



BROADCASTING

Painting of the Netherlands World Broadcasting Centre at Lopik by J. Sluijters, jr



BROADCASTING



N.V. PHILIPS' TELECOMMUNICATIE INDUSTRIE, HILVERSUM, THE NETHERLANDS

General

As long ago as 1923 the predecessor of Philips' Telecommunicatie Industrie — Nederlandsche Seintoe-stellen Fabriek (NSF) — regularly carried out experimental transmissions using the recently discovered medium of radio broadcasting.

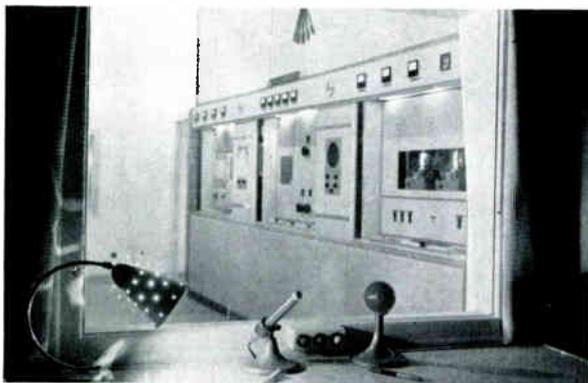
These experiments led to the birth of a Dutch broadcasting system which, though it operated independently of NSF, maintained close contact with it in the form of orders for transmitters and studio equipment. Although the original broadcasts had duly attracted interest even in the foreign press, their significance was mainly of a local character. International fame, however, resulted from the pioneering work done first in the Philips laboratory at Eindhoven and later at Huizen in the field of short-wave broadcasting. A few years earlier transmissions from the laboratory had revealed the possibility of short-wave telegraphy over very long distances and with comparatively little power. The first experimental broadcast transmissions took place in 1927 and they were an immediate success. In next to no time the transmitter was internationally known by its call sign PCJJ. The permanent PCJJ transmitter was later set up at Huizen, a fishing village on the Zuyder Zee, where it was to function for over twenty years.

The factory's market grew in almost direct proportion to the range of the transmitters and from 1930 onwards transmitters were supplied and installed in places as far apart as Indonesia, Buenos Aires, Rio de Janeiro and India, where the transmitters made for

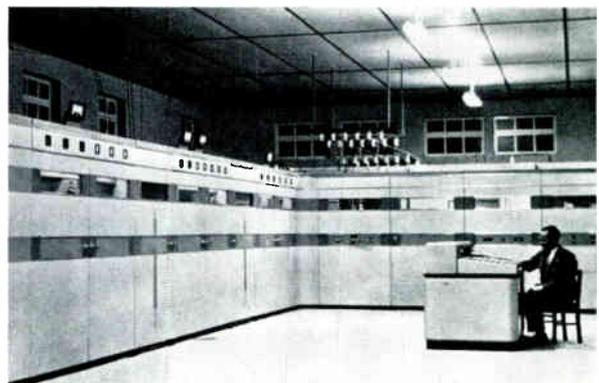
All India Radio are still, twenty-five years later, doing yeoman service. The biggest pre-war order, however, came from Holland and was for two 125 kW medium-wave transmitters, to be erected at Lopik. Shortly after World War II these transmitters, still undamaged, came in for great praise from the Chief Technical Officer of SHAEF, who called them 'the most beautiful in all Europe'.

New developments

An important factor in the development of broadcast transmitters was the co-operation between the factory in Hilversum and Philips in Eindhoven, a co-operation which is still bearing fruit. We need only cite the considerable simplification in equipment design which has resulted from the replacement of water-cooled transmitting tubes by air-cooled tubes. Transmitter manufacture further came to be based on several principles of industrial design, great care being devoted to the outward appearance of installations. Formerly, broadcast transmitters were almost invariably designed, built and supplied to order. The market for this article being far greater nowadays, it is possible to manufacture a standard series of transmitters of varying power and keep a stock of them in hand. Not only is production more economic, but quicker delivery is ensured. What is more, the standard series possesses a flexibility such that a large variety of requirements can be met, ranging from low-power transmitters for local broadcasting to huge



20 kW medium-wave broadcast transmitter of the Spanish General Post Office



100 kW medium-wave equipment of the Radio Clube Português at Miramar

installations for world-wide broadcasting purposes. Another development of more recent origin is VHF-FM broadcasting which with its extremely fine sound quality is particularly suitable for local broadcasting services. FM transmitters are being produced in the form of small units which can be easily combined to make up transmitters of greater power. A special application of FM techniques worthy of mention here is as sound transmitters in television broadcasts.

An important point in this connection is that the necessary line and radio-link equipment also figures in PTT's production programme. In other words PTT are capable of devising and carrying out entire projects, including auxiliary installations such as aerial sites, studio equipment, studio-transmitter links and power generating sets.

Programme

Our production activities in the broadcasting sector may be summed up as follows:

A series of medium-wave transmitters ranging from medium to high power (5-120 kW);

A series of short-wave transmitters covering the same power range (5-120 kW), and comprising both continuously tunable and channelized versions;

In the FM field a range of VHF transmitters varying from 10 W to 12 kW, together with a large number of accessories for aerial systems;

AF equipment such as line and compression amplifiers for transmitter inputs;

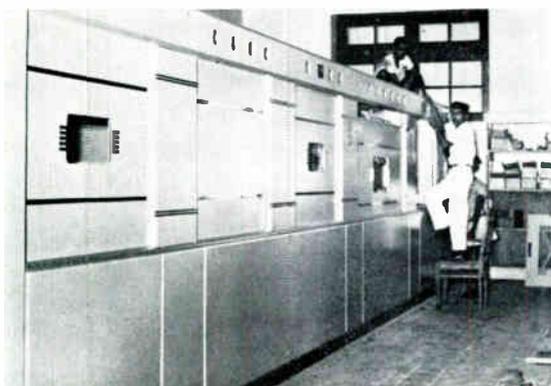
A full range of studio equipment such as microphones, control desks, recording and play-back equipment. Test and monitoring equipment, HF dummy loads.

Integrated systems

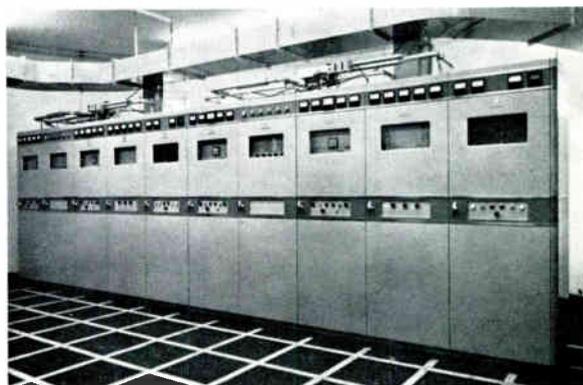
To give an idea of the versatility of systems built up from parts listed in this catalogue we illustrate on the following two pages a complete broadcasting system; similar systems adapted to any existing circumstances can, if necessary, be designed by our engineers.

The diagram shows a completely equipped sound studio with pick-up, amplifying and recording equipment. Programmes can be controlled and directed from a studio console. A complete self-contained OB (outside broadcast) van is connected to the studio by VHF programme and service links.

In the difficult terrain conditions assumed the audio signals are relayed to the transmitter site by means of VHF studio-transmitter links (STL), while a two-way channel is also provided for service conversation. In the transmitter building the incoming signals are amplified and corrected in an audio-control unit and subsequently fed into the modulators of medium-wave or short-wave transmitters, the latter being channelized. Suitable feeder lines transport the RF energy to an omnidirectional aerial in the case of the medium-wave and to a highly directional rhombic aerial to concentrate the short-wave energy on a certain area. Power is taken from normal mains or, in an emergency, from a diesel power supply.

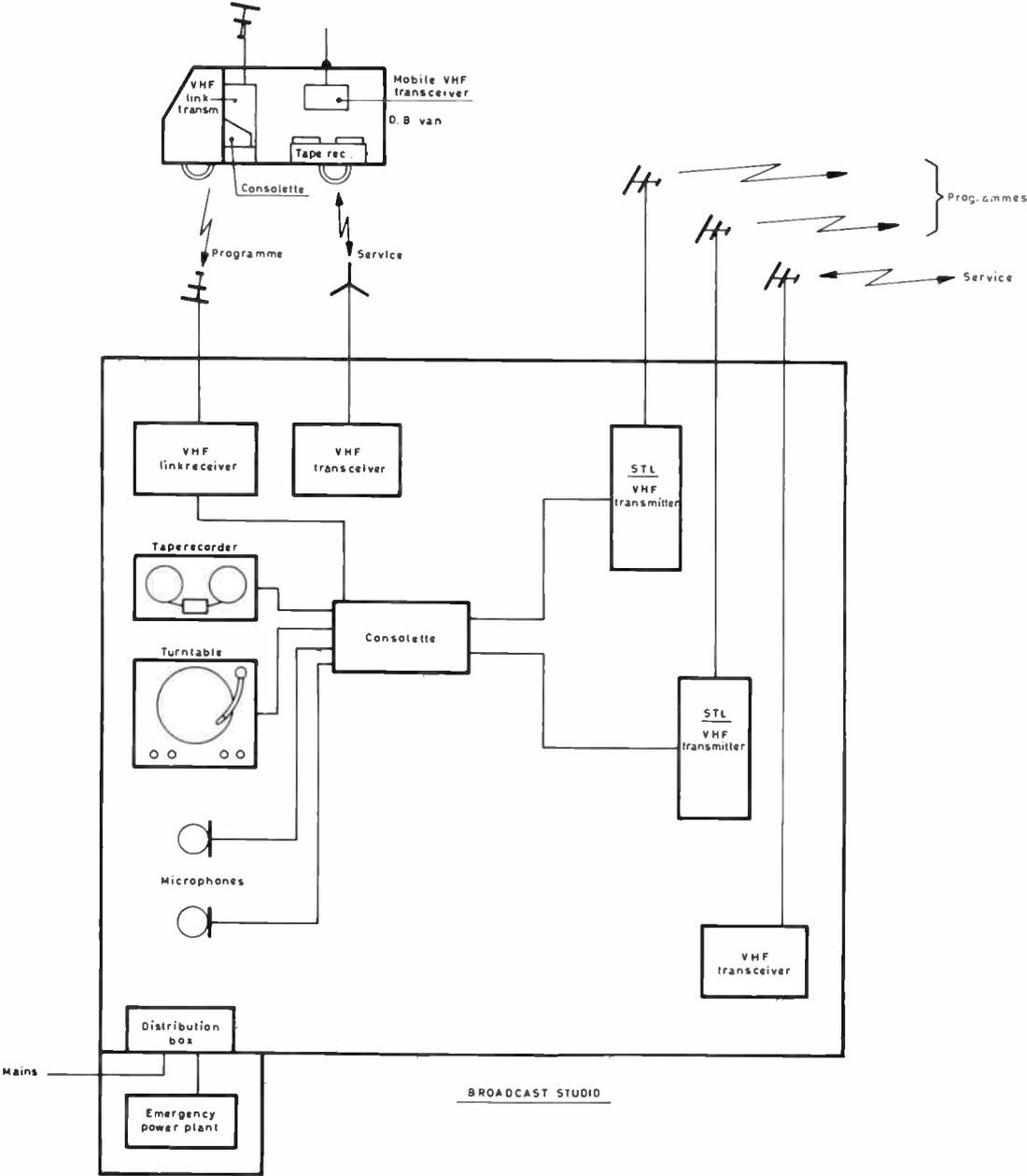


installing a Philips 50 kW short-wave broadcast transmitter at Radio Goa Broadcasting Centre

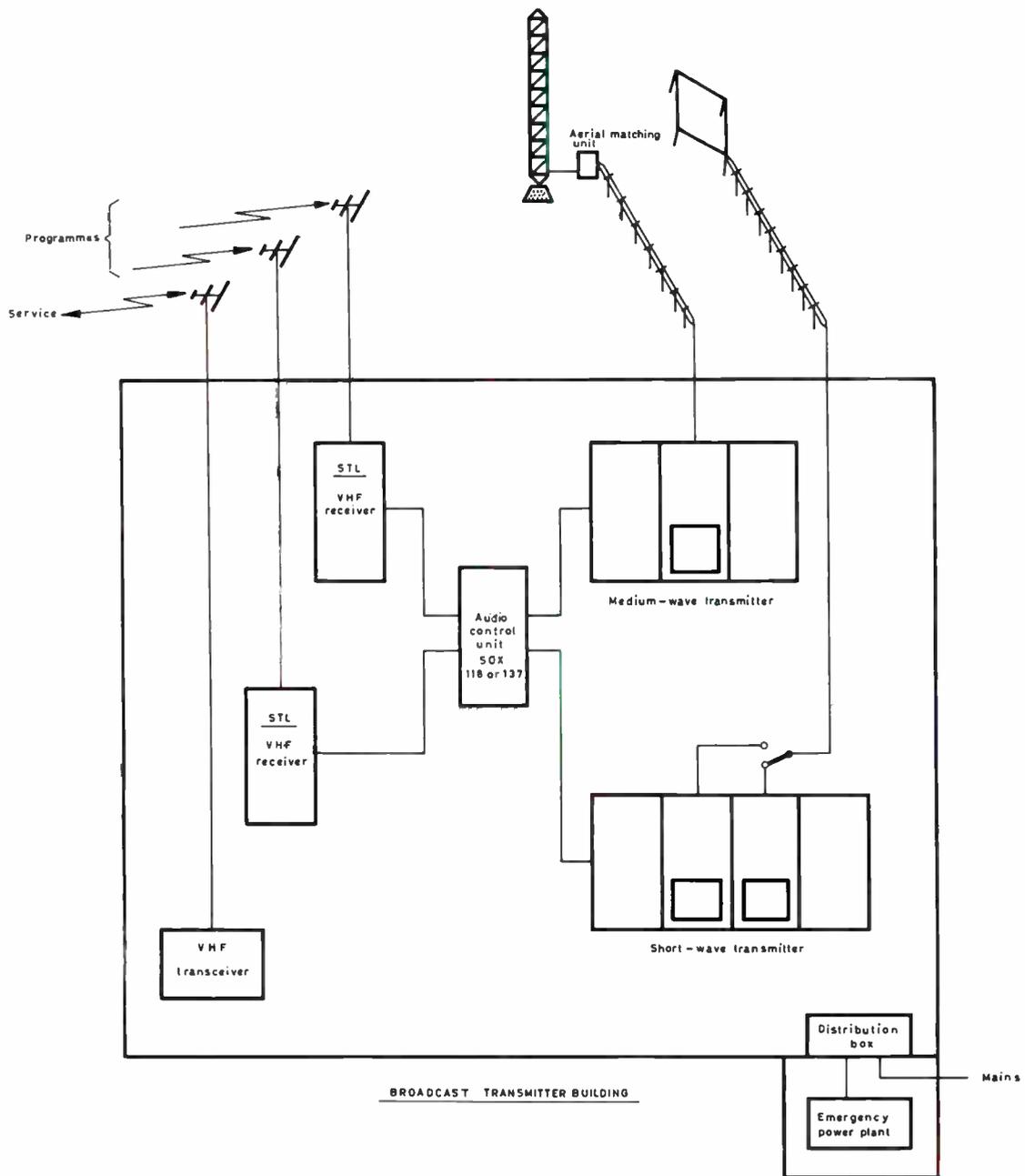


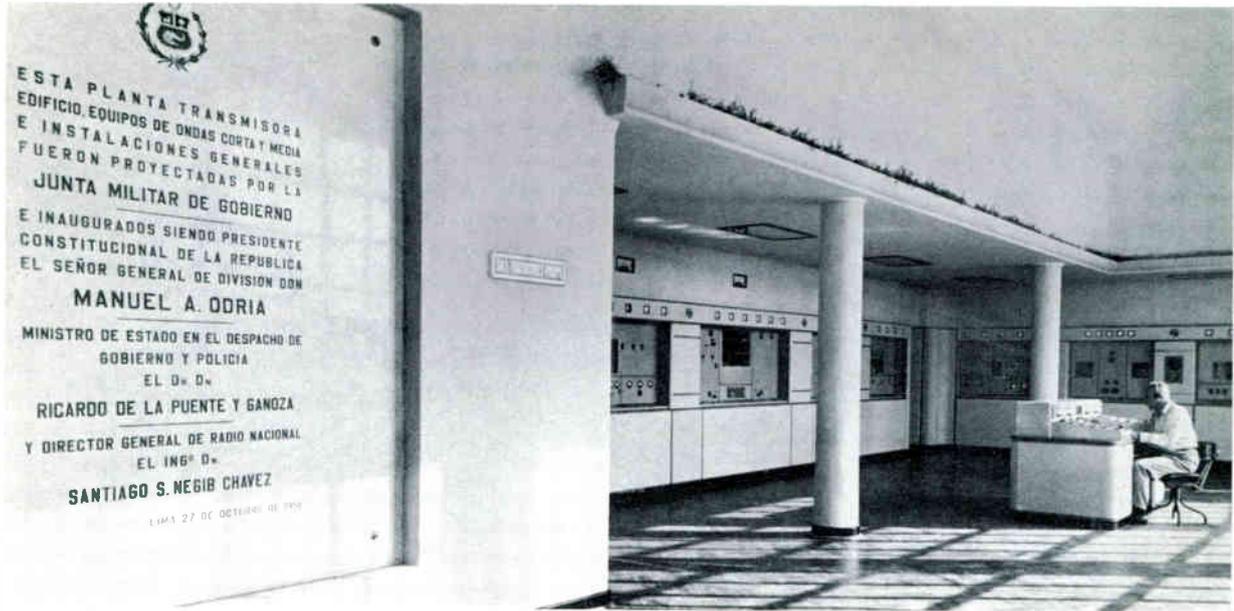
5 kW twin FM broadcast equipment with automatic switch-over facilities (Mierlo, Netherlands)

Diagrams showing how the various types of equipment are combined to form a complete

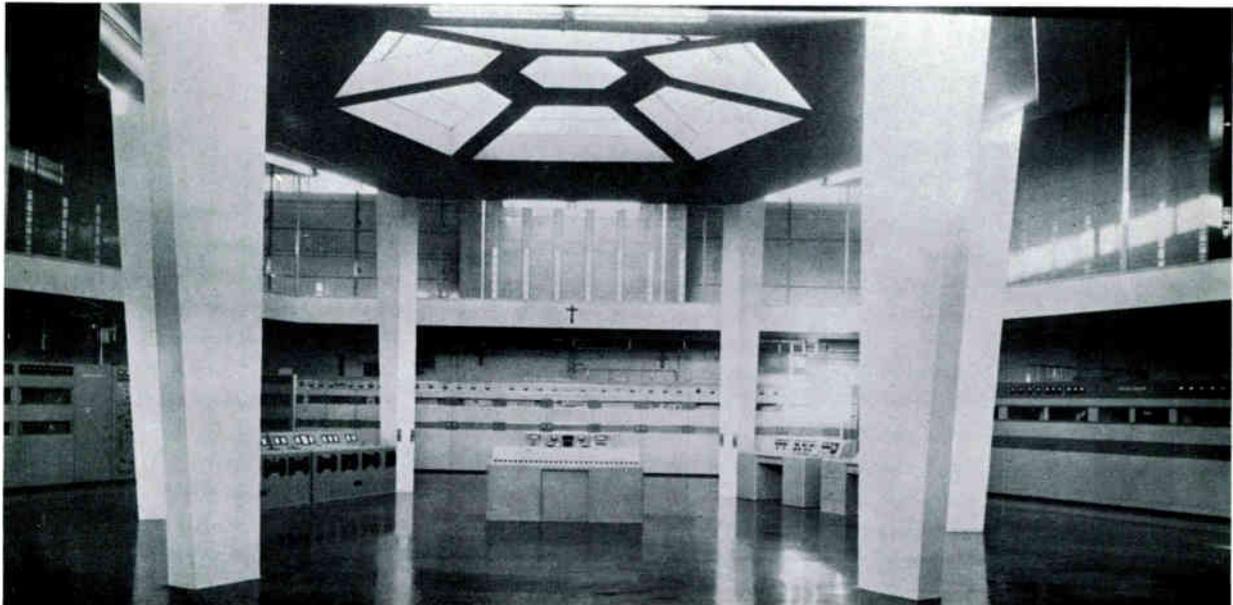


network for broadcasting purposes (for a description of this system see previous page)





top: Philips 50 kW short-wave and 20 kW medium-wave broadcast installations at Lima (Peru)
 bottom: Radio Vaticana – in centre Philips 100 kW short-wave broadcast transmitting equipment



ABOUT THIS SECTION CATALOGUE

This catalogue is intended for customers whose interests are confined to a particular section of Philips radio-radar production programme.

The booklet is composed of loose catalogue sheets arranged in the same order as the corresponding descriptions in the bound radio-radar catalogue 1963.

Separate reprints of the sheets are available; for the code number see the lower right-hand corner of the front page. Inquiries should be addressed to:

PUBLICITY DEPARTMENT
N.V. PHILIPS' TELECOMMUNICATIE INDUSTRIE
POSTBOX 32 - HILVERSUM - THE NETHERLANDS

1. 5 kW AM medium-wave broadcast transmitter type SOZ 348
2. 10 kW AM medium-wave broadcast transmitter type SOZ 346
3. 25 kW AM medium-wave broadcast transmitter type 8FZ 511
4. 50 kW AM medium-wave broadcast transmitter type 8FZ 516
5. 120 kW AM medium-wave broadcast transmitter type 8FZ 517
6. 5 kW AM short-wave broadcast transmitter type SOZ 362 (channelized)
7. 10 kW AM short-wave broadcast transmitter type SOZ 363 (channelized)
8. 10 kW AM short-wave broadcast transmitter type 8FZ 701 (continuous tuning)
9. 25 kW AM short-wave broadcast transmitter type 8FZ 510 (channelized)
10. 25 kW AM short-wave broadcast transmitter type 8FZ 513 (continuous tuning)
11. 50 kW AM short-wave broadcast transmitter type 8FZ 514
12. 120 kW AM short-wave broadcast transmitter type 8FZ 515
13. Studio-transmitter link equipment (single versions)
10 W - type 8FZ 505; 50 W - type SFZ 364
14. Studio-transmitter link equipment (twin versions)
10 W - types 8FZ 506, 8FZ 507
50 W - types SFZ 403/00, SFZ 403/01
15. 250 W FM broadcast transmitter type SOZ 334
16. 1 kW FM broadcast transmitter type SOZ 335
17. 5 kW FM broadcast transmitter type 8FZ 705
18. 6½ kW FM broadcast transmitter type SOZ 336
19. 10 kW FM broadcast transmitter type 8FZ 706
20. 12 kW FM broadcast transmitter type SOZ 337
21. Diplexer type SFE 272 (band II)
Harmonic filter type SFE 368 (band II)
22. VHF coaxial accessories
23. Transmitter audio control equipment type SOX 118
24. Transmitter audio control equipment type SOX 137
25. HF dummy aerials types 8RT 501, 8RT 502, 8FT 506
26. Broadcast aerials
27. Audio equipment for broadcast and television studios (ELA Division - Eindhoven)

PHILIPS

5 kW AM medium-wave broadcast transmitter type SOZ 348

General

The SOZ 348 is a medium-wave (525–1605 kc/s) transmitter specially designed for ease of operation and maintenance. This and the fact that operating costs are low make the transmitter extremely economical to use.

The transmitter can be operated without specialized technical knowledge. It is suitable for continuous unattended operation and, if desired, can be remotely controlled, facilities being already incorporated for this purpose. Full metering facilities are provided.

Description

The transmitter comprises three cabinets and a number of high-tension components. The three cabinets respectively house a power supply unit, an RF unit and a modulator unit and can be linked to form a single front.

The exciter is incorporated in the RF unit. If desired, the transmitter can also be driven by an outside oscillator. To protect the exciter against accidental detuning and consequent inconvenience, it is covered by a swivel panel.

The transmitter fully complies with international standards.

Modulation takes place in the anode circuit of the output stage. The modulator consists entirely of push-pull stages and gives excellent audio response as a result of a carefully designed negative-feedback circuit. The nominal output impedance is 300 ohms unbalanced.

An aerial matching unit can be supplied. It is housed in a drip-proof galvanized steel cabinet.

Mechanical design

Various standard lay-outs are possible. The arrangement best adapted to the available accommodation can be chosen. The building-block construction used

considerably simplifies installation. No special skill or tools are required.

Heavy components may be installed behind the transmitter cabinets or, if preferred, in an adjacent room or cellar.

The fans, too, are separate units and can also be installed in an adjacent room or cellar, with a further decrease in the already low mechanical noise. These fans are fitted with replaceable air filters. A slight



division Telecommunication

section Broadcasting

product 5 kW AM MW broadcast transmitter

type SOZ 348

pamphlet R-63.1108

Mechanical design (continued)

excess pressure inside the transmitter prevents dust from entering.

The components in the transmitter are fitted on slide-out panels and therefore easily accessible. The materials have been carefully selected, so that the transmitter is fully tropic-proof.

A detailed assembly and maintenance manual is sup-

plied with the transmitter. Like the inscriptions on the latter, this manual is normally in English, but other languages (e.g. Spanish) are available on request.

Also supplied are certain spares, such as pilot lamps and fuses, as well as some enamel for touching-up purposes.

Technical data

Frequency range any specified frequency in the 525–1605 kc/s band

Frequency tolerance ± 5 c/s

Power output 5 kW (carrier)

Output impedance 300 ohms unbalanced (five-wire cage feeder); on special order 50 or 75 ohms unbalanced

Standing wave ratio max. 1.4:1

Spurious emissions comply with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level 0 dBm ± 2 dB, reference 1000 c/s at 100% modulation: 0 dBm = 1 mW into 600 ohms

Linear distortion within ± 1.5 dB from 30 to 10,000 c/s at 60% modulation

Non-linear distortion less than 3% from 50 to 10,000 c/s and 2% from 100 to 7500 c/s at 90% modulation

Noise level better than -60 dB unweighted, reference 1000 c/s at 100% modulation

Modulation capability 100% instantaneously; 60% (average mod. level) continuously, in the modulating frequency range of 30–10,000 c/s

Power supply 3 \times 380V $\pm 5\%$, 50 and 60 c/s $\pm 5\%$, four-wire mains; adaptation to other voltages by means of an optional separate auto-transformer

Power consumption

at 0% modulation approx. 11 kW;

at 30% modulation approx. 13 kW;

at 100% modulation approx. 16 kW

Power factor approx. 0.82

Ambient temperature

at sea level: $+10^\circ$ to $+45^\circ$ C under tropical conditions; at 6000 ft: $+10^\circ$ to $+35^\circ$ C

Relative humidity up to 95%

Dimensions (approx.)

height 212 cm (84 in.), width 152 cm (60 in.), depth 90 cm (36 in.)

Minimum floorspace 300 \times 350 cm (120 \times 140 in.)

Weight (approx.) 2100 kg (4620 lb.) unpacked

Tube complement

Philips type	*	CV number	*	USA type
2 \times E80L		–		6227
7 \times QE06/50		124		807
2 \times QQE06/40		2797		5894
4 \times QBL5/3500		–		6076
8 \times DCG4/1000G		32		866A
3 \times DCG5/5000GB		642		872A



PHILIPS

10 kW AM medium-wave broadcast transmitter type SOZ 346

General

A simple but very efficient medium-wave (525–1605 kc/s) broadcast transmitter of high audio quality.

Installation, operation and maintenance require only a minimum of specialized technical skill.

Unattended continuous operation is possible for extended periods, reducing the already low costs of operation.

Description

The main units of the transmitter are housed in three separate cabinets: the RF unit, the modulator and the power supply unit.

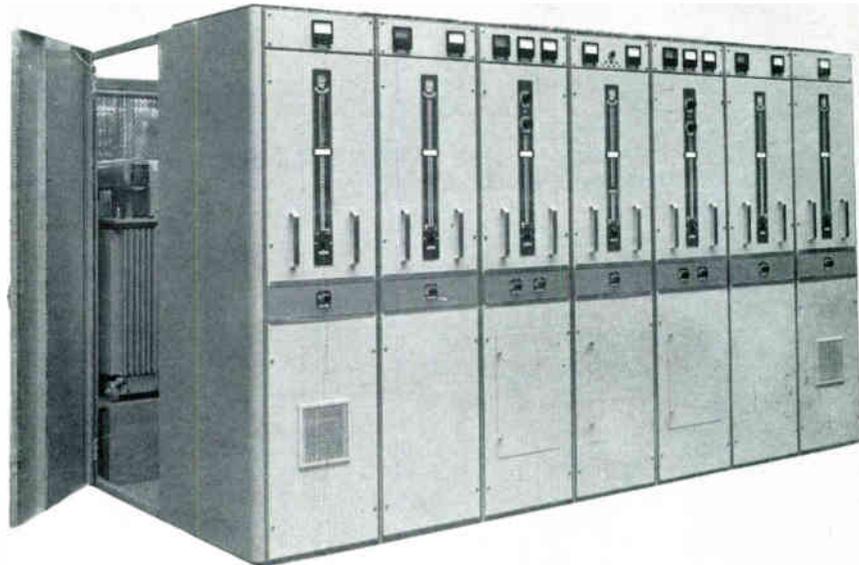
The RF unit comprises an exciter, an intermediate stage and the power amplifier. The exciter unit, which is mounted behind a hinged panel, generates a very stable signal in accordance with international requirements. The output of the transmitter is designed for

connection to an asymmetrical feeder with a nominal impedance of 300 ohms. If necessary, an aerial-matching unit can be supplied. This unit is housed in a weather-proof galvanized steel cubicle.

The modulator consists of a number of push-pull stages with a very stable feedback network, ensuring undistorted modulation at the anodes of the PA tubes. The ease of operation is enhanced by logically grouped front-panel controls and extensive built-in metering facilities.

All meters are mounted at the top of the cabinets for ease of observation. Facilities have been incorporated for the connection of remote-control equipment, which is available as an optional extra.

The transmitter is amply protected against overloads and other failures. Door interlocks cut off high tension, thereby safeguarding maintenance personnel.



combined installation of two coupled 10 kW type SOZ 346 medium-wave broadcast transmitters



division Telecommunication
section Broadcasting
product 10 kW AM medium-wave
 broadcast transmitter
 type SOZ 346
pamphlet R-63.1113

Mechanical design

The transmitter is composed of independent units which permit great flexibility of lay-out. A choice of many standard arrangements is possible, and the transmitter will suit almost any space available in existing buildings. Special arrangements can also be made to suit special circumstances.

The main units are the RF unit, the modulator unit and the power supply unit. The blower assemblies for the RF and modulator unit, the power supply and modulating transformers, chokes and capacitors are independent units and can be installed where space is available, e.g. behind the transmitter or in a separate room or cellar. Dummy panels to maintain a symmet-

rical outward appearance can be supplied if various components are installed behind the transmitter proper. The blower assemblies include air filters. These filters and the slightly higher pressure maintained in the cabinets prevent the ingress of dust. Extensive and detailed information in the instruction manual facilitates installation, operation and maintenance of the equipment.

Installation is simple and requires no special tools or highly skilled personnel.

The name-plates and manuals supplied with the equipment are normally in English but other languages (e.g. Spanish) can be had on special order.

Technical data

Frequency range 525–1605 kc/s

Frequency tolerance ± 5 c/s

Power output 10 kW (carrier)

Output impedance 300 ohms unbalanced; on special order 50 or 75 ohms coaxial

Standing wave ratio max. 1.4:1

Spurious emissions comply with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level 0 dBm ± 2 dB at 100% modulation (1000 c/s); 0 dBm = 1 mW into 600 ohms

Linear distortion within ± 1.5 dB from 30 to 10,000 c/s, reference 1000 c/s at 60% modulation

Non-linear distortion less than 3% from 50 to 10,000 c/s and 2% from 100 to 7000 c/s at 90% modulation

Noise level better than -60 dB, unweighted; reference 1000 c/s at 100% modulation

Modulation capability 100% instantaneously; 60% (average mod. level) continuously, in the modulating frequency range of 30–10,000 c/s

Power supply 3 \times 380 V ± 5 %, 50 and 60 c/s ± 5 %, four-wire mains (adaptation to other voltages by means of an optional separate auto-transformer)

Power consumption

at 0% modulation approx. 21 kW

at 30% modulation approx. 24 kW

at 100% modulation approx. 30 kW

Power factor approx. 0.82

Ambient temperature at sea level: $+10^\circ$ to $+45^\circ$ C under tropical conditions; at 6000 ft: $+10^\circ$ to $+35^\circ$ C

Relative humidity up to 95%

Dimensions transmitter proper: height 212 cm (84 in.); width 152 cm (60 in.); depth 90 cm (36 in.)

Minimum floorspace 300 \times 350 cm (10 \times 12 ft)

Weight (unpacked) approx. 2500 kg (5500 lb.)

Tube complement

Philips type	*	CV number	*	USA type
2 \times E80L		–		6227
9 \times QE06/50		124		807
4 \times QQE06/40		2797		5894
8 \times QBL5/3500		–		6076
8 \times DCG4/1000G		32		866A
3 \times DCG6/18		–		6693



PHILIPS

25 kW AM medium-wave broadcast transmitter type 8FZ 511

General

Many years of broadcasting experience have gone into this transmitter which is the economic answer to most problems in this field.

The 8FZ 511 is an air-cooled medium-wave (525–1605 kc/s) transmitter of exemplary simplicity.

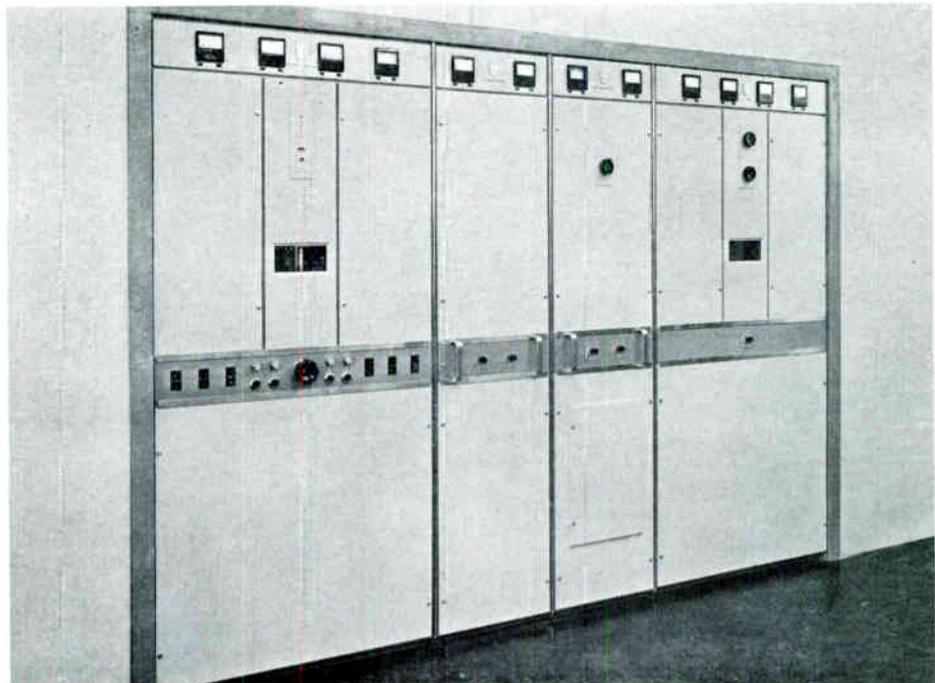
Description

The frequency required is generated in a broad-band tuned exciter unit with an oven-controlled crystal oscillator. The exciter is followed by 2 intermediate stages and the power amplifier. The transmitter is supplied complete with the various tuning elements for the desired working frequency. The aerial connection is designed for an asymmetric feeder with a nominal impedance of 300 ohms. If required, the transmitter can be supplied with an aerial matching

unit, housed in a weather-proof galvanized steel cubicle.

The frequency stability and spurious radiation satisfy the relevant international requirements. Excellent audio quality is obtained by using push-pull stages throughout the modulator and incorporating efficient negative feedback circuits.

The power supply for the entire transmitter is provided for by only 3 rectifiers, so that a very simple and effective switching and protective system is possible. The transmitter is switched on and off with only two sets of two switches and switching can, if necessary, be effected by remote control. When fault conditions of short duration occur the high tension is switched off for very short periods. Interlock switches protect the staff against dangerously high voltages.



type 8FZ 511 broadcast equipment comprising from left to right: power supply, modulator, driver and final stage



division Telecommunication
section Broadcasting
product 25 kW AM medium-wave
broadcast transmitter
type 8FZ 511
pamphlet R-63.1114

Mechanical design

The distinguished-looking front of the transmitter is formed by 2 large and 2 smaller cabinets from our standard range placed side by side. The larger cabinets contain the power supply unit and the output stage, the smaller ones the modulator and the RF premodulator, in the latter of which the exciter unit is mounted behind a hinged panel.

The large cabinets have doors and the two smaller cabinets slide-out panels so that all components are easily accessible. Heavier units such as the HT and modulation transformers are placed behind the cabinets, as also are the 3 fans which provide cooling air.

Technical data

Frequency range 525–1605 kc/s

Frequency tolerance ± 5 c/s

Power output 25 kW (carrier)

Output impedance 300 ohms unbalanced

Standing wave ratio max. 1.4:1

Spurious emissions comply with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level adjustable between +5 and 0 dBm ± 2 dB, reference 1000 c/s at 100% modulation; 0 dBm = 1 mW into 600 ohms

Linear distortion within ± 1 dB from 30 to 10,000 c/s, reference 1000 c/s at 60% modulation

Non-linear distortion less than 3% from 50 to 10,000 c/s at 90% modulation

Noise level –60 dB unweighted, reference 1000 c/s at 100% modulation

Modulation capability 100% instantaneously, decreasing to 90% for carrier frequencies lower than 800 Kc/s and mod. frequencies higher than 7000 Kc/s 60% (average mod. level) continuously, in the modulating frequency range of 30–10,000 c/s

Power supply 3 \times 380 V ± 5 %, 50 or 60 c/s ± 5 %, four-wire mains (adaptation to other voltages by means of an optional separate auto-transformer)

Power consumption

at 0% modulation approx. 50 kW

The fans are connected to the various cabinets by ducts, the air intakes are fitted with filters and the slightly higher pressure inside the cabinets prevents dust from entering.

Installation, which is a simple matter, operation and maintenance are described in detail in the manuals supplied with the transmitter. No special tools are needed for the installation work, which, like the maintenance, can be carried out by semi-skilled personnel. The equipment is normally supplied with name-plates and manuals in English. Other languages (e.g. Spanish) are available but must be specially ordered.

at 30% modulation approx. 56 kW

at 100% modulation approx. 77 kW

Power factor approx. 0.82

Ambient temperature at sea level: +10° to +45° C under tropical conditions; at 6000 ft: +10° to +35° C

Relative humidity up to 95%

Dimensions

pre-ampl. + mod.: height 212 cm (84 in.), width 102 cm (40 in.), depth 90 cm (36 in.);

final stage: 212 cm (84 in.), width 102 cm (40 in.), depth 90 cm (36 in.);

rectifier: height 212 cm (84 in.), width 102 cm (40 in.), depth 90 cm (36 in.)

Minimum floorspace 450 \times 350 cm (15 \times 12 ft)

Weight (approx.) 8000 kg (17,600 lb.) unpacked

Tube complement

Philips type	*	CV number	*	USA type
2 \times E80L		–		6227
5 \times QE06/50		124		807
2 \times QQE06/40		2797		5894
1 \times QBL5/3500		–		6076
8 \times TBL7/8000		–		6961
6 \times QE08/200		–		–
6 \times DCG5/5000GB		642		872A
3 \times DCG7/100		–		–

Data subject to alteration without notice

Printed in The Netherlands

R-63.1114



PHILIPS

50 kW medium-wave broadcast transmitter type 8FZ 516

General

The new type 8FZ 516 air-cooled transmitter is designed for broadcasting services in the medium-wave band 525–1605 kc/s.

This economical transmitter is of compact design and pleasing appearance, combining high-fidelity and performance with ease of operation.

It is suitable for continuous operation, and it is fully tropicalized.

Reliability in operation and high efficiency are achieved by the use of 'high-gain' tetrodes, reducing the number of stages and simplifying the supply and protective circuits.

Careful study has been given to the question of access to individual stages and supply units, with the result that tube replacement, etc. can be effected safely and rapidly.

All operating controls are fitted on the front panel, so that no separate control console is needed, although one can be supplied on special request.

Description

The transmitter is made up of an RF section (exciter

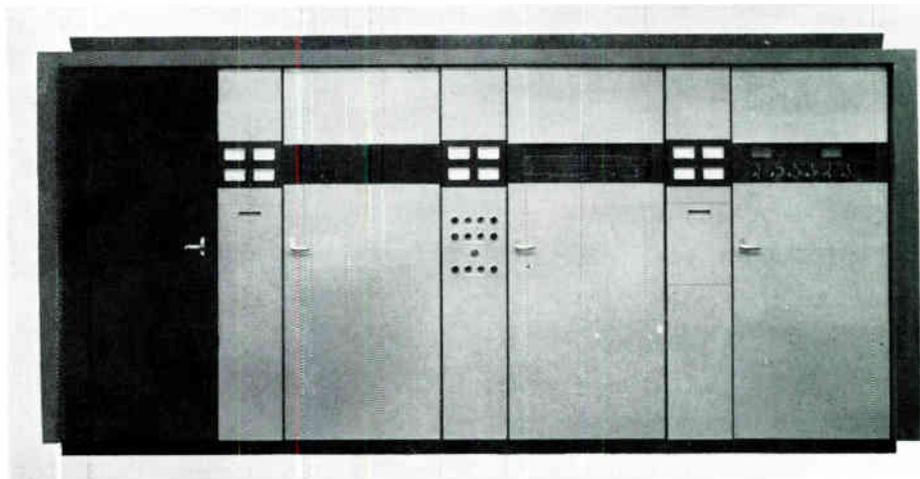
stage—pre-stage—power stage), an AF section and a power supply section.

The exciter stage is composed of an exciter with a crystal oscillator unit which is followed by a separator stage and a frequency-doubler or straight amplifier. The pre-stage comprises a two-stage amplifier, using two double tetrodes in the first stage and two forced-air cooled power tetrodes in the second stage. The two amplifiers are tuned by means of a π -network. The 50 kW RF power stage employs two forced-air cooled triodes connected in parallel.

The AF section comprises four stages, viz. a two-stage input amplifier, a cathode-follower driver and a modulator. A low-pass filter with a cut-off frequency of 10 kc/s and an input control are incorporated in the input circuit of the modulation amplifier.

Feedback is applied from the modulator anodes to the grids of the input voltage amplifier via a frequency-independent network.

Power for the different sections is supplied by three DC supplies, viz. main HT, auxiliary HT and grid bias, the last two of which are equipped with silicon diodes.



type 8FZ 516 broadcast transmitter



division	Telecommunication
section	Broadcasting
product	50 kW medium-wave broadcast transmitter
type	8FZ 516
pamphlet	R-63.1129

Description (continued)

Despite its high power, the transmitter is easily operated by means of three pairs of pushbuttons. Once these pushbuttons have been operated, the auxiliary circuits are all switched on automatically, the whole switching procedure being made visible on a mimic diagram. All necessary controls and full metering facilities are built in. The automatic switching and safety systems give full protection in the event of mistakes in operation or failures.

When failures or disturbances occur, the high tension is reduced to zero for a very short time and then switched on automatically again. This cycle is carried out three times, after which the transmitter is switched off definitely if the fault has not been remedied.

An operator's console can be supplied as an optional extra.

Technical data

Frequency range 525–1605 kc/s

Frequency stability within ± 5 c/s with the built-in crystal oscillator

Carrier power output 50 kW

Output impedance 230 ohms unbalanced (50–75 ohms unbalanced on request)

Standing wave ratio max. 1:1.4

Spurious emission less than 50 mW, complying with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level adjustable between 0 and 20 dBm into 600 ohms for 100% modulation at 1000 c/s; 0 dBm = 1 mW into 600 ohms

Linear distortion flat within ± 1 dB between 30 and 10,000 c/s measured with reference to 60% modulation at 1000 c/s

Non-linear distortion less than 2% from 100 to 3,000 c/s, less than 3% from 30 to 10,000 c/s at modulation depths up to 90%.

Mechanical design

The type 8FZ 516 transmitter is housed in a nicely styled cabinet divided into identical compartments, with four doors at the front and back. The first door encloses the preliminary RF stages; these are separated from the RF power stages which occupy the compartment behind the next door. The last two compartments house the AF sections and the power supply equipment. This layout gives easy access to the various parts of the equipment and also facilitates the replacement of tubes.

To reduce the cost of installation to a minimum, the cabinet, though completely assembled in the factory, can be taken apart into sections which are then bolted together on the installation site.

The blower for cooling the power tubes can be installed at low cost either in a separate room on the ground floor or in a basement underneath the transmitter room.

Hum and noise level better than —60 dB unweighted and —70 dB weighted (CCIF curve) with reference to the level at 100% modulation depth

Carrier amplitude drop less than 5% for any modulation depth up to 95%

Max. depth of modulation 100%

Power supply 3 \times 380 V $\pm 5\%$, 50 or 60 c/s four-wire mains.

Power factor 0.9 (average)

Ambient temperature at sea level: +10° to +45°C; at 6000 feet: +10° to +35°C

Relative humidity up to 95%

Dimensions of transmitter cabinet:

height 235 cm (7'8")

width 500 cm (16'5")

depth 210 cm (6'10½")

Weight 12,000 kg (26,600 lb.), (unpacked)



PHILIPS

120 kW medium-wave broadcast transmitter type 8FZ 517

General

The new type 8FZ 517 air-cooled transmitter is designed for broadcasting services in the medium-wave band 525–1605 kc/s.

This economical transmitter is of compact design and pleasing appearance, combining high fidelity and performance with ease of operation.

It is suitable for continuous operation, and it is fully tropicalized.

Reliability in operation and high efficiency are achieved by the use of 'high-gain' tetrodes, reducing the number of stages and simplifying the supply and protective circuits.

Careful study has been given to the question of access to individual stages and supply units, with the result that tube replacement, etc. can be effected safely and rapidly.

All operating controls are fitted on the front panel, so that no separate control console is needed, although one can be supplied on special request.

Description

The transmitter is made up of an RF section (exciter stage—pre-stage—power stage), an AF section and a power supply section.

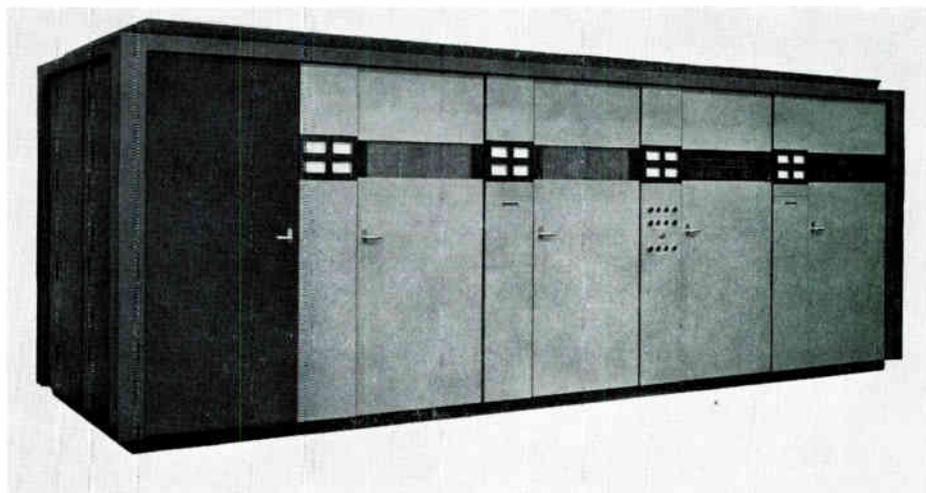
The exciter stage is composed of an exciter with a crystal oscillator unit which is followed by a separator stage and an amplifier stage.

The pre-stage comprises a two-stage amplifier, using two double tetrodes in the first stage and two forced-air cooled power tetrodes in the second.

The two amplifiers are tuned by means of a network. The 120 kW RF power stage employs two forced-air cooled triodes connected in parallel.

The AF section comprises four stages, viz. a two-stage input amplifier, a cathode-follower² driver and a modulator. A low-pass filter with a cut-off frequency of 10 kc/s and an input control are incorporated in the input circuit of the modulation amplifier. Feedback is applied from the modulator anodes to the grids of the input voltage amplifier via a frequency-independent network.

Power for the various sections is supplied by three DC



type 8FZ 517 broadcast transmitter



division Telecommunication
section Broadcasting
product 120 kW medium-wave
 broadcast transmitter
type 8FZ 517
pamphlet R-63-1130

Description (continued)

supplies, viz. main HT, auxiliary HT and grid bias, the last two of these being equipped with silicon diodes. Despite its high power, the transmitter is easily operated by means of three pairs of pushbuttons. Once these pushbuttons have been operated, the auxiliary circuits are all switched on automatically, the whole switching procedure being made visible on a mimic diagram.

All necessary controls and full metering facilities are built in. The automatic switching and safety systems give full protection in the event of mistakes in operation or failures. When failures or disturbances occur, the high tension is reduced to zero for a very short time and then switched on automatically again. This cycle is carried out three times, after which the transmitter is switched off definitely if the fault has not been remedied.

An operator console can be supplied as an optional extra.

Technical data

Frequency range 525–1605 kc/s

Frequency stability within ± 5 c/s with the built-in crystal oscillator.

Carrier power output 120 kW

Output impedance 230 ohms unbalanced (50–75 ohms unbalanced on request)

Standing wave ratio max. 1:1.4

Spurious emission less than 50 mW, complying with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level adjustable between 0 and 20 dBm into 600 ohms for 100% modulation at 1000 c/s; 0 dBm = 1 mW into 600 ohms.

Linear distortion flat within ± 1 dB between 30 and 10,000 c/s measured with reference to 60% modulation at 1000 c/s

Non-linear distortion less than 2% from 100 to 3,000 c/s; less than 3% from 50 to 10,000 c/s at modulation depths up to 90%. If required, less than 3% from 30 to 10,000 c/s.

Mechanical design

The type 8FZ 515 transmitter is housed in a nicely styled cabinet divided into identical compartments, with five doors at the front and back. The first door encloses the preliminary RF stages; these are separated from the RF power stages which occupy the space enclosed behind the next two doors. The last two compartments house the AF sections and the power supply equipment. This layout gives easy access to the various parts of the equipment and also facilitates the replacement of tubes.

To reduce the cost of installation to a minimum, the cabinet, though completely assembled in the factory, can be taken apart into sections which are then screwed together on the installation site.

The blower for cooling the power tubes can be installed at low cost either in a separate room on the ground floor or in a basement underneath the transmitter room.

Hum and noise level better than -60 dB unweighted and -70 dB weighted (CCIF curve) with reference to the level at 100% modulation depth

Carrier amplitude drop less than 5% for any modulation depth up to 95%

Max. modulation depth 100%

Power supply 3 \times 380 V $\pm 5\%$, 50 or 60 c/s four-wire mains. For the HT rectifier, taps on the HT transformer permit adjustments to $\pm 10\%$ and -15% to compensate for an average fluctuation exceeding $\pm 5\%$ of the nominal voltage

Power factor 0.9 (average)

Ambient temperature at sea level: $+10^\circ$ to $+45^\circ\text{C}$; at 2000 m (6600 ft.): $+10^\circ$ to $+35^\circ\text{C}$

Relative humidity up to 95%

Dimensions transmitter cabinet:

height 234.5 cm (7'8")

width 602 cm (19'9")

depth 210 cm (6'10½")

Weight 18.000 kg (40,000 lb.) unpacked



PHILIPS

5 kW AM short-wave broadcast transmitter type SOZ 362

channelized

General

This transmitter combines ease of control and maintenance with reliable operation, making it perfectly suitable for use in stations with nonspecialized staff. The installation is suited to unattended operation, having built-in facilities for remote control. The transmitter can be provided with up to 3 RF units. Each of these units is pre-tuned to a specific frequency in the 2.3–26.1 Mc/s band, so that a rapid change-over (within 1 second) from one frequency to another can be made by merely switching from one RF unit to another. These properties permit very efficient use to be made of the transmitter.

Description

The transmitter consists of a number of individual units, such as the power supply unit, the modulator unit and 1 to 3 RF units. Devices which protect the transmitter from damage caused by faulty switching manipulations, and the operating staff from dangerously high voltages, are fitted throughout the installation.

Each of the pre-set RF units is supplied with tuning elements for its specific frequency.

When a change-over to another frequency is made, the aerial relay may switch the aerial over automatically.

The fact that the transmitter consists of individual units makes it possible to take full advantage of the available space when it is installed.

Each RF unit has a built-in exciter unit which is intended for crystal control, although it is suitable for self-oscillation in case of emergency. It is also possible for an external oscillator to be used.

Both the frequency stability and the suppression of spurious radiation satisfy international standards.

The circuit of the modulator ensures excellent sound quality by the use of push-pull stages throughout and a special method of feedback.

Mechanical design

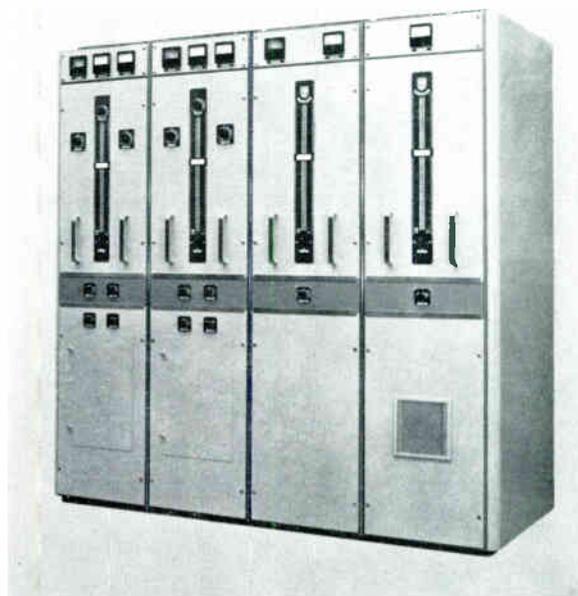
The essential units are housed in completely closed cabinets of standardized dimensions, finished in subdued colours, giving the transmitter a neat appearance.

The components in the modulator and RF cabinets are fitted on slide-out panels, so that easy access can be gained to them. The power supply unit has a door and removable panels.

The large individual components, such as the transformers, may be set up behind the transmitter or in a separate room (e.g. a cellar).

The transmitter is air-cooled by means of external ventilating fans. The air ducts are supplied separately

5 kW amplitude-modulated short-wave broadcast transmitter SOZ 362, suitable for 2 frequencies in the 2.3–26.1 Mc/s band



division Telecommunication
section Broadcasting
product 5 kW AM SW broadcast transmitter
type SOZ 362
pamphlet R-63.1106

Mechanical design (continued)

and consequently the cooling plant can be adapted to local circumstances. Warm air exhausted from the transmitter may be employed to heat the transmitter room.

All components are suitable for use in tropical climates, the transmitter proper being equipped with an anti-condensation drying system.

Technical data

Frequency range 2.3–26.1 Mc/s in 7 sub-ranges

Frequency tolerance

$\pm 20 \cdot 10^{-6}$ (2.3–4 Mc/s);

$\pm 15 \cdot 10^{-6}$ (4–26.1 Mc/s)

Power output 5 kW (carrier)

Output impedance 600 ohms balanced; 50 or 75 ohms unbalanced, on special request

Standing wave ratio max. 1.4:1

Spurious emissions comply with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level 0 dBm ± 2 dB, reference 1000 c/s at 100% modulation; 0 dBm = 1 mW into 600 ohms

Linear distortion within ± 1.5 dB from 30 to 10,000 c/s, reference 1000 c/s at 60% modulation

Non-linear distortion less than 3% from 50 to 10,000 c/s at 90% modulation

Noise level better than -60 dB unweighted, reference 1000 c/s at 100% modulation

Modulation capability 100% instantaneously, 60% (average mod. level) continuously, in the modulating frequency range of 30–10,000 c/s

Power supply 3 \times 380V $\pm 5\%$, 50 and 60 c/s $\pm 5\%$, four-wire mains; adaptation to other voltages by means of an optional separate auto-transformer

Power consumption transmitter with 1 RF unit:

at 0% modulation approx. 11 kW;

at 30% modulation approx. 13 kW;

at 100% modulation approx. 16 kW;

at stand-by approx. 2.5 kW

Power consumption per additional RF unit:

at stand-by approx. 1 kW

A detailed assembly and maintenance manual is supplied with the transmitter. Like the inscriptions on the latter, this manual is normally in English, but other languages (e.g. Spanish) are available on request. Also supplied are certain spares, such as pilot lamps and fuses, as well as some enamel for touching-up purposes.

Power factor approx. 0.82

Ambient temperature

at sea level: $+10^\circ$ to $+45^\circ$ C under tropical conditions; at 6000 ft: $+10^\circ$ to $+35^\circ$ C

Relative humidity up to 95%

Dimensions (approx.) transmitter with 1 RF unit: height 212 cm (84 in.), width 152 cm (60 in.), depth 90 cm (36 in.)

Minimum floorspace 300 \times 350 cm (120 \times 140 in.)

Weight (approx.) transmitter with 1 RF unit: 2100 kg (4620 lb.) unpacked

Tube complement transmitter with 1 RF unit:

Philips type * CV number * USA type

Exitron unit SFE 133

1 \times EF91 138 6AM6

1 \times QQE06/40 2797 5894

1 \times E80L – 6227

1 \times OA2 1832 OA2

RF unit SFE 287

2 \times QQE06/40 2797 5894

2 \times QBL5/3500 – 6076

Modulator unit SFV 169

6 \times QE06/50 124 807

2 \times QBL5/3500 – 6076

Power supply unit SFD 167

8 \times DCG4/1000G 32 866A

3 \times DCG5/5000GB 642 872A



PHILIPS

10 kW AM short-wave broadcast transmitter type SOZ 363

channelized

General

This air-cooled transmitter embodies a number of properties which render it particularly suitable for use in broadcast stations where nonspecialized staff are employed.

The transmitter is easily installed without special tools or special knowledge. Because it consists of individual units, full advantage can be taken of the available space. The transmitter is easy to control and tune and is suitable for unattended operation. Facilities for remote control are included.

Maintenance requires no special training, while doors and slide-out panels give easy access to all components. Extensive precautions throughout the transmitter protect it from damage by faulty switching manipulations, and the operating staff from dangerously high voltages.

Description

The transmitter consists of a number of individual units, viz. a modulator unit, a power supply unit, up to 5 RF units and a few large component parts, such as transformers and ventilating fans.

Each of the RF units can be pre-set to a specific frequency in the 2.3–26.1 Mc/s band and is supplied with tuning elements for that frequency. In this way, a change-over from one RF unit to another can be made within one second, thus permitting a rapid change in frequency.

Aerials may be switched over automatically at the same time by means of a built-in aerial relay. These provisions render it possible to make a highly efficient use of the transmitter.

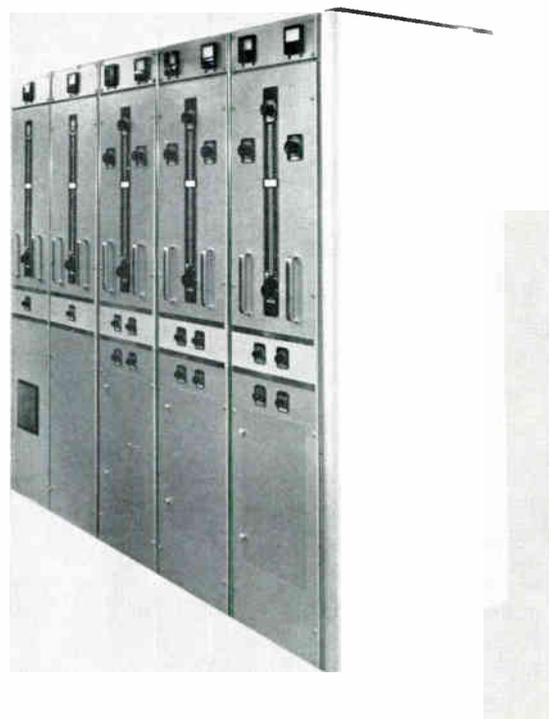
The transmitter satisfies international standards. It has been used in many countries all over the world for years and has always given complete satisfaction. Frequency stability is enhanced by a crystal-controlled exciter unit. This unit is also suitable for self-oscillation in case of emergency. The use of an external oscillator is also possible.

The modulator consists of push-pull circuits throughout and, because of its special feedback circuit, excellent sound reproduction is ensured.

Mechanical design

The modulator, power supply and RF units are housed in individual all-metal cabinets of pleasing design. The controls and meters are conveniently arranged. The modulator and RF units are fitted on slide-out panels.

10 kW amplitude-modulated short-wave broadcast transmitter SOZ 363, equipped for 3 frequencies in the 2.3–26.1 Mc/s band



division Telecommunication
section Broadcasting
product 10 kW AM SW broadcast transmitter
 type SOZ 363
pamphlet R-63.1107

Mechanical design (continued)

The large components, such as the modulation and high-tension transformers, may be set up behind the transmitter proper or installed in a separate room (e.g. a cellar).

The ventilating fans for the air-cooling of the transmitter may be arranged in various ways, so that the cooling system can be adapted to local circumstances. The carefully selected components make

the transmitter suitable for use in tropical climates. A detailed assembly and maintenance manual is supplied with the transmitter. Like the inscriptions on the latter, this manual is normally in English, but other languages (e.g. Spanish) are available on request. Also supplied are certain spares, such as pilot lamps and fuses, as well as some enamel for touching-up purposes.

Technical data

Frequency range 2.3–26.1 Mc/s in 7 sub-ranges

Frequency tolerance

$\pm 20.10^{-6}$ (2.3–4 Mc/s);

$\pm 15.10^{-6}$ (4–26.1 Mc/s)

Power output 10 kW (carrier)

Output impedance 600 ohms balanced; 50 or 75 ohms unbalanced, on special request

Standing wave ratio max. 1.4:1

Spurious emissions comply with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level 0 dBm ± 2 dB, reference 1000 c/s at 100% modulation; 0 dBm = 1 mW into 600 ohms

Linear distortion within ± 1.5 dB from 30 to 10,000 c/s, reference 1000 c/s at 60% modulation

Non-linear distortion less than 3% from 50 to 10,000 c/s at 90% modulation

Noise level better than -60 dB unweighted, reference 1000 c/s at 100% modulation

Modulation capability 100% instantaneously; 60% (average mod. level) continuously in the modulating frequency range of 30–10,000 c/s

Power supply 3 \times 380V $\pm 5\%$, 50 and 60 c/s $\pm 5\%$, four-wire mains; adaptation to other voltages by means of an optional separate autotransformer

Power consumption transmitter with 1 RF unit:

at 0% modulation approx. 21 kW;

at 30% modulation approx. 24 kW;

at 100% modulation approx. 30 kW;

at stand-by 4 kW

Power consumption per additional RF unit:

at stand-by approx. 1.7 kW

Power factor approx. 0.82

Ambient temperature

at sea level: $+10^{\circ}$ to $+45^{\circ}$ C under tropical conditions; at 6000 ft: $+10^{\circ}$ to $+35^{\circ}$ C

Relative humidity up to 95%

Dimensions (approx.) transmitter with 1 RF unit: height 212 cm (84 in.), width 152 cm (60 in.), depth 90 cm (36 in.)

Minimum floorspace 300 \times 350 cm (120 \times 140 in.)

Weight (approx.) transmitter with 1 RF unit: 2500 kg (5500 lb.) unpacked

Tube complement transmitter with 1 RF unit:

Philips type * CV number * USA type

Exciter unit SFE 133

1 \times EF91 138 6AM6

1 \times QQE06/40 2797 5894

1 \times E80L – 6227

1 \times OA2 1832 OA2

RF unit SFE 288

4 \times QQE06/40 2797 5894

4 \times QBL5/3500 – 6076

Modulator unit SFV 170

8 \times QE06/50 124 807

4 \times QBL5/3500 – 6076

Power supply unit SFD 168

8 \times DCG4/1000G 32 866A

3 \times DCG6/18 – 6693



PHILIPS

10 kW AM short-wave broadcast transmitter type 8FZ 701

continuous tuning

General

The type 8FZ 701 continuously tunable short-wave transmitter is a versatile and simple station for broadcasting in the 2.3–26.1 Mc/s band. Installation, operation, and maintenance can all be carried out by unskilled staff.

The transmitter is forced-air cooled and works reliably—also when continuously operated—in extremely varied climatic conditions, including tropical.

Description

The transmitter is made up of three units and a number of separate elements. The units are: the RF stages, the modulator and the power supply section. The separate elements include the mains and modulation transformers and the blowers.

The RF unit houses the driver stage, which is a self-contained but built-in unit, an intermediate stage and the output stage. The driver stage includes a crystal oscillator and a choice of up to 10 crystal-controlled frequencies is possible. Alternatively, a continuously tunable VFO can be incorporated optionally.

The various stages are continuously tunable and the entire frequency range is divided into a number of switch-selected sub-ranges.

All tuning buttons are on the front panel, which greatly simplifies tuning. Remote control is also possible.

The circuits used in the second, i.e. the modulator unit, ensure that modulation distortion is very slight over a wide frequency spectrum.

The third unit comprises the power supply equipment for both the modulator and the RF unit.

Meters required for checking the working of the transmitter are built in.

Safety devices are fitted at important points as a safeguard against overloading and to protect the operating and maintenance staff.

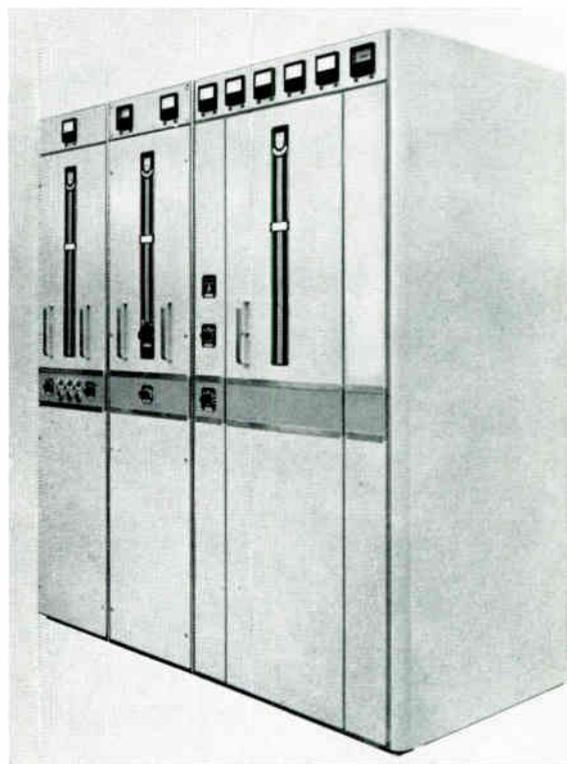
Mechanical design

The three main units are housed in individual cabinets which give the transmitter an attractive appearance.

The RF unit and power supply unit have a door on the front. The modulator is constructed on a slide-out panel.

As a rule the separate transformers, etc. are placed behind the transmitter, but they may also be set up elsewhere, e.g. in a basement.

Two blowers, one for the RF unit and one for the modulator, provide the necessary cooling. They too are placed behind the transmitter.



division	Telecommunication
section	Broadcasting
product	10 kW AM short-wave broadcast transmitter (continuous tuning)
type	8FZ 701
pamphlet	R-63.1115

Mechanical design (continued)

Only tropicalized parts and materials are used in this transmitter, and tubes and components are conservatively rated.

Detailed manuals contain all the instructions needed for installation, maintenance and operation.

Technical data

Frequency range 2.3–26.1 Mc/s, continuously tunable

Frequency selection one of up to ten crystal-controlled frequencies

Frequency tolerance $\pm 20 \cdot 10^{-6}$ (2.3–4 Mc/s); $\pm 15 \cdot 10^{-6}$ (4–26.1 Mc/s)

Power output 10 kW (carrier)

Output impedance 600 ohms balanced

Standing wave ratio max. 1.4:1

Spurious emissions according to Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level 0 dBm ± 2 dB, reference 1000 c/s at 100% modulation; 0 dBm = 1 mW into 600 ohms

Linear distortion within ± 1 dB from 30–10,000 c/s, reference 1000 c/s at 60% modulation

Non-linear distortion less than 3% from 50–10,000 c/s at 90% modulation

Noise level better than -60 dB, unweighted; reference 1000 c/s at 100% modulation

Modulation capability 100% instantaneously; 60% (average mod. level) continuously on the modulating frequency range of 30–10,000 c/s

Power supply 3×380 V $\pm 5\%$, 50 and 60 c/s $\pm 5\%$, four-wire mains; adaptation to other voltages by means of an optional separate auto-transformer

Assembly is extremely simple and can be effected without a need for special tools or highly skilled staff. Transmitter name-plates and instruction manuals are normally supplied in English. Other languages (e.g. Spanish) are available on request.

Power consumption

at 0% modulation approx. 21 kW

at 30% modulation approx. 24 kW

at 100% modulation approx. 30 kW

Power factor approx. 0.82

Ambient temperature at sea level: $+10^\circ$ to $+45^\circ$ C under tropical conditions; at 6000 ft: $+10^\circ$ to 35° C

Relative humidity up to 95%

Dimensions transmitter proper: height 212 cm (84 in.); width 202 cm (80 in.); depth 90 cm (36 in.)

Minimum floorspace 450×280 cm (15×9 ft)

Weight approx. 2500 kg (5500 lb.) unpacked

Tube complement

Philips type	*	CV number	*	USA type
4 \times E80L		–		6227
1 \times OA2		1832		OA2
5 \times QQE06/40		2797		5894
8 \times QBL5/3500		–		6076
8 \times QE06/50		124		807
8 \times DCG4/1000G		32		866A
3 \times DCC6/18		–		6693



PHILIPS

25 kW AM short-wave broadcast transmitter type 8FZ 510

channelized

General

This powerful short-wave (2.3–26.1 Mc/s) broadcast transmitter can be quickly adapted to changing conditions owing to the ease with which another frequency can be chosen.

The fact that the drive units are channelized makes this possible: up to three separate drive units are available, each of which can be tuned in advance to any desired frequency. A simple switch-over connects the drive unit selected to the 25 kW output stage which can then be tuned to the appropriate working frequency inside a few minutes.

Description

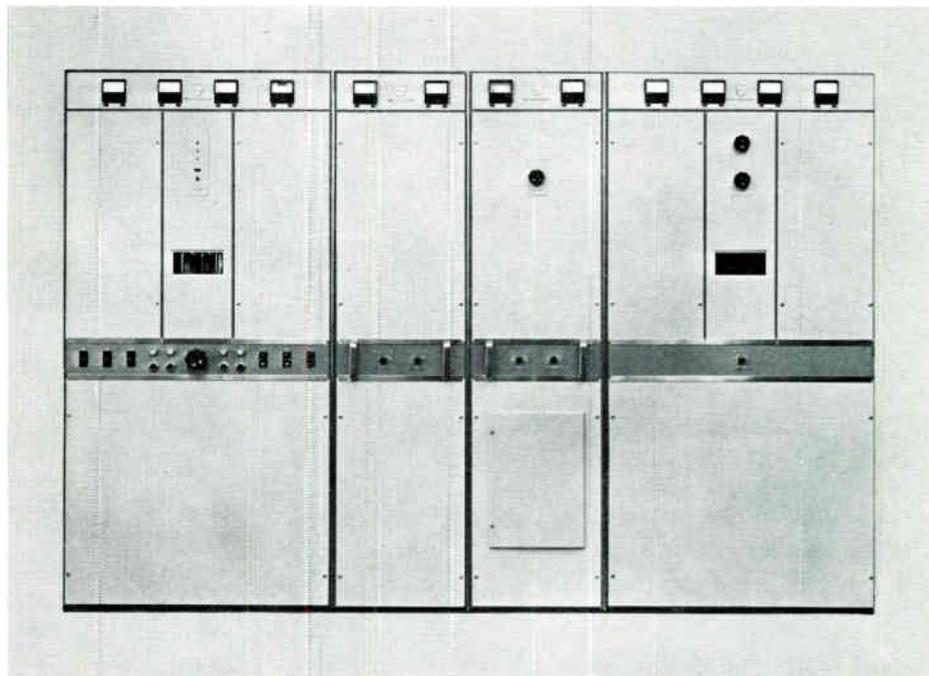
The transmitter comprises 6 cabinets: a power supply, a modulator, up to 3 drivers and an output stage. The drive units each include a crystal-controlled

oscillator, the crystal being enclosed in an oven to ensure the required frequency stability in all circumstances. These drive units are supplied with plug-in coils for the frequency range specified.

The output stage is continuously tunable and can be easily adjusted to the required frequency.

Only push-pull stages are used in the modulator and a specially designed negative feedback circuit helps to ensure an extremely high modulation quality.

The use of modern air-cooled transmitting tubes results in great efficiency. This and the fact that operation is simple, being restricted to a few manipulations, make the 8FZ 510 very economic to run. The little maintenance required can be effected quickly, for doors and extending panels give easy access to all components.



type 8FZ 510 broadcast transmitter comprising from left to right: power supply, modulator, driver and output stage



division Telecommunication
section Broadcasting
product 25 kW AM short-wave broadcast
 transmitter (channelized)
type 8FZ 510
pamphlet R-63.1116

Description (continued)

The transmitter is equipped with an extensive safety and protection system, including a quick-trip circuit which cuts off the high tension for very short periods in the event of faults of short duration. The staff are also protected from the dangers of HT by door switches, etc.

Mechanical design

The 6 sheet-steel cabinets form a harmonious whole. Separate parts such as the HT transformer, HT smoothing filter, modulation transformer and choke,

and ventilating fans can be set up behind the transmitter in a space enclosed in dummy panels harmonizing with the transmitter proper. Installation in a separate room, e.g. a cellar, is also possible.

The transmitter is fully tropicalized and the components and tubes are conservatively rated.

The detailed manuals provided give all the information needed for installation. No special tools or highly skilled labour are required. Transmitter nameplates and instruction manuals are normally supplied in English. Other languages (e.g. Spanish) are available on request.

Technical data

Frequency range 2.3–26.1 Mc/s

Frequency selection one of three spot frequencies within 4 minutes

Frequency tolerance $\pm 20 \cdot 10^{-6}$ (2.3–4 Mc/s); $\pm 15 \cdot 10^{-6}$ (4–26.1 Mc/s)

Power output 25 kW (carrier)

Output impedance 600 ohms balanced

Standing wave ratio max. 1.4:1

Spurious emissions comply with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level adjustable between +5 and 0 dBm ± 2 dB, reference 1000 c/s at 100% modulation; 0 dBm = 1 mW into 600 ohms

Linear distortion within ± 1 dB from 30 to 10,000 c/s, reference 1000 c/s at 60% modulation

Non-linear distortion less than 3% from 50 to 10,000 c/s at 90% modulation

Noise level –60 dB, unweighted; reference 1000 c/s at 100% modulation

Modulation capability 100% instantaneously, 60% (average mod. level) continuously in the modulating frequency range of 30–10,000 c/s

Power supply 3 \times 380 V $\pm 5\%$, 50 or 60 c/s $\pm 5\%$; four-wire mains (adaptation to other voltages by means of an optional separate auto-transformer)

Power consumption

at 0% modulation approx. 50 kW

at 30% modulation approx. 56 kW

at 100% modulation approx. 80 kW

Power factor approx. 0.82

Ambient temperature at sea level: +10° to +45° C under tropical conditions; at 6000 ft: +10° to +35° C

Relative humidity up to 95%

Dimensions

3 pre-stages (overall) + modulator: height 212 cm (84 in.); width 204 cm (80 in.); depth 90 cm (36 in.); final stage: height 212 cm (84 in.); width 102 cm (40 in.); depth 90 cm (36 in.);

power supply: height 212 cm (84 in.); width 102 cm (40 in.); depth 90 cm (36 in.)

Minimum floorspace 450 \times 450 cm (15 \times 15 ft)

Weight approx. 8000 kg (17,600 lb.) unpacked

Tube complement transmitter with 3 drive units

Philips type	* CV number	* USA type
3 \times EF91	138	6AM6
3 \times E80L	–	6227
9 \times QQE06/40	2797	5894
3 \times OA2	1832	OA2
6 \times QBL5/3500	–	6076
8 \times TBL7/8000	–	6961
4 \times QE06/50	124	807
6 \times QE08/200	–	–
3 \times DCG7/100	–	–
6 \times DCG5/5000GB	642	872A



PHILIPS

25 kW AM short-wave broadcast transmitter type 8FZ 513

continuous tuning

General

In short-wave broadcasting stations a need frequently exists for a powerful transmitter which can be tuned rapidly to any frequency in the 2.3–26.1 Mc/s band. This modern 25 kW air-cooled transmitter fills the bill and does so economically.

Description

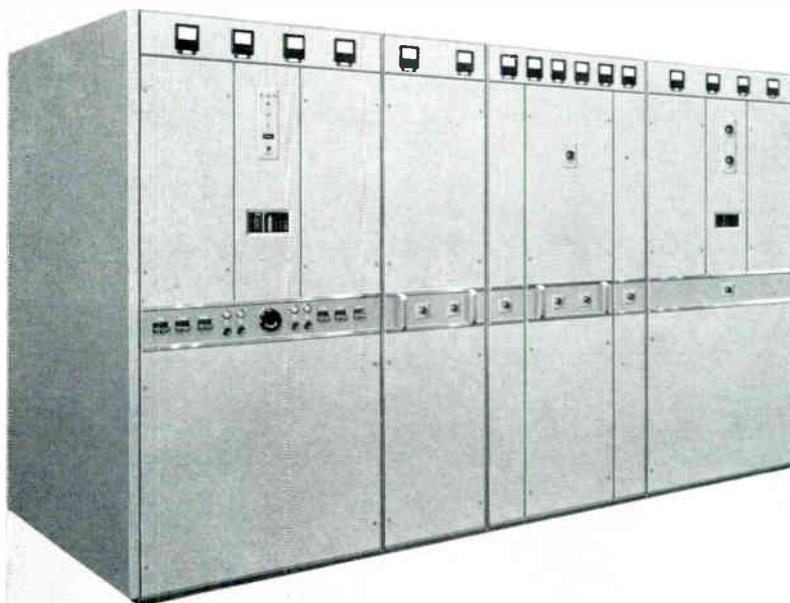
The transmitter consists of 4 cabinets housing: the driver stage — the output stage — the modulator — the power supply unit. The driver comprises a crystal-controlled exciter unit, while a special continuously tunable exciter unit is also available as an optional extra. With either of these exciters the transmitter fully meets international requirements as to frequency stability. If the tuning tables supplied are used, the

transmitter can be fully tuned by hand to any desired frequency inside four minutes.

All the modulator stages are connected in push-pull, which, together with the negative feedback employed, ensures excellent modulation characteristics.

The power supply unit comprises only 3 rectifiers, so that a simple and effective protection system is possible. This system also includes a quick-trip circuit which switches off the HT for several seconds in the event of faults or disturbances of short duration. The system simultaneously ensures great reliability and renders operation extremely simple.

Modern air-cooled transmitting tubes give great electrical efficiency. This combination of excellent characteristics results in low running and maintenance costs.



type 8FZ 513 broadcast equipment comprising from left to right: power supply, modulator, driver and final stage



division **Telecommunication**
section **Broadcasting**
product **25 kW AM short-wave broadcast transmitter (continuous tuning)**
type **8FZ 513**
pamphlet **R-63.1117**

Mechanical design

The four cabinets have doors which, in the case of the modulator and drive unit, conceal pull-out panels. Separate HT components such as mains and modulation transformers, etc. are arranged behind the transmitter or, if desired, in another room. In either case they can be placed in an enclosure composed of dummy panels harmonizing with the transmitter.

There are three separate fans for cooling the driver stage, the modulator and the output stage. The cooling air is filtered at the intake and the exhaust air can, if desired, be taken to an outlet outside the building.

Technical data

Frequency range 2.3–26.1 Mc/s, continuously tunable

Frequency selection one of up to ten crystal-controlled frequencies

Frequency tolerance $\pm 20.10^{-6}$ (2.3–4 Mc/s); $\pm 15.10^{-6}$ (4–26.1 Mc/s)

Power output 25 kW (carrier)

Output impedance 600 ohms balanced

Standing wave ratio max. 1.4:1

Spurious emissions comply with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level adjustable between +5 and 0 dBm ± 2 dB, reference 1000 c/s at 100% modulation (0 dBm = 1 mW into 600 ohms)

Linear distortion within ± 1 dB from 30 to 10,000 c/s, reference 1000 c/s at 60% modulation

Non-linear distortion less than 3% from 50 to 10,000 c/s at 90% modulation

Noise level –60 dB, unweighted; reference 1000 c/s at 100% modulation

Modulation capability 100% instantaneously; 60% (average mod. level) continuously in the modulating frequency range of 30–10,000 c/s

Power supply 3 \times 380 V $\pm 5\%$, 50 or 60 c/s $\pm 5\%$; four-wire mains (adaptation to other voltages by means of an optional separate auto-transformer)

Power consumption

at 0% modulation approx. 50 kW

Logical lay-out of components and sufficient doors make for a high degree of serviceability. All necessary precautions have been taken against HT hazards. The cooling system and the carefully chosen components make the transmitter suitable for the tropics.

Detailed manuals give full instructions as to installation, operation and maintenance of the transmitter. Installation is very simple and no special tools or highly skilled labour are necessary.

Transmitter name-plates and instruction manuals are normally supplied in English. Other languages (e.g. Spanish) are available on request.

at 30% modulation approx. 56 kW

at 100% modulation approx. 80 kW

Power factor approx. 0.82

Ambient temperature at sea level: +10° to +45° C under tropical conditions; at 6000 ft: +10° to +35° C

Relative humidity up to 95%

Dimensions

driver + modulator: height 212 cm (84 in.); width 142 cm (56 in.); depth 90 cm (36 in.);

final stage: height 212 cm (84 in.); width 102 cm (40 in.); depth 90 cm (36 in.);

power supply: height 212 cm (84 in.); width 102 cm (40 in.); depth 90 cm (36 in.)

Minimum floorspace 450 \times 420 cm (15 \times 14 ft)

Weight approx. 8000 kg (17,600 lb.) unpacked

Tube complement

Philips type	*	CV number	*	USA type
4 \times E80L		–		6227
1 \times OA2		1832		OA2
3 \times QQE06/40		2797		5894
2 \times QBL5/3500		–		6076
8 \times TBL7/8000		–		6961
4 \times QE06/50		124		807
6 \times QE08/200		–		–
3 \times DCG7/100		–		–
6 \times DCG5/5000GB		642		872A

Data subject to alteration without notice

Printed in The Netherlands

R-63.1117



PHILIPS

50 kW AM short-wave broadcast transmitter type 8FZ 514

General

This new powerful broadcast transmitter embodies the latest developments in engineering and styling and combines excellent qualities with an attractive appearance.

It permits continuous tuning in the 3.2–26.1 Mc/s broadcasting bands. A built-in crystal oscillator offers a choice of 10 crystal-controlled frequencies. (A variable-frequency oscillator (VFO) can be incorporated if required.)

The operating costs are lower owing to the overall efficiency, which has been raised to a maximum and the number of tubes and tube types, which has been minimized (low running costs and only three DC supplies).

The transmitter is suitable for continuous operation and it is fully tropicalized. Other technical requirements such as audio response, distortion figures, dependability, and stability of the power stage satisfy the highest requirements.

Extensive safety devices are incorporated to protect staff and equipment from the dangers of HT and overloads.

Description

The transmitter is made up of an RF section (exciter stage—pre-stage—power stage), an AF section and a power supply section.

The exciter stage comprises a crystal oscillator and three broadband amplifiers. The crystal oscillator offers a choice of 10 switch-selected crystals. The three amplifiers operate either as straight amplifiers or as frequency doublers, depending on the frequency selected.

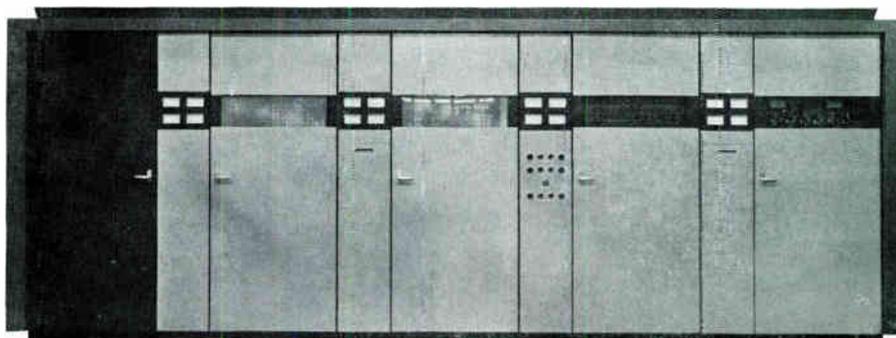
The pre-stage comprises three amplifiers, each of which has balanced grid and anode circuits permitting continuous tuning.

The power stage is designed on a push-pull basis and makes use of grounded-grid operation.

The AF section comprises four balanced amplifier stages; the AF input signal enters the first amplifier stage via an input control and a 10 kc/s low-pass filter.

Negative feedback is applied from the modulator anodes to the grids of the input amplifier tubes by means of a frequency-independent network.

Power for the various sections is supplied by a



type 8FZ 514 broadcast transmitter



division	Telecommunication
sectio	Broadcasting
product	50 kW AM short-wave broadcast transmitter
type	8FZ 514
pamphlet	R-63.1127

Description (continued)

three-phase grid bias rectifier (-300V), a three-phase rectifier ($+800\text{ V}$) and an HT rectifier ($10/5\text{ kV}$). Despite its high power, the transmitter is easily operated by means of three pairs of pushbuttons as the front. Once these pushbuttons have been operated, the auxiliary circuits are all switched on automatically, the whole switching procedure being made visible on a mimic diagram. All necessary controls and full-metering facilities are built-in.

The automatic switching and safety systems give full protection in the event of mistakes in operation or failures. When failures or disturbances occur, the high tension is reduced to zero for a very short time and then switched on automatically again. This cycle is carried out three times, after which the transmitter is switched off definitely if the fault has not been remedied.

An operator's console can be supplied as an optional extra.

Technical data

Frequency range any frequency in the 3.2–26.1 Mc/s broadcast bands

Frequency stability better than $15 \cdot 10^{-6}$ with built-in crystal oscillator, complying with Radio Regulations, Geneva 1959

Frequency selection one of up to ten crystal-controlled frequencies

Carrier power output 50 kW

Output impedance 320 ohms balanced

Standing wave ratio max. 1 : 1.4

Spurious emission less than 50 mW, complying with Radio Regulations, Geneva 1959

Frequency selection one of up to ten crystal-controlled frequencies

AF input impedance approx. 600 ohms balanced

AF input level Adjustable between 0 dBm and +20 dBm at 100% modulation (1000 c/s); 0 dBm = 1 mW into 600 ohms

Linear distortion flat within $\pm 1\text{ dB}$ between 30 and 10,000 c/s with reference to 1000 c/s at 60% modulation

Mechanical design

The type 8FZ 514 transmitter is housed in a nicely styled cabinet divided into identical compartments, with five doors at the front and back. The first door encloses the preliminary RF stages; these are separated from the RF power stages which occupy the space enclosed behind the next two doors. The last two compartments house the AF sections and the power supply equipment.

This layout gives easy access to the various parts of the equipment and also facilitates the replacement of tubes.

To reduce the cost of installation to a minimum, the cabinet, though completely assembled in the factory, can be taken apart into sections which are then bolted together on the installation site.

The blower for cooling the power tubes can be installed at low cost either in a separate room on the ground floor or in a basement under the transmitter room.

Non-linear distortion less than 2% from 100 to 3000 c/s; less than 3% from 50 to 10,000 c/s at modulation depths up to 90%. If desired, 3% from 30 to 10,000 c/s

Hum noise level less than -60 dB ; weighted value less than -70 dB (CCIF curve) referred to level for 100% modulation

Carrier amplitude drop less than 5% up to a maximum modulation depth of 95%

Max. depth of modulation 100%

Power supply $3 \times 380\text{ V} \pm 5\%$ with neutral, 50 or 60 c/s $\pm 2\%$.

Power factor 0.9 average

Ambient temperature at sea level: $+10^\circ\text{ C}$ to $+45^\circ\text{ C}$; at 2000 m (6600 ft.): $+10^\circ\text{ C}$ to $+35^\circ\text{ C}$

Relative humidity max. 95%

Dimensions (transmitter cabinet)

height 235 cm (7'8")

width 602 cm (19'9")

depth 210 cm (6'10½")

Weight 14,000 kg (30,000 lb.) unpacked



PHILIPS

120 kW AM short-wave broadcast transmitter type 8FZ 515

General

The new powerful type 8FZ 515 broadcast transmitter embodies the latest developments in engineering and styling. It combines excellent qualities with an attractive appearance.

It permits continuous tuning in the 3.2–26.1 Mc/s broadcasting bands. A built-in crystal oscillator offers a choice of 10 crystal-controlled frequencies. (A variable-frequency oscillator (VFO) can be incorporated if required.)

The operating costs are lower owing to the overall efficiency, which has been raised to a maximum, and the number of tubes and tube types, which has been minimized (low running costs and only three DC supplies). The transmitter is suitable for continuous operation and it is fully tropicalized. Other technical requirements as audio response, distortion figures, dependability, and stability of the power stage satisfy the highest requirements.

Extensive safety devices are incorporated to protect staff and equipment from the dangers of HT and overloads.

Description

The transmitter is made up of an RF section (exciter stage—pre-stage—power stage), an AF section and a power supply section.

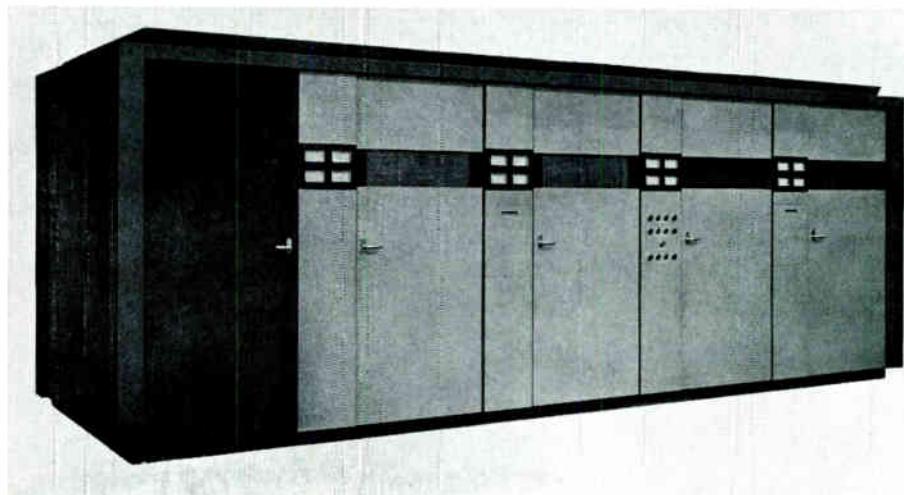
The exciter stage comprises a crystal oscillator and three broadband amplifiers. The crystal oscillator offers a choice of 10 switch-selected crystals. The three amplifiers operate either as straight amplifiers or as frequency-doublers, depending on the frequency selected.

The pre-stage comprises three amplifiers each of which has balanced grid and anode circuits permitting continuous tuning.

The power stage is designed on a push-pull basis and makes use of grounded-grid operation.

The AF section comprises four balanced amplifier stages; the AF input signal enters the first amplifier stage via an input control and a 10 kc/s low-pass filter. Negative feedback is applied from the modulator anodes to the grids of the input amplifier tubes by means of a frequency-independent network.

Power for the various sections is supplied by a



type 8FZ 515 broadcast transmitter



division **Telecommunication**
section **Broadcasting**
product **120 kW AM short-wave
broadcast transmitter**
type **8FZ 515**
pamphlet **R-63.1128**

Description (continued)

three-phase grid bias rectifier (—300 V), a three-phase rectifier (+800 V) and an HT rectifier (11/5.5 V) Despite its high power the transmitter is easily operated by means of three pairs of pushbuttons at the front. Once these pushbuttons have been operated, the auxiliary circuits are all switched on automatically, the whole switching procedure being made visible on a mimic diagram. All necessary controls and full metering facilities are built in.

The automatic switching and safety systems give full protection in the event of mistakes in operation or failures. When failures or disturbances of short duration occur the high tension is reduced to zero for a very short time and then switched on automatically again. This cycle is carried out three times, after which the transmitter is switched off definitely if the fault has not been remedied.

An operator console can be supplied optionally.

Technical data

Frequency range any frequ. in the 3.2–26.1 Mc/s broadcast bands

Frequency stability better than $15 \cdot 10^{-6}$ with built-in crystal oscillator, complying with Radio Regulations, Geneva 1959

Frequency selection one of up to ten crystal-controlled frequencies

Carrier power output 120 kW

Output impedance 320 ohms balanced

Standing wave ratio max. 1 : 1.4

Spurious emission less than 50 mW, complying with Radio Regulations, Geneva 1959

AF input impedance approx. 600 ohms balanced

AF input level adjustable between 0 dBm and +20 dBm at 100% modulation (1000 c/s); 0 dBm = 1 mW into 600 ohms

Linear distortion flat within ± 1 dB between 30 and 10,000 c/s with reference to 1000 c/s at 60% modulation

Non-linear distortion less than 2% from 100 to 3000 c/s; less than 3% from 50 to 10,000 c/s at modulation

Mechanical design

The type 8FZ 515 transmitter is housed in a nicely styled cabinet divided into identical compartments, with five doors at the front and back. The first door encloses the preliminary RF stages; these are separated from the RF power stages which occupy the space enclosed behind the next two doors. The last two compartments house the AF sections and the power supply equipment. This layout gives easy access to the various parts of the equipment and also facilitates the replacement of tubes.

To reduce the cost of installation to a minimum, the cabinet, though completely assembled in the factory, can be taken apart into sections which are then bolted together on the installation site.

The blower for cooling the power tubes can be installed at low cost either in a separate room on the ground floor or in a basement under the transmitter room.

depths up to 90%. If desired, 3% from 30 to 10,000 c/s

Hum noise level less than —60 dB; weighted value less than —70 dB (CCIF curve) referred to level for 100% modulation

Carrier amplitude drop less than 5% up to a maximum modulation depth of 95%

Max. depth of modulation 100%

Power supply 3 \times 380 V \pm 5% with neutral, 50 or 60 c/s \pm 2%. For the HT rectifier, taps on the HT transformer allow adjustments from +10% to —15% to compensate for an average deviation from the nominal voltage variations

Power factor 0.9 average

Ambient temperature at sea level: +10° C to +45° C; at 2000m (6600 ft.): +10° C to +35° C

Relative humidity max. 95%

Dimensions of transmitter cabinet:

height 235 cm (7'8")

width 602 cm (19'9")

depth 210 cm (6'10½")

Weight 20,000 kg (44,000 lb) unpacked



PHILIPS

Studio-transmitter link equipment 10 W - type 8FZ 505; 50 W - type SFZ 364

single versions

General

Geographical and economic considerations frequently make it necessary to employ radio links instead of cables or open-wire lines to convey programmes from the studio to the transmitter. To fill this need Philips manufacture 10 and 50 W FM-VHF radio-link transmitters which satisfy very exacting specifications and provide the required degree of reliability.

The transmitters are composed of standard FM broadcasting units and offer the same excellent features of sound quality and stability.

Apart from their normal use as studio-transmitter links, these installations are also ideal for use as low-power broadcast transmitters in shaded areas, isolated centres of population, etc.

Description

The 10 W version, type 8FZ 505, consists of a type SFE 262 exciter unit and a suitable power supply panel mounted together in a standard 19-in. cabinet. The exciter incorporates a specially designed circuit which ensures a high degree of frequency stability and keeps the distortion percentage extremely low. Frequency stability is obtained by controlling the carrier with a crystal frequency. Meters are incorporated in all the main circuits so that a complete check on operation is possible. A VU-meter is fitted to a separate panel.

Operation of the transmitter is very simple and, if desired, a remote-control panel can be supplied.

The 50 W version, type SFZ 364, is similar to the 10 W, except that it has a 50 W final stage connected to the output of the exciter and is provided with a larger supply unit.

The output stage has only one tube, a double tetrode with its halves connected in push-pull. The tube is protected against power failure. Two built-in meters permit supervision of this stage when in service.

Only dry-plate rectifiers are used, which ensure long life.

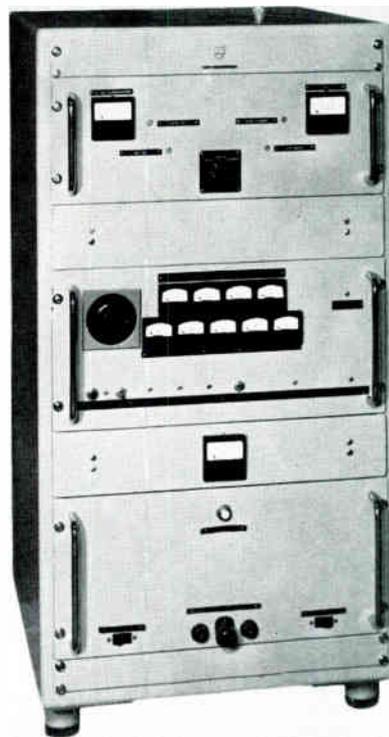
Mechanical design

Their relatively small dimensions enable the transmitters to be set up in any convenient position.

Installation is a very simple matter: operation can start once the aerial cable and the mains cable have been connected to the transmitters.

Detailed instruction manuals are supplied with the transmitters. These manuals and the name-plates are normally in English but can be supplied in other languages (e.g. Spanish) on special request.

50 W FM link transmitter type SFZ 364



division Telecommunication
section Broadcasting
product Studio-transmitter link equipment
types 8FZ 505 (10 W); SFZ 364 (50 W)
pamphlet R-63.1111

Mechanical design (continued)

The transmitters are fully tropic-proof and the components are to a great extent conservatively rated, thus ensuring reliable operation in severe climatic conditions.

Note: Companion receivers and aerials also available.

Technical data

Frequency range 87.5–108 Mc/s

RF output power

10 W — type 8FZ 505;

50 W — type SFZ 364

RF output impedance 50 ohms nominal (coaxial)

Max. standing wave ratio 1:1.3

Carrier frequency stability ± 1000 c/s

Frequency deviation ± 75 kc/s

Pre-emphasis 50 μ sec (75 μ sec on request)

Linear distortion within ± 1 dB from 30 to 15,000 c/s, reference frequency 1000 c/s

Non-linear distortion $\leq 1\%$ from 30 to 15,000 c/s including all harmonics up to 45 kc/s at ± 75 kc/s deviation

AF input level +6 dBm ± 2 dB at 100% modulation; 6 dBm = 4 mW into 600 ohms

AF input impedance 600 ohms $\pm 10\%$

FM hum and noise level ≤ -60 dB with standard de-emphasis, reference 75 kc/s deviation

AM hum and noise level ≤ -50 dB, reference 100% AM

Synchronous AM level ≤ -45 dB, reference 100% AM at 75 kc/s deviation

Power supply single-phase, 220 V $\pm 5\%$, 50 or 60 c/s $\pm 5\%$

Power consumption

275 W — type 8FZ 505;

325 W — type SFZ 364

Ambient temperature at sea level: 0° to +45° C under tropical conditions

Dimensions height 94 cm (38 in.); width 52 cm (21 in.); depth 57 cm (23 in.)

Weight (unpacked)

120 kg (265 lb.) — type 8FZ 505;

140 kg (310 lb.) — type SFZ 364

Tube complement SFZ 364

Philips type	* CV number	* USA type
5 × EF80	—	6BX6
4 × E80L	—	6227
2 × QQE06/40	2797	5894
1 × OA2	1832	OA2
2 × EAA91	283	6AL5
1 × 6201	—	6201
1 × ECH81	2128	6AJ8

Tube complement 8FZ 505

Philips type	* CV number	* USA type
5 × EF80	—	6BX6
3 × E80L	—	6227
1 × QQE06/40	2797	5894
1 × OA2	1832	OA2
2 × EAA91	283	6AL5
1 × 6201	—	6201
1 × ECH81	2128	6AJ8
1 × GZ34	1377	5AR4



PHILIPS

Studio-transmitter link equipment 10 W - types 8FZ 506 and 507 50 W - types SFZ 403/00 and /01 twin versions

General

These twin versions of the 10 and 50 W VHF-FM transmitters are specially designed to ensure a very high degree of reliability in a studio-transmitter link. The equipment is suitable for unattended operation. When the automatic change-over panel is fitted, the operative transmitter is immediately replaced by the stand-by unit if the output of the former transmitter should happen to drop below a specific level. A remote control panel which includes monitoring facilities can be provided. All units are fully tropicalized.

Description

Type 8FZ 506: this 10 W installation consists of two type SFE 262 exciter units, which supply the required output power at the operating frequency, two power supply panels and two separate VU-meters. The equipment is housed in a 19-in. cabinet.

The exciter unit works on a special principle and provides modulation which to all intents and purposes is free of distortion, whilst the centre frequency is very stable. This stability is obtained by controlling the frequency with a crystal oscillator.

The transmitter permits broadcasts to be made on a single frequency in the 87.5-108 Me/s band.

Type 8FZ 507: this installation is similar to the above installation, but it has a built-in change-over panel. If the output power of the operative transmitter should happen to drop below a preset value, the stand-by transmitter is automatically switched into circuit and connected to the aerial.

A remote control panel has been developed for use in unattended stations. The transmitters in such a station can then be switched on and off and the operation supervised, all by remote control.

10 W link transmitter type 8FZ 507: twin version with automatic change-over panel (top)



division Telecommunication
section Broadcasting
product Studio-transmitter link
equipment (twin versions)
types 8FZ 506-507; SFZ 403/00-/01
pamphlet R-63.1121

Description (continued)

Type SFZ 403/00: this installation is a 50 W version of the smaller type 8FZ 506. It embodies the same facilities as the latter. The higher output power is obtained by including a power amplifier after the exciter unit. The power amplifier is equipped with a single tube, a twin tetrode connected in a push-pull circuit. In addition, it is fitted with a special device to protect it from damage caused by failure of the drive signal.

Type SFZ 403/01: the 50 W version may also be fitted with an automatic change-over panel, the type number of this installation being SFZ 403/01.

Technical data

Frequency range 87.5–108 Mc/s

RF output power type 8FZ 506 and 8FZ 507: 10 W;
type SFZ 403/00 and SFZ 403/01: 50 W

RF output impedance 50 ohms nominal (coaxial)

Max. standing wave ratio 1:1.3

Carrier frequency stability ± 1000 c/s

Frequency deviation ± 75 kc/s

Pre-emphasis 50 μ sec (75 μ sec on request)

Linear distortion within ± 1 dB from 30 to 15,000 c/s,
reference frequency 1000 c/s

Non-linear distortion $\leq 1\%$ from 30 to 15,000 c/s, including all harmonics up to 45 kc/s at ± 75 kc/s deviation

AF input level +6 dBm ± 2 dB at 100% modulation;
6 dBm = 4 mW into 600 ohms

AF input impedance 600 ohms $\pm 10\%$

FM hum and noise level ≤ -60 dB with standard de-emphasis, reference 75 kc/s deviation

AM hum and noise level ≤ -50 dB, reference 100% AM

Synchronous AM level ≤ -45 dB, reference 100% AM at 75 kc/s deviation

Power supply single-phase, 220 V $\pm 5\%$, 50 or 60 c/s $\pm 5\%$

Mechanical design

The installations are panel-mounted and housed in standard 19-in. cabinets. The panels are fitted with telescopic runners to facilitate maintenance and repair work. All essential meters and pilot lamps are built in. The transmitters are easy to install: special tools or skill are not required. The connection between the 50-ohm aerial terminal and the aerial proper can be made by means of standard coaxial cable.

Detailed instruction manuals accompany the equipment. Instruction manuals and inscriptions on the transmitters are in English. On special request they can be supplied in other languages, e.g. Spanish.

Power consumption 8FZ 506: 2×275 W; 8FZ 507: 325 W; SFZ 403/00: 2×325 W; SFZ 403/01: 400 W

Ambient temperature at sea level: 0° to $+45^\circ$ C under tropical conditions

Dimensions height 212 cm (84 in.), width 64 cm (26 in.), depth 68 cm (27 in.)

Weights (approx.) 8FZ 506: 250 kg (550 lb.); 8FZ 507: 260 kg (572 lb.); SFZ 403/00: 327 kg (719 lb.); SFZ 403/01: 337 kg (741 lb.) – unpacked

Tube complement

10 W	50 W	Philips type	CV number	USA type
2 \times	4 \times	QQE06/40	2797	5894
10 \times	10 \times	EF80	–	6BX6
6 \times	8 \times	E80L	–	6227
2 \times	2 \times	OA2	1832	OA2
4 \times	4 \times	EAA91	283	6AL5
2 \times	2 \times	6201	–	6201
2 \times	2 \times	ECH81	2128	6AJ8
2 \times	–	GZ34	1377	5AR4



PHILIPS

250 W FM broadcast transmitter type SOZ 334

General

A medium-powered FM transmitter, suitable for operation in the 87.5–108 Mc/s broadcast band and offering the same facilities as more powerful equipment, e.g. excellent audio response and very simple installation, operation and maintenance.

The transmitter has been designed for use under tropical conditions and offers facilities for unattended operation.

Description

The SOZ 334 is a completely self-contained unit, housed in a single, easily installed cabinet. The exciter used is the Philips special type SFE 262. This unit produces a frequency-modulated signal, with extremely low distortion, at a specified frequency in the 87.5–108 Mc/s range.

The carrier frequency is continuously checked against a crystal frequency, resulting in excellent stability, independent of ambient temperature. The transmitter complies fully with international standards.

Meters are incorporated in every important circuit in both the exciter and the transmitter. Those pertaining to the transmitter are mounted at the top of the front panel and remain visible even with the door closed. The transmitter is suitable for unattended operation and incorporates remote-control relays. A remote-control unit is available as an optional extra.

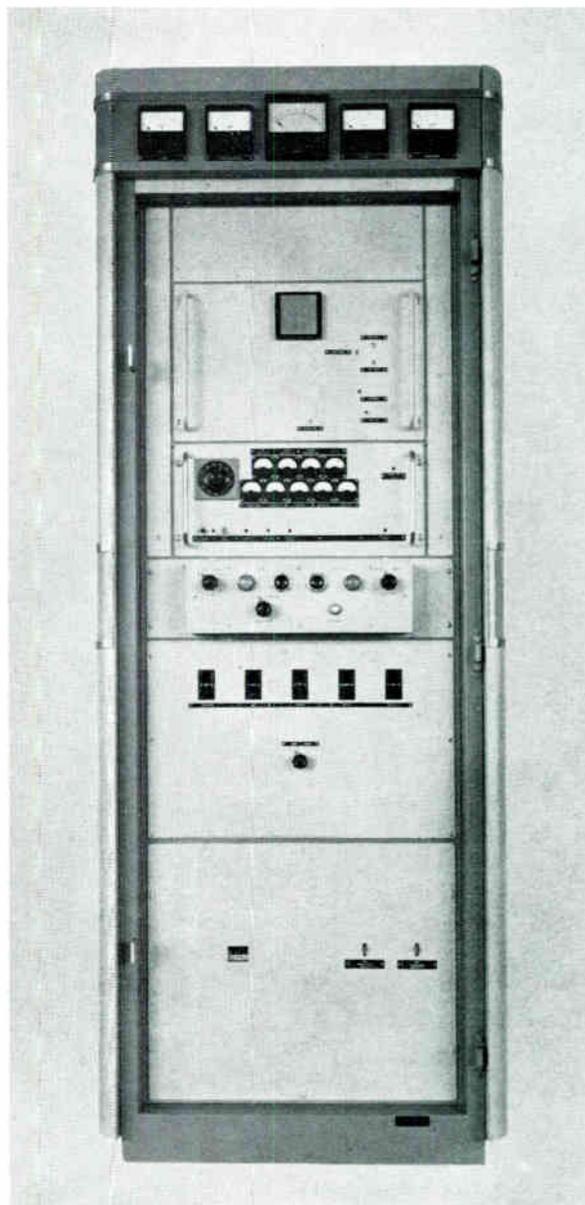
Operation and tuning are very simple and do not demand great skill.

The transmitter is fully protected against overloads and other faults, while gate switches prevent accidental contact with parts carrying high tension.

The coaxial output terminal has a nominal impedance of 50 ohms. A reflectometer system provides means of measuring the forward and reflected power.

Mechanical design

The installation is housed in an attractively styled cabinet with a front and a rear door, giving easy



division Telecommunication
section Broadcasting
product 250 W FM broadcast transmitter
type SOZ 334
pamphlet R-63.1100

Mechanical design (continued)

access to all components. The cabinet is dust-proof and has an internal blower with a filtered intake. The PA tubes have their own blower and cooling system.

Heavy components of the power supply units are mounted in the lower part of the cabinet on a hinged chassis, which can be swivelled outwards for ease of maintenance.

Technical data

Frequency range 87.5–108 Mc/s

RF output power 250 W

RF output impedance 50 ohms nominal (coaxial)

Max. standing wave ratio 1:1.3

Carrier frequency stability ± 1000 c/s

Frequency deviation ± 75 kc/s

Pre-emphasis 50 μ sec (75 μ sec on request)

Linear distortion within ± 1 dB from 30 to 15,000 c/s, reference frequency 1000 c/s

Non-linear distortion $\leq 1\%$ from 30 to 15,000 c/s including all harmonics up to 45 kc/s at ± 75 kc/s deviation

AF input level +6 dBm ± 2 dB at 100% modulation; 6 dBm = 4 mW into 600 ohms

AF input impedance 600 ohms $\pm 10\%$

FM hum and noise level ≤ -60 dB with standard de-emphasis, reference 75 kc/s deviation

AM hum and noise level ≤ -50 dB, reference 100% AM

Synchronous AM level ≤ -45 dB, reference 100% AM at 75 kc/s deviation

Power supply single-phase, 220 V $\pm 5\%$, 50 or 60 c/s $\pm 5\%$

The modern construction of the transmitter makes it quick and simple to install. Specialized technical skill is not essential and no special tools are needed. A detailed assembly and maintenance manual is supplied with the transmitter. This manual, like the inscriptions on the transmitter, is normally in English but can be supplied in other languages (e.g. Spanish) on special request.

Power consumption approx. 1000 W

Power factor approx. 0.83

Ambient temperature

at sea level: $+10^\circ$ to $+45^\circ$ C under tropical conditions; at 6000 ft: $+10^\circ$ to $+35^\circ$ C

Maximum altitude 6000 ft.

Dimensions (overall) height 210 cm (83 in.), width 77 cm (30 in.), depth 73 cm (29 in.)

Weight approx. 375 kg (825 lb.) unpacked

Tube complement

Philips type	*	CV number	*	USA type
2 \times QB3/300		2130		6155
3 \times GZ34		1377		5AR4
2 \times DCG4/1000G		32		866A
5 \times EF80		–		6BX6
3 \times E80L		–		6227
1 \times QQE06/40		2797		5894
1 \times OA2		1832		OA2
2 \times EAA91		283		6AL5
1 \times 6201		–		6201
1 \times ECH81		2128		6AJ8



PHILIPS

1 kW FM broadcast transmitter type SOZ 335

General

This item from our range of FM broadcast transmitters will deliver a power of 1 kW at one specified frequency in the band 87.5–108 Mc/s.

The transmitter is completely self-contained and combines simplicity in operation and maintenance with excellent audio quality. The equipment is fully tropicalized and offers facilities for unattended operation.

Description

The first stage of this transmitter features the special type SFE 262 exciter unit, which generates a frequency-modulated signal of high stability with very low distortion. A control circuit incorporating a crystal oscillator keeps the main frequency constant over a wide range of ambient temperatures.

The exciter is followed by two push-pull stages: the buffer stage and the final amplifier. The latter delivers 1 kW RF power to the 50-ohm coaxial output terminal.

The transmitter circuits incorporate several protective devices against internal and external faults. It is equipped with a three-cycle restoring unit. Safety-switches protect personnel against high tension hazards.

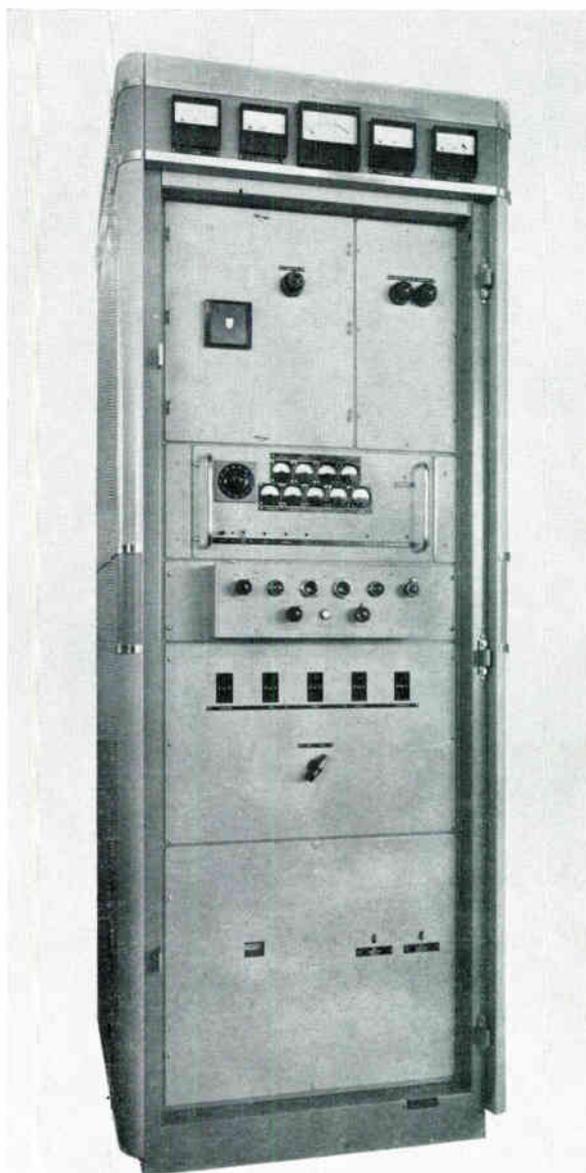
The performance of the transmitter is easily checked on several built-in meters, e.g. the VU-meter. A reflectometer indicates the forward and reflected power in the aerial transmission line.

Operation and maintenance of this installation, being very simple, require only a minimum of skill on the part of the operators.

The transmitter is suitable for unattended operation and incorporates remote-control relays.

A remote-control unit is optionally available. A reflection safety device may also be fitted as an optional extra.

No particular skill or special tools are needed to



division **Telecommunication**
section **Broadcasting**
product **1 kW FM broadcast transmitter**
type **SOZ 335**
pamphlet **R-63.1101**

Description (continued)

install the transmitter. All the necessary information is given in the manual supplied with the equipment. This manual is normally in English but can also be supplied in other languages (e.g. Spanish) upon request.

Mechanical design

The transmitter equipment, housed in a well-styled cabinet, is accessible by doors at the front and the

rear. An internal blower gives over-all ventilation in the cabinet, while the power-amplifier tubes are cooled by an extra blower. The cabinet is dust-proof and the air intakes are fitted with filters, which make it impossible for dust to enter.

Careful choice of components and materials and the more than ample cooling ensure trouble-free operation even in tropical climates.

Technical data

Frequency range 87.5–108 Mc/s

RF output power 1 kW

RF output impedance 50 ohms nominal (coaxial)

Max. standing wave ratio 1:1.3

Carrier frequency stability ± 1000 c/s

Frequency deviation ± 75 kc/s

Pre-emphasis 50 μ sec (75 μ sec on request)

Linear distortion within ± 1 dB from 30 to 15,000 c/s, reference frequency 1000 c/s

Non-linear distortion $\leq 1\%$ from 30 to 15,000 c/s including all harmonics up to 45 kc/s at ± 75 kc/s deviation

AF input level +6 dBm ± 2 dB at 100% modulation; 6 dBm = 4 mW into 600 ohms

AF input impedance 600 ohms $\pm 10\%$

FM hum and noise level ≤ -60 dB with standard de-emphasis, reference 75 kc/s deviation

AM hum and noise level ≤ -50 dB, reference 100% AM

Synchronous AM level ≤ -45 dB, reference 100% AM at 75 kc/s deviation

Power supply single-phase, 220 V $\pm 5\%$, 50 or 60 c/s $\pm 5\%$

Power consumption approx. 3 kW

Power factor approx. 0.83

Ambient temperature at sea level: $+10^\circ$ to $+45^\circ$ C under tropical conditions; at 6000 ft: $+10^\circ$ to $+35^\circ$ C

Maximum altitude 6000 ft

Dimensions (overall) height 210 cm (83 in.), width 77 cm (30 in.), depth 73 cm (29 in.)

Weight approx. 425 kg (935 lb.) unpacked

Tube complement

Philips type *	CV number	USA type *
2 \times QQE06/40	2797	5894
2 \times QB3.5/750	2131	6156
2 \times GZ34	1377	5AR4
4 \times DCG4/1000G	32	866A
5 \times EF80	–	6BX6
3 \times E80L	–	6227
1 \times OA2	1832	OA2
2 \times EAA91	283	6AL5
1 \times 6201	–	6201
1 \times ECH81	2128	6AJ8



PHILIPS

5 kW FM broadcast transmitter type 8FZ 705

General

A 5 kW FM transmitter for the 87.5–108 M c/s band, combining all the advantages of VHF-FM broadcasting with ease of operation and maintenance, and low operating costs. This is achieved by compact construction and the use of straightforward circuits. The transmitter is suitable for unattended operation and is fully tropicalized.

Description

The nucleus of this transmitter is its type SFE 262 exciter. A specially designed circuit enables this exciter to provide an FM signal with very little distortion and great stability. The latter is achieved by comparing the carrier frequency continuously with that of a crystal oscillator.

An economic 50 W driver stage is used to drive the 5 kW output stage, the nominal output impedance of which is 50 ohms coaxial.

Operation is simple and requires no special technical knowledge.

All the most important circuits are provided with meters, including a VU-meter. A reflectometer system permits measurement of the forward and reflected power. The transmitter is fitted with devices for protection against overloading and other mishaps. Gate switches protect personnel from accidental contact with conductors, the high tension being switched off immediately a door is opened.

The transmitter is fitted with a three-cycle restoring unit and may be optionally equipped with a reflection safety device. A remote-control unit can also be supplied as an optional extra.

Mechanical design

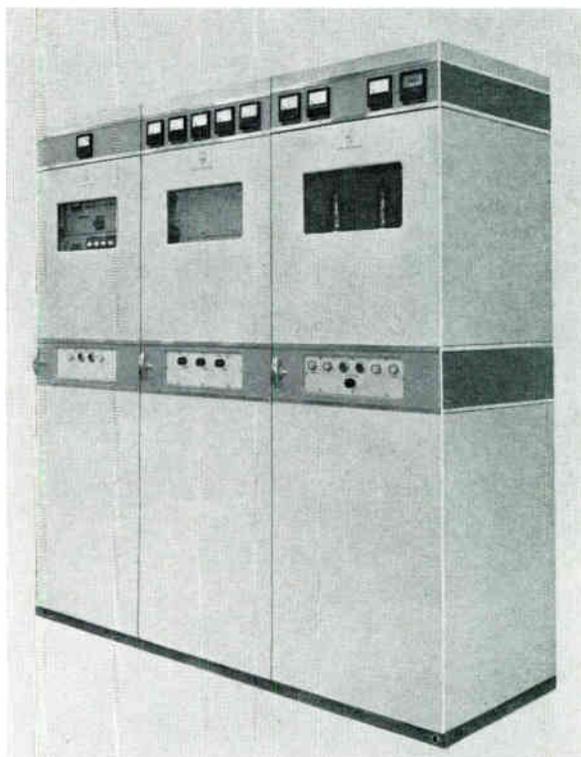
All components are housed in three attractively styled cabinets. One cabinet contains the exciter and the driver stage, together with the corresponding power supply units. The second contains the output stage, while the power supply unit for this stage is

housed in the third. The cabinets are fitted with doors at front and back.

The meters, etc. are on the front of the transmitter, above the doors, where they are always visible.

Air-cooling is catered for by built-in fans. The air intake to each fan is fitted with a dust filter. As the cabinet itself is dust-proof, the transmitter is completely protected against foreign matter.

Components and materials have been carefully chosen to ensure that the transmitter is fully tropical-proof.



division Telecommunication
section Broadcasting
product 5 kW FM broadcast transmitter
type 8FZ 705
pamphlet R-63.1102

Mechanical design (continued)

The modern construction of the transmitter makes it easy and quick to install. No specialized technical skill or special tools are needed.

A detailed assembly and maintenance manual is sup-

plied with the equipment. This manual, like the inscriptions on the transmitter, are in English, but it is also available in other languages, e.g. Spanish, on request.

Technical data

Frequency range 87.5–108 Mc/s

RF output power 5 kW

RF output impedance 50 ohms nominal (coaxial)

Max. standing wave ratio 1:1.3

Carrier frequency stability ± 1000 c/s

Frequency deviation ± 75 kc/s

Pre-emphasis 50 μ sec (75 μ sec on request)

Linear distortion within ± 1 dB from 30 to 15,000 c/s, reference frequency 1000 c/s

Non-linear distortion $\leq 1\%$ from 30 to 15,000 c/s including all harmonics up to 45 kc/s at ± 75 kc/s deviation

AF input level +6 dBm ± 2 dB at 100% modulation; 6 dBm = 4 mW into 600 ohms

AF input impedance 600 ohms $\pm 10\%$

FM hum and noise level ≤ -60 dB with standard de-emphasis, reference 75 kc/s deviation

AM hum and noise level ≤ -50 dB, reference 100% AM

Synchronous AM level ≤ -45 dB, reference 100% AM at 75 kc/s deviation

Power supply 3 \times 380 V $\pm 5\%$, four-wire mains, 50 or 60 c/s $\pm 5\%$

Power consumption approx. 10 kW

Power factor approx. 0.83

Overall efficiency approx. 50%

Ambient temperature

at sea level: $+10^\circ$ to $+45^\circ$ C under tropical conditions;

at 6000 ft: $+10^\circ$ to $+35^\circ$ C

Maximum altitude 6000 ft

Dimensions (overall) height 210 cm (84 in.); width 216 cm (86 in.); depth 73 cm (29 in.)

Weight approx. 1500 kg (3300 lb.) unpacked

Tube complement

Philips type	*	CV number	*	USA type
2 \times QBL5/3500		–		6076
4 \times GZ34		1377		5AR4
3 \times DCG5/5000GB		642		872A
5 \times EF80		–		6BX6
4 \times E80L		–		6227
2 \times QQE06/40		2797		5894
1 \times OA2		1832		OA2
2 \times EAA91		283		6AL5
1 \times 6201		–		6201
1 \times ECH81		2128		6AJ8



PHILIPS

6.5 kW FM broadcast transmitter type SOZ 336

General

The 6.5 kW model in our range of FM broadcast transmitters also combines a high standard of quality with economy in operation and simplicity of control and maintenance.

This transmitter comprises three standard cabinets. The liberal air-cooling and the careful choice of components and materials make it suitable for use in the tropics. The equipment is designed for unattended operation.

Description

The transmitter operates on a frequency which may be chosen anywhere in the VHF broadcasting band (87.5–108 Mc/s). This frequency is generated and modulated in the type SFE 262 exciter unit. Great stability of the transmitted signal is ensured by a crystal-controlled supervision circuit. The extremely low value of distortion is due to the original modulation method employed.

The exciter controls a 250 W driver stage and the two are housed together in a single cabinet. The driver stage comprises 2 tetrodes in push-pull. The second cabinet contains the 6.5 kW output stage, and the third the power supply equipment for this stage. The latter in turn consists of two tubes connected in push-pull. The nominal output impedance is 50 ohms coaxial. The transmitter has a reflectometer for the measurement of forward and reflected power. The currents and voltages of all important circuits in the exciter, driver and output stages are indicated by built-in meters, while there is a VU-meter for supervision of the modulation.

The transmitter is fitted with a three-cycle restoring unit and may be optionally equipped with a reflection safety device. Further (optional) extras are remote-control units; remote-control relays are incorporated.

One of the Philips type SOZ 336 FM twin installations of the Swedish broadcasting network

Mechanical design

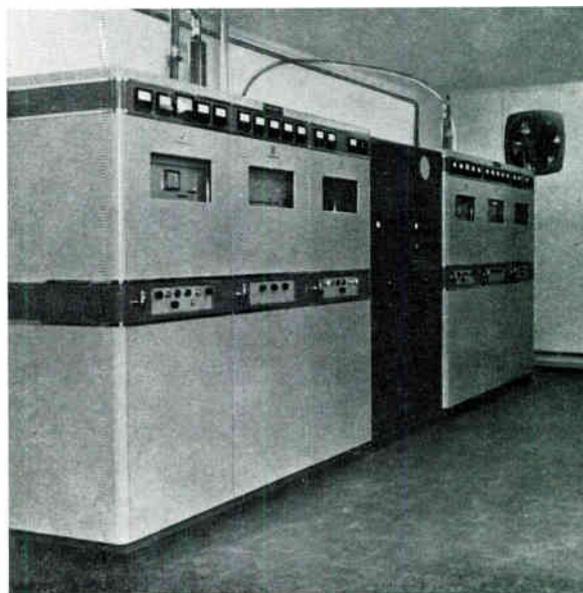
The entire installation comprises only three cabinets and an external HT transformer.

Each of the cabinets has doors at front and back, and all components are therefore easily accessible.

The main meters are fitted at the front of the cabinets, above the doors, where they are easily read.

In addition to the forced up-draught fan in each cabinet, the power amplifier tubes are efficiently cooled by an airstream directed from an extra blower. The air intakes are fitted with air filters and the cabinets themselves are dust-proof.

The transmitter is easily and quickly assembled. Special technical skill is not essential and no special tools are required. Detailed assembly and maintenance instructions are supplied with the equipment. These, like the transmitter inscriptions, are in English, but can be provided in other languages (e.g. Spanish) on special request.



division Telecommunication
section Broadcasting
product 6.5 kW FM broadcast transmitter
 type SOZ 336
pamphlet R-63.1103

Technical data

Frequency range 87.5–108 Mc/s
RF output 6.5 kW
RF output impedance 50 ohms nominal (coaxial)
Max. standing wave ratio 1:1.3
Carrier frequency stability ± 1000 c/s
Frequency deviation ± 75 kc/s
Pre-emphasis 50 μ sec (75 μ sec on request)
Linear distortion within ± 1 dB from 30 to 15,000 c/s
reference frequency 1000 c/s
Non-linear distortion $\leq 1\%$ from 30 to 15,000 c/s
including all harmonics up to 45 kc/s at ± 75 kc/s
deviation
AF input level +6 dBm ± 2 dB at 100% modulation;
6 dBm = 4 mW into 600 ohms
AF input impedance 600 ohms $\pm 10\%$
FM hum and noise level ≤ -60 dB with standard
de-emphasis, reference 75 kc/s deviation
AM hum and noise level ≤ -50 dB, reference 100%
AM
Synchronous AM level ≤ -45 dB, reference 100%
AM at 75 kc/s deviation
Power supply 3 \times 380 V $\pm 5\%$ four-wire mains,
50 or 60 c/s $\pm 5\%$
Power consumption approx. 13 kW
Power factor approx. 0.83
Overall efficiency approx. 50%

Ambient temperature

at sea level: $+10^\circ$ to $+45^\circ$ C under tropical condi-
tions; at 6000 ft: $+10^\circ$ to $+35^\circ$ C

Maximum altitude 6000 ft

Dimensions (overall)

transmitter: height 210 cm (83 in.), width 216 cm
(86 in.), depth 73 cm (29 in.);

HT transformer: height 85 cm (34 in.), width 75 cm
(30 in.), depth 57 cm (23 in.)

Weight (unpacked)

transmitter approx. 1500 kg (3300 lb.);
HT transformer approx. 200 kg (440 lb.)

Tube complement

Philips type	*	CV number	*	USA type
2 \times QB3/300		2130		6155
2 \times QBL5/3500		–		6076
7 \times GZ34		1377		5AR4
3 \times DCG5/5000GB		642		872A
2 \times DCG4/1000G		32		866A
5 \times EF80		–		6BX6
3 \times E80L		–		6227
1 \times QQE06/40		2797		5894
1 \times OA2		1832		OA2
2 \times EAA91		283		6AL5
1 \times 6201		–		6201
1 \times ECH81		2128		6AJ8



PHILIPS

10 kW FM broadcast transmitter type 8FZ 706

General

A 10 kW FM transmitter for the 87.5–108 Mc/s band, combining all the advantages of VHF-FM broadcasting with ease of operation and maintenance, and low operating costs. This is achieved by compact construction and the use of straightforward circuits. The transmitter is suitable for unattended operation and is fully tropicalized.

Description

The nucleus of this transmitter is its type SFE 262 exciter. A specially designed circuit enables this exciter to provide an FM signal with very little distortion and great stability. The latter is achieved by comparing the carrier frequency continuously with that of a crystal oscillator.

An economic 50 W driver stage is used to drive the 10 kW output stage, the nominal output impedance of which is 50 ohms coaxial.

Operation is simple and requires no special technical knowledge.

All the most important circuits are provided with meters, including a VU-meter. A reflectometer system permits measurement of the forward and reflected power. The transmitter is fitted with devices for protection against overloading and other mishaps. Gate switches protect personnel from accidental contact with conductors, the high tension being switched off immediately a door is opened.

The transmitter is fitted with a three-cycle restoring unit and may be optionally equipped with a reflection safety device. A remote-control unit can also be supplied as an optional extra.

Mechanical design

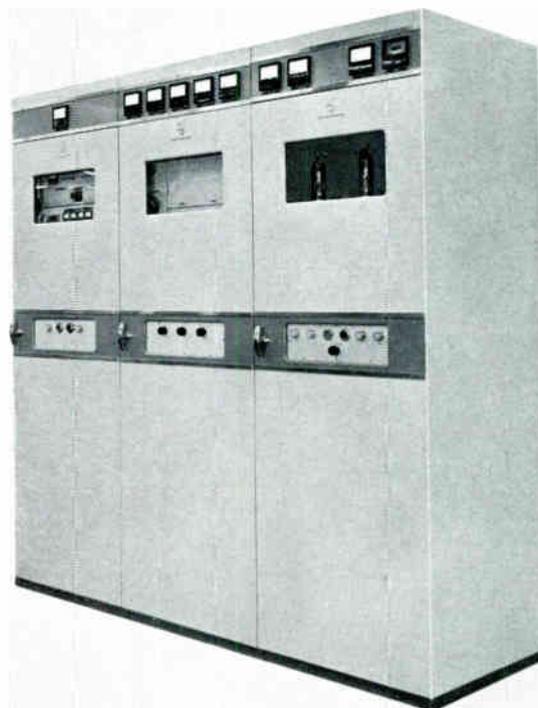
All components are housed in three attractively styled cabinets. One cabinet contains the exciter and the driver stage, together with the corresponding power supply units. The second contains the output stage, while the power supply unit for this stage is

housed in the third. The cabinets are fitted with doors at front and back.

The meters, etc. are on the front of the transmitter, above the doors, where they are always visible.

Air-cooling is catered for by built-in fans. The air intake to each fan is fitted with a dust filter. As the cabinet itself is dust-proof, the transmitter is completely protected against impurities.

Components and materials have been carefully chosen to ensure that the transmitter is fully tropic-proof.



division Telecommunication
section Broadcasting
product 10 kW FM broadcast transmitter
type 8FZ 706
pamphlet R-63.1125

Mechanical design (continued)

The modern construction of the transmitter makes it easy and quick to install. No specialized technical skill or special tools are needed.

A detailed assembly and maintenance manual is sup-

plied with the equipment. This manual, like the inscriptions on the transmitter, are in English, but it is also available in other languages, e.g. Spanish, on request.

Technical data

Frequency range 87.5–108 Mc/s

RF output power 10 kW

RF output impedance 50 ohms nominal (coaxial)

Max. standing wave ratio 1:1.3

Carrier frequency stability ± 1000 c/s

Frequency swing ± 75 kc/s

Pre-emphasis 50 μ sec (75 μ sec on request)

Linear distortion within ± 1 dB from 30 to 15,000 c/s, reference frequency 1000 c/s

Non-linear distortion $\leq 1\%$ from 30 to 15,000 c/s including all harmonics up to 45 kc/s at ± 75 kc/s swing

AF input level +6 dBm ± 2 dB at 100% modulation; 6 dBm = 4 mW into 600 ohms

AF input impedance 600 ohms $\pm 10\%$

FM hum and noise level ≤ -60 dB with standard de-emphasis, reference 75 kc/s deviation

AM hum and noise level ≤ -50 dB, reference 100% AM

Synchronous AM level ≤ -45 dB, reference 100% AM at 75 kc/s deviation

Power supply 3 \times 380 V $\pm 5\%$, four-wire mains, 50 or 60 c/s $\pm 5\%$

Power consumption approx. 20 kW

Power factor approx. 0.83

Overall efficiency approx. 50%

Ambient temperature

at sea level: +10° to +45° C under tropical conditions;

at 6000 ft: +10° to +35° C

Maximum altitude 6000 ft

Dimensions (overall) height: 210 cm (84 in.);

width: 216 cm (86 in.); depth: 73 cm (29 in.)

Weight approx. 1700 kg (3800 lb.) unpacked

Tube complement

Philips type	CV number	USA type
4 \times QBL5/3500	–	6076
3 \times DCG4/1000G	32	866A
3 \times DCG5/5000GB	642	872A
5 \times EF80	–	6BX6
4 \times E80L	–	6227
2 \times QQE06/40	2797	5894
1 \times OA2	1832	OA2
2 \times EAA91	283	6AL5
1 \times 6201	–	6201
1 \times ECH81	2128	6AJ8



PHILIPS

12 kW FM broadcast transmitter type SOZ 337

General

A powerful transmitter suitable for providing an extensive area with a high-quality and efficient broadcasting service in the 87.5–108 Mc/s band.

The entire installation consists of only 3 units and a separate HT transformer. Simple to operate and maintain, the transmitter will work reliably and unattended, even in tropical conditions.

Description

The signal is generated and modulated in the type SFE 262 exciter, a unit developed with particular care. The frequency generated is kept very constant with a crystal circuit, while modulation satisfies the highest requirements of quality.

The exciter is easy to tune and a number of built-in meters make it a simple matter to supervise operation. The exciter is immediately followed by, and controls, a 250 W driver stage which can also operate as a self-contained transmitter. This driver stage and the exciter, with their power packs, together form a single unit.

The second unit is the output stage with two tetrodes connected in push-pull which deliver 12 kW into a nominal load of 50 ohms. The aerial connection is made with 50-ohm coaxial tubing. On special request the output can be adapted to take coaxial cable.

A built-in reflectometer system measuring the forward and reflected power gives a continuous and straightforward check on the condition of the aerial and its feeder. The operation of other circuits is also indicated on built-in meters.

The third unit comprises the power supply section for the output stage, with the exception of the high tension transformer which is set up outside the cabinet.

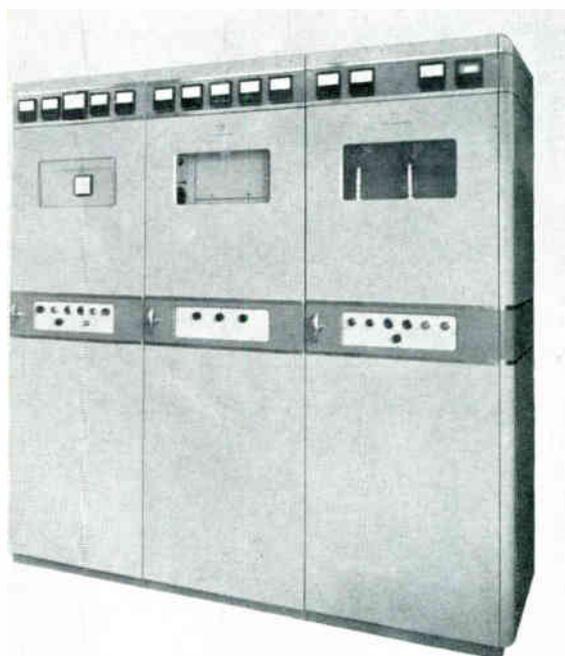
The transmitter complies fully with international requirements for FM broadcasting. It is fitted with a three-cycle restoring unit and may optionally be equipped with a reflection safety device. A remote control unit is also optionally available.

Mechanical design

The three units are housed in three separate cabinets which when placed side by side give the transmitter a pleasing outward appearance. They are fitted with both front and back doors for ease of access to components. The most important meters are mounted above the doors, on the outside of the cabinets.

Each cabinet has a dust-proof seal and its own internal fan, fitted with a dust filter. In addition, the power tubes in the 250 W and 12 kW stages also have their own fan which ensures very effective cooling. The various panels all slide out, so that rapid servicing is possible.

All components and materials, and also the finish, are of the highest quality, so that long service is assured even in the tropics.



division Telecommunication
section Broadcasting
product 12 kW FM broadcast transmitter
type SOZ 337
pamphlet R-63.1110

Mechanical design (continued)

The extensive and detailed information contained in the instruction manual facilitates installation, operation and maintenance of the equipment. Installation is, in fact, simple and does not call for special tools

or highly skilled personnel. Name-plates and manuals supplied with the equipment are normally in English but other languages (e.g. Spanish) are obtainable on special order.

Technical data

Frequency range 87.5–108 Mc/s

RF output power 12 kW

RF output impedance 50 ohms nominal (coaxial)

Max. standing wave ratio 1:1.3

Carrier frequency stability ± 1000 c/s

Frequency deviation ± 75 kc/s

Pre-emphasis 50 μ sec (75 μ sec on request)

Linear distortion within 1 dB from 30 to 15,000 c/s, reference frequency 1000 c/s

Non-linear distortion $\leq 1\%$ from 30 to 15,000 c/s including all harmonics up to 45 kc/s at ± 75 kc/s deviation

AF input level +6 dBm ± 2 dB at 100% modulation; 0 dBm = 1 mW into 600 ohms

AF input impedance 600 ohms $+10\%$

FM hum and noise level ≤ -60 dB with standard de-emphasis, reference 75 kc/s deviation

AM hum and noise level ≤ -50 dB, reference 100% AM

Synchronous AM level ≤ -45 dB, reference 100% AM at 75 kc/s deviation

Power supply 3 \times 380 V $\pm 5\%$, four-wire mains, 50 or 60 c/s $\pm 5\%$

Power consumption approx. 22 kW

Power factor approx. 0.83

Overall efficiency approx. 55%

Ambient temperature

at sea level: $+10^\circ$ to $+45^\circ$ C, under tropical conditions;

at 6000 ft: $+10^\circ$ to $+35^\circ$ C

Maximum altitude 6000 ft

Dimensions (overall)

transmitter: height 210 cm (84 in.); width 216 cm (86 in.); depth 73 cm (29 in.);

transformer: height 85 cm (34 in.); width 75 cm (30 in.); depth 57 cm (23 in.)

Weight (unpacked)

transmitter approx. 1500 kg (3300 lb.);

transformer approx. 200 kg (440 lb.)

Tube complement

Philips type	* CV number	* USA type
2 \times QB3/300	2130	6155
4 \times QBL5/3500	–	6076
3 \times GZ34	1377	5AR4
3 \times DCG5/5000GB	642	872A
5 \times DCG4/1000G	32	866A
5 \times EF80	–	6BX6
3 \times E80L	–	6227
1 \times QQE06/40	2797	5894
1 \times OA2	1832	OA2
2 \times EAA91	283	6AL5
1 \times 6201	–	6201
1 \times ECH81	2128	6AJ8



PHILIPS

Diplexer type SFE 272 (band II) Harmonic filter type SFE 368 (band II)

Diplexer type SFE 272 (band II)

This diplexer makes possible the simultaneous transmission of two separate programmes from a single aerial and thus gives a saving on transmission lines, aerials and towers.

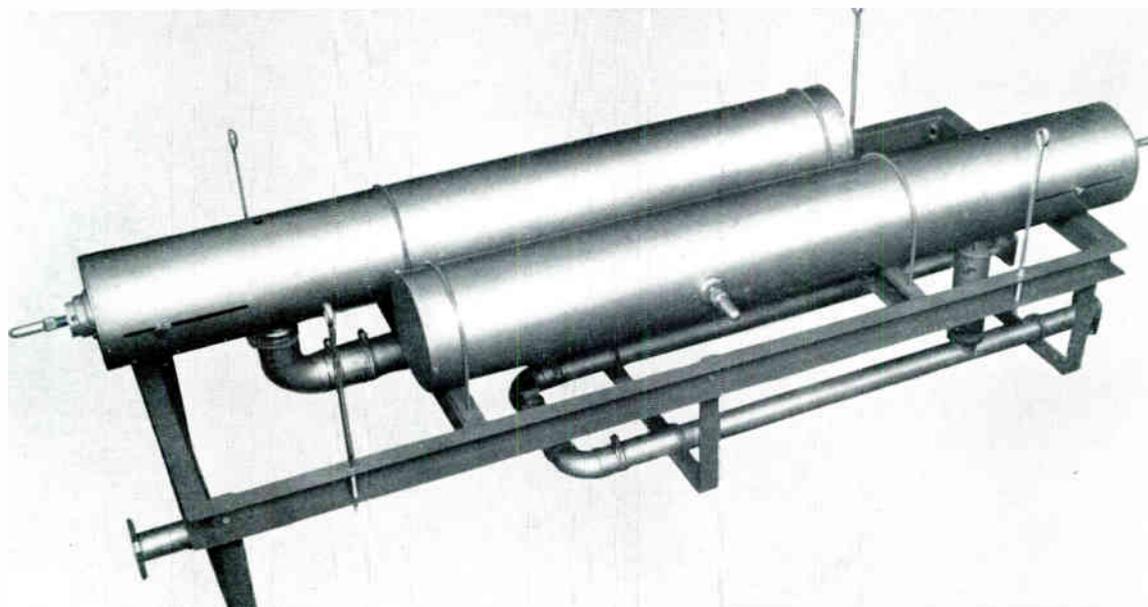
The minimum difference between the operating frequencies of VHF-FM broadcast transmitters is 2 Mc/s.

The power-handling capacity is as much as 10 kW per input. An additional blower is used for powers over 2×6 kW when the frequency difference is less than 3 Mc/s.

The diplexer is of the coaxial type. Two stubs, each connected to a transmitter output terminal, are

spaced $\frac{1}{2} \lambda$ from the common aerial feeder circuit. As a result practically no power from one transmitter can enter the anode circuit of the other. For the minimum permissible difference between operating frequencies the diplexer efficiency is nearly 100%. The crosstalk between the two inputs is over 30 dB. The various component coaxial parts are fitted to a welded steel frame which may be mounted horizontally or vertically.

The diplexer is placed between the transmitter output terminals and the aerial terminal, normally as part of the 50-ohm coaxial feeder tubing. Adaptors to suit other types of feeder are supplied to special order.



division **Telecommunication**
section **Broadcasting**
product **Diplexer — harmonic filter**
type **SFE 272 (band II) — SFE 368 (band II)**
pamphlet **R-63.1104**

Harmonic filter type SFE 368 (band II)

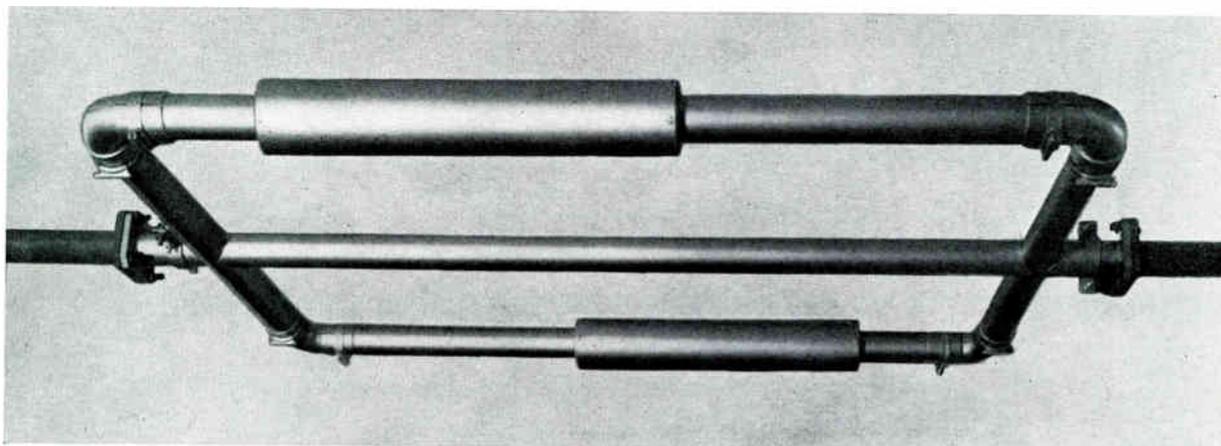
This is an efficient aerial filter to prevent band II FM broadcast transmitters (87.5–108 Mc/s) from interfering with television programmes in band III (174–223 Mc/s).

The filter consists of four stubs, two of which are adjusted to $\frac{1}{4} \lambda$ and the other two to $\frac{1}{8} \lambda$. The $\frac{1}{4} \lambda$ stubs short-circuit the second and fourth, the $\frac{1}{8} \lambda$ stubs the third and sixth harmonics of the operating frequency. The distance between the stubs is such

that reflection of the basic operating frequency is minimum.

Suppression of the 2nd and 3rd harmonics is more than 60 dB at a load of 50 ohms.

The filter is inserted between the transmitter output and the aerial input, normally as a part of the 50-ohm coaxial feeder tubing. Adapters to suit other types of feeder are supplied to special order. Either horizontal or vertical mounting can be employed.



PHILIPS *VHF coaxial accessories*

FM monitor type SBO 107

This is an instrument for the continuous monitoring of band II FM broadcasts. The unit requires no power supply and causes little distortion, viz. less than 1.5%. It is provided with a built-in switch-controlled de-emphasis network for distortion measurements.

The tuned circuit of the monitor is easily mounted in the transmitter aerial feeder. The use of germanium diodes eliminates the need for a power supply. The output load impedance of 2500 ohms unbalanced and the output of 0.1 volt at a frequency deviation of ± 50 kc/s suits a conventional audio amplifier.

The monitor as a part of the 50-ohm coaxial aerial feeder may be mounted horizontally or vertically. Adapters to match other feeder types are supplied to special order.

Coaxial switch type SFT 129

Type SFT 129 is a manually operated or remote-controlled commutator switch for use in VHF-FM and TV coaxial system.

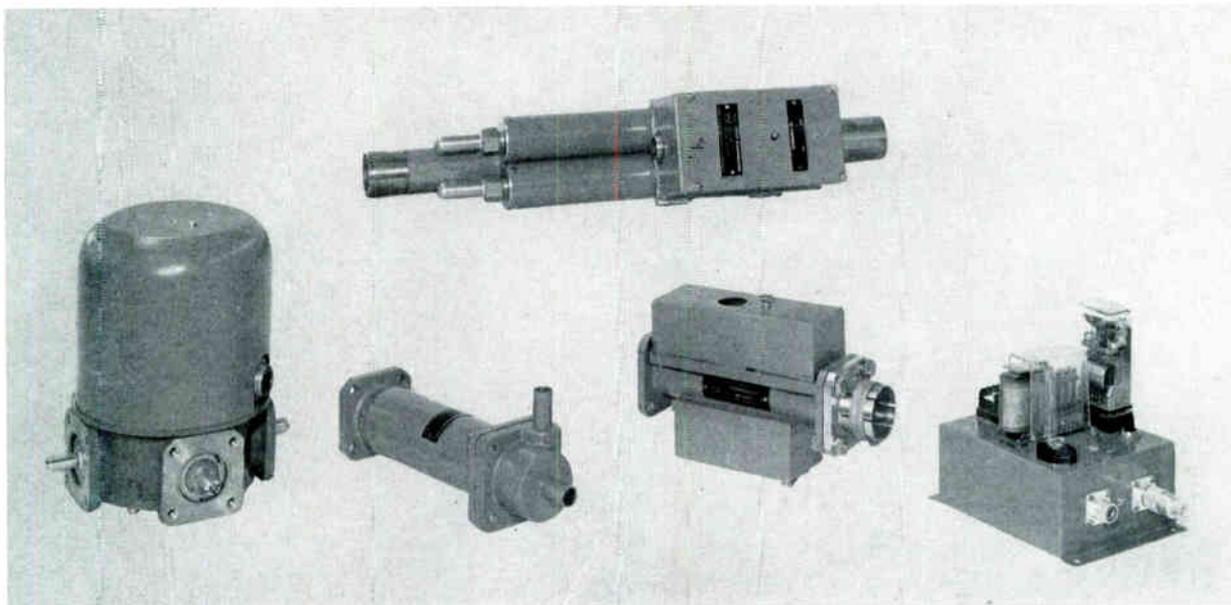
Its maximum power-handling capacity is 13 kW, its nominal impedance 50 ohms. The remote-controlled version is motor-driven.

Both versions have a set of microswitches for signalling and interlocking, and the motor-driven version also has microswitches for motor control.

Reflection losses are reduced to a bare minimum by precision tooling and careful assembly.

The four flanges of the switch fit 50-ohm coaxial tubing. Adapters to suit other types are supplied to special order. The switches are fitted with a position indicator.

VHF coaxial accessories — top: monitor type SBO 107 — bottom (from left to right): motor-driven coaxial switch type SFT 129, dummy load type SFT 125, reflectometer type SBE 547, reflection safety device type 8BL 501



division **Telecommunication**
section **Broadcasting**
product **VHF coaxial accessories**
pamphlet **R-63.1105**

Reflectometer type SBE 547

The reflectometer is a device to measure the forward and reflected power in FM 50-ohm coaxial feeder systems. The unit can be used for frequencies in the VHF range and for power up to 10 kW. The reflectometer type SBE 547 is suitable for measurement and actuation of safety device 8BL 501.

The reflectometers fit standard 50-ohm coaxial feeder tubing.

Reflection safety device type 8BL 501

The reflection safety device cuts off HT to the transmitter when the reflected power reaches a pre-deter-

mined level. The device is actuated by a reflectometer type SBE 547. It is housed in the actual FM or TV transmitter and is supplied as an optional extra.

Dummy loads types SFT 125 and SFT 126

These water-cooled dummy loads are suitable for frequencies up to 250 Mc/s. The type SFT 125 is rated for 6.5 kW max., and the type SFT 126 for 20 kW maximum.

They consist of a carbon resistor with a ceramic body; nominal impedance 50 ohms.



PHILIPS

Transmitter audio control equipment type SOX 118

General

The SOX 118 can be used when centralized control of incoming programmes for one or more transmitters in the same station is needed.

It contains facilities for the connection of up to 4 outgoing lines to transmitters and of two independent incoming programme lines, 2 local studio lines and one spare input. There is also a high-level input to which a local auxiliary studio may be connected when the studio lines are out of order.

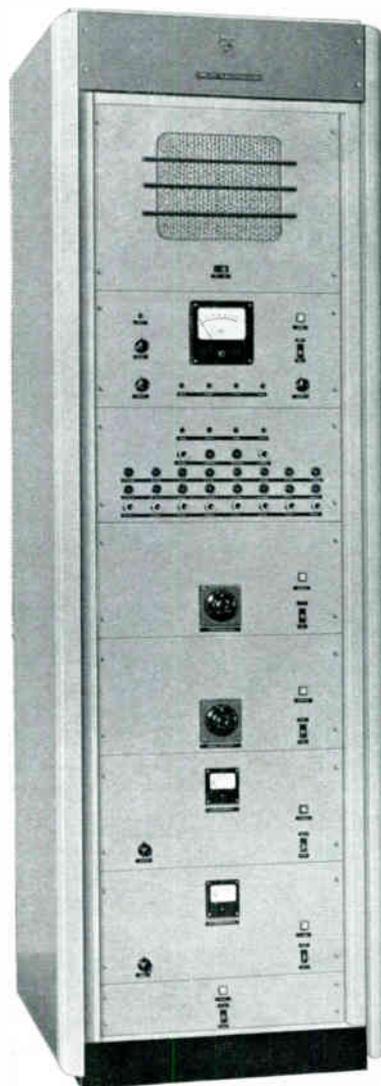
When a TV station is equipped with this rack, the type SBM 110 video pre-amplifier and correction-rack is recommended for the video section.

Description

The installation consists of a patch panel for incoming and outgoing lines, two high-quality linear amplifiers, two compression amplifiers, a monitoring loudspeaker and a level (VU) meter.

An incoming signal can be connected at will to one of the linear amplifiers and amplified to the required level. The signal is then fed to a compression amplifier, which prevents the transmitter(s) from being over-modulated. The programme can then be taken to one or more (of up to 4) transmitters. Via a separate monitoring amplifier the signal can be monitored at several points with the aid of the level meter and the loudspeaker.

The second available programme channel may be used at the same time for the same or an independent programme. High-quality amplifiers are employed which ensure very low distortion over a wide frequency range.



SOX 118 audio control equipment comprising from top to bottom: loudspeaker panel, monitor panel, patch panel, two programme amplifier panels, two compression amplifier panels and a switching panel



division **Telecommunication**
section **Broadcasting/Television**
product **Transmitter audio
control equipment**
type **SOX 118**
pamphlet **R-63.1123**

Mechanical design

All units are panel-mounted and housed in a 19-in. standard cabinet. The equipment is completely self-

contained and therefore easy to install. Space requirements are small.

Technical data

Programme channels a. two studio line inputs, each with adjustable gain and compression-rate controls; b. one spare input; c. one high-level input

Transmitter channels four transmitter line outputs
Input levels a. studio line input, adjustable between -16 dBm and +18 dBm; b. spare input as studio line input; c. high-level input +18 dBm

Note: 0 dBm = 1 mW into 600 ohms

Output levels +8 dBm \pm 2 dB

Input impedances 600 ohms balanced

Load impedances 600 ohms balanced

Linear distortion within \pm 1 dB from 30 to 15,000 c/s for a compression of 0-6 dB; reference 1000 c/s

Non-linear distortion better than 2% from 30 to 15,000 c/s without compression; better than 3% from 30 to 15,000 c/s with maximum compression of 18 dB

Hum and noise level better than -70 dB with reference to +8 dBm output

Gain max. 24 dB with or without compression

Compression if the input level exceeds the threshold value of 18 dB, the increase in output level is not more than 2 dB

Attack time less than 1 msec.

Release time adjustable at either 0.35, 0.7, 1.4 or 2.8 sec. (\pm 30%) to 63% of the normal output level

MONITORING CHANNEL

Load impedance 600 ohms (7 ohms on special request)

Output power max. 6 W

Linear distortion within \pm 2 dB from 30 to 15,000 c/s, reference 1000 c/s

Non-linear distortion less than 3% between 50 and 10,000 c/s for 6 W output

Power supply 220 V \pm 5%, 50 or 60 c/s \pm 5%, single phase

Power consumption approx. 250 W

Ambient temperature +10° C to +45° C under tropical conditions

Dimensions height 212 cm (84 in.); width 65 cm (26 in.); depth 68 cm (27 in.)

Weight approx. 200 kg (440 lb.) unpacked

Tube complement

Philips type	* CV number	* USA type
2 programme amplifiers type SFV 144		
2 \times EF86	2901	6267
2 \times EL91	136	6AM5
2 \times 5Y3GT	1856	5Y3GT
2 compression amplifiers type SFV 168		
2 \times EAA91	283	6AL5
4 \times EBF80	-	6N8
4 \times E80CC	-	6085
2 \times E80F	2729	6084
4 \times EZ90	493	6X4
1 monitor booster amplifier type SFV 166		
1 \times EF86	2901	6267
1 \times EF80	-	6BX6
1 monitor amplifier type SFV 146		
1 \times EF86	2901	6267
1 \times ECC81	455	12AT7
2 \times EL83	2726	6CK6
1 \times 5Y3GT	1856	5Y3GT



PHILIPS

Transmitter audio control equipment type SOX 137

General

The SOX 137 equipment provides means for centralized control at the transmitter station of all incoming lines from a distant studio.

It contains two independent programme channels with an equalizing and a compression amplifier, a patch panel for two incoming lines, a high-level input, a spare input, four outgoing lines to the transmitters and extensive monitoring facilities.

Description

Each programme channel comprises two cascaded amplifiers. The first amplifier is equipped with an adjustable equalizing circuit which may be used to compensate for the linear distortion caused by the cable between the studio and the transmitter station.

The second is a compression amplifier which maintains the AF output below a predetermined level, thus preventing the transmitter from being overmodulated. An incoming signal can be connected to one of the channels and amplified to the required level. The programme can then be taken to one or more (of up to 4) transmitters.

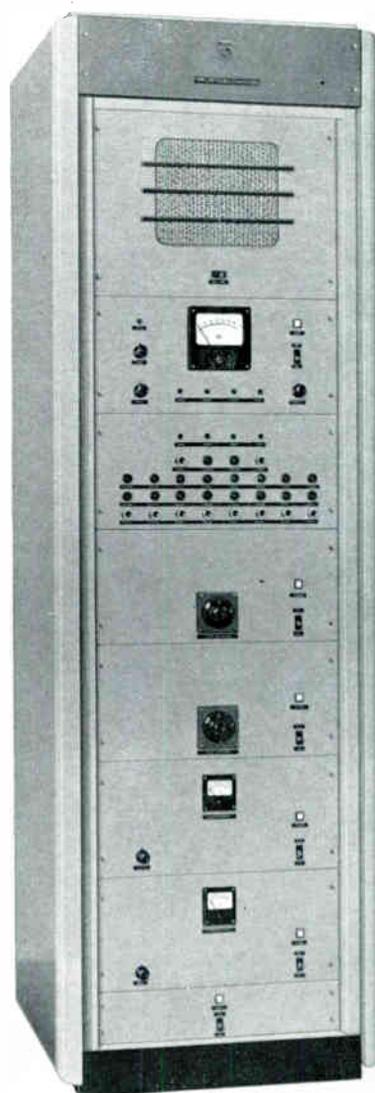
Via a separate monitoring amplifier the signal can be monitored at several points with the aid of the level meter and the loudspeaker. The second channel may be used at the same time for the same or a separate programme.

High-quality amplifiers are employed which ensure very low distortion over a wide frequency range.

Mechanical design

All units are panel-mounted and housed in a 19-in. cabinet. The equipment is completely self-contained and therefore easy to install.

SOX 137 audio control rack comprising from top to bottom: loudspeaker panel, monitor panel, patch panel, two equalizing amplifier panels, two compression amplifier panels and a switching panel



division Telecommunication
section Broadcasting
product Transmitter audio
control equipment
type SOX 137
pamphlet R-63.1122

Technical data

Programme channels a. two studio line inputs, each with adjustable gain, compression-rate controls and variable line equalization; b. one spare input; c. one high-level input

Transmitter channels four transmitter line outputs

Input levels a. studio line input, adjustable between -30 dBm and $+10$ dBm; b. spare input as studio line input; c. high-level input $+18$ dBm

Note: 0 dBm = 1 mW into 600 ohms

Output levels $+8$ dBm ± 2 dB

Input impedances 600 ohms balanced

Load impedances 600 ohms balanced

Linear distortion within ± 1 dB from 50 to $10,000$ c/s for a compression of $0-6$ dB; reference 1000 c/s

Non-linear distortion better than 2% from 50 to $10,000$ c/s without compression; better than 3% from 50 to $10,000$ c/s with maximum compression

Hum and noise level better than -60 dB with reference to $+8$ dBm output and without equalization

Gain max. 38 dB with 18 dB compression

Equalization value max. $+20$ dB at $10,000$ c/s, referred to 50 c/s

Compression if the input level exceeds the threshold value of 18 dB, the increase in output level is not more than 2 dB

Attack time less than 1 msec

Release time adjustable at either 0.35 , 0.7 , 1.4 or 2.8 sec. ($\pm 30\%$) to 63% of the normal output level

MONITORING CHANNEL

Load impedance 600 ohms (7 ohms on request)

Output power max. 6 W

Linear distortion within ± 2 dB from 30 to $15,000$ c/s reference 1000 c/s

Non-linear distortion less than 3% between 50 and $10,000$ c/s for 6 W output

Power supply 220 V $\pm 5\%$, 50 or 60 c/s $\pm 5\%$, single phase

Power consumption approx. 250 W

Ambient temperature $+10^\circ$ C to $+45^\circ$ C under tropical conditions

Dimensions height 212 cm (84 in.); width 65 cm (26 in.); depth 68 cm (27 in.)

Weight approx. 200 kg (440 lb.) unpacked

Tube complement

Philips type	* CV number	* USA type
2 equalizing amplifiers type SFV 167		
6 \times ECC81	455	12AT7
2 \times 5Y3GT	1856	5Y3GT
2 compression amplifiers type SFV 168		
2 \times EAA91	283	6AL5
4 \times EBF80	—	6N8
4 \times E80CC	—	6085
2 \times E80F	2729	6084
4 \times EZ90	493	6X4
1 monitor booster amplifier type SFV 166		
1 \times EF86	2901	6267
1 \times EF80	—	6BX6
1 monitor amplifier type SFV 146		
1 \times EF86	2901	6267
1 \times ECC81	455	12AT7
2 \times EL83	2726	6CK6
1 \times 5Y3GT	1856	5Y3GT



General

These aerials are used as artificial loads in cases where transmitter test operation and/or output power measurements are required and no signal is to be radiated.

Description

Measurements with these dummy aerials are based on the calorimetric principle, whereby the dissipative part of the load impedance is cooled by a flow of water. The dissipative section is composed of one or more ceramic tubes with a carbon layer. The power dissipated is calculated from the temperature rise and rate of flow in mass per unit time of the cooling water.

The temperature rise is determined by measuring the inlet and outlet water temperature with thermometers and the rate of flow with a water-flow meter. The dummy aerials described here are each equipped with these instruments. Measurement is accurate within approx. 5%. The power dissipated is calculated from the formula: $P = c (t_2 - t_1) Q$ where:

P = power in kW

c = constant factor (approx. 0.07)

t_2 = outlet temperature of water in °C

t_1 = inlet temperature of water in °C

Q = rate of water flow in litres per minute

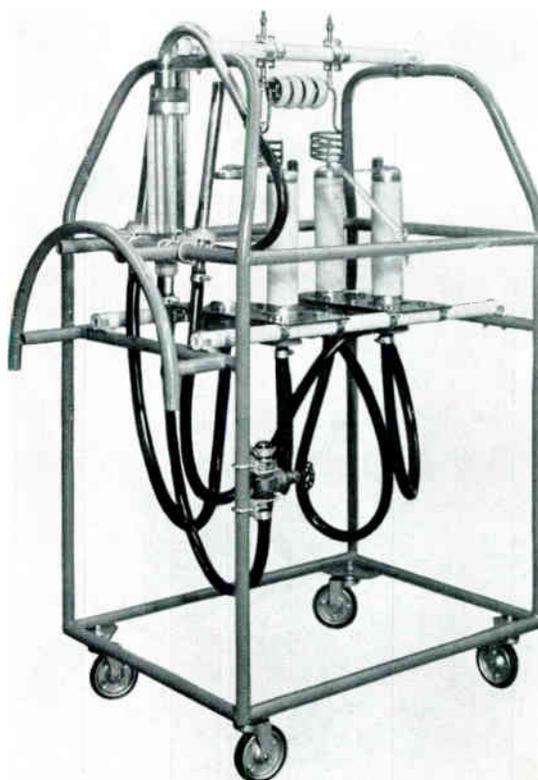
The required water pressure is between 1.5 and 5 kg/cm² for all types of aerials. SWR = 1 : 1.05 for 50 c/s–1.6 Mc/s and 1:1.4 for 1.6–30 Mc/s.

Note: the 50 and 75 ohms type 8RT 501 can only be used for up to 1.6 Mc/s.

Mechanical design

The components—water-cooled resistance rods, thermometers, valves, tubing etc.—are mounted on a welded tubular steel frame, which is portable, mobile or stationary, depending on the size of the dummy aerial.

type 8RT 501 mobile dummy aerial with a dissipative power of up to 80 kW



division	Telecommunication
section	Broadcasting
product	HF dummy aerials
types	8RT 501, 8RT502, 8FT 506
pamphlet	R-63.1124

Technical data

TYPE 8RT 502 DUMMY AERIAL

Version portable

Max. dissipative power 20 kW

Impedance 50, 75, 300 or 600 ohms balanced; 50, 75 or 300 ohms unbalanced

Water consumption up to 25 liters/min.

Diameter of connecting water-pipe $\frac{3}{4}$ in.

Dimensions height 52 cm (21 in.); width 65 cm (26 in.); depth 40 cm (16 in.)

TYPE 8RT 501 DUMMY AERIAL

Version mobile

Max. dissipative power 80 kW

Impedance 50, 75, 300 or 600 ohms balanced; 50, 75 or 300 ohms unbalanced

Water consumption up to 40 litres/min.

Diameter of connecting water-pipe $\frac{3}{4}$ in.

Dimensions height 135 cm (54 in.); width 92 cm (37 in.); depth 60 cm (24 in.)

TYPE 8FT 506 DUMMY AERIAL

Version stationary

Max. dissipative power 180 kW

Impedance 230 ohms unbalanced; 320 ohms balanced

Water consumption up to 100 litres/min.

Diameter of connecting water-pipe 2 in.

Dimensions height 200 cm (80 in.); width 130 cm (52 in.); depth 70 cm (28 in.)



PHILIPS *Broadcast aerials*

General

The aerial used with broadcast transmitters has just as much influence on the performance of the transmitter as, for example, the transmitter power.

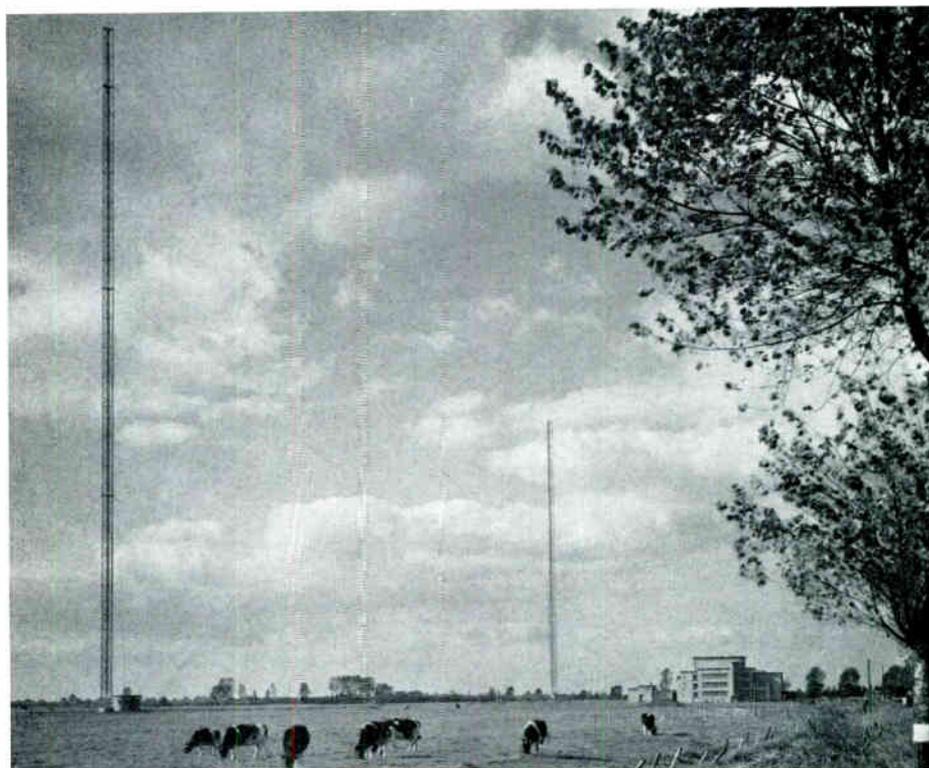
For this reason it is necessary to adapt the aerial to the area to be covered and to local circumstances. In medium-wave broadcasting the extent and the shape of the area to be covered are matters of importance. In short-wave broadcasting the distance to be spanned, the extent of the area to be covered and the operating frequency should be taken into account. Backed by long experience in the field of aerials and the propagation of radio waves, Philips engineers are

in an excellent position to work out complete projects, if this should be required.

It is not possible to list all the aerials that can be supplied and therefore the main groups are summarized below to give the reader an impression of the various possibilities.

Aerials for the medium-wave band

Guyed radiating towers are usually employed for broadcasting in the medium-wave band. The height of these towers varies between 0.17 and 0.63 of the wavelength.



broadcast aerials for the medium-wave band (Netherlands)



division **Telecommunication**
section **Broadcasting**
product **Broadcast aerials**
pamphlet **R-63.1112**

Aerials for the medium-wave band (continued)

There are several types of tower, all of which can be fitted with obstacle lights, if so required. The towers usually have a triangular cross-section and are completely hot-dip galvanized. An earthing system is essential for proper operation.

In special cases, if additional radiation or the suppression of radiation in one or more particular directions is required, arrays made up of several towers can be supplied.

Aerials for the short-wave bands

Dipole aerials and dipole arrays

Dipole aerials are principally used to span relatively short distances (less than 1500 to 2000 km).

The dipole aerial is also used as part of a dipole array. Arrays with vertically upward radiation are used for broadcasting in the tropics. Curtain arrays are used for radiation over large distances.

The direction of radiation can be changed within specific limits by changing the phase relationship existing between the various groups of dipoles.

Rhombic aerials

Rhombic aerials are used to span distances in excess of 1500 to 2000 km.

Their principal properties are: simplicity of design, large bandwidth and high gain.

The ever-changing propagation conditions often necessitate the use of two different aerials for broadcasting in one and the same direction.

The most economical solution is then to suspend the two rhombic aerials concentrically from the same masts.

Feeders

Feeders link up the transmitter with the aerial. A distinction is made between balanced and unbalanced feeders. Either type can be supplied as open-wire lines and the unbalanced types as enclosed or coaxial lines.

Feeder switches

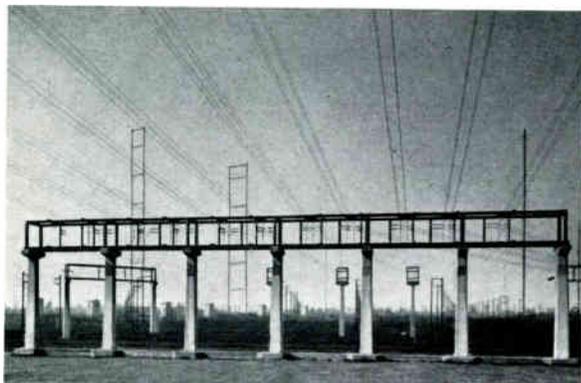
These switches are employed to change over the various aerials to one or more transmitters or to change the direction of radiation of the aerial system. There are both open and coaxial versions of these switches.

Masts

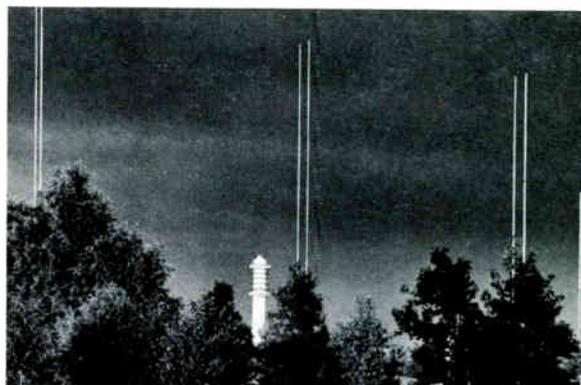
In addition to the mentioned radiating towers above, hot-dip galvanized lattice-type masts for supporting the aerials can be supplied in several versions and lengths.

They can be fitted with obstacle lights, if so required.

open 4-line feeders of the Dutch World Broadcasting Centre



dipole aerial system at Lopik (photo Eva Eckhardt)



PHILIPS

Philips Audio equipment for broadcast and television studios

(ELA Division — Eindhoven)

General

Philips offer a complete range of audio equipment for broadcast and television stations. Only a general and brief impression is given here, but detailed information will be supplied on request.

Moreover, the Electro-Acoustics Division in Eindhoven will gladly assist in the planning of small or elaborate installations and at the same time advise on the latest developments in this field.

Microphones

High-quality studio and general-purpose microphones with various directional characteristics are produced. The most important types are:

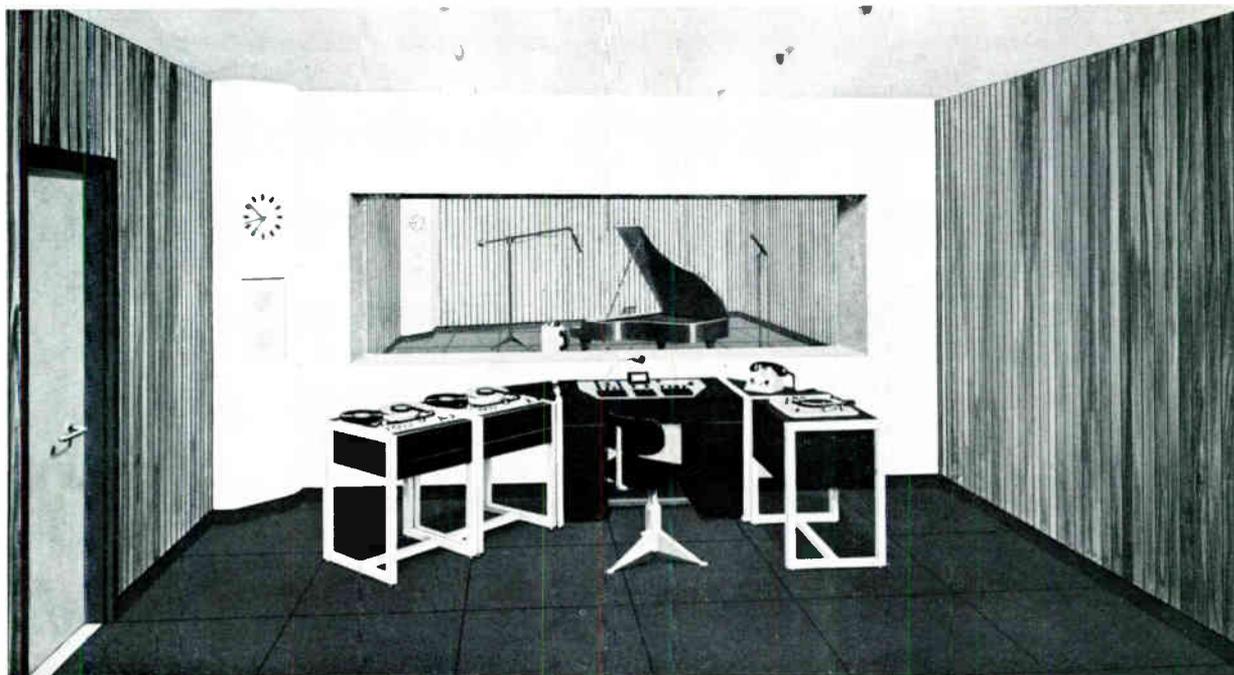
EL 6050/01 Condenser microphone featuring excellent sound reproduction, switch-selected directional characteristics (omnidirectional or cardioid) and built-in pre-amplifier.

C 60 Condenser microphone of light weight and small dimensions, with superior frequency response. It is supplied with cardioid capsule CK 28. This can be exchanged for a CK 26 omnidirectional capsule.

EL 6031 Moving-coil microphone with a cardioid directional response.

A great variety of accessories such as floor stands, screened cables, connectors, etc. is available.

typical lay-out of modern studio



division Telecommunication
section Broadcasting/Television
product Audio equipment for broadcast
and television studios
pamphlet R-63.1109

Consolette type EL 3700

This extremely versatile consolette, type EL 3700, contains all the necessary amplifiers with the exception of the 20-W monitor amplifier, which is accommodated with the power supply unit in a separate wall cabinet.

This equipment offers the following principal features:

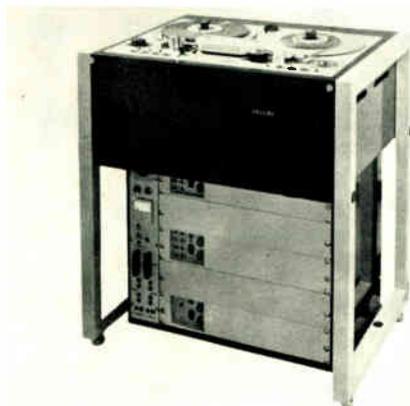
eight mixing channels comprising four microphone channels, two turntable channels and two line channels, each with numerous key and push-button selection facilities. A large-scale illuminated standard VU-meter and an extra meter for checking valve currents are built in.

The equipment is suitable for use with two separate studios while several facilities can be easily added.

Turntable type EMT 930

This turntable with pick-up arm has been designed for playing gramophone records up to 33 cm (13 in.) in diameter at speeds of 78, 45 and 33 $\frac{1}{3}$ r.p.m. The

studio tape recorder EL 3562/3564



quality of reproduction is of a very high standard. Features: highly uniform, slightly adjustable speed; extremely low wow, flutter and rumble figures; instantaneous starting by local or remote control. It is supplied with a built-in equalizing amplifier.

Tape recording equipment

Several types of tape recorders in both studio and transportable versions are available.

EL 3562/3564, a studio tape recorder in console offering the following features:

two tape speeds: 7 $\frac{1}{2}$ and 15 in. per second; tape path conforming to CCIR 1; wide dynamic range; instantaneous starting and stopping; fast winding and re-winding; optical-electronic control of tape tension; head assembly of plug-in type; adapted to American and European reels; long-life valves; push-button operation; high-precision elapsed-time indicator; remote-control facility; adjustable equalizers; adaptable for stereo and 3 to 4 channel recording.

Pro' 20 (EL 3566), a transportable recorder for studio and field work, satisfying very high demands; tape speeds 7 $\frac{1}{2}$ and 15 in. per second. Can be used for CCIR, NARTB and Cine spools. A special input permits the direct recording of microphone signals. The tape deck and amplifier are separate units enclosed in sturdy cabinets. The Pro' 20 can be operated in a horizontal or vertical position and can also be mounted in 19-inch racks. If the recording heads are changed and a second amplifier unit added, the equipment can be used for stereophonic recording and playback. A built-in VU-meter indicates the recording level of line input and/or microphone input signals. Devices to facilitate editing are incorporated. A stationary, console-mounted version is also available.