



## MedZense LG20/LG20-e



### User manual *English*

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V2.0	11-06-2020	Fixed chapter references in Troubleshooting. Updated Manufacturer address.

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# 1 Important

## Important Notice

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### Disposal of your old product



Your product is designed and manufactured with high quality materials and components, which can be recycled and reused.



When this crossed-out wheeled bin symbol is attached to a product it means that the product is covered by the European Directive 2002/96/EC. Please inform yourself about the local separate collection system for electrical and electronic products. Please act according to your local rules and do not dispose of your old products with your normal household waste. Correct disposal of your old product helps to prevent potential negative consequences for the environment and human health.



This product may not be used for any other purpose than described in this manual. This product may not be modified in any way without consensus of the manufacturer. Never apply power extension cords. The mains adapter may only be inserted in a suitably protected (e.g. by circuit breaker) mains outlet. The adapter must be installed in a readily accessible position.



Read instructions prior to use.



This product complies with the radio interference requirements of the European Community.



This product complies with the radio interference requirements of the Federal Communications Commission.

This product complies with the following harmonized standards following the provisions of 2006/95/EC LV product safety directive:

- EN62233 (Human exposure)
- EN61180 (Pulse tests)

This device should be maintained and cleaned on a regular base. It is advised to have this device checked and calibrated once per year. Poor maintenance and wrongful use could lead to unwanted rejection of fiber optic cables and instruments. Therefore, only trained personnel should use this device.

## 2 Your LG20 / LG20-e

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### Feature highlights

#### **LG20**

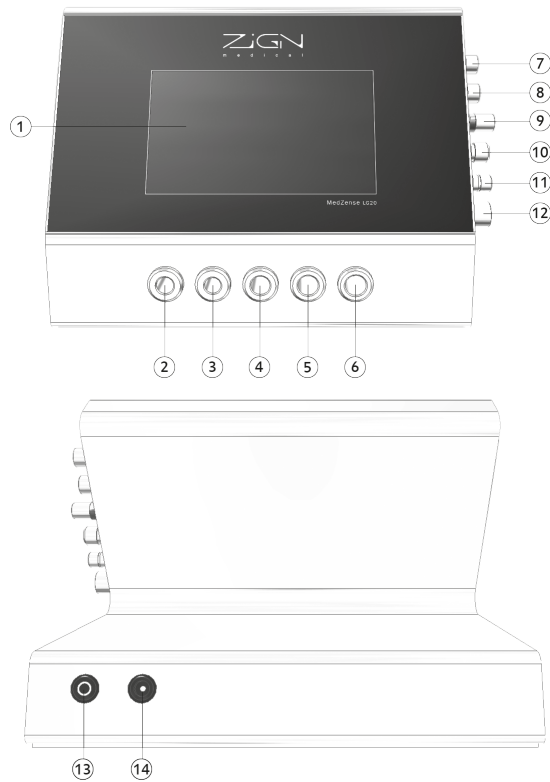
- Fiber optic cable light throughput measurement
- Color spectrum measurement
- Simple & Advanced mode
- Multi-language interface
- Custom fail/pass threshold settings
- Supports all major types of cable fittings

#### **LG20-e**

- Light throughput measurement for scopes
- Color spectrum measurement
- Test scopes up to Ø10mm

## Product overview LG20

### Main unit

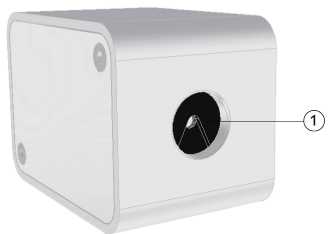


- 1 Touch screen
- 2 Storz light source
- 3 NCS light source
- 4 Olympus light source
- 5 Wolf light source
- 6 Stryker light source
- 7 Storz /Olympus instrument fitting
- 8 Olympus WA instrument fitting
- 9 Universal instrument fitting
- 10 Wolf instrument fitting
- 11 ACM instrument fitting
- 12 Stryker instrument fitting
- 13 Probe connector
- 14 Power entry connector

## Product overview PT10

### Probe

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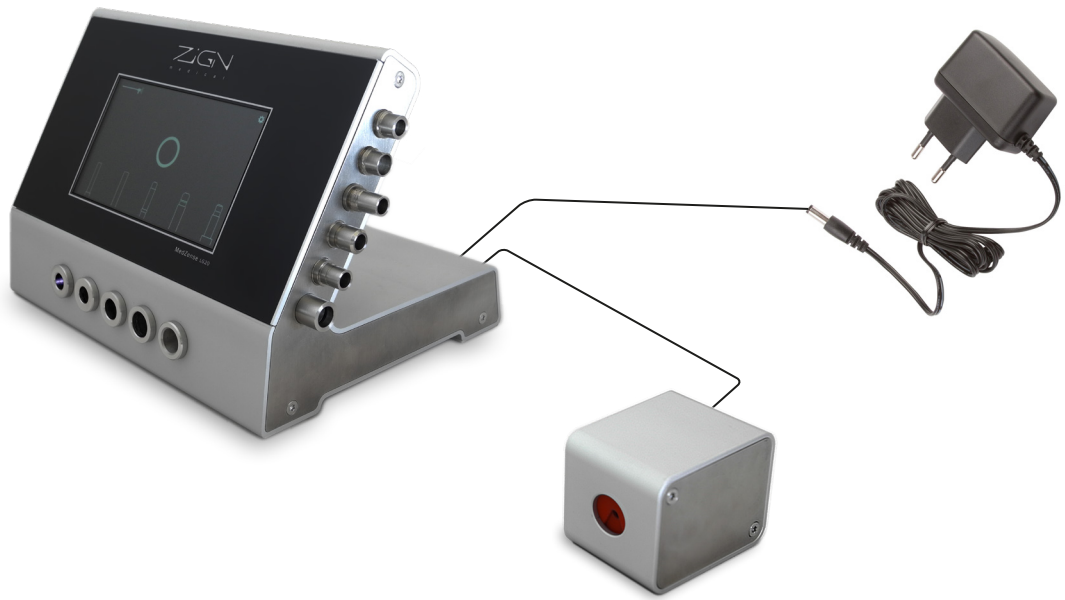
- 1 Scope insertion socket
- 2 Main unit connector

# 3 Connect

## Connect power & probe

Connect the LG20, power adapter and probe\* as shown in this diagram.

\*The probe is only available in the model LG20-e



# 4 Getting started

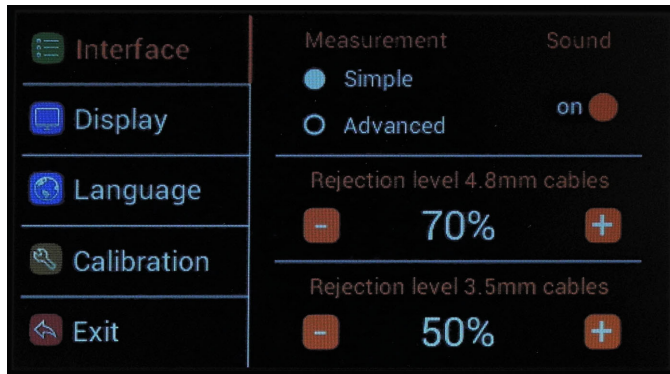
## Using the settings menu

To access the settings menu, press the gear icon (⚙️) in the upper right corner on the main screen. Use the tabs on the left to select the topic of interest.

## Interface settings

The first tab shows the interface settings. Here you can adjust the following settings:

- Sound on / off
- Measurement modes
- Rejection levels for fiber optic cables



## Sound

Use the slider button on the right to enable or disable system sounds. This includes ticks when the touch screen is pressed and notification sounds.

## Measurement modes

You can choose between simple and advanced measurement modes. Each mode has a different effect on how the measurement results are displayed.

### Simple mode:

- There is one rejection threshold level for all fiber optic cables.
- During fiber optic cable measurement, the displayed results are kept simple.
- Light throughput measurements will be limited to the 100% reference value.
- Color spectrum measurement results are displayed using a score only. Relative percentages are not shown.

### Advanced mode:

- There are separate rejection levels for both thin (3.5mm) and thick (4.8mm or more) fiber optic cables.
- Light throughput measurements are not limited to the 100% reference value.
- Color spectrum measurements are displayed in more detail. Relative percentages are shown.

## Rejection level

Use the '-' and '+' buttons to decrease or increase the rejection levels for fiber optic cables. Cables with a light throughput equal or less than the rejection level will be rejected.

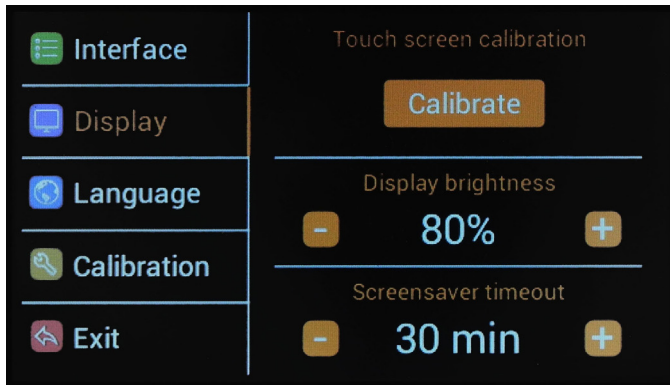
In advanced mode the rejection level needs to be set for both thin (3.5mm) and thick (4.8mm or more) cables.

## Display settings

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The second tab shows the display settings. Here you can adjust the following settings:

- Touch screen calibration
- Display brightness
- Screen saver time out



### Touch screen calibration

The touch screen calibration feature can be used to improve the touch precision if needed. After pressing the “Calibrate” button, follow the steps shown on the screen to accurately calibrate the touch sensor.

**Caution:** Please perform this calibration with precision. When the touch sensor is not accurately calibrated it can become very difficult to regain control over the interface.

### Display brightness

Use the '-' and '+' buttons to adjust the brightness of the display between 25 and 100%.

### Screen saver time out

Use the '-' and '+' buttons to adjust the time out setting for the screen saver. When the device is not used for the specified time, the display will dim and the light sources will be shut down completely. The screen saver time out can be set between 5 and 180 minutes.

When the screen saver is activated you can wake up the device by simply pressing the touch screen.



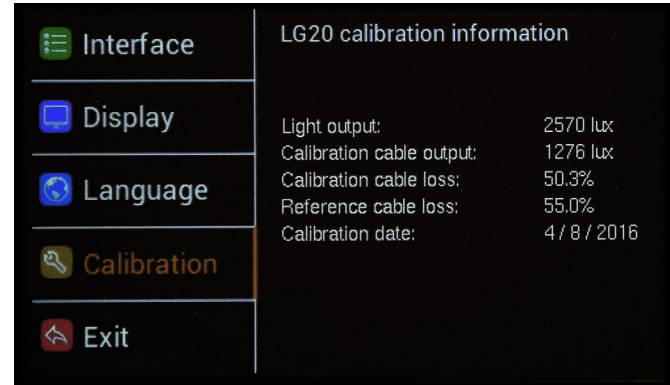
## Language setting

The third tab shows the language settings. Here you can set the interface language to German, English, French, Italian or Dutch.



## Calibration information

The fourth tab shows the calibration information. This information may be useful to expert users who want to gain a better understanding of the measurement results.



Light output:

The light output of the far most left light source, which is used as the reference in the calibration procedure. In case of this example the light output is 2570 lux.

Calibration cable output:

The light output of the fiber optic cable that was used for calibration. In case of this example the light output was 1276 lux when supplied with the 2570 lux light source.

Calibration cable loss:

The used calibration cable has a loss of 50.3%

Reference cable loss:

The calibration reference is a loss of 55%. This number is based on the average quality of brand new cables, which represent how much loss would be acceptable for new cables. If a fiber optic cable has a loss of 55%, it will be displayed as 100% on the measurement result, as it performs equal to the reference.

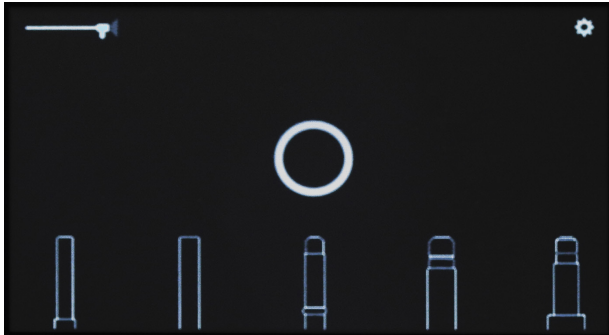
Calibration date:

The date on which the device was last calibrated (Month / Day / Year).

# 5 Testing fiber optic cables

## Connecting the cable

Fiber optic cables can be tested when the device is in normal operating mode, showing the main screen. In the center of the screen a breathing circle should be visible and the light sources on the front side should blink periodically from left to right.



The five drawings on the bottom of the screen represent the five different types of fittings which are supported by the corresponding light sources at the front of the device. If you are uncertain which source matches your fitting, you can press the image on the screen and a photograph of the actual fitting will be shown.

First connect the instrument adapter to the correct fitting on the right side of the device. The adapter should connect firmly to the fitting, either by using the thread or the snap system, depending on the type of fitting.



Now the light source adapter can be inserted in the matching light source. Please make sure you select the correct light source. The on-screen images should guide you in the right direction. If you have selected the correct light source, the adapter should have a snug fit which allows for very little room to wiggle inside the light source. Make sure you insert the adapter fully into the light source.

**Caution:** Fitting the adapter in the wrong light source will lead to unreliable measurements!

**Caution:** The adapter should fit in the light source without applying force. Do not apply force when connecting an adapter, this can damage the device and your fiber optic cable!

The device will detect the presence of the cable in the specific light source. An animation will show that the cable is detected. The detection will be confirmed visually and with a sound notification. The detection animation will continue as long as the cable is not held still.

After the detection is confirmed the measurement procedure will start automatically. The cable should be held still during the measurement procedure to prevent measurement errors.

## Simple mode

When the test starts, two kinds of measurements are performed.

### 1. Light throughput

The light throughput is measured using white light. During this measurement the gauge on the left will show the strength of the received light.

The displayed percentage is based on the calibration reference. 100% means the cable is at least as good as the reference, meaning the quality is comparable to a new cable. If the light throughput is better than the reference, in simple mode the result will still display 100%.

See chapter 4, section “Calibration information” for a detailed explanation of this reference.

### 2. Color spectrum

Next the light throughput is measured through the visible color spectrum from red to blue. The test results are displayed for the three primary colors: red, green and blue. A bar is shown for each color, visualizing the difference in light throughput between the colors and an overall score is displayed.

### Test results

After the test is completed the screen will show the results of the measurement. The left side of the screen will show an “OK” or “FAIL” result based on the light throughput. When the result is “OK”, a green circle with a check mark will appear at the top center of the screen. In case of a “FAIL” test result, a red circle with a cross will appear.

The light throughput test result depends on the selected threshold for the rejection level. For more details about this rejection level, see chapter 4, sections “measurement” and “rejection level”.

The color spectrum test result is displayed as a score from 1 to 10. A score of 10 indicates that the colors red, green and blue have similar performance. For every 10% difference between red and one of the other colors a point is deducted from the score. The minimum score is 1.

For example: When green performs 10% lower than red and blue performs 20% lower than red, the loss is considered 30% and the score will be 7 out of 10. Similarly, when green performs 30% lower than red and blue performs 50% lower than red, the score will be 2 out of 10.

### Important note:

The test results as displayed on the device are an advice to the end user. It is the responsibility of the user / owner to set the rejection threshold to the required level and to make sure the device is regularly cleaned and maintained.



## Advanced mode

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In advanced mode, more details of the test result are shown and a test result for two types of cables is supported.

### 1. Light throughput

The light throughput is measured using white light. During this measurement the gauge on the left will show the strength of the received light.

The displayed percentage is based on the calibration reference percentage. 100% means the cable is at least as good as the reference, meaning the quality is comparable to a new cable. If the light throughput is better than the reference, the test result will display a value above 100%. See chapter 4, section “Calibration information” for a detailed explanation of the reference.

In the light throughput gauge there are two dials: The thick dial displays the scale for thick (4.8 mm or more) cables and the thin one for thin (3.5 mm) cables. The color of the dial corresponds with the threshold rejection level. Where the dial color is red, it specifies the levels where the cable would be rejected. Where it is green it specifies the acceptable level.

### 2. Color spectrum

Next, the light throughput is measured through the visible color spectrum from red to blue. The test results are displayed for the three primary light colors: red, green and blue. A bar is shown for each color, visualizing the difference in light throughput between the colors and an overall score is displayed. Under each bar, the relative percentages of the color throughput are shown, where the best performing color is always shown as 100%.

### Test results

After the test is completed the screen will show the results of the measurement. The left side of the screen will show an “OK” or “FAIL” result for both thin (3.5mm) and thick (4.8mm or more) cables, based on the light throughput.

When the result is “OK” for both cable types, a green circle with a check mark will appear at the top center of the screen.

When the result is “FAIL” for both cable types, a red circle with a cross will appear.

When the result is OK for only one of the cable types, a blue circle with a question mark will appear. In this case the user will have to verify whether the cable is thin or thick and reject or accept the cable based on this information.

The light throughput test result depends on the selected threshold for the rejection level. For more details about this rejection level, see chapter 4, sections “measurement” and “rejection level”.

The color spectrum test result is displayed as a score from 1 to 10. A score of 10 indicates that the colors red, green and blue have similar performance. For every 10% difference between red and one of the other colors, a point is deducted from the score. The minimum score is 1. For example: When green performs 10% lower than red and blue performs 20% lower than red, the loss is considered 30% and the score will be 7 out of 10. Similarly, when green performs 30% lower than red and green performs 50% lower than red, the score will be 2 out of 10. Furthermore, the relative percentages of the color throughput are shown. The percentage shows the relative performance of the specific color against the performance of red. Consequently, the color spectrum performance of the best performing color is always shown as 100%.

### Important note:

The test results as displayed on the device are an advice to the end user. It is the responsibility of the user / owner to set the rejection threshold to the required level and to make sure the device is regularly cleaned and maintained.



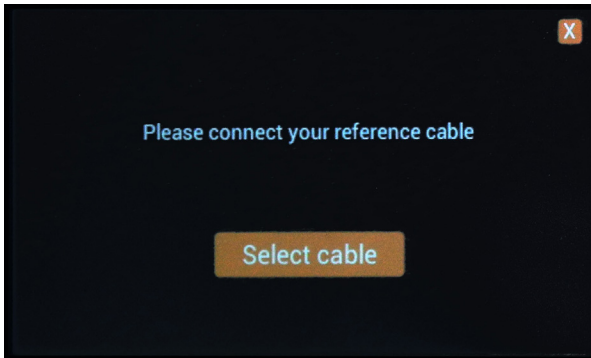
# 6 Testing scopes

## Test cable

**Note:**

Scope testing is only available for model LG20-e, or in other words: when the probe is included and connected to the LG20. See chapter 3 for connecting the probe.

To enter scope testing mode, press the endoscope icon (🔍) in the upper left corner of the main screen. Now the following screen should be visible:



Select a good quality (preferably new) test cable you wish to use for testing your scopes. It is advised to always use the same test cable to minimize differences between measurements. The selected test cable should have a light throughput measurement of at least 75%.

Connect both sides of the test cable to the matching fittings, as you would for a normal fiber optic cable measurement as described in chapter 5.

Make sure the test cable is fully inserted and kept still. Next, press the "Select cable" button. Now the device will detect the cable and perform a reference measurement. If the light throughput is less than 75% the cable is not accepted as reference cable.

Both the light throughput and color deviations are stored and used for compensation when the scope is tested. This means that any loss or color deviation of your reference cable is not visible in the test results of the scope. Only the actual performance of the scope will be shown.

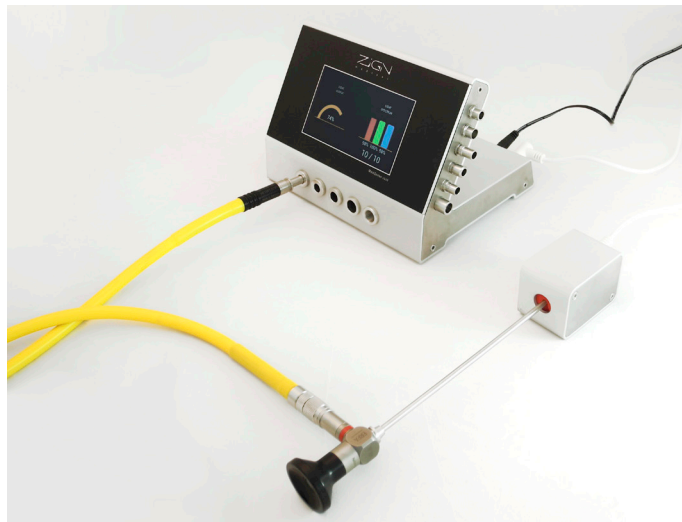
## Testing the scope

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Once the reference cable is accepted you are ready to test scopes. Leave the adapter of the reference cable in the light source connected to the LG20 and connect the instrument side of the cable to the scope.

Carefully insert the scope into the probe until it cannot go further. Do not apply force in order not to damage the scope or the inside of the PT10 scope testing probe.

Once the scope is detected the measurement will start. Always make sure the reference cable is still fully inserted into the light source and the scope and probe are held still. It is advised to leave them laying on the table during measurement.



### **Note:**

Since ambient light can enter through the eyepiece and enter the probe, the eyepiece should be covered during the measurement. This can be done by hand or with an eyepiece cap.

When the test starts, two kinds of measurements are performed.

### **1. Light throughput**

The light throughput is measured using white light. During this measurement the gauge on the left will show the strength of the received light.

The displayed percentage is based on a reference light level. The 100% reference level is based on a light loss of 50% through the scope, which is a common average for scopes.

### **2. Color spectrum**

Next the light throughput is measured through the visible color spectrum from red to blue. The test results are displayed for the three primary colors: red, green and blue. A bar is shown for each color, visualizing the difference light throughput between the colors and an overall score is displayed. Under each bar, the relative percentage for the color is shown, where the best performing color is always shown as 100%.

### **Test results**

After the test is completed, the screen will show the resulting throughput of white light on the left side gauge and the corresponding throughput percentage. The right side of the screen shows the results of the color spectrum measurement with its corresponding percentages.

**Important note:** There is no “PASS” or “FAIL” result in the scope testing mode.

There is a significant difference in light throughput between different kinds of scopes. Some have lots of light fibers, some have only few. Therefore, it is not possible to determine one fixed threshold.

To determine the light throughput quality of the scope, we advise the user to maintain a list of the light throughput score for each type of scope. By performing a reference measurement when the scope is new, a reference throughput can be set. Based on this reference, the user can assess the quality of the scope and the deterioration over time.

# 7 Maintenance

## Cleaning instructions



- 1 Clean the light sources using a non pilling, dry cotton swab
- 2 Clean the instrument adapters using a non pilling, dry cotton swab
- 3 The electrical connections cannot be cleaned and should be kept dry
- 4 The inside of the probe cannot be cleaned and should be kept dry
- 5 The outside surface of the device and the touch screen may be cleaned using a moist towel. Do not use a wet towel. Make sure no moist enters any openings of the device!



# 8 Tips for reliable measurements

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## Tips

### 1 **Always make sure your device is clean**

Fiber optic cables may not always be 100% clean and will leave dirt in the fittings. Cleaning the fittings on a regular basis will make sure the measurements will ensure reliable test results. Refer to chapter 7 for detailed cleaning instructions.

### 2 **Check your adapters**

If you are using special adapters to connect fiber optic cables to a scope, always check the optical quality of this adapter. Often such adapters are of bad quality or do not directly connect the fibers from the cable to the scope. If there is a big gap between the two fiber bundles, a lot of light will be lost. Keep this in mind before you discard good cables which are fitted with bad adapters.

We advice to always test your cables without adapters to assess the cable quality. When you want to measure the performance of the system including adapter, off course you should test with the adapter.

### 3 **Consistent methods**

A fiber optic cable may have several broken fibers. This can result in deviations in the outcome when performing consecutive measurements with the same cable. Specifically, the position of the cable can be of significant influence. In a rolled-up fashion, the cable might pass through less light compared to when the cable is fully unrolled. Therefore, be consistent when choosing to unroll or not to unroll the fiber optic cable before testing. If you want to know the maximum performance of your cables unroll your cables first. If you want to know the worst-case performance of your cables roll up the cables before testing. Be careful not to roll up your cables too tight or you may damage the fibers.

### 4 **Keep your instruments clean**

More than often, dirt and calcic residue accumulates inside the light guide adapter on scopes. This will result in lower light throughput and it can strongly affect the color balance. Although the LG20-e will correctly display the worsened condition, this result might be caused by dirt rather than material damage. Make sure to thoroughly clean the scope before testing it. This will prevent unneeded rejection and repair of your scopes.



# 9 Trouble shooting

## Common issues & solutions

### 1 **My fiber optic cable is brand new, but the test results shows a very low light throughput**

*Possible cause: Bad adapter*

*Solution:*

If you are using a special adapter on you fiber optic cable, check the quality of this adapter. Many cheap adapters do not directly connect the light fibers between cable and scope, which result in a great loss of light. Please remove the adapter and verify the quality of the light guide cable by connecting it without special adapter.

*Possible cause: Cable is inserted in the wrong fitting.*

*Solution:*

Please refer to chapter 5 on how to correctly connect your fiber optic cable to the LG20.

### 2 **My fiber optic cable looks really bad, but the test results show the light throughput is OK**

*Possible cause: Unevenly polished fibers*

*Solution:*

Sometimes the end surface of a fiber optic cable can have dark patches when you look at it. These dark patches are usually caused by unevenly polished fibers. You will see that when you move the other end of the cable in other directions, the dark patches will become lighter, while the lighter patches will become darker. This is the result of light exiting the cable in slightly different angles. This does mean the quality of the cable is not excellent, but as the measurement shows, the light throughput can be perfectly acceptable.

*Possible cause: Cable is inserted in wrong fitting.*

*Solution:*

Please refer to chapter 5 on how to correctly connect your fiber optic cable to the LG20.

### 3 **When I measure the same fiber optic cable multiple times, I get different results**

*Possible cause: broken fibers*

*Solution:*

*A fiber optic cable may have several broken fibers.* Broken fibers can cause inconsistencies in measurements because each time the cable moves, more or less fibers may be lined-up properly or not. Nothing can be done to improve such a measurement, since the source is unstable. However, since this inconsistency in measurement indicates a significant number of broken fibers you may consider to reject the cable.

*Possible cause: The cable is not inserted fully and it is moved during measurement*

*Solution:*

Please refer to chapter 5 on how to correctly connect your fiber optic cable to the LG20.

# 10 Additional information

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## Technical specifications

### Power supply:

Type:	External AC-DC adapter
Construction:	Class II
Supply voltage rating:	110 - 240 VAC
Input frequency:	50 - 60 Hz
Input current:	0.3 A
No load input power:	< 0.1 W
Input protection:	Internal T1.0A / 250 VAC fuse
Output voltage:	9 V
Short circuit protection:	Continuous, trip and restart (hiccup mode) with auto recovery

### Main unit:

Model number:	LG20
Power consumption:	1.8 W
Input protection:	Internal T0.75A 63VDC fuse
Output protection:	Internal 0.2A self recovering fuse
Dimensions (w x h x d):	190 x 133 x 147 mm
Net weight:	1.6 kg
Installation class:	II
Safety class:	II
Operating temperature range:	5 - 35 °C
Operating humidity range:	5 - 95% non condensing humidity
Maximum usage height:	2000 meter above sea level
IP class:	IP41

### Probe:

Model number:	PT10
Power consumption:	0.13 W
Dimensions (w x h x d):	40 x 44 x 64mm
Net weight:	0.16 kg
IP class:	IP21

### Manufacturer:

Name:	Zign Medical B.V.
Address:	Marconibaan 57 3439 MR Nieuwegein The Netherlands
Phone:	+31 85 273 67 53
Email:	support@zignmedical.com
Website:	www.zignmedical.com



m e d i c a l

## EC Declaration of Conformity (Doc)

Document Version: 0002

### We:

Company Name: ZiGIM Medical  
Postal Address: Colbaan 1  
Postcode: 3439 NG  
City: Nieuwegein  
Telephone Number: +31 (0) 85 273 67 53  
E-Mail address: [sales@zigimmedical.com](mailto:sales@zigimmedical.com)

**Declare that the Doc is issued under the sole responsibility and belongs to the following product:**

Apparatus model/Product: Fiber Optic Cable & Scope Tester  
Type: LG20 / LG20-e

**The object of the declaration described above is in conformity with the relevant Union harmonization legislation:**

- EMC Directive 2014/30/EU
- Low Voltage Directive (LVD) 2014/35/EU

**The following harmonized standards and technical specifications have been applied:**

- EN 55011:2016, A1:2017
- EN 55016-2-3:2017, A1:2019
- EN 61000-3-2:2019
- EN 61000-3-3:2013, A1:2019
- EN 61000-4-2:2009
- EN 61000-4-3:2006, A1:2008, A2: 2010
- EN 61000-4-4:2012
- EN 61000-4-5:2014, A1:2018
- EN 61000-4-5:2014
- EN 61000-4-8:2010
- EN 61000-4-11:2004, A1: 2017
- EN 61010-1:2010

**Signed for and on behalf of:**

Nieuwegein, 08-01-2020  
Place of issue Date of issue

Erik Bockweg, Managing Director  
Name, function, signature

A handwritten signature in blue ink, appearing to read 'Erik Bockweg'. The signature is written in a cursive, flowing style.