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A SERVICE PUBLICATION OF LOCKHEED-GEORGIA COMPANY, A DIVISION OF LOCKHEED CORPORATION

Hercules LOX System

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Cover: A U.S. Coast Guard Hercules is the subject of the cover painting by Robert Karr of our Technical Information Department, Coastal surveillance is among the many missions of the Coast Guard Hercules. Search and rescue efforts are aided by the sea/search radar in the Hercules' nose which serves not only as a weather radar, but also has the capability of detecting small boats, even in high sea conditions,

vol. 5, No. 3, July - September 1978

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The Hercules
Liquid Oxygen System

by Fred Tatum, *Flight Line Mechanic*
John Walters, *Design Engineer, Senior*

Under normal operating conditions, an airplane's pressurization equipment is used to maintain a safe and comfortable cabin environment during flight. In certain circumstances, however, it may not be possible or even desirable to pressurize the aircraft at high altitudes. For such situations, there must be an oxygen system on board that can supply pure oxygen as needed to protect the crew from the dangerous effects of hypoxia. Every Hercules is equipped with a system designed to do this.

There are two basic kinds of oxygen systems in use on Hercules aircraft. The differences between them stem primarily from the way the oxygen supply is stored in each case. One type relies on compressed oxygen gas in steel cylinders for its supply; the second type makes use of oxygen which has been cooled sufficiently to convert it into a liquid. The liquified oxygen, which is at a temperature of -297'F (-183'C) or below, is carried in a specially insulated container. It is with this second type of oxygen system that we shall be concerned here.

Liquid oxygen (LOX) systems have several important advantages over those systems which depend upon gaseous oxygen : The heavy gas storage cylinders are not required in a LOX system; this saves both space and weight. Furthermore, since oxygen increases in volume over 860 times when it changes from a liquid to a gas, a small amount of LOX will yield a very large volume of oxygen gas. A practical result of this fact of physics is that a comparatively compact LOX system can satisfy the oxygen requirements of a given aircrew for a much longer period of time than would be possible using a gaseous system of equivalent size and weight. This can be a significant safety factor, particularly on long overwater flights.

The advantages offered by LOX systems for a variety of flight applications have made the installation of this type of equipment on new aircraft increasingly more commonplace. It is worth noting, however, that LOX systems do present special maintenance problems. A thorough understanding of the operation and proper servicing of LOX equipment is necessary if the inherent advantages of these systems are to be fully realized.

MAJOR COMPONENTS

The operation of the Hercules LOX system can most readily be understood by first examining the functions of the major components of the system.

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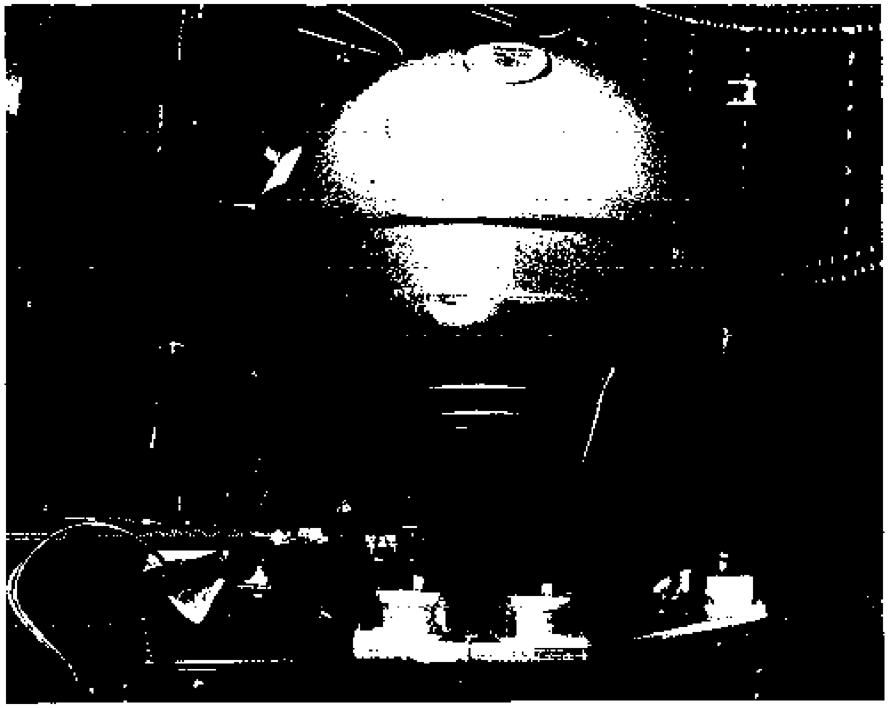
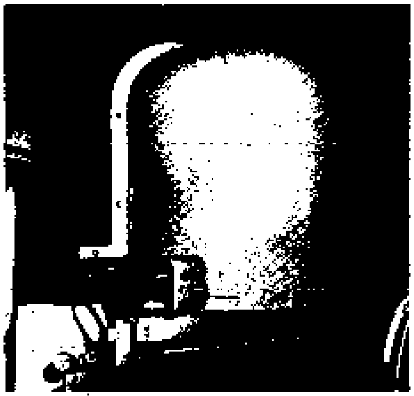
Right. The LOX converter with protective cover removed. The converter is located in the right aft corner of the NLG wheel well. ***Below.*** Fiberglass cover in place over converter.





The heart of the LOX system is the converter assembly. It consists of a double-walled sphere that will hold 25 liters (26.4 quarts) of liquid oxygen. The space between the walls is evacuated, which in effect forms an insulating barrier that reduces the flow of heat into the interior of the vessel. A coil of tubing is wrapped around the sphere and serves as a heat exchanger. Specifically, this unit is known as the ***buildup*** heat exchanger. Here the heat of ambient air converts the liquid oxygen present in the tubing to gas, and the gas pressure is allowed to build up in a controlled manner until it is sufficient to meet the operating requirements of the system.

The converter is provided with a series of valves which control its operation and protect the system from pressure extremes.

The valves and their most important functions in the system may be described as follows:

Pressure Closing Valve – The purpose of this valve is to stop the flow of LOX through the buildup heat exchanger when the pressure reaches approximately 305 PSI.

Low Pressure Relief Valve – This valve opens at between 330 and 380 PSI, and serves as the primary overpressure protection for the inner sphere.

High Pressure Relief Valve – Pressure of 380 to 430 PSI is required to open this valve. It provides secondary overpressure protection for the sphere, and primary protection for the supply tubing downstream of the converter-mounted check valve.

Supply-line Check Valve – The function of this valve is to prevent gas pressure in the supply line from backing up into the sphere.

The converter also contains a capacitance probe to transmit data on the quantity of LOX in the sphere to a flight station gage.

In addition to the converter and related components, the LOX system includes a combination fill-buildup-vent valve, external heat exchangers (two on most Hercules models), a manually operated shutoff valve, breathing regulators, masks, and interconnecting tubing.

The LOX system has two principal modes of operation; the fill mode and the buildup-supply mode.

The system goes into the fill mode only when the transfer cart filler valve is connected to the combination valve on the aircraft. When the cart filler valve is disconnected, the combination valve automatically shifts the system to the buildup-supply mode. Figure 1 is a diagrammatic representation of the LOX system in the fill mode; Figure 2 shows the buildup-supply mode. Refer to Figure 1 as we examine the fill (or refill) operation.

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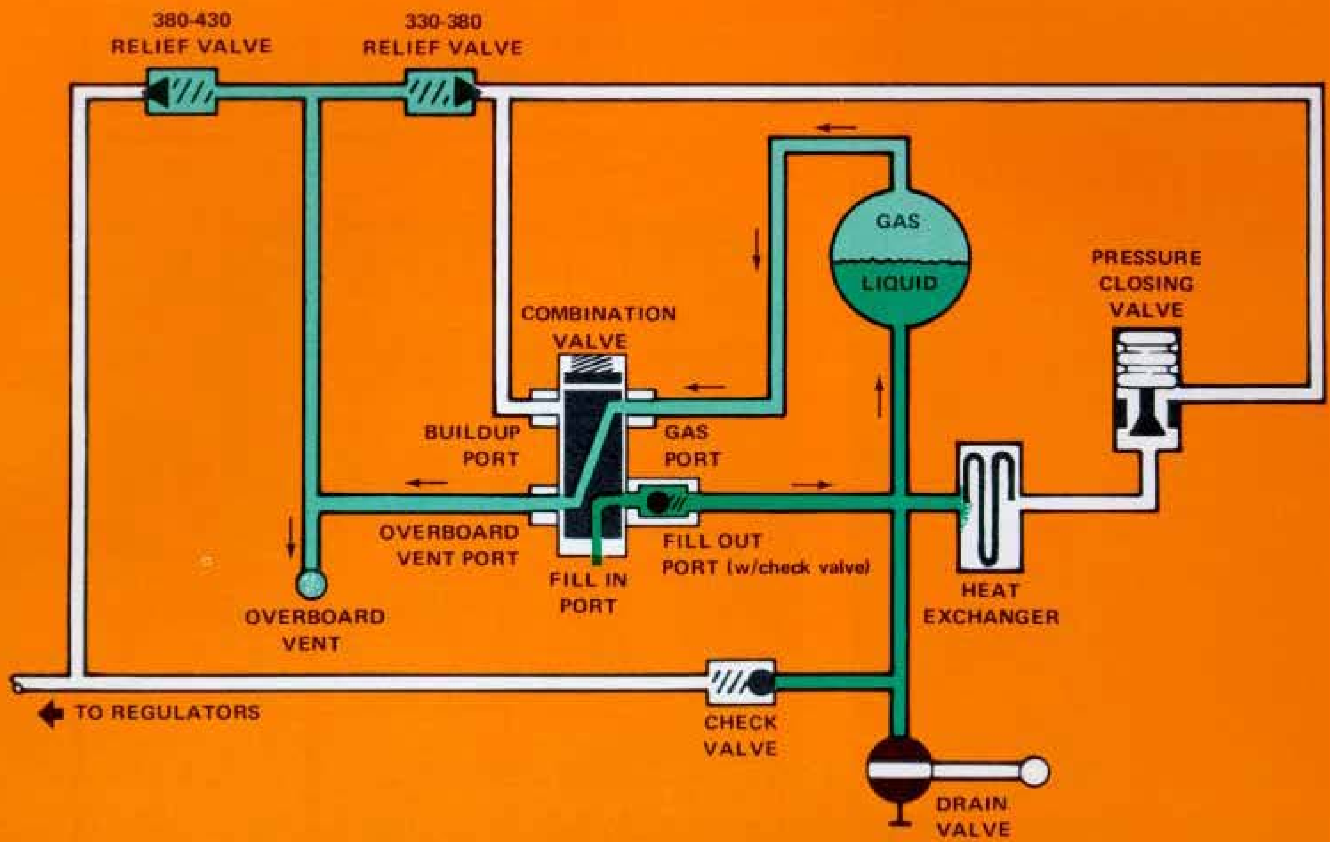


Figure 1 LIQUID OXYGEN FILL/REFILL OPERATION

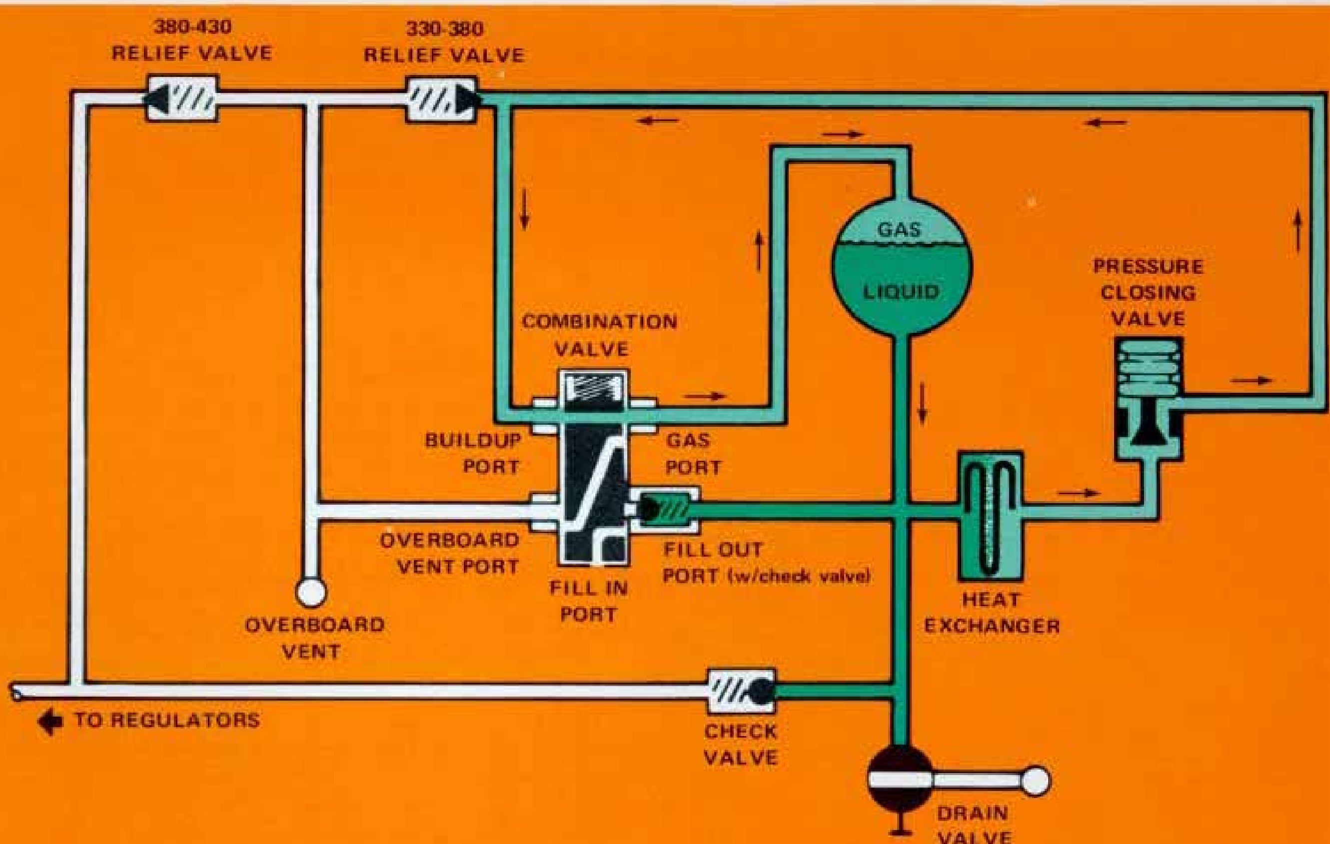
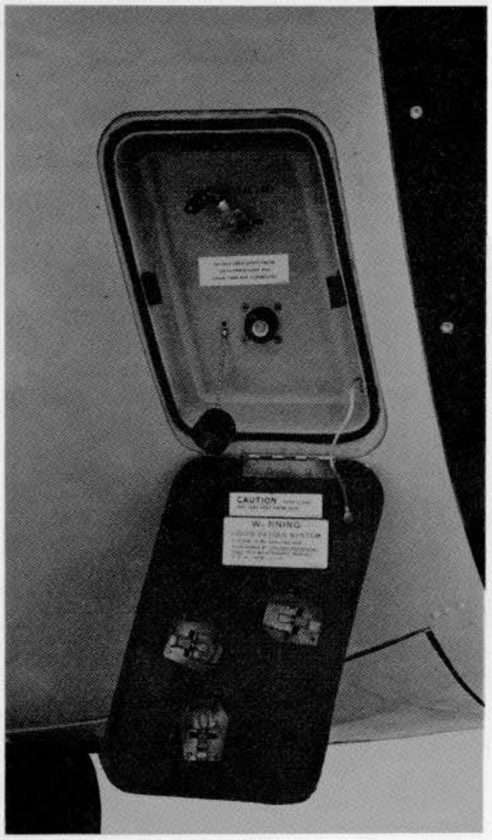
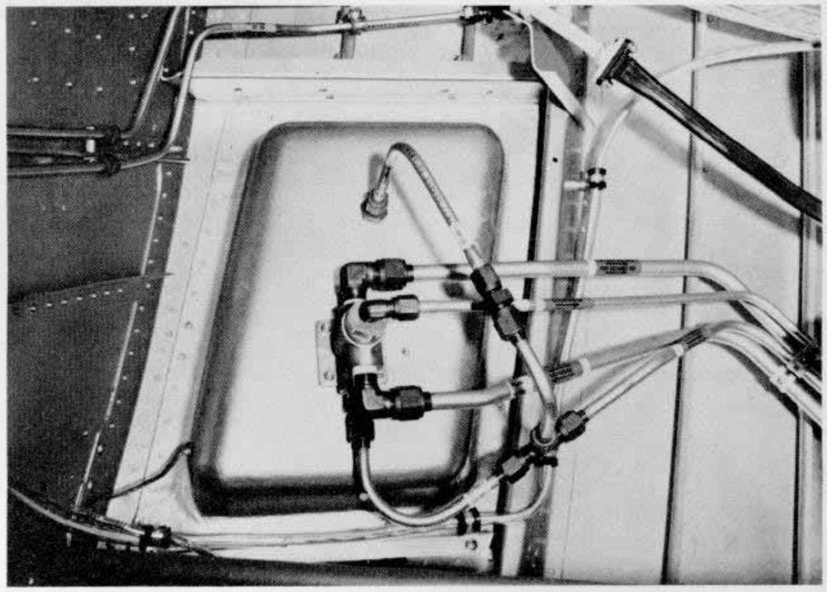


Figure 2 LIQUID OXYGEN BUILDUP/SUPPLY OPERATION



Left: **The LOX service panel is located in a recess in the lower right surface of the nose section.** ***Right:*** **Plumbing on the back side of the LOX service panel showing the combination fill- buildup-vent valve.** ***Below:*** **Connecting the service hose to the LOX service panel. Note tubing leading to the drip pan from the overboard vent.**



When the service hose from the LOX transfer cart is connected to the filler port of the combination valve, any gas pressure present in the converter is automatically vented to the atmosphere. This permits the liquid oxygen in the cart, which is under approximately 30 PSI pressure, to flow through the combination valve into the converter.

As the liquid enters the lower part of the sphere, gas from the upper part is forced out the overboard vent. When a clear stream of LOX begins to flow from the vent, the sphere has reached its full capacity and the fill is discontinued by shutting off the transfer cart filler valve. The transfer cart filler valve and the aircraft combination valve should, however, remain connected for approximately 10 minutes to allow the LOX in the interconnecting lines time to turn into gas and boil off. Then the filler valve may be safely disconnected.

Now consider Figure 2 as we describe the buildup, and subsequently, the supply operations.

Disconnecting the transfer cart filler valve from the combination valve on the aircraft positions the system to the buildup-supply mode. Initially, during buildup, the liquid in the buildup heat exchanger turns into a gas, thus increasing the pressure as it flows through the pressure closing valve. The pressure closing valve remains open until the pressure builds to about 305 PSI. Then it closes, halting the flow of liquid oxygen through the buildup heat exchanger.

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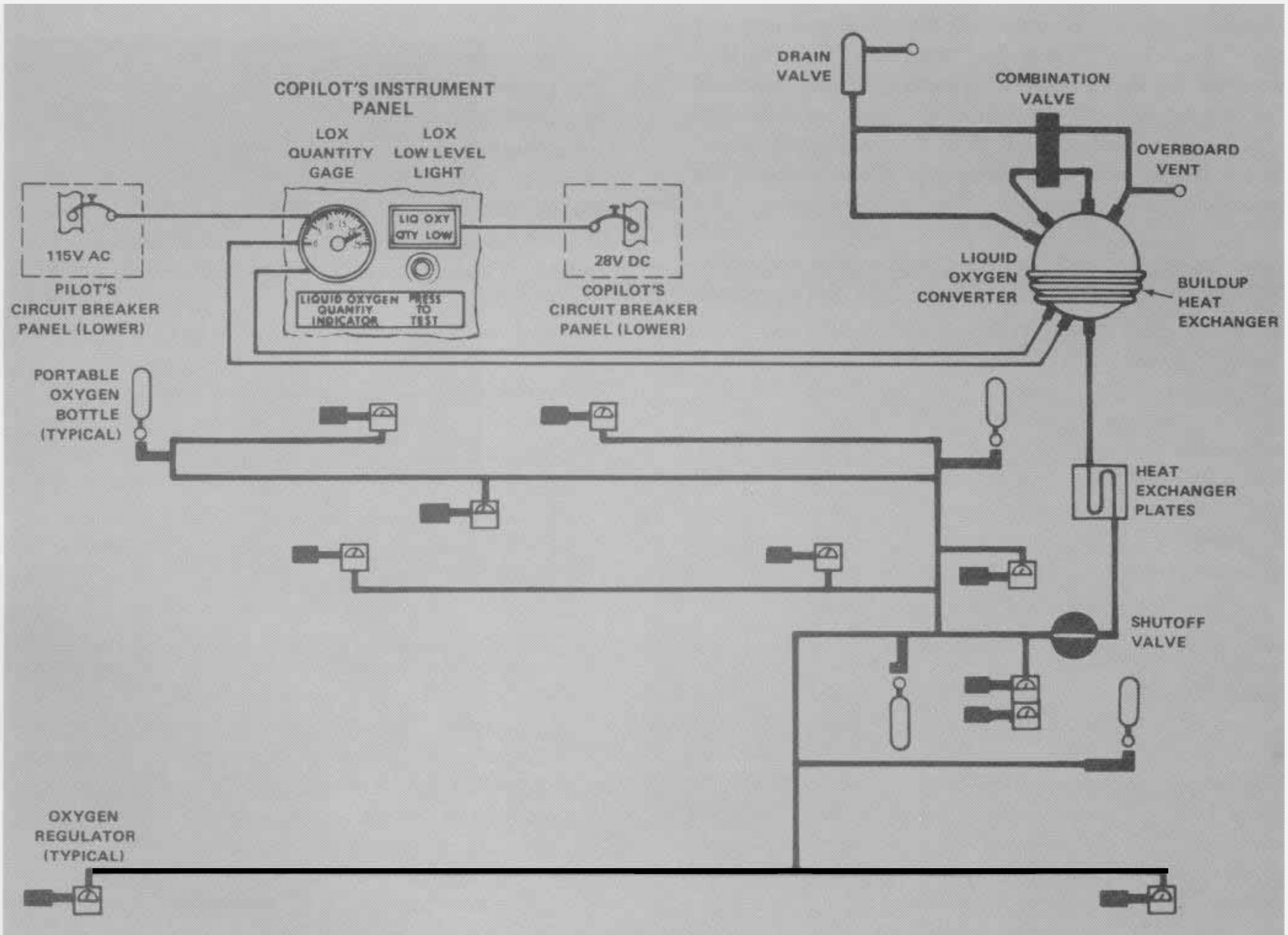
At this point, the system is as relatively static as a LOX system can be. The excellent insulation of the sphere helps keep the LOX cold, and for a while whatever heat does penetrate to the interior of the sphere is absorbed in the form of latent heat of vaporization; that is, the heat which is absorbed by a liquid – without an increase in its temperature – as it changes from the liquid to the gaseous state. The pressure in the converter will remain at about 305 PSI during this period, and there will be no gas released from the aircraft's overboard vent.

The system cannot remain static for long, however. The sphere is actually a big thermos bottle, and even the best thermos bottle will not keep its contents cold forever. There is a gradual transfer of heat into the LOX, and eventually the LOX will have absorbed all of the heat it can and still remain in the liquid state. Any additional heat at this point will cause some of it to change into gas. Then the pressure will begin to rise in the converter; it will continue to do so until the low-pressure relief valve opens at somewhere between 330 and 380 PSI, and venting to the atmosphere begins. It can take up to several hours for this stage to be reached, depending on the ambient temperature and other factors. Once venting has begun, it may be continuous or cyclic, depending on the relief valve configuration. Either of these reactions is considered normal.

The regulator pressure gages in the airplane will indicate at least 330 PSI when the system is stabilized but not in use. The actual pressure reading may be much higher than this. If the gaseous oxygen in the supply lines between the check valve and the breathing regulator is warmed by heat transferred from the surrounding atmosphere, thermal expansion occurs and the pressure can rise until the high-pressure relief valve opens (380 to 430 PSI). That is why a pressure of up to 430 PSI is considered normal. In practice, a reading on the regulator pressure gages of up to 455 PSI can be considered normal since the gages have a tolerance of +/- 25 PSI.



TYPICAL HERCULES LIQUID OXYGEN SYSTEM

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The pressure demand oxygen regulator.

High pressure readings are often seen after a high flow demand has been imposed on the system. High flow can occur when EMERGENCY or TEST MASK is selected at the regulator, during the recharging of portable oxygen bottles, or when several people simultaneously breathe 100% oxygen.

Liquid oxygen can flow past the check valve during very high flow demand periods. When the flow is then stopped, the liquid trapped between the check valve and the regulators will turn into gas and expand. The high-pressure relief valve will limit the maximum pressure in the supply line by opening and allowing the excess pressure to bleed off.

Most Hercules aircraft have two flat-plate heat exchangers installed in the supply line adjacent to the underdeck electronics rack on the right side of the aircraft. These plates, in addition to the aircraft supply tubing, serve to warm the cold gas to ambient, or near ambient, temperature for comfortable breathing. This system configuration can warm the oxygen required for ten people simultaneously breathing normal oxygen at the altitude (25,000 feet) at which maximum consumption occurs. A flow rate of approximately 70 cubic feet per minute is required for this.

There are several ways that *excessive flow* rates can be imposed on the system; i.e., flow rates that overtax the capability of the system to turn LOX to gas and warm it to the ambient temperature: Selecting EMERGENCY at a regulator and allowing the gas emitted from the regulator breathing hose to flow freely into the atmosphere can cause LOX to enter the aircraft supply line. Similarly, recharging more than one portable oxygen bottle at a time will also result in LOX flowing into the supply line faster than the system can convert it to gas.

As we have previously noted, LOX systems have several advantages over gaseous systems, but one of their disadvantages is the necessity of providing a means to change LOX to a gas and warm it to comfortable temperatures prior to breathing.

SERVICING

There are two things that must not be introduced into the LOX converter: solid contaminants (especially those which are petroleum-based) and moisture. Solid contaminants are visible to the naked eye and require only normal precautionary measures and due care. Moisture, however, presents a special problem. Moisture can be very tricky stuff. It changes from a liquid, or frost, when outside the system to solid ice when it gets inside. Once it turns into a solid, it remains in that state as long as it is inside the converter. If ice lodges under a valve seat, the result is excessive release of oxygen gas from the overboard vent. When, however, the converter is emptied and removed from the aircraft for repair, the ice reverts to water and quietly drains off.

The bench functional test inspector is thus left with a good unit and a puzzle; the problem has literally drained away.

The single most important factor in keeping the operation of a LOX system free of dust, moisture, and trouble in general is careful adherence to correct procedures when filling or refilling the system. You should, of course, always follow the procedures which have been approved for use by your organization when servicing a LOX system. For informational purposes, however, here is a procedure that has given reliable results at Lockheed-Georgia:

Recharging the Liquid Oxygen System

1. Ensure that both aircraft and transfer cart are grounded, and ground the cart to the aircraft. Insert the drain tube into the overboard vent opening, and place a clean, degreased drip pan on the ground under the outlet of the tube.

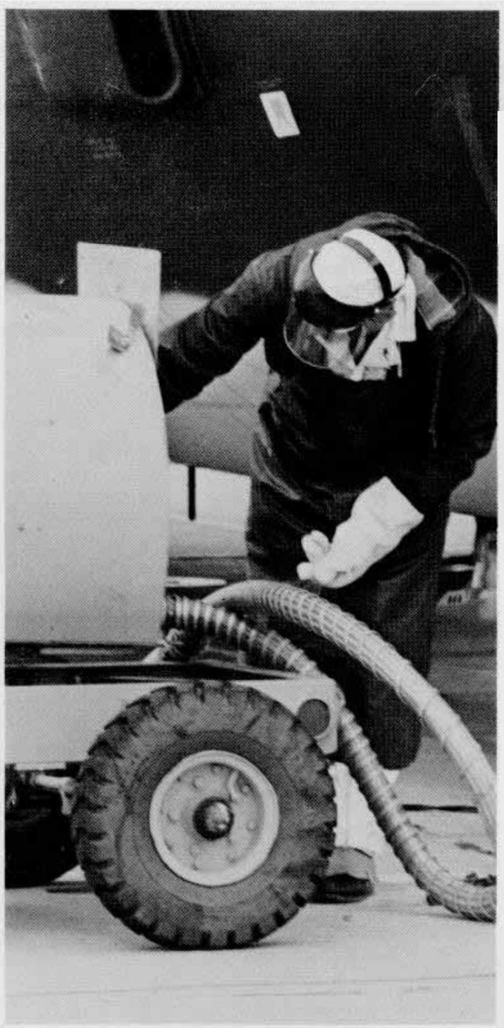
2. Remove the filler cap from the “fill in” port of the aircraft combination valve.

3. Inspect the “fill in” port of the combination valve for contamination. Remove contaminants, if present, with a clean, lint-free cloth. If frost is present, remove it, using isopropyl alcohol. Dry thoroughly prior to making a hookup.

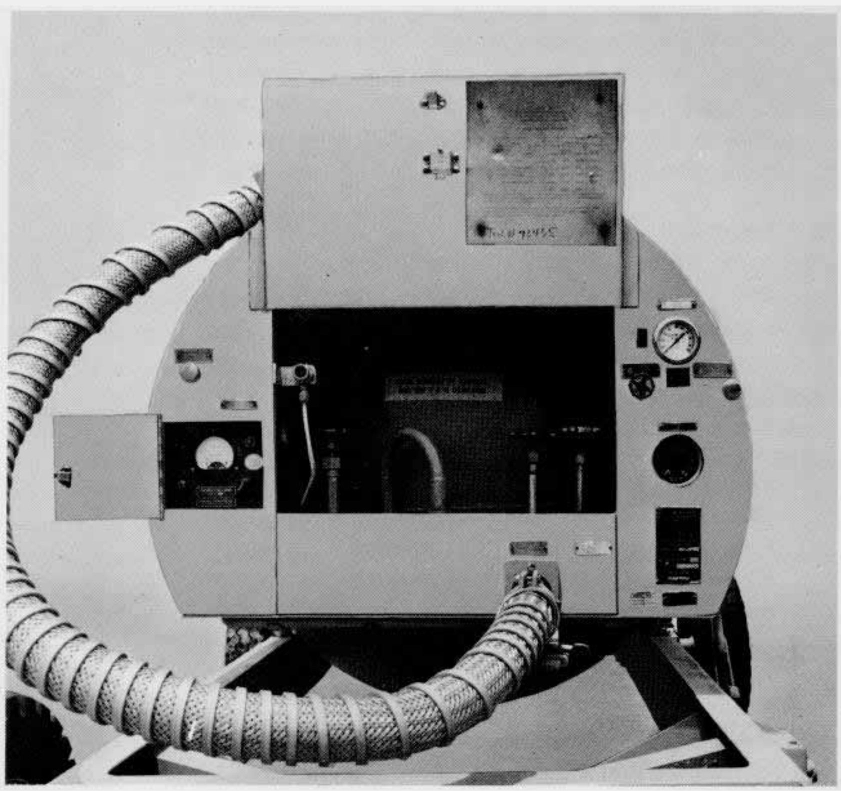
4. Inspect the transfer cart purge fitting for contamination. Remove contaminants with a clean, lint-free cloth. If frost is present, remove it, using isopropyl alcohol. Dry thoroughly prior to making a hookup.

Installing the drain tube between the overboard vent opening and the drip pan.

Cleaning hose connection fittings on the service panel.



Left: Inspecting and cleaning the fitting used for purging the service cart system. *Below:* Typical LOX transfer cart.



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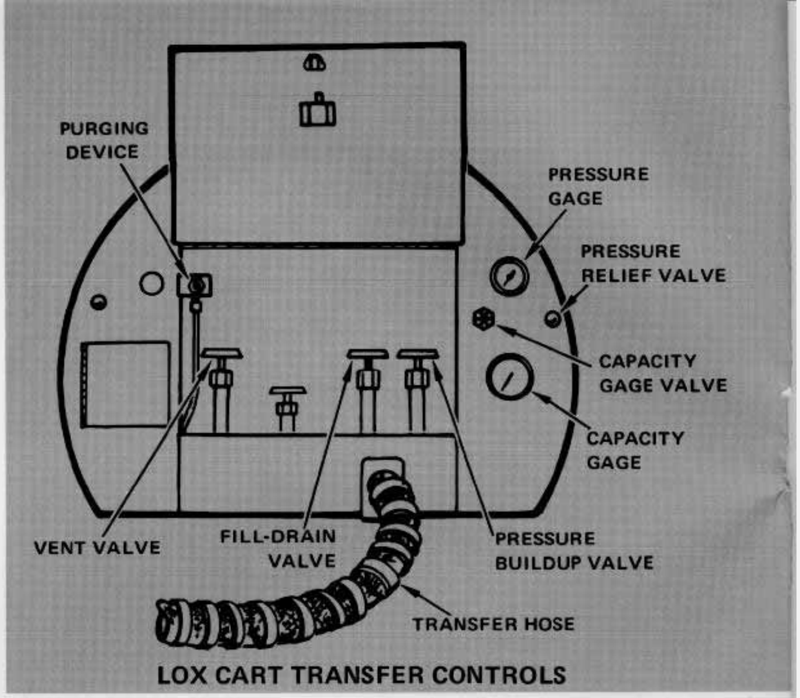
Purging the transfer cart system.



5. Connect the transfer cart filler valve to the transfer cart purge fitting. Build pressure in the transfer cart up to 30 (+/-5) PSI as follows:
   - Close transfer cart vent valve.
   - Open pressure buildup valve.
   - **Close** pressure buildup valve when the desired pressure is reached.

6. Purge the transfer cart hose by opening the transfer cart fill-drain valve until a steady stream of LOX is observed coming from the purge fitting overflow line.

7. Close the transfer cart fill-drain valve. Release hose pressure by pulling the transfer cart hose pressure relief valve knob.

8. Disconnect the transfer cart filler valve from the purge fitting. If frost is present, remove it, using isopropyl alcohol. Dry thoroughly prior to making a hookup to the airplane.

9. Connect the transfer cart hose's **clean, dry** tiller valve to the aircraft's clean, dry combination valve. Go to one of the aircraft oxygen regulators and place the mask end of the breather hose out of a window or door. Position the regulator SUPPLY switch to ON and position the regulator emergency switch to EMERGENCY. Allow the LOX system pressure to decay to zero.

10. Position the regulator SUPPLY switch to OFF, and position the regulator emergency switch to NORMAL; then immediately open the transfer cart fill-drain valve and transfer LOX.

11. Fill until a clear stream of LOX flows from the aircraft's overboard vent and out the drain tube.

12. Shut the LOX transfer off by closing the transfer cart fill-drain valve. Wait 10 minutes and then disconnect the filler valve from the combination valve. Be sure to restow the breather hose used in Step 9.

Watching for stream of liquid that indicates the converter is full of liquid oxygen.

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Finally, there are two points that deserve special emphasis. Assuming that the LOX being received from the distributor is of high quality, and that all handling equipment such as storage tanks and transfer carts are properly maintained, service personnel can greatly influence the reliability of aircraft LOX systems by rigid observance of these rules:

- ***Always wash the transfer cart filler valve and the aircraft combination valve with isopropyl alcohol (FED SPEC TT-I-735A) and then wipe completely dry*** prior ***to*** making ***a*** hookup.

  Allow the aircraft ***LOX system to*** deplete to zero pressure before opening ***the*** transfer cart fill-drain valve. This ensures ***an*** immediate ***flow of LOX*** and ***helps*** prevent ice from ***collecting*** and snowballing around ***the valves.***

SAFETY

Always keep safety uppermost in mind when you are working with any type of oxygen system. The number one area of concern in dealing with oxygen is always the danger of fire. The problem is not so much that the oxygen might burn – strictly speaking, it won't – but that nearly everything else will burn so well in its presence. A smoldering cigarette will erupt into flame in an oxygen atmosphere, and tiny sparks that would dissipate harmlessly in ordinary air can set off fires and explosions if supplied with a little extra oxygen.

In general, all of the safety rules that apply to gaseous oxygen also apply to the handling of liquid oxygen – and several more besides. If your job brings you into contact with oxygen or oxygen systems, it's a good idea to review all the safety regulations pertaining to oxygen handling on a regular basis. Keeping alert to potential dangers and knowing the correct measures to use in avoiding them is what safety is all about.

Here are some safety pointers in connection with LOX that are worth special notice: When using liquid oxygen, the fire danger is aggravated by the fact that as a liquid, LOX is spillable. It can be splattered onto combustible materials, or accidently poured into containers of grease or solvents. Make certain that accidents of this sort don't happen by keeping all flammable substances far away from areas where LOX systems are being serviced.

LOX also poses some unique handling hazards because it is so very cold. At -297'F (-183'C), liquid oxygen is a cryogenic fluid that will instantly freeze solid anything it doesn't ignite. This, of course, includes human flesh. Even a small quantity spilled on the skin will cause frostbite "burns" which are extremely painful.

Be sure to use proper protective clothing when handling LOX. Particularly avoid wearing anything with tucks or folds that might tend to trap spilled liquid and hold it in contact with the skin. Clean, loose-fitting, tightly woven cotton coveralls plus a cotton cap offer satisfactory basic protection, but make certain that the coveralls are without pockets or cuffs, and that the legs are long enough to extend over the shoe tops. The shoes should have high tops and rubber soles and heels.

This protective clothing – with you inside it – is the first step toward personal safety when handling LOX. Have a container of wash water handy to immediately thaw the skin should any of the liquid oxygen somehow come in contact with it.

The hands and face are particularly subject to injury during the handling of LOX. Asbestos gloves, or rubber gloves with loose-fitting cotton liners should be used to cover the hands, and a face protector shield will provide protection for the face and eyes.

Another point worth special notice is that stored LOX is always releasing a certain amount of oxygen gas. The ambient air is so much warmer than the liquid oxygen that some of the LOX is constantly boiling off. This means that any container which is used to hold LOX must be provided with adequate safety valves, or left open so the gas can escape. Don't set the stage for a possible explosion by "bottling up" liquid oxygen.

The proper handling of LOX systems requires a combination of attention to correct procedures, cleanliness, safety-mindedness, and common sense. A balanced maintenance approach combining these elements will ensure both safe and reliable LOX system operation.

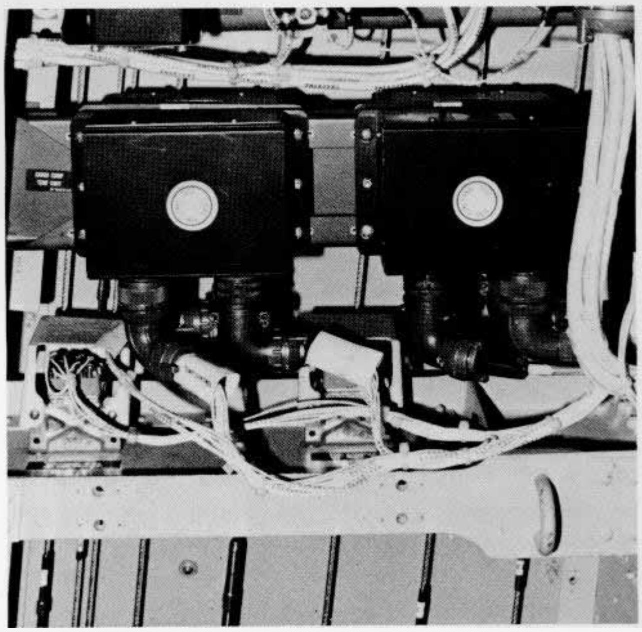
SOLID-STATE COMPONENTS

for Hercules air conditioning systems

Solid-state devices are not exactly news any more and we have all become rather accustomed to the reliability and long life of these marvels of modern electronics.

Still, every once in a while we see some figures that remind us just how much difference the conversion to solid-state circuitry can make in the performance and dependability of a given system.

An excellent example can be found in our experience with the air conditioning system of the Hercules aircraft. About two years ago, starting with aircraft serial number LAC 4579, we began incorporating improved solid-state temperature control boxes and resistive-type sensors in the air conditioning systems. The data compiled from the aircraft equipped with the new components have been most impressive.



Air conditioning temperature control boxes located on the aft side of the 245 bulkhead.

Table *1*

RELIABILITY		
Components	MTUR	
	Solid State	Old Type
Flight Deck Temperature Control Box	4,379	1,484
Cargo Compartment Temperature Control Box	3,649	1,023
Cabin Sensor/Thermostats	10,948	1,117
Blower Motors	43,790	10,056
Flight Deck Duct Sensor/ Anticipator	21,895	4,892
Cargo Compartment Duct Sensor/Anticipator	21,895	4,892
Flight Deck Duct Overheat Sensor/Hi Limit	10,948	2,479
Cargo Compartment Duct Overheat Sensor/Hi Limit	21,985	3,851
Temperature Selector	43,790	40,222

The improved performance includes a quicker response to desired temperature changes, an increased range of temperature selections and, best of all, a mean time to unscheduled removal (MTUR) of up to nearly ten times that of the old-type components. This adds up to a worthwhile reduction in maintenance costs. The figures in Table 1 show the improvement in reliability for specific units.

Operators of older Hercules will be pleased to learn that existing aircraft can easily be retrofitted with the new solid-state components. The only requirement is that all of the following solid-state components be installed as a complete system: Temperature control box, cabin temperature sensor, duct temperature sensor, duct overheat sensor, and temperature selector. There are no changes required to the aircraft wiring or connectors.

The following table is a handy reference of both Lockheed and vendor part numbers affected by this change.

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LOCATION	NEW PART NUMBER		OLD PART NUMBER	
Flight Station	Lockheed	Vendor	Lockheed	Vendor
Temperature Control Box	697639-37	27231317-01	695304-8	25430135-07 25430135-09
Cabin Sensor	-13	27231296	695479-5	25423200-02
Duct Sensor	-15	27231293	695314-11	25423199-04
Duct Overheat Sensor	-17	27231294	695315-8	25523158-03
Temperature Selector	-19	27221345	695480-3 695480-5	25422268* 25422268-02
Cargo Compartment				
Temperature Control Box	-39	27231318-01	695304-7	25430135-06 25430135-08
Cabin Sensor	-13	27231296	695479-5	25423200-02
Duct Sensor	-25	27231292	695314-7	25423199-02
Duct Overheat Sensor	-27	27231295	695315-7	25523158-04
Temperature Selector	-19	27221345	69580-3	25422268*

Table 2

*No Dash No.

For further information regarding price and availability of these parts, contact the Lockheed-Georgia Supply Sales and Contracts Department, D/65-1 1, Zone 287.

Other articles relating to the Hercules air conditioning system can be found in ***Service News*** issues Vol. 3, No. 2, April- June 1976, and Vol. 3, No. 3, July - September 1976.

StarTip

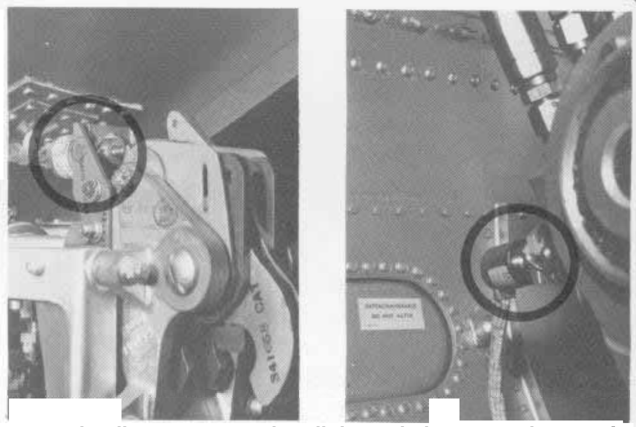
NOSE LANDING GEAR SWITCH ADJUSTMENTS

by C. E. Shuler, ***Field Service Representative***

Both the nose gear uplock limit switch and the downlock limit switch on the Hercules can be adjusted without jacking the airplane and operating the gear. With the gear indicating down and locked, perform the following steps:

1. Back off the downlock limit switch until the switch plunger just contacts the actuating piston. The nose gear indicator in the cockpit should now indicate "in-transit" (barber pole) and the gear handle light should be illuminated.

2. Actuate the uplock assembly with a large screwdriver. Back off the uplock limit switch until the switch plunger just contacts the actuator plate, then advance the switch from 2 to 2-l/2 threads or until the plunger measures 0.225 to 0.275 inches in length. Lock and safety wire the switch. The nose gear indicator should now indicate UP. Release the uplock assembly by pushing back on the phenolic or aluminum block for the manual release of the uplock. The nose gear indicator should again indicate "in-transit" and the gear handle light should be illuminated.



Nose landing gear warning light switches. As shown, the uplock switch is on the left and the downlock switch is on the right.

3. Advance the downlock limit switch forward 2 to 2-l/2 threads or until the plunger measures 0.225 to 0.275 inches in length. Lock and safety wire the switch. The nose gear indicator should indicate wheels down and the gear handle light should be extinguished.

4. Make sure the switches are locked and safetied and that all wires are properly secured.

This procedure checks both switches for sticking and proper operation and adjusts them for correct actuation and travel.

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Reclaiming Fuel Compensator Units

Investigations have shown that fuel quantity compensators of the fiberglass type which have malfunctioned due to moisture contamination can be reclaimed and returned to service. This is accomplished by cleaning and recoating the compensators.

The material used for coating is Laminar X-500. Laminar X-500 Flex Clean 7-C-27-36 coating (essentially the same as 7C-27-40), has proven to be successful and is recommended by Lockheed. This material is available from Magna Coatings and Chemical Corporation and is qualified to MIL-C-83019. It may be ordered under NSN 8030-00-241-2498 for quart sizes or 8030-00-496-9275 for gallon sizes.

When ordering, it is imperative to specify the entire nomenclature as “Flex Clear 7-C-27-36”. Incidentally, this is the same material used to coat the aircraft fuel tank sealant.

An outline of a procedure for reclaiming compensators is as follows:

Step 1. Wash compensators in a warm (1 20°F, 49’C) detergent solution – a mild liquid dishwashing detergent will suffice – and rinse well in clean tap water.

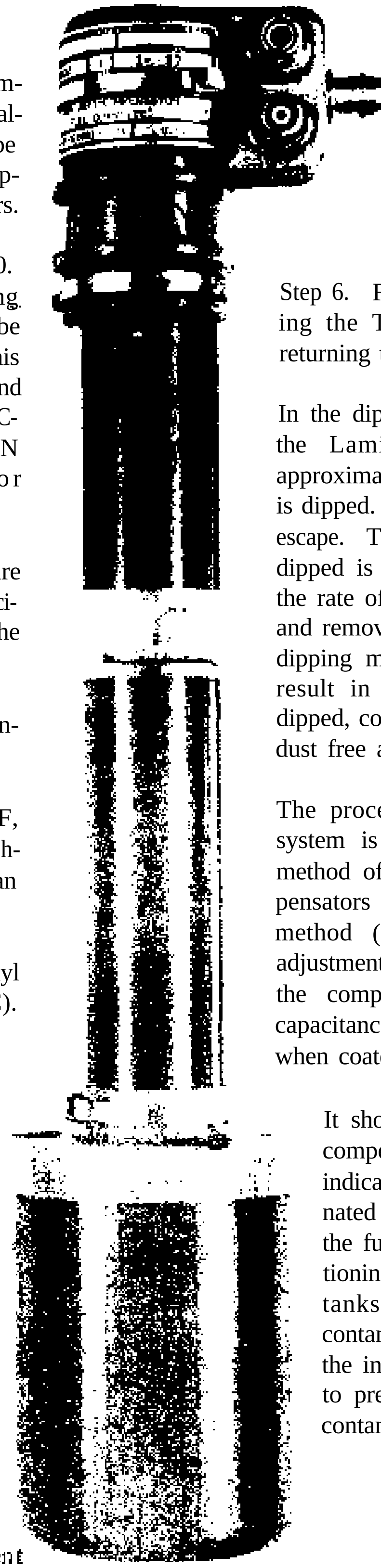
Step 2. Flush compensators with methyl ethyl ketone and dry two to four hours at 160’F (71’C).

Step 3. Dip the compensator unit for 30 seconds in a heated solution containing one ounce per gallon of water of chemical conversion coating material such as Alodine 1200, Iradite 14-2, Turco Alumigold or other materials conforming to MILC-554 1.

The temperature of the solution should be maintained at 120’F (49’C). Then rinse the compensator with clear water and dry thorroughly at ambient conditions.

Step 4. Dip coat the compensator portion of the probe with Laminar X-500 Flex Clean 7-C-27-36, or - 40.

Step 5. Cure the coating for 38 hours at ambient conditions. After drying, bake at 140’F (6O’C) from two to four hours. This will improve the cure and, at the same time, reveal any lack of adhesion in the coating.



FUEL QUANTITY COMPENSATOR PROBE

Step 6. Functionally test each compensator, utilizing the TF-20 Test Set or equivalent, prior to returning the compensator to service.

In the dipping operation, it is very important that the Laminax X-500 be allowed to stand for approximately 15 minutes before the compensator is dipped. This allows air bubbles in the mixture to escape. The manner in which the compensator is dipped is also important. It should be inserted at the rate of approximately one inch per 15 seconds and removed at the same speed. A rapid or erratic dipping may allow air bubbles to form and thus result in pin holes in the final coating. Once dipped, compensators should be allowed to dry in a dust free area in order to insure a perfect coating.

The procedure for calibrating the fuel quantity system is not affected as long as the preferred method of calibration is used (tanks empty, compensators dry); however, when the alternate method (tanks containing fuel) is used, a full adjustment should be made with 62.5 mmf set for the compensator. The average compensator dry capacitance is increased approximately 0.5 mmf when coated with Laminar.

It should be noted that a malfunctioning fuel compensator due to moisture accumulation is indicative of contaminated fuel or contaminated fuel tanks. When it is determined that the fuel quantity indicating system is malfunctioning due to moisture accumulation, the fuel tanks should be thoroughly inspected for contamination and corrosion. In addition to the inspection, a procedure should be initiated to prevent recurrence of contaminated fuel or contaminated fuel tank problems,

SERVICE NEWS

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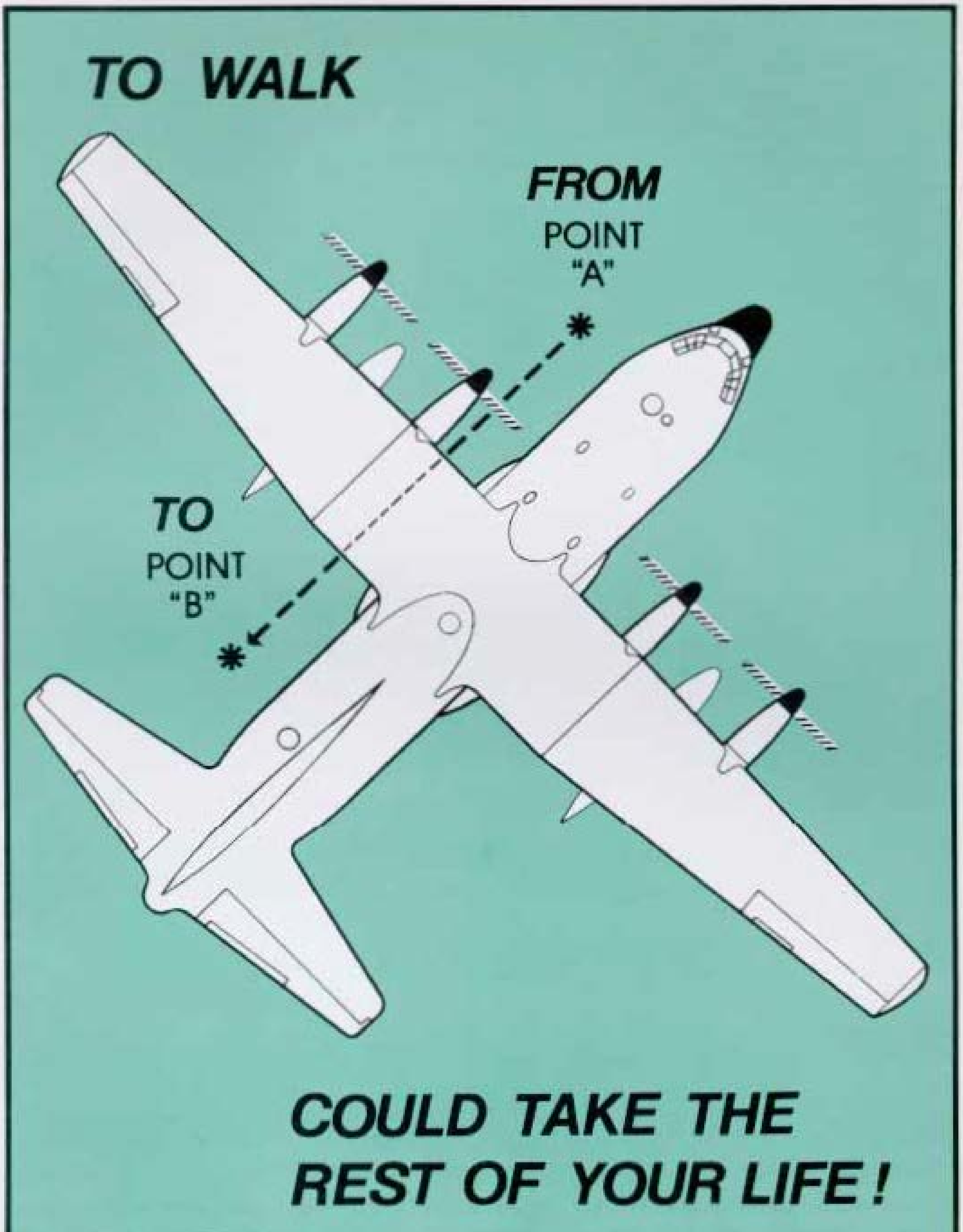

Courtesy of *Approach* Magazine
Idea contributed by LCDR R. L. Fillinghim, VP-6 Safety Officer

CUSTOMER SERVICE DIVISION
LOCKHEED-GEORGIA COMPANY
A DIVISION OF LOCKHEED CORPORATION
MARIETTA GEORGIA 30063

Lower fuel consumption brings new economy and versatility

Lower fuel consumption – especially important today – brings new economy and versatility to JetStar II operations.

The JetStar II has demonstrated its nonstop capability, flying 3,425 miles from Los Angeles to San Juan in 6-1/2 hours. Other nonstop demonstration flights were made from New York to Mexico City, and from Honolulu to El Paso.

The new JetStar II is powered by four TFE-731-3 engines to increase range while meeting federal regulations on both noise and pollution. There is good-neighbor quietness outside and a quieter environment inside the spacious cabin. The JetStar II fleet has acquired more than 6500 flight hours and has traveled over 3-1/2 million statute miles since going into operational service in early 1977.