TELERAD

Aeronautical and Maritime Radiocommunication Systems

VHF TRANSCEIVER

EMRY991N

The EMRY991N unit is a VHF ground transceiver derived from the TELERAD 900 series technology which already proved its utmost reliability.

OVERVIEW

Especially designed for voice communication in control towers, control shelters or ships, the EMRY991N can be used for the Navy communications (Navy Mobile Service channels*) in frequency modulation.
The channel spacing and associated bandwidth parameters are automatically determined by the displayed frequency value, in accordance with annex 10 of the ICAO recommendations.
For transmission, the operator can, at any time, select one of two output levels : nominal power or reduced power.
There are 99 channels available to users with frequencies, power levels (normal or reduced) and with squelch initiation levels that can be programmable individually.
Principally designed to be operated by a controller from a front panel which includes all the required elements and required ergonomics, the set is also equipped with all the means of access required for remote operation and a remote control/supervision serial link.
The control human/machine interface consists of a keyboard and a display unit with four lines of 20 characters each, all operated in "menus" mode.
The rear panel has separate RF connectors for transmitter and receiver section, and also a location for a coaxial relay, allowing the use of one common T/R antenna, or separate T and R antennas according the installation.
The transceiver, is 19" wide and 3U high, and can be supplied in rack mounting or desk version.

GENERAL CHARACTERISTICS

Frequency range:
118-144 MHz in A3E mode
118-163 MHz in F3E and G3E modes
Other frequency range in option

Channel spacing:
25 kHz (12.5 kHz), 8.33 kHz automatic selection according to the frequency coding (ICAO annex 10) in A3E mode

Preset channels:
99 preset channels with frequency, offset frequency, bandwith, power level, squelch threshold level parameters

Frequency accuracy:
1 ppm

Remote control:
- By series link RS485, under JBUS protocol
- 3 wires parallel access (channels 1 to 8)

Radio squelch:
locking of a loop to the ground to forbid transmission

Power supply (all versions):
DC: 21-31 V_{DC} (rated 24 V)

Power supply EMRY991NxA:
AC: 85-265 V_{AC}, 47-63 Hz

Mechanical characteristics:
- 132 mm x 430 mm x 470 mm (H x W x D)
- Weight: 12 kg about

Climatic and environmental characteristics:
- Operating temperature: -20 °C to +55 °C,

95 % relative humidity at +40 °C (non-condensing)
- Temperature storage: -40 °C to +80 °C

TRANSMISSION SECTION

Power consumption:
- Typical at 24 V_{DC}: < 12 A
- At 115 V_{AC}: < 4.4 A
- At 230 V_{AC}: < 2.2 A

Output power (at 24 V_{DC}):
- ≥ 50 W as a nominal value can be reduced to 10 W by the user
- > 30 W for NL version (A3E > 144 MHz)
- Reduced power: adjustable down to 10 W
- Reduced power on load mismach = normal operation up to SWR = 2. Gradual power reduction for VSWR > 2. No damage on infinite VSWR.

Frequency stability (between -20 and +55°C):
± 1 ppm

Channel spacing:
25 kHz in AM and FM, or 8.33 kHz in AM

Offset carrier generation (25 kHz channels):
in accordance with annex 10 of ICAO compatible: 2, 3 or 4 carriers (only in AM)

Silent key:
closing of a loop to ground to prohibit transmission

Modulation:
- Modulation types: A3E, F3E or G3E
- Input level with 600 Ω: -30 to +10dBm.
- Sensitivity: adjustable by -30 to 0 dBm by step of 6 dB
- Level regulation: < 1dB for a 30 dB variation of the input level above the compression threshold (Typ. 0.3dB)

A3E modulation (all versions):
- Modulation depth: > 85 %
- Harmonic distortion: < 5 % at 1 kHz (Typ. 1.5 %)
- AF bandwidth at 3 dB in 25 kHz: > 300-3400 Hz, ≤ -30 dB at 5000 Hz
- AF bandwidth in 8.33 kHz: ≥ -3 dB at 2500 Hz, ≤ -40 dB at 3200 Hz.
- Residual Modulation: < -50 dB (0 dB at 85 % mod. 1000 Hz), (Typ. 55 dB)

F3E or G3E modulation (EMRY991NFx versions):
- Frequency excursion: 4.25 kHz ± 0.5 dB (at 1 kHz)
- Modulation bandwidth at −4 dB: > 300-3400 Hz
- Harmonic distortion: < 5 %
- Modulation residual noise: < -35 dB (0 dB at 4.25 kHz excursion at 1 kHz)

Spectral purity
- Harmonics: < -36 dBm
- Spurious: < -46 dBm pour ΔF > 100 kHz
- Wide band noise at ± 1% of Fo: < -150 dBc/Hz
- ACP in accordance with ETSI EN300676: < -70 dBc at 25 kHz, < -50 dBc at 8.33 kHz

OPTIONS

- Maritime Mobile Service (SMM)
- Coaxial relay
- Accessories: microphone, headset, control unit for remote operation
- Maintenance: measuring panel for maintenance, PCB extension
- Extended frequency range: 116-154 MHz A3E/30 W (NLA and NLB versions)

RECEPTION SECTION

Power consumption
- At 24 V_{DC}: < 1.5 A
- At 115 V_{AC}: < 0.8 A
- At 230 V_{AC}: < 0.5 A

Frequency stability:
± 1 ppm between -20°C and +55°C

Channel spacing:
25 kHz, 12.5 kHz and 8.33 kHz

Sensitivity:
(S+N)/N ≥ 10 dB for a 1.5 µV signal 30 % modulated at 1000 Hz (CCITT weighting)

Overall selectivity:
- 25 kHz channel spacing: > ± 8 kHz at -6 dB / ≤ ± 18.5 kHz at -60 dB
- 8.33 kHz channel spacing: > ± 3,5 kHz at -6 dB / ≤ ± 8 kHz at -60 dB

Image rejection:
≥ 80 dB

Preset channels:
99

Channel monitoring through polling (option):
main operation + maximum 9 channels

Remote control:
- Configurable serial access: current loop 0/20 mA, RS485
- 3-lead parallel access: channels 1 to 8

Frequency display:
in compliance with annex 10 of ICAO

Overall bandwidth:
- 25 kHz channel spacing: ≥ ± 11 kHz at 6 dB / ≤ ± 25 kHz at 60 dB
- 8.33 kHz channel spacing:≥ ± 3.5 kHz at 6 dB / ≤ ± 8 kHz at 60 dB

IF filters switch:
automatic depending on the frequency

3rd order intermodulation:
≥ 80 dB for 2 signals, 0.5 and 1 MHz apart (ref. 0.5 µV)

Transmodulation:
≥ 95 dB for an interfering signal 0.5 MHz apart (ref. 1.5 µV)

AGC regulation:
≤ 3 dB (between 3 µV and 500 mV emf)

Squelch:
adjustable (locally or through remote control) from 1 to 15 µV

AF outputs:
- Balanced 600 Ω line: adjustable between +10 dBm and -17 dBm at 80 % modulation
- Bandwidth at 3 dB (25 kHz): > 300-3400 Hz
- Bandwidth at 3 dB (8.33 kHz): > 300-2500 Hz.
- Harmonic distortion: ≤ 5 % (1 kHz, m = 0.6 in AM), ≤ 8 % (1 kHz, ΔF = 4.25 kHz in FM)
- At headset socket: 2 mW max. at 600 Ω
- Power at loudspeaker: 6 W max. at ≤ 8 %
- AF compressor: threshold at 50 %, desactivable

RF outputs:
- Level at 50 Ω: 2 dBm ± 3 dB (transmitter excitation)
- Noise beneath the carrier: > 150 dBc/Hz (at 1 % of Fo)

VERSIONS

- EMRY991NA: A3E, 50 W - AC/DC version
- EMRY991NB: A3E, 50 W - DC version
- EMRY991NFA: A3E, F3E, 50 W - AC/DC version
- EMRY991NFB: A3E, F3E, 50 W - DC version
- EMRY991NGA: A3E, G3E, 50 W - AC/DC version
- EMRY991NGB: A3E, G3E, 50 W - DC version
- EMRY991NLA: A3E, 30 W - wide band AC/DC version
- EMRY991NLB: A3E, 30 W - wide band DC version

2, avenue de la Butte aux Cailles - BP 302 - 64 603 ANGLET CEDEX - FRANCE
Tel.: +33 (0)5 59 58 55 00 - Fax: +33 (0)5 59 58 55 01 - Email: courrier@telerad.fr

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