

INSTRUCTIONS FOR USE

RPU-2100R INSTRUCTIONS FOR USE

Version 1.3 MRN-184-EN



Master Registration Number: MRN-184-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

© Copyright Mechatronics BV
All rights reserved.
Subject to changes without prior notice.
Issued by the After Sales Department of Mechatronics

CONTENTS

1. INTRODUCTION	9
1.1. About this manual	9
1.2. Disclaimer	9
1.3. Protected names	9
1.4. Legend; Wording and information	10
2. INSTRUMENT DESCRIPTION	11
2.1. General information	11
2.2. Specified conditions of use	12
2.3. Performance characteristics	12
2.3.1. Reagent output	12
2.4. Dilution principle	12
2.5. Operation principles	13
2.6. Technical specifications	14
2.7. Supply water and reagent conditions	15
2.8. Instrument overview	17
2.8.1. Outside view and overall dimensions	17
2.8.2. Inside view	18
2.8.3. Water container	18
2.8.4. Mix container	19
2.8.5. Storage container and circulation system	19
2.8.6. Reagent pump	19
2.8.7. Waste collection	19
2.8.8. Control unit	19
2.8.9. External communication connection	19
2.8.9.1. I/O	20
2.8.9.2. RS-232 (only model NARP109000)	20
2.8.9.3. Ethernet/USB (only model NARP109010)	20
3. SAFETY INFORMATION	21
3.1. General safety precautions	21
3.2. Avoidance of infection	21
3.3. Installation	22
3.4. Handling reagents	22
4. INSTALLATION	23
5. USER INTERFACE AND SOFTWARE MENU	24
5.1. Display layout	24
5.1.1. Mode information	24
5.1.2. Status information	25
5.2. Using the keyboard	25
5.3. Signals	26

5.4.	Menu items overview	26
5.4.1.	Menu structure (user level).....	27
5.4.2.	Main menu	28
5.4.3.	Machine log menu.....	29
5.4.4.	Error log menu	29
5.4.5.	Service menu	30
6.	STANDARD OPERATION PROCEDURES.....	31
6.1.	Start-up.....	31
6.2.	"Active" mode	31
6.2.1.	Circulation pump behaviour in active mode	32
6.3.	"Standby" mode	32
6.3.1.	Circulation pump behaviour in standby mode.....	32
6.4.	Replacing concentrated reagent	32
6.5.	Shutdown.....	33
7.	TROUBLESHOOTING	34
7.1.	Error, condition and warning messages	34
7.1.1.	Difference between errors, conditions and warnings	34
7.1.2.	Error, condition and warning list and possible causes	36
7.1.2.1.	Error list (Extended)	36
7.1.2.2.	Condition list	40
7.1.2.3.	Warning list.....	41
7.2.	Troubleshooting actions.....	42
7.2.1.	E1 Waste – check waste	42
7.2.2.	C2 Waste container full – check waste	42
7.2.3.	C12 Circulation – change internal filter	42
7.2.4.	C21 No H2O supply – check water supply	42
7.2.5.	C38 Conductivity – change Cellpack concentrate.....	43
7.2.6.	Service call procedure-call local Sysmex technical service representative ..	43
7.2.7.	Actions in the event of a change in performance	43
7.2.8.	Resetting the water safety stop	43
8.	MAINTENANCE	45
8.1.	Maintenance schedule for the user	45
8.2.	Cleaning	45
8.2.1.	Cleaning of the casing.....	45
8.2.2.	Cleaning of the containers.....	45
8.3.	Preventive Cellpack concentrate replacement	46
8.4.	Pre-filter replacement.....	46
8.5.	Final filter replacement.....	48
8.6.	Water demineralization device replacement.....	50
9.	APPENDIX SECTION.....	53
9.1.	Appendix - Menu structure user level.....	54
9.2.	Appendix - Ordering information: Consumables and Spare parts.....	55

10. INDEX..... 57

Document history overview

MRN-184-EN

Issue No	Date	Revised Section(s)	Changes	Authorised
1.0	June 2010	All	<ul style="list-style-type: none"> Build manual from MRN-081, revised to reflect design changes in model RPU-2100R 	K. Artz
1.1	May 2011	2.6, 4.2.3, 4.5, 4.7, 9.1, 9.4, 9.5, Appendix	<ul style="list-style-type: none"> Number of analyser connections, installation details, filter connection details and filter exchange interval, consumables list 	K. Artz
1.2	April 2012	All	<ul style="list-style-type: none"> Change of technical specifications and naming Cellpack concentrate 	H. Schavemaker
1.3	September 2013	External communication	<ul style="list-style-type: none"> Introduction Ethernet/USB connection First start-up removed 	H. Schavemaker

Published date 31 October 2013

1. INTRODUCTION

1.1. About this manual

This manual describes all necessary procedures and information required for the correct and successful use of the RPU-2100R, covering normal operation, user maintenance and troubleshooting.

This manual does not describe specific service related issues, such as detailed technical information and repair procedures.

In this manual, the following graphical symbols are used to draw attention to important information:

**ATTENTION:**

This symbol indicates warnings and other danger related information. Ignoring this information could result in personal injury, damage to the instrument or property or malfunction of the instrument.

**NOTE:**

This symbol indicates useful tips and other important information, that are not related to any specific danger.

1.2. Disclaimer

The instrument is not equipped with backup- or control systems to prevent production of incorrect reagent due to conditions such as:

- Uncalibrated measuring circuitry
- Instrument malfunction
- Wrong type or quality of concentrated reagent
- Poor quality of demineralized water



The manufacturer disclaims any liability for any direct, indirect, incidental, special or consequential damages of any kind, arising from the use of incorrect prepared reagent.

1.3. Protected names

Sysmex is a registered trademark of Sysmex Corporation, Japan.

Cellpack is a registered trademark of Sysmex Corporation.

Cubitainer is a registered trademark of Hedwin Corporation.

1.4. Legend; Wording and information

For the RPU-2100R different reagents can be used depending on the connected analyser system, therefore the following wording is valid:

- The RPU-2100R is manufactured suitable for analysers of the X-class as well as the XN-Series.
- The wording “pre-filter” describes the internal liquid pre-filer which is located inside the RPU-2100R.
- The wording “final filter” describes the liquid final-filter(s) which are located inside the door of the RPU-2100R.
- “Cellpack® -S Conc.” is used if the RPU-2100R is connected to X-Class analyser(s).
- “Cellpack DST” is used if the RPU-2100R is connected to XN-Series.
- The wording “Cellpack concentrate” and “concentrate” is interchangeable for “Cellpack® -S Conc.” and “Cellpack DST”, depending on which analyser system is connected to the RPU-2100R.
- The wording “ready-to-use Cellpack” is interchangeable for “Cellpack®” and “Cellpack DCL”, depending on which analyser system is connected to the RPU-2100R.
- The RPU-2100R produces out of “Cellpack® -S Conc.” or “Cellpack DST”, independent on which analyser system is connected to the RPU-2100R, a “ready-to-use diluent”.
- The Cellpack concentrate (Cellpack® -S Conc. and Cellpack DST) is available in 10 and 20 liter cubitainer reagent boxes. The open vial stability of Cellpack® -S Conc. is 30 days and the open vial stability of Cellpack DST is 60 days.

2. INSTRUMENT DESCRIPTION

2.1. General information

The RPU-2100R is an automated reagent preparation unit. It produces a ready-to-use diluent out of Cellpack concentrate (e.g. (Cellpack® S Conc.) and demineralized water at a ratio of 1:25.

The instrument is a single unit, housing all necessary parts inside a closed frame. The frame is covered with easily removable, epoxy coated, sheet metal covers.

All external connectors are situated on the rear side of the instrument, including the ON/OFF switch.

All user serviceable and replaceable parts are accessible through the front door. A trolley for the Cellpack concentrate (Cellpack® S Conc.) shown here for an example) container can be attached on 3 sides of the unit as desired.



2.2. Specified conditions of use

The instrument “RPU-2100R” shall only be used to produce out of Cellpack concentrate a ready-to-use diluent for in-vitro diagnostic use in a direct connection with SYSMEX haematology analysers of the X-Class and XN-series.

The instrument may only be used with the reagents and cleaning solutions mentioned in this manual.

Any other use is considered as non-specified.

2.3. Performance characteristics

2.3.1. Reagent output

The output of diluted reagent depends on the temperature of the supplied water and on the amount of extraction of the diluted reagent.

When the water is very cold, the heating process takes more time than the mixing process.

For a detailed overview of the output see table **Supply water and reagent conditions** (on page 15).

2.4. Dilution principle

The method to determine the dilution rate of the reagent is by measuring its conductivity.

The conductivity measurement in the RPU-2100R is performed according the following international standards:

ISO 7888:1985 (Water quality - Determination of electrical conductivity)

EN-IEC 60746-3:2002 (Expression of performance of electrochemical analyzers - Part 3: Electrolytic conductivity)

Conductivity is defined as the ability of a substance to conduct electrical current.

In aqueous solutions, the current is carried by charged ions. The higher the number of ions (as in saline solutions), the higher the conductivity gets. Since the conductivity of both ingredients of the reagent (demineralized water and the concentrated reagent) is known, the dilution rate can be determined with great accuracy.

The ionic motion in aqueous solutions is highly temperature dependant. Therefore, the temperature of the solution is also measured and the conductivity value at that temperature is converted to the value if the temperature were 25 °C.

In order to avoid conversion inaccuracies, which can occur when the temperature difference is very large, the demineralized water is heated to 25 °C.

2.5. Operation principles

The instrument uses demineralized water, which needs to be supplied by an external device. The demineralized water is filled into the water container by pressure of the external water supply. The water is heated inside the water container and flows into the mix container by gravitation.

A first dosage of concentrated reagent is added by a peristaltic pump. This produces a dilution at 80-90% of the desired value. The dilution is mixed and the conductivity measured. The remaining required amount of concentrated reagent is calculated and added in several steps and decreasing amounts.

When the measured conductivity value is within a specified range, the dilution is correct and flows into the storage container by gravitation.

Rejected dilutions are flowing into the waste manifold by gravitation and are pumped out of the instrument to the waste.

The diluted reagent in the storage container is pumped through a bacterial filter into an overflow container. The external analysers draw the reagent from this overflow container through a final filter by means of vacuum, which is provided by the vacuum device of the analyser. From the overflow container, the reagent flows back into the storage container by gravitation.

All containers are connected to a main air intake/exhaust and a waste manifold by a combined ventilation/overflow tube. This open system prevents pressurization of the containers. An air filter protects the system from pollution with airborne particles. A float switch inside the waste manifold triggers the waste pump.

2.6. Technical specifications

RPU instrument models:

Model	Model name	Catalogue number
	RPU-2100-R	NARP109000 NARP109010
Mains supply	Voltage	230 VAC (+/- 10%)
	Frequency	50-60 Hz
Power consumption		500 VA
Environment	Minimum and maximum operation temperature	15...30 °C
	Optimum operation temperature	15...25 °C
	Transport and storage temperature	5...50 °C
	Humidity level	40...80 % non condensing
External connections	Power mains	Euro power cord
	Ethernet/USB (only NARP109010)	RJ45/USB-B
	RS-232 (only NARP109000)	9 pin SUB-D female
External connections (Fluids)	Water connector (1x, on included connection tube)	G 3/4" female
	Reagent out connector (4x)	Push-in tubing connector, OD 6 mm
	Waste out connector (1x)	Hose barb, tube ID 12 mm
Overall dimensions (without reagent trolley)	Width	500 mm
	Height	< 700 mm
	Depth	430 mm

Total weight (without fluids)		ca. 50 kg
Volumes	Water container	2.5 liters
	Storage container	2.5 liters
	Mix container	0.6 liters
	Overflow container	0.6 liters
	Waste container (optional, external)	20 liters
Heat output	Standby mode	max. 50 W
	Full operation	max. 500 W
Acoustical noise level	Maximum at 1m (during waste discharge)	65 dB(A)
	Continuous at 1m	< 60 dB(A)
User interface languages	Currently available (extension of list is possible)	de, en, es, fr, hu, it, nl, sk, sv

2.7. Supply water and reagent conditions

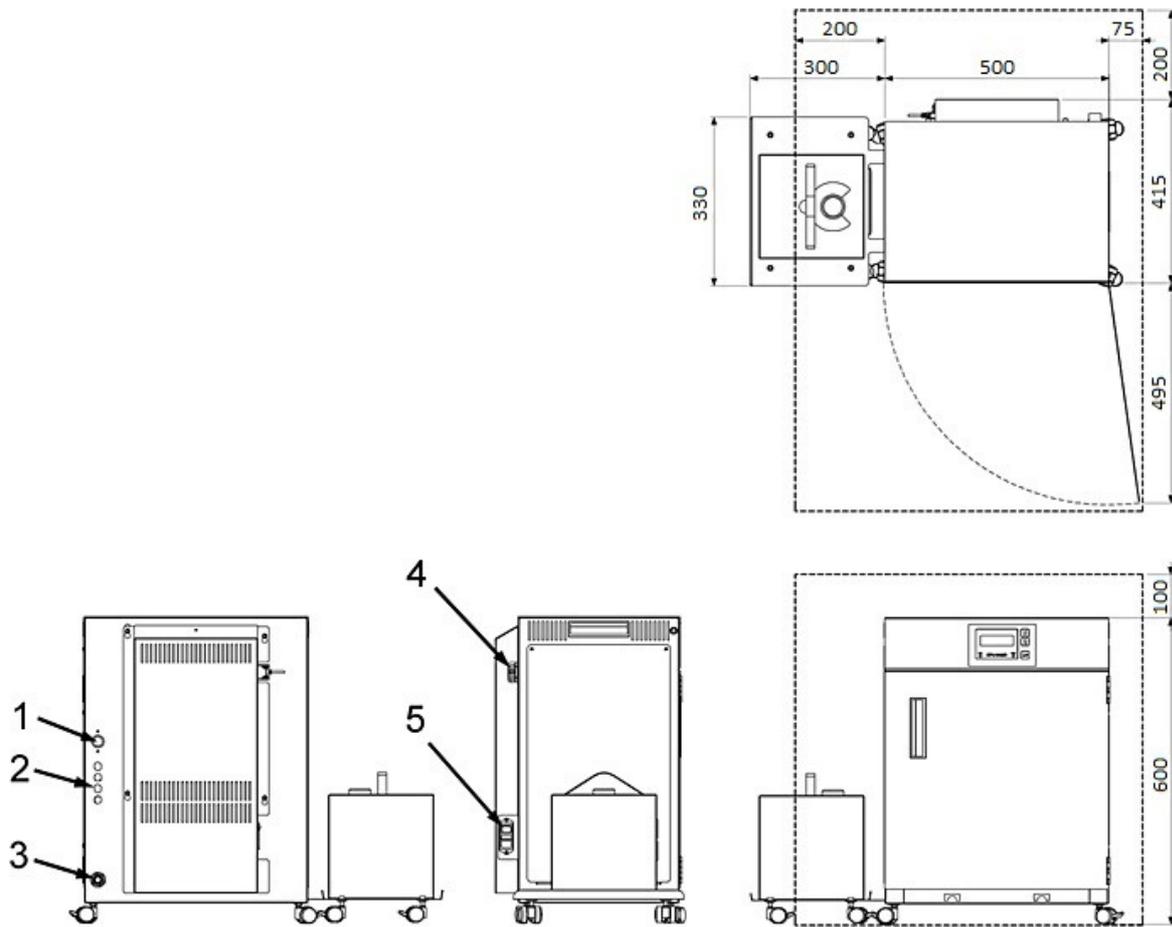
Demineralized water	Required quality (conductivity)	Less than 0,2 μ S/cm
	Required volume (consumption during normal operation)	20 liters/hour
	Required temperature	5 ... 25 °C
	Minimum pressure	1 bar
	Maximum pressure	5 bar
	Required tube connector	G 3/4" male

Instrument description

Concentrated reagent supply	Max. Container size	390 x 260 x 300 mm (width x depth x height)
	Reagent type	SYSMEX Cellpack concentrate
Filtration	Air filter	Bacterial filter, pore size 0.2 µm
	Liquid pre-filter	Pharmaceutical grade capsule (sterilised), pore size 0.8+0.45 µm, self-venting
	Liquid final filter	Pharmaceutical grade capsule (sterilised), pore size 0.2 µm, self-venting
Diluted reagent conductivity range		In accordance with "Solution for technical adjustment" ZE000901: 13.47 mS/cm (+/- 0.1 mS/cm) at 25 °C (+/- 2 °C)
Diluted reagent continuous output	At water temperature 5 ... 20 °C	less than 16 liters/hour
(during continuous extraction)	At water temperature 20 ... 25 °C	ca. 16 liters/hour minimum ca. 18 liters/hour maximum
Throughput	(18 liters/hour equals approx. 600 samples/hours)	
Diluted reagent peak extraction	0.5 liters/minute	6 minutes max.
(with full storage and overflow container and new pre-filter)	1 liter/minute	2 minutes max.
Diluted reagent extraction method	Method	Vacuum
	Range	75 .. 600 mm Hg

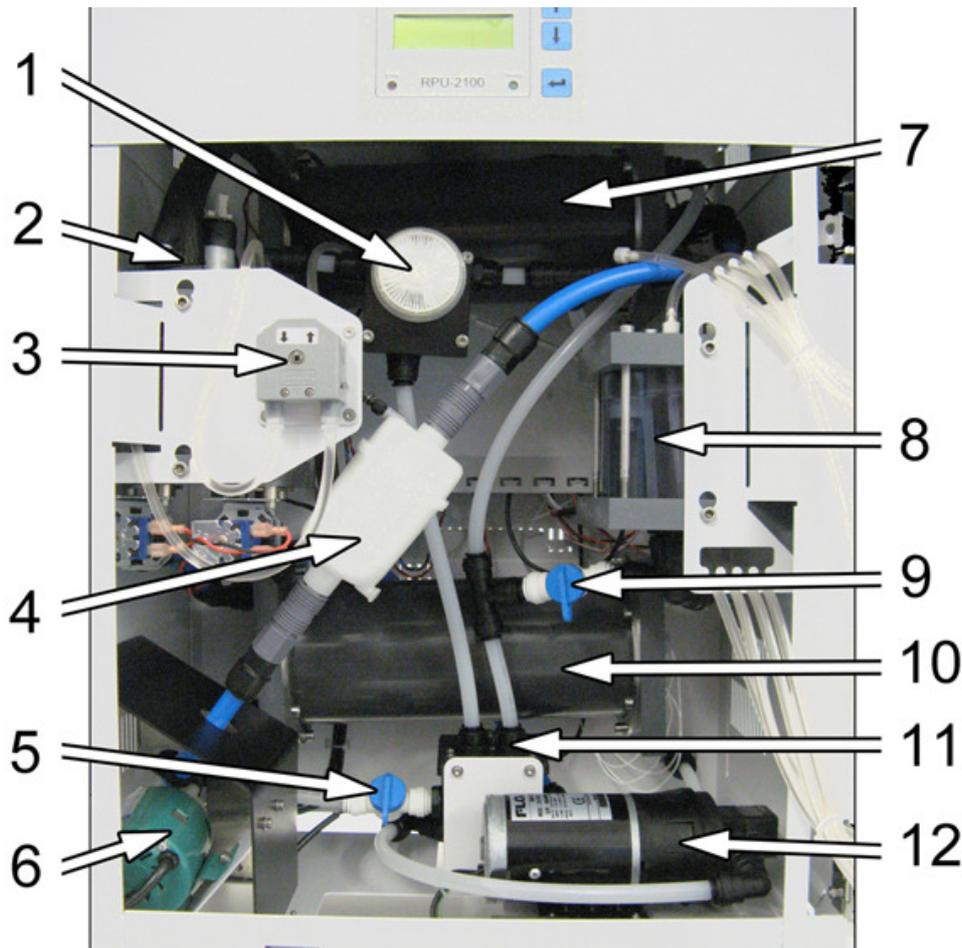
2.8. Instrument overview

2.8.1. Outside view and overall dimensions



- | | | | |
|---|---------------------------|---|----------------------|
| 1 | Water intake connector | 4 | External connections |
| 2 | Reagent outlet connectors | 5 | Mains entry module |
| 3 | Waste outlet connector | | |

2.8.2. Inside view



- | | | | |
|---|-------------------------------|----|--------------------------------|
| 1 | Air filter | 7 | Water container |
| 2 | Mix container | 8 | Overflow container |
| 3 | Reagent pump | 9 | Overflow container drain valve |
| 4 | Fluid pre-filter | 10 | Storage container |
| 5 | Storage container drain valve | 11 | Waste manifold |
| 6 | Circulation pump | 12 | Waste pump |

2.8.3. Water container

The water container is a non transparent, closed vessel that holds a supply of demineralized water from the external water supply. The water is heated to 25 °C in this container. A stirring device provides a uniform temperature gradient in the water. The container is ventilated and protected from pressurizing by a tube connection to the waste manifold.

2.8.4. Mix container

The mix container is a transparent vessel in which the dilution is produced. It houses the conductivity sensor assembly and a mixing device. The container is ventilated and protected from pressurizing by a tube connection to the waste manifold.

2.8.5. Storage container and circulation system

The storage container is a non transparent, closed vessel that holds the diluted reagent. The stored mixture is continuously pumped through a bacterial filter into an overflow container. The filter removes particles and bacteria from the reagent. The flow capacity of the filter is monitored.

The overflow container is a transparent, closed vessel from which the connected analysers draw the reagent. A separate connection for each analyser leads through the rear side of the RPU-2100R to the outside. Each analyser is connected to a separate final bacterial filter. Excess mixture flows back to the storage container.

Both containers are ventilated and protected from pressurizing by a tube connection to the waste manifold.

At the lowest point, between the storage container and the circulation pump, a drain valve is located, which redirects the flow to the waste pump in case the system needs to be drained. A second drain valve is located under the overflow container to drain the overflow container. Both valves are operated manually.

2.8.6. Reagent pump

The peristaltic pump transports the concentrated reagent into the mix container. The pump tube is easily replaceable.

2.8.7. Waste collection

All containers are connected to the waste manifold, which leads to the waste pump. A float switch inside the manifold triggers the waste pump which pumps the waste out of the instrument. If the RPU-2100R is not connected to a central waste collection system, an optional 20 liter waste container can be connected. The optional waste container is monitored by a level switch to prevent overfilling.

2.8.8. Control unit

The electronic control unit is located at the rear side of the instrument and is shielded from the fluid system. The control unit is not accessible for the user.

All activators, sensors etc. are controlled by a single PCB. The software is embedded and stored in Flash-memory.

The software is flash programmable from a PC via an USB connection or RS232 (SUB-D plug), depending on the model (see **Technical specifications** (on page 13)).

2.8.9. External communication connection

An array of connectors for external communication purposes is located on the rear side of the instrument.

2.8.9.1. I/O

Three I/O connectors are available for external devices, such as the optional waste container level switch.



NOTE:

Contact your Sysmex representative for more information about auxiliary external devices. These devices must be connected by a trained engineer.

2.8.9.2. RS-232 (only model NARP109000)

The RS-232 connector is used to send data from the RPU-2100R to a monitor system and for programming purposes. Via the RS-232 online connection to the Extended IPU is realised.



NOTE:

The RS-232 connector is for service purposes only.

2.8.9.3. Ethernet/USB (only model NARP109010)

The Ethernet connection is used to send data from the RPU-2100R to a monitor system.
The USB connection is used for firmware updates.

3. SAFETY INFORMATION

3.1. General safety precautions



Read the instructions before operating the instrument. Observe all cautionary markings in the manual and on the instrument. Keep this manual for future reference.

Do not spill fluids on to the instrument. This could cause a short-circuit. If this happens, turn the main switch OFF immediately and unplug the power cable. Contact the Sysmex service representative.

Should the instrument emit unusual odours or smoke, turn the main switch OFF immediately and unplug the power cable. Using the instrument further carries the risk of fire, electric shock or personal injury. Contact the Sysmex service representative.

Do not touch the electric circuits inside the instrument particularly with wet hands, as there is a risk of electric shock.

This instrument must be connected to a power outlet of the correct voltage. Please note that the instrument must be earthed.

Avoid damage to the power cable. Do not place any appliances on the power cable nor pull on the power cable.

When the instrument is not used (including overnight), the water supply must be closed to avoid water spillage accidents.

This instrument must only be opened as instructed in this manual

3.2. Avoidance of infection

The internal fluid containers may never be opened by the user, but only by trained service personnel. During prolonged use of the RPU, harmful bacteria (f.e. legionella) may grow inside the containers. Before the containers are opened, the disinfection procedure must be performed (see section Maintenance for details).

3.3. Installation

The instrument must be installed in a dry and dust-free location.

Do not expose the instrument to excessive temperature fluctuation and direct sunlight. Avoid shocks and vibrations. Ensure good ventilation.

Avoid installation near devices causing interference e.g. radios, centrifuges, etc.

Installation of the instrument in places where chemicals are stored or gas develops is not permitted.

3.4. Handling reagents

Observe the labelling on reagent packages and the information on the package insert.

Avoid direct contact with reagents. Reagents can cause irritation of the eyes, skin and mucous membranes.

Should you inadvertently have come into contact with reagent rinse the skin immediately with plenty of water.

Following eye contamination, rinse at once with plenty of water. Consult a doctor without delay. Observe the material safety data sheet.

If reagent has inadvertently been swallowed consult a physician immediately!

Avoid contamination of reagents by dust or bacteria. Reagents must not be used after their expiry date.

Following minor reagent spills, wipe with a damp cloth. For major spills follow your standard laboratory procedure.

Cellpack concentrate is a good conductor and therefore if spilled close to electrical cables or appliances there is a risk of electric shock. Switch the instrument off, unplug before cleaning the spillage.

RPU DISINFECTANT is a strong alkaline cleaning material. If it comes into contact with skin or clothing flush the affected surface with copious amounts of water. Observe the material safety data sheet.

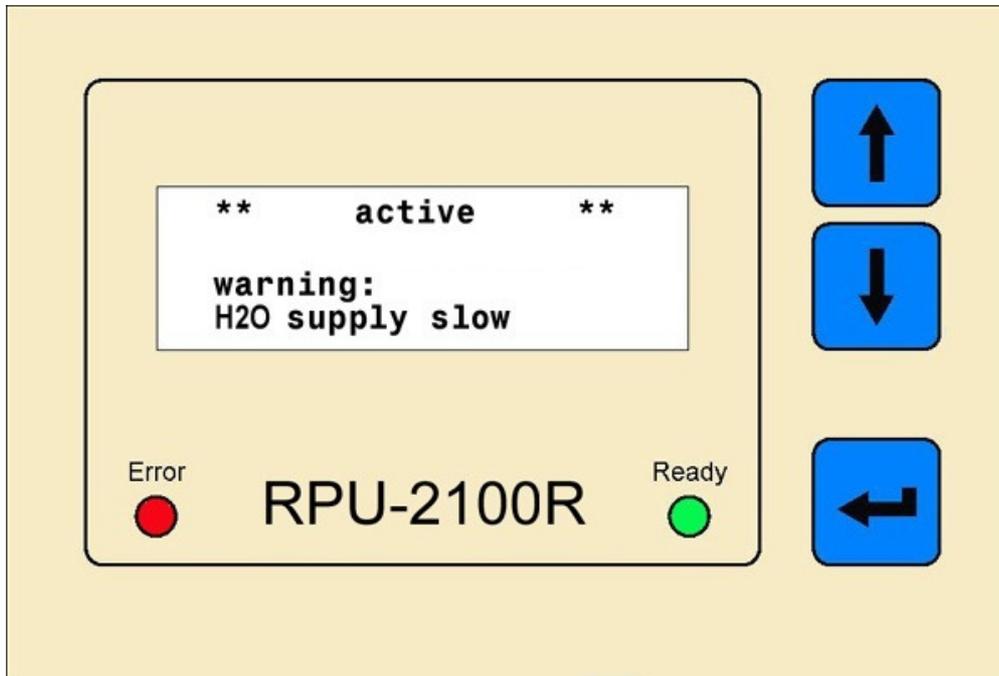
RPU DISINFECTANT contains sodium hypochlorite which is corrosive. Wipe immediately with a damp cloth.

4. INSTALLATION

The instrument must be unpacked, installed and checked by a trained Sysmex service representative prior to first operation.

Detailed installation instructions are given in the RPU-2100R Service manual.

5. USER INTERFACE AND SOFTWARE MENU



5.1. Display layout

The display is arranged in 4 lines x 20 characters. The main display comes up when the instrument is switched ON.

In the display the following information is provided:

5.1.1. Mode information

The first display line shows whether the instrument is [ACTIVE] or [STAND-BY] or performs a [SERVICE FUNCTION].

[ACTIVE] means the instrument is operational and automatically produces reagent. Service functions are not available at this setting.

[STAND-BY] means the production of reagent is suspended, so that service functions and maintenance tasks can be performed.

Switching the instrument to either setting is done by the user. At start-up, the instrument switches automatically to the [ACTIVE] mode after 15 seconds.

5.1.2. Status information

Line three and four show short messages, that indicate the current status or the reagent production:

- "filling"
 - the water container is being filled
- "heating: xx,x °C (xx,x °C)"
 - the water heating is in progress, current temperature, between brackets: final temperature
- "mixing, please wait"
 - reagent mixing is in progress
- "READY"
 - diluted reagent is available for the analysers

Whenever an error or warning occurs, the status line is switched in 1-second intervals between the error or warning messages and the regular status information.

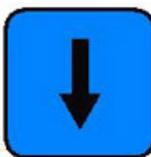
5.2. Using the keyboard

The RPU-2100R has a menu-controlled operating system. The menu's can be selected by pressing the [**ENTER**] key and/or using the [**ARROW UP**] and [**ARROW DOWN**] keys to scroll. An arrow [>] in front of the line indicates the chosen position.

To activate the chosen function or enter the submenu, press [**ENTER**].

The [RETURN] entrance in submenu's always returns to the previous menu.

The [RETURN] entrance in the main menu returns to the main display

Button	Description	use this key to:
	ARROW UP	<ul style="list-style-type: none"> • scroll up in a menu • increase the value of a parameter • switch the beeper temporarily off
	ARROW DOWN	<ul style="list-style-type: none"> • scroll down in a menu • decrease the value of a parameter • switch the beeper temporarily off
	ENTER	<ul style="list-style-type: none"> • select a menu item • start a function • confirm an action

5.3. Signals

Two LED's are implemented in the display of the RPU-2100R. Simultaneously with an internal beeper, they indicate various conditions:

LED	Status	Mode
Green ("Ready")	Continuously ON	Active mode
Green ("Ready")	Flashing	Standby mode
Red ("Error")	Continuously ON + short beeps	Error
Red ("Error")	Flashing + long beeps	Warning

See Section "Troubleshooting" for details on errors and warnings.

5.4. Menu items overview

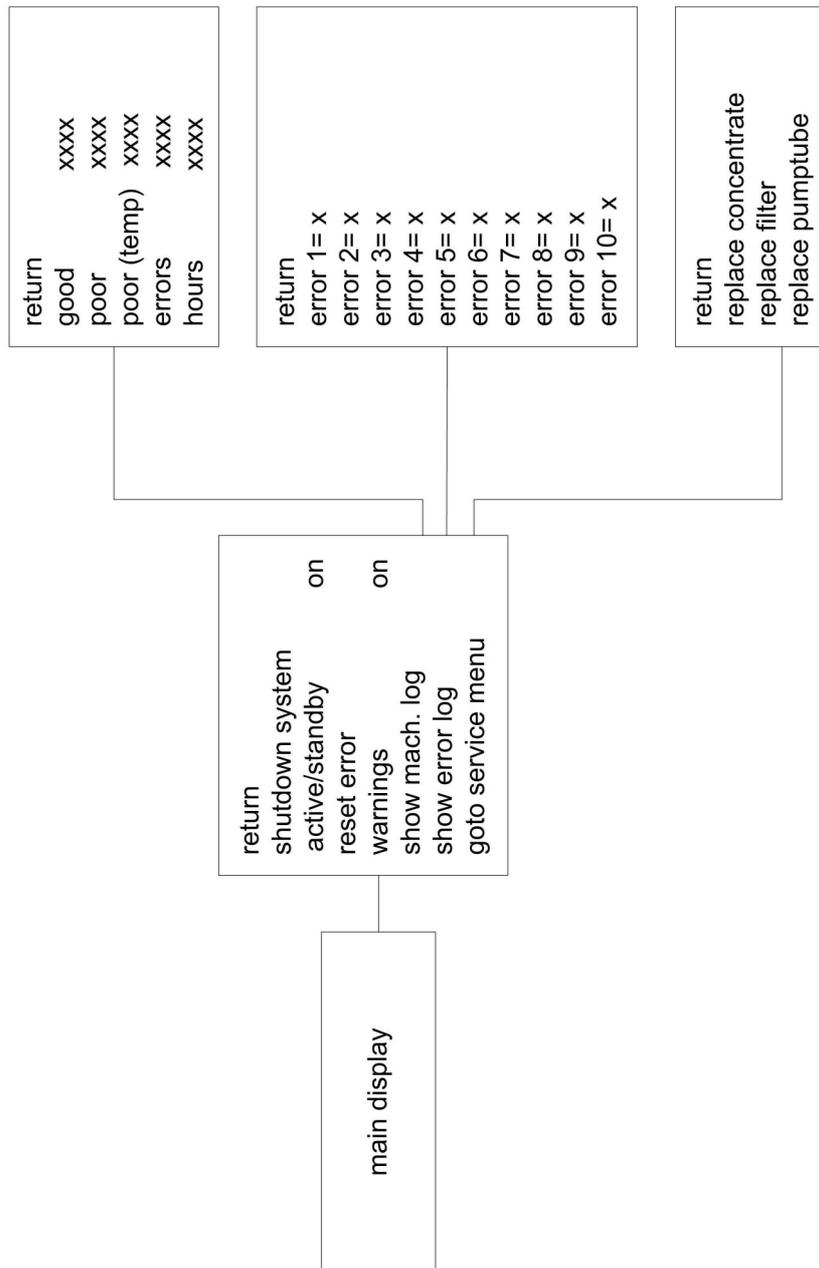
The various menu items are only briefly explained in this section. Please refer to Section Maintenance for more details.

Legend: [BOLD TEXT] is the text on the display

Bold text is the default setting

[**ENTER**] is the key function

5.4.1. Menu structure (user level)



5.4.2. Main menu

The following items are accessible in Active- or Standby modes.

Main menu	
[RETURN]	Returns to the main display
[SHUTDOWN SYSTEM]	Before the instrument is switched off, this function must be executed. See section "Normal operation" for details.
[ACTIVE / STAND-BY ON/OFF]	Toggles between the "active" and "standby" modes. [On] corresponds to "active"; [off] corresponds to "standby". Default at start-up: standby. Is automatically switched to active after 15 seconds. See section "Normal operation" for details
[RESET ERROR]	Resets an error message
[WARNINGS ON/OFF]	Default at start-up: warnings on. If the user does not want warnings to be signalled, this item can be switched off. Error messages will not be affected by this setting.
[SHOW MACH. LOG]	Enters the instrument log menu
[SHOW ERROR LOG]	Enters the error log menu
[GOTO SERVICE MENU]	Enters the service menu

5.4.3. Machine log menu

The following items are accessible in Active- or Standby modes.

Machine log	
[RETURN]	Returns to previous menu.
[GOOD]	Shows the total amount of good mixtures. Non-volatile value. Range: 0-9,999,999
[POOR]	Shows the total amount of rejected mixtures due to incorrect conductivity values. Non-volatile value. Range: 0-9,999,999
[POOR (TEMP)]	Shows the total amount of rejected mixtures due to too much temperature deviation. Non-volatile value. Range: 0-9,999,999
[ERRORS]	Shows the total amount of errors. Non-volatile value. Range: 0-9,999,999
[HOURS]	Shows the cumulative running hours of the circulation pump.

5.4.4. Error log menu

The following items are accessible in Active- or Standby modes.

Error log	
[RETURN]	Returns to previous menu
[errors 1 through 10]	Shows the last 10 errors that have occurred. Non-volatile value.

5.4.5. Service menu

Most of the items of the service menu can only be accessed when the instrument is in Standby mode. Inaccessible items are signalled with a ringing sound.

Service menu	
[RETURN]	Returns to previous menu.
[REPLACE CONCENTRATE]	Allows replacement of the Cellpack concentrate reagent container. See Section Maintenance for a step-by-step procedure.
[REPLACE FILTER]	Allows replacement of the internal fluid pre-filter. See Section Maintenance for a step-by-step procedure.
[REPLACE PUMPTUBE]	Allows replacement of the reagent pump tube. See Section Maintenance for a step-by-step procedure.

6. STANDARD OPERATION PROCEDURES

6.1. Start-up



NOTE:

The RPU-2100R should be started 20..30 minutes earlier than the connected analysers. This will assure, that the RPU-2100R is running at full capacity when the analysers demand ready-to-use diluent.

1. Make sure, that the demineralized water supply is running and the waste container (if installed) is empty.
2. Switch the instrument ON.
3. During the first 15 seconds, the display shows the software version and the message [PRESS ENTER TO START IN STANDBY]
If [**ENTER**] is not pressed during this period, the software will switch automatically into the "Active" mode and the main screen is displayed.
The instrument will now begin to make diluted reagent.

6.2. "Active" mode

The "Active" mode is indicated at the first line of the display and the green "Ready" LED is continuously ON.

All necessary processes for the production of diluted reagent are performed automatically, for as long as demineralized water and concentrated reagent are available and diluted reagent is being extracted. The display shows short messages, indicating the ongoing processes.

Production of diluted reagent will be suspended, when the internal storage container is filled.

When reagent is being drawn from the overflow container, the level in the storage container will drop and production of reagent continues automatically.

Menu items of monitoring character can be accessed in active mode.

Service functions that interfere with the automatic processes are inaccessible. This is signalled with a ringing sound.

6.2.1. Circulation pump behaviour in active mode

When sufficient diluted reagent is available in the storage container, the circulation pump automatically pumps the reagent through the filter into the overflow container. Circulation is in turns activated for 1 minute and then suspended for 15 minutes if no reagent is extracted from the overflow container. When reagent is drawn from the overflow container and the level drops, circulation is continued as long as necessary to keep the level up.

If the storage container level is low, the pump might stop temporarily, to prevent damage. It will restart automatically when sufficient reagent is available again.

6.3. "Standby" mode

The "Standby" mode is indicated at the first line of the display and the green "Ready" LED is flashing.

In order to access service functions, the instrument needs to be set to standby mode. This means, that production of diluted reagent is stopped.

This function may be invoked at all times. However, it may take a few seconds, since the automatic processes need to be stopped at safe conditions.

6.3.1. Circulation pump behaviour in standby mode

In general, the circulation pump behaves in the same way as in active mode. However, if it is necessary for the execution of certain service functions, the pump will be stopped.

6.4. Replacing concentrated reagent

When the Cellpack concentrate reagent cubitainer is run out, the instrument signals "C38 CONDUCTIVITY - CHANGE CONCENTRATE".

See section "Trouble shooting actions **C38 Conductivity – change Cellpack concentrate** (on page 43)" for the procedure.

The reagent container can also be replaced preventive.

See section "Maintenance **Preventive Cellpack concentrate replacement** (on page 46)" for the procedure.

6.5. Shutdown

Whenever the RPU-2100R is to be shut down, this must always be done by using the menu option [SHUTDOWN SYSTEM] in the main menu. This ensures that the running hours are logged correctly.



NOTE:

When the system is to be shut down, the connected analysers should be shut down first. This will avoid that the connecting tubes and internal reserves of the analysers are drained empty.

**ATTENTION:**

Whenever the instrument is to be switched OFF, the external water supply must be closed first!

After closing the water supply, activate [SHUTDOWN SYSTEM] in the main menu. This can be done in either “active” or “standby” mode.

The user is notified when the instrument can be switched OFF safely.

7. TROUBLESHOOTING

7.1. Error, condition and warning messages

The RPU-2100R detects various error-, condition- and warning situations in order to provide the user with information about malfunction or possible imminent malfunction of the instrument.



NOTE:

The audio signal can be turned off temporarily, by pressing one of the arrow buttons. The audio signal will be switched on automatically when another error or warning condition arises.

7.1.1. Difference between errors, conditions and warnings

Warning signal:

- Display shows the warning number and description
- Error LED is flashing
- Beeper produces long beeps (1 second) with evenly long pauses (1 second)

A warning is signaled, whenever a situation occurs, that might interfere with the desired output of diluted reagent such as slow filling and draining cycles. Warnings do not affect the ongoing processes, and are reset automatically when the warning situation is over.

Warnings turn into errors, when specific limits for that situation are exceeded.

When a warning is signaled persistently without turning into an error, contact the Sysmex service representative for maintenance to prevent possible imminent malfunction in the future.

The user can choose not to be informed about warnings by switching the function off. Warnings are not logged in the error-log.

Condition signal:

- Display shows the condition number and description and a short advice for user action
- Error LED is flashing
- Beeper produces long beeps (1 second) with longer pauses (3 seconds)

Conditions are situations that interfere with the correct function of the instrument and need the immediate attention of the user. Conditions are usually related to external factors, which must be resolved by the user. In some cases, the condition can also be caused by internal problems.

See section "Troubleshooting" for appropriate actions in case of conditions.

Error Signal:

- Display shows the error number and description and a short advice for user action
- Error LED is continuously on
- Beeper produces short beeps (0.3 seconds) with evenly short pauses (0.3 seconds)

Errors need the immediate attention of the user because the correct function of the instrument is no longer guaranteed. All ongoing processes are halted with the exception of waste removal and storage circulation.

See section "Troubleshooting" for appropriate actions in case of errors.



NOTE:

If a condition or error is reset whenever the error situation still exists, the instrument will go into error again!

The last 10 errors are logged, following the first in-first out principle.

Errors, conditions and warnings are displayed with an error number, a short description of the error and a short description of the appropriate action of the user.

The errors are divided into groups for the main processes in the instrument:

Process	Errors	Conditions	Warnings
Waste	E1 through E10	C1 through C10	W1 through W10
Storage	E11 through E20	C11 through C20	W11 through W20
H2O	E21 through E30	C21 through C30	W21 through W30
Mix	E31 through E40	C31 through C40	W31 through W40
Internal	E41 through E50		

7.1.2. Error, condition and warning list and possible causes

7.1.2.1. Error list (Extended)

Error message RPU-2100R and cockpit of <i>Extended</i> IPU	Triggered by	Possible causes	Explanation/Message shown in <i>Extended</i> IPU
E1 WASTE - CHECK WASTE	Waste manifold float switch timeout	<ul style="list-style-type: none"> Waste tube kinked or blocked Water pressure too high Waste manifold float switch malfunction Waste pump malfunction H2O inlet valve malfunction Variable setting "twaste" too short 	<p>[waste (E1)]: Empty the waste container and check the waste container sensor connection and the external waste tube for kinks or blockages.</p> <p>If error persists after action change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.</p>
E11 SENSOR CONFLICT - CALL SERVICE - CALL SERVICE	sensor "STORAGE EMPTY" = OFF, sensor "STORAGE FULL" = ON detected	<ul style="list-style-type: none"> Storage container float switch malfunction 	<p>[sensor conflict (E11)]: Storage container float switch malfunction.</p> <p>Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.</p>
E22 H2O HEATING - CALL SERVICE	water temp. sensor timeout (< 24,5°C)	<ul style="list-style-type: none"> Mechanical heater setting too low Heater malfunction Water temp. sensor malfunction Variable setting "theat" too short 	<p>[H2O heating (E22)]: Heater settings too low or heater malfunction.</p> <p>Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.</p>
E23 H2O STIRRING - CALL SERVICE	H2O stirring sensor timeout	<ul style="list-style-type: none"> Stirrer motor or sensor malfunction Stirrer jammed 	<p>[H2O stirring sensor timeout (E23)]: Stirrer motor or sensor malfunction or Stirrer jammed.</p> <p>Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.</p>
E31 MIX SUPPLY - CALL SERVICE	Mix container float switch	<ul style="list-style-type: none"> No water supply from water 	<p>[mix supply (E31)]: Malfunction supply of the mixing container.</p>

Error message RPU-2100R and cockpit of <i>Extended</i> IPU	Triggered by	Possible causes	Explanation/Message shown in <i>Extended</i> IPU
	timeout	container <ul style="list-style-type: none"> • "Mix container IN" valve malfunction • Mix container float switch malfunction • Variable setting "tmixfull" too short 	Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E32 DRAIN POOR - CALL SERVICE	Mix container float switch timeout	<ul style="list-style-type: none"> • "Mix container Out poor" valve malfunction • Mix container float switch malfunction • Variable setting "tmixempty" too short 	[drain poor (E32)]: Malfunction draining of the mixing container. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E33 DRAIN OK - CALL SERVICE	Mix container float switch timeout	<ul style="list-style-type: none"> • "Mix container Out OK" valve malfunction • Mix cont. float switch malfunction • Variab. setting "tmixempty" too short 	[drain ok (E33)]: Malfunction draining of the mixing container. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E34 MIX FULL - CALL SERVICE	Mix container float switch triggered prematurely	<ul style="list-style-type: none"> • Leaking "mix container Out" valves • Mix container float switch malfunction 	[mix full (E34)]: Leaking of the mixing container or float switch malfunction. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E35 H2O COND. NOT OK -CALL SERVICE	External H2O device	<ul style="list-style-type: none"> • H2O device is depleted or malfunctioning 	[H2O cond. not OK (E35)]: Water demineralization device is depleted or malfunctioning. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative. If error persists after conditioning contact service representative of the water supply system.
E36 H2O TEMPERATURE > -	Water temp. in mix container >	<ul style="list-style-type: none"> • Water temp. sensor malfunction 	[H2O temperature> (E36)]: Water temperature too high in mixing container or heater malfunction.

Error message RPU-2100R and cockpit of <i>Extended</i> IPU	Triggered by	Possible causes	Explanation/Message shown in <i>Extended</i> IPU
CALL SERVICE	27°C	<ul style="list-style-type: none"> Heater malfunction 	Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E37 H2O TEMPERATURE < - CALL SERVICE	Water temp. in mix container < 23°C	<ul style="list-style-type: none"> Water temp. sensor malfunction Too much temp. drop due to cold environment 	[H2O temperature< (E37)]: Water temperatur too low in mixing container or heater malfunction. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E41 PARAMETER - CALL SERVICE	CPU	<ul style="list-style-type: none"> Conflicting data read from Eeprom 	[parameter (E41)]: Conflicting data read from Eeprom. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E42 COMMUNICATION - CALL SERVICE	CPU	<ul style="list-style-type: none"> Communication error between instrument CPU and conductivity measurement CPU 	[communication (E42)]: Communication error between instrument CPU's. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E43 NTC H2O SENSOR - CALL SERVICE	water temperature > 40°C	<ul style="list-style-type: none"> Malfunction in water temperature sensor circuit 	[NTC H2O sensor (E43)]: Malfunction of water temperature sensor circuit. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E44 NTC MIX SENSOR - CALL SERVICE	Mix container temperature > 40°C	<ul style="list-style-type: none"> Malfunction in Mix container temperature sensor circuit 	[NTC Mix sensor (E44)]: Malfunction of water temperature sensor: circuit. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.
E45 GX SENSOR - CALL SERVICE	CPU	<ul style="list-style-type: none"> Conductivity or temperature sensor malfunction 	[Gx sensor (E45)]: Conductivity or temperature sensor malfunction. Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.

Error message RPU-2100R and cockpit of <i>Extended</i> IPU	Triggered by	Possible causes	Explanation/Message shown in <i>Extended</i> IPU
E46 COMMUNICATION	CPU	<ul style="list-style-type: none"> Electronics malfunction (internal) 	<p>[internal communication (E46)]: Electronics malfunction.</p> <p>Change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.</p>

7.1.2.2. Condition list

Condition message RPU-2100R and cockpit of <i>Extended</i> IPU	Triggered by	Possible causes	Explanation/Message shown in <i>Extended</i> IPU
C2 WASTE CONT. FULL-CHECK WASTE	Waste container float switch	<ul style="list-style-type: none"> Waste container is full External waste sensor or Loop connector malfunction or not connected 	<p>[waste container full (C2)]: Empty waste container or check drain connection.</p> <p>If error persists after action change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.</p>
C12 CIRCULATION - CHANGE INT. FILTER	overflow container float switch (circulation < 14l/h)	<ul style="list-style-type: none"> Internal filter is blocked Circulation pump malfunction Overflow container float switch malfunction 	<p>[circulation (C12)]: Customer Maintenance - Change analyser(s) to ready-to-use Cellpack.</p> <p>Replace Internal filter. If error persists after replacement contact local Sysmex technical service representative.</p>
C21 H2O SUPPLY - CHECK WATER SUPPLY	water container float switch timeout	<ul style="list-style-type: none"> Insufficient or no water supply Water container float switch malfunction H2O inlet valve malfunction Variable setting "tro" too short 	<p>[H2O supply (C21)]: Check connected water demineralization device if taps and valves are fully opened.</p> <p>1. If error persists change analyser(s) to ready-to-use Cellpack and contact technical service representative of the water supply system.</p> <p>2. If water demineralization device is working according to the specifications, contact local Sysmex technical service representative</p>
C38 CONDUCTIVITY - CHANGE CONCENTRATE		<ul style="list-style-type: none"> Concentrated reagent container empty Reagent pump malfunction Large air bubbles in concentrated reagent line 	<p>[conductivity (C38)]: Replace the connected Cellpack concentrate reagent container.</p> <p>If the Cellpack concentrate container is certainly not empty, change analyser(s) to ready-to-use Cellpack and contact local Sysmex technical service representative.</p>

7.1.2.3. Warning list

Warning message RPU-2100R and cockpit of <i>Extended</i> IPU	Triggered by	Possible causes	Explanation/Message shown in <i>Extended</i> IPU
W12 SLOW CIRCULATION	overflow container float switch (circulation < 28l/h)	<ul style="list-style-type: none"> Internal filter is partially blocked 	[slow circulation (W12)]: Warning does not affect ongoing process.
W21 H2O SUPPLY LOW	water container float switch timeout	<ul style="list-style-type: none"> Slow water supply "H2O container IN" valve not fully open Variable setting "tro" too short 	[H2O supply slow (W21)]: Warning does not affect ongoing process. Check connected water demineralization device if taps and valves are fully open.
W23 H2O STIRRING	H2O stirring sensor timeout	<ul style="list-style-type: none"> Stirrer motor or sensor malfunction Stirrer jammed 	[H2O stirring (W23)]: Warning does not affect ongoing process.
W31 DRAIN POOR SLOW	Mix container float switch timeout	<ul style="list-style-type: none"> "Mix container Out poor" valve not fully open 	[drain poor slow (W31)]: Warning does not affect ongoing process.
W32 DRAIN OK SLOW	Mix container float switch timeout	<ul style="list-style-type: none"> "Mix container Out OK" valve not fully open 	[drain OK slow (W32)]: Warning does not affect ongoing process.
W33 MIX SUPPLY SLOW	Mix container float switch timeout	<ul style="list-style-type: none"> "Mix cont. in" valve not fully open 	[mix supply slow (W33)]: Warning does not affect ongoing process.

7.2. Troubleshooting actions

7.2.1. E1 Waste – check waste

If the waste pump is running:

1. Press one of the arrow keys to switch the beeper temporarily off.
2. Perform the "service call procedure"

If the waste pump is not running:

1. Press one of the arrow keys to switch the beeper temporarily off.
2. Empty the waste container and check the waste container sensor connection.
3. Check the external waste tube for kinks or blockages. Remove these if necessary.
4. Go to menu [RESET ERROR] and press [**ENTER**].
5. If the error returns, perform the "Service call procedure"

7.2.2. C2 Waste container full – check waste

If the waste pump is running:

1. Press one of the arrow keys to switch the beeper temporarily off.
2. Perform the "service call procedure"

If the waste pump is not running:

1. Press one of the arrow keys to switch the beeper temporarily off.
2. Empty the waste container and check the waste container sensor connection.
3. Go to menu [RESET ERROR] and press [**ENTER**].
4. If the error returns, perform the "Service call procedure"

7.2.3. C12 Circulation – change internal filter

1. Press one of the arrow keys to switch the beeper temporarily off.
2. The circulation pump stops automatically.
3. Replace the internal filter. Connect the tubes as explained in **Pre-filter replacement** (on page 46)
4. Go to menu [RESET ERROR] and press [**ENTER**].
5. If the error returns, perform the "Service call procedure"

7.2.4. C21 No H2O supply – check water supply

This condition is usually caused by a temporary drop of the water supply pressure.

1. Press one of the arrow keys to switch the beeper temporarily off.
2. Go to menu [RESET ERROR] and press [**ENTER**] .or switch the RPU-2100R off and on.

When this condition is signalled persistently:

1. Check that the external water supply taps and valves are fully opened.
2. If the error returns, perform the "Service call procedure".

7.2.5. C38 Conductivity – change Cellpack concentrate

1. Press one of the arrow keys to switch the beeper temporarily off.
2. Confirm the error message by pressing [**ENTER**].
3. The display shows then the instruction: [REPLACE CONCENTRATE **and press enter when ready...**].
4. Check the concentrated reagent container.
5. If the container is certainly not empty, perform the "Service call procedure".
6. Otherwise, replace the reagent container.
7. Press [**ENTER**]
8. If the error returns, perform the "Service call procedure".

7.2.6. Service call procedure-call local Sysmex technical service representative

1. Press one of the arrow keys to switch the beeper temporarily off.
2. Make a note of the displayed error message.
3. Close the water tap at the water demineralization device.
4. Close the water shut-off valve at the RPU-2100R.
5. Switch the RPU-2100R off.
6. Disconnect the tubing between the external filters and the analysers from the external filters.
7. Connect the tubes to one or more cubitainers of ready-to-use Cellpack.
8. Contact the Sysmex service representative for immediate service.

7.2.7. Actions in the event of a change in performance

If there is a change in the performance of the connected analysers, that seems to be related to the performance of the RPU-2100R, the service call procedure must be performed.

7.2.8. Resetting the water safety stop

A water safety stop device is located within the water connection tube between the RPU-2100R and the water demineralization device. If the safety stop device has been triggered, it must be reset as follows:

1. Close the water supply at the inlet side of the demineralization device.
2. Close the shut-off valve at the RPU-2100R.
3. Disconnect the water supply tube from the RPU-2100R
4. Place the tube end in a suitable vessel (the RPU-2100R waste container may be used) and open the shut-off valve to release the water pressure from the tube.
5. Disconnect only the water supply tube from the outlet of the water safety stop device.

6. Place a suitable container under the safety stop and push the red pin into the safety stop (this pin is located inside the outlet port).



Warning:

The water demineralization device may be under pressure and water may be gushing from the water stop when it is reset.

8. MAINTENANCE

8.1. Maintenance schedule for the user

Time frame	Actions	Duration (approx.)
Daily	<ul style="list-style-type: none"> • Check for signs of leaks or fluid spills • Check demineralized water supply < 0.2 $\mu\text{S}/\text{cm}$ 	1 minute
on request of the RPU-2100R	<ul style="list-style-type: none"> • Replace fluid pre-filter 	2 minutes
approx. every 3 month, latest during service maintenance	<ul style="list-style-type: none"> • Replace fluid final filters 	1 minute per filter

Order numbers:

Fluid pre-filter	QWLV040012
Final filter tubing set	NARP110904
Fluid final filter	QWLV040008 (QWLV040013)

8.2. Cleaning

8.2.1. Cleaning of the casing

The epoxy coated outer casing of the instrument and the reagent trolley can be cleaned with any standard (non-abrasive) kitchen cleaner or soap solution.

The LCD screen and keypad can be cleaned with a slightly damp cloth.

Do not use organic solvents!

The instrument should be switched off, to prevent unwanted activation of functions.

8.2.2. Cleaning of the containers

The outside of the containers and tubing can be cleaned with clear water.

The inside should only be rinsed with demineralized water (by a service representative). In case of excessive deposits, contact your service representative to have the containers cleaned.

The entire fluid system should be disinfected once a year by a service representative.

8.3. Preventive Cellpack concentrate replacement

Duration: approximately 2 minutes.

Necessary tools: None.

1. Switch the instrument to Standby mode.
2. Go to the [SERVICE MENU] and activate service function [REPLACE CONCENTRATE]. The reagent remaining in the tube will be pumped back into the container and the display shows the instruction: **[replace reagent and press enter when ready...]**, accompanied by a series of short beeps.
3. Remove cubitainer spout kit.
4. Exchange the Cellpack concentrate container on the trolley.
5. Replace cubitainer spout kit.
6. Press [**ENTER**].
7. Wait until the display returns to the menu.
8. Switch the instrument to Active mode.

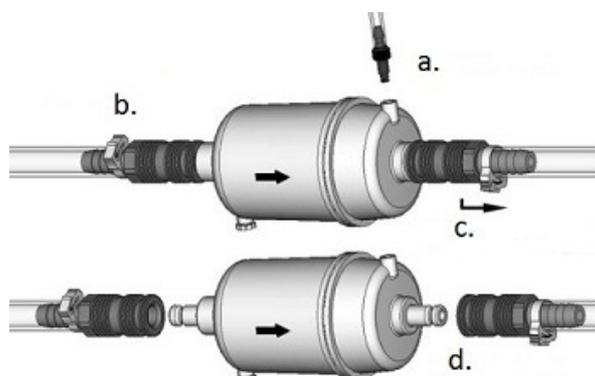
8.4. Pre-filter replacement

The flow capacity of the fluid pre-filter is monitored by the RPU-2100R and the software will indicate when the filter must be exchanged by reporting "**C12 circulation**".

Duration: approximately 2 minutes.

Necessary tools: None.

1. Switch the instrument to Standby mode.
2. Activate service function [REPLACE FILTER]. The circulation pump will stop and the display shows the instruction: [CHANGE FILTER AND PRESS ENTER WHEN READY], accompanied by a series of short beeps.
3. Open the door.
4. Unscrew the connector with the small overflow tube from the filter (shape and color of the connector may vary). Wait until all fluid has flown from the filter back into the inlet tube.
5. Remove the inlet and outlet tubes.



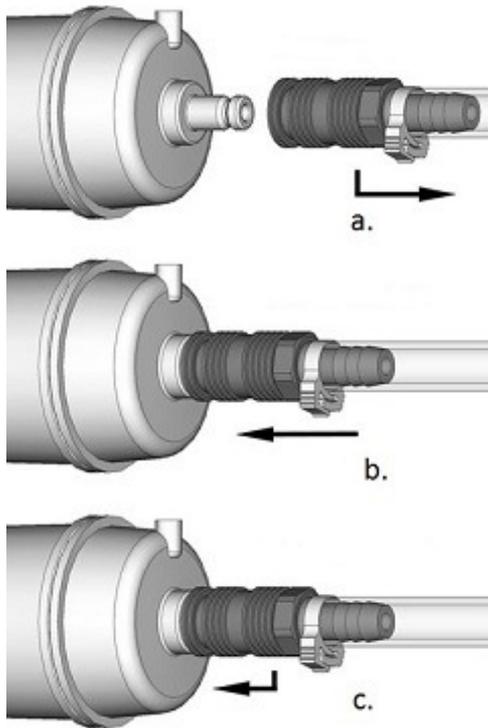
a. Remove overflow tube.

b. Wait until filter is empty.

c. Press coupling against filter and pull back the sliding ring

d. Pull coupling from filter

6. Take the new filter (QWLV040012) out of the packaging. Observe the flow direction of the filter as indicated with an arrow on the filter housing. Make sure, that the vent tap on the intake side is closed. Remove the vent tap plug from the outlet side.
7. Connect the inlet and outlet tubes to the filter:



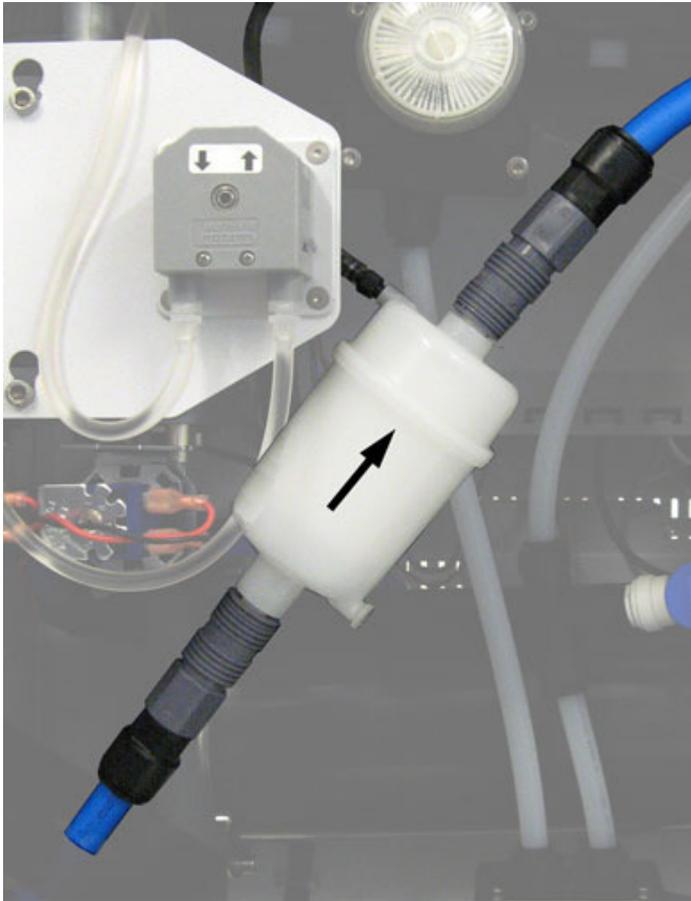
a. Pull back the sliding ring

b. Press coupling against filter

c. Push sliding ring towards filter

8. Pull the tubes to check the connection. The tubes may not come off.
9. Attach the small overflow tube with the connector on the vent tap at the outlet side of the filter (shape and color of the connector may vary).

The filter must be installed with the exhaust side facing upward and the vent tube at top position:



Pre-filter QWLV040012 location

10. Close the door.
11. Press [**ENTER**].
12. Switch the instrument to active mode.
13. Discard the old filter in the packaging of the new filter.

8.5. Final filter replacement

The fluid final filters need to be replaced immediately when they are blocked and the analysers are no longer able to draw reagent. The filters must be exchanged preventive approximately every 3 month, but latest during the routine service maintenance.

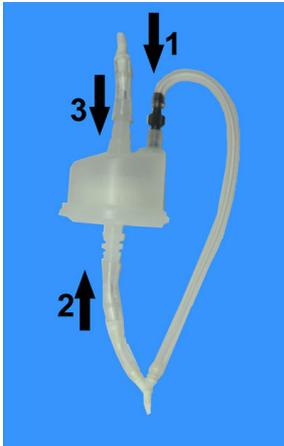
Duration: approximately 1 minute per filter.

Necessary tools: None.

The final filters are located on the inside of the door.

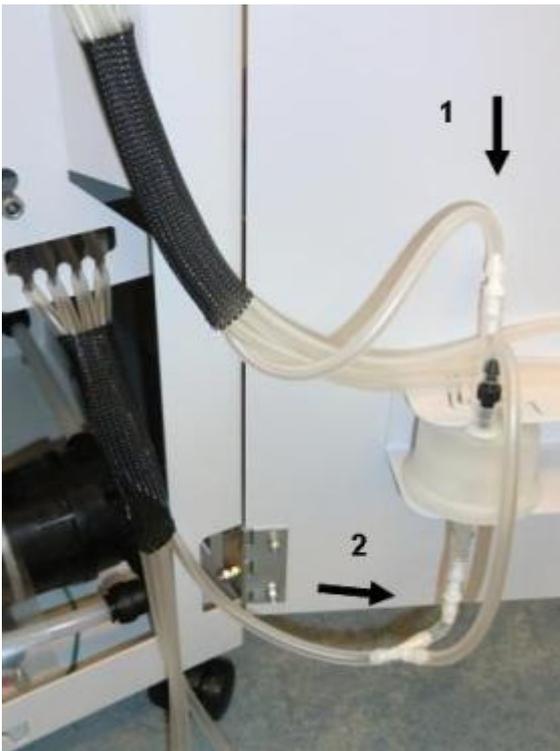
1. Remove the inlet and outlet tubes from the filter.
2. Remove the old filter from the clamps.
3. Take the new final filter out of the packaging. Depending on the type of filter used, continue as follows.

4. Filter type **QWLV040008**: Remove the vent port plug from the filter and connect the tubing set NARP110904 as shown:



1. Connect the threaded connector to the vent port.
2. Push the tube on the outlet port.
3. Connect the separate tube to the inlet port of the filter.

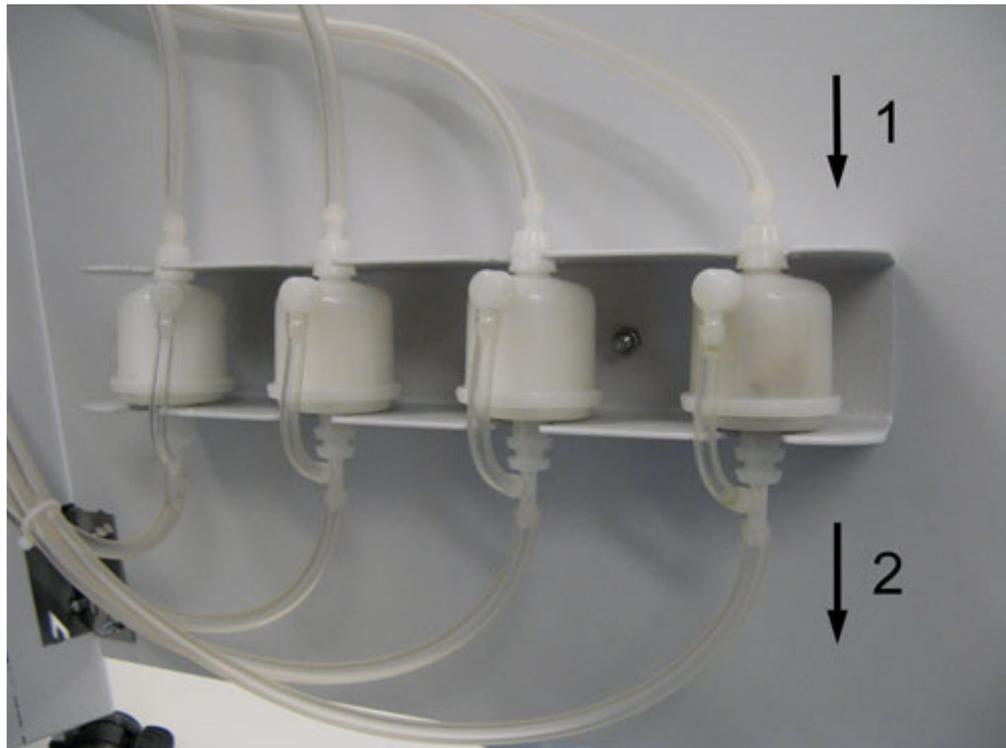
QWLV040008+NARP110904



Click the filter into the clamps as shown

1. Connect the tubes coming from the overflow container to the top of the filter
2. Connect the tubes leading to the reagent outlets to the Y-connector at the bottom of the filter.

Filter type **QWLV040013**: Click the filter into the clamps as shown:



QWLV040013

1. Connect the tubes coming from the overflow container to the top of the filter.
2. Connect the tubes leading to the reagent outlets to the bottom of the filter.

8.6. Water demineralization device replacement

When the water demineralization device shows a conductivity higher than 0,2 $\mu\text{S}/\text{cm}$, the device must be replaced. Approximate lifetime: 1 month.

Duration: approximately 15 minutes.

Necessary tools: None for RPU-2100R connections. A 20 liter vessel is necessary to collect water during the process. If the optional waste container is installed, this will be used for the purpose.

The water demineralization device replacement should be performed, when the connected analysers are offline and there is no demand for ready-to-use diluent.

If this is not possible, the analysers must be connected to ready-to-use Cellpack first:

1. Switch the RPU-2100R to standby mode.
2. Disconnect the tubing coming from the analyzers from the reagent outlet ports.
3. Connect the tubes to one or more cubitainers of ready-to-use Cellpack.

When the analysers are rerouted, begin the replacement procedure:

4. Close the water tap at the inlet side of the water device and close the water shut-off valve at the RPU-2100R.
5. Start the function [SHUTDOWN SYSTEM] and switch the RPU-2100R off when indicated.
6. If applicable, empty the (optional) waste container. Do not re-install the container!

7. Place a towel or cloth below the inlet connector, as there might be some minor water spillage.
8. Remove the tube from the inlet connector by pushing the outermost ring of the connector into the connector and at the same time pull the tube out:



9. Place the tube end into the collection vessel (e.g. the optional waste container).



ATTENTION:

Open the shut off valve **SLOWLY** and **GRADUALLY**, as the water is under pressure.

10. After 3 seconds, close the shut-off valve and wait for 3 seconds, then re-open the valve. Closing and re-opening of the valve is necessary to prevent the water safety stop from triggering. Repeat this procedure until there is no more water flowing.
11. Close the shut-off valve.
12. Empty the collection vessel.
13. Remove the inlet and outlet tubes from the water device. Refer to the manual of the water device for further instructions.
14. Replace the device and reconnect the inlet and outlet tubes to the new device. Refer to the manual of the water device for instructions.

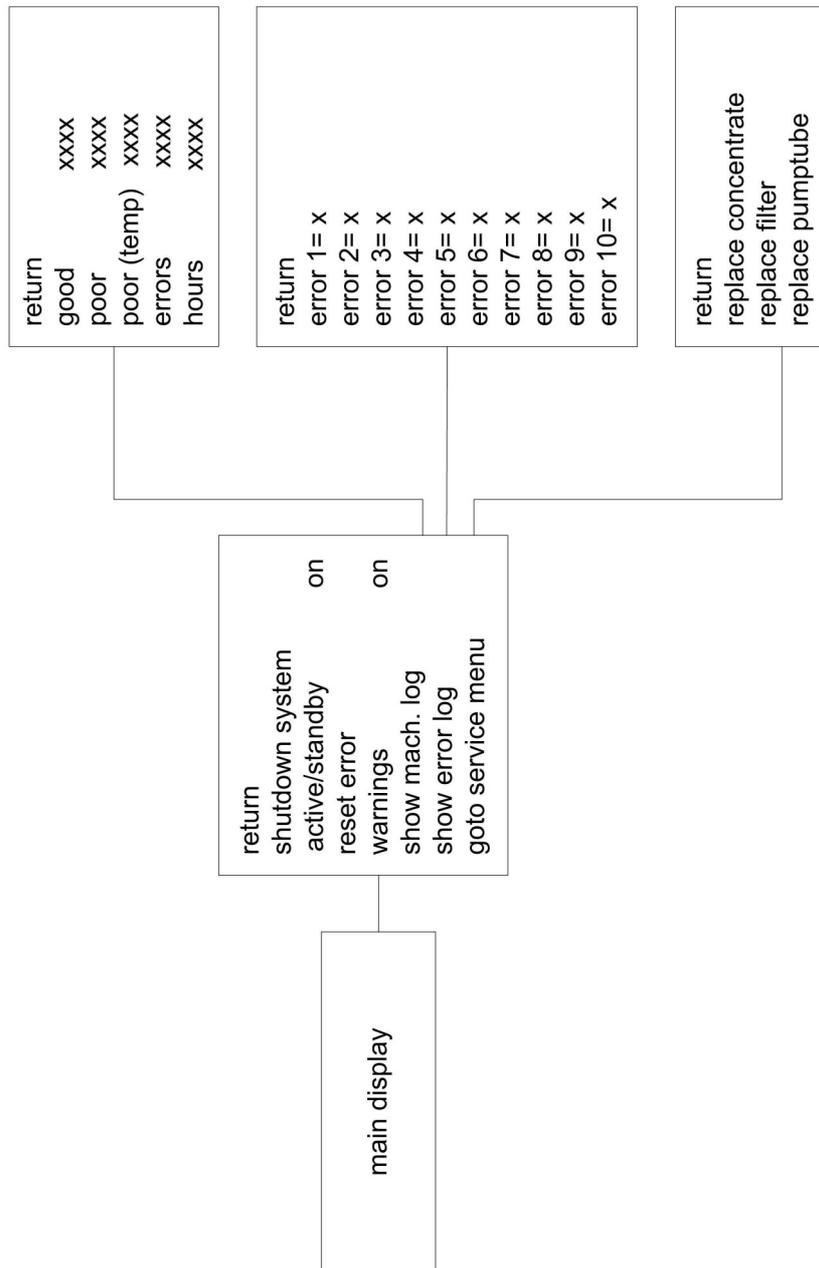
**ATTENTION:**

Tighten the plastic tube connections only by hand! Do not use tools!
Using tools may damage the connectors and result in fluid spillage.

15. Check that the shut-off valve is closed!
16. Open the water tap and check all connections for leaks. If there are leaks, close immediately the water tap and release the pressure from the tube as described in steps 9-11.
17. If there are no leaks, place the tube end in the collection vessel. Open and close the valve in 3 seconds intervals until the vessel is full. Closing and re-opening of the valve is necessary to prevent the water safety stop from triggering.
This will flush possible loose particles from the water device and tubes.
18. Close the shut-off valve and connect the tube end to the RPU-2100R inlet valve.
19. Open the valve and check for leaks.
20. If applicable, empty and reconnect the waste container.
21. Switch the RPU-2100R on and wait until the display shows **[ready]**.
22. Reconnect the analysers to the reagent outlet ports.

9. APPENDIX SECTION

9.1. Appendix - Menu structure user level



9.2. Appendix - Ordering information: Consumables and Spare parts

Order at:

Contact your Sysmex service representative for information.

Concentrated reagent

Part description	Sysmex part number
Cellpack®-S conc. 20 litre	95404210
Cellpack®-S conc. 10 litre	CF508690
Cellpack® DST 20 litre	AJ370801
Cellpack® DST 10 litre	BQ505775

Other consumables

Part description	Mechatronics part number
Air filter	QWLV040002
Fluid pre-filter	QWLV040012
Fluid final filter	QWLV040013 or QWLV040008
Cubitainer spout kit	ARPU110003
Final filter tubing set (only for use with final filter QWLV040008)	NARP110904
Reagent pump tube	QWLV090011
RPU disinfectant 100ml	ARPU110906

Spare parts:

Part description	Mechatronics Part number
Inline connector	ARPU110007
Waste container assembly (optional)	NARP110901

10. INDEX

A

- About this manual • 9
- Actions in the event of a change in performance • 43
- Appendix - Menu structure user level • 54
- Appendix - Ordering information
 - Consumables and Spare parts • 55
- APPENDIX SECTION • 53
- Avoidance of infection • 21

C

- C12 Circulation – change internal filter • 42
- C2 Waste container full – check waste • 42
- C21 No H₂O supply – check water supply • 42
- C38 Conductivity – change Cellpack concentrate • 32, 43
- Circulation pump behaviour in active mode • 32
- Circulation pump behaviour in standby mode • 32
- Cleaning • 45
- Cleaning of the casing • 45
- Cleaning of the containers • 45
- Condition list • 40
- Control unit • 19

D

- Difference between errors, conditions and warnings • 34
- Dilution principle • 12
- Disclaimer • 9
- Display layout • 24
- Document history overview • 7

E

- E1 Waste – check waste • 42
- Error list (Extended) • 36
- Error log menu • 29
- Error, condition and warning list and possible causes • 36
- Error, condition and warning messages • 34
- Ethernet/USB (only model NARP109010) • 20
- External communication connection • 19

F

- Final filter replacement • 48

G

- General information • 11
- General safety precautions • 21

H

- Handling reagents • 22

I

- I/O • 20
- Inside view • 18
- Installation • 22
- INSTALLATION • 23
- INSTRUMENT DESCRIPTION • 11
- Instrument overview • 17
- INTRODUCTION • 9

M

- Machine log menu • 29
- Main menu • 28
- MAINTENANCE • 45
- Maintenance schedule for the user • 45
- Menu items overview • 26
- Menu structure (user level) • 27
- Mix container • 19
- Mode information • 24

O

- Operation principles • 13
- Outside view and overall dimensions • 17

P

- Performance characteristics • 12
- Pre-filter replacement • 42, 46
- Preventive Cellpack concentrate replacement • 32, 46
- Protected names • 9

R

- Reagent output • 12
- Reagent pump • 19
- Replacing concentrated reagent • 32
- Resetting the water safety stop • 43
- RS-232 (only model NARP109000) • 20

S

- SAFETY INFORMATION • 21

Service call procedure-call local Sysmex
technical service representative • 43
Service menu • 30
Shutdown • 33
Signals • 26
Specified conditions of use • 12
STANDARD OPERATION PROCEDURES •
31
Start-up • 31
Status information • 25
Storage container and circulation system • 19
Supply water and reagent conditions • 12, 15

T

Technical specifications • 14, 19
TROUBLESHOOTING • 34
Troubleshooting actions • 42

U

USER INTERFACE AND SOFTWARE
MENU • 24
Using the keyboard • 25

W

Warning list • 41
Waste collection • 19
Water container • 18
Water demineralization device replacement •
50
Legend • 10