Half Angle @ 100 hrs: 6°

Beam Half Angle @ 1000 hours: 7°

Visible Output @ 0 hrs: 5000 lm

Visible Output @ 100 hrs: 3500 lm

Visible Output @ 1000 hrs: 3250 lm

POWER SUPPLY SPECIFICATIONS

Line Voltage: 115/230 \pm 10% Vac

Line Current: 8.0/4.0 Aac

Line Frequency: 50/60 Hz, 1 ϕ

Starting Pulse, Voltage: 23 KV

Lamp Voltage, Operating: 13 - 16 Vdc

Lamp Current, Operating: 10 - 22 Adc

Overall Dimensions: 18" x 14" x 10"

Total Unit Weight: 38 lbs

Operating Temperature Range: 15°C - 50°C

MODULATOR SPECIFICATIONS

Current "OFF TIME": 100 - 30,000 μ Sec

Current "ON TIME": 100 - 42,000 μ Sec

Modulation Depth: 0 - 85%

Monitor Signal: Lamp Current Waveform,
Approximately 400 millivdc / Adc,
dc - Coupled, Uncalibrated.

NOTES

Date: _____

Re: _____

***sai*TM Helium Bubble Generator**