

SQA-V *Gold* **and** **SQA-V** **Service Manual**



V e r s i o n 2 . 4 8 / 2 . 4 9 / 2 . 6 0

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SECTION I: Introduction

The SQA-V is a high performance analytical medical device that combines state-of-the-art technology in electro-optics, computer algorithms and video microscopy. The system performs a precise, 75-second semen analysis. The SQA-V runs a self-test and auto-calibration on start-up and also runs external quality controls. The SQA-V incorporates two systems: An **automated system** and a **visualization system** which allows flexibility to analyze all types of semen samples.

Automated Test Results

WHO 5 th Semen Parameters with SQA-V Abbreviation in Brackets			
Sperm Concentration (SPERM CONC.)	M/ml	Velocity (VELOCITY)	mic /sec
Total Motility (TOTAL MOTILITY <PR+NP>)	%	Sperm Motility Index (SMI)	#
Progressive Motility (PROG. MOTILITY <PR>)	%	Total Sperm Number / ejaculate (SPERM #)	M
Non-progressive Motility (NONPROG. MOTILITY <NP>)	%	Total Motile Sperm / ejaculate (MOT. SPERM)	M
Immotility (IMMOTILITY <IM>)	%	Total Progressively Motile Sperm / ejaculate (PROG. SPERM)	M
Sperm Morphology (normal forms, %) (MORPH. NORM. FORMS, WHO 5 th)	%	Total Functional Sperm / ejaculate (FUNC. SPERM)	M
Motile Sperm Concentration (MSC)	M/ml	Total Morphologically Normal Sperm / ejaculate (MORPH. NORM. SPERM)	M
Progressively Motile Sperm Concentration (PMSC)	M/ml	Postvasectomy: Motile, Immotile and Total Sperm/Scan (#SPERM/SCAN: MOTILE, IMMOTILE and TOTAL)	#
Functional Sperm Concentration: Progressively Motile Sperm with Normal Morphology (FSC)	M/ml	Postvasectomy: Motile, Immotile and Total Sperm/sample volume (#SPERM/SAMPLE VOLUME: MOTILE, IMMOTILE AND TOTAL)	M

Technology

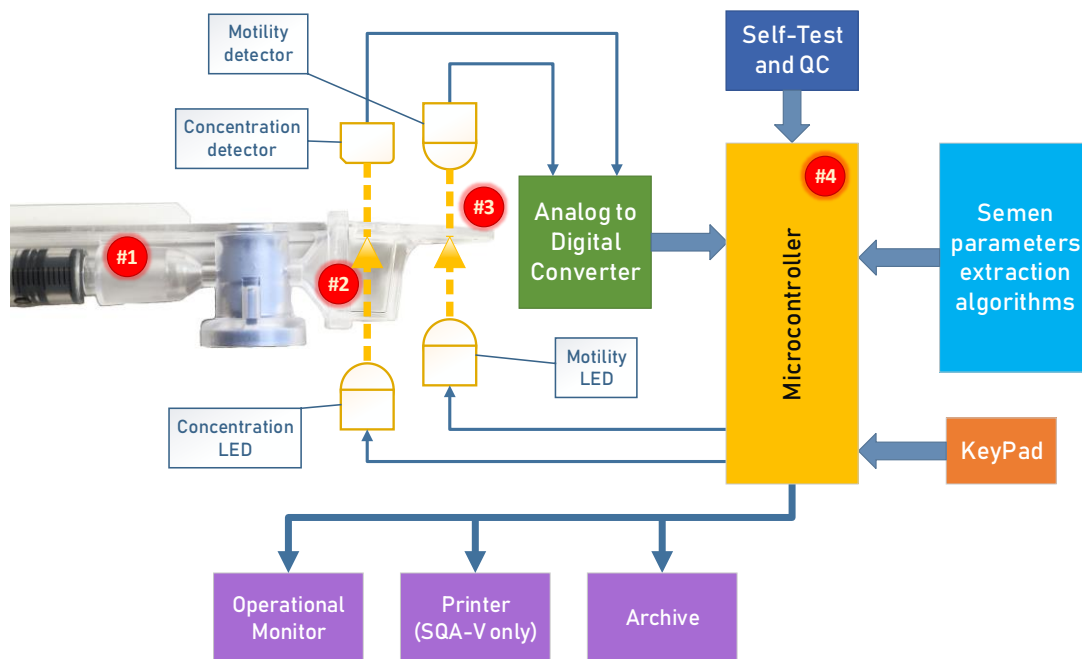
Automated System

Motility Channel

- Light disturbances caused by moving sperm cells are detected and translated into **analog signal peaks**.
- The greater the number of motile sperm cells in the field of view, the higher the **peak**.
- The slower the sperm velocity the broader the signal peaks.
- The **average analog signal** is mathematically proportional to **MSC**.

Concentration Channel

- Sperm concentration is measured in the cuvette section of the SQA-V testing capillary.
- An infrared light wavelength specific to sperm cells is maximally absorbed by sperm cells and minimally absorbed by other seminal fluid components.
- In the final calculation of sperm concentration the SQA-V algorithm makes an adjustment to account for the infrared light absorption of the seminal fluid components.

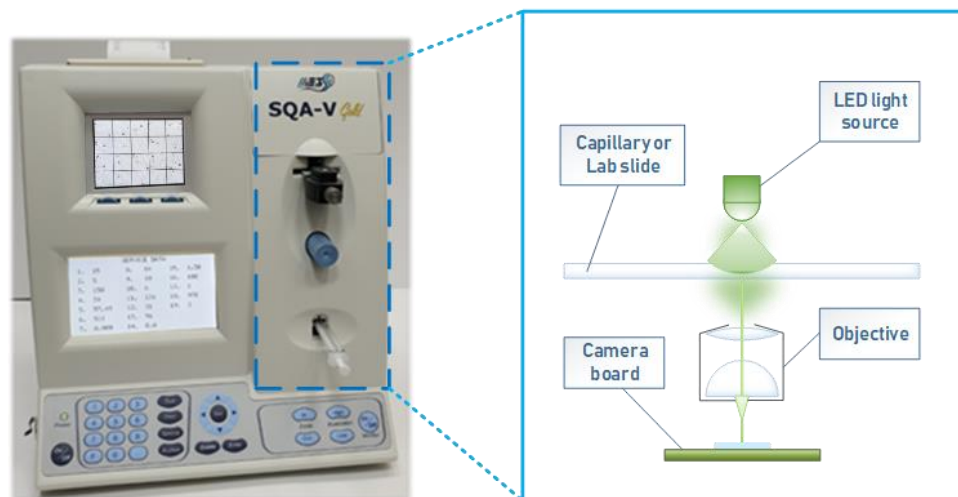


- Step 1:** The capillary is inserted into the measurement compartment.
- Step 2:** Sample concentration is evaluated in the "tall" 10 mm chamber of the capillary by measuring the amount of **optical absorption of light as a beam traverses the seminal fluid.**
- Step 3:** Motility is detected in the "thin" 0.3 mm section of the capillary by analyzing **light modulations caused by sperm motion.**
- Step 4:** This information is then digitized and routed to the microprocessor that applies algorithms to extract the required clinical semen parameters and performs internal self-testing and calibration.

Visualization System

- LED light source
- Objective lens 20X
- Total system magnification: 300X – 500X
- Focal depth: Approximately 30 microns
- Color video camera with resolution 700 TVL
- Accommodates both: a testing capillary and the SQA-V slide adaptor

Visualization system



Sperm Quality Analyzer

SQA-V Gold

SECTION II: System Specifications

Dimensions: Height x Width x Depth: 32 x 31 x 24 cm
 Weight: 4.5 kg
 AC power supply: 100 to 250 VAC, 50/60 Hz, 24W
 Fuse rating: 2A 250V
 Power stability requirements: Voltage fluctuations \pm 5% nominal

Measurement Compartment

- **Sources of radiant energy** - two IR LEDs for motility and concentration channels
- **Detector system** - two photo detectors - Motility and Optical Density

Visualization Compartment

- LED illumination source
- Video camera: sensor size - 1/4"; resolution: 700 TV lines
- Objective: Standard, 20X
- Signal Output (analog): PAL or NTSC standard
- Zoom system for magnification transition between 300X and 500X
- Focus knob

Display(s)

- Operational LCD screen with white backlight (resolution: 240 x 128 pixels)
- Video LCD screen (3.5" diagonal, resolution [pixels]: 320RGB x 240 QVGA)
- Use monitor **On/Off** key on the keypad to independently operate the video display

Printer

SW version 2.49:

- Built-in, Serial impact dot matrix printer
- Copier paper roll 58mm width
- Ink ribbon cartridge (Citizen)

SW version 2.48, 2.60:

- Built-in thermal printer (CASHINO)
- Thermal paper roll (CASHINO)

Keypad

- **Operational keys:** On/Off (Power), Test, Print, Service, Archive, Delete, Enter, four cursor buttons, Esc, ten numeric buttons (0-9), F (function key) and . (decimal dot)
- **Video control keys:** Zoom In/Out, Illumination High/Low (light source intensity) and Monitor On/Off (video monitor)

Front Panel

- Built-in printer
- Visualization compartment
- LCD video monitor and controls
- Focus knob
- LCD operational display
- Measurement compartment
- Multi-button keypad
- I-Button port

Rear Panel

- Power inlet with fuse-holder (2 fuses: 250V, 2A)
- RCA Video connector
- RS232 communication port

Specimen Testing Supplies

- **Measurement capillary:** Disposable, plastic, positive displacement testing capillary. (Testing depth of capillary section: 300-micron; Cuvette section: 10 mm).
- **Standard laboratory slide:** 20 micron depth, 22 x 22 mm cover-slip.

Operating System

- **Control:** Keypad
- **Analysis Time:** Normal Test – 75 seconds; High Sensitivity/Postvasectomy Test – 5 minutes (9 minutes in version 2.43).
- **Software:** Resides on flash memory and drives all man-machine interface functions, runs algorithms for test measurements (according to WHO guidelines), and operates visual and automated screens. System can be upgraded from a PC CD-ROM.
- **Sample Testing Temperature:** Calibrated for room temperature only 20-25° C / 68-77° F. Motility results will be impacted by heating the specimen.
- **Motility channel input signal:** Analog, up to 5V.
- **Spectrophotometer channel input signal:** Modulated (1 kHz) analog, up to 5V.

Quality Control

- **Internal:** Electronic Self-Test and Auto-Calibration.
- **External:** Counts can be run on the SQA-V automated and visualization systems using commercially available assayed control material: "**QwikCheck-beads™**" (product of Medical Electronic Systems) or Stabilized Sperm as a non-assayed control in version 2.45 and higher.

PC Compatibility

Minimum requirements for V-Sperm software

- **PC:** 1 GHz processor, Pentium 3
- **RAM:** 256 MB
- **AGP-video display card** with at least 16 MB of RAM memory
- **Video color:** At least 16 bit (65,535)
- **CD ROM drive**
- **200 MB free hard disk space** for image capturing
- **Video resolution:** Minimum 640 x 480
- **Operating system compatibility:** Windows XP, VISTA, Windows 7, (Windows 10 pending)
- **Ports:** One serial; two USB ports
- **Monitor:** 15" color

Required Software

- **V-Sperm software for SQA-V system and I-button set-up, archive and CONTROL reporting** also permits user to benefit from many features such as real time visualization interface between PC and SQA-V visualization system, data analysis, video/picture capture and archives test records.
- **Excel/Word for exporting files and clips**

Operational Temperature and Humidity

- System is operational at 15-38°C.
- *NOTE:* SQA-V operates in a wide range of ambient temperatures however the system is calibrated to measure semen samples at room temperature: 20-25°C (68-77°F).
- *NOTE:* Variations in ambient temperature may impact the accuracy of test results because of the effect of temperature on human semen.
- System is fully operational at up to 80% humidity and 26°C.

Maintenance Schedule

- Daily cleaning of measurement compartment (refer to User Guide – "Cleaning") or with each 10-15 tests and/or spillage. **USE ONLY the MANUFACTURER supplied cleaning kit, brush and solution to clean the SQA-V or the system may be damaged and/or inoperable!**

Manufacturer Recommendations

- Operate the SQA-V away from devices that may cause electronic noise (cell phones) or other devices causing vibrations such as centrifuges.
- Turn system **OFF** at the rear-panel when not in use for extended period of time.
- When running High Sensitivity or Post-vasectomy tests do not interrupt test cycle nor interfere with system or testing capillary in any way – this test requires complete stability of the system during the 5-minute testing cycle.
- Variations in ambient temperature can affect semen samples. The SQA-V (HUMAN) is calibrated to test samples at room temperature: 20-25°C (68-77°F). All VET SQA's are calibrated with internal heaters.
- Semen is considered a biologically hazardous material and is subject to individual laboratory protocols for handling such materials.

Factory Default Settings

- **Chamber standard:** 2 (Neubauer)
- **Morphology:** WHO
- **Date format:** DD/MM/YY
- **Time/Date:** Manufacturer's local time/date
- **Controls (all levels/types):** Exp date 01/01

SQA-V System

Front Panel

SECTION III: System Overview

NOTE: The **TEST** button of the SQA-V keypad is only active in the **CALIBRATION** mode

The **ARCHIVE** button on the keypad is inactive- the archive is managed through the V-Sperm GOLD.

Rear Panel

Side Panel



Keypad Navigation

- Use **NUMERIC** keys to enter data; **ARROW** keys to move to the next field
- Press **ENTER** to select menu options, confirm data entries and to move to the next screen or field
- Use the **ESC** button to return to the previous screen or field



- The side panel has an I-Button port (with clip in newer SQA-V's starting with Serial Number 1333)
- Refer to the Appendix Section for instructions on how to load I-button tests.



Assemblies

The rear panel assembly

The rear panel assembly contains the following sub-assemblies:

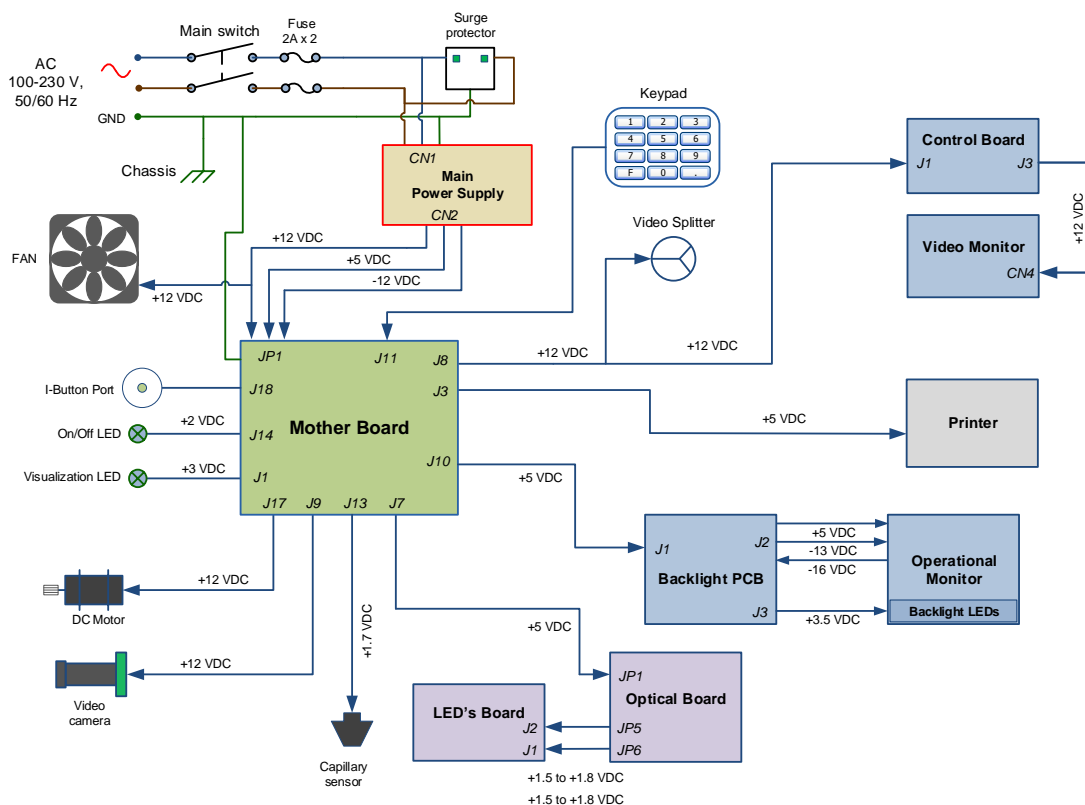
- Motherboard
- Power Supply Unit
- Surge Protector (starting with SN# 1270)
- AC Power Inlet Assembly
- Cooling Fan
- Printer
- Communication Port
- Video Board Assembly (till SN#1317)
- T-Jack Video Adaptor (for SN# 1318-1410)
- Video splitter (starting with SN# 1411)

The front panel assembly

The front panel assembly includes the following:

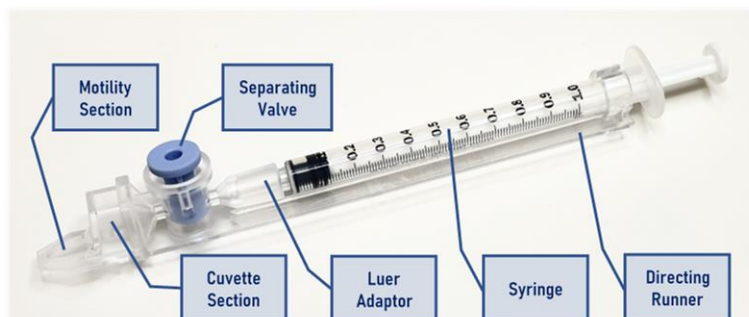
- Operational Display
- Video screen
- Keypad
- Power Indicator LED
- Visualization Compartment
- Visualization Compartment Cover
- Measurement Compartment
- Focus control knob

Schematic of the SQA-V



Testing Capillary

SECTION IV: System Components and Accessories



- Can be used in both measurement chambers of the SQA-V.
- Disposable, designed to collect and test samples in a biologically safe manner.
- Motility is measured in the 0.3 mm (thin) "Capillary Section."
- Concentration is measured in the 10 mm (tall) "Cuvette Section."

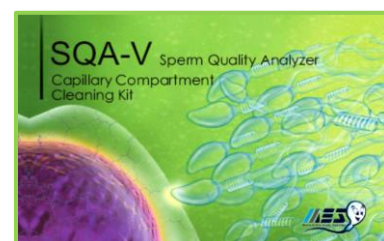
Slide Adaptor



- For use with a standard laboratory slide 76 x 25.6 mm and 22 x 22 mm cover-slip in the **visualization compartment** of the SQA-V to visually assess semen samples

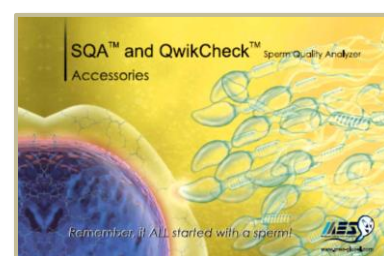
Cleaning Kit

- Daily cleaning is recommended or after testing 10-15 specimens.
- See the detailed cleaning instructions in the Appendix Section
- **NOTE:** Only use the manufacturer's cleaning kit or the SQA-V can be damaged



Accessories Kit

- Each kit contains:
 - Slide Adaptor
 - Power Cables
 - Communication Cable
 - Printer Paper
 - Printer Ribbon (only for SW version 2.49)
 - Instructional Guides



Electronic Self-Test and Auto- Calibration

SECTION V: Electronic Self-Test and Auto-Calibration

A series of tests are automatically run on the SQA-V to check the calibration and internal operating system. Tests are run when the SQA-V is first turned-on and also prior to each semen analysis test.

Start-up:

- **Stabilization and auto calibration:** Checks system stability and reference ranges. The system sensors are analyzed for several minutes to ensure that the values are within a very narrow acceptable range. Once the system is stable for 30 seconds it will pass stabilization and auto calibration. The system will fail if it is not stable for at least 30 seconds and a warning message will be displayed.
- **System noise:** The level of electronic noise in the system is measured to ensure that noise thresholds are accurately defined to ensure effective measurement of electronic signals. The system will use this measurement prior to running a test and will automatically adjust the noise level thresholds to ensure accurate readings.
- **Self-test:** The system produces electronic signals that simulate motility and concentration in order to check the performance of the system and verify that the calibration settings are consistent with the factory specifications. The SQA-V will report failures (see section on error and warning messages) and "freeze" the system if the system is not within the established ranges.

Prior to testing a sample:

- **Auto calibration verification:** Reference values are read again. The concentration and motility parameters are measured (without a testing capillary).
- **System noise:** Measures the electronic noise level of the system to ensure that noise thresholds are accurately defined in the system to ensure effective measurement of electronic signals. The system will use this measurement prior to running a test and will automatically adjust the noise level thresholds to insure accurate readings.
- **Electronic spikes:** Checks for any measurement points that are out of range electronically. More than three such points will fault the system and a warning message will be displayed.

The following procedure details how the user can document the system parameters to prepare for technical support if the system fails (see section of this user guide on Error Messages and Warning Messages).

How to run a copy of the system parameters version 2.48/2.49 GOLD:

- From the **MAIN MENU** select: **SERVICE>PRINT SQA-V DEFAULT SETTINGS>SELF TEST DATA**

All other versions:

- Remove any testing capillaries from the system.
- Turn the SQA-V on from rear panel and from the front keypad.
- When the MAIN MENU appears or when a FAILED SELF TEST message appears press the **SERVICE** key on the keypad to enter the SERVICE menu.
- Select **USER**.
- Press the **PRINT** key on the keypad to generate the required printout.

Refer to the table below. Enter numbers in the "SQA-V Value" column that corresponds to #1 - #10 from the SQA-V system parameters printout. Compare the values. If the value from the SQA-V is within range mark the "Pass" column. If not, mark the "Fail" column.

#	Parameter	Software version 2.45, 2.46, 2.48, 2.49	SQA-V Value	Pass	Fail
1.	Ref 1	150 – 350 mV			
2.	LED Cur 1	5 – 25 mA			
3.	Amplitude	50 – 100 mV			
4.	Zero Level	500 - 525			
5.	Ref 2	2500 – 3500 mV			
6.	LED Cur 2	10 – 32 mA			
7.	CONC. 1	0 – 1 M/ml			
8.	CONC. 2	50-150 M/ml			
9.	CONC. 3	300-600 M/ml			
10.	Count (Internal Data, Item #12)	26 - 36			

SECTION VI: Getting Started / Set-Up

Please refer to the relevant SQA-V User Guide for start-up and set-up instructions (based upon the software version of the SQA-V).

NOTE:

Turn off the power supply to the SQA-V and disconnect the power supply cable from the back of the device before opening the SQA-V.

Only a qualified, MES certified distributor is authorized to open the SQA-V without voiding the warranty.

SECTION VII: Troubleshooting

Overview: The following sections describe how to troubleshoot and repair potential problems that may occur with the SQA-V. These section will discuss how to provide support for three types of issues: **Technical, Self-test, Clinical**

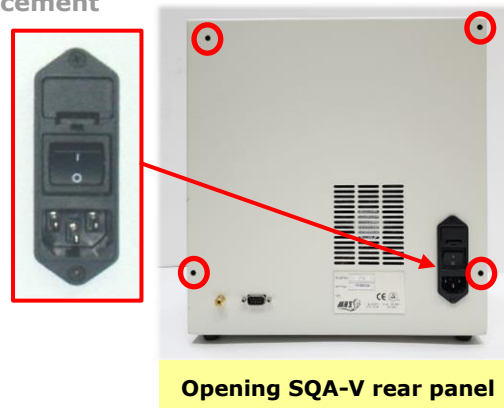
PLEASE NOTE:

- **Only a qualified MES distributor who has been trained to perform technical support is authorized to open the SQA-V.**
- **Opening SQA-V device without authorization may cause to the calibration corruption and will VOID THE WARRANTY.**
- **The electro-optical board should NEVER be touched when the SQA-V is opened – it will cause damage to the SQA-V calibration.**

SECTION VIII: Technical Support/Part Replacement

1. Opening the SQA-V

- Turn off the main switch located on the rear panel and disconnect the SQA-V from the mains.
- Using a Philips screwdriver, unscrew all the screws on the rear panel.



**Printer
Section 1:
SW version
2.48 and
2.60**

NOTE: Use only paper rolls supplied by the SQA-V manufacturer, otherwise the printer can be damaged.

NOTE: For devices with SW version 2.48 and 2.60 with old impact printer

2. Closing the SQA-V

- Grip each panel from the side and gently push them back together making sure that all cables and connectors are free and not "pinched" between the panels.
- Use a Phillips screwdriver to tighten all screws of the rear panel.



3. Thermal Printer (Part # V-E-01428-00)

ISSUE: The printer is not working
Check the following (SQA-V is powered on):

- Thermal printer has a roll of paper loaded properly
- Printer paper is not jammed in the printer
- Press the FEED button, if the paper does not advance please proceed to the steps below

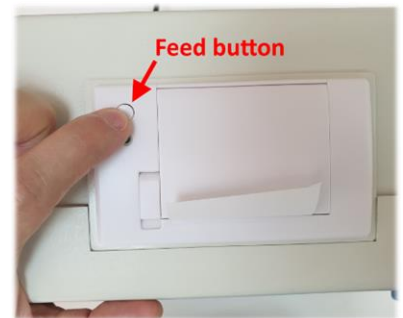
Open the SQA-V device (Device is switched off):

- Remove the printer from rear panel
- Check the cable connected between the printer and the main board (location J3) and verify that is not damaged or disconnected
- If the cable is O.K. but printer is not working, please proceed to printer replacement instructions below

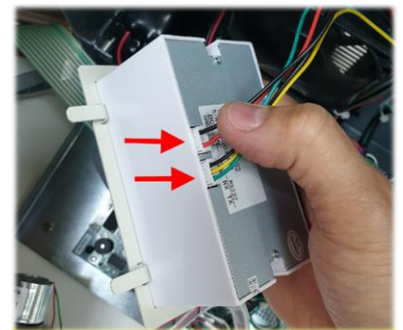
Replacing the thermal printer:

- Disconnect the printer cable
- Remove the two screws holding the printer bracket
- Pull the printer gently out of its bracket
- Replace the printer with new one
- Assemble the bracket, reconnect the cable to the printer and main board (location J3)
- Attach the printer to the SQA-V rear panel
- Close the SQA-V according to the instructions from "Closing the SQA-V" section above

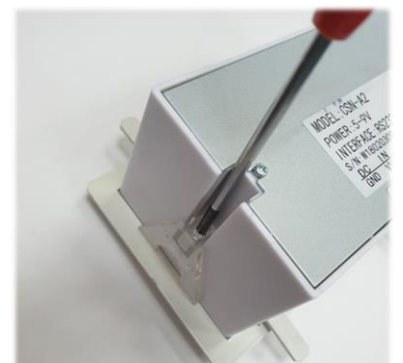
If you have device with SW version 2.48 or 2.60 and the impact printer has failed or damaged, MES would highly recommend replacing it with newer printer version - thermal printer (Part # V-E-01428-00).



Press the feed button



Check the cables connected to the printer



Remove two screws holding the bracket

**Section 2:
SW version
2.49 and
Pro**

NOTE: Use only paper rolls supplied by the SQA-V manufacturer, otherwise the printer can be damaged.

4. Printer (Part # PCD-0171)

ISSUE: The printer is not working
Check the following (SQA-V is powered on):

- Printer has a roll of paper loaded properly
- Printer ribbon (ink) is not dry
- Printer paper is not jammed in the printer
- Press the FEED button, if the paper does not advance please proceed to the steps below

Open the SQA-V device (Device is switched off):

- Remove the printer from rear panel
- Check the cable connected between the printer and the main board (location J3) and verify that is not damaged or disconnected
- If the cable is O.K. but printer is not working, please proceed to printer replacement instructions below

Replacing the printer:

- Disconnect the printer cable
- Replace the printer with new one
- Reconnect the cable to the printer and main board (location J3)
- Attach the printer to the SQA-V rear panel
- Close the SQA-V according to the instructions from "Closing the SQA-V" section above



Press the feed button



Check the printer cable

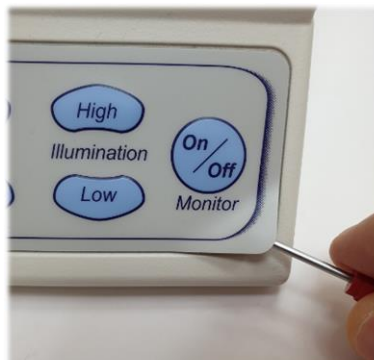
Keypad

5. Keypad (Part # PCD-0201)

ISSUE: The Keypad is not working

- Open the SQA-V
- Verify that the keypad cable is connected firmly to the Main board at J11 location (connector is not loose)
- Confirm that the cable is connected in the correct orientation: The golden stripe on the cable connector should be facing the rear panel
- If the cable is connected properly and the keypad is still not working- replace the keypad
- **Replacing the keypad:** Disconnect the keypad cable connector from location J11 on the main board

- Using a flat screwdriver, carefully peel off the faulty keypad from the front panel. Clean the surface with alcohol and let it dry for a few minutes



Pull the old Keypad Cable



Verify firm connection of keypad cable



Verify the cable correct orientation

- Pull out the faulty keypad cable through the slit in the front panel

- Insert the new keypad cable into the slit in the front panel

Please note: **DO NOT connect currently the keypad**

- Attach the keypad to its designated location on the front panel by gradually removing the paper while pressing it firmly into place from one side to the other.

Please note: **DO NOT bend the keypad during this process otherwise electrical wires/connectors will be damaged**

- Plug the keypad connector to the J11 location on the main board

Please note: **The golden stripe on the cable connector should face the rear panel (the fan side)**

- Close the SQA-V using 4 screws on the rear panel



Keypad cable slit



Attach the new keypad



Plug the keypad connector and verify correct orientation

Power Supply Unit (PSU)

Notes:

1. Turn off the main On/Off switch and disconnect the device from the mains before opening.
2. Refer to the Appendix section for instructions on how to address power supply problems.

Note:

Before checking the input\ output connectors of the main PSU, turn on the SQA-V from the switch on the rear panel.

Power Supply Unit (PSU)

Note:

Turn off the main On/Off switch and disconnect the power cord from the device inlet before opening.

6. Power Supply Unit – PSU

ISSUE: The main switch is **ON** but the power indicator does not light up and the fan is not working.

- Check the fuses in the fuse box located inside inlet on the rear panel of the SQA-V.
- Replace the fuses if they are burned out.
- Reconnect the power cord and turn the unit back on.
- If the unit still does not work, check the input/output voltage of PSU as instructed below.

How to check the input connector:

- Check the voltage in the input connector of the main PSU using a multimeter
- The measured voltage between black and red wires should be about 220 Volt AC
- If no voltage is evident, replace the power inlet (see paragraph 8)
- If voltage is being supplied to the input connector, check the output connector.

How to check the output connector:

- Disconnect the output cable from the motherboard.
- Check the voltage on the output connector of the main PSU using a multimeter:
 - Black wire: GND
 - Red wire: $+5V \pm 0.3$
 - Purple wire: $+12V \pm 0.8$
 - White wire:
 - -11.3V to -13.3V: New PSU
 - -16.1V to -12.7V: Old PSU
- If there is no voltage on the output connector, or if the voltage is out of the range – please replace the faulty PSU. If the problem persists - contact support services.

7. Replacement of the Power Supply Unit

ISSUE: The power supply and/or cables are not working.

PLEASE NOTE: The instructions depend on the SERIAL NUMBER (SN#) of the SQA-V.

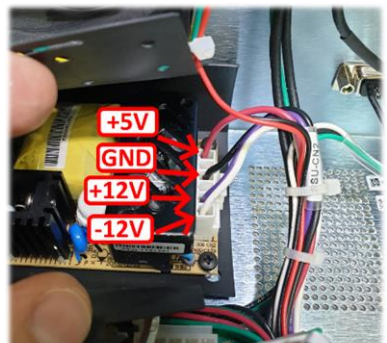
- SN# 1329 and below – follow the instructions in SECTION 1
- SN# 1330 and above – follow the instructions in SECTION 2



Check the fuses



Check the voltage in the input connector



Check the voltage on output connector



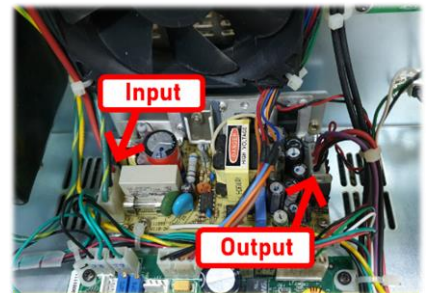
Old version PSU (SN #1329 and below)

SECTION 1:
SN #1329
and below,
Old PSU P/N:
PSD-0492

1. Open the SQA-V
 2. Disconnect the two cables of the faulty PSU:
 - Input connector- location P1
 - Output connector- location P2
 3. Place the SQA-V on its rear side
 4. Using a #1.5 Philips screwdriver, remove the three screws that connect the PSU to the rear panel
 5. Replace the faulty PSU
 6. Secure the new PSU to the rear panel using the same three screws
 7. Re-connect the input and output cable connectors to the new PSU
 8. Close the SQA-V
- If the problem persists - Contact Customer Support



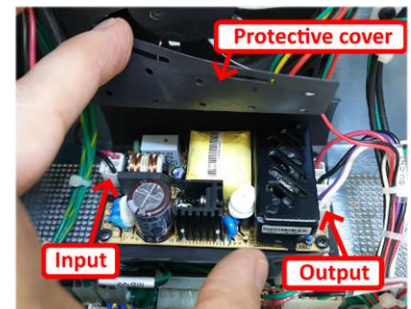
Unscrew the Power Supply Unit (PSU)



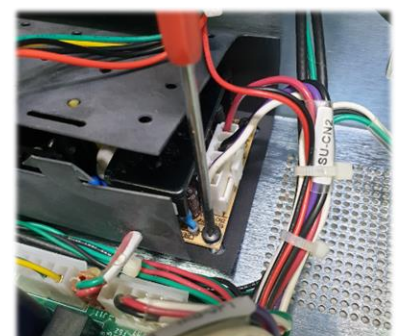
Disconnect the cables

SECTION 2:
SN# 1330
and above,
PSU part #:
FPE-E-
00146-00

1. Open the SQA-V
2. Open protective black cover of faulty PSU
3. Disconnect the two cables of the PSU:
 - Input connector- location CN1
 - Output connector- location CN2
4. Using a #1.5 Philips screwdriver open four screws holding the faulty PSU
5. Replace the faulty PSU
6. Secure the new PSU to the rear panel using the same three screws
7. Re-connect the input and output cable connectors to the new PSU
8. Close the SQA-V
9. If the problem persists - Contact Customer Support



Disconnect the cables



Disconnect the cables

Power Inlet

8. Power Inlet (Part# AP-9081001)

ISSUE: There is no power supplied to the PSU from the inlet.

Notes:

1. Turn off the power supply and disconnect the power cord from the back of the SQA-V device before opening.

2. Refer to the Appendix section for a flow chart of power supply problems and solutions.

1. Open the SQA-V
2. Gently remove the rubber cover of the power inlet until the connectors are exposed
3. Disconnect the three terminals from the power inlet
4. Unscrew the power-inlet screws at the rear panel of the device.
5. Gently pull out the power inlet from the rear panel
6. Insert a new power inlet and reconnect the terminals
7. Put the rubber cover back on the power inlet



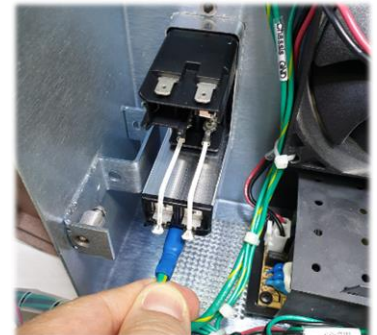
Remove the rubber cover to expose the connectors



Gently pull the power inlet out the rear panel



Unscrew the power inlet screws



Disconnect the terminals

Fan Assembly

9. Fan Assembly

ISSUE: The main power switch is ON, the power indicator is lit, but the fan is not rotating.

- For SQA-V of SN 1329 and below: use part# KHD-08-000856
- For SQA-V of SN 1330 and above: use part #V-H-00575-00

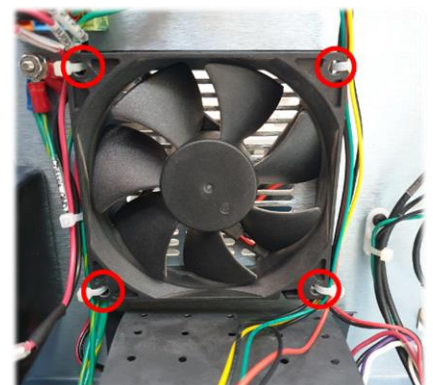
Note:

When replacing the fan, do not change the direction of airflow. Install the new fan in the same direction and orientation as a replaced fan.

Note:

The fan on veterinary systems work only when the system reaches a certain internal temperature and requires cooling.

1. Open the SQA-V
2. Verify that the both sides of cable connecting the fan are plugged firmly
3. Verify that the voltage between black and purple wires on output connector of PSU is $+12V \pm 0.8$ (see paragraph 6 – "How to check the output connector")
4. If no power is evident, replace the main PSU (see paragraph 7)
5. If the voltage is as described above, replace the fan + cable:
 - Disconnect the fan cable from PSU and from main board
 - Unscrew the four fan screws
 - Replace the fan assembly (fan+ cable) by new one
 - Screw the new fan to the rear panel of the SQA-V using four screws
 - Reconnect all the disconnected cables



Unscrew the four fan screws

Operation Monitor

SECTION 1: SN #2228 and below

Note:

Turn off the SQA-V and disconnect the power cord from the back of the device before opening the SQA-V.

WARNING:

DO NOT TOUCH the backlight lamp and inverter board while SQA-V is on! There is a risk of HIGH VOLTAGE shock!

SECTION 2: SN #2229 and above

NOTE:

Turn off the SQA-V and disconnect the power cord from the back of the device before opening the SQA-V.

10. Operation Monitor - ISSUE #1:

LCD Screen (P/N: V-MA-00615-00)

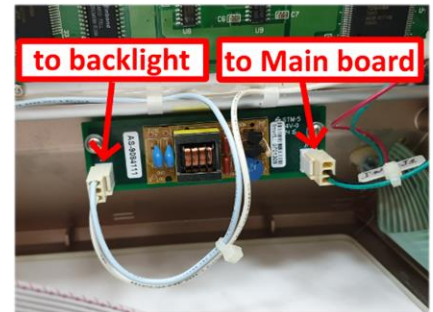
The SQA-V is ON, power indication LED is functioning and the fan is working, but the LCD screen (Operation Monitor) is not illuminated although data is displayed on the screen.

PLEASE NOTE: The instructions depend on the SERIAL NUMBER (SN#) of the SQA-V

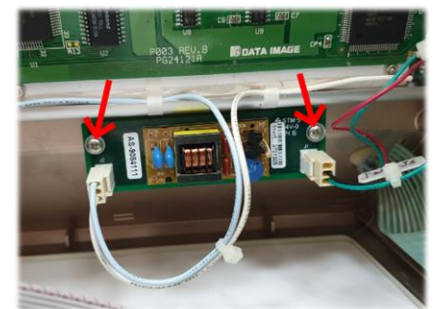
- SN# 2228 and below – follow the instructions in SECTION 1
- SN# 2229 and above – follow the instructions in SECTION 2

1. Open the SQA-V
2. Turn on the SQA-V and check the input and output cables of the inverter board: verify they are connected properly and the connection is not loose
3. Check the voltage on purple wire of PSU output connector and verify that it is within the range (refer to Power Supply Unit section, paragraph #6). If the measured voltage is OK but the screen doesn't light up, replace the faulty inverter board (Item#AS-9084111):
 - Turn the SQA-V off and disconnect the cables connecting the inverter board to the main board and LCD screen
 - Using a Phillips screwdriver, remove the two screws that secure the faulty inverter board
 - Replace the faulty inverter board with a new one and secure it with the two screws
 - Re-connect the cables of the inverter board

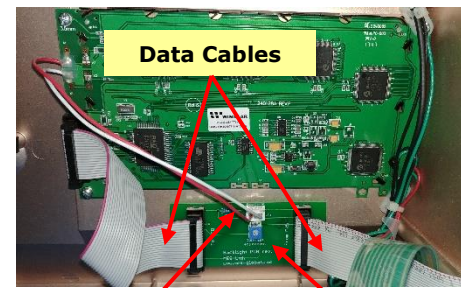
If the problem persists, contact MES Customer Support.



Disconnect both cables



Remove both screws



Backlight power cable

Backlight PCB



Check voltage on J3 connector

1. Open the SQA-V.
2. Turn on the SQA-V and check the input and output cables of the Backlight PCB: verify they are connected properly and the connection is not loose
3. Using multimeter check the voltage on J3 connector of Backlight PCB. If the supplied voltage is not $+3.5V \pm 0.1$ replace the Backlight PCB:
 - Turn the SQA-V off and disconnect the data cables connecting the Backlight PCB to the LCD screen and to the mother board
 - Disconnect the backlight power cable
 - Using a Phillips screwdriver, remove the two screws that secure the faulty Backlight PCB
 - Replace the Backlight PCB with a new one and secure it back with two screws
 - Re-connect all the cables to the new Backlight PCB
4. If the measured voltage is $+3.5V \pm 0.1$ – replace the Operation monitor (refer to section below for detailed instructions)
5. If the problem persists after replacing of Backlight PCB and/or Operational monitor, contact MES Customer Support

Operation Monitor replacement

SECTION 1: SN #2228 and below

Note:

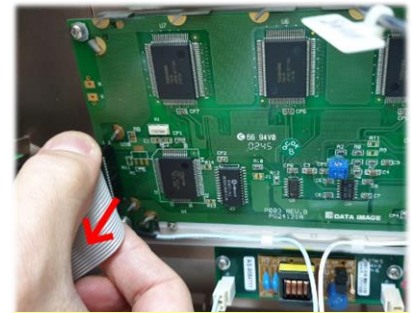
Turn off the SQA-V and disconnect the power cord from the back of the device before opening the SQA-V.

11. How to replace Operation monitor (P/N: V-MA-00615-00):

PLEASE NOTE: The instructions depend on the SERIAL NUMBER (SN#) of the SQA-V

- SN# 2228 and below – follow the instructions in SECTION 1
- SN# 2229 and above – follow the instructions in SECTION 2

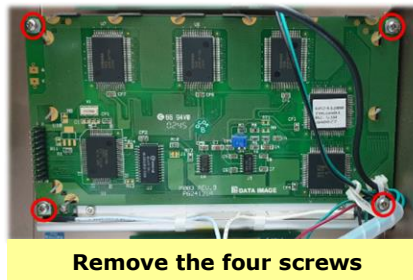
1. Open the SQA-V
2. Disconnect the data flat cable connected to Operation monitor
3. Disconnect backlight power cable connected to Inverter board (location J2)
4. Using a Phillips screwdriver, remove the four screws that secure the faulty Operation monitor
5. Replace the faulty Operation monitor with a new one and secure it with the four screws
6. Reconnect the data flat cable to new Operation monitor
7. Reconnect backlight power cable to Inverter board (location J2)



Disconnect flat data cable



Disconnect the backlight power cable



Remove the four screws

SECTION 2: SN #2229 and above

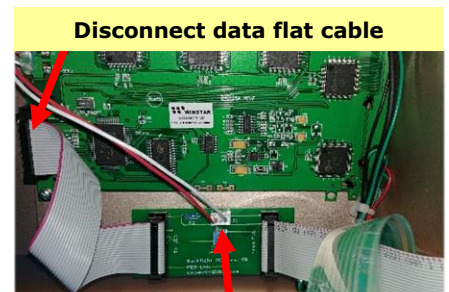
Note:

Turn off the SQA-V and disconnect the power cord from the back of the device before opening the SQA-V.

1. Open the SQA-V
2. Disconnect the data flat cable connected to Operation monitor
3. Disconnect backlight power cable connected to Backlight PCB (location J3)
4. Using a Phillips screwdriver, remove the four screws that secure the faulty Operation monitor
5. Replace the faulty Operation monitor with a new one and secure it with the four screws
6. Reconnect the data flat cable to Operation monitor
7. Reconnect the backlight power cable to Backlight PCB (location J3)



Remove the four screws



Disconnect data flat cable

Disconnect backlight power cable

Operation Monitor

**12. Operation Monitor – ISSUE #2:
LCD Screen (P/N: V-MA-00615-00)**

ISSUE #2- Blank Screen: There is no data displayed on the screen although the SQA-V is ON, power indication LED is lit and the fan is working.

PLEASE NOTE: The instructions depend on the SERIAL NUMBER (SN#) of the SQA-V.

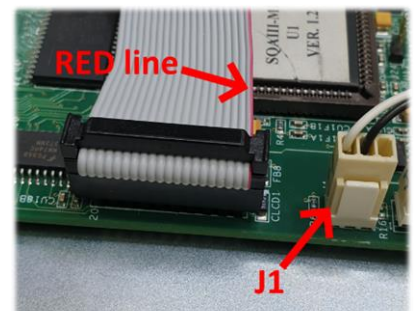
- SN# 2228 and below – follow the instructions in SECTION 1
- SN# 2229 and above – follow the instructions in SECTION 2

**SECTION 1:
SN #2228 and below**

1. Re-install SQA-V software.
2. If the software installation failed - please refer to "**SECTION 3: Replacing the SQA-V processor**" below for further instructions
3. If the software was installed successfully and the problem persists - check the data flat cable:
 - Open the SQA-V and verify that the LCD flat cable, is connected so that the red line facing the location indicated with a "1 2" on the LCD board
 - Also verify that the other end of LCD flat cable is correctly connected to main board. The connection should be so that the red line of the flat data cable facing connector J1 on main board
 - If data flat cable is not correctly connected – reconnect it in correct orientation
 - If data flat cable appears damaged in any way – it should be replaced (Item P/N: KHD-908-000858)
4. If replacing the cable will not resolve the issue - replace the processor on the main board (see Appendix section for instructions).
5. If replacing the processor will not resolve the issue – please follow the instructions below
6. Re-start the SQA-V and check if the LCD operation screen is still blank
7. If yes, replace the Operation screen following instructions from paragraph #11 (How to replace Operation monitor) above
8. In case the problem persists after replacing the LCD screen- contact MES Customer Support.



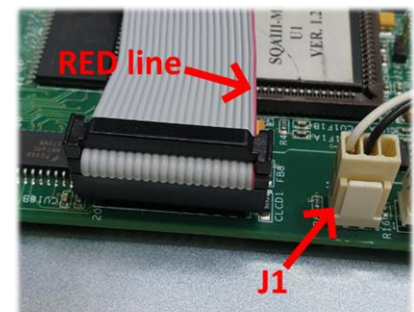
Note the correct alignment of the red line on the flat cable



Note the correct alignment of the red line on the flat cable

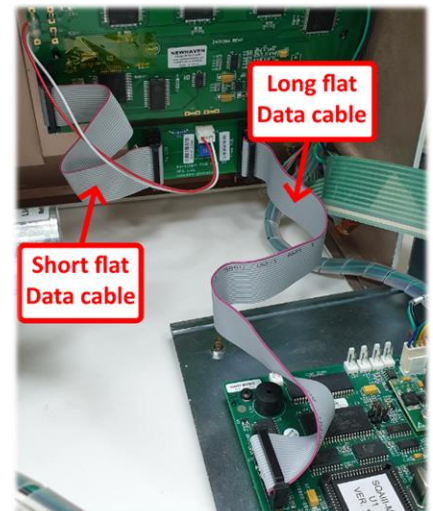
**SECTION 2:
SN #2229 and above**

1. Re-install SQA-V software.
2. If the software installation failed - please refer to "**SECTION 3: Replacing the SQA-V processor**" below for further instructions
3. If the software was installed successfully and the problem persists - check the connection of data flat cable:
 - a. Open the SQA-V and verify the orientation of flat data cable connecting Backlight PCB to Main board at Main board side
 - b. The connection should be so that the red line of the flat data cable facing connector J1 on Main board



Note the correct alignment of the red line on the flat cable

- If the orientation of flat data cable is correct but the problem persists – replace it (Item P/N: KHD-908-000858)
 - If replacement of flat data cable does not solve the issue - Replace short flat data cable connecting the LCD screen to the Backlight PCB. (Item P/N: V-H-01411-00)
4. If replacement of the short flat data cable does not solve the problem - Replace backlight PCB (Item P/N: V-B-01410-00)
 5. If replacement of the backlight PCB does not solve the problem - replace the processor on the main board (see Appendix section for instructions).
 6. If replacement of the processor has been already done but the problem persists – replace the Operation monitor (Item P/N: V-MA-00615-00) following instructions from paragraph #11 (How to replace Operation monitor) above
 7. If the problem persists with the new screen – perform an MBOB replacement OR send the SQA back to the manufacturer (MES) for a repair RMA.



Connection of flat data cables inside the device

SECTION 3: Replacing the SQA-V processor

Instructions for RE-SEATING or REPLACING the SQA-V PROCESSOR

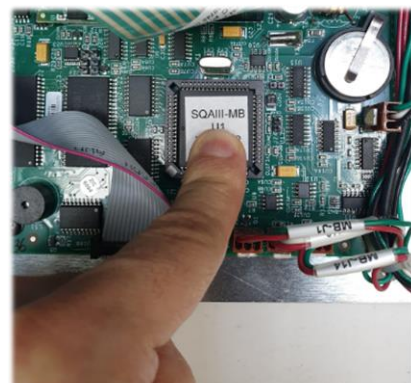
Applies to all SQA-V system versions

Stage 1: Re-seating the processor to the correct position

1. Turn off the SQA-V and disconnect the power supply cable
2. Loose the 4 screws on the rear panel using a Philips screwdriver #2 and open the SQA-V
3. Slightly press the center of the processor with an index finger to re-seat it into the correct position
4. Close the SQA-V and tighten all screws of the rear panel
5. Connect the power cable of the SQA-V
6. Turn the SQA-V on and run the SELF-TEST
7. If the SQA-V passes, the repair process is complete
8. If the SQA-V does not turn-on or fails the self- test, go to **Stage 2**



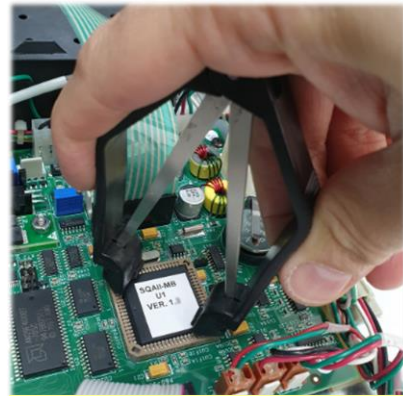
Open the SQA-V



Slightly press the center of the processor

Stage 2: Replace the damaged processor

1. Turn off the SQA-V and disconnect the power supply cable.
2. Release the 4 screws on the rear panel using a Philips screwdriver #2 and open the SQA-V.
3. Remove the damaged processor using extractor tweezers as shown on the figure to the right.



Remove the damaged processor

4. Replace the damaged processor with a new processor according to the following directions: Align the "dot" which is marked on the processor with the "Arrow" mark on the processor socket (see the figure to the right)

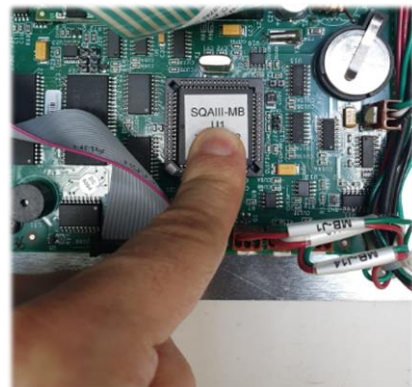


Dot mark



Arrow mark

5. Slightly press the center of the processor with an index finger to re-seat it into the correct position (see the figure to the right).



Slightly press the center of the processor

6. Close the SQA-V and tighten all screws of the rear panel
7. Connect the power cable of the SQA-V
8. Turn on the SQA-V and verify that it successfully passes the SELF-TEST

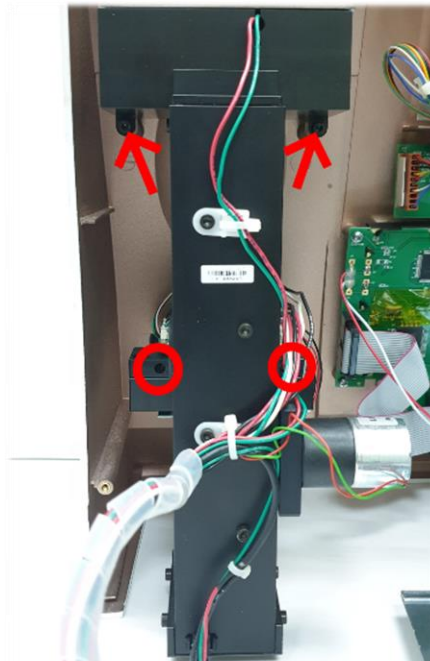
Focus Knob 13. Focus Knob (Part# PE-MA-00538-00)

ISSUE: When rotating the focus knob, the image shown on the video screen or in the V-Sperm software has no change.

The focus knob should be replaced:

- Open the SQA-V and disconnect the optical assembly from the front panel (four screws)
- Disconnect the focus knob from the optical assembly by unscrewing three screws
- Remove the old focus knob
- Insert the new focus knob making sure it is turned all the way counterclockwise before replacing

Re-connect the optical assembly to the front panel and close the SQA-V



Disconnect the optical assembly



Disconnect the focus knob



Replace the focus knob

Video system

14. Video Screen (Part# LCD-0010)

ISSUE: A problem in the video system occurs when there is a malfunction or maladjustment in one of the following components:

- **Light source, CCD camera, Harness connection, Video display monitor**

To diagnose a video system problem, refer to the table below. Detailed instructions on how to repair the problem are presented after the table.

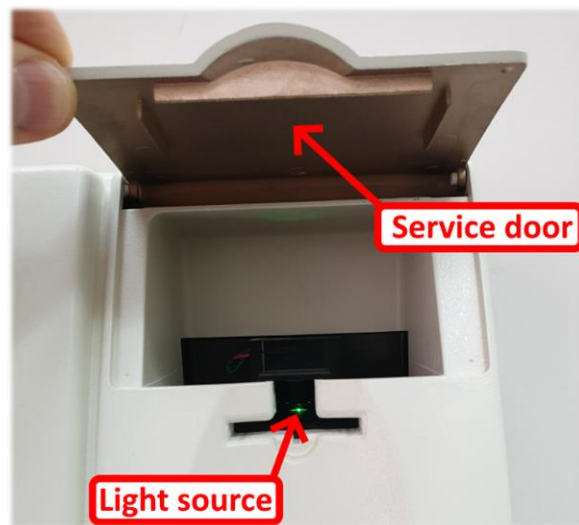
Problem description

1. Dim image on both the SQA-V and V-Sperm monitors, OR no image on both SQA-V and V-sperm

NOTE: To adjust **Illumination** you should intermittently press "High" or "Low" illumination button on the keypad – do not press and hold!

VIDEO Troubleshooting/Repair

1. Check if the visualization **LED** is lit – open the service door of visualization compartment and verify that the light source can be seen from the bottom of the LED house. If no light can be seen please check the **Illumination** settings of SQA-V.



2. **Illumination** setting can be adjusted using designated buttons on keypad. If after **Illumination** adjustment the light still can't be seen, replace Visualization LED cable - Item P/N: KHD-908-000849-03 (detailed instructions can be found below in the paragraph "Visualization LED replacement").

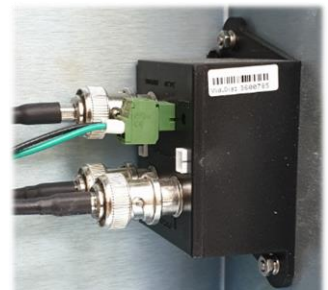
If the LED is lit but the image still can't be seen - check the cable connecting the optical column to the MB and to the video splitter/T-Jack adaptor/ video board (see the figures below):



Old video board: SQA-V with SN below 1318



T-Jack adaptor: SQA-V with SN 1318 - 1410



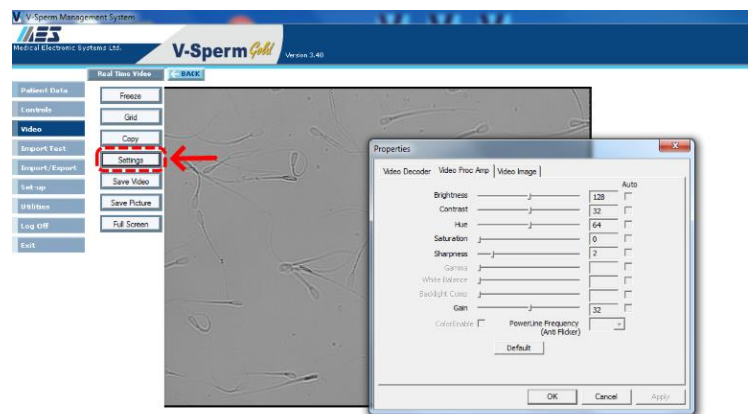
New video splitter: SQA-V with SN 1411 and above

2. The quality of the image is different on the SQA-V screen compared to the V-Sperm computer screen

- Open the SQA-V
 - Check to see if all the harness connections are secure and tightly connected.
 - Check the voltage on the main board at location J9 using a multimeter. The voltage measured between green and black wires should be $12V \pm 0.8$. If voltage is out of the range, it's likely a PSU issue. Please proceed to paragraph #6 (Power Supply Unit – PSU) for further instructions.
3. If the voltage is OK but the problem persists – replace the CCD camera (part #5226, see instructions in this manual).
 4. If after replacing the camera there still no image seen neither on SQA-V video monitor nor in V-Sperm, please contact MES Customers service.

Scenario #1: SQA-V image better than V-Sperm image (or no image on the V-Sperm):

- Adjust the video settings in V-Sperm: Go to VIDEO>Real Time Video>Settings
- Check to make sure the **Brightness** and **Contrast** setting are adjusted to achieve optimal image.



- Check the external cables connecting the SQA-V to the V-Sperm frame grabber (if problematic, replace the cables).
- If there is no problem with the cables, open the SQA-V and check the cable connecting the video board\ video adaptor\ video splitter to the video out port:
 - ♦ Verify that it is attached securely on both sides and that the cable does not appear damaged in any way
 - ♦ If the cable is damaged- replace it with a new one (part # KHD-908-000852, instructions can be found in the appendix section of this manual)
- If the problem persists after replacing the cable- contact MES support

Scenario #2: V-Sperm Image is better than the SQA-V:

- Adjust the **Brightness** and **Contrast** of the SQA-V video screen. These setting can be adjusted using blue round control buttons below the Video Screen.
- Adjust the **Illumination** of the SQA-V to a higher level.
- If no improvement, replace the LCD video display.

3. There are spots on the SQA-V and V-Sperm screens

To remove dust spots: Clean the CCD and the lens, according to the instructions in this manual.

4. The image on the SQA-V is flickering

The problem is specific to systems with SN below #1411 – please contact MES support for upgrade option. If your device has SN which is above 1410, open the SQA-V and check the cable connecting the optical column to the MB and to the video splitter

- Verify that it is attached securely on both sides and that the cable does not appear damaged in any way
- If the cable is damaged- replace it with a new one (part # KHD-908-000852, instructions can be found in the appendix section of this manual)

If the problem persists after replacing the cable- contact MES support

5. The image on the SQA-V is frozen or stuck

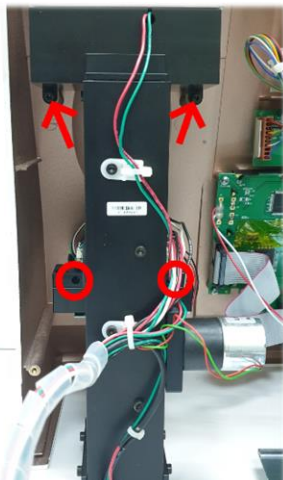
This type of problem can only occur in old systems- with SN below #1318. In case of frozen or stuck image- please contact MES support services

Visualization LED

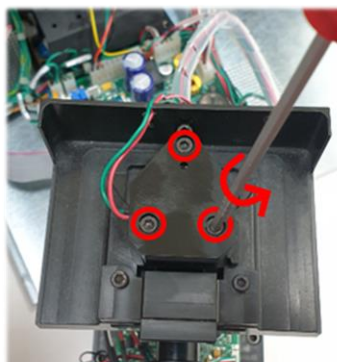
15. Visualization LED Replacement (Part #KHD-908-000849-03)

ISSUE: No light seen from the light source, even after increasing the illumination by pressing the illumination button intermittently.

1. Open the SQA-V
2. Disconnect the Optical Assembly
3. Unscrew three screws holding LED house cover
4. Using small flat screwdriver remove the LED house cover
5. Disconnect the LED cable from the main board (location J1)
6. Replace the faulty LED cable, re-attach the Optical Assembly and close the SQA-V



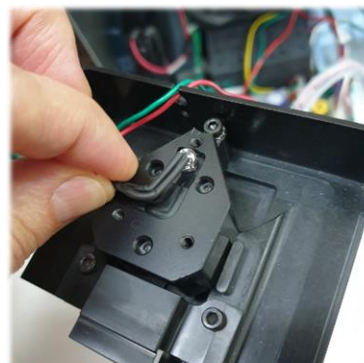
Disconnect the optical assembly



Remove the screws



Remove the LED house cover



Replace faulty visualization LED cable

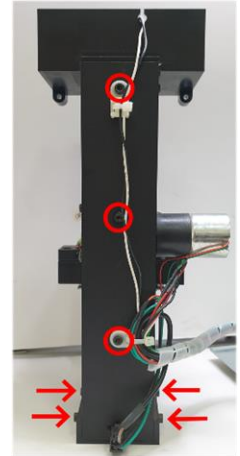
**CCD Cleaning
or
Replacement**

**Instructions
for SQA-Vs
with SN# 770
and below**

16. CCD Cleaning (Part #5226)

ISSUE: The CCD needs cleaning (spots on the video screen)

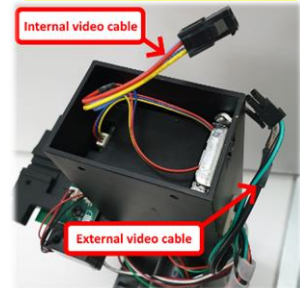
1. Open the SQA-V
2. Remove the four screws connecting the optical assembly to the front panel
3. Pull the optical assembly to remove it from the front panel
4. Disassemble the optical assembly, remove a total of seven screws:
 - Three screws are located at the rear section of the optical assembly.
 - Four screws are located at the base of the optical assembly.
5. Turn the optical assembly upside down to lift the lid that is on the base of the optical assembly.
6. Disconnect the external video cable from the internal video cable.
7. The internal video cable is held in place by two plastic clips. While pressing the two plastic clips, push the internal video cable connector inside to release it.
8. Gently lay the optical assembly on its rear section.
9. Move the internal video cable aside and make sure nothing obstructs the open top of the optical assembly.
10. Turn on the SQA-V at the main switch on the rear panel. The Power LED Indicator should light up, the operational display should display Standby mode.
11. Press the ZOOM-IN key on the SQA-V keypad.
12. Pull out the CCD assembly.
13. Turn off the SQA-V main switch.
14. Use a Phillips screwdriver to remove the two screws that secure the base of the dust cover.
15. The CCD is now visible within the CCD adaptor.
16. Use ONLY lint-free commercial lens cleaning paper to wipe the CCD screen.
17. Place the CCD back into the housing of the optical assembly and visually check to see if it is clean.
18. Using a Phillips screwdriver re-attach the dust cover base and the dust cover.



Seven Screws – Optical Assembly



Lift the lid



Remove the two screws



Clean the CCD

**Instructions
for SQA-Vs
with SN# 771
and above**

Servicing the visualization system requires the use of a FALSE TRACK. This item is supplied with the system (see Fig. 9 below).



Fig. 9

Do not start this procedure unless you have this track. Contact MES if you need a FALSE TRACK.

CCD Cleaning (continued)

Issue: The CCD is malfunctioning or needs cleaning (dust spots on the video screen)

1. Remove the four screws connecting the visualization system assembly to the front panel.
2. Pull the visualization system assembly to remove it from the front panel.
3. Unscrew the 4 screws on the base of the visualization system (fig. 1)
4. Lift the lid (fig. 2)

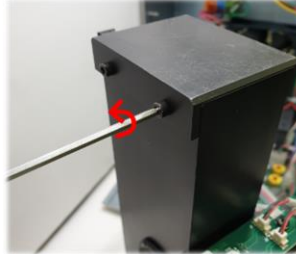


Fig. 1

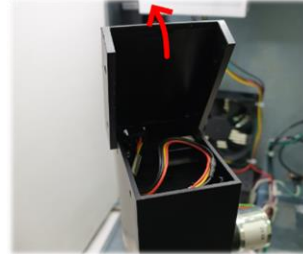


Fig. 2

5. Unscrew the 2 screws holding DC Motor and remove it (fig. 3 and 4).



Fig. 3



Fig. 4

6. Disconnect the internal video cable of the camera attached to the pipe from the external video cable. Unscrewing the 2 screws (fig. 5) and remove the stopper (fig. 6) from the bench at the bottom of the visualization system.

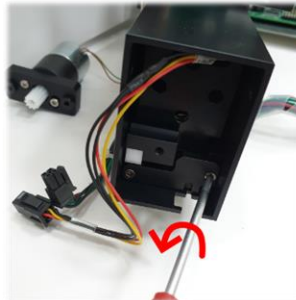


Fig. 5

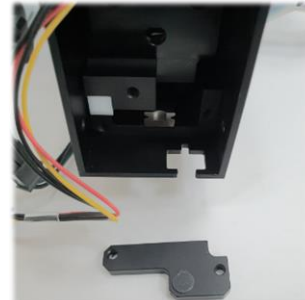


Fig. 6

7. The focus system contains many tiny stainless-steel balls that could be lost unless a *false track tool* is used to secure them. Join the *false track* to the metal guide rail and slide the camera tray over the *false track* (fig. 7). Now while the stainless-steel balls are safety secured (fig. 8) you can proceed to the next step.

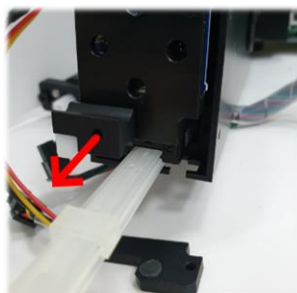


Fig. 7

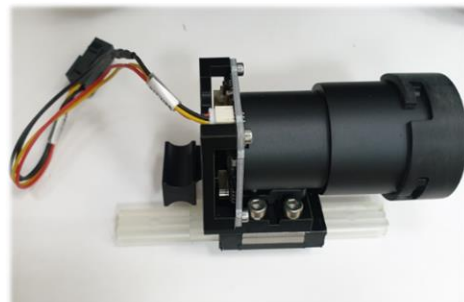


Fig. 8

8. Remove the dust sleeve by unscrewing 2 Phillips screws (fig. 10).
9. Gently clean the CCD using a lint-free microfiber cloth (fig. 11).

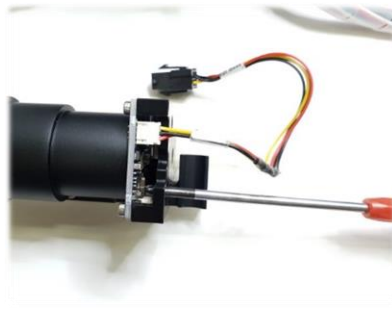


Fig. 10

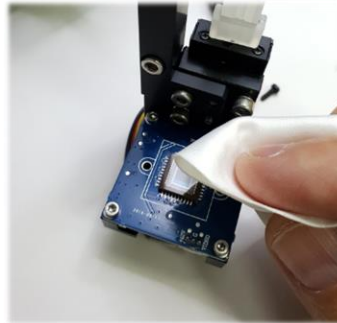


Fig. 11

10. Attach the dust sleeve back to the CCD board and fasten 2 Phillips screws through designated holes in the CCD tray
11. Carefully align the false track tool with the metal guide rail and gently push the CCD tray back over the guide rail.
12. Re-install the black stopper to the bench and fasten the screws.
13. Re-connect the internal and external video cables.
14. Assemble the lid on the base of the visualization system and fasten the screws.
15. Assemble the DC motor, and make sure the cogwheel teeth coincide with the teeth of the white plastic rack.
16. Re-attach the visualization system back to the front panel.

**Instructions
for all of
SQA-V's
serial
numbers
range**

17. Replacing the CCD camera (no image on both SQA-V and V-sperm)

1. Follow the instructions for CCD cleaning, but this time do not remove the dust sleeve.
2. Using a Phillips screwdriver remove the four screws holding the camera PCB.
3. Replace the defective CCD camera with a new one.
4. Fasten the four screws holding the CCD camera.
5. Follow the rest of the instructions to finish the assembling of the visualization system and re-attach it to the front panel.

**Video screen
malfunction**

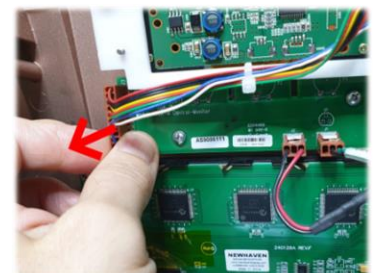
Note:

This repair is applicable for all SQA-Vs serial numbers range. Regardless of which type of video screen is malfunctioning, it must be replaced by a new 3.5" video screen.

18. Replacing the video screen assy.

ISSUE: The image on the Video Screen is poor or wavy

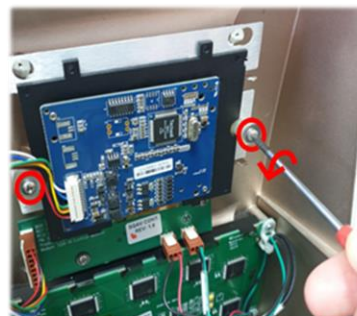
1. Open the SQA-V device
2. Disconnect the video screen cable from the Control board
3. Using a Phillips screwdriver, remove the screws holding the video screen
4. Remove the hollow spacers holding the Video screen



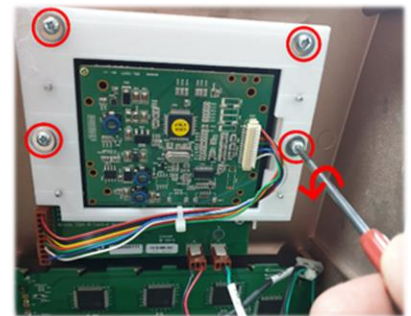
Disconnecting the Video screen cable



**Remove the screws
(for SQA-Vs with SN
1504 and below)**

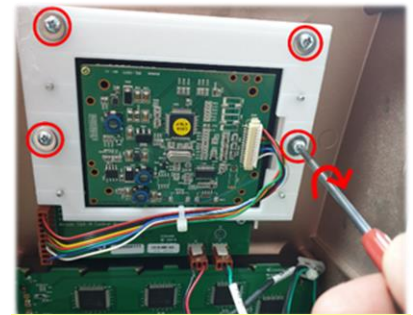


**Remove the screws
(for SQA-Vs with SN 1505
to 2383)**



**Remove the screws
(for SQA-Vs with SN 2384
and above)**

5. Replace the defective video screen with the new one (3.5" Video screen assy. - P/N: V-EA-01745-00)
6. Re-assemble the hollow spacers
7. Using a Phillips screwdriver, secure the video screen with the screws
8. Connect the video cable of the new video screen to the Control board
9. Close the SQA-V



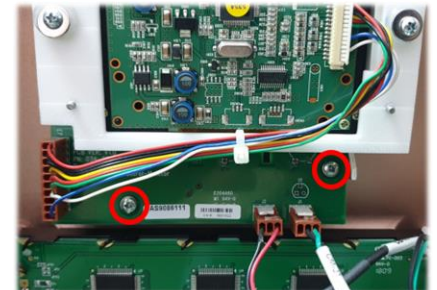
**Fasten the screws
(new 3.5" LCD)**

Video Control Board

19. Video Control Board Replacement (Part #AS-9086111)

Issue: The image on the SQA-V screen is flickering on and off and adjustments to the brightness, illumination or contrast has no effect.

1. Open the SQA-V
2. Disconnect the Video screen cable from the video control board
3. Remove the two screws holding the video control board
4. Remove the defective Video Control board and replace it with the new one.
5. Secure the new Video Control board to SQA-V front panel with the screws
6. Re-connect the Video screen cable
7. Close the SQA-V



**Video control board
disassembly**

Surge Protector for

Surge

Note:

This repair is applicable for SQA-Vs with SN 1270 to 1526.

Please be advised:

Only an experienced and licensed electrical technician or electrician should perform this repair

20. Surge Protector Replacement (PN: V-A-00475-00)

Issue: The SQA-V does not turn-on

Electrical surges or unstable electricity may cause damage to the SQA-V. The SQA-V contains an internal surge protector to prevent damage to the components of the SQA-V.

How to check the Surge Protector:

- Turn off the power and unplug the power cord from the inlet on rear panel of SQA-V
- Open the SQA-V
- Turn the power on briefly just to check to see if the green indication light of the surge protector is on
- If the indication light is off, the surge protector must be replaced



Green light indicator

How to replace the Surge Protector:

- Turn off the SQA-V and disconnect the power cord from the rear panel
- Remove the printer from the rear panel
- Disconnect the printer cable and set the printer aside
- Pull down to unplug the green connector of the surge protector
- Using a 5.5mm socket screwdriver, unscrew the 4 nuts connecting the Surge Protector to the rear panel
- Replace the surge protector "body" (grey part) with a new one
- Reinstall and tighten the four nuts
- Reconnect the printer cable and return the printer to its designated location on the rear panel

Close the SQA-V



Pull down and unplug the connector



Remove the 4 nuts

Surge Protector

21. Surge Protector Replacement (PN: V-A-00475-01)

Electrical surges or high voltage spikes in mains may cause damage to the SQA-V surge protector. Follow below instructions to check if the surge protector is intact or to replace the damaged surge protector to prevent further damage of SQA-V internal components.

Note:

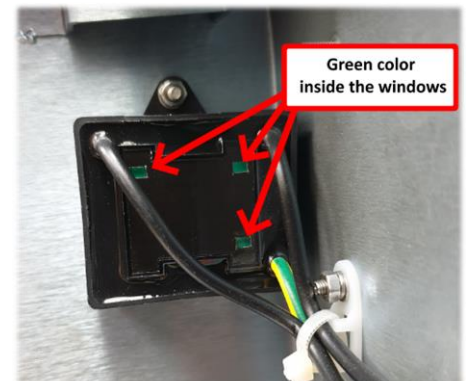
This repair is applicable for SQA-Vs with SN 1527 and above.

Please be advised:

Only an experienced and licensed electrical technician or electrician should perform this repair

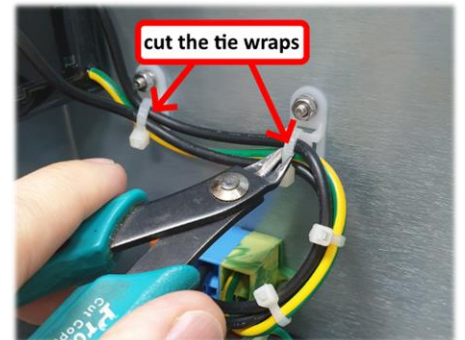
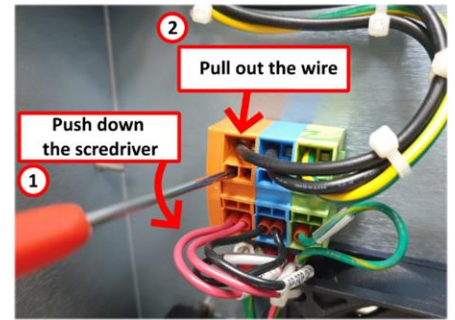
How to check the Surge Protector:

- Turn off the power and unplug the power cord from the inlet on rear panel of SQA-V
- Open the SQA-V
- Remove the printer from the rear panel
- Disconnect the printer cable and set the printer aside
- Look through 3 small windows located on the front face of the surge protector and verify that the surface inside the windows is green
- If at least one of the surfaces inside the windows is not green, replace the surge protector



How to replace the Surge Protector:

- Follow the instructions from the section above to open the SQA-V and remove the printer
- In order to remove the defective Surge Protector all its 3 wires should be released
- Insert a small flat screwdriver into square opening in PDP (tri-colored contact block) right below the wire
- Simultaneously gently push down the screwdriver in order to release the wire and pull out the released wire
- Release and pull out from the PDP all 3 wires of Surge Protector (2 black and 1 yellow-green)
- Cut all tie wraps attaching the wires to the rear panel
- Using 5.5mm socket screwdriver unscrew the nut connecting the Surge Protector to the rear panel
- Replace the defective Surge Protector with the new one and reconnect all its wires back to the PDP

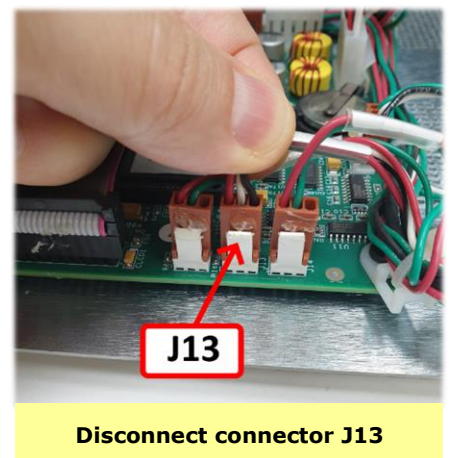


Capillary Sensor

22. Capillary Sensor Troubleshooting and Replacement (KHD-908-000846 REV 02)

Issue: The SQA-V fails to pass SELF-TEST and the values of Conc 1, Conc 2 and Conc. 3 are ZERO.

- Turn off the power and open the SQA-V by unscrewing the screws from the rear panel using a #2 Philips screwdriver.
- Disconnect capillary sensor harness connected to location J13 on Motherboard
- Close the SQA-V and reboot it
- Press On/Off key on the front panel to begin Auto-Calibration and Stabilization
- If SQA-V successfully passed the SELF-TEST, the capillary sensor is defective and must be replaced (follow the instructions in next section)
- If the SELF-TEST keeps failing while the values of Conc 1, Conc 2 and Conc. 3 are ZERO, call technical support for assistance



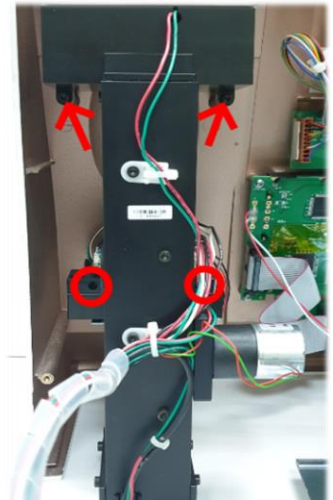
Disconnect connector J13

How to replace the capillary sensor

- Turn off the power and open the SQA-V by releasing the screws from the rear panel using a #2 Philips screwdriver
- Using a #2.5 Allen key release the four screws connecting the optical assembly to the front panel of the SQA-V.

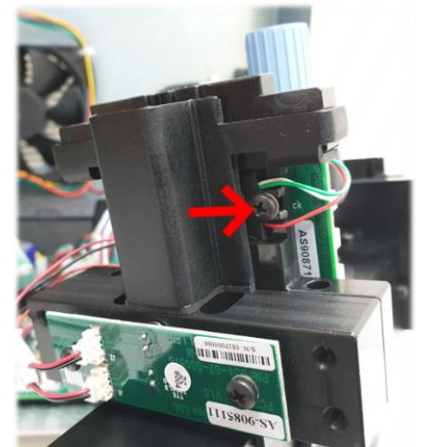


Open the SQA-V



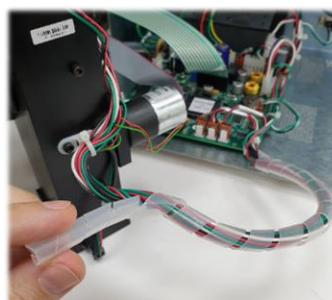
Release the screws of the optical assembly

- Carefully pull the optical assembly in order to detach it from the front panel.
- Place the optical assembly on its side.
- Release the screw holding the capillary sensor using a #2 Philips screwdriver.

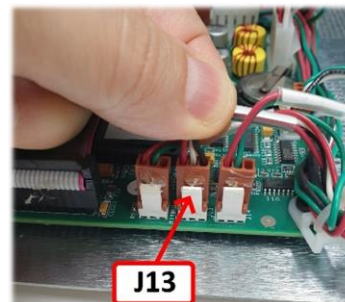


Release the capillary sensor screw

- Unwind the white plastic cable wrap that holds the capillary sensor and other cables
- Unplug the cable connector from its location on the main board- J13 and remove the damaged capillary sensor from the optical block



Unwind the Plastic Cable Wrap



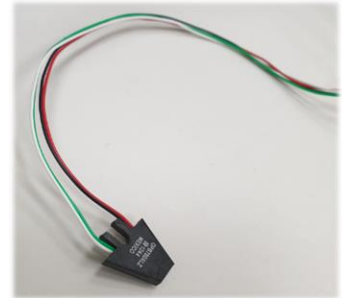
Unplug the connector

Optical Board to LED Board cables

Important Note:

Pay attention to connect the new cables in the CORRECT manner

- Install a new capillary sensor harness on the optical block and fasten it using the screw
- Re-attach the cable to the cable bundle, fasten the cables using the white plastic cable wrap
- Connect the cable connector to its designated location on the Motherboard - J13
- Attach the optical column to the front panel of the SQA-V using the original 4 screws
- Attach back the front panel to the rear panel using a #2 Philips screwdriver



Capillary Sensor

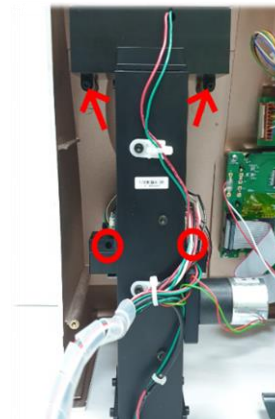
23. Optical Board to LEDs Board Cables - Replacement (Part#: KHD-908-000689)

- **Issue:** The noise level of the SQA-V (Parameter #17) is higher than 3. Probably the cables connecting the Optical Board to the LED Board were damaged and therefore require replacement
- Turn off the power and unplug the power cord from the inlet on rear panel of SQA-V. Using a #2 Philips screwdriver open the SQA-V by unscrewing four screws from the rear panel

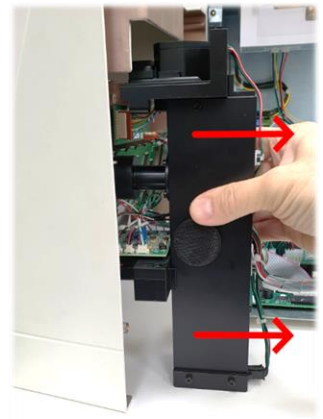


Open the SQA-V

- Using a #2.5 Allen key remove four screws connecting the optical assembly to the front panel of the SQA-V (see the pictures to the right)
- Pull the optical assembly to remove it from the front panel



Release the screws of optical assembly

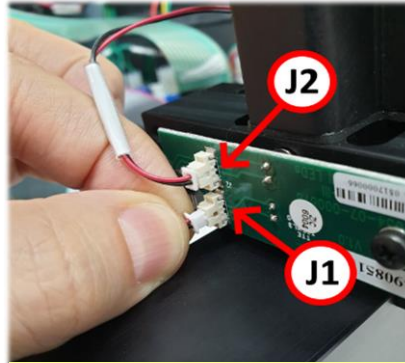


Pull the optical assembly

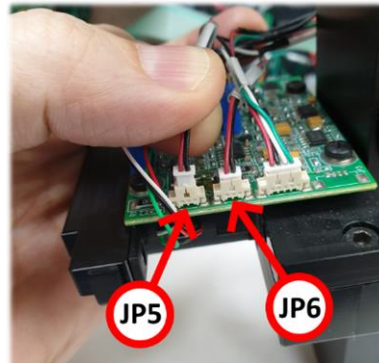
- Disconnect the damaged cables from JP5 and JP6 connectors located on the Optical board
- Carefully place the Optical assembly in a horizontal position
- Disconnect the other end of damaged cables from J1 and J2 connectors located on the LEDs board (see picture)
- Connect a new pair of cables as follows:
 1. Connect one of the cables between the JP5 connector on the Optical Board and J2 connector on the LEDs board
 2. Connect one of the cables between the JP6 connector on the Optical Board and J1 connector on the LEDs board

**Visualization
System
Upgrade**

- Reattach the optical assembly using the same 4 screws and close the SQA-V



**Disconnect
the J1 and J2**



Disconnect the JP5 and JP6

24. Visualization System Upgrade (Part#: V-M00571-00)

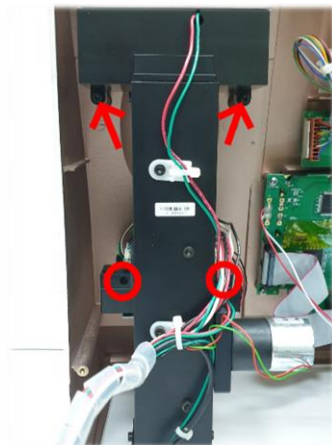
Issue: A Visualization System Upgrade is available for purchase and can be easily installed on existing systems. The upgrade consists of 3 components:

1. Improved Visualization LED Housing
2. New Focus Knob Assembly
3. Improved Slide Adaptor

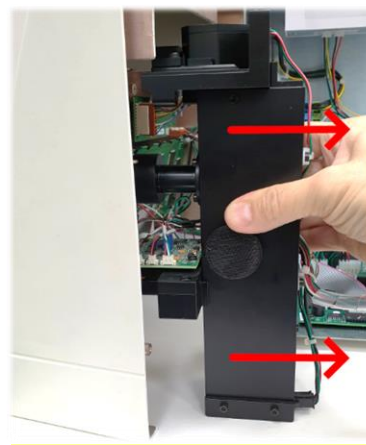
Below are instructions for assembling the new components.

Stage 1: Open the SQA-V and detach the Optical Assembly

- Turn off the SQA and disconnect it from the mains.
- Release the 4 screws on the rear panel using a #2 Philips screwdriver and open the SQA-V.
- Use a #2.5 Allen key to remove the 4 screws that hold the Optical assembly and pull it out as shown in the picture below:



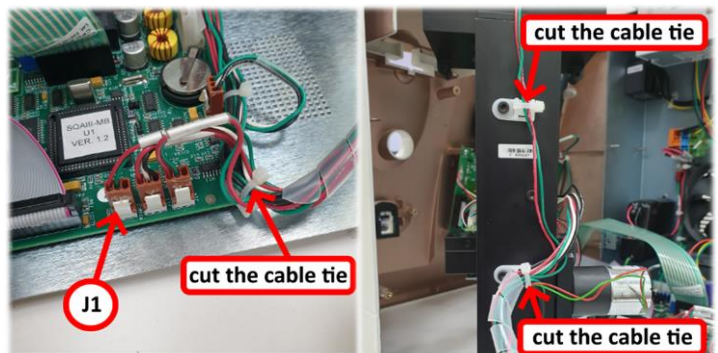
**Release the screws of
optical assembly**



Pull the optical assembly

**Stage 2: Replace the
Visualization LED Housing**

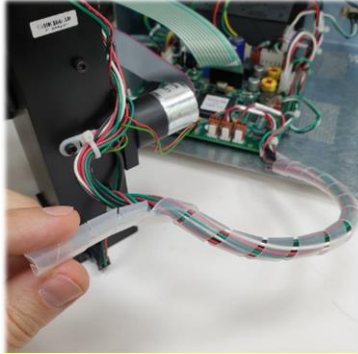
- Unplug the cable connector from J1 on the Main board and cut the cable ties.



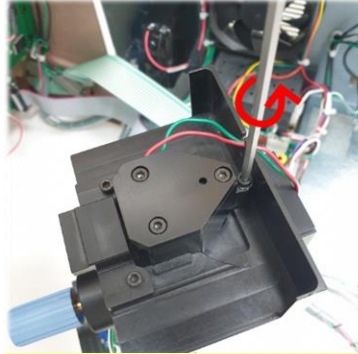
Please note:

Remember the spring position – it will have to be placed in the exact same position when inserting the new Visualization LED housing.

- Remove the spiral cable wrap
- Release the screw and remove the old Visualization LED housing
- Place the new Visualization LED housing on the same platform and refasten the screw
- Plug-in the connector of the LED to J1 on the Motherboard and replace the cable ties
- Re-wrap spiral wrap band



Unwrap the plastic cable wrap



Release the screw



Remove the old Visualization LED housing

Stage 3: Replace the Focus knob

See section #13 in this manual for detailed instructions

Stage 4: Close the SQA-V

- Re-connect the optical assembly to the front panel. Make sure to screw back all 4 screws
- Close the back of the unit and fasten the 4 screws on the rear panel using a #2 Philips screwdriver

Additional Components: New, improved Slide Adaptor

One of the components of the improved visualization system, as mentioned above, is a newly improved slide adaptor. This new slide adaptor holds the slide firmly and allows movement back and forth from one field of view to the next smoothly, without losing focus.



**ERROR
Messages****SECTION IX: Error Messages****1. Stabilization Failed:**

STABILIZATION FAILED
TURN OFF MAIN SWITCH ON REAR PANEL
REACTIVATE UNIT

IF PROBLEM PERSISTS,
CALL FOR TECHNICAL SUPPORT

- Ensure there is no testing capillary in the measurement compartment.
- Remove the SQA-V from sources of electronic noise (centrifuge, stirrer and other rotating devices).
- Clean measurement compartment (refer to Appendix).
- Reboot the SQA-V without a testing capillary in the chamber:
 - Turn system **OFF** then back **ON** at the main switch on the rear panel.
 - Press the front panel **ON/OFF** key to begin Auto-Calibration/Stabilization.
- Call technical support if failure recurs.

2. Self-test Failed:

FAILED SELF-TEST
TURN OFF MAIN SWITCH ON REAR PANEL
CLEAN OPTICAL CHAMBER
REACTIVATE UNIT

IF PROBLEM PERSISTS,

- Ensure there is no testing capillary in the measurement compartment.
- Remove the SQA-V from sources of electronic noise (cell phones, etc.).
- Clean measurement compartment (refer to Appendix).
- Reboot the SQA-V without a testing capillary in the chamber:
 - Turn the system **OFF** then back **ON** at the main switch on the rear panel.
 - Press the front panel **ON/OFF** key to begin Auto-Calibration and Stabilization.
 - Call technical support if this message is displayed again. Prepare for technical support by printing a copy of the SQA-V internal parameters

3. Electronic Noise:

ELECTRONIC NOISE
TURN OFF MAIN SWITCH ON REAR PANEL
REACTIVATE UNIT

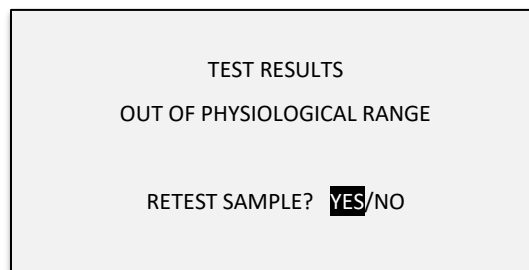
IF PROBLEM PERSISTS,
CALL FOR TECHNICAL SUPPORT

- Ensure there is no testing capillary in the measurement compartment.

- Remove SQA-V from sources of electronic noise (cell phones, etc.).
- Clean measurement compartment (refer to Appendix).
- After cleaning:
 - Press **SERVICE > ESC**, MAIN MENU will be displayed.
 - Select **TEST NEW PATIENT** and re-run test.
- If this message is displayed again, reboot the device:
 - Turn the system **OFF** then back **ON** at the main switch on the rear panel.
 - Press the front panel **ON/OFF** key to begin Auto-Calibration and Stabilization.
- From MAIN menu: Select TEST NEW PATIENT and rerun.

Call technical support if this message is displayed again. Prepare for technical support by printing a copy of the SQA-V internal parameters.

4. Concentration Out of Range



- A message will appear indicating that the tests results for SPERM CONC. and/or MSC are beyond the dynamic range established by the manufacturer for testing. This message will appear if the SQA-V reads:
 - SPERM CONC. > 500 M/ml or
 - MSC > 450 M/ml
- Review sample handling technique (see Appendix "Filling the SQA-V Capillary").
- Re-test the sample in a new SQA-V capillary. If the message appears again, reboot the system.
- Call for technical assistance if problem persists.

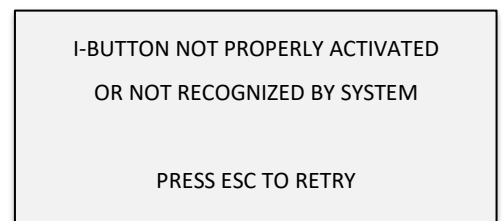
5. Sample size out of range

If the sample size has been entered as > 50 ml the calculated parameters will not import to the V-Sperm software.

6. I-Button warning screens

"I-button not properly activated"

- Remove the I-button
- Press ESC and Retry



"Empty I-button inserted"

- Press ESC and Retry with a new I-Button
- XX denotes quantity of tests remained

EMPTY I-BUTTON INSERTED!
INSERT A NEW I-BUTTON

TESTS REMAINING: XX
PRESS ESC TO RETRY

"I-button warning"

- This screen will be displayed when less than 10 tests remain in the SQA-V
- Insert a new I-Button

I-BUTTON WARNING:
LESS THAN 10 TESTS REMAINING

"Please insert a new I-button"

- This screen will be displayed when test new patient is activated, but no more tests remain in the SQA-V
- Insert a new I-Button

PLEASE INSERT A NEW I-BUTTON
NO MORE TESTS ARE AVAILABLE

7. Communication error

A communication error may occur in one of the following cases:


- Defective wire connection: The cable that connects the optical board to the main board is not well connected or was damaged
- Hardware problem

COMMUNICATION ERROR

CALL FOR TECHNICAL SUPPORT

Appendix 1:
SQA
Cleaning
Instructions

SECTION X: Appendixes



SQA and QwikCheck™ Cleaning Instructions

When to clean: DAILY (step 1), WEEKLY (step 2)

- or if Self-test or any other failure occurs
- or if System becomes contaminated with semen

Cleaning kit contents:

- Long cleaning brush
- Fibrous material cleaning paddle
- Sponge tipped drying paddle
- Cleaning fluid

Cleaning: Step 1 (DAILY)

1. Insert the long brush (bristle-side down) fully into the upper portion of the lower chamber of the system in the same manner as a testing capillary (Fig. 1).




Fig. 1 Cleaning brush

2. Pull the brush out applying downward pressure to sweep or “dust off” the optics (you will feel a “shelf” in the back/top section of the chamber) - (Fig. 2 and 3)




Fig. 2 Lower chamber





Fig. 3 “Dusting off”

3. Monitor the system’s “REF. 2” parameter. It should be between 2,800 and 3,200 mV if possible.

ADDITIONAL INSTRUCTIONS ON REVERSE SIDE

CE Only use the manufacturer’s cleaning kit and brushes to clean the system

30_NOV_17



Cleaning: Step 2 (WEEKLY)

1. Select the fibrous cleaning paddle (Fig.4)
 - Moisten with **ONE** drop of cleaning fluid
 - Shake off excess fluid
 - Insert into measurement compartment with fibrous material facing DOWN ONLY (Fig.5)
 - Move cleaning paddle in and out three times




Fig.4 Fibrous material cleaning paddle




Fig.5 Insert into measurement compartment

2. Insert the sponge-tipped drying paddle into the testing chamber and leave it for 10 seconds (Fig.6)

NOTE: Do not move this drying capillary in and out.




Fig.6 Sponge tipped drying paddle

CE

30_NOV_17

**Appendix 2:
Loading
I-Button
Tests**

How to Load the I-button

Applies to: ALL SQA-V (V, Vb, Ve, Vp and Vt) with new I-button clip hardware
Issue date: August 3, 2021

Instructions:

Procedure for LOADING THE I-BUTTON:

1. Turn on the SQA-V and the V-Sperm Computer
2. From the SQA-V go to: MAIN MENU > SERVICE > ADD I-BUTTON TESTS

3. Insert the I-button card (with the I- button attached to it) into the I-button port of the SQA:

- The back of the card (instructions side) should be facing up so that the clip touches the I- button through the round hole at the back of the card (See Fig. 1).
- The I-button should be placed snugly into the port and held firmly in place by the clip (See Fig. 2).
- There is no need to hold the I-button or the card during the loading process – the clip will do this.



Figure 1: I-button insertion

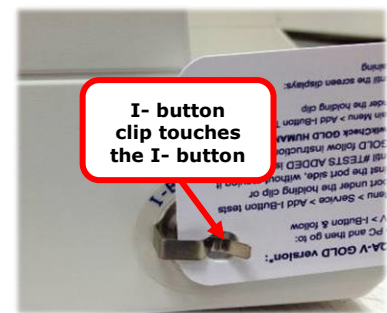


Figure 2: Final location of the I-button inside the port

4. When the button is in place, go to **V-Sperm** (or B-Sperm, or E-Sperm, etc.) and click: **CONTINUE** (See Fig. 3)

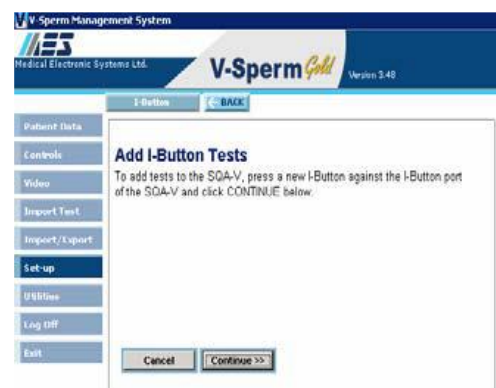


Figure 3: Click "Continue"

5. A progress bar can now be seen on V-Sperm.
6. **The button must remain inside the port as described above during the ENTIRE process of loading the tests until you receive the message: I-Button Tests successfully updated** (see Fig. 4).

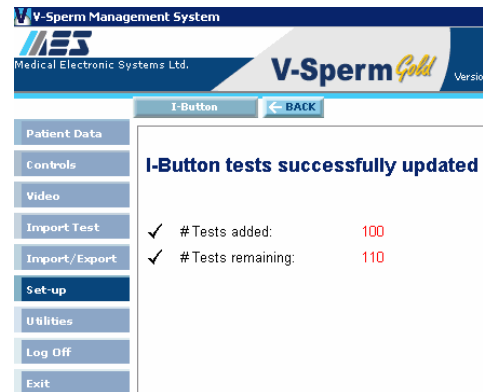


Figure 4: Success Message

Troubleshooting Errors

Problem description: I-Button Tests are not loading from the I-Button after repeated attempts and an error message is displayed on the V-Sperm screen (see Figure 5)

Explanation of the failure: There is an intermittent I-button communication failure between the SQA-V and the computer in some cases.



Figure 5: Error Message

Troubleshooting Instructions

1. Click **CONTINUE** again if the I-button it doesn't load tests and you receive a communication error.
2. If you still receive a **Communication Error** check the following:
 - **Is the I- button properly located (fully inserted) inside the port?**
 - **Is every step being followed exactly as explained in the I-button loading procedure?**
 - **Is a NEW I-button card being used?**
3. Is the SQA-V connected (via an RS232) to your V-Sperm Computer? (To test this- try importing your patient data...does this work?)
4. If you answered "Yes" to all of these questions, follow these instructions:
 - **Turn off the power on the SQA-V (from the back)**
 - **While holding the SERVICE button of the SQA-V, turn the power switch back on**
 - **You should now have a blank screen (sometimes with garbled lines)**
 - **Immediately turn off the power again.**
5. Finally, turn on the power and follow the "I-button loading instructions" again (section 1- section 6 above).

Appendix 4: Power Supply Troubleshooting Flowchart

