

iRis **DVR X**
Videoendoskop

iCONCEPTS
Inspection Technology Concepts



Operation Manual





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Introduction

We congratulate you on buying your iRis DVR **X** Industrial Videoscope, in the following just named iRis. It unites Light Source, TFT Display plus Image Storage and Video Recording Device.

The diversity of inspection objects, materials and lightning conditions often makes it difficult to get high-quality images. It is easy to adjust the iRis to your application to receive optimal inspection images even in extreme situations.

Always keep the Operation Manual with the iRis. It contains all information for safe and efficient operation. However, should you have further questions, feel free to contact our Service Team.

Warning Notices and Precautions



Read the Operation Manual carefully before using the iRis.



Caution! The iRis has to be employed by skilled and qualified personnel appropriate to the application. The iRis is designed for a diversified field of applications in Industry, Building and Science. Only use the iRis as intended.



Caution! Never use the iRis in running machines.



Caution! The iTool has not to be used in specially designated or prohibited areas (e.g. Explosion Prevention).



Electric Shock! No unauthorised opening of the casing. There is high danger of electric shock due to parts being under voltage. For higher abrasion resistance the flexible and bendable probe is sheathed with tungsten. This can lead to electric shock at contact with live parts. Therefore the iRis is never to be used in or at objects under tension.



Caution! Never look directly into the light emitting part of the iRis. It can cause injuries of eyes. Always switch off the Light Source before changing, controlling or cleaning the objective or the distal end of the Videoscope.



Caution! Use the iRis in dry environments only. According IP53 the housing is protected against splash water. The housing of the iRis is never to be immersed in water or cleaned directly under running water.



Caution! Using mains adapter without earth conductor and without galvanic isolation can lead to a tungsten braid being under electric tension. Therefore only use mains supplies delivered with the iRis.



Caution! If the objective is dirty the distal end may heaten up. This can lead to ignition of highly combustible materials. Furthermore it can lead to burns at direct contact. Regular cleaning should be made.

Warning Notices and Precautions



Caution! When inspecting hot objects the probe may heat up according ambient temperature. Avoid direct contact to the probe after such applications – High risk of burns.



Do not throw battery into fire.

Do not recharge defect battery, but replace it immediately.



The iRis is an electric device and must not be disposed in domestic waste. Pursuant to European Directive 2002/96/EG on waste electrical and electronic equipment (WEEE) and its transposition to national law used up power tools have to be collected separately and returned to environmentally compatible recycling.



Recycling. Withdrawal of batteries pursuant to the Battery Policy: According to the German Battery Policy (BattV) we are obliged to inform you about the rules and liabilities for disposal and withdrawal of used batteries and accumulators. According to §7 German Battery Policy the end-user is

obliged to return used batteries and accumulators. Contaminant-laden batteries and accumulators are marked with a crossed dustbin with the chemical symbol of the contained heavy metal under it (Cd for cadmium, Hg for mercury, Pb for lead). Batteries and accumulators must not be disposed in domestic waste and can be handed free of charge to any designated collection and withdrawal point. Of course batteries and accumulators you got from IT Concepts can be handed or sent to us.

Scope of Delivery

The iRis is delivered with the components shown in adjacent images.

Further interchangeable objectives or additional accessories are not included. These items you will find in this manual on page 42ff., in our accessories catalogue or on our homepage www.itcworld.com. We are certainly pleased being at your disposal for personal consulting as well.



Charger



Rechargeable Battery
(in device when delivered)



Operation Manual



ITC Case Pocket



Neck Holder

System Presentation

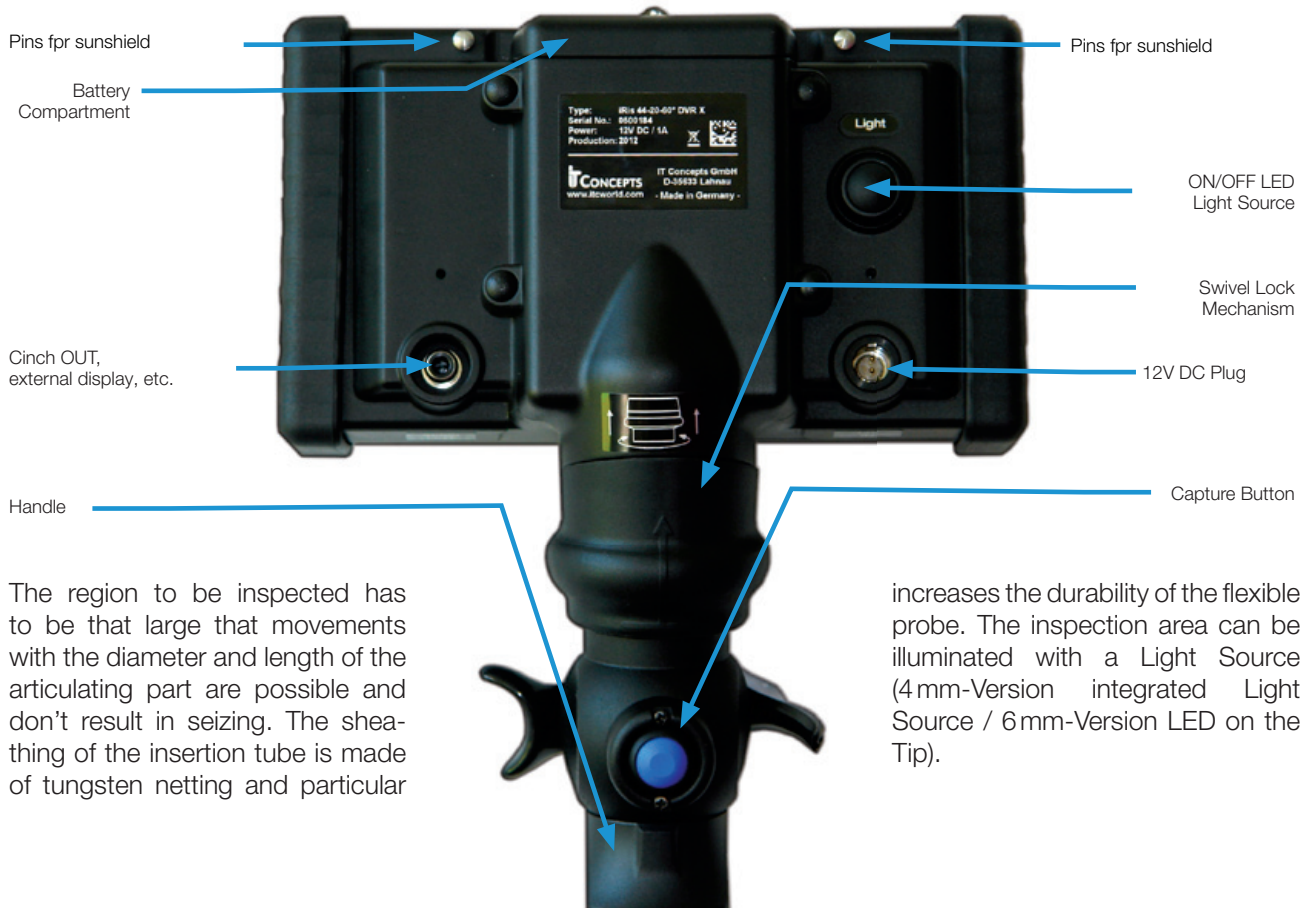


Live and saved images as well as video recordings are shown on the TFT Display. Image captures and video recordings can be marked with a text line.

The probe can be inserted to a cavity, e.g. a tube. The user can

lock the articulating head of the probe in the desired position during inspections. The articulation can be moved in four directions (up/down and left/right) which really facilitates passing multiple coverings.

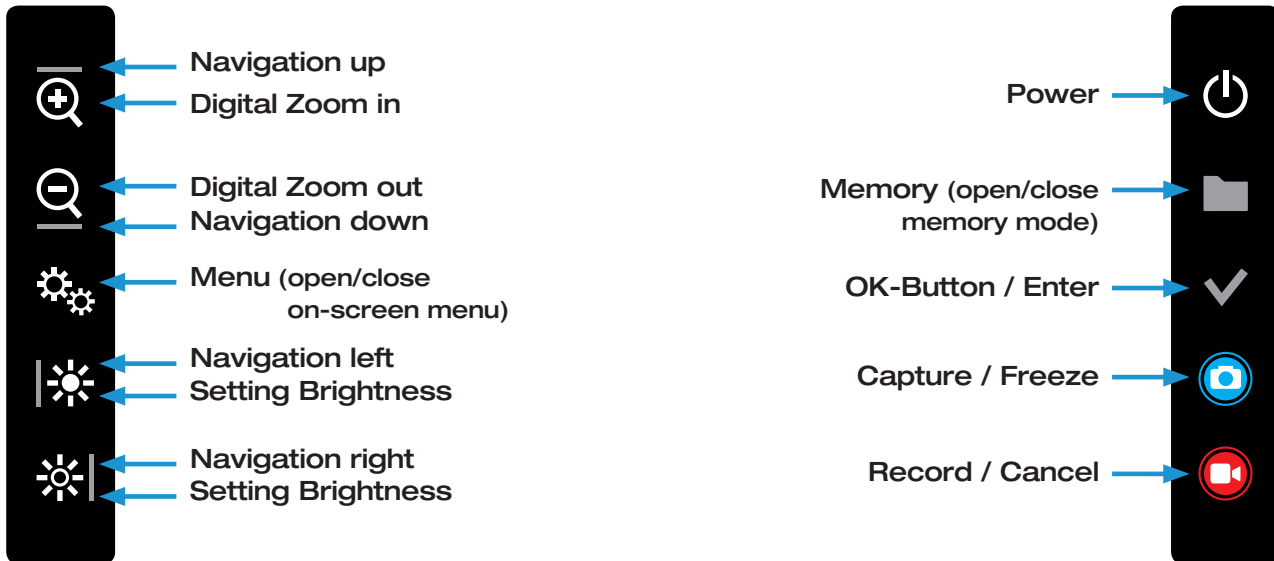
Presentation



System Presentation

The Control Panel

Using the control panel you can navigate through the menu structure, select and confirm functions.



System Presentation

Charging the Battery

Before charging please pay attention to the included manual for the charger. For charging the accumulator has to be removed from the housing. For this the cover of the battery compartment has to be detached by releasing the locking screw. To charge the battery place it in the charger. Charging process is finished when charge indicator lamp continuously glows green.

Caution! Only use the delivered charger to charge the battery. Otherwise there is high risk of damages to the cells.

The operating voltage is shown in the status indicator line on the iRis display. The fully charged battery is placed in the device when delivered.



Charger



Rechargeable Battery
(in device when delivered)

Preparing the iRis

Working with external Power Supply

As an option the iRis can be powered as follows:

- 1) AC Adapter + Power Supply Cable
- 2) PowerBelt
- 3) Car Battery Cable
- 4) Cigarette Lighter Cable

Note: The 12V DC plug as well as the socket is marked with a red dot. Assure that both red dots are visibly opposed when connecting the 12V DC plug to the iRis.

Preparing the iRis

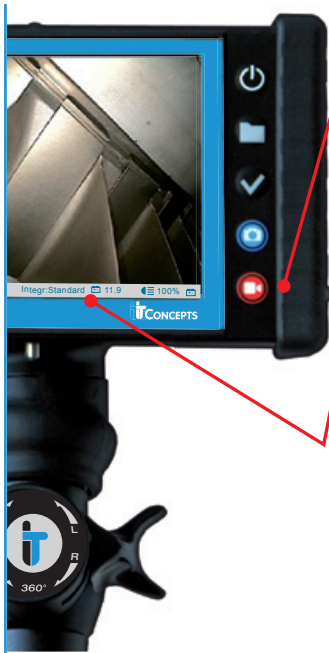
Inserting the SD Card

Slightly remove the right edge protector and put a formatted SD Card (32GB max.) into the card slot. The SD Card included in the scope of delivery is already inserted and properly formatted.

If the SD Card is not formatted you have to format it as described on page 17.



Starting Inspection



Switching-on the iRis

After having prepared the iRis according this operation manual switch it on by pressing POWER. Please inspect the iRis probe as described on page 40 before inserting the endoscope into the inspection object!

Status Indicator Line

At start-up the iRis always is in Live Mode. At the bottom of the display the status indicator line can be seen. It shows the status of zoom, image flip, camera, power supply and light intensity.

Switching-on the LED

The LED is switched on or off by a long push on the Light Source Button. With short push the intensity of the LED can be adjusted in three steps.



Starting Inspection

Language Selection

At delivery status the iRis should already be set to your language or to English.

At initial operation you should check if the appropriate language is set and adjust if necessary. The following languages are available:

- English (default setting)
- German
- French
- Spanish
- Italian
- Polish
- Turkish

Image Control
Camera Control
Annotation
Dimension
System Setting
Safety remove SD

If you want to change the language set proceed as follows:

- MENU
- System Setting - OK
- Select language –
the menu will immediately be shown in the selected language.
- To quit press MENU again

Status Line	: ON
Freeze Frame	: OFF
Language	: English
Date/Time	: Press OK
SD info	: Press OK
SD format	: Press OK
Fabric Settings	: Press OK
Software Status	: P011 72
Serial Number	: 20110815

Starting Inspection

Format SD Card

The SD Card delivered with the iRis is already formatted. To format a SD Card proceed as follows:

Press MENU, select menu item System Setting and press OK. Using the arrow keys select the menu item Format SD and press OK. A confirmation prompt appears on the display. Select via arrow keys and confirm with OK.

Image Control
Camera Control
Annotation
Dimension
System Setting
Safety remove SD

Status Line	: ON
Freeze Frame	: OFF
SD format	: Press OK
Date/Time	: Press OK
SD info	: Press OK
SD format	: Press OK
Fabric Settings	: Press OK
Software Status	: P011 72
Serial Number	: 20110815

Starting Inspection

Setting Time and Date

In the delivery status time and date should already be set.

At initial operation you should check time and date and set them if necessary.

If you want to change time and/or date proceed as follows:

Press MENU, select menu item System Setting and press OK. Using the arrow keys select menu item Date/Time and press OK. Set the desired time and date via the arrow keys and then confirm by pressing OK.

Image Control
Camera Control
Annotation
Dimension
System Setting
Safety remove SD

Status Line : ON
Freeze Frame : OFF
SD format : Press OK
Date/Time : Press OK
SD info : Press OK
SD format : Press OK
Fabric Settings : Press OK
Software Status : P011 72
Serial Number: 20110815

Starting Inspection

Resetting to Default Settings

By selecting the menu item Fabric Settings all manually changed and adjusted parameters can be put back to factory setting, except for date, time and text generator.

- MENU
- System Setting - OK
- Fabric Settings - OK

You are in Live-Mode again afterwards.

Image Control
Camera Control
Annotation
Dimension
System Setting
Safety remove SD

Status Line	: ON
Freeze Frame	: OFF
Language	: English
Date/Time	: Press OK
SD info	: Press OK
SD format	: Press OK
Fabric Settings	: Press OK
Software Status	: P011 72
Serial Number	: 20110815

Starting Inspection

Image Control

Image parameter (brightness, contrast and colour as well as zoom and image flip) can be adjusted under Image Control in the menu.

Change the select parameter by using the arrow keys. New settings will immediately be effective. Pressing OK will reset the marked parameter to default setting. Using the MENU button will bring you back to Live Mode.

Caution! The image parameter are effective to the image displayed as well as to images and videos being saved. Image captures and video recordings will be saved as displayed.

Image Control

Camera Control

Annotation

Dimension

System Setting

Safety remove SD

Brightness		50%
Contrast		50%
Colour		50%
Zoom	1x	
Flip	Normal	
Dimmen		50%

Starting Inspection

Turning the Display

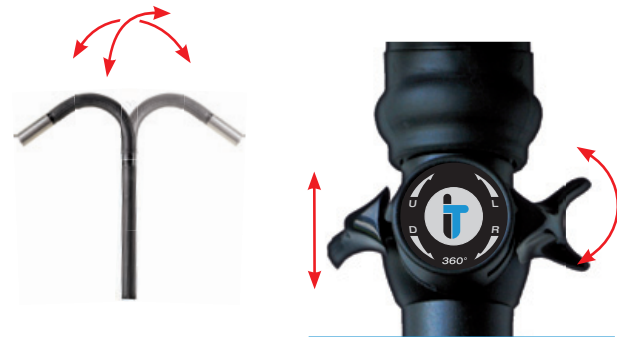
By lifting the locking ring under the rubber cover the detent of the display is released. Now the display can be turned in two directions.



Controlling the Articulation

The articulation section can be moved in two planes by means of the levers on the handle (see fig.). If the levers are released during movement the articulation section will be locked in the current position.

On the image the levers are shown in „neutral“ home position. In this position the articulation section is straighten.



Starting Inspection

Passing Covings

Size and covings of the object to be inspected have to be large enough to allow the movements of the articulating part and the distal end. The feasibility should be verified visually or by means of design drawings before the inspection. The actions described in the following have to be carried out at every coving analogue to the described procedure. If a resistance or any other problem occurs retract the probe carefully.

Fig. A

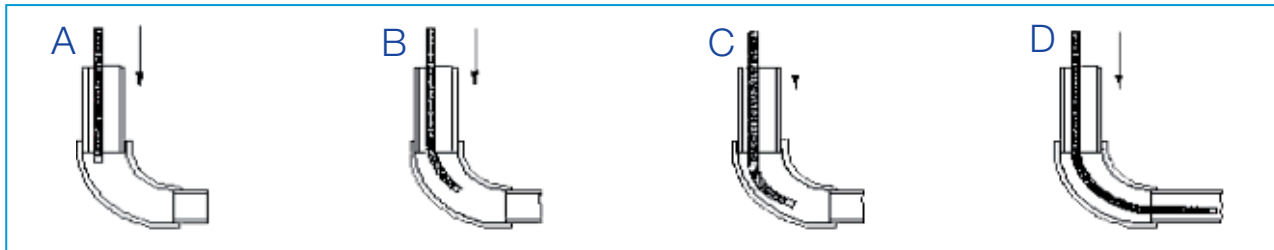
Carefully push the probe to the beginning of the coving while observing on the display.

Fig. B

Still observing on the display adapt the articulating section to the coving of the cavity by using the levers.

Fig. C and D

Continue the insertion process while always observing on the display. The angle of the articulating section has to be adapted step by step to the coving of the object. After having passed the coving the articulating section has to be straightened by putting the levers to neutral position.



Starting Inspection

Retracting the Endoscope

To retract the endoscope the articulating section has to be straighten first, i.e. the levers have to be put to neutral position.

By observing on the display and appropriate movement of the levers an equal distance of the distal end to the walls of the cavity has to be kept. Avoid contacts of the distal end with the walls of the surrounding.

At resistance during the retraction it is recommended to slightly twist the probe in both senses around its longitudinal axis and at the same time carefully push and pull until the probe is released again.

Caution! Put both levers to neutral position (as shown) before retracting the scope!



Caution! Put both levers to neutral position (as shown) before retracting the scope!



Creating and saving Image Captures and Video Recordings

Choosing a Standard Setting

There are two standard settings available. Decide whether you want to work in Mode Freeze Frame ON or OFF for image captures and video recordings (see pages 27-29) before starting the inspection.

Press MENU, select the menu item System Setting and press OK. Using the arrow keys select Freeze Frame and choose ON or OFF.

Image Control
Camera Control
Annotation
Dimension
System Setting
Safety remove SD

Status Line	: ON
Freeze Frame	: OFF
Language	: English
Date/Time	: Press OK
SD info	: Press OK
SD format	: Press OK
Fabric Settings	: Press OK
Software Status	: P011 72
Serial Number:	20110815

Creating and saving Image Captures and Video Recordings

Inserting Text

With the text generator you have the possibility to mark all images with a text commentary (a single line of 31 characters). Please insert text before saving the image.

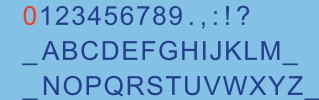
Press MENU, select menu item Annotation and press OK,

Use the arrow keys to select the desired character and press OK. To quit and save the text press RECORD, to quit without saving press MENU.

You can delete single characters by pressing FREEZE.



Image Control
Camera Control
Annotation
Dimension
System Setting
Safety remove SD

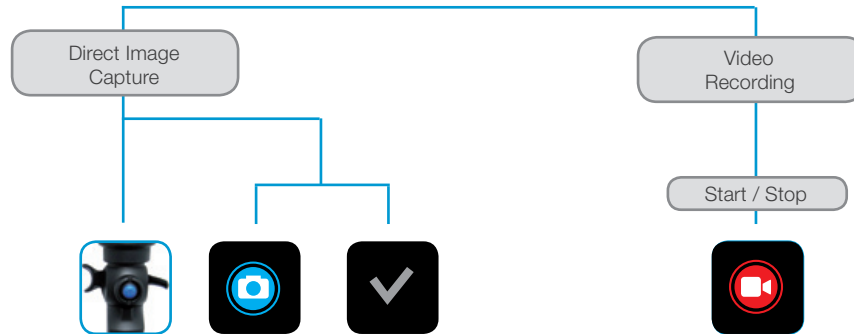


—
0123456789.,:!?
ABCDEFGHIJKLM
NOPQRSTUVWXYZ
—

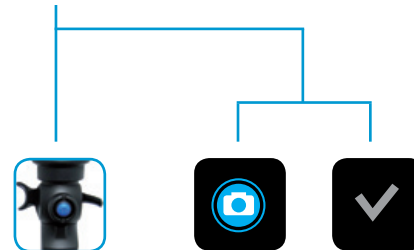
arrows - move cursor
<OK> - add symbol
<RECORD> - close editor, save the changes
<MENU> - close editor, cancel the changes
<FREEZE> - delete last right symbol

Creating and saving Image Captures and Video Recordings

Standard Setting Nr. 1 „Freeze Frame OFF“

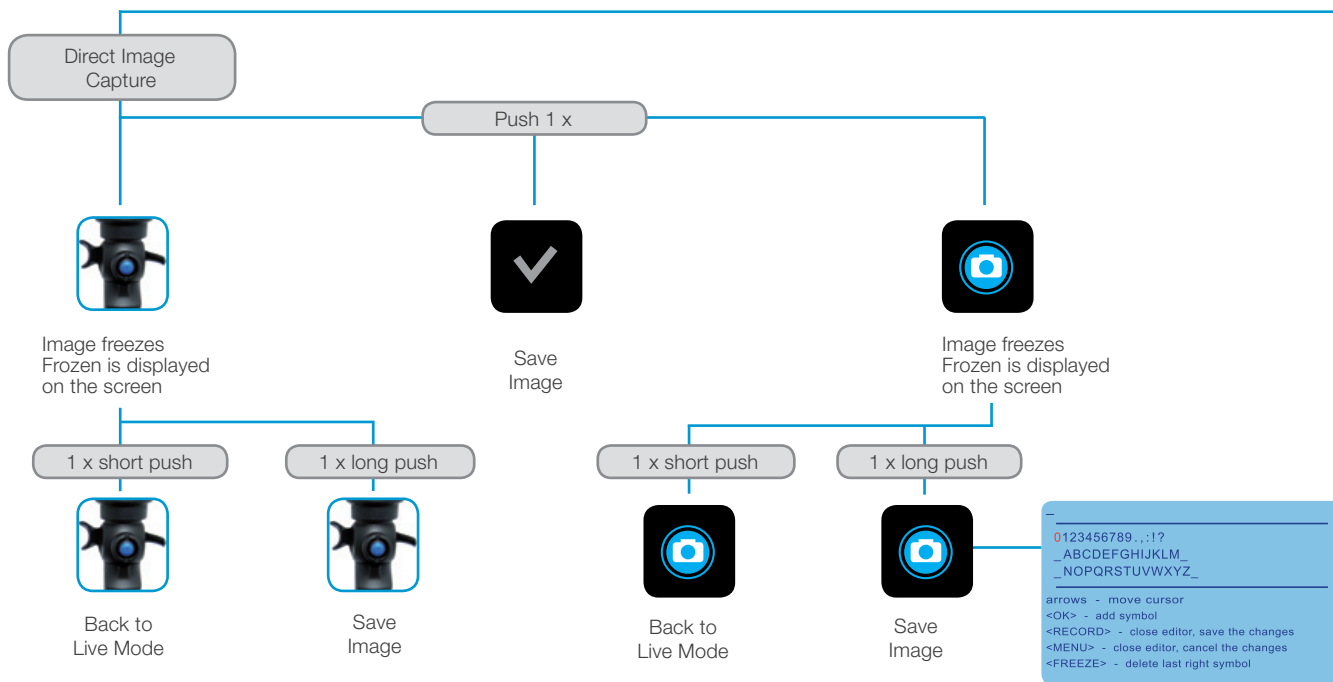


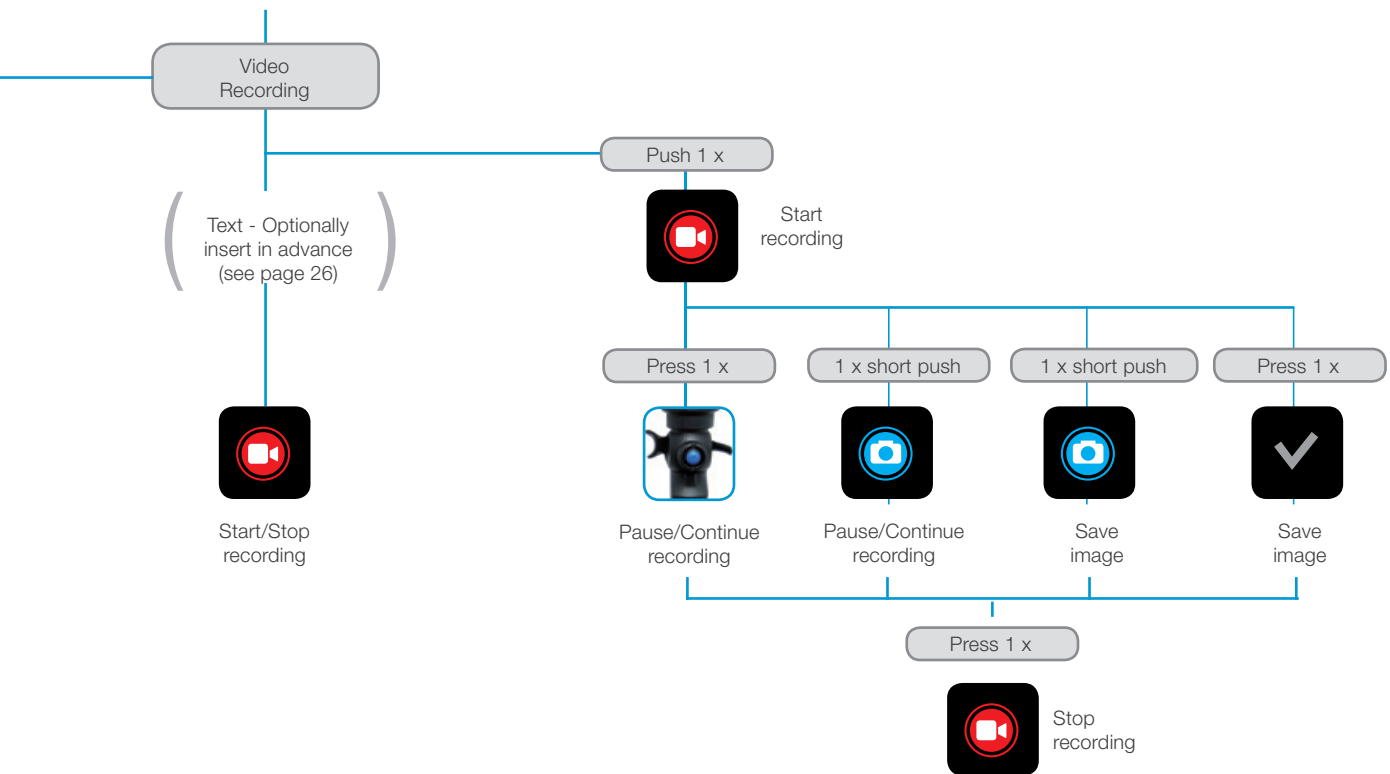
During recordings single images
can be saved as follows:



Creating and saving Image Captures and Video Recordings

Standard Setting Nr. 2 „Freeze Frame ON“





Calibrating and Comparative Measuring with the iRis

The iRis provides the possibility of point-to-point measuring within the image. This can be used in the Live Mode as well as in the Memory Mode.

Press MENU on the keypad. Select the menu item Dimension, select Calibration confirming with OK each time - two flags appear on the display. The distance in pixels is shown in the status indicator line.

Before you can use the Comparative Measuring you need to make a calibration as follows: Hold the distal end in your defined working distance to an object of known size (e.g. ruler). Move the active flag (displayed in white) to one side of the geometry. Press OK to switch between the flags and lead the second flag to the end of the geometry. When both flags are on the desired positions, press MENU twice, choose Dimension and Calibration afterwards, always confirming with OK.

Please insert the measure as value in front of the ":" and the unit (e.g. mm) behind of it. To save and quit Calibration press RECORD. To quit without saving press MENU. After having pressed RECORD the inserted unit appears in the display, while being

in Live Mode with visible flags. Now you may save as usual (see pages 27-29). Your measuring value occurs in the saved image and video recording.



Playback of saved Images or Video Recordings

You can access all saved data.

The iRis System saves images and video recordings automatically to the SD Card as follows:

Image:

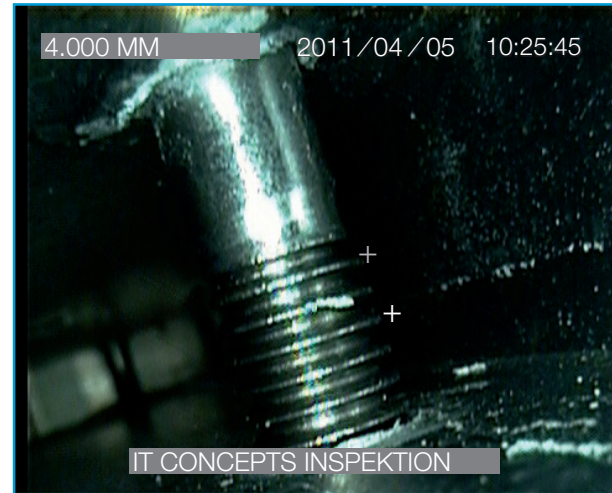
Format:	bmp
Resolution:	640 x 480 pixel
Location:	Folder Picture

Video:

Format:	avi
Resolution:	800 x 600 pixel
LOCATION:	Folder HVR

Name:

All files (image as well as video recording) are named by the system. Each image and video gets an automatically created file name consisting of date and time.



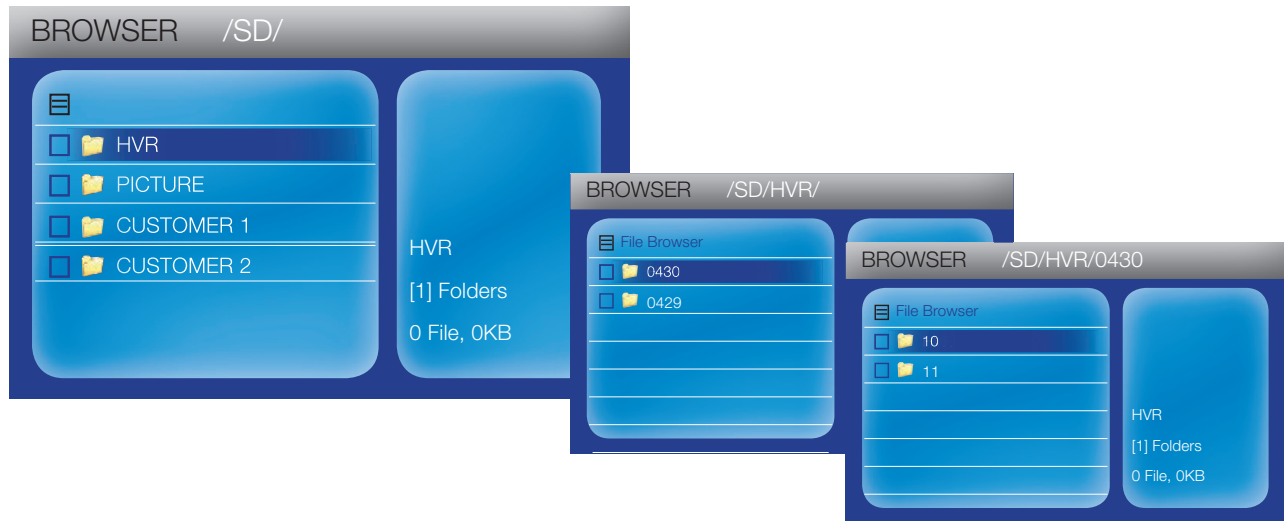
Attention! You are able to create and name new folders on the removable media by connecting a card reader to your personal computer. Moreover you are able to directly save and more your images and recordings on the iRis system.

Playback of saved Images or Video Recordings

How to access files.

Press MEMORY to access the Browser Mode. Navigate through the folder structure to the desired file by using the arrow keys and the OK button

Note! The LED Light Source is automatically switched-off in Memory Mode and reactivated when changing to Live Mode again.



Playback of saved Images or Video Recordings

Images

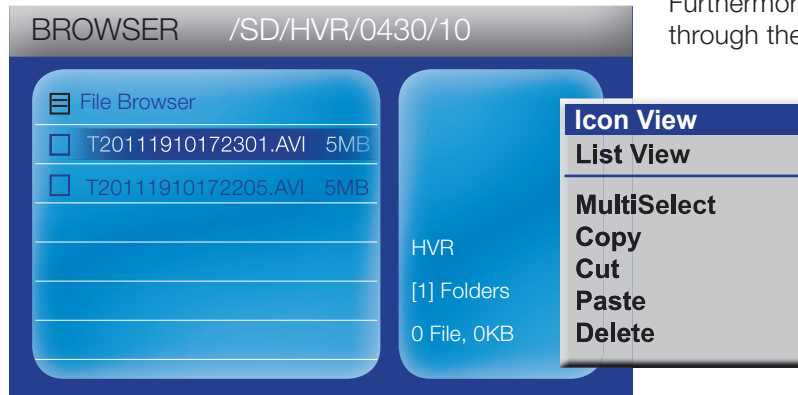
After having accessed the desired file you can control it as follows by using the arrow keys and the OK button:

OK	=	Open/Flip image
Arrow keys	=	Leaf for- and backwards
Cancel	=	Back to browser

Video Recordings

After having accessed the desired file you can control it as follows by using the arrow keys and the OK button:

"OK"	=	Start / Stop / Pause video
"Left"	=	Rewind
"Right"	=	Fast forward
"Cancel"	=	Quit



Furthermore you may select additional functions through the context menu.

Optimising Camera Settings

Camera Setting

The camera settings help to optimal adjust the videoscope or camera to your application to get perfect images.

The iRis System provides two camera settings:

STANDARD INTEGRATION
MANUAL INTEGRATION

Press MENU, select the menu item Camera Control and press OK. Choose the desired camera setting by using the arrow keys.

- Image Control
- Camera Control**
- Annotation
- Dimension
- System Setting
- Safety remove SD

Integration		:	Standard
Detector Type		:	Mean
Manual Shutter		50%
Manual Gain		50%
AGC Level		50%
Gamma		+2
White Balance	:		Press OK

Optimising Camera Settings

Camera Setting STANDARD

The standard setting is approved for a variety of applications to get clear and expressive inspection images.

This setting produces an automatic optimising of the camera settings.

In this setting you can influence two further parameter:

Integration	:	Standard
Detector Type	:	Mean
Manual Shutter	50%
Manual Gain	50%
AGC Level	50%
Gamma	+2
White Balance	:	Press OK

White Balance

The white balance can only be executed in the camera setting STANDARD.

How colours of an image or video recording are displayed is depending on the colour temperature of the light source. For optimal colour reproduction it is required to make a white balance.

1. Place the distal end of the videoscope in front of a white non-reflecting sheet of paper.
2. Switch on the light source
3. Put the distal end in a position where no irradiations are visible in the picture.
4. Select the menu item White balance and hold the OK button until the white balance is carried out.

Gamma

With Gamma the video signal is corrected regarding brightness and contrast.

Optimising Camera Settings

Camera Setting MANUAL

The camera setting Manual gives you the possibility to individually change the camera setting without the influence of the automatic camera control system.

Integration	:	Manuell
Detector type	:	mean
Manuel Shutter	50%
Manuel Gain	50%
AGC Level	50%
Gamma	+2
White Balance	:	Press OK

Manual shutter

Setting image brightness by adjusting the relative exposure time of the sensor. This allows image capture at poor lighting conditions.

Manual gain

Setting image brightness by adjusting the signal gain. But this will increase electric signal noise and reduce image quality.

Gamma

With Gamma the video signal is corrected regarding brightness and contrast.

Cleaning and Care

Basics

The following procedures have to be carried out after each use of the iRis. A want of care can lead to corrosion and damages. The grade of the required cleaning depends on the degree of pollution.

Cleaning the Housing

Clean the housing with a soft and moist cotton cloth. If necessary use mild detergent and dry carefully afterwards. Do not clean display or housing under running water or immerse in liquids!

Cleaning the Probe

Wipe off dust and dirt with a soft cotton cloth. Wash the flexible part with a moist sponge. Dry with a clean and soft cotton cloth after cleaning.

The distal end has to be cleaned with cotton swabs (Q-Tip®) soaked with high-proof alcohol. Do not use rough cloths for cleaning!

Housing



Probe



Cleaning and Care

Inspecting the iRis Probe

The probe of the iRis has to be controlled regarding visible external damages before every use. Furthermore the objective's surface has to be checked and cleaned if necessary (see page 39).

The manoeuvrability of the articulating section has to be checked: First push the lever U/D towards the housing and move it from one extreme position to the other, so that the articulation moves in an angle ca. $+160^\circ$ to ca. -130° in the vertical plane.

Then bring the lever back to the neutral position and release it. Analogical move the lever R/L, so that the articulation moves in an angle of ca. $\pm 100^\circ$ in the horizontal plane. Bring the lever back to the home position afterwards and release it.

At occurrence of any problem stop operating and contact the Customer Service of IT Concepts (see page 43).



Transport and Storage

System Transport and Storage

The System needs to be dry and cleaned for storage. The levers have to be brought to neutral position.

Carefully insert the probe into the reel in the case. Push the probe slowly into the reel until you are able to place the housing in the corresponding recess without bending the probe. Afterwards push the rest of the probe thoroughly into the reel until the probe is securely placed and cannot be damaged by the case or any accessories.



Attention: Avoid bending the probe to an arc radius less than 45mm.

For larger probe lengths we recommend storage outside the transport case. At best, it should be hung at the housing.

The storing location should be protected against humidity, direct sunlight and high temperature fluctuation. At hanging take care that the probe hangs free and doesn't butt at something.



Spare Parts and Accessories

iRis Accessories

- SD Memory Card
- Neckholder
- iRis DVR Clamp
- Li-Ion rechargeable Battery NC2040A24
- Charger for Li-Ion rechargeable Battery NC2040A24
- iRis AC Adapter 12V DC / 5,50A
- iRis Case
- Lens Box for Objective Lenses
- ITC Case Pocket

Service

To help us to efficiently execute any maintenance or repair of the product please directly contact us.

Thank you!

Contact

KELCO Industrial
248 421 9882
sales@kelcoindustrial.com

Technical Specifications

Operating Unit

Display Size:	5" (12,7cm) TFT Colour
Display Resolution:	VGA (640x480 Pixel)
Operating System:	Realtime operating System, with On-Screen-Menu
User Interface:	Direct Action Keys, Function-Keys, Arrow-Keys
Languages:	Englisch, French, Spanish, Italian, German, polish, turkish
Video interface:	Composite Video-out
Power Supply, primary:	changable Li-Ion-Battery (Charger is provided)
Power Supply, secondary:	12V Adapter

Measurement

Method	Comparative Measurement Function
--------	----------------------------------

Documentation

Video Format:	AVI (.avi)
Image Format:	BMP (.bmp)
Storage:	SD-HC-Memory Card up to 32GB (FAT32)

Camera Control

Image Sensor:	Advanced image Sensor
Camera Control / Exposure:	Integration modes: Automatic, Short, Long, Manuell
White Balance:	adjustable
Gamma:	adjustable

Image Control

Zoom:	x3.5 (Digital)
Invert:	horizontal and vertical Image Inversion
Brightness, Contrast, Colour:	adjustable
Text Annotation:	Textline for 32 letters

Technical Specifications

Illumination			
Type:	High-Power Whitelight-LED's with fiber optic light guides		
Illumination Control:	3-steps		
Colour Temperature:	ca. 6500k		
Average Lamp Lifetime:	ca. 5000h		
Probe			
Diameter:	4.0mm	6.0mm	
Working Length:	4.9 - 13.1ft (1.5 - 3.0m)	4.9 - 13.1ft (1.5 - 7.5m)	
	4.0mm	6.0mm	6.0mm SD
Working distance:	15mm - ∞	20mm - ∞	10 - 60mm
Articulation:	4-way (Control Levers)	4-way (Control Levers)	
Articulation Angle* L/R U/D:	100°/100° 100°/100°	100°/100° 160°/130°	
Integrated Objective Lens:	90° FOV	90° FOV	
Braid:	Tungsten Braid on PU-Jacket		
Construction			
Monitor unit:	± 90° rotatable Display Unit		
System Weight:	2.97lb (1.35kg) Operating Unit		
Dimensions:	180mm x 105mm x 45mm		
Housing:	rugged PU, with integrated rubber shock caps		
Protection Class:	IP53		
Operating Environment			
Tip Operating Temperature:	+14°F to 176°F (-10°C to +80°C)		
System Operating Temperature:	-13°F to 115°F (-25°C to +45°C)		
Storage Temperature:	-13°F to 115°F (-25°C to +45°C)		
Manufacturing			
Country:	Germany		

Chip on the tip
LED on the tip
(6mm)



Notes



KELCO Industrial
8845 El Dorado
White Lake, MI 48386

248 421 9882

sales@kelcoindustrial.com



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