

NEW FEATURES IN DIGITAL & ANALOG POWER TV TRANSMITTERS

2014



3.5kW Digital TV Transmitter
High efficiency – Ducted Cooling

ABE Elettronica is proud to present the relevant new features introduced in the “MTX” Series of Multistandard – Multimode advanced TV Transmitters.

These new features are the results of significant R&D efforts focused on **TCO reduction** (TCO - Total Cost of Ownership: running cost reduction, ease of use and maintenance etc.).

EFFICIENCY:

ABE has developed very high efficiency power amplifiers for both digital and analog applications, employing various technologies (including Doherty) to significantly reduce electrical power consumption.

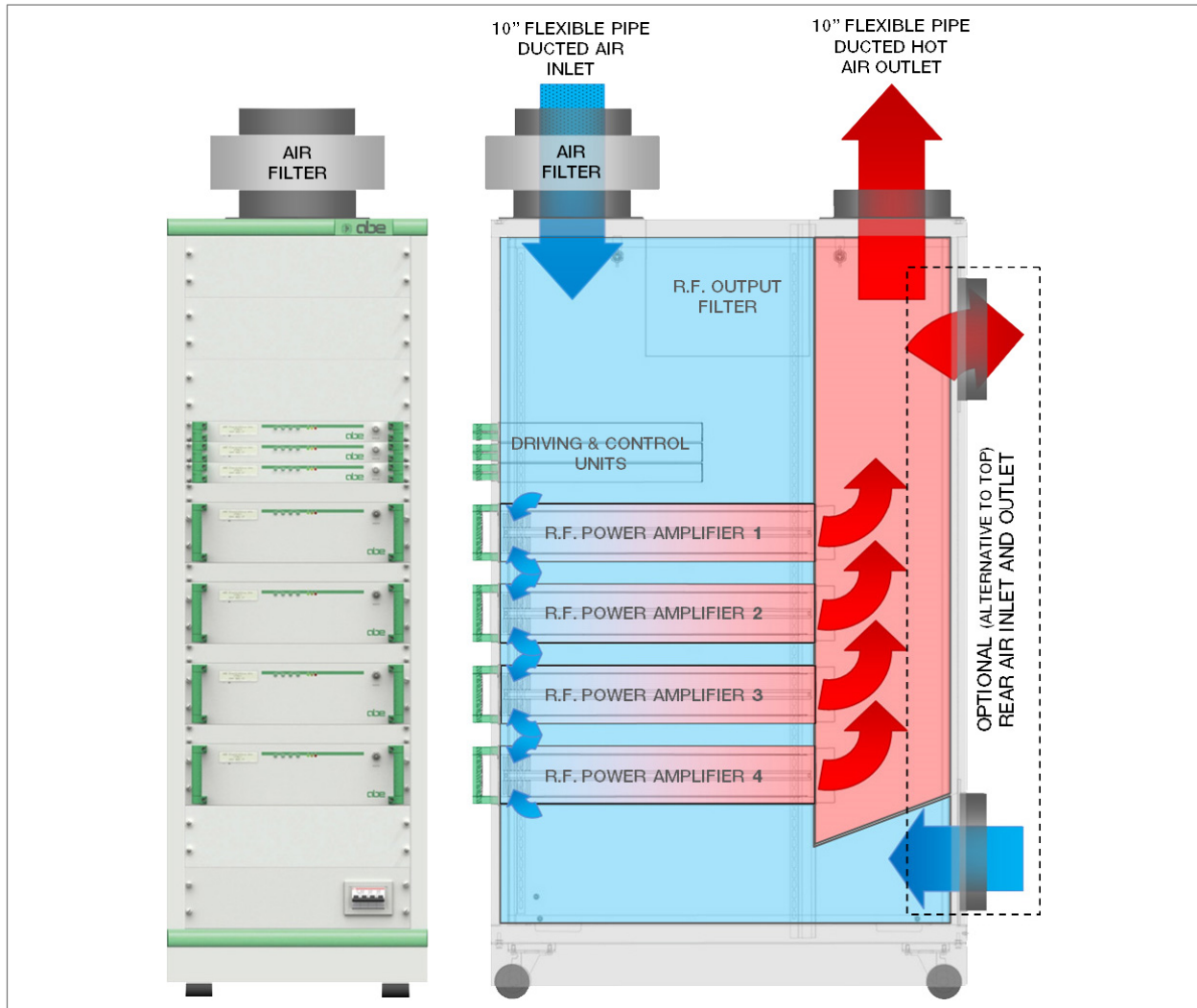
For example, a 1KW digital transmitter (1.2KW before the filter) absorbs less than 4KW (efficiency: 30% and higher) as opposed to the 6 to 6.5KW (efficiency: 18/20%) of the standard model. A 2KW power consumption reduction, over a year's operation, is equivalent to a saving of 17,520KWh, or 2,452€ (considering a typical Italian tariff of 14 €cents/KWh). Considering this over a 15 year period (a transmitter's life expectancy), the total saving would be of 36,792€.

The prices of our new high efficiency amplifiers are, in any case, roughly comparable to those of previous series. This increase in efficiency, besides being advantageous from a financial point of view, is also beneficial from the thermal (less heat to dissipate and disperse) and environmental ones. The drawbacks linked to this new technology, in the form it is being developed by ABE, are, essentially, the following: the amplifiers will no longer be completely “broadband” but “optimized” to narrower sub-bands, although capable of being retuned over the whole frequency spectrum, and will have slightly lower MER values, although not in a way to compromise the coverage area. It is, in any case, possible to supply completely broadband, high MER performance amplifiers, but with less increase in efficiency.

These “high efficiency” transmitters are, obviously, recommended for medium-high power ratings.

**DIGITAL TRANSMITTER
EFFICIENCY ENHANCEMENT
UP TO**

OVER 60%



COOLING:

With the high efficiency amplifiers described above, the **lower consumption implies much less generated heat** which, in turn, entails **less need for cooling**.

In the example given above, a standard transmitter with a 6KW power absorption and 1.2KW of radiofrequency output produces **4.8KW of heat**; an equivalent high efficiency amplifier, while still outputting 1.2KW at radiofrequency, absorbs 4KW, therefore producing **only 2.8KW of heat**, just over half that of the standard one.

Alternatively, you could say that a 2.5KW high efficiency transmitter generates an amount of heat only slightly higher than a standard 1.2KW one.

Currently, for high power ratings (*typically for power outputs above 2.5KW digital or 10KW analog*), some network operators who have

to install equipment in specific environmental conditions prefer liquid cooled transmitters as opposed to air cooled ones, as the former do not necessitate substantial air circulation within the transmitter's housing and therefore require less conditioning.

With high efficiency transmitters, **the tipping point for choosing liquid cooling systems is shifted, therefore**, to power levels that are twice those currently considered (*e.g. 5KW digital/20KW analog*).

Liquid cooled transmitters, with respect to their advantages (*they do not require substantial air circulation/conditioning of the housing, allow smaller housing sizes and are quieter*), **are subject**, however, **to some non negligible problems**: higher costs, higher installation complexities, shorter equipment life expectancy due to cooling liquid corrosion effects, an external heat dissipation unit which ages quickly through exposure to environmental conditions, higher maintenance, etc.

Comparing the pros and cons of air and liquid cooling solutions, **ABE has developed a solution** that we believe could be ideal as it features the advantages of both systems **without being affected by their disadvantages**.

The transmitter is air cooled, but the air itself is piped in and out of the transmitter through easily fitted, flexible and adaptable ducts: this way, the housing does not require, as in liquid cooled solutions, substantial environmental air circulation/conditioning and the equipment is also quieter.

The only maintenance required is the periodical cleaning of the air filters (*which is also the case with the external heat dissipation units of liquid cooled systems*) and, when external air temperature drops below -5°C (*as is typically the case with the onset of winter*), modifying the air flow circuit to mix part of the hot out-flowing air with the cold in-flowing one and, possibly, re-circulating part of the hot out-flowing air back into the housing, taking therefore care of its heating.

EASE OF MAINTENANCE:

The new power transmitters **do not require particular maintenance** and, especially if supplied in configurations featuring multiple amplifiers and double drivers, **are intrinsically redundant** and provide a reasonable service reliability, even without protection (*i.e. in single configuration, in lieu of 1+1 or N+1*).

The only maintenance to be carried out periodically is the **cleaning**



Ease of a substitution of a cooling fan: it is enough to disconnect the power plug and to remove 3 or 4 screws



Ease of substitution of a power supply: it is enough to remove four screws

and/or replacing of the air filters and the modification of the air flow circuit in winter, if there is a likelihood of temperatures dropping below -5°C .

In a power transmitter, those parts that are, theoretically (*based on MTBF calculations*) or by common practice, considered to be more subject to malfunction are the cooling fans and the power supply units.

The new power equipment allow the replacement of the cooling fans and of the power supply units **without the need to turn off the transmitter** and extract the drawers from the rack cabinet.

The amplifiers' power supply units are **equipped with fast connectors** and can be extracted and replaced from the front panel (*from the rear panel in the transmitters with 100-200W output power*); the cooling fans are also fitted with connectors and are easily replaceable.

CONTROLS AND MEASUREMENTS:

Each unit (*rack drawer*) making up the transmitter is equipped with a display and keypad for local control; furthermore, each transmitter features a LAN interface (*Ethernet*) through which the WEB server can be accessed for remote control.

The equipment can also be controlled by an SMNP protocol via LAN and features an email client for the notification of any malfunction.

The new transmitters can also be equipped with an on-board tablet featuring control of all parameters, on-screen visualization of emitted programs, monitoring of the main parameters and Transport Stream analysis.

Furthermore, the tablet memorizes the transmitter's Test Report and manual, making them easy to consult.

BESIDES ALL THIS...

The new high efficiency transmitters are part of the innovative



Transmitter "on board" tablet



"MTX" series and are therefore **Multistandard-Multimode equipment**; this means that the same hardware can be used for either analog and digital transmission, based on various standards, with the possibility of easily changing transmission standard and mode (e.g. **DVB-T, DVB-T2, ISDB-T, Analog...**) with all the advantages of digital processing analog transmitters (see *ABE general catalog* - "MTX" series).

Among other features, ABE would like to remind you of the adaptive pre-correction, the possibility of configurations featuring single or double drivers, single or multiple amplifiers, **1+1** or **N+1** reserve, etc.