User Guide

WELL-CAMERA.2

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1.Important Notice

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This guide refers to “WellCamera.2” HW version 1.0

Torino, ITALIA 2016

2. Warranty and safety instructions

Read these instructions carefully before using the product:

- Warranty will be void, if the product is used in any way that does not follow the instructions given in this manual.
- Warranty will be void if any part of WellCamera.2 has been tampered with.
- The device must be used only according to the instructions described in this manual. Faultless and safe operation of the device can be guaranteed only if the transport, storage, handling and operation of the device is appropriate.
- To prevent damage, use only original accessories or those approved by PASI srl.
- The box is waterproof only if closed. When a suitable location has been selected for the WellCamera.2, it must be ensured that no water can get into the device under any conditions. Direct sunlight is also to be avoided. It is not recommended that the WellCamera.2 is installed on a strongly vibrating surface.

3.Introduction

The WellCamera.2 is a device designed and assembled by P.A.S.I. srl, a leading company in Italy in the production of instruments for inspection, geology and geophysics.

Taking advantage of our wide experience in designing and manufacturing TV systems for
borehole and well applications, PASI has created the innovative WELL-CAMERA; this compact and lightweight device is the answer for anybody who are looking for an easy-to-use, reliable and affordable tool for quick in-field video inspections.

A complete WELL-CAMERA.2 system consists of:

- Reel and Camera head;
- Control Unit with integrated LCD, USB2.0 grabber board and microphone;
- Encoder (optional accessory);
- Battery charger.

Main technical features are:

- internal 12V rechargeable battery / external 12V battery connecting cable;
- camera head waterproof up to 35 bar (approx. 350m of freshwater column);
- wide angle lens 120° - available 90° view option;
- integrated monitor 9" TFT LCD;
- 8x high intensity LED (max. 200 lumen), with regulation knob;
- integrated audio/video grabber board USB2 for recording on external PC;
- Available lengths: **100m, 200m, 300m, 400m, 500m.**

This guide details the technical specifications and how to use the device. Please follow these guidelines.

4.Technical specifications

Camera Head Specifications

Diameter	40mm
Length	150mm
Sensor Type	CCD 1/3”
Resolution	700 lines
Lens	2.9mm fixed lens
Minimum intensity required	0.005 lux @ F1.2
Light type	8x high intensity LEDs (max. 200 lumen)
Waterproof protection	IP68, submergible up to 350m (35bars)

Monitor Specifications

Display	9” TFT LCD
Wide Screen	16:9 or 4:3
System	NTSC/PAL
Resolution	800x480 pixel

Control Unit Specifications

Power Supply	Internal or external 12V battery, for up to 10 hours of field use
Digital Output	Integrated USB 2.0 audio/video grabber board + microphone for saving movies and vocal comments directly to any external PC
Analog Video Output	BNC connector
Weight	6Kg
Size	30.6cm X 23.4cm X 13cm

Encoder Specifications

Encoder	Optional accessory for WellCamera.2 only – for monitor display of depth and its automatic recording on file
Unit of measurements	Meter / Feet – User selectable

To charge the battery use the charger included.

We suggest you do not use the device while charging from very low battery levels. Wait at least 15-20 minutes for the battery level to pick up.

When not in use, we suggest you store the device with a charged battery, not completely discharged.

The device is shipped with a partially charged battery. We suggest you charge the battery before use. The charger is provided with a LED indicator that shows the charging state. If it is off the battery is fully charged.

IMPORTANTE NOTE FOR THE BATTERY:

It is highly recommended to charge the battery once every 30/40 days even if the equipment is not used.

When the battery is discharged the main LED on the top panel will blink.

5. User interface Description

Main Panel

FIGURE 1 - MAIN PANEL

In 1 the top panel of the WellCamera.2 is shown. On the bottom-left the On/Off switch. In the center the push buttons to access and interact with the overlaid menu on the monitor. Knob to adjust light intensity on the bottom right. Connectors on the right.

Connectors onthe panel

Starting from the top:

- Video Out: Analog video output;
- Mic: Internal microphone;
- Encoder: 4 poles male connector to connect the external encoder for measuring depth;
- Camera Line: 4 poles female connector to connect the Control Unit to the winch of the camera cable;
- Ext.Batt/Charg: 3 poles male connector to connect the battery charger or an external battery.
- USB: mini USB connector to connect the WellCamera.2 to an external PC for video recording.

NOTE:

For video recording you should refer to the Manhattan Video Grabber documentation provided in the pack and not included this manual.

Video User Interface

FIGURE 2 - OVERLAID USER INTERFACE

Figure 2 shows the user interface overlaid on the monitor of the WellCamera.2.

On the bottom-right there is the battery indicator. If it is totally white, the battery is fully charged.

On the bottom-left there is the depth indicator. It is visible only if the encoder is connected to the WellCamera.2. It can be in meters (m) or feet(f).

In the center, there is the MENU. It can be opened by pressing the MENU button on the main panel. Navigate using the arrow buttons and OK buttons. Press the MENU button to ESC.

NOTE:

If the encoder is not connected the functionalities of the WellCamera.2 are limited. In this case it's possible to use only the "View" function. The UP and DOWN pushbutton will be disabled.

Menu functions

The MENU is composed of the following elements:

1 – Unit

If you are positioned on the unit element, by pressing the OK button you can switch the unit of measurement. There are two possible units: Meters (m) and Feet (f).

2 – Reset

If you are positioned on the Reset element, by pressing the OK button you can reset the depth counter to zero.

3 – View

If you are positioned on the View element, by pressing the OK button you can hide the depth counter and the battery info overlaid on the monitor and only see the video from the camera or video plus depth counter. Press again to see the info overlaid on the monitor.

4 – Setting

The setting function allows you to set the meter(feet) counter manually to adjust the depth or, for example, to select a starting point for the counter.

You can access this function by pressing OK when you are positioned on the Setting element of the MENU. Automatically the right digit of the counter will blink, use the up and down arrow button to set the number you want and pass to the next digit by pressing the OK button. To terminate the manual adjustment press the MENU button.

6. Installation

What's inside

The WellCamera.2 is composed of the following parts:

- Control Unit;
- Winch with camera cable and camera head;
- 1 black cable with two 4 pins male connectors to connect the winch to the Central Unit;
- 1 black cable with 4 pins female connectors to connect the encoder to the Central Unit (optional);
- 1 USB cable to connect the Control Unit to an external PC for video and audio recording;
- 1 charger;
- 1 Encoder (Optional);
- Cable for connecting external battery (optional).

Check List

The following points must be considered when installing the WellCamera.2.

1. After placing the components of the WellCamera.2 in the inspection site, connect one end of the 4-pin black cable male connectors to the winch of the camera;
2. Connect the other end of the 4 pins male cable to the "Camera Line" connector on the panel of the Control Unit. The WellCamera.2 must be switched off while connecting the cable of the Camera Line. In Figure 3 the control is showed unit properly connected to the winch with cable and camera head;
3. If you are going to use the encoder, connect one end of the4-pin black cable female connectors to the Encoder connector and then the other end on the "Encoder" connector to the Control Unit main panel;
4. It is recommended you turn on the WellCamera.2 when the above points have been carried out. If you need to connect the encoder when the WellCamera.2 is already in operation remember to connect the cable first to the encoder and then to the panel of the Control Unit;

5. If the battery is discharged, you can use the WellCamera.2 during charging or using an external battery.

FIGURE 3 - WELLCAMERA.2 CONTROL UNIT CONNECTED TO THE WINCH WITH 500M CABLE AND CAMERA HEAD

Encoder

To obtain the best performance in reading the depth it is essential that the following point are respected:

- The encoder must be properly mounted on a solid support;
- The cable must be placed correctly between pulleys.
- The reading will be reliable only if there is sufficient friction. Therefore the cable should not be wet or dirty otherwise the cable will slide on the pulleys. Also make sure that the cable is tensioned.
- unrolling the cable too quickly may result in read errors;

If all recommendations are respected, encoder precision is ±0.05%

Figure 4 shows the encoder properly mounted with the camera cable.

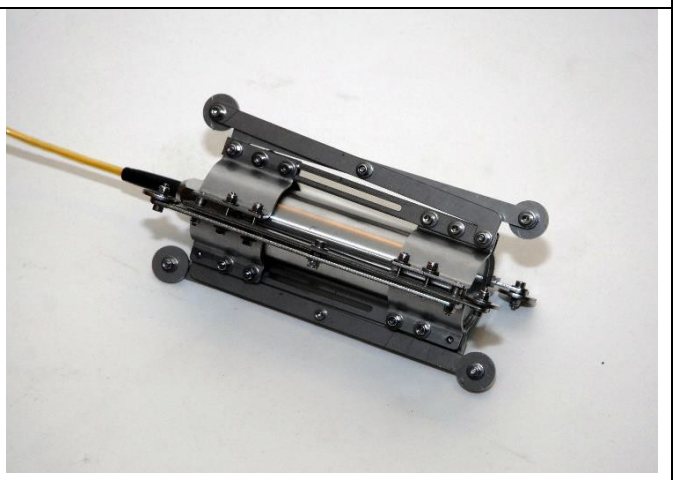
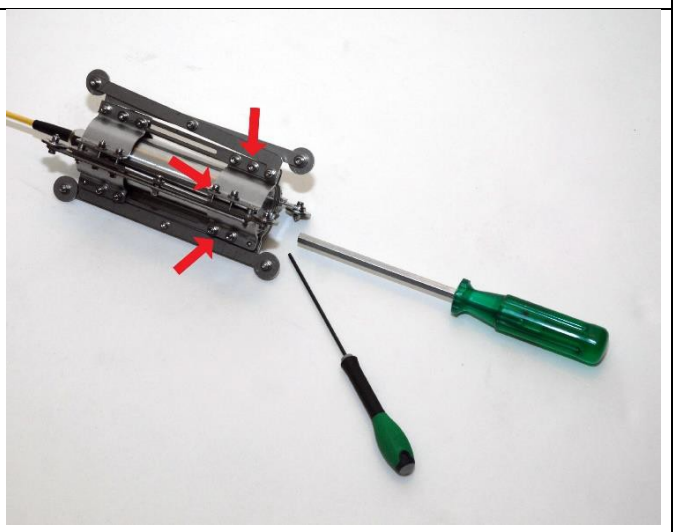
FIGURE 4 - ENCODER PROPERLY INSTALLED

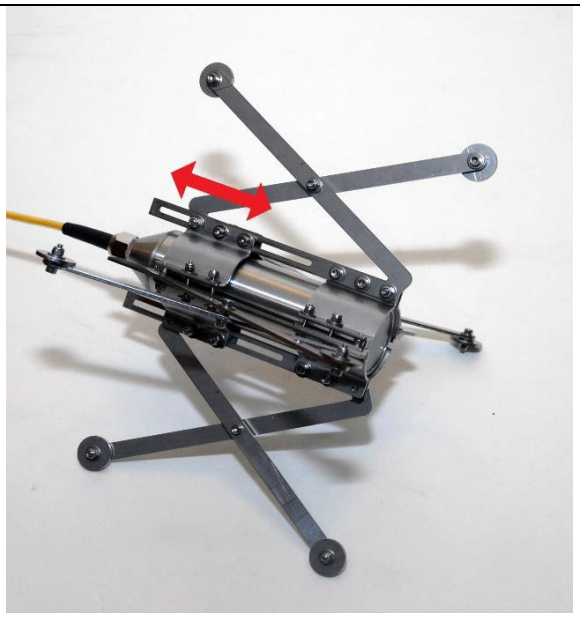
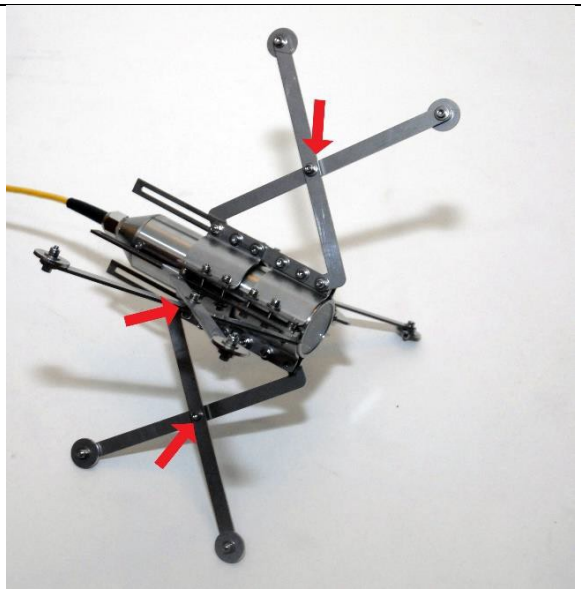
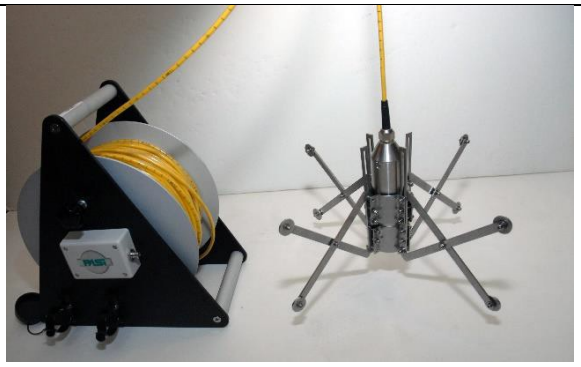
Video Recording

For instructions on video recording please refer to the Manhattan Video Grabber documentation included.

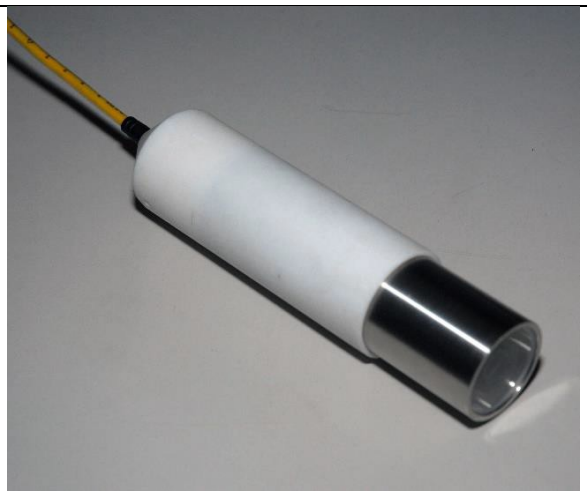
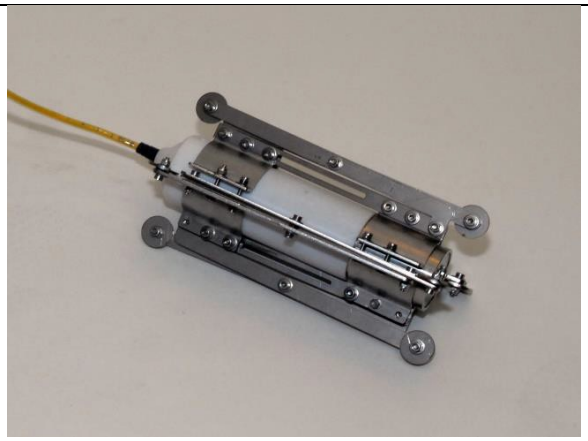
7.Accessories

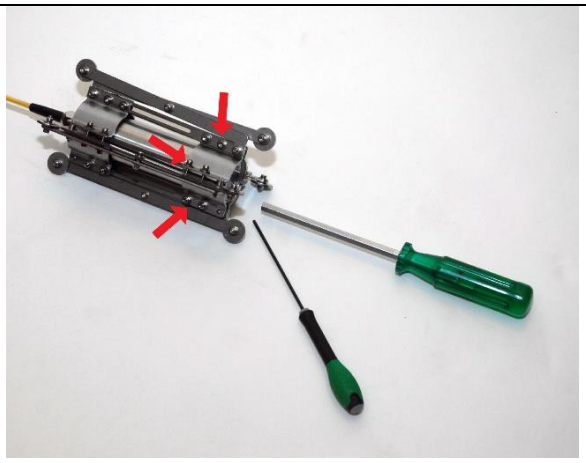
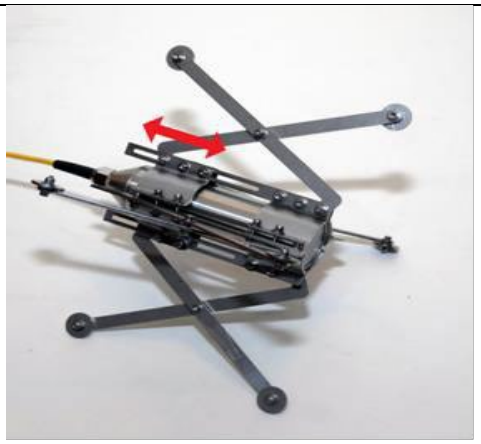
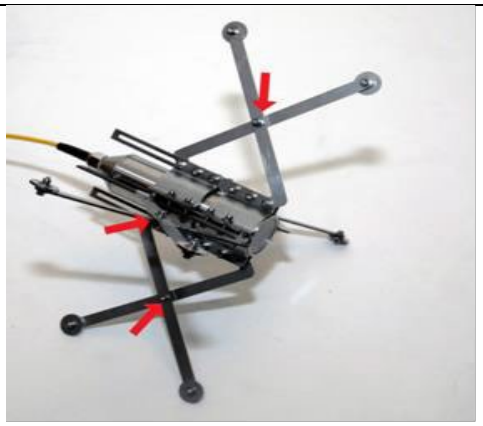
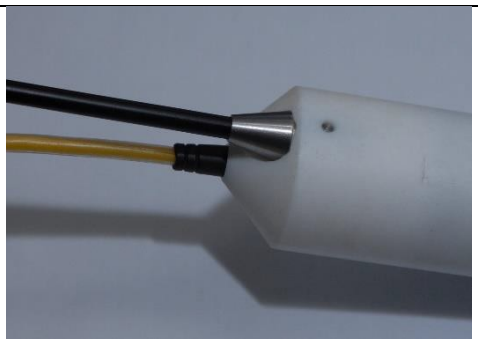
Horizontal centering device (Optional)

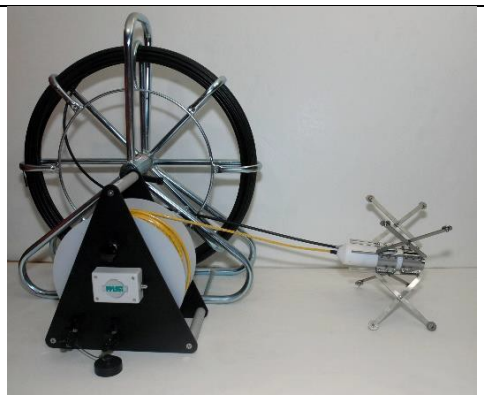
1)Well-Camera head.	
2)Insert Well-Camera head inthe centering device as shown in the picture. Be sure to mount the Well-Camera head in the right direction: the front side of the camera head fits the narrowest part of the centering device, indicated by a label.	
3) Tighten the bolts of the centering device with the special tools as shown in the picture	

4)The diameter of the centering device can be adjusted as indicated by sliding the two flanges along the device	
5)Fix into position by tightening the bolts & the screws as shown in the picture.	
6)The Well Camera with the centering devices is now ready to use	

How to mount and use the horizontal centering device with the aspo (optional)

1)Well-Camera head	
2)Insert the Well-Camera head in the Teflon shield.	
3)Insert Well-Camera head in the centering device as shown in the picture. Be sure to mount the Well-Camera head in the right direction: the front side of the camera head fits the narrowest part of the centering device, indicated by a label).	

4) Tighten the bolts of the centering device with the special tools as shown in the picture	
5) The diameter of the centering device can be adjusted as indicated by sliding the two flanges along the device	
6) Fix into position by tightening the bolts & the screws as shown in the picture	
7)Fix the ASPO fiber glass cable to the teflon shield as shown in the picture.	

8)The Well Camera with the ASPO option and centering device is now ready to use.	

Installation and use of the adjustable pulley assembly (Optional)

1) Unscrew anticlockwise the clamp until it reaches the thickness of the borehole casing, then tighten it by screwing it clockwise until it is secure. The clamping device can be regulated for a thickness from 0 to 9.3 cm.

2) Align the blue pulley with the centre of the shaft, unscrew it by using a wrench measure #17 (not supplied with the accessory).
Once the desired position is reached, secure the blue pulley by tightening the wrench clockwise.
3) Insert the camera head in the well, by placing the connecting cable into the groove of the pulley.

FIGURE 5 - THE POSITION OF THE BLUE PULLEY CAN BE REGULATED

Installation and use of the suspending tripod with pulley (Optional)

FIGURE 6 - SUSPENDING TRIPOD WITH PULLEY

How to adjust the height of the tripod:

1) Loosen the three screws at the base of the tripod legs to adjust their length in order to reach the right position to allow the Well-Camera.2 to be lower vertically and centred in the borehole.
2) Pass the camera head and its cable carefully inside the pulley bracket and then slowly lower the camera head inside the well.
3) The cable reel has a braking system to optimize the camera head descent speed: turn the knob clockwise to descend faster or turn anticlockwise to slow down.

How to mount and use the centering device for vertical use and the 90° viewoption (Optional)

1)Well-Camera head	
2)Insert the Well-Camera head in the vertical centering device and mount the elastic band as shown. The centering device can be fixed at different opening diameters by sliding the adjusting ring along the camera head body. The ring can be fixed simply by tightening the screw clockwise. The centering device can be regulated from 80mm to 260mm of diameter.	

3) The 90°view option can be mounted using its own special mounting ring simply by tightening the screw clockwise. The distance between the mirror and the camera front glass can be regulated by sliding the 90°view option mounting bracket and tightening its screws clockwise. We recommend you use the 90°view option together with the vertical centering device.