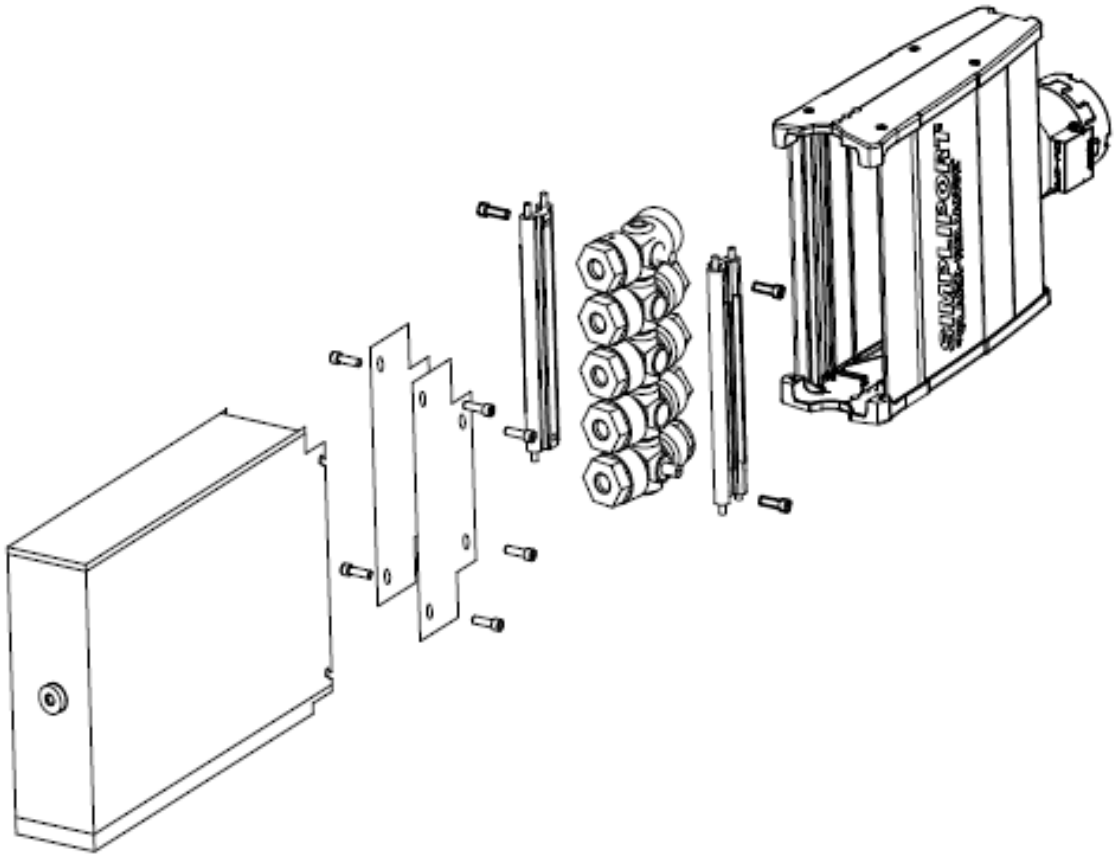
Installation, Operation, & Maintenance Instructions
R500.E149A
10/31/2016

FiberLevel® Bicolor Direct/Remote Reading Water Level Gage System



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STORAGE and HANDLING

The Reliance® FiberLevel® System meets or exceeds all applicable specifications when shipped from the factory. The equipment should be stored in an area protected from the elements and corrosive fumes, in a secure manner where they can neither fall, nor be struck by other objects. Avoid placing any objects on the FiberLevel Illuminator, Sensor Hood, Remote Viewer, or Fiber Optic Cable at any time. The temperature of the storage area should not exceed 150 degrees F. (65.5 degrees C) or drop below 32 degrees F (0 degrees C).

Unpacking and inspection

Upon receipt of the Boiler Drum Level instruments, examine the contents of the container(s) for damage. Care should be exercised as the items are uncrated. The shipment may contain fragile glass components. Report any faulty conditions as soon as possible to your carrier to avoid acceptance of damaged goods. Clark-Reliance will not be responsible for goods damaged in shipping or storage, or subsequent loss or damage due to improper storage or exposure as a result of damage to shipping containers. Submit a digital photo of any damaged equipment and container to Clark-Reliance, if possible

Verify that all materials are present as recorded on the Packing List provided with each shipment. Report any discrepancies to Clark-Reliance immediately. Have the Clark-Reliance order number and shipping waybill available at the time of your call.

Handling

Your Clark-Reliance shipment has been carefully packed. However, the shipment may include spare parts, temporary water gages for “Boil-out” purposes, maintenance instructions, and engineering drawings. Upon receipt of the order, the equipment and above items should be identified and verified against the packing list. Any documentation that has been provided should be directed to the appropriate personnel.

COMPONENTS

The main components that make up the FiberLevel Viewing System are:

1) Fiber Optic Cable
2) Sensor Hood
3) LED Illuminator
4) Remote Viewer
5) Simpliport Gage Glass

INSTALLATION

Caution: All lights are tagged with the service conditions for that particular unit. These specifications are located on the Reliance tag on the power supply housing, and are contained in the “Specifications” section of this manual. Review the ratings prior to installation and again prior to start-up. Should there be any doubt as to the applicability of a unit for the installed environment, consult the factory before placing the unit into service.

Notes:

1) All installation steps should be performed by a qualified technician and should be executed in accordance with all applicable national and local codes.
2) The light and power supply should be checked to ensure that they contain no foreign matter, and that the end connections are clean, undamaged, and in line with existing conduit.

IMPORTANT: Never remove the blue cord between the power supply and illuminator while power is applied. Doing so will cause permanent damage to the LEDs.

INSTALLATION OF THE SIMPLIPORT GAGE GLASS

NOTE: Industrial Power Boilers are one of the harshest environments for Level Gage Glasses. Actual service life will vary based on one or more of the following conditions: cycle frequency, temperature fluctuations, water quality, and other factors. Depending upon these factors, the average service life is from 6-18 months. Complete gage rebuilds are suggested on an annual basis for personnel and plant safety. This can reduce the number of maintenance intervals caused by the need to replace individual glass modules.

Boil-out procedure (Form E146A) must be completed prior to start-up

To place Simpliport P4000/P4100 in service:

NOTE: Bench torque all new Simpliport Gages to 80 ft-lbs before installing on the boiler!

1. Shut off water and steam water gage valves.
2. Make proper connection of SIMPLIPORT P4000/P4100 end nipples or flanges to the water gage valves.

   Note 1: When end nipples are furnished, make sure that the window packing nuts are angled slightly to the **left** as observed by the viewer.

   Note 2: Where expansion loops and flanges are furnished, models with a single expansion loop should be on the top side and the window packing nuts are angled slightly to the **left** as observed by the viewer. Flange bolting should be lubricated with a copper based high temperature anti-seize lubricant, or equal, and torqued to 85 ft-lbs.

3. **With Cold Boiler:**
   a. Open water and steam gage valves and allow the Simpliport Gage to heat up along with the boiler.
   b. Check each port window for leakage. A small mirror held opposite the leak-detector hole (found on the side of each packing nut) is useful here. If leakage is observed, shut off the water gage valves and replace the module of the affected port as described on page 3 of this manual.
   c. Mounting the Illuminator and Front Hood:
      i. For Simpliport 180 Illumination refer to IOM #R500.E245A
      ii. For Classified Area Illumination refer to IOM #R5400
4. **With Hot Boiler:**
   a. Open drain valve. Open steam and water valves far enough to allow a small amount of water and steam to pass through the gage for about 5 minutes. This permits a gradual warm-up of the Simpliport Gage Glass
   b. Close the drain valve and finish opening the steam and water valves.
   c. Check each port window for leakage, as in procedure 3b.
   d. Mount illumination as described in 3c.

CAUTIONS:

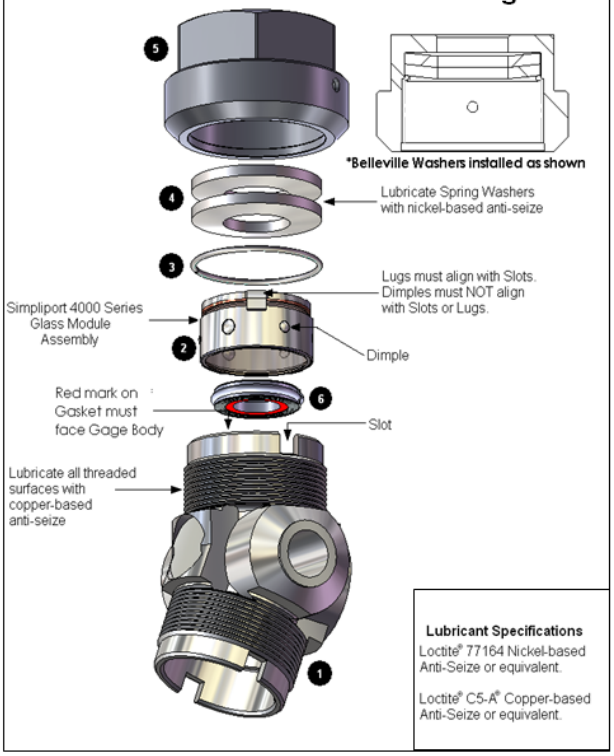
1. **NEVER APPLY TORQUE TO THE SIMPLIPORT GAGE GLASS UNDER PRESSURE.**
2. **DO NOT HOT TORQUE THE SIMPLIPORT P4000/P4100 GAGE GLASSES**
3. **DO NOT TORQUE THE PACKING NUTS GREATER THAN THE 80 FT-LBS SPECIFIED.**
4. **EXCESSIVE BLOWDOWNS MAY SHORTEN THE GAGE SERVICE LIFE (Refer to IOM R500.E156D).**

SIMPLIPORT 4000 SERIES COMPONENTS (Figure 1)

1. Simpliport 4000 Series Body Section
2. Glass Module (PW-87)
3. Spring Retainer (PW-40)
4. Spring Washers (PW-66)
5. Packing Nut (PW-65)
6. Spiral Wound Gasket (PW-90I)

Notes:
1) PW-68 Packing Nut Assembly consists of items 3, 4 (2 req'd.), and 5. Item 5 is not sold separately.
2) Replacement Module Kit PW-87B consists of (1) PW-87 Glass Module and (1) PW-90I Gasket. Items are not sold separately.

Figure 1



Note: Refer to IOM R500.E241A for complete maintenance instructions.

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INSTALLATION OF THE FIBERLEVEL ILLUMINATOR

Step by step instructions:

1) Assemble the mounting bar assemblies to the Simpliport Gage mounting lugs using the (4) 5/16" X 1" SHCS that are provided (Figure 1).

2) To mount the LED Illuminator assembly to the gage: While holding the illuminator at a slight angle, slide illuminator top onto pins. Align bottom pins with slots and rest unit in place.
Note: The Simpliport® Gage must be viewed with the packing nuts facing slightly to the left. Make sure the Illuminator and viewing hood are in the correct orientation to the Simpliport® Gage.

3) Repeat the procedure in Step 2 to mount the front end hood to the opposite side (viewing side) of the gage.

4) The unit's power supply has wire leads and a fuse ready to connect to the incoming AC power source. Remove the enclosure lid to access wiring. Connect incoming AC power source per local and National Electric Codes. The fused (red) wire is to be connected is the "Hot" and the remaining white wire is the "common".

5) The power supply can be remote mounted if desired. After remote mounting of power supply, if the blue power cord will not reach the power supply, contact your local representative.

NOTE: Never remove the blue cord between the power supply and illuminator while power is applied. Doing so will cause permanent damage to the LEDs.

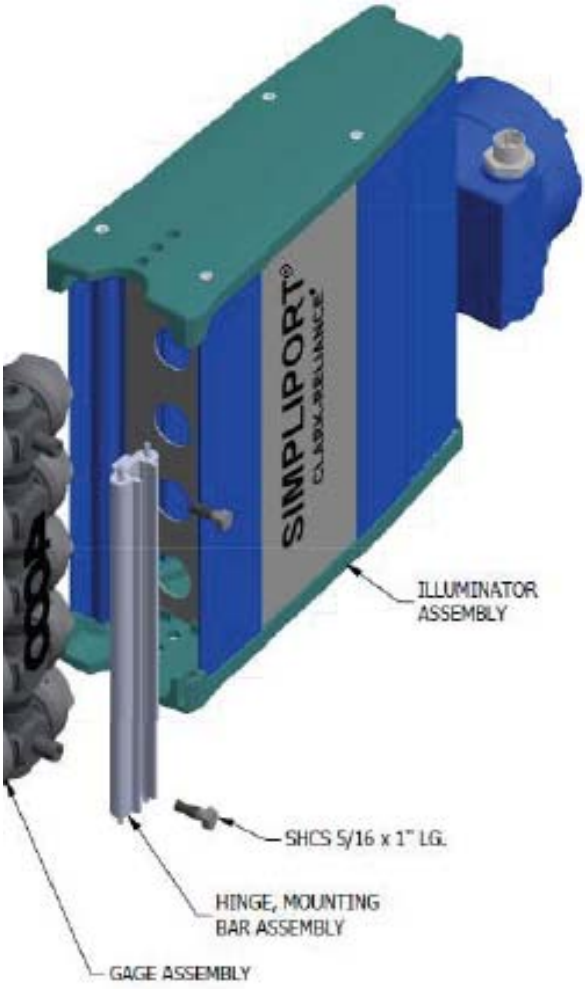


Figure 1

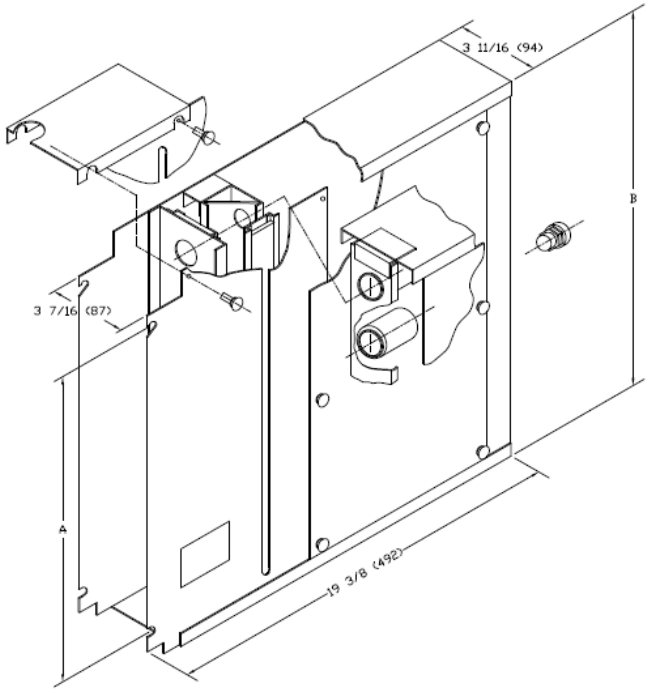
Note: See IOM R500.245A for complete illuminator installation and maintenance instructions

INSTALLATION OF THE FIBERLEVEL SENSOR HOOD

Installing the Mounting Bracket:

1) Install the mounting bracket on the back side of the right hand Mounting Bar Assembly using (2) 5/16”-18 X 1” SHCS and (2) 5/16”-18 Hex Head Cap Screw. Note that the shorter side of the bracket goes onto the Mounting Bar. Tighten the hex nuts. Repeat on the left side. (Ref. Figure 2).

Installing the Sensor Hood:



1) Mount the Sensor hood to the top side mounting bracket using (2) 5/16”-18 X 5/8” SHCS and (2) 5/16”-18 Hex Head Cap Screw. Note that the Sensor Hood mounts to the longer side of the bracket.
2) Tighten the hex nuts. Repeat on the bottom side. (Ref. Figure 2)

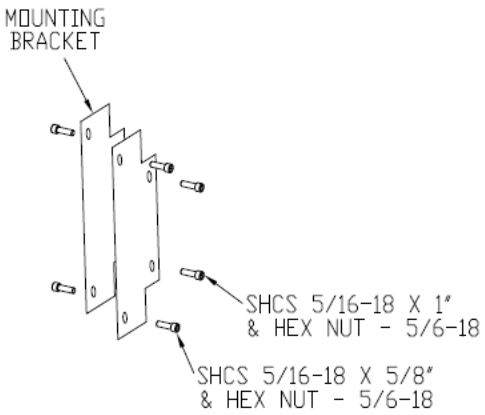


Figure 2

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INSTALLATION OF THE FIBERLEVEL REMOTE VIEWER

The Remote Viewer should be mounted in the Control Room in a convienient location so it can be easily observed by the operators. The Remote Viewer should be mounted at eye level for optimum viewing of the readout.

Installing the Remote Viewer:

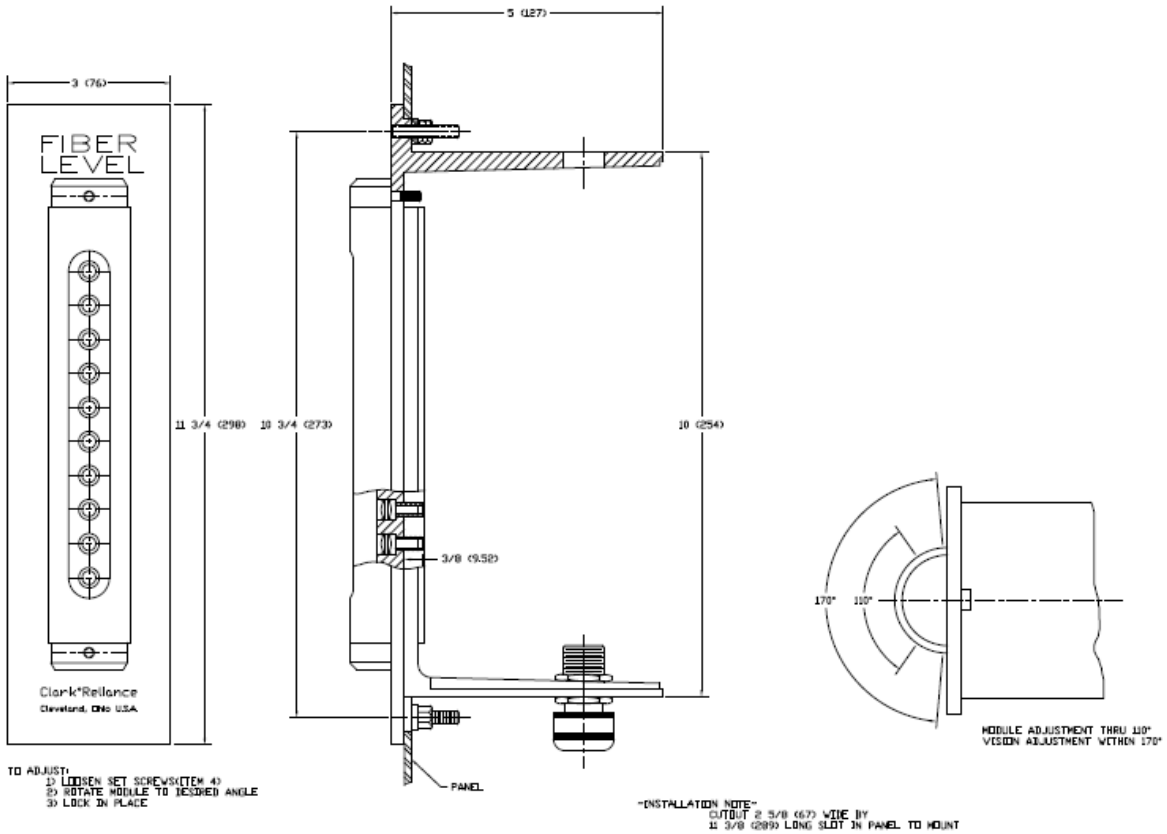
1) Determine the best location for observing the display. Also consider clearance for the fiber optic cable entry in the top back or bottom back of the Remote Viewer.

2) Prepare the panel opening for the Remote viewer. The required size for the opening is

2 5/8” wide X 11 3/8” long.

3) Insert the Remote Viewer into the slot and secure with the included panel brackets and ¼”-20 hex nuts.

4) Note that the Viewing Module can be adjusted by loosening the set screws at the top and bottom of the module and rotated to the desired angle. Tighten the set screws to lock the Viewing Module in place.



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INSTALLATION OF THE FIBERLEVEL FIBER OPTIC CABLE

The fiber optic cable contains individual fiber strands, one for each Simpliport Gage port. The cable can be installed in present cable trays, ducts or conduit. The light signals inside the cable are not influenced by electromagnetic interference. The cable is sheathed within a nylon cover, remains flexible, and permits a 12” minimum bending radius. When installing the fiber optic cable, fasten the terminations to the Remote viewer and to the Sensor Hood Pick-up Bushings *finger tight only!*

Installing the Fiber Optic Cable:

1) If using conduit to route the fiber optic cable, Clark-Reliance recommends using 1 ½” conduit for protection of the cable. The conduit bend radius should not be less than 12”.

2) When pulling the fiber optic cable through the conduit, fasten the pull line to the assembly sheath and not to the individual fibers.

3) The fiber optic terminations are fragile and should be handled with care to avoid damage. If any of the terminations are damaged, they can be repaired by a qualified technician using Clark-Reliance FiberLevel Repair Kit, P/N FL-RK.

IMPORTANT: When fastening the terminations to the Remote Viewer and the Sensor Hood Pick-up Bushings, tighten only finger tight.

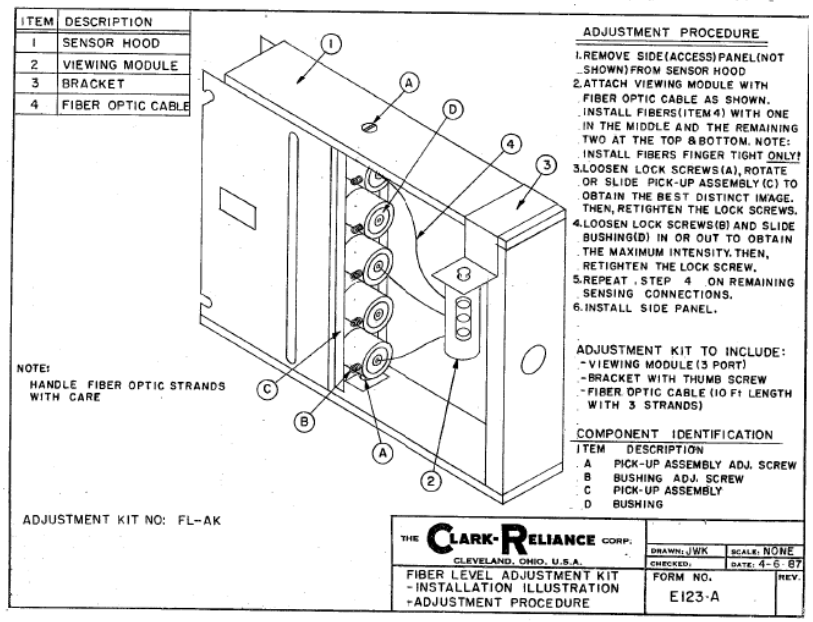
4) Note that the lamps are preset at the factory, but when necessary, make the following adjustments if required:

a) Using the Remote Viewer near the Sensor Hood before installing it in the remote panel, communicating with a technician observing the Viewer at the remote panel, or using a FiberLevel Adjustment Kit (P/N FL-AK if purchased) attach the cable to both units, making sure that the terminations are fastened finger tight.

b) For vertical adjustment of the pick-up assembly, loosen the four (4) set screws that hold the assembly in place and slide it up or down to maximize the remote viewing intensity. Tighten screws when complete.

c) For axial adjustment of the pick-up assembly, loosen the top and bottom screws and rotate the assembly to maximize the red and green image at the remote viewer. Tighten screws when complete.

d) To adjust the focus, loosed the screw on the pick-up bushing and slide the connector in and out to obtain maximum intensity at the remote view. Tighten the screw when complete.



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FIBERLEVEL SPECIFICATIONS

Characteristics of Clark-Reliance Fiber Optic Cable Assemblies

- Low Transmission Loss
- High Radiation Resistance
- EMVRFI Immunity
- Complete Electrical Isolation
- Temperature Range -65•F to 225•F
- Lengths to 750 Feet

Component Specifications:

1) Plastic Clad Silica (PCS) Fiber Strands	- Tensile Tested to 50,000 PSI - Weight = .328 Grams/Foot - Core Diameter = 600 um - Clad O.D. = 850 um - Buffer O.D. = 1000 um
2) Outside Jacket Tube	- Nylon #12 .275 I.D. x .375 O.D. - Weight = 11.2 Grams/Foot
3) Spaghetti Tubing	- Size 16 - PVS: UL-VWI .029 I.D. x .061 O.D.
4) Connectors	- Amphenol SMA 905-222-5002
5) Bend Radius of Single Strand	- 4" Minimum
6) Single Strand Pulling Limit	- 18-20 Lbs.

Assembly Specifications:

1) Bend Radius of Assembly	- 1 Foot Minimum
2) Assembly Pulling Limit	- 49-53 Lbs. @ Temp. Below 100 • F 30 Lbs. @ 100 • F and Above
3) Recommended Conduit Size	- 1-1/2"

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FIBERLEVEL MAINTENANCE

I. GAGE AREA

A) Simpliport Gage Glass (Ref: P4000 Series IOM - Form R500.E241A).

B) Sensor Hood

1) Clean glass components, as required, with caution to avoid the use of abrasive cleaning methods (Caution: all glass components must remain in place).

2) Tighten all fasteners.

C) Illuminator

1) Clean glass heat shield as necessary with caution to avoid the use of abrasive cleaning methods

2) Check electrical connections. Refer to IOM R500.E245A for Illuminator instructions.

II. FIBER OPTIC CABLE

A) No maintenance required (Note: Care must be taken to prevent damage to cable).

B) Secure fiber cable connectors; fasten finger tight only!

III. REMOTE READOUT DISPLAY

A) No maintenance required.

B) Secure fiber cable connectors; fasten linger tight only!

FIBERLEVEL TROUBLESHOOTING

CONDITION	REASON
Weak image, poor color definition, white image.	a) LED out or electrical failure. b) Foreign material contamination in gage area. Examine quality of side view image, in order to determine condition of gage. Gage maintenance required (Ref: P4000 Series IOM - Form R500.E241A) c) Improper adjustment of pick-up bushing d) Damage to one or more of the individual fibers or cable ends.
Hood or Illuminator failure or damage	Consult C·R Representative or Factory.
Cable failure or damage	Consult C·R Representative or Factory. (Field repairs may be difficult and must be performed by a technician experienced with fiber terminations).

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FIBERLEVEL MODEL NUMBER REFERENCE

REMOTE VIEWER

Number of Ports	Model Number
5	PFLV-5A
6	PFLV-6A
7	PFLV-7A
8	PFLV-8A
9	PFLV-9A
10	PFLV-10A

SENSOR HOOD

Number of Ports	Model Number
5	PFLS-5
6	PFLS-6
7	PFLS-7
8	PFLS-8
9	PFLS-9
10	PFLS-10

ILLUMINATOR (ORDINARY LOCATIONS)

Number of Ports	Model Number
5	SWAI-5
6	SWAI-6
7	SWAI-7
8	SWAI-8
9	SWAI-9
10	SWAI-10

ILLUMINATOR (HAZARDOUS AREA LOCATIONS)

Number of Ports	Model Number
5	SI5-LED
6	SI6-LED
7	SI7-LED
8	SI8-LED
9	SI9-LED
10	SI10-LED

FIBER OPTIC CABLE

Number of Ports	Model Number
5	CABLE-5
6	CABLE-6
7	CABLE-7
8	CABLE-8
9	CABLE-9
10	CABLE-10

FIBERLEVEL ACCESSORIES

FL-AK	FiberLevel Adjustment Kit
FL-RK	FiberLevel Repair Kit

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Notes:

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