

Congratulation to your new INVIZ® VUMAN® / RA-Y / RA system!

A system constructed strictly according to the practical demand of our customers and users. To obtain maximum benefit and for a secure and safe operation please read the manual before starting up and using the instrument. When used proper, this system will be offering you excellent inspection capabilities over a long lifetime.

The video endoscope at hand, VUMAN® is currently the most innovative remote visual test equipment available. Expect highest resolution, colour neutrality, high light sensitivity, full image, digital image and video memory as well as a smart text generator option. The most advanced and versatile long range video scope system with [x-way] articulation and patented RF "Remote Focus" capabilities.

With the market launch of remote control focusing (motorized image sharpness adjustment – Model RF) for a video endoscope, the viZaar® research and development team has once again proved its innovative competence. Step by step, we are innovating optical mechanisms, which have been the standard procedure in traditional photography for centuries. Out of focus and poorly exposed inspection images belong to the past.

Whether you choose the non articulating or our pneumatic driven 360° [x-way] articulating probe type, we bring to you great advantages during the difficult 100% inspection of weld seams and pipe walls at minimal cost:

- :: Simple rotating and manoeuvring of the probe with attached side view optic.
- :: Consistent stability of the entire probe even after 15 m inserted length.
- :: Longterm-tested durability of the entire probe.
- :: Extremely light sensitive 5m, 8 m and 15 m probes with performance often seen with the 3-4 m probe lengths.
- :: Manoeuvrability through many pipe bends.
- :: [x-way] articulating after several bends or with most probe secured on the reel.
- :: RF providing always focused images without optical adapters.

The INVIZ® probe series offers a variety of advantages which simplify the work for you and are particularly easy:

- :: Explore technology which has been registered as a patent; you only unroll as much of the probe as you really need – during operation, naturally, since the time-tested and energy-saving high power LED light source revolves alongside in the reel section. A comfort, which was available only in case of electrically illuminated sewage cameras.
- :: Additionally, every INVIZ® probe is available with White LED illumination upon request
- :: Focusable and water-tight optics: Do not invest in superfluous and cumbersome optical adapters, rather, keep the image always in sharp focus at the touch of a button.
- :: Field-tested helping aids for simple application of professional centering tools and pushing aids.

In order to obtain the economic advantages of your endoscope even in the long run, you ought to read and follow the following advice, tips and warnings carefully. The observance of these instructions serve the purpose of your own safety as well as the safety of those in the work field of the endoscope.

All tips, code of behaviour, suggestions for measures to be undertaken, advice, warnings and instructions are exclusively valid for the operation of INVIZ® video endoscopes and not for devices by other manufacturers.

For questions, which have not been answered by this instructions manual, your dealer and/or the manufacturer are gladly available for advice. Kindly contact us even if you have suggestions for the improvement of this manual or the product. For contact details please consult the last page.

Thanks for choosing a viZaar® product for your inspection service.



Compulsory instructions for a safe start-up in accordance with regulations. Reading before the initial operation is compulsory!

Before the initial operation, this instructions manual must be completely read and understood by the user in order to prevent damage and danger to life and property through the operation of the video endoscope system (the device). The operation of the device without the understanding of the instructions manual is not allowed under any circumstances. The device has been designed exclusively for industrial applications to be used exclusively by trained operators. It is absolutely not suited for any medical or veterinary application must never be operated by private users.

For a generally non-destructive operation of the device, beside the safety of the personnel and environment, an extensive knowledge of the device, the inspection technology, the safety instructions as well as the industrial field of application are absolutely necessary!

The device must never be connected to electric mains, if you have not understood this instruction including safety warnings or even if you have not understood individual sections or if you cannot or do not wish to use the device in accordance with the regulations.

viZaar® is not liable under any circumstances for the consequences of misinterpretation or faulty inspection results, which were achieved with the device.

viZaar® shall not be liable under any circumstances for the loss of inspection data.

viZaar® shall not be liable under any circumstances if device parts are left behind in the inspected plant inadvertently.

For compulsory attention:



Warning against risk of injury or loss of life to humans



Warning against significant risk of damage to device and plant



Warning against fatal electric shock



Warning against life-threatening explosion risk



Warning against life-threatening fire risk

WARNING! Not for medical use. Never use close to electrical facilities, or in hazardous or explosive environments. US or EUROPEAN patents may apply to all INVIZ® products. Microsoft®, Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and / or other countries. © Copyright 2012 viZaar AG. Subject to change. Illustrations may differ from the original. Subject to technical modifications and errors. All rights reserved.

	<p>The device or parts thereof must never be inserted into human body openings and / or used for (veterinary) medical analyses.</p>
	<p>The device must never be opened by the user at any place other than the lamp shaft. Life-threatening electric currents are used or generated in the device; in particular, the device must never be used with the housing open. The device must never be used when there are audibly loose parts inside the device.</p>
	<p>The video probe of the device must never be used in or in the vicinity of apparatus or equipment, which are partly or fully energized by electric current of any type (e.g. transformers, motors, generators, switchboards etc.). The metallic mesh of the probe conducts electricity and dangerous currents are transmitted during every contact or even short-circuits can be triggered in the plant.</p>
	<p>In case an exchange of the lamp becomes necessary, one must proceed according to the procedure in the instructions!</p>
	<p>The device must never be operated in moist environment (e.g. during precipitation) nor must the control device or the operating pendant be submerged in water – there is a risk to life due to electric currents!</p>
	<p>Before start-up, the device must be acclimatized according to the ambient temperature. This is valid in particular for cooled devices, wherein condensate accumulation during warm-up can lead to destruction and damage due to electric spark over.</p>
	<p>The device must never be operated with damaged video probe. There is a risk of damage to hand due to the metallic protective mesh (suggestion: always wear work gloves for protection). At the same time, there is a danger that liquids might penetrate the probe and thereby impair the functioning permanently or might cause a life-threatening electric shock to the operator! Even the use of a slightly damaged probe can quickly lead to the total destruction of the probe due to destruction of the light fibres or the electric conductors lying inside. The operation of a damaged probe is impermissible within the area of jurisdiction of the European Union, since the regulations on emission of electro-magnetic radiation can no longer be adhered to with safety.</p>
	<p>Never operate the probe without working gloves! Considerable risk of damage! At the same time, protective glasses must always be worn while operating the probe.</p>
	<p>Never operate the device under conditions which do not comply with the operating conditions or storage conditions described in the instructions manual!</p>
	<p>The device must never be operated in operating environments which are vulnerable to explosion or fire risk. The device is not equipped with safety devices or acceptance for operation in environments vulnerable to explosion or fire risk. An impermissible employment in environments susceptible to explosion or fire leads unavoidably to a device-induced life-threatening explosion and to a fire in the plant. The operator is obliged to check the plant for substances vulnerable to explosion or fire before every new start-up of the device.</p>
	<p>The device must be checked annually by the manufacturer or an authorized third party for compliance with the electrical safety instructions obligatory at the usage site and conformance with the as-delivered condition of the device. The device must not be connected to the electric supply mains or otherwise operated after the ascertainment of a defect or any deviation from the as-delivered condition. This is valid, in particular, if the device has tumbled or fallen down or was exposed to a liquid.</p>

	<p>Never allow the device to be operated without supervision. For safety reasons, it is necessary to switch-off the machine during pauses.</p>
	<p>Never operate the device in radio-actively contaminated environment! Never expose the probe to ionizing radiation of any type!</p>
	<p>Never bring the probe in contact with corrosive substances of any kind (acid or alkali). Risk of damage and injury while manipulating the probe. Never bring the probe in contact with solvent containing liquids! Risk of damage!</p>
	<p>Never insert the probe in plant parts the contents of which are unknown!</p>
	<p>For increasing your own safety against electric shocks with risk of injury or loss of life, the device must always be connected and operated via a residual current circuit breaker system or an isolating transformer. This can in any case be a compulsory condition depending upon the operating environment. For this, consult your responsible safety in-charge or the accident protection measures in force in your respective country.</p>
	<p>The device must be transported exclusively in the transport case conceived for it by the manufacturer. The device and the corresponding accessories must be packed in the transport case only according to the instructions at hand.</p>
	<p>The use of too long power extension cords is life-threatening and forbidden (max. 25 m in case of a supply line made of copper 3 x 1.5 mm²). Hereby, a life-threatening loss of the protective function of the upstream safety element is possible. At the same time, voltage differences of the earth potential as compared to the displaced reference point of electric output (bridged by a too long extension cord) could cause dangerous electric currents on contact with the device housing or impermissibly high equalizing currents at the probe. In case of uncertainties, consult your on-site electrical expert.</p>
	<p>Always ensure that the respectively inspected metallic pipeline systems conform exclusively to a homogenous ground potential; electrically insulated transition points (e.g. sealings, plastic line sections) can exhibit different electric earth voltage potentials depending upon the plant, which could build up very high electric currents with sparking and substance burn-out in case of bridging through the metallic, electrically conducting probe. Kindly consult your on-site expert in advance.</p>
	<p>The endoscope system can be connected to the public electric supply mains through a 'IEC-plug lead' included in the delivery or a 'IEC-plug lead' which complies with the local socket standards. The system accepts faultlessly all power supplies known worldwide with alternate currents of 96 VAC to 246 VAC at 46 to 60 Hz. For safe operation, the device needs a reliable potential earth (PE) connection. In case of doubt, an expert or the manufacturer must be consulted. The minimum output supplied by the power connection can be derived from the device specifications contained in the instructions.</p>
	<p>Never insert the probe in plant parts, if weld or cutting work is being undertaken simultaneously or soon. Likewise, the probe must never be inserted if further inspection procedures like eddy current or radiography tests are being undertaken on the same plant part. Never insert the probe in plant parts, which are not fully switched-off (e.g. danger from rotating plant components) or cooled down.</p>
	<p>Exclusively the viZaar® accessory articles or spare parts described in this instructions manual may be used in connection with the device. Always consult and follow the national and international operations and safety regulations, Norms or regulatory authority's advice.</p>

	<p>Never look directly at the light emission in the camera head. There is danger of lasting eye injury or at least a long-lasting eye irritation with accidental consequences through a temporarily restricted power of vision.</p>
	<p>When operating the device outside the permissible operating conditions or with destruction caused by usage which deviates from the instructions, non-compliance with the operating conditions or through the usage of non-original spare parts or accessories as well as through impermissible opening of the device, the guarantee obligation or the guarantee commitment by the supplier or manufacturer lapses, in principle.</p>
	<p>The different probe models require handling which is different each time and deviate from each other significantly even in the technical specifications. The enclosed operating and application instructions of the respective probe must be compulsorily adhered to.</p>
	<p>When operating the device outside the permissible operating conditions or with destruction caused by usage which deviates from the instructions, non-compliance with the operating conditions or through the usage of non-original spare parts or accessories as well as through impermissible opening of the device, the guarantee obligation or the guarantee commitment by the supplier or manufacturer lapses, in principle.</p>
	<p>Avoid tight coils or even knots in the tube. Do not step onto the insertion tube or camera head. Do not smash the camera head with its optics onto the floor or cause any other possible impact to the instrument. This can damage your probe!</p>
	<p>When changing probe do not try to force the instrument into the connector!</p>
	<p>Do not use the probe for transporting the system! This can damage your probe! To transport the system use the carry handle on the base unit.</p>
	<p>Please use a protective earth conductor! The use of bifilar extension cords or other procedures can't ensure safe operation.</p>
	<p>The system must be earthed properly in case of an electrified application in relationship to the ground. If impossible, connect the system to the application or the ground (depending on which one the user needs to touch). The user needs to be isolated against the current path of the earthed path.</p>
	<p>While connecting to the car's voltage transformer, the base unit should be connected to protective earth and the car body, even when a grounding plug is available.</p>
	<p>Never connect a triplolar plug to a bipolar socket! Avoid any contact between INVIZ® / VUMAN® RA-Y / RA (and all working equipment) and components carrying electrical charges.</p>
	<p>viZaar® does not take responsibility for any risk of the system by ignoring the notification of cleaning the water trap! The condensed water is no drinking water!</p>

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1.1 Removal from the transport case

Before opening the optional transport case, check the container for possible transport damages.

Dimensions: H 640 x W 645 x D 455 mm; PE;
Weight empty: 8,7 kg.

- 1 Push in to unpack
- 2 Pull-out lever for easy transportation
- 3 Wheels
- 4 Press the tab to unlock the lever
- A Lift here to open the transport case
- B Turn counter-clockwise to unlock

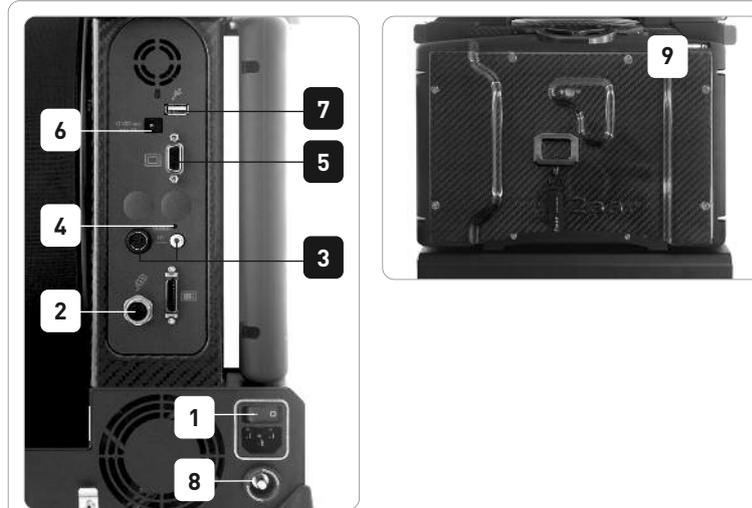


To remove the device from the box lift carefully on both sides of the reel. Memorize the location of each accessory part during removal to proceed later in reverse sequence.

- 1 INVIZ® VUMAN® / RA-Y / RA base unit
- 2 Accessory case
- 3 Cord case
- 4 Short Guide: Operating instructions
- 5 INVIZ® VUMAN® / RA-Y / RA:
Without optional battery
- 6 INVIZ® VUMAN® / RA-Y / RA:
With optional battery
- A Lift here
- B Do not dispose the battery fixture
from the transport case



- 1 Main power in
- 2 Connector for umbilical cord
- 3 Video / S-Video In
- 4 Reset button
- 5 VGA ext. Monitor out
- 6 12V DC out
- 7 USB 2.0 interface
- 8 Connector ground clamp
- 9 Control unit locked to the base unit



ATTENTION!

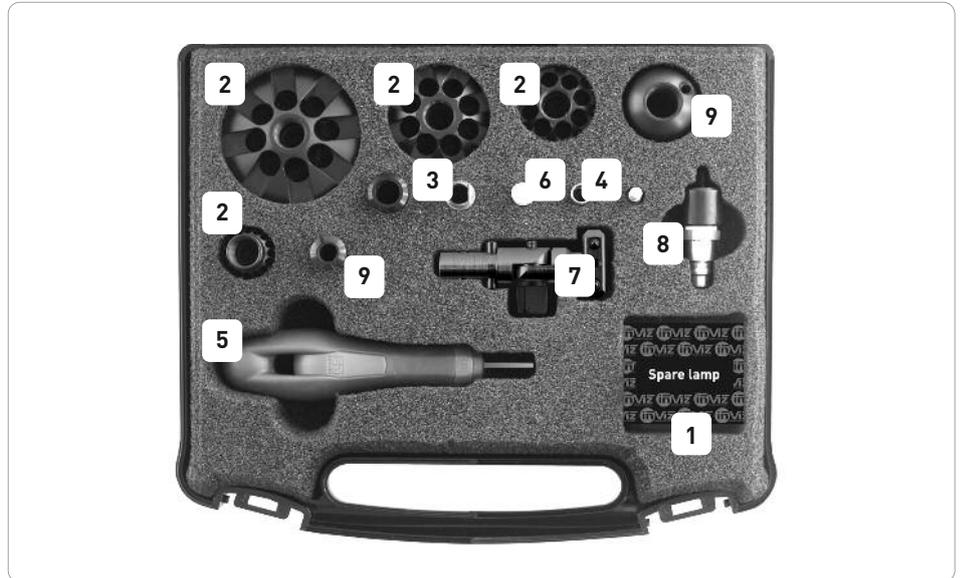
Do not restart the system immediately after shutting it down! This could cause several damage to your system!

- 1 Reel handle
- 2 Lamp duct
- 3 Handle for carrying
- 4 Latch for Battery pack (optional)
- 5 Extendable bar to fix and elevate the control unit
- 6 Wing screw (allows pan and extension of the connected control unit)
- 7 Reel storage position



1.1.1 Accessory case

- 1 Optional spare lamp
- 2 Different quantities of centering discs depending upon the model, possibly optional
- 3 Mounting clip for centering disc
- 4 Camera head protection ring (for operation without sideview optics)
- 5 Key for holding the mounting clip
- 6 Optional side view prism
- 7 Mounting adapter for LCD control pendant
- 8 External air supply adapter
- 9 Connection ball for optional push aid



1.1.2 Specifications

Base unit

Dimensions in mm	(W) 335 x (H) 410 x (D) 275
Weight	16,4 lbs / 7,4 kg (21,8 lbs / 9,9 kg X-WAY)
Environmental Specifications	Operation temperature 5°F – 118°F [-15°C - 48°C] Storage temperature -13°F – 150°F [-25° - 65°C] Relative humidity max. 95%, non condensing
AC input	96 VAC – 256 VAC / 47Hz – 63Hz / max. 175 Watt
Housing	Aluminum – carbon fibre with elastomer bumpers
[x-way] drive	Integrated compressor, maintenance free
Video input	PAL or NTSC composite and S-Video, auto dedecting
Video output	Analog VGA PC to monitor connector [Resolution 1024 x 768], worldwide standard
Connectors and outlets	USB 2.0, recording remote control, 12VDC / 500mA Aux-Out, external compressed air, rechargeable battery
LED light source	Lifetime guarantee High efficient LED illumination 7,8 Watt Daylight quality 6.500 K
System memory	Up to 60 hours of high resolution MPEG 4 video-recording or several thousand BMP and JPG high quality screen shoots* 2 GB, AVI recording in medium resolution, JPG image recording**

LCD control panel

Dimensions in mm	(W) 320 x (H) 30 x (D) 230
Weight	2,85 lbs / 1,3 kg
Mounting	Base Unit: integrated recording Portable: shoulder harness or magic-arm
LCD monitor	10,4" LCD, contrast 600:1, 350 cd, transreflective LED illumination, 262.144 colors, viewing angle all directions +/- 90°
Operation	Resistive touch screen incl. five direct access buttons and joystick
Housing	Carbon fibre design with all around elastomer bumper; power tube 2,5 meter (8,2 ft)
Features	Color-onscreen text editing with memory*, 8x enhanced digital zoom with variable image section, 360° image rotation*, reference-colour chart* , whitebalance adjustment, longtime exposure 40ms -10 sec.*, light- and brightness control, color, camera focus control, memory for nine user settings*, full directory and file management*

* Available with INVIZ® VUMAN® / RA-Y

** Availabke with INVIZ® VUMAN® RA

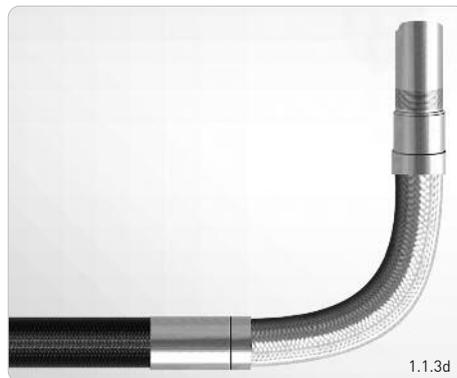
1.1.3 Control unit

- 1 Joy stick controls 360° probe articulation
- 2 Push to lock / unlock the probe articulation
- 3 Direct access button pad
 - A = 1) Toggle between standard / setup.
2) Switch to setup from every menu (except setup).
 - B = Capture single image
 - = Lock / unlock the probe
 - || = Freeze / unfreeze
 - = Start / stop video recording
- 4 Slight control button light control
- 5 Slight control RF Remote Focus (patented all distance Remote Focus)
- 6 Battery status indication
- 7 Touch screen (image presentation and system control keypad)
- 8 Four openings for stop pins of the shoulder strap
- 9 Holding fixture for snap lock (connects to tripod / magic arm or systems extendable pan and tilt shaft)
- 10 Connector (cable to base unit connection)



Push the stop pin into the opening with the flat side looking up. Turn the stop pin clockwise to lock the mounting.

A) Absolute articulation is working with direct response of the probe head. Move the probe head by moving the joystick. After you stop moving the joystick, the probe head will return to it's standard position (straight, not articulated). See pictures 1.1.3d to 1.1.4e or "Extended settings" on page 20.



B) Relative articulation means scanning the application step by step. By moving the joystick, the probe head follows slowly in the desired direction. After you stop moving the joystick, the probe head remains in it's position. You can correct the position by directing the joystick to another position. To redirect the probe head into it's standard position (straight, not articulated), press the joystick. See pictures 1.1.3d to 1.1.4e or "Extended settings" on page 20.



1.2 Accessories

Scope of delivery version basic device in optional transport:

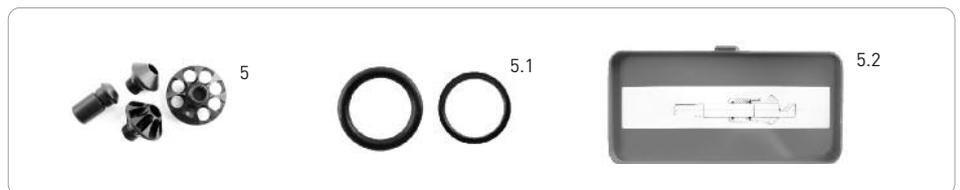
- 1 INVIZ® VUMAN® / RA-Y / RA base unit
- 2 Control unit
- 3 Cord case
 - 3.1 Power cord D, UK or US
 - 3.2 S-Video cord
 - 3.3 BNC video cord
 - 3.4 BNC to RCA video adapter
 - 3.5 Umbilical cord for control unit
 - 3.6 Ground clamp



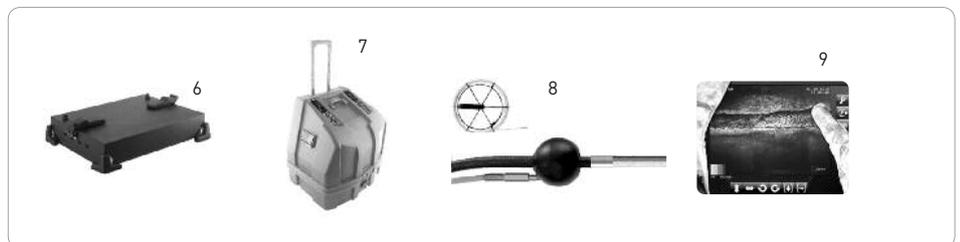
- 4 Accessory case
 - 4.1 Optional spare lamp*
 - 4.2 Different quantities of centering discs depending upon the model, possibly optional
 - 4.3 Mounting clip for centering disc
 - 4.4 Standard device: Camera head protection ring (for operation without sideview optics)
 - 4.5 Standard device: Key for holding the mounting clip
 - 4.6 RF devices: Optional sideview prism
 - 4.7 RF device 6: Hexagon Wrench
 - 4.8 Mounting adapter for LCD control pendant
 - 4.9 External air-hose-adapter



- 5 Revolver 12.7: Four-part centering tool
 - 5.1 Revolver 12.7: O-Ring and plastic ring
 - 5.2 Revolver 12.7: Instruction for mounting of centering disc in the lid



- 6 Optional battery incl. charging unit
- 7 Optional transport case
- 8 Optional pushing aid
- 9 Optional LCD display protective foil



* Only available with INVIZ® VUMAN®

Optional pushing aid tools cannot be accommodated in the transport case. The usage is explained separately.

Some accessories are not included in delivery and must be purchased additionally. Therefore, please contact your local sales representative.

Connection and operation of the control units software and functions is represented in the following chapters.

1.3 Quick reference, initial setup and operation

This part will allow you a quick first setup and inspection. Your INVIZ® VUMAN® / RA-Y / RA offers many valuable and useful options. For safety and to have full benefit of your system please ensure to read and explore the detailed descriptions and the complete manual.

1.3.1 Hardware setup

Power the system by connecting the power cord and/or attaching the charged battery pack. Turn the main switch ON. The system will boot up while the integrated micro compressor will audible charge up the system. Only with configuration INVIZ® VUMAN® / RA-Y / RA [x-way] base unit. The lamp will be started.

1 Insert power



2 Optional: power from battery



1.3.2 Safe power supply & safe earthing

The maintenance of the safety instructions behooves to the user. Connect the system to a low-impedance neutral conductor to route stray currents and electrical charging to the ground. Please refer to the warnings in the operating instructions.

To ensure safe operating with the INVIZ® VUMAN® / RA-Y / RA, a protective earth conductor must be available in the AC power plug. The plug of the AC power cord must include an earthing pin. The power cord must be in proper condition. The socket should include a plug for the earthing pin.

Earthing while working with the battery

Please use a protective earth conductor while working with the battery. Connect the earth cable to the earth plug on your INVIZ® VUMAN® / RA-Y / RA Base Unit (see pictures 1 and 2).



Then connect the earth cable to protective earth or the application. For further questions please contact your dealer or the viZaar service.

1.3.3 The control panel

3 Release control unit (lift latch)



The control panel with the integrated touch screen can be operated in five different ways.

To start, release the control panel by simultaneous pushing with two fingers the two locking pins under the latch up (figure 3). The latch will move up allowing the panel to be gently pulled forward and lifted out of the bracket.

4 Connect umbilical cord control unit to base unit



Possible ways to use the panel

5a On the workbench

(Put the panel down onto a clean workbench.)



5b On the system

(Return the control unit back into the bracket with the display showing outside and lock it by pushing the latch down)



5c Using the shoulder strap

(Take the harness and push the four stop pins provided on the key rings (see page 05).

5d With a magic arm



(Connect the 1/4" connector of your tripod or magic arm into the 1/4" nut provided on the back of the panel. Ensure secure locking and solid fixation.)

5e Elevated with the integrated extendable



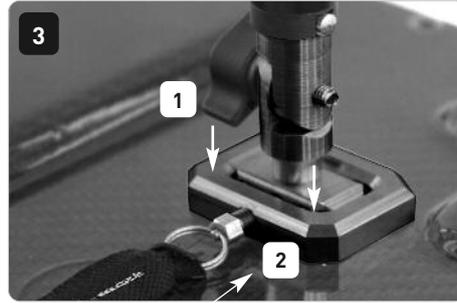
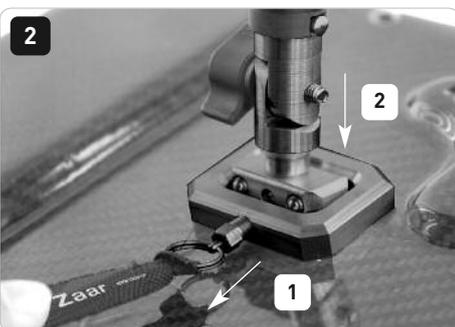
pan and tilt bar

Attach the adapter:
A left turn on the wing screw will release the pan and tilt bar. Connect the control unit by sliding the connector shaft into the bar. Two spherules will lock the bar. Together with the panel pull the extendable bar into the preferred level and position and securely tighten the wings screw. To pan the control screen into an optimal position use the screw top of the adapter.

For setup 5e fit adapter as described. Connect-



ting the adapter between control unit and base unit extension shaft pulling the shaft back. Remove the safety belt and take videoprobe tip



out of the reel storage position.



Articulation types

A) Absolute articulation is working with direct response of the probe head. Move the probe head by moving the joystick. After you stop moving the joystick, the probe head will return to it's standard position (straight, not articulated). See pictures 1.1.3d to 1.1.4e or "Extended settings" on page 20.

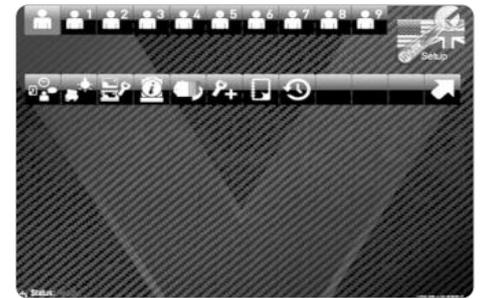
B) Relative articulation means scanning the application step by step. By moving the joystick, the probe head follows slowly in the desired direction. After you stop moving the joystick, the probe head remains in it's position. You can correct the position by directing the joystick to another position. To redirect the probe head into it's standard position (straight, not articulated), press the joystick. See pictures 1.1.3d to 1.1.4e or "Extended settings" on page 20.

1.3.4 User setup menu

The first screen setting will ask you to choose a user setting. For a fast and first start choose **default user**.



Additionally up to nine codes secured individual user configurations can be chosen. (See page 19)



Enter by touching the forward arrow on the screen



A first camera image will show up on the screen.



By setting the white light control slide bar on the control unit to maximum the light control is in automatic (see page 05).

The red slide bar offers the patented Remote Focus (see page 05). Sliding up or down will bring your image into perfect focus.

Before using the joystick ensure that the tip of the probe is released from it's storage position. The tips with approximately 50 cm of the probe are securely stored in a guide tube in the vessel wall of the probe reel. Carefully pull out the probe tip.

Pull the desired probe length from the reel. Best tip articulation will be achieved with at least the first three to four meter probe length pulled straight.

ATTENTION! Never operate the joystick with insufficient space for the tip to follow and move. This can cause damage!

To control the tip articulations use the joystick on the control panel. A push on the direct access button will lock the tip in it's position.

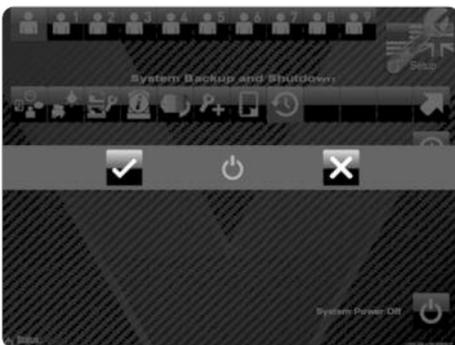
ATTENTION! Never leave or pull back the instrument with the tip in a locked position. This can cause damage (see page 05)!

Please follow further advice to ensure a safe shutdown of the system:

1. Touch the OFF symbol on your touch screen (the OFF symbol finds itself on the left bottom of every menu).



2. After pushing OFF, a menu occurs on the touch screen. Now select if you want to turn off your system or return to operation.



If you want to turn off your system through the setup menu, go to „System Backup and Shutdown” and push „System Power Off”.



After pushing „System Power Off”, please wait for the shutdown screen to occur and turn off your system with the main switch.



ATTENTION! Always shut down the system as shown in the operating instructions. Non-observance of the instruction may cause system failures and/or data loss!

For turning off the system in any another menu, follow further instructions.



1. Touch the OFF symbol on your touch screen (the OFF symbol finds itself on the left bottom of every menu).
2. After pushing OFF, a menu occurs on the touch screen. Now select if you want to turn off your system or return to operation.

For further shutdown instructions and backup installation after system breakdowns please refer to „3.7 System backup and shutdown” on page 36.

The device must be operated exclusively in environments, which guarantee that the in-built ventilator supplies the lamp with sufficient air for cooling. In case of insufficient cooling, there can be damage to the lamp or at the input of the light transmitting fibres.

The INVIZ® VUMAN® device requires a pause of minimum 9 sec. for regeneration before a restart, so that the arc lamp can be ignited successfully once again. The INVIZ® VUMAN® RA-Y / RA doesn't require a pause before restart.

For full benefit and usability consult the related parts of this manual. If you have questions or encounter problems, **please contact your viZaar® representative (contact details see page 42).**

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2.1 Tips for your inspections with the INVIZ® VUMAN® / RA-Y / RA

2.1.1 After the initial start-up

After the initial startup of the INVIZ® system, the following points may be noticed by you:

- :: The image is out of focus. The focal range was perhaps not set for current setting and the observation of the environment. Use the Remote Focus slide knob on your control panel to get your system into focus.
- :: The image appears slightly violet; the correct image shooting under the influence of daylight is not foreseen; the infra-red portion, which is invisible to the human eye, is often no longer filtered in endoscopic cameras for reasons of light sensitivity, since an IR filter is already integrated in the cold light sources. This is no cause for worry.
- :: Optionally, the system is equipped with a manual white balance calibration. Conduct a white balance adjustment before the initial application of the endoscope and after a site change. See also manual page 24.

2.1.2 General tips

In the following, we have collected a few general tips, which can help you to economically and fast achieve good inspection results. The points do not concern your work safety, but exclusively serve the purpose of communicating general technical knowledge.

Before introducing the probe into a cavity or a pipeline, it must always be ensured:

- :: That the highest permissible operating temperature (e.g. 70° C) of the probe is not exceeded. A sure sign for too high a temperature is the appearance of white pixels (white image noise); the device must be immediately switched-off and the probe must be removed from the application urgently. One-time temperatures above 84° C destroy the camera head and the light fibres irreversibly. Fresh weld seams in pipelines have high local temperatures, which quickly lead to the destruction of the instrument!
- :: That the application is free of acids, alkali, oils and solvents. All non ph-neutral liquid media may destroy different parts of the probe.

- :: That the application is not impurified with liquids, the viscosity of which lies below that of water (e.g. glysantine). In such case, a suitable special camera head with sealed fix focus optic is needed.
- :: That the entry point is deburred; sharp edges damage the braiding of the insertion tube.
- :: That the sheathing of the distal probe end is not visibly damaged and leaky right from the beginning.
- :: That no elements in the application can be activated, e.g. remote control valves, turbine rotors, agitators etc.
- :: For achieving meaningful inspection results, the application ought to be cleaned in advance, as long as depositions need not be documented. In case of unclean plants, the optic or the light out of the camera is dirtied fast.
- :: The probe must be inserted inside plants only when it is clean, in order to prevent so-called "cross contamination". This is in particular true for the food and pharmaceuticals field.
- :: Therefore, the probe must never be inserted in the sewerage.
- :: Autoclaving is not possible.
- :: The probe is especially sensitive at the camera end and at the extra-flexible section vis-à-vis the action of forces. While unwinding the probe from the reel, you must not, therefore, pull at the camera head, in principle, but only approx. 30 cm in front of the probe end. At the same time, the camera head must not be pitched on other objects or the floor.
- :: The farther you insert a probe, the greater is the danger that it might get stuck. In principle, an endoscopic probe can be more easily inserted than extracted, as far as straight, narrow and steeples pipelines are not being inspected. In perimeters (e.g. heating pipes at apparatus and reactors) this can lead to self-obstruction – similar to a lasso. Do not lose your nerves in such a case- there are often different methods of disengaging the probe without opening the plant or destroying the probe. The risk of getting stuck on steps is increased with the employment of centring tools. In principle, never use force while releasing! The manufacturer offers a foreign parts retrieving service. In order to limit the long-time action of unknown substances, the probe ought to be cleaned after use.
- :: Although the elastic INOX POWERFLEX protective braid of INVIZ® probes is significantly softer than the wrongly often favoured wolfram alloyed braid wires, still high-value pipelines with the lowest degree of roughness (e.g. electro polished) can be lastingly damaged or even destroyed here through the endoscopy. Many users, therefore, prefer, in case of need, a shrink hose to a probe and camera head. This still does not prevent the "abrasion" through the tiniest foreign particles. When the hose shrinks with heat (hot air gun) a highest temperature of 84°C on the inside of the probe must not be exceeded!
- :: Mount your equipment basically in such a manner, that it stands absolutely securely. Fundamentally, the probe does not possess the constructive characteristics of stopping a free fall of the control device without breaking. Through an insecure mounting, you are principally seriously endangering persons, perhaps working on levels beneath you. At the same time, strong jolts are resented by a rotating arc lamp, besides shortening its lifetime, possibly accompanied by total failure.

2.1.3 Further advice from practice

- :: If the illumination of your endoscope is not sufficient in an axial inspection (view angle 0°), the environment can be brightened with a white Styrofoam piece or a paper ball, which are moved in front of the endoscope.
Attention, connect Styrofoam or paper well with a fishing line, in order to ensure a simple retrieval.
- :: You can mark the probe with coloured insulation tape at regular intervals, in order to localize the inspection spot more easily. Kindly take a zigzag position of the probe into calculation.
- :: While the endoscope reel is rotating, the light temperature changes slightly; at the same time, the light output is not constant in all positions. The camera is calibrated to the so-called 'three o'clock position', i.e. the lamp shaft is set at a three o'clock position as compared to the hour indicator of an analogue clock. At the same time, the lamp output is maximum in this position (100%, 9 h = 90%).
- :: A rotating pipe weld seam can be continually inspected without motorized mirror, by means of unwinding an additional approx. 2 m probe material. The additional material is formed into a small loop (diameter approx. 20cm), with which the probe can now be carefully rotated comfortably. An alternating inspection rhythm with left / right rotation is recommended.
Although the probe transmits torsion forces perfectly, one must take care that no one-sided twists are caused, which could lastingly damage probe and inner life.
- :: A stuck probe can be released with deliberate rotation and simultaneous pulling or even pushing. In connection with centring tools, steps or down-coming, T-outlets with downward incline, can be jumped over a "swing"; heavy centring tools ought to be manoeuvred around the T-piece laterally on the wall (simultaneous high rolling). The friction while the probe is stuck through self-obstruction can be strongly reduced through a streaming liquid (in the simplest case, water). Furthermore, there's the possibility of releasing the stuck probe by means of remote controlled motorized tongs, slings and additional endoscope technology. In extreme urgency, it can be considered whether a retrieval of the probe by accessing

- it from the opposite end of the pipe is possible. For this, you ought to contact the manufacturer, who can give you technically correct instructions for releasing the probe from the control device. viZaar® even makes service technicians available for this difficult task, which will support you on-site.
- :: In spite of the extensive accessories, operators often make use of fast and easy means in order to achieve good image results. While adhering to all safety regulations and already named risks, an empty PET bottle (cola, drinking yoghurt etc.), e.g., could serve as an ideal centring tool. Even the help of cable binders and adhesive tapes can be certainly described as usual, if it leads to good inspection quality. For understandable reasons, viZaar®, however, rejects any liability claims arising from the use of such aids.
- :: Semi-flexible plastic compound pipes are splendidly suited to guide the endoscope over larger recesses, in difficult positions or over sharp edges.

Further questions in respect of the selection of the device technology or settings, all viZaar® co-workers and dealers are gladly available to you for help.

2.2 Problems and system warnings

The system doesn't start up.

- A) Check the main power connection cable is well connected at both ends and power is available.
 - B) Optional battery power (Check that the battery pack is fully charged (see battery power indicator on your control unit see description page 39).
 - C) Check that the battery is well connected.
 - D) Check the systems function using main power.
 - E) Check that the main power switch is turned ON (see page 02).
- I) Straighten the first four meter of your [x-way] probe. From the tip 20 cm down take the probe with one hand and gently pull the last view meters of the insertion tube straight.

ATTENTION! Never squeeze or pull on the articulating bending neck! This can cause severe damage to your probe!

Light and probe work well but there is no image of the probe

The system starts up but the touch screen doesn't respond.

- A) Due to Windows® typical timing issues the handshake between base unit and control unit might not be established. Disconnect and reconnect (hot plug) the connection to restart and establish the handshake. (See picture 4, system setup page 07).
 - B) Is the cable connection between base unit and control unit established and both connectors solid connected?
 - C) Due to the handshake.
- A) Check whether the system configuration, the control panel, or the manual main menu video IN / OUT is set to internal.
 - B) Check if there is not dirt between on the light input rod and that the connector of the video probe is properly connected to the reel of the probe?
(See "2.1.1 Replacing the INVIZ® probe" on page 10.)
 - C) Is there a defect on the tip of the probe?

The probe does not articulate properly. Is the micro compressor running? Listen if there is noise?

- A) Is the micro compressor turned off in the user setup ON. (See chapter 3.2.5, page 20)
- B) Check the compressor control switch symbol on the operating window is shown ON (touch screen). See page 25, button „Micro compressor“.
- C) Does the air control meter in the lower left screen show sufficient air pressure? (min 6 to 12 bar).
- D) Is the optional external air supply turned on?
- E) Is the in plug on the air house for the external air supply tightened?
- F) Is there unexpected air flow noise?
- G) Check the sealing on the interchangeable probe connector (see page 10).
- H) Is the articulation of the [x-way] probe locked? Press the direct access button (see page 05).

The image is not clearly visible

- A) This can be caused by moisture or dirt on the optics or light output of the probe. Clean the optics and / or side view adapter refer page 41.
- B) The light source has not been started or is turned off on the touch screen see also page 20/22.
- C) Not focused. set the system in focus using the slight bar on the control panel see page 05.
- D) Light control is set manually and low. Push the white slide bar to maximum see manual page 05.
- E) Not enough light, try additional image exposure time. See "Image exposure time" button description on page 24.
- F) The time exposure function is turned on causing smearing images when moving the probe see page 24.

The image is flipped, rotated or mirrored

Touch  to reset all image operations. (See page 24, button „RESET“).

Smearing turn of image manipulation

Set back all image configuration see page 24, button „RESET“.

The colour of the image is not correct

- A) Perform a white balance calibration see page 11.
- B) Check the color values see page 24, button „Color“.
- C) Check the brightness level see page 25, button „Brightness“.

The system doesn't respond anymore

If your system doesn't respond turn the main switch off and start it again by turning the main switch on.

The system doesn't boot anymore

If your system doesn't boot perform the alternative boot. (See "5.4 Alternative boot" on page 41).

The system shows an error message after booting

If your system shows an error message after booting please follow the instructions on your touch screen.

A warnign occurs to instruct the cleaning of the water trap

WARNING! Don't turn off the system while performing the restart!

If your system shows the warning to clean the water trap, click OK to start the process immediately. By clicking "Remind me later" the warning will occur after 5 hours. (See also page 41, "5.2 Cleaning the water trap").

An error occurs: "Drive not found!"

If your system shows the error please follow the instructions on the screen. In case the error occurs again, please contact your local distributor or viZaar® (contact details see page 42, "5.7 Customer service").

The software version on the right bottom of the screen is changing its color / blinking

If your software version on the right bottom of the screen is changing its color into orange, the system is restoring system files. With the next start of your system, the color will change back to white.

If your software version on the right bottom of the screen is blinking red by the next start, there is a hardware failure. We recommend to contact your local sales representative.

The background is flashing red and an error message is occurring / the background is flashing red

If the saving of images failed, the background begins to flash red and an error message occurs. Please repeat the saving procedure.

If the saving of images during the filming of a video failed, the background begins to flash red. Please repeat the procedure.

EC declaration of conformity

Manufacturer:

viZaar industrial imaging AG
 Hechinger Straße 152
 72461 Albstadt
 Germany

declares that following products:

- :: INVIZ VUMAN RA
- :: INVIZ VUMAN RA [X-WAY]
- :: INVIZ VUMAN RA-Y
- :: INVIZ VUMAN RA-Y [X-WAY]

are qualified for operation with following probes:

- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
30 meter X-WAY probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
20 meter X-WAY probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
15 meter X-WAY probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
12 meter X-WAY probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
8 meter X-WAY probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
5 meter X-WAY probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
30 meter non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
20 meter non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
15 meter non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
12 meter non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
8 meter non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA 8,4mm,
5 meter non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA 6mm,
15 meter 90° side view,
non-articulating probe

- :: INVIZ VUMAN / RA-Y / RA 6mm,
8 meter 90° side view,
non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA 6mm,
15 meter, 0° straight view, wide angle, fix
focus, non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA 6mm,
8 meter, 0° straight view, wide angle, fix
focus, non-articulating probe
- :: INVIZ VUMAN / RA-Y / RA Revolver 12.7mm,
15 meter, endless rotating side view probe
- :: INVIZ VUMAN / RA-Y / RA Revolver 12.7mm,
8 meter, endless rotating side view probe

This device possesses CE- identification and fulfills the conformity with standardisation:

- :: EN 50081-2, EN 50082-2
- :: EN 55022

The fulfillment of this standard presupposes the application in industrial area.

The device is designed for an application under the following electro-magnetic conditions:

“Commercial and, to a limited extent, industrial segment (E2)”.

ATTENTION! In a laid-out probe in very rare, accidental and irreproducible layer constellations, there can be electro-magnetic emissions at 44.7 Mhz of +3 db above the permissible limit value. The conformity is valid for the nominal operating voltage 115 V / 60 Hz and 230 V / 50 Hz.

Location: Albstadt Date: 21.08.2008



Kersten Zaar (CEO)



Felix Sandel (CTO)

Quality is in the focus of our activities!

To provide you with the most innovative and reliable products and services in constant high quality we work on continuous improvements in all aspects of our business.
This is an ongoing process involving all staff and

processes guided and certified by experts. Furthermore, our personal commitment to quality is attached to your INVIZ® VUMAN® / RA-Y / RA inspection system to ensure best quality and high value check-ups.



Our personal commitment to quality



DIN / EN / ISO 9001



DIN / EN / ISO 14001



SCC**



KTA 1401