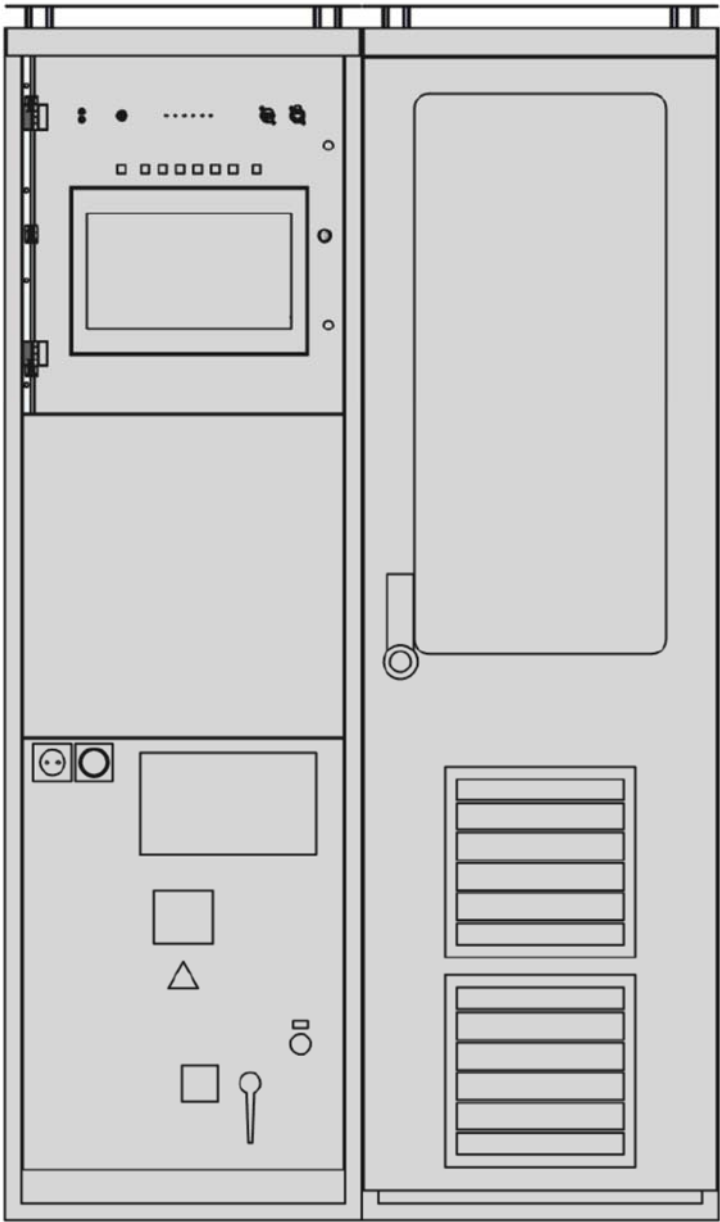


**20 kW Solid State MW Broadcast Transmitter
TRAM 20 LCD**



Datasheet



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Arrangement

Only two 19" cabinets contain all components of the transmitter:

- One amplifier cabinet
- One control cabinet

Amplifier

The amplifier section of the transmitter has one 20 kW power block equipped with 20 power modules. This power module is the basic unit of the RF amplifier. It supplies somewhat more than 1 kW into a special series transformer assembly (doughnut combiner) which summarises the power of all 20 power modules to the total transmitter power of 20 kW.

The module is designed as one single printed circuit board, which is plugged into the assembly. The module comprises a switched RF amplifier bridge and an associated PDM modulator. Each unit supplies a completely modulated RF signal into the combining transformer. Thus, in case of a module fault, the service is maintained with only slightly reduced power but without reduction of quality performance.

RF Output Filter

The 20 kW power block has an RF output filter which is contained in the amplifier cabinet above the power block and in the rear section of the control cabinet.

The transmitter is factory equipped for and tuned on the determined operation frequency. The coils of the output circuit can be tuned for the whole MF band, while the capacitors are determined for sub-ranges of this frequency band.

Drive and Signal Processing

The transmitter is equipped with a common drive unit (PLL synthesizer) and a common PDM processing unit for all power modules. A dual synthesizer assembly in passive standby configuration is available as an option. The RF drive can also be switched to an external frequency generator or synchronised from an external standard.

Power Supply

A common power supply, comprising a 400 V to 210 V three-phase transformer and a three-phase rectifier unit, is provided for the 20kW power block. The 400 V / 230 V feed also supplies the auxiliary equipment. The transformer is contained in the bottom of the amplifier cabinet.

Cooling

The components of the whole transmitter are basically air-cooled. A fan assembly located below the 20 kW power block moves the cooling air along the heat sinks of the power modules. This fan assembly compensates only the pressure drop inside the amplifier cabinet. The air is taken from the room and will be exhausted into the room.

Should external air ducts be required, an additional external blower system is needed to compensate the pressure drop in the external air ducts. Layout of the external air cooling system depends on the individual conditions at site.

Control Section

The control section of the transmitter comprises the 400 V / 230 V mains input, the internal distribution, a 15.6" high-resolution colour touchscreen with graphical user interface for readout and control of all transmitter conditions and parameters as well as the remote-control interface. Furthermore, it comprises the common drive unit (PLL synthesizer) and the AF input unit with PDM processing.

An integrated UPS backs up the power supply of the touchscreen and the internal computer during a short-term loss of mains power.

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TRAM 20 LCD



Datasheet

Technical Data

Amplifier configuration	One 20 kW power block, equipped with 20 individual power modules. Each power module comprises an RF amplifier and an envelope modulator. One further power module of the same type is employed as driver module for the 20kW power block.
RF output power	20 kW carrier power Up to 16 kW DRM power with external DRM DMOD3 Modulator
RF power reduction	Output power continuously adjustable from 20% to 100% in steps of 5%
Frequency range	525 kHz to 1710 kHz The TX will be equipped for and tuned on the determined operation frequency in factory (components for other frequencies on request)
Frequency stability	Deviation $< \pm 2$ ppm under operating conditions Input for external synchronization (selectable 1 / 2 / 5 / 10 MHz)
Operation modes	AM (A3E) DCC mode DAM (X3E) or AMC / EAMC (selectable by jumper setting) DRM with external TRANSRADIO DRM Exciter
RF output connector	1-5/8" EIA
Load impedance	50 Ohm unbalanced
Load VSWR	Max. 1.3 VSWR > 1.3: Automatic RF power reduction VSWR > 1.5: Automatic RF power shutdown
Out-of-band emissions	According to ITU-R SM.328-10
Spurious & Harmonics	According to ITU-R SM.329-8 (≤ 50 mW from 9 kHz to 1 GHz)
Modulation system	Pulse Duration Modulation (PDM)
AF Input	600 Ohm balanced (can be changed inside the unit to ≥ 2000 Ohm) Adjustable from - 10 dBu to + 10 dBu referred to 100% modulation
AF Response	± 0.5 dB (30 Hz to 10 kHz) Two audio filters available (4.5 kHz / 6.75 kHz)
THD	$\leq 1\%$ at 80% modulation
Modulation capability	100% continuously, 125% peak program capability
Carrier shift (amplitude drop)	$\leq 1\%$
Signal-to-noise ratio	≥ 60 dB referred to 100% modulation

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Datasheet

AC Input	3N 400 V, TN-S resp. TN-C mains configuration (5-wire resp. 4-wire) 50 Hz (60 Hz on request)
Permissible voltage variation	$\leq \pm 5\%$ with full performance $\leq \pm 10\%$ with minor performance degradation
Power factor	≥ 0.90
Power consumption	≤ 24.2 kW at no modulation ≤ 36.1 kW at 100% modulation
Overall efficiency	$\geq 83\%$
Metering	15.6" high-resolution colour touchscreen with GUI for digital readout and control of all transmitter conditions and parameters Set of analog meters (RF crosspointer meter, voltmeter, amperemeter) for additional analog readout of relevant transmitter parameters (Option)
Local control	Local / Remote, Transmitter On / Off, PDM On / Off RF power P1 / P2, Mode AM / DAM Audio lowpass filter On / Off Audio lowpass filter 4.5 kHz / 6.75 kHz Readout and control of all transmitter conditions and parameters LEDs for additional indication of most relevant status information Event logbook and counter for transmitter operating hours Integrated Quick Reference Guide (comprehensive help function) Scheduler with ten editable timer settings
Remote control interface	Ethernet with integrated HTML web server Ethernet with SNMP (Option) Floating relay contacts (Option)
Environmental temperature	- 10° C ... + 45° C
Relative humidity	Max. 90% (non-condensing)
Installation altitude	Max. 2000 m above sea level (higher altitudes on request)
Cooling system	Air cooling with internal fan assembly below the power block (air intake from the room, exhaust air into the room) Cooling air consumption approx. 1320 cbm / h External blower system with filtering and air ducts on request
Dimensions	WDH = 1200 mm x 1000 mm x 2000 mm

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