TELEFUNKEN

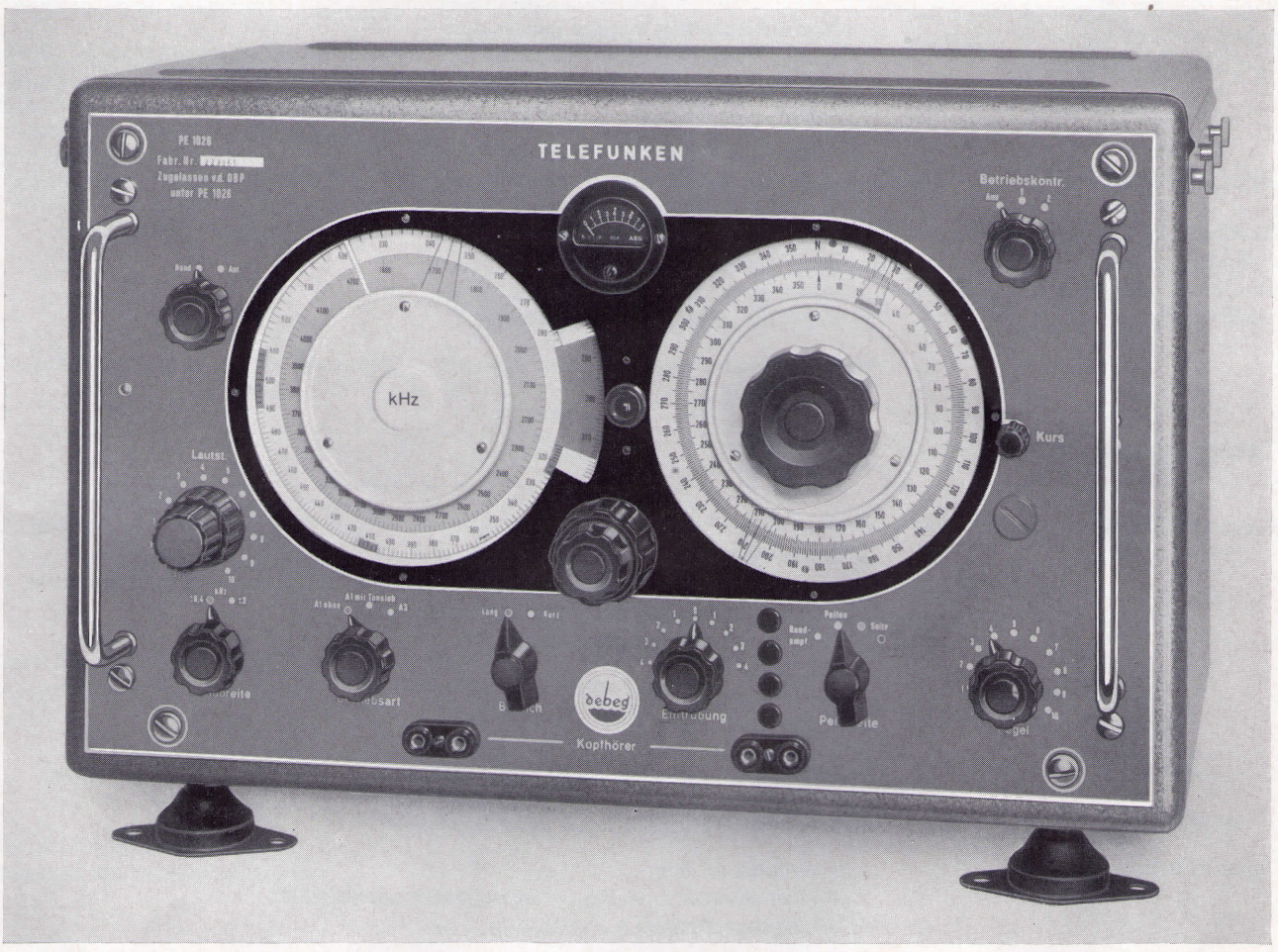
TELEGON V

Radio Direction Finder Equipment with Aural Minimum and Automatic Follow-Up Direction Finding Method, PST 1026

Frequency Range: 230 to 538 kHz and 1.6 to 4.2 MHz

Leaflet

IB 600 E



3-15749.1

Direction Finder Unit PE 1026/1

General Remarks

Modern radio navigation calls for a direction finder unit which automatically indicates the DF bearing with correct sense after it has been tuned to the reception frequency. The DF unit must also be operatable by untrained persons, in accordance with a set of operating instructions. The DF bearing reading must be unambiguous within the ground-wave range of the observed transmitter. The Radio DF Equipment

TELEGON V, Type PST 1026

fulfils these requirements. DF bearings can be taken with this equipment according to two different methods. Firstly, DF bearings can be taken by the classical aural minimum DF method with zero-sharpening and aural (acoustic) sense determination; secondly, according to the follow-up DF method with automatic DF bearing and sense indication.

Applications

For taking DF bearings on maritime and coastal radio stations, beacon ships, etc. according to the follow-up method (fully automatic setting, onto the DF azimuth, with correct sense), or according to the aural minimum method. Homing course onto transmitters according to the automatic 0° indication on the DF bearing scale. Also suitable for omnidirectional reception of all services, e.g. for monitoring weather, warning and time signal services, MF/HF telephony, broadcast transmissions and similar items. The DF equipment is particularly suited for installation on ships or in coastal radio DF stations.

Special Features

Automatic DF operation and aural minimum DF operation combined in one equipment, selectable with DF operating mode switch.

Omnidirectional reception selectable with DF/Sense switch.

Monitoring facilities for the communications content during automatic DF operation, even when the goniometer is turned to the DF setting.

Highly efficient DF performance with modern circuit for the follow-up DF method.

Facilitated DF operation with automatic DF method, since fluctuating zero-aberration voltages have little effect on the DF process. No manual actuation of the zero-sharpening control necessary.

High DF accuracy through the good response sensitivity of the follow-up circuit for automatic setting of the goniometer.

Automatic sense determination with follow-up DF method. No manual operation of DF/Sense switch necessary. Aural-minimum operation very well defined, through actuation of the DF/Sense switch without turning the goniometer out of the DF bearing setting.

Meter indication for fine tuning and relative field strength measurement with automatic DF operation, resp. AF output voltage for aural minimum DF operation.

Equipment operational check for testing the DF antenna and the DF input circuit for both modes of DF operation.

Compensation of quadrantal DF errors through incorporation of compensating coils, individually for each range.

Course scale adjustable manually, or automatic follow-up drive from gyro compass with repeater compass. Auxiliary unit can be fitted to receiver subsequently.

Power supply optionally from AC board mains or board emergency battery, or from local mains supply for land-based DF installations.

Convenient maintenance through easy accessibility of all equipment sections, thus also easy tube replacement.

Technical Data

Frequency Ranges (Wavebands)	
LF:	230 to 538 kHz (558 to 1300 m) The range from 285 to 315 kHz, as principal navigational range, possesses a particularly enlarged scale (bandspread facility). The navigational frequency sub-ranges 285 to 325 kHz 405 to 415 kHz 490 to 510 kHz are marked in blue. The operational check frequency range from 356 to 360 kHz is marked in red.
MF/HF:	1600 to 4200 kHz (71.5 to 187 m)
Types of Service:	A1 without AF filter A1 with AF filter ±100 Hz, center frequency about 850 Hz A2, A3 reception
Operating Modes:	Omnidirectional reception, with MGC Automatic DF operation, with AGC Aural minimum DF operation, with MGC Sense determination for aural minimum DF operation Equipment operational check function
DF Accuracy and Equipment DF Errors:	better than ±0.75°
DF Sensitivity for Aural Minimum DF Operation:	For a DF accuracy of ±1°, by virtue of the convenient interpolation on the goniometer scale, only the following field strength is required: 2.5 μV/m for A1 operation; loop diameter 1.10 m, RF cable length 12 m; about 10 times this field strength is required for an aural minimum width of ±1°. Measured according to the recommendations of the FTZ of the Federal German Post Office, at 300 kHz and for ±0.4 kHz bandwidth

DF Sensitivity for Automatic DF Operation:

For a pointer fluctuation of ±1° about the correct DF bearing indication, a field strength of 3 μV/m is required, with 1.10 m diameter DF loop, 12 m RF cable length and normal external noise level

Setting Accuracy:

Full-circle scale with about 355° coverage; scale with floodlight illumination

LF:

1 mm pointer displacement represents about 0.8 kHz frequency change

MF/HF:

1 mm pointer displacement represents about 10 kHz frequency change

Intermediate Frequency:

180 kHz

IF Bandwidth for Aural Minimum DF Operation and Omnidirectional Reception:

sharp (narrow) ±0.4 kHz
broad (wide) ±3 kHz

IF Bandwidth for Automatic DF Operation:

≦ ±0.2 kHz

Selectivity for Aural Minimum DF Operation and Omnidirectional Reception:

frequency displacement from passband center for

	3 dB down	20 dB down	40 dB down	60 dB down
sharp	±0.4 kHz	±1.1 kHz	±1.7 kHz	±2.4 kHz
broad	±3.0 kHz	±4.7 kHz	±6.8 kHz	±12.0 kHz

Selectivity for Automatic DF Operation:

frequency displacement from passband center for

3 dB down	20 dB down	40 dB down	60 dB down
≦ ±0.2 kHz	≧ ±0.35 kHz	≧ ±0.55 kHz	≧ ±0.8 kHz

Omnidirectional Reception Sensitivity:

The following field strengths are required for a signal/noise ratio of 10 dB:

for A1 reception 4 μV/m
for A2, A3 reception 11 μV/m with 100 % modulation depth

measured for an IF bandwidth of ±0.4 Hz and 300 kHz reception frequency

Zero-Sharpening Voltage for Aural Minimum DF Operation:

continuously adjustable from zero to

±%	15	30	50	100
at	250 kHz	500 kHz	2 MHz	4 MHz

of the maximum DF voltage

Sense Determination Ratio for Aural Minimum DF Operation:

in LF range better than 1:5
in MF/HF range better than 1:4
from 3.0 MHz to 4.2 MHz better than 1:2.5

Antennas:

a) single turn air-cored crossed loop antenna, 1.1 m diameter
b) sense antenna rod about 3.5 m long, arranged centrally in DF loop

Compensations Possibilities for D-Errors:

LF Range (4 coils)	MF/HF Range (3 coils)
3 to 7°	9 to 13°
8 to 12°	14 to 18°
13 to 17°	19 to 23°
18 to 22°	

Graded in whole numbers of degrees

Meter Indication: (illuminated scale)

a) tuning indication for both types of DF operation
b) output (AF voltage) for aural minimum DF operation
c) relative field strength indication for automatic DF operation

Gain Control for Aural Minimum DF Operation and Omnidirectional Reception:

RF preselector stage voltage-delayed, mixer stage, IF stage, all manually controllable

Gain Control for Automatic DF Operation:

The IF output voltage changes by a maximum factor of 18 dB for a field strength change of 120 dB

AF Outputs:

a) for headset connection; 4 kΩ, 50 mW output power, harmonic distortion factor $\leqq$ 5 %
b) loudspeaker (built-in); 10 Ω, 100 mW output power, harmonic distortion factor $\leqq$ 10 %

AF Passband:

without AF filter 300 Hz to $>$ 10 kHz for 3 dB down, relative to 850 Hz;
with AF filter 750 Hz to 950 Hz for 3 dB down, relative to 850 Hz

Operational Check:

test frequency 358.3 kHz, crystal controlled

Tubes Fitted:

4 tubes EF 85
2 tubes EBF 80
2 tubes ECH 81
2 tubes ECC 81
2 tubes EL 803

Temperature Range:

+10 °C to +40 °C full guarantee of performance specifications
−20 °C to +50 °C able to function
−40 °C to +70 °C may be stored

Power Supply:

a) from Mains Power Unit N 1026

power consumption	about 90 VA
current drain	at 220 V, 50 Hz, 410 mA
	at 110 V, 50 Hz, 820 mA
Power Output:	
anode voltage	+250 V, 120 mA, about 30 W
filament voltage	7 V AC, 4.5 A, about 32 VA
bias voltage	−65 V, 1 mA, about 0.7 W

The mains power unit is switched on and off from the DF receiver unit

b) from Power Supply Unit StG 1026

power consumption:	24 V DC, about 4.6 A, 110 W
Power Output:	
anode voltage	+250 V, 120 mA, about 30 W
filament voltage	7 V AC, 4.5 A, about 32 VA
bias voltage	−65 V, 1 mA, about 0.7 W

The power supply unit is switched on and off from the DF receiver unit

Dimensions and Weights:

	Height about mm	Width about mm	Depth about mm	Weight approx kg
Single-Turn Crossed-Loop DF Antenna PR 310	1300	1140	1140	
with Sense Antenna	3730	–	–	11.5
Tubular Shaft	2500	100 diam.	–	20
Fixing Flange	–	400 diam.	–	
DF Receiver PE 1026	320	518	266	27
overall measurements	352	530	369	
Mains Power Unit N 1026	130	175	240	5.5
overall measurements	–	–	265	

Further details are given in our Description KB 075 E

ALLGEMEINE ELEKTRICITÄTS-GESELLSCHAFT
AEG-TELEFUNKEN
Geschäftsbereich Nachrichtentechnische Anlagen
Export
Fachbereich Anlagen Hochfrequenz
Technische Informationsstelle
79 Ulm · Elisabethenstraße 3

N1 2.6 Nov. 67 (Eb)