RF2050 - EPM mobile transceiver

Type designation: **RF2050**
PN (RN): **2310.100.11**

RF2050 mobile multiband transceiver with increased resistance against radio-electronic warfare is intended for installation in all tracked and wheeled vehicles. It is fully compatible with RF20 and RF23 transceivers. Depending on the selected frequency band, the transceiver communicates with older RF13 and RF1301 transceivers. You may use two types of modems on frequency hopping channels - P2P and NET to transfer data. On fixed frequency channels you can use the NET modem complying with MIL-STD-188-220, which is compatible with MD13.1 modems or with modems in ZV13.1 amplifiers. The transceiver design allows easy upgrading of existing vehicle installations.

The transceiver is manufactured in two versions: 2310.100.10 without the co-site filter and 2310.100.11 with the co-site filter.

The co-site filter allows simultaneous operation of multiple RF2050 transceivers or of one RF2050 transceiver with RX2050 receivers in one vehicle in 30 MHz to 90 MHz operating band. There must be at least 1.5 m between the recommended types of vehicle antennas and spacing between receiving and transmitting frequencies of at least 10 % to guarantee compatible operation.

The RF2050 transceiver can also be remotely controlled over PRC20 protocol, which allows the transceiver implementation in the AR20 automatic rebroadcast station and connecting of the RC20 remote control.

Operating features

a) in all operation modes
• automatic self-test after power-up, with failure indication on the transceiver display (BITE);
• operational data programming from external units;
• emergency erasure of operation data on fixed frequency channels, including encryption unit codes and information for FH networks including TRANSEC and COMSEC;
• acoustic signaling switching on/off by transceiver operator;
• transmission of tone calling (1000 ± 200) Hz, in VHF III band (1750 ± 25) Hz;
• display and keypad backlight;
• adjustable display contrast;
• transmission power signaling on the display, transmission signaling by LED on the top panel;
• operation channel signal reception signaling by a LED on the transceiver panel;
• transmitter overheat signaling LED on the transceiver panel with automatic

switching to lower power output;
• signaling of active mode with co-site filter (version 2310.100.11);
• optional external cooling box for improved cooling efficiency;
• "reception only" mode, with transmission disabled;
• whisper mode with increased microphone sensitivity and decreased audio volume;
• loud received signal monitoring with volume regulation and LED signaling;
• transceiver remote control via PRC20 protocol;
• configurable transceiver output for operation with antennas for VHF I, VHF II and VHF III tactical bands;
• displaying of servicing information – firmware;
• position, velocity and time display on the LCD with GPR23 receiver connected;
• easy to control.

b) in fixed frequency mode
• max. 10 presets from the entire frequency range 25 MHz to 145.9875 MHz, fewer preset channels if occupied by FH networks;
• simplex or semi-duplex operation;
• 150 Hz sub-tone squelch or signal squelch (only signal in VHF II);
• voice operation via internal encryption unit compatible with RF13, RF20, RF23;
• transmission and reception of short encrypted messages – FLASH, with the opposite transceiver identification;
• channel parameter programming from keypad;
• preset channel scanning;
• data transmission according to MIL-STD-188-220 compatible with modems MD13.1;
• direct dialing when calling from transceiver to a fixed telephone network;
• operation frequency setting in 6.25 kHz, 8.33 kHz, 25 kHz or 1 MHz steps;
• transmission band for digital voice and data transmission 16 kbit/s according to STANAG 4204, edition 2.

c) in FH operation
• max. 6 network presets;
• operation in frequency range 30.000 MHz to 87.975 MHz;
• secure operation TRANSEC and secret operation COMSEC;
• simplex or semi-duplex operation with frequency hopping;
• compatibility with RF20 and RF23 transceivers and RX2050 receiver on simplex and semi-duplex channels;
• selectable frequency hopping operation mode – FH, DFF, FCS and MIX with quick transition to HLC, HLG or HLA;
• communication on the channel with a continuous carrier;
• iso-fixed frequency operation mode;
• establishing of connection with fixed frequency transceivers through HLC and HLG monitoring;
• 121.500 MHz (HLA) frequency monitoring and transition to HLA with transmission disabled;
• late net entry with synchronization request;
• master transceiver switching depending on the network condition;
• transmission of warning message to all network participants;
• all MASTER transceivers authentication request;
• MASTER transceiver selective communication with a selected slave transceiver;
• transmission and reception of short text message, maximum 156 characters;
• preparation, saving and reading of up to 10 short text messages;
• transmission over notification (BREAK IN) by all transceivers;
• INTERLEAVING switching off for close-to-the-limits communication;
• data transmission at adjustable rates – 7100 bit/s, 4800 bit/s and 2400 bit/s (P2P);
• data transmission according to MIL-STD-188-220 (NET);

• CW mode suitable for use with external frequency converters;
• G-track, sending position reports via radio channel (with GPR23 receiver connected);
• own position sending by SMS (with GPR23 receiver connected).

Technical parameters

Frequency range	25.0000 MHz to 145.9875 MHz
Nominal input/output impedance	50 Ω
Frequency ranges	
HF	25.000 MHz to 29.975 MHz
VHF I	30.000 MHz to 108.000 MHz
VHF II	117.975 MHz to 140.000 MHz
VHF III	140.0250 MHz to 145.9875 MHz
Type of modulation	
HF	F3E (FM)
VHF I	F3E (FM)
VHF II	A3E (AM)
VHF III	F3E (FM)
Channel spacing	
HF	25 kHz
VHF I	25 kHz; 12.5 kHz; 6.25 kHz
VHF II	25 kHz; 8.33 kHz
VHF III	25 kHz; 12.5 kHz
Number of operation channels with 25 kHz spacing	
HF	200
VHF I	3121
VHF II	882
VHF III	239
Preset channels	10

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Monitored channels in all special operation modes	3 (two selectable, third fixed – 121.500 MHz)
Maximum number of programmable nets	6
Special operation modes (usable in 30 MHz to 88 MHz band)	
FH	secure frequency hopping
DFF	secure digital fixed frequency
FCS	secure free channel search
MIX	secure mixed operation FH and FCS
IFF	secure iso-fixed frequency
CW	continuous wave
Time to initial synchronization	max. 5 s
Time of autonomous synchronization holding	48 h
Minimum number of operation frequencies for FH operation	1
Hopping rate	100 hops/s
Interface for data transmission	USB/RS232
POWER SUPPLY (according to MIL-STD-1275B)	
Nominal supply voltage	12 VDC or 24 VDC
Limit supply voltage	10 VDC to 33 VDC
Current consumption	
• Transmission - nominal output power (at 12 V)	max. 25 A
• Transmission - nominal output power (at 24 V)	max. 12 A
• Reception	
RF2050 without co-site filter (at 12 V)	max. 1 A
RF2050 without co-site filter (at 24 V)	max. 0.5 A
RF2050 with co-site filter (at 12 V)	max. 1.25 A

RF2050 with co-site filter (at 24 V)	max. 0.625 A
TRANSMITTER PARAMETERS	
Nominal output power	FM 50 W
Nominal output power	AM 15 W
Reduced output power	FM 5 W
Reduced output power	AM 2 W
Harmonic suppression	min. 60 dB
Spurious suppression at Δf > 25 kHz	min. 70 dB
Time of continuous operation at +50 °C at duty cycle reception : transmission = 1 : 1	without limit
Average ranges in medium undulated terrain at nominal power FF mode (with antenna 2.6 m)	25 km
RECEIVER PARAMETERS	
Sensitivity 2310.100.10 (VHF I, VHF II, VHF III)	0,5 µV at 12 dB SINAD
Sensitivity 2310.100.10 (HF)	0.6 µV at 12 dB SINAD
Sensitivity 2310.100.11	
(30-90) MHz	0.7 µV
(90-145.9875) MHz	0.5 µV
(25-29.975) MHz	0.6 µV
AF output	1 W
Range of effectively transmitted frequencies	
• narrow band	300 Hz to 3000 Hz
• wide band	20 Hz to 11000 Hz
ENVIRONMENTAL SPECIFICATION (according to MIL-STD-810E)	
Operating temperatures	-40 °C to +70 °C
EMI	according to MIL-STD-461E
Power reguirements	MIL-STD-1275B
MECHANICAL SPECIFICATION	
Dimensions [w x h x d]	
• without cooling block	202 mm x 210 mm x 186 mm

• **with cooling block**	202 mm x 231 mm x 186 mm
Weight	9 kg

Documentation

RF2050 operating instructions	2310.010.12
RF2050 short operating instructions	2310.011.12

Set

Type designation	**PN (RN)**	**Name**
RF2050	2310.000.11	EPM mobile transciever set

Accesories

Type designation	**PN (RN)**	**Name**
	7007.100.14	Mobile set frame
RF13.3	2022.100.52	Handset
	2026.700.01	Handset holder
	1050.126.02	Power supply cable 3 m
	1050.993.01	Grounding
	2025.500.51	CD for modem configuration
	2036.100.23, 2036.100.24	2.6 m VHF vehicle antenna
	2036.100.40	1.88 m VHF vehicle antenna
	2036.100.45	Vehicle antenna 2.6 m with GPS antenna
	2036.100.84	Vehicle antenna VHF/ UHF 1.3 m
	2036.100.85	Vehicle antenna VHF 1.6 m

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	2036.100.86	Vehicle antenna VHF/ UHF 2.7 m
	2036.100.38	Groundplane antenna
	2036.100.68	Discon antenna
	2036.100.39	Antenna mast
	2036.100.70	Telescopic winch driven mast 10 m
PK20	2320.000.02	Fill gun set
RC20	2312.000.01	Remote control unit set
RM1301	2009.100.01	Handheld microphone/speaker
	2310.270.01	Cooling block
	2011.904.01	Antenna cable (3 m)
	2011.904.02	Antenna cable (10 m)
	1050.299.01	PC interconnection cable (USB)
	1050.350.01	Data cable (RS232C)
	1050.405.02	RF cable
	5605002002	High frequency protection 1 GHz 200 V 400 W
		RF headsets