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VIS 2000^{PRO} DC Monitor



Contents

3. Technical Specifications.....	4	10. Transferring Images to a PC.....	19
4. Getting Started.....	6	11. Troubleshooting.....	20
5. Using the Key Menus.....	7	12. System Components	22
6. Capturing Images.....	8	13. Accessories/SpareParts of the Colour Monitor VIS 2000	27
7. Reviewing Images and Videos.....	10	14. Declaration of conformity	28
8. Using the Gallery Menu	11	15. Guarantee and Service	29
9. Configuring the PRO Monitor	14		

1. Introduction

1.1 About the Wöhler PRO DC monitor

The PRO DC monitor (PRO) is a unique product that provides a convenient way of capturing still images or video clips to a removable CompactFlash card. It is compatible with both NTSC and PAL, composite or S-video signals, and a built-in LCD display allows you to preview the video before saving it to the memory card. Video clips are captured at 12 frames per second at full NTSC or PAL resolution, and stored in Motion-JPEG (MJPEG) compressed format, allowing approximately 3 minutes of video to be stored on a 128MB CompactFlash card. Still images are stored in a compressed JPEG format, and over 150 images can be stored on a 128MB CompactFlash card. The storage capacity is limited only by the size of the CompactFlash card used, and a 1GB card will hold many thousands of images or approximately 30 minutes of video. Captured images and video clips are automatically named with the date and a sequence label. Alternatively you can supply a name using the PRO monitor keypad. Images can be organized into named folders, and a range of cataloguing functions help in archiving and retrieving images, including the ability to rename images, delete images, and move or copy images between folders.

The PRO monitor includes a convenient thumbnail gallery feature, which allows you to search through the library of captured images 12 at a time, and then select one for full size viewing. Alternatively the images can be uploaded to a PC using the supplied card reader, where they can be displayed or processed by any suitable image editing software.

The PRO monitor is simple to operate, using intuitive onscreen displays, and the keypad can be used even when wearing gloves or protective clothing. For convenience the PRO monitor display image can also be flipped so the monitor can accommodate either right or left-handed use. A range of user options allows you to specify how the image files are named, the display orientation, and video parameters.

The PRO monitor is ideal for any application in which sequences of still images or video clips need to be captured and stored on site. The PRO monitor is an ideal replacement for a VCR or computer based video capture system where still images or video clips need to be captured from a video source. Its rugged construction and the absence of moving parts make it extremely durable and it is ideal for use in the field.

Typical applications include:

- Chimney, Duct, Vent or pipe inspection and documentation
- Routine maintenance and quality control
- Inspection and fault-finding

- Digital capture from other video/TV sources

The PRO monitor comes standard with a high quality, leather case and strap for protection and ease of transport and has a flip out sun visor for outdoor viewing. The PRO monitor also comes with a power supply unit (PSU) for recharging the internal batteries or for direct 120V AC operation. For digital capture the PRO comes with a 128MB CompactFlash card and a USB 2.0 High Speed CF reader with software. CF cards up to 1 GB can be used in the PRO monitor.

The PRO monitor can also operate as a secondary monitor for viewing or to capture images from other analog video sources (ie VCR, TV etc.). Simply plug in the external analog video source to the Video-In RCA socket (no. 3, fig 1). See Section 6 for details. Note: The Video-In socket is not active while the camera is attached and live.

2. Components and Controls

2.1 PRO DC Monitor Components and Controls

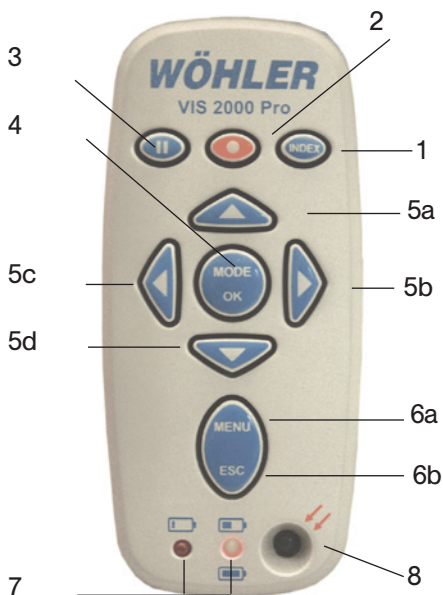


Figure 2.1: Components and Controls

- | | |
|----------------------------------|----------------------------------|
| 1 ON/OFF Switch | 6 CF Card slot/release |
| 2 Monitor and camera control pad | 7 Video cable connection |
| 3 Video-In | 8 Camera mount plate (back) |
| 4 Video-Out | 9 Power supply socket |
| 5 CompactFlash (CF) card | 10 Future external device socket |

2.2 Front Panel Controls

The diagram below shows the function of each of the PRO monitor front panel controls and connections:



Pro Monitor controls:

- 1 Picture index
- 2 Record picture or video
- 3 Pause/freeze screen
- 4 Mode menu
(bright/contrast/color/spot)
- 5a,b,c,d
 - 5a UP Pan
 - 5b Right Tilt
 - 5c Down Pan
 - 5d Left Tilt
- 6 Menu/ESC
 - 6a Press top for Menu
 - 6b Press bottom for ESC
- 7 Charge indicators
- 8 IR Remote control
(not currently available)

Figure 2.2: Front Panel controls

3. Technical Specifications

Display

Type:	6.5" TFT LCD
Resolution:	640 x 480 pixels
Brightness:	300cd/m ₂
Color depth:	262,144 colors (18-bits)
Video System:	Auto selecting NTSC/PAL
Resolution:	NTSC – 640 x 480 PAL – 768 x 512

Inputs:	Auto selecting Composite (CVBS)/ S-Video (Y/C)
Connectors:	Camera - 8 pin Composite – Phono S-Video – 4-pin mini-DIN
Media:	
Flash memory:	CompactFlash™ Type I & II cards (128 MB supplied)
Capacity (max.):	CompactFlash™ 1GB
File system:	
Capacity:	Root directory – 256 folders Folders – Unlimited files
Format:	FAT-16 Long filename convention
File formats:	
Still image:	JPEG, high quality
Video clip:	Motion-JPEG (.MOV), 12 fps
Power:	
Internal Battery:	NiMH 6-cell
Voltage:	7.2V (nominal)
Capacity:	4Ahr (typical operation 1 – 1.5 hrs approx.)
Charger:	Internal smart fast charger Charging indicators
Mounting:	threaded insert (standard camera mount)
Approved CompactFlash cards:	Type I: Dane-elec. Please contact WöhlerUSA for details of currently approved CompactFlash card manufacturers.
Operating temperature:	32 to 104 °F (0 to 40 °C)
Weight:	79 oz. (1300 g)
Dimensions:	10.5 x 8 x 2.5 in. (27 x 20x 6 cm)

4. Getting Started

This chapter provides a general overview of the PRO monitor to get you started as quickly as possible. More detailed instructions on the various menu features will be discussed in following chapters.

NOTE: Please read all instructions fully before using the monitor. Incorrect operation of the monitor or the system can cause poor performance or damage to the monitor or other components.

4.1 Battery charger

IMPORTANT: Before using the PRO monitor for the first time the internal batteries should be fully charged by plugging the supplied charger into any 120V AC socket. A full charge requires approximately 4 hours. The PRO monitor can be operated while the battery is being recharged. The PRO monitor will operate 1 to 1.5 hours on a fully charged battery depending on activity and camera. The battery will trickle charge while plugged in and operating. See Section 11.4 for details.

WARNING: DO NOT substitute another charger for the one provided. Using a different charger could damage the monitor and/or cause a fire hazard.

4.2 Inserting/Removing the CompactFlash Card

The CompactFlash card can be removed or plugged in even while the PRO monitor is switched on. After plugging in a CompactFlash card the screen will blink for a few seconds while the PRO reads the data on the card. When finished blinking, you can proceed as normal. To remove a card press the eject button beside the slot. Care should be taken to properly align the card during insertion. Otherwise the card could be damaged and data lost.

4.3 Camera Connection

Connect the video cable (male) to the video socket (female) located on the top of the monitor (No. 7, fig. 1). You can use either NTSC or PAL Wöhler camera heads as the monitor automatically detects and adjusts for either format.

4.4 Switching on

Switch the PRO monitor ON by using the switch located on the face of the cable connector on top of the unit (No. 1, fig. 1). After a brief delay, during which the unit performs an internal check, the Video Auto-Selector screen will be displayed:

```

Woehler
(REV 1.10NI)
AUTOVIDEO IN
NO VIDEO SIGNAL
NTSC      S-VIDEO
NTSC      COMPOSITE
PAL S-VIDEO
PAL COMPOSITE

```

The PRO monitor will then display the live video signal on the display.

5. Using the Key Menus

The PRO monitor is operated using the nine keys on the touch panel to the left of the display in conjunction with a series of on-screen menus. The Main Menu and the Mode Menu are accessed directly from the key pad. The Main Menu has a variety of setup and file management features and settings accessed via submenus. See Section 9 (Configuring The PRO Monitor) for details. The Mode Menu accesses display adjustment features screen and has the camera's Hi Beam ON/OFF control.

5.1 To display the Main Menu

° Press menu/esc.

The Main Menu is displayed as an overlay on the current video image:

```

MAINMENU
-----
VIDEOSTANDARD>
IMAGE FREEZE>
RECORD TIME>
BASE FILENAME>
DISPLAY ORIENTATION>
LANGUAGE>
SETUP>
FORMAT>
FOLDER>
+FOLDER>
RENAME FOLDER>
TOP LINE>
BOTTOM LINE>

```


To move between menu options

- Press ▲ or ▼.

To select an option

- Press ►.

To exit from the current menu

- Press menu/esc.

NOTE: Pressing menu/esc at any stage generally exits from the current function and takes you back to the previous function.

5.2 To display the Mode Menu

The Mode Menu allows you to adjust the brightness, contrast and color of the screen display. This is frequently done during the course of any inspection as the quality of the displayed picture changes due to distance, surface conditions and light levels the camera experiences. You also turn ON or OFF the camera's Hi Beams in this menu. You toggle up or down the numerical options by using buttons 5a ▲ and 5d ▼ (Fig 2).

- Press Mode/OK

The Main Menu is displayed as an overlay on the current video image:

```

MODE MENU
-----
SPOT (0-1)                < 0 > "0" = Off, "1" = On
CONTRAST (0-9)           < 5 >
BRIGHTNESS (0-9)        < 5 >
COLOR (0-9)              < 5 >

```

The default setting for the display is "5" and for the Hi Beam Spot is "0". The monitor automatically resets these settings when turned off. **NOTE: The Mode Menu cannot be accessed when there is no video-in signal present.**

6. Capturing Images

6.1 Image capacity

The PRO monitor is provided with a preformatted blank 128MB CompactFlash card. To use other CompactFlash cards with the PRO monitor they should first be formatted as described in Section 9.41 (To format a CompactFlash card).

6.2 Freezing an image

To freeze the video image:

- Press II (No. 3 Fig. 2.1)

When the video image is frozen the display shows:

```
STILL
```

- Press II again to unfreeze the video image.

6.3 To save the image

While the image is frozen:

- Press • (the red record button) (No. 2 Fig 2.1)

The FILENAME EDITOR is briefly displayed to show the filename assigned to the image, and the space remaining:

```
FILENAMEEDITOR
Storeas:
—0128030V—
Filespaceleft:0126
```

If the image is in double-field mode a D is displayed in the top right-hand corner of the FILENAME EDITOR. The first six characters of the filename will be the current date in US format; for example 012803. Alternatively you can supply a six-character prefix using the BASE FILENAME option on the Main Menu. To specify the base filename see Section 9.31. The last two characters of the filename are automatically incremented through the sequence of characters 0-9 and A-Z to ensure that every file is saved with a unique name. For example, the first few filenames will end in 00, 01, 02 ... 09, 0A, 0B ... 0Z, 10, 11 ... etc.

6.4 Capturing a video clip

To capture a video clip:

- Press • the red record button. (No. 2 Fig 2.1)

The display shows the maximum length of video clip you can capture, depending on the amount of space remaining on the CompactFlash card:

```
RECORDING
OK (will be highlighted on screen)
CANCEL
RECORD:MM SS
TIME:02 34
```

- ° Press OK and start recording. Alternatively, to cancel video capture press ▼ to highlight CANCEL and press MODE/OK to select it, or press menu/esc.

While video is being captured the display shows:



RECORDING

- ° Press • to stop recording.

7. Reviewing Images and Videos

The image gallery allows you to review the still images and video clips you have captured, and provides commands to help you to organize the images.

7.1 To display the image gallery

- ° Press index.

The display briefly shows:



IMAGE GALLERY
GALLERY LOADING:

It will then show thumbnail previews of the 12 most recent images you have captured in the current folder. A flashing filename indicator highlights the most recently captured image. For video clips the thumbnail shows the first frame, and a play icon ► is displayed in the lower left corner.

7.2 To highlight a thumbnail

- ° Move the filename indicator with ▲ or ▼.
- ° Hold down either key to move quickly between the images. You can step through the 12 thumbnails in the gallery, and as you highlight each thumbnail the filename indicator changes to show the full filename of that image or video clip.

7.3 To display the previous page of thumbnails

- ° Move the filename indicator to the first thumbnail in the top left corner of the image gallery, and press ▲. The next page of 12 thumbnails will be displayed. If there are no more images in the current folder the filename indicator will wrap to the last image in the lower right corner of the image gallery.

7.4 To display the next page of thumbnails

- ° Move the filename indicator to the last thumbnail in the lower right corner of the image gallery, and press ▼. The next page of 12 thumbnails will be displayed. If you

are already displaying the most recent files in the current folder the filename indicator will wrap to the first image in the top left corner of the image gallery.

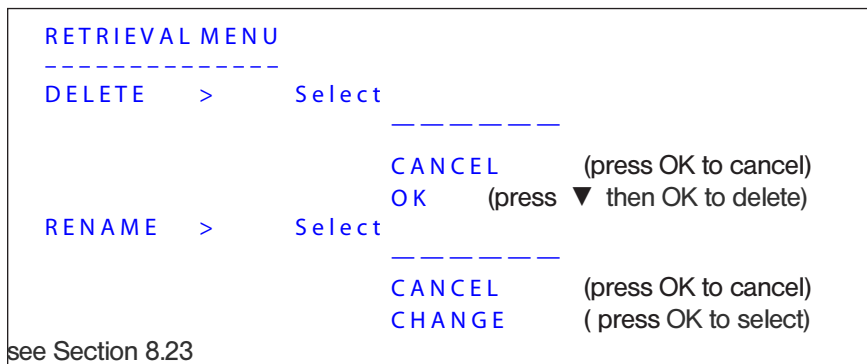
7.5 To display an image at full size, or replay a video clip

- Highlight the thumbnail of the file you want to display.
- Press Mode / OK

The image or video clip will be displayed at full size. To return to the image gallery press index. While a full size image is being displayed you can use the following keys:

- ▼ Step to the next image
- ▲ Step to the previous image
- Press MENU

Displays the Retrieval menu to allow you to delete or rename the image



While a video clip is playing or paused you can use the following keys to control play-back:

|| Pause/continue playing

- ▼ Play backwards
- ▲ Play forwards

7.6 To exit from the image gallery

- Press ESC.

8. Using the Gallery Menu

You can manipulate the images displayed in the gallery using the options on the Gallery menu. The following tables summarize the options:

Option Description:

MARK	Allows you to mark several thumbnails and then apply a function to all the marked files.
DELETE	Deletes the selected file or marked files.
MOVE	Moves the selected file or marked files to another folder.
COPY	Copies the selected file or marked files to another folder.
RENAME	Renames the selected file.
FOLDER	Changes the current folder.
+FOLDER	Creates a new empty folder.

8.1 To display the Gallery menu

The Gallery menu automatically displays on the left side of the display when you enter the image gallery. To activate the Gallery menu:

- Press MENU



The first option on the Gallery menu will be highlighted.

8.2 To mark files in the gallery

- Highlight MARK on the Gallery menu and press OK to select it. The MARK option will flash to indicate that you are in marking mode.
- Use the ▲ or ▼ keys to highlight the first thumbnail you want to mark, and press OK to mark it. The filename indicator will change to show that the file is marked. If necessary you can unmark a marked file by pressing OK again.
- Mark other files in the gallery the same way. When you have marked the files to work with:
- Press MENU to return to the Gallery menu.
- Highlight the option you want to apply to the marked files: DELETE, MOVE, or COPY, and press OK to select it.

- Proceed as described in the appropriate section below to perform the operation on the marked files.

8.2.1 To delete one or more files

- Highlight DELETE on the Gallery menu and press OK to select it. A DELETE menu will be displayed to allow you to confirm that you want to delete the selected file or marked files.
- Press ▼ to highlight OK and press OK to select it. Alternatively to cancel the operation press OK to select cancel.

8.2.2 To move or copy one or more files

- Highlight MOVE or COPY in the Gallery menu and press OK to select it. A menu will allow you to confirm that you want to proceed.
- Press ▼ to highlight FOLDER and press OK to select it. Alternatively to cancel the operation press OK when CANCEL highlighted. A SELECT FOLDER menu will be displayed, showing a list of the names of each folder on the CompactFlash card.
- Highlight the folder you want to use and press OK to select it. The files will be moved or copied to the folder you specified.

8.2.3 To rename a file

- Highlight RENAME in the Gallery menu and press OK to select it. A RENAME menu will allow you to confirm that you want to proceed.
- Press ▼ to highlight CHANGE and press OK to select it. Alternatively to cancel the operation press OK when CANCEL highlighted.

The CHANGE FILENAME EDITOR will be displayed:

```
CHANGE FILE NAME EDITOR
Store as:
— 0128030V —
```

Edit the first six characters of the filename as follows:

- Press ▲ or ▼ to step between the characters A-Z and 0-9.
- Press OK to step between the six character positions.
- Press OK after editing the sixth character to return to the Gallery menu. You cannot change the two-character suffix.

8.2.4 To change the current folder

- Highlight FOLDER in the Gallery menu and press OK to select it. A SELECT FOLDER menu will show a list of the names of the folders on the CompactFlash card.
- Highlight the folder you want to use and press OK to select it. The image gallery will be updated to show the 12 most recent files in the folder you specified.

8.2.5 To create a new folder

- Highlight +FOLDER in the Gallery menu and press OK to select it. The +FOLDER menu will be displayed.
- Press OK to select DEFAULT and create a folder with the default name FOLDER followed by a two-character suffix which is automatically incremented through the sequence AA, AB...AZ, BA... etc. Alternatively, press ▼ to highlight USER and press OK to select it to provide a custom folder name, in exactly the same way as renaming a file; see Section 8.23 (To rename a file) above.

9. Configuring the PRO Monitor

This chapter describes the option settings available from the Main Menu to allow you to configure the PRO monitor to suit the requirements of your application.

9.1 Using the Main Menu

To display the Main Menu

- Press MENU

```
MAIN MENU
-----
VIDEOSTANDARD>
IMAGE FREEZE>
RECORD TIME>
BASE FILENAME>
DISPLAY ORIENTATION>
LANGUAGE>
SETUP>
FORMAT>
FOLDER>
+FOLDER>
RENAME FOLDER>
TOP LINE>
BOTTOM LINE>
POWER SAVE>
```

To scroll up and down the main menu selections use the ▲ and ▼ keys. To enter a selection and to view the submenu:

° Press ►.

9.2 Video settings

The VIDEO STANDARD, IMAGE FREEZE, and RECORD TIME options on the Main Menu allow you to configure the video operation of the PRO monitor.

9.2.1 To specify the video standard for replaying images

This setting is retained when the PRO monitor is switched off. Normally AUTO is the recommended setting. With this option the PRO monitor automatically sets the standard based on the current video source, and retains the settings even when the video source is disconnected. However, you can only replay images saved with the current video standard. If you want to replay images on the PRO monitor of either standard, without a video input connected, set the VIDEO STANDARD option to NTSC or PAL as appropriate.

```

MAINMENU
-----
VIDEO STANDARD> Select
          -----
                                AUTO
                                NTSC
                                PAL

```

° Choose AUTO for auto-detection of the video standard from the current video input, NTSC to set the standard to NTSC, or PAL to set the standard to PAL.

9.2.2 To specify the image freeze mode

By default the IMAGE FREEZE option is set to FRAME, which captures both frames of the video image. You can override this on an individual image basis. The FIELD option sets double-field mode for all images by default. This is useful if most images you capture are of moving objects.

```

MAINMENU
-----
IMAGEFREEZE> Select
                                -----
                                FRAME

```


9.2.3 To specify the record time

This option allows you to select the maximum length of video clips. LONG allows maximum recording time but clips will only replay correctly in half-size image mode under QuickTime. SHORT limits the recording time to half that of LONG clips, but clips will replay correctly in any QuickTime mode. The corresponding recording times are displayed when you press •.

```

MAINMENU
-----
RECORDTIME>Select
-----
LONG
SHORT

```

9.3 Other Menu Options

9.3.1 To specify the base filename

This option allows you to specify a six-character filename prefix instead of the default date prefix. Selecting DEFAULT saves each file with a six-character prefix, consisting of the current date in US format, MMDDYY.

```

MAINMENU
-----
BASEFILENAME>Select
-----
DEFAULT
USER

```

Selecting USER displays the following dialog box to allow you to enter a six-character prefix using the ▲, ▼, and enter keys

```

BASEFILENAMEEDITOR

Stores:
—AAAAA—

```

9.3.2 To rotate the display

Note: In software version 1.10 and later this function has been disabled!

This option inverts the display so the PRO monitor can be operated with the keypad on the right.

The operation of the ▲ or ▼ keys is also reversed, for consistency with the menus.

```

MAINMENU
-----
DISPLAYORIENTATION>Select

```

```

-----
NORMAL
ROTATED

```

9.3.3 To select the language

This option allows you to select the on-screen menu language. This setting is retained when the PRO monitor is switched off.

```

MAINMENU
-----
LANGUAGE>      Select

```

```

-----
ENGLISH
DEUTSCH
FRENCH
SPANISH
ITALIAN

```

9.3.4 System setup

The Setup Menu allows you to set the date and time, and adjust the video display setting:

```

SETUPMENU
-----
Date-012903-MMDDYY
Time-141620-HHMMSS
BEEP      (0-1)<1> Keypress BEEP (0=No Beep, 1=Beep)
CONTRAST  (0-9)<5>
BRIGHTNESS (0-9)<5>
COLOR     (0-9)<5>

```

To set the date and time

- Press ► to highlight the current date. The first digit of the date is highlighted with a flashing cursor.
- Use ▲ and ▼ to change the current digit, use ► to move to the next. When you have edited each digit of the date and time:
- Press OK to exit from editing mode.

To adjust the other settings in the SETUP menu, use the ▲ and ▼ to scroll up or down

through each selection.

9.4 File System Utilities

The next group of options on the Main Menu allow you to format a CompactFlash card, and work with the folders on a card.

```
MAIN MENU
-----
FORMAT >
FOLDER >
+FOLDER >
RENAME  FOLDER >
```

9.4.1 To format a CompactFlash card

- Select FORMAT on the Main Menu, and select OK on the submenu. **Warning: This will erase any images already on the CompactFlash card.** After formatting a card there will be one folder named FOLDERAA.

9.4.2 To Select the Current Folder

- Select FOLDER on the Main Menu.

The SELECT FOLDER menu shows a list of the names of the folders on the Compact-Flash card.

- Use the ▲ or ▼ keys to highlight the folder you want to use and press enter to select it.

9.4.3 To Create a New Folder

- Select +FOLDER on the Main Menu, then proceed as described in Section 8.25 (To create a new folder).

9.4.4 To Rename a Folder

- Select RENAME FOLDER on the Main Menu, then proceed as for renaming a file; see Section 8.23 (To rename a file).

9.5 Top Line and Bottom Line on Display

The final group of options on the Main Menu allow you to select between showing or not showing on the top left and bottom left of the screen select information.

MAINMENU	

TOPLINE>	Displays next file number that will be assigned on saving
BOTTOMLINE>	Displays the date and time set in the system as well as the distance measurement if that option is available and activated.

Toggle to the line you wish from the menu.

- Press OK to enter and toggle between ON, OFF using the ▲ or ▼ keys.
- Use OK to select. The choice will immediately show on the screen and the submenu will disappear.

9.6 Power Save

The Power Save options on the Main Menu allows you to select between five different auto-off time.

MAINMENU	

POWER SAVE>	Select

	OFF
	30 SEC
	1 MIN
	5 MIN
	10 MIN

10. Transferring Images to a PC

This chapter describes how to install the card reader, software supplied with the PRO monitor, and use it to copy images between a CompactFlash card and PC, or format new CompactFlash cards.

10.1 Installing the Card Reader and Software

The PRO Monitor set comes with a high speed, USB 2.0 CompactFlash I/II reader. PCs running Windows 2000ME or later should recognize the card reader automatically and install the appropriate driver when you plug it into the port, in which case you do not need to perform any installation. If the card reader is working correctly, Windows will allocate a drive letter, such as D: or E: to the reader. You can then use it just like another disk drive. Please read the instructions on the back of the Card reader for minimum system requirements and appropriate installation instructions for your system.

10.2 Copying images to the PC

To copy images from a CompactFlash card to the PC simply drag them from the drive allocated to the CompactFlash card and copy them to a suitable disk on your PC. The images are stored in standard JPEG/MOV format and can be edited or printed from any suitable application, such as Paint Shop Pro.

10.3 Copying images to the CompactFlash card

Images created by the PRO monitor and edited on the PC can be copied back to the CompactFlash card for subsequent display on the PRO monitor. You can also create JPEG images on the PC and copy them to the PRO monitor for display. In this case the JPEG image must be the correct size and aspect ratio for the PAL or NTSC display. In addition it must comply with the JPEG baseline image specification, and be encoded in 4:2:2 format for correct color rendition.

11. Troubleshooting

This chapter provides answers to typical questions and problems that may arise when using the PRO monitor.

11.1 Why can't I display images from the gallery?

Images can only be displayed if they were captured using the same video standard as the current setting of the PRO monitor. Either switch off the PRO monitor, connect an appropriate video source, and switch it on again so the auto-detection selects the new video standard, or set the VIDEO STANDARD option to NTSC or PAL; see Section 9.21 (To specify the video standard for replaying images).

11.2 Why are the images not displayed chronologically after copying them from a PC?

If image files are copied back onto a CompactFlash card from a PC, the order of the files will be determined by the PC directory listing order, which is not the same as the order in which they were captured. Unfortunately there is no way to modify this.

11.3 The frozen image appears to jitter?

If the frozen STILL image appears to jitter, due to movement between the two fields of the full frame image, the PRO monitor allows you to double-up a single field to remove the jitter:

° Press OK while the image is frozen. STILL. One of the two sequential fields is then doubled up to create a flicker-free image at half the resolution. The display shows Double-Field Mode to show that only one field will be saved. You can configure the PRO monitor to save all images in double-field mode; see Section 9.22.

11.4 Battery charging

The Monitor disposes of an internal rechargeable battery, which is charged by the power supply that is delivered with the monitor. For this purpose, plug the single-ended plug connector of the power supply into the charging jack at the bottom of the right side of the monitor (figure 1, point 9: power supply socket). As soon as you have put the mains plug into the socket, loading will begin and both cahрге indicators (see fig. 2.2) will blink. Once the rechargeable battery is completely loaded, loading process will stop and both LEDs will glow permanently. If the rechargeable battery is still warm after the discharging process, first both LEDs will glow when the monitor is connected to the power supply. In this case the loading process will begin automatically after some minutes and the LEDs will blink.

In order to conserve the rechargeable battery, the monitor can always be used in mains operation as well when the power supply is connected.

11.5 The charging LED shows ● pulse flash / Steady ON ?

This indicates an over-temperature condition. The battery pack has a temperature sensor, which detects an over-temperature condition. With a prolonged period of charging (particularly with the unit switched on) the internal temperature will rise sufficiently to trigger the battery pack's thermistor sensor and shut down the charging process. This will cause no harm to the battery pack or the PRO monitor. To reset, disconnect the PSU and allow the system to cool down for a period of time. When the PSU is reconnected, charging should resume as normal. This condition will normally only happen when the battery pack is already near the end of its charging cycle, so little further charging will be required.

12. System Components

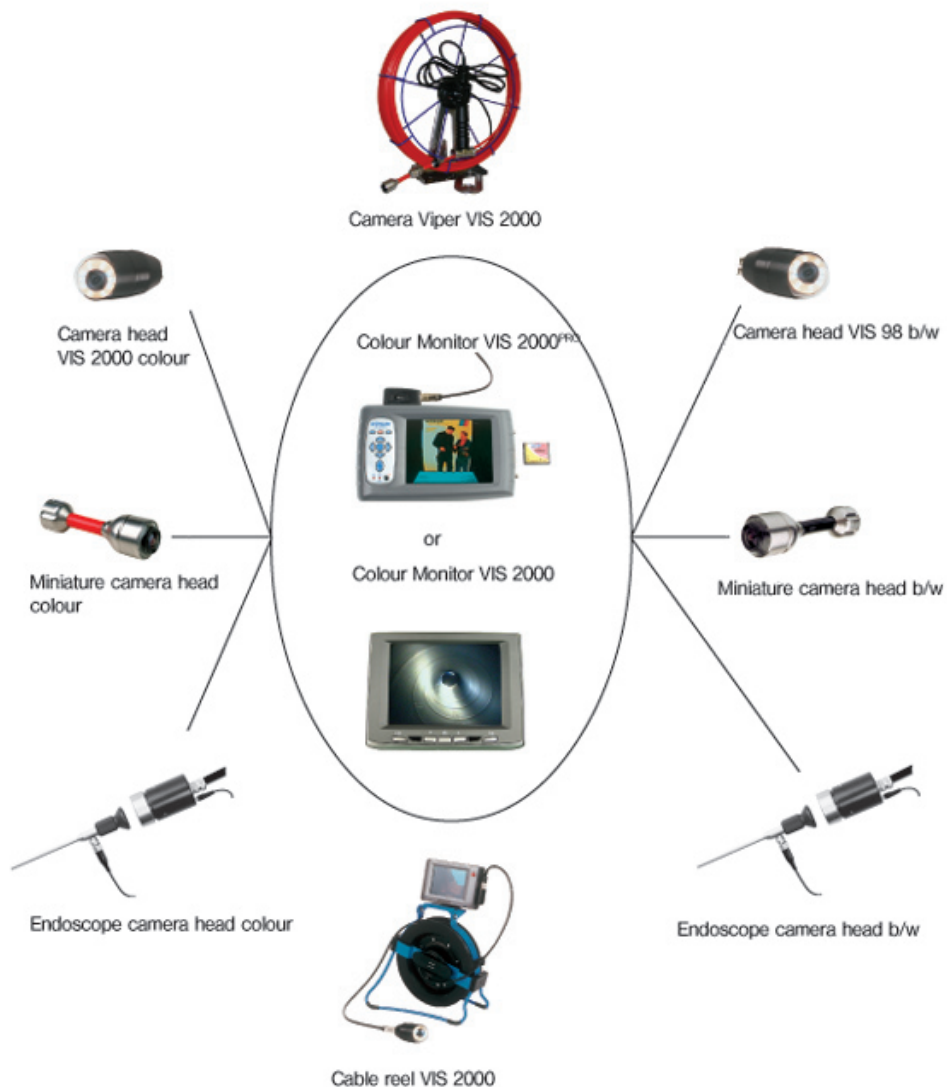
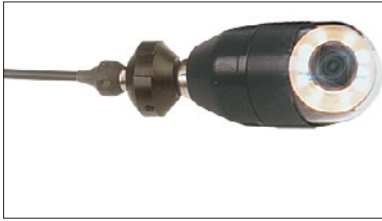


Figure 12.1: System - components

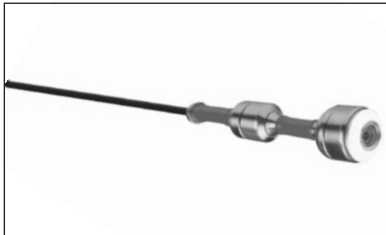
12.1 Camera head VIS 2000 Colour (Order no. 7806 J) Camera head VIS 98 b/w (Order no. 7801)



The camera heads VIS 2000 colour and VIS 98 b/w are watertight enclosed in illuminating housing. They enable a simple and exact inspection by the 180° tilt and 360° pan of the camera head. High beam LEDs for extra light make it possible to see even at far distances. The camera head disposes of a wide angle objective (f=2.0 mm) for large point of view and large depth sharpness.

Applications: Inspection and documentation of damage in ventilation and exhaust systems from approx. 70 mm on.

12.2 Miniature camera head (Order no. 7817 J) Miniature camera head b/w (Order no. 7871 J)



The mini camera head is watertight up to 3 bar and has a durable stainless housing with a wide angle objective (f=2.0 mm).

Because of the small diameter of only 26 mm, the short length and the flexible viper it can be used in small lines and pipes with various bows without problems.

Applications: Inspection and direct documentation of flue lines and ventilations as well as water pipes with a diameter from 40 mm to 100 mm.

Especially the mini camera head black and white is extremely sensitive to light and therefore convenient for the control of chimneys up to 20 x 20 Ø and flue lines up to 30 cm Ø.

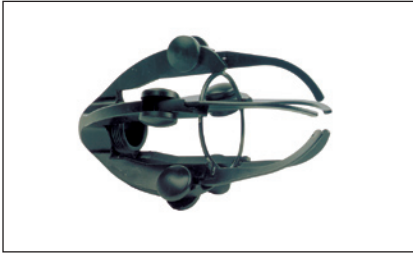
12.3 Endoscope camera head colour (Order no. 8697 J)



The Endoscope Camera Head color is used especially for the documentation of endoscopic snapshots for expertises. It also makes it possible that various persons can regard the endoscopic picture.

12.4 Assessories Video inspection

12.4.1 Camera roller guide (Order no. 7826 J)



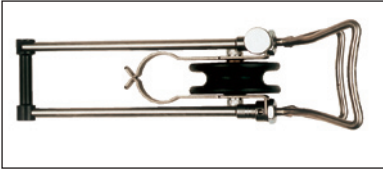
Camera roller guide for the Camera head VIS 2000 and VIS 98, for pushing the camera head in horizontally exhaust systems and ventilation systems and chimneys.

- outer roll
- simple installation at the camera head
- special steal protection , powder coated
- stabilization sleeve, especially recommended in large pipes

12.4.2 Stabilization sleeve with star holder (Order no. 3590 J)



For the stabilization of the camera heads VIS 2000 and VIS 98 on the camera viper when pushing through large pipes; simply is screwed into the roller guide. When pushing downwards, for example in the chimney, a star can be plugged on for better guiding (not included in delivery).

12.4.3 Telescope Dolly (Order no. 5706 L)

For letting down the camera head at the cable. Especially light and stable because of special steel. Extendable from 22 to 40 cm.

12.4.4 LED supplementary light (Order no. 9377 P und 9177 P)

The LED supplementary light with red-yellow and white LEDs, for camera head VIS 2000 and VIS 98 makes it possible to illuminate the distant zone during the inspection.

12.4.5 Cable reel VIS 2000 and SK 95 (Order no. 7816 J)**Cable reel VIS 2000^{PRO} (Order no. 3816 J)**

The usefull cable reel with patented stable metric marking can be carried in front of the body during the measuring with a shoulder strap. For the transport the stand legs and the monitor can be collapsed.

12.4.6 Camera viper (Order no. 7822 J)

The camera viper is offered with a camera rod with a diameter of 6 or 7mm diameter and a length of 30 m. With the viper a comfortable inspection of horizontally and vertically running exhaust systems is possible.

12.4.7 Viper Camera Holder (Order no. 8680 J)

The viper camera holder disposes of a connection cable and a M 10 thread and therefore can easily be installed to all camera rods. The camera is in a protective cage and faces downwards, so that incidental daylight does not cause problems. Attached to rods, both horizontal and vertical pipes can be examined.

12.4.8 Camera Spring Guide (Order no. 8633 J)

For centering of the camera head in vertical vents. A stainless steel spring prevents a rotating and oscillating of the camera head. The spring is adjustable on the tubing size.

12.4.8 Special Cable (Order no. 9181 L)

0.8 m, for the connection of the Camera rod to the monitor.

12.4.9 Camera rod

Camera rod black, flexible, 6 mm Ø, 5 m long (Order no. 7821 J)

Camera rod black, flexible, 6 mm Ø, 20 m long (Order no. 7818 J)

Camera rod black, flexible, 6 mm Ø, 30 m long (Order no. 7819 J)

Camera rod red, stable, 7 mm Ø, 5 m long (Order no. 7305 J)

Camera rod red, stable, 7 mm Ø, 20 m long (Order no. 7829 J)

Camera rod red, stable, 7 mm Ø, 30 m long (Order no. 7306 J)

13. Accessories/SpareParts of the Colour Monitor VIS 2000

13.1 Power Supply VIS 2000^{PRO} (Order no. 6837 J)

for mains operation and charging

13.2 Leather protection bag for monitor VIS 2000^{PRO} (Order no. 6838 J)



With protection anti-dazzle and shoulder-strap. For the secure transport and a comfortable position of the monitor during the inspection.

13.3 Adaptercable (Order no. 8637 O)

for the 12 volt car-system

13.4 Shoulder strap (Order no. 8136 I)



Makes it possible to carry the Cable reel comfortably in front of the body, so that both hands will be free for working.

14. Declaration of conformity

Manufacturer: WÖHLER Messgeräte Kehrgeräte GmbH
Schützenstr. 38, 33181 Bad Wünnenberg

declares that the following product:

Product name: Wöhler VIS 2000^{PRO} Monitor

complies with key safety requirements set down in the guidelines of the Council for the Harmonisation of the Legal Requirements of the Member States in relation to electro-magnetic compatibility (89/336/EWG and 93/97/EWG).

The following standards are used to assess the product in terms of electromagnetic compatibility:

EN 50082-1 : 11.97 Resistance to interference

EN 50081-1 : 03.93 Emissions

FCC 15.109 : Emissions

EN 55024 Resistance to jamming

EN 55022 Emitted interference

EN 61000-3-2 Harmonic oscilation

EN 61000-3-3 Voltage fluctuation, flicker

This declaration is issued on behalf of the aforementioned manufacturer by:

Johannes Lötfering, Managing Director Bad Wünnenberg, 28.10.2004

15. Guarantee and Service

15.1 Guarantee

Every Wöhler VIS2000^{PRO} Monitor has been subjected to a thorough functional check and only leaves our factory after detailed quality control. The final inspection is recorded in detail in a test report and is kept by us on our premises. If the device is used correctly, the guarantee period is 12 months from the date of purchase. This guarantee does not cover wear and tear parts.

The guarantee does not include the costs for transport and packing material in case of repair. It will expire, if third persons, who are not authorized, repair or change the device.

We see SERVICE as a very important element in our business. That is why we are still available to you even after the guarantee period has expired.

- An immediate repair will be carried out if you bring your meter to us in Bad Wünnenberg.
- If you send us the meter, it will be returned to you by our delivery service after repair in just a few days.
- We can lend you a device for a small standard fee.
- You can obtain immediate help from our engineers by telephone.

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