Optical Wavelength Laboratories

OPERATIONS GUIDE

FIBER OWL 7 SERIES
FIBER OPTIC LINK CERTIFIERS

FIBER OWL 7 OPM W/INTEGRATED OPTICAL LENGTH TESTER
F7X   **Stand-alone certification power meter**
F7V   **Stand-alone certification power meter w/integrated VFL**

FIBER OWL 7 SERIES TEST KITS
KF7XMS   **F7X + quad-wave source (MM: 850/1300nm, SM:1310/1550nm)**
KF7XMX   **F7X + multimode dual-wave source (850/1300nm)**
KF7XMV   **F7X + multimode dual-wave source (850/1300nm) w/integrated VFL**
KF7XSX   **F7X + singlemode dual-wave source (1310/1550nm)**
KF7XSV   **F7X + singlemode dual-wave source (1310/1550nm) w/integrated VFL**

FIBER OWL 7V SERIES TEST KITS
KF7VMS   **F7V + quad-wave source (MM: 850/1300nm, SM:1310/1550nm)**
KF7VMX   **F7V + multimode dual-wave source (850/1300nm)**
KF7VMV   **F7V + multimode dual-wave source (850/1300nm) w/integrated VFL**
KF7VSX   **F7V + singlemode dual-wave source (1310/1550nm)**
KF7VSV   **F7V + singlemode dual-wave source (1310/1550nm) w/integrated VFL**

Revision 1.0d

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INTRODUCTION

TABLE OF CONTENTS

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INTRODUCTION

BEFORE YOU BEGIN

All personnel testing optical fibers should be adequately trained in the field of fiber optics before using any fiber optic test equipment.

If the user is not completely familiar with testing fiber optics, they should seek competent training. Such training can be acquired from a variety of sources, such as local hands-on training classes.

Valuable information about fiber optic testing can also be gathered from reading printed literature carefully or by thoroughly reading supplied operations manuals.

Fiber optic testers vary from other types of test equipment due to issues such as:

1) standards-based testing
2) proper fiber optic test procedures (FOTPs)
3) "zeroing" or referencing of power levels
4) determining the correct link budget to pass or fail by

Complete understanding of each of these issues is critical for performing proper fiber optic tests.

ABOUT THIS MANUAL

Throughout this manual you will find various symbols that assist with understanding the procedures outlined in this manual. Below is a list of these symbols and a short description of their purpose:

Shows a helpful tip that will make a procedure go more smoothly

Tells the user some useful information about the successful completion of a procedure

Warns the operator of a potentially dangerous condition

INTRODUCTION

DESCRIPTION

Fiber OWL 7 series fiber optic link certifiers are high-accuracy, high-resolution, microprocessor-controlled optical power meters capable of performing a wide variety of testing applications, from basic optical loss measurement up to dual-wavelength fiber link certification. With a wide measurement range and NIST-traceable wavelengths, Fiber OWL 7 series certifiers are ideal for both singlemode and multimode fiber link certification.

Enclosed in an attractive hand-held case made from high impact plastic and protected by a protective rubber boot, test readings and graphical help screens can be viewed on the color LCD, and an intuitive 10-key keypad allows for easy data entry.

Each Fiber OWL 7 fiber link certification power meter is powered by a re-chargeable lithium polymer battery, which typically allows up to 50 hours of continuous use. A built-in auto-shutdown feature further conserves battery life. The battery is re-charged through the USB port via a supplied battery charger.
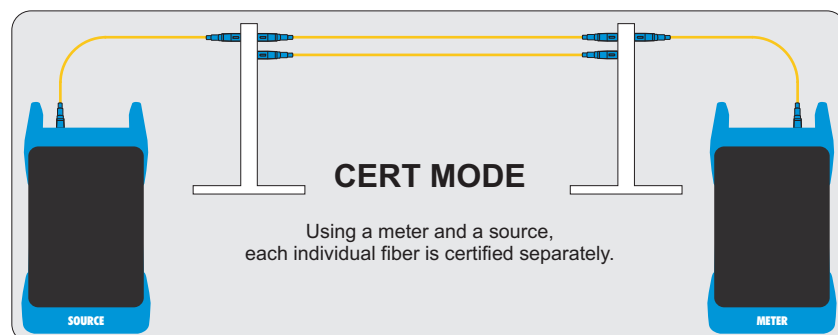
The intuitive built-in Link Wizard prompts the user to enter key information used to calculate standards-based link budgets for fiber optic certification testing, and helpful diagrams guide the user through the setup and testing procedure.

Thousands of data points with descriptive link and fiber run labels can be stored in internal memory. Stored information can be selectively viewed, re-tested, or deleted from the device.

The data can also be downloaded to OWLView certification software to produce professional-looking formatted certification reports. OWLView software includes a "tri-report" option that integrates power meter certification, OTDR traces, and endface analysis results all on the same report.

APPLICATIONS

Traditional Fiber Optic Link Certification. When used with a separate stand-alone light source, CERT (certification) mode allows users to certify individual optical fibers at up to two wavelengths simultaneously. The Link Wizard in the Fiber OWL 7 uses attenuation parameters from popular cabling standards to certify fiber links, and shows a link's PASS/FAIL status right in the field.

CERT MODE

Using a meter and a source,
each individual fiber is certified separately.

SOURCE   METER

INTRODUCTION

APPLICATIONS, cont.

**Attenuation (Optical Loss) Measurements.** After a fiber cable has been installed and terminated, optical loss measurements can be used to determine if the fiber is installed according to standards and specifications. A comparison between the actual power measurement and the reference value determines how much optical power is lost through the link.

LOSS MODE

Using a meter and a source, technicians can measure the optical loss of optical fiber links.

SOURCE   METER
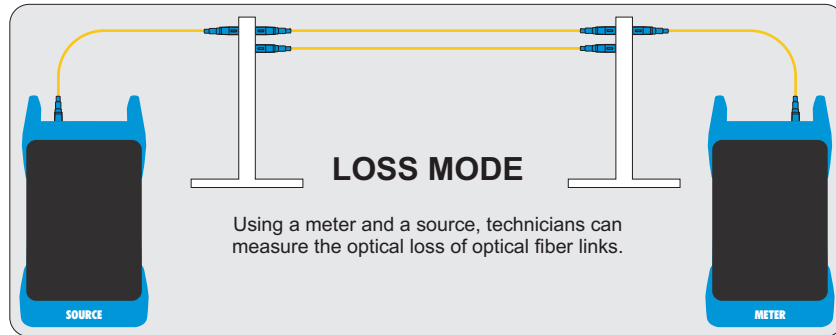
Optical Power Measurements. Optical power is an absolute measurement of the amount of light intensity; i.e. "brightness", and can be measured either at the output of a transmitter (transmit power), or at the input of a receiver (receiver sensitivity). When in OPM mode, Fiber OWL 7 certifiers can be directly attached to this equipment via a patch cord to check whether the transmitter is within the manufacturer's specified power range.

Measure transmitter power

OPTICAL POWER MEASUREMENT

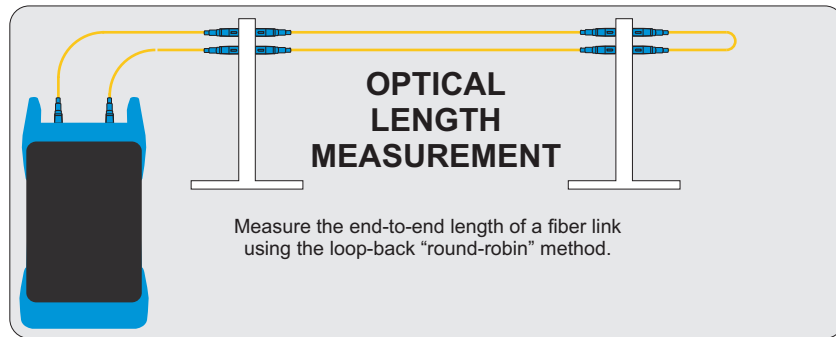Measure receiver sensitivity

METER   METER
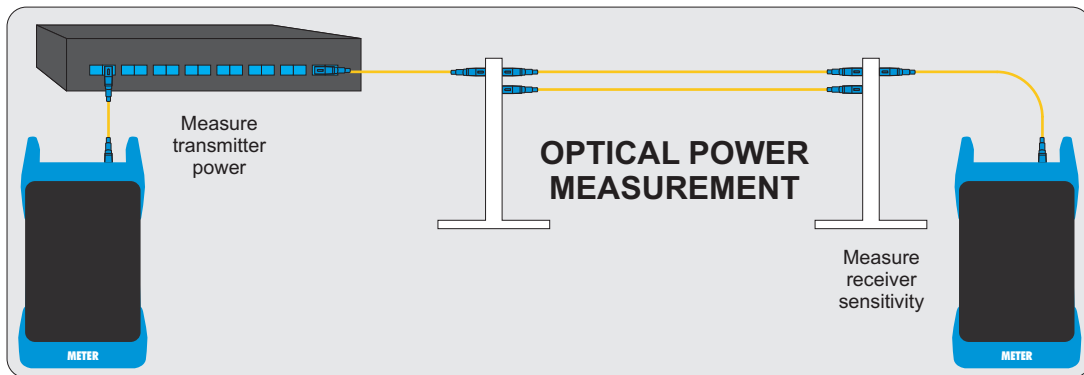
Fiber Continuity Testing. Continuity can be measured with OPM mode in the Fiber OWL 7 by placing a calibrated light source on one end of the fiber and the meter on the other end. This is also a simple way to measure the attenuation of the fiber.

FIBER CONTINUITY

Using a meter and a source, continuity can be verified.

SOURCE   METER
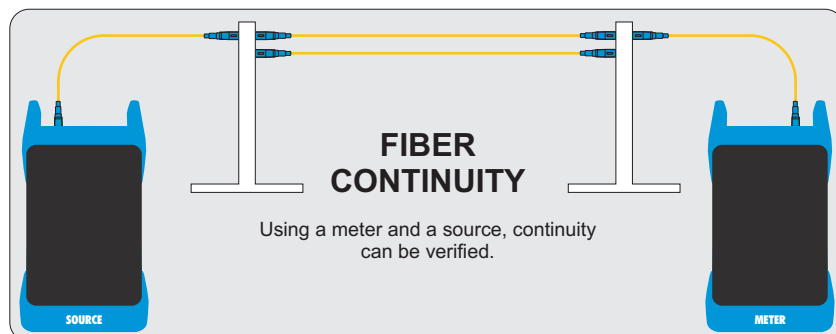
INTRODUCTION

APPLICATIONS, cont.

Optical Fiber Cable Length Measurement. Fiber OWL 7 fiber certifiers can also be used to perform a "round-robin" optical fiber length measurement. If the unit has an integrated OTDR port, length measurement is done via OTDR trace.

**OPTICAL
LENGTH
MEASUREMENT**

Measure the end-to-end length of a fiber link
using the loop-back "round-robin" method.

INTRODUCTION

PRECAUTIONS

Safety - Exercise caution when working with any optical equipment. High-intensity fiber optic laser sources output potentially dangerous high energy invisible light, and could cause serious, irreparable damage to the eye. Thus, it is recommended to **NEVER** look into the connector port of a light source or the end of a fiber.

Operational - It is important to keep connector ferrules and optical connector ports clean. If dirt, dust, and oil are allowed to build up inside connector ports, irreparable damage may occur to the optics inside the port. For best results, replace dust caps after each use.

Light Source Connector - Do NOT insert APC (Angled Physical Contact) connectors into any light source or OTDR port on your Fiber OWL 7 as this may damage the angled ferrule on the APC connector.

PRODUCT LABEL

On the back of each Fiber OWL 7 series fiber link certifier are labels similar to the one shown below containing model number, serial number, power requirements, and special cautionary information.
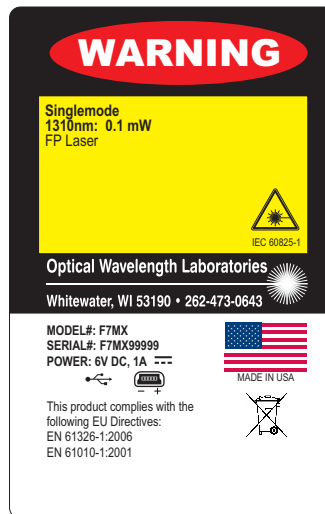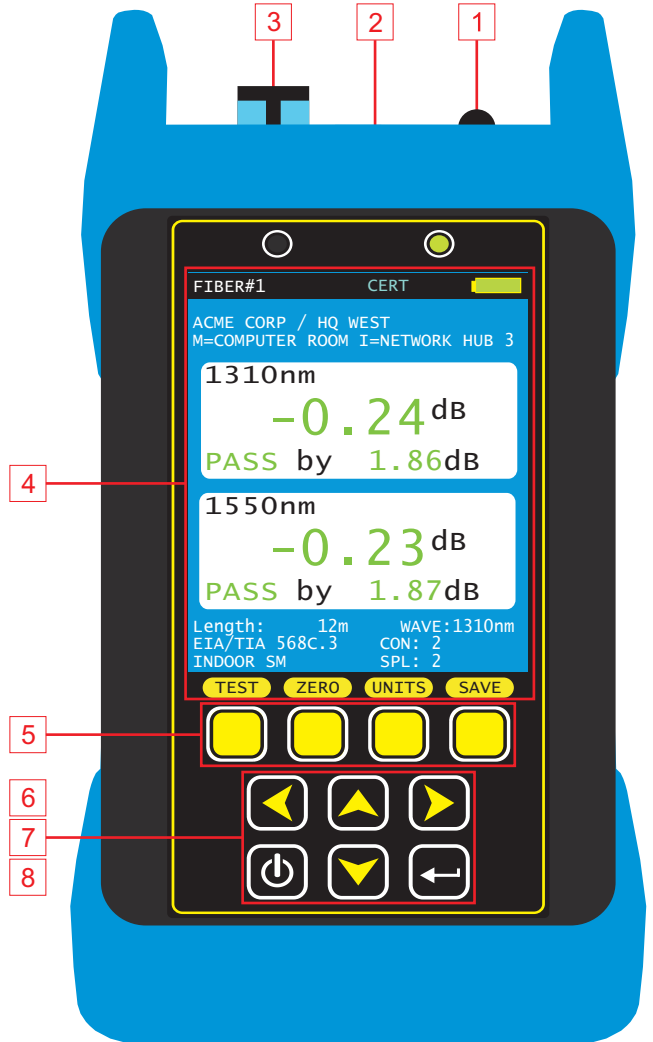
FIBER OWL 7 SERIES
OPTICAL POWER METER W/INTEGRATED LENGTH TESTER
(MODEL #s: F7X, F7V)

GENERAL FEATURES

1 **Universal Connector Port** - includes two adapter caps: 2.5mm for many popular 2.5mm ferrule connectors, including ST, SC, and FC, and 1.25mm for LC, MU, and other SFF connectors).

2 **USB Serial Download Port** - downloads stored data to a PC using the supplied USB download cable. Also used for charging re-chargeable batteries (not included).

3 **Light Source Port** - options include multimode only, multimode w/VFL, singlemode only, singlemode w/VFL, and quad multimode and singlemode. See Optical Ports Diagram below for options.

4 **High-resolution Color LCD Display**

5 ▢ - **Function keys** - activate corresponding menu options shown at the bottom of the Fiber OWL 7 LCD display

6 ◀ ▲ ▶ ▼ - **Arrow keys**

7 ↵ - **Enter key**

8 ⏻ - **Power key**

Display reads:
FIBER#1 CERT
ACME CORP / HQ WEST
M=COMPUTER ROOM I=NETWORK HUB 3
1310nm
−0.24 dB
PASS by 1.86 dB
1550nm
−0.23 dB
PASS by 1.87 dB
Length: 12m   WAVE:1310nm
EIA/TIA 568C.3   CON: 2
INDOOR SM   SPL: 2
TEST ZERO UNITS SAVE

SPECIFICATIONS

OPTICAL POWER METER PORT

Detector Type	InGaAs
Wavelengths	850, 980, 1300, 1310, 1490, 1550, 1625 nm
Measurement Range	+5 to -70 dBm
Accuracy (Uncertainty)	±0.15 dB
Display Resolution	0.01 dB
Measurement Units	dBm, dB
Connector Type	Universal (2.5 mm and 1.25 mm)
Data Storage Points	<10,000
Download Port Connection	USB
Software	OWLView
Modes of Operation	PAIR, BIDI, CERT, LOSS, OPM
Length Measurement Range	up to 25 km
Length Measurement Accuracy	±2.5 meters

INTEGRATED VFL PORT (OPTIONAL)

VFL Output Wavelength	650 nm Laser
VFL Output Power	1 mW
VFL Operating Modes	CW, Modulated

GENERAL

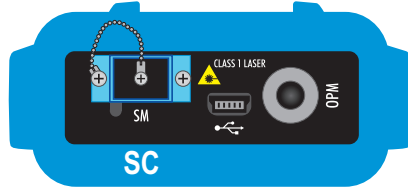|	
Display Type	2.8" Color LCD
Battery Type	Lithium Polymer
Battery Life	up to 50 hours
Auto-shutdown	Yes
Operating Temperature	-10 to 55° C
Storage Temperature	-30 to 70° C
Dimensions	2.87" x 4.42" x 1.25"
Weight	10 ounces (284 g)

FIBER OWL 7 SERIES
OPTICAL PORTS

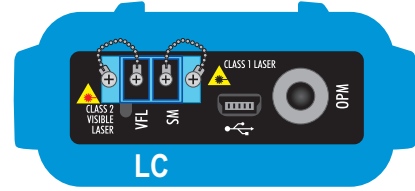### OPTICAL POWER METER W/INTEGRATED LENGTH TESTER

Model #: F7X

Stand-alone
certification
power meter

CLASS 1 LASER

SM

OPM

SC

Model #: F7V

Stand-alone
certification
power meter
w/VFL

CLASS 1 LASER

CLASS 2
VISIBLE
LASER

VFL

SM

OPM

LC
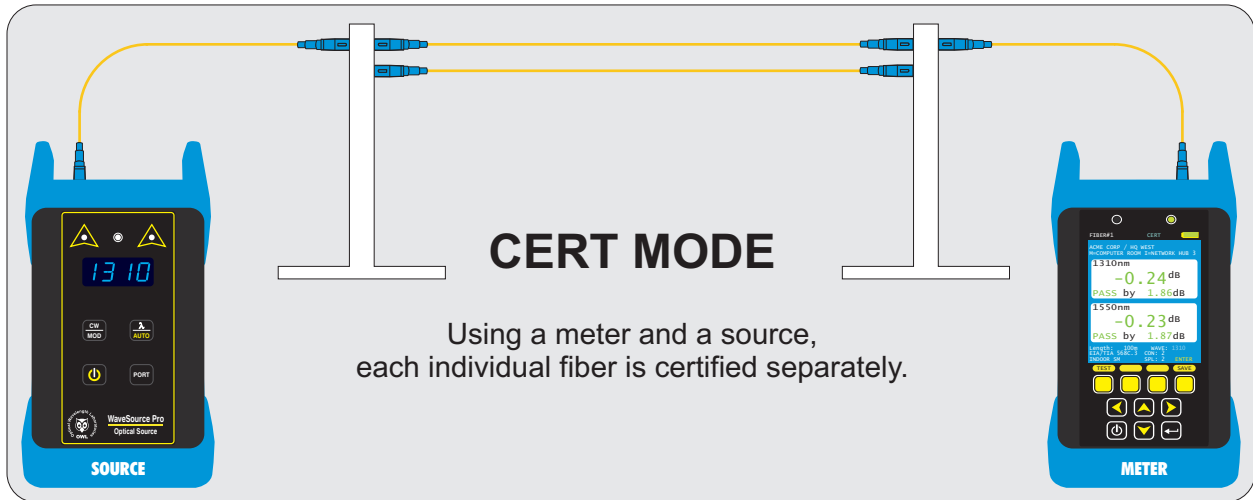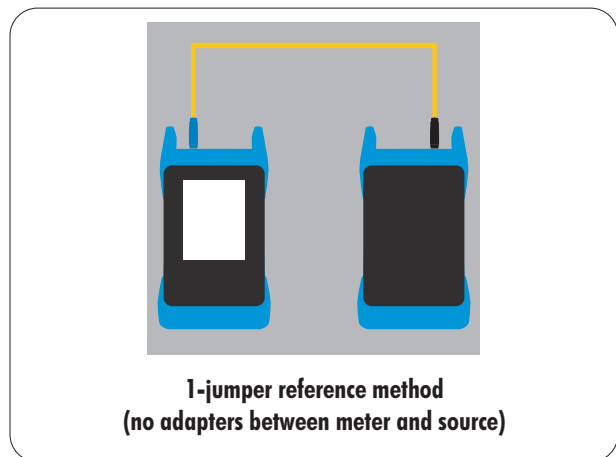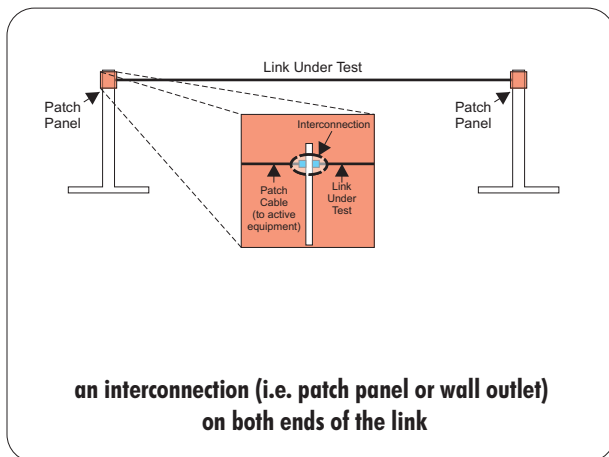
CERT MODE

OVERVIEW

CERT MODE – When used with a separate stand-alone light source, technicians can certify individual optical fibers at up to two wavelengths simultaneously. The Link Wizard in the Fiber OWL 7 uses attenuation parameters from popular cabling standards to certify fiber links, and shows a link's PASS/FAIL status right in the field.

CERT MODE

Using a meter and a source,
each individual fiber is certified separately.

CERT MODE can be performed with all models of **FIBER OWL 7 optical power meter** and standalone light source (purchased separately or as part of a certification test kit).

TEST PROCEDURE
This procedure demonstrates a test procedure that assumes that the fiber link was properly designed, installed, and tested according to industry standard requirements and recommended "best practices" as shown below:

**an interconnection (i.e. patch panel or wall outlet)
on both ends of the link**

**1-jumper reference method
(no adapters between meter and source)**

For non-standard link configurations, such as a patch panel on one end, or "home run" (i.e. no patch panels), technicians may need to adjust their test procedure and reference method accordingly.

CERT MODE

GATHER LINK SETUP INFORMATION

To make the setup process go more smoothly, have the following information ready in advance. See the appendix for a helpful Link Setup Worksheet:

LINK NAME – general information about the job (user-definable)
Project	Name of the overall project
Location	Building or geographic area where the fiber link is located
Meter End	End of the fiber link where the meter unit will be used
Source End	End of the fiber link where the light source unit will be used

FIBER TEST MODE – how to go about testing the fiber link
Test Mode	**CERT**
Standard	Cabling standard used for the certification test; most technicians will use EIA/TIA 568C.3

TEST CORD TYPE – defines inter-connection loss at the very ends of the fiber link .where the test equipment connects in (patch panels, wall outlets) – Options: REFERENCE-grade or STANDARD-grade
SOURCE PORT	refers to the type of test cord attached to the light source
OPM PORT	refers to the type of test cord attached to the optical power meter

LINK INFORMATION – physical configuration of the link under test
Fiber Type	Type of fiber used in the link under test; options may vary based on chosen cabling standard (see appendix for a fiber type diagram)
Connections	Number of inter-connections in the middle of the link under test (patch panels, other mating sleeves) NOT including the connections at the far end of the link
Splices	Number of splices in the link under test; can be either fusion or mechanical splices
Reference Method	**1-jumper reference method**

ENCIRCLED FLUX – is EF compliance required for this test: YES or NO (only required for multimode testing)
Consult cabling standard documentation or end user requirements to determine if EF compliance is required; if so, special mode controller cables will be required for setting the optical reference (aka "zeroing").

RUN NAME – naming of fiber test results within the job to uniquely identify individual fiber strands
Name	The name used to identify the group of individual fiber strands in the link
Number	The starting fiber strand number in the link. The number will be automatically incremented as the test results are saved.

TEST PROCEDURES

CERT MODE

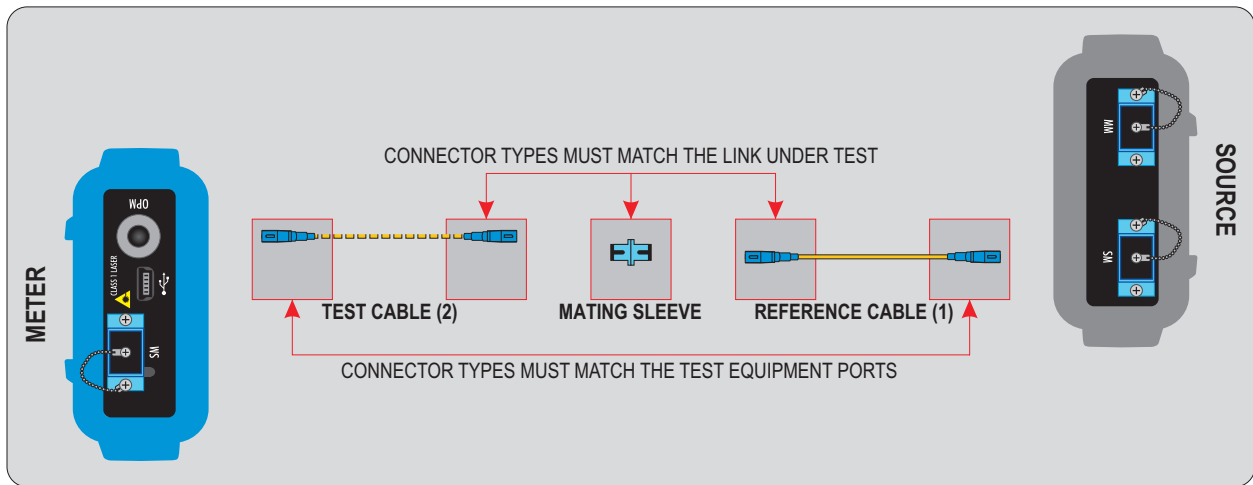## GATHER EQUIPMENT AND ACCESSORIES (SINGLEMODE)

(4) SINGLEMODE CABLES

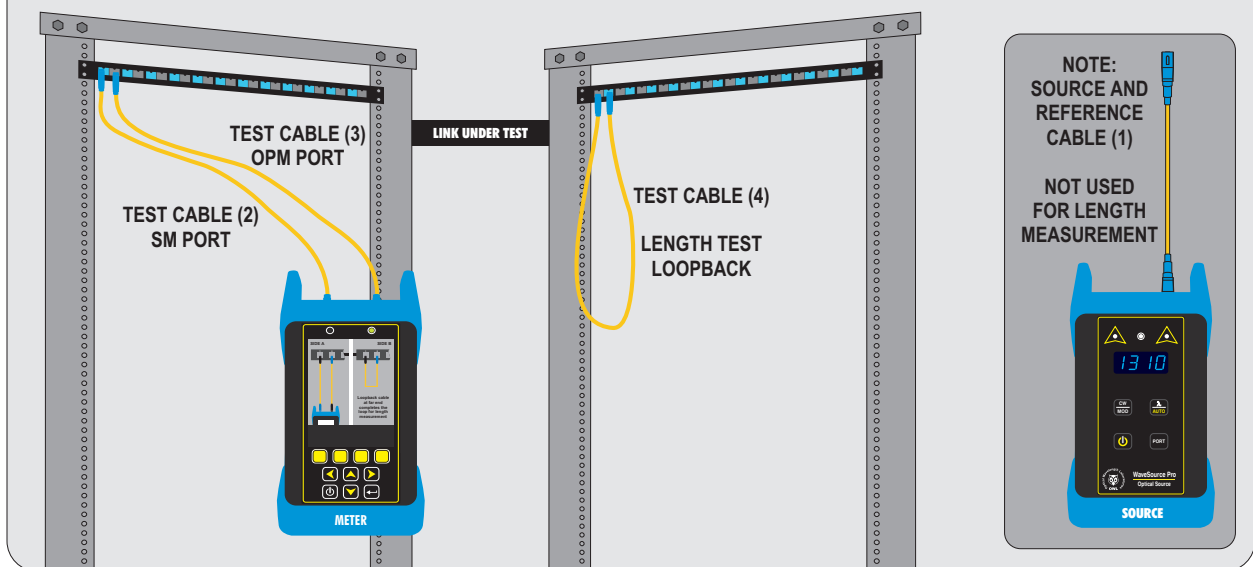**MATING SLEEVE (1)**

REFERENCE CABLE (1)
(per light source port)

TEST CABLE (2)

TEST CABLE (3)

TEST CABLE (4)

METER

OPM

CLASS 1 LASER

SM

SOURCE

WW

WS

CONNECTOR TYPES MUST MATCH THE LINK UNDER TEST

TEST CABLE (2)   MATING SLEEVE   REFERENCE CABLE (1)

CONNECTOR TYPES MUST MATCH THE TEST EQUIPMENT PORTS

ACCESSORIES REQUIRED FOR OPTICAL LENGTH MEASUREMENT

TEST CABLE (3) OPM PORT

LINK UNDER TEST

TEST CABLE (2) SM PORT

TEST CABLE (4)

LENGTH TEST LOOPBACK

NOTE: SOURCE AND REFERENCE CABLE (1)

NOT USED FOR LENGTH MEASUREMENT

METER

1310

CW MOD   AUTO

PORT

WaveSource Pro
Optical Source

SOURCE

CERT MODE

GATHER EQUIPMENT AND ACCESSORIES
(62.5/125μm MULTIMODE OM1)

(4) 62.5/125 MULTIMODE CABLES
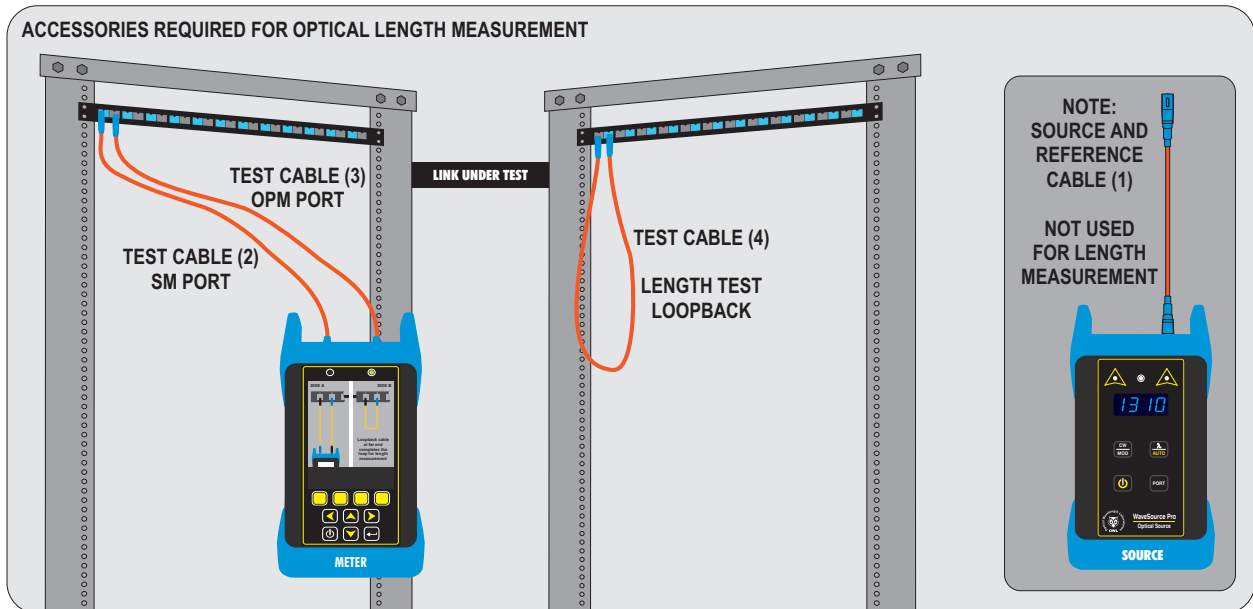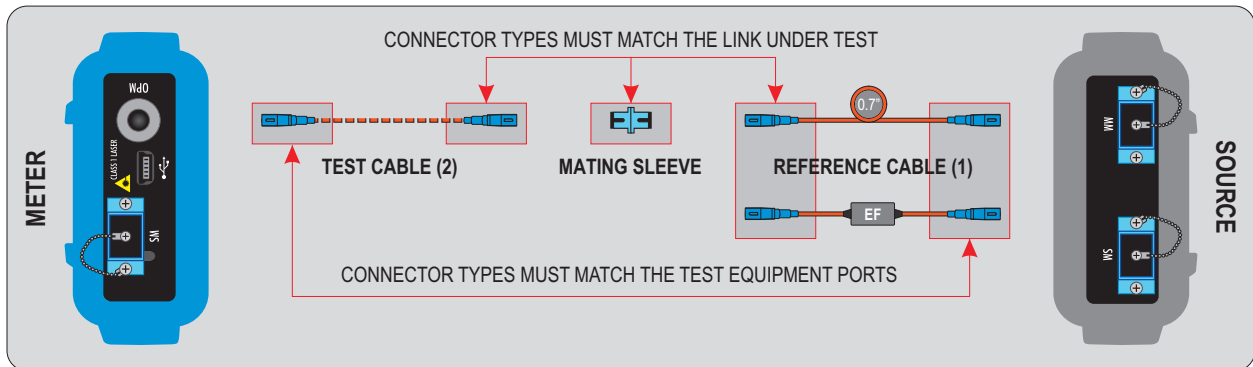
MATING SLEEVE (1)

TEST CABLE (2)

TEST CABLE (3)

TEST CABLE (4)

REFERENCE CABLE (1) & 0.7" MANDREL (1)
(per light source port)

– OR –

ENCIRCLED FLUX MODE CONTROLLER CABLE
(per light source port)

EF

CONNECTOR TYPES MUST MATCH THE LINK UNDER TEST

METER

OPM

CLASS 1 LASER

SM

TEST CABLE (2)

MATING SLEEVE

0.7"

REFERENCE CABLE (1)

EF

CONNECTOR TYPES MUST MATCH THE TEST EQUIPMENT PORTS

SOURCE

WW

WS

ACCESSORIES REQUIRED FOR OPTICAL LENGTH MEASUREMENT

TEST CABLE (3)
OPM PORT

LINK UNDER TEST

TEST CABLE (2)
SM PORT

TEST CABLE (4)

LENGTH TEST
LOOPBACK

METER

NOTE:
SOURCE AND
REFERENCE
CABLE (1)

NOT USED
FOR LENGTH
MEASUREMENT

1310

CW
MOD

AUTO

PORT

WaveSource Pro
Optical Source

SOURCE

14

CERT MODE

GATHER EQUIPMENT AND ACCESSORIES
(50/125μm MULTIMODE OM2/3/4)

(4) 50/125 MULTIMODE CABLES

MATING SLEEVE (1)

TEST CABLE (2)

TEST CABLE (3)

TEST CABLE (4)

REFERENCE CABLE (1) & 0.7" MANDREL (1)
(per light source port)

– OR –

ENCIRCLED FLUX MODE CONTROLLER CABLE
(per light source port)

EF
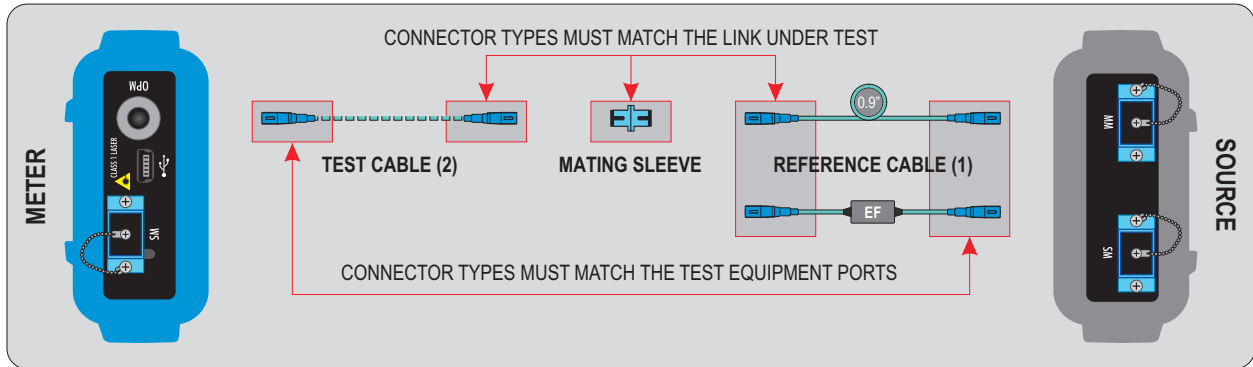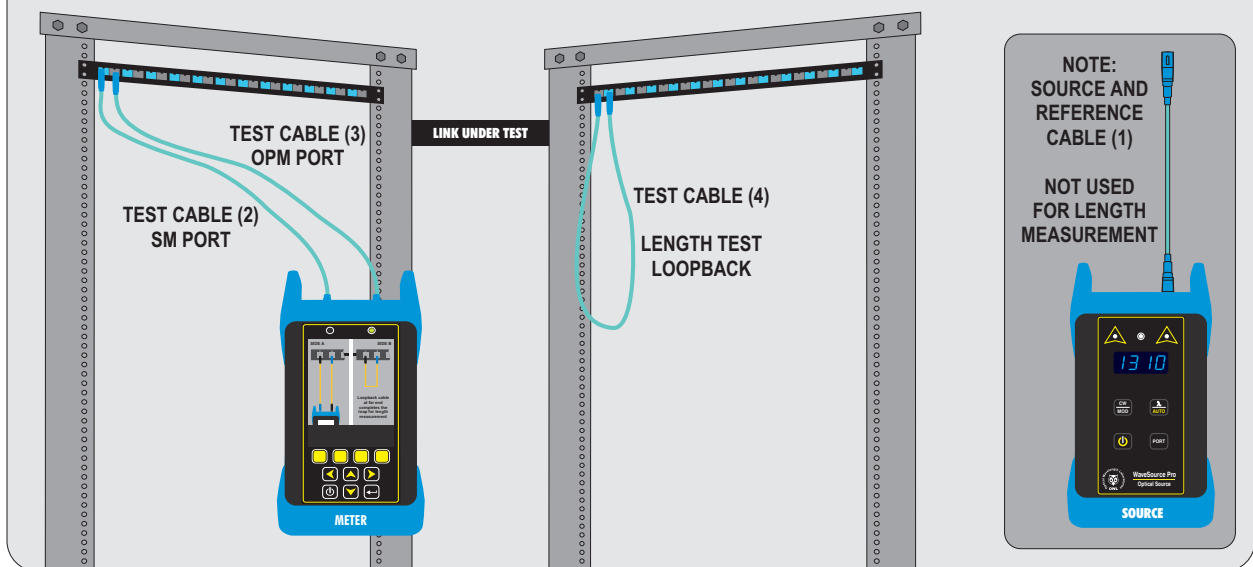

CONNECTOR TYPES MUST MATCH THE LINK UNDER TEST

METER

OPM

CLASS 1 LASER

SM

TEST CABLE (2)

MATING SLEEVE

0.9"

REFERENCE CABLE (1)

EF

CONNECTOR TYPES MUST MATCH THE TEST EQUIPMENT PORTS

SOURCE

WW

WS

ACCESSORIES REQUIRED FOR OPTICAL LENGTH MEASUREMENT

LINK UNDER TEST

TEST CABLE (3)
OPM PORT

TEST CABLE (2)
SM PORT

TEST CABLE (4)

LENGTH TEST
LOOPBACK

NOTE:
SOURCE AND
REFERENCE
CABLE (1)

NOT USED
FOR LENGTH
MEASUREMENT

METER

13 10

CW/MOD

AUTO

PORT

WaveSource Pro
Optical Source

SOURCE

CERT MODE

CONFIGURE JOB PARAMETERS

1 Power on the Fiber OWL 7.

2 Press ⊠ to **CREATE NEW LINK**, then ▶ to start link configuration.

STARTUP MENU
RESUME TESTING
▶ CREATE NEW LINK ◀
LOAD STORED LINK
OPM MODE
MAIN MENU

◀ BACK ▶ SELECT ⏻ EXIT

start link configuration

3 **LINK INFORMATION**
⊠ ⊡ to navigate the entry fields, and ▶ to edit the contents of the selected field. Press NEXT to continue.

LINK NAME
PROJECT
ACME_CORP
LOCATION
HQ WEST
METER/MASTER END 'M'
MC
SOURCE/REMOTE END 'R'
WA10

NEXT BACK HELP

4 **FIBER TEST MODE - CERT** mode
⊠ ⊡ to navigate the entry fields, and ▶ to select the appropriate setting. Press NEXT to continue.

FIBER TEST MODE
TEST MODE CERT
STANDARD
EIA/TIA 568C.3
Note: In LOSS mode the selected
standard is ignored and no
Pass/Fail results are shown.
SOURCE PORT TEST CORDS
STANDARD
OPM PORT TEST CORDS
STANDARD

NEXT BACK HELP

CERT MODE

CONFIGURE JOB PARAMETERS

5 **LINK PARAMETERS**
🔽 🔼 to navigate the entry fields, and ▶ to edit the contents of the selected field. Press NEXT to continue.

LINK INFORMATION
FIBER TYPE
INDOOR SM
CONNECTIONS: 000
SPLICES: 000
REFERENCE METHOD: 1 JUMPER

NEXT   BACK   HELP

6 **ENCIRCLED FLUX** *(multimode only)*
select YES if Encircled Flux compliance is required; select NO if EF compliance is not required.

Encircled Flux Mode Controller Cable
EF
Controlling the output from a multimode light source port...
...produces a specific modal output pattern at the optical power meter...
...ensuring consistent test results across a broad range of multimode light sources

Will this link be tested using Encircled Flux Compliant methods?
YES   NO

7 **RUN NAME**
🔽 🔼 to navigate the entry fields, and ▶ to edit the contents of the selected field. Press NEXT to continue.

RUN NAME
NAME
FIBER#
NUMBER
1

NEXT   BACK   HELP

8 Review the **LINK INFORMATION**. If the information is correct, SAVE to continue.

LINK INFORMATION
Project: ACME CORP
Location: HQ WEST
Meter End: MC
Source End: WA10
Test Mode: CERT
Standard: EIA/TIA 568.3-D
Fiber Type: Indoor SM
Connections: 2
Splices: 2
Reference Method: 1 Jumper
Encircled Flux Compliant: No
Fiber Group: FIBER#
Fiber Number: 1

SAVE   BACK

TEST PROCEDURES

CERT MODE

SET REFERENCE

9 On the METER, YES to begin the SET REFERENCE procedure.

Setting a reference
(aka "zeroing")

Sets a baseline optical power
level between a power meter
and light source prior to
taking measurements.

The difference between this
reference level and the
link power measurement
is called optical loss.

You must set a zero reference
before testing. Do you wish
to do it now?

YES   NO

10 Power ON the light source to be used for the test.

1310

CW
MOD   AUTO

PORT

WaveSource Pro
Optical Source
OWL

11 Connect the appropriate reference cable as shown between the OPM port on the Fiber OWL 7 and the light source port being used for this test, then press any key on the meter to proceed.

Using your test reference
cables, please connect the meter
and source as shown and
press any key to proceed.

1310

CW
MOD   AUTO

PORT

WaveSource Pro
Optical Source
OWL

CERT MODE

SET REFERENCE

12 Set the light source to the wavelength shown or AUTO mode if the source is an OWL source that is capable of AUTO mode (which allows simultaneous dual-wavelength testing).
Press **TEST** to set the **SOURCE REFERENCE POWER**.

13 After a few seconds, the **SOURCE REFERENCE POWER** will be shown. Press **DONE** when all references have been set.

NOTE: if not using an AUTO source and a second wavelength is required, connect a separate reference cable between the testers and follow the procedure for the second wavelength.

CERT MODE

SET REFERENCE

14 This slide explains testing the additional test cable. Press YES to continue.

15 Connect a mating sleeve to the end of each reference cable, then plug an additional test cable as shown. Press any key on the meter to proceed.

CERT MODE

SET REFERENCE

16   Press **TEST** to measure the **REFERENCE CABLE LOSS.**

17   After a few seconds, the **REFERENCE CABLE LOSS** will be shown. (NOTE: If Loss exceeds Maximum, it is recommended to replace the additional test cable and/or mating sleeve.)
Press **DONE** to record the **REFERENCE CABLE LOSS** and continue.

CERT MODE

MEASURE FIBER LENGTH

Fiber length is required for the meter to correctly calculate the PASS/FAIL link budget (fiber loss + connection loss + splice loss). If no length is entered, the link budget will be lower than it should be because the fiber loss value will be 0.0 dB, resulting in potentially false FAIL results when the link may be perfectly fine to begin with.

18 The testers are now ready to take measurements. Press YES on the meter to start testing the fiber link at this time.
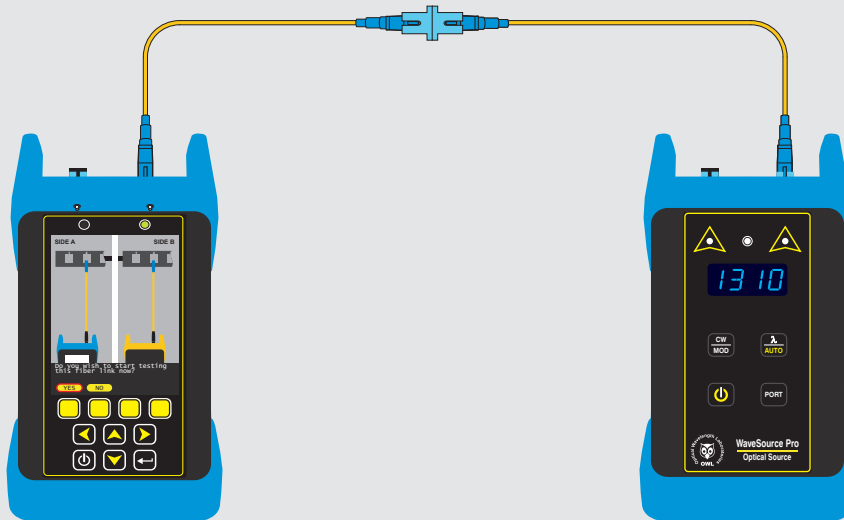
19 Remove the mating sleeve from between the reference cable and test cable.
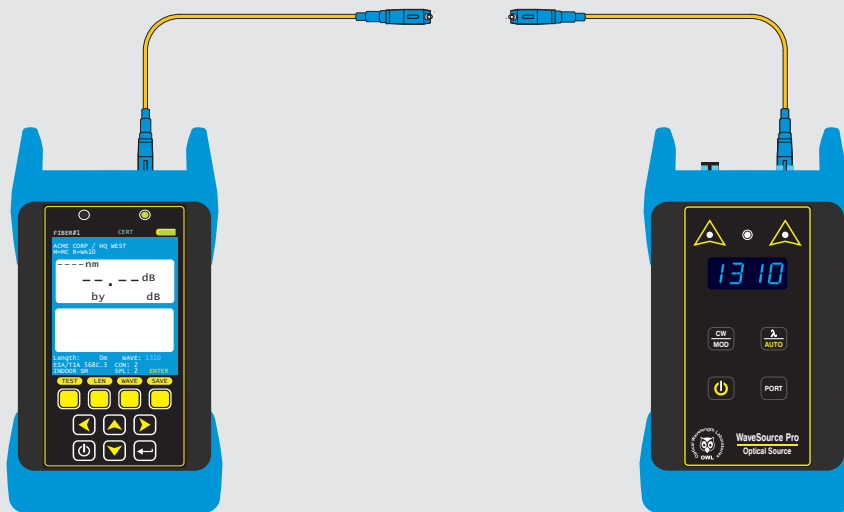
CERT MODE

MEASURE FIBER LENGTH

20 Remove the mating sleeve from between the reference cable and test cable, then connect a second additional test cable to the OPM port on the meter.
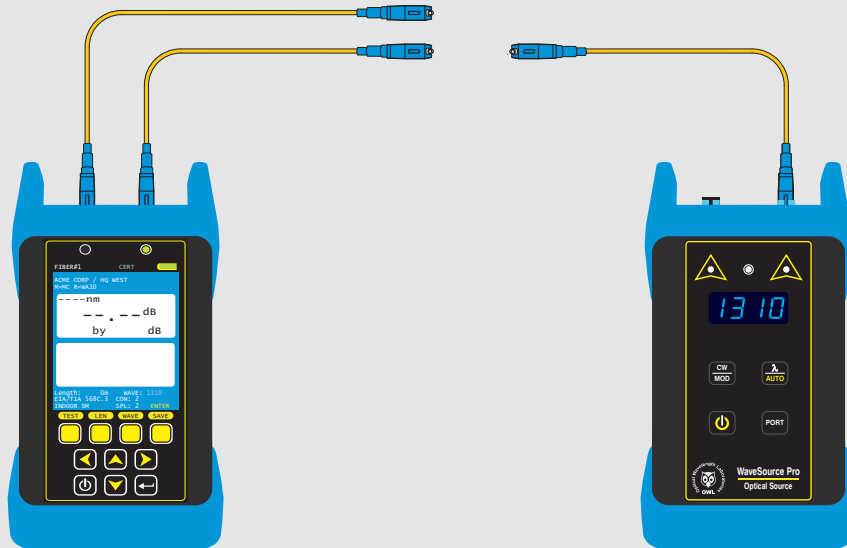
21 With both test cables still attached, take the METER to its assigned location. Take the light source to its assigned location along with a separate additional test cable.
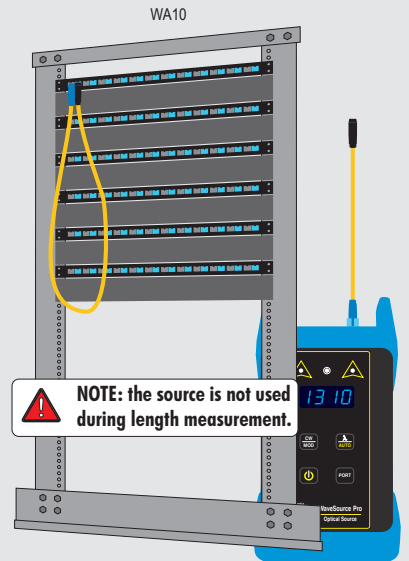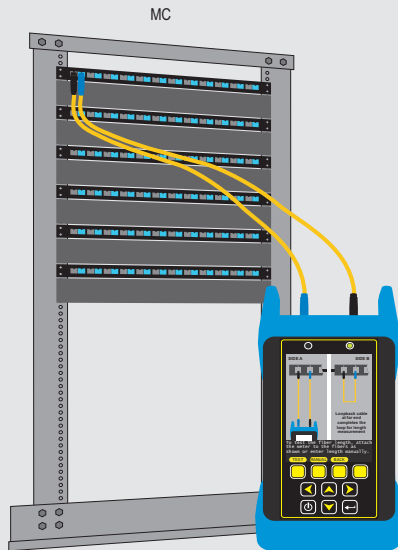
MC   WA10
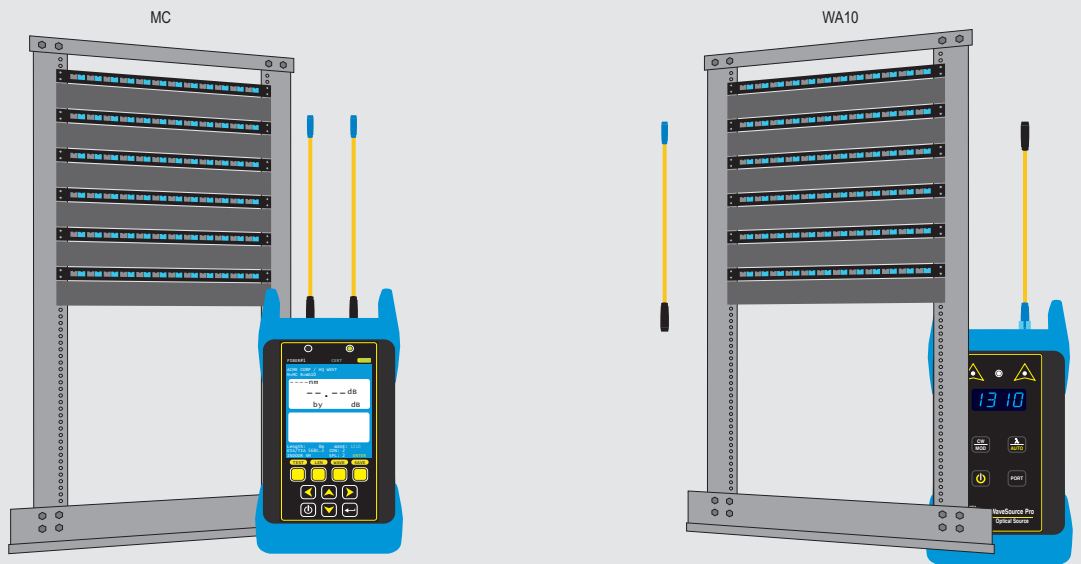
CERT MODE

MEASURE FIBER LENGTH

22 Press **TEST** on the **METER** to initiate the optical length measurement.

MC

WA10

NOTE: the source is not used during length measurement.

23 Press **LENGTH** on the **METER.** Connect the meter cables into a pair of fibers, then connect the third additional cable to the same pair on the far end of the link as shown on the meter display.
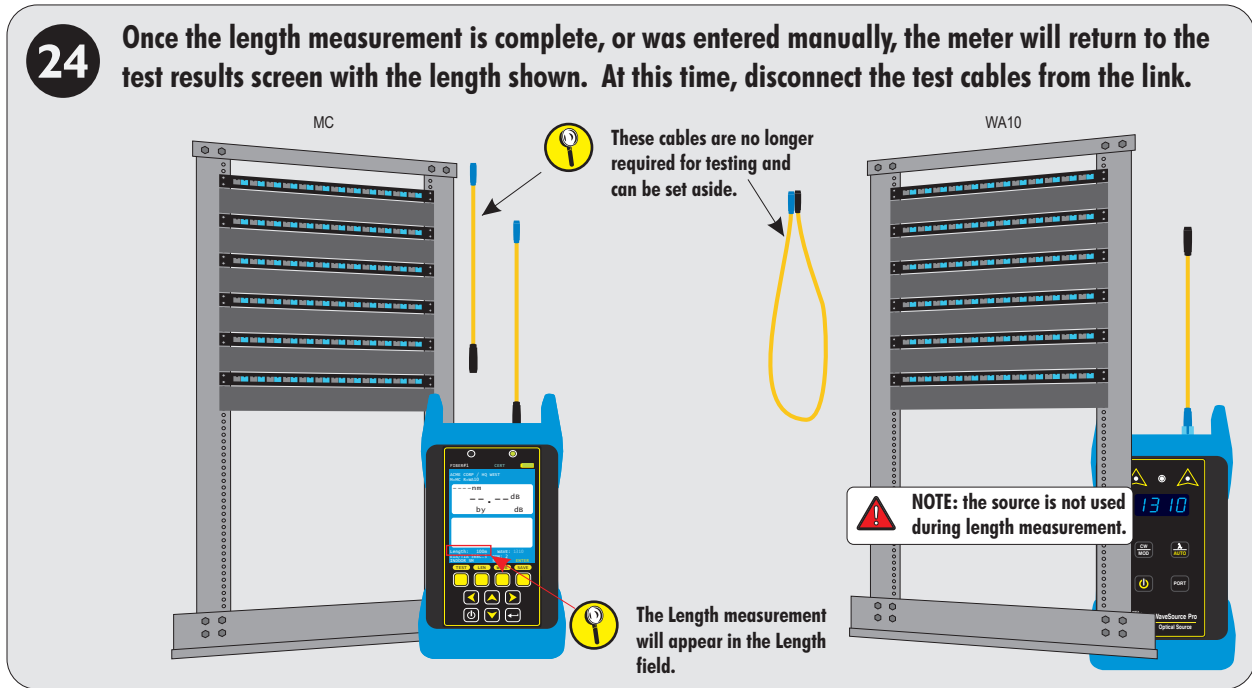
MC

WA10

NOTE: the source is not used during length measurement.
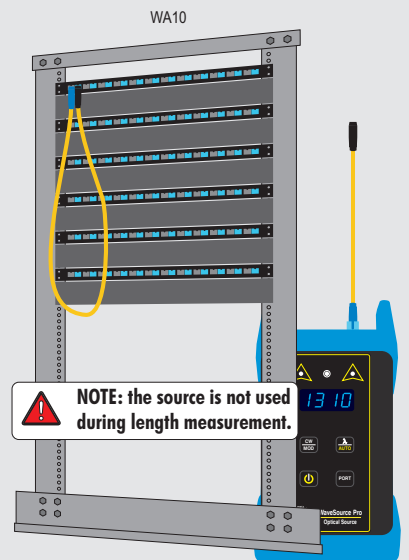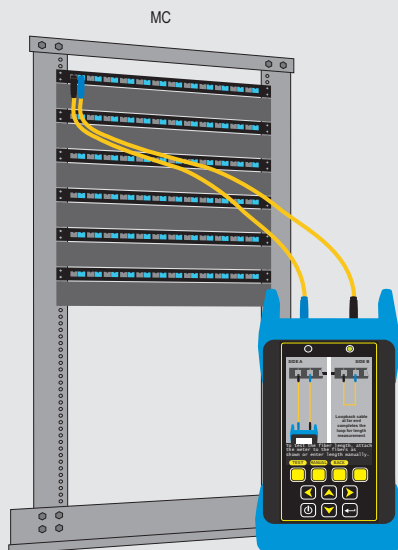
CERT MODE

MEASURE FIBER LENGTH

24 Once the length measurement is complete, or was entered manually, the meter will return to the test results screen with the length shown. At this time, disconnect the test cables from the link.

MC

These cables are no longer required for testing and can be set aside.

WA10

NOTE: the source is not used during length measurement.

The Length measurement will appear in the Length field.

NOTE: as an option, the fiber length may be entered manually instead of connecting the meter and loopback cable to the link under test.

To enter the fiber length in meters manually, press MANUAL. For example, if the fiber length is 100 meters, enter the number '100'.

When the number has been entered, press DONE to return to the test results screen.

Enter fiber length in meters:

```
100█
```

```
ABCDEFGHIJKLM
NOPQRSTUVWXYZ
0123456789:;<
```

Use arrows to highlight letter then press the enter key. Tap the power button to abort.

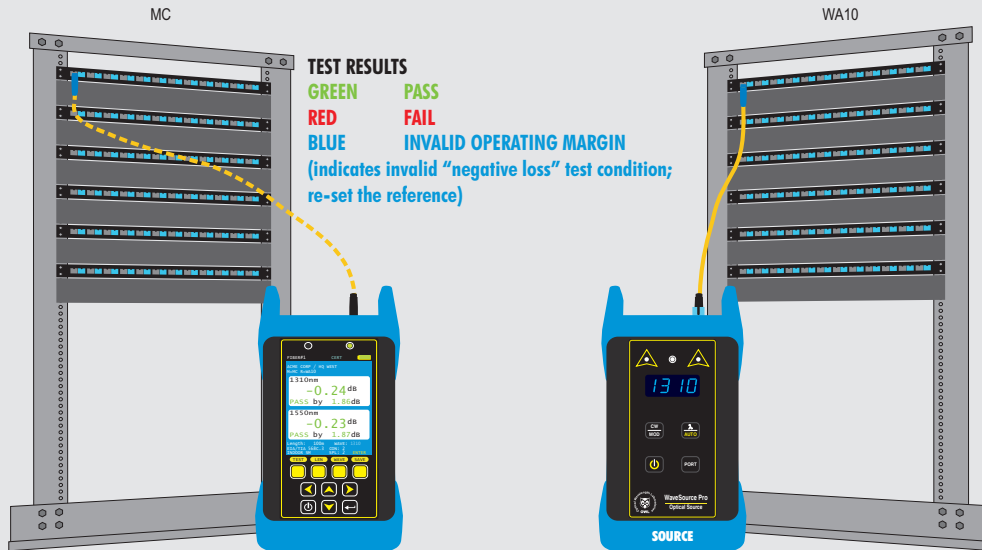| <-- | SHIFT | SPACE | DONE |

CERT MODE

TAKE READINGS AND STORE TEST RESULTS

To reset the reference during testing, press the ENTER key until the ZERO button appears in the menu. Press ZERO, then follow steps ❾ through ⓱.

25 Connect the METER and source into the first fiber in the link under test as shown, then press TEST. After a few seconds, the test reading(s) will appear on the screen.

MC   WA10

TEST RESULTS
GREEN PASS
RED FAIL
BLUE INVALID OPERATING MARGIN
(indicates invalid "negative loss" test condition; re-set the reference)

26 Press SAVE to store the test result, then SAVE again at the RUN NAME screen (run name can be changed if necessary).

MC   WA10
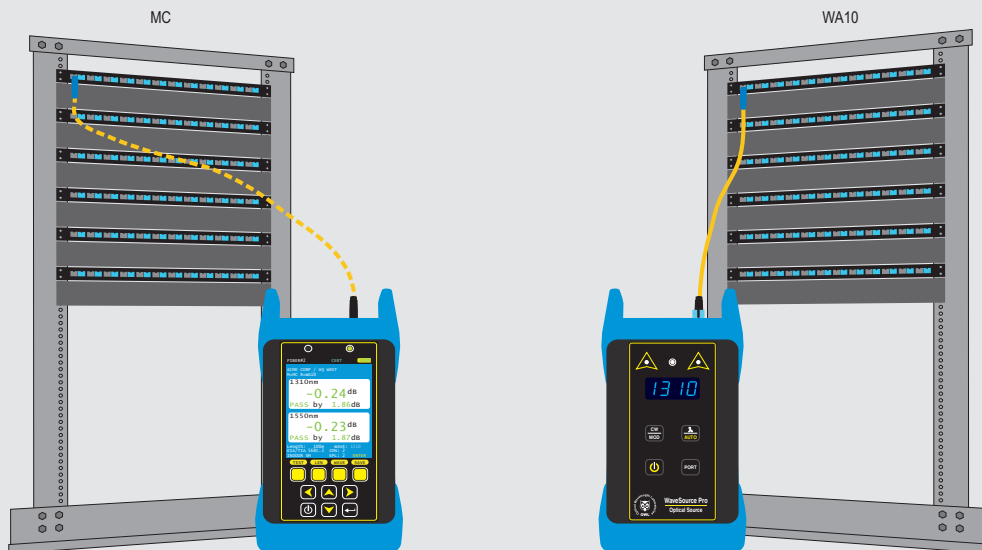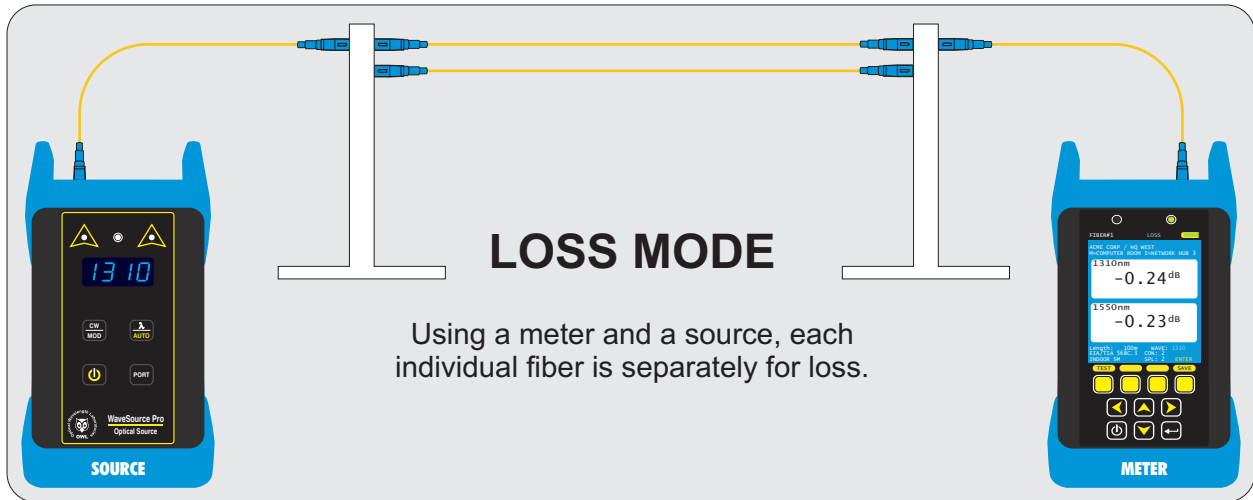
REPEAT STEPS ㉕ THROUGH ㉖ FOR EACH SUBSEQUENT FIBER TO BE TESTED.
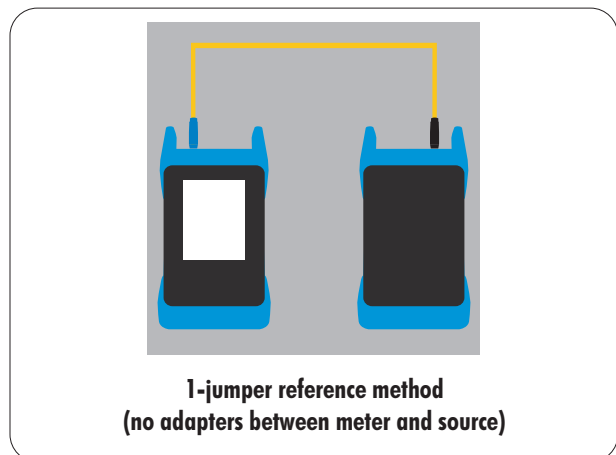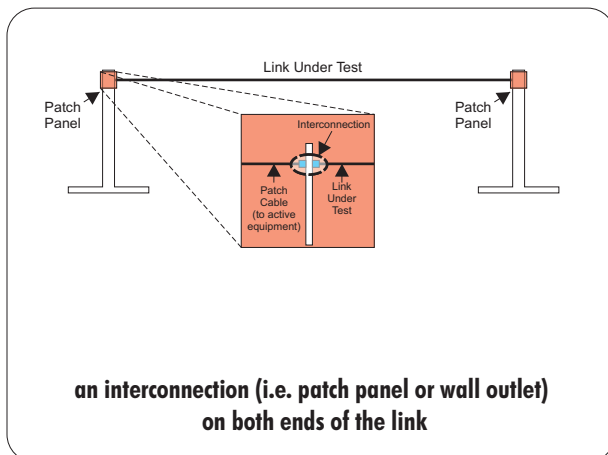
LOSS MODE

OVERVIEW

LOSS MODE – After a fiber cable has been installed and terminated, optical loss measurements can be used to measure the quality of a fiber link. A comparison between the actual power measurement and the reference value determines how much optical power is lost through the link.

LOSS MODE

Using a meter and a source, each individual fiber is separately for loss.

LOSS MODE can be performed with all models of **FIBER OWL 7 optical power meter** and standalone light source (purchased separately or as part of a certification test kit).

TEST PROCEDURE

This procedure demonstrates a test procedure that assumes that the fiber link was properly designed, installed, and tested according to industry standard requirements and recommended "best practices" as shown below:

an interconnection (i.e. patch panel or wall outlet) on both ends of the link

1-jumper reference method (no adapters between meter and source)

For non-standard link configurations, such as a patch panel on one end, or "home run" (i.e. no patch panels), technicians may need to adjust their test procedure and reference method accordingly.

TEST PROCEDURES

LOSS MODE

GATHER LINK SETUP INFORMATION

To make the setup process go more smoothly, have the following information ready in advance. See the appendix for a helpful Link Setup Worksheet:

LINK NAME – general information about the job (user-definable)
Project	Name of the overall project
Location	Building or geographic area where the fiber link is located
Meter End	End of the fiber link where the meter unit will be used
Injector End	End of the fiber link where the light source unit will be used

FIBER TEST MODE – how to go about testing the fiber link
Test Mode	**LOSS**
Standard	not required, since LOSS MODE does not determine PASS/FAIL

 TEST CORD TYPE – defines inter-connection loss at the very ends of the fiber link .where the test equipment connects in (patch panels, wall outlets) – Options: REFERENCE-grade or STANDARD-grade
SOURCE PORT	refers to the type of test cord attached to the light source
OPM PORT	refers to the type of test cord attached to the optical power meter

LINK INFORMATION – physical configuration of the link under test
Fiber Type	Type of fiber used in the link under test; options may vary based on chosen cabling standard (see appendix for a fiber type diagram)
Connections	Number of inter-connections in the middle of the link under test (patch panels, other mating sleeves) NOT including the connections at the far end of the link
Splices	Number of splices in the link under test; can be either fusion or mechanical splices
Reference Method	**1-jumper reference method**

ENCIRCLED FLUX – is EF compliance required for this test: YES or NO (only required for multimode testing)
Consult cabling standard documentation or end user requirements to determine if EF compliance is required; if so, special mode controller cables will be required for setting the optical reference (aka "zeroing").

RUN NAME – naming of fiber test results within the job to uniquely identify individual fiber strands
Name	The name used to identify the group of individual fiber strands in the link
Number	The starting fiber strand number in the link. The number will be automatically incremented as the test results are saved.

LOSS MODE

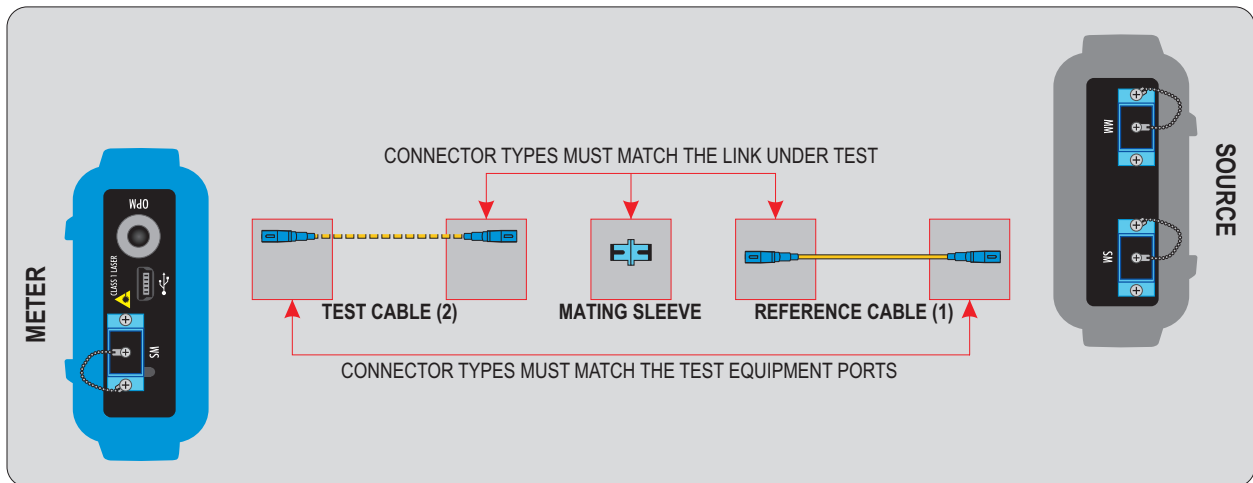## GATHER EQUIPMENT AND ACCESSORIES (SINGLEMODE)

(2) SINGLEMODE CABLES

MATING SLEEVE (1)

REFERENCE CABLE (1)
(per light source port)

TEST CABLE (2)

CONNECTOR TYPES MUST MATCH THE LINK UNDER TEST

METER

OPM

CLASS 1 LASER

SM

SOURCE

WW

WS

TEST CABLE (2)   MATING SLEEVE   REFERENCE CABLE (1)

CONNECTOR TYPES MUST MATCH THE TEST EQUIPMENT PORTS

TEST PROCEDURES

LOSS MODE

GATHER EQUIPMENT AND ACCESSORIES
(62.5/125μm MULTIMODE OM1)

(2) 62.5/125 MULTIMODE CABLES   MATING SLEEVE (1)   TEST CABLE (2)
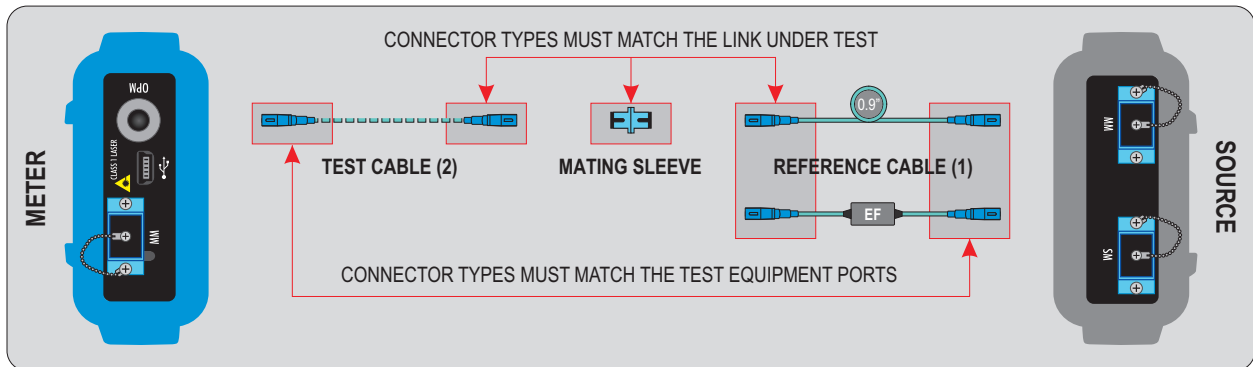
REFERENCE CABLE (1)   &   0.7" MANDREL (1)
(per light source port)

– OR –

ENCIRCLED FLUX MODE CONTROLLER CABLE
(per light source port)

EF

CONNECTOR TYPES MUST MATCH THE LINK UNDER TEST

METER

OPM

CLASS 1 LASER

MM

TEST CABLE (2)   MATING SLEEVE   REFERENCE CABLE (1)

0.7"

EF

CONNECTOR TYPES MUST MATCH THE TEST EQUIPMENT PORTS

SOURCE

WW

WS

LOSS MODE

GATHER EQUIPMENT AND ACCESSORIES
(50/125μm MULTIMODE OM2/3/4)

(2) 50/125 MULTIMODE CABLES

MATING SLEEVE (1)

TEST CABLE (2)

REFERENCE CABLE (1)   &   **0.7" MANDREL (1)**
(per light source port)

– OR –

ENCIRCLED FLUX MODE CONTROLLER CABLE
(per light source port)

EF

CONNECTOR TYPES MUST MATCH THE LINK UNDER TEST

METER

OPM

CLASS 1 LASER

MM

TEST CABLE (2)   MATING SLEEVE   REFERENCE CABLE (1)

0.9"

EF

CONNECTOR TYPES MUST MATCH THE TEST EQUIPMENT PORTS

SOURCE

WW

WS

TEST PROCEDURES

LOSS MODE

CONFIGURE JOB PARAMETERS

1 Power on the Fiber OWL 7.

2 Press ▼ to **CREATE NEW LINK**, then ▶ to start link configuration.

```
STARTUP MENU
   RESUME TESTING
 ▶ CREATE NEW LINK ◀
   LOAD STORED LINK
      OPM MODE
      MAIN MENU

◀ BACK   ▶ SELECT  ⏻ EXIT

start link configuration
```

3 **LINK INFORMATION**
▼ ▲ to navigate the entry fields, and ▶ to edit the contents of the selected field. Press NEXT to continue.

```
        LINK NAME
PROJECT
 ACME_CORP
LOCATION
 HQ WEST
METER/MASTER END 'M'
 MC
SOURCE/REMOTE END 'R'
 WA10

 NEXT   BACK   HELP
```

4 **FIBER TEST MODE**
▼ ▲ to navigate the entry fields, and ▶ to select the appropriate setting. Press NEXT to continue.

```
      FIBER TEST MODE
TEST MODE   LOSS
         STANDARD
 EIA/TIA 568C.3
Note: In LOSS mode the selected
standard is ignored and no
Pass/Fail results are shown.
   SOURCE PORT TEST CORDS
    STANDARD
   OPM PORT TEST CORDS
    STANDARD
 NEXT   BACK   HELP
```
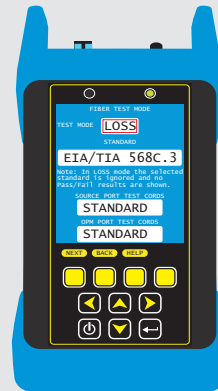
💡 **NOTE: STANDARD is not used for LOSS mode.**

LOSS MODE

CONFIGURE JOB PARAMETERS

5 **LINK PARAMETERS**
▽ △ to navigate the entry fields, and
▷ to edit the contents of the selected field. Press NEXT to continue.

LINK INFORMATION
FIBER TYPE
Indoor SM
CONNECTIONS: 2
SPLICES: 2
REFERENCE
METHOD: 1 JUMPER

NEXT BACK HELP

6 **ENCIRCLED FLUX** *(multimode only)*
select YES if Encircled Flux compliance is required; select NO if EF compliance is not required.

Encircled Flux Mode Controller Cable
EF
Controlling the output from a multimode light source port...
...produces a specific modal output pattern at the optical power meter...
...ensuring consistent test results across a broad range of multimode light sources

Will this link be tested using Encircled Flux compliant methods?
YES NO

7 **RUN NAME**
▽ △ to navigate the entry fields, and
▷ to edit the contents of the selected field. Press NEXT to continue.

RUN NAME
NAME
FIBER#
NUMBER
1

NEXT BACK HELP

8 Review the **LINK INFORMATION**. If the information is correct, SAVE to continue.

LINK INFORMATION
Project: ACME CORP
Location: HQ WEST
Meter End: MC
Source End: WA10
Test Mode: LOSS
Standard: EIA/TIA 568C.3
Fiber Type: Indoor SM
Connections: 2
Splices: 2
Reference Method: 1 Jumper
Encircled Flux Compliant: No
Source jumper: STANDARD
Meter jumper: STANDARD
Fiber Group: FIBER#
Fiber Number: 1

SAVE BACK

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An Interworld Highway, LLC Company

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LOSS MODE

CONFIGURE JOB PARAMETERS

9 On the METER, YES to begin the SET REFERENCE procedure.

Setting a reference
(aka "zeroing")

Sets a baseline optical power
level between a power meter
and light source prior to
taking measurements.

The difference between this
reference level and the
link power measurement
is called optical loss.

You must set a zero reference
before testing. Do you wish
to do it now?

YES   NO

10 Power ON the light source to be used for the test.

1310

CW
MOD   AUTO

         PORT

WaveSource Pro
Optical Source
OWL

11 Connect the appropriate reference cable as shown between the OPM port on the Fiber OWL 7 and the light source port being used for this test, then press any key on the meter to proceed.

Using your test reference
cables, please connect the meter
and source as shown and
press any key to proceed.

1310

CW
MOD   AUTO

         PORT

WaveSource Pro
Optical Source
OWL

LOSS MODE

SET REFERENCE

12 Set the light source to the wavelength shown or AUTO mode if the source is an OWL source that is capable of AUTO mode (which allows simultaneous dual-wavelength testing).
Press **TEST** to set the **SOURCE REFERENCE POWER.**

13 After a few seconds, the **SOURCE REFERENCE POWER** will be shown. Press **DONE** when all references have been set.

NOTE: if not using an AUTO source and a second wavelength is required, connect a separate reference cable between the testers and follow the procedure for the second wavelength.

LOSS MODE

SET REFERENCE

14 This slide explains testing the additional test cable. Press YES to continue.

15 Connect a mating sleeve to the end of each reference cable, then plug an additional test cable as shown. Press any key on the meter to proceed.

LOSS MODE

SET REFERENCE

16 Press **TEST** to measure the **REFERENCE CABLE LOSS.**

17 After a few seconds, the **REFERENCE CABLE LOSS** will be shown. (NOTE: If Loss exceeds Maximum, it is recommended to replace the additional test cable and/or mating sleeve.)
Press **DONE** to record the **REFERENCE CABLE LOSS** and continue.

TEST PROCEDURES

LOSS MODE

TAKE READINGS AND STORE TEST RESULTS

To add the fiber length value to **LOSS MODE** stored readings, follow the procedure in the **LINK LENGTH** section.

18 The testers are now ready to take measurements. Press YES on the meter to start testing the fiber link at this time.

19 Connect the **METER** and source into the first fiber in the link under test as shown, then press **TEST.**

COMPUTER ROOM

NETWORK HUB 3

LOSS MODE

TAKE READINGS AND STORE TEST RESULTS

To reset the reference during testing, press the **ENTER** key until the **ZERO** button appears in the menu. Press **ZERO**, then follow steps **❾** through **⓱**.

---

20 After a few seconds, the test reading(s) will appear on the screen.

COMPUTER ROOM

NETWORK HUB 3

TEST RESULTS
BLACK   NORMAL
BLUE   INVALID OPERATING MARGIN
(indicates invalid "negative loss" test condition; re-set the reference)

---
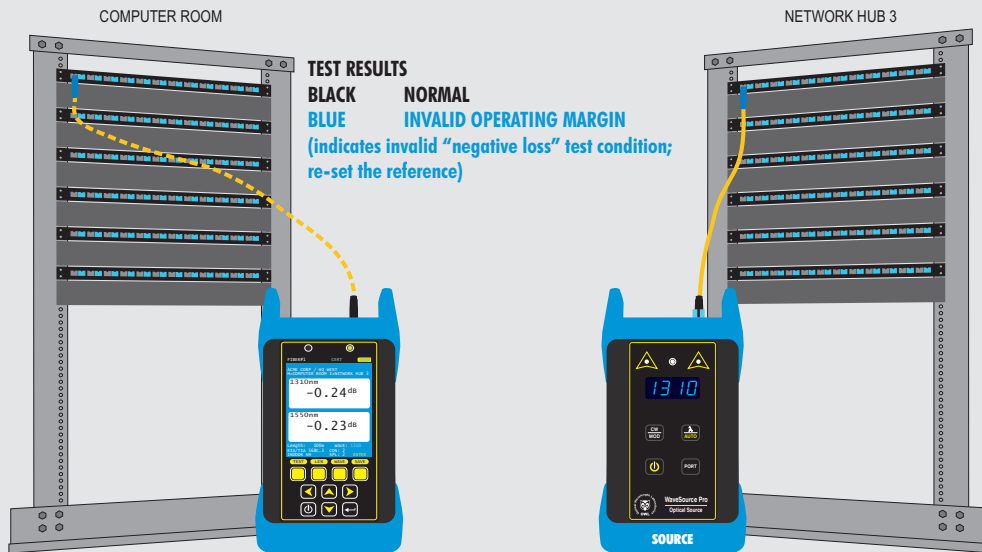
21 Press SAVE to store the test result, then SAVE again at the RUN NAME screen (run name can be changed if necessary).

COMPUTER ROOM

NETWORK HUB 3
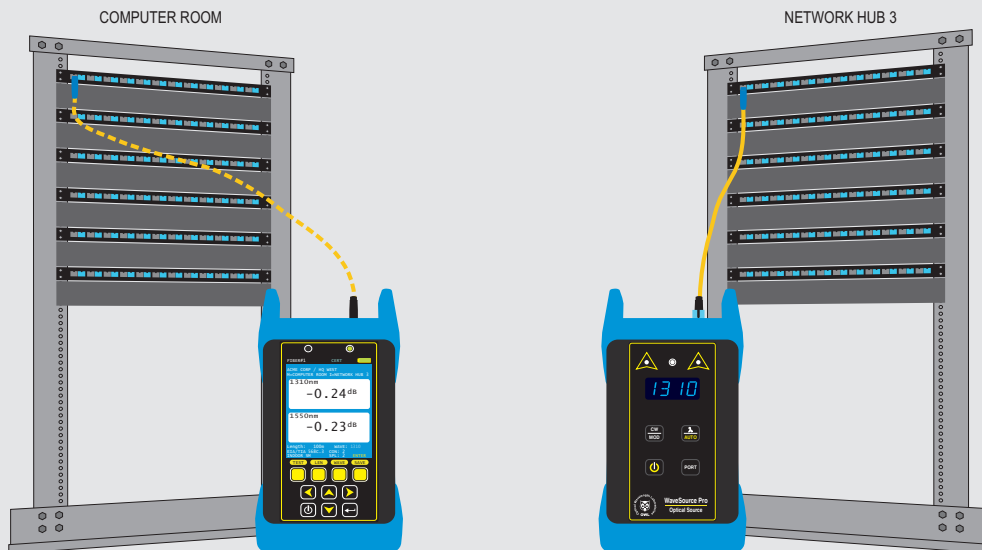
REPEAT STEPS ⓲ THROUGH ㉑ FOR EACH SUBSEQUENT FIBER TO BE TESTED.

OPM MODE

OVERVIEW

OPM MODE – Optical power is an absolute measurement of the amount of light intensity; i.e. "brightness", and can be measured either at the output of a transmitter (transmit power), or at the input of a receiver (receiver sensitivity). When in OPM (optical power meter) mode, Fiber OWL 7 certifiers can be directly attached to this equipment via a patch cord to check whether the transmitter is within the manufacturer's specified power range.
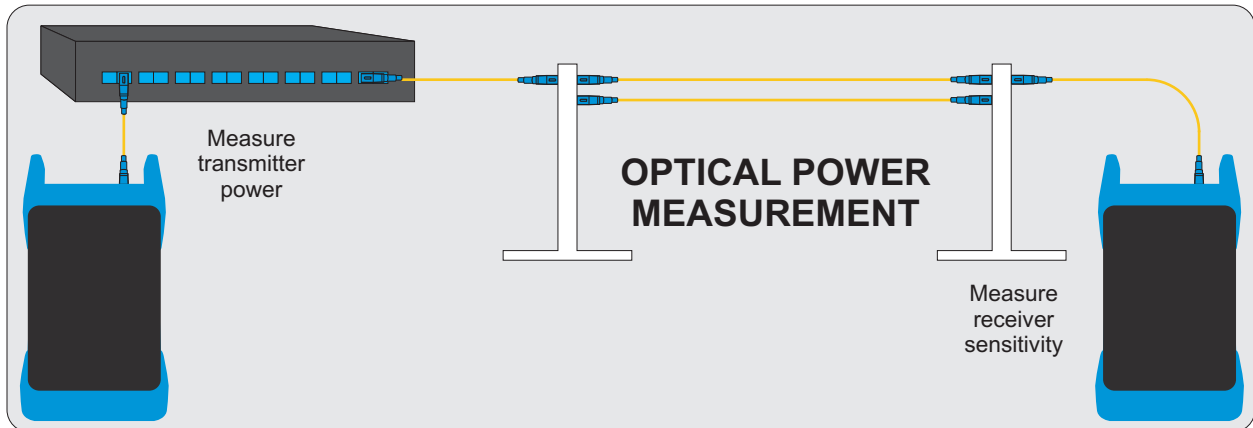
OPM MODE can be performed with all models of **FIBER OWL 7 optical power meter**.

TEST PROCEDURES

OPM MODE

ACCESSING OPM MODE

1 **Power on the Fiber OWL 7.**
Or, if meter is already powered on, press MENU, then ▶ for OPERATIONS MENU.

2 **Press ▼ to OPM MODE, then ▶ to continue.**

STARTUP MENU

RESUME TESTING
▶ CREATE NEW LINK ◀
LOAD STORED LINK
OPM MODE
MAIN MENU

◀ BACK   ▶ SELECT   EXIT

start link configuration
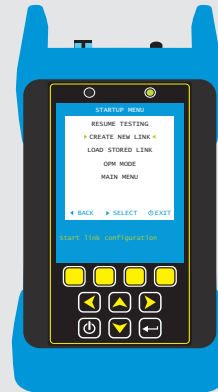
3 **The meter will immediately begin to display optical power readings.**

OPM

1310nm
LOW   dBm

1550nm
LOW   dBm

Length: 0m   WAVE: 1310
ENTER

LEN   WAVE

AVAILABLE FUNCTIONS

LENGTH   Measure fiber spool or link length; see LINK LENGTH section
WAVE   Select next wavelength
ZERO   Sets optical reference for the currently displayed wavelength (or two wavelengths if using a compatible OWL auto-capable light source)
UNITS   Toggles display units between dBm (optical power) and dB (optical loss)
EDIT   Edit link setup information
LOAD   Load a previously stored link (make sure that references are re-set before taking further measurement
MENU   Access MAIN MENU

DISPLAYED RESULT

LOW   No measurable amount of incoming optical power
HIGH   Incoming optical power is too bright to be measured

(black)   Normal optical power/loss measurement
(blue)   INVALID OPERATING MARGIN (indicates invalid "negative loss" or "gain" test condition; re-set the reference using the ZERO function)

TEST PROCEDURES

OPM MODE

TRANSMITTER OUTPUT POWER MEASUREMENT

Measure the output power directly from network transmission equipment to determine if the equipment is transmitting within manufacturer output power specifications.

Connect the Fiber OWL 7 to the transmitter port of the transmission equipment (e.g. switch, router, hub, GBIC, light source, etc.) and make sure the equipment is powered on.
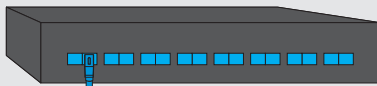
example: network switch

Press WAVE until the meter is set to the same wavelength as the network equipment.
Press UNITS until the meter is set to display optical power in <u>dBm</u>.
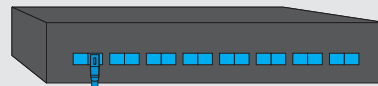
example: network switch

View the displayed optical power.
NOTE: if the transmitter is sending out digital data, the displayed power level will fluctuate based on average power of data bits received during the sampling period.

example: network switch

42
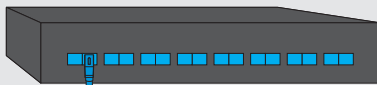
TEST PROCEDURES

OPM MODE

RECEIVER SENSITIVITY MEASUREMENT

Output power measured from a transmitter through a link at the far-end receiver will determine if the received power is within manufacturer receiver sensitivity specifications.
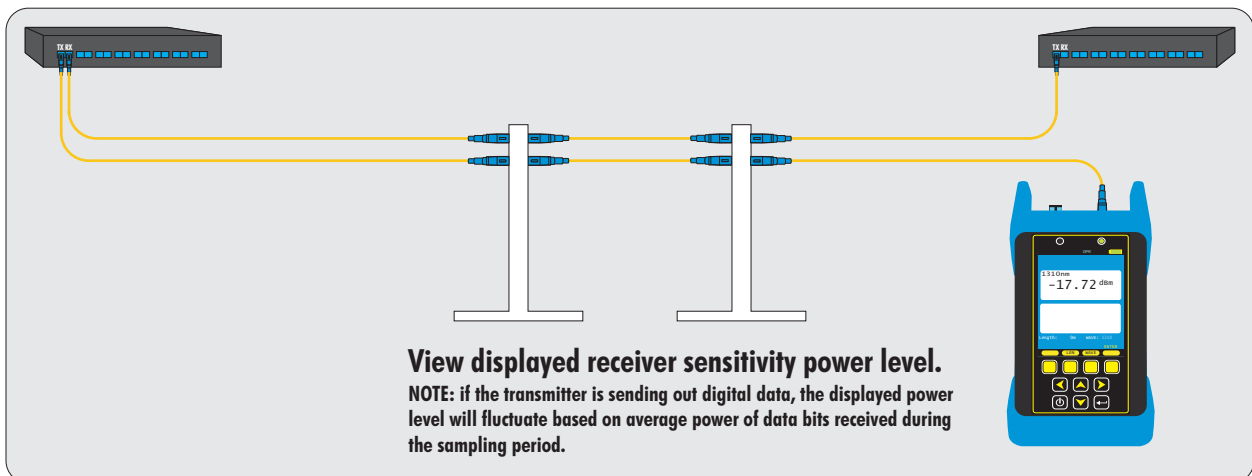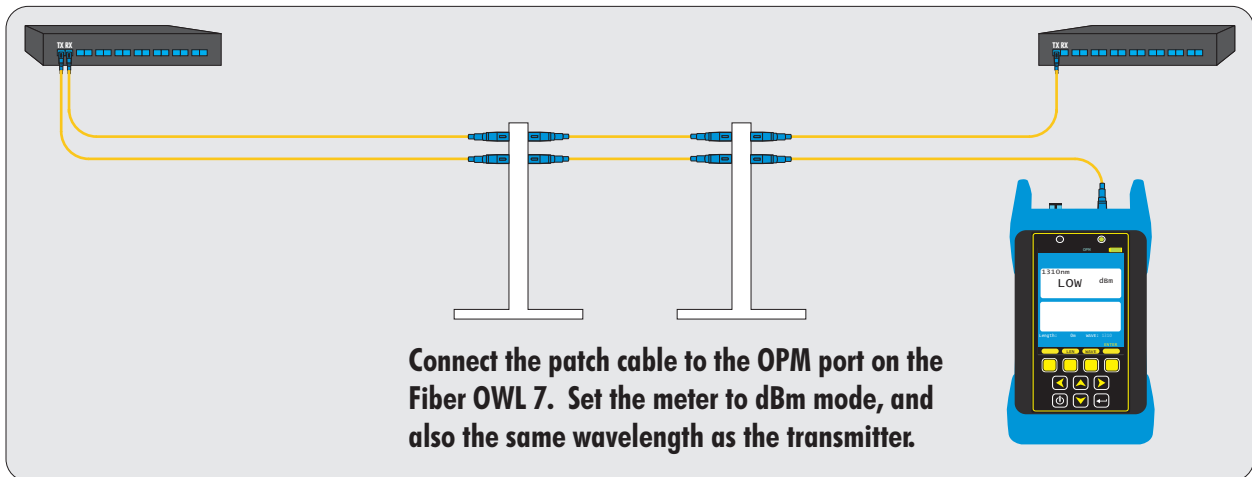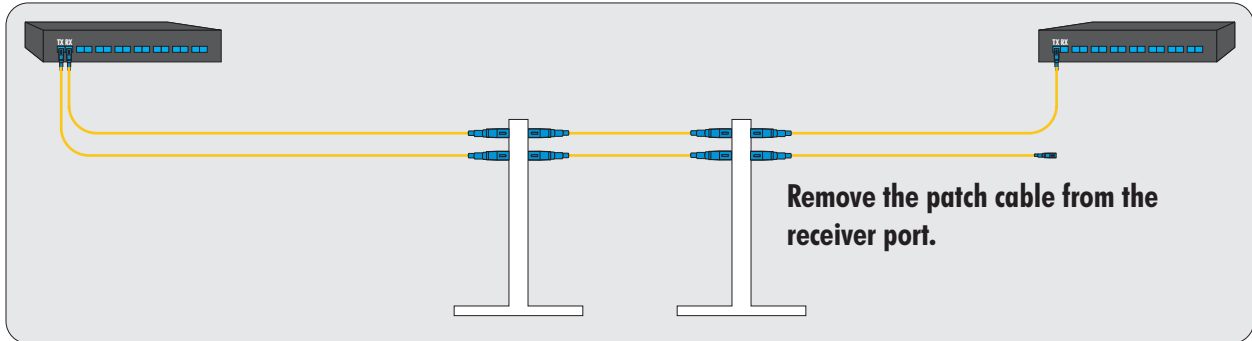
Remove the patch cable from the receiver port.

```
1310nm
     LOW    dBm
```

Connect the patch cable to the OPM port on the Fiber OWL 7. Set the meter to dBm mode, and also the same wavelength as the transmitter.

```
1310nm
  -17.72 dBm
```

View displayed receiver sensitivity power level.
NOTE: if the transmitter is sending out digital data, the displayed power level will fluctuate based on average power of data bits received during the sampling period.

TEST PROCEDURES

OPM MODE

OPTICAL LOSS MEASUREMENT

Measure the attenuation, or loss, of optical fiber links.

Connect an appropriate reference cable (one per light source port) as shown between the OPM port on the Fiber OWL 7 and the light source port being used for the loss measurement.
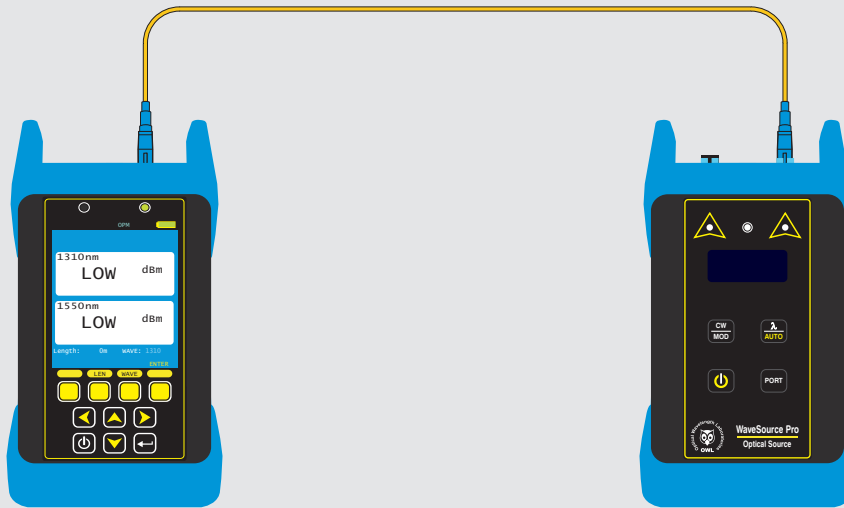
Power on the light source, then set both units to the same wavelength.
NOTE: if using an OWL auto-test capable source, set the source into AUTO mode to test both wavelengths simultaneously.
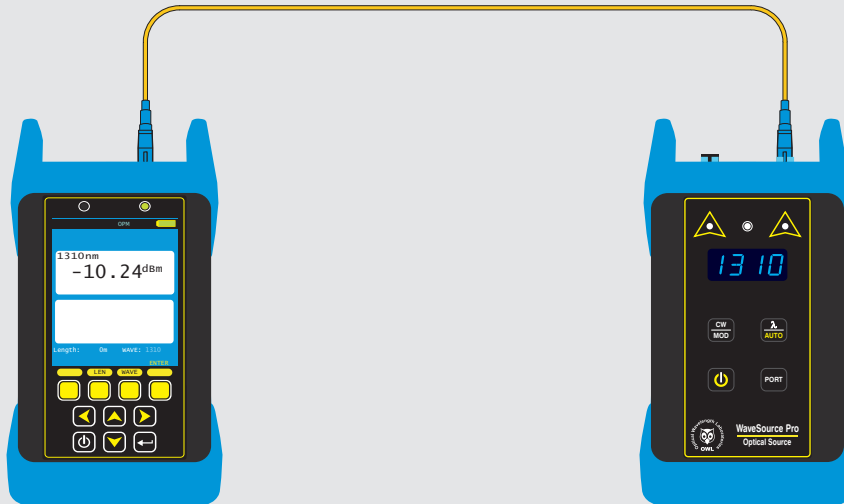
TEST PROCEDURES

OPM MODE

OPTICAL LOSS MEASUREMENT

Measure the attenuation, or loss, of optical fiber links.

Press ZERO to set the reference. The measurement units will automatically change to dB.
NOTE: if using an OWL auto-test source, both wavelengths will be set simultaneously.
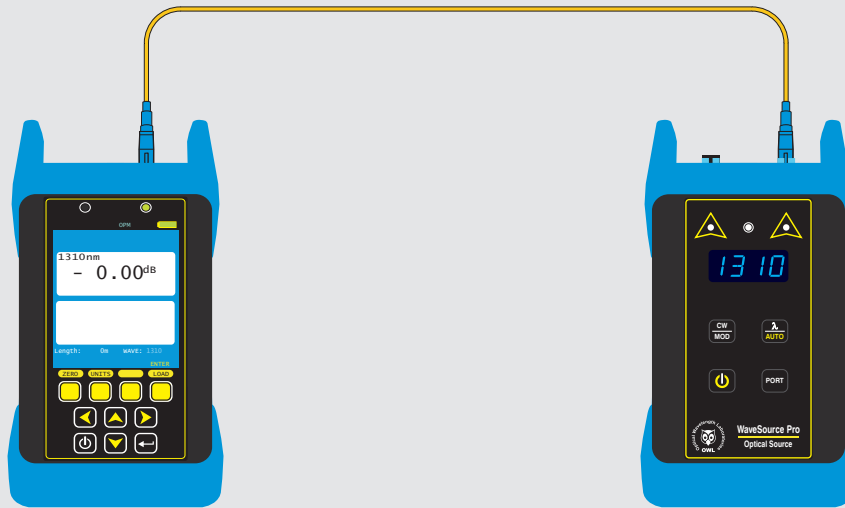
Connect the METER and source into the first fiber in the link under test as shown. The meter will begin to display loss readings automatically.
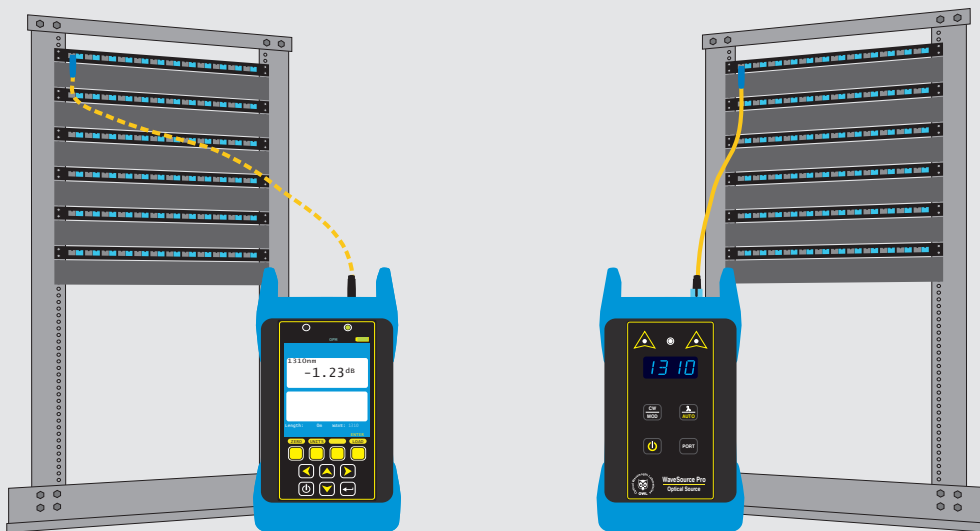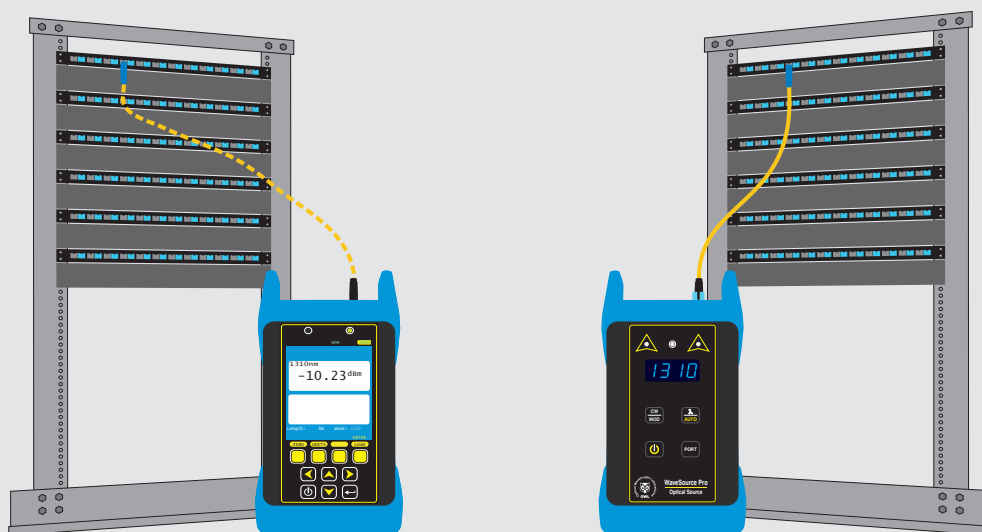
OPM MODE

CONTINUITY

To ensure fibers are installed into a patch panel in the correct order, or need to trace a particular fiber from one end to the other, connect a light source to one end of the fiber link, then connect the Fiber OWL 7 into each fiber at a time until a proper reading appears on the display.

Connect the light source into the fiber port being verified, then connect the Fiber OWL 7 into the fiber ports one at a time. Connecting into the wrong port will result in a very low power reading.
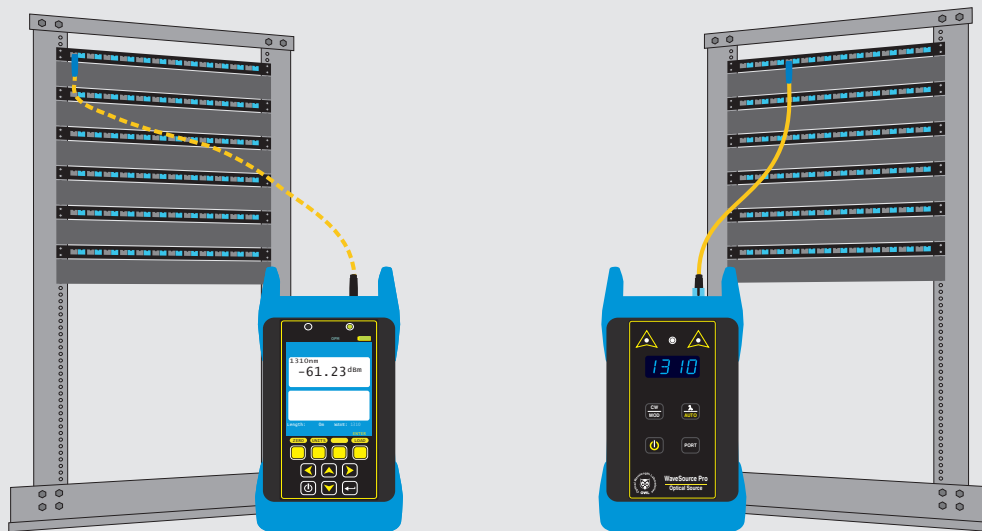
Once the meter is connected to the same fiber (continuity achieved), a reading that is close to the light source's calibration power level will appear.

OPM MODE

PATCH CABLE VERIFICATION

Check patch cables before testing to determine if they are okay to use.

Connect a patch cable between the OPM port and the source port on the Fiber OWL 7.
Make sure the UNITS are set to dBm.
NOTE: the Fiber OWL 7 must be capable of testing that type of fiber; i.e. singlemode and/or multimode.
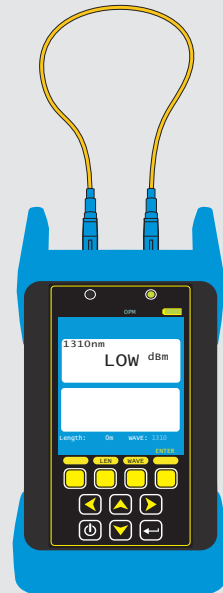
Press MENU > OPERATIONS MENU > CONFIGURE SOURCE
NOTE: the Fiber OWL 7 must be capable of testing that type of fiber; i.e. singlemode and/or multimode. See table below for a list of source settings.

If using CW (continuous wave) mode, choose one of the available wavelengths.

If using AUTO mode, both available wavelengths will be used.

Once all the settings have been set, press EXIT to return to the OPERATIONS MENU, then re-ENTER OPM MODE.
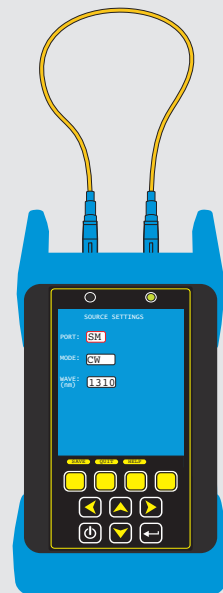
TEST PROCEDURES

OPM MODE

PATCH CABLE VERIFICATION

Check patch cables before testing to determine if they are okay to use.

Connect a patch cable between the OPM port and the source port on the Fiber OWL 7.
NOTE: If AUTO mode was chosen, both wavelengths will fill in automatically.
If CW mode was chosen, press WAVE so that the OPM wavelength is the same as the chosen source wavelength.

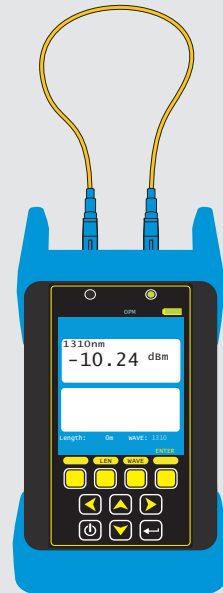**The patch cable measurement should be close to the NIST calibrated power level:**
(may be a little higher or lower)

SINGLEMODE (1310/1550): -10.00 dBm

62.5/125um MULTIMODE (850/1300): -20.00 dBm

50/125um MULTIMODE (850/1300): -23.00 dBm

NOTE: consider replacing patch cables that fall more than 1 dB below these suggested values

OPERATION/MAINTENANCE

MAIN MENU

From any test results screen on the MASTER, press the MENU button to access the MAIN MENU.

OPERATIONS MENU

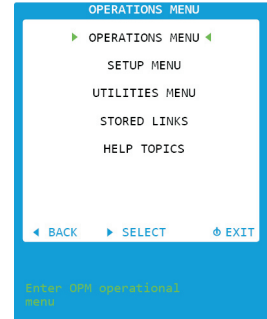|	
CREATE NEW LINK	See "Link Wizard" section
CONFIGURE SOURCE	Control the light source port
SYSTEM INFORMATION	Display system information
ENTER OPM MODE	Optical Power Meter (OPM) mode

SETUP MENU

OPERATING PARAMETERS	Set Length units / index of refraction
USER INFORMATION	Enter user name and phone number
DISPLAY PREFERENCES	Display dimness / brightness / speaker
POWER OPTIONS	Display timer: dim / standby / off
CUSTOM STANDARD	Configure a user-customizable standard

UTILITIES MENU

SET SYSTEM CLOCK	Set real-time clock
FORMAT DATA FLASH	Formats data storage - erases all stored links
FACTORY RESET	Reset to factory defaults
VIEW SLIDES	View help slides
MANUFACTURER SETUP	Manufacturer only - no user configurable settings

STORED LINKS   View the data stored in the MASTER

HELP TOPICS   View various help topics regarding the operation of the MASTER

<table>
<tr><td>OPERATIONS MENU</td></tr>
<tr><td>▶ OPERATIONS MENU ◀</td></tr>
<tr><td>SETUP MENU</td></tr>
<tr><td>UTILITIES MENU</td></tr>
<tr><td>STORED LINKS</td></tr>
<tr><td>HELP TOPICS</td></tr>
<tr><td>◀ BACK   ▶ SELECT   ⏻ EXIT</td></tr>
<tr><td>Enter OPM operational menu</td></tr>
</table>

OPERATION/MAINTENANCE

OPERATIONS MENU

From any test results screen on the MASTER, press the MENU button to access the MAIN MENU.

From the MAIN MENU, select OPERATIONS MENU.

CREATE NEW LINK   See "Link Wizard" section
CONFIGURE SOURCE   Control the light source port
SYSTEM INFORMATION   Display system information
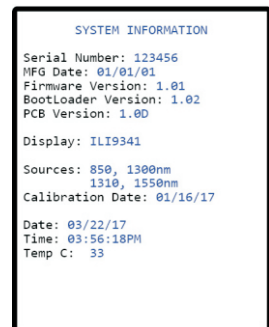ENTER OPM MODE   Optical Power Meter (OPM) mode

OPERATIONS MENU > CONFIGURE SOURCE -- Control the light source port in the MASTER
PORT   SM   Singlemode (SM) port -- **WAVE (nm)**: 1310nm
MODE   OFF   source is powered off
          CW   displayed WAVE is on continuously
          TONE   displayed WAVE modulates at specific frequency
          AUTO   displayed PORT auto-switches (MM: 850/1300, SM: 1310/1550)
EXIT   Save settings and return to OPERATIONS MENU
**HELP**   Context-sensitive help
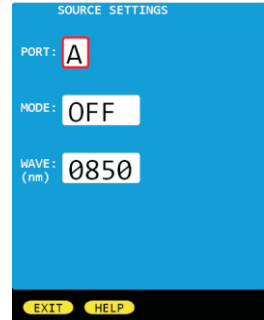
OPERATIONS MENU > SYSTEM INFORMATION -- View system-specific hardware, firmware, calibration, and date/time information

OPERATIONS MENU > ENTER OPM MODE -- Allows the user to perform basic optical power measurements in dBm when certification or loss measurements are not required -- such as measuring output power from an active transmitter (NIC, SFP, GBIC, switch port, etc.)

When used with an OWL auto-wavelength light source, up to 2 wavelengths can be measured simultaneously.

⏻   context-sensitive help

⬅   scroll through various groups of menu options
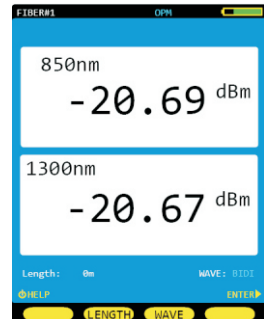
OPERATION/MAINTENANCE

SETUP MENU

From any test results screen on the MASTER, press the MENU button to access the MAIN MENU.

From the MAIN MENU, select SETUP MENU.

OPERATING PARAMETERS	Set Length units / index of refraction
USER INFORMATION	Enter user name and phone number
DISPLAY PREFERENCES	Display dimness / brightness / speaker
POWER OPTIONS	Display timer: dim / standby / off
CUSTOM STANDARD	Configure a user-customizable standard
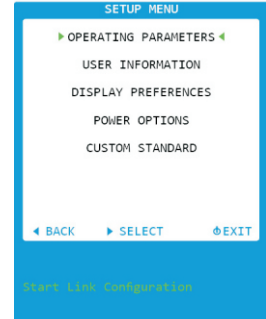
SETUP MENU > OPERATING PARAMETERS -- set length units and index of refraction

LENGTH UNITS   METERS   display length measurements in meters
FEET   display length measurements in feet

FIBER INDEX   sets the index of refraction used for length measurements
Range of values: 1.4000 to 1.6000
Default value: 1.4681

SAVE   Save settings and return to SETUP MENU
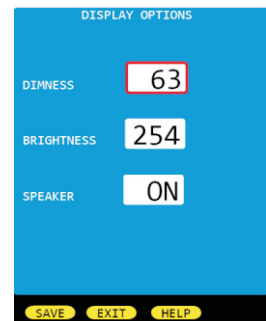**EXIT**   Exit without saving settings and return to SETUP MENU
HELP   Context-sensitive help
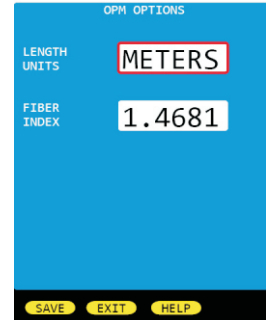
SETUP MENU > USER INFORMATION -- Set user name and phone number

USER NAME	15 characters
PHONE NUMBER	10-digit phone number
SAVE	Save settings and return to SETUP MENU
EXIT	Exit without saving settings and return to SETUP MENU
HELP	Context-sensitive help

SETUP MENU > DISPLAY OPTIONS -- Set options for the user interface such as display dimness and brightness levels, and internal speaker operation.

|	
DIMNESS	dimness level during power saving mode
	Range of values: 25 to 125 (dim level previews as value changes)
BRIGHTNESS	Brightness level during normal operation
	Range of values: 150 to 254 (brightness level previews as value changes)
SPEAKER	turns speaker ON or OFF
SAVE	Save settings and return to SETUP MENU
EXIT	Exit without saving settings and return to SETUP MENU
HELP	Context-sensitive help

SETUP MENU

**SETUP MENU > POWER OPTIONS** -- Set duration for various power saving modes

DIM TIME minutes before display dims
     Range of values: 1 to 250

STANDBY TIME minutes before unit goes into standby mode (only display turns off)
     Range of values: 2 to 250

OFF TIME minutes before unit turns completely off
     Range of values: 3 to 250

SAVE   Save settings and return to SETUP MENU

EXIT   Exit without saving settings and return to SETUP MENU

HELP   Context-sensitive help
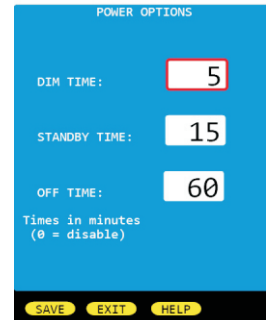
SETUP MENU > CUSTOM STANDARD -- configure a custom standard with user-definable standard pa[...]
set for each fiber type.

FIBER TYPE Options: 62.5um OM1 / 50.0um OM2 / 50.0um OM3 / 50.0um OM4
   Indoor SM / Outdoor SM

Select a fiber type and press EDIT to set parameters for that fiber type.
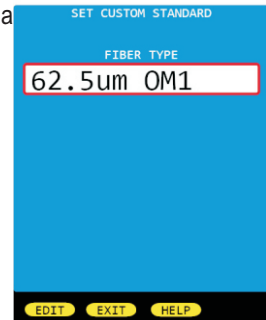
Wave (nm) Up to 2 wavelengths (column A and B) can be defined per fiber type
     Options: 850, 980, 1300, 1310, 1490, 1550, 1625, 0

Two types of standards can be defined:

GENERIC STANDARDS (link budget is calculated based on link configuration)
   uses Loss/km, Max len, Con loss, and Spl loss
APPLICATION STANDARDS (link budget is a fixed number)
   uses Max loss, Min loss, and Max len
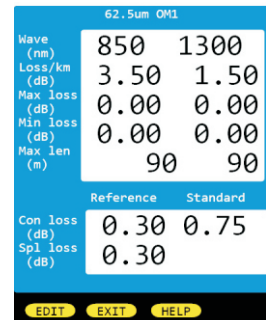
GENERIC STANDARD PARAMETERS

Loss/km (dB) Amount of acceptable dB loss (attenuation) per kilometer of fiber
Max len (m) Maximum length of fiber link in meters
Con loss (dB) dB loss per interconnection; defines both reference-grade and standard-grade reference cable connectors
Spl loss (dB) dB loss per splice; can be either fusion or mechanical splices

APPLICATION STANDARD PARAMETERS

Max loss (dB) loss measurements that exceed Max loss will show as a FAIL
Min loss (dB) loss measurements that do not reach the Min loss will show as a FAIL
Max len (m) Maximum length of fiber link in meters

OPERATION/MAINTENANCE

UTILITIES MENU

From any test results screen on the MASTER, press the MENU button to access the MAIN MENU.

From the MAIN MENU, select UTILITIES MENU.

SET SYSTEM CLOCK	Set real-time clock
FORMAT DATA FLASH	Formats data storage - erases all stored links
FACTORY RESET	Reset to factory defaults
VIEW SLIDES	Browse through the various help slides
MANUFACTURER SETUP	Manufacturer only - no user configurable settings

UTILITIES MENU > SET SYSTEM CLOCK -- set time and date
DATE   Format: MM/DD/YY (MM=month/DD=day/YY=year)
TIME   Format: HH:MM:SS (HH=hour/MM=minute/SS=second) : AM/PM
SET   Save settings and return to UTILITIES MENU
EXIT   Exit without saving settings and return to UTILITIES MENU
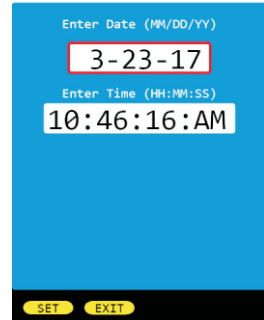
UTILITIES MENU > FACTORY RESET -- reset to factory defaults
YES   Reset device to factory defaults
NO   Exit without resetting device and return to UTILITIES MENU
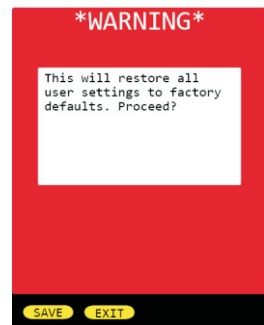
OPERATION/MAINTENANCE

WORKING WITH STORED DATA

Each stored link has two lines of information:
>   Job / Site info
>   Location info for the MASTER and REMOTE.

GREEN text shows the link that is currently loaded in memory.

Use the link selection cursor (▶) to select a link to work with.

Stored runs: shows how many data points are stored at the link selection cursor.

LOAD	loads the selected link, and displays a list of fiber runs stored for that link
DONE	exits the stored links list without loading a link (prompting the user to set a reference and start testing the selected fiber link), or exits the stored runs list while loading the last run in the selected link
DELETE	delete the selected link, or all links
PAGE	loads the next page of stored links (if more links than will fit on one page)
HELP	view context-sensitive help
BACK	same as **DONE**
VIEW	view LINK INFORMATION screen

LOAD	displays the test results for the currently selected fiber run
DONE	exits the stored runs list while loading the last run in the selected link
DELETE	delete the selected fiber, or all fiber runs for that link
PAGE	loads the next page of stored runs (if more runs than will fit on one page)
HELP	view context-sensitive help
BACK	same as **DONE**
VIEW	view all STORED RUN data for the selected fiber run

NEXT	displays next set of fiber runs
PREV	displays the previous set of fiber runs
BACK	return to the previous STORED LINKS screen
HELP	view context-sensitive help

Information includes:
Project / Job info (ACME CORP / OPS)
MASTER / REMOTE location info (COMPUTER ROOM - DATA CENTER)
Fiber run info (FIBER#1   03/22/17 10:47AM)
Fiber test result, and wavelength
Fiber parameters (Length, Mode, Standard, Fiber Type, Connections, Splices)

Use arrow keys to navigate through the available fiber data
GREEN text indicates a PASS
RED text indicates a FAIL
BLUE text indicates an invalid reading

OPERATION/MAINTENANCE
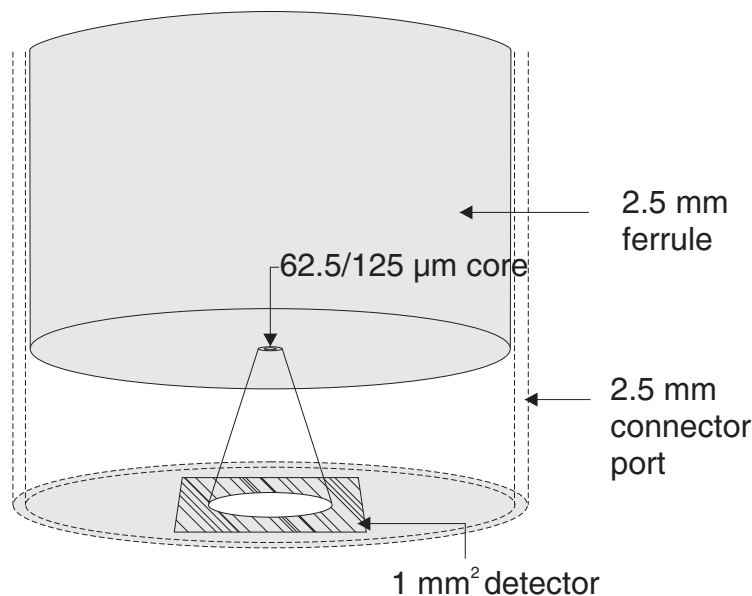
UNIVERSAL PORT

Universal Port

The Fiber OWL 7 optical power meter contains a universal connector port which allows for coupling to any fiber optic connector that uses a 2.5mm ferrule (e.g. ST, SC, FC, etc.).

What gives this port its flexibility is that only the ferrule is inserted into the port. Since there is no latching mechanism to speak of, any 2.5mm ferrule connector can be inserted into the same port without having to swap adapter ports. There is no longer the need to purchase or maintain additional adapter caps for each different connector type.

This detector port is designed so that the cone of acceptance falls completely onto the detector, regardless of how the connector may turn, twist, or wiggle in the port. Because of this, you can be assured that the connection will always produce an accurate reading as long as it is inserted completely into the port (see the diagram below).

Additionally, some connectors use a 1.25mm ferrule. The flexible universal port system on the Fiber OWL 7 allows the user to remove the 2.5mm adapter and place a 1.25mm adapter (included with each Fiber OWL 7) for connection to LC, MU, and other SFF connectors which use the 1.25mm ferrule.

Please call 262-473-0643 with any questions you may have about the universal port, or any other of our fiber optic test products.

62.5/125 µm core

2.5 mm ferrule

2.5 mm connector port

1 mm^2 detector

Use of SC Connectors with 2.5mm Universal Port

Take extra care when inserting SC connectors into the 2.5mm universal port as the spring-loading action of the SC connector may cause improper insertion. Call OWL at (262) 473-0643 with any questions.

OPERATION/MAINTENANCE

CLEANING THE DETECTOR PORT

Required accessories:

A) Isopropyl Alcohol (91% or better)

B) Round **wooden** toothpick with sharp point
(NOTE: do not use a metal pin or needle since metal will scratch the surface of the detector)

C) Cotton swab

D) Jeweler's loupe (10x magnification recommended)
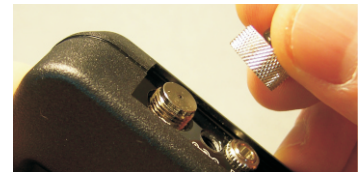
E) Compressed Air (not shown)

1. Place a small amount of cotton from the swab onto the wooden toothpick as shown at right.

2. Wet the cotton toothpick tip with the isopropyl alcohol.

3. Remove the adapter cap from the power meter detector port.

4. **USING GREAT CARE**, gently insert the cotton toothpick tip into the detector port.

   ⚠️ **WARNING! BE VERY CAREFUL WHEN INSERTING THE TOOTHPICK INTO THE DETECTOR PORT. THERE IS A VERY THIN GLASS WINDOW THAT WILL EASILY BREAK WITH TOO MUCH PRESSURE.**

5. Using as little pressure as possible, rotate the cotton toothpick tip in the detector port to clear away any dust or dirt that has accumulated on the detector.

6. Using light pressure from the compressed air, blow out the detector port.

7. Use the jewelers loupe to inspect the detector end face.

If dust or dirt are still present, repeat steps **5** **6** **7** until the detector port is free of debris.

If no dust or dirt is found, replace the adapter cap on the detector port and cover the detector port with the dust cap.

OPERATION/MAINTENANCE

CLEANING THE LIGHT SOURCE/VFL PORT

This cleaning procedure applies to the light source/VFL port on the Fiber OWL 7 optical power meter. For more information about cleaning the DETECTOR port on the Fiber OWL 7, see page 23.

Required Accessories:

›   Isopropyl alcohol (91% or better)
›   In-adapter fiber optic cleaning accessories, such as 2.5mm cleaning swabs or 2.5mm HUXCleaner™
›   In-adapter fiber optic inspection scope (200x magnification or greater recommended)
›   Compressed Air (optional)

Below are procedures for "wet" cleaning and "dry" cleaning. For best results, a combination of these cleaning methods is recommended.

⚠   **IMPORTANT SAFETY NOTE: WHEN INSPECTING AN OPTICAL PORT, NEVER LOOK DIRECTLY OR INDIRECTLY INTO THE PORT WITHOUT SUFFICIENT EYE PROTECTION. THE OPTICAL PORT MAY BE ENERGIZED WITH POWERFUL INVISIBLE RADIATION THAT IS HARMFUL TO THE HUMAN EYE.**

INVISIBLE LIGHT IS ESPECIALLY DANGEROUS SINCE THE EYE IS NOT AWARE OF EXPOSURE TO HARMFUL INVISIBLE ENERGY, AND BECOMES INCREASINGLY DANGEROUS WITH PROLONGED EXPOSURE.

TO AVOID ACCIDENTAL EXPOSURE TO OPTICAL ENERGY, IT IS HIGHLY RECOMMENDED TO POWER OFF EQUIPMENT BEFORE INSPECTING OPTICAL PORTS.

IT IS ALSO HIGHLY RECOMMENDED TO USE AN LCD-BASED FIBER INSPECTION SCOPE, WHICH CAN INSPECT OPTICAL PORTS AND FIBER ENDFACES WITHOUT EXPOSING THE EYE TO HARMFUL OPTICAL RADIATION.

"WET" CLEAN PROCEDURE

1   Wet the tip of a 2.5mm cleaning swab with isopropyl alcohol.

2   Carefully insert the wet tip of the swab into the optical port.

3   Clean out the optical port according to the directions provided with the swabs.

4   Blow dry the optical port with the compressed air. If compressed air is not available, allow 2 minutes for the alcohol to evaporate.

5   Inspect the optical port with the in-adapter fiber optic inspection scope to ensure the port is clear of obstructions.

If the port is still dirty, another round of cleaning will be necessary. You may also want to use a combination of "wet" and "dry" cleaning to achieve best results.

"DRY" CLEAN PROCEDURE

1   Carefully insert a dry 2.5mm cleaning swab or a 2.5mm HUXCleaner™ into the optical port.

2   Clean out the optical port according to the directions that came with the cleaning accessories.

3   Inspect the optical port with the in-adapter fiber optic inspection scope to ensure the port is clear of obstructions.

If the port is still dirty, another round of cleaning will be necessary. You may also want to use a combination of "wet" and "dry" cleaning to achieve best results.

APPENDICES

WARRANTY INFORMATION

Repair. Repair of this unit by unauthorized personnel is prohibited, and will void any warranty associated with the unit.

Cleaning. For accurate readings, the optical connectors on the Fiber OWL 7 and the connectors on the patch cords should be cleaned prior to attaching them to each other. Minimize dust and dirt buildup by replacing the dust caps after each use.

Calibration. It is recommended to have Optical Wavelength Laboratories calibrate this unit once per year.

Warranty. The Fiber OWL 7 comes standard with a two-year factory warranty, which covers manufacturer defect and workmanship only.

CONTACT INFORMATION

Address:

Optical Wavelength Laboratories, Inc.
N9623 US Hwy 12
Whitewater, WI 53190

Phone:

262-473-0643

Internet:

OWL-INC.COM

APPENDICES

SUPPORTED CABLING STANDARDS

The Fiber OWL 4 supports the following fiber optic network cabling standards:

ITU G.983.3	EIA/TIA-568	CAN-T529	ISO/IEC 11801
10 Gigabit Ethernet	1000Base-SX	1000Base-LX	100Base-FX
10Base-FL	10Base-FB	FDDI	ATM-155
ATM-622	Fibre Channel	Token Ring	FTTH

10-GIGABIT ETHERNET STANDARD

Support for the IEEE 802.3ae 10-Gigabit Ethernet standard has been added to OWL Reporter, which means that Fiber OWL 4 users can now certify their 10GbE networks.

With this new standard, users are given the option of choosing from one of several versions of this standard, based on the fiber type, wavelength, and 10GbE electronics used. Below is a summary of the various 10GbE standards.

In order to choose the correct 10GbE standard, it is important to know the specifications of the fiber under test, especially the fiber type and modal bandwidth.

If these specifications are unknown, contact the optical fiber manufacturer for more details.

IEEE Standard Name	Fiber OWL Link Wizard Name	Fiber Type	Modal Bandwidth	Wavelength	Loss (dB)	Maximum Distance (m)
10GBASE-S	10GBASE-S LEGACY	62.5/125 multimode	160 MHz • km	850nm	2.6	26
10GBASE-S	10GBASE-S OM1/OM2	62.5/125 multimode	200 MHz • km	850nm	2.5	33
10GBASE-S	10GBASE-S LEGACY	50/125 multimode	400 MHz • km	850nm	2.2	66
10GBASE-S	10GBASE-S OM1/OM2	50/125 multimode	500 MHz • km	850nm	2.3	82
10GBASE-S	10GBASE-S OM3	laser-optimized 50/125 multimode	2000 MHz • km	850nm	2.6	300
10GBASE-LX4	10GBASE-LX4 LEGACY	62.5/125 multimode	500 MHz • km	1300nm	2.5	300
10GBASE-LX4	10GBASE-LX4 LEGACY	50/125 multimode	400 MHz • km	1300nm	2.0	240
10GBASE-LX4	10GBASE-LX4	50/125 multimode	500 MHz • km	1300nm	2.0	300
10GBASE-LX4	10GBASE-LX4	50/125 multimode	2000 MHz • km	1300nm	2.0	300
10GBASE-LX4	10GBASE-LX4	singlemode	NA	1310nm	6.3	5000
10GBASE-L	10GBASE-L/E	singlemode	NA	1310nm	6.2	5000
10GBASE-E	10GBASE-L/E	singlemode	NA	1550nm	11.4	5000

APPENDICES

UPDATING FIRMWARE

The firmware in Fiber OWL 7 series devices can be updated on any computer that has OWLView software installed.

To update the firmware:
1)   Save the firmware file to the PC
2)   Connect the device to the computer via the supplied USB cable
          -- do NOT remove the USB cable until the whole process is complete
3)   Power on the device
4)   Open OWLView software
5)   Click Tools > Update Fimware > From file...
6)   Browse to the location of the firmware file, then click Open
7)   The software and the device will indicate the firmware update process

Once the firmware is updated, the device will re-boot. Now it is safe to remove the USB cable.

RE-CHARGING THE DEVICE BATTERY

The Lithium Polymer battery in the Fiber OWL 7 is re-charged through the USB port.

A battery charger and USB cable is supplied for this purpose.

The device can either be recharged using the battery charger or a computer USB port.

⚠ **To avoid damage to the unit or harm to the user, only use approved battery chargers.**

Battery charger electrical specifications:

INPUT: 100-240V AC 50-60Hz
OUTPUT: DC 5.0V 100mA +/- 5%

LINK PLANNING WORKSHEET

Fill out the blanks below with information about the link under test. This information will help you plan out the key information about the link, and will be used to enter the link setup information in the Fiber OWL 7 certifier.
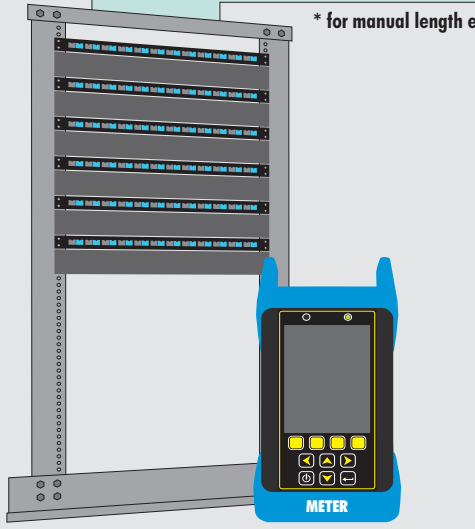
PROJECT INFORMATION

Project Name: _____   **Location:** _____

LINK CONFIGURATION INFORMATION

Fiber Type: _____   **Standard:** _____
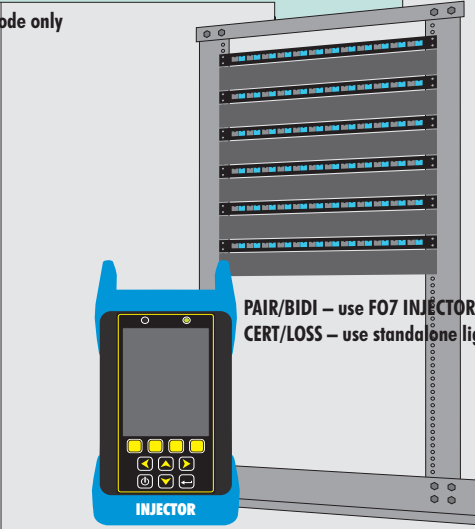
Connections: ____   **Splices:** ____   **Test Mode:** PAIR   BIDI   CERT   LOSS

*Length(m): _____   **Reference Method:** ____ -jumper

* for manual length entry in CERT mode only

METER

INJECTOR

PAIR/BIDI – use FO7 INJECTOR
CERT/LOSS – use standalone light source

Meter End: _____

Injector End: _____

ENCIRCLED FLUX COMPLIANCE (*MULTIMODE TESTING ONLY*)

Is Encircled Flux compliant testing required?   YES   NO

FIBER PAIR SETTINGS (*PAIR/BIDI MODES ONLY*)

Fiber Pair Geometry: STRAIGHT   CROSSED   **Number Fiber Pairs By:** STRAND   PAIR

RUN NAME SETTINGS

Fiber Group Name: _____   **Starting Fiber Number:** _____