



# **VGA RESOLUTION PROBE**

*USER'S MANUAL*



**P16181HP**  
**P16182HP**  
**P16183HP**

*Please read this manual carefully and thoroughly before using this product.*

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## INTRODUCTION

Thank you for purchasing General Tools & Instruments' (General's) P16181HP, P16182HP or P16183HP VGA Resolution Probe. Please read this manual carefully and thoroughly before using the probe.

The P16181HP, P16182HP and P16183HP are high-performance camera-tipped probes that capture video and still images at VGA (640 x 480 pixel) resolution. The only difference among the three probes is their length. The P16181HP is 1m (3.3 ft.) long, the P16182HP is 2m (6.6 ft.) long, and the P16183HP is 3m (9.8 ft.) long. Each probe's six super-bright LEDs make it particularly suitable for inspecting dark environments and viewing parts and structures within them.

All three probes are compatible with:

- General's DCS1600, DCS1600ART, DCS1700, DCS1800, DCS800 and DCS2000 Recording Video Borescope Inspection Systems
- The H16, H17 and H8 Handheld Recording Consoles (the DCS1600, DCS1700 and DCS800 Systems without a probe)
- The DCS1800-TR Transmitting Probe Handle/Controller, which enables video and images captured by the probe to be viewed on the console of a DCS1800ART system

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## KEY FEATURES

- Six super-bright white LEDs (four forward-facing and two side-facing) support capture of 640 x 480 pixel (VGA) resolution video and still images
- 1m, 2m or 3m long, 0.22 in. (5.5mm) diameter probe goes deep into tight spaces and is flexible-obedient (semi-rigid) to hold its configured shape
- Light boost, anti-reflection and 90° image rotation buttons on handle
- Superior optics tailored for close-focus viewing from 0.4 in. to 2.4 in. (10 to 60mm) over 60° (diagonal) field of view
- 0.78 in. (20mm) long stainless steel camera head is waterproof to IP67 standard and immune to bathroom toilet cleaner, unleaded gasoline, diesel fuel, brake/transmission fluid and machine oil
- Includes 110° mirrored viewing tip

# SAFETY INSTRUCTIONS

## CAUTION!

*Do not use the probe to inspect ducts or areas known or suspected to contain live electric wiring or flammable liquid or gas*

## WHAT'S IN THE BOX

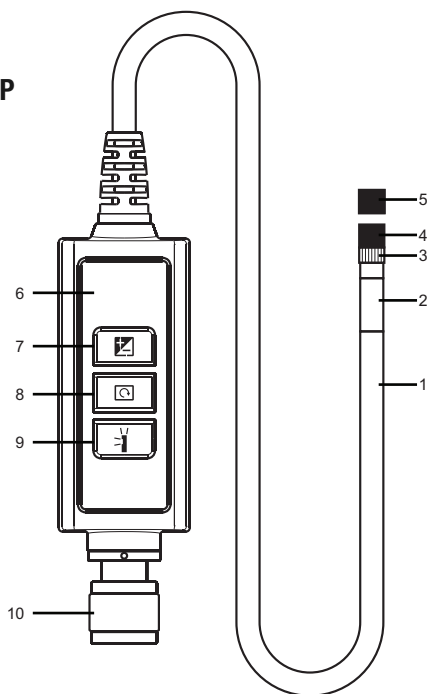
The VGA Resolution Probe comes in a cardboard box along with a 110° mirrored viewing tip and this user's manual.

## PRODUCT OVERVIEW

Fig. 1 shows the controls and key structures of the probe. Familiarize yourself with their names and functions before moving on to the Setup Instructions and Operating Instructions.

**Fig. 1. The controls and key structures of the P16181HP/P16182HP/P16183HP**

1. Probe
2. Stainless steel camera head containing four forward-facing LEDs and two side-facing LEDs
3. Stainless steel accessory alignment ring
4. Black metal thread protector ring
5. Red rubber protective cap
6. Probe handle
7. Light boost button
8. 90° rotation button
9. Anti-reflection button
10. Probe connector



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# SETUP INSTRUCTIONS

## ***ATTACH TO BORESCOPE***

The probe is compatible with the following systems and components from General:

- The DCS1600, DCS1600ART, DCS1700, DCS800, DCS1800 and DCS2000 Recording Video Borescope Inspection Systems
- The H16, H17, and H8 Handheld Recording Consoles (the DCS1600, DCS1700 and DCS800 Systems without a probe)
- The DCS1800-TR Transmitting Probe Handle/Controller, which enables video and images captured by the probe to be viewed on the console of a DCS1800ART system

To attach the probe to any of the above systems, consoles or handle/controller, retract the metal collar of the Probe connector (Fig. 1, Callout 10) to expose the alignment key with a dot. Keeping the collar pulled back, align this dot with the dot on the connector of your borescope, borescope console or handle/controller and push the two connectors together. To secure the connection, push the collar forward and turn it clockwise until tight.

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# OPERATING INSTRUCTIONS


For general guidelines on using the probe as an inspection tool, refer to the Operating Instructions section of the user's manual for your borescope or borescope console.

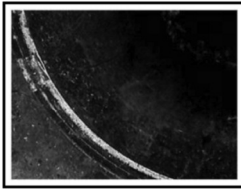
To adjust the intensity of the LEDs at the tip of the probe, roll the thumbwheel on your borescope, borescope console or probe handle/controller forward or back.

Because the VGA Resolution Probe has four extra-bright LEDs that require more power than the LEDs of General's QVGA (320 x 240 pixel) resolution probes, using the P16181HP, P16182HP or P16183HP will drain the batteries of your borescope more quickly. You will have to recharge your borescope more often.

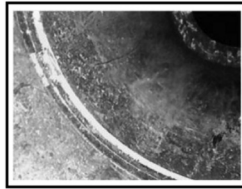
Remember to remove the red rubber protective cap from the tip of the probe before using it.

## USING THE THREE CONTROL BUTTONS

**To boost the intensity of the four LEDs** normally providing camera lighting, press the  button. Doing so lights a red LED behind the button and improves the brightness of video and images, as shown below.






BEFORE BOOST




AFTER BOOST

This feature can help you cope with very low-light conditions. When recording with the boost feature activated, you must hold the probe very steady or your videos and images will be blurred.

**To rotate the probe's field of view**, use the  button. Pressing the button once backlights the button red and rotates the frame clockwise by 90°. Pressing it a second time rotates the frame by an additional 90°, in effect turning the original view upside-down. Pressing the  button a third time rotates the field of view yet another 90°. Pressing the button a fourth time restores the original view and extinguishes the red button backlight.

To remove glare, reflections or spots from the field of view, use the  button. Pressing the button adds a red backlight to it, just like the other two buttons on the VGA Probe handle.

This anti-reflection feature of the probe is most useful for eliminating reflections of the four forward-facing LEDs in the camera head from shiny surfaces. Note that pushing the  button extinguishes the four forward-facing LEDs and shifts responsibility for camera lighting to the two side-facing LEDs. The net effect, as shown below, is a clearer and more-readable image.

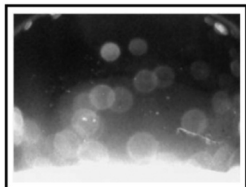


WITHOUT ANTI-REFLECTION

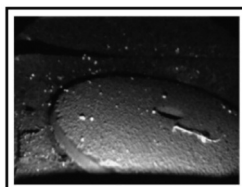


WITH ANTI-REFLECTION

You can also use the anti-reflection function to remove glare created by the probe's mirrored viewing tip (see the next section of this manual for installation and alignment instructions). The pair of images below illustrates the net positive effect.



**MIRRORED VIEW  
WITHOUT ANTI-REFLECTION**



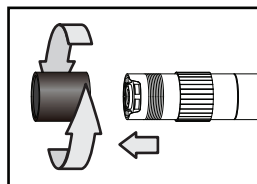
**MIRRORED VIEW  
WITH ANTI-REFLECTION**

### ***ATTACHING THE MIRRORED VIEWING TIP (OPTIONAL)***

The only accessory included with the probe is a 110° mirrored viewing tip. To attach it to the probe:

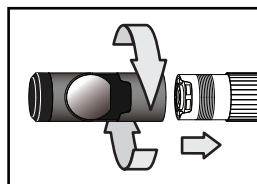
1. Pull off the red rubber protective cap (Fig. 1, Callout 5).


2. Unscrew and remove the black metal thread protector ring (Callout 4), as shown at right.



3. Turn the stainless steel accessory alignment ring (Callout 3) clockwise to move it away from the probe tip. Keep turning until the ring can travel no further.

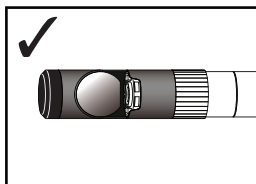
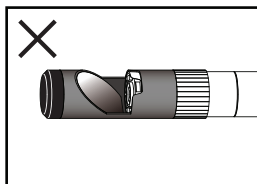
4. Screw the mirrored viewing tip onto the camera head (Callout 2) by turning it clockwise, as shown at right. Keep turning until the viewing tip is as far from the probe tip as possible. In this position, it can rotate freely.



5. Press the  button to activate the two-side facing LEDs.

6. Slowly turn the mirrored viewing tip counterclockwise to move it toward the probe tip. Once the threads of the tip grip the camera head, continue turning only until the two LEDs are clearly visible through the gap in the tip's housing.

7. Secure the tip with the thumb and forefinger of one hand and use your other hand to turn the alignment ring clockwise. Keep turning the ring until its leading edge contacts the mirrored viewing tip, locking it in place. The pair of figures below illustrate the incorrect (left) and correct (right) orientation of the mirror with respect to the LEDs.



Remove the blue circular protective film from the mirror by pulling on its tab with a tweezers.

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## SPECIFICATIONS

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Probe Length, Type:	1m, 2m or 3m (3.3 ft., 6.6 ft. or 9.8 ft.), Flexible-obedient
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Camera Head Diameter, Type	0.22 in. (5.5mm), Stainless steel
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Camera Head Diameter with Thread Protector:	0.23 in. (6mm)
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Camera Head Length:	0.78 in. (20mm)
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Camera Resolution:	VGA (640 x 480 pixels)
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Camera Depth of Field:	0.4 to 12 in. (10 to 300mm)
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Camera Field of View:	60° (diagonal)
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Camera Lighting:	4 forward-facing LEDs + 2 side-facing LEDs
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Operating Temperature:	-4° to 150°F (-20° to 65°C)
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Dimensions of Probe Handle:	5.47 x 1.38 x 1.26 in. (139 x 35 x 32mm)
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Weight of Handle and Probe:	7.76 oz. (220g)
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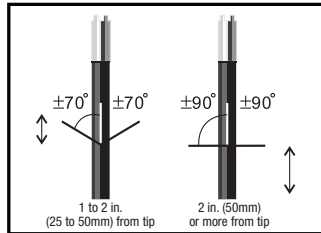


# OPERATING & MAINTENANCE TIPS

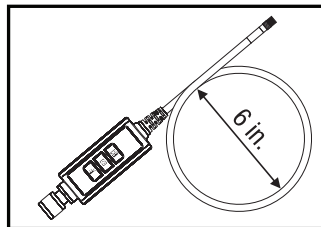
The probe is flexible to make it easy for you to inspect hard-to-reach areas. Never insert or bend it by force, and never over-bend any part of the probe.

Specifically:

- Do not bend the last 1 to 2 inches (25 to 50mm) of the probe by more than  $70^{\circ}$
- Do not bend the probe at any other point by more than  $90^{\circ}$



To avoid permanently damaging the delicate wires and fiber optic cables inside the probe, never curl it into a circle with a diameter of less than 6 in. (150mm).



Never use the probe or camera head to modify surroundings or to clear pathways or clogged areas.

The camera head, LEDs and thread protector ring are waterproof, but not acid-proof or fire-proof. Do not touch acidic, corrosive or hot materials or they will ruin the head.

Cover the camera-tipped end of the probe with the protective rubber cap when not using it.

Unless you wish to install the  $110^{\circ}$  mirrored viewing tip, do not remove the thread protector ring (Fig. 1, Callout 4).

Never use the probe as a hammer or to clear debris.

When inspecting a vehicle, shut off the engine. Metal and liquid under the hood may be hot. Do not get oil or gas on the camera head.

If condensation forms inside the camera lens, let it evaporate before using the probe again.

Do not try to disassemble any part of the probe. Doing so creates an electrical hazard, could damage the probe, and voids the limited warranty.

Do not use any corrosive liquid—such as alcohol—to clean the probe body or camera head. Use a cotton swab and a mild fluid detergent to clean the body and head.

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## **WARRANTY INFORMATION**

General Tools & Instruments' (General's) P16181HP, P16182HP or P16183HP VGA Resolution Probe is warranted to the original purchaser to be free from defects in material and workmanship for a period of one year. Subject to certain restrictions, General will repair or replace this instrument if, after examination, the company determines it to be defective in material or workmanship.

This warranty does not apply to damages that General determines to be from an attempted repair by non-authorized personnel or misuse, alterations, normal wear and tear, or accidental damage. The defective unit must be returned to General Tools & Instruments or to a General-authorized service center, freight prepaid and insured.

Acceptance of the exclusive repair and replacement remedies described herein is a condition of the contract for purchase of this product. In no event shall General be liable for any incidental, special, consequential or punitive damages, or for any cost, attorneys' fees, expenses, or losses alleged to be a consequence of damage due to failure of, or defect in any product including, but not limited to, any claims for loss of profits.

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## **RETURN FOR REPAIR POLICY**

Every effort has been made to provide you with a reliable product of superior quality. However, in the event your instrument requires repair, please contact our Customer Service to obtain an RGA (Return Goods Authorization) number before forwarding the unit via prepaid freight to the attention of our Service Center at this address:

General Tools & Instruments  
80 White Street  
New York, NY 10013  
212-431-6100

Remember to include a copy of your proof of purchase, your return address, and your phone number and/or e-mail address.



## **Specialty Tools & Instruments**

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P16181HP/P16182HP/P16183HP User's Manual

Specifications subject to change without notice

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9/22/14



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