INSTRUCTION BOOK

RICHAUDIO SMOKE DETECTING SYSTEM
AND
KIDDE FIRE EXTINGUISHING SYSTEM

Walter Kidde & Company, Inc.

Main Office
Bloomfield,
New Jersey

New York Office
140 Cedar Street
New York, N. Y.

Sales and Service Agencies in Principal Cities

INSTRUCTION BOOK

FOR THE

OPERATION AND MAINTENANCE

OF THE

KIDDE FIRE EXTINGUISHING SYSTEM &
RICHAUDIO SMOKE DETECTING SYSTEM
FOR
FEDERAL S/B & D/D CO.
HULLS 268-277

This equipment is for occasional emergency use, which requires the apparatus be in perfect condition at all times. Experience has shown that emergency equipment of this nature is often unintentionally neglected. It is desirable to have some one in charge become fully familiar with the system and arrange for proper periodical inspection.

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Sales and Service Agencies In Principal Cities

See Kidde or Lux System, or Walter Kidde Sales Agency in Your Telephone Directory

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Form 228H 5M-2-43

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RICHAUDIO FIRE SYSTEM

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1	Laundry - C. Deck - Port.	
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3	Forepeak Stores - R. Deck	
4	No. 1 Hold	
5	Wiring Trunk - Forward Fr. 88	
6	Dry Stores - Platform Dk No 3 C Dk Port No 3 - Sta 6	
7	Issue Rm. Post Exchange + Stores	
8	No. 6 Hold	
9	Bosuns Stores - A. Deck	
10	Carpenter Shop - Prom. Deck	
11	No. 3 - Hold	
12	Stores - No 3 - Sta 6 C - Deck	
13	Dry Stores No 3 Platform Dk. Port	
14	No. 5 Hold	
15	Bosuns Stores - Prom Dk	
16	Paint Lockers - Ports + Stbd - Prom. Dk	
17	Wiring Trunk - Aft Fr 118 ¢	
18	Navy Exchange Stores - C Dk. Stbd	
19	No 7 Hold	
20	Not in Service	
21		
22		
23		
24		

Detector Control Station Unit

Detector Unit "

Detector Unit "

VALVE MANIFOLD LOCATION

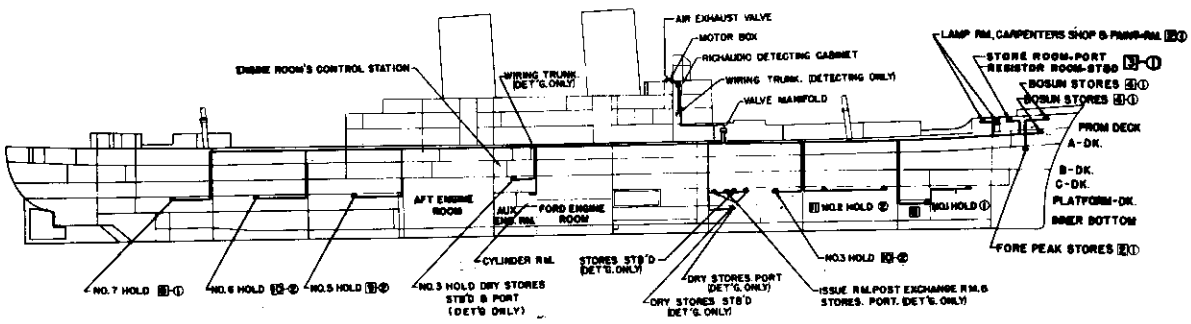
FORD.

AFT

Form 1579 2C - 4-43

KIDDE FIRE EXTINGUISHING SYSTEM
AND
RICHAUDIO SMOKE DETECTING SYSTEM
OPERATING INSTRUCTIONS

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
HULLS 268 TO 271



OPERATION
ENGINE ROOM SYSTEMS

FOR SMALL FIRES:

OPERATE HOSE RACKS LOCATED IN THE FORD AND AFT ENGINE ROOMS. INSTRUCTIONS AT RACK.

FOR LARGE FIRES:

AIR OPERATION:

1. HAVE SOMEONE CLOSE ALL DOORS, HATCHES, VENTS AND ANY OTHER OPENINGS, ALSO SHUT DOWN ANY MECHANICAL VENTILATION BUT DO NOT DELAY OPERATING THE SYSTEM.
2. GO TO AIR CONTROL STATION LOCATED IN CONTROL ROOM (PORT SIDE PASSAGE, "B" DECK). OPEN DOOR OF AIR CONTROL VALVE CABINET AND TURN HANDWHEEL OF PROPER VALVE COUNTER CLOCKWISE UNTIL WORD "OPEN" APPEARS.

IN THE EVENT THE SYSTEM CANNOT BE OPERATED FROM THE AIR CONTROL CABINET, PROCEED AS FOLLOWS:

1. GO TO CYLINDER ROOM (STARBOARD SIDE, PLATFORM DECK, AT FRAME 182). OPEN VALVE TO SPACE AFIRE. TO DO THIS, PULL OUT LATCH AND TURN LEVER COUNTER-CLOCKWISE TO "OPEN" POSITION.
2. IF THE FIRE OCCURS IN THE AUXILIARY ENGINE ROOM CLOSE MANIFOLD VALVE BY TURNING VALVE LEVER CLOCKWISE TO CLOSED POSITION. THIS APPLIES TO AUXILIARY ENGINE ROOM FIRES ONLY!
3. GO TO MASTER CYLINDERS AND PULL CONTROL HANDLE.

NOTE: THE DISCHARGE OF CARBON DIOXIDE TO THE SPACE IS DELAYED APPROXIMATELY 25 SECONDS. DURING THIS PERIOD A SIREN IS SOUNDED, WARNING OCCUPANTS TO LEAVE THE SPACE.

FIRE IN CARGO SPACES

1—BEFORE OPERATING THE SYSTEM

A-Determine location of fire by observation of smoke through windows in lieu of fixed. Observe number of fixed and refer to index chart for name of space. Shut off smoke alarm switch to stop gong.

B-Make certain that no one is in space afire.

C-Shut off all mechanical ventilation, and all ventilators, ports, sounding pipes, hatches, etc., leading to compartment afire. Thoroughly wet all canvas covers, tarpaulins, etc. Spend a little time thoroughly sealing all openings of the compartment afire to prevent excessive leakage of carbon-dioxide.

2—GO TO VALVE MANIFOLD

Go to valve manifold and open valve in line leading to space afire. (Opening this valve automatically closes the line to detecting cabinet.)

3—CONSULT OFFICER ON BRIDGE

Consult officer on bridge to see if fixed in detecting cabinet has ceased emitting smoke. If smoke has stopped, it indicates that proper valve has been operated.

4—DISCHARGE INTO COMPARTMENT AFIRE

Discharge into compartment afire the quantity of carbon dioxide cylinders as specified in the square within corresponding compartment in the above profile. CAUTION: DO NOT DISCHARGE CONTROL CYLINDERS until main banks have been completely discharged. Discharge the individually released cylinders first, by turning valve lever clockwise as far as possible. Then discharge pressure-operated cylinders individually by removing cap and pushing plunger hard.

5—TO MAINTAIN INERT ATMOSPHERE IN COMPARTMENT AFIRE

In order to keep the fire under control, discharge into the space afire the quantity of carbon-dioxide cylinders specified in the circle within corresponding compartment in the above profile at intervals of from ½ hour to 6 hours depending upon the condition of the fire. If smoke appears to increase in intensity or the plates or bulkheads get warmer, the discharges should be injected at closer intervals. If conditions are favorable a longer time between discharges can be allowed.

As the supply of carbon dioxide is limited, proper judgment should be exercised in its use. The distance that the ship is away from port, as well as the possibility of obtaining an additional supply of carbon dioxide at that port, should be taken into account. The object is to keep the fire under control until an additional supply of carbon dioxide can be obtained and the cargo worked out in accordance with instructions for unloading after arrival at port. (See instruction book.)

6—DURING THE ABOVE PROCEDURE

During the above procedure and until arrival at port, keep all openings sealed with wet tarpaulins and all fans shut down. Also keep control valve at valve manifold set, so that the line to detecting cabinet is closed. (See instruction book.)

7—DO NOT OPEN HATCHES

Do not open the hatches or any other openings, or ventilate the compartment afire until arrival at port in order to avoid loss of carbon dioxide.

8—IF FIRE IS CONFINED TO TWO COMPARTMENTS

If fire occurs in two spaces located one above the other, follow above instructions exactly for both initial and delayed discharges, but in each case discharge the carbon dioxide first into lower space and then into the upper space. Only one control valve is to be open at a time. Wait until all the carbon dioxide has discharged into the lower space before closing the valve to the lower space. Then open the valve to the upper space and discharge the carbon dioxide into the upper space.

TROUBLE SIGNALS

TROUBLE BUZZER SOUNDING OR GREEN LIGHT INDICATE ANY OF THE FOLLOWING:

1. Defective exhaust unit.
2. Smoke alarm switch "off."
3. Burned out underlight.
4. Burned out audio lamp.
5. Ships voltage below 100 or above 130 volts.
6. Defective auxiliary gong circuit.

CAUTION:

1. Ships voltage must be over 100 volts D. C.
2. Never operate the Richaudio system on alternating current.
3. Do not substitute ordinary lamps for the special pre-focused underlight lamps.

MAINTENANCE

1—AS REQUIRED

A-Remove silk flickers in fixed as they become worn.

B-Remove and clean lens boxes when the light coming through them becomes weak.

2—DAILY

A-Transfer from one exhauster unit to the other.

B-Set meter reading to 50.

3—ONCE EVERY THREE MONTHS

A-Oil exhauster units.

B-Oil timer motor.

4—ONCE EVERY SIX MONTHS

A-Run a smoke test on all lines in system.

B-Examine motor brushes.

C-Make certain that all valves are in their normal set positions.

5—ONCE EVERY YEAR

A-Remove and weigh all cylinders to detect any possible loss of carbon dioxide. See instruction book before proceeding.

B-Inspect any safety outlet installed at the ends of cylinder manifold to make certain disc therein is intact.

C-Make certain all distributing valves work freely and are in their normal tightly closed position.

RECOMMENDATIONS

It is recommended that all pipe lines be blown out at least once every two years to remove accumulation of dirt. If pipe lines are shown to be clogged up by occasion of warning silt flickers or failure in smoke test, they must be cleaned at once. After inspection the regular inspector's card located alongside of this chart must be initialed.

SPARE PARTS REQUIRED —

1—Audio Lamp.
3—Underlight lamps.
1—Pilot lamp.
2—6-ampere fuses.
2—1-ampere fuses.
1—Set of motor brushes for each of 3 motors.

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RICHAUDIO SMOKE DETECTING SYSTEM
AND
KIDDE FIRE EXTINGUISHING SYSTEM

INTRODUCTION

1. General Description

The Richaudio Smoke Detecting System indicates the occurrence of fire by the detection of smoke and the KIDDE Fire Extinguishing System extinguishes the fire by means of carbon dioxide gas. The system consists essentially of a Richaudio detecting cabinet, usually located in the wheelhouse; a motor box, containing exhaust fans for drawing air continously into the detecting cabinet through pipe lines running from smoke accumulators in the compartments protected; and a supply of carbon dioxide gas, stored in cylinders, which is tied in with the piping to the spaces protected by means of distributing valve manifolds.

2. Detecting Cabinet Operation

Air samples are being drawn continuously from each of the compartments protected through individual pipe lines which terminate in the visual detection chamber of the cabinet. A focussed light beam is projected through each line; invisible in clear air, it becomes visible by the reflection of smoke particles which causes intense illumination of the visual detection chamber. This method of visual smoke detection is known as the "Rich System".

In addition, the air drawn from the compartments is momentarily by-passed from each line in turn to a photo-electrically controlled system which, when smoke is present, causes alarm gongs to sound as an audible warning signal.

When smoke is detected, visually or audibly, its source is determined either by observing which pipe outlet in the visual detecting chamber is issuing the smoke or by referring to the number appearing on the cabinet panel (Line Number Indicator) which is controlled by the audible detecting portion of the cabinet. A line number index chart is furnished to indicate the name of the space; the exact location of each space is shown on the ship profile which forms part of the operating chart.

3. Air Exhaust Valve and Exhaust Fan

The air drawn from the compartments by the exhaust fan ordinarily is discharged into the wheelhouse to provide detection of fire by smell. An air exhaust valve is provided to permit discharge of this air into the atmosphere in case obnoxious odors occur in cargoes. The exhaust fans are supplied in duplicate as one is always in use. They are housed in a metal box, usually located on the top deck of the wheelhouse, and are connected to the detecting cabinet and air exhaust valve with brass flues.

4. Distributing Valves

Three Way Valves, normally open to the detecting cabinet, are installed in the pipe lines to the compartments and are connected to the carbon dioxide gas supply piping. They serve to direct the gas to the compartment afire by the operation of a single handwheel, which simultaneously closes the line to the detecting cabinet and opens the line from the gas supply to the space afire.

5. Carbon Dioxide Supply

Special KIDDE Cylinders are manifolded together providing sufficient gas to extinguish a fire in the largest space protected. The carbon dioxide gas contained therein is a clean, dry, non-corrosive and non-poisonous substance which will not support combustion. It is stored under pressure in the steel cylinders and extinguishes fire by smothering it. An instruction chart is furnished to indicate the proper discharge of cylinders for each compartment.

NOTE: See further pages for detailed installation of parts described above.

1225-3
1477-3

RICHAUDIO SMOKE DETECTING SYSTEM AND
KIDDE FIRE EXTINGUISHING SYSTEM

OPERATION INSTRUCTIONS

FOR FIRE IN CARGO SPACES

When a flare in detecting cabinet emits smoke indicating a fire, proceed as follows:

1. BEFORE OPERATING THE SYSTEM

   A - Determine location of fire by observation of smoke through window in base of flare.

   B - Make certain that no one is in compartment afire.

   C - Shut off all mechanical ventilation. Seal all ventilators, ports, sounding pipes, hatches, etc., leading to compartment afire. Thoroughly wet all canvas covers, tarpaulins, etc. Spend a little time thoroughly sealing all openings of the compartment afire to prevent excessive leakage of carbon dioxide.

2. GO TO PROPER VALVE MANIFOLD

   Go to proper valve manifold as indicated on line index chart and open the valve in line leading to space afire (as you would open an ordinary stop valve) as far as possible. Resistance will be met at about three turns, if the gas pressure is on the valve, but keep turning until valve is fully open.

3. CONSULT OFFICER ON BRIDGE

   Consult officer on bridge to see if flare in detecting cabinet has ceased emitting smoke. If smoke has stopped, it indicates that proper valve has been operated.

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4. FOR INITIAL DISCHARGE INTO COMPARTMENT AFIRE

Discharge into the compartment afire the quantity of carbon dioxide cylinders as specified in the following table:

SPACE AFIRE	DISCHARGE INITIALLY	DISCHARGE AT 1/2 TO 6 HR. INTERVALS
NO. 1 HOLD	8	1
NO. 2 HOLD	11	2
NO. 3 HOLD	10	2
NO. 5 HOLD	9	2
NO. 6 HOLD	10	2
NO. 7 HOLD	8	1
FORE PEAK STORES - B DECK	2	1
BOS'N STORES - A DECK	4	1
BOS'N STORES - PROMENADE DECK	4	1
STORE ROOM - PORT & RESISTOR ROOM - STBD.	3	1
LAMP ROOM, C.A.R. ENTERTAINMENT & PAINT ROOM	2	1

Use individually released cylinders first. Discharge proper number of cylinders, as specified under "Discharge Initially", by turning stem counter-clockwise as far as possible, using the ratchet wrench from the KIDDE Parts Box in the Cylinder Room.

To discharge pressure-operated cylinders, remove cap and push plunger hard. CAUTION: DO NOT DISCHARGE control cylinders until main banks have been completely discharged; otherwise, all pressure-operated cylinders will be discharged simultaneously.

5. TO MAINTAIN INERT ATMOSPHERE IN COMPARTMENT AFIRE BY DELAYED DISCHARGE

In order to keep the fire under control, discharge into the space afire the quantity of carbon dioxide cylinders specified in the foregoing table at intervals of from 1/2 to 6 hours. The best guide as to the intervals between discharges is the condition of the fire. If smoke appears to increase in intensity, or the plates or bulkheads get warmer, the discharge should be injected at closer intervals. If conditions are favorable, a longer time between discharges can be allowed.

As the supply of carbon dioxide is limited, proper judgment should be exercised in its use. The distance that the ship is away from port, as well as the possibility of obtaining additional supply of carbon dioxide at that port, should be taken into account. As cargo fires cannot be extinguished quickly by any means, (often requiring one or more days to completely extinguish a fire) the object is to keep the fire under control until an additional supply of carbon dioxide can be obtained and the cargo worked out in accordance with "Procedure For Unloading at Port", given under Item 10.

6. DURING THE ABOVE PROCEDURE

During the above procedure and until arrival at port, keep all openings sealed with wet tarpaulins and all fans shut down. Also keep control valve at valve manifold set, so that the line to the detecting cabinet is closed. (See "General Description" for action of three-way valve.)

7. DO NOT OPEN HATCHES

Do not open the hatches or any other openings or ventilate the compartment afire until arrival at port, in order to avoid loss of carbon dioxide.

8. IF FIRE IS CONFINED TO TWO COMPARTMENTS

If fire occurs in two spaces located one above the other, follow above instructions exactly for both initial and delayed discharges, but in each case discharge the carbon dioxide first into the lower space and then into the upper space. Only one control valve is to be open at a time. Wait until all the carbon dioxide has discharged into the lower space before closing the valve to the lower space. Then open the valve to the upper space and discharge the carbon dioxide into the upper space.

9. UPON ARRIVAL AT PORT

A - If possible, arrange at once to have all the carbon dioxide cylinders recharged and placed in position for future use.

B - Run a water line to the hatch of the cargo hold afire. Connect the hose to a fresh water supply, if possible.

PROCEDURE FOR UNLOADING CARGO AT PORT

The object of the following procedure is to reach the seat of the fire as quickly as possible by unloading the cargo, while an atmosphere of carbon dioxide is maintained in the hold.

(a) Open half of the hatch cover and work the cargo out in the usual manner, but do not open any of the ventilators. As the men work their way deeper into the hold, check the atmosphere for gas concentration with a Davy type safety lamp to make sure the atmosphere is suitable for breathing. If the flame of the safety lamp flickers or is extinguished, it indicates that there is insufficient oxygen to support life. If the hold is partially loaded, it is safest to check with the safety lamp before any work is started or before anyone enters the hold.

(b) If the fire is in the lower hold or lower tween deck, unload the cargo from the hatchway so as to expose the lower hatch cover. Seal the lower compartments for further gas injections, if necessary.

(c) WHILE UNLOADING THE CARGO, DO NOT ALLOW ANY MORE FRESH AIR TO ENTER THE SPACE THAN IS ABSOLUTELY NECESSARY.

(d) IF SMOKE OR HEAT IS DETECTED, work toward the source, moving cargo as necessary to reach the seat of the fire. If smoke or heat increases in intensity, making work uncomfortable, close the hatches, battening them down securely with tarpaulins. Discharge the number of carbon dioxide cylinders for that space, as specified in the table given in Item 4, one at a time, allowing approximately 2 to 3 minutes to elapse between each cylinder. In this manner, the necessary concentration of carbon dioxide will be obtained with the minimum loss of gas.

If at all possible, sample the atmosphere with an orsat, or other chemical analyzing apparatus, to determine the exact carbon dioxide content. It is desirable to maintain a 35 to 50 per cent carbon dioxide concentration in the space for a minimum of four to six hours. After this time has elapsed, no smoke will exist and the hatch may be opened.

If the atmosphere is suitable for working, as indicated by check tests with the safety lamp, the unloading operations may be resumed.

When the seat of the fire is reached, water should be used on the fire sparingly in order to extinguish any smouldering embers. By working out the cargo from the hold in this manner, the actual damage to the cargo, other than the fire damage, is held to an absolute minimum.

CAUTION - IMPORTANT

Ordinary gas masks of the canister type should never be used in spaces which contain carbon dioxide. Under these conditions, there is a lack of oxygen and a person may literally "drown" in a carbon dioxide atmosphere just as one may drown in water, simply due to lack of oxygen. Carbon dioxide is not poisonous and leaves no ill effects. If a person is overcome by carbon dioxide, give artificial respiration the same as used in cases of drowning.

Symptoms of carbon dioxide suffocation:

1. Increased respiration rate
2. Increased heart action
3. Faintness

Masks fitted with air hoses running to a blower on deck or approved oxygen breathing apparatus as used in mine rescue work must be used.

As a safety measure, it is essential to attach a lifeline to men working in holds under these conditions because the men may not be experienced in this kind of work.

Before the men work too deeply into the wings during the unloading operations, particular care should be taken to check the atmosphere with the Davy safety lamp.

AFTER FIRE HAS BEEN EXTINGUISHED

Open all doors, hatches, vents, and other openings to thoroughly ventilate the space before allowing anyone to enter.

CAUTION: DO NOT APPROACH the space with an open flame or a lighted cigarette as the possible presence of inflammable vapors may cause an explosion.

1. Remove the empty cylinders and have them recharged as soon as possible. (See instructions given later on for the removal of cylinders.)

2. Close valve to its normal, tightly-closed position.

3. Reinstall the fully charged cylinders. (See instructions given later on for the reinstallation of cylinders.)

PRINCIPLE

The KIDDE Fire Extinguishing System uses carbon dioxide gas as the extinguishing agent. Carbon dioxide (not to be confused with carbon monoxide) is not poisonous, but it is suffocating. It is a standard commercial product, being most commonly used for carbonating beverages, and is available in most of the large cities and seaports throughout the world.

Carbon dioxide is normally colorless except that, when discharging, it resembles a cloud of steam. When inhaled, it produces a tingle in the nostrils the same as experienced when drinking soda water. It is a non-conductor of electricity, is non-corrosive, and non-injurious to all substances and, although heavier than air, it may be easily diffused and removed by ventilation. Unlike air, it does not contain oxygen in any form available for supporting combustion or for sustaining human life in breathing.

"Fast" fires, such as engine room, oil, or paint fires, are quickly extinguished by flooding the area with carbon dioxide gas. This reduces the oxygen content and creates an inert atmosphere which smothers the fire. "Slow" or "deep-seated" fires, such as fires in baled cotton and similar substances, are extinguished by prolonged action of a high concentration of carbon dioxide. In addition to its smothering action, carbon dioxide is aided in extinguishing fire by its cooling effect.

Since a person cannot breathe but will suffocate in an atmosphere of carbon dioxide, caution must be taken before entering any space filled with this gas. Thoroughly ventilate the space into which the gas has been discharged to make certain that all portions contain only fresh air. Test the condition of the atmosphere by inserting a lighted Davy-type safety lamp into the compartment. DO NOT test by inserting a naked flame, such as a candle or lighted cigarette, as the possible presence of inflammable vapors may cause an explosion. If the flame of the safety lamp flickers or is extinguished, it indicates that there is insufficient oxygen to support life and, therefore, the space must be thoroughly ventilated and again tested with the safety lamp.

The Davy-type safety lamp does not detect the presence of small (but harmful) amounts of carbon monoxide or other inflammable or poisonous gases which may be detected only by chemical analysis.

Should it be necessary for a person to enter a space before it is thoroughly ventilated, he may do so by using a hose type gas mask or oxygen supply breathing spparatus. DO NOT USE CANISTER TYPE MASK.

PRINCIPLE (Cont'd)

Should a person be overcome by carbon dioxide, it is essential that he be rescued from the space containing the gas within five minutes. To revive a person so overcome, give him plenty of fresh air and apply artificial respiration as in the case of drowning.

The carbon dioxide is stored in liquid form in steel cylinders carefully tested for strength under governmental supervision. The pressure within the cylinder depends on the temperature, being 504 pounds per square inch at 32 degrees F. and 849 pounds per square inch at 70 degrees F., although the carbon dioxide content is never determined by using a pressure gauge. The gas content may be determined only by the weighing of the cylinder.

Each cylinder is provided with a safety relief disc which will release the gas before the pressure exceeds the cylinder test pressure. Cylinders should be stored in a cool place whenever possible. The maximum safe storage temperature for standard cylinders is 130 degrees F. (54.4 degrees C.). Special cylinders can be supplied for higher storage temperatures.

KIDDE FIRE EXTINGUISHING SYSTEM

MAINTENANCE

(For Richaudio System Maintenance, see paragraphs 118 to 122 in description of Richaudio System.)

The KIDDE System as installed requires no more than ordinary care to insure its proper operation at all times. Frequent inspections should be made, however, as experience has shown that emergency equipment of this kind is often unintentionally neglected or tampered with.

ONCE EVERY MONTH

Make a general inspection of the entire system to make certain that nothing has been placed to interfere with the operation of the equipment. Inspect all piping and equipment for mechanical breakage. Replace any damaged equipment immediately.

ONCE EVERY YEAR

It is recommended that the system be inspected by an experienced Service Engineer of Walter Kidde & Company, Inc.

Weigh all cylinders to detect any possible loss of gas. (Do not attempt to determine contents by using a pressure gauge.) Cylinders do not have to be removed in order to be weighed. See sketch following.

Loosen front racks (1) from cylinders and disconnect piston cutter valves. See instructions under "Removal of Cylinders". Then hook yoke (2) under cylinder valve and weigh cylinders from front. Weighing device can slide along angle (3) to engage each cylinder.

Subtract from total weight the tare (empty) weight that is stamped on the cylinder valve body. If resulting net weight has decreased from the proper gas charge by more than 10%, the cylinder must be recharged to its full rated capacity. The proper gas charge is indicated on the cylinder nameplate. Record the net weight of gas in each cylinder on the record sheets included in this book.

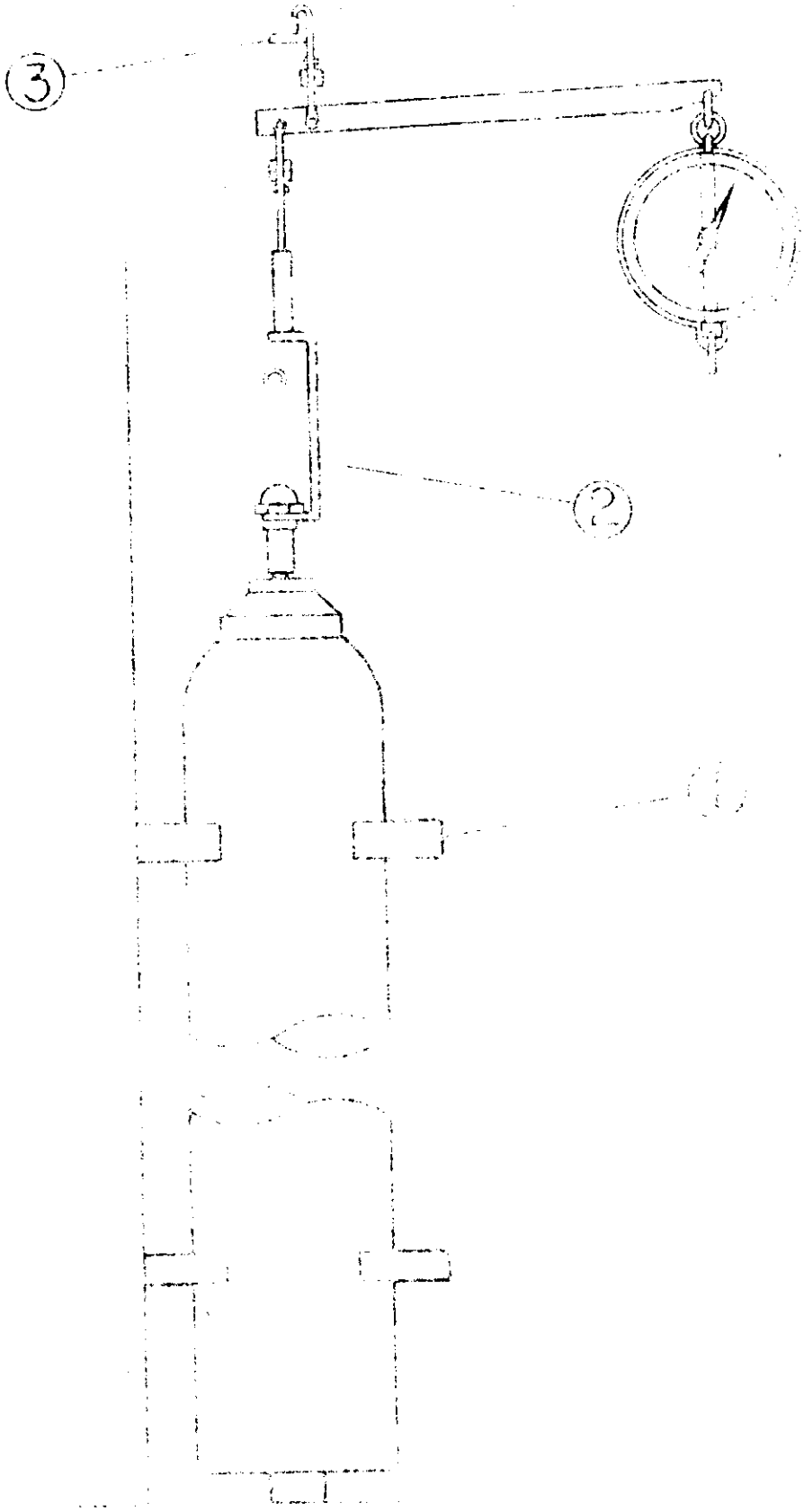
CAUTION: Avoid turning cylinder or levers while weighing as this may cause the cylinder to discharge.

A new safety disc and washer must be used whenever a cylinder is recharged, even though the safety disc contained in the cylinder valve may not have been cut. This is important. Otherwise, the cylinder may not retain the charge. For manual-operated cylinders, use red discs for cutter (Part #2517) and white disc for safety outlet (Part #2516). For individually released cylinders, use red discs for safety outlet (Part #2517).

ONCE EVERY TWO YEARS

In addition to the procedure outlined above, blow out all piping with air or carbon dioxide to make sure that it is not stopped up. The detecting lines leading from the three-way valve to the detecting cabinet should be blown separately by breaking the first union below the cabinet, and also the connection at the three-way valve. Do not blow dirt in the valve. The piping from the cylinder to each space should be blown out separately by opening one three-way valve at a time.

CAUTION: DO NOT use water or oxygen for blowing out the pipe lines. The use of oxygen especially is dangerous as the possible presence of even a minute quantity of oil may cause an explosion.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INSTRUCTIONS

FOR THE

OPERATION AND MAINTENANCE

OF THE

RICHAUDIO DETECTING SYSTEM

When communicating with Walter Kidde & Company, Inc., regarding any part of the system, refer to the serial number stamped on the nameplate located at the front of the Richaudio Detecting Cabinet.

I N D E X

The description of the Richaudio System is divided into numbered paragraphs. The following index refers to these paragraph numbers. The index items are cross-referenced to aid in locating the item in question. In addition, each item is sub-divided into nine parts to show the location of special kinds of information.

The main sub-divisions of the description are:

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
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Alarm - Ship's General		See General Alarm							
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			84					121	
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B Resistor		See Resistor B							
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Brushes - Timer Motor								104	
Brushes - Voltage Regulator Motor	3							104	
Breaker Contacts - Motor		See Timer - Contacts - Motor							
Breaker Contacts - Valve		See Timer - Contacts - Valve							
Bulb - Electric		See Lights							

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust - Maintain	Circuit
Button Re-check		See Line Re-check							
Buzzer		See Trouble Buzzer							
Buzzer Switch		See Trouble Buzzer Switch							
C Relay		See Relay C							
C Resistor		See Resistor C							
Cabinet - Detecting		See Detecting Cabinet							
Cabinet Fire Gong		See Gong - Cabinet							
Cabinet Light		21 60	60	54 60					63 140
Cabinet Light Switch	1 & 2	20		54					140
Cabinet Panel		See Control Panel							
Cabinet Top	1 2	18					18		
Cell - Photoelectric		See Photoelectric Cell							
Center Relay - Voltage Regulator		See Voltage Regulator - Center Relay							
Check (Re-check)		See Line Re-check							
Circuits			123						
Circuit Breakers - Exhauster Units	2		99	99					123
Cleaning			44 59 78 84						
Coil - Fire Alarm Reset		See Solenoid - Fire Alarm Reset							
Coil - Motor Solenoid		See Solenoid - Timer Motor							
Coil - Valve		See Solenoid - Valve							
Collector - Smoke		See Smoke Accumulator							
Compartment - Rear		See Rear Compartment							
Compartment - Top		See Top Compartment							
Compartment - Visual Detecting		See Visual Detecting Compartment							
Compartment - Underlight		See Underlight Compartment							
Connections - Aux. Gong		See Terminals - Aux. Gong							
Connections - Exhausters		See Terminals - Exh. Units							
Connections - Ship's Alarm		See Terminals - General Alarm							
Connections - Ship's Power		See Terminals - Main							
Connector - Valve		See Valve Manifold							
Contact Panel		See Multi-Contact Panel							
Contacts - Timer Motor		See Timer Contacts - Motor							
Contacts - Valve Breaker		See Timer Contacts - Valve							
Control - Meter		See Meter Control							
Control Panel	1 2		43 to 54			18			
Control Panel Meter		See Meter							
Corrections		See Adjustments							
Current - Alternating		See Voltage - Alternating							

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Cut-Off Switch - Audio		See Fuse Panel Switch							
D Relay		See Relay D							
D Resistor		See Resistor D							
Derangement Lamp		See Trouble Light							
Derangement Signals		See Trouble Signals							
Detecting Cabinet	1&2	2 12	17						
Detection - Audible		See Smoke Detection - Audible							
Detection - Smell		See Smoke Detection - Smell							
Detection of Smoke		See Smoke Detection							
Detection - Visual		See Smoke Detection - Visual							
Detection - Visual Compartment		See Visual Detection Compartment							
Diagram - Wiring		See Circuits							
Dirt		See Cleaning							
Drains - Pipe		See Pipe Drains							
Drop in Voltage		See Ship Voltage - Drop							
Drum - Indicator		See Line Indicator							
Ducts		See Pipe							
Dust		See Cleaning							
E Relay		See Relay E							
E Resistor		See Resistor E							
Earths		See Grounds							
Engine Room Gong		See Gong - Auxiliary							
Electric-Photocell		See Photoelectric Cell							
Electromagnet - Fire Alarm Reset		See Solenoid Fire Alarm Reset							
Electromagnet - Motor		See Solenoid - Timer Motor							
Electromagnet - Valves		See Solenoid - Valve							
Electromagnetic Relays		See Relays							
Exhauster Unit		13	2 13 15	14 43 109 119		48 49 99 114			123
Exhauster Unit Motor		13				95 99		104 120	66 95 123
Exhauster Unit Switch	1 2	14 20	14 43	14 43					123
Exhauster Unit Wiring		See Wiring - Exhauster Unit							
Exhaust Valve - Air		See Air Exhaust Valve							
External Gong		See Gong - Auxiliary							
Extra Gong		See Gong - Extra							
F Relay		See Relay F							
False Fire Alarm		See Fire Alarm - False							

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Fans		See Exhauster Unit							
Fire Alarms		See Smoke Alarm							
Fire Alarm - False			44		44				
			94						
			141						
Fire Alarm - Relay	2	21	73	73		138	74	75	73
			76	132					151
			92						
			94						
Fire Alarm Relay Reset			73					76	
			76						
Fire Detection - Audible		See Smoke Detection - Audible							
Fire Detection - Smell		See Smoke Detection - Smell							
Fire Detection - Visual		See Smoke Detection - Visual							
Fire Gong		See Gong - Fire							
Fire Gong - Auxiliary		See Gong - Auxiliary							
Fire Gong - Cabinet		See Gong - Cabinet							
Fire Gong - Engine Room		See Gong Auxiliary							
Fire Gong - Extra		See Gong - Extra							
Fire Gong - General Alarm		See General Alarm							
Flares	2	3	3					78	
	5	21	56						
		56	78						
Flare Lights		See Underlight							
Flare Windows	2	56	3						
	5		56						
			58						
			110						
Flickers - Silk		See Silk Flickers							
Foous - Audio Lamp	2		25						
			83						
Focus - Underlight	2		79						
Front Relay - Voltage Regulator		See Voltage Regulator - Front Relay							
Fuse - Auxiliary Gong	2	100	100			93		104	93
			101			115			139
Fuse - Blown			93		93			104	
			99		99				
					115				
					116				

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Instructions - General		See General Operation							
J Relay		See Relay J							
K Resistor		See Resistor K							
L Resistor		See Resistor L							
Lamps - Electric		See Lights 178 to 186							
Lens Box - Underlight	2	24	78				78	78 79 121	
Lens & Mirror Audio		See Audio Lamp Lens & Mirror							
Light - Audio		See Audio Lamp							
Light-Cabinet		See Cabinet Light							
Light - Fire (Red)		See Smoke Light							
Light - Flare		See Underlight							
Light - Focussing		See Focus							
Light - Green		See Trouble Light							
Light - Smoke (Red)		See Smoke Light							
Light - Trouble		See Trouble Light							
Light - Under		See Underlight							
Light Switch - Cabinet		See Cabinet Light Switch							
Limit Switch - Voltage Regulator		See Voltage Regulator Limit Switch							
Line Drains - Pipe		See Pipe Drains							
Line Fuses		See Main Fuses							
Line Indicator	1 2	20	8 34 51 110 111	34 118				37	
Line - Pipe		See Pipe							
Line - Re-check	1 2	20	8 35 73	8 35 46 73 113					132
Line Valves		See Richaudio Valves							
Line Voltage		See Ship Voltage							
Line Voltage - Changes		See Ship Voltage Changes							
Line Voltage - Drop		See Ship Voltage Drop							
Line Voltage - High		See Ship Voltage High							
Line Voltage - Increases		See Ship Voltage Increases							
Line Voltage - Limits		See Ship Voltage Limits							
Line Voltage - Low		See Ship Voltage Low							
Line Voltage - Rise		See Ship Voltage Rise							

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Low Voltage		See Ship Voltage Low							
Lubrication	3		32					32	
	4		36					36	
			120					120	
			121					121	
M Resistor		See Resistor M							
Main Fuse		See Fuse - Main							
Main Power Supply		See Ship Voltage							
Maintenance			32	118				108	
			59					109	
			78						
			80						
			84						
			114						
			118						
			119						
			120						
			121						
			122						
Manifolds - Valve		See Valve Manifold							
Meter	1	20	45	119		84		44	73
	2		106					72	131
			107					74	
			110						
			118						
Meter Control	1	20	31	84				44	141
	2		84					84	
Meter Panel		See Control Panel							
Meter Relay - Fire Alarm		See Fire Alarm Relay							
Motor Brushes		See Brushes							
Motor - Contacts (Timer)		See Timer Contacts - Motor							
Motor - Exhauster		See Exhauster Unit Motor							
Motor - Solenoid (Timer)	4			35				142	142
				142					
Motor - Timer	4		34	34				36	69
				35					142
Motor - Voltage Regulator		See Voltage Regulator Motor							
Multi-contact Panel	2		33				37		143
			34						
N Resistor		See Resistor N							
Name of Parts		See Parts - Names							

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Number Indicator		See Line Indicator							
O Resistor		See Resistor O							
Odor		See Smoke Detection - Smell							
Oiling		See Lubrication							
Operation - Exhauster Units		See Exhauster Unit							
Operation - Fire Alarms		See Smoke Alarms							
Operation - Fire Alarm Relay		See Fire Alarm Relay							
Operation - General		See General Operation							
Operation - Photo-cell		See Photoelectric Cell							
Operation - Timer		See Timer							
Operation - Trouble Signals		See Trouble Signals							
Operation - Valves		See Richaudio Valves							
Operation - Voltage Regulator		See Voltage Regulator							
Outside Gong		See Gong - Auxiliary							
P Resistor		See Resistor P							
Painting		See Maintenance							
Panel - Control		See Control Panel							
Panel - Fuse		See Fuse Panel							
Panel - Meter		See Meter							
Panel - Multi-contact		See Multi-contact Panel							
Parts - Names	ALL								
Parts - Spare		See Spare Parts							
Photoelectric Cell		19 38	7 34 84 94	7			38 39	38	39 73 131
Pipe			11 25 121 122	56		56		121 122	
Pipe (Audio-Tube)		See Audio Tube							
Pipe Drains			11						
Plunger - Valve		See Valve Plunger							
Power Supply		See Ship Voltage							
Purpose of Parts			26 UP						
Q Resistor		See Resistor Q							
R Resistor		See Resistor R							
Raise in Voltage		See Ship Voltage Increase							
Rear Compartment	2	21 61					61		

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Re-check - Line		See Line Re-check							
Red Light		See Smoke Light							
Reflection - Light			59					59	
Regulator - Voltage		See Voltage Regulator							
Regulator Motor		See Voltage Regulator - Motor							
Relays	2	24	91						
		91							
Relay - Audio Lamp Supervisory		See Relay E							
Relay - Exh. Motor Super.		See Relay F							
Relay - Fire Alarm		See Fire Alarm Relay							
Relay - Gong Ringing		See Relay C							
Relay - Gong Supervisory		See Relay D							
Relay - Underlight Superv.		See Relay G (& H)							
Relay C	2	24	92	73		138			62
		91	94	132					65
				92					73
									92
									132
									142
Relay D	2	24	93	93		93			62
		91	139						93
									139
Relay E	2	24	94	94		83			141
		91	134			94			
			141						
Relay F	2	24	95	95		95			95
		91							123
Relay G	2	24	81	96		81			96
		91	96			96			124
									127
Relay H	2	24	81	96		81			96
		91	96			96			125
									97
Relay J	2	24	81	98					70
		91							98
Relay Voltage Regulator - Center		See Voltage Regulator - Center Relay							
Relay Voltage Regulator - Front		See Voltage Regulator - Front Relay							
Relay Voltage Regulator - Galvan.		See Voltage Regulator - Galv. Relay							
Relay Voltage Regulator - Rear		See Voltage Regulator - Rear Relay							
Reset - Fire Alarm		See Fire Alarm Relay Reset							

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Resistors	2 3 4	20 28 34	22						
Resistor A	3	28							28
B	3	28							28
C	3	28							28
D	3	28	28						28
E	2	28	28						
K	2	21 65	65						65
L	2	21 66	66						66 123
M	2	21 67	67						67 124 125 127
N	2	21 68	68						68 143
O	2	21 69	69						69 142
P	2	21	70						67 70
Q	2	21 62	62						62 139
R	2	21 63	63						63 140
S	2	21 64	64					30	30 64 132 141
T	4	34 142	142						142
V	2	20 21 55 132	55 71 134						55 71 132 134

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	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Ship Voltage-Drop			45						
			134						
Ship Voltage - High						114			
Ship Voltage - Increase			27						
Ship Voltage - Limits			27						
Ship Voltage - Low			134			114			
Ship Voltage - Rise		See Ship Voltage Increase							
Signal Buzzer		See Trouble Buzzer							
Signal - Fire (Smoke)		See Smoke Signal							
Signal - Gongs		See Gongs							
Signal - Light (Green)		See Trouble Light							
Signal - Light (Red)		See Smoke Light							
Signal - Trouble		See Trouble Signals							
Silk Flickers	5	56	56	56		122		104	
			90	118					
			106						
			107						
Smell - Smoke		See Smoke Detection - Smell							
Smoke		See Smoke Detection							
Smoke Accumulator		10	10						
Smoke Alarms			7	7	73	134			132
			106	35	92	138			
				46	110				
				80					
				51					
Smoke Alarm Switch	1	20		50		50			139
	2					114			
Smoke Detection		See Smoke Detection - Audible-Visual-Smell							
Smoke Detection - Audible			7	7					
				51					
			110						
Smoke Detection - Smell			5						
Smoke Detection - Visual			3	3					
				58					
			110						
			111						
			112						

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Test - Voltage Regulator			28 144						
Threads - Silk		See Silk Flickers							
Timer		19	33 142	46 142			33 37	104	142
Timer - Contacts - Motor	4		34	34				142	142 143
Timer - Contacts - Valve	4		34	34				143	142 143
Timer - Lubrication		See Lubrication							
Timer - Motor		See Motor - Timer							
Timer - Motor Brush		See Brushes - Timer Motor							
Timer - Multi-contacts		See Multi-contact Panel							
Timer - Number Drum		See Line Indicator							
Timer - Solenoid		See Motor Solenoid Timer							
Top - Cabinet		See Cabinet Top							
Top Compartment	1 2	17	18						
Traps - Water		See Pipe Drains							
Trouble Buzzer	2	82	82 106	47					130
Trouble Buzzer Switch	1 2	20		47					
Trouble Light	1 2	20	106	47				104	130
Trouble Signals			47 48 49 50 114	114	27 48 49 50 93 94 95 96 97 113 114				
Tube - Audio		See Audio Tube							

	Reference Figure	Location	General Information	Normal Operation	Cause of	Cause of Trouble	Removal	Adjust-Maintain	Circuit
Underlight	2	24	3 79 80			48 49 80 81 96 97 114		79 80 104	67 81 95 etc. 124 etc.
Underlight Compartment	2	17	23 78						
Underlight Focus		See Focus - Underlight							
Underlight Lens Box		See Lens Box - Underlight							
V - Resistor		See Resistor V							
Valve - Air Exhaust		See Air Exhaust Valve							
Valve - Automatic		See Richaudio Valve							
Valve - Coils (Solenoids)		See Solenoid Valve							
Valve Breaker Contacts		See Timer Contact - Valve							
Valve Manifold	2 6		86				86 89 90		
Valve Plunger	6			87			86 89 90	104	
Visual - Audio Switch		See Fuse Panel Switch							
Visual Detection		See Smoke Detection - Visual							
Visual Detect. Compartment	1 2	3 17	3 21 56 59					59	
Voltage		See Ship Voltage							
Voltage - Alternating			41 100 118			118			
Voltage - Changes		See Ship Voltage Changes							
Voltage - Limits		See Ship Voltage Limits							
Voltage Regulator	2 3	19	26 27 83 132 141 144	27 29		134	26	30	28 132 144