

Radio Base Station in accordance with UIC 751-3

## FESA 2010



Within complex railway communication systems, train radio gained a central position. Train radio systems provide permanent communication between engine driver, dispatcher and traffic controller.

FESA stationary train radio units are constructed along the railway line. They essentially consist of FESA 2010 units housed in shelters and directional antennas provided at masts at a height of 20 to 30 m.

### FESA 2010

Even though the digital radio network GSM-R was implemented, analog train radio tracks will continue to be used in Europe.

To fit such railway equipment, the FESA 2010 was developed, and it represents a reinvestment in exchange of outdated base stations.

The FESA 2010 base station is a fixed radio station of the latest generation. FESA 2010 consists of modern electronic components and modules. It was developed based on state-of-the-art technology.

FESA 2010 allows for substitution of outdated and torn analog base stations. The repair of those stations is virtually impossible since the spare parts are obsolete.

FESA 2010 is also used for other radio systems within the 450/460 MHz frequency band.

## TECHNICAL DESCRIPTION

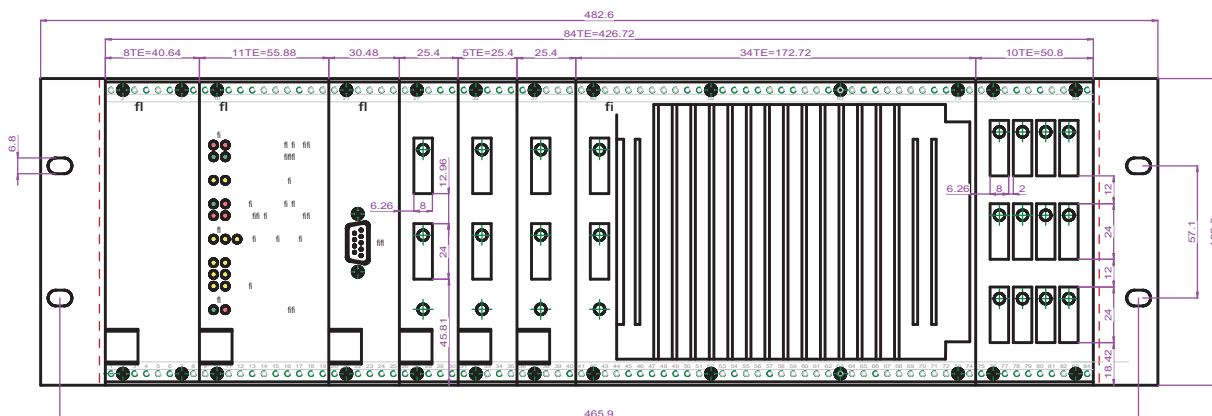
### GENERAL PROPERTIES

Dimensions	3HE, 84TE, 298,5mm dept, 19" standard rack
Power supply	24/48 V DC, isolated input based on chassis
Power consumption	< 120 W
Operating temp.range	-10 - 55 °C
Storage temp. range	-40 - 70 °C
Protection class	IP 20
operating condition	stationary operation
HF transmission frequency range	466.950 - 468.650 MHz according to UIC 751-3 frequency table
HF receiving frequency range	456.950 - 458.650 MHz, according to UIC 751-3 frequency table
Modulation	F3E
Channel spacing	25 kHz
Duplex spacing	10 MHz
Antenna connector	Type N (50 Ω)
Transmitter output	1 to 6 W adjustable, at antenna connector N
Frequency deviation (audio input)	50 Hz to 3kHz ± 2dB
Sensitivity	0.9 μV(20 dB SINAD), CCITT filter
NF Distortion	< 5%
Nominal level of line, input	U <sub>e</sub> = 385 mVRMS (- 6 dBm)
Minimum level of line, input	U <sub>e</sub> = 27 mV RMS (- 29 dBm)
Maximum level of line, input	U <sub>e</sub> = 1,55 V RMS (+ 6 dBm)
Input impedance	Z <sub>e</sub> = 600 Ω ±10 %, balanced, floating ground

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### GENERAL PROPERTIES

Equalizer	$\pm 9$ dB / 4 kHz, range treble $\pm 8$ dB / 300 Hz, range low
Equalizer treble	adjustable, 3 steps, adapted at cable types
Equalizer resonance	adjustable, 3 steps, adapted at cable types
Low pass	passive, cutting frequ. 7 kHz
Nominal level of line output	$U_a = 385$ mVeff (- 6 dBm)
Minimum level of line, output	$U_a = 275$ mVeff (- 9 dBm)
Maximum level of line, output	$U_e = 1,10$ Veff (+ 3 dBm)
Output impedance	$Z_a = 600 \Omega \pm 10 \%$ , balanced, floating ground



## TECHNICAL DESCRIPTION

### MODULES - FESA 2010

#### Power supply PS

The main power supply of FESA 2010 with potential separation.

#### Transceiver MTR 451

The transceiver is a SW programmable duplex, semi-duplex and simplex FM radio module for communication systems. It operates within the UHF 450 MHz frequency band according to UIC 751-3.

#### Control and Signal Processor unit COSIP

This is the main unit of FESA 2010. The function control of FESA 2010 is realized based on a digital signal processor (DSP) of the TMS320 series. All analog signals provided by four-wire circuits and radio are digitized via CODEC and delivered to the DSP. Special settings are feasible via RS232 interface on the front panel, for instance focus groups, test tones, transmission power, signal levels of RSSI, or carrier frequencies.

#### Adapter radio AR451

The adapter radio connects the transceiver MTR451 with the backplane. Inside this unit, the audio frequency of the MTR451 is adapted. It also contains interface converters for the RS422. On the front panel, there are isolating connectors that separate the modulating and demodulating signals from the transceiver. This is required for implementing or maintaining the base station.

#### Status Display SD

The actual operational state of the FESA2010 is displayed by several LEDs. This is useful for implementing or trouble-shooting.

#### Line Interface and Amplifier (LIA)

This component connects the four-wire lines between the base stations. It compensates the AF line loss that may occur during transmitting of LF signals via long cables. The LIA amplifies and equalizes transmitted signals. The digital measurement points are located on the front panel.

## TECHNICAL DESCRIPTION

### MODULES - FESA 2010

#### Measurement field MF

On the MF front plate, isolating AF connectors are arranged. These are used to separate the AF lines from the LIAs to the local four-wire lines which is required for implementing and maintaining the base stations.

#### Connecting board CB

To connect the four-wire circuits to the dispatcher or the next basis station by use of clamps or connectors made by WAGO. No special mounting tool is needed.

#### Mechanical design

The FESA 2010 is housed in a 19-inch standard rack 3HE 84TE (G-B-BGT-84/3/298,5-F). Its depth is 298,5mm. The front panels are made of anodized aluminum (2,5mm). The MTR451 has a black heat sink at the front.

All connectors are located at the rear side (i.e. four-wire circuits, power supply input, aerial socket). The digital measuring points and interfaces for servicing are at the front.

