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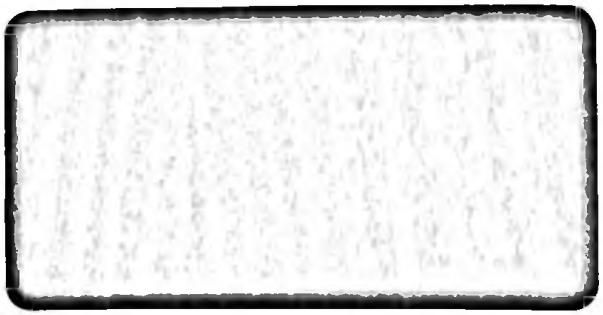
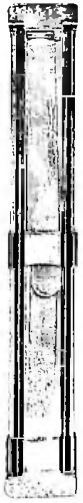


Technical Manual

# Antenna Multicoupler Equipment
# AVA 1270

containing

Appendix (specific to delivered equipment)



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## Foreword

This technical manual contains only system-specific information concerning the Antenna Multicoupler Equipment AVA 1270, and the electrical and technical data of the modules which are required for assembling an antenna multicoupler equipment. Depending on the set of equipment in a given system, further information is given in the appendix hereto and in the following individual technical manuals:

1. Antenna Multicoupler V 1274 L
2. Antenna Multicoupler V 1275 H
3. Antenna Multicoupler V 1276 V
4. Antenna Multicoupler V 1277 VU
5. Power Supply SV 1275 (contained in items 1 to 4)
6. Relay Matrix RM 1275 and Antenna Switch AS 1275
7. Relay Matrix RM 1275/2 and Antenna Switch AS 1275/2
8. Selection Decoder DEC 1275

CONTENTS

# 1 DESCRIPTION

## 1.1 General Information

### 1.1.1 Designation

The system described here bears the designation "Antenna Multicoupler Equipment AVA 1270".

#### 1.1.1.1 Versions

The Antenna Multicoupler Equipment AVA 1270 is composed according to the specific requirements of the radio receiving stations. The individual modules are usually mounted in a system cabinet. In small systems they can be accommodated alternatively in a rack or table cabinet. Further details are seen on Fig. 5 on page B 05 and in Annex 1 of this manual.

### 1.1.2 Possible Applications

The Antenna Multicoupler Equipment AVA 1270 is used in radio receiving stations which are equipped with several receivers and, in many instances, also with several antennas.
A multicoupler module is required for each antenna signal, in order to produce a matched replica of this antenna signal for each receiver.

When several antennas are present in the station, a means must be provided for each receiver to select the antenna signal which is connected through to the receiver input.

The AVA 1270 fulfils both these tasks by virtue of its modular construction for the frequency ranges extending from the VLF band to the UHF band.

### 1.1.3 General Description

The Antenna Multicoupler Equipment AVA 1270 is composed of several individual modular subunits which are combined according to the particular application. A modules carrier frame (magazine) is always provided even for a minimum application. This modules carrier frame can be equipped with multicouplers, relay matrix units or power supplies. No particular order of arrangement of the modular units is stipulated. However, when a Relay Matrix RM 1275 is used, it must be inserted in one of the right three compartments, on account of the overall width. The rear sides of the modules carrier frame are closed with blank panels.

When several modules carrier frames of a system are combined in a cabinet rack, then one or more blower units are provided too, to remove the dissipated heat.

A cable duct is provided for leading cables from the front to the rear or conversely.

Jack strips are provided for leading cables from the receivers or antennas on the rear side. The connections are then made on the front side with patch cords.

## 1.2 Scope of Delivery

Antenna Multicoupler Equipments AVA 1270 are assembled individually according to the given application, using the standard modular subunits listed below.

The actual scope of delivery for the present equipment is listed in the **appendix** to this technical manual.

### 1.2.1 Standard Modular Subunits

| Pos. | Description | Part Number |
|---|---|---|
| 1 | Antenna Multicoupler VT 1274 L | 52.3128.200.00 |
| 2 | Antenna Multicoupler VT 1275 H | |
| 2.1 | without filter | 52.3105.201.00 |
| 2.2 | with filter 1.5 MHz to 30 MHz | 52.3105.200.00 |
| 2.3 | with filter 1 MHz to 30 MHz | 52.3105.300.00 |
| 3 | Antenna Multicoupler VT 1276 V | 52.3120.200.00 |
| 4 | Antenna Multicoupler VT 1277 VU | 52.3123.200.00 |
| 5 | Power Supply Unit SV 1275 | 52.3105.100.00 |
| 6 | Relay Matrix RM 1275 | 52.3112.200.00 |
| 6.1 | Selection Decoder DEC 1275 | 52.3112.150.00 |
| 7 | Relay Matrix RM 1275/2 | 52.3112.400.00 |
| 8 | Antenna Switch AS 1275 | 52.3112.601.00 |
| 8.1 | Desk Cabinet for AS 1275 with connecting cable (length to order) | 52.3112.685.00 |
| 9 | Antenna Switch AS 1275/2 | 52.3112.700.00 |
| 9.1 | Desk Cabinet for AS 1275/2 with connecting cable (length to order) | 52.3112.780.00 |
| 10 | Blower Drawer Unit According to Operating Voltage | |
| 10.1 | Blower Drawer Unit 220 V AC | 5L.6812.001.69 |
| 10.2 | Blower Drawer Unit 115 V AC | 5L.6812.001.71 |
| 10.3 | Blower Drawer Unit 24 V DC | 5L.6812.001.70 |
| 11 | Jack Strip, empty | 52.3127.601.00 |
| 11.1 | Cable Jack, Type N/TNC | 5L.4583.002.44 |
| 12 | Cable Routing Drawer Unit | 5L.6071.001.95 |
| 13 | Modules Carrier Frame TR 1270/3 | 52.3105.820.00 |
| 13.1 | Blank Panel 4 T (20 mm) | 52.1850.500.10 |
| 13.2 | Blank Panel 18 T (90 mm) | 52.3105.903.00 |
| 14 | Cabinet / Rack | see Appendix |



| Pos. | Description | Part Number |
|---|---|---|
| 15 | RF Patching Cable RG 316/TNC - TNC, with three transparent shrink sleeves for additional marking; length 500 mm to 2500 mm in steps of 100 mm | 52.3127.821/.842.00 |
| 16 | Connecting Cable for modules carrier frame, with 3 transparent shrink sleeves for additional marking; length 500 mm | |
| 16.1 | for fault signalling alone | 52.3127.816.00 |
| 16.2 | for common fault signalling and power supply | 52.3127.811.00 |
| 17 | Connecting Cable antenna switch to relay matrix; length to order (not for desk cabinet) | |
| 17.1 | AS 1275 ⟷ RM 1275 | 52.3112.801.00 |
| 17.2 | AS 1275/2 ⟷ RM 1275/2 | 52.3112.820.00 |
| 18 | Technical Manual AVA 1270 | 5X.0172.223.69 |
| 18.1 | Appendix to Technical Manual AVA 1270 | |
| 19 | Technical Manuals for the Modular Units | see Foreword and Appendix |

### 1.2.2 Special Accessories

| Pos. | Description | Part Number |
|---|---|---|
| 20 | Plug Connector for AS 1275 ⟷ RM 1275, consisting of: | |
| 20.1 | Plug Strip, 25-pole | 5L.4561.001.73 |
| 20.2 | Cover | 5L.4595.001.81 |
| 20.3 | Locking Device (2 each) | 5L.4594.001.57 |
| 21 | Plug Connector for AS 1275/2 ⟷ RM 1275/2 | 5N.4541.201.18 |
| 22 | Plug Connector for modules carrier frame (fault signalling, power supply) | 5L.4541.012.98 |

### 1.2.3 Replacement Parts

See the individual manuals (cf. Foreword)

## 1.3 Technical Data

### 1.3.1 Electrical Data

The electrical data for the complete system result from the technical data of the utilized modular units constituting the system.

The power consumption for each modular unit is tabulated in Annex 3.

The data are measured at ambient temperature 25 °C ± 15 °C.

## .1 Antenna Multicoupler VT 1274 L

| | |
|---|---|
| Frequency range: | 10 kHz to 1.5 MHz |
| Input | |
| – Maximum input level: | +27 dBm (U eff = 5 V) |
| – Impedance: | 50 Ω |
| – Voltage standing wave ratio, with respect ot 50 Ω: | typical value 1.4<br>maximum value 1.7 |
| Back-Attenuation from outputs to input: | greater than 50 dB |
| Outputs | |
| – Number of outputs: | 6 |
| – Impedance: | 50 Ω |
| – Voltage standing wave ratio, with respect to 50 Ω: | typical value 1.1<br>maximum value 1.2 |
| Noise figure: | 5 $kT_0$ (7 dB) typical |
| Decoupling attenuation between the outputs: | greater than 40 dB |
| Gain: | 2 dB ±1 dB |
| Linear selectivity | |
| – Attenuation of frequencies above 2 MHz by low-pass filter interposed at input: | at least 45 dB |
| Intermodulation | |
| – IPIP 2nd. order: | ≧ 80 dBm |
| – IPIP 3rd. order: | ≧ 36 dBm |
| 1 dB compression point: | +20 dBm |
| Fault signalling internal: | by red warning lamp in the case of failure of a transistor; flashing in the case of low voltage (less than 17 V) |
| Fault signalling connection external: | Open collector output, for visual or acoustic alarm device, 24 V 50 mA sinking capability |
| Operating voltage: | 24 V DC (+25 % ÷ −10 %) |
| Power consumption: | about 15 W (at 24 V) |



## .2 Antenna Multicoupler VT 1275 H

| | |
|---|---|
| Frequency range: | 1.5 MHz to 30 MHz<br>(1 MHz to 30 MHz extendable) |
| Input | |
| – Tolerated overvoltage: | up to 30 V EMF |
| – Impedance: | 50 Ω, coaxial |
| – Voltage standing wave ratio, with respect to 50 Ω: | typical value 1.5<br>maximum value 2.5 |
| Back-attenuation from outputs to input: | greater than 40 dB |
| Outputs | |
| – Number of outputs: | 12 |
| – Impedance: | 50 Ω, coaxial |
| – Voltage standing wave ratio, with respect to 50 Ω: | typical value 1.1<br>maximum value 1.2 |
| Decoupling between any two outputs: | greater than 35 dB (typically 40 dB) |
| Gain: | 1.0 dB ±0.5 dB (with filter) |
| Threshold Sensitivity: | ≦5.5 $kT_0$ at 30 MHz |
| Linear selectivity | |
| – Attenuation of frequencies below 1.3 MHz and above 40 MHz: | at least 35 dB |
| Intermodulation | |
| – IPIP 3rd. order: | ≧ 34 dBm |
| – IPIP 2nd. order: | ≧ 80 dBm |
| To special order (set of three VT 1275 H–P) | |
| – Phase matching: | ±1.5° |
| – Gain matching: | ±0.25 dB |

| | |
|---|---|
| Linear drive limit | Limiting of output signal requires more than 10 V input EMF |
| Cross-modulation rejection: | An unmodulated wanted transmitter with 100 µV EMF acquires a cross modulation depth of not more than 10 % due to an interfering transmitter with 50 % modulation depth and up to 2 V EMF. |
| Fault signalling internal: | by red warning lamp in the case of failure of a transistor |
| Fault signalling connection external: | Open collector output, for visual or acoustic alarm device; 24 V 50 mA sinking capability |
| Operating voltage: | 24 V DC (+25 % ÷ −10 %) |
| Power consumption: | about 30 W (at 24 V) |

### .3 Antenna Multicoupler VT 1276/2 V

| | |
|---|---|
| Frequency range: | 20 MHz to 200 MHz |
| Input | |
| – Tolerated overvoltage: | +18 dBm |
| – Impedance: | 50 Ω, coaxial |
| – Voltage standing wave ratio, with respect to 50 Ω: | typical 1.40 (not exceeding 1.75) |
| – Back-attenuation from the outputs to the input: | at least 40 dB |
| Outputs | |
| – Number of outputs: | 12 |
| – Impedance: | 50 Ω, coaxial |
| – Voltage standing wave ratio, with respect to 50 Ω: | typical value 1.2 maximum value 1.4 |
| – Decoupling between any two outputs: | at least 30 dB |
| Gain: | 1.5 dB ±0.5 dB |
| Noise figure (Sensitivity): | 6 $kT_o$ (8 dB) or better |
| Linear selectivity: | |
| – Attenuation for frequencies below 15 MHz: | at least 30 dB |
| To special order (set of three VT 1276/2 V–P): | |
| – Phase matching: | ±3° |
| – Gain matching: | ±0.3 dB |



| | |
|---|---|
| Intermodulation | |
| – IPIP 3rd. order: | ≥ 27 dBm |
| – IPIP 2nd. order: | ≥ 60 dBm |
| 1 dB compression point: | ≥ 13 dBm |
| Fault signalling internal: | by red warning lamp in the case of undervoltage (< 20 V) or short circuit |
| Fault signalling connection external: | open collector output for visual or acoustic alarm device; 24 V 50 mA sinking capability |
| Operating voltage: | 24 V DC (+25 % ÷ −10 %) |
| Power consumption: | about 6 W (at 24 V) |

### .4 Antenna Multicoupler VT 1277 VU

Total frequency range: 20 MHz to 1000 MHz (derating in range 102 MHz to 108 MHz)

| Inputs | Input 1 | Input 2 |
|---|---|---|
| – Frequency range: | 20 MHz to 105 MHz | 105 MHz to 1000 MHz |
| – Maximum input level: | +36 dBm | +13 dBm |
| – Maximum impedance: | 50 Ω coaxial | 50 Ω coaxial |
| – Maximum voltage standing wave ratio, with respect to 50 Ω: | typical value 1.5 max. 2.5 | typical value 1.5 max. 2.0 |
| Back-attenuation from output to input: | at least 30 dB | at least 40 dB |
| Intermodulation | | |
| – IPIP 3rd. order: | 32 dBm typical | 17 dBm typical |
| – IPIP 2nd. order: | 65 dBm typical | 40 dBm typical |
| 1 dB compression point: | ≧ 20 dBm | ≦ 3 dBm at input |
| Outputs | | |
| – Number of outputs: | 6 | |
| – Impedance: | 50 Ω coaxial | |
| – Voltage standing wave ratio, with respect to 50 Ω: | typical value 1.2 maximum value 1.4 | |
| Decoupling between any two outputs | at least 30 dB | |
| Gain: | 1.5 dB ±0.5 dB | |
| Noise figure: | 6 $kT_o$ (8 dB) or better | |

| | |
|---|---|
| Fault signalling internal: | by red warning lamp in the case of failure of the stabilization or drop of the operating voltage below 17 V |
| Fault signalling connection external: | open collector output for visual or acoustic alarm device; 24 V 50 mA sinking capability |
| Operating voltage: | 24 V DC (+25 % + −10 %) |
| Power consumption: | about 20 W (at 24 V) |

### .5 Power Supply Unit SV 1275

| | |
|---|---|
| Input voltage | |
| – Mains operation: | 110/220 V ±10 %, 45 Hz to 480 Hz |
| – Battery operation: | 24 V (+25 % + −10 %); negative pole grounded |
| Output voltage | |
| – Mains operation: | 24 V DC ±10 % |
| – Battery operation: | 24 V DC (+25 % ÷ −10 %) |
| Output Current/Power, max. | 3.75 A/90 W |

### .6 Relay Matrix RM 1275

| | |
|---|---|
| Frequency range: | 1 MHz to 30 MHz |
| Characteristic impedance: | 50 Ω |
| Insertion loss: | max. 0.5 dB |
| Off state attenuation: | at least 40 dB |
| Voltage standing wave ratio: | VSWR = not exceeding 1.2 |
| Number of inputs/outputs: | 12 to 1 or twice 6 to 1 |
| Control: | by Antenna Switch AS 1275 or by Selector Decoder DEC 1275 (2 x 4 bit parallel BCD, pos. logic, TTL level) |
| Fault signalling internal: | on AS 1275 |
| Fault signalling external: | open collector output for visual or acoustic alarm device; 24 V 50 mA sinking capability |
| Operating voltage: | 24 V DC (+25 % ÷ −10 %) |
| Power consumption: | 2.4 W per switched connection |



### .7 Relay Matrix RM 1275/2

| | |
|---|---|
| Frequency range: | up to 1 GHz |
| Characteristic impedance: | 50 Ω |
| Insertion loss at 500 MHz: | 0.2 dB typical value for 1 of 6<br>0.4 dB typical for 1 of 11 |
| Off state attenuation: | at least 60 dB |
| Voltage standing wave ratio: | VSWR = 1.2 typical for 1 of 6<br>VSWR = 1.4 typical for 1 of 11 |
| Number of inputs/output: | 6 to 1 or twice 6 to 1 or 11 to 1 |
| Control: | 2 x 4 bit parallel BCD, positive logic, TTL level (by receiver or AS 1275/2) |
| Operating voltage: | 24 V DC (+25 % ÷ −10 %) |
| Power consumption: | 4 W per switched connection |

### .8 Antenna Switch AS 1275

| | |
|---|---|
| Possible control with RM 1275: | 12 to 1 or twice 6 to 1 |
| Display: | illuminated keys |
| Fault indication: | by light emitting diode (LED) |
| Power supply: | from RM 1275 |
| Power consumption: | 0.6 W for each illuminated key |
| Plug connector: | 25-pole Cannon jack connector |

### Antenna Switch AS 1275/2

| | |
|---|---|
| with RM 1275/2: | 11 to 1 or twice 6 to 1 |
| | light emitting diodes |
| | none |
| | from RM 1275/2 |
| | 0.12 W for each light emitting diode |
| | 12-pole Tuchel jack connector |

### .10 Blower Units

#### .10.1 Blower Drawer Unit 220 V AC

| | |
|---|---|
| Input voltage: | 220 V, 50 Hz |
| Power consumption: | 54 VA |
| Air feed rate: | about 450 m³/h |
| Service life: | about 20 thousand operating hours |

#### .10.2 Blower Drawer Unit 115 V AC

| | |
|---|---|
| Input voltage: | 115 V, 50 Hz |
| Power consumption: | 60 VA max. |
| Air feed rate: | about 450 m³/h |
| Service life: | about 20 thousand operating hours |

#### .10.3 Blower Drawer Unit 24 V DC

| | |
|---|---|
| Operating voltage: | 18 V to 30 V DC |
| Power consumption: | about 15 W |
| Air feed rate: | about 450 m³/h |
| Service life: | about 20 thousand operating hours |

### 1.3.2 Environmental Conditions

| | | |
|---|---|---|
| Ambient temperature range: | +10 °C to +40 °C | full guarantee of performance specifications |
| | −20 °C to +50 °C | may be operated |
| | −40 °C to +70 °C | may be stored |
| Humidity tolerance: | Operation is permissible for 96 hours with 90 % relative humidity and +40 °C ambient temperature. | |
| Vibration and mechanical shock tolerance: | No damage results when the switched-on equipment is subjected to vibration with a stroke of ±0.5 mm at 10 Hz to 30 Hz or with a peak acceleration of 2 g at 30 Hz to 70 Hz. Mechanical shocks of 10 g acceleration and 10 ms duration are tolerated too. | |

### 1.3.3 Dimensions and Weights

The dimensions and weight of the complete equipment depend on the scope and system configuration of the modular subassemblies and the modules carrier frame configuration resulting therefrom.

The dimensional and weight specifications for the modular subassemblies are listed below.



| Pos. | Modular Subassembly | Width mm | Height mm | Depth mm | Weight kg |
|---|---|---|---|---|---|
| 1 | Antenna Multicoupler VT 1274 L | 91 | 128.5 | 305 | 1.7 |
| 2 | Antenna Multicoupler VT 1275 H | 91 | 128.5 | 305 | 1.5 |
| 3 | Antenna Multicoupler VT 1276 V | 91 | 128.5 | 305 | 2.0 |
| 4 | Antenna Multicoupler VT 1277 VU | 91 | 128.5 | 305 | 1.6 |
| 5 | Power Supply Unit SV 1275 | 91 | 128.5 | 305 | 3.3 |
| 6 | Relay Matrix Rm 1275 | 111.5 | 128.5 | 305 | 1.1 |
| 7 | Relay Matrix RM 1275/2 | 91 | 128.5 | 305 | 1.1 |
| 8 | Antenna Switch AS 1275 | 91 | 128.5 | 60 | 0.3 |
| 9 | Antenna Switch AS 1275/2 | 91 | 128.5 | 60 | 0.3 |
| 10 | Blower Drawer Unit 220/115 V AC/24 V DC | 483 | 44.5 | 360 | 3 |
| 11 | Jacks Strip | 483 | 44.5 | — | 0.2 |
| 12 | Cables Routing Drawer Unit | 483 | 44.5 | 360 | 0.8 |
| 13 | Modules Carrier Frame 19", 3 HU | 483 | 132.5 | 359 | 2.9 |

### 1.4 Technical Description

The minimum configuration Antenna Multicoupler Equipment AVA 1270 consists of at least a modules carrier frame containing the respective modular subunits required for a complete AVA system. It can be equipped with various modular subunits (relay matrix, antenna multicouplers and power supply unit) required for the particular system configuration. No particular position configuration of the individual modular subunits need be adhered to. The RF cable interconnections between the modular subunits are always established on the front side. On the rear side of the modules carrier frame, all power supply inputs of the drawer units are connected to the output of the power supply unit. The "external fault signalling" output of all modular subunits is also connected here to a common busbar. This fault signal is also available on the front side of the power supply unit when the latter is a SV 1275.

The two jack connectors BU1, BU2 on the rear panel of the modules carrier frame are connected in parallel (see Section 4.4.4 for pinout).

When several modules carrier frames are used, each with its own power supply unit, then the jacks BU1 and BU2 of all modules carrier frames must be interconnected with **3-pole link** cables. The free jack remaining on the last modules carrier frame is then the connector for the pilot indicator and central fault signalling device. Any desired indicator system can be linked to this connector.

When all or some of the modules carrier frames are operated without individual power supply units, they can be fed from a central power supply unit via a **4-pole cable**. Here too it is possible to take the power supply voltage from a modules carrier frame which is equipped with a power supply unit, to another modules carrier frame which does not contain its own individual power supply unit.

**CAUTION!** Do not overload the power supply unit and the plug connectors. The permitted current for the plug connectors is 10 A.

Modules carrier frames with own power supply may be linked only with the "fault signalling" **three-conductor cable** (Section 1.2.1, Pos. 16.1), because otherwise the Power Supply Units SV 1275 are switched together (short-circuited).

### 1.4.1 Antenna Multicoupler VT 1274 L

The Antenna Multicoupler VT 1274 L has a filter at the input, consisting of a 1.5 MHz low-pass filter section and a 10 kHz high pass filter section. A push-pull transformer driving push-pull amplifier stages follows after the filter network.

A push-pull output transformer combines the amplified push-pull voltages. The combined output voltage is distributed to six outputs (A1 to A6) via a distribution network. The fault signalling circuit switches on a red indicator lamp on the front panel in the case of failure of a transistor. The fault indication signal is transmitted via an external connection.

### 1.4.2 Antenna Multicoupler VT 1275 H

The Antenna Multicoupler VT 1275 H consists of a wideband push-pull amplifier stage, the distribution network with output jacks A1 to A12, the fault signalling circuit and the high-pass and low-pass filter.

The high-pass and low-pass filter network suppresses signals coming from the antenna which lie outside the reception frequency range 1.5 MHz to 30 MHz.

The push-pull amplifier amplifies the filtered antenna signal such that approximately the same antenna signal power as applied to the input, appears again at each output. The push-pull output transformer recombines the two amplified push-pull voltages. This cancels even order harmonic distortion components.

The fault signalling circuit switches on a red indicator lamp on the front panel in the case of failure of a transistor, and an open collector output for an external fault indicator device.

### 1.4.3 Antenna Multicoupler VT 1276 V

The Antenna Multicoupler VT 1276 V consists of a wideband amplifier, a 1:3 power distributor and four 1:4 power distributors. The gain is dimensioned such that about the same antenna signal power as is applied to the input of the amplifier appears again at each one of the 12 outputs.

A red warning lamp on the front panel lights in the case of power supply under or overvoltage. An external alarm device can be connected.

### 1.4.4 Antenna Multicoupler VT 1277 VU

The Antenna Multicoupler VT 1277 VU has separate inputs for the frequency bands from 20 MHz to 105 MHz and from 105 MHz to 1000 MHz, and six identical outputs for the entire frequency coverage. This unit consists of a wideband push-pull amplifier for the range 20 MHz to 105 MHz, the high-pass filter with amplifier for the range 105 MHz to 1000 MHz, the frequency bands diplexer and a wideband passive distributor network.

The amplifiers in the two branches are dimensioned such that the six output signal levels are about the same as the input signal level.

The high-pass filter at the input for 105 MHz to 1000 MHz suppresses undesired intermodulation effects otherwise produced by, for example, powerful VHF broadcast transmissions in the upper frequency range.

The 15 V stabilized power supply voltage is monitored by a window discriminator which produces the signal voltage for the internal and external fault signalling functions.



### 1.4.5 Power Supply Unit SV 1275

The Power Supply Unit SV 1275 is operated with 24 V DC or with 110/220 V AC mains input voltage. The green pilot lamp on the front panel is lit when the unit is switched on.

When the DC and the AC input voltage are connected simultaneously, the unit is powered by the AC mains voltage, as long as the actual voltage at the rectifier output is greater than the actual voltage of the DC supply. If the mains input voltage fails or drops below a certain threshold value, then the unit is powered by the DC input voltage, without interruption.

When powering several modules carrier frames from a single power supply unit, take care not to exceed the maximum total output current rating of the power supply unit (3.75 A).

### 1.4.6 Relay Matrix RM 1275

The Relay Matrix RM 1275 is designed for connecting 12 antennas to a single receiver. After transferring a soldered jumper connection, 6 antennas can be connected to 2 receivers, with separate antenna selection. The Relay Matrix RM 1275 is controlled via the Antenna Switch AS 1275 or (after inserting the Selection Decoder DEC 1275) directly via the receiver. The respective control and connection possibilities may be seen in the description of the DEC 1275.

If none of the relays is in the energized state during operation, this fault status is indicated on the AS 1275 and an external fault signal is issued via an open collector output.

### 1.4.7 Relay Matrix RM 1275/2

The Relay Matrix RM 1275/2 is designed for connecting 6 antennas to one receiver. A second 1 to 6 relay can be incorporated for independent connection of a second receiver or for connecting 11 antennas to one receiver. The 1 to 11 configuration is obtained by connecting the output of one relay to one input of the second relay. The required drive modification for this switching configuration is described in the technical manual for the RM 1275/2.

### 1.4.8 Antenna Switch AS 1275

The Antenna Switch AS 1275 is intended for driving the Relay Matrix RM 1275. The relay matrix is controlled by actuating the illuminated keys on the antenna switch. The operating status is indicated on the antenna switch by light-up of the respective depressed key. The red ligth emitting diode on the antenna switch lights when the relay matrix is in fault status. Changeover of the switching configuration (12 to 1 or twice 6 to 1) is made only on the relay matrix.

### 1.4.9 Antenna Switch AS 1275/2

The Antenna Switch AS 1275/2 is intended for driving the Relay Matrix RM 1275/2. The relay matrix is controlled by actuating the respective keys on the antenna switch. The operating status is indicated on the antenna switch by light-up of the respective depressed key. Changeover of the switching configuration (11 to 1 or twice 6 to 1) is made only on the relay matrix.

### 1.4.10 Blower Drawer Unit

Forced ventilation is required for antenna multicoupler equipments which have a power dissipation exceeding 200 W. One blower module is required for every 200 W power dissipation. Forced ventilation may be omitted if good convectional cooling is ensured when the power dissipation is less than 200 W.

One blower module contains three individual blower fans in order to obtain the rated air throughput. The blowers are fitted with ball bearing for long service life and quiet running. The blower module type must be selected in accordance with the nominal operating voltage of the equipment.

To determine the power dissipation of an equipment, consult Annex 3 which lists the power consumption of the individual modules.

### 1.4.11 Jack Connectors Strip

Thin antenna or receiver cables can be connected directly to the individual modular units. Thicker and stiff cables with type N plugs are terminated on the jack connectors strip and the connections are continued from there with patching cables which are fitted with TNC plugs.

### 1.4.12 Cable Routing Drawer Unit

For systems in which the RF cables (antenna, receivers) are taken in from below or from the rear side, these cables are passed via the cable routing drawer unit to the front side of the equipment.



# 2 OPERATING INSTRUCTIONS

## 2.1 Special Precautions to Prevent Accidents

When the equipment is operated with mains power supply voltage, duly observe the local safety regulations for mains voltage equipment.

## 2.2 Assembling an Antenna Multicoupler Equipment

The set of antenna multicouplers and relay matrix units required for a given system depends on the particular task, as shown by the examples in Annex 1. When the required set of modules has been determined, determine their total power consumption by referring to the specifications in Annex 3 for the power consumptions of the individual modules. The total power consumption gives the required number of Power Supply Modules SV 1275 or the current drain from an external power supply.

The power supply modules are mounted together with the other modules (VT and RM) in the module carrier frames, as shown for the example in Fig.5. Annex 2 shows the mutual wiring of the module carrier frames for power supply and fault signalling.

The total power consumption determines the required number of blower modules. The appropriate cabinet rack is selected for mounting the module carrier frames and the blowers. If the installation of the cables from the antennas and to the receiver operator positions is taken via cable routing drawer units between the front side and the rear side, the mounting height of these drawer units must be taken into account when selecting the total height of the cabinet.

The power supply for the module carrier frames must be installed in the cabinet rack. The power for the entire equipment can be switched on and off via a master switch. A pilot lamp indicates the operating status of the equipment. If fuse protection is required for the power supply input circuits of the SV 1275 modules, the fuses must be installed too. The SV 1275 modules provide fuse protection for the output circuits.

The equipment can be powered with a stationary mains supply, a board electrical system rated for 24 V DC +25/–10 % or a central mains power supply unit. Thereby take into consideration the maximum current rating (10 A) of the plug connectors BU1 and BU2 on the module carrier frames.

The central fault signalling connection can be used for indicating a fault condition appearing anywhere within the complete system (e.g. using a 24 V, 50 mA filament lamp as fault status indicator). This fault indicator lamp can be mounted in the antenna multicoupler system cabinet rack or in any other more convenient location.

The cable installation plans for the RF, power supply and fault signalling cables according to the particular system configuration are included as **Appendix** to this technical manual.

### 2.2.1 System Cable Connections

The RF cable connections for the complete system are located on the front side of the antenna multicoupler equipment. The cables according to Section 1.2.1, Pos.15 can be used for this purpose. All internal RF plug connections are made with TNC plug connectors. All external connections are of type N or TNC.

The control line for the relay matrix is connected on the front side. This connecting cable must be made up individually for the given application.

### 1.4.10 Blower Drawer Unit

Forced ventilation is required for antenna multicoupler equipments which have a power dissipation exceeding 200 W. One blower module is required for every 200 W power dissipation. Forced ventilation may be omitted if good convectional cooling is ensured when the power dissipation is less than 200 W.

One blower module contains three individual blower fans in order to obtain the rated air throughput. The blowers are fitted with ball bearing for long service life and quiet running. The blower module type must be selected in accordance with the nominal operating voltage of the equipment.

To determine the power dissipation of an equipment, consult Annex 3 which lists the power consumption of the individual modules.

### 1.4.11 Jack Connectors Strip

Thin antenna or receiver cables can be connected directly to the individual modular units. Thicker and stiff cables with type N plugs are terminated on the jack connectors strip and the connections are continued from there with patching cables which are fitted with TNC plugs.

### 1.4.12 Cable Routing Drawer Unit

For systems in which the RF cables (antenna, receivers) are taken in from below or from the rear side, these cables are passed via the cable routing drawer unit to the front side of the equipment.



# 2 OPERATING INSTRUCTIONS

## 2.1 Special Precautions to Prevent Accidents

When the equipment is operated with mains power supply voltage, duly observe the local safety regulations for mains voltage equipment.

## 2.2 Assembling an Antenna Multicoupler Equipment

The set of antenna multicouplers and relay matrix units required for a given system depends on the particular task, as shown by the examples in Annex 1. When the required set of modules has been determined, determine their total power consumption by referring to the specifications in Annex 3 for the power consumptions of the individual modules. The total power consumption gives the required number of Power Supply Modules SV 1275 or the current drain from an external power supply.

The power supply modules are mounted together with the other modules (VT and RM) in the module carrier frames, as shown for the example in Fig.5. Annex 2 shows the mutual wiring of the module carrier frames for power supply and fault signalling.

The total power consumption determines the required number of blower modules. The appropriate cabinet rack is selected for mounting the module carrier frames and the blowers. If the installation of the cables from the antennas and to the receiver operator positions is taken via cable routing drawer units between the front side and the rear side, the mounting height of these drawer units must be taken into account when selecting the total height of the cabinet.

The power supply for the module carrier frames must be installed in the cabinet rack. The power for the entire equipment can be switched on and off via a master switch. A pilot lamp indicates the operating status of the equipment. If fuse protection is required for the power supply input circuits of the SV 1275 modules, the fuses must be installed too. The SV 1275 modules provide fuse protection for the output circuits.

The equipment can be powered with a stationary mains supply, a board electrical system rated for 24 V DC +25/–10 % or a central mains power supply unit. Thereby take into consideration the maximum current rating (10 A) of the plug connectors BU1 and BU2 on the module carrier frames.

The central fault signalling connection can be used for indicating a fault condition appearing anywhere within the complete system (e.g. using a 24 V, 50 mA filament lamp as fault status indicator). This fault indicator lamp can be mounted in the antenna multicoupler system cabinet rack or in any other more convenient location.

The cable installation plans for the RF, power supply and fault signalling cables according to the particular system configuration are included as **Appendix** to this technical manual.

### 2.2.1 System Cable Connections

The RF cable connections for the complete system are located on the front side of the antenna multicoupler equipment. The cables according to Section 1.2.1, Pos.15 can be used for this purpose. All internal RF plug connections are made with TNC plug connectors. All external connections are of type N or TNC.

The control line for the relay matrix is connected on the front side. This connecting cable must be made up individually for the given application.

Only the interconnecting cables of the modules carrier frames for fault signalling and power supply are installed on the rear side of the equipment. For this purpose the connecting cables according to Section 1.2.1, Pos. 16 are used (Refer also to Annex 2).

### 2.2.2 Grounding

The system cabinet rack should be connected to the signal ground of the receiving station. The screwed-on sidepanels and the doors must be connected to the cabinet rack frame with grounding ropes. Several cabinet racks should be interconnected mutually and to the signal/power ground. For mains operation, observe the local safety regulations for mains voltage equipment.

## 2.3 Commissioning and Operation

The system is switched on at the **master switch,** which may also be designed as current overload circuit breaker. All power supplies and blower drawer units remain constantly switched-on.

The operating status is indicated on the system by the pilot lamp and at the operator position either digitally on the receiver or on the antenna switch by the illuminated keys.
No manual control actuations are required on the equipment during routine operation.

## 2.4 Operation under Severe Environmental Conditions

See specifications for ambient temperature range and humidity tolerance in Section 1.3.2.

The equipment must be set up such that adequate ventilation is ensured. Protect the equipment against strong solar radiation, dust and moisture. If necessary, filter the air of forced air-cooling. Clean the air filters at regular intervals as specified by the manufacturer.

The plug connectors require special care. Lightly grease the screwthreads with silicone paste and the electrical contacts with contact grease.

## 2.5 Care

Regular care preserves dependability and availability of the system. Care tasks must be carried out by the operating staff. The care tasks comprise:

- Cleaning the external parts
- Removing any moisture
- Checks that the plug connectors are firmly seated
- Check of the equipment units mountings

Use a mild soap solution to remove greasy dirt deposits. The front panels may not be cleaned with methylated spirit or other aggressive agents.



# 3 MAINTENANCE AND REPAIRS BY THE OPERATING STAFF

## 3.1 Maintenance

Special tools are not required.

Maintenance tasks should be carried out at regular intervals. They comprise the care tasks listed in Section 2.6 and, in addition thereto, the following tasks:

- Functional check
- Determination of defects and damage
- Replacement of defective parts (which are provided as spare parts) by the operating staff

In the case of severe dust deposits, clean the equipment with a soft dry rag or small brush. Dry oil-free compressed air or a suction cleaner may be used to remove dust from otherwise inaccessible places if necessary.

**CAUTION!** Do not use an excessively strong airstream; the maximum permissible overpressure is 1 bar.

### 3.1.1 Functional Check, Fault Signalling

The lamp on the particular modular unit lights and the central fault signalling device is switched on, when an antenna multicoupler unit is in fault status.

The function of the Power Supply Unit SV 1275 is indicated by a light emitting diode on the front panel. The actual switching status of the relay matrix unit is indicated by the illuminated keys on the antenna switch or on the receiver.

### 3.1.2 Functional Check of the Blower Drawer Units

In systems incorporating blower drawer units, check their function daily by visual inspection. In the case of failure of a blower, the complete system should not be left switched on for a longer time (cf. Section 1.4.10).

## 3.2 Repairs by the Operating Staff

Repairs by the operating staff are confined to replacing damaged cables and blown fuses. If replaced fuses blow again or if the fault indicator lamp is lit, forward the defective module for repair by trained staff.

## 3.3 Conservation of the equipment in case of prolonged idle periods

Operation of the equipment may be discontinued for a prolonged time without requiring special maintenance tasks. The equipment contains no components whose characteristics change or which are subject to self consumption during prolonged storage. However, make sure that the storage room is dry and dustproof; otherwise special packing is required, e.g. sealing in plastic film. The same conditions as customary in general for safe storage of electronic equipment apply here too.

# 4 REPAIRS BY TRAINED PERSONNEL

General Remarks

The following subsections give a general overview of the methods and measures for remedying any mechanical or electrical damage which may appear. Determination of the fault and its cause and the remedial measures require adequate knowledge and understanding of the antenna multicoupler equipment as described in the respective sections of this technical manual. Do not commence any service work in the antenna multicoupler system before fully appraising the circumstances and having determined the extent of necessary work therefrom. In the case of every encountered malfunction, first check whether just a point of the operatin instructions or maintenance schedule has been overlooked.

If fault remedy involves replacement of defective individual components, then bear in mind that proper equipment functions are ensured only by using the replacement parts as specified by the manufacturer.

When replacing plug connectors, flexible connecting wires and cables, make sure that only acid-free solders and fluxes are used for the associated soldering operations. When unsoldering cable sections, mark the individual conductors unambiguously to prevent confusion when reassembling and do not make any changes in the configuration of the grounding and chassis ground potential connections.

## 4.1 Special Tools, Measuring Equipment and Test Units

Use the following test units:

- 1 RF signal generator for the needed frequency range
- 1 RF voltmeter
- 1 Multimeter
- 1 Ohm meter (continuity tester)

The required test equipment for the modular units is listed in Section 4.1 of the individual technical manual for each modular unit.

## 4.2 Functional Principles

The functional principles of the individual modular subassemblies are described in Section 4.2 of the respective individual technical manual for the subassembly or equipment unit.

The **Appendix** contains connection and overview circuit diagrams as well as cable and equipment lists. The construction, configuration and mutual functioning of the individual system parts are evident from these documents.

## 4.3 Fault Tracing

When a fault is suspected in the antenna multicoupler equipment, first check the internal fault signalling of the system. If the fault indicator lamp of an antenna multicoupler indicates a fault condition, then replace this antenna multicoupler and repair it according to the instructions given in Section 4.4 of its individual technical manual. If the internal fault signalling system indicates no fault condition, then check the power supply for the equipment. This is possible with a multimeter at BU1 or BU2 on the rear of the modules carrier frame (see Section 4.4.4 for the pinout).

Faults which lie in the path from the antenna signal input to the receivers are most easily localized with the aid of a RF signal generator and RMS voltmeter.

The modules carrier frame can be checked with a continuity tester for malfunctioning connections. The through connections which should be present can be determined by reference to the respective wiring diagram contained in Annex 4.

## 4.4 Instructions for Making Repairs

### 4.4.1 Removing and Remounting

Before taking out or remounting any modular subunits, switch off the power supply to the equipment. If operation is not to be interrupted completely and it is the intention to replace only one particular modular unit, then at least switch off the power supply to the modules carrier frame in which this unit is located.

The modular unit can be taken out of the modules carrier frame after releasing the plugged cable connections on the front panel of the modular unit and releasing the four fixing screws on the front panel.

To remount a modular unit, proceed in reversed order, making sure that the plug connectors are reconnected correctly.

### 4.4.2 Repairing Modular Subunits

Follow the instructions given in section 4.4. of the respective individual technical manuals for repairing defective modular units.

### 4.4.3 Reparing the Modules Carrier Frames

Resolder any soldered connections which are found to be defective. Replace defective jack strip connectors by new ones.

### 4.4.4 Pinout of the Jacks BU1 and BU2 on the Modules Carrier Frame TR 1270/3 (See circuit diagram in Annex 4)

Flange jack, type NC 4 FP (Messrs. NEUTRIK)

| Contact | Function | Remarks |
|---|---|---|
| 1 | +24 V | Operating voltage |
| 2 | Open collector output max. 50 mA | Fault signalling, external |
| 3 | 0 V | Ground (chassis potential) |
| 4 | +24 V, 200 mA max. | Signal voltage for pilot indicator, taken via diode from contact 1 |

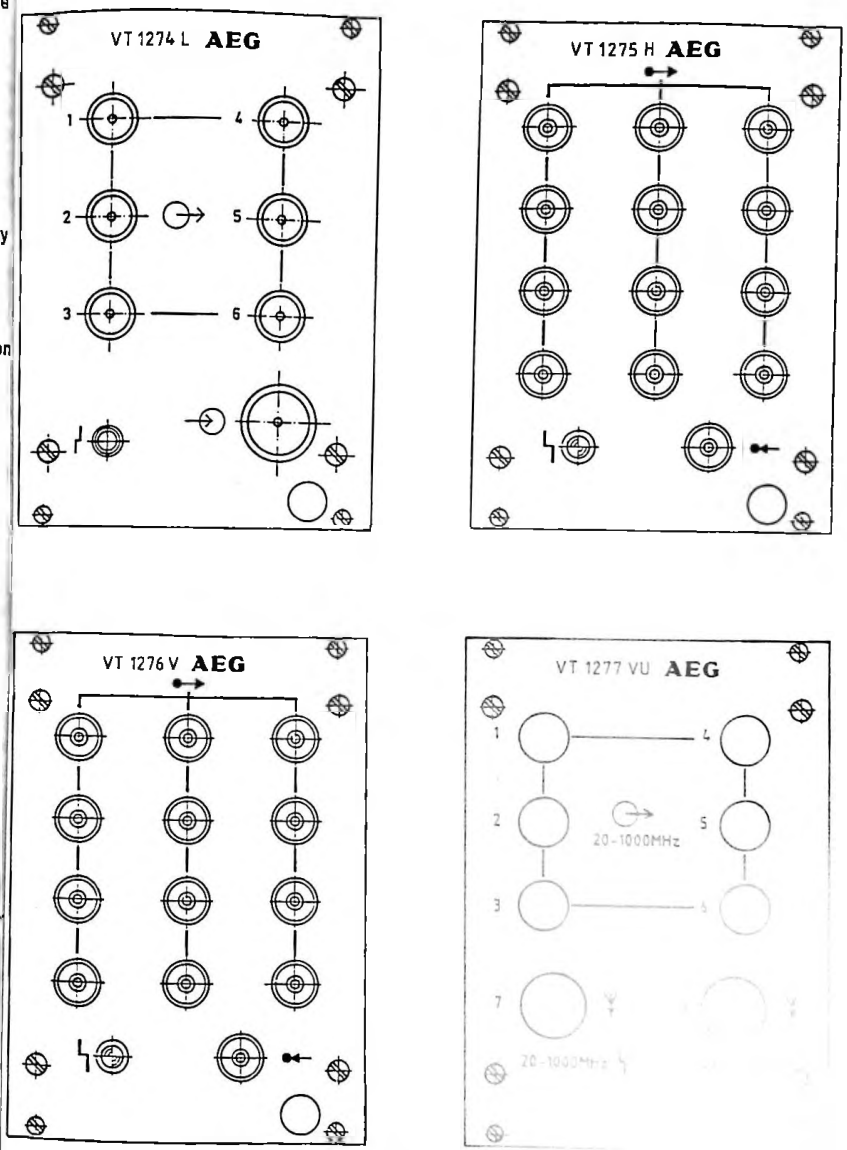


Fig. 1 Amplifier-Multicoupler (Antenna Multicoupler)

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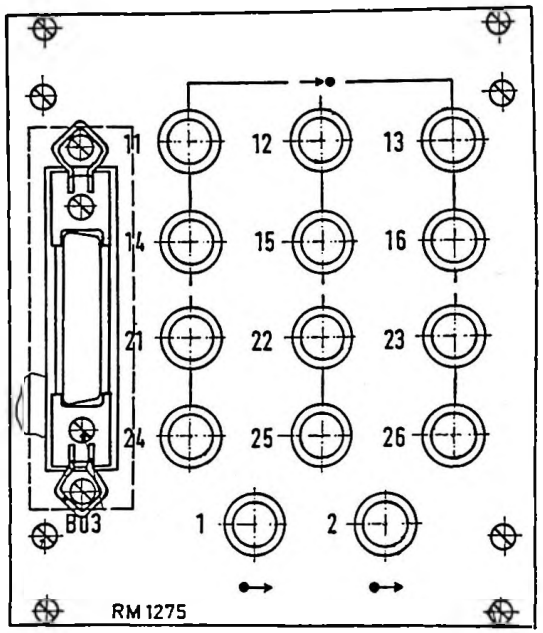


Fig. 2 Relay Matrix RM 1275

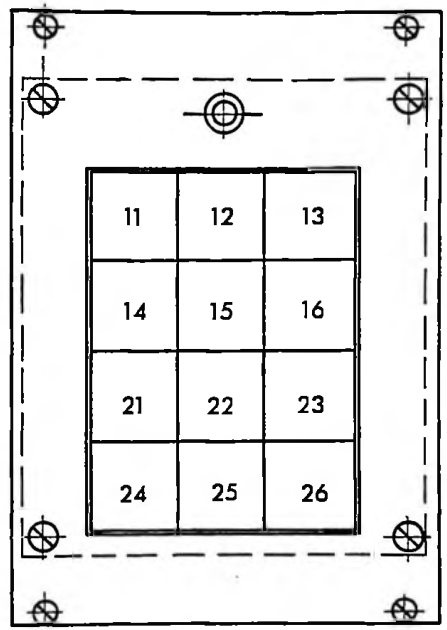


Fig. 3 Antenna Switch AS 1275

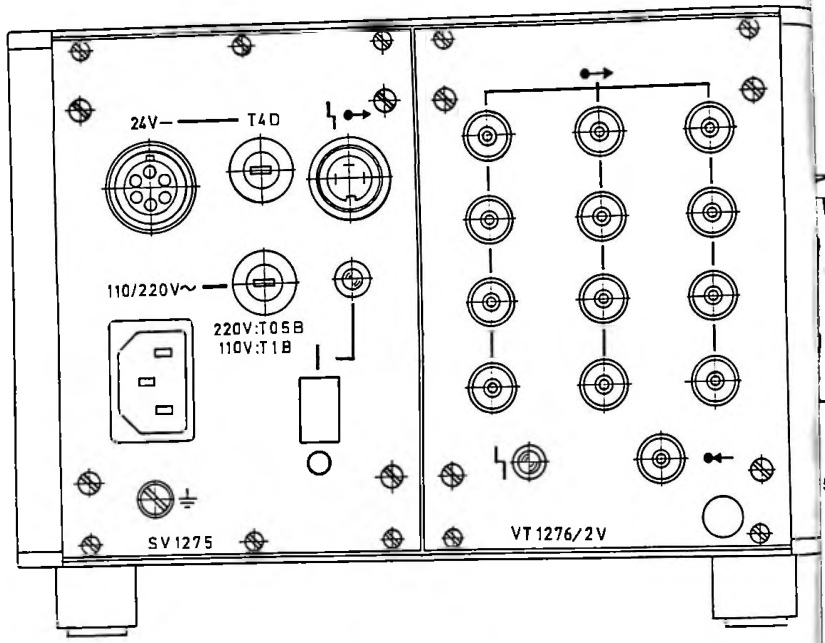


Fig. 4 Power Supply Unit SV 1275

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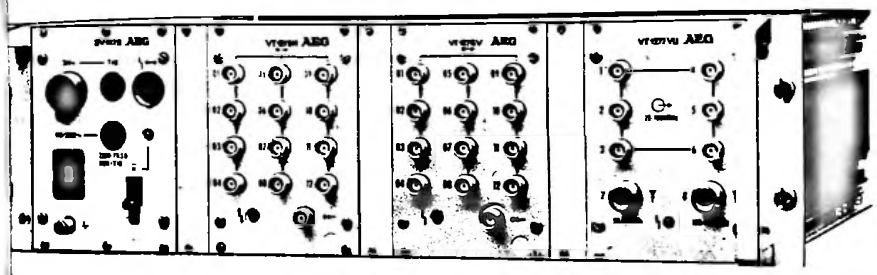
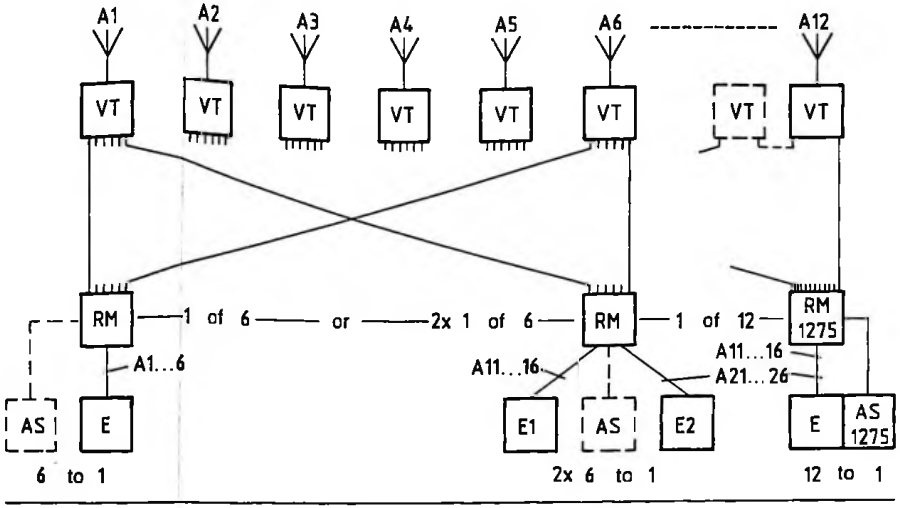
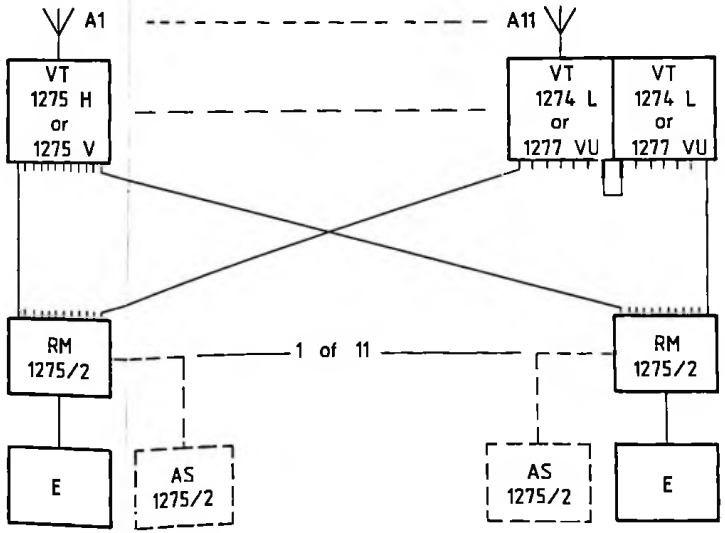


5 Configuration Example for TR 1270/3

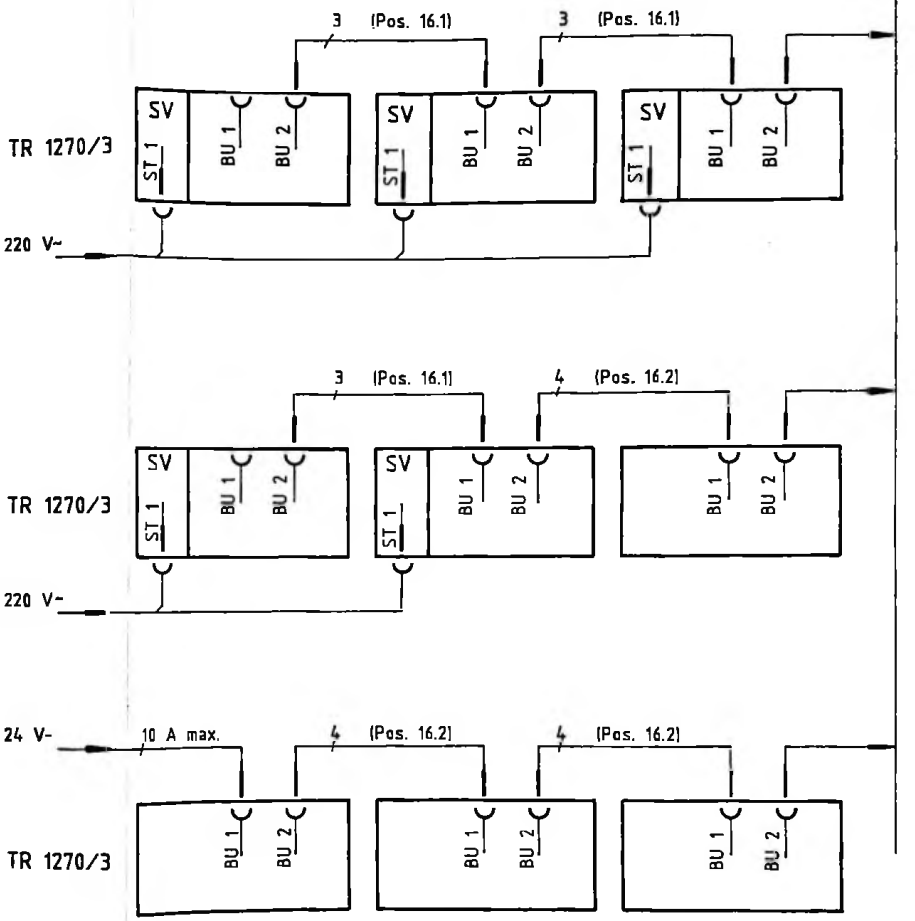





Configuration Examples
Antenna Multicoupler Equipment AVA 1270
**Annex 1**

External pilot indicator and fault signalling




Modules carrier frames with internal power supply unit (PS) may be interconnected only with the **3-conductor** cable of the "fault signalling".

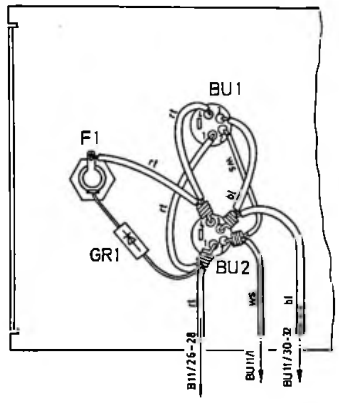
When operating with central power supply, observe the maximum current ratings of the plug connectors (10 A) and power supply units.

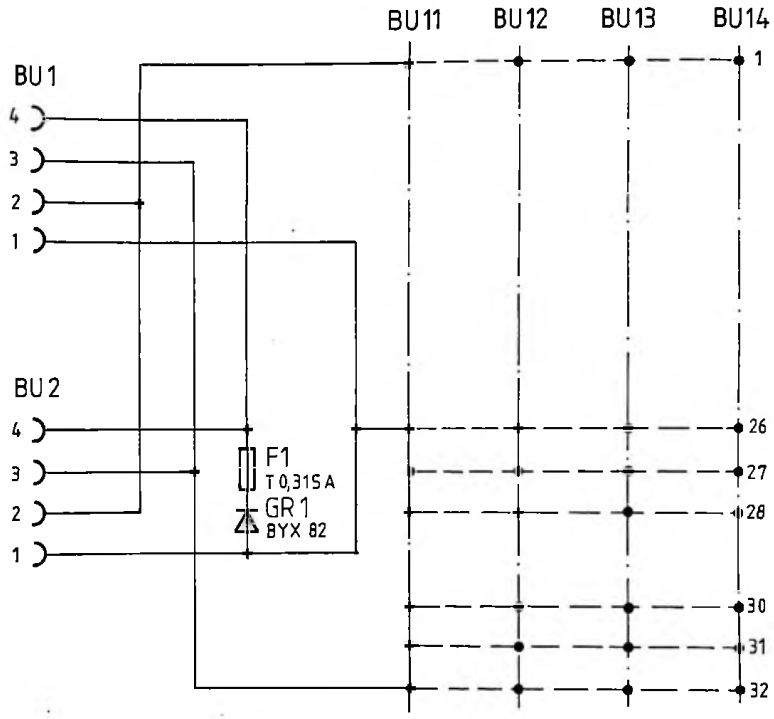
The total power dissipation of the equipment system is determined by adding up the power consumptions of the individual modular subunits. One blower drawer unit must be incorporated for every 200 W power consumption. Include the power consumption of the blower unit(s) in the calculations.

The power consumption values listed below are valid for 24 V DC or mains voltage.

| Modular Unit | Power Consumption | Remarks |
|---|---|---|
| VT 1274 L | 15 W | |
| VT 1275 H | 30 W | |
| VT 1276 V | 12 W | |
| VT 1277 VU | 20 W | |
| RM 1275 | 2.4 W | for each switched connection |
| AS 1275 | 0.6 W | for each switched connection max. (including AS 1275/2) |
| RM 1275/2 | 4 W | for each switched connection |
| Blower drawer unit | 15 W<br>54 VA | at 24 V DC<br>at 115/220 V AC |
| **Power Supply Unit SV 1275** | | |
| Power dissipation | 10 W | only for 115/220 V AC |
| Output power | 90 W | max. at 24 V DC |

Power consumption of the modular subunits
Antenna Multicoupler Equipment AVA 1270
**Annex 3**

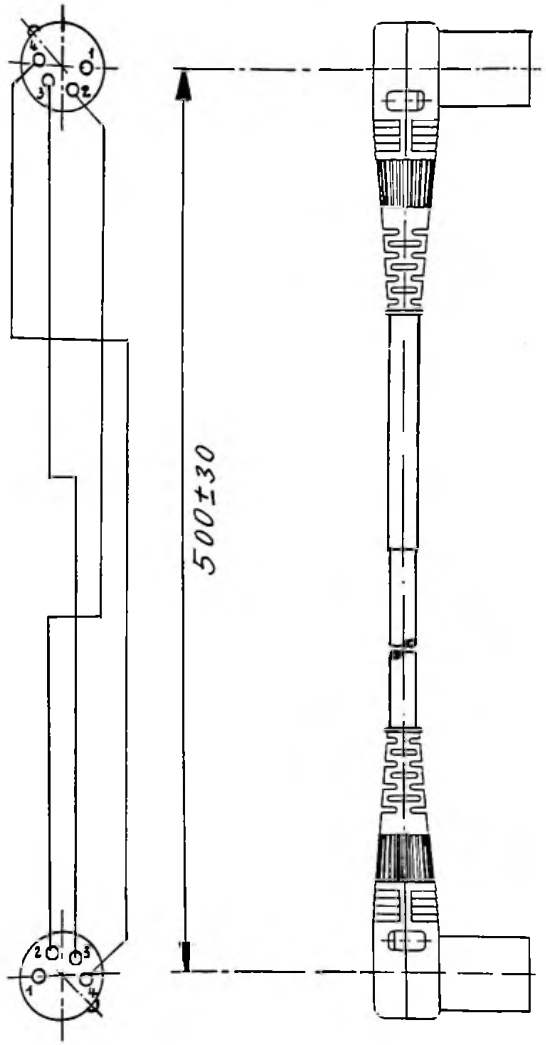



See also Section 4.4.4



Circuit Diagram
Carrier Frame TR 1270/3
Antenna Multicoupler Equipment AVA 1270
**Annex 4**




Carrier Frame Link Cables
(Fault signalling alone; three conductors)
Antenna Multicoupler Equipment AVA 1270
**Annex 5, Sheet 1**

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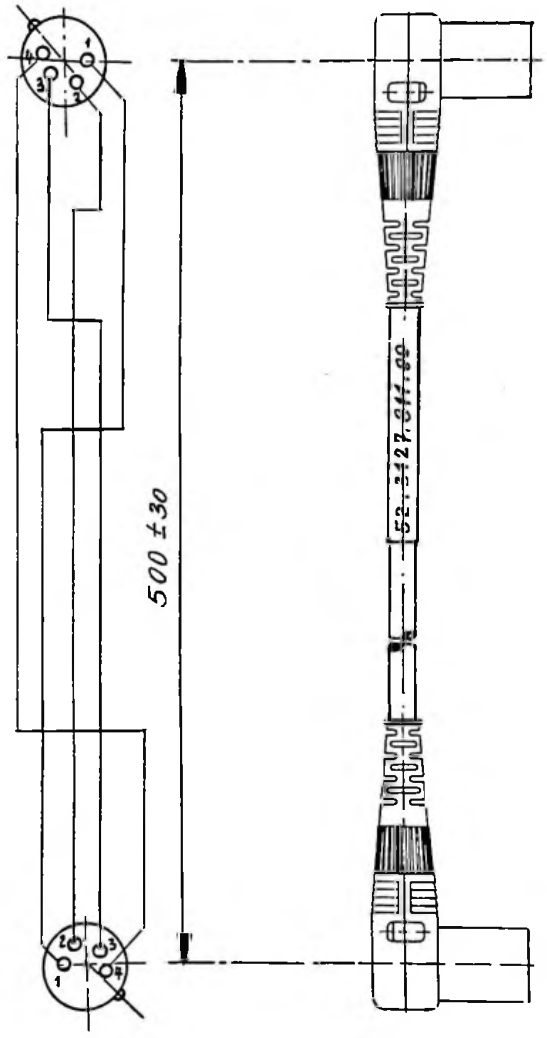
AVA 1270




Carrier Frame Link Cables
(Fault signalling plus power supply; four conductors)
Antenna Multicoupler Equipment AVA 1270
**Annex 5, Sheet 2**

**AVA 1270**

# APPENDIX

concerning delivered equipment