ABX MICROS ES60/ESV60

Technical Manual

P/n: RAA033AEN

CE IVD

HORIBA ABX SAS
B.P. 7290
34184 MONTPELLIER Cedex 4 - FRANCE

HORIBA Medical

Revisions

Index	P/n revision	Software revision	Section	Date
A	RAN033A	V1.1.X	All	12/02/09

- This document applies to the latest software version as indicated above.
- When a subsequent software version changes the information in this manual, a new section and/or sections will be released.

Notice of liability

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Potential hazards

- To alert the operator of potentially hazardous conditions, one of the bold captioned headings which are described below is provided wherever necessary throughout this text.

Flags a procedure that if not followed properly, can prove to be extremely hazardous to either the operator or the environment or both.

Emphasizes an operating procedure that must be followed to avoid possible damage to the instrument or erroneous test results.

Emphasizes important information especially helpful to the operator before, during or after a specific operational function.

Graphics

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1. Operational conditions

1.1. Environment

- The operation of the ABX Micros ES60/ESV60 should be restricted to indoor location use only. Instrument is operational at an altitude of maximum 3000 meters (9840 feet).
- The ABX Micros ES60/ESV60 is designed for safety from voltages surges according to INSTALLATION CATEGORY II and POLLUTION DEGREE 2 (IEC 61010-1) Please contact your local HORIBA Medical representative for information regarding operation locations, when it does not comply with the recommended specifications.

1.2. Location

- The ABX Micros ES60/ESV60 should be placed on a clean and leveled table or workbench.
- Please note that the instrument, printer and reagents weigh approximately 20 kilograms (44 lbs).
- Avoid exposure to sunlight.
- Place your instrument in a well-ventilated area.
- Place your instrument where it is not exposed to water or vapor.
- Place your instrument where it is free from vibration or shock.
- Place your instrument where an independent power receptacle can be used.
- Use a receptacle different from the one used by a device that easily generate noise such as a centrifuge, etc...
- Provide a space of at least 20 cm (8 inches) at the back of the instrument for arranging the power cable and tubings.

The power switch and input voltage supply connection should always be accessible. When positioning the system for operational use, leave the required amount of space for easy accessibility to these items.

1.3. Grounding

- Proper grounding is required when installing the system. Check the wall outlet ground (Earth) for proper grounding to the facilities electrical ground. If you are unsure of the outlet grounding, contact your facilities engineer to verify the proper outlet ground.

1.4. Humidity/temperature conditions

- The ABX Micros ES60/ESV60 must operate between temperatures of 16°C to 30°C (61°F to 86°F).
- Maximum relative humidity 85% for temperature up to 30°C (86°F) without condensation.
- If it is stored at a temperature less than 10°C (50°F), the instrument should stand for 1 hour at the correct room temperature before use.

1.5. Electromagnetic environment check

- The ABX Micros ES60/ESV60 has been designed to produce less than the accepted level of electromagnetic interference in order to operate in conformity with its destination, allowing the correct operation of other instruments also in conformity with their destination.
- In case of suspected electromagnetic noise, check that the instrument has not been placed in the proximity of electromagnetic fields or short wave emissions, (i. e. Radar, X-rays, Scanners, Cell phones, etc...).

1.6. Main supply

- Grounding is required. Check that the earth wall-plug is correctly connected to the laboratory grounding system. If there is no such system a ground stake should be used.
- Use only main supply cable delivered with the ABX Micros ES60/ESV60.
- Main supply voltage fluctuations must not exceed +/-10% of the nominal voltage.

2. Environmental protection

2.1. Disposal used accessories and consumables

- Must be collected by a laboratory specialized in elimination and recycling of this kind of material according to the local legislation.

2.2. Disposal ABX Micros ES60/ESV60 instrument

- It should be disposed of, in accordance with local legislation, and should be treated as being contaminated with blood. The appropriate biological precautions should be taken.

If any doubt, please contact your HORIBA Medical representative service department.

2.3. European Legislation

In accordance with the European Directive (2002/96/CE, known also as W.E.E.E) instruments having the above symbol and sold into a European country by HORIBA Medical or an authorised representative must be disposed of and recycled correctly at the end of its useful life.
Due to the local changing regulations in each country, please contact your local representative for detailed and upto date information on how to appropriately dispose of the instrument.

2.4. Transportation and storage conditions

- Condition for storage and transportation: Temperature from -20°C to +65°C (-4°F to 122°F).

Prior to the shipping of an instrument by transporter, whatever the destination, an external decontamination of the instrument must be carried out.

Specifications

1. Specifications

1.1. Parameters

- 16 parameters

Parameter	Definition
WBC	White blood cells
LYM%	Lymphocyte Percentage
LYM#	Lymphocyte Absolute number
MON%	Monocyte Percentage
MON#	Monocyte Absolute number
GRA%	Granulocyte Percentage
GRA#	Granulocyte Absolute number
RBC	Red blood cells
HGB	Hemoglobin
HCT	Hematocrit
MCV	Mean Corpuscular Volume
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration
RDW	Red cell Distribution Width
PLT	Platelets
MPV	Mean Platelet Volume
WBC, RBC and PLT Distribution Curves	

- 18 parameters

Parameter	Definition
WBC	White blood cells
LYM%	Lymphocyte Percentage
LYM#	Lymphocyte Absolute number
MON%	Monocyte Percentage
MON#	Monocyte Absolute number
GRA%	Granulocyte Percentage
GRA#	Granulocyte Absolute number
RBC	Red blood cells
HGB	Hemoglobin
HCT	Hematocrit
MCV	Mean Corpuscular Volume
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration
RDW	Red cell Distribution Width
PLT	Platelets
MPV	Mean Platelet Volume
PDW*	Platelet Distribution Width
PCT*	Plateletcrit
WBC, RBC and PLT Distribution Curves	

***PDW and PCT have not been established as indications for this product, in the United States. The use of PDW and PCT should be restricted to Research Use Only.**

1.2. Instrument specifications

ABX MICROS ES60 (OT/CT)/ ABX MICROS ESV60 (OT)	
Throughput analysis	Approximately 60 Samples/hour for the ABX Micros ES60 OT, 50 Samples/hour for the ABX Micros ES60 CT and 50 Samples /hour for the ABX Micros ESV60.
Minimum sample volume	Minimum blood sample requirement 50µl Analyzer sample volume 10µl
Dilution ratios	WBC Approximately 1/260 for ABX Micros ES60 and 1/255 for ABX Micros ESV60 RBC/PLT Approximately 1/15000
Measurements and Computation	Impedance change for WBC, RBC, PLT. Spectrophotometry for HGB. Impedance change for LYM%, MON%, GRA%. Computation from stored Data that was directly measured for MCV, MCH, MCHC, RDW, MPV, LYM#, MON#, GRA#.
Counting Aperture Diameter	WBC: 80µm / RBC: 50µm.
Hemoglobin Measurement	Performed in the WBC/HGB Chamber. Light source LED (Light Emiting Diode) at wavelength 550nm.
Statistics and Quality Control	Extended Quality Control package.
Calibration	Automatic Calibration procedure. Direct entering of Calibration Coefficients.
Reagents	ABX Micros ES60: 3 Reagents or 1 Pack of Reagents: Diluent: ABX Minidil LMG (10L) Cleaner: ABX Miniclean (1L) or ABX Cleaner (0.5L) Lyse: ABX Minilyse LMG (1L), ABX Alphalyse (0.4L) or ABX Alphalyse 360 (0.36L) Pack all reagents: ABX Minipack LMG (4.2L) ABX Micros ESV60: ABX VetPack
Wastes	Automatic disposal Waste handling according to Local/National regulations

1.3. Technical specifications

ABX MICROS ES60 (OT/CT)/ ABX MICROS ESV60 (OT)	
Software	Designed by HORIBA Medical, Installed on a Flash EPROM
Memory capacity	1000 results
Display	Operated touch screen, LVDS Screen: 8"4, 640x480, 256000 colours
Outputs	Hard Copy printing (Internal or external printer) External output (RS232)
Barcode reader	C 39, C 128, ITF (2of5), CODABAR, ISBT C128 (for ABX Micros ES60 CT only). (External barcode reader optional for ABX Micros ES60)
Internal ticket printer	ABX Micros ES60 only
Power requirements	Power supply 100V, 240V (+/- 10%) 50/60Hz. Power Consumption Maximum: 150VA (-30%, +10%) In use: 100VA (-30%, +10%) Stand-by mode: 35 VA (-30%, +10%) Heat output 197Kj/h (187BTU/h)
Dimensions	Height Approximately 430mm (16.9 inches) Width Approximately 360mm (14.2 inches) Depth Approximately 360mm (14.2 inches)
Weight	Weight Approximately 17Kgs (37.5 lbs)

2. Description

2.1. Overview

2.1.1. ABX Micros ES60 CT

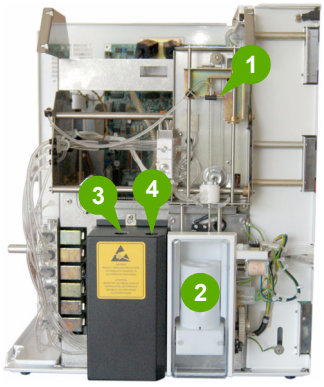
1- LCD display touchscreen
2- Cap piercing mechanism & Tube Holder
3- Reagent compartment
4- Printer
5- Barcode reader
6- USB port

2.1.2. ABX Micros ES60 OT

1- LCD display & touchscreen
2- Manual sampling needle
3- Reagent compartment
4- Printer
5- USB port

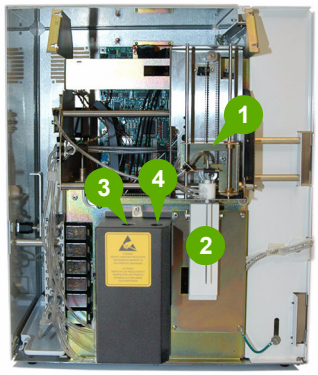
2.2. Front view (covers opened)

2.2.1. ABX Micros ES60 CT



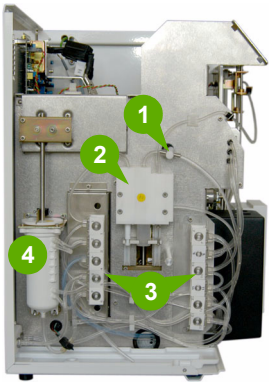
1- Carriage assembly
2- Tube holder
3- WBC/HGB chamber
4- RBC chamber

2.2.2. ABX Micros ES60 OT



1- Carriage assembly
2- Sampling needle and analysis start bar
3- WBC/HGB chamber
4- RBC chamber

2.3. Left side view (covers opened)



1- Diluent temperature sensor
2- Liquid syringe
3- Valve blocks
4- Vacuum/waste syringe

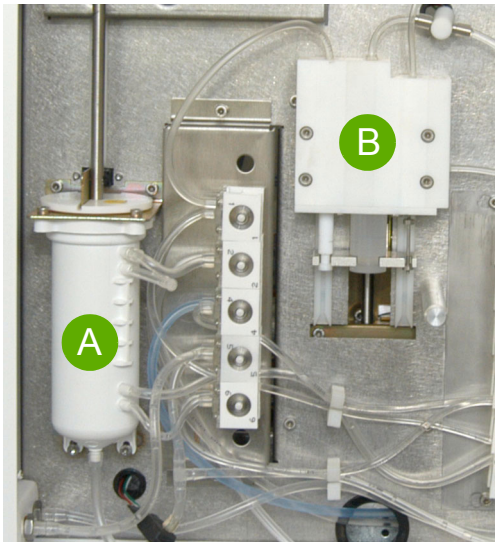
2.4. Rear view

1- 2 RS232 ports
2- 2 USB ports
3- 1 Jack connector: not functional
4- 1 PS2 ports
5- 1 RJ45 port
6- 1 power supply
7- 1 Diluent input connector
8- 1 Waste output connector

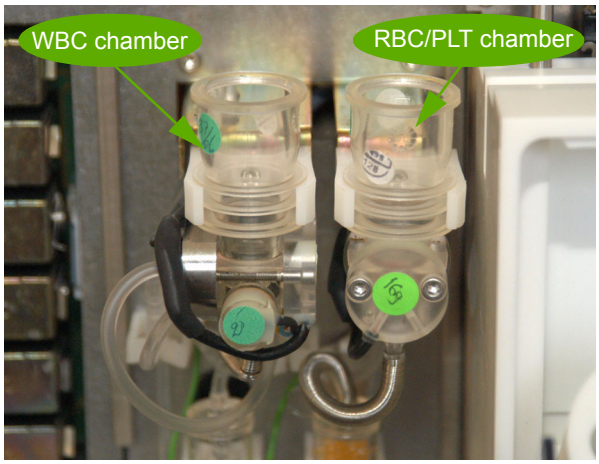
ABX Micros ES60/ESV60

1. Generalities

- The ABX Micros ES60/ESV60 instrument has been designed for simple mechanical operations.
- 4 stepper motors provide movements to mechanical assemblies.
- Pressure and vacuum are provided by the vacuum/waste syringe up and down movements (A).
- Liquid movements are achieved either by means of mechanical assembly movements (B) or by pressure/vacuum syringe and simultaneous action of specific valves.



- Dilution chambers
  The diode and the cell of the spectrophotometer are glued on the WBC/HGB chamber.
  Chamber positions can be modified in order to obtain the best sampling position possible.



- Dilutions:
  First dilution is carried out in the WBC/HGB chamber (with a bubbling phasis).
  The RBC blood sample is aspirated from this dilution.
  Lyse is sent from the drain nipple of the WBC/HGB chamber.
- Rinse:
  To obtain the best rinse in the counting heads, diluent is sent from the liquid syringes. This is carried out before, between and after the two counts.

A window on the HGB/WBC chamber allows the needle to move down into the chamber and to inject reagents. As important light or variation of light can cause HGB result drifts, close instrument cover and door before running blood analyses.

- Bubbling:
  Insulators avoid polluted liquid overflows during bubbling phasis. They also allows an accurate adjustment of the bubbling volume.

- ABX Micros ES60 CT specifics:
  - The piercing needle is equipped with two injectors to obtain a homogeneous diluent flow during needle rinsing phasis (see procedures RAS188A and RAS187A).
  - Atmosphere is provided to sample tubes to allow a correct aspiration of blood.

2. ABX Micros ES60 OT hydraulic

2.1. Tubes list

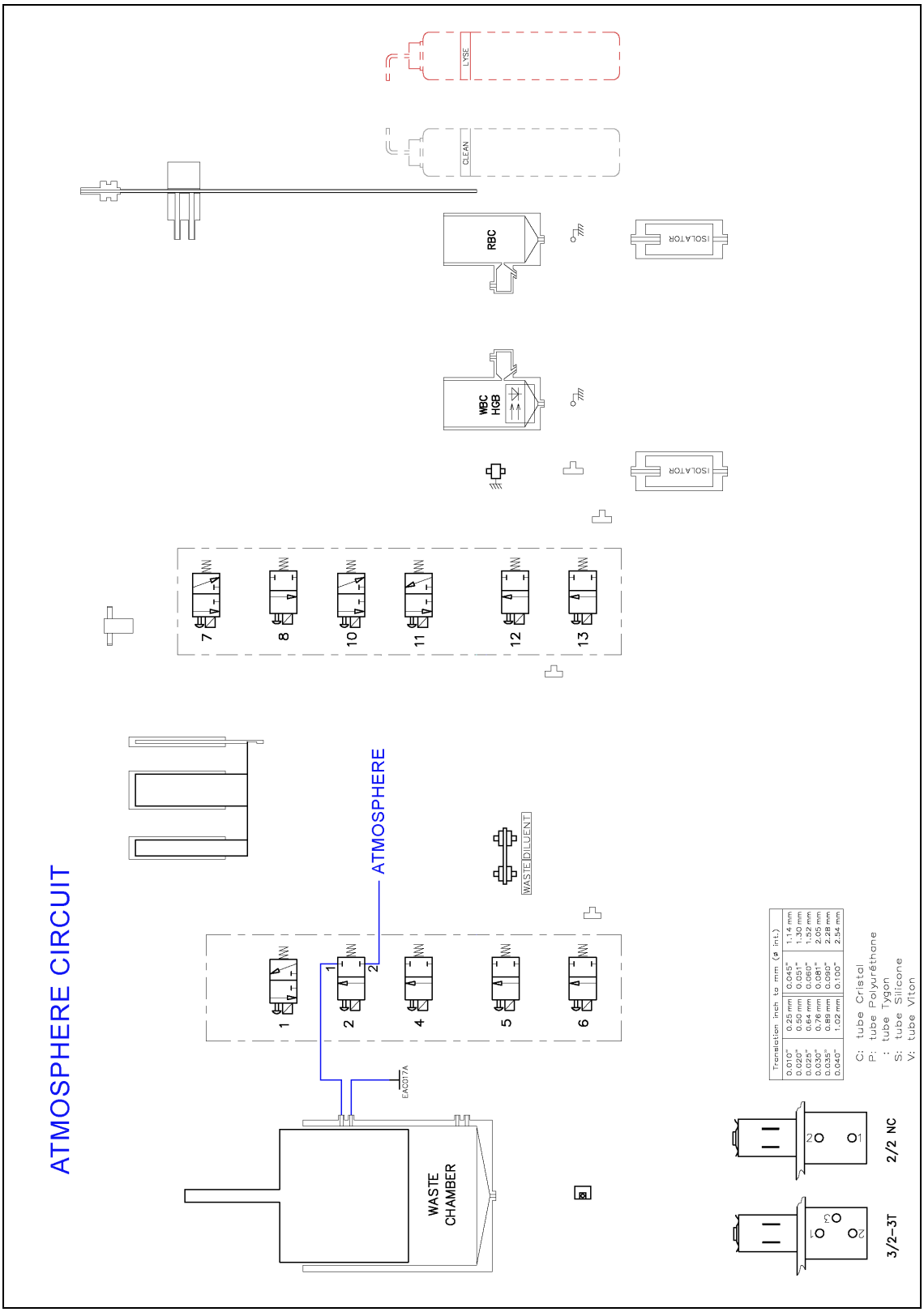
DESIGNATION	PART NUMBER	DIAMETER
SLEEVE HPS3	DBD005A	5-9
T CONNECTOR	EAB006B	2.3
T CONNECTOR	EAB032A	1.5
TUBE CAP	EAC017A	2.5
TYGON TUBE 0.051"	EAE006A	1.30
TYGON TUBE 0.060"	EAE007A	1.52
TYGON TUBE 0.081"	EAE008A	2.05
TYGON TUBE 0.090"	EAE009A	2.28
SLEEVE	GAL098A	
TUBE SHIELD	GBC088A	4.4
GROUND FITTING	GAA162A	
METALLIC SHEATH (Pack model only)	GBC170A	5.2
TEFFLON TUBE (2 meter)	EAE061AS	1.32x1.93

2.2. Function of valves

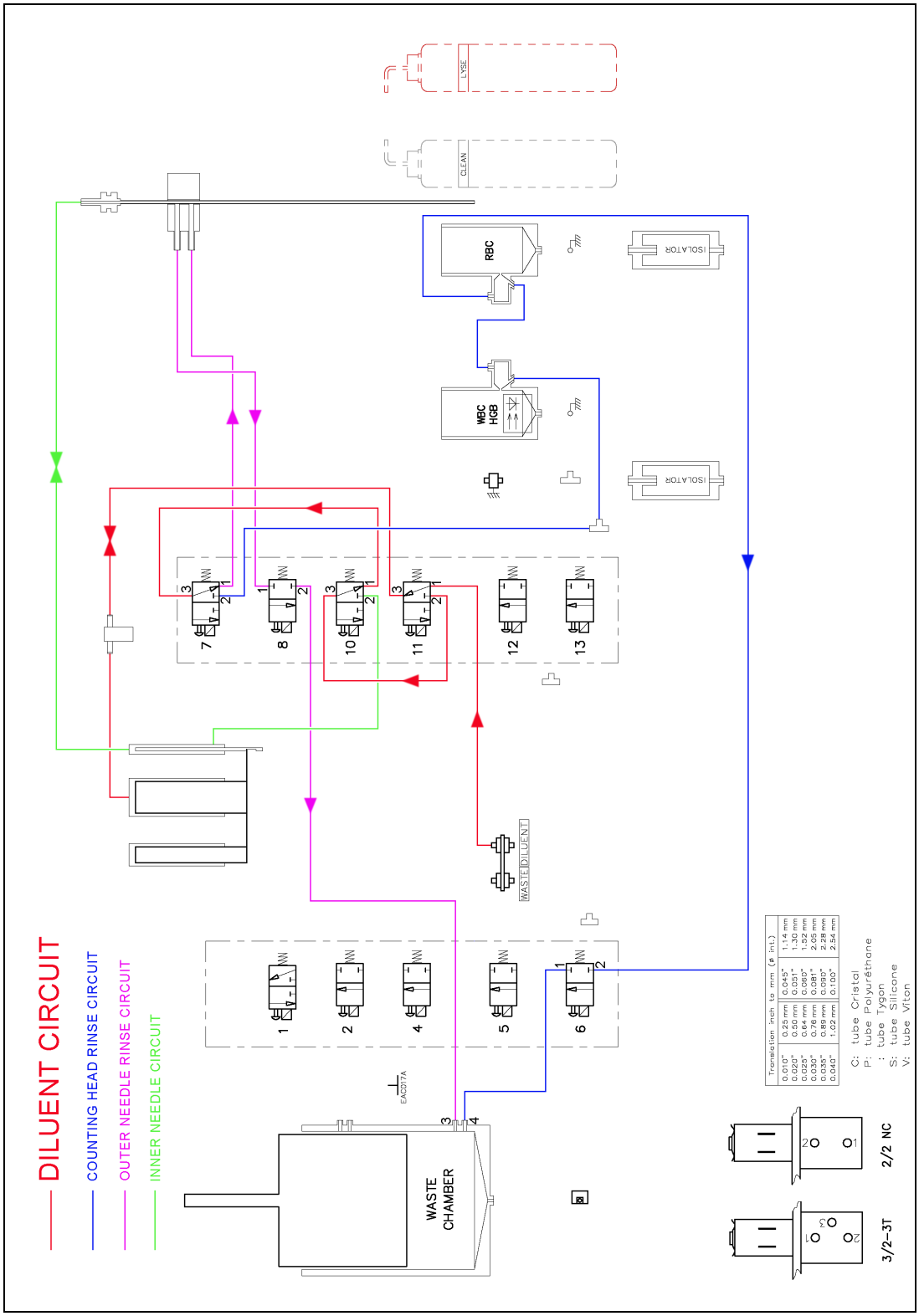
Valve number	Functions
1	Controls the lyse distribution
2	Cancels the pressure/vacuum in the pressure/vacuum syringe
4	Controls the cleaner input in the WBC counting head during the rinsing
5	Controls the drain of the pressure/vacuum syringe
6	Activates the vacuum needed in the WBC/RBC counting heads
7	Controls the diluent input in the RBC counting head during the rinsing
8	Controls the aspiration of the diluent/air input inside the needle rinse block
10	Controls the diluent inside the aspiration needle
11	Controls the diluent distribution
12	Controls the drain of the WBC chamber
13	Controls the drain of the RBC chamber

2.3. Hydraulic cycle description

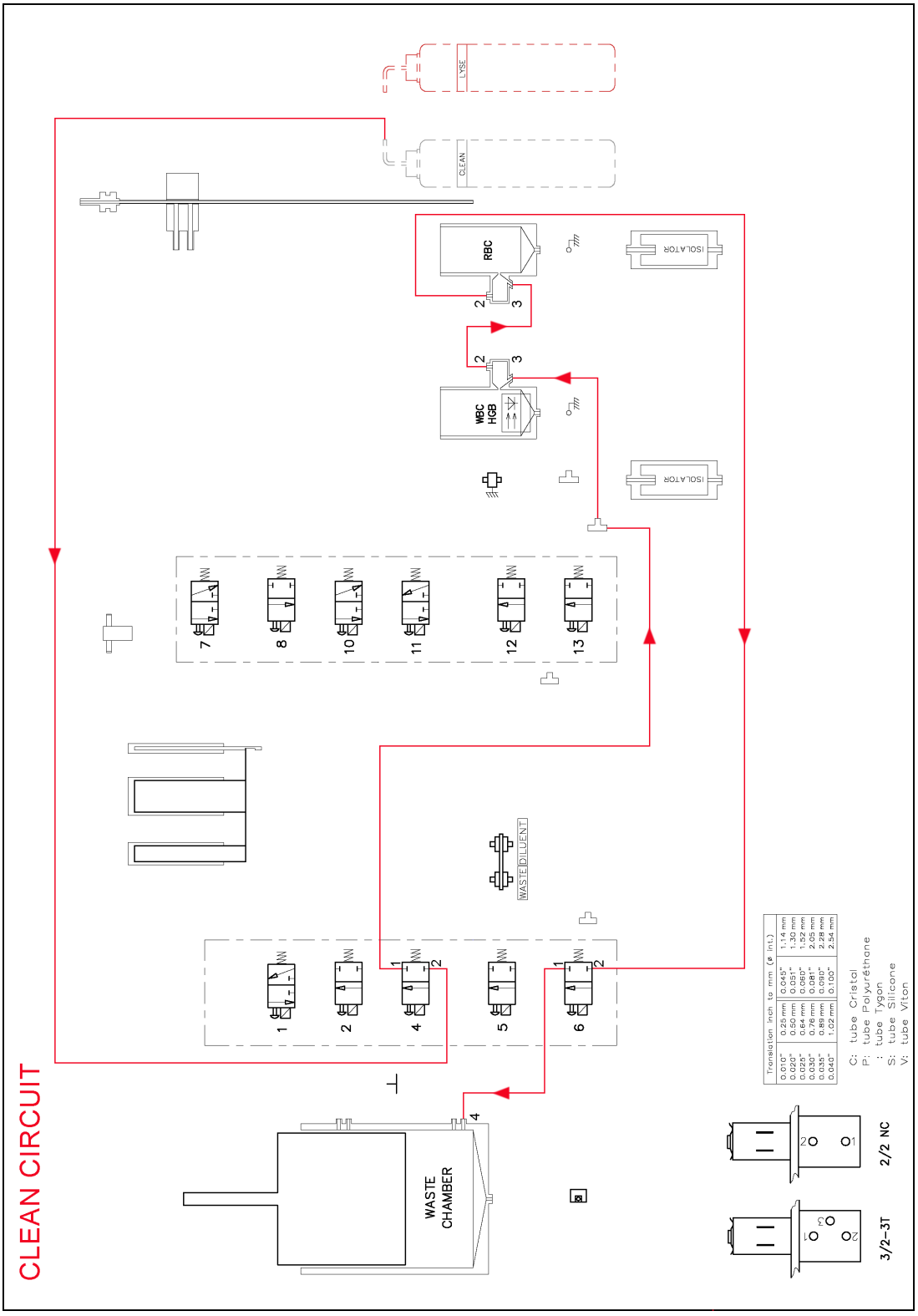
2.3.1. Atmosphere circuit



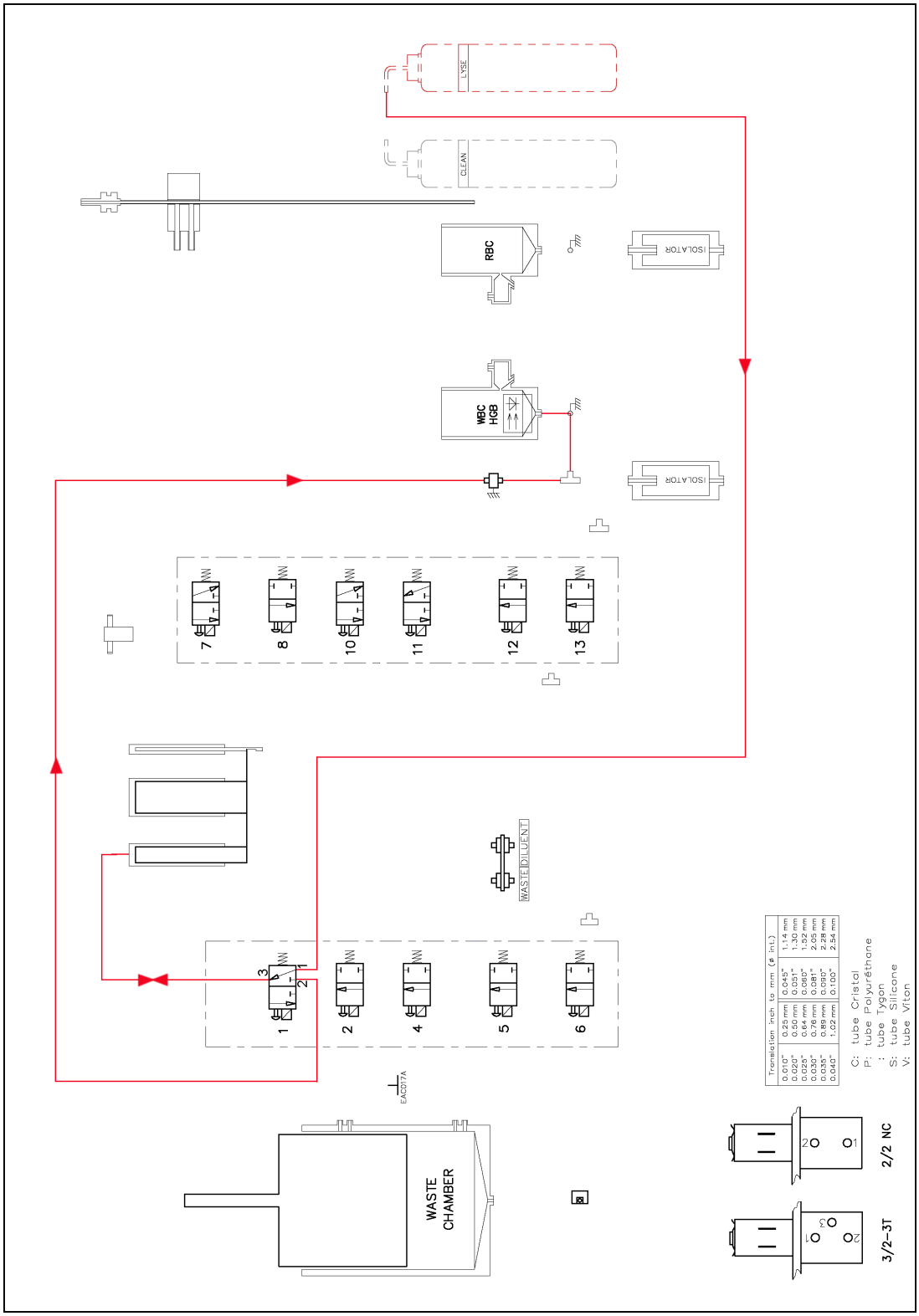
2.3.2. Diluent circuit



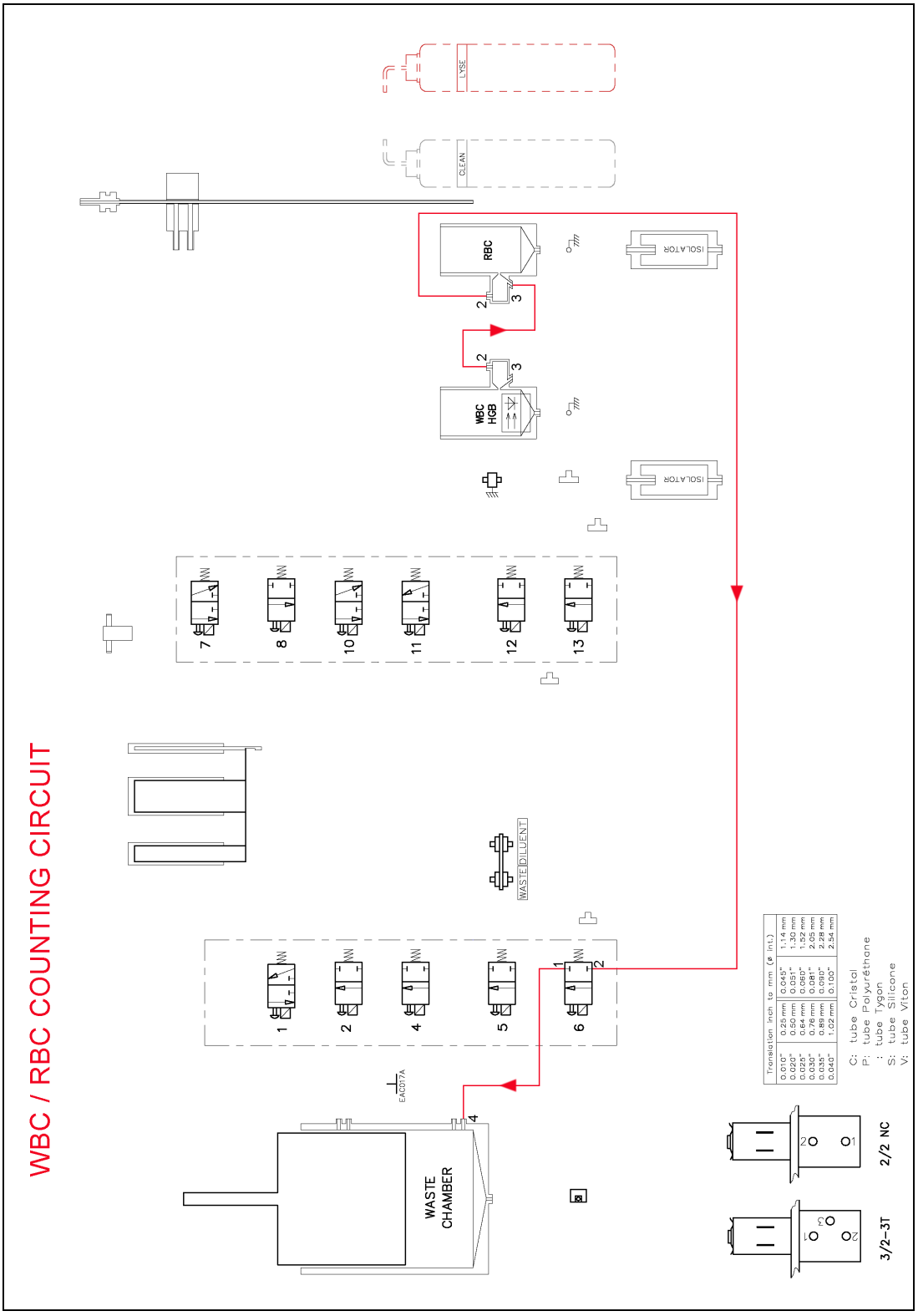
2.3.3. Clean circuit



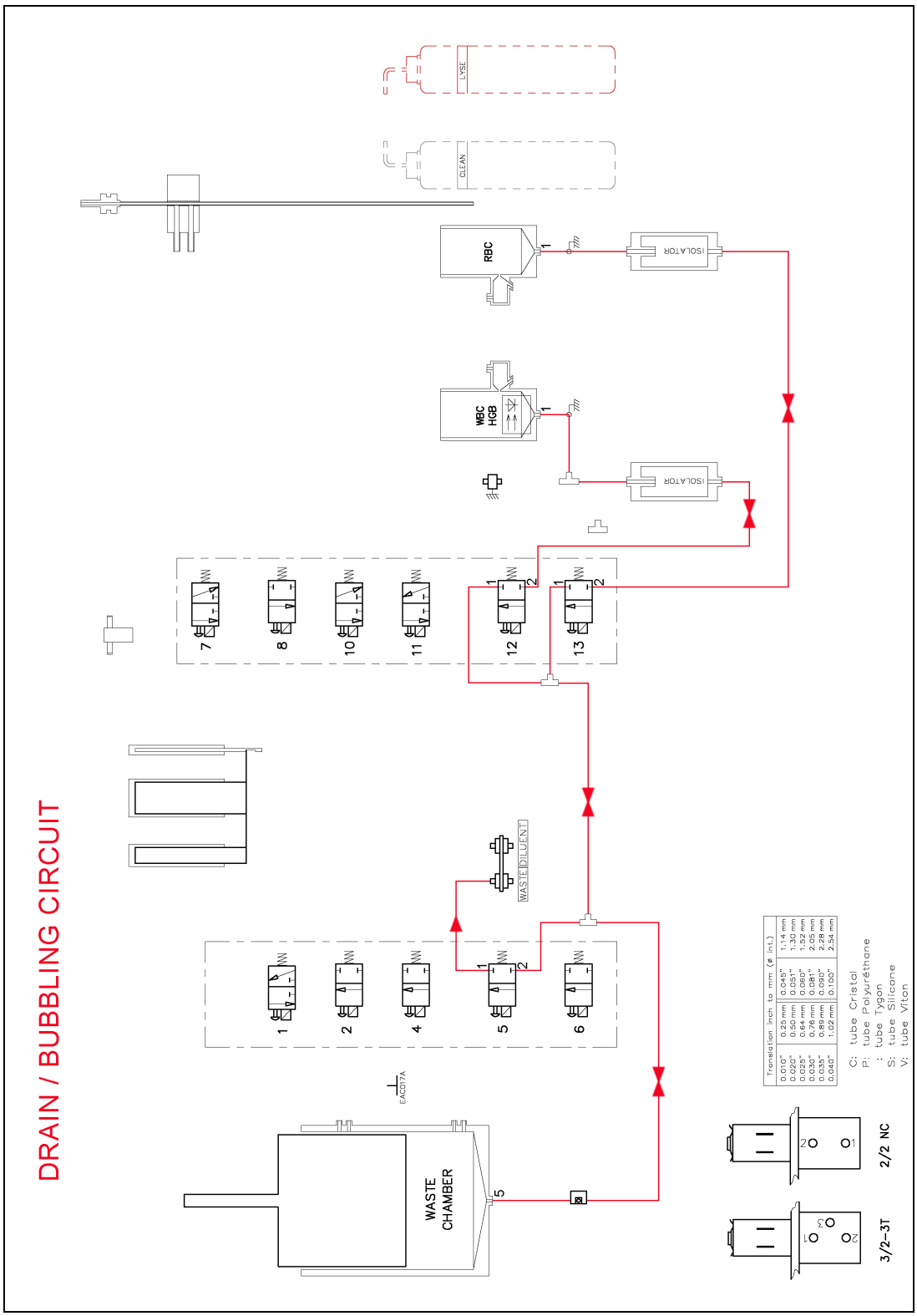
2.3.4. Lyse circuit



2.3.5. WBC / RBC counting circuit



2.3.6. Drain / bubbling circuit



3. ABX Micros ES60 CT hydraulic

3.1. Tubes list

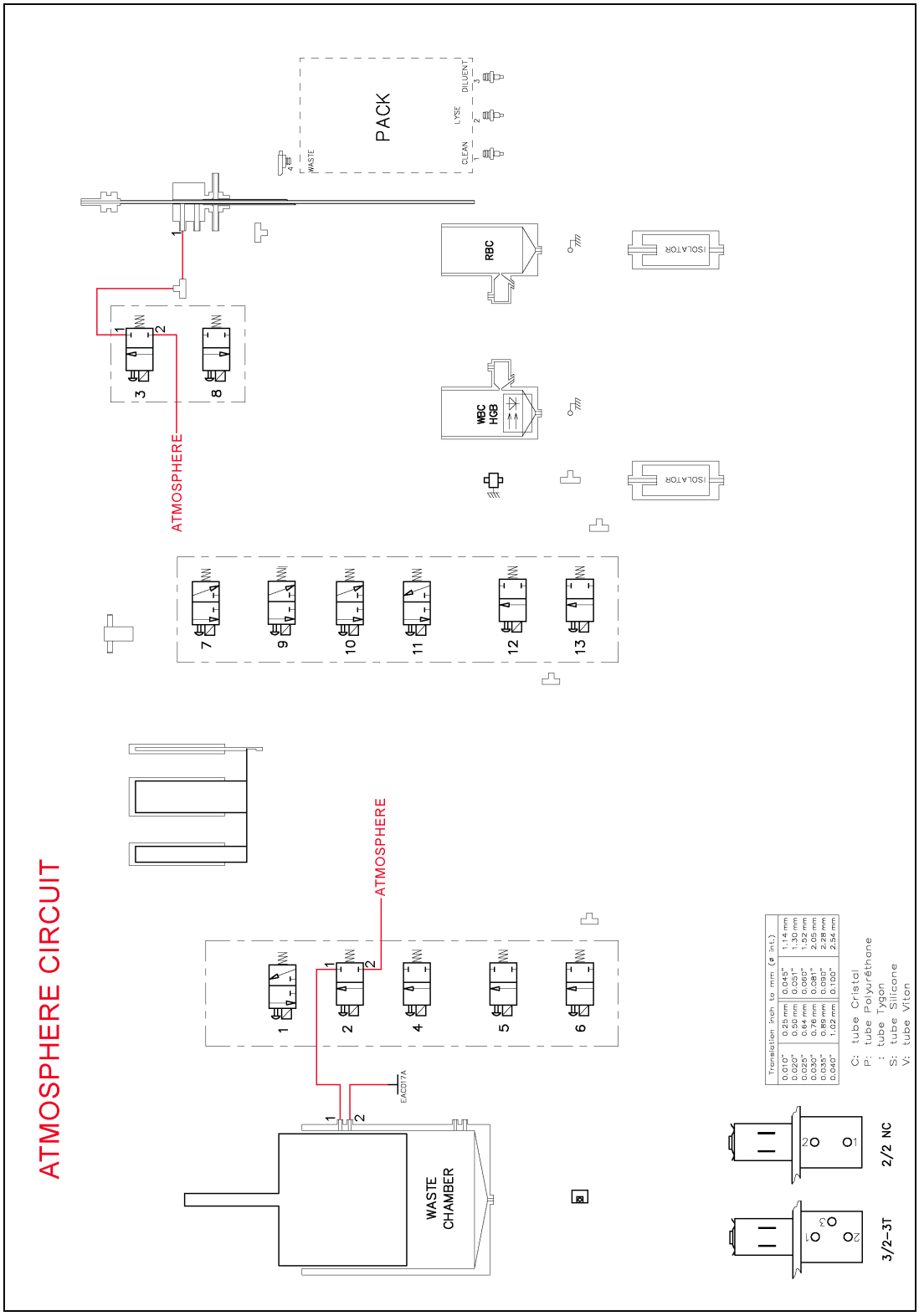
DESIGNATION	PART NUMBER	DIAMETER
T CONNECTOR	EAB006B	2.3
STRAIGHT CONNECTOR	EAB015B	1.5/2.5
T CONNECTOR	EAB032A	1.5
TUBE CAP	EAC017A	2.5
TYGON TUBE 0.040"	EAE005A	1.02
TYGON TUBE 0.060"	EAE007A	1.52
TYGON TUBE 0.081"	EAE008A	2.05
TYGON TUBE 0.090"	EAE009A	2.28
SILICON TUBE	EAE025A	1.5/3.5
SLEEVE	GAL098A	
TUBE SHIELD	GBC088A	4.4
GROUND FITTING	GAA162A	
METALLIC SHEATH (Pack model only)	GBC170A	5.2

3.2. Function of valves

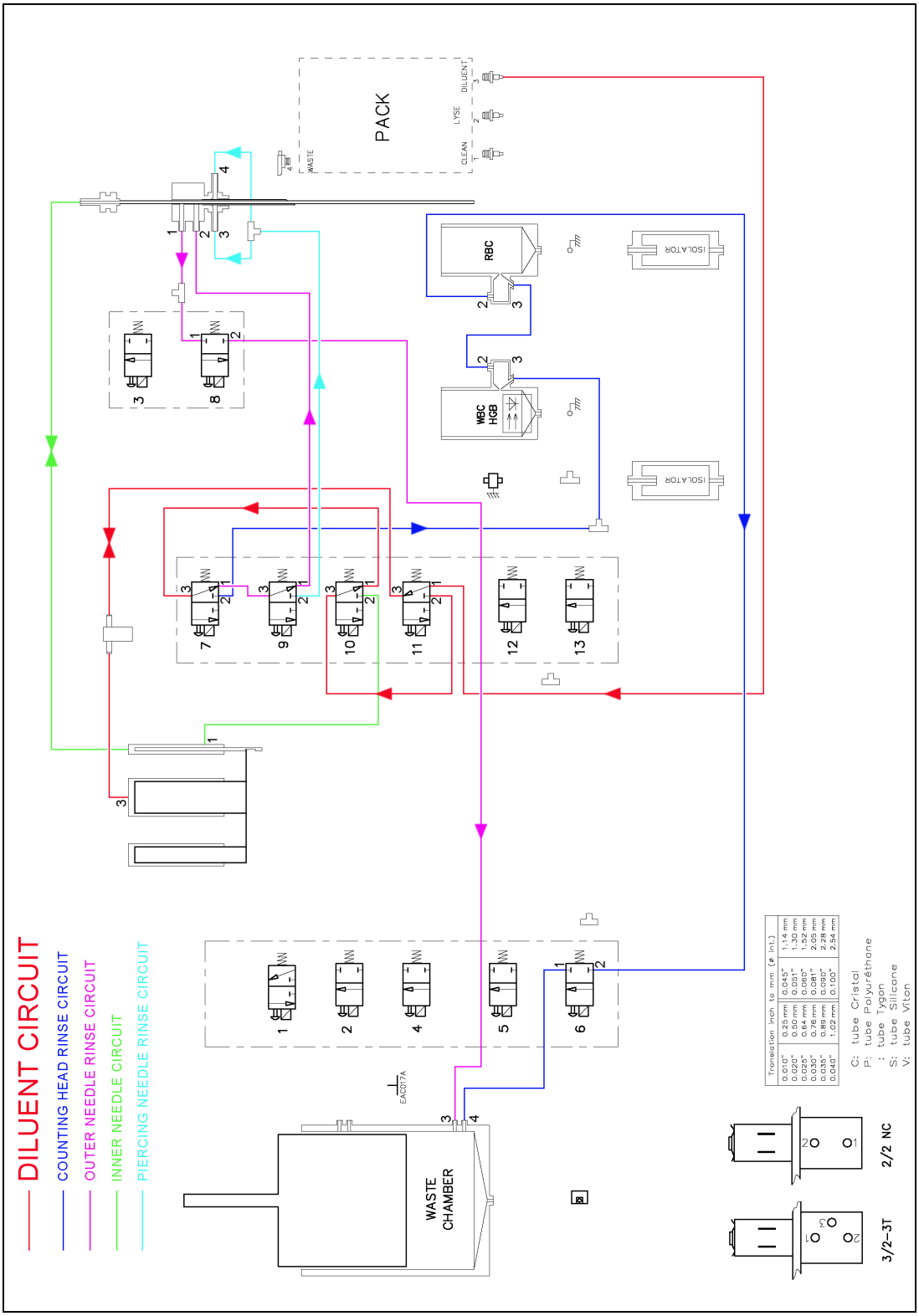
Valve number	Functions
1	Controls the lyse distribution
2	Cancels the pressure/vacuum in the pressure/vacuum syringe
3	Air input inside the needle rinse block
4	Controls the cleaner input in the WBC counting head during the rinsing
5	Controls the drain of the pressure/vacuum syringe
6	Activates the vacuum needed in the WBC/RBC counting heads
7	Controls the diluent input in the RBC counting head during the rinsing
8	Controls the aspiration of the diluent/air input inside the needle rinse block
9	Routes the diluent distribution to the inside or outside of the piercing needle
10	Controls the diluent inside the aspiration needle
11	Controls the diluent distribution
12	Controls the drain of the WBC chamber
13	Controls the drain of the RBC chamber

3.3. Hydraulic cycle description

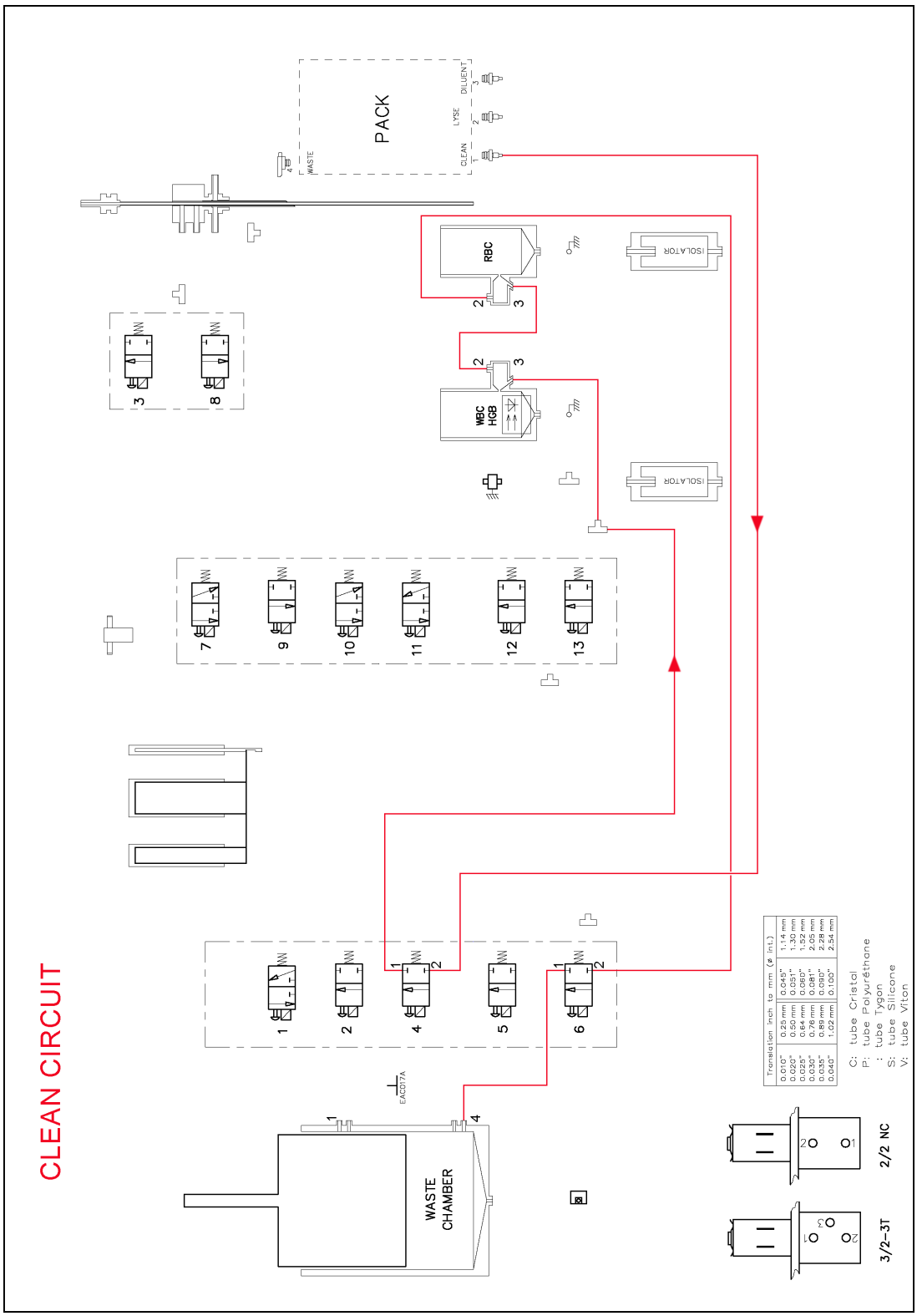
3.3.1. Atmosphere circuit



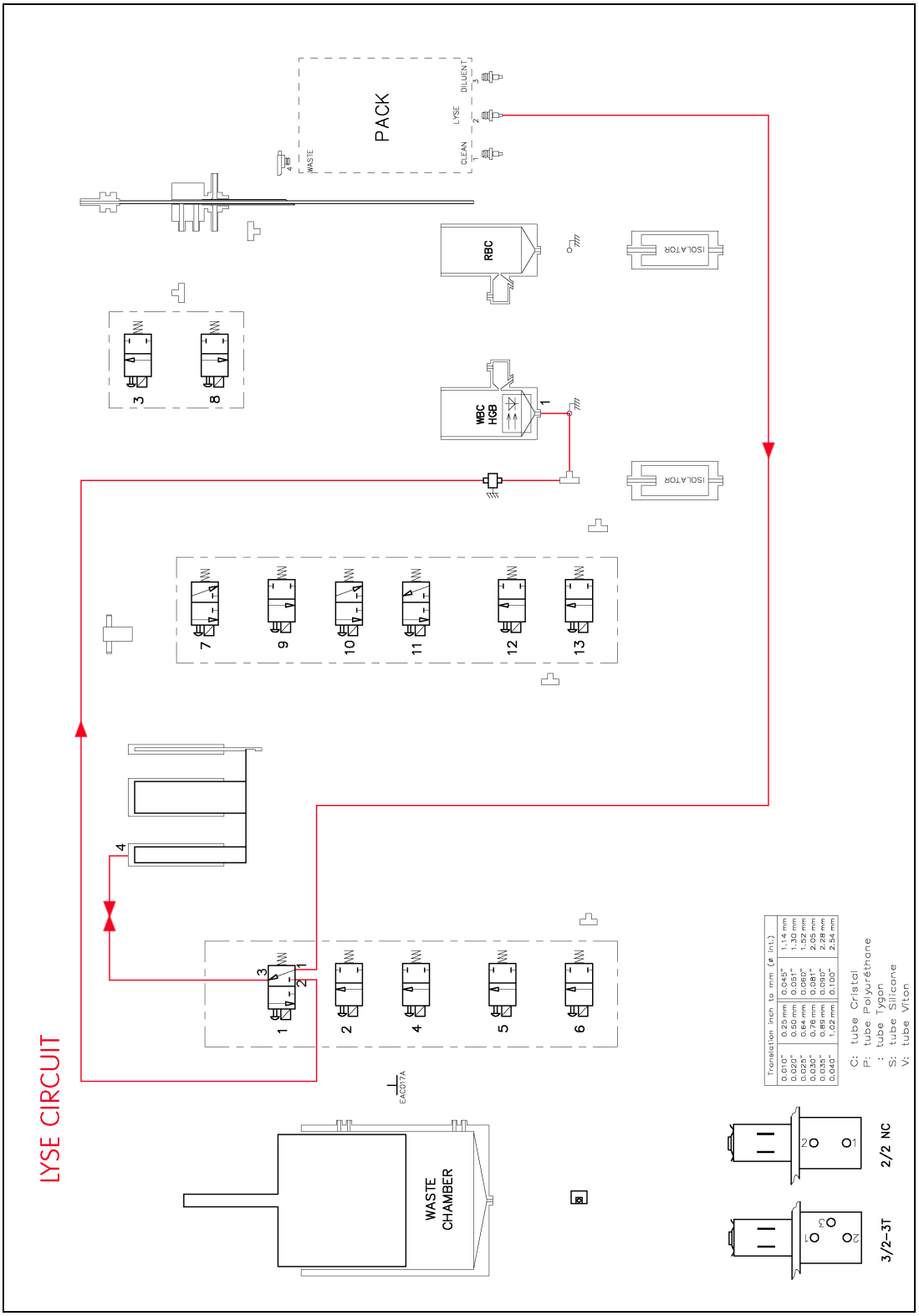
3.3.2. Diluent circuit



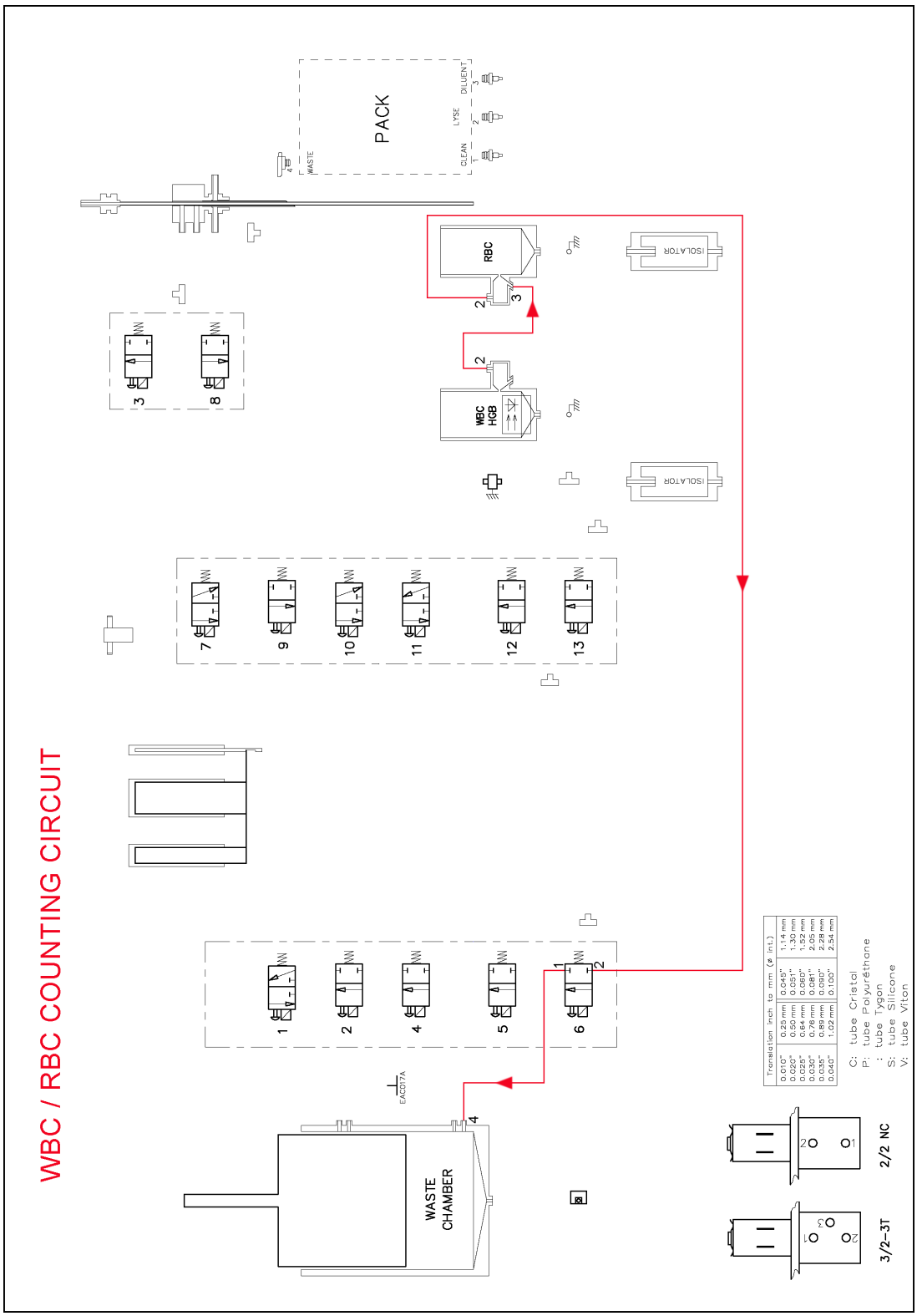
3.3.3. Clean circuit



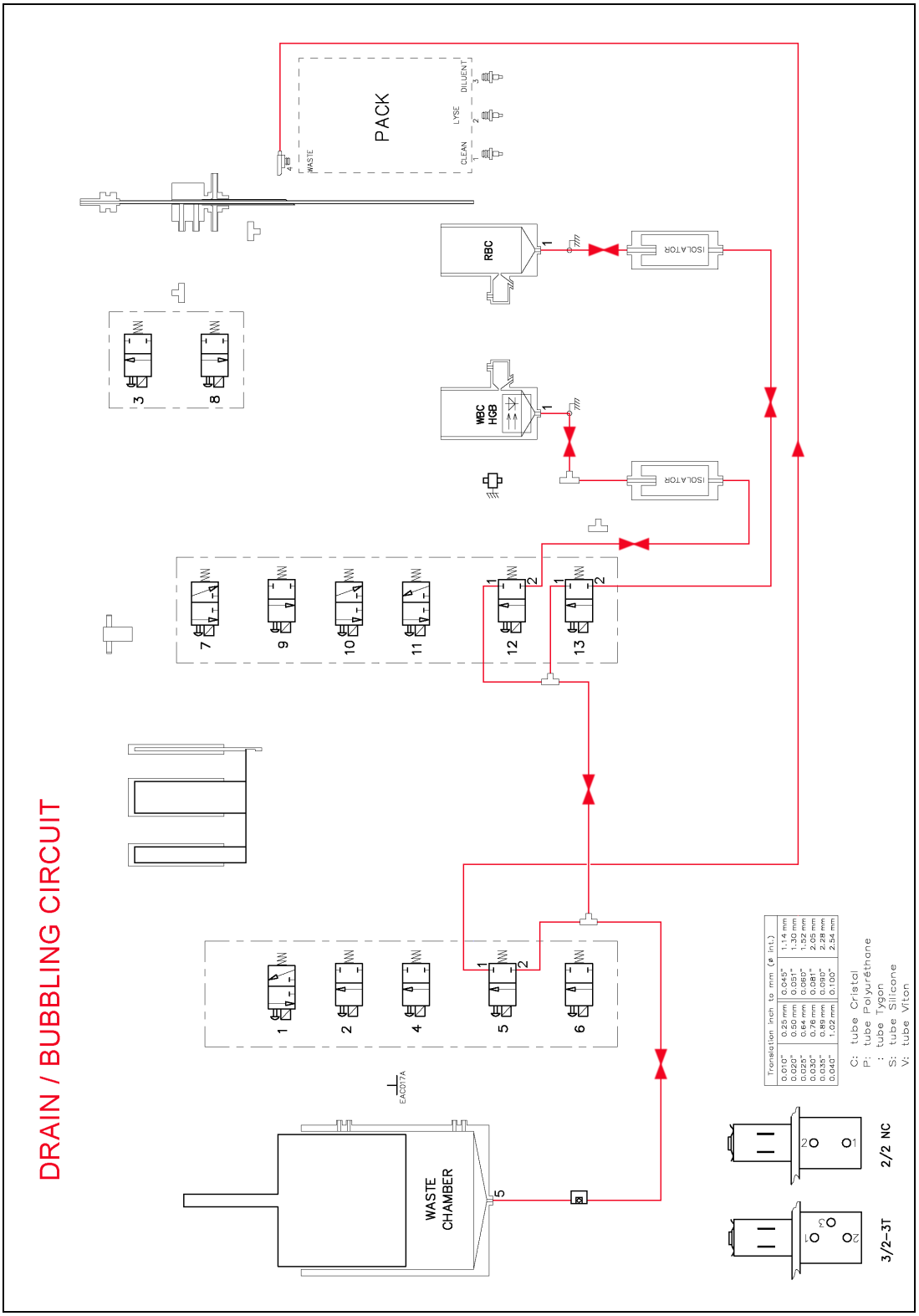
3.3.4. Lyse circuit



3.3.5. WBC / RBC counting circuit



3.3.6. Drain / bubbling circuit



4. Pneumatic diagrams

4.1. ABX Micros ES60 CT bottle version

see following pages

4.2. ABX Micros ES60 CT pack version

see following pages

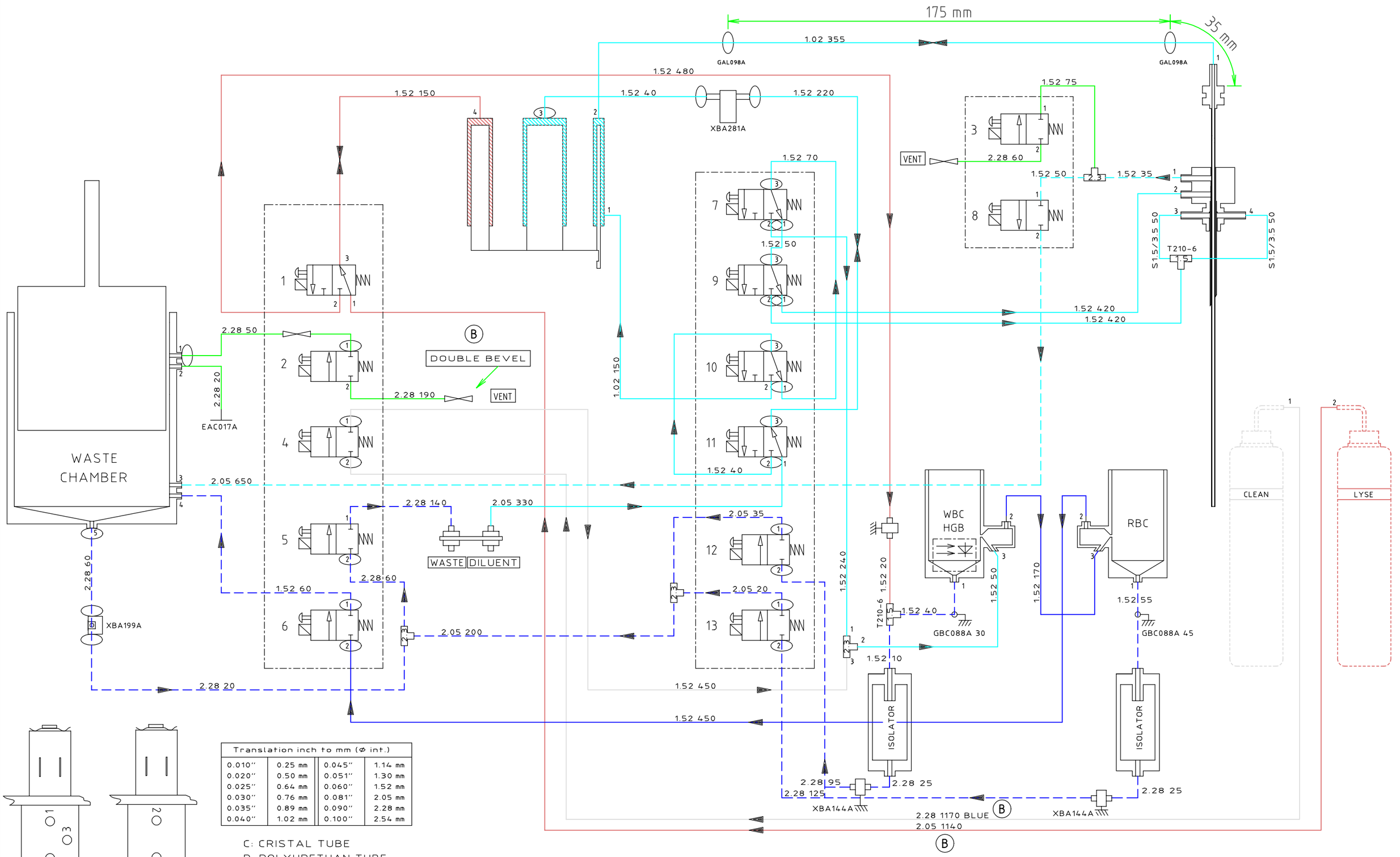
4.3. ABX Micros ES60 OT bottle version

see following pages

4.4. ABX Micros ES60 OT pack version

see following pages

ABX Micros ES60/ESV60



Translation inch to mm (ø int.)			
0.010"	0.25 mm	0.045"	1.14 mm
0.020"	0.50 mm	0.051"	1.30 mm
0.025"	0.64 mm	0.060"	1.52 mm
0.030"	0.76 mm	0.081"	2.05 mm
0.035"	0.89 mm	0.090"	2.28 mm
0.040"	1.02 mm	0.100"	2.54 mm

C: CRISTAL TUBE
P: POLYURETHAN TUBE
: TYGON TUBE
S: SILICON TUBE
V: VITON TUBE
B

3/2-3T

2/2 NC

Description	Chk	By	Date	ECR	Rev
1170, 1140 were 1100, 1080 and translation French/English	A0	AS	22/12/08	3844	B
Creation from NMS025C2 Rev.C; Add XBA144A.	A0	AS	12/06/08	3621	A

Designation: HYDROPNEUMATIC DIAGRAM
MICROS 60ES C.T. BOUTEILLE

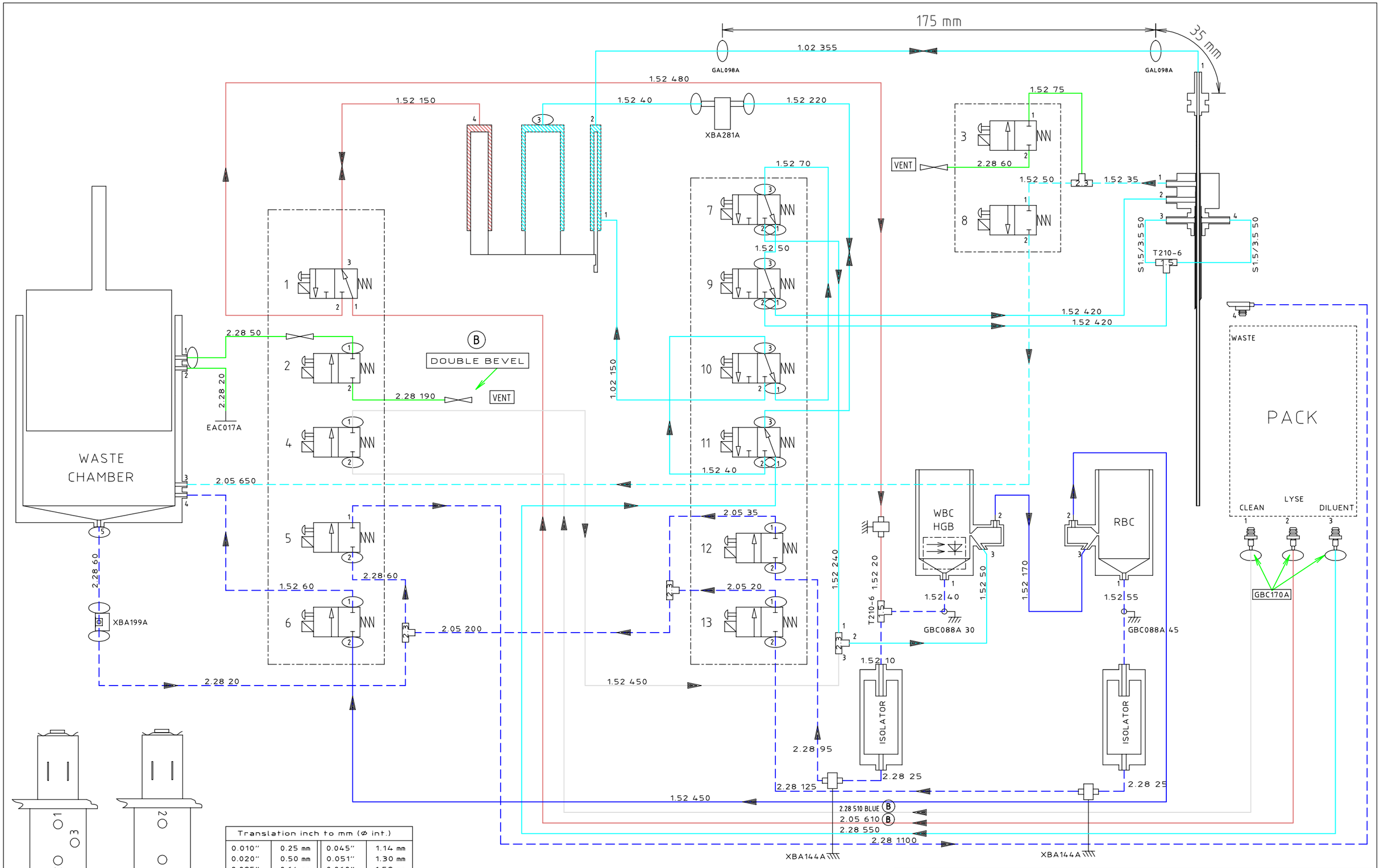
Design & Symbol According to AFNOR NORM

Electrical Manufacturing Refer to RCF001A & RCF013A

Standard tolerance: -
Roughness: -
Material: -
Treatment: -
Coating: -

HORIBA ABX
Montpellier FRANCE

N° : NMS057A | Sheet: 1/1 | Drw size: A3 | Scale: - | Dim. in millimeters



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C: CRISTAL TUBE
P: POLYURETHAN TUBE
: TYGON TUBE
S: SILICON TUBE
V: VITON TUBE
(B)

Description	Chk	By	Date	ECR	Rev
610 was 590, color blue for cleaner tubing and translation French/English	AO	AS	22/12/08	3844	B
Creation from NMS027C2 Rev.D; Add XBA144A.	AO	AS	12/06/08	3621	A

Designation: HYDRAUPNEUMATIC DIAGRAM
MICROS 60ES C.T. PACK

Design & Symbol According to AFNOR NORM
Electrical Manufacturing Refer to RCF001A & RCF013A

Standard tolerance: -
Roughness: -
Material: -
Treatment: -
Coating: -

HORIBA ABX
Montpellier FRANCE

N° : NMS058A | Sheet: 1/1 | Drw size: A3 | Scale: - | Dim. in millimeters

175 mm
35 mm
PTFE 1.32 350
2.28 10
2.28 10
1.30 15
1.52 480
1.52 150
1.52 40
1.52 220
XBA281A
1.52 70
1.30 15
1.30 15
PTFE 1.32 140
1.52 370
1.52 410
1/2 DBD005A
2.28 50
2.28 20
EAC017A
DOUBLE BEVEL
VENT
2.28 190
WASTE CHAMBER
1.52 300
2.28 140
2.05 330
WASTE
DILUENT
2.28 60
2.28 60
1.52 60
XBA199A
2.05 200
2.28 20
1.52 40
2.05 35
2.05 20
1.52 240
1.52 20
T210-6
1.52 40
GBC088A 30
1.52 50
1.52 170
1.52 55
GBC088A 45
1.52 10
1.52 450
1.52 450
WBC
HGB
RBC
CLEAN
LYSE
ISOLATOR
ISOLATOR
2.28 95
2.28 125
2.28 25
2.28 25
XBA144A
XBA144A
2.28 1170 BLUE
2.05 1140
B
B
B
B

Translation inch to mm (⌀ int.)			
0.010"	0.25 mm	0.045"	1.14 mm
0.020"	0.50 mm	0.051"	1.30 mm
0.025"	0.64 mm	0.060"	1.52 mm
0.030"	0.76 mm	0.081"	2.05 mm
0.035"	0.89 mm	0.090"	2.28 mm
0.040"	1.02 mm	0.100"	2.54 mm

C: CRISTAL TUBE
P: POLYURETHAN TUBE
: TYGON TUBE
S: SILICON TUBE
V: VITON TUBE
PTFE: TEFLON TUBE

3/2-3T

2/2 NC

Description	Chk	By	Date	ECR	Rev
1170, 1140 were 1100, 1080 and translation French/English	AO	AS	22/12/08	3844	B
Creation from NMS021C2 Rev.B; Add XBA144A. Change PTFE tubing input/output needle syringe + sleeves and grommet	AO	AS	12/06/08	3621	A

Designation: HYDROPNEUMATIQUE DIAGRAM
MICROS 60ES O.T BOUTEILLE

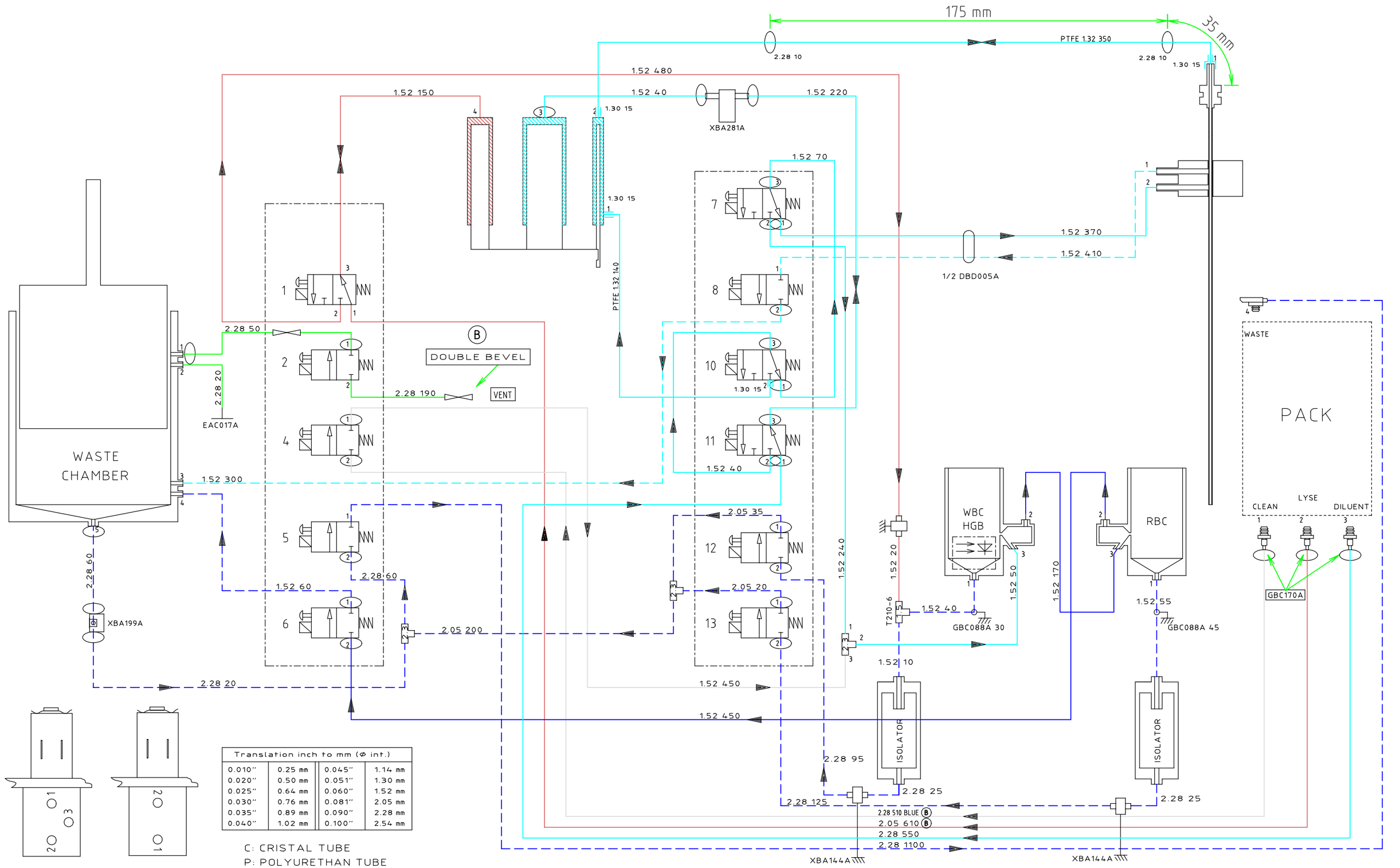
Design & Symbol According to AFNOR NORM

Electrical Manufacturing Refer to RCF001A & RCF013A

Standard tolerance: -
Roughness: -
Material: -
Treatment: -
Coating: -

HORIBA ABX
Montpellier FRANCE

N° : NMS055A | Sheet: 1/1 | Drw size: A3 | Scale: - | Dim. in millimeters



Translation inch to mm (Ø int.)			
0.010"	0.25 mm	0.045"	1.14 mm
0.020"	0.50 mm	0.051"	1.30 mm
0.025"	0.64 mm	0.060"	1.52 mm
0.030"	0.76 mm	0.081"	2.05 mm
0.035"	0.89 mm	0.090"	2.28 mm
0.040"	1.02 mm	0.100"	2.54 mm

Description	Chk	By	Date	ECR	Rev
610 was 590, color blue for cleaner tubing and translation French/English	A0	AS	22/12/08	3844	B
Creation from NMS023C2 Rev.B; Add XBA144A. Change PTFE tubing input/output needle syringe + sleeves and grommet	A0	AS	12/06/08	3621	A

Designation: HYDRAUPNEUMATIC DIAGRAM
MICROS 60ES O.T. PACK

Design & Symbol According to AFNOR NORM

Electrical Manufacturing Refer to RCF001A & RCF013A

Standard tolerance: -

Roughness: -

Material: -

Treatment: -

Coating: -

HORIBA ABX
Montpellier FRANCE

N° : NMS056A | Sheet: 1/1 | Drw size: A3 | Scale: -

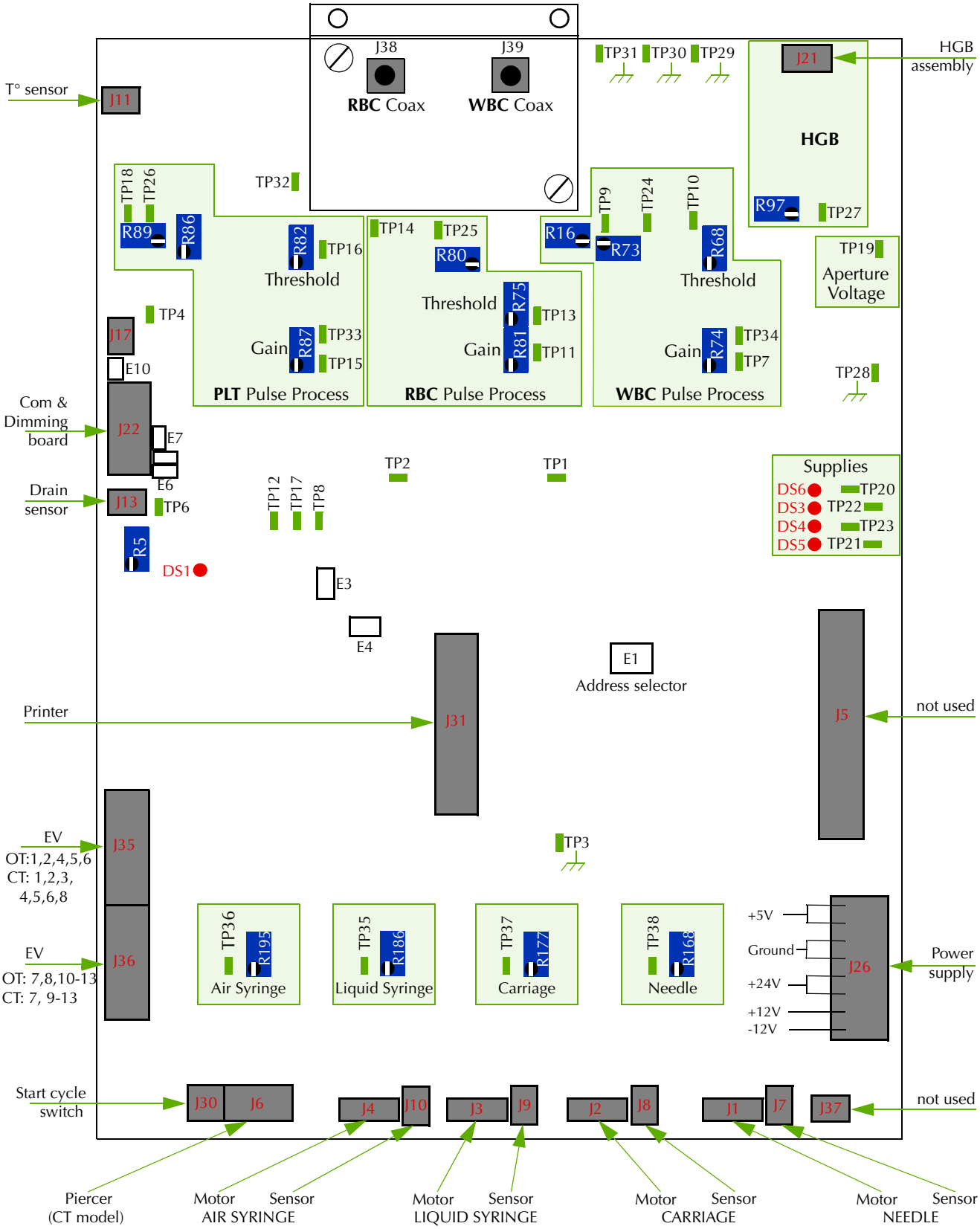
Dim. in millimeters

1. Main board

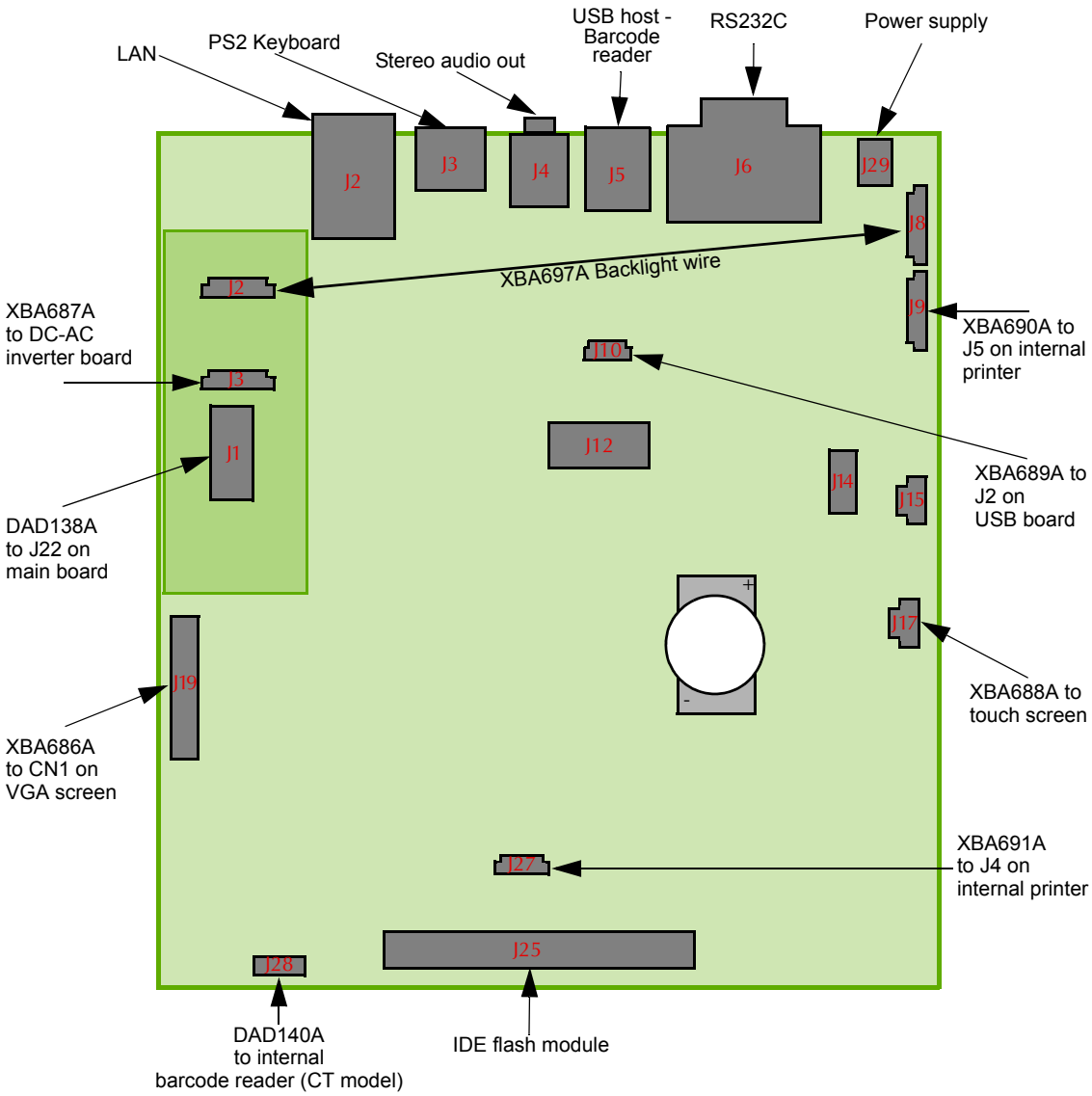
1.1. Test points

Adjustment	Test point	Ground	Potentiometer	Target value
WBC line adjustment	TP9		Factory adjusted	
WBC threshold	TP10	TP31	R68	280 mV +/-7 (826 mV +/-7 for ABX Micros ESV60)
RBC line adjustment	TP14		Factory adjusted	
RBC threshold	TP13	TP31	R75	400 mV +/-7 (350 mV +/-7 for ABX Micros ESV60)
PLT line adjustment	TP18		Factory adjusted	
PLT threshold	TP16	TP31	R82	180 mV +/-3
Power supply (check)	TP20	TP31	No adjustment	-12 V +/- 0.5
	TP21	TP31	No adjustment	+12 V +/- 0.4
	TP23	TP31	No adjustment	+5 V +/-0.2
	TP22	TP31	No adjustment	+24 V +2.5/-1
Liquid syringe motor voltage	TP35	TP31	R186	2.5V +/- 0.05
Air syringe motor voltage	TP36	TP31	R195	2.5V +/- 0.05
Carriage motor voltage	TP37	TP31	R177	1.5V +/- 0.05
Needle motor voltage	TP38	TP31	R168	1.0V +/- 0.05
Aperture voltage (check)	TP19	TP31	No adjustment	60V -1.5/+2.8

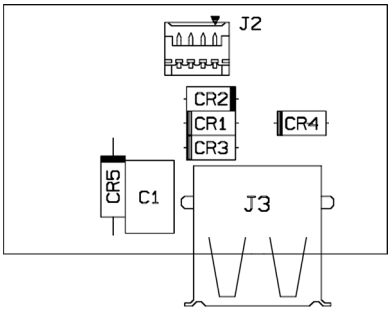
1.2. General view



2. SBC9312 board



3. USB board



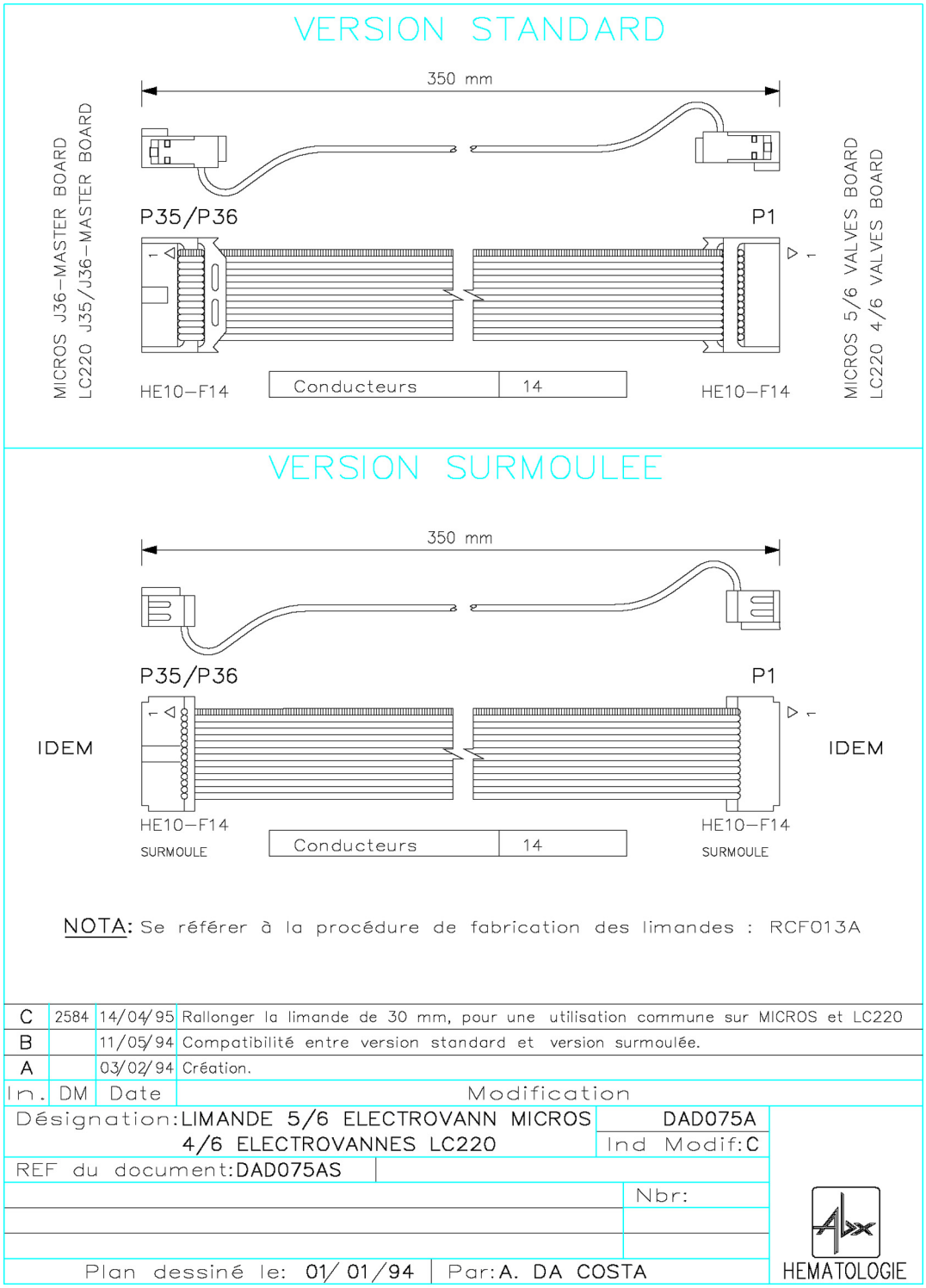
4. Connections

4.1. Connection table

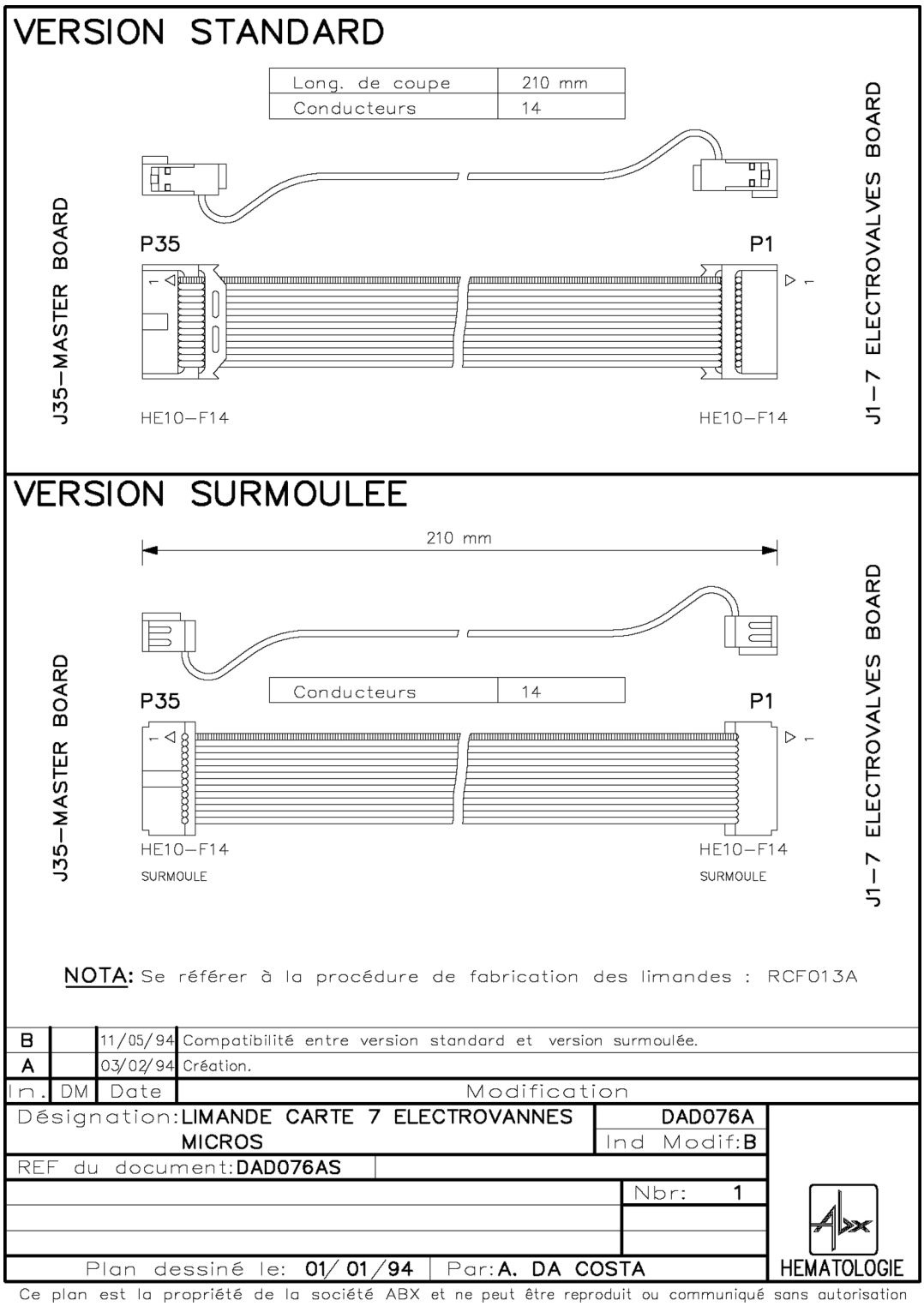
From	To	Reference
Power supply	J26 on master board (XAA355E) J29 on SBC9312 board (XAA586C)	XBA692A
RBC Chamber	J38 on master board (XAA355E)	XBA723A
HGB photometer	J39 on master board (XAA355E)	XDA472B
WBC chamber	J21 on master board (XAA355E)	XBA722A
Temperature sensor	J11 on master board (XAA355E)	XBA281A
Vertical carriage motor	J1 on master board (XAA355E)	DAL008A
Vertical carriage home sensor	J7 on master board (XAA355E)	XBA250A
Horizontal carriage motor	J2 on master board (XAA355E)	DAL008A
Horizontal carriage home sensor	J8 on master board (XAA355E)	XBA250A
Waste/Vacuum syringe motor	J4 on master board (XAA355E)	XBA273AS
Waste/Vacuum syringe home sensor	J10 on master board (XAA355E)	XBA319B
Dilution syringe motor	J3 on master board (XAA355E)	XBA273AS
Dilution syringe home sensor	J9 on master board (XAA355E)	XBA319B
RBC/WBC/Waste drain sensor	J13 on master board (XAA355E)	XBA199A
Start cycle switch	J30 on master board (XAA355E)	XBA278A
Piercing assembly (CT model only)	J6 on master board (XAA355E)	XBA275A
J1 on 5 valves assembly	J35 on master board (XAA355E)	DAD076A
J1 on 6 valves assembly	J36 on master board (XAA355E)	DAD075A
J2 on 5 valves assembly	2 valves assembly (CT model only)	XBA363A
J22 on master board (XAA355E)	J1 on Com & dimming board (XAA581A)	DAD138A
J2 on Com & dimming board (XAA581A)	J8 on SBC9312 board (XAA586C)	XBA697A
J10 on SBC9312 board (XAA586C)	J2 on USB board (XAA580A)	XBA689A
J3 on Com &dimming board (XAA581A)	CN1 on DC-AC inverter (ABC009A)	XBA687A
J19 on SBC9312 board (XAA586C)	CN1 on VGA screen	XBA686A
J17 on SBC9312 board (XAA586C)	Touch screen	XBA688A
J28 on SBC9312 board (XAA586C)	Barcode reader CBC016A (CT model only)	DAD140A
J9 on SBC9312 board (XAA586C)	J5 on Thermal printer	XBA690A
J27 on SBC9312 board (XAA586C)	J4 on Thermal printer	XBA691A

4.2. Cables, flat cables, motors and sensors

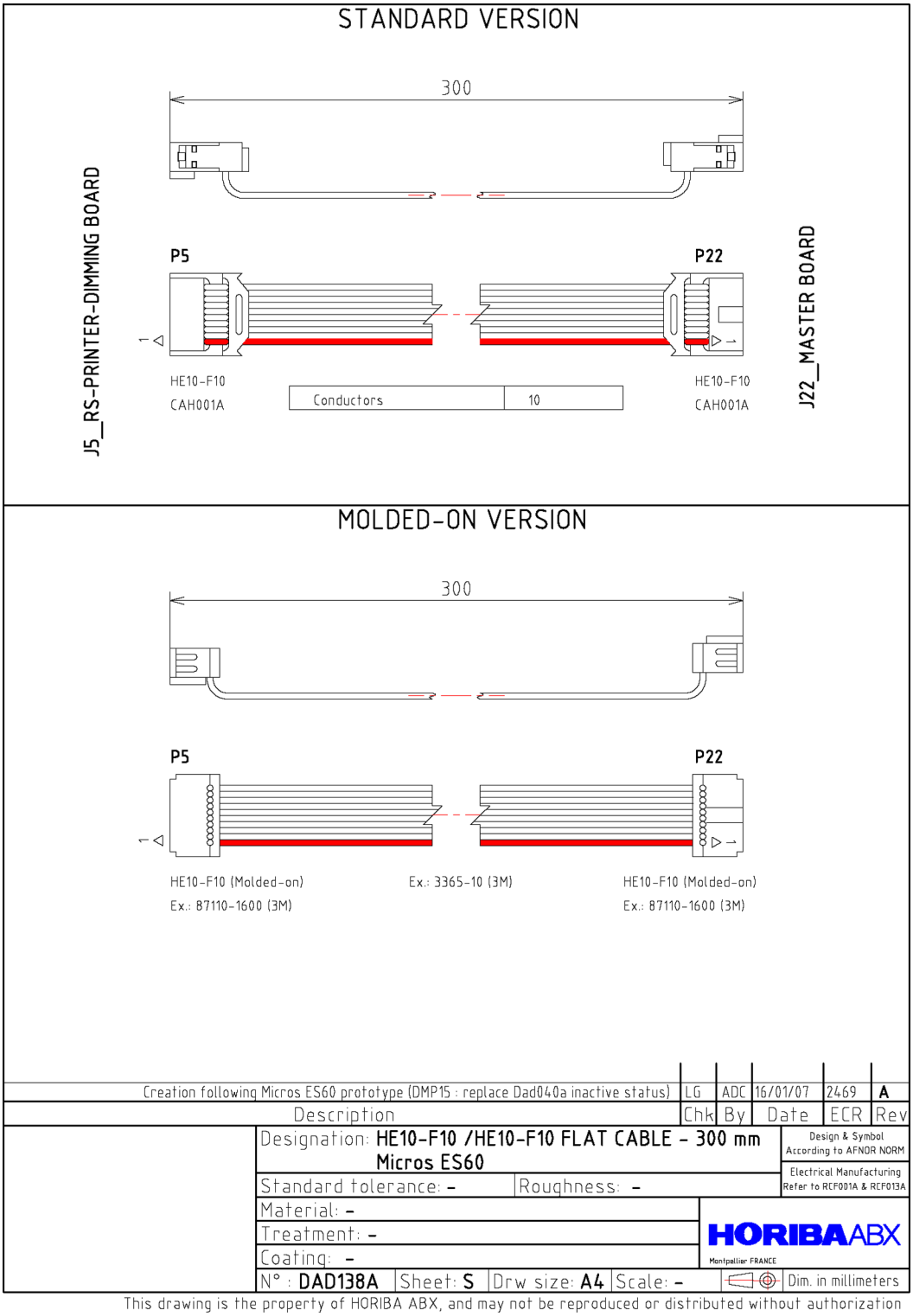
4.2.1. DAD075A



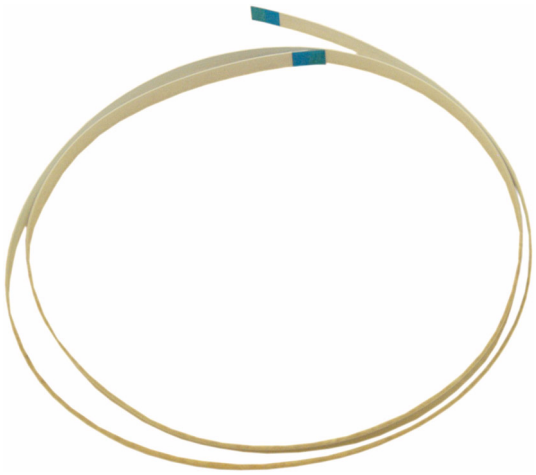
4.2.2. DAD076A



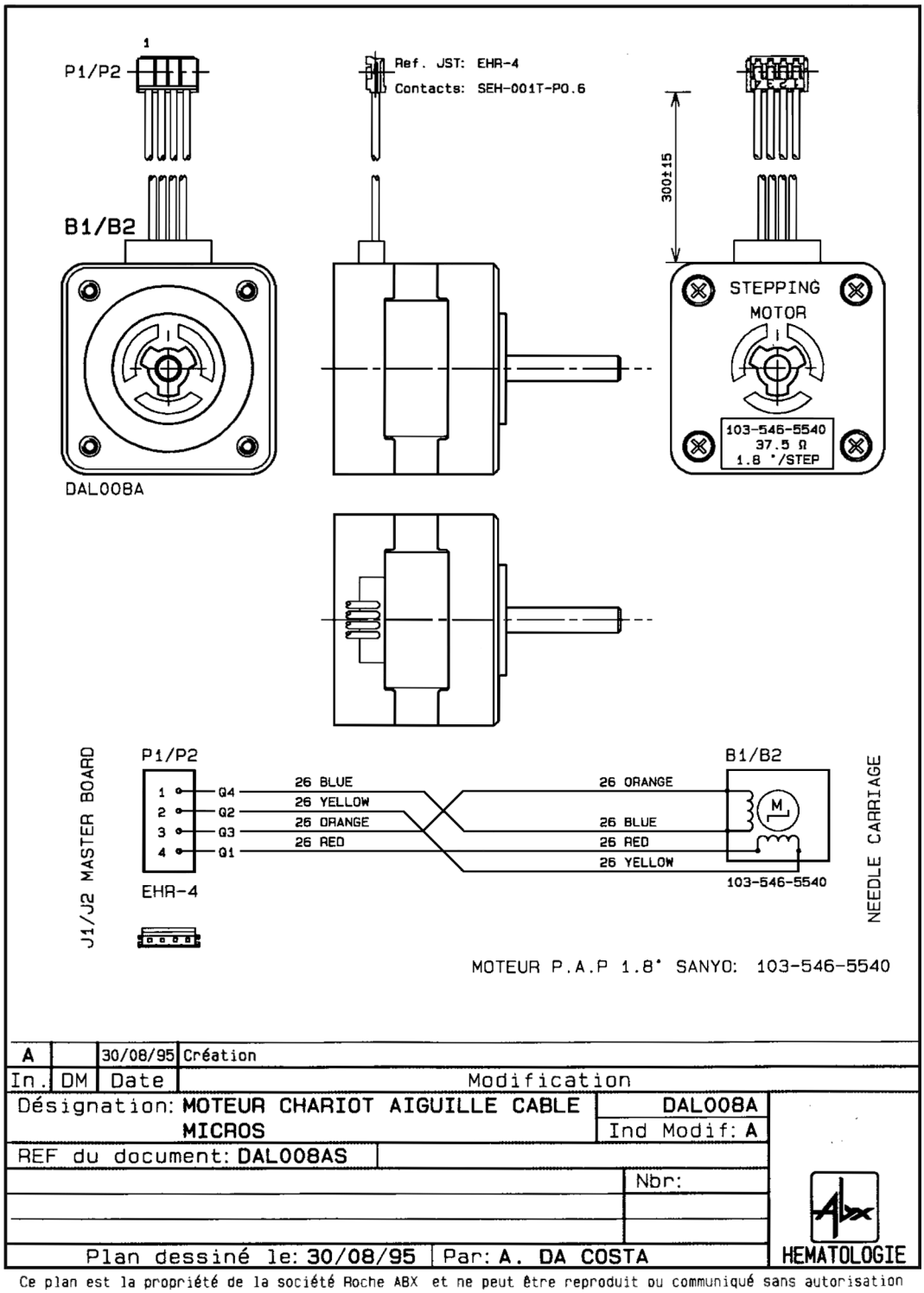
4.2.3. DAD138A


STANDARD VERSION
300
J5_RS-PRINTER-DIMMING BOARD
P5
P22
J22_MASTER BOARD
1
HE10-F10
CAH001A
Conductors
10
HE10-F10
CAH001A
MOLDED-ON VERSION
300
P5
P22
1
HE10-F10 (Molded-on)
Ex.: 87110-1600 (3M)
Ex.: 3365-10 (3M)
HE10-F10 (Molded-on)
Ex.: 87110-1600 (3M)
Creation following Micros ES60 prototype (DMP15 : replace Dad040a inactive status)
LG
ADC
16/01/07
2469
A
Description
Chk
By
Date
ECR
Rev
Designation: HE10-F10 /HE10-F10 FLAT CABLE - 300 mm
Micros ES60
Design & Symbol
According to AFNOR NORM
Standard tolerance: -
Roughness: -
Electrical Manufacturing
Refer to RCF001A & RCF013A
Material: -
Treatment: -
Coating: -
HORIBA ABX
Montpellier FRANCE
N° : DAD138A
Sheet: S
Drw size: A4
Scale: -
Dim. in millimeters
This drawing is the property of HORIBA ABX, and may not be reproduced or distributed without authorization

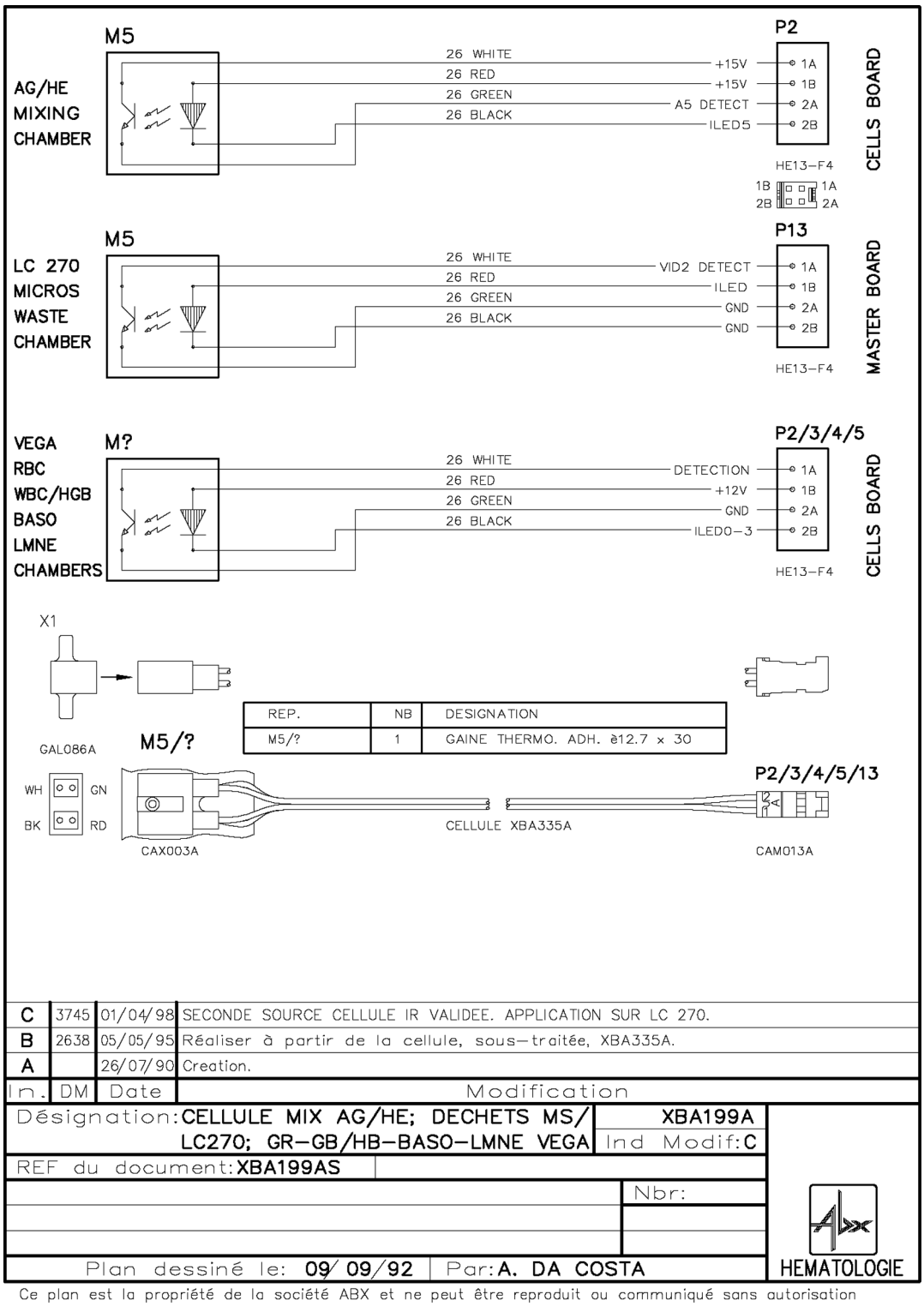
4.2.4. DAD140A



4.2.5. DAL008A



4.2.6. XBA199A



In.	DM	Date	Modification
C	3745	01/04/98	SECONDE SOURCE CELLULE IR VALIDEE. APPLICATION SUR LC 270.
B	2638	05/05/95	Réaliser à partir de la cellule, sous-traitée, XBA335A.
A		26/07/90	Creation.

Désignation: CELLULE MIX AG/HE; DECHETS MS/ LC270; GR-GB/HB-BASO-LMNE VEGA — XBA199A — Ind Modif: C

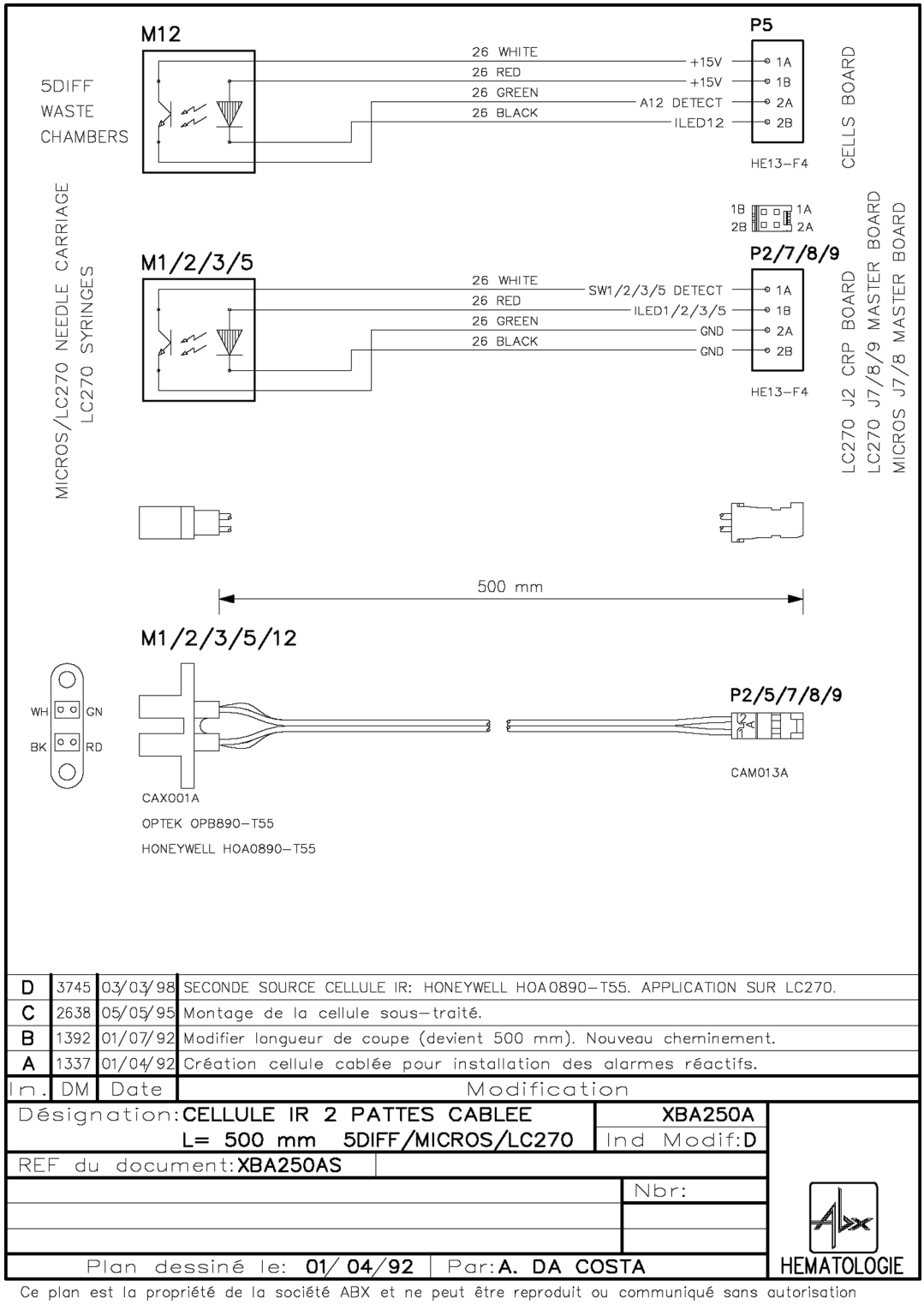
REF du document: XBA199AS

Nbr:

Plan dessiné le: 09/09/92 — Par: A. DA COSTA

HEMATOLOGIE

4.2.7. XBA250A



In.	DM	Date	Modification
D	3745	03/03/98	SECONDE SOURCE CELLULE IR: HONEYWELL HOA0890-T55. APPLICATION SUR LC270.
C	2638	05/05/95	Montage de la cellule sous-traité.
B	1392	01/07/92	Modifier longueur de coupe (devient 500 mm). Nouveau cheminement.
A	1337	01/04/92	Création cellule cablée pour installation des alarmes réactifs.

Désignation: CELLULE IR 2 PATTES CABLEE L= 500 mm 5DIFF/MICROS/LC270

XBA250A

Ind Modif: D

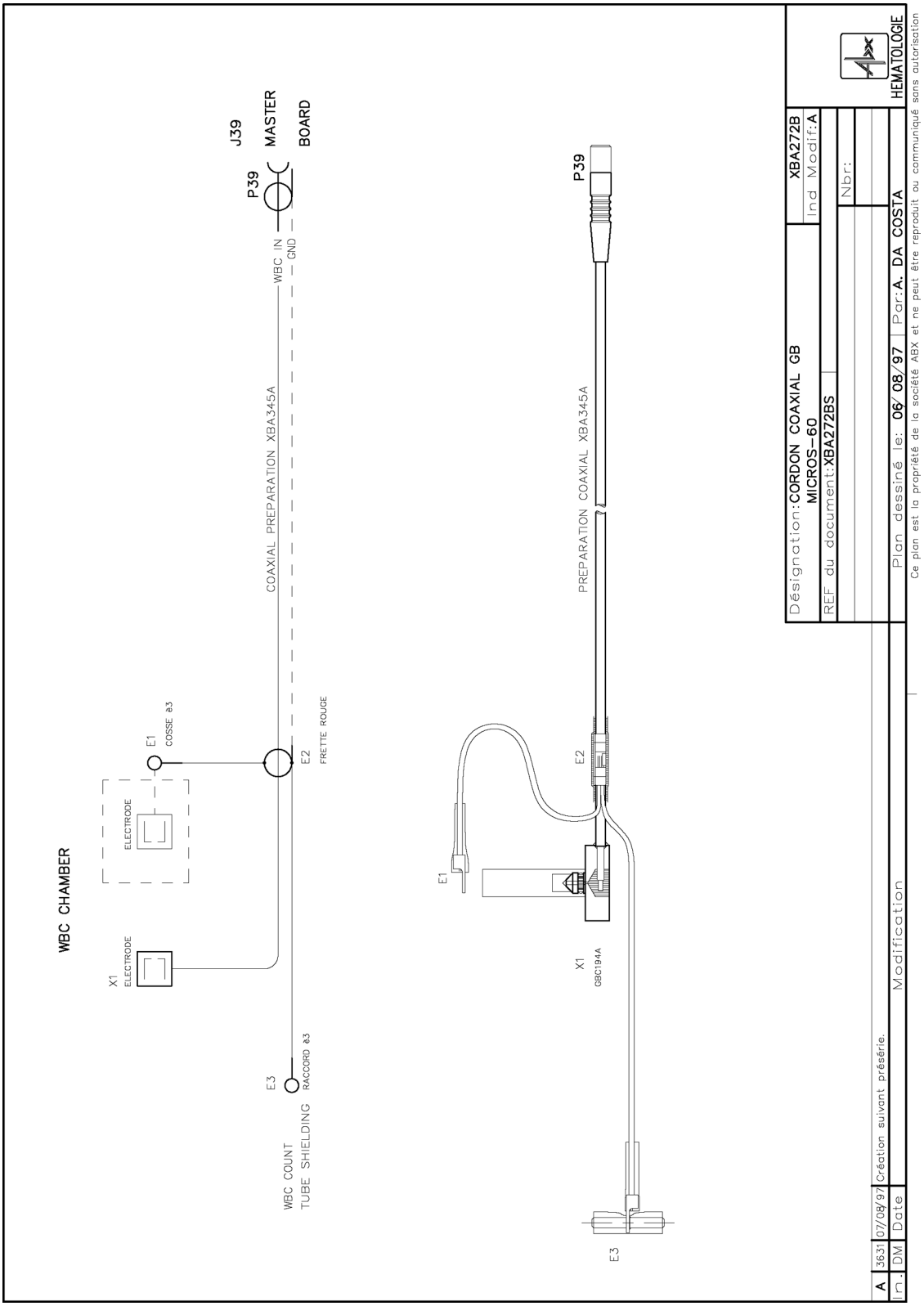
REF du document: XBA250AS

Nbr:

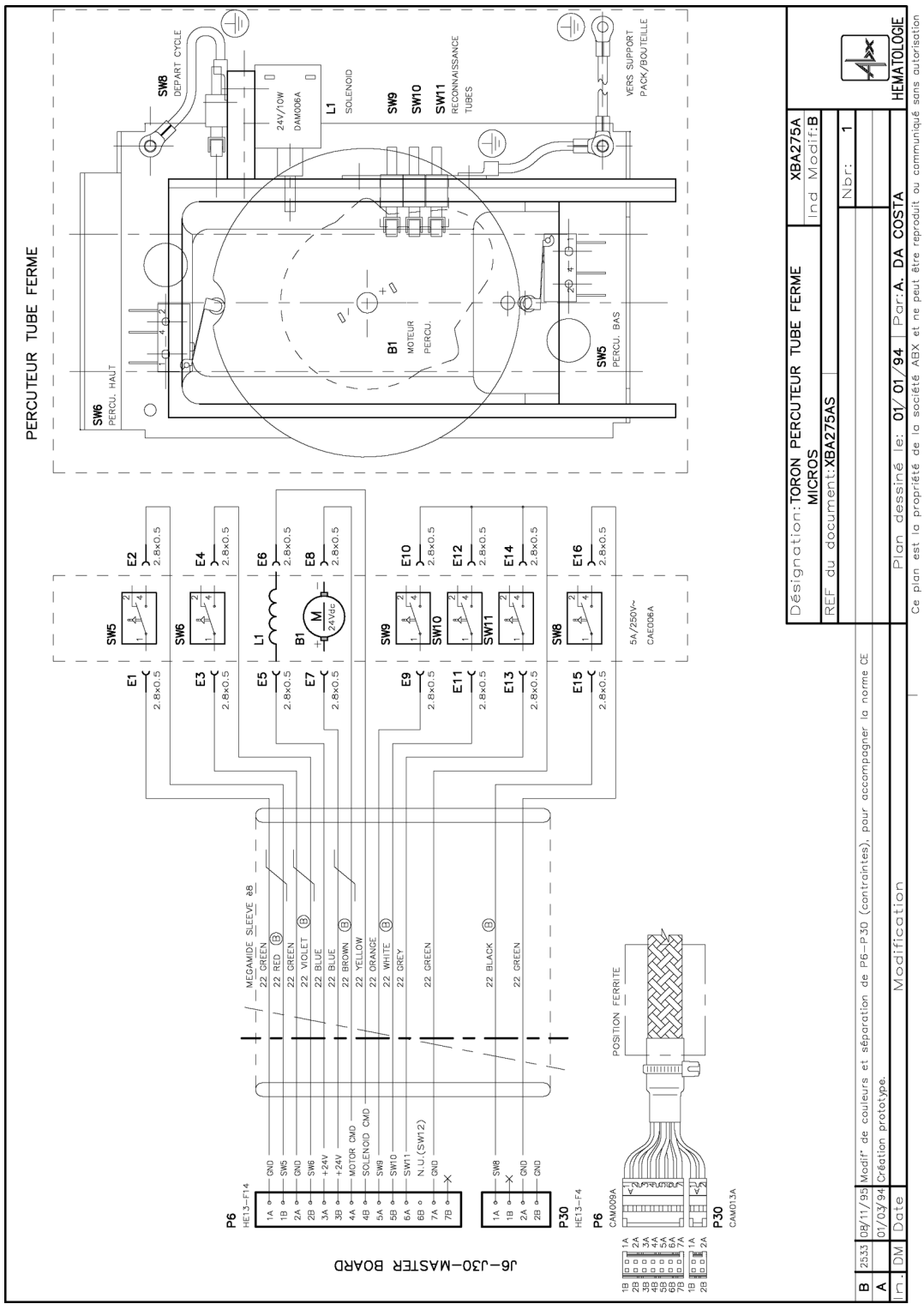
Plan dessiné le: 01/04/92 Par: A. DA COSTA

HEMATOLOGIE

4.2.8. XBA272B


WBC CHAMBER
X1
ELECTRODE
ELECTRODE
E1
COSSE ø3
E2
FRETTE ROUGE
E3
RACCORD ø3
WBC COUNT
TUBE SHIELDING
COAXIAL PREPARATION XBA345A
WBC IN
GND
P39
J39
MASTER
BOARD
P39
PREPARATION COAXIAL XBA345A
E1
E2
X1
GBC194A
E3
Désignation:CORDON COAXIAL GB
MICROS-60
REF du document:XBA272BS
XBA272B
Ind Modif:A
Nbr:
HEMATOLOGIE
Plan dessiné le: 06/08/97 | Par:A. DA COSTA
Ce plan est la propriété de la société ABX et ne peut être reproduit ou communiqué sans autorisation
A
In.
3631
DM
07/08/97
Date
Création suivant préséries.
Modification

4.2.9. XBA275A


PERCUTEUR TUBE FERME
SW8 DEPART CYCLE
L1 SOLENOID
24V/10W DAM006A
SW9 SW10 SW11 RECONNAISSANCE TUBES
VERS SUPPORT PACK/BOUTEILLE
SW6 PERCU. HAUT
B1 MOTEUR PERCU.
SW5 PERCU. BAS
E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16
2.8x0.5
5A/250V~ CAE006A
MEGAMIDE SLEEVE ø8
22 GREEN
22 RED
22 VIOLET
22 BLUE
22 BROWN
22 YELLOW
22 ORANGE
22 WHITE
22 GREY
22 BLACK
GND SW5 GND SW6 +24V +24V MOTOR CMD SOLENOID CMD SW8 SW10 SW11 N.U.(SW12) GND
SW8 GND GND
P6 HE13-F14
P30 HE13-F4
POSITION FERRITE
P6 CAM009A
P30 CAM013A
J6-J30-MASTER BOARD
Désignation:TORON PERCUTEUR TUBE FERME MICROS
REF du document:XBA275AS
XBA275A Ind Modif:B
Nbr: 1
Plan dessiné le: 01/01/94 Par:A. DA COSTA
HEMATOLOGIE
Modification
Date
DM
In.
B 2533 08/11/95 Modif° de couleurs et séparation de P6-P30 (contraintes), pour accompagner la norme CE
A 01/03/94 Création prototype.
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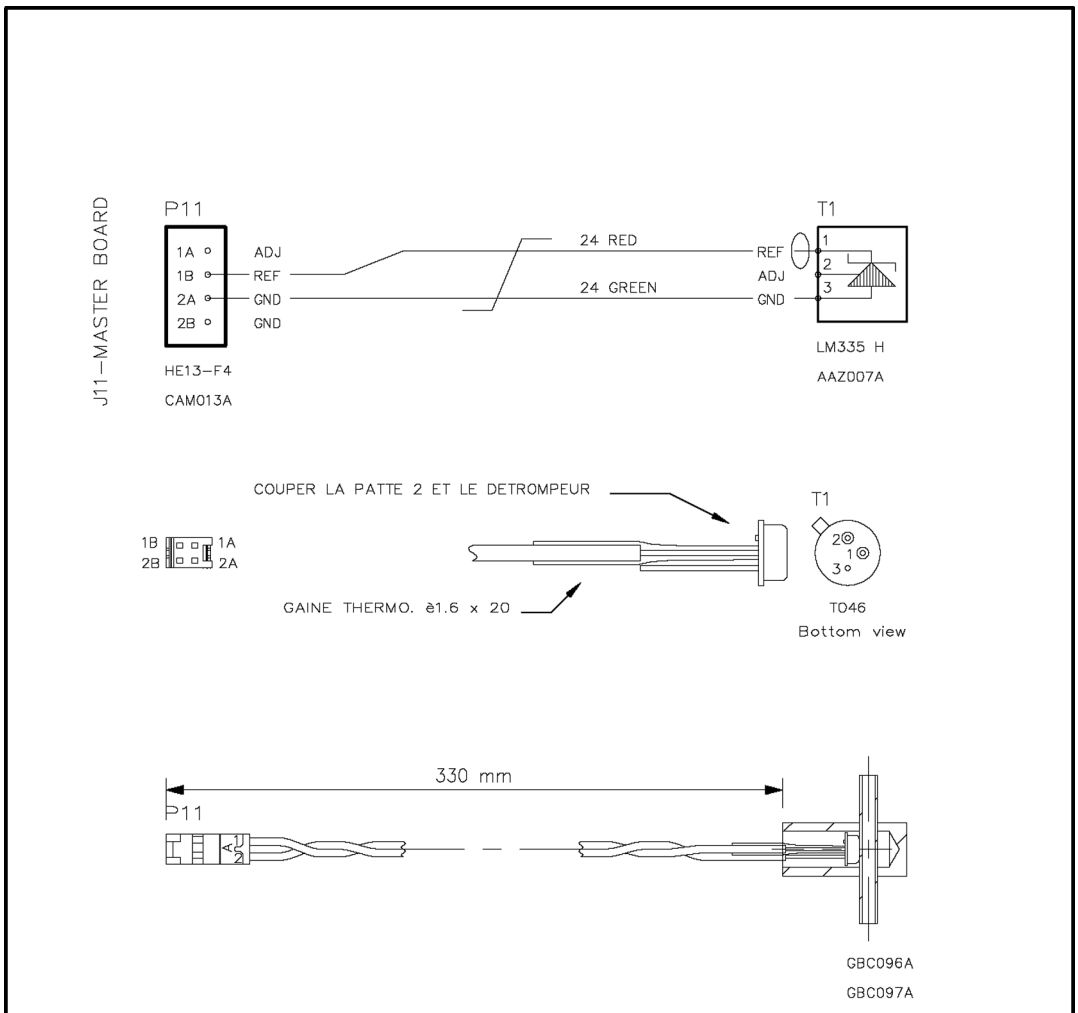
4.2.10. XBA281A



NOTA: LONGUEUR DE COUPE DES FILS: 360 mm

In.	DM	Date	Modification
D	3627	05/08/97	Rallonger le câble de 50 mm, pour compatibilité entre MICROS, LC220 et LC-CRP.
C	3185	30/12/96	Supprimer la liaison "ADJ", fils gris: Couper la patte 2 et supprimer 2 gaines.
B	2533	19/10/95	Passage à la norme CE: Torsader les fils
A		02/06/94	Création.

Désignation: CAPTEUR DE TEMPERATURE CABLE MICROS / LC220 / LC-CRP

XBA281A

Ind Modif: D

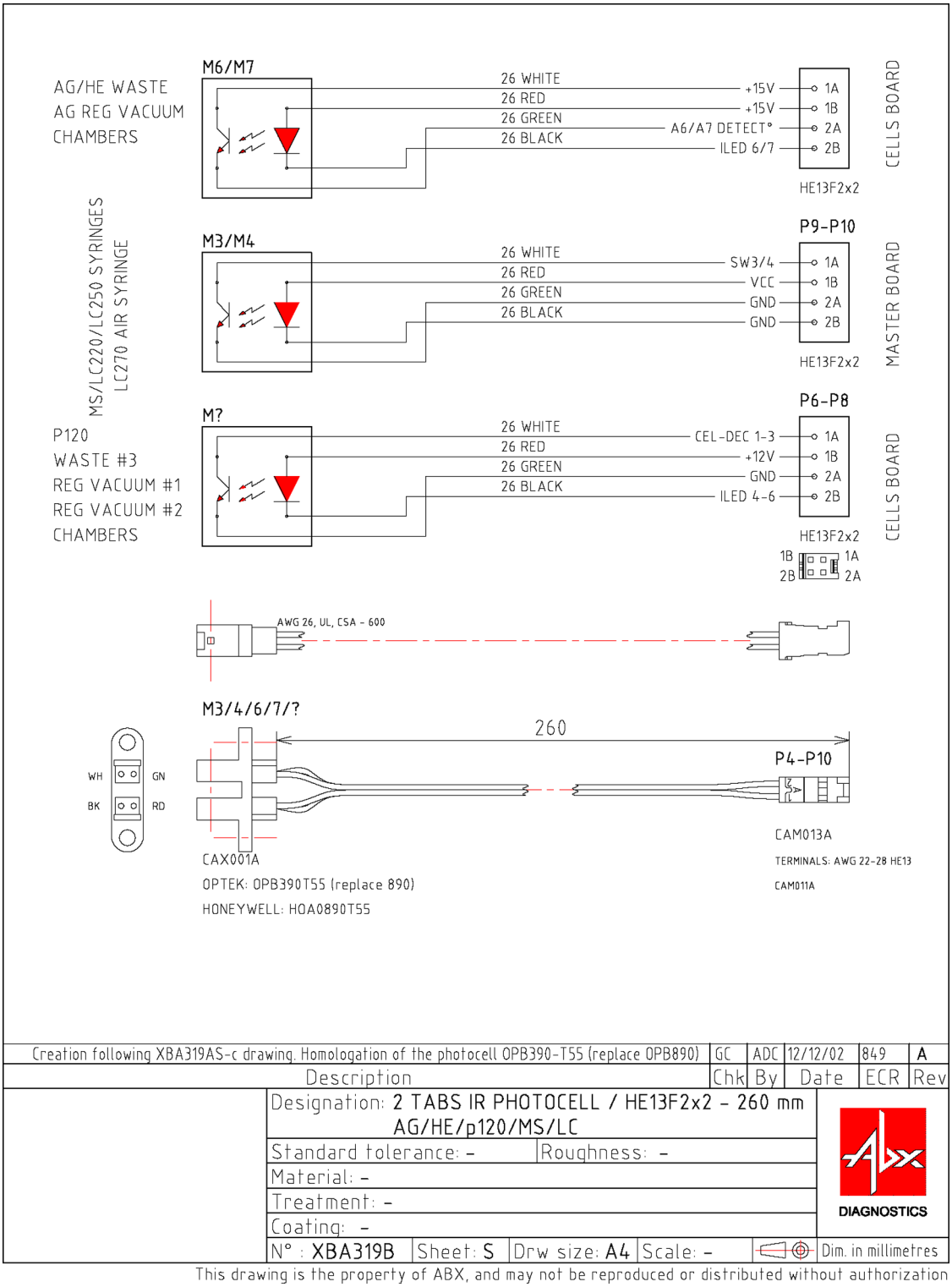
REF du document: XBA281AS

Nbr:

Plan dessiné le: 02/06/94 Par: A. DA COSTA

HEMATOLOGIE

4.2.11. XBA319B



Creation following XBA319AS-c drawing. Homologation of the photocell OPB390-T55 (replace OPB890)	GC	ADC	12/12/02	849	A
Description	Chk	By	Date	ECR	Rev

Designation: 2 TABS IR PHOTOCELL / HE13F2x2 - 260 mm AG/HE/p120/MS/LC

Standard tolerance: - | Roughness: -

Material: -

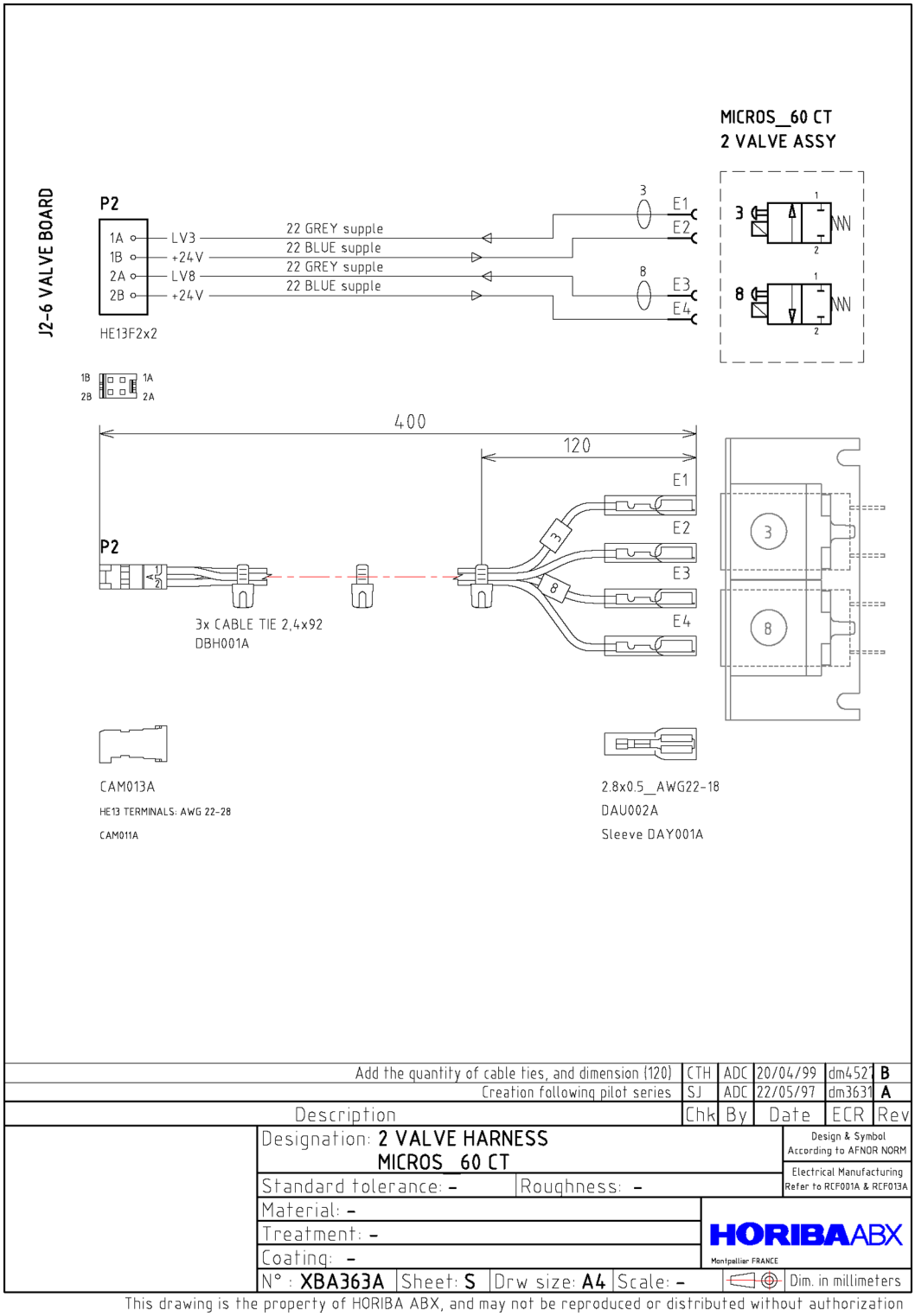
Treatment: -

Coating: -

N° : XBA319B | Sheet: S | Drw size: A4 | Scale: - | Dim. in millimetres

DIAGNOSTICS

4.2.12. XBA363A



Description	Chk	By	Date	ECR	Rev
Add the quantity of cable ties, and dimension (120)	CTH	ADC	20/04/99	dm4527	B
Creation following pilot series	SJ	ADC	22/05/97	dm3631	A

Designation: 2 VALVE HARNESS MICROS_60 CT

Design & Symbol According to AFNOR NORM

Electrical Manufacturing Refer to RCF001A & RCF013A

Standard tolerance: – | Roughness: –

Material: –

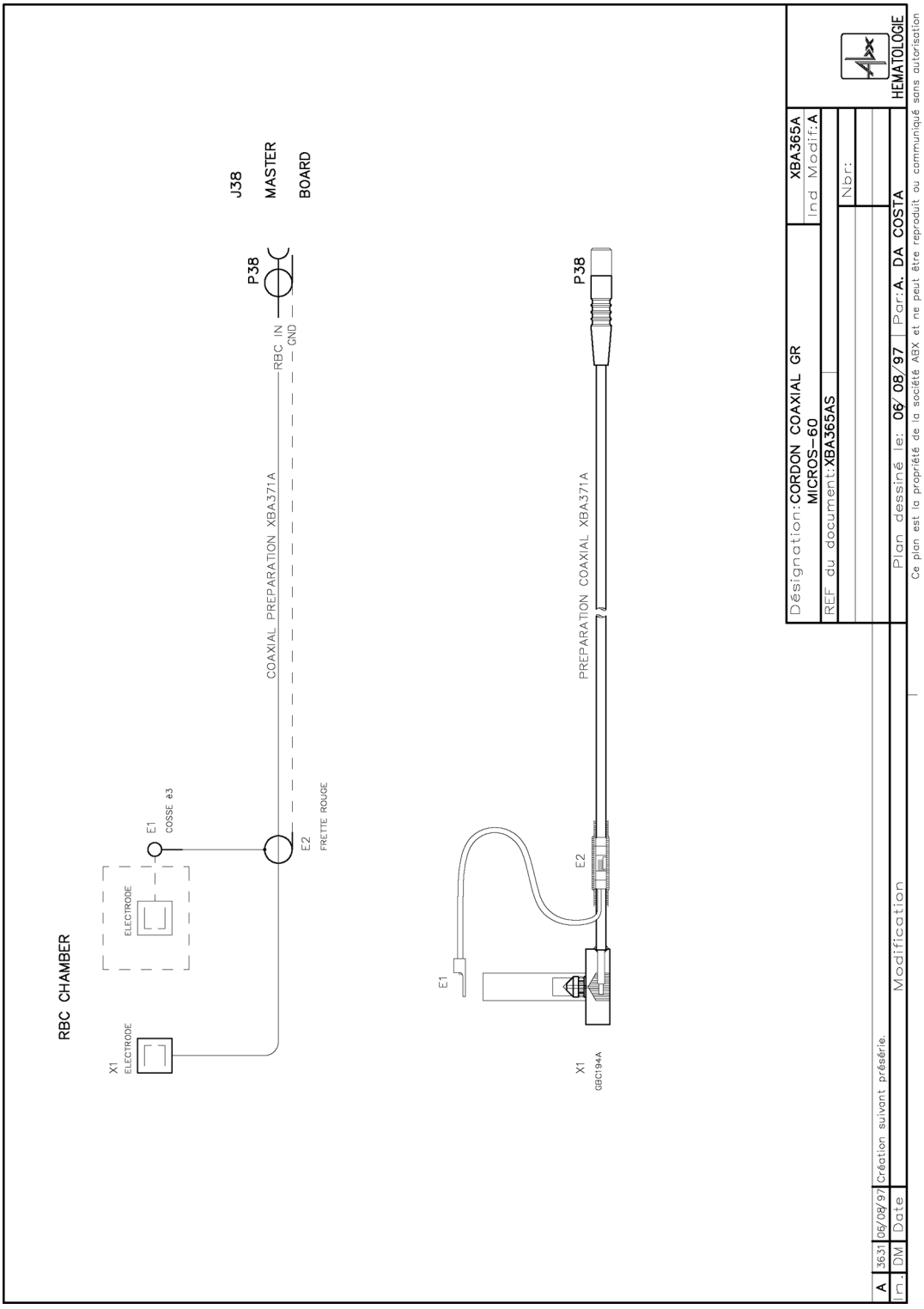
Treatment: –

Coating: –

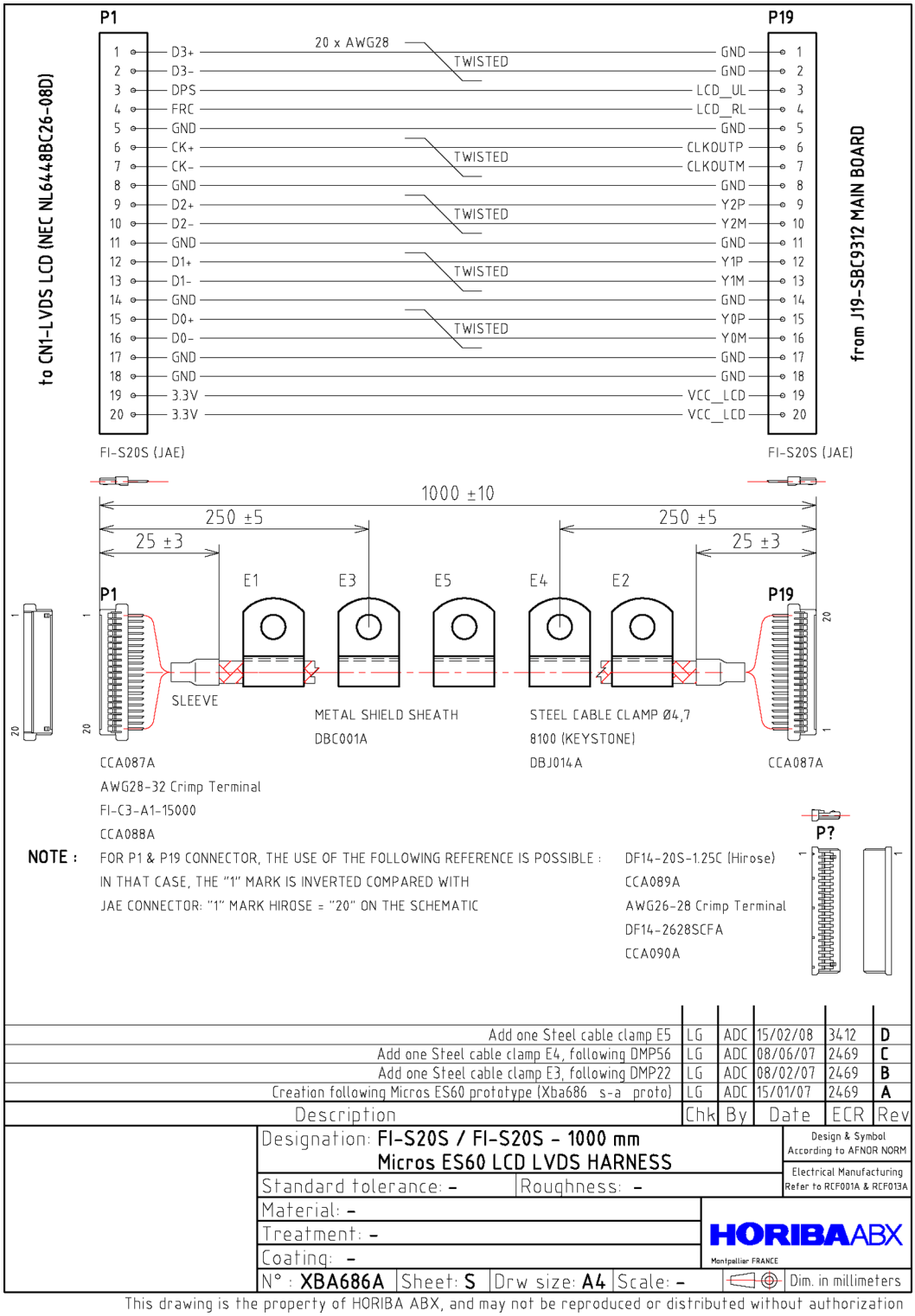
HORIBA ABX Montpellier FRANCE

N° : XBA363A | Sheet: S | Drw size: A4 | Scale: – | Dim. in millimeters

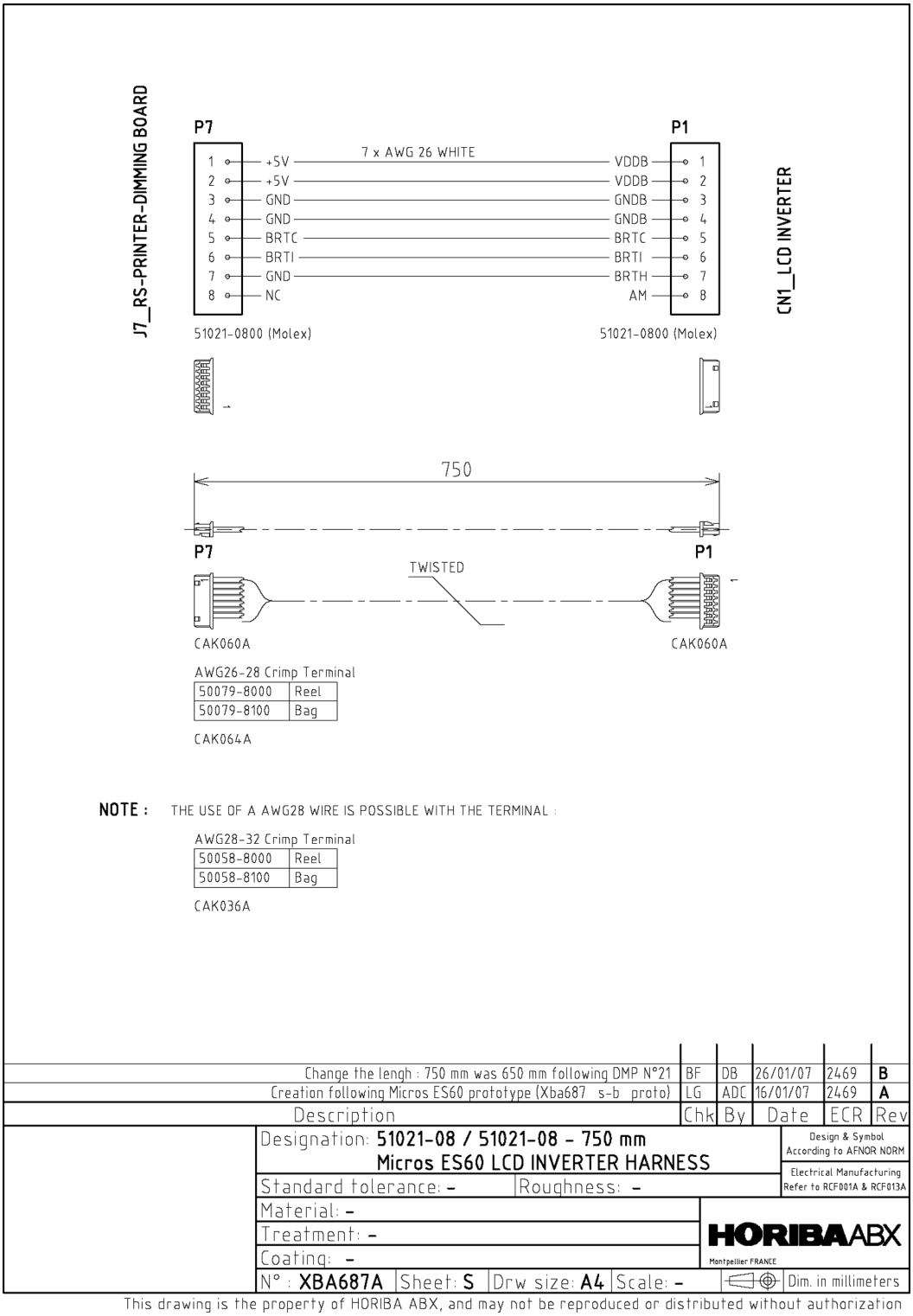
4.2.13. XBA365A



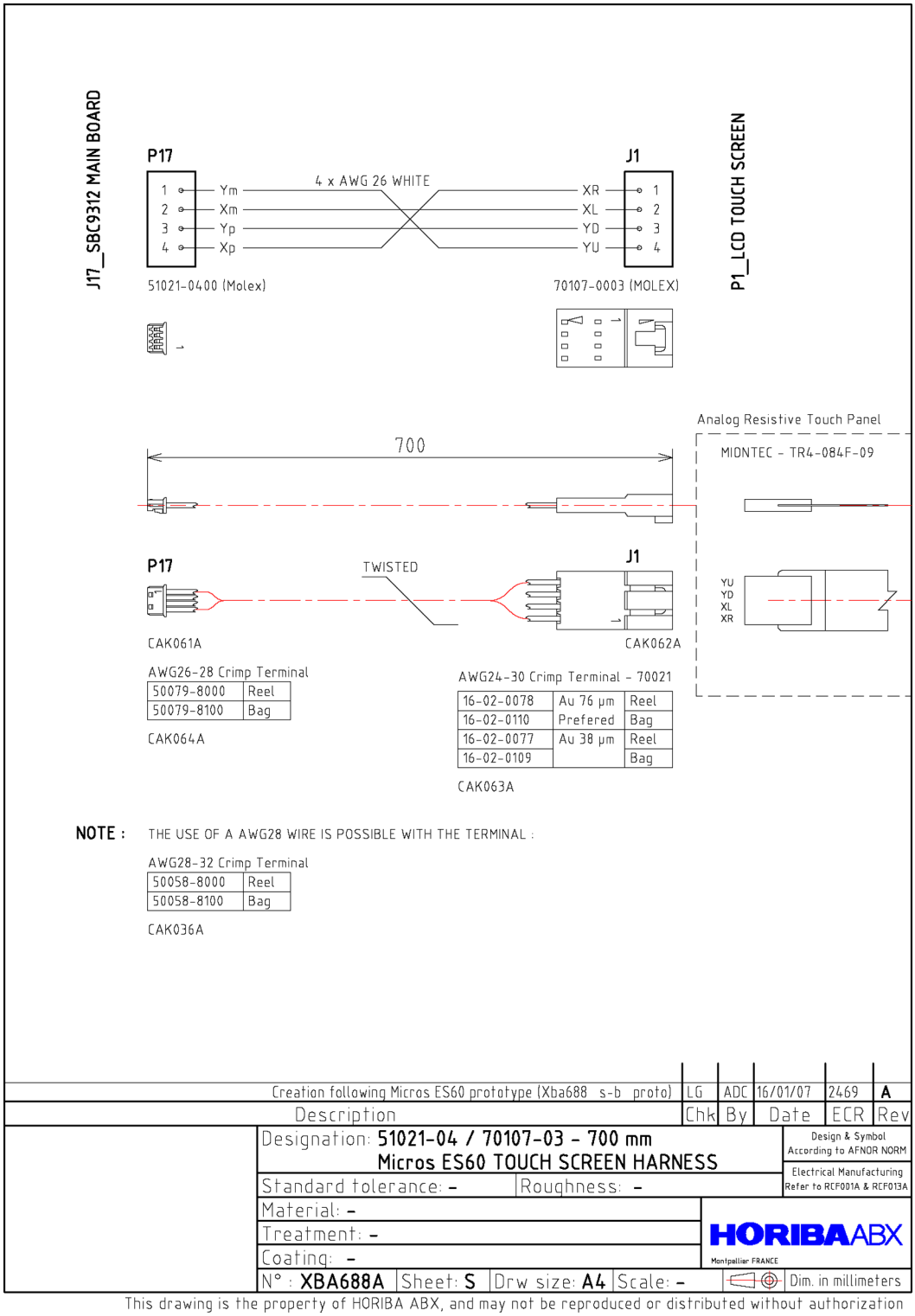
4.2.14. XBA686A



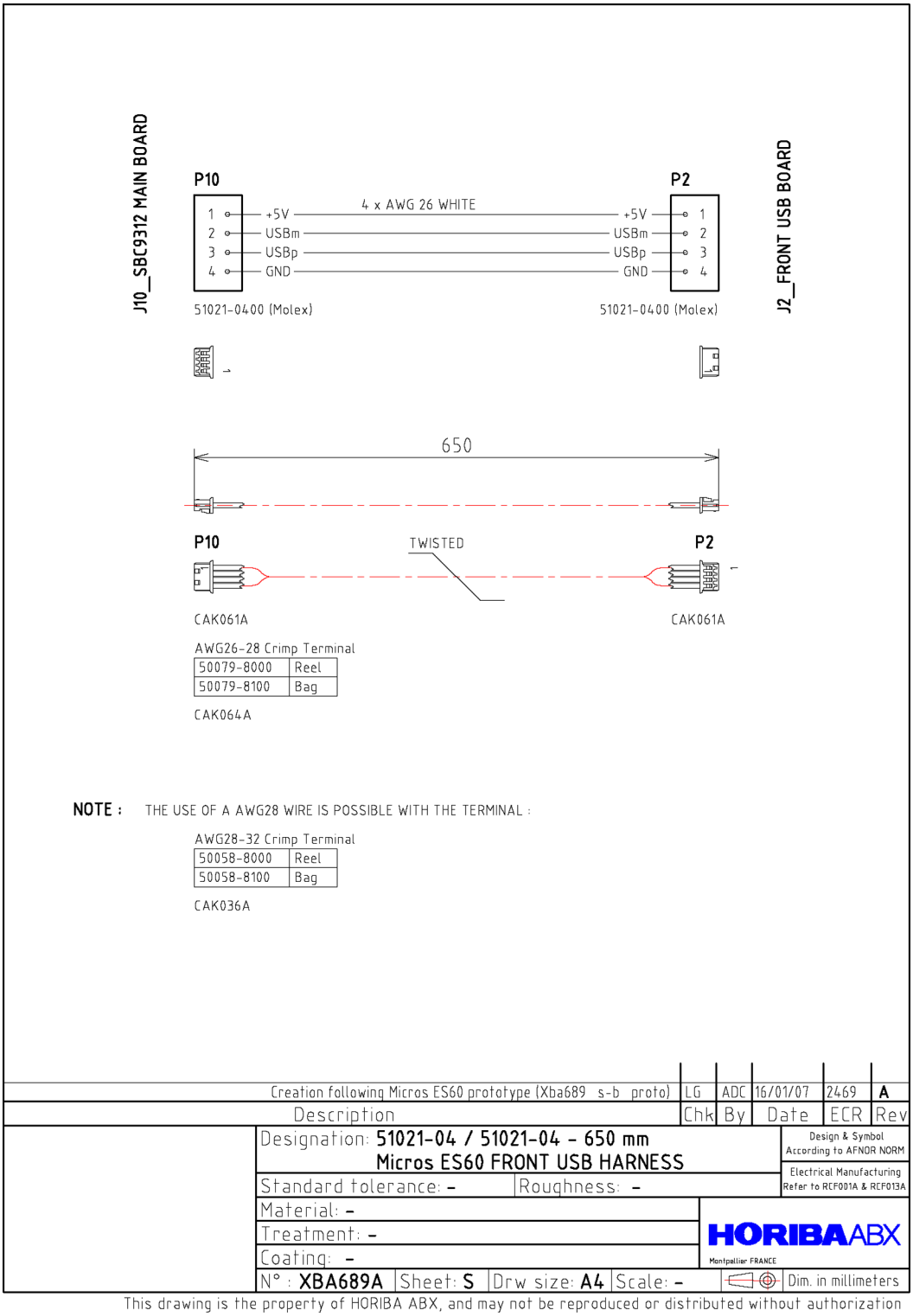
4.2.15. XBA687A



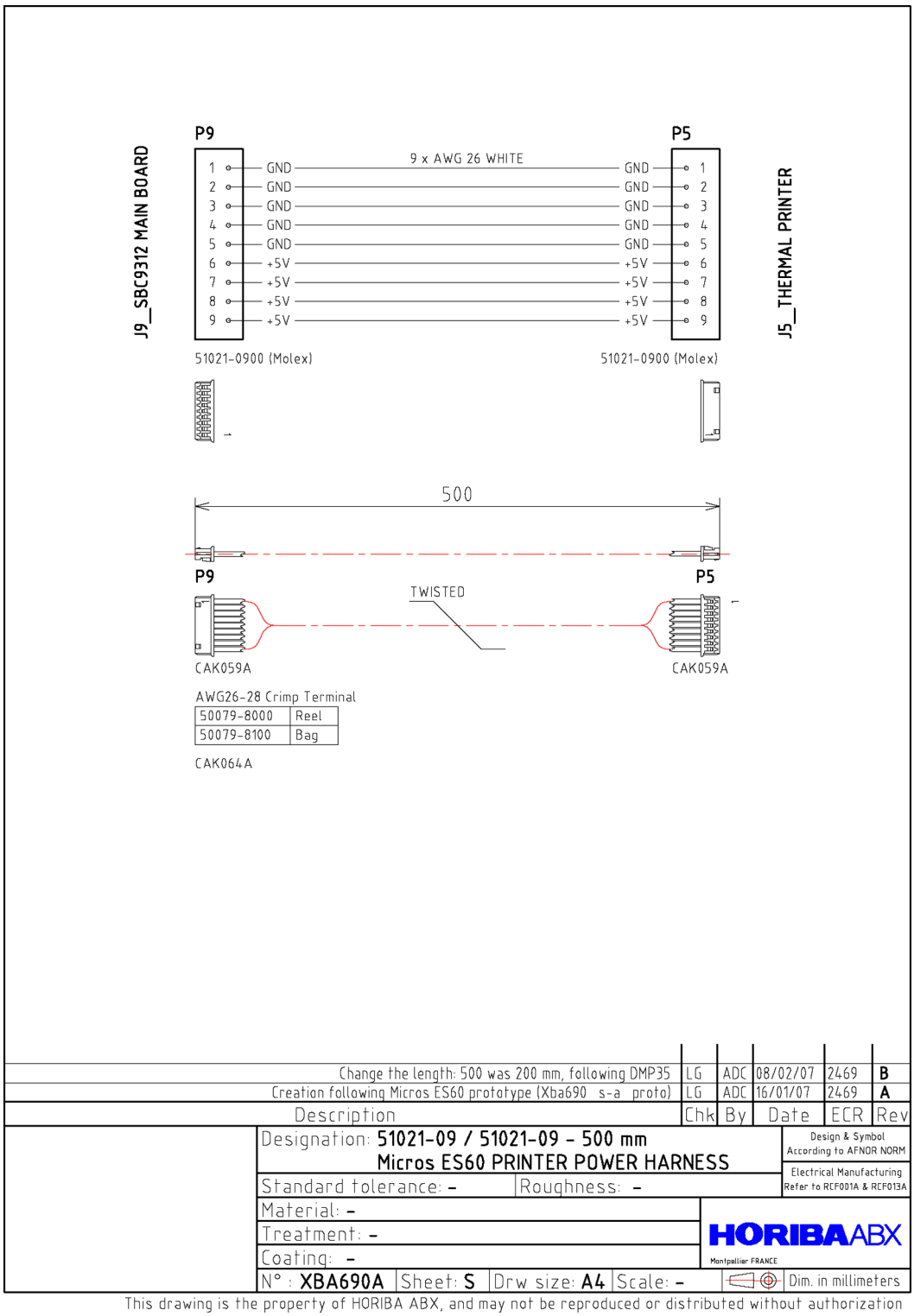
4.2.16. XBA688A



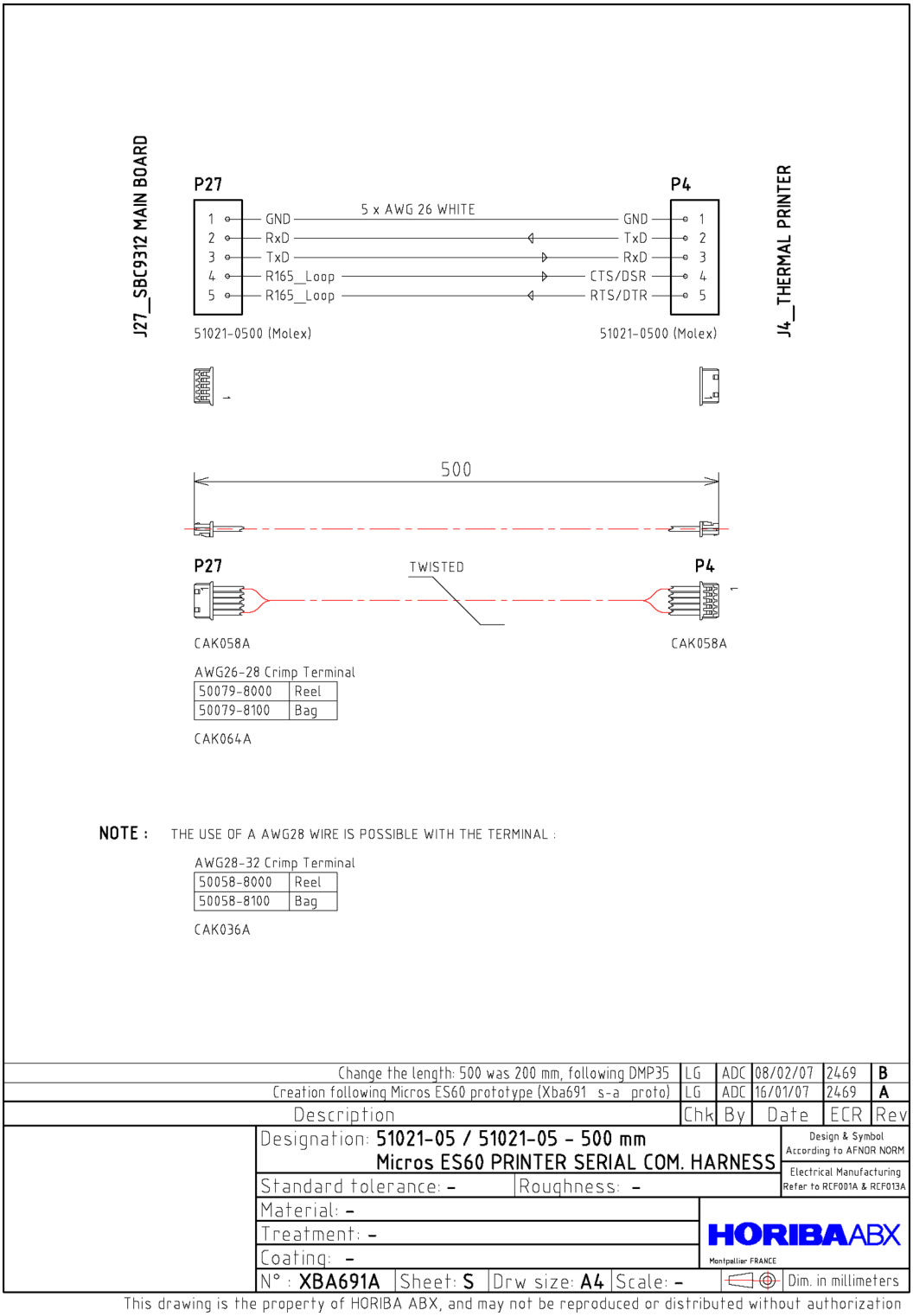
4.2.17. XBA689A



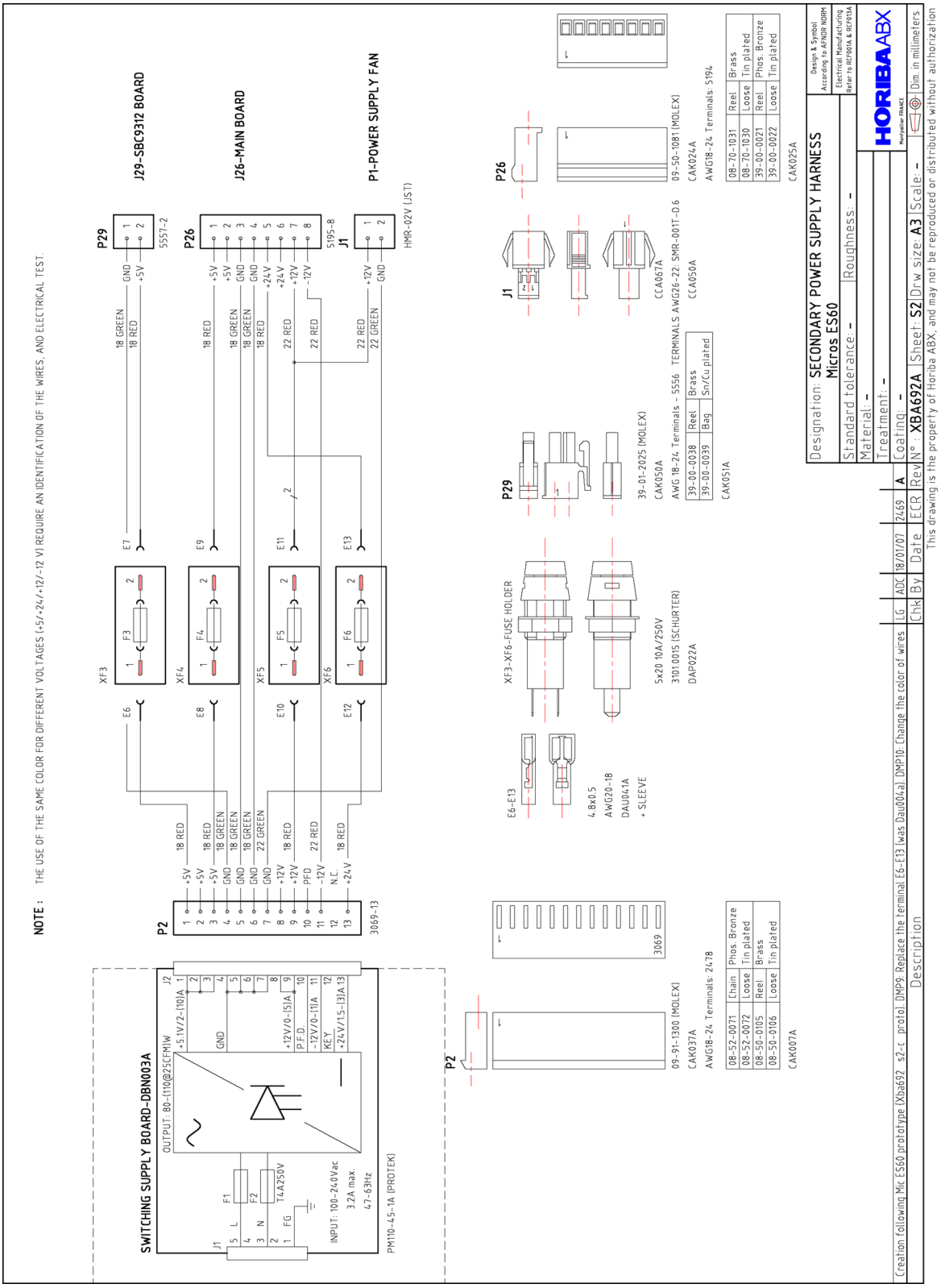
4.2.18. XBA690A



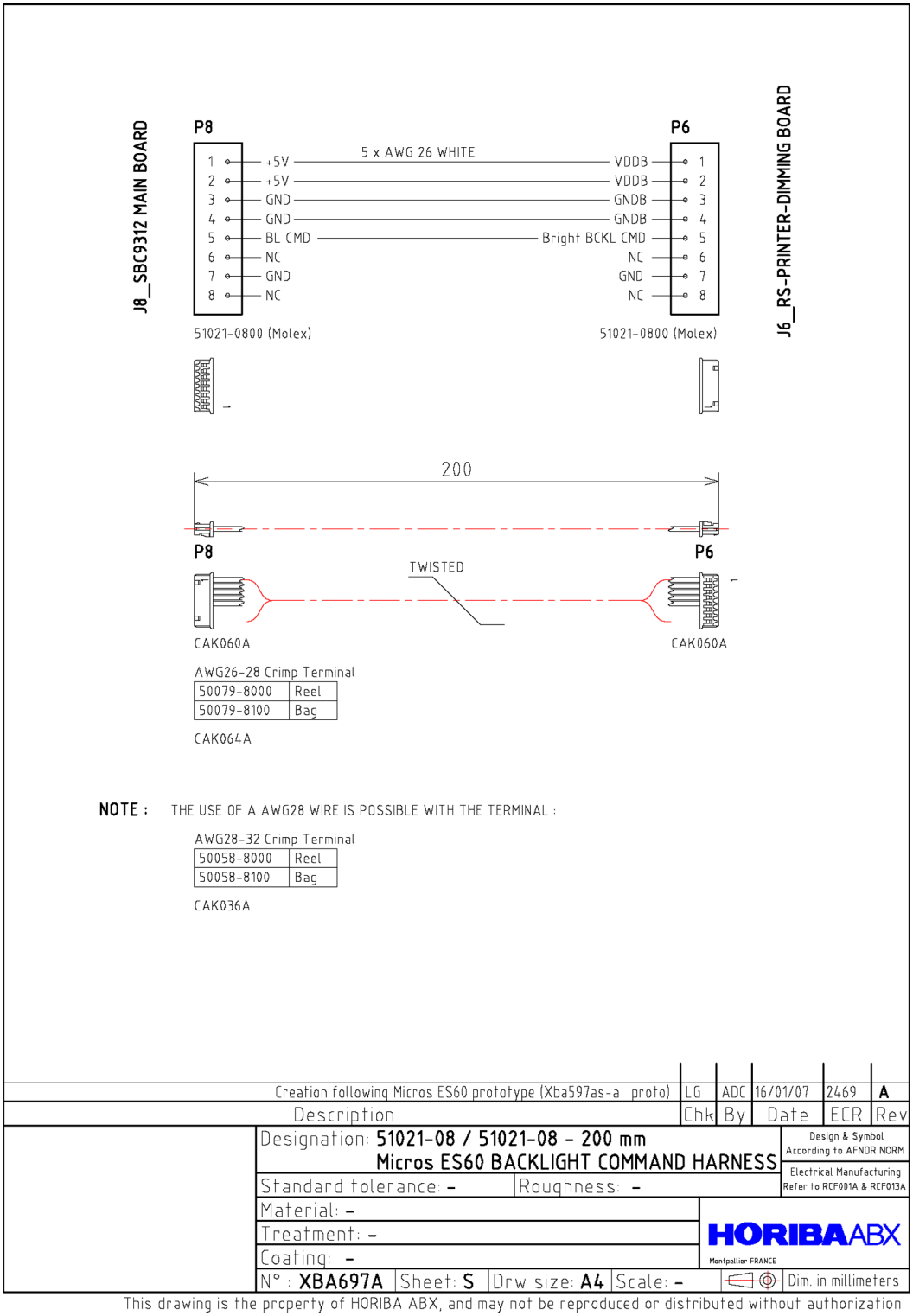
4.2.19. XBA691A



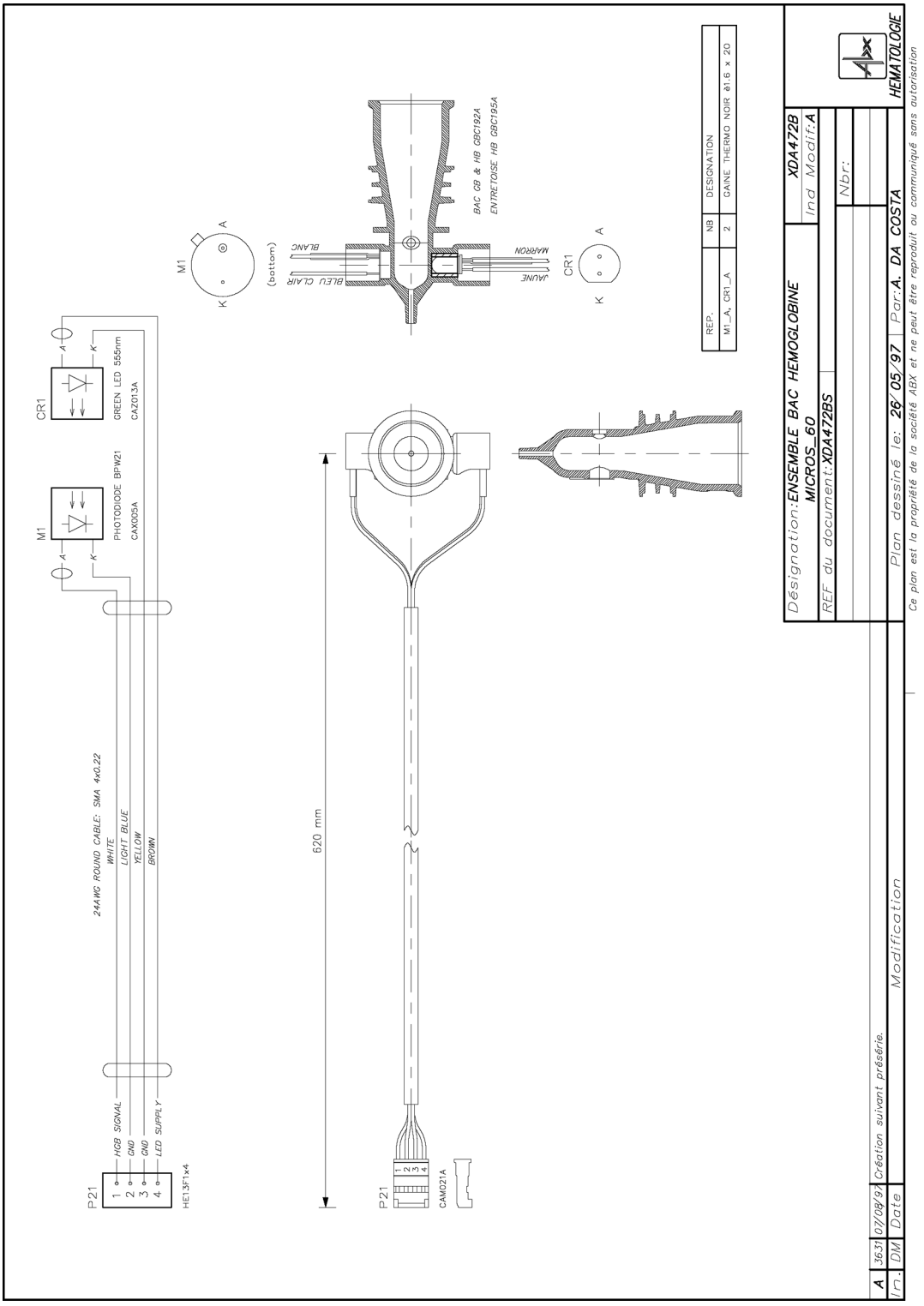
4.2.20. XBA692A



4.2.21. XBA697A



4.2.22. XDA472D



5. Synoptics

◆ See synoptic diagrams on next page.

POWER SUPPLY

MAINS SUPPLY
50-60Hz
100-240VAC
DAC011A
DAC012A
MAINS COMBINED PLUG-DAN024A
T2A
FUSES
ON/OFF
FILTER
XBA692A
80/110 W SWITCHING SUPPLY BOARD-DBN003A
J1
T4A
FUSES
J2
+24V
+12V
+5V
-12V
GND
T2A5-
T0A8-
T2A5-
FUSES
T4A
XBA699A
+12V FAN
XBA692A
FERRITE
DZZ014A
XBA692A
SHIELDING
POWER SUPPLY MODULE-(XBA710A)

MEASURE

RBC
CHAMB.
WBC
HGB
CHAMB.
SSS NM
BLACK SHIELDING
XBA723A
XBA722A
XDA472B
DZZ018A
N = 1
DZZ018A
N = 1

MASTER BOARD-XAA355E

J17
J37
+24V
R_LED
J26
TP22 +24V
TP21 +12V
TP23 +5V
TP20 -12V
TP28 GND
LANGUAGE SELECTION
A18
A17
MEMORY STORAGE
512 KBYTE ROM
8 KBYTE SAVEGUARDED RAM + REAL CLOCK

MICRO CONTROLER UNIT
MCU 8
68HC11
8 MHz

HT TP19 +60V/+12V
+12V/VREF
CMD-HT
VREF
SCI
PROBES PRE-AMPLIFICATOR
2.5V
180mV
400mV
350mV
R87
R82
R81
R75
R74
R68
PLT PROCESSING
RBC PROCESSING
WBC PROCESSING
PLT
RST-P
RBC
RST-R
WBC
RST-W
SHIELDING
J38
J39
J21
I/+12V
R97
INTEGRATOR
HGB1-3
TEMP
RESET
SPI
INC
U/D

RS232 INTERFACE
BUS INTERFACE & CONTROL LOGIC
E2POT
DSR
J22
10
+5V
DAD138A

TEMPERATURE SENSOR XBA281A 4 J11
B1 VERTICAL CARRIAGE DAL008A 4 J1 — STEPPER MOTOR CONTROLER 1 — 3 VREF1 TP38 R168 — CLK1, DIR1, SET1
M1: HOME XBA250A 4 J7 SW1
M2: HOME XBA250A 4 J8 SW2
B2 HORIZONTAL CARRIAGE DAL008A 4 J2 — STEPPER MOTOR CONTROLER 2 — 3 VREF2 TP37 R177 — CLK2, DIR2, SET2
SAMPLING NEEDLE
B4 WASTE/VACUUM SYRINGE XBA273A 4 J4 — STEPPER MOTOR CONTROLER 4 — 3 VREF4 TP36 R195 — CLK4, DIR4, SET4
M4: HOME XBA319B 4 J10 SW4
WASTE VACUUM CHAMBER
M3: HOME XBA319B 4 J9 SW3
B3 DILUTION SYRINGE XBA273A 4 J3 — STEPPER MOTOR CONTROLER 3 — 3 VREF3 TP35 R186 — CLK3, DIR3, SET3
M5: RBC-WBC-WASTE DRAIN XBA199A 4 J13 — R6 TP6 — 3V — COMPARATOR — VID
BLOOD OPENED TUBE
SW8: START CYCLE SWITCH XBA278A 4 J30 SW8
J6 SW6
CMDEA
SW9-SW12
SW5
MOTOR DRIVER PERCU

I/O INTERFACE & LATCHES

J5 +5V SPI LUM
DATA & CONTROL
A1 A2
R_LED
G_LED
R_LED/A1
G_LED/A2
MACHINE SELECTION
4 LINES x 5 COLUMNS
J31
DATA & CONTROL PRINTER
+24V
BUZZER

J35 +24V DAD076A 14 EV1-EV7
J36 +24V DAD075A 14 EV8-EV13
5 VALVE ASSY-XDB061A
EV1, 2, 4-6
6 VALVE ASSY-XDB062A
EV7, 8
EV10-13

SERVO-CONTROLS

INPUT/OUTPUT INTERFACES

DiskOnChip
IDE-44 FLASH MEMORY
SBC9312 MAIN BOARD-XAA586C
J29
J25
+5V/GND
D0-D15
I/O & CTRL
+5V/GND USB J10 4 XBA689A
XBA697A
COM & DIMMING BOARD-XAA581A
+5V/GND
DIMMING INTERFACE
BRTC
BRTI (0-2.5 V)
J2
J3
RS232 INTERFACE
Rx/Tx/GND
+3.3V/GND
XU19
+5V/GND BL CMD J8 XBA687A 8
+3.3V/GND LVDS INTF (25 MHz) J19 20 XBA686A
XR, XL
YD, YU
J17 4 XBA688A 4
+5V/GND J3 6 PS2 Data/CLK
+3.3V/GND Rx/Tx/GND CTRL J28 12
+5V/GND J9 9 XBA690A
Rx/Tx/GND J7 5 XBA691A
Rx+/GND Tx+/GND J2 8
Line Out L Line Out R J4 5
+5V/GND USB +5V/GND USB J5 4
Rx/Tx/GND Rx/Tx/GND J6 9

INPUTS/OUTPUTS

USB BOARD-XAA580A
USB KEY
J2
J3
DISPLAY ASSY-CAY016A
DC-AC INVERTER-ABC009A
+5 Vdc (1.75 A limit)
CN1
CN2
1.25-435 Vrms, 52.5 kHz
TFT COLOR LCD MODULE
CN2
BACKLIGHT
2x5 mArms
210 mm (8.4") VGA 640x3/480
CNT
RESISTIVE TOUCH SCREEN
PS/2 KEYBOARD
THERMAL PRINTER-CBE081A
J5
J4
ETHERNET 10/100
STEREO AUDIO OUT
20-20k Hz, 1Vrms,
BARCODE READER-CBC017A (OPTION)
5V, 150 mA
USB HOST
RS232C
10101

Creation following Pilot-series. SBC9312 board become Xaa586c (IDE DiskOnChip replace SD card). Update Ecr3621 and Ecr3159	PS	ADC	14/01/09	3640	A	Designation: **MICROS_ES60 Opened Tube ELECTRICAL SYNOPTIC**			Design & Symbol According to AFNOR NORM
Description	Chk	By	Date	ECR	Rev	Standard tolerance: – Roughness: –			Electrical Manufacturing Refer to RCF080A & RCF05DA
						Material: –			HORIBA ABX Montpellier FRANCE
						Treatment: –			
						Coating: –			
						N° : **ZAL055A**	Sheet: **F**	Drw size: **A1**	Scale: –

Dim. in millimeters

POWER SUPPLY

MAINS SUPPLY
50-60Hz
100-240VAC
DAC011A
DAC012A
MAINS COMBINED PLUG-DAN024A
T2A
FUSES
ON/OFF
FILTER
XBA692A
J1
T4A
FUSES
80/110 W SWITCHING SUPPLY BOARD-DBN003A
J2
+24V
+12V
+5V
-12V
GND
T2A5-
T0A8-
T2A5-
FUSES
T4A
XBA699A
+12V FAN
XBA692A
FERRITE
DZZ014A
XBA692A
SHIELDING
POWER SUPPLY MODULE-(XBA710A)

MEASURE

RBC
CHAMB.
WBC
HGB
CHAMB.
SSS NM
BLACK SHIELDING
XBA723A
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DZZ018A
N = 1
DZZ018A
N = 1

MASTER BOARD-XAA355E

+24V
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J37
R_LED
J26
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2.5V
180mV
400mV
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R87
R82
R81
R75
R74
R68
PLT PROCESSING
RBC PROCESSING
WBC PROCESSING
PLT
RST-P
RBC
RST-R
WBC
RST-W
SHIELDING
J38
J39
J21
I
+12V
R97
INTEGRATOR
HGB1-3
TEMP
RESET
SCI
SPI
INC
U/D

TEMPERATURE SENSOR XBA281A
B1 VERTICAL CARRIAGE DAL008A
M1: HOME XBA250A
M2: HOME XBA250A
B2 HORIZONTAL CARRIAGE DAL008A
B4 WASTE/VACUUM SYRINGE XBA273A
M4: HOME XBA319B
M3: HOME XBA319B
B3 DILUTION SYRINGE XBA273A
M5: RBC-WBC-WASTE DRAIN XBA199A
J11
J1
J7
J8
J2
J4
J10
J9
J3
J13
STEPPER MOTOR CONTROLER 1
STEPPER MOTOR CONTROLER 2
STEPPER MOTOR CONTROLER 4
STEPPER MOTOR CONTROLER 3
CLK1, DIR1, SET1
SW1
SW2
CLK2, DIR2, SET2
CLK4, DIR4, SET4
SW4
SW3
CLK3, DIR3, SET3
VREF1 TP38 R168
VREF2 TP37 R177
VREF4 TP36 R195
VREF3 TP35 R186
R6 TP6
3V
COMPARATOR
VID

PIERCING ASSY
BLOOD CLOSED TUBE
B5 24V
SW8: START CYCLE SWITCH
SW6: PIERCING HIGH
L1: DOOR OPENING
SW9-11: TUBE RECOGNITION
SW5: PIERCING LOW
XBA275A
FERRITE
DZZ014A
J30
J6
SW8
SW6
CMDEA
SW9-SW12
SW5
PERCU
MOTOR DRIVER

XBA363A
5 VALVE ASSY-XDB061A
EV3, 8
EV1, 2, 4-6
6 VALVE ASSY-XDB062A
EV7, 9-13
DAD076A
DAD075A
J35
J36
+24V
+24V
EV1-EV7
EV8-EV13

SERVO-CONTROLS

I/O INTERFACE & LATCHES

RS232 INTERFACE
DSR
BUS INTERFACE & CONTROL LOGIC
E2POT
J22
+5V
DSR
DAD138A
J5
+5V
SPI
LUM
DATA & CONTROL
A1 A2
R_LED
G_LED
R_LED/A1
G_LED/A2
MACHINE SELECTION
4 LINES x 5 COLUMNS
DATA & CONTROL PRINTER
J31
+24V
BUZZER

INPUT/OUTPUT INTERFACES

DiskOnChip
IDE-44 FLASH MEMORY
SBC9312 MAIN BOARD-XAA586C
J29
J25
+5V/GND
D0-D15
I/O & CTRL
COM & DIMMING BOARD-XAA581A
DIMMING INTERFACE
BRTC
BRTI (0-2.5 V)
RS232 INTERFACE
Rx/Tx/GND
+3.3V/GND
XU19
J2
J1
J3
XBA697A
+5V/GND
BL CMD
J8
+5V/GND
USB
J10
+5V/GND
LVDS INTF (25 MHz)
J19
+5V/GND
XR, XL
YD, YU
J17
+5V/GND
PS2 Data/CLK
J3
+3.3V/GND
Rx/Tx/GND
CTRL
J28
+5V/GND
J9
Rx/Tx/GND
J27
Rx±/GND
Tx±/GND
J2
Line Out L
Line Out R
J4
+5V/GND
USB
+5V/GND
USB
J15
J15
Rx/Tx/GND
Rx/Tx/GND
J16
J16

INPUTS/OUTPUTS

USB BOARD-XAA580A
USB KEY
J2
J3
XBA689A
DISPLAY ASSY-CAY016A
DC-AC INVERTER-ABC009A
+5 Vdc (1.75 A limit)
CN1
CN2
1.25-435 Vrms, 52.5 kHz
XBA687A
TFT COLOR LCD MODULE
CN2
BACKLIGHT
2x5 mArms
210 mm (8.4") VGA 640x3/480
CNT
XBA686A
XBA688A
RESISTIVE TOUCH SCREEN
PS/2 KEYBOARD
BARCODE READER-CBC018A
DAD140A
3.3V, 110 mA
THERMAL PRINTER-CBE081A
J5
J4
XBA690A
XBA691A
ETHERNET 10/100
STEREO AUDIO OUT
20-20k Hz, 1Vrms,
BARCODE READER-CBC017A (OPTION)
5V, 150 mA
USB HOST
RS232C
IOIOI

Creation following Pilot-series. SBC9312 board become Xaa586c (IDE DiskOnChip replace SD card). Update Ecr3621 and Ecr3159	PS	ADC	31/12/08	3640	A				
Description	Chk	By	Date	ECR	Rev				

Designation: **MICROS_ES60 Closed Tube ELECTRICAL SYNOPTIC**
Design & Symbol According to AFNOR NORM
Electrical Manufacturing Refer to RCF010A & RCF010A
Standard tolerance: - Roughness: -
Material: -
Treatment: -
Coating: -
HORIBA ABX Montpellier FRANCE
N° : **ZAL057A** Sheet: **F** Drw size: **A1** Scale: -
Dim. in millimeters

1. Measuring principles

1.1. WBC and differential count

1.1.1. General counting principles

The WBC measurement principles are the same as the RBC/PLT measuring principles. The WBC count is performed in the WBC/HGB chamber. The electronic signal-processing device places an electronic threshold between the WBC and PLT signals. The electronic pulses for the WBC are then placed into 256 channels according to their pulse size. The pulses are then thresholded, grouped and then mathematically calculated to create a numerical value for the determination of the WBC's.

1.1.2. Differential Measuring principles

The Diluent preserves and prepares the WBC cell membrane for differentiation reaction. The Lyse has specific reactions with each sub-population of the WBC cytoplasmic membranes.

- When the Lyse reacts with the Lymphocytes cytoplasmic membranes, it allows the release of water-soluble cytoplasm and shrinks the cell membrane around the nucleus.
- When the Lyse reacts with the Monocytes cytoplasmic membranes, it has an intermediate reaction, maintaining it's large size in comparison to the Lymphocytes.
- When the Lyse reacts with the Granulocytes cytoplasmic membranes, it has a limited reaction due to a molecule in their cytoplasmic structure which protects them from the shrinking action of the lyse. This limited reaction makes the Granulocytes the largest of the sub-populations in the cell differentiation.

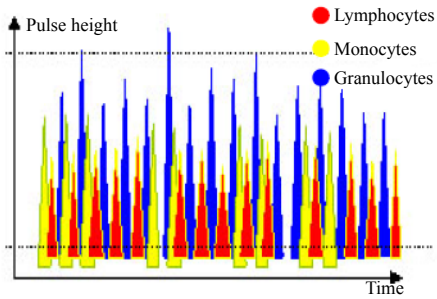
After the differential lysing action, the ABX Micros ES60/ESV60 analyzes the height of each pulse as the cells pass through the micro-aperture in the WBC chamber. These pulses are then channelized, thresholded, grouped according to their size, (30fL to > 450fL), and calculated mathematically to create the WBC distribution curve, which is also known as the WBC Histogram.

The 3 sub-populations of WBC's are placed according to the number of cells and the size of cells in each sub-population. The distribution of WBC's are as followed:

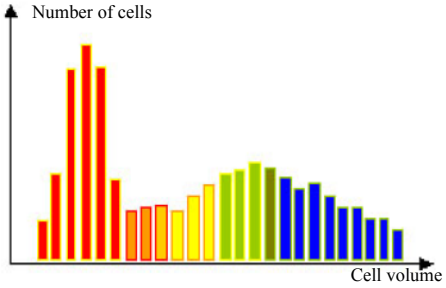
Lymphocytes	(30fL to 100fL)
Monocytes	(100fL to 150fL)
Granulocytes	(150fL to 450fL)

This differentiation term is also known as LMG's.

Cells passing through the WBC aperture creating electronic pulses.



Cells are grouped according to the number of cells and the cell size.



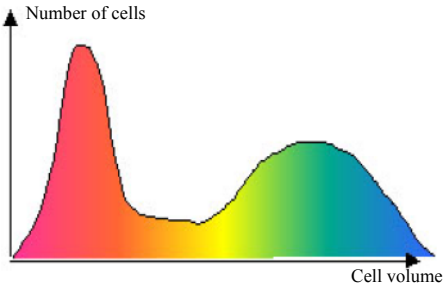
Pulses are electronically calculated and smoothed to produce the WBC distribution curve.

◆Results

Number of cells counted per volume unit x calibration coefficient

◆Histograms

Distribution curves on 256 counting channels from 30fl to 450fl.



◆ Technical characteristics for the WBC count:

<u>Dilution</u>	
Initial blood volume	10 µl
Vol. ABX Diluent	2100 µl
Vol. Lyse	520µl for ABX Micros ES60 and 470µl for ABX Micros ESV60
Final dilution ratio	1/260 for ABX Micros ES60 and 1/255 for ABX Micros ESV60
<u>Measurement</u>	
Method	Impedance
Ruby diameter	80µm
Depression of count	200mb
Duration of the count	2 (or 3)x6 sec.

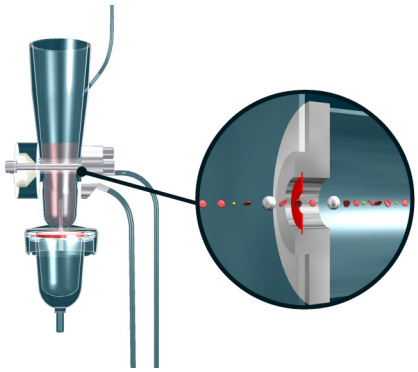
1.2. RBC/PLT

The RBC's and PLT's are measured by an electronic impedance variation principle. This means that an electronic field is generated around the micro-aperture within the chamber in which the blood cells are pulled through.

The sample is diluted with an electrolytic Diluent (electronic current conducting fluid), mixed then pulled through a calibrated micro-aperture. Two electrodes are placed on either side of the aperture and electric current continuously passes between the two electrodes.

As the blood cells pass through the aperture, they create resistance (Impedance) in the electronic field between the two electrodes. The voltage, which measures the cells, is proportional to the size of the cell. Since the current is constant and remains unchanged, the larger the cell is, the «more» resistance it has. The smaller the cell is, the «less» resistance it has.

These electronic voltages vary in pulse size as the cells pass through the aperture. The pulses are amplified, channeled according to size and threshold, grouped and then mathematically calculated along with the calibration coefficients to give a final numerical value for both RBC's and PLT's.



◆Results

Number of cells counted per volume unit x calibration coefficient

◆Histograms

RBC:

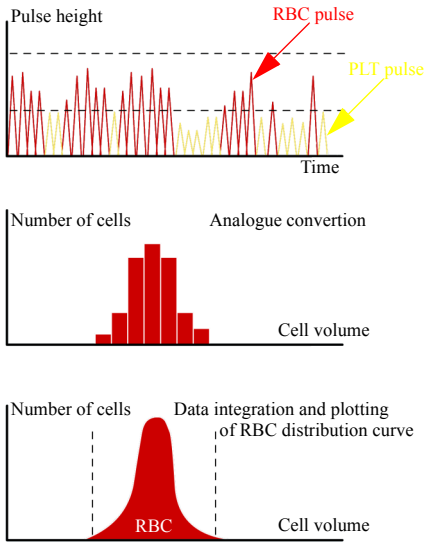
Distribution curves on 256 counting channels from 30fl to 300fl.

PLT:

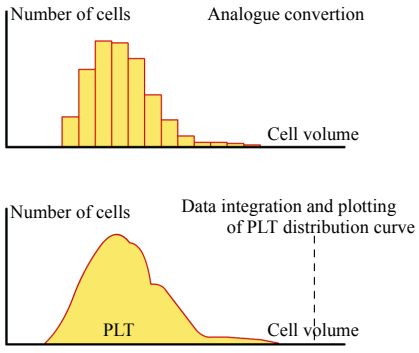
Distribution curves on 128 channels from 2fl to a mobile threshold.

This threshold moves according to the microcyte population present in the analysis area.

RBC distribution curve:



PLT distribution curve:



◆ Technical characteristics for the RED BLOOD CELL and PLATELET count:

Dilution

First dilution volume used	28.3 µl: rate 1/170
Vol. ABX Diluent	2500 µl
Final dilution rate	1/15000

Measurement

Method	Impedance
Ruby diameter	50µm
Depression of count	200mb
Duration of the count	2 (or 3)x6 sec.

Results

Number of cells counted per volume unit x Calibration coefficient

1.3. Hemoglobin measurement principle

During the Startup cycle, an HGB blank test sequence including 2 blank measures is run. If the difference between these two measures is too important, a third measure is performed.

HGB reference blank sequence will be carried out prior to an analysis to come.
If the operator:
- Has left system more than 10 minutes after analysis.
- Has not carried out the Startup cycle after switching on the system.

Every cycle, an HGB blank is carried out on diluent and compared to the previous HGB blank analysis. Lyse reagent is added to the first dilution in the WBC/HGB chamber.

◆ Lyse

This reagent contains potassium ferrocyanide [Fe(CN)]K and potassium cyanide [KCN].
The hemoglobin freed by the lysis of the red blood cells combines with the potassium cyanide to form the chromogenous cyanmethemoglobin compound.
The compound is then measured by spectrophotometry, through the optical part of the WBC/HGB chamber, with a wave length of 550 nm.

◆ Technical characteristics for the measurement of the hemoglobin:

Dilution

Initial blood volume	10 µl
Vol. ABX Diluent	2100 µl
Vol. Lyse	520µl for ABX Micros ES60 and 470µl for ABX Micros ESV60
Final dilution ratio	1/260 for ABX Micros ES60 and 1/255 for ABX Micros ESV60

Measurement

Method	Photometry
Wavelength	550nm

Result

Absorbance value obtained x coefficient of calibration

1.4. Hematocrit measurement principle

The height of the impulse generated by the passage of a cell through the micro-aperture is directly proportional to the volume of the analyzed RBC.
The hematocrit is measured as a function of the numeric integration of the MCV.

1.5. RDW calculation

The RDW (Red cell Distribution Width) is used to determine erythrocyte abnormalities linked to Anisocytosis.
The RDW will enable the user to follow the evolution of the width of the curve in relation to the cell number and average volume.
The RDW is also a calculation from the RBC histogram, as follow:

$$RDW = \frac{KSD}{MCV}$$

K = system constant
SD = Determined standard deviation according to statistical studies on cell distribution.
MCV = Mean Corpuscular Volume of erythrocytes

1.6. MCV, MCH, MCHC calculation

- MCV (Mean Cell Volume) is calculated directly from the entire RBC histogram.
- MCH (Mean Corpuscular Hemoglobin) is calculated from the HGB value and the RBC count.
  The Mean HGB weight in each RBC is given by the formula:
  MCH (pg) = HGB/RBC x 10
- MCHC (Mean Corpuscular Hemoglobin Concentration) is calculated according to the HGB and HCT values.
  The Mean HGB concentration in the total volume of RBC is given by the formula:
  MCHC (g/dL) = HGB/HCT x 100

1.7. Measuring the MPV:

MPV (Mean Platelet Volume) is directly derived from the analysis of the platelet distribution curve.
The MPV is expressed in µm3 or fl.

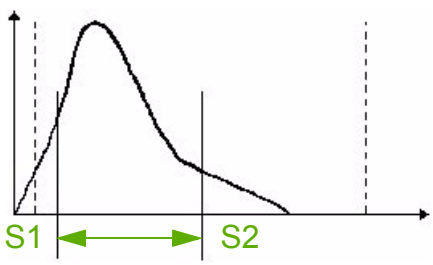
1.8. Calculating the PCT:

Thrombocrit is calculated according to the following formula:

$$PCT\% = \frac{PLT(10^3/\mu L) \times MPV(fL)}{1000}$$

1.9. Calculating the PDW:

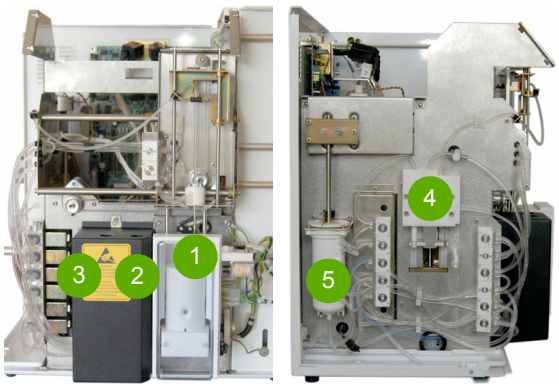
This count is derived from the platelet curve.
PDW (Platelet Distribution Curve)= Width of the curve between 15% of the number of platelets starting from 2 fl (S1) and 15% of the number of platelets beginning with the variable top threshold (S2) as shown on next diagram:



2. ABX Micros ES60 CT cycle description

2.1. Cycle start condition

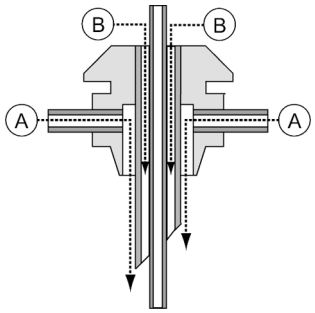
- Needle «1» in the sampling position.
- RBC chamber «2» filled with 2.5 mL of diluent.
- WBC/HGB chamber «3» filled with 2.5 mL of diluent.
- Liquid syringes «4» in standby position.
- Vacuum syringe «5» in the lower position.



2.2. Cap piercing

- Carriage motion over the WBC/HGB chamber.
- WBC/HGB chamber drain: Aspiration by means of the vacuum syringe raise.

- Diluent injection into the WBC/HGB chamber through the channels (A) and (B):
  - Diluent is delivered by means of the liquid syringes raise.

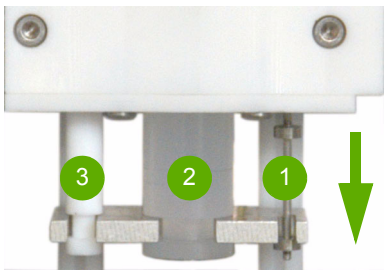


- HGB blank measure (beep triggered).
- Carriage return over the piercing device.
- Atmosphere is provided inside the tube: Liquid valve #3 is activated.
- Cap piercing:
  - Sampling holder rises in the upper position.
  - The needle pierces the tube cap.

2.3. Sampling

- Sampling needle moves down to the lower position (inside the tube).

- Aspiration of 10 µL of blood sample:
  - The liquid syringes assembly moves down and pulls down the sampling syringe «1».



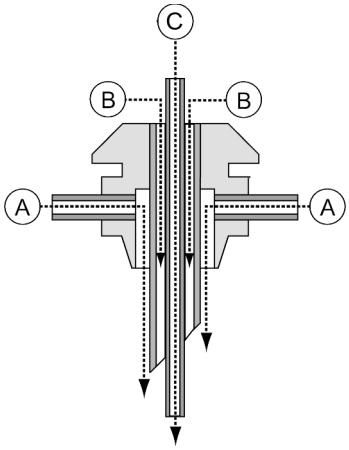
- The sampling needle comes back in the upper position.
- RBC chamber drain.
- Counting head rinse.
- Carriage motion over the WBC/HGB chamber.
- Sampling holder door opens.
- WBC/HGB chamber drain.

2.4. Needle rinses

- The liquid syringe «2» sends diluent for rinse through the outer piercing needle «A» and inner piercing needle «B».

  - A: Piercing needle outer channel
  - B: Sampling needle outer channel
  - C: Sampling needle inner channel

- The polluted diluent is sent to the WBC/HGB chamber.
- WBC/HGB chamber drain.
- Second needle rinses.



The piercing needle inner rinse is equivalent to the sampling needle outer rinse.

- WBC/HGB chamber drain.
- The sampling needle moves down into the WBC/HGB chamber.

2.5. Dilutions

- Injection of 1.7 mL of diluent into the WBC/HGB chamber + injection of 10 µL of blood sample:
  Raise of the liquide syringe:
  - delivers 0.5 mL of diluent from the outer sampling needle (B)
  - injects 1.2 mL of diluent + blood sample from the inner sampling needle (C).
- Bubbling (by means of vacuum syringe downward motion).
- Sampling needle moves up.
- Outer needle short aspiration (dries the needle).
- Sampling needle moves back in the chamber.
- Aspiration of 30 µL of diluted blood (dilution 1/170).
- Sampling needle moves up.
- Injection of 0.4 mL of diluent into the WBC/HGB chamber
  Raise of the liquide syringes (D):
  - delivers 0.4 mL of diluent from the outer sampling needle (B).
- Carriage motion over the RBC chamber.
- Sampling needle moves down to the RBC chamber.
- Lyse injection into the WBC/HGB chamber + bubbling:

The liquid syringes raise and the syringe «1» delivers lyse via the WBC chamber bottom.

FINAL DILUTION in the WBC CHAMBER:
- ABX Micros ES60: 1.7 mL + 0.4 mL diluent + 0.52 mL of lyse = 1/260.
- ABX Micros ESV60: 1.7 mL + 0.4mL diluent + 0.47 mL of lyse = 1/255.

- Injection of 2.5 mL of diluent into the RBC chamber + injection of 30 µL of diluted blood:
  The liquid syringes raise:
  - delivers 0.5 mL diluent via the outer sampling needle.
  - injects diluted blood from the inner needle + 2 ml of diluent.

  FINAL DILUTION in the RBC CHAMBER:
  - 30 µL of diluted blood at 1/170 + 2.5 mL diluent.
  (1/170) * (30/2500) = 1/15000
- Bubbling.
- Sampling needle moves up.
- Carriage motion over the WBC/HGB chamber.
- Counting head rinse.

2.6. Counts

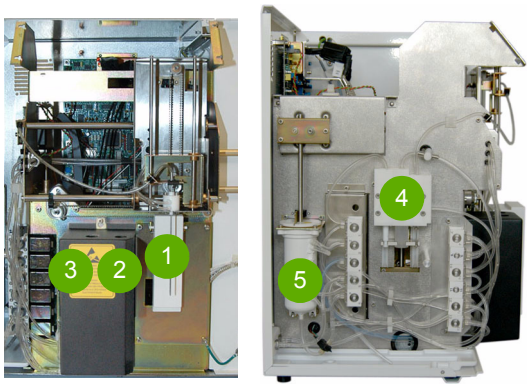
- First counts (beep triggered).
- Counting head rinse.
- Second counts (beep triggered).

  A third count (C3) is carried out if the difference between first (C1) and second count (C2) is not within acceptable limits:
  - **WBC:**
  If C1 or C2 > 3000, C3 is carried out if difference between C1 and C2 > 7%.
  If Max C1 or C2 ≤ 3000, C3 is carried out if difference between C1 and C2 > 9%.
  - **RBC:**
  If C1 or C2 > 16000, C3 is carried out if difference between C1 and C2 > 5%.
  If Max C1 or C2 ≤ 16000, C3 is carried out if difference between C1 and C2 > 8%.
  - **PLT:**
  If C1 or C2 > 400, C3 is carried out if difference between C1 and C2 > 15%.
  If Max C1 or C2 ≤ 400, C3 is carried out if difference between C1 and C2 > 20%.
- Counting head rinse.
- WBC chamber drain.
- Diluent injection into the WBC chamber from the outer sampling needle.
- RBC chamber drain.
- Carriage motion over the RBC chamber.
- Diluent injection into the RBC chamber from the outer sampling needle.
- Carriage & needle motions back to the initial positions.
- Results display and printed out.

3. ABX Micros ES60 OT cycle description

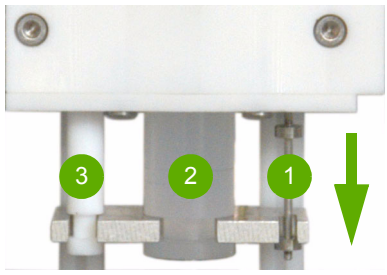
3.1. Cycle start condition

- Needle «1» in the sampling position.
- RBC chamber «2» filled with 2.5 mL of diluent.
- WBC/HGB chamber «3» filled with 2.5 mL of diluent.
- Liquid syringes «4» in standby position.
- Vacuum syringe «5» in the lower position.



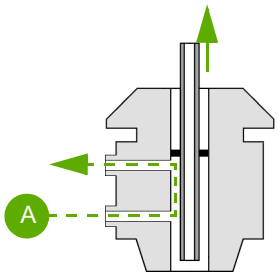
3.2. Sampling

- Aspiration of 10 µL of blood sample:
  - The liquid syringes assembly moves down and pulls down the sampling syringe «1».



3.3. Outer sampling needle rinse

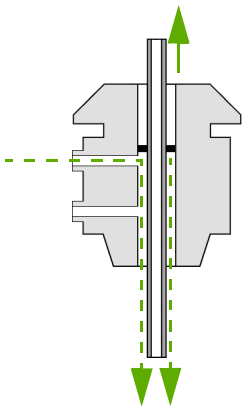
- The sampling needle moves up.
- During this motion, the liquid syringe «2» sends diluent for rinse through the rinsing block (A).
- The polluted diluent is aspirated from the upper tube by means of the vacuum syringe raise.



3.4. WBC/HGB chamber rinse & HGB blank measure

- Sampling carriage transfer over the WBC/HGB chamber.
- Counting head rinse:
  Diluent is delivered by means of the liquid syringes raise.
- WBC/HGB chamber drain:
  Aspiration by means of the vacuum syringe raise.

- Needle motion downward of a few steps.
- Diluent is delivered from the rinsing block:
  -The liquid syringes move up and a flow of diluent is delivered to the chamber via the outer needle.



- WBC/HGB chamber drain (second time).
- Diluent is delivered from the outer needle (second time).
- HGB blank measure (beep triggered).
- RBC and WBC/HGB chamber drains.

3.5. Dilutions

- Sampling needle moves down to the WBC/HGB chamber.
- Injection of 1.7 mL of diluent into the WBC/HGB chamber + injection of 10 µL of blood sample:
  Raise of the liquide syringe:
  - delivers 0.5 mL of diluent from the outer sampling needle.
  - injects 1.2 mL of diluent + blood sample from the inner sampling needle.
- Bubbling (by means of vacuum syringe downward motion).
- Sampling needle moves up.
- Outer needle short aspiration (dries the needle).
- Sampling needle moves back in the chamber.
- Aspiration of 30 µL of diluted blood (dilution 1/170).
- Sampling needle moves up.
- Injection of 0.4 mL of diluent into the WBC/HGB chamber
  Raise of the liquide syringes (D):
  - delivers 0.4 mL of diluent from the outer sampling needle (B).
- Outer needle aspiration
- Carriage motion over the RBC chamber.
- Sampling needle moves down into the RBC chamber.
- Lyse injection into the WBC/HGB chamber + bubbling:
  The liquid syringes raise and the syringe «1» delivers lyse via the WBC chamber bottom.

  FINAL DILUTION in the WBC CHAMBER:
  - ABX Micros ES60: 1.7 mL + 0.4 mL diluent + 0.52 mL of lyse = 1/260.
  - ABX Micros ESV60: 1.7 mL + 0.4mL diluent + 0.47 mL of lyse = 1/255.

- Injection of 2.5 mL of diluent into the RBC chamber + injection of 30 µL of diluted blood:
  The liquid syringes raise:
  - delivers 0.5 mL diluent via the outer sampling needle.
  - injects diluted blood from the inner needle + 2 ml of diluent.

FINAL DILUTION in the RBC CHAMBER:
- 30 µL of diluted blood at 1/170 + 2.5 mL diluent.
(1/170) * (30/2500) = 1/15000

- Bubbling.
- Sampling needle moves up.
- Carriage motion over the WBC/HGB chamber.
- Counting head rinse.

3.6. Counts

- First counts (beep triggered).
- Counting head rinse.
- Second counts (beep triggered).

A third count (C3) is carried out if the difference between first (C1) and second count (C2) is not within acceptable limits:
- **WBC:**

If C1 or C2 > 3000, C3 is carried out if difference between C1 and C2 > 7%.
If Max C1 or C2 ≤ 3000, C3 is carried out if difference between C1 and C2 > 9%.
- **RBC:**

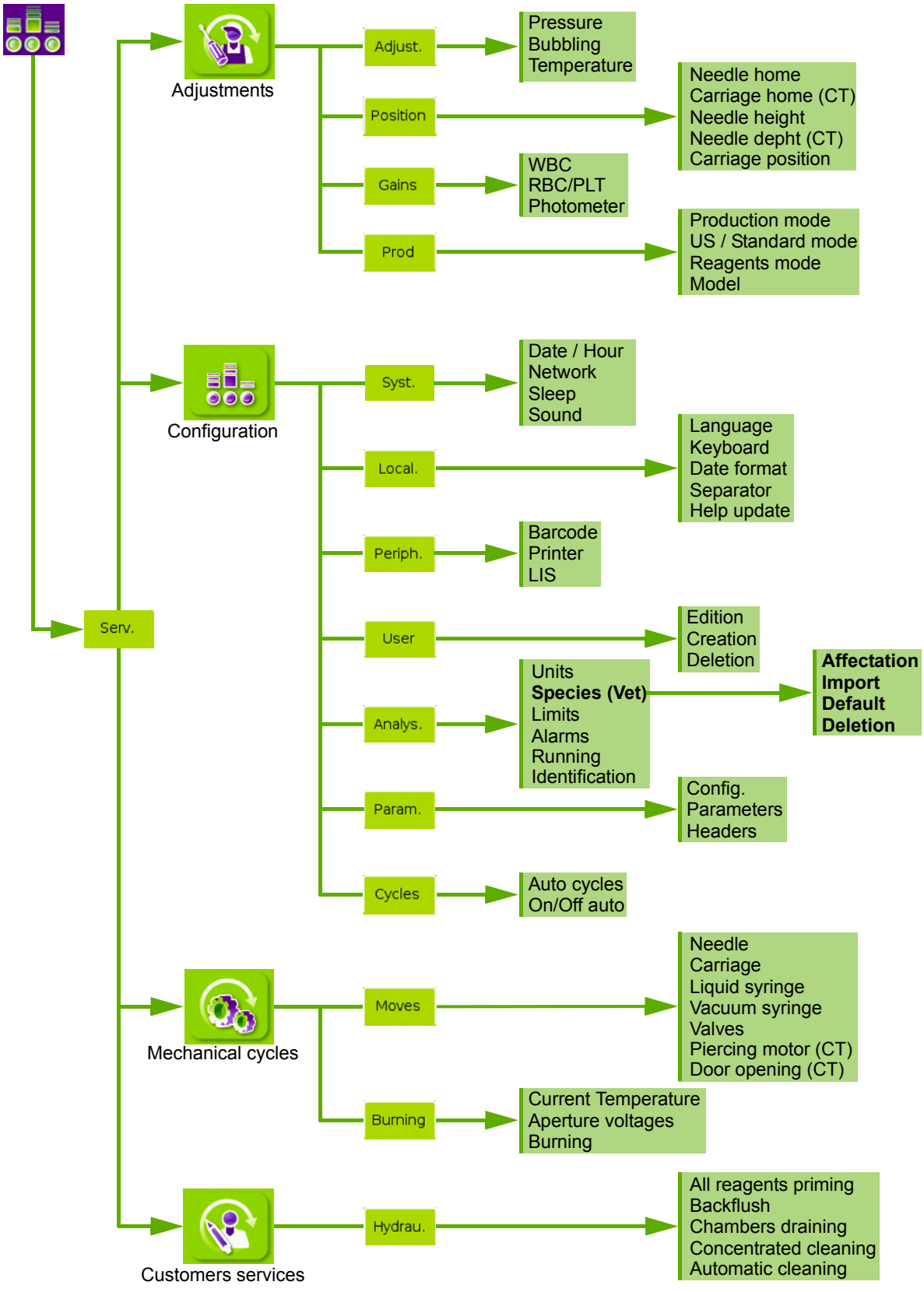
If C1 or C2 > 16000, C3 is carried out if difference between C1 and C2 > 5%.
If Max C1 or C2 ≤ 16000, C3 is carried out if difference between C1 and C2 > 8%.
- **PLT:**

If C1 or C2 > 400, C3 is carried out if difference between C1 and C2 > 15%.
If Max C1 or C2 ≤ 400, C3 is carried out if difference between C1 and C2 > 20%.

- Counting head rinse.
- WBC chamber drain.
- Diluent injection into the WBC chamber from the outer sampling needle.
- RBC chamber drain.
- Carriage motion over the RBC chamber.
- Diluent injection into the RBC chamber from the outer sampling needle.
- Carriage & needle motions back to the initial positions.
- Results display and printed out.

Software version

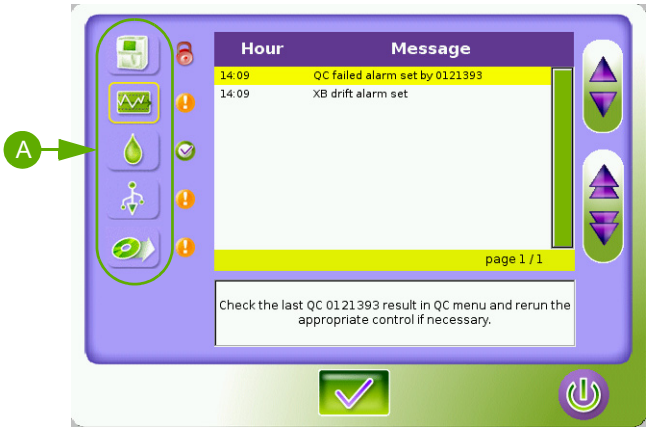
1. Maintenance menu overview



Alarm & error list

1. Alarms

- When an alarm is triggered on the instrument, the status button blinks.
- Press "Status" button to display the "Status" area.



- The alarms are sorted by 5 categories (A). Press the corresponding category button to display the alarm messages.

1.1. Alarms non triggered by errors

Alarm N°	Alarm	Description and action
1	XB Drift	A statistic dot is out of limits (the alarm is enable/desable depending of the following batch result). Suggested action: Check XB data in QC menu \ XB screen.
2	Inter QC time limit <lot number>	Inter QC <lot number> time set elapsed. Suggested action: Run the appropriate control.
3	Invalid QC <lot number>	Check the last QC <lot number> result in QC menu and rerun the appropriate control if necessary.
4	Cycle cancelled by user	Run a startup cycle directly from this status screen.
7	Startup cycle failed	The cycle has not been able to be completely performed or: No result received or: No previous result to display Suggested action: Run a startup cycle directly from this status screen.
10	Reagent temperature error	A reagent is not at the correct temperature: Run a startup cycle directly from this status screen.
12	Reagent %s expired	Check %s expiration date in Maintenance menu\Reagent screen. If necessary, replace the appropriate reagent by another lot number, run priming cycle from reagent screen and run a Startup cycle. (%s = Lyse, Diluent, Cleaner or Pack)"
13	Low reagent level %s	"Check%s level in Maintenance menu \ Reagent screen. If necessary, replace the appropriate reagent , run priming cycle from reagent screen and run a Startup cycle. (%s = Lyse, Diluent, Cleaner or Pack)"
14	%s archive should be archived	Archive the %s category in the Maintenance menu \ Archive screen by connecting a USB key on the analyser.
15	Bar code reader error	Restart the analyser (Logout screen\Shutdown\Restart).
18	LIS connection error	Check the connection with the LIS or its availability or its configuration.
19	Printer queue full	More than 3 print jobs pending. Wait or check the status of your printer.
20	Print error	An error occurred during the last print job. Check the status of your printer and consult the error log.

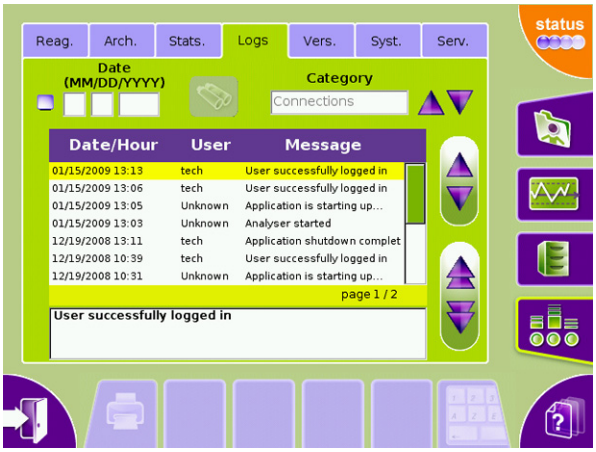
1.2. Alarms triggered by errors

Refer to the «2.1.Errors listed by n°» table to see the corresponding error(s).

Alarm N°	Alarm	Description and action	corresponding error n°
5	Critical cycle error	Run a startup cycle directly from this status screen.	95 96 97 98 99 100 101 102 103 104 105 106 107 108
6	Invalid startup cycle	Parameters WBC , RBC , HGB & PLT > startup limits or Delay between 2 analyses (X hour adjustable) is over. or Technician ask for a restart without Shutdown. Suggested action: Run a startup cycle directly from this status screen.	94
8	Analyser connection failed	The connection with the analyzer is not correctly initialyzed. Restart the analyser (Logout screen\Shutdown\Restart).	10
9	Analyser communication failed	Run a startup cycle directly from this status screen.	108
11	Reagent empty	Check level in maintenance menu\Reagent screen. If necessary, replace the appropriate reagent, run priming cycle from reagent screen and run a Startup cycle.	11
16	Ticket printer error	Restart the analyser (Logout screen\Shutdown\Restart).	90
17	Application error	Restart the analyser (Logout screen\Shutdown\Restart).	19 20 23 27 34 35 39 41 42 47 58 63 90 93

2. Errors

- When the instrument detects an error, the status button blinks and the error message is displayed in the "Logs" tab.
- To access the "Logs" tab:
  1 - Press "Maintenance menu" button
  2 - Press "Logs" tab.



2.1. Errors listed by n°

N°	Error	Detail
1	Unexpected error (%ld)	Internal read/write error. Suggested action: Application must be reinstalled
2	Settings file not found	Internal read/write error. Suggested action: Application must be reinstalled
3	Settings file corrupted	Setting file is corrupted. Suggested action: Application must be reinstalled
4	Settings file not found : Translations	Setting file is missing. Suggested action: Application must be reinstalled
5		N/A
6		N/A
7		N/A
8		N/A
9	Software internal error, try to restart the application.	Reception of an analysis result instead of a QC result or conversely. Internal read/write error. Suggested action: Try to restart the application.
10	Incompatible EPROM version.	Suggested action: Contact your local technical support.
11	Internal connection failure, please contact your local technical support.	Internal communication error. or Serial port opening error Suggested action: perform a Diagnostic procedure (RAS544) and if not ok, try to reinstall the application.
12	Internal read command failure, try to restart the application.	Internal communication error. Suggested action: Try to restart the application.
13	Internal write command failure, try to restart the application.	Internal communication error. Suggested action: Try to restart the application.

N°	Error	Detail
14	Analyser connection failed (internal RS232)	RS232 port opening error. Internal communication error. Suggested action: Application must be reinstalled.
15	Cannot configure bar code reader.	Error during the barcode reader serial port opening Suggested action: Restart the analyser (Logout screen\Shutdown\Restart), if not OK, perform a Diagnostic procedure (RAS544)
16	Cannot connect to bar code reader.	Error during the barcode reader initialization. Suggested action: Restart the analyser (Logout screen\Shutdown\Restart), if not OK, perform a Diagnostic procedure (RAS544)
17	Cannot connect to bar code reader.	Error during the barcode reader initialization. Suggested action: Restart the analyser (Logout screen\Shutdown\Restart), if not OK, perform a Diagnostic procedure (RAS544)
18	Read write / error on history file, the application must be reinstalled, contact your local technical support.	Error during «result historic», or «QC list», or «LJ graphic», or «LJ save», or «result save» or «result in historic save» recuperation. Suggested action: Application must be reinstalled.
19	Cannot update XB statistics, the application must be reinstalled, contact your local technical support.	Error during XB loading or No parameter for XB calculation or Corrupted datas or Recording error Suggested action: Application must be reinstalled.
20	Cannot send calibration factors, try to restart the application.	Internal communication error. Suggested action: Try to restart the application.
21	Internal command error, try to restart the application.: (code = %s)	Internal communication error. Suggested action: Try to restart the application.
22	All reagents prime service cycle failed	Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart) and run a Startup.
23	Backup of current default reagents configuration files failed	Internal read/write error. Suggested action: Try to restart the application. If not ok, application must be reinstalled.
24	Invalid reagents import file format	Bad file format or corrupted file Import is not possible Suggested action: Try to import another file.
25	Copy of default reagents files failed	Bad file format or corrupted file Copy is not possible Suggested action: Try to restart the application.
26	Invalid default reagents import file	Bad file format or corrupted file Import is not possible Suggested action: Try to import another file.
27	Copy of new default species configuration files failed.	Internal read/write error. Suggested action: Try to restart the application.
28	Copy of new default species configuration files failed.	Internal read/write error. Suggested action: Try to restart the application.
29	Invalid default species installation file	Corrupted species file. Installation is not possible Suggested action: Try to import another file.
30		N/A
31	Analyser com port initialisation failed	Error during instrument serial port opening Suggested action: perform a Diagnostic procedure (RAS544)

N°	Error	Detail
32	Archive restoration failed	Internal read/write error. Suggested action: perform a Diagnostic procedure (RAS544)
33	Bar code reader initialisation failed	Barcode reader initialization failure in the sample identification screens. Suggested action: Restart the analyser (Logout screen\Shutdown\Restart), if not OK, perform a Diagnostic procedure (RAS544)
34	Read write / error on history file, the application must be reinstalled, contact your local technical support.	Error during «result historic», or «QC list», or «LJ graphic», or «LJ save», or «result save» or «result in historic save» recuperation. Suggested action: Application must be reinstalled.
35	Error cannot read QC controls files, the application must be reinstalled, contact your local technical support.	QC files repository does not exist or QC files have been corrupted during QC purge. Suggested action:Application must be reinstalled.
36	Read / write error on settings file, the application must be reinstalled, contact your local technical support.	The setting file exists but its format is not correct. Corrupted file. Suggested action: Application must be reinstalled.
37	Production comm. port initialisation failed	N/A
38	Error cannot read QC controls files, the application must be reinstalled, contact your local technical support.	Internal read/write error. The files cannot be load. Suggested action: Application must be reinstalled.
39	Read error on history file, the application must be reinstalled, contact your local technical support.	Internal read/write error. Error during historic results recovery Suggested action: Application must be reinstalled
40		N/A
41	QC file write error.	Internal read/write error. Suggested action: Application must be reinstalled.
42	Read / write error on reagents file, the application must be reinstalled, contact your local technical support.	The reagent list has not been loaded during starting Suggested action: Application must be reinstalled
43	Read / write error on XB file, the application must be reinstalled, contact your local technical support.	XB files loading (opening) error. Suggested action: Application must be reinstalled
44	Read / write error on settings file, the application must be reinstalled, contact your local technical support.	The setting file do not exist. Suggested action: Application must be reinstalled
45	Ticket printer comm. port initialisation failed, try to restart the application.	Error during internal printer serial port opening. Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart). If not OK, perform a Diagnostic procedure (RAS544)
46	Ticket printer do not answer (timeout)	Error during internal printer initialization or functionning. Suggested action: Perform a Diagnostic procedure (RAS544).
47	Read/write error on LJ file, the application must be reinstalled, contact your local technical support.	files loading (opening) error.
48	Send result failed.	Check communication protocol setup.
49		N/A
50	Cannot import the species file on disk.	Corrupted species file. Import is not possible Suggested action: Try to import another file.

N°	Error	Detail
51	Online help installation failed, check the help file on your USB key.	Possible causes: - USB key withdrawal - Missing file - Corrupted file Suggested action: check the help file on USB key.
52	Critical error, the application must be reinstalled, contact your local technical support.	Internal error. Suggested action: Application must be reinstalled
53	Critical error, the application must be reinstalled, contact your local technical support.	Internal error. Suggested action: Application must be reinstalled
54	Critical error, the application must be reinstalled, contact your local technical support.	Internal error. Suggested action: Application must be reinstalled
55	Critical error, the application must be reinstalled, contact your local technical support.	Internal error. Suggested action: Application must be reinstalled
56	Invalid limit value, the application must be reinstalled, contact your local technical support.	Species file is corrupted. Suggested action: Application must be reinstalled
57	Invalid patient type, software internal error.	Internal read/write error. Suggested action: Application must be reinstalled
58	Software internal error, try to restart the application.	Reception of an analysis result instead of a QC result or conversely. Internal read/write error. Suggested action: Try to restart the application.
59	Minor error (key not found in %s).	Internal read/write error. Suggested action: Application must be reinstalled
60	Get user list failed (unable to open the file), the application must be reinstalled, contact your local technical support.	Internal read/write error. Suggested action: Application must be reinstalled
61	LIS connection failed	Possible causes: Bad RS connection parameter setting, Ethernet, FTP: Bad IP address, bad user name or password, etc... Suggested action: Check communication protocol setup.
62	Software internal error, please contact your local technical support.	Suggested action: Application must be reinstalled. If not ok, contact your local technical support.
63	Error while deleting user.	Internal read/write error. Suggested action: Try to restart the application. If not ok, application must be reinstalled.
64	Error while modifying user	N/A
65		N/A
66		N/A
67	Carriage positioning mechanic cycle failed	Error during carriage motion check cycle Suggested action: manually check the mechanical movement and run a Startup
68	Diluter positioning mechanic cycle failed	Error during diluter motion check cycle Suggested action: manually check the mechanical movement and run a Startup
69	Door opening mechanic cycle failed	Error during door opening check cycle Suggested action: manually check the mechanical movement and run a Startup

N°	Error	Detail
70	Needle positioning mechanic cycle failed	Error during needle motion check cycle Suggested action: manually check the mechanical movement and run a Startup
71	Tube piercing mechanic cycle failed	Error during tube piercing motion check cycle Suggested action: manually check the mechanical movement and run a Startup
72	Valve positioning mechanic cycle failed	Error during valves check cycle Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart).
73	Waste piston positioning mechanic cycle failed	Error during waste piston motion check cycle Suggested action: manually check the mechanical mouvement and run a Startup
74	Read error on QC file, the application must be reinstalled, contact your local technical support.	Error on QC list import. Suggested action: Application must be reinstalled
75	Printing calibration report failed.	Print error or report generation error.
76	Printing LJ report failed.	Print error or report generation error.
77	Printing log report failed.	Print error or report generation error.
78	Printing QC report failed.	Print error or report generation error.
79	Printing QC matrix report failed.	Print error or report generation error.
80	Printing result report failed.	Print error or report generation error.
81	Printing settings report failed.	Print error or report generation error.
82	Printing XB report failed.	Print error or report generation error.
83	QC control not found	Impossible to found a QC with this ID.
84	Previous invalid QC result automatic deletion.	A QC failed is removed when instantly followed by a QC passed.
85	Cleaning service cycle failed	Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart) and run a Startup.
86	Concentrated cleaning service cycle failed	Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart) and run a Startup.
87	Draining service cycle failed	Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart) and run a Startup.
88	The %s species import failed.	Already existing species or corrupted species file Import is not possible Suggested action: Try to import another file.
89	Delete %s species failed.	Internal read/write error. Suggested action: application must be reinstalled.
90	Ticket printer initialisation failed.	Error during internal printer initialization Suggested actions: Restart the analyser (Logout screen\Shutdown\Restart). If not OK, perform a Diagnostic procedure (RAS544)
91	Cannot save closed reagent, please contact your local technical support.	Internal read/write error. Application must be reinstalled.
92	Software internal error, please contact your local technical support.	Suggested action: Application must be reinstalled. If not ok, contact your local technical support.
93	Cannot open control configuration file, the application must be reinstalled, contact your local technical support.	QC list recovery impossible. Suggested action: Application must be reinstalled
94	Invalid startup cycle (wbc/rbc/hgb/plt)	Parameters WBC , RBC , HGB & PLT > startup limits Suggested action: Run a startup cycle directly from this status screen.

N°	Error	Detail
95	Internal command error : Temperature sensor unplugged.	Temperature sensor unplugged.
96	Internal command error : Temperature sensor error.	Replace temperature sensor.
97	Internal command error : Carriage motor.	Error during carriage motion. Problem of home detection, blocked motor or motor out of order.
98	Internal command error : Needle motor.	Error during needle motion. Problem of home detection, blocked motor or motor out of order.
99	Internal command error : Pressure syringe motor.	Error during pressure syringe motion. Problem of blocked pneumatical circuit, home detection, blocked motor or motor out of order.
100	Internal command error : Liquid syringe motor.	Error during liquid syringe motion. Problem of home detection, blocked motor or motor out of order.
101	Internal command error : Piercing motor.	Error during tube piercing motion. Problem of tube holder position switches, blocked motor or motor out of order.
102	Internal command error : No tube holder or door opened.	Error during door opening cycle. Problem of tube holder position switches, or missing tube holder.
103	Internal command error : Tube holder position.	Error of tube holder detection. Error of tube holder positioning or defective tube holder position switches.
104	Internal command error : Close tube holder door.	Defective detection door switch.
105	Internal command error : Tube holder door error: please open the door manually.	Defective tube holder detection door or blocked door.
106	Internal command error : Sensor error or diluent empty.	Defective/Misadjusted draining sensor or diluent empty.
107	Internal command error : Bad HGB reference measure.	Error during HGB blank measurement. Run a startup cycle. Check HGB blank (see RAS523A)
108	Internal command error : Analyser communication failed.	Restart the instrument.

2.2. Erros listed by topics

2.2.1. QC

N°	Error	Detail
41	QC file write error.	Internal read/write error. Suggested action: Application must be reinstalled.
83	QC control not found	Impossible to found a QC with this ID.
84	Previous invalid QC result automatic deletion.	A QC failed is removed when instantly followed by a QC passed.

2.2.2. Printer

N°	Error	Detail
45	Ticket printer comm. port initialisation failed, try to restart the application.	Error during internal printer serial port opening. Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart). If not OK, perform a Diagnostic procedure (RAS544)
46	Ticket printer do not answer (timeout)	Error during internal printer initialization or functionning. Suggested action: Perform a Diagnostic procedure (RAS544).
75	Printing calibration report failed.	Print error or report generation error.
76	Printing LJ report failed.	Print error or report generation error.
77	Printing log report failed.	Print error or report generation error.
78	Printing QC report failed.	Print error or report generation error.
79	Printing QC matrix report failed.	Print error or report generation error.
80	Printing result report failed.	Print error or report generation error.
81	Printing settings report failed.	Print error or report generation error.
82	Printing XB report failed.	Print error or report generation error.
90	Ticket printer initialisation failed.	Error during internal printer initialization Suggested actions: Restart the analyser (Logout screen\Shutdown\Restart). If not OK, perform a Diagnostic procedure (RAS544)

2.2.3. Barcode

N°	Error	Detail
9/ 58	Software internal error, try to restart the application.	Reception of an analysis result instead of a QC result or conversely. Internal read/write error. Suggested action: Try to restart the application.
15	Cannot configure bar code reader.	Error during the barcode reader serial port opening Suggested action: Restart the analyser (Logout screen\Shutdown\Restart), if not OK, perform a Diagnostic procedure (RAS544)
16	Cannot connect to bar code reader.	Error during the barcode reader initialization. Suggested action: Restart the analyser (Logout screen\Shutdown\Restart), if not OK, perform a Diagnostic procedure (RAS544)
17	Bar code reader cannot read.	Error during the barcode reader functionning.

2.2.4. Software, connection and communication

N°	Error	Detail
1	Unexpected error (%ld)	Internal read/write error. Suggested action: Application must be reinstalled
2	Settings file not found	Internal read/write error. Suggested action: Application must be reinstalled
3	Settings file corrupted	Setting file is corrupted. Suggested action: Application must be reinstalled
4	Settings file not found : Translations	Setting file is missing. Suggested action: Application must be reinstalled
10	Incompatible EPROM version.	Suggested action: Contact your local technical support.
11	Internal connection failure, please contact your local technical support.	Internal communication error. or Serial port opening error Suggested action: perform a Diagnostic procedure (RAS544) and if not ok, try to reinstall the application.
12	Internal read command failure, try to restart the application.	Internal communication error. Suggested action: Try to restart the application.
13	Internal write command failure, try to restart the application.	Internal communication error. Suggested action: Try to restart the application.
14	Analyser connection failed (internal RS232)	RS232 port opening error. Internal communication error. Suggested action: Application must be reinstalled.
18/ 34	Read write / error on history file, the application must be reinstalled, contact your local technical support.	Error during «result historic», or «QC list», or «LJ graphic», or «LJ save», or «result save» or «result in historic save» recuperation. Suggested action: Application must be reinstalled.
19	Cannot update XB statistics, the application must be reinstalled, contact your local technical support.	Error during XB loading or No parameter for XB calculation or Corrupted datas or Recording error Suggested action: Application must be reinstalled.
20	Cannot send calibration factors, try to restart the application.	Internal communication error. Suggested action: Try to restart the application.
21	Internal command error, try to restart the application.: (code = %s)	Internal communication error. Suggested action: Try to restart the application.
23	Backup of current default reagents configuration files failed	Internal read/write error. Suggested action: Try to restart the application. If not ok, application must be reinstalled.
24	Invalid reagents import file format	Bad file format or corrupted file Import is not possible Suggested action: Try to import another file.
25	Copy of default reagents files failed	Bad file format or corrupted file Copy is not possible Suggested action: Try to restart the application.
26	Invalid default reagents import file	Bad file format or corrupted file Import is not possible Suggested action: Try to import another file.
27	Backup of current default species configuration files failed	Internal read/write error. Suggested action: Try to restart the application.

N°	Error	Detail
28	Copy of new default species configuration files failed.	Internal read/write error. Suggested action: Try to restart the application.
29	Invalid default species installation file	Corrupted species file. Installation is not possible Suggested action: Try to import another file.
31	Analyser com port initialisation failed	Error during instrument serial port opening Suggested action: perform a Diagnostic procedure (RAS544)
32	Archive restoration failed	Internal read/write error. Suggested action: perform a Diagnostic procedure (RAS544)
33	Bar code reader initialisation failed	Barcode reader initialization failure in the sample identification screens. Suggested action: Restart the analyser (Logout screen\Shutdown\Restart), if not OK, perform a Diagnostic procedure (RAS544)
34	Read / write error on history file, the application must be reinstalled, contact your local technical support.	Error of historic result reading during purge. Suggested action: Application must be reinstalled.
35	Error cannot read QC controls files, the application must be reinstalled, contact your local technical support.	QC files repository does not exist or QC files have been corrupted during QC purge. Suggested action:Application must be reinstalled.
36	Read / write error on settings file, the application must be reinstalled, contact your local technical support.	The setting file exists but its format is not correct. Corrupted file. Suggested action: Application must be reinstalled.
37	Production comm. port initialisation failed	N/A
38	Error cannot read QC controls files, the application must be reinstalled, contact your local technical support.	Internal read/write error. The files cannot be load. Suggested action: Application must be reinstalled.
39	Read error on history file, the application must be reinstalled, contact your local technical support.	Internal read/write error. Error during historic results recovery Suggested action: Application must be reinstalled
42	Read / write error on reagents file, the application must be reinstalled, contact your local technical support.	The reagent list has not been loaded during starting Suggested action: Application must be reinstalled
43	Read / write error on XB file, the application must be reinstalled, contact your local technical support.	XB files loading (opening) error. Suggested action: Application must be reinstalled
44	Read / write error on settings file, the application must be reinstalled, contact your local technical support.	The setting file do not exist. Suggested action: Application must be reinstalled
47	Read/write error on LJ file, the application must be reinstalled, contact your local technical support.	files loading (opening) error.
48	Send result failed.	Check communication protocol setup.
50	Cannot import the species file on disk.	Corrupted species file. Import is not possible Suggested action: Try to import another file.
51	Online help installation failed, check the help file on your USB key.	Possible causes: - USB key withdrawal - Missing file - Corrupted file Suggested action: check the help file on USB key.
52	Critical error, the application must be reinstalled, contact your local technical support.	Internal error. Suggested action: Application must be reinstalled

N°	Error	Detail
56	Invalid limit value, the application must be reinstalled, contact your local technical support.	Species file is corrupted. Suggested action: Application must be reinstalled
57	Invalid patient type, software internal error.	Internal read/write error. Suggested action: Application must be reinstalled
59	Minor error (key not found in %s).	Internal read/write error. Suggested action: Application must be reinstalled
60	Get user list failed (unable to open the file), the application must be reinstalled, contact your local technical support.	Internal read/write error. Suggested action: Application must be reinstalled
61	LIS connection failed	Possible causes: Bad RS connection parameter setting, Ethernet, FTP: Bad IP address, bad user name or password, etc... Suggested action: Check communication protocol setup.
62/ 92	Software internal error, please contact your local technical support.	Suggested action: Application must be reinstalled. If not ok, contact your local technical support.
63	Error while deleting user.	Internal read/write error. Suggested action: Try to restart the application. If not ok, application must be reinstalled.
74	Read error on QC file, the application must be reinstalled, contact your local technical support.	Error on QC list import. Suggested action: Application must be reinstalled
88	The %s species import failed.	Already existing species or corrupted species file Import is not possible Suggested action: Try to import another file.
89	Delete %s species failed.	Internal read/write error. Suggested action: application must be reinstalled.
91	Cannot save closed reagent, please contact your local technical support.	Internal read/write error. Application must be reinstalled.
93	Cannot open control configuration file, the application must be reinstalled, contact your local technical support.	QC list recovery impossible. Suggested action: Application must be reinstalled
108	Internal command error : Analyser communication failed.	Restart the instrument.

2.2.5. Mechanical and service cycles

N°	Error	Detail
22	All reagents prime service cycle failed	Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart) and run a Startup.
67	Carriage positioning mechanic cycle failed	Error during carriage motion check cycle Suggested action: manually check the mechanical movement and run a Startup
68	Diluter positioning mechanic cycle failed	Error during diluter motion check cycle Suggested action: manually check the mechanical movement and run a Startup
69	Door opening mechanic cycle failed	Error during door opening check cycle Suggested action: manually check the mechanical movement and run a Startup
70	Needle positioning mechanic cycle failed	Error during needle motion check cycle Suggested action: manually check the mechanical movement and run a Startup

N°	Error	Detail
71	Tube piercing mechanic cycle failed	Error during tube piercing motion check cycle Suggested action: manually check the mechanical movement and run a Startup
72	Valve positioning mechanic cycle failed	Error during valves check cycle Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart).
73	Waste piston positioning mechanic cycle failed	Error during waste piston motion check cycle Suggested action: manually check the mechanical mouvement and run a Startup
85	Cleaning service cycle failed	Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart) and run a Startup.
86	Concentrated cleaning service cycle failed	Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart) and run a Startup.
87	Draining service cycle failed	Suggested action: Restart the analyser (Logout screen \ Shutdown \ Restart) and run a Startup.
95	Internal command error : Temperature sensor unplugged.	Temperature sensor unplugged.
96	Internal command error : Temperature sensor error.	Replace temperature sensor.
97	Internal command error : Carriage motor.	Error during carriage motion. Problem of home detection, blocked motor or motor out of order.
98	Internal command error : Needle motor.	Error during needle motion. Problem of home detection, blocked motor or motor out of order.
99	Internal command error : Pressure syringe motor.	Error during pressure syringe motion. Problem of blocked pneumatical circuit, home detection, blocked motor or motor out of order.
100	Internal command error : Liquid syringe motor.	Error during liquid syringe motion. Problem of home detection, blocked motor or motor out of order.
101	Internal command error : Piercing motor.	Error during tube piercing motion. Problem of tube holder position switches, blocked motor or motor out of order.
102	Internal command error : No tube holder or door opened.	Error during door opening cycle. Problem of tube holder position switches, or missing tube holder.
103	Internal command error : Tube holder position.	Error of tube holder detection. Error of tube holder positioning or defective tube holder position switches.
104	Internal command error : Close tube holder door.	Defective detection door switch.
105	Internal command error : Tube holder door error: please open the door manually.	Defective tube holder detection door or blocked door.
106	Internal command error : Sensor error or diluent empty.	Defective/ misadjusted draining sensor or diluent empty.
107	Internal command error : Bad HGB reference measure.	Error during HGB blank measurement. Run a startup cycle. Check HGB blank (see RAS523A)

RAS520: Installation

RAS521: Yearly maintenance

RAS522: Power supply & SBC board dismantling

RAS523: Main board check & adjustment

RAS524: Vacuum check & adjustment

RAS525: Bubbling check & adjustment

RAS526: Thermic adjustment

RAS527: Needle & carriage adjustment

RAS528: Instrument decontamination

RAS529: Drain and rinse

RAS530: Check up after intervention

RAS543: OS & software installation

RAS544: Diagnostic tool

RAS545: Boards replacement

RAS546: Screen replacement

RAS547: External barcode reader setup

ABX Micros ES60/ESV60

1. Maintenance

1.1. Introduction

Customer maintenance has to be carried out according to the recommended frequency, after having attended a HORIBA Medical approved customer training course. The system warranty may be affected if damage occurs after a non trained technician intervenes or if replaced spare parts and consumables do not come from a HORIBA Medical approved origin.

1.2. Daily customer maintenance

Only a Startup and a Shutdown are required at the beginning and the end of the day.
Those cycles are described in the User manual.

1.3. Weekly customer maintenance

An overall check for cleanliness of the system is recommended every week.
All traces of blood or reagent have to be wiped off as soon as possible using a piece of cloth and distilled water.

Never use solvent or abrasive cleaning material to clean the system.

1.4. Maintenance periodicity

Number of cycles	Maintenance
< 6000/year	1/year
> 6000/year	every 6 month

2. Maintenance kit

◆ Yearly maintenance kit (XEC061AS) contents:

Part numbers	Designation	Qty
FAA017A	O'ring, 30,8x3,6 NIT. 70SH (vacuum syringe O'ring)	1
FAA023A	O'ring, 16x1,25 NIT. 70SH (not used on ABX Micros ES60)	1
FAA029A	O'ring, 15x1,5 NIT. 70SH (Diluent piston O'ring)	1
FAA036A	O'ring, 6x1,5 SILIC. 60SH (Lyse piston O'ring)	2
FAA046A	O'ring, 2,75x1,6 VITON (Coaxial O'ring)	2
FAA049A	O'ring, 2,2x1 SILIC. 60SH (not used on ABX Micros ES60)	2
FAA053A	O'ring, 1,4x1,25 FLUOCARBO.	1
FAA054A	O'ring, 0,74x1 FLUOCARBO	2
FAA055A	O'ring, 1,07x1,27 FLUOCARBO (Sampling syringe O'ring)	2
GBC236A	Diluent piston	1
GBG275A	Flat seal, ep = 0.5 (Aperture seal)	4
GBC364A	Insulator	1

3. Procedures

- Maintenance and adjustments that need to be done on ABX Micros ES60/ ESV60 are divided up into procedures according to the specific assemblies. This should make any update easier as all interventions can be carried out with the corresponding procedure on its own.
- Each procedure has to be read in full before beginning the intervention.

3.1. Procedure list

P/N and tittle	Concerns
RAS520: Installation	Unpacking - Package & installation kits - Visual checks - Reagents installation - Printers - Connexion - Startup - Check after intervention - Archive parameters
RAS521: Yearly maintenance	Preparation - Yearly maintenance kit description - Chamber maintenance - Insulator replacement - Vacuum & Liquid syringes maintenance - Axis lubricating - Reagent pack O'ring replacement - Sampling needle or O'ring replacement - Piercing needle or O'ring replacement - Pulley maintenance - Check & adjustments
RAS522: Power supply & SBC board dismantling	Dismantling - Power supply voltages check
RAS523: Main board check & adjustment	Main board general view - Power supply voltage check - Aperture voltage check - WBC/RBC/PLT thresholds check and adjustment - Motor voltage adjustment - Drain sensor adjustment - HGB photometer adjustment - WBC/RBC/PLT gain adjustment - Summary adjustment table.
RAS524: Vacuum check & adjustment	Vacuum check and adjustment
RAS525: Bubbling check & adjustment	Bubbling check and adjustment
RAS526: Thermic adjustment	Temperature sensor adjustment
RAS527: Needle & carriage adjustment	Needle and carriage home adjustment - Needle and carriage position adjustment
RAS528: Instrument decontamination	Preliminary - Manual decontamination - Analysis circuit decontamination - Drain & rinse
RAS529: Drain and rinse	Preliminary - Drain & rinse
RAS530: Check up after intervention	Preliminary - Repeatability - Control - Calibration
RAS531: Remote display setup	DHCP server - Fixed IP (not available for this version)
RAS543: OS & software installation	OS & Software installation
RAS544: Diagnostic tool	Touchscreen test - Serial N° & MAC adress- RTC Eprom test - Screen test - Buzzer test - Barcode test - RS232 ports test - SD card test RTC and EEPROM test - Printer test
RAS545: Boards replacement	Main board - SBC9312 board - USB board - Internal barcode reader
RAS546: Screen replacement	Screen dismantling & replacement
RAS547: External barcode reader setup	External barcode reader configuration and test

3.2. Training department procedure list

P/N and tittle	Concerns
RAS520: Installation	Unpacking - Package & installation kits - Visual checks - Reagents installation - Printers - Connexion - Startup - Check after intervention - Archive parameters
RAS521: Yearly maintenance	Preparation - Yearly maintenance kit description - Chamber maintenance - Insulator replacement - Vacuum & Liquid syringes maintenance - Axis lubricating - Reagent pack O'ring replacement - Sampling needle or O'ring replacement - Piercing needle or O'ring replacement - Pulley maintenance - Check & adjustments
RAS524: Vacuum check & adjustment	Vacuum check and adjustment
RAS525: Bubbling check & adjustment	Bubbling check and adjustment
RAS523: Main board check & adjustment	Main board general view - Power supply voltage check - Aperture voltage check - WBC/RBC/PLT thresholds check and adjustment - Motor voltage adjustment - Drain sensor adjustment - HGB photometer adjustment - WBC/RBC/PLT gain adjustment - Summary adjustment table.
RAS526: Thermic adjustment	Temperature sensor adjustment
RAS527: Needle & carriage adjustment	Needle and carriage home adjustment - Needle and carriage position adjustment
RAS530: Check up after intervention	Preliminary - Repeatability - Control - Calibration
RAS528: Instrument decontamination	Preliminary - Manual decontamination - Analysis circuit decontamination - Drain & rinse
RAS529: Drain and rinse	Preliminary - Drain & rinse
RAS547: External barcode reader setup	External barcode reader configuration and test
RAS543: OS & software installation	OS & Software installation
RAS544: Diagnostic tool	Touchscreen test - Serial N° & MAC adress- RTC Eprom test - Screen test - Buzzer test - Barcode test - RS232 ports test - SD card test RTC and EEPROM test - Printer test
RAS531: Remote display setup	DHCP server - Fixed IP (not available for this version)
RAS545: Boards replacement	Main board - SBC9312 board - USB board - Internal barcode reader
RAS546: Screen replacement	Screen dismantling & replacement
RAS522: Power supply & SBC board dismantling	Dismantling - Power supply voltages check

ABX Micros ES60/ESV60

ABX Micros ES60/ESV60

RAS520A

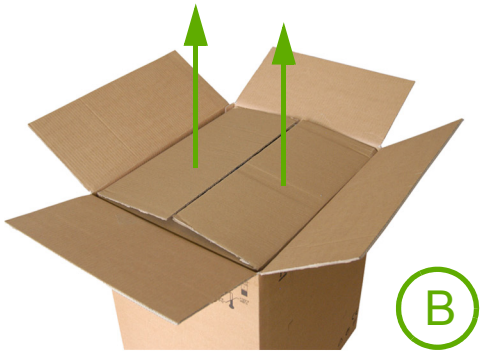
Installation

- Concerns
  - Unpacking
  - Kits (package & installation)
  - Visual check
  - Reagents installation
  - Printers
  - Connexions
  - Startup
- Required tools
  - None
- Required products
  - ABX Micros ES60 reagents: bottles or pack
- Intervention time
  - 0 h 30
- Frequency
  - On request
- Specific kit or consumables
  - All included in the instrument cardboard box

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Unpacking

- The instrument is enveloped in a special, protective foam before being placed in a cardboard box.
- Carrefully unpack the system as follow:



2. Package kit:

Reference	Designation	Qty
DAC011A or DAC012A	Power supply cable EU or Power supply USA	1
HAN516B	Pen for touchscreen	1
1103113 (for human model only)	Thermic paper roll	5
XBA725A (optional)	USB Barcode reader	1
7005057 + LAU014A	Cardboard box + sticker	1
7001070	Waste plastic bag	1
RAX055x	Reagent leaflet CD ROM	1
RAX061x or RAX062x or RAX064x	User manual CD ROM for ABX Micros ES60/ESV60 User manual CD ROM for ABX Micros ESV60 User manual CD ROM for SCIL VET ABC+	1
RAC075x (french model only)	Maintenance book	1
RAB238xxx or RAB239xxx	Daily guide ABX Micros ES60 Daily guide ABX Micros ESV60	1

3. Installation kits

- Remove the cardboard box containing the installation kit from its location:

XEC001A: ABX Micros ES60 bottle

Reference	Designation	Qty
DAR006A	Fuse 5x20 0.8A T250V	1
DAR012A	Fuse 5x20 2A T 250V	2
DAR013A	Fuse 5x20 2.5A T250V	2
DAR023A	Fuse 5x20 4A 250V	1
EAB032A	«T» connector D=1.6 mm T210-6	1
EAE007A	Tygon tube 1.52 mm (0.60")	2 m
EAE009A	Tygon tube 2.29 mm (0.090")	2 m
FAA017A	O'ring 30.8x3.6 nit. 70SH	1
FAA029A	O'ring 15x1.5 nit. 70SH	1
FAA036A	O'ring 6x1.5 Silic. 60SH	2
GBC337A	Dust sheet	1
MAB001A	Bent key 2 mm	1
MAB002A	Bent key 2.5 mm	1
MAB003A	Bent key 1.5 mm	1
MAB069A	Spherical key 2.5 mm	1
MAB090A	Male Torx bent key	1
XEA019A	KM1011 grease pot	1
XEA821A	Vactra oil 100 mL bottle	1
GBG138A	Cover key	1
EAC019A	Male Luer connector I=3	2
EAE011A	Cristal tube 3x6	4 m
FBL001A	Rubber stopper 2 holes D inf = 28	1
XDA566A	Machined red cap	2
XEA017A	Reagent straws	3

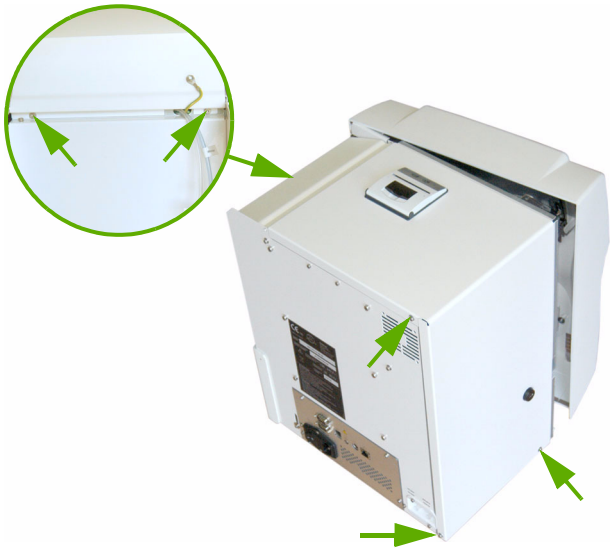
XEC002A: ABX Micros ES60/ESV60 Pack

Reference	Designation	Qty
DAR006A	Fuse 5x20 0.8A T250V	1
DAR012A	Fuse 5x20 2A T 250V	2
DAR013A	Fuse 5x20 2.5A T250V	2
DAR023A	Fuse 5x20 4A 250V	1
EAB032A	«T» connector D=1.6 mm T210-6	1
EAE007A	Tygon tube 1.52 mm (0.60")	2 m
EAE009A	Tygon tube 2.29 mm (0.090")	2 m
FAA017A	O'ring 30.8x3.6 nit. 70SH	1
FAA029A	O'ring 15x1.5 nit. 70SH	1
FAA036A	O'ring 6x1.5 Silic. 60SH	2
GBC337A	Dust sheet	1
MAB001A	Bent key 2 mm	1
MAB002A	Bent key 2.5 mm	1
MAB003A	Bent key 1.5 mm	1
MAB069A	Spherical key 2.5 mm	1
MAB090A	Male Torx bent key	1
XEA019A	KM1011 grease pot	1
XEA821A	Vactra oil 100 mL bottle	1
GBG138A	Cover key	1

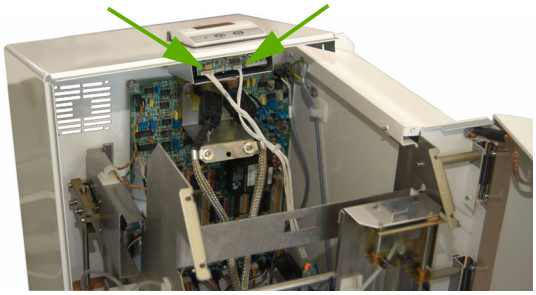
4. Visual checks

- Using the key from the installation kit, turn the locker to open the front panel.

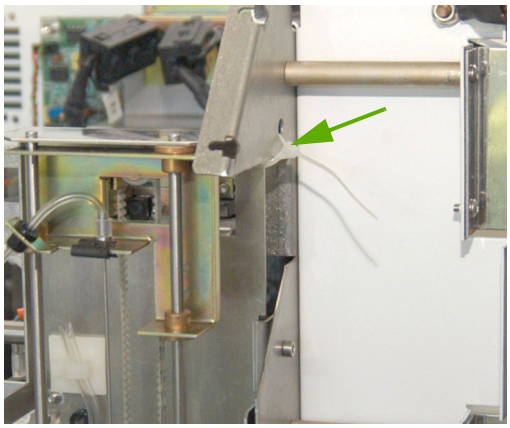
- Unscrew the 3 CHC fixation screws and loosen the 2 located under the reagent flap.
- Remove the cover: pull it backward and slowly lift it up to the rear of the instrument.



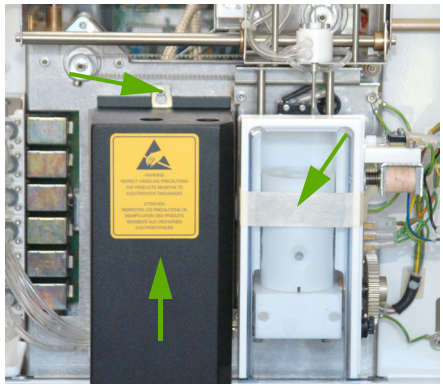
- If the instrument is equipped with a printer on the cover, disconnect its connectors when removing the cover.



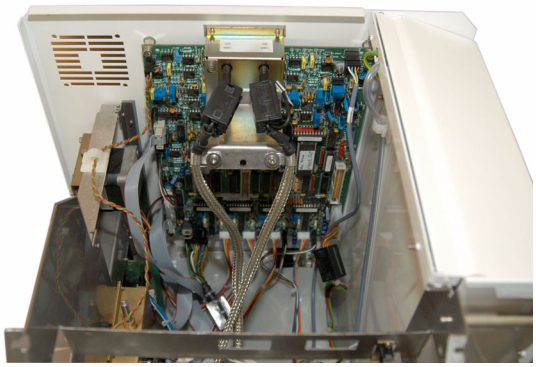
- Cut and remove the tyrap maintening the carriage on the frame.
- Check that the needle is not bend and make sure it is in its upper position.



- Loosen the CHC screw.
- Lift and remove the chamber cover.
- Check that both chambers are correctly fixed in their clips and that the electrode blocks are firmly screwed to the chambers.
- Install the chamber cover back.
- Remove the tape mantening the tube holder.



- Check that the connectors on the main board are securely in place.
- Install back the cover.
- If the instrument is equipped with a printer on the cover, connect its connectors when installing back the cover.
- Remove the screen protection



5. Reagent installation

5.1. Bottle connections

5.1.1. ABX Cleaner

- ABX Cleaner (ABX Miniclean or ABX Cleaner) is placed inside the reagent compartement.
- Install the reagent straw and the bottle stopper (XEA017A and XDA566A) on the ABX Cleaner bottle.
- Connect the blue tube to the ABX Cleaner bottle.

5.1.2. ABX Lyse

- 3 different ABX Lyse bottles are available.
  - ABX Minilyse LMG (1 L)
  - ABX Alphalyse 360 (0.36 L)
  - ABX Alphalyse (0,4 L)
- Depending on the ABX Lyse bottle, the straws are differents (note that the installation kit only includes straw and cap for ABX Minilyse LMG bottle).

ABX Minilyse LMG

- ABX Minilyse LMG is placed inside the reagent compartment.
- Install the reagent straw and the bottle stopper (XEA017A and XDA566A) on the ABX Minilyse LMG bottle.
- Connect the white tube to the ABX Minilyse LMG bottle.

ABX Alphalyse 360 (0.36L)

- The ABX Alphalyse 360 straw (P/n: G0166740) is not provided in the installation kit. Contact your local HORIBA Medical Technical support to order it.
- Open the pack pulling the flap A and open the level window B

- Install the G0166740 straw on the ABX Alphalyse 360 bottle.
- Connect the white tube to the ABX Alphalyse 360 bottle.
- Install the ABX Alphalyse 360 bottle into the reagent compartment.

ABX Alphalyse (0.4L)

- The ABX Alphalyse straw (P/n: GBG145A + GBG155A) is not provided in the installation kit. Contact your local HORIBA MEDICAL Technical support to order it.
- Install the reagent straw and the bottle stopper (GBG155A and GBG145A) on the ABX Alphalyse bottle.
- Connect the white tube to the ABX Alphalyse bottle.
- Install the ABX Alphalyse bottle into the reagent compartment.

5.2. Diluent & waste connection

Diluent connection:

- Install a Luer male connector (EAC019A) on a 3x6 cristal tube (EAE001A) having a length of 1 meter maximum.
- Install a straw (XEA017A) on this tubing.
- Connect this tubing to the Diluent input at the rear of the instrument
- Plunge the straw in the ABX Diluent container using the rubber stopper (FBL001A).

- **The ABX Diluent container should be installed at the same level than the instrument.**
- **Make sure that the Diluent Luer connector is firmly screwed to the rear connection.**

Waste connection:

- Prepare the waste container using the Waste plastic bag (7001070) and the cardboard box with sticker (7005057 + LAU014A).
- Install a Luer male connector (EAC019A) on a 3x6 cristal tube (EAE001A).
- Connect this tubing to the Waste output at the rear of the instrument
- Plunge the tubing in the waste container previously prepared.

- **The waste container should be installed below the instrument.**
- **Make sure that the waste Luer connector is firmly screwed to the rear connection.**

- **Always follow the recommended procedures for waste disposal. Never connect the instrument wastes directly to the laboratory drain pipes.**
- **If required, waste can be neutralized before being discarded. Follow your laboratory's protocol when neutralizing and disposing of waste.**
- **Dispose of the waste container according to the local or national regulatory requirements.**

5.3. Pack connection

- Remove the reagent output protections, as well as the waste input protection.

- Install the pack directly in the reagent compartment.
- Push the pack down in order to correctly plug the pack on the male connectors.

- The free male connector must be plugged on the pack upper valve to receive the waste liquids.

In order to avoid leak problems, it is recommended not to unplug several times the same reagent pack.

6. Printers

6.1. Integrated ticket printer

ABX Micros ES60 includes an integrated ticket printer:

- It allows printing of results, QC matrix and XB statistics. All the printouts are in grey levels.

Button	Name	Action
	Feed paper	Enable user to load paper into the printer.
	Pause	Allows to stop and start again printing without losing data (when paper loading is required for example).
	Printer self test	Press both button simultaneously and start the instrument with the "ON/OFF" button to start a printer self test.

- **Integrated ticket printer accepts "latin characters" only.**
- **Please use an external printer when non "latin characters" are used.**

6.2. External printer

An external printer can be set up. It can be used:

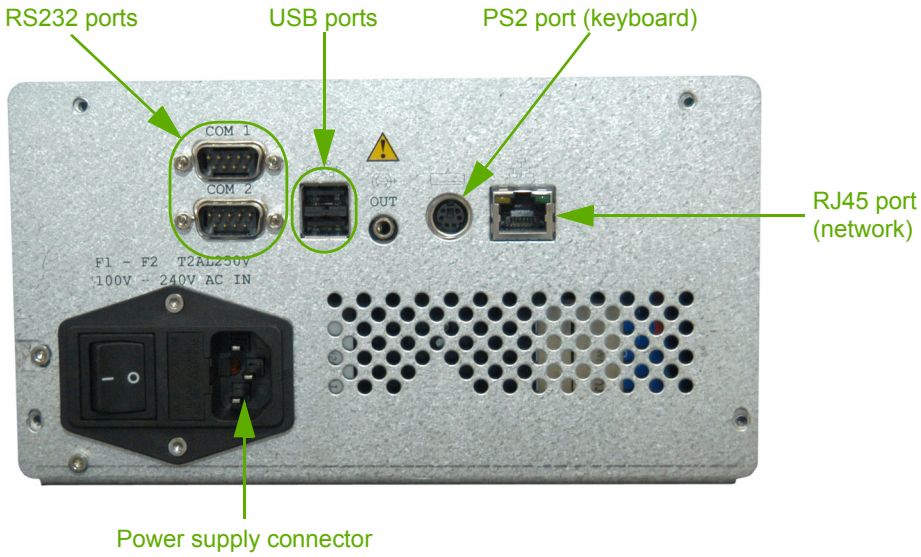
- Locally (connected to the USB port)
- Remotely (connected on laboratory network)

- **User must check his printer compatibility with ABX Micros ES60/ESV60.**
- **A non exhaustive list of printer that can be used with the instrument can be found on the website: http://www.horiba-abx.com/documentation/Other/printers.**
- **To acquire the complete and updated list of compatible drivers and printers, please refer to the website: http://www.linuxprinting.org/driver_list.cgi.**
- **HORIBA Medical does not guarantee the functioning of all these printers. If necessary, try out several drivers.**
- **For more detailed information, please contact your local HORIBA Medical Technical Support Representative.**

7. Connexion

Plug the connectors that you need on the rear side of the ABX Micros ES60/ESV60:

- 2 RS232 ports:
  - COM1: to send data to the LIS (top).
  - COM2: reserved for factory.
- 2 USB ports:
  - 1 to connect an external printer
  - 1 available
- 1 power supply connector: to connect power supply cable to the ABX Micros ES60/ESV60.
- 1 PS2 port: to connect an external keyboard.
- 1 RJ45 port: to connect to LAN Network.



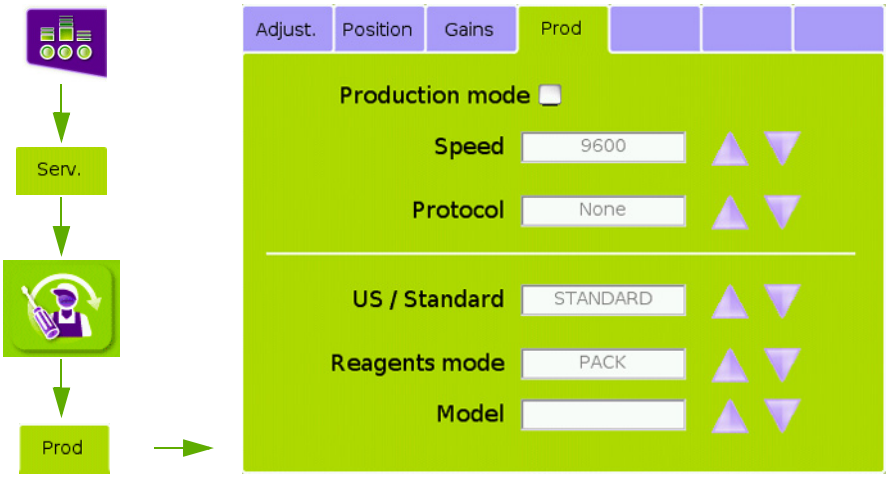
Setup

Please refer to RAS531: Remote display setup procedure

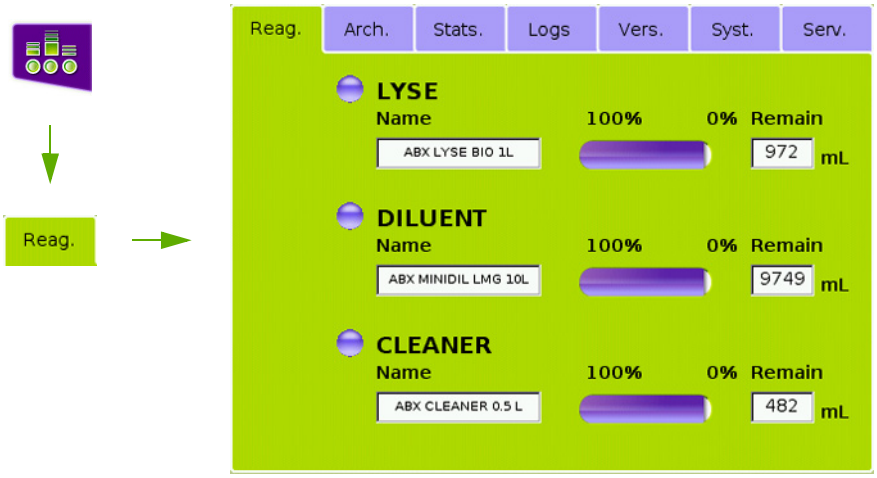
8. Instrument startup

8.1. Reagent prime

- Turn on the instrument.
- Press the «Stop» button when the startup cycle starts, the error message «Command has been cancelled» is displayed.
- Press the «Valid» button.
- Enter the Technician menu by pressing the «Tech» button.
- Enter the password: 01hb05 using the virtual keyboard or the external keyboard, if connected.
- Press the «Valid» button twice.
- Enter: Maintenance/Service/Adjustment/Prod



- Press the «Edit» button:
  - For Pack model, select «Pack» in the «Reagents mode» field, even if «Pack» is already selected.
  - For Bottle model, select «Bootles» in the «Reagents mode» field, even if «Bootles» is already selected.
- Press the «Valid» button.
- Enter: Maintenance/Reagent
- Refer to the User manual to enter the lot number, name and volume for each reagent, pack or bottle depending of the model.



- Press the «Serv.» tab.
- Press the «Service cycle» button.
- Select «All reagents priming» then press the «Start cycle» button.

8.2. Startup

- When all reagents are primed, press the «Status» button.
- Press the «Startup» button and wait for the end of the cycle.

- **If a problem occurs during the first phasis of the startup (mechanical initialization), the cycle stops and an error message is displayed. No values are displayed.**

- **If the startup finishes with a wrong blank reference, an error message is displayed (Startup failed) and the mesured blank values are displayed.**

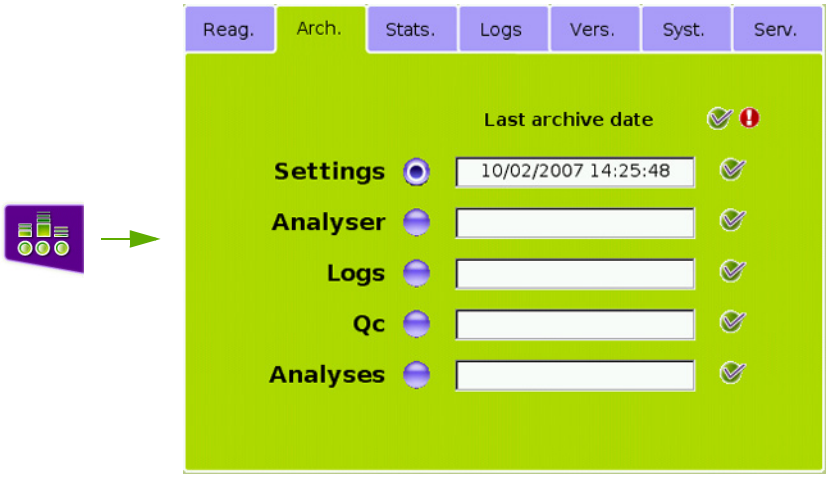
- **If the startup finishes with correct blank values, the values are displayed.**

9. Check up after intervention

- Perform a «RAS530: Check up after intervention» to ensure the correct functioning of the instrument.

10. Archive parameters

- Once all parameters have been adjusted, and the instrument is ready,
- Press the Maintenance button, then the Arch. tab.



- Select:
  - «Settings» in order to save the application parameters (Ranges, etc...)
  - «Analyser» in order to save instruments parameters (mechanical adjustments,
- Press the «Complete Archive» button.

- Insert a USB key into the front slot of the instrument and follow the instruction on the screen.

ABX Micros ES60/ESV60

RAS521A

Yearly maintenance

- Concerns
  - Chambers maintenance
  - Isolator replacement
  - Vacuum & liquid syringes maintenance
  - Axis lubricating
  - Pack connections maintenance (Pack model only)
  - Needle O'ring replacement
  - Piercing needle O'ring replacement (CT model only)
  - Pulley maintenance
- Required tools
  - Hexagonal keys
  - Cutting pliers
  - Dynamometric screw driver (100, 120, 400 & 700 mNm)
- Required products
  - Grease (LAM009A + LAM004A)
  - Oil (XEA821A)
  - Distilled water
  - Soft paper
  - Ethanol
- Intervention time
  - 2 h
- Frequency
  - 1/Year
- Specific kit or consumables
  - Yearly maintenance kit XEC061AS

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Preparation

- Run a drain chamber cycle (Maintenance\Service\Customer services\Hydrau.\Chambers Draining).
- Turn off the instrument then remove the power supply cable.
- Open the front door.
- Remove the cover.

2. Yearly maintenance kit description

- XEC061AS contents:

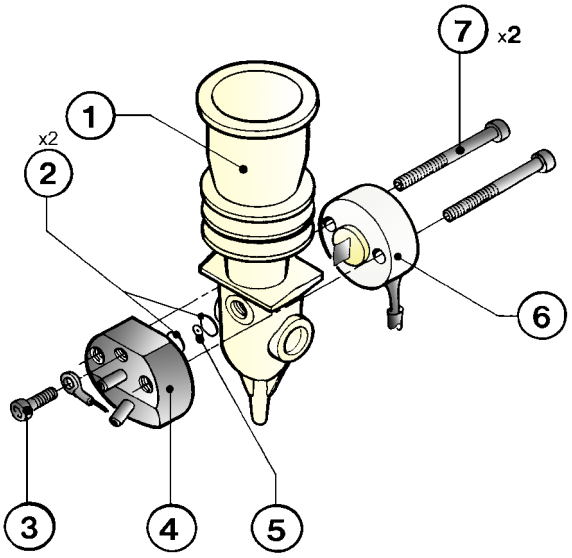
Part numbers	Designation	Qty
FAA017A	O'ring, 30,8x3,6 NIT. 70SH (vacuum syringe O'ring)	1
FAA023A	O'ring, 16x1,25 NIT. 70SH (not used on ABX Micros ES60)	1
FAA029A	O'ring, 15x1,5 NIT. 70SH (Diluent piston O'ring)	1
FAA036A	O'ring, 6x1,5 SILIC. 60SH (Lyse piston O'ring)	2
FAA046A	O'ring, 2,75x1,6 VITON (Coaxial O'ring)	2
FAA049A	O'ring, 2,2x1 SILIC. 60SH (not used on ABX Micros ES60)	2
FAA053A	O'ring, 1,4x1,25 FLUOCARBO.	1
FAA054A	O'ring, 0,74x1 FLUOCARBO	2
FAA055A	O'ring, 1,07x1,27 FLUOCARBO (Sampling syringe O'ring)	2
GBC236A	Diluent piston	1
GBG275A	Flat seal, ep = 0.5 (Aperture seal)	4
GBC364A	Insulator	1

3. Chambers

- Loosen the WBC/RBC chamber cover screws and remove the cover.
- Record the tube position before dismantling the chambers.

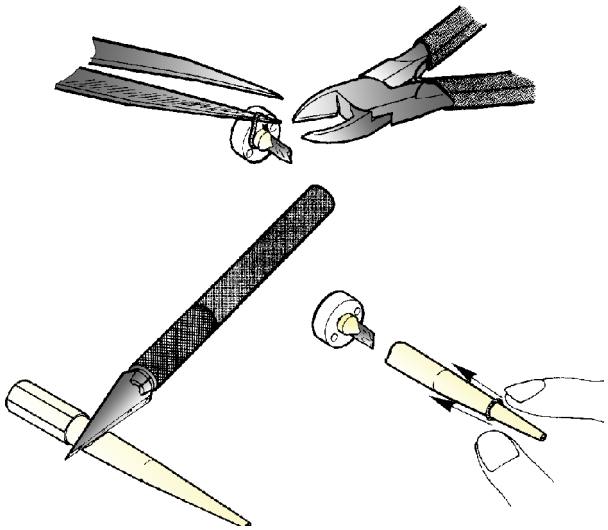
3.1. RBC chamber

- Disconnect the chamber tubing and unclip the RBC chamber.
- Dismantle the electrode (6) by loosening the 2 fixation screws (7) and the coaxial ground screw(3).
- Install the chamber over a piece of absorbant paper or cloth.
- Carefully remove the counting head (4) and plunge the aperture (5) in distilled water.
- Replace the O'rings (2) by new ones (GBG275A).



Do not manipulate the aperture using hard instrument. Clean the aperture with a piece of soft paper or preferably, in between 2 fingers.

- Use a previously cut micropipette tip to replace the electrode O'ring (FAA046A).
- Clean the chamber and the counting head with liquid soap, do not introduce any sharp instruments inside so as to avoid damaging the inside of the chamber and the aperture.
- Reassemble the electrode.



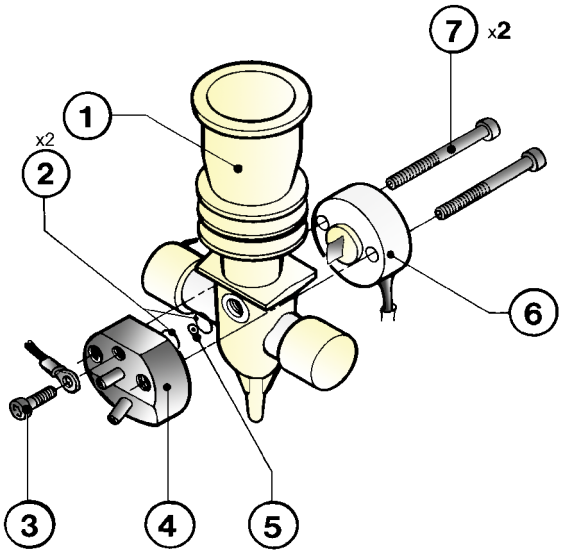
- **Do not apply too much pressure on the electrode fixation screws, as it can break the aperture: tightening torque = 120 mN.m / 17 Ozf.in**
- **It is recommended to reconnect the tubes on the counting head before reassembling the «electrode/chamber/counting head» assy in order to avoid applying constraint on the chamber.**

- Rinse thoroughly with distilled water then dry the exterior of the chamber with a soft paper.
- Position the chamber in its fixation clips and reconnect the tubes.

3.2. WBC chamber

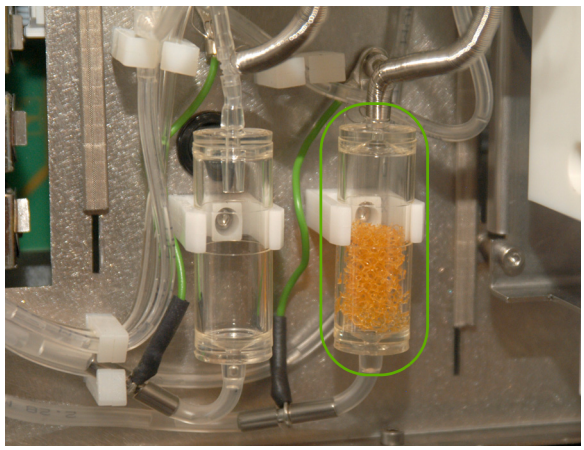
- Disconnect the chamber tubing and unclip the WBC chamber.
- Dismantle the electrode (6) by loosening the 2 fixation screws (7) and the coaxial ground screw(3).
- Proceed as described for the RBC chamber, to clean the chamber and to replace the electrode and aperture O'rings.

The spectrophotometer can not be dismantled from the chamber. If this one has been dammaged it is necessary to replace the whole chamber assy. When cleaning the spectrophotometer, make sure to thoroughly rinse it in order to obtain a correct HGB blank measure.



4. Insulator replacement

- Remove the insulator from the drain line exiting the RBC chamber.
- Install the sponge filter GBC364A in its place. Take care to orient the sponge filter so that the recess in the housing that accommodates the clamp is closer to the top of the housing (the ABX logo molded into one end cap of the housing will be facing downwards).



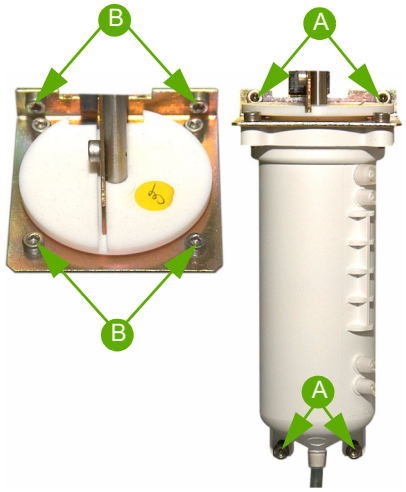
5. Vacuum syringe

5.1. O'ring replacement

- Manually pull the piston out of the syringe in order to freed it from the syringe body.

To pull the piston out of the syringe body, the syringe has to be linked to the atmosphere by pressing the valve 2.

- Unscrew the fixation screws «A» in order to remove the syringe body.
- Unscrew the O'ring tightening screws «B» and remove the O'ring.
- Spread a little amount of silicone grease between two fingers and apply a very thin film of grease (LAM004A) on a new O'ring (FAA017A).
- Reinstall in the reverse order. Apply the following torque to the screws «A»: 700 mN.m.
- Push the piston back inside the syringe body before tightening the O'ring fixation screws «B». Use the dynamometric screwdriver to tighten the screws «B» to 400 mN.m.

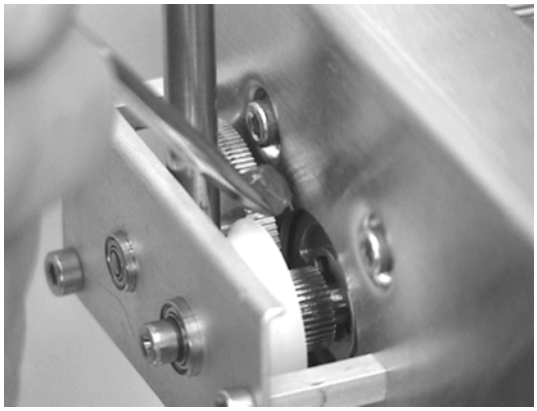


- Check the watertightness of the syringe by running a «Check pressure» cycle (Maintenance\Service\Adjustments\Sensors\Pressure).
- Run cycles and check for correct operations.

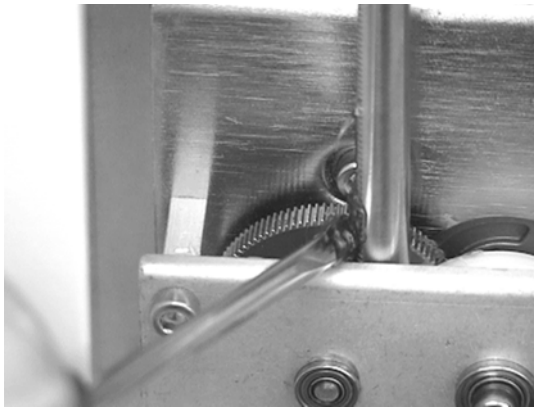
5.2. Lubrication

- Disconnect the diluent and waste inputs located at the rear of the instrument.

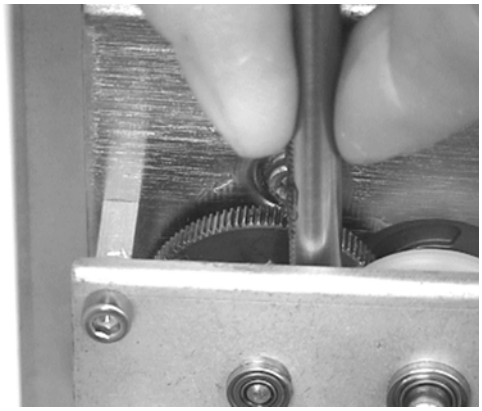
- Using a small and flat screwdriver, spread a little amount of grease (LAM009A) on the gearings of the air syringe reductor plate.



- Spread a little amount of grease (LAM009A) on the coggs of the piston axis



- Move by hand the piston axis up and down in order to spread the grease all around the gearings and along the axis

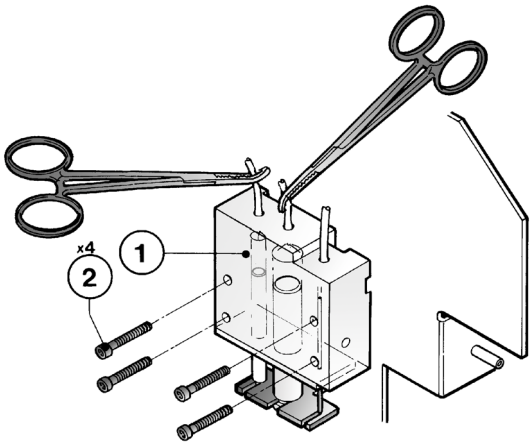


6. Liquid syringe

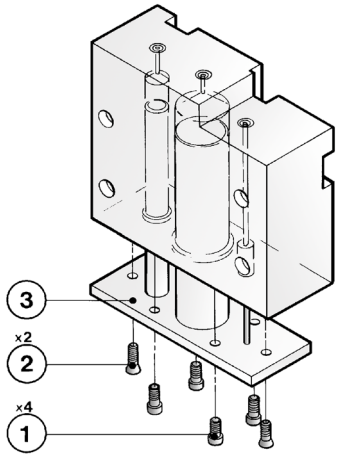
6.1. O'ring and piston replacement

Before this operation, remove the reagent pack.
In case of a leak on one of the three syringes it is recommended to replace the entire dilution block. If not proceed as following:

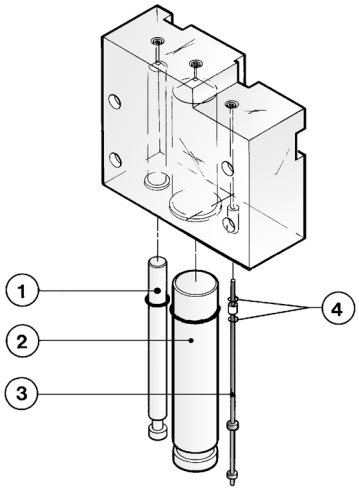
- Pull the piston assy in the upper position and clamp the diluent and lyse tubing.
- Disconnect the diluent/lyse/sampling tubings from the 3 syringes and the tube on the sampling syringe side.
- Unscrew the 4 fixation screws (2), and remove the dilution block (1).



- Unscrew the 6 screws (1) and (2) in order to remove the body cover (3).

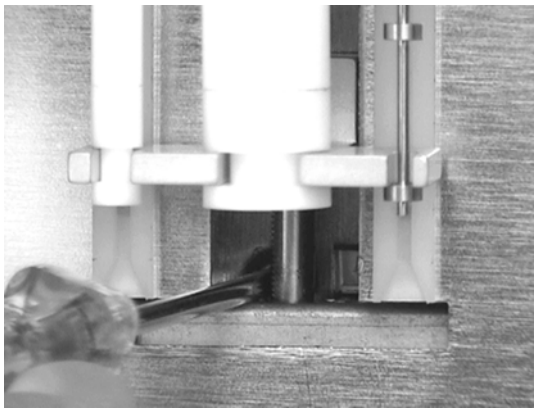


- Pull out the pistons «1», «2» and «3» from the body with their respective O'ring still around.
- Replace the lyse (FAA036A) and diluent (FAA029A) O'rings by new ones. Spread a little amount of silicone grease between two fingers and apply a very thin film of grease (LAM004A) on the new O'ring. Check the cleanliness of the piston and of the syringe bodies. If necessary clean with a soft paper.
- Once a year, change the diluent piston (GBC236A) by the new from the kit. Spread a little amount of silicone grease between two fingers and apply a very thin film of grease (LAM004A) on the new O'ring.
- Spread a little amount of silicone grease between two fingers and apply a very thin film of grease on the 2 new sampling syringe O rings (FAA055A). Replace the old ones «4».
- Reinstall the dilution block assy in the reverse order.
- Use the A301 dynamometric screwdriver to tighten the screws «1» and «2» to 400 mN.m



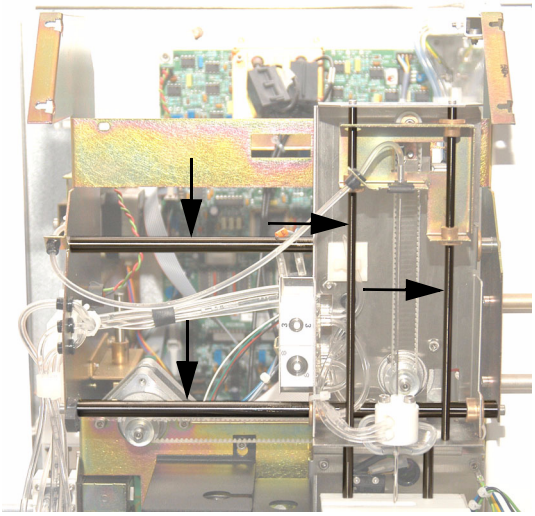
6.2. Lubrication

- Disconnect the diluent and waste inputs located at the rear of the instrument (or remove the reagent pack).
- Move the liquid syringe by hand in order to have an access to the motor gearings.
- Spread a little amount of grease (LAM009A) on the gearings and on the piston axis.
- Move by hand the syringe assembly to spread the grease on all parts of the gearings and piston axis.



7. Axis lubricating

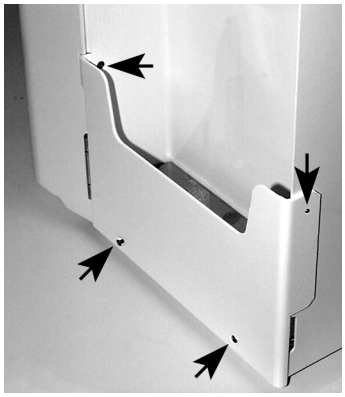
- Clean the carriage and the needle carriage axis.
- Put a drop of oil (XEA821A) on each axis.
- Refer to RAN199A: «Lubrication: information»



8. Specific Reagent pack

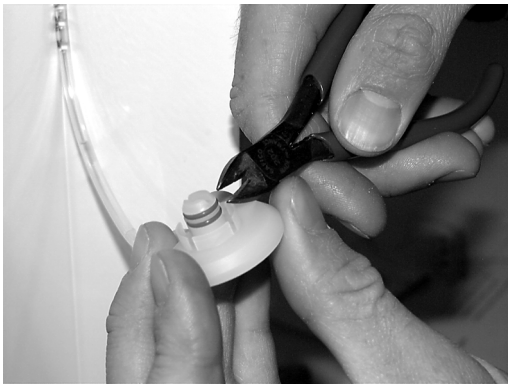
Run this procedure in case of problem only (leaks,etc...)
The O'rings (FAA036A) are not included in the XEA328AS kit.

- Disconnect the pack if this one is still connected.
- Dismantle the reagent pack front panel unscrewing the four torx screws.



- Use a pair of pliers to cut the O'rings of the reagent connectors.
- Replace the O'rings by new ones (FAA036A).

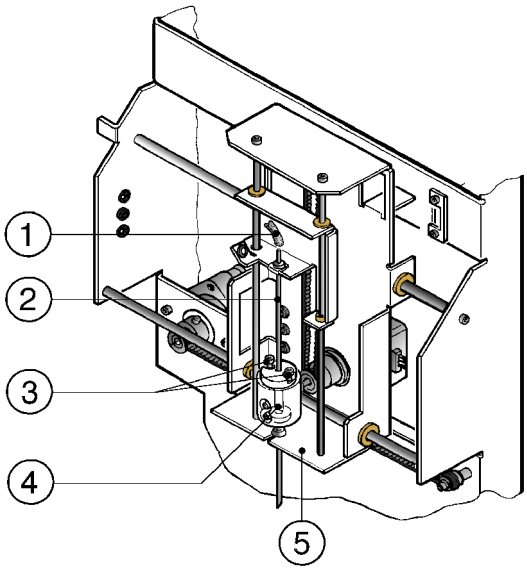
- Replace as well the waste connector O'rings (FAA036A).



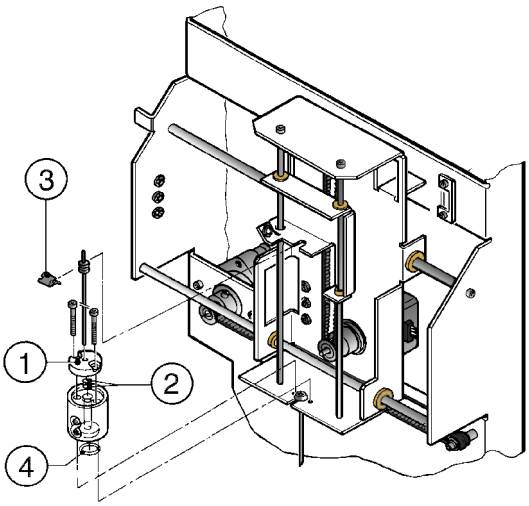
9. Specific ABX Micros ES60 CT

9.1. Sampling needle or O'ring replacement

- Disconnect the tube «1» from the top of the needle «2».
- Unscrew the 2 screws «3» in order to free the needle rinsing block «4» from the carriage frame «5».



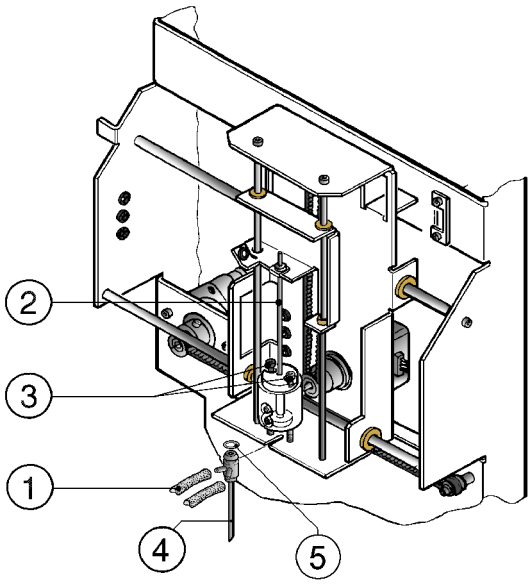
- Remove the clip «3» and manually lift up the sampling needle.
- Remove the rinsing block/needle assy from the carriage taking care not to bend the needle.
- Lift up the O'ring holder «1» and replace the O'rings «2» (FAA054A) by new ones previously greased (with LAM004A). Wipe all excess of grease away.
- If necessary clean the inner surface of the rinsing block with a little piece of paper.
- Proceed the same way to replace the needle if necessary.
- Reassemble in the reverse order. Use a dynamometric screwdriver to tighten the screws «3» to 700 mN.m (99.4 Ozf.in).



The sampling needle is not included in the XEA328AS kit. The reference is GBC052AS.

9.2. Piercing needle or O'ring replacement

- Disconnect the tube «1» from the piercing needle «4».
- Lift the needle «2» in the upper position.
- Loosen the 2 screws «3» just enough to enable the rinsing block to be lifted up of about 5 mm.
- Pull the piercing needle «4» (foreward) and replace it by a new one if necessary.
- Replace the piercing needle O'ring «5» (FAA036A) by a new one. Spread a little amount of silicone grease between two fingers and apply a very thin film of grease (LAM004A) on a new O'ring
- Reassemble in the reverse order. Apply the same torque: 700 mN.m (99.4 Ozf.in) to tighten the two screws «3».

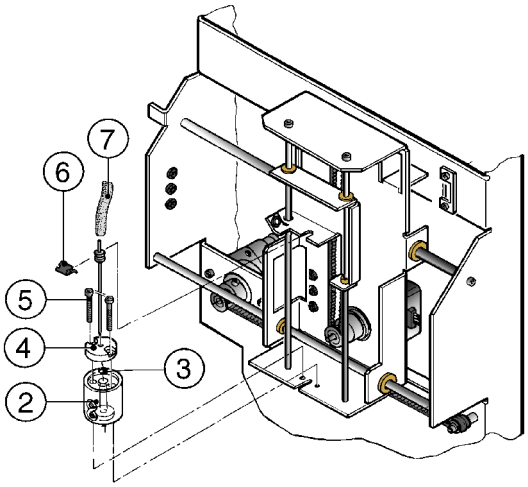


- **It is recommended to check the correct motion of the needle. Proceed as follows: Enter: Maintenance\Service\Mechanical cycles\ Moves\ Needle.**
- **The piercing needle is not included in the XEA328AS kit. The reference is GBC189A.**

10. Specific ABX Micros ES60 OT

10.1. Sampling needle

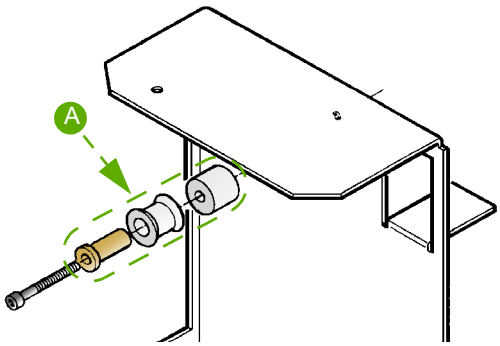
- Disconnect the tube «7» from the top of the needle. Manually lift up the sampling needle.
- Unscrew the 2 screws «5» in order to freed the needle rinsing block «2» from the carriage frame.
- Remove the clip «6».
- Remove the rinsing block/needle assy from the carriage taking care not to bend the needle.
- If necessary clean the inner surface of the rinsing block by means of a little piece of soft paper.
- Spread a little amount of grease (LAM004A) in between the rinsing block «2» and its support.
- Lift up the O ring holder «4» and replace the O'ring «3» by a new one (FAA053A) previously greased (with LAM004A).
- Wipe all excess of grease away.
- Proceed the same way to replace the needle if necessary.
- Reassemble in the reverse order. Use a dynamometric screwdriver to tighten the screws «5» to 100 mN.m.



- **It is recommended to check the correct motion of the needle. Proceed as follows: Enter: Maintenance\Service\Mechanical cycles\Moves\Needle**
- **The sampling needle is not included in the XEA328AS kit. The reference is GBC069AS.**

11. Pulley

- Blockage problems may occur on some instruments during the needle or carriage motions giving some motor error messages.
- Before replacing the concerned motor, it is necessary to check the correct rotation of the free pulley located at the end of the notched belt.
- Remove the axle screw of the pulley and clean its 2 parts and the washer. Reinstall the pulley assy, the rounded edge facing the pulley.
- Check that the pulley turns freely after the tightening. Add a drop of oil (LAM007A) if necessary.
- A - XEA343AS: KIT,PULLEY ASSY MICROS



12. Check and adjustments

12.1. Needle & carriage position check

- Perform a «RAS527: Needle & carriage adjustment» to ensure the correct position of the needle and the carriage.

12.2. Hydraulic

- **If necessary, refer to the corresponding procedure:**
  - RAS524: Vacuum check & adjustment procedure.
  - RAS525: Bubbling check & adjustment procedure.
  - RAS526: Thermic adjustment procedure.

12.2.1. Vacuum

- Barflex connected instead of the tube coming from the valve «8».
  Value: - 200 mbar ± 10 mbar
- Check vacuum drop down during 30 secondes ≤2 mbar

12.2.2. Bubbling

- Default values:
  - Bubbling 1: 190
  - Bubbling 2: 80

12.2.3. Temperature

- Thermometer plunged into the RBC chamber.
- Temperature diluent = temperature displayed ± 2°

Temperature adjustment must be done 20 minutes at least after the instrument has been switched on.

12.3. Main board adjustment

- Perform a «RAS523: Main board check & adjustment» to ensure the correct adjustment of all the voltages, thresholds and gains.

12.4. Check up after intervention

- Perform a «RAS530: Check up after intervention» to ensure the correct functioning of the instrument.

ABX Micros ES60/ESV60

RAS522A

Power supply & SBC board dismantling

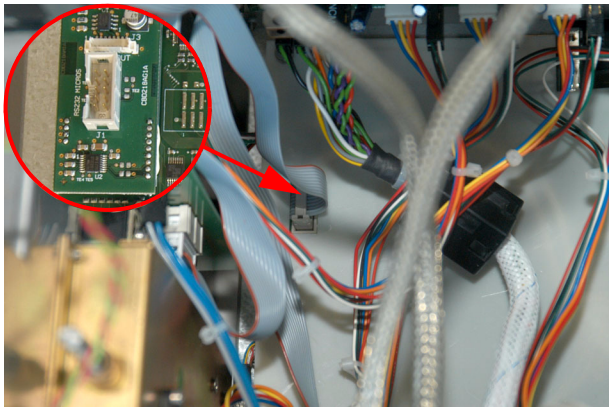
- Concerns
  - Dismantling of the drawer allowing the access to:
    - The SBC board
    - The power supply
    - The power supply fan
- Required tools
  - hexagonal keys
  - cutting pliers
- Required products
  - None
- Intervention time
  - 30 mn
- Frequency
  - On request
- Specific kit or consumables

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Dismantling

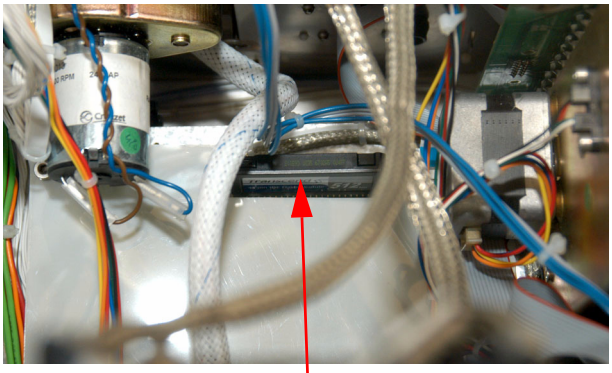
- Turn off the instrument and remove the power supply cable.
- Open the Front door.
- Unscrew the 4 CHC screws maintening the upper cover.
- Disconnect the printer wires (no printer on Vet model) and remove the upper cover.

- Gently disconnect the flat cable coming from J22 on the mother board and connected on J1 on the small «Com & dimming board».



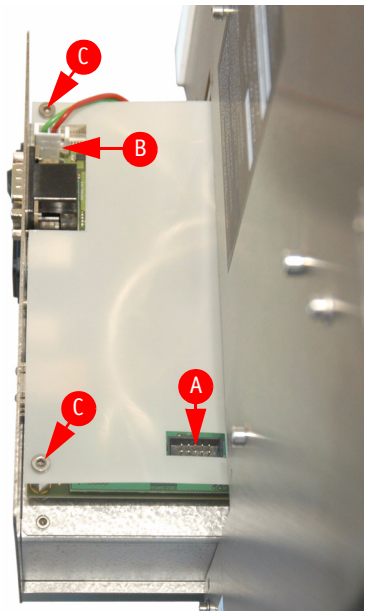
As the «Com & dimming board» is sticked on the SBC board, maintain this board with the fingers when disconnecting the flat cable.

- Remove the IDE flash module.

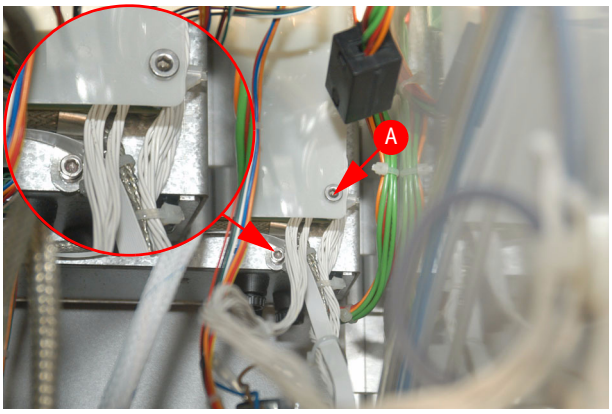


- Unscrew the 4 CHC screws a the rear of the power supply drawer.

- Slowly pull the drawer until the connector of the flat cable previously disconnected appears (A).
- Disconnect the power supply connector (B).
- Unscrew the 2 CHC screws (C) maintening the mylar protection.



- Unscrew the last mylar screw (A) and remove the mylar.
- Unscrew the CHC screw maintening the LVDS wire on the power supply assembly. This allows to pull a little bit more the drawer.



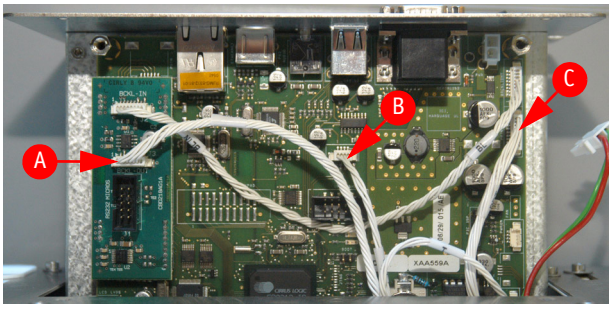
- Disconnect:

  A: The backlight connector (BL OUT), connected on J3 on «Com & dimming board».

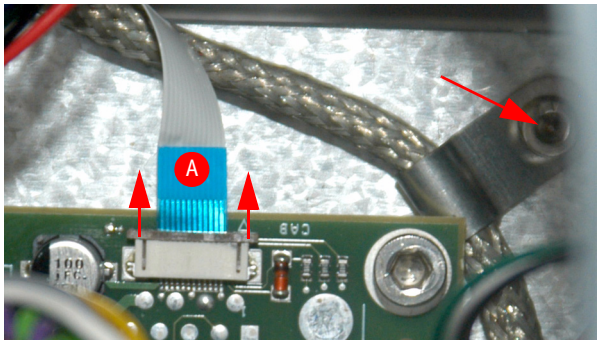
  B: The USB connector (USB), connected on J10 (USB3) on SBC board.

  C: On ABX Micros ES60 CT, the printer connector (PRT) connected on Print PWR on SBC board.

- This allows to pull a little bit more the drawer.



- On ABX Micros ES60 CT, carrefuly disconnect the Barcode reader flat cable (A) by unlocking the connector.
- Unscrew the last CHC screw maintening the LVDS wire on the power supply assembly.



The Barcode reader flat cable connector is very fragile.
Take care not to damage it when disconnecting the flat cable.

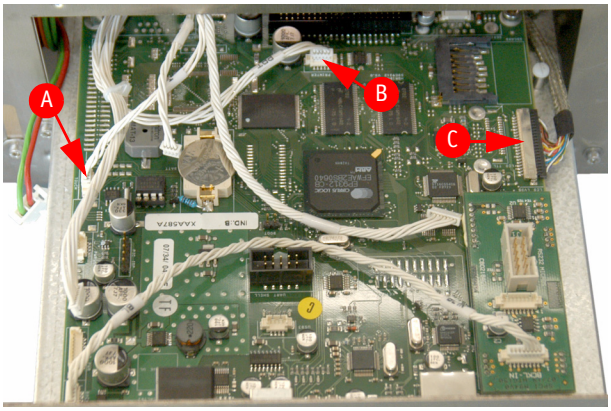
- Disconnect:

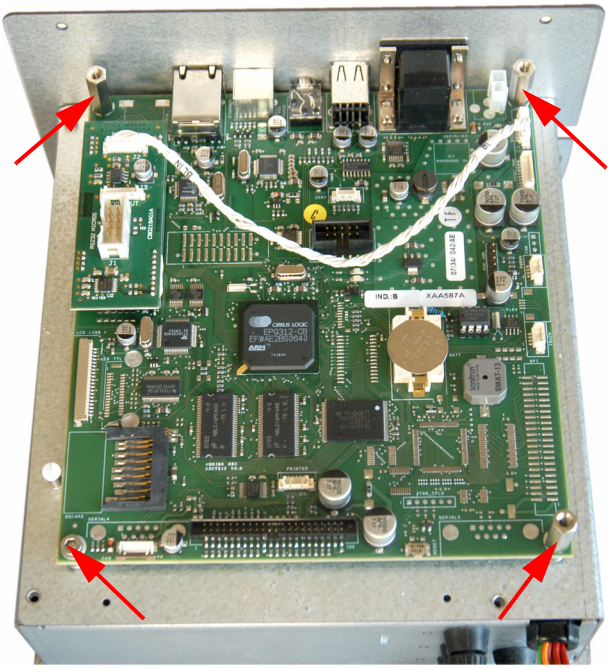
  - The Touchscreen connector (T), connected in «Touch» on SBC board (A).

  - On ABX Micros ES60 CT, the printer connector (PRT), connected on Print on SBC board (B).

  - The LVDS wire (C).

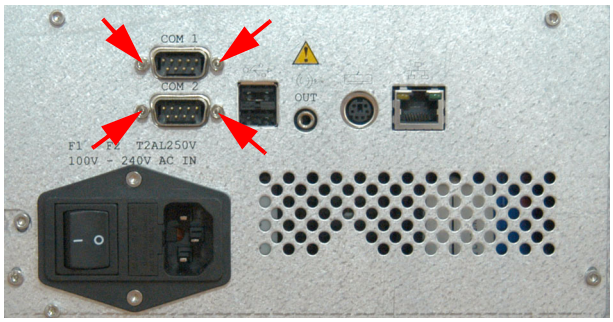
- Make sure that the IDE flash module has been removed.
- The drawer may be entirely removed.



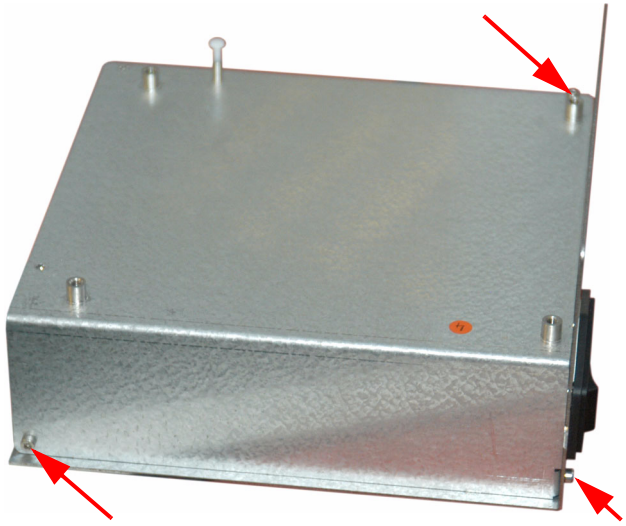


- Unscrew the 3 spacers and the CHC screws.

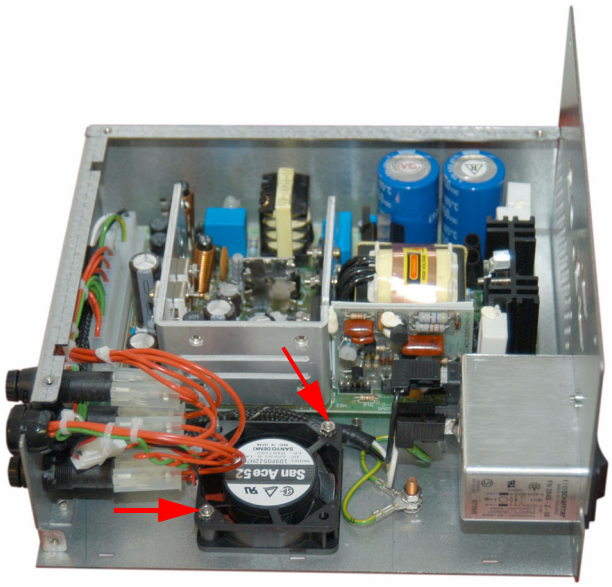
- Unscrew the 4 spacers maintening the 2 RS ports.
- Remove the SBC board.



- Unscrew the 3 CHC screws and remove the power supply upper plate.



- To remove the fan, unscrew the 2 nuts with washers.
- Cut the tyraps maintening the wiring, disconnect the connector and remove the fan.

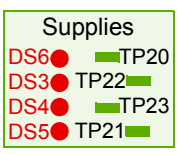


When installing back the fan, make sure that the sticker is on the upper side.

- Install in reverse order.
- Insert the drawer in the ABX Micros ES60/ESV60.
- Take care to the wirings when pushing the drawer in the instrument.

2. Power supply voltages check

- Install the power supply cable and turn on the ABX Micros ES60/ESV60.
- Check the power supply voltages, the test points are located on the right side of the main board:



No adjustment available for power supply voltages.

2.1. Power supply - 12 V

Target check: -12V +/- 0.5

- Check between TP20 and TP31 (Ground) -12V Power supply voltage.

2.2. Power supply + 12 V

Target check: +12V +/-0.4

- Check between TP21 and TP31 (Ground) +12V Power supply voltage.

2.3. Power Supply +24V

Target check: 24V +2.5/-1

- Check between TP22 and TP31 (Ground) +24V Power supply voltage.

2.4. Power Supply +5V

Target check: 5V +/- 0.2

- Check between TP23 and TP31 (Ground) +5V Power supply voltage.

- Install back the upper cover then close the front door.

ABX Micros ES60/ESV60

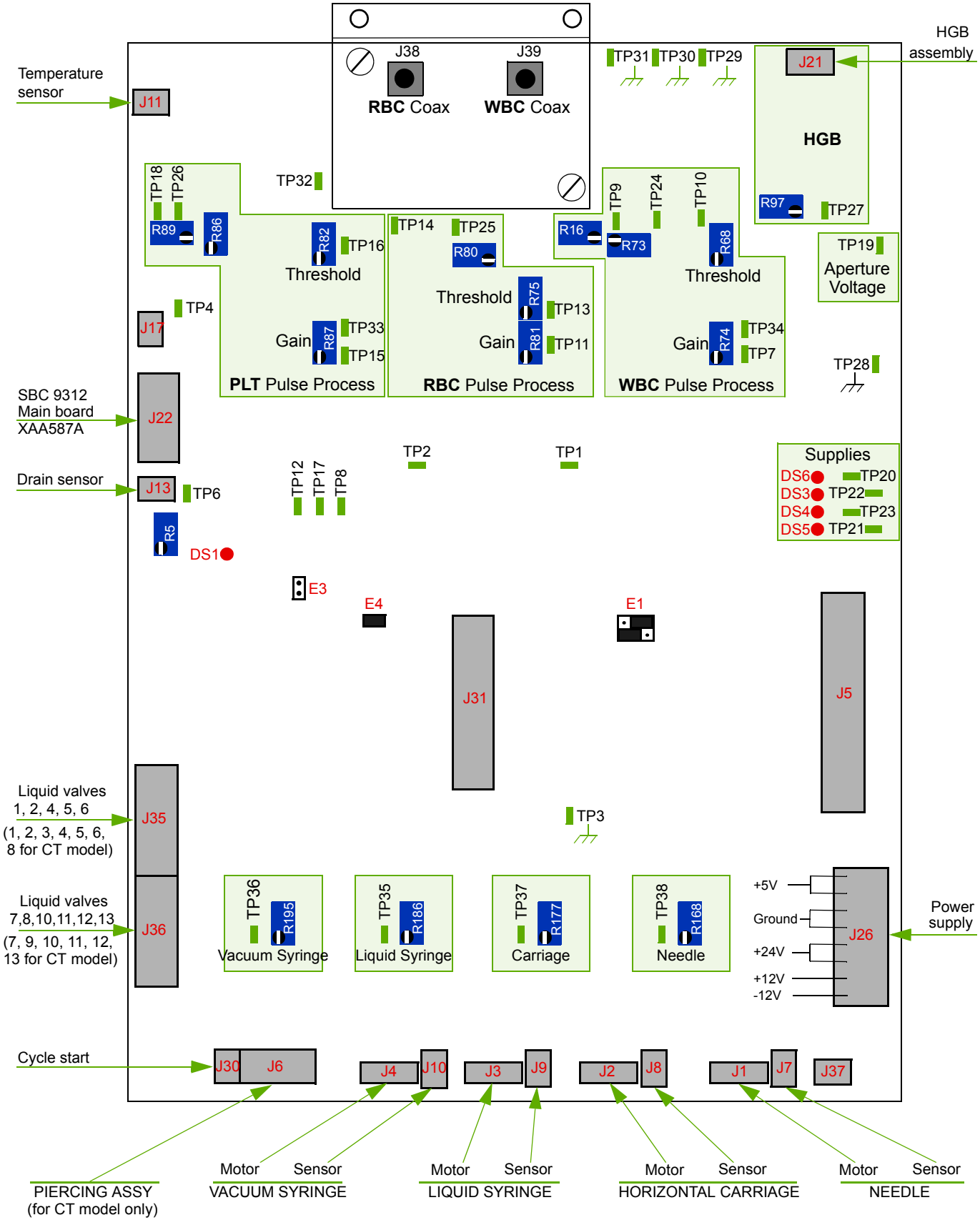
RAS523A

Main board check & adjustment

- Concerns
  - Check of:
    - Power supply voltages
    - Aperture voltage
  - Adjustment of:
    - Thresholds
    - Motor voltages
    - Drain sensor
    - HGB photometer
    - Gains
- Required tools
  - Voltmeter
  - Thermometer
  - Screwdriver
- Required products
  - LYM latex
  - GRA latex
  - RBC/PLT latex
- Intervention time
  - 30 minutes
- Frequency
  - On request
- Specific kit or consumables
  - None

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Main board general view



2. Power supply voltages check

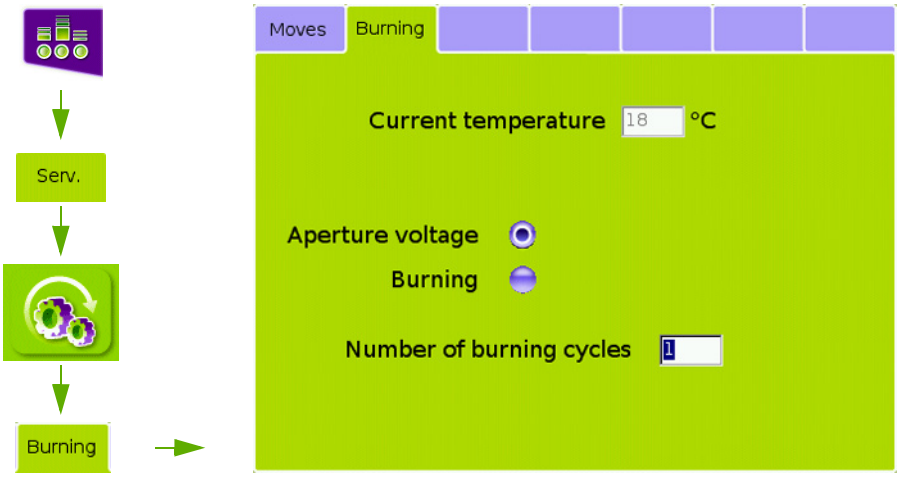
- Remove the ABX Micros ES60/ESV60 cover.
- Switch on instrument.
- Ground on TP31 (no adjustments)

TEST POINTS	VOLTAGE
TP20	- 12 V +/- 0.5
TP22	+ 24 V + 2.5/- 1
TP23	+ 5 V +/- 0.2
TP21	+ 12 V +/- 0.4

No adjustment available for power supply voltages.

3. Aperture voltage check

- Remove the ABX Micros ES60/ESV60 cover.
- Switch on instrument.
- Access to the «Aperture voltage» menu: Maintenance/Service/Mechanical cycles/Burning
- Select «Aperture voltage».



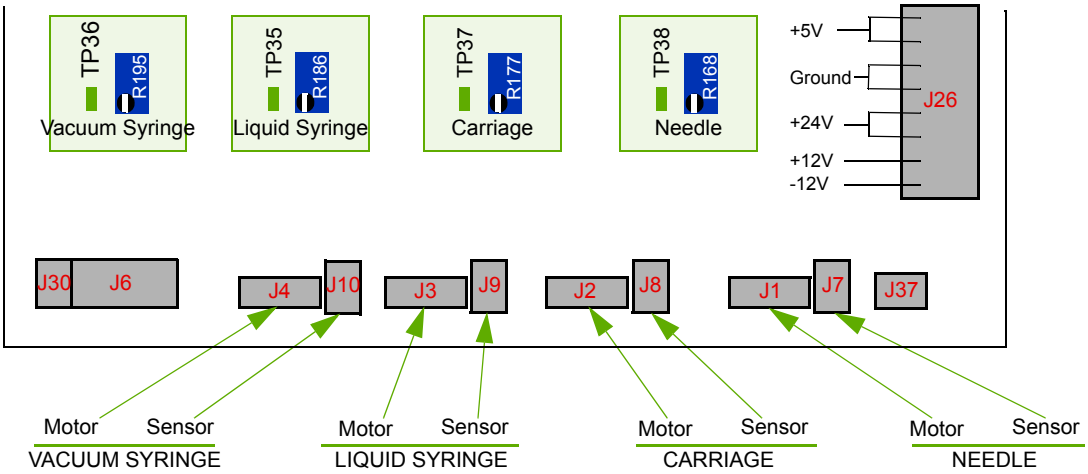
- Voltmeter connected between TP31 (ground) and TP19
- Press the «Start cycle» button.
- Target value: 60 V +2.8/-1.5 (no adjustments)
- Press the «Valid» button to terminate.

No adjustment available for aperture voltages.

4. Motor voltages adjustment

- Remove the ABX Micros ES60/ESV60 cover.
- Switch on instrument.
- Ground on TP31, check and if necessary adjust the following voltages:

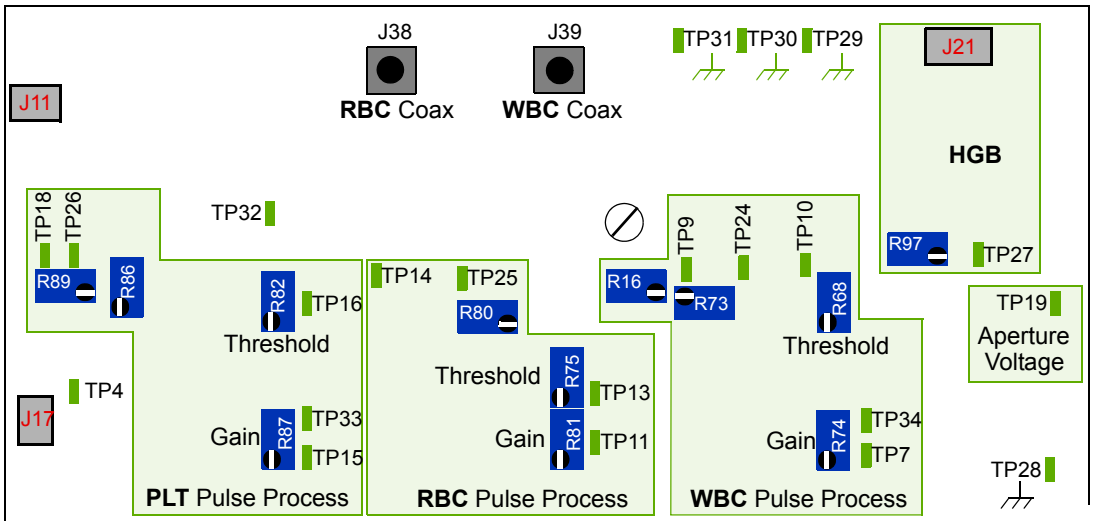
Motors	Voltage	Test points	Potentiometers
Vacuum syringe	2.50 V ± 0.05 V	TP36	R195
Liquid syringe	2.50 V ± 0.05 V	TP35	R186
Carriage	1.50 V ± 0.05 V	TP37	R177
Needle	1.00 V ± 0.05 V	TP38	R168



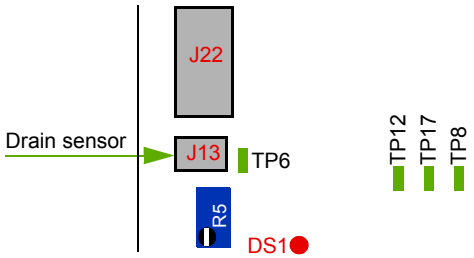
5. WBC/RBC/PLT thresholds adjustment

- Remove the ABX Micros ES60/ESV60 cover and switch on instrument.
- Ground on TP31, check and if necessary adjust the following voltages:

Thresholds	Voltages	Test points	Potentiometers
WBC	280 mV +/- 7 (826 mV +/-7 on ABX Micros ESV60)	TP10	R68
RBC	400 mV ± 7 (350 mV +/-7 on ABX Micros ESV60)	TP13	R75
PLT	180 mV ± 3	TP16	R82



6. Drain sensor adjustment



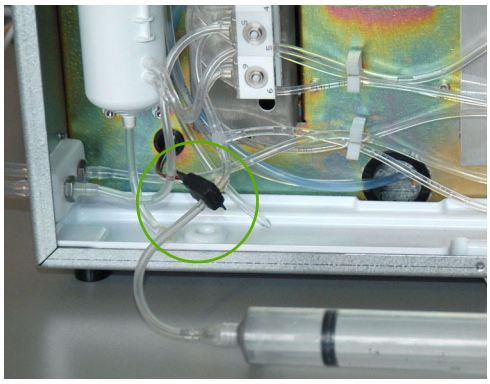
6.1. Description

The vacuum/waste syringe and the chambers drains are controled by an infrared sensor located below the syringe. Controls carried out by the cell during a cycle are as follows:

- Control of the correct operation of the cell:
  At the first chamber drain, air must be detected in the cell within defined timeout, and followed by liquids.
  If this switch «air-liquid» has been successfull, the adjustment of the cell (see below) is validated.
  If not, the cycle is stopped and the following message is triggered: «Reagent diluent empty» (check the connection or the adjustment of the cell).
- Control of the chamber drains:
  A first measure controls that liquids circulate in the cell during a defined timeout. A second measure checks that air has replaced liquid. If so, the drain phasis is validated.

6.2. Adjustment

- Raise the piston up and press the valve <2>.
- Manually perform a syringe drain pressing the valve <5> and pulling down the syringe piston. Make sure the cell is perfectly drained (no bubble).
- Connect a voltmeter between the ground TP31 and TP6 and adjust, by increasing this adjustment voltage from an inferior value (like 3V), to the target 4.5V ± 0.3 V by means of R5.
- Fill the syringe up with diluent and connect it on the detection cell.



- Push diluent through the sensor and check that the voltage falls down below 1 Volt on the voltmeter.

Check the commutation from 4.5 Volts to ~ 0 Volt once again pushing and drawning alternately liquid and air through the sensor by means of the syringe.

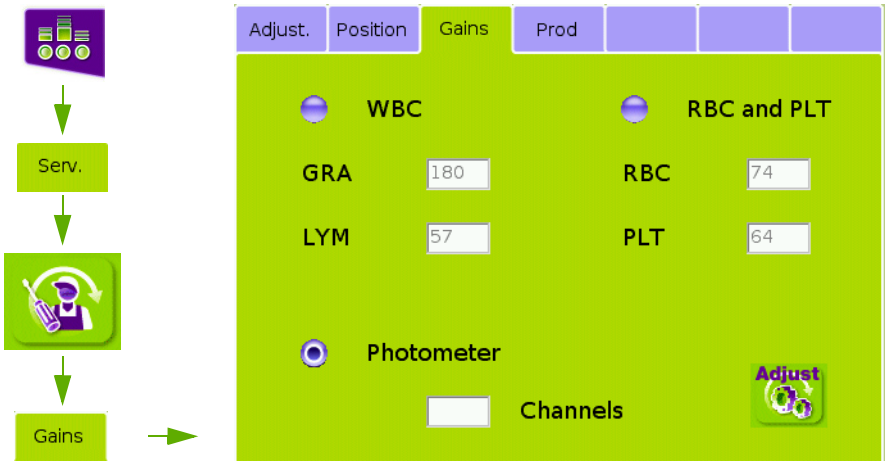
- If nothing happens, switch off the instrument, disconnect the connector from J13 and replace the drain detection sensor by a new one.
- Switch on the instrument and carry out the new sensor adjustment as described above.

However it is posible to control the correct operation of the sensor by means of the LED located next to R5. Indeed the LED should be lit when liquid circulates through the sensor and switched off with air.

7. HGB photometer adjustment

- **The HGB photometer calibration must be done 20 min at least after the instrument has been switched on.**
- **This adjustment must be done with the WBC chamber cover installed!**
- **If the WBC chamber has been dismantled previously, make sure no liquid has flown in between the spectrophotomer and the chamber. Clean the inner surfaces of the spectrophotometer as well as the chamber. Reassemble the assy and tighten the two screws to the following torque: 400mN.m**

- Remove the ABX Micros ES60/ESV60 cover and dismantle the WBC/HGB chamber cover.
- Check the general cleanliness of the WBC chamber/spectrophotometer assy.
- Re-install the chamber cover and switch on instrument.
- Enter: Maintenance\Service\Adjustments\Gains. and select «Photometer».



- Press the «Adjust» button, the curent channel is displayed on the screen.
- By means of R97 adjust the HGB channel according to the room temperature using the following chart table.

Room T° (°C)	Channel		
	Mini	Nominal	Maxi
15	240	245	250
16	240	245	250
17	239	244	249
18	238	243	248
19	237	242	247
20	236	241	246
21	235	240	245
22	234	239	244
23	234	239	244
24	233	238	243
25	232	237	242
26	231	236	241
27	230	235	240
28	229	234	239
29	228	233	238
30	228	233	238
31	227	232	237
32	226	231	236
33	225	230	235
34	224	229	234
35	223	228	233

8. WBC gain adjustment

The gain adjustment must be done in STANDARD mode only (not in US).
Enter menu: Maintenance/Service/Adjustment/Prod, press the Edit button and select STANDARD in the US/STANDARD list. Press the Valid button.

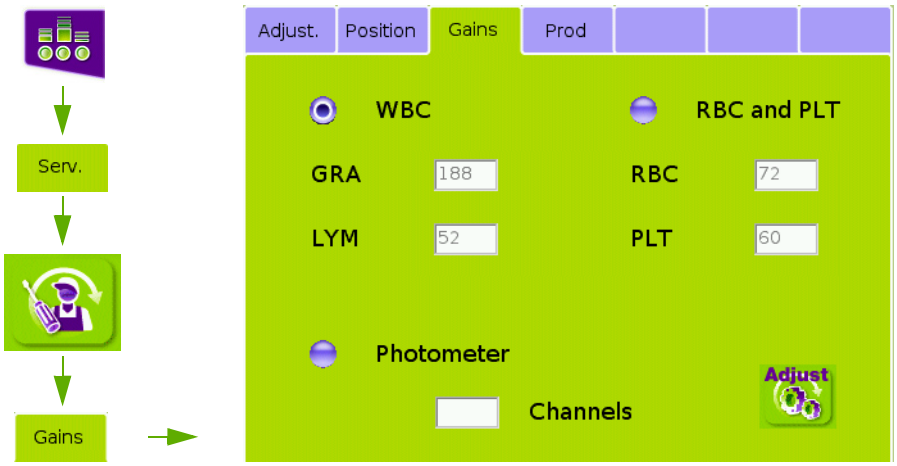
8.1. LYM

- Put the LYM latex on a Vortex during 1 minute or shake thoroughly.

As the WBC gain is a factory adjustment, it is mandatory not to readjust it without taking the following precautions:

- **Carry out previously an autoconcentrated cleaning to make sure of the cleanliness of the WBC counting circuit (If necessary clean the WBC chamber aperture).**
- **Do not operate gain adjustment as long as the Lym. and Gran. values are not stable.**
- **Make sure the Latex has been thoroughly mixed before.**

- Run a blank cycle to check the cleanliness of the instrument.
- Access to the «Gains» menu: Maintenance/Service/Adjustments/Gains and select WBC.



- Press the «Adjust» button.
- When the message «Close the door or push the trigger to start» appears:
  - ABX Micros ES60 OT: Present the LYM vial of Latex to the open probe and press the sampling bar located behind the sampling needle.
  - ABX Micros ES60 CT: Put the LYM latex vial into the tube holder position and close the door of the piercing mechanism.
  An analysis cycle starts
- During the cycle measuring phasis, the Lymphocyte and Granulocyte volumes are displayed every 3 seconds. Wait for several results to be displayed and check the stability of both values.
- Do not consider here the GRA value.

It is mandatory not to operate the gain adjustment as long as the Lym and Gra values are not stable.

- After one minute, the last volume value displayed on the screen is printed out as well as the WBC histogram.
- Check that this printed values corresponds to the following target values:
  LYM = 52 +/-1 (74+/-1 on ABX Micros ESV60)
- If not, rerun a «WBC» gain cycle after having previously mixed the latex vial again and, by means of R74, adjust the volume to the target values during the measuring phasis.

The «Edit» button allows the technician to change the latex target values if the latex run on the instrument is different from the latex recommended above.

8.2. GRA

When the LYM gain is correctly adjusted, follow the same procedure to check the GRA gain:

- When the message «Close the door or push the trigger to start» appears:
  - ABX Micros ES60 OT: Present the GRA vial of Latex to the open probe and press the sampling bar located behind the sampling needle.
  - ABX Micros ES60 CT: Put the GRA latex vial into the tube holder and close the door of the piercing mechanism.
  An analysis cycle starts
- During the cycle measuring phasis, the Lymphocyte and Granulocyte volumes are displayed every 3 seconds.
- Wait for several results to be displayed and check the stability of both values.
- Do not consider here the LYM value.
- After one minute, the last volume value displayed on the screen is printed out as well as the WBC histogram.
- Check that this printed values corresponds to the following target values:
  GRA = 188 +/-2 (222+/-5 on ABX Micros ESV60)
- If not, re-adjust LYM gain with the LYM latex.

9. RBC/PLT gain adjustment

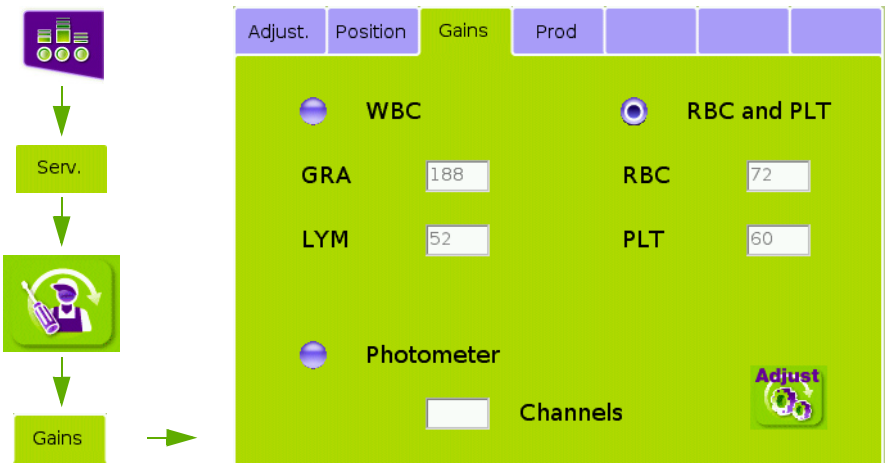
The gain adjustment must be done in STANDARD mode only (not in US).
Enter menu: Maintenance/Service/Adjustment/Prod, press the Edit button and select STANDARD in the US/STANDARD list. Press the Valid button.

- Put the RBC/PLT latex on a Vortex during 1 minute or shake thoroughly.

As the RBC/PLT gain is a factory adjustment, it is mandatory not to readjust it without taking the following precautions:

- **Carry out previously an autoconcentrated cleaning to make sure of the cleanliness of the RBC/PLT counting circuit (If necessary clean the RBC/PLT chamber aperture).**
- **Do not operate gain adjustment as long as the RBC and PLT values are not stable.**
- **Make sure the Latex has been thoroughly mixed before.**

- Run a blank cycle to check the cleanliness of the instrument.
- Enter: Maintenance\Service\Adjustments\Gains and select RBC and PLT.



- Press the «Adjust» button.
- When the message «Close the door or push the trigger to start» appears:
  - ABX Micros ES60 OT: Present the RBC/PLT vial of Latex to the open probe and press the sampling bar located behind the sampling needle.
  - ABX Micros ES60 CT: Put the RBC/PLT latex vial into the tube holder position and close the door of the piercing mechanism.
  An analysis cycle starts

- During the cycle measuring phasis, the RBC and PLT volumes are displayed every 3 seconds. Wait for several results to be displayed and check the stability of both values.

It is mandatory not to operate the gain adjustment as long as the RBC and PLT values are not stable.

- After one minute, the last volume value displayed on the screen is printed out as well as the RBC and PLT histograms, and the CBC's results.
- Check that this printed values corresponds to the following target values:
  RBC = 72 +/-1
  PLT = 60 +/-1
- If not, rerun a «RBC and PLT» gain cycle after having previously mixed the latex vial again and adjust the volume to the target values during the measuring phasis by means of following potentiometers:
  RBC gain with **R81**
  PLT gain with **R87**

The «Edit» button allows the technician to change the latex target values if the latex run on the instrument is different from the latex recommended above.

10. Summary adjustment table

Adjustment	Test point	Ground	Potentiometer	Target value	
				ABX Micros ES60	ABX Micros ESV60
WBC threshold	TP10	TP31	R68	280 mV +/-7	826 mV +/-7
WBC gain (latex)			R74	LYM = 52 +/-1 GRA = 188 +/-2	LYM = 74 +/-1 GRA = 222 +/-5
RBC threshold	TP13	TP31	R75	400 mV +/-7	350 mV +/-7
RBC gain (latex)			R81	72 +/-1	
PLT threshold	TP16	TP31	R82	180 mV +/-3	
PLT gain (latex)			R87	60 +/-1	
Vacuum syringe motor	TP36	TP31	R195	2.5V +/- 0.05	
Liquid syringe motor	TP35	TP31	R186	2.5V +/- 0.05	
Carriage motor	TP37	TP31	R177	1.5V +/- 0.05	
Needle motor	TP38	TP31	R168	1.0V +/- 0.05	
Drain sensor	TP6	TP31	R6	4.5V +/- 0.3 on air < 1V on liquid	
Power supply (check)	TP20	TP31	No adjustment	-12 V +/- 0.5	
	TP21	TP31	No adjustment	+12 V +/- 0.4	
	TP22	TP31	No adjustment	+24 V +2.5/- 1	
	TP21	TP31	No adjustment	+5 V +/- 0.2	
HGB photometer			R97	According to the room temperature: See "7. HGB photometer adjustment, page 6"	
Aperture voltage (check)	TP19	TP31	No adjustment	60V -1.5/+2.8	

ABX Micros ES60/ESV60

RAS524A

Vacuum check & adjustment

- Concerns
  - Vacuum check and adjustment
- Required tools
  - Barflex
- Required products
  - None
- Intervention time
  - 0 h 15
- Frequency
  - On request
- Specific kit or consumables
  - None

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

Target value: - 200 mbar +/- 10

- Access to the «Adjust.» menu: Maintenance/Service/Adjustments/Adjust. and select «Pressure».

- Click the «Start cycle» button, the following message appears:
  - Disconnect the tube from the wacuum/waste syringe coming from the valve «8».

- Follow the instructions given on the screen: (disconnect the tubing and plug a Barflex on air syringe).
- Press the «Valid» button: the piston raises in order to create a vacuum in the syringe body.
- Check the stability of the vacuum during 30 seconds: the vacuum drop must be ≤ 2mbar.
- If the value is not stable:
  - Check the quality of the vacuum syringe O'ring (P/n: FAA017A) and replace it if dirty or damaged (see RAS521: Yearly maintenance).
  - Check the correct greasing of this O'ring (see RAN199A technical note).
  - Check the tubing watertightness, replace them if too loosy.
  - Start this procedure again.
- If the value is stable but not correct (-200 mB +/-10):
  - Press the «Edit» button.
  - Change the value: decrease the value to reduce vacuum or increase the value to augment the vacuum.
  - Press the «Valid» button.
- Check the vacuum again.
- Reconnect the tube.
- Press the «Valid» button.

ABX Micros ES60/ESV60

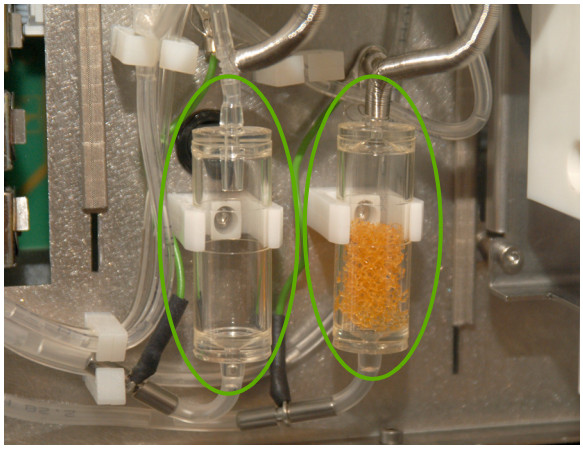
RAS525A

Bubbling check & adjustment

- Concerns
  - Bubbling check and adjustment
- Required tools
  - None
- Required products
  - None
- Intervention time
  - 15 minutes
- Frequency
  - On request
- Specific kit or consumables
  - None

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

- An overflow protection tank is installed on the drain circuit of each chamber. This one prevents from polluted liquid to overflow during bubbling phasis.



- Access to the «Adjust.» menu: Maintenance/Service/Adjustments/Adjust and select «Bubbling»..

- Press the «Check» button, the following message appears:
  - Please close tube holder door and valid to continue (CT model only)
- Close the tube holder and press the «Valid» button.
- The bubbling check cycle starts.
- Two bubblings are adjustable:
  - «BUBBLING 1» is the first dilution (WBC/HGB chamber) bubbling value.
  - «BUBBLING 2» is the second dilution (WBC/HGB chamber + lyse) value and RBC chamber bubbling value.
- Both values correspond to a number of steps carried out by the waste/vacuum syringe.
  Default values are:
  - BUBBLING 1: 190
  - BUBBLING 2: 80

These values are factory adjusted (and may be different from the default values shown above) and should be modified only when hematologic erroneous results are given by the instument. If values are too important, liquid overflows can occur or if bubbling is too low, homogeneity of the dilution can be affected.
Ranges:
- **150 < BUBBLING 1 < 200**
- **60 < BUBBLING 2 < 120**

- To modify the bubbling values, press the «Edit» button and type in new step value.
- Start this procedure again to check the bubbling.

ABX Micros ES60/ESV60

RAS526A

Thermic adjustment

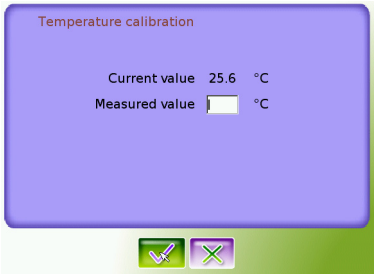
- Concerns
  - Temperature sensor calibration
- Required tools
  - Thermometer
- Required products
  - None
- Intervention time
  - 0 h 15
- Frequency
  - On request
- Specific kit or consumables
  - None

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

Temperature adjustment must be done 20 minutes at least after the instrument has been switched on. This adjustment must be run as quickly as possible.

- Plunge a thermometer in the RBC chamber.
- Access to the «Adjust.» menu: Maintenance/Service/Adjustments/Adjust. and select «Temperature».

- Press the «Adjust» button.
- Press «Valid» on next screen (Plunge a thermometer in the RBC chamber), a reagent prime cycle starts.
- At the end of the prime cycle, the following screen appears.



- Type in the value read on the thermometer in the «Calibration measure» window then press the «Valid» button.
- Press again the «Adjust» button.
- At the end of the new reagent prime cycle, check that:
  Temperature value displayed on the screen = temperature value read on the thermometer +/-2°C

- This adjustment has a direct influence on the LMG results.

ABX Micros ES60/ESV60

RAS527A

Needle & carriage adjustment

- Concerns
  - Needle & carriage position check and adjustment
- Required tools
  - Hexagonal keys
  - GBC218A tool
- Required products
  - None
- Intervention time
  - 30 mn
- Frequency
  - On request
- Specific kit or consumables
  - None

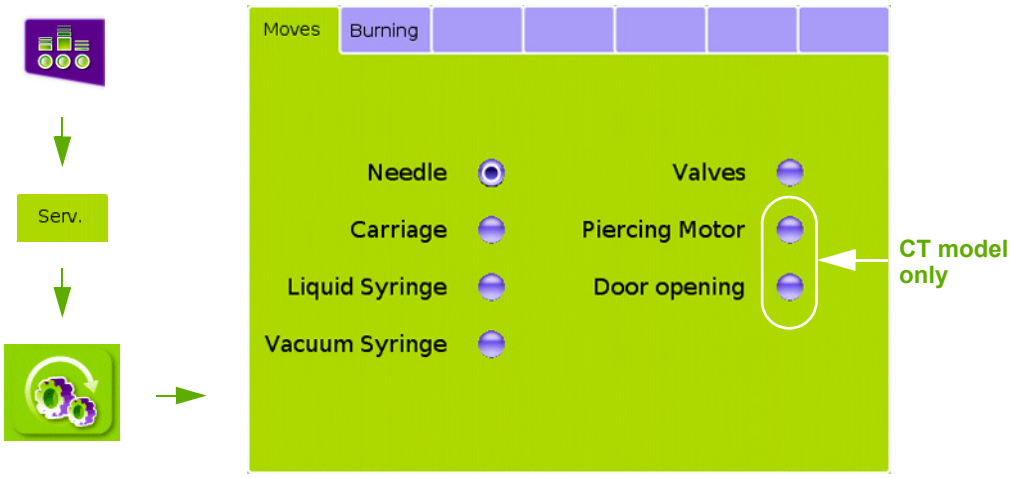
Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Screen description:

1.1. Moves screen

1.1.1. Sub assembly movements check:

- This screen allows to check the different moves of the sub assemblies.
- Access to the «Moves» menu: Maintenance/Service/Mechanical Cycles/Moves:

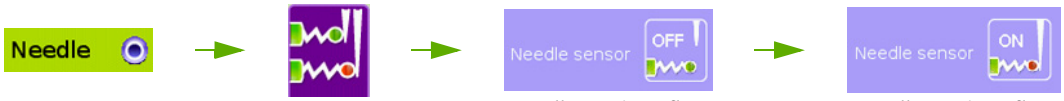


- «Start cyle» button to launch the selected movement:

1.1.2. Needle & Carriage Sensors check:

This function allows to check the needle and carriage sensor functioning.
Wait a few seconds to check the change of status.

- Needle sensor:
  - In the «Moves» menu select «Needle» and press the «Needle Sensor» button.
  - Manually move the needle carriage (up & down), check the Needle button status:



Needle carriage flag in the sensor

Needle carriage flag out of the sensor

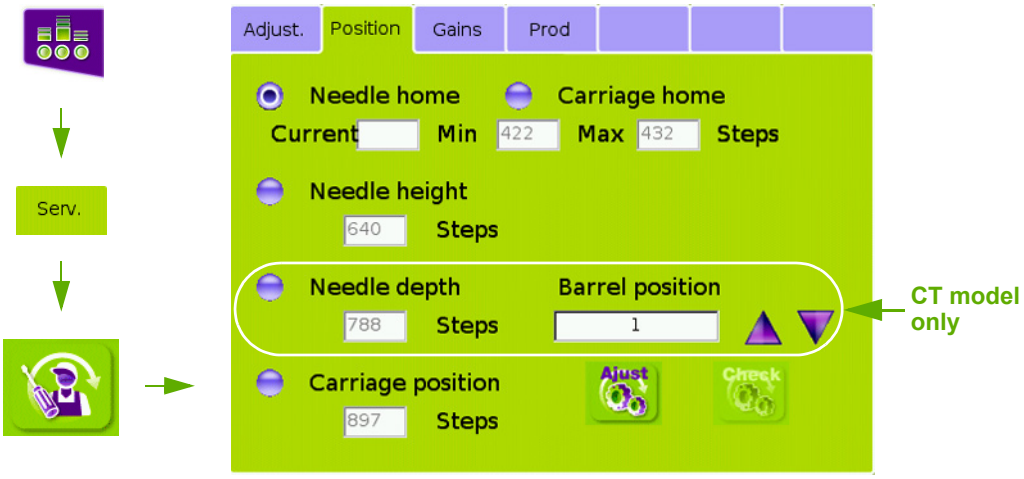
- Carriage sensor:
  - In the «Moves» menu select «Carriage» and press the «Carriage Sensor» button.
  - Manually move the needle carriage (up & down), check the Carriage button status:

Carriage flag in the sensor

Carriage flag out of the sensor

1.2. Position screen

- This screen allows the adjustment of the needle and carriage positions.
- Access to the «Position» menu: Maintenance/Service/Adjustments/Position:



- Use the «Check» button to launch the selected position (except for needle home):

- Use the «Adjust» button to adjust the selected position:

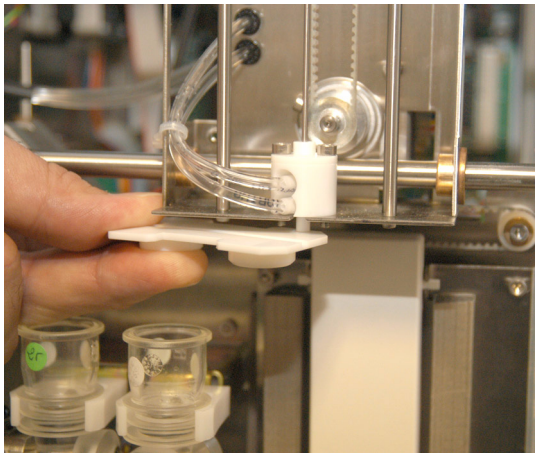
- Adjustments are described thereafter.

2. Needle home adjustment

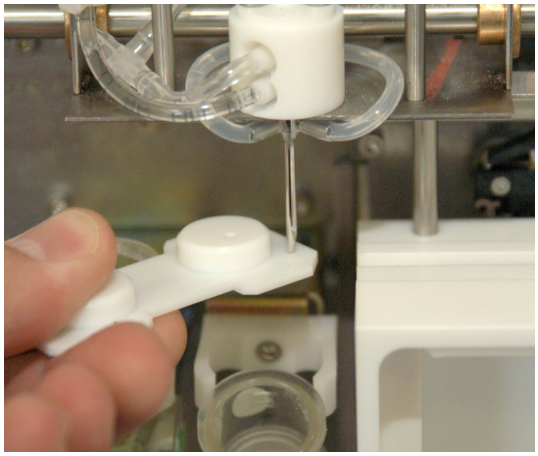
If the needle detector has been replaced by a new one or dismantled for any reason, it is mandatory to re-position it at the right height. Proceed as following:

- Enter: Maintenance\Service\Adjustments\Position and select «Needle home».
- Press the «Adjust» button and follow the instructions on the screen:
- Install the piece of plastic underneath the needle rinsing block.

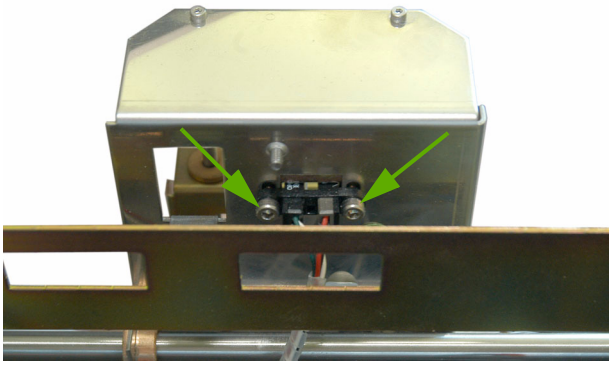
OT model



CT model



- Push the sampling needle downward until it stops against the piece of plastic and press the «Valid» button in order to raise the needle back in its upper position.
- The current number of steps, the mini and maxi values are displayed.
- If the current value is out of ranges, adjust the Needle Home sensor position as follow:
  For a current number of steps out of ranges, unloosen the 2 cell fixation screws and gently move the sensor:
  - upward if the current value is too low
  - downward if the current value is too high.



Tighten the screws and rerun a «Needle sensor» cycle. Check that the current value is correct.

- **10 steps correspond to around 1 mm.**
- **Ranges:**
  - ABX Micros ES60 CT: 422 ≤ current value ≤ 432
  - ABX Micros ES60 OT: 65 ≤ current value ≤ 75

3. Carriage home adjustment (CT model only)

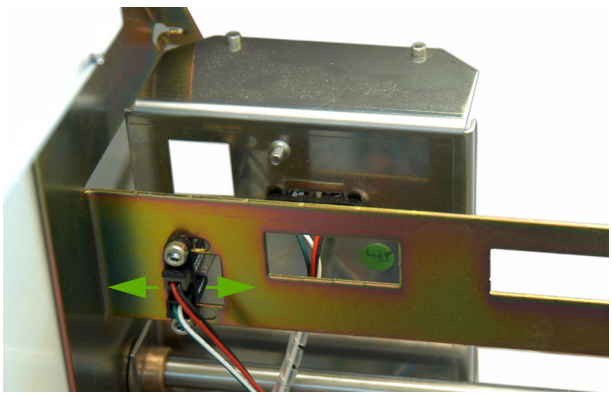
3.1. Check

- Enter: Maintenance\Service\Adjustments\Position and select «Carriage home».
- Turn the tube holder in order to use the smaller hole (needle position 2).
- CLose the tube holder and press the «Check» button.
- The carriage moves over the tube holder, the tube holder moves up and the sampling needle gets down.
- Check the centring of the sampling needle during this cycle.

3.2. Adjustment:

- Enter: Maintenance\Service\Adjustments\Position and select «Carriage home».
- Turn the tube holder in order to use the smaller hole (needle position 2).
- CLose the tube holder.
- Manually move the carriage over the tube holder.
- Push the sampling needle donward into the smaller hole of the tube holder.
- Slowly move the carriage to center the needle in the hole.

- Press the «Adjust.» button.
- The needle raises up, the carriage comes back to its initial position, then the value is displayed.
- This value must be recorded between 1 and 50.
- Valid this value or cancel to keep the previous one.
- Check the position again (see above).
- For a current value of steps out of range, unloosen the 2 screws and gently move the sensor:
  - towards the right if the current value is too low.
  - towards the left if the current value is too high.



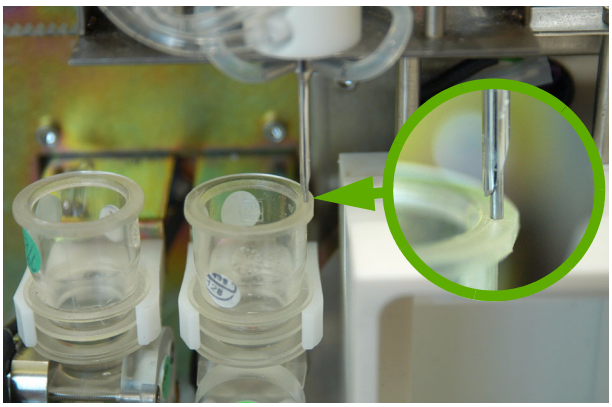
It is also possible to enter the value by pressing the «Edit» button, and typing in the value.

4. Needle position adjustment

4.1. Needle height adjustment

When replacing a needle, it is mandatory to adjust the height of the needle in the chambers. Proceed as follows:

- Remove the WBC/HGB chamber cover.
- Enter: Maintenance\Service\Adjustments\Position and select «Needle height».
- Press the «Adjust.» button and follow the instructions on the screen.
- Manually move the carriage over the edge of the RBC chamber.
- Manually pull down the needle until it comes into contact with the edge of the RBC chamber.

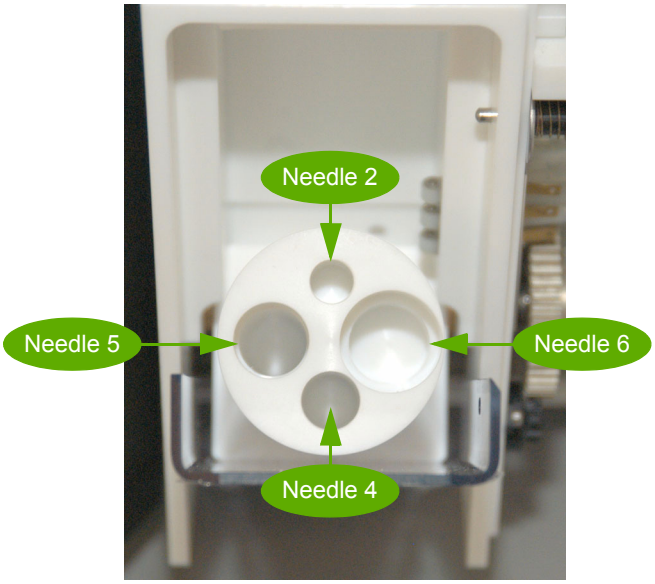


- Press the «Valid» button: the needle moves up to the initial position: the value is displayed.
- Valid this value or cancel to keep the previous one.
- Press the «Check» button: the needle moves into the WBC chamber: check that the needle does not touch the bottom of the chamber or the electrode.
- Press the «Valid» button, the needle moves into the RBC chamber: check that the needle does not touch the bottom of the chamber or the electrode.

It is also possible to enter the value by pressing the «Edit» button, and typing in the value.

4.2. Needle depth adjustment (CT model only)

- Enter: Maintenance\Service\Adjustments\Position and select «Needle depth».
- Turn the tube holder to one of the four positions.

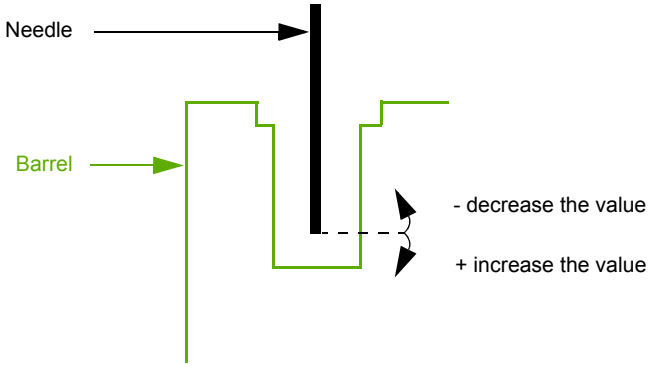


- Press the «Adjust» button.
- Close the tube holder and press the «Valid» button.
- The sampler assy moves to the upper position (exept in «Needle 6» position).
- Manually pull down the needle until it comes into contact with the bottom of the required sampling position.
- Press the «Valid» button.
- The sampler assy comes back to the initial position and the sampler door is opened.

The ABX Micros ES60 CT adjusts automatically the needle depth whatever the tube holder position can be.

- A message is displayed and gives the measured value for the detected position.
- Press the «Valid» button to use it or the «Cancel» button to keep the previous one.
- Turn the tube holder to another needle position and carry out the same procedure to adjust the needle depth.

- It is also possible to directly enter the required number of steps for each sampling position. Proceed as follow:
  - Press the «Edit button».
  - Select the «Barrel position» using the arrows, the corresponding number of steps is displayed in the «Needle depth» window.
  - Enter the new value: increase the number of steps to move the needle deeper or decrease the value to raise the needle.

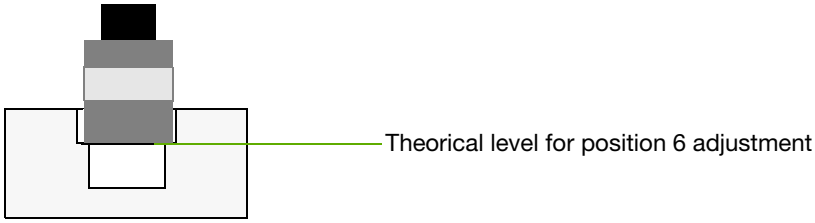


- Confirm the new value by pressing the «Valid» button or cancel.
- The minimum and maximum step values are as follow:

Needle pos.	Number of steps		
	Mini	Default	Maxi
1	1	790	1100
2	1	660	1100
3	1	890	1100
4	1	960	1100
5	1	1040	1100
6	1	920	1100

Specific adjustment for control blood position

If the needle touches the bottom of the control vial, or if the control blood vial is not well emptied, perform the following adjustment:

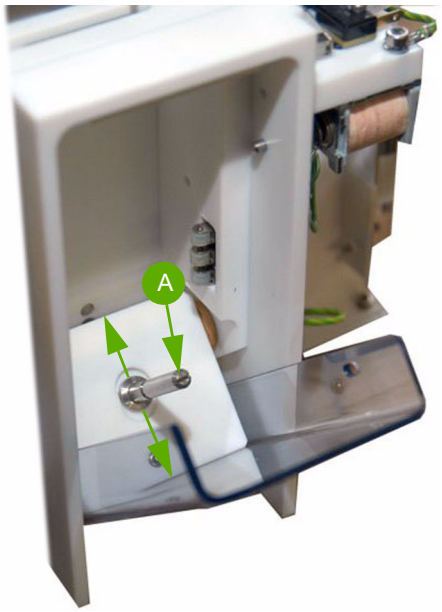


- Enter: Maintenance\Service\Adjustments\Position and select «Needle depth».
- Select «6» for barrel position.
- Install an empty vial in position 6.
- Press the «Adjust» button.
- Close the tube holder.
- Manually move the needle down, inside the vial, then press the «Valid» button: the needle moves up and the value is displayed.
- Press the «Valid» button to confirm the new value, or the «Cancel» button to keep the previous one.
- For the bottom vial thickness, it is necessarry to add 20 steps to the new value.
- Press the «Edit» button, and enter the value+20 steps for Neddle depth.
- Press the «Valid» button.
- Select «Needle depth» again, and press the «Check» button.
- The needle moves down into the vial, then it moves up to the home position. Check that the needle do not touch the bottom of the vial.

5. Barrel front/rear ajustment

This adjustment is factory made but it is possible, if necessary, to re adjust it.

- Loosen the Tube holder axis (A) then move it forward or backward to center the needle in the hole of the tube holder.
- Tighten the axis

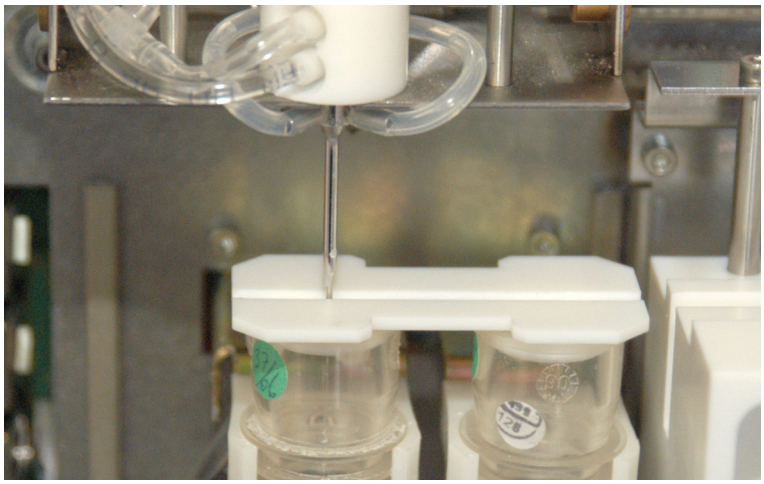


6. Carriage position adjustment

6.1. Adjustment

This adjustment is the same for a ABX Micros ES60 CT and for a ABX Micros ES60 OT (CT model on pictures).
The needle position in the WBC chamber can be adjusted as follows:

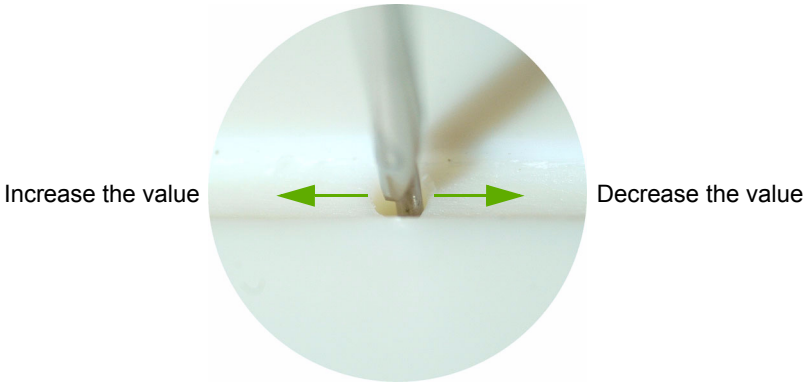
- Enter: Maintenance\Service\Adjustments\Position and select «Carriage position».
- Press the «Adjust» button and follow the instructions on the screen.
- Position the tool (P/N: GBC218A) over the RBC and WBC chambers.
- Manually lower the needle into the WBC chamber.



- Validate to raise the needle back to its upper position: the value is displayed.
- Valid this value or cancel to keep the previous one.

6.2. Check

- Enter: Maintenance\Service\Adjustments\Position and select «Carriage position».
- Position the tool (P/N: GBC218A) over the RBC and WBC chambers.
- Press the «Check» button and follow the instructions on the screen.
- The needle comes down to the WBC chamber: check that the needle is centered in the hole of the tool.
- Press the «Valid» button.
- If the needle is not well centered in the hole, start the «Carriage position adjustment again, or press the «Edit button and modify the value as follow:
  - If the needle goes too far on the right, add 1 step to the current value for 0.1 mm.
  - If the needle is too much on the left, decrease the current value of 1 step for 0.1 mm.



- Check the position again.

ABX Micros ES60/ESV60

RAS528A

Instrument decontamination

- Concerns
  - Instrument decontamination before maintenance operation in the following cases:
    - Instrument move out of the biologic risks area
    - Maintenance intervention on contaminate suspected assemblies.
- Required tools
  - Hexagonal keys
  - Clamps
  - Flat screwdriver
  - Torx keys
- Required products
  - Fungicidal, bactericidal, virus killing detergent spray, non corrosive for metals, non plastic altering
  - Bleach solution 9°Cl
  - Deionize water
  - Protection gloves
  - Absorbant paper
  - Distilled water
- Intervention time
  - 1h35
- Frequency
  - On request
- Specific kit or consumables
  - Drain and rinse kit XEA349AS for Pack equipped instrument

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

1. Preliminary (20 min.)

- Switch on the instrument and run a «Startup» cycle.
- Run an «Automatic cleaning» cycle:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «Automatic cleaning» and press the «Start cycle» button.
- Switch off the instrument, remove the supply cable and open the instrument cover.
- Spray the bactericidal cleaner on all assemblies that may provide biologic risks and wait for 10 minutes (assemblies in contact with the operator such as instrument cover, tube holder, keyboard, start key, sampling needle neighboured assemblies...

2. Manual decontamination (20 min.)

- Remove the WBC/HGB chamber cover.
- Dilute the 9°Cl bleach to 1 part of bleach for 4 of deionize water (1/5).
- Instrument environment must be cleaned and decontaminated.
- No sponge, nor cloth must be used. Only absorbant paper, thrown after use, in contamination bins, can be employed. For small or weak assemblies use accurate drier papers.
- All assemblies that is suspected to have contact with biologic product must be disinfected with the diluted bleach (the stainless steel must bleached below 30°Celsius).
- Blood stains or salt marks must be cleaned with spray detergent first.

Concerned assemblies:
- Outer surfaces of the instrument (perpex, covers, touchscreen, reagent locations...)
- Keyboards
- Waste connector plug
- Liquid valve push
- Needle neighboured assemblies
- Tube holder assy
- Overflow trays

- Reinstall all the assemblies and setup the instrument in its initial configuration.

3. Analysis circuit decontamination (30 min.)

3.1. Bottle version

- Prepair 1 bottle containing 1/2 litre of bleach diluted to 1 part of bleach for 9 parts of deionize water (1/10).
- Prepair 1 bottle containing 1/2 litre of distilled water.
- Switch on the instrument.
- Replace the reagent bottles by the diluted bleach bottle.
- Run a «All reagents priming» cycle:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button.
- Fill a sample tube with diluted bleach to 1 part of bleach for 4 of deionize water (1/5).
- Run 15 analysis cycles:

1- for a ABX Micros ES60 CT:
  - Enter: Maintenance\Service\Mechanical cycles\Burning
  - Select «Burning» and type in «15» in the «Number of burning cycles» window.
  - Press the «Start cycle» button.

2- For a ABX Micros ES60 OT
  - Manually run 15 cycles.

- Leave the instrument operating until it stops.

3.2. Pack version

- Prepair 1 bottle containing 1/2 litre of bleach diluted to 1 part of bleach for 9 parts of deionize water (1/10).
- Prepair 1 bottle containing 1/2 litre of distilled water.
- Prepair one empty bottle of 1 litre for waste.
- Switch on the instrument.
- Replace the reagent pack by the Drain & Rinse kit (XEA349AS).
- Plunge the straws into the diluted bleach bottle and the waste tube into the empty waste bottle.
- Run one «All reagents priming» cycle:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button.
- Fill a sample tube with diluted bleach to 1 part of bleach for 4 of deionize water (1/5).
- Run 15 analysis cycles:

1- for a ABX Micros ES60 CT:
  - Enter: Maintenance\Service\Mechanical cycles\Burning
  - Select «Burning» and type in «15» in the «Number of burning cycles» window.
  - Press the «Start cycle» button.

2- For a ABX Micros ES60 OT
  - Manually run 15 cycles.

- Leave the instrument operating until it stops.

4. Drain and rinse (30 min.)

- Remove the 3 reagent straws from the bottle containing the diluted bleach.
- Wrap the straws in absorbant paper.
- Run 2 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button twice.
- The bleach is drained.
- Replace the diluted bleach by the distilled water bottle and plunge the straws in distilled water.
- Run 6 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button 6 times.
- Remove the 3 reagent straws from the distilled water (wrap the straws in absorbant paper).
- Run 2 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button twice.
- The distilled water is drained.
- Run a «Standby» cycle.
- Re-install the reagent bottles and the straws (or re-install the Pack instead of the Drain & Rinse kit).
- Run one «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button.
- Switch off the instrument.
- Close the instrument cover.

ABX Micros ES60/ESV60

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Drain and rinse

- Concerns
  - Instrument rinse and drain before:
    - an extended shutdown
    - an instrument removing
- Required tools
  - None
- Required products
  - Distilled water
- Intervention time
  - 0 h 35
- Frequency
  - On request
- Specific kit or consumables
  - Drain and rinse kit XEA349AS for Pack equipped instrument.

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

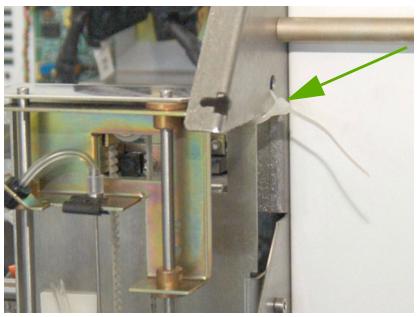
1. Preliminary (5 min.)

- Switch on the instrument and run a «Startup» cycle.
- Run an «Automatic cleaning» cycle:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «Automatic cleaning» and press the «Start cycle» button.

2. Drain and rinse (30 min.)

2.1. Bottle version

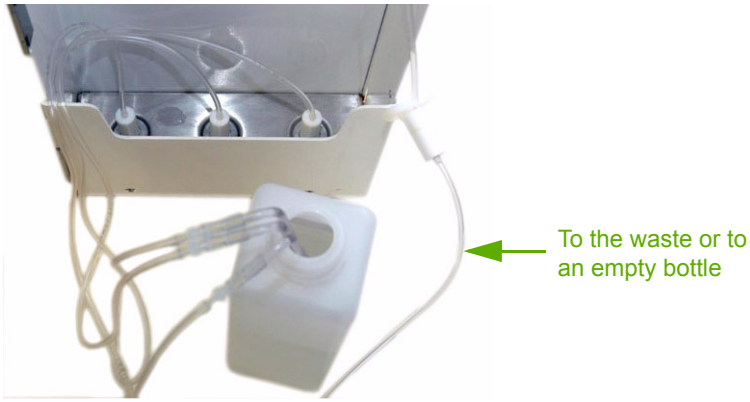
- Prepair one bottle containing 1/2 litre of distilled water.
- Remove the 3 reagent straws from the bottles and container.
- Wrap the straws in absorbant paper.
- Run 2 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button twice.
- The reagents are drained.
- Replace the reagent bottles by the distilled water bottle and plunge the straws into distilled water.
- Run 6 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button 6 times.
- Remove the 3 reagent straws from the distilled water (wrap the straws in absorbant paper).
- Run 2 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button twice.
- The distilled water is drained.
- Run a «Standby» cycle.
- Check that the diluent syringe piston is in park position (upper position).
- Remove the distilled water and install the installation kit box instead.
- Install a tyrap in order to block the needle carriage.



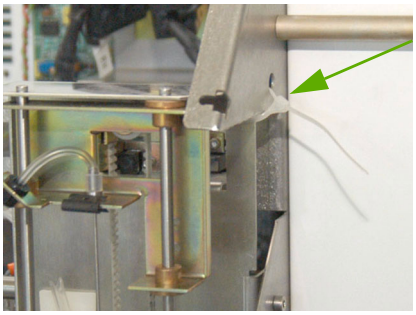
- Clean the reagent stains from the instrument.
- Put an adhesive tape on the tube holder door (ABX Micros ES60 CT) to prevent from opening it.
- Switch the instrument off.

2.2. Pack version

- Prepair one bottle containing 1/2 litre of distilled water.
- Prepair one empty bottle of 1/2 litre for waste.
- Install the «Drain and rinse kit», XEA349AS instead of the Reagent pack.
- Plunge the waste tube into the empty waste bottle.
- Wrap the 3 reagent straws in absorbant paper.
- Run 2 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button twice.
- The reagents are drained.
- Plunge the straws into distilled water.



- Run 6 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button 6 times.
- Remove the 3 reagent straws from the distilled water (wrap the straws in absorbant paper).
- Run 2 «All reagents priming» cycles:
  - Enter: Maintenance\Service\Customer Services\ Hydrau.
  - Select «All reagents priming» and press the «Start cycle» button twice.
- The distilled water is drained.
- Run a Standby cycle.
- Check that the diluent syringe piston is in park position (upper position).
- Remove the Drain and rinse kit.
- Switch off the instrument.
- Install a tyrap in order to block the needle carriage.



- Clean the reagent stains from the instrument.
- Put an adhesive tape on the tube holder door (ABX Micros ES60 CT) to prevent from opening it.
- Switch the instrument off.
- Install the installation kit box on the pack location.

ABX Micros ES60/ESV60

RAS530A

Check up after intervention

- Concerns

  Check up and control of the instrument accuracy:
  - Repeatability
  - Control
  - Calibration

- Required tools
  - None

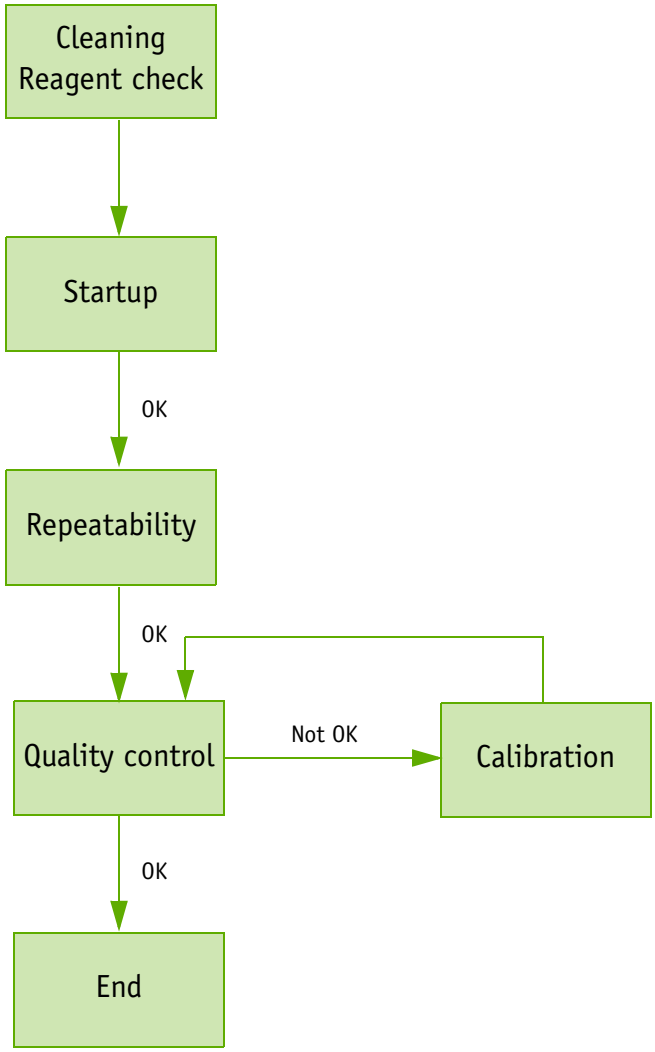
- Required products
  - Fresh and normal blood sample
  - Control blood
  - Calibration blood sample

- Intervention time
  - 1h

- Frequency
  - on request

- Specific kit or consumables
  - None

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.



1. Preleminary

- **This procedure must be perform on a clean instrument.**
- **If the instrument is suspected not to be perfectly clean, run an «Automatic cleaning» cycle:**

- Enter: Maintenance\Service\Customer Services\ Hydrau.
- Select «Automatic cleaning» and press the «Start cycle» button.

- Run a «Startup» cycle and ensure the results are correct.

2. Repeatability

- Based on 20 consecutive analyses without alarm from one fresh and normal blood sample.
- Run 20 consecutive analyses
- Control to have variation coefficients (CV) within the following acceptable limits:

Parameters	CV	Measurement range	
		From	to
WBC	< 2.5 %	4.75	12.50 x 10^3/mm^3
RBC	< 2 %	4.00	5.00 x 10^6/mm^6
HGB	< 1.7 %	12.0	16.6 g/dL
HCT	< 2 %	37.0	50.0 %
PLT	< 5 %	150	355 x 10^3/mm^3

$\overline{X}$: Mean
Xi: Measure value
n: Measure number
SD: Standard deviation

$$\overline{X} = \frac{\sum Xi}{n} \qquad SD = \sqrt{\frac{\sum(\overline{X} - Xi)^2}{n-1}}$$

CV is calculated by means of the below formula:

$$CV(\%) = \frac{SD}{\overline{X}} x100$$

3. Control

- Run a Quality Control, as described in the User manual.
- If the results of this Quality Control are within the ranges, this procedure is finished.
- If the results are out of the ranges, run a calibration procedure

4. Calibration

- Run a calibration only if the Control results are out of ranges.
- Refer to the User manuel to run this calibration.

Calibration coefficient ranges

- After any calibration has been performed on the ABX Micros ES60, verify that all parameter calibration coefficients are within their specified ranges, as indicated in this table:

Coefficients of calibration	Minimum	Maximum
WBC	0.89	1.29
RBC	0.73	1.05
HGB	0.83	1.39
HCT	0.87	1.29
PLT	0.99	1.41
MPV	0.75	1.13
RDW	0.75	1.25
PDW	00.75	1.25

ABX Micros ES60/ESV60

RAS543A

OS & software installation

- Concerns
  - Installation of the Operating System and/or the ABX Micros ES60/ESV60 application
- Required tools
  - USB key
  - External keyboard
- Required products
  - None
- Intervention time
  - 20 mn
- Frequency
  - On request
- Specific kit or consumables
  - ABX Micros ES60: XEC071AS
  - ABX Micros ESV60: XEC072AS

or

  - http://www.horiba-abx.com

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

- On a personal computer, from the CD ROM, copy the following files on an empty USB key (32Mo minimum):
  - ARMBSP_SYSTEM_X.X.X (X.X.X.X)
  - NMH_Application_V.X.X.X.X or NMV_Application_V.X.X.X.X

- Connect the USB key, the keyboard and the power supply.

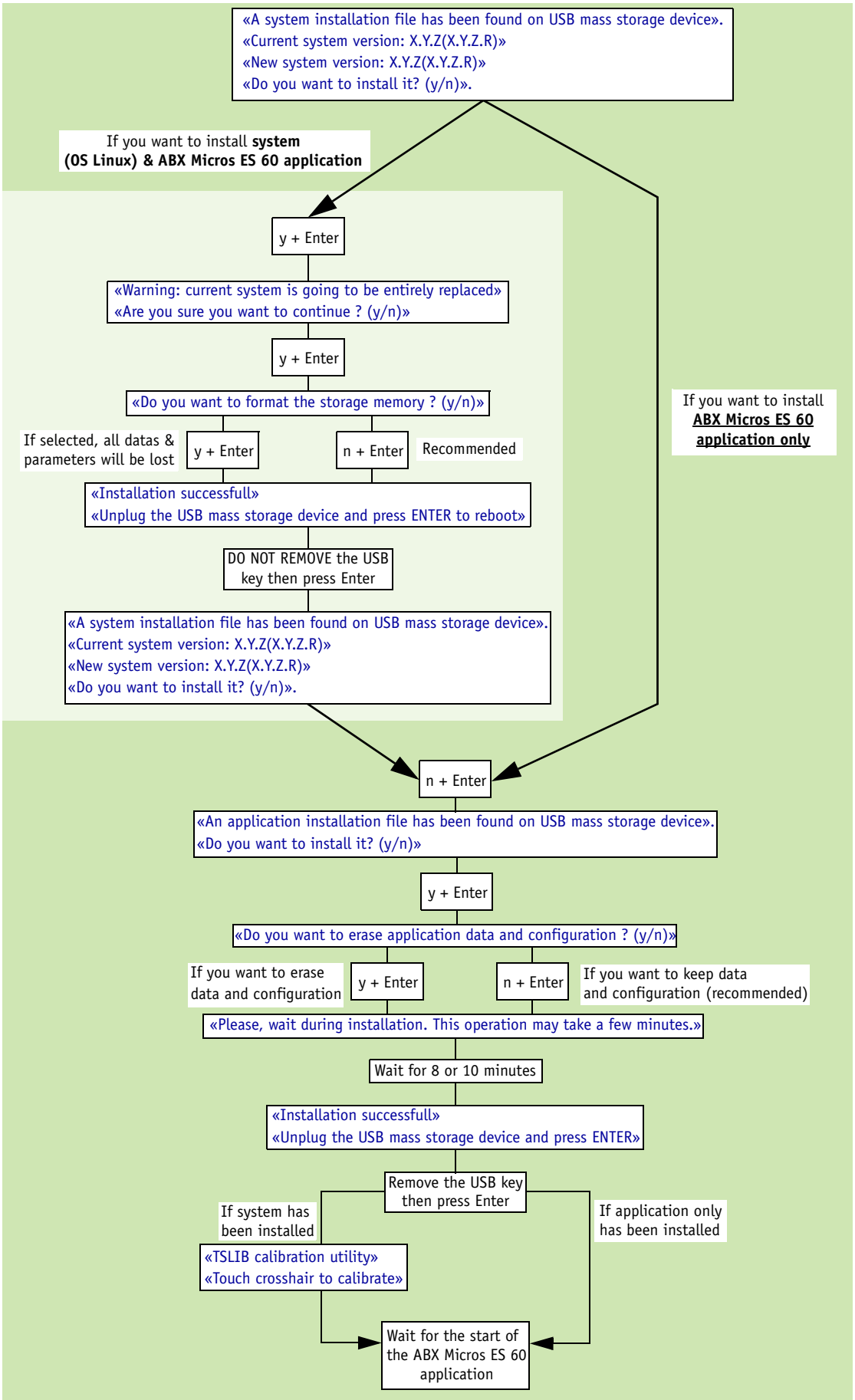
- Turn ON the instrument.

- Follow the diagram on next page to release:

  - The system (OS linux) and the ABX Micros ES60/ESV60 apllication.

or

  - The ABX Micros ES60/ESV60 application only.


«A system installation file has been found on USB mass storage device».
«Current system version: X.Y.Z(X.Y.Z.R)»
«New system version: X.Y.Z(X.Y.Z.R)»
«Do you want to install it? (y/n)».
If you want to install system (OS Linux) & ABX Micros ES 60 application
y + Enter
«Warning: current system is going to be entirely replaced»
«Are you sure you want to continue ? (y/n)»
y + Enter
«Do you want to format the storage memory ? (y/n)»
If selected, all datas & parameters will be lost
y + Enter
n + Enter
Recommended
«Installation successfull»
«Unplug the USB mass storage device and press ENTER to reboot»
DO NOT REMOVE the USB key then press Enter
«A system installation file has been found on USB mass storage device».
«Current system version: X.Y.Z(X.Y.Z.R)»
«New system version: X.Y.Z(X.Y.Z.R)»
«Do you want to install it? (y/n)».
If you want to install ABX Micros ES 60 application only
n + Enter
«An application installation file has been found on USB mass storage device».
«Do you want to install it? (y/n)»
y + Enter
«Do you want to erase application data and configuration ? (y/n)»
If you want to erase data and configuration
y + Enter
n + Enter
If you want to keep data and configuration (recommended)
«Please, wait during installation. This operation may take a few minutes.»
Wait for 8 or 10 minutes
«Installation successfull»
«Unplug the USB mass storage device and press ENTER»
Remove the USB key then press Enter
If system has been installed
«TSLIB calibration utility»
«Touch crosshair to calibrate»
If application only has been installed
Wait for the start of the ABX Micros ES 60 application

ABX Micros ES60/ESV60

RAS544A

Diagnostic tool

- Concerns
  - Enter Serial number -> MAC Adress
  - Test all hardware features
- Required tools
  - External keyboard
- Required products
  - None
- Intervention time
  - 20 mn
- Frequency
  - On request or after SBC9312 board replacement
- Specific kit or consumables
  - XEC027AS: ABX Micros ES60/ESV60 Diagnostic kit

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

The diagnostic kit allows to check the different sub assemblies of the ABX Micros ES60/ESV60.

- Connect the keyboard and the power supply cable.
- Insert the USB key in the front USB port then turn ON the ABX Micros ES60/ESV60.

1. Touchscreen test

- A cross appears on the screen. Press the center of this cross, it will move to the next position. Press the cross for each position.
- The message «Dalle calibrée, vous pouvez lancer les tests*» appears.
  *: «Touchscreen calibrated, you can launch the tests»

If the touchscreen test is failed, it will not allow you to correctly perform the rest of the procedure.
None of the following tests block the rest of the procedure until the end.

- Click the button: «2- SAV».

2. Printer and barcode reader

- The message «Disposez vous d'une imprimante:Interne? Externe?*»
  *: «Have you got a printer: Internal? External?»

and the message «Disposez vous d'un lecteur code barre: Oui Non»** appear
  **: «Have you got a barcode reader: Yes No»?

- Select your printer.
- Declare or not your barcode reader.
- Click the button: «Test suivant*»
  *: «Next»

3. Serial number/MAC adress

- On next screen, enter the ABX Micros ES60/ESV60 number and the day:
  example: Micros n: 7 06 ESO H 00008*
  JOUR: 10 (actual day)

  The MAC adress appears
  example 00:50:C2:58:93:F1
  *: the serial number is located on a label behind the instrument.

- Click the button: «Test suivant*»
  *: «Next»

4. RTC EEPROM test

- On next screen, enter the date and time:
  example: Date: 10 31 2006 (Month, day, year)
  Heure: 10 36 52 (hours, minutes, secondes)
- Click the button: «1- RTC»
- Click the button: «Test suivant*»
  *: «Next»

5. Screen test

◆ Click the button: «1- Demarrer le test de l'ecran»*.
*: «1- Start the screen test».

◆ A black screen appears, check that there is no default (missing pixel, for example).

◆ On next screen : «Avez vous constate des defauts sur l'ecran noir ?»*:
*: «Have you seen some default on the black screen ?»

- If you want to test the black screen again, click the button: «4- Recommencer le test*». The test starts again.
*: «4- Start the test again»

or

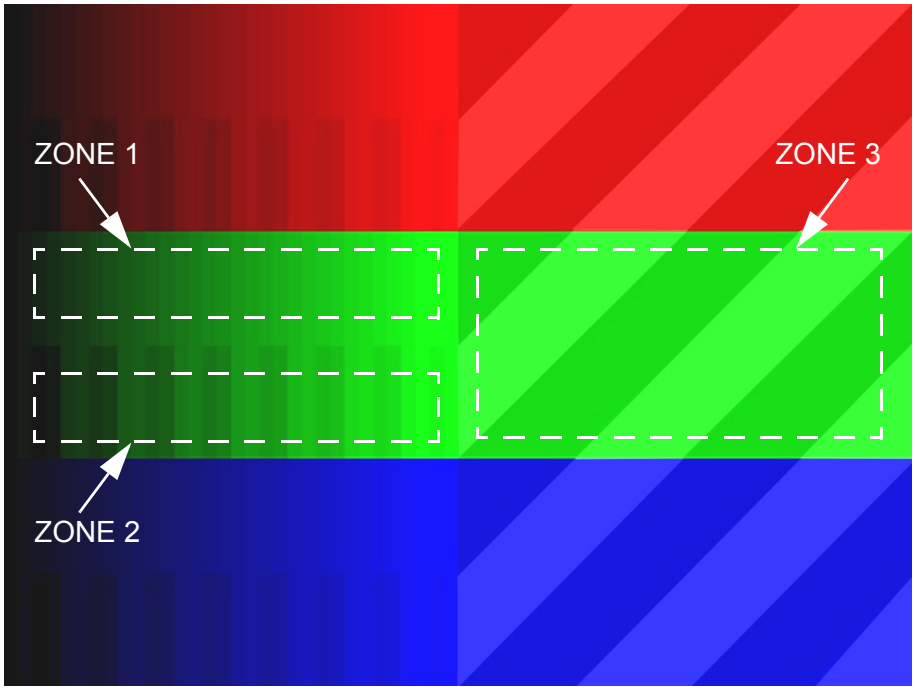
- If you have seen some defaults, click the button: « 2- Oui*».
*: «2- Yes»
The message: «Erreur "test noir" non passe»* is displayed.
Click the «Accepter»**button, the Diagnostic software goes to next test.
*: «Error "black test" failed».
**: «Accept»

or

- If the black screen is ok, click the button: «3- Non*».
*: «3- No»

◆ A red screen appears, then a green, and a blue. Follow the same procedure for those screens.

◆ The following screen appears:



For each color, check the 3 different zones as follow:
- Zone 1: Progressive range from dark to clear.
- Zone 2: Range vertical dark/clear hatches.
- Zone 3: Diagonal dark/clear hatches starting with a dark triangle in the left upper corner.

◆ On next screen : «Avez vous constate des defauts sur l'ecran mire ?»*:
*: «Have you seen some default on the test screen ?»

- If you want to test the screen again, click the button: «4- Recommencer le test*». The test starts again.
*: «4- Start the test again»

or

- If you have seen some defaults, click the button: « 2- Oui*».

*: «2- Yes»
The message: «Erreur "test mire" non passe»* is displayed.
Click the «Accepter»**button, the Diagnostic software goes to next test.
*: «Error "screen test" failed».
**: «Accept»

or
- If the screen is ok, click the button: «3- Non*».
*: «3- No»

◆ On next screen:

- If you want to test the screen again, click the button: «4- Recommencer le test*». The test starts again.
*: «4- Start the test again»

or
- Click the button: «Test suivant*»
*: «Next»

◆ On next screen, click the button: «1- Demarrer le test de luminosite»*
*:»Start the luminosity test»

◆ On next screen : «Avez vous constate un changement de luminosité?»*:
*: «Have you seen a luminosity change?»

- If you want to run the luminosity test again, click the button: «4- Recommencer*». The test starts again.
*: «4- Start again»

or
- If you have not seen a luminosity change, click the button: « 3- Non*».
*: «3- No»
The message: «Erreur: test de luminosite non passe»* is displayed.
Click the «Accepter»**button, the Diagnostic software goes to next test.
*: «Error: luminosity test failed».
**: «Accept»

or
- If you have seen a luminosity change, click the button: «2- Oui*».
*: «2- Yes»

6. Buzzer test

◆ On next screen, click the button: «1- Lancer le test du buzzer*»
*: «Launch the buzzer test»

◆ On next screen: «Avez vous entendu les 3 frequences differentes?»*
*: «Did you heard the 3 different frequencies?»

- If you want to test the buzzer again, click the button: «4- Recommencer*».
*: «Start again»

or
- If you did not correctly heard the buzzer, click the button: «3- Non*».
*: «No»
The message: «Erreur: test du buzzer non valide»* is displayed.
Click the «Accepter»**button, the Diagnostic software goes to next test.
*: «Error: Buzzer test invalid».
**: «Accept»

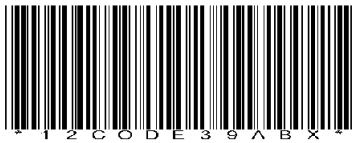
or
- If you heard correctly the buzzer, click the button: «2- Oui*».
*: «Yes»

7. Barcode test

- On next screen, click the button: «1- Demarrer le test code barres»*.
  *: «Start the barcode reader test»

- Wait for the scanner initialization, then pass the following barcodes in front of the barcode reader, at a distance from approximately 10 to 15 cm.

- Check that all the barcodes are correctly read.



CODE 39

Interleaved 2 of 5

CODABAR

CODE 128

ISTB128

- Click the button: «Test suivant*»
  *: «Next»

8. RS232 ports test

- Plug a serial cable (DAC028A) between serial port 1 and serial port 2 at the rear of the instrument.

- Click the button: «1 - Demarrer le test des ports serie»*.
  *: «1- Start the serial port test».

- Click the button: «Test suivant*» when it becomes green.
  *: Next

9. Memory test

- On next screen, if not selected, select «Disk on chip» in the column «Choix utilisateur*»

  *: «User choice»

- Click the button: «1- Test Memoire*».

  *: «1- Memory test»

- Click the button: «Test suivant*» when it becomes green.

  *: Next

10. RTC and EEPROM test

- On next screen, click on «Arreter»*.

  *: «Stop»

  Turn the ABX Micros ES60/ESV60 OFF.

  - Unplug the serial cable (DAC028A) from the serial port 1 & 2 at the rear of the instrument (leave the USB key).

- Turn the ABX Micros ES60/ESV60 ON.

  - The first screen displays the date and time of the instrument when it has been turned off and the date and time after boot.

- Click the button: «Test suivant*»

  *: Next

- In order to test the ethernet connexion, the ABX Micros ES60/ESV60 should be connected to a PC by the mean of an ethernet cross cable on the RJ45 port at the rear of the instrument.

- Enter the IP address (See “IP address:, page 7”) of the test PC, then click on «2- IP fixe».
- Click the button: «Test suivant*»

  *: Next

- If the ABX Micros ES60/ESV60 is not connected, click on «3- Bypass».

11. Printer test

- Click the button: «1- Imprimer resultats»*.

  *: «Print results».

  The results of the test are printed (this will check the printer).

- Check the correct printout of the results:

RAPPORT DU TEST DE SAV

Micros nb 611ESCH82195 valide

MAC : 00:50:C2:58:90:10

Tech:

Nom du test	Resultat du test
1 Touch screen test	ok
2 PS2 port test	ok
3 RTC EEPROM test	ok
4 Screen test	ok
5 Luminosity test	ok
6 Buzzer test	ok
7 Barcode test	ok
8 USB test	non applicable
9 RS232 port test	ok
10 RS232 port 3 test	non applicable
11 SD card test	non applicable
12 Disk on chip	ok
13 SD/IDE test	ok
14 Linux test	non applicable
15 RTC and EEPROM test	ok
16 Ethernet port test	non applicable

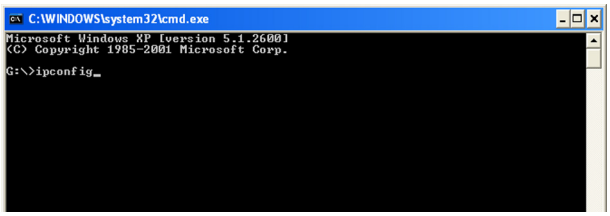
Fin du test: 11/10/2007 - 14:29:00

- ok: test done and passed
- nok: test done, but not passed
- non applicable: test for factory only, or not done

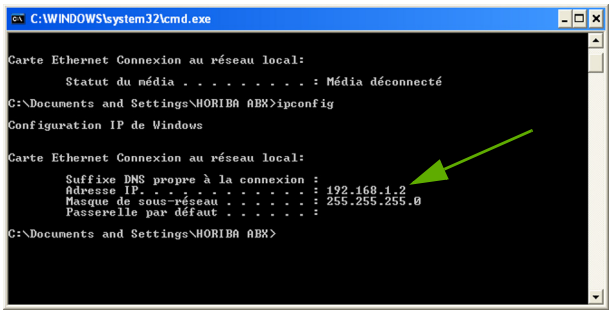
◆ On next screen, click the button «Eteindre le Micros*».
*: Turn off the ABX Micros ES60/ESV60

◆ Remove the USB key.

◆**IP address:**
To know the IP address, the ABX Micros ES60/ESV60 must be connected to a PC and be turned ON. On the PC, click on "Start/Run", enter "cmd" and click on "ok". When the following window appears, enter "ipconfig".



Press on Enter, the IP address is displayed.



ABX Micros ES60/ESV60

RAS545A

Boards replacement

- Concerns
  - Main board, SBC9312 board, USB board and barcode reader board replacement.
- Required tools
  - Hexagonal key
- Required products
  - Backup of the previous parameters (analyser & settings) on a USB key.
- Intervention time
  - 1 h 00
- Frequency
  - On request
- Specific kit or consumables
  - XEC027AS: ABX Micros ES60/ESV60 Diagnostic kit

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

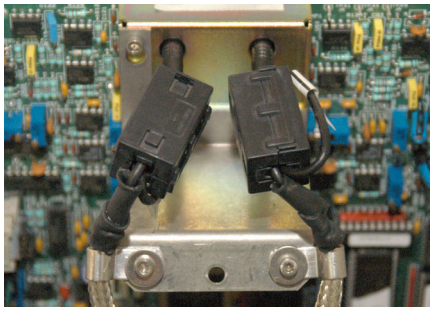
1. Main board

1.1. Preliminary

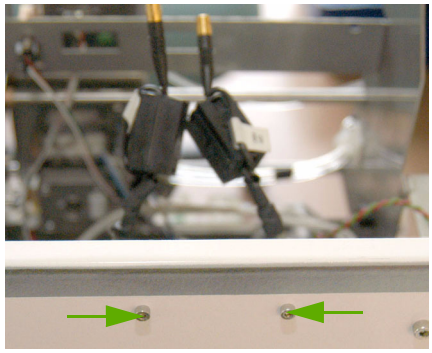
- This board includes:
  - A software EPROM: pneumatical and mechanical cycles...
  - A RAM: stepper motor parameters...

1.2. Dismantling

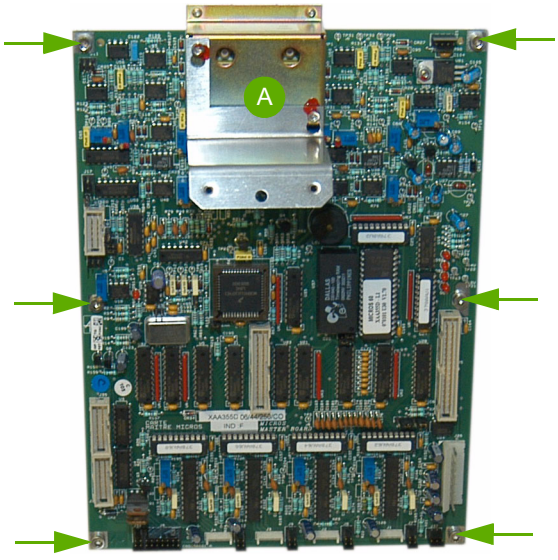
- Turn off the instrument and remove the power supply cable.
- Remove the upper cover.
- Unscrew the 2 CHC screws with washers maintening the coaxial cables on the support plate.



- Disconnect all connectors from the main board.
- Unscrew the 2 CHC screws at the rear of the instrument.



- Unscrew the 6 CHC screws and remove the Main board.
- Remove the Coaxial protection (A) by unscrewing the 2 CHC screws at the rear of the board.
- Install the Coaxial protection on the new board by screwing the 2 CHC screws at the rear of the board.
- Install the new board at the place of the previous one and screw it using the 6 CHC screws (do not forget the 2 at the rear of the instrument).
- Connect back all connectors.
- Screw the 2 CHC screws with washers maintening the coaxial cables on the support plate.

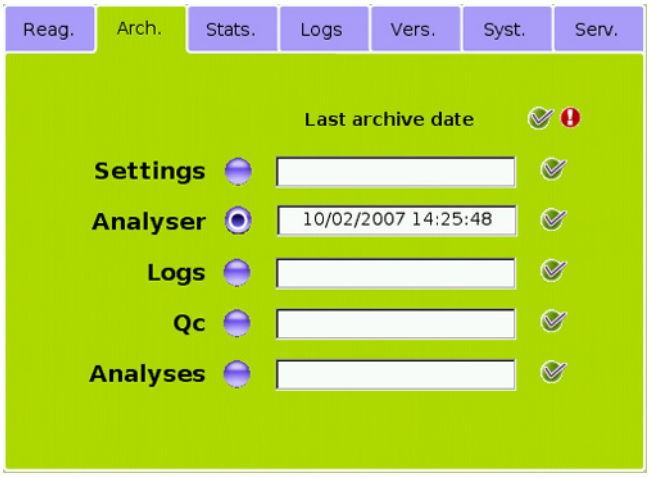


1.3. Adjustment

Run a «RAS523: Main board check & adjustment» procedure.

1.4. Restoring parameter

- If a backup has been previously done (see RAS520: Installation "10. Archive parameters, page 13") on a USB key, it is possible to restore all analyser settings (mechanical adjustments) from this USB key by pressing the «Archive restore» button:



2. SBC9312 board

2.1. Preliminary

- This board includes:
  - One Flash EPROM: Operating system Linux ARMBSP (Size ~ 16 Mo)
  - One EEPROM: serial number, MAC address
  - One IDE flash module: Application software, customer parameters (pathological limits...), sample results, QC, logs...

2.2. Dismantling

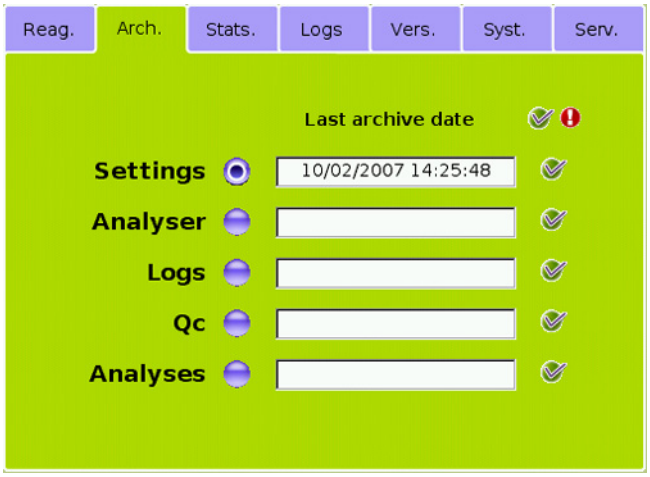
- See «RAS522: Power supply & SBC board dismantling» procedure
- If the previous IDE flash module is not damaged, install it on the new SBC9312 board. In this case, all application/user settings/results/QC/logs will not be loosen.
- If the previous IDE flash module has been damaged, use the IDE flash module supplied with the new SBC9312 board. The software application is already installed on it. In this case, it is possible to restore all user settings.

2.3. Diagnostic

Run a «RAS544: Diagnostic tool» procedure.

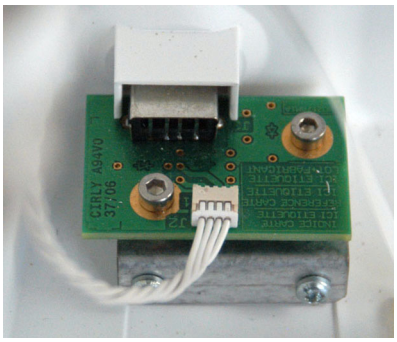
2.4. Restoring parameter

- If a backup has been previously done (see RAS520: Installation "10. Archive parameters, page 13") on a USB key, it is possible to restore all customer settings (pathological limits...) from this USB key by pressing the «Archive restore» button:



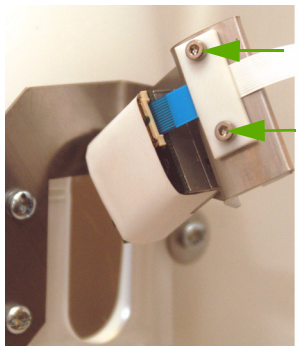
3. USB board

- Disconnect the USB board connector.
- Unscrew the 2 CHC screws then remove the board.
- Install the new one in reverse order.
- Run a «RAS544: Diagnostic tool» procedure.

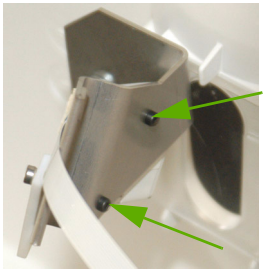


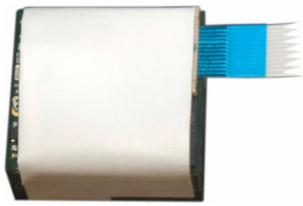
4. Internal barcode reader

- Unscrew and remove the upper screw.
- Loosen the lower screw and turn the white plate.

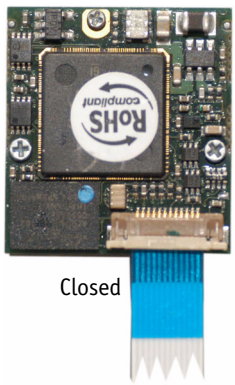


- Unscrew the 2 black CHC screws and carrefuly remove the barcode reader with its flat cable.

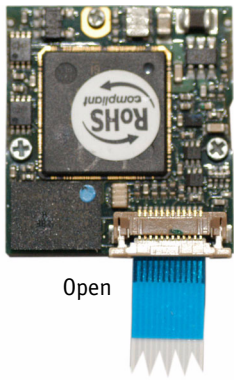




- Carrefuly open the barcode reader connector to disconnect the flat cable.
- Connect the Flex to the new barcode reader then install in reverse order.
- Run a «RAS544: Diagnostic tool» procedure.



Closed



Open

If the barcode reader flat cable (flex) need to be removed, the power supply drawer should be opened to disconnect this cable from the SBC9312 board. Follow the «RAS522: Power supply & SBC board dismantling» procedure, to access to the flex connector on the SBC9312 board.

ABX Micros ES60/ESV60

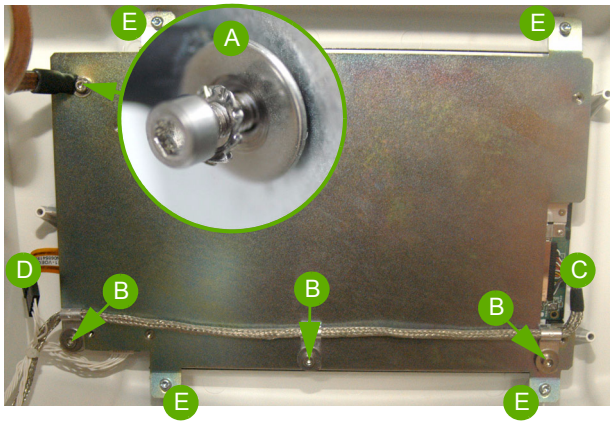
RAS546A

Screen replacement

- Concerns
  - Screen dismantling and replacement
- Required tools
  - Hexagonal key
- Required products
  - None
- Intervention time
  - 20 mn
- Frequency
  - On request
- Specific kit or consumables

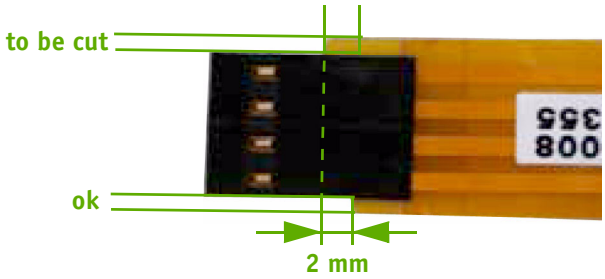
Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

- Turn on the ABX Micros ES60 and disconnect the power supply cable.
- Open the front door.
- Unscrew the screen ground (A). Take care to the washers.
- Unscrew the 3 LVDS cable fixations (B).
- Disconnect the LVDS cable (C).
- Disconnect the touch screen flat cable (D).
- Unscrew the 4 torks screws maintening the screen on the front door.
- Carefully remove the screen and disconnect the inverter board cable.



- Connect the inverter board cable on the screen assembly.
- Screw the screen on the front door using the 4 Torks screws.
- Connec the LVDS flat cable.
- Connect the touch screen flat cable (see below).
- Screw the 2 LVDS fixation on the screen plate.
- Screw the ground on the screen plate (2 washers).
- Connect the power supply cable and turn on the ABX Micros ES60/ESV60.
- Run a «RAS544: Diagnostic tool» procedure.

- When installing a new screen assembly, the sides of the flat cable should be cut on 2 mm in order to ensure a correct entry of the male connector in the female connector



- Take care to the sense of the Touch screen connector when reassembling the screen assy.
- Make sure the arrows are in this position

ABX Micros ES60/ESV60

RAS547A

External barcode reader setup

- Concerns
  - Internal barcode reader setup
- Required tools
  - None
- Required products
  - None
- Intervention time
  -
- Frequency
  - On request
- Specific kit or consumables
  - XEA725A

Disposal gloves, eyes protection and lab coat must be worn by the operator.
Local or national regulations must be applied in all the operations.

- Never type data with the external keyboard when reading barcode label with the external barcode reader. Risk of erroneous data entries!
- Never use a PS2 keyboard at the same time as the external barcode reader (connected on the USB port). Risk of erroneous data entries!
- Never connect external barcode reader on PS2 port.

1. Initial setup

$+$* Restore system default configuration

2. Interface selection

- The ALT-mode selection allows barcodes sent to PC to be interpreted correctly independently from the keyboard nationality used.

Make sure the Num Lock key on your keyboard is ON.

$+UA04$- USB-KBD -ALT-MODE

3. Data formatting

$+EA10$- no Terminator

4. Code selection

$+ Enter configuration

AZ0 Disable all family codes

AB11AB*0ll6 Code39, no C.D. , 1 to 16 char

AC110416 ITF, no C.D. , 4 to 16 char

AD111AD*0316 Codabar, no start/stop, 3 to 16 char

AI11 Code128, C.D. control without transmission

$- Exit and save configuration

5. Decoding parameters

$+ Enter configuration

ED3 4 good reads before accepting code

$- Exit and save configuration

Exploded views

1. List

Drawing	N° in drawing	Reference	Designation
2. ABX Micros ES60/ESV60 front cover, p5	1	GBC320A	ABX Micros ES60 CT front cover
2. ABX Micros ES60/ESV60 front cover, p5	2	GBC321A	ABX Micros ES60 OT front cover
2. ABX Micros ES60/ESV60 front cover, p5	2*	GBC322A	ABX Micros ESV60 front cover
2. ABX Micros ES60/ESV60 front cover, p5	2**	GBC323A	SCIL abc VET front cover
3. ABX Micros ES60/ESV60 upper cover, p6	1	XDB083AS	UPPER COVER ASSY ABX Micros ES60
3. ABX Micros ES60/ESV60 upper cover, p6	2	XDB084AS	UPPER COVER ASSY ABX Micros ESV60
4. ABX Micros ES60/ESV60 internal left side view, p7	1	XDA474DS	SYRINGE, WASTE CPTE MICROS (See 9. Vacuum syringe, page S08-12)
4. ABX Micros ES60/ESV60 internal left side view, p7	2	XDB061A	VALVE, LIQ 5 VALVES ASSY M60 (See 11. Valves, page S08-14)
4. ABX Micros ES60/ESV60 internal left side view, p7	3	XDA473BS	SYRINGE, 3 SYRINGE BLOCK ASSY (See 8. Liquid syringe, page S08-11)
4. ABX Micros ES60/ESV60 internal left side view, p7	4	XDB062A	VALVE, LIQ 6 VALVES ASSY M60 CT (See 11. Valves, page S08-14)
4. ABX Micros ES60/ESV60 internal left side view, p7	4*	XDB134A	VALVE, LIQ 6 VALVES ASSY M60 OT (See 11. Valves, page S08-14)
4. ABX Micros ES60/ESV60 internal left side view, p7	5	GBC333A	Chamber cover (See 21. Miscellaneous, page S08-22)
5. Power supply, p8	1	XBA710AS	Power supply assemby
5. Power supply, p8	2	XBA699AS	Power supply fan
5. Power supply, p8	3	XEC009AS	Fuse kit ABX Micros ES60/ESV60
6. Boards, p9	1	XAA591AS	MOTHER BOARD ABX Micros ES60
6. Boards, p9	1*	XAA592AS	Mother Board ABX Micros ESV60 (veterinary version)
6. Boards, p9	2	XAA607AS	SBC9312 BOARD + COM MES60 ABX Micros ES60
6. Boards, p9	2*	XAA608AS	SBC9312 BOARD + COM MES60 ABX Micros ESV60
6. Boards, p9	2**	XAA609AS	SBC9312 BOARD + COM MES60 SCIL
6. Boards, p9	3	GBC318A	BOARD MYLAR PROTECTION
6. Boards, p9	4	XAA580A	USB BOARD MES60
6. Boards, p9	5	AAK014A	PCB, IDE FLASH MODULE MES60
6. Boards, p9	6	BBC010A	PCB, BATTERY, LITHIUM 3V
7. Screen, p10	1	XBA721AS	SCREEN ASSY ABX Micros ES60/ESV60
8. Liquid syringe, p11	1	XDA473BS	SYRINGE, 3 SYRINGE BLOCK ASSY
8. Liquid syringe, p11	2	XBA273AS	MOTOR, STEP BY STEP + GEARING
8. Liquid syringe, p11	3	GBC173A	SYRINGE, COGGRAIL FOR LIQ. SYR.
8. Liquid syringe, p11	4	GBC032A	SYRINGE, 3 SYR. TRANSL. GUIDE
8. Liquid syringe, p11	5	GBC244A	MOTOR, REDUCTOR PLATE ASSY
8. Liquid syringe, p11	6	GBC028A	SYRINGE, DILUTION BLOCK BODY
8. Liquid syringe, p11	7	FAA036A	O'RING, FLOWCELL + LYSE DISP. MIC
8. Liquid syringe, p11	8	GBC029A	SYRINGE, DILUTION BLOCK COVER
8. Liquid syringe, p11	9	FAA029A	O'RING, DISPENSER MICROS 15x1,5
8. Liquid syringe, p11	10	GBC031A	SYRINGE, LYSE PISTON MIC/P60/80
8. Liquid syringe, p11	11	GBC236A	SYRINGE, DILUENT PISTON (KELF)
8. Liquid syringe, p11	12	GBC027A	O'RING, TEFLON 12µL SYRINGE MIC
8. Liquid syringe, p11	13	FAA055A	O'RING, MICROS SAMPLING SYRINGE
8. Liquid syringe, p11	14	GBC033A	NEEDLE, SAMPLING DISPENSER MIC
8. Liquid syringe, p11	15	XBA319B	SENSOR, IR WASTE AG/HE + SYR.MIC

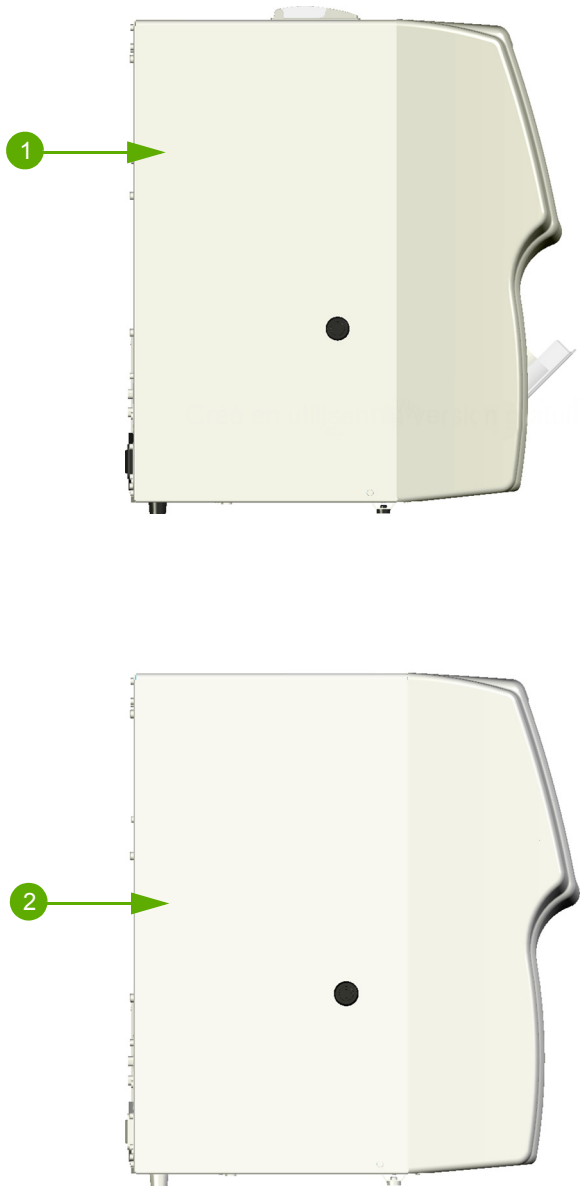
Drawing	N° in drawing	Reference	Designation
9. Vacuum syringe, p12	1	XBA273AS	MOTOR, STEP BY STEP + GEARING
9. Vacuum syringe, p12	2	XDA474DS	VAC/WASTE SYRINGE ASSY
9. Vacuum syringe, p12	3	CAG008A	SYRINGE, PLASTIC GUIDE L=63,5
9. Vacuum syringe, p12	4	GBC035A	SYRINGE, COGGRAIL FOR AIR SYR.
9. Vacuum syringe, p12	5	XBA319B	SENSOR, IR WASTE AG/HE + SYR.MIC
9. Vacuum syringe, p12	6	GBC235A	CHAMBER, WASTE/VAC. SYR. PISTON
9. Vacuum syringe, p12	7	FAA017A	O'RING, TANK MIN/AG + WASTE MIC
9. Vacuum syringe, p12	8	GBC238A	CHAMBER, WASTE CHICANE MICROS
9. Vacuum syringe, p12	9	GBC260AS	CHAMBER, INJ.WASTE/VAC.SYR.BODY
9. Vacuum syringe, p12	10	GBC244A	MOTOR, REDUCTOR PLATE ASSY
9. Vacuum syringe, p12	11	GBC143A	SYRINGE, PULLEY SYR/LIQ + AIR MIC
10. Carriage, p13	1	XEA343AS	KIT, PULLEY ASSY MICROS
10. Carriage, p13	2	DBE014A	CABLE, BUSHING D=3,2 BLACK
10. Carriage, p13	3	FBR002A	BELT, NEEDLE MICROS 290MM
10. Carriage, p13	4	XBA250A	SENSOR, IR WASTE CH. 5D (2 EAR)
10. Carriage, p13	5	GBC049A	MOTOR, PULLEY (NEEDLE)
10. Carriage, p13	6	DAL008A	MOTOR, STEPPER MICROS/P60
10. Carriage, p13	7	FBR003A	BELT, CARRIAGE MICROS 380MM
10. Carriage, p13	8	XDA639AS	CARRIAGE, NEEDLE ASSY MICROS
10. Carriage, p13	9	XDA638AS	CARRIAGE, FRAME ASSY MICROS60
11. Valves, p14	1	XDB062A	VALVE, LIQ 6 VALVES ASSY M60 CT
11. Valves, p14	1*	XDB134A	VALVE, LIQ 6 VALVES ASSY M60 OT
11. Valves, p14	2	XDB061A	VALVE, LIQ 5 VALVES ASSY M60
11. Valves, p14	3	XDB041A	VALVE, LIQ. 2 WAYS/NC 24V 4W
11. Valves, p14	4	XDB042A	VALVE, LIQ. 3 WAYS 24V 4W
11. Valves, p14	5	XDB135A	VALVE, LIQ. 2WAYS/NC W/O COIL
11. Valves, p14	6	EAZ006A	VALVE, SOLENOID 24V 4W
11. Valves, p14	7	XDB136A	VALVE, LIQ. 3WAYS W/O COIL
12. WBC Chamber, p15	1	XDA471ES	CHAMBER, WBC/HB MICROS 60 CPTE
12. WBC Chamber, p15	2	XBA722AS	CABLE, COAX WBC ABX Micros ES60/ESV60
12. WBC Chamber, p15	3	GBG275A	O'RING, APERTURE D=0,5
12. WBC Chamber, p15	4	FAK003A	CHAMBER,APERTURE 80µm
13. RBC Chamber, p16	1	XDA470ES	CHAMBER, RBC MICROS COMPLETE
13. RBC Chamber, p16	2	XBA723AS	COAX RBC ABX Micros ES60/ESV60
13. RBC Chamber, p16	3	GBG275A	O'RING, APERTURE D=0,5
13. RBC Chamber, p16	4	FAK001A	CHAMBER,APERTURE 50µm
14. ABX Micros ES60 OT rinsing block, p17	1	DBK019A	CLIP, SAMPLING NEEDLE HOLDER
14. ABX Micros ES60 OT rinsing block, p17	2	GBC069AS	NEEDLE, SAMPLING MICROS OT/LC
14. ABX Micros ES60 OT rinsing block, p17	3	GBC071A	NEEDLE GUIDE
14. ABX Micros ES60 OT rinsing block, p17	4	FAA053A	NEEDLE O'RING
14. ABX Micros ES60 OT rinsing block, p17	5	GBC070A	NEEDLE RINSING BLOCK
15. ABX Micros ES60 CT rinsing block, p17	1	DBK019A	CLIP, SAMPLING NEEDLE HOLDER
15. ABX Micros ES60 CT rinsing block, p17	2	GBC052AS	NEEDLE, SAMPLING MICROS CT
15. ABX Micros ES60 CT rinsing block, p17	3	GBC124A	NEEDLE,GUIDE MICROS CT
15. ABX Micros ES60 CT rinsing block, p17	4	FAA054A	O'RING, SAMPL. NEEDLE CT/C+/P80
15. ABX Micros ES60 CT rinsing block, p17	5	GBC123A	NEEDLE, RINSING BLOCK MICROS CT
15. ABX Micros ES60 CT rinsing block, p17	6	FAA036A	O'RING, FLOW CELL+LYSE DISP. MIC
15. ABX Micros ES60 CT rinsing block, p17	7	GBC279A	NEEDLE, PIERC. MIC CT (2 PINS)
16. Sample tube holder assembly (CT), p18	1	XDB094AS	SAMPLE TUBE HOLDER ASSEMBLY MES60

Drawing	N° in drawing	Reference	Designation
16. Sample tube holder assembly (CT), p18	2	CAE006A	SWITCH, MICROSWITCH XC5-81-S2
16. Sample tube holder assembly (CT), p18	3	DAM006A	VALVE, SOLENOID MICROS CT PIERC
16. Sample tube holder assembly (CT), p18	4	FCB001A	SAMPLING, BRAKING GEAR MIC/SPS
16. Sample tube holder assembly (CT), p18	5	GBC058A	COVER, TUBE HOLDER PLASTIC DOOR
16. Sample tube holder assembly (CT), p18	6	GBC226AS	SAMPLING, STANDARD TUBE HOLDER
16. Sample tube holder assembly (CT), p18	6*	GBC229AS	SAMPLING,OPTIONAL TUBE HOLDER
16. Sample tube holder assembly (CT), p18	7	GBC330A	SPRING, CT DOOR
16. Sample tube holder assembly (CT), p18	8	KAG001A	SAMPLING, PLASTIC SCREW 3x8, Q50
16. Sample tube holder assembly (CT), p18	9	GBC362A	SAMPLING, GEARING FOR CLOSE TUBE
17. Sample tube holder motor (CT), p19	1	XDB094AS	SAMPLE TUBE HOLDER ASSEMBLY MES60
17. Sample tube holder motor (CT), p19	2	GBC056A	SAMPLING, CAM FOR PIERCING BLOCK
17. Sample tube holder motor (CT), p19	3	CAE006A	SWITCH, MICROSWITCH XC5-81-82
17. Sample tube holder motor (CT), p19	4	DAL009A	MOTOR, MICROS CT PIERCER
17. Sample tube holder motor (CT), p19	5	DBE018A	CABLE, BUSHING D=9,5 BLACK
18. Sampling bar (OT), p20	1	GBC219A	SAMPLING, NEW TOUCH BAR MICROS
18. Sampling bar (OT), p20	2	CAE006A	SWITCH, MICROSWITCH XC5-81-S2
18. Sampling bar (OT), p20	3	GBC368A	TOUCH BAR HOLDER
19. Reagent connection assembly, p20	1	XDA538AS	REAGENT, CONNEXION PLATE
19. Reagent connection assembly, p20	2	EAC019A	FITTING, LUER MALE I=3MM
19. Reagent connection assembly, p20	3	EAC010A	FITTING, LUER FEMALE CONNECT.
19. Reagent connection assembly, p20	4	EAC008A	ANTI TRACTION RING
20. Wire kits, p21	1	XEC006AS	Printer wire kit (XBA690A +XBA691A)
20. Wire kits, p21	2	XEC008BS	Front cover wire kit (XBA686A + DAD140A + XBA689A + XBA697A + XBA688A)
21. Miscellaneous, p22	1	GBC177A	COVER, LATCH FOR MICROS DOOR
21. Miscellaneous, p22	2	FAJ010A	COVER, LOCKER REF: E3-59-15
21. Miscellaneous, p22	3	XBA619A	SENSOR, IR L=360 (Waste detection)
21. Miscellaneous, p22	4	XBA281A	SENSOR, TEMPERATURE MIC./LC220
21. Miscellaneous, p22	5	CBE081A	PRINTER
21. Miscellaneous, p22	6	XEC007BS	Barcode kit (CBC018A + DAD140A)
21. Miscellaneous, p22	7	XEC009AS	Fuses kit (2xDAR012A + 1xDAR006A + 2xDAR013A + 1xDAR045A)
21. Miscellaneous, p22	8	GBC364A	Insulator
21. Miscellaneous, p22	9	GBC333A	Cover, WBC/RBC metal MES60
21. Miscellaneous, p22	10	1103113	Thermal paper roll
21. Miscellaneous, p22	11	EAE061AS	TEFLON TUBE 1,32x1,93, Lg = 2m
21. Miscellaneous, p22	12	XBA727A	Cable, ground with flat clip Lg=190mm d=4

2. ABX Micros ES60/ESV60 front cover

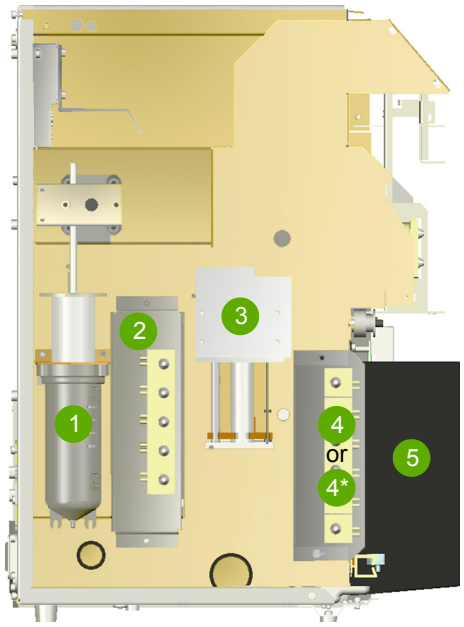
Number	Reference	Designation
1	GBC320A	ABX Micros ES60 CT front cover
2	GBC321A	ABX Micros ES60 OT front cover
2*	GBC322A	ABX Micros ESV60 front cover
2**	GBC323A	SCIL abc VET front cover

3. ABX Micros ES60/ESV60 upper cover



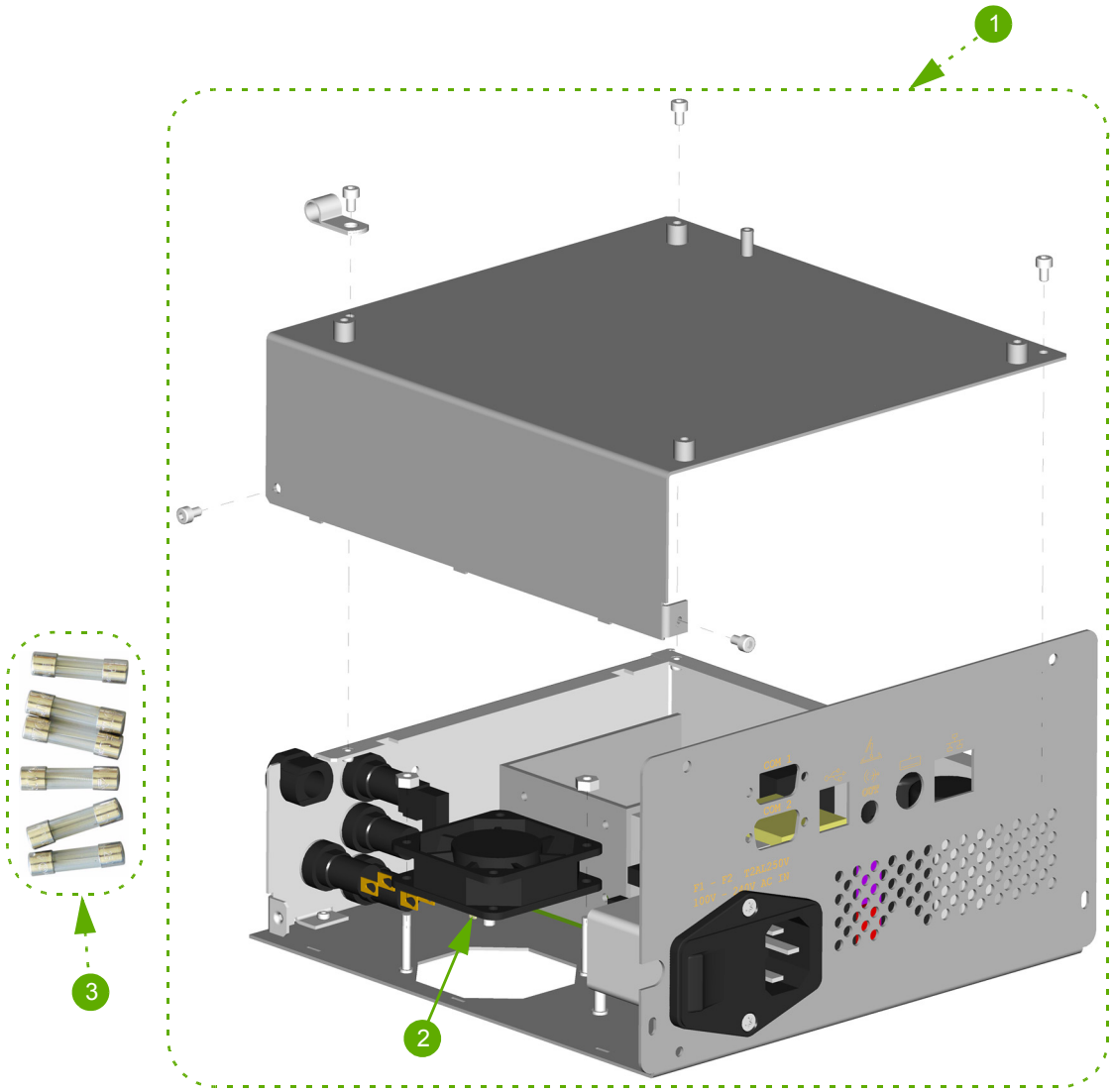
Number	Reference	Designation
1	XDB083AS	UPPER COVER ASSY ABX Micros ES60
2	XDB084AS	UPPER COVER ASSY ABX Micros ESV60

4. ABX Micros ES60/ESV60 internal left side view



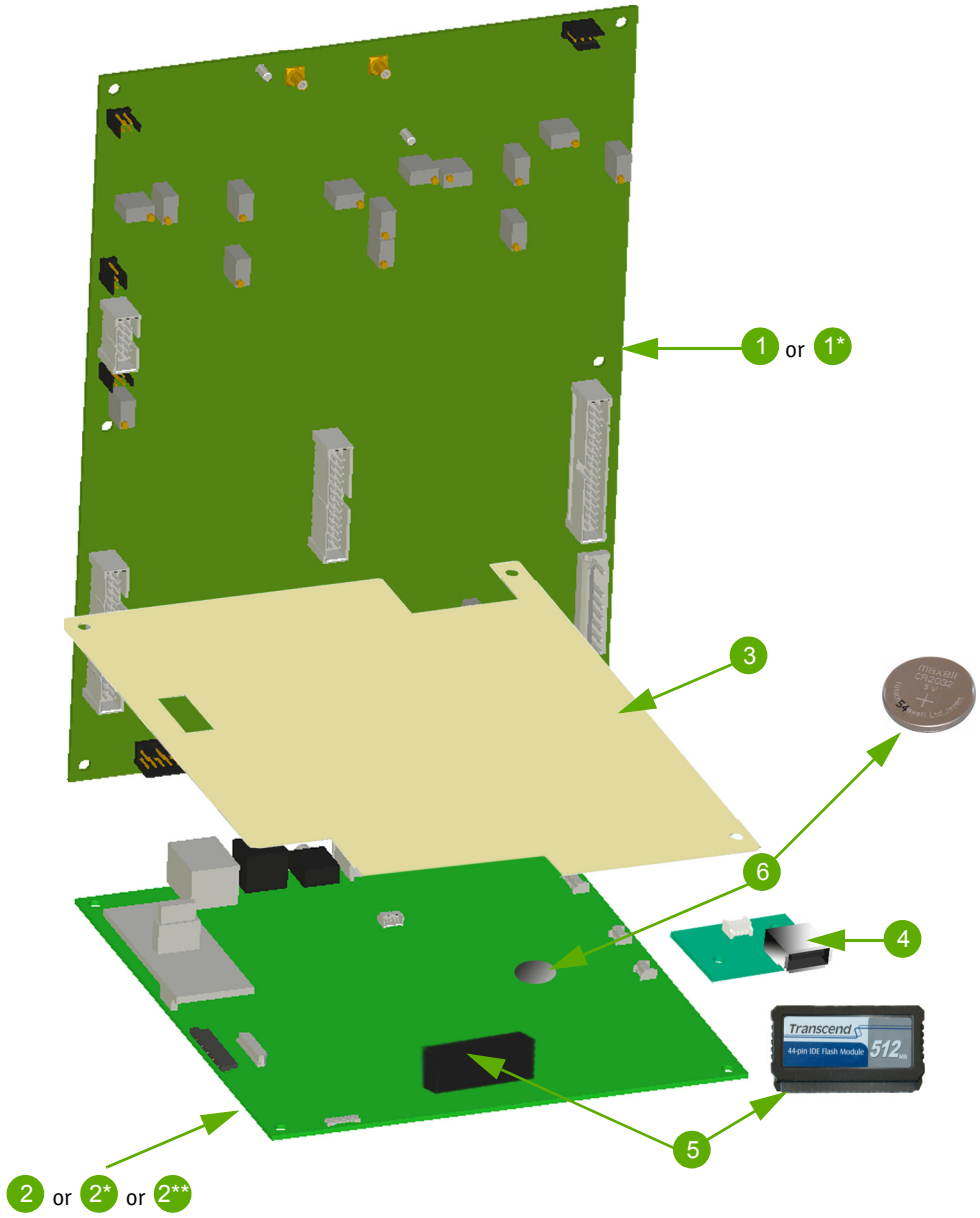
Number	Reference	Designation
1	XDA474DS	SYRINGE, WASTE CPTE MICROS (See 9. Vacuum syringe, page S08-12)
2	XDB061A	VALVE, LIQ 5 VALVES ASSY M60 (See 11. Valves, page S08-14)
3	XDA473BS	SYRINGE, 3 SYRINGE BLOCK ASSY (See 8. Liquid syringe, page S08-11)
4	XDB062A	VALVE, LIQ 6 VALVES ASSY M60 CT (See 11. Valves, page S08-14)
4*	XDB134A	VALVE, LIQ 6 VALVES ASSY M60 OT (See 11. Valves, page S08-14)
5	GBC333A	Chamber cover (See 21. Miscellaneous, page S08-22)

5. Power supply



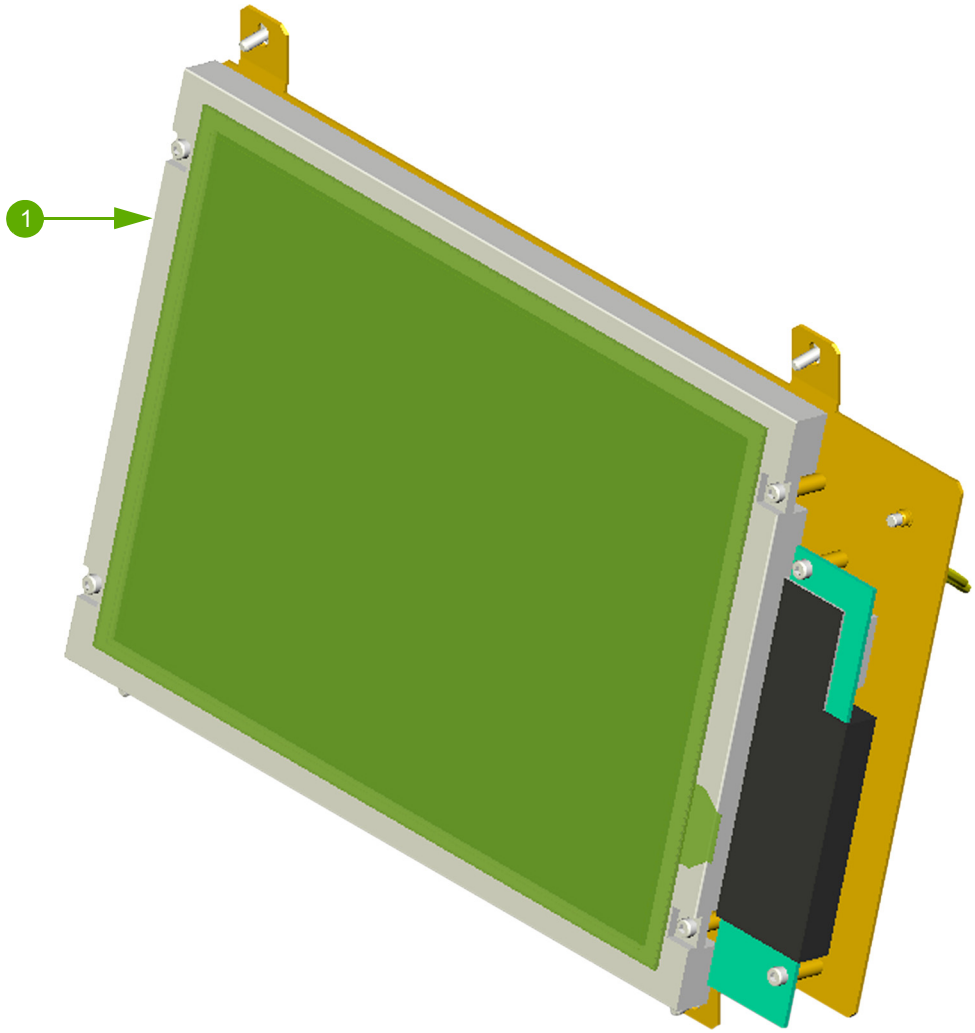
Number	Reference	Designation
1	XBA710AS	Power supply assemby
2	XBA699AS	Power supply fan
3	XEC009AS	Fuse kit ABX Micros ES60/ESV60

6. Boards



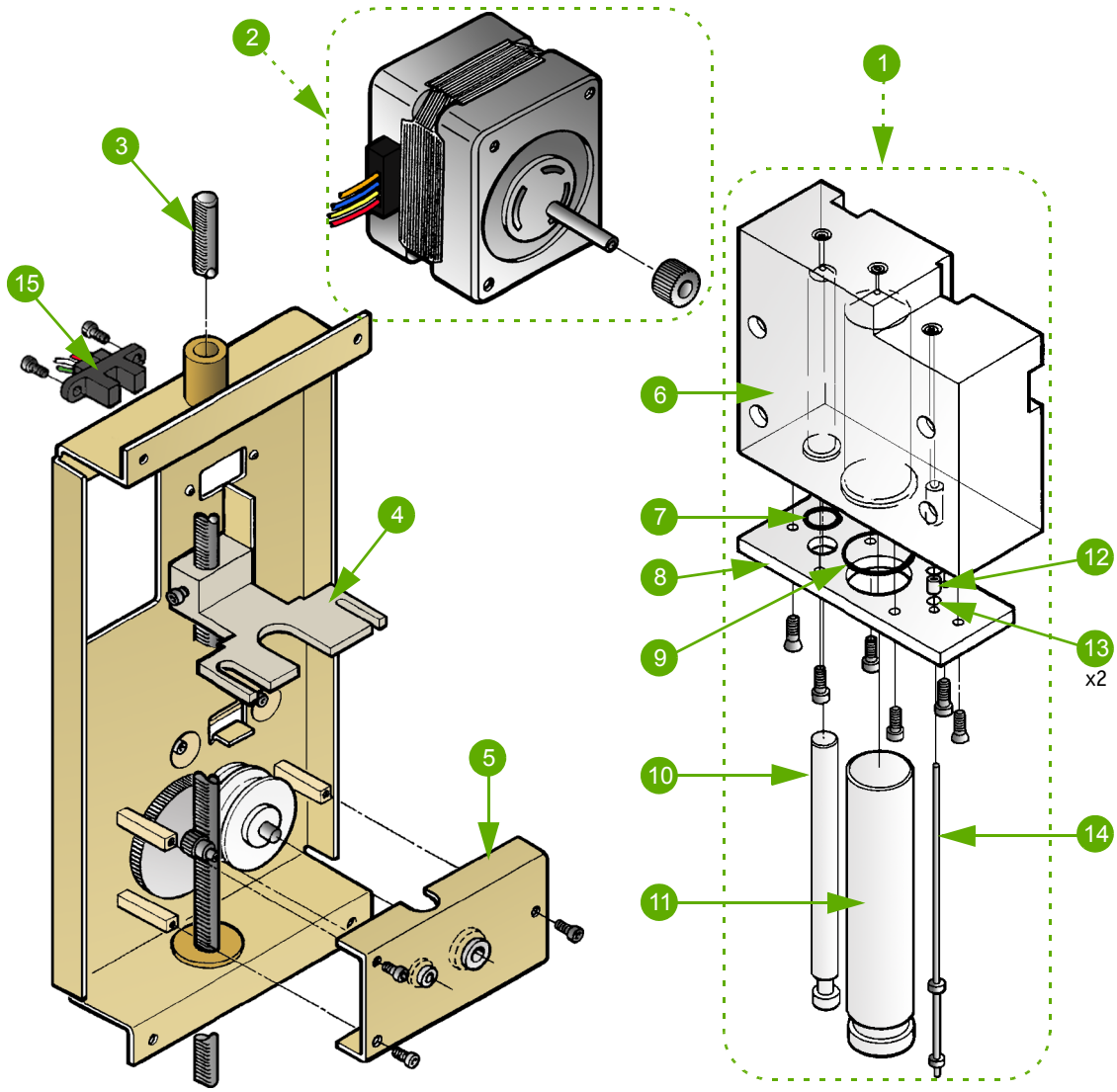
Number	Reference	Designation
1	XAA591AS	MOTHER BOARD ABX Micros ES60
1*	XAA592AS	Mother Board ABX Micros ESV60 (veterinary version)
2	XAA607AS	SBC9312 BOARD + COM MES60 ABX Micros ES60
2*	XAA608AS	SBC9312 BOARD + COM MES60 ABX Micros ESV60
2**	XAA609AS	SBC9312 BOARD + COM MES60 SCIL
3	GBC318A	BOARD MYLAR PROTECTION
4	XAA580A	USB BOARD MES60
5	AAK014A	PCB, IDE FLASH MODULE MES60
6	BBC010A	PCB, BATTERY, LITHIUM 3V

7. Screen



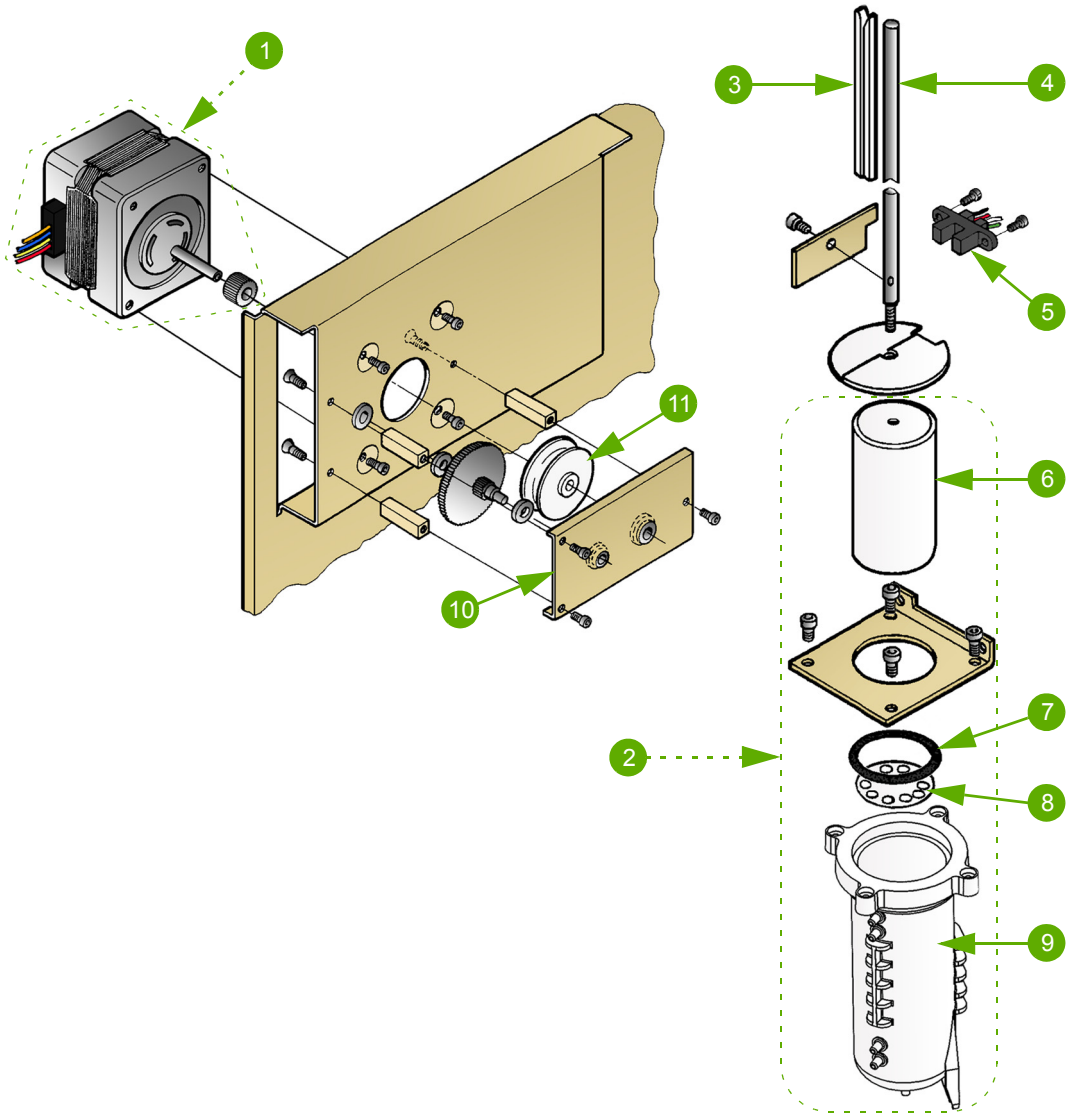
Number	Reference	Designation
1	XBA721AS	SCREEN ASSY ABX Micros ES60/ESV60

8. Liquid syringe



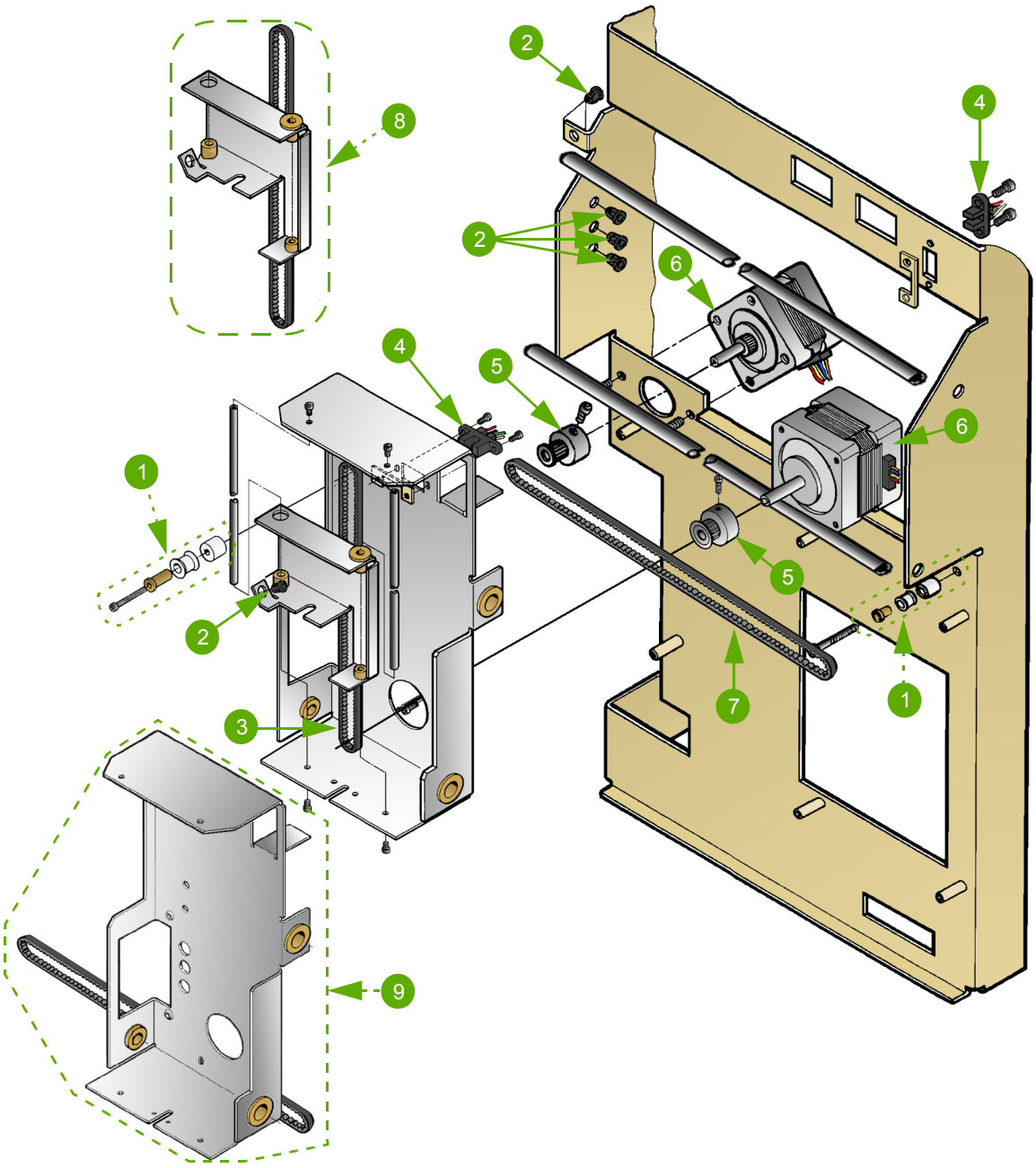
Number	Reference	Designation
1	XDA473BS	SYRINGE, 3 SYRINGE BLOCK ASSY
2	XBA273AS	MOTOR, STEP BY STEP + GEARING
3	GBC173A	SYRINGE, COGGRAIL FOR LIQ. SYR.
4	GBC032A	SYRINGE, 3 SYR. TRANSL. GUIDE
5	GBC244A	MOTOR, REDUCTOR PLATE ASSY
6	GBC028A	SYRINGE, DILUTION BLOCK BODY
7	FAA036A	O'RING, FLOWCELL + LYSE DISP. MIC
8	GBC029A	SYRINGE, DILUTION BLOCK COVER
9	FAA029A	O'RING, DISPENSER MICROS 15x1,5
10	GBC031A	SYRINGE, LYSE PISTON MIC/P60/80
11	GBC236A	SYRINGE, DILUENT PISTON (KELF)
12	GBC027A	O'RING, TEFLON 12µL SYRINGE MIC
13	FAA055A	O'RING, MICROS SAMPLING SYRINGE
14	GBC033A	NEEDLE, SAMPLING DISPENSER MIC
15	XBA319B	SENSOR, IR WASTE AG/HE + SYR.MIC

9. Vacuum syringe



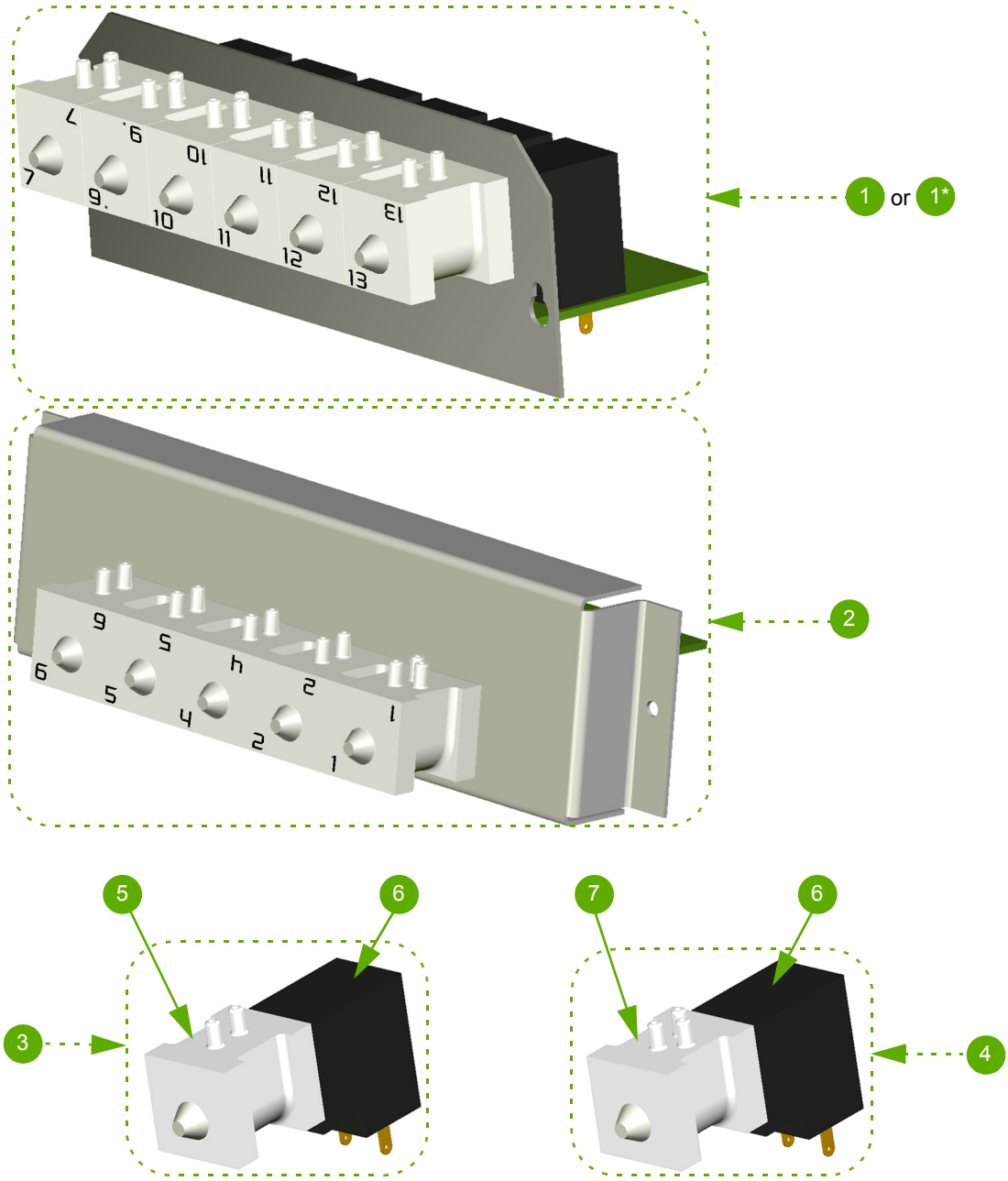
Number	Reference	Designation
1	XBA273AS	MOTOR, STEP BY STEP + GEARING
2	XDA474DS	VAC/WASTE SYRINGE ASSY
3	CAG008A	SYRINGE, PLASTIC GUIDE L=63,5
4	GBC035A	SYRINGE, COGGRAIL FOR AIR SYR.
5	XBA319B	SENSOR, IR WASTE AG/HE + SYR.MIC
6	GBC235A	CHAMBER, WASTE/VAC. SYR. PISTON
7	FAA017A	O'RING, TANK MIN/AG + WASTE MIC
8	GBC238A	CHAMBER, WASTE CHICANE MICROS
9	GBC260AS	CHAMBER, INJ.WASTE/VAC.SYR.BODY
10	GBC244A	MOTOR, REDUCTOR PLATE ASSY
11	GBC143A	SYRINGE, PULLEY SYR/LIQ + AIR MIC

10. Carriage



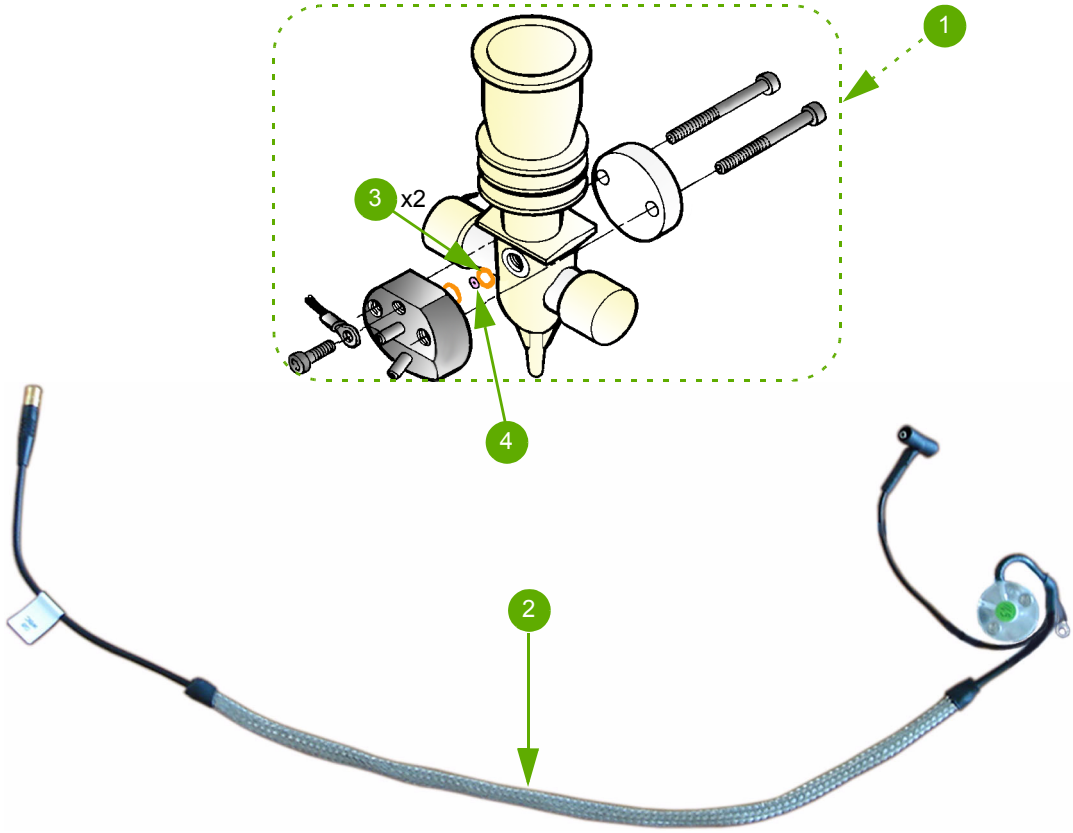
Number	Reference	Designation
1	XEA343AS	KIT, PULLEY ASSY MICROS
2	DBE014A	CABLE, BUSHING D=3,2 BLACK
3	FBR002A	BELT, NEEDLE MICROS 290MM
4	XBA250A	SENSOR, IR WASTE CH. 5D (2 EAR)
5	GBC049A	MOTOR, PULLEY (NEEDLE)
6	DAL008A	MOTOR, STEPPER MICROS/P60
7	FBR003A	BELT, CARRIAGE MICROS 380MM
8	XDA639AS	CARRIAGE, NEEDLE ASSY MICROS
9	XDA638AS	CARRIAGE, FRAME ASSY MICROS60

11. Valves



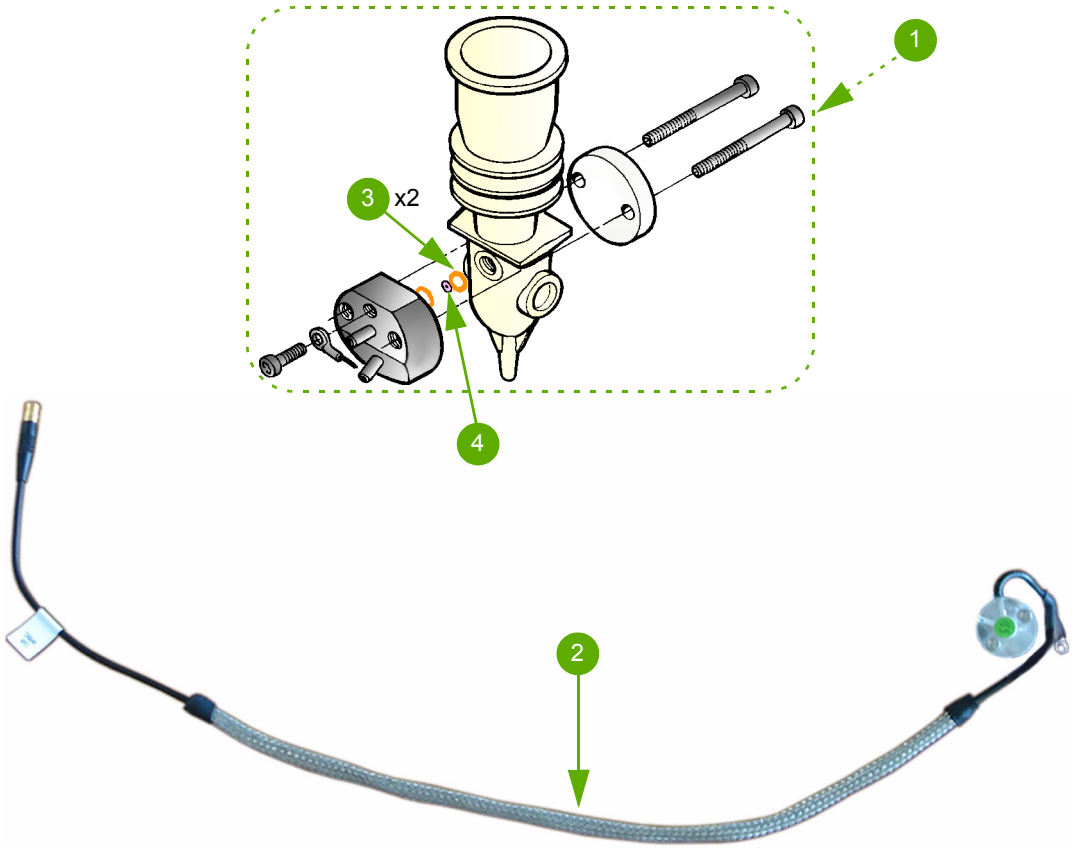
Number	Reference	Designation
1	XDB062A	VALVE, LIQ 6 VALVES ASSY M60 CT
1*	XDB134A	VALVE, LIQ 6 VALVES ASSY M60 OT
2	XDB061A	VALVE, LIQ 5 VALVES ASSY M60
3	XDB041A	VALVE, LIQ. 2 WAYS/NC 24V 4W
4	XDB042A	VALVE, LIQ. 3 WAYS 24V 4W
5	XDB135A	VALVE, LIQ. 2WAYS/NC W/O COIL
6	EAZ006A	VALVE, SOLENOID 24V 4W
7	XDB136A	VALVE, LIQ. 3WAYS W/O COIL

12. WBC Chamber



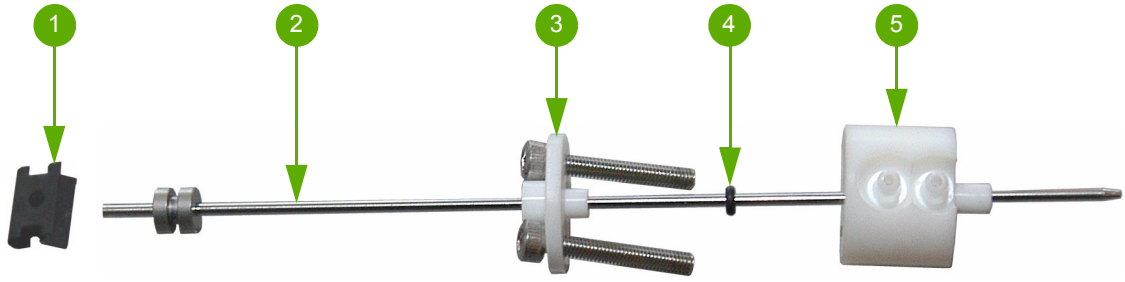
Number	Reference	Designation
1	XDA471ES	CHAMBER, WBC/HB MICROS 60 CPTE
2	XBA722AS	CABLE, COAX WBC ABX Micros ES60/ESV60
3	GBG275A	O'RING, APERTURE D=0,5
4	FAK003A	CHAMBER,APERTURE 80µm

13. RBC Chamber



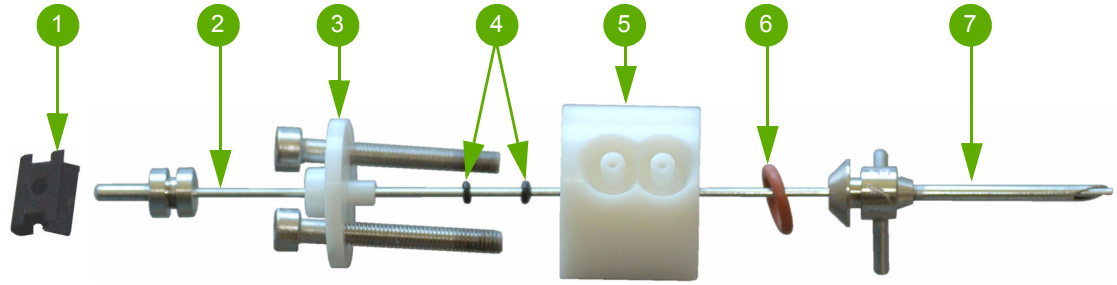
Number	Reference	Designation
1	XDA470ES	CHAMBER, RBC MICROS COMPLETE
2	XBA723AS	COAX RBC ABX Micros ES60/ESV60
3	GBG275A	O'RING, APERTURE D=0,5
4	FAK001A	CHAMBER,APERTURE 50µm

14. ABX Micros ES60 OT rinsing block



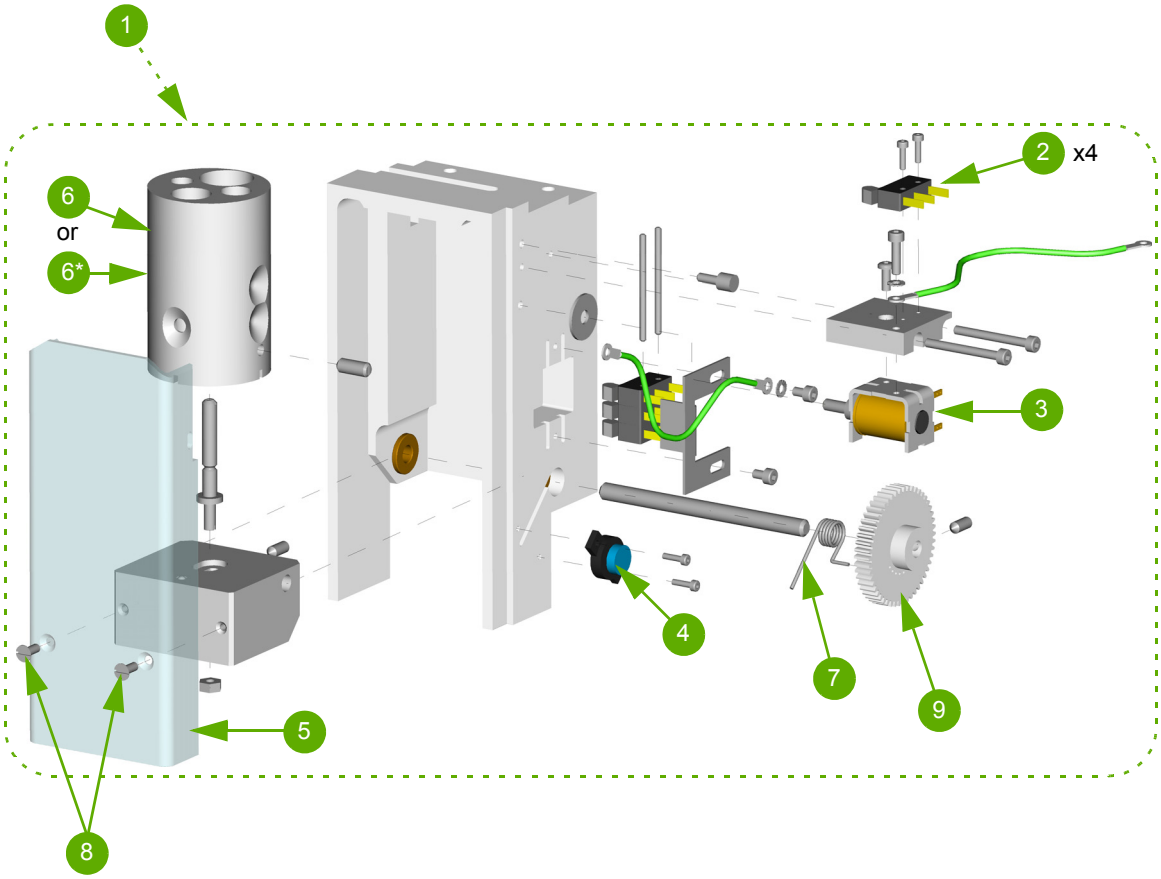
Number	Reference	Designation
1	DBK019A	CLIP, SAMPLING NEEDLE HOLDER
2	GBC069AS	NEEDLE, SAMPLING MICROS OT/LC
3	GBC071A	NEEDLE GUIDE
4	FAA053A	NEEDLE O'RING
5	GBC070A	NEEDLE RINSING BLOCK

15. ABX Micros ES60 CT rinsing block



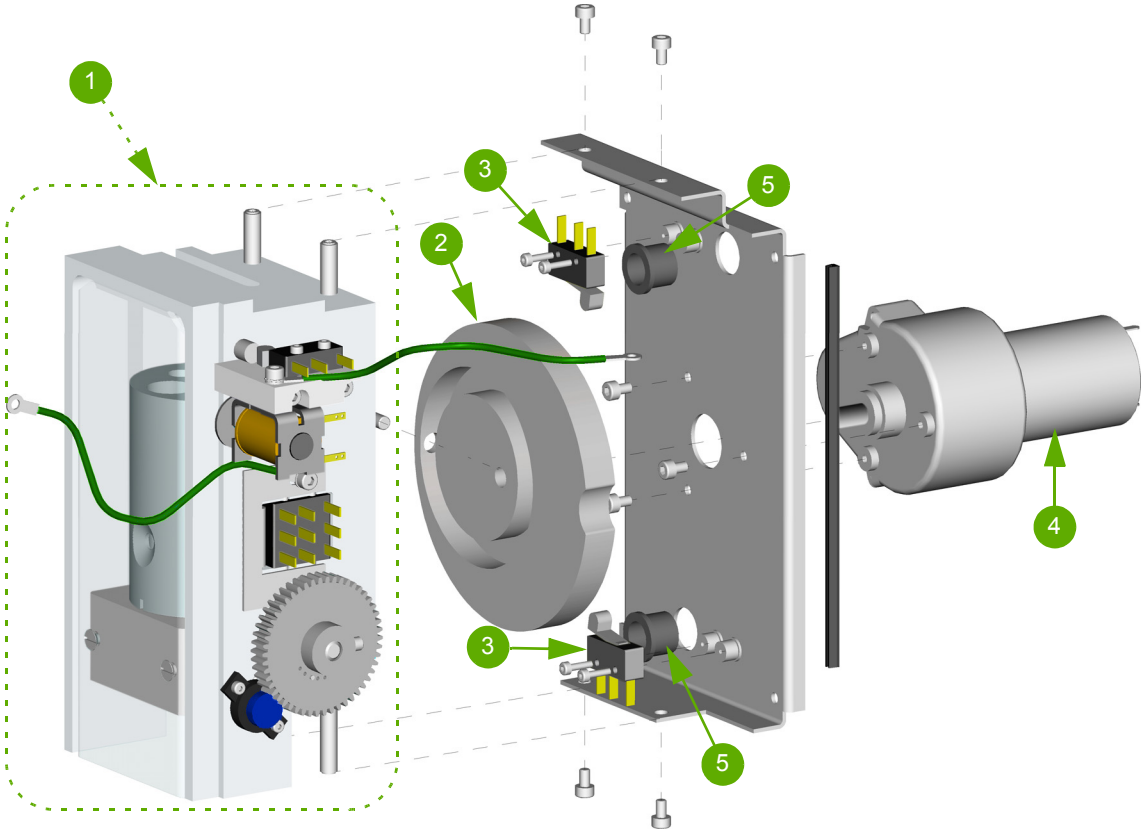
Number	Reference	Designation
1	DBK019A	CLIP, SAMPLING NEEDLE HOLDER
2	GBC052AS	NEEDLE, SAMPLING MICROS CT
3	GBC124A	NEEDLE,GUIDE MICROS CT
4	FAA054A	O'RING, SAMPL. NEEDLE CT/C+/P80
5	GBC123A	NEEDLE, RINSING BLOCK MICROS CT
6	FAA036A	O'RING, FLOW CELL+LYSE DISP. MIC
7	GBC279A	NEEDLE, PIERC. MIC CT (2 PINS)

16. Sample tube holder assembly (CT)



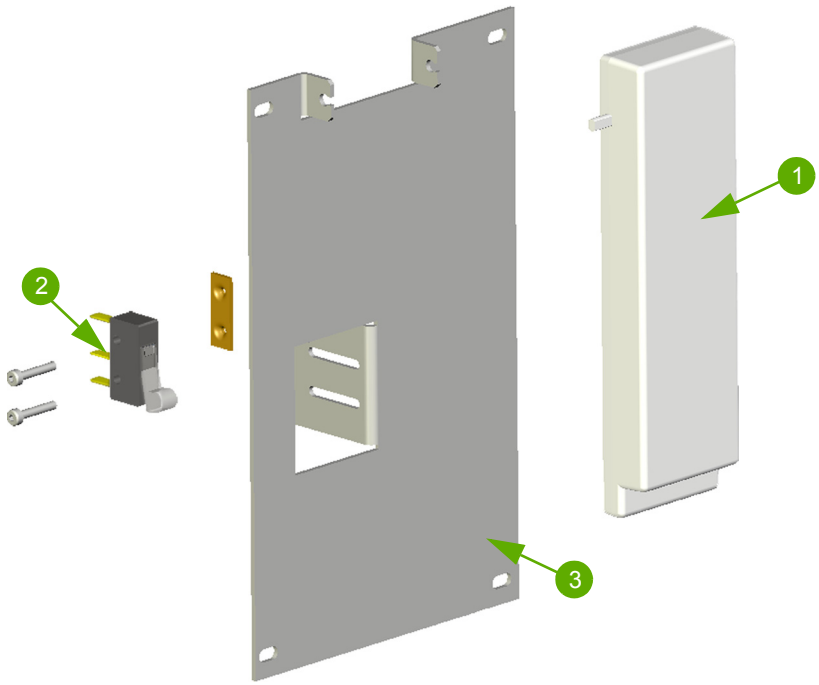
Number	Reference	Designation
1	XDB094AS	SAMPLE TUBE HOLDER ASSEMBLY MES60
2	CAE006A	SWITCH, MICROSWITCH XC5-81-S2
3	DAM006A	VALVE, SOLENOID MICROS CT PIERC
4	FCB001A	SAMPLING, BRAKING GEAR MIC/SPS
5	GBC058A	COVER, TUBE HOLDER PLASTIC DOOR
6	GBC226AS	SAMPLING, STANDARD TUBE HOLDER
6*	GBC229AS	SAMPLING,OPTIONAL TUBE HOLDER
7	GBC330A	SPRING, CT DOOR
8	KAG001A	SAMPLING, PLASTIC SCREW 3x8, Q50
9	GBC362A	SAMPLING, GEARING FOR CLOSE TUBE

17. Sample tube holder motor (CT)



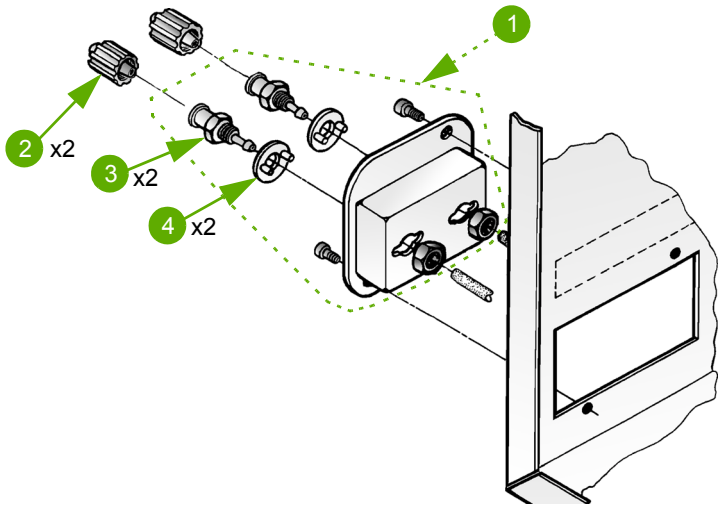
Number	Reference	Designation
1	XDB094AS	SAMPLE TUBE HOLDER ASSEMBLY MES60
2	GBC056A	SAMPLING, CAM FOR PIERCING BLOCK
3	CAE006A	SWITCH, MICROSWITCH XC5-81-82
4	DAL009A	MOTOR, MICROS CT PIERCER
5	DBE018A	CABLE, BUSHING D=9,5 BLACK

18. Sampling bar (OT)



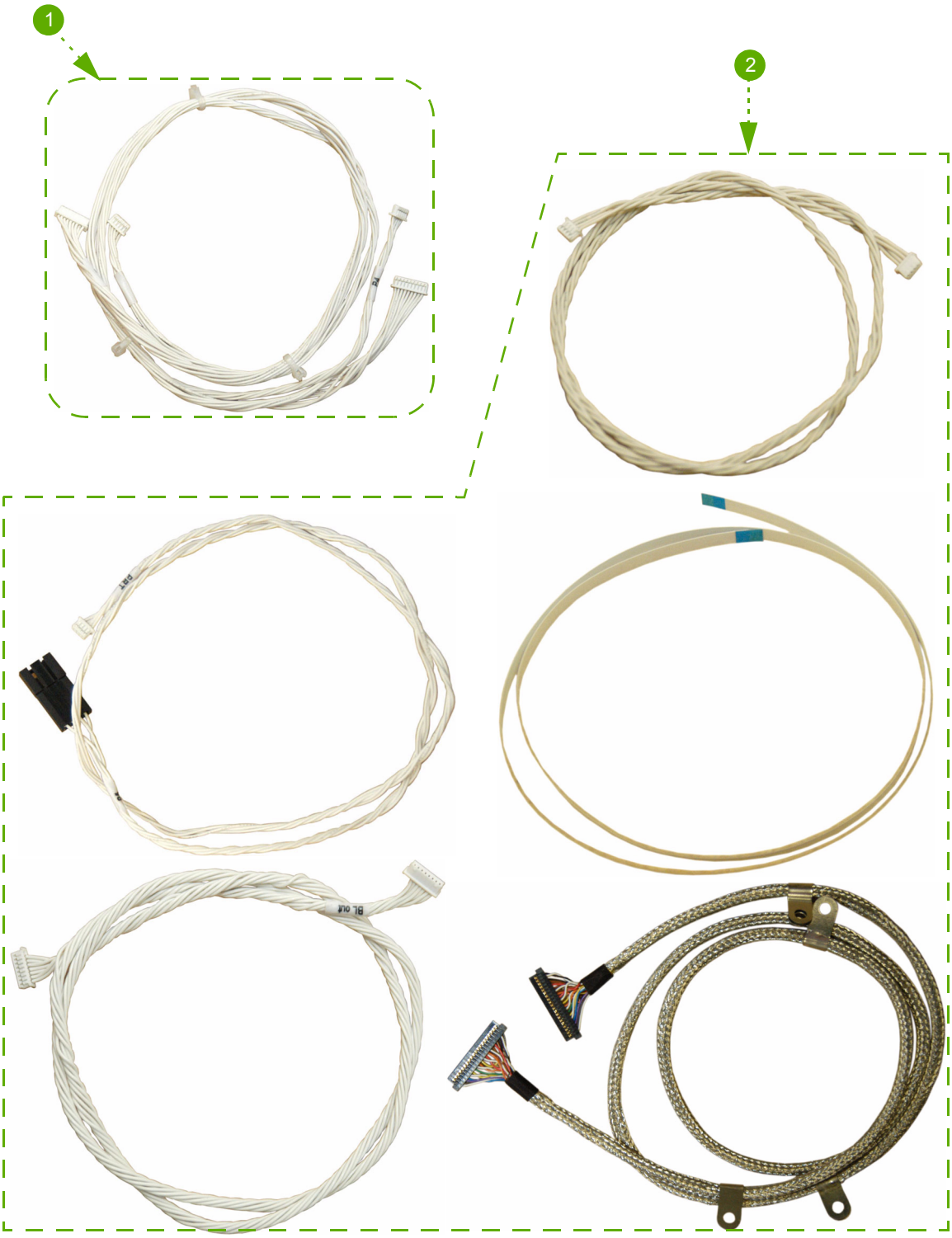
Number	Reference	Designation
1	GBC219A	SAMPLING, NEW TOUCH BAR MICROS
2	CAE006A	SWITCH, MICROSWITCH XC5-81-S2
3	GBC368A	TOUCH BAR HOLDER

19. Reagent connection assembly



Number	Reference	Designation
1	XDA538AS	REAGENT, CONNEXION PLATE
2	EAC019A	FITTING, LUER MALE I=3MM
3	EAC010A	FITTING, LUER FEMALE CONNECT.
4	EAC008A	ANTI TRACTION RING

20. Wire kits



Number	Reference	Designation
1	XEC006AS	Printer wire kit (XBA690A +XBA691A)
2	XEC008BS	Front cover wire kit (XBA686A + DAD140A + XBA689A + XBA697A + XBA688A)

21. Miscellaneous

Number	Reference	Designation
1	GBC177A	COVER, LATCH FOR MICROS DOOR
2	FAJ010A	COVER, LOCKER REF: E3-59-15
3	XBA619A	SENSOR, IR L=360 (Waste detection)
4	XBA281A	SENSOR, TEMPERATURE MIC./LC220
5	CBE081A	Printer
6	XEC007BS	Barcode kit (CBC018A + DAD140A)
7	XEC009AS	Fuses kit (2xDAR012A + 1xDAR006A + 2xDAR013A + 1xDAR045A)
8	GBC364A	Insulator
9	GBC333A	Cover, WBC/RBC metal MES60
10	1103113	Thermal paper roll
11	EAE061AS	TEFLON TUBE 1,32x1,93, Lg = 2m
12	XBA725A	USB barcode reader
13	XBA727A	Cable, ground with flat clip Lg=190mm d=4