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10. Maintenance, Trouble-shooting, Ancillaries

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10. Maintenance, Trouble-shooting, Ancillaries

10.1. Maintenance and trouble-shooting

The test set XS92b does not require any particular maintenance. It is recommended that the output current, voltage and frequency be measured at regular intervals (at least once a year) to confirm that they agree with values which have been entered.

10.1.1. Current measurement

The current can be measured during injection via the connector A (AC93) by connecting an ammeter to sockets "I" and "(I)", providing no load or relay is connected (the burden should be as low as possible).
If a relay is connected for testing, the ammeter must be connected in series. The jumper between "I" and "(I)" must be removed.

Providing neither a relay is connected nor are the current amplifier switched in parallel, the procedure is as follows:

Connect an ammeter (accuracy class 0.2) having ranges up to 20 A to the sockets "+I//" and "-I//". The socket strip A must be open-circuit on the unit AC93. Steady-state testing UI is the best measuring mode. In this case, the following parameters must be set and the output measured in both current ranges (IRA = 31 and 30):

I	= 1.0 A (10.0 A)
DI	= 0.1 A
MOD	= UI
FR	= 50.00 Hz
FC	= 033
IRA	= 31 (30)

After making the above settings, press the 'START' key and vary and measure the current. The output must be within ± 1% at 1 A for IRA = 31 and at 10 A for IRA = 30. After recording the measurements press the '0' key.

Also check the fuse (15 in Fig. 2.6) as part of routine testing.

10.1.2. Voltage measurement

Firstly connect a voltmeter (accuracy class 0.1) between the sockets "N" and "U_R" (and then "U_S" and "U_T"). For "U_R" the range should be suitable for measuring 220 V and for "U_S" and "U_T" for 70 V AC. The values entered remain the same as for current measurement. The fault code for measuring "U_R" is FC 001 and for "U_s" and "U_T" FC = 033. A frequency of 50 or 60 Hz must be entered and a voltage increment selected by setting the parameter DU. After pressing the 'START' key the voltage can be varied with the '+' or '-' keys. The measured value must be within ± 1% at 100 V in R phase for fault code 001 and within ± 1% at 50 V and 3 V in all phases for fault code 033. Press the '0' key upon completing the measurements.

10.1.3. Frequency measurement

Fault code FC = 002 must be entered for frequency measurement. Select a voltage between 5 and 50 V. The frequency can be set between 40.00 and 70.00 Hz and the measured value must be within 0.005 Hz of setting.

10.1.4. Replacement of the wet electrolytic condensers

A number of the units are equipped with wet electrolytic condensers which deteriorate with time and it is recommended that they be replaced about eight years after delivery of the test set XS92b.

Only qualified personnel should carry out this work.

Unit NF92

C43 to C46 (Fig. 11.3)

10.1.5. Trouble-shooting

Should the display *XS92b ready* not appear when switching on the test set, its self-testing procedure can be repeated by pressing the reset key (16 in Fig. 2.7). A cause, however, could be that the Baud rate settings do not agree (see Section 7.1.6.).

Before commencing with the trouble-shooting check list, ascertain that the following are in order:

- the connecting cables between the upper and lower racks of the test set and the jumpers between "+I//" and "-I//" of the AC93 are correctly fitted,

- the power supply is applied to the test set,
- the m.c.b. (Fig. 2.4) on unit AI93 is switched on,
- values have been entered for the parameters,
- the fuse in unit AC93 (15 in Fig. 2.6) is intact.

Caution:	**Before removing a plug-in units from a rack (e.g. to check fuses), ensure that the m.c.b. on the unit AI93 is switched off and the power plug is withdrawn!**

The control unit XC92 does not operate, i.e. no input is possible via the PC or handheld terminal

1 Is the DC/DC converter NF92 switched on?

2 • YES: Is the LED "DC" (a in Fig. 2.5) on the NF92 lit?

3 • YES: Press reset button on right-hand side of the test set.

4 Does control unit XC92 operate now?

5 • YES: Enter parameters.
The XS92b is serviceable again!

6 • NO: The XC92 unit is possibly defective.

7 • NO: Switch on DC/DC converter NF92.
Continue trouble-shooting at step 9.

8 • NO: Switch on DC/DC converter NF92.

9 Is the LED "DC" on the NF92 lit?

10 • YES: Continue trouble-shooting at step 3.

11 • Lights up briefly and goes out again; the test set XS92b is defective.

12 • NO: Has the fuse (Fig. 11.3) in NF92 blown?

13 • YES: Replace the fuse and continue trouble-shooting at step 8.

14 • NO: Has the fuse (1 in Fig. 2.4) in AI93 blown?

15 • YES: Replace the fuse and continue trouble-shooting at step 8.

16 • NO: NF92 or AU92 possibly defective.

No current at the output of unit AC93

(measured according to Section 10.1.1.)

1 Is the LED marked "T>>" (e) on AI93 lit?

2 • YES: Wait until AI92 has cooled down and LED "T>>" goes out and then continue trouble-shooting at step 4.

3 • NO: Can current be measured at the output of AC93?

4 • YES: XS92b is serviceable again.

5 • NO: Either AC93 or AI93 is possibly defective.

6 Have the checks (steps 1 to 10) of "The control unit XC92 does not operate" been carried out?

7 • YES: The AI93 is possibly defective.

8 • NO: Carry out checks (steps 1 to 10) and switch on NF92 again. Should there still be no output current, continue trouble-shooting at step 1 above.

No voltage at one or more of the outputs of the unit AC93 ?

(measured according to Section 10.1.2.)

1 Is there a short-circuit on the external testing circuit?

2 • YES: Locate and remove.

3 • NO: Or is a red LED on AU92 lit?

4 • YES: Replace the fuse or allow AU92 to cool and continue trouble-shooting at step 6.

5 • NO: Is the green LED on AU92 lit?

6 • YES: Continue trouble-shooting at step 10.

7 • NO: Press reset button (3 in Fig. 2.5).

8 Can the voltage be measured now at the output of AC93?

9 • YES: XS92b is serviceable again.

10 • NO: Have the checks (steps 1 to 10) of "The control unit XC92 does not operate" been carried out?

11 • YES: Either AU91 or AU92 is possibly defective.

12 • NO: Carry out checks (steps 1 to 10) and continue trouble-shooting at step 8 above.

Should it not be possible to locate a defect by following the above procedure, the test set XS92b or the corresponding plug-in unit must be returned to ABB Power Automation Ltd, Baden, or the nearest ABB agent (see "Notification forms" at the end of these Operating Instructions).

10.1.6. Error messages and signals

Error messages at the hand terminal or in the „Terminal Mode“:

The microprocessor detects the following errors and conditions which are displayed and signalled on the handheld terminal:

"er 1 Syntax ?"	Indicates that the syntax of the entry or program line is incorrect, e.g. wrong parameter designator, letters instead of figures, wrong symbols or number of places, incomplete commands etc.
"er 2 SQ ?"	Indicates that during manual operation the value 0 or 1 has been entered for the parameter SQ. These values can only be used within the program.
"er 3 Config ?"	Appears when the fault code is set to 002 or 003 and an inadmissible step parameter is active.
"er 4 Range ?"	Appears when the test set detects that a parameter has been entered (after 'ENTER') or calculating injection signals (after 'START' or 'RUN') which are out of limits. It also appears if an upper limit of a parameter is entered which is lower than the lower limit.

"er 6 UN < 10 V"	The calculation of the fault quantities would require a reduction of the load voltages below 10 V. Since this is not permitted, injection is inhibited and the values entered have to be changed.
"er 7 I-Range ?"	The lower current range is set, but the processor has calculated a current higher than 1.3 A. The current range must therefore be changed (see control parameter IRA).
"er 8 Div.zero ?"	Inputs have not been made for "ZS" and "ZL" in computing mode "MOD = ZZ" and a division by zero has resulted for the calculation of the injection signals.
"er 10 Logic ?"	Results from an internal software test. Reset the test set!
"er 65 Pgm.name"	Error occurred when carrying out INClude instruction (e.g. INC without program name).
"er 66 End no EP"	Appears at the end of a program, if no EP (end of program) was found, or after RUN "name", if the program does not exist (e.g. because YS92 is missing).
"er 68 RAM occup."	Appears after RUN, EDT or PRT with name, or there is a program already in the RAM.
"er 70 RAM full"	The RAM capacity of 6000 Bytes has been exceeded (entry from terminal).
"er 71 Pgm. fail"	Internal fault, e.g. wrongly coded instruction in the RAM.
"er 76 Nesting"	The number of cascaded instruction blocks (BEG...END) after REP, IF or SBR is over 30.
"er 77 Illeg. END"	Appears after RUN, if one or several END's are programmed without BEG.

"er 78 Illeg. stm"	Appears after RUN, if SBR (sub-routine) found at an inadmissible position.
"er 79 Illeg. stm"	Appears after RUN, if the order of instructions is incorrect, e.g. BEG, BRK or ELS not preceded by IF or the like.
"er 80 No END"	Means that the program (after RUN) was terminated by EP in an instruction block, i.e. a set of cascaded programs does not finish with the first program (e.g. an END is missing).
"er 81 Not found"	The name of the sub-routine was not found when executing CAL.
"er 82 Not found"	Label was not found when executing GOTO.
"er 87 Illeg. stm"	Appears after RUN, if there is a label in an instruction block.
"er 89 RAM full"	Insufficient RAM capacity (6000 Bytes) to accommodate a program with INClude.
"er 94 RAM empty"	Appears when executing STO or EDT, PRT and RUN without a name if the RAM is empty.
"er 95 YS full"	Appears after STO, if there is insufficient capacity on the program memory PCB YS92 for the program.
"er 96 YS ROM"	Appears after STO, if the program to be stored is in a ROM and cannot be overwritten.
"er 97 YS fail"	Appears after STO, if there is no read/write memory or no program memory board YS92.
"er 98 YS no pgm"	When executing PRT, INC or DEL with program name, if the program does not exist or there is no program memory board.

"UN<<" Indicates that the load voltages have had to be reduced (see Section 4.3.2.).

Note: Many of the error messages only appear after the program has been started by RUN. In order to find the line with the error, select the single-step mode TSS 4 immediately the error message appears and then the editor EDT. The line with the error then appears. TSS 0 must be set before a new run can be started.

If no characters or indefinable characters appear on the display of the terminal after switching the test set on, check that the Baud rates set on the control unit (XC92 and the terminal) agree (see Section 7.1.6.).

Error signals

Equipment defects or dangerous operating conditions are signalled by LED's on various units. The small letters in brackets refer to Figures 2.5 and 2.6.

green LED (a, b, d) An extinguished green LED indicates that a unit is not standing by, e.g. auxiliary supply failure.

red LED (c) The voltage amplifier **AU92** of the phase(s) concerned is thermally overloaded and as a result one or several LED's light up and the supply voltage is switched off. The unit can only be restarted after it has cooled down. The supply is also switched off (green LED goes out without any red LED's lighting up) whenever the amplifiers in more than one phase are overloaded simultaneously (current rise). In this case, check the load on the amplifiers (possible short-circuit) and — if everything is in order — the unit can be reset by pressing the white button.

red LED (e)	LED 'T>>' lighting up on the current amplifier AI93 indicates that its thermal overload protection has picked up. This results in the amplitude of the current being reduced to a sixteenth of its setting where the current range IRA = 0 (see parameter list FF) was selected until the unit has cooled down and the red LED has extinguished.
red LED (f)	Whenever the red LED 'Z>>' lights, even if only briefly, the impedance of the burden is too high or the current circuit is interrupted. A voltage greater than 13 V (peak) across the burden will result in a reduction of the current and possibly in falsification of the test results. It is essential therefore that the current circuit be restored or the burden be reduced (see Section 8.1.5.) before continuing testing. The LED extinguishes after about 2 s once the burden is within the permissible limits again. The design of the amplifier output prevents it from being damaged when open-circuited.
handheld terminal	Red, yellow, green, yellow LED's Should one or several of the handheld terminal LED's light up when the test set is switched on, the hand terminal control circuit or the LED('s) are defective. The best solution in this situation is to replace the handheld terminal.

10.2. Ancillaries and spares

When ordering ancillaries and spares, please quote the model and serial number of the test set.

*10.2.1. **Standard ancillaries** (Order No. HESG 440 486 R1)*

1 mains lead 2P + E

1 set of connecting cables with 25 pin plugs at both ends

4 laboratory cables with 2 mm diameter plugs at both ends

3 6.3 A slow fuses (AI93)

4 10 A slow fuses (AI93 / NN93)

3 1.6 A slow fuses (NF92)

3 800 mA slow fuses (AC93)

1 AMP adapter for connector YX90-1 (4 mm diameter pins)

5 jumpers (4 mm diameter pins)

10.2.2. Optional equipment

		Order No.
1	test connector YX91-.	See table Section 10.2.2.
1	connector cable YX92-1, 2 m (see Fig. 11.4)	HESG 441 258 R1
1	connector cable YX92-2, 2 m (see Fig. 11.5)	HESG 441 258 R2
1	connector cable YX92-4, 2 m (see Fig.11.6)	HESG 441 258 R4
1	interposing c.t. WI 23 Z 5/1 A	HE 65 814
1	memory board YS92 fully equipped with 8 EEPROM's	HESG 440 667 R101
1	supplementary rack with voltage amplifier (rack 4)	HESG 440 437 R4
1	D/A transducer unit YU92a with 6 additional signalling relay outputs	HESG 448 517 R1

Table for determining the test plug YX91- …
(see section 1.3.5.)

Test set	Test plug adapter / Test plug unit (Cable)	Test relay	
	Type: Order No.:	Type:	Remarks
XS91, XS92, XS92a/b	YX91 - 4 HESG 216 587 R4	All individual MODURES relays (Except DT..) LZ91, LZ92, LZ95, LZ96	together with test socket unit XX91
XS91, XS92, XS92a/b	YX91 - 6 HESG 216 587 R6	L3, LI4, LZ4, etc...	for relays with comb-type test connector
XS91, XS92, XS92a/b	YX91 - 7 HESG 216 587 R7	any protection relay	connection with banana plugs of a diameter of 4mm or alligator clips

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