ELITech ELITe InGenius™

Service Training Manual

ELITech Group Molecular Diagnostics
27 Wellington Rd Lincoln, RI 02865

Revision 4.0 (6/30/2015)

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ELITech ELITe InGenius™

Chapter 1: Instrument Safety

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Chapter 1: Instrument Safety

1.1. Attention Symbols

The attention symbols described hereafter are used in the current manual, on the instrument and on its packaging

DANGER

The signal word "Danger" and relating symbol points to imminent dangers.
The non-observance of a “Danger” warning can result in death or at least serious irreversible injuries. Damage to the system or an adverse effect on the system function cannot be excluded.

WARNING

The signal word "Warning" and relating symbol points to potential dangers.
The non-observance of a “Warning” instruction can result in death or at least serious irreversible injuries. Damage to the system or an adverse effect on the system function cannot be excluded.

CAUTION

The signal word "Caution" and relating symbol points to potential dangers/problems.
The non-observance of “Caution” instructions can result in minor injuries. Damage to the system or an adverse effect on the system function cannot be excluded.

NOTE

The signal word "Note" points to potential problems.
The non-observance of “Note” instructions can result in an adverse effect on the system function (result deterioration). Damage to the system or an adverse effect on the system function cannot be excluded.

Additional Warning Symbols

Symbol	Description
	Indicates that manual should be consulted for further information and to proceed with appropriate caution
	Indicates potentially infectious materials. Safety measures must be followed according to local regulation when performing the described task
	Indicates the presence of an electrical shock hazard and to proceed with appropriate caution
	Indicates the presence of a U.V light inside the instrument and to proceed with appropriate caution
	Indicates the presence of a laser inside the instrument and to proceed with appropriate caution
	Indicates the presence of moving parts and to proceed with appropriate caution
	Indicates that protective measures have to be used in order to prevent electronic component from electrostatic discharge during handling
	Indicates that protective gloves have to be worn
	Indicates that protective lab coat has to be worn
	Indicates that protective goggles have to be worn

Other Symbols

Symbol	Description
CE	**Conformité Européenne** – CE mark This symbol indicates European conformity
	Manufacturer
	Date of manufacture
IVD	**In-Vitro Diagnostic device**
	Disposal of Electrical and Electronic Equipment In the European Union, electrical and electronic equipment must not be disposed with other household-type waste. It must be collected separately. Please observe the relevant legal regulations effective in your country.
REF	**Catalog number**
SN	**Serial number**
TUV	**TUV mark**
	Consult Instruction for Use
	Fuse

1.2. Electrical Safety

DANGER

Electrocution/Fire Hazard
Non-observance of rules and regulations can cause serious personal injuries with deadly consequences and material damages. National rules and legal regulations for the safe electrical operation of the system must be observed.

DANGER

Electrocution/Fire Hazard
Improper connection of the system and the peripheral devices to mains supply can cause serious personal injuries with deadly consequences and material damages (e.g. fire). Use only connection and extension cables with a protective earth conductor and sufficient capacity (performance, power) to connect the system and the peripheral devices to the mains supply. Never interrupt the grounding contacts. Grounding of the system and its peripheral devices to the same protective earth potential must be ensured. The use of a power strip is not allowed.

DANGER

Electrocution/Fire Hazard
Damaged connecting cables can cause serious personal injuries with deadly consequences and material damaged (e.g. fire). Damaged connecting cables must be replaced immediately! No objects may be placed on the connecting cables. Connecting cables must be laid so that they cannot be squeezed or damaged. Connecting cables must be laid so that they do not lay in accessible or drivable areas.

DANGER

Electrocution/Fire Hazard!
Defective systems can result in serious injuries with deadly consequences and material damages (e.g. fire). Separate immediately the defective system from the mains supply, if safe usage is no longer possible. Secure the defective system against reconnection. Label the defective system clearly as being defective.

DANGER

Electrocution!
Working with electrical devices on wet floors can cause serious injuries with deadly consequences and material damages due to electrocution. Surfaces (floors, work table) must be dry when working with the system.

DANGER

Emergency
In emergencies use the mains switch or the mains plug to switch off the instrument or separate the instrument from the mains supply.

WARNING

Danger due to Improper Place of Installation
Improper place of installation of the system can cause accidents with serious injuries with deadly consequences, fire or serious system damage if the system cannot be switched off or be separated from the mains supply. Ensure that the power supply and mains switch are easily accessible in the place of installation of the system.

CAUTION

Electrostatic Discharge
During handling, electrostatic discharge can damage components of electronic circuit boards. Use protective measures against electrostatic discharge.

1.3. Additional Safety

WARNING

Eye Injuries due to Laser Radiation
Laser radiation can cause eye irritation when you look directly into the laser beam. During operation of laser, inform to all people around the instrument to do not watch the beam. Never look directly into the laser beam. Do not use optical devices (e.g. mirror). Take off watches and mirroring jewelry before operating the laser

WARNING

Conjunctivitis and Skin Burns due to UV-Light
The radiation of the UV-Lamps causes conjunctivitis and skin burns within minutes. Never look directly into the UV-Lamp! Protect your eyes and skin from direct radiation. Keep the instrument door closed during UV sterilization.

WARNING

Danger of Electrocution or Mechanical Injuries by Missing or Open Protective Covers

To avoid serious injuries with deadly consequences due to electrocution or injuries by the system (e.g. contusion, cuts etc.), protective covers may only be opened, by-passed, or removed for certain maintenance procedures and with the highest level of caution.
Only perform maintenance procedures described in this manual. Make sure that no one is working on the system and that all covers are attached and closed before reconnecting the system to the mains supply. Make sure that all covers are attached before switching on the instrument. Switch off the system, separate it from the mains supply and protect the system against restarting, if protective covers or gear is missing. Make sure that the motion of the pipettor has stopped before opening covers and/or accessing the working area of the instrument. Avoid touching the pipettor and other moving parts while the system is in operation. Perform all maintenance procedures with the highest level of caution. Do not wear clothes or accessories which can be caught by the system.
System malfunction or unexpected movement can cause injury. Keep away, shut down and remove power supply in such cases.

WARNING

Improper place of installation/operation of the system may cause fire or serious system damage due to overheating.

Select the place of installation of the system so that the ventilation slots are not blocked or covered. Select the place of installation of the system so that air can circulate.
Never cover ventilation slots. Do not touch hot collar or PCR block during or immediately after PCR process. To minimize the risk for the users the system automatically decreases the temperature after completion of the PCR process. Pay attention to heated areas accessible to user during removal/placement of consumables.

1.4. Biological Safety

Risk of infection

DANGER

Biological samples used in association with the ELITech ELITe InGenius™ *sy*stem have the potential to transmit infectious diseases. Follow all applicable national and international laboratory safety regulations.
There are biological hazards during the following user activities:

- Sample handling
- Elution handling
- Waste disposal (fluids and consumables)
- Maintenance and cleaning

The following guidelines must be observed:

- Observe local and national provisions, legislation and laboratory regulations.
- Use appropriate gloves
- Use an appropriate lab coat!
- Use appropriate eye protection (e.g. goggles)
- Avoid contact between skin/mucous membrane and samples/test reagents or parts of the instrument.
  - Clean, disinfect and decontaminate the system immediately if potentially infectious material has been spilled.

- In case of spills of reagent or samples, wash and clean by using 70% alcohol and dispose as potentially infections
- Do not use broken or chipped tubes or bottles.
- Observe the instructions in the package inserts for correct use of reagents.
- Observe the legal regulations for the handling of infectious material
- Never use bio-hazardous liquids for testing the instrument!
- Do not drink or eat in the lab

1.5. Chemical Safety

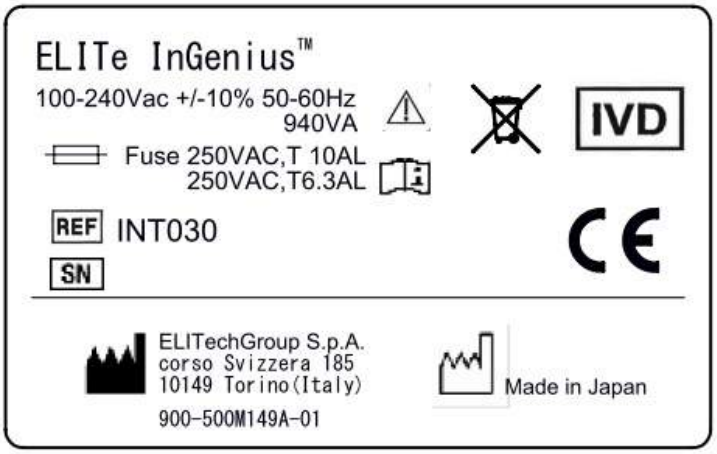
There is possibility of exposure to hazardous chemicals through handling of reagents, calibrators or controls. Proceed as follows to minimize the risk.

- Carefully read and follow the MSDS for each assay.
- Wear recommended protection to prevent exposure.
- In case of exposure, follow the guidance on the SDS.

1.6. Instrument Type Plate

Serial Number Label Instrument REF and serial number can be found on the right side of the instrument on the serial number label. The serial number is unique for each instrument.

Figure 1



1.7. Power Switch

The main power switch is located on the right side of the instrument. In case of emergency, stop the instrument by switching this switch to the OFF position.

1.8. Hot Surfaces

A Caution Hot Surface label is located near the hot collar and heating block. Handle with care.

ELITech ELITe InGenius™

Chapter 2: Instrument Overview

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Chapter 2: Instrument Overview

2.1. Instrument Theory of Operation

The ELITe InGenius™ system is a fully automated solution integrating the following tasks: extraction and purification of nucleic acids, amplification and detection of the target sequence by Real-Time Polymerase Chain Reaction (RT-PCR) and result interpretation. The system is suitable with multiple sample types for qualitative and quantitative in vitro diagnostics applications.

The ELITe InGenius™ system can be used in combination with proprietary extraction and amplification reagents as well as open amplification reagents.

The ELITe InGenius™ system is a bench top instrument integrating all the required hardware, reagent and software components to perform nucleic acid sample preparation and real-time PCR operations.

- extraction modules, liquid handling pipettors, RT-PCR units
- nucleic acid extraction and RT-PCR reagents
- dedicated software piloted with an integrated touch screen, interfacing bi-directionally with the Laboratory Informatics System (LIS).

The ELITe InGenius™ system can processed from 1 to 12 samples in 12 parallel tracks. It features a primary tube loading capability, a universal extraction process combined with multiple and independent PCR from one or several extracted sample enabling the laboratories to develop and custom testing panels according to their specific needs.

The nucleic acid extracted can be stored for retesting or archiving.
Several operational modes are available: nucleic acid extraction only, RT-PCR amplification only, or nucleic acid extraction, RT-PCR amplification and result analysis.

2.2. Instrument Features

The ELITe InGenius™ instrument is able to automatically perform the following operations:

- Nucleic acid extraction and purification based on a magnetic beads technology with optional ultra-sonication capability
- Amplification and detection by RT-PCR of the target sequence
- Liquid handling operations including sample & reagent dispensing
- Barcode reading with an integrated barcode reader for extraction cartridge and PCR cartridge, or with a hand-held barcode reader for samples and RT PCR reagents

2.3. Instrument Components

Single nozzle pipettor

- operates in the X-Y-Z axis
- sample transfer from the primary tube to the secondary tube, nucleic acid and RT-PCR reagents dispensing
- dispensed volume ranges from 5 to 300 µl, using 300 µl filter tips

Twelve nozzle head

- operates in the Y-Z axis and performed various tasks:
- fluorescent detection
- magnetic extraction
- PCR cap closing

- liquid handling operations during extraction and extracted nucleic acid elution
- dispensed volume ranges from 10 to 1000 µl

Both nozzle assemblies are equipped with a liquid sensor to detect the samples and reagents liquid levels, clots, tips and liquid leakage

Twelve extraction modules

- Each one is equipped with an ultra-sonication and a heat block.
- Three elution volumes available: 50µl, 100µl, 200µl.

Twelve RT-PCR units

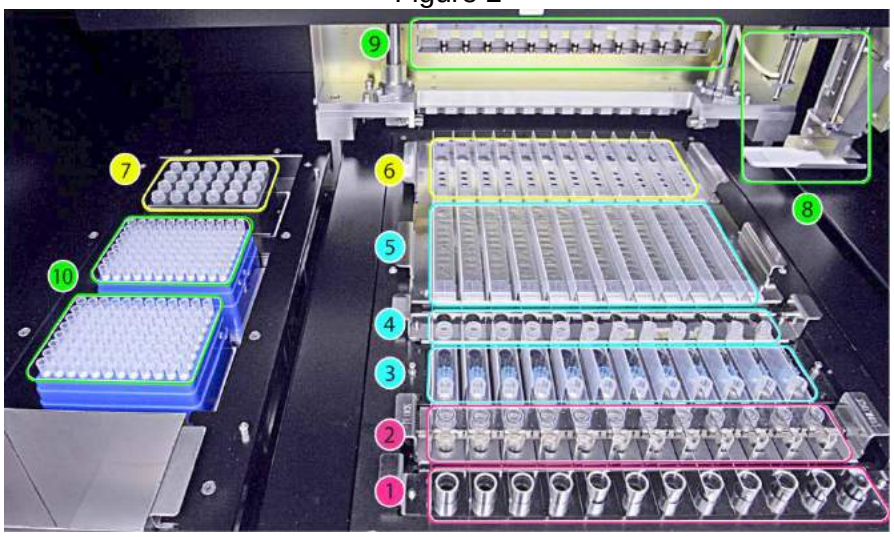
- Independent temperature control enables to run in parallel diverse PCR thermal-profile.
- Peltier block
- Reaction volume range from 20µl to 50µl.
- Melt curve analysis capability
- Six fluorescent channel are available per RT-PCR unit with the following specifications:

Table 1

Channel	ELITechGroup Dyes	Excitation filter (nm)	Detection filter (nm)
1	FAM	470	510
2	AP525	530	560
3	AP559	560	590
4	AP593	590	630
5	AP642	630	670
6	AP680	670	710

The ELITe InGenius™ is organized in 12 parallel tracks enabling it to process in parallel and independently 12 samples from extraction to amplification. The loading of the reagents and consumables is done in dedicated ELITe InGenius™ racks.

Figure 2



1. Primary tubes sample 6. Universal PCR vessel and caps

2. Sonication tubes & sonication caps
3. Extraction Tip cassettes
4. Nucleic acid storage tubes
5. Extraction cartridges
7. Inventory reagent manager area
8. Single nozzle pipettor arm
9. Twelve nozzles pipettor head
10. Filter tips racks (300µl)

2.4. Component Identification

Figure 3

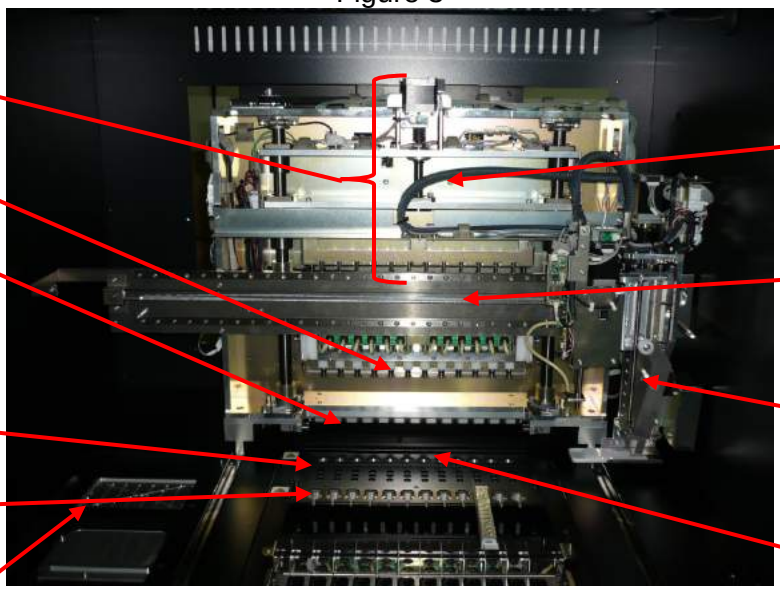


Figure 4

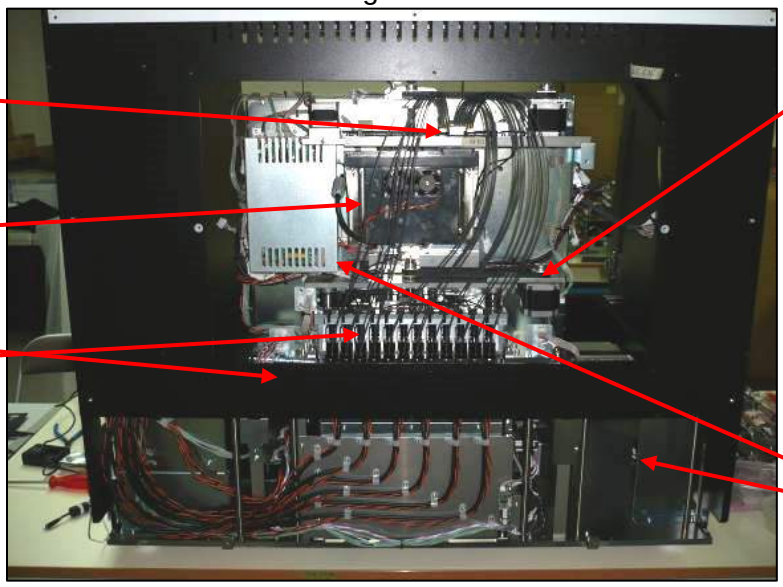
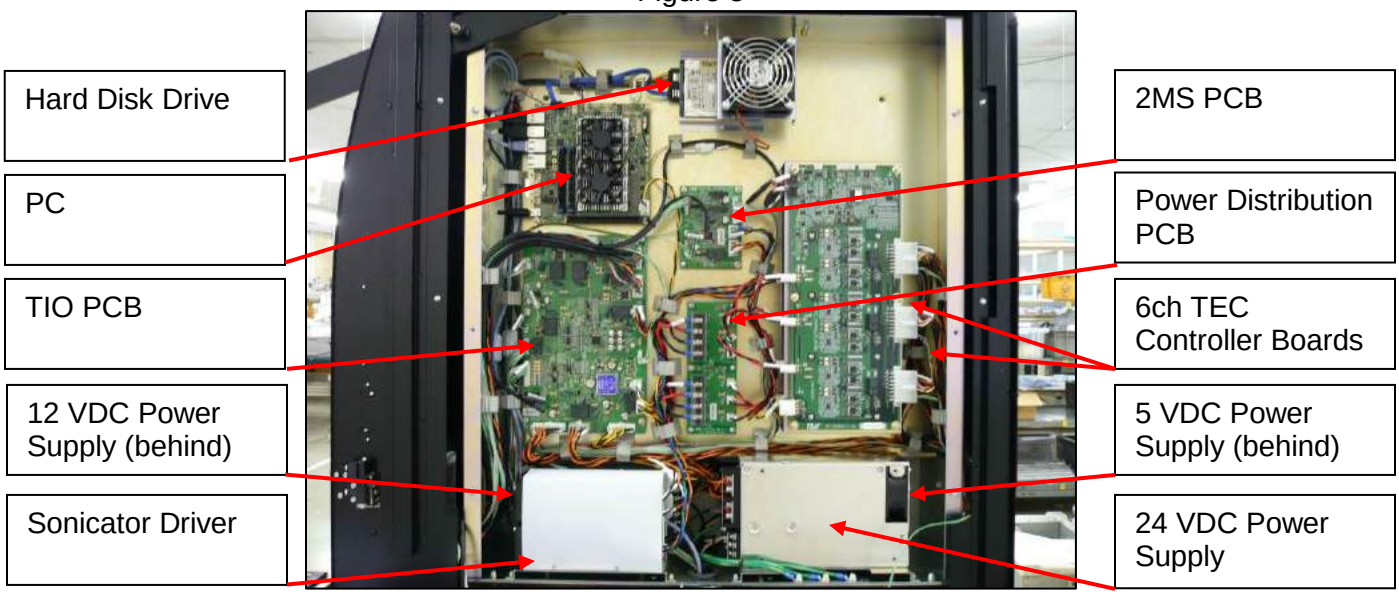


Figure 5



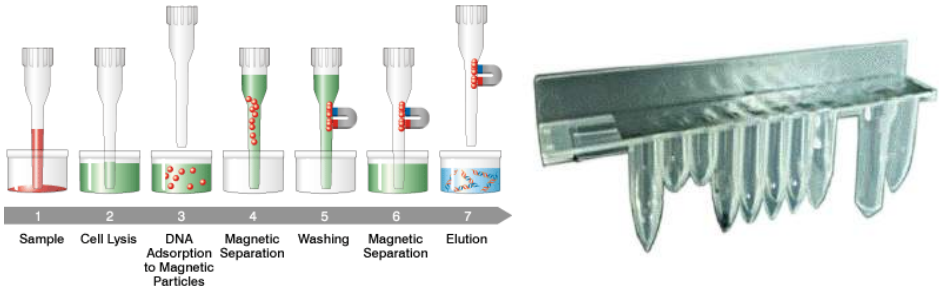
2.5. Reagents and Consumables

The following ELITe InGenius™ reagents are necessary for the nucleic acid extraction in open and closed mode.

ELITe InGenius™ SP 200

- 8-wells prefilled, unitary cartridge sealed with an aluminum foil containing all the necessary reagents for cell lysis, extraction and purification including the magnetic beads.
- universal cartridge suitable for human genomic DNA and viral DNA/RNA and validated on a very large range of sample matrices (Figure 1.4: ELITe InGenius™ - Extraction cartridge and extraction principle)

Figure 6



ELITe InGenius™ SP 200 Consumable Set

- Contains all necessary consumables for extraction along with ELITe InGenius™ SP 200:
- sonication tubes and sonication caps
- tips cassette, including one piercing tip for automated extraction cartridge piercing and one pipetting tip for samples and extraction processing
- nucleic acid storage tube and screw caps.

The following ELITe InGenius™ consumables are necessary for RT-PCR amplification in open and closed mode

ELITe InGenius™ PCR cassette: universal PCR vessel and caps for IVD and user defined assay protocol (Figure 1.5: ELITe InGenius™ - PCR cassette)

Figure 7

Filter tips (300µl) – Axygen
The following Reagents are necessary for RT-PCR amplification with ELITe InGenius™ system RT-PCR

ELITe MGB® line: target–specific RT-PCR assays in monoreagent format including probes, primers and enzyme for qualitative and quantitative IVD applications.

2.6. Software Workflow

The ELITe InGenius™ system operates in CLOSED or OPEN mode.

- The CLOSED mode enables the user to run only IVD assay protocol. The CLOSED mode is also considered as a depository including all the IVD validated assay protocol according to the IFUs of the ELITe MGB assays in use. Modification of assay protocols or creation of a new assay protocol is not allowed in the CLOSED mode.

- The OPEN mode enables the user to run additional non-IVD user-defined assay protocols developed by the laboratory to fit their specific needs. The OPEN mode enables the user to run simultaneously IVD assay protocol previously imported from the CLOSED mode and user-defined assay protocol.

ELITe InGenius™ workflow with IVD assay protocol

1. Start the ELITe InGenius™ system
2. Select the CLOSED mode
3. Select the extraction elution volume
4. Query the LIS to import the sample work list
5. Select IVD assay protocol or testing panel for each sample
6. Load ELITe InGenius™ extraction reagents & consumables
7. Load ELITe InGenius™ amplification reagents
8. Load the scanned samples
9. Start the run
10. Approve result
11. Upload data to the LIS

ELITe InGenius™ workflow with IVD protocol & user-defined protocol

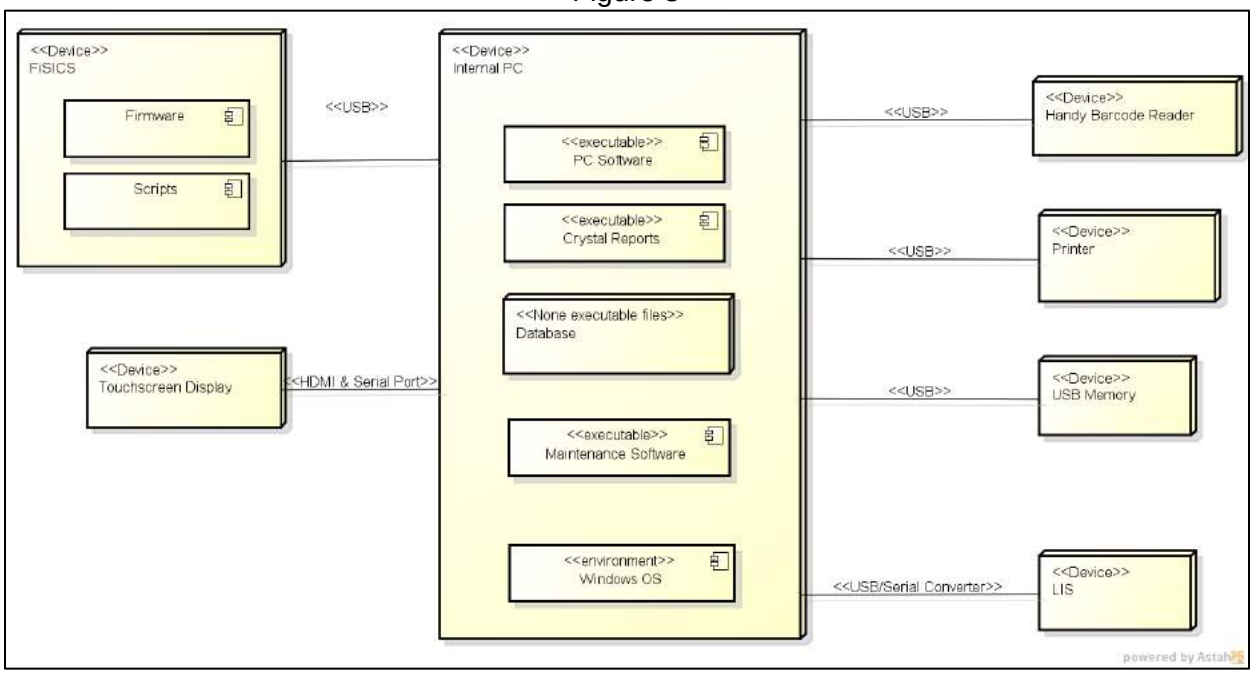
1. Start the ELITe InGenius™ system
2. Select the OPEN mode
3. Select the extraction elution volume
4. Query the LIS to import the sample work list
5. Select user-defined assay protocol or panel for each sample and/or IVD assay protocol previously imported without modification from the IVD mode
6. Load ELITe InGenius™ extraction reagents & consumables
7. Load user-defined amplification reagents (and/or ELITe MGB® RT-PCR reagents)

8. Load the scanned samples
9. Start the run
10. Approve result
11. Upload data to the LIS

- Assay calibration is recommended once every two weeks for each parameter running one positive and one negative control.
- One assay calibration per PCR reagent batch is mandatory running one positive and one negative control.

2.7. Instrument Software

Figure 8



- Table 2 details how the software is updated and maintained

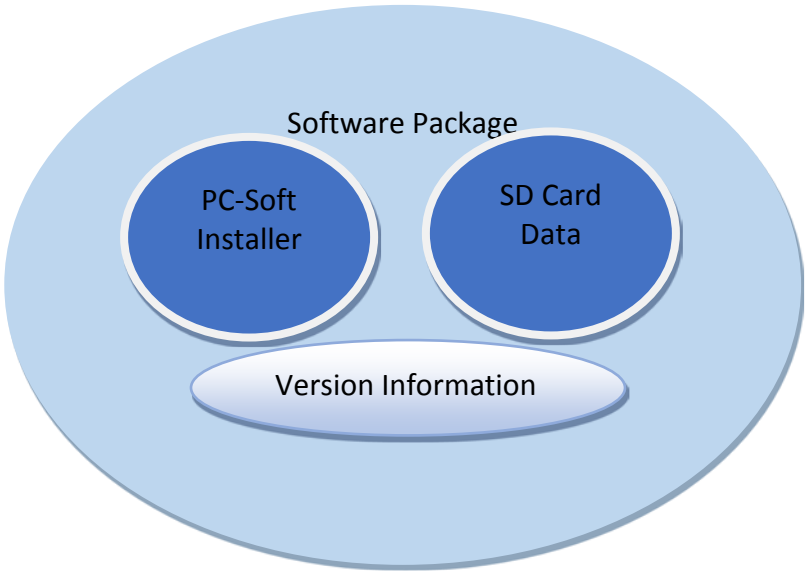
Table 2

Name	Function	Update Method
PC Software	Provide Graphical User Interface (GUI)	By PC-Soft Installer
Database	Manage data including diagnostic results	
Crystal Reports	Prepare data for printing	
Maintenance Software	Service GUI and functionality	
Firmware	Manage and control instrument devices	By SD Card Data
Scripts	Defines operation of each device	

- Software downloaded or updated by PC-Soft Installer runs on Windows Embedded Standard 7 which is the operating system (OS) of the instrument.
- Software downloaded or updated by SD Card Data is installed in micro SD card on the FiSICS control board of the instrument to run.
- When the instrument's main power is turned on, the OS of the onboard PC starts and then the PC Software starts up automatically. After the start-up is successfully complete, the software communicates with the firmware on the FiSICS board, which performs a self-diagnosis of the instrument status and makes the entire system available for use.

Version Update
The InGenius system can be updated via a software version update. The software version update needs to be handled as a software package.

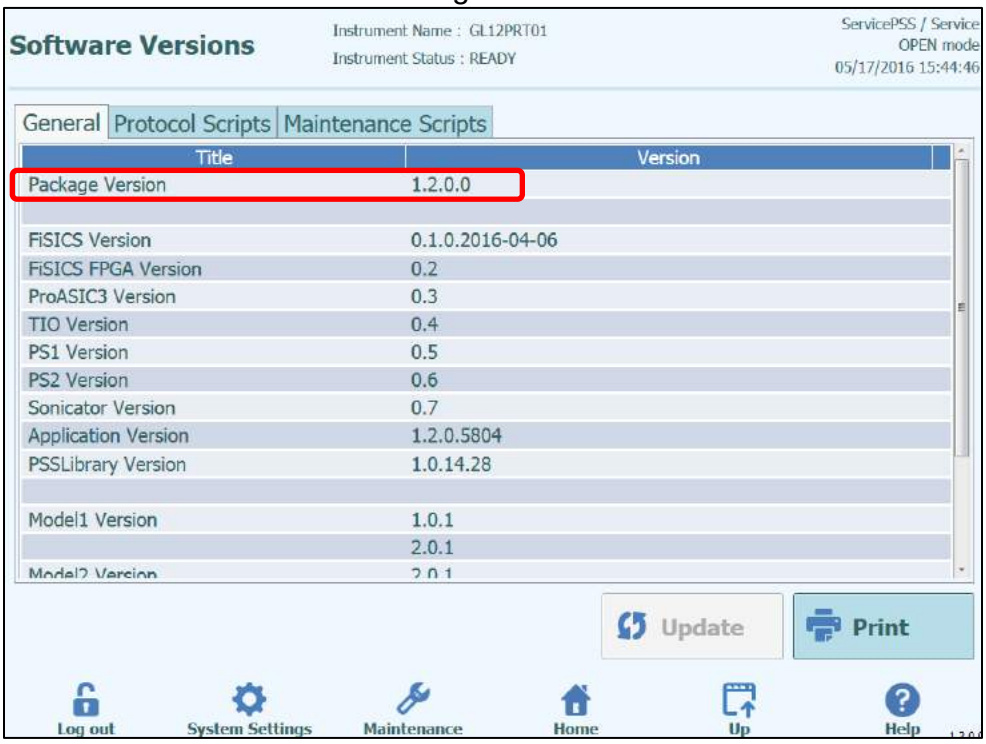
Software Package
PC-Software Installer and SD Card data together are called the Software package



The software packages come with unique version information. This version information is different from the one given to each PC-Software or Firmware. In version 1.2 and later this version information can be confirmed via the *Package Version* in the splash screen upon start-up or via the *System Version* screen (Figure 9 & Figure 10)

Figure 9

Figure 10



File configuration of the Software package

File configuration of PC-Soft Installer Software Package

AdbeRdr11007_en_US.exe	Adobe Reader Installer
CRRuntime_32bit_13_0_10.msi	Crystal Reports Installer
dotnetfx45_full_x86_x64.exe	Microsoft .NET 4.5 Installer
FStat.exe	SQL Server Version Check program
Install.bat	PC-Soft Installer execution file
install_2012_D.config	Installation Settings file
setup.exe	PC-Soft / Database / Maintenance Software Installer
SQLEXPR_x86_ENU.exe	Microsoft SQL-Server Installer

File Configuration of SD Card Data

File name	Function	Updated	Instrument
bin folder (execution file folder)			
geneLEAD.bin	Firmware execution		X
data folder (instrument data storage folder)			
Remainder.bd	(Not in use)	X	X
def (defined parameter files folder)			
position.def	Position teaching information	X	
QRCode.def	Barcode reader position information	X	
vptable.def	V-P table for DN100N tip	X	
vptable_ME200.def	V-P table for ME200 tip	X	
vptable_Single.def	V-P table for Axygen Tip (1:1)	X	
vptable_SingleIC.def	V-P table for Axygen Tip (1:n)	X	
ini (defined files folder)			
debug.ini	Flag for debugging		X
device.ini	Initial settings for UX/UZ-axis		X
fisics.ini	Initial settings for each axis		X
iaddress.ini	(Not in use)	X	X
package_ver.ini	Package version definition		X
pos_err.ini	Backlash detection counter for Encoder		X
preinit.ini	(Not in use)	X	X
protocol.ini	Define script to read in		X
psad.ini	Settings for Pressure Sensor threshold		X
scan.ini	Settings for fluorescent detection		X
serial.ini	Define instrument serial No.	X	
singletip.ini	(Not in use)	X	X
singletip1.ini	(Not in use)	X	X
singletip2.ini	(Not in use)	X	X
temptable.ini	Temperature control conversion table for Peltier	X	
tippos.ini	(Not in use)	X	X
scr (applications & scripts folder)			

bcr.scr	On-board barcode reader settings		X
File name	Function	Updated	Instrument
scr (applications & scripts folder)			
common.scr	Various common settings		X
DNASampleDisp.scr	DNA sample dispensing settings after extraction		X
ExtCasPiercing.scr	Extraction Cassette piercing settings		X
FinishPCR.scr	Finish PCR settings		X
ICDisp.scr	IC dispensing settings		X
IrradiationUvLamp.s	UV lamp settings		X
MagDEA Dx MV	Extraction settings (1000uL)		X
MagDEA Dx SV	Extraction settings (200uL)		X
OrgAll_glxii.scr	ORG all (home return of all axes) settings		X
PCRCasPiercing.scr	PCR Cassette piercing settings		X
PCRReagentDisp.sc	PCR Reagent dispensing settings		X
PCRSetup.scr	PCR setup settings		X
PreICDisp.scr	(Not in use)	X	X
prologue.scr	Initialization of the instrument settings		X
SampleDisp.scr	Sample dispensing settings		X
SelfCheck.scr	Self-check settings		X
Sonicate.scr	Sonicator unit settings		X
Start_glxii.scr	Start-up settings		X
temp (temporary storage folder)			
instrument.ini	Instrument.ini Backup folder	X	

mscr (maintenance Script folder)	
File name	Function
Aging-02.scr	
Aging_DX_DZ.scr	
Aging_DX_SX_SZ_SP_P.scr	
Aging_P_SP_M.scr	
Aging_Y_SX.scr	
Aging_Z_SZ.scr	
auto_qrcode_teach.scr	Teach barcode reading positions
bcrloop_Ver118.scr	
Check_SonicUnit.scr	
Check_Z_SZ_Bottom.scr	
disptest.scr	
DN100_PressureSensor_Specific_Test.scr	
DoorLockEnduranceTest.scr	
EMC_TEST.scr	
F80P_encoder_test_DX_R00.scr	
F80P_encoder_test_DX_R01.scr	
F80P_encoder_test_DZ_R00.scr	
F80P_encoder_test_DZ_R01.scr	
F80P_encoder_test_P_R00.scr	

F80P_encoder_test_P_R01.scr	
F80P_encoder_test_R01.scr	
F80P_encoder_test_R02.scr	
F80P_encoder_test_SP_R00.scr	
F80P_encoder_test_SP_R01.scr	
F80P_encoder_test_SX_R00.scr	
F80P_encoder_test_SX_R01.scr	
F80P_encoder_test_SZ_R00.scr	
F80P_encoder_test_SZ_R01.scr	
F80P_encoder_test_UX_R00.scr	
F80P_encoder_test_UX_R01.scr	
F80P_encoder_test_Y_R00.scr	
F80P_encoder_test_Y_R01.scr	
F80P_encoder_test_Z_R00.scr	
F80P_encoder_test_Z_R01.scr	
MakePCRUnitTemperatureTable_12.scr	
ME200_PressureSensor_Specific_Test.scr	
qc-test_sonication_5sec.scr	
RampTest_Temp .scr	
Repeat.scr	
ScanLiquidA1.scr	
ScanLiquidA2.scr	
ScanLiquidS.scr	
ScanStuffA1.scr	
ScanStuffA2.scr	
ScanStuffS1.scr	
ScanStuffS2.scr	
ScanTipA.scr	
ScanTipS.scr	
short-stroke_encoder_test_DX_R00.scr	
short-stroke_encoder_test_DX_R01.scr	
short-stroke_encoder_test_DZ_R00.scr	
short-stroke_encoder_test_DZ_R01.scr	
short-stroke_encoder_test_P_R00.scr	
short-stroke_encoder_test_P_R01.scr	
short-stroke_encoder_test_R01.scr	
short-stroke_encoder_test_R02.scr	
short-stroke_encoder_test_SP_R00.scr	
short-stroke_encoder_test_SP_R01.scr	
short-stroke_encoder_test_SX_R00.scr	
short-stroke_encoder_test_SX_R01.scr	
short-stroke_encoder_test_SZ_R00.scr	
short-stroke_encoder_test_SZ_R01.scr	
short-stroke_encoder_test_Y_R00.scr	
short-stroke_encoder_test_Y_R01.scr	

short-stroke_encoder_test_Z_R00.scr	
short-stroke_encoder_test_Z_R01.scr	
Single_PressureSensor_Specific_Test.scr	
Teaching DZ New PCR-Rack.scr	Teaching script (See MDSOP.004)
teaching_12nozzle_Z_BackStage.scr	Teaching script (See MDSOP.004)
teaching_12nozzle_Z_Bottom.scr	Teaching script (See MDSOP.004)
teaching_12nozzle_Z_Tip1Jig.scr	Teaching script (See MDSOP.004)
teaching_12nozzle_Z_Y.scr	Teaching script (See MDSOP.004)
teaching_Detection_nozzle_DY_PCRTube.scr	Teaching script (See MDSOP.004)
teaching_Detection_nozzle_DZ_PCRTube_Cap_Adju	Teaching script (See MDSOP.004)
teaching_L.scr	Teaching script (See MDSOP.004)
teaching_M.scr	Teaching script (See MDSOP.004)
teaching_Single_SZ_Bottom.scr	Teaching script (See MDSOP.004)
teaching_Single_SZ_SideFrame_Tip1Jig.scr	Teaching script (See MDSOP.004)
teaching_Single_SZ_SX_Y.scr	Teaching script (See MDSOP.004)
teaching_Single_SZ_User.scr	Teaching script (See MDSOP.004)
teaching_Single_User_SZ_SX_Y.scr	Teaching script (See MDSOP.004)
TestPCRUnitTemperatureTable_12.scr	
UXteaching_Position_Set.scr	Teaching script (See MDSOP.004)
Ycenter_check_pcr_tube_12nozzle.scr	Teaching script (See MDSOP.004)
Ycenter_check_pcr_tube_single_nozzle.scr	Teaching script (See MDSOP.004)
Ycenter_check_sonic_tube_12nozzle.scr	Teaching script (See MDSOP.004)
Ycenter_check_sonic_tube_single_nozzle.scr	Teaching script (See MDSOP.004)
Y_Axis_SS-F80P_EncTest_Ver00.scr	

2.8. User Interface

Starting the Instrument

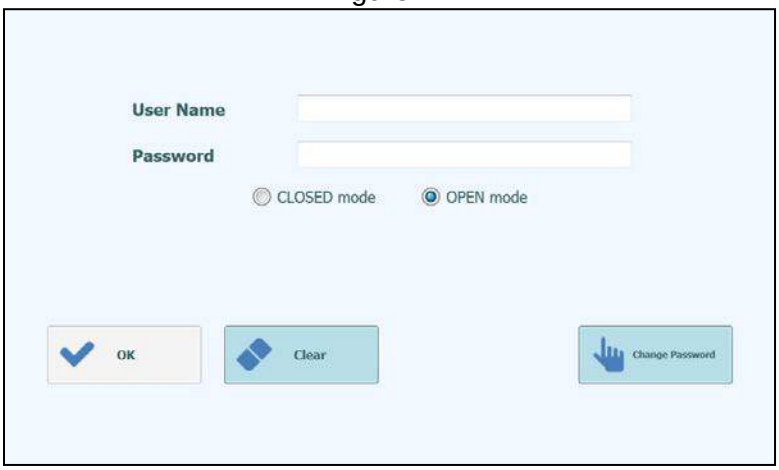
- Close the Door
- Turn on the power switch which is located on the right side of the instrument.
- The instrument starts the ELITe InGenius™ software on the integrated PC. The system displays the start-up screen while the start-up checks are being performed.

Figure 11

Logging in

- After the system start-up checks are complete, the ELITe InGenius software shows the login screen:

Figure 12



Description of Login Display:

User Name: Field/input box to enter the user name.
Password: Field/input box to enter the password.
Select login mode: select the login mode as shown in the following table

Table 3

Mode Name	Outline
CLOSED Mode	Mode that allows execution of IVD assays only

OPEN Mode	Mode that allows execution of Open assays (e.g. RUO)

- Press the User name field/input box and enter your user name with the on-screen keyboard. The service login is ServicePSS which is case sensitive
- Press the Password field/input box and enter your password with the on-screen keyboard. The service password is softdevpss which is case sensitive.
- Choose either CLOSED mode or OPEN mode
- Press OK button.
- If the username and password can be authenticated, the Home Screen display will be shown.
- The ELITe InGenius instrument implements an access model that restricts access to certain functions in the software by associating a User Role to each account when the account is setup (Table 4)

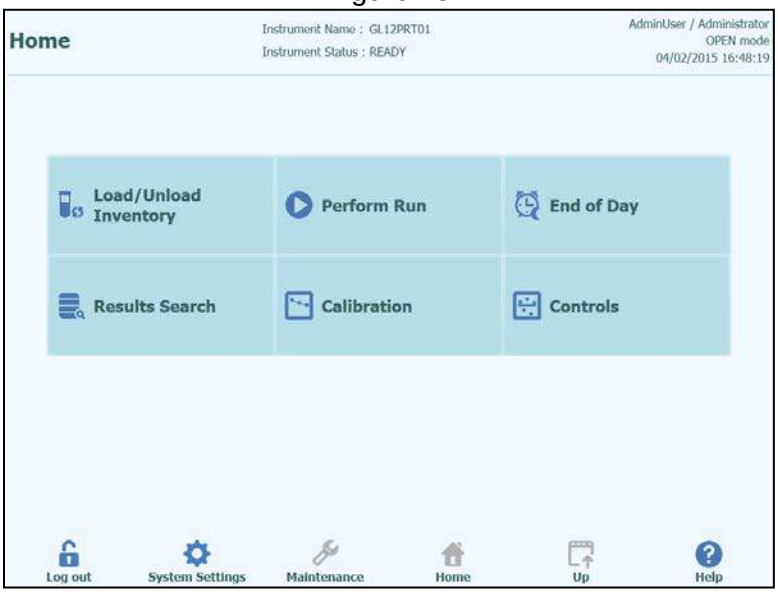
Table 4

	Operator	Analyst	Administrator	Service
Run assays	●	●	●	●
Approve assay results		●	●	●
Approve expired or missing calibrators or controls during run			●	●
Export Data from Runs			●	●
Change system settings			●	●
Access Maintenance				●

Home Screen

The Home Screen is the main screen of application software and is used to access the main features of the ELITe InGenius™ software.

Figure 13



There are six main functions that can be accessed from the Home Screen:

- **Load/Unload Inventory**

Displays the Inventory Manager screen which is used to configure the Reagents that are loaded in the 24 Well User Blocks

- **Perform Run**

Used for setting up and accessing the details for a run while it is in progress. Depending on the progress of the run, selecting the Perform Run icon will display one of three different screens as follows:

Table 5

RUN progress	Destination screen
Run not started	Setup Run Screen
Run in progress	Run Status Screen
Run completed	Run Result Screen

- **End of Day**

  Used for Shutting down the system at the end of the day. If a run is in progress, this button is disabled until the run has completed.

- **Results Search**
  Used to access the database of completed Run Results
- **Calibration**
  Display Calibration Manager screen.
- **Controls**
  Display Controls Manager screen.

Additional Functions from All screens

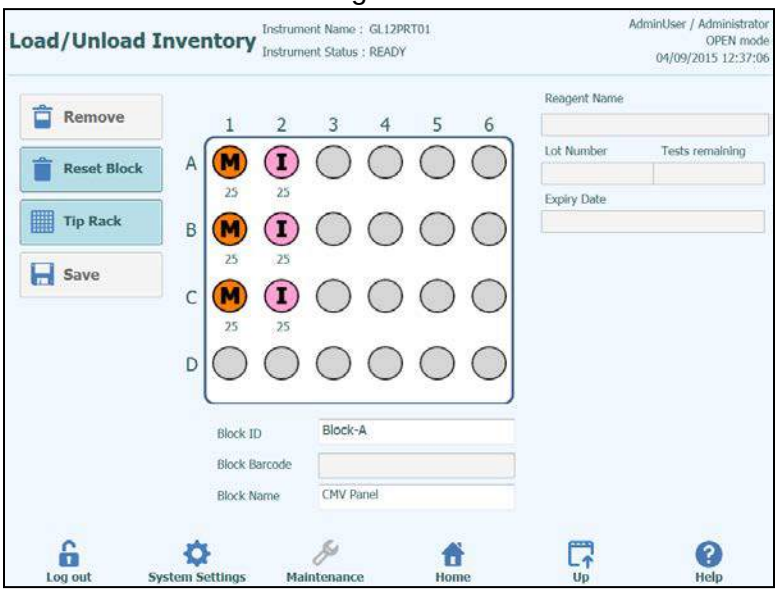
- **Logout**
  Logs the current user out
- **System Settings**
  Displays the System Settings Screen (Administrator and Service Users only)
- **Maintenance**
  Displays the Maintenance software (Service User only)
- **Home**
  Shortcut back to the Home Screen
- **Up**
  Navigate back/up the menu structure
- **Help**
  Displays this user manual

Load / Unload Inventory Screen

The Load / Unload Inventory screen manages the inventory of the cooled block used to hold PCR Mono-reagent and Internal Control fluids, as well as an area for storing the Single Tips that are used for moving the fluids to the 12 tracks. The ELITe InGenius™ Software supports up to ten different block configurations that can be recalled at will. This feature allows the definition of a number of different configurations to support the most commonly used Assay Panels. The ELITe InGenius™ Software maintains the following traceability and usage information for each reagent loaded in each block:

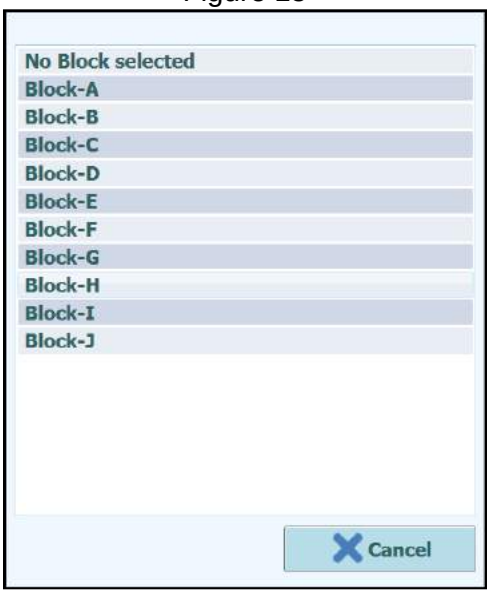
- Reagent name
- Reagent expiry date
- Reagent lot number
- Number of tests remaining in tube

Figure 14



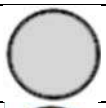
Select the Block ID for the Inventory Manager Block you wish to setup or view by clicking on the “Block ID” field on the screen and choosing a Block ID from the list that is shown.

Figure 15



Once an Inventory Manager Block has been selected, it is possible to view or change the Reagent details for that block. Any changes that are made must be saved by pressing the “SAVE” button on the left side of the screen. It is possible to give the block a User Defined Block Name by clicking on the “Block Name” field to bring up the on-screen keyboard and entering a Name for the Block. The type and expiry status of each reagent loaded to the Inventory Manager block is indicated by the color and character displayed in each grid position (Table 6).

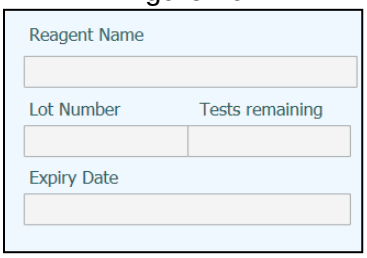
Table 6

Description	Icon	Notes
Mono-Reagent		
Internal Control (IC)		
Location selected for editing		Icon highlighted in Blue (letter can be blank, M, I or X) Multiple positions can be selected at the same time
Empty Location		
Reagent expiry date has passed		Reagent should be used for running assays

Loading / Viewing Reagent / Block Details

To change or view the reagent details (reagent name, expiry date, lot number and number of tests remaining) for a tube in the block, click on the corresponding tube location on the grid. It is possible to select multiple locations at the same time.
The reagent details for the selected positions are shown in the fields on the right hand side of the screen. You can check the number of tests remaining for each reagent before starting a run using this screen.

Figure 16

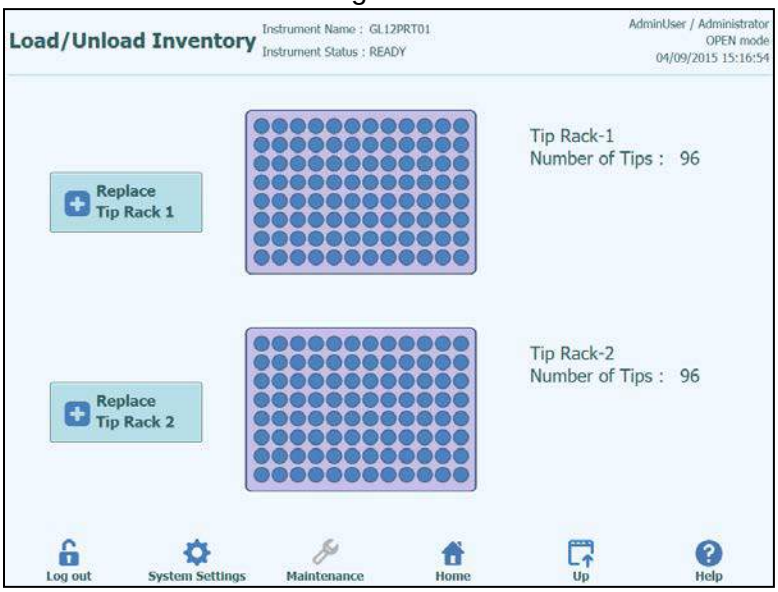


If the “Reagent Name” field is clicked, it is possible to choose a Reagent from the list of all the Reagents registered in the ELITe InGenius™ Database to be loaded to the selected locations in the Inventory Manager Block.

Configure Single Tips

Press the “Tip Rack” button in the Inventory Manager screen to access the Tip Rack screen. The ELITe InGenius™ System has space to load two Tip Racks, each of which holds 96 Single Tips.

Figure 17

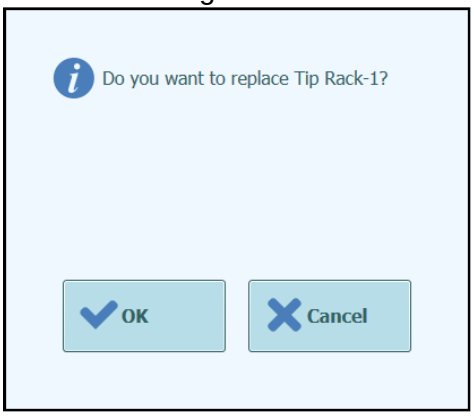


The ELITe InGenius™ Software counts the number of tips it has used for each run and updates the information on this screen to show the number of tips remaining in each rack. The presence of a single tip in each location is displayed using the following icons:

when the position is empty when the position is occupied.

If you wish to replenish either one or both of the tip racks, open the instrument front door and remove the empty tip box from left hand side of the instrument working area and replace with a new tip box. It is important to replenish the box with a new box containing all 96 tips.
Click on either “Replace Tip Rack 1” or “Replace Tip Rack 2” depending on the rack position you have replenished. Confirm the action in the popup message that follows.

Figure 18

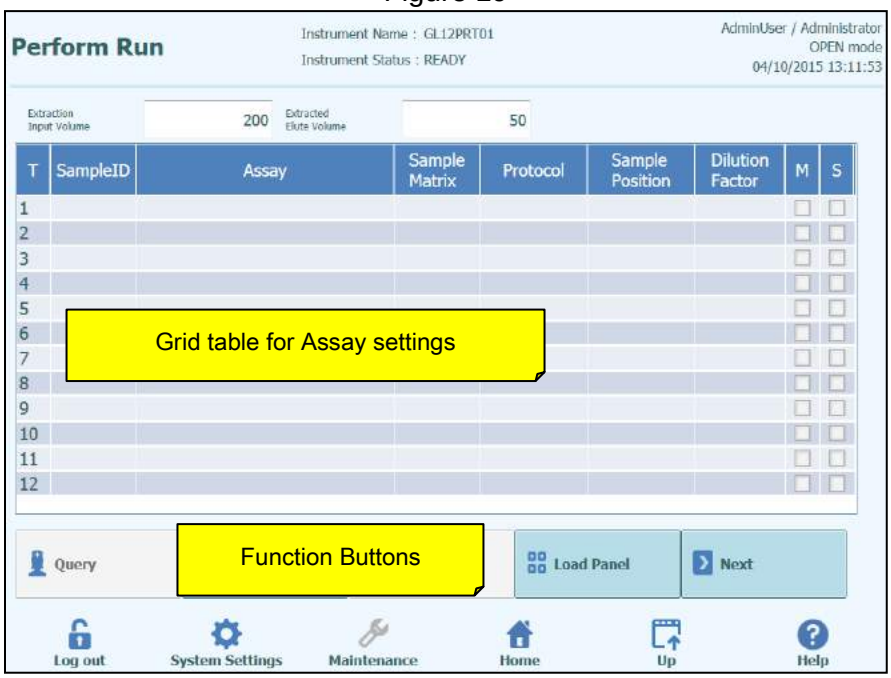


The number of Tips for the block is reset to 96 following the above confirmation.
Press the “Up” button at the bottom of the screen to return to the Inventory Manager screen.

Perform Run Screen

The “Perform Run” button on the Home Screen displays the Run Setup Screen

Figure 19



Within the Perform Run screen select the “Extraction Input Volume” and “Extracted Eluate Volume” by touching on the corresponding fields above the main grid. The ELITe InGenius™ Software uses these settings to filter the list of Assays to ensure that all tracks have the same Input and Output volume settings.

NOTE	If you cannot find an Assay in the list that you would expect to see, check the Extraction Input Volume and Extracted Eluate Volume settings in case these are causing the Assay to be filtered out from the list,

NOTE	Put the Sample Tubes on the rack in the same order indicated in grid table. The position in the Sample Carrier of the Sample Tubes is very important for the traceability of results. Place the sample tubes without caps.

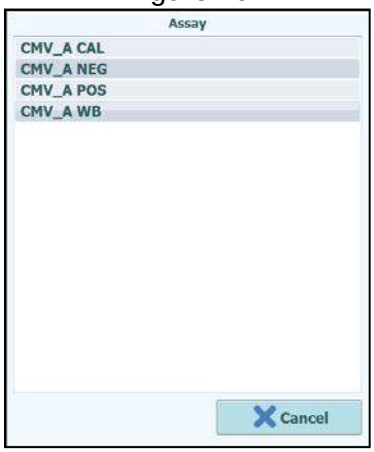
NOTE	It is possible to perform Quantitative and Qualitative Assays in the same Run as long as all the Assays you wish to run have the same Extraction Input Volume and Extracted Eluate Volume requirements.

Each row in the grid corresponds to a single track on the instrument working area.
For each track in turn:

- Enter the Sample ID (SID) for Patient Samples
  - If the sample tube does not have a barcode, it is necessary to enter the Sample ID (SID) manually. Click on the SampleID cell for the track to be setup and enter the SID manually using the on-screen keyboard.
  - If the sample tube has a bar code, click on the SampleID cell and then use the Handheld Barcode to load the SID into the system.

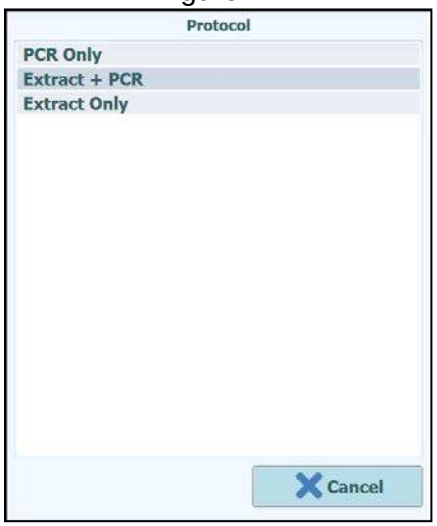
- Choose the Assay to be run in the track by clicking in the “Assay” cell for the track to be setup and selecting the required Assay from the list that is presented.

Figure 20



- Once you have selected the Assay, the columns for Sample Matrix, Protocol, Sample Position, Dilution Factor, M (Melting), S (Sonication) will be automatically completed based on the process settings for the Assay.
- Choose the Protocol you wish to run for the Assay by clicking on the “Protocol” cell for the track and choose from the pop up list.
    - **Extract Only**
      The sample will be processed to extract DNA but processing will not proceed to PCR step, so no diagnostic result will be output
    - **Extract + PCR**
      Full sample-to-answer process
    - **PCR Only**
      This process performs PCR amplification on previously extracted eluate to give a diagnostic result. Eluate may be loaded to the track from a previous run, or may be shared from a different track in the same run.

Figure 21

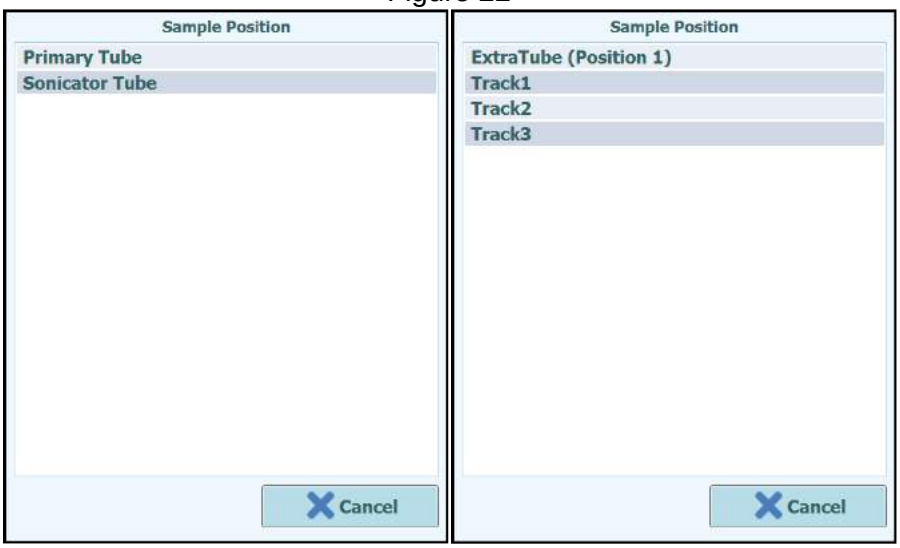


NOTE It is possible to combine different protocols in the same Run. e.g. Track 1 may perform Extract Only, Track 2 may perform Extract+PCR and Track 3 may perform PCR only

Choose the Sample Position for the Assay. This tells the system where the input sample can be found for each track.

- **Primary Tube** (Extraction only or Extraction + PCR) When Sample is to be found in the Primary Tube
- **Sonicator Tube** (Extraction only or Extraction + PCR) When Sample is to be found in the Sonicator Tube
- **Extra Tube (Position1)** (PCR Only) When Eluate is to be found in the Extra Tube rack (position 1)
- **Track 1..12**(PCR Only) When Eluate is to be shared from another track

Figure 22



NOTE

If the source track is performing an extraction step, the system will check that sufficient Eluate will be output from the extraction step to meet the needs of all the tracks sharing the Eluate.
If the source track is performing PCR only, it is not possible for the SW to check the volume of Eluate placed in the source track, so cannot check that sufficient Eluate is available for all the tracks sharing the Eluate.

- If you have logged in to “OPEN” mode, it is possible to modify the Dilution factor setting for tracks that are running Patient Samples. The Dilution Factor is used to inform the system if the Sample has already been diluted before loading to the instrument and is used to adjust the reported Quantities. Dilutions of up to x10 may be configured.
- Once all the Assay settings have been entered, press the “Next>” button to move to Step 4 (Load Consumables and Samples)

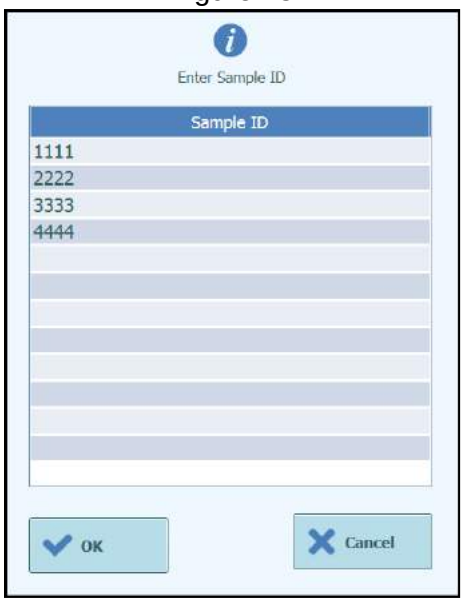
NOTE

When the “NEXT>” button is pressed, the ELITe InGenius™ Software will check the Run setup information for problems and give error and warning messages if any settings need to be corrected.

LIS Query

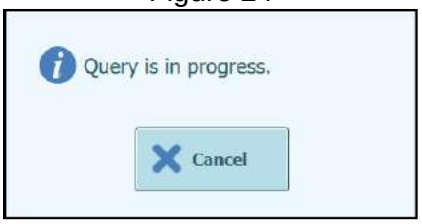
The “Query” button at the bottom of the Run Setup screen is used to obtain Test Orders from an external Lab Information System (LIS). This button will only be active if the ELITe InGenius™ System has been configured for LIS access. To check for Test Orders, click on the “Query” button and enter the Sample ID’s that are to be queried into the dialogue box.

Figure 23



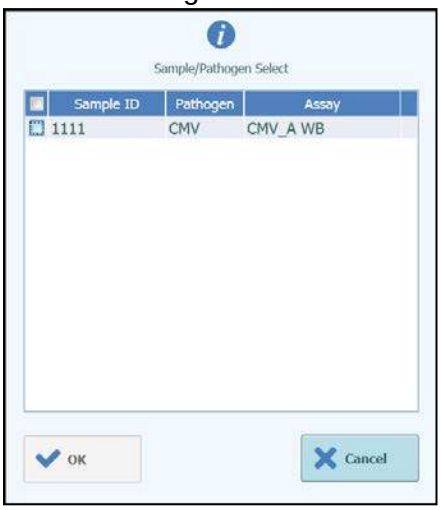
Click “OK” and the ELITe InGenius™ System will then query the external LIS system to obtain a list of Test Orders for each of the Sample ID’s

Figure 24



On completing the LIS Query, the ELITe InGenius™ System will show a list of all Test Orders found on the LIS for the Patient Samples for which there are matching Assays available on the ELITe InGenius™ System. Since the LIS Test Order does not specify the Sample Type to be used for the test, it is possible that several different Assays will be listed for the same pathogen, each for a different Sample Type. Choose the Assay program from the list for the Patient Sample Type actually available at the instrument.

Figure 25



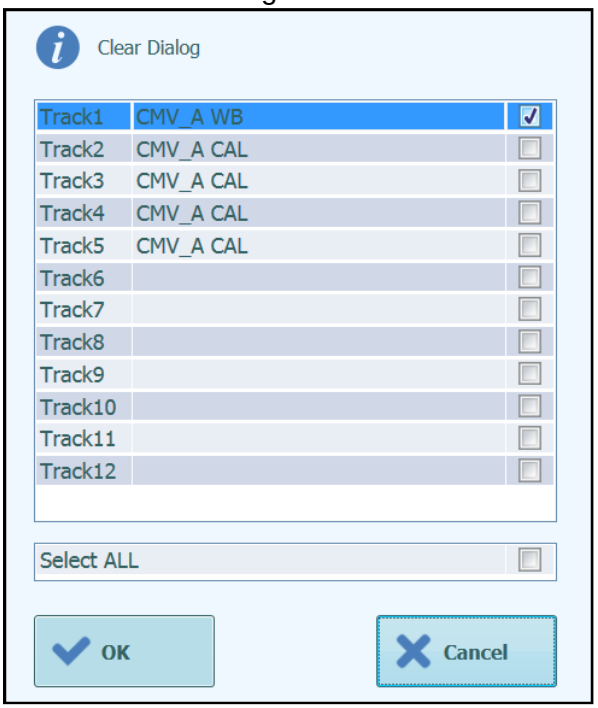
The details for the selected Assays are then automatically completed in the Run Setup Screen.

Figure 26

Clear Button

The “Clear” button is used to clear the Run settings from one or more of the Tracks in the Run Setup grid. Press the “Clear” button to show the Clear Tracks dialogue. Click on each of the tracks in the dialogue box that are to be cleared. Tracks selected for clearing will be highlighted in blue and have a tick mark. The “Select All” tick box can be used to toggle the selection of all tracks. Press the “OK” button and information will be cleared from the Run Setup Grid.

Figure 27

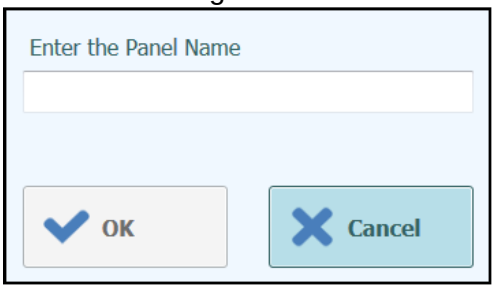


NOTE Multiple level Calibrators and Controls (that use more than one track) are cleared as an entire group.

Save Panel Button

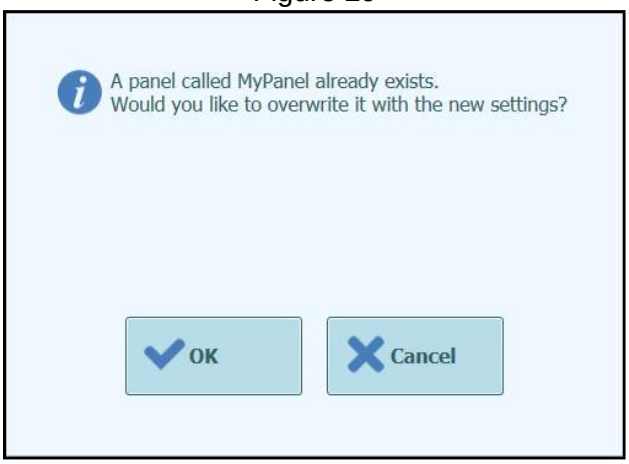
An run may be saved to the ELITe InGenius™ System Panel Database from the Run Setup Screen and recalled later to speed up the setting up of runs. To create a Panel, complete the Assay, Sample Matrix, Protocol, Sample Position, Dilution factor, M(elt) and S(onication) settings in the Run Setup Screen, then press the “Save Panel” button at the bottom of the Run Setup screen to display the following popup.

Figure 28



Enter the name for the Panel and press “OK” button to confirm. All settings from the Run Setup screen are saved to the ELITe InGenius™ System Panel Database with the exception of any Patient Sample ID’s. If a Panel already exists with the same name as the one specified, a warning will be issued and it is possible to then choose whether to overwrite the existing panel, or to cancel the creation of the new Panel.

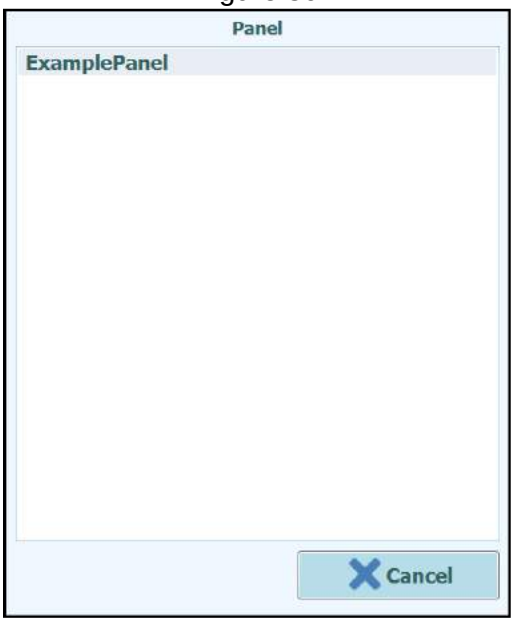
Figure 29



Load Panel Button

To load a previously created Panel from the ELITe InGenius™ System Panel Database, click the “Load Panel” button at the bottom of the Run Setup screen to display the Load Panel Selection Dialogue:

Figure 30



When you click on a “Panel” name in the list then the dialogue box will be closed and the Run Setup for the selected panel will be automatically loaded to the Run Setup Screen. When loading a Panel, all settings in the Run Setup screen are loaded from the ELITe InGenius™ System Panel Database with the exception of any Patient Sample ID’s. These must be entered after loading the Panel.

Monitoring Run Progress

Once the Run has been started selecting the Setup Run screen will display the following which shows the progress of the Run through the various process steps.

Figure 31

Table 7

Execution Process	Description
Scan Barcodes	Process of reading QR bar codes from the consumables loaded to the instrument to check correct placement and prevent accidental.
Dispense Samples	Process to dispense patient samples
Sonicate Samples	Process to destruct cell-wall of patient samples using ultrasonic agitation
Extract DNA/RNA	Process to extract nucleic acids
Setup PCR Reactions	Process to dispense reagents
Perform Real-time PCR	Process to amplify nucleic acid
Generate Melt-Curves	Process to generate Melt curves

Table 8

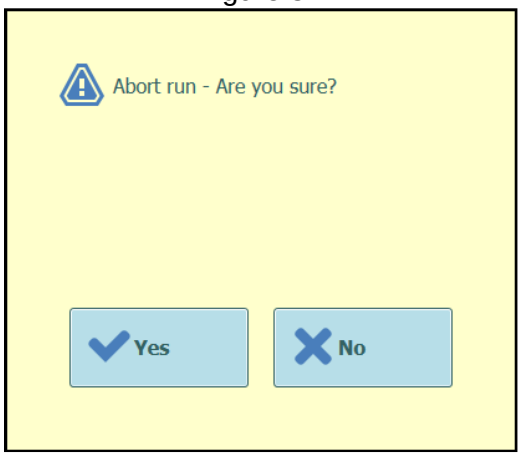
	Process that is not needed or has been completed
	Process that is scheduled to be run
	The currently executing process

While a run is in progress, it is possible to press the “Up” button to return to the Home Screen and carry out other operations. To return to the During Run screen, press the “Perform Run” button on the Home Screen.

Aborting the Run

If you wish to stop the run before it has completed, press the “Abort Run” button in the “During Run” display. A pop-up confirmation box is show to avoid stopping the run accidentally. Press “Yes” to stop the run or “No” allow the run to continue.

Figure 32



After a run is aborted, the Results display will be shown.

NOTE	If the run is aborted, results for some Assays may not be reported if not all the needed processes have been completed. The Run Results screen will show that the Run was aborted.

NOTE	After Aborting a run, the front door will remain locked until the temperature of the PCR and Extraction units has cooled down to a safe temperature.

Displaying Fluorescence Plots during Run

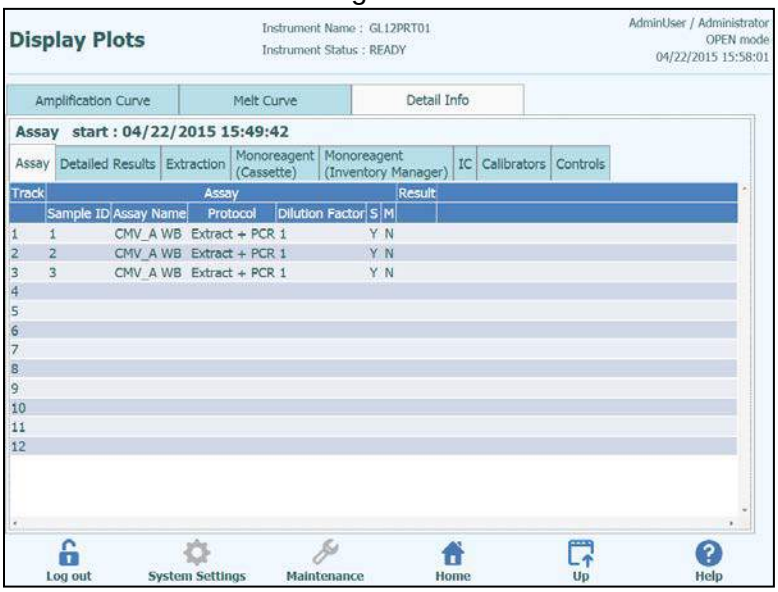
If you wish to view the fluorescence curves during PCR Amplification or Melting, press the “Display Plot” button in the During Run Screen. The Display Plots Screen has three tabs that can be used to view

- Amplification Curves
- Melt Curves
- Detailed Information about run (includes details of calibrators, controls, samples etc.)

The curves in the Display Plots screen are updated in real time as the run progresses. A maximum of three tracks can be displayed simultaneously by selecting the check boxes on the right hand side of the screen. For each track, it is then also possible to add and remove specific targets (including Internal Control) from the plot area using the check boxes. To return to the During Run Screen, press the “Up” button at the bottom of the screen.

Figure 33

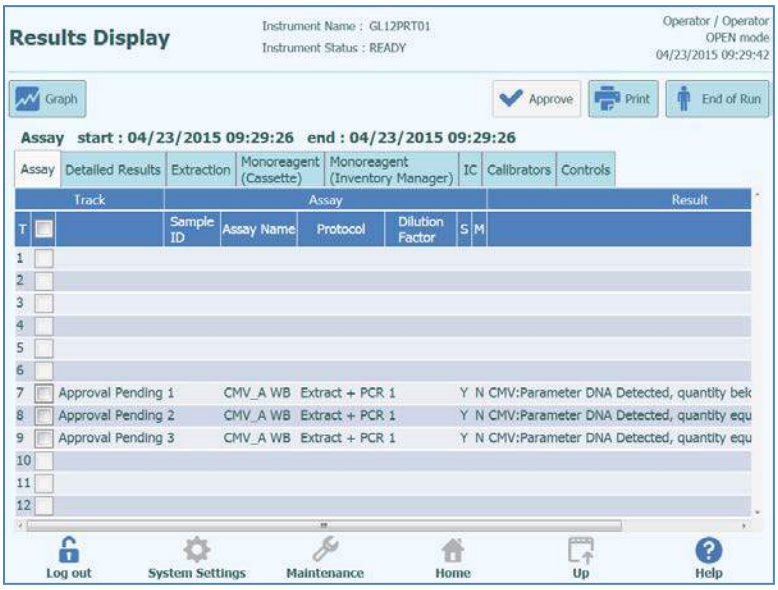
Figure 34



Result Output

Once all the processes have been completed for a Run, the “Result Display” screen is displayed automatically.

Figure 35



The Results Screen provides a number of different data views that may be accessed by clicking on the tabs above the table of results.

- Assay Tab
  Shows a summary of the assay settings for each track together with the interpreted results for the track and approval status for each track.
- Detailed Results Tab
  Shows further details of the result interpretation for patient samples, calibrators and controls
- Extraction Tab
  Shows traceability information for each extraction cassette used in the run (Name, Lot Number, Expiry Date)
- Monoreagent (Cassette) Tab
  Shows traceability information for each Reagent Cassette based Monoreagent that was used in the run (Name, Lot Number, and Expiry Date)
- Monoreagent (Inventory Manager) Tab
  Shows traceability information for each Inventory Manager based Monoreagent that was used in the run (Name, Lot Number, and Expiry Date)
- IC Tab
  Shows traceability information for each Inventory Manager based Internal Control that was used in the run (Name, Lot Number, and Expiry Date)
- Calibrators Tab
  Shows details of the calibration curve that was used to calculate the viral load in each track (Calibrator fluid Lot Number and Expiry Date, Calibration Curve Approval Status and Expiry Date)
- Controls Tab
  Shows details of the Control plots that were used to validate the result in each track (Control fluid Lot Number and Expiry Date, Control Approval Status and Expiry Date)

NOTE	It is possible to resize the columns in the results table by dragging the separators in the column headings. It is also possible to scroll left/right and up/down if the results do not fit on the screen

In addition to the results table, the Run Results screen also provides buttons to access graphical views:

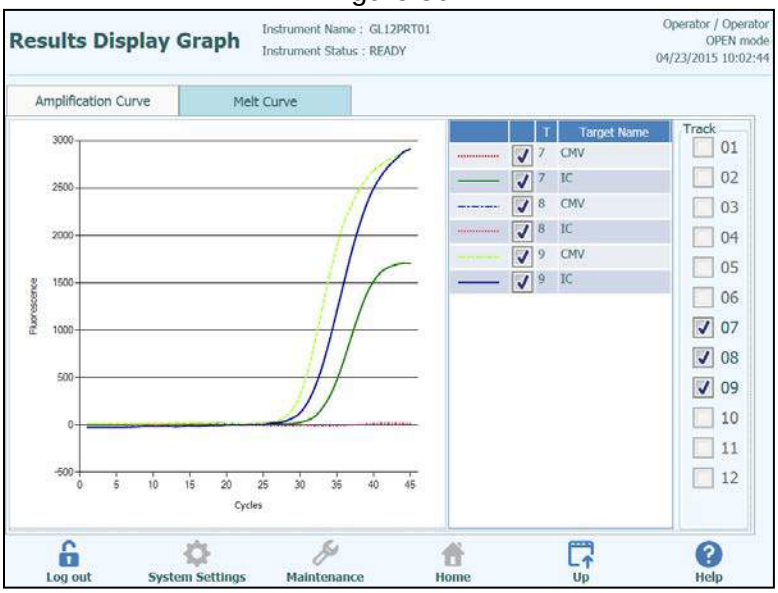
- **Graph** Button: View PCR amplification and Melting Curves
- **Calibration** Button: View and Approve Calibration Curves
- **Controls** Button: View and Approve Control Plots

NOTE	The "Calibrator" and "Control" buttons are only displayed if the Run includes Calibrator or Control Assays.

Viewing PCR Amplification and Melt Curve Results

This screen is accessed by pressing the "Graph" button in the Result Display screen.

Figure 36



The Results Display Graphs Screen has two tabs that can be used to view

- Amplification Curves
- Melt Curves

The curves in the Results Display Graphs screen show the processed data used to calculate C_t and T_m values. A maximum of three tracks can be displayed simultaneously by selecting the check boxes on the right hand side of the screen. For each track, it is then also possible to add and remove specific targets (including Internal Control) from the plot area using the check boxes. To return to the Run Results Screen, press the "Up" button at the bottom of the screen.

Printing Track and Patient Sample Reports

The ELITe InGenius™ System supports two styles of output reports for the track results. These reports can be exported to a .PDF file or sent to a printer.

- **Sample Report**

This report is intended to allow paper copies of the report to be separated by Sample ID for inclusion to different patient files.

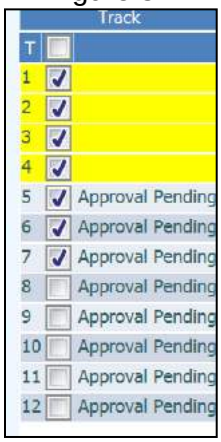
- **Track Report**

This report has a summary page showing the Assay results and approvals for each of the selected tracks in the run, and detailed pages for track 1 Assay, Assay Parameters, and PCR and Melt plots and Ct/Tm results

To generate either of these reports,

1. Select the tracks / samples you wish to include in the report by clicking on the check boxes on the left hand side of the Run Results Screen

Figure 37



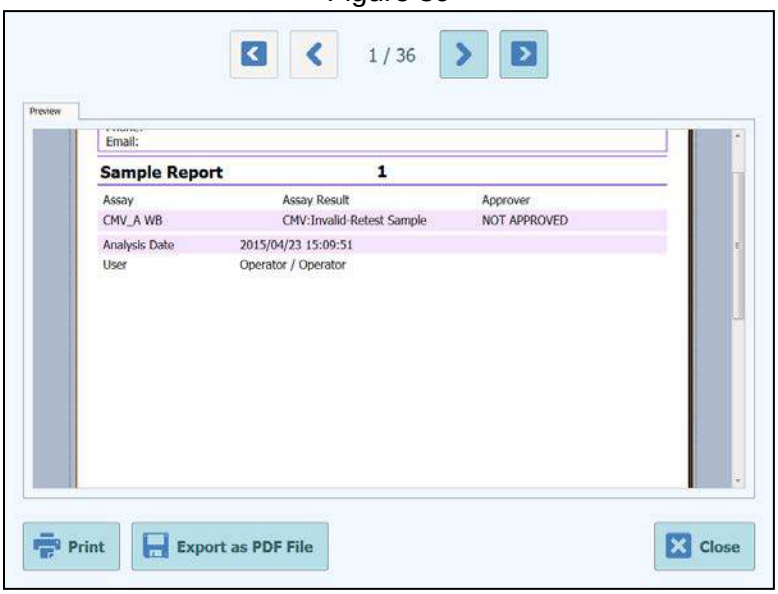
2. Press the “Print” button at the top of the Run Results Screen
3. Select the report style from the pop-up list

Figure 38

The report viewer tool can be used to preview the report on the screen and step between pages in the report.

- Press the “Print” button to send the report to the printer.
- Press the “Export as PDF file” button to specify a PDF output.
- Press the “Close” button once you have finished with the report.

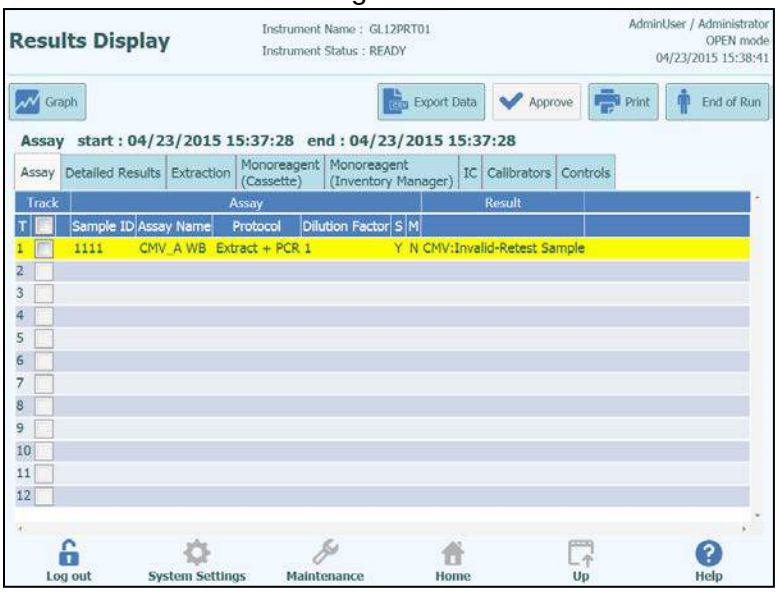
Figure 39



Exporting Run Data

When the logged in user is an Administrator or Service User, it is possible to export run data from the ELITe InGenius™ System for offline analysis.

Figure 40

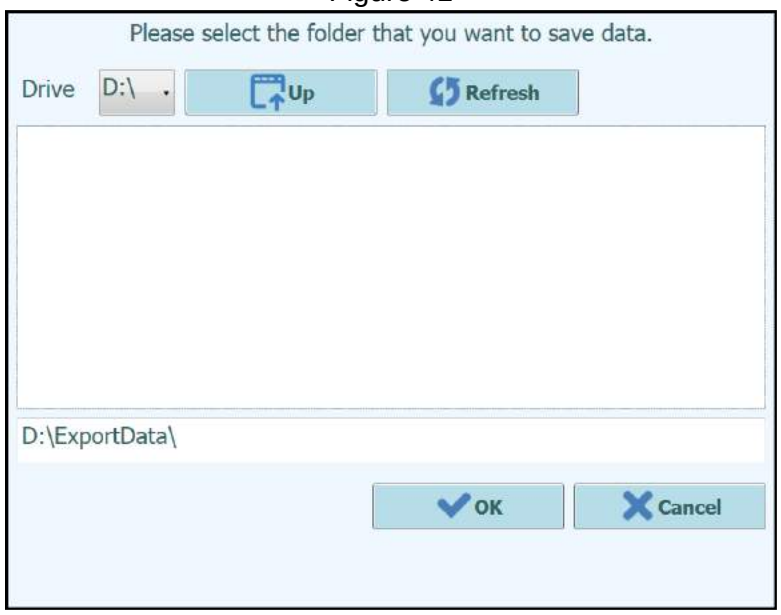


To save the run data to an external USB memory stick or folder on the ELITe InGenius™ System, click on the “Export Data” button at the top of the Results Display Screen.

NOTE	The “Export Data” button is not displayed for an Operator or Analyst user.

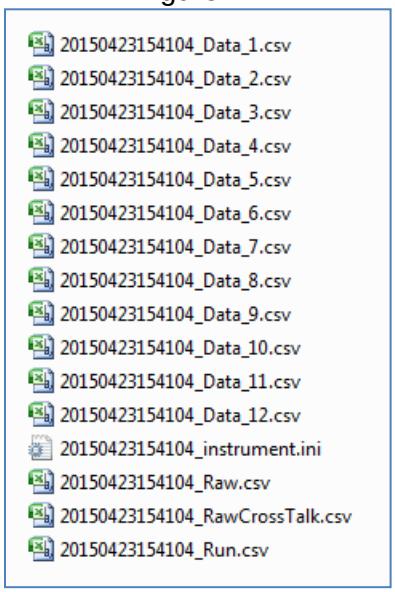
Choose a destination folder for the data to be exported to using the folder dialog and click on “OK” to output the data.

Figure 41



The data is created in a number of .csv and .ini files, with filenames that are defined by the ELITe InGenius™ System.

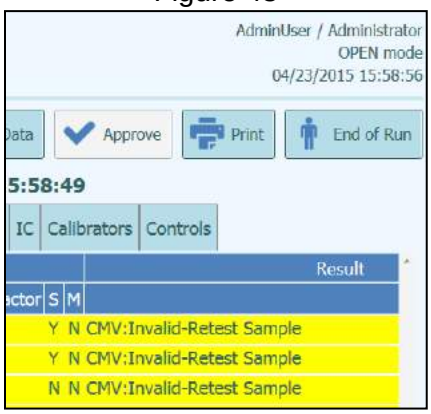
Figure 42



Completing the Run and Shutdown

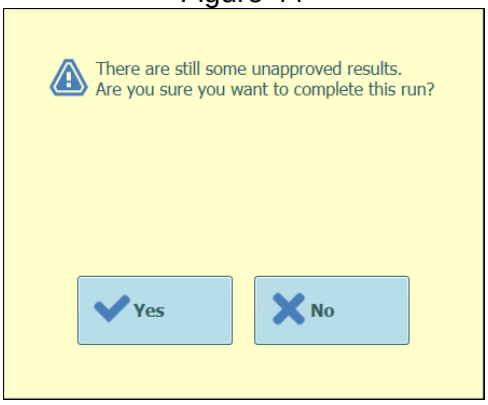
Once you have completed the review and approval of the Run Results, press the “End Of Run” button in the top right corner of the Results Display Screen.

Figure 43



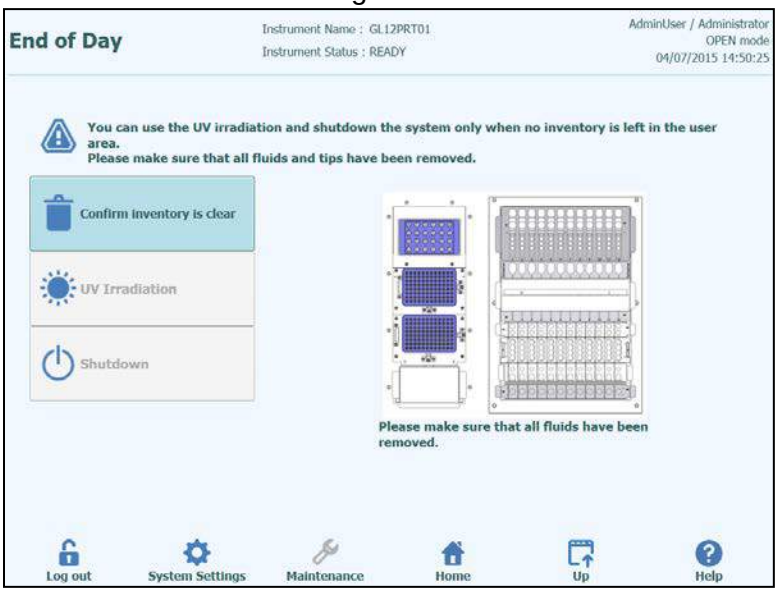
If there are still results with Approvals pending, a warning message will be shown. Select "Yes" to proceed with the run completion, or "No" to return to the Run Results Screen to approve the remaining test results.

Figure 44



At the end of each day you should perform the following steps to shut down the system. The ELITe InGenius software will guide you through this procedure when you select the "End of Day" option from the Home Screen. If a Run is currently in progress, you will need to wait until the Run completes before you will be able to select the "End of Day" option.

Figure 45



Open the front door. Remove the block from the Inventory Area and store it in the refrigerator.

NOTE	The instrument should not left with reagents in the Inventory Area since the cooling block will be switched off once the instrument is shut down

Press the “Confirm Inventory is Clear” button. Press the “Shutdown” button

NOTE	It is also possible to perform a UV sterilization cycle before you shut down the instrument. See section 0 for details.

Once the system has completed its shut down, you should turn off the power switch at the side of the instrument. You may then perform any additional cleaning processes once the instrument is switched off.

WARNING 	Carry out cleaning of the instrument only after switching off the instrument power.

NOTE	Do not use disinfecting materials which contain hypochlorite or bleaching fluids. Only use cleaning, disinfecting and decontaminating fluid in accordance with manufacturer’s instructions (see Maintenance section of User’s Manual)

Additional Features

UV Sterilization

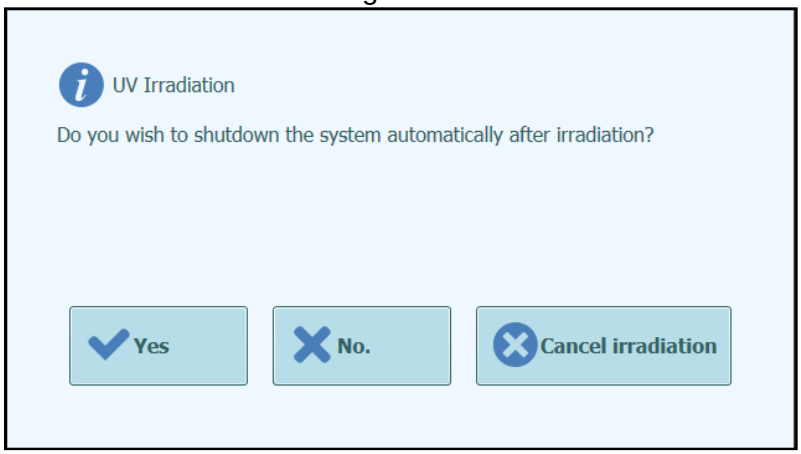
The instrument working area may be sterilized using the built-in UV lamp. You must select the sterilization function manually by clicking on the “UV Irradiation” button prior to shutting down the instrument. The UV sterilization process is an optional step of the shutdown process.

WARNING 	Conjunctivitis and Skin Burns due to UV-Light The radiation of the UV-Lamp may cause conjunctivitis and skin burns within minutes. Never look directly into the UV-Lamp! Protect your eyes and skin from direct radiation! Keep the instrument door closed during UV sterilization!

NOTE	The UV sterilization function not enabled until you have confirmed that the Inventory Area has been cleared using the "Confirm Inventory is Clear" button.

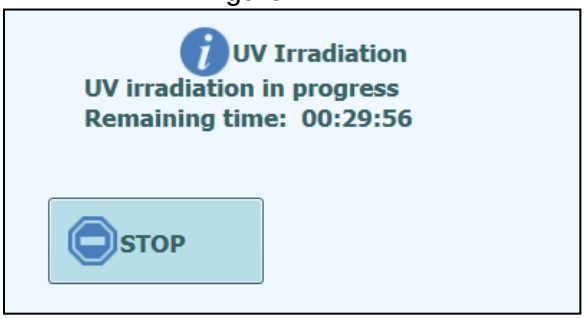
- Close the front door.
- Click on the "UV Irradiation" button to start the UV sterilization procedure and click OK on the following pop-up box to confirm that the Instrument Door is closed.
- The following popup will be displayed to confirm whether you want to run automatic shutdown after the UV radiation or not.

Figure 46



You should normally choose to shutdown the system on completion of the UV sterilization procedure.

Figure 47

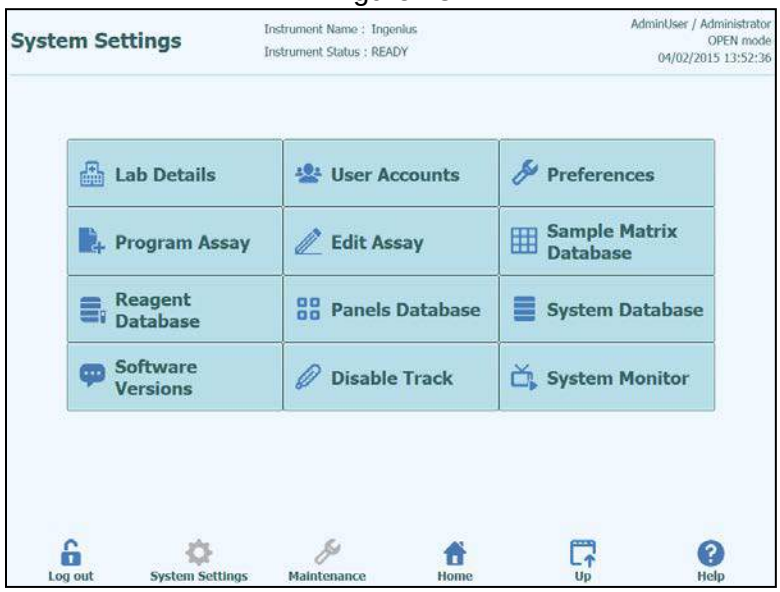


After the UV sterilization has completed, the door lock is unlocked and the system software is shutdown automatically. Once the system has completed its shutdown, you should turn off the power switch at the side of the instrument.

System Settings

- Before using the system, it is advisable to configure some initial settings and user accounts. A default Administrator account is provided to provide access to the System Settings on first use of the system.
- The “System Settings” menu is accessed by selecting the “System Settings” icon at the bottom of the Home screen. This icon will be greyed out and disabled if you are logged in as an Operator or Analyst.

Figure 48



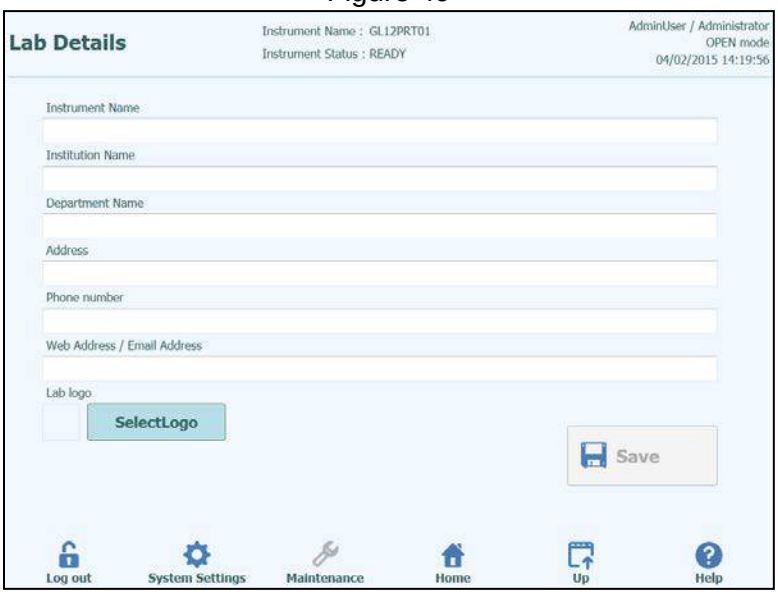
Lab Details

This screen allows you to configure the contact details and logo for your institution or laboratory. These details are included on all printed reports that are generated by the system.

This screen also allows you to define the “Instrument Name” that is shown on the user interface and printed reports.

It is not mandatory to provide the information in this screen. Running of assays and generation of reports will still be possible even if some or all of the fields in this screen are not completed.

Figure 49

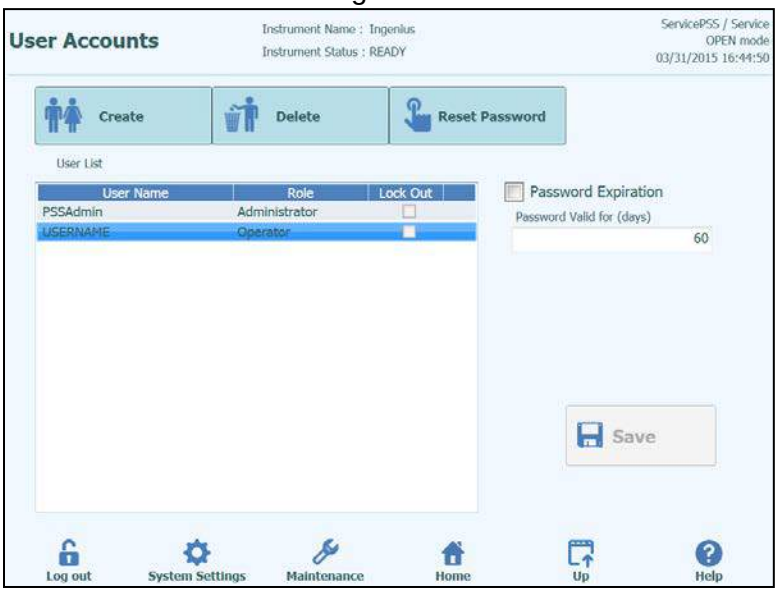


1. Access the “Lab Details” screen by selecting the “Lab Details” button on the “System Settings” menu
2. Input your institution information
3. Press “Save” button.
4. Information is saved in the system.

User Accounts

This screen is used to manage the login details for users of the system. Accounts can be created, deleted or the passwords reset in this screen. It is also possible to unlock a locked account (after an incorrect password has been entered repeatedly) and to control the password expiry feature (requires users to change password on a regular basis). This screen can be accessed by pressing the “User Accounts” button in the System Settings screen.

Figure 50



Creating a new User Account

1. Press the “Create” button and the following dialog box is displayed:

Table 9

2. Enter a User Name for the account (must contain at least 8 characters).
3. Select the Role for the account (Table 10).
4. Enter a temporary Password for the account.
5. Re-enter the temporary Password in the Confirmation box.
6. Press “OK” button to create the new user account.
7. Check that the added user account is listed in User List and press “Save” button.

Table 10

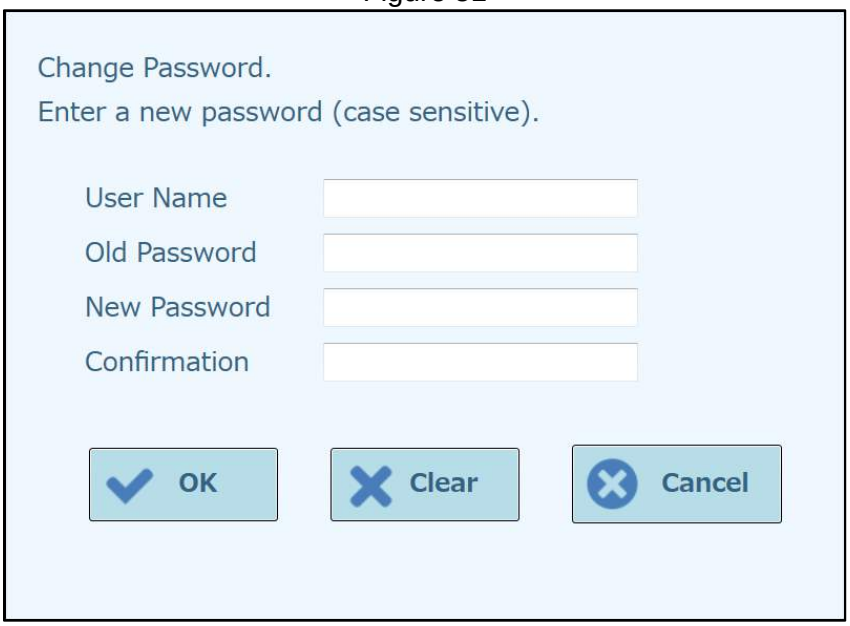
	Operator	Analyst	Administrator	Service
Run assays	●	●	●	●
Approve assay results		●	●	●
Approve expired or missing calibrators or controls during run			●	●
Export Data from Runs			●	●
Change system settings			●	●
Access Maintenance				●

NOTE When the user logs in to the new account for the first time, they will be asked to change the temporary password that was set when creating the account.

Changing Password

On first login to a newly created user account, or if your password has been reset by an Administrator or Service user, the system will prompt for the temporary password to be changed to a password that only the user of the account will know. After the first login has been completed, Users may also change their passwords on-demand by clicking on the "Change Password" button on the login screen. Administrator or Service users may reset the password for any user from the User Account Screen.

Figure 51



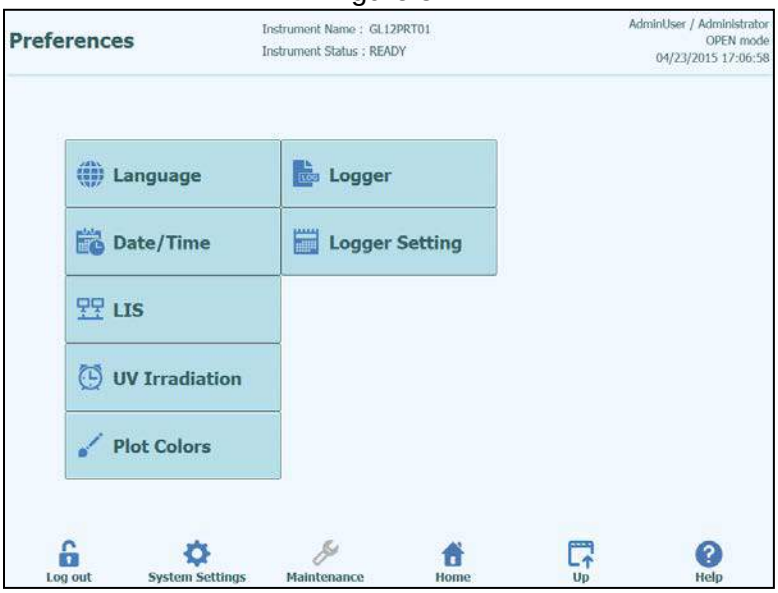
Changing the password for a user account is achieved by providing the following information:

1. Input User Name.
2. Input Old Password.
3. Input New Password.
4. Input New Password again in the Confirmation box.
5. Press "OK" button.

Preferences

The Preferences Screen is used to configure a number of different configuration settings for the software. This screen can be accessed by pressing the “Preferences” button in the System Settings screen.

Figure 52



Language

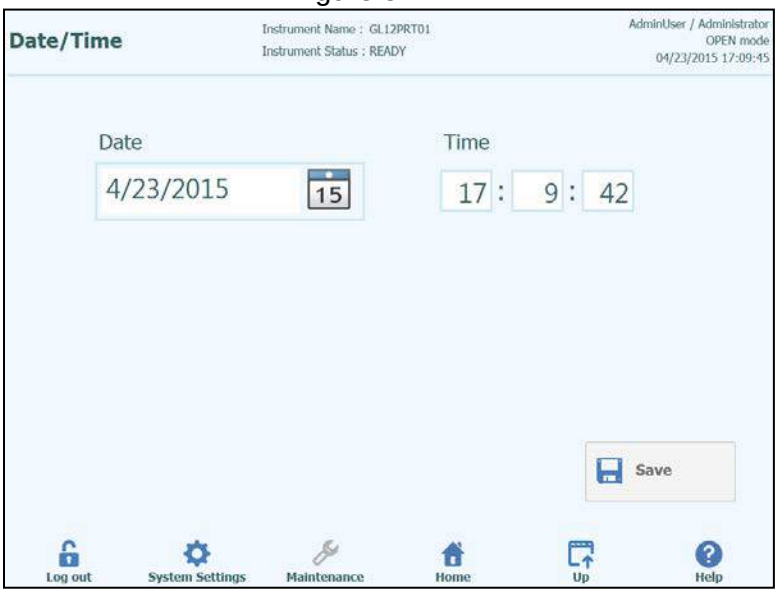
This screen is used to select the language for the user interface and report generator. This version of the software only supports US English.

Figure 53

Date/Time

This screen is used to set the system date and time.

Figure 54



LIS

This screen is used to configure the preferences for the LIS interface.
Use the tick boxes to enable the

- LIS Query during assay setup
- Upload of Approved test results to LIS

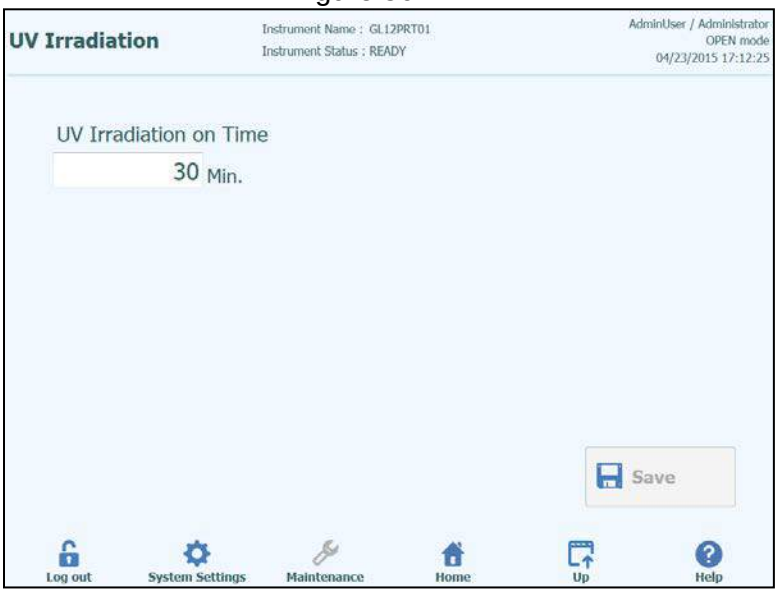
This screen can also be used to configure the serial port settings to match the requirements of the LIS as well as the field delimiters and ID's used in the LIS communication protocol. Please consult your LIS Administrator for details on what settings are necessary for your LIS installation.

Figure 55

UV Irradiation

This screen is used to configure the duration of the UV sterilization that is run as part of the End-Of-Day shutdown process.

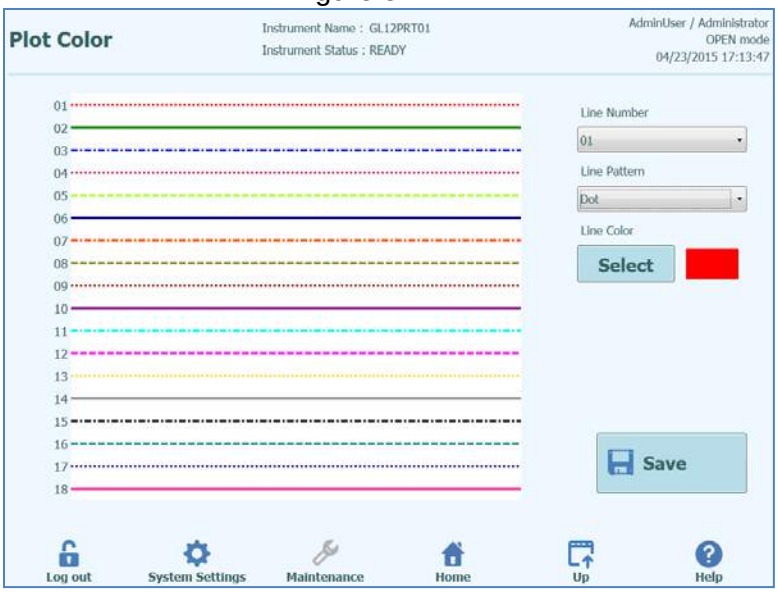
Figure 56



Plot Colors

This screen is used to configure the line styles for the PCR Amplification and Melt Analysis plots. The software supports up to 18 different line styles (3 tracks with 6 optical channels each)

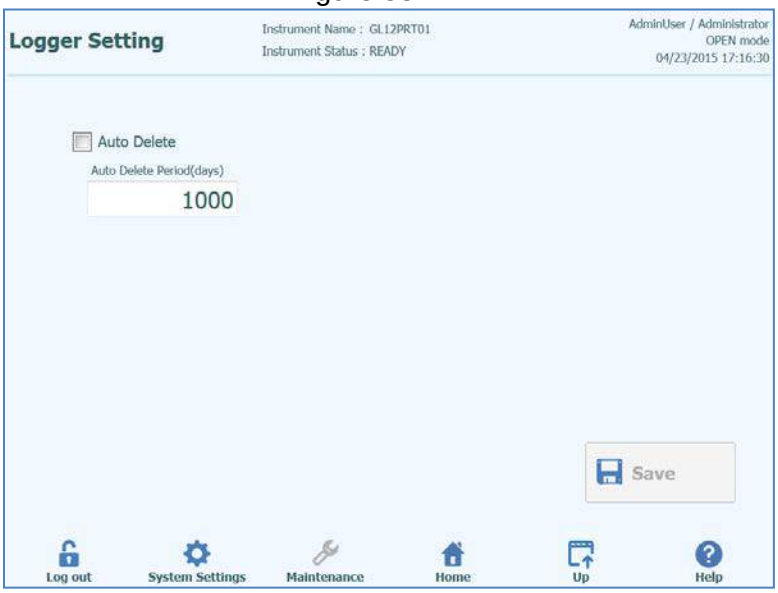
Figure 57



Logger Setting

This screen is used to configure the logging function of the ELITe InGenius™ System. The settings in this screen allow you to configure the policy used for managing the various log files that are generated as the system is used. If Auto-delete is enabled, log files are deleted from the system after the number of days specified by the Auto Delete Period. If Auto-delete is disabled, log files remain on the system indefinitely.

Figure 58



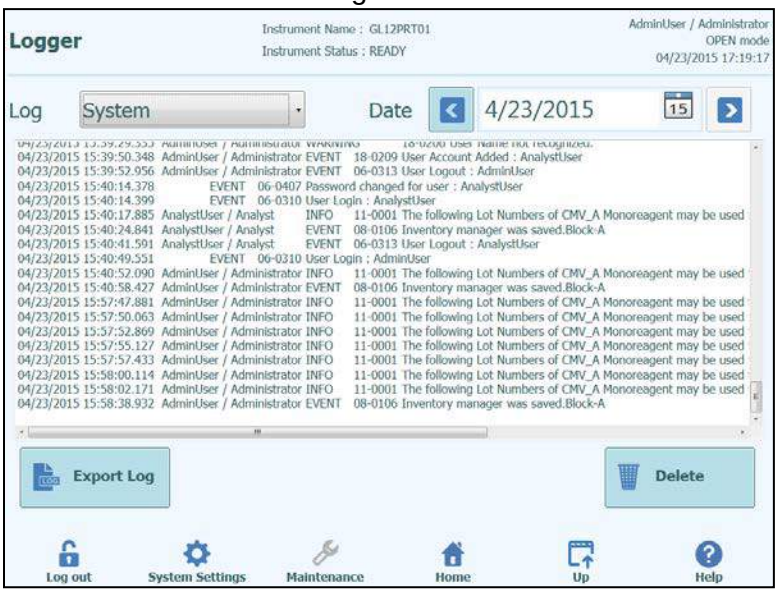
Logger

This screen is used to view the various log files that are generated by the ELITe InGenius™ System.
Log files are segregated according to the following functional areas:

- System
- Debug
- FiSICS
- Operation

The “Log” pulldown list allows switching of the display between the different types of log. Separate log files are created for each day. The “Date” picker allows the switching between historical logs. Press the “Delete” button to clear the log that is currently displayed. Copies of the logs may be requested to aid fault finding by your service partner. Press the “Export Log” button to Export the Log data to an external file suitable for sharing with your service partner.

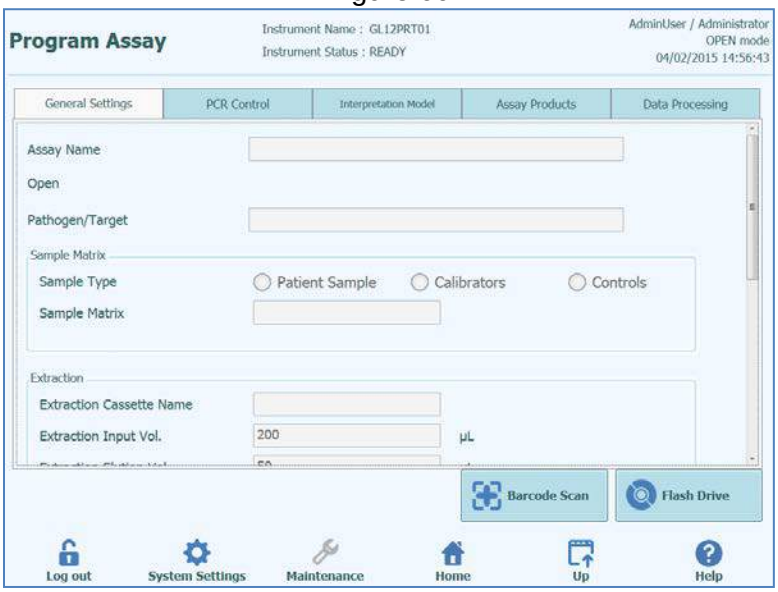
Figure 59



Loading Assay Programs

Assay Programs are loaded onto the system through the “Program Assay” screen. This screen can be accessed by pressing the “Program Assay” button in the System Settings screen. Assay Information can then be loaded onto the system either from barcode information provided by ELITech in the Assay kit (“Barcode Scan”), or from a USB memory stick (“Flash Device”).

Figure 60



Loading from Barcodes

1. Press "Barcode Scan" button.
2. Read the Assay Program barcodes from the Assay Kit Insert one at a time with Handheld Barcode Reader connected via USB connector. (Due to the amount of data to be loaded, this step is likely to require several barcodes to be read)

3. Once the required barcode have been scanned, the Assay Information is displayed on the screen.

NOTE	**As well as loading the Assay program itself, the system will also attempt to load any additional configuration data it needs to run the assay such as settings for Calibrators, Controls, Reagents, and Sample Matrix etc. These additional settings will only be loaded if they are not already registered in the ELITe InGenius™ system.**

Loading from Flash Device

Warning 	It is recommended to scan USB memory sticks for viruses using third-party anti-virus software prior to attaching them to the InGenius System.

1. Insert a USB memory stick containing the Assay Program files into the USB port of the InGenius System.
2. Press "Flash Device" button.
3. Navigate to the Assay Program file on the USB key using the on-screen dialogue.
4. Press “OK” button to load the selected Assay Program file.
5. Once the information has been read from the USB memory stick, the Assay Information is displayed on the screen.

NOTE	As well as loading the Assay program itself, the system will also attempt to load any additional configuration data it needs to run the assay such as settings for Calibrators, Controls, reagents, Sample Matrix etc. These additional settings will only be loaded if they are not already registered in the ELITe InGenius™ system.

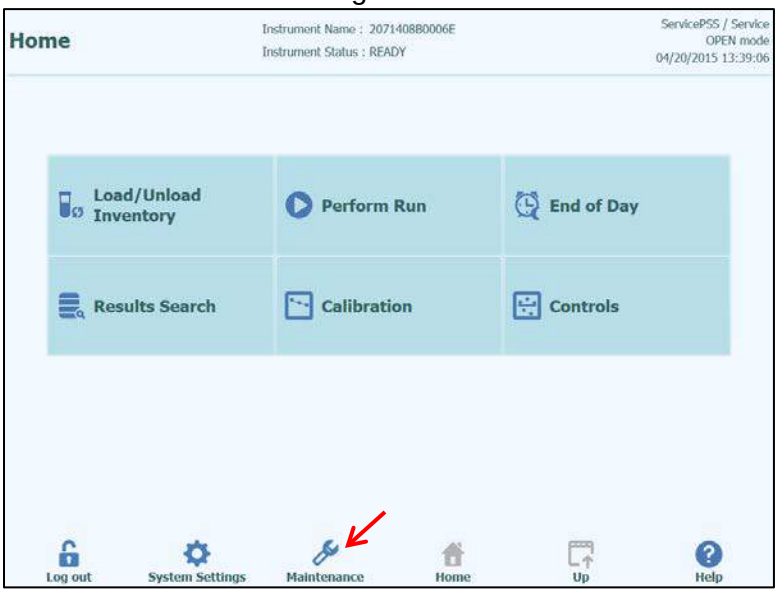
2.9. Maintenance Software

1. To access the maintenance software you must be logged in as the service administrator

   User Name *ServicePSS*
   Password *softdevpss*

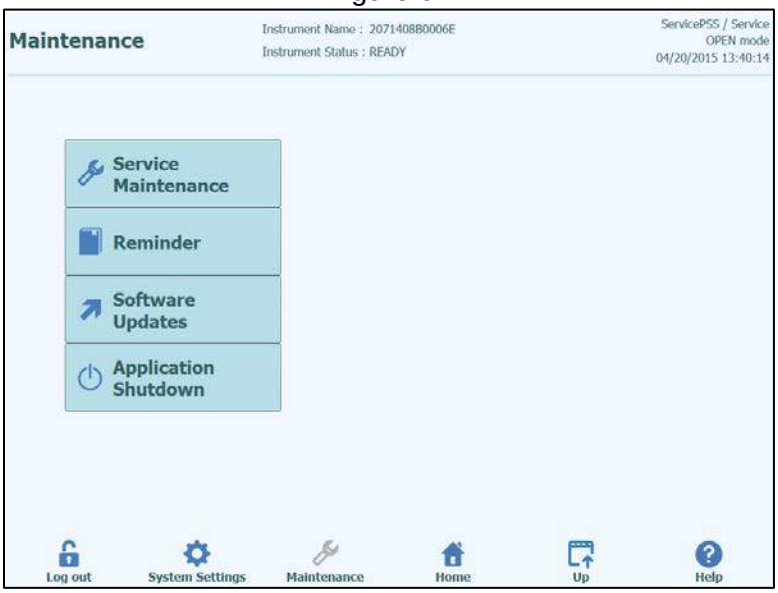
2. To enter the *Maintenance* screen press the *Maintenance* button (Figure 61)

Figure 61



3. Within the *Maintenance* screen there are four options (Figure 62)

Figure 62

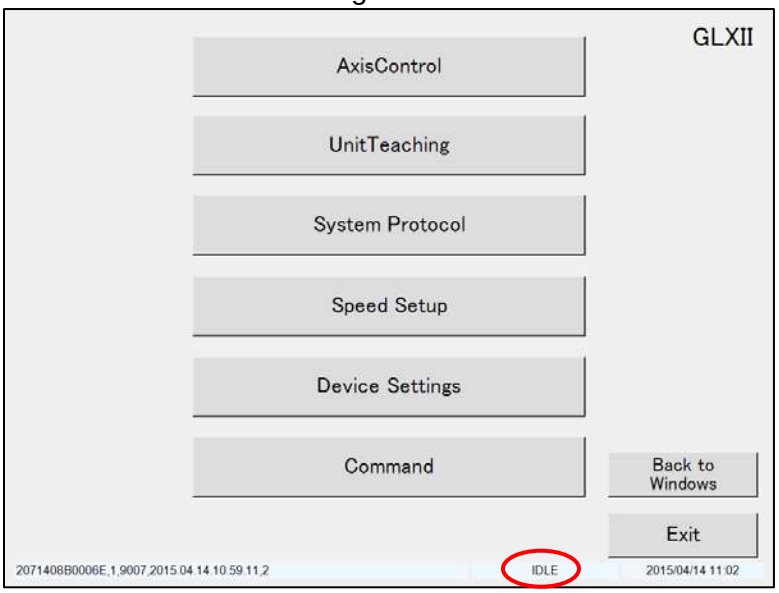


- **Service Maintenance –** Contains many sub-menus to control the components of the instrument and be given real time feedback from the instrument's sensors
- **Reminder –** Contains the counters and functionality to reset the counters for the instruments consumable components
- **Software Updates –** Used to update the firmware of the instrument
- **Application Shutdown –** Used to shut down the InGenius software and return to the Windows desktop

Service Maintenance

1. Within the *Service Maintenance* screen there are six sub-menus with various functions
2. When entering the *Service Maintenance* screen ensure that the status message at the bottom has reached *IDLE* before selecting any of the sub-menu options (Figure 63)

Figure 63



Axis Control - (Figure 64) Used to operate the axes and check feedback from axes sensors Table 11 details the functionality

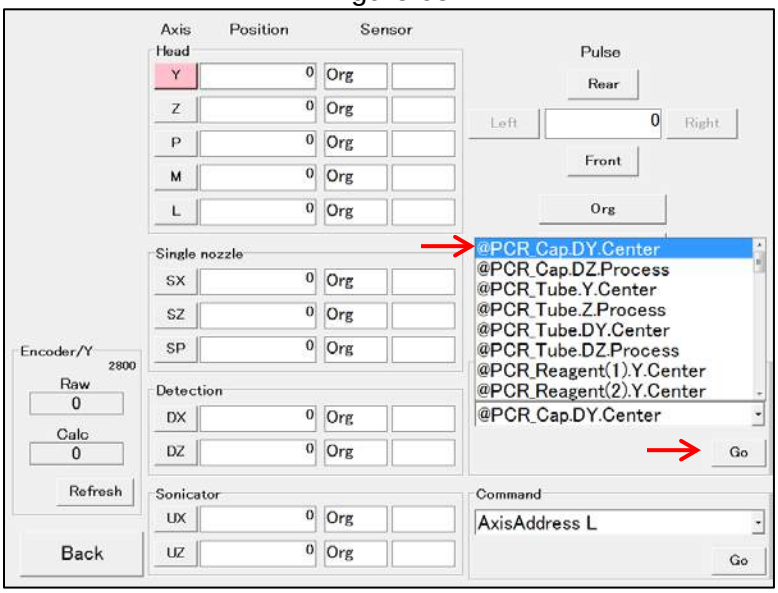
Figure 64

Table 11

Item	Description
Axis Buttons	Select individual axis to move, currently selected axis will be highlighted
Position Field	The current position of the instrument axes
Sensor Field	The state of the each axis sensor is displayed
Pulse Field	Enter the travel distance of the selected axis in # of pulses
Front, Rear, Left, Right Buttons	Moves the selected axis in that direction, these will change based on axis selected
Org Button	Returns the selected axis to its origin
Org All Button	Return all axes to their origin
Repeat Button	Moves axis back and forth between the specified pulse position and its origin
Repeat Field	Displays the number of times repeat function has completed
Enable Z Bottom Check Box	When the box is unchecked the axis operation disregards the sensor, when the box is checked the axis operation will stop when the sensor is blocked
12 Nozzle Radio Button	Specifies 12 nozzle module movement
Single Nozzle Radio Button	Specifies single nozzle module movement
Module Pull Down List	Specifies location to send selected module to
Go Button	Sends specified axis to selected location
Command Pull Down List	The previously registered commands are displayed
Go Button	Executes the selected command
Raw Field	The encoder value of the selected axis is displayed
Calc Field	The pulse number calculated from the encoder value is displayed
Refresh Button	Updates the display

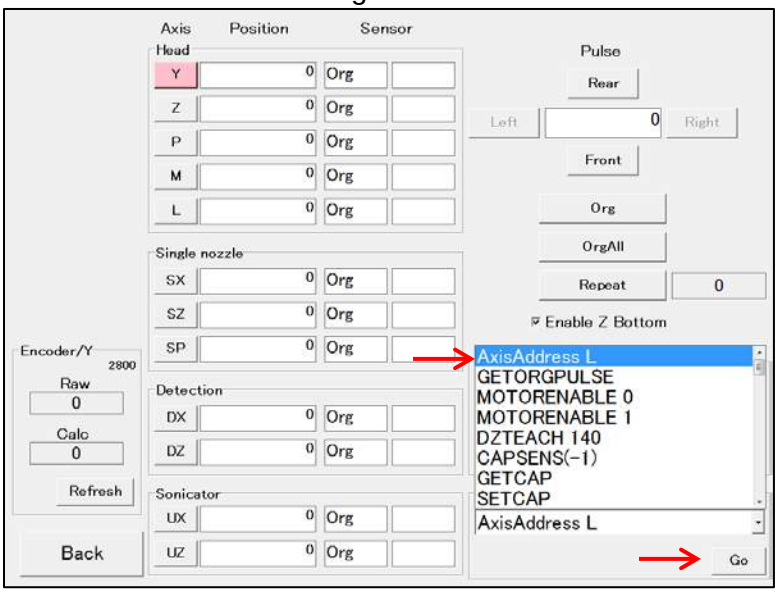
1. A user can move each axis to its teaching point by selecting a position from the pull down list in the *Module* area, choosing either *12 Nozzle,* or *Single Nozzle*, and pressing *Go (*Figure 65*)*

Figure 65



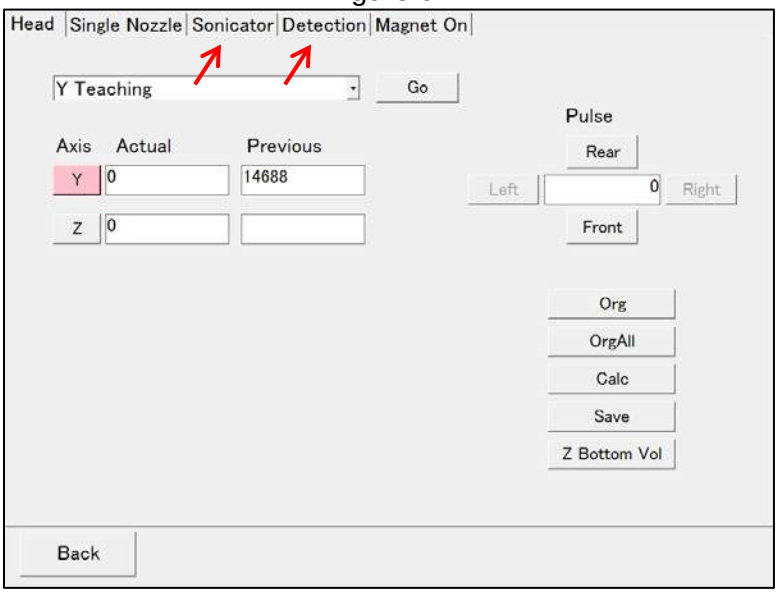
2. A user can execute a command by selecting a command from the pull down list in the *Command* area, and pressing *Go* (Figure 66)
3. Only commands that have been previously registered will show up in this pull down list. To enter commands see *Commands* screen on page 87

Figure 66



Unit Teaching - Only two tabs within the *Unit Teaching* screen (Figure 67) are used on the InGenius instrument. These are:

Figure 67



- **Sonicator Tab -** (Figure 68) Used to input sonicator teaching positions manually, and it can also be used to test the sonicator functionality similar to the utility available within the *Axis Control* screen. Table 12 details the functionality

Figure 68

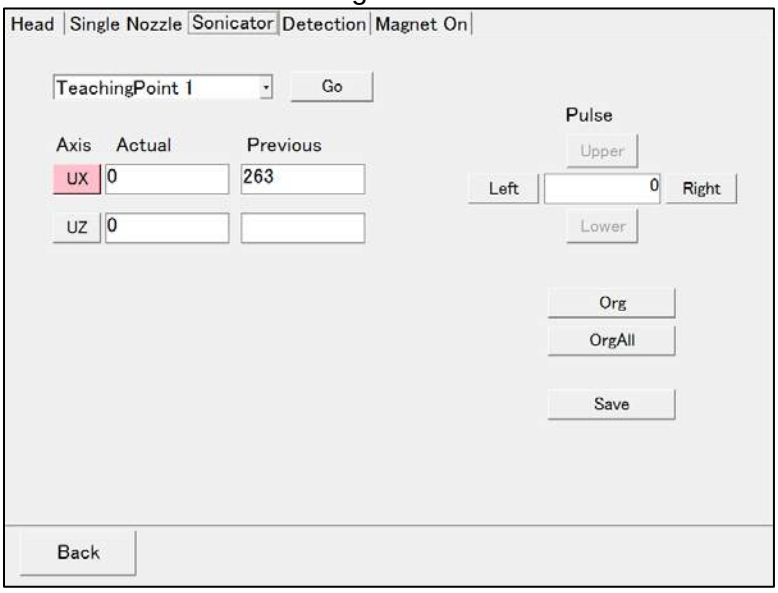


Table 12

Item	Description
Teaching Point Pull Down List	Selects teaching point for corresponding track position
Go Button	Moves the UX axis to the selected track teaching point
UX, UZ Buttons	Select the axis to be moved
Actual Field	The current position is displayed
Previous Field	The currently set teaching point for selected track is displayed
Pulse Field	Enter the travel distance of the selected axis in # of pulses
Upper, Lower, Left, Right Buttons	Moves the selected axis in that direction, these will change based on axis selected
Org Button	Return the selected axis to its origin
Org All Button	Return the UX and UZ axes to their origin
Save Button	Saves the teaching point of the selected track to the 2MS board

- **Detection Tab, DX Sub Tab –** (Figure 69) Used to carry out basic screening of the optics and it can also be used to manually gather data used in the crosstalk matrix generation procedure carried out after an optical hardware component replacement. Table 13 details the functionality

Figure 69

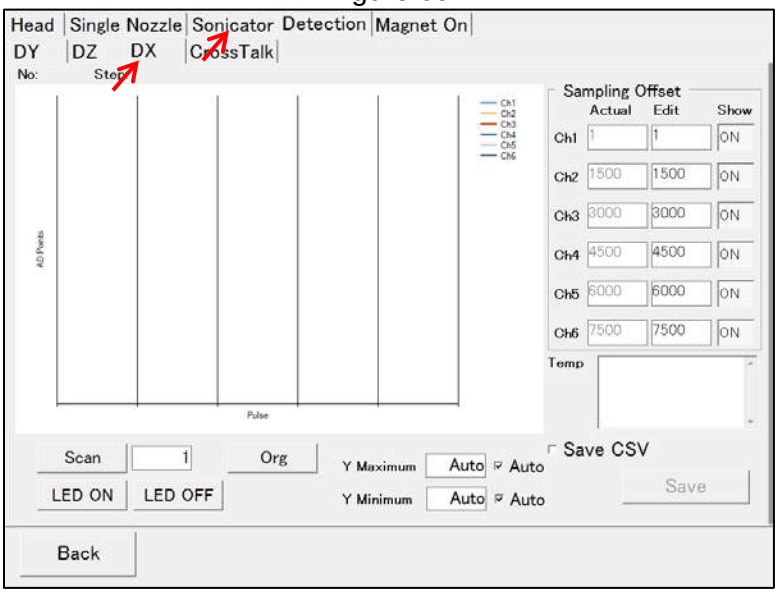


Table 13

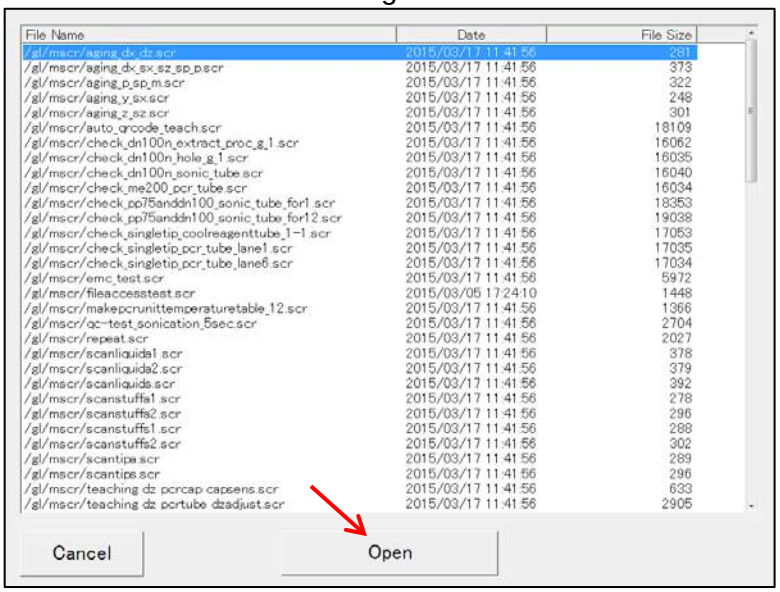
Item	Description
Scan Button	Conducts a scan using the optics and displays results in window
Scan Field	Input the number of scans to be conducted when the *scan* button is pressed
LED ON Button	Turns on the LED sources
LED OFF Button	Turns off the LED sources
Org Button	Return the DX axis to its origin
Back Button	Returns to the *Service Maintenance* screen
Y Maximum Field	Adjusts the scale of the displayed results window
Y Minimum Field	Adjusts the scale of the displayed results window
Auto Check Boxes	Turn on or off the auto scaling of the *Y Maximum* and *Y Minimum*
Save CSV Check Box	When checked scan data is saved to *D:\gl\SN####\PeakData*
Show ON/OFF Toggle Buttons	Turns on or off the selected optics channel in the displayed results window

- **Head tab, Single Nozzle tab, and Magnet On tab are not used**

System Protocol - Used to run scripts for maintenance and troubleshooting

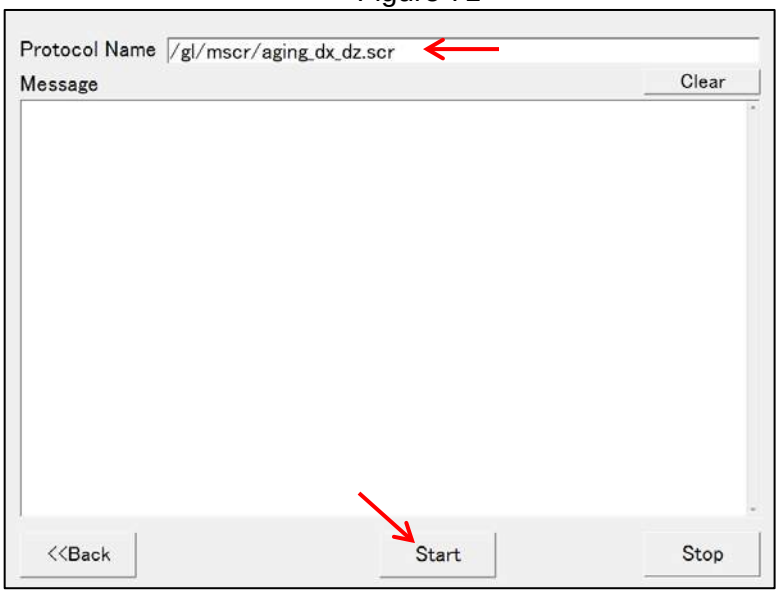
1. When *System Protocol* is selected from the *Service Maintenance* screen the SD card information will be retrieved and the protocol list will appear on the display, this can take a few minutes (Figure 70)
2. To execute a script select it from the list and press *Open*

Figure 70



3. The protocol execution screen will be displayed (Figure 71)
4. If the script displayed in the Protocol Name field is correct press Start

Figure 71



5. The script will be executed and the status will be displayed in the *Message* field
6. To interrupt a script that is being executed press *Stop*

Speed Setup - (Figure 72) Used to adjust speed settings of the instrument motors. This feature is not generally used for troubleshooting or service and is only covered here for reference purposes Table 14 details the functionality

Figure 72

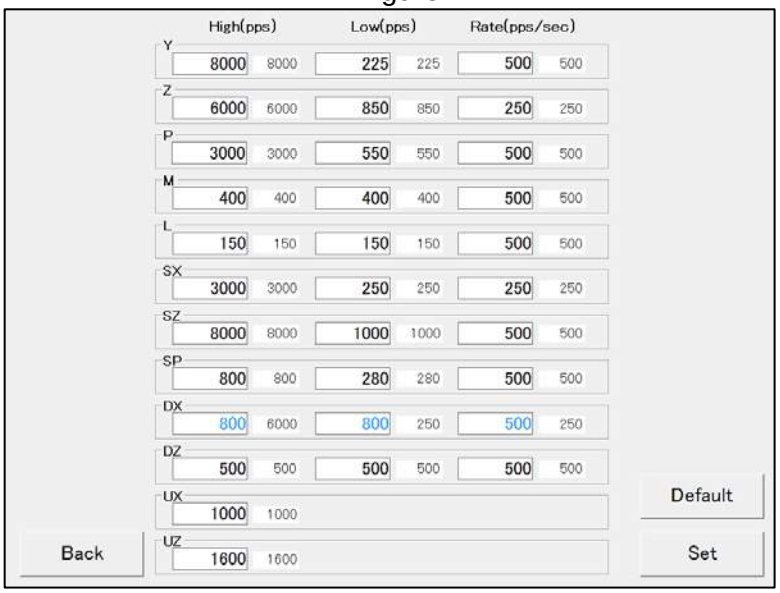


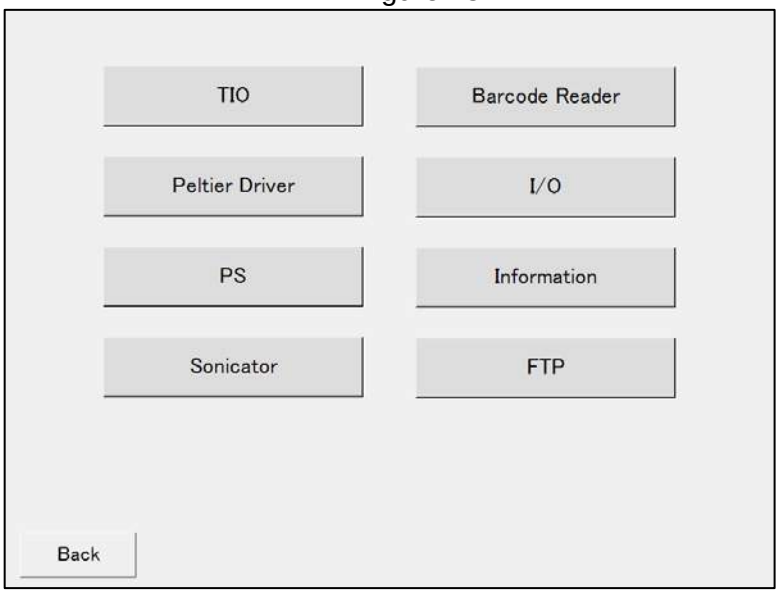
Table 14

Item	Description
High (pps)	Specify the high speed in pulses per second
Low (pps)	Specify the low speed in pulses per second
Rate (pps/sec)	Specify the acceleration rate in pulses per second
Default Button	Restores the speed and acceleration rate to default settings
Set Button	Sets the speed and acceleration rate to entered values
Back Button	Returns to the *Service Maintenance* screen

1. To change a speed setting touch any axis parameter field and the numeric keypad will be displayed
2. Enter the new value for the axis parameter field
3. a different value than default is displayed in blue
4. Any changes made to the settings are temporary and will be returned to an initial value when the instrument is powered on again
5. To restore speed settings to their default value press the *Default* button and then the *Set* button

Device Settings - There are 8 screens within the Device Settings screen

Figure 73



TIO Temperature Tab – (Figure 74) Used to set, and monitor the temperature set points of the Heat Block, Cool Block, Hot Collars, and Cool Block(Ext)

- Table 15 details the functionality

Figure 74

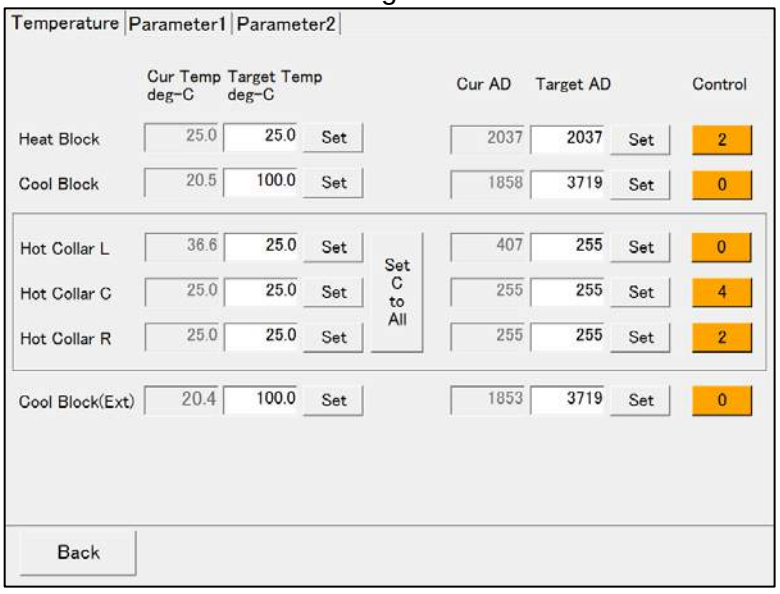


Table 15

Item	Description
Cur Temp deg-C	Displays currently measured temperature
Target Temp deg-C	Used to input/display the desired temperature set point

Cur AD	Displays the current AD value
Target AD	Used to input/display the desired AD set point
Control	Displays percent control to component (0 – 100) pressing a control button turns off the component control

TIO Parameter 1 Tab – (Figure 75) Used to adjust the coefficients and bias of the temperature control algorithms This feature is not generally used for troubleshooting or service and is only covered here for reference purposes Table 16Table 16 details the functionality

Figure 75

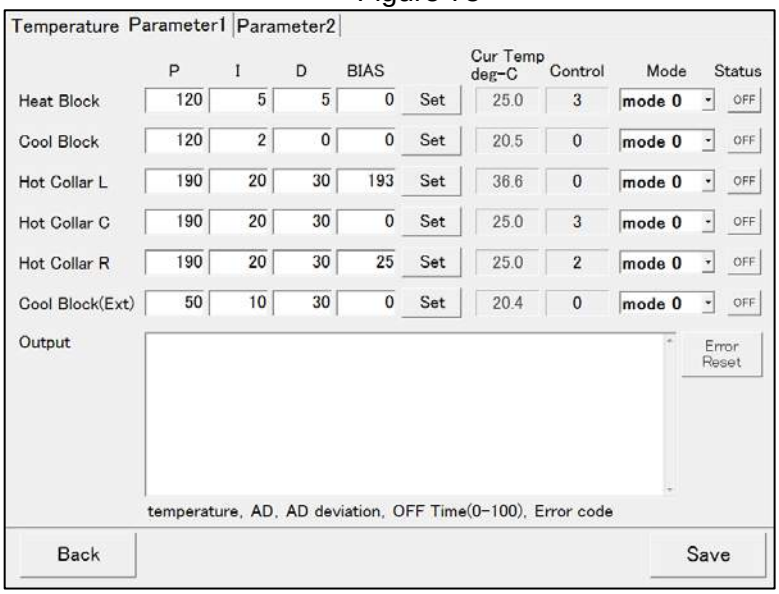


Table 16

Item	Description
P	Display/Set the proportional coefficient
I	Display/Set the integration coefficient
D	Display/Set the differential coefficient
BIAS	Display/Set the AD correction value
Cur Temp deg-C	The current temperature is displayed
Control	The current control quantity is displayed.
Mode	Specify the temperature control status mode.
Sel.	Enable/disable the temperature control status notification
Output	The notified information is displayed.

Error Reset	Resets errors in all channels.
Save	Writes BIAS, and PID parameters, into the Flash ROM.

- **TIO Parameter 2 Tab –** (Figure 76) Used to adjust the initial temperatures, percent control, HEPA Fan duty cycle and baud rates. This feature is not generally used for troubleshooting or service and is only covered here for reference purposes. Table 17 details the functionality

Figure 76

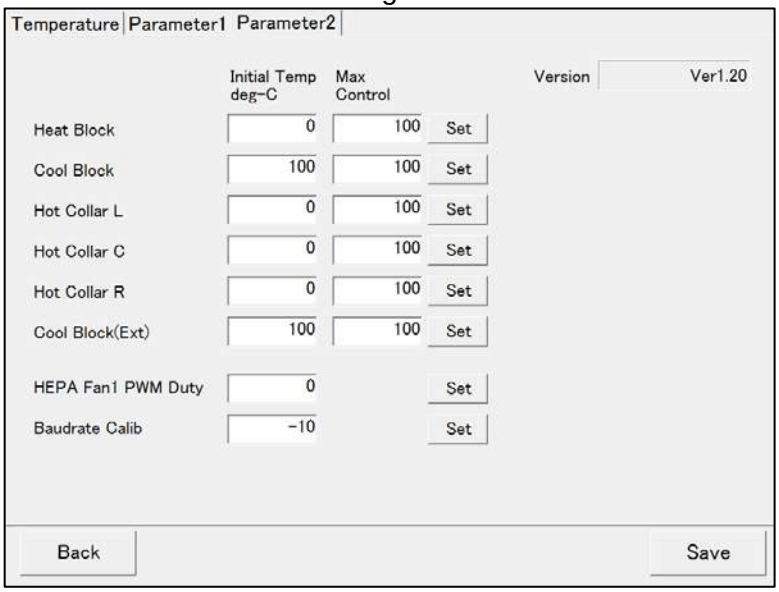


Table 17

Item	Description
Version	Displays TIO PCB firmware version
Initial Temp deg-C	Display/Set the initial set temperature
Max Control	Display/Set the maximum control quantity
HEPA Fan PWM Duty	Display/Set the HEPA Fan PWM Duty value
Baud rate Calib	Display/Set the Baud rate calibration value
Save	Writes the HEPA Fan PWM Duty, the initial set temperature, and Baud Rate Calibration into the Flash ROM.

- **Peltier Driver –** Controls the PCR thermal cycling unit and allows setting of heating, cooling, and feedback mechanisms

Temperature Tab – (Figure 77) Used to set PCR well temperatures, toggle control on and off and monitor alarm status Table 18 details the functionality

Figure 77


Temprature
Limit Setting
Parameter1
Parameter2
Peltier1
Peltier2
Cur Temp deg -C
Current A
Voltage V
Target Temp deg-C
Status
Alarm
Auto Tuning
Thermal Control
All CH
Set
OFF
CH1 20.95 -0.00 -0.01 25.00 Set 3 600 Run OFF
CH2 20.62 -0.00 -0.03 25.00 Set 3 600 Run OFF
CH3 20.64 -0.00 -0.00 25.00 Set 3 600 Run OFF
CH4 21.17 -0.00 -0.03 25.00 Set 3 600 Run OFF
CH5 20.94 0.00 -0.00 25.00 Set 3 600 Run OFF
CH6 20.86 -0.00 0.00 25.00 Set 3 600 Run OFF
Error Reset
Back

Table 18

Item	Description	
Cur Temp deg-C	The current temperature is displayed.	
Current A	The peltier current value is displayed.	
Voltage V	The peltier voltage value is displayed.	
Target Temp deg-C	Display/set the target temperature.	
Status	0	Stabilized
	1	Under control
	2	In auto tuning
	3	Standby
Alarm	000	Normal
	001	Soft limit of Peltier current
	002	Temperature upper/lower limit alarm
	004	Peltier connection alarm
	008	Temperature sensor alarm
	010	Power voltage alarm
	020	FET driver alarm
	040	Heat sink temperature alarm
	080	Board temperature alarm
	100	Interlock
	200	FAN stop
	400	Temperature fuse breaking
	Alarm code displays in hex format and are added when more	
Error Reset	Reset an alarm	
Auto Tuning	Executes/Stop auto tuning	
Thermal Control	Turns temperature control ON/OFF	

- **Limit Setting Tab –** (Figure 78) Used to adjust the limits of the temperature and current for the peltier cooler. This feature is not generally used for troubleshooting or service and is only covered here for reference purposes. Table 19 details the functionality

Figure 78

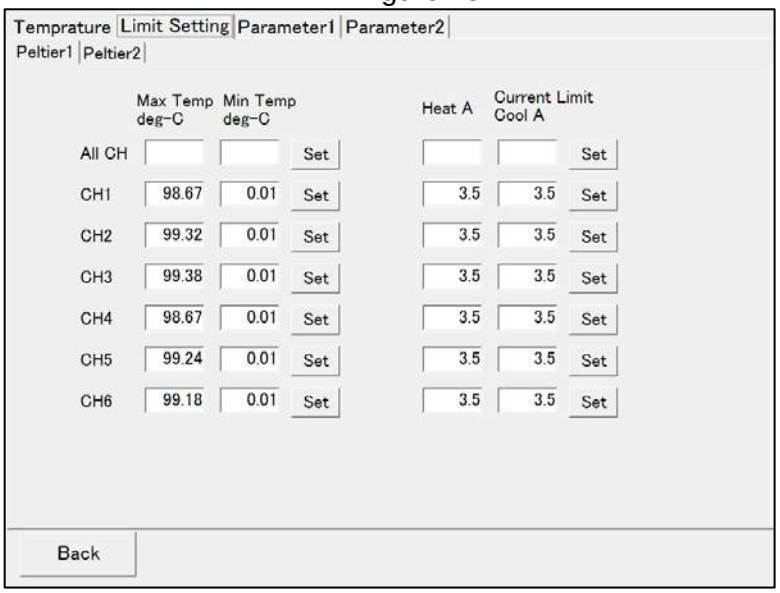


Table 19

Item	Description
Max Temp deg-C	Display/Set the upper limit temperature
Min Temp deg-C	Display/Set the lower limit temperature
Limit Heat A	Display/Set the heating side current limit value
Limit Cool A	Display/Set the cooling side current value limit value

- **Parameter 1 Tab –** (Figure 79) Used to adjust the settings for the peltier thermistor. This feature is not generally used for troubleshooting or service and is only covered here for reference purposes. Table 20 details the functionality

Figure 79

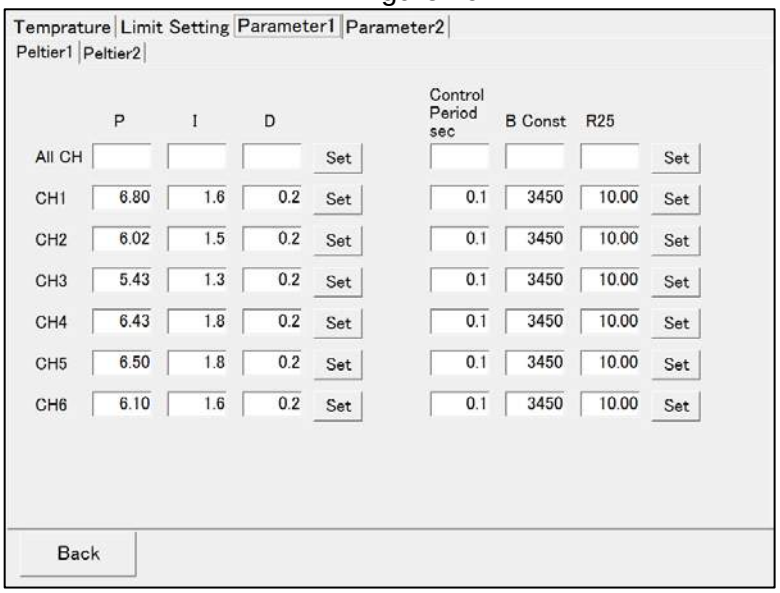


Table 20

Item	Description
P	Display/Set the proportional band.
I	Display/Set the integral time.
D	Display/Set the derivative time.
Control Period sec	Display/Set the control period.
B Const	Display/Set the thermistor B constant.
R25	Display/Set R25（the resistance value when the thermistor is 25 °C.）

- **Parameter 2 Tab –** (Figure 80) Used to adjust the settings for the alarm and ramp slope rates for heating. This feature is not generally used for troubleshooting or service and is only covered here for reference purposes. Table 21 details the functionality

Figure 80

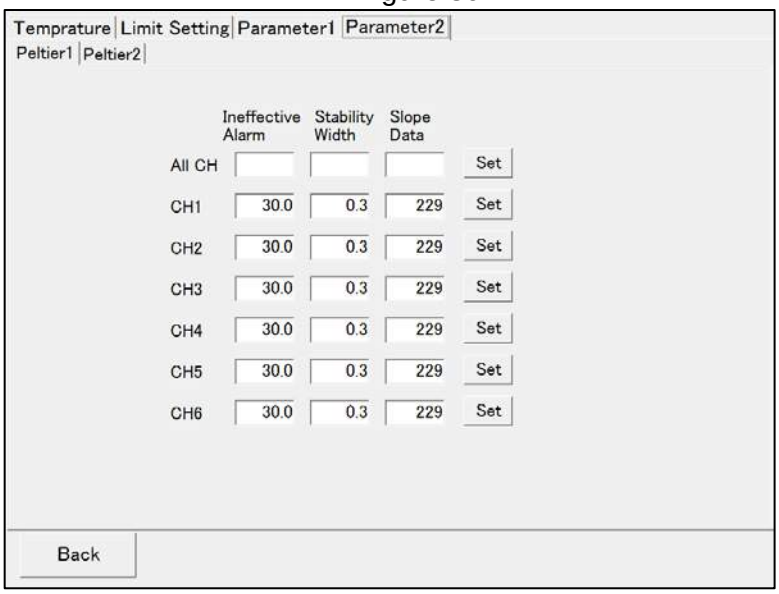


Table 21

Item	Description
Ineffective Alarm	Display/Set the invalidation time of the upper/lower limit alarm
Stability Width	Display/Set the temperature stability discrimination width
Slope Data	Display/Set the slope (°C/min)

- **PS Screen –** (Figure 81Figure 77) Used to check the status of the pressure sensors and adjust settings for their use. Table 22 details the functionality

Figure 81

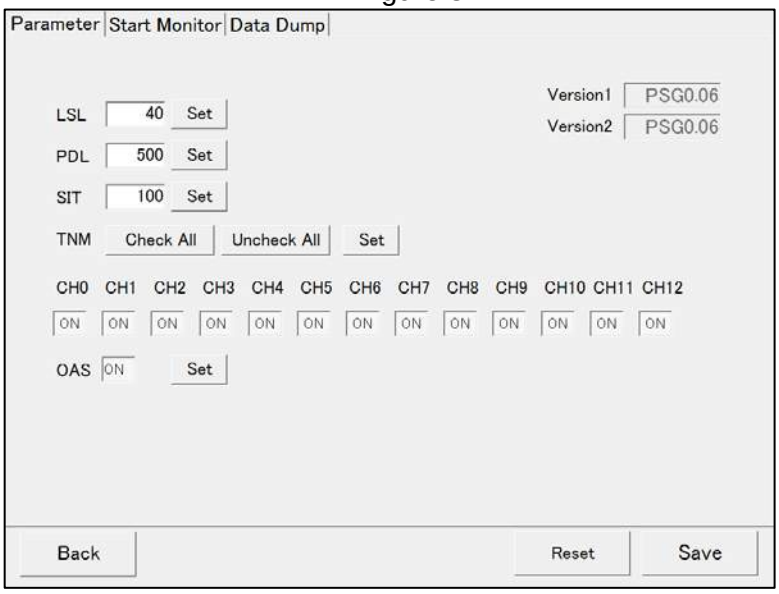


Table 22

Item	Description
LSL	Display/Set the Liquid Surface detect Level
PDL	Display/Set the Plug Detect Level
SIT	Display/Set the Scan Interval Time
TNM	Display/Set the Target Nozzle Map
Check All button	Checks all TNM check boxes
Uncheck All button	Unchecks all TNM check boxes
OAS	Display/Set the One or All Switch
Version	The version information of two PS boards is displayed
Reset button	Resets the pressure sensor board, and restore the current value to the initial value
Save button	Writes the LSL, PDL, SIT, TNM, and OAS parameters into a Flash ROM

- **Start Monitor Tab –** (Figure 82) Used to monitor the pressure transducer readings and run a protocol for transducer adjustment. Table 23 details the functionality

Figure 82

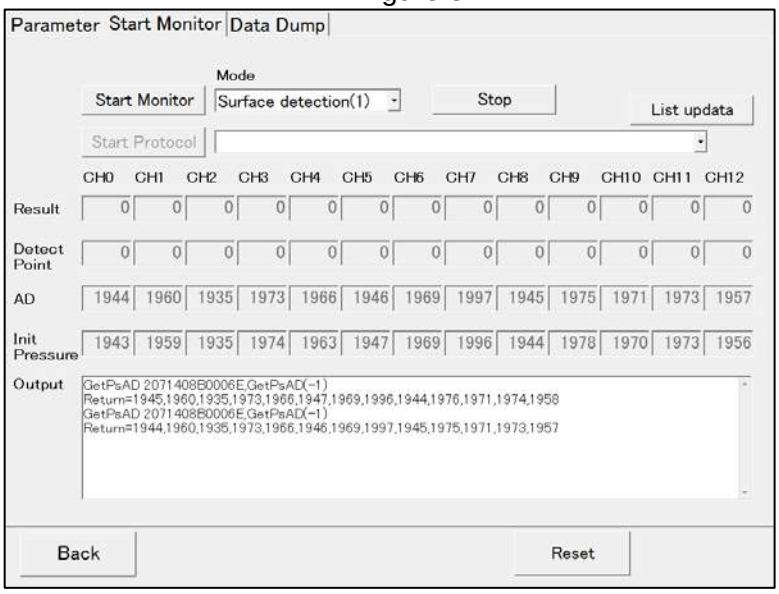


Table 23

Item	Description
Mode	Select a pressure monitor mode
Start Monitor button	Starts the pressure monitoring
Stop button	Stops the pressure monitoring
Protocol selection list box	Select a protocol to be used for adjusting the pressure monitor
Start Protocol button	Executes the protocol
Result	The pressure monitor result is displayed
Detect Point	The detection point is displayed
AD	The AD value is displayed
Init Pressure	The initial pressure is displayed
Output	The progress of the protocol is displayed
Reset button	Reset the pressure sensor board to their initial values

- **Data Dump Tab –** (Figure 83) Used to adjust the settings for the alarm and ramp slope rates for heating. This feature is not generally used for troubleshooting or service and is only covered here for reference purposes. Table 24 details the functionality

Figure 83

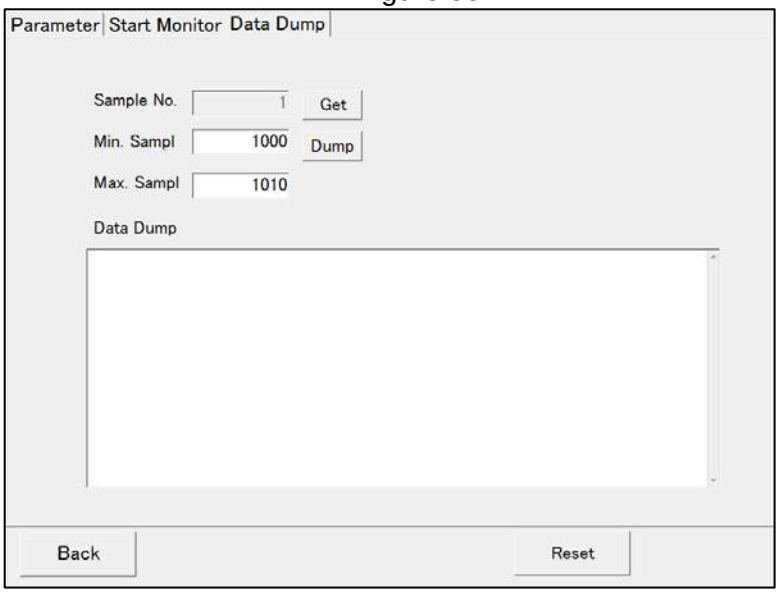


Table 24

Item	Description
Sample No.	The number of samples is displayed
Get button	Obtains the number of samples
Min. Sample	Specify the sampling address where the dump process is started
Max. Sample	Specify the sampling address where the dump process is ended
Dump button	Starts data dump
Data Dump	The pressure data is displayed
Reset button	Reset the pressure sensor board to the initial values

- **Sonicator Screen –** (Figure 84) Used to check the state of the sonication unit and adjust various settings. Table 25 details the functionality

Figure 84

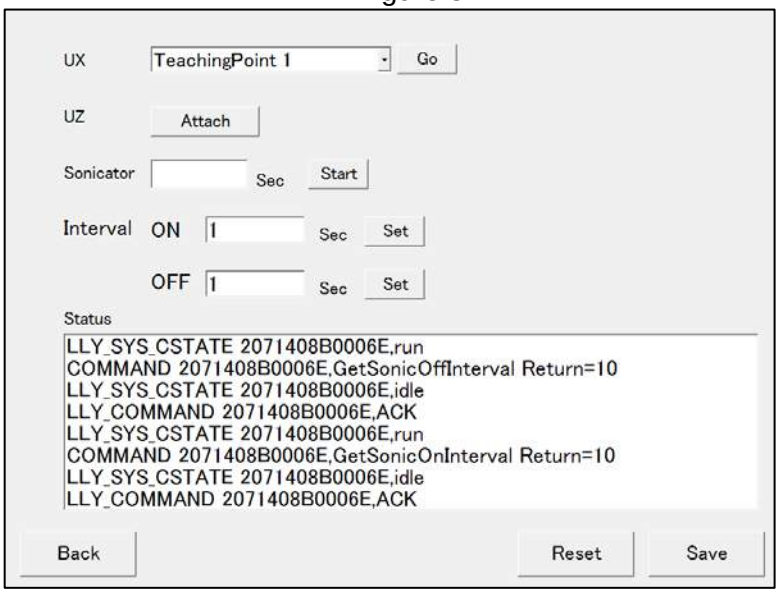


Table 25

Item	Description
UX	Select a track to which ultrasonic horn is moved
Go button	Moves the UX axis to specified teaching point
Attach/Detach button	Moves UZ axis until bottom sensor is tripped and then returns to its origin
Sonicator	Specify time to apply ultrasonic wave.
Start/Stop button	Starts/Stops applying ultrasonic wave
Interval ON	Specify the time (in 0.1 sec.) between each ON time
Interval OFF	Specify the time (in 0.1 sec.) between each OFF time
Reset button	Initializes the status
Save button	Saves the edited contents

- **Barcode Reader Screen –** (Figure 85) Used to activate the internal barcode scanner and view feedback from scans. Table 26 details the functionality

Figure 85

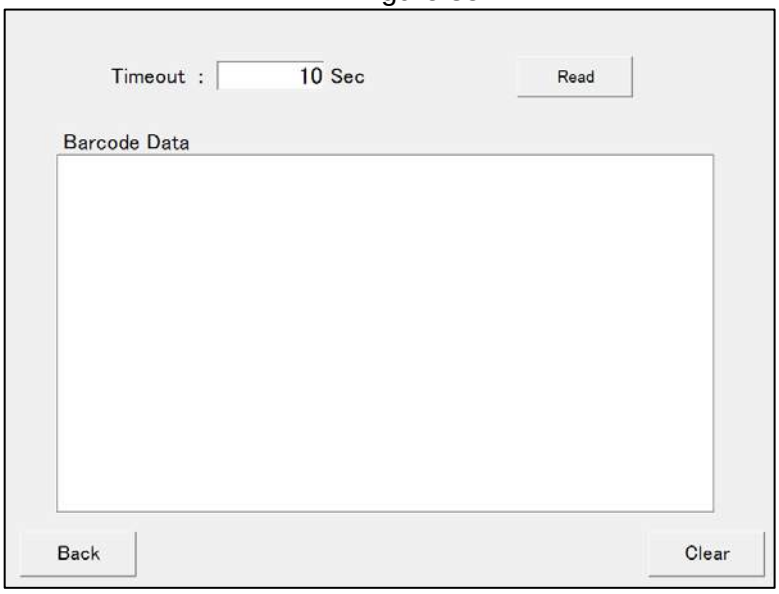


Table 26

Item	Description
Timeout display	Input the length of time to activate the scanner
Read button	Starts the reading of Barcode
Barcode Data display	The read barcode data is displayed
Clear button	Clears entire display area

- **I/O Screen TIO Tab –** (Figure 86) Used to check the status of the input port of the TIO and FiSICS board and control the output port. Table 27 details the functionality

Figure 86

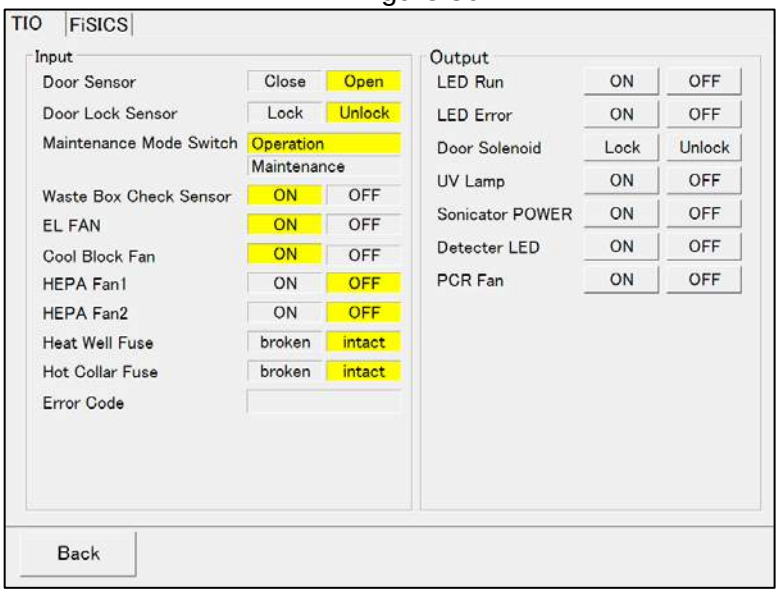
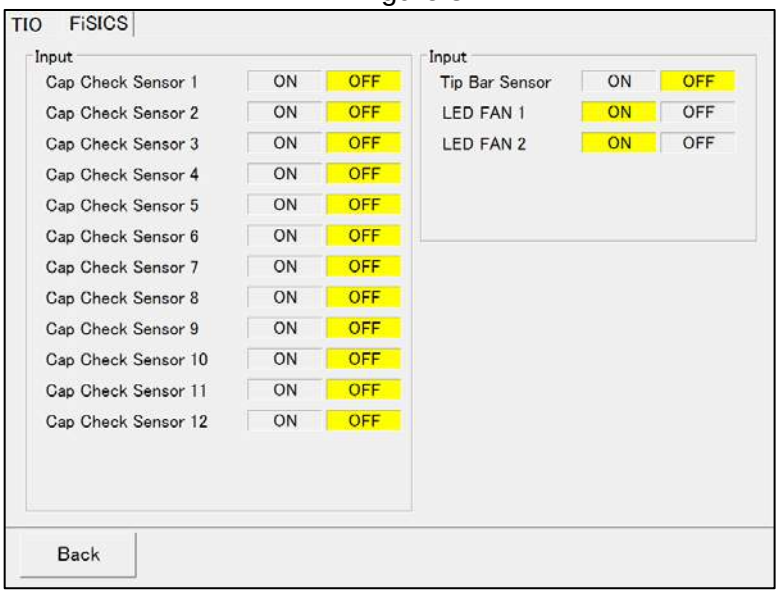


Table 27

Item	Description
Input	The status of the port into the TIO board is displayed
Output	Control the output from the TIO board

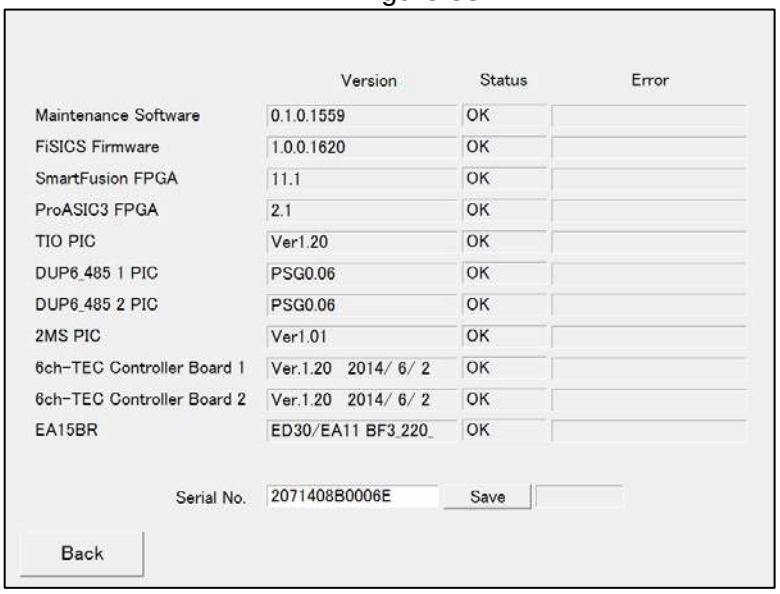
- **I/O Screen FiSICS Tab –** (Figure 87) Used to check the status of the input port of FiSICS board

Figure 87



- **Information Screen –** (Figure 88) Used to check the version information of the control PCBs and their communication status and any errors

Figure 88



FTP Screen – () Used to view, retrieve and update the files in the SD card of the FiSICS board Table 28 details the functionality

Figure 89

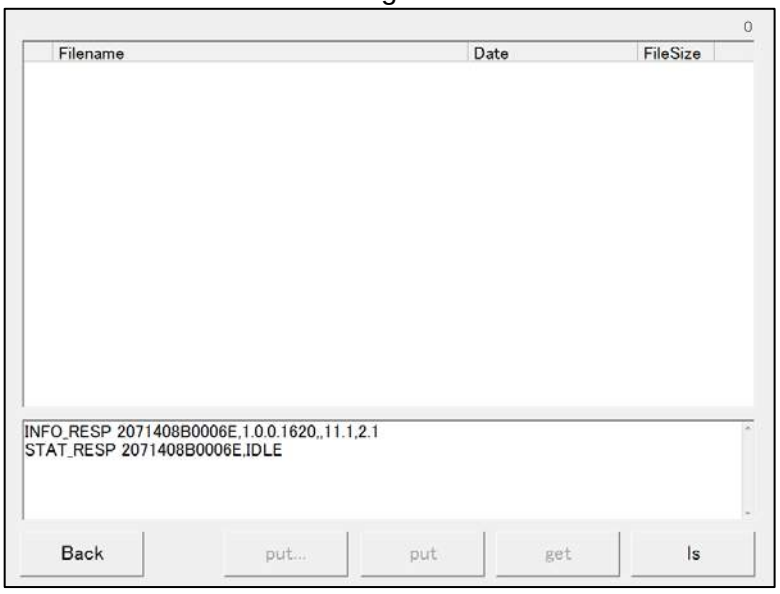
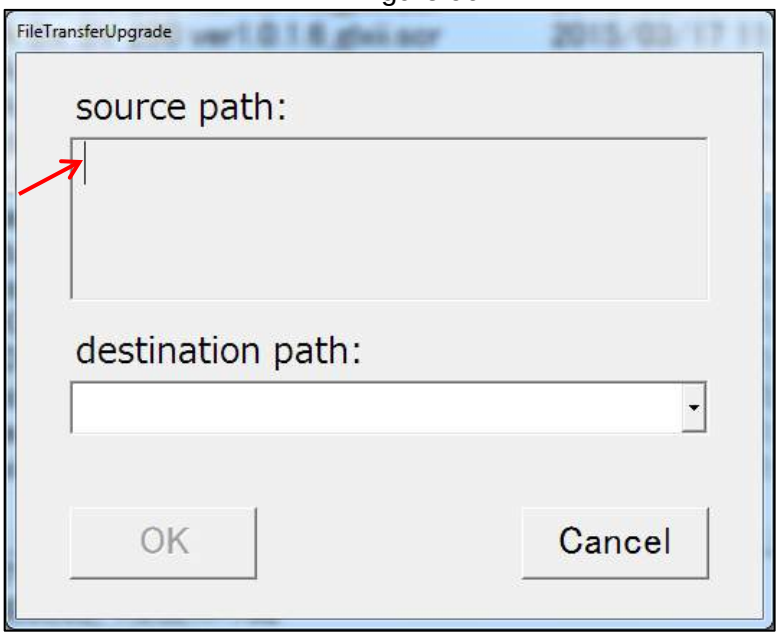


Table 28

Item	Description
ls button	Displays the list of files currently on the SD card
get button	Copies the selected file from the SD card to D:\gl\(serial №)\Backup\gl
put button	Copies the selected file to the SD card.

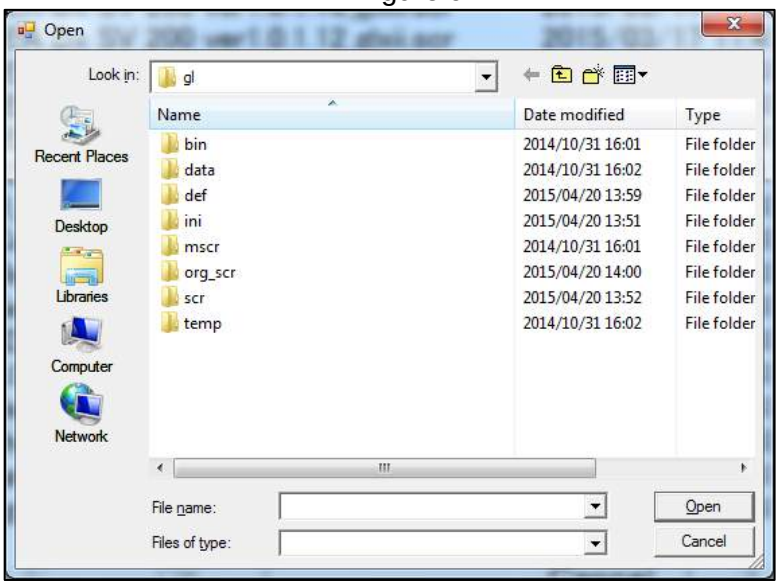
1. To load a file onto the SD card from another location press the *put* button
2. Click in the *source path* field (Figure 90)

Figure 90



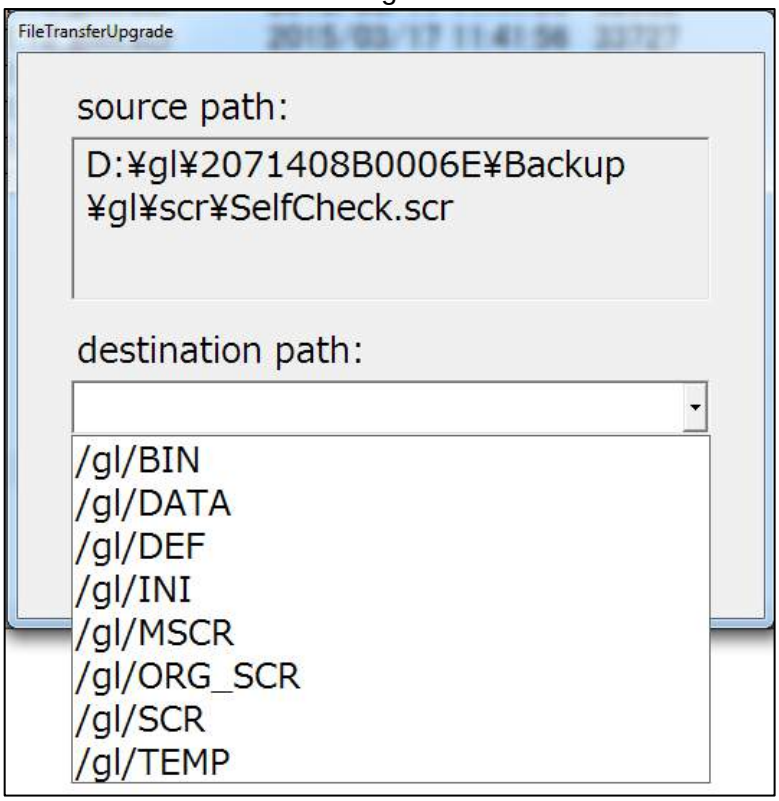
3. Browse to the location where the file resides (Figure 91)

Figure 91



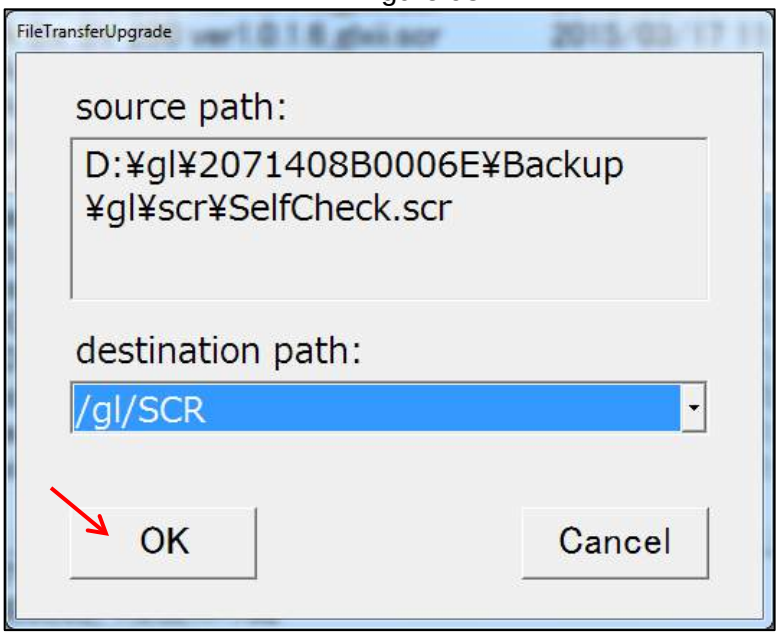
4. Touch the destination path field to display the pull-down list and select a copy destination folder (Figure 92)

Figure 92



5. Press *OK* (Figure 93) to write the file specified in the source path to the folder of the SD card selected in the destination path, overwriting the file with the same name if it exists in the SD card

Figure 93



Command Screen - (Figure 94) Used to execute commands and to add commands to the registry. Table 29 details the functionality

Figure 94

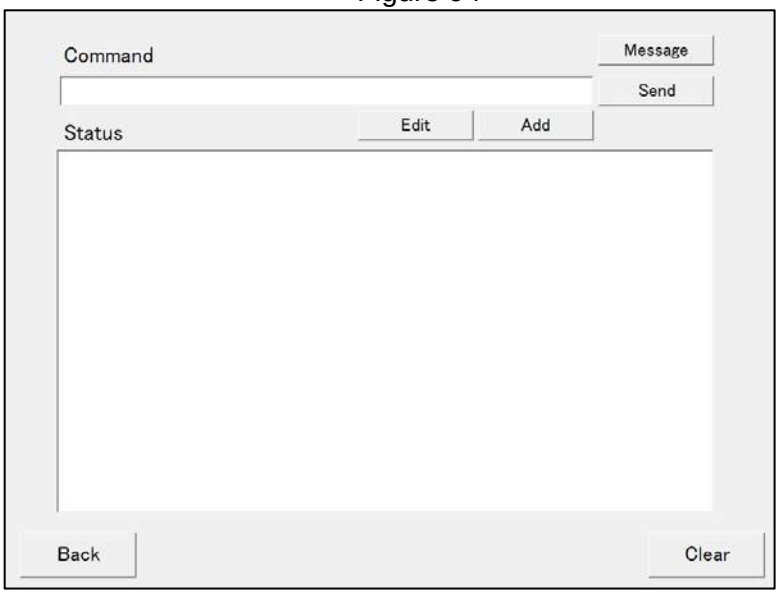


Table 29

Item	Description
Command field	Used to enter a command to be carried out
Send button	Executes the command
Message button	Sends the message
Edit button	Edits the command list
Add button	Adds the content of the *Command* field to the command list
Status field	The execution status and return value is displayed
Clear button	Clear the Status display area

- **Execute a command**

1. To execute a command touch the *Command* field and using the on screen keyboard enter the command to be executed
2. Press *Send* to execute the command

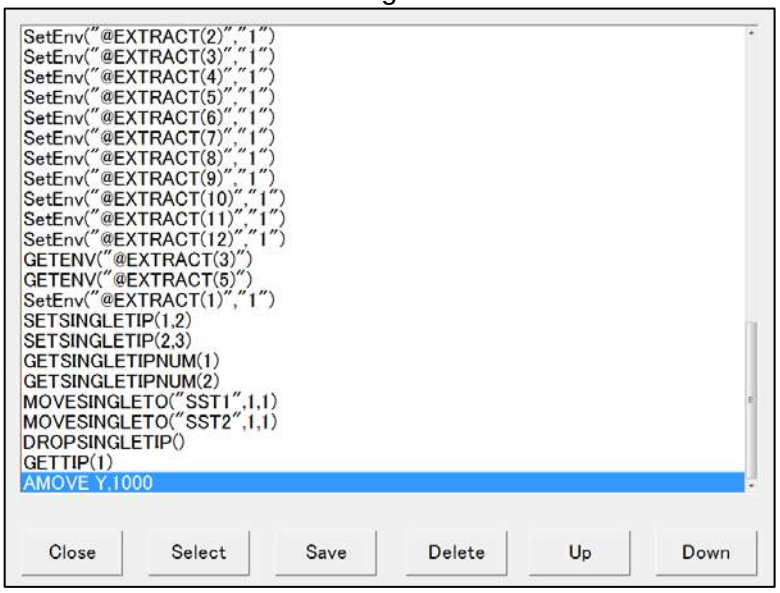
- **Send a message**

1. To send a message touch the *Command* field and using the on screen keyboard enter the message to be sent
2. Press *Message* to send the message

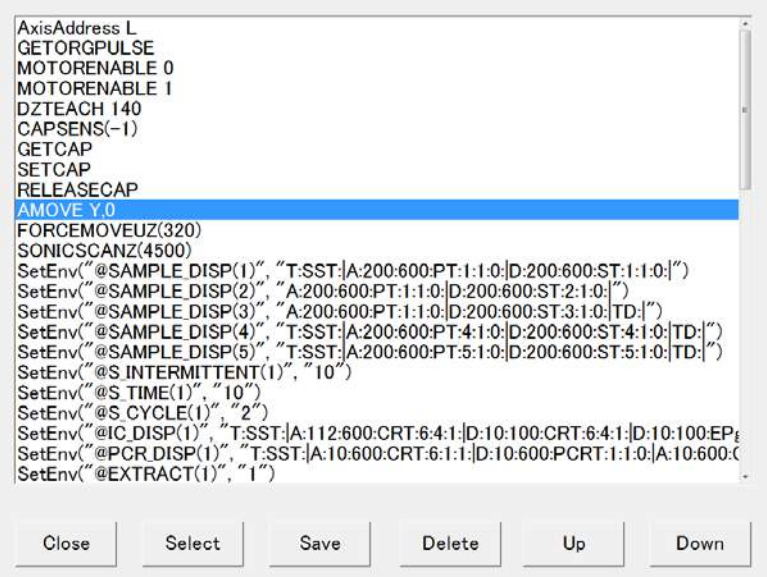
- **Register a command**

1. To register a command in the command list touch the *Command* field and using the on screen keyboard enter the command to be registered in the list
2. Press *Add*
3. The command list will be displayed.
4. Make sure that the command entered in the *Command* field is added to the final line of the list. Touch *Save* (Figure 95)

Figure 95



- **Call from command list**
  1. To execute a command previously registered Press the *Edit* button
  2. The command list will be displayed, choose the command to be executed, and press *Select*

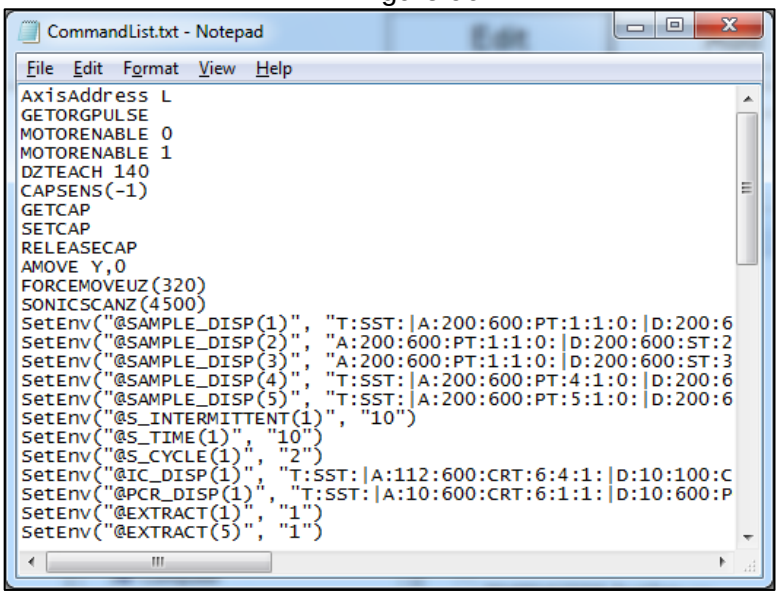


  3. The selected command will be shown in the *Command* field
  4. Press *Send* to execute the command

- **Directly Editing Command List**

1. The command list is stored in D:\gl\CommandList.txt
2. A command can be registered or deleted by editing it with a text editor (Figure 96)

Figure 96



ELITech ELITe InGenius™

Chapter 3: Module Removal and Replacement

ELITech Group Molecular Diagnostics
27 Wellington Rd Lincoln, RI 02865

Chapter 3: Module Removal and Replacement

3.1. Exterior Panels

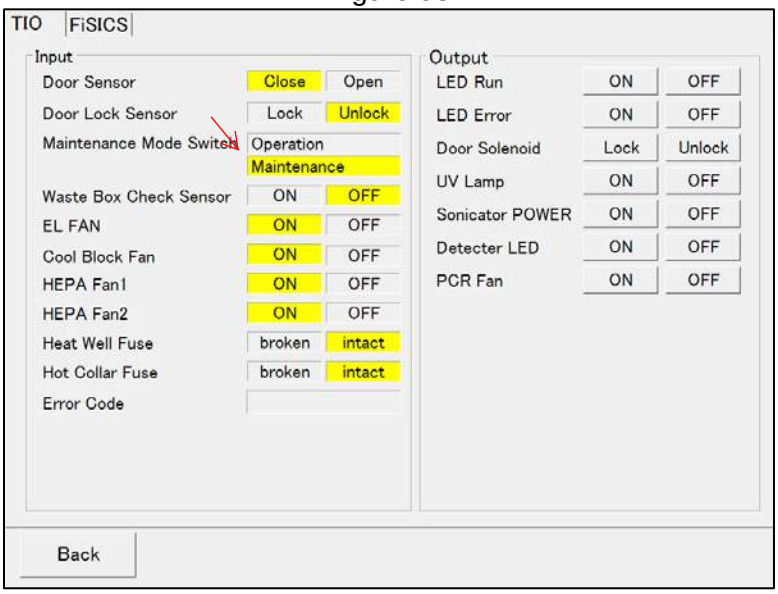
3.1.1. Right side panel

3.1.1.1 Remove the four cross slot screws and pull the panel away from the instrument (Figure 97)

Figure 97

3.1.1.2 Reverse the removal steps to reinstall ensuring the maintenance switch is depressed.
3.1.1.3 Check the maintenance switch functionality through the instrument software
3.1.1.4 Go to the maintenance screen and press the Service Maintenance button
3.1.1.5 From the Service Maintenance screen Press the *Device Settings* button
3.1.1.1 From the Device Settings screen press the *I/O* button
3.1.1.2 In the I/O screen go to the TIO tab
3.1.1.3 Ensure the Maintenance mode shows active (Figure 98)

Figure 98



3.1.2 Left side panel

3.1.2.1 Remove the four cross slot screws and pull the panel away from the instrument (Figure 99).

3.1.2.2 Reverse removal steps to reinstall.

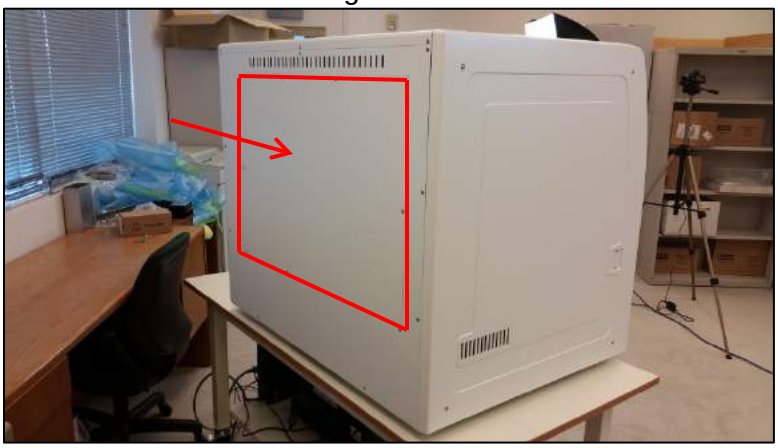
Figure 99

3.1.3 Rear panels

3.1.3.1 There are two rear panels that allow access to the rear of the instrument

3.1.3.2 The inner panel is held in place by ten cross slot screws. Remove eight of the screws and loosen the top two corner screws to remove. (Figure 100).

Figure 100



3.1.3.3 The outer panel is held in place by nine cross slot screws. Remove these screws to free the outer panel, using care as it is heavy (Figure 101).

Figure 101

3.1.3.4 Beneath the two exterior panels is a light shield panel. To remove the light shield panel loosen the top two corner cross slot screws and remove the other 6 cross slot screws then lift up and out on the panel (Figure 102).

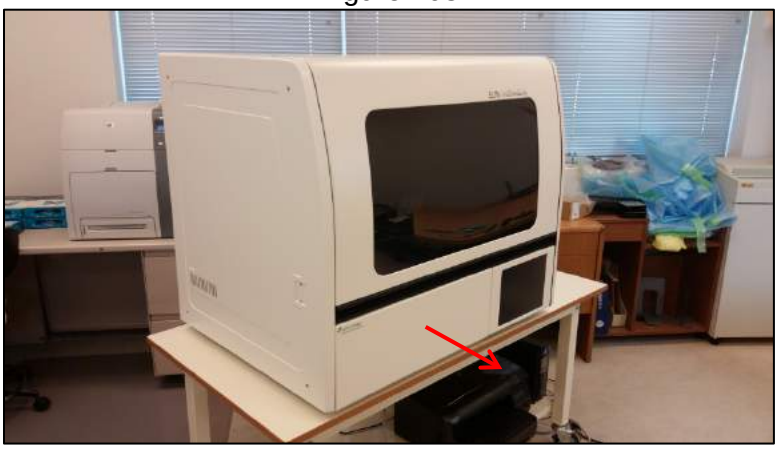
3.1.3.5 To reinstall these panels reverse the steps taken to remove them.

Figure 102

3.1.4 Front Panels

3.1.4.1 To remove the front panel, pull outward on it to release it from the magnets that secure it (Figure 103).

Figure 103



3.1.4.2 Beneath the front cover is a gold anodized cover. Remove the 8 cross slot screws securing it for removal (Figure 104).

Figure 104

3.1.4.3 Beneath the gold anodized cover is a black anodized duct cover. Remove the 4 cross slot screws that hold it in place to remove it (Figure 105). The two screws on the right side can be accessed via openings beneath the touch screen (Figure 106).

Figure 105

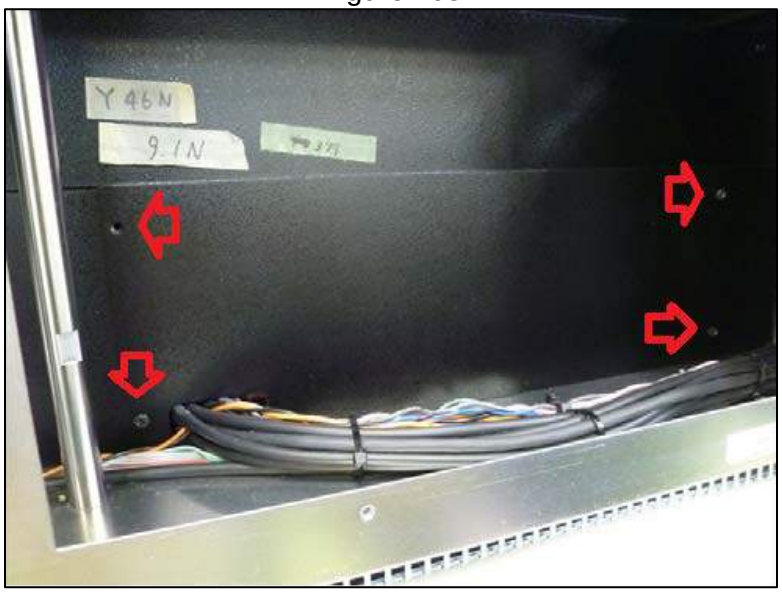
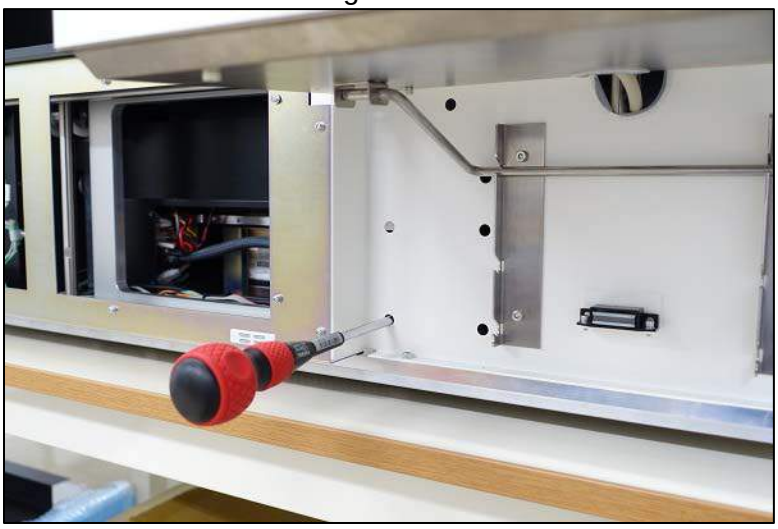


Figure 106



3.1.1.1 To reinstall these panels reverse the steps taken to remove them

3.2 Door Assembly

3.2.1. Door

3.2.1.1 From the underside of the door remove the four 3 mm hex head screws that secure it, 2 on each side (Figure 107 & Figure 108) and carefully lift it away from the support brackets.

Figure 107

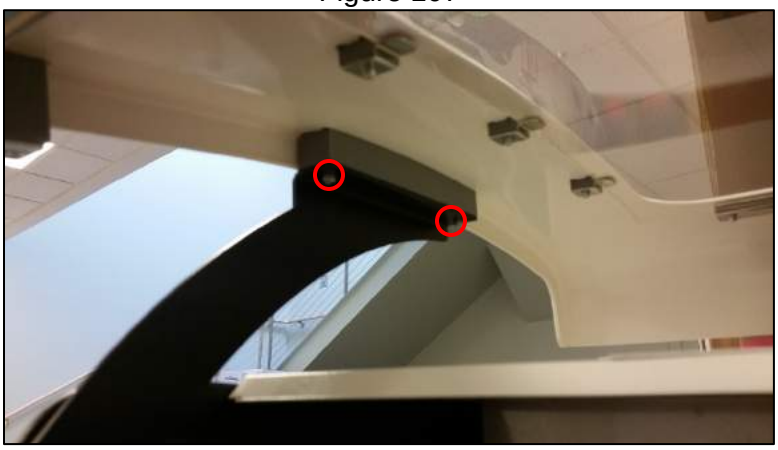


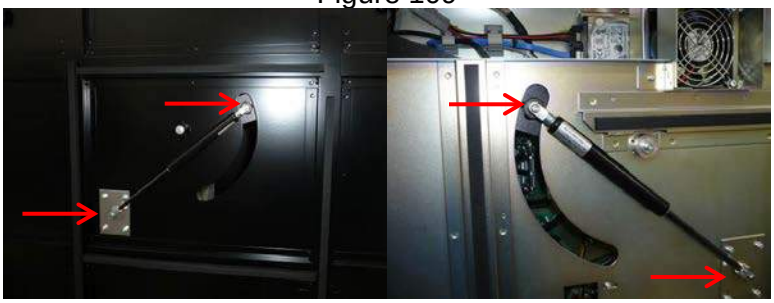
Figure 108

3.2.1.2 Reverse this step to reinstall the door.

3.2.2. Door Cylinders

3.2.2.1 Remove the right side panel of the instrument
3.2.2.2 Remove the left side panel of the instrument
3.2.2.3 Remove the electronics bay covers
3.2.2.4 Remove the two e-rings securing each end of the door cylinders (Figure 109)

Figure 109

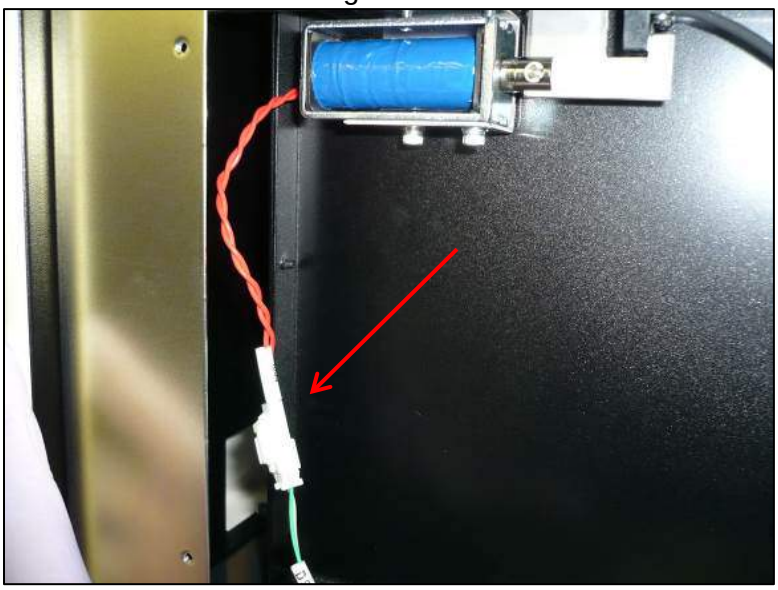


3.2.2.5 Support the door while pulling outward on the door cylinder to remove each end from its respective pivot point.
3.2.2.6 Continue to support the door while removing the second door cylinder.
3.2.2.7 Gently lower door until closed
3.2.2.8 Reverse these steps to reinstall the cylinders.

3.2.3. Door Lock Solenoid

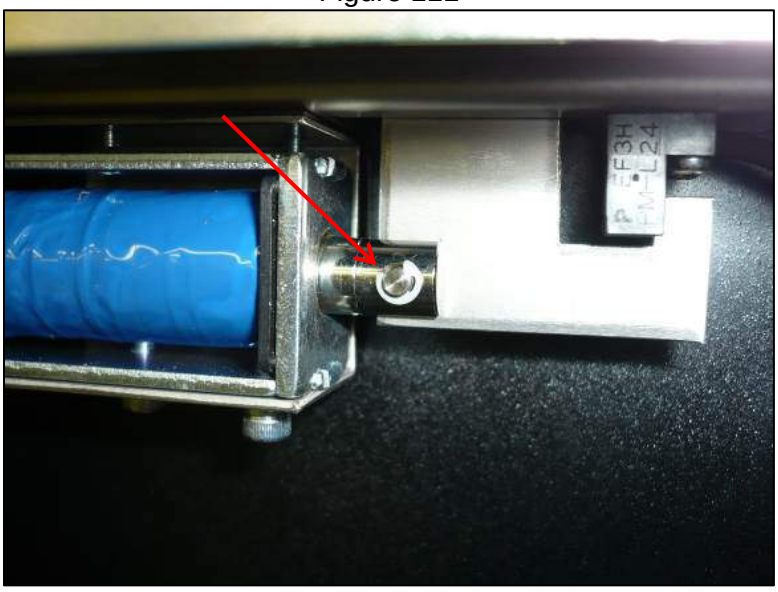
3.2.3.1 Remove the inner and outer front panels from the instrument
3.2.3.2 Disconnect the solenoid electrical connection (Figure 110)

Figure 110



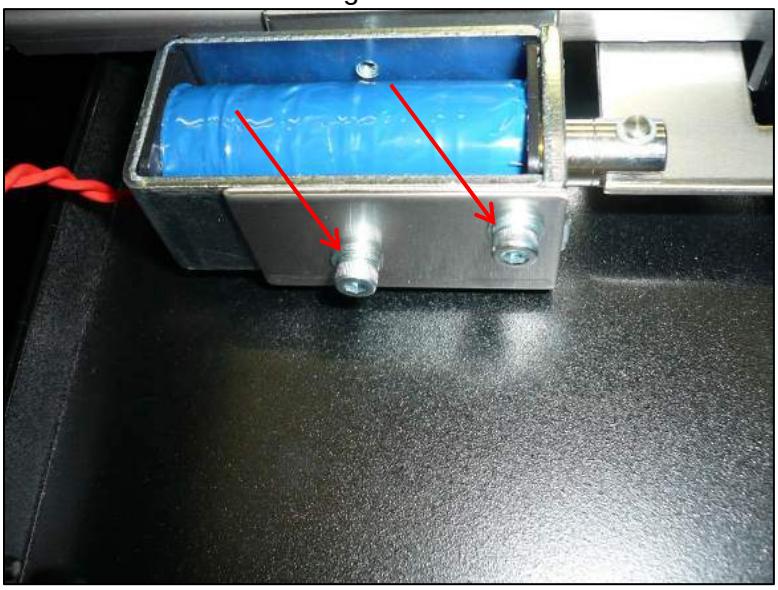
3.2.3.3 Remove the e-ring connecting the solenoid to the lock mechanism (Figure 111)

Figure 111



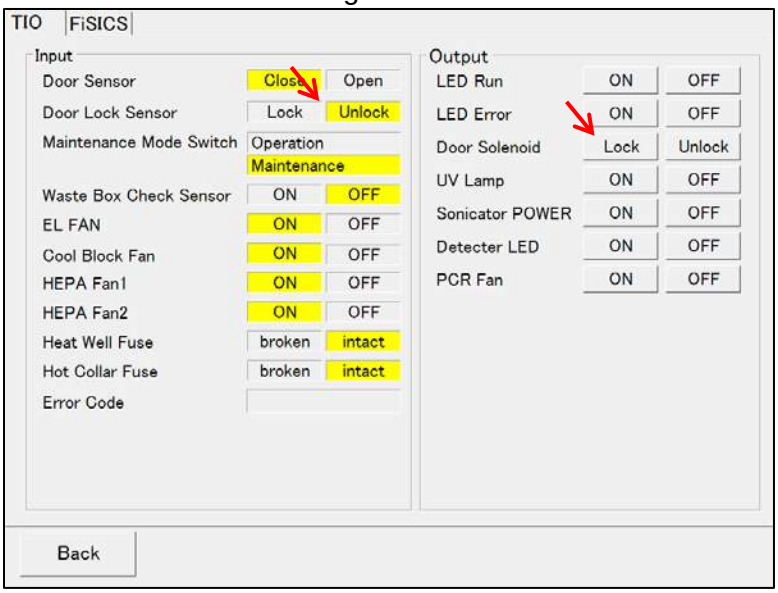
3.2.3.4 Remove the 2 cross slot screws that secure the solenoid from below (Figure 112)

Figure 112



3.2.3.5 Reverse the removal steps to reinstall
3.2.3.6 Check the solenoid functionality through the instrument software
3.2.3.7 Go to the maintenance screen and press the Service Maintenance button
3.2.3.8 From the Service Maintenance screen press the Device Settings button
3.2.3.9 From the Device Settings screen press the I/O button
3.2.3.10 In the I/O screen go to the TIO tab
3.2.3.11 Ensure the door lock sensor shows Unlock (Figure 113)

Figure 113

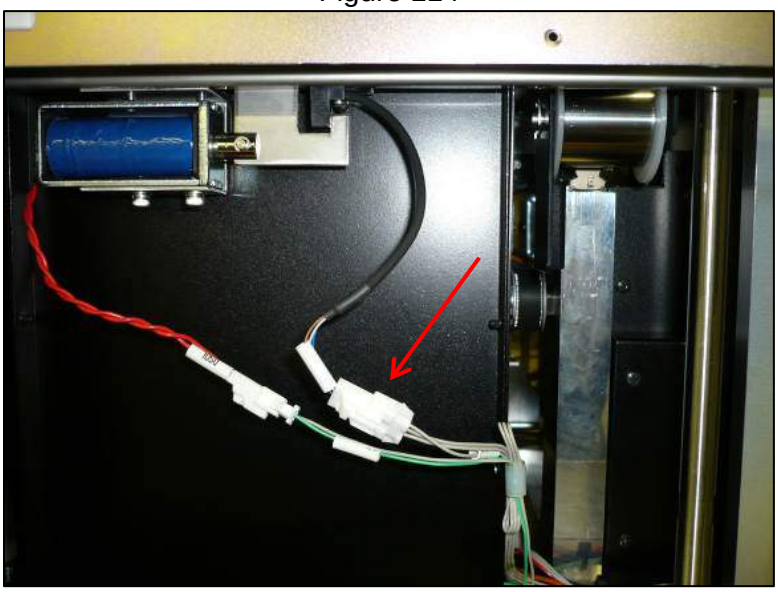


3.2.3.12 Using the Door Solenoid Lock and Unlock buttons test the operation

3.2.4. Door Lock Solenoid Sensor

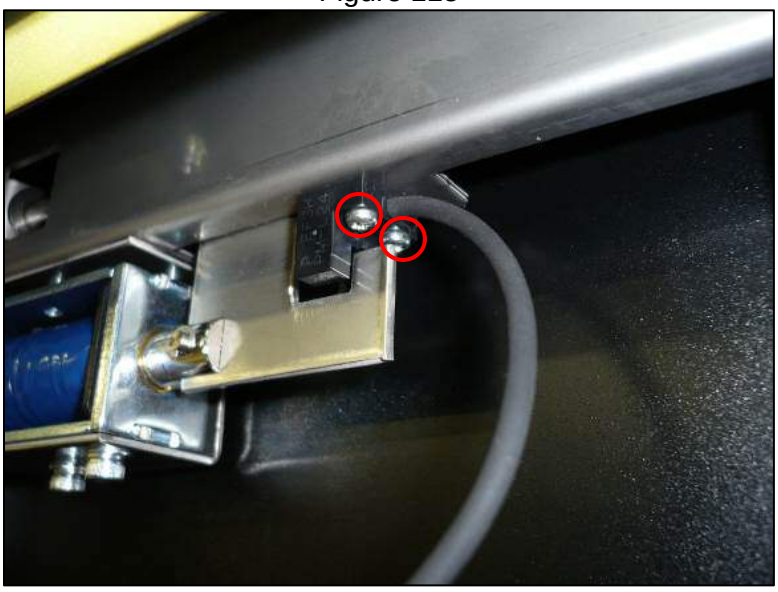
3.2.4.1 Remove the inner and outer front panels from the instrument
3.2.4.2 Disconnect the sensor electrical connection (Figure 114)

Figure 114



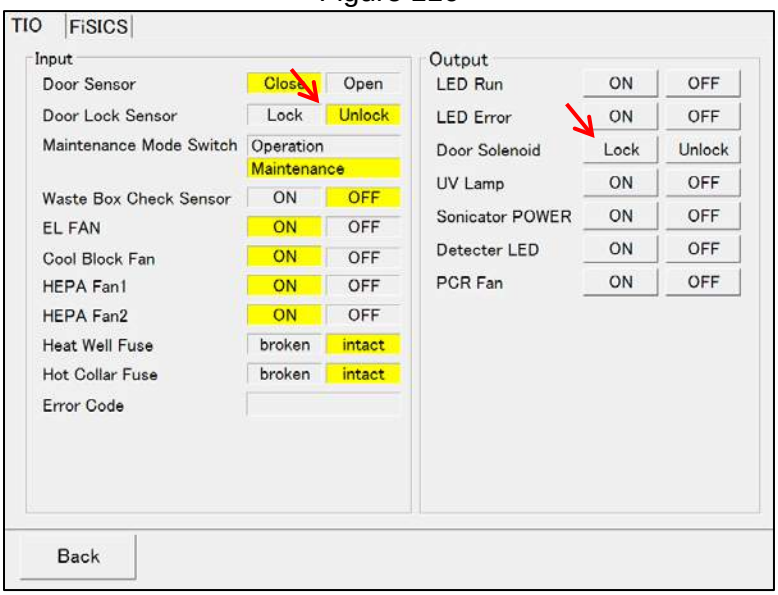
3.2.4.3 Remove the two cross slot screws securing the connector (Figure 115)
3.2.4.4 Reverse these steps to reinstall the sensor.

Figure 115



3.2.4.5 Reverse the removal steps to reinstall
3.2.4.6 Check the sensor functionality through the instrument software
3.2.4.7 Go to the maintenance screen and press the Service Maintenance button
3.2.4.8 From the Service Maintenance screen Press the *Device Settings* button
3.2.4.9 From the Device Settings screen press the *I/O* button
3.2.4.10 In the I/O screen go to the TIO tab
3.2.4.11 Ensure the Door Lock Sensor shows Unlock (Figure 116)

Figure 116

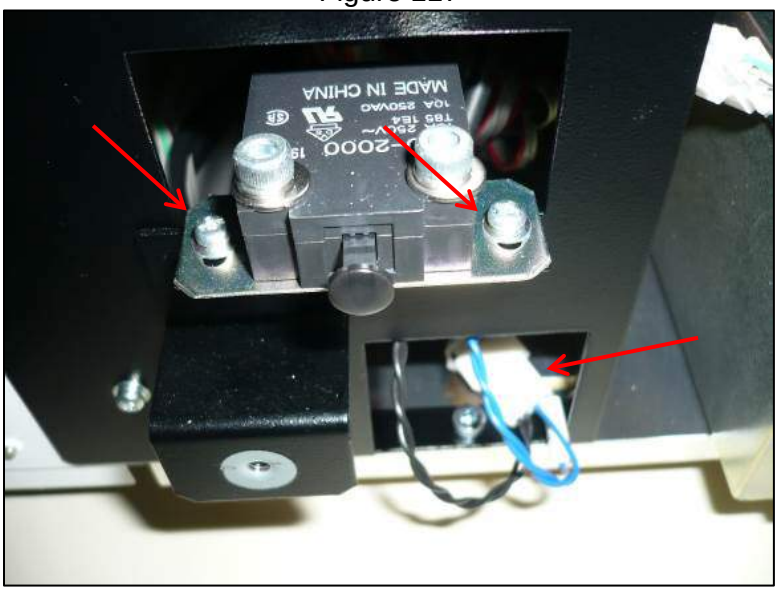


3.2.4.12 Using the Door Solenoid Lock and Unlock buttons test the sensor function.

3.2.5. Maintenance Switch

3.2.5.1 Remove the right side panel of the instrument
3.2.5.2 Remove the two cross slot screws securing the switch and disconnect the electrical connection (Figure 117)

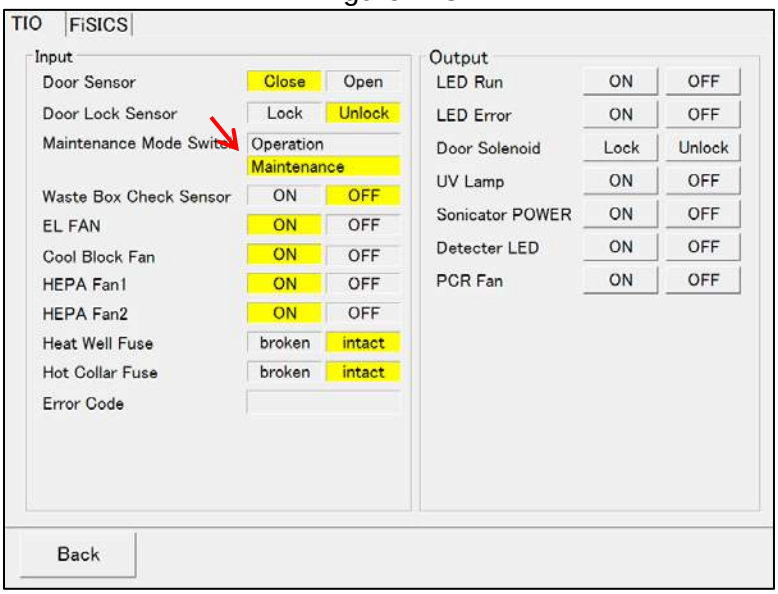
Figure 117



3.2.5.3 Reverse the removal steps to reinstall ensuring the maintenance switch is depressed when the right side is put into place.
3.2.5.4 Check the maintenance switch functionality through the instrument software
3.2.5.5 Go to the maintenance screen and press the Service Maintenance button
3.2.5.6 From the Service Maintenance screen Press the *Device Settings* button
3.2.5.7 From the Device Settings screen press the *I/O* button
3.2.5.8 In the I/O screen go to the TIO tab

3.2.5.9 Ensure the Maintenance mode shows active (Figure 118)

Figure 118

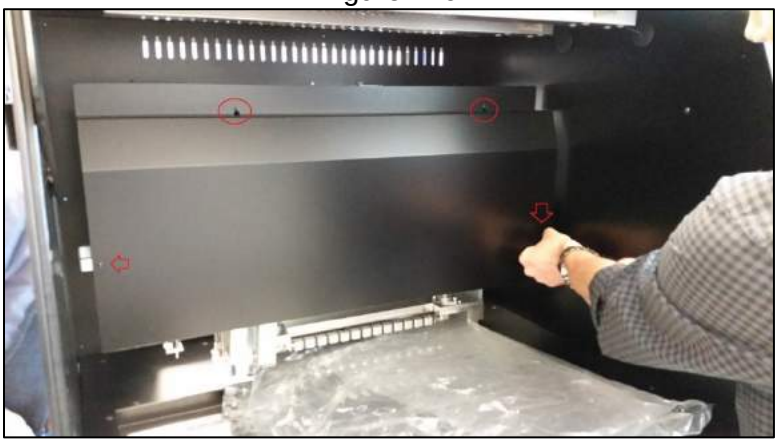


3.3 Interior Panels

3.3.1. Gantry Cover

3.3.1.1 The gantry cover is held in place with 4 cross slot screws. Remove the two lower screws and loosen the two upper screws. The gantry cover can then be lifted upward and tilted out to remove (Figure 119).

Figure 119



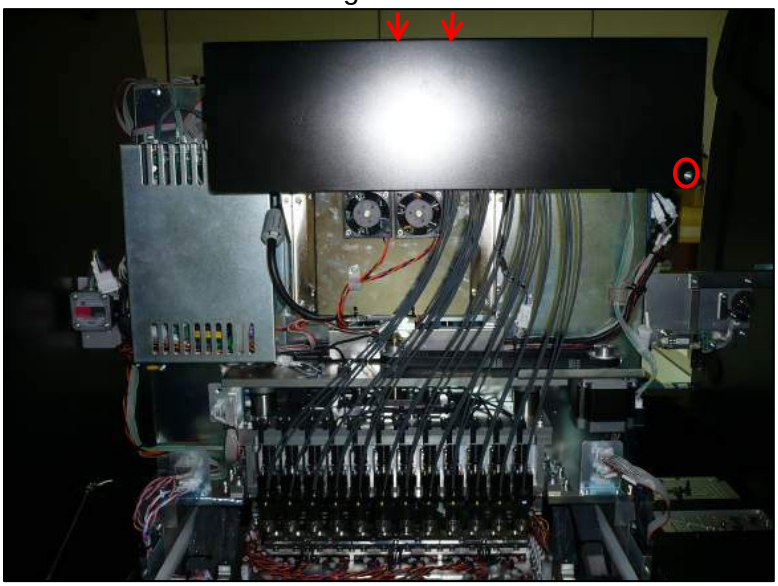
3.3.1.2 To reinstall this cover reverse the steps taken to remove it.

3.3.2. Optics Cover

3.3.2.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.3.2.2 Remove the three cross slot screws that secure the optics cover in place (Figure 120)

Figure 120



3.3.2.3 Tilt the cover toward you as you remove it.

3.3.2.4 To replace the cover ensure that all of the fibers for the detectors lie to the right and reinstall by securing the three screws

3.3.3. Stage Cover

3.3.3.1 Remove the outer rear panel of the instrument (Section 3.1.3)

3.3.3.2 Remove the 6 cross slot screws securing the stage cover downward (Figure 121) and the one that secures it laterally from the back of the instrument (Figure 122)

Figure 121

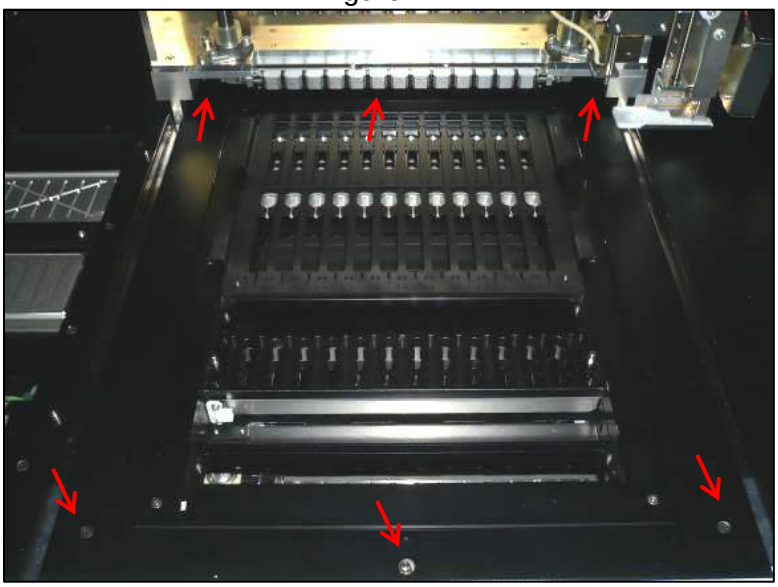
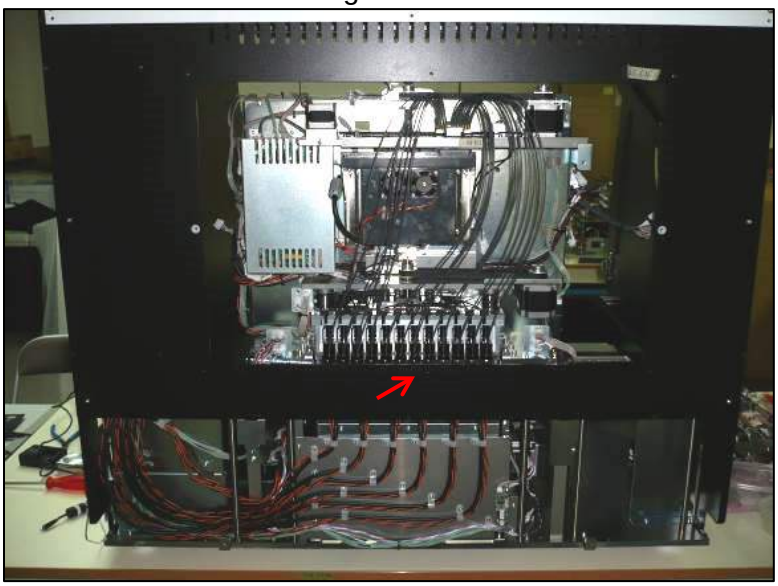


Figure 122



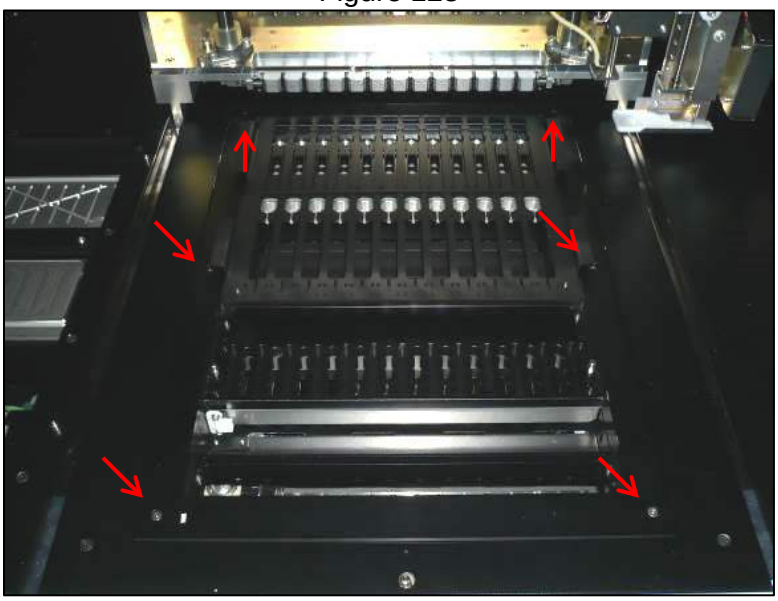
3.3.3.3 Raise the stage cover slightly and slide it forward and out from the instrument

3.3.3.4 Reinstall the stage cover by reversing the steps taken to remove it

3.3.4. Stage

3.3.4.1 Remove the 6 cross slot screws securing the stage downward (Figure 123)

Figure 123



3.3.4.2 Raise the stage slightly and slide it forward and out from the instrument

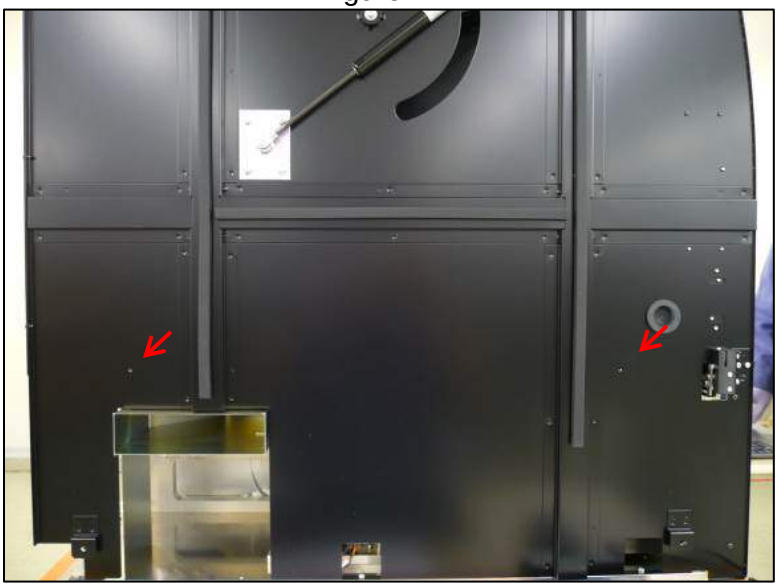
3.3.4.3 To reinstall the stage reverse the steps taken to remove it

3.3.5. Left Side Stage

3.3.5.1 Remove the outer rear panel of the instrument (Section Remove the left side panel of the instrument

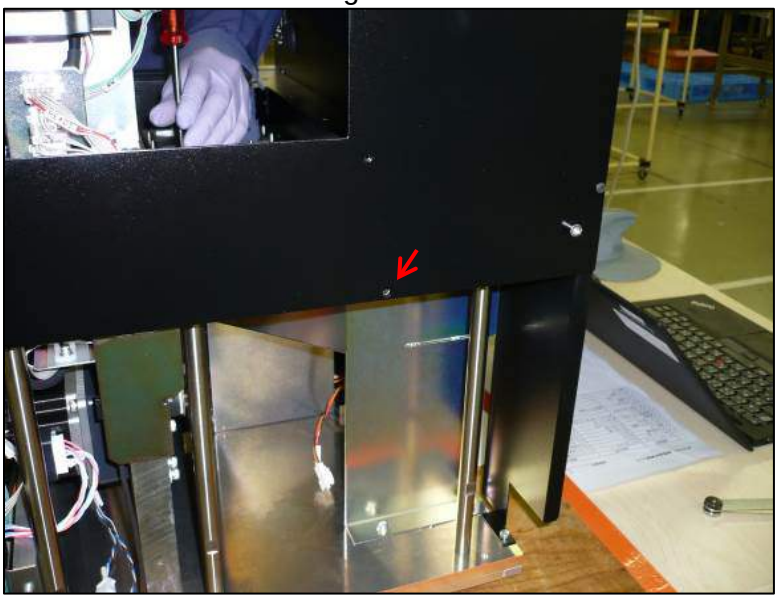
3.3.5.2 Remove the two cross slot screws securing the left stage from the left side of the instrument (Figure 124)

Figure 124



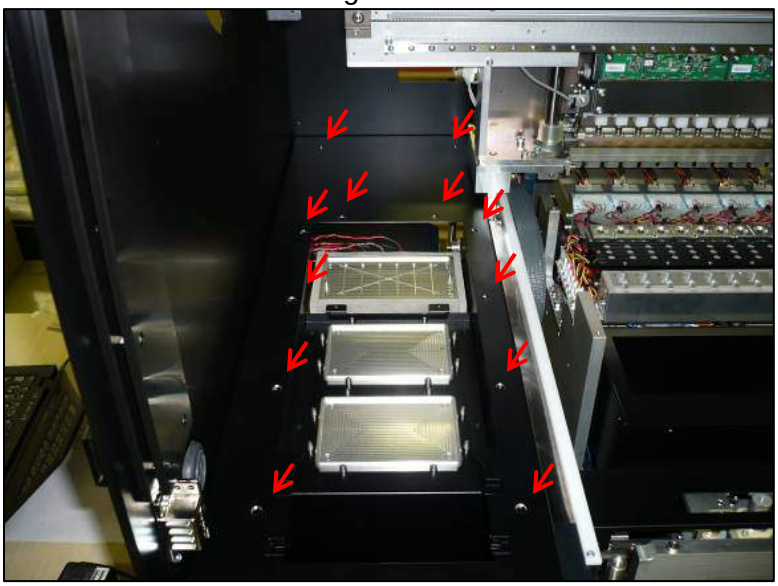
3.3.5.3 Remove the one cross slot screw securing the left stage from the rear of the instrument (Figure 125)

Figure 125



3.3.5.4 Remove the 12 cross slot screws securing the left stage downward (Figure 126)

Figure 126



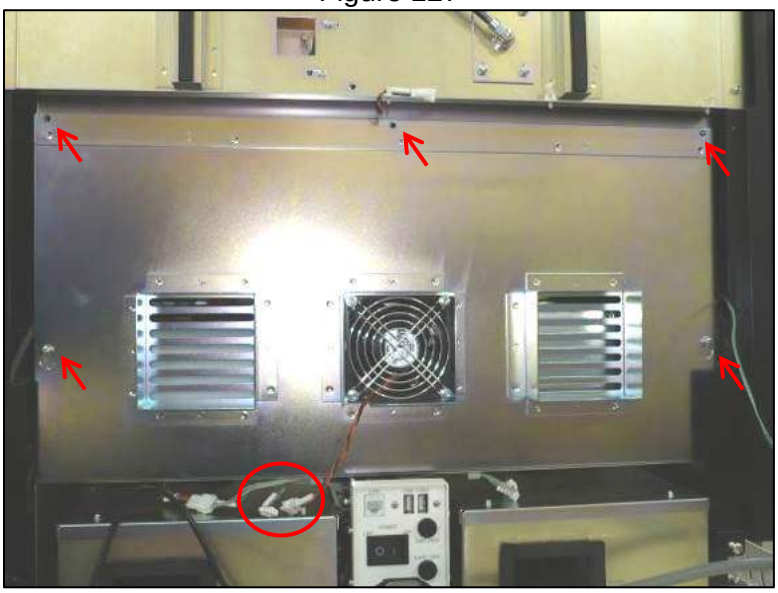
3.3.5.5 Lift up and outward to remove the left stage from the instrument

3.3.6. Electronics Bay Covers

3.3.6.1 Remove the right side panel of the instrument

3.3.6.2 To remove the lower panel remove the three top cross slot screws and loosen the two bottom cross slot screws on the lower panel and disconnect the cooling fan (Figure 127)

Figure 127



3.3.6.3 Lift and tilt the lower panel outward to remove it

3.3.6.4 The upper panel is held by 3 cross slot screws, 2 are accessed via holes in the door damper mounting plate (Figure 128)

Figure 128

3.3.6.5 Once the screws are removed the upper panel can by slid downward while applying slight inward pressure to allow it to clear the cooling fan housing.

3.3.6.6 To remove the door damper panel the door must be disconnected from the damper by removing the E-ring.

3.3.6.7 After removing the E-ring either support the door in the open position or close it, taking care not to bend the end still connected to the damper

3.3.6.8 Remove the door damper panel by removing the 4 cross slot screws that secure it (Figure 129)

Figure 129

3.3.6.9 To replace the dampers install the new ones by reversing the steps taken to remove them

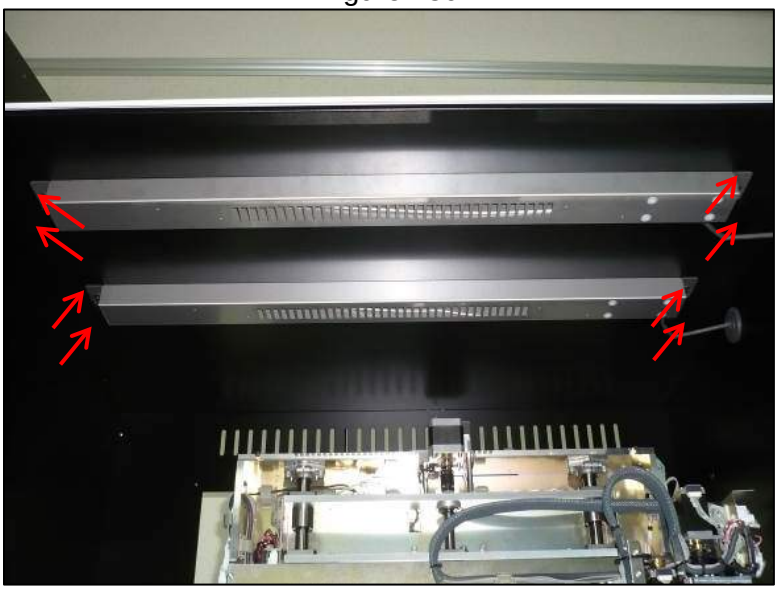
3.3.6.10 Test the new dampers by opening and closing the door ensuring there is no binding

3.4 Consumable Components

3.4.1. UV Bulbs

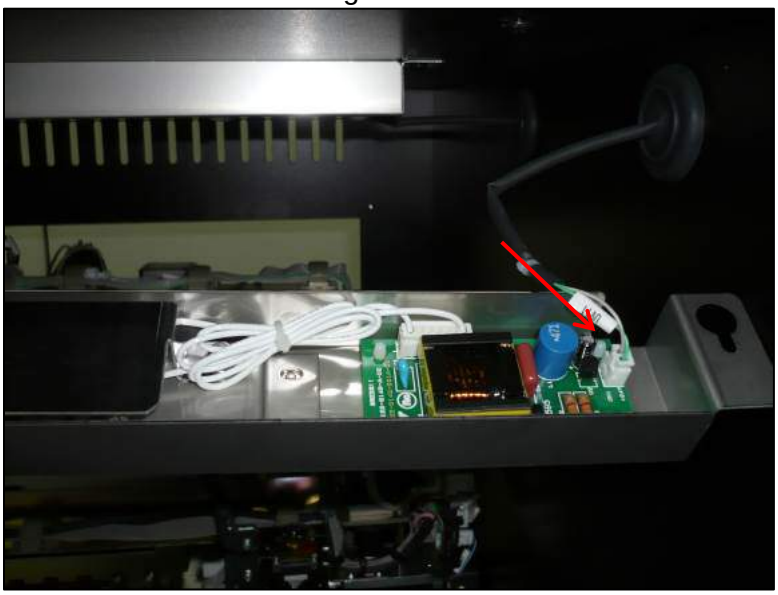
3.4.1.1 Remove the four cross slot screws that secure each UV lamp assembly to the instrument (Figure 130)

Figure 130



3.4.1.2 Carefully lower the UV lamp assembly and unplug the electrical connection (Figure 131)

Figure 131



3.4.1.3 Remove the two cross slot screws that secure the reflector (Figure 132)

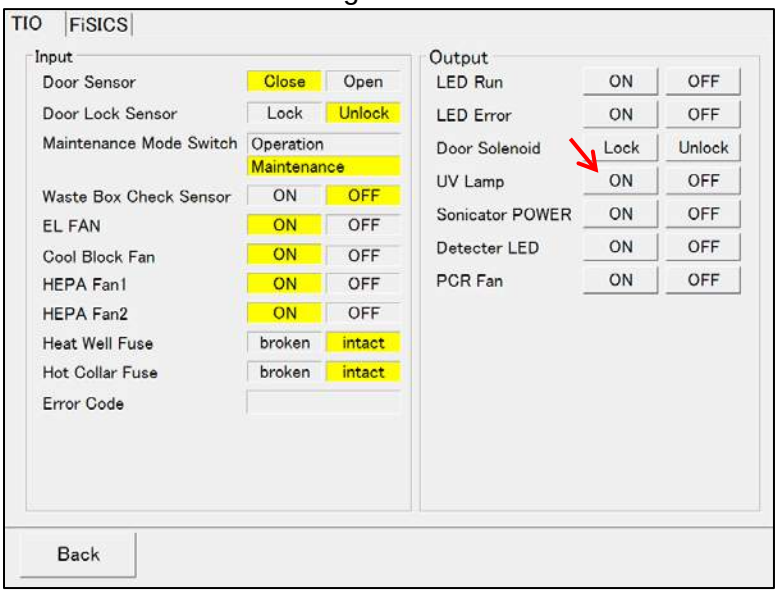
Figure 132

3.4.1.4 Next remove the four cross slot screws that secure the lamp itself (Figure 133)

Figure 133

3.4.1.5 To replace the lamp reverse the steps taken to remove it.
3.4.1.6 Check that the lamps function through the instrument maintenance software
3.4.1.7 Go to the maintenance screen and press the Service Maintenance button
3.4.1.8 From the Service Maintenance screen Press the *Device Settings* button
3.4.1.9 From the Device Settings screen press the *I/O* button
3.4.1.10 In the I/O screen go to the TIO tab
3.4.1.11 Press the UV Lamp ON button and ensure both lamps are on (Figure 134)

Figure 134

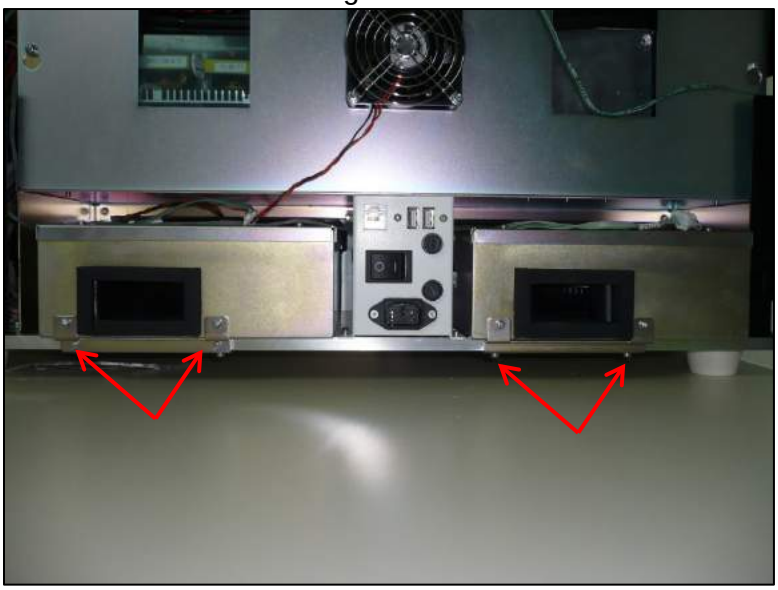


3.4.2. HEPA Units and Filters

3.4.2.1 Remove the right side panel of the instrument

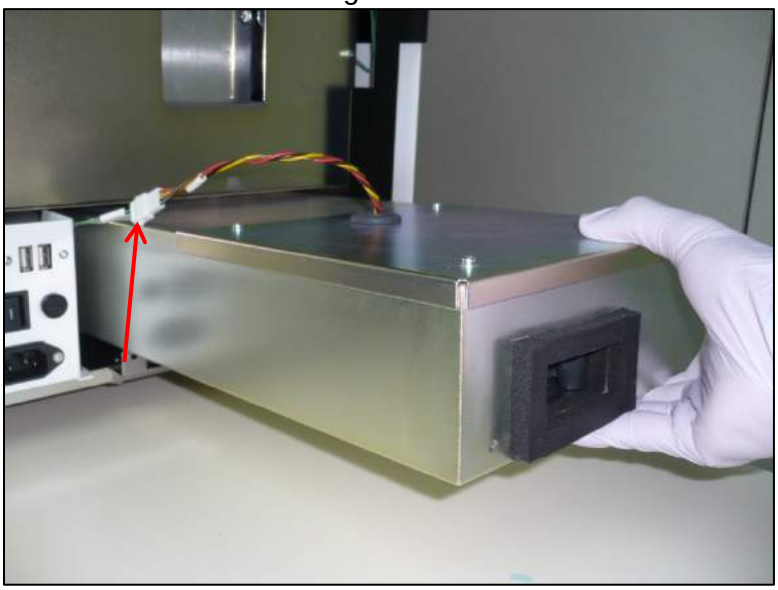
3.4.2.2 Remove the two cross slot screws that secure each HEPA unit (Figure 135)

Figure 135



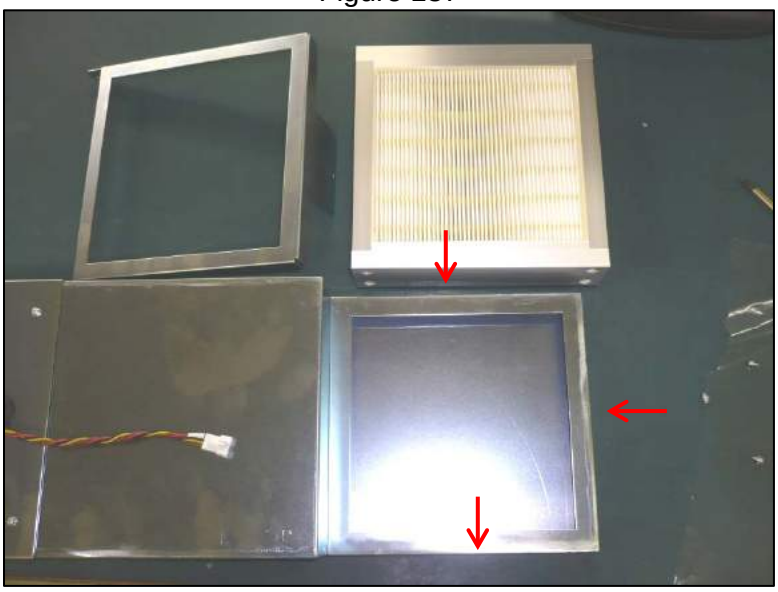
3.4.2.3 Slide the HEPA unit outward and disconnect the fans power cord (Figure 136)

Figure 136



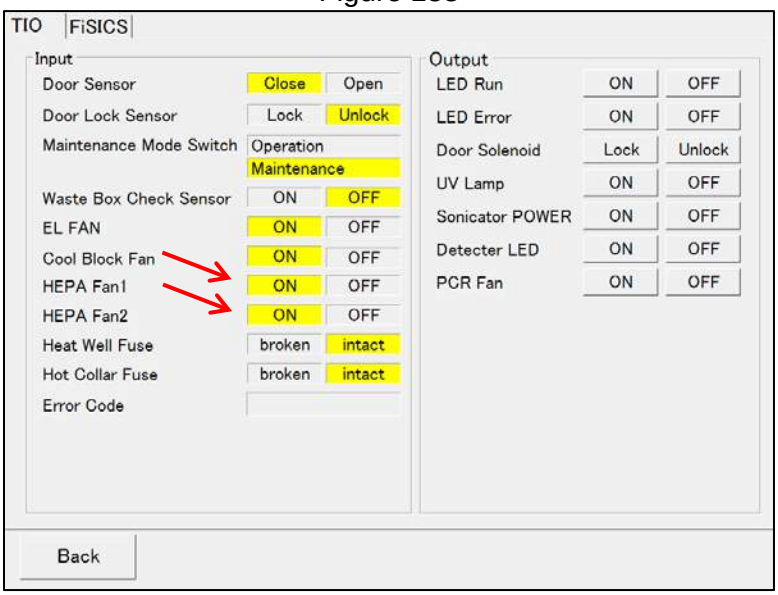
3.4.2.4 To access the HEPA filter remove the three screws that secure it and lift the cover and then the filter out (Figure 137)

Figure 137



3.4.2.5 To replace the filter and / or the unit reverse the steps taken to remove it.
3.4.2.6 Check that the fans function through the instrument maintenance software
3.4.2.7 Go to the maintenance screen and press the Service Maintenance button
3.4.2.8 From the Service Maintenance screen Press the *Device Settings* button
3.4.2.9 From the Device Settings screen press the *I/O* button
3.4.2.10 In the I/O screen go to the TIO tab
3.4.2.11 Ensure the door is closed and that both fans show ON (Figure 138)

Figure 138



3.5 Thermal Control and Ventilation

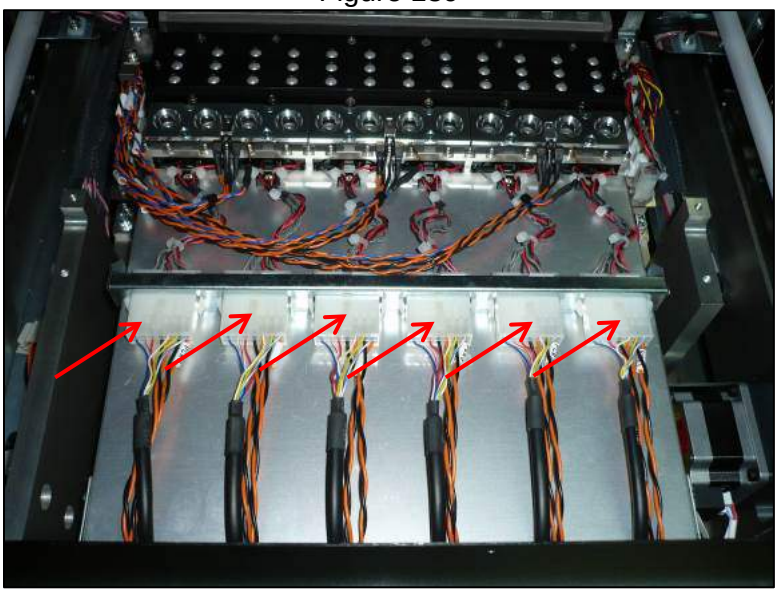
3.5.1. PCR Cycler Assembly

3.5.1.1 Remove the outer rear panel of the instrument and the light shield

3.5.1.2 Remove the stage and stage cover

3.5.1.3 From the rear of the instrument disconnect the 6 electrical connections for the hot collars (Figure 139)

Figure 139



3.5.1.4 Remove the five cross slot screws securing the PCR Cycler assembly (Figure 140, Figure 141, Figure 142)

Figure 140

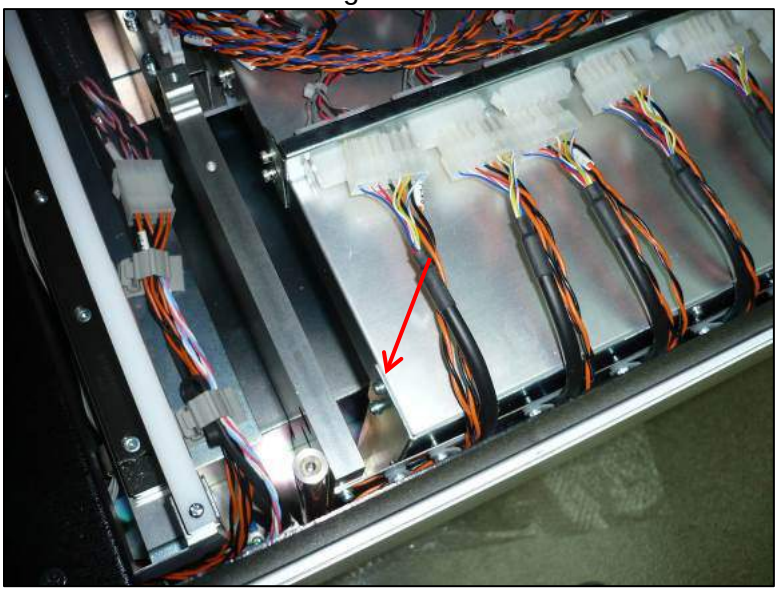


Figure 141

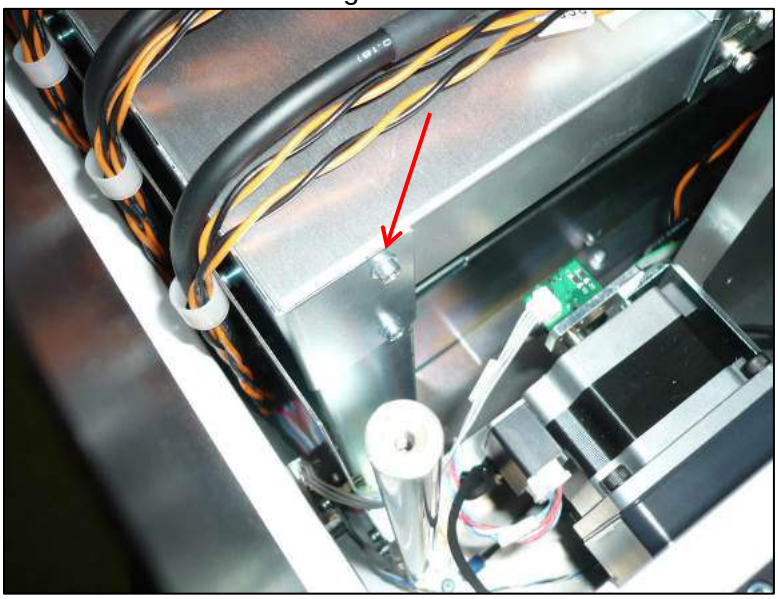
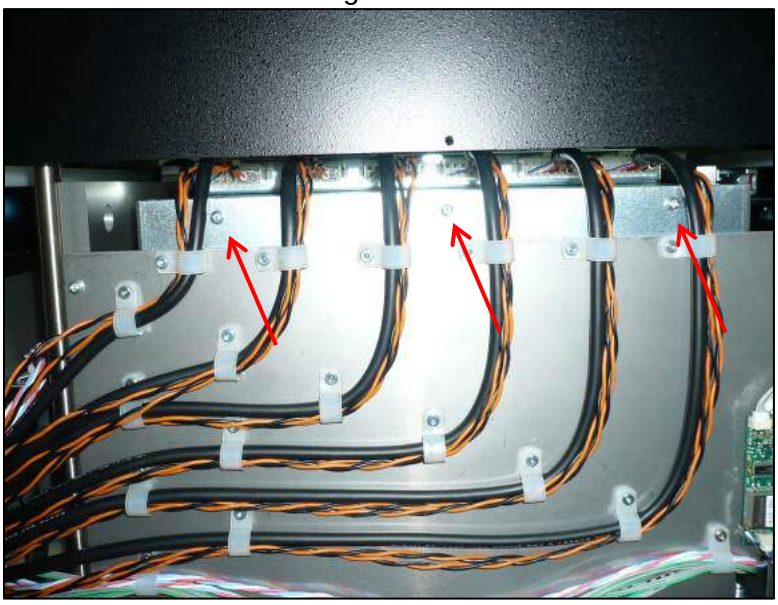
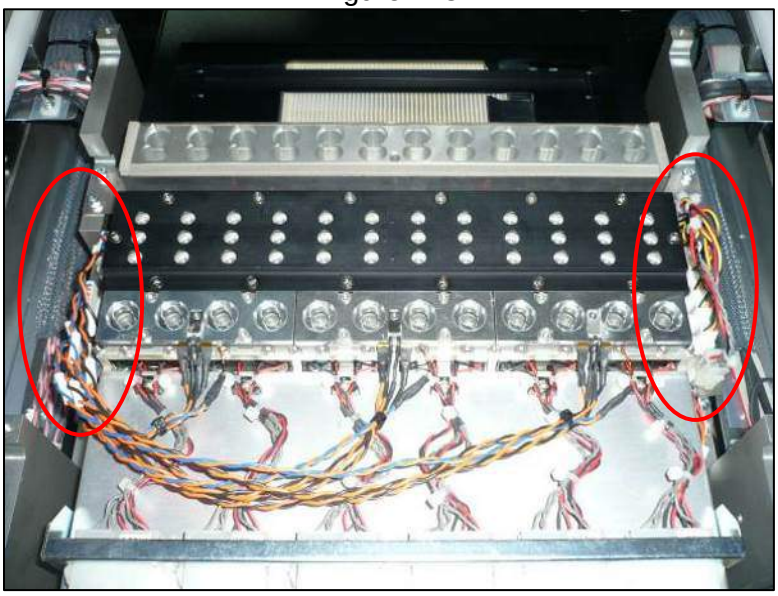


Figure 142



3.5.1.5 Remove the six connectors on each end of the PCR cycler assembly (Figure 143)

Figure 143



3.5.1.6 Remove the six 4 mm hex head screws on either end of the PCR cycler assembly (Figure 144, Figure 145)

Figure 144

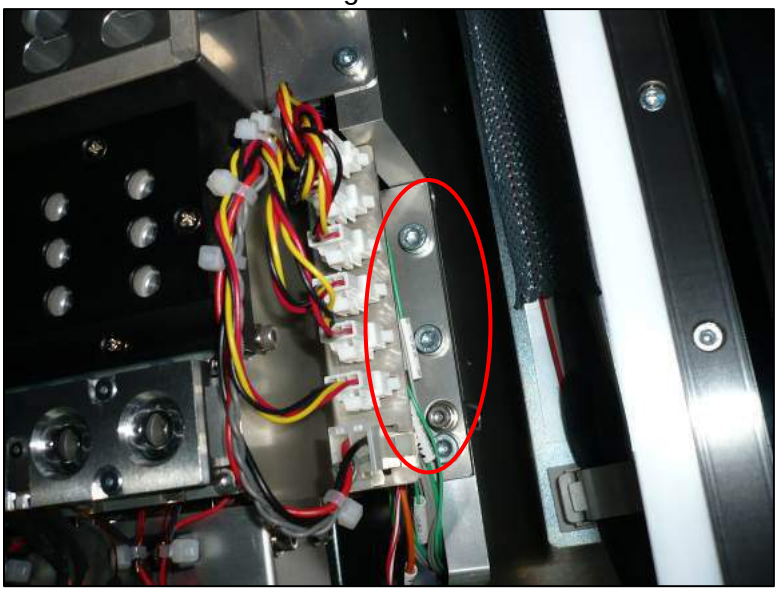
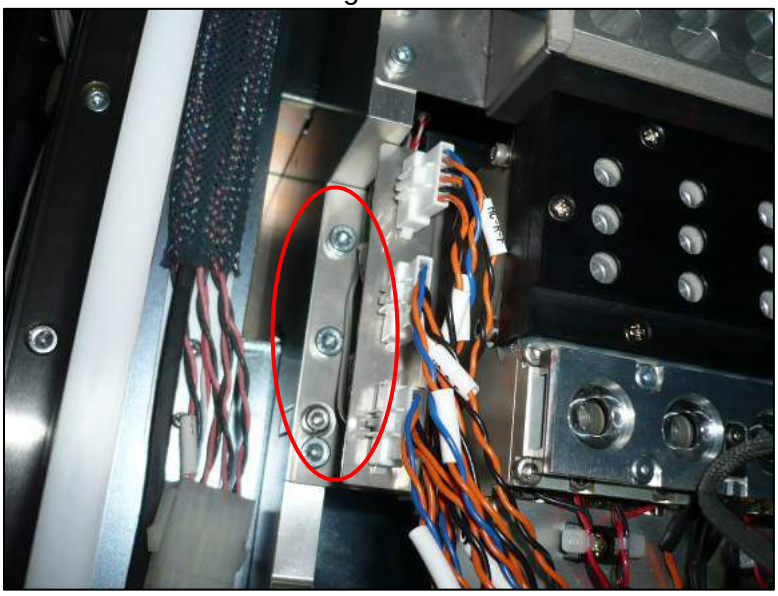


Figure 145

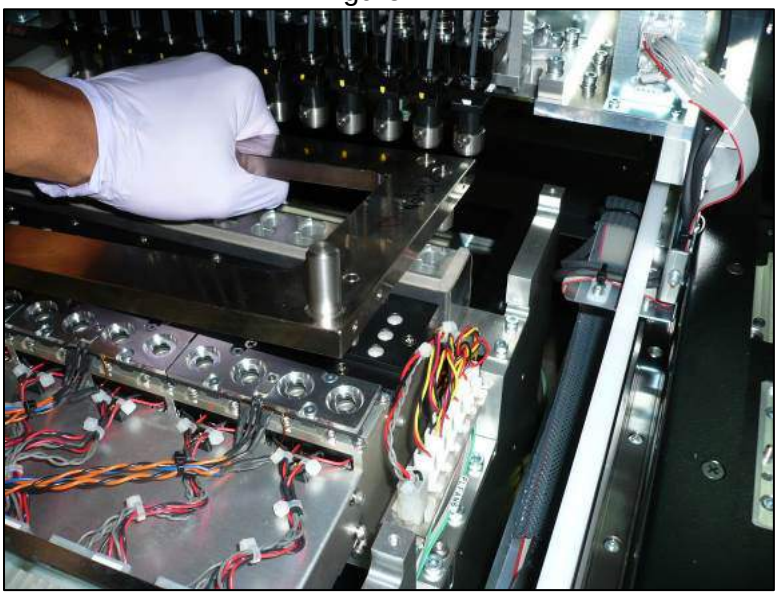


3.5.1.7 Carefully lift the entire PCR cycler assembly up and out of the instrument from the rear side (Figure 146)

Figure 146

3.5.1.8 Insert the new PCR cycler assembly into the instrument and position it using the PCR Cycler Assembly positioning jig (Figure 147)

Figure 147



3.5.1.9 When the PCR cycler assembly is properly installed and positioned with the jig re-install the six 4 mm hex head screws removed earlier, and also the five cross slot screws. Use care to not overtighten the five cross slot screws as they thread into the aluminum frame.

3.5.1.10 Reconnect all of the electrical connections paying close attention to the labels to ensure proper connections.

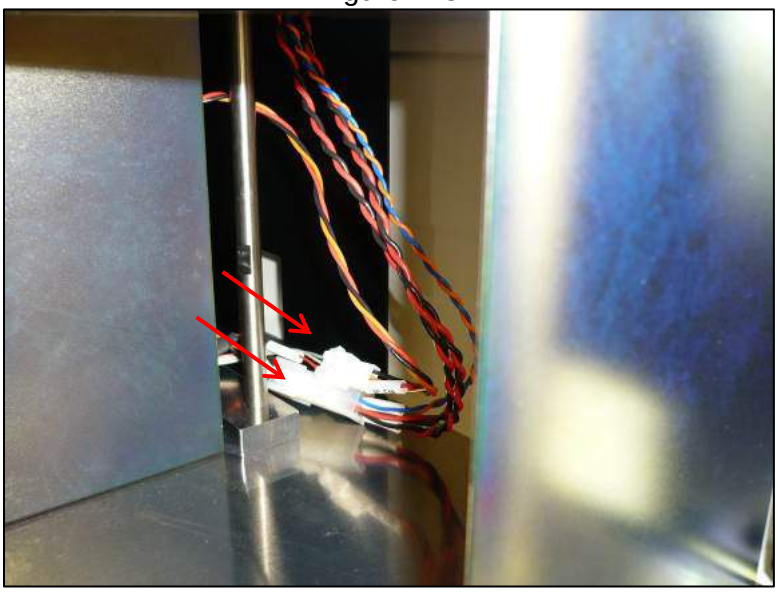
3.5.1.11 Reassemble the rest of the instrument by reversing the steps taken to remove the components and following the teaching and positioning steps in the latest revision of PSS Document P280062MQ001 or MDSOP-002 whichever is more recent.

3.5.1.12 Following PCR cycler assembly it is necessary to carry out a PCR cycler assembly calibration and an instrument performance qualification run as described in the latest revision of PSS Document P280062PQ004 or MDSOP-002 whichever is more recent.

3.5.2. Cooling Block Assembly

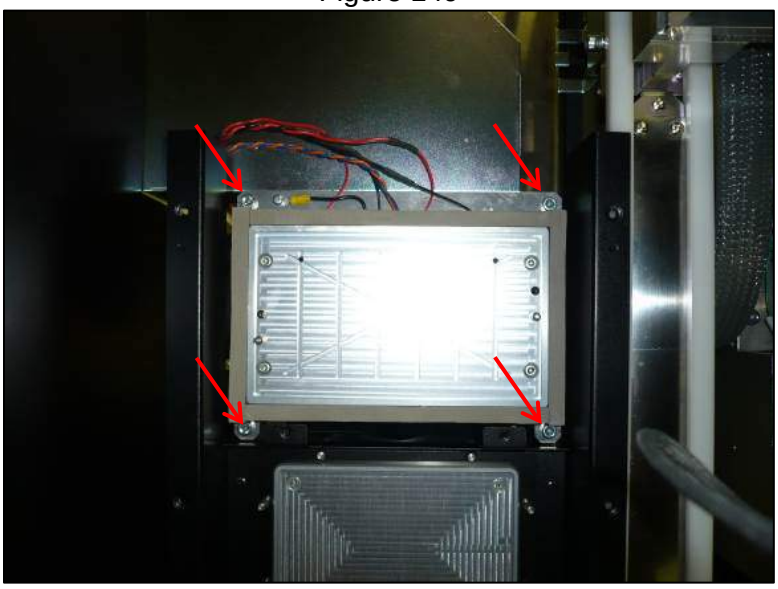
3.5.2.1 Remove the outer rear panel of the instrument and the light shield
3.5.2.2 Remove the left side panel of the instrument
3.5.2.3 Remove the left side stage of the instrument
3.5.2.4 Cut the zip tie securing the wiring for the cooling block assembly and disconnect the two electrical connections (Figure 148)

Figure 148



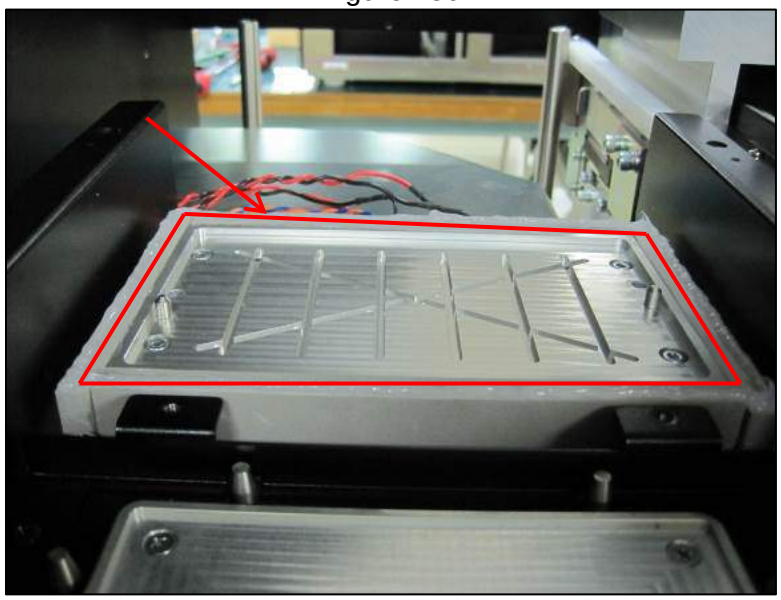
3.5.2.5 Remove the four 3mm hex head screws securing the cooling block assembly (Figure 149)

Figure 149



3.5.2.6 Install insulation onto new cooling block and then reverse removal steps to reinstall (Figure 150)

Figure 150



3.5.2.7 Reassemble the rest of the instrument by reversing the steps taken to remove the components and following the teaching and positioning steps in the latest revision of PSS Document P280062MQ001 or MDSOP-002 whichever is more recent.

3.5.2.8 Check that the cooling block is functioning correctly by carrying out the temperature control function check portion of MDSOP-002

3.5.3. Heat Block Assembly

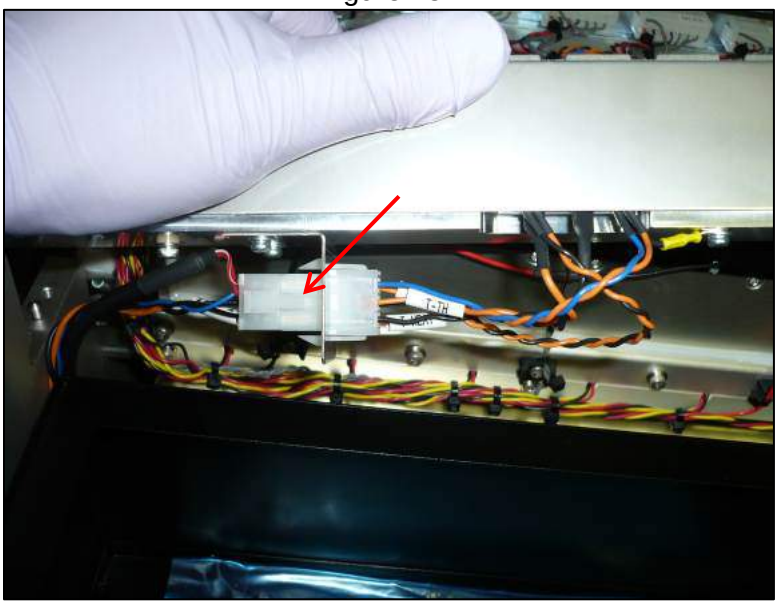
3.5.3.1 Remove the stage and stage cover

3.5.3.2 Remove the four 3 mm hex head screws securing the heat block assembly (Figure 151)

Figure 151

3.5.3.3 Unplug the electrical connection to the heat block assembly (Figure 152)

Figure 152



3.5.3.4 Reverse the steps taken to remove the heat block assembly to reinstall.

3.5.3.5 Reassemble the rest of the instrument by reversing the steps taken to remove the components and following the teaching and positioning steps in the latest revision of PSS Document P280062MQ001 or MDSOP-002 whichever is more recent.

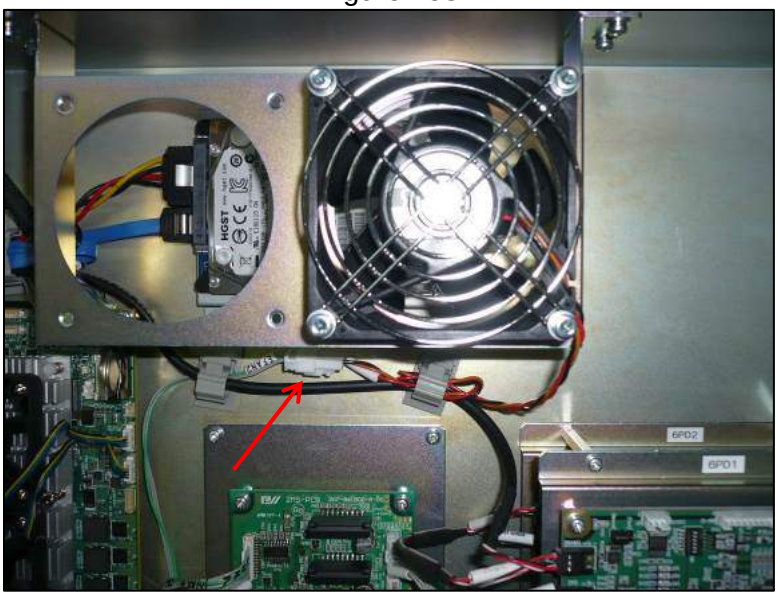
3.5.3.6 Check that the heat block is functioning correctly by carrying out the temperature control function check portion of MDSOP-002

3.5.4. Upper Electronics Bay Fan

3.5.4.1 Remove the electronics bay covers of the instrument

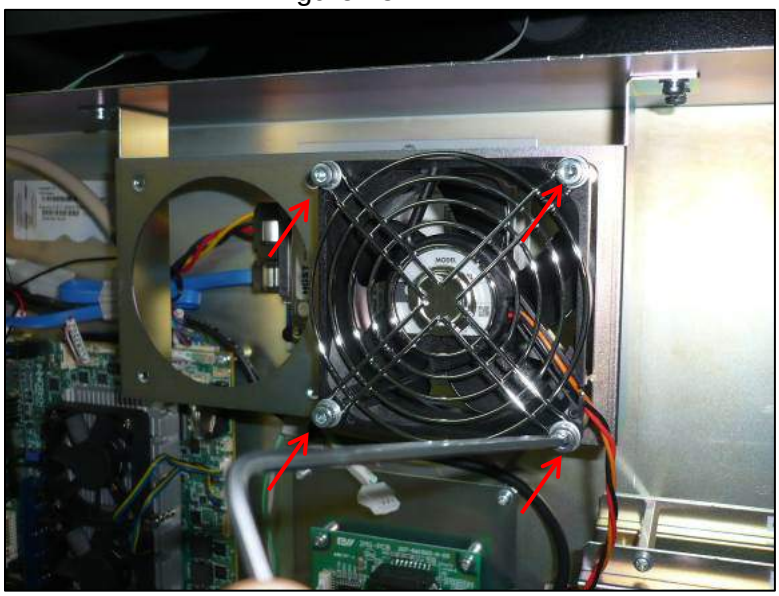
3.5.4.2 Disconnect the fan's electrical connection (Figure 153)

Figure 153



3.5.4.3 Remove the four 3 mm hex head screws securing the fan (Figure 154)

Figure 154

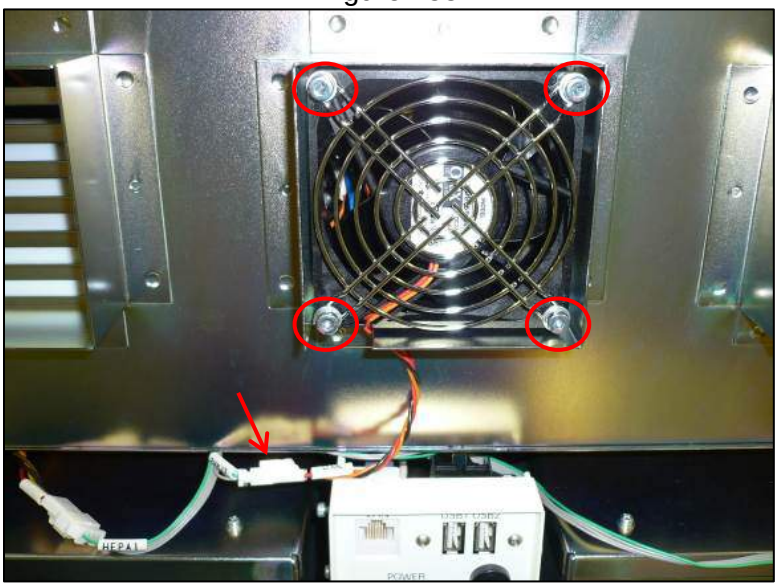


3.5.4.4 Install the new fan by reversing the steps taken to remove the old one.
3.5.4.5 Test the fan by powering on the instrument and observing that the fan functions.

3.5.5. Lower Electronics Bay Fan

3.5.5.1 Remove the right side panel of the instrument
3.5.5.2 Disconnect the fan's electrical connection (Figure 155)
3.5.5.3 Remove the four 3 mm hex head screws securing the fan(Figure 155)

Figure 155



3.5.5.4 Install the new fan by reversing the steps taken to remove the old one.
3.5.5.5 Test the fan by powering on the instrument and observing that the fan functions.

3.6 Single Nozzle Module

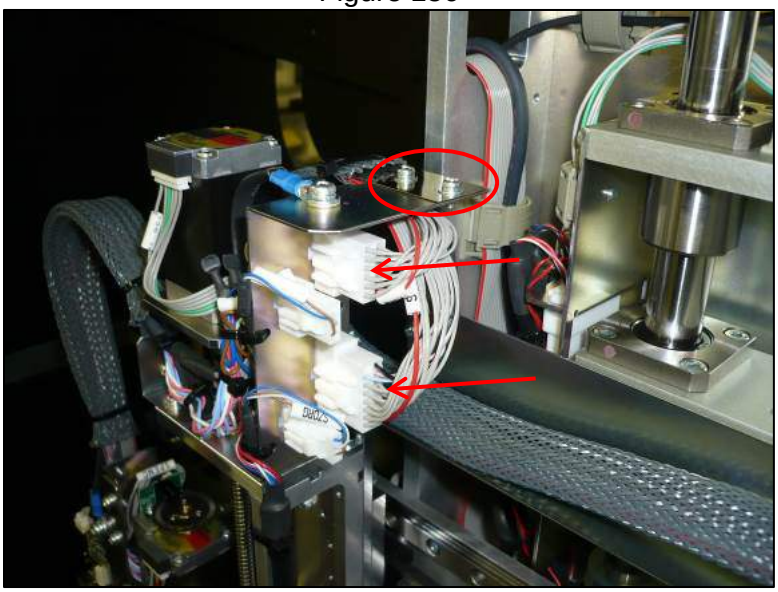
3.6.1. Single Nozzle Assembly

3.6.1.1 Remove the gantry cover of the instrument

3.6.1.2 With the power off manually move the single nozzle assembly so that it is over the tip receptacle

3.6.1.3 Remove the two cross slot screws that secure the cable guide from the single nozzle assembly and disconnect the two electrical connections (Figure 156)

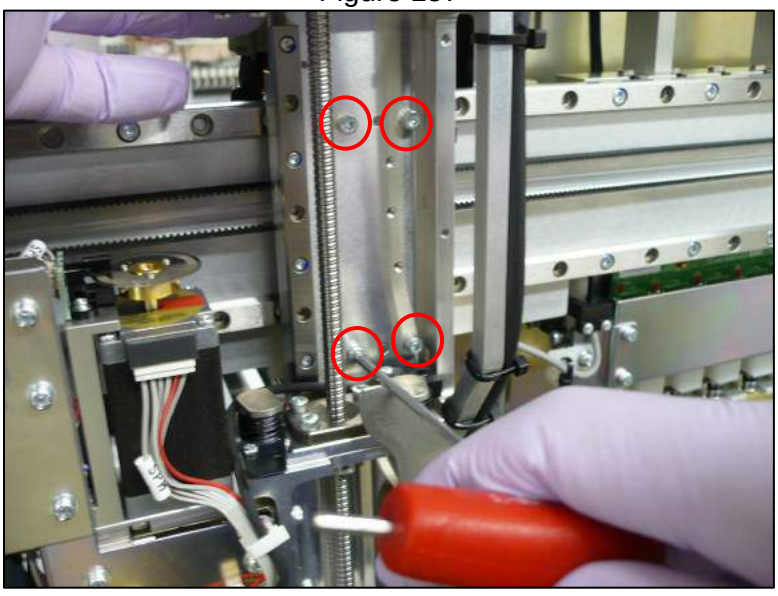
Figure 156



3.6.1.4 Lower the single nozzle pipette head by manually turning the screw shaft until the four 2.5 mm hex head bolts that secure it are exposed and can be removed (Figure 157)

3.6.1.5 Support the assembly as you remove the four screws to prevent dropping it

Figure 157



3.6.1.6 Install the new single nozzle assembly by reversing the steps taken to remove it.

3.6.1.7 Reassemble the rest of the instrument by reversing the steps taken to remove the components and following the teaching and positioning steps in the latest revision of PSS Document P280062MQ001 or MDSOP-002 whichever is more recent.

3.6.1.8 After replacement carry out the single nozzle pipetting accuracy checks as specified in the MDSOP-002 qualification procedure to confirm functionality

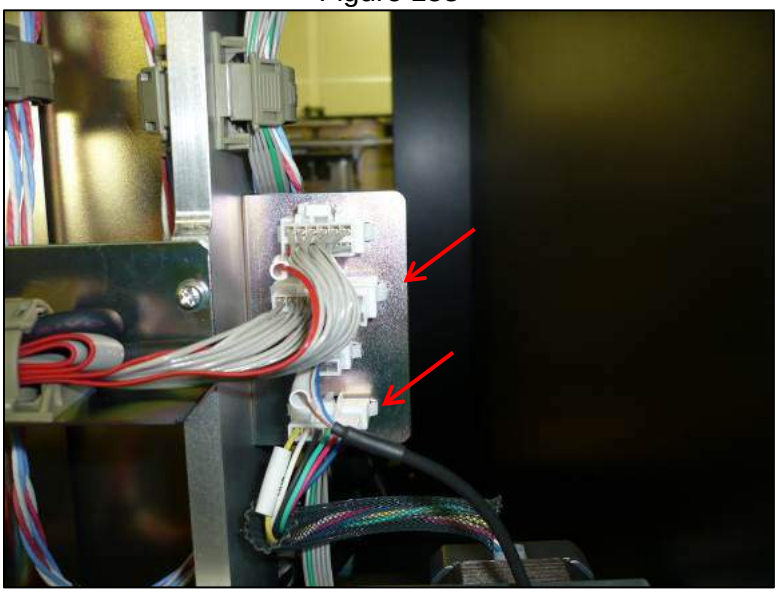
3.6.2. SX Axis Assembly

3.6.2.1 Remove the gantry cover of the instrument

3.6.2.2 Remove the single nozzle assembly from the instrument

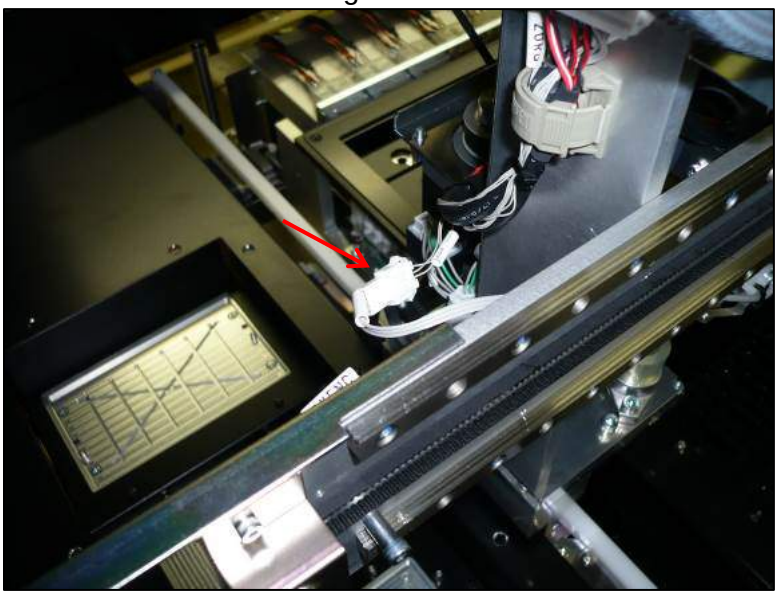
3.6.2.3 Remove the SX axis motor and org sensor electrical connections on the right side of the SX axis assembly (Figure 158)

Figure 158



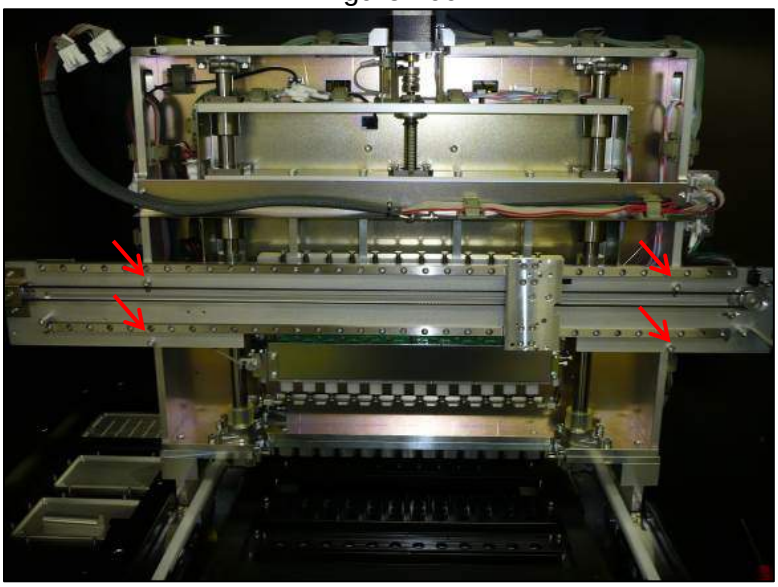
3.6.2.4 Remove the SX axis encoder electrical connection on the left rear of the SX axis assembly (Figure 159)

Figure 159



3.6.2.5 Remove the four 3 mm hex head screws that secure the SX axis assembly taking care to support it while removing (Figure 160)

Figure 160



3.6.2.6 Reinstall the new unit by reversing the steps taken for removal

3.6.2.7 Reassemble the rest of the instrument by reversing the steps taken to remove the components and following the teaching and positioning steps in the latest revision of PSS Document P280062MQ001 or MDSOP-002 whichever is more recent.

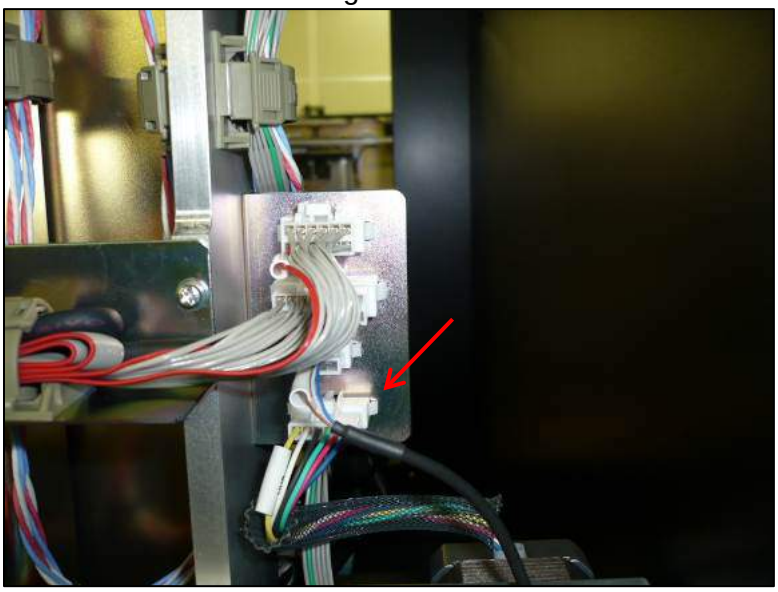
3.6.2.8 After replacement carry out the single nozzle pipetting accuracy checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.3. SX Axis Motor

3.6.3.1 Remove the gantry cover of the instrument

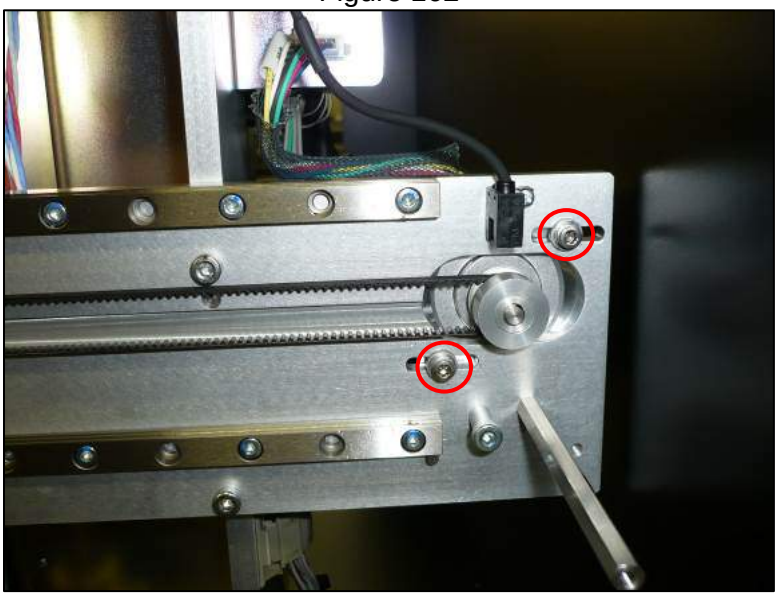
3.6.3.2 Disconnect the motor's electrical connection (Figure 161)

Figure 161



3.6.3.3 Remove the two 2.5 mm hex head screws that secure the motor while supporting it (Figure 162)

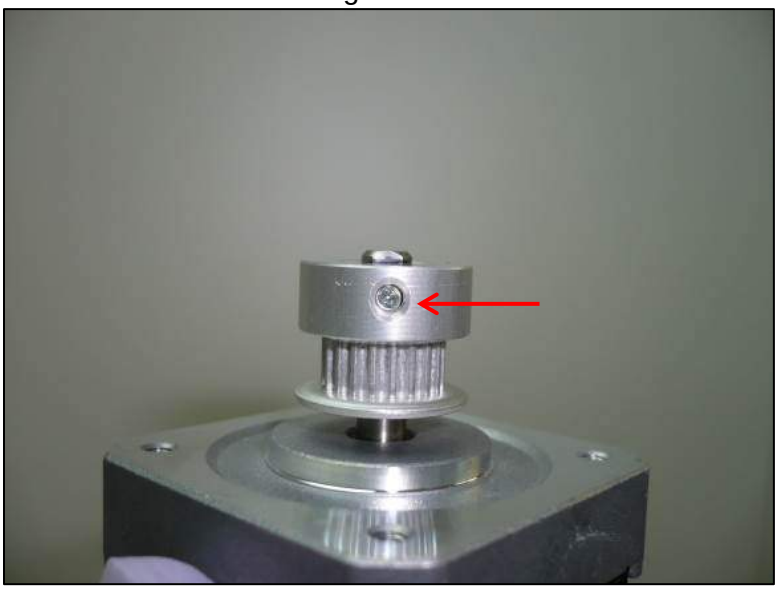
Figure 162



3.6.3.4 Slip the belt over the pulley as you remove the motor

3.6.3.5 Loosen the 1.5 mm hex head screw and remove the pulley from the old motor and place on the new motor shaft (Figure 163)

Figure 163



3.6.3.6 Reinstall the motor by reversing the steps taken to remove it and re-tension the belt to its specified tension

3.6.3.7 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

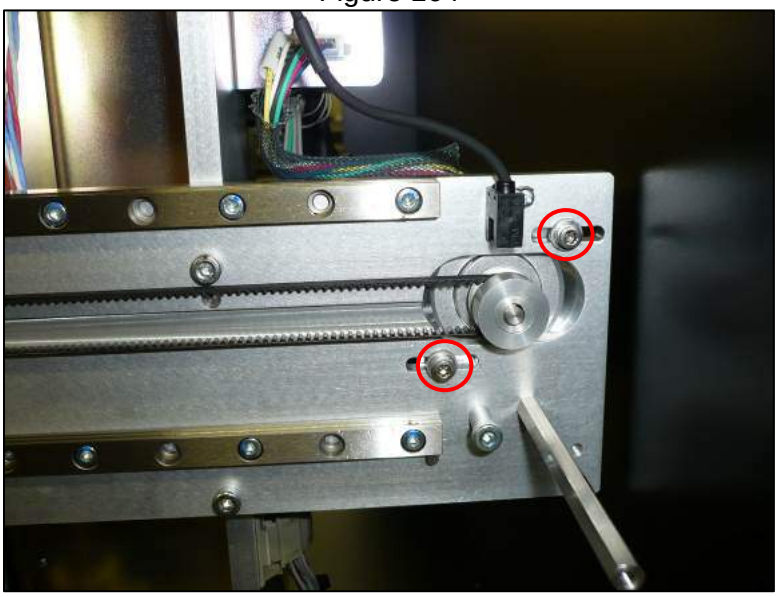
3.6.4. SX Axis Belt

3.6.4.1 Remove the gantry cover of the instrument

3.6.4.2 Remove the single nozzle assembly from the instrument

3.6.4.3 Loosen the two 2.5 mm hex head screws that secure the motor (Figure 164)

Figure 164



3.6.4.4 Slip the belt over the right end pulley

3.6.4.5 Remove the two cross slot screws that secure the SX axis belt fixture and remove it from the belt (Figure 165 & Figure 166)

Figure 165

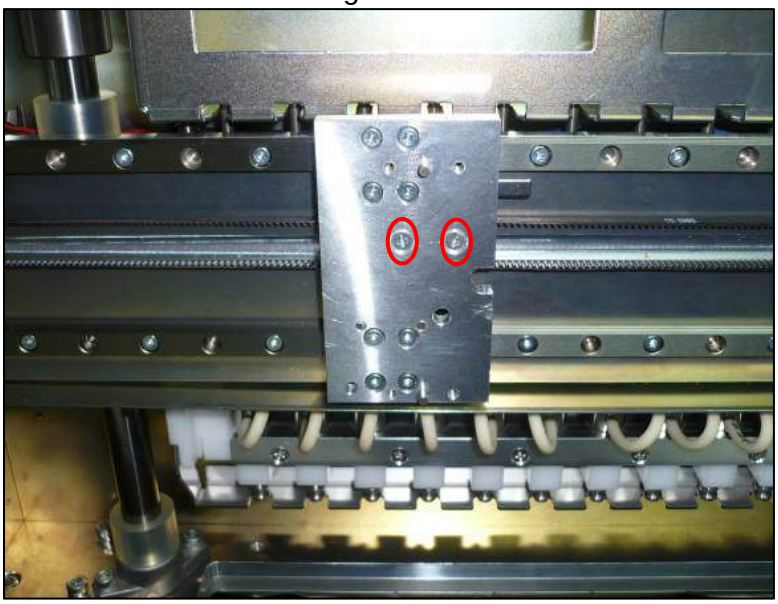
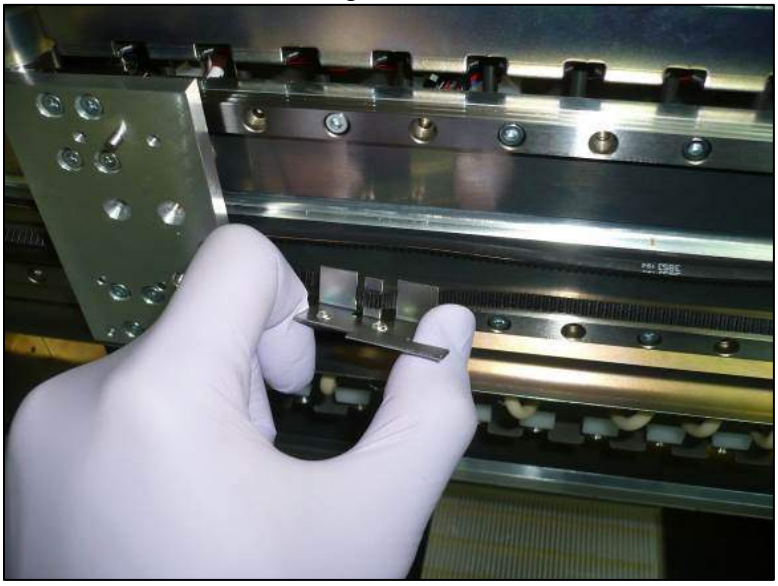
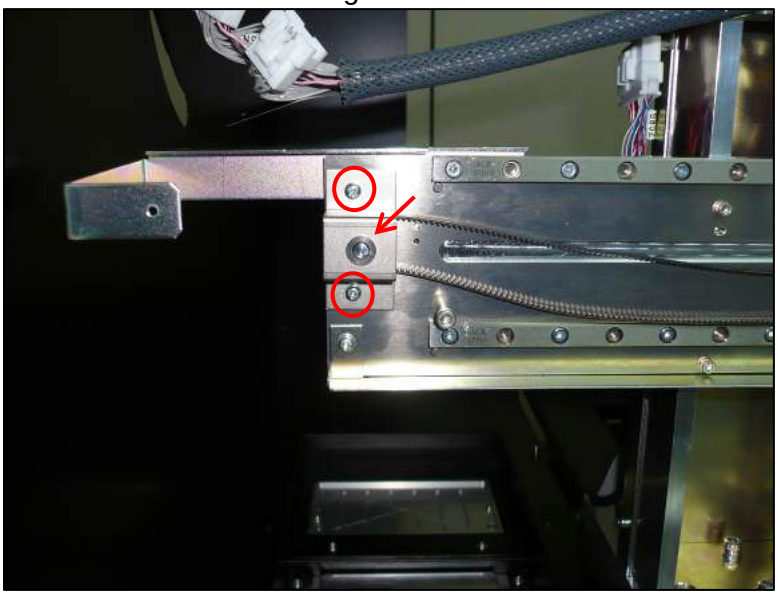


Figure 166



3.6.4.6 Remove the e-ring and the two cross slot screws that secure the pulley on the left end of the SX axis and slip the belt off of the idler pulley (Figure 167)

Figure 167



3.6.4.7 Install the new belt by reversing the procedure to remove it

3.6.4.8 Install the new belt by reversing the steps taken to remove it and re-tension the belt to its specified tension

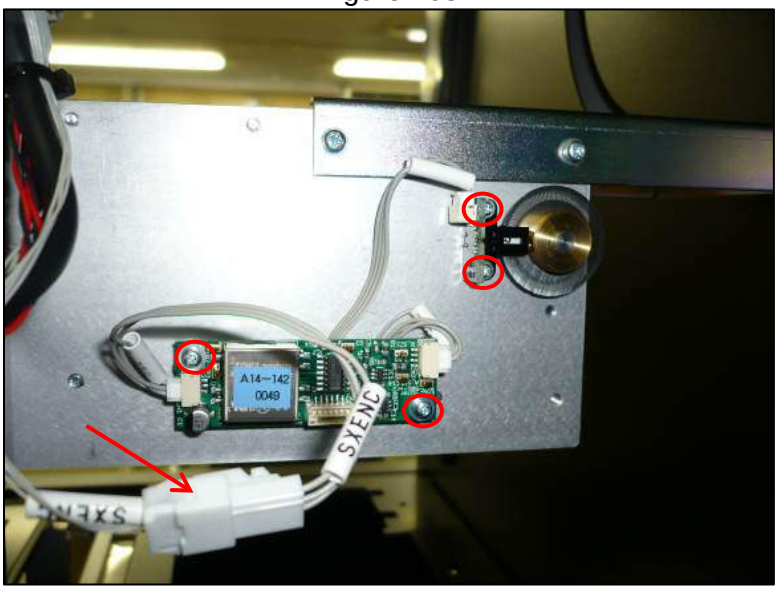
3.6.4.9 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.5. SX Axis Encoder Board and Sensor

3.6.5.1 Remove the gantry cover of the instrument

3.6.5.2 Disconnect the encoders electrical connection and remove the four cross slot screws (two for encoder board, and two for sensor) (Figure 168)

Figure 168



3.6.5.3 Reverse the steps taken to remove the encoder board and sensor to install the replacement.

3.6.5.4 Using the encoder boss jig ensure that the encoder wheel is the proper distance from the sensor. If not adjust the encoder wheel position

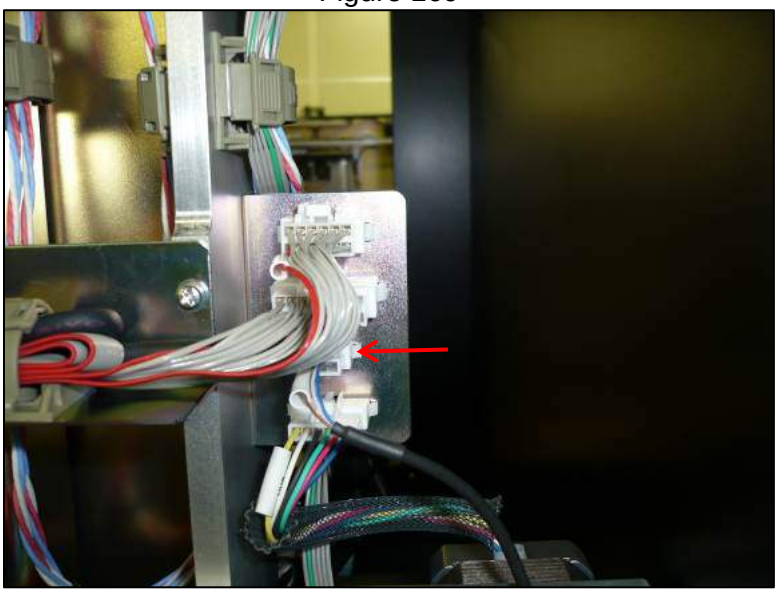
3.6.5.5 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.6. SX Axis Org Sensor

3.6.6.1 Remove the gantry cover of the instrument

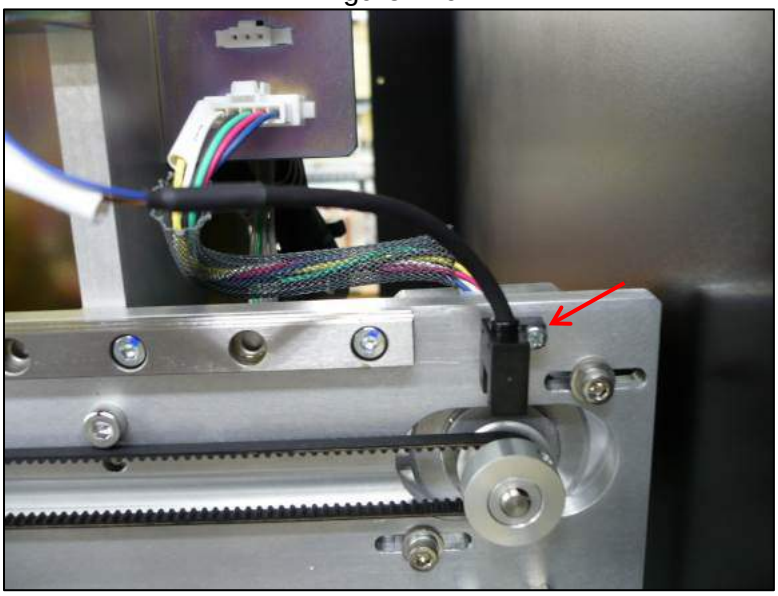
3.6.6.2 Disconnect the org sensor electrical connection (Figure 169)

Figure 169



3.6.6.3 Remove the cross slot screw that secures the sensor to the SX axis (Figure 170)

Figure 170



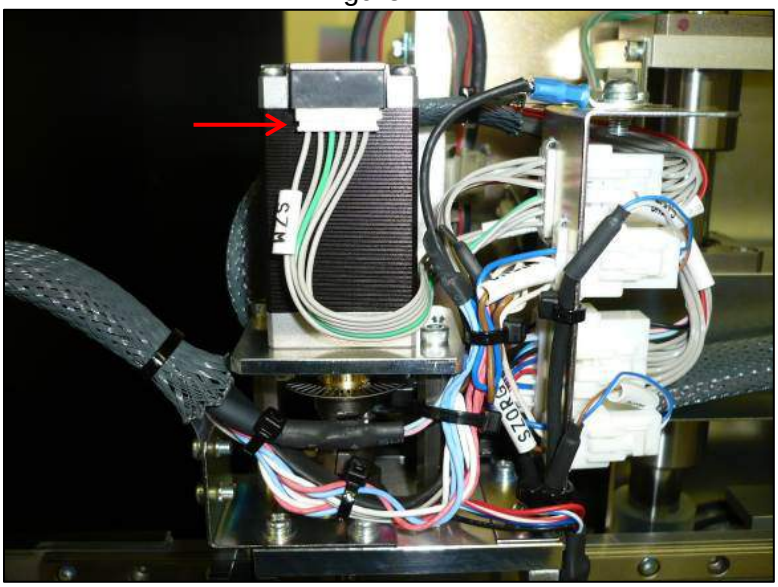
3.6.6.4 Install the replacement org sensor by reversing the steps to remove the old one

3.6.6.5 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.7. SZ Axis Motor

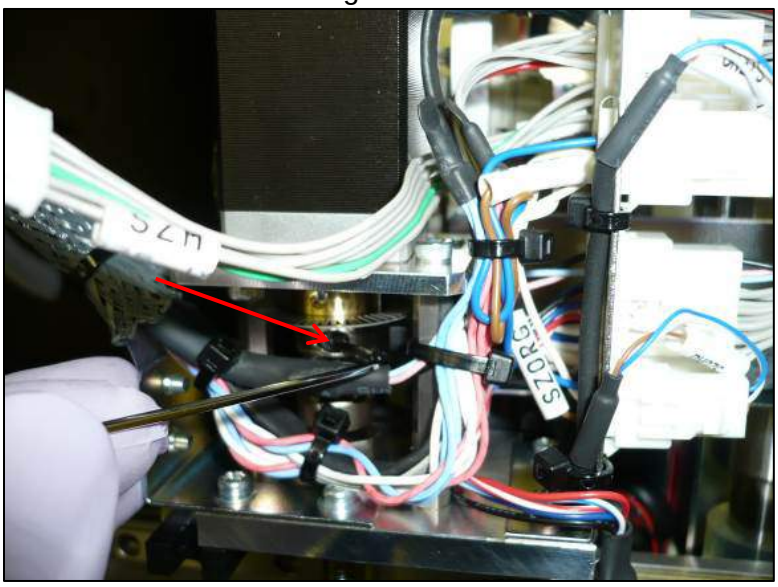
3.6.7.1 Remove the gantry cover of the instrument
3.6.7.2 Disconnect the motor's electrical connection (Figure 171)

Figure 171



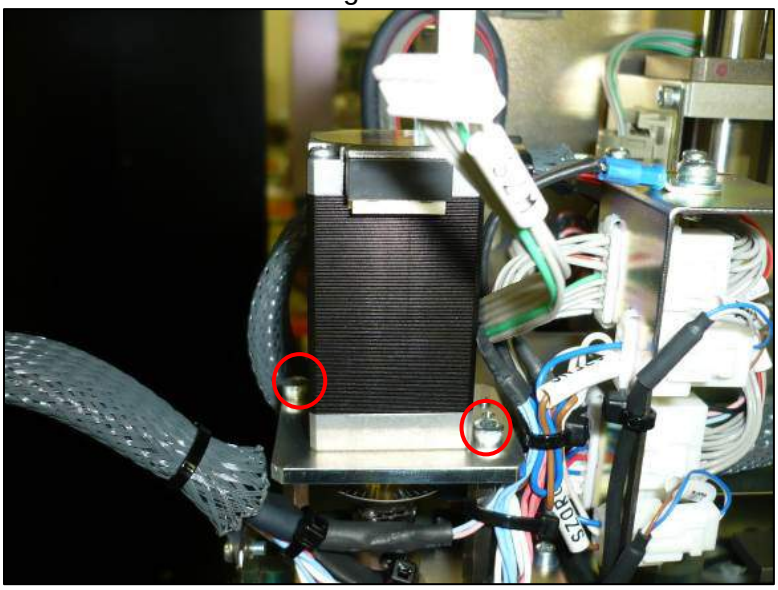
3.6.7.3 Loosen but do not remove the 1.5 mm hex head coupling screw (Figure 172)

Figure 172



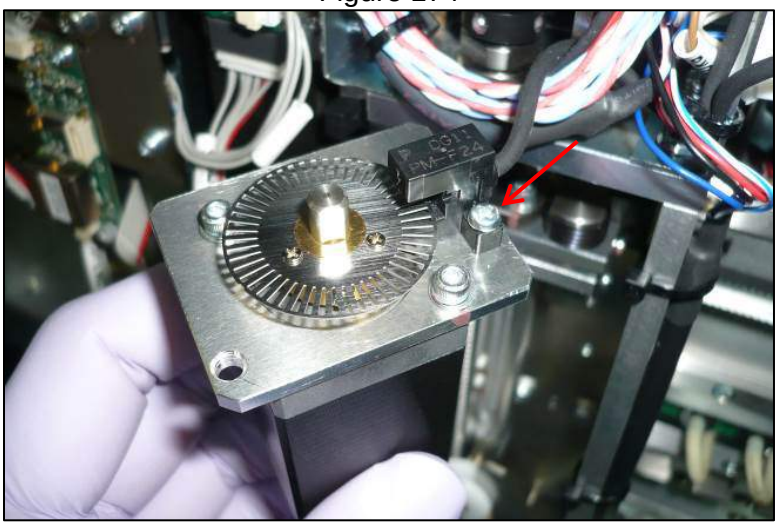
3.6.7.4 Remove the two 2.5 mm hex head screws that secure the motor (Figure 173)

Figure 173



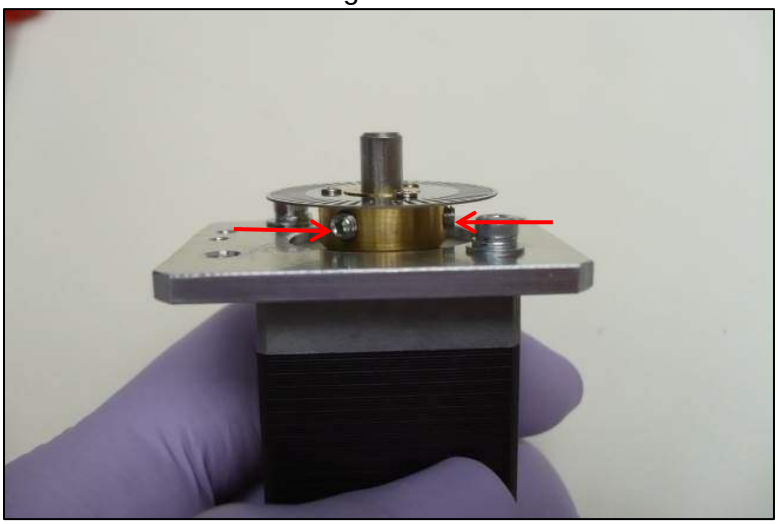
3.6.7.5 Once the motor is removed from its base remove the cross slot screw that secures the encoder sensor (Figure 174)

Figure 174



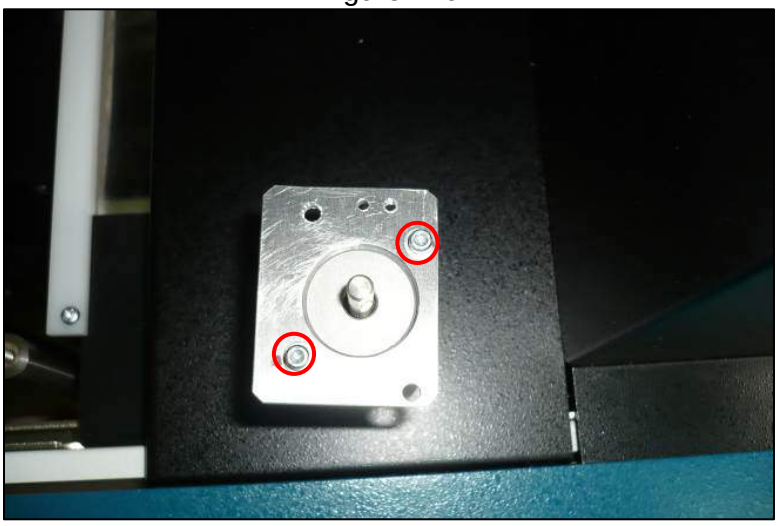
3.6.7.6 Remove the encoder boss from the old motor by loosening the two 1.5 mm set screws that hold it on the shaft (Figure 175)

Figure 175



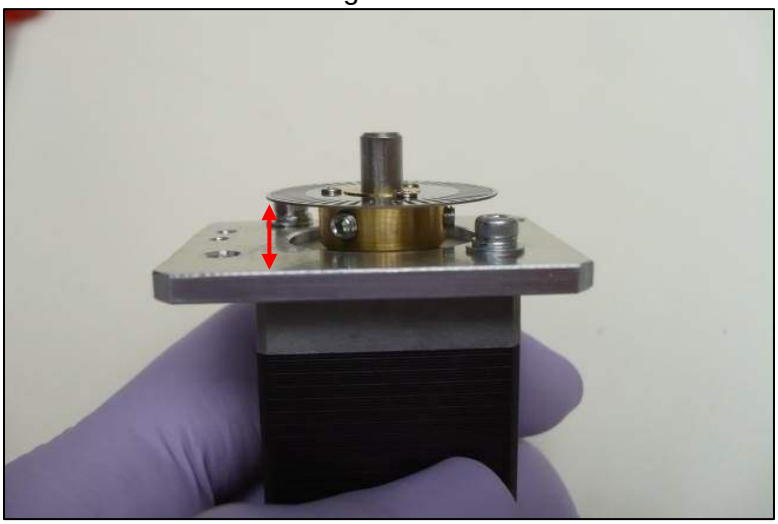
3.6.7.7 Remove the two 2 mm hex head screws that secure the base place of the motor (Figure 176)

Figure 176



3.6.7.8 Reattach the base plate and the encoder boss to the new motor setting the gap between the base plate and the encoder wheel at 7 mm spacing (Figure 177)

Figure 177



3.6.7.9 Reverse the steps taken to remove the motor to reinstall the new one

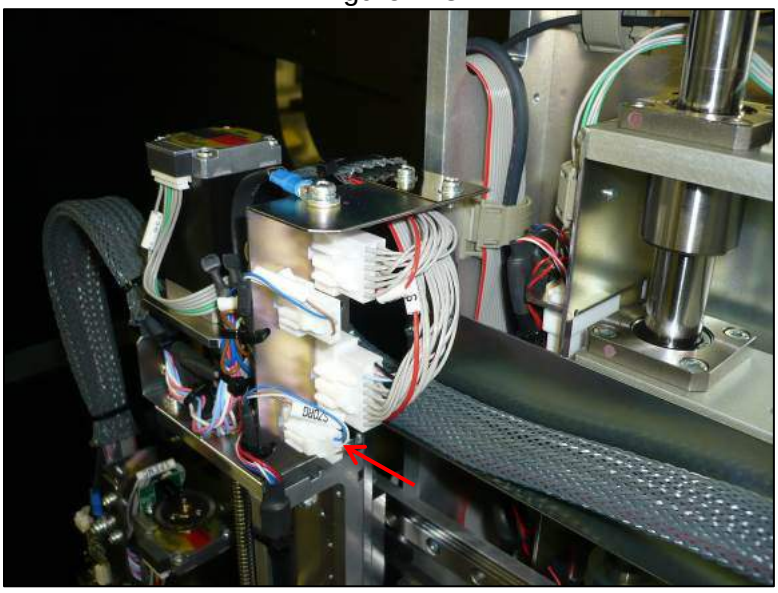
3.6.7.10 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.8. SZ Axis Org Sensor

3.6.8.1 Remove the gantry cover of the instrument

3.6.8.2 Disconnect the SZ org sensor electrical connection (Figure 178)

Figure 178



3.6.8.3 Remove the three zip ties securing the cabling for the SZ org sensor (Figure 179, Figure 180) It may be necessary to access the rear of the instrument to remove them, if so remove the rear inner cover and light shield

Figure 179

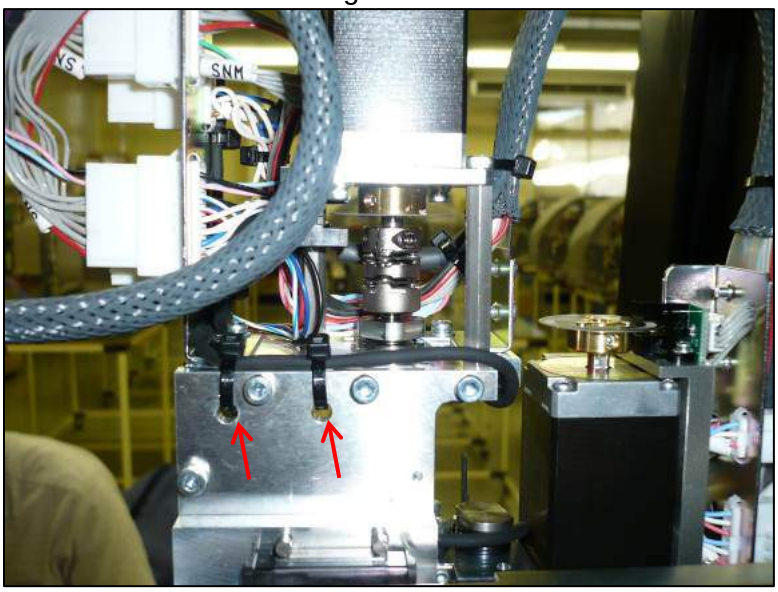
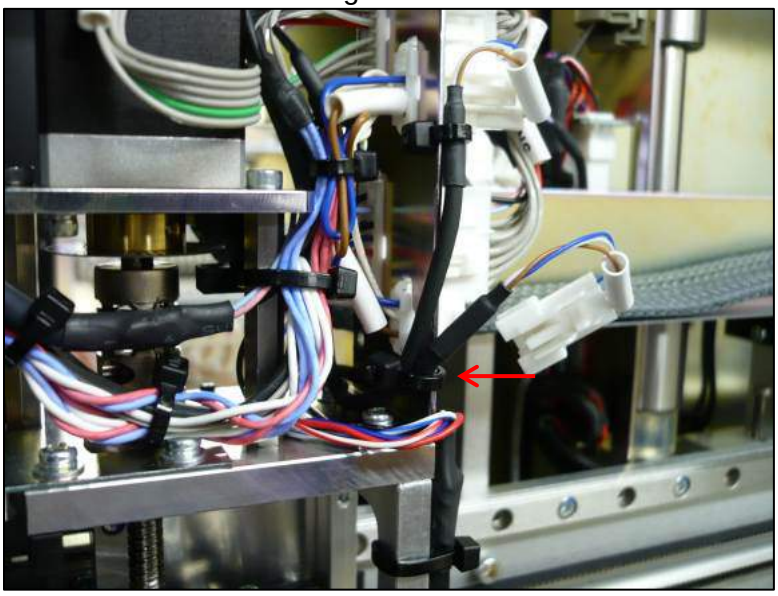
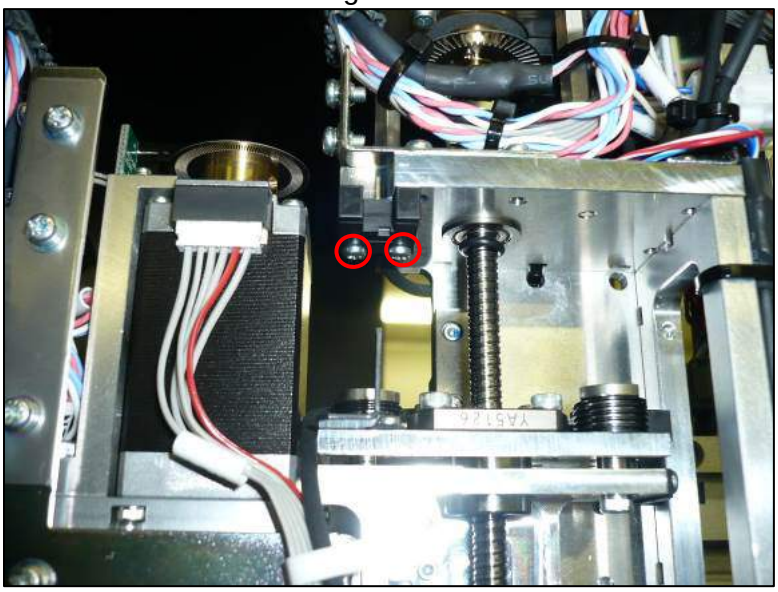


Figure 180



3.6.8.4 Remove the two cross slot screws securing the sensor (Figure 181)

Figure 181

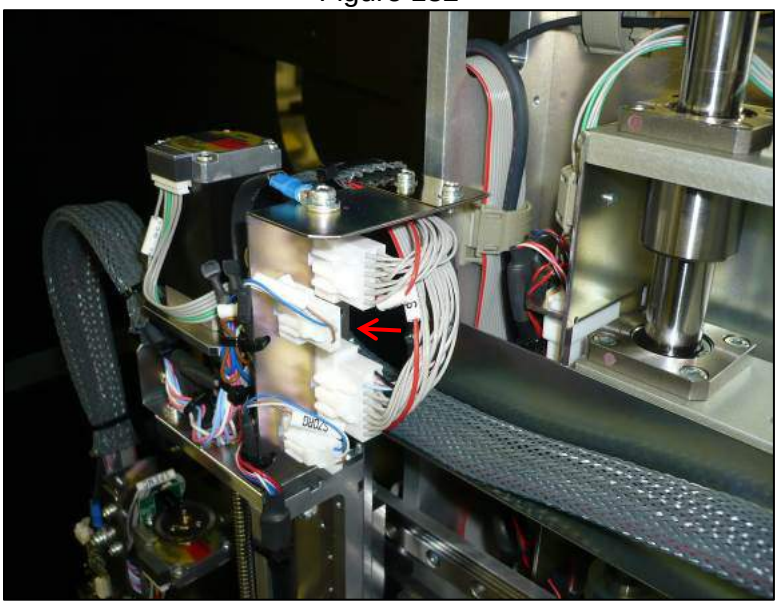


3.6.8.5 Install the new sensor and reverse the steps taken to remove it to reinstall
3.6.8.6 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.9. SZ Axis Encoder Sensor

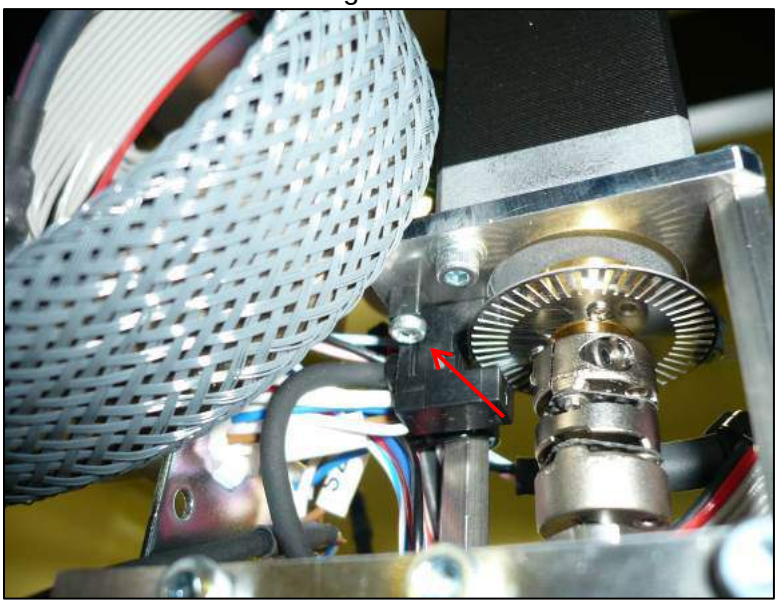
3.6.9.1 Remove the gantry cover of the instrument
3.6.9.2 Disconnect the SZ encoder sensor electrical connection (Figure 182)

Figure 182



3.6.9.3 Cut zip ties that secure SZ encoder sensor cabling
3.6.9.4 Remove the single cross slot screw that secures the sensor (Figure 183) It may be necessary to access the rear of the instrument to remove it, if so follow instructions to remove the inner rear cover and light shield

Figure 183



3.6.9.5 Install the new sensor by reversing the steps taken to remove the old one

3.6.9.6 Using the encoder boss jig ensure that the encoder wheel is the proper distance from the sensor. If not adjust the encoder wheel position

3.6.9.7 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

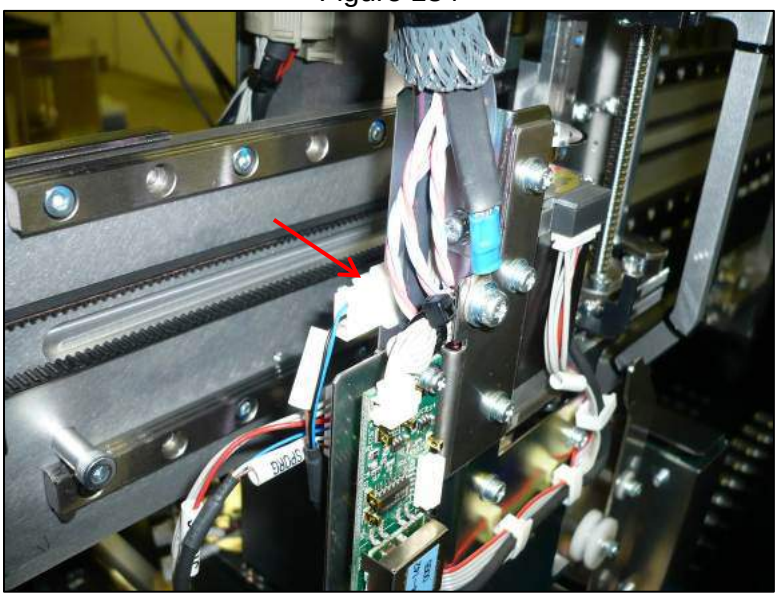
3.6.10. SZ Axis Bottom Sensor

3.6.10.1 Remove the gantry cover of the instrument

3.6.10.2 Lower the single nozzle pipette head by manually turning the screw shaft until the four 2.5 mm hex head bolts that secure it are exposed and can be removed

3.6.10.3 Remove the electrical connection to the SZ bottom sensor (Figure 184)

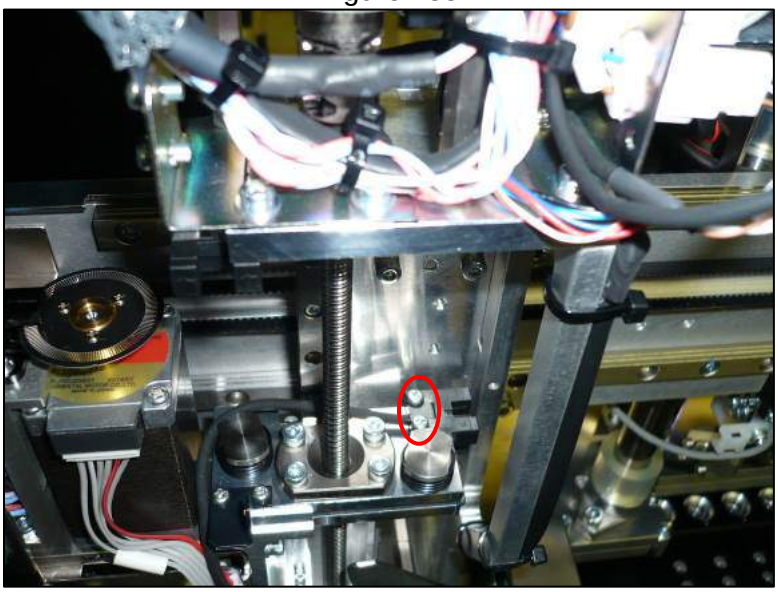
Figure 184



3.6.10.4 Remove the cabling from the cable clamps that secure it

3.6.10.5 Remove the two cross slot screws that secure the sensor to remove (Figure 185)

Figure 185



3.6.10.6 Install the new sensor by reversing the steps taken to remove the old one

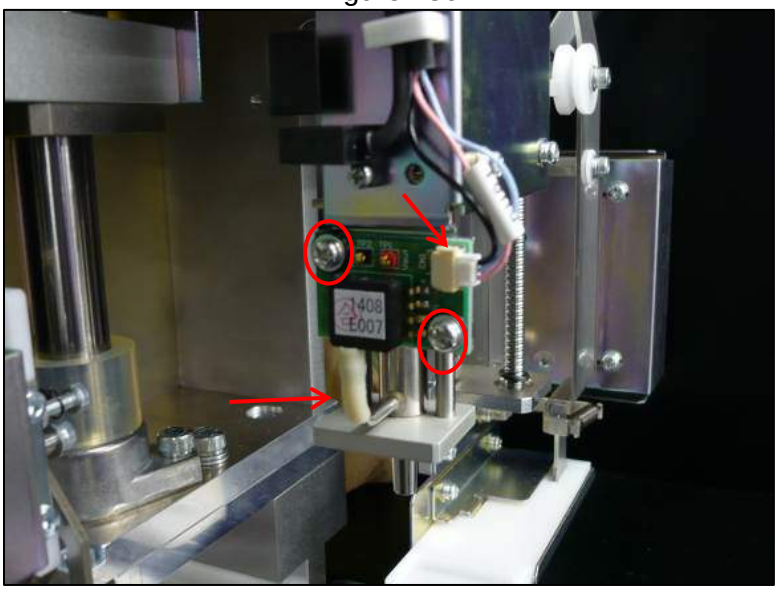
3.6.10.7 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.11. SP Axis DUP1L PCB

3.6.11.1 Remove the gantry cover of the instrument

3.6.11.2 Remove the electrical connection, the two cross slot screws and the rubber tubing that connects the board to the nozzle (Figure 186)

Figure 186

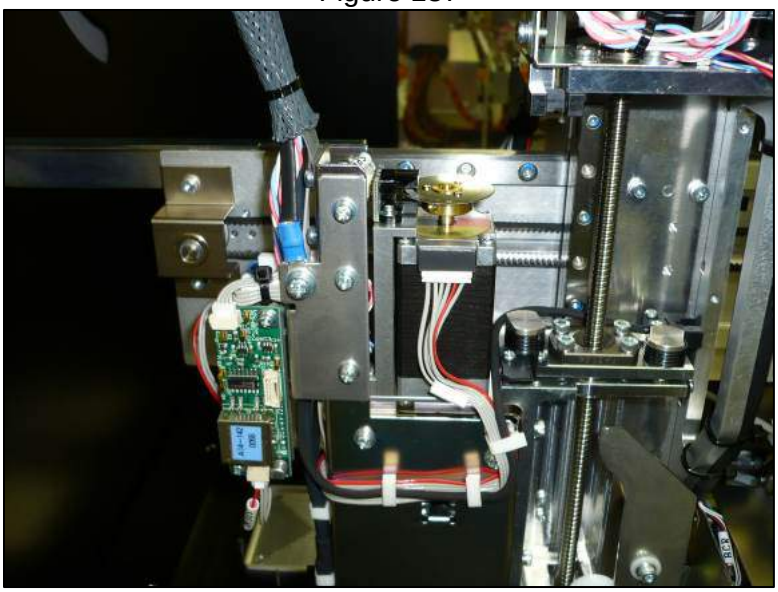


3.6.11.3 Reverse the steps taken to remove the DUP1L PCB to install the new one
3.6.11.4 After replacement carry out the pressure transducer checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.12. SP Axis Encoder Board and Sensor

3.6.12.1 Remove the gantry cover of the instrument
3.6.12.2 Remove the two connectors from the encoder board, one from the sensor, the two cross slot screws securing the encoder board, and the one cross slot screw securing the sensor (Figure 187)

Figure 187

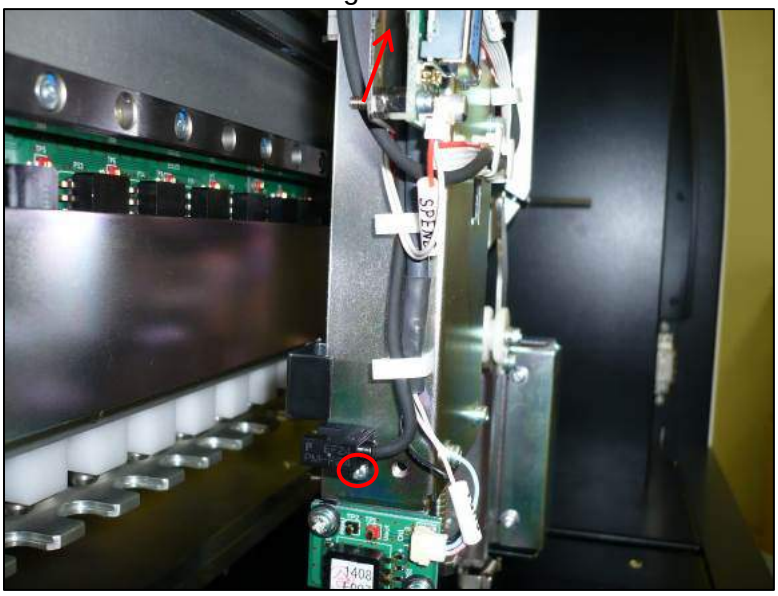


3.6.12.3 To install the new encoder board and sensor reverse the steps taken to remove them
3.6.12.4 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.13. SP Axis Org Sensor

3.6.13.1 Remove the gantry cover of the instrument
3.6.13.2 Disconnect the SP axis org sensor connection, release the cable from the clips that secure it, and remove the screw that secures the sensor (Figure 188)

Figure 188



3.6.13.3 To install the new sensor reverse the steps taken to remove it

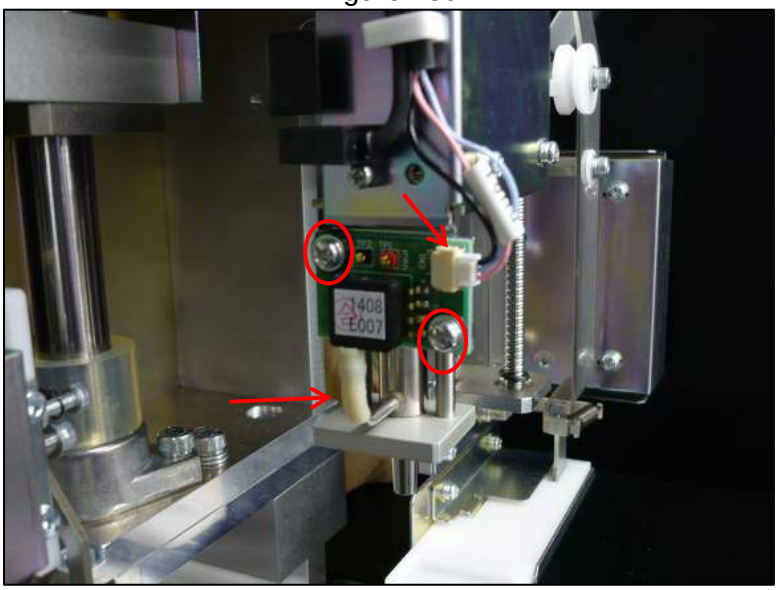
3.6.13.4 After replacement carry out the motor and encoder function checks, and pipetting accuracy checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.14. SP Axis Pressure Transducer Tubing

3.6.14.1 Remove the gantry cover of the instrument

3.6.14.2 Remove the electrical connection, the two cross slot screws and the rubber tubing that connects the board to the nozzle (Figure 189)

Figure 189



3.6.14.3 Reverse the steps taken to remove the tubing to install the new one

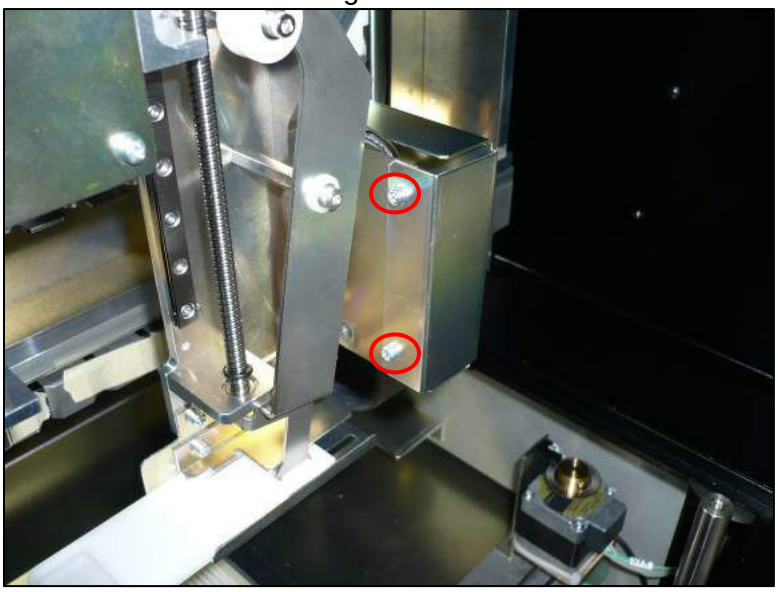
3.6.14.4 After replacement carry out the pressure transducer checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.6.15. Barcode Reader PCB

3.6.15.1 Remove the gantry cover of the instrument

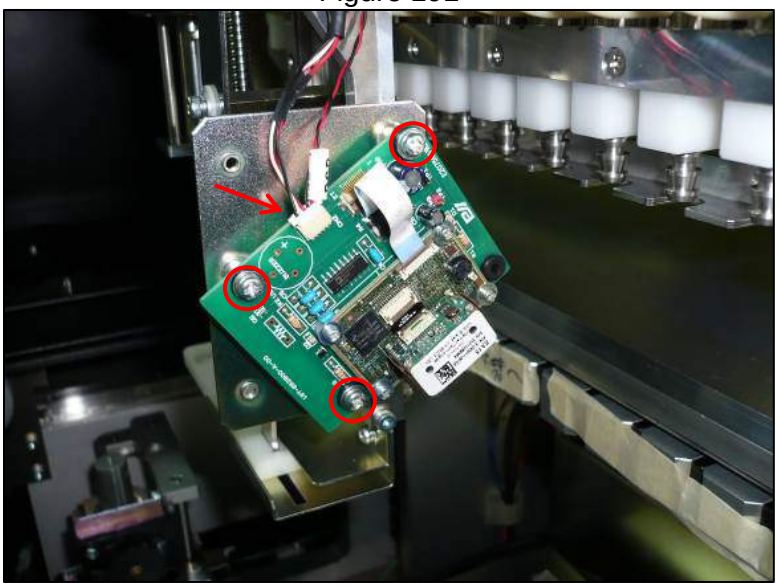
3.6.15.2 Remove the two cross slot screws that secure the cover over the barcode reader PCB(Figure 190)

Figure 190



3.6.15.3 Remove the electrical connection to the barcode reader PCB and the three cross slot screws that hold it in place (Figure 191)

Figure 191



3.6.15.4 Reverse the steps taken to remove the barcode reader PCB to install the new one

3.6.15.5 After replacement carry out the output function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

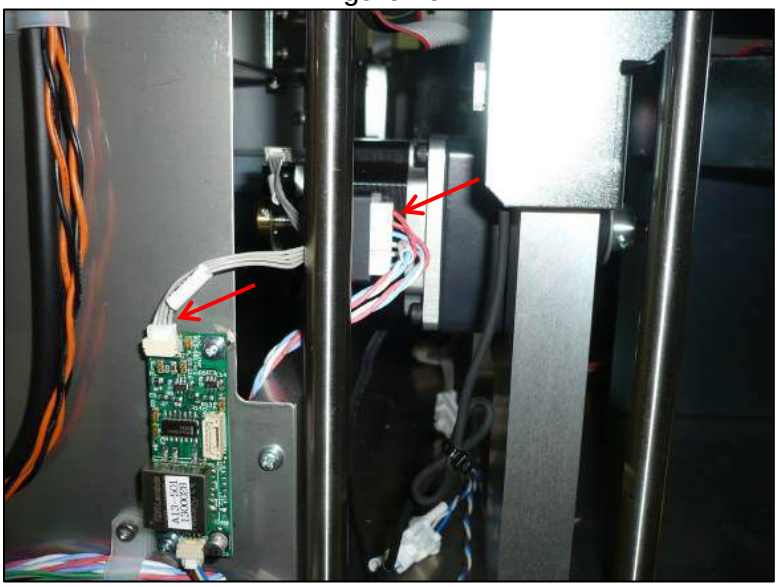
3.7 Y Gantry Module

3.7.1. Y Axis Motor

3.7.1.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.7.1.2 Disconnect the motor power and encoder electrical connections (Figure 192)

Figure 192

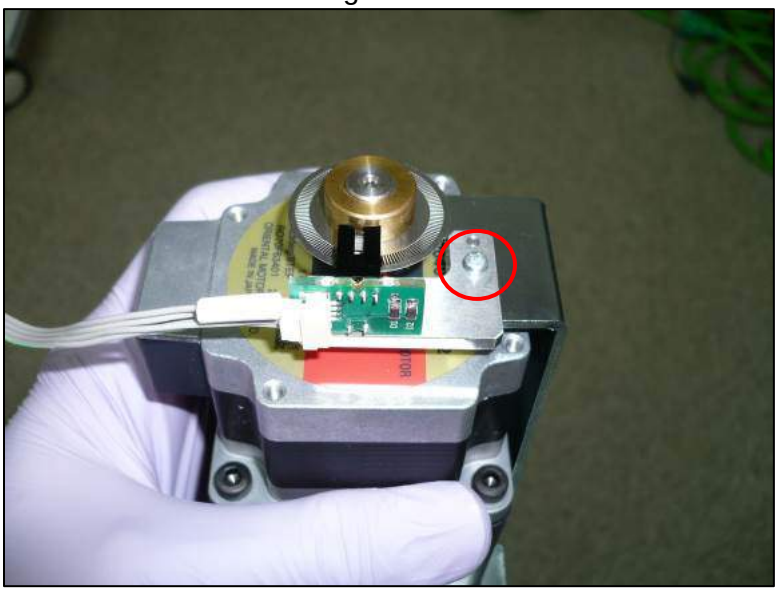


3.7.1.3 Remove the four 3 mm hex head screws that secure the motor (Figure 193)

Figure 193

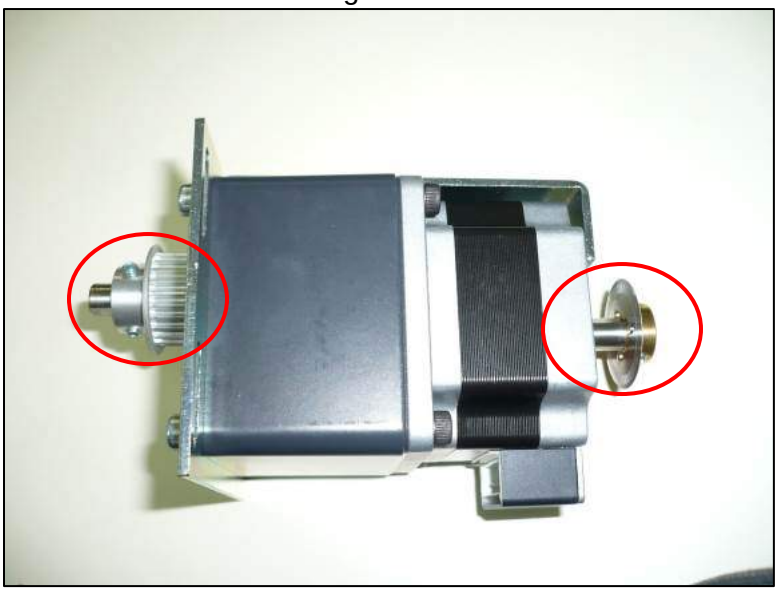
3.7.1.4 Remove the cross slot screw that secures the encoder sensor (Figure 194)

Figure 194



3.7.1.5 Loosen the 1.5 mm hex head screws that secure the encoder boss and pulley to the motor shaft and remove them both (Figure 195)

Figure 195



3.7.1.6 Remove the four 3 mm screws that secure the motor base plate (Figure 196)

Figure 196

3.7.1.7 Replace the motor base plate onto the new motor
3.7.1.8 Replace the pulley onto the new motor's shaft with a spacing of 1 mm from the motor base plate
3.7.1.9 Replace the encoder boss and encoder sensor and adjust the spacing with the encoder boss jig
3.7.1.10 Reinstall the motor into the instrument and re-tension the belt to its proper specification
3.7.1.11 Reverse the remaining removal steps to complete the replacement
3.7.1.12 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

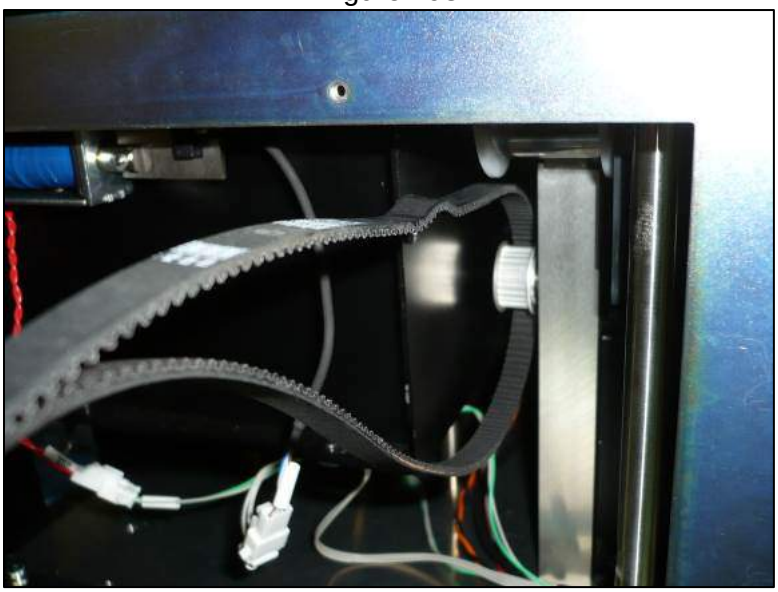
3.7.2. Y Axis Belt

3.7.2.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)
3.7.2.2 Remove the 2 outer lower front covers of the instrument
3.7.2.3 From the back of the instrument loosen the four 3 mm hex head screws that secure the motor (Figure 197)

Figure 197

3.7.2.4 Slip the belt off of the motor pulley and out of the Y axis belt fixture
3.7.2.5 From the front of the instrument slip the belt off of the idler pulley and remove from the instrument (Figure 198)

Figure 198

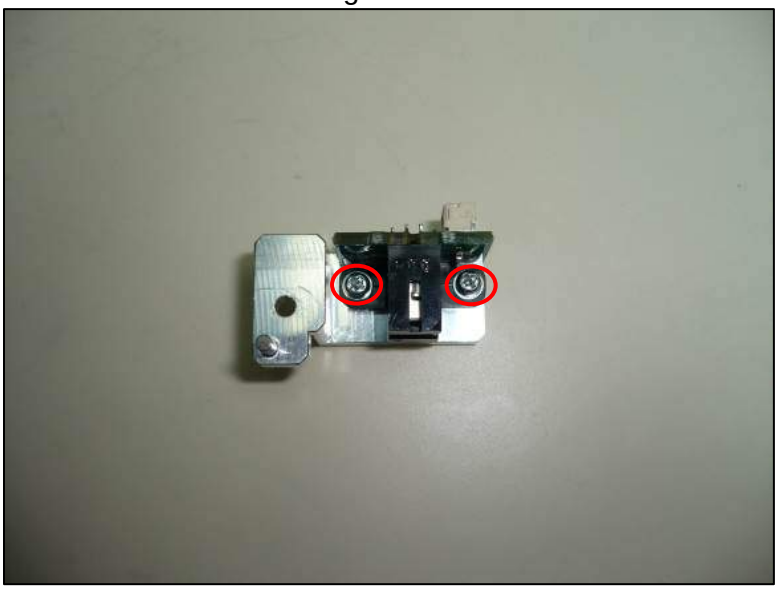


3.7.2.6 Reverse the steps taken to remove the belt to install the new one
3.7.2.7 Re-tension the belt to its proper specification
3.7.2.8 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.3. Y Axis Encoder Board and Sensor

3.7.3.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)
3.7.3.2 Remove the Y axis motor
3.7.3.3 Remove the two cross slot screws that secure the sensor (Figure 199)

Figure 199



3.7.3.4 Reverse the steps taken to remove the encoder board and sensor to install the new ones

3.7.3.5 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.4. Y Axis Org Sensor

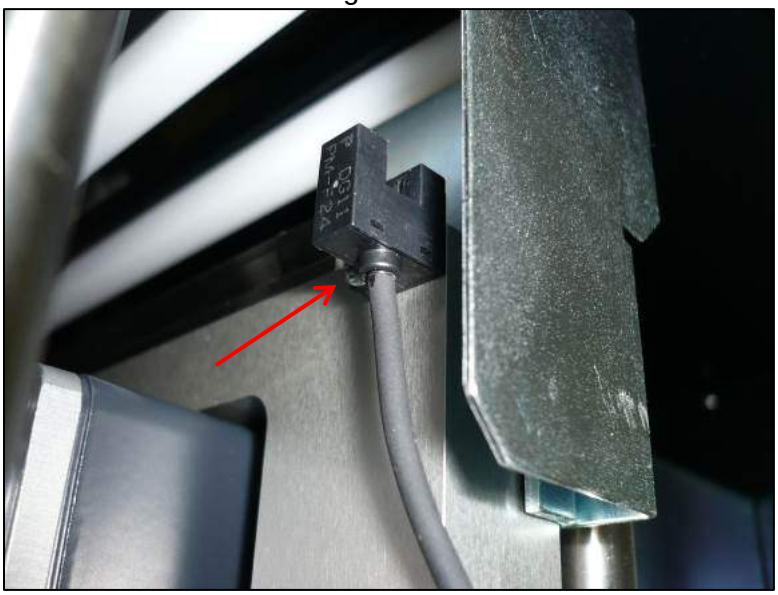
3.7.4.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.7.4.2 Disconnect the electrical connection to the sensor (Figure 200)

Figure 200

3.7.4.3 Remove the cross slot screw that secures the sensor (Figure 201)

Figure 201



3.7.4.4 Reverse the steps taken to remove the sensor to replace it

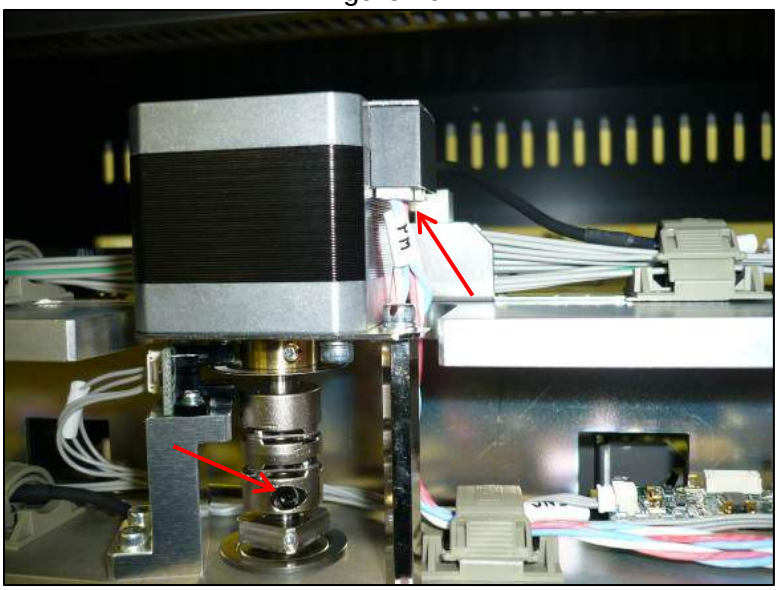
3.7.4.5 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.5. P Axis Motor

3.7.5.1 Remove the gantry cover of the instrument

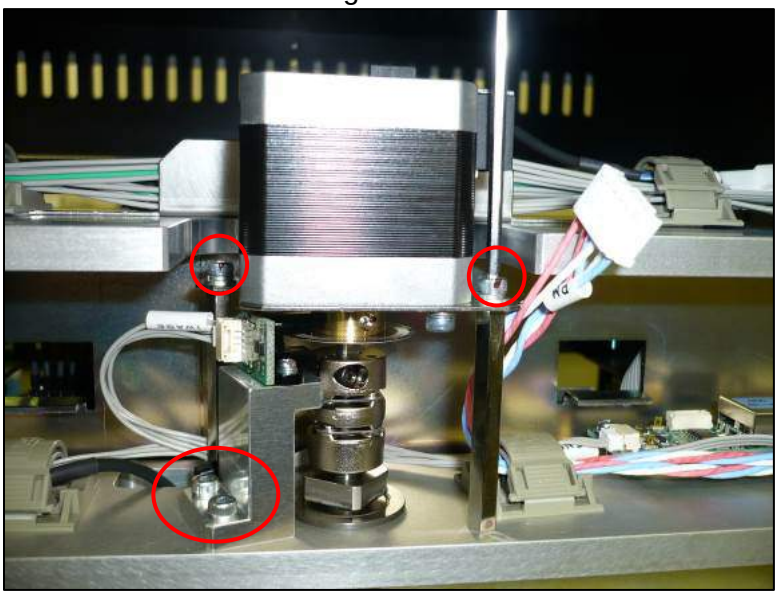
3.7.5.2 Disconnect the motor's electrical connection and loosen the 1.5 mm hex head coupling screw (Figure 202)

Figure 202



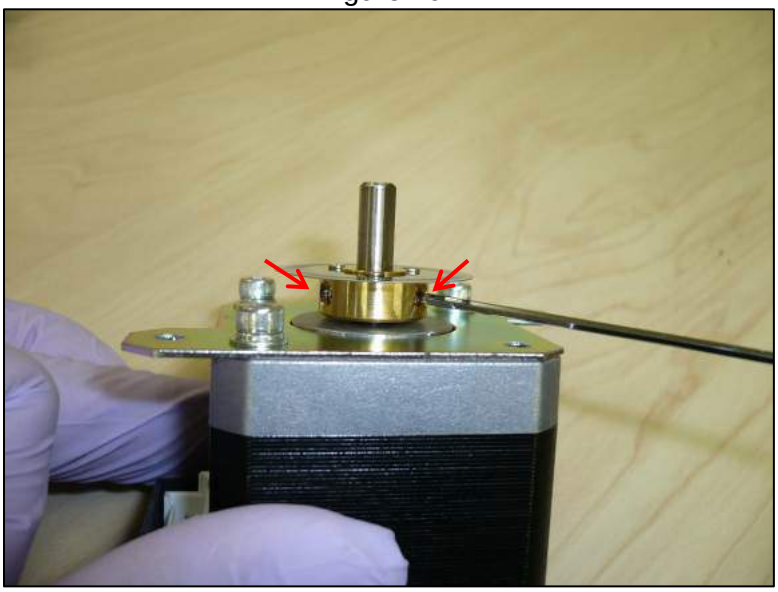
3.7.5.3 Remove the two 2.5 mm hex head screws securing the motor, and the two 2.5 mm hex head screws securing the encoder sensor (Figure 203)

Figure 203



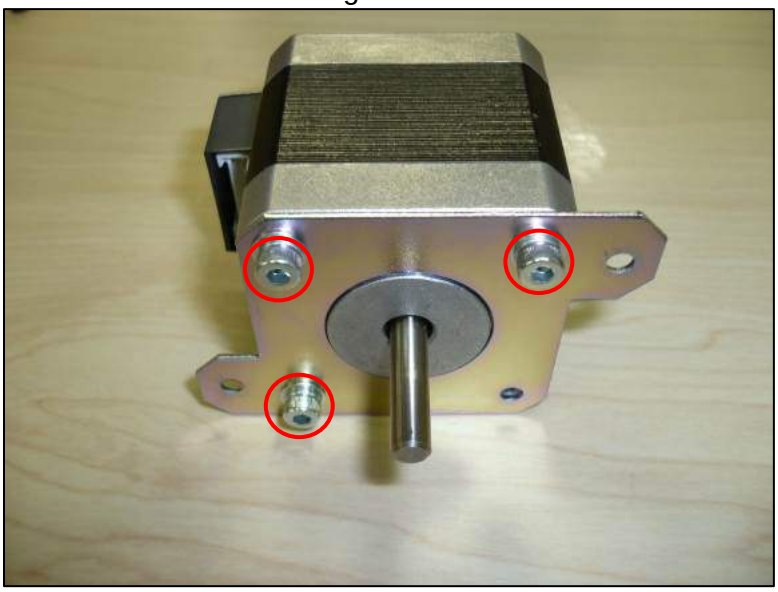
3.7.5.4 Remove the motor and loosen the two 1.5 mm hex head screw that secures the encoder boss to the motor shaft (Figure 204) and remove it

Figure 204



3.7.5.5 Remove the motor base plate by removing the three 2.5 mm hex head screws that secure it (Figure 205)

Figure 205



3.7.5.6 Reverse the steps taken to remove the motor to install the new one

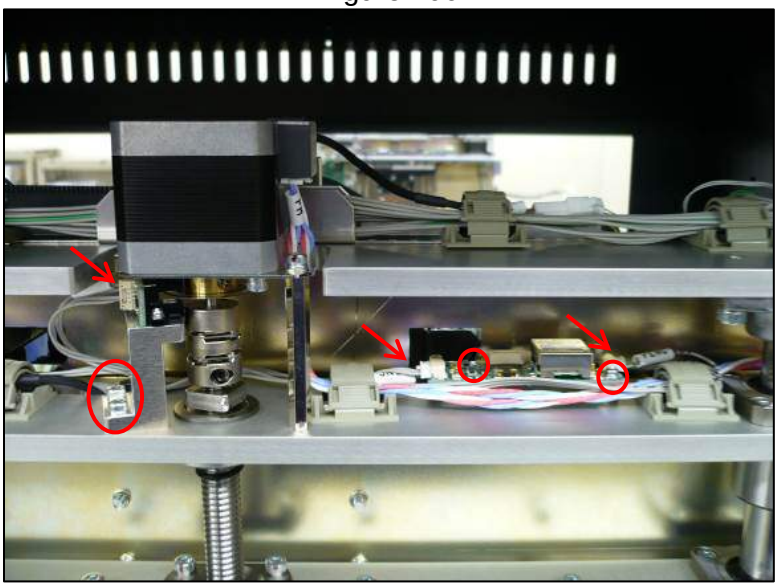
3.7.5.7 After replacement carry out the motor and encoder checks as well as the multi nozzle pipetting accuracy checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.6. P Axis Encoder Board and Sensor

3.7.6.1 Remove the gantry cover of the instrument

3.7.6.2 Disconnect the electrical connections for the encoder board and sensor and the 2 cross slot screws securing the encoder board, and the 2 2.5 mm hex head screws for the sensor mount (Figure 206)

Figure 206



3.7.6.3 Install the new encoder board and sensor by reversing the steps taken to remove them

3.7.6.4 Ensure proper spacing of the sensor by using the encoder boss jig

3.7.6.5 After replacement carry out the motor and encoder checks as well as the multi nozzle pipetting accuracy checks as specified in the MDSOP-002 qualification procedure to confirm functionality

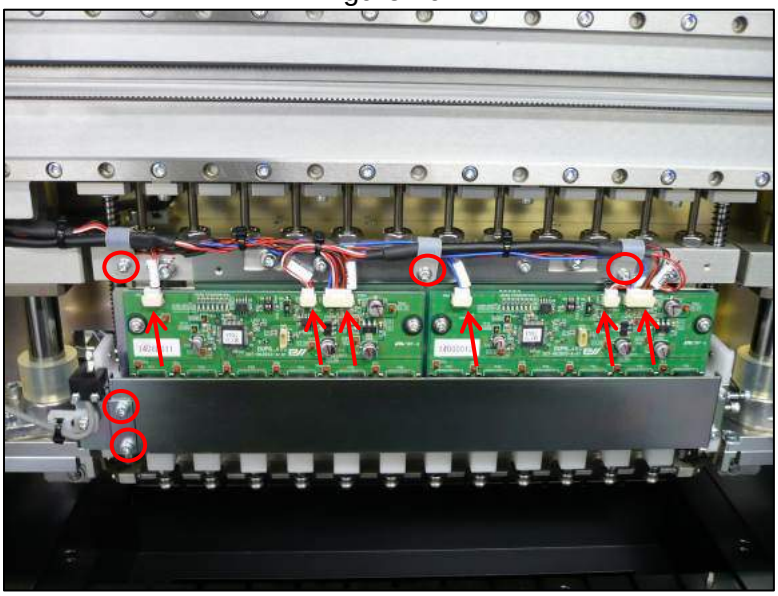
3.7.7. P Axis Syringe Assembly

3.7.7.1 Remove the gantry cover of the instrument

3.7.7.2 With the power to the instrument off, lower the Z axis by turning the drive belt

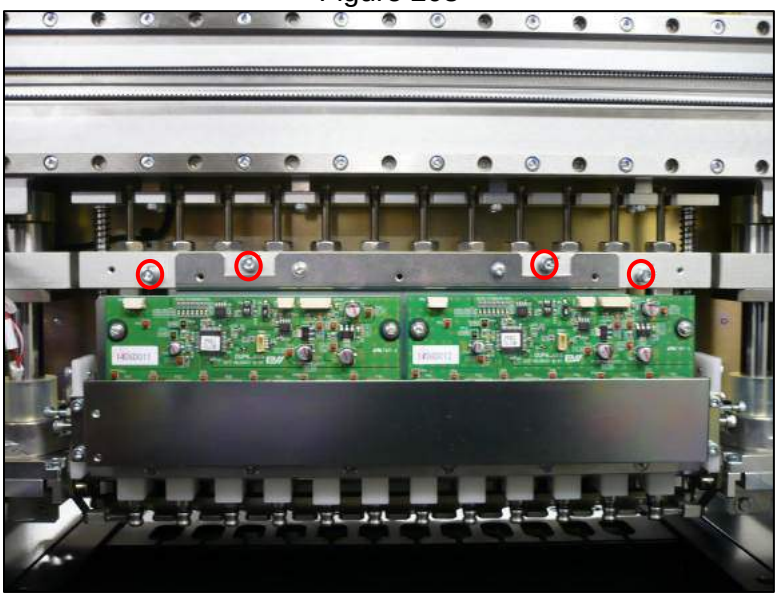
3.7.7.3 Remove the three cross slot screws, two 2.5 mm screws, and disconnect the six electrical connectors going to the two DUP6_485 PCBs (Figure 207)

Figure 207



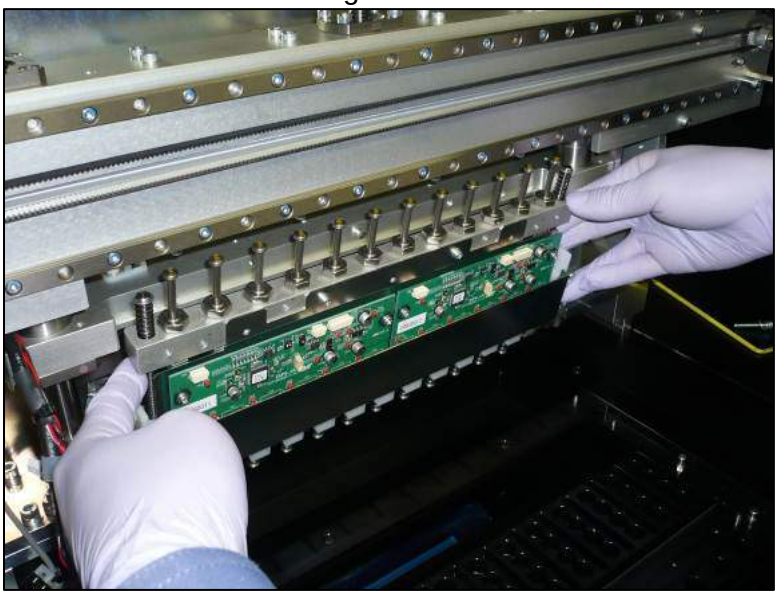
3.7.7.4 Remove the four 3 mm hex head screws (Figure 208)

Figure 208



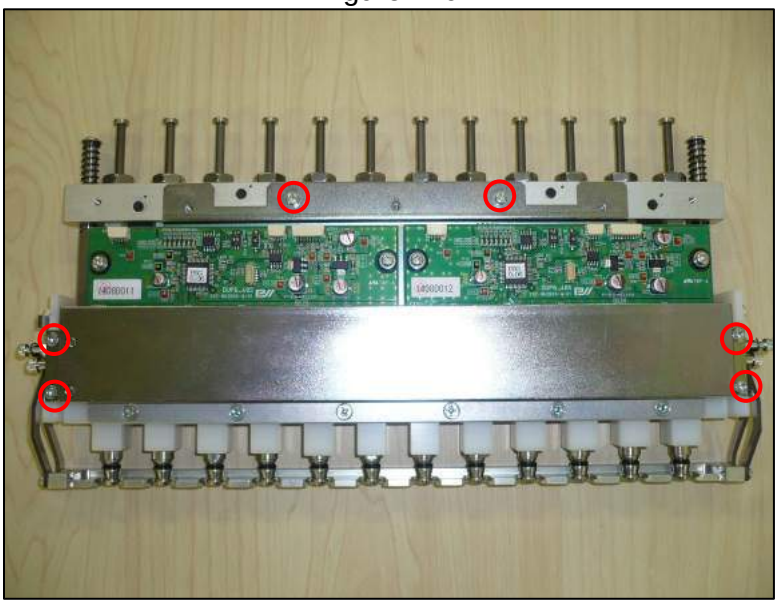
3.7.7.5 Remove the syringe assembly by gently lifting it upward and outward (Figure 209)

Figure 209



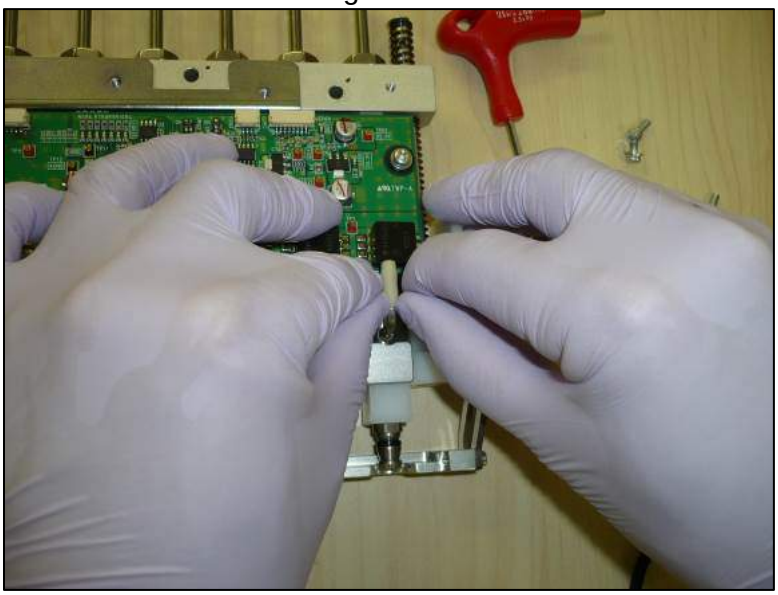
3.7.7.6 Once the syringe assembly is removed from the instrument remove the four 2.5 mm hex head screws and the two cross slot screws (Figure 210)

Figure 210



3.7.7.7 Carefully remove the twelve rubber tubes that connect the two DUP6_485 PCBs to the 12 nozzle assembly (Figure 211)

Figure 211



3.7.7.8 Reverse the steps taken to remove the P axis syringe assembly to install the replacement

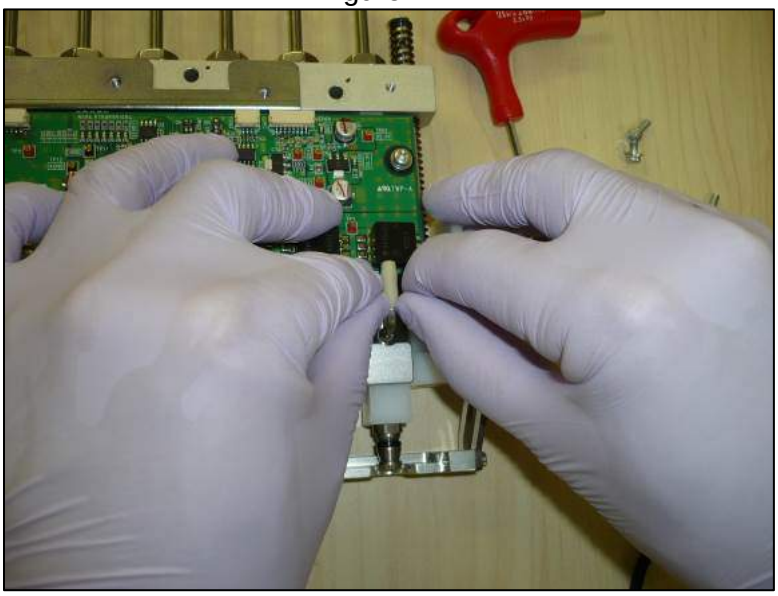
3.7.7.9 After replacement carry out the motor and encoder checks as well as the multi nozzle pipetting accuracy checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.8. P Axis DUP6_485_485 PCBs

3.7.8.1 Remove the P axis syringe assembly

3.7.8.2 Carefully remove the twelve rubber tubes that connect the DUP6_485_485 PCB(s) to the 12 nozzle assembly (Figure 212)

Figure 212



3.7.8.3 Install the replacement DUP6_485_485 PCB(s)

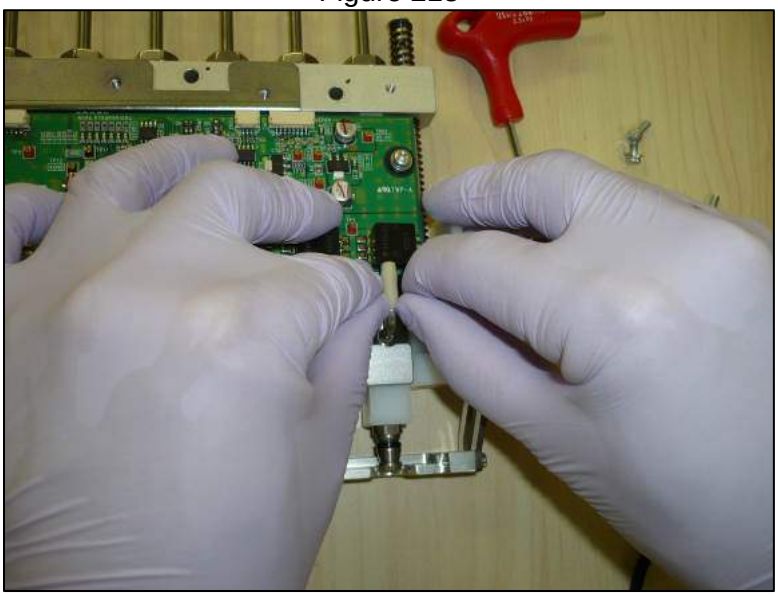
3.7.8.4 Reverse the steps taken to remove the DUP6_485 PCB(s) to install the replacement(s)

3.7.8.5 After replacement carry out the motor and encoder checks as well as the multi nozzle pipetting accuracy checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.9. P Axis Pressure Transducer Tubing

3.7.9.1 Remove the P axis syringe assembly
3.7.9.2 Carefully remove the twelve rubber tube(s) that connect the DUP6_485_485 PCB(s) to the 12 nozzle assembly (Figure 213)

Figure 213

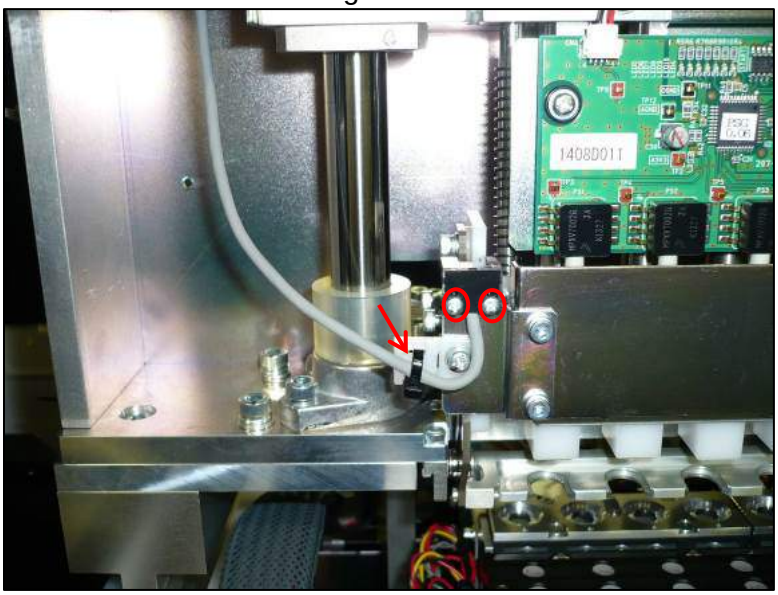


3.7.9.3 Install the replacement tube(s)
3.7.9.4 Reverse the steps taken to remove the tube(s) to install the replacement(s)
3.7.9.5 After replacement carry out the motor and encoder checks as well as the multi nozzle pipetting accuracy checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.10. P Axis Tip Bar Check Sensor

3.7.10.1 Remove the gantry cover of the instrument
3.7.10.2 Remove the two cross slot screws securing the sensor and cut the zip tie that secures it (Figure 214)

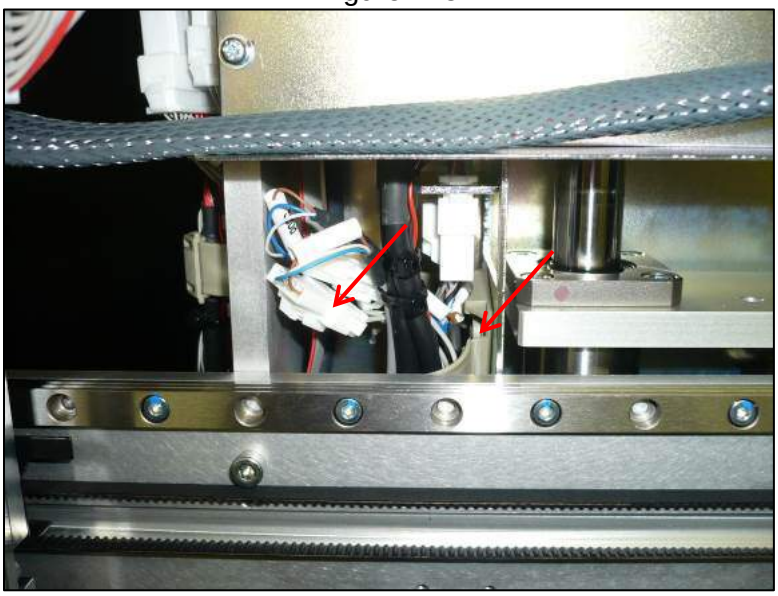
Figure 214



3.7.10.3 Move the gantry so that the nozzles are over an open area of the deck and manually lower the Z axis by turning the drive belt until the sensor connection is accessible

3.7.10.4 Open the cable clamp that secures the sensor cabling and disconnect the sensor (Figure 215)

Figure 215



3.7.10.5 Reverse the steps taken to remove the sensor to install the replacement

3.7.10.6 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

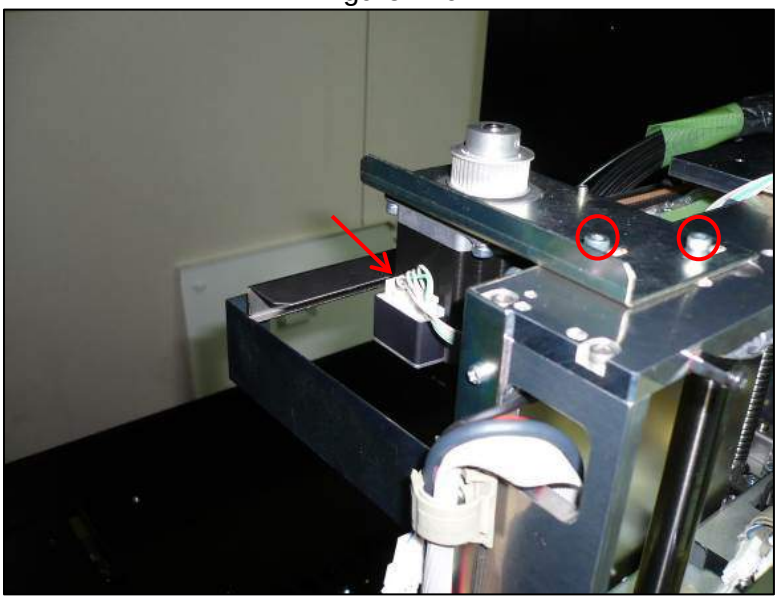
3.7.11. Z Axis Motor

3.7.11.1 Remove the gantry cover of the instrument

3.7.11.2 Move the gantry so that the nozzles are over an open area of the deck and manually lower the Z axis until it is resting on the rubber stops at the bottom

3.7.11.3 Disconnect the electrical connection to the motor and remove the two 3 mm hex head screws that secure it (Figure 216)

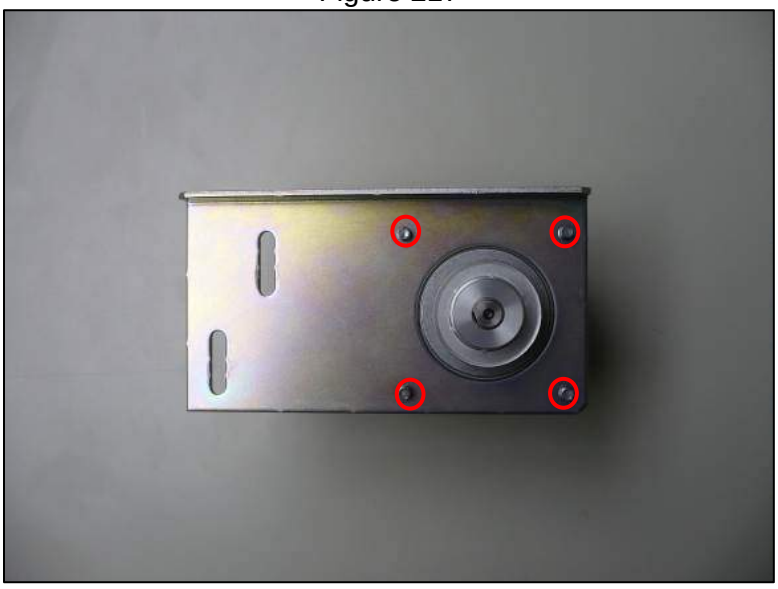
Figure 216



3.7.11.4 Loosen the 1.5 mm set screws that secure the pulley to the motor shaft and remove it

3.7.11.5 Remove the four 3 mm hex head screws that secure the motor base plate to remove it (Figure 217)

Figure 217



3.7.11.6 Replace the base plate and pulley onto the new motor and ensure the spacing between them is 0.5 mm

3.7.11.7 Reverse the steps taken to remove the motor to install the replacement

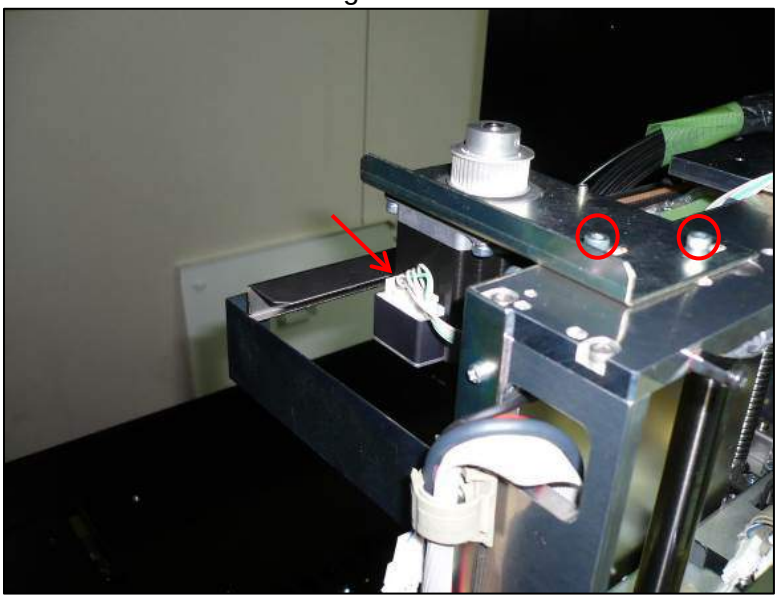
3.7.11.8 Re-tension the belt to its proper specification

3.7.11.9 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.12. Z Axis Belt

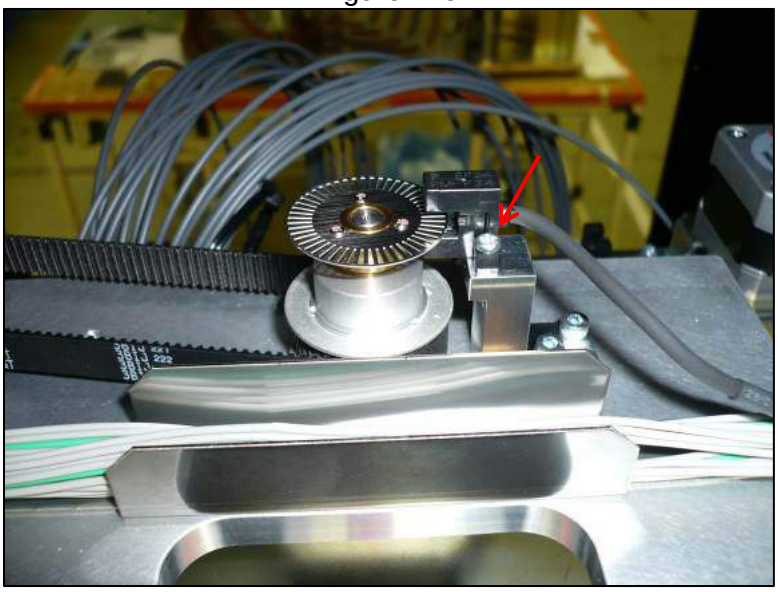
3.7.12.1 Remove the gantry cover of the instrument
3.7.12.2 Move the gantry so that the nozzles are over an open area of the deck and manually lower the Z axis until it is resting on the rubber stops at the bottom
3.7.12.3 Loosen the two 3 mm hex head screws that secure it (Figure 218)

Figure 218



3.7.12.4 Remove the cross slot screw securing the encoder sensor and move the sensor aside (Figure 219)

Figure 219

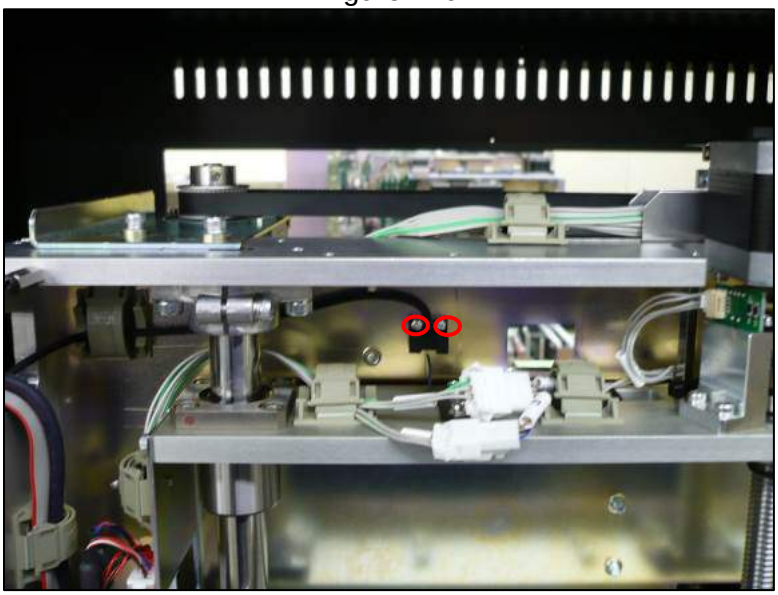


3.7.12.5 Remove the old belt from the instrument and replace with the new belt
3.7.12.6 Reverse the steps taken to remove the motor to install the replacement
3.7.12.7 Re-tension the belt to its proper specification
3.7.12.8 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.13. Z Axis Org Sensor

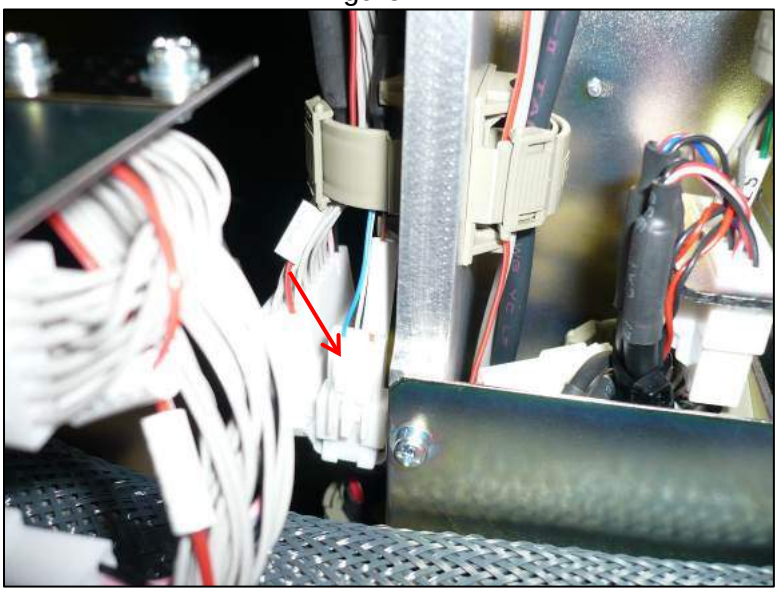
3.7.13.1 Remove the gantry cover of the instrument
3.7.13.2 Remove the two cross slot screws that secure the sensor (Figure 220)

Figure 220



3.7.13.3 Disconnect the motor's electrical connection and open the cable clamps that secure the cabling (Figure 221)

Figure 221



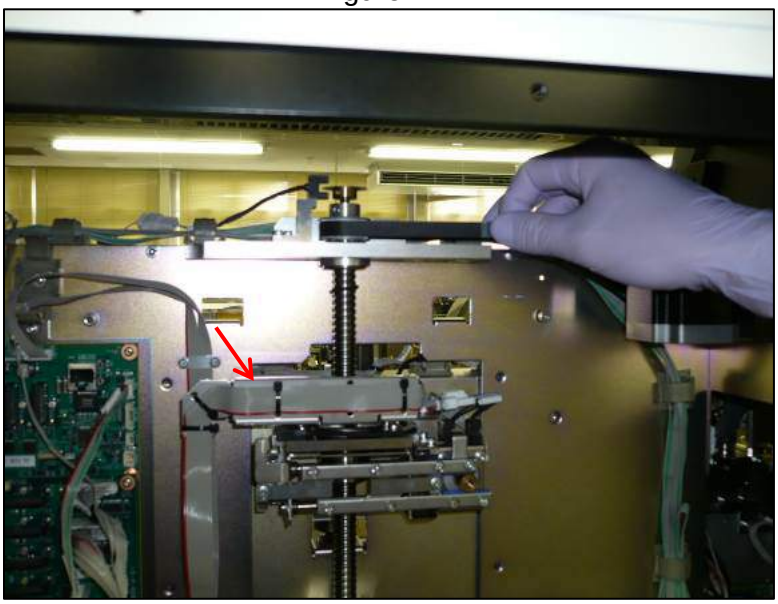
3.7.13.4 Attach the new sensor by reversing the steps taken to remove the old one
3.7.13.5 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.14. Z Axis Bottom Sensor

3.7.14.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

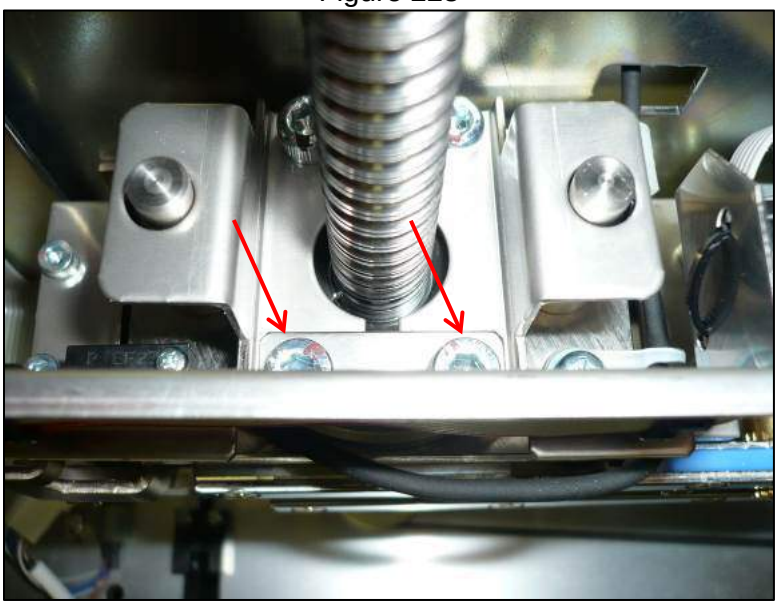
3.7.14.2 Remove the PCR detector assembly (Section)
3.7.14.3 Manually lower the Z axis to provide access to the sensor
3.7.14.4 Sensor location is indicated in (Figure 222)

Figure 222



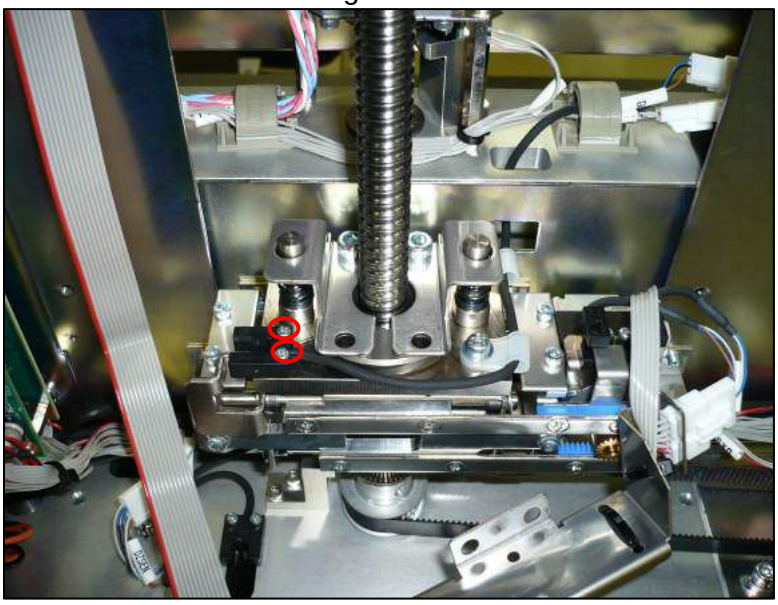
3.7.14.5 Remove the two indicated 4 mm hex head screws and bracket to allow access to the sensor (Figure 223)

Figure 223



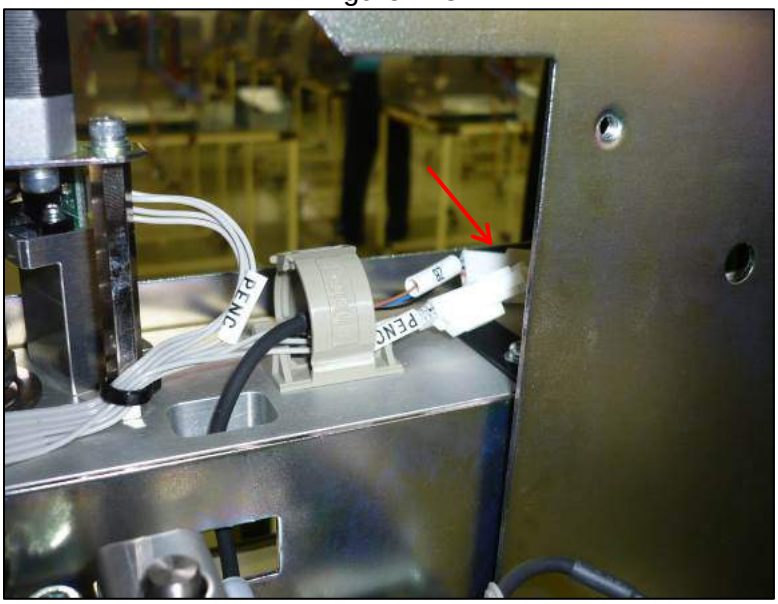
3.7.14.6 Remove the two cross slot screws that hold the sensor in place (Figure 224)

Figure 224



3.7.14.7 Disconnect the sensor's electrical connection and release it from the cable clamps that secure it (Figure 225)

Figure 225



3.7.14.8 Install the new sensor by reversing the steps taken to remove the old one

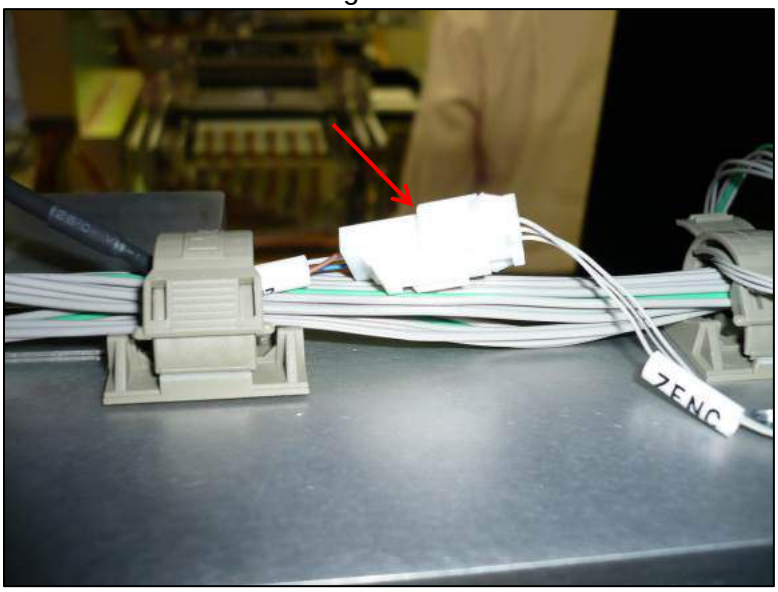
3.7.14.9 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.15. Z Axis Encoder Sensor

3.7.15.1 Remove the gantry cover of the instrument

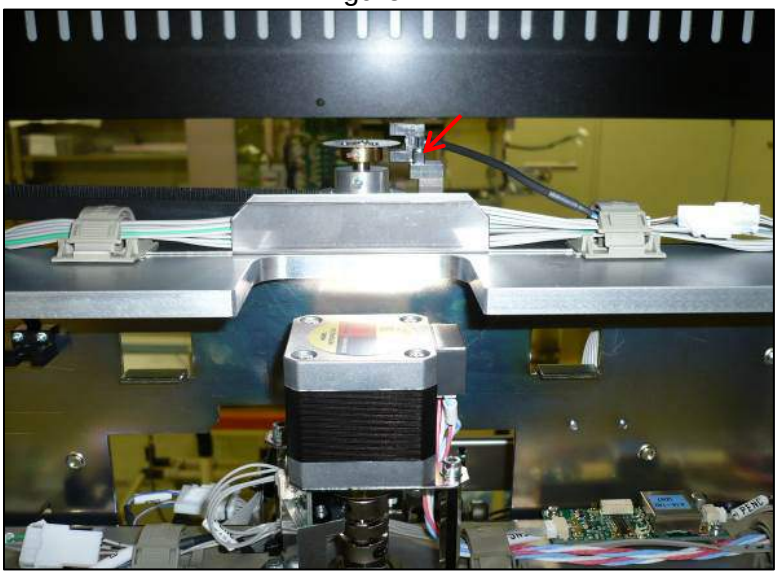
3.7.15.2 Disconnect the sensor's electrical connector (Figure 226)

Figure 226



3.7.15.3 Remove the cross slot screw that holds the sensor in place (Figure 227)

Figure 227



3.7.15.4 Replace the sensor by reversing the steps taken to remove it

3.7.15.5 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.16. Magnet Axis Assembly

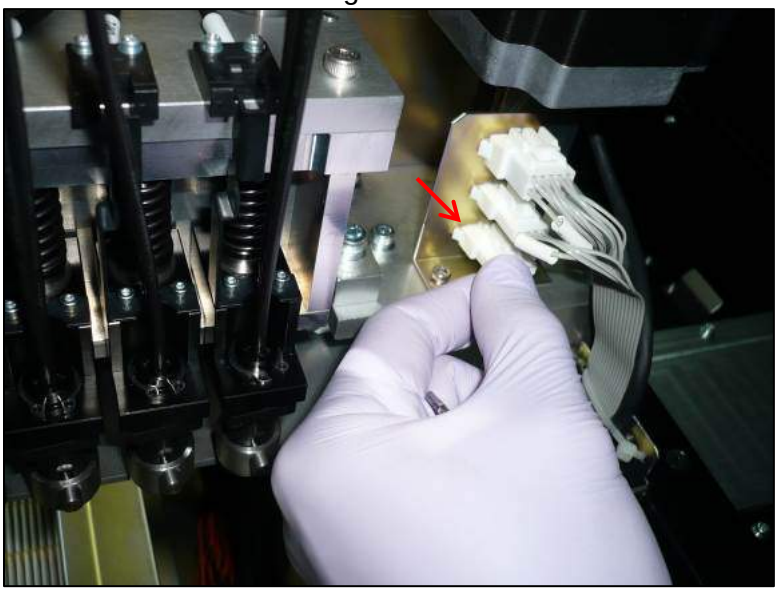
3.7.16.1 Remove the gantry cover of the instrument

3.7.16.2 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.7.16.3 Remove the stage and stage cover

3.7.16.4 From the rear of the instrument disconnect the sensor cabling (Figure 228)

Figure 228



3.7.16.5 Remove the four cross slot screws (two on either end) that hold on the electrical connection brackets (Figure 229 & Figure 230)

Figure 229

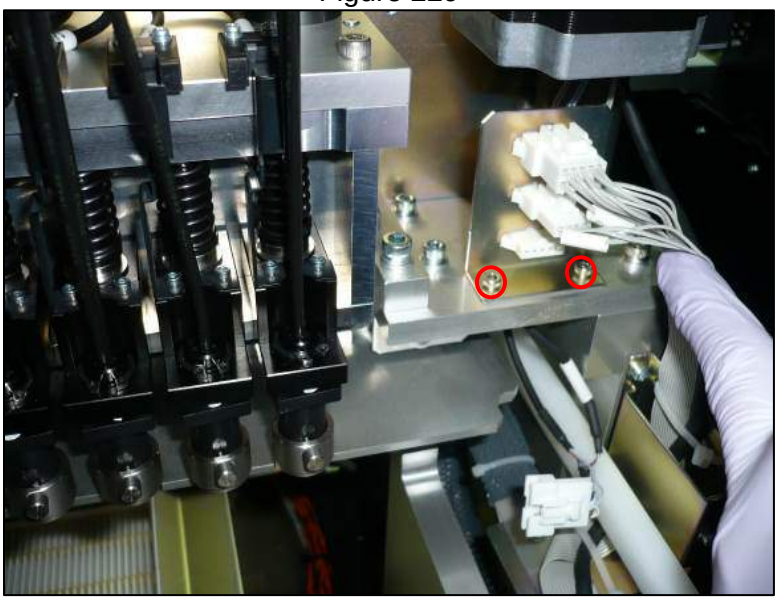
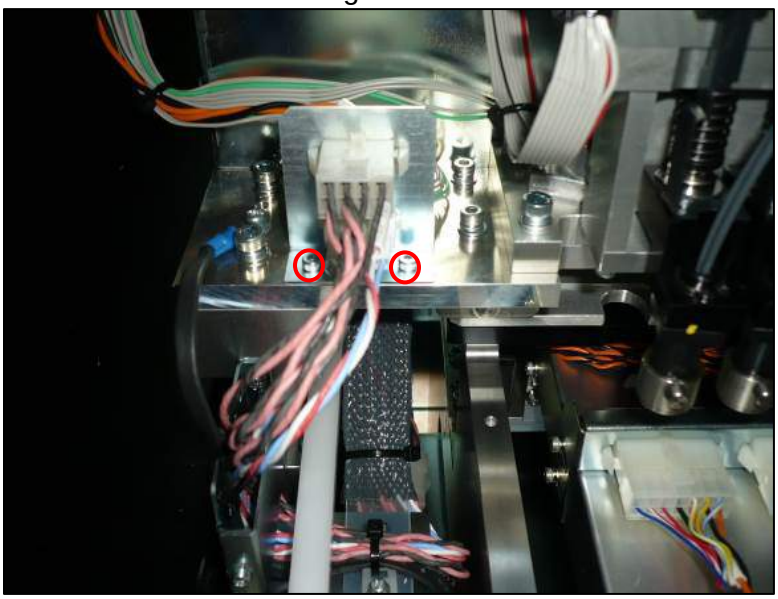


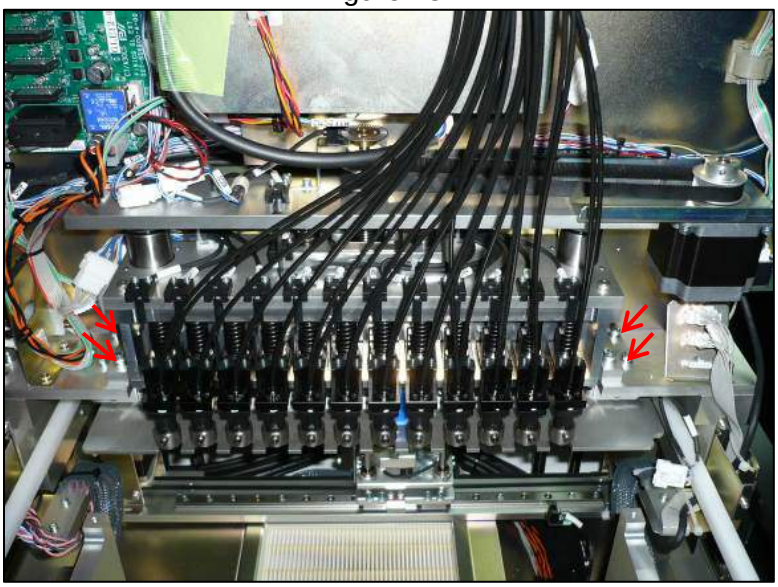
Figure 230



3.7.16.6 Manually move the gantry assembly so that the magnet axis assembly is above the open area over the HEPA filters

3.7.16.7 While supporting the magnet axis assembly remove the four 3 mm hex head screws that secure it (Figure 231)

Figure 231



3.7.16.8 Gently lower the magnet axis assembly downward and disconnect the motor power connector (Figure 232)

Figure 232

3.7.16.9 Replace the sensor by reversing the steps taken to remove it

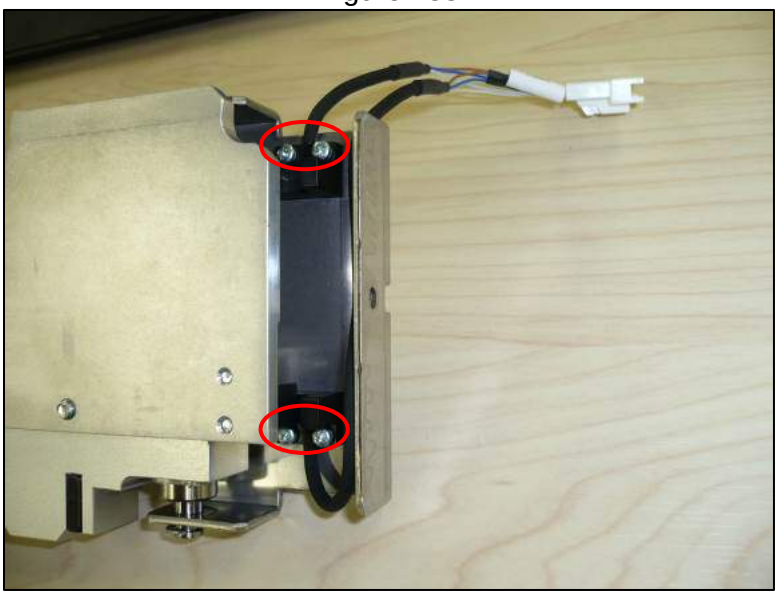
3.7.16.10 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.17. Magnet Axis Org and MagOn Sensors

3.7.17.1 Remove the magnet axis assembly

3.7.17.2 Remove the four cross slot screws that secure the two sensors and the zip ties that secure the cabling (Figure 233)

Figure 233



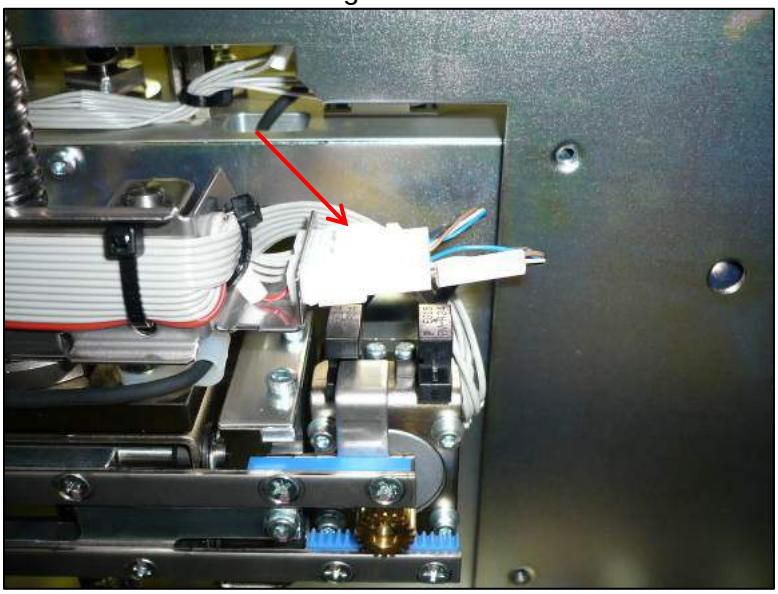
3.7.17.3 Reverse the steps taken to remove the sensors to install the replacements

3.7.17.4 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.18. Lock Axis Org and Lock Sensors

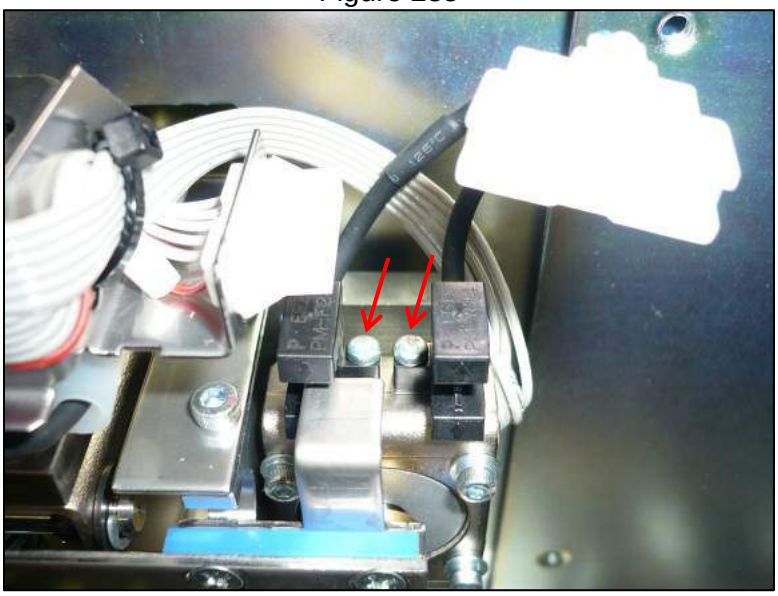
3.7.18.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)
3.7.18.2 Remove the PCR cycler assembly (Section 3.5.1)
3.7.18.3 Disconnect the sensors electrical connector(Figure 234)

Figure 234



3.7.18.4 Remove the two cross slot screws that secure the sensors (Figure 235)

Figure 235



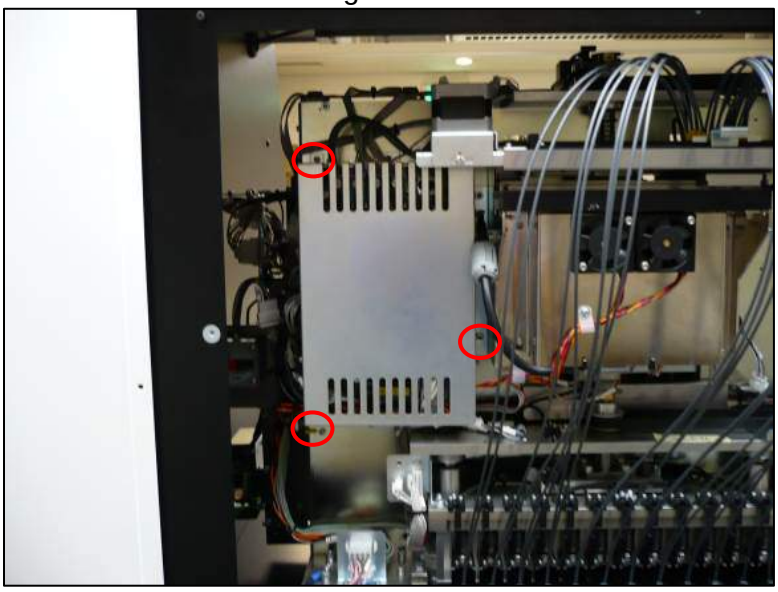
3.7.18.5 Reverse the steps taken to remove the sensors to install the replacements
3.7.18.6 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.7.19. FiSICS GL PCB

3.7.19.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

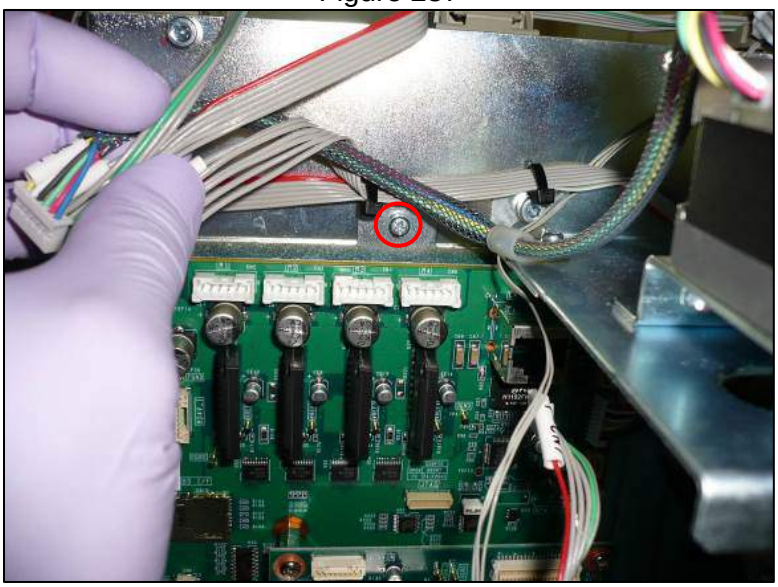
3.7.19.2 Remove the three cross slot screws that secure the FiSICS GL PCB cover (Figure 236)

Figure 236



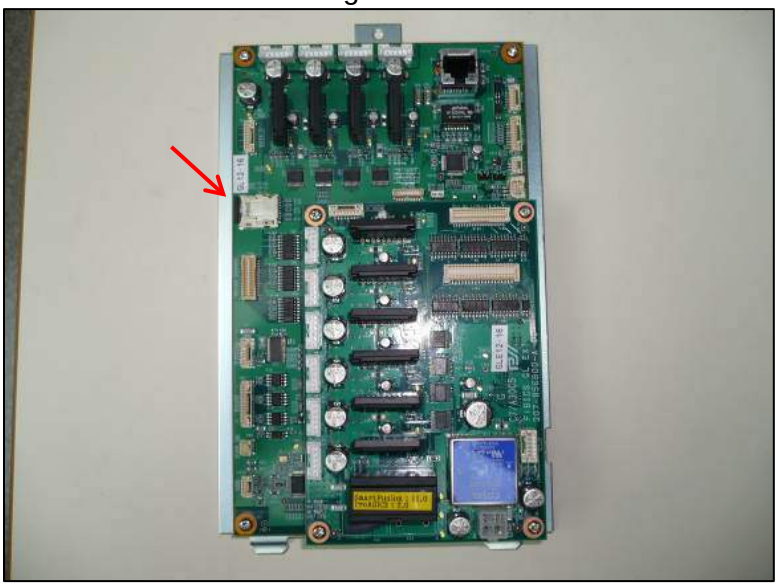
3.7.19.3 Disconnect all cabling to the FiSICS GL PCB and remove the cross slot screw that secures it (Figure 237)

Figure 237



3.7.19.4 Remove the micro SD card from the FiSICS GL PCB and transfer it to the replacement board (Figure 238)

Figure 238



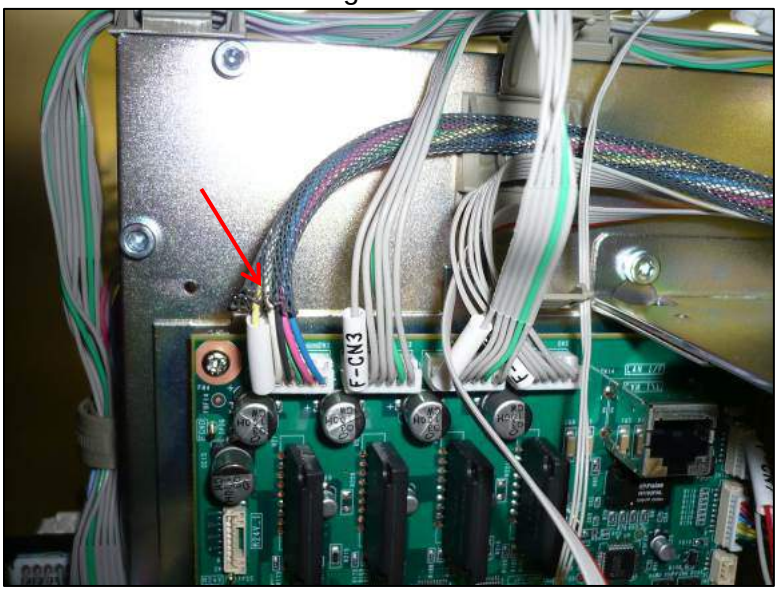
3.7.19.5 Reverse the removal steps to install the new board
3.7.19.6 Ensure that the PC connects to the new FiSICS GL PCB and that the software is able to boot up properly

3.8 Detector Module

3.8.1. DX Axis Motor

3.8.1.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)
3.8.1.2 Remove the detector cover
3.8.1.3 Remove the three cross slot screws that secure the FiSICS GL PCB cover
3.8.1.4 Disconnect the motor electrical connection from the FiSICS board (Figure 239)

Figure 239

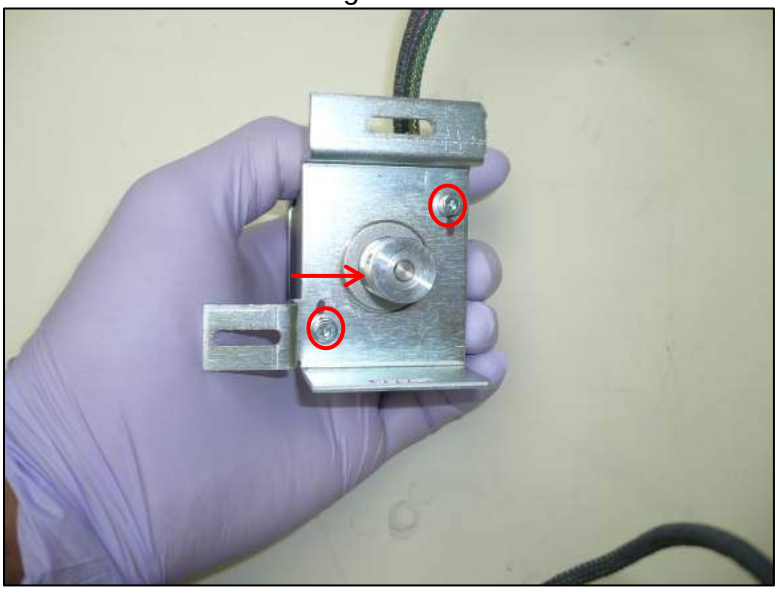


3.8.1.5 Remove the three 2.5 mm hex head screws that secure the motor (Figure 240)

Figure 240

3.8.1.6 Loosen the 1.5 mm hex head set screw that secures the pulley of the motor and remove it and remove the two 2.5 mm hex head screws that secure the motor baseplate and remove that too (Figure 241)

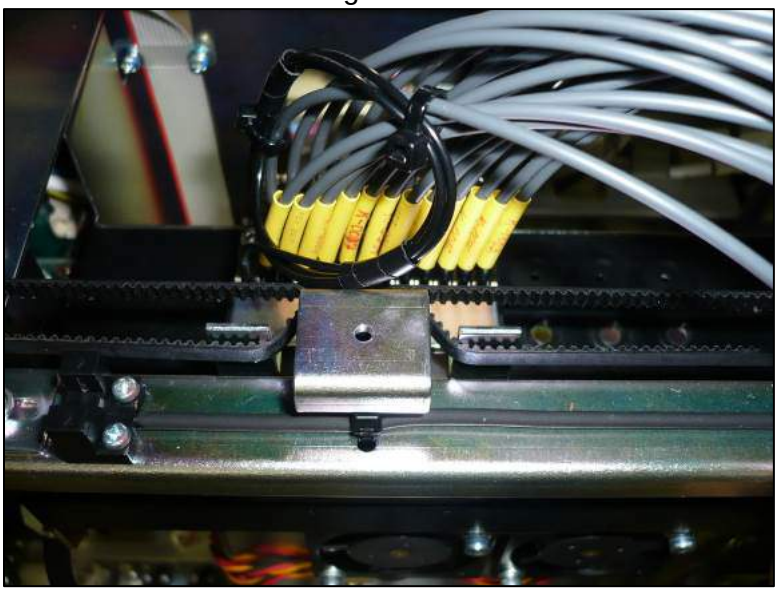
Figure 241



3.8.1.7 Attach the base plate and pulley to the new motor and reinstall the motor by reversing the steps taken to remove it

3.8.1.8 Re-tension the belt to its specified tension paying attention to its routing on the belt fixture (Figure 242) also ensure the belt is horizontal and not angled (Figure 242)

Figure 242



3.8.1.9 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.8.2. DX Axis Belt

3.8.2.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

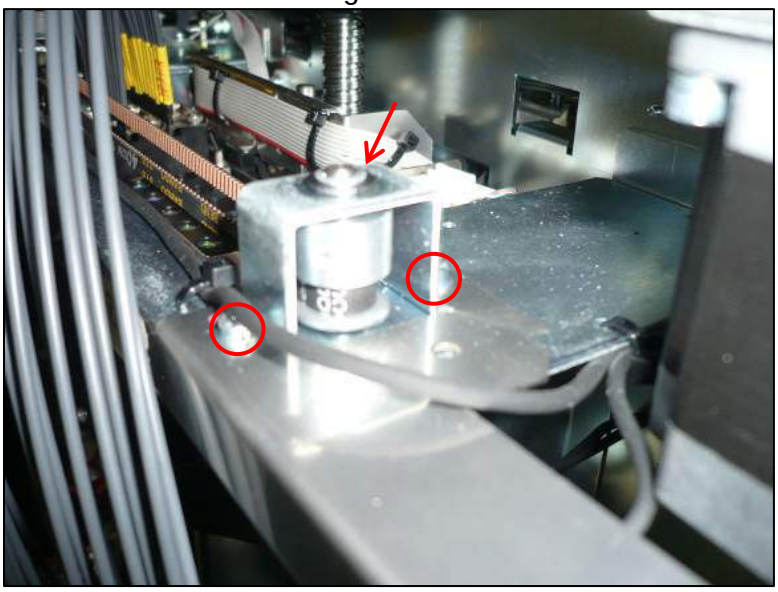
3.8.2.2 Remove the detector cover

3.8.2.3 Remove the three 2.5 mm hex head screws that secure the motor (Figure 243)

Figure 243

3.8.2.4 Remove the e ring and two 2.5 mm hex head screws that secure the idler pulley (Figure 244)

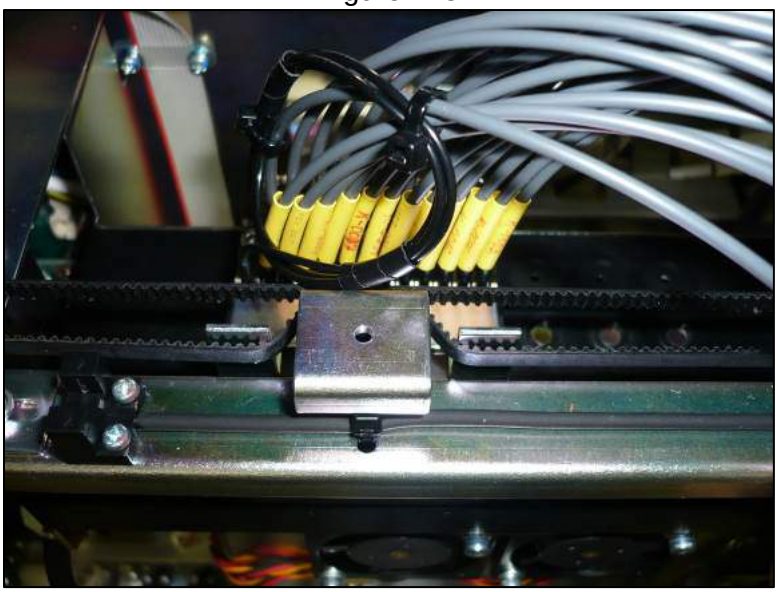
Figure 244



3.8.2.5 Reinstall the belt by reversing the steps taken to remove it

3.8.2.6 Re-tension the belt to its specified tension paying attention to its routing on the belt fixture (Figure 245) also ensure the belt is horizontal and not angled

Figure 245



3.8.2.7 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

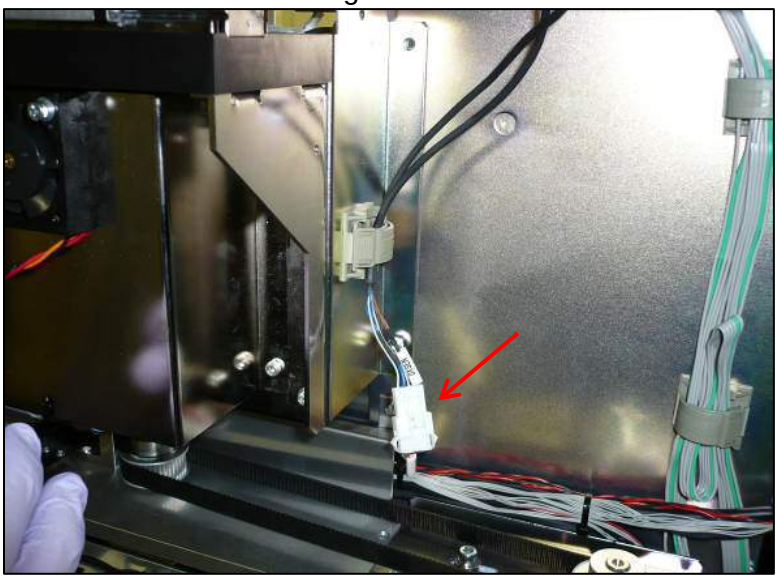
3.8.3. DX Axis Org and Encoder Sensors

3.8.3.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.8.3.2 Remove the detector cover

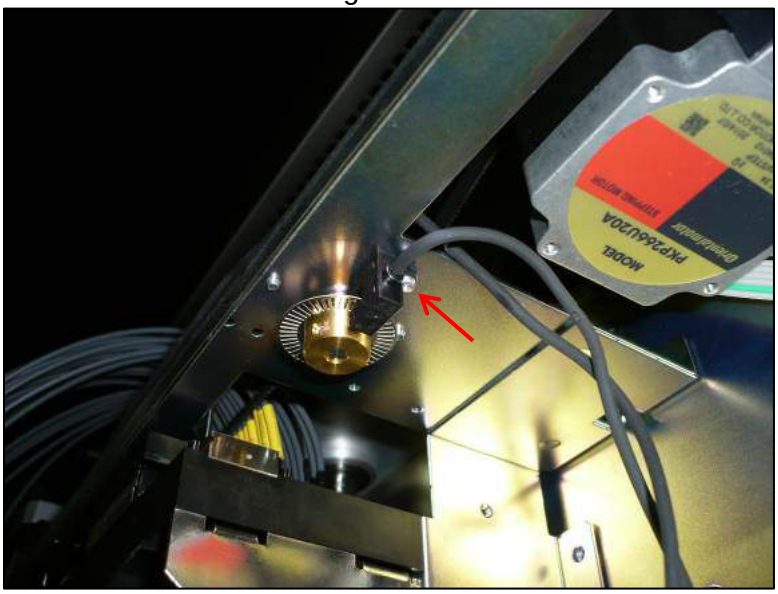
3.8.3.3 Disconnect the sensors electrical connection(Figure 246)

Figure 246



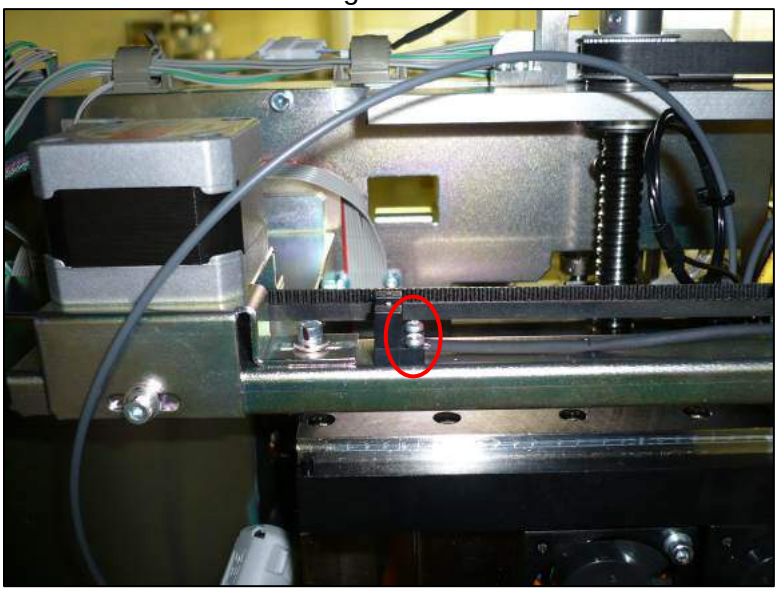
3.8.3.4 Remove the cross slot screw that secures the encoder sensor (Figure 247)

Figure 247



3.8.3.5 Remove the two cross slot screws that secure the org sensor(Figure 248)

Figure 248

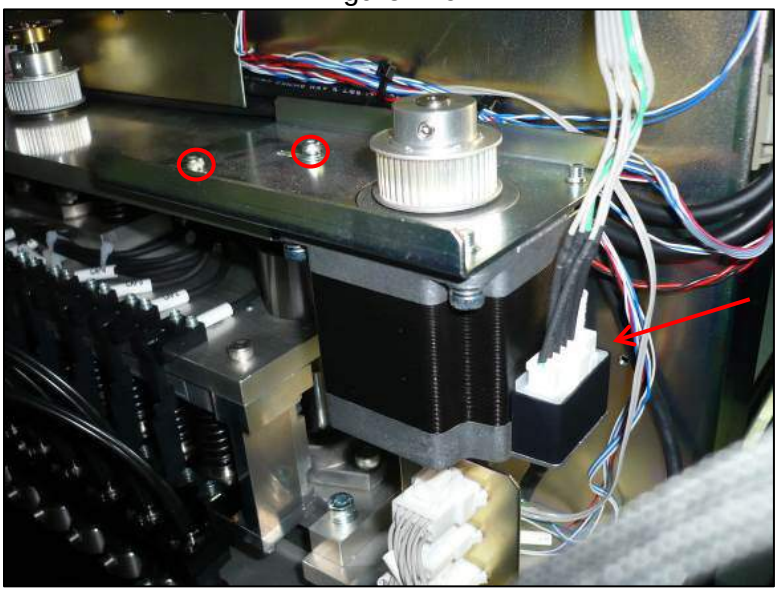


3.8.3.6 Remove any zip ties and release cable clamps that secure cabling
3.8.3.7 Reinstall the sensors by reversing the steps taken to remove them
3.8.3.8 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.8.4. DZ Axis Motor

3.8.4.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)
3.8.4.2 Remove the two 2.5 mm hex head screws that secure the motor and unplug the electrical connector (Figure 249)

Figure 249

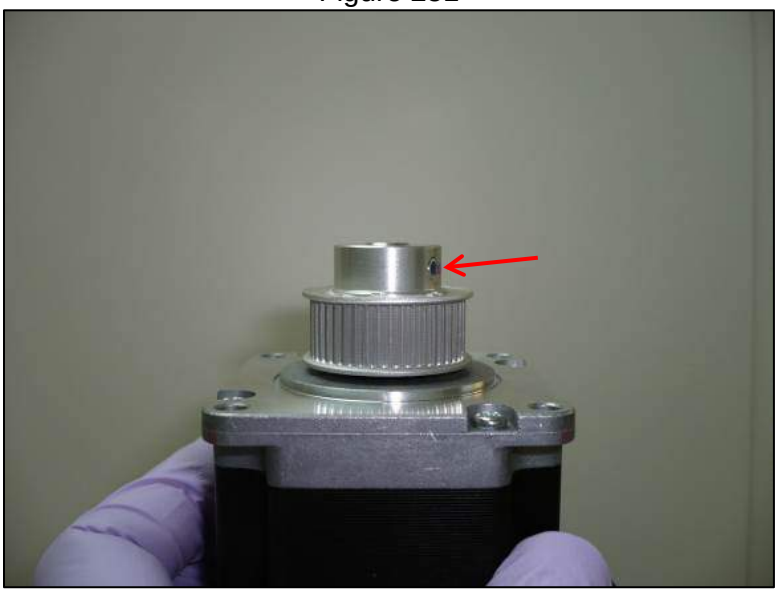


3.8.4.3 Remove the four 3 mm screws that secure the motor base plate (Figure 250)

Figure 250

3.8.4.4 Loosen the 1.5 mm hex head set screw and remove the pulley and the base plate from the motor (Figure 251)

Figure 251



3.8.4.5 Install the pulley and base plate onto the new motor with a gap of 0.5 mm between them

3.8.4.6 Reverse the steps taken to remove the motor to install the replacement

3.8.4.7 Re-tension the belt to its specified tension

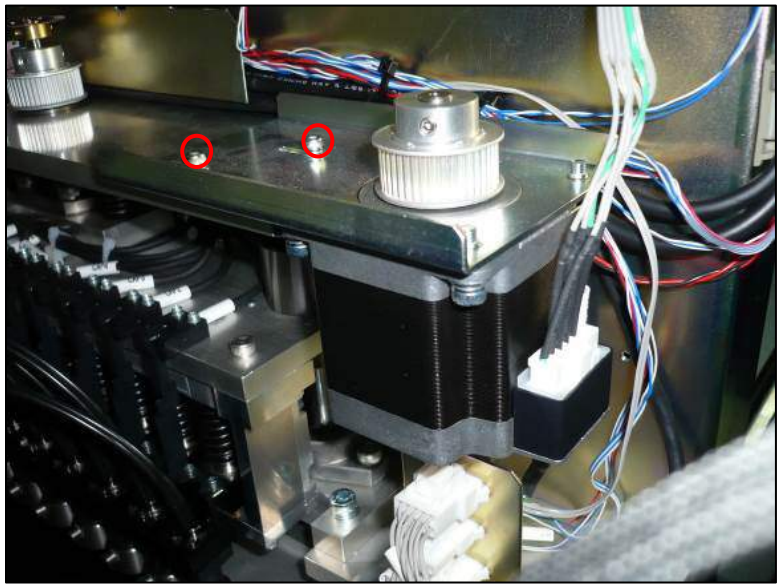
3.8.4.8 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.8.5. DZ Axis Belt

3.8.5.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

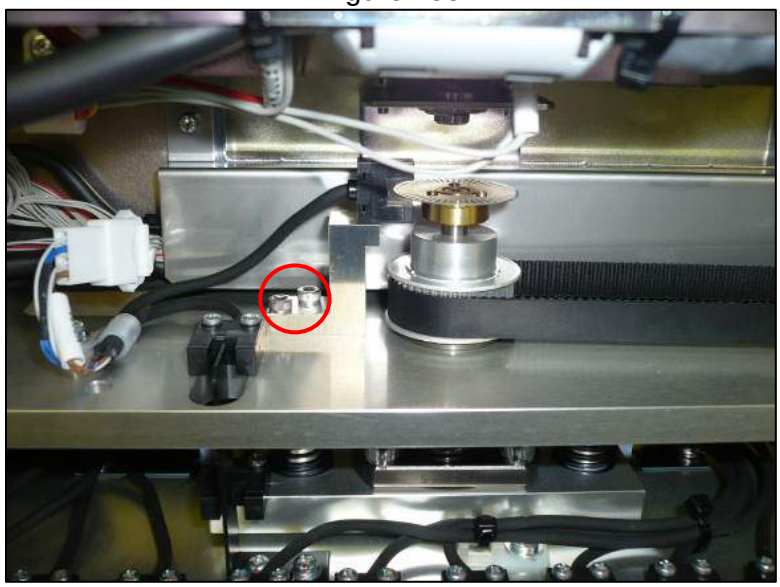
3.8.5.2 Loosen the two 2.5 mm hex head screws that secure the motor (Figure 252)

Figure 252



3.8.5.3 Remove the two 2.5 mm hex head screws that secure the encoder sensor bracket and remove the bracket (Figure 253)

Figure 253



3.8.5.4 Lift belt off of both pulleys to remove taking care not to damage encoder wheel

3.8.5.5 Reverse the steps taken to remove the belt to install the replacement

3.8.5.6 Re-tension the belt to its specified tension

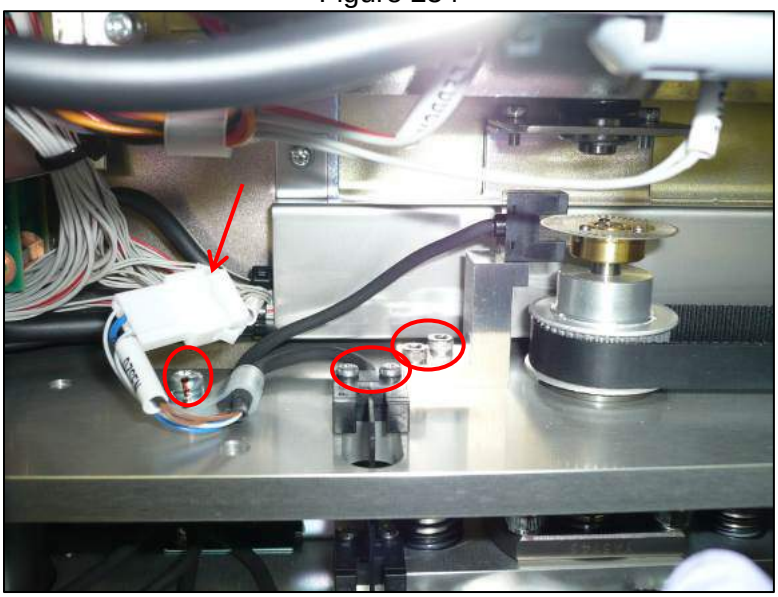
3.8.5.7 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.8.6. DZ Axis Org and Encoder sensors

3.8.6.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.8.6.2 Disconnect the electrical connection to the two sensors, undo the wire clamp securing it, remove the two cross slot screws securing the org sensor and the two 2.5 mm hex had screws securing the encoder sensor bracket(Figure 254)

Figure 254



3.8.6.3 Remove the encoder sensor from the bracket by removing the cross slot screw that secures it (Figure 255)

Figure 255

3.8.6.4 Reverse the steps taken to remove the sensors to install the replacement

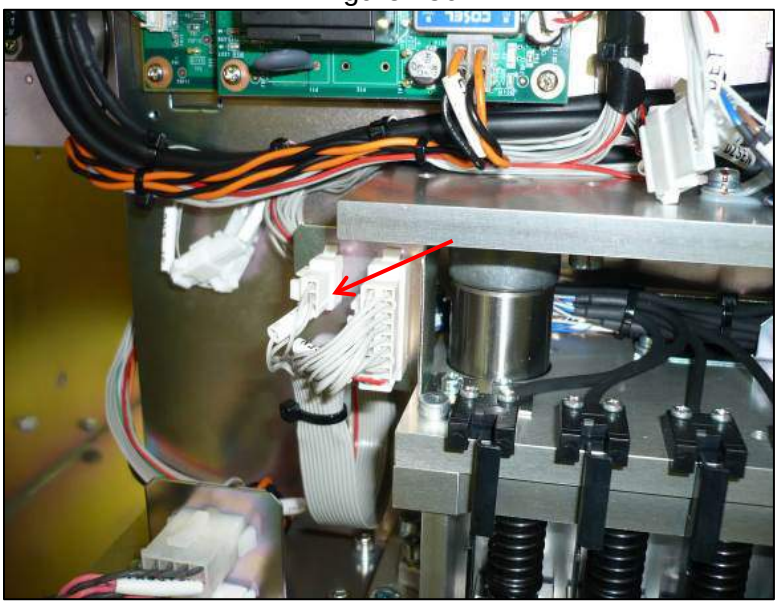
3.8.6.5 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.8.7. DZ Axis Bottom Sensor

3.8.7.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

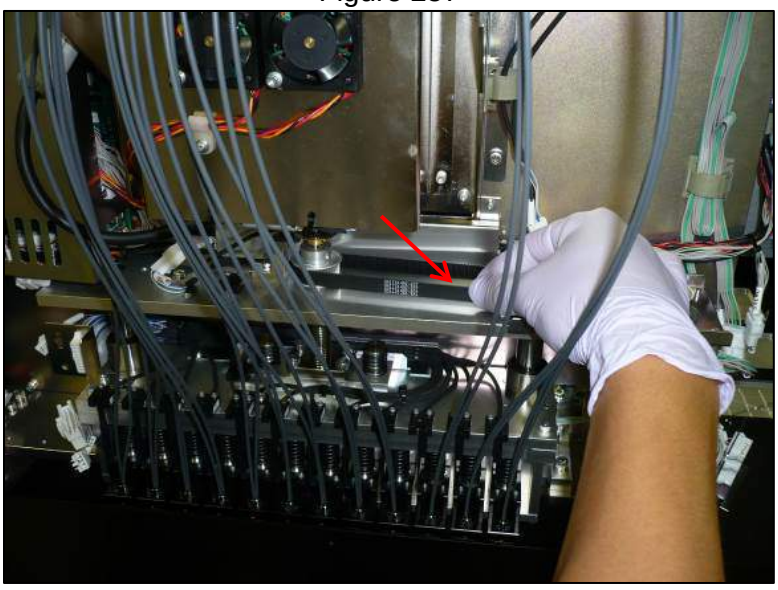
3.8.7.2 Disconnect the electrical connection to the sensor (Figure 256)

Figure 256



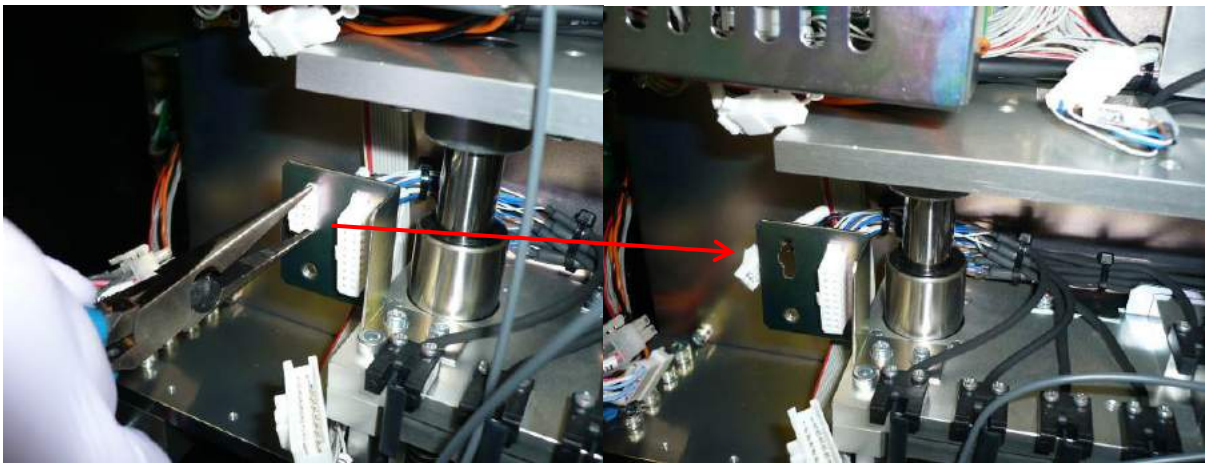
3.8.7.3 Manually lower the DZ axis by turning the drive belt so that you can access the bottom sensor (Figure 257)

Figure 257



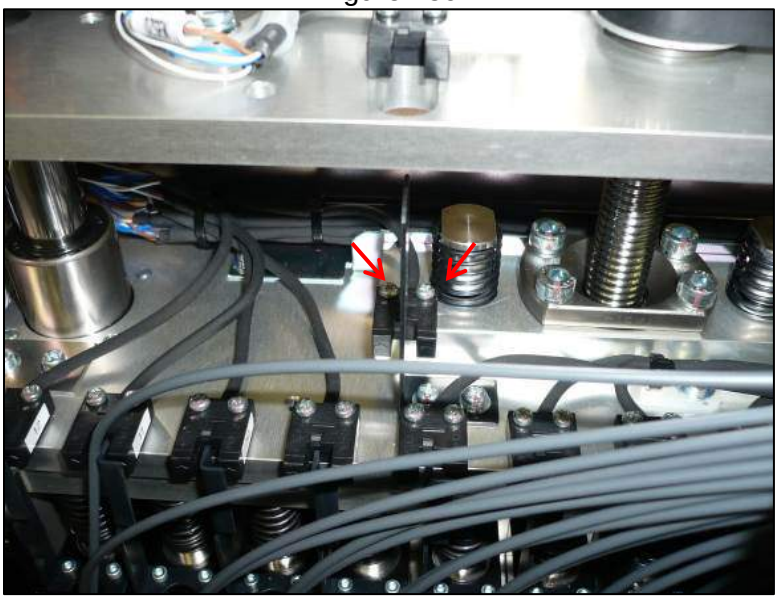
3.8.7.4 Remove sensor connector from connector bracket by depressing locking tabs (Figure 258)

Figure 258



3.8.7.5 Remove two cross slot screws that secure sensor (Figure 259)

Figure 259

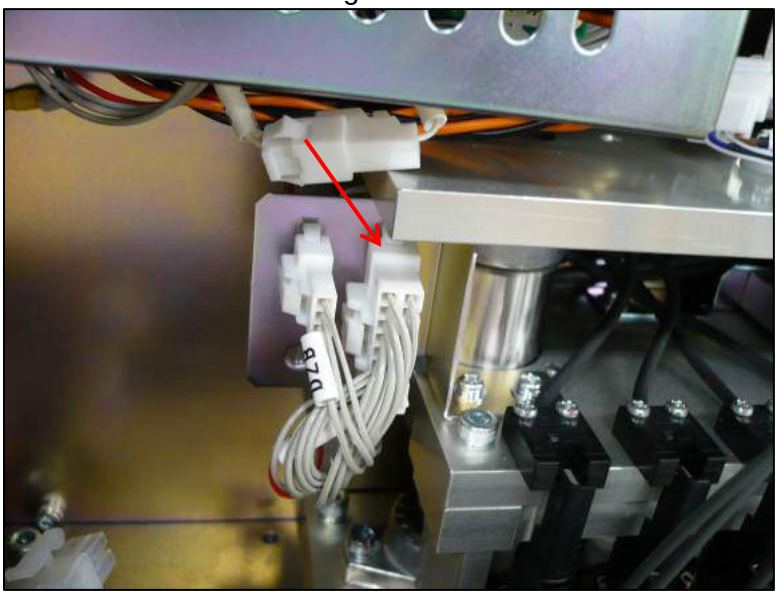


3.8.7.6 Cut zip ties that secure cabling to remove sensor
3.8.7.7 Install replacement sensor by reversing removal steps
3.8.7.8 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.8.8. DZ Axis Cap Check Sensors

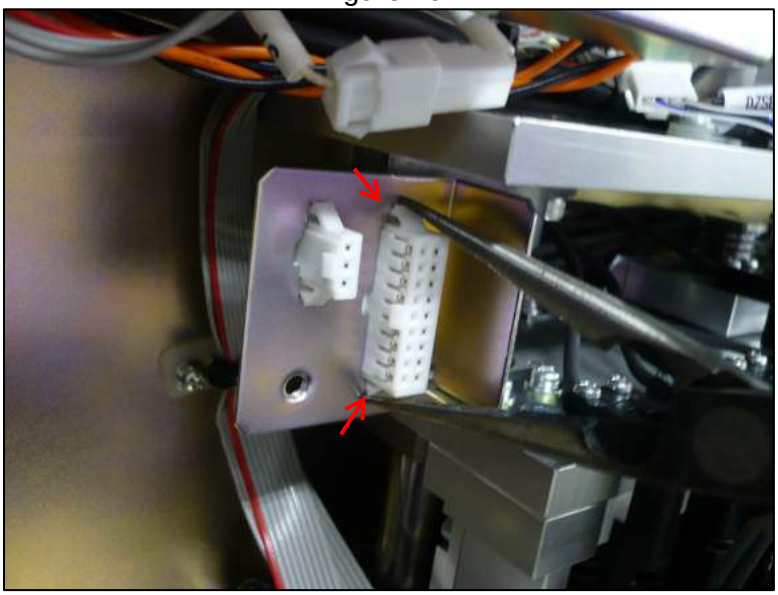
3.8.8.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)
3.8.8.2 Disconnect the electrical connection to the sensors (Figure 260)

Figure 260



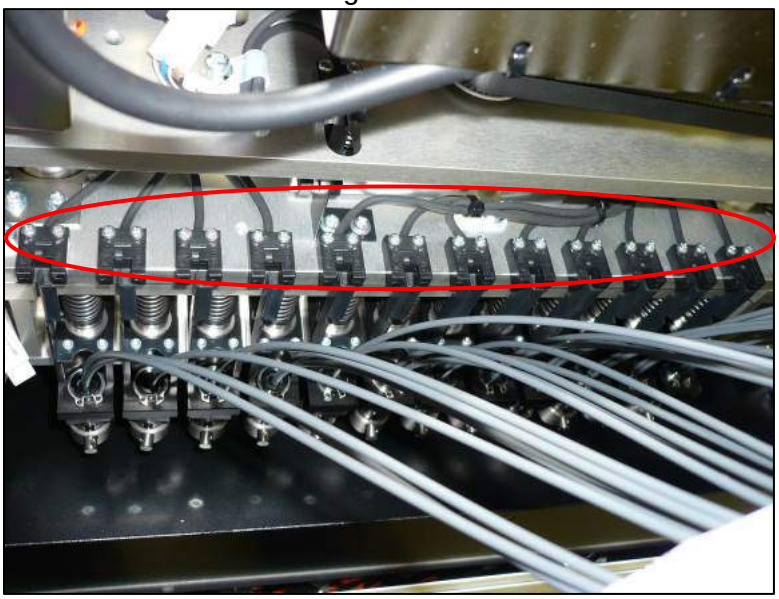
3.8.8.3 Remove sensor connector from connector bracket by depressing locking tabs (Figure 261)

Figure 261



3.8.8.4 Remove the twenty four cross slot screws that secure the twelve sensors and remove all zip ties securing cables (Figure 262)

Figure 262



3.8.8.5 Reverse the removal steps to install the replacement sensors

3.8.8.6 After replacement carry out the motor and encoder checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.8.9. PCR Detector Assembly

3.8.9.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.8.9.2 Remove the fibers from the PCR detector Assembly (Section 3.8.11)

3.8.9.3 Remove the FiSICS PCB cover (3.7.19.2)

3.8.9.4 Disconnect the electrical connections as shown (Figure 263, Figure 264 & Figure 265) and remove the cabling from any cable clamps and zip ties

Figure 263

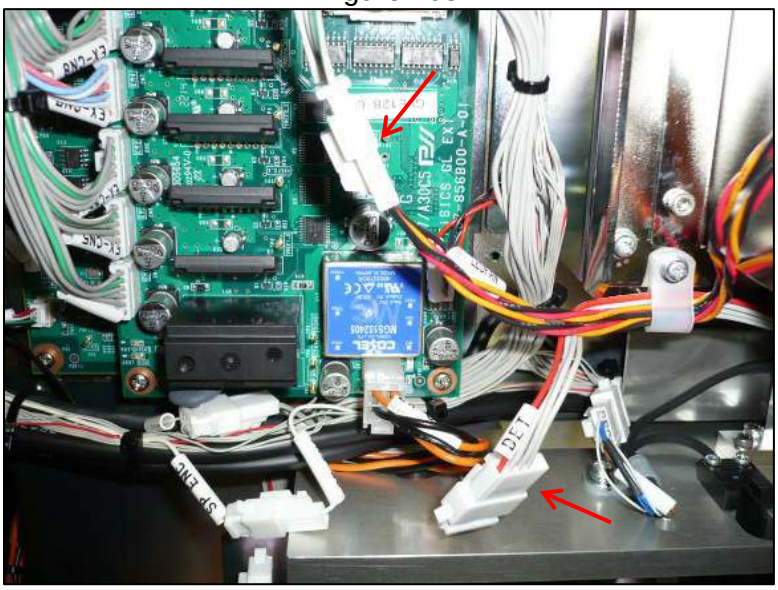


Figure 264

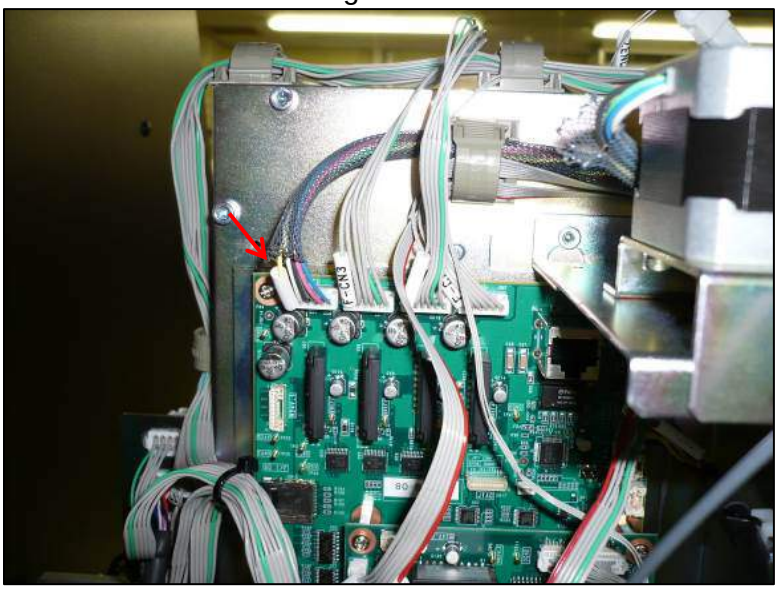
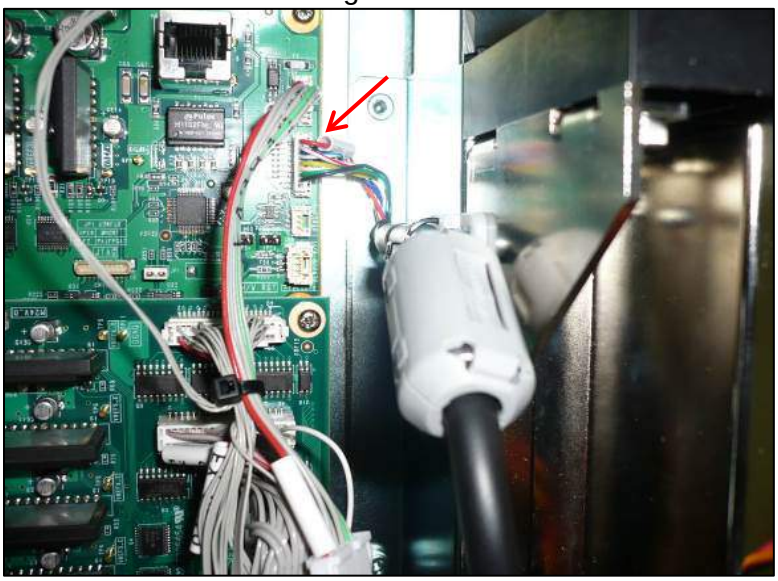
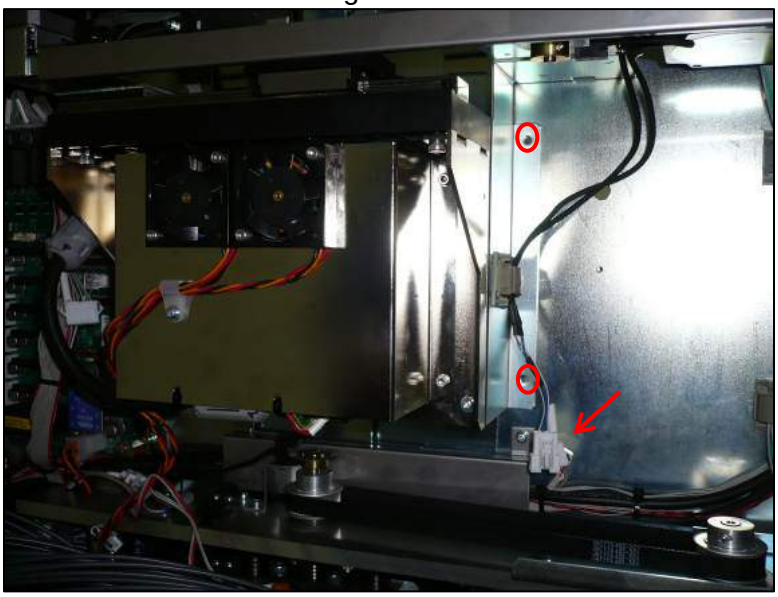


Figure 265



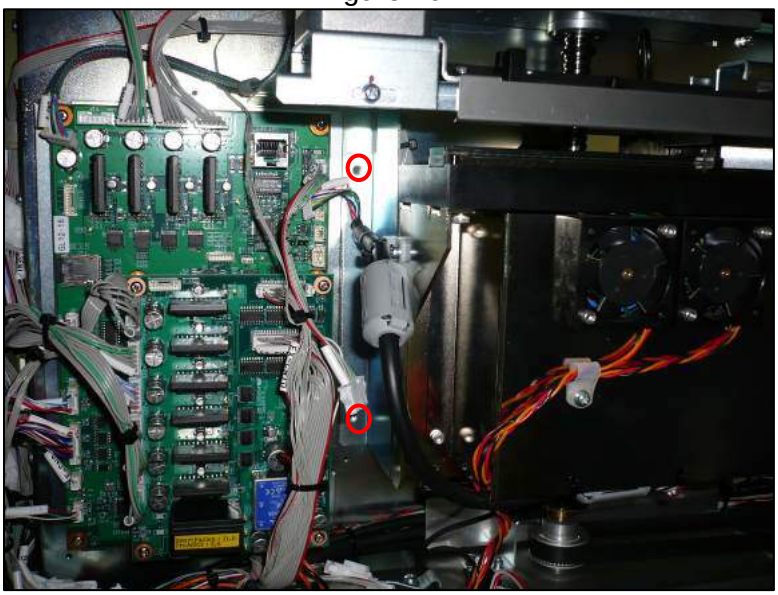
3.8.9.5 Disconnect the DX axis sensors and remove the two 3 mm hex head screws that secure the right side of the PCR detector assembly (Figure 266)

Figure 266



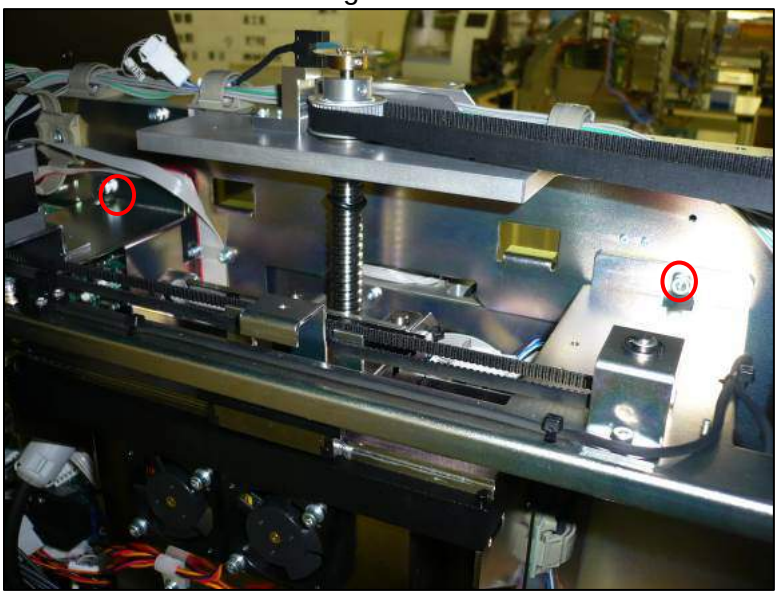
3.8.9.6 Remove the two 3 mm hex head screws that secure the left side of the assembly (Figure 267)

Figure 267



3.8.9.7 While supporting the assembly, remove the two 3 mm hex head screws from the top side (Figure 268)

Figure 268



3.8.9.8 Install the replacement PCR detector assembly by reversing the steps taken for removal

3.8.9.9 Be sure to route wiring away from pinch points and follow directions for reinstalling the optics cover (Section 3.3.2)

3.8.9.10 After replacement carry out the optics check and generate a new crosstalk matrix as specified in the MDSOP-002 qualification procedure to confirm functionality

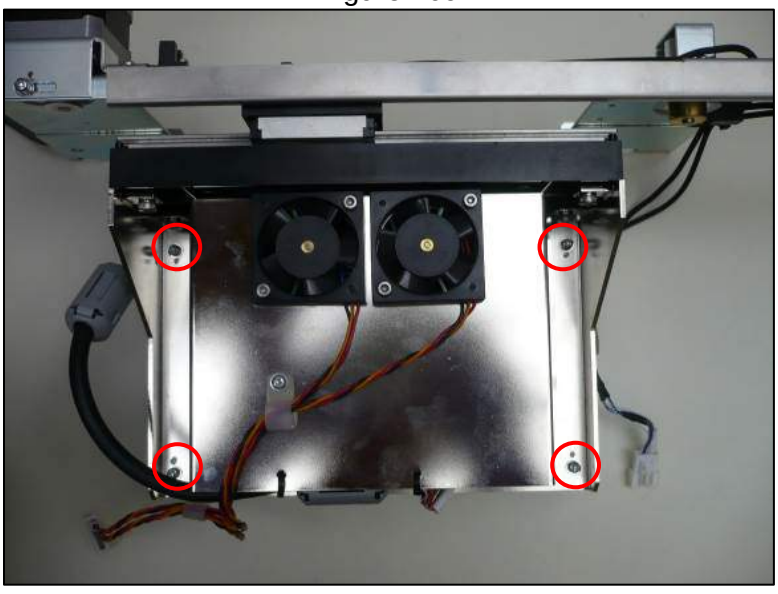
3.8.10. PCR Detector Fiber Shift Assembly

3.8.10.1 Remove the PCR detector assembly (Section 3.8.9)

3.8.10.2 Remove the DX axis belt (Section 3.8.2)

3.8.10.3 Remove the four cross slot screws that secure the fiber shift assembly (Figure 269)

Figure 269



3.8.10.4 Install the replacement assembly by reversing the steps taken to remove it

3.8.10.5 After replacement carry out the optics check and generate a new crosstalk matrix as specified in the MDSOP-002 qualification procedure to confirm functionality

3.8.11. PCR Detector Fiber Assembly

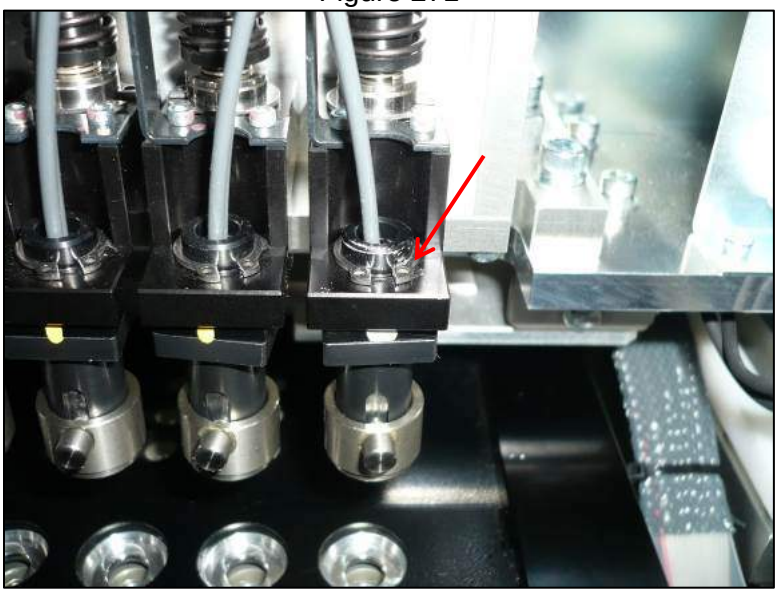
3.8.11.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.8.11.2 Remove the six 2.5 mm hex head screws that secure the fiber brackets to the PCR detector assembly to allow the fiber(s) to be lifted upward and free from the assembly (Figure 270)

Figure 270

3.8.11.3 Remove the e ring that secures the lens end of the fiber(s) to the DZ axis (Figure 271)

Figure 271



3.8.11.4 Remove the fiber assembly by sliding it downward through the opening in the DZ axis assembly (Figure 272)

Figure 272

3.8.11.5 Replace the fiber(s) by reversing the steps taken to remove them

3.8.11.6 After replacement carry out the optics check and generate a new crosstalk matrix as specified in the MDSOP-002 qualification procedure to confirm functionality

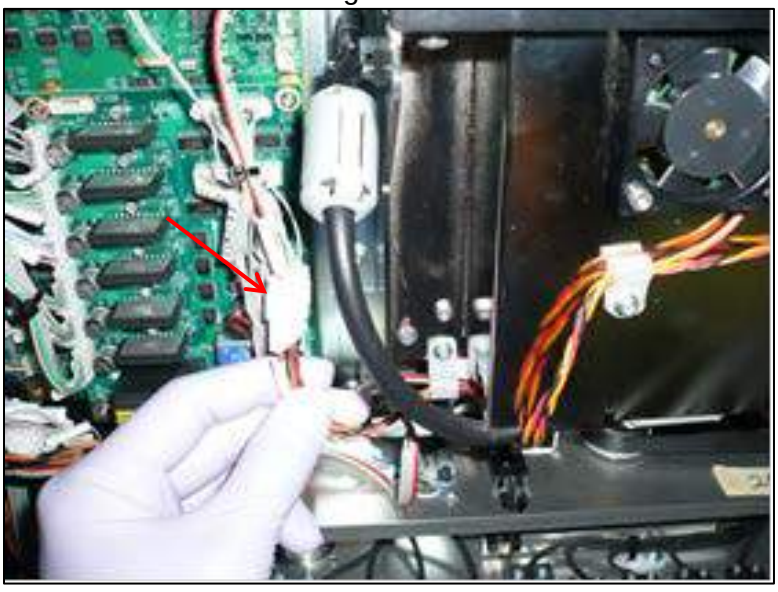
3.8.12. PCR Detector Fans

3.8.12.1 Remove the inner rear panel of the instrument and the light shield (Section 3.1.3)

3.8.12.2 Remove the FiSICS PCB cover (3.7.19.2)

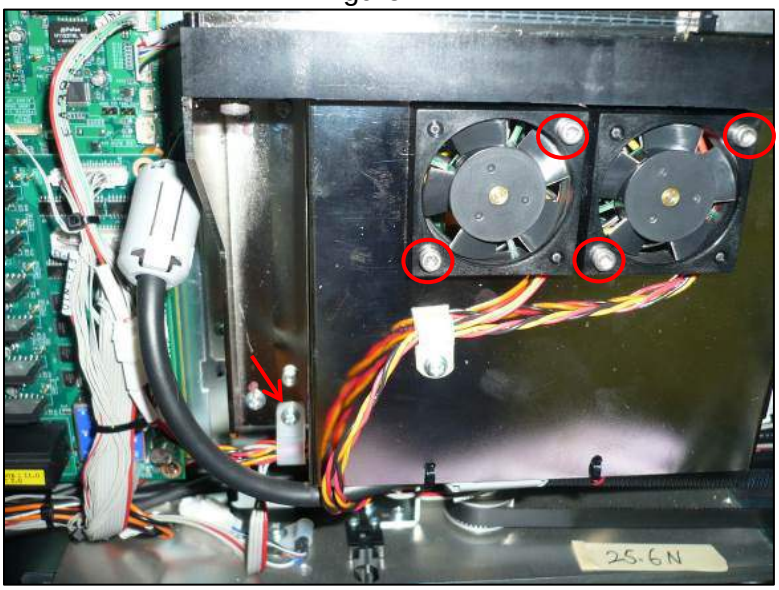
3.8.12.3 Disconnect the electrical connection to the fans (Figure 273)

Figure 273



3.8.12.4 Remove the four 2.5 mm hex head screws that secure the two fans in place and the cross slot screw that secures the wiring harness

Figure 274



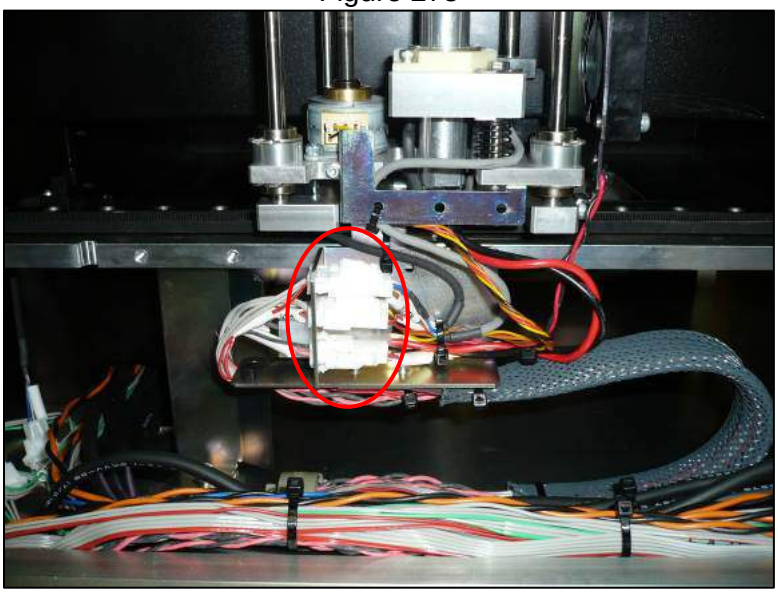
3.8.12.5 Reverse the steps taken to remove the fans to install the replacements
3.8.12.6 Power on the instrument and ensure that the fans are functional

3.9 Ultrasonic Module

3.9.1. Ultrasonic Module

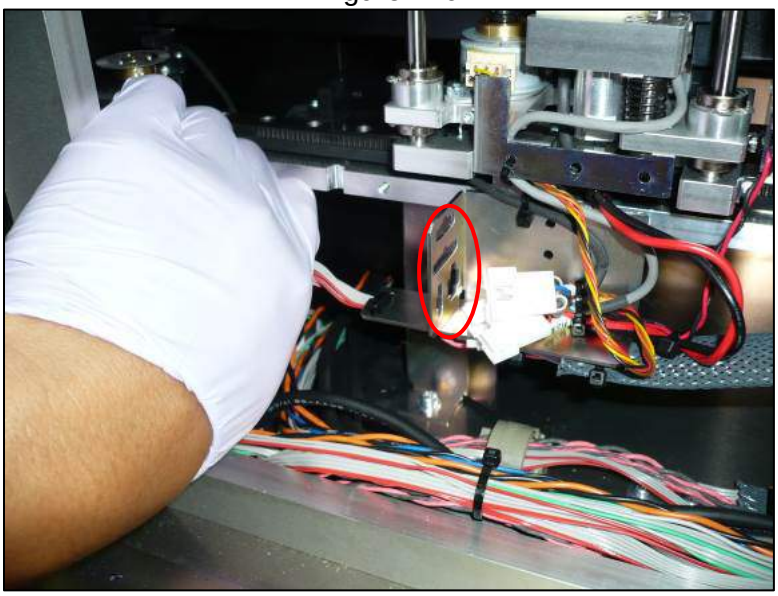
3.9.1.1 Remove the stage cover
3.9.1.2 Remove the inner and outer front panels as well as the duct cover from the instrument
3.9.1.3 Remove the front HEPA unit assembly
3.9.1.4 Disconnect the four electrical connections to the ultrasonic module (Figure 275)

Figure 275



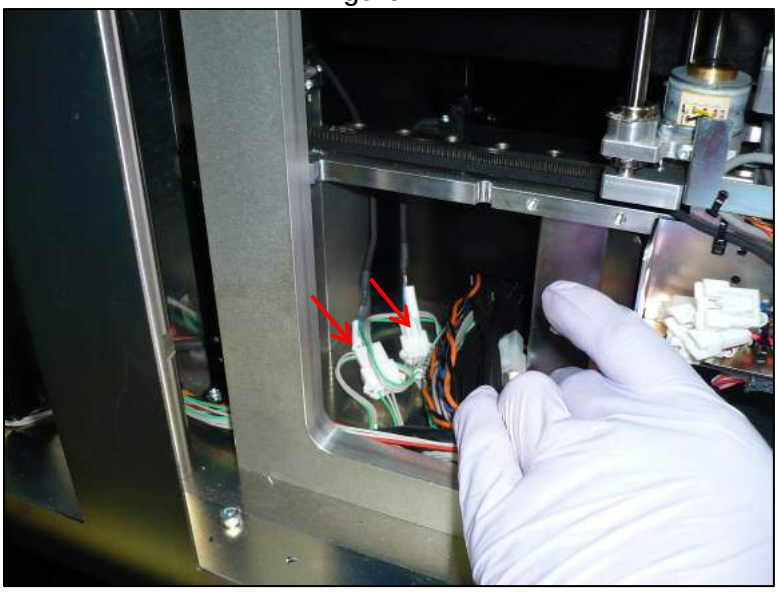
3.9.1.5 Depress the locking tabs and remove the four connectors from the bracket and cut zip ties securing cables (Figure 276)

Figure 276



3.9.1.6 Disconnect the UX axis org and encoder electrical connectors (Figure 277)

Figure 277



3.9.1.7 Depress the locking tab and disconnect the motor electrical connection (Figure 278)

Figure 278

3.9.1.8 Remove the three 3 mm hex head screws that secure the ultrasonic module (Figure 279 & Figure 280)

Figure 279

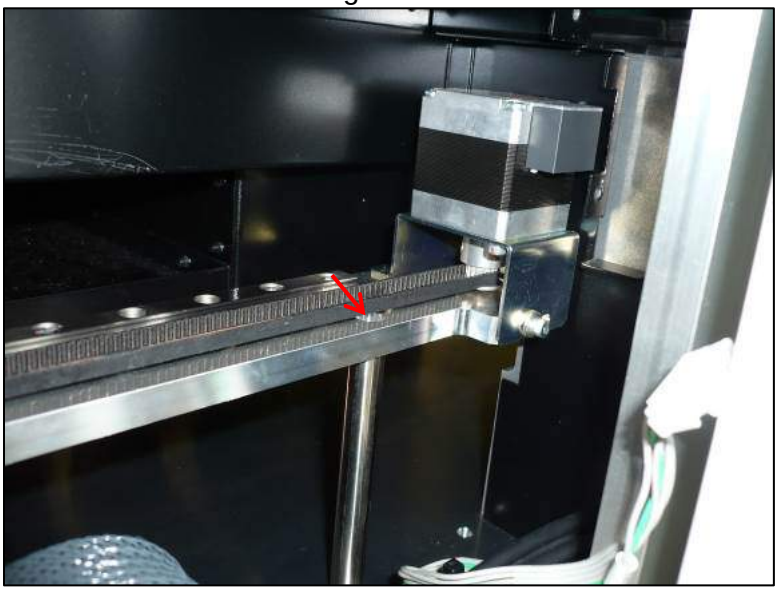
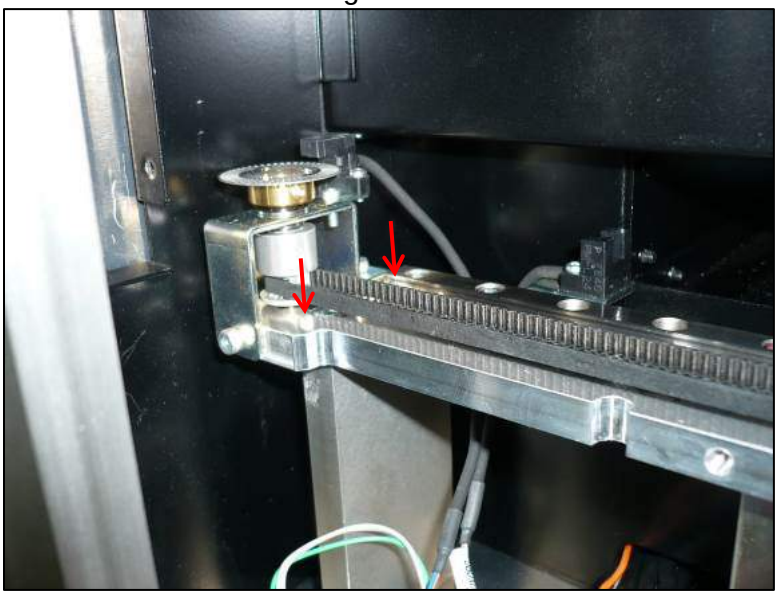
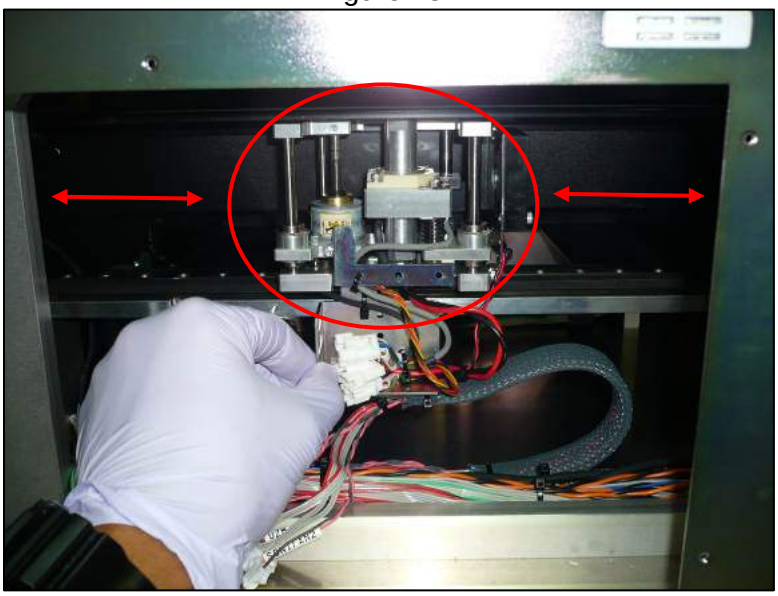


Figure 280



3.9.1.9 Move the ultrasonic head to the center of the UX axis (Figure 281)

Figure 281



3.9.1.10 Move the ultrasonic module to the right into the space where the HEPA unit occupied and then tilt the left end toward you and out of the instrument (Figure 282 & Figure 283)

Figure 282

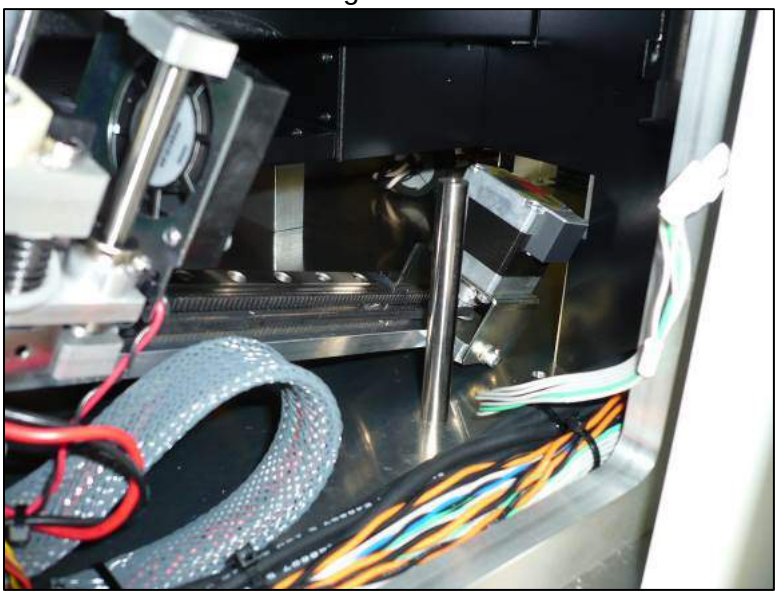
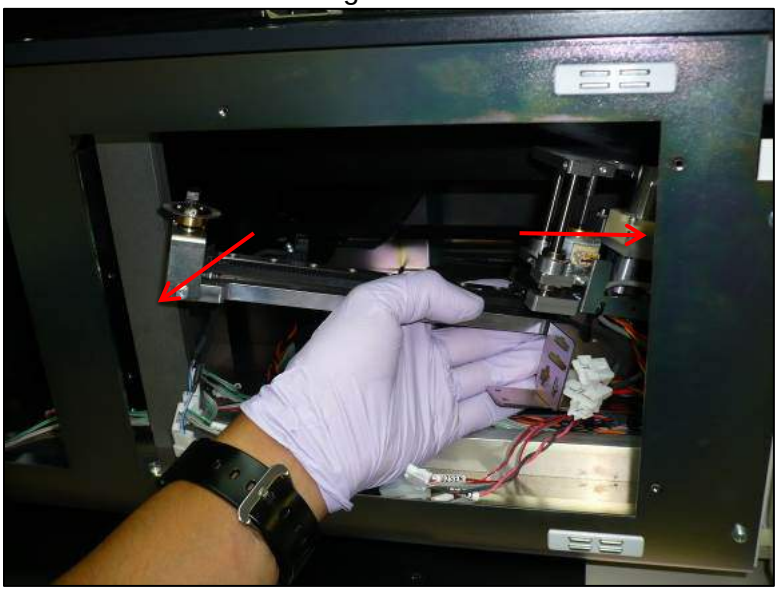
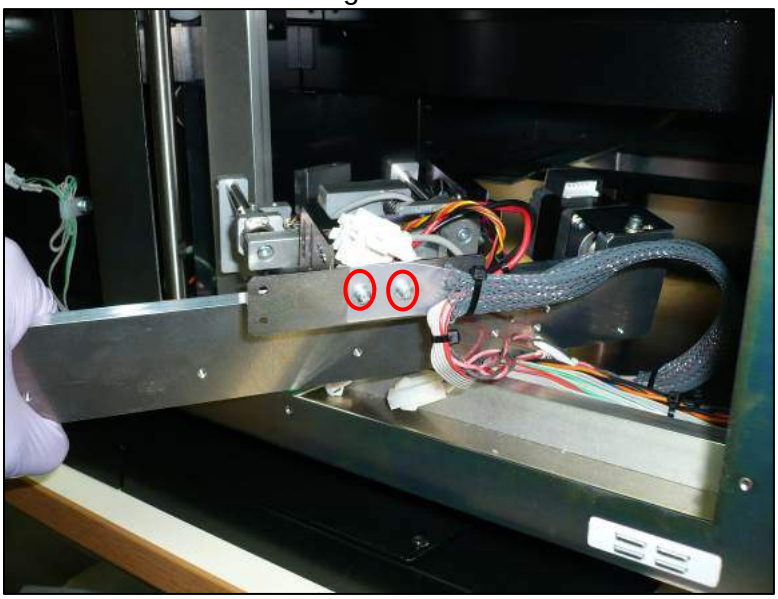


Figure 283



3.9.1.11 Remove the two cross slot screws from the bottom side of the module that secure the cable support (Figure 284)

Figure 284



3.9.1.12 To reinstall the ultrasonic module reverse the steps taken to remove it

3.9.1.13 Reassemble the rest of the instrument by reversing the steps taken to remove the components and following the teaching and positioning steps in the latest revision of PSS Document P280062MQ001 or MDSOP-002 whichever is more recent.

3.9.1.14 After replacement carry out the sonicator check as specified in the MDSOP-002 qualification procedure to confirm functionality

3.9.2. Ultrasonic Oscillator Head and Sonicator Driver

3.9.2.1 The ultrasonic head and driver must be replaced as a pair

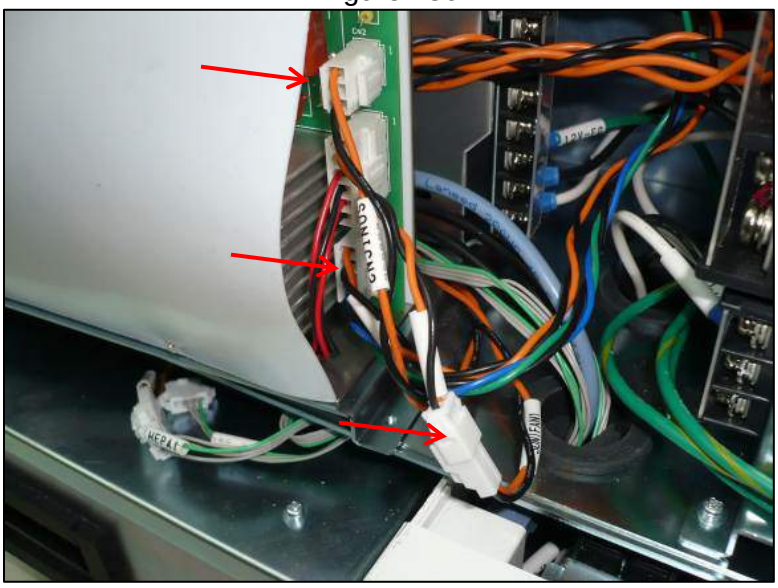
3.9.2.2 Remove the ultrasonic module (Section 3.9)

3.9.2.3 Using the special removal tool unscrew the ultrasonic oscillator head (Figure 285)

Figure 285

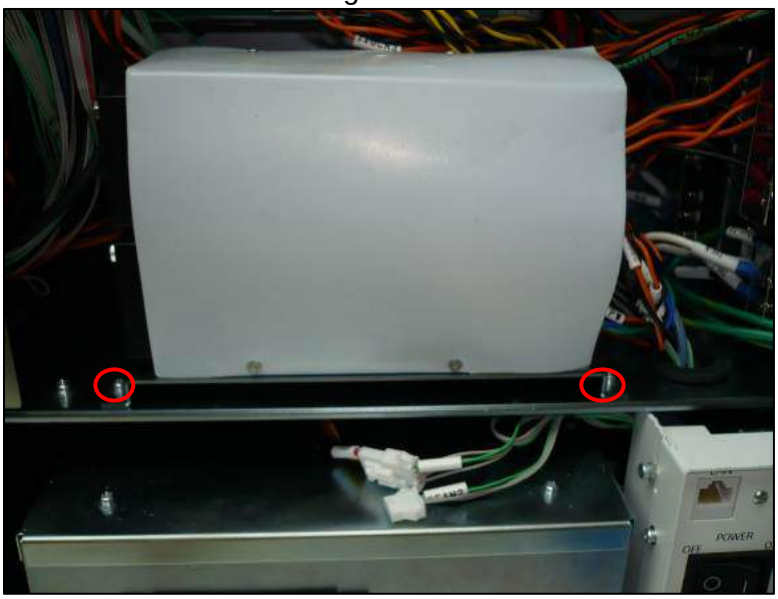
3.9.2.4 Install the replacement ultrasonic oscillator using the special tool and use care not to overtighten
3.9.2.5 Remove the right side panel of the instrument
3.9.2.6 Remove the lower electronics bay covers
3.9.2.7 Remove the three electrical connections to the driver (Figure 286)

Figure 286



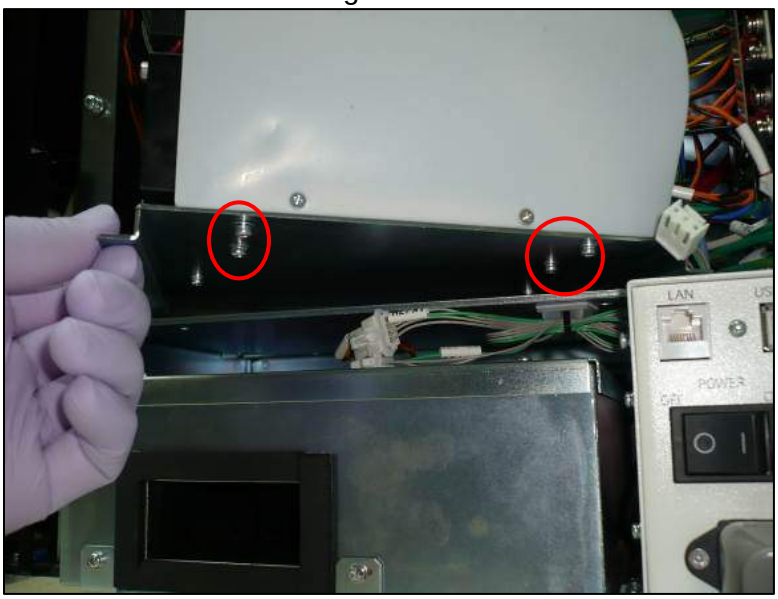
3.9.2.8 Remove the two cross slot screws securing the driver assembly (Figure 287)

Figure 287



3.9.2.9 Slide the driver toward you and lift it up to access and remove the four cross slot screws on the underside (Figure 288)

Figure 288



3.9.2.10 Reverse the steps taken to remove the driver and the oscillator to install the replacements

3.9.2.11 After replacement carry out the sonicator check as specified in the MDSOP-002 qualification procedure to confirm functionality

3.9.3. UX Axis Assembly

3.9.3.1 Remove the ultrasonic module (Section 3.9)

3.9.3.2 Using the special removal tool unscrew the ultrasonic oscillator head (Figure 289)

Figure 289

3.9.3.3 Install the ultrasonic oscillator onto the replacement UX axis using the special tool and use care not to overtighten

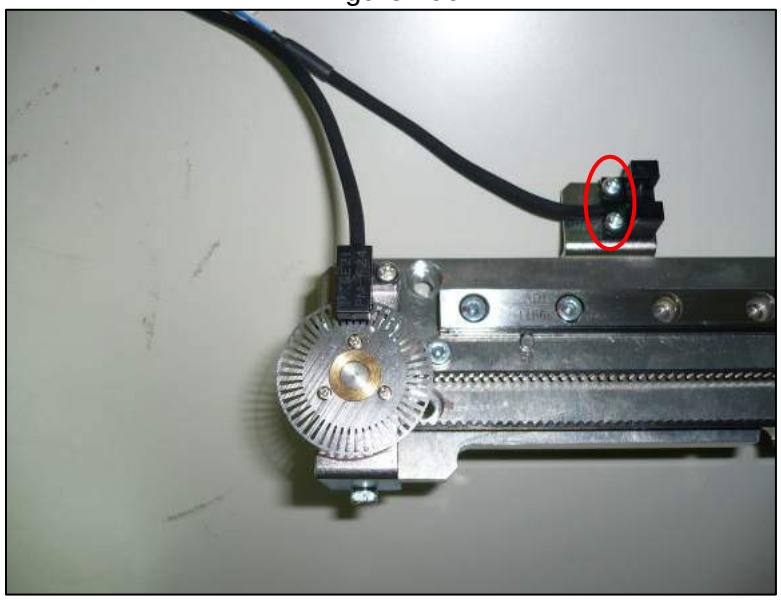
3.9.3.4 Reverse the steps taken to remove the UX axis to replace it into the instrument

3.9.3.5 After replacement carry out the sonicator check as specified in the MDSOP-002 qualification procedure to confirm functionality

3.9.4. UX Axis Org Sensor

3.9.4.1 Remove the ultrasonic module (Section 3.9)
3.9.4.2 Remove the two cross slot screws that secure the sensor (Figure 290)

Figure 290

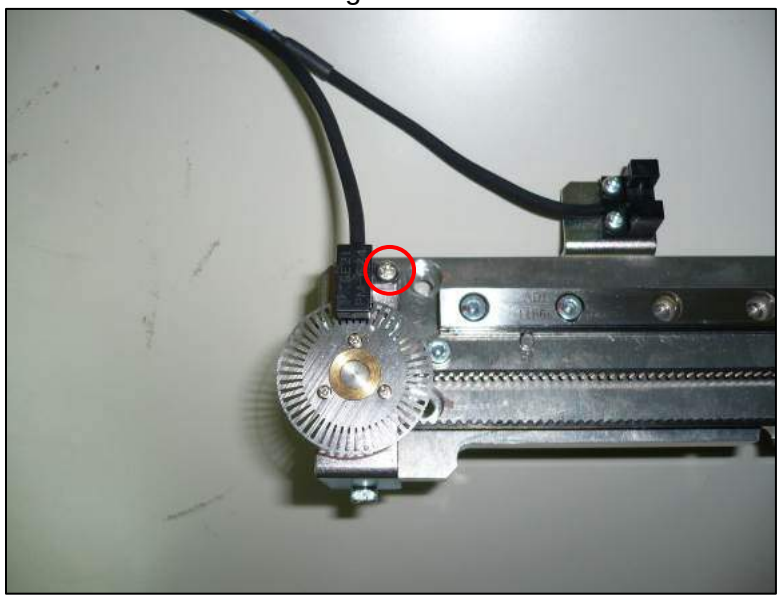


3.9.4.3 Reverse the steps taken to remove the sensor to install the replacement
3.9.4.4 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.9.5. UX Axis Encoder Sensor

3.9.5.1 Remove the ultrasonic module (Section 3.9)
3.9.5.2 Remove the cross slot screw that secures the sensor (Figure 291)

Figure 291

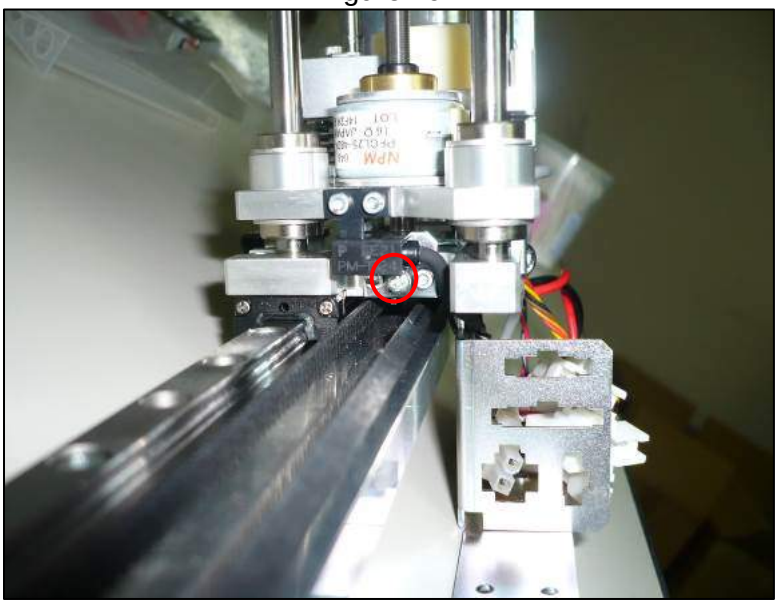


3.9.5.3 Install the replacement sensor by reversing the steps taken to remove it
3.9.5.4 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.9.6. UZ Axis Org and Touch Sensor

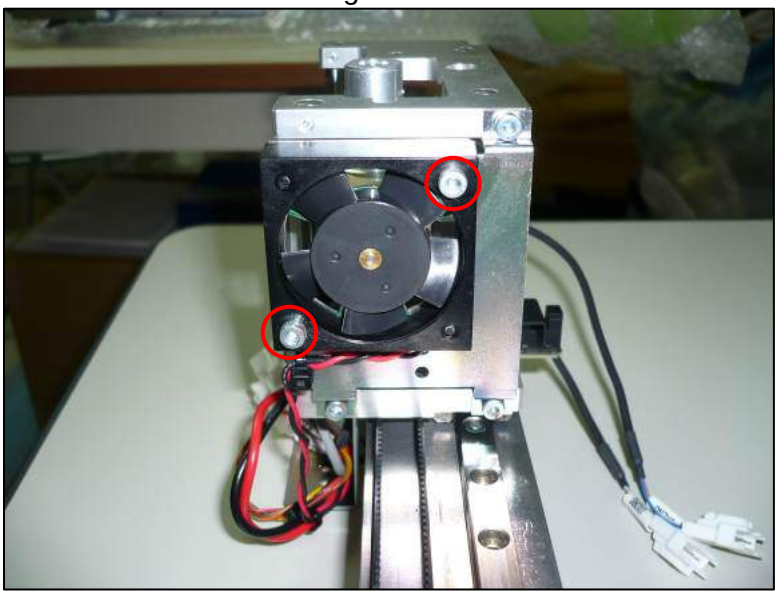
3.9.6.1 Remove the ultrasonic module (Section 3.9)
3.9.6.2 Remove the cross slot screw that secures the encoder sensor (Figure 292)

Figure 292



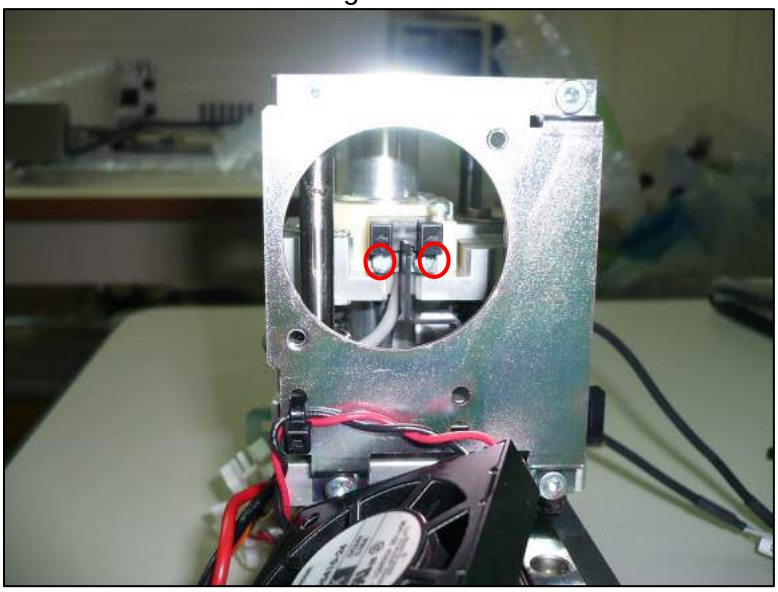
3.9.6.3 Remove the cooling fan by removing the two 2.5 mm hex head screws that secure it (Figure 293)

Figure 293



3.9.6.4 Remove the two cross slot screws that secure the org sensor to remove it (Figure 294)

Figure 294



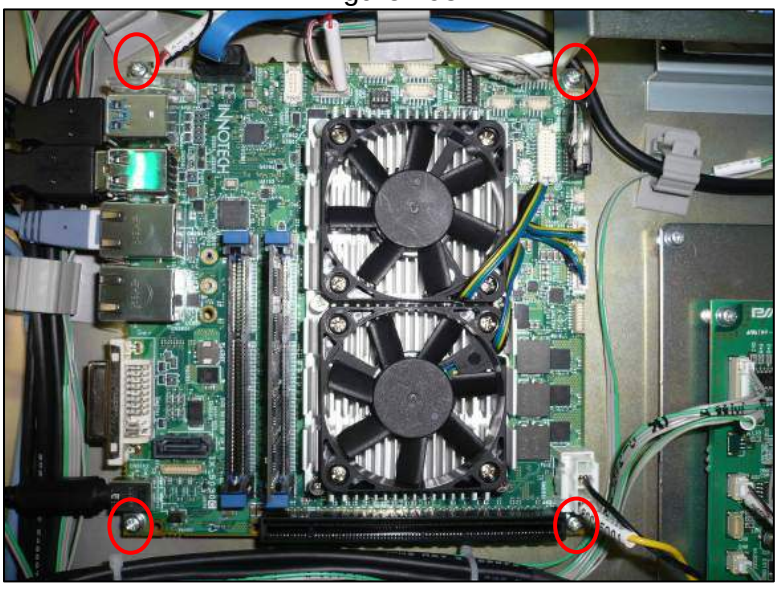
3.9.6.5 Install the replacement sensors by reversing the steps taken to remove it
3.9.6.6 After replacement carry out the motor and encoder function checks as specified in the MDSOP-002 qualification procedure to confirm functionality

3.10 PCBs and Power Supplies

3.10.1. PC

3.10.1.1 Remove the right side panel of the instrument
3.10.1.2 Remove both electronics bay covers
3.10.1.3 Remove all of the electrical connections to the PC and remove the four cross slot screws that secure it (Figure 295)

Figure 295



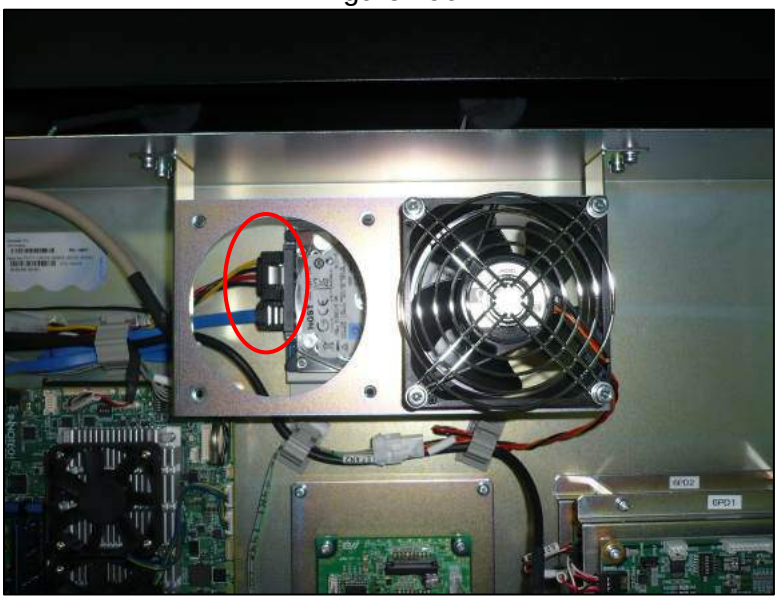
3.10.1.4 Remove the PC license label and package with the removed PC, if it cannot be removed note the license number manually and package it with the removed PC

3.10.1.5 Install the replacement PC by reversing the steps taken to remove it
3.10.1.6 Install the new PC license label on the chassis of the instrument where the old one was removed
3.10.1.7 Power on the instrument and ensure that it boots up and completes its self-check

3.10.2. PC Hard Disk Drive

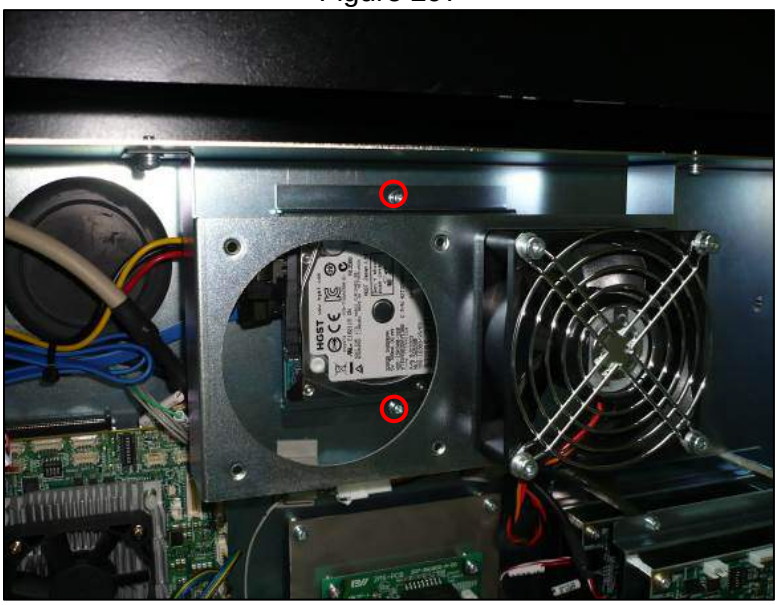
3.10.2.1 Remove the right side panel of the instrument
3.10.2.2 Remove both electronics bay covers
3.10.2.3 Remove both connections to the hard disk drive (Figure 296)

Figure 296



3.10.2.4 Remove the two cross slot screws of the mounting bracket (Figure 297)

Figure 297



3.10.2.5 Free the hard disk drive by removing the four cross slot screws that secure it to the mounting bracket (Figure 298)

Figure 298

3.10.2.6 Reverse steps taken to remove the hard disk drive to install the replacement

3.10.2.7 Power on the instrument and ensure that it boots up and completes its self-check

3.10.2.8 Update the instrument to the latest software and firmware revisions

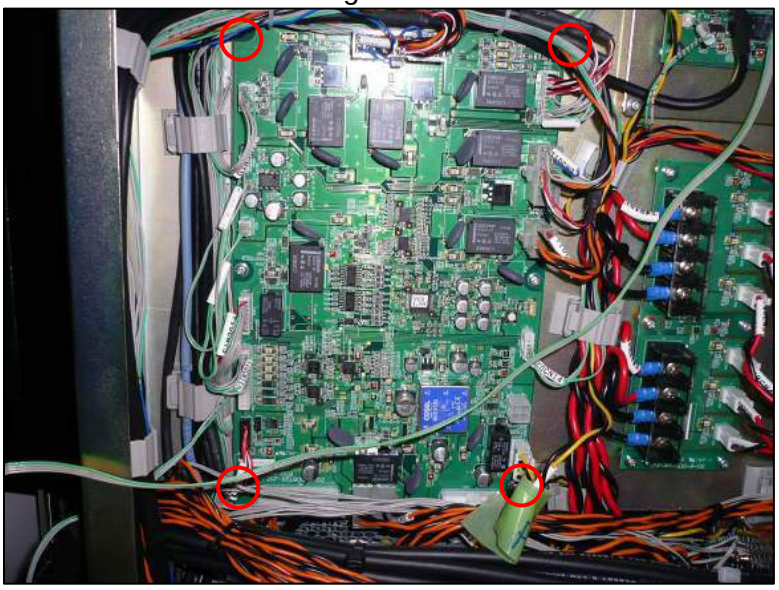
3.10.3. TIO PCB

3.10.3.1 Remove the right side panel of the instrument

3.10.3.2 Remove both electronics bay covers

3.10.3.3 Remove the four cross slot screws that secure the TIO PCB and disconnect all connectors to the board (Figure 299)

Figure 299

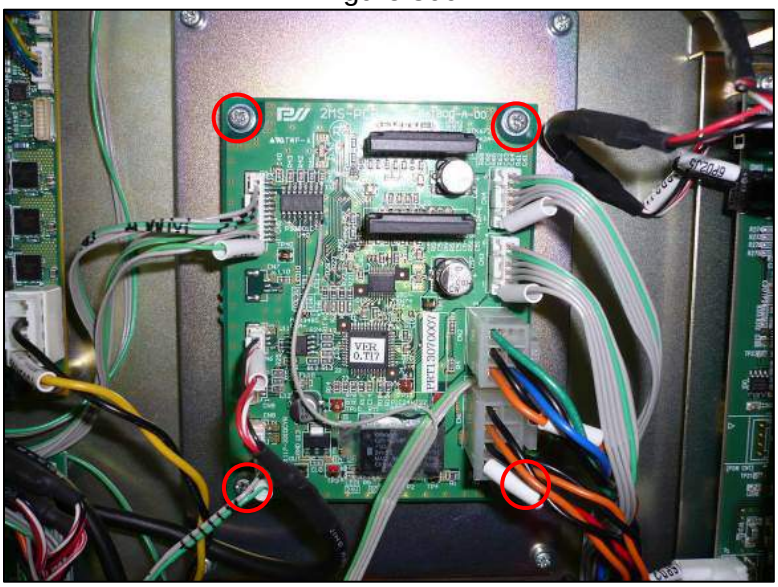


3.10.3.4 Reverse the steps taken to remove the board to install the replacement
3.10.3.5 Power on the instrument and ensure that it boots up and completes its self-check
3.10.3.6 Update the instrument to the latest software and firmware revisions

3.10.4. 2MS PCB

3.10.4.1 Remove the right side panel of the instrument
3.10.4.2 Remove both electronics bay covers
3.10.4.3 Remove the four cross slot screws that secure the board and disconnect all of the connectors (Figure 300)

Figure 300

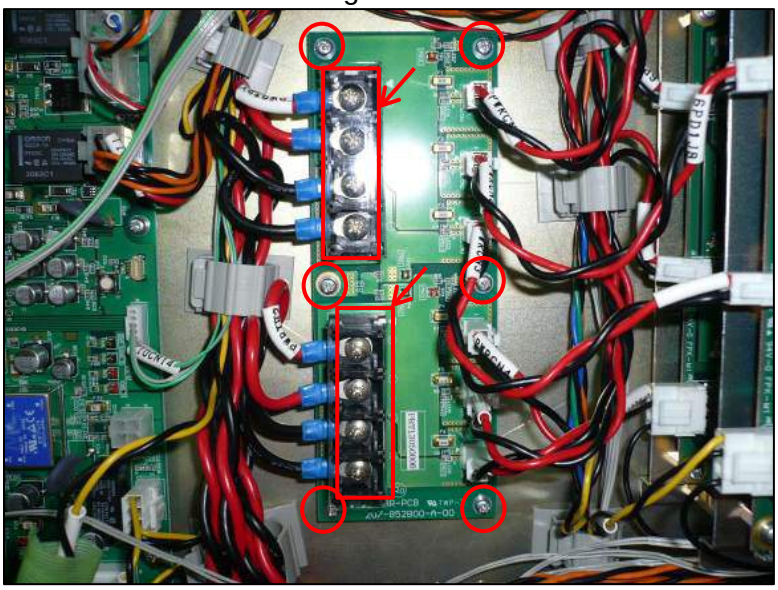


3.10.4.4 Reverse the steps taken to remove the board to install the replacement
3.10.4.5 Power on the instrument and ensure that it boots up and completes its self-check
3.10.4.6 Update the instrument to the latest software and firmware revisions

3.10.5. Power Distribution PCB

3.10.5.1 Remove the right side panel of the instrument
3.10.5.2 Remove both electronics bay covers
3.10.5.3 Lift the protective covers over the terminal lugs and undo the wires secured in them then unplug the remaining electrical connections and remove the six cross slot screws that secure the board (Figure 301)

Figure 301



3.10.5.4 Reverse the steps taken to remove the board to install the replacement

3.10.5.5 Power on the instrument and ensure that it boots up and completes its self-check

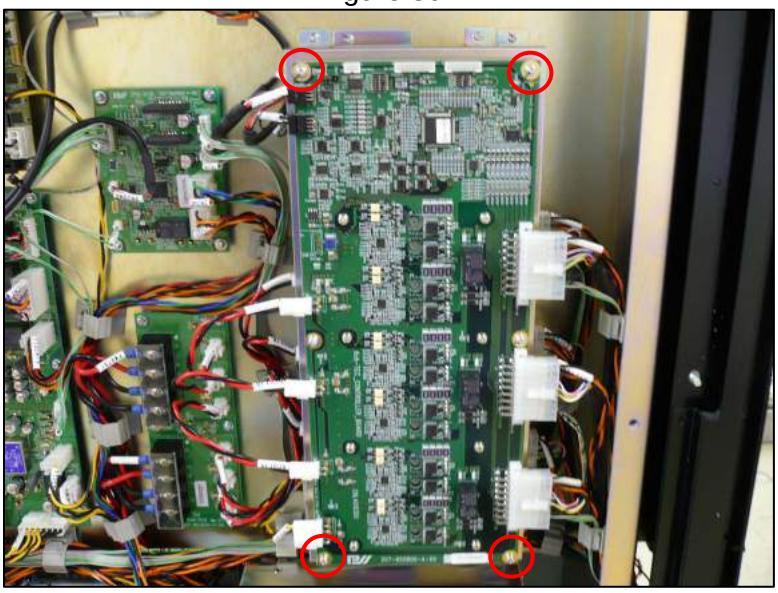
3.10.6. 6ch TEC Controller Boards

3.10.6.1 Remove the right side panel of the instrument

3.10.6.2 Remove both electronics bay covers

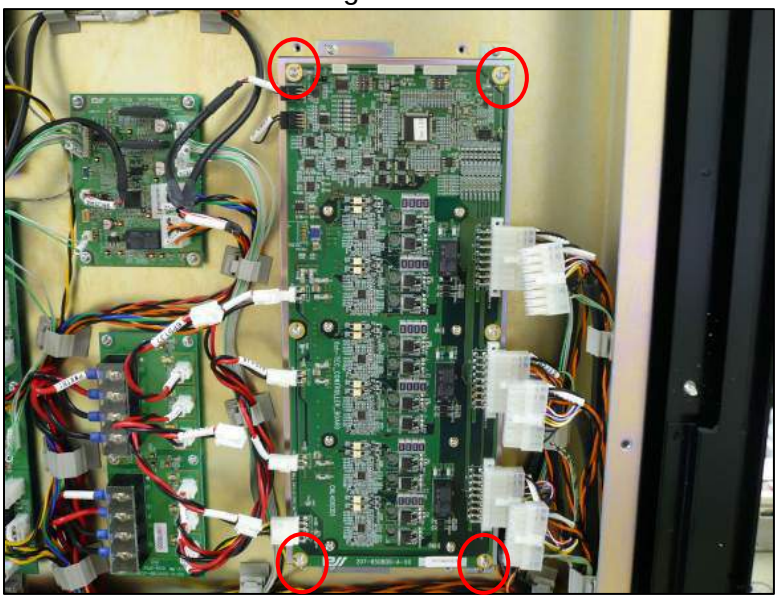
3.10.6.3 Remove all electrical connections to 6ch TEC controller board 1 and remove the four cross slot screws that secure it (Figure 302)

Figure 302



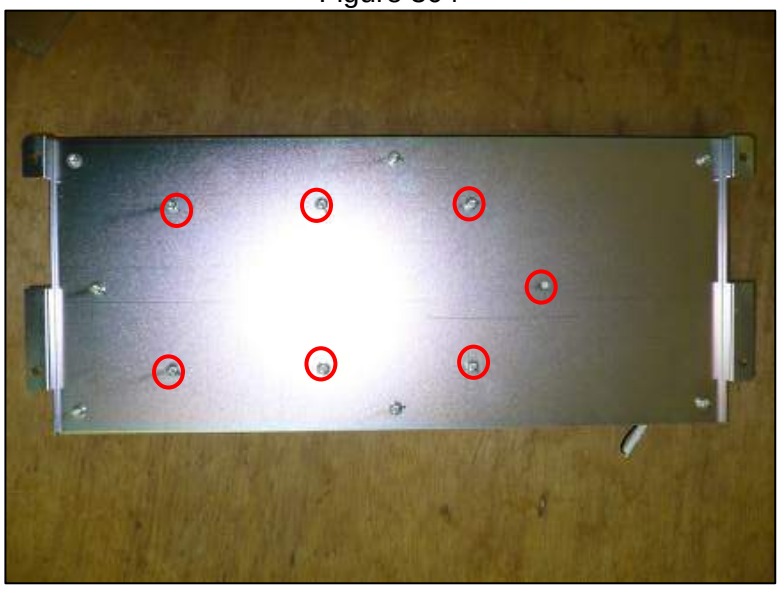
3.10.6.4 With board 1 removed from the instrument board 2 is accessible, it is also secured by four cross slot screws (Figure 303)

Figure 303



3.10.6.5 Remove all connectors to the board prior to removal
3.10.6.6 Both boards are secured to their framework by seven cross slot screws (Figure 304)

Figure 304

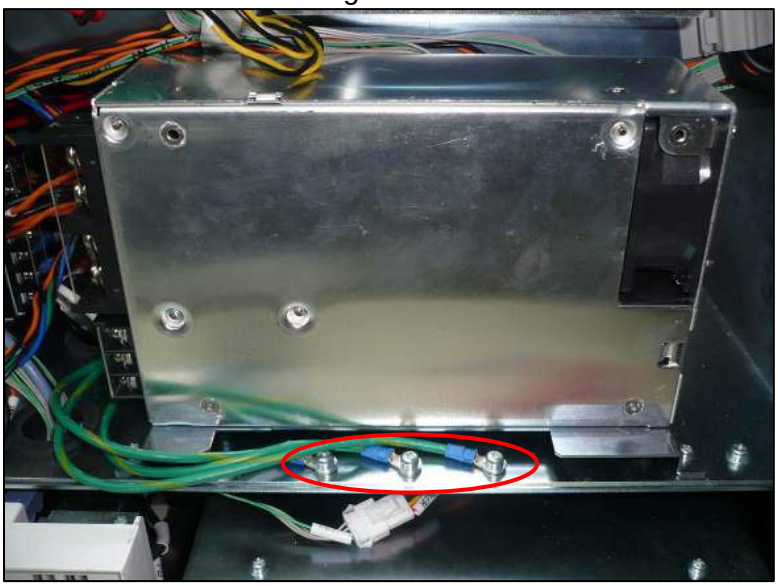


3.10.6.7 Remove the seven screws to release the board(s) from their framework
3.10.6.8 Reinstall the board(s) by reversing the steps taken to remove them
3.10.6.9 Power on the instrument and ensure that it boots up and completes its self-check

3.10.7. 24 VDC Power Supply

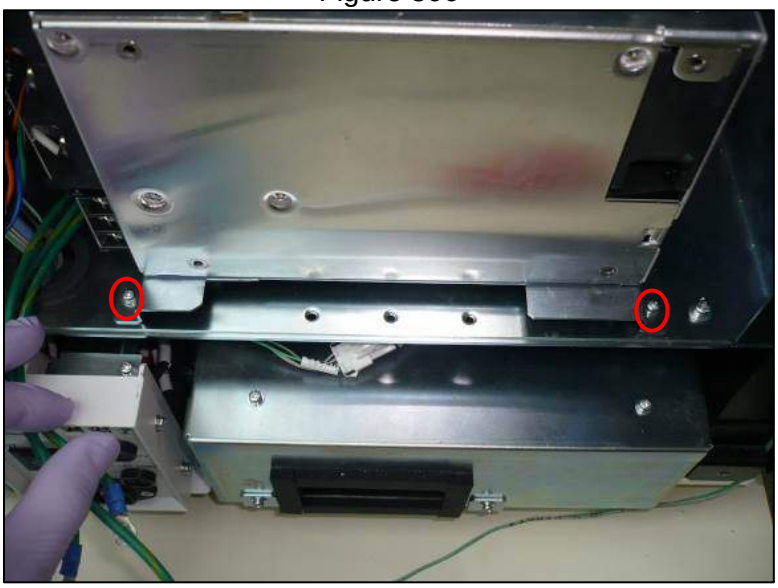
3.10.7.1 Remove the right side panel of the instrument
3.10.7.2 Remove the lower electronics bay cover
3.10.7.3 Remove the three cross slot screws that secure the grounding wires in front of the power supply base (Figure 305)

Figure 305



3.10.7.4 Remove the two cross slot screws that secure the power supply base (Figure 306)

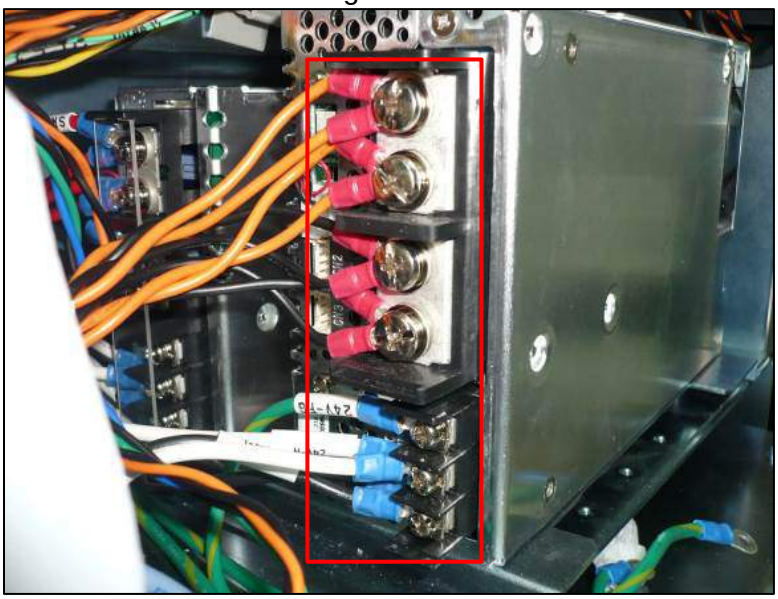
Figure 306



3.10.7.5 Slide power supply base toward you to release it from the rear securing screws

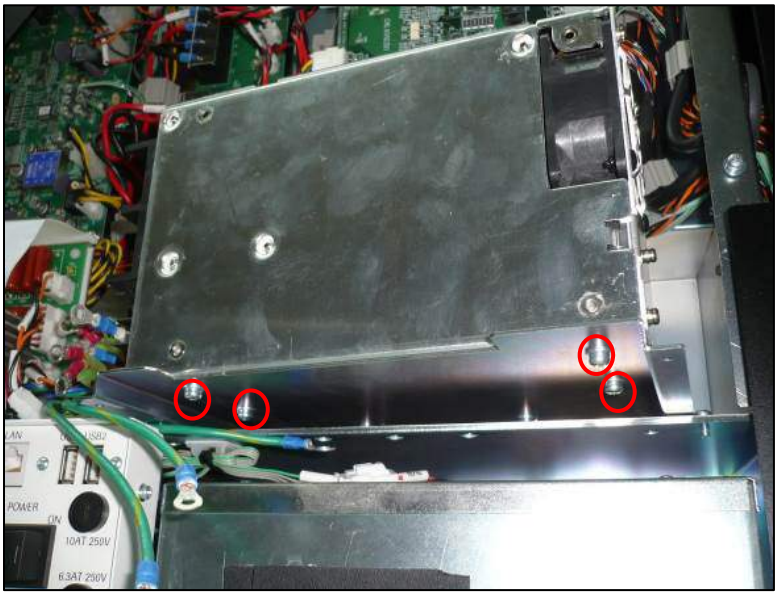
3.10.7.6 Remove the protective covers and release the wiring from the terminal lugs (Figure 307)

Figure 307



3.10.7.7 From the bottom of the power supply base remove the four cross slot screws that secure the 24 VDC power supply (Figure 308)

Figure 308



3.10.7.8 Reverse the steps taken to remove the power supply to install the replacement

3.10.7.9 Power on the instrument and ensure that it boots up and completes its self-check

3.10.7.10 With all leads reconnected ensure that the power supply output is within specification and adjust if needed

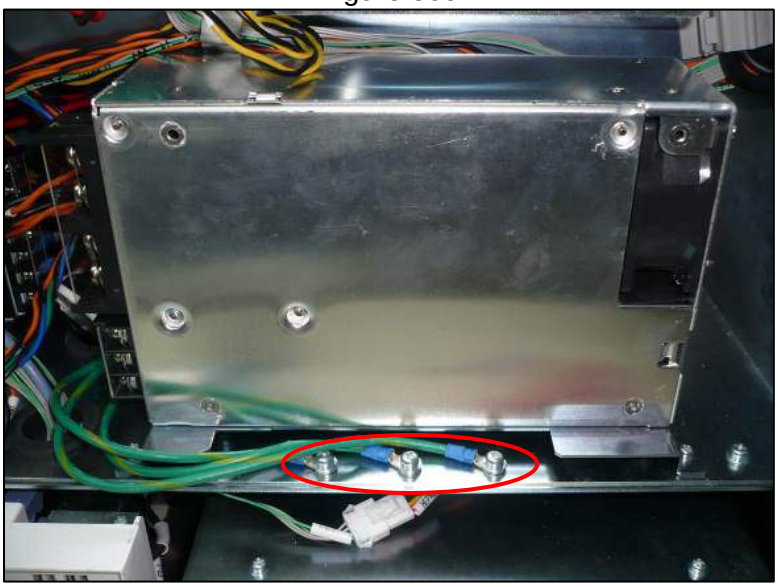
3.10.8. 5 VDC Power Supply

3.10.8.1 Remove the right side panel of the instrument

3.10.8.2 Remove the lower electronics bay cover

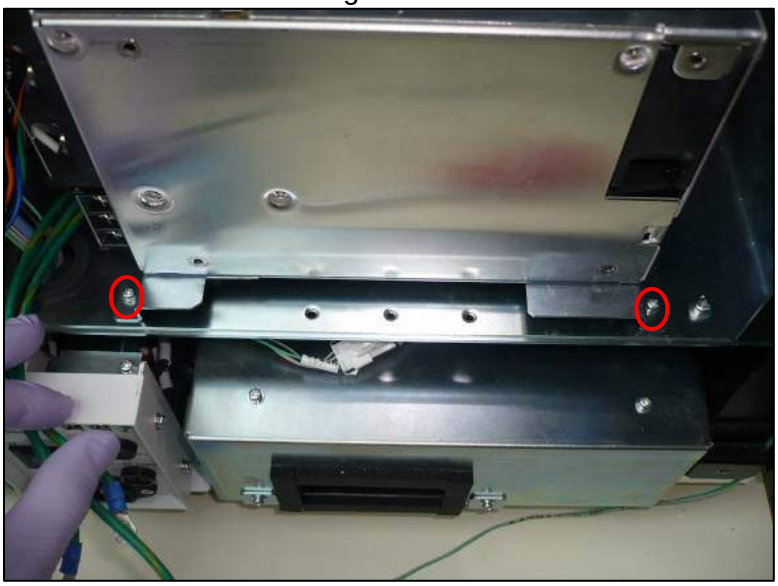
3.10.8.3 Remove the three cross slot screws that secure the grounding wires in front of the power supply base (Figure 309)

Figure 309



3.10.8.4 Remove the two cross slot screws that secure the power supply base (Figure 310)

Figure 310

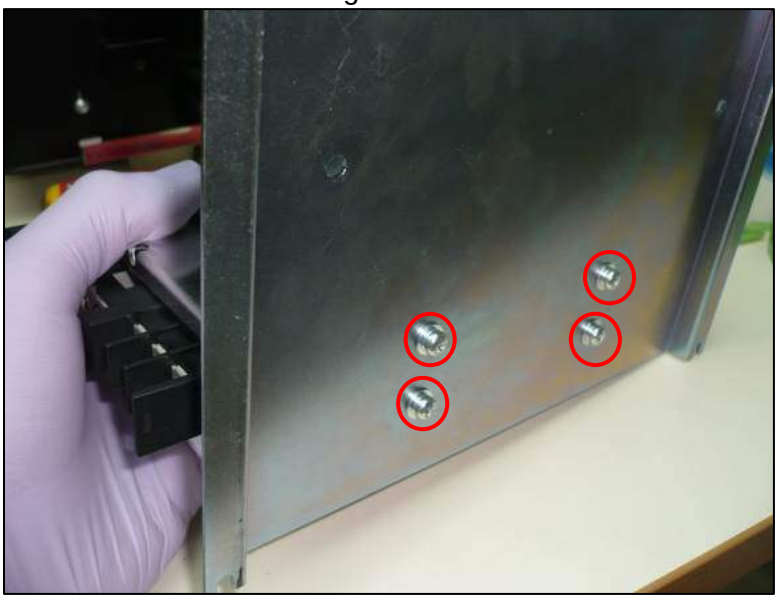


3.10.8.5 Slide power supply base toward you to release it from the rear securing screws

3.10.8.6 If necessary remove the 24 VDC power supply (Section 3.10.7) to access the 5 VDC power supply

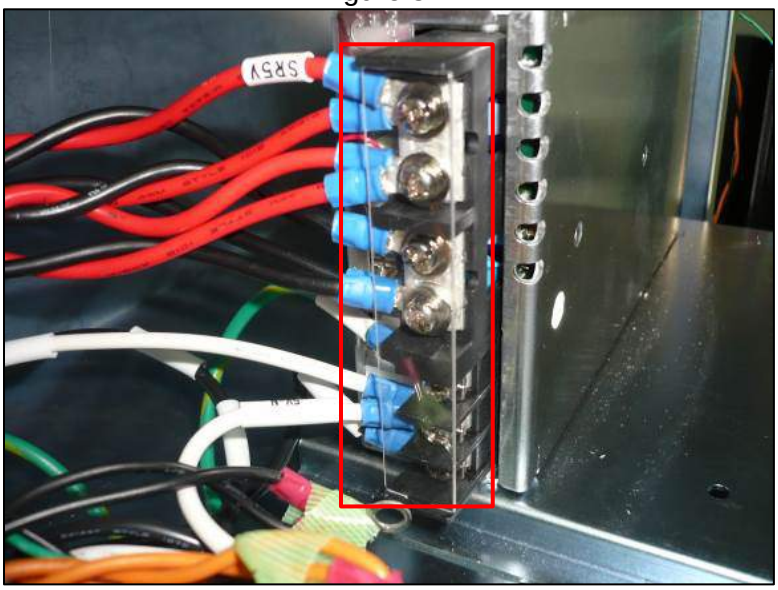
3.10.8.7 Remove the four cross slot screws that secure the 5 VDC power supply to the base (Figure 311)

Figure 311



3.10.8.8 Remove the protective covers and release the wiring from the terminal lugs (Figure 312)

Figure 312



3.10.8.9 Reverse the steps taken to remove the power supply to install the replacement

3.10.8.10 Power on the instrument and ensure that it boots up and completes its self-check

3.10.8.11 With all leads reconnected ensure that the power supply output is within specification and adjust if needed

3.10.9. 12 VDC Power Supply

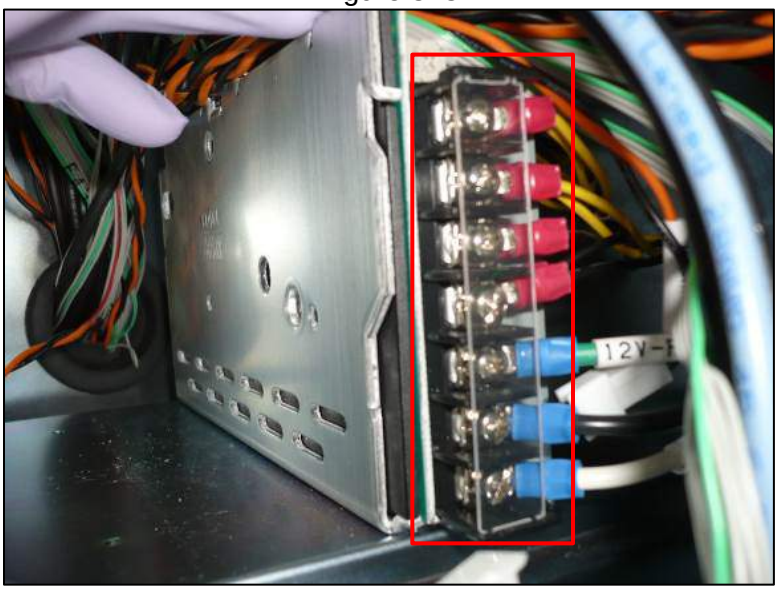
3.10.9.1 Remove the right side panel of the instrument

3.10.9.2 Remove the lower electronics bay cover

3.10.9.3 Remove the Ultrasonic Sonicator Driver (section 3.9.2)

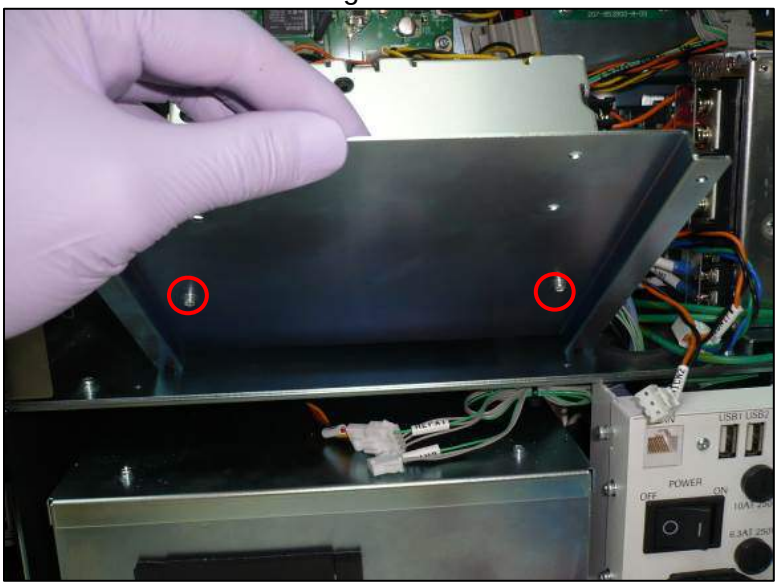
3.10.9.4 Remove the protective covers and release the wiring from the terminal lugs (Figure 313)

Figure 313



3.10.9.5 Remove the two cross slot screws that secure the power supply (Figure 314)

Figure 314



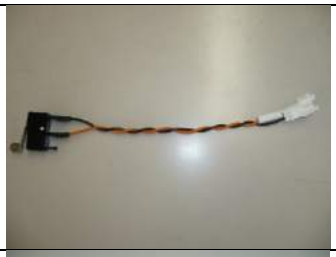
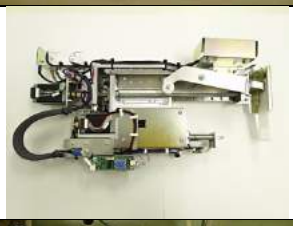
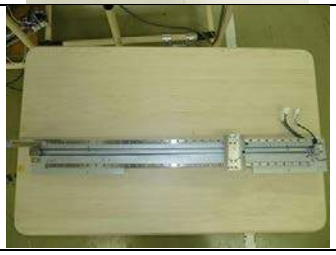
3.10.9.6 Reverse the steps taken to remove the power supply to install the replacement

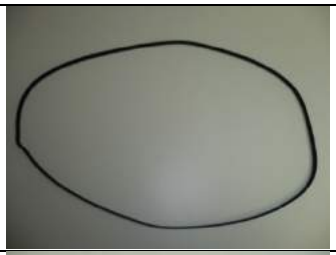
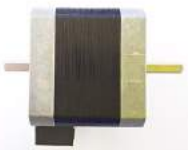
3.10.9.7 Power on the instrument and ensure that it boots up and completes its self-check

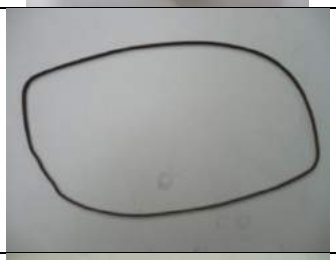
3.10.9.8 With all leads reconnected ensure that the power supply output is within specification and adjust if needed

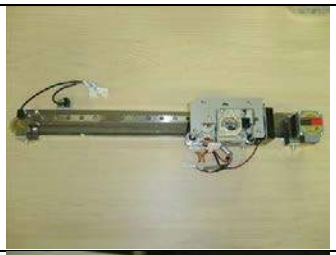
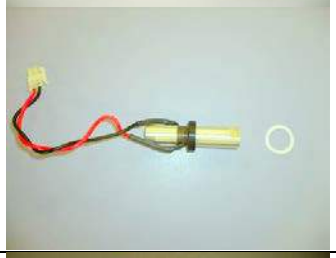
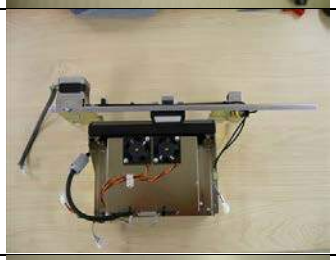
3.2. Parts Identification

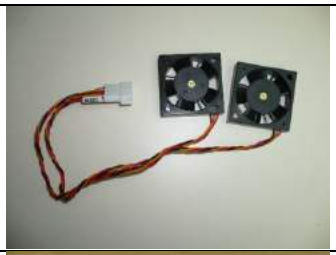
- This section should be used as a reference for identification only. Use the current parts list for parts ordering.

Part #	Description and Picture	
G2400- 000	Door Sensor	
G2401-000	maintenance switch	
G2402-000	door lock solenoid	
G2403-000	Solenoid sensor	
G2404-000	single nozzle unit	
G2405-000	SX axis unit	

Part #	Description and Picture	
G2406-000	SX axis belt	
G2407-000	SX axis motor	
G2408-000	Multiplying Encoder Unit	
G2409-000	2 Pulse Multiplying Encoder Unit	
G2410-000	SZ axis motor	
G2411-000	P axis motor	
G2412-000	Z axis belt	

Part #	Description and Picture	
G2413-000	Z axis motor	
G2414-000	DX axis belt	
G2415-000	DX axis motor	
G2416-000	DZ axis belt	
G2417-000	DZ axis motor	
G2418-000	Y axis belt	
G2419-000	Y axis motor	

Part #	Description and Picture	
G2420-000	UX axis unit	
G2421-000	alex-pss SON PCB Unit & BLT oscillator	 
G2422-000	Fiber unit assembly (12pieces)	
G2423-000	PCR detection unit	
G2424-000	6ch fiber shift unit 12	

Part #	Description and Picture	
G2425-000	back side fan	
G2426-000	PCR Cool Unit	
G2427-000	cooler unit for sample	
G2428-000	Caulking material	
G2429-000	heat block	
G2430-000	12 syringe unit	
G2431-000	M axis unit (including motor)	

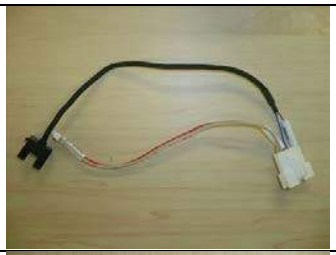
Part #	Description and Picture	
G2432-000	PC	
G2433-000	TIO pcb	
G2434-000	2MS pcb	
G2435-000	PWR pcb	
G2436-000	6ch-TEC CONTROLLER BOARD	
G2437-000	DUP6_485 pcb	
G2438-000	DUP1L pcb	

Part #	Description and Picture	
G2439-000	Bar code reader	
G2440-000	24V Power Supply	
G2441-000	5V Power Supply	
G2442-000	12V Power Supply	
G2443-000	FiSICS GL pcb	
G2444-000	UVI pcb	

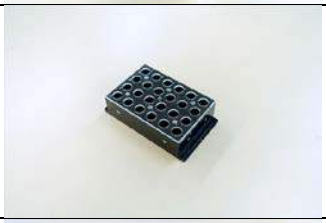
Part #	Description and Picture	
G2445-000	UV lamp	
G2446-000	Electric equipment FAN1	
G2447-000	Electric equipment FAN2	
G2448-000	HDD for PC	
G2449-000	Y org sensor	
G2450-000	Z org sensor	

Part #	Description and Picture	
G2451-000	Z Bottom sensor	
G2452-000	Z ENC sensor	
G2453-000	Tip bar CHECK sensor	
G2454-000	M ORG & Mag ON sensor	
G2455-000	L ORG & Lock Check sensor	
G2456-000	DX ORG & ENC sensor	

Part #	Description and Picture	
G2457-000	DZ ORG & ENC sensor	
G2458-000	DZ Bottom sensor	
G2459-000	SX ORG sensor	
G2460-000	SZ ORG sensor	
G2461-000	SZ ENC sensor	
G2462-000	SZ Bottom sensor	

Part #	Description and Picture	
G2463-000	SP ORG sensor	
G2464-000	UX ORG sensor	
G2465-000	UX ENC sensor	
G2466-000	UZ ORG & Touch sensor	
G2467-000	CAP Check sensor 1-12 set	
G2468-000	HEPA unit1	

Part #	Description and Picture	
G2469-000	HEPA unit2	
G2470-000	HEPA filter	
G2471-000	10unit (130pieces)	
G2472-000	10unit (120pieces)	
G2473-000	Sample rack(long)	
G2474-000	Sample rack(short)	
G2475-000	Sonication rack	

Part #	Description and Picture	
G2476-000	Tip Sheath Holder	
G2477-000	Extra tube rack	
G2478-000	Extraction cassette rack	
G2479-000	PCR cassette rack	
G2480-000	Tip Waste Box	
G2482-000	External cool block(24hole)	
G2483-000	Fuse set (6.3A x 2, 10AT x 2)	

Part #	Description and Picture	
G2484-000	LOOP BACK Fiber	
G2491-000	Teaching Tool (Full Set)	
G2492-000	Temperature Calibration Tool (Full Set)	
G2493-000	HIVAC-G	
G2494-000	Encoder boss Tool (Callipers)	
G2495-000	Power Cable (EU & US)	
G2496-000	Handy barcode reader & Cable	

Part #	Description and Picture	
G2498-000	Sample rack Spacer	
G2499-000	Multiplying Encoder Unit Double multiplication type (Y)	
G2500-000	Detection fiber	
G 556701	D-ring Removal Tool	
G 556702	D-ring Replacement Tool	
G2501-000	New Teaching Tool (Full set)	

Part #	Description and Picture	
G2502-000	Cool Block teaching Plate	
G2503-000	Tip rack teaching adapter Assay	
G2504-000	Main area teaching plate	
G2505-000	Main area teaching pin	
G2506-000	Z teaching plate	
G2507-000	UX teaching pin	

Part #	Description and Picture	
G2508-000	Cool block teaching pin	
G2509-000	Parallel pin	
G2510-000	Ultrasonic wave head replacement jig	
G2491-000	Teaching Tool (Full Set)	
G2511-000	12Z_teaching jig Assy	
G2512-000	Cool block teaching pin	

Part #	Description and Picture	
G2513-000	S tip rack T block	
G2514-000	S tip rack positioning plate	
G2515-000	Heater_PCR positioning jig Assy	
G2516-000	12Z teaching pin	
G2517-000	Heater stage cover positioning jig	
G2518-000	US jig base	

Part #	Description and Picture	
G2519-000	US jig shaft	
G2520-000	US jig top plate	
G2521-000	Positioning Jig	
G2522-000	Sonic Y Positioning Jig	
G2523-000	US Horn positioning Jig	
G2524-000	Y positioning Jig	

Part #	Description and Picture	
G2525-000	Teaching check (Full set)	
G2526-000	Y positioning Jig Sonic tube	
G2527-000	Y positioning Jig PCR tube	
G2528-000	Action Z check Jig	
G2529-000	Cool block 96 hole	

ELITech ELITe InGenius™

Chapter 4: Troubleshooting and Performance Evaluation

ELITech Group Molecular Diagnostics
27 Wellington Rd Lincoln, RI 02865

Chapter 4: Troubleshooting

4.1. Instrument Error Codes and Potential Resolution

Error Code with Description	Possible Resolution
1 Cannot open "{0}" Fatal Error FiSICS Protocol definition file: open error	Review Log Data and SD card data for source or error or corrupt files
2 Syntax error.\nfile:"{0}"\ncategory:"{1}"\nkeyword:"{2}" Fatal Error FiSICS Protocol definition file: syntax error	Review Log Data and SD card data for source or error or corrupt files
5 Invalid batch name.\n{0}\nname:"{1}" Fatal Error FiSICS Protocol definition file: duplicated batch name	Review Log Data and SD card data for source or error or corrupt files
10 Cannot open define file.\n{0} Fatal Error FiSICS Data cannot read from the definition file.	Review Log Data and SD card data for source or error or corrupt files
11 Invalid VP Table Fatal Error FiSICS Invalid VP table	Review Log Data and SD card data for source or error or corrupt files
12 Motor controller connection error Fatal Error FiSICS Motor connection error	Review Log Data and SD card data for source or error or corrupt files
1001 System error.\n{0} Fatal Error FiSICS System error message Stop "ThreadName".""	Review Log Data and SD card data for source or error or corrupt files
2001 Axis error\nAxis:"{0}" Fatal Error Motor Control The axis was stopped unexpectedly. This happens when wrong values are in the register of FPGA.	Replace the FiSICS GL board.
2002 Z Bottom sensor error. Fatal Error Motor Control The Z axis was stopped by the EL signal.	1. Check whether the Z Bottom sensor and the Z motor are working. 2. Check the teaching position.
2003 Hardware endlimit error.\nAxis:"{0} Fatal Error Motor Control The motor tried to move to the position exceeding to the Pulse set as the counter upper limit of the encoder.	1. Check whether the encoder and the motor ae working based on the encoder check procedure document. 2. If the problem was not solved, send the Log data to ELITech Group Customer Support
2004 Software endlimit error.\nAxis:"{0} Fatal Error Motor Control Blocked by Software Limit. The motor tried to move to the position exceeding to the Pulse set in Maximum/ Minimum of Fisics.ini.	Check the protocol and the setting of FiSICS.ini
2005 Interlock error.\n{0} Fatal Error Door Unit The cover was opened during Assay.	1. Check whether the door lock unit broke. 2. Check whether the door sensor is working.
2006 Initialize Motor error.\n{0} Fatal Error Motor Control SwLimit and EndLimit were detected during Org return.	1. Try ORG on Axis Control in the Maintenance Software. 2. If the problem was not solved, send the Log data to ELITech Group Customer Support.
2503 Failed to initialize motor.\nAxis:{0}" Fatal Error Motor Control ORG return using the Org command was not completed even after a certain period of time.	1. Try ORG on Axis Control in the Maintenance Software. 2. If the problem was not solved, send the Log data to ELITech Group Customer Support.

2505 Cannot open ini file\n{0} Fatal Error FiSICS fisics.ini could not be opened.	Review Log Data and SD card data for source or error or corrupt files
2506 Motor out-of-step error\nAxis:"{0}" Fatal Error Motor Control There was significant difference between the specified pulse before the axis operation and the encoder counter after the operation.	1. Check whether the encoder and the motor ae working based on the encoder check procedure document. 2. If the problem was not solved, send the Log data to ELITech Group Customer Support
2507 Motor out-of-step warning\nAxis:"{0}" Warning Motor Control	1. Check whether the encoder and the motor ae working based on the encoder check procedure document. 2. If the problem was not solved, send the Log data to ELITech Group Customer Support
3001 Axis error\nAxis:"{0}" Error Fluorescence Detection Unit Axis control failed.	Check visually whether the axis is working
3002 Failed to transmit fluorescence detection data Fatal Error Fluorescence Detection Unit Fluorescence detection data was not normally transmitted.	Handle the measurement result as invalid, and check the electrical wiring
3003 Failed to receive fluorescence detection data reception response Fatal Error Fluorescence Detection Unit The DATA_ACK message has not been returned after the fluorescence detection data reception from the PC software.	Handle the measurement result as invalid, and check the electrical wiring
3501 System did not reach target temperature within the expected time {0} Error Fluorescence Detection Unit Temperature attainment time out	1. Check the PCR rack is proper supply. 2. Check there is no foreign material (especially metal) at the point that accessories are placed. 3 If the problem is not solved, replace the unit or the board. 4. Calibrate the temperature after the unit replacement.
4001 Temperature Control Unit : Thermistor connection error\nCh:"{0}"\nCmd:"{1}" Fatal Error Temperature Control Unit “Thermistor disconnection” is notified by the TIO board.	1. Replace the unit. 2. Calibrate the temperature after the unit replacement.
4002 Temperature Control Unit : Measurement value over range error\nCh:"{0}"\nCmd:"{1}" Error Temperature Control Unit “Measurement value over range error” is notified by the TIO board.	1. Replace the unit or the board. 2. Calibrate the temperature after the unit replacement.
4003 Temperature Control Unit : Thermal Fuse open error\nCh:{0}\nCmd:{1} Fatal Error Temperature Control Unit “Temperature Fuse open” is notified by the TIO board.	1. Replace the unit. 2. Calibrate the temperature after the unit replacement.
4004 Temperature Control Unit : Setpoint value over range error\nCh:"{0}\nCmd:"{1}" Fatal Error Temperature Control Unit “Setting value over range” is notified by the TIO board.	Reconsider the setting temperature.

4005 Temperature Control Unit : Continuous operation error\nCh:"{0}"\nCmd:"{1}" Fatal Error Temperature Control Unit “Overrun error of continuous operation” is notified by the TIO board.	1. The Cool Block, Extraction Cartridge, Extraction Cartridge Rack, PCR Tube and PCR rack at the user area are proper supply. 2. Check that they are mounted correctly. 3. Check there is no foreign material (especially metal) at the point that accessories are placed. 4. If the problem is not solved, replace the unit or the board. 5. Calibrate the temperature after the unit replacement.
4006 Temperature Control Unit : Peltier Module Cooling Fan stopped\nCh:"{0}"\nCmd:"{1}" Error Temperature Control Unit “Stop of Cooling Fan of the peltier module” is notified by a TIO board.	1. Clean the FAN to remove dusts. 2. If the problem is not solved, replace the unit. 3. Calibrate the temperature after the unit replacement.
4007 Temperature Control Unit : Undefined command error\nCh:"{0}"\nCmd:"{1}" Fatal Error Temperature Control Unit “Undefined command” is notified by a TIO board.	1. Check the version of FiSICS firmware and TIO firmware. 2. If it is not latest version, write the latest version. 3. If the problem was not solved, replace the TIO board.
4008 Temperature Control Unit : Communication Error : Bad Checksum\nCh:{0}\nCmd:{1} Error Temperature Control Unit “Mismatch checksum” is notified by the TIO board.	1. Check the version of TIO firmware. 2. If it is not latest version, write the latest version. 3. If the problem was not solved, replace the TIO board.
4009 Temperature Control Unit : Communication Error : Invalid index\nCh:"{0}"\nCmd:"{1}" Fatal Error Temperature Control Unit “Invalid index specification” is notified by the TIO board.	1. Check the version of FiSICS firmware and TIO firmware. 2. If it is not latest version, write the latest version. 3. If the problem was not solved, replace the TIO board.
4010 Temperature Control Unit : Communication Error : Invalid parameter\nCh:"{0}"\nCmd:"{1}" Fatal Error Temperature Control Unit “Invalid parameter” is notified by the TIO board.	1. Check the version of TIO firmware. 2. If it is not latest version, write the latest version. 3. If the problem was not solved, replace the TIO board.
4013 Cannot open conversion table file.\n{0} Fatal Error FiSICS	1. Check the version of TIO firmware. 2. If it is not latest version, write the latest version. 3. If the problem was not solved, replace the TIO board.
4050 Temperature Control Unit : Communication Error : Did not respond\nCh:"{0}"\nCmd:"{1}" Fatal Error Temperature Control Unit No response is received from the TIO board.	1. Check the version of TIO firmware. 2. If it is not latest version, write the latest version. 3. Check the electrical wiring from TIO to FiSICS. 4. If the problem was not solved, replace the TIO board.
4051 Temperature Control Unit : Communication Error : Bad Checksum\nCh:"{0}"\nCmd:"{1}" Error Temperature Control Unit Mismatch of checksum of data received from the TIO board.	1. Check the version of TIO firmware. 2. If it is not latest version, write the latest version. 3. If the problem was not solved, replace the TIO board.

4052 Temperature Control Unit : Communication Error : Received data error\nCh:"{0}"\nCmd:"{1}" Error Temperature Control Unit The data received from the TIO board is abnormal.	1. Check the version of FiSICS firmware and TIO firmware. 2. If it is not latest version, write the latest version. 3. If the problem was not solved, replace the TIO board.
4053 Temperature Control Unit : Communication Error : Invalid Ch specified\nCh:"{0}"\nCmd:"{1}" Fatal Error Temperature Control Unit The specified Ch is invalid.	1. Check the version of FiSICS firmware and TIO firmware. 2. If it is not latest version, write the latest version. 3. If the problem was not solved, replace the TIO board.
4099 Temperature Control Unit : Undefined error occurred\nCh:"{0}"\nCmd:"{1}" Fatal Error Temperature Control Unit The cause is unknown.	1. Check the version of TIO firmware. 2. If it is not latest version, write the latest version. 3. Check the electrical wiring from TIO to FiSICS. 4. If the problem is not solved, replace the TIO board or the unit. 5. Calibrate the temperature after the unit replacement.
5001 2CH Motor Controller : Communication Error : Undefined command\n{0} Fatal Error 2CH Motor Controller “Undefined command” is notified by the 2ch Motor Controller.	Review Log Data and SD card data for source or error or corrupt files
5002 2CH Motor Controller : Communication Error : Bad Checksum\n{0} Fatal Error 2CH Motor Controller “Checksum mismatch” is notified by the 2ch Motor Controller. There is a possibility of communication error.	1. Check the communication line. 2. If the problem is not solved, replace the 2MS board.
5003 2CH Motor Controller : Communication Error : Invalid index\n{0}} Fatal Error 2CH Motor Controller “Invalid index notification” is notified by the 2ch Motor Controller.	Review Log Data and SD card data for source or error or corrupt files
5004 2CH Motor Controller : Communication Error : Invalid parameter\n{0} Fatal Error 2CH Motor Controller “Invalid parameter” is notified by the 2ch Motor Controller.	Review Log Data and SD card data for source or error or corrupt files
5005 2CH Motor Controller : Z axis not at origin\n{0} Fatal Error 2CH Motor Controller “The Z axis is not present at the original position” is notified by the 2ch Motor Controller.	1. Check whether UZ ORG sensor and UZ motor are working based on the 2CH Motor Controller inspection procedure. 2. If the problem is not solved, send the Log data to ELITech Group Customer Support
5006 2CH Motor Controller : Z axis Touch Sensor Error\n{0} Error 2CH Motor Controller “Z axis Touch Sensor Error” is notified by the 2ch Motor Controller.	1. Check whether UZ Touch sensor, UZ motor and UX motor are working based on the 2CH Motor Controller inspection procedure. 2. If the problem is not solved, send the Log data to ELITech Group Customer Support

5007 2CH Motor Controller : ORG parameters error\n{0} Fatal Error 2CH Motor Controller “ORG parameter error” is notified by the 2ch Motor Controller.	Review Log Data and SD card data for source or error or corrupt files
5008 2CH Motor Controller : Mis tracking of the X axis detected\n{0} Fatal Error 2CH Motor Controller “Detecting X axis step-out” is notified by the 2ch Motor Controller.	1. Check whether UX encoder and UX motor are working based on the 2CH Motor Controller inspection procedure. 2. If the problem is not solved, send the Log data to ELITech Group Customer Support
5012 2CH Motor Controller : Busy\n{0} Fatal Error 2CH Motor Controller There is a possibility of communication error.	1. Check the communication line. 2. If the problem is not solved, replace the 2MS board.
5050 2CH Motor Controller : Communication Error : Did not respond\n{0} Fatal Error 2CH Motor Controller No response is received from the 2ch Motor Controller. There is a possibility of communication error.	1. Check the communication line. 2. If the problem is not solved, replace the 2MS board.
5051 2CH Motor Controller : Communication Error : Bad Checksum\n{0} Fatal Error 2CH Motor Controller The checksum of the data received from 2ch Motor Controller mismatches. There is a possibility of communication error.	1. Check the communication line. 2. If the problem is not solved, replace the 2MS board.
5052 2CH Motor Controller : Communication Error : Received data error\n{0} Fatal Error 2CH Motor Controller An abnormality is found in the data received from the 2ch Motor Controller. There is a possibility of communication error.	1. Check the communication line. 2. If the problem is not solved, replace the 2MS board.
5053 2CH Motor Controller : Communication Error : Invalid Ch specified\n{0} Fatal Error 2CH Motor Controller The specified Ch is invalid. There is a possibility of communication error.	1. Check the communication line. 2. If the problem is not solved, replace the 2MS board.
5099 2CH Motor Controller : Undefined error occurred.\n{0} Fatal Error 2CH Motor Controller The cause is unknown. There is a possibility of communication error.	1. Check the communication line. 2. If the problem is not solved, replace the 2MS board.

6001 Pressure Sensor Board : Out of range ADC reading\n{0}\n{1} Error Pressure Sensor Board Abnormal AD value	1. Check whether the tip for single nozzle and the tip for 12 ch nozzle are the proper supply. 2. Check there is no grease or other materials at the apex of the nozzle. 3. Check there is no anomaly such as crack or damage at the O-rings of 12 ch nozzle. 4. Check the crack or damage at the rubber tubes between the board and the nozzle. 5. If the problem is not solved, replace the board.
6002 Pressure Sensor Board : Communication Error : Invalid parameter\n{0}\n{1} Fatal Error Pressure Sensor Board Invalid parameter is specified.	1. Check the firmware version of DUP6. 2. If it is not latest version, write the latest version. 3. If the problem is not solved, replace the DUP6 board.
6003 Pressure Sensor Board : Communication Error : Undefined command\n{0}\n{1} Fatal Error Pressure Sensor Board Undefined command	1. Check the firmware version of DUP6 and FiSICS. 2. If it is not latest version, write the latest version. 3. If the problem is not solved, replace the DUP6 board.
6004 Pressure Sensor Board : Communication Error : Bad checksum\n{0}\n{1} Error Pressure Sensor Board Mismatch of checksum	1. Check the firmware version of DUP6. 2. If it is not latest version, write the latest version. 3. If the problem is not solved, replace the DUP6 board.
6005 Pressure Sensor Board : Communication Error : Invalid index\n{0}\n{1} Fatal Error Pressure Sensor Board Invalid index specification	1. Check the firmware version of DUP6 and FiSICS. 2. If it is not latest version, write the latest version. 3. If the problem is not solved, replace the DUP6 board.
6050 Pressure Sensor Board : Communication Error : Did not respond\n{0}\n{1} Fatal Error Pressure Sensor Board No response is received from the pressure sensor board.	1. Check the firmware version of DUP6. 2. If it is not latest version, write the latest version. 3. Check the electrical wiring from DUP6 to FiSICS. 4. If the problem is not solved, replace the DUP6 board.
6051 Pressure Sensor Board : Communication Error : Bad checksum\n{0}\n{1} Error Pressure Sensor Board Mismatch of checksum of data received from the pressure sensor board	1. Check the firmware version of DUP6 and FiSICS. 2. If it is not latest version, write the latest version. 3. If the problem is not solved, replace the DUP6 board.
6052 Pressure Sensor Board : Communication Error : Received data error\n{0}\n{1} Error Pressure Sensor Board The control parameter value is invalid.	1. Check the firmware version of DUP6. 2. If it is not latest version, write the latest version. 3. If the problem is not solved, replace the DUP6 board.
6053 Pressure Sensor Board : Communication Error : Invalid Ch specified\n{0}\n{1} Fatal Error Pressure Sensor Board The specified Ch is invalid.	1. Check the firmware version of DUP6. 2. If it is not latest version, write the latest version. 3. If the problem is not solved, replace the DUP6 board.

6099 Pressure Sensor Board : Undefined error occurred\n{0}\n{1} Fatal Error Pressure Sensor Board The cause is unknown.	1. Check whether the tip for single nozzle and the tip for 12 ch nozzle are the proper supply. 2. Check there is no grease or other materials at the apex of the nozzle. 3. Check there is no anomaly such as crack or damage at the O-rings of 12 ch nozzle. 4. Check the crack or damage at the rubber tubes between the board and the nozzle. 5. Check the firmware version of DUP6. 6. If it is not the latest version, write the latest version. 7. Check the electrical wiring from DUP6 to FiSICS. 8. If the problem is not solved, replace DUP6 or FiSICS board.
7000 PCR Unit : Parameter is out of range\n{0}\n{1} Error PCR Unit Parameter is out of range.	1. The PCR Tube and PCR rack at the user area are proper supply. 2. Check that they are mounted correctly. 3. Check there is no foreign material (especially metal) at the point that accessories are placed. 4. If the problem is not solved, replace the unit or the board. 5. Calibrate the temperature after the unit replacement.
7001 PCR Unit : Under temperature control\n{0}\n{1} Warning PCR Unit Under temperature control	1. The PCR Tube and PCR rack at the user area are proper supply. 2. Check that they are mounted correctly. 3. Check there is no foreign material (especially metal) at the point that accessories are placed. 4. If the problem is not solved, replace the unit or the board. 5. Calibrate the temperature after the unit replacement.
7002 PCR Unit : In autotuning\n{0}\n{1}" Warning PCR Unit In autotuning	The auto-tuning shall be done every channel separately. 1. Check there is no check mark at the check box for auto-tuning. 2. Do auto-tuning for every channel.
7003 PCR Unit : Interlock\n{0}\n{1} Warning PCR Unit Interlock	1. Check the J5 connector of the Peltier Control board. 2. Check no anomaly for the J5 connector. 3. Check between Pin2 and Pin4 of J5 connector is short-circuit.

7004 PCR Unit : Upper limit temperature < Lower limit temperature\n{0}\n{1}" Error PCR Unit Upper limit temperature < Lower limit temperature	1. The PCR Tube and PCR rack at the user area are proper supply. 2. Check that they are mounted correctly. 3. Check there is no foreign material (especially metal) at the point that accessories are placed. 4. Check the setting from the GUI of Maintenance software. 5. If the problem is not solved, replace the unit or the board. 6. Calibrate the temperature after the unit replacement.
7050 PCR Unit : Communication Error : Did not respond\n{0}\n{1} Error PCR Unit No response is received from the PCR unit.	1. Check the wiring from 6ch-TEC board and FiSICS board. 2. Check the firmware version of 6ch-TEC board. 3. If it is not the latest version, replace the TEC board.
7051 PCR Unit : Communication Error : Bad Checksum\n{0}\n{1}" Error PCR Unit Mismatch of checksum of data received from the PCR unit.	1. Check the firmware version of FiSICS and 6ch-TEC. 2. If it is not the latest version, replace the 6ch-TEC board.
7052 PCR Unit : Communication Error : Received data error\n{0}\n{1} Error PCR Unit The data received from the PCR unit is abnormal.	1. Check the firmware version of FiSICS and 6ch-TEC. 2. If it is not latest version, replace the 6ch-TEC or the unit. 3. Calibrate the temperature after the unit replacement.
7053 PCR Unit : Communication Error : Invalid Ch specified.\n{0}\n{1} Fatal Error PCR Unit The specified Ch is invalid.	1. Check the firmware version of FiSICS and 6ch-TEC. 2. If it is not latest version, replace the 6ch-TEC or the unit. 3. Calibrate the temperature after the unit replacement.
7056 PCR Unit : TempADTable.ini cannot be opened.\n{0} Fatal Error PCR Unit TempADTable.ini cannot be opened.	1. Check there is "g/ini/TempADTable" in the SD Card of FiSICS. 2. Check the extension of filename of "TempADTable.ini" is "ini". 3. If the problem is not solved, initialize "TempADTable.ini". 4. Calibrate the temperature.

7099 PCR Unit : Undefined error occurred.\n{0}\n{1} Fatal Error PCR Unit The cause is unknown.	1. The PCR Tube and PCR rack at the user area are proper supply. 2. Check that they are mounted correctly. 3. Check there is no foreign material (especially metal) at the point that accessories are placed. 4. If it is not solved, check the wiring from the 6ch-TEC board to FiSICS. 5. Check the firmware version of FiSICS board and 6ch-TEC board. 6. If it is not the latest version, replace the unit or the board. 7. Calibrate the temperature after the unit replacement.
8001 Reply timeout Error BCR Unit Reply timeout	1. Retry the scan. 2. If the problem is not solved, check the electrical wiring. 2-1. Check whether the wire broke. 2-2. Check whether the connector disconnected. 3. If a problem is found by check of wiring, replace the wiring. 4. If the problem is not solved, replace the BCR board. 5. If the problem is not solved, replace the FiSICS board.
8002 Char timeout Error BCR Unit Inter-character timeout	1. Retry the scan. 2. If the problem is not solved, check the electrical wiring. 2-1. Check whether the wire broke. 2-2. Check whether the connector disconnected. 3. If a problem is found by check of wiring, replace the wiring. 4. If the problem is not solved, replace the BCR board. 5. If the problem is not solved, replace the FiSICS board.
8003 Buffer overrun Error BCR Unit Buffer overrun of response string	1. Retry the scan. 2. If the problem is not solved, check the electrical wiring. 2-1. Check whether the wire broke. 2-2. Check whether the connector disconnected. 3. If a problem is found by check of wiring, replace the wiring. 4. If the problem is not solved, replace the BCR board. 5. If the problem is not solved, replace the FiSICS board.

8004 Checksum Error BCR Unit Checksum error of communication string	1. Retry the scan. 2. If the problem is not solved, check the electrical wiring. 2-1. Check whether the wire broke. 2-2. Check whether the connector disconnected. 3. If a problem is found by check of wiring, replace the wiring. 4. If the problem is not solved, replace the BCR board. 5. If the problem is not solved, replace the FiSICS board.
8005 Packet format Error BCR Unit Message format error	1. Retry the scan. 2. If the problem is not solved, check the electrical wiring. 2-1. Check whether the wire broke. 2-2. Check whether the connector disconnected. 3. If a problem is found by check of wiring, replace the wiring. 4. If the problem is not solved, replace the BCR board. 5. If the problem is not solved, replace the FiSICS board.
8006 Communication error Fatal Error BCR Unit Other communication errors	1. Retry the scan. 2. If the problem is not solved, check the electrical wiring. 2-1. Check whether the wire broke. 2-2. Check whether the connector disconnected. 3. If a problem is found by check of wiring, replace the wiring. 4. If the problem is not solved, replace the BCR board. 5. If the problem is not solved, replace the FiSICS board.
8007 System error Fatal Error BCR Unit System error	1. Retry the scan. 2. If the problem is not solved, check the electrical wiring. 2-1. Check whether the wire broke. 2-2. Check whether the connector disconnected. 3. If a problem is found by check of wiring, replace the wiring. 4. If the problem is not solved, replace the BCR board. 5. If the problem is not solved, replace the FiSICS board.

8008 Parameter error Fatal Error BCR Unit Parameter error	1. Retry the scan. 2. If the problem is not solved, check the electrical wiring. 2-1. Check whether the wire broke. 2-2. Check whether the connector disconnected. 3. If a problem is found by check of wiring, replace the wiring. 4. If the problem is not solved, replace the BCR board. 5. If the problem is not solved, replace the FiSICS board.
9001 Fluorescence Detector LED cooling fan fault\nNo:{0}"""" Error FAN The fluorescence detection Led cooling FAN is not working.	Check the cooling FAN for fluorescent detection LED is working and the wiring connection.
9002 Electrical Box Fan fault Error FAN The electrical FAN is not working.	Check the EL FAN is working and the wiring connection.
9003 Well Cooling Fan fault Error FAN The Cool Well Fan is not working.	Check the Well Cooling Fan is working and the wiring connection
9004 Inventory Manager Cooling Fan fault Error FAN The Cool Block Fan is not working.	Check the Cool Block FAN is working and the wiring connection.
9005 TEC Driver Fan fault Error FAN The TEC Driver Fan is not working.	Check the TEC Driver Fan is working and the wiring connection
9006 TEC Blower Fan fault Error FAN The TEC Blower Fan is not working.	Check the TEC Blower Fan is working and the wiring connection
9007 HEPA Fan fault\nNo:{0}" Error FAN The HEPA FAN is not working.	Check the HEPA FAN is working and the wiring connection.
9100 The PCR cap came off during PCR/Melting. {0} Fatal Error PCR Unit PCR/Melting	Contact ELITech Group Customer Support
3005 Cannot open ini file\n{0} FiSICS	Review Log Data and SD card data for source or error or corrupt files
3006 Failed to initialize AD Converter. Fluorescence Detection Unit Failed to Initialize an AD convertor used for florescence detection.	Review Log Data and SD card data for source or error or corrupt files
10000 Failed to update the reminder information.	Review Log Data and SD card data for source or error or corrupt files
10001 The specified selection is not found\n{0}	Review Log Data and SD card data for source or error or corrupt files
10002 The specified key is not found \n{0}	Review Log Data and SD card data for source or error or corrupt files
10003 The reminder information is not found \n{0}	Review Log Data and SD card data for source or error or corrupt files
10004 The reminder is currently being updated.	Review Log Data and SD card data for source or error or corrupt files

30001 The abnormal temperature is detected. Error Fluorescence Detection Unit Not updated temperature data before scan and after scan in fluorescent data.	1. Re-start a system 2. Confirm the judgement result at the time of error occurrence.
30101 {1}: Ct calculation error - Error PC Software/Firmware An unknown error occurred at Ct value calculating	Send the Log data to ELITech Group Customer Support
30102 {1}: Ct calculation error - Parameter Error PC Software/Firmware Incorrect parameter at Ct value calculating	Send the Log data to ELITech Group Customer Support
30103 {1}: Ct calculation error - Input template concentration is too high Error PC Software/Firmware The maximum second derivative is less than or equal to 14 + skipped cycles (typically 18). Typically a hot sample	Reconfirm setting reagents and assay.
30104 {1}: Ct calculation error - Undetermined Error PC Software/Firmware 1.Standard Deviation of Total data points is below limit. 2.Signal to noise is below limit. 3.Fluorescence did not get high enough to cross the threshold.	Reconfirm setting reagents and assay.
30105 {1}: Ct calculation error - non-EXP Error PC Software/Firmware Ramp up slope (fluorescence) is negative or cannot be defined.	Reconfirm setting reagents and assay.
30106 {1}: Ct calculation error - Base line Error PC Software/Firmware BaseLine calculation is incorrect.	Reconfirm setting reagents and assay.
30107 {1}: Ct calculation error - Threshold Error PC Software/Firmware 1.Ct+ < Ct- (negative slope as fluorescence curve crosses threshold). 2.Ct+ fluorescence is above the threshold and Ct- fluorescence is negative.	Reconfirm setting reagents and assay.
30201 {1}: Tm calculation error - Error PC Software/Firmware An unknown error occurred at Tm value calculating	Send the Log data to ELITech Group Customer Support
30202 {1}: Tm calculation error - Parameter Error PC Software/Firmware Incorrect parameter at Tm value calculating	Send the Log data to ELITech Group Customer Support
1005 Multiple define ext function\n"{0}" Fatal Error FiSICS Duplicated extension function (system error)	Review Log Data and SD card data for source or error or corrupt files
1006 Invalid argument type.\n{0}\n{1} Fatal Error FiSICS Invalid Argument type	Review Log Data and SD card data for source or error or corrupt files
1007 System terminated. Warning FiSICS The system is terminated.	Review Log Data and SD card data for source or error or corrupt files

1008 Unrecognized block code.\n{0}\n{1} Fatal Error FiSICS The block definition code is not recognized.	Review Log Data and SD card data for source or error or corrupt files
1009 Unrecognized smp code.\n{0}\n{1} Fatal Error FiSICS The smp definition code is not recognized.	Review Log Data and SD card data for source or error or corrupt files
1010 Syntax error.\n{0}\n{1} Fatal Error FiSICS Syntax error	Review Log Data and SD card data for source or error or corrupt files
1045 Unknown axis name. Axis: “Axis” Fatal Error FiSICS The filed not defined in Fisics.ini was specified to try to start a motor.	Review Log Data and SD card data for source or error or corrupt files
1046 Unknown IO name. IO: “Io” Fatal Error FiSICS The IO name not defined in Fisics.ini was specified.	
1047 Cannot open file.\n{0} Fatal Error FiSICS The file cannot be opened.	Review Log Data and SD card data for source or error or corrupt files
1048 File read error.\n{0} Fatal Error FiSICS File reading error	Review Log Data and SD card data for source or error or corrupt files
1501 System error.\n{0} Fatal Error FiSICS System error	Review Log Data and SD card data for source or error or corrupt files
1502 Unknown script type.\n{0} Fatal Error FiSICS The script type is unknown.	Review Log Data and SD card data for source or error or corrupt files
1503 Cannot open script file.\n{0} Fatal Error FiSICS Data cannot be read from the script file.	Review Log Data and SD card data for source or error or corrupt files
1504 Multiple define function.\nline:"{0}"\n{1} Fatal Error FiSICS Duplicated FUNCTION definition	Review Log Data and SD card data for source or error or corrupt files
1505 Multiple define label.\nline:"{0}"\n{1} Fatal Error FiSICS Duplicated label definition	Review Log Data and SD card data for source or error or corrupt files
1506 Function 'Main' not defined.\n{0} Fatal Error FiSICS No MAIN function	Review Log Data and SD card data for source or error or corrupt files
1507 System terminated. Fatal Error FiSICS A system is terminated.	Review Log Data and SD card data for source or error or corrupt files
1508 Status is not ready. Fatal Error FiSICS Interpreter: the script cannot be executed because the status is not ready.	Review Log Data and SD card data for source or error or corrupt files
1509 Stack over flow. Fatal Error FiSICS Interpreter: stack exceeds its upper limit.	Review Log Data and SD card data for source or error or corrupt files
1510 Stack under flow. Fatal Error FiSICS Interpreter: stack falls below its lower limit.	Review Log Data and SD card data for source or error or corrupt files
1511 Undefined function.\n{0}\n{1}\n{2} Fatal Error FiSICS Interpreter: undefined function is called.	Review Log Data and SD card data for source or error or corrupt files
1512 Too few arguments.\n{0}\n{1}\n{2} Fatal Error FiSICS Interpreter: lack of an argument	Review Log Data and SD card data for source or error or corrupt files
1513 Unknown variable.\n{0}\n{1}\n{2} Fatal Error FiSICS Interpreter: unknown variable	Review Log Data and SD card data for source or error or corrupt files

1514 Divide by zero.\n{0}\n{1} Fatal Error FiSICS Interpreter: divided by 0	Review Log Data and SD card data for source or error or corrupt files
1515 Syntax error.\n{0}\n{1}\n{2} Fatal Error FiSICS Syntax error	Review Log Data and SD card data for source or error or corrupt files
1516 Command Syntax error.\n{0} Fatal Error FiSICS Syntax error (command)	Review Log Data and SD card data for source or error or corrupt files
1517 Unavailable operator.\n{1} Fatal Error FiSICS Invalid operator	Review Log Data and SD card data for source or error or corrupt files
1518 Dim:Syntax error.\n{0}\n{1} Fatal Error FiSICS Dim statement: invalid syntax	Review Log Data and SD card data for source or error or corrupt files
1519 Dim:Invalid variable name.\n{0}\n{1}\n{2} Fatal Error FiSICS Dim statement: invalid variable name	Review Log Data and SD card data for source or error or corrupt files
1520 Dim:Out of array range.\n{0}\n{1} Fatal Error FiSICS Dim statement: array number is out of range	Review Log Data and SD card data for source or error or corrupt files
1521 Dim:Multiple define.\n{0}\n{1}\n{2} Fatal Error FiSICS Dim statement: duplicated variable definition	Review Log Data and SD card data for source or error or corrupt files
1522 Function:Syntax error.\n{0}\n{1} Fatal Error FiSICS Function statement: invalid syntax	Review Log Data and SD card data for source or error or corrupt files
1523 Function:Invalid function name.\n{0}\n{1}\n{2} Fatal Error FiSICS Function statement: invalid function name	Review Log Data and SD card data for source or error or corrupt files
1524 Function:Invalid argument name.\n{0}\n{1}\n{2} Fatal Error FiSICS Function statement: invalid argument name	Review Log Data and SD card data for source or error or corrupt files
1525 Function:Redefinition function name.\n{0}\n{1}\n{2} Fatal Error FiSICS Function statement: duplicated function definition	Review Log Data and SD card data for source or error or corrupt files
1526 Function:Inner function.\n{0}\n{1} Fatal Error FiSICS Function statement: FUNCTIONname in FUNCTION	Review Log Data and SD card data for source or error or corrupt files
1527 Label:Syntax error.\n{0}\n{1} Fatal Error FiSICS Label statement: invalid syntax	Review Log Data and SD card data for source or error or corrupt files
1528 Label:Redefinition label name.\n{0}\n{1}\n{2} Fatal Error FiSICS Label statement: duplicated label definition	Review Log Data and SD card data for source or error or corrupt files
1529 Goto:Syntax error.\n{0}\n{1} Fatal Error FiSICS Goto statement: invalid syntax	Review Log Data and SD card data for source or error or corrupt files
1530 Goto:Undefined label.\n{0}\n{1}\n{2} Fatal Error FiSICS Goto statement: undefined label name	Review Log Data and SD card data for source or error or corrupt files
1531 Expression:Invalid parenthesis.\n{0}\n{1} Fatal Error FiSICS Expression: invalid parenthesis	Review Log Data and SD card data for source or error or corrupt files
1532 Expression:Unknown operator.\n{0}\n{1}\n{2} Fatal Error FiSICS Expression: Unknown operator	Review Log Data and SD card data for source or error or corrupt files

1533 Expression:Syntax error.\n{0}\n{1} Fatal Error FiSICS Expression: Syntax error	Review Log Data and SD card data for source or error or corrupt files
1534 Expression:Uncorrect operator equal.\n{0}\n{1} Fatal Error FiSICS Expression: incorrect operator equal. '='	Review Log Data and SD card data for source or error or corrupt files
1535 Expression:Invalid argument.\n{0}\n{1} Fatal Error FiSICS Expression: invalid argument	Review Log Data and SD card data for source or error or corrupt files
1536 Substitution:Syntax error.\n{0}\n{1} Fatal Error FiSICS Substitution: syntax error	Review Log Data and SD card data for source or error or corrupt files
1537 Substitution: Invalid left value.\n{0}\n{1}\n{2} Fatal Error FiSICS Substtitution: Invalid left value	Review Log Data and SD card data for source or error or corrupt files
1538 If:Syntax error.\n{0}\n{1} Fatal Error FiSICS If statement: syntax error	Review Log Data and SD card data for source or error or corrupt files
1539 Eval:Syntax error.\n{0}\n{1} Fatal Error FiSICS Eval command: syntax error	Review Log Data and SD card data for source or error or corrupt files
1999 Invalid index.\n{0} Fatal Error FiSICS The Index value which shows the position of single nozzle after its move	Review Log Data and SD card data for source or error or corrupt files
5009 2CH Motor Controller : Total exposure time exceeded 20 sec\n{0} Fatal Error 2CH Motor Controller This happens when 20 seconds or more was set in a protocol.	1. Check the protocols since it seems protocol is wrong.
5010 2CH Motor Controller : Sonicator oscillator fault\n{0} Fatal Error 2CH Motor Controller Alarm has occurred	1. Check disconnected wiring. 2. Check whether the sonicator is working.
5011 2CH Motor Controller : Sonicator motor overheated\n{0} Fatal Error 2CH Motor Controller It was overheating	Check whether the FAN for sonicator is working.
20001 Clogging during aspiration with DN100N.[Track{0}] Error DN100N Tip that is attached to the 12 nozzle. When it was clogged up in Aspiration for the DN100N tip	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20003 Clogging during aspiration of Monoreagent.[Track{0}] Error Single Tip that is attached to the Single nozzle. When it was clogged up in Aspiration of Monoreagent	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.

20004 Liquid was remaining after dispensing with DN100N.[Track{0}] Error DN100N Tip that is attached to the 12 nozzle. When a liquid was left for the tip in dispense for the DN100N tip	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20005 No liquid found to aspirate (DN100N tip).[Track{0}] Error DN100N Tip that is attached to the 12 nozzle. When there is not a liquid doing Aspiration for DN100N tip	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20006 No eluate found to aspirate (ME200 tip).[Track{0}] Warning - -	-
20007 Liquid was remaining after dispensing with ME200.[Track{0}] Error - -	-
20008 Failed to aspirate specified volume of Monoreagent.[Track{0}] Error Single Tip that is attached to the Single nozzle. When Aspiration is not made in Monoreagent of quantity of designation (10μℓ)	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20009 Failed to aspirate Monoreagent.[Track{0}] Error Single Tip that is attached to the Single nozzle. When there is not Aspiration Monoreagent liquid to do for Single tip.	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.

20010 Liquid was remaining after dispensing of Monoreagent.[Track{0}] Error Single Tip that is attached to the Single nozzle. A liquid was left for Single tip in dispense of the Monoreagent liquid.	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20011 Failed to eject piercing tip (PP75).[Track{0}] Warning the 12 nozzle. When piercing tip(PP75) is not removed from 12 nozzles	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20012 Failed to eject DN100N tip.[Track{0}] Warning the 12 nozzle. When DN100 tip is not removed from 12 nozzles	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20013 Failed to pickup piercing tip (PP75).[Track{0}] Warning the 12 nozzle. 1.When there is not piercing tip(PP75) 2.When a 12 nozzle cannot acquire piercing tip(PP75)	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20014 Failed to eject ME200 tip.[Track{0}] Warning - -	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20015 Failed to pickup DN100N tip.[Track{0}] Warning the 12 nozzle. 1.When there is not DN100 tip 2.When a 12 nozzle cannot acquire DN100 tip	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20016 Failed to pickup ME200 tip.[Track{0}] Warning - -	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20017 Failed to eject single tip Warning the Single nozzle. When Single Tip is not removed from the single nozzle	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20019 Failed to pickup single tip Warning the Single nozzle. When there is no Single Tip	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.

20020 Failed to eject sonication cap.[Track{0}] Warning the 12 nozzle. When a sonication cap is not removed from 12 nozzles	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20022 Failed to pickup sonication cap.[Track{0}] Warning the 12 nozzle. 1.When there is not a sonication cap 2.When a 12 nozzle cannot acquire sonication cap	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20024 No single tip found Warning the Single tip rack with no single tip When there is no Single Tip rack	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20025 Magnet is not extended Warning M Axis Unit The sensor of the M axis is not turned on at time of Magtration Processing	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20026 No sample found.[Track{0}] Warning Primary rack with no sample When there is not a sample	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20027 No PCR cap found.[Track{0}] Warning PCR cartridge with No PCR Cap When a PCR cartridge does not have a PCR cap	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20029 No sonication tube found.[Track{0}] Warning Sonication rack with no Sonication Tube When a sonication rack does not have a sonication tube	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20030 Connection of tip is loose Error L Axis Unit When there is not L axis at the Lock On position before burglary processing	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.

20031 No Monoreagent found.[Track{0}] Warning Single Tip that is attached to the Single nozzle. When Cool block does not have Monoreagent	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20032 Clogging during sample aspiration.[Track{0}] Error Single Tip that is attached to the Single nozzle. When it was clogged up during sample Aspiration	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20033 Clogging during eluate aspiration.[Track{0}] Error Single Tip that is attached to the Single nozzle. When it was clogged up during absorption of Elution	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20034 Clogging during IC aspiration.[Track{0}] Error Single Tip that is attached to the Single nozzle. When it was clogged up during the absorption of the IC	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20035 Liquid was remaining after sample dispensing.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a liquid was left for the tip in dispense of the sample	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.

20036 Liquid was remaining after eluate dispensing.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a liquid was left for the tip in dispense of the Elution	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20037 Liquid was remaining after IC dispensing.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a liquid was left for the tip in dispense of the IC	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20038 Failed to aspirate specified volume of sample.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was not able to absorb sample of the designated quantity	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20039 Failed to aspirate specified volume of eluate.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was not able to absorb Elution of the designated quantity	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20040 Failed to aspirate specified volume of IC.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was not able to absorb an IC of the designated quantity	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.

20041 Failed to aspirate sample.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was not able to play Aspiration with a sample	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20042 Failed to aspirate eluate.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was not able to absorb Elution	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20043 Failed to aspirate IC.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was not able to absorb an IC	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20044 Insufficient piercing Error L Axis Unit When there is not L axis at the Lock On position before pierce processing	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20045 Failed to aspirate specified volume of liquid (DN100N tip) Error the 12 nozzle. When DN100N tip cannot absorb a liquid of the designated quantity	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.

20046 Clogging during dispensing (DN100N tip).[Track{0}] Error DN100N Tip that is attached to the 12 nozzle. When DN100N tip was clogged up during a discharge	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20047 Unnecessary DN100N tip found.[Track{0}] Warning No need DN100N Tip Exist at Tip Holder When DN100 tip was put to the tip holder of the truck not to use	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20048 Failed to aspirate specified volume of eluate (ME200 tip) Error - -	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20049 Clogging during aspiration of eluate (ME200 tip).[Track{0}] Error - -	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20050 Clogging during dispensing of eluate (ME200 tip).[Track{0}] Error - -	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20051 Unnecessary ME200 tip found.[Track{0}] Warning - -	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20052 Unnecessary PCR cap found.[Track{0}] Warning No need PCR Cap Exist at PCR cartridge When PCR Cap was put in the PCR cartridge of the truck not to use	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20053 Unnecessary PP75 tip found.[Track{0}] Warning No need PP75 Tip Exist at Tip Holder When PP75 tip was put to the tip holder of the truck not to use	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20054 No IC found.[Track{0}] Warning Single Tip that is attached to the Single nozzle. When a single nozzle cannot detect the surface of the IC at the place that A user appointed it	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.

20055 No eluate found.[Track{0}] Warning Single Tip that is attached to the Single nozzle. When a single nozzle cannot detect a surface of Elution	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20056 Clogging during dispensing of sample.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was processing the dispense of the sample, and becoming clogged	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20057 Clogging during dispensing of eluate.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was processing the dispense of the Elution, and becoming clogged	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20058 Clogging during dispensing of IC.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was processing the dispense of the IC, and becoming clogged	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20059 Clogging during dispensing of Monoreagent.[Track{0}] Error Single Tip that is attached to the Single nozzle. When a single nozzle was processing the dispense of the Monoreagent, and becoming clogged	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.

20060 Leakage of DN100N during head movement Error DN100N Tip that is attached to the 12 nozzle. When the leak in the DN100N tip occurred during head movement	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20061 Leakage of ME200 during head movement Error - -	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20062 Leakage of sample during head movement Error Single Tip that is attached to the Single nozzle. When the leak of the sample occurred during head movement	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20063 Leakage of eluate during head movement Error Single Tip that is attached to the Single nozzle. When a leak of Elution occurred during head movement	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20064 Leakage of IC during head movement Error Single Tip that is attached to the Single nozzle. When the leak of the IC occurred during head movement	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.

20065 Leakage of Monoreagent during head movement Error Single Tip that is attached to the Single nozzle. When a leak of Monoreagent occurred during head movement	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20066 Unnecessary sonication cap found.[Track{0}] Warning No need sonication cap at sonication rack When Sonication Cap was put to the sonication rack of the truck not to use	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20068 Unexpected atmospheric pressure measured.[Nozzle{0}] Error 13 ch pressure sensor unit A pressure level is time beyond the normal range at the time of device start	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20069 Waste Box not detected Warning Waste Box When Waste Box is not put	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20070 Piercing tip (PP75) dropped unexpectedly.[Track{0}] Warning PP75 Tip was dropped from a 12 nozzle. When piercing tip(PP75) came off during piercing processing	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20071 DN100N tip dropped unexpectedly Warning DN100N Tip was dropped from a 12 nozzle. When a DN100 tip came off during extraction processing	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20072 Could not lock door Warning Door Lock Unit 1.When "Continue Run" button was pushed with the situation that there was a door 2.When Locke of the door failed	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20073 Could not unlock door Warning Door Lock Unit When the door of the device failed in door lock cancellation	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.

20074 Sonicator cap loose Error L Axis Unit When there is not L axis at the Lock On position at time of When 12 nozzles perform fit of a sonication Cap	1.Message is displayed in the dialog screen. Display the remark after Assay process is completed. Is not performed concentration calculation of the lane if an error occurs 2.Protocol is stopped when detecting the step-out of the axis. 3. How to close the dialog screen that is displayed Dialog window is closed and press the OK button.
20075 DN100N tip clogged. Warning DN100N Tip that is attached to the 12 nozzle. When DN100 is clogged up	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.
20076 Empty Waste Box. Warning Waste box inside of a large number of single-tip There is no space to throw away a single chip to Waste Box.	1.Message is displayed on the screen User Input. Processing is paused. To perform the necessary actions. To resume the process, press the "Continue Run" button. Action: Put the subject consumables.

4.2. Troubleshooting and Problem Resolution

This section is a summary of problems encountered on the InGenius system and steps taken to resolve them. It will be updated as relevant

4.2.1. M Axis Errors

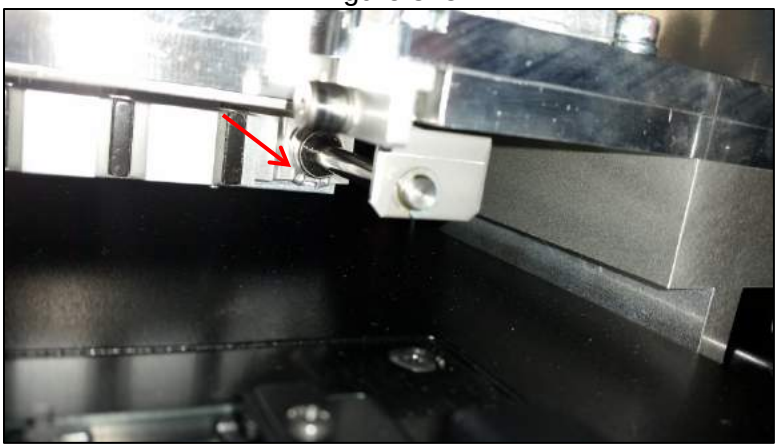
4.2.1.1. Magnet fails to extend

Identification: This problem is identified by a 20025 error message being displayed on screen during a run, and or by hearing the M axis motor trying to move the assembly but being impeded

Troubleshooting:

- Ensure that the shipping tape has been removed if this is a newly installed instrument
- Ensure that the retaining rings on the M axis bearings have the protruding portion pointing downward to prevent interference with mounting screws (Figure 315)

Figure 315



- If interference with mounting screw is a concern the M4x14 screws can be replaced with like material M4x12 screws. This has been changed in late model instrument assemblies

4.2.2. Y Axis Errors

4.2.2.1. Axis encounters obstacle during movement

Identification: This problem is identified by a ratcheting noise of the belt slipping or Y axis motor stepping

Troubleshooting:

- Ensure that the shipping bracket has been removed if this is a newly installed instrument
- Ensure that the cassette racks are seated properly in their respective positions

4.2.2.2. Y Belt comes off pulley

Identification: This problem is identified by no movement of the axis when commanded to do so

Troubleshooting:

- With power to axis try to move it, if it moves freely belt is no longer engaged to drive motor

4.2.3. Z Axis Errors

4.2.3.1. Axis encounters obstacle during movement

Identification: This problem is identified by an error message during a run, or by a ratcheting noise from the motor

Troubleshooting:

- Inspect travel path of axis for any obstructions
- Ensure consumables are in proper location and not reused

4.2.4. DX Axis Errors

4.2.4.1. Axis encounters obstacle during movement

Identification: This problem is identified by an error message during a run, or by a ratcheting noise from the motor

Troubleshooting:

- Inspect travel path of axis for any obstructions
- Ensure optic fibers have not entangled on anything

4.2.5. DZ Axis Errors

4.2.5.1. Cap pickup failure

Identification: This problem is identified by an error message during a run

Troubleshooting:

- Ensure caps were in proper position at start of process
- Inspect cap detector sensors to ensure functionality
- Reteach DZ positions and retry

4.2.5.2. Cap detection failure

Identification: This problem is identified by an error message during a run

Troubleshooting:

- Ensure caps were in proper position at start of process

- Inspect cap detector sensors to ensure functionality
- Reteach DZ positions and retry

4.2.5.3. PCR chamber capping failure

Identification: This problem is identified by an error message during a run

Troubleshooting:

- Ensure caps were in proper position at start of process
- Inspect cap detector sensors to ensure functionality
- Reteach DZ positions and retry

4.2.6. SX Axis Errors

4.2.6.1. Motor encoder error

Identification: This problem is identified by a discrepancy during axis testing, or by an error message during a run

Troubleshooting:

- Inspect travel path of axis for any obstructions
- Check belt tension to ensure it is in acceptable range
- Check encoder boss positioning

4.2.7. SZ Axis Errors

4.2.7.1. Axis encounters obstacle during movement

Identification: This problem is identified by an error message during a run, or by a ratcheting noise from the motor

Troubleshooting:

- Inspect travel path of axis for any obstructions
- Ensure consumables are in proper location and not reused

4.2.8. UX Axis Errors

4.2.8.1. Movement error

Identification: This problem is identified by an error message during a run, or by a ratcheting noise from the motor

Troubleshooting:

- Inspect travel path of axis for any obstructions
- Ensure no liquid has been dripped on to LM guide rail and dried. If so clean and test via maintenance software

4.2.9. UZ Axis Errors

4.2.9.1. Tube detection error

Identification: This problem is identified by an error message during a run, or by a ratcheting noise from the motor

Troubleshooting:

- Visually check that UX axis is moving to proper position
- Ensure consumables are in proper location and not reused

4.2.10. Single Nozzle Pipette Errors

4.2.10.1. Failure to aspirate liquid

Identification: This problem is identified by an error message during a run

Troubleshooting:
- Ensure consumables and reagents are in proper location and not reused
- Ensure instrument is running latest version of software
- Perform pipetting test to verify operation
- Perform pressure transducer check to verify operation

4.2.11. Multi Nozzle Pipette Errors

4.2.11.1. Liquid movement failure

Identification: This problem is identified by an error message during a run

Troubleshooting:
- Ensure consumables and reagents are in proper location and not reused
- Perform pipetting test to verify operation
- Perform pressure transducer check to verify operation

4.2.12. Barcode Read Errors

4.2.12.1. Failure to read cassette barcode

Identification: This problem is identified by an error message during a run

Troubleshooting:
- Ensure consumables are in proper location and not reused
- Ensure instrument is running latest version of software and firmware
- Remove cassette that is not being read and reinsert or replace
- Reteach barcode scanning positions

4.2.13. Operating System Errors

4.2.13.1. Database write errors

Identification: This problem is identified by a Windows error message during a run, and most likely will occur during PCR. Syntax varies, but is usually identifying a *DB* related error

Troubleshooting:
- Pressing the *OK* button to clear the error message also shuts down the software
- Data from the run will most likely be lost, though extracted eluate is still viable and can be re-ran as a PCR only, be sure to replace PCR cassettes before starting PCR only run

4.2.13.2. Disk read error at startup

Identification: This problem is identified by a Windows error message at startup that *a disk read error occurred, Press Ctrl+Alt+Del to restart (*Figure 316*)*

Figure 316

Troubleshooting:

- Press *Ctrl+Alt+Del* and allow system to reboot to see if problem re-occurs
- Check cable connection between HDD and PC
- Replace HDD and or PC with properly formatted and loaded replacements

4.2.14. Optics Errors

4.2.14.1. Weak signal on a specific channel across tracks

Identification: This problem is identified by unexpected results from a standard or control, or by comparison to other like results

Troubleshooting:

- Inspect optics source and detector for foreign material

Figure 317

4.2.14.2. Weak signal on a specific track across channels

Identification: This problem is identified by unexpected results from a standard or control, or by comparison to other like results

Troubleshooting:

- Inspect optic fibers for damage

4.2.15. Heating & Cooling Errors

4.2.15.1. 4001, 4002, and 4005 errors at startup

Identification: This problem is identified by 4002, 4005, 4001 errors or a combination of these during initialization and startup of a newly installed instrument

Troubleshooting:

- This error is caused by the temperature of the unit being too low
- This error can be cleared by shutting down the unit and allowing it to come to room temperature and restarting, or alternatively resetting the error by following PSS procedure P280062SW003-00