Specifications TSW 2100 100 kW Shortwave Transmitter

All information and specifications are subject to change without notice

	DRM Digital		Analog AM
Modulation	DRM standard (ETSI ES 201 980)		DSB: A3E (option A3E with DCC or AMC)
Frenquency Range (MHz)		3.9 MHz ÷ 21.85 MHz Frequency extension to 3.2 MHz or 26.1 MHz on request optional Frequency change: 35 sec. max	
RF Output Power at P_{nom}	50 kW mean power with 9 dB crest factor		Carrier: 100 kW
Output Impedance		50/75 Ω unbalanced or 300 Ω balanced	
Permissible VSWR		2.0 at 50/75 Ω unbalanced 1.8 at 300 Ω balanced	
Mains Power Supply		400 V, 3-phase and neutral	
Frequency		50 or 60 Hz (± 2Hz)	
Power Factor		≥ 0.9 at nominal AM output power	
Overall Efficiency at P_{nom}	guaranteed: ≥ 60 % typically: ≥ 63 %		guaranteed: ≥ 70 % typically: ≥ 72 %
Performance	Out of Band: Compliant ETSI EN 302 245-2 MER: ≥ 30 dB Compliant ETSI EN 302 245-2 (for bandwidth up to 10 kHz)		AF response: ± 1 dB (50 ÷ 7500 Hz) AF distortion: ≤ 3.5 % (50 ÷ 7500 Hz) Noise level: ≤ -58 dB rms unweighted
Audio Input	DRM/MDI		Analog: 0 ÷ 20 dB into 600 Ω balanced Digital: AES3, IEC 60958 and EBU 3250
Local Operation		Local control through 19" touch-screen	
Remote Control & Supervision		Ampegon MasterSeries II software, Web-Interface, SNMP V2c	
Environmental Conditions		Ambient temperature : +1° ÷ +45° C Maximum humidity : 95 % non-condensing	
Tube Complement		Final Stage: 1 x TH 581	
Dimensions		LxWxH: 1900 mm x 5500 mm x 2100 mm	
Personnel Safety Standard		IEC 215, EN 60215	

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The Heartbeat of High Power

100 kW Shortwave Transmitter

TSW 2100

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TSW 2100

Ampegon shortwave transmitters have been leading the market for more than 70 years and are the best choice for economical, efficient and flexible broadcast operation

True to its tradition of combining innovative technology with reliable and well proven techniques, Ampegon has developed an enhanced shortwave transmitter line with integrated DRM solutions. The Ampegon shortwave transmitters are designed and produced in our factory in Switzerland to meet the highest quality and industrial design standards. Satisfied customers around the world testify to the superior design, performance and maintainability of Ampegon shortwave transmitters. Ampegon high power shortwave transmitter TSW product line extends from 50 kW to 500 kW.

As a proud founding member of the Digital Radio Mondiale (DRM) Consortium, Ampegon strongly supports the digital broadcasting system. Therefore, the Ampegon TSW product line is fully DRM compatible and enables broadcasters to choose between classical AM analog and/or DRM digital operation.

A small footprint and simple installation and commissioning time make this member of the Ampegon shortwave family truly unique. The air-cooled PSM modulator is built into the transmitter cabinet. The control rack can be situated optionally either on the front or the side of the transmitter cabinet.

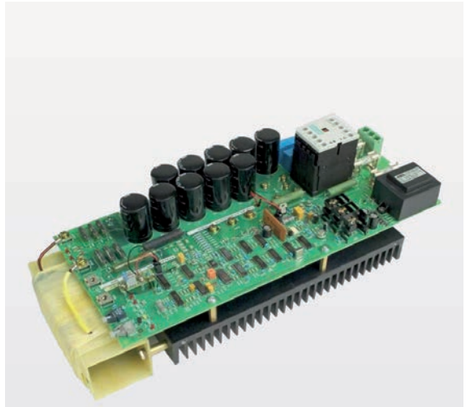
Radio Frequency Stages
The TSW 2100 is fitted with a solid-state driver circuit and a single-tube final stage. The continuously tunable output network is designed as a three stage PI network circuit acting as harmonic filter and impedance transformer. In addition, the transmitter is equipped with an entirely integrated coaxial VHF low pass filter to ensure that the strict radio regulations will be satisfied. The output impedance of the transmitter is either unbalanced 50 ohm or 75 ohms or balanced 300 ohms by means of a balun.

PSM – Ampegon Solid State Modulator
At the heart of every TSW 2100 is a powerful, field proven solid-state pulse step modulator (PSM6). As the industry leader in PSM technology for more than twenty years, our solutions enhance your broadcasting performance via their outstanding distortion and signal-to-noise specifications. The high efficiency of better than 97 % and the high power factor of the PSM result in minimum energy and operating costs.

Our air-cooled PSM is equipped with 32 power modules. Each module comprises a modern IGBT switching device, an integrated step-start system, and integrated safety features like short-circuit protection and IGBT supervision. Its patented module-management system ensures equal loading of all modules as well as the highest possible redundancy for reliable operation. Each of the modules represents an individual voltage source that is switched on or off independently.

Key Features

- High guaranteed overall efficiency
- Integrated DRM modulator for automatic operation
- Fully automatic tuning system
- User-friendly control system with touch screen
- Full remote control facilities and interfaces providing optional remote diagnostics system
- Energy-saving operation options e.g. AMC, DCC and DRM
- Compact, high quality design with full accessibility for maintenance
- ISO 9001 system design
- IEC standards and ITU recommendations applicable



Air-cooled PSM6 Module.

System Overview

New Generation Transmitter Control System UCS
The new UCS transmitter control system (Unified Control System) sets new standards for shortwave transmitters. This embedded control system features the latest embedded PC and FPGA technology. The interaction with the various subsystems is based on a network distributed Middleware solution and a sophisticated HMI represents the link to the operator. In order to facilitate the various monitoring, control and processing purposes, a modular concept is used which consists of dedicated subsystems.

The UCS SW for shortwave applications is the heart of the new control system. It is capable of generating highly accurate RF signals with best stability and achieving fast direct sampling for RF measurement purposes. The control system comprises the complete audio signal processing path required for shortwave transmission, such as adjustable analog and digital audio inputs, dedicated audio filters, modulation mode and more. The optionally installed embedded DRM modulator completes the entire range of modulation schemes. For monitoring and measuring purposes, the UCS ASM analog signal measuring is used. Thanks to its analog interfaces, which include fast acquisition channels, the device allows alarm- and failure-detection within the broadcast transmitter. The UCS PSM controls the PSM modules. The system calculates the number of modules and pulse width required to provide the output voltage, based upon a reference signal and feed forward regulation. The wide range and fast processing of the reference inputs allows modulation frequencies suitable for analog and digital modulation.

A state-of-the-art safety system is also included in the control system. This operates completely independently in order to ensure unconditional safely and simple operation according to the IEC 215 safety standards. However, the dedicated communication interface guarantees interaction with the transmitter control system. The new tuning system with the latest DC motor technology allows faster and more accurate positioning of the transmitter tuning circuits with full digital control. This leads to comfortable and fully automated frequency changes supporting the customer for best on air performance.

Digital Radio Mondiale (DRM)
DRM is bringing a bright new future for AM broadcasting. The TSW 2100 provides cristal clear sound in near FM quality to listeners around the globe. The integrated DRM modulator/RF exciter serves as radio frequency source for both analog and DRM mode. Automatic changeover between analog and DRM mode as well as automatic tuning in both modes are only some outstanding features of the TSW series. As one of the most cost-effective, reliable technologies in the world, shortwave radio broadcasting is still the favoured medium for keeping millions of listeners informed.