

FIELD AND DEPOT MAINTENANCE MANUAL

PP-3620

POWER SUPPLY UNIT



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POWER SUPPLY UNIT
PP-3620

TECHNICAL MANUAL
and
REPAIR PARTS LIST
APRIL 1972



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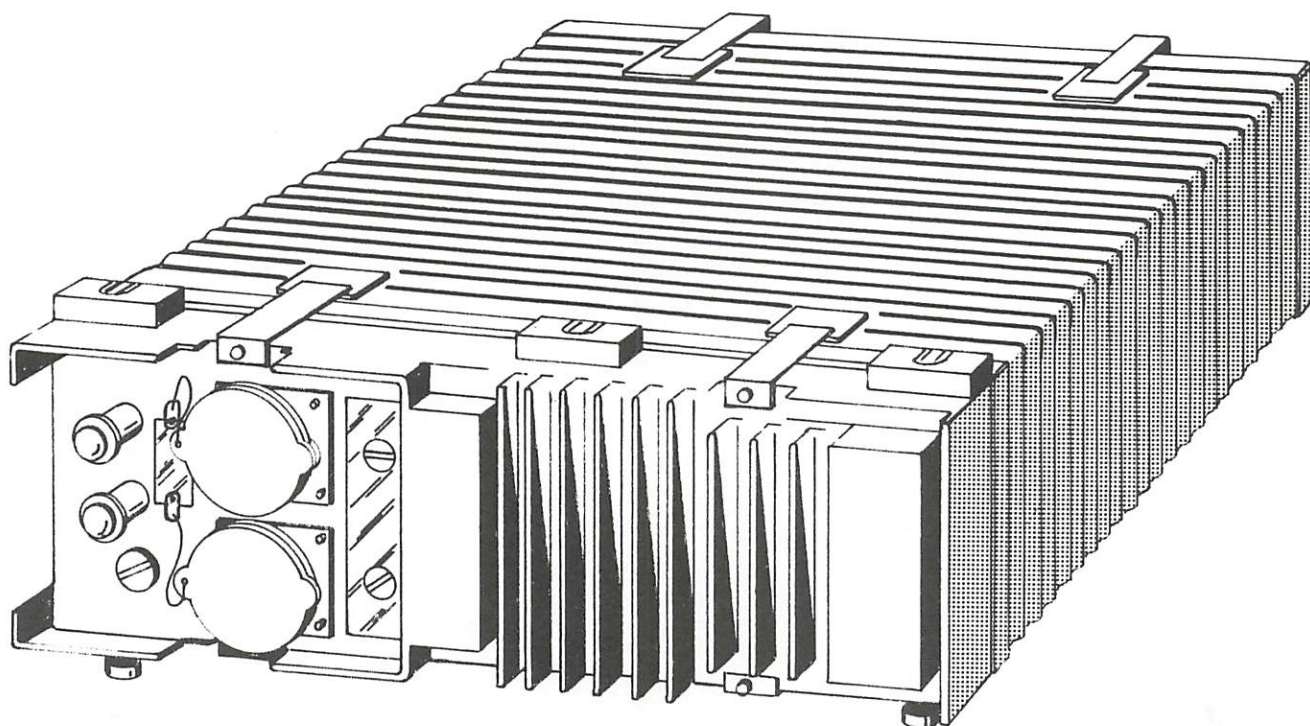
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TECHNICAL MANUAL

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CHAPTER 1Introduction and descriptionsSection 1 - Introduction1. SCOPE

This technical manual describes the operation and maintenance of the power supply unit PP-3620.

This unit, combined with a control unit forms a combined piece of equipment which is used in a vehicle-borne installation.

The principal duty of the power supply unit is to stabilise the vehicle's battery voltage at various voltage levels. The stabilised voltages are then fed to the various units of the vehicular installation.

2. DIFFERENCES AMONG MODELS

No known differences exist at the time being within the model covered in this manual.

3. TECHNICAL DATA

Input voltage	- 24 V DC nominal (min. 22 V, max. 33 V vehicle battery voltage).
Output voltages	- 15 V DC $\pm$ 1 V (stabilised)
	15 V DC $\pm$ 1 V (stabilised)
	18 V DC $\pm$ 1 V (stabilised)
	24 V DC $\pm$ 2 V - 3 V (voltage limiter)
	24 V DC (vehicle battery voltage, smoothed)
Max. current	15 V stabilised outputs - 1 A
ratings	18 V stabilised output - 1 A
	24 V limited output - 3.5 A

The unit is housed in a case with accommodation for an additional control unit, which is constructed as a plug-in unit.

Dimensions	- 252 x 104 x 311 mm (9 15/16 x 4 1/8 x
Weight	- 4,2 kg (9.3 lbs.) 12 1/4 in.)

4. COMPOSITION OF THE POWER SUPPLY UNIT

The power supply unit consists of three modules.

A module is a piece of equipment which, mechanically and often electrically, forms a self-contained whole and which can be readily removed from the unit.

When the exchangeable modules are removed from the unit, a chassis with front panel and wiring remains. This is what is called the "frame assembly" of the unit.

The frame assembly is in itself also a module.

The power supply unit consists of the following modules:

Module 16 : stabiliser circuits

Module 17 : heatsink with transistors

Module 18 : frame assembly

Module 16 takes the form of a rectangular box containing two printed circuits, which are connected to the remainder of the power supply unit via pins.

When plugged in, the module must be fastened by a single captive screw through the bottom of the frame assembly

Module 17 takes the form of a heatsink with two bow handles and is mounted on the rearside of the frontpanel with four screws. The circuits of this module are connected to the remainder of the power supply unit via two connectors.

The numbering of the electric parts such as resistors, capacitors, transistors etc. starts with 1 for each printed circuit and pin terminal board. It may therefore happen that in one and the same drawing, one or more resistors R1, capacitors C1 etc. are shown.

This cannot lead to any confusion in the drawing, as it will be perfectly clear to which printed circuit or terminal board the component in question pertains. Confusion in the text is avoided by making use, wherever and whenever necessary, of designations such as 16A-R1, 17-TS1, which means: resistor R1 on printed circuit 16A and transistor TS1 on module 17.

5. CONNECTIONS AND CONTROLS (FIG. 2.a)

The power supply unit and a control unit form a combined piece of equipment.

The vehicle battery voltage enters the power supply unit via the circuit breaker of the control unit.

The power supply unit has no direct controls, switches "803" and "804" are not operational controls. They are set once and for all when the units are put together to form a vehicular installation.

Connector "801"	This connector connects a transceiver consisting of RT-3600 + JB-3600 or RT-3600 + AM-3600 to the power supply unit.
Connector "802"	This connector connects a transceiver consisting of RT-3600 + JB-3600
Switches "803" and "804"	These switches are used to connect the transceiver to a multi-wire intercom system. If the transceiver connected to connector "801" is numbered "1", switch "803" must be set to position "1". The transceiver to connector "802" may then be numbered "2" or "3" and the switch "804" must be set accordingly. A possible third transceiver connected to a second power supply unit is given the remaining number and the appropriate switch "803" or "804" on that second power supply unit is set accordingly.

Field telephone connection "805"	Remote control of the numbered transceivers will then be possible from each control unit in the intercom system. If the power supply unit is combined with a central control unit IC-3620, a field telephone installation may be connected via this connection "805" to the intercom network.
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Section 2 - Descriptions

6. DESCRIPTION OF THE BLOCKDIAGRAM (FIG. 2.b)

The principal function of the power supply unit is to stabilise the vehicle's battery voltage at various voltage levels.

The stabilised voltages are then fed to the various equipment items of the vehicular installation.

The power supply unit will be described with reference to the block diagram and the numbers between brackets (...) will refer to item numbers in that blockdiagram.

The vehicle battery voltage enters the power supply unit via circuit breaker (1) of the control unit plugged into the power supply unit.

Circuit breaker (1) is both a starter and a cut-out.

As a starter it permits the equipment powered by the supply unit to be switched on and off jointly. As a cut-out it opens the battery voltage circuit when the current drawn from the battery is excessive.

Via polarity reversal protector (2) the voltage is fed through smoothing filter (3) which levels out ripples and voltage peaks.

Next the voltage is fed to three stabilisers, a voltage limiter and an "unstabilised voltage" output.

Each of the stabilisers (4) and (5) produces an output voltage stabilised at 15 volts DC for the transceivers. Stabiliser (6) delivers a stabilised 18 volts DC for the control unit(s) and a loudspeaker LS-3621 (if used).

The principal function of circuit (7) is to limit the vehicle battery voltage at the upper end.

This voltage may rise appreciably above the maximum permissible value of 26 volts when the vehicle's engine is running. Variations of the battery voltage between 22 and 33 volts will be limited between 21 and 26 volts.

The unstabilised voltage is used for the operation of the relays in a 30 watt RF amplifier and/or junction unit(s). The power supply unit further incorporates two selector switches (8) designed for screwdriver adjustment. They are used to connect the associated transceivers to the particular sections of the intercom allotted to them.

Finally the power supply unit provides a connecting facility for a field telephone system. In this respect the power supply unit simply provides the passage for this system to the intercom system of the vehicle.

7. DESCRIPTION OF THE CIRCUIT DIAGRAM (FIG. 3)

a. General

Connector PD3 feeds the 24-volt battery voltage to relay RE1. When this voltage is switched on with the circuit breaker on the control unit (plugged into the power supply unit), relay RE1 is energised provided the voltage has the correct polarity. Relay RE1 in turn energises relay RE2 and this extends the 24 V to the four stabiliser circuits on printed circuits 16A and 16B. Resistor R4 limits the current surge during switching-on. Choke L1 and capacitor C1 combine to smooth out any unwanted ripple on the battery voltage due to any type of disturbance. R3-C2 causes RE2 to pull up with some delay so that R4 will not be shorted out until C1 has charged up.

Diode GR1 limits the voltage during the switching-off. Printed circuit 16A with part of module 17 comprise the two 15 volt stabilisers, which provide the supply voltage via connectors PD1 and PD2 to the transceivers. Printed circuit 16B with part of module 17 comprise the 18 volt stabiliser and the 24 volt limiter.

The 18 volt circuit delivers via connector PD3 the supply voltage for the various AF amplifiers in the control units and in the loudspeaker unit LS-3621.

The 24 volt circuit limits its output to 26 volt when the battery voltage rises up to 33 volt.

The output is fed to the H-contacts of PD1 and PD2. The H-contact of PD2 is interconnected with the L- and M-contacts of PD2, giving 24 volt branch-off routes to the possibly connected 30 Watt RF amplifier.

It is for this reason that the combined piece of equipment consisting of an RT-3600 + AM-3600 (see para. 5) must be connected to PD2 "801" and not to PD1 "802".

The same goes for earth contacts P and R on connector PD2 and contacts G and J of PD2 which connect the power switch lines to the 30 watt RF amplifier.

The squelch, microphone, audio and transmitter contact signals from the transceiver connected via PD1 and PD2 are fed to the switches SK1 and SK2.

If switch SK1 is in position "1" the signals from the transceiver connected to PD1 are extended to lines squelch 1, microphone 1, audio 1 and transmit contact 1 and via PD4 to the intercom system.

Remote control of this transceiver from one of the control units in the intercom system is then possible when the NETWORK switch on the control unit concerned is set on position "1".

If switch SK1 is in position "2" or "3" the signals in question are extended to resp. the no. 2 or 3 lines of the intercom system.

Switch SK2 performs the same functions for the transceiver connected via connector PD2.

The power supply unit further provides a connecting facility for a field telephone system. In this respect the power supply unit simply provides the passage for this system to the intercom system via connector PD4.

b. The stabiliser circuits

Apart from the voltages handled, the two 15 volt- and the 18 volt stabilisers are almost identical, so we shall confine description to the 18 V circuit.

The 24 volt battery voltage comes in via terminal 6 of printed circuit 16B. Resistor R6 feeds it via terminal 1 to the collector of series regulating transistor TS3 of module 17.

The voltage taken from the emitter of this transistor is stabilised because the base voltage of 17-TS3 is kept constant by means of emitter follower 17-TS5 and zener diodes 16B-GR3 and 16B-GR2.

The stabiliser incorporates protection against short-circuits and overloads of the output. If the output current rises above about 1,2 amperes, the voltage drop across R6 becomes so great that transistor TS2 begins to carry current. As a result also TS1 becomes conductive, reducing the current through zener diodes GR2 and GR3 eventually to zero.

When that happens the stabilising action is stopped, so any further current rise causes the output voltage to drop fast.

Additional protection is provided by transistor 16B-TS3. This has its base voltage stabilised at about 12 volts by zener diode GR1. If a short-circuit or overload leads to operation of TS1 and TS2 and to a drop of the output voltage as described above, the emitter of TS3 obtains a voltage which is lower than the zener stabilised base voltage, whereupon TS3 becomes conductive. The voltage drop across resistor R3 then rises further, so the output voltage of the stabiliser goes further down.

The two protection circuits thus combine to restrict the current through the stabiliser circuit to a safe value under any conditions.

When the protection circuits have become active, the output voltage will remain low (substantially zero) even after the short-circuit or overload has been removed. The circuit can be restored to normal operation by briefly turning the circuit breaker on the control unit, plugged into the power supply unit, off and then on again.

The 24-volt circuit (voltage limiter) operates as follows:

As long as the incoming battery voltage is 24 V or less, the output voltage is only a few tenths of a volt lower. This is achieved by adjusting variable resistor R19, thereby giving transistor 16B-TS4 such an operating point that its collector current and the base current of 17-TS8 are high enough to keep 17-TS7 bottomed. Let us now describe the situation that the battery voltage begins to rise gradually.

Initially the output voltage will rise proportionally. The emitter voltage of TS4 will also rise so TS4 becomes less conductive and the base current of 17-TS7 drops in sympathy.

This leads to a greater voltage drop across transistor 17-TS7 so the output voltage now begins to rise at a slower rate than the battery voltage. With this arrangement a

battery voltage rise to 33 V will lead to an output voltage no higher than about 26 V.

There is no compensation for a battery voltage drop below the 24 V point, for the function of the circuit is only to protect the equipment from excessive supply voltages. The circuit is protected against short-circuits or overloads in the following manner.

When the output current rises above roughly 4 amps, the voltage drop across parallel resistors R8/R9 (fitted outside module 16) becomes so high that transistor 16B-TS6 begins to carry current. As a result also TS5 becomes conductive so the current through zener diodes GR5 and GR8 drops to zero and the base voltage of TS4 goes down. This in turn causes a drop of the output voltage.

If, as a consequence of this protective action, the output voltage drops below some 15 volts, also transistor 16B-TS7 becomes conductive with the result that the action of 16B-TS6 is given extra force. In this way the current through the circuit is limited to a safe value under all circumstances. Here again the removal of the overload will not restore the circuit automatically. The circuit breaker on the control unit has to be turned briefly off and on again to restore normal operation.

CHAPTER 2MaintenanceSection 1 - Electrical Testing, Trouble-shooting and repair.8. GENERAL

This section gives the testing, trouble-shooting and electrical repairwork of the power supply unit.

The tracing and locating of a faulty module (the frame assembly is in itself also a module) will be described in para. 9.

Module tester TS-3611 (fig. 5) is used when testing, trouble-shooting or adjusting modules 16 and 17.

The module tester takes the form of a small desk into which the module under test will be plugged. Connectors on the module tester enable the connection of the instruments required for testing.

An array of pushbuttons permits the supply voltage to be connected to or removed from certain parts of the circuit and allows the measuring instruments to be connected to particular terminals of the module circuit.

Trouble-shooting of a module always starts with the testing of the module; when a certain reading is not correct follow the instructions given. After each repair, repeat the test sequence.

The frame assembly (module 18) may be best tested with tested modules 16 and 17 fitted, following the test procedure for the power supply unit, see para. 9.

By means of the circuit diagram (fig. 3) the test will give an indication which part of the circuit is at fault. Then, using the wiring diagram (fig. 8) wiring list (para. 19) and an ohmmeter, the faulty part(s) can be located.

9. TESTING AND TROUBLE-SHOOTING OF THE POWER SUPPLY UNIT

Measuring instruments required:

- (1) Stabilised adjustable power supply 35 V DC, 10 A or more (e.g. Philips PE 4817); to be connected to connector PD3 contacts 7, 8, 9, 10 (+) and 3, 4, 5, 6 (-)
- (2) Multimeter 20.000 Ω /V or better (e.g. Philips PM 2411)
- (3) Resistor 6.8 Ω 100 W, resistor 15 Ω 20 W and resistor 18 Ω 20 W.

- Notes:
- a. If the above mentioned power supply is not available, the power may be derived from the vehicle's battery (use 10 A fuse).
 - b. For the safe measuring of voltages at the pins of the connectors of the power supply unit, it is advised to construct various auxiliary extension cable assemblies.
One cable assembly consists of a 15-pole socket connector (to match connector PD3) and 15 wires (each with an insulated pin bushing attached) connected to the connector.

Similar extension cables may be made for connectors PD4, "801" and "802".

The test procedure is given in the form of tables.

The first column gives the sequence of each test to be performed.

The second column states what operations are to be performed and what result this operation should have if all is well.

The third column states what actions should be taken to eliminate the fault if the correct result, as given in the second column, is not obtained.

Set the stabilised power supply to 25,2 V DC and perform the following tests:

Test no	Operation and normal indication	Corrective action
1	Using the multimeter measure 25,2 V DC between contacts: "801/K" (+) and "801/N" (-) "802/K" (+) and "802/N" (-)	. replace frame assembly
2.	To test the polarity reversal protection circuit, reverse momentarily the connections from the stabilised adjustable power supply to connector PD3. The voltage between "802/K" and "802/N" should be zero volts DC.	. replace frame assembly
3.	Measure between contacts: "802/D" (+) and "802/N": 15 V DC $\pm$ 1 V	. replace module 16 and/or 17 . replace frame assembly
4	Connect the 15 Ω resistor between contacts "802/D" and "802/N" and measure again 15 V DC $\pm$ 1 V between these contacts.	. replace module 16 and/or 17
5	Remove the 15 Ω resistor. Measure between contacts "801/D" (+) and "801/N": 15 V DC $\pm$ 1 V	. replace module 16 and/or 17 . replace frame assembly
6	Connect the 15 Ω resistor between contacts "801/D" and "801/N" and measure again 15 V DC $\pm$ 1 V between these contacts.	. replace module 16 and/or 17

Test no	Operation and normal indication	Corrective action
7	Remove the 15 Ω resistor. Measure between contacts PD3/1 (+) and PD3/2 (-) 18 V DC $\pm$ 1 V	. replace module 16 and/or 17
8	Connect the 18 Ω resistor between contacts PD3/1 and PD3/2 and measure again 18 V DC $\pm$ 1 V between these contacts.	. replace module 16 and/or 17
9	Remove the 18 Ω resistor. Measure between contacts "801/H" and "801/N" : 24 V DC $\pm$ 1 V "802/H" and "802/N" : 24 V DC $\pm$ 1 V	. replace module 16 and/or 17 . replace frame assembly
10	Connect the 6.8 Ω resistor between contacts "801/H" and "801/N" and measure 24 V DC $\pm$ 1 V between these contacts.	. replace module 16 and/or 17
11	Adjust the stabilised adjustable power supply to 33 V and measure 24 ... 26 V DC between "801/H" and "801/N" The test may be omitted when using vehicle battery voltage. Remove the 6.8 Ω resistor after the test.	. replace module 16 and/or 17

After each replacement, repeat the test sequence.
Switch off the stabilised adjustable power supply and disconnect this power supply.
Using the multimeter, measure the resistance between the connector contacts, given in the lists below. If the result of a measurement fails to meet the requirements, replace the frame assembly.

From	To	Value ($\pm 20\%$)
"802/N"	"802/C", 801/N", "801/C", "801/P" and "801/R"	0 Ω
PD3/2	PD3/11	0 Ω
"805/1"	PD4/15	0 Ω
"805/2"	PD4/14	0 Ω
"801/G"	PD3/12	0 Ω
"801/J"	PD3/14	0 Ω
"802/V"	801/V and PD4/13	0 Ω
Set switches "803" and "804" to position "1"		
"802/E"	"801/E" and PD4/1	0 Ω
"802/T"	PD4/4	330 Ω
"802/T"	"801/T"	660 Ω
"802/U"	PD4/4	100 Ω
"801/U"	PD4/4	100 Ω
"802/U"	"801/U"	200 Ω
"801/B"	"802/N"	1000 Ω
"802/B"	"801/B" and PD4/7	0 Ω
"802/A"	"801/A", PD4/10 and PD3/15	0 Ω
Set switches "803" and "804" to position "2"		
"802/E"	"801/E" and PD4/2	0 Ω
"802/T"	PD4/5	330 Ω
"802/T"	"801/T"	660 Ω
"802/B"	"802/N"	1000 Ω
"802/B"	"801/B" and PD4/8	0 Ω
"802/A"	"801/A" and PD4/11	0 Ω
Set switches "803" and "804" to position "3"		
"802/E"	"801/E" and PD4/3	0 Ω
"802/T"	PD4/6	330 Ω
"802/T"	"801/T"	660 Ω
"802/B"	"802/N"	1000 Ω
"802/B"	"801/B" and PD4/9	0 Ω
"802/A"	"801/A" and PD4/12	0 Ω

10. TESTING MODULE 16

Measuring instruments required:

1. Module tester TS-3611.
2. Stabilised adjustable power supply 35 V DC, 10 A (e.g. Philips PE 4817), to be connected to BD1 (+) and BD2 (-) of the module tester.
3. Ammeter, 2 A DC, to be connected to BD3 (+) and BD4 (-).
4. Multimeter 20000 Ω /V or better (e.g. Philips PM 2411) to be connected to BD5 (+) and BD6 (-). Switch to 30 V DC range.
5. Oscilloscope (e.g. Philips PM 3200) to be connected to BD7 and BD8 (earth).
6. Multimeter 20000 Ω /V or better (e.g. Philips PM2411) to be connected to BD9 (+) and BD10 (-). Switch to 30 mA DC range.
7. Ammeter, 10 A DC, to be connected to BD11 (+) and BD12 (-).
8. Tested module 17, to be inserted in module holder "17" of the module tester.
9. Multimeter (e.g. Philips PM 2403) not to be connected; to be used for trouble-shooting only.

For testing, proceed as follows:

Note: The numbers between brackets (.) refer to the measuring instruments listed above.

1. Connect the module tester up in accordance with the instructions given above. Make sure that not a single pushbutton is pressed and insert the module to be tested in holder "16" on the tester.
Switch on the fan in the module tester.
2. Press "D9" and set the power supply (2) to 25.2 V to be read on meter (4).
Release "D9".
3. Press "D10". Meter (4) reads $15 \text{ V} \pm 0.5 \text{ V}$.
If wrong, see para. 11 item 1.
4. Meter (6) reads 20 mA or less.
If wrong, see para. 11 item 2.
5. Check on the oscilloscope if there are any ripple voltages or oscillations. Any such phenomena must not exceed 10 mV. If wrong, see para. 11 item 3.

Note: Oscilloscope checks are further required for all the following items.

6. Set meter (6) to the max. DC current range. Press "D1". Meter (3) indicates approx. 100 mA; meter (4) indicates $15\text{ V} \pm 1\text{ V}$. If wrong, see para. 11 item 4.
7. Press "D2" ("D1" releases). Meter (3) indicates approx. 1A; meter (4) indicates $15\text{ V} \pm 1\text{ V}$. If wrong, see para. 11 item 4.
8. Press "D3" ("D2" releases). Meter (4) indicates 16.4 V or less; meter (3) 1.2 A or less. If wrong, see para. 11 item 6.
9. Press "D4" ("D3" releases). Meter (6) indicates 40 mA or less. (Switch meter (6) momentarily to a lower current range). If wrong, see para 11, item 7.
10. Release "D4" and press "D11" ("D10" releases). Meter (4) indicates $15\text{ V} \pm 0.5\text{ V}$. If wrong, see para. 11 item 8.
11. Repeat steps 4 through 9. If wrong, see para. 11 item 9.
12. Release "D4" and press "D12" ("D11" releases). Meter (4) indicates $18\text{ V} \pm 0.5\text{ V}$. If wrong see para. 11 item 10
13. Meter (6) indicates 20 mA or less. If wrong, see para. 11 item 11.
14. Set meter (6) to the max. DC current range and press "D1". Meter (3) indicates approx. 120 mA; meter (4) indicates $18\text{ V} \pm 1\text{ V}$. If wrong, see para. 11 item 12.
15. Press "D2" ("D1" releases). Meter (3) indicates approx. 1.2 A; meter (4) indicates $18\text{ V} \pm 1\text{ V}$. If wrong, see para. 11 item 12.
16. Press "D3" ("D2" releases). Meter (4) indicates 19 V or less, meter (3) 1,3 A or less. If wrong, see para. 11 item 14.
17. Press "D4" ("D3" releases). Meter (6) indicates 40 mA or less. (Switch meter (6) momentarily to a lower current range). If wrong, see para. 11 item 15.
18. Release "D4" and press "D13" ("D12" releases). Meter (4) indicates between 23.5 V and 25.2 V. If wrong, see para. 11 item 16.
19. Set meter (6) to the max. DC current range. Press "D5". Meter (3) indicates approx. 0.5 A; meter (4) indicates between 23.5 V and 25.2 V. If wrong, see para. 11 item 17.
20. Press "D6". ("D5" releases). Meter (7) indicates approx. 3,5 A. meter (4) indicates 23.5 ... 25.2 v. If wrong, see para. 11 item 17.
21. Press "D7" ("D6" releases). Meter (7) indicates 4.8 A or less. If wrong, see para. 11 item 20.

22. Press "D8" ("D7" releases). Meter (6) indicates 40 mA or less. (Switch meter (6) momentarily to a lower current range). If wrong, see para. 11 item 21.
23. Press "D1", "D9" and "D10" ("D13" releases) and release "D8". Adjust the power supply to 33 V (to read on meter (4)). Release "D9". Meter (4) indicates 13 ... 17 V. If wrong, see para. 11 item 5.
24. Press "D11" ("D10" releases). Meter (4) again indicates 13 ... 17 V. If wrong, see para. 11 item 9.
25. Press "D12" ("D11" releases). Meter (4) indicates 16 ... 20 V. If wrong, see para. 11 item 13.
26. Press "D5" and "D13" ("D12" releases) and release "D1". Meter (4) indicates 24 ... 26 V. If wrong, see para. 11 item 18.
27. Press "D9" and "D6" ("D5" releases). Adjust the power supply to 22 V. (to read on meter (4)). Release "D9". Meter (4) indicates 21 V or more. If wrong, see para. 11 item 19.
28. If all requirements are met, module 16 has approval for use.

11. TROUBLE-SHOOTING MODULE 16 (fig. 6)

Trouble-shooting of module 16 always starts with the test procedure of paragraph 10. When a reading is not correct remove the cover from the module and proceed directly to the indicated item of this paragraph.

Refer to paragraph 15 for the instructions of the repair of the module.

After repair, repeat the test sequence of paragraph 10.

1. 15 Volts stabiliser (nr. 1) is faulty.
Using meter (9) measure on printed circuit 16 A the following DC voltages against earth.

MP1	:	9 ... 11 V	MP5	:	10.8 ... 13,5 V
MP2	:	25.2 V	pin 2	:	14.8 ... 18 V
MP3	:	0.6 V or less	pin 5	:	14.5 ... 15.5 V
MP4	:	7.4 ... 8.8 V	pin 6	:	25.2 V

If wrong, check the associated components.

2. Quiescent current of 15 V stabiliser (no. 1) is not correct. Check on 16A : R2, GR1 and R3. If still faulty see item 1 above.
3. If oscillations or ripples occur:

Check on 16 A : C1, C2, C3 (for 15 V stabiliser (no. 1))
 Check on 16 A : C5, C6, C7 (for 15 V stabiliser (no. 2))
 Check on 16 B : C1, C2, C3 (for 18 V stabiliser)
 Check on 16 B : C7 and C8 (for 24 V limiter)

4. Output voltage of 15 V stabiliser (no. 1) deviates under load. Release "D1" or "D2" and check the voltages mentioned in item 1 above.
 If still wrong check on 16 A: TS1, TS2, R4, R5, R6 and R7.
5. Output voltage of 15 V stabiliser (no. 1) deviates if input voltage is raised to 33 V.
 Check on 16 A: GR2 and GR3. If still wrong, set power supply (2) back to 25.2 V, release "D1" and check the voltages mentioned in item 1 above.
6. Current limitation of 15 V stabiliser (no. 1) is not correct. Adjust on 16 A variable resistor R7 ("A") fully anti-clockwise and then clockwise until meter (3) indicates 1.2 A. If not possible, check on 16 A: TS1, TS2, R3, R4, R5, R6 and R7.
7. Short-circuit protection of 15 V stabiliser (no. 1) does not work properly. Check on 16A: TS3, C4, R3, R9, GR2 and GR3.
8. 15 V stabiliser (no. 2) is faulty.
 Using meter (9) measure on printed circuit 16 A the following DC voltages against earth.
9.

MP6 : 9 ... 11 V	MP10 : 10.8 ... 13.5 V
MP7 : 25.2 V	pin 9 : 25.2 V
MP8 : 0.6 V or less	pin 10 : 14.5 ... 15.5 V
MP9 : 7.4 ... 8.8 V	pin 13 : 14.8 ... 18 V

 If wrong, check the associated components.
9. 15 V stabiliser (no. 2) is identical to 15 V stabiliser (no. 1) so trouble-shooting is done likewise.
 See items 2 through 7 mentioned above and check the circuit diagram for the parts concerned.
10. 18 V stabiliser is faulty.
 Using meter (9) measure on printed circuit 16 B the following DC voltages against earth.

MP1 : 11.3 ... 13.7 V	MP5 : 12.6 ... 15.4 V
MP2 : 25.2 V	pin 2 : 18 ... 20.5 V
MP3 : 0.6 V or less	pin 5 : 17.5 ... 18.5 V
MP4 : 9 ... 11 V	pin 6 : 25.2 V

 If wrong, check the associated components
11. Quiescent current of 18 V stabiliser is not correct.
 Check on 16B : R2, GR1 and R3. If still faulty, see item 10 above.

12. The output voltage of 18 V stabiliser deviates under load. Release "D1" or "D2" and check the voltages mentioned in item 10 above. If still wrong, check on 16B : TS1, TS2, R4, R5, R6 and R7.
13. The output voltage of 18 V stabiliser deviates if input voltage is raised to 33 V.
Check on 16B : GR2 and GR3. If still wrong, set power supply (2) back to 25.2 V, release "D1" and check the voltages mentioned in item 10 above.
14. Current limitation of 18 V stabiliser is not correct
Adjust on 16B R7 ("C") fully anti-clockwise and then clockwise until meter (3) indicates 1.3 A. If not possible, check on 16B : TS1, TS2, R3, R4, R5, R6 and R7.
15. Short-circuit protection of 18 V stabiliser does not work properly. Check on 16B : TS3, C4, R3, R9, GR2, and GR3.
16. The 24 V voltage limiter is faulty.
Using meter (9) measure on printed circuit 16B the following DC voltages against earth:

MP6	: 11.3...13.7 V	MP14	: 22.8...24.2 V
MP7	: 10.1...12.3 V	MP15	: 18.9...23.1 V
MP8	: 5 ... 6.2 V	pin 12:	25.2 V
MP11	: 17 ...19.5 V	pin 13:	23.5...24.5 V
MP12	: 12.4...15.2 V	pin 14:	23.5...24.5 V
MP13	: 0.6 V or less		

 If wrong, check the associated components.
17. The output voltage of the 24 V voltage limiter deviates under load. Release "D5" or "D6" and check the voltages mentioned in item 16 above.
If still wrong, check on 16B : TS4, TS5 and associated components.
18. The output voltage of the 24 V voltage limiter deviates if input voltage is raised to 33 V.
Adjust on 16B R19 ("B") fully anti-clockwise and then clockwise until meter (4) indicates 26 V.
If not possible, check the voltages mentioned in item 16 above.
19. The output voltage of the 24 V voltage limiter deviates if input voltage is lowered to 22 V.
Check the voltages mentioned in item 16 above.
20. Current limitation of 24 V voltage limiter is not correct. Adjust on 16B R16 ("A") fully anti-clockwise and then clockwise until meter (4) indicates 24 V.
If not possible, check on 16B : TS5, TS6 and associated components.

21. Short-circuit protection of 24 V voltage limiter does not work properly. Check on 16B : TS5, TS6, TS7 and associated components.

12. TESTING MODULE 17

Measuring instruments required

1. Module tester TS-3611.
2. Stabilised adjustable power supply 35 V DC, 10 A (e.g. Philips PE 4817) to be connected to BD1 (+) and BD2 (-) of the module tester.
3. Ammeter 2 A DC to be connected to BD3 (+) and BD4 (-).
4. Multimeter 20000 Ω /V or better (e.g. Philips PM 2411) to be connected to BD5 (+) and BD6 (-). Switch to 30 V DC range.
5. Oscilloscope (e.g. Philips PM 3200) to be connected to BD7 and BD8 (earth).
6. Multimeter 20000 Ω /V or better (e.g. Philips PM 2411) to be connected to BD9 (+) and BD10 (-). Switch to 30 mA DC range.
7. Ammeter, 10A DC to be connected to BD11 (+) and BD12 (-).
8. Tested module 16, to be inserted in module holder "16" of the module tester.

For testing, proceed as follows:

Note: The numbers between brackets (.) refer to the measuring instruments listed above.

1. Connect the module tester up in accordance with the instructions given above. Make sure that not a single pushbutton is pressed and insert the module to be tested in holder "17" on the tester. Switch on the fan in the module tester.
2. Press "D9" and set the power supply (2) to 25.2 V to be read on meter (4). Release "D9".
3. Press "D10". Meter (4) reads 15 V $\pm$ 0.5 V. If wrong, see para. 13 item 1.
4. Meter (6) indicates 20 mA or less. If wrong, see para. 13 item 1.
5. Check on the oscilloscope if there are any ripple voltages or oscillations. Any such phenomena must not exceed 10 mV. If wrong, see para. 13 item 1.

Note: Oscilloscope checks are further required for all the following items.

6. Set meter (6) to the max. DC current range.
Press "D1". Meter (3) indicates 100 mA; meter (4) indicates $15\text{ V} \pm 1\text{ V}$. If wrong, see para 13 item 1.
7. Press "D2" ("D1" releases). Meter (3) indicates approx. 1 A; meter (4) indicates $15\text{ V} \pm 1\text{ V}$.
If wrong, see para. 13 item 1.
8. Release "D2" and press "D11" ("D10" releases)
Meter (4) indicates $15\text{ V} \pm 0.5\text{ V}$. If wrong, see para 12 item 2.
9. Repeat steps 4 through 7, but if wrong, see para. 13 item 2.
10. Release "D2" and press "D12" ("D11" releases).
Meter (4) indicates $18\text{ V} \pm 0.5\text{ V}$. If wrong, see para. 13 item 3.
11. Meter (6) indicates 20 mA or less. If wrong, see para 13 item 3.
12. Set meter (6) to the max. DC current range and press "D1"; meter (3) indicates approx. 120 mA, meter (4) indicates $18\text{ V} \pm 1\text{ V}$. If wrong, see para 13 item 3.
13. Press "D2" ("D1" releases). Meter (3) indicates approx. 1.2 A; meter (4) indicates $18\text{ V} \pm 1\text{ V}$
If wrong, see para. 13 item 3.
14. Release "D2" and press "D13" ("D12" releases).
Meter (4) indicates 23.5 - 25.2 V.
If wrong, see para. 13 item 4.
15. Press "D5". Meter (3) indicates approx. 0.5 A;
meter (4) indicates 23.5 - 25.2 V.
If wrong, see para. 13 item 4.
16. Release "D5" and press "D1", "D9" and "D10" ("D13" releases). Adjust power supply (2) to 33 V, to read on meter (4). Release "D9". Meter (4) indicates 13 ... 17 V. If wrong, see para. 13 item 1.
17. Press "D11" ("D10" releases). Meter (4) again indicates 13 ... 17 V. If wrong, see para. 13 item 2.
18. Press "D12" ("D11" releases). Meter (4) indicates 16 ... 20 V. If wrong, see para. 13 item 3.
19. Press "D13" ("D12" releases) and "D5". Release "D1"
Meter (4) indicates 24 ... 26 V. If wrong, see para. 13 item 4.

20. Press "D9" and "D6" ("D5" releases). Adjust power supply (2) to 22 V, to read on meter (4). Release "D9". Meter (4) indicates 21 V or more. If wrong see para. 13 item 4.
21. If all requirements are met, module 17 has approval for use.

13. TROUBLE-SHOOTING MODULE 17 (fig. 7)

Trouble-shooting of module 17 always starts with the test procedure of paragraph 12. When a reading is not correct proceed directly to the indicated item of this paragraph. After repair, repeat the test sequence of paragraph 12.

1. 15 V stabiliser (no. 1) is at fault.
Check transistor TS1 and TS6.
2. 15 V stabiliser (no. 2) is at fault.
Check transistors TS2 and TS4.
3. 18 V stabiliser is at fault.
Check transistors TS3 and TS5.
4. 24 V voltage limiter is at fault.
Check transistors TS7 and TS8.

14. TROUBLE-SHOOTING AND REPAIRING THE FRAME ASSEMBLY (MODULE 18)

The frame assembly may be best tested with tested modules 16 and 17 fitted, following the test procedure of the power supply unit in para. 9.

Using the circuit diagram (fig. 3) the test will give an indication which part of the circuit is at fault. By means of the wiring diagram (fig. 8), wiring list (para. 19) and an ohmmeter, the faulty part(s) may be located.

Section 2 - Mechanical construction, maintenance and repair15. DISASSEMBLY AND ASSEMBLY OF MODULE 16

Loosen the two screws on top of the module and remove the cover. Unscrew the five fastening screws of the circuit to be repaired and remove this circuit.

Removing a defective part from a printed circuit may be best done by first cutting the connecting wires, after which the part may be removed and the wires unsoldered. Parts that are glued to the print may be removed by carefully heating the glue with a soldering iron.

If the part has a plastic envelope, cut the plastic envelope first, then cut the wires, after which the part may be removed from the print and the glued envelope may be removed with the soldering iron. Be very careful not to damage the printed wiring.

When new parts are to be glued to the printed circuit use a cement composed of an epoxy resin and a catalyst (hardening agent) (e.g. Philips code nos 1322 501 36601 and 1322 502 14301).

Proceed as follows:

- . Carefully degrease the parts to be glued together.
- . Mix equal parts of epoxy resin and catalyst thoroughly taking care to avoid air bubbles in the mixture. A mixture so prepared is immediately ready for use and will remain workable for about 45 minutes at approx 18° C (65° F).

When the mixture thickens, do not try to dilute it. Never prepare more of the mixture than you will need immediately.

- . Apply the cement with a small brush or spatula.
- . Allow the cement to set. This takes 3 hours at 70° C (160° F) in an oven.

If the hardened glue must have high electrical surface resistance, do not prepare and apply the cement at relative humidities of 60% and upwards.

Parts having a weight of over 15 grammes have to be glued to the print. This is also the case with parts having connecting wires exceeding a length of 25 mm and a weight of over 5 grammes.

During the assembly of module 16 care should be taken with the alignment of the two circuits with respect to each other and with the bottom of the module. Use the socket of the module tester TS-3611 as jig to insure correct alignment before tightening the screws.

16. DISASSEMBLY AND ASSEMBLY OF MODULE 17 (fig. 7)

No special instructions are necessary for the replacement of parts of module 17. Do not forget to replace the mica and/or lead washers of the transistors.

17. MECHANICAL CONSTRUCTION, MAINTENANCE AND REPAIR OF THE FRAME ASSEMBLY (MODULE 18, FIG. 4)a. Removal from the cabinet

Loosen the four set screws in the four bridge clamps, swing the clamps outwards and remove the power supply unit from the cabinet.

b. Removal of module 16

Loosen the captive screw (3) at the underside of the chassis and pull the module from the unit by the two rings on top of the module.

c. Removal of module 17

Swing the front of the power supply unit down, loosen the four captive screws located at the corners of the module and pull the module from the front by the two bow handles.

d. Replacing the connectors

Before removing a connector, mark the connecting wires for later identification.

Fig. 2.a shows in what position the keys of the connectors "801" and "802" have to be fitted.

Do not forget to replace the O-ring on the connector before fitting. The O-rings should be greased as described under h.

e. Air leakage

Air leakage can be tested only, of course, with a power supply PP-3620 combined in a case together with a control unit AF-3620 or IC-3620. Alternatively, the unit can be tested in a specially designed case.

After removing the screw on front of the unit (located under telephone connectors "805") a fitting comes available for attaching a compressed air hose.

Pressurise the case inside with a maximum of 0.1 atmosphere above normal. In this condition, immerse the case in a tank of water. No air bubbles should escape.

f. Replacement and maintenance of the blocks

The blocks (1) have to be mounted accurately. The intervening spaces are given on the figure.

The blocks and the headed shoulder pins are not to be painted.

g. Replacement of the rubber seal in the front

The rubber seal is glued to the front.

Pull the old seal from the groove and remove the remaining glue with a special thinner (Philips order code 1322 508 72501).

Carefully clean both the groove and the new seal with a special cleaning fluid (Philips order code 1322 510 50701). Do not keep the seal more than 10 sec. in the cleaning fluid. Dry the seal with oilfree compressed air.

Apply a very thin layer of glue (Philips order code 1322 508 72401) to the bottom of the groove. The layer of glue should be appr. 2 mm wide and without interruptions or thick spots.

Let the glue dry for 20 to 30 minutes and carefully press the seal in the groove. Remove excess glue with the special thinner. Let the glue dry for 48 hours.

Before mounting the unit in the cabinet the seal should be greased lightly with silicon grease (Philips order code 1322 504 98001).

Warning: all ingredients used are inflammable. Keep fire away! Clean the hands carefully afterwards.

h. The cleaning and greasing of rubber O-rings.

All rubber O-rings used in the set should be greased before mounting.

If an O-ring has been dirtied during disassembly it can be wiped clean with a dry cloth. Afterwards it should be greased again. Even slightly damaged O-rings should be replaced. The greasing of the O-rings is done in the following way.

- . Prepare a mixture of 6 parts by weight silicone grease type DC33 light (manufacturer DOW CORNING) and 40 parts by weight refined petrol.
- See to it that the grease is completely dissolved.
- . Dip the O-ring in the mixture but do not immerse it for more than 10 seconds.
- . Let the O-ring dry for 24 hours.

If too much solvent evaporates, a new mixture should be prepared. Greased O-rings which are not used at once should be wrapped in plastic foil. The silicone grease should not come in contact with other parts of the set. If necessary use cleaning fluid nr. 14 (Philips order code 1322 501 06401) to remove grease.

Warning! The mixture of silicone grease and refined petrol is inflammable, gives off poisonous fumes and may damage the skin after prolonged contact. Keep fire away, have a fume exhaust working and wear gloves.

i. Replacing capacitor C1

If capacitor C1 (2) is replaced, tighten the screws of the mounting brackets with a torque of max. 7kg cm. Overtightening of the screws may distort the can of the capacitor.

j. Replacing the terminal board

If the terminal board (5) is replaced, care should be taken that the board is mounted in the correct position.

To insure correct alignment of the terminal board with the earth sockets in the chassis, use a spare module 16 as jig before tightening the six screws. Tighten the six screws with a torque of 4.5 kgcm. A spare module 16 should also be plugged in the terminal board before soldering the wires to the contacts.

This improves the alignment of the contacts.

Section 3 - Wiring Lists18. WIRING LIST OF MODULE 17

Use the list below in combination with figure 7.
This figure shows, in addition to the routing of the wiring harnesses, the numbers of terminations and components.

<u>no.</u>	<u>colour</u>	<u>from</u>	<u>to</u>	<u>Wiring harness</u>
1	orange	BD5-1	TS6-B	1
2	blue	BD5-2	TS6-C	1
3	red-white	BD5-3	TS1-C	1
4	yellow-white	BD5-5	TS2-C	1
5	orange white	BD5-6	TS4-C	1
6	green	BD5-7	TS4-B	1
7	red	BD5-8	TS6-E	1
8	orange	BD5-11	TS1-E	1
9	orange-white	BD5-13	TS2-E	1
10	yellow-white	BD5-15	TS4-E	1
12	white	TS1-B	TS6-E	
13	red	TS2-B	TS4-E	
20	orange-white	BD6-1	TS8-B	2
21	yellow-white	BD6-2	TS8-C	2
22	green	BD6-3	TS7-E	2
23	green-white	BD6-4	TS7-C	2
24	red-white	BD6-5	TS3-C	2
25	blue	BD6-6	TS5-C	2
26	orange	BD6-7	TS5-B	2
27	yellow	BD6-8	TS8-E	2
28	green	BD6-9	TS7-E	2
29	green	BD6-10	TS7-E	2
30	green-white	BD6-11	TS7-C	2
31	green-white	BD6-12	TS7-C	2
32	orange-white	BD6-13	TS3-E	2
33	red	BD6-15	TS5-E	2
34	red	TS3-B	TS5-E	
35	orange	TS7-B	TS8-E	
38		BD6-2	C3	
39		C3	BD6-4	

19. WIRING LIST OF THE FRAME ASSEMBLY (MODULE 18)

Use the list below in combination with figure 8.
This figure shows, in addition to the routing of the wiring harnesses, the numbers of terminations and components.

<u>no.</u>	<u>colour</u>	<u>from</u>	<u>to</u>	<u>wiring harness</u>
1	orange-white	PD3-1	16B-5	1
2	black	PD3-2	board 2-A2	1
3	black	PD3-3	board 2-A1	1
4	black	PD3-4	board 2-A1	1
5	black	PD3-5	board 2-B1	1
6	black	PD3-6	board 2-B1	1
7	green-white	PD3-7	RE1-A2	1
8	green-white	PD3-8	RE1-A2	1
9	green-white	PD3-9	RE1-X2	1
10	green-white	PD3-10	RE1-X2	1
11	black-white	PD3-11	board 2-A2	1
12	red	PD3-12	board 2-A4	1
13	yellow	PD3-14	board 2-B4	1
14	brown	PD3-15	board 2-C4	1
15	orange-white	PD6-1	16B-11	1
16	yellow-white	PD6-2	board 3-F1	1
17	green	PD6-3	board 2-A5	1
18	green-white	PD6-4	board 3-K2	1
19	red-white	PD6-5	16B-1	1
20	blue	PD6-6	16B-4	1
21	orange	PD6-7	16B-2	1
22	yellow	PD6-8	16B-10	1
23	green	PD6-9	board 2-A5	1
24	green	PD6-10	board 2-A5	1
25	green-white	PD6-11	board 3-K2	1
26	green-white	PD6-12	board 3-J2	1
27	orange-white	PD6-13	16B-5	1
28	red	PD6-15	16B-3	1
29	black-white	RE1-X1	board 3-F3	1
30	green	RE1-A1	L1-1	1
31	green	RE1-A1	L1-1	1
32	black	RE1-B1	board 2-C1	1
33	black	RE1-B1	board 2-C1	1
34	black	RE1-B1	board 2-D1	1
35	black-white	RE1-B2	board 2-B2	1
36	black-white	RE1-B2	board 2-B2	1
37	black-white	RE1-B2	board 2-C2	1
38	black	RE2-X1	board 3-K5	1
39	green	RE2-X2	board 3-F5	1
40	black-white	RE2-A1	board 2-C2	1
41	green-white	RE2-B1	L1-2	1
42	green-white	RE2-B1	L1-2	1
43	green-white	RE2-B1	L1-2	1
44	green	RE2-B2	board 2-C5	1
45	green	RE2-B2	board 2-C5	1

<u>no.</u>	<u>colour</u>	<u>from</u>	<u>to</u>	<u>Wiring harness</u>
46	green	RE2-B2	board 2-D5	1
48	green	16B-6	board 2-B5	1
49	black-white	16B-7	board 2-D2	1
50	green-white	16B-8	board 3-F2	1
51	black-white	16B-9	board 2-D2	1
52	green	16B-12	board 2-B5	1
53	green-white	16B-13	board 3-J3	1
54	green	16B-14	board 3-J1	1
55	orange	16A-5	board 2-E5	1
56	green	16A-6	board 2-D5	1
57	black	16A-7	board 2-E2	1
58	black-white	16A-8	board 2-E2	1
59	green	16A-9	board 2-B5	1
60	orange-white	16A-10	board 2-A6	1
61	green-white	L1-2	board 2-E4	1
62	green-white	board 2-E4	board 3-N1	1
63	black	C1-2	board 3-M1	1
64	black	board 3-M2	board 2-A3	1
65	black	board 3-L3	board 2-A3	1
66	black	board 3-H3	board 2-E1	1
70	orange	PD5-1	16A-2	1
71	blue	PD5-2	16A-4	1
72	red-white	PD5-3	16A-1	1
73	yellow-white	PD5-5	16A-14	1
74	orange-white	PD5-6	16A-11	1
75	green	PD5-7	16A-13	1
76	red	PD5-8	16A-3	1
77	orange	PD5-11	board 2-E5	1
78	orange-white	PD5-13	board 2-A6	1
79	yellow	PD5-15	16A-12	1
80	brown	SK2-F2	board 2-C4	1
81	grey	PD4-1	SK1-r2	1
82	white	PD4-2	SK1-r3	1
83	grey-white	PD4-3	SK1-r4	1
84	cond.	PD4-4	SK1-r6	1
	screen	support A	support W1, W2	1
85	cond.	PD4-5	SK1-r7	1
	screen	support A	support W1, W2	1
86	cond.	PD4-6	SK1-r8	1
	screen	support A	support W1, W2	1
87	brown-white	PD4-7	board 2-B6	1
88	red-white	PD4-8	board 2-C6	1
89	yellow-white	PD4-9	board 2-D6	1
90	brown	PD4-10	board 1-R1	1
91	red	PD4-11	board 1-R3	1
92	yellow	PD4-12	board 1-R2	1
93	black-white	PD4-13	support A	1
94	blue	PD4-14	field tel. 2	1
95	blue	PD4-15	field tel. 1	1

<u>no.</u>	<u>colour</u>	<u>from</u>	<u>to</u>	<u>wiring harness</u>
96	brown-white	SK1-r10	board 2-B6	1
97	red-white	SK1-r11	board 2-C6	1
98	yellow-white	SK1-r12	board 2-D6	1
99	brown-white	board 2-B6	board 3-P6	1
100	red-white	board 2-C6	board 3-P4	1
101	yellow-white	board 2-D6	board 3-P3	1
102	violet	SK1-r5	board 1-T1	1
103	violet	SK2-r5	board 1-S3	1
104	black-white	PD1-V	board 1-W1	2
105	yellow	board 1-R2	SK1-f5	1
106	red	board 1-R3	SK1-f4	1
107	brown	board 1-R1	SK1-f3	1
108	green-white	PD1-K	board 2-D4	2
109	black-white	PD1-N	board 2-B2	2
110	black-white	PD1-U	board 1-S2	2
111	red-white	PD1-T	board 1-S1	2
112	blue	PD1-E	SK1-r1	2
113	blue white	PD1-B	SK2-r9	2
114	brown-white	PD1-A	SK1-f2	2
115	black-white	PD1-C	board 2-B2	2
116	orange	PD1-D	board 2-E5	2
117	green	PD1-H	board 3-K1	2
120	brown	PD2-A	board 2-C4	3
121	black-white	PD2-C	board 2-C3	3
122	orange-white	PD2-D	board 2-A6	3
123	red	PD2-G	board 2-A4	3
124	green	PD2-H	board 3-K1	3
125	yellow	PD2-J	board 2-B4	3
126	green-white	PD2-K	board 2-D4	3
127	green	PD2-L	board 3-J1	3
128	green	PD2-M	board 3-K1	3
129	black-white	PD2-N	board 2-C3	3
130	black-white	PD2-P	board 2-D3	3
131	black-white	PD2-R	board 2-E3	3
132	blue-white	PD2-B	SK2-r9	3
133	blue	PD2-E	SK2-r1	3
134	red-white	PD2-T	board 1-T3	3
135	black-white	PD2-U	board 1-T2	3
138	black-white	PD2-V	board 1-W1	3
139	grey	SK1-r2	SK2-r2	
140	white	SK1-r3	SK2-r3	
141	grey-white	SK1-r4	SK2-r4	
142	violet	SK1-r6	SK2-r6	
143	violet-white	SK1-r7	SK2-r7	
144	blue-white	SK1-r8	SK2-r8	
145	brown-white	SK1-r10	SK2-r10	
146	red-white	SK1-r11	SK2-r11	
147	yellow-white	SK1-r12	SK2-r12	
148	brown	SK1-f3	SK2-f3	
149	red	SK1-f4	SK2-f4	
150	yellow	SK1-f5	SK2-f5	
156	green-white	L1-2	C1-1	

<u>No.</u>	<u>colour</u>	<u>from</u>	<u>to</u>	<u>Wiring harness</u>
157	green-white	C1-1	GR1-A	
160	bare	L1-1	R16	
161	bare	R16	GR1-K	
162	bare	RE1-A2	RE1-X2	
163	bare	RE2-X1	RE2-A2	
164	bare	L1-1	R17	
165	bare	R17	L1-2	
166	bare	16B-10	C4	
167	bare	C4	16B-11	
168	bare	16B-11	C5	
169	bare	C5	16B-14	

PP-3620

REPAIR PARTS LIST

PREFACE

1) General

This manual is a list of items authorized for operator (first echelon) organizational (second echelon), field (third echelon) and depot (fourth and fifth echelon) maintenance.

The unit is divided in subassemblies as indicated on page 3.

From the subassemblies, the maintenance repair parts are listed in a alpha numerical order.

The fastening material of a repair part is listed directly below this repair part and the quantities of this fastening material are given for one repair part only. Fastening material for parts which are not repair parts, are listed as the maintenance repair parts mentioned above.

2) Explanation of columns

Column 1 lists the NATO stocknumber of the item

Column 2 lists the Manufacturing Code Number of the item

Column 3 lists the official name of the item and any additional description required for supply operations.

Column 4 lists the quantities of the item, used in the next higher assembly of this item.

Unless otherwise indicated, the quantities are given in pieces

Column 5 lists the echelon which is authorized to make a request for the item

Column 6 lists the number of the figure, which shows the location of the item

Column 7 lists the key number of the item on the figure mentioned in column 6

3) Abbreviations

The abbreviations listed below may appear in this manual.

al	aluminium
al-alloy	aluminium alloy
amp	ampere(s)
anodic-fin	anodic-finish
approx	approximate(ly)
assy	assembly
blk	black
blu	blue
br	brass
brn	brown
bz	bronze
cd	cadmium
cd-pltd	cadmium-plated

Repair parts List PP-3620

cond	conductor(s)
cop	copper
cop-pltd	copper-plated
corr-res-s	corrosion-resistant steel
dp	double-pole
dpdt	double-pole, double-throw
dpst	double-pole, single-throw
fil-hd	fillister head
fl-fil-hd	flat fillister head
fl-hd	flat head
grn	green
hex	hexagon
hex-hd	hexagon head
id	inside diameter
l	length
ni	nickel
ni-pltd	nickel plated
no	number
od	outside diameter
orn	orange
p-bz	phosphor bronze
posn	position(s)
pr	purple
ru	rubber
s	steel
sil-pltd	silver-plated
sltd	slotted
spdt	single-pole, double-throw
spst	single-pole, single-throw
spg-s	spring-steel
sq-hd	square head
stls-s	stainless steel
term	terminal
thk	thick
tn-pltd	tin-plated
tot	total
vio	violet
w/	with
wht	white
yel	yellow
zn	zinc
zn-pltd	zinc plated

Repair parts List PP-3620

POWER SUPPLY UNIT PP-3620

This equipment consists of the following subassemblies.

Cabinet, electrical equipment	page 4
Module, 26	
Frame assembly, Module 18	page 5
Module, 16	page 18
Module, 17	page 25

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig.No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
1	5820-17-034-3468	3522 142 24781	CABINET, ELECTRICAL EQUIPMENT, MODULE 26 <u>consisting of the following spare parts:</u>	1	3	7		
2	5820-17-034-3469	3522 142 24791	CABINET, ELECTRICAL EQUIPMENT	1	4	7	1	
3	5340-17-034-3464	3522 103 00681	CLAMP, BRIDGE	8	4	7	3	
4	5340-17-034-3506	3522 102 93931	PIN, PILOT <u>secured with:</u>	2	4	7	2	
5	5310-17-022-8011	2522 404 02009	NUT, HEXAGON; s cd-pltd; type BM 6 NEN 2334	2	4			
6	5310-17-034-3462	3522 102 93921	WASHER, FLAT; cr-ni-s; 12 mm od, 6.2 mm id, 0.5 mm thk	2	4			
7	5310-17-033-6733	2522 613 01014	WASHER, LOCK; p-bz cd-pltd; type B6,1 NEN 1197	2	4			
8	5305-17-034-3461	2522 043 18049	SCREW, SET; corr-res-s; type AM4 x 8 NEN 2343	8	4	7	4	
9	3040-17-034-3460	3522 102 93961	SHAFT, STRAIGHT	8	4	7	5	

Repair parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
1	6130-17-033-1526	3522 140 70291 ¹⁾	FRAME ASSEMBLY, MODULE 18	1	3			
	-----	3522 142 69461 ²⁾						
	-----	3522 142 80411 ³⁾						
			<u>consisting of the following spare parts:</u>					
2	5340-17-033-1512	3522 102 91531	BLOCK; cr-ni-s; to guide stacked units	3	3	5	1	
			<u>secured with:</u>					
3	5305-17-033-0075	2522 001 24171	SCREW, FL-FIL-HD; corr-res-s; type AM4 x 10 NEN 1602	2	3			
4	5310-17-033-6249	2522 613 03009	WASHER, LOCK; p-bz cd-pltd; type B4,1 NEN 1197	2	3			
5	5340-17-033-1513	3522 102 93681	BRACKET; br ni-pltd;	4	4	5	8	
			<u>secured with:</u>					
6	5305-17-003-5781	2522 005 01068	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 8 DIN 84	1	4			
7	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	1	4			
8	5340-17-033-1474	3522 103 00871	BRACKET, ANGLE; cr-ni-s; for Corner piece	4	4	5	13	
			<u>secured with:</u>					
9	5305-17-029-6852	2522 021 01042	SCREW, FL-HD; s cd-pltd; type AM2 x 6 NEN 2329	2	4			

¹⁾ With Dutch designation plates

²⁾ With Spanish designation plates

³⁾ With German designation plates

Repair parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			FRAME ASSEMBLY (continued)					
1	5340-17-038-0103	3522 140 79681	BRACKET, ANGLE; cr-ni-s; for Strap, retaining 5340-17-033-1149 <u>secured with:</u>	1	4			
2	5305-17-029-4218	2522 005 01067	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 6 DIN 84	2	4			
3	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	2	4			
4	5340-17-033-1473	3522 103 00701	BRACKET, ANGLE; cr-ni-s <u>secured with:</u>	1	4	8	1	
5	5325-17-033-0882	2522 642 06134	EYELET, METALLIC; br tn-pltd; type B3 x 0.3 x 5 DIN 7340	2	4			
6	5310-17-025-9030	2522 600 16016	WASHER, FLAT; s cd-pltd; type 3,2 NEN 433	2	4			
7	5340-17-034-9133	3522 103 62481	BRACKET, ANGLE; cr-ni-s <u>secured with:</u>	1	4	8	2	
8	5325-17-033-0882	2522 642 06134	EYELET, METALLIC; br tn-pltd; type B3 x 0,3 x 5 DIN 7340	2	4			
9	5310-17-025-9030	2522 600 16016	WASHER, FLAT; s cd-pltd; type 3,2 NEN 433	2	4			
10	5910-17-034-7532	2222 749 02272	CAPACITOR, FIXED, CERAMIC DIELECTRIC; 2700 pF -20 +50%; 50V (C4, C5))	2	3	5		
11	5910-00-926-8217	3522 020 63071	CAPACITOR, FIXED, ELECTROLYTIC; 47 uF + 10%; 35V; type CSR13F476KL (C2)	1	4	6		

Repair parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>FRAME ASSEMBLY (continued)</u>					
1	5910-00-984-3130	3522 020 55171	CAPACITOR, FIXED, ELECTROLYTIC; 3300 uF -10 +75%; 50V; type CE71C332G (C1)	1	4	5		
2	6130-17-033-1530	3522 140 79701	CHASSIS; al-alloy	1	5			
3	5935-17-035-2635	3522 020 72111	CONNECTOR, RECEPTACLE, ELECTRICAL; 15 male contacts <u>secured with:</u>	4	4			
4	5305-17-005-1460	2522 005 01016	SCREW, FL-FIL-HD; s cd-pltd; type AM2 x 8 DIN 84	2	4			
5	5310-12-139-3850	2522 600 16007	WASHER, FLAT; s cd-pltd; type 2,2 DIN 433	2	4			
6	5310-17-032-5543	2522 613 01001	WASHER, LOCK; p-bz cd-pltd; type B 2,1 NEN 1197	2	4			
7	5935-00-835-3031	3522 020 38191	CONNECTOR, RECEPTACLE, ELECTRICAL; 26 male contacts, bayonet; type MS 3112E-16-26P (801, 802) <u>secured with:</u>	2	4	1		
8	5305-17-033-0074	2522 001 24098	SCREW, FL-FIL-HD; corr-res-s; type AM3 x 8 NEN 1602	4	4			
9	5310-17-015-5052	2522 613 03005	WASHER, LOCK; p-bz ni-pltd; type B3,1 NEN 1197	4	4			
10	5940-17-033-1471	3522 020 38241	CONTACT, ELECTRICAL; br ni-pltd; 1 pole (805).	2	4	1		
11	5940-17-033-7242	3522 103 04201	CONTACT, ELECTRICAL; br sil-pltd; tot 1 8.5 mm for Terminal board 5940-17-035-1505	28	4			

Repair parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig.No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			FRAME ASSEMBLY (continued)					
1	5340-17-033-1517	3522 140 75541	CORNER PIECE; al-alloy anodic-fin <u>secured with:</u>	2	4	5	12	
2	5305-17-022-0045	2522 005 01069	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 10 NEN 1602	2	4			
3	5310-17-025-9030	2522 600 16016	WASHER, FLAT; s cd-pltd; type 3,2 DIN 433	2	4			
4	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	2	4			
5	5935-17-036-0807	3522 142 37691	COVER, ELECTRICAL CONNECTOR <u>secured with:</u>	2	3	1	3	
6	5305-17-710-1645	2522 001 24045	SCREW, FL-FIL-HD; corr-res-s; type AM2 x 6 NEN 1602	1	3			
7	5310-17-033-4820	2522 613 03001	WASHER, LOCK; p-bz ni-pltd; type B2,1 NEN 1197	1	3			
8	6130-17-033-1531	3522 140 79711	FRONT, al-alloy; for Module 18 <u>secured with:</u>	1	5	5	2	
9	5305-17-033-0190	3522 102 78921	SCREW, FL-FIL-HD; cr-ni-s; M4; thread 1 4.1.mm, shank 1 6 mm, tot 1 12.8 mm	2	5	5	3	
10	5305-17-024-5511	2522 005 01141	SCREW, FL-FIL-HD; s cd-pltd; type AM4 x 10 DIN 84	2	5	5	4	
11	5310-17-024-5507	2522 613 01009	WASHER, LOCK; p-bz cd-pltd; type B4,1 NEN 1197	2	5	5	5	
12	5970-17-036-0255	3522 103 77401	INSULATOR, PLATE; for Capacitor, fixed,ceramic C4 and C5	2	3			
13	5935-17-033-0426	3522 020 68791	JACK, TIP; 1 pole	2	3	5	15	

Repairs parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			FRAME ASSEMBLY (continued)					
1	5330-17-033-5825	2622 080 30708	O-RING; ru; 10.31 mm od, 6.75 mm id, 1.78 mm thk; to ensure the Power supply unit PP-3620 is airtight	1	5	1	1	
2	5330-17-033-5209	2622 080 30993	O-RING; ru; 29.05 mm od, 23.81 mm id, 2.62 mm thk; for Connector, receptacle, electrical (801, 802)	2	4	1		
3	5340-17-033-1515	3522 103 00861	PIN; cr-ni-s; for Corner piece 5340-17-033-1517	4	4			
4	5315-17-033-0184	3522 102 91521	PIN, SHOULDER, HEADED; cr-ni-s; to guide stacked units	2	3	1	5	
5	9905-17-033-1480	3522 103 00751	PLATE, DESIGNATION; al-alloy; 23 x 67 mm	1	3	1	4	
			<u>secured with:</u>					
6	5305-17-033-0073	2522 001 24044	SCREW, FL-FIL-HD; corr-res-s; type AM2 x 5 NEN 1602	4	3			
7	5310-17-033-4820	2522 613 03001	WASHER, LOCK; p-bz ni-pltd; type B2,1 NEN 1197	4	3			
8	5340-17-033-1475	3522 103 01351	PLATE, MENDING; br tn-pltd; 4 x 8.1 x 0.3 mm on Terminal board 5940-17-033-1503	1	4			
9	5340-17-033-1476	3522 103 01361	PLATE, MENDING; br tn-pltd; 4 x 18.2 x 0.3 mm on Terminal board 5940-17-033-1503	1	4			
10	5340-17-033-1477	3522 103 01371	PLATE, MENDING; br tn-pltd; 4 x 23.3 x 0.3 mm on Terminal board 5940-17-033-1503	1	4			

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Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			FRAME ASSEMBLY (continued)					
1	5340-17-033-1478	3522 103 01381	PLATE, MENDING; br tn-pltd; 11.5 x 23.3 x 0.3 mm on Terminal board 5940-17-033-1503	1	4			
2	5950-17-033-1521	3522 149 11591	REACTOR (L1)	1	4	5		
			<u>secured with:</u>					
3	5305-17-024-5511	2522 005 01141	SCREW, FL-FIL-HD; s cd-pltd; type AM4 x 10 DIN 84	4	4			
4	5310-17-003-8219	2522 600 16026	WASHER, FLAT; s cd-pltd; type A4,3 NEN 2269	4	4			
5	5310-17-024-5507	2522 613 01009	WASHER, LOCK; p-bz cd-pltd; type B4,1 NEN 1197	4	4			
6	5945-00-913-0339	3522 020 53901	RELAY, ARMATURE; 26.5V (RE1, RE2)	2	4	5		
			<u>secured with:</u>					
7	5305-17-003-5781	2522 005 01068	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 8 DIN 84	2	4			
8	5310-17-025-9030	2522 600 16016	WASHER, FLAT; s cd-pltd; type 3,2 DIN 433	2	4			
9	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	2	4			

Repair parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>FRAME ASSEMBLY (continued)</u>					
1	5905-00-880-2350	2322 151 01001	RESISTOR, FIXED, FILM; 100 ohm $\pm$ 2%; 0.25W; type RL07S101G (R1, R11)	2	4	8		
2	5905-00-051-0737	2322 151 03301	RESISTOR, FIXED, FILM; 330 ohm $\pm$ 2%; 0.25W; type RL07S331G (R2, R10)	2	4	8		
3	5905-00-682-6988	2322 151 01002	RESISTOR, FIXED, FILM; 1 kohm $\pm$ 2%; 0.25W; type RL07S102G (R5, R6, R7)	3	4	6		
4	5905-00-068-6818	3522 020 02121	RESISTOR, FIXED, WIREWOUND; 0.15 ohm $\pm$ 10%; 3W; type RW69VR15 (R8, R9)	2	4	6		
5	5905-00-051-5557	3522 020 02181	RESISTOR, FIXED, WIREWOUND; 0.47 ohm $\pm$ 10%; 3W; type RW69VR47 (R16)	1	3	5		
6	5905-00-990-4151	3522 020 02321	RESISTOR, FIXED, WIREWOUND; 6.8 ohm $\pm$ 5%; 3W; type RW69V6R8 (R4)	1	4	6		
7	5905-00-990-4151	3522 020 02321	RESISTOR, FIXED, WIREWOUND; 6.8 ohm $\pm$ 5%; 3W; type RW69V6R8 (R17)	1	3	5		
8	5905-00-892-6799	3522 020 02381	RESISTOR, FIXED, WIREWOUND; 22 ohm $\pm$ 5%; 3W; type RW69V220 (R15)	1	4	6		
9	5905-00-044-2222	3522 020 02481	RESISTOR, FIXED, WIREWOUND; 150 ohm $\pm$ 5%; 3W; type RW69V151 (R3)	1	4	6		
10	5905-00-984-7704	3522 020 02521	RESISTOR, FIXED, WIREWOUND; 330 ohm $\pm$ 5%; 3W; type RW69V331 (R12, R13, R14)	3	4	6		

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>FRAME ASSEMBLY (continued)</u>					
1	5910-17-033-1483	3522 140 79531	RETAINER, CAPACITOR; cr-ni-s; for Capacitor, fixed, electrolytic C1 <u>secured with:</u>	2	4			
2	5305-17-003-5788	2522 005 01142	SCREW, FL-FIL-HD; s cd-pltd; type AM4 x 12 DIN 84	2	4			
3	5310-17-024-5507	2522 613 01009	WASHER, LOCK; p-bz cd-pltd; type B4,1 NEN 1197	2	4			
4	5305-17-033-0191	3522 102 93651	SCREW, CAPTIVE; cr-ni-s; M4; thread 1 5 mm, total 1 14,5 mm, to secure Module 16	1	4			
5	5305-17-032-9886	3522 101 90181	SCREW, FL-FIL-HD; cr-ni-s; M5; thread 1 5.6 mm, shank 1 8 mm	1	5	1	2	
6	5330-17-033-0204	3522 102 67791	SEAL, RUBBER STRIP; ru nitril; blk, 249 x 79 x 4 mm	1	3			
7	5961-00-577-6084	9330 720 60682	SEMICONDUCTOR DEVICE, DIODE; type 1N645 (GR2, GR3)	2	4	6		
8	5961-00-878-2737	9330 720 70682	SEMICONDUCTOR DEVICE, DIODE; type 1N1126A (GR1) <u>secured with:</u>	1	4	5		
9	5310-17-003-1856	2522 449 01009	NUT, HEXAGON; br ni-pltd	1	4			
10	5310-17-036-7339	2522 600 10147	WASHER, FLAT; br ni-pltd; type A6,4 DIN 125	1	4			
11	5310-17-036-4247	2522 616 06008	WASHER, LOCK; TOOTHED; spg-s ni-pltd	1	4			

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			FRAME ASSEMBLY (continued)					
1	5340-17-033-1516	3522 142 24421	SHIELD, PROTECTING; al-alloy <u>secured with:</u>	1	4	5	11	
2	5305-17-003-5781	2522 005 01068	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 8 DIN 84	5	4			
3	5310-17-025-9030	2522 600 16016	WASHER, FLAT; s cd-pltd; type 3,2 DIN 433	5	4			
4	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	5	4			
5	5360-17-033-1145	3522 103 00891	SPRING, HELICAL, COMPRESSION; p-bz; for Corner piece 5340-17-033-1517	4	4			
6	5340-17-033-1149	2522 705 18144	STRAP, RETAINING; s cd-pltd; double sided 26 x 10 x 5.5 mm <u>secured with:</u>	1	4	5	19	
7	5305-17-029-4218	2522 005 01067	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 6 DIN 84	2	4			
8	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	2	4			
9	5340-17-035-4493	2522 705 15109	STRAP, RETAINING; s cd-pltd; single sided; 22 x 10 x 1 mm <u>secured with:</u>	2	4	5	10	
10	5305-17-003-5781	2522 005 01068	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 8 DIN 84	1	4			
11	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	1	4			

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>FRAME ASSEMBLY (continued)</u>					
1	5930-17-025-9995	3522 020 72021	SWITCH, ROTARY; 5 poles, 3 posn (803, 804)	2	4	1		
2	5940-17-033-1504	3522 140 79611	TERMINAL BOARD; 93 x 46 x 1.5 mm <u>secured with:</u>	1	4	5	17	see also fig. 6
3	5305-17-003-5781	2522 005 01068	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 8 DIN 84	4	4			
4	5310-17-025-9030	2522 600 16016	WASHER, FLAT; s cd-pltd; type 3,2 DIN 433	4	4			
5	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	4	4			
6	5940-17-033-1502	3522 140 79561	TERMINAL BOARD; w/2 term; 20 x 20 x 1 mm <u>secured with:</u>	1	4	5	14	
7	5305-17-003-9694	2522 005 01014	SCREW, FL-FIL-HD; s cd-pltd; type AM2 x 5 DIN 84	2	4			
8	5310-17-032-5543	2522 613 01001	WASHER, LOCK; p-bz cd-pltd; type B2,1 NEN 1197	2	4			

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig.No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>FRAME ASSEMBLY (continued)</u>					
1	5940-17-033-1505	3522 142 60361	TERMINAL BOARD; for 28 term; for Wiring harness, branched no 1A, 1B	1	4			
			<u>secured with:</u>					
2	5310-17-033-0415	2522 500 05006	NUT, SQUARE; s cd-pltd; M3; 5.5 mm width across flats, 2.5 mm thk	6	4			
3	5305-17-029-6857	2522 021 01095	SCREW, FL-HD; s cd-pltd; type AM3 x 10 DIN 63	6	4			
4	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	6	4			
5	5940-17-033-1501	3522 140 79521	TERMINAL BOARD; 59,5 x 26 x 1,6 mm	1	4	5	6	see also fig. 8
			<u>secured with:</u>					
6	5305-17-029-4218	2522 005 01067	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 6 DIN 84	2	4			
7	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	2	4			

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig.No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			FRAME ASSEMBLY (continued)					
1	5940-17-033-1495	3522 103 24021	TERMINAL BOARD; 40.3 x 17 x 1 mm for Terminal board 5940-17-033-1505 <u>secured with:</u>	2	4			
2	5310-17-032-9692	2522 405 01003	NUT, HEXAGON; br ni-pltd; type M1,4 DIN 934	3	4			
3	5305-17-032-9695	2522 021 02018	SCREW, FL-HD; s ni-pltd; type M1,4 x 5 DIN 63	3	4			
4	5310-17-032-9497	2522 600 30003	WASHER, FLAT; s ni-pltd; type 1,5 DIN 433	3	4			
5	5310-17-035-1599	2522 610 14015	WASHER, SPRING TENSION; cr-ni-s; 3 mm od, 1.5 mm id, 0.25 mm thk	3	4			
6	5940-17-033-1503	3522 140 79581	TERMINAL BOARD; 46 x 46 x 1.5 mm <u>secured with:</u>	1	4	5	7	
7	5305-17-003-5781	2522 005 01068	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 8 DIN 84	4	4			
8	5310-17-025-9030	2522 600 16016	WASHER, FLAT; s cd-pltd; type 3,2 DIN 433	4	4			
9	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	4	4			
10	5310-17-036-4213	2522 610 14006	WASHER, SPRING TENSION; cr-ni-s, 8 mm od, 4.3 mm id, 0.5 mm thk; to secure Module 16	1	4			

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig.No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>FRAME ASSEMBLY (continued)</u>					
1	5995-17-033-1522	3522 142 00141	WIRING HARNESS, BRANCHED; no 1A	1	5	5	21	
2	5995-17-033-1525	3522 142 00941	WIRING HARNESS, BRANCHED; no 1B	1	5	5	18	
3	5995-17-033-1523	3522 142 00161	WIRING HARNESS, BRANCHED; no 2	1	5	5	22	
4	5995-17-033-1524	2522 142 00181	WIRING HARNESS, BRANCHED; no 3	1	5	5	20	

Repair parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
1	6130-17-033-1528	3522 140 70311	MODULE, 16 <u>consisting of the following spare parts:</u>	1	3			
2	6130-17-033-1529	3522 140 79451	BOTTOM; br sil-pltd; 142 x 24.5 x 6 mm for Module, 16	1	4			
3	6130-17-033-1532	3522 140 79721	COVER; for Module <u>secured with:</u>	1	4			
4	5305-17-035-8608	3522 103 72191	SCREW; FL-FIL-HD; corr-res-s; M3 x 6.4	2	4			
5	5310-17-015-5052	2522 613 03005	WASHER, FLAT; p-bz ni-pltd; type B3,1 NEN 1197	2	4			
6	5310-17-035-8609	3522 103 72201	RING; p-bz ni-pltd; for the removing of the Module	2	3			
7	5340-17-032-9799	3522 102 94461	PIN, PILOT; cr-ni-s; M3; tot 1 16 mm	2	4			
8	5340-17-032-9811	3522 102 94471	SPACER; br ni-pltd; in lower end corners of Module	2	4			
9	5340-17-032-9810	3522 102 94481	SPACER; br ni-pltd; in the middle of lower end of Module	1	4			
10	5340-17-032-9809	3522 102 94491	SPACER; br ni-pltd; in upper end corners of Module	2	4			

Repair parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			MODULE, 16 (continued)					
1	6130-17-033-1533	3522 145 91811	STABILIZER UNIT, 16A; 2 x 15V secured with:	1	4	2	4	
2	5305-17-015-4446	2522 001 08045	SCREW, FL-FIL-HD; br ni-pltd; type AM2 x 6 NEN 1602	5	4	2	1	
3	5310-17-029-2217	2522 600 10007	WASHER, FLAT; br ni-pltd; type 2,2 NEN 2270	5	4	2	2	
4	5310-17-033-4820	2522 613 03001	WASHER, LOCK; p-bz ni-pltd; type B2,1 NEN 1197	5	4	2	3	
5	5910-17-034-7532	2222 749 02272	CAPACITOR, FIXED, CERAMIC DIELEC- TRIC; 2700 pF -20 +50%; 50V (C1 (2x), C2 (2x), C3, C5 (2x) C6 (2x), C7)	10	4	2		
6	5910-00-938-4753	3522 020 62801	CAPACITOR, FIXED, ELECTROLYTIC; 0.33 uF + 10%; 50V; type CSR13G334KL (C9, C10)	2	4	2		
7	5910-00-997-4078	3522 020 62861	CAPACITOR, FIXED, ELECTROLYTIC; 3.3 uF + 10%; 15V; type CSR13D335KL (C4, C8)	2	4	2		
8	5970-17-009-9466	9390 004 90002	INSULATOR, DISK; for Transistor TS1 thru TS6	6	4			
9	5970-17-036-0255	3522 103 77401	INSULATOR, PLATE; for Capacitor C1 (2x), C2 (2x) C3, C5 (1x, see remarks) C6 (2x) and C7.	9	4			Not for C5 near TS6

Repair parts List PP-3620

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>STABILIZER UNIT, 16A, part of</u> <u>MODULE 16 (continued)</u>					
1	5905-00-727-9761	2322 152 01001	RESISTOR, FIXED, FILM; 100 ohm + 2%; 0.5W; type RL20S101G (R4, R14)	2	4	2		
2	5905-00-774-8292	2322 151 04701	RESISTOR, FIXED, FILM; 470 ohm + 2%; 0.25W; type RL07S471G (R5, R15)	2	4	2		
3	5905-00-774-8290	2322 151 02202	RESISTOR, FIXED, FILM; 2.2 kohm + 2%; 0.25W; type RL07S222G (R2, R3, R12, R13)	4	4	2		
4	5905-00-774-8301	2322 151 04702	RESISTOR, FIXED, FILM; 4.7 kohm + 2%; 0.25W; type RL07S472G (R1, R11)	2	4	2		
5	5905-00-051-0146	2322 151 08202	RESISTOR, FIXED, FILM; 8.2 kohm 2%; 0.25W; type RL07S822G (R8, R18)	2	4	2		
6	5905-00-774-8331	2322 151 01003	RESISTOR, FIXED, FILM; 10 kohm + 2%; 0.25W; type RL07S103G (R9, R19)	2	4	2		
7	5905-00-774-8321	2322 151 01503	RESISTOR, FIXED, FILM; 15 kohm + 2%; 0.25W; RL07S153G (R10, R20)	2	4	2		
8	5905-00-060-3731	3522 020 02221	RESISTOR, FIXED, WIRE WOUND; 1 ohm + 5%; 3W; type RW69V1R0 (R6, R16)	2	4	2		
9	5905-00-780-8689	3522 020 42511	RESISTOR, VARIABLE; 5 kohm + 5%; 0.75W; type RT24C2X502 (R7, R17)	2	4	2		

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>STABILIZER UNIT 16A, part of</u> <u>MODULE 16 (continued)</u>					
1	5961-99-037-2205	9330 183 00692	SEMICONDUCTOR DEVICE, DIODE; type CV7105 (GR3, GR6)	2	4	2		
2	5961-99-037-2392	9330 183 70692	SEMICONDUCTOR DEVICE, DIODE; type CV7142 (GR2, GR5)	2	4	2		
3	5961-99-037-2393	9330 183 80692	SEMICONDUCTOR DEVICE, DIODE; type CV7143 (GR1, GR4)	2	4	2		
4	5940-17-033-1142	3522 142 05521	TERMINAL BOARD; w/7 term; 35.48 x 5 x 5 mm	2	4	2	5	
5	5961-17-027-6034	9330 203 40112	TRANSISTOR; type BFY55 (TS1, TS3, TS4, TS6)	4	4	2		
6	5961-00-880-4779	9330 719 10682	TRANSISTOR; type 2N2905 (TS2, TS5)	2	4	2		
7	6130-17-033-1534	3522 145 91911	STABILIZER UNIT; 16B; 18V + 24V <u>secured with:</u>	1	4	3	4	
8	5305-17-015-4446	2522 001 08045	SCREW, FL-FIL-HD; br ni-pltd; type AM2 x 6 NEN 1602	5	4	3	1	
9	5310-17-029-2217	2522 600 10007	WASHER, FLAT; br ni-pltd; type 2,2 NEN 2270	5	4	3	2	
10	5310-17-033-4820	2522 613 03001	WASHER, LOCK; p-bz ni-pltd; type B2,1 NEN 1197	5	4	3	3	
11	5910-17-034-7532	2222 749 02272	CAPACITOR, FIXED, CERAMIC DIELEC- TRIC; 2700 pF -20 +50%; 50V (C1, (2x), C2 (2x), C3, C7, C8)	7	4	3		
12	5910-00-938-4753	3522 020 62801	CAPACITOR, FIXED, ELECTROLYTIC; 0.33 uF + 10%; 50V; type CSR13G334KL (C5, C6)	2	4	3		

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>STABILIZER UNIT, 16B, part of</u> <u>MODULE 16 (continued)</u>					
1	5910-00-997-4078	3522 020 62861	CAPACITOR, FIXED, ELECTROLYTIC; 3.3 uF + 10%; 15V; type CSR13D335KL (C4)	1	4	3		
2	5970-17-009-9466	9390 004 90002	INSULATOR, DISK; for Transistor, TS1 thru TS7	7	4			
3	5970-17-036-0255	3522 103 77401	INSULATOR, PLATE; for Capacitor C1 (2x), C2 (2x), C3, C8	6	4			
4	5905-00-727-9761	2322 152 01001	RESISTOR, FIXED, FILM; 100 ohm + 2%; 0.5W; type RL20S101G (R4)	1	4	3		
5	5905-00-774-8292	2322 151 04701	RESISTOR, FIXED, FILM; 470 ohm + 2%; 0.25W; type RL07S471G (R5)	1	4	3		
6	5905-00-781-9695	2322 151 05601	RESISTOR, FIXED, FILM; 560 ohm + 2%; 0.25W; type RL07S561G (R20)	1	4	3		
7	5905-00-900-2051	2322 152 01002	RESISTOR, FIXED, FILM; 1 kohm + 2%; 0.5W; type RL20S102G (R3)	1	4	3		
8	5905-00-774-8290	2322 151 02202	RESISTOR, FIXED, FILM; 2.2 kohm + 2%; 0.25W; type RL07S222G (R2, R12, R23)	3	4	3		
9	5905-00-774-8288	2322 151 02702	RESISTOR, FIXED, FILM; 2.7 kohm + 2%; 0.25W; type RL07S272G (R13, R17)	2	4	3		

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Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			STABILIZER UNIT, 16B, part of MODULE 16 (continued)					
1	5905-00-774-8301	2322 151 04702	RESISTOR, FIXED, FILM; 4.7 kohm $\pm$ 2%; 0.25W; type RL07S472G (R1, R11)	2	4	3		
2	5905-00-051-0146	2322 151 08202	RESISTOR, FIXED, FILM; 8.2 kohm $\pm$ 2%; 0.25W; type RL07S822G (R8)	1	4	3		
3	5905-00-774-8331	2322 151 01003	RESISTOR, FIXED, FILM; 10 kohm $\pm$ 2%; 0.25W; type RL07S103G (R9, R15, R18, R22)	4	4	3		
4	5905-00-774-8321	2322 151 01503	RESISTOR, FIXED, FILM; 15 kohm $\pm$ 2%; 0.25W; type RL07S153G (R10)	1	4	3		
5	5905-00-954-2380	3522 020 08501	RESISTOR, FIXED, FILM; 261 kohm $\pm$ 1%; 0.125W; type RN55D2613F (R21)	1	4	3		
6	5905-00-060-3731	3522 020 02221	RESISTOR, FIXED, WIRE WOUND; 1 ohm $\pm$ 5%; 3W; type RW69V1R0 (R6)	1	4	3		
7	5905-00-103-7443	3522 020 42481	RESISTOR, VARIABLE; 500 ohm $\pm$ 5%; 0.75W; type RT24C2X501 (R19)	1	4	3		
8	5905-00-780-8689	3522 020 42511	RESISTOR, VARIABLE; 5 kohm $\pm$ 5%; 0.75W; type RT24C2X502 (R7, R16)	2	4	3		

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			<u>STABILIZER UNIT, 16B, part of</u> <u>MODULE 16 (continued)</u>					
1	5961-99-037-2134	9330 181 60692	SEMICONDUCTOR DEVICE, DIODE; type CV7076 (GR9)	1	4	3		
2	5961-99-037-2201	9330 182 60692	SEMICONDUCTOR DEVICE; DIODE; type CV7101 (GR5 thru GR8)	4	4	3		
3	5961-99-037-2393	9330 183 80692	SEMICONDUCTOR DEVICE, DIODE; type CV7143 (GR2, GR3)	2	4	3		
4	5961-99-037-2395	9330 417 00692	SEMICONDUCTOR DEVICE, DIODE; type CV7145 (GR1)	1	4	3		
5	5940-17-033-1142	3522 142 05521	TERMINAL BOARD; w/7 term; 35.48 x 5 x 5 mm	2	4	3	5	
6	5961-17-027-6034	9330 203 40112	TRANSISTOR; type BFY55 (TS1, TS3, TS4, TS5)	4	4	3		
7	5961-00-880-4779	9330 719 10682	TRANSISTOR; type 2N2905 (TS2, TS6, TS7)	3	4	3		
8	5310-17-015-5052	2522 613 03005	WASHER, LOCK; p-bz ni-pltd; type B3,1 NEN 1197; for Pin, pilot	2	4			

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Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
1	6130-17-033-1527	3522 140 70301	MODULE, 17 <u>secured with:</u>	1	3	4		
2	5305-17-033-1148	3522 103 00551	SCREW, CAPTIVE; cr-ni-s; M5; thread 1 8 mm, shank 1 25 mm	4	4	4	5	
3	5310-17-033-0887	2522 613 01012	WASHER, LOCK; p-bz cd-pltd; type B5,1 NEN 1197 <u>consisting of the following spare parts:</u>	4	4	4	6	
4	5970-17-033-0876	9390 006 50002	BUSHING, INSULATING; for Transistor TS1, TS2, TS3, TS7	4	4			
5	5340-17-033-1472	3522 103 00541	BUSHING, INSULATING; teflon, for Transistor TS4, TS5, TS6, TS8	4	4			
6	5910-17-034-7532	2222 749 02272	CAPACITOR, FIXED, CERAMIC; 2700 pF -20 +50%; 50V (C3)	1	4	4		
7	5935-17-035-2634	3522 020 72101	CONNECTOR, RECEPTACLE, ELECTRICAL; 15 female contacts <u>secured with:</u>	2	4	4	2	
8	5305-17-029-6402	2522 005 01015	SCREW, FL-FIL-HD; s cd-pltd; type AM2 x 6 DIN 84	2	4			
9	5310-17-032-5543	2522 613 01001	WASHER, LOCK; p-bz cd-pltd; type B2,1 NEN 1197	2	4			
10	5340-17-033-1492	3522 103 00531	HANDLE, BOW; al-alloy anodic-fin <u>secured with:</u>	2	4	4	3	
11	5305-17-022-0045	2522 005 01069	SCREW, FL-FIL-HD; s cd-pltd; type AM3 x 10 NEN 1602	2	4			
12	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	2	4			

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			MODULE, 17 (continued)					
1	5970-17-036-0255	3522 103 77401	INSULATOR, PLATE; for Capacitor, fixed, ceramic dielectric C3	1	4			
2	5961-17-032-9800	9390 002 20002	MOUNTING, TRANSISTOR; consisting of mylar washer, bottom clamping washer and top clamping washer; for Transistor TS4, TS5, TS6, TS8	4	4	4	1	
			<u>secured with:</u>					
3	5305-17-033-8398	2522 005 01058	SCREW, FL-FIL-HD; s cd-pltd; type BM2,6 x 12	2	4			
4	5310-17-032-2745	2522 600 16013	WASHER, FLAT; s cd-pltd; type 2,8 DIN 433	2	4			
5	5310-17-024-5505	2522 613 01003	WASHER, LOCK; p-bz cd-pltd; type B2,7 NEN 1197	2	4			
6	5315-17-033-1493	3522 103 00561	PIN, SHOULDER, HEADLESS; cr-ni-s; for the guiding of the Module	1	4	4	4	
			<u>secured with:</u>					
7	5310-17-022-4379	2522 405 02008	NUT, HEXAGON; s cd-pltd; type M3 NEN 1560	1	4			
8	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	1	4			

Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			MODULE, 17 (continued)					
1	5315-17-033-1494	3522 103 00571	PIN, SHOULDER, HEADLESS; for the guiding of the Module <u>secured with:</u>	1	4	4	7	
2	5310-17-022-4379	2522 405 02008	NUT, HEXAGON; s cd-pltd; type M3 NEN 1560	1	4			
3	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	1	4			
4	5961-17-027-6034	9330 203 40112	TRANSISTOR; type BFY55 (TS4, TS5, TS6)	3	4	4		
5	5961-00-880-4779	9330 719 10682	TRANSISTOR; type 2N2905 (TS8)	1	4	4		
6	5961-00-912-8444	9330 226 50112	TRANSISTOR; type 2N3055 (TS1, TS2, TS3) <u>secured with:</u>	3	4	4		
7	5310-17-022-4379	2522 405 02008	NUT, HEXAGON; s cd-pltd; type M3 NEN 1560	2	4			
8	5305-17-033-9552	2522 005 01086	SCREW; FL-FIL-HD; s cd-pltd; M3 x 12	2	4			
9	5310-17-025-8700	2522 600 16017	WASHER, FLAT; s cd-pltd; type A3,2 NEN 2269	4	4			
10	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	2	4			

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Line No.	NATO Stocknumber	Mfg. Code No.	Description	Quant.	Echelon	Fig. No.	Key No.	Remarks
	1	2	3	4	5	6	7	8
			MODULE, 17 (continued)					
1	5961-00-904-2021	9330 869 40682	TRANSISTOR; type 2N3791 (TS7)	1	4	4		
			<u>secured with:</u>					
2	5310-17-022-4379	2522 405 02008	NUT, HEXAGON; s cd-pltd; type M3 NEN 1560	2	4			
3	5305-17-033-6741	2522 005 01087	SCREW, FL-FIL-HD; s cd-pltd; type BM3 x 15 NEN 1602	2	4			
4	5310-17-025-8700	2522 600 16017	WASHER, FLAT; s cd-pltd; type A3,2 NEN 2269	4	4			
5	5310-17-024-5506	2522 613 01005	WASHER, LOCK; p-bz cd-pltd; type B3,1 NEN 1197	2	4			
6	5960-17-023-7886	9390 000 30002	WASHER, LEAD, TRANSISTOR; for Transistor TS1, TS2, TS3, TS7	4	4			
7	5970-17-033-0877	9390 000 50002	WASHER, MICA, TRANSISTOR; for Transistor TS1, TS2, TS3, TS7	4	4			

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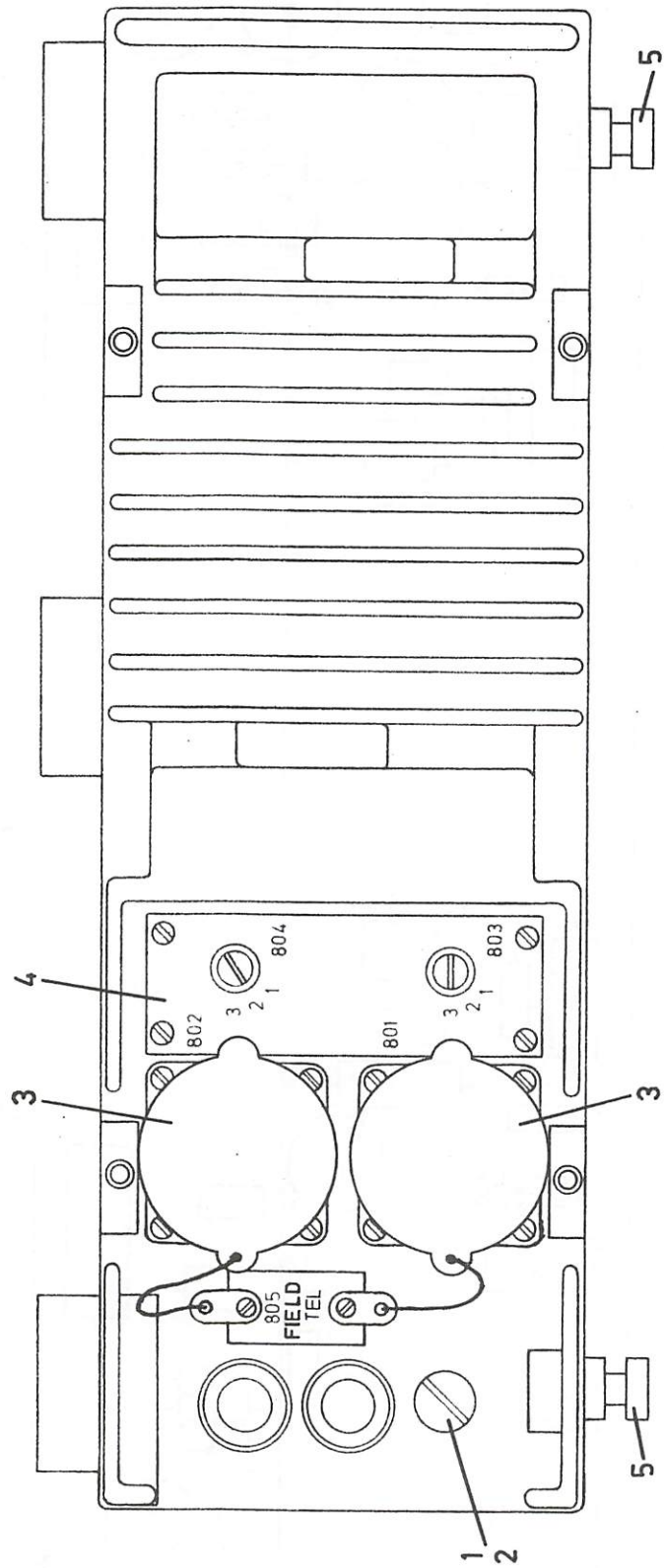


Fig 1. Power supply unit PP-3620 - front view

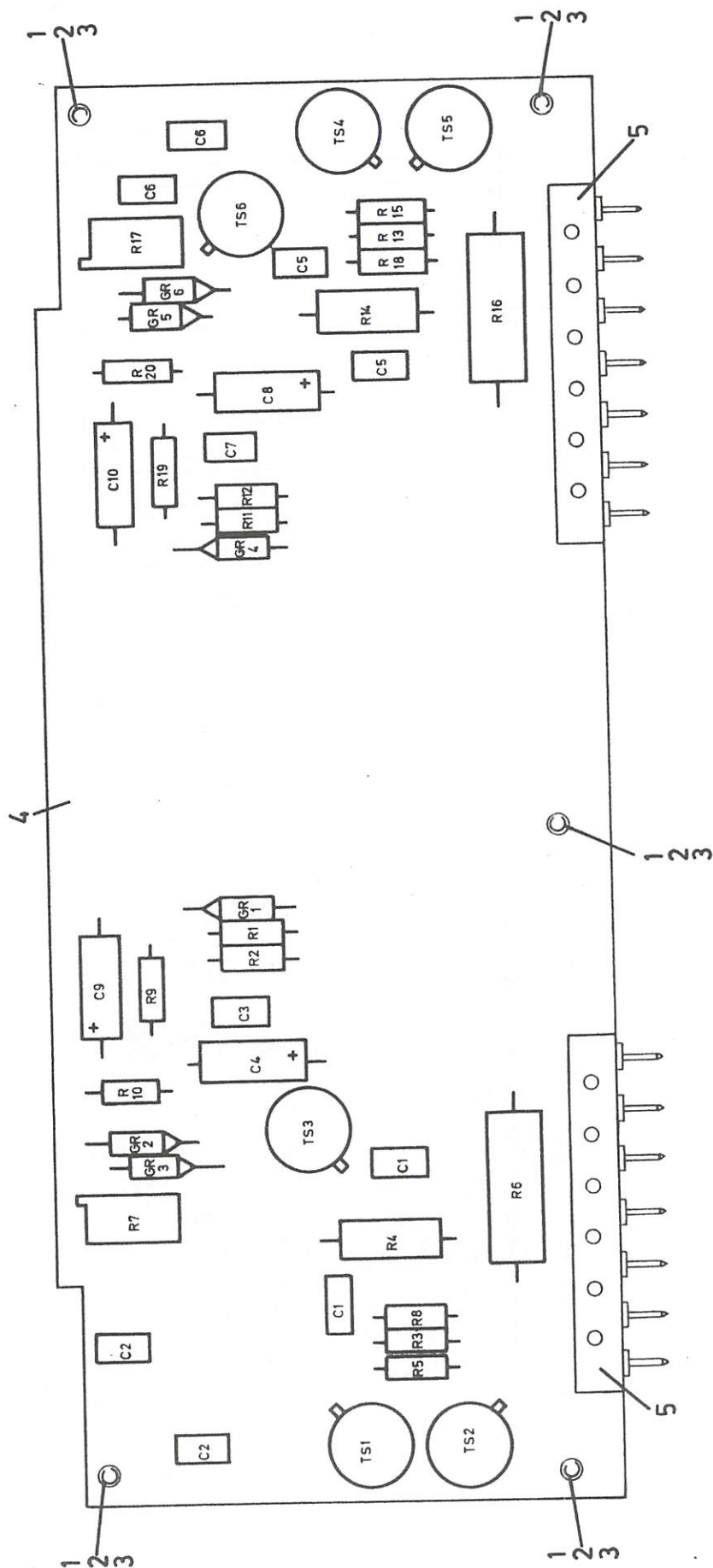


Fig 2.. Stabilizer unit, 16A

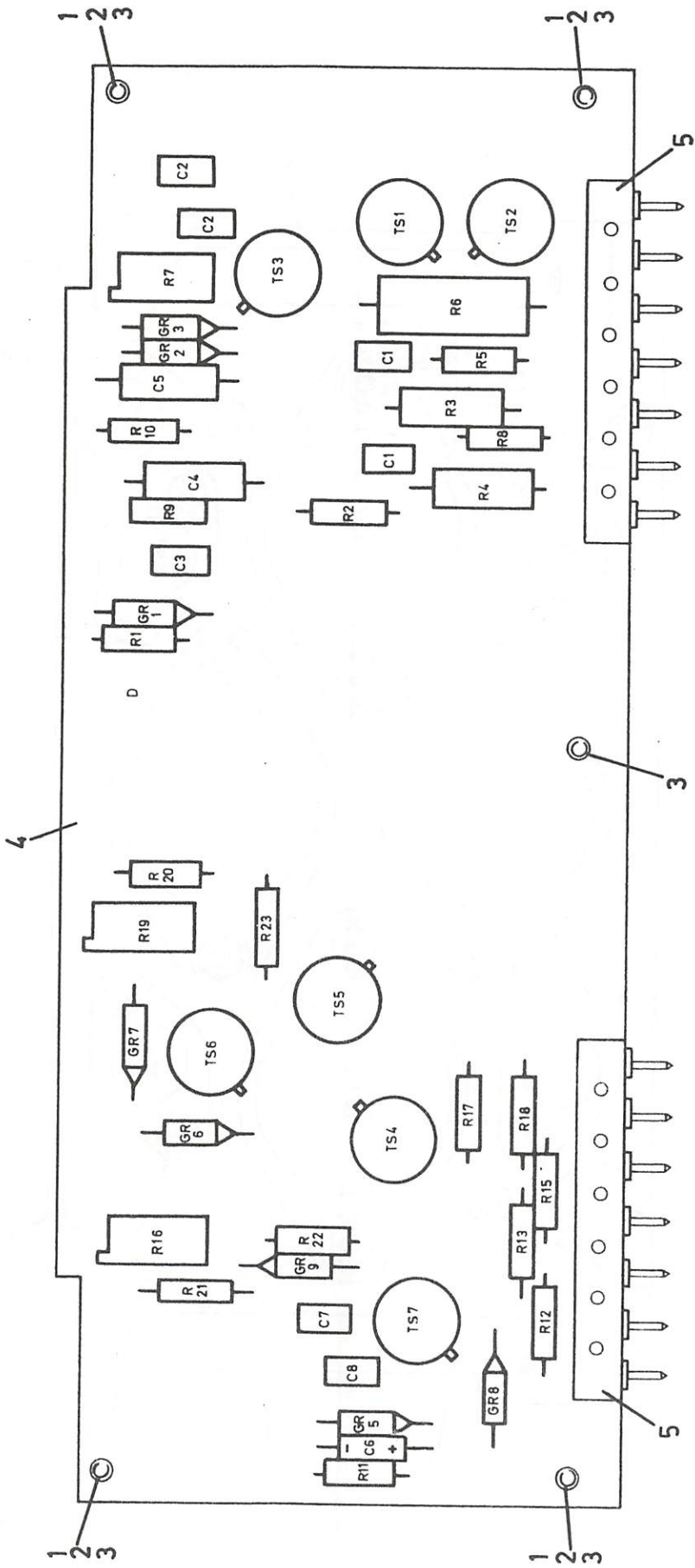


Fig 3: Stabilizer unit, 16B

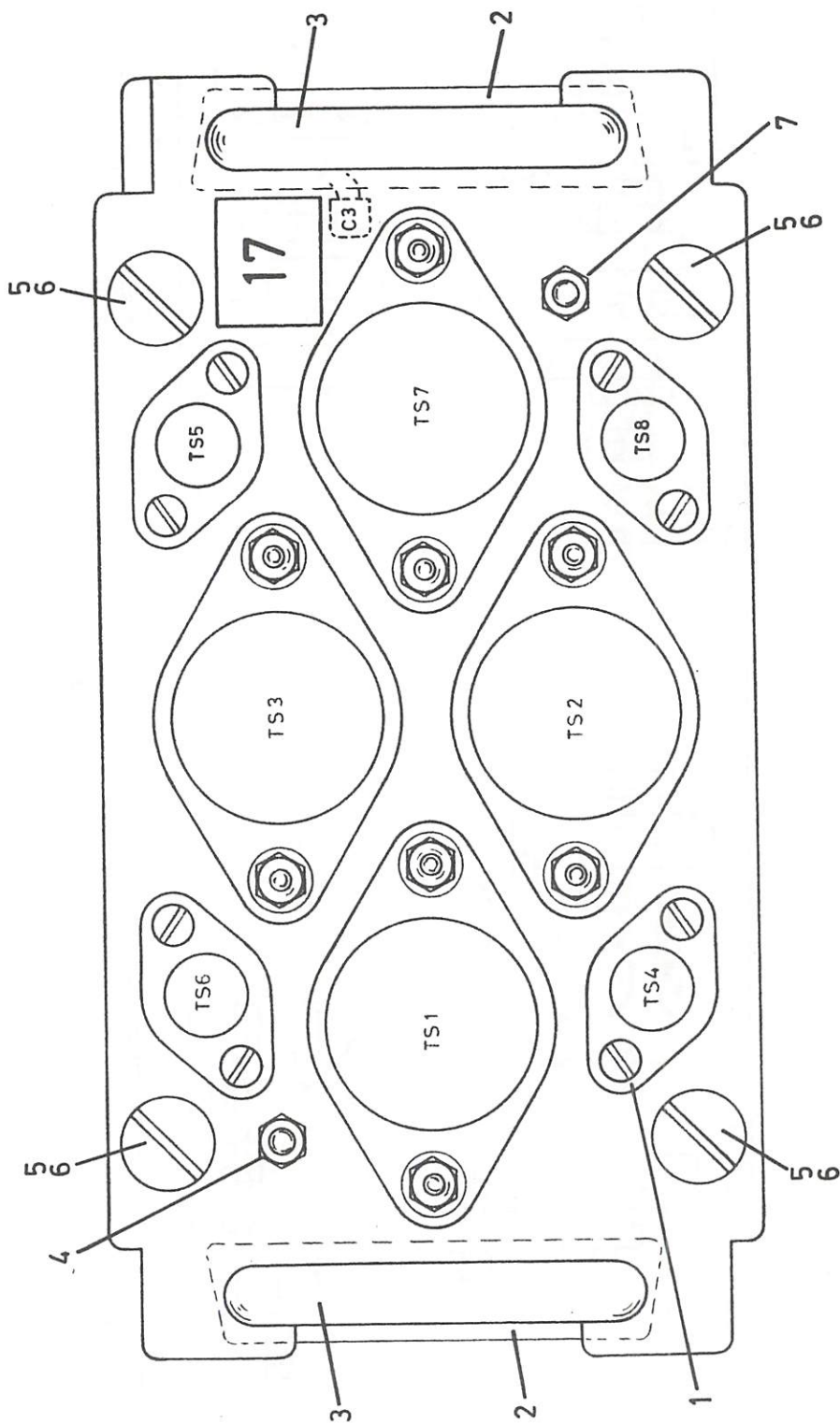


Fig 4. Module 17

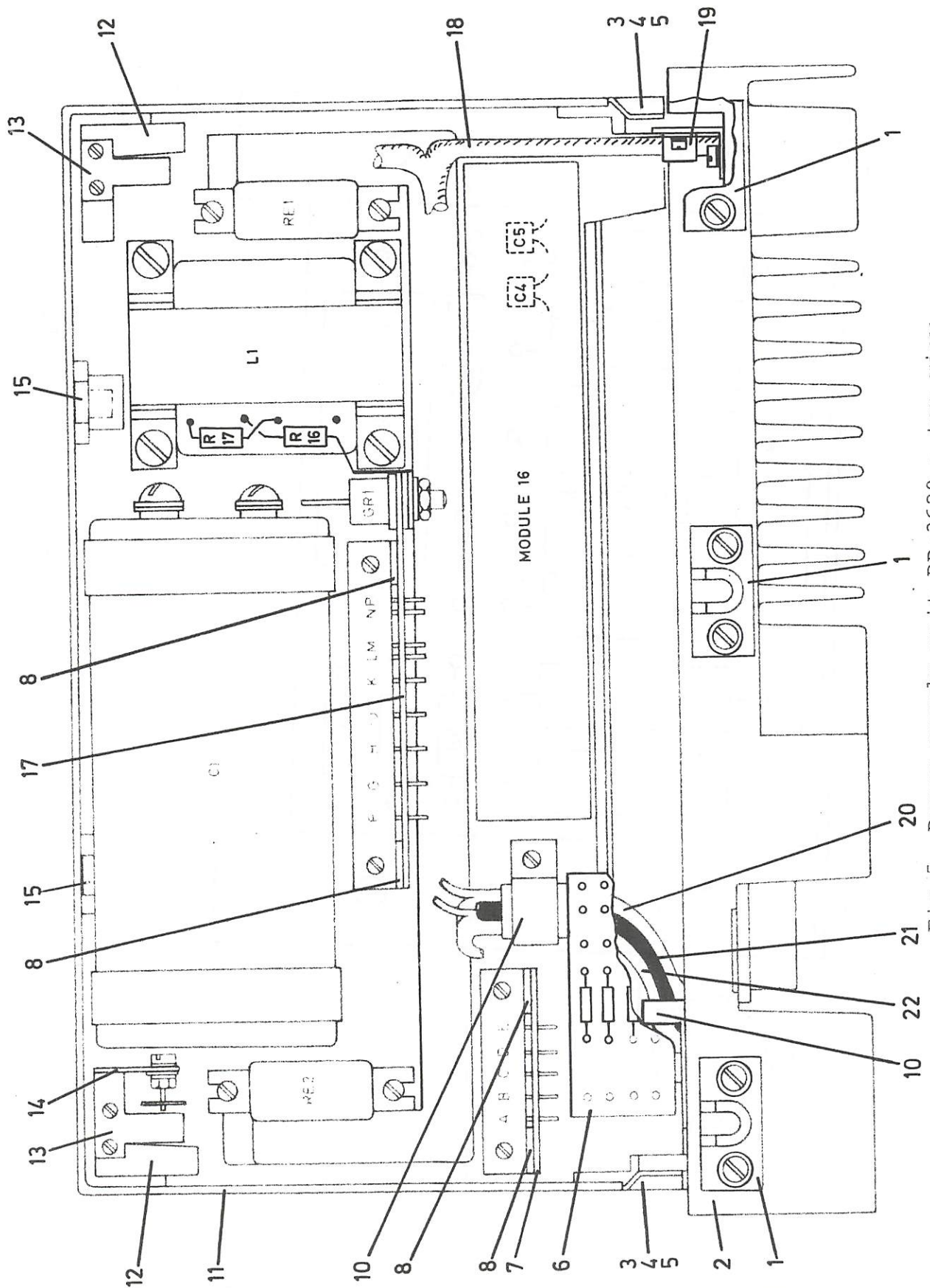


Fig 5. Power supply unit PP-3620 - top view

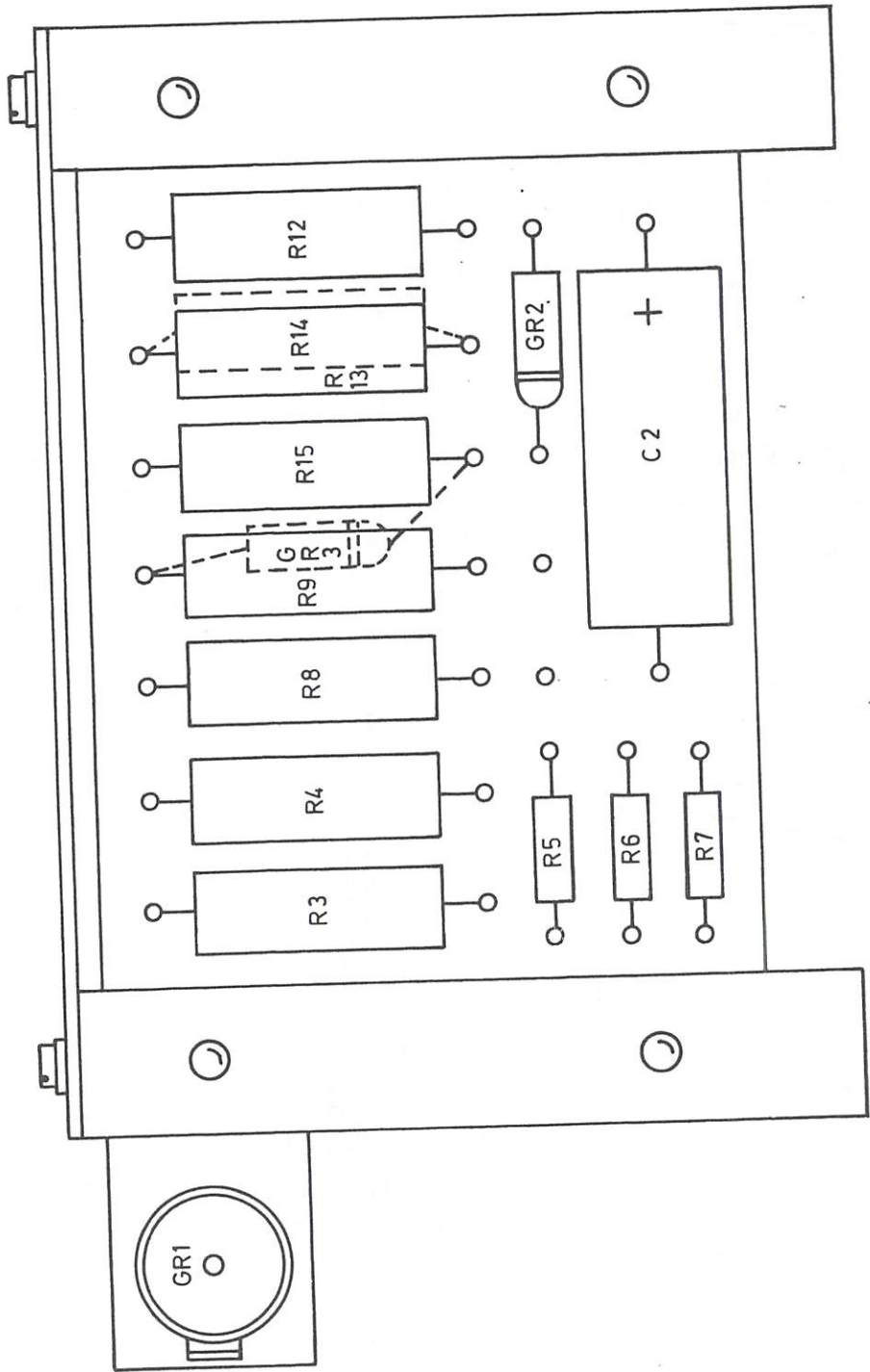


Fig 6. Terminal board NSN-5940-17-033-1504

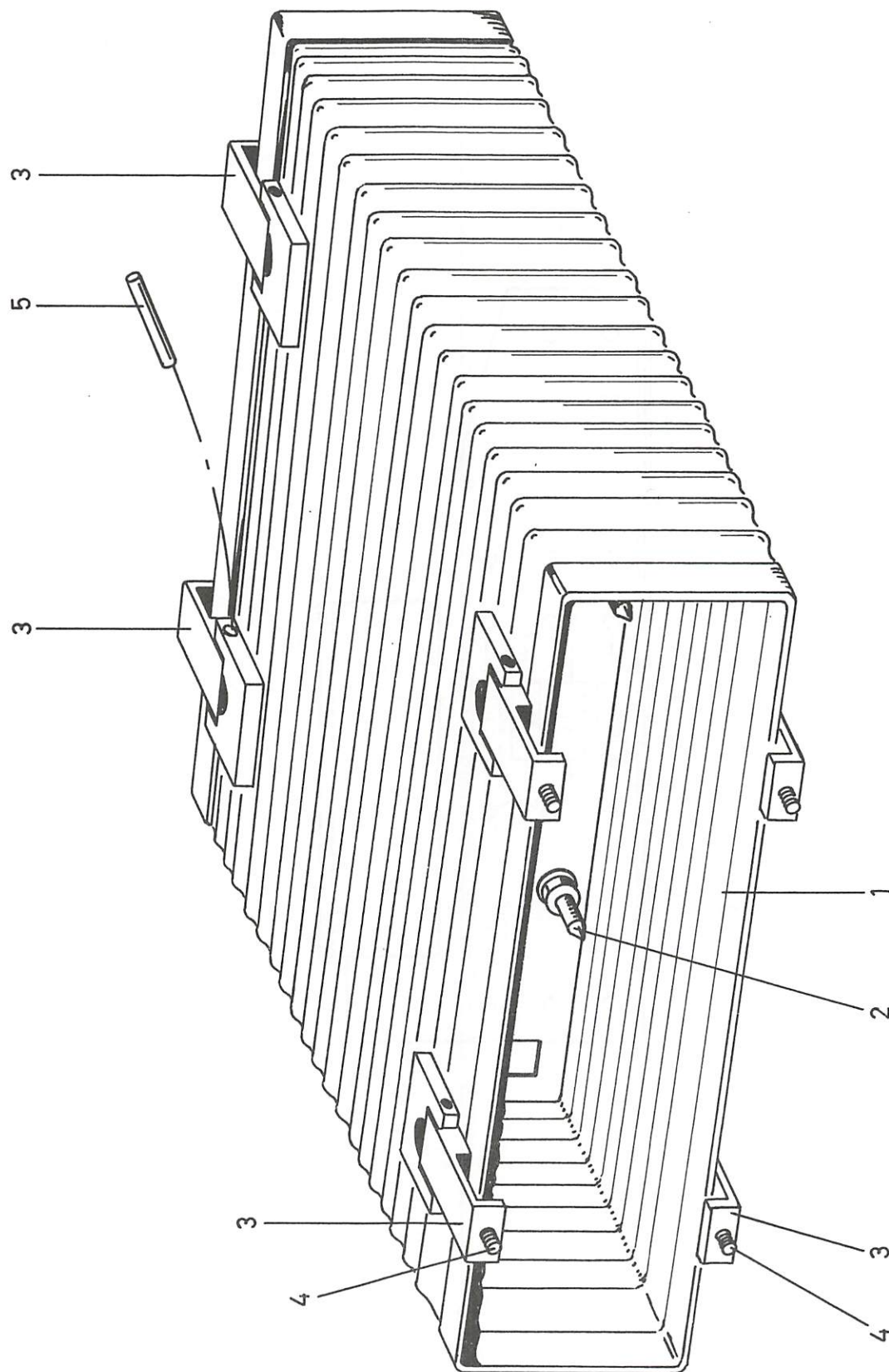


Fig 7. Cabinet, Module 26

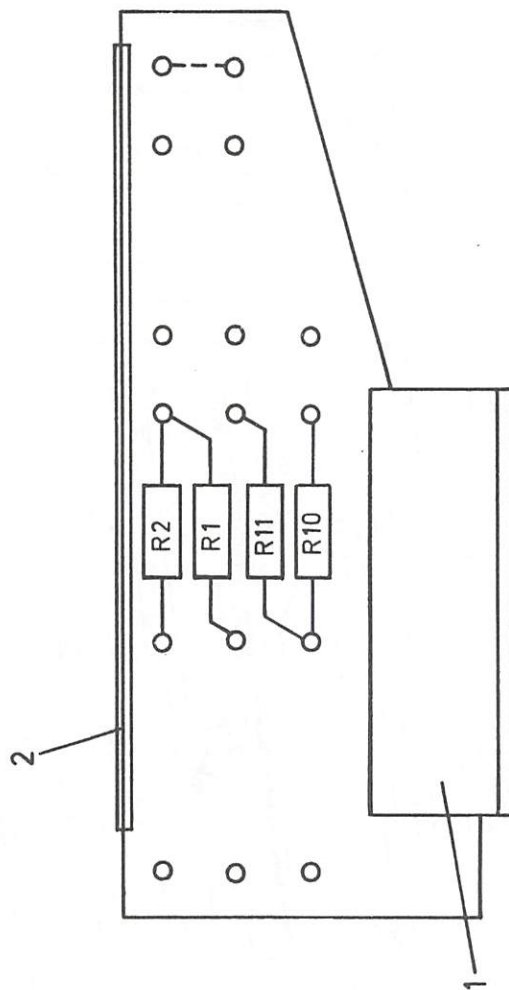


Fig. 8. Terminal board NSN 5940-17-033-1501