MAINTENANCE AND USER'S MANUAL

PENSKY MARTENS
FLASH POINT TESTER

K87100 / K87190

EN 22719 – ISO 2719
ASTM D 93
IP 34

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Petroleum Testing & Analysis Instrumentation • Custom Design & Manufacturing

Koehler
INSTRUMENT COMPANY, INC.

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I - INTRODUCTION

- 1.1 – SAFETY INSTRUCTIONS

For any use of the instrument, operators must have the following expertise:

- A good knowledge of manual petroleum testing methods and the experience of performing flash point tests,
- A good understanding of the risks associated with product and sample manipulation.

Manipulations of hot cup and cover are prohibited. In case of absolute necessity, manipulations have to be realized with utmost care. In every case, operators have to wear gloves, glasses and protective safety clothes.

- 1.2 – OPERATION INSTRUCTIONS

Tests have to be exclusively performed:

- according to the methods described in the user's manual,
- with the accessories delivered and recommended in the user's manual,
- according the testing process and starting up procedures described in the manual.

Testing processes have to be permanently watched.

The instrument has to be located under a fume hood equipped with a vapor extractor and the working space has to be sufficiently ventilated.

Water and gas supplies have to be controlled at least once a month in order to verify the good condition of pipes and fastenings. Gas pipes have to be replaced prior to the expiration date.

If an incident occurs (gas cut off, overheating of the instrument, leakage) which could damage the instrument or components, an internal and external check up has to be carried out by a person with the adequate technical level.

Only skilled technicians are allowed to perform maintenance on the instrument which has to be back at ambient T°, and unplugged from electric supply - excepted for calibration purpose - water and gas supplies.

Maintenance functions described as in the user's manual should only be performed by a qualified technician.

Prior to using the instrument, operators have to take knowledge of keyboard function keys described in the user's manual.

- 1.3 – INSTALLATION INSTRUCTIONS

- The cooling circuit of the instrument must be connected to a max 5 psi pressure water supply.

- The water connections must be done with the delivered tubes and clamp collars.

- The gas circuit of the instrument must be connected to a max 50 mbar pressure gas supply with the tubes and clamp collars delivered in accessories or to a removable gas cartridge delivered in option with its connecting accessories.

- The instrument has to be located on a stable and strong table or laboratory bench.

- Electric supply has to be in accordance with the one described on the identification tag and the instrument has to be connected to the earth.

- The instrument has to be located under a fume hood equipped with a vapor extractor and the working space has to be sufficiently ventilated.

- 1.4 – CHECK WHEN DELIVERED

- Packaging should not be damaged. If so, the necessary claims have to be made to the carrier.

- Compare the content of the packing with the provided list of accessories.

- Control accessory identification and quality.

II – TECHNICAL FEATURES

Determination of the Closed Cup Flash Point according to the following standards:

- EN 22719
- ISO 2719
- ASTM D93
- IP 34

⇒ Ambient working temperature	15°C to 30°C
⇒ Working temperature range	-20 °C to 400 °C
⇒ Detection temperature range	-70 °C to 700 °C
⇒ Sample temperature measurement	4-wired glass Pt100 probe, accuracy 0,1°C
⇒ Flash point detection	Ionization and or thermocouple
⇒ Flame dipping	Automatic with gas or electrical
⇒ Test electric spark	Electrical supply potentiometric tune up
⇒ Stirring	2 speeds : 90 to 120 rpm, 240 to 260 rpm
⇒ Cooling of heating block	Air ventilation and/or refrigerant
⇒ Gas supply	Gas network (50 mbar max), optional gas cartridge (about 8H of autonomy)
⇒ Water supply	Water network (5 psi max) Connection : ext. diameter 12,5 mm
⇒ Pilot and test flame	Adjustable by valves
⇒ Safety of heating	Hard heating cut-off at 550°C Measured in the heating block, Independently of the microprocessor, With sound alarm
⇒ Safety on samples	Cut-off of on-going test with sound alarm ; programmable safety from 15°C to 99°C above expected temperature
⇒ Probe safety	Faulty probe ; abnormal temperature reading
⇒ Gas safety	Optical detection of flame absence with sound alarm and automatic gas cut-off after 30" and test termination
⇒ Apparatus management	Carte 386SX
⇒ Programming through tactile keyboard with membrane	• Automatic barometric correction : with manual registration of the atmospheric pressure or by pressure transducer • Selection of the units : °C, °F, mbar, mm Hg

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	• Calibration of the temperature measurement (regulated bath or resistance box) • Obliteration or preservation of the presumed temperature after each test • Buzzer (continuous or 3 minutes) • Stop temperature of the cooling heating block • Correction of temperature deviation on result : +/- 9,9°C • Safety on sample from 15°C to 99°C above ambient temperature • Alarm sounds at safety temperature -15°C
⇒ Instrument piloting	Waterproof tactile screen, liquid Crystal backlit graphic display, 256x128 pixels
⇒ Printing of configuration report	
⇒ Printing of results	80 column printer or ticket printer (supplied)
⇒ Maintenance function	For logic I/O
⇒ Back up of programmed parameters	Flash Eprom
⇒ Software up dating	Through teleloading
⇒ Recording of previous 100 results	
⇒ Size LxHxW (mm)	270 x 550 x 550
⇒ Weight	20 kgs
⇒ Power supply	115 or 230 V ± 10 % - 50/60 HZ

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III – INSTRUMENT DESCRIPTION

- 3.1 - PRESENTATION

3.1.1 – Control panel

- 1 waterproof tactile keyboard (1)
- 1 backlit liquid crystal graphic display 256x128 pixels (2)

3.1.2. Front panel (middle)

- thermocouple connector for the flash point detector (3)
- cable connector for ionization detection (4)
- sample Pt100 probe connector (5)
- gas connections for the pilot (6) and the test flame (7)

3.1.3 – Front panel (bottom)

- pilot flame needle valve (8), test flame needle valve (9)
- light indicators for heating (10) and cooling (11) of the heating block
- electrical supply potentiometer of the lighting spark (28)

3.1.4 – Rear panel

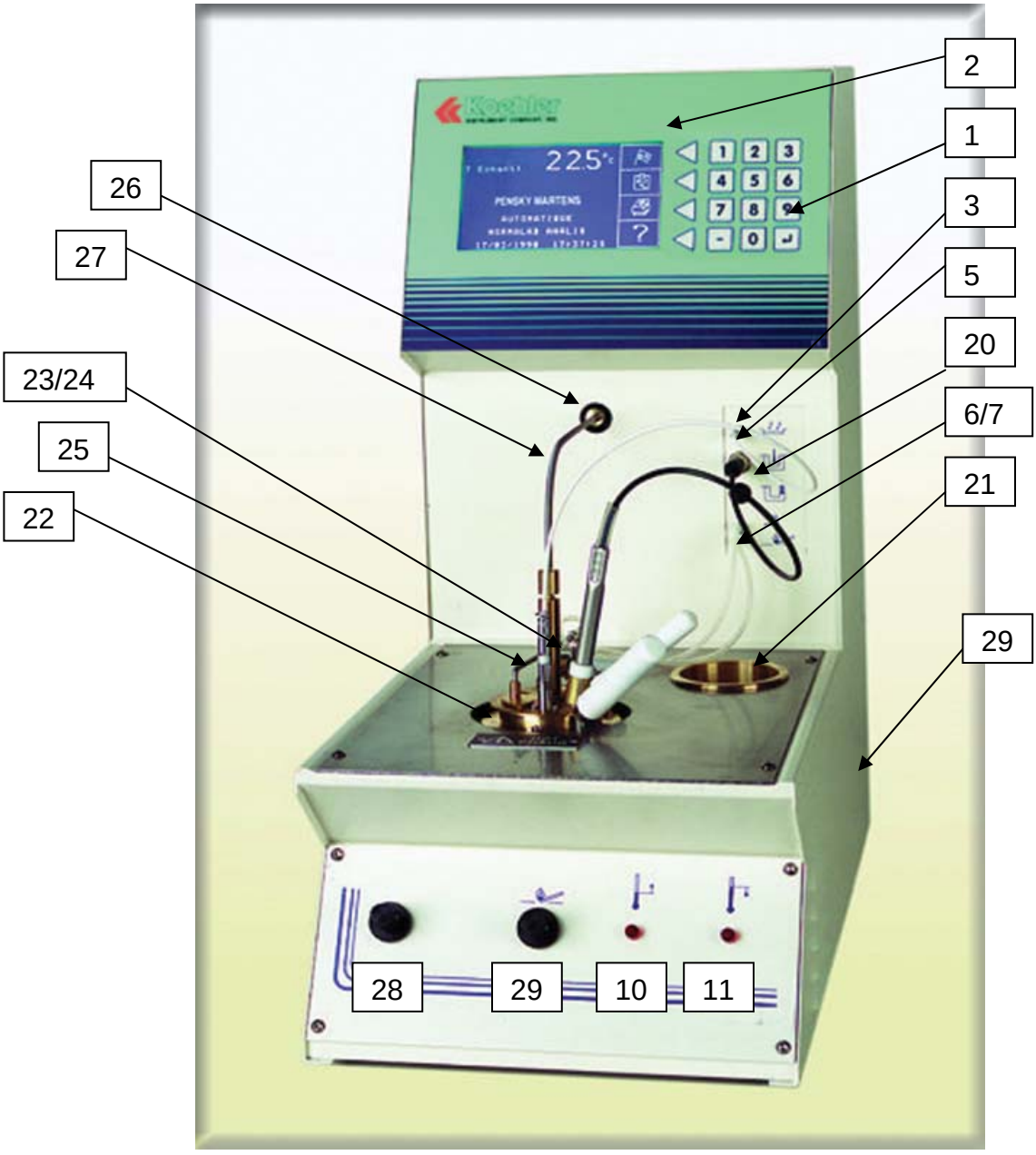
- general power supply switch with fuses (12)
- RS232 port for PC connection (13)
- printer connector (14)
- gas inlet (15)
- inlet (16) and outlet (17) connections of the cooling circuit
- gas cartridge fastenings (18)
- pressure generator connection for pressure sensor calibration (19)
- electrical regulator connection for pressure sensor calibration (30)

3.1.5 – Working space

- electrical spark connections (20)
- cup container when no test is under way (21)
- heating block (22)
- flame dipper (23) or electrical spark
- pilot flame (24)
- arm for controlling the flame presentation traps (25)
- connection axis of the stirring (26)
- flexible stirrer (27)

3.1.6 – Right side

- Identification tag (29)



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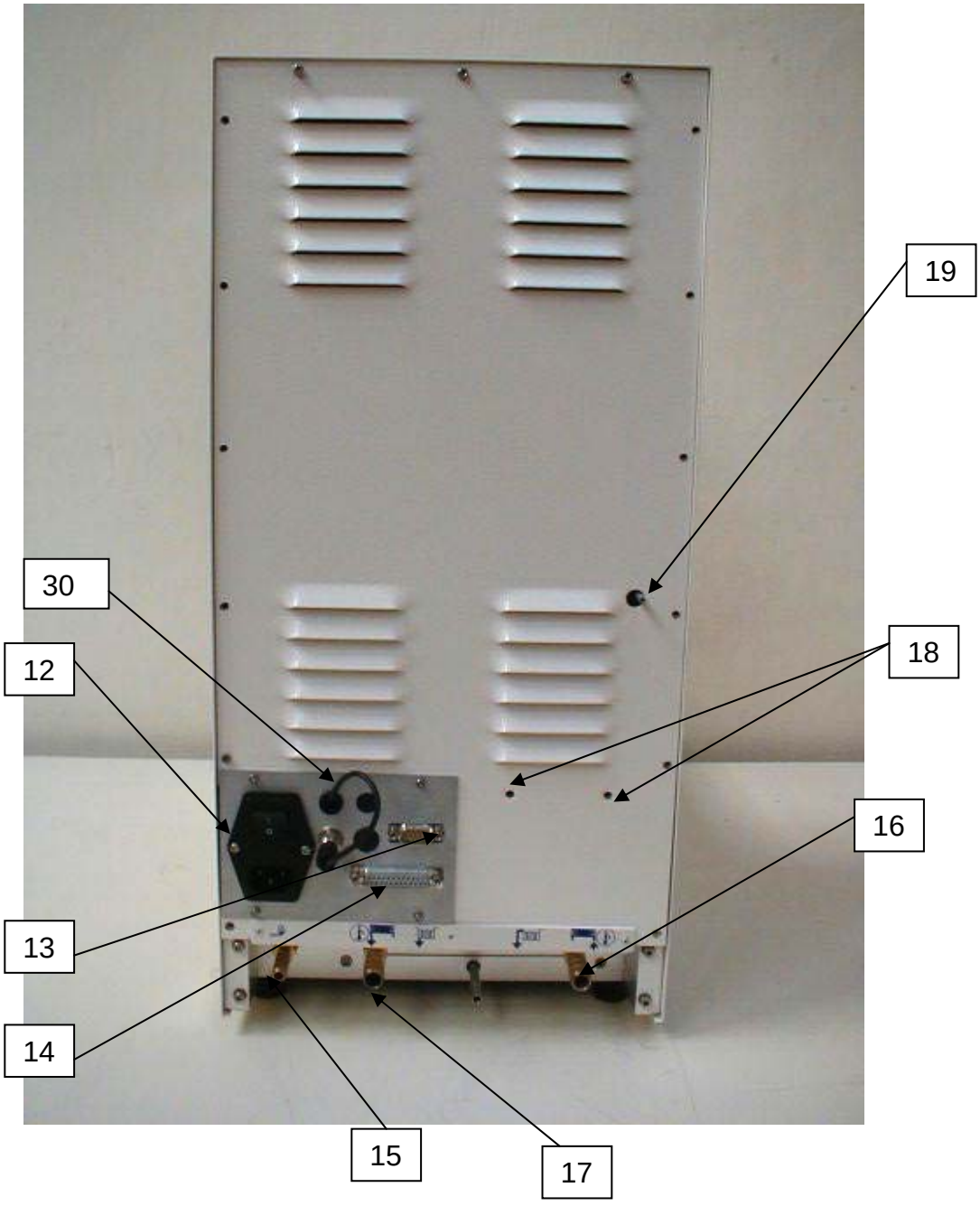

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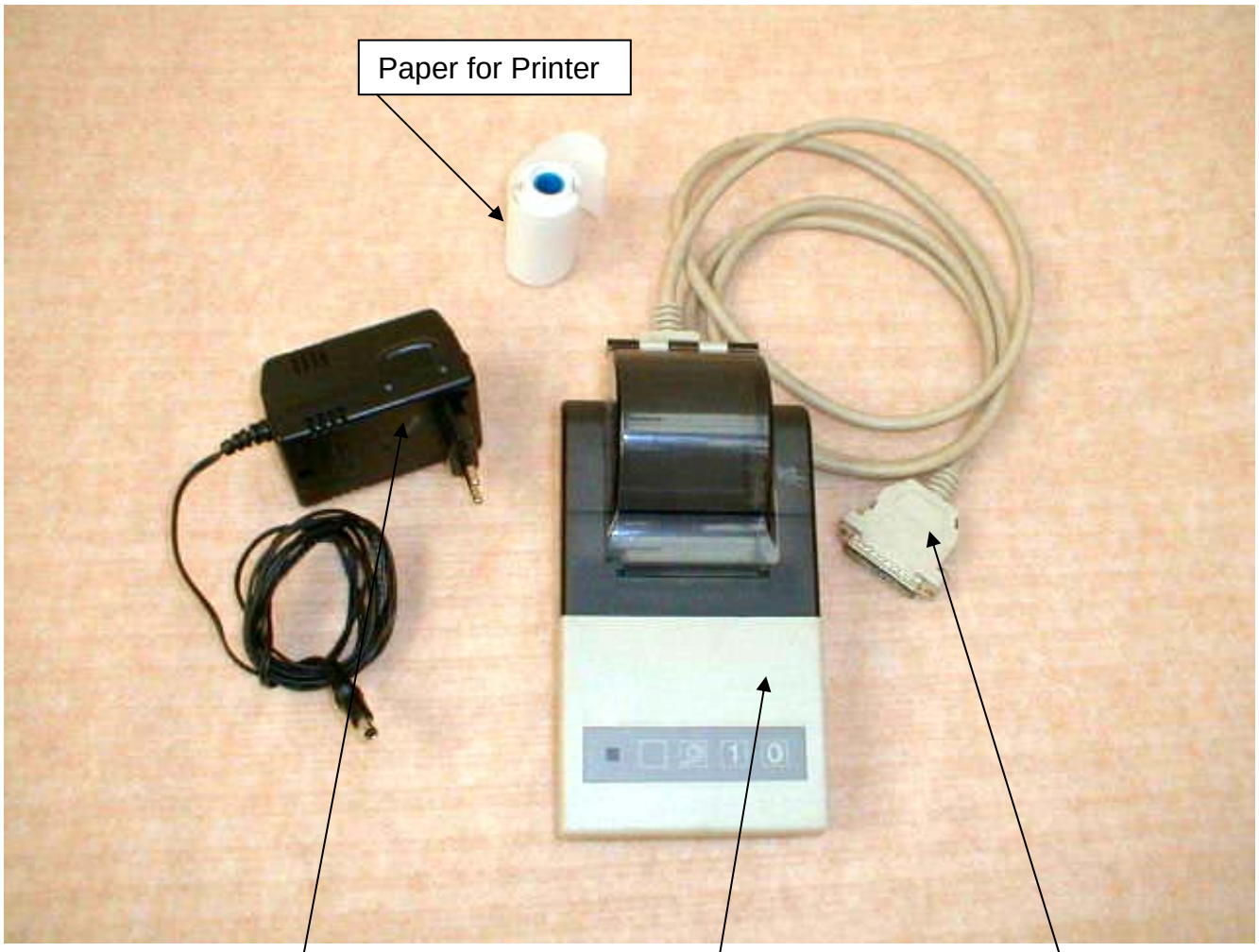
IV - ACCESSORIES DELIVERED WITH THE INSTRUMENT

- 1 power supply cable
- 1 cover and 1 Pensky Martens cup
- 1 container
- 1 detection cable
- 1 glass Pt 100 probe for the sample
- 2 tubings with clamp collars for connection to water supply
- 1 gas tubing with clamp collars
- 1 stirring flexible
- 1 RS232C cable
- 1 user's manual
- 1 compliance certificate and quality control certificate
- 1 ticket printer with connection cables + power supply for loading
- 1 electrical spark
- 1 detection thermocouple

- 4.1 - OPTIONS

- Removable gas cartridge with stand and connections

- 4.2 – SET OF ACCESSORIES



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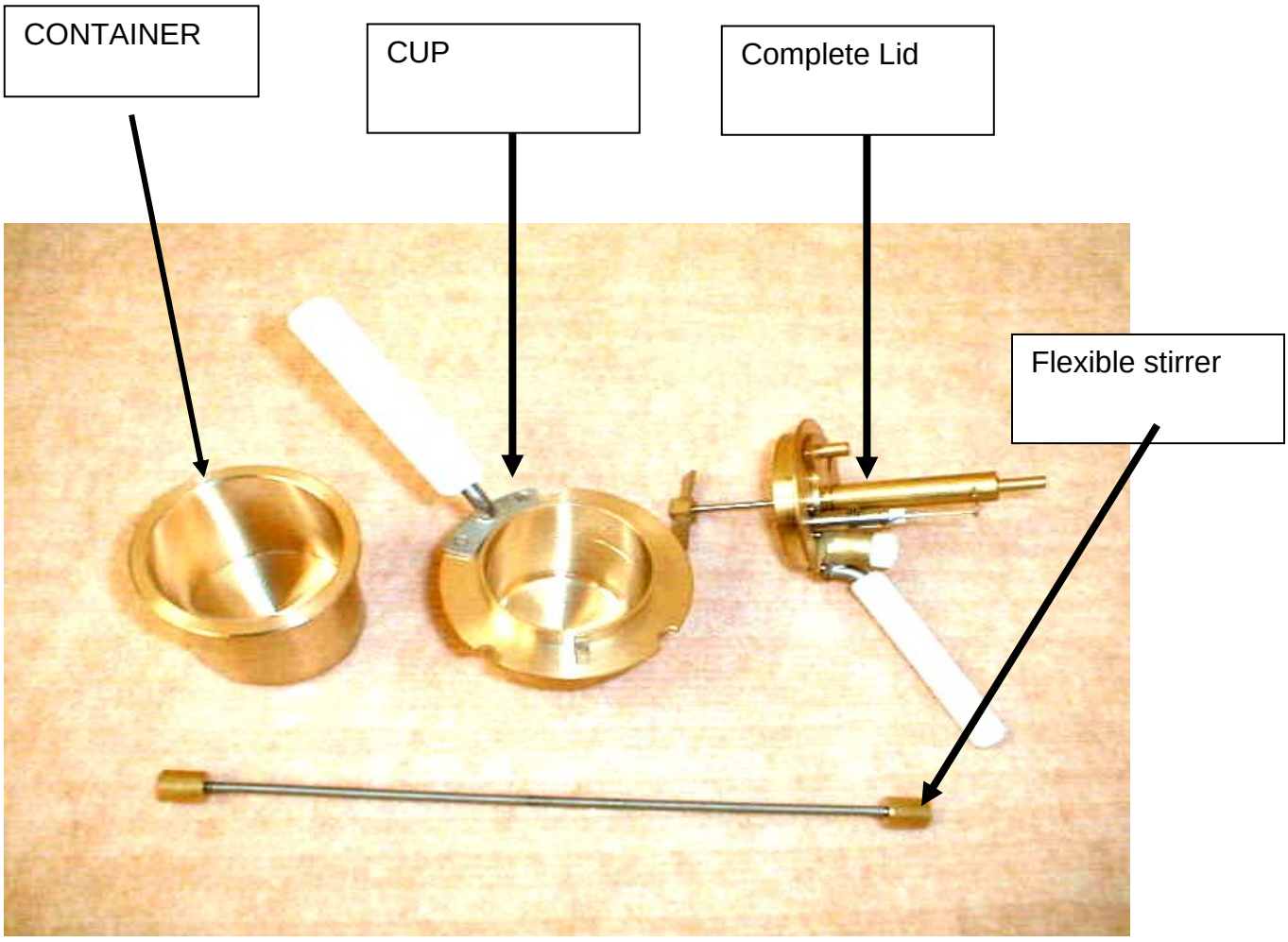
– SET OF ACCESSORIES



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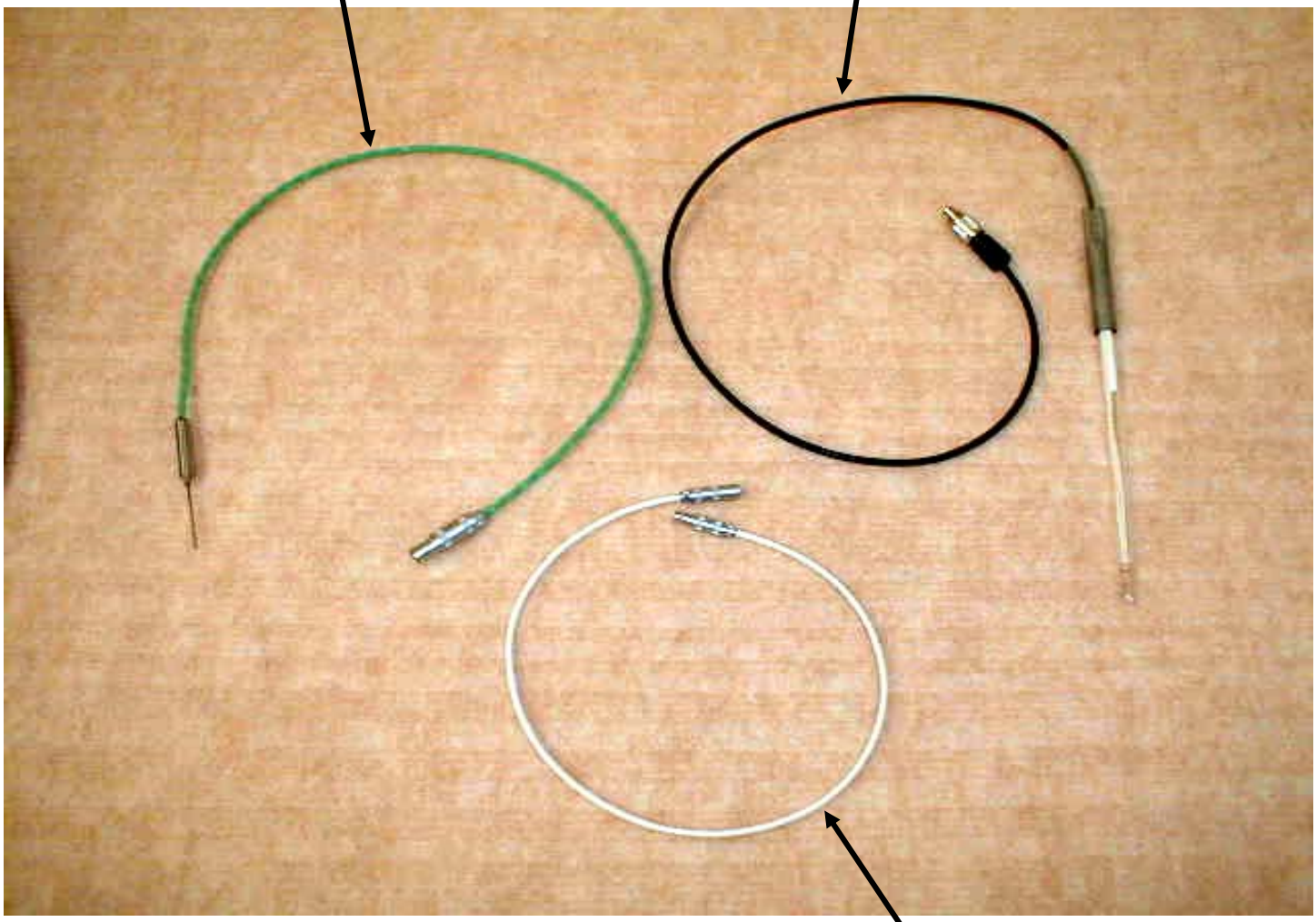
– SET OF ACCESSORIES



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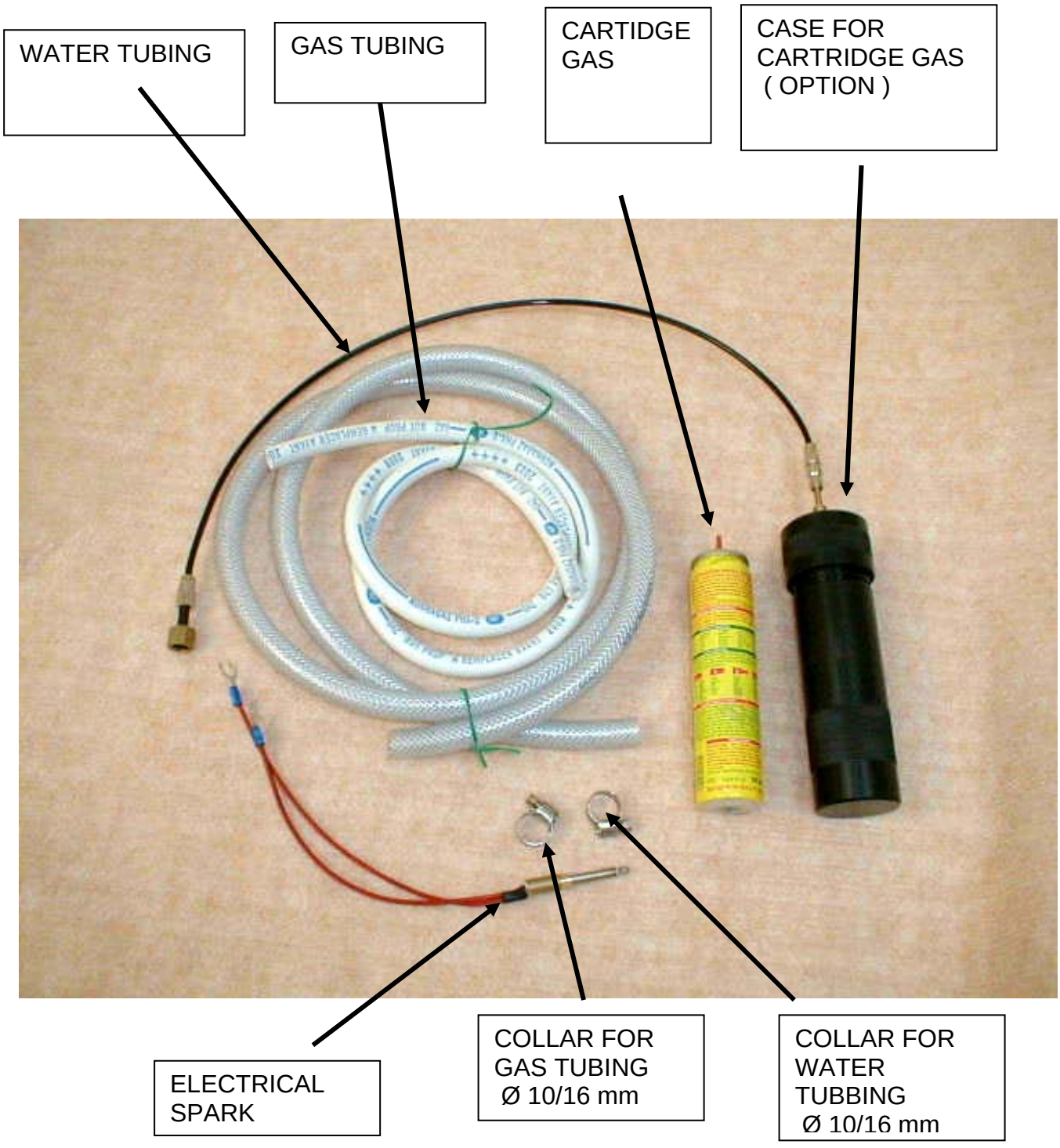

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V – METHODS AND STARTING UP

- 5.1 - STANDARDS

The instrument conforms to the following standards:

- EN 22719
- ISO 2719
- ASTM D 93
- IP 34

Determination of a closed cup Flash Point of fuels, lubricating oils, liquids with suspensions of solids and liquids that tends to form a surface film under test conditions. A 75mL test specimen is heated at a slow constant rate with continual stirring in a brass test cup of specified dimensions with cover of specified dimensions. An ignition source is directed into the test cup at regular intervals with simultaneous interruption of the stirring. The flash point is the lowest liquid temperature at which application of the ignition source causes the vapor of the test specimen of the sample to ignite.

• Test range	0 to 400 °C
• Repeatability (1)	Up to 104 °C ➔ 2 °C Above 104 °C ➔ 5.5 °C
• Reproducibility (1)	Up to 104 °C ➔ 3.5 °C Above 104 °C ➔ 8.5 °C

- 5.2 - METHODS

METHOD	SLOPE °C/MIN	1st FLAME PRESENTATION	SPEED	STIRRING
A	5 to 6 °C/min	18 °C before expected T°	1 °C < 110 °C 2 °C > 110 °C	90 to 120 RPM
B	1 to 1.5 °C/min	"	"	240 to 260 RPM
Ambient	Natural rise	At first degree	1 °C	90 to 120 RPM or without stirring
Bitumen (preheating +B)	**	18 °C before expected T°	1 °C < 110 °C 2 °C > 110 °C	Without stirring 240 to 260 RPM
Quick A	Average 12 °C/min then 5 to 6 °C /min at expected T°– 50 °C	"	"	90 to 120 RPM
Search of an unknown Flash Point	A or B or Bitumen or Quick A	At first degree	1 °C < 110 °C 2 °C > 110 °C	As per the method

*** Sample preheating at programmed t° without stirring, than test starts up with stirring at programmed T° with a method B slope.*

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- 5.3 – STARTING-UP

5.3.1 – Rear panel connections

For water cooling:

- connect the inlets/outlets with refrigerated water (5 psi maximum), fasten the clamps, switch on the water circuit and check that there is no leak

For gas connection (50 mbar max.):

- connect the gas, fasten the clamps (the automatic valve is closed out of test, check that the flame valves are closed), switch on the gas and check that there is no leak.

- connect the PC and/or printer cables if necessary

- connect the power supply cable

WARNING: Connect the cooling system to a soft water supply or a drinking water supply. Hard water may cause a premature limestone progressing. In that case, the cooling system efficiency is decreasing, clean the cooling system with an anti-limestone rinse (vinegar, anti-limestone kettle). Rinse the cooling system before using the tester. Do not use acids since the pipes are made of copper. Periodic preventive anti-limestone treatments are recommended.

5.3.2 – Front connections of the tester

Connect :
* the glass Pt100 probe
* the detection cable (the lid mass spiral must correctly lean on the connector cable)
* the thermocouple detection cable

Use with electric ignition :

- Set the electric spark in its stand.
- The inserted ring is designed to correctly position the spark
- Connect the 2 spark wires with the 2 electrical supply given (see schema).
- Tune up the electrical supply potentiometer of the heating spark at 7/8 for the first run.

Note : the heating spark is supplied with AC at low voltage.

The use of the instrument with a heating spark absolutely requires to disconnect gas supply on the rear panel.

5.3.3 – Power supply connection

- Check the voltage indicated of the instrument and be sure it is equivalent to the laboratory supply to be used.

- Press the switch located on the rear panel of the tester

- During the central unit inititialization, the screen remains empty. After around 20 seconds, the instrument is ready and the screen provides parameters and data.

VI – SOFTWARE DESCRIPTION

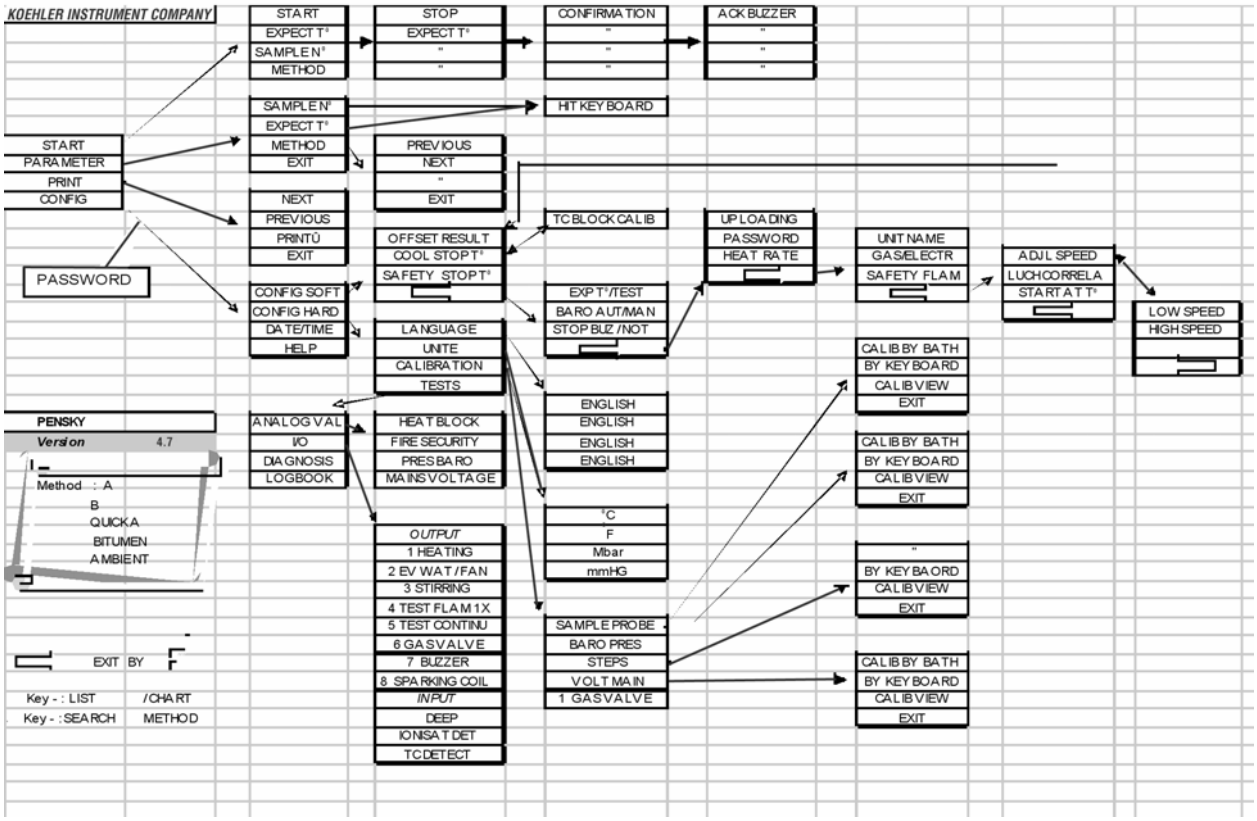
- 6.1 – SCREEN

The main screen has arrows and icons for making choices of programs to run.

- 6.2 – PROGRAM SCHEMAS

Note : Access to programs and options is provided with a « click » on the arrows located on the right of icons. The screen is not a tactile one and a strong pressure on displayed icons could deteriorate the screen.

Each menu or sub menu is designated by an icon. Their signification is summarized hereafter :



Note : in any case (except after entering data), a pressure on  key will provoke to return to the main screen or to the previous display.

VII – RUNNING A TEST

Handling liquid petroleum products or equivalent ones requires to wear protective gloves, glasses and clothes. Do not handle flammable products near a source or a flame.

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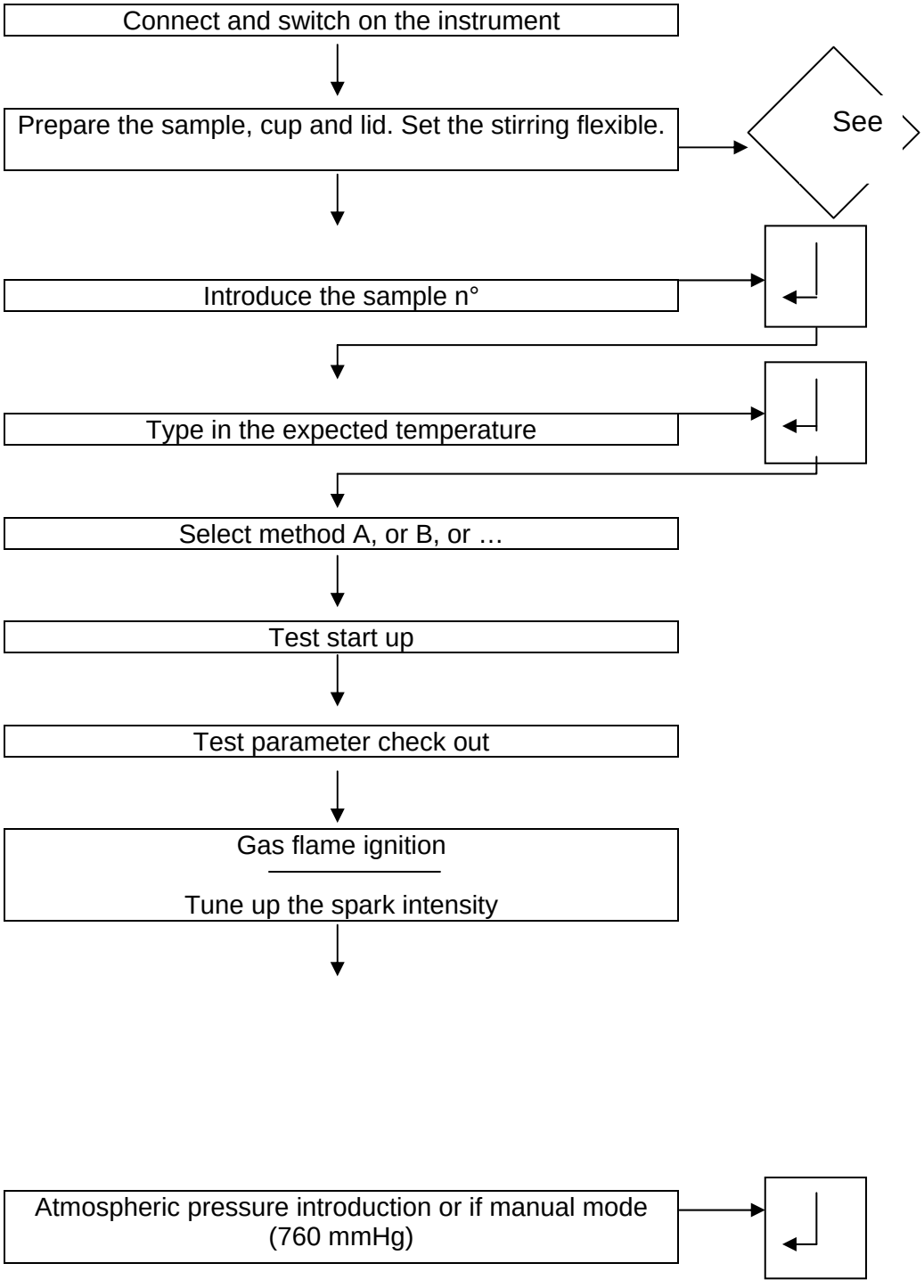
- 7.1 – TESTING PROCESS



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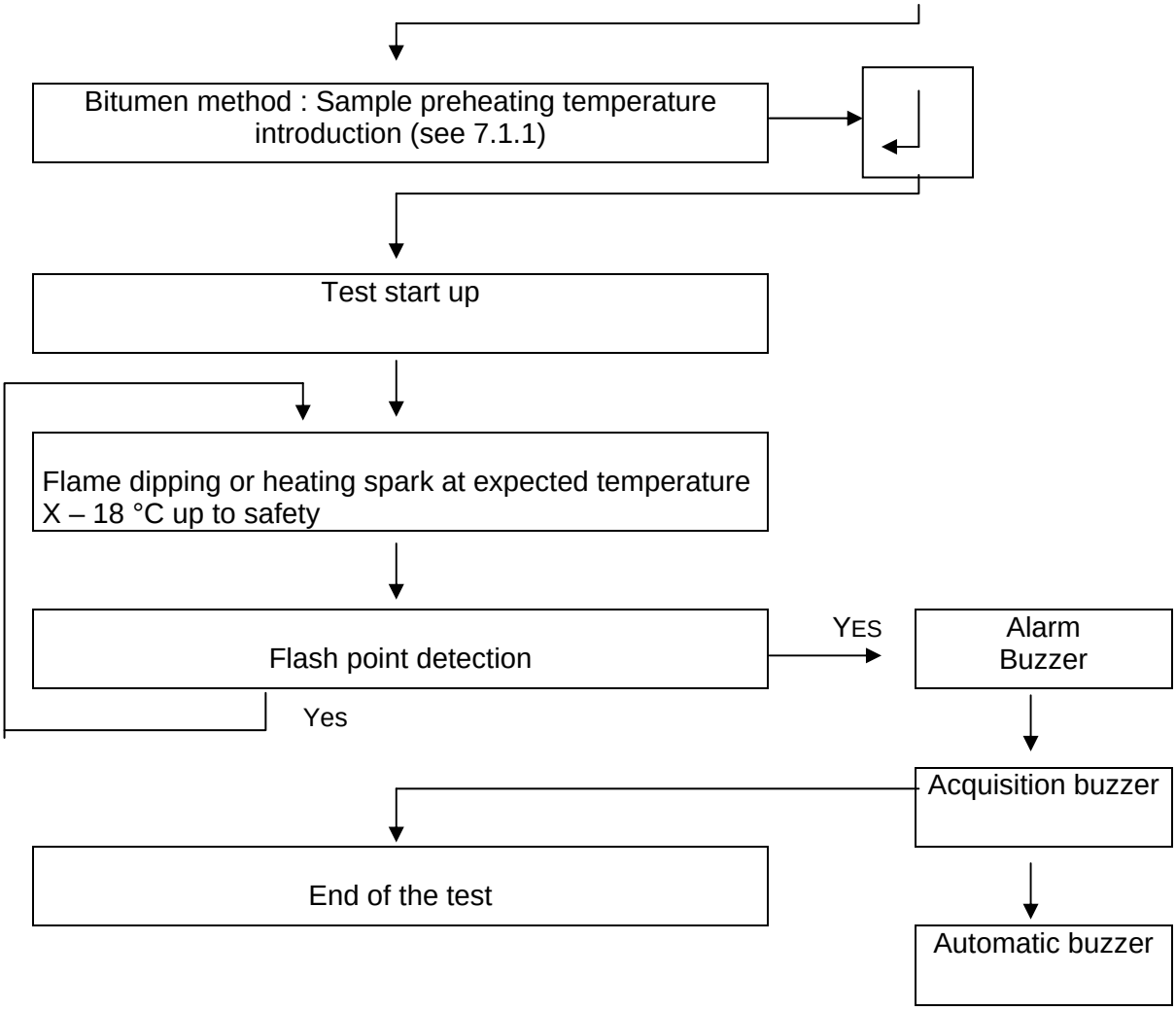

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- 7.1.1 – Bitumen method

- Aimed at viscous or thick samples at ambient temperature.
- Stirring and test will effectively start up when sample has reached the preheating temperature.

The stirring system can be severely damaged if the sample is not fluid enough or if the preheating temperature is too low.

- 7.2 – STARTING A TEST IN « SEARCH » MODE FOR A PRODUCT CORRESPONDING TO THE SPECIFICATIONS OF THE PENSKY MARTENS METHOD AND FOR WHICH THE FLASHPOINT IS UNKNOWN.

- Enter the expected T° C
- Enter a sample identification number by pushing on (-) key
- Start the test like in 7.1

The instrument carries on flame dipping as soon as the beginning of the test, every 1 or 2 °C. The slope is automatically set up according to selected method.

Note : for a larger « search » area without several selections of expected temperature, it's possible to modify through keyboard the alarm and safety stop related to expected temperature.

- 7.3 – QUICK METHOD (OUT OF STANDARD)

The method consists of performing tests with the A method, on known samples with a temperature slope higher than 10 °C /min.
This method allows to rapidly approach the Flash Point value of the sample. In order to get the correct value, a second test with the standardized method is necessary.

VIII – PRINTING RESULTS

- 8.1 - TYPES OF PRINTERS

- Ticket printer (delivered with the instrument)
- All types of 80 column printers (except laser printer)

- 8.2 –PRINTING CURRENT TEST RESULTS

Automatic right after the « end of test » buzzer alarm.

- 8.3 – PRINTING PREVIOUS TEST RESULTS (see chap. VI)

Possibility of printing out results of the previous 100 tests when necessary.

- 8.4 – PRINTING TEMPERATURE SLOPE

(see chap. VI "software configuration).
(see chap. 11.2.9)

Allows to follow up the sample temperature increase during the test (print out every minute starting after 5 minutes).

- 8.5 – PRINT OUT EXAMPLES

FLASH POINT PENSKY-MARTENS
ISO 2719 ASTM D 93 IP 34/85

App :3711
Date : 1/12/1998 Time : 15 :36
Duration :48 :08
Sample : 236
Expected temperature : 250 °C
Method : A
Bar. Corr. : 760 mmHg
Nb of dips : 32
Flash point : 122.0 °C
Corr. Flash Point : 122.1 °C
Flam Gas Flash
NB OF DIPS > 20

- 8.6 – LOCK BOOK PRINT OUT

Printing the lock book makes available the necessary pieces of information to follow up the instrument in terms of Quality Assurance.

FLASH POINT PENSKY-MARTENS
ISO 2719 ASTM D 93 IP 34/85

App :3711
Date : 1/12/1998 Time : 15 :36
Duration :48 :08
Sample : 236
Expected temperature : 250 °C
Method : A
Bar. Corr. : 760 mmHg
Nb of dips : 32
Flash point : 122.0 °C
Corr. Flash Point : 122.1 °C

Flam Gas Flash
NB OF DIPS > 20

CONFIGURATION : V1.2
App : 3711
Date : 8/4/1999

Stop safety at expected temper + 20 °C
End of cold : 040 °C
Write ET at each test : No
Flash by : Gas
Security Flam Ok : No
Atmo pressure calibration :
690 mmHg / 920 mbar -> 0101 pts
800 mmHg / 1066 mbar -> 0211 pts
Last calibration of Pressure : 24/02/1999
Power Supply Calibration :
210 V -> 0033 pts
245 V -> 0129 pts
Last Calibration of supply 24/02/1999
Corrected result : 0.0 °C
Start Param (%) : 080 060 032
Temperature :
119.4 ohms -> 50.0 °c -> 186796 pts
153.6 ohms -> 140.0 °C -> 316873 pts
Last temperature calibration : 24/02/1999
Nb of test since last calibration : 41
Nb of test since first uses : 112

IX – SAFETY

- 9.1 – PT100 PROBE ABSENCE

When starting a test, the instrument automatically checks out the presence or absence of the sample probe. In case of absence, the test can't be performed, a warning message is displayed on the screen and a buzzer sounds.

- 9.2 – DEFAULT IN SAMPLE TEMPERATURE INCREASE

The test automatically stops and a buzzer sounds when the recorded sample temperature remains unchanged after 10 min of test.

- 9.3 – ELECTRIC SAFETY

An electric safety of the heating block is programmed in the factory at 550° C. When the safety operates, a sound alarm with the following displayed message « High Safety » appears. To recover the normal functions of the tester, it's necessary to switch off the instrument and to start it again.

If the problem keep on occurring, the instrument has to be disconnected and the local distributor's maintenance department has to be contacted.

- 9.4 – SAMPLE TEMPERATURE SAFETY

The sample temperature safety is determined by adding X degrees to the expected test temperature during the keyboard configuration procedure.

Limits are from +15 °C to +99 °C above the expected T°.

A buzzer sounds when the sample temperature reaches 15 °C under this limit. It's then possible to modify the expected temperature to carry on the test.

A buzzer sounds with a displayed message « Safety Stop » when this limit is reached : acquisition by « ACQBUZZER ». The test procedure is cancelled.

The programmed difference between the expected temperature and the safety temperature remains the same whatever the entered expected temperature.

- 9.5 – GAS SAFETY

Automatic cut-off at the end of the test.

Message « Gas Ignition » with a sound alarm at the beginning of the test.

An optic flame detection operates during the test. In case of flame absence during 30 sec, the test is automatically stopped and a buzzer sounds.

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X – INSTALLATION OF SOFTWARE UPDATE

Switch on the instrument.

Enter the « administration » password in order to have access to « new release » in « configuration/configuration software »

Note : the « administration » password is provided with the connection cable kit and the up-dating diskette.

Follow the instructions displayed on the PC's screen.

Connect series port to the PC's COM 1 and restart the PC's with the up-dating diskette (boot included). Follow instructions on PC's screen.

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XI - FEATURES

See chap. VI

This function allows the operator to have access to configuration, control and maintenance functions.

This access can be protected by a password.

- 11.1 –PASSWORD

Initially no password is necessary. A simple validation of the original password allows to have access to the following functions.

In order to define a new password, the following procedure has to be followed :

Press software configuration icon.

Use arrow keys in order to access to "new password" icon (see chap. VI).

Enter the new password and validate.

Confirm this new password and validate.

Switch off and restart the instrument after a few seconds.

Note : The configuration menu remains available prior to any instrument switch off. Afterwards, the new password is necessary in order to have access to it.

- 11.2 – SOFTWARE CONFIGURATION (see chap. VI)

- 11.2.1 – RESULT CORRECTION (see chap. VI)

Possibility of making up results up to +/- 9.9 °C (9.9 °F).

- 11.2.2 – STOP OF BLOCK COOLING (see chap. VI)

Programmable temperature of the stop of the block cooling after test between 0 °C and 60 °C (32 °F to 140 °F).

- 11.2.3 –SAFETY STOP (see chap. VI)

The instrument can be configured in order to stop the test as soon as the preset temperature is reached. This temperature has to be between 15 °C and 99 °C (27 °F à 178 °F).

- 11.2.4 – ENTER THE EXPECTED TEMPERATURE (see chap.VI)

Possibility of introducing a different expected temperature each time a new test is started associated with an automatic reset at the end of the test , if requested.

- 11.2.5 – BAROMETRIC PRESSURE (see chap. VI)

Automatic determination of the barometric pressure or manual introduction (status modification with ⇨). ☐

If the manual barometric pressure setting is chosen, the adaptable default value (760 mmHg or 1013 mbar) appears at the beginning of the testing process.

- 11.2.6 - BUZZER (see chap. VI)

Choice of the alarm "buzzer" mode : continuous or 3 minutes.

- 11.2.7 – SOFTWARE NEW RELEASE (see chap. VI and chap. X)

Up-dating of the instrument software.

- 11.2.8 - NEW PASSWORD (see chap. VI)

Allow to change the password.

In order to validate the new password, the instrument has to be switch off. After a new start up, the configuration panel can't be accessed anymore without the newly introduced password.

- 11.2.9 – PRINT OF THE TEMPERATURE SLOPE (see chap. VI)

Allow to print the temperature slope of the current test as well as the result at the end of it or if required only the final result at the end of the test.

(status modification with ⇨).

- 11.2.10 - "TO ESCAPE " FROM SOFTWARE CONFIGURATION PANEL

Press ↵ (except if an expected numerical data is entered)

- 11.3 - CONFIGURATION HARDWARE

- 11.3.1 - LANGUAGE (see chap. VI)

A language has to be selected on screen.

- 11.3.2 - UNITS (see chap. VI)

Pressure and temperature units have to be selected on screen.

- 11.3.3 - CALIBRATIONS (see chap. VI)

Allow to calibrate temperature and barometric pressure measurement, steps at the beginning of the test and the electric network image.

- 11.3.3.A – SAMPLE PROBE (see chap. VI)

Physical calibration

A resistance box simulating a Pt 100 probe (0,01 Ω resolution) and a specific cable to connect the instrument with the resistance box are necessary in order to perform the physical calibration of the sample temperature measurement.

In order to achieve a complete physical calibration of the sample temperature measurement (probe included), it's required to successively put the Pt 100 probes in two thermostatic baths. The temperature gradient between the two baths has to be at least 100 °. Temperatures lower than –50 °C and higher than 450 °C are not acceptable.

1° Connect the resistance box with the specific wire or, in case of a complete calibration with two thermostatic baths, connect the Pt 100 probe with the specific wire.

2° Tune up the resistance box in order to get a low reference value, i.e. 50 °C (see Figure 1) or dip the Pt 100 probe in a 40 °C bath, for example.

3° Type in this low reference value (in °C) and confirm with the "enter" key.

4° Tune up the resistance box in order to get a high value, i.e. 400°C (see figure 1) or dip the Pt 100 probe in a 150°C bath, for example.

5° Type in this high reference value (in °C) and confirm with the "enter" key.

A « calibration refused » message indicates a wrong calibration, which has to be performed again.

Figure 1

°C	Ohms
0	100
50	119.4
100	138.5
150	157.32
200	175.84
250	194.08
300	212.03
350	229.69
400	247.06

To issue a lock book (see chap. VI and 11.3.4.D).

Information stored in the lock book could be used for a multiple point calibration in case of unexpected loss of calibration data.

Display of sample probe calibration values

Allows to check up the conversion values of the probe calibration.

Point calibration

In case of an unexpected loss of calibration values, it's possible to type in a calibration by conversion point value. It's also possible to type in a calibration value by conversion points previously edited on the lockbook.

A calibration through conversion points required for the low and high reference temperature to be entered.

- 11.3.3.B – BAROMETRIC PRESSURE (see chap. VI)

Physical calibration

The physical calibration of the barometric pressure measurement system requires :

- Either a device able to reach a 920 mbar pressure with a +/- 1 mbar precision of 920 mbar (690 mmHg) and a 1066 mbar – (see cap. III for connection.
- Either a voltage generator able to provide a 4.345 V (for 920 mbar) and 4.877 (for 1066 mbar) – (see chap. III for connection). A specific wire is also necessary.
- Connect the pressure generator or the voltage one with the specific wire.
- Apply a pressure equivalent to 920 mbar and press « Enter » key (see figure 2)
- Apply a pressure equivalent to 1066 mbar and press « Enter » key (see figure 2)
- A « calibration refused » message indicates a wrong calibration, which has to be performed again.

Figure 2

Mbar	mmHg	mV
920	690	4345
1066	800	4877

To issue a lock book (see chap. VI and 11.3.4.D).

In case of an unexpected loss of calibration values, it's possible to type in a calibration by conversion point value. It's also possible to type in a calibration value by conversion points, previously edited on the lockbook.

Display of the calibration values.

Allow to control the conversion point values of the sensor calibration.

Point calibration

In case of an unexpected loss of barometric calibration values, it's possible to type in a calibration by conversion point previously edited in the lockbook.

The point conversion calibration requires to enter the high and low pressure corresponding to the conversion points.

- 11.3.3.C – PRE TEST STEPS (see chap. VI)

3 steps can be defined at the beginning of the test. Those steps determine the 3 heating power during the first 5 minutes of the test in order to benefit from the optimum start conditions. Electrical power variations are automatically compensated during the 5 first minutes (see 11.3.3.D).

Step calibration

Through keyboard enter the 3 percentages corresponding to the required heating power. Step 1 controls the heating power for the first minute, Step 2 between minute 1 and 3, and Step 3 between minute 3 and 5.

Press  after each data introduction.

Step display.

Allow to control steps' values when starting the test.

- 11.3.3.D – ELECTRICAL SUPPLY REGULATION (See chap. VI)

The electrical supply regulation guarantees that for the first 5 minutes of the test, any public electric supply variation will have no impact on the provided heating power during the 3 start up steps.

Physical calibration

The physical calibration of the electrical supply regulation requires an auto variable transformer with a minimum operating range at least between 210 V and 245 V.

The electrical supply of the instrument through the auto transformer has to be maintained only during the calibration process.

The procedure is the following :

Apply a 210 V power supply (wait for roughly 1 minute prior calibration). Enter the value 210 and press "enter" key.

Apply a 245 V power supply (wait for roughly 1 minute prior calibration). Enter the value 245 and press "enter" key.

Issue a lock book (see chap. VI et 11.3.4.D). The information contained in this lock book could be used afterwards for a point calibration in case of an unexpected loss of calibration data.

Electrical power supply regulation display

Allow to control the calibration values of the electrical power supply regulation.

Point calibration

In case of an unexpected loss of the electrical supply regulation calibration, it is possible to enter point calibration values thank to the conversion points previously edited on the lock book.

Point calibration requires to enter the conversion point values corresponding to the voltage displayed on the screen.

- 11.3.4 - CONTROLS (see chap. VI)

- 11.3.4.A - ANALOGIC READINGS

Display of the instrument's analogic entries.

(to end task, press  key)

- 11.3.4.B – LOGIC I/O

Allow to operate the instrument's logic I/O and to display the logic outputs.

(to end task, press  key)

- 11.3.4.C - AUTODIAGNOSTIC

Automatic procedure to install an automatic control of some instruments' components including a report print out.

- 11.3.4.D – LOCK BOOK PRINT OUT

Print out of a lock book with the calibration safety and operation parameters.

Model

CONFIGURATION : V1.2
App : 3711
Date : 8/4/1999

Stop safety at expected temper + 20 °C
End of cold : 040 °C
Write ET at each test : No
Flash by : Gas
Security Flam Ok : No
Atmo pressure calibration :
690 mmHg / 920 mbar -> 0101 pts
800 mmHg / 1066 mbar -> 0211 pts
Last calibration of Pressure : 24/02/1999
Power Supply Calibration :
210 V -> 0033 pts
245 V -> 0129 pts
Last Calibration of supply 24/02/1999
Corrected result : 0.0 °C
Start Param (%) : 080 060 032
Etalonnage Temperature :
119.4 ohms -> 50.0 °c -> 186796 pts
153.6 ohms -> 140.0 °C -> 316873 pts
Last temperature calibration : 24/02/1999
Nb of test since last calibration : 41
Nb of test since first uses : 112

XII - INCIDENTS

A gas over pressure can provoke internal disconnection of pipes, fastenings and valves. In that case, a check out by a qualified technician is mandatory prior to starting up the instrument.

An over heating can provoke damages to internal components, pipes and valves. A check out by a qualified technician is mandatory prior to starting up again the instrument.

Any sample leakage can provoke a fire inside the instrument. A complete clean up by a qualified technician is mandatory.

XIII – MAINTENANCE

- 13.1 - CALIBRATION

Perform a calibration check out at least once a year.

- 13.2 - CONTROLS

The user shall define a periodicity for an autodiagnostic.

The cleaning of the instrument has to be performed as often as possible in order to maintain adequate working conditions (No drastic solvents).

An internal check out of the instrument will be performed depending on the number of achieved tests. In case of intensive use, the instrument should be checked by a duly appointed technician.

- 13.3 – COOLING SYSTEM SCALING

The use of hard water in the cooling system can provoke a stopping in the pipes. In that case, a monthly scaling is recommended.

White vinegar or a dedicated scaling solution could circulate by gravity in the cooling system. In order to improve the efficiency of the procedure, the heating block can be heated a little.

In any case, avoid using acid or strongly corrosive products, because the cooling system pipes made of copper, will be severely damaged.

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XIV – ACCESSORIES ET REFERENCES

- 14.1 – ACCESSORIES

Designation
Cup
Complete cover
Glass Pt 100 probe
Ionization detection wire
Thermocouple detection
Stirring spring
Ticket printer
Paper roll for ticket printer
Ink ribbon for ticket printer
Electric test spark
Reinforced water pipe (10x16) minimum 5 meters
Gas pipe (back side connection) 1 meter
Gas tube for test flame. minimum 2 meters

- 14.2 – OPTIONAL ACCESSORIES

Designation
Wire for sample temperature calibration
Extension wire for Pt 100 probe (calibration with thermostatic baths)
Wire for barometric pressure sensor

XVI – YOUR KEY CONTACT

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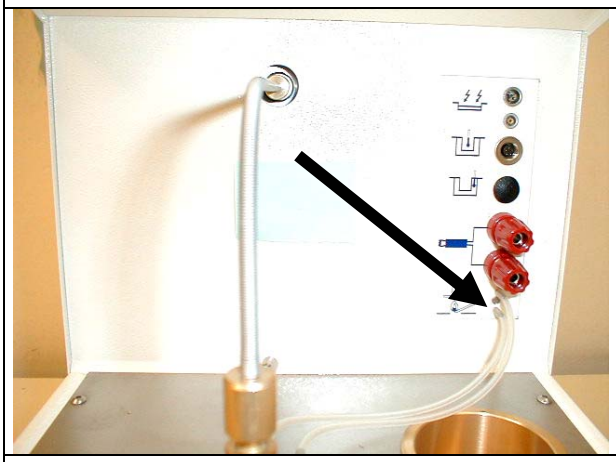
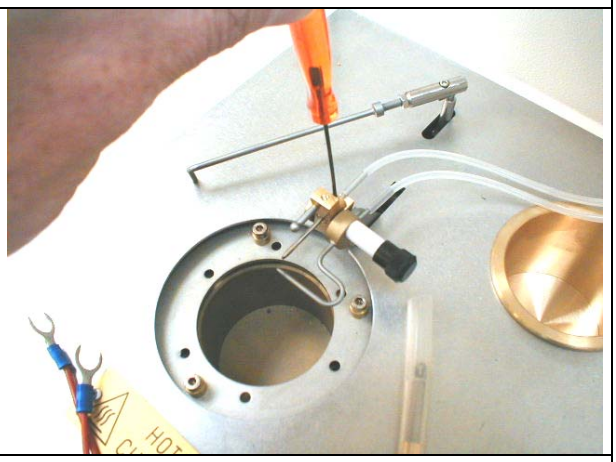
XV To put into service the electric ignition on the apparatus

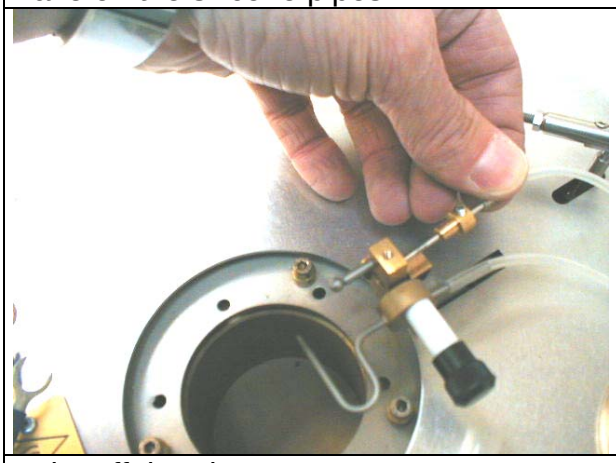
(i.e., not using gas ignition.)



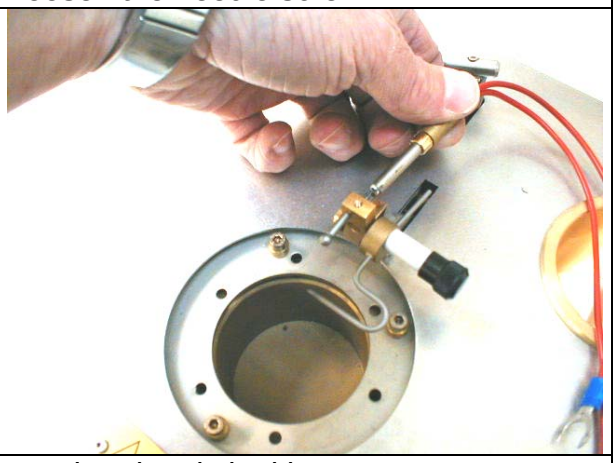
Take off the silicone pipes



Loosen the needle screw



Take off the pipe



Put the electric ignition

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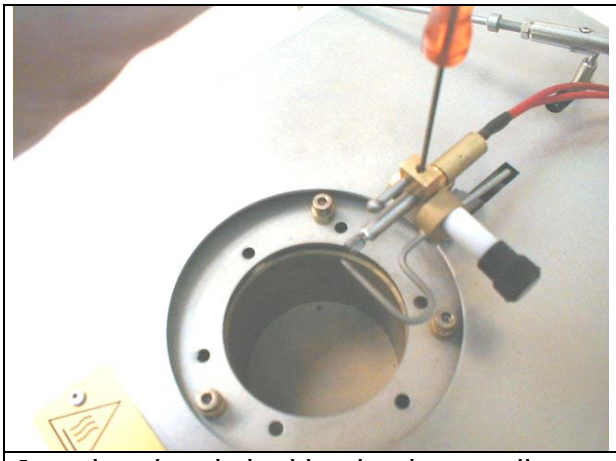
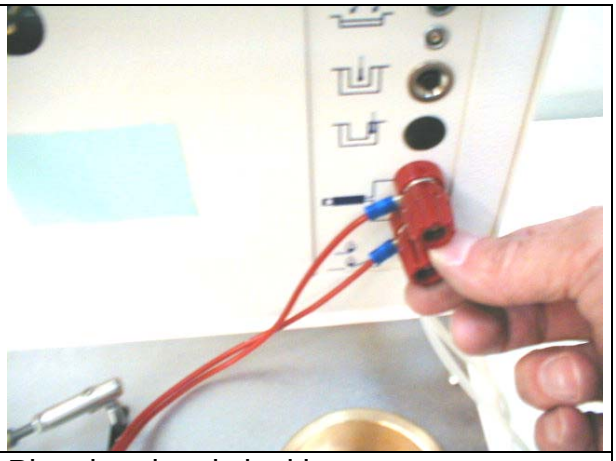
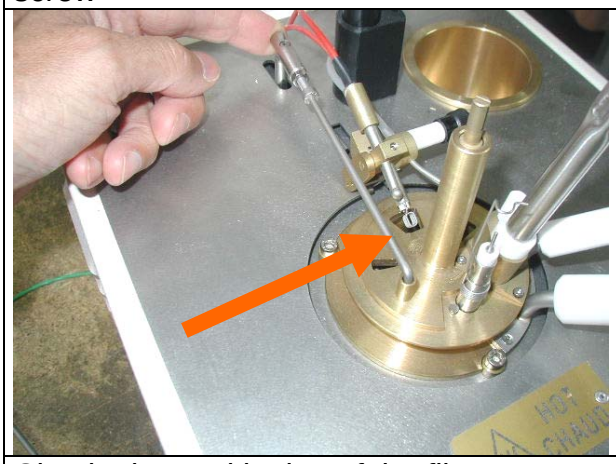
	
Jam the electric ignition by the needle screw	Plug the electric ignition
	
Check the positioning of the filament It can not touch the edge of the lid	Configure by keypad the electric ignition See the flow chart

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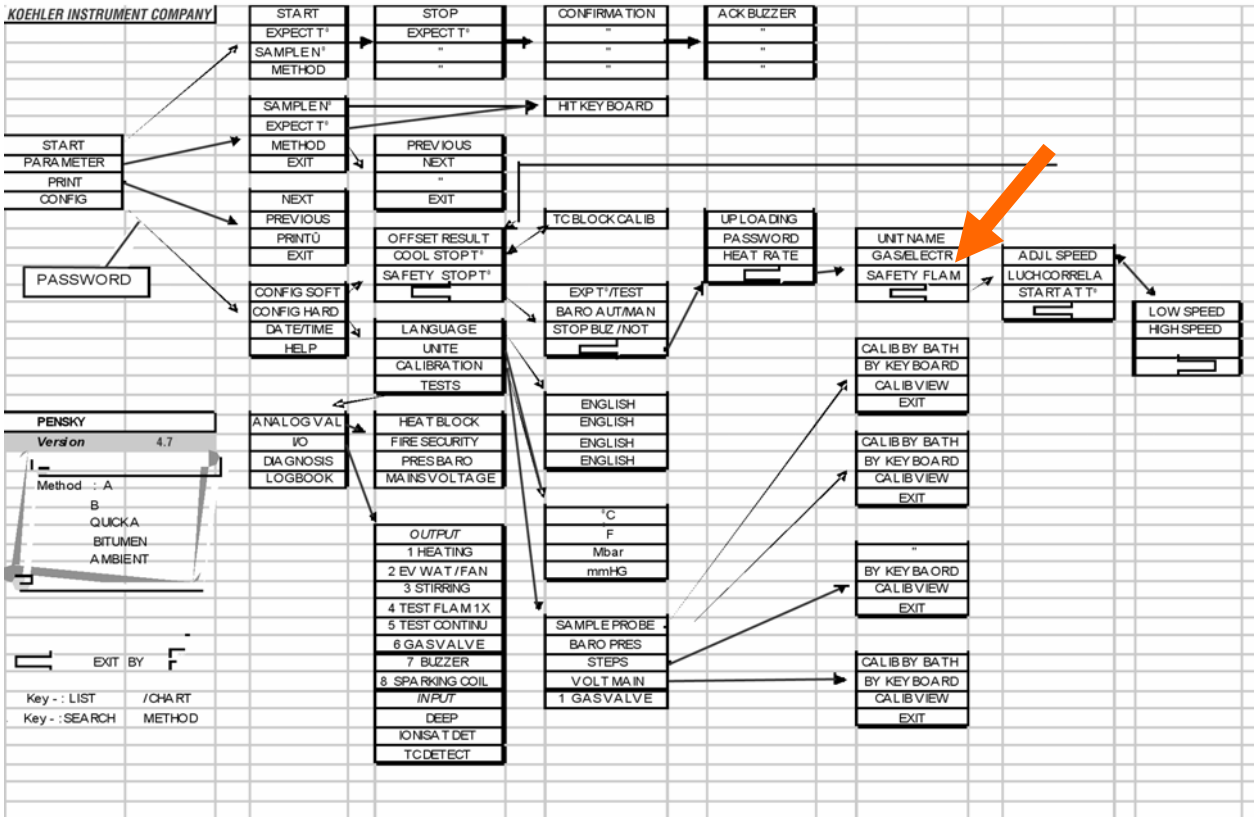

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XV Troubleshooting

Troubles shooting

- Offset on the flash point
  - Mechanical problem
    - insufficient openning of the trap (hatch)
    - depth dive too weak
    - bad stirring
  - Size of the flame not correct
  - Bad volume of the sample
  - bad slope of temperature
    - bad start power level
    - board of main supply correction out
    - electro-valve with leak
    - starting temperature of sample not correct
- illogical values of flash point
  - Sample with water (default detection with ionisation)
  - Sample with silicone (default detection with ionisation)
  - faulty ionisation cable
  - faulty thermocouple

XVI Error codes

Trouble code on the report

-55	Overflow in the cup (emulsion)
-66	security flam (ignition gas or electric)
-77	safety stop (no detection)
-88	Flash on the first dip
-99	Manual stop

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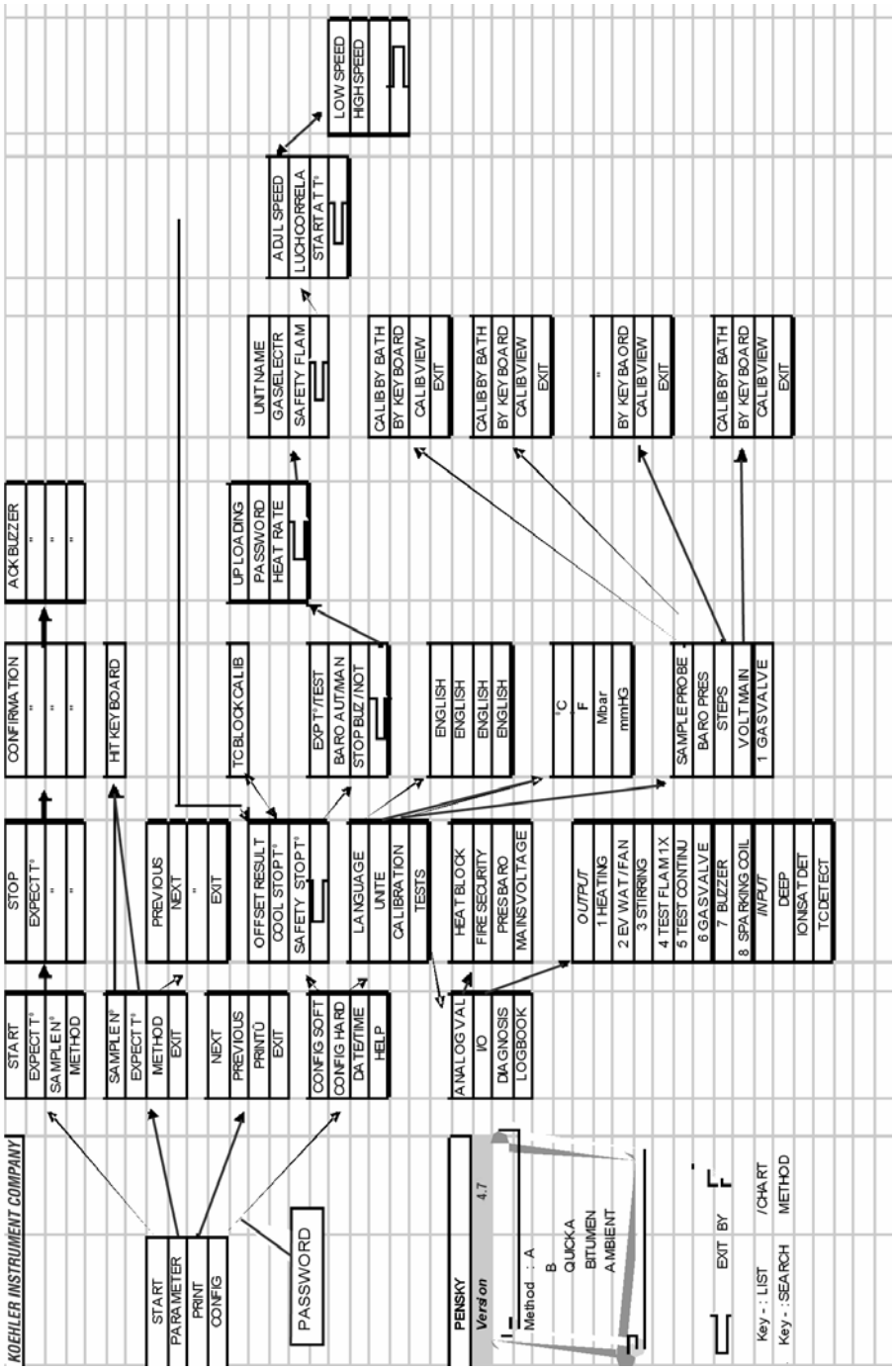
XVII Chart of the functions



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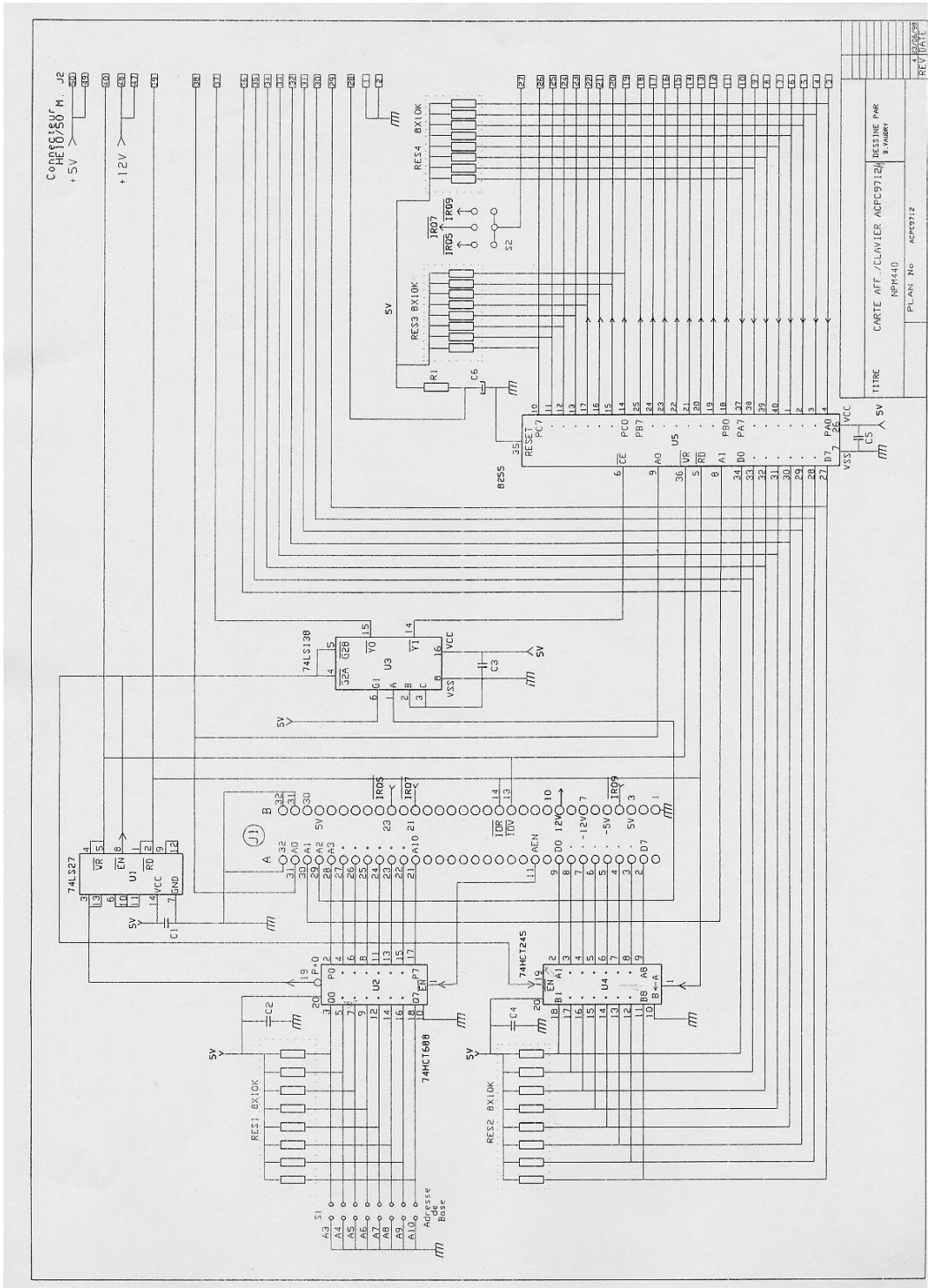
XVIII – ELECTRIC AND ELECTRONIC SCHEMES



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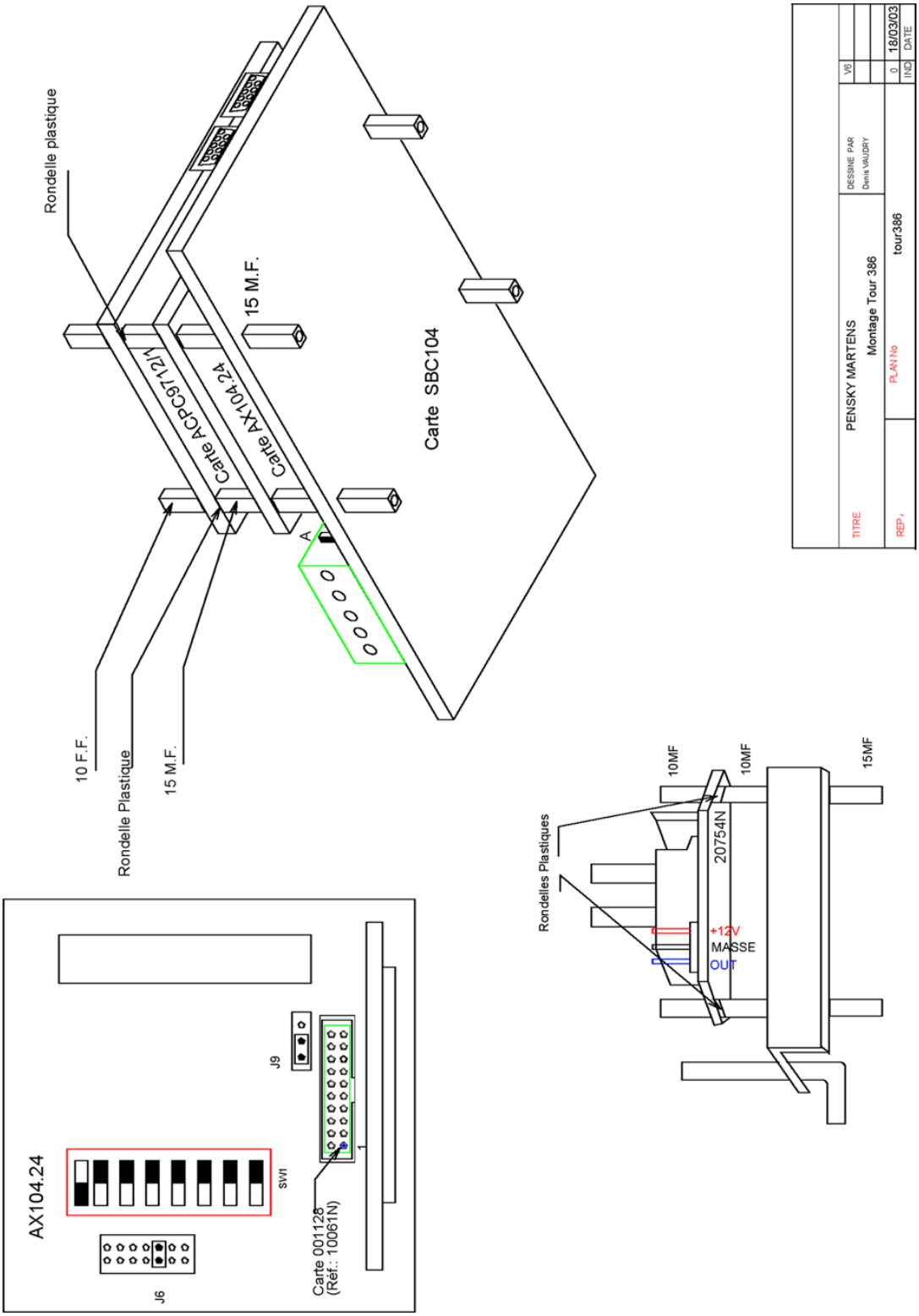

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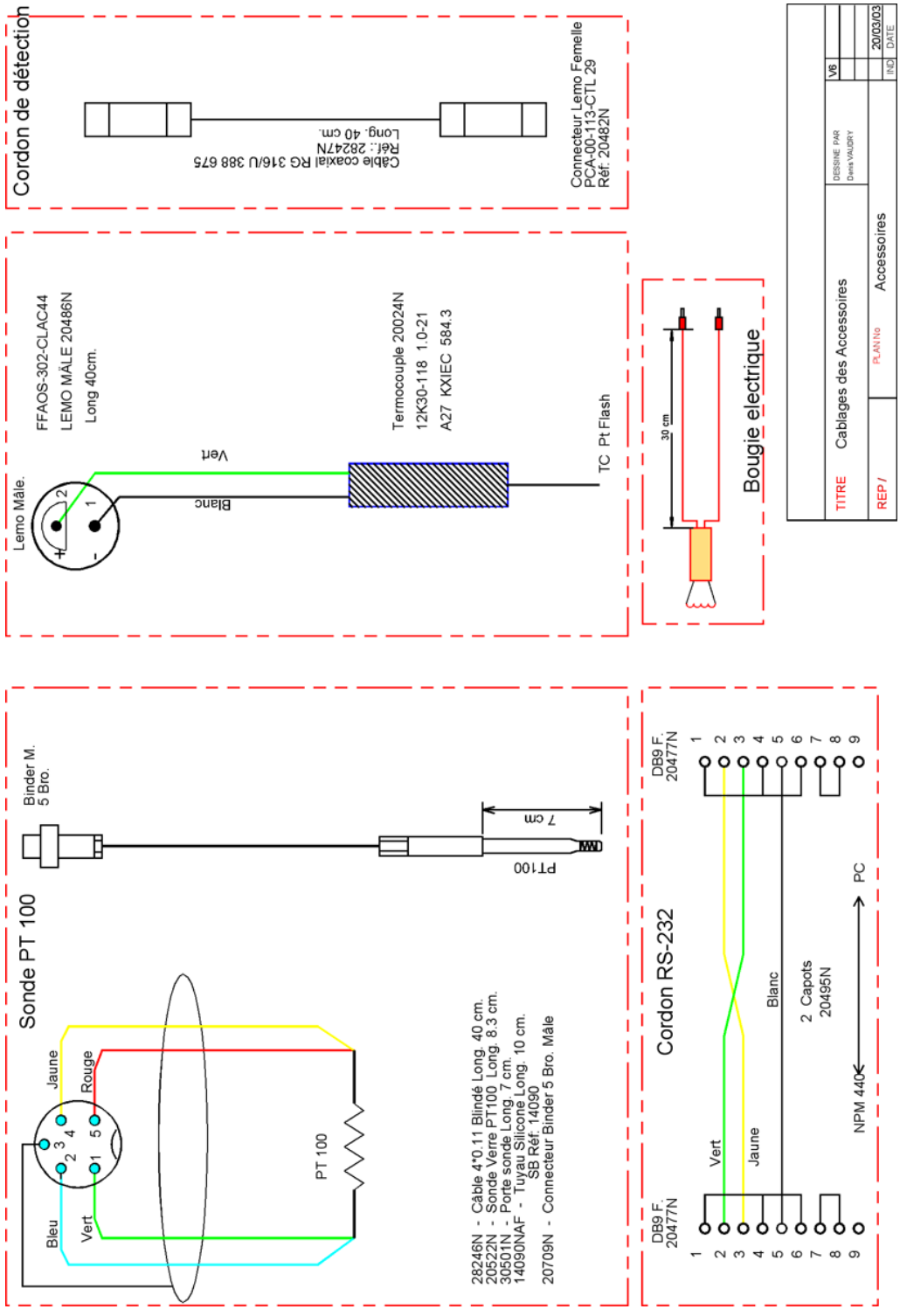

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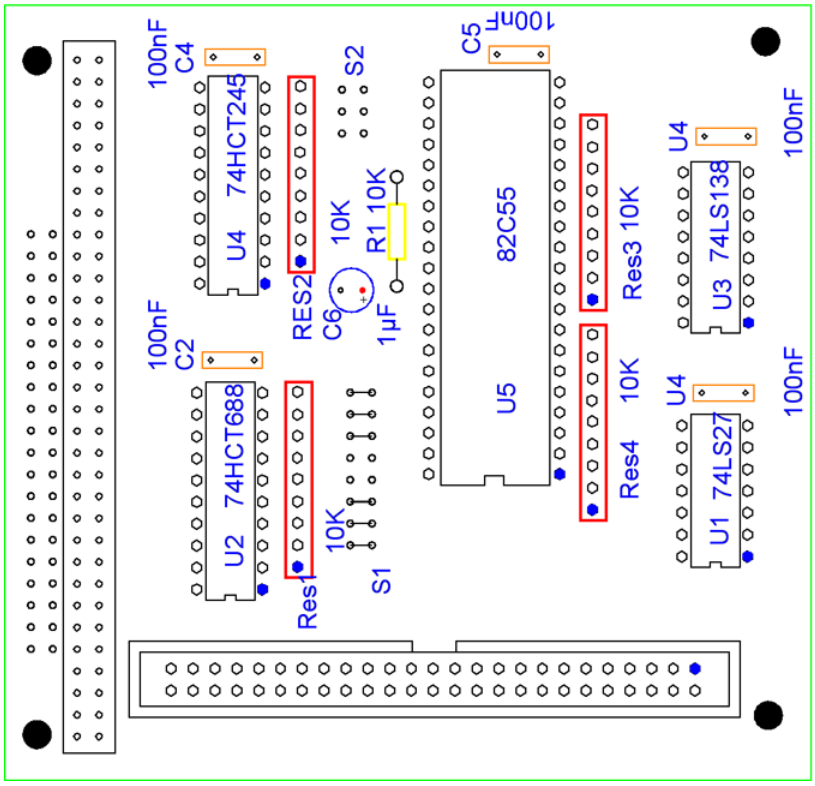

TITRE	CARTE ACPC9712/1	DESSINE PAR Denis VAUDRY	
REP /	PLAN No Câblage ACPC9712	4	25/06/03
		IND	DATE

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