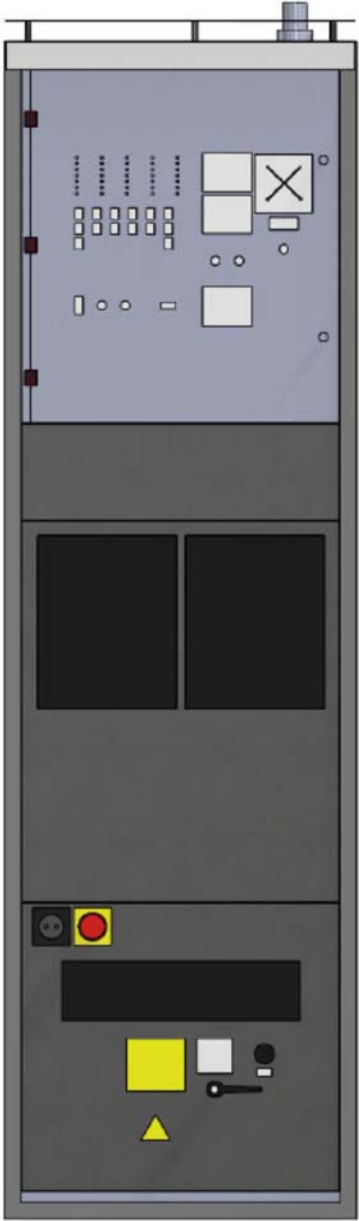


**10 kW Solid State MF Broadcast Transmitter  
TRAM 10**

Datasheet

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# 10 kW Solid State MF Broadcast Transmitter

## TRAM 10



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#### Arrangement

Only one single 19" cabinet contains all components of the transmitter.

#### Amplifier

The amplifier section of the transmitter has one 10 kW power block equipped with 10 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 10 power modules to the total transmitter power of 10 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 10 kW power block has an RF output filter which is contained in the rear section of the 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 10 kW power block. The 400 V / 230 V feed also supplies the auxiliary equipment. The transformer is contained in the bottom of the transmitter cabinet.

#### Cooling

The components of the whole transmitter are basically air-cooled. A fan assembly located below the 10 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, the control panel with the components for local control and for metering as well as the remote control interface. Furthermore it comprises the common drive unit (PLL synthesizer) and the AF input unit with PDM processing.

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|                                |   |
|--------------------------------|---|
| Amplifier configuration        | One 10 kW power block, equipped with 10 individual power modules. Each power module comprises an RF amplifier and an envelope modulator.                    |
| RF output power                | 10 kW carrier power<br>Typical > 8 kW DRM power with external TRANSRADIO DRM Exciter  |
| RF power reduction             | Two preset power levels P1 and P2<br>(P1 adjustable from 50% to 100%, P2 adjustable from 25% to 50%)  |
| Frequency range                | 525 kHz to 1710 kHz<br>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<br>Input for external synchronization (selectable 1 / 2 / 5 / 10 MHz)   |
| Operation modes                | AM (A3E)<br>DCC mode DAM (X3E) or AMC/EAMC (selectable by jumper setting)<br>DRM with external TRANSRADIO DRM Exciter                                       |
| RF output connector            | 7/8" EIA  |
| Load impedance                 | 50 Ohm unbalanced   |
| Load VSWR                      | Max. 1.3<br>VSWR > 1.3: Automatic RF power reduction<br>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 ( $\leq 50$ 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 $\geq 2000$ Ohm)<br>Adjustable from - 10 dBu to + 10 dBu referred to 100% modulation                    |
| AF range                       | 30 Hz to 10 kHz<br>Two audio lowpass filters available (4.5 kHz / 6.75 kHz)   |
| AF response                    | $\pm 0.5$ dB (30 Hz to 10 kHz) with band limiting filters switched off  |
| AF harmonic distortion (THD)   | $\leq 1\%$ at 80% modulation  |
| Modulation capability          | 100% continuously, 125% peak program capability   |
| Carrier shift (amplitude drop) | $\leq 1\%$  |
| Signal-to-noise ratio          | $\geq 60$ dB referred to 100% modulation  |

# 10 kW Solid State MF Broadcast Transmitter

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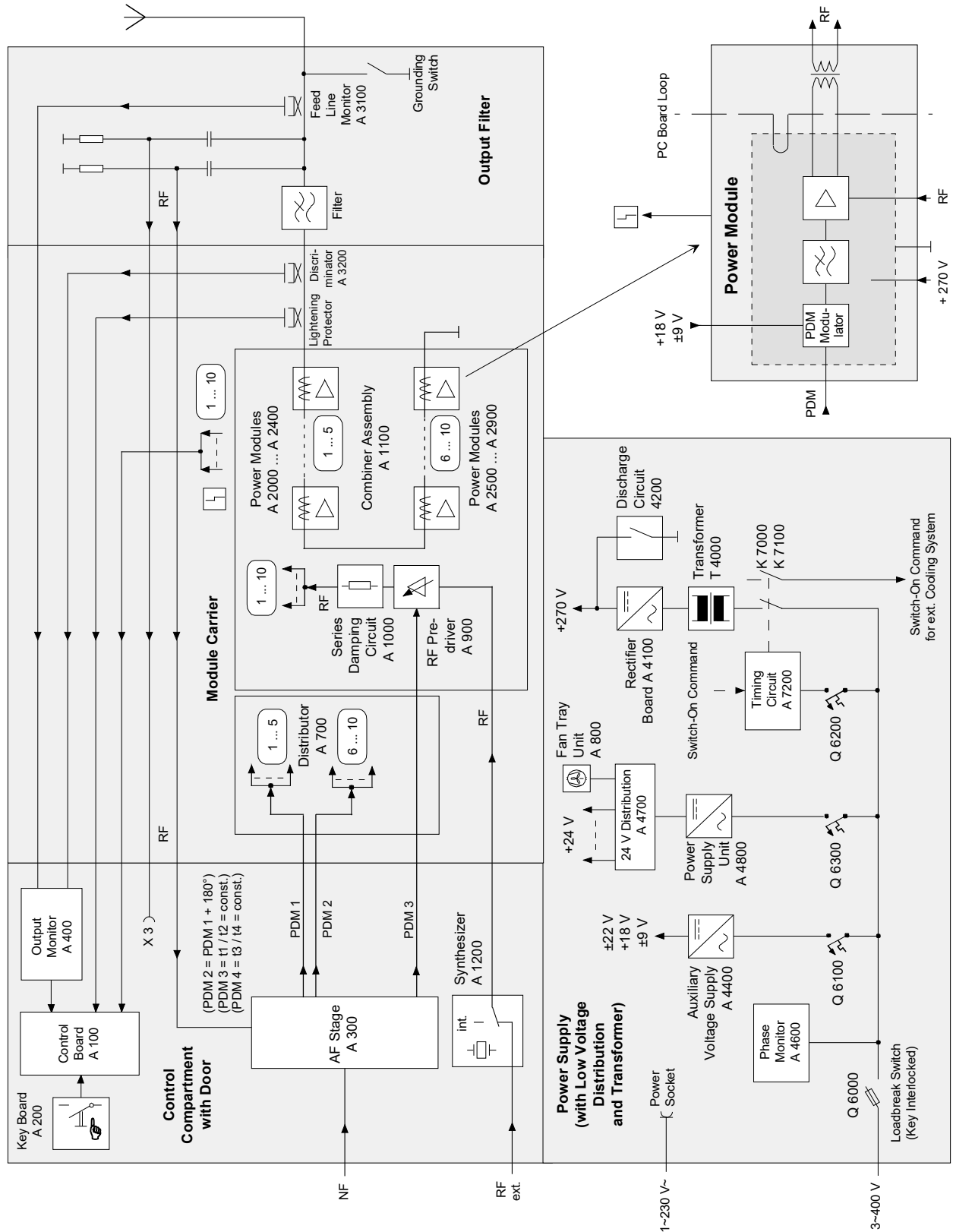
|                               |  |
|-------------------------------|--|
| Power supply                  | 3N 400 V, TN-S resp. TN-C mains configuration (5-wire resp. 4-wire)<br>(3N 230 V on request)   |
| Mains frequency               | 50 Hz (60 Hz on request)   |
| Permissible voltage variation | $\leq \pm 5\%$ with full performance<br>$\leq \pm 10\%$ with minor performance degradation   |
| Power factor                  | $\geq 0.90$  |
| Power consumption             | $\leq 12.2$ kW at no modulation<br>$\leq 18.3$ kW at 100% modulation   |
| Overall efficiency            | $\geq 82\%$  |
| Metering                      | Pointer meters for currents and voltages of the power amplifier section<br>Crosspointer meter for RF output power and VSWR<br>Terminal for external second crosspointer meter available  |
| Local control                 | Local / Remote, Transmitter On / Off, PDM On / Off<br>RF power P1 / P2, Mode AM / DAM<br>Audio lowpass filter On / Off<br>Audio lowpass filter 4.5 kHz / 6.75 kHz<br>LEDs for status indication<br>Clear fault                         |
| Remote control interface      | Parallel interface with floating contacts<br>Ethernet interface with HTML web server and SNMP (Option)<br>Serial interface RS 232 (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<br>(air intake from the room, exhaust air into the room)<br>Cooling air consumption approx. 660 cbm / h<br>External blower system with filtering and air ducts on request |
| Dimensions                    | WDH = 600 mm x 1000 mm x 2000 mm   |

|                              |  |
|------------------------------|--|
| Contact for further details: | <b>Elsyscom GmbH</b><br>Oderstraße 67<br>D-14513 Teltow<br>Germany<br>Tel.: +4933283398521<br>Fax.: +4933283398525<br>mail: wittling@elsyscom.de |
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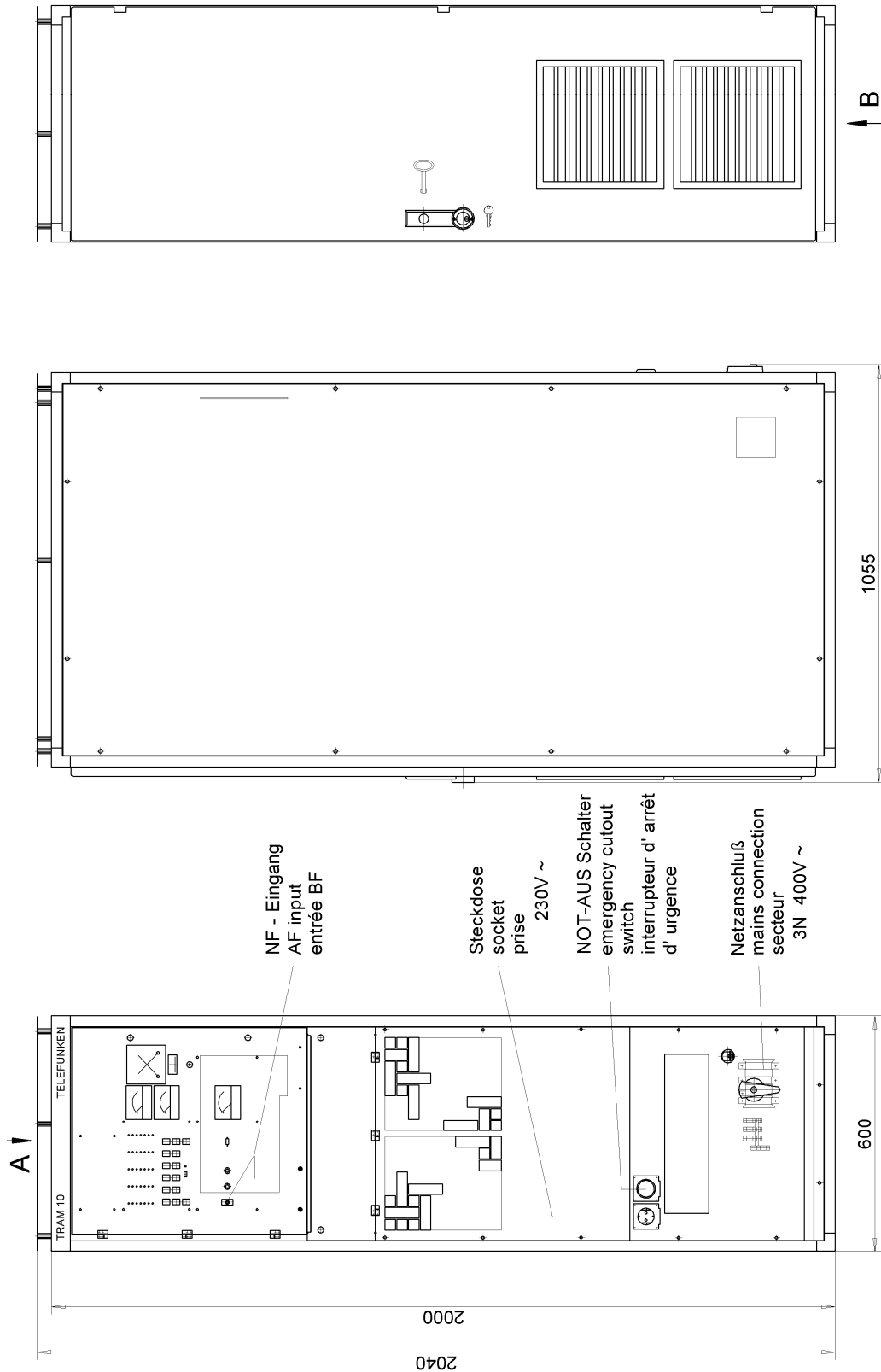
### Schematic Diagram TRAM 10



# 10 kW Solid State MF Broadcast Transmitter TRAM 10

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## Mechanical Drawing TRAM 10

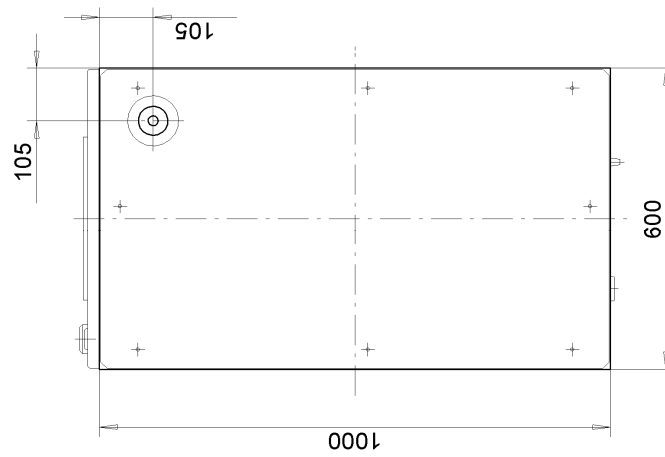


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HF - Ausgang, 7/8" EIA Flansch - System  
RF - output, 7/8" EIA flange system  
sortie - HF, 7/8" EIA bride système

A



Befestigungsmaße - Gestell  
fixing dimensions - frame  
cote de fixation - baie

B

