iCAP 7000 Series ICP-OES Spectrometer

Qtegra ISDS Installation Procedure

This is section 2 (of 3) for part number 8423 460 10030

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1 Contents

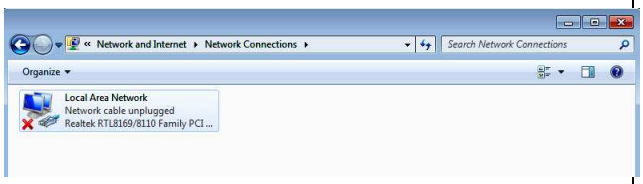
‘

2 Setting up the PC instrument network connection

If the PC is connected to a network, an additional Ethernet port is required for connection to the instrument. The ports are configured differently and are not interchangeable. To avoid confusion, the Ethernet port on the motherboard should be used for the instrument.
If the computer is connected to a network the security settings need to be set by the customer Network Administration.

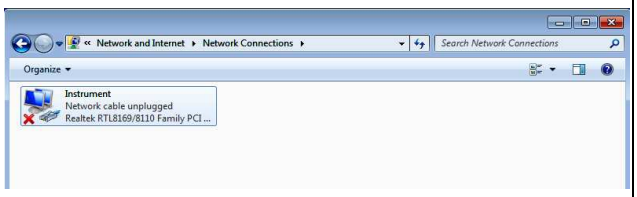
2.1 Network Set-up

Windows 7: Open the Network connections dialog (Start->Control Panel ->Network & Internet->Network & Sharing Centre->Change Adapter Settings)



2.2 Ethernet adaptor naming

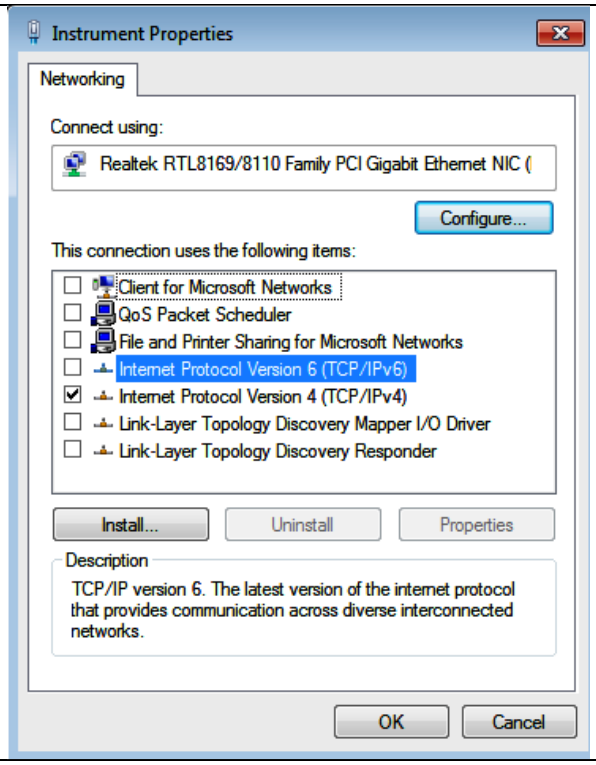
Rename the dedicated instrument Ethernet adaptor to “Instrument”. Do this by right clicking on the connection, select Rename and enter “Instrument”.



2.3 Configure Ethernet adaptor

Configure the Instrument Ethernet adaptor. Right click on the Instrument connection and select properties.

De-select all components with the exception of Internet Protocol (TCP/IPv4).

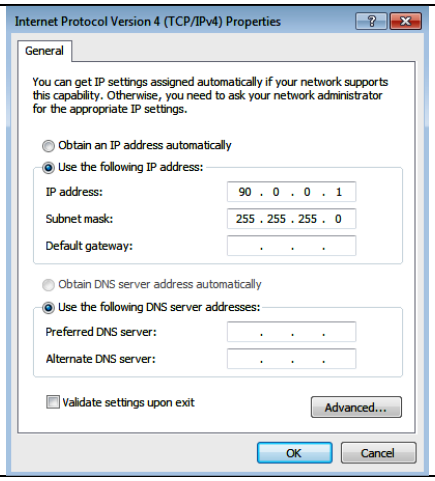


Ethernet configured ☐

2.4 Configure the TCP/IP settings

Select the Internet Protocol (**TCP/IPv4**) component and select Properties. Make sure **Use the following IP address** is selected. Enter an IP address of **90.0.0.1** and a subnet mask of **255.255.255.0** as shown to the right.

Apply the setting by pressing **OK** (on the Internet Protocol Properties dialog) and then Close.



Internet Protocol Set ☐

2.5 Hosts file

For access open All Programs/accessories/notepad (right click)/run as administrator
Locate the Hosts file (select all file types).
C:\WINDOWS\system32\drivers\etc\hosts
using notepad add at the bottom the following line:
90.0.0.50 ICPOES_PCB
as shown on the right, save the file and exit.
NOTE: The host file may already contain a number of other entries; these must not be removed or replaced. Simply append to the end of the existing entries
Note: The Hosts file is required for iTEVA

On a new installation the hosts file should be empty and look similar to the following:

Copyright (c) 1993-1999 Microsoft Corp.

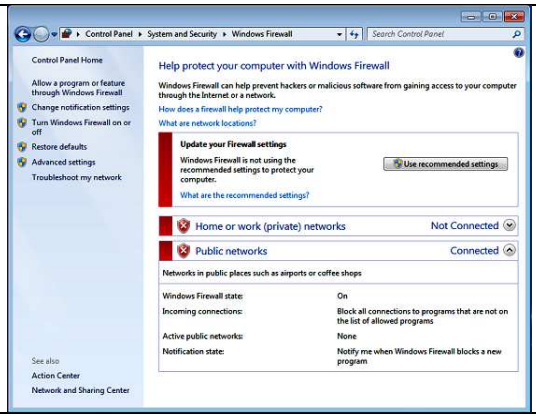
```
#
# This is a sample HOSTS file used by Microsoft TCP/IP for
    Windows.
#    102.54.94.97    rhino.acme.com        # source server
#     38.25.63.10    x.acme.com            # x client host

127.0.0.1           localhost
90.0.0.50           ICPOES_PCB
```

Hosts file Set ☐

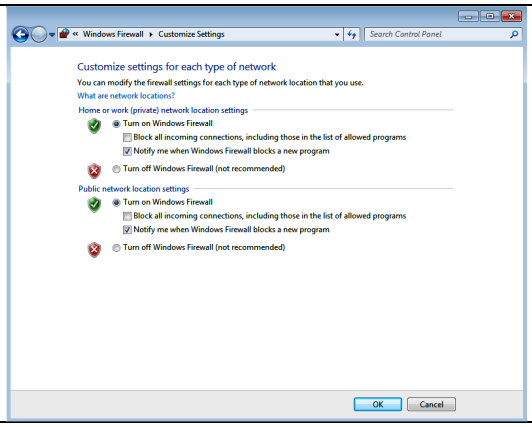
2.6 Firewall

Any firewalls installed on the PC must be disabled for the Instrument Ethernet adaptor. Start->Control Panel>System and Security>Windows Firewall->Turn Windows Firewall Off.



Turn off ALL network location settings

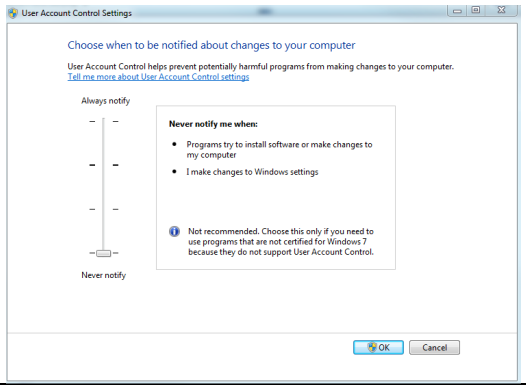
(It is possible to customise the firewall settings and add exceptions to allow the instrument to communicate. For this it is suggested to involve the customer's IT representative).



Firewall Set ☐

2.7 Change User Account Control Settings

User Account Control Settings needs to be changed to 'Never notify'.
(This enables you to edit the line library and register the software with this version of Qtegra).
Start->Control Panel>System and Security>Action Center



User Account Off ☐

2.8 PC configuration

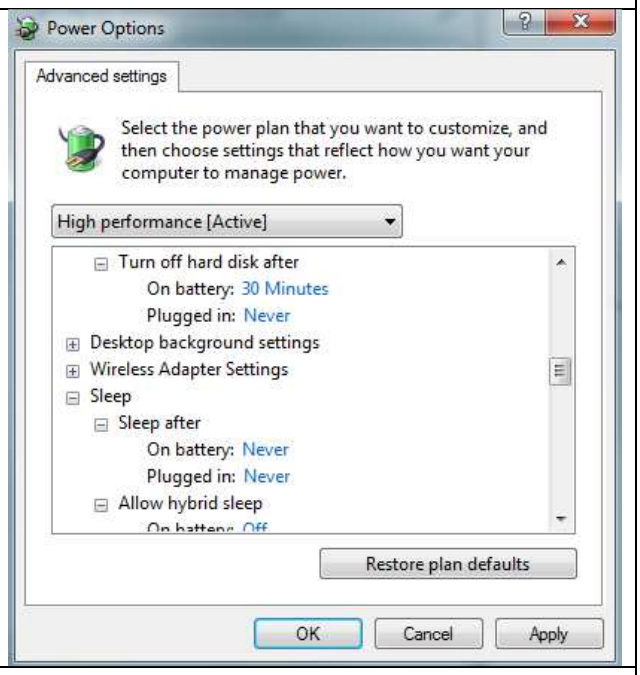
2.8.1 Power settings

Before connecting the instrument to the PC, ensure any PC power saving settings are turned off.

This is changed from the Power Options Dialog (Start->Control Panel>Power Options) Click on Change plan settings

Advanced Power Settings must also be disabled. For each tab ensure that the power saving setting is set to <u>Never</u>.

Note: The power settings will have to be set for each user who uses Qtegra



PC Power Settings Off ☐

2.8.2 Windows Automatic Updates

In Control Panel/System/Windows Update - Switch off Automatic Updates.
Reboot the PC.

Windows Updates Off ☐

2.9 ***PC Warranty Transfer***	If the iCAP system is supplied with a PC purchased through Thermo Fisher Scientific then the warranty should be transferred to the customer in the event that there is a requirement to make a claim. Please log on to the following website and enter the required Thermo Fisher Scientific and customer information http://www.dell.com/globaltagtransfer
	PC warranty transferred ☐
3 Qtegra ISDS Installation Before you start the installation you need to have checked the following: ☐ The User account you are loading the software in is an Administrator on the PC concerned. ☐ User Account Control Settings turned off ☐ Firewall is turned off. ☐ You have a software key to install Qtegra.	
	Confirm Qtegra checks ☐

3.1 Insert DVD,

Warning - Do not allow the DVD to autostart.

3.2 Open Windows Explorer,

Navigate to the DVD directory " Prerequisites" Directory.

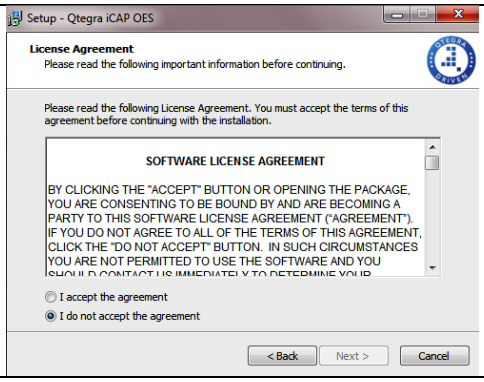
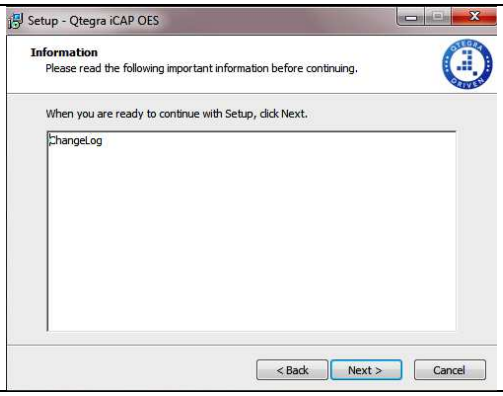
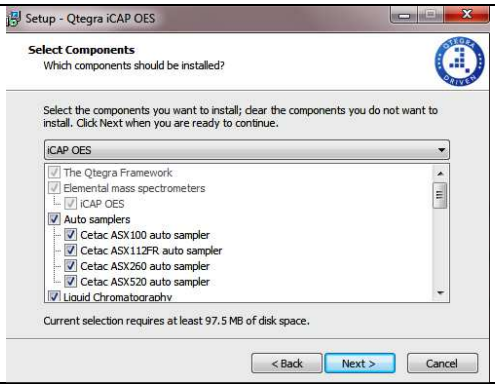
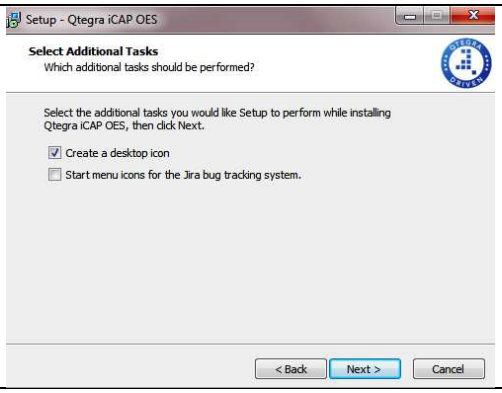
3.3 Load dot Net

Run the "dotNetFX40_full_x86_x64.exe" file and follow the instructions.
This is required to enable Qtegra to install.

	Dot Net loaded ☐

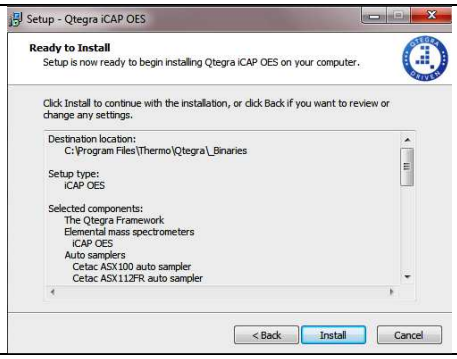
3.4 Accept the Licence agreement.

Navigate back to the Root directory for the DVD and run the "Qtegra-iCAP_OES-x.x.xxxx.xx.exe" file.
This will extract both the Qtegra software and the Sprint valve software (iCAP 7600 only)

Accept software license agreement and Press Next.	
Press Next	
Leave the hardware component settings as the defaults. Select Next.	
Select to Create a desk icon.	
	Qtegra icon created ☐

To begin installation, click **Install.**

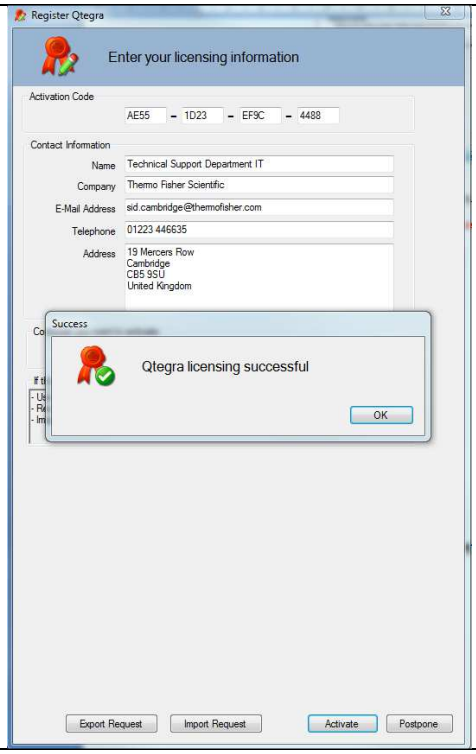
A computer restart will be requested when finished**.**



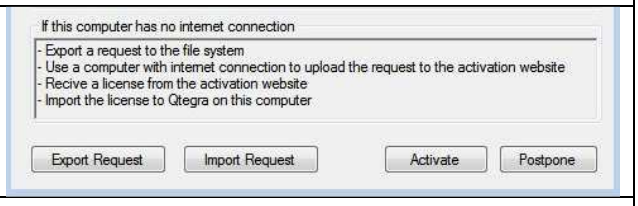
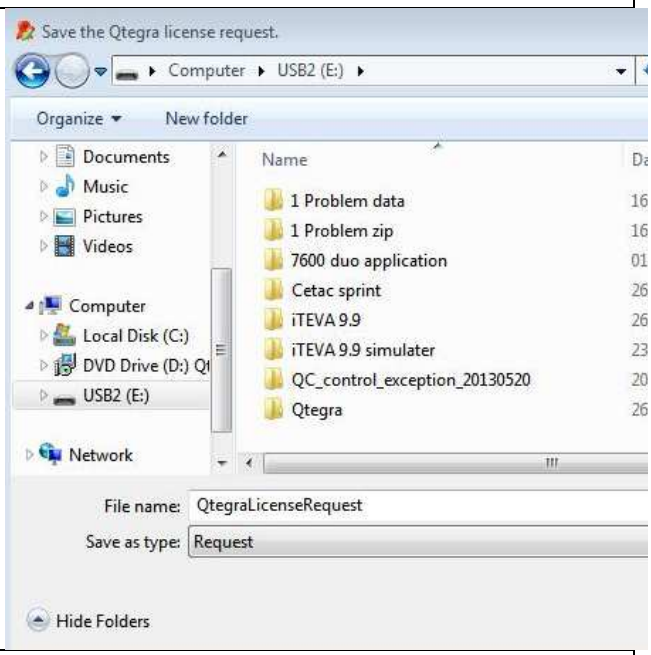
Select Instrument to install Qtegra for iCAP control.

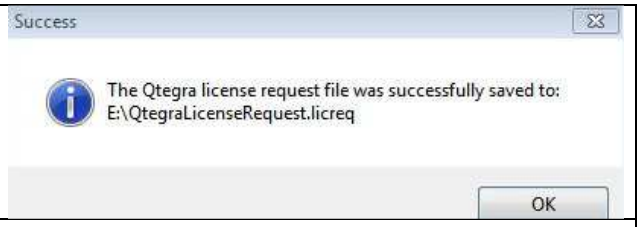
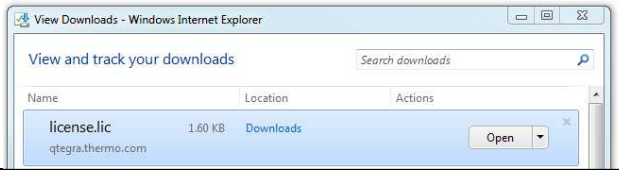
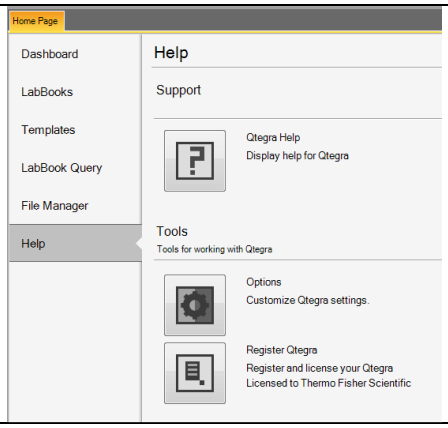
Enter the licensing details

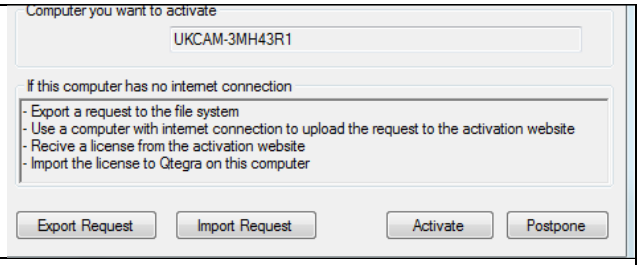
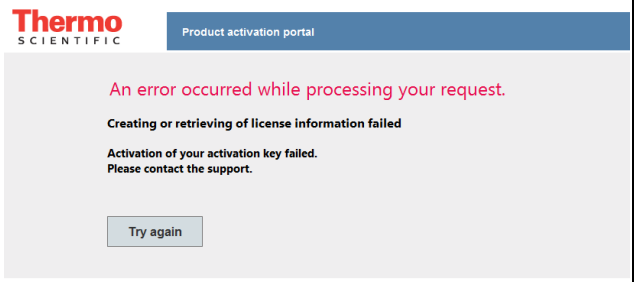
Press activate if the PC is connected to the internet. Or move to next section.

Press OK to complete the installation.	
Print the IQReport if possible	

3.5 If the PC does not have an internet connection.

For a Computer without internet access **PRESS Export Request** This will export a file “QtegraLicenseRequest.licreq”	
Save this file to a USB memory drive. Allow the PC to reboot.	
Print the IQReport if possible	

Take the file to a computer with internet connection then log onto http://Qtegra.Thermo.com/Register and follow the instructions.	
Browse to the location where “QtegraLicenseRequest.licreq” is stored. Open the file.	
Press Request and download the licence. Use ‘save as’ to save to USB.	
Save the licence to the USB memory drive. Take the USB stick to the iCAP PC	
Open Qtegra, in the Dashboard select Help, then Register Qtegra.	

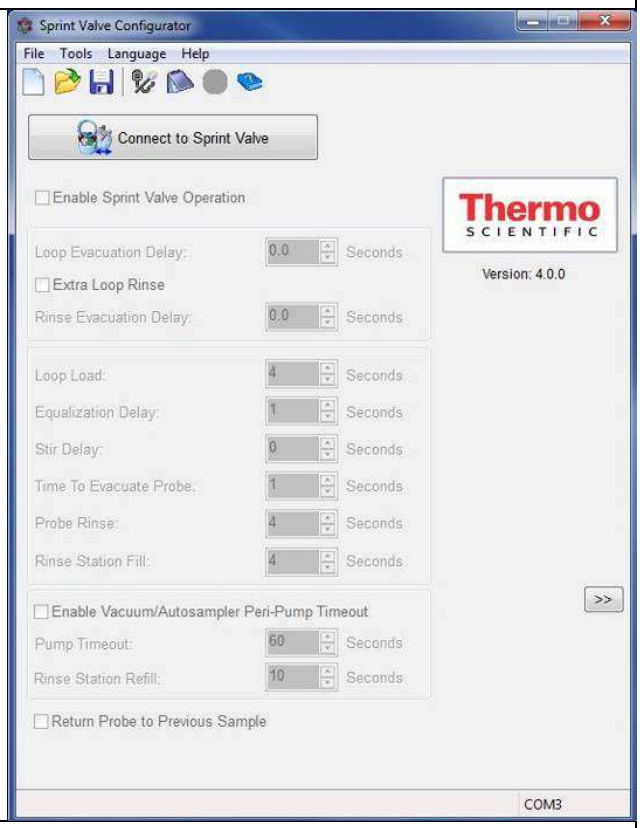
Press Import Request from the Register Qtegra page. Restart Qtegra and check you are licenced.	
Contact your local support organisation if this error occurs.	
	Qtegra ISDS installed ☐
Note - If it is not possible to Register the software on installation the customer has 60 days to register. After 60 days the software will stop working.	

4 Configuring the Sprint valve (iCAP 7600 only)

For other systems miss this section, the autosampler should be connected later

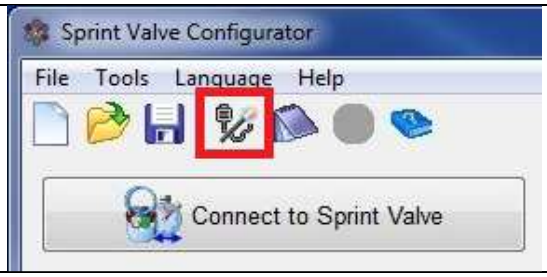
Open the Sprint Valve Configurator software.
This can be in the directory under C:\Program Files (x86)\Thermo\Qtegra\Sprint Valve Configurator\Sprint_Valve_Config.
Place a shortcut on the Desktop.

The software will open with most options greyed out

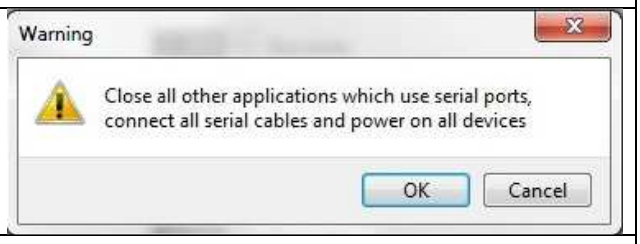


Note: Qtegra should not be connected to the auto sampler when performing the next operation.

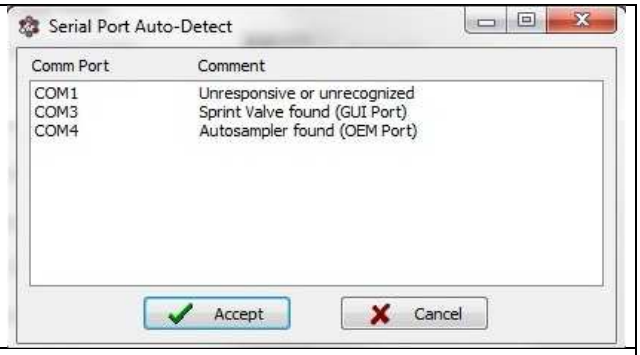
Press the Serial port auto detect icon.



Follow the displayed instructions.
Press OK.



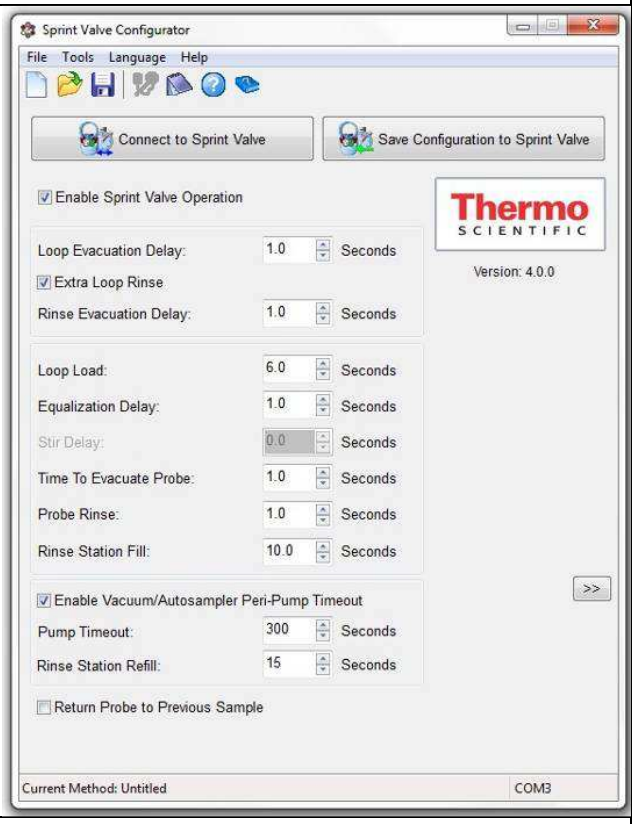
After selecting Ok the Serial Port Auto-Detect will appear.

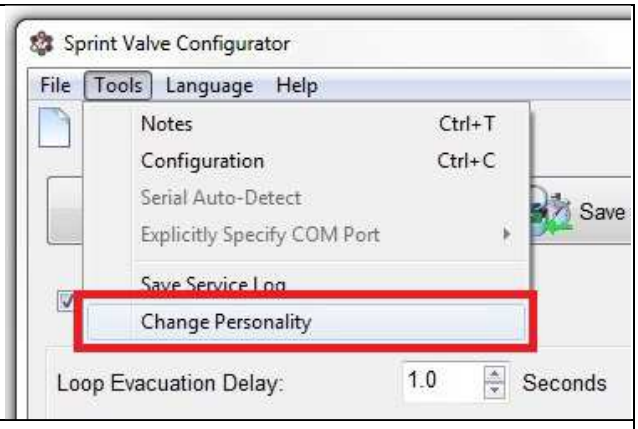
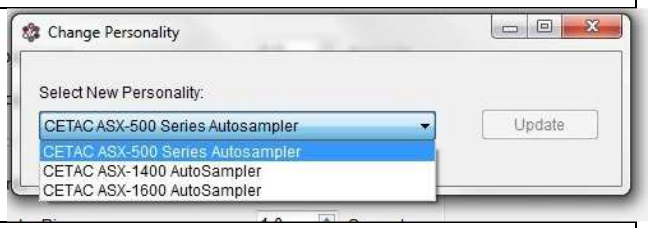
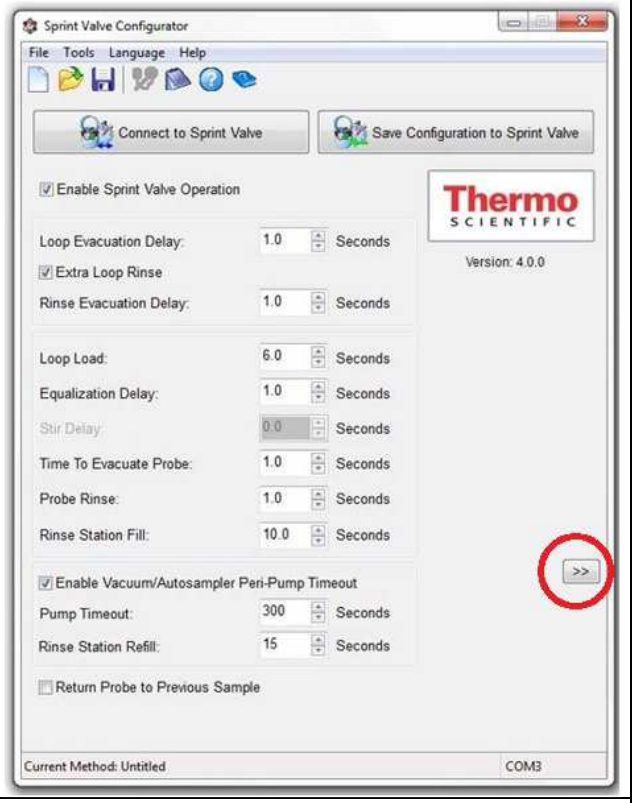


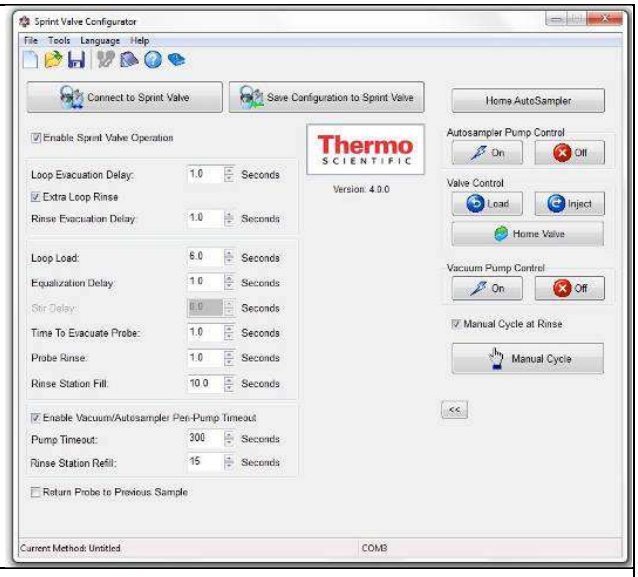
The software will check each available communications port in turn

When completed, the sprint valve and the autosampler will be shown.

Make a Note of the com port the autosampler is connected to,
(This will be required when creating the instrument configuration in Qtegra).

Autosampler COM PORT:	
Press accept.	
Now click to connect to the sprint valve	
The Configurator Window will now have multiple options available.	

In the tools menu, select change personality:	
The following menu will appear, select the autosampler being used, the default setting is ASX-500 series	
To check the sprint valve has connected properly press >> to open the manual control functions	

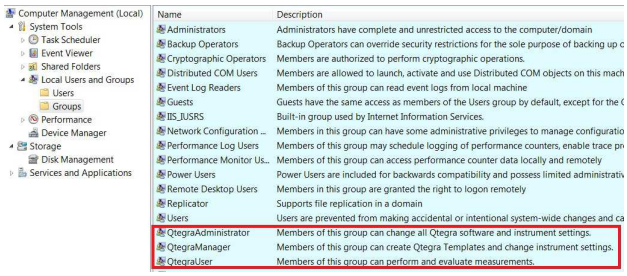
Switch the autosampler pump on and off, check the autosampler responds Switch the valve between load and inject to make sure the setup is working. Check there is a sound from the valve working.	
	Sprint Valve installed ☐

5 Configuring Qtegra ISDS

Note: Do not start Qtegra yet.

5.1 Qtegra User Groups

Check the Windows Groups have been set-up on the computer.
This can be viewed from:
Control Panel/Administrative Tools/Computer Management/Local Users and Groups/Groups.
QtegraAdministrator, QtegraManager and QtegraUser should be visible.
If the groups have not been set-up make sure the Windows login being used is the PC Administrator.



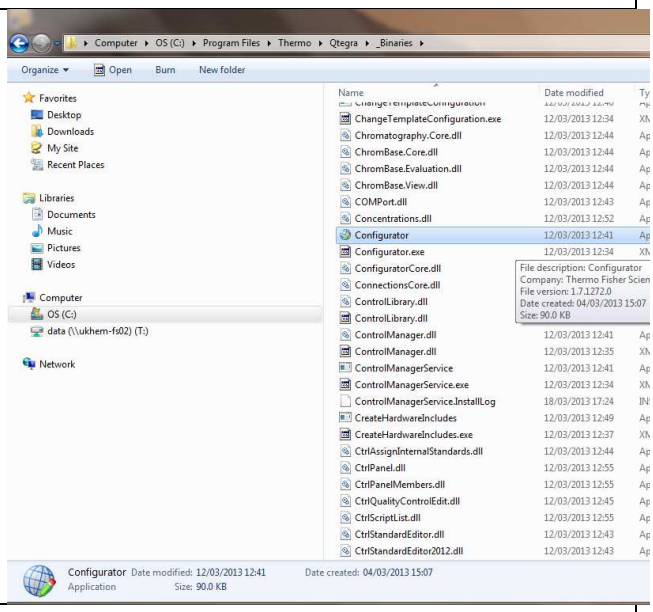
Note: If Qtegra does not start check the Windows access for Qtegra.

User Groups Checked ☐

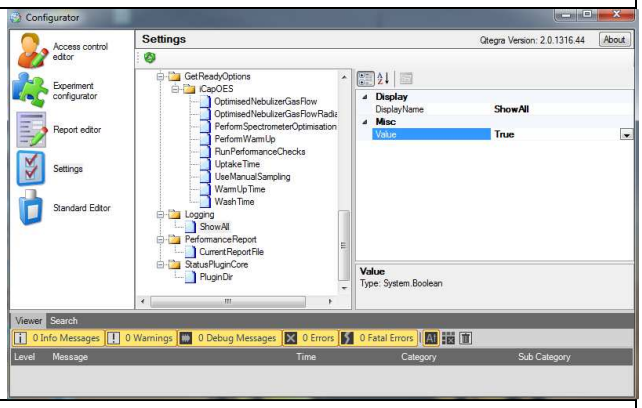
5.2 Turn on the Log file (Journal)

Once the installation is complete the "**Journal" LOG** needs to be turned on as follows
Locate **Configurator** in C:\Program Files (x86)\Thermo\Qtegra\Binaries\Configurator.exe.
Run this Application

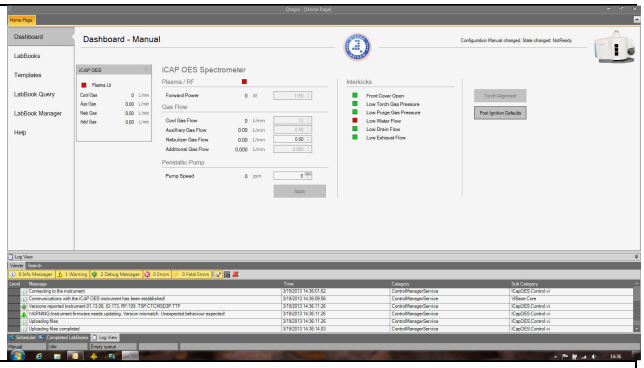
Select Settings and scroll down to Logging/Show all



Set Misc/value to **True**.
Do not close Configurator.exe



Note:- The Journal/Log will be available in Qtegra.
This is required for iCAP Service work and should always be left on.

The journal will be visible in Qtegra when it is started.	
	Journal/log on ☐

6 Configuration of the iCAP system.

6.1 Explanation

Qtegra is supplied with the “iCAP 7000 Manual” configuration preloaded.
To use an autosampler use the Configurator software to create configurations with the appropriate autosamplers.

To enable iTEVA on the customers PC for optical alignment, it is very important you create an EMPTY configuration. Being empty means that the Services running in the background will not be trying to communicate with the iCAP. Failure to load an empty configuration results in communication problems with iTEVA.

ALWAYS drag the iCAP first to the configurator; (Apart from empty configuration) failure to have the iCAP first may cause the configuration created not to work and application error to occur.

NEVER put two or more autosamplers in a configuration, this causes a major crash in Qtegra when that configuration is selected. It is then not possible to reconfigure Qtegra and it must be uninstalled and reinstalled.

For a configuration with an autosampler make sure the autosampler is powered up and communicating with Qtegra before lighting the plasma.

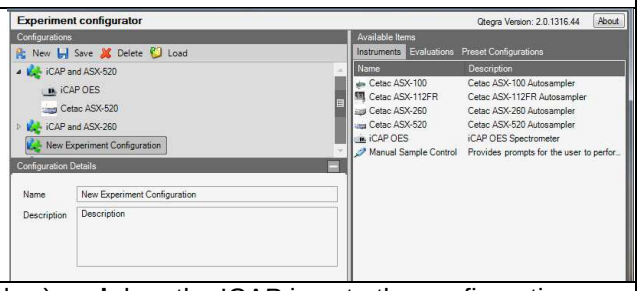
Set up the Configurator for **each** accessory that is available for use with the iCAP as the customer may at a future date change the accessory being used.

Note: <u>At this time</u> it is imperative to use common Configuration naming schemes in order for the supplied Test Methods / Templates to be imported and used without valid configuration issues

6.2 Setting Configuration

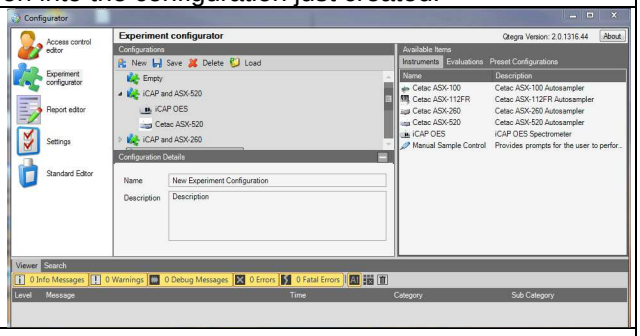
To build configurations for instrument operation:

Within Configurator.exe
In Experiment configurator press **New.**



Edit the name (use one of the names listed below) **and** drag the ICAP icon to the configuration, then the Autosampler icon, then the manual icon into the configuration just created.

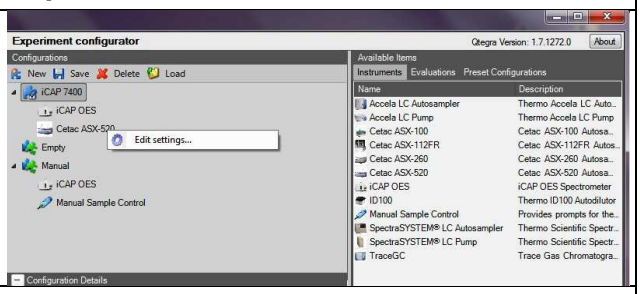
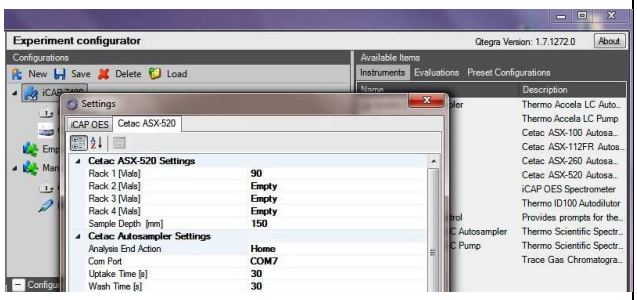
Save the configuration.



Repeat the process for each different configuration.

	iCAP 7000 ☐ iCAP 7000 ASX520 ☐ iCAP 7000 ASX260 ☐ Empty (Contains nothing) When selected you can run iTEVA on the same PC. This is essential for future Service and diagnostic capabilities ☐

6.3 Setting Com Port for autosampler

Right click on autosampler and “edit settings” will open.	
For each configuration edit the Autosampler Settings. Change Com Port to the one used for the autosampler. (For the iCAP7600 use the settings selected in the Sprint Valve Serial Port autodetect). Select the rack type (usually 60) and Analysis End Action (usually Rinse) Set the default settings for the autosampler uptake – 30 seconds, wash time and the rack configuration) Press **OK**, then **Save**	
Close down the configurator	
Note - Turn the computer off and on at this point	
	Autosampler Com Port set ☐

7 Sample Introduction System

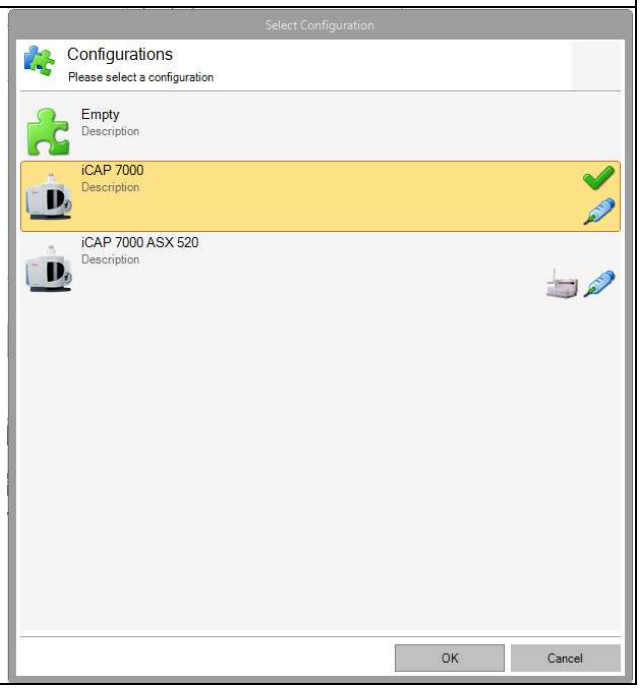
Assemble the torch, torch holder, spray chamber and tubing as detailed in the customer manuals. Clean the spray chamber in a 10% v/v Decon solution (or a suitable laboratory surfactant) for 30 minutes (remove the o-rings and replace them after rinsing the spray chamber).

	Sample introduction set up ☐

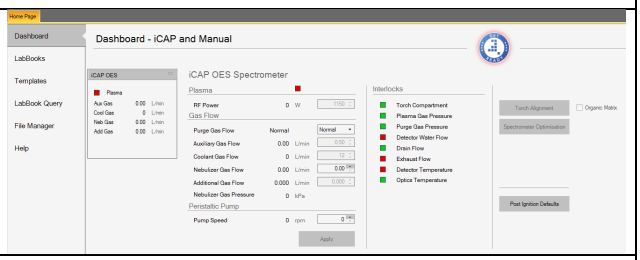
8 Lighting the Plasma

Connect the PC to the iCAP with the network cable Use the shortcut on the desktop to Load Qtegra	

Note:- Failure to communicate at this stage indicates one of the following problems:
The network card not set to 90.0.0.1, 255.255.255.0
The network cable not plugged in correctly.
The iCAP Spectrometer does not have the correct iTEVA 9.9 instrument firmware loaded.
The software was installed with the firewall turned ON (Turn off the Firewalls and reinstall Qtegra)

Click on Dashboard to open configuration choice.	
Select “iCAP 7000” Configuration	

This window will appear.



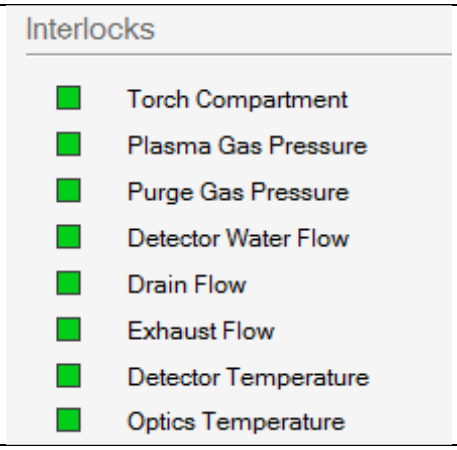
8.1 Water chiller settings

- Insure purge has been on for <u>at least 30 minutes</u>
- Switch on chiller and set temperature to 5°C below the ambient temperature, but not above 25°C.
- The water flow rate should be between 5 to 6 l/min when the solenoid valve is open (plasma on) or open using Manufacturing S/W. (This will typically equate to 30 – 60psi at the chiller but does vary with make). With the valve shut the flow should be at least 2.5 l/min.
- Use a water flow meter to help check this figure – a digital meter is available to engineers from Cambridge, part no.8423 155 50661. Alternatively the iCAP water flow sensor pulses can be measured and should be above 55Hz for the open valve and 25Hz for the closed valve.

Note: If the pressure shows about 20psi at this stage, the water connections may be connected the wrong way round.

8.2 Check Interlocks

Check the interlocks are all green and take appropriate action if any are RED (detailed in the iCAP Diagnostic Manual or at the end of the Installation Procedure).
Note – to reset the Drain Flow sensor change the pump and nebulizer flow to force a hardware response.



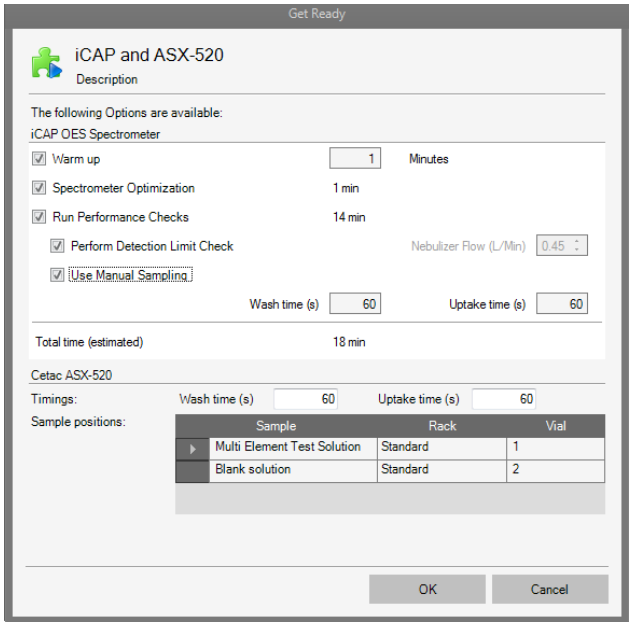
All interlocks green ☐

Using the **Dashboard Page**, click on the "red ringed" Get ready icon.

Set the options as shown:

- ☐ Warm up time normally set to 15 minutes. This enables the system to warm up prior to spectrometer optimization.
- ☐ Spectrometer optimization should be turned on. This is used to make a minor adjustment to the spectrometer optics.
- ☐ Make sure Run Performance Check is unselected.

  This will run the factory recommended performance test, using defined sample introduction glassware, tubing and Standards. (On installation Torch Alignment and Autopeak must be completed).
- ☐ Use Manual Sampling. When using an autosampler this will enable manual sampling to be performed.



Turn off the Engineers Fast purge at the back of the right of the instrument.

Clicking OK will turn the plasma on and a spectrometer optimization will be performed. During these procedures the remaining warm-up time is shown in the **Dashboard** page.

▲**Note:** To allow the plasma to stabilize leave the plasma on with a blank solution running for about 10 minutes before carrying out an analysis.

Qtegra with Red outer ring indicates the plasma is off/in standby	
Qtegra with Yellow outer ring indicates software is busy	
Qtegra with Green outer ring means plasma is on	
To turn off plasma click on Get Ready. Icon.	
	Spectrometer Optimisation Completed ☐

9 Installation Checks

9.1 Alignment check

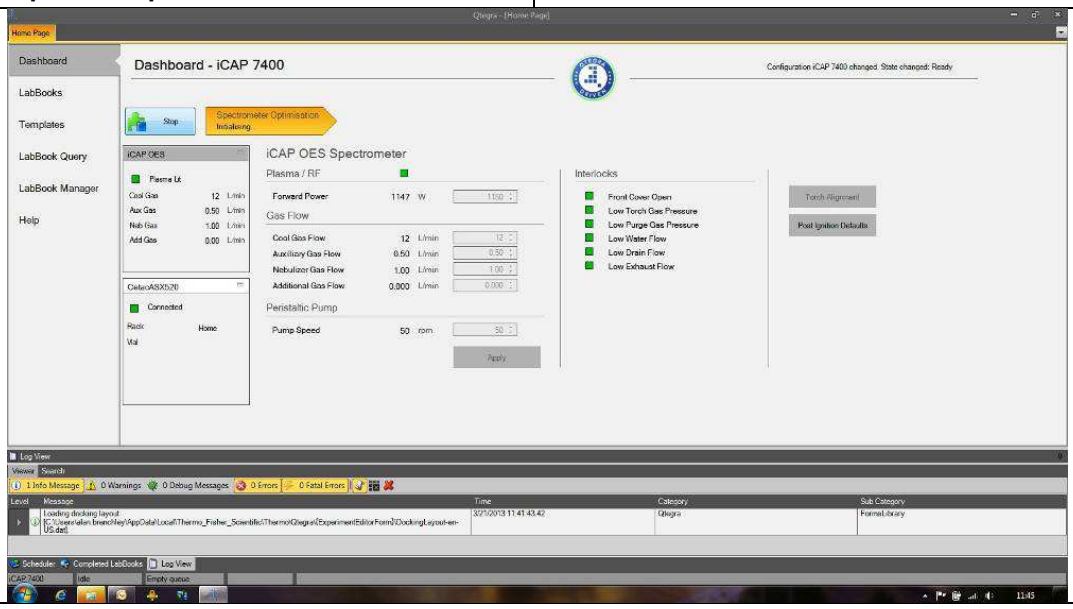
Turn off the Engineers Fast Purge at the back right of the instrument.

The analysis of elements by ICP-OES will only give good results if care is taken to avoid cross contamination. For example ensure the sampling probe is rinsed with good quality clean water between solutions.

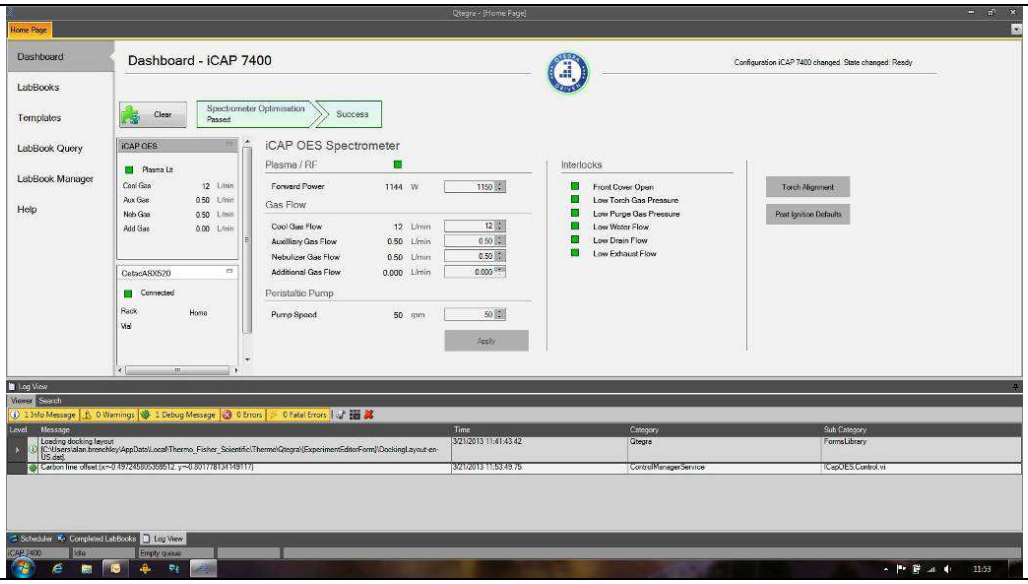
To ensure that the optics have not moved in transit it is necessary to check the optical alignment.

Complete a Spectrometer Optimisation (accessed from the get ready ignition screen) and check the debug wavelength positions.

Run **Optimise Spectrometer**:



The Text will indicate when the check is complete:

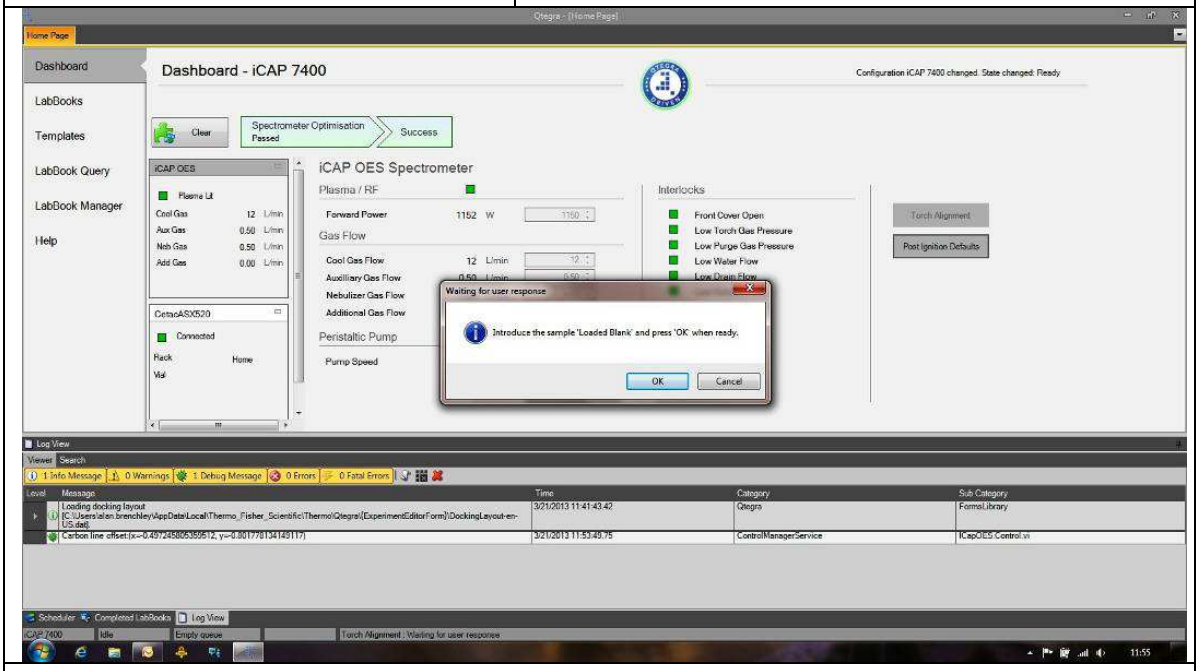


Check results in log view and if this is **less than ± 3** in both x and y then continue to the Performance Checks.

If the check shows more than ± 3, or the Optimise Spectrometer fails refer to the diagnostics manual for optical alignment instructions.	
If the carbon line offset is not visible then logging is turned off (set in the configurator screen).	
	Alignment Check OK ☐

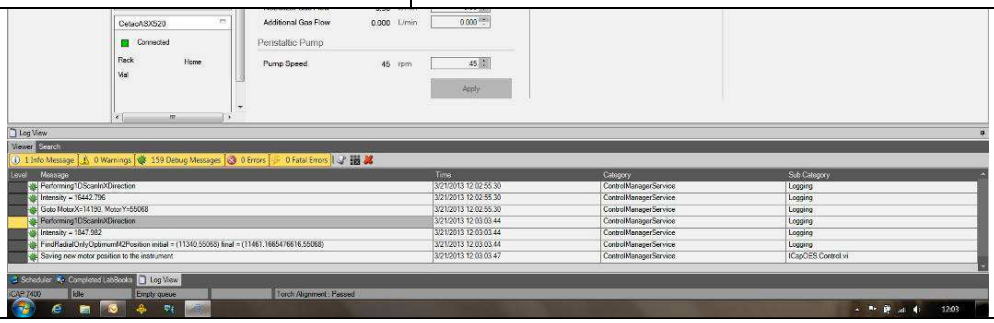
10 Performance Checks

10.1 Torch Alignment



Before running performance checks a **torch alignment** must be completed using the iCAP 7000 Set-Up Solution (Loaded Blank - 2ppm Zn, 0.01% Methanol).

Note: The iCAP test solutions are included with a new instrument and in the optional Installation and Maintenance Kit.



NOTE: Torch alignment should be completed for any new torch or when the torch position is disturbed.

Torch alignment complete ☐

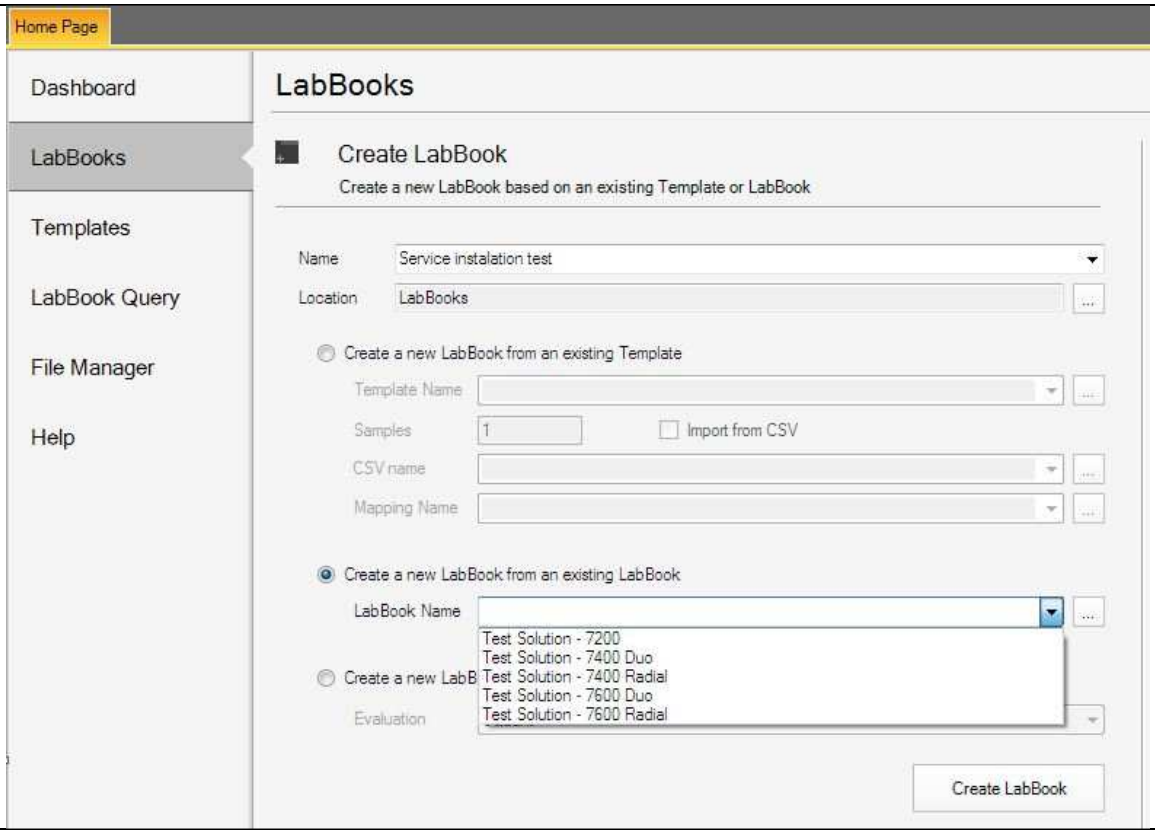
10.2 Setting up Analyses

Note: An iCAP 7600 performance test must be completed with the valve deselected (effectively the same as an iCAP 7400) The valve is tested separately.

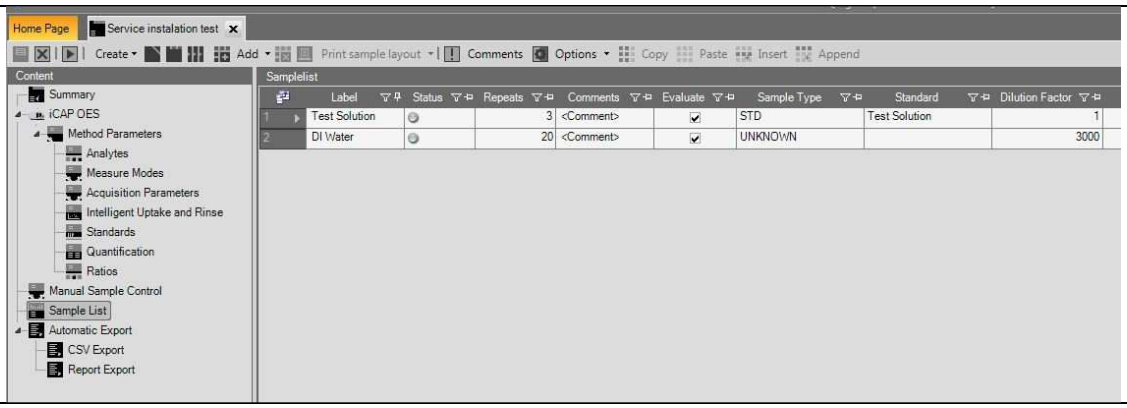
Click on the **Qtegra** short cut to open the program.

On the **Homepage page**, select **LabBooks**.

Name a new **LabBook** “Service Installation Test”.

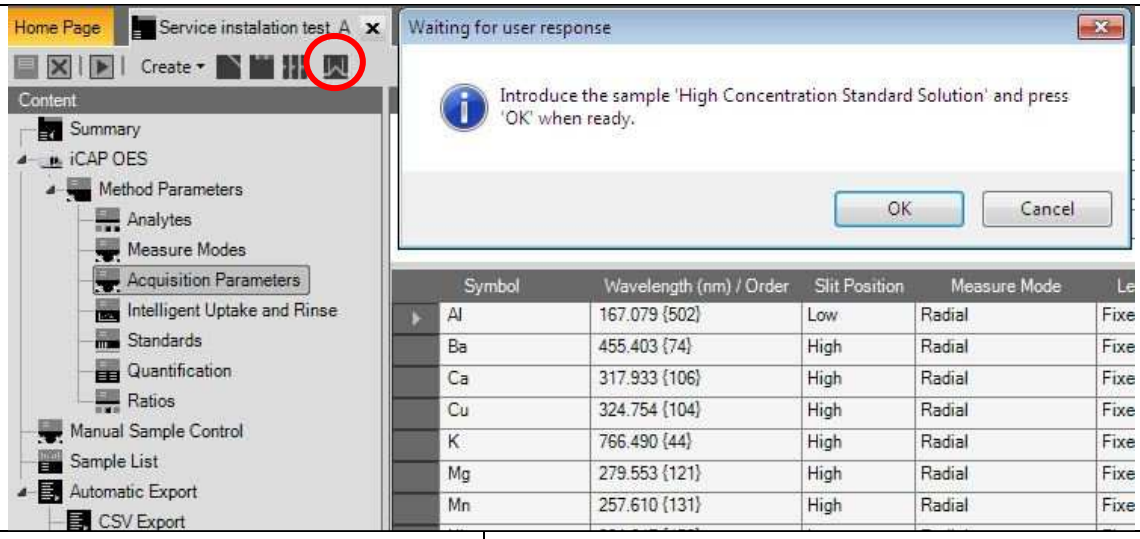


Create a manual installation test LabBook by:	
Use the pull down menu to select the correct LabBook for the instrument being installed.	
Press ‘Create LabBook’	
	LabBook Created ☐
Note:- LabBooks can be created from blank **Template**, existing **Templates**, imported **Templates of appropriate configuration,** or from existing **LabBooks**.	
Note - The LabBooks loaded with Qtegra have parameters to manually run the service performance tests. The performance test supplied with Qtegra should not be used at this time.	
Note - Unlike iTEVA a blank does not need to be analysed to calculate detection limits.	



10.3 Auto Peak

Go to the LabBook Acquisition Parameters section, run an auto peak using the iCAP 7000 Test Solution (High Concentration Standard Solution containing: 10ppm P, 5ppm K, Ni; 1ppm Al, Mn, Cu and 0.2 ppm Zn, Mg, Ca, Ba, 0.2% HNO3).
Press the icon and follow the instructions as shown below:



Autopeak Complete ☐

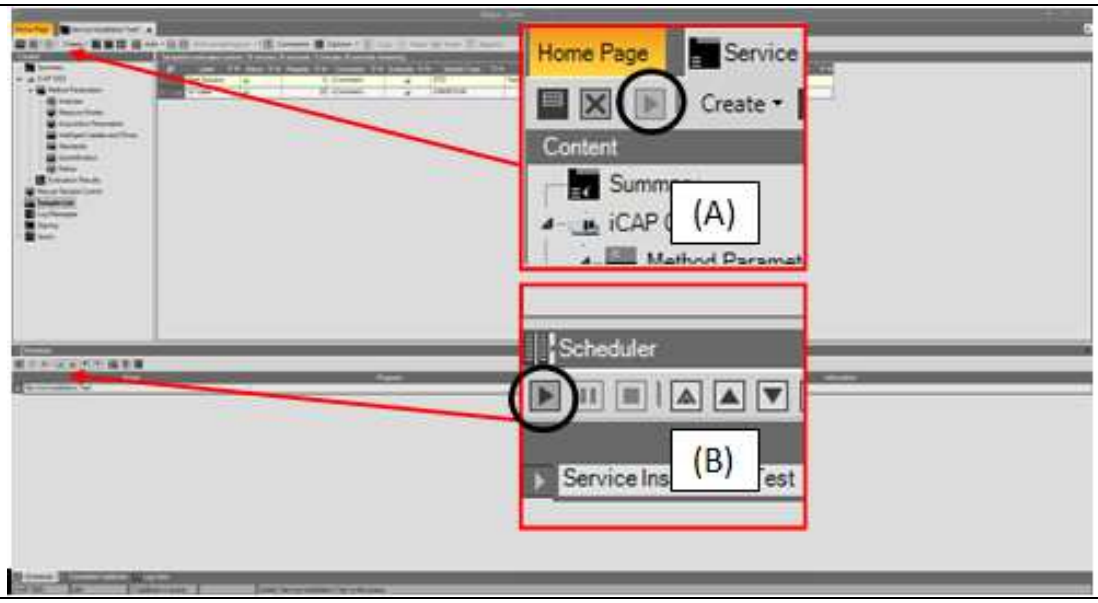
<u>Make sure the purge is good before running the performance check</u>
Do this by checking that orders are visible below the nitrogen lines in a UV full frame image

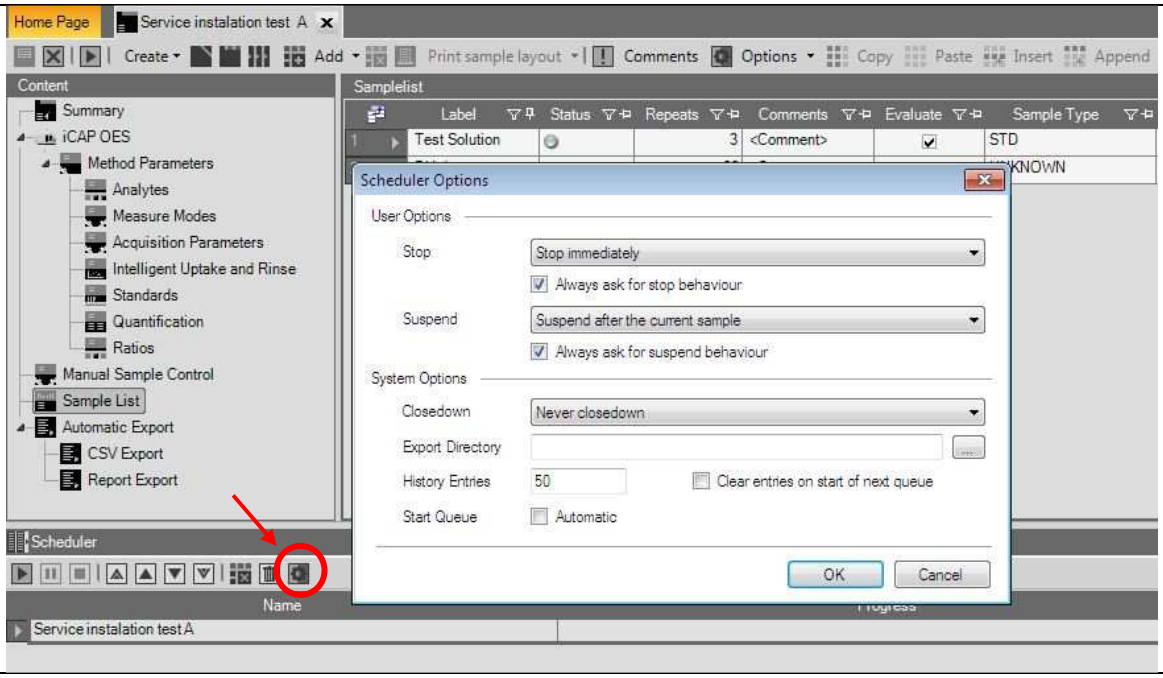
10.4 Running the Analysis

Click **Run** on the toolbar of the LabBook to schedule the LabBook (A in the picture below)

Add the LabBook to the Scheduler by clicking on **Run** (B in the picture below)

Note:- If the check box Automatic has been selected for Start Queue in the options settings of the scheduler the measurement is started immediately.





The LabBook sample sequence run will wait in the queue until the Scheduler "Run" button is clicked (unless the "Automatic" Start Queue has been selected in Scheduler Options).

10.5 Performance Test Limits

Note:- To achieve optimum signals the nebuliser, gas settings, nebuliser position and torch parameters should be optimised and the spray chamber cleaned (use 10% Decon 90 or equivalent solution).

10.5.1 Method parameters for performance testing

Nebuliser flow (Duo)	0.45 l/m /0.15 MPa
Nebuliser flow (Radial)	0.55 l/m /0.25 MPa
Purge	Normal (not set for iCAP 7200)
Centre tube for Radial instruments	1.5 mm
Centre tube for Duo instruments	2.0 mm

10.5.2 Sensitivity Counts Test – Example Counts

Axial view for Duo Instrument				Radial view for Radial only instrument		
Counts/S	7200	7400	7600	7400	7600	Result
Al1670	Not measured	2800	2800	196	196	
Ba4554	114500	114500	114500	17220	17220	
Ca3179	5350	5350	5350	610	610	
Cu3247	27540	27540	27540	4075	4075	
K_7664	412300	412300	412300	4310	4310	
Mn2576	114400	114400	114400	17420	17420	
Ni2216	45230	45230	45230	5420	5420	
P_1774	4913	5780	5780	810	810	
Zn2138	4300	4300	4300	600	600	

Notes: Radial counts on a Duo system are not specifically measured, but the Zn (213.8) line should have greater than 150 counts.

Data should be close to, or higher than those in the table below, to enable achievement of acceptable detection limits.

If counts are not above those in the table then detection limits should be used for the pass fail criteria.

Some elements in the High Concentration Standard Solution are not measured in the performance testing of the instrument.

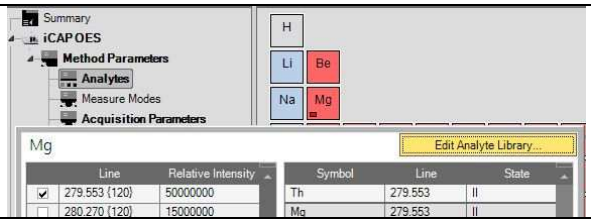
If the sensitivity test fails for Zn then the 'Service Installation Test' LabBook could have the incorrect orders selected for the instrument being tested. Select the alternative orders by first creating a new LabBook from the 'Service Installation Test' LabBook.

Sensitivity Check Completed ☐

10.5.2.1 Change the Wavelength Order

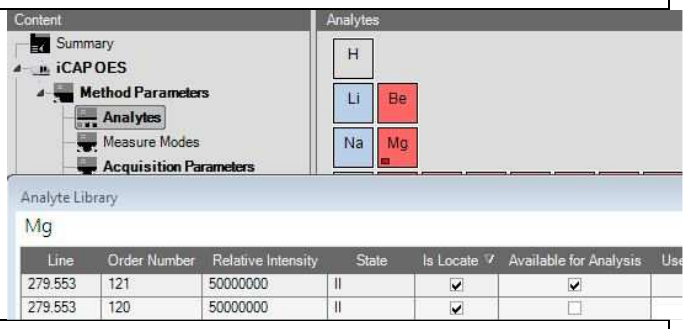
To do this for a Zn line where the sensitivity is low

Right Hand click on Zn then select edit line library



Deselect the old order "Available for Analysis" and "Use as Default"

Select the other order for the same wavelength "Available for Analysis" and "Use as Default"



Repeat Autopeak to ensure the lines are optically aligned.

10.5.2.2 Additional checks if the sensitivity is low

Note:- Boost purge is not used for testing the iCAP 7000 so Al and P have limits set for normal purge. The detection limits and counts for all elements are specified for normal purge.

For Al ensure that the purge is OK

Check that the plasma image is positioned correctly on the slit

Check the nebuliser pressure is optimised.

Change pump tubing	
Check the nebuliser position	
Make sure there is no collecting of droplets in the glassware	
Check the torch 'O' rings are fitted correctly	
Check the elbow and nebuliser are fitted correctly	
Try a new nebuliser	

10.6 Detection limit checks

Ignite the plasma and wait for 20 minutes	
Using the 'Service installation test' LabBook analyse the iCAP Test Solution (Loaded Blank). Allow a stabilization time of one minute. Any contamination will increase the possibility of test failure, so take care to avoid cross contamination or dust.	

10.6.1 Detection Limit Test

The LabBook 'Service installation test' has factors that enable the Std DEV calculation to display the analysis detection limit in units of ppb (µg/l). The dilution factor should be set to 3000.

Axial view for Duo Instrument				Radial view for Radial only instrument		
ppb	7200	7400	7600	7400	7600	Result
Al1670	Not measured	0.68	0.5	5.3	4.4	
Ba4554	0.3	0.3	0.2	0.5	0.4	
Ca3179	1.5	1.5	1.1	6	4	
Cu3247	1.7	1.7	1.2	4.2	2.9	
K_7664	2.9	2.9	2	122	78	
Mn2576	0.3	0.3	0.2	0.71	0.4	
Ni2216	1.1	1.1	0.78	4	2.6	
P_1774	8	6.6	4	20.4	13.1	

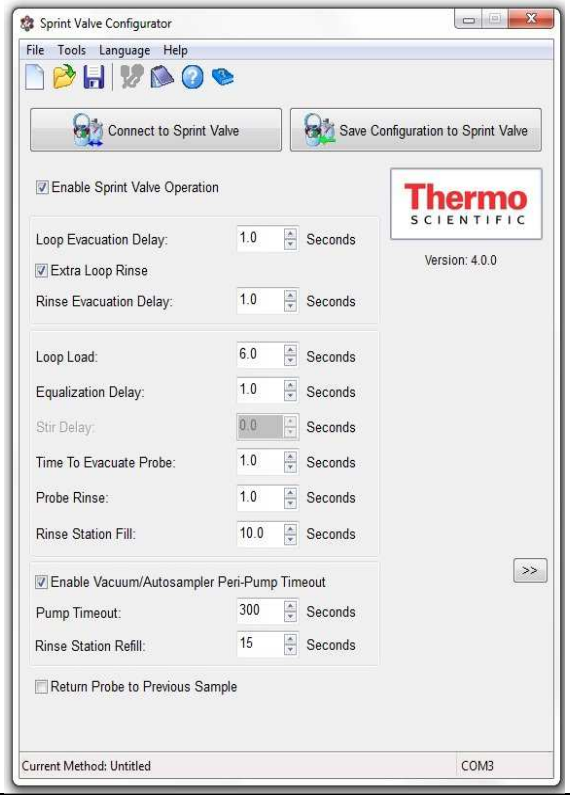
Compare the data to the table, (a pass is where the numerical value of the Std DEV is lower than the table value).

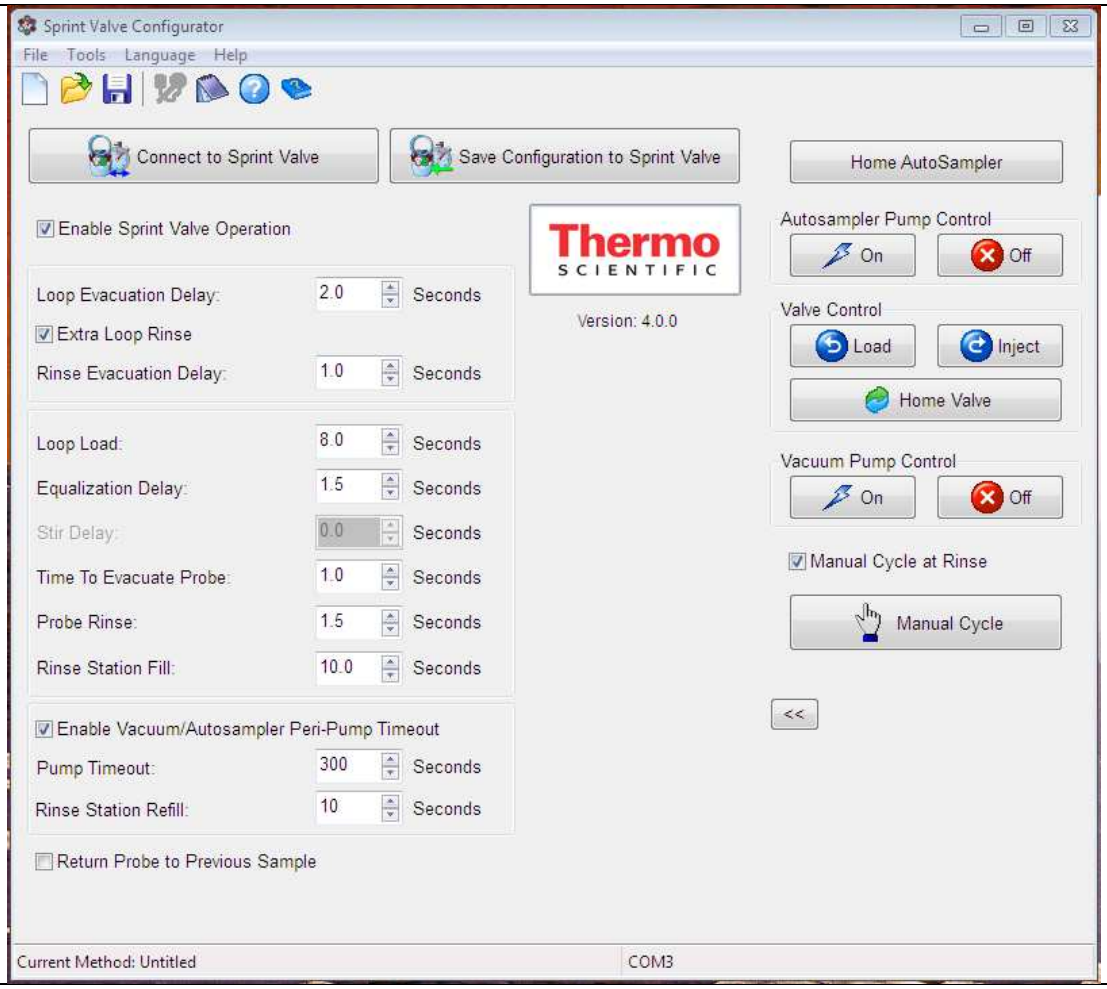
Performance test completed ☐

11 iCAP 7600 Sprint Valve Test

11.1 Sprint Valve Parameters

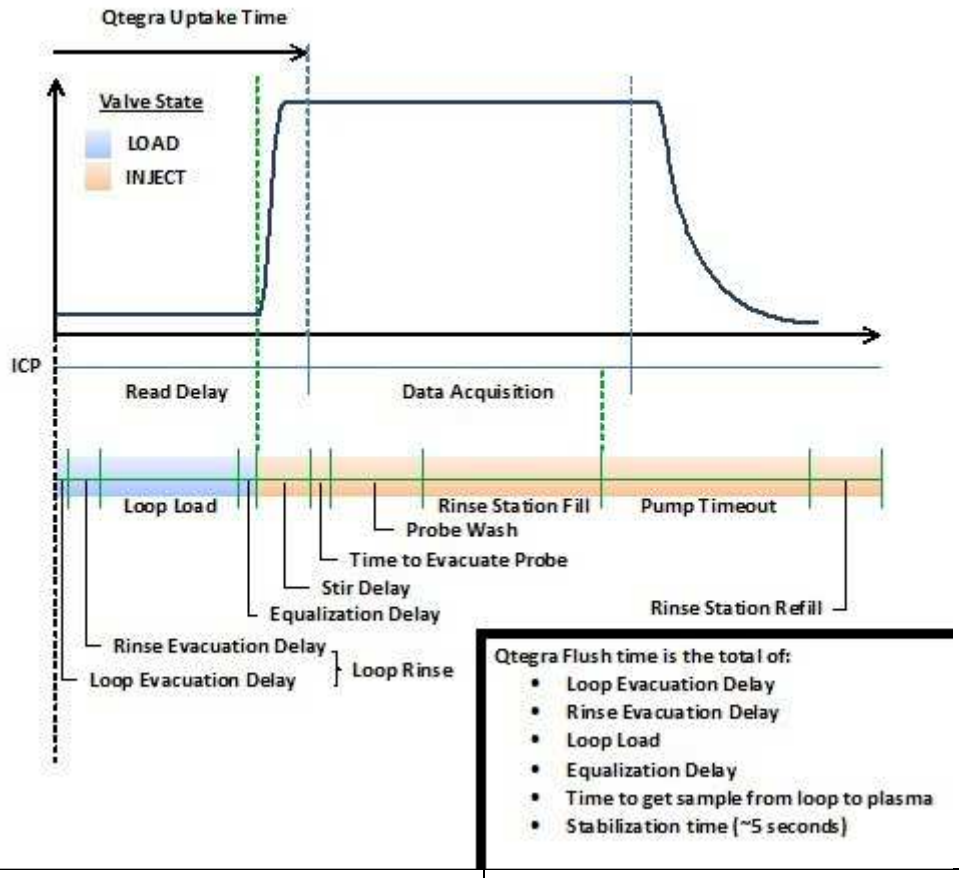
For non iCAP 7600 systems skip this section and move to the next section.

Open the Sprint Valve Configurator software from the desktop icon.	
Click the “**connect to sprint valve**” button	
Set the following parameters:	
Use a 4ml sampling loop	
Loop Evacuation Delay = **2.0**	
Loop Load = **8.0**	
Equalization Delay = **1.5**	
Probe Rinse = **1.5**	
Rinse Station Refill = **10**	
Set the autosampler uptake time = 20 (To allow the valve to fill and the sample to reach the plasma, this is set in Qtegra)	
Press “**save configuration to sprint valve**”	
If most of the options are grayed out click “Connect to Sprint Valve”.	
Expand the window using the arrow button on the right side of the window to open manual controls.	



The software should look like the image above.

Verify both Sample and Rinse probes are in air, toggle **Load** and Inject, turn On and Off the Vacuum Pump. Correct operation indicates the valve is working.
The parameters above and the autosampler operation will be fully tested during the Customer Familarisation.



	Sprint Valve Test complete ☐

12 Configuring the autosampler for non iCAP 7600 Systems

Connect the autosampler to the PC Serial port, check autosampler pump can be activated and the autosampler arm moved.

13 Customer Training	
Follow the procedure using the material detailed in the Customer Familiarisation Manual.	

14 Customer Acceptance

System: *Customer generated number for the complete system*		
serial number		
Chiller type and serial number		
PC type and serial number		

Tester Signature	**Tester Initials:**
	Date: (Check customer format)
Print Name	
Witness Signature (sign only if this page is completed)	
	Date:
Print Name	