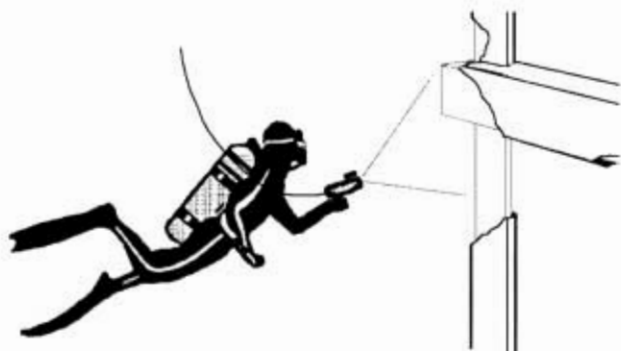


# DHC-1

DIVER HELD CAMERA

## OPERATION MANUAL



### CAUTION

- DO NOT ALLOW CAMERA TRANSFORMER OR GFI OUTLET TO GET WET
- 120 vac IS DANGEROUS - DO NOT EXPOSE CONNECTORS TO WATER
- DO NOT DISCONNECT UNDERWATER CONNECTOR FROM CAMERA WITHOUT FIRST UNPLUGGING POWER AT SURFACE.
- DO NOT OPERATE LIGHTS OUT OF WATER

## INTRODUCTION

The J.W. Fishers DHC-1 Diver Held video Camera and lighting system was designed for commercial diving applications. It can be used as a diver held camera, or the handle can be removed for fixed-mount applications. The system was specifically designed for inspection work in up to 500 ft. of working depth. The DHC-1 is an ideal tool for hull inspection, bridge inspection, or any of the numerous underwater structure inspections encountered by today's commercial diver.

The very low light black and white camera (standard), or color camera (optional), produce sharp high resolution video images which are sent to the surface for viewing. The video picture is displayed on a video monitor and a VCR can be used to create a permanent record. A TV can also be used as a monitor.

A very powerful lighting system is provided by two 100 w tungsten halogen lamps. A switch is provided on the back of the camera so that the diver can select hi or low intensity (100 w or 200 w) of lighting. The switch is also used to turn the camera on/off. The system is powered by 120 vac. The diver is protected by a Ground Fault Interrupt device.

The housing is constructed with high-impact corrosion proof PVC and urethane for years of trouble-free operation. Stainless steel hardware is used throughout. Two leak sensors inform the diver, and the surface if the smallest (a few drops) amount of water is in the housing. The camera is slightly negative buoyant.

A highly abrasive resistant urethane jacketed cable connects the camera to the surface. A waterproof connector allows the cable to be disconnected from the housing. The system comes standard with 150' of cable. Optional cable lengths in excess of 1000 ft. can be ordered.

The DHC-1 has been assembled for use as received. The camera and lens have been set up at the factory. Your specific situation may require a re-adjustment. To adjust your system, follow the instructions in the camera and lens manuals supplied (see Lens Adjustment on page 6 of this manual).

The DHC-1 is available in both black and white and an optional color model. It may be used with either a monitor or a TV.

Options include: monitors, 12 vdc (inverter) or 220 vac operation, a 1000 ft of cable, PAL format camera for European use, carrying case, and a spares kit.

## MONITOR/TV

The use of a regular TV is not the best setup due to the slight loss of picture quality when converting the video signal to an RF signal. When using a regular TV, the ANT input must be used which requires an RF adaptor. The video quality is dependent upon the characteristics of the RF adaptor. A good RF adaptor can be purchased from Radio Shack for \$30.

A monitor, or a TV with a video input, uses the video signal directly and gives the best quality picture.

Some TV's and monitors have a RCA plug and others have a BNC plug. The 10' cable we provide has a removable adaptor on one end which allows a RCA or a BNC connection.

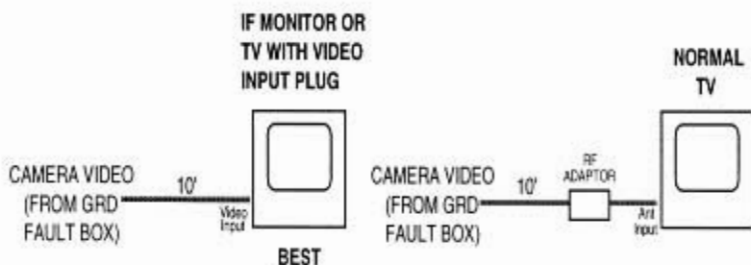


Figure 1

### CABLING AND POWERING UP - Out of Water

The DHC-1 housing is ready to go, there is no need to open the underwater housing. Follow figure 2 to cable the system. Before plugging into 120 vac, be sure the master light switch on the side of the ground fault box is turned off (light housings will be damaged if operated out of water for more than five seconds).

When connecting the video coax cable from the ground fault box to the monitor, be sure to connect the coax cable to the video input jack of the monitor. If a VCR is used, be sure to use the input and output jacks that are marked video input and video output.

Camera hook-up to VCR:

1. Remove the RCA to BNC adaptor from the video cable connector.
2. Plug the RCA connector into the video input jack on the VCR.
3. You will need a second video cable, with RCA connectors on each end, to connect the VCR to the monitor. Cable the VCR's video output jack to the monitors input jack. You may have to use the RCA to BNC adaptor if you are using a black and white monitor.

After insuring the lights are turned off, plug the system into 120 vac. Turn the switch on the back of the camera to on (first position - no lights). After a few seconds you should have a normal picture. Turn the master light switch (on side of grd fault box) on. Turn the light switch on the camera housing on just long enough (five seconds or less) to insure the lights are working. Try both the low and high position.

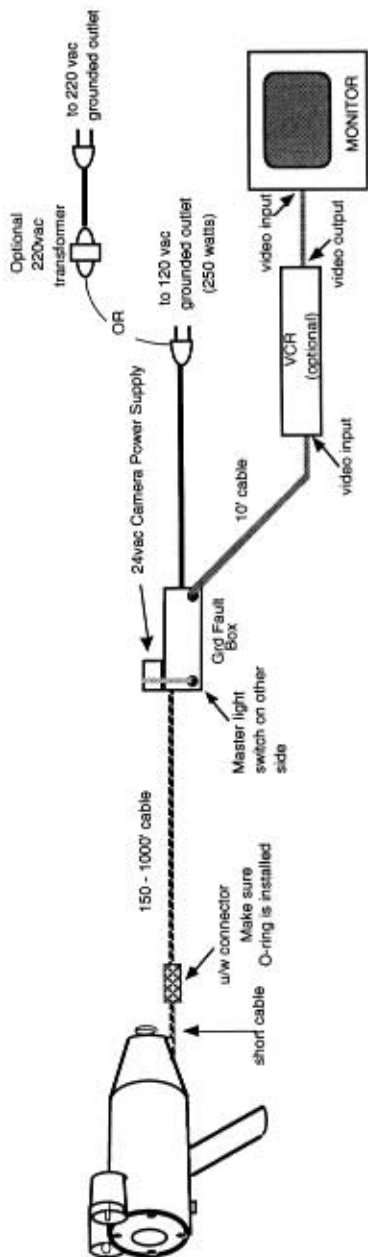
The lens was adjusted at the factory, but be sure to read "Lens Adjustment" on page 6 of this manual.

### CABLING ASSEMBLY AND POWERING UP - For Water Use

After cabling up the system, test the system before putting it in the water. After testing, allow 5 to 10 seconds for the lights to cool before putting the camera housing and lights in the water. 120 vac is dangerous, keep all surface connectors dry and away from water. Never connect or disconnect the camera connector with the ground fault plugged in. Remove all power first.

While descending with the camera, always have the system powered up. In the unlikely event that a leak should occur, a small red LED, on the top rear area of the camera, will illuminate and the picture will scramble which will enable the diver to bring the camera to the surface before any damage can occur.

## DHC-1 CABLING



## INVERTER HOOKUP

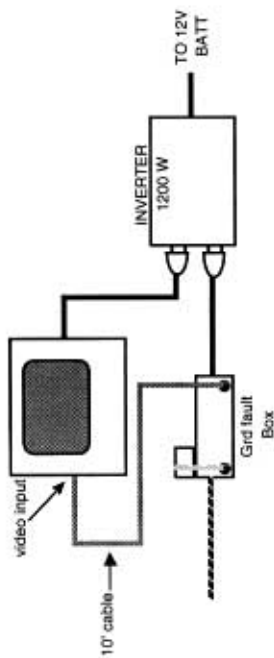


Figure 2

## LEAK DETECTION

The underwater housing is equipped with leak detection circuitry which is designed to inform you of any leak problem before any damage can occur.

The Leak Detector board is mounted on top of the camera (see figure 5). There are two leak sensors which are connected to the leak board. One leak sensor is mounted at the low point in front of the camera housing and the second one is mounted at the rear of the housing. Each leak sensor is made up of two wires that are very close to each other. When water touches the ends of the two wires, the picture will scramble (see figure 3) and a small red LED, that is mounted on the top of the housing, will illuminate. The leak system should be periodically tested by removing the front faceplate and touching the two wire ends with a wet finger.

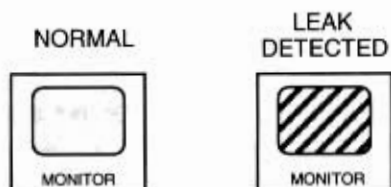


Figure 3

## LENS ADJUSTMENT

There are two different lenses used on the DHC-1 camera. The B/W system uses a wide angle 4mm lens with an operator adjustable Iris (light level) ring and Focus ring. The color system uses a wide angle 6mm lens with an operator adjustable Focus and automatic Iris.

The Focus adjustment is used to give a sharp focused picture on the monitor. If the picture is not sharp then the DHC-1 faceplate should be removed and the Focus ring adjusted for a sharp picture at your normal viewing distance. The focus ring was factory set at several feet to infinity. This setting will work for most jobs.

The Iris adjustment is used to adjust the lens opening which determines the amount of light that enters the camera. The more light that enters the camera the brighter the picture will be, however the more open the lens (more light) the less "focal length" or "depth of field" (the range or distance that the picture will remain in focus).

Example: if you open the lens all the way (marked open) and set the focus ring at 3 ft. The picture will be very bright and the target will be in focus at 3 ft. If you move the target in to 1ft. or out to 5ft. the picture will start to blur (out of focus).

If you close up the lens towards C (closed) and leave the focus at 3 ft, the picture will not be as bright but will stay in focus over a much broader range. The picture can be brightened by lighting the target and adjusting the monitors picture (good contrast and brightness). If you have poor lighting conditions then you have no choice, open the Iris for the brightest picture on the monitor.

Note: The lens is screwed into the camera (clockwise), in the process of adjusting the lens it may come loose; if so, retighten by hand. Do not overtighten.

## GROUND FAULT BOX

The Ground Fault Box (see figure 2) is hard wired to the 120 vac lights and the Camera Power transformer plugs into it. If even a small electrical leak occurs underwater, the Ground Fault Breaker will trip. If the Ground Fault Breaker trips, call the factory for assistance. Never bypass the Ground Fault Breaker, it is used for safety reasons.

## CAMERA HOUSING ASSEMBLY

The DHC-1 may be disassembled to gain access to the camera lens (front) or to gain access to the camera switch or for removal of the camera (rear).

To make adjustments to the camera lens, remove the four 4-40 x 5/8" panhead screws from the faceplate. The black shroud can then be removed by removing the two 4-40 x 1/4" black PH screws. This gives access to make lens adjustments. The camera cannot be removed from this end. Clean the o-ring and seat with a clean cloth before reassembly.

To gain access to the camera switch, or camera, the rear cone must be removed. Because the rear cone fits tightly into the camera body it cannot be easily removed. It is recommended that the 3/8-16 black plug be removed from the bottom of the unit, and the pressure plug (supplied) be inserted, and a small amount of air from a bicycle pump be put in the camera housing. The pressure makes for easy removal of the rear dome.

To remove the rear dome:

1. Disconnect the main cable from the short cable that comes from the camera. Note that there is an O-ring inside the connector. Take special care not to lose this O-ring (7/8" OD x 1/16" W).
2. Note the position of the short cable in reference to the camera body. It is pointed downwards at approximately 45 deg on the right hand side of the housing. This angle is adjustable, but was selected to insure the cable does not interfere with hand movement.
3. Sit the camera housing faceplate down on a flat table.
4. Remove the two 6-32 x 1/2" FH screws from the yellow housing that hold the rear cone in place.
5. Remove the 3/8-16 black plug (9/16" wrench) from the bottom of the camera housing.



6. Screw in the 3/8"-16 pressure plug.

7. Connect a bicycle pump to the pressure plug and while holding one hand on top of the rear cone, pump the bicycle pump several times. The pressure should push out the rear cone.

Note: Do not overpressurize. If the rear cone does not lift up with a small amount of air then call the factory (800) 822-4744 or (508) 822-7330.

The camera is held in place by a aluminum bracket which is held in place by two 4-40 x 3/8" PH screws.

Clean the o-rings and inside of the case with a clean cloth before reassembly. Be sure and line up the short cable to the correct position (See step 2 above) before inserting rear cone into case.

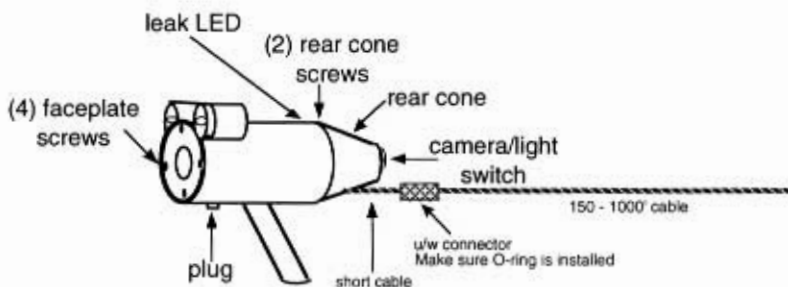
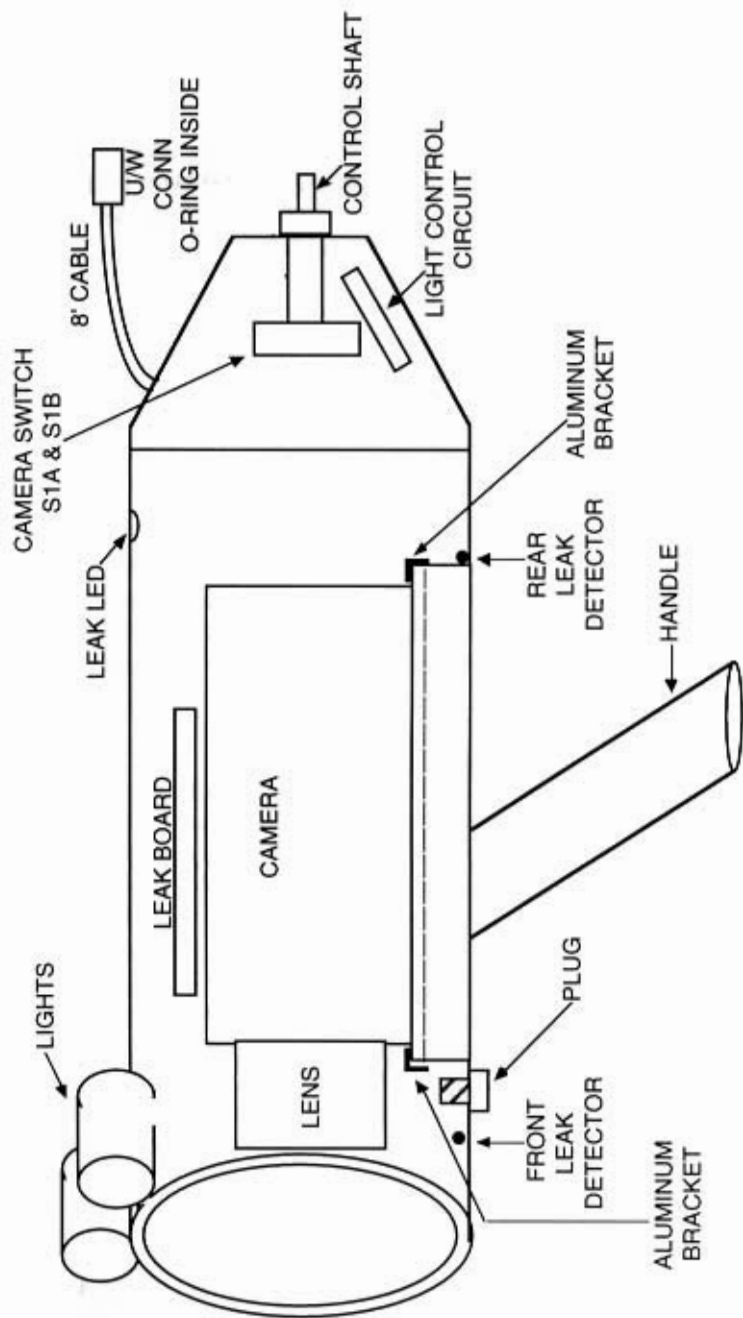


Figure 4

# DHC-1 DETAIL DRAWING



## POWER REQUIREMENT

The DHC-1 is powered by 120 vac. If your boat is not equipped with 120 vac, then you must use a motor generator set or an inverter.

A motor generator set is the first choice, a 1000 watt unit does a nice job. They are powered by a small gasoline engine and are very portable. They produce a "clean" 120 vac and can power the complete system including a VCR.

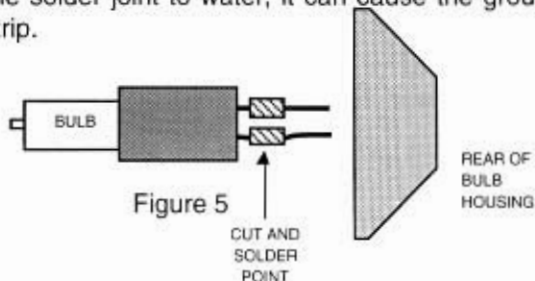
The second choice is an inverter. They are powered by a 12 vdc battery and a good one is expensive. They produce a "dirty" 120 vac but do an OK job. You can sometimes see noise (from the inverter) interference in the video picture. The noise can be reduced by putting an isolation transformer between the output of the inverter and the Diver Held Camera.

## MAINTENANCE

The DHC-1 was designed to be maintenance free. After use in salt water, rinse in fresh water. A periodic check of the leak detector should be made. Wet your finger and touch the leak sensor tip (faceplate must be removed) - the picture should scramble. Call the factory at (800) 822-4744 or (508) 822-7330 for any questions.

## BULB REPLACEMENT

Remove the two 4-40x3/8" screws from the rear of the bulb housing (see figure 5) and push the bulb out the rear of the housing. Cut the wires to the bulb (about 1/2" from the bulb), strip away a minimum amount of insulation, and solder on the replacement bulb. Clean the solder joint and surrounding wires with denatured alcohol or lacquer thinner. Form the wires into their final bent position by inserting the light bulb into the yellow housing and positioning the black cap against the housing. Carefully remove the light from its housing taking care not to unbend the wires. Coat the solder splices and surrounding wires with several thin coats of "automotive goop" adhesive. Wait about one hour between each coat. Let final coat dry overnight and reassemble light housing. If the sealed joint leaks exposing the solder joint to water, it can cause the ground fault breaker to trip.



## **SPECIFICATIONS**

### **DIMENSIONS/WEIGHT:**

- Camera Housing ..... 11"L x 4.5" Dia ..... in air 7 lbs.  
..... in water 6 oz.
- Cable ..... .4"D x 150'-1000'L ..... in air 9-60 lbs.  
..... in water 4-30 lbs.
- Carrying Case ..... ?L x ?W x ?H ..... ? lbs.

### **PERFORMANCE/DESCRIPTION:**

- Camera ..... B&W CCD low light (.5)lux.
- Lens ..... 6 mm 60 deg wide angle.
- Lights ..... Two 100 w tungsten halogen.
- Cable ..... Urethane jacketed.
- Operating Depth ..... 500 ft.
- Color ..... Yellow.
- Sealing ..... O-ring sealed; contains leak detector.
- Power Req ..... 120 vac, 1.5 amps, 225 w.

### **OPTIONS**

- 150-1000 ft cable
- Color camera
- Monitor
- 12 vdc (inverter)
- 220 vac (Europe)
- PAL camera (Europe)
- Spares kit
- Carrying case

### **LIMITED WARRANTY**

Your DHC-1 underwent constant inspection during assembly to insure many years of trouble free performance. The DHC-1 is warranted for TWO FULL YEARS from the date of purchase. During this period, your unit will be repaired free of charge should a failure occur due to materials or workmanship. The Warranty does not cover damage due to water leak, broken cable, droppage, or general misuse of the unit. It is the responsibility of the operator to insure the leak detector is working.