DIESSE DIAGNOSTICA SENESE S.p.a.

MINI-VES

Service Manual

Release 2.0.0. - English

Automatic instrument for the determination of the erythrosedimentation rate (ESR)

(patent pending)

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1. MINI VES - INTERVENTION PROCEDURES (TROUBLE SHOOTING)

Before performing any type of intervention on the instrument:

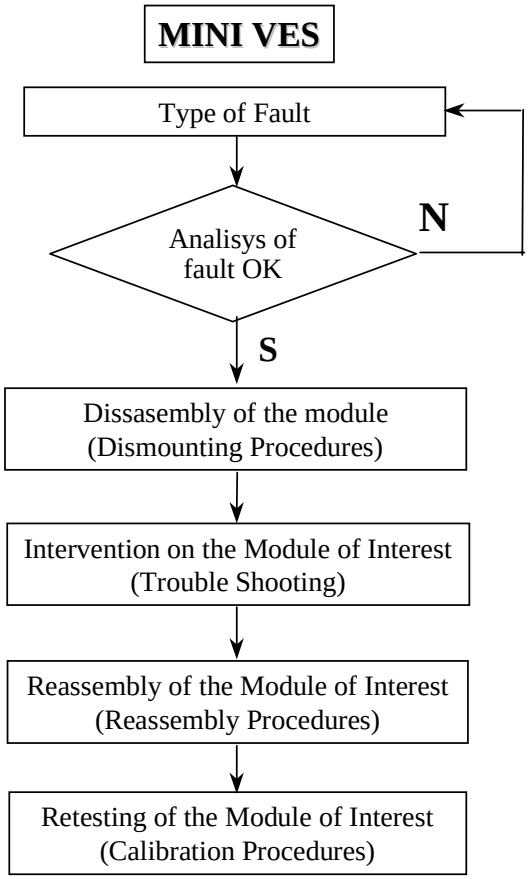
a) SWITCH OFF THE ON/OFF SWITCH ON THE VES MATIC INSTRUMENT.

b) DISCONNECT THE INSTRUMENT FROM THE POWER SUPPLY IN ORDER TO AVOID ANY RISK OF CONTACT WITH ELECTRICAL OR MECHANICAL PARTS UNDER LINE VOLTAGE.

IF THESE BASIC RULES ARE NOT FOLLOWED, THE MANUFACTURER OF THE MINI VES INSTRUMENT WILL ACCEPT NO FURTHER RESPONSABILITY.

1.1. APPROACH TO THE MINI VES INSTRUMENT

1. Observe the recommendations reported in paragraph 1.
2. Open the outer covering of the instrument.
3. Gain access to the module of interest, as described in the procedures reported hereafter (see Flow Chart no. 1).



Flow-chart n°1

1.2. ANALYSIS OF THE FAULTS

The faults reported in the following paragraphs make reference to the Trouble Shooting procedures described for the individual modules, in order to demonstrate the type of approach to follow in these situations.

1.2.1. The instrument does not switch on

a) Check that the mains power supply is working.
b) Check the power cable.
c) Check the ON/OFF switch on the back of the instrument.
d) Check the CPU board (see CPU procedure).

1.2.2. The instrument switches on / Self Test

The instrument is switched on but the Self-Test is performed incorrectly, gives Error codes, or is not performed at all.

a) The Self-Test is not performed
Check the CPU board (see CPU procedure).

b) The Self-Test is performed incorrectly - Error codes are visualized.
During the Self-Test the following Error Messages may appear on the display:

1) Sensor xx K.O.
Check that no cuvettes are present during the Self Test.
Replace the Sensor Board code 30100042.
Replace CPU Board code 30100002.

2) Error reading
Replace photocell code 30100100 (Home position).
Replace photocell code 30100100 (Counter).
Replace CPU Board code 30100002 .
Replace Motor code 30100010.

1.2.3. The instrument is switched on / Display

The display does not visualize any message; alternatively, strange figures appear.

a) Replace the Display code 30100030.
b) Replace CPU Board code 30100002.

1.2.4. The instrument switches on / Keyboard

The instrument does not accept any command introduced via the keyboard.

a) Replace the keyboard code 30100690.
b) Replace CPU Board code 30100002.

2. MINI VES
PROCEDURE TO DISMOUNT AND TO REASSEMBLE

Proceed step by step as reported below:

1. Procedure to dismount:

a) Follow the recommendations in paragraph 1 points a) and b).

b) Unscrew the 4 screws (11101634) underneath the instrument.

c) Open the lower covering (30200181)

d) Disconnected all cables connected on CPU Board (30100002).

e) Unscrew the 2 screws (1110390G) which block the internal covering (30200170) and the external covering (30200161).

2. Procedure to reassemble

Perform the operations for the dismounting procedure in reverse order.

Note: Pay attention that during reassembly the cables do not jammed to mechanical parts (in particular to the Counter Dish (10300190)).

3. SERVICE MENU

Description of the Service Menu Function :

EN/DIS CKD = to active and disactive the CHECK DEVICE

RESET CKD = to reset the CHECK DEVICE to the initial value.

CLEAR CKD = to clear the CHECK DEVICE

SET CKD = to set (100 tests for once) the CHECK DEVICE

TIME NORMAL/FAST = to convert Minutes into Seconds

TEST FUNCTION = to check the Motor

TEST SENSOR = to calibrate the Sensors

Press the ⓓ key to visualize these functions

Press the RUN key to enter and utilize these functions.

4. PROCEDURES TO FOLLOW FOR INTERVENTIONS ON THE DIFFERENT MODULES

This section gives details of the Trouble Shooting to be performed periodically or after a repair, or in any case to check the correct operation of all the functions of the instrument.

4.1. Service Manual SENSOR READING Board code 30100042

4.1.2. General

4.1.1.1. Aim

The present document furnishes details of the Trouble Shooting procedures regarding the Sensors Reading module code 30100042, assembled on the MINI VES.

4.1.1.2. Applicability

The recommendations contained in the present document are applicable for use in the final service check-up to ascertain the acceptability of the instrument.

4.1.2. Relative documentation

20010000 Scheme of the MINI VES system (in the current edition).

20100011 Electrical scheme of the Sensors Reading Board code 30100042.

30100042 Layout of the Sensors Reading Board code 30100042.

4.1.3. Relative instrumentation

Multimeter Mod. FLUKE 8010A or equivalent.

Philips Laboratory Oscilloscope or equivalent.

Standard laboratory welder.

3-4 mm screw-drivers, pliers, standard laboratory tools.

CPU Board code 30100002.

Power Supply code 30401350.

4 tubes with latex 3ml code 19900490.

4 tubes with latex 6ml code 19900530.

4.1.4. Description of the module

The Sensors Reading Board allows the height of the blood column to be read. It trasforms the optic signal coming through the blood in the cuvette, into an electric signal which is sent to the MPU of the CPU Board where it is processed.

4.1.5. Calibration procedure of the module.

For a correct result in agreement with Westergren's Method, it's necessary to calibrate the sensor with test samples, as described below:

a) Switch on the instrument and wait until the message Select Function appears on the display.

b) Press consequently

3 times the RUN key, 3 times the ↓ key and another 2 times the RUN key.

c) Press the ↓ key until TEST SENSOR appears on the display.

d) Insert 4 test cuvettes with latex 3 ml code19900490.

e) Four D's (dark) should appear on the display.

f) If one or more L's appears, turn the trimmer corresponding to the position which indicates L in the clock-wise direction, and repeat the test from point e).

g) Insert 4 test cuvettes with latex 6 ml code19900530.

h) Four L's (Light) should appear on the display.

i) If one or more D's appears, turn the trimmer corresponding to the position which indicates D in the anti-clock-wise direction, and repeat the test from point e).

j) If the Trimmer cannot be turned any further, replace the corresponding sensor and repeat the test from point e).

4.2. Service Manual CPU Board code 30100002

4.2.1 General

4.2.1.1. Aim

The present document furnishes details of the Trouble Shooting procedures regarding the CPU Board code 30100002, assembled on the MINI VES.

4.2.1.2. Applicability

The recommendations contained in the present document are applicable for use in the final service check-up to ascertain the acceptability of the instrument.

4.2.2. Relative documentation

20010000 Scheme of the MINI VES system (in the current edition).

20100011 Electrical scheme of the CPU Board code 30100002.

30100042 Layout of the CPU Board code 30100002.

4.2.3. Relative instrumentation

Multimeter Mod. FLUKE 8010A or equivalent.

Philips Laboratory Oscilloscope or equivalent.

Standard laboratory welder.

3-4 mm screw-drivers, pliers, standard laboratory tools.

Power Supply code 30401350.

4.2.4. Description of the module

The CPU Board controls all the peripheral, process the data provided by the reading sensor board and calculate the Westergren value at the first hour , at the second hour and the katz index of each one of the examined samples

Its function can be divided into the following main blocks:

a) MPU	68HC11A1FN	(U1)
b) MEMORY	27C64	(U2)
c) DECODER	74HC138	(U3)
d) POWER SUPPLY	7805	(U6)
e) TIMING+RESET	74HC04	(U7)

4.2.5. Examination of the faults

a) The display does not work
   Replace U7 (74hc14)
   Replace U3 (74hc138)
   Replace U2 (27c64)
   Replace U6 (7805)

b) The program does not start up
   Replace U2 (27c64)
   Replace U1 (68hc11a1)
   Replace U6 (7805)

c) The Home Sensor are not read
   Replace U1 (68hc11a1)
   Replace U7 (74hc14)

d) The command given through the Keyboard are not accepted
   Replace U1 (68hc11a1)

e) The Reading Motor does not move
   Replace U5 (L293D)
   Replace U1 (68hc11a1)

5. MINI-VES EXPLODED VIEW