USER MANUAL

INTERRLINER V8 USER MANUAL

Version 1.38 MRN-121-EN

Master Registration Number: MRN-121-EN

Manufacturer:	Mechatronics Manufacturing B.V.
Phone:	+31 (0)229 - 29 11 29
Fax:	+31 (0)229 - 24 15 34
E-mail:	support@mechatronics.nl
Internet:	http://www.mechatronics.nl
Postal address:	P.O. Box 225 1620 AE Hoorn The Netherlands
Office address:	De Corantijn 13 1689 AN Zwaag The Netherlands

Issued by the After Sales Department of Mechatronics

Document history overview

MRN-121-EN

Published date 16 October 2014

Issue No	Date	Revised Section(s)	Changes	Authorised
1.38	October 2014	Introduction Safety Technical specifications History screen Service screen Data management Appendix	• General safety instructions • Explanation of documentation • Weight specifications added • Fill and clean instructions modified • Read rack number • Result path • TCP/IP • Protocol R-3500 EPU added • Error list revised, E21, E29, E32 added	H. Schavemaker
1.37	August 2014	Service screen	• Temporary release	H. Schavemaker
1.36	November 2013	History screen Quality control Trouble shooting	• Introduction of chapter Quality Control	H. Schavemaker
1.35	February 2013	History screen Maintenance screen Maintenance Error list	• Addition print result header • Hazy aspect not suppressed in case of limit error • Prime/Clean text • Maintenance items up to level 4 included • Reagent installation • Error 19 added	H. Schavemaker

1.34	July 2012	Reagents screen Limit error settings screen Reporting Operation Trouble shooting Keyboard InteRRliner	• Reagent barcode reader • Limit error settings • Air bubble trouble shooting • Add XO settings	H. Schavemaker
1.33	January 2012		• Annual update and publication	H.E. van Dijk
1.32	June 2011	Turn off Start up first time	• It is not a problem if the InteRRliner V8 is on all the time. However,....> • Check limit settings • Add appendix default settings • Changed picture of Settings screen	H.E. van Dijk
1.31	February 2011	Main screen History screen	• Explain Rack pictogram	H.E. van Dijk
1.30	July 2010	Appendix Settings	• Add new the new MECHATRONICS 01 and 02 string Language selection • Make a new Settings screen for limit error	H.E. van Dijk
1.20	January 2010	Appendix	• New error list	H.E. van Dijk
1.10	June 2009	Compact InteRRliner V8 program	• Update screens to apply for this software update 3.13	H.E. van Dijk
1.00	December 2008	All sections	• Make corrections and add the latest pictures Update the sections according the latest version of the Graphic User Interface Combine the InteRRliner user manual in this manual	H.E. van Dijk
Preliminary	December 2007	All sections	• Start of he manual	H.E. van Dijk

CONTENTS

1. INTRODUCTION

The **StaRRsed Blood Sedimentation Rate Instrument** (hereafter called InteRRliner V8) is an in vitro diagnostic medical device that automatically carries out the erythrocyte sedimentation rate analysis according to the **Westergren** method, conforming to CLSI approved standard H02-A5, using closed sample tubes filled with citrate or EDTA blood.

The InteRRliner V8 is an advanced ESR system that offers many unique features and benefits over the traditional ESR procedures. Automating this method has the following advantages:

- The Westergren pipettes are always filled to the correct level.
- Using closed sample tubes reduces the possibility of contamination for the user and environment.
- Standard glass Westergren pipettes are used, in which the measurement can be corrected to a constant temperature (18 C° Celsius). Even small ab normalities can be detected over a longer period of time, irrespective of where and when the blood sample was taken.
- Every sedimentation measurement is directly linked to an identified sample, so that a manual work sheet is unnecessary. Patient ID errors are reduced to a minimum by using the bar-code reader.
- In the EDTA mode, the accuracy of dilution of EDTA blood with citrate is considerably better than manual dilution achieved either by "tipping off" or using evacuated blood collection tubes pre-filled with citrate solution.
- The data can be send to your Lab Information System.
- The used sedimentation pipettes are automatically washed and dried.
- Minimum sample volume is 1.4 ml for the InteRRliner V8.
- The InteRRliner V8 integrates with the Sysmex HST - XN line.

The InteRRliner can be delivered in several configurations. All configurations use the Sysmex sample racks;

- **InteRRliner SA / EL I V8** (Standalone single system).
- **InteRRliner SA / EL II-III V8** (Standalone multiple system), more than one analyser is fitted.
- **InteRRliner HST / EL I V8** (Sysmex HST - XN single system), the InteRRliner is connected to the Sysmex HST - XN line.
- **InteRRliner HST / EL II-III V8** (Sysmex HST - XN multiple system), more than one analyser is fitted and the InteRRliner is connected to the Sysmex HST - XN line.

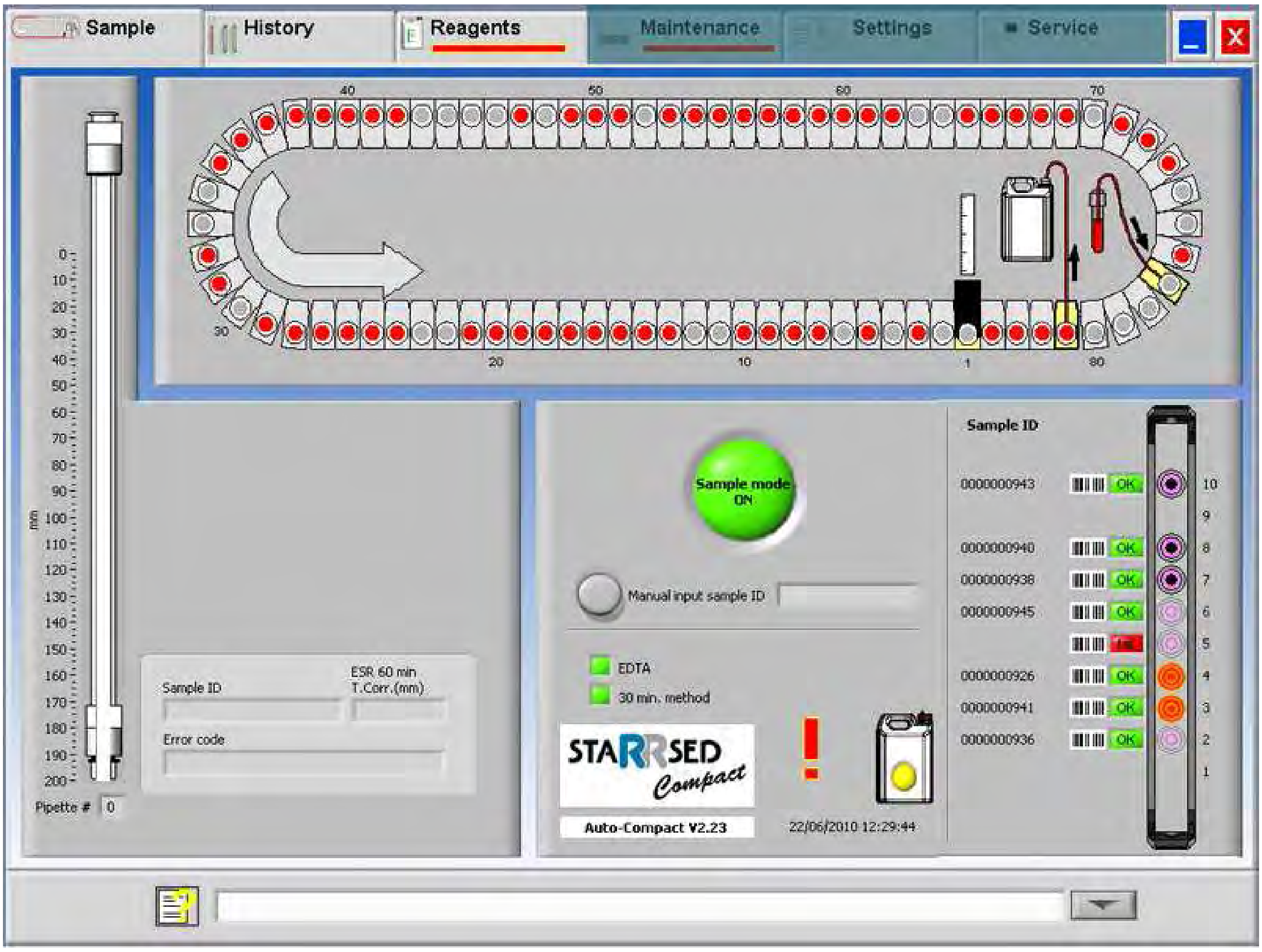
The advanced software allows the InteRRliner V8 to communicate with the Sysmex Lab Comm host computer systems.

1.1. PC Operation and User Interface

The entire operation of the InteRRliner V8 is driven by a personal computer with Windows operating system. The user interface is intuitive and can be activated via the keyboard or the optional touch screen. All the data from each sample, including the raw measuring data and a pictorial representation of the pipette, is stored and may be retrieved later if needed.

The Main screen shows which pipettes are in use. The section in the middle of the layout gives the sample number and status for each pipette including "time to go" before the result is due;

A pictorial representation of the pipette at the measuring position and a graph of the optical density over the length of the entire pipette is shown on the side. This data is retained in memory for subsequent retrieval if required.



1.2. Dilution principle

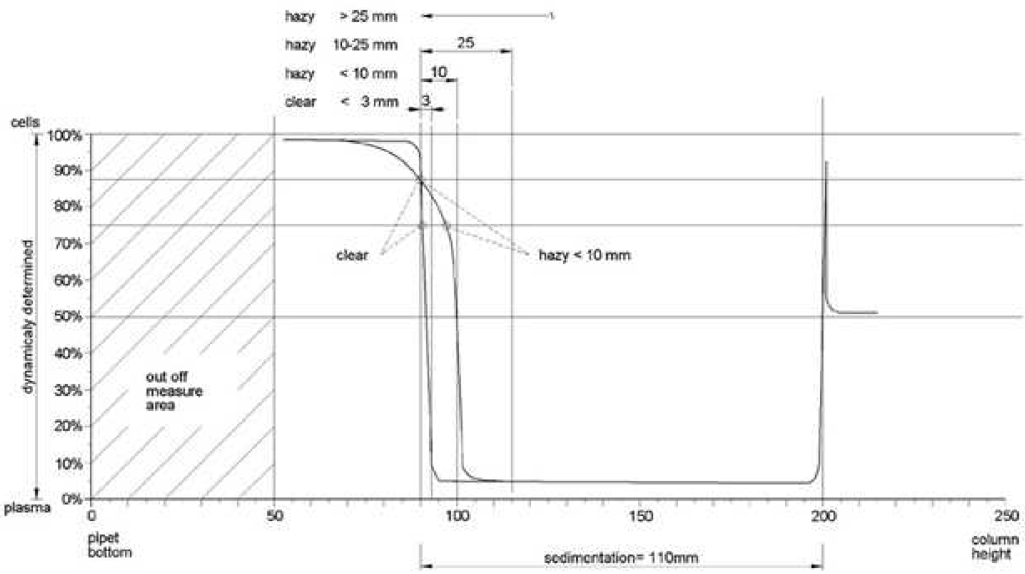
The principle of adding Diluent to a flow of whole blood is unique. The InteRRliner V8 has the capability of monitoring the air displacement during the aspiration cycle. This is called on-line dilution. The CPU receives data from the airflow sensor and calculates the syringe speed. Diluter accuracy is ± 3%.

1.3. Sedimentation measurement principle

The automatic reading of the Westergren sedimentation pipettes is carried out by moving an optical sensor along the pipettes. While the sensor is moving, a reading is made every 0.25 mm. The sensor is reading the absorption of infra red light through the Westergren pipette filled with blood. From these readings, values at a number of absorption levels are determined. All absorption figures are relative to the darkest and lightest reading (darkest = 100 % and the lightest = 0 % absorption respectively).

By definition the levels are:

87.5%	Cells/ plasma separation
75.0%	Hazy detection
50.0%	Meniscus detection



Graphic showing typical absorption values of a sample

1.4. Explanation of available documentation

Manuals for the InteRRliner V8 are available on three levels: for the operator, the supervisor and the service engineer.

The following manuals are available:

1. Instructions for Use (IFU)
   Intended for the operator: Contains instructions for normal operation, safety, preventive maintenance and trouble shooting procedures to solve the most common problems. Available in several languages.
2. User Manual (UM)
   Intended for the lab supervisor. Contains information from the IFU and additional information concerning settings, service, higher maintenance levels and trouble shooting procedures to solve more complicated problems. Only available in English.
3. Service Manual (SM)
   Intended for trained service engineers. Describes maintenance, servicing and repair of the instrument in detail. Contains detailed descriptions of parts, assembly drawings, modifications, extended trouble shooting, flow diagrams etc. Only available in English.
4. Installation Manual (IM)
   Intended for trained service engineers. Contains instructions and procedures for installation and start-up. Only available in English.

Manuals are available in PDF and HTML-format and can be downloaded from http://www.rrmechatronics.com.

2. INSTRUMENT DESCRIPTION

The InteRRliner consists of the following main modules:

Entry-pool

- Loading of racks through belt-driven transport system
- Capability of holding 21 Sysmex racks
- Printer stand (to hold optional printer)

Note: If the InteRRliner is used as part of the Sysmex HST - XN, the Entry-pool is connected to the Sysmex SKY unit, which is the output pool of the HST system. HST processed samples are automatically transferred to the InteRRliner Entry-pool.

Tube handling and transport

- Indexer unit, initialising racks and reading the barcode of the sample tubes.
- Sample robot unit, mixing the sample tubes and placing successively each sample tube on the StaRRsed Compact for aspiration.
- Conveyor belt, running from the Entry pool to the Exit pool to transport the racks.
- Protection hood.

StaRRsed Compact analyzer

- ESR measuring instrument with a belt holding 84 precision's bore glass Westergren pipettes.
- Automated aspiration of the sample tube.
- Automated dilution of EDTA blood sample with citrate.
- Automated measurement of ESR after 30 or 60 minutes.
- Automated cleaning and drying of pipettes.

End-pool

- Capability of holding 21 Sysmex racks
- Manually off loaded
  or
- Off-loaded automatically (if the InteRRliner V8 is used as part of the Sysmex XN system)

Reagents cabinet

- Swing door for easy access
- Capable of storage of all needed reagents

PC with touch screen LCD monitor

- Windows based platform
- Dedicated instrument software
- Optional network connections
- USB port

Option:

External bar code reader, which can be connected on the USB port of the Compact Analyzer. This bar code reader can be used for reagent handling and for ID-input in sample history search.

2.1. Technical specifications

Technical specifications for the InteRRliner V8:

StaRRsed InteRRliner V8 instrument models:

Model	Model name	Catalogue number
	StaRRsed InteRRliner V8 XN/XO **StaRRsed InteRRliner V8 XN**	**EHST109421/422/423** **EHST109321/322/323**

ESR method:

ESR method	Westergren method
Temperature compensation method	R.W. Manley: J. clin Path (1957), 10, 354
30 minute method	R. Rogers: Medical Laboratory World 1994
Allowed blood specimen types	• For EDTA mode: Whole blood with < 1% EDTA anticoagulant. • For Citrate mode: Whole blood (4 vols.) with sodium citrate anticoagulant-diluent (1 vol.)
Automatic dilution	4 vols. blood + 1 vol. sodium citrate diluent (3.2% NaCl); accuracy ±3%
Reported result	mm after 1 hour

Reagents:

Reagents used	QRR 010931 Diluent QRR 010947 Disinfectant QRR 010933 Saline QRR 010934 Rinse solution De-ionized water
Reagent barcode label information	Code39

Blood volume:

Aspirated blood volume per sample	1.4 ml in EDTA mode 1.6 ml in Citrate mode

Rack and tube types:

Rack type	Sysmex sample rack (low profile)
Sample tube types	Most commonly used brands/types. Closed tubes with concentric cap only.

Barcode reader:

Barcode reader type	CCD.
Reading capabilities	Most common barcode labels
	Code39, ITF, Industrial 2 or 5, CodaBar,
	EAN/UPC and CODE128.

StaRRsed Compact:

Mains voltage	100/240V	50-60Hz
Fuse (20 x 5 mm)	Slow blow 220V	2.5 Amp
	Slow blow 110V	5.0 Amp
Power consumption	Standby	60 VA
	Maximum	500 VA
Heat output	Standby	70 Watt
	Full operation	360 Watt

StaRRsed Compact environment:

Sound level	Less than 65 dBA
Environment temperature	18 - 28 ℃
Relative humidity	10-90%

InteRRliner overall dimensions:

Dimensions	InteRRliner configuration		
	single	double	triple
Width	1800 mm	2900	4000
Height	1530 mm	1530	1530
Depth	1010 mm	1010	1010

Weight	
Compact unit	45 kg
Input pool	65 kg
Output pool	65 kg
Conveyer/robot unit	140 kg
Back panels	18 kg (single) 22 kg (double) 26 kg (triple)

InteRRliner sample throughput:

Throughput [ESR/hr] (100% occupation)	InteRRliner configuration		
	single	double	triple
30 minute method	140	240	375
60 minute method	75	140	215

Data storage:

Storage medium	30 Gb Hard disk on external PC
Storage capacity indication	approx. 5 Mb per 1000 samples (results and raw data)

2.2. Accessories kit

The InteRRliner V8 comes with an accessories kit. For a complete list of the the contents of accessories kit, see ***Appendix - Article reference list Compact InteRRliner*** (on page 223)

2.3. Sample unit and End-pool

The analyser section is located in the center part of the InteRRliner, and holds the following three units:

1. Conveyor belt, running from the In-pool to the End-Pool.
2. Indexer unit initialize racks and reads the barcode of the present sample tubes.
3. Sample robot unit, mixes the sample tubes and places one sample tube in the sample tube adapter of the ESR analyser.

2.3.1. Conveyor belt section

The main conveyor belt runs the sample racks from the In-pool to the End-Pool.
On the analyser unit rack pushers shifts the racks in and out of the Indexer unit.

On multiple systems, racks can pass other Indexer units while it is running, in order to be processed by another Compact unit.

NOTE:
Do not remove or add racks to the conveyor belt while the system is in operation!
Removing racks from positions other then the end pool's storage area will cause errors.
The conveyor belt is an open system; beware that no objects can drop on the conveyor belt.

2.3.2. End-pool section

XO: The End-pool transports the racks to an external device.

XN : The End-pool collects all processed racks. Racks are pushed to the rear of the pool. If no more racks can be placed, an error is signalled in the form of beeps and a message shown on the display. Remove processed racks and reset the End-pool if necessary.

2.4. Indexer and Sample Robot

The Indexer receives the racks from the rack transport and initializes the sample unit.
After initialization of all the sample tubes the rack is being transferred to the sample robot and sample tubes are mixed at a minimum of eight inversions.

A rotating arm will place one tube in the ESR analysers tube adapter. Processed racks are being transferred back to conveyor belt.

Note: Adding, removing or changing the order of sample tubes while a rack has been transferred to the Indexer unit will result in unpredictable errors.

2.4.1. Indexer

** CAUTION MOVING PARTS **

The Indexer is a carriage that holds the rack and moves independently from the conveyor belt. The rack is being checked for the presence of sample tubes and the barcode is being read.

If the barcode can not be read right away, a spring assisted tube rotator is pushed onto the tubes and turns the sample tubes at the barcode reader position clock-wise and anti-clockwise until the barcode reader reads a positive patient ID.

If the barcode is not readable the InteRRliner will set the status for this tube to N (NO) and this tube will not be processed! In all other cases the InteRRliner will send an inquiry and wait for the host to receive a YES or NO status for sampling.
Tubes with the status NO will not be processed by the analyser.

Note:
In order to read the barcode ID correctly, ensure that labels are located correctly on the sample tubes and are firmly attached. The tube rotator turns in two directions, in case the label comes loose from the sample tube.

2.4.2. Sample robot

After reading the barcodes the sample rack moves towards the robotic arm, the arm moves forward and picks up at least one tube (if present: three tubes).
The tube(s) are turned up side down up nine times. The robot places the tube(s) back in the rack, the rack moves one position and the robotic arm picks up the next tubes.
The first tube is then placed in the sample tube adapter of the ESR analyser.

The analyser starts the aspirating procedure and in the meantime the robotic arm starts mixing the remaining tubes.

When the aspirating cycle is finished, the tubes are placed back into the rack and the sequence starts all over again.

As soon as the rack has been processed completely, it is moved to the conveyor belts shifting mechanism, released to the conveyor belt and transported to the End-Pool.

ATTENTION:
The quality of the barcode labels is of critical importance for the correct function of the sample robot. Labels may not come loose or have “dog-ears”! Poor label quality cannot be compensated by mechanical adjustments!

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3. GENERAL SAFETY INSTRUCTIONS

The instrument described in this manual is designed to be used by properly trained personnel only. For the correct and safe use of this instrument it is essential that both operating and servicing personnel follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

- Execute your work according to this manual. Read the instructions before operating the instrument. Observe all cautionary markings in the manual and on the instrument. Keep this manual for future reference.
- Follow the bio safety procedures when working with blood-contaminated parts.
- Be cautious to prevent stinging during cleaning or replacing the needle assembly.
- Repair can only be executed by trained and qualified personnel.
- Wear protective clothing.
- When the instrument is running it is not allowed to:
    - Open and remove safety covers.
    - Touch moving parts.
- It is not allowed to give access to the instrument to a non-authorised person at any time.
- Whenever it is likely that safety-protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation. The matter should then be referred to qualified technicians.
- Safety protection is likely to be impaired if, for example, the instrument fails to perform the intended measurements or shows visible damage or unusual smells, smoke, liquids are flowing out.

3.1. Safety warning

When there was an incident with the StaRRsed Auto-Compact which caused damage to the instrument, please notify your superior and your local equipment dealer before you continue using the instrument.

Example:

- A collision with a moving object or a person
- Something falling on the instrument
- Liquids spilling into the instrument

3.2. StaRRsed Incident Report

mechatronics — *StaRRsed Incident Report*

StaRRsed Incident Report

Environmental Health and Safety plan

Important - Complete this form within 24 hours of the incident and FAX to Mechatronics: +31 (0) 229 - 24 15 34					
Last Name:	First name:		Initial:	Company:	
Student – Visitor - Employee	Occupation at time of injury		Years exp. in this occupation		
Date of incident	20_ _-_ _-_ _	Time of day _ _-_ _	Date Reported	20_ _-_ _-_ _	Time of day _ _-_ _

Description of Incident State exactly the sequence of events leading to the incident; where it occurred; What the person was doing; the size, weight and type of equipment or materials involved; etc.	**Type of incident**	
	Incident involved results	☐
	Injury	☐
	First Aid Health Care [Medical Aid]	☐
	Other	☐

Names and addresses of witnesses:

Contributing Factors: What conditions contributed to the incident? Number the factors in order of importance.

Details of property damage if any:

Explanation of contributing factor[s]:

Corrective measures: Actions to prevent incident recurrence

Checkmark actions taken to prevent recurrence; More than one item may apply.

1 Reinstruct person involved	4 Improve personal protective equipment	7 Install guard or safety device	10 Inform all department supervision
2 Reassign person	5 Repair or replace equipment	8 Improve work procedure	11 Discipline persons involved
3 Order job safety analysis	6 Correct congested area	9 Check with manufacturer	1 2 Other (explain)

Describe actions taken to prevent recurrence:

Who is the attending physician?	
Occupational Health Services	
Organisation / Hospital	
Treatment of Injury	
Name of person reporting incident	Signature of person reporting incident

F8300 - StaRRsed Incident Report V 0.1 - August 2004

Issued by the Service Department of Mechatronics

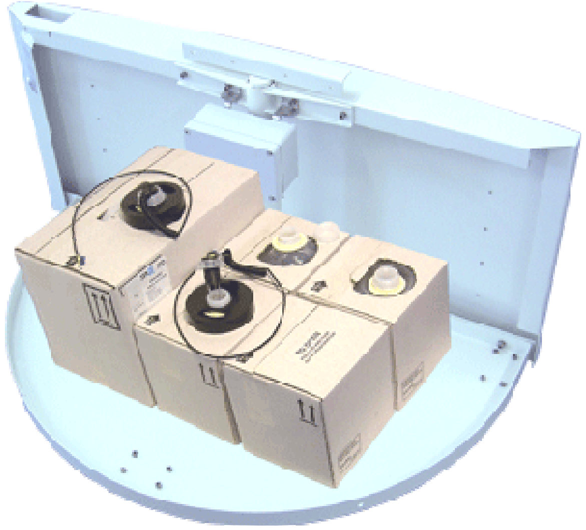
4. INSTALLATION

The installation of the InteRRliner is to be carried out by the supplier. Manual MRN-023 gives detailed information about the actual installation.

4.1. Reagents preparation

Use only the genuine Mechatronics bulk reagent containers on the InteRRliner.

1. Open the swing door and place the containers on the turntable.



2. Remove the container screw caps and pull the necks of the bottle packs out of the cardboard box.
3. Install the level sensors and spacers according the following pictures.
   Make sure to place the appropriate level sensors in the containers by matching the color codes on the tube and on the container:

The sensors and the reagents have the following numbers and color codes:

Reagent	Connector number	Color code
RINSE SOLUTION	Number 34	Green
SALINE	Number 35	Yellow
DILUENT	Number 36	Grey
DE-IONIZED WATER	Number 37	Blue
DISINFECTANT	Number 38	White

NOTE: Wrongly placed pickup tubes may cause incorrect results or instrument malfunction.

4.1.1. Rinse solution

Rinse solution is used for rinsing the Westergren pipettes; approximately 8 ml is used for each sample.
The Rinse container is a 20- liter container (QRR 010934).

4.1.2. Saline

Saline is used for cleaning the needle and fill-nozzle assembly, approximately 1 ml of saline is used for each sample.
The saline container is a 5-liter container (QRR 010933).

4.1.3. Diluent

Sodium citrate is used for the dilution of undiluted EDTA samples,

- Approximately 0.5 ml Diluent is used for each sample.
- Approximately 2.5 ml is used for one Prime cycle.

The diluent container is a 5-liter container (QRR 010931).

The solution should be discarded if it becomes turbid.
If the Diluent does become turbid, clean the Diluent container thoroughly with 10% Na-hypochlorite. Make sure that the container is thoroughly rinsed with de-ionized water after cleaning.

4.1.4. De-ionised water

The water container is a 5-liter container and must be filled up when empty.

De-ionised water is used for rinsing the fill-nozzle, approximately 0.5 ml.
The outside of the metal fill-nozzle tube is washed automatically after each aspiration.
Note: Add one or two drops of saline to the de-ionised water to avoid **<bottle empty alarm>**.

4.1.5. Disinfectant

The disinfectant is used to disinfect the waste system; approximately 0.5 ml disinfectant is used after each pipette rinse.
The disinfectant bottle is a 5-liter container (QRR 010947)

Note: Since January 2013 Disinfectant QRR 010932 is no longer be used and is replaced by QRR 010947. See Information bulletin IB 2013001.

4.1.6. Cleaning solution

The cleaning agent needs to be prepared for a cleaning procedure which is used in level 4 maintenance.

1. Fill a container with hot 80℃ de-ionised water
2. Add cleaning agent **(**QRR 010905**)** to the container.
3. Stir well. (Do not shake).

4.2. Waste container

The waste container will hold a maximum 2.5 liters of waste. The waste may be discharged into a drain or the container simply replaced by a new one.
As the Compact disinfects the waste, it may discharge into a drain/sink.

Disclaimer: Check your local environment rules about discharging the waste.

4.2.1. Waste line connection to central waste system

If the waste line is to be connected to a centralised waste collection system, the following requirements must be met:

1. Waste tube must not exceed 5 meters or 18 feet in length.
2. Drain height must not be higher than the original waste container inside the instrument.

Disclaimer: Check the specifications of the central waste system for rules about discharging the waste.

4.2.2. Replacing the waste container

1. Lift the left cover and pull the waste container forwards.
2. Unscrew the cap.

3. Place the new waste container and tighten the screw cap.
4. Lift the left cover and place the waste container back into the Compact.

Note: If you are re-cycling waste containers, make sure that they are bleached and rinsed thoroughly.

4.3. Start-up first time

Ensure that racks, which are placed by hand, are correctly placed in the InteRRliner; the groove on the side of the rack must catch the strip at the right side of the storage area.
The InteRRliner can store up to 21 racks; racks may be placed randomly in the InteRRliner.

Each rack which is placed by hand or fed in by the HST SKY unit is trimmed and pushed automatically to the front where it lines up with the sampler conveyor-belt.

Do not push racks manually against or away from the front end, as this will interfere with the ejector mechanism.

Racks will wait until the sampler unit sends a rack request. On a rack request, one rack is pushed into the sampler section and will be processed by the sampler.

The InteRRliner controls all the belt movements and rack transports. The InteRRliner is also controlling the host communication between Compact and Lab communication system.

1. Check the ***Pipette position*** (on page 34).
2. ***Prime the fluid system*** (on page 144).
3. Check the ***Sample probe depth*** (on page 33), depending on sample tube length.
4. Check the temperature sensor is ***Set room temperature*** (on page 34).
5. Check barcode reader.
6. Perform a First Fill and Clean.
7. Perform a leak check on the pipettes by run a fill and clean.
8. Start filling the carrousel with blood samples and check for leaking pipettes.

4.3.1. Main power connections

The main switch for the StaRRsed Compact ESR analyzer is located at the left side of this instrument.
The main switch for the InteRRliner V8 rack transport units is located in the cabinet beneath the Entry Pool.

Attention: The sample robot unit is powered by the ESR analyzers power supply. Switching the transport units OFF will not switch OFF the sample robot!

A central power distribution block to connect all units and auxiliary devices to is located at one of the rear support legs near the Entry pool. This distribution block has a main switch and an indicator light showing the status ON or OFF.

Check if all the power cables from the Compact(s) and printer(s) are connected to the distribution block.

Note: Do not switch the InteRRliner V8 OFF during normal operation!

4.3.2. Power up sequence

- Check the Start- and End pools, the conveyor-belt and the robotic unit for unblocked passageways. Racks may only be present on the pool's stainless steel storage areas.
- Start sequence
  - Switch **ON** the Compact.
  - Switch **ON** the PC and the monitor.
  - Wait until "Windows" is ready for use.
  - Start the InteRRliner software.
  - Observe the Robotic arm movement during the start-up, after finishing the reset sequence the Compact is ready for use.
  - Switch **ON** the InteRRliner. The system becomes operational when the lines "HST Version X.XX" and "Lab Comm On (or OFF)" are shown in the display.
  - If applicable switch **ON** the printer. The printer prints the paper header automatically.
  - InteRRliner is ready for use.

4.3.3. InteRRliner

Ensure that racks, which are placed by hand, are correctly placed in the InteRRliner; the groove on the side of the rack must catch the strip at the right side of the storage area. The InteRRliner can store up to 21 racks; racks may be placed randomly in the InteRRliner. Each rack which is placed by hand or fed in by the HST SKY unit is trimmed and pushed automatically to the front where it lines up with the sampler conveyor-belt.

Racks will wait until the sampler unit sends a rack request. On a rack request, one rack is pushed into the sampler section and will be processed by the sampler. The InteRRliner controls all belt movements and rack transports. The InteRRliner is also controlling the host communication between Compact and LAB COMM.

Note: Do not push racks manually against or away from the front end, as this will interfere with the ejector mechanism.

4.3.4. Tube/rack feeding

Ensure that racks, which are placed by hand, are correctly placed in the InteRRliner; the groove on the side of the rack must catch the strip at the right side of the storage area.
The InteRRliner can store up to 21 racks; racks may be placed randomly in the InteRRliner.

Each rack which is placed by hand or fed in by the HST SKY unit is trimmed and pushed automatically to the front where it lines up with the sampler conveyor-belt.

Do not push racks manually against or away from the front end, as this will interfere with the ejector mechanism.

Racks will wait until the sampler unit sends a rack request. On a rack request, one rack is pushed into the sampler section and will be processed by the sampler.

The InteRRliner controls all the belt movements and rack transports. The InteRRliner is also controlling the host communication between Compact and Lab communication system.

4.3.5. General settings

Check the general settings and select the required options

1. 30 minutes (Default is OFF)
2. Display dilution (Default is OFF)
3. EDTA mode (Default is ON)
4. Display graph (Default is OFF)
5. Sample probe protection (Default is ON)
6. Temperature correction (Default is ON)
7. Fast filling (Default is ON)
8. Virtual keyboard (Default is ON)
9. Print after measurement (Default is OFF)
10. Check for duplicate ID's
11. Check the limit filter settings as recommended set by default.

The tab Settings is protected by the password. Select the tab Settings, type the password 3964 and press the **[ENTER]** key.

4.3.5.1. EDTA settings

Before you run large batch of samples check on the Main screen the EDTA indicator is displayed.

EDTA can be set in the menu SETTINGS. Toggle the EDTA mode switch to the ON status for using EDTA blood samples and toggle the switch to the OFF status for using citrate blood samples.

4.3.5.2. 60 or 30 minute method

Check which mode the Auto Compact has to be run the 60 minute method (default) or the 30 minute method.

30 minute method can be set in menu SETTINGS. Toggle the 30 min method switch to ON for the 30 minute method or switch to OFF for using the 60 minutes method.

4.3.6. Limit filter settings

Check the LIMIT FILTER SETTINGS: If it is certain that the LIMS has been programmed to handle all these exceptions correctly, these options may be set to **YES**.
In all other situations, the options should be set to **NO** to avoid that results associated with exceeded limits are transmitted to LIMS and/or printed.

4.3.7. Sample probe depth

Sample probe depth is depending on sample tube length.
Select SETTINGS - GENERAL the sample probe depth in millimeters.
For each individual type of blood collection tube, the sample probe depth must be checked and set.

Example:

Measure the safe needle depth. The sample probe depth is usually slightly less than the maximum safety distance, enter this depth in millimeters. This will be the depth that the sample probe goes down into the sample tube.

- The safety depth distance is found to be 65 millimeters.
- Set needle depth in the software at 62 millimeters.

See also section Measuring maximum safe needle depth

Note: Setting the needle too close to the tube bottom may cause a fill time error. There should be approximately 2-millimeter clearance between the sample tube bottom and the tip of the sample probe.

4.3.8. Pipette belt position

Select SETTINGS - CAROUSEL and check if the correct pipette number is at the Rinse station position.

This function will show the current pipette number at the Measure station position, Rinse station position and the Fill station position. If the position is not according the pipette numbers on the belt enter the correct numbers.

4.3.9. Set room temperature

Select SETTINGS - GENERAL SETTINGS - TEMPERATURE (°)

The displayed value is the temperature according the build-in thermometer of the InteRRliner V8.

1. Check the room temperature near the pipettes with a room thermometer.
2. Enter the measured temperature from the room thermometer as the current value for the temperature sensor.
3. "SAVE SETTINGS"

4.3.10. Priming the fluid system

Select MAINTENANCE -> PRIME / CLEAN (on page 73) and perform all prime sequences manually. Check fluid flow through the applicable tubing. repeat a step if fluid flow is not correct.

1. PRIME RINSE SOLUTION, activates the Rinse pump. RINSE SOLUTION must flow through the pipette.
2. PRIME SALINE, activates the SALINE pump. Liquid must flush through the needle assembly.
3. PRIME DILUENT, activates the diluter prime cycle. Diluter system must be filled with diluent and free of air bubbles.
   - Diluter prime cycle is executed once. In order to fully prime the system it will be necessary to perform this step several times. (One cycle is 5 strokes of the Diluter)
4. PRIME DE-IONIZED WATER, activates the fill nozzle water valve. DE-IONIZED WATER must flow through the tube connected to the fill nozzle cap.
5. PRIME DISINFECTANT, activates the disinfectant valve. Disinfectant must flow through the small tube connected to the pipette wash station.

4.4. Last step

Familiarise yourself with the Keyboard and how to navigate through the menu. See for detail information section ***Keyboard*** (on page 40).

5. STANDARD OPERATING PROCEDURES (S.O.P.)

In this section the following issues can be found:

- Basics of Bio safety
- S.O.P. for working with bio hazardous materials
- Safety warning
- StaRRsed Incident Report
- E.C. Declaration
- Labels and stickers on containers

5.1. Basics of Bio safety

Basic rules on bio safety in a laboratory;

- Wash hands after handling biological materials, removing gloves, or before leaving work area.
- Don't eat, drink, etc. in the work area.
- Never mouth pipette.
- Take extreme precautions when sharps must be used. Dispose sharps carefully and properly.
- Conduct procedures likely to create splashes, sprays, or aerosols within a biological safety cabinet that is certified annually.
- Decontaminate work surfaces at least daily.
- Decontaminate waste materials before disposal.
- Wear a BUTTONED lab coat to protect street clothes.
- Wear gloves when hands may contact potentially infectious materials, contaminated surfaces, or equipment.
- Wear eye/face protection if splashes or sprays are anticipated during work outside a biological safety cabinet.
- Transport materials outside of the laboratory using secondary containment and a cart. Avoid public areas during transport.
- Transfer materials to and from the MCG according to federal and international regulations.
- Be familiar with written instructions for laboratory procedures and proper responses to emergencies.
- Report spills, exposures, illnesses, and injuries immediately.

5.2. S.O.P. for working with bio hazardous materials

Purpose:

To inform and educate all engineers that work with biohazards
Effective Date: July 27, 2004

5.2.1. Facts and definitions:

Biological hazards are present in all human and animal tissues and body fluids.

The "normal" research activities carried out in a blood laboratory expose workers to human blood, urine, sweat, semen, saliva and muscle tissue.

For the purpose of assessing risk, we assume that all volunteers to our clinical studies are not normal healthy individuals, and take appropriate precautions.

We remain aware at all times that increased knowledge of disease transmission and occupational hazards may result in situations currently considered safe to be reclassified as having risk.

"Universal Precautions" describes a set of procedures for dealing with subjects based on the assumption that they are positive for blood borne pathogens. Other precautions are necessary to prevent exposure to potential respiratory diseases.

5.2.2. Medical requirements:

Routine personal medical assessments are advised at regular intervals (yearly) for all personal exposed to potential biohazard.
Immunisation for Hepatitis B is recommended for everyone who is taking blood samples or dealing with human blood or bodily fluids.

5.2.3. General laboratory practices:

The laboratory is a shared facility; it must be booked in advance with the Technician in Charge. All users must follow all Departmental Safety Guidelines and Bio safety Policy.
Each user is responsible to leave a clean, disinfected and tidy work place.
All biohazard waste must be properly disposed.

5.2.4. Specific laboratory practices and requirements:

Biohazard waste:

Dispose blood tubes into a biohazard sharps container.
Dispose sharps into a biohazard sharps container.
All other bio hazardous waste is to be deposited into a biohazard bag.
All bio hazardous waste is deposited into the Medical Waste Management (MWM) bin for pick up.

Decontamination procedures:

Routine: At the end of each experiment, or each day, disinfect lab benches and any equipment
Spills: Small spills of biohazard material should be treated by first covering them with an absorbent paper to avoid the formation of aerosols. Disinfect the spill by slowly pouring on a disinfecting solution working from the outside to the centre of the spill in a circular motion. Leave the spill long enough for disinfection to take place (check decontaminating instructions on the disinfectant container for time) and then carefully wipe up wearing gloves.
Pick up any glass using forceps.
Once all the material has been removed disinfect the area thoroughly.
Inform the Technician in Charge of the spill.

Food:

No food or beverages will be brought into or consumed inside a blood laboratory at any time.

Accident reporting:

All accidents and injuries must be reported within 24 hours to the technician in Charge, to the Departmental Joint Health and Safety Committee and to the Department of Environmental Health and Safety using an Incident Report from the main office or the Technician in Charge.

Laboratory access:

Access to the haematology laboratory is limited to persons who are directly involved with the testing equipment. Children are not permitted in the laboratory.

Personal protective equipment:

Laboratory and maintenance personnel are expected to use a laboratory coat while working in the blood laboratory.
We advice the use of non-canvas closed-toe shoes wherever there is a potential for foot injury from hazardous materials or from small physical objects.
Personal outer clothing should not be stored in the blood laboratory.
Lab coats worn in the blood laboratory should not be worn outside of the blood laboratory and should not be stored with personal outer clothing, to avoid transfer of contaminants.
Gloves are considered contaminated after ones wearing. Avoid contamination of work surfaces with gloves. Dispose of gloves into a biohazard container.
The use of eye protection is advised while processing samples.
Remove and properly dispose of gloves and wash hands before leaving the laboratory.

5.3. E.C. Declaration InteRRliner

Mechatronics Manufacturing B.V.

De Corantijn 13
1689 AN ZWAAG
The Netherlands

P.O.Box 225
1620 AE HOORN
The Netherlands

Telephone	+31 (0)229 291129
Fax	+31 (0)229 241534
E-mail	purchase@mechatronics.nl
Internet	www.mechatronics.nl
V.A.T. number	NL 8048 22 979 B01
C.o.C. number	36048153 (at Hoorn)
Banker	ABN AMRO
Account number	5335.19.985
Swift-address	ABNANL2A
IBAN	NL04 ABNA 0533 5199 85

E.C. DECLARATION OF CONFORMITY

Herewith we declare that:

the Automatic Erythrocyte Sedimentation Rate Analyser:

InteRRliner V8

- Is in conformity with the requirements of the following EC directives:

98 / 79 / EC	**IVD devices**
2006 / 42 / EC	**Machinery**

- The following harmonized standards have been applied:

EN 12100-1,	Safety of machinery - Part 1: Basic terminology, methodology
EN 12100-2,	Safety of machinery - Part 2: Technical principles
EN 61010-1,	Safety requirements for electr. equipm. for meas., control, and lab. use - General requirements
EN 61010-2-101,	Safety requirements for electr. equipm. for meas., control, and lab. use - Particular requirements for in vitro diagnostic (IVD) medical equipment
EN 591,	Instructions for use for in vitro diagnostic instruments for professional use
EN 980,	Symbols for use in the labelling of medical devices
EN ISO 14971,	Medical devices - Application of risk management to medical devices
EN ISO 13485,	Medical devices - Quality management systems - Requirements for regulatory purposes

The CE mark was applied for the first time on this instrument model in 2007

Zwaag, The Netherlands
September 12, 2012

Mechatronics Instruments BV
De Corantijn 13
1689 AN ZWAAG
The Netherlands
www.mechatronics.nl

J. Nowee
Director Sales & Marketing
Mechatronics Manufacturing BV

Conditions: By the ORGALIME GENERAL CONDITIONS S2000 of August 2012
Any other conditions are herewith explicitly rejected by us.

5.4. Labels and stickers on containers

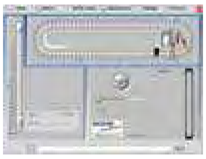
5.4.1. Stickers of the reagents containers

6. INTERRLINER V8 PROGRAM

The InteRRliner V8 is controlled via an external computer on which runs the InteRRliner V8 software. The software functions are grouped on six tabbed screens. The software is controlled by mouse pointer or directly via the touch screen. A virtual keyboard is automatically displayed on screen, when numerical or alphanumerical input is required.

Normal operational screens are the SAMPLE and the HISTORY screen.
The REAGENTS screen is used to check the reagent levels and log reagent replacement.
To activate priming sequences and cleaning operations, the screen MAINTENANCE is used.
The SETTINGS and SERVICE screens are protected by a password to prevent accidental change of settings. The SERVICE menu is used for service and control purposes.

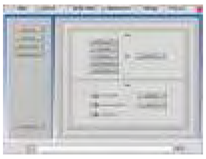
SAMPLE ***screen*** (on page 41)



HISTORY ***screen*** (on page 46)

REAGENTS ***screen*** (on page 69)

MAINTENANCE ***screen*** (on page 72)



SETTINGS ***screen*** (on page 86) (General settings, password protected:3964)

SERVICE SCREEN (on page 100) (password protected: 3964)

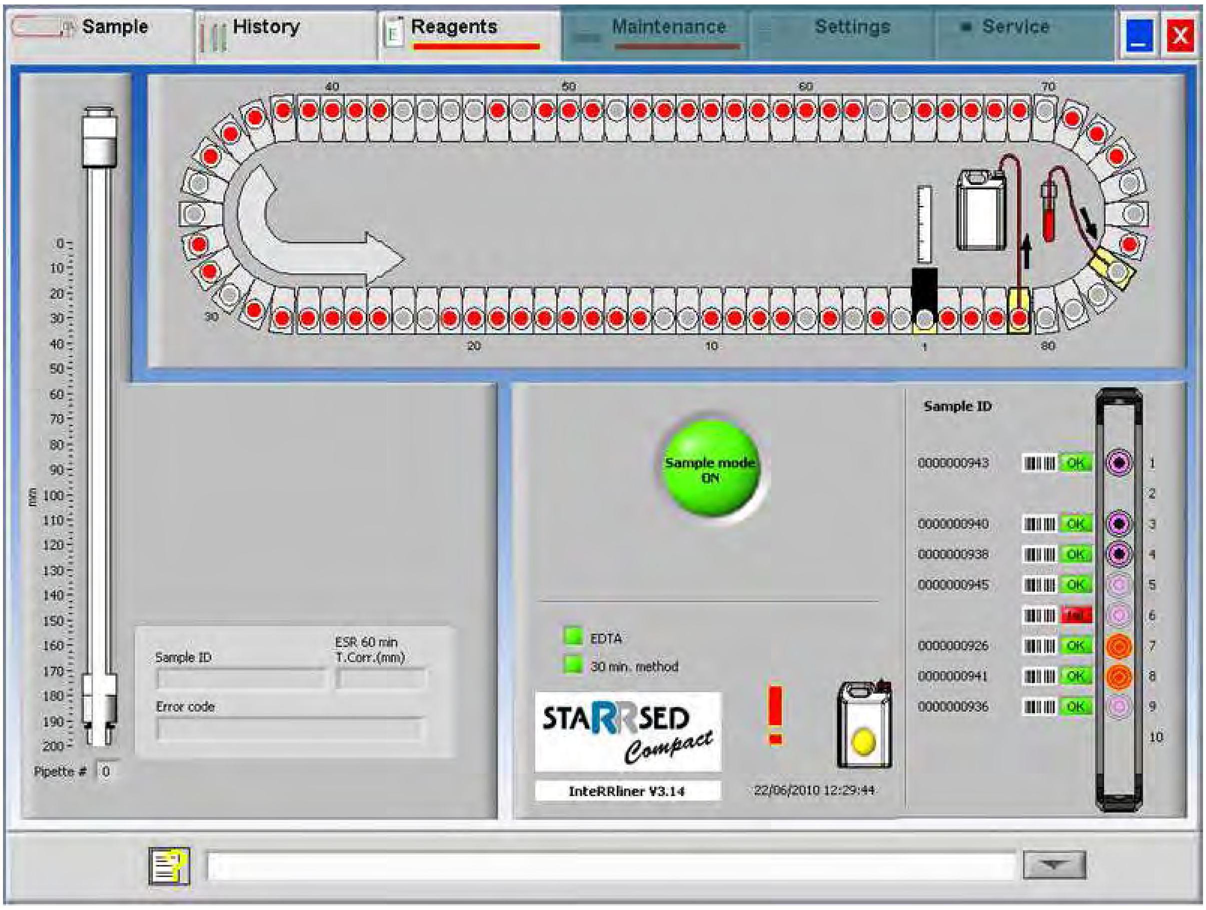
6.1. Software version

The latest software and manuals for the InteRRliner V8 can be downloaded from our website; www.rrmechatronics.com.

The following program description is valid for software up to version 5.01.

Software version V5.00 and higher runs only on a Windows 7 PC.

6.2. Sample screen



Display of the Status line in service mode:

The main menu is displayed during operation. To access other menus, select the required tab on the display and press the mouse button.
To access the other sub menus in the selected tab, select the required button and press the mouse button.

The following screens are selectable via the associated tabs:

1. SAMPLE ***screen*** (on page 41)

2. HISTORY ***screen*** (on page 46)
3. REAGENTS ***screen*** (on page 69)
4. MAINTENANCE ***screen*** (on page 72)
5. SETTINGS ***screen*** (on page 86)
6. SERVICE ***screen*** (on page 100)

The above picture is an example of the SAMPLE screen of the Compact in the normal operation mode. If the Service mode button with light is shown in the Status line, the Compact is running in the service mode. The User Manual button is also in the status line. Click this button to open the InteRRliner V8 User manual.

When the Compact is running in the Service mode all kinds of settings can be changed and the instrument will run with the changed settings.
For instance, when ESR time is set to 12 minutes, the Carousel will move according this time setting to be in time at the measure position.

When the Compact is running in the NORMAL MODE, the instrument uses the standard saved settings. For instance the ESR time is set back to 60 minutes or 30 minutes according the used method.

6.2.1. Carousel:

`Carousel`:
This is a graphical representation of the Compact carousel. When an ESR is required the carousel is moving to the Measure position. On the display, the belt is also moving accordingly. The decimal numbers next to the pipettes are the numbers on the pipette belt.
When a pipette is filled successfully, a red dot marks the filled pipette. In case of a failure the pipette is marked with a flashing red dot.
All the sample information can be found in tab HISTORY.

6.2.2. Measure station:

`Measure station`:
This is the position of the measure station where the ESR of the sample is measured.

6.2.3. Wash station:

`Wash station`: (Also named Rinse station)
This is the position where the sample is washed out of the pipette. The pipette is clean and dry after this process.

6.2.4. Fill station:

`Fill station`:
This is the position where the pipette is filled with a blood sample.

6.2.5. Pipette:

`Pipette`:
This is a graphical representation of the pipette. It is generated from the results of the ESR measurement. It can be used to locate possible air bubbles.

6.2.6. Rack:

`Rack`:
This is a representation of a rack in process. Empty positions indicate, that no sample tube was detected at that position.

The combinations of the pictograms have the following meaning:

Barcode could not be read (read failure).

Barcode was read correctly, but ESR is not required for this sample.

ESR is required and waiting to be done.

ESR was measured successfully.

ESR was measured, but with fill errors.

After processing the rack, the information of the rack is transferred to the DISPLAY RACK HISTORY (on page 51) screen.

6.2.7. Sample mode button:

Sample mode button:
This is the button to start or stop the run mode of the instrument.

6.2.8. Version information:

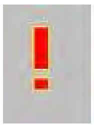
`Version information:`
Shows the version information of the software.

6.2.9. Sample information:

`Sample information:`
After measurement, the results of the sample are shown in this window. This window is refreshed after every new result of a sample.

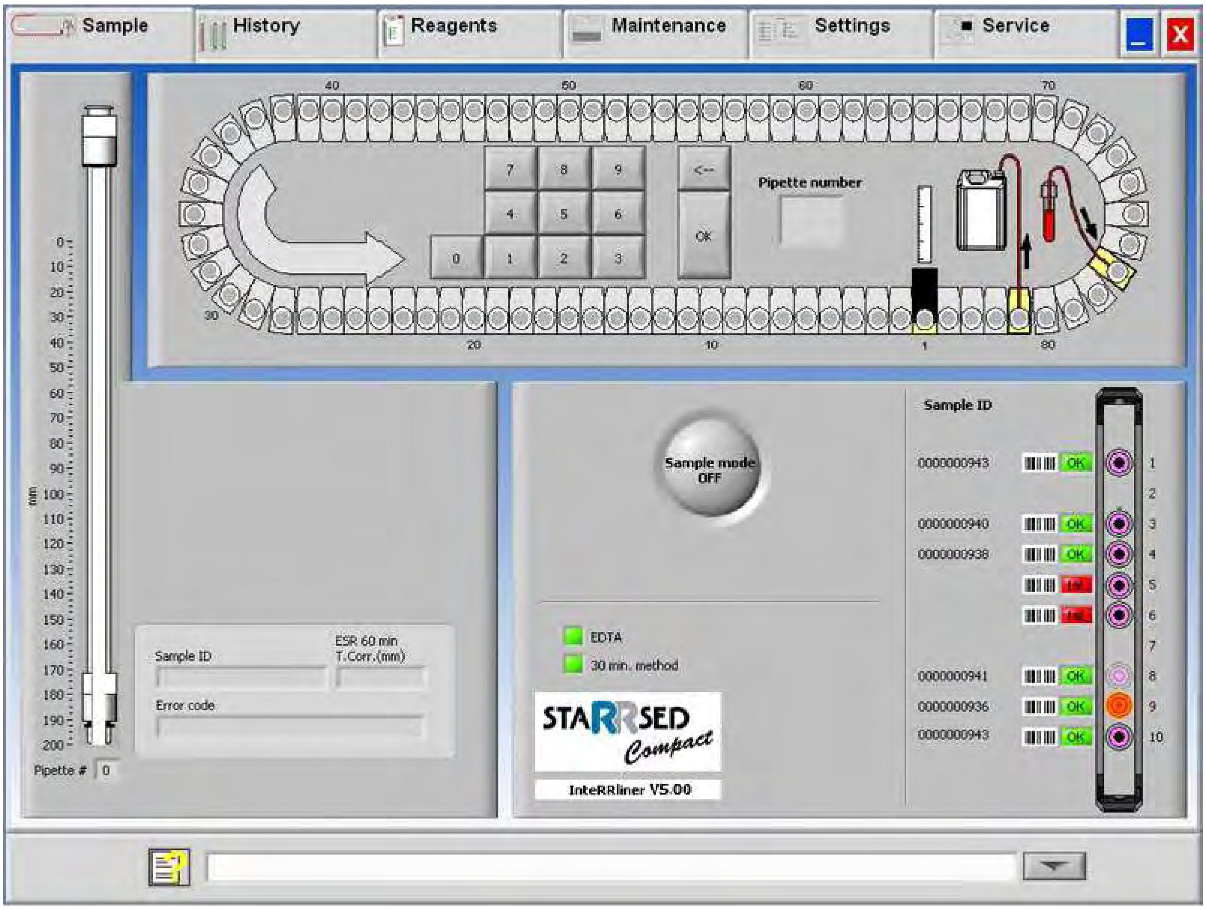
6.2.10. Status:

`Status:`
Information about the current status of the instrument is shown here, such as the selected mode (EDTA or Citrate), selected method (60 or 30 minute) and symbols that draw attention to certain maintenance conditions or QC sample status (if applicable).



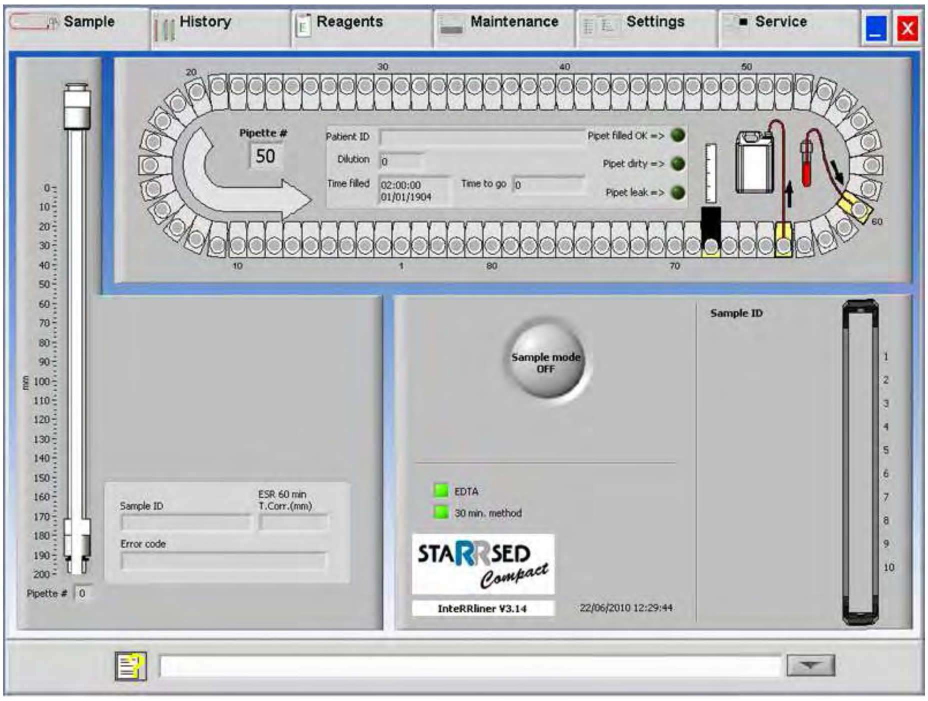

6.2.11. Sample screen with keyboard

To view the status of a specific pipette, click directly on the pipette itself or click the open space in the center of the belt representation. A virtual number pad is shown.



Type the number of the requested pipette and press the OK button. The following screen is shown.

6.2.12. Pipette information



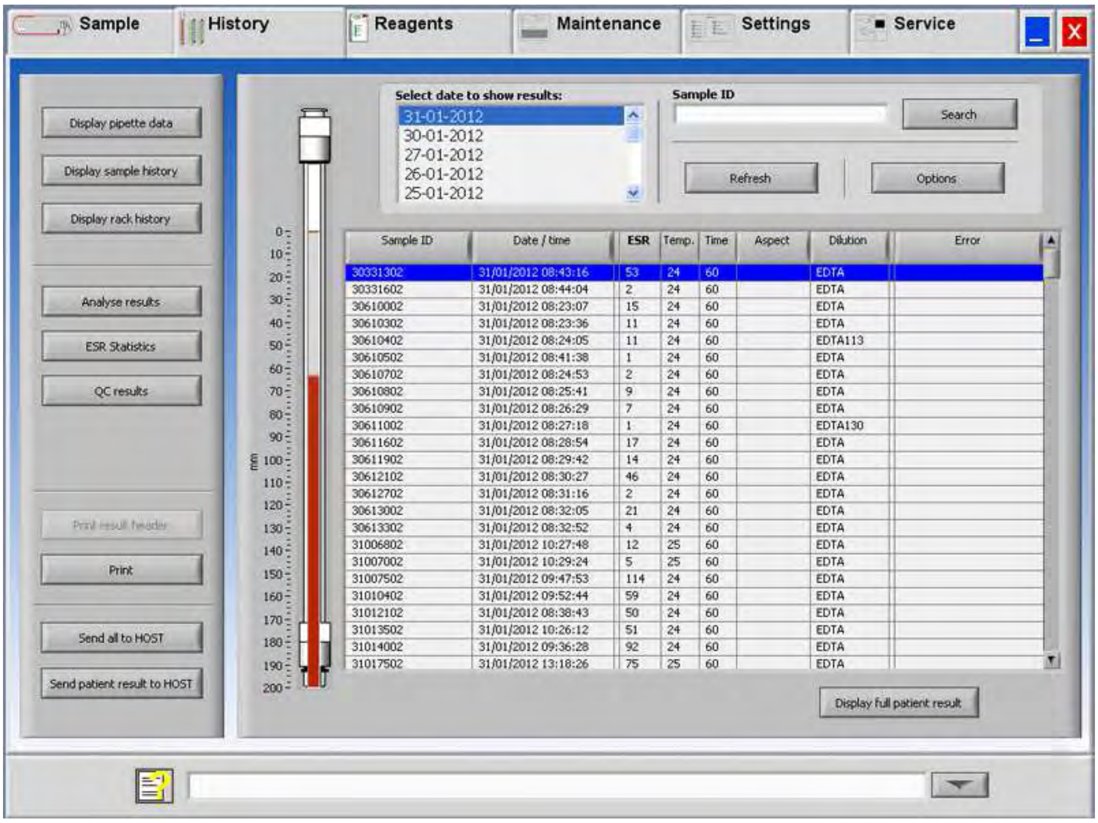
The following information is shown:

- Sample ID:
  The sample identification (barcode) of the sample tube.
- Dilution:
  The dilution rate of this sample as calculated during the aspiration process.
- Time filled:
  The date and time when the sample was aspirated.
- TIME TO GO:
  The number of minutes to wait until the sample will be measured.

The indicators at the right side show the current status of the selected pipette:

- Pipette filled OK:
  A sample has been aspirated into the pipette without problems.
- Pipette dirty:
  The sample has been measured and the pipette is marked to be washed when it reaches the rinse station. This indicator is also on when a sample could not be aspirated properly.
- Pipette leak:
  Reserved for future use.

6.3. History screen

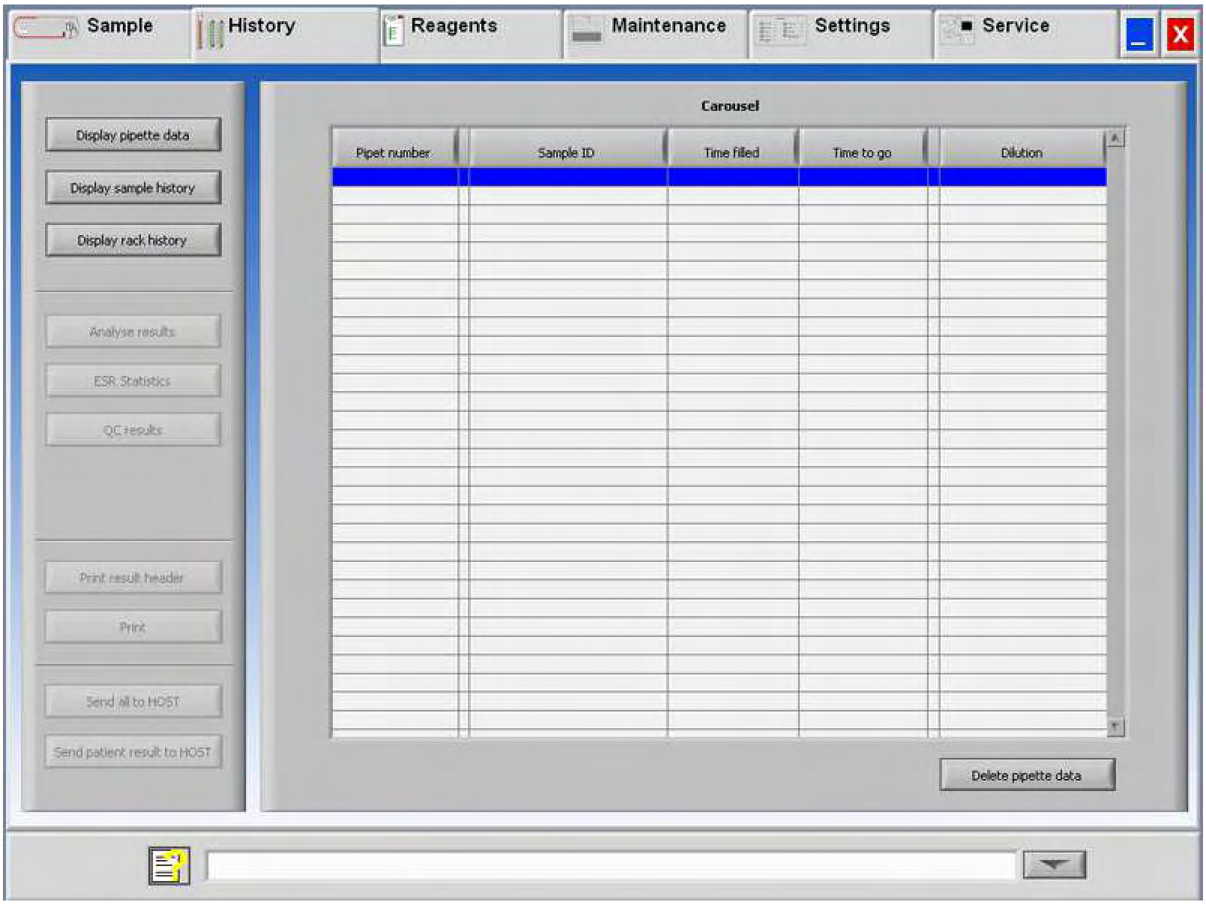


In History the following options can be selected:

- DISPLAY PIPETTE DATA (on page 47)
  Use button PRINT to send the selected data to the printer.
- DISPLAY SAMPLE HISTORY (on page 48)
  - DISPLAY FULL PATIENT RESULT (on page 49)
    In Display sample history are the following options available:

    PRINT: Send the selected result to the printer.
    PRINT RESULT HEADER: Only if option Settings - General settings "PRINT AFTER MEASUREMENT" is switched **ON** it is possible to print a result header.
    SEND ALL TO HOST: Send all results again to the HOST.
    SEND PATIENT RESULT TO HOST: Send only the selected patient result to the HOST.
- DISPLAY RACK HISTORY (on page 51)
  - DISPLAY RACK DETAILS (on page 52)
- ANALYSE RESULTS (on page 63)
- ESR STATISTICS (on page 53)
- QC RESULTS (on page 54) (with StaRRsed Control)
  - LINKED QC ID'S (on page 62)

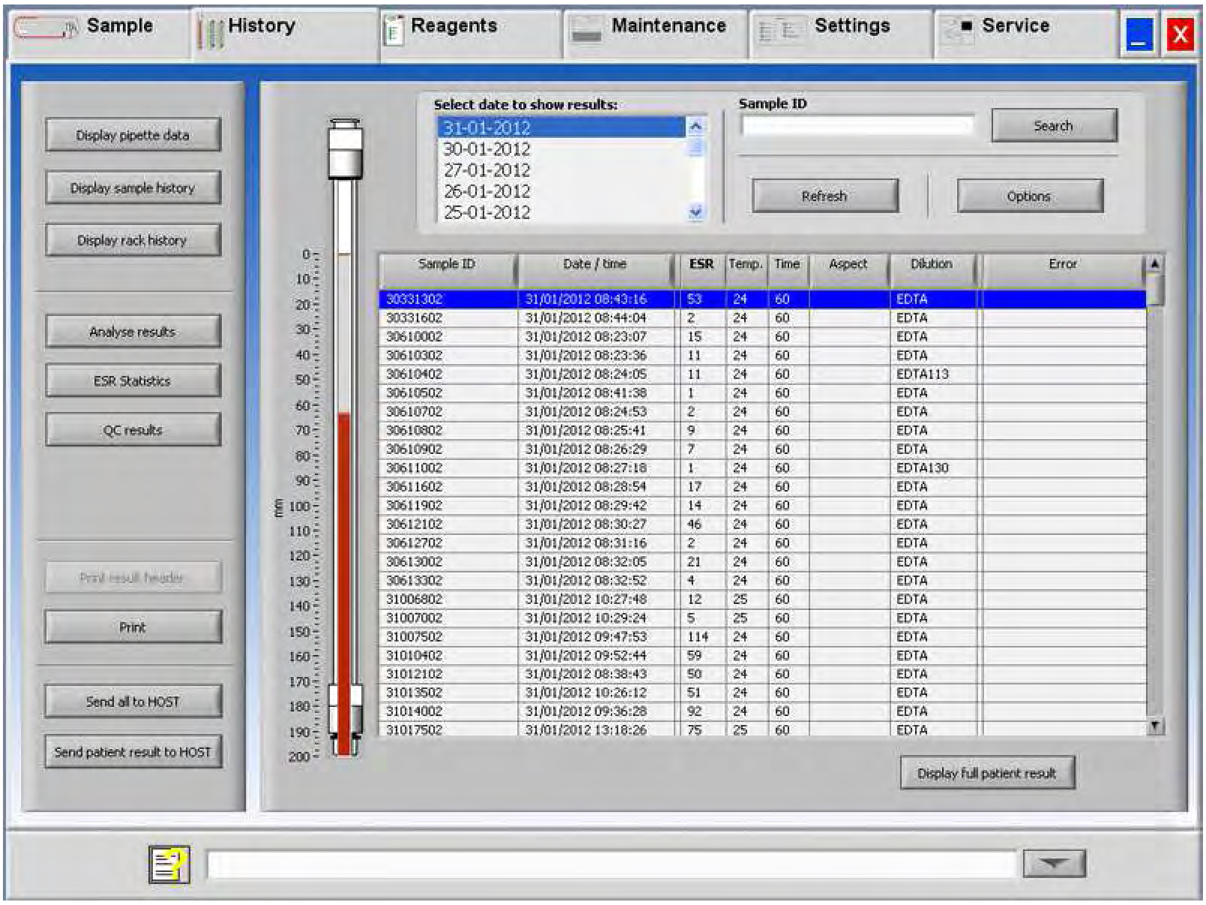
6.3.1. Display pipette data



This table shows information of the samples in the carousel during the selected ESR process time. After measuring the pipette, the pipette data is transferred to the sample history files.

In the header of the table the names of the columns are shown. Double-click the header of any column to sort the table by this column in ascending order.

6.3.2. Display Sample history



In the window Select date to show results: double click on the file name to select the results of the selected date.
Press **Refresh** to refresh the list of available files.
In the window Sample ID type the sample ID information and press **Search**.

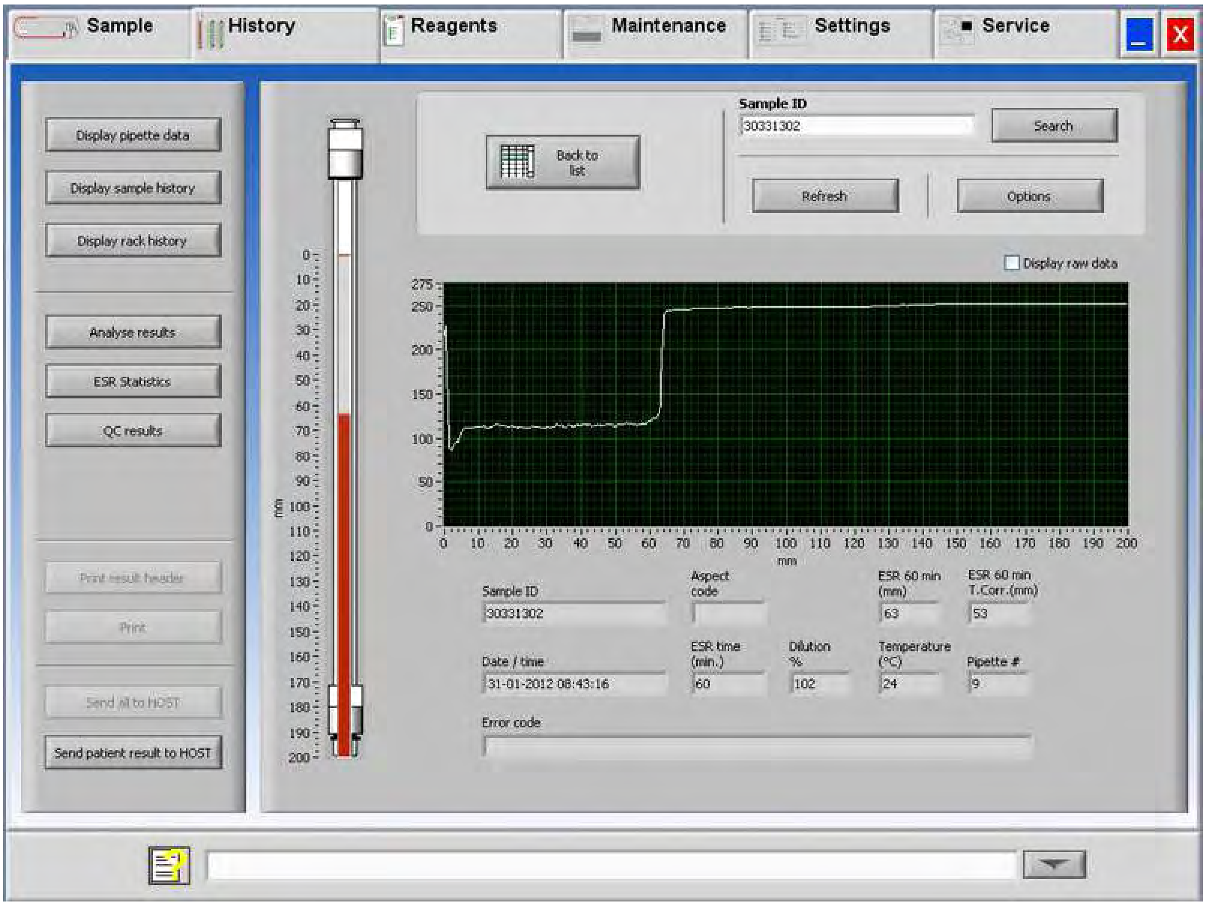
Press **Options** for the following search options:

- Show today's results.
- Show today's results from a selected time frame of the day.
- Show results of a number of past days. Default value is set for 7 days.
- Show results of a specific day.
- Show results of the range between the first selected date to the next selected date.

Select in the table a 'Sample ID' and click the button DISPLAY FULL PATIENT RESULT (on page 49) for more detailed information of the selected sample.

In the header of the table the names of the columns are shown. Double-click the header of any column to sort the table by this column in ascending order.

6.3.2.1. Display patient results



In the window Select date to show results: double click on the file name to select the results of the selected date.
Press **Refresh** to refresh the list of available files.
In the window Sample ID type the sample ID information and press **Search**.

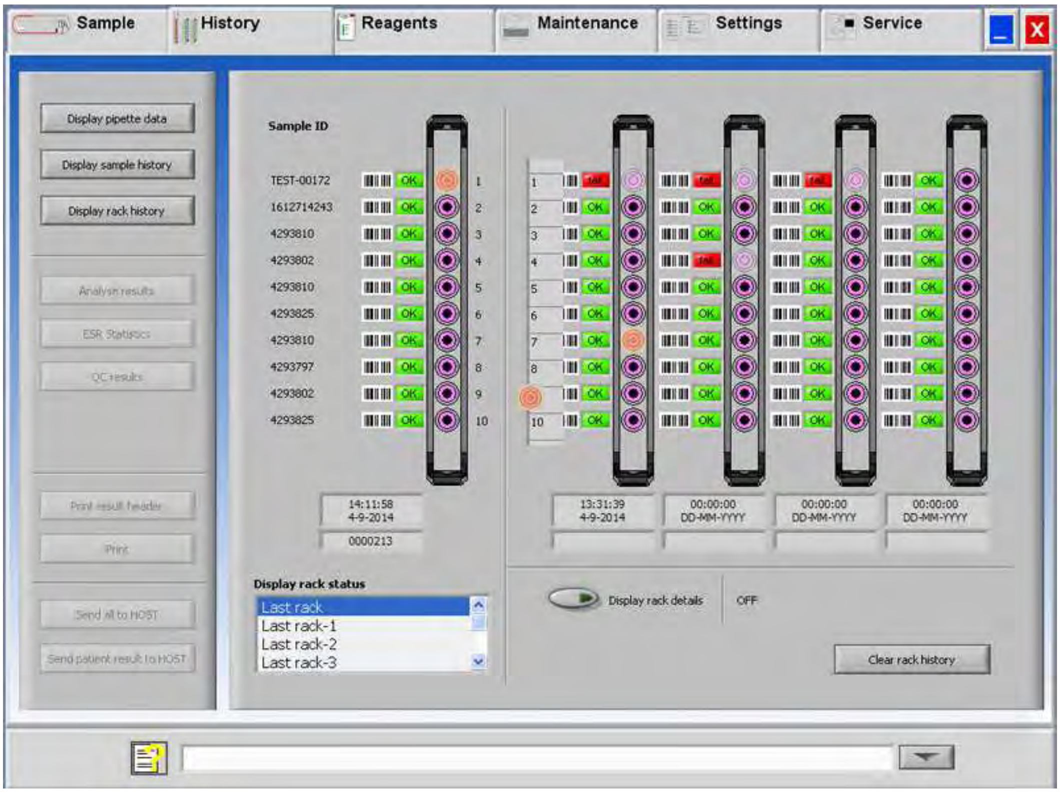
Press **Options** for the following search options:

- Show today's results.
- Show today's results from a selected time frame of the day.
- Show results of a number of past days. Default value is set for 7 days.
- Show results of a specific day.
- Show results of the range between the first selected date to the next selected date.

From the selected Sample ID detailed information is shown on this screen.

Sample ID	Sample Identification number
ASPECT code	Shows the aspect code (e.g. Hazy <10)
ESR 30 min	The 30 minute method is used. This is the measured 30 minutes value.
ESR 60 min	When the 60 minute method is used, this is the *measured* 60 minutes value. When the 30 minutes method is used, this is the *calculated* 60 minutes value.
ESR 60 min T.CORR.	Temperature correction is used. This is the 60 minutes value corrected to 18℃.
Date / time	Date and time of the measurement of the result.
ESR time (min.)	Actual duration of the ESR.
Dilution %	The calculated dilution rate after aspiration of the sample.
TEMPERATURE (℃)	Room temperature at the time of the measurement of the sample.
Pipet number	Pipette in which the sample was measured.
Error code	Shows any ESR error code (e.g. "Too many borders found").

6.3.3. Display rack history



After completion of the rack, the status of the rack is displayed here. The last 10 racks are stored and can be selected. The selected rack is displayed left (above the selection window). The previous 4 racks are also displayed and can be checked simultaneously. More detailed information of the selected rack is shown with DISPLAY RACK DETAILS (on page 52) **ON**.

The combinations of the pictograms have the following meaning:

Barcode could not be read (read failure).

Barcode was read correctly, but ESR is not required for this sample.

ESR is required and waiting to be done.

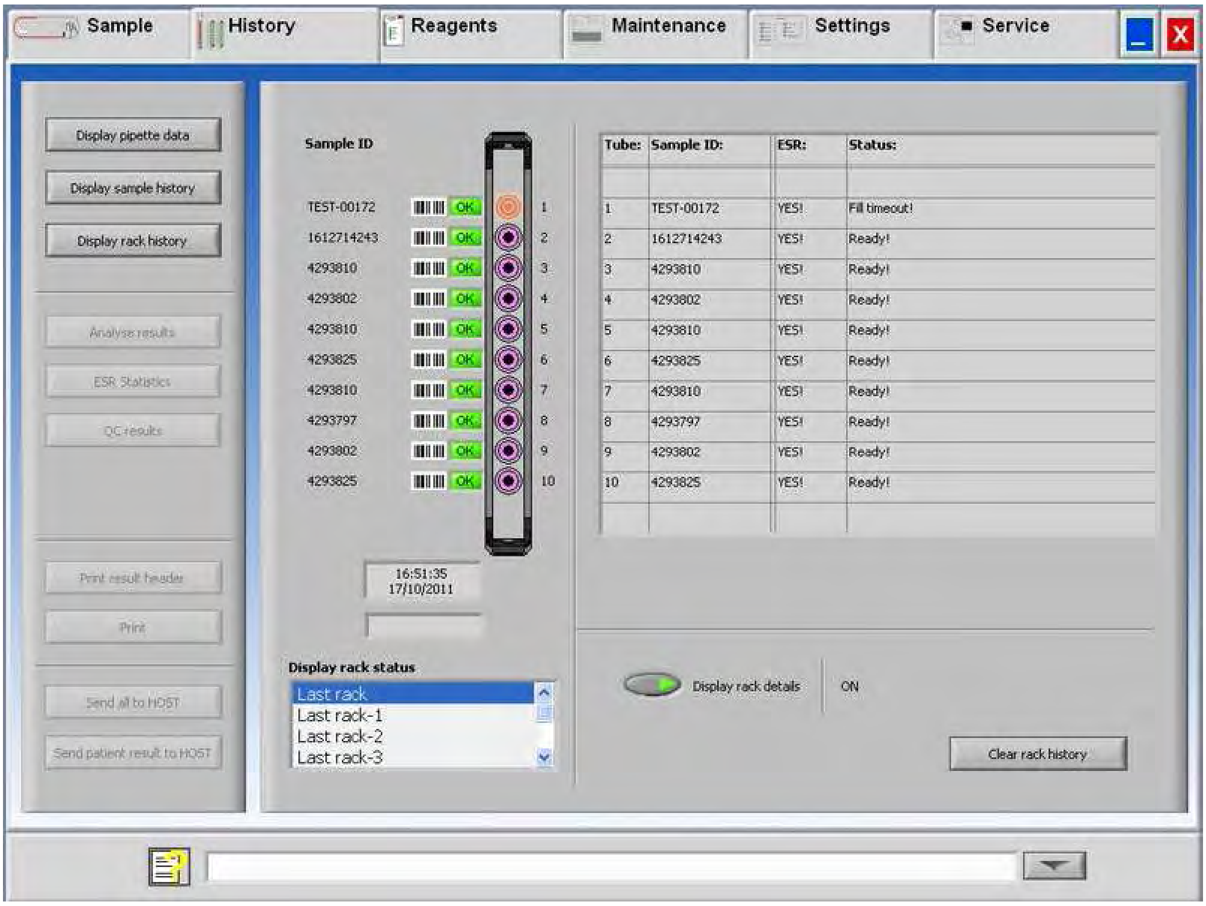
ESR was measured successfully.

ESR was measured, but with fill errors.

The Clear rack history button will clear the contents of the rack history file and restart to build-up a new rack history file.

If option "Read rack number" is "ON" (Service - General/Barcode), the rack number is shown under date/time.

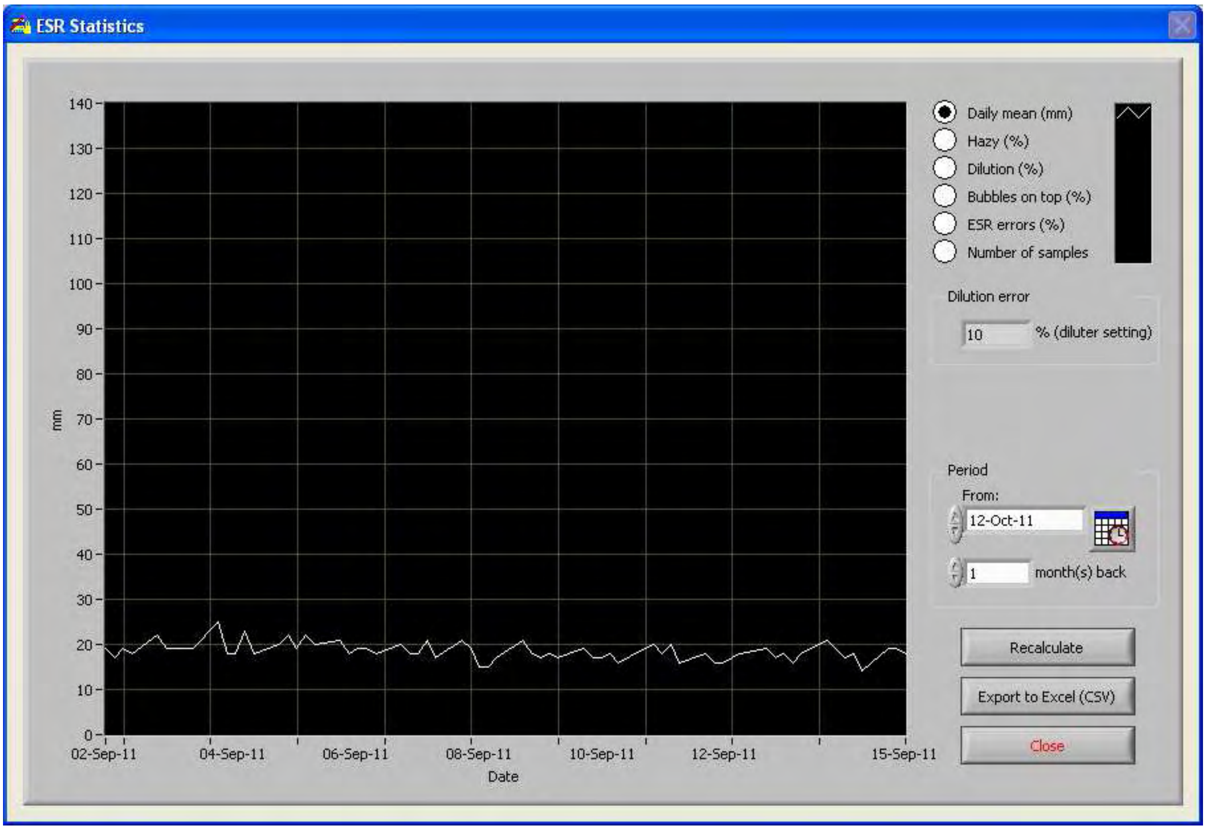
6.3.3.1. Display rack status



More detailed information of the samples in the selected rack is shown in the status table.
The last 10 racks are stored and can be selected.

The Clear rack history button will clear the contents of the rack history file and restart to build-up a new rack history file.

6.3.4. ESR Statistics screens



A statistical graph is produced over a selected period. Make a selection of the following graphs;

- Daily mean (mm)
  Use this to check variations in the daily mean ESR.
- Hazy (%)
  Increasing hazy aspects are an indication for contamination of the instrument, see ***Aspect Hazy*** (on page 157)
- Dilution (%)
  Increasing dilution errors indicate the need for maintenance of the diluter system.
- Bubbles on top (%)
  Increasing samples with bubbles indicate the need for maintenance of the aspiration system, see ***Foam in column*** (on page 183)
- ESR errors (%)
  Increasing ESR errors may indicate the need for maintenance, see ***ESR Error*** (on page 155)
- Number of samples
  This can be used to document variations in work load.

6.3.5. QC Results screens

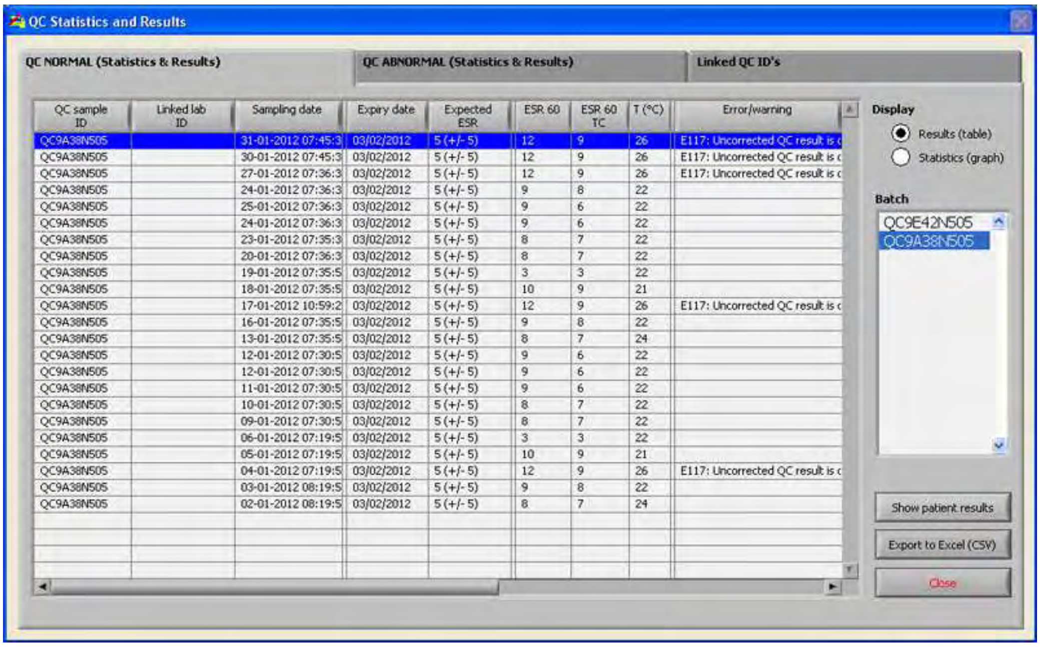
In this section results and statistics from QC samples are shown, in the section ***Linked QC ID's*** (on page 62) links can be created between QC sample ID's and Lab ID's.

The results from StaRRsed Control level N and level A are separated on their own tabs. Both tabs have the same layout and options. Results can be displayed in table format or in graphical format.

When the StaRRsed Control sample ID is used, results are only listed here. When Lab ID barcode is used, QC results are also listed in "Patient results".

Note: This part of the software can only be used in combination with StaRRsed Control as quality control material.

6.3.5.1. QC Normal results (table)



Display Results (table):
Results are shown in table as default.

QC sample ID:
Read from the barcode. The original StaRRsed Control barcode (=batch number)

Linked lab ID:
The Lab ID is given if it is linked to the StaRRsed Control sample ID

Sampling date:
The date and time when the QC sample was aspirated.

Expiry date:
If the StaRRsed Control expiry date is exceeded, it is not possible to continue with this QC sample. The sample is not measured, but the failed attempt is logged in the table.

Expected ESR:
This is the temperature corrected mean value (incorporated in the StaRRsed barcode) and the accepted range of deviation. The applicable values for the acceptable range depend on the user setting.

ESR 60:
Uncorrected result from QC sample.

ESR 60 T.CORR.:
Temperature corrected result from QC sample.

T(℃):
Temperature at which the sample was measured.

Error/Warning:
Only special QC errors are mentioned here, general ESR warnings/errors are mentioned in the next column.

After these columns additional data is shown: pipette number, dilution rate, ESR30, ESR time and Aspect. Scroll to the right.

Results are always shown with and without Temperature correction, independent of the setting TEMP. CORRECTION (ON or OFF).

The following options can be selected:

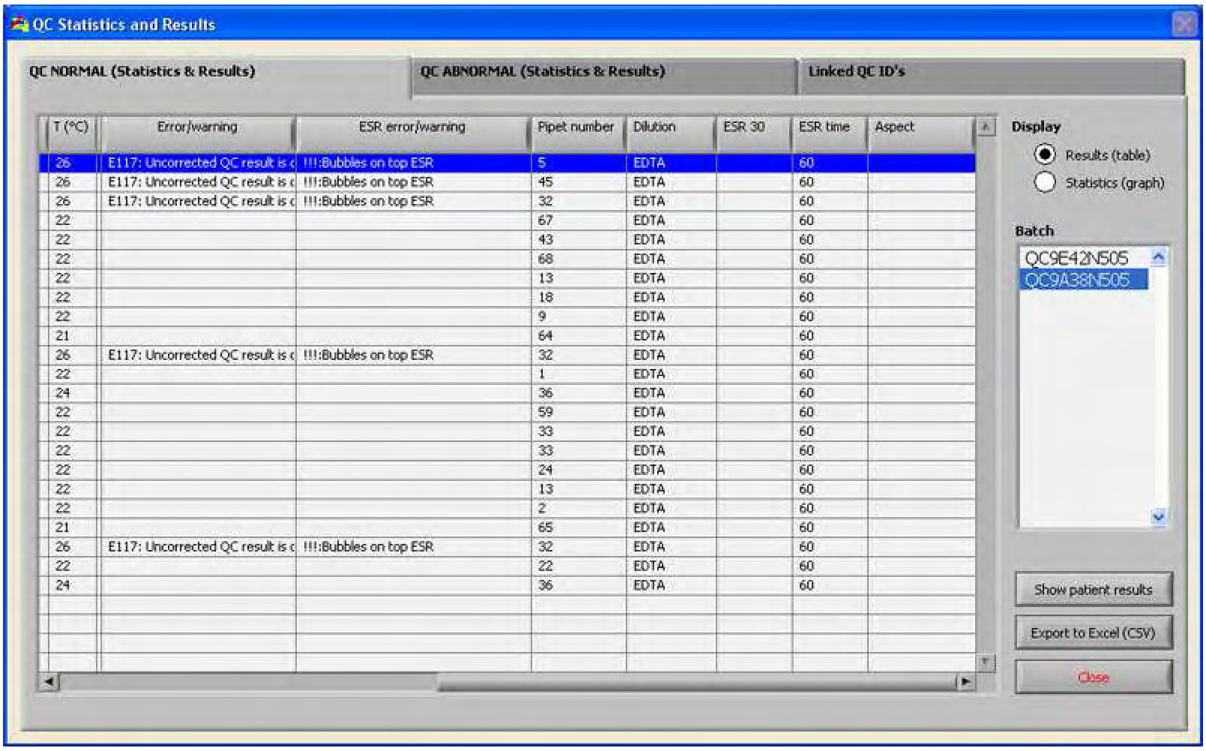
RELATED PATIENT RESULTS
This screen is simular to the "Display sample history" screen. The background colour of the patient history table is switched to light yellow to distinguish these QC related patient results from the standard patient history table. Depending on the frequency of QC samples, related patient results may span over multiple days and are listed per date.

EXPORT TO EXCEL (CSV)
Results can be exported to a .CSV file and imported in an MS Excel file for further analyses.

BATCH
All used batches of StaRRsed Control are shown, results are shown for chosen batch ID.

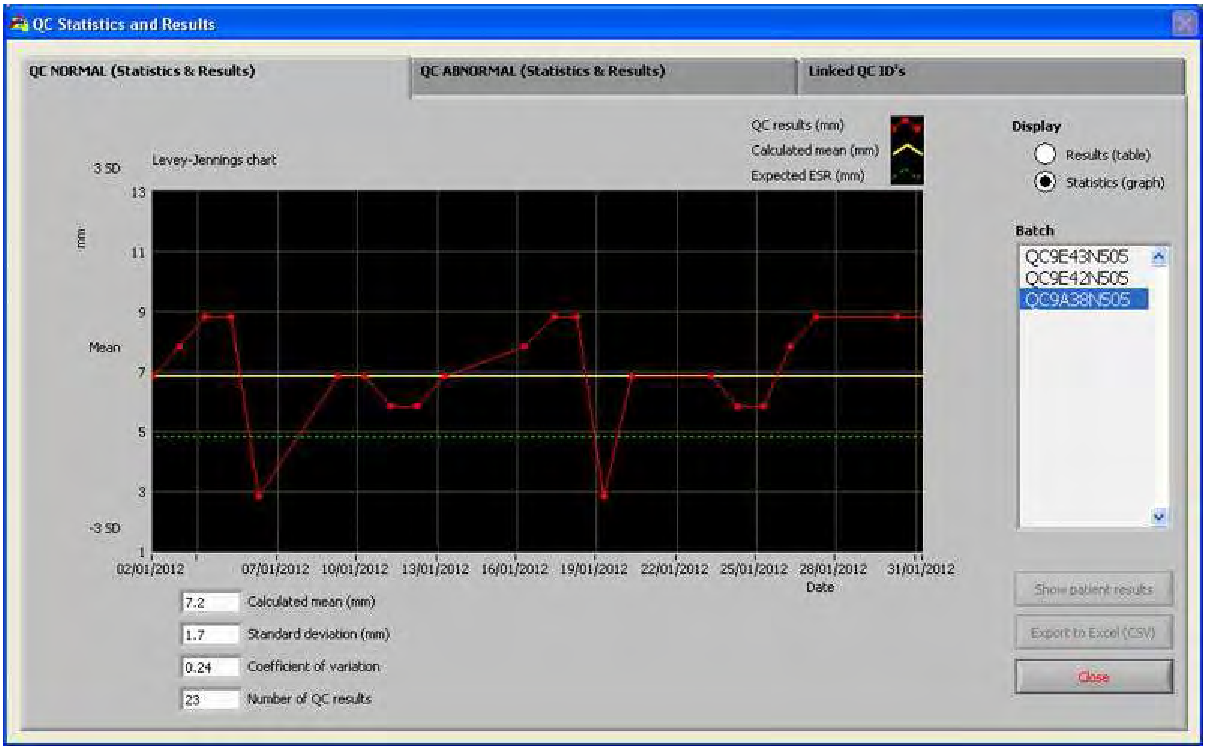
CLOSE
Return to History Screen.

6.3.5.2. QC normal results screen extended



After scrolling the general data from the QC results are shown.

6.3.5.3. QC normal results (graph)



Display Statistics (graph):

All QC results from the chosen StaRRsed Control batch are shown in a Levey-Jennings chart.

Shown in the graph:

- QC results (red) = values of measurements per date
- Calculated mean (yellow) = mean value of all QC results of the specific batch
- Expected ESR (green) = Assay mean value of chosen StaRRsed Control

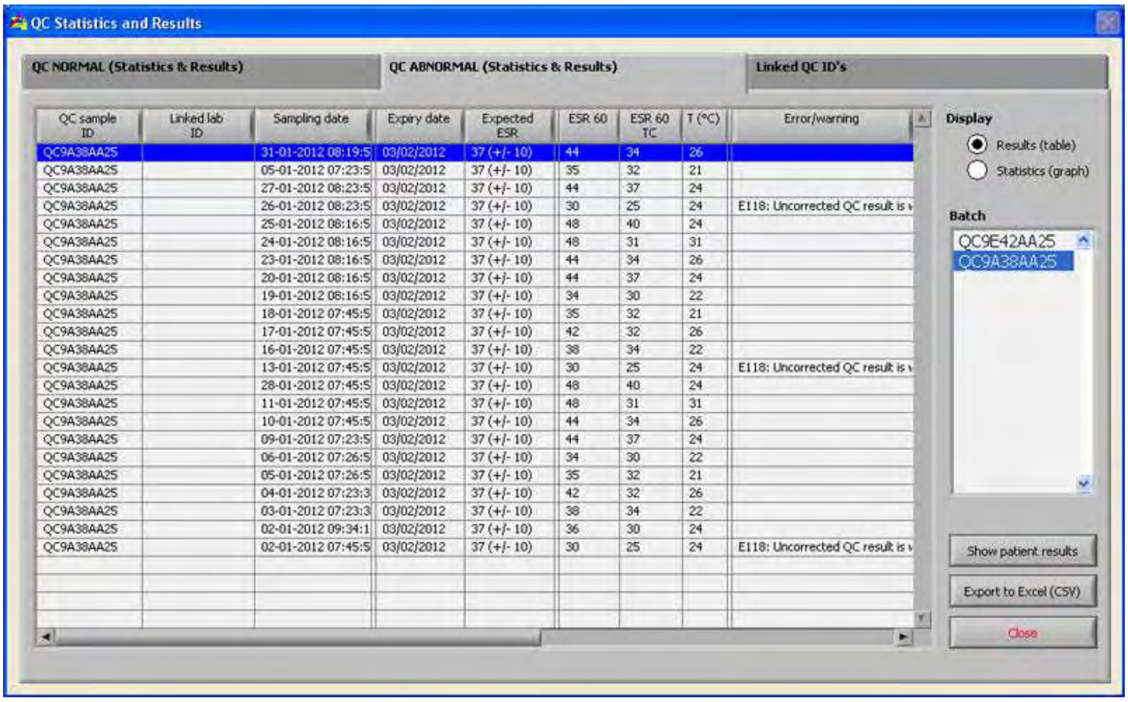
Shown as value:

- Calculated mean = mean value of all QC results of the specific batch
- Standard deviation = the average deviation of all QC results compared with the expected ESR
- Coefficient of variation = ratio of the standard deviation to the expected ESR, expressed in a percentage
- Number of QC results

This graph gives a first indication of the measuring stability of the InteRRliner V8. Further analysis and identification of systematic errors have to be performed in the user's Quality Control System.

CLOSE
Return to History Screen

6.3.5.4. QC abnormal results (table)



The results from StaRRsed Control level A are shown.

Display Results (table)

QC sample ID:
Read from the barcode. The original StaRRsed Control barcode (=batch number)

Linked lab ID:
The Lab ID is given if it is linked to the StaRRsed Control sample ID

Sampling date:
The date and time when the QC sample was aspirated.

Expiry date:
If the StaRRsed Control expiry date is exceeded, it is not possible to continue with this QC sample. The sample is not measured, but the failed attempt is logged in the table.

Expected ESR:
This is the temperature corrected mean value (incorporated in the StaRRsed barcode) and the accepted range of deviation. The applicable values for the acceptable range depend on the user setting.

ESR 60:
Uncorrected result from QC sample.

ESR 60 T.CORR.:
Temperature corrected result from QC sample.

T(℃):
Temperature at which the sample was measured.

Error/Warning:
Only special QC errors are mentioned here, general ESR warnings/errors are mentioned in the next column.

After these columns additional data is shown: pipette number, dilution rate, ESR30, ESR time and Aspect. Scroll to the right.

Results are always shown with and without Temperature correction, independent of the setting TEMP. CORRECTION (ON or OFF).

The following options can be selected:

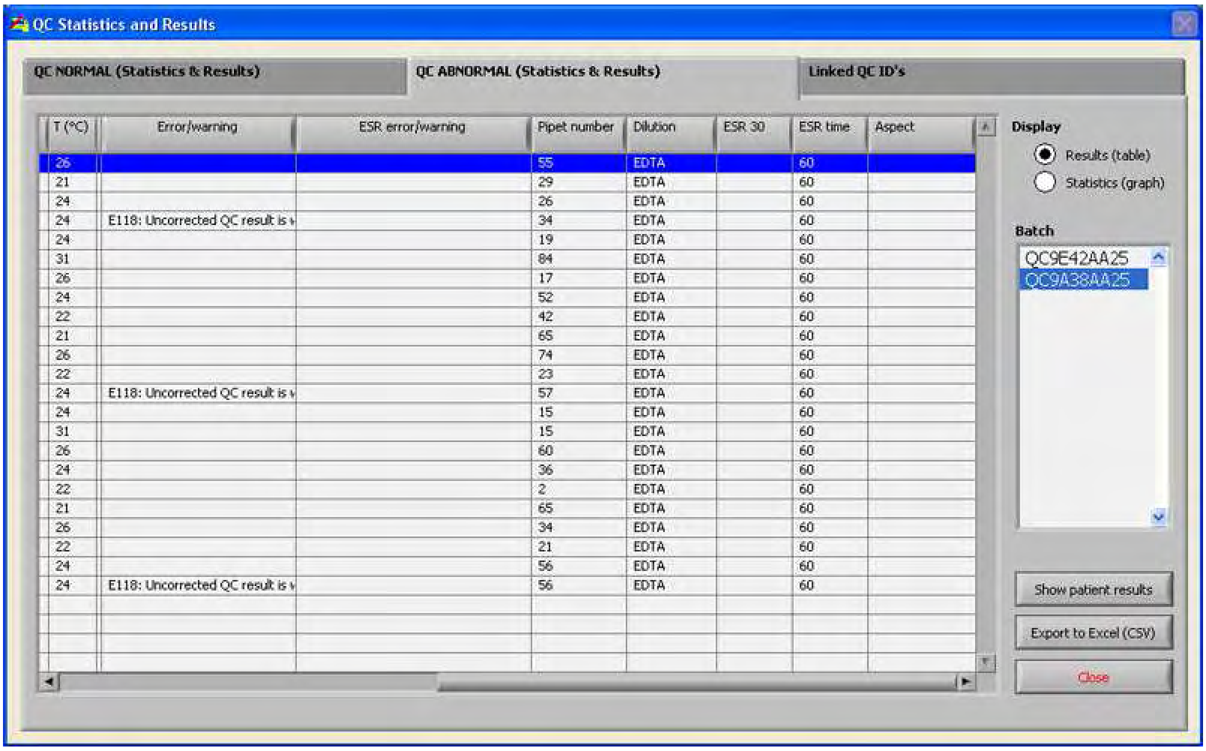
RELATED PATIENT RESULTS
This screen is simular to the "Display sample history" screen. The background colour of the patient history table is switched to light yellow to distinguish these QC related patient results from the standard patient history table. Depending on the frequency of QC samples, related patient results may span over multiple days and are listed per date.

EXPORT TO EXCEL (CSV)
Results can be exported to a .CSV file and imported in an MS Excel file for further analyses.

BATCH
All used batches of StaRRsed Control are shown, results are shown for chosen batch ID.

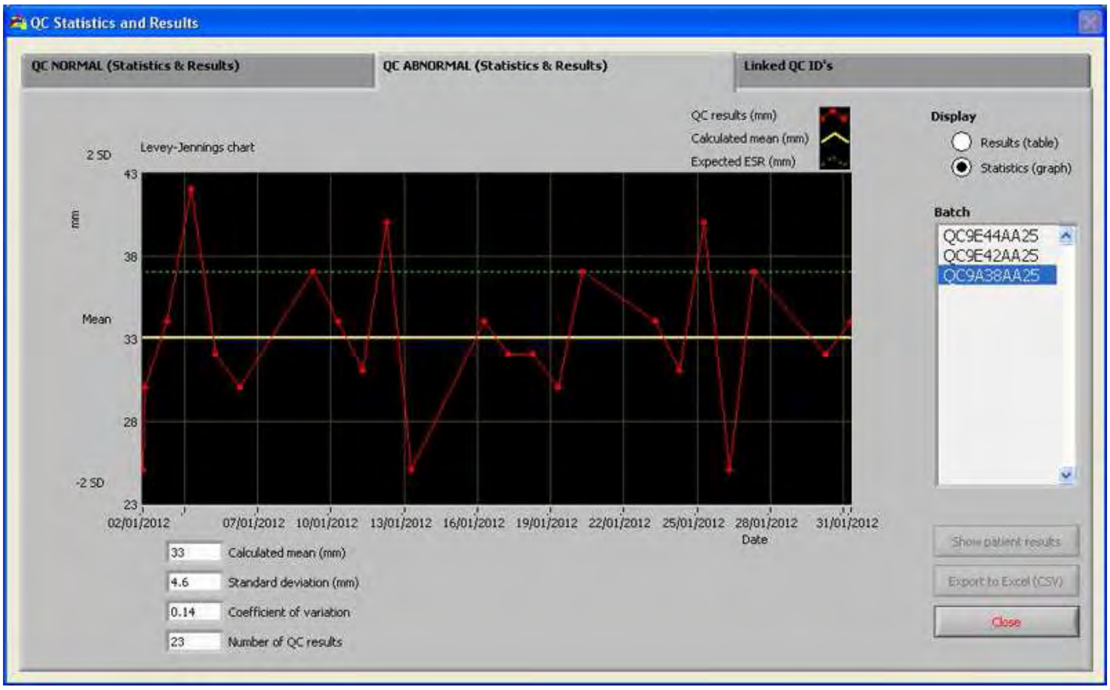
CLOSE
Return to History Screen.

6.3.5.5. QC abnormal results screen extended



After scrolling the general data from the QC results are shown.

6.3.5.6. QC abnormal results (graph)



Display Statistics (graph):

All QC results from the chosen StaRRsed Control batch are shown in a Levey-Jennings chart.

Shown in the graph:

- QC results (red) = values of measurements per date
- Calculated mean (yellow) = mean value of all QC results of the specific batch
- Expected ESR (green) = Assay mean value of chosen StaRRsed Control

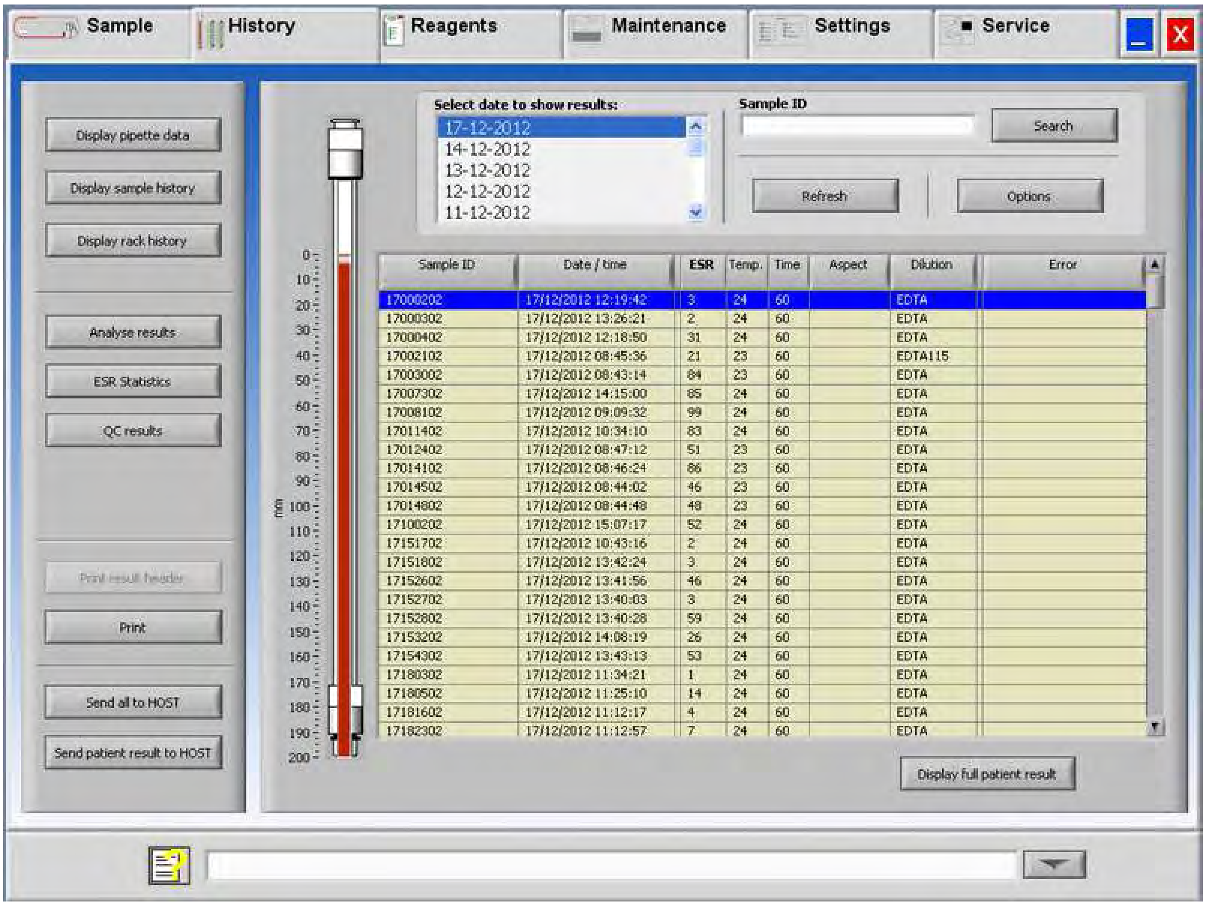
Shown as value:

- Calculated mean = mean value of all QC results of the specific batch
- Standard deviation = the average deviation of all QC results compared with the expected ESR
- Coefficient of variation = ratio of the standard deviation to the expected ESR, expressed in a percentage
- Number of QC results

This graph gives a first indication of the measuring stability of the InteRRliner V8. Further analysis and identification of systematic errors have to be performed in the user's Quality Control System.

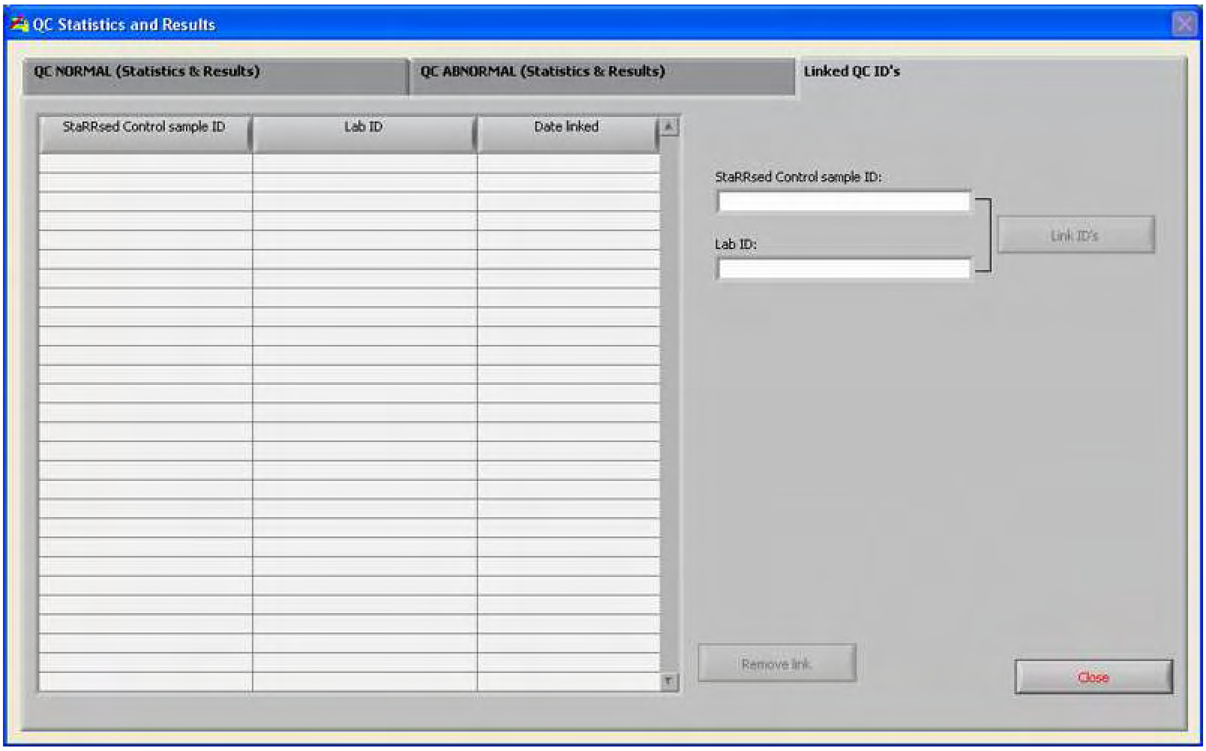
CLOSE
Return to History Screen

6.3.5.7. Display sample history (QC)



This screen shows all patient results that have been measured after the selected QC result and up to the following QC result. The results are presented in the layout of the "DISPLAY SAMPLE HISTORY (on page 48)" screen. Depending on the frequency of QC samples, related patient results may span over multiple days and are listed per date. All general ESR data and errors of QC samples are shown here.

6.3.5.8. Linked QC ID's



Use this screen to link the StaRRsed Control sample ID with a Lab ID or to check which links are active.

1. "StaRRsed Control sample ID": Enter the lot number or scan the barcode from the original StaRRsed Control tube label. If the original label is already covered by the Lab ID label, find the lot number and barcode on the package insert.
2. "Lab ID": Enter the patient number or scan the barcode from the label that the lab is using to identify the sample.
3. Click button "Link ID's" to add the linked ID's to the list. The "Date linked" will be added automatically.
4. Attach the Lab ID label on the StaRRsed Control sample tube so that the original barcode is completely covered to ensure that only the Lab ID barcode can be scanned by the InteRRliner V8.

If the StaRRsed Control sample ID is not correct or the expiry date is exceeded, a message will be shown and the ID's are not added to the list.

To remove a link that will no longer be used, select the link in the table and click on "REMOVE LINK".

Depending on the optional setting "AUTOMATICALLY REMOVE LINKED QC ID AFTER RESULT", (SETTINGS - QC SETTINGS (ON PAGE 98)) the links can be removed automatically when a usable ESR result has been reported for this particular Lab ID.

6.3.5.9. QC Result analysis

Authorized staff should identify and differentiate acceptable/unacceptable random errors and trends and/or shifts in systematic errors from the statistical data. Depending on the users Quality Control Procedures analytical results could be accepted or rejected.

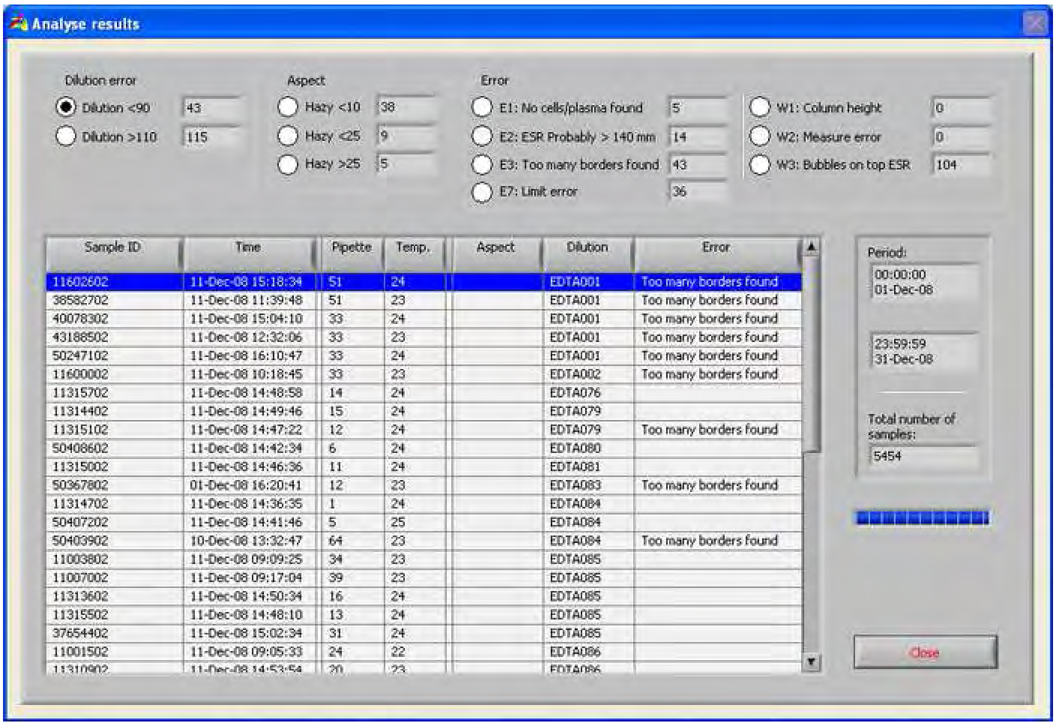
Changes in QC results can be gradual or abrupt. Gradual changes can be caused by contamination and incidental environmental variations. Abrupt changes can be caused by change of QC material batch or possible hardware errors.

If results are continuously out of range due to significant difference between calculated mean and control value, but the statistics show precise results with small deviations, it should be considered to expand the acceptable assay range with ***QC Settings*** (on page 98).

If results are incidentally out of range it is advised to perform a daily maintenance and/or fill and clean step and then perform another QC sample step before releasing patient results.

If results are not send to the LIMS QC Results can be exported to MS Excel CSV files for further analysis in lab's own Quality Control data system.

6.3.6. History analyse

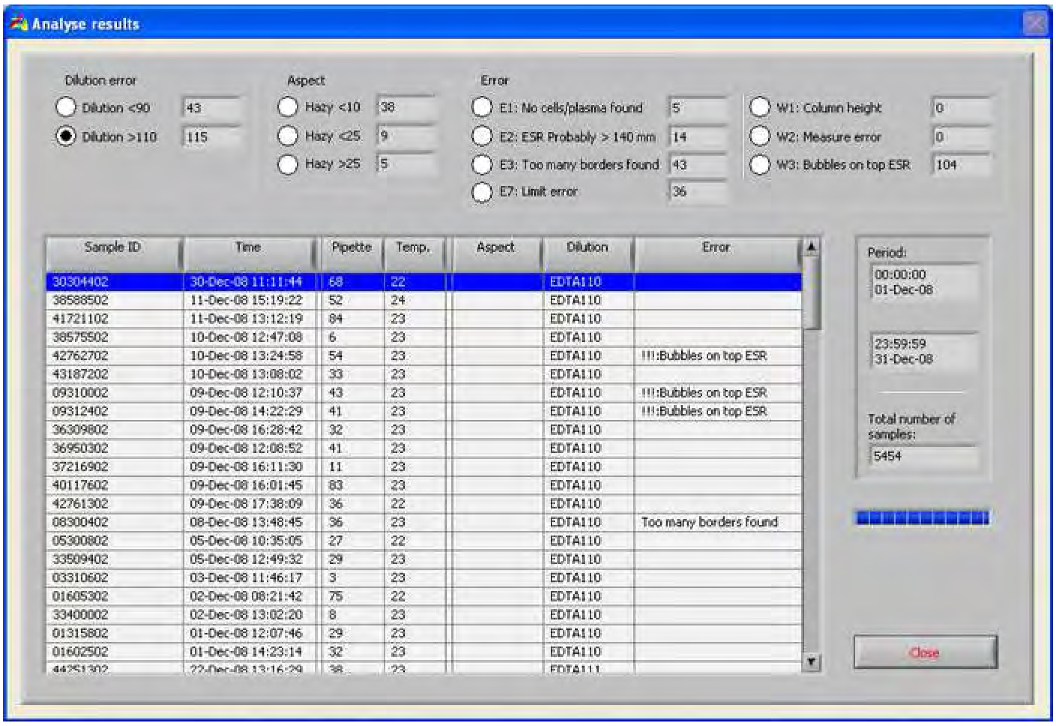


DILUTION ERROR

The dilution error detection is a user setting and can be changed in SETTINGS - dilution error detection to 0 ... 25 %. In this example, the dilution error detection is set to 10% and limit errors set to YES.
By selecting Dilution >= 110 all the samples with a dilution rate >= 110 are displayed in the table.
By selecting Dilution <= 90 all the samples with a dilution rate <= 90 are displayed in the table.

In the header of the table the names of the columns are shown. Double-click the header of any column to sort the table by this column in ascending order.

6.3.7. History analyse results high dilution

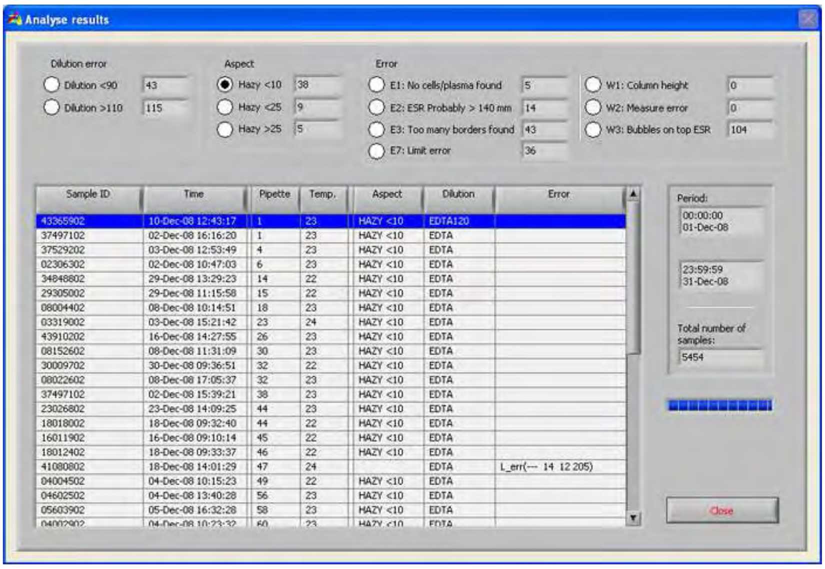


DILUTION ERROR

The dilution error detection is a user setting and can be changed in SETTINGS - dilution error detection to 0 ... 25 %. In this example, the dilution error detection is set to 10% and limit errors set to YES.
By selecting Dilution >= 110 all the samples with a dilution rate >= 110 are displayed in the table.
By selecting Dilution <= 90 all the samples with a dilution rate <= 90 are displayed in the table.

In the header of the table the names of the columns are shown. Double-click the header of any column to sort the table by this column in ascending order.

6.3.8. History aspect

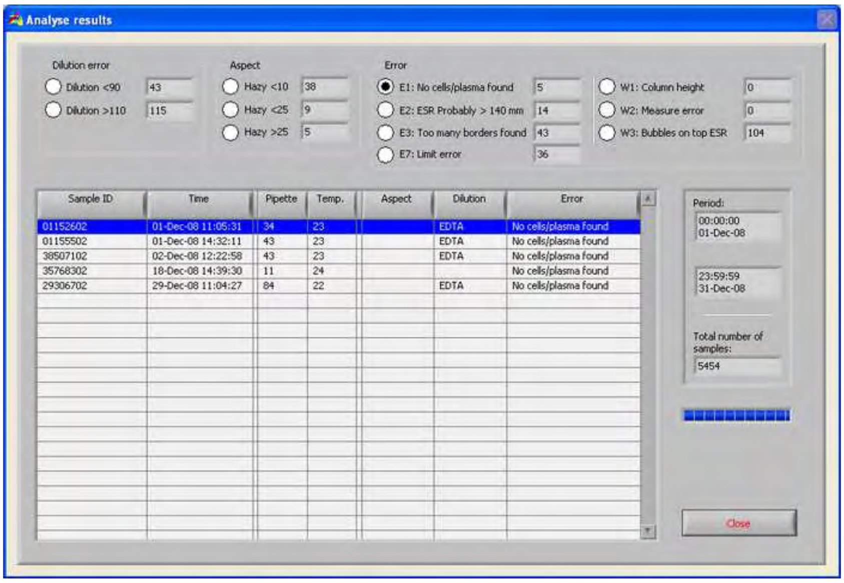


ASPECT

By selecting one of the three Hazy aspect codes, all the samples with this aspect code are displayed in the table, also in case of an error.

In the header of the table the names of the columns are shown. Double-click the header of any column to sort the table by this column in ascending order.

6.3.9. History analyse error

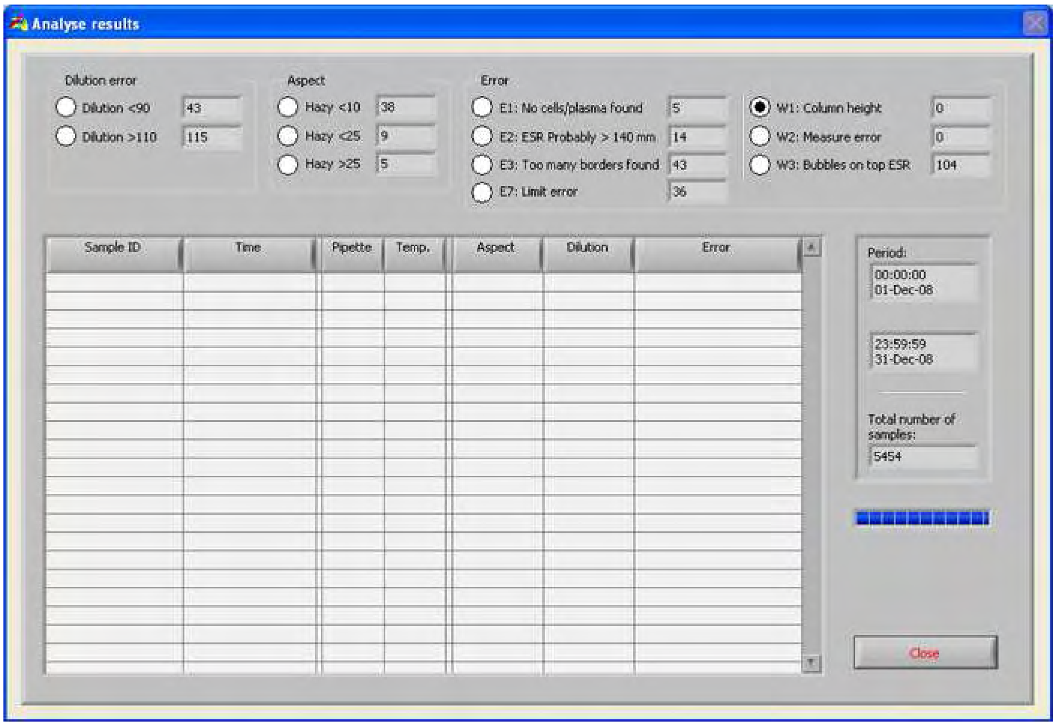


ERROR

By selecting one of the error codes, all the samples with this error code are displayed in the table.

In the header of the table the names of the columns are shown. Double-click the header of any column to sort the table by this column in ascending order.

6.3.10. History analyse warning

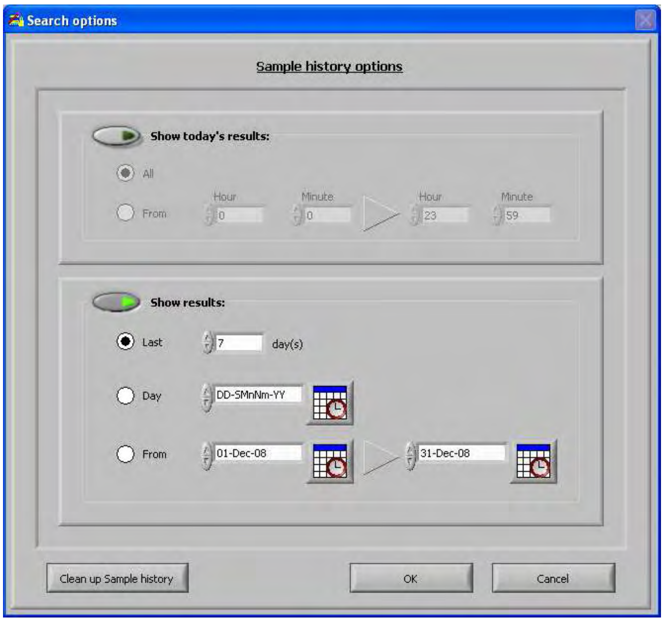


WARNING

By selecting one of the warning codes, all the samples with this warning code are displayed in the table.

In the header of the table the names of the columns are shown. Double-click the header of any column to sort the table by this column in ascending order.

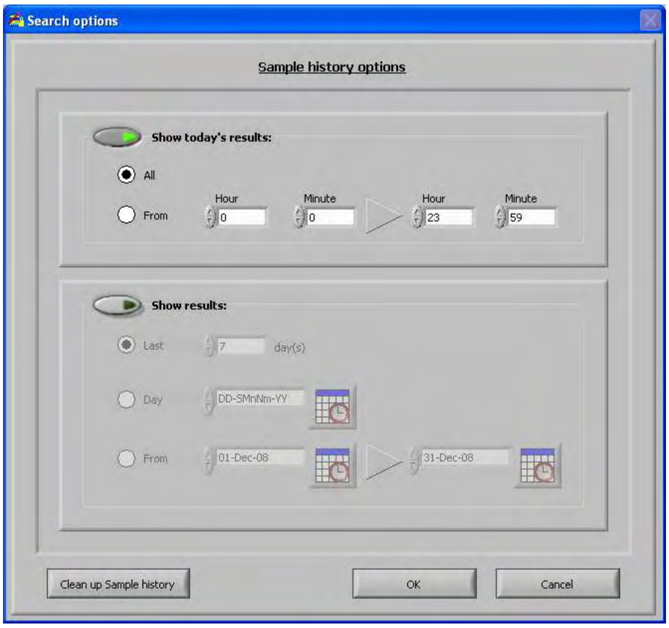
6.3.11. History sample analyse option



Make a selection for

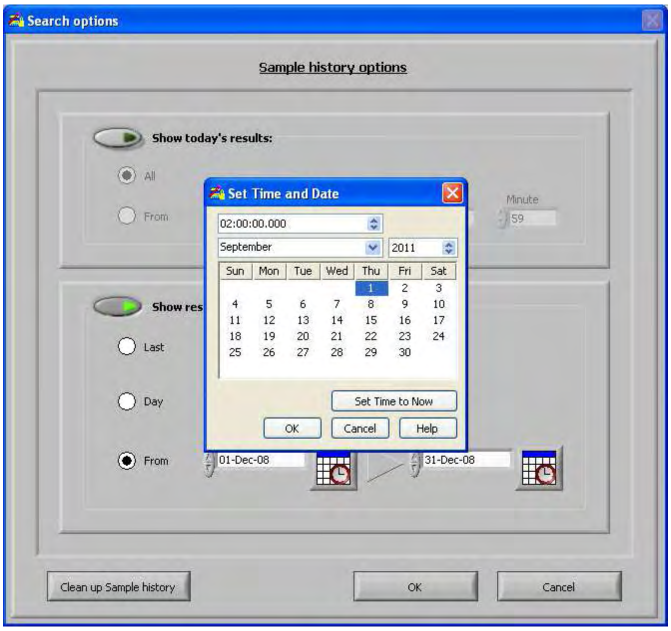
1. A specific number of past days.
2. A specific date.
3. A range of days from start date to end date.

6.3.12. History sample analyse option day



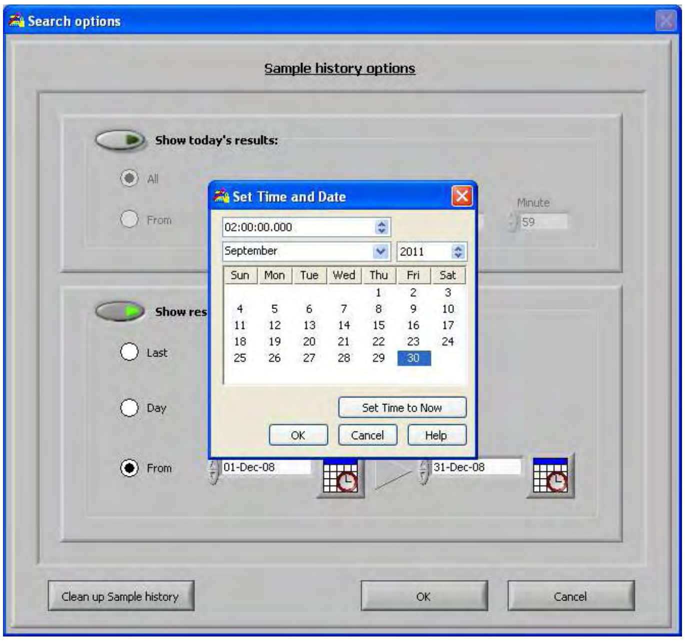
Make a selection for all of today's results or only today's results between start time and end time.

6.3.13. Set start date



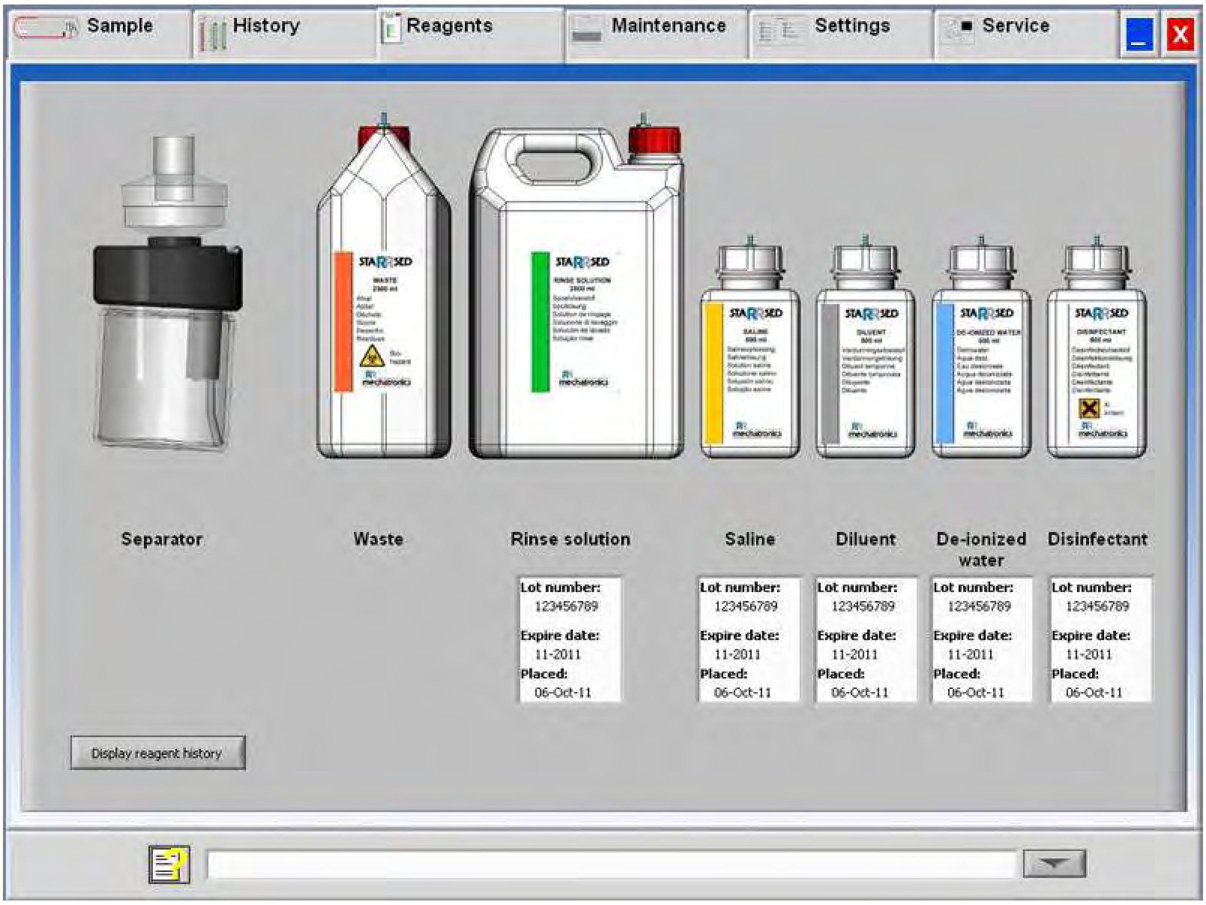
Input the Start date and time.

6.3.14. Set end date



Input the End date and time.

6.4. Reagents screen



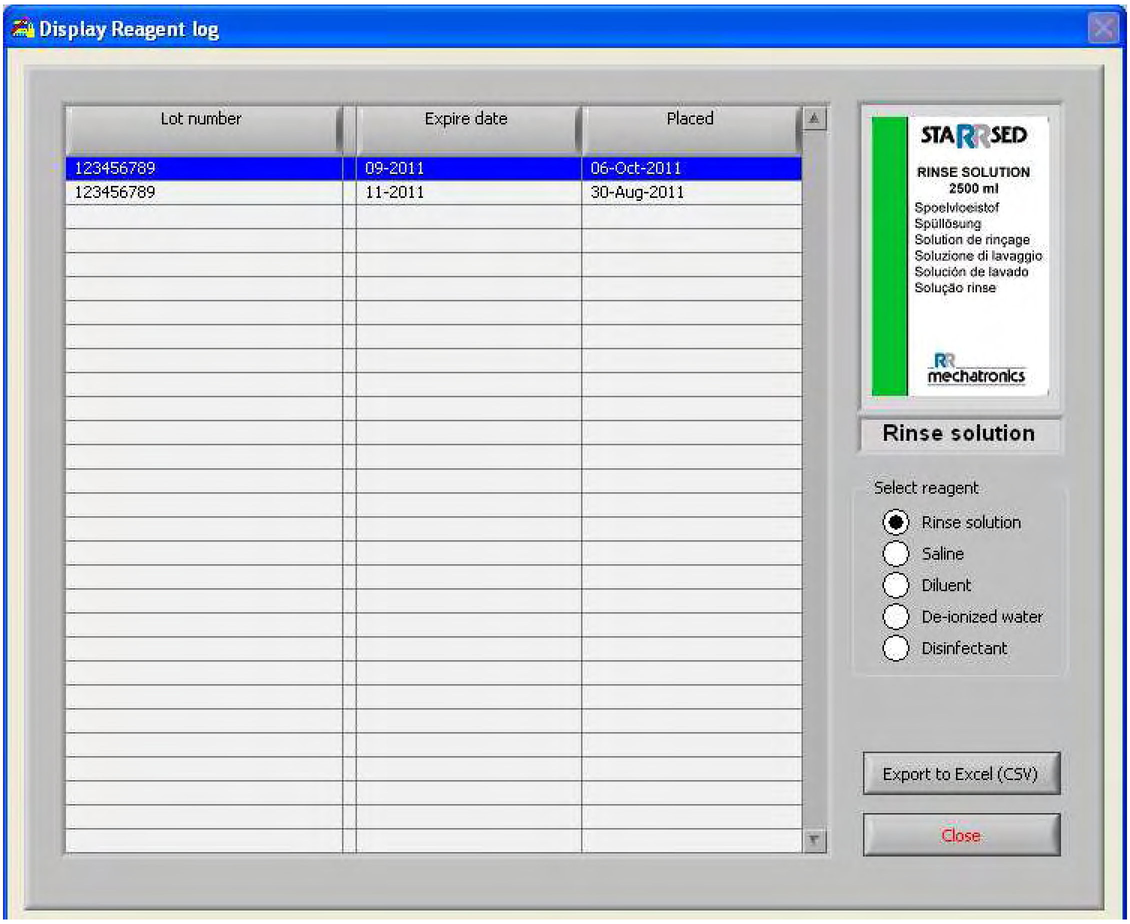
When there is a sensor alarm, an alarm indicator is shown in the tab REAGENTS. The alarm status of the bottles and separator are shown in this screen. An empty bottle is marked by a flashing red to yellow mark.
When the bottle status screen is active, the bottle audio alarm is switched off.
Reagent information is shown in the little text boxes. To input new reagent information when reagent container is replaced, click on the appropriate text box.

Note: When the expire date is exceeded the text box will flash red.

The software checks the bottle status before starting a new rack. If a level alarm is **ON**, it will not process the new rack. If an alarm comes **ON** during a rack, it will finish to aspirate that rack (10 samples max.). Washing dirty pipettes always continues, as to avoid that the samples are left in the pipettes.

Reagents alarm is also set when the expire date of the reagent is exceeded or opened more than three months. The message Not allowed now! See REAGENTS! appears. Processing of new samples is stopped. A log is available for all reagents and can be accessed by clicking on DISPLAY REAGENT HISTORY (on page 70).

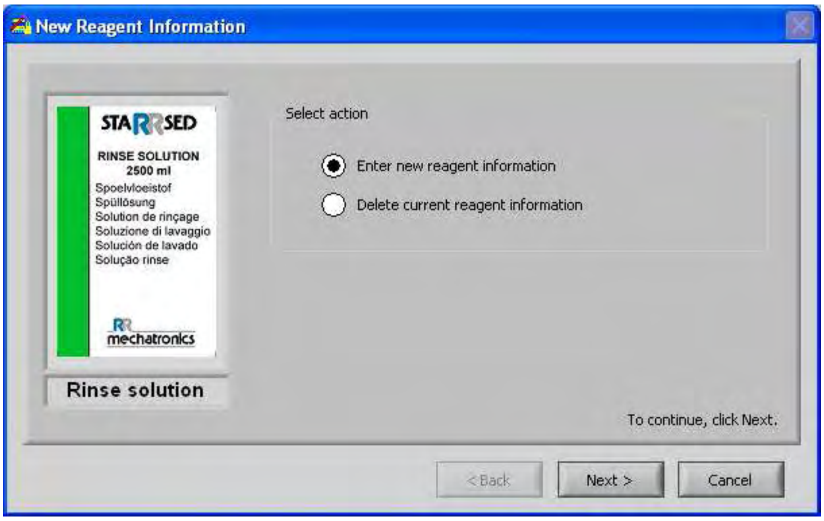
6.4.1. Display reagent history



This screen shows the history of the used reagents.
Select the reagent type on the right side.

For external use of the information all the logged reagent data can by exported to EXCEL .CSV format by clicking Export to Excel (CSV).

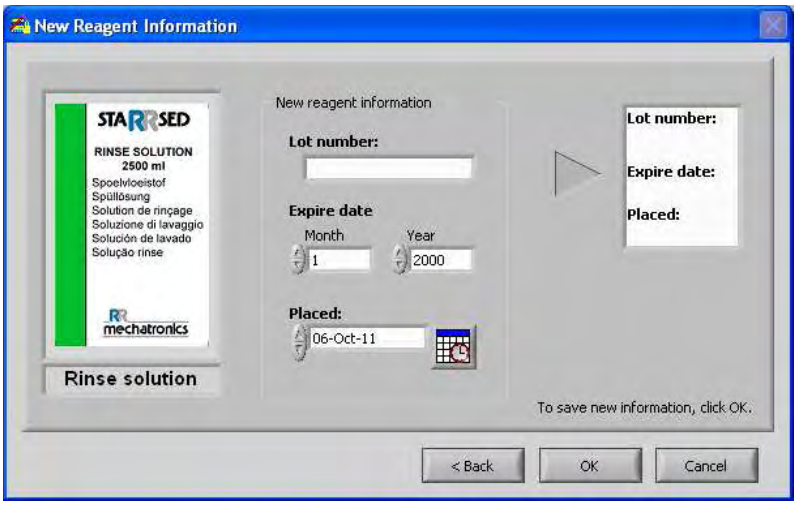
6.4.2. New reagent input



Input screen for new reagents. Make a selection to add new (default setting) or delete the current information and continue with "Next".

Note: Only the Rinse solution input screen is shown in this manual. The input screens are the same for all reagents.

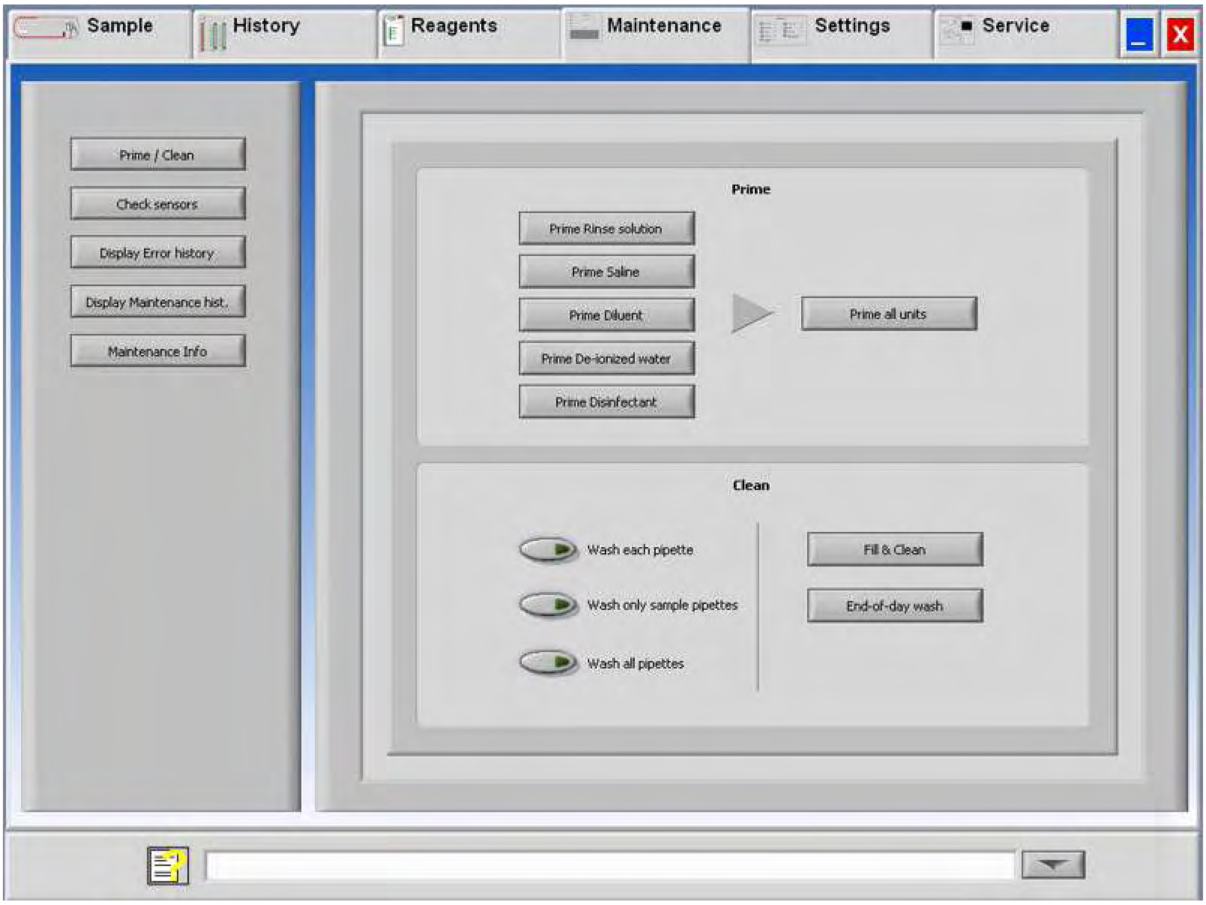
6.4.2.1. New reagent input (cont)



Data can be entered with the keyboard or with a barcode reader.

1. First enter / read the Article number
2. Enter/ read Lot number.
3. Enter / read the Expiry date (if barcode reader is used: cursor has to be in one of the two boxes)
4. If necessary, adjust the date when the reagent was placed.
5. Check if the preview box shows the correct information, then press OK.

6.5. Maintenance screen

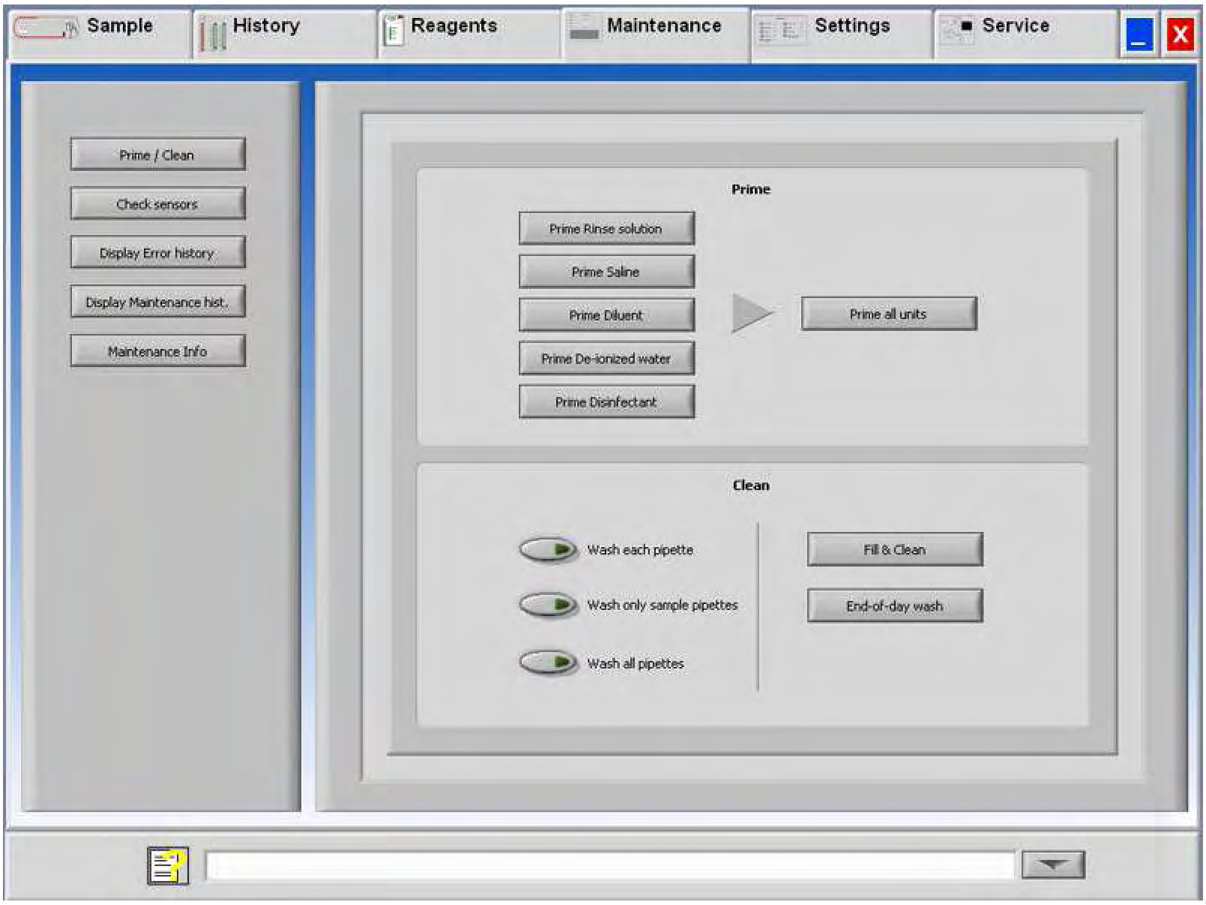


When there is a sensor alarm, an alarm indicator is shown in the tab MAINTENANCE.

This screen has 5 sub screens:

1. PRIME (ON PAGE 73) / CLEAN
2. CHECK SENSORS (on page 76)
3. DISPLAY ERROR HISTORY (on page 81)
4. DISPLAY MAINTENANCE HIST. (on page 82)
5. MAINTENANCE INFO (on page 83)

6.5.1. Prime / Clean



When there is a sensor alarm, an alarm indicator is shown in the tab MAINTENANCE.

All maintenance functions for the fluid system are grouped under button PRIME / CLEAN (on page 73).

After each reagent change, the fluid system must be primed to fill the relevant tubes with reagent and remove air. This is also part of the daily start-up. Use the applicable button to perform the automatic priming cycle for this reagent:

6.5.1.1. Prime Rinse solution

- PRIME RINSE SOLUTION:
  After each measurement, the pipettes are washed and dried automatically.

6.5.1.2. Prime Saline

- PRIME SALINE:
  After each aspiration, the outer needle, sample probe and fill nozzle are washed with saline.

6.5.1.3. Prime Diluent

- PRIME DILUENT:
  The Diluter prime cycle is 5 strokes of the syringe.

6.5.1.4. Prime de-ionized water

- PRIME DE-IONIZED WATER:
  After each aspiration, the fill nozzle is flushed with de-ionized water.

6.5.1.5. Prime Disinfectant

- PRIME DISINFECTANT:
  During a pipette rinse cycle, a small amount of disinfectant is flushed around the bottom of the pipette and into the waste system.

6.5.1.6. Prime all units

When the InteRRliner V8 has been idle for more than eight hours, some reagents may have dropped from the tubes due to gravity. Prime all tubing before sampling with:

- PRIME ALL UNITS
  All priming functions are sequentially performed one time.

6.5.1.7. Wash each pipette

- Wash each pipette:
  When the pipette belt turns one position, the pipette at the rinse position will be rinsed and dried, regardless if it was filled or not.

6.5.1.8. Wash only sample pipettes

- Wash only sample pipettes:
  All pipettes which are currently holding samples are washed and dried ones.
  A warning is shown on the display: <Pipette data will be lost!>.

  NOTE: Before executing this function, check carefully if there are samples in the pipette belt that need to be measured.
  Any remaining samples will be washed away and will **NOT** be measured!

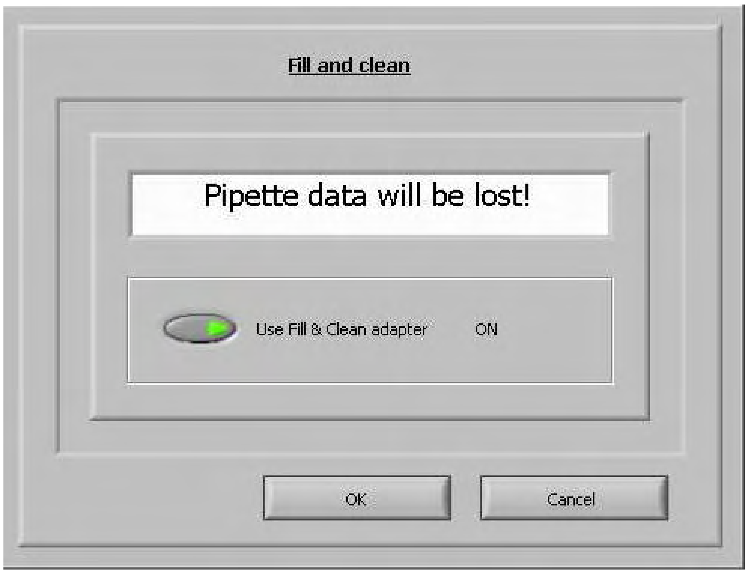
6.5.1.9. Wash all pipettes

- Wash all pipettes:
  All pipettes on the pipette belt are washed and dried ones.
  A warning is shown on the display: <Pipette data will be lost!>.

  NOTE: Before executing this function, check carefully if there are samples in the pipette belt that need to be measured.
  Any remaining samples will be washed away and will **NOT** be measured!

6.5.1.10.Fill and clean screen

Fill & Clean:
Automatic fill and clean function, each individual pipette on pipette belt will be filled with cleaning solution. During prolonged use of the instrument, proteins are building up in the Westergren pipettes which need to be removed using a strong cleaning agent.
This cycle takes about 90 minutes.
The Fill & Clean function is part of the monthly maintenance procedure.
A warning is shown on the display: <Pipette data will be lost!>.



By toggling the switch ON the Fill and clean adapter is used.

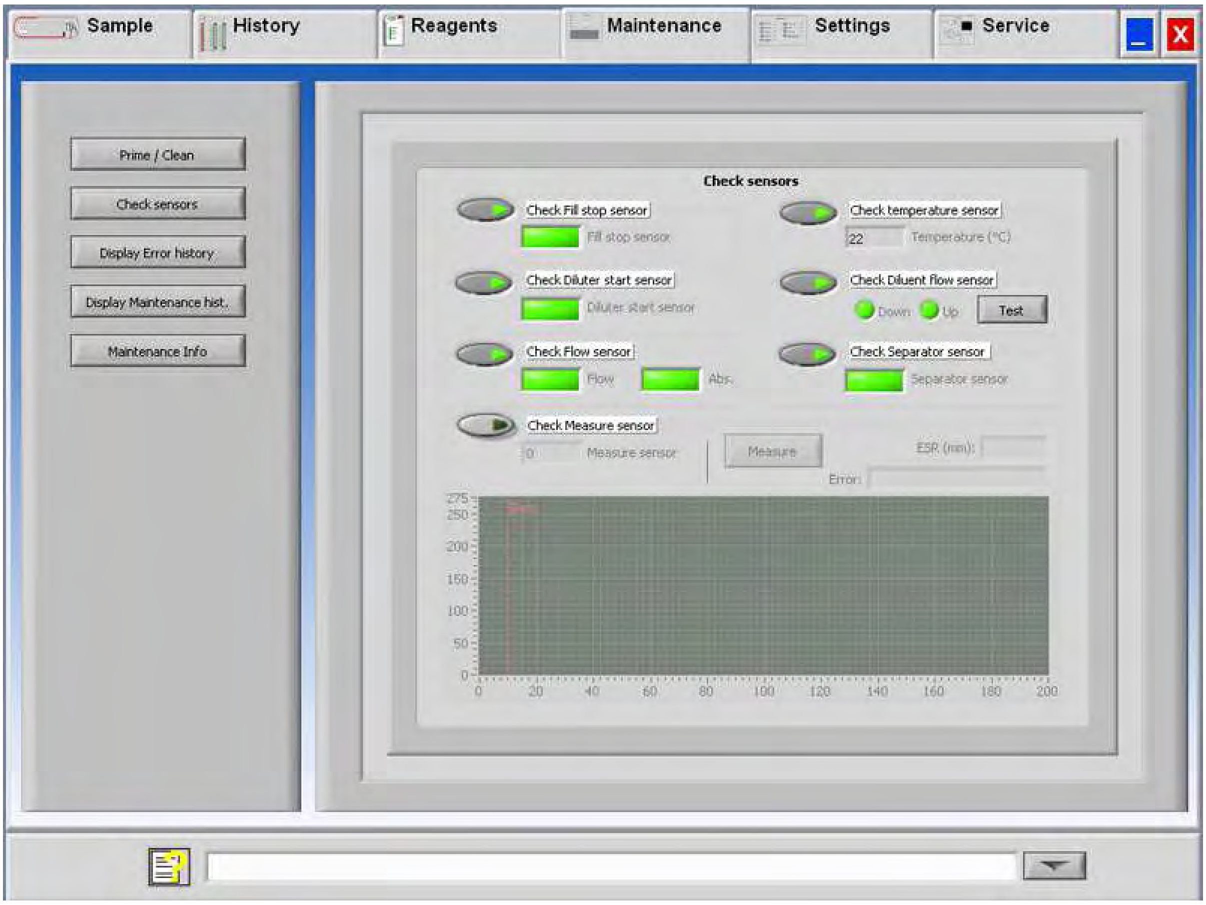
By toggling the switch OFF the Fill and clean without adapter is used.

See chapter Maintenance ***Fill and clean procedure*** (on page 166) for more information.

6.5.1.11.End-of-day-wash procedure

- End-of-day wash:
  All pipettes will be washed once and needle, fill-nozzle and rinse-nozzle (wash station) are primed.

6.5.2. Check sensors

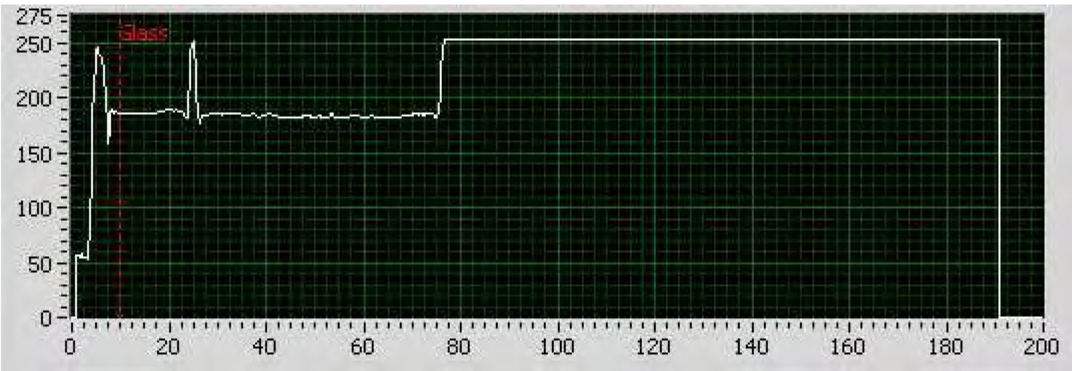


When there is a sensor alarm, an alarm indicator is shown in the tab MAINTENANCE.

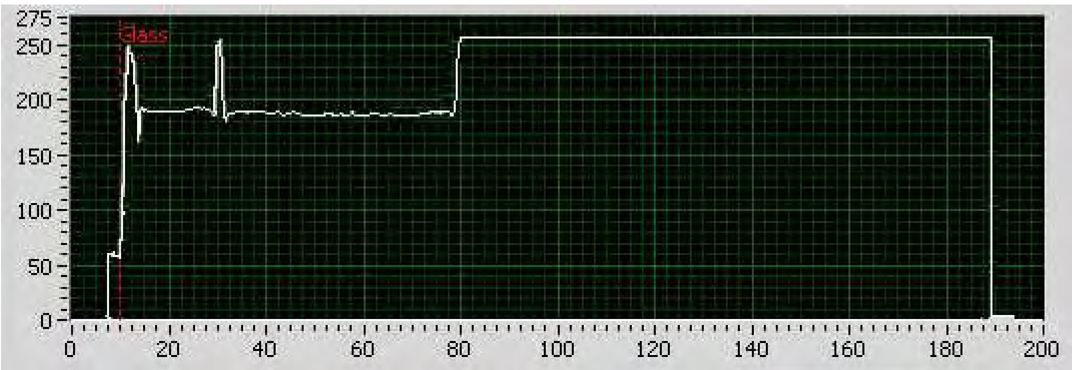
All functions to check the status of the sensors are grouped under button CHECK SENSORS (on page 76).

- Check Fill stop sensor: Click the Check button. The green light is shown if the sensor value is in range.
- Check temperature sensor: Value must be equal to the actual room temperature near the pipette belt.
  The value can be set in tab SETTINGS.
- Check Diluter start sensor: This sensor is only used in EDTA mode. If the diluter does not start during the aspiration, the status of this sensor must be checked.
  Click the Check button. The green light is shown if the sensor value is in range.
- Check Diluent flow sensor: This sensor is only used in EDTA mode. When activated, the LED Down is green and the LED Up is red. When the button Test is clicked, the LED Up must become green. After finishing the test, both LED's must be green.
- Check Separator sensor: Click the Check button. The green light is shown if the sensor value is in range.

- Check Flow sensor: Click the Check button. The green light is shown if the sensor value is in range.
- Check Measure sensor: Click the Check button. The green light is shown if the sensor value is in range.
  Press the button MEASURE. The pipette currently at the measure position will be measured.
  The results are displayed in graphical form:



Measure head start position correct



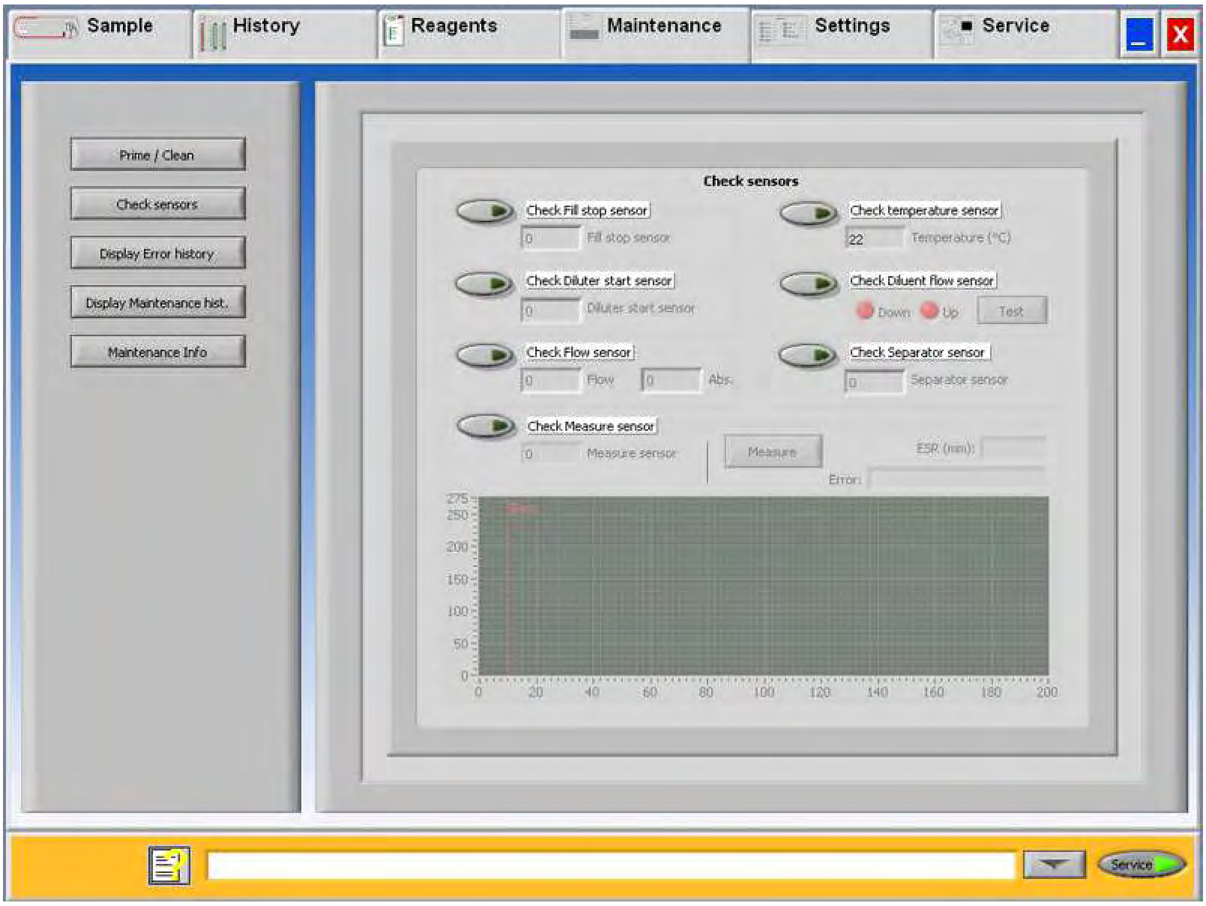
Measure head start position wrong

NOTE: Clean sensors first before executing this function.

NOTE: When a test pipette is installed at the measuring position the result of the test pipette is displayed in the field "ESR (mm)".

Note: When the sensor is out of range and the light is red, the ***sensor values*** (on page 78) can be checked by turning on the service mode.

6.5.2.1. Check sensors in service mode



When there is a sensor alarm, an alarm indicator is shown in the tab MAINTENANCE.

All functions to check the status of the sensors are grouped under button CHECK SENSORS (on page 76).

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6.5.2.2. Fill stop sensor

- Check Fill stop sensor: Values must be within the following limits: FS 90..**140**..165
  NOTE: Clean sensors first before executing this function.

6.5.2.3. Temperature sensor

- Check temperature sensor: Value must be equal to the actual room temperature near the pipette belt.
  The value can be set in tab SETTINGS.

6.5.2.4. Diluter start

- Check Diluter start sensor: This sensor is only used in EDTA mode. If the diluter does not start during the aspiration, the status of this sensor must be checked.
  The value should be: Diluter start sensor400-700.

6.5.2.5. Diluent flow sensor

- Check Diluent flow sensor: This sensor is only used in EDTA mode. When activated, the LED Down is green and the LED Up is red. When the button Test is clicked, the LED Up must become green. After finishing the test, both LED's must be green.

6.5.2.6. Separator sensor

- Check Separator sensor: The value must be in range of <200 600 >700.

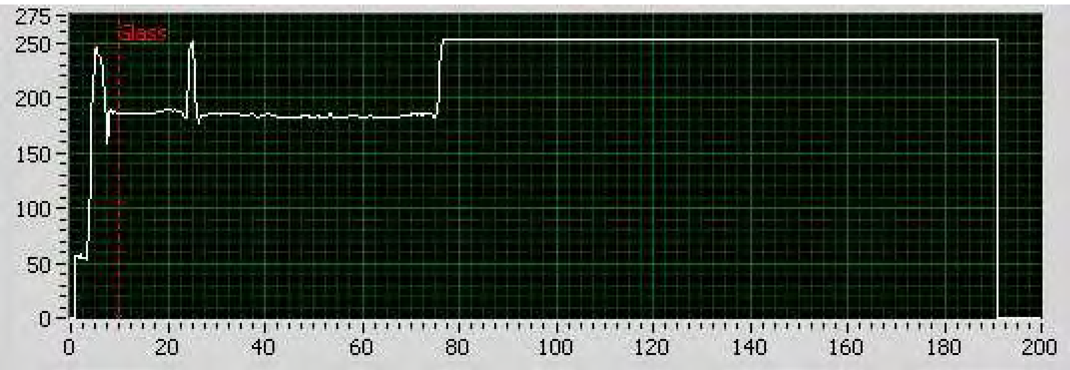
6.5.2.7. Flow sensor

- Check Flow sensor: The vacuum unit switches on and the values must be in this range:
  For InteRRliner V8 Flow: 0925-**0980**-1020   Abs: 0300-**380**-0390

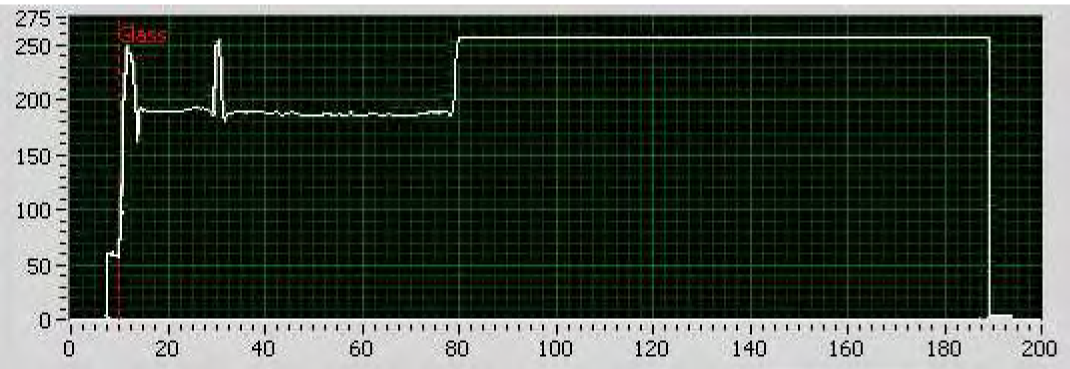
  Note: If for example the yellow orifice is blocked the flow will be: Offset: 0045-**0050**-0055.

6.5.2.8. Measure sensor

- Check Measure sensor (In Service mode): When the sensor is not engaged with the pipette, the Value must be within the following limits: MS 40..**50**..60.
  Press the button MEASURE. The pipette currently at the measure position will be measured. The results are displayed in graphical form. Raw data is also stored on the D: drive (D:\MeasureTest.txt).



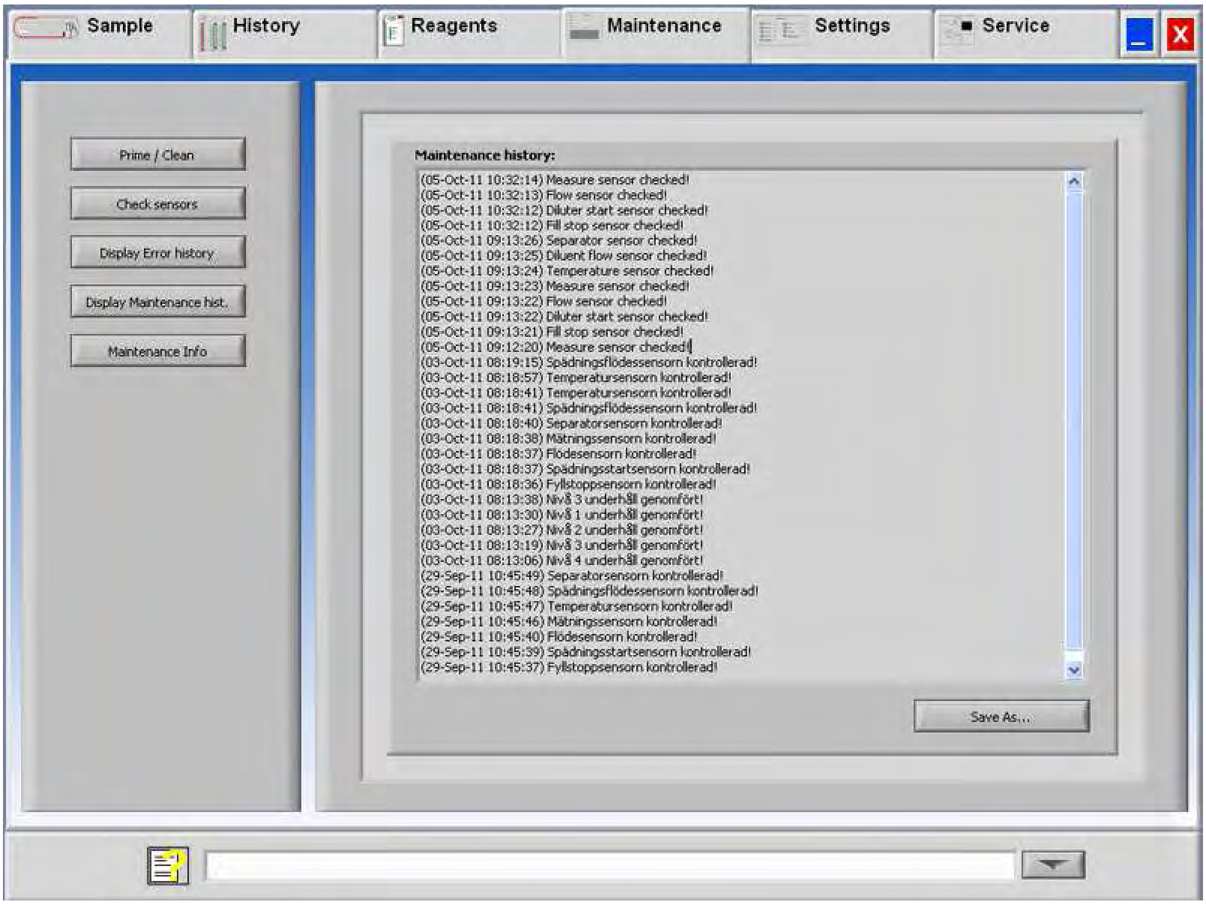
Measure head start position correct



Measure head start position wrong

NOTE: Clean sensors first before executing this function.
NOTE: When a test pipette is installed at the measuring position the result of the test pipette is displayed in the field "ESR (mm)".

6.5.3. Display error history

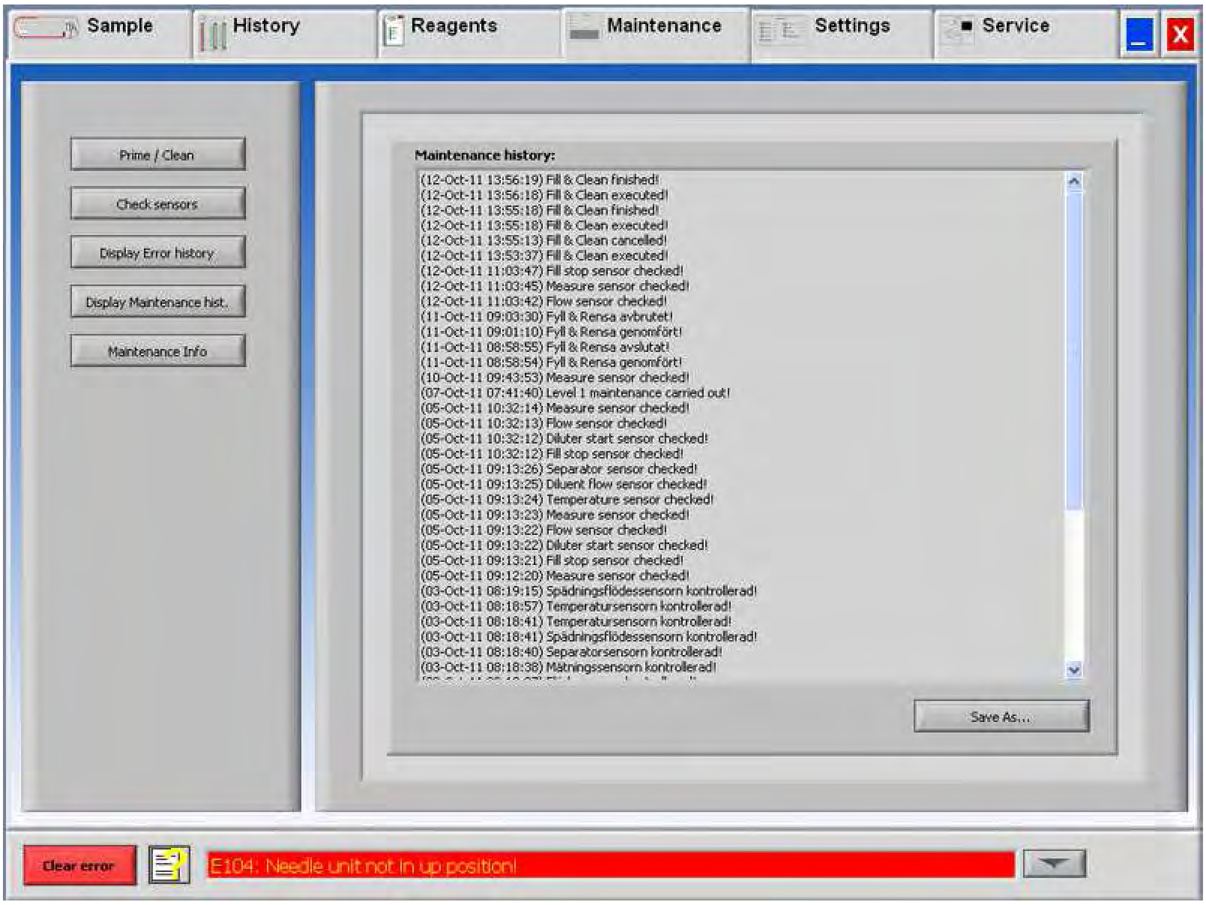


When there is a sensor alarm, an alarm indicator is shown in the tab MAINTENANCE.

All errors that occurred during operation are logged automatically.
This list can be used by field engineers to check check the status of the instrument and locate possible problems.

This log can be saved e.g. to a memory stick by clicking button **Save As ...**

6.5.4. Display maintenance history

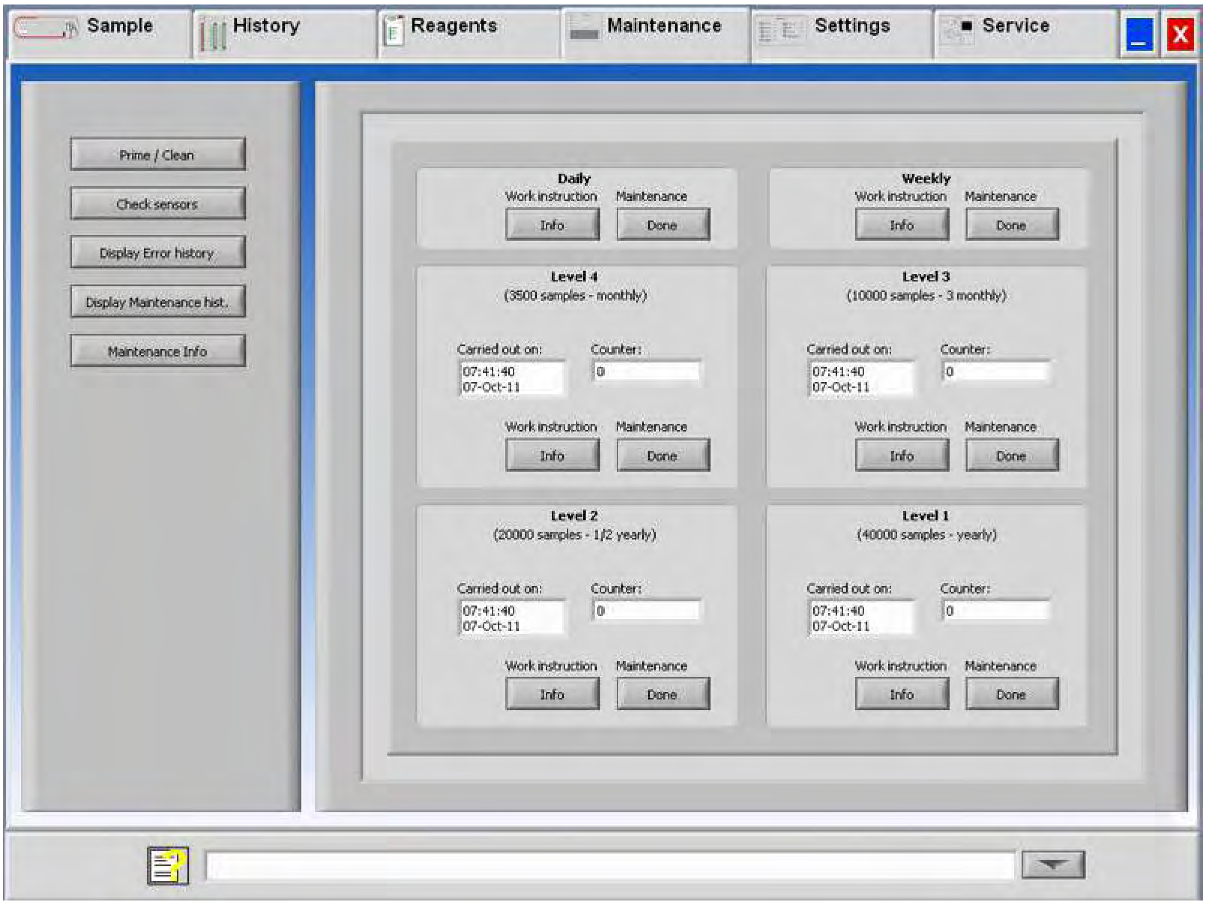


When there is a sensor alarm, an alarm indicator is shown in the tab MAINTENANCE.

All performed maintenance functions are logged automatically.

This log can be saved e.g. to a memory stick by clicking button **Save As ...**

6.5.5. Maintenance info



When there is a sensor alarm, an alarm indicator is shown in the tab MAINTENANCE.

This screen is divided in 6 maintenance level sections. For maintenance levels 1 to 4, the status is monitored and flagged if it is overdue.

Press the button **Info** to open the work instruction for a specific maintenance level.

When this maintenance is done press the button **Done** to log the completed work in the maintenance log file.

6.5.5.1. Maintenance info overview

When there is a sensor alarm, an alarm indicator is shown in the tab MAINTENANCE.

This screen is divided in 6 maintenance level sections. For maintenance levels 1 to 4, the status is monitored and flagged if it is overdue.

Press the button **Info** to open the work instruction for a specific maintenance level.

When this maintenance is done press the button **Done** to log the completed work in the maintenance log file.

6.5.6. Close

Make the selection End-of-day wash procedure or Close program:

End-of-day wash procedure will start to wash all pipettes, needle, fill-nozzle and rinse-nozzle (wash station). The function can be set up for automatic execution in the following screen.

Close program will only close down the program.

6.5.7. End-of-day-wash schedule settings

End-of-day wash procedure:
All pipettes will be washed once, needle, fill-nozzle and rinse-nozzle (wash station) are primed.

Select the time of the day in hours and minutes for automatic start of this function.

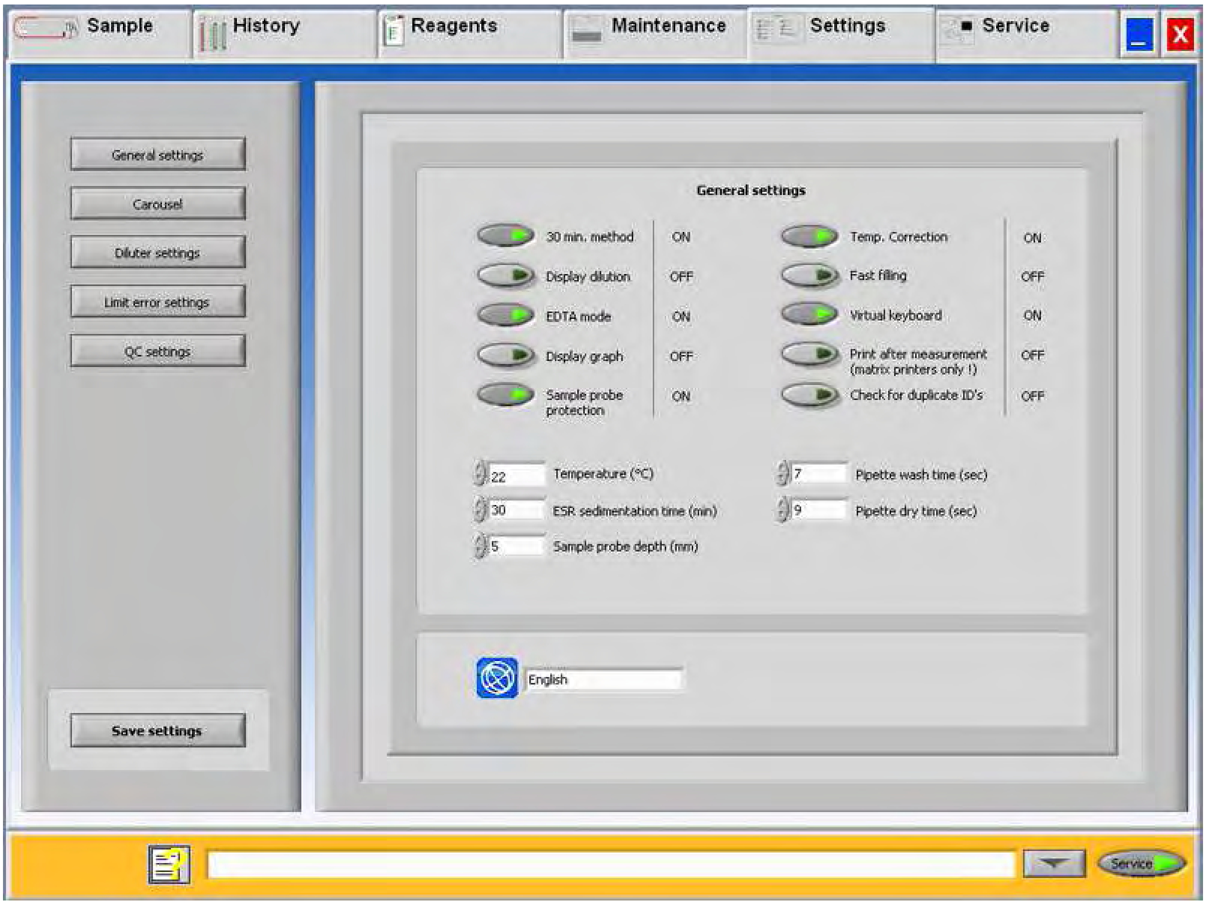
6.5.8. End-of-day-wash options

End-of-day wash procedure:
All pipettes will be washed once, needle, fill-nozzle and rinse-nozzle (wash station) are primed.

The following settings can be selected for the function:

- No End-of-day wash: The function is not active.
- Immediately: The function runs immediately after pressing the button OK.
- Only once: The function runs only once at the selected time.
- Weekdays: The function runs only on working days (monday till friday) at the selected time.
- Daily: The function runs on a daily base at the selected time.

6.6. General settings



This screen has five sub screens

1. ***General settings*** (on page 86)
2. ***Carousel control*** (on page 89)
3. ***Diluter settings*** (on page 95)
4. ***Limit error settings*** (on page 97)
5. ***QC Settings*** (on page 98)

Selections are made by an ON-OFF switch in the screen and by numerical inputs.
If virtual keyboard is switched ON a virtual keyboard pops up for input the data. When Virtual keyboard is switched OFF the arrow keys must be used for input of data.

When ready with press SAVE SETTINGS before you continue.

The selection box for the language is marked with a symbol depicting a globe.
Select the language for the software and the "Instructions For Use" by clicking on the appropriate language name.

Note: To switch to the selected language the first time, close and restart the software.

The following selections can be switched ON or OFF:

1. 30 MIN. METHOD
   - 30 MIN. METHOD ON: ESR's are measured after 30 minutes.
   - 30 MIN. METHOD OFF: ESR's are measured after 60 minutes.

2. DISPLAY DILUTION
   - DISPLAY DILUTION ON: The dilution rates of all samples are shown in the status line on the screen directly after aspiration.
   - DISPLAY DILUTION OFF: Dilution rates are only shown if they are outside the selected accepted range.

3. EDTA MODE
   - EDTA MODE ON: Samples are presented in EDTA sample tubes. The samples are diluted in the InteRRliner V8.
   - EDTA MODE OFF: Samples are presented in pre-diluted CITRATE sample tubes. Dilution on the InteRRliner V8 is switched OFF.

4. DISPLAY GRAPH
   - DISPLAY GRAPH ON: A graphical presentation from the measured sample data is shown on the Main screen.
   - DISPLAY GRAPH OFF: Default setting, no graph is shown.

5. SAMPLE PROBE PROTECTION
   - SAMPLE PROBE PROTECTION OFF: The sample probe motor will push the sample probe (inner needle) down to the set depth.
   - SAMPLE PROBE PROTECTION ON: The sample probe motor will stop when a certain current limit is exceeded and returns to the home position.
   - Reset the SAMPLE PROBE PROTECTION switch from ON to OFF and ON again.

6. TEMP. CORRECTION
   - TEMP. CORRECTION ON: A temperature corrected value for the ESR is shown besides the actual measured value.
   - TEMP. CORRECTION OFF: Only the actual measured ESR value is shown.

7. FAST FILLING
   - FAST FILLING OFF (Default setting): The carousel is filled with optimum pipette usage but completion of a sample rack takes a little longer. The rotation sequence of the carousel is evenly divided. In 60 minute method, the carousel moves one position every 40 seconds (approx.). In 30 minute method, the carousel moves one position every 20 seconds (approx.).

- FAST FILLING ON: The carousel is filled with optimum sample speed. The sample tubes in the rack are faster available for the user but the carousel shows more unused pipettes.

8. VIRTUAL KEYBOARD
   - VIRTUAL KEYBOARD ON: If keyboard input is required, a virtual keyboard automatically pops up on the screen.
   - VIRTUAL KEYBOARD OFF: No pop-up screen of virtual keyboard.

9. PRINT AFTER MEASUREMENT
   - This will print the measured result on a single line directly to a dot matrix printer. If this option is switched ON, it is also possible to print a new header at the top of the results. When other printers then dot matrix are used, every result is printed on one new page.

10. CHECK FOR DUPLICATE ID'S
    - CHECK FOR DUPLICATE ID'S ON: It is not possible to run the same sample ID as long as this ID is in the pipette carousel data buffer
    - CHECK FOR DUPLICATE ID'S OFF: It is possible to run the same sample ID, even when it is still stored in the carousel data buffer.

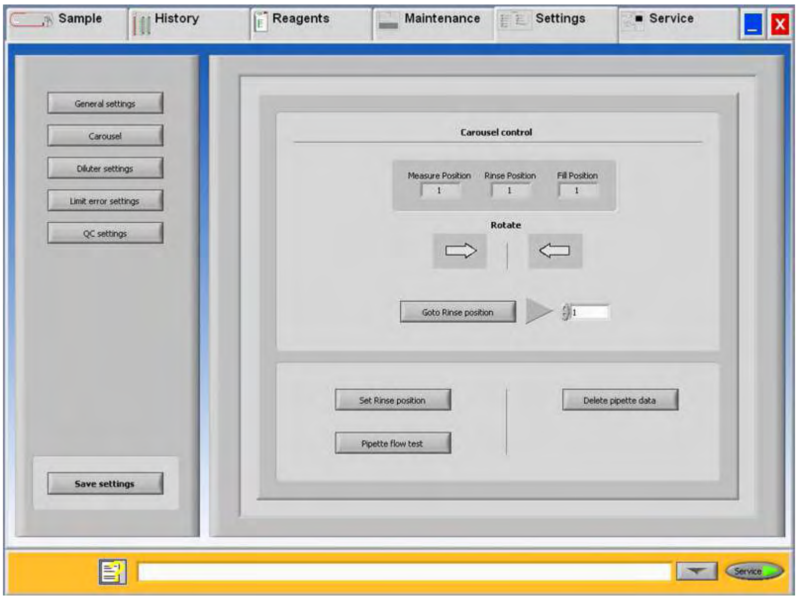
The following numerical inputs can be made:

1. TEMPERATURE IN CELSIUS. for the correct room temperature.
2. ESR SEDIMENTATION TIME IN MINUTES. for the correct time 30 or 60 minutes. This time is reset to default when Service mode is switched OFF.
3. SAMPLE PROBE DEPTH in millimeters.
4. PIPETTE WASH TIME (SEC) in seconds. Default value 7. This setting is reset to default when Service mode is switched OFF.
5. PIPETTE DRY TIME (SEC) in seconds. Default value 5. This setting is reset to default when Service mode is switched OFF.

The selection box for the language is marked with a symbol depicting a globe.
Select the language for the software and the "Instructions For Use" by clicking on the appropriate language name.

Note: To switch to the selected language the first time, close and restart the software.

6.6.1. Carousel control



CAROUSEL POSITION
This display presents the position of the carousel for the Measure station position, Rinse station position and the Fill station position.

FORWARD AND BACKWARD MOVEMENT OF THE CAROUSEL
With this function the carousel can be moved one position backwards and forwards.

Warning: Only for trained personnel. When this function is used the built-in safety functions are not active, be careful.

GO TO RINSE POSITION
Enter a pipette number; the carousel will then turn to the stop position, which is always the Rinse station.

SET RINSE POSITION
The Compact has a self-encoding pipette position system.
If an intermittent 'position error' is displayed the position must be entered manually.

PIPETTE FLOW TEST

Warning: Pipettes must be empty, before starting this function.

Before the confirmation of the function the warning <Pipette data will be lost! > is displayed.
This is a useful function for checking the pipette position adjustment, vacuum adjustment and filling height sensor positioning adjustment.
Each individual pipette is tested and results are sent to the printer.

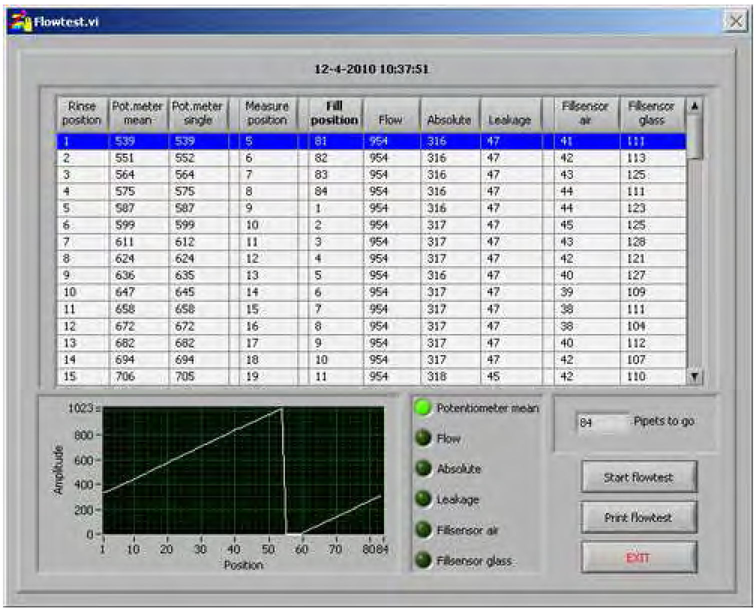
DELETE PIPETTE DATA
This function will erase all pipette data. Make sure that there are no samples on the pipette belt.

LANGUAGE
The selection box for the language is marked with a symbol depicting a globe.

Select the language for the software and the "Instructions For Use" by clicking on the appropriate language name.

Note: To switch to the selected language the first time, close and restart the software.

6.6.1.1. Flow test potentiometer mean

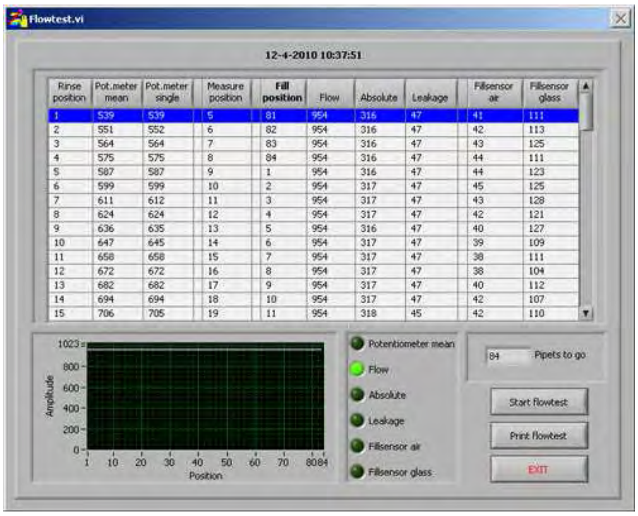


Pipette flow test

Warning: Pipettes must be empty, before starting this function.

Before the confirmation of the function the warning < PIPETTE DATA WILL BE LOST! > is displayed.
This test is a useful function for checking the pipette position adjustment, vacuum adjustment and filling height sensor positioning adjustment.
Each individual pipette is tested and results are displayed in their own line of the diagram.

6.6.1.2. Flow test flow

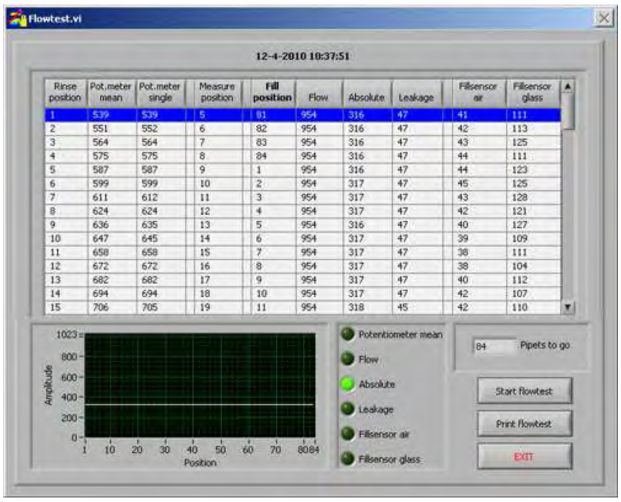


Pipette flow test

Warning: Pipettes must be empty, before starting this function.

Before the confirmation of the function the warning < PIPETTE DATA WILL BE LOST! > is displayed.
This test is a useful function for checking the pipette position adjustment, vacuum adjustment and filling height sensor positioning adjustment.
Each individual pipette is tested and results are displayed in their own line of the diagram.

6.6.1.3. Flow test absolute

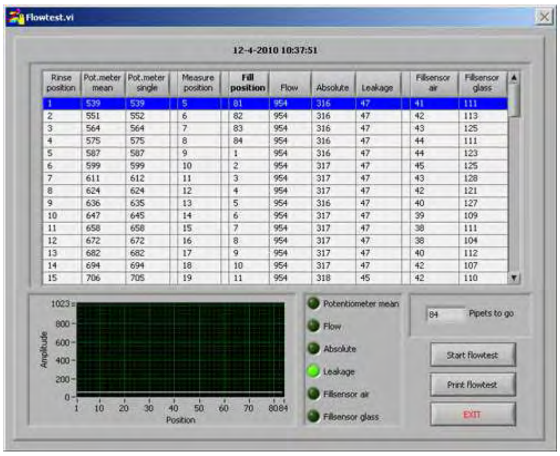


Pipette flow test

Warning: Pipettes must be empty, before starting this function.

Before the confirmation of the function the warning < PIPETTE DATA WILL BE LOST! > is displayed.
This test is a useful function for checking the pipette position adjustment, vacuum adjustment and filling height sensor positioning adjustment.
Each individual pipette is tested and results are displayed in their own line of the diagram.

6.6.1.4. Flow test leakage

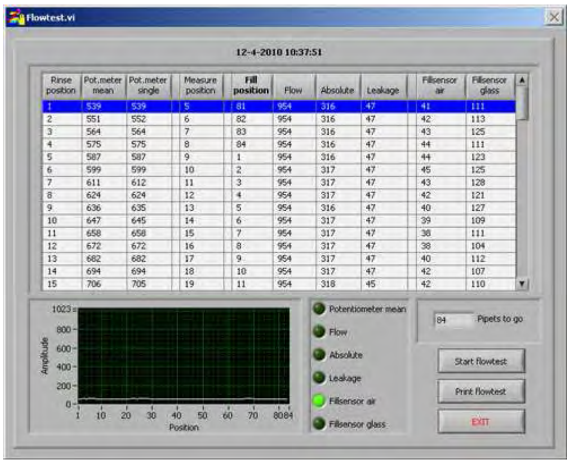


Pipette flow test

Warning: Pipettes must be empty, before starting this function.

Before the confirmation of the function the warning < PIPETTE DATA WILL BE LOST! > is displayed.
This test is a useful function for checking the pipette position adjustment, vacuum adjustment and filling height sensor positioning adjustment.
Each individual pipette is tested and results are displayed in their own line of the diagram.

6.6.1.5. Flow test Fill sensor air

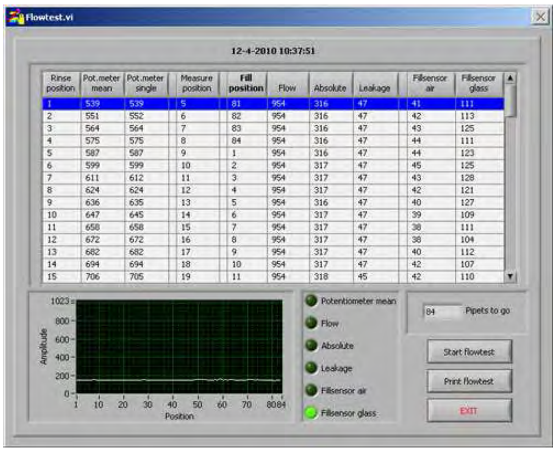


Pipette flow test

Warning: Pipettes must be empty, before starting this function.

Before the confirmation of the function the warning < PIPETTE DATA WILL BE LOST! > is displayed.
This test is a useful function for checking the pipette position adjustment, vacuum adjustment and filling height sensor positioning adjustment.
Each individual pipette is tested and results are displayed in their own line of the diagram.

6.6.1.6. Flow test Fill sensor glass

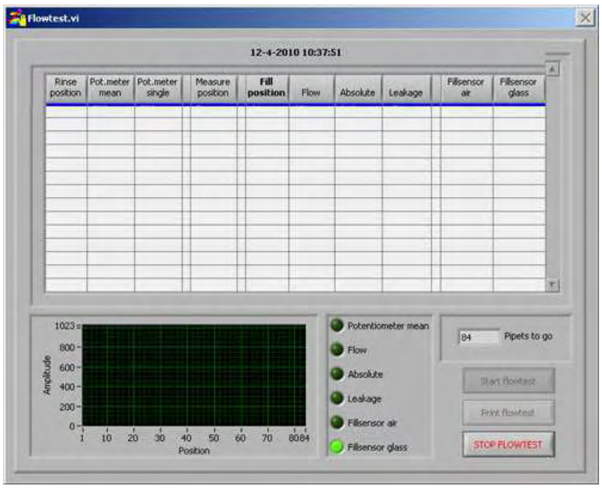


Pipette flow test

Warning: Pipettes must be empty, before starting this function.

Before the confirmation of the function the warning < PIPETTE DATA WILL BE LOST! > is displayed.
This test is a useful function for checking the pipette position adjustment, vacuum adjustment and filling height sensor positioning adjustment.
Each individual pipette is tested and results are displayed in their own line of the diagram.

6.6.1.7. Flow test start



Pipette flow test

Warning: Pipettes must be empty, before starting this function.

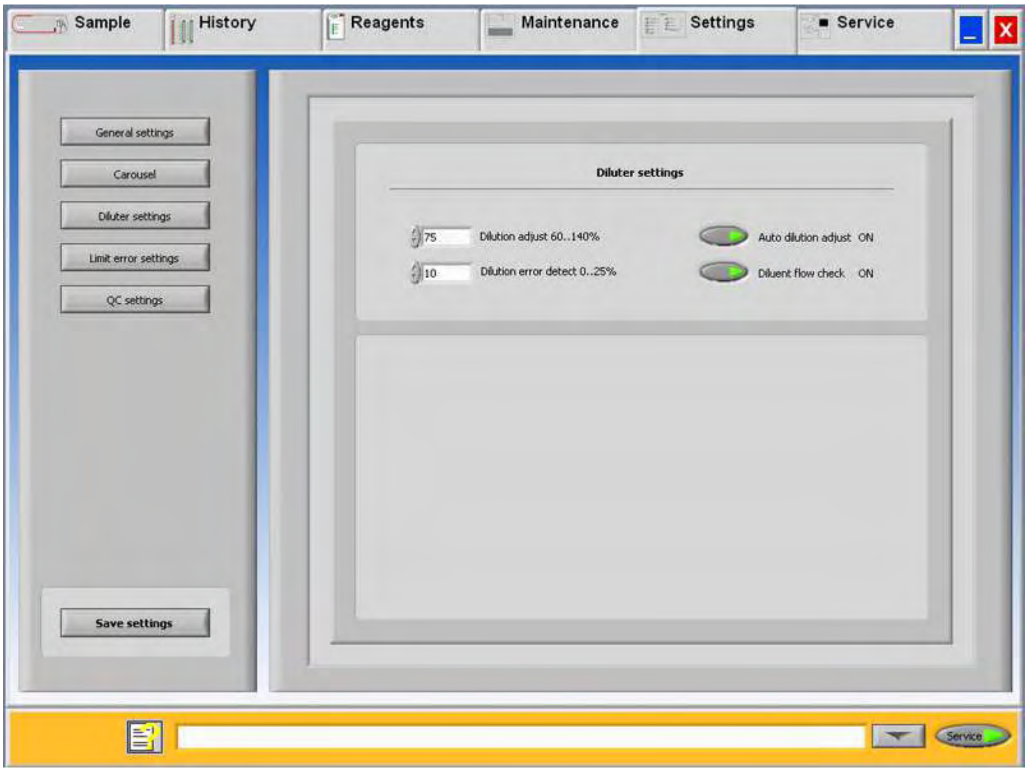
Before the confirmation of the function the warning < PIPETTE DATA WILL BE LOST! > is displayed.
This test is a useful function for checking the pipette position adjustment, vacuum adjustment and filling height sensor positioning adjustment.
Each individual pipette is tested and results are displayed in their own line of the diagram.

6.6.1.8. Set new rinse position

Click on CHANGE RINSE POSITION and enter via the keyboard the accurate rinse position and press the LEARN CAROUSEL POSITION key for learning a new position table.

Note: This option is used when there is a position error.

6.6.2. Diluter settings



6.6.2.1. Dilution adjustment 60 till 140%

- `Dilution adjustment 60 till 140%`
  For adjusting the dilution rate: run a number of sample tubes filled with fresh blood. Write down the dilution rate, which is shown in the numerical window.
  By entering the percentage deviation, a correction value can be made.
  Example: The average dilution rate is 92%, enter 108 in order to correct to a 100% dilution rate.

6.6.2.2. Dilution error detection 0 till 25%

- `Dilution error detection 0 till 25%`
  Dilution Error deviation report. If a dilution error occurs during the aspiration sequence, an audible alarm sounds and the deviation value will be shown on the screen. When the measure unit has evaluated the sample, the deviation value will be printed after the text "EDTA"
  Sending or not sending results with dilution errors to the output is optional, see ***Limit error settings*** (on page 97).

  Example: Dilution error detection is set at 10%. When the dilution error is outside the 10% range, in the last column of the report EDTA 079 or EDTA 121 is printed which indicating this sample is 21% under or over diluted.

6.6.2.3. Auto dilution adjust

- `Auto dilution adjust`
  The Automatic Dilution adjust is by default setting ON.

  Feature to automatically make a correction to the dilution rate if set to ON.
  This mode checks the dilution rate, if the dilution rate tends to get too low or too high, it automatically makes a correction to the (manual) "dilution adjust" setting
  In this way long term instability or long term changes will be corrected. The system "looks" to the mean average of the 32 last dilutions to estimate the corrections on the syringe speed calculations.
  If Auto dilution adjust is set to OFF the system works with the number which is set in Dilution adjustment 60 till 140%.
  If Auto dilution adjust is set to ON the software automatically set the Dilution adjustment 60 till 140%.

  Instructions to set-up the Auto dilution adjust
  Set the Auto dilution adjust OFF. Set in SETTINGS - GENERAL SETTINGS Display dilution ON.
  Run a few representative fresh blood samples of the day and note the dilution rates which are displayed at the status line.
  Add the found dilution rate and take the average. By entering the percentage deviation, a correction value can be made.

  Example: If the average dilution rate is 92%, enter 108 in order to correct to a 100% dilution rate.
  If no input is given, a warning <Out of range> is displayed.

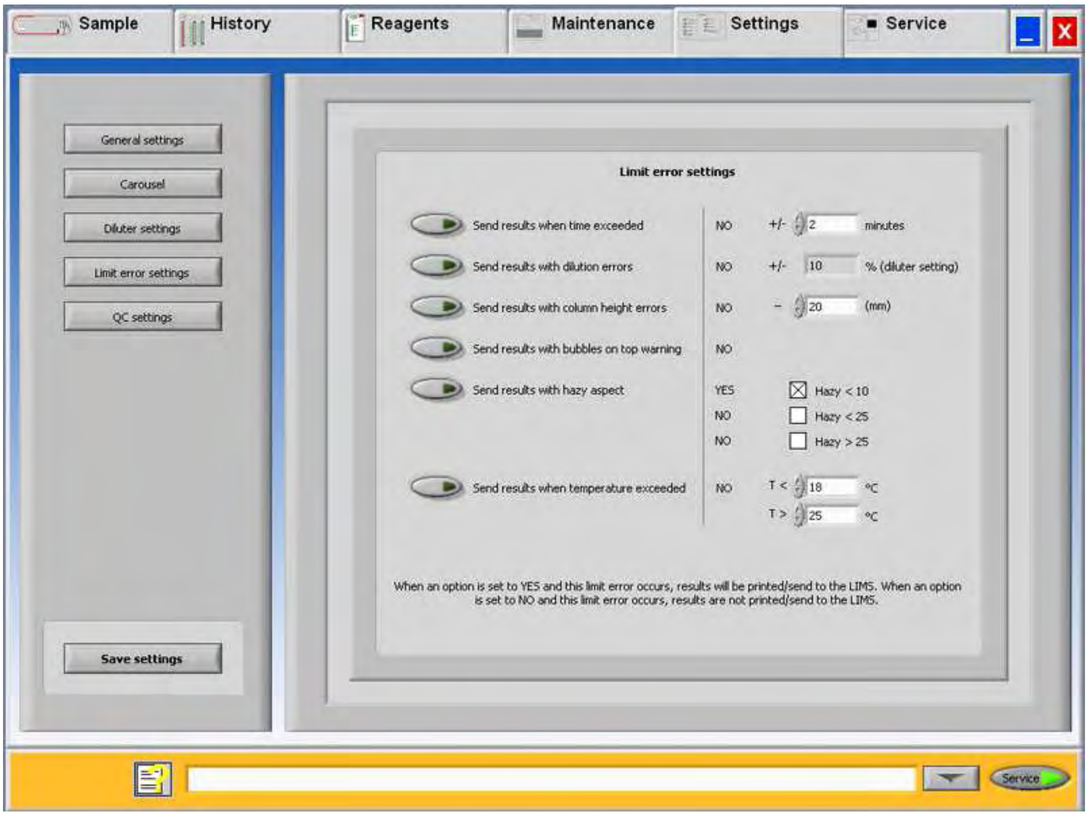
Note: Use only recent samples (<12 hours), otherwise the software settings will not be representative.

- Set the average dilution rate in Dilution adjust 60%…140%
- Run more samples, to inspect the dilution rate again
- If the dilution rates are in expectation, continue to the following steps
- Set Auto dilution adjust ON
- Run a few more samples to inspect the dilution rate again

6.6.2.4. Diluent flow check

- `Diluent flow check`:
  The Diluent flow check is default switched ON.
  When the flow sensor is still giving errors after trouble shooting and there are no detectable faults in the liquid flow, use the switch OFF function. This check is now not active, call for service.

6.6.3. Limit error settings



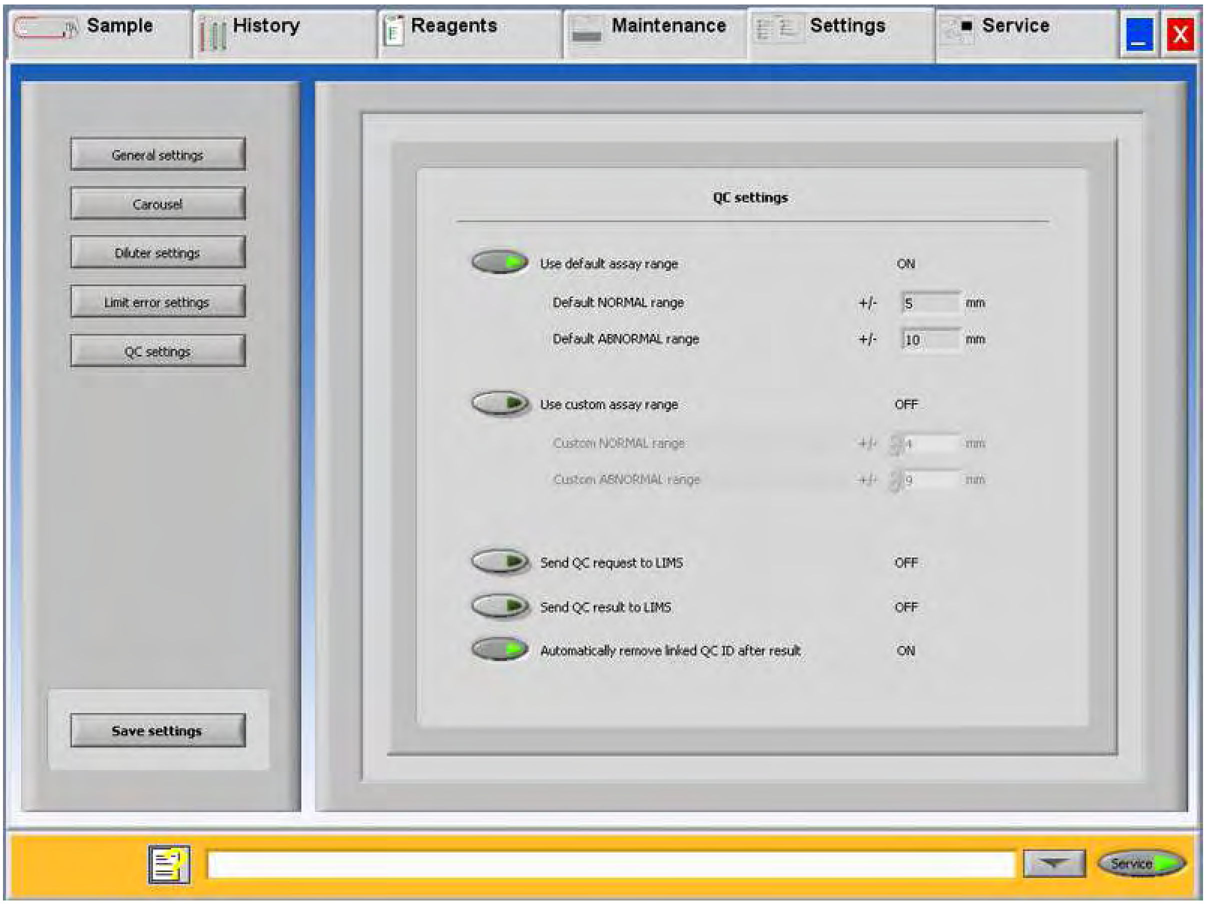
The screen Limit error settings has the following options:

- SEND RESULTS WHEN TIME EXCEEDED
  - set to YES: always transmit results to the output.
  - set to NO: transmit no results to the output when the ESR time is outside the selected range.
- SEND RESULTS WITH DILUTION ERRORS
  - set to YES: always transmit results to the output.
  - set to NO: transmit no results to the output when the dilution rate is outside the selected range (set with Diluter settings).
- SEND RESULTS WITH COLUMN HEIGHT ERRORS
  - set to YES: always transmit results to the output.
  - set to NO: transmit no results to the output when the column height is outside the selected range.
- SEND RESULTS WITH BUBBLES ON TOP WARNING
  - set to YES: always transmit results to the output
  - set to NO: transmit no results to the output when there is generated a warning for bubbles on top.

- SEND RESULTS WITH HAZY ASPECT
  - set to YES: always transmit results to the output.
  - set to NO: three options are possible, Hazy >10, Hazy <25 and Hazy >25, transmit results to the output as specified.
- SEND RESULTS WITH TEMPERATURE EXCEEDED
  - set to YES: always transmit results to the output.
  - set to NO: the settings can be set/changed between a minimum of 15 and maximum of 34 ℃.

When an option is set to YES and this limit error occurs, results will be printed/send to the LIMS.

6.6.4. QC Settings



In "QC settings" the following options can be selected:

USE DEFAULT ASSAY RANGE

- ON (=Default setting): The default assay range which is predetermined for the current batch of StaRRsed Control is used. These ranges cannot be changed in this option.
- OFF: USE CUSTOM ASSAY RANGE is used.

USE CUSTOM ASSAY RANGE

- ON: The lab can establish their own acceptable ranges, both ranges can be set from a minimum of +/- 2 mm to a maximum of +/- 15 mm.
- OFF: USE DEFAULT ASSAY RANGE is used.

Note: It is advised to use the default assay ranges. Use caution when setting the custom ranges. A too narrow range may cause unjustified rejection of QC sample results, subsequent rejection of patient results and undue burden on maintenance.

SEND QC REQUEST TO LIMS

- ON: A sample request for the QC sample is send to LIMS. The QC sample will only be processed if the LIMS responds with YES.
  Use this setting if the ESR result of the QC sample will be send to LIMS as well and LIMS requires that all samples are requested first.
  If the QC sample is linked with a Lab ID, the sample will be requested at LIMS with the Lab ID.
  If the QC sample is used with the original StaRRsed Control sample ID, the sample will be requested at LIMS with the StaRRsed Control sample ID.
- OFF (=Default setting): All QC samples will be processed without requesting at LIMS.

SEND QC RESULT TO LIMS

- ON: QC results are send to the LIMS as a standard ESR result.
  If the QC sample is linked with a Lab ID, the result will be send to LIMS with the Lab ID.
  If the QC sample is used with the original StaRRsed Control sample ID, the result will be send to LIMS with the StaRRsed Control sample ID.

Note: When the MECHATRONICS-01 or MECHATRONICS-02 protocols are used, the "Sample code" (or "Sample type") flag is set accordingly to mark the QC samples.

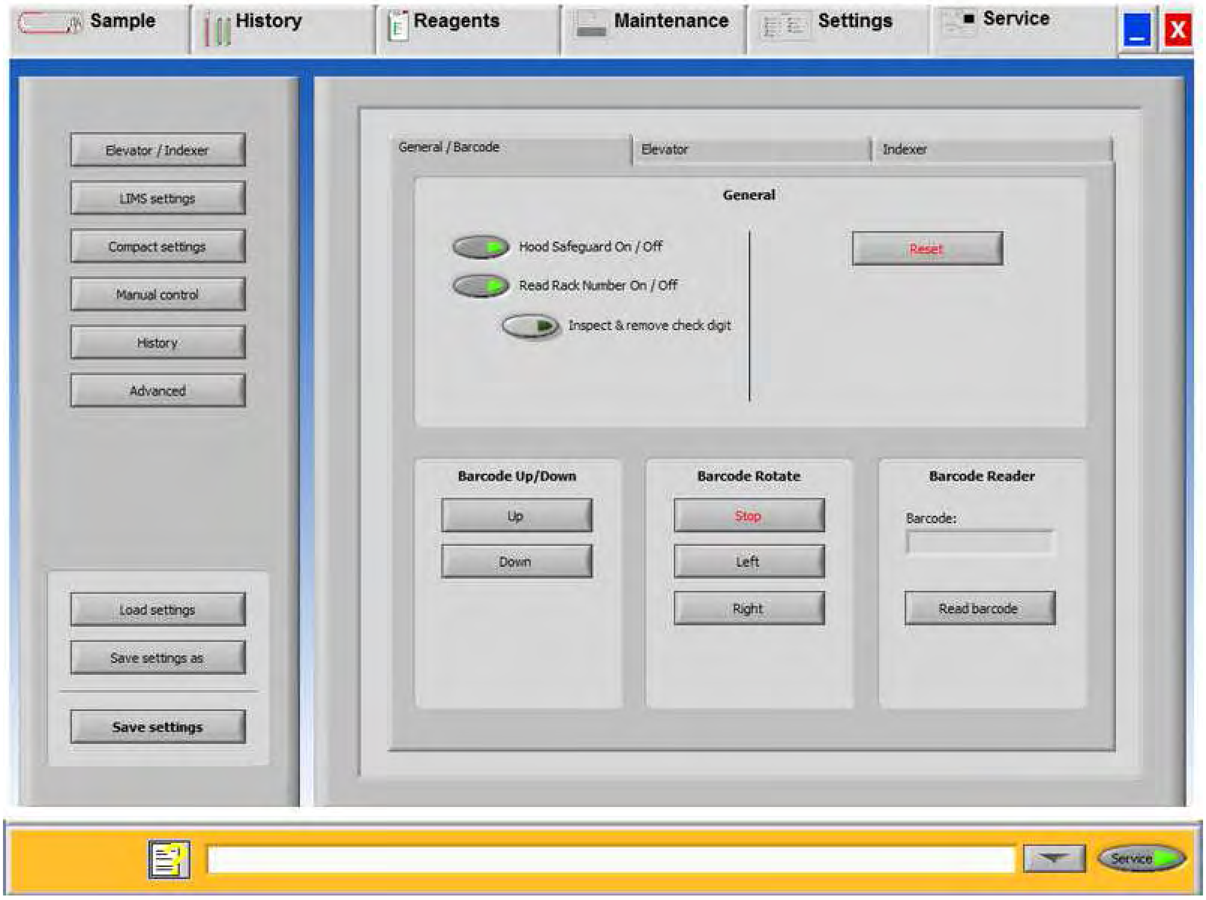
- OFF (=Default setting): Results will not be send to LIMS, data is only available on the InteRRliner V8.

AUTOMATICALLY REMOVE LINKED QC ID AFTER RESULT

- ON (=Default setting):The link between StaRRsed Control Sample ID and Lab ID will be deleted after a useable result has been reported for this particular lab ID. For each QC sample a new link must be created. This link will stay active if there is no result or a general ESR error is generated. This setting is useful when the lab issues a new and unique Lab ID for every QC sample.
- OFF: The link will be available until its deleted manually. This could be useful when using a general Lab ID for QC monitoring. Only in case of a new batch of StaRRsed Control a new link has to be created.

When ready press SAVE SETTINGS before you continue.

6.7. Service screen

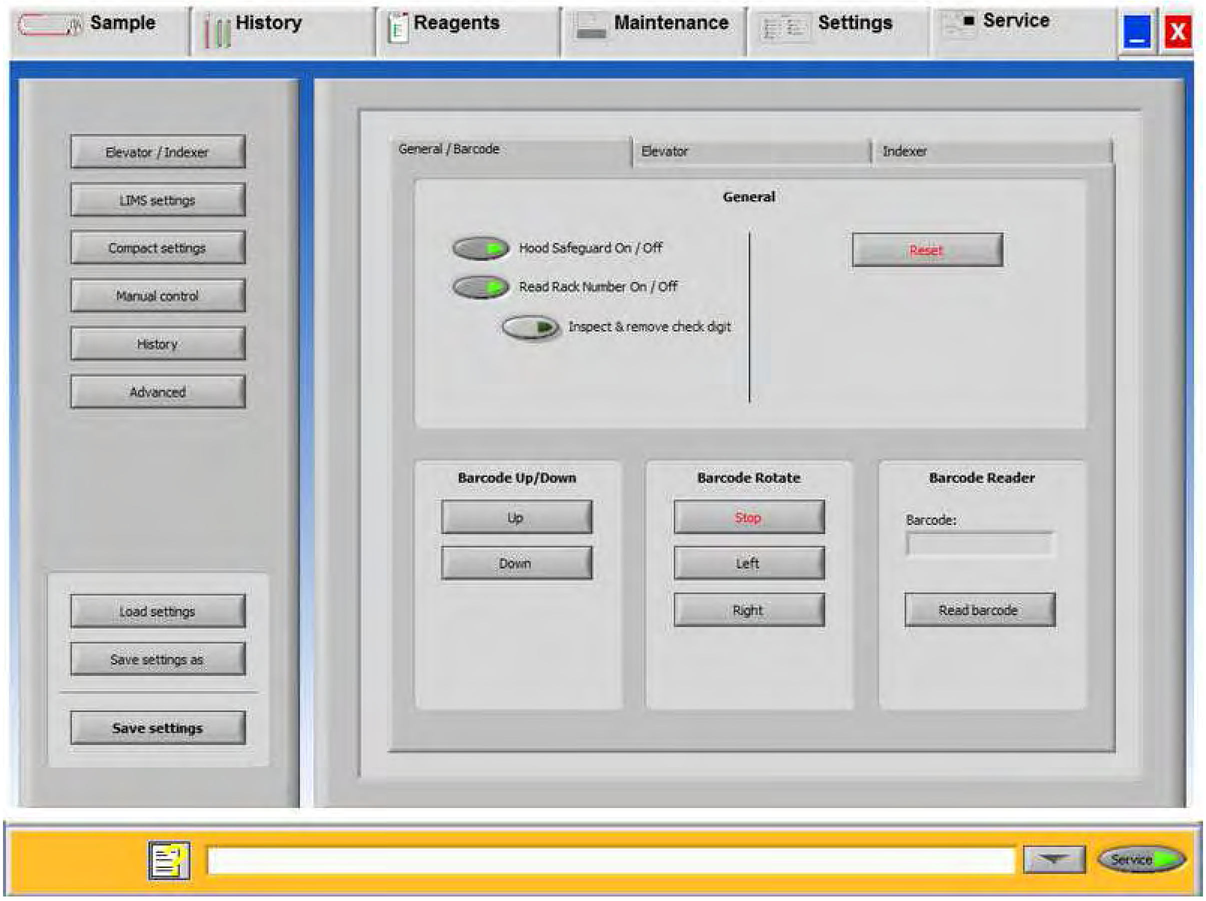


- LOAD SETTINGS is used for reloading the stored software settings.
- SAVE SETTINGS AS is used for storing software settings to a file. There are no restrictions for the file name.
- SAVE SETTINGS is used for storing software settings after settings are changed or altered.

This menu has all the functions related to the following items.

1. ***General screen*** (on page 101)
2. ***Elevator screen*** (on page 103)
3. ***Indexer screen*** (on page 104)

6.7.1. General / Barcode screen



This menu has all the functions related to the following items.

1. ***General screen*** (on page 101)
2. ***Elevator screen*** (on page 103)
3. ***Indexer screen*** (on page 104)

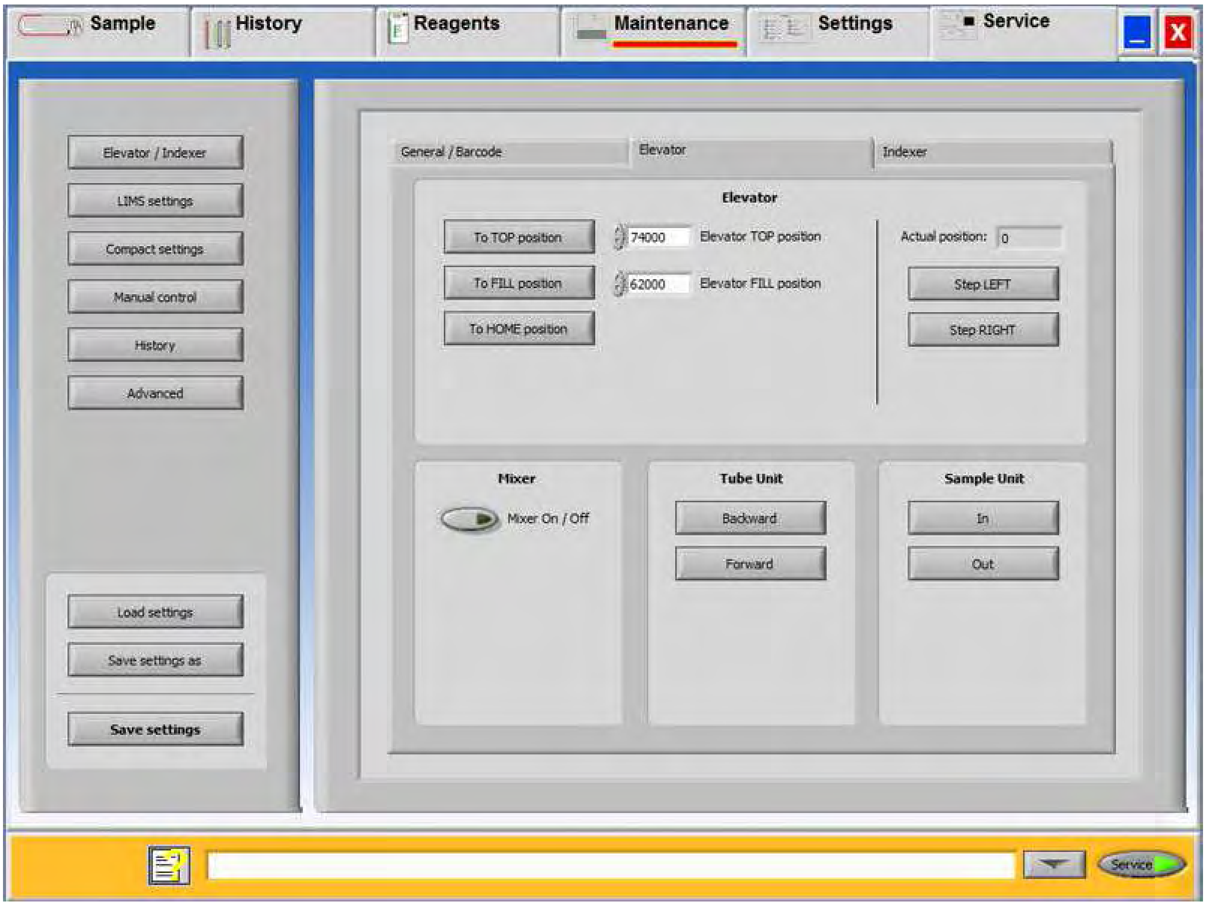
The following can be set and tested:

1. HOOD SAFEGUARD.
   - Switch safeguard alarm ON or OFF.
2. READ RACK NUMBER

- *Only applicable when Sysmex racks and a Sysmex protocol are used.*
  Option for reading the rack number with the barcode reader.
  To be able to handle tube labels without check digit and rack labels (always with check digit), reading or ignoring the check digit can be set ON or OFF with INSPECT CHECK DIGIT & REMOVE CHECK DIGIT. If the check digit settings on the barcode reader are not activated, rack labels (with a check digit) can be handled with this option.

3. RESET
   - Reset the Indexer and the elevator.
4. BARCODE MANIPULATOR.
   - Barcode manipulator to the UP position.
   - Barcode manipulator to the DOWN position.
5. BARCODE ROTATE MOTOR
   - Barcode motor STOP turning.
   - Barcode motor turns LEFT.
   - Barcode motor turns RIGHT.
6. BARCODE READER.
   - Shows the Barcode which is read.
   - READ BARCODE. For testing the barcode reader.

6.7.1.1. Elevator screen



This menu has all the functions related to the following items.

1. ***General screen*** (on page 101)
2. ***Elevator screen*** (on page 103)
3. ***Indexer screen*** (on page 104)

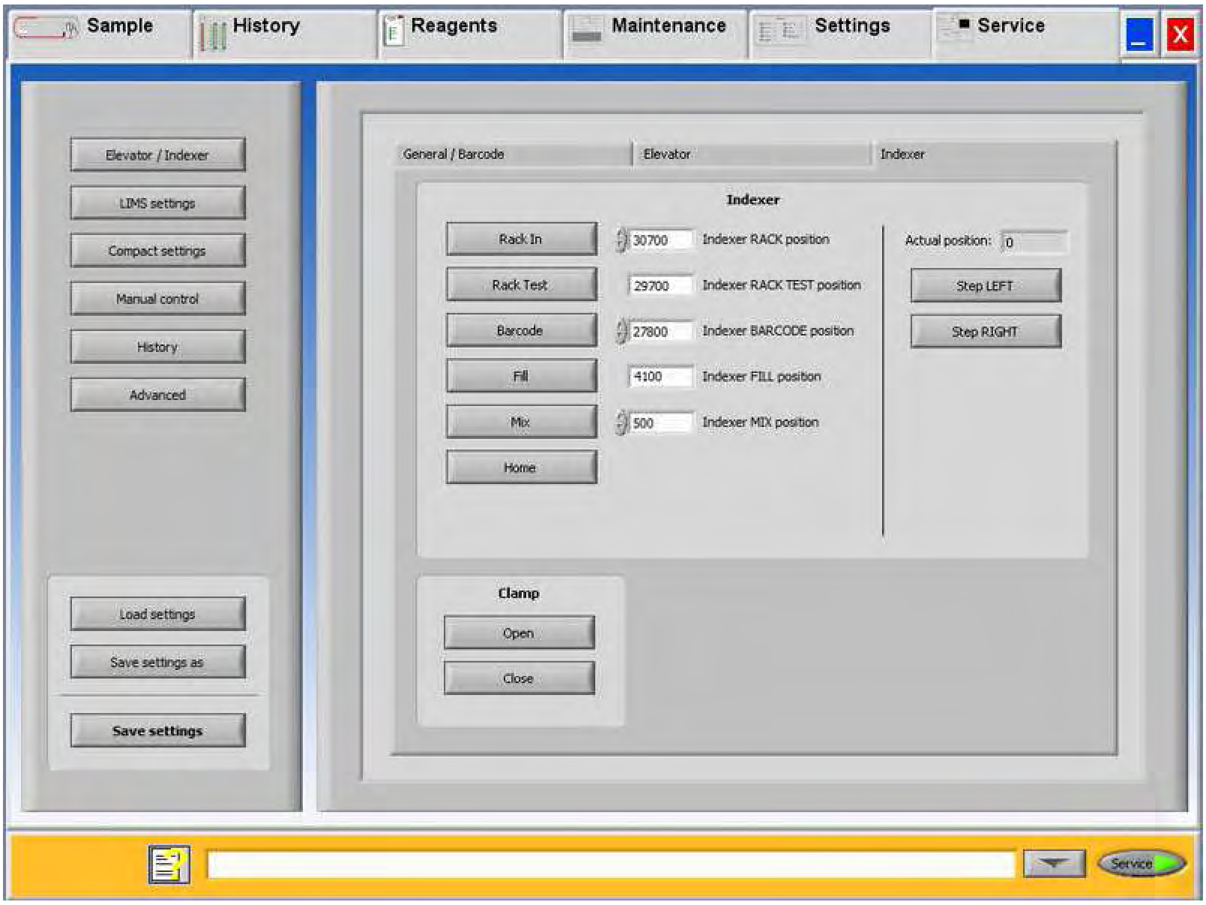
The following Elevator settings can be made:

1. Elevator to Top position.
   - This function send the elevator to the top position.
   - The top position is set default at 75500, no need to change the default value.
2. Elevator to Fill position.
   - This function send the elevator to the fill position.
   - The fill position is set default at 64000, no need to change the default value.
3. Elevator to Home position.
   - This function send the elevator to the Home position.
4. Elevator Reset.

- This function reset the elevator to Home position.

5. MIXER ASSEMBLY TEST.
   - Switch ON and OFF the mixer motor.
6. TUBE UNIT test.
   - The FORWARD function send the tube unit to the front.
   - The BACKWARD function send the tube unit to the back.
7. SAMPLE UNIT test.
   - The IN function move the sample arm from the home position into the needle assembly of the Compact.
   - The OUT function move the sample arm from the needle assembly of the Compact to the Home position.
8. **Actual position** shows the position of the Elevator.
   - Step LEFT: The Elevator will move in steps to the left.
   - Step RIGHT: The Elevator will move in steps to the right.

6.7.1.2. Indexer screen



This menu has all the functions related to the following items.

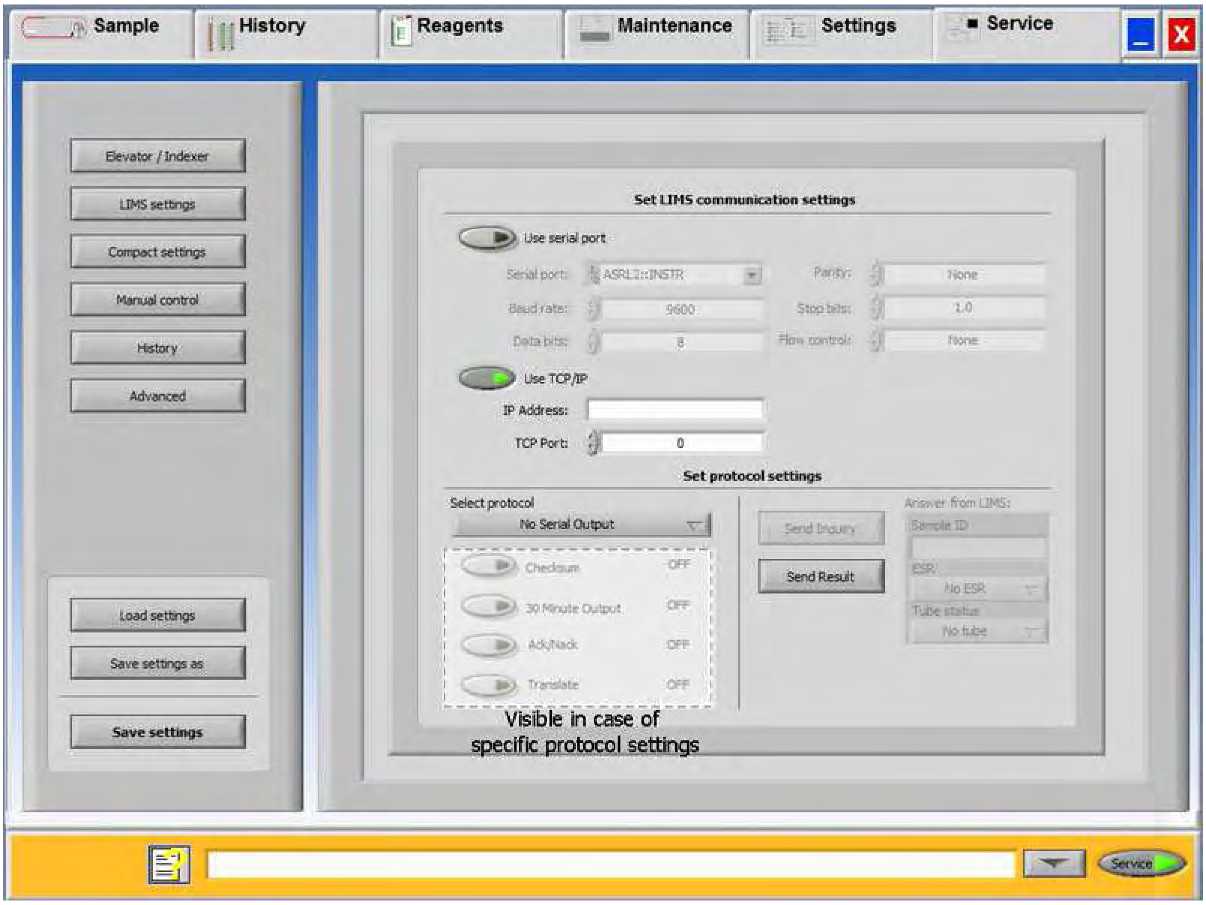
1. ***General screen*** (on page 101)
2. ***Elevator screen*** (on page 103)
3. ***Indexer screen*** (on page 104)

The following INDEXER settings can be set:

1. RACK IN position
   - Moves the Indexer to the rack in position.
   - The rack IN position is set at 30700, no need to change the value.
2. RACK TEST position
   - Moves the Indexer to the rack test position.
   - The rack Test position has a default value, this value can not be changed.
3. Rack BARCODE position
   - Moves the Indexer to the barcode reader position.
   - The rack Barcode position is set at 27900, no need to change the value.
4. Rack FILL position
   - Moves the Indexer to the rack fill position.
   - The rack Fill position has a default value, this value can not be changed.
5. Rack MIX position
   - Moves the Indexer to the mix position.
   - The rack Mix position is set at 500, no need to change the value.
6. Rack HOME
   - Moves the Indexer to the home position.
7. Indexer CLAMP
   - OPEN the Indexer clamp.
   - CLOSE the indexer clamp.
8. **Actual position** shows the position of the Indexer.
   - Step LEFT: The Indexer will move in steps to the left.
   - Step RIGHT: The Indexer will move in steps to the right.

Note:
When the settings need to be changed enter type a new number in the input window and test the new position again by pressing the associated key for that position.
Press SAVE SETTINGS to store the new values to disk and to flash Eprom when everything is correct.

6.7.2. LIMS settings



6.7.2.1. Set LIMS communication settings

Communication with LIMS can be a serial or an ethernet connection.

USE SERIAL OUTPUT:

1. Serial output comport.ASRL2::INSTR. By default
2. Baud rate. Selectable 1200, 4800 and 9600 *
3. Data bits. Selectable 7 or 8 data bits
4. Party bit: Selectable none, space, mark, even and odd
5. Stop bits: Selectable 1, 1.5 or 2 stop bits
6. Flow control: Selectable for;
   - None
   - XON/XOFF
   - RTS/CTS
   - DTR/DSR
   - XON/XOFF & RTS/CTS
   - XON/XOFF & DTR/DSR

*When the selection button is pressed, the virtual keyboard pops up. Type the correct numbers into the numerical fields, for instance in the baud rate field 9600.

USE TCP/IP: Select IP Adress and TCP Port.

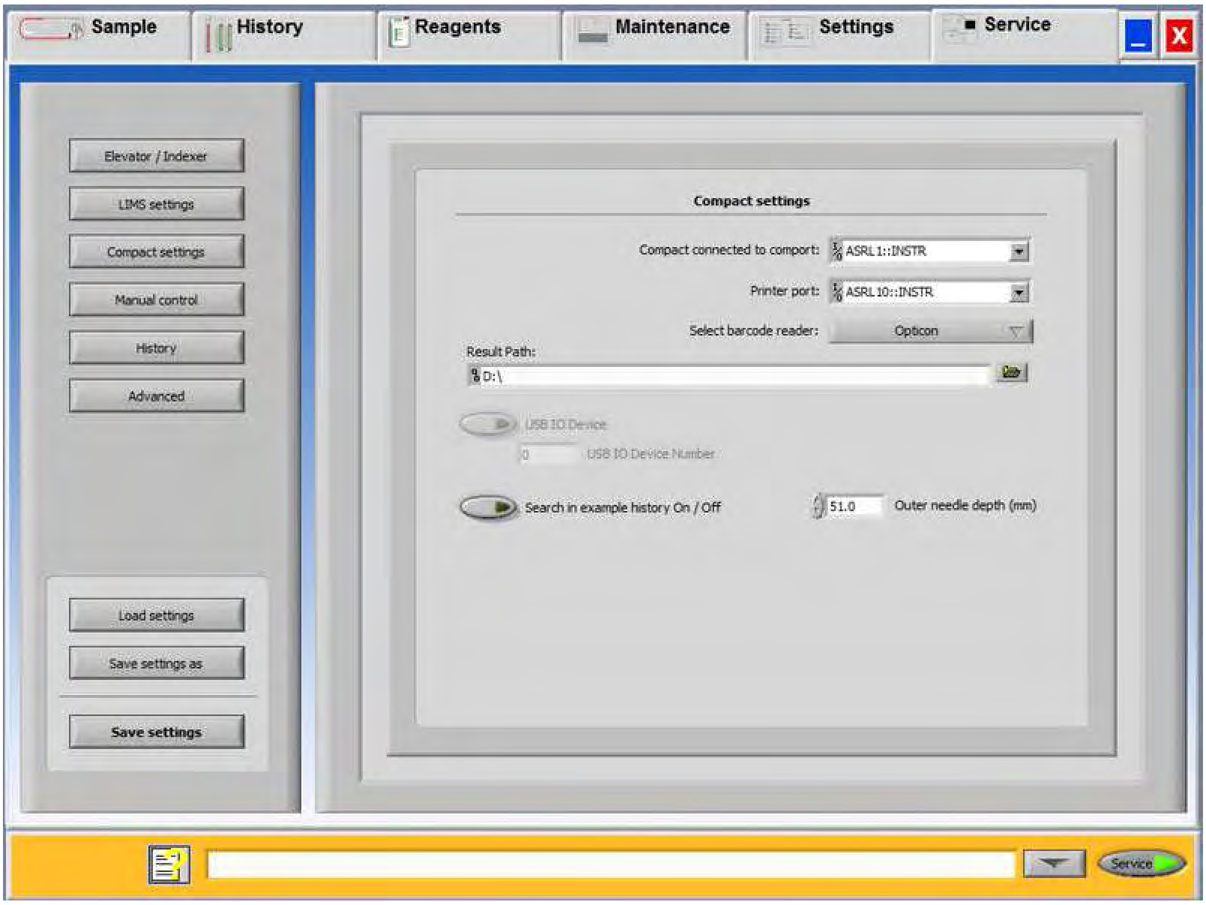
6.7.2.2. Set protocol settings

The following protocols can be selected for out putting data;

1. No Serial output.
2. MECHATRONICS-01 Bidirectional
3. MECHATRONICS-02 Unidirectional
4. SE 9000.
5. SE 9000 Unidirectional
6. R3500.
7. R3500 unidirectional.
8. Compact unidirectional
   When selected the following keys will pop-up.
   - Checksum On/Off.
   - 30 Minute method On/Off.
   - Ack/Nack On/Off.
9. Compact Bidirectional.
   When selected the following keys will pop-up.
   - Checksum On/Off.
   - 30 Minute method On/Off.
10. StaRRsed III (v14)
    When selected the following keys will pop-up.
    - Checksum On/Off.
    - 30 Minute method On/Off.
    - Ack/Nack On/Off.
11. Vesmatic
12. Sedimatic 15
13. Sedimatic 100
14. OPUS
    When selected the following keys will pop-up.
    - Checksum On/Off.
    - 30 Minute method On/Off.
15. Advia 120
16. Advia 120 unidirectional
17. InteRRliner

For more details see ***Section 9 Protocols*** (on page 152) and the Appendix

6.7.3. Compact settings



6.7.3.1. Compact connected to

Select which port the InteRRliner V8 is connected to. No need to change the default setting ASRL1::INSTR.

6.7.3.2. Printer port

Select which PRINTER PORT is connected to the printer. No need to change the default setting ASRL10::INSTR.

6.7.3.3. Select barcode reader

SELECT BARCODE READER is used in the InteRRliner V8 for selecting which barcode reader is used. There is no need for re-selecting, this setting is already done by the factory.

6.7.3.4. Result path

Select location for storage of ESR-results at RESULT PATH. The underlying folder structure (year/month/day) is created by the software.

6.7.3.5. USB IO Device

USB IO DEVICE:
Not applicable for the InteRRliner V8.

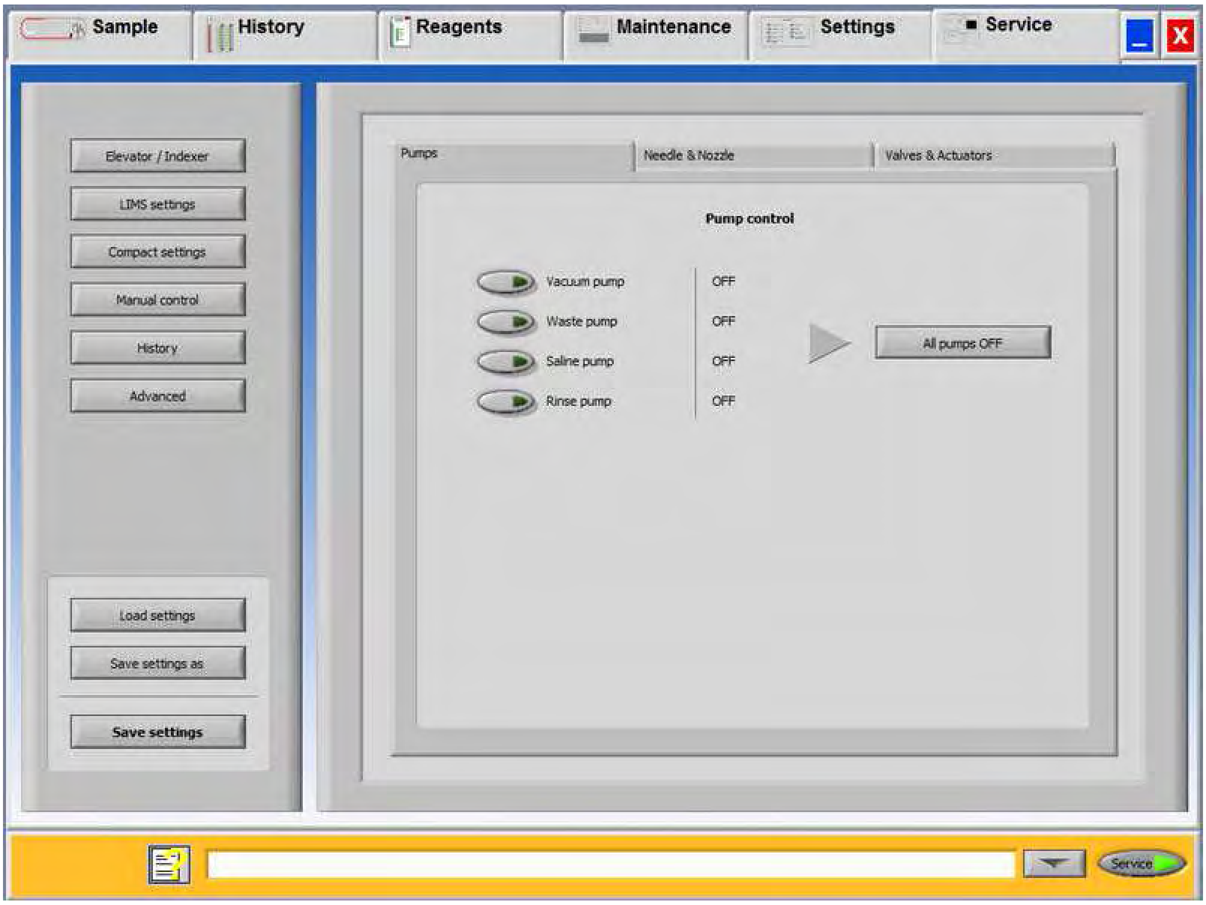
6.7.3.6. Search in example history

- If SEARCH IN EXAMPLE HISTORY is OFF, this file cannot be selected in the history window.
- If SEARCH IN EXAMPLE HISTORY is ON, this can be selected in the history window.

6.7.3.7. Outer needle depth

Setting for the OUTER NEEDLE DEPTH. No need to change the default 51.0 mm setting.

6.7.4. Manual control



VACUUM PUMP:
ON the main vacuum pump is switched on.
OFF the main vacuum pump is switched off.

WASTE PUMP:
ON the waste pump is switched on.
OFF the waste pump is switched off.
The waste pump is used for emptying the liquid separator. Do not leave this function ON as it may cause waste pump damage.

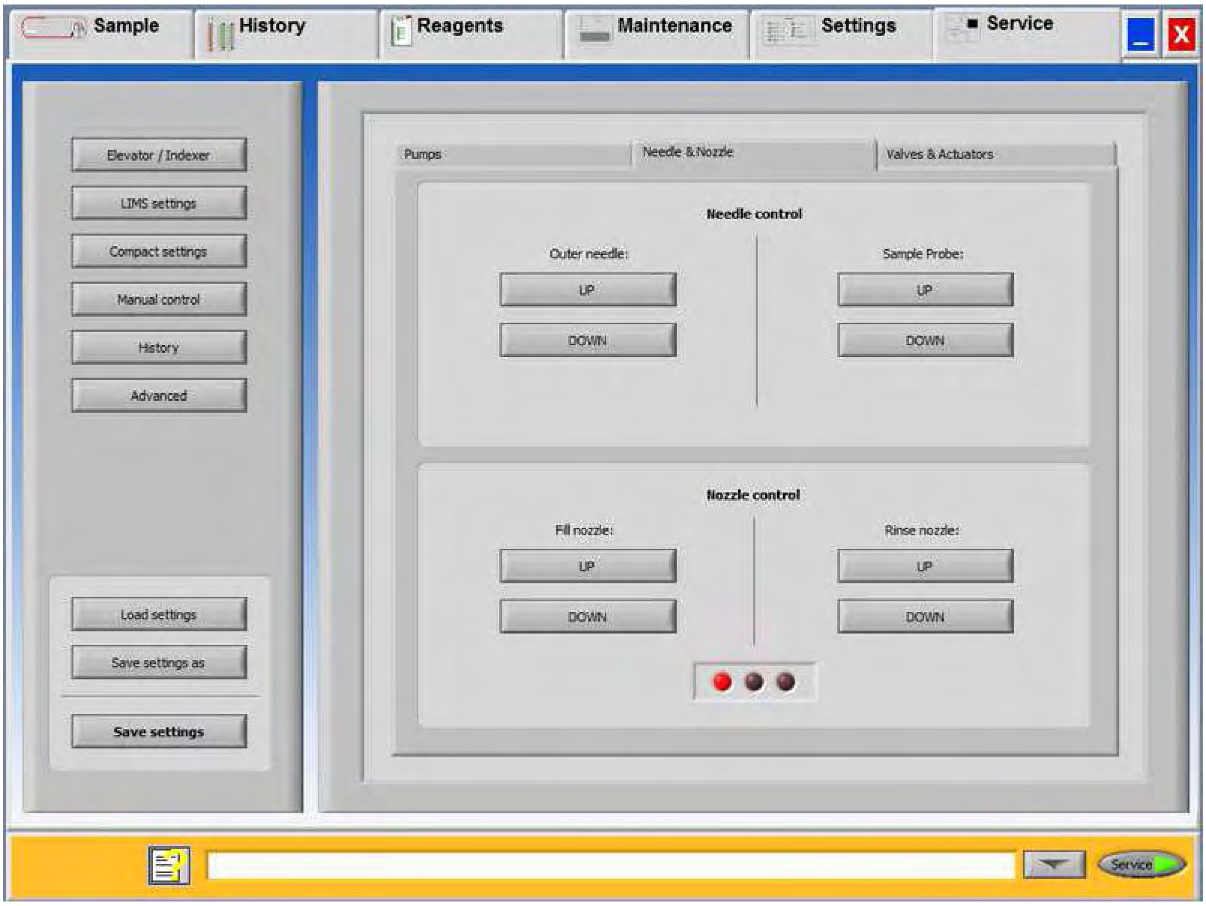
SALINE PUMP:
ON the saline peristaltic pump is switched on.
OFF the saline peristaltic pump is switched off.
Note: If vacuum pump is OFF rinse solution will spill over the Auto rack unit

RINSE PUMP:
ON the pipette wash peristaltic pump is switched on.
OFF the pipette wash peristaltic pump is switched off.
Note: If vacuum pump is OFF rinse solution will spill over the Auto rack unit

6.7.4.1. All pumps OFF

ALL PUMPS OFF:
All active pumps will be switched OFF. The waste pump is switched ON for one minute.

6.7.4.2. Needle control



This function is only operational if the rack is in a fill position.

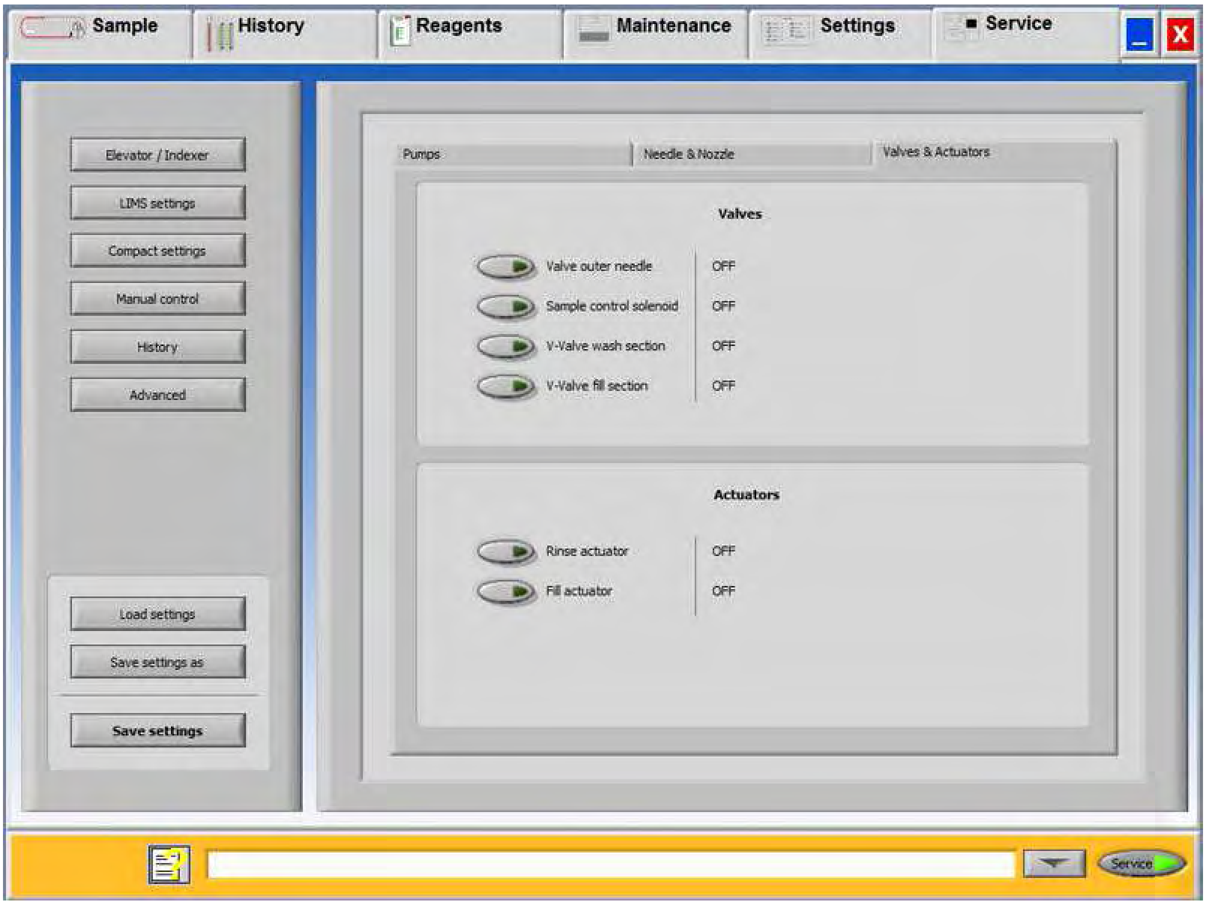
1. OUTER NEEDLE UP: The Outer needle is send to the up home position.
2. OUTER NEEDLE DOWN: The Outer needle is send to the down position.
3. SAMPLE PROBE UP: The Sample probe is send to the up home position.
4. SAMPLE PROBE DOWN: The Sample probe is send to the down position.
5. FILL NOZZLE UP: The Fill nozzle is send to the pipette position
6. FILL NOZZLE DOWN: The Fill nozzle is send to the fill nozzle home position.
7. RINSE NOZZLE UP: The Rinse nozzle is send up to the pipette.

8. RINSE NOZZLE DOWN: The Rinse nozzle is send to the rinse nozzle home position.

Led status display

- Led status check for the fill- and rinse nozzle is displayed.

6.7.4.3. Valve control



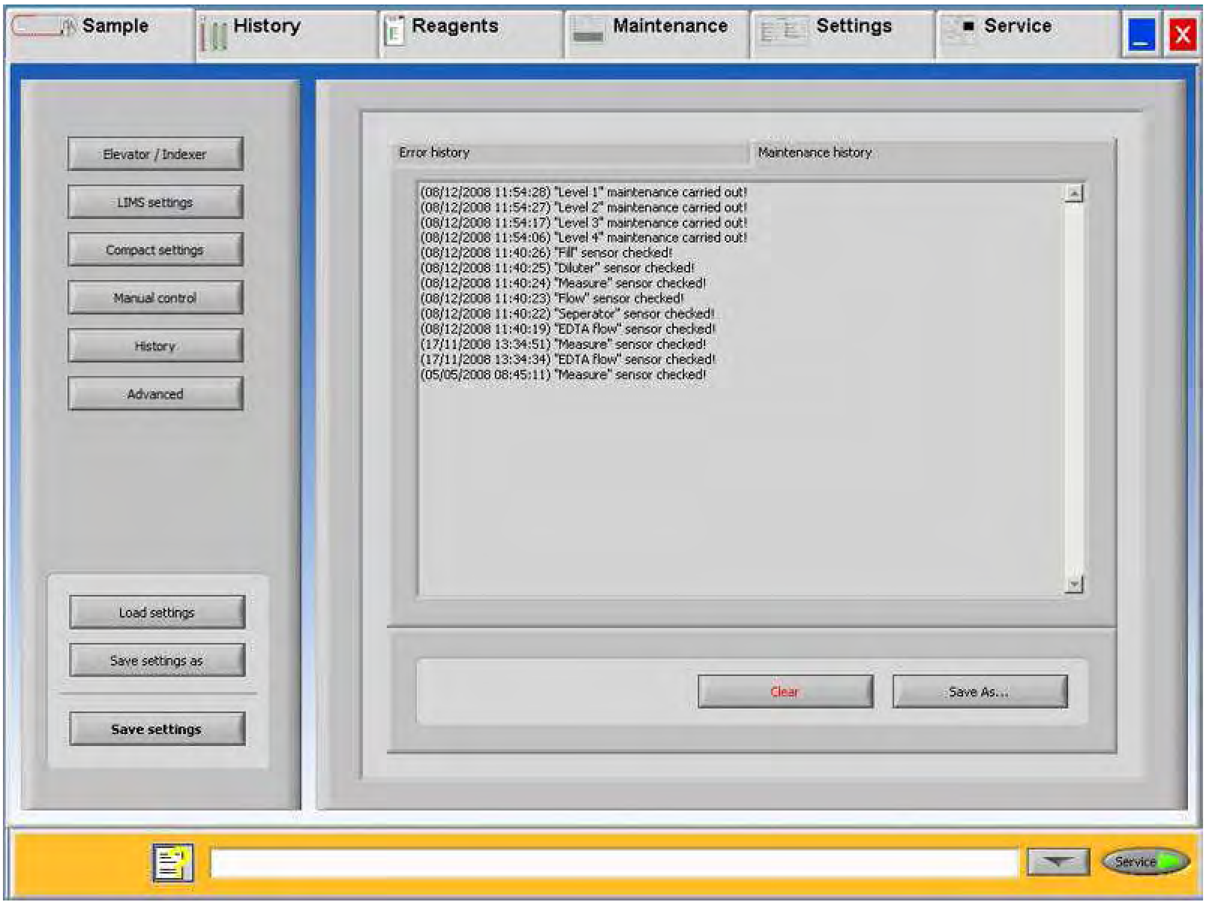
.

1. VALVE OUTER NEEDLE: Energizing the outer needle solenoid valve.
2. SAMPLE CONTROL SOLENOID: Sample control solenoid fill sequence energized. The function of this solenoid is to build up a vacuum in the Westergren pipette before the aspiration starts.
3. V-VALVE WASH SECTION: Pipette wash vacuum control valve, controls the main vacuum line between the wash-station and separator.
4. V-VALVE FILL SECTION: Vacuum control fill-nozzle / sample probe, controls the main vacuum line between the fill nozzle cap and separator.

Actuator control

1. RINSE ACTUATOR: Rinse solenoid active, rinse valve-block down.
2. FILL ACTUATOR: Fill solenoid active, fill valve-block down.

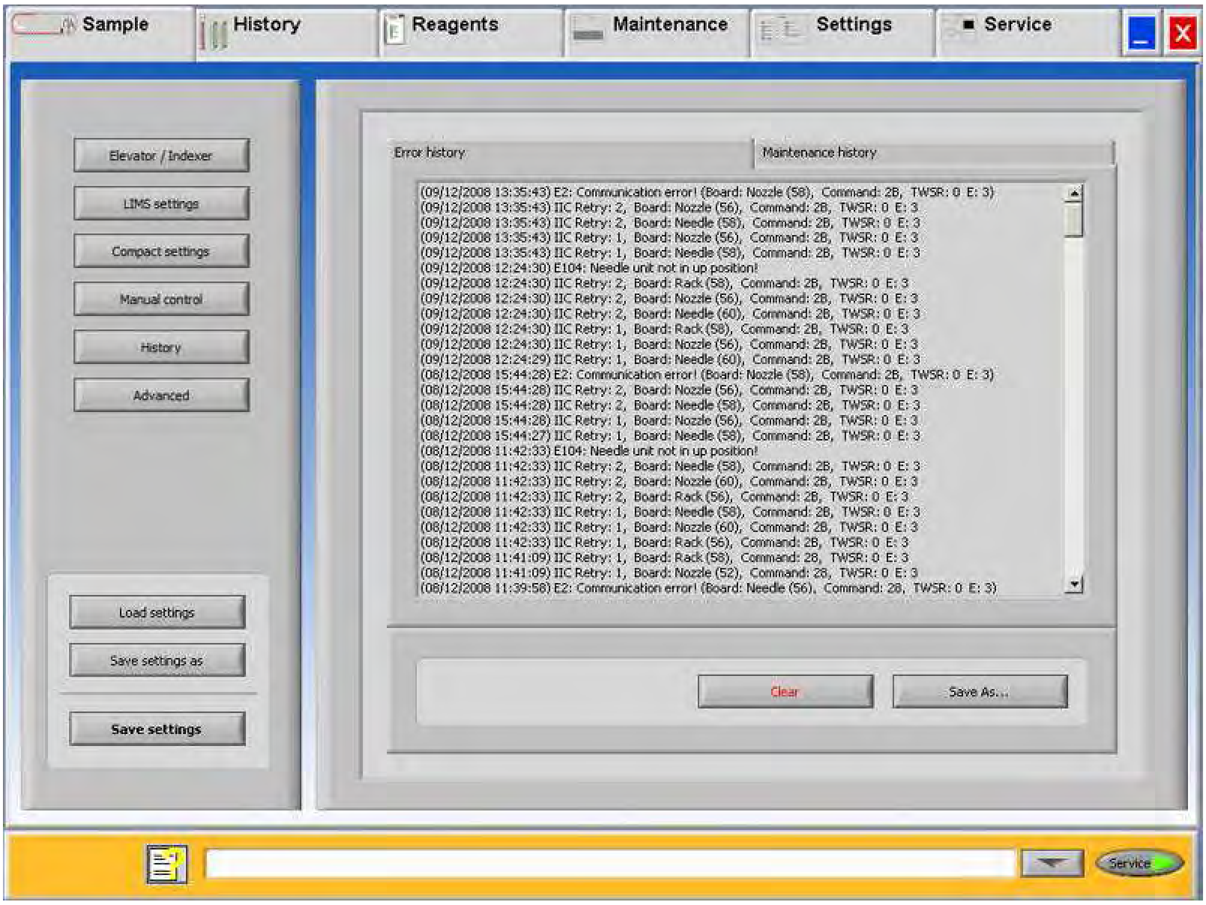
6.7.5. Display maintenance history



This list contain a log of all the maintenance what is done which can be useful for the field engineer to check the problems with the instrument in the past.

The key CLEAR will delete all errors from the list.

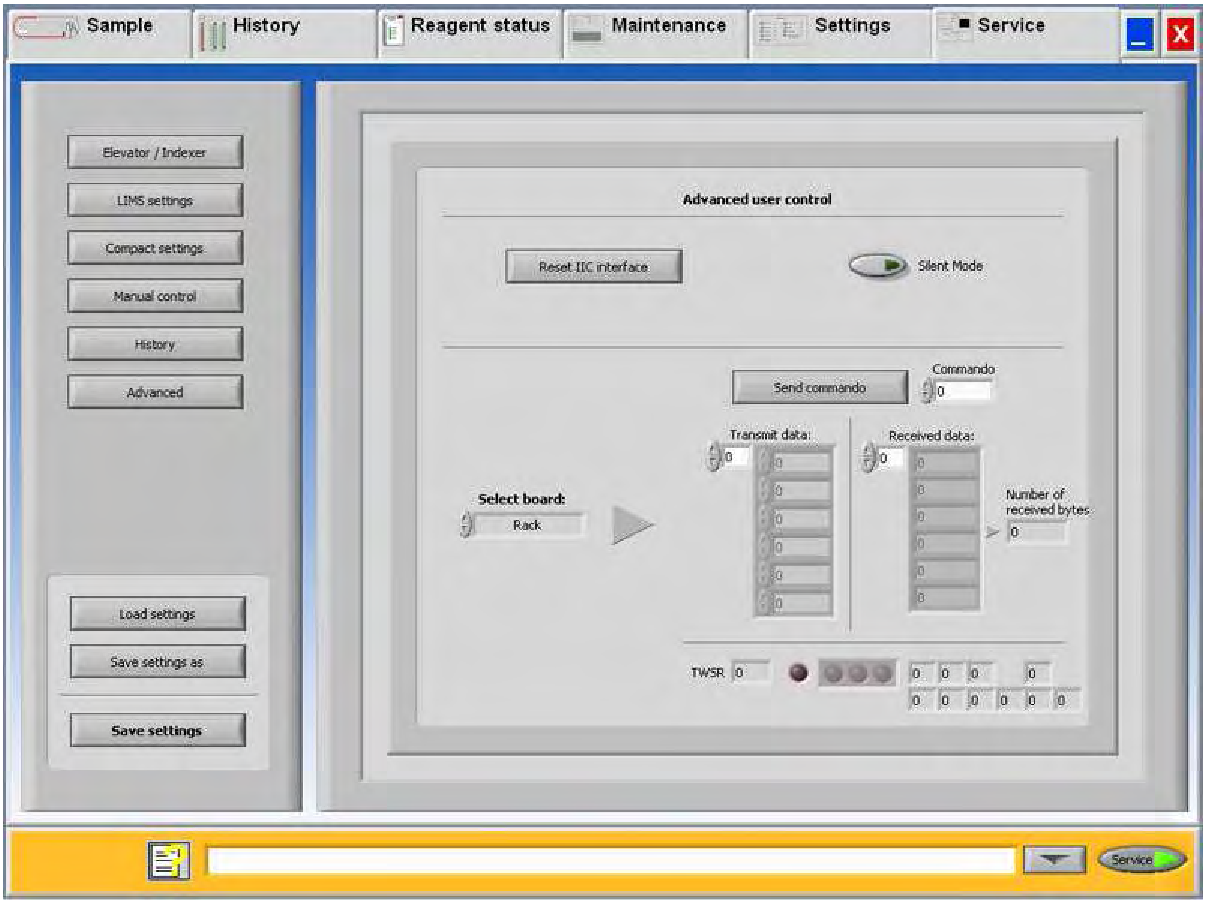
6.7.6. Display error history



A list of the error detection during operation.
This list contain error numbers what can be useful for the field engineer to check the problems with the instrument in the past.

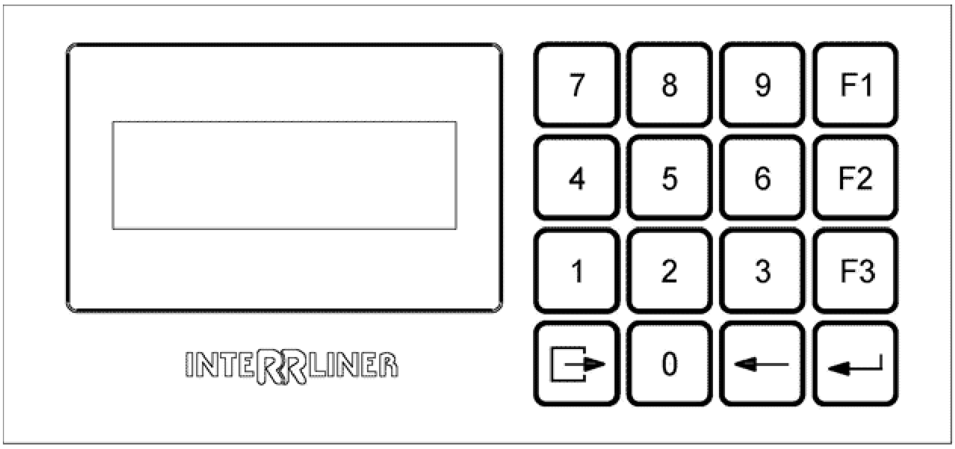
The key CLEAR will delete all errors from the list.

6.7.7. Advanced



This screen is used for input direct commands into the software to control all kinds of hardware and software settings.
This is only used by Mechatronics engineers and is not available for third parties

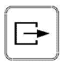
7. KEYBOARD INTERRLINER (SOFTWARE V 4.XX AND UP)



Function key 1

Function key 2

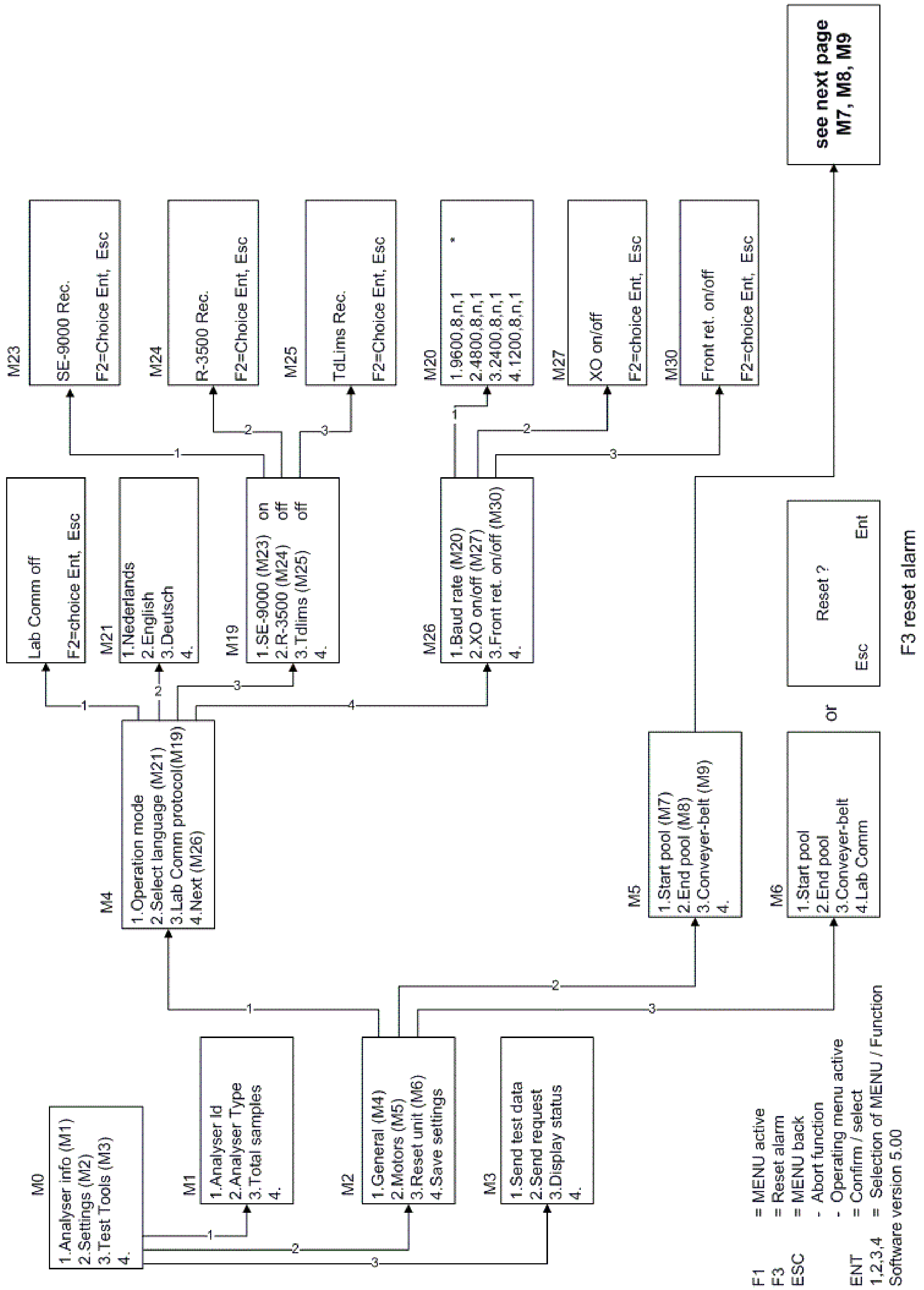
Function key 3

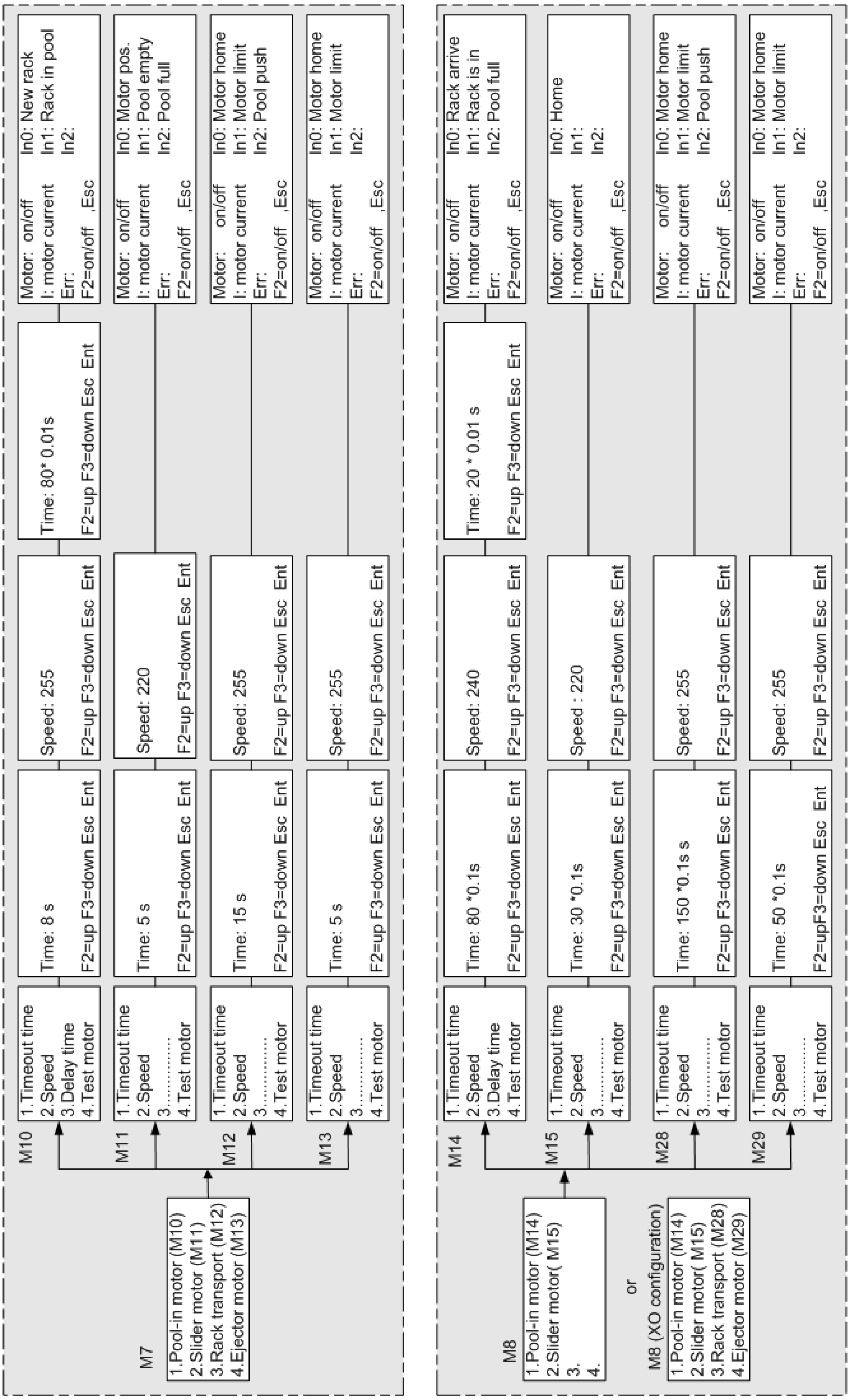

Escape key


Back space


Enter key

The menu overview includes all available options of the software. The menu descriptions which are included are applicable for this model.


M0
1.Analyser info (M1)
2.Settings (M2)
3.Test Tools (M3)
4.
M1
1.Analyser Id
2.Analyser Type
3.Total samples
4.
M2
1.General (M4)
2.Motors (M5)
3.Reset unit (M6)
4.Save settings
M3
1.Send test data
2.Send request
3.Display status
4.
M4
1.Operation mode
2.Select language (M21)
3.Lab Comm protocol(M19)
4.Next (M26)
Lab Comm off
F2=choice Ent, Esc
M21
1.Nederlands
2.English
3.Deutsch
4.
M19
1.SE-9000 (M23) on
2.R-3500 (M24) off
3.Tdlims (M25) off
4.
M26
1.Baud rate (M20)
2.XO on/off (M27)
3.Front ret. on/off (M30)
4.
M23
SE-9000 Rec.
F2=Choice Ent, Esc
M24
R-3500 Rec.
F2=Choice Ent, Esc
M25
TdLims Rec.
F2=Choice Ent, Esc
M20
1.9600,8,n,1 *
2.4800,8,n,1
3.2400,8,n,1
4.1200,8,n,1
M27
XO on/off
F2=choice Ent, Esc
M30
Front ret. on/off
F2=choice Ent, Esc
see next page
M7, M8, M9
M5
1.Start pool (M7)
2.End pool (M8)
3.Conveyer-belt (M9)
4.
M6
1.Start pool
2.End pool
3.Conveyer-belt
4.Lab Comm
or
Reset ?
Esc Ent
F3 reset alarm
F1 = MENU active
F3 = Reset alarm
ESC = MENU back
- Abort function
- Operating menu active
ENT = Confirm / select
1,2,3,4 = Selection of MENU / Function
Software version 5.00


M7
1.Pool-in motor (M10)
2.Slider motor (M11)
3.Rack transport (M12)
4.Ejector motor (M13)
M10
1.Timeout time
2.Speed
3.Delay time
4.Test motor
Time: 8 s
F2=up F3=down Esc Ent
Speed: 255
F2=up F3=down Esc Ent
Time: 80* 0.01s
F2=up F3=down Esc Ent
Motor: on/off
I: motor current
Err:
F2=on/off ,Esc
In0: New rack
In1: Rack in pool
In2:
M11
1.Timeout time
2.Speed
3..............
4.Test motor
Time: 5 s
F2=up F3=down Esc Ent
Speed: 220
F2=up F3=down Esc Ent
Motor: on/off
I: motor current
Err:
F2=on/off ,Esc
In0: Motor pos.
In1: Pool empty
In2: Pool full
M12
1.Timeout time
2.Speed
3..............
4.Test motor
Time: 15 s
F2=up F3=down Esc Ent
Speed: 255
F2=up F3=down Esc Ent
Motor: on/off
I: motor current
Err:
F2=on/off ,Esc
In0: Motor home
In1: Motor limit
In2: Pool push
M13
1.Timeout time
2.Speed
3..............
4.Test motor
Time: 5 s
F2=up F3=down Esc Ent
Speed: 255
F2=up F3=down Esc Ent
Motor: on/off
I: motor current
Err:
F2=on/off ,Esc
In0: Motor home
In1: Motor limit
In2:
M8
1.Pool-in motor (M14)
2.Slider motor(M15)
3.
4.
or
M8 (XO configuration)
1.Pool-in motor (M14)
2.Slider motor(M15)
3.Rack transport (M28)
4.Ejector motor (M29)
M14
1.Timeout time
2.Speed
3.Delay time
4.Test motor
Time: 80 *0.1s
F2=up F3=down Esc Ent
Speed: 240
F2=up F3=down Esc Ent
Time: 20 * 0.01 s
F2=up F3=down Esc Ent
Motor: on/off
I: motor current
Err:
F2=on/off ,Esc
In0: Rack arrive
In1: Rack is in
In2: Pool full
M15
1.Timeout time
2.Speed
3..............
4.Test motor
Time: 30 *0.1s
F2=up F3=down Esc Ent
Speed : 220
F2=up F3=down Esc Ent
Motor: on/off
I: motor current
Err:
F2=on/off ,Esc
In0: Home
In1:
In2:
M28
1.Timeout time
2.Speed
3..............
4.Test motor
Time: 150 *0.1s s
F2=up F3=down Esc Ent
Speed: 255
F2=up F3=down Esc Ent
Motor: on/off
I: motor current
Err:
F2=on/off ,Esc
In0: Motor home
In1: Motor limit
In2: Pool push
M29
1.Timeout time
2.Speed
3..............
4.Test motor
Time: 50 *0.1s
F2=upF3=down Esc Ent
Speed: 255
F2=up F3=down Esc Ent
Motor: on/off
I: motor current
Err:
F2=on/off ,Esc
In0: Motor home
In1: Motor limit
In2:


M22
2 or more conveyor belts
1.Transport 1
2.Transport 2
3.Transport 3
4.Transport 4
M9
1.Switch in motor(M16)
2.Switch out motor(M17)
3.Transport motor(M18)
4.
or
M9 (Front return configuration)
1.Switch in motor(M16)
2.Switch out motor(M17)
3.Transport motor(M18)
4.Front return(M31)
M31
1.Transfer motor (M32)
2.Long belt motor (M33)
3.Short belt motor (M34)
4.
M16
1.Timeout time
2.Speed
3...............
4.Test motor
Time: 20 * 0.1s
F2=up F3=down Esc Ent
Speed: 210
F2=up F3=down Esc Ent
Motor: on/off In0: Home
I: motor current In1: Catch pos.
Err: In2: In pos.
F2=on/off F3=catch ,Esc
M17
1.Timeout time
2.Speed
3...............
4.Test motor
Time: 20 *0.1s
F2=up F3=down Esc Ent
Speed: 240
F2=up F3=down Esc Ent
Motor: on/off In0: Home
I: motor current In1: In pos.
Err: In2:
F2=on/off ,Esc
M18
1.Timeout time
2.Speed
3.Delay time
4.Test motor
Time: 255* 0.1s
F2=up F3=down Esc Ent
Speed: 120 (255 if no new motor)
F2=up F3=down Esc Ent
Time: 5* 0.01s
F2=up F3=down Esc Ent
Motor: on/off In0: Rack detect
I: motor current In1:
Err: In2:
F2=on/off ,Esc
M32
1.Timeout time
2.Speed
3.Delay time
4.Test motor
Time: 100 * 0.1s
F2=up F3=down Esc Ent
Speed: 255
F2=up F3=down Esc Ent
Time: 5* 0.01s
F2=up F3=down Esc Ent
Motor: on/off In0: Home
I: motor current In1: Catch pos.
Err: In2: In pos.
F2=on/off F3=catch ,Esc
M33
1.Timeout time
2.Speed
3...............
4.Test motor
Time: 100 *0.1s
F2=up F3=down Esc Ent
Speed: 255
F2=up F3=down Esc Ent
Motor: on/off In0: Home
I: motor current In1: In pos.
Err: In2:
F2=on/off ,Esc
M34
1.Timeout time
2.Speed
3...........
4.Test motor
Time: 100* 0.1s
F2=up F3=down Esc Ent
Speed: 255
F2=up F3=down Esc Ent
Motor: on/off In0: Rack detect
I: motor current In1:
Err: In2:
F2=on/off ,Esc

7.1. Navigation through the menus

During normal operation, press "F1" key once to access the main menu M0.To access submenus and functions, press the item number shown at the front of the line.
Press "**ESC**" to return to previous menus and to abort functions. Press "F3" and the "ENTER" key to reset the alarm of the InteRRliner itself. Function key F2 is reserved for future purposes.

How to use the header of the menu for instance MENU M3 M0 (3) TEST TOOL.
Take the Menu structure diagram and follow the route backwards. MENU M3 is only accessible via MENU M0 line 3 with text TEST TOOLS.

The submenus are listed by a menu number. (See overview in section Menu structure)

The legend is;	**Line** data or information in display
	Item is toggle function or input data
	Bold text is a default setting
	[ESC] is the key function

7.2. Keyboard InteRRliner (Software V 4.xx)

The menus described in this chapter are applicable for an InteRRliner equipped with a XN or XO output unit.

7.3. Menu M0 Main menu

Menu M0 Main menu		
1	Analyser Info	See menu ***M1*** (on page 121) (shows information for administrative purposes)
2	Settings	See menu ***M2*** (on page 122) (Functions to control the operating parameters of the system)
3	Test tools	See menu ***M3*** (on page 122) (Functions to check communication with LAB COMM and status)

7.4. Menu M1 M0(1) analyser info

Menu M1 ***M0*** (on page 121) (1) Analyser Info		
1	Analyser ID	Analyser ID number
2	Analyser type	Analyser configuration
3	Total of samples	The total amount of racks processed by the InteRRliner

7.5. Menu M2 M0 (2) Settings

Menu M2 ***M0*** (on page 121) (2) Settings

1	General	Holds functions that control overall behaviour of the transport system (See ***Menu M4*** (on page 123))/***Menu M4 (software V 4.xx)*** (on page 123)
2	Motors	Submenus to control motor timing (See ***Menu M5*** (on page 123))
3	Reset unit	Reset functions for separate units (See ***Menu M6*** (on page 124))
4	Save settings	Save all settings entered in various menus to Eprom. A confirmation is not needed and the data is stored immediately. Press **[ESC]** to return to the menu.

7.6. Menu M3 M0 (3) Test Tools

Menu M3 ***M0*** (on page 121) (3) Test Tools

1	Send test data	The test data string is similar to the normal out-put string of the StaRRsed Compact, but the result is a dummy. Function is used to test Lab Comm communication.
2	Send request	The request string sent by this menu function is similar to the normal routine sample tube request and can be captured by the Sysmex Lab Comm host computer system. Function is used to test Lab Comm communication.
3	Display status.	For test purposes only.

7.7. Menu M4 M2 (1) General (software V 4.xx)

Menu M4 ***M2*** (on page 122) (1) General		
1	Operation mode	Select Lab Comm offline/online. Toggle selection with **[F2]**, confirm with **[ENT]**, and abort with **[ESC]**.
2	Select language	Select the menu language for the rack transport system only (see ***Menu M21*** (on page 125)).
3	Lab Comm protocol	Select the type of record used in communication with Lab Comm (See ***Menu M19*** (on page 126))
4	***Next*** (on page 123)	

7.8. Menu M26 M4 (4) General (Software V4.xx)

Menu M26 ***M4*** (on page 123) (4) General		
1	Baud rate	Select the port settings used in communication with Lab Comm (See ***Menu M20*** (on page 126))
2	XO on/off	Select the communications off/on to external belt transport system only (see ***Menu M27*** (on page 139))
3	Front ret on/off	Select the communications off/on to Front Return Line only (see Menu M30)
4		

7.9. Menu M5 M2 (2) Motors

Menu M5 ***M2*** (on page 123) (2) Motors		
1	Start-Pool	Submenus to control all the motors for Start-Pool (See ***Menu M7*** (on page 124))
2	End-Pool	Submenus to control all the motors for the End-Pool (See ***Menu M8*** (on page 124))
3	Conveyer-belt	Submenus to control all the motors for the conveyer belt (See ***Menu M9*** (on page 125))
4		

7.10. Menu M6 M2 (3) Reset Unit

Menu M6 ***M2*** (on page 123) (3) Reset unit		See also the error handling
1	Start-Pool	Reset the Start-Pool
2	End-Pool	Reset the End-Pool
3	Conveyor belt	Reset the Conveyor
4	Lab Comm	Reset the Lab communication

7.11. Menu M7 M5 (1) Start-Pool

Menu M7 ***M5*** (on page 123) (1) Start-Pool		
1	Pool-in motor	Settings for the belt-drive motor, that feeds the rack into the Start-Pool. See (***Menu M10)*** (on page 127)
2	Slider motor	Settings for the motor, that slides (pushes) the rack off the belt (See ***Menu M11*** (on page 128))
3	Rack transport motor	Settings for the motor, that pushes the racks to the front of the Start-Pool (See ***Menu M12*** (on page 129))
4	Ejector motor	Settings for the motor, that pushes the rack onto the conveyer belt (See ***Menu M13*** (on page 130))

7.12. Menu M8 M5 (2) End-Pool

Menu M8 ***M5*** (on page 123) M5 (2) End-Pool		
1	Pool-in motor	Settings for the belt-drive motor, that feeds the rack into the End-Pool (See ***Menu M14*** (on page 131))
2	Slider motor	Settings for the motor, That slides (pushes) the rack off the belt. (See ***Menu M15*** (on page 132))

7.13. Menu M8 M5 (2) (XO configuration)

Menu M8 ***M5*** (on page 123) M5 (2) End-Pool

1	Pool in motor	Settings for the belt-drive motor, that feeds the rack into the End-Pool (See ***Menu M14*** (on page 131))
2	Slider motor	Settings for the motor, That slides (pushes) the rack off the belt. (See ***Menu M15*** (on page 132))
3	Rack transport	Settings for the motor, that pushes the racks to the back of the End-Pool (See ***Menu M28*** (on page 133))
4	Ejector motor	Settings for the motor, that pushes the rack out the End-pool. (See ***Menu M29*** (on page 134))

7.14. Menu M9 M5 (3) Conveyer belt

Menu M9 ***M5*** (on page 123) (3) Conveyor belt

1	Switch-in motor	Settings for the motor, that pushes the rack from the conveyer belt into the indexer (See ***Menu M16*** (on page 135))
2	Switch-out motor.	Settings for the motor, that pushes the rack out of the indexer (See ***Menu M17*** (on page 136))
3	Transport motor.	Settings for the conveyer belt drive motor (See ***Menu M18*** (on page 137))

7.15. Menu M21 M4 (2) Select language

Menu M21 ***M4*** (on page 123) (2) Select language

1	Nederlands	Selects Dutch language
2	English	Selects English language
3	Deutsch	Selects German language

7.16. Menu M19 M4 (3) LAB COMM protocol

Menu M19 ***M4*** (on page 123) (3) LAB COMM protocol

1	SE-9000	ON	Selects the SYSMEX SE-9000 type protocol as record for Lab Comm (See ***Menu M23*** (on page 139))
2	R-3500	OFF	Selects the SYSMEX R-3500 type protocol as record for Lab Comm (See ***Menu M24*** (on page 139))
3	Tdlims	OFF	Select the Tdlims (See ***Menu M25*** (on page 139))

7.17. Menu M20 M4 (4) Baud rate

Menu M20 ***M4*** (on page 123)(4) Baud rate

1	9600,8,n, 1	Baud rate setting: 9600 baud, 8 data bits, no parity, 1 stop bit (* shows selection is active)
2	4800,8,n, 1	Baud rates setting: 4800 baud, 8 data bits, no parity, 1 stop bit (* shows selection is active)
3	2400,8,n, 1	Baud rate setting: 2400 baud, 8 data bits, no parity, 1 stop bit (* shows selection is active)
4	1200,8,n, 1	Baud rate setting: 1200 baud, 8 data bits, no parity, 1 stop bit (* shows selection is active)

7.18. Menu M10 M7 (1) Pool in motor (Start-Pool)

Menu M10 ***M7*** (on page 124) (1) Pool-in motor (Start-Pool)	
1	Time:
2	Speed:
3	Delay time
4	Test motor:

Timeout time		
1		
2	Time:	5 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed		
1		
2	Speed:	255
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Delay time		
1		
2	Time:	80*0.01 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor		
1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

In0: New rack

In1: Rack in-pool

7.19. Menu M11 M 7(2) Slider motor (Start-Pool)

Menu M 11 ***M7*** (on page 124) (2) Slider motor (Start-Pool)

1	Time-out:	
2	Speed:	
3		
4	Test motor:	

Timeout time

1		
2	Time:	5 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed

1		
2	Speed:	220
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor

1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

In0: Motor pos

In1: Pool empty

In2: Pool full

7.20. Menu M12 M7 (4) Rack transport (Start-Pool)

Menu M12 ***M7*** (on page 124) (4) Rack transport (Start-Pool)

1	Time-out:
2	Speed:
3	
4	Test motor:

Timeout time

1		
2	Time:	15 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed

1	Speed:	
2		255
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor

1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

In0: Motor home

In1: Motor limit

IN2 Pool push

7.21. Menu M13 M7 (4) Ejector motor (Start-Pool)

Menu M13 ***M7*** (on page 124) (4) Ejector motor (Start-Pool)	
1	Time-out:
2	Speed:
3	
4	Test motor:

Timeout time		
1		
2	Time:	5 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed		
1		
2	Speed:	255
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor		
1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

-

In0: Motor home

In1: Motor limit

In2:

7.22. Menu M14 M8 (1) Pool in motor (Exit-Pool)

Menu M14 ***M8*** (on page 124) (1) Pool in motor (Exit-Pool)

1	Time-out:
2	Delay Time:
3	Speed:
4	Test motor:

Timeout time

Line 1		
Line 2	Time:	80*0.1 second
Line 3		
Line 4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed

1		
2	Speed:	240
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Delay time

1		
2	Time:	20*0.01 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor

1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

-

In0: Rack arrived

In1: Rack is in

In2: Pool full

7.23. Menu M15 M8 (2) Slider motor (Exit-Pool)

Menu M15 ***M8*** (on page 124) (2) Slider motor (Exit-Pool)	
1	Time-out:
2	Speed:
3	
4	Test motor:

Timeout time		
1		
2	Time:	30*0.1 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed		
1		
2	Speed:	220
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor		
1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

-

In0: Home

In1:

In2:I

7.24. Menu M28 M8 (3) Rack transport (XO configuration)

Menu M12 ***M7*** (on page 124) (4) Rack transport (Exit-Pool)

1	Time-out:
2	Speed:
3	
4	Test motor:

Timeout time

1		
2	Time:	15 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed

1	Speed:	
2		255
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor

1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

In0: Motor home

In1: Motor limit

IN2: Pool push

7.25. Menu M29 M8 (4) Ejector motor (XO configuration)

Menu M13 ***M7*** (on page 124) (4) Ejector motor (Exit-Pool)	
1	Time-out:
2	Speed:
3	
4	Test motor:

Timeout time		
1		
2	Time:	5 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed		
1		
2	Speed:	255
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor		
1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

In0: Motor home

In1: Motor limit

In2:

7.26. Menu M16 M9 (1) Switch-in motor (Conveyer belt)

Menu M16 ***M9*** (on page 125) (1) Switch-in motor

1	Time-out:
2	Speed:
3	
4	Test motor:

Timeout time

1		
2	Time:	20*0.1 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed

1		
2	Speed:	210
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor

1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

-

In0: Home

In1: Catch position

In2: In position

7.27. Menu M17 M9 (2) Switch-out motor (Conveyer belt)

Menu M17 ***M9*** (on page 125) (2) Switch-out motor (Conveyer belt)	
1	Time-out:
2	Speed:
3	
4	Test motor:

Timeout time		
1		
2	Time:	20*01 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed		
1		
2	Speed:	240
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor		
1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

-

In0: Home

In1: In position

In2:

7.28. Menu M18 M9 (3) Transport motor (Conveyer belt)

Menu M1 ***M9*** (on page 125) (3) Transport motor (Conveyer belt)		
1	Time-out:	
2	Speed:	
3	Delay timer	Not applicable in software lower than V4.xx
4	Test motor:	

Timeout time		
1		
2	Time:	255*0.1 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Speed		
1		
2	Speed:	255 (up to 2010) 120 (from 2011 and on, see bulletin 2110601)
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Note:Delay time is not applicable in software lower than V4.xx

Delay time		
1		
2	Time:	5*0.01 second
3		
4	**[F2]**=up **[F3]**=down **[ESC] [ENT]**	

Test motor		
1	**Motor:**ON**/**OFF	In0:
2	I: Motor current	In1:I
3	Err:	In2:
4	**[F2]**=ON/OFF, **[ESC]**	

In0: Rack detect

In1:

In2:

7.29. Notes for menu’s M10 through M18

Notes for menu’s M10 through M18.
Improper use of the following functions can introduce unpredictable errors, service personnel should only use them. Settings will only be preserved through a power-on cycle, if they are saved (see ***Menu M2*** (on page 123)).

Timeout time.	Controls the amount of time the motor will run, in case a sensor malfunctions or a rack is not detected. After this time a timeout error will occur.	Set time: 0…255 sec	Change the setting using "F2" / "F3", confirm with "Enter", abort with "ESC"
Speed.	Controls the motor speed	Set speed: 0…255	Change the setting using "F2" / "F3", confirm with "Enter", abort with "ESC"
Delay time	Controls the amount of time for a motor to run, after a sensor is triggered. This setting is used to ensure, that racks have reached the end of the passageway.	Set time: 0…255 x 10ms	Change the setting using "F2" / "F3", confirm with "Enter", abort with "ESC"
Test motor	Test function to check the motor and related sensors.		

7.30. Note for menu M22

Items 1 through 4: Transport (x) this menu is only accessible, if multiple sample sections are present. Sections are counted in the direction of the rack flow (starting at the Start-Pool). Select the section for which the motor settings need to be accessed.

Menu M22 M5 (3) Conveyer belt if more then 1 unit is connect

Item 1	Transport 1	Then menu 9 is copied 4 times
Item 2	Transport 2	Then menu 9 is copied 4 times
Item 3	Transport 3	Then menu 9 is copied 4 times
Item 4	Transport 4	Then menu 9 is copied 4 times

7.31. Note for menus M23 till M25

Note for menus M23 till M25
Only one of the protocols is activated. If one protocol is active and you select a new protocol to be active, by switching it ON, the previous protocol is automatically switched OFF.

Menu M23 M19 (1) SE-9000		
Item.1		
Item 2	SE-9000 Rec.	OFF
Item 3		
Toggle selection with "F2"=on/off, confirm with "Enter", abort with "ESC".		

Menu M24 M19 (2) R-3500		
Item 1		
Item 2	R-3500 Rec.	OFF
Item 3		
Toggle selection with "F2"=on/off, confirm with "Enter", abort with "ESC".		

Menu M25 M19 (3) Tdlims		
Item 1		
Item 2	Tdlims Rec.	OFF
Item 3		
Toggle selection with "F2"=on/off, confirm with "Enter", abort with "ESC".		

7.32. Note for menu M27

Note for menu M27
Only one of the protocols is activated. If one protocol is active and you select a new protocol to be active, by switching it ON, the previous protocol is automatically switched OFF.

Menu M27 (***M26*** (on page 123)) (2) XO on/off		
Item 1		
Item 2	XO on/off.	OFF
Item 3		
Toggle selection with "F2"=on/off, confirm with "Enter", abort with "ESC".		

8. GETTING STARTED

Blood cell counter racks are placed onto the Start Yard by hand or fed in through the input conveyer belt of the Start Yard. The racks are trimmed and subsequently pushed automatically to the front end where it lines up with the rack conveyor-belt.

Manually pushing racks against or away from the front end will interfere with the ejector mechanism causing errors. Racks will wait until the sampler unit sends a rack request. On that rack request, one rack is pushed towards the indexer and subsequently grabbed by it to be processed.

The InteRRliner controls all the belt movements, rack transports and also the host communication between Compact and Lab communication system.

The Indexer is a carriage that grabs and holds the rack from the conveyor belt and performs a check for the presence of sample tubes and reads the barcode. The indexer acts independently. In case the barcode can not be read right away, a tube rotator will rotate the sample tubes in the rack both clock-wise and anti-clockwise until the barcode reader reads the barcode.
The InteRRliner will send an inquiry and wait for the host to receive a YES or NO status for sampling.
In case the barcode is not readable the InteRRliner will set the status for this tube to N (NO) and this tube will not be processed!
Tubes with the status NO will not be processed by the analyzer.

After reading the barcodes the sample rack moves towards the robotic arm, the arm moves forward and picks up at least one tube (if present: three tubes).
The tube(s) are turned up side down up nine times. The robot places the tube(s) back in the rack, the rack moves one position and the robotic arm picks up the next tubes.
The first tube is then placed in the sample tube adapter of the ESR analyser.

The analyser starts the aspirating procedure and in the meantime the robotic arm starts mixing the remaining tubes.

When the aspirating cycle is finished, the tubes are placed back into the rack and the sequence starts all over again.

As soon as the rack has been processed completely, it is moved to the conveyor belts shifting mechanism, released to the conveyor belt and transported to the End-Pool.

ATTENTION:
The quality of the barcode labels is of critical importance for the correct function of the sample robot. Labels may not come loose or have “dog-ears”! Poor label quality cannot be compensated by mechanical adjustments!

At aspiration the blood is accurately diluted with citrate (1:4) subsequently fed into the Westergren pipette. After 60 or 30 minutes (depending on the method settings) the automatic reading of the pipettes is carried out by moving an optical sensor along the pipettes. This reading is then stored in the integrated PC system and reported to the connected LIMS. A direct print out is also possible by connecting a printer.

The pipettes are automatically flushed, cleaned and dried to be ready for a next sample to perform ESR.

When the aspirating cycle is finished, the sample tube is placed back into the rack and the sequence starts all over again.

8.1. First set-up

Check the general settings and select the required options

1. 30 minutes (Default is OFF)
2. Display dilution (Default is OFF)
3. EDTA mode (Default is ON)
4. Display graph (Default is OFF)
5. Sample probe protection (Default is ON)
6. Temperature correction (Default is ON)
7. Fast filling (Default is ON)
8. Virtual keyboard (Default is ON)
9. Print after measurement (Default is OFF)
10. Check for duplicate ID's
11. Check the limit filter settings as recommended set by default.

The tab Settings is protected by the password. Select the tab Settings, type the password 3964 and press the **[ENTER]** key.

8.1.1. Liquid levels

Liquid containers and levels must be checked frequently.
If the small onboard bottles are used, wash and keep the bottles clean to avoid bacterial growth.

The InteRRliner V8 has liquid level sensors. When the level sensor alarm appears, replace reagent as soon as possible.

9. OPERATION

9.1. Quick start-up

This section describes a quick start-up procedure and a general description of what to do before starting a large batch of samples to run through the system.

9.1.1. Check list

Run this checklist before each large batch of samples.

1. Waste container (if applicable), should be empty.
2. Check the liquid levels.

9.1.2. Start-pool

Ensure that racks are correctly placed in the Start-Pool; the groove on the side of the rack must catch the strip at the right side of the storage area.

Note: Do not push racks manually against or away from the front end, as this will interfere with the ejector mechanism.

9.1.3. End-pool

XO: The End-pool transports the racks to an external device.

XN : The End-pool collects all processed racks. Racks are pushed to the rear of the pool. If no more racks can be placed, an error is signalled in the form of beeps and a message shown on the display. Remove processed racks and reset the End-pool if necessary.

9.1.4. Power up sequence

- Check the Start- and End pools, the conveyor-belt and the robotic unit for unblocked passageways. Racks may only be present on the pool’s stainless steel storage areas.
- Start sequence
  - Switch **ON** the Compact.
  - Switch **ON** the PC and the monitor.
  - Wait until "Windows" is ready for use.
  - Start the InteRRliner software.
  - Observe the Robotic arm movement during the start-up, after finishing the reset sequence the Compact is ready for use.
  - Switch **ON** the InteRRliner. The system becomes operational when the lines "HST Version X.XX" and "Lab Comm On (or OFF)" are shown in the display.

- If applicable switch **ON** the printer. The printer prints the paper header automatically.
- InteRRliner is ready for use.

9.1.5. Priming the fluid system

Select MAINTENANCE -> PRIME / CLEAN (on page 73) and perform all prime sequences manually. Check fluid flow through the applicable tubing. repeat a step if fluid flow is not correct.

1. PRIME RINSE SOLUTION, activates the Rinse pump. RINSE SOLUTION must flow through the pipette.
2. PRIME SALINE, activates the SALINE pump. Liquid must flush through the needle assembly.
3. PRIME DILUENT, activates the diluter prime cycle. Diluter system must be filled with diluent and free of air bubbles.
    - Diluter prime cycle is executed once. In order to fully prime the system it will be necessary to perform this step several times. (One cycle is 5 strokes of the Diluter)
4. PRIME DE-IONIZED WATER, activates the fill nozzle water valve. DE-IONIZED WATER must flow through the tube connected to the fill nozzle cap.
5. PRIME DISINFECTANT, activates the disinfectant valve. Disinfectant must flow through the small tube connected to the pipette wash station.

When the InteRRliner V8 has been idle for more than eight hours, some reagents may have dropped from the tubes due to gravity. Prime all tubing before sampling with:

- PRIME ALL UNITS
  All priming functions are sequentially performed one time.

9.1.6. Fill procedure

The protective hood must be closed to prevent injuries from the moving parts of the robotic unit.

Fill a rack with sample tubes and set the rack in the input pool of the InteRRliner. Select the tab SAMPLE and press the Sample mode button.

The Rack will be transported to the barcode manipulator to read the barcode labels. Then the rack is moved to the robotic arm and three sample tubes are picked up for mixing. After mixing, the tubes are replaced into the rack and the Rack is moved one position. The robotic arm is picking up the sample tube and places the tube into the needle unit to be aspirated.

ATTENTION: It is not allowed to change sample tubes in a rack or remove sample tubes while the rack is processed. This may cause malfunction of the instrument.

Note: BE SURE THAT THE COMPACT IS SET TO THE CORRECT MODE. i.e. EDTA or CITRATE.

9.2. Checks during operation

- Perform regularly visual checks for air bubbles in the sample pipettes, see ***Air bubbles*** (on page 183).
- Check regularly the ESR statistics in the software for any increase in ESR errors, haziness, dilution errors or bubbles on top warnings, see ***ESR Statistics screens*** (on page 53).

In case of a considerable number of pipettes with air bubbles:

- Perform the necessary maintenance or contact the service representative.

9.3. Turn off

It is recommended to turn the InteRRliner V8 off at the end of the day. Before the instrument is turned off, it is good practice to carry out the ***Daily maintenance*** (on page 161) or at least the End-of-day wash procedure. This will help to keep the instrument clean and almost free of bacterial growth for a period of days.

W A R N I N G!!!
Always be aware of the dangers of infection, especially during maintenance. Take the appropriate precautions.

Note: The InteRRliner V8 may remain switched ON continuously. However, the customer should consider environmental issues such as energy consumption when the instrument is not to be used for some time. It is also recommended to completely restart the instrument and (if applicable) Windows once in a while to clear the memory and ensure a stable operating system.

9.3.1. End-of-day-wash procedure

Select the tab MAINTENANCE and press the button End-of-day wash. A pop-up screen is shown. Selecting Close program will stop the program immediately **without** running the End-of-day wash procedure.
When End-of-day wash procedure is selected, a selection screen for this function is shown.

The following options are available for this function:

1. Select from the list the desired option:
   - No End-of-day wash!: The function is not active
   - Immediately: The function runs immediately after pressing **OK**.
   - Only once: The function runs only once at the selected time.
   - Weekdays: The function runs only on the working days (Mo-Fr) at the selected time.
   - Daily: The function runs on a daily base at the selected time.
2. Select the time of the day in hours and minutes for the selected option.

Pressing **OK** activates the settings.

10. QUALITY CONTROL

10.1. Control pipettes

The correct function of the hardware and software of the InteRRliner V8 measurement unit should be checked at regular intervals with the aid of Mechatronics Control Pipettes (Order nr. QTST049000). More information can be found in the Control Pipette User Manual (MRN-019).

10.2. Monitoring measurement quality with StaRRsed Control

StaRRsed Control is an in-vitro diagnostic quality control material to monitor the accuracy and precision of Erythrocyte Sedimentation Rate (ESR) instruments and procedures. This instruction is only applicable for StaRRsed Control, used on Mechatronics ESR StaRRsed instruments.

StaRRsed Control is available in:

- Abnormal range (Level A)

- Normal range (Level N)

The software can produce statistical data for further analysis for:

- Defining control limits (accept or reject patient results)
- Error detecting (systematic or random errors)
- Evaluation of QC results

10.2.1. Limitations

StaRRsed Control is to be used for Erythrocyte Sedimentation Rate testing only and shall not be used to control any other hematology procedure.
StaRRsed Control shall not be used as a standard.
StaRRsed Control should not be used past the expiration date.
Mechatronics as supplier of the StaRRsed Control shall not be liable for any claimed damages arising from other than intended usage.

10.2.2. Expected value range

StaRRsed Control is assayed for the StaRRsed ESR analyzers.
The assayed mean values and expected ranges are derived from multiple analyses at different sites and on multiple instruments. The values, provided on the package insert and encoded in the tubes barcode, are specific for this lot of product. The lab should establish its own acceptable ranges. Whenever the Controls fail to perform consistently within the acceptable ranges, patient results should be considered invalid. Contact your StaRRsed instrument provider for assistance.
If results vary outside the specified assay ranges, discard the tube and utilize a new tube. If difficulties persist, contact your supplier for further assistance and/or instructions.

10.2.3. Temperature correction

The assayed values are based on an 60 minutes ESR, with dilution and temperature correction. Therefore, the measured ESR value should be compared with the expected value *using temperature correction*. The calculation of a 30 minute measurement to a 60 minute ESR result with temperature correction influences the QC result.

See chapter ***QC Results*** (on page 149) for more information.

10.2.4. Usage options

StaRRsed Control can be used in two ways:

1. With original StaRRsed barcode label:
   The StaRRsed software maintains internal QC history and sends an error message when test results are out of range.
2. With user barcode label:
   The user can use his own ID labels (hereafter called "Lab ID"). Existing QC procedures and LIMS interface settings can be maintained without any changes. The Lab ID is linked within the StaRRsed software to the original StaRRsed Control barcode.
   An external barcode reader can be used to read the 10-character QC barcode labels on the tube or the package insert to create the link. The barcode symbology is "Code 39".

When StaRRsed Control label or a linked user barcode label is used:

- The StaRRsed software recognises the StaRRsed Control sample by the structure of the barcode, which contains the following information: Level A or N, the expected mean value and range and the expiry date.
- The history of QC results is maintained internally. Error messages are generated when the QC results are outside the acceptable range.
- QC samples can be optionally requested by the LIMS and QC results can be send to the LIMS.

StaRRsed Control can be used on StaRRsed analysers in EDTA or in Citrate mode. Quality Control sampling can be performed at any time during the normal ESR procedure, depending on users Quality Control schedule.

Quality Control scheduling is the responsibility of the user. The StaRRsed software does not provide Quality Control scheduling functionality.

10.2.5. Quality control procedure

StaRRsed Control is provided in ready-to-use sample tubes and is used in the same manner as patient samples. StaRRsed Control is to be used for the Westergren method with dilution only as prescribed by the "ICSH review of the measurement of the ESR" (2011) and the "CLSI Procedures for the ESR Test; Approved standard; H02-A5" (2011).

Citrate mode: When the StaRRsed analyzer is used in the Citrate mode, the StaRRsed Control material must be diluted manually by transferring the necessary amount of material into a pre-citrated ESR blood collection tube. Immediately after re-suspending, transfer the necessary amount of material into a pre-citrated tube according instructions of the tube manufacturer. Close the tube with the mixture and invert at least 12 times, then place the sample into the analyzer.

1. *When using LAB ID:* Link the Lab ID with StaRRsed Control Sample ID, see chapter ***Linked QC ID's*** (on page 62). Attach the lab ID label on the tube on top of the original StaRRsed Control label
2. Invert the StaRRsed Control tube until packed cells have been completely re-suspended. Continue mixing for 30 seconds (at least 12 complete inversions).
   Avoid foaming. DO NOT VORTEX.
   NOTE: To ensure consistent and reproducible results, the Control material must be thoroughly mixed and handled in the same manner each time.
3. Place StaRRsed Control tube immediately after mixing into the analyzer.
4. Start the Sample mode. The StaRRsed Control sample is processed in the same manner as a patient sample. Depending on the settings in "QC settings", a request and/or result is send to the LIMS.
5. Restore tube after each use (at 18°-30°C).

For detailed information see the StaRRsed Control Package Insert.

The contents of one tube of 5ml is sufficient for three Control samples. Do not mix residual material with material from other tubes. Do not re-use empty tubes.

The software interface is described in the chapter ***History screen*** (on page 46).

StaRRsed Control should be disposed of as medical waste.

10.2.6. QC Results

The measured QC results are compared with the Assay mean value and the acceptable range. The applicable values for the acceptable range depend on the user setting. See chapter "***QC Settings*** (on page 98)" for more information.

If applicable, the QC result is reported to LIMS using the chosen settings regarding temperature correction, display of dilution rate and limit error settings.

10.2.6.1.QC Error messages

The general ESR errors and warnings are also applied on the QC results, see "***ESR Error and Warning code messages*** (on page 155)"

When the result is within range, no message is shown.

When the result is out of range an error message is shown in the status line of the Sample screen and the QC icon is blinking on the Sample screen. When the sample mode is started again by the operator, the following messages appears:
Last QC result was out of range! Continuing could produce incorrect results! Do you still want to continue?
Press "**Accept**" to continue sampling without performing a new QC, press "**Cancel**" to return and take appropriate action.

Messages when the general setting "Temperature Correction" is switched ON:

- "E116: QC is out of acceptable range!"
  The Sample mode is switched OFF automatically. Remaining filled pipettes are processed in the normal manner.

Messages when the general setting "Temperature Correction" is switched OFF:
The software always calculates a temperature corrected result because only temperature corrected results can be compared with the Assay mean value.

- "E116: QC is out of acceptable range!"
  The uncorrected and the corrected result are out of range.
- "E117: Uncorrected QC result is out of acceptable range, but corrected result is within range!"
  The uncorrected result is out of range, but the corrected result is within range.
- "E118: Uncorrected QC result is within acceptable range, but corrected result is out of range!"
  The uncorrected result is within range, but the corrected result is out of range.

See ***Quality control trouble shooting*** (on page 194) and ***QC Results screen*** (on page 54) for more details.

10.2.6.2.QC Result analysis

Authorized staff should identify and differentiate acceptable/unacceptable random errors and trends and/or shifts in systematic errors from the statistical data. Depending on the users Quality Control Procedures analytical results could be accepted or rejected.

Changes in QC results can be gradual or abrupt. Gradual changes can be caused by contamination and incidental environmental variations. Abrupt changes can be caused by change of QC material batch or possible hardware errors.

If results are continuously out of range due to significant difference between calculated mean and control value, but the statistics show precise results with small deviations, it should be considered to expand the acceptable assay range with ***QC Settings*** (on page 98).

If results are incidentally out of range it is advised to perform a daily maintenance and/or fill and clean step and then perform another QC sample step before releasing patient results.

If results are not send to the LIMS QC Results can be exported to MS Excel CSV files for further analysis in lab's own Quality Control data system.

11. REPORTING

The InteRRliner V8 is able to handle different types of protocols. The selection is made in SERVICE - SERIAL OUTPUT SETTING.

11.1. Protocols

A protocol is a set of rules governing the communication and the transfer of data between machines, as in a computer system. It is also a formal set of rules and procedures to be followed during a request for information before data is transferred between machines and computer systems.
The following protocols can be selected for data transfer to the Laboratory data processor computer.

1. No Serial output
2. ***MECHATRONICS-01 bidirectional*** (on page 289)
3. ***MECHATRONICS-02 unidirectional*** (on page 295)
4. ***Sysmex SE 9000*** (on page 321)
5. ***Sysmex SE-9000 unidirectional*** (on page 325)
6. ***Sysmex R-3500*** (on page 311)
7. ***Sysmex R-3500 unidirectional*** (on page 315)
8. ***Sysmex R-35500 EPU (***on page 319)
9. ***Compact bidirectional*** (on page 301)
10. Compact unidirectional (***String format for StaRRsed*** (on page 276))
11. ***StaRRsed III (V14)*** (on page 278)
12. ***Vesmatic*** (on page 287)
13. ***Sedimatic 15*** (on page 285)
14. ***Sedimatic 100*** (on page 281)
15. ***Opus bidirectional*** (on page 305)
16. Advia 120 bidirectional
17. Advia 120 unidirectional

The protocol can be set in tab SERVICE - Serial output settings. After selecting a protocol, save the new settings by pressing the Save setting key.

11.2. Result Printout

The results of the ESR measurements are send to the printer. The layout of the report depends on the selection of the 60- or 30 minute method.

11.2.1. Report 60-Minute mode

Colums:

1. Patient number.
2. Not corrected 30-minute ESR result (only in use if 30 minute mode is active).

3. Not corrected 60-minute ESR result.
4. 60-minute ESR result in millimeters, corrected for **18℃**. (only in use if temperature correction is active).
5. Aspect (clear, hazy).
6. Manually entered code number.
7. Sedimentation pipette number (number on the pipette belt).
8. Actual sedimentation time in minutes.
9. Temperature (in degrees Centigrade).
10. Error message (if the Analyser detects an error).
11. EDTA mode.

+ REPORT EXAMPLE +(Not to scale)

-- StaRRsed-- Date 20/05/14 Time: 15:28

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
905001		84	75	CLEAR		17	60	23		EDTA
905002		14	13	Hazy<10mm		18	60	23		EDTA
905003		22	21	Hazy<25mm		19	60	23		EDTA
905004		67	61	Hazy>25mm		20	60	23		EDTA
905005				CLEAR	**3**	21	60	23		EDTA
905006		5	5	CLEAR		22	60	23		**EDTA 079**
905007						24	60	23	Too many borders found	
905008						25	60	23	**L_err(---/ 84/ 75/200)**	EDTA

905002/905003/905004
Sample results with hazy aspect

905005:
Sample result with a manual aspect, where the manual aspect is shown as a number **3** in column 6 of this data record sample.

905006:
In this sample, the dilution rate has a dilution failure of 21% and that is printed as **EDTA 079.**

905007
Sample results with a text error. This sample gives Too many borders found. Result of a pipette possibly filled with air bubbles.

905008
Sample result with a text error. This sample is given limit error L_err(---/ 84/ 75/200)

11.2.2. Report 30 Minute mode

Columns:

1. Patient number.
2. Not corrected 30-minute ESR result (only in use if 30 minute mode is active).
3. Not corrected 60-minute ESR result.
4. 60-minute ESR result in millimeters, corrected for **18**℃. (only in use if temperature correction is active).
5. Aspect (clear, hazy).
6. Manually entered code number.
7. Sedimentation pipette number (number on the pipette belt).
8. Actual sedimentation time in minutes.
9. Temperature (in degrees Centigrade).
10. Error message (if the Analyser detects an error).
11. EDTA mode.

+ REPORT EXAMPLE +(Not to scale)

- StaRRsed--			Date 20/05/14			Time:		15:28		
1	2	3	4	5	6	7	8	9	10	11
915001	42	84	75	CLEAR		17	30	23		EDTA

11.2.3. ESR Error

Error messages can be found on the printout in column 10.
If errors are found during the measurement, the Compact will give an audible alarm.
The Error message is displayed on the main screen.

11.2.3.1.ESR Error and Warning code messages

ESR "ERROR" and "WARNING" code messages

This code appears in the "sample data record" at column 10.
The following codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.
2	ESR Probably > 140 mm	Error	Extremely high ESR value.
3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).
7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

11.2.4. Limit error settings

When an option (at Limit error settings) is set to YES and this limit error occurs, results will be printed/send to the LIMS.

When an option is set to NO and this limit error occurs, the fields for *30 min ESR, 60 min ESR* and the *temperature corrected ESR* are filled with spaces and thus results are not printed/send to the LIMS.

The error message in the error field (column 10) indicates that at least one of the limits (ESR time, dilution rate, column height, bubbles on top, hazy aspects and temperature) has been exceeded.

Together with the sedimentation time and dilution rate (which are still printed at the usual position), the operator/analyst can see what caused the error and may or may not use the ESR values which are preserved in the error message.

Description of the error message **L_err(hhh/www/ttt/ccc)** :

- **L_err** means it is a "limit error"
- **hhh** is the 30 minutes ESR
- **www** is the 60 minute ESR
- **ttt** is the temperature corrected 60 minute result
- **ccc** is the column height

Example of a limit error message:

- L_err(42/ 84/ 75/200) means 42 mm in the 30 minute method and temperature correction 75 with a correct column height.
- L_err(---/ 84/ 75/200) means 84 mm in the 60 minute method and temperature correction 75 with a correct column height.

11.2.5. Reporting range

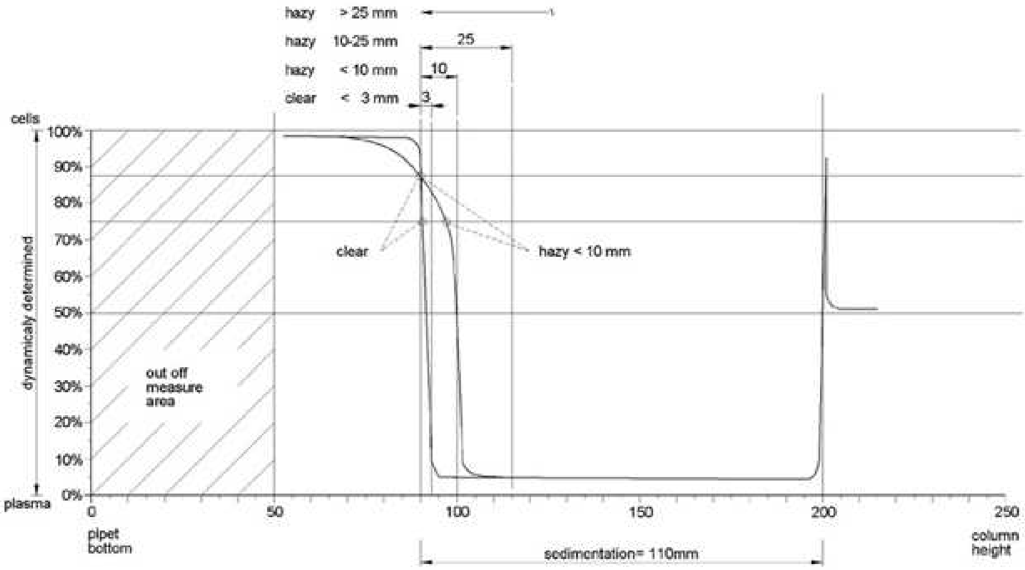
The reporting range in the columns 2, 3 and 4 are in millimeters. The start of the measure range is at the top of the meniscus down to 140 mm. If the detection of cells/plasma is over 140 mm then the report will be >140.

11.2.6. Aspect Hazy

The automatic reading of the Westergren sedimentation pipettes is carried out by moving an optical sensor along the pipettes. While the sensor is moving, a reading is made every 0.25 mm. The sensor is reading the absorption of infra red light through the Westergren pipette filled with blood. From these readings, values at a number of absorption levels are determined. All absorption figures are relative to the darkest and lightest reading (darkest = 100 % and the lightest = 0 % absorption respectively).

By definition the levels are:

87.5%	Cells/ plasma separation
75.0%	Hazy detection
50.0%	Meniscus detection



Graphic showing typical absorption values of a sample

The 'sedimentation' value is the distance in millimeters between the cells/plasma level (87.5% absorption) and the meniscus. If there is no haze, the absorption drops quickly to a value below the 75% level. If the distance between the 87.5% and the 75% level is less then 3mm, the report will state 'CLEAR'. If the distance between 87.5% and 75% level is more than 3mm then the report will state 'HAZY'.

Depending on the length of the 'hazy' area, three classes of 'haziness' are reported,

Length of area		**Reported class**	
Hazy area	>25 mm	Hazy	>25 mm
Hazy area	>10 mm <25 mm	Hazy	<25 mm
Hazy area	>3 mm < 10 mm	Hazy	<10 mm
Hazy area	< 3 mm	CLEAR	<3 mm

Hazy reports are shown when the change from the hazy level to the cell/plasma separation level occurs not within a given distance. The following code messages are reported in column 5.

11.2.6.1.Analyser "HAZY" code messages

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.
1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.

12. COMPACT SYSTEM MESSAGES

The Compact generates four main types of error messages;

- System messages.
- Test messages.
- System time-out messages.
- Error messages.

12.1. System messages

During normal operation the following "**System messages**" may occur:

1. *Waiting tube*
   - If a filled pipette is at the measuring position before the elapsed time has finished and the operator is ready to fill the next pipette, the *Waiting tube* message will be displayed.
   - To continue the sample loading sequence the operator must wait until the pipette at the measuring position has been measured.
2. *Printer failure*.
   - Check paper feed and quantity.
   - Check printer cable connection.
   - Printer must be on-line.
   - Check power is ON.
3. *Reagents level empty message*
   - All reagent bottles have level detectors; the display shows an error that indicates which reagent bottle(s) is (are) empty.
   - The expiry date of the reagent is exceeded or the container is opened longer than three months.
   - Prepare new reagent as described in section Reagents installation.
4. *Waste bottle full message or No waste bottle message*
   - The waste container also has a level detector. If a waste error is shown on the display, the InteRRliner V8 will stop filling and cleaning pipettes until a new or empty container has been installed.
   - Empty the waste container and press **Clear error.**
5. *Fatal separator error*
   - The Separator container has a level detector. If the "*Fatal Separator error*" message is indicated on the display, the Compact will stop the "rinse" cycle until the separator is empty.
   - The cause of this problem can be foam or the waste pump is not working. The Compact will continue to measure and send the ESR results on time to the printer, but the rinse and fill sequences are stopped until the error is solved.

- The Separator container has a level detector. If the "*Fatal Separator error*" message is indicated on the display, the Compact will stop the "rinse" cycle until the separator is empty.
- The cause of this problem can be foam or the waste pump is not working. The Compact will continue to measure and send the ESR results on time to the printer, but the rinse and fill sequences are stopped until the error solved.

12.2. Test messages

During the start-up sequence all the positing sensors are tested, if incorrect the instrument will generate a **Test message**,

1. Switch printer on.
2. Test fill-nozzle unit.
3. Test rinse-unit.
4. Test measure-unit.
5. Test needle-unit.
6. Test drive-unit.

12.3. System time-out <xxxx>

If during normal operation the following "**system time-out**" errors occur, call distributor or local supplier of this instrument.

These errors are usually fatal and need engineer's assistance.

1. Drive-unit.
2. Measure-unit.
3. Rinse-unit.
4. Fill-nozzle unit.
5. Needle adapter.
6. Sample probe.

12.4. Error messages

The following error messages may occur during normal operation:

1. Vacuum error.
2. Vacuum stabilisation error.
3. Fill time-out error.
4. Diluter error.
5. Position error.
6. Up sensor or down sensor error.
7. Rinse head up error.
8. Measure head not home error.
9. Separator full error

The explanation of all these messages can be found in Appendix - System messages Compact V8

13. MAINTENANCE

The **InteRRliner V8** is an analyzer that operates with considerable amounts of whole blood virtually undiluted, and stores it in a pipette for one hour. For this reason instrument maintenance is of the utmost importance.

To maintain the maximum reliability of the instrument, the maintenance procedures must be strictly followed. All procedures are based on a number of samples.

Maintenance levels	Work instruction
Daily (on page 161)	***WI-187 Daily*** (on page 357)
Weekly (on page 162)	***WI-191 Weekly maintenance*** (on page 358)
Level 4 maintenance (on page 164)	***WI-1215 Level 4 maintenance*** (on page 363) Every 7500 samples
Level 3 maintenance (on page 168)	***WI-224 Level 3 maintenance*** (on page 369) Every 22500 samples
Level 2 maintenance (on page 168)	***WI-225 Level 2 maintenance*** (on page 378) Every 45000 samples
Level 1 maintenance (on page 169)	***WI-199 Level 1 maintenance*** (on page 349) Every 90000 samples

Note: Numbers are based on 5 days week with 350 samples per day.

WARNING!!!
Always be aware of the danger of infection, especially during maintenance. Take appropriate precautions.
There is blood involved and therefore a **BIO HAZARD**

13.1. Maintenance Schedule example

See the Appendix **Maintenance Schedule example** (on page 273).

13.2. Daily

The purpose of the daily maintenance is to keep the instrument clean and contamination as low as possible.
Clean all parts that are exposed to blood, wipe the outer surface and the stainless steel plate below the pipette belt. See ***WI Daily maintenance*** (on page 357).

13.2.1. Check or replace sample probe or outer needle

A faulty or broken needle can cause a fill time-out error or a dilution error.
Inspect sample needle condition each day, clean if necessary.
If necessary replace the sample probe or outer needle.

Remove cover Compact InteRRliner

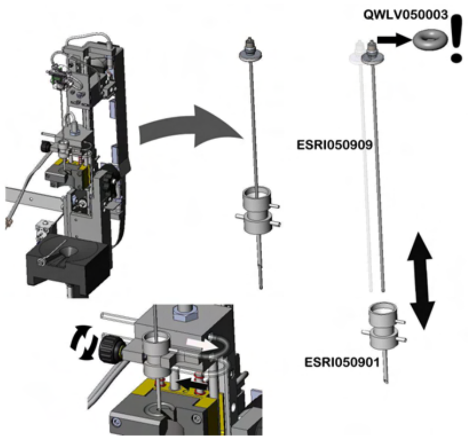
1. Lift the robotic protection cover.

Needle exchange:

1. Unscrew sample probe manually. (E)
2. Mark each tube for easier reconnecting to the correct nipple.
3. Disconnect the tubes from the outer needle.
4. Pull the sample probe, complete with outer needle, towards the front edge of the Compact. The outer needle must be supported to protect it from falling.
5. Slide the new sample probe into the (new) outer needle.
6. Make sure the Sample probe has a (new) O-ring QWLV050003.
7. Install (new) sample probe ESRI050909 together with the (new) outer needle ESRI050901.
8. Tighten the sample probe. Do not over-tighten the sample probe in the T-piece / Y-piece or it will crack or strip the threading inside the block.
9. Replace the correct tubes on the outer needle.

Replace cover Compact InteRRliner

1. Shut down the robotic protection cover.



13.3. Weekly

The purpose of the weekly maintenance is to carry out the daily maintenance and additionally check the optical sensor of the measure head and the vacuum pressure.
Detailed instructions of this procedure can be found in the Work Instruction ***Weekly maintenance.*** (on page 358)

13.3.1. Check the sensors in service mode

Vacuum pressure check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FLOW SENSOR box.
  Flow: 0925-**0980**-1020 Abs: 0300-**380**-0390 Offset: 0045-**0050**-0055
  If the flow is not in range there might be a blockage in the vacuum flow line to the flow sensor.

Fill Stop sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FILL STOP SENSOR box.
  Fill stop sensor FS 90..**140**..165

Diluter Start sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select DILUTER START SENSOR box.
  Diluter start sensor 400-700

Measure sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK MEASURE SENSOR box.
  Measure sensor MS 40..**50**..60

Temperature sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK TEMPERATURE SENSOR box.
  Temperature sensor TS [Room temperature]

Diluent flow sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK DILUENT FLOW SENSOR box.
  Press test. When test is finished, signal Down and signal Up must be green.

Separator check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK SEPARATOR SENSOR box.
  Separator sensor <200 600 >700

13.3.2. Cleaning liquid separator

The separator is designed to separate liquid from the air and can handle a lot of blood, rinse and other used reagents from the instrument. After a period of time the separator is getting dirty and therefore it needs to be cleaned weekly.

Detailed instructions of this procedure can be found in the Work Instruction **WI-196 Cleaning liquid separator (on page 348).**

Symptoms of a dirty separator:

1. Separator errors.
2. Foam in the separator.
3. Waste pump cannot sufficiently remove the waste from of the separator.

13.4. Level 4 maintenance

The purpose of level 4 maintenance is to carry out the daily / weekly maintenance and replace the pump tubing, bacterial filters and the Fill nozzle O-ring. After replacing those items, the instrument needs a Fill and Clean sequence to clean the pipettes. Over a monthly period protein builds up in the Westergren pipettes and needs to be deproteinized using a strong cleaning agent.

Detailed instructions of this procedure can be found in the Work Instruction ***WI-1215 Level 4 maintenance*** (on page 363).

13.4.1. Rinse-pump tube replacement

New rinse pump tube assembly **ESRI090902**.

New tube replacement:

1. Open left cover.
2. Pull pump tube slightly downwards and at the same time towards the front of the unit to release the tube out of the pump plate holder.
3. Remove the old tube from the peristaltic pump rotor.
4. Disconnect the tubing at both ends of the tube connectors.
5. Connect new tubing to both ends of the connectors.
6. Place one end of the tube in the pump plate holder.
7. Pull the new tube over the peristaltic pump rotor.
8. Pull pump tube slightly downwards and at the same time towards the back of the InteRRliner V8.

If the tube is not fitted correctly or is worn the following symptoms can occur.

- Liquid flowing back into the container.
- First glass tube on the pipette belt is not washed sufficiently.

Note: The wider bore tube is for the rinse pump.

13.4.2. Saline-pump tube replacement

New saline pump tube assembly **ESRI090903**

New tube replacement:

1. Open left cover.
2. Pull pump tube slightly downwards and at the same time towards the front of the unit to release the tube out of the pump plate holder.
3. Remove the old tube from the peristaltic pump rotor.
4. Disconnect the tubing at both ends of the tube connectors.
5. Connect new tubing to both ends of the connectors.
6. Place one end of the tube in the pump plate holder.
7. Pull the new tube over the peristaltic pump rotor.
8. Pull pump tube slightly downwards and at the same time towards the back of the InteRRliner V8.

If the tube is not fitted correctly or is worn the following symptoms can occur.

- Liquid flowing back into the container.
- Sample needle is not washed sufficiently.

Note: The narrower bore tube is for the saline pump.

13.4.3. Replace bacterial filters

Detailed instructions of this procedure can be found in **WI-196 Cleaning liquid separator (on page 348).**

As part of the Cleaning liquid separator procedure the bacterial Hepa filter **QWLV040002** is replaced with a new one.

Exchange bacterial filter **QWLV040001** on the waste bottle assembly.

13.4.4. Fill-nozzle O-ring replacement

As the fill nozzle O-ring (**QWLV050004**) ages, it looses its flexibility and air-bubbles may occur in the Westergren pipettes, the washer needs to be replaced.

Symptoms for a bad fill-nozzle O-ring
After the aspiration, the Westergren pipette has a zebra pattern (air- blood- air -blood, nicely divided in the column.)
Vacuum stabilisation errors may occur.

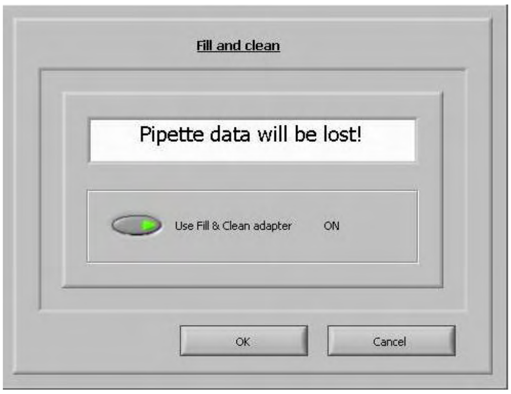
13.4.5. Fill and clean procedure

Note: Each pipette on the pipette belt will be filled with cleaning agent, after one hour the first pipette is washed and dried. Fill and clean takes about 1 ½ hours to complete.

Fill and clean with adapter:

Cleaning agent preparation InteRRliner V8 Compact: Fill and clean:
This cycle takes about 90 minutes.

1. Fill the clean adapter EHST110907 with hot de-ionized water. (100 ml)
2. Add 10 ml cleaning agent (QRR 010905) to the hot water in the adapter.
3. Place the cap on the adapter and mix well.
4. Put the adapter with cleaning solution on the lower tube holder.
5. Select MAINTENANCE tab, PRIME/CLEAN, button FILL AND CLEAN.

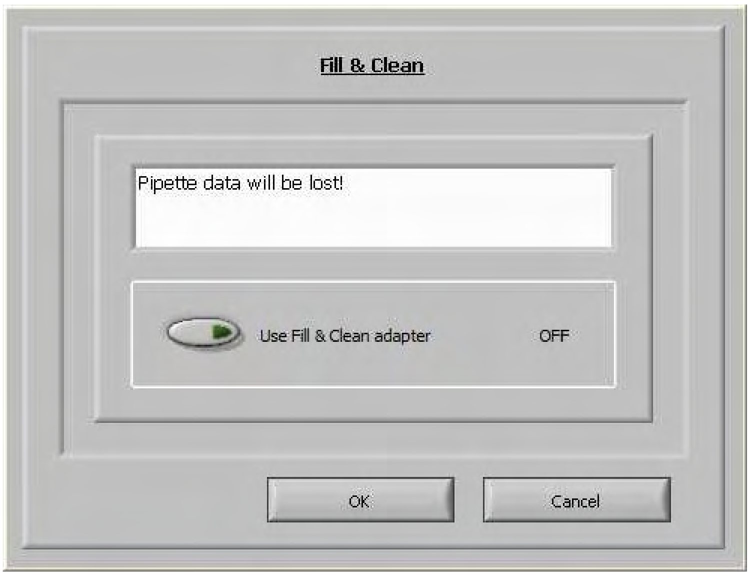


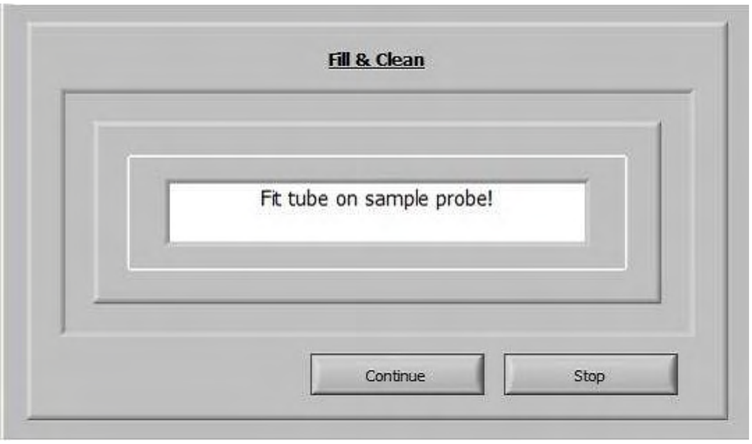
Start Fill and clean procedure:

1. Select button **OK**.
2. The needle goes down and the process is started.
3. When all the pipettes are filled, the needle goes back to the home position.

Remove the adapter from the needle assembly.

Fill and clean without adapter:





1. The needle comes down.
2. Fill a container with 150 ml hot de-ionized water.
3. Add 15 ml cleaning agent. (QRR 010905)
4. Stir the prepared solution.
5. Put the container close to the needle location.
6. Push the silicon tube over the sample probe.
7. Press CONTINUE.
8. The fill and clean process is started.

Erroneous haziness looks more like haemolytic plasma than 'normal' hazy plasma. If there is an abnormal number of 'hazy' aspects, check the dispenser system carefully and clean it if there is any doubt.

Symptoms for a contaminated instrument:

1. If more than **3… 5** out of **20** measurements are reported **HAZY.**
2. Poor meniscus may be reported.
3. Incorrect results.

See also ***WI-178 Hazy problems*** (on page 344).

13.5. Level 3 maintenance

Level 3 maintenance is level 4 maintenance adding the following extra's.

1. Replace the pinch valve tube **ESRI010246.**
2. Replace the blue disk filter **QWLV040003.**
3. Replace the Peristaltic waste pump cassette **ESRI 090921** including the Blotting washer **ESRI090920.**

   Be careful, as there may be blood in the cassette. First, make up some disinfectant and put this in the liquid separator. Press PRIME DISINFECTANT to pump disinfectant through the pump cassette.

   Symptoms for a bad or faulty waste pump cassette:

   - Waste separator error.
   - Taking too long before the separator empties.

Detailed instructions of this procedure can be found in the Work Instruction ***Level 3 maintenance*** (on page 369).

13.6. Level 2 maintenance

Level 2 maintenance is level 3 maintenance and add the following extra's.

Replace the Teflon tip on the syringe of the diluter assembly. (From repair set QWLV030902.)
See Work Instruction ***WI-181 Dis- and re-assembly diluter syringe*** (on page 356).

Detailed instructions of this procedure can be found in the Work Instruction number ***WI-198 Level 2 maintenance*** (on page 378).

13.7. Level 1 maintenance

Annual maintenance (Level 1 maintenance) is Level 2 Maintenance and the following extras;

We recommend that this procedure is carried out by dealers service engineers.

The following items need to be replaced annually:

1. All tubing **ESRI079200 and additional tube set**.
2. Waste pump motor **ESRI090920.**
3. Waste pump cassette **ESRI090921**.
4. Blue Vacuum filter disc. Part no **QWLV040003**.
5. Fill block washer. Part no **ESRI030906.**
6. Waste container filter disc **QWLV040001.**(only applicable if internal waste container is used)
7. Teflon tip of syringe on the Diluter assembly.

The following items need to be checked (and replaced if needed) annually:

1. Outer needle and sample probe
2. Pipette valves bodies and replace if necessary (84 pieces) **QTST040001**.

Check:

1. Adjustment of fill nozzle and rinse nozzle.

All these parts are included in the PM-kit (Periodical Maintenance Kit).

See ***Appendix - Maintenance schedule*** (on page 273)

13.8. Reagents installation

Use only the genuine Mechatronics bulk reagent containers on the InteRRliner.

1. Open the swing door and place the containers on the turntable.

2. Remove the container screw caps and pull the necks of the bottle packs out of the cardboard box.
3. Install the level sensors and spacers according the following pictures.
   Make sure to place the appropriate level sensors in the containers by matching the color codes on the tube and on the container:

The sensors and the reagents have the following numbers and color codes:

Reagent	Connector number	Color code
RINSE SOLUTION	Number 34	Green
SALINE	Number 35	Yellow
DILUENT	Number 36	Grey
DE-IONIZED WATER	Number 37	Blue
DISINFECTANT	Number 38	White

NOTE: Wrongly placed pickup tubes may cause incorrect results or instrument malfunction.

After each reagents change, the fluid system must be primed:

1. Select MAINTENANCE -> PRIME / CLEAN (on page 73).
2. Perform the applicable prime step to fill the relevant tubes with reagent and remove air.

14. DATA SAFETY MANAGEMENT

The InteRRliner V8 has its own external PC. This means that all collected data is stored on the hard-disk of the external computer.

This means that all raw data and results are kept, irrespective of a power failure or if the instrument is un-intentionally turned off. After the start-up procedure the software checks whether there are any ESR's still outstanding. If so, these will be carried out first. After a power failure the sedimentation time (60 or 30 min.) may be exceeded. However, the start time is saved and therefore the actual sedimentation time can be checked.

Important system settings are kept in an internal Flash Eprom inside the instrument.
In case of corrupted files, the program will automatically load and use the backup files.

14.1. Power failure

If a power failure occurs it is recommended that the InteRRliner V8 is switched **OFF** by the power switch. When the power returns, the instrument can be switched **ON**. After the standard start-up process the InteRRliner V8 will continue to process the remaining samples.

14.2. RS232 serial output

The InteRRliner V8 PC is equipped with a serial port, which can be connected to any laboratory host computer system or PC. The data sent by the (Auto) Compact PC can also be sent to a host computer or PC. for further processing.

14.3. Specifications for the RS232 port

The Serial RS232 settings need to be set in SERVICE - SERIAL OUTPUT SETTINGS.
Baud rate can be set from 1200 to 19200 baud (default setting is 2400 baud).
Transmission protocol is default setting: 8 bit data, 1 stop bit, and no parity.
To change the baud rate go to SERIAL OUTPUT SETTINGS.
For more detail information on the Serial connection see the Appendix - RS-232 hardware connections Compact.

14.4. Data management

The Start-pool of the InteRRliner is equipped with a serial port, which can be connected to any laboratory host computer system or PC.

14.4.1. Output protocols

The data is transmitted in one of the Sysmex protocol.

The InteRRliner is equipment to transmit the Sysmex protocol type SE9000, R3500 and Tdlims protocol. The protocols can be changed in Menu M4 - 3 of the Start-Pool of the InteRRliner. Transmission protocol SE9000 is the factory default setting.

For detailed information on the protocol see Appendix ***Protocol Sysmex SE9000*** (on page 321) , ***Protocol Sysmex R-3500*** (on page 311) and ***Protocol TDLIMS*** (on page 330).

14.4.2. Specifications for the RS232 port of the Start-Pool

Baud rate can be set from 1200 to 9600 baud. The default factory transmission settings are: 9600, 8 bit data, 1 stop bit, and no parity. The settings on the serial port can be changed via the keyboard of the Start-Pool in ***Menu M4 M2 (1) General*** (on page 123) of the InteRRliner.

14.4.3. Folder Structure on PC

Patient result files (including measured raw data) are stored on the D-drive as default setting. It is possible to change this location. The underlying folder structure is created by the software and each result can be found in subfolders Year\Month\Day, for example D:\2014\01\03-01-2014. Each result is stored with the sample ID as document name.

QC results are stored on D:\QC\NORMAL\batchXXX and D:\QC\ABNORMAL\batchYYY.

15. TROUBLE SHOOTING

Occasionally small faults may cause major problems. This chapter may help to solve the most common faults and explain why a specific problem occurs.
A lot of the problems or errors are due to a lack of maintenance. Remember that this instrument operates with a considerable amount of whole blood, virtually undiluted, stores it in a pipette for one hour and then cleans pipettes for re-use. Therefore, it is important to keep to the maintenance schedules. It is recommended that trained service personnel checks and applies service to the instrument at least once a year. Errors which are not explained in this section can usually not be solved by the operator. Refer to the Service manual for more information (available only in English).

The error numbers are displayed in the PC software.

15.1. Peristaltic pumps

The Peristaltic pumps are located under the Waste bottle housing assembly flap.

15.1.1. Rinse solution not primed through the system

1. Check the rinse tube condition. It may be worn or leaking or incorrectly fitted.
   Check the pick-up tube in the rinse container, it may have become detached from the tube connector in the cap. See ***WI-162 rinse tube replacement*** (on page 335).
2. Check rinse solution level in rinse solution container.
   - If the level is insufficient, a message is displayed and the alarm sounds!

3. One of the tubes carrying the rinse solution may be blocked or kinked.

15.1.2. Rinse solution spilling over the instrument

If rinse solution spills over the top of the pipettes, the following items must be checked:

1. Is the vacuum pump working?

Check the vacuum pressure: Check the airflow, go to MAINTENANCE tab - CHECK SENSORS and select CHECK FLOW SENSOR.

Note: In Sample mode, the indicators are shown green the vacuum is ok. In Service mode the indicators are showing numbers.

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1. When rinsing, the rinse actuator must be energised.
   - The rinse actuator can be found under the top cover at the top of pipette being rinsed.
2. Wash station must engage with pipette.
   - The Wash station is the white Rinse nozzle that engages the bottom of the pipettes.
3. Check the piercing pin in the wash station, it must be straight.
   - The piercing pin is to pierce the bottom meniscus when a filled pipette is at the wash station.
4. Wash station or tubing from wash station may be blocked.
   - Activate the PRIME DISINFECTANT function. The disinfectant must flow through the system.

15.1.3. Rinse pump failure

1. Liquid flows back into the rinse container.
   - Replace the rinse pump tube.
2. At the start of the rinse sequence the first pipette is not washed.
   - Replace the rinse pump tube. ***WI-162 rinse tube replacement*** (on page 335).

15.1.4. Sample probe is not washed after aspiration

1. Check saline level in saline container.
   - If the level is insufficient, usually a message will be on the display and the alarm sounds!
2. Check pick-up tube in saline container.
   - It may have become detached from the tube connector.
   - Loosen the cap of the saline container in order to inspect.
3. Check the saline peristaltic pump tube condition.
   - It may be worn or leak. (See ***Level 4 maintenance*** (on page 164)).
   - An incorrectly fitted saline peristaltic pump tube may cause the same problem.

- One of the tubes carrying saline maybe blocked or bended.

15.1.5. Saline dripping in the sample tube adapter

If Saline drips from the needle assembly check the following;

1. Does the vacuum pump work?
   - Check the vacuum pressure by using the option CHECK FLOW SENSOR.
2. Sample probe may be blocked.
3. Fill nozzle may be blocked.
4. Waste line may be blocked.
5. Outer needle may be blocked.
6. Pinch valve not working or blocked.
   - Replace pinch valve tube, **technical assistance** is needed.

15.1.6. Saline pump failure

1. Liquid flowing back to the saline container.
   - Replace the saline pump tube.
2. Needle is not washed sufficiently.
   - Replace the saline pump tube see ***WI-163 saline tube replacement*** (on page 336).

15.1.7. Pipettes not dry after washing and drying

If pipettes are not dried after the wash cycle, the following items need to be checked.

1. Does the vacuum pump work?
   - Check the vacuum pressure by using the option CHECK FLOW SENSOR.
2. Rinse vacuum control valve not working, technical assistance is needed.
3. Waste separator leaking, remove separator and reassemble.
4. Rinse nozzle not aligning,
   - Re-alignment for the rinse nozzle, **technical assistance** is needed.

15.2. Liquid level sensor not sensing

1. Liquid in the container is not detected. This occurs sometimes with the DE-IONIZED WATER bottle and is caused by a very low conductivity.
2. Add one or two drops of SALINE to the DE-IONIZED WATER to increase the conductivity.

15.3. Diluter

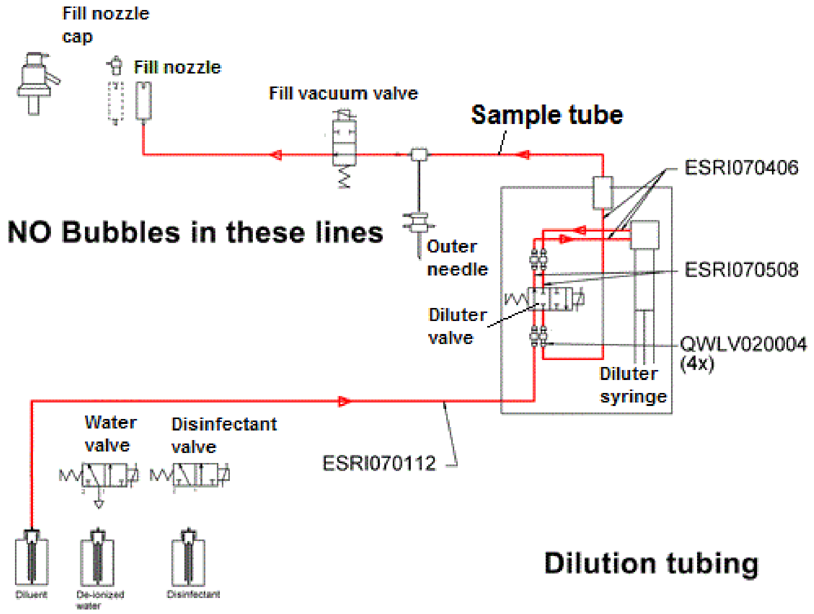
15.3.1. Diluter system not sufficiently primed

Before aspirating, the citrate system must be free of air bubbles.

Select MAINTENANCE-> PRIME -> PRIME DILUENT, vacuum pump is on and system must be filled with Diluent. When the citrate is priming, liquid should be seen flowing through the tube connection to the fill nozzle cap.

Occasionally when the diluter system is primed for the first time, air locks occur in the tubing and the diluter will not self-prime. If this occurs, disconnect the luer fitting at the syringe and connect a syringe filled with Diluent to the tubing and fill system manually.

1. Check pick-up tube at the Diluent container, it may be kinked.
2. One of the Diluent lines has become blocked or kinked.
3. Check all tubes are still connected.
4. Check if the 2 tubes (ESRI070508) are still connected with the tubes ESRI070406.
5. Check if the 2 tubes positioned correctly in the pinch valve.



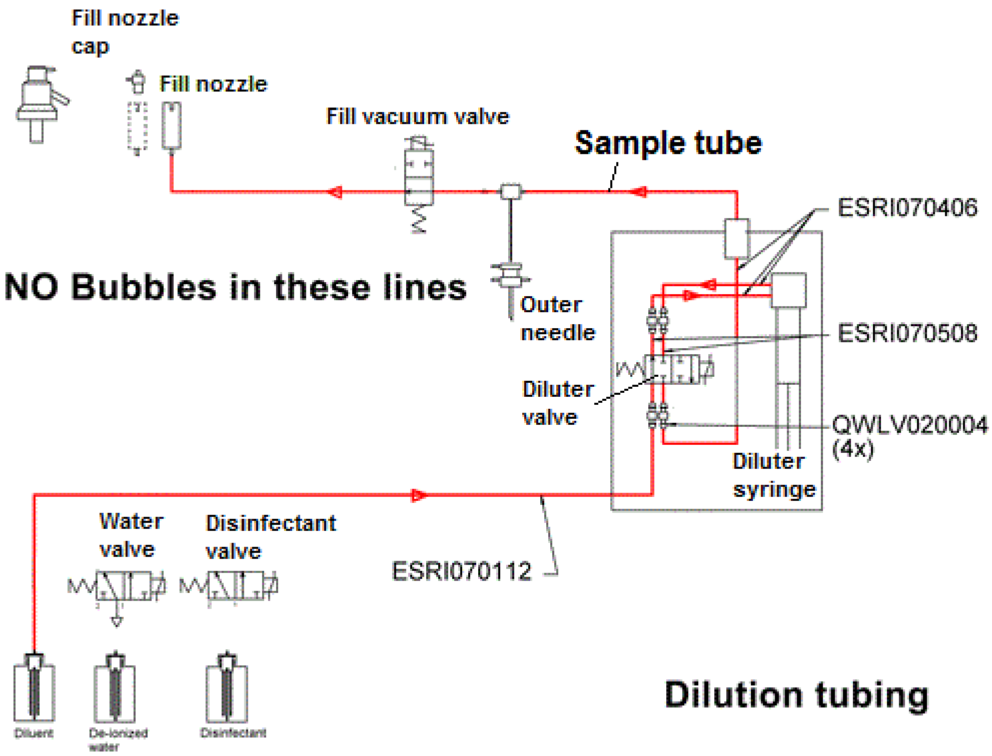
15.3.2. Air bubbles entering the Diluent system

1. Check the diluter syringe tip
2. Check on the **T-piece / Y-piece** joints and connectors for leaks and replace if necessary.
3. Check the connectors on the EDTA flow sensor for leaks and replace if necessary.

Select MAINTENANCE-> PRIME -> PRIME DILUENT, vacuum pump is on and system must be filled with Diluent. When the citrate is priming, liquid should be seen flowing through the tube connection to the fill nozzle cap.

Occasionally when the diluter system is primed for the first time, air locks occur in the tubing and the diluter will not self-prime. If this occurs, disconnect the luer fitting at the syringe and connect a syringe filled with Diluent to the tubing and fill system manually.

1. Check pick-up tube at the Diluent container, it may be kinked.
2. One of the Diluent lines has become blocked or kinked.



15.3.3. Diluter errors

Dilution error

If the display shows dilution errors it indicates that the current sample has not been diluted correctly e.g. **-21%** Diluent added to the sample. After the sample measurement the dilution rate will be printed as: **EDTA 079.**

Dilution errors can be caused by:	**Solution**
Irregular filling speed due to poor vacuum.	Check the vacuum settings.
Blocked sample probe.	Remove the blockage.
Blocked T-piece / Y-piece.	Unblock the the T-Piece / Y-Piece by using a syringe with hot water.
Sample tube pinch valve error.	Check if the sample tube pinch valve is working.
Sample tube not correct in the sample tube pinch valve.	Check the sample tube is still fitted correctly in the pinch valve.
Insufficient sample volume.	Check before sampling if the sample tube has sufficient blood volume.
Wrong diluter settings	Check/change diluter settings in software: See ***Diluter settings*** (on page 95) for all possible settings

Dilution errors can be solved by the user, when all the mentioned solutions does not help to solve the problem **technical assistance** is needed.

Display shows "Diluter failure"

May be caused by;

1. Mechanical obstruction.
2. Diluter power cable loose.
3. A defective diluter motor.
4. Top or bottom position sensor failure.
5. Broken flexible print cable or connector.
6. Motor tacho failure.

For Diluter failure **technical assistance** is needed.

15.4. Vacuum

The Compact uses vacuum, for both aspirating and the wash/rinse system. If trouble occurs, it is most likely because of poor or no vacuum.

Check the airflow, go to MAINTENANCE tab - CHECK SENSORS and select CHECK FLOW SENSOR.

Note: In Sample mode, the indicators are shown green the vacuum is ok. In Service mode the indicators are showing numbers.

The following values are shown on the screen:
Flow: 0925-**0980**-1020 Abs: 0300-**380**-0390 Offset: 0045-**0050**-0055

If for example the yellow orifice is blocked the flow will be: 0050 (offset value).
Low value for the airflow may be caused by a dirty or blocked blue disc filter, or orifices (especially the yellow one).
Start the pipette wash sequence via MAINTENANCE tab - PRIME/CLEAN - WASH ALL PIPETTES and observe the drying process, pipettes must be free of water spots.

15.4.1. Vacuum stabilisation problems

The Compact checks the vacuum built up in a pipette just before Sampling. A vacuum stabilisation error will occur if it takes too long to evacuate a pipette or vacuum level is not stable.

Vacuum stabilisation error may caused by:

1. Leak in sample tube connecting T-piece/Y-piece and fill nozzle.
   - Replace the silicone sample tube.
2. Fill block washer defective or not in place.
   - Needs replacement, fatal error.
3. Leaking washer in the fill nozzle, replace fill-nozzle washer.
   - ***WI-203 Replace the fill nozzle O-ring*** (on page 352))
4. Sample tube pinch valve next to fill nozzle not operating.
   - Needs replacement, fatal error.
5. Wet or dirty blue air filter on flow-sensor board, replace blue air filter.
   - ***WI-179 Replace blue air filter*** (on page 345))
6. Defective flow sensor board.
   - Needs replacement, fatal error.
7. Outer needle valve is not functioning correctly and vacuum is leaking away, check outer needle valve.

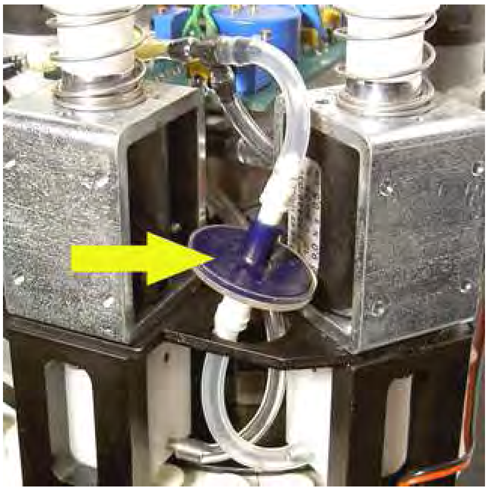
15.4.2. Vacuum error

The Compact monitors the vacuum pressure. If the vacuum pressure drops below a pre-set level, a *Vacuum error* message will be indicated on the Main screen.

Vacuum error may caused by:

1. Blocked filter. Replace the blue filter.

- ***WI-179 Replace blue air filter*** (on page 345).



2. Liquid separator wrongly assembled or blocked.

- ***WI-196 Cleaning liquid separator*** (on page 348).

3. Main vacuum pump defective.

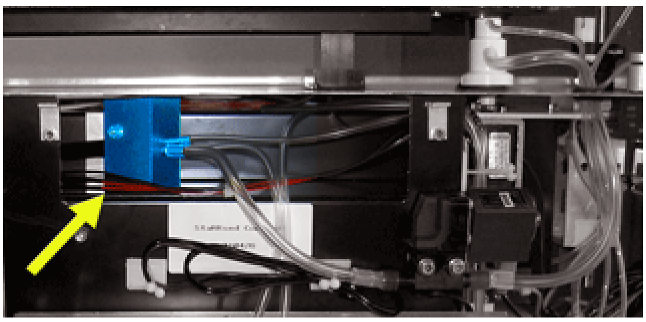
- Fatal error, **technical assistance** is needed.

4. Bad vacuum. Adjustment needed on the vacuum.

- Fatal error, **technical assistance** is needed.

5. Blockage in the 3 way vacuum manifold.

- Fatal error, **technical assistance** is needed.



15.5. Flushing liquids

After each sample aspiration the entire system is washed automatically.
If there is no liquid flow:

- Check that the peristaltic pumps are running. If the pump tubes are worn or leaking, replace the tubes.
- Check that the pump tubes are installed correctly.
- Check the tubes between the containers and pumps/valves.
- Unscrew the cap from the container. Check the pick-up tubes in the container and that there is enough liquid in the container.
- Check the tubes for blockages or kinks.

15.5.1. De-ionized water

Select from MAINTENANCE -> PRIME / CLEAN -> [PRIME DE-IONIZED WATER], the vacuum pump should operate and liquid flows through the thin tube connected to the side of the fill nozzle cap.

After each sample aspiration, the fill nozzle aspiration tube is washed automatically with de-ionized water.

If there is no liquid flow and no reagent alarm:

1. Unscrew the cap of the deionized water container to check.
2. One of the de-ionized water lines may be blocked or kinked.
3. For older models:.Check pick-up tube in de-ionized water container, it may have become disconnected from the nozzle in the lid.

15.5.2. Disinfectant

To disinfect the Compact waste, Select from MAINTENANCE -> PRIME / CLEAN -> [PRIME DISINFECTANT], the vacuum pump should operate, and liquid must be seen flowing through the thin tube connected to the side of the wash station.

After each wash cycle, approximately 0.5 ml of disinfectant will be flushed through the wash station.

If no disinfectant flows;

1. Unscrew the cap of the disinfectant container to check.
2. One of the disinfectant lines may be blocked or kinked.

15.6. Tube adapter

As soon as the barcode is accepted or the ID number keyed in manually, the tube adapter closes.

15.6.1. Tube adapter does not close

Check for mechanical obstructions.

1. The sample tube size must be within the span of the sample tube adapter.
   - Only qualified service engineers may change the sample tube adapter span.
2. Electronic failure, fatal error, **technical assistance** is needed.
3. Mechanical failure, fatal error, **technical assistance** is needed.

15.6.2. Sample probe fails to go down

Under normal circumstances, the sample probe goes down.
If sample probe fails to go down check the following:

- Sample probe depth wrong. Check the correct sample depth: SETTINGS - GENERAL SETTINGS - SAMPLE PROBE DEPTH
  - If the sample probe has being set too deep, it will touch the bottom of the sample tube. The sample probe then pushes the sample tube slightly downwards, and the aspiration cycle will be aborted.
  - A broken outer needle may cause a similar fault.
- Check for mechanical obstructions.
- Electronic failure.
  - Fatal error, call distributor.
- Mechanical failure.
  - Fatal error, call distributor.

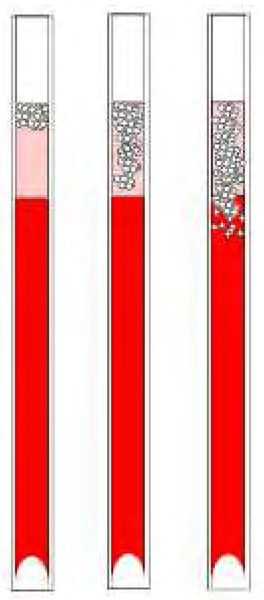
See the Error list for other sample probe errors.

15.7. Air bubbles

After a normal aspiration, the Westergren pipette must be free of air bubbles. In the following examples different patterns of air bubbles which can appear in the pipettes are shown. Air bubbles can affect the sedimentation and are mostly reported as errors and no ESR result is reported.

Usually bubbles are caused by a leakage at the bottom of the pipette. If air bubbles are visible in the pipette, check the following :

15.7.1. Foam in column



A layer of air bubbles that is concentrated on top of the blood column does not affect the sedimentation process itself. The sedimentation develops normally below the bubbles. However, too many bubbles bring about a shortening of the effective blood column, which is a deviation from the Westergren method.

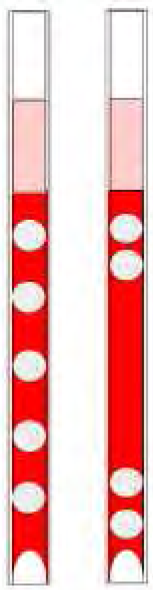
A layer of bubbles up to 5 mm: No message. Normal ESR result is reported.

A layer of bubbles from 5 to 25 mm: ESR warning 6: "Bubbles on top". Results should be reviewed before release.

A layer of bubbles larger than 25 mm: ESR Error 3: "Too many borders found". No ESR result is given.

1. Check that tube connections are not leaking.
2. Check the fill nozzle condition:
   - Inspect for any cracks or deep scratches in the base that holds the fill nozzle washer or O-ring.
3. Check for air in diluter system.
4. Check that the sample probe O-ring is not leaking.
5. Check transparent T- piece or Y-piece block for cracks.

15.7.2. Pipette looks like zebra crossing



If this always occurs in the same pipette, check the bottom of the pipette for the following:

1. Glass may be chipped.
   - Replace pipette.
2. Dirt, e.g. dried blood.
   - Clean the pipette.
   - Check disinfectant flow at the rinse nozzle.
3. Perpendicularity and straightness of the bottom face.
   - Replace pipette.

If this happens randomly or with each pipette, check the following:

1. Fill nozzle O-ring or flat washer.
2. Fill nozzle alignment to pipette.
   - Check the nozzle arm is tight on the rear vertical shaft. Usually engineer’s assistance is required.

A pipette which looks like zebra crossing gives ESR Error 3.

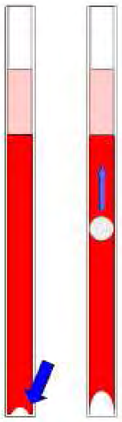
15.7.3. One air bubble about 5 mm under meniscus

The filling (aspiration) speed is not critical but should be within certain limits.

1. If just one air bubble is found about 5mm below the meniscus, the filling speed may be too high.
2. The blood column should not exceed the filling height sensor by more than 10mm.

One air bubble can result in ESR Error 3.

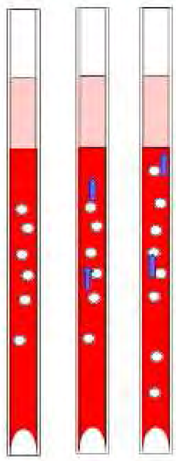
15.7.4. One air bubble rising in pipette



1. Usually this is caused by a wet or dirty fill nozzle.
   - The blood column should not reach right to the base of the pipette. There must be a clear air gap of 4...5mm at the bottom of each pipette.
2. Insufficient sample volume.
   - Need more blood in the sample tube.

One air bubble rising can result in ESR Error code 3.

15.7.5. Small air bubbles rising in pipette



Usually this is caused by a dirty or damaged fill nozzle.

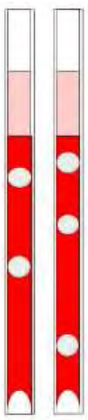
- Observe the maintenance schedules.
- Clean the fill nozzle.
- Check the fill nozzle for damage. If necessary, replace the fill nozzle.

Sample tube is leaking on the fill nozzle side.

- Replace the silicon sample tube

Small air bubbles result in ESR Error 3.

15.7.6. Random air bubbles in pipette



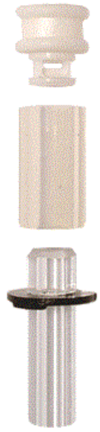
1. Check Diluent flow by priming the diluter system.
2. Insufficient sample volume.

Random air bubbles result in ESR Error 3.

15.8. Leaking pipettes

If blood or cleaning solutions leak from a pipette, perform the following procedures and check the performance of the system after each step to see if the problem has been solved. If the completion of the following steps does not result in a correction of the problem contact technical support.

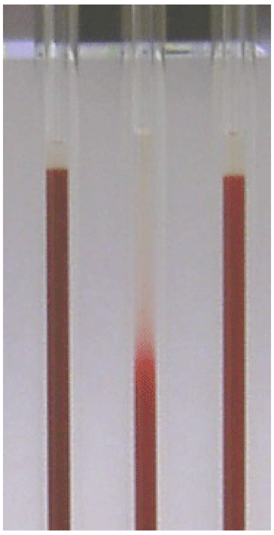
1. Check for specks of dirt or hairs in the pipette valves.
2. A scratched valve tube.
3. A scratched valve body.
4. Valve on top of the pipette is dirty or damaged.
5. Check pipette bottom, glass may be chipped.
6. Check the pipette valve for contamination or wear.



15.9. Hazy reports

"Hazy" reports are usually caused by build-up of proteins on the inner wall of the pipettes. Another cause is growth of micro organisms in the diluter system. It is extremely important that the system is kept sterile.

First run an extra Fill & Clean sequence, then check after a day's run if haziness is decreased. When there are still many reports, it is recommended to fill the diluter system with a 5% chlorine solution. See ***WI-178 Hazy problem*** (on page 344).



A picture example of haziness

15.10. Contaminated instrument

The InteRRliner V8 has bacterial and micro organism's growth. Clean the instrument monthly with a strong cleaning agent.

See Work instructions ***WI-197 Fill and Clean InteRRliner V8*** (on page 377) and ***WI-195 Cleaning the diluent system*** (on page 347) for details.

15.11. Fill time-out error

Normally the fill sequence takes about 3 seconds. However, if the fill sequence exceeds 10 seconds, a fill time-out error will be generated. The Compact aborts the fill sequence and this error message will be shown on the display and reported to the printer.

Fill time-out error may be caused by:

1. Blood clots or rubber debris from the tube cap in the sample.
   - Check the condition of the outer needle.
2. Filling procedure stopped by operator.
3. Insufficient sample volume.
   - Should be at least 1.4 ml.
4. Faulty filling nozzle or filling nozzle washer/O-ring.
   - Check filling nozzle and washer/O-ring.
5. Incorrectly adjusted sample probe depth.
   - Check needle depth, SETTINGS - GENERAL SETTINGS - SAMPLE PROBE DEPTH <default 5 mm>
6. No or poor vacuum.
   - Check vacuum MAINTENANCE - CHECK SENSORS - CHECK FLOW SENSOR

15.12. Position error

E18 is the error code for Carousel position error. InteRRliner V8 was not able to position the carousel. There was a difference found in the pipette memory position table and the actual measured position of the position sensor.

A position error can occur if the InteRRliner V8 is switched OFF while the carousel is moving to the next position.

When the Rinse nozzle sticks up this can also cause a position jump.

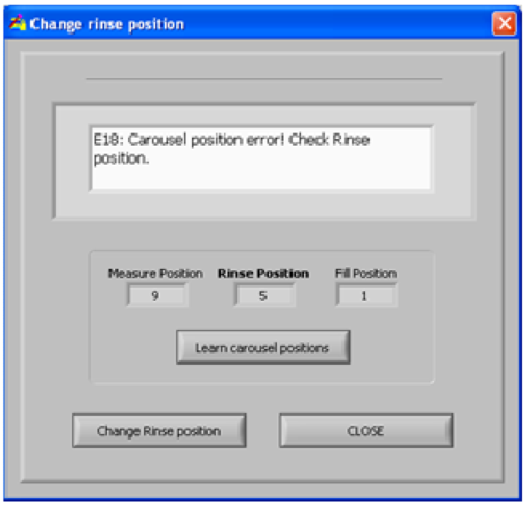
Warning: It is highly recommended to wash all samples after a position error.

Position error solutions

1. Check in tab SETTINGS (password 3964)- CAROUSEL CONTROL the Rinse position.
   - Select SET RINSE POSITION.
   - CHANGE RINSE POSITION.

- Enter the right value of the pipette number at the rinse station.
- Close pop-up menu.

2. Select SET RINSE POSITION
   - CHANGE RINSE POSITION
   - Press LEARN CAROUSEL POSITION
   - Close pop-up menu.



Check if the position error is solved: Select GO TO RINSE POSITION, enter a higher value than the actual rinse position and the carousel should move without position error.

If position error is solved:

1. Select the Service mode Icon to leave service mode.
2. If samples or liquid is present in any pipette go to tab MAINTENANCE - PRIME/CLEAN - WASH ALL PIPETTES which removes the liquid from the pipettes. All sample information will be lost.

If there is still a position error:

If the position is still not correct or if position errors occur frequently and the solutions above does not solve the problem, the following procedure must be carried out:

1. Select the Service mode Icon to leave service mode.
2. a) If liquid or samples are present in isolated pipettes use a combination of GO TO RINSE POSITION at the service tab and MAINTENANCE -PRIME RINSE SOLUTION to remove the blood samples. All sample information will be lost.
   or
   b) Go to tab SETTINGS and select DELETE PIPETTE DATA. The carousel stops moving. Use the sequence mentioned above to remove the blood samples.
3. Check mechanical connection potentiometers.

If the position error is not solved after all the mentioned actions, the positioning device needs replacement. This is a fatal error, call distributor.

15.13. Separator error

If it takes too long for the waste pump to empty the liquid separator, the system generates a separator error.

Separator error may be caused by:	
Extensive foam build-up in the liquid separator.	Check the separator assembly and connections for possible air leaks.
Waste-tube between liquid separator and waste pump is blocked.	Replace the tube.
Waste-tube between waste pump and waste container blocked.	Replace the tube.
Waste pump failure.	Exchange the waste pump cassette. If the error returns, call for service.
Electrical bridge between the waste-level electrodes.	Clean liquid separator, see ***WI-196 Cleaning liquid separator*** (on page 348)

15.14. Reagents

Check the expire dates of the reagents regularly. Do not use the reagents if expired.

Note: If expired reagent has been used accidentally, the results obtained with these reagents may only be used, when the expire date was not exceeded more than 30 days.

DILUENT is sensitive for bacterial growth. The solution should be discarded if it becomes turbid or infected. When using the small onboard containers, clean the DILUENT container thoroughly with 10% Na-hypochlorite. Make sure that the container has been thoroughly rinsed after cleaning.

15.15. Reagents alarm

The software checks the bottle status before starting a new rack. If a level alarm is **ON**, it will not process the new rack. If an alarm comes **ON** during a rack, it will finish to aspirate that rack (10 samples max.). Washing dirty pipettes always continues, as to avoid that the samples are left in the pipettes.

Reagents alarm is also set when the expire date of the reagent is exceeded or opened more than three months. The message Not allowed now! See REAGENTS! appears. Processing of new samples is stopped.

15.16. Fill nozzle

Normally the fill sequence takes about 3 seconds. However, if the fill sequence exceeds 10 seconds, a fill time-out error will be generated. The Compact aborts the fill sequence and this error message will be shown on the display and reported to the printer.
Check for mechanical obstructions and remove them. If the error returns, call for service.

15.16.1. Fill nozzle does not engage with pipette

1. Motor time out generated, fill nozzle stops half way up.
2. Check for mechanical obstruction.
3. Motor failure. Fatal error, call distributor.

15.16.2. Fill nozzle not at fill position

E8 is the error code and in the status line the text Fill nozzle not in the fill position.

The fill nozzle did not reach the fill position in a certain time limit.

Possible reason;

- Fill nozzle motor is faulty.
- Fill nozzle motor driver is faulty.
- Fill nozzle is blocked.
- Fatal error, call distributor.

15.16.3. Fill nozzle not at home position

E13 is the error code and in the status line the text Fill nozzle did not reached the Home position within a certain time limit.

The fill nozzle did not reach the home top sensor with a certain time limit.

- Fill nozzle motor faulty.
- Fill nozzle motor driver is faulty.
- Fill nozzle is blocked.
- Fatal error call distributor.

15.17. Elevator

Time out error Elevator.

1. Clear time out error by pressing CLEAR ERROR button.
1. Check resettable fuses at the back. When the fuse was triggered:
   a. Switch OFF the Compact.
   b. Close the InteRRliner V8 PC software.
   c. Check for mechanical obstructions of the elevator/indexer.
   d. Reset the fuse.
   e. Switch ON the Compact.
   f. For InteRRliner V8: restart the PC software.
2. When the error occurs again, switch OFF all units and call for service.

15.18. Indexer

Time out error Indexer.

1. Clear time out error by pressing CLEAR ERROR button.
1. Check resettable fuses at the back. When the fuse was triggered:
   a. Switch OFF the Compact.
   b. Close the InteRRliner V8 PC software.
   c. Check for mechanical obstructions of the elevator/indexer.
   d. Reset the fuse.
   e. Switch ON the Compact.
   f. For InteRRliner V8: restart the PC software.
2. When the error occurs again, switch OFF all units and call for service.


15.19. Communication error (E2)

Error E2 appears if there is a communication problem between the InteRRliner V8 and computer. During startup 3 retries are performed, the software checks the availability of all needed connections.

Example of the message:

E2: Communication error! (Board: Needle (56), Command: 28, TWSR: 0, E: 3)

The indication of the board gives the first location to check, but because all PCB's are internally connected the error can be originated on another location in the instrument.

The other codes (command: XX, TSWR: XX and E:XX) are indicators for status/actions from software and I2C connections. Each board has its own range of commands and can not be explained in one way.

Most common solutions:

- Power cable not connected on the communication PCB mounted on the back panel.
- An I2C cable not connected
- Serial cable not connected
- No power on one of the PCB's
- Short circuit or fault on one of the PCB's

15.20. Quality control trouble shooting

Error messages	Extra information	Action
E115: QC expired, not sampled!	The used StaRRsed Control is out of date, no ESR result is given	• Check expire date • Use a new batch of StaRRsed Control
E116: QC is out of acceptable range!	Result is out of range, the applicable values for the acceptable range depend on the user setting. E116 is shown in the status line of the Sample screen and the QC icon is blinking on the Sample screen. ESR Result is given.	• Try new QC sample tube (normal samples will be finished) • Check acceptable range in QC settings. If results are continuously out of range but the statistics show identical/stable results, it should be considered to expand the acceptable assay range with QC Settings • If this error persists check/clean instrument
E117: Uncorrected QC result is out of acceptable range, but corrected result is within range!	ESR Result is given. Temperature correction not activated.	• Consider QC Sample as correct. The mean value is assayed with temperature correction • Check temperature correction setting.
E118: Uncorrected QC result is within acceptable range, but corrected result is out of range!	ESR Result is given. Temperature correction not activated.	• Consider QC Sample as not correct • Try new QC sample tube (normal samples will be finished) • Check acceptable range in QC settings • If this error persists check/clean instrument • Check temperature correction setting.

QC result with ESR error	no ESR Result is given	• Check general ESR data, see ***ESR Error*** (on page 155) • Check sample tube volume • Try new QC sample tube
QC result with ESR warning	ESR Result is given	• Check general ESR data, general ***ESR Warnings*** (on page 155) • Check limit settings
Screen messages	**Extra information**	**Action**

QC icon is blinking at Sample screen	The last QC sample was not within acceptable range or has no result	• Press on QC icon
		  • Press "Accept" to continue sampling without performing a new QC, continuing could produce incorrect results.
		  • Press "Cancel" to return. Try new QC sample tube (normal samples will be finished)

QC result out of range!		• Perform a new QC sample, normal samples will be finished • If this error persists check/clean instrument
QC sample expired!		• Use a new batch of Starrsed Control
It is not possible to link this Lab ID. Lab ID is already linked!	The "Linked QC ID's" table may only contain one link to a particular Lab ID.	• Consider changing AUTOMATICALLY REMOVE LINKED QC ID AFTER RESULT option to YES
Last QC result was out of range! Continuing could produce incorrect results! Do you still want to continue?	Result of last QC sample was not within acceptable range.	• The last QC result should be evaluated by authorized staff to decide whether the InteRRliner V8 may run patient samples depending on the the nature of errors • Press "Yes" to continue sampling without performing a new QC, press "No" to return and take appropriate action.

General errors	Extra information	Action
Barcode is not accepted	Barcode cannot be read Data is incorrect	• Check barcode
QC sample is not accepted and not performed	StaRRsed Control ID is not known in LIMS.	• Check barcode
QC result is not visible in QC History	A specific QC result cannot be found in the list of results.	• Check Lab-ID link
Deviating results	**Extra information**	**Action**
Systematic QC errors with a shift in control values (QC results are out of range)	The measured control values change abruptly up- or downwards. Do not compare 30 minute method with 60 minute method result. The calculation method can give some deviation in the general QC results statistics.	• Check/clean instrument and perform a new QC sample • If these errors persist perform maintenance step • Compare only results from one batch. • If Lab ID is used check the linked StaRRsed Control ID. It is possible that a new batch is in use without changing to the new assayed mean value
Systematic QC errors with a trend in control values (QC results out of the range or nearly out of the range)	The measured control values change gradually upwards or downwards.	• Irregular or insufficient maintenance can cause unnecessary QC errors and ESR errors/warnings

Note on QC Errors

Error messages are only shown and stored in QC results and not send to LIMS.

QC result is given with the same general errors and warnings as a normal patient ESR-result

16. TROUBLE SHOOTING INTERRLINER TRANSPORT

This section describes trouble shooting for the rack transport system.

It is recommended that trained service personnel checks and services the instrument at least once a year.

16.1. Start-Pool

An Error number produced by the Start-Pool self is showed on the display of the Start-Pool.

12	E4012 Start pool Eeprom Fault	The serial EEPROM on the Start-pool board was not detected.	• Faulty EEPROM (24C01) on Start-pool board. • EEPROM not mounted on Start-pool board.
13	E4013 Start pool IIC write error	There was an I2C communication error between the End-pool or Transport unit and the Start-pool.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
14	E4014 Start pool IIC status error	There was an I2C communication error between the End-pool or Transport unit and the Start-pool.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
15	E4015 Start pool IIC read_1 error	There was an I2C communication error between the End-pool or Transport unit and the Start-pool.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
16	E4016 Start pool IIC read_2 error	There was an I2C communication error between the End-pool or Transport unit and the Start-pool.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
17	E4017 Start pool TOO many Mess./Text	The InteRRliner tried to load all the text messages (according to the selected language), but there were	• Corrupted memory. Service engineer can reload the InteRRliner

		too many text messages in memory.	software. Note for service engineer: HEX-file can also be corrupted. • Faulty Flash Memory (…28F010 or …28F020) on Start-pool board.
18	E4018 Start pool TOO many Menu items	The InteRRliner tried to load all the menus (according to the selected language), but there were too many menu items in memory.	• Corrupted memory. Service engineer can reload the InteRRliner software. Note for service engineer: HEX-file can also be corrupted. • Faulty Flash Memory (…28F010 or …28F020) on Start-pool board.
19	E4019 Start pool TOO much Error text	The InteRRliner tried to load all the error text messages (according to the selected language), but there were too many error text messages in memory.	• Corrupted memory. Service engineer can reload the InteRRliner software. Note for service engineer: HEX-file can also be corrupted. • Faulty Flash Memory (…28F010 or …28F020) on Start-pool board.
20	E4020 Start pool NO transport units	The Start-pool did not detect any of the Transport units.	• No power on the Transport board(s). • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
21	E4021 Start pool Eeprom read error	There was a communication error between the EEPROM and the main processor during a read operation. Check all settings (see below error list)!	• Faulty EEPROM (24C01) on Start-pool board. • EEPROM not mounted on Start-pool board.
22	E4022 Start pool	There was a	• Faulty EEPROM

	Eeprom write error	communication error during a write operation. The main processor was not able to store the settings (see below error list) in EEPROM.	(24C01) on Start-pool board. • EEPROM not mounted on Start-pool board.
24	E1024 Start pool Rack slider timeout	The Slider motor (Start-pool) did not reach the home position within a certain time limit.	• Check Timeout time and Speed settings of the Slider motor (Start-pool). • Slider mechanically blocked. • Check Slider motor sensor. • Faulty Slider motor. • Broken wire(s) to Slider motor. • Faulty Slider motor driver on Start-pool board.
25	E2025 Start pool Rack forward timeout	The Rack Transport motor (Start-pool) did not reach the front or back position within a certain time limit.	• Check Timeout time and Speed settings of the Rack Transport motor (Start-pool). • Rack Transport mechanically blocked. • Check transport sensors. • Check Rack Home sensor (little red switch). • Faulty transport motor. • Broken wire(s) to transport motor. • Faulty transport motor driver on Start-pool board.
26	E3026 Start pool Rack emitter timeout	The Ejector motor (Start-pool) did not reach the left or right position within a certain time limit. Or the motor was stopped due to a maximum current.	• Check Timeout time and Speed settings of the Ejector motor (Start-pool). • Ejector mechanically blocked. • Check ejector sensors.

			• Faulty ejector motor. • Broken wire(s) to ejector motor. • Faulty ejector motor driver on Start-pool board.

32	E4032 Start pool No ID match	The InteRRliner transmitted a request to the Host (LIMS), but the answer from the Host contained a different patient ID.	• Check Host (LIMS) system. • Bad cable(s) between InteRRliner and Host (LIMS) system.
33	E4033 Start pool ESRI timeout	There was a communication error between the InteRRliner and the Compact. The communication was interrupted.	• Switching off the Compact could cause this error. This is normal. • Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact I2C cable(s). • If there are I2C errors in the InteRRliner: check the InteRRliner I2C cable(s).

37	W5037 Start pool ESRI ack timeout	There was a communication error between the InteRRliner and the Compact. The InteRRliner did not receive an answer from the Compact after sending a patient confirmation to the Compact. The communication was interrupted.	• Switching off the Compact could cause this error. This is normal. • Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact I2C cable(s). • If there are I2C errors in the InteRRliner: check the InteRRliner I2C cable(s).
38	E2038 Start pool Startpool rack blocked.	A rack was detected and transported in the Start-pool. The Rack Transport unit (Start-pool) reached the front position, but the Rack Home sensor did not detect the rack.	• Check Start-pool for misplaced rack(s). • Check Rack Home sensor (little red switch). • Check Start-pool cross sensor (transmitter & receiver). • Check Rack transport home sensor.
40	W7040 Start pool Startpool full!!	A new rack is ready to be slide in the Start-pool, but the Start-pool is already full. This is a text message (no alarm) and will clear itself.	• If this message comes up and the Start-pool is not full, check the Start-pool Full sensor.
42	W5042 Start pool Rack slider pos.err	A rack on the Start-pool conveyer belt (Pool-in) did not reach the Rack-in sensor within a certain time limit.	• Check Slider unit (Start-pool). • Check Slider motor sensor.

43	W5043 Start pool Feed belt timeout	A rack on the Start-pool conveyer belt (Pool-in) did not reach the Rack-in sensor within a certain time limit.	• Check Timeout time and Speed settings of the Pool-in motor (Start-pool). • Rack on conveyer belt (Start-pool) mechanically blocked. • Check Rack-in sensor. • Faulty belt motor. • Broken wire(s) to belt motor. • Faulty belt motor driver on Start-pool board.
44	W5044 Start pool Eeprom chksum error	After reading the settings from EEPROM the calculated checksum did not match with the checksum stored in EEPROM. Default settings are loaded! Check all settings (see below error list)!	• Faulty EEPROM (24C01) on Start-pool board.
45	W5045 Start pool Warning: pool empty	The Rack Home switch (Start-pool) was activated during a rack transportation, but the Start-pool cross sensor detected NO rack.	• Removing the rack during transportation and pressing the Rack Home switch by hand could cause this warning. This is normal! • Check Start-pool for misplaced rack(s). • Check Rack Home switch (little red switch). • Check Start-pool cross sensor (transmitter & receiver).

49	W5049 Start pool NO host response_1	The InteRRliner did not receive an answer (Ack / Nack) from the Host (LIMS) system after sending an inquiry to the Host.	• Check Host (LIMS) system. • Check protocol settings. • Check baudrate settings. • Bad cable(s) between InteRRliner and Host (LIMS) system.
50	W5050 Start pool NO host response_2	The InteRRliner did not receive the “patient order information record” from the Host (LIMS) system within a certain time limit.	• Check Host (LIMS) system. • Bad cable(s) between InteRRliner and Host (LIMS) system.
51	W5051 Start pool Error info length	The InteRRliner received an incorrect “patient order information record” from the Host (LIMS) system. The length of the record was incorrect!	• Check Host (LIMS) system. • Check protocol settings. • Bad cable(s) between InteRRliner and Host (LIMS) system.
52	W5052 Start pool NO host response_3	The communication was interrupted while receiving a “patient order information record” from the Host (LIMS) system.	• Check Host (LIMS) system. • Bad cable(s) between InteRRliner and Host (LIMS) system.
53	W5053 Start pool NO host response_4	The InteRRliner did not receive an answer (Ack / Nack) from the Host (LIMS) system after sending a “sample result record” to the Host.	• Check Host (LIMS) system. • Check protocol settings. • Check baudrate settings. • Bad cable(s) between InteRRliner and Host (LIMS) system.
54	W5053 Start pool NO host response_5	The InteRRliner did not receive an answer (Ack / Nack) from the Host (LIMS) system after sending a “flag record” to the Host.	• Check Host (LIMS) system. • Check protocol settings. • Check baudrate settings. • Bad cable(s) between InteRRliner and Host (LIMS) system.

Start-Pool motors errors have numbers from 24 till 26 and can give time outs. Time out means that the software does not receive any response after the motion is started. Common solution to solve this problem, check if there is an object in the way or stuck. Remove the object and press the "F3" key on the InteRRliner key path.

Errors generated by LAB COMM and host communications have error numbers 32 and from 49 till 54.

Common solution to solve this problem;

- Check the data cable is connected to the host system LAB COMM
- Check the host system is switched ON
- Restart the host system. Eprom Checksum error can be reset by the function Save settings in Menu 2

Check if all functions are operational. If not change the settings of that particular unit. After finishing, go to the Save settings menu (Menu 2) and press Enter. See for the complete list of the numbers ***Appendix - Error list InteRRliner rack transport*** (on page 246).

16.2. Conveyer belt (Middle section)

Note:

If an error occurs on the rack transport system:

- Remove all racks from the passageways (not from the storage areas).
- Reset the alarm by pressing **[F3].**
- In case the error remains, switch OFF the power supply inside the cabinet, wait a few seconds, then switch ON again.
- If the error remains or occurs frequently, contact your distributor or service agency.

An Error number produced by the Conveyer belt is showed on the display of the Start-Pool.

62	E0062 Transport 1..4 Supply rack lost!	A rack was lost during transportation from Start-pool to Compact.	• Removing the rack during transportation could cause this error. This is normal! • Rack mechanically blocked. • Check Timeout time and Speed settings of the Transport motor (Transport unit) or the Ejector motor (Start-pool). • Check Rack Catch sensor (Transport unit). • Check main conveyer belt motor (Transport unit). • Check Ejector motor (Start-pool).
63	E0063 Transport 1..4 ESRI timeout_1	The Compact did not open or close the indexer within a certain time limit.	• Check the indexer (clamp). The indexer (clamp) can be tested in menu Indexer. • Check RS232 cable between Elevator board and InteRRliner Transport board.

65	E0065 Transport 1..4 ESRI timeout_3	A rack has been sampled and was ready to be pushed (switch-out) on the conveyer belt, but the Compact did not open the indexer within a certain time limit.	• Check the indexer (clamp). The indexer (clamp) can be tested in menu Indexer. • Check RS232 cable between Elevator board and InteRRliner Transport board.
66	E0066 Transport 1..4 ESRI timeout_4	A rack has been sampled and pushed (switch-out) on the conveyer belt, but the Compact did not close the indexer within a certain time limit.	• Check the indexer (clamp). The indexer (clamp) can be tested in menu 8-6 on the Compact. • Check RS232 cable between Elevator board and InteRRliner Transport board.
67	E0067 Transport 1..4 Discharge rack lost!	A rack was lost during transportation from Compact to End-pool.	• Removing the rack during transportation could cause this error. This is normal! • Rack mechanically blocked. • Check Timeout time and Speed settings of the Transport motor (Transport unit) or the Pool-in motor (End-pool). • Check Switch-out sensor (Transport unit). • Check transport unit motor(Conveyer belt) • Check Rack-in sensor (End-pool). • Check Pool-in motor (End-pool).

70	E1070 Transport 1..4 Switch_in timeout	The Switch-in motor (Transport unit) did not reach the home position within a certain time limit.	• Check Timeout time and Speed settings of the Switch-in motor (Transport unit). • Switch-in unit mechanically blocked. • Check Switch-in sensors. • Faulty Switch-in motor. • Broken wire(s) to Switch-in motor. • Faulty Switch-in motor driver on Transport board.
71	E1071 Transport 1..4 Switch_out pos. err	The Switch-in motor (Transport unit) could not move to the home position, because the Switch-out motor (Transport unit) was not on position (home).	• Check Switch-out unit (Transport unit). • Check home sensor of Switch-out unit.
72	E1072 Transport 1..4 Catch timeout	The Switch-in motor (Transport unit) did not reach the catch or release position within a certain time limit.	• Check Timeout time and Speed settings of the Switch-in motor (Transport unit). • Switch-in unit mechanically blocked. • Check Switch-in sensors. • Faulty Switch-in motor. • Broken wire(s) to Switch-in motor. • Faulty Switch-in motor driver on Transport board.

73	E1073 Transport 1..4 Switch_in pos. error or E2073 Transport 1..4 Switch_in pos. error	The Switch-in motor (Transport unit) did not reach the home position within a certain time limit. or The Switch-out motor (Transport unit) could not move the release position, because the Switch-in motor (Transport unit) was not on position (home).	• Check Timeout time and Speed settings of the Switch-in motor (Transport unit). • Switch-in unit mechanically blocked. • Check Switch-in sensors. • Faulty Switch-in motor. • Broken wire(s) to Switch-in motor. • Faulty Switch-in motor driver on Transport board.
74	E1074 Transport 1..4 Switch_in out pos.	The Switch-in motor tried to move from the release to the home position, but the Switch-in motor was not on the release position. The position is unknown!	• Check Switch-in sensors (Transport unit).
75	E2075 Transport 1..4 Switch_out timeout	The Switch-out motor (Transport unit) did not reach the home or release position within a certain time limit.	• Check Timeout time and Speed settings of the Switch-out motor (Transport unit). • Switch-out unit mechanically blocked. • Check Switch-out sensors. • Faulty Switch-out motor. • Broken wire(s) to Switch-out motor. • Faulty Switch-out motor driver on Transport board.

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Time out means that the software does not detect any response back after the motion is started. Common solution to solve this problem, check if there is an object in the way or stuck. Remove the object and press the **[F3]** key on the InteRRliner key path. Rack is lost means the rack is absent on one of the transport belts and the sensors does not detect any response.

See for the complete list on the numbers the ***Appendix - Error list InteRRliner rack transport.*** (on page 246)

16.3. End-Pool

Note:

If an error occurs on the rack transport system:

- Remove all racks from the passageways (not from the storage areas).
- Reset the alarm by pressing **[F3].**
- In case the error remains, switch OFF the power supply inside the cabinet, wait a few seconds, then switch ON again.
- If the error remains or occurs frequently, contact your distributor or service agency.

An Error number produced by the End-Pool is showed on the display of the Start-Pool.

80	E1080 End pool Endpool. slider timeout	The Slider motor (End-pool) did not reach the home or front position within a certain time limit.	• Check Timeout time and Speed settings of the Slider motor (End-pool). • Slider mechanically blocked. • Check Slider sensors. • Faulty Slider motor. • Broken wire(s) to Slider motor. • Faulty Slider motor driver on End-pool board.
81	E4081 End pool Endpool full !!	A rack has been sampled, but could not be transported to the End-pool. This error will clear itself when the racks on the End-pool are removed.	• Remove racks from End-pool. • If this message comes up and the End-pool is not full, check the Pool Full sensor.

Only for XO:

82	E2082 End pool End pool rack blocked.	A rack was detected and transported in the End-pool. The *Rack Transport* unit (End-pool) reached the end position (back), but the *Rack Home* sensor did not detect the rack.	• Check End-pool for misplaced rack(s). • Check *Rack Home* sensor (little red switch). • Check End-pool cross sensor (transmitter & receiver).

			• Check Rack transport end sensor.
83	W5083 End pool HST fault !	Warning: an error occurred during rack handling between End-pool and external device (HST). Possible rack jam.	• Remove rack and **reset external device** (HST). Warning is automatically cleared when external device is ready. • Reset InteRRliner if warning is not automatically cleared
84	E2084 End pool Transport motor err.	The *Rack Transport* motor (End-pool) did not reach the front or back position within a certain time limit.	• Check *Timeout time* and *Speed settings* of the Rack Transport motor (End-pool). • *Rack Transport* mechanically blocked. • Check transport sensors. • Check *Rack Home* sensor (little red switch). • Faulty transport motor. • Broken wire(s) to transport motor. • Faulty transport motor driver on End-pool board.
85	E3085 End pool Ejector motor error.	The *Ejector* motor (End-pool) did not reach the left or right position within a certain time limit.	• Check *Timeout time* and *Speed settings* of the Ejector motor (End-pool). • Ejector mechanically blocked. • Check ejector sensors. • Faulty ejector motor. • Broken wire(s) to ejector motor. • Faulty ejector motor driver on End-pool board.

Time out means that the software does not receive any response back after the motion is started. Common solution to solve this problem: check if there is an object in the way or stuck. Remove the object and press the **[F3]** key on the InteRRliner key path.
The warning <End-pool full> will come up as soon the sensor sees a rack. Remove racks of the End-pool and the alarm is automatically reset by the software.

See for the complete list on the numbers the ***Appendix - Error list InteRRliner rack transport*** (on page 246)

16.4. Indexer

An error number what is showed on the display on the transport module and in the range from 00 till 86 is produced by the Indexer, the Elevator and some communication error from the rack transport module. See for the complete list on the numbers the ***Appendix - Error list InteRRliner rack transport.*** (on page 246)

16.4.1. The numbers from 00 till 06

The numbers from 00 till 06 are generated for the internal boards. Most common fault is that there is a power failure to one of the boards.

Restart the Compact by switching OFF and ON again.

	Error	Explanation	Possible Reason/Solution
05	Elevator unit not functioning.	Elevator unit did not respond to main unit (Compact keyboard) during start-up.	• No power on the Elevator board. • IIC cable(s) not connected. • Bad IIC cable(s). • Note: the boards in the Compact are connected in series.
06	Indexer unit not functioning.	Indexer unit did not respond to main unit (Compact keyboard) during start-up.	• No power on the Indexer board. • IIC cable(s) not connected. • Bad IIC cable(s). • Note: the boards in the Compact are connected in series.

16.4.2. The numbers from 20 till 31

Errors in the next range are problems with the internal communications between the Compact and the Elevator board.

Restart the Compact by switching OFF and ON again.

20	Read error battery RAM real time clock (RTC).	There was a communication error between the RTC and the main processor. The following settings are lost: • Carrousel position. • Service & Sample counter. • Pipette data. • Historical data.	• Faulty RTC chip (PCF8583) on Compact keyboard. • RTC chip not mounted on Compact keyboard.
21	Write error battery RAM real time clock (RTC)	There was a communication error during a write operation. The main processor was not able to store the settings in the battery RAM of the RTC.	• Faulty RTC chip (PCF8583) on Compact keyboard. • RTC chip not mounted on Compact keyboard.
25	Read error serial EEPROM on Compact keyboard.	There was a communication error between the EEPROM and the main processor during a read operation. Default settings are loaded! Check all settings !	• Faulty EEPROM (24C01) on Compact keyboard. • EEPROM not mounted on Compact keyboard.
26	Write error serial EEPROM on Compact keyboard.	There was a communication error during a write operation. The main processor was not able to store the settings (see below error list) in EEPROM.	• Faulty EEPROM (24C01) on Compact keyboard. • EEPROM not mounted on Compact keyboard.
27	Checksum error serial EEPROM on Compact keyboard.	After reading the settings from EEPROM the calculated checksum did not match with the checksum stored in EEPROM. Default settings are loaded! Check all settings !	• Faulty EEPROM (24C01) on Compact keyboard.
28	Read error serial EEPROM on Elevator or Indexer	There was a communication error	• Faulty EEPROM (24C01) on Elevator or

	board.	between the serial EEPROM (on Elevator or Indexer board) and the main processor (Compact keyboard) during a read operation.	Indexer board. • EEPROM not mounted on Elevator or Indexer board. • EEPROM mounted on both Elevator and Indexer boards. Only one board must have the EEPROM installed.
30	Checksum error Indexer settings.	After reading the settings from EEPROM the calculated checksum did not match with the checksum stored in EEPROM. Default Indexer settings are loaded!	• Faulty EEPROM (24C01) on Elevator or Indexer board. • Settings can be checked (by service engineer) with the Test program for InteRRliner & Compact.
31	Checksum error Elevator settings.	After reading the settings from EEPROM the calculated checksum did not match with the checksum stored in EEPROM. Default Elevator settings are loaded!	• Faulty EEPROM (24C01) on Elevator or Indexer board. • Settings can be checked (by service engineer) with the Test program for InteRRliner & Compact.

16.4.3. The numbers from 35 till 41

Errors in the next range are problems with the communication bus between the Compact and via the Conveyer belt to the Start-Pool.

Restart the Compact and InteRRliner by switching OFF and ON again.

35	IIC communication error between Compact keyboard and Indexer board.	There was a communication error between the Indexer board and the main processor during an IIC operation.	• No power on the Indexer board. • IIC cable(s) not connected. • Bad IIC cable(s). • Note: the boards in the Compact are connected in series.
36	IIC communication error between Compact keyboard and Elevator board.	There was a communication error between the Elevator board and the main processor during an IIC operation.	• No power on the Elevator board. • IIC cable(s) not connected. • Bad IIC cable(s). Note: the boards in the Compact are connected in series.
37	IIC communication error between Compact keyboard and Elevator, Indexer or Needle board.	There was a communication error between the Elevator, Indexer or Needle board and the main processor during an IIC operation.	• No power on one of the boards. • IIC cable(s) not connected. • Bad IIC cable(s). • Note: the boards in the Compact are connected in series.
38	IIC communication error between Compact keyboard and Diluter or Needle board.	There was a communication error between the Diluter or Needle board and the main processor during an IIC operation.	• No power on one of the boards. • IIC cable(s) not connected. • Bad IIC cable(s). • Note: the boards in the Compact are connected in series.
39	I2C communication error between Compact keyboard and Drive board.	There was a communication error between the Drive board and the main processor during an IIC operation.	• No power on the Drive board. • IIC cable(s) not connected.

			• Bad IIC cable(s). • Note: the boards in the Compact are connected in series.
40	IIC communication error between Compact keyboard and Drive board.	There was a communication error between the Drive board and the main processor during an IIC operation. Drive unit did not respond.	• No power on the Drive board. • IIC cable(s) not connected. • Bad IIC cable(s). • Note: the boards in the Compact are connected in series.
41	IIC communication error between Compact keyboard and Elevator board.	There was a communication error between the Elevator board and the main processor during an IIC operation.	• No power on the Elevator board. • IIC cable(s) not connected. -Bad IIC cable(s). • Note: the boards in the Compact are connected in series.

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16.4.4. The numbers from 51 till 55

Error number 51 till 55 is a problem with the Indexer unit itself. Check the Robotic unit if there are no obstructions.

Remove the obstructions and restart the Compact by switching OFF and ON again.

51	Barcode rotator up / down motor timeout.	The Barcode rotator up / down motor didn't reach its up or down position within a certain time limit.	• Check up and down sensors. • Faulty up/down motor. • Barcode rotator unit mechanically blocked. • Broken wire to up/down motor. • Faulty up/down motor driver on Indexer board.
52			
53	Indexer motor timeout.	The indexer didn't reach its position within a certain time limit.	• Faulty indexer motor. • Indexer mechanically blocked. • Broken wire(s) to indexer motor. • Faulty indexer motor driver on Indexer board. • Check resettable fuse at the back of the InteRRliner
54	Indexer error: barcode rotator not in up position.	The indexer could not move to a new position, because the barcode rotator was not in its up position.	• Check Barcode rotator up / down motor. • Check up sensor of Barcode rotator up / down unit.
55	Indexer error: elevator platform not in back position.	The indexer could not move to a new position, because the elevator platform was not in its back position.	• Check Tube unit front / back motor. • Check back sensor of Tube unit front / back unit.

Time out means that the software does not detect any responds back after the motion is started. Common solution to solve this problem, check if there is an object in the way or stuck

See for the complete list on the numbers the Appendix Compact InteRRliner Errors numbers.

16.4.5. The numbers from 80 till 84

Errors in the next range are problems with the communication bus between the Compact and via the Start-Pool to the LAB COMM host system.

Restart the Compact and InteRRliner by switching OFF and ON again.

80	Bad communication between Compact and Input-pool.	Bad communication between Compact and Input-pool, or the communication between the Compact and the Input-pool was interrupted.	• Switching off the InteRRliner could cause this error. This is normal. • Check RS232 cable between Elevator board and InteRRliner Transport board.
81	Unknown command from Input-pool.	The communication was OK, but an unknown command was received from the Input-pool.	• Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact IIC cable(s). • If there are IIC errors in the InteRRliner: check the InteRRliner IIC cable(s).
82	Bad communication between Compact and Input-pool.	The Compact did not receive a good answer (first part) after sending an inquiry to the Input-pool.	• Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are IIC errors in the Compact: check the Compact IIC cable(s). • If there are IIC errors in the InteRRliner: check the InteRRliner IIC cable(s).
83	Bad communication between Compact and Input-pool.	The Compact did not receive a good answer (second part) after sending an inquiry to the Input-pool.	• Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are IIC errors in the Compact: check the Compact I2C cable(s). • If there are IIC errors in the InteRRliner: check the InteRRliner IIC

			cable(s).
84	No response from Input-pool.	The Input-pool did not response to the Compact after sending a result to the Input-pool.	• Switching off the InteRRliner during run mode could cause this error. This is normal. • Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are IIC errors in the Compact: check the Compact I2C cable(s). • If there are IIC errors in the InteRRliner: check the InteRRliner IIC cable(s).

16.5. Elevator

An Error number what is showed on the display of the Compact which is produced by the Indexer, the Elevator and some communication errors from the rack transport module. See for the complete list on the numbers the ***Appendix - Error list InteRRliner rack transport.*** (on page 246)

16.5.1. The numbers from 63 till 71

If the error number is in the range of 63 till 71 then there are some problems with the Elevator itself. Restart the Compact by switching OFF and ON again.

63	Elevator motor timeout.	The elevator didn't reach its position within a certain time limit.	• Faulty elevator motor. • Elevator mechanically blocked. • Broken wire(s) to elevator motor. • Faulty elevator motor driver on Elevator board. • Check resettable fuse at the back of the InteRRliner
64	Tube unit front / back motor timeout.	The Tube unit front / back didn't reach the front or back position within a certain time limit.	• Check front and back sensors. • Faulty front/back motor. • Tube unit front / back mechanically blocked. • Broken wire to front/back motor. • Faulty front/back motor driver on Elevator board.
65	Sample unit in / out motor timeout.	The Sample unit in / out didn't reach the in (= needle) or out (= rack) position within a certain time limit.	• Check in and out sensors. • Faulty in/out motor. • Sample unit in / out mechanically blocked. • Broken wire to in/out motor. • Faulty in/out motor driver on Elevator board.
66	Mixer motor timeout.	The Mixer didn't reach the up or down position within a certain time limit.	• Check mixer sensors. • Faulty mixer motor. • Mixer mechanically blocked. • Broken wire to mixer motor. • Faulty mixer motor

			driver on Elevator board.
67	Sample unit in / out error: elevator platform not in back position.	The Sample unit in / out could not move to a new position, because the elevator platform was not in its back position.	• Check Platform front / back motor. • Check back sensor of Platform front / back unit.
68	Sample unit in / out error: elevator not in up position.	The Sample unit in / out could not move to a new position, because the elevator was not in its up position.	• Check elevator motor (see also error 63).
69	Platform front / back error: sample arm not in out position.	Platform unit front / back could not move to a new position, because the sample arm was not in its out position (= rack position).	• Check Sample unit in / out motor. • Check (Out) Front sensor of Sample unit in / out.
70	Sample unit in / out and Tube unit front / back not on position during initialisation of the elevator.	The initialisation routine of the elevator was cancelled, because the Sample unit in / out was not in its out position (= rack position) and the Tube unit front / back was not in its front position. The positions of both units are unknown!	• Check Sample unit in / out (Rotation) motor. • Check (Out) Front sensor of Sample unit in / out. • Check unit front / back motor. • Check front sensor of Tube unit front / back.
71	Outer needle not in up position during initialisation of the elevator.	The initialisation routine of the elevator was cancelled, because the outer needle (sample tube holder) was not in its up position.	• Check outer needle up sensor. • Check outer needle motor.

Time out means that the software does not detect any responds back after the motion is started. Common solution to solve this problem, check if there is an object in the way or stuck. See for the complete list on the numbers the Appendix Compact InteRRliner Errors numbers.

17. APPENDIX FOR INTERRLINER V8

Appendix section

Appendix - Article reference list Compact InteRRliner

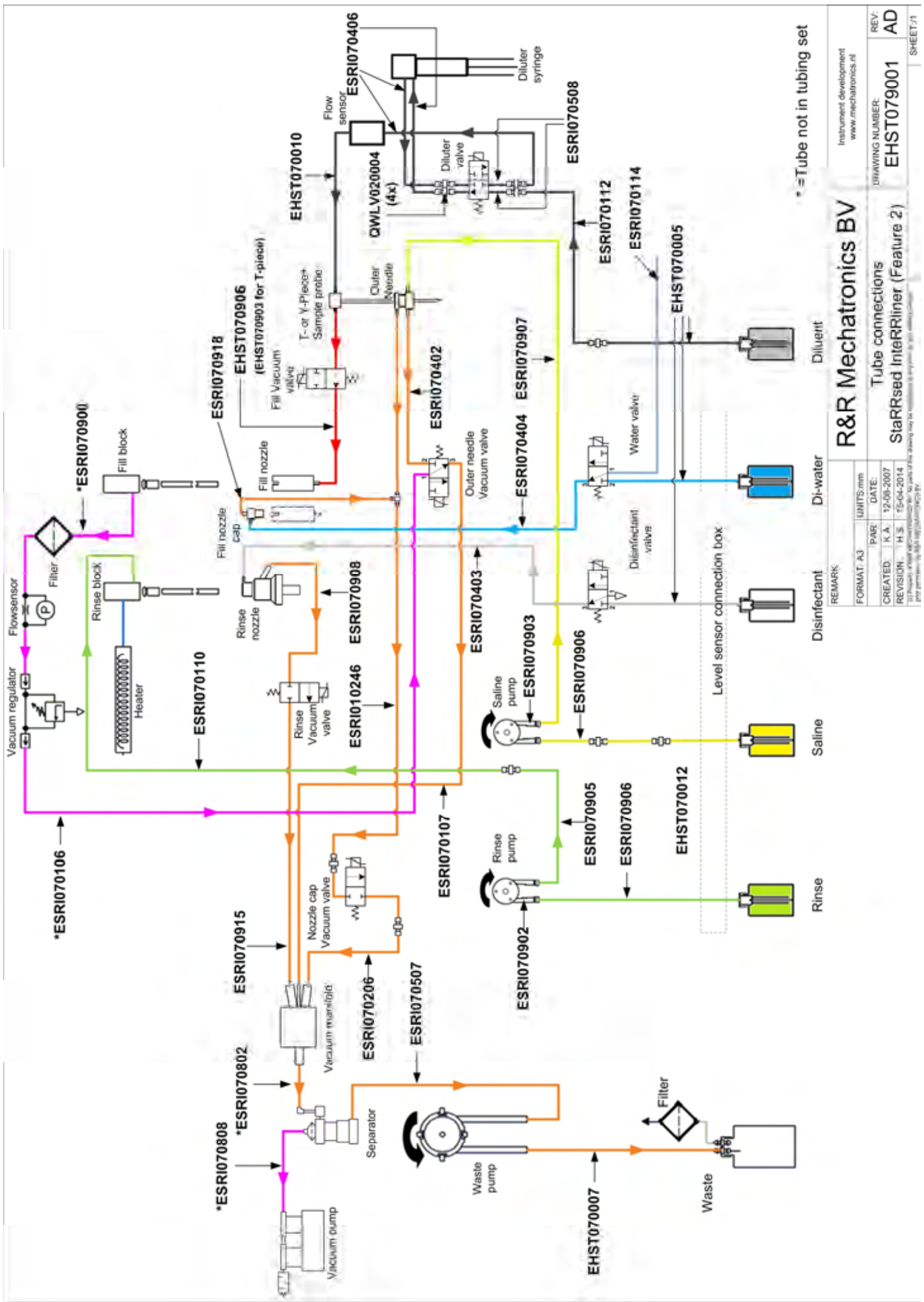
The Compact InteRRliner is delivered with a complete accessories kit ESRI 110991. This reference list is for article order numbers only.

Part number	Description
QWFG010200	Bottle 2.5 liters
QWFG010201	Cap bottle 2.5 liters
ESRI010246	Pinch valve tube
QWLV040002	Bacterial Filter (waste separator)
ESRI010907	Cap waste bottle
QRR 010905	Cleaning agent
QRR 010931	Diluent
QRR 010947	Disinfectant
QRR 010933	Saline
QRR 010934	Rinse solution
QRR 010945	Poly cube container 5 liters (Empty)
QWLV050004	O-ring for Fill Nozzle
ESRI030903	Westergren pipette assembly
QWLV050003	O-ring Sample Probe
ESRI050909	Sample Probe assembly
QWLV040001	Disc filter 25mm Waste cont. (White)
QWLV040003	Disc filter Vacuum Regulator (Blue)
ESRI090902	Rinse Tube assembly
ESRI090903	Saline Tube assembly
ESRI090921	Waste pump cassette assembly
ESRI090026	Blotting washer
QEPT100001	Parallel Printer cable
ESRI110001	Ruler StaRRsed Compact
ESRI110004	Tube silicon 1.5*3.2 (Fill & clean)
QEDV130022	Fuse 5 A. (110V) Slow 5x20 mm.
QEDV130019	Fuse 2.5 A. (230V) Slow 5x20 mm.
QWLV030901	Teflon tip repair set (Syringe)
QWLV050070	O-ring for Separator

ESRI110105	Waste sticker 2500 ml
QWFG010131	Glass jar (Separator)

QEDV130022	Fuse 5 A. (110V) Slow 5x20 mm.
QEDV130019	Fuse 2.5 A. (230V) Slow 5x20 mm.
ESRI110105	Waste sticker 2500 ml
EHST110007	User manual InteRRliner UK version
EHST110010	Installation Manual InteRRliner UK version
ESRI110920	Spacer for reagents container
EHST110907	Fill and clean container assembly
QWFG010501	Plug for fill and clean container

Appendix - Tube connections InteRRliner



Appendix - 60 minutes reporting

Colums:

1. Patient number.
2. Not corrected 30-minute ESR result (only in use if 30 minute mode is active).
3. Not corrected 60-minute ESR result.
4. 60-minute ESR result in millimeters, corrected for **18**℃. (only in use if temperature correction is active).
5. Aspect (clear, hazy).
6. Manually entered code number.
7. Sedimentation pipette number (number on the pipette belt).
8. Actual sedimentation time in minutes.
9. Temperature (in degrees Centigrade).
10. Error message (if the Analyser detects an error).
11. EDTA mode.

+ REPORT EXAMPLE +(Not to scale)

-- StaRRsed-- Date 20/05/14 Time: 15:28

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
905001		84	75	CLEAR		17	60	23		EDTA
905002		14	13	Hazy<10mm		18	60	23		EDTA
905003		22	21	Hazy<25mm		19	60	23		EDTA
905004		67	61	Hazy>25mm		20	60	23		EDTA
905005				CLEAR	**3**	21	60	23		EDTA
905006		5	5	CLEAR		22	60	23		**EDTA 079**
905007						24	60	23	Too many borders found	
905008						25	60	23	**L_err(---/ 84/ 75/200)**	EDTA

905002/905003/905004
Sample results with hazy aspect

905005:
Sample result with a manual aspect, where the manual aspect is shown as a number **3** in column 6 of this data record sample.

905006:
In this sample, the dilution rate has a dilution failure of 21% and that is printed as **EDTA 079.**

905007
Sample results with a text error. This sample gives Too many borders found. Result of a pipette possibly filled with air bubbles.

905008
Sample result with a text error. This sample is given limit error L_err(---/ 84/ 75/200)

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.
1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.

ESR "ERROR" and "WARNING" code messages

This code appears in the "sample data record" at column 10.
The following codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.
2	ESR Probably > 140 mm	Error	Extremely high ESR value.
3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).
7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

Appendix - 30 minutes reporting

Columns:

1. Patient number.
2. Not corrected 30-minute ESR result (only in use if 30 minute mode is active).
3. Not corrected 60-minute ESR result.
4. 60-minute ESR result in millimeters, corrected for **18**℃. (only in use if temperature correction is active).
5. Aspect (clear, hazy).
6. Manually entered code number.
7. Sedimentation pipette number (number on the pipette belt).
8. Actual sedimentation time in minutes.
9. Temperature (in degrees Centigrade).
10. Error message (if the Analyser detects an error).
11. EDTA mode.

+ REPORT EXAMPLE +(Not to scale)

- StaRRsed-- Date 20/05/14 Time: 15:28

1	2	3	4	5	6	7	8	9	10	11
915001	42	84	75	CLEAR		17	30	23		EDTA

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.
1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.

ESR "ERROR" and "WARNING" code messages

This code appears in the "sample data record" at column 10.
The following codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.
2	ESR Probably > 140 mm	Error	Extremely high ESR value.
3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).
7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

Appendix - System messages Compact V8

The Compact generates four types of messages

- System messages.
- Test messages.
- System time-out messages.
- Error messages.

During normal operation the following "**System messages**" may occur:

1. *Waiting tube*
   - If a filled pipette is at the measuring position before the elapsed time has finished and the operator is ready to fill the next pipette, the *Waiting tube* message will be displayed.
   - To continue the sample loading sequence the operator must wait until the pipette at the measuring position has been measured.

2. *Printer failure*.
   - Check paper feed and quantity.
   - Check printer cable connection.
   - Printer must be on-line.
   - Check power is ON.

3. *Reagents level empty message*
   - All reagent containers have level detectors; the display shows an error that indicates which reagent container(s) is (are) empty.
   - The expiry date of the reagent is exceeded or the container is opened longer than three months.
     Prepare new reagent as described in section Reagents preparation.

4. *Waste bottle full message or No waste bottle message*
   - The waste container also has a level detector. If a waste error is shown on the display, the InteRRliner V8 will stop filling and cleaning pipettes until a new or empty container has been installed.
   - Empty the waste container and press **Clear error.**

5. *Fatal separator error*
   - The Separator container has a level detector. If the "*Fatal Separator error*" message is indicated on the display, the Compact will stop the "rinse" cycle until the separator is empty.
   - The cause of this problem can be foam or the waste pump is not working. The Compact will continue to measure and send the ESR results on time to the printer, but the rinse and fill sequences are stopped until the error is solved.

During the start-up sequence all the positioning sensors are tested, if incorrect the instrument will generate "**Test messages** "

1. Test fill-nozzle unit.
   - Checks position of the fill-nozzle unit, if incorrect the unit will be re-positioned by the system.

2. Test rinse-unit.
   - Checks position of the rinse-unit, if incorrect the unit will be re-positioned by the system.

3. Test measure-unit.
   - Checks position of the measure-unit, if incorrect the unit will be re-positioned by the system.

4. Test Needle-unit.
   - Checks position of the needle-unit, if incorrect the unit will be re-positioned by the system.

5. Test Diluter-unit
   - Check the position of the syringe, if incorrect the unit will be re-positioned by the system.

6. Test drive.
   - Checks position of the drive unit, if incorrect the unit will be re-positioned by the system.

7. Test Rack unit
   - Check the position of the Mixing motor, if incorrect the unit will be re-positioned by the system
   - Check the rack, if incorrect the unit will be re-positioned by the system

During normal operation the following "**System time-out**" errors may occur.
These are usually fatal errors. Call distributor or your local supplier of the Compact.

1. Drive-unit.
   - Compact was not able to position the pipette belt within a certain time limit.
   - Check for mechanical obstructions.

2. Measure-unit.
   - Compact was not able to position the measure-unit within a certain time limit.
   - Check for mechanical obstructions.

3. Rinse-unit.
   - Compact was not able to position the rinse-unit within a certain time limit.
   - Check for mechanical obstructions.

4. Fill-nozzle unit.
   - Compact was not able to position the fill-nozzle unit within a certain time limit.
   - Check for mechanical obstructions.

5. Needle adapter.
   - Compact was not able to position the needle adapter within a certain time limit.
   - Check for mechanical obstructions.

6. Sample probe.
   - Compact was not able to position the sample probe within a certain time limit.
   - Check for mechanical obstructions.

The following "**Error messages**" may occur during normal operation.

1. Vacuum error.
   - Check if vacuum is available.
   - Check in screen MAINTENANCE - CHECK SENSORS the value of flow sensor.
   - Fatal error, call distributor.

2. Vacuum stabilisation error.
   Compact was not able to get a stable reading during the vacuum test before aspiration the sample.
   - Check for leakage on the pipette or fill nozzle.
   - Fatal error, call distributor.

3. Fill time error.
   The fill sensor was not triggered in time.
   - Not enough liquid was sucked up in the pipette.
   - Insufficient sample.
   - No vacuum or a blocked needle or fill block.

4. Diluter error.
   Diluter not started.
   - Can be seen in the sample mode display as EDTA 001
   - Check in screen MAINTENANCE - CHECK SENSORS the value of the diluter sensor.
   - Check in screen MAINTENANCE - CHECK SENSORS if vacuum is available.
   - Check in screen MAINTENANCE - CHECK SENSORS the value of flow sensor.
   - Fatal error, call distributor.

5. Position error.

- E18 is the error code for Carousel position error. InteRRliner V8 was not able to position the carousel. There was a difference found in the pipette memory position table and the actual measured position of the position sensor.

6. Up or Down sensor error.
   Compact was not able to detect the position of the fill nozzle on the sensors.
   - Up sensor failure, the fill nozzle is not at the fill position.
   - Down sensor failure, the fill nozzle is not at the home position.
   - Check for mechanical obstruction around the fill nozzle.
   - Fatal error, call distributor.

7. Rinse head up error.
   The Rinse head down sensor was not triggered during the movement time of the carousel.
   - Check the gap between the top of the rinse nozzle and the bottom of the pipette. Should be 1.5 to 2 mm.
   - Check if the sensor is correct, or re-adjust the sensor.
   - Fatal error, call distributor.

8. Measure head not home error.
   Measure head is not at the home position.
   - Check the home sensor.
   - Measure motor is faulty.

9. Separator full error
   It takes too long for the waste pump to empty the liquid separator.
   - Check separator assembly on air leaks.
   - Replace waste tubes.
   - Exchange waste pump cassette.
   - Clean liquid separator.

Appendix - Error list Compact V8

last updated: 01-09-2014

Error	Extra explanation	Reason/Solution
E2: Communication error! (Board: %s (%x), Command: %x, TWSR: %x E: %d)	Communication lost after 3 retries between Computer and InteRRliner V8.	• Power cable not connected on the communication PCB mounted on the back panel. • An I2C cable not connected • Serial cable not connected • No power on one of the PCB's • Short circuit or fault on one of the PCB's
E3: Measure motor timeout!	Measure head motor did not move or motor is blocked.	• Measure head is not at the Home position. • Check the Home sensor. • Motor is faulty. • Motor driver on drive board is faulty.
E4: Sample probe not in top position! (home)	Sample probe not back at Home position after sampling a tube.	• Check sample probe home sensor. • Sample probe motor is faulty. • Sample probe motor driver on needle board is faulty. • Sample probe is blocked.
E5: Duplicated ID !!	Sample rejected. Sample already in carousel.	• Wait until sample is measured • Check general settings (Check for duplicate ID's
E6: Program was not properly shut down. Check settings before continuing!	There is a possibility that changed settings which were not saved to disk are lost.	• Program stopped and computer needed to be reset. • Computer reset after power failure.

E7: Outer needle motor position error! Timeout! (piercing)	Outer needle did not go down within a certain time limit.	• Outer needle motor is faulty. • Outer needle motor driver on needle board is faulty. • Outer needle is blocked.
E8: Fillnozzle not in fill position!	Fill nozzle did not reach the fill position within a certain time limit.	• Fill nozzle motor is faulty. • Fill nozzle motor driver on nozzle board is faulty. • Fill nozzle is blocked.
E9: Air flow failure!	Compact was not able to get a stable reading during the vacuum test before aspiration the sample.	• Check for leakage on the pipette or fill nozzle.
E10: Sample probe was jammed. Check both needles before sampling!	Sample probe was probably jammed when going down and exceeded the maximum current level. Sample probe went back to its home position after the error.	• Check if outer needle is clogged up with rubber. • Sample probe maybe bend.
E11: Sample probe not on position (going down)! Timeout error!	Sample probe did not go down within a certain time limit.	• Sample probe motor is faulty. • Sample probe motor driver on needle board is faulty. • Sample probe is blocked.
E12: Dilution error: wrong or no diluent flow. Check the diluter!	Diluter malfunction	• Check diluent flow sensor • Check tubes diluter system
E13: Fillnozzle not in home position!	Fill nozzle did not reach the Home position within a certain time limit.	• Fill nozzle motor is faulty. • Fill nozzle motor driver on nozzle board is faulty. • Fill nozzle is blocked.
E14: Outer needle motor position error! (home)	Outer needle did not reach the home (top) sensor within a certain time limit.	• Check home (top) sensor. • Outer needle motor is faulty. • Outer needle motor driver on needle board is faulty. • Outer needle is blocked.

E18: Carousel position error! Check Rinse position.	Value of potentiometer does not match the value stored in memory of the current rinse position.	• Check if the rinse position is right. • Set correct rinse position and do a "Learn carousel positions". • Check mechanical connection potentiometers.
E19: Drive motor timeout!	Drive motor did not move or motor is blocked	• Check the home sensor • Motor is faulty • Motor driver on drive board is faulty
E22: Waste bottle full!	Empty waste bottle and clear error.	• Check level sensor.
E23: "Fill " sensor out of range. Check/clean this sensor !	The Fill sensor has reached a critical level. Continuing could result in filling errors.	• Check and/or clean the Fill sensor.
E24: "Diluter Start" sensor out of range. Check/clean this sensor !	The Diluter Start sensor has reached a critical level. Continuing could result in filling errors.	• Check and/or clean the Diluter Start sensor.
E25: "Measure" sensor out of range. Check/clean this sensor !	The Measure sensor has reached a critical level. Continuing could result in wrong ESR results.	• Check and/or clean the Measure sensor.
E26: "Diluent Flow" sensor out of range. Check/clean this sensor !	The EDTA Flow sensor has reached a critical level. Continuing could result in filling errors.	• Check and/or clean the EDTA Flow sensor.
E27: "Temperature" sensor out of range. Check Settings !	The measured room temperature has reached a critical level. Continuing could result in wrong ESR results.	• Check the temperature sensor setting. • Check and/or clean the Temperature sensor.

E29: Result path not found. Switched to default (D:\). Check "Result Path" setting.	Selected result path is not valid. Software is using the default setting	• Check result path setting • Check if network or USB devices are used.
E30: No ACK/NACK received from host after sending inquiry!	No response from Host within a certain time limit after sending an inquiry 3 times.	• Check communication cable between Host and InteRRliner V8 computer. • Check serial port settings (baud rate, etc...) • Check protocol settings. • Check Host computer.
E31: NACK received from host after sending inquiry!	Did not receive ACK from Host after sending inquiry 3 times.	See E30
E32: LIMS Connection timeout. Host not found!	The Compact could not establish a connection with the HOST (server) via TCP/IP.	• Check TCP/IP settings • Check network cable • Check HOST settings
E34: No response from host after sending 'Sample data record'!	No response from Host within a certain time limit after 3 attempts.	See E30
E35: No response from host after sending 'Sample flag record'!	No response from Host within a certain time limit after 3 attempts.	See E30
E36: No ACK/NACK received after sending 'Sample result string'!	No response from Host within a certain time limit after 3 attempts.	See E30
E37: NACK received from host after sending 'Sample result string'!	Did not receive ACK from Host after sending 'Sample result string' 3 times.	See E30
E40: Position settings error. Settings loaded from Eeprom. Check settings before sampling!	Position settings in Eeprom do not match settings saved to file. Settings in Eeprom OK and loaded from Eeprom. Check positions and save settings.	• Configuration file maybe corrupted.
E41: Timeout settings error. Settings loaded from Eeprom. Check settings before sampling!	Timing settings in Eeprom does not match settings saved to file. Settings in Eeprom OK and loaded from Eeprom. Check timeouts and save settings.	• Configuration file maybe corrupted.

E104: Needle unit not in up position!	Could not start the position motor, because the outer needle or sample probe is not its home position (top).	• Check outer needle home sensor. • Check sample probe home sensor. • Faulty Outer needle motor. • Faulty Sample probe motor. • Check if needles are blocked. • Faulty motor drivers on the needle board.
E116-118	Quality Control Errors	See section ***Quality control trouble shooting*** (on page 194)
E135: Elevator unit not functioning!	Elevator unit did not respond to main unit (Compact keyboard) during start-up.	• No power on the Elevator board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the Compact are connected in series.
E136: Indexer unit not functioning!	Indexer unit did not respond to main unit (Compact keyboard) during start-up.	• No power on the Indexer board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the Compact are connected in series.

E150: Read error battery RAM real time clock (RTC)!	There was a communication error between the RTC and the main processor. The following settings are lost: • Carrousel position. • Service & Sample counter. • Pipette data. • Historical data.	• Faulty RTC chip (PCF8583) on Compact keyboard. • RTC chip not mounted on Compact keyboard.
E151: Write error battery RAM real time clock (RTC)!	There was a communication error during a write operation. The main processor was not able to store the settings in the battery RAM of the RTC.	• Faulty RTC chip (PCF8583) on Compact keyboard. • RTC chip not mounted on Compact keyboard.
E152: CHECKSUM error battery RAM real time clock (RTC)!	After reading the settings in the RTC the calculated checksum did not match with the checksum stored in the RTC. Settings are lost (see error 20).	• Faulty RTC chip (PCF8583) on Compact keyboard.
E153		
E154		
E155: Read error serial EEPROM on Compact keyboard!	There was a communication error between the EEPROM and the main processor during a read operation. Default settings are loaded! Check all settings (see below error list)!	• Faulty EEPROM (24C01) on Compact keyboard. • EEPROM not mounted on Compact keyboard.
E156: Write error serial EEPROM on Compact keyboard!	There was a communication error during a write operation. The main processor was not able to store the settings (see below error list) in EEPROM.	• Faulty EEPROM (24C01) on Compact keyboard. • EEPROM not mounted on Compact keyboard.
E157: CHECKSUM error serial EEPROM on Compact keyboard!	After reading the settings from EEPROM the calculated checksum did not match with the checksum stored in EEPROM. Default settings are loaded! Check all settings (see below error list)!	• Faulty EEPROM (24C01) on Compact keyboard.
E158: Read error serial EEPROM on Elevator or	There was a communication error between the serial	• Faulty EEPROM (24C01) on Elevator or Indexer

Indexer board!	EEPROM (on Elevator or Indexer board) and the main processor (Compact keyboard) during a read operation.	board. • EEPROM not mounted on Elevator or Indexer board. • EEPROM mounted on both Elevator and Indexer boards. Only one board must have the EEPROM installed.
E159: Write error serial EEPROM on Elevator or Indexer board!	There was a communication error between the serial EEPROM (on Elevator or Indexer board) and the main processor (Compact keyboard) during a write operation.	• Faulty EEPROM (24C01) on Elevator or Indexer board. • EEPROM not mounted on Elevator or Indexer board. • EEPROM mounted on both Elevator and Indexer boards. Only one board must have the EEPROM installed.
E160: Checksum error Indexer settings!	After reading the settings from EEPROM the calculated checksum did not match with the checksum stored in EEPROM. Default Indexer settings are loaded!	• Faulty EEPROM (24C01) on Elevator or Indexer board. • Settings can be checked (by service engineer) with the Test program for InteRRliner & Compact.
E161: Checksum error Elevator settings!	After reading the settings from EEPROM the calculated checksum did not match with the checksum stored in EEPROM. Default Elevator settings are loaded!	• Faulty EEPROM (24C01) on Elevator or Indexer board. • Settings can be checked (by service engineer) with the Test program for InteRRliner & Compact.
E162		
E163		
E164		

E165: I2C communication error between Compact PC and Indexer board!	There was a communication error between the Indexer board and the main processor during an I2C operation.	• No power on the Indexer board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the Compact are connected in series.
E166: I2C communication error between Compact PC and Elevator board!	There was a communication error between the Elevator board and the main processor during an I2C operation.	• No power on the Elevator board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the Compact are connected in series.
E167: I2C communication error between Compact PC and Elevator ,Indexer or Needle board!	There was a communication error between the Elevator, Indexer or Needle board and the main processor during an I2C operation.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). • **Note:** the boards in the Compact are connected in series.
E168: I2C communication error between Compact PC and Diluter or Needle board!	There was a communication error between the Diluter or Needle board and the main processor during an I2C operation.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the Compact are connected in series.
E169: I2C communication error between Compact PC and Drive board!	There was a communication error between the Driver board and the main processor during an I2C operation.	• No power on the drive board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the Compact are connected in series.

E170: I2C communication error between Compact PC and Drive board!	There was a communication error between the Drive board and the main processor during an I2C operation.	• No power on the Drive board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the Compact are connected in series.
E171: I2C communication error between Compact PC and Elevator board!	There was a communication error between the Elevator board and the main processor during an I2C operation. Drive unit did not respond.	• No power on the Elevator board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the Compact are connected in series.
E180		
E181: Barcode rotator up / down motor timeout!	The Barcode vertical motor didn't reach its up or down position within a certain time limit.	• Check up and down sensors. • Faulty Barcode vertical motor. • Barcode rotator unit mechanically blocked. • Broken wire to barcode vertical motor. • Faulty Barcode vertical motor driver on Indexer board.
E182:		
E183: Indexer motor timeout!	The indexer didn't reach its position within a certain time limit.	• Fuse was triggered. • Faulty indexer motor. • Indexer mechanically blocked. • Broken wire(s) to indexer
E184: Indexer error: barcode rotator not in up position!	The indexer could not move to a new position, because the barcode rotator was not in its up position.	• Check Barcode rotator up / down motor. • Check sensors of Barcode rotator up / down unit.

E185: Indexer error: elevator platform not in back position!	The indexer could not move to a new position, because the elevator platform was not in its back position.	• Check platform slider motor. • Check home sensor of platform unit.
E193: Elevator motor timeout!	The elevator didn't reach its position within a certain time limit.	• Fuse was triggered. • Faulty lift motor. • Elevator mechanically blocked. • Broken wire(s) to lift motor. • Faulty lift motor driver on Elevator board.
E194: Tube unit front / back motor timeout!	The platform slider didn't reach the front or back position within a certain time limit.	• Check platform home and front sensors. • Faulty platform slider motor. • Platform unit mechanically blocked. • Broken wire to platform slider motor. • Faulty platform slider motor driver on Elevator board.
E195: Sample unit in / out motor timeout!	The Sample arm unit in / out didn't reach the in (= needle) or out (= rack) position within a certain time limit.	• Check sample arm out and home sensors. • Faulty rotation motor. • Sample arm unit mechanically blocked. • Broken wire to rotation motor. • Faulty rotation motor driver on Elevator board.
E196: Mixer motor timeout!	The Mixer didn't reach the up or down position within a certain time limit.	• Check mixer sensors. • Faulty mixer motor. • Mixer unit mechanically blocked. • Broken wire to mixer motor. • Faulty mixer motor driver on Elevator board.

E197: Sample unit in / out error: elevator platform not in back position!	The Sample arm unit could not move to a new position, because the elevator platform was not in its back position.	• Check platform slider motor. • Check back sensor of the platform slider unit.
E198: Sample unit in / out error: elevator not in up position!	The Sample arm unit could not move to a new position, because the elevator was not in its up position.	• Check lift motor (see also rack transport error 63).
E199: Tube unit front / back error: sample arm not in out position!	The platform slider unit could not move to a new position, because the sample arm was not in its out position (= rack position).	• Check rotation motor. • Check out sensor of Sample arm.
E200: Sample unit in / out and Tube unit front / back not on position during initialisation of the elevator!	The initialisation routine of the elevator was cancelled, because the Sample arm unit was not in its out position (= rack position) and the Platform slider unit was not in its front position. The positions of both units are unknown!	• Check rotation motor. • Check out sensors of sample arm unit. • Check platform slider motor. • Check front sensor of platform slider unit.
E201: Outer needle not in up position during initialisation of the elevator!	The initialisation routine of the elevator was cancelled, because the outer needle (sample tube holder) was not in its up position.	• Check outer needle up sensor. • Check outer needle motor.
E210: Bad communication between Compact and Input-pool!	Bad communication between Compact and Input-pool, or the communication between the Compact and the Input-pool was interrupted.	• Switching off the InteRRliner could cause this error. This is normal. • Check RS232 cable between Elevator board and InteRRliner Transport board.
E211: Unknown command from Input-pool!	The communication was OK, but an unknown command was received from the Input-pool.	• Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact I2C cable(s). • If there are I2C errors in the InteRRliner: check the InteRRliner I2C cable(s).

E212: Bad communication between Compact and Input-pool!	The Compact did not receive a good answer (first part) after sending an inquiry to the Input-pool.	• Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact I2C cable(s). • If there are I2C errors in the InteRRliner: check the InteRRliner I2C cable(s).
E213: Bad communication between Compact and Input-pool!	The Compact did not receive a good answer (second part) after sending an inquiry to the Input-pool.	• Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact I2C cable(s). • If there are I2C errors in the InteRRliner: check the InteRRliner I2C cable(s).
E214: No response from Input-pool!	The Input-pool did not response to the Compact after sending a result to the Input-pool.	• Switching off the InteRRliner during run mode could cause this error. This is normal. • Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact I2C cable(s). • If there are I2C errors in the InteRRliner: check the InteRRliner I2C cable(s).

Appendix - Error list InteRRliner rack transport

Software V5.xx Last update: 14-05-2014

Error		Problem	Possible Cause/Solution
09	E4009 Start pool IIC comm.fault	The End-pool or a Transport unit received an unknown command from the Start-pool. The command has been ignored by one of the units!	• I2C cable(s) not connected properly. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
10	E4010 Transport 1 NO transport unit	The first Transport unit was not detected by the Start-pool. The Transport-unit did not response!	• No power on the Transport board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note**: the boards in the InteRRliner are connected in series.
11	E4011 End pool NO end-pool	The End-pool was not detected by the Start-pool. The End-pool did not response!	• No power on the End-pool board. • I2C cable(s) not connected. • Bad I2C cable(s). **Note:** the boards in the InteRRliner are connected in series.
12	E4012 Start pool Eeprom Fault	The serial EEPROM on the Start-pool board was not detected.	• Faulty EEPROM (24C01) on Start-pool board. • EEPROM not mounted on Start-pool board.
13	E4013 Start pool IIC write error	There was an I2C communication error between the End-pool or Transport unit and the Start-pool.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
14	E4014 Start pool	There was an I2C communication error	• No power on one of the boards.

	IIC status error	between the End-pool or Transport unit and the Start-pool.	• I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
15	E4015 Start pool IIC read_1 error	There was an I2C communication error between the End-pool or Transport unit and the Start-pool.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
16	E4016 Start pool IIC read_2 error	There was an I2C communication error between the End-pool or Transport unit and the Start-pool.	• No power on one of the boards. • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
17	E4017 Start pool TOO many Mess./Text	The InteRRliner tried to load all the text messages (according to the selected language), but there were too many text messages in memory.	• Corrupted memory. Service engineer can reload the InteRRliner software. Note for service engineer: HEX-file can also be corrupted. • Faulty Flash Memory (…28F010 or …28F020) on Start-pool board.
18	E4018 Start pool TOO many Menu items	The InteRRliner tried to load all the menus (according to the selected language), but there were too many menu items in memory.	• Corrupted memory. Service engineer can reload the InteRRliner software. Note for service engineer: HEX-file can also be corrupted. • Faulty Flash Memory (…28F010 or …28F020) on Start-pool board.
19	E4019 Start pool	The InteRRliner tried to	• Corrupted memory.

	TOO much Error text	load all the error text messages (according to the selected language), but there were too many error text messages in memory.	Service engineer can reload the InteRRliner software. Note for service engineer: HEX-file can also be corrupted. • Faulty Flash Memory (…28F010 or …28F020) on Start-pool board.
20	E4020 Start pool NO transport units	The Start-pool did not detect any of the Transport units.	• No power on the Transport board(s). • I2C cable(s) not connected. • Bad I2C cable(s). Note: the boards in the InteRRliner are connected in series.
21	E4021 Start pool Eeprom read error	There was a communication error between the EEPROM and the main processor during a read operation. Check all settings (see below error list)!	• Faulty EEPROM (24C01) on Start-pool board. • EEPROM not mounted on Start-pool board.
22	E4022 Start pool Eeprom write error	There was a communication error during a write operation. The main processor was not able to store the settings (see below error list) in EEPROM.	• Faulty EEPROM (24C01) on Start-pool board. • EEPROM not mounted on Start-pool board.

24	E1024 Start pool Rack slider timeout	The Slider motor (Start-pool) did not reach the home position within a certain time limit.	• Check Timeout time and Speed settings of the Slider motor (Start-pool). • Slider mechanically blocked. • Check Slider motor sensor. • Faulty Slider motor. • Broken wire(s) to Slider motor. • Faulty Slider motor driver on Start-pool board.
25	E2025 Start pool Rack forward timeout	The Rack Transport motor (Start-pool) did not reach the front or back position within a certain time limit.	• Check Timeout time and Speed settings of the Rack Transport motor (Start-pool). • Rack Transport mechanically blocked. • Check transport sensors. • Check Rack Home sensor (little red switch). • Faulty transport motor. • Broken wire(s) to transport motor. • Faulty transport motor driver on Start-pool board.
26	E3026 Start pool Rack emitter timeout	The Ejector motor (Start-pool) did not reach the left or right position within a certain time limit. Or the motor was stopped due to a maximum current.	• Check Timeout time and Speed settings of the Ejector motor (Start-pool). • Ejector mechanically blocked. • Check ejector sensors. • Faulty ejector motor. • Broken wire(s) to ejector motor. • Faulty ejector motor driver on Start-pool

			board.
32	E4032 Start pool No ID match	The InteRRliner transmitted a request to the Host (LIMS), but the answer from the Host contained a different patient ID.	• Check Host (LIMS) system. • Bad cable(s) between InteRRliner and Host (LIMS) system.
33	E4033 Start pool ESRI timeout	There was a communication error between the InteRRliner and the Compact. The communication was interrupted.	• Switching off the Compact could cause this error. This is normal. • Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact I2C cable(s). • If there are I2C errors in the InteRRliner: check the InteRRliner I2C cable(s).

37	W5037 Start pool ESRI ack timeout	There was a communication error between the InteRRliner and the Compact. The InteRRliner did not receive an answer from the Compact after sending a patient confirmation to the Compact. The communication was interrupted.	• Switching off the Compact could cause this error. This is normal. • Check RS232 cable between Elevator board and InteRRliner Transport board. • If there are I2C errors in the Compact: check the Compact I2C cable(s). • If there are I2C errors in the InteRRliner: check the InteRRliner I2C cable(s).
38	E2038 Start pool Startpool rack blocked.	A rack was detected and transported in the Start-pool. The Rack Transport unit (Start-pool) reached the front position, but the Rack Home sensor did not detect the rack.	• Check Start-pool for misplaced rack(s). • Check Rack Home sensor (little red switch). • Check Start-pool cross sensor (transmitter & receiver). • Check Rack transport home sensor.
40	W7040 Start pool Startpool full!!	A new rack is ready to be slide in the Start-pool, but the Start-pool is already full. This is a text message (no alarm) and will clear itself.	• If this message comes up and the Start-pool is not full, check the Start-pool Full sensor.
42	W5042 Start pool Rack slider pos.err	A rack on the Start-pool conveyer belt (Pool-in) did not reach the Rack-in sensor within a certain time limit.	• Check Slider unit (Start-pool). • Check Slider motor sensor.

43	W5043 Start pool Feed belt timeout	A rack on the Start-pool conveyer belt (Pool-in) did not reach the Rack-in sensor within a certain time limit.	• Check Timeout time and Speed settings of the Pool-in motor (Start-pool). • Rack on conveyer belt (Start-pool) mechanically blocked. • Check Rack-in sensor. • Faulty belt motor. • Broken wire(s) to belt motor. • Faulty belt motor driver on Start-pool board.
44	W5044 Start pool Eeprom chksum error	After reading the settings from EEPROM the calculated checksum did not match with the checksum stored in EEPROM. Default settings are loaded! Check all settings (see below error list)!	• Faulty EEPROM (24C01) on Start-pool board.
45	W5045 Start pool Warning: pool empty	The Rack Home switch (Start-pool) was activated during a rack transportation, but the Start-pool cross sensor detected NO rack.	• Removing the rack during transportation and pressing the Rack Home switch by hand could cause this warning. This is normal! • Check Start-pool for misplaced rack(s). • Check Rack Home switch (little red switch). • Check Start-pool cross sensor (transmitter & receiver).

49	W5049 Start pool NO host response_1	The InteRRliner did not receive an answer (Ack / Nack) from the Host (LIMS) system after sending an inquiry to the Host.	• Check Host (LIMS) system. • Check protocol settings. • Check baudrate settings. • Bad cable(s) between InteRRliner and Host (LIMS) system.
50	W5050 Start pool NO host response_2	The InteRRliner did not receive the "patient order information record" from the Host (LIMS) system within a certain time limit.	• Check Host (LIMS) system. • Bad cable(s) between InteRRliner and Host (LIMS) system.
51	W5051 Start pool Error info length	The InteRRliner received an incorrect "patient order information record" from the Host (LIMS) system. The length of the record was incorrect!	• Check Host (LIMS) system. • Check protocol settings. • Bad cable(s) between InteRRliner and Host (LIMS) system.
52	W5052 Start pool NO host response_3	The communication was interrupted while receiving a "patient order information record" from the Host (LIMS) system.	• Check Host (LIMS) system. • Bad cable(s) between InteRRliner and Host (LIMS) system.
53	W5053 Start pool NO host response_4	The InteRRliner did not receive an answer (Ack / Nack) from the Host (LIMS) system after sending a "sample result record" to the Host.	• Check Host (LIMS) system. • Check protocol settings. • Check baudrate settings. • Bad cable(s) between InteRRliner and Host (LIMS) system.
54	W5053 Start pool NO host response_5	The InteRRliner did not receive an answer (Ack / Nack) from the Host (LIMS) system after sending a "flag record" to the Host.	• Check Host (LIMS) system. • Check protocol settings. • Check baudrate settings. • Bad cable(s) between InteRRliner and Host (LIMS) system.

62	E0062 Transport 1..4 Supply rack lost!	A rack was lost during transportation from Start-pool to Compact.	• Removing the rack during transportation could cause this error. This is normal! • Rack mechanically blocked. • Check Timeout time and Speed settings of the Transport motor (Transport unit) or the Ejector motor (Start-pool). • Check Rack Catch sensor (Transport unit). • Check main conveyer belt motor (Transport unit). • Check Ejector motor (Start-pool).
63	E0063 Transport 1..4 ESRI timeout_1	The Compact did not open or close the indexer within a certain time limit.	• Check the indexer (clamp). The indexer (clamp) can be tested in menu Indexer. • Check RS232 cable between Elevator board and InteRRliner Transport board.
65	E0065 Transport 1..4 ESRI timeout_3	A rack has been sampled and was ready to be pushed (switch-out) on the conveyer belt, but the Compact did not open the indexer within a certain time limit.	• Check the indexer (clamp). The indexer (clamp) can be tested in menu Indexer. • Check RS232 cable between Elevator board and InteRRliner Transport board.
66	E0066 Transport 1..4 ESRI timeout_4	A rack has been sampled and pushed (switch-out) on the conveyer belt, but the Compact did not close the indexer within a certain time limit.	• Check the indexer (clamp). The indexer (clamp) can be tested in menu 8-6 on the Compact. • Check RS232 cable between Elevator board and InteRRliner Transport board.

67	E0067 Transport 1..4 Discharge rack lost!	A rack was lost during transportation from Compact to End-pool.	• Removing the rack during transportation could cause this error. This is normal! • Rack mechanically blocked. • Check Timeout time and Speed settings of the Transport motor (Transport unit) or the Pool-in motor (End-pool). • Check Switch-out sensor (Transport unit). • Check transport unit motor(Conveyer belt) • Check Rack-in sensor (End-pool). • Check Pool-in motor (End-pool).
70	E1070 Transport 1..4 Switch_in timeout	The Switch-in motor (Transport unit) did not reach the home position within a certain time limit.	• Check Timeout time and Speed settings of the Switch-in motor (Transport unit). • Switch-in unit mechanically blocked. • Check Switch-in sensors. • Faulty Switch-in motor. • Broken wire(s) to Switch-in motor. • Faulty Switch-in motor driver on Transport board.
71	E1071 Transport 1..4 Switch_out pos. err	The Switch-in motor (Transport unit) could not move to the home position, because the Switch-out motor (Transport unit) was not on position (home).	• Check Switch-out unit (Transport unit). • Check home sensor of Switch-out unit.

72	E1072 Transport 1..4 Catch timeout	The Switch-in motor (Transport unit) did not reach the catch or release position within a certain time limit.	• Check Timeout time and Speed settings of the Switch-in motor (Transport unit). • Switch-in unit mechanically blocked. • Check Switch-in sensors. • Faulty Switch-in motor. • Broken wire(s) to Switch-in motor. • Faulty Switch-in motor driver on Transport board.
73	E1073 Transport 1..4 Switch_in pos. error or E2073 Transport 1..4 Switch_in pos. error	The Switch-in motor (Transport unit) did not reach the home position within a certain time limit. or The Switch-out motor (Transport unit) could not move the release position, because the Switch-in motor (Transport unit) was not on position (home).	• Check Timeout time and Speed settings of the Switch-in motor (Transport unit). • Switch-in unit mechanically blocked. • Check Switch-in sensors. • Faulty Switch-in motor. • Broken wire(s) to Switch-in motor. • Faulty Switch-in motor driver on Transport board.
74	E1074 Transport 1..4 Switch_in out pos.	The Switch-in motor tried to move from the release to the home position, but the Switch-in motor was not on the release position. The position is unknown!	• Check Switch-in sensors (Transport unit).

75	E2075 Transport 1..4 Switch_out timeout	The Switch-out motor (Transport unit) did not reach the home or release position within a certain time limit.	• Check Timeout time and Speed settings of the Switch-out motor (Transport unit). • Switch-out unit mechanically blocked. • Check Switch-out sensors. • Faulty Switch-out motor. • Broken wire(s) to Switch-out motor. • Faulty Switch-out motor driver on Transport board.
80	E1080 End pool Endpool. slider timeout	The Slider motor (End-pool) did not reach the home or front position within a certain time limit.	• Check Timeout time and Speed settings of the Slider motor (End-pool). • Slider mechanically blocked. • Check Slider sensors. • Faulty Slider motor. • Broken wire(s) to Slider motor. • Faulty Slider motor driver on End-pool board.
81	E4081 End pool Endpool full !!	A rack has been sampled, but could not be transported to the End-pool. This error will clear itself when the racks on the End-pool are removed.	• Remove racks from End-pool. • If this message comes up and the End-pool is not full, check the Pool Full sensor.

If applicable:

82	E2082 End pool End pool rack blocked.	A rack was detected and transported in the End-pool. The *Rack Transport* unit (End-pool) reached the end position (back), but the *Rack Home* sensor did not detect the rack.	• Check End-pool for misplaced rack(s). • Check *Rack Home* sensor (little red switch). • Check End-pool cross sensor (transmitter &

			receiver). • Check Rack transport end sensor.
83	W5083 End pool HST fault !	Warning: an error occurred during rack handling between End-pool and external device (HST). Possible rack jam.	• Remove rack and **reset external device** (HST). Warning is automatically cleared when external device is ready. • Reset InteRRliner if warning is not automatically cleared
84	E2084 End pool Transport motor err.	The *Rack Transport* motor (End-pool) did not reach the front or back position within a certain time limit.	• Check *Timeout time* and *Speed settings* of the Rack Transport motor (End-pool). • *Rack Transport* mechanically blocked. • Check transport sensors. • Check *Rack Home* sensor (little red switch). • Faulty transport motor. • Broken wire(s) to transport motor. • Faulty transport motor driver on End-pool board.
85	E3085 End pool Ejector motor error.	The *Ejector* motor (End-pool) did not reach the left or right position within a certain time limit.	• Check *Timeout time* and *Speed settings* of the Ejector motor (End-pool). • Ejector mechanically blocked. • Check ejector sensors. • Faulty ejector motor. • Broken wire(s) to ejector motor. • Faulty ejector motor driver on End-pool board.

Appendix - Elevator and Index controls

The following Elevator settings can be made:

1. ELEVATOR TO TOP POSITION.
   - This function send the elevator to the top position.
   - The top position is set default at 75500, no need to change the default value.
2. ELEVATOR TO FILL POSITION.
   - This function send the elevator to the fill position.
   - The fill position is set default at 64000, no need to change the default value.
3. ELEVATOR TO HOME POSITION.
   - This function send the elevator to the Home position.
4. ELEVATOR RESET.
   - This function reset the elevator to Home position.
5. MIXER ASSEMBLY TEST.
   - Switch ON and OFF the mixer motor.
6. TUBE UNIT test.
   - The FORWARD function send the tube unit to the front.
   - The BACKWARD function send the tube unit to the back.
7. SAMPLE UNIT test.
   - The IN function move the sample arm from the home position into the needle assembly of the Compact.
   - The OUT function move the sample arm from the needle assembly of the Compact to the Home position.
8. **Actual position** shows the position of the Elevator.
   - Step LEFT: The Elevator will move in steps to the left.
   - Step RIGHT: The Elevator will move in steps to the right.

The following INDEXER settings can be set:

1. RACK IN position
   - Moves the Indexer to the rack in position.
   - The rack IN position is set at 30700, no need to change the value.
2. RACK TEST position
   - Moves the Indexer to the rack test position.
   - The rack Test position has a default value, this value can not be changed.
3. Rack BARCODE position
   - Moves the Indexer to the barcode reader position.
   - The rack Barcode position is set at 27900, no need to change the value.
4. Rack FILL position
   - Moves the Indexer to the rack fill position.
   - The rack Fill position has a default value, this value can not be changed.
5. Rack MIX position
   - Moves the Indexer to the mix position.
   - The rack Mix position is set at 500, no need to change the value.
6. Rack HOME
   - Moves the Indexer to the home position.
7. Indexer CLAMP
   - OPEN the Indexer clamp.
   - CLOSE the indexer clamp.
8. **Actual position** shows the position of the Indexer.
   - Step LEFT: The Indexer will move in steps to the left.
   - Step RIGHT: The Indexer will move in steps to the right.

Note:
When the settings need to be changed enter type a new number in the input window and test the new position again by pressing the associated key for that position.
Press SAVE SETTINGS to store the new values to disk and to flash Eprom when everything is correct.

Appendix - Configuration barcode readers

The Barcode interface can handle two types of barcode readers,

- The Opticon (6 mil resolution).
- The Keyence (4 mil resolution).

If you are using labels with a higher density, contact your local distributor or agent.

The Barcode reader may be set to accept check digits, however this needs to be programmed by the distributor. Coda bar, Code 39, Code128, UPC, EAN and ITF 2 or 5 barcode types can be read with those barcode reader types.

To set-up the barcode readers to client specifications, use the set-up tools for the barcode readers. Detailed information can be found in Keyence Configuration manual MRN-011 or in Opticon Configuration manual MRN-015.

Appendix - Barcode labels

Example of barcode labels

Codabar ABC-code
01234 56789

UPC A
0 071589 812308

Industrial 2of5 (without CD)
0123456789

EAN 13
(ISBN)
9 780123 456786 >
(0123456789)

Interleaved 2of5 (with CD)
with bearer bars
0123456784

EAN 13 ADDON 5
7 376221 357463 12345

Telepen ASCII
(Telepen numeric)
Telepen
(57748174857483)

Code 39
(Code 39 FULL ASCII)
C+O+D+E 39
(Code 39)

Code 128 Code C
(EAN 128)
0123456789
( ]C10123456789)

Code 39
(Italian Pharmaceutical)
V2GZD9
(908557705)

Figure 1: Barcode labels examples

Appendix - Default settings InteRRliner V8

[SETTINGS] > GENERAL SETTINGS			
General settings			
	Software Default Setting	Factory Setting	Client Settings
30 min. Method	Off	Off	
Display dilution	Off	Off	
EDTA mode	On	On	
Display graph	Off	Off	
Sample probe protection	On	On	
Temp correction	On	On	
Fast filling	Off	Off	
Virtual keyboard	On	On	
Print after measurement	Off	Off	
Temperature	22 ℃	22 ℃	
ESR sedimentation time	60 Min.	60 Min.	
Sample probe depth	5 mm	5 mm	
Pipette wash time	7 sec.	7 sec.	
Pipette dry time	9 sec.	9 sec.	

[SETTINGS] > DILUTER SETTINGS			
Diluter settings			
Dilution adjust	75	75	
Dilution error detect	10	10	
Auto dilution adjust	On	On	
Dilution flow check	On	On	

[SETTINGS] > LIMIT ERROR SETTINGS			
General settings			
	Software Default Setting	Factory Setting	Client Settings
Send results when time exceeded	No	No	
Send results with dilution errors	No	No	
Send results with column height errors	No	No	
Send results with bubbles on top warning	No	No	
Send results with hazy aspect	No	No	
Send results with temperature exceeded	No	No	
[SETTINGS] > QC SETTINGS			
Use default assay range	On	On	
other options	Off	Off	

[SERVICE] > SERIAL OUTPUT SETTINGS			
InteRRliner V8 settings			
	Software Default Setting	Factory Setting	Client Settings
InteRRliner V8 connected to comport	I/o ASRL1::INSTR	I/o ASRL1::INSTR	
Printer port	I/o ASRL10::INSTR	I/o ASRL1::INSTR	
Select barcode reader	Opticon or Keyence	Opticon or Keyence	
Search in example history	Off	Off	

[SERVICE] > SET LIMS COMMUNICATION SETTINGS			
Set serial output comport			
	Software Default Setting	Factory Setting	Client Settings

In case of use of serial port:			
Serial output comport	I/o ASRL2::INSTR	I/o ASRL2::INSTR	
Baud rate	9600	9600	
Data bits	8	8	
Parity	None	None	
Stop bits	1.0	1.0	
Flow control	None	None	
In case of use of TCP/IP			
TCP Port	0	0	
Set protocol settings			
Select protocol	InteRRliner	InteRRliner	
Send ESR on Warning	ON	ON	

Appendix - Default Rack Transport settings InteRRliner V8

Motor diagnose information and settings.

Entry Pool

Entry Pool	Default Time out	Client Time out	Default speed counts	Client Speed counts	Default delay *0.01 Sec	Client Delay *0.01 Sec	Motor current
Pool In motor	8 Sec		255		80		100/150 mA
Slider Motor	3 Sec		220		N.A.	N.A.	150/250 mA
Rack Transport motor	15 Sec		255		N.A.	N.A.	100/200 mA
Ejector motor	5 Sec		255		N.A.	N.A.	50/150 mA

Exit pool

Exit Pool	Default Time out	Client Time out	Default speed counts	Client Speed counts	Default delay *0.01 Sec	Client Delay *0.01 Sec	Motor current
Pool in motor	80*0.1 Sec		240		20		50/150 mA
Slider Motor	30*0.1 Sec		220		N.A.		50/150 mA

For InteRRliner with output:

Exit Pool XO	Default Time out	Client Time out	Default speed counts	Client Speed counts	Default delay *0.01 Sec	Client Delay *0.01 Sec	Motor current
Pool in motor	80*0.1 Sec		240		20		50/150 mA
Slider Motor	30*0.1 Sec		220		N.A	N.A	50/150 mA
Rack Transport motor	150*0.1 Sec		240		N.A	N.A	50/150 mA
Ejector motor	50*0.1 Sec		240		N.A	N.A	50/150 mA

gegevens pool-in/slider-motor gelijkgetrokken: staat zo in software/afregeldoc en defaultsettings

Conveyor belt

Conveyer Belt	Default Time out	Client Time out	Default speed counts	Client Speed counts	Default delay *0.01 Sec	Client Delay *0.01 Sec	Motor current
Switch-in motor	20*0.1 sec	*0.1	210			N.A.	100/200 mA
Switch-out motor	20*0.1 sec	*0.1	240			N.A.	100/200 mA
Transport motor	255*0.1 sec	*0.1	255		5	N.A.	100/200 mA
Transport motor (bulletin 2110601)	255*0.1 sec	*0.1	120		5	N.A.	100/200 mA

Note:Delay time is not applicable in software lower than V4.xx

Elevator

Elevator	Default Pulse count	Client pulse count	Direction	Default Motor Current
Elevator top position	74500		Top position	1400-300 mA
Elevator fill position	62000		Down position	390-100 mA

Indexer

Indexer	Default Pulse count	Client pulse count	Direction	Default Motor Current
Indexer mix position	500			970-400 mA
Indexer rack position	30700		Rack - home pos.	1400-400 mA
	30700		Home - rack pos.	1800-400 mA
Indexer barcode position	27900		Turn left	900-500 mA
	27900		Turn right	900-500 mA

Mixer

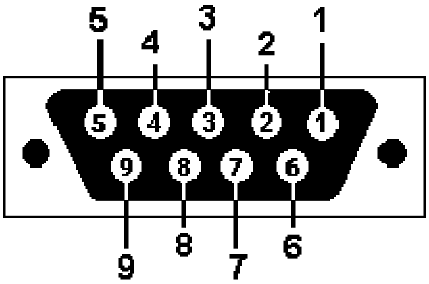
Mixer	Direction	Motor Current		Menu items	Default
Mixer arm motor	N.A.	970-400 mA		Protocol setting	SE 9000
Lift platform motor	To the front	960- 400 mA		Baud rate setting	9600
	To the back	970- 400 mA		LAB comms ON/OFF	OFF

Tube position Motor	N.A.	970-400 mA		
Barcode vertical motor	Up	1400-400 mA		
	Down	1800-400 mA		

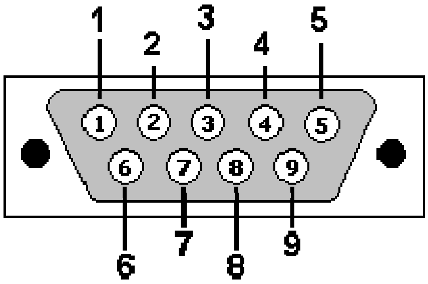
Appendix - Serial cable to LAB comms

For the serial connection from the laptop to the InteRRliner use a “one to one” standard 9-pin D connector serial cable. This serial cable can be bought in any computer shop.
The pin lay out for a “*one to one*” connection is as follows.

Connector layout DB9



DB9: View looking into female connector DCE



DB9: View looking into male connector DTE

At the female connector the pin layout is:

Pin no	Name	Dir	Notes / Description
1	DCD	Input	Data Carrier Detect. Raised by DCE when modem synchronized.
2	SD (TXD)	Output	Transmit Data (a.k.a TxD, Tx). Sending data to DTE.
3	RD (RXD)	Input	Receive Data (a.k.a RxD, Rx). Arriving data from DCE.
4	DTR	Output	Data Terminal Ready. Raised by DTE when powered on. In auto-answer mode raised only when RI arrives from DCE
5	GND (SG)		ground
6	DSR	Input	Data Set Ready. Raised by DCE to indicate ready.
7	RS (RTS)	Output	Request To Send. Raised by DTE when it wishes to send. Expects CTS from DCE.
8	CS (CTS)	Input	Clear To Send. Raised by DCE in response to RTS from DTE
9	RI	Input	Ring Indicator. Set when incoming ring detected - used for auto-answer application. DTE raised DTR to answer.

.

Female side Pin no	Male side Pin no
1	1
2	2
3	3

4	4
5	5
6	6
7	7
8	8
9	9

In case of preparation of a cable the following connections must be made.

Female side Pin no	**Male side Pin no**
2	2
3	3
5	5

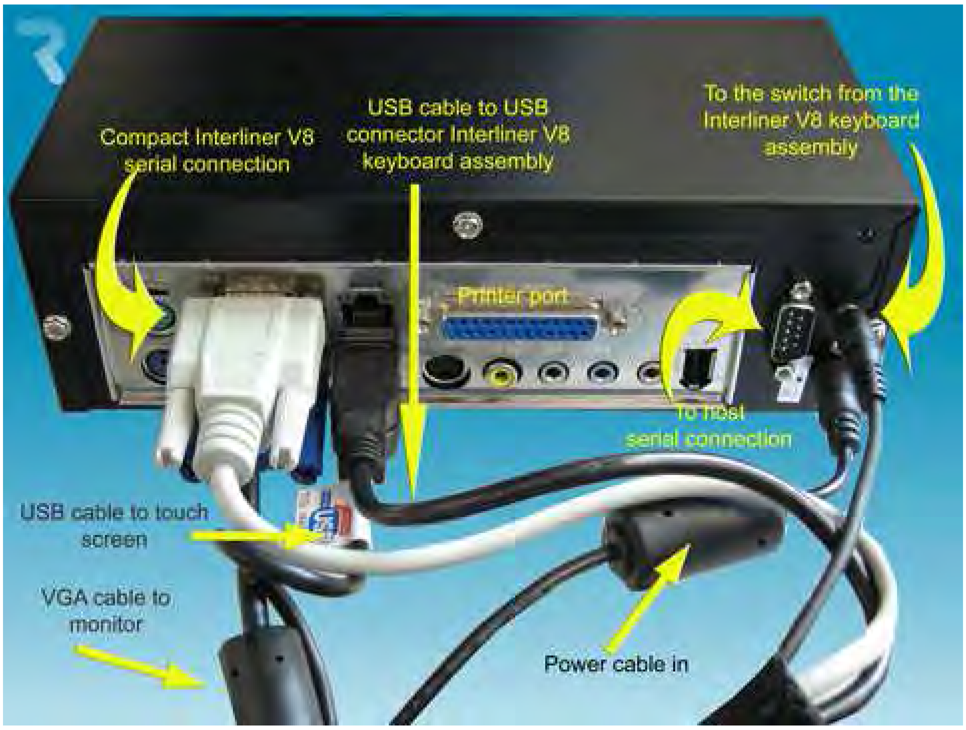
If you have no result you can try changing the following pin wires.

Female side Pin no	**Male side Pin no**
2	3
3	2
5	5

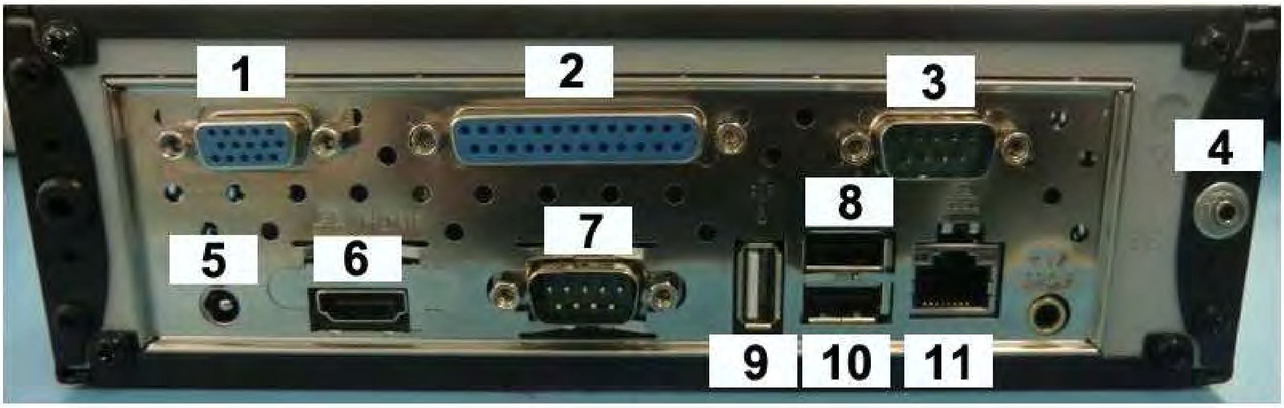
Appendix - PC connections for InteRRliner V8

At the back side of the computer the following connections must be made;

- VGA monitor cable comes from the monitor.
- USB cable comes from the touch screen.
- USB cable connected to the keyboard assembly.
- Compact serial cable comes from the Interface RS232 to IIC.
- Power cable comes from the power supply.
- The switch cable comes from keyboard assembly.
- When the printer is used connect the printer cable onto the 25 pin printer port connector.
- The host serial cable is connected to the host serial connection.



Appendix - PC connections for InteRRliner V8 (Windows 7)



At the back side of the computer the following connections must be made;

1. VGA monitor cable comes from the monitor.
2. When a printer is used connect the printer cable onto the 25 pin printer port connector.
3. Com 2 not used
4. Power switch on keyboard assembly.
5. Power cable 12V to power adapter.
6. HDMI not used.
7. Compact serial cable comes from the Interface RS232 to IIC.
8. USB connection not used
9. USB connection for touch screen.
10. USB connection not used.
11. Ethernet connection.

Appendix - Maintenance schedule

Maintenance Schedule InteRRliner V8 (Example)								
Sample volume: 350 per day (5 working days)	Daily	Weekly	Level 4	Level 3	Level 2	Level 1	Parts	Total amount/year
Perform End-of-day wash	X							
Clean outside aspiration needle	X							
Check needle condition	X							
Check tubing/diluent syringe	X							
Clean outside instrument	X							
Clean Fill nozzle		X						
Clean Liquid separator		X						
Check sensors		X						
Replace Fill nozzle O-ring			X				QWLV040002	12
Replace bacterial air filter (HEPA)			X				QWLV050004	12

Replace Disc filter (white) Only if internal waste container is used)			X				QWLV040001	12
Replace Rinse tube assembly			X				ESRI090902	12
Replace Saline tube assembly			X				ESRI090903	12
Run Fill and clean			X					
Replace Waste cassette assembly				X			ESRI090921	4
Replace Blotting washer waste pump				X			ESRI090026	4
Replace Pinch valve tube				X			ESRI010246	4
Replace Blue disc filter				X			QWLV040003	4
Replace diluter syringe tip					X		QWLV030901	2
Replace Waste pump motor						X	ESRI090920	1
Replace Fill block washer						X	ESRI030906	1
Replace Sample probe assembly						X	ESRI050909	1
Check Pipette valves bodies and replace if necessary (84 pieces)						X	QTST040001	84
Replace Outer needle assembly						X	ESRI050950	1
Replace all tubing (with Tubing set)						X	EHST079200	1
Compression spring outer needle						X	EHST050053	1

Needle cable assembly						X	EHST089056	1

For older models

Flat washer Fill nozzle EDTA			X				QWLV060001	12
Teflon top repair set (Version I diluter 2 rings)					X		ESRI060911	2
One-way check valve (Version I diluter 2 rings)						X	QWLV010104	1

Appendix - String format for StaRRsed

ESR string format for StaRRsed 60 minutes format

```
[stx]PPPPPPPPPP www WWW AAAAAAAAmm ppp TTT CC EEEEEEEEEEEEEEEEEEEEEE
MMMMMMMMMM[cr][lf][eot]
```

stx	80 data characters	cr	lf	eot			Checksum - OFF	60 min
stx	80 data characters	cr	lf	etx	cs	eot	Checksum - ON	60 min

Data consists, if 30 min. output is switched to OFF				
Position		Description	Format	
1	10	Patient identification text	Text	PPPPPPPPPP
13	15	E.S.R. in mm. 60 minute	xxx	www
18	20	E.S.R. in mm. (60 min corrected for temp)	xxx	WWW
22	30	Aspect	Text	AAAAAAAAA
31	32	Manually added code	xx	mm
34	36	Pipette number	xxx	ppp
39	41	Sedimentation time	xxx	TTT
45	46	Temperature in degree. (Default C.)	xx	CC
48	69	Error messages	Text	EEEEEEEEEEEEEEEEEEEEEE
71	80	EDTA message	Text	MMMMMMMMMM

CS =1 byte checksum = 256 - (modulo 256 (ASCII string sum)).
ASCII string sum = the ASCII sum of all preceding characters incl. stx, cr, lf and ext modulo 256 (ASCII string sum) = the remainder of the ASCII string sum when divided by 256.

ESR string format for StaRRsed 30 minutes format

```
[stx]PPPPPPPPPP hhh www WWW AAAAAAAAAmm ppp TTT CC EEEEEEEEEEEEEEEEEEEEEE
MMMMMMMMMM[cr][lf][eot]
```

stx	80 data characters	cr	lf	eot			Checksum - OFF	30 min
stx	80 data characters	cr	lf	etx	cs	eot	Checksum - ON	30 min

Data consists, if 30 min. output is switched to ON				
Position		Description	Format	
1	10	Patient identification text	Text	PPPPPPPPPP
12	14	E.S.R. in mm. Half hour method	xxx	hhh

16	18	E.S.R. in mm. (calculated to 60 minutes)	xxx	www
20	22	E.S.R. in mm. (60 min corrected for temp)	xxx	WWW
24	32	Aspect	Text	AAAAAAAAA
33	34	Manually added code	xx	mm
37	39	Pipette number	xxx	ppp
41	43	Sedimentation time	xxx	TTT
45	46	Temperature in degree. (Default C.)	xx	CC
48	69	Error messages	Text	EEEEEEEEEEEEEEEEEEEEEE
71	80	EDTA message	Text	MMMMMMMMMM

Where	**ASCII**	**HEX**	**DEC**
STX	ASCII	$02	02
ETX	ASCII	$03	03
EOT	ASCII	$04	04
LF	ASCII	$0A	10
CR	ASCII	$0D	13
CS	1 byte		

Text.: left aligned followed by spaces (ASCII $20).
xx….: number made up of (xx...) digits 0 9 (ASCIII $30 $39) with leading zeros.
Leading zeros and non-specified positions are filled with spaces (ASCII $20).

Appendix - String format for StaRRsed (V14)

ESR string format for StaRRsed 60 minutes format

```
[stx]PPPPPPPPPP www WWW AAAAAAAAmm ppp TTT CC EEEEEEEEEEEEEEEEEEEEEE
MMMMMMMMMM[cr][lf][eot]
```

stx	80 data characters	cr	lf	eot			Checksum - OFF	60 min
stx	80 data characters	cr	lf	etx	cs	eot	Checksum - ON	60 min

Data consists, if 30 min. output is switched to OFF				
Position		Description	Format	
1	10	Patient identification text	Text	PPPPPPPPPP
13	15	E.S.R. in mm. 60 minute	xxx	www
18	20	E.S.R. in mm. (60 min corrected for temp)	xxx	WWW
22	30	Aspect	Text	AAAAAAAAA
31	32	Manually added code	xx	mm
34	36	Pipette number	xxx	ppp
39	41	Sedimentation time	xxx	TTT
45	46	Temperature in degree. (Default C.)	xx	CC
48	69	Error messages	Text	EEEEEEEEEEEEEEEEEEEEEE
71	80	EDTA message	Text	MMMMMMMMMM

CS =1 byte checksum = 256 - (modulo 256 (ASCII string sum)).
ASCII string sum = the ASCII sum of all preceding characters incl. stx, cr, lf and ext modulo 256 (ASCII string sum) = the remainder of the ASCII string sum when divided by 256.

ESR string format for StaRRsed 30 minutes format

```
[stx]PPPPPPPPPP hhh www WWW AAAAAAAAAmm ppp TTT CC EEEEEEEEEEEEEEEEEEEEEE
MMMMMMMMMM[cr][lf][eot]
```

stx	80 data characters	cr	lf	eot			Checksum - OFF	30 min
stx	80 data characters	cr	lf	etx	cs	eot	Checksum - ON	30 min

Data consists, if 30 min. output is switched to ON				
Position		Description	Format	
1	10	Patient identification text	Text	PPPPPPPPPP
12	14	E.S.R. in mm. Half hour method	xxx	hhh
16	18	E.S.R. in mm. (calculated to 60 minutes)	xxx	www
20	22	E.S.R. in mm. (60 min corrected for temp)	xxx	WWW
24	32	Aspect	Text	AAAAAAAAA
33	34	Manually added code	xx	mm
37	39	Pipette number	xxx	ppp
41	43	Sedimentation time	xxx	TTT
45	46	Temperature in degree. (Default C.)	xx	CC
48	69	Error messages	Text	EEEEEEEEEEEEEEEEEEEEEE
71	80	EDTA message	Text	MMMMMMMMMM

Where	**ASCII**	**HEX**	**DEC**
STX	ASCII	$02	02
ETX	ASCII	$03	03
EOT	ASCII	$04	04
LF	ASCII	$0A	10
CR	ASCII	$0D	13
CS	1 byte		

Text.: left aligned followed by spaces (ASCII $20).
xx….: number made up of (xx...) digits 0 9 (ASCIII $30 $39) with leading zeros.
Leading zeros and non-specified positions are filled with spaces (ASCII $20).

Appendix - Sedmatic 100 string format

Normal result string:

pp[ ]PPPPPPPPPP[ ]WWWW[ ][ ][ ][ ][ ][ ][ ][ ][cr][lf]

26 data characters	CR	LF	Total length = 28 characters

- Or - -: Result string with Aspect:

pp[ ]PPPPPPPPPP[ ]WWWW[ ][ ][ ][ ][ ][ ][ ][ ]AAAAAAAAAAA[cr][lf]

- Or -: Result string with Error:

pp[ ]PPPPPPPPPP[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]EEEEEEEEEEE[cr][lf]

37 data characters	CR	LF	Total length = 39 characters

Data consists:				
Position		Description	Format	
1	2	Pipette number	xx	pp
4	13	Patient identification text	Text	PPPPPPPPPP
15	18	E.S.R. in mm. (60 min)	xxxx	WWWW
		String with Aspect or Error		
27	37	Aspect	Text	AAAAAAAAAAA
27	37	Error	Text	EEEEEEEEEEE

Where		Hex	Dec
CR	ASCII	$0D	013
LF	ASCII	$0A	010
[ ] = Space	ASCII	$20	032

Text.: left aligned followed by spaces (ASCII $20).
xx….: number made up of (xx...) digits 0 9 (ASCIII $30 $39) with leading zeros..
Leading zeros and non-specified positions are filled with spaces (ASCII $20).

Aspect messages:

Aspect	AAAAAAAAAAA
Hazy < 10	Hazy[ ]<[ ]10
Hazy < 25	Hazy[ ]<[ ]25
Hazy > 25	Hazy[ ]>[ ]25

Error messages:

Error	EEEEEEEEEEE
1.No cells / plasma found	Error[ ]1
2.ESR Probably >140 mm	Error[ ]2
3.Too many borders found	Error[ ]3
7.Limit error	Error[ ]7

Note:
If the Compact is switched to the 30 min method the output string has the same format. The Compact automatic apply the conversion table to the 60 min method.
If temperature correction is switched on the ESR value will be the temperature corrected ESR value.

Appendix - Sedmatic 15 string format

1	2..28	29..30	31..32
STX	Data (28 characters)	**CC**	**ETX**
stx	R04PPPPPPPP01pp01WWWW[ ][ ][ ][ ][ ][ ][ ]	CC	etx

Data consists:				
Position		Description	Format	
4	11	Patient identification text	Text	PPPPPPPP
14	15	Pipette number	xx	pp
18	21	E.S.R. in mm. (60 min)	xxxx	WWWW
29	30	Checksum	xx	CC

Checksum = EXOR sum off all 28 data characters.
If checksum is equal to the [ETX] character the checksum is converted to [DEL].

Where		**Hex**	**Dec**
STX	ASCII	$02	002
ETX	ASCII	$03	003
ACK	ASCII	$06	006
NACK	ASCII	$15	021
[ ] = Space	ASCII	$20	032
DEL	ASCII	$7F	127

Text.: left aligned followed by spaces (ASCII $20).
xx….: number made up of (xx...) digits 0 9 (ASCIII $30 $39) with leading zeros.

Note:

- Timeout for response (ACK/NACK) from HOST is 20 seconds.
- If the Compact is switched to the 30 min method, the output string has the same format. The Compact automatic applies the conversion table to the 60 min method.
- If temperature correction is switched on, the ESR value will be the temperature corrected ESR value.
- If the result has an error, the ESR value will be 4 space characters (ASCII $20).

Appendix - String format Vesmatic

[CR] [SP] XX [SP] = [SP] AAAAAAAAAAAAA [SP] NNN [SP]

[cr] + 24 data characters Total length = 25 characters

Where		Hex	Dec
cr	ASCII	$0D	13
sp	ASCII	$20	32

Data consists, if 30 min. method is switched to OFF				
Position		Description	Format	
2	3	Pipette number (1..84)	Number	XX
7	19	Patient identification text	Text	AAAAAAAAAAAAA
21	23	The ESR value 60 minute method	Text	NNN
If error is detected				
21	23	E and an error number (see table for number translation)	Text	[sp]EN

Data consists, if 30 min. method is switched to ON				
Position		Description	Format	
2	3	Pipette number (1..84)	Number	XX
7	19	Patient identification text	Text	AAAAAAAAAAAAA
21	23	The ESR value convert to 60 minute method	Text	NNN

If error is detected				
21	23	E and an error number (see table for number translation)	Text	[sp]EN

Text.: left aligned followed by spaces (ASCII $20).
xx….: number made up of (xx...) digits 0 9 (ASCII $30 $39)
Leading zeros and non-specified positions are filled with spaces (ASCII $20).

The following error codes are defined:		
EN		
E1	No cells / plasma found	ERROR
E2	ESR Probably >140 mm	ERROR
E3	Too many borders found	ERROR
E7	Limit error	ERROR

Note:
If the Compact is switch to the 30 min method the output string has the same format. The Compact automatics apply the conversion table to the 60-minute method.
If temperature correction is switched on the ESR value will be the temperature corrected ESR value.

Appendix - Protocol MECHATRONICS-01 bidirectional

MECHATRONICS_01 request / workorder record

1	2..126	127	128
STX	Data (125 characters)	**CS**	**ETX**

Position	Data field	# of Bytes	Format	Comment
1	Start of text	1	[STX]	
2	Text distinction code	8	"ESRSR"	Left aligned followed by spaces
10	Instrument ID	20	text	If applicable
30	Sample ID	40	text	
70	Reserved (spaces)	55	text	
125	Request / workorder	1	text	**"R"** = Request; **"Y"** = ESR yes; **"N"** = ESR no
126	Space	1	text	
127	Checksum	1	[CS]	See section Checksum calculation
128	End of text	1	[ETX]	
	Total	**128**		

Text.: left aligned followed by spaces

xx….: number (digits 0-9) with leading spaces

Non-specified positions are filled with spaces

Request record from analyzer to LIMS: Request (capital R on position 125)					
STX	Data	**"R"**	space	CS	ETX
Workorder record from LIMS to analyzer: ESR = Yes (capital Y on position 125)					
STX	Data	**"Y"**	space	CS	ETX
ESR = No (capital N on position 125)					
STX	Data	**"N"**	space	CS	ETX

MECHATRONICS result record

1	2..254	255	256
STX	Data (253 characters)	**CS**	**ETX**

Position	Data field	# of Bytes	Format	Comment
1	Start of text	1	[STX]	
2	Text distinction code	8	"ESRRE"	Left aligned followed by spaces
10	Instrument ID	20	text	If applicable
30	Sample ID	40	text	
70	Reserved (spaces)	15	text	
85	Aspiration date	10	ddmmyyyy	Text format. E.g. 01012010 = January 1, 2010

95	Aspiration time	5	hhmm	Text format. E.g. 0001 = 0:01 (24-hour clock)
100	E.S.R. 30 minutes (mm/½h)	5	xxxxx	
105	E.S.R. in mm. 60 minute (mm/h)	5	xxxxx	
110	E.S.R. 60 minutes temperature corrected (mm/h)	5	xxxxx	
115	E.S.R. 120 minutes (mm/h)	5	xxxxx	If applicable
120	Reserved (spaces)	10	text	
130	Sample code	5	xxxxx	See section Sample codes
135	Aspect code	5	xxxxx	See section Aspect codes
140	Manually added code	5	xxxxx	
145	Pipette number	5	xxxxx	
150	Sedimentation time (minutes)	5	xxxxx	
155	Temperature	5	xxxxx	
160	Dilution rate (%)	5	xxxxx	
165	Column height (mm)	5	xxxxx	
170	Error code	5	xxxxx	See section ESR error codes
175	Limit error message (results)	30	text	See section ***Limit error message*** (on page 156)
205	Reserved (spaces)	50	text	
255	Checksum	1	[CS]	See section Checksum calculation
256	End of text	1	[ETX]	
	Total	**256**		

Text.: left aligned followed by spaces

xx….: number (digits 0-9) with leading spaces

Non-specified positions are filled with spaces

Sample codes		Aspect codes	
Sample type	**Transmitted code**	**Aspect**	**Transmitted code**
Patient sample	0	Clear	0
QC normal	1	Hazy<10	1
QC abnormal	2	Hazy<25	2
		Hazy>25	3

Note: Transmission of QC codes 1 and 2 is part of the internal QC procedure.

ESR error codes		
ESR error	**Transmitted code**	**Comment**
No errors	0	
No cells/plasma found	1	ERROR, no result transmitted!
ESR Probably > 140 mm	2	ERROR, no result transmitted!
Too many borders found	3	ERROR, no result transmitted!
Column height	4	WARNING!
Measure error	5	WARNING!
Bubbles on top	6	WARNING!
Limit error	7	ERROR, see ***Limit error messages*** (on page 156)

Note: See analyzer manual for more information about limit error settings!

When a limit error occurs, the fields for *ESR 30 min, ESR 60 min, temperature corrected ESR* and *ESR 120 min* are filled with spaces and thus results are not send to LIMS.

Together with the other data fields, e.g. the sedimentation time, the operator can see what caused the error and may or may not use the ESR values which are preserved in the limit error message.

Description of the limit error message: **L_err(hhh www ttt ccc ddd)**

- **L_err** means "limit error"
- **hhh** is the 30 minutes ESR
- **www** is the 60 minute ESR
- **ttt** is the temperature corrected 60 minute ESR
- **ccc** is the column height
- **ddd** is the 120 minute ESR (if applicable)

Example of a limit error message without 30 minute ESR and 120 minute ESR:
L_err(--- 123 89 200 ---)

Appendix - Protocol MECHATRONICS-02 unidirectional

1	2..254	255	256
STX	Data (253 characters)	**CS**	**ETX**

Position	Data field	# of Bytes	Format	Comment
1	Start of text	1	[STX]	
2	Text distinction code	8	"ESRRE"	Left aligned followed by spaces
10	Instrument ID	20	text	If applicable
30	Sample ID	40	text	
70	Reserved (spaces)	15	text	
85	Aspiration date	10	ddmmyyyy	Text format. E.g. 01012010 = January 1, 2010
95	Aspiration time	5	hhmm	Text format. E.g. 0001 = 0:01 (24-hour clock)
100	E.S.R. 30 minutes (mm/½h)	5	xxxxx	
105	E.S.R. in mm. 60 minute (mm/h)	5	xxxxx	
110	E.S.R. 60 minutes temperature corrected (mm/h)	5	xxxxx	
115	E.S.R. 120 minutes (mm/h)	5	xxxxx	If applicable
120	Reserved (spaces)	10	text	
130	Sample code	5	xxxxx	See section Sample codes
135	Aspect code	5	xxxxx	See section Aspect codes
140	Manually added code	5	xxxxx	

145	Pipette number	5	xxxxx	
150	Sedimentation time (minutes)	5	xxxxx	
155	Temperature	5	xxxxx	
160	Dilution rate (%)	5	xxxxx	
165	Column height (mm)	5	xxxxx	
170	Error code	5	xxxxx	See section ESR error codes
175	Limit error message (results)	30	text	See section ***Limit error message*** (on page 156)
205	Reserved (spaces)	50	text	
255	Checksum	1	[CS]	See section Checksum calculation
256	End of text	1	[ETX]	
	Total	**256**		

Text.: left aligned followed by spaces

xx….: number (digits 0-9) with leading spaces

Non-specified positions are filled with spaces

Sample codes		**Aspect codes**	
Sample type	**Transmitted code**	**Aspect**	**Transmitted code**
Patient sample	0	Clear	0
QC normal	1	Hazy<10	1
QC abnormal	2	Hazy<25	2
		Hazy>25	3

Note: Transmission of QC codes 1 and 2 is part of the internal QC procedure.

ESR error codes		
ESR error	**Transmitted code**	**Comment**
No errors	0	
No cells/plasma found	1	ERROR, no result transmitted!
ESR Probably > 140 mm	2	ERROR, no result transmitted!
Too many borders found	3	ERROR, no result transmitted!
Column height	4	WARNING!
Measure error	5	WARNING!
Bubbles on top	6	WARNING!
Limit error	7	ERROR, see ***Limit error messages*** (on page 156)

Note: See analyzer manual for more information about limit error settings!

When a limit error occurs, the fields for *ESR 30 min, ESR 60 min, temperature corrected ESR* and *ESR 120 min* are filled with spaces and thus results are not send to LIMS.

Together with the other data fields, e.g. the sedimentation time, the operator can see what caused the error and may or may not use the ESR values which are preserved in the limit error message.

Description of the limit error message: **L_err(hhh www ttt ccc ddd)**

- **L_err** means "limit error"
- **hhh** is the 30 minutes ESR

- **www** is the 60 minute ESR
- **ttt** is the temperature corrected 60 minute ESR
- **ccc** is the column height
- **ddd** is the 120 minute ESR (if applicable)

Example of a limit error message without 30 minute ESR and 120 minute ESR:
L_err(--- 123 89 200 ---)

CS = Checksum, XOR sum off all the data (with the exception of CS, STX, and ETX).
E.g.: CS = ((byte2 XOR byte3) XOR byte 4) XOR….etc.

Note: Cannot be equal to that of the ETX byte (03h).

The CS byte verifies the accuracy of each transmitted message. Before transmission, the value of the CS byte is calculated by the “exclusive-or’ing” of all data bytes in the message, with the exception of CS, STX, and ETX. Since the CS byte precedes the ETX byte within the data stream, the calculated value for CS cannot be equal to that of the ETX byte (03h). Therefore, if the calculated CS value is 03h, the transmitted CS byte is set to the substitute value 83h in order to avoid erroneous action by the receiving device.

Appendix - Protocol Compact bidirectional

Bidirectional protocol definition of the sample request string from the InteRRliner V8 to the Host computer Positions in the string.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

ESR Sample request string definition from InteRRliner V8 to host computer.

STX	**SP**	**E**	**S**	**R**	**S**	**R**	**SP**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	**SP**	**R**	**SP**	**cs**	**ETX**

Definition of the string:

STX and ETX are at fixed position, first (1) and last (31th) position respectively.

SP	Space character ($20)
E	Capital letter E
S	Capital letter S
R	Capital letter R
1…18	Position of the sample identification (left adjusted) and filled up with spaces at the end of the string
cs	Checksum, one char ($00 .. $FF) that is the EXOR sum of all the data. Data = The position from position 2 up to and including position 29. Take position 2 and position 3 and EXOR those 2. Take the result and EXOR this with position 3 ect till the position 29.
R	At position 28, means that this is the Request string
STX	Char $02
ETX	Char $03

Sample conformation string definition, replied by the host computer to perform an ESR test.

STX	SP	E	S	R	S	R	SP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	SP	**Y**	SP	cs	ETX

Y = Capital Y at position 28 of the string.

Sample refuse string definition, replied by the host computer to skip the ESR test.

STX	SP	E	S	R	S	R	SP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	SP	**N**	SP	cs	ETX

N = Capital N at position 28 of the string.

If either the host computer as well the InteRRliner V8 receives a string it should reply by sending an Acknowledge (char $06) if the string is found okay.
If either the host computer as well the InteRRliner V8 receives a string it should reply by sending a Non Acknowledge (char $15) if the string is found faulty.

Sample request:

Checksum = always ON

After sending the request string, the InteRRliner V8 expects a ACK/NACK (seeCompact bi-directional protocol definition) from the Host-computer:

- If the InteRRliner V8 receives an ACK it will wait for the conformation string and respond with a ACK/NACK according to the protocol definition.
  - When the conformation string is received it will:
    Respond with an ACK if the conformation string is OK and goes to the next sample.

- Or -

- When the string is not OK it is responding with an NACK and the Host-computer must send the conformation string again.
  After 3 attempts the Host-computer must stop sending the conformation string and the InteRRliner V8 won't do an ESR on this sample and goes to the next sample.
  The Host-computer needs to be ready for the request string of the next sample!

- If the InteRRliner V8 does not receive the conformation string within 10 seconds it will send the request string again. After 3 attempts it won't do an ESR on this sample and goes to the next sample.
- If the InteRRliner V8 receives a NACK it will send the request string again.
  After 3 attempts it will stop communication and generate an error.
- If the InteRRliner V8 does not get any response, (timeout 10 sec.) it will send the request string again.
  After 3 attempts it will stop communication and generate an error.

Request string example:

Sample ID = 123456789
Request string = ..ESRSR.123456789..........R...(31 bytes)

Sample result:

- Checksum ON/OFF = user defined
- 30 minute output ON/OFF = user defined

The sample result will be output according to the standard Compact/StaRRsed ESR string (See String format for StaRRsed) . If the host computer receives the result string it should reply by sending an ACK or a NACK:

- If the InteRRliner V8 receives an ACK it will start sending the next result.
- If the InteRRliner V8 receives a NACK it will send the result string again.
  After 3 attempts it will start sending the next result.
- If the InteRRliner V8 does not get any response from the host, (timeout 10 sec) it will send the result string again.
  After 3 attempts it will stop communication and generate an error.

Appendix - Protocol Opus bidirectional

Bidirectional protocol definition of the sample request string from the InteRRliner V8 to the Host computer Positions in the string.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

ESR Sample request string definition from InteRRliner V8 to host computer.

STX	**SP**	**E**	**S**	**R**	**S**	**R**	**SP**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	**SP**	**R**	**SP**	**cs**	**ETX**

Definition of the string:

STX and ETX are at fixed position, first (1) and last (31th) position respectively.

SP	Space character ($20)
E	Capital letter E
S	Capital letter S
R	Capital letter R
1…18	Position of the sample identification (left adjusted) and filled up with spaces at the end of the string
cs	Checksum, one char ($00 .. $FF) =((EXOR sum off all the data) OR 128).
R	At position 28, means that this is the Request string
STX	Char $02
ETX	Char $03

Sample conformation string definition, replied by the host computer to perform an ESR test.

STX	SP	E	S	R	S	R	SP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	SP	**Y**	SP	cs	ETX

Y = Capital Y at position 28 of the string.

Sample refuse string definition, replied by the host computer to skip the ESR test.

STX	SP	E	S	R	S	R	SP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	SP	**箕**	SP	cs	ETX

N = Capital N at position 28 of the string.

If either the host computer as well the InteRRliner V8 receives a string it should reply by sending an Acknowledge (char $06) if the string is found okay.
If either the host computer as well the InteRRliner V8 receives a string it should reply by sending a Non Acknowledge (char $15) if the string is found faulty.

Checksum ON/OFF = always ON

After sending the request string, the InteRRliner V8 expects a ACK/NACK (see Opus protocol request string) from the Host-computer:

- If the InteRRliner V8 receives an ACK it will wait for the conformation string and respond with a ACK/NACK according to the protocol definition.
  - When the conformation string is received it will:
    Respond with an ACK if the conformation string is OK and goes to the next sample.

  - Or -

  - When the string is not OK it is responding with an NACK and the Host-computer must send the conformation string again.
    After 3 attempts the Host-computer must stop sending the conformation string and the InteRRliner V8 won't do an ESR on this sample and goes to the next sample.
    The Host-computer needs to be ready for the request string of the next sample!

- If the InteRRliner V8 does not receive the conformation string within 10 seconds it will send the request string again. After 3 attempts it won't do an ESR on this sample and goes to the next sample.
- If the InteRRliner V8 receives a NACK it will send the request string again.
  After 3 attempts it will stop communication and generate an error.
- If the InteRRliner V8 does not get any response, (timeout 10 sec.) it will send the request string again.
  After 3 attempts it will stop communication and generate an error.

Request string example:

Sample ID = 123456789
Request string = ..ESRSR.123456789..........R...(31 bytes)

Sample result:

- Checksum ON/OFF = user defined
- 30 minute output ON/OFF = user defined

The sample result will be output according to the standard Compact/StaRRsed ESR string (See String format for StaRRsed) . If the host computer receives the result string it should reply by sending an ACK or a NACK:

- If the InteRRliner V8 receives an ACK it will start sending the next result.
- If the InteRRliner V8 receives a NACK it will send the result string again.
  After 3 attempts it will start sending the next result.
- If the InteRRliner V8 does not get any response from the host, (timeout 10 sec) it will send the result string again.
  After 3 attempts it will stop communication and generate an error.

OPUS string format

```
[stx]PPPPPPPPPP www WWW AAAAAAAAmm ppp TTT CC EEEEEEEEEEEEEEEEEEEEEE MMMMMMMMMM[cr][lf][eot]
```

stx	80 data characters	cr	lf	eot			Checksum - OFF	60 min
stx	80 data characters	cr	lf	etx	cs	eot	Checksum - ON	60 min

Data consists, if 30 min. output is switched to OFF				
Position		Description	Format	
1	10	Patient identification text	Text	PPPPPPPPPP
13	15	E.S.R. in mm. 60 minute	xxx	www
18	20	E.S.R. in mm. (60 min corrected for temp)	xxx	WWW
22	30	Aspect	Text	AAAAAAAAA
31	32	Manually added code	xx	mm
34	36	Pipette number	xxx	ppp
39	41	Sedimentation time	xxx	TTT
45	46	Temperature in degree. (Default C.)	xx	CC
48	69	Error messages	Text	EEEEEEEEEEEEEEEEEEEEEE
71	80	EDTA message	Text	MMMMMMMMMM

CS = 1 byte checksum = 256 - (modulo 256 (ASCII string sum)) OR 128).
ASCII string sum = the ASCII sum of all preceding characters incl. stx, cr, lf and ext modulo 256 (ASCII string sum) = the remainder of the ASCII string sum when divided by 256. OR 128 = setting the MSB-bit to 1.

OPUS string format

```
[stx]PPPPPPPPPP hhh www WWW AAAAAAAAAmm ppp TTT CC EEEEEEEEEEEEEEEEEEEEEE MMMMMMMMMM[cr][lf][eot]
```

stx	80 data characters	cr	lf	eot			Checksum - OFF	30 min
stx	80 data characters	cr	lf	etx	cs	eot	Checksum - ON	30 min

Data consists, if 30 min. output is switched to ON				
Position		Description	Format	
1	10	Patient identification text	Text	PPPPPPPPPP
12	14	E.S.R. in mm. Half hour method	xxx	hhh
16	18	E.S.R. in mm. (calculated to 60 minutes)	xxx	www
20	22	E.S.R. in mm. (60 min corrected for temp)	xxx	WWW
24	32	Aspect	Text	AAAAAAAAA
33	34	Manually added code	xx	mm
37	39	Pipette number	xxx	ppp
41	43	Sedimentation time	xxx	TTT
45	46	Temperature in degree. (Default C.)	xx	CC
48	69	Error messages	Text	EEEEEEEEEEEEEEEEEEEEEE
71	80	EDTA message	Text	MMMMMMMMMM

Where	ASCII	HEX	DEC
STX	ASCII	$02	02
ETX	ASCII	$03	03
EOT	ASCII	$04	04
LF	ASCII	$0A	10
CR	ASCII	$0D	13
CS	1 byte		

Text.: left aligned followed by spaces (ASCII $20).
xx….: number made up of (xx...) digits 0 9 (ASCIII $30 $39) with leading zeros.
Leading zeros and non-specified positions are filled with spaces (ASCII $20).

Appendix - Sysmex R-3500 Protocol

R-3500 sample data record format (202 bytes)
This is a modified data record coming from a R-3500.

Sample data record format (202 bytes)			
Parameter	**# Of chars**	**Example**	**Comment**
Text distinction code I	1	"D"	
Text distinction code II	1	"1"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Instrument ID number	9		ID number from compact
Analysis information	1	0	n.a.
Reserved	18	0	n.a.
RET%	5	12300	Esr value = 123
RET#	5	00200	Hazy code = 2
RBC	5	00200	Error code = 2
IRF	5	01200	Temperature in degr. Celsius = 12 degr.
LFR	5	01200	Sedimentation time in minutes = 12 min.
MFR	5	10100	Dilution rate = 101
HFR	5	12300	30 minute ESR value = 123
Reserved	105	0000…	n.a.

n.a. = not applicable

R3500 Sample data flag record format (131 bytes)

Parameter	**# Of**	**Example**	**Comment**

	chars		
Text distinction code I	1	"D"	
Text distinction code II	1	"B"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Flags	97	0	n.a.

R3500 Inquiry data record format (21 bytes)

Parameter	# Of chars	Example	Comment
Text distinction code I	1	"R"	
Inquiry mode	1	1	Real time inquiry
Sample ID no.	13		Patient number (same as sample data)
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	03	Tube position in rack = 3

R-3500 order information record format (156 bytes)

Parameter	# of chars	Example	Comment
Text distinction code I	1	"S"	
Information status	1	0	0 = sample does not exist 1 = sample exists
Date ordered	8	"yyyymmdd"	
Sample ID no.	13		Must be the same as inquiry record
Rack no.	4		
Tube position no.	2		
Inquiry mode	1		
Patient ID no.	13		

Patient name	25		
Sex	1		
Patient birthday	8	"yyyymmdd"	
Doctor name	15		
Ward	8		
Patient comments	20		
Reserved	20		
RET%	1	0	Esrflag: 0 = ESR no 1 = ESR yes
Reserved	15		

Compact "HAZY" code messages.
The code appears in the "sample data record" at variable 'RBC'

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.
1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.

Compact "ERROR" code messages
This code appears in the "sample data record" at variable 'HGB'.

The following 7 codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.
2	ESR Probably > 140 mm	Error	Extremely high ESR value.
3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).

7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

Appendix - Sysmex R-3500 unidirectional protocol

R-3500 sample data record format (202 bytes)
This is a modified data record coming from a R-3500.

Sample data record format (202 bytes)			
Parameter	**# Of chars**	**Example**	**Comment**
Text distinction code I	1	"D"	
Text distinction code II	1	"1"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Instrument ID number	9		ID number from compact
Analysis information	1	0	n.a.

Reserved	18	0	n.a.
RET%	5	12300	Esr value = 123
RET#	5	00200	Hazy code = 2
RBC	5	00200	Error code = 2
IRF	5	01200	Temperature in degr. Celsius = 12 degr.
LFR	5	01200	Sedimentation time in minutes = 12 min.
MFR	5	10100	Dilution rate = 101
HFR	5	12300	30 minute ESR value = 123
Reserved	105	0000…	n.a.

n.a. = not applicable

R-3500 Sample data flag record format (131 bytes)

Parameter	**# Of chars**	**Example**	**Comment**
Text distinction code I	1	"D"	
Text distinction code II	1	"B"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234

Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Flags	97	0	n.a.

Compact "HAZY" code messages.
The code appears in the "sample data record" at variable 'RBC'

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.
1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.Compact "ERROR" code messages
This code appears in the "sample data record" at variable 'HGB'.

The following 7 codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.
2	ESR Probably > 140 mm	Error	Extremely high ESR value.

3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).
7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

Appendix - Protocol Sysmex R-3500 EPU

R-3500 sample data record format (202 bytes)
This is a modified data record coming from a R-3500.

Sample data record format (202 bytes)			
Parameter	**# Of chars**	**Example**	**Comment**
Text distinction code I	1	"D"	
Text distinction code II	1	"1"	
Sample distinction code	1	"U"	
Measurement data	8	05092014	Format = ddmmyyyy
Measurement time	6	084626	Format = hhmmss
Rack no	6	001234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Inquiry mode	1	1	Barcode from barcode label
Sample ID number	20		Patient number
Reserved	10		n.a.
IP Messages	6		n.a.
ESR 60 MINUTES	6	000123	ESR value = 123
HAZY CODE	5	00001	Hazy code = 1
ERROR CODE	5	00001	Error code = 2
TEMPERATURE	5	00018	Temperature in degr. Celsius = 18 degr.
SEDIMENTATION TIME	5	00030	Sedimentation time in minutes = 30 min.
DILUTION RATE	5	00101	Dilution rate = 101
ESR 30 MINUTES	5	00123	ESR value = 123
Reserved	10		n.a.
Aspiration date	8		Format = ddmmyyyy
Aspiration time	6		Format = hhmmss
Reserved	80	00..	n.a.

n.a. = not applicable

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.
1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.

Compact "ERROR" code messages
The following 7 codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.
2	ESR Probably > 140 mm	Error	Extremely high ESR value.
3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).
7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

Appendix - Sysmex SE9000 protocol

SE9000 Sample data record format (234 bytes)
This is a modified data record from SE9000 without instrument ID

Sample data record format (234 bytes)			
Parameter	**# of chars**	**Example**	**Comment**
Text distinction code I	1	"D"	
Text distinction code II	1	"1"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Analysis information	1	0	n.a.
NEG/POS/ERR information	1	0	n.a.
POSITIVE (diff.)	1	0	n.a.
POSITIVE (morph.)	1	0	n.a.
POSITIVE (count)	1	0	n.a.
ERROR (func.)	1	0	n.a.
ERROR (result)	1	0	n.a.
Order information	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
IP message information	6	000000	n.a.
WBC	6	123000	Esr value = 123 mm

RBC	5	102000	Hazy code = 12
HGB	5	00200	Error code = 2
HCT	5	01200	Temperature in degr. Celsius i.e. 12 degr.
MCV	5	01200	Sedimentation time in minutes i.e. 12 min
MCH	5	10100	Dilution rate = 101
MCHC	5	12300	30 minute ESR value = 123
Reserved	145	0000…	n.a.

n.a. = Not applicable

SE 9000 Sample data flag record format (131 bytes)

Parameter	# Of chars	Example	Comment
Text distinction code I	1	"D"	
Text distinction code II	1	"B"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Flags	97	0	n.a.

SE9000 Inquiry data record format (21 bytes)

Parameter	# Of chars	Example	Comment
Text distinction code I	1	"R"	
Inquiry mode	1	1	Real time inquiry
Sample ID no.	13		Patient number (same as sample data)
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	03	Tube position in rack = 3

SE9000 order information record format (171 bytes)

Parameter	# of chars	Example	Comment
Text distinction code I	1	"S"	
Information status	1	0	0 = sample does not exist 1 = sample exists
Date ordered	8	"yyyymmdd"	
Sample ID no.	13		Must be the same as inquiry record
Rack no.	4		
Tube position no.	2		
Inquiry mode	1		
Patient ID no.	13		
Patient name	25		
Sex	1		
Patient birthday	8	"yyyymmdd"	
Doctor name	15		
Ward	8		
Sample comments	40		
Wbc	1	0	Esrflag: 0 = ESR no 1 = ESR yes
Reserved	30		

Compact "HAZY" code messages.
The code appears in the "sample data record" at variable 'RBC'

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.
1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.Compact "ERROR" code messages
This code appears in the "sample data record" at variable 'HGB'.

The following 7 codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.

2	ESR Probably > 140 mm	Error	Extremely high ESR value.
3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).
7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

Appendix - Protocol Sysmex SE-9000 unidirectional

SE9000 Sample data record format (234 bytes)
This is a modified data record from SE9000 without instrument ID

Sample data record format (234 bytes)			
Parameter	**# of chars**	**Example**	**Comment**
Text distinction code I	1	"D"	
Text distinction code II	1	"1"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Analysis information	1	0	n.a.
NEG/POS/ERR information	1	0	n.a.
POSITIVE (diff.)	1	0	n.a.

POSITIVE (morph.)	1	0	n.a.
POSITIVE (count)	1	0	n.a.
ERROR (func.)	1	0	n.a.
ERROR (result)	1	0	n.a.
Order information	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
IP message information	6	000000	n.a.
WBC	6	123000	Esr value = 123 mm
RBC	5	102000	Hazy code = 12
HGB	5	00200	Error code = 2
HCT	5	01200	Temperature in degr. Celsius i.e. 12 degr.
MCV	5	01200	Sedimentation time in minutes i.e. 12 min
MCH	5	10100	Dilution rate = 101
MCHC	5	12300	30 minute ESR value = 123
Reserved	145	0000…	n.a.

n.a. = Not applicable

SE9000 Sample data flag record format (131 bytes)

Parameter	# Of chars	Example	Comment
Text distinction code I	1	"D"	
Text distinction code II	1	"B"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Flags	97	0	n.a.

Compact "HAZY" code messages.
The code appears in the "sample data record" at variable 'RBC'

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.

1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.Compact "ERROR" code messages
This code appears in the "sample data record" at variable 'HGB'.

The following 7 codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.
2	ESR Probably > 140 mm	Error	Extremely high ESR value.
3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).

7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

Appendix - TDLIMS protocol

Tdlims sample data record format (234 bytes)
This is a modified data record coming from a SE9000 with instrument ID.

Sample data record format (234 bytes)			
Parameter	**# of chars**	**Example**	**Comment**
Text distinction code I	1	"D"	
Text distinction code II	1	"1"	
Sample distinction code	1	"U"	
Day	2	23	Day 23
Month	2	03	Month 3 = march
Year	2	00	Year 00 = 2000
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	05	Tube position in rack = 5
Sequence no.	5	00000	n.a.
ID information	1	4	Barcode from barcode label
Sample ID number	13		Patient number
Analysis information	1	0	n.a.
NEG/POS/ERR information	1	0	n.a.
POSITIVE (diff.)	1	0	n.a.
POSITIVE (morph.)	1	0	n.a.
POSITIVE (count)	1	0	n.a.
ERROR (func.)	1	0	n.a.
ERROR (result)	1	0	n.a.
Order information	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
Reserve	1	0	n.a.
IP message information	6	000000	n.a.
WBC	6	123000	Esr value = 123 mm
RBC	5	102000	Hazy code = 12
HGB	5	00200	Error code = 2
HCT	5	01200	Temperature in degr. Celsius i.e. 12 degr.

MCV	5	01200	Sedimentation time in minutes i.e. 12 min
MCH	5	10100	Dilution rate = 101
MCHC	5	12300	30 minute ESR value = 123
Reserved	145	0000…	n.a.

n.a. = Not applicable

No Sample data flag record format.
This protocol contains no sample flag record.

Tdlims Inquiry data record format (21 bytes)

Parameter	# Of chars	Example	Comment
Text distinction code I	1	"R"	
Inquiry mode	1	1	Real time inquiry
Sample ID no.	13		Patient number (same as sample data)
Rack no.	4	1234	Rack number = 1234
Tube position no.	2	03	Tube position in rack = 3

Tdlims order information record format (171 bytes)

Parameter	# of chars	Example	Comment
Text distinction code I	1	"S"	
Information status	1	0	0 = sample does not exist 1 = sample exists
Date ordered	8	"yyyymmdd"	
Sample ID no.	13		Must be the same as inquiry record
Rack no.	4		
Tube position no.	2		
Inquiry mode	1		
Patient ID no.	13		
Patient name	25		
Sex	1		
Patient birthday	8	"yyyymmdd"	
Doctor name	15		
Ward	8		

Sample comments	40		
Wbc	1	0	Esrflag: 0 = ESR no 1 = ESR yes
Reserved	30		

Compact "HAZY" code messages.
The code appears in the "sample data record" at variable 'RBC'

This code appears in the "sample data record" at column 5.

The following 4 codes are defined:

0	Sample is clear.
1	Sample is Hazy < 10
2	Sample is Hazy < 25
3	Sample is Hazy > 25

Results with hazy aspect can be suppressed in the menu Limit error settings.

Compact "ERROR" code messages.
This code appears in the "sample data record" at variable 'HGB'.

The following 7 codes are defined:

0	No errors		
1	No cells/plasma found	Error	No contents could be detected in the pipette.
2	ESR Probably > 140 mm	Error	Extremely high ESR value.
3	Too many borders found	Error	More than three borders found, possibly air bubbles. See Section Trouble shooting ***Air bubbles*** (on page 183).
4	Column height <nnn>	Warning	Column height must be between 180 and 210mm. <nnn> = the actual column height.
5	Measure error	Warning	The down count is not equal to the up count from the measure head.
6	Bubbles on top	Warning	Air bubbles on top of the ESR. See Section Trouble shooting ***Air bubbles*** (on page 183).

7	Limit error	Error	One of the following limits are out of the setting range: • ESR Time • Column height • Dilution • Bubbles on top • Hazy aspect • Temperature

18. WORK INSTRUCTION INTERRLINER V8

Work instruction section

Work instruction Number 162	
Page 1 of 1	**Purpose:** Change Rinse pump tube
Safety: None Bio Hazard area	
Instrument: Compact	**Revision:** 001,October 2012

New rinse pump tube assembly **ESRI090902**.

New tube replacement:

1. Open left cover.
2. Pull pump tube slightly downwards and at the same time towards the front of the unit to release the tube out of the pump plate holder.
3. Remove the old tube from the peristaltic pump rotor.
4. Disconnect the tubing at both ends of the tube connectors.
5. Connect new tubing to both ends of the connectors.
6. Place one end of the tube in the pump plate holder.
7. Pull the new tube over the peristaltic pump rotor.
8. Pull pump tube slightly downwards and at the same time towards the back of the InteRRliner V8.

Work instruction Number 163	
Page 1 of 1	**Purpose:** Change Saline pump tube
Safety: None Bio Hazard area	
Instrument: Compact	**Revision:** 001,October 2012

New saline pump tube assembly **ESRI090903**

New tube replacement:

1. Open left cover.
2. Pull pump tube slightly downwards and at the same time towards the front of the unit to release the tube out of the pump plate holder.
3. Remove the old tube from the peristaltic pump rotor.
4. Disconnect the tubing at both ends of the tube connectors.
5. Connect new tubing to both ends of the connectors.
6. Place one end of the tube in the pump plate holder.
7. Pull the new tube over the peristaltic pump rotor.
8. Pull pump tube slightly downwards and at the same time towards the back of the InteRRliner V8.

Work instruction Number 166	
Page 1 of 2	**Purpose:** Peristaltic waste pump cassette replacement
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** Draft,October 2008

Clean Waste Cassette

The waste system must be cleaned before replacing the waste pump cassette.

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Remove bacterial HEPA filter.
5. Fill waste separator with 100ml disinfectant or 100 ml water with 2% bleach.
6. Replace bacterial HEPA filter.
7. Lift left cover.
8. Lift stainless steel vacuum tube up.
9. Insert the liquid separator sliding it over the support shelf.
10. Push the liquid separator towards the rear, with the sensor connectors in the holes.
11. Release the stainless steel vacuum tube.
12. Replace the waste container.
13. Close left cover.

Prime Saline

1. Select PRIME SALINE. Repeat the prime saline until the liquid separator is empty.

Exchange Waste Cassette and blotting washer

1. Disconnect the two tubes from the waste pump cassette.
2. Press levers (at three o'clock and nine o'clock positions) and pull at the same time.
3. Clean peristaltic pump motor shaft using a tissue soaked in alcohol.
4. Remove the old blotting washer **ESRI090026** around the motor shaft.
5. Place the new blotting washer **ESRI090026**.
6. Insert new waste pump cassette **ESRI090921** until it clicks into place.
7. Remove the protection caps on from the tubes.
8. Connect the two tubes to new waste pump cassette.

Work instruction Number 168	
Page 1 of 1	**Purpose:** Pipette handling valve
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** Version 1, October 2008

Remove of the top cover

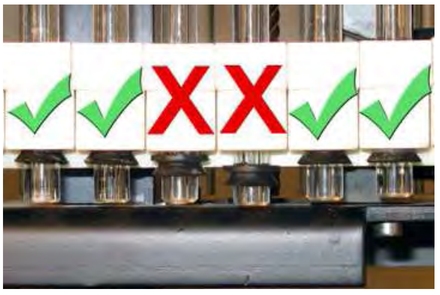
1. Switch InteRRliner V8 **OFF**.
2. Remove the two rear screws of the top cover.
3. Lift the top cover carefully from the instrument.

Pipette valve check or replacement:

1. Hold the top pipette clamp and remove the valve body QTST040002
2. Clean or replace the valve body.
3. Check the silicon tube position inside the pipette clamp, it must be in the centre of the hole and equidistant from the sides.
4. Re-install pipette valve body.

Pipette installation

1. Hook pipette assembly on to the pipette belts.
2. Make sure that pipettes are correctly fitted on to the pipette belts.
3. Visually check if all pipette valves are at the same height.
4. Visually check the bottom of the pipette V shape ring.
5. Incorrect fitted pipettes may cause **mechanical damage** to the instrument.
6. Check for leakage with **Fill & Clean**.



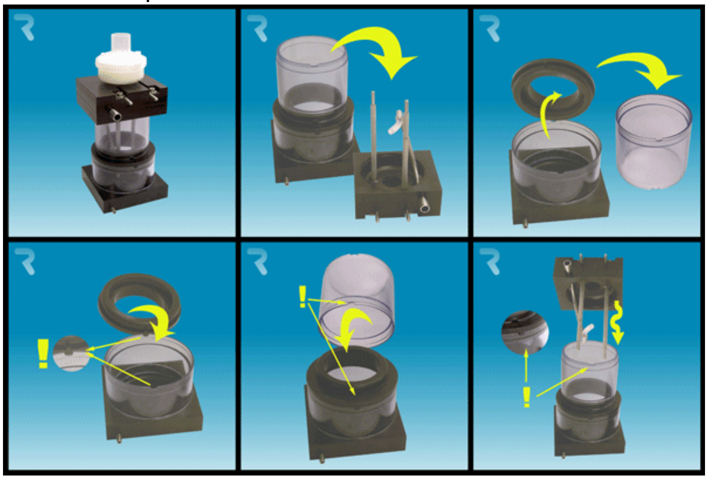
Replace the top cover:

1. Put the cover carefully over the instrument.
2. Fasten the two rear screws of the top cover. (If present/if needed).

Work instruction Number 169	
Page 1 of 3	**Purpose:**Cleaning liquid separator
Safety: *Bio Hazard area*	
Instrument: Compact:	**Revision:** Draft, October 2001

Prepare disinfectant: (if not already prepared).
Add **10 ml** bleach (sodium hypochlorite) to **190 ml** de-ionized water. **(5% solution)**
This disinfectant is for cleaning of all external parts that are exposed to blood.
Clean liquid separator

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Disconnect the silicon tube from the tube connection.
5. Remove bacterial HEPA filter.
6. Open the liquid separator by pulling off the top section.
7. Clean the internal parts of the separator with disinfectant.



Replacing

1. Replace the top section.
   A little silicon grease on the rim of separator will make the assembling and adjustment easier
2. If applicable replace the bacterial HEPA filter
   (For Maintenance Level 4 exhange bacterial HEPA filter QWLV040002)
3. Re-connect the silicon tube to the bottom tube connector.
4. Lift left cover.
5. Lift stainless steel vacuum tube up.
6. Insert the liquid separator sliding it over the support shelf.
7. Push the liquid separator towards the rear, with the sensor connectors in the holes.
8. Release the stainless steel vacuum tube.
9. Replace the waste container.
10. Close left cover.

Work instruction Number 172	
Page 1 of 2	**Purpose:** Cleaning Measure sensor
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 002, February 2014

Remove of the top cover

1. Switch InteRRliner V8 **OFF**.
2. Remove the two rear screws of the top cover.
3. Lift the top cover carefully from the instrument.

If the measure sensor is out of range, the sensor must be cleaned.
In order to clean the measure sensor remove the pipette at the measuring position (complete with top and bottom clamp).
For cleaning use a cotton bud dipped in deionised water or aerosol air blower, make sure the cotton bud is just damp. Do not use any organic solvents.

Pipette removal

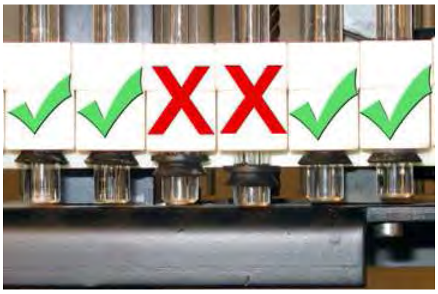
1. Push and pull vertically the pipette from the holding position of the belts.
2. Take pipette off the carousel.
3. Store the pipette on a safe place.

Switch Compact **ON**

1. Carefully clean the inner part of the measuring sensor by using a cotton bud.
2. Check the values of the Measure sensor MS 40..**50**..60 by using the CHECK MEASURE SENSOR function.

3. If not in range repeat cleaning the inner part of the measuring sensor.
4. When in range switch **OFF** the Compact.

Pipette installation



1. Hook pipette assembly on to the pipette belts.
2. Make sure that pipettes are correctly fitted on to the pipette belts.
3. Visually check if all pipette valves are at the same height.
4. Visually check the bottom of the pipette V shape ring.
5. Incorrect fitted pipettes may cause **mechanical damage** to the instrument.
6. Check for leakage with **Fill & Clean**.

Replace the top cover:

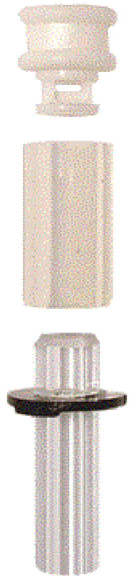
1. Put the cover carefully over the instrument.
2. Fasten the two rear screws of the top cover. (If present/if needed).

Switch **ON** the InteRRliner V8.

Pipette removal

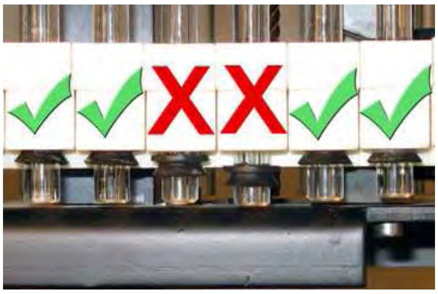
1. Push and pull vertically the pipette from the holding position of the belts.
2. Take pipette off the carousel.
3. Store the pipette on a safe place.

Re-assemble pipette



1. Re-assemble valve body ESRI 030522 and silicon valve tube ESRI 030516.
2. Insert the re-assembly in top pipette clamp.
3. Wet the top of the pipette with water. (black C-clip indicates pipette top)
4. Compress the valve body into the pipette clamp and insert the pipette into pipette clamp.
5. The black C-clip must be as close to the pipette clamp as possible!
6. The flat surface of the C-clip must be next to the pipette clamp.
7. Remove the valve body and check the silicon tube position, it must be exactly centred.
8. Fit the bottom tube clamp and V-seal ring.
9. Check the position of the valve. If incorrect, disassemble pipette valve and tube and re-assemble again.

Pipette installation



1. Hook pipette assembly on to the pipette belts.
2. Make sure that pipettes are correctly fitted on to the pipette belts.
3. Visually check if all pipette valves are at the same height.
4. Visually check the bottom of the pipette V shape ring.
5. Incorrect fitted pipettes may cause **mechanical damage** to the instrument.
6. Check for leakage with **Fill & Clean**.

Replace the top cover:

1. Put the cover carefully over the instrument.
2. Fasten the two rear screws of the top cover. (If present/if needed).

Work instruction Number 178	
Page 1 of 1	**Purpose:** Hazy problems
Safety: *Bio Hazard area*	
Instrument: InteRRliner V8	**Revision:** 002, December 2013

Prepare disinfectant:
Add **10 ml** bleach (sodium hypochlorite) to **190 ml** de-ionized water. **(5% solution)**

Cleaning the diluent system:

Step 1

1. Remove the suction-tube from the diluent bottle.
2. Place the suction tube in chlorine solution.
3. Use the [PRIME DILUENT] function. This fills the dispenser system with the disinfectant.
4. After the prime sequence stops press [PRIME DILUENT] 5 times to fill the dispenser system with the disinfectant.
5. Leave the disinfectant in the system for 15 minutes.

Step 2

1. Take the diluent suction tube out of the disinfectant.
2. Wipe the tube clean and dry with a tissue.
3. Place the diluent suction tube in hot de-ionized water (80℃).
4. Use the [PRIME DILUENT] function.
5. After the prime sequence stops press [PRIME DILUENT] 5 times to fill the dispenser system with the hot water.

Step 3

1. Clean the diluent bottle(s) with the disinfectant.
2. Rinse the diluent bottle with hot de-ionized water (80℃).
3. Rinse the diluent bottle with diluent solution.
4. Refill the diluent bottle with new diluent solution.
5. Use the [PRIME DILUENT] function.
6. After the prime sequence stops press the [PRIME DILUENT] key 5 times to fill the dispenser system with the new diluent solution.

Step 4

1. Prepare a Fill and Clean arrangement.
2. Run the fill and clean sequence. When all the pipettes are filled the needle goes back to the home position.
3. Remove the Fill and clean arrangement.

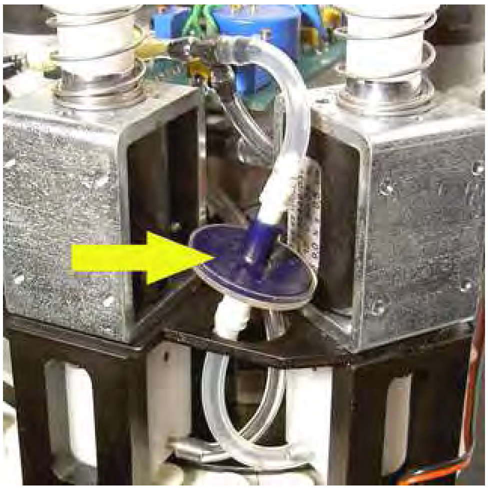
Work instruction Number 179	
Page 1 of 1	**Purpose:** Replace blue air filter
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** Draft, October 2001

Remove of the top cover

1. Switch InteRRliner V8 **OFF**.
2. Remove the two rear screws of the top cover.
3. Lift the top cover carefully from the instrument.

Air filter replacement (ESRI) QWLV0400003

1. Pull both tube connectors out of the blue filter.
2. Place new blue filter
3. Reconnect the tube connectors on the filter



Replace the top cover:

1. Put the cover carefully over the instrument.
2. Fasten the two rear screws of the top cover. (If present/if needed).

Work instruction Number 188	
Page 1 of 1	**Purpose:** Replace diluter tip
Safety: None Bio Hazard area	
Instrument: Compact	**Revision:** 001, August 2014

Replace diluter tip

1. Take the syringe from the diluter assembly.
2. Pull the plunger out of the syringe.
3. Cut the Teflon tip of the plunger with a sharp knife.
   Be careful not to damage the metal plunger.
4. Replace the O-ring and then the tip.
5. Replace the old tip for the new tip assembly. (From repair set QWLV030902)
6. Moisten the tip with water to ease the tip back into the glass syringe barrel.
7. Install the syringe back on to the attachment.

Clean dilution system

1. Perform PRIME DILUENT
2. Repeat above step until there are no air bubbles in the whole diluent system anymore.

Check dilution settings

1. Go to tab SETTINGS> GENERAL SETTINGS and select DISPLAY DILUTION OFF
2. Run 10 samples through the instrument and make a note of the dilution rate.
3. Calculate the mean of the 10 samples.
4. Make dilution adjustment if necessary in SETTINGS> DILUTER SETTINGS.
5. Go to tab SETTINGS> GENERAL SETTINGS and select DISPLAY DILUTION ON

Work instruction Number 195	
Page 1 of 1	**Purpose:** Cleaning diluent system
Safety: *Bio Hazard area*	
Instrument: InteRRliner V8	**Revision:** 003, August 2014

Step 1

1. Remove the suction-tube from the diluent bottle and empty the diluent bottle.
2. Fill the diluent bottle with 50 ml bleach (sodium hypochlorite) and 950 ml de-ionized water. (5% solution)
3. Place the suction tube in chlorine solution.
4. Use the [PRIME] function to fill the dispenser system with the disinfectant.
5. After the prime sequence stops, press [PRIME] to fill the dispenser system with the disinfectant.
6. Leave the disinfectant in the system for 15 minutes.

Step 2

1. Take the diluent suction tube out of the disinfectant.
2. Wipe the tube clean and dry with a tissue.
3. Empty the diluent bottle and refill it with hot de-ionized water (80℃).
4. Place diluent suction tube in the diluent bottle with hot water.
5. Use the [PRIME] function.
6. After the prime sequence stops, press "PRIME" again to fill the dispenser system with the hot water.

Step 3

1. Empty the diluent bottle.
2. Clean the diluent bottle with new hot de-ionized water (80℃)
3. Refill the diluent bottle with new diluent solution.
4. Perform another [PRIME] .
5. After the prime sequence stops press [PRIME] again to fill the dispenser system with the new diluent solution.

Work instruction Number 196	
Page 1 of 1	**Purpose:** Cleaning liquid separator (Version 2)
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 002, March 2013

Removing

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Disconnect the silicon tube from the tube connection on the top section.
5. Remove bacterial HEPA filter.
6. Remove and disassemble the liquid separator.

Cleaning

1. Clean all parts with hot water and a brush.
2. Use some acid free vaseline on the screw-thread of the glass jar.
3. Assemble the separator.

Replacing

1. Replace the top section.
   A little silicon grease on the rim of separator will make the assembling and adjustment easier.
2. If applicable replace the bacterial HEPA filter
   (For Maintenance Level 4: Exchange bacterial HEPA filter QWLV040002)
3. Re-connect the silicon tube to the tube connector on the top section.
4. Lift left cover.
5. Lift stainless steel vacuum tube up.
6. Insert the liquid separator sliding it over the support shelf.
7. Push the liquid separator towards the rear, with the sensor connectors in the holes.
8. Release the stainless steel vacuum tube.
9. Replace the waste container.
10. Close left cover.

Work instruction Number 199	
Page 1 of 1	**Purpose:** Maintenance level 1
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 001, January 2013

We recommend that this procedure is carried out by dealers service engineers.

The following items need to be replaced annually:

1. All tubing **ESRI079200 and additional tube set**.
2. Waste pump motor **ESRI090920.**
3. Waste pump cassette **ESRI090921**.
4. Blue Vacuum filter disc. Part no **QWLV040003**.
5. Fill block washer. Part no **ESRI030906.**
6. Waste container filter disc **QWLV040001.**(only applicable if internal waste container is used)
7. Teflon tip of syringe on the Diluter assembly.

The following items need to be checked (and replaced if needed) annually:

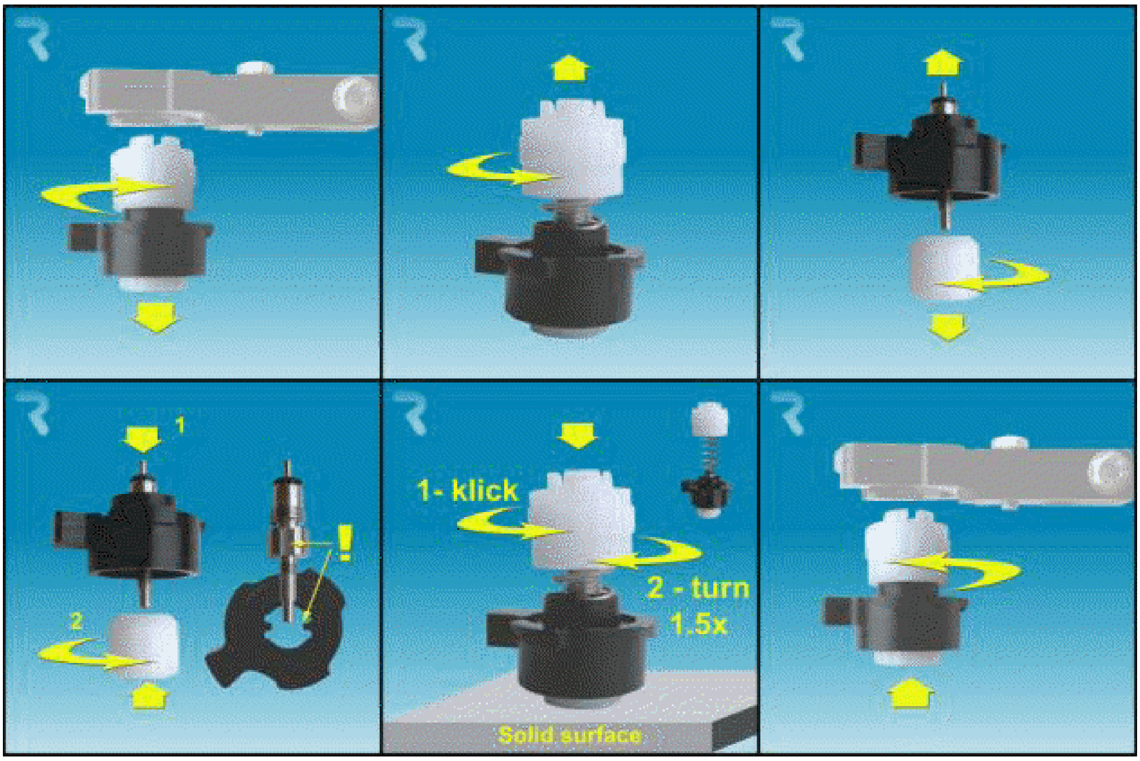
1. Outer needle and sample probe
2. Pipette valves bodies and replace if necessary (84 pieces) **QTST040001**.

Check:

1. Adjustment of fill nozzle and rinse nozzle.

Work instruction Number 201	
Page 1 of 1	**Purpose:** Disassembly and assembly of the fill nozzle
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** Draft, February 2005

Instructions for disassembling and assembling the fill nozzle



Note: For the O-ring replacing, only take the top part away from the fill nozzle.

Work instruction Number 202	
Page 1 of 1	**Purpose:** Cleaning the fill nozzle
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 001, March 2014

Disassemble the fill-nozzle:

1. Turn the holder to the right.
2. The fill-nozzle can now be removed.
3. Disconnect the silicon tube from the fill nozzle.

The use of a toothbrush and detergent is recommended.

1. Carefully scrub the fill nozzle inner part.
2. Use a tissue to dry the fill nozzle.

Assemble fill-nozzle:

1. Connect the silicon tube to the fill nozzle.
2. Put the fill nozzle into the holder.
3. Push the fill nozzle upwards and turn the holder to the left.

Work instruction Number 203	
Page 1 of 2	**Purpose:** Replace the fill nozzle O-ring
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 001, February 2013

Assemble fill-nozzle:

1. Connect the silicon tube to the fill nozzle.
2. Put the fill nozzle into the holder.
3. Push the fill nozzle upwards and turn the holder to the left.

The use of a toothbrush and detergent is recommended.

1. Carefully scrub the fill nozzle inner part.
2. Use a tissue to dry the fill nozzle.

Disassemble fill nozzle holder:

1. Turn the holder to the right.
2. The holder can now be removed

Replace O-ring:

Remove the O-ring. (**QWLV050004**)

Install new O-ring. (**QWLV050004**)

Assembly holder:

Push the head down

1. Turn the head anti clockwise till clicking sound
2. Turn the head clockwise for 1.5 turns.

Assemble fill nozzle holder:

Push the plastic top part down against the spring pressure.

1. Turn the plastic top part until you hear of feel a click
2. Turn the plastic top part clokwise for 1.5 turns.

Assemble fill-nozzle:

1. Connect the silicon tube to the fill nozzle.
2. Put the fill nozzle into the holder.
3. Push the fill nozzle upwards and turn the holder to the left.

Assemble fill-nozzle:

1. Connect the silicon tube to the fill nozzle.
2. Put the fill nozzle into the holder.
3. Push the fill nozzle upwards and turn the holder to the left.

Work instruction Number 205	
Page 1 of 1	**Purpose:** Replace the pinch valve tube ESRI010246
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 001, February 2005

Replace the pinch valve tube
ESRI010246

1. Open the left cover.
2. Pull the tube out the pinch valve.
3. Disconnect the silicon tube from the bottom connector and the top connector.
4. Remove the tube.
5. Connect the silicon tube to the bottom connector and the top connector.
6. Push the tube in the pinch valve.
7. Close the left cover.

Work instruction Number 227	
Page 1 of 1	**Purpose:** Preparation for temporary storage and starting operation after storage
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 002, june 2014

Preparing Compact for temporary storage

1. Perform end-of-day wash
2. Remove all reagent containers and replace with containers with DI water
3. Start wash all pipettes
4. Prime the diluter for 5 times
5. Disconnect and remove reagent containers
6. Perform Prime all until all liquid is removed from all tubing
7. Remove tubing from rinse and saline pump
8. Release tubing from pinch valves (On the diluter, sample valve and the big pinch valve next to the separator)
9. Check if the separator is clean
10. Clean outside of the sample needle
11. Clean outside of instrument
12. Disconnect waste connection
13. Disconnect power
14. Cover machine as dust protection

Before starting normal operation Compact

1. *In case of physical removal of instrument*: check levelling
2. Check tubes and replace tubes if needed
3. Connect saline and rinse pump tubes
4. Re-install tubes in pinch valves
5. Replace fill nozzle o-ring
6. Check needle condition
7. Connect/check reagent containers, check expiry date of reagents
8. Connect power
9. Perform all prime steps separately and check liquid flow
10. Perform Fill and clean
11. Check if pipettes are leaking, replace check valves if leakage is persistent
12. Check sensors and vacuum pressure settings
13. Check instrument settings
14. Check communication interface settings
15. Perform aspiration with test blood before normal operation, check if all steps are performed without errors

Work instruction Number 181 (7)	
Page 1 of 1	**Purpose:**Replace diluter syringe Teflon tip
Safety: None Bio Hazard area	
Instrument: Compact with new diluter version	**Revision:** Draft, October 2001

Disassembly diluter syringe:

Unscrew the syringe from the attachment.

1. Take the syringe from the diluter assembly.
2. Pull the plunger out of the syringe.
3. Cut the Teflon tip of the plunger with a sharp knife.
   Be careful not to damage the metal plunger.
4. Replace the O-ring and then the tip.
5. Replace the old tip for the new tip assembly. (From repair set QWLV030902)
6. Moisten the tip with water to ease the tip back into the glass syringe barrel.
7. Install the syringe back on to the attachment.

1. Prime diluent [MAINTENANCE] [PRIME DILUENT]
2. Repeat this step until there are no air bubbles in the total diluent system.

Check your dilution settings:

1. Select display dilution on [SETTINGS] -> [GENERAL SETTINGS] -> [DISPLAY DILUTION] -> ON.
2. Run 10 samples through the instrument and make a note of the dilution rate.
3. Calculate the mean value of the 10 samples.
4. Make adjustment if necessary in [SETTINGS] -> [DILUTER SETTINGS] -> [DILUTION ADJUSTMENT].

Work instruction Number 187	
Page 1 of 1	**Purpose:** Daily maintenance
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 001, March 2014

Prepare disinfectant: (if not already prepared).
Add **10 ml** bleach (sodium hypochlorite) to **190 ml** de-ionized water. **(5% solution)**
This disinfectant is for cleaning of all external parts that are exposed to blood.

1. Go to tab [MAINTENANCE] and perform the [End-of-day wash] procedure. (when Fill & Clean is used, End-of-day wash is not required)
2. Check system for leakage.
   - Inspect the peristaltic pump tubes and connections for leaks.
   - Check that liquid does not run back into the supply bottles after the pumps have stopped.
3. Clean and inspect the sample needle.
   - Inspect sample needle condition.
     If necessary replace the sample probe or outer needle. See Work Instruction Sample probe or outer needle replacement.
   - Clean the outer needle with disinfectant.
4. Check tubing from the syringe for trapped air bubbles.
5. Check Diluent syringe for trapped air bubbles.
6. If trapped air bubbles are found, go to tab [MAINTENANCE], click button [PRIME / CLEAN (ON PAGE 73)] and perform the [PRIME DILUENT] function.
7. Wipe outer surface and stainless steel plate below the pipettes with disinfectant.

Work instruction Number 191	
Page 1 of 3	**Purpose:**Weekly maintenance
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 001, March 2014

Prepare disinfectant: (if not already prepared).
Add **10 ml** bleach (sodium hypochlorite) to **190 ml** de-ionized water. **(5% solution)**
This disinfectant is for cleaning of all external parts that are exposed to blood.

1. Clean Fill nozzle

Disassemble the fill-nozzle:

1. Turn the holder to the right.
2. The fill-nozzle can now be removed.
3. Disconnect the silicon tube from the fill nozzle.

The use of a toothbrush and detergent is recommended.

1. Carefully scrub the fill nozzle inner part.
2. Use a tissue to dry the fill nozzle.

Assemble fill-nozzle:

1. Connect the silicon tube to the fill nozzle.
2. Put the fill nozzle into the holder.
3. Push the fill nozzle upwards and turn the holder to the left.

2. Clean Liquid separator

Removing

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Disconnect the silicon tube from the tube connection on the top section.
5. Remove bacterial HEPA filter.
6. Remove and disassemble the liquid separator.

Cleaning

1. Clean all parts with hot water and a brush.
2. Use some acid free vaseline on the screw-thread of the glass jar.
3. Assemble the separator.

Replacing

1. Replace the top section.
   A little silicon grease on the rim of separator will make the assembling and adjustment easier.
2. If applicable replace the bacterial HEPA filter
   (For Maintenance Level 4: Exchange bacterial HEPA filter QWLV040002)
3. Re-connect the silicon tube to the tube connector on the top section.
4. Lift left cover.
5. Lift stainless steel vacuum tube up.
6. Insert the liquid separator sliding it over the support shelf.
7. Push the liquid separator towards the rear, with the sensor connectors in the holes.
8. Release the stainless steel vacuum tube.
9. Replace the waste container.
10. Close left cover.

3. Check sensors

Vacuum pressure check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FLOW SENSOR box.
  Flow: 0925-**0980**-1020 Abs: 0300-**380**-0390 Offset: 0045-**0050**-0055
  If the flow is not in range there might be a blockage in the vacuum flow line to the flow sensor.

Fill Stop sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FILL STOP SENSOR box.
  Fill stop sensor FS 90..**140**..165

Diluter Start sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select DILUTER START SENSOR box.
  Diluter start sensor 400-700

Measure sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK MEASURE SENSOR box.
  Measure sensor MS 40..**50**..60

Temperature sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK TEMPERATURE SENSOR box.
  Temperature sensor TS [Room temperature]

Diluent flow sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK DILUENT FLOW SENSOR box.
  Press test. When test is finished, signal Down and signal Up must be green.

Separator check

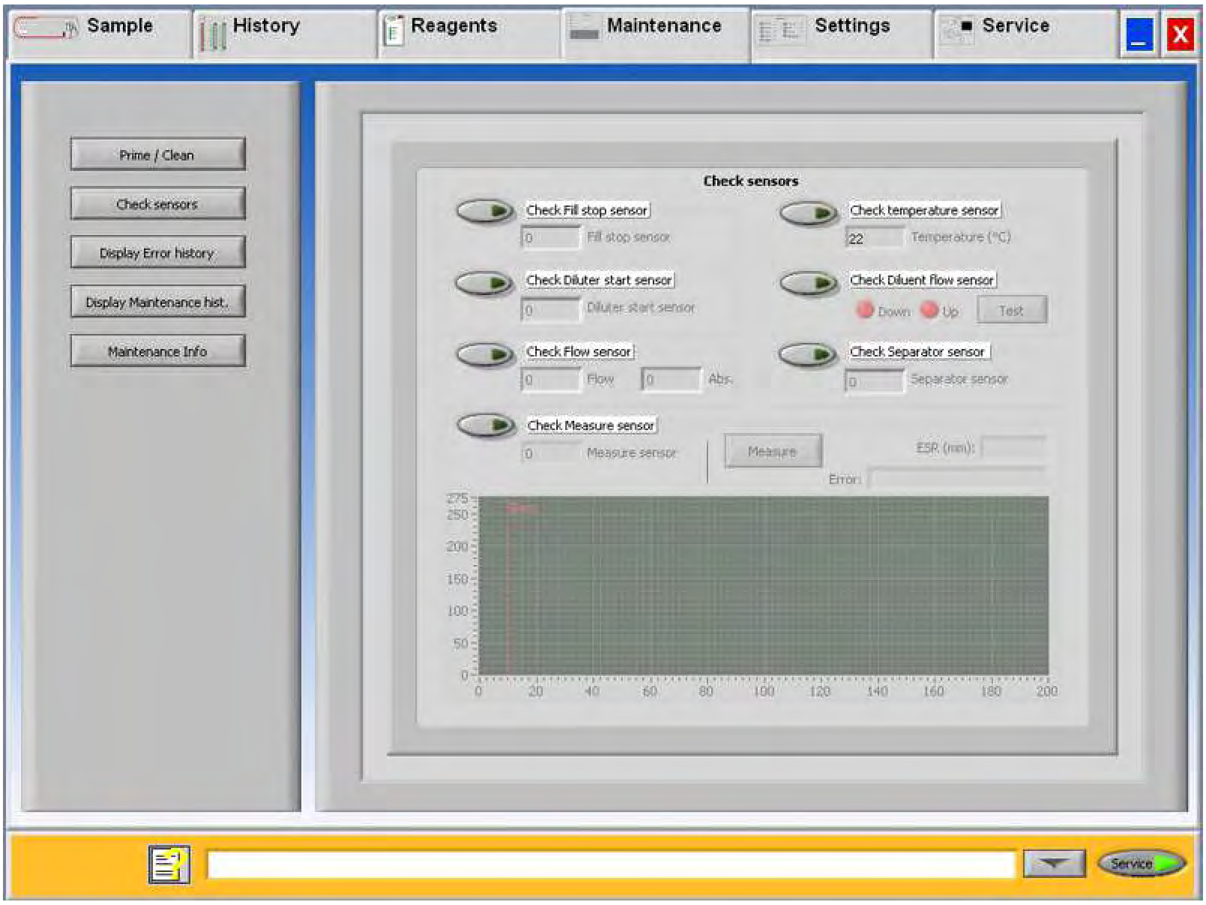
- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK SEPARATOR SENSOR box.
  Separator sensor <200 600 >700

4. Final preparation

1. Go to tab [MAINTENANCE] and perform the [End-of-day wash] procedure. (when Fill & Clean is used, End-of-day wash is not required)
2. Check system for leakage.
   - Inspect the peristaltic pump tubes and connections for leaks.
   - Check that liquid does not run back into the supply bottles after the pumps have stopped.
3. Clean and inspect the sample needle.
   - Inspect sample needle condition.
     If necessary replace the sample probe or outer needle. See Work Instruction Sample probe or outer needle replacement.
   - Clean the outer needle with disinfectant.
4. Check tubing from the syringe for trapped air bubbles.
5. Check Diluent syringe for trapped air bubbles.
6. If trapped air bubbles are found, go to tab [MAINTENANCE], click button [PRIME / CLEAN (ON PAGE 73)] and perform the [PRIME DILUENT] function.
7. Wipe outer surface and stainless steel plate below the pipettes with disinfectant.

Work instruction Number 204	
Page 1 of 2	**Purpose:** Check sensor values
Safety: *Bio Hazard area*	
Instrument: Compact	**Revision:** 001, January 2014

Check sensor values in Service mode:



Vacuum pressure check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FLOW SENSOR box.
  Flow: 0925-**0980**-1020 Abs: 0300-**380**-0390 Offset: 0045-**0050**-0055
  If the flow is not in range there might be a blockage in the vacuum flow line to the flow sensor.

Fill Stop sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FILL STOP SENSOR box.
  Fill stop sensor FS 90..**140**..165

Diluter Start sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select DILUTER START SENSOR box.
  Diluter start sensor 400-700

Measure sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK MEASURE SENSOR box.
  Measure sensor MS 40..**50**..60

Temperature sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK TEMPERATURE SENSOR box.
  Temperature sensor TS [Room temperature]

Diluent flow sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK DILUENT FLOW SENSOR box.
  Press test. When test is finished, signal Down and signal Up must be green.

Separator check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK SEPARATOR SENSOR box.
  Separator sensor <200 600 >700

Work instruction Number 1215

Page 1 of 6	**Purpose:**Maintenance level 4
Safety: *Bio Hazard area*	
Instrument: Compact InteRRliner V8	**Revision:** 001, March 2014

1. Clean Fill nozzle and exchange O-ring Fill Nozzle

Disassemble the fill-nozzle:

1. Turn the holder to the right.
2. The fill-nozzle can now be removed.
3. Disconnect the silicon tube from the fill nozzle.

The use of a toothbrush and detergent is recommended.

1. Carefully scrub the fill nozzle inner part.
2. Use a tissue to dry the fill nozzle.

Disassemble fill nozzle holder:

1. Turn the holder to the right.
2. The holder can now be removed

Replace O-ring:

Remove the O-ring. (**QWLV050004**)

Install new O-ring. (**QWLV050004**)

Assemble fill nozzle holder:

Push the plastic top part down against the spring pressure.

1. Turn the plastic top part until you hear of feel a click
2. Turn the plastic top part clokwise for 1.5 turns.

Assemble fill-nozzle:

1. Connect the silicon tube to the fill nozzle.
2. Put the fill nozzle into the holder.
3. Push the fill nozzle upwards and turn the holder to the left.

2. Clean Liquid Separator and exchange filters

Removing

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Disconnect the silicon tube from the tube connection on the top section.
5. Remove bacterial HEPA filter.
6. Remove and disassemble the liquid separator.

Cleaning

1. Clean all parts with hot water and a brush.
2. Use some acid free vaseline on the screw-thread of the glass jar.
3. Assemble the separator.

Replacing

1. Replace the top section.
   A little silicon grease on the rim of separator will make the assembling and adjustment easier.
2. If applicable replace the bacterial HEPA filter
   (For Maintenance Level 4: Exchange bacterial HEPA filter QWLV040002)
3. Re-connect the silicon tube to the tube connector on the top section.
4. Lift left cover.
5. Lift stainless steel vacuum tube up.
6. Insert the liquid separator sliding it over the support shelf.
7. Push the liquid separator towards the rear, with the sensor connectors in the holes.
8. Release the stainless steel vacuum tube.
9. Replace the waste container.
10. Close left cover.

On waste bottle (If used):

Exchange bacterial filter **QWLV040001** on the waste bottle assembly.

3. Exchange Rinse and Saline tube assembly

New rinse pump tube assembly **ESRI090902**.

New saline pump tube assembly **ESRI090903**

New tube replacement:

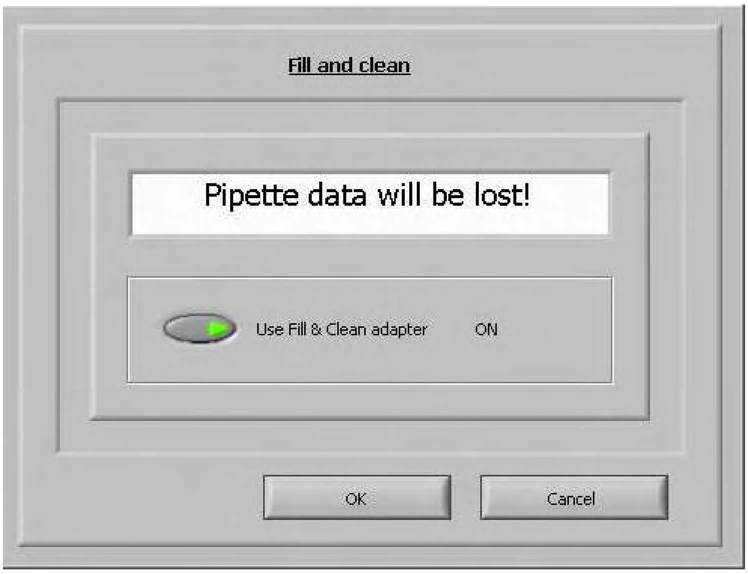
1. Open left cover.
2. Pull pump tube slightly downwards and at the same time towards the front of the unit to release the tube out of the pump plate holder.
3. Remove the old tube from the peristaltic pump rotor.
4. Disconnect the tubing at both ends of the tube connectors.

5. Connect new tubing to both ends of the connectors.
6. Place one end of the tube in the pump plate holder.
7. Pull the new tube over the peristaltic pump rotor.
8. Pull pump tube slightly downwards and at the same time towards the back of the InteRRliner V8.

4. Fill and clean

Cleaning agent preparation InteRRliner V8 Compact: Fill and clean:
This cycle takes about 90 minutes.

1. Fill the clean adapter EHST110907 with hot de-ionized water. (100 ml)
2. Add 10 ml cleaning agent (QRR 010905) to the hot water in the adapter.
3. Place the cap on the adapter and mix well.
4. Put the adapter with cleaning solution on the lower tube holder.
5. Select MAINTENANCE tab, PRIME/CLEAN, button FILL AND CLEAN.



Start Fill and clean procedure:

1. Select button **OK**.
2. The adapter will be transported to the needle position.
3. The needle goes down and the fill and clean process is started.
4. When all the pipettes are filled, the needle goes back to the home position and the adapter is moved to the release position and will be transported into the End-pool.

5. Check sensors

Vacuum pressure check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FLOW SENSOR box.
  Flow: 0925-**0980**-1020 Abs: 0300-**380**-0390 Offset: 0045-**0050**-0055
  If the flow is not in range there might be a blockage in the vacuum flow line to the flow sensor.

Fill Stop sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FILL STOP SENSOR box.
  Fill stop sensor FS 90..**140**..165

Diluter Start sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select DILUTER START SENSOR box.
  Diluter start sensor 400-700

Measure sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK MEASURE SENSOR box.
  Measure sensor MS 40..**50**..60

Temperature sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK TEMPERATURE SENSOR box.
  Temperature sensor TS [Room temperature]

Diluent flow sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK DILUENT FLOW SENSOR box.
  Press test. When test is finished, signal Down and signal Up must be green.

Separator check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK SEPARATOR SENSOR box.
  Separator sensor <200 600 >700

6. Final preparation

Prepare disinfectant: (if not already prepared).
Add **10 ml** bleach (sodium hypochlorite) to **190 ml** de-ionized water. **(5% solution)**
This disinfectant is for cleaning of all external parts that are exposed to blood.

1. Go to tab [MAINTENANCE] and perform the [End-of-day wash] procedure. (when Fill & Clean is used, End-of-day wash is not required)
2. Check system for leakage.
   - Inspect the peristaltic pump tubes and connections for leaks.
   - Check that liquid does not run back into the supply bottles after the pumps have stopped.
3. Clean and inspect the sample needle.
   - Inspect sample needle condition.
     If necessary replace the sample probe or outer needle. See Work Instruction Sample probe or outer needle replacement.
   - Clean the outer needle with disinfectant.
4. Check tubing from the syringe for trapped air bubbles.
5. Check Diluent syringe for trapped air bubbles.
6. If trapped air bubbles are found, go to tab [MAINTENANCE], click button [PRIME / CLEAN (ON PAGE 73)] and perform the [PRIME DILUENT] function.
7. Wipe outer surface and stainless steel plate below the pipettes with disinfectant.

Work instruction Number 224	
Page 1 of 8	**Purpose:** Maintenance level 3
Safety: *Bio Hazard area*	
Instrument: InteRRliner V8	**Revision:** 001, March 2014

1. Clean Fill nozzle and exchange O-ring Fill Nozzle

Disassemble the fill-nozzle:

1. Turn the holder to the right.
2. The fill-nozzle can now be removed.
3. Disconnect the silicon tube from the fill nozzle.

The use of a toothbrush and detergent is recommended.

1. Carefully scrub the fill nozzle inner part.
2. Use a tissue to dry the fill nozzle.

Disassemble fill nozzle holder:

1. Turn the holder to the right.
2. The holder can now be removed

Replace O-ring:

Remove the O-ring. (**QWLV050004**)

Install new O-ring. (**QWLV050004**)

Assemble fill nozzle holder:

Push the plastic top part down against the spring pressure.

1. Turn the plastic top part until you hear of feel a click
2. Turn the plastic top part clokwise for 1.5 turns.

Assemble fill-nozzle:

1. Connect the silicon tube to the fill nozzle.
2. Put the fill nozzle into the holder.
3. Push the fill nozzle upwards and turn the holder to the left.

2. Clean Liquid Separator and exchange filters

Removing

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Disconnect the silicon tube from the tube connection on the top section.
5. Remove bacterial HEPA filter.
6. Remove and disassemble the liquid separator.

Cleaning

1. Clean all parts with hot water and a brush.
2. Use some acid free vaseline on the screw-thread of the glass jar.
3. Assemble the separator.

Replacing

1. Replace the top section.
   A little silicon grease on the rim of separator will make the assembling and adjustment easier.
2. If applicable replace the bacterial HEPA filter
   (For Maintenance Level 4: Exchange bacterial HEPA filter QWLV040002)
3. Re-connect the silicon tube to the tube connector on the top section.
4. Lift left cover.
5. Lift stainless steel vacuum tube up.
6. Insert the liquid separator sliding it over the support shelf.
7. Push the liquid separator towards the rear, with the sensor connectors in the holes.
8. Release the stainless steel vacuum tube.
9. Replace the waste container.
10. Close left cover.

On waste bottle (If used):

Exchange bacterial filter **QWLV040001** on the waste bottle assembly.

3. Exchange Rinse and Saline tube assembly

New rinse pump tube assembly **ESRI090902**.

New saline pump tube assembly **ESRI090903**

New tube replacement:

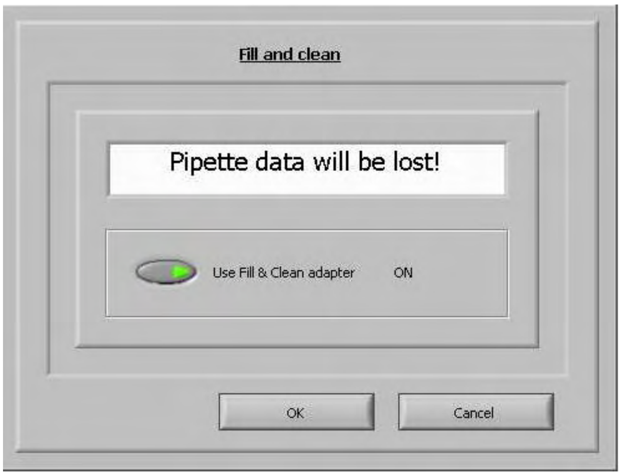
1. Open left cover.
2. Pull pump tube slightly downwards and at the same time towards the front of the unit to release the tube out of the pump plate holder.
3. Remove the old tube from the peristaltic pump rotor.
4. Disconnect the tubing at both ends of the tube connectors.

5. Connect new tubing to both ends of the connectors.
6. Place one end of the tube in the pump plate holder.
7. Pull the new tube over the peristaltic pump rotor.
8. Pull pump tube slightly downwards and at the same time towards the back of the InteRRliner V8.

4. Fill and clean

Cleaning agent preparation InteRRliner V8 Compact: Fill and clean:
This cycle takes about 90 minutes.

1. Fill the clean adapter EHST110907 with hot de-ionized water. (100 ml)
2. Add 10 ml cleaning agent (QRR 010905) to the hot water in the adapter.
3. Place the cap on the adapter and mix well.
4. Put the adapter with cleaning solution on the lower tube holder.
5. Select MAINTENANCE tab, PRIME/CLEAN, button FILL AND CLEAN.



Start Fill and clean procedure:

1. Select button **OK**.
2. The adapter will be transported to the needle position.
3. The needle goes down and the fill and clean process is started.
4. When all the pipettes are filled, the needle goes back to the home position and the adapter is moved to the release position and will be transported into the End-pool.

5. Sensor check

Vacuum pressure check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FLOW SENSOR box.
  Flow: 0925-**0980**-1020 Abs: 0300-**380**-0390   Offset: 0045-**0050**-0055
  If the flow is not in range there might be a blockage in the vacuum flow line to the flow sensor.

Fill Stop sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK FILL STOP SENSOR box.
  Fill stop sensor   FS 90..**140**..165

Diluter Start sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select DILUTER START SENSOR box.
  Diluter start sensor   400-700

Measure sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK MEASURE SENSOR box.
  Measure sensor   MS 40..**50**..60

Temperature sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK TEMPERATURE SENSOR box.
  Temperature sensor   TS [Room temperature]

Diluent flow sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK DILUENT FLOW SENSOR box.
  Press test. When test is finished, signal Down and signal Up must be green.

Separator check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK SEPARATOR SENSOR box.
  Separator sensor <200 600 >700

6. Exchange Waste cassette assembly

Be careful, as there may be blood in the cassette. First, make up some disinfectant and put this in the liquid separator. Press PRIME DISINFECTANT to pump disinfectant through the pump cassette.

Clean Waste Cassette

The waste system must be cleaned before replacing the waste pump cassette.

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Remove bacterial HEPA filter.
5. Fill waste separator with 100ml disinfectant or 100 ml water with 2% bleach.
6. Replace bacterial HEPA filter.
7. Lift left cover.
8. Lift stainless steel vacuum tube up.
9. Insert the liquid separator sliding it over the support shelf.
10. Push the liquid separator towards the rear, with the sensor connectors in the holes.
11. Release the stainless steel vacuum tube.
12. Replace the waste container.
13. Close left cover.

Exchange Waste Cassette and blotting washer

1. Disconnect the two tubes from the waste pump cassette.
2. Press levers (at three o'clock and nine o'clock positions) and pull at the same time.
3. Clean peristaltic pump motor shaft using a tissue soaked in alcohol.
4. Remove the old blotting washer **ESRI090026** around the motor shaft.
5. Place the new blotting washer **ESRI090026**.
6. Insert new waste pump cassette **ESRI090921** until it clicks into place.
7. Remove the protection caps on from the tubes.
8. Connect the two tubes to new waste pump cassette.

7. Exchange Pinch valve tube

Replace the pinch valve tube **ESRI010246**

1. Open the left cover.
2. Pull the tube out the pinch valve.
3. Disconnect the silicon tube from the bottom connector and the top connector.
4. Remove the tube.
5. Connect the silicon tube to the bottom connector and the top connector.
6. Push the tube in the pinch valve.
7. Close the left cover.

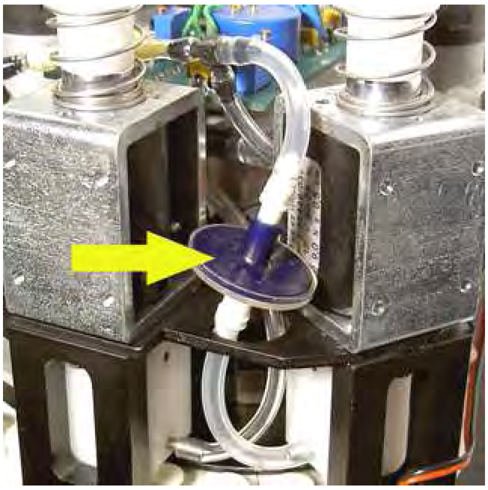
8. Final preparation

Prepare disinfectant: (if not already prepared).
Add **10 ml** bleach (sodium hypochlorite) to **190 ml** de-ionized water. **(5% solution)**
This disinfectant is for cleaning of all external parts that are exposed to blood.

1. Go to tab [MAINTENANCE] and perform the [End-of-day wash] procedure. (when Fill & Clean is used, End-of-day wash is not required)
2. Check system for leakage.
   - Inspect the peristaltic pump tubes and connections for leaks.
   - Check that liquid does not run back into the supply bottles after the pumps have stopped.
3. Clean and inspect the sample needle.
   - Inspect sample needle condition.
     If necessary replace the sample probe or outer needle. See Work Instruction Sample probe or outer needle replacement.
   - Clean the outer needle with disinfectant.
4. Check tubing from the syringe for trapped air bubbles.
5. Check Diluent syringe for trapped air bubbles.
6. If trapped air bubbles are found, go to tab [MAINTENANCE], click button [PRIME / CLEAN (ON PAGE 73)] and perform the [PRIME DILUENT] function.
7. Wipe outer surface and stainless steel plate below the pipettes with disinfectant.
8. Exchange air filter:

Air filter replacement (ESRI) QWLV0400003

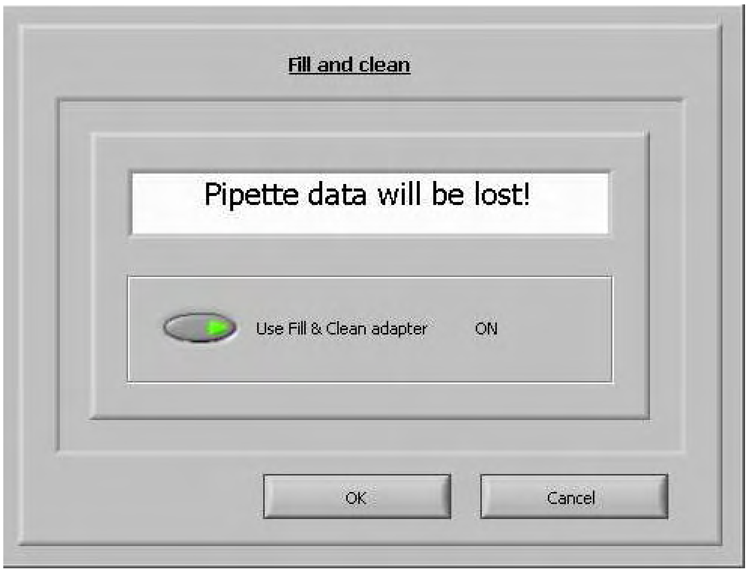
1. Pull both tube connectors out of the blue filter.
2. Place new blue filter
3. Reconnect the tube connectors on the filter



Work instruction Number 197	
Page 1 of 2	**Purpose:** Fill and Clean
Safety: *Bio Hazard area*	
Instrument: InteRRliner V8	**Revision:** 002, September 2012

Cleaning agent preparation InteRRliner V8 Compact: Fill and clean:
This cycle takes about 90 minutes.

1. Fill the clean adapter EHST110907 with hot de-ionized water. (100 ml)
2. Add 10 ml cleaning agent (QRR 010905) to the hot water in the adapter.
3. Place the cap on the adapter and mix well.
4. Put the adapter with cleaning solution on the lower tube holder.
5. Select MAINTENANCE tab, PRIME/CLEAN, button FILL AND CLEAN.



Start Fill and clean procedure:

1. Select button **OK**.
2. The needle goes down and the process is started.
3. When all the pipettes are filled, the needle goes back to the home position.
4. Remove the adapter from the needle assembly.

Work instruction Number 225	
Page 1 of 9	**Purpose:** Maintenance level 2
Safety: *Bio Hazard area*	
Instrument: InteRRliner V8	**Revision:** 001, March 2014

1. Clean Fill nozzle and exchange O-ring Fill Nozzle

Disassemble the fill-nozzle:

1. Turn the holder to the right.
2. The fill-nozzle can now be removed.
3. Disconnect the silicon tube from the fill nozzle.

The use of a toothbrush and detergent is recommended.

1. Carefully scrub the fill nozzle inner part.
2. Use a tissue to dry the fill nozzle.

Disassemble fill nozzle holder:

1. Turn the holder to the right.
2. The holder can now be removed

Replace O-ring:

Remove the O-ring. (**QWLV050004**)

Install new O-ring. (**QWLV050004**)

Assemble fill nozzle holder:

Push the plastic top part down against the spring pressure.

1. Turn the plastic top part until you hear of feel a click
2. Turn the plastic top part clokwise for 1.5 turns.

Assemble fill-nozzle:

1. Connect the silicon tube to the fill nozzle.
2. Put the fill nozzle into the holder.
3. Push the fill nozzle upwards and turn the holder to the left.

2. Clean Liquid Separator and exchange filters

Removing

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Disconnect the silicon tube from the tube connection on the top section.
5. Remove bacterial HEPA filter.
6. Remove and disassemble the liquid separator.

Cleaning

1. Clean all parts with hot water and a brush.
2. Use some acid free vaseline on the screw-thread of the glass jar.
3. Assemble the separator.

Replacing

1. Replace the top section.
   A little silicon grease on the rim of separator will make the assembling and adjustment easier.
2. If applicable replace the bacterial HEPA filter
   (For Maintenance Level 4: Exchange bacterial HEPA filter QWLV040002)
3. Re-connect the silicon tube to the tube connector on the top section.
4. Lift left cover.
5. Lift stainless steel vacuum tube up.
6. Insert the liquid separator sliding it over the support shelf.
7. Push the liquid separator towards the rear, with the sensor connectors in the holes.
8. Release the stainless steel vacuum tube.
9. Replace the waste container.
10. Close left cover.

On waste bottle (If used):

Exchange bacterial filter **QWLV040001** on the waste bottle assembly.

3. Exchange Rinse and Saline tube assembly

New rinse pump tube assembly
ESRI090902.

New saline pump tube assembly
ESRI090903

New tube replacement:

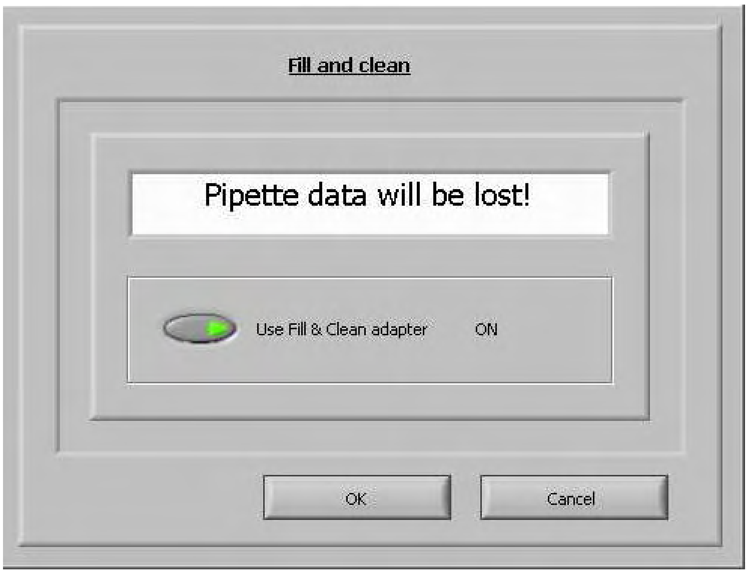
1. Open left cover.
2. Pull pump tube slightly downwards and at the same time towards the front of the unit to release the tube out of the pump plate holder.
3. Remove the old tube from the peristaltic pump rotor.
4. Disconnect the tubing at both ends of the tube connectors.
5. Connect new tubing to both ends of the connectors.
6. Place one end of the tube in the pump plate holder.

7. Pull the new tube over the peristaltic pump rotor.
8. Pull pump tube slightly downwards and at the same time towards the back of the InteRRliner V8.

4. Fill and clean

Cleaning agent preparation InteRRliner V8 Compact: Fill and clean:
This cycle takes about 90 minutes.

1. Fill the clean adapter EHST110907 with hot de-ionized water. (100 ml)
2. Add 10 ml cleaning agent (QRR 010905) to the hot water in the adapter.
3. Place the cap on the adapter and mix well.
4. Put the adapter with cleaning solution on the lower tube holder.
5. Select MAINTENANCE tab, PRIME/CLEAN, button FILL AND CLEAN.



Start Fill and clean procedure:

1. Select button **OK**.
2. The adapter will be transported to the needle position.
3. The needle goes down and the fill and clean process is started.
4. When all the pipettes are filled, the needle goes back to the home position and the adapter is moved to the release position and will be transported into the End-pool.

5. Sensor check

Vacuum pressure check

- Go to tab Maintenance -> Check sensor. Select Check Flow sensor box.
  Flow: 0925-**0980**-1020 Abs: 0300-**380**-0390 Offset: 0045-**0050**-0055
  If the flow is not in range there might be a blockage in the vacuum flow line to the flow sensor.

Fill Stop sensor check

- Go to tab Maintenance -> Check sensor. Select Check Fill stop sensor box.
  Fill stop sensor FS 90..**140**..165

Diluter Start sensor check

- Go to tab Maintenance -> Check sensor. Select Diluter start sensor box.
  Diluter start sensor 400-700

Measure sensor check

- Go to tab Maintenance -> Check sensor. Select Check measure sensor box.
  Measure sensor MS 40..**50**..60

Temperature sensor check

- Go to tab Maintenance -> Check sensor. Select Check Temperature sensor box.
  Temperature sensor TS [Room temperature]

Diluent flow sensor check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK DILUENT FLOW SENSOR box.
  Press test. When test is finished, signal Down and signal Up must be green.

Separator check

- Go to tab MAINTENANCE -> CHECK SENSOR. Select CHECK SEPARATOR SENSOR box.
  Separator sensor <200 600 >700

6. Exchange Waste cassette assembly

Be careful, as there may be blood in the cassette. First, make up some disinfectant and put this in the liquid separator. Press PRIME DISINFECTANT to pump disinfectant through the pump cassette.

Clean Waste Cassette

The waste system must be cleaned before replacing the waste pump cassette.

1. Open the left cover and remove the waste container. The liquid separator is now visible.
2. Lift the stainless steel vacuum tube with use of the lever.
3. Pull the liquid separator towards the front of the Compact. (Note: The separator has two sensor connectors at the rear)
4. Remove bacterial HEPA filter.
5. Fill waste separator with 100ml disinfectant or 100 ml water with 2% bleach.
6. Replace bacterial HEPA filter.
7. Lift left cover.
8. Lift stainless steel vacuum tube up.
9. Insert the liquid separator sliding it over the support shelf.
10. Push the liquid separator towards the rear, with the sensor connectors in the holes.
11. Release the stainless steel vacuum tube.
12. Replace the waste container.
13. Close left cover.

Exchange Waste Cassette and blotting washer

1. Disconnect the two tubes from the waste pump cassette.
2. Press levers (at three o'clock and nine o'clock positions) and pull at the same time.
3. Clean peristaltic pump motor shaft using a tissue soaked in alcohol.
4. Remove the old blotting washer **ESRI090026** around the motor shaft.
5. Place the new blotting washer **ESRI090026**.
6. Insert new waste pump cassette **ESRI090921** until it clicks into place.
7. Remove the protection caps on from the tubes.
8. Connect the two tubes to new waste pump cassette.

7. Exchange Pinch valve tube

Replace the pinch valve tube **ESRI010246**

1. Open the left cover.
2. Pull the tube out the pinch valve.
3. Disconnect the silicon tube from the bottom connector and the top connector.
4. Remove the tube.
5. Connect the silicon tube to the bottom connector and the top connector.
6. Push the tube in the pinch valve.
7. Close the left cover.

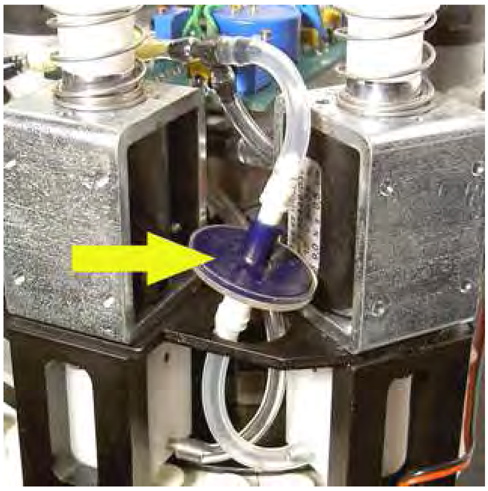
8. Final preparation

Prepare disinfectant: (if not already prepared).
Add **10 ml** bleach (sodium hypochlorite) to **190 ml** de-ionized water. **(5% solution)**
This disinfectant is for cleaning of all external parts that are exposed to blood.

1. Go to tab [MAINTENANCE] and perform the [End-of-day wash] procedure. (when Fill & Clean is used, End-of-day wash is not required)
2. Check system for leakage.
   - Inspect the peristaltic pump tubes and connections for leaks.
   - Check that liquid does not run back into the supply bottles after the pumps have stopped.
3. Clean and inspect the sample needle.
   - Inspect sample needle condition.
     If necessary replace the sample probe or outer needle. See Work Instruction Sample probe or outer needle replacement.
   - Clean the outer needle with disinfectant.
4. Check tubing from the syringe for trapped air bubbles.
5. Check Diluent syringe for trapped air bubbles.
6. If trapped air bubbles are found, go to tab [MAINTENANCE], click button [PRIME / CLEAN (ON PAGE 73)] and perform the [PRIME DILUENT] function.
7. Wipe outer surface and stainless steel plate below the pipettes with disinfectant.
8. Exchange air filter:

Air filter replacement (ESRI) QWLV0400003

1. Pull both tube connectors out of the blue filter.
2. Place new blue filter
3. Reconnect the tube connectors on the filter



9. Replace diluter syringe tip

Replace diluter tip

1. Take the syringe from the diluter assembly.
2. Pull the plunger out of the syringe.
3. Cut the Teflon tip of the plunger with a sharp knife.
   Be careful not to damage the metal plunger.
4. Replace the O-ring and then the tip.
5. Replace the old tip for the new tip assembly. (From repair set QWLV030902)
6. Moisten the tip with water to ease the tip back into the glass syringe barrel.
7. Install the syringe back on to the attachment.

Clean dilution system

1. Perform PRIME DILUENT
2. Repeat above step until there are no air bubbles in the whole diluent system anymore.

Check dilution settings

1. Go to tab SETTINGS> GENERAL SETTINGS and select DISPLAY DILUTION OFF
2. Run 10 samples through the instrument and make a note of the dilution rate.
3. Calculate the mean of the 10 samples.
4. Make dilution adjustment if necessary in SETTINGS> DILUTER SETTINGS.
5. Go to tab SETTINGS> GENERAL SETTINGS and select DISPLAY DILUTION ON

Work instruction Number 208	
Page 1 of 1	**Purpose:** Sample probe or outer needle replacement
Safety: *Bio Hazard area*	
Instrument: Compact InteRRliner V8	**Revision:** Draft, October 2008

Remove cover Compact InteRRliner

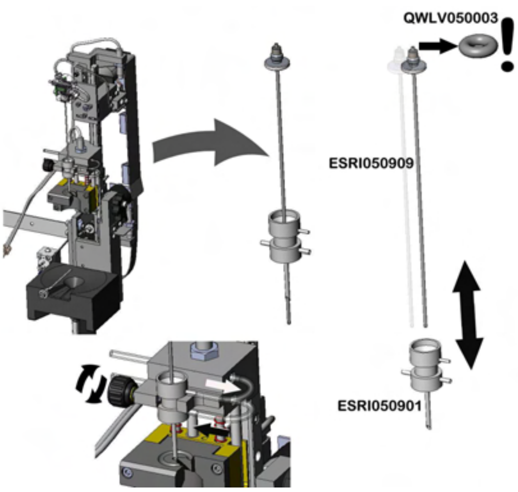
1. Lift the robotic protection cover.

Needle exchange:

1. Unscrew sample probe manually. (E)
2. Mark each tube for easier reconnecting to the correct nipple.
3. Disconnect the tubes from the outer needle.
4. Pull the sample probe, complete with outer needle, towards the front edge of the Compact. The outer needle must be supported to protect it from falling.
5. Slide the new sample probe into the (new) outer needle.
6. Make sure the Sample probe has a (new) O-ring QWLV050003.
7. Install (new) sample probe ESRI050909 together with the (new) outer needle ESRI050901.
8. Tighten the sample probe. Do not over-tighten the sample probe in the T-piece / Y-piece or it will crack or strip the threading inside the block.
9. Replace the correct tubes on the outer needle.

Replace cover Compact InteRRliner

1. Shut down the robotic protection cover.



19. GLOSSARY OF TERMS

B

19.1.1.1.1. Bidirectional

Bidirectional communication means that there is two-way communication from the InteRRliner V8 to the HOST (sample requests and results) and from the HOST to the InteRRliner V8 (confirmation or denial of sample requests).

C

19.1.1.1.2. Citrate mode

Citrate mode is used for *pre-diluted samples* collected in tubes with *sodium citrate anticoagulant-diluent*. The samples are *not* diluted on the InteRRliner V8 during aspiration.
The concentration of sodium citrate within the diluent solution in the tube should be 3.2%. This is not to be confused with the required dilution rate of blood and diluent.
For example, in a citrate tube with a total draw volume of 1.6 ml (= 5 volumes), the amount of pre-filled diluent must be 0.32 ml (= 1 volume). If this information is not provided by the tube manufacturer, it should be checked by the customer.

E

19.1.1.1.3. EDTA mode

EDTA mode is used for *undiluted samples* collected in tubes with *EDTA anticoagulant*. The samples are automatically diluted on the InteRRliner V8 during aspiration.
The usual amount of EDTA in sample tubes is 1.8 mg per 1 ml blood. 1 ml of blood weighs ca. 1060 mg and the concentration of EDTA is therefore 0.17% and well within the requirements for the EDTA mode on this instrument.

19.1.1.1.4. ESR

ESR is short for **Erythrocyte Sedimentation Rate.** It is the amount of sedimentation (setting) of erythrocytes (red blood cells) in a blood column during a specified time.

H

19.1.1.1.5. Hazy

A sedimentation is reported to be "**hazy**", when the boundary between blood plasma and erythrocytes can not be defined clearly.

19.1.1.1.6. Host

In this manual, the term **HOST** is used to indicate the computer system and associated software (LIMS) that provides the sample management for the laboratory.

I

19.1.1.1.7. IVD

IVD is short for **In Vitro Diagnostic.** This kind of diagnostic is performed on biological samples in a test tube, or more generally in a controlled environment outside a living organism. *In vitro* means *in glass* in Latin.

M

19.1.1.1.8. MRN

MRN is short for **Master Registration Number**. It is used as an identification number for any manual for Mechatronics products.

19.1.1.1.9. MSDS

MSDS is short for **Material Safety Data Sheet**. In this type of MSDS all kind of important data can be found on reagents.

T

19.1.1.1.10. Temperature correction

The sedimentation of blood cells is a temperature dependent process. To achieve comparable results, **temperature correction** should always be used. The ESR results are then corrected to the value they would have been at the *standard temperature of 18.3℃*.

U

19.1.1.1.11. Unidirectional

Unidirectional communication means that there is only one-way communication from the InteRRliner V8 to the HOST. Only sample results and result related messages are send.

W

19.1.1.1.12. WI

WI is short for **Work Instruction** and is used with an index number for a range of work instructions.

20. INDEX