DIVERSIFIED TECHNOLOGIES, INC.®

Diversified Technologies,

Systems In Action


Transmitter System


Stand Alone Magnetron Modulator and HVPS

Magnetron Transmitters / Modulators

Diversified Technologies, Inc. (DTI) has introduced a new high power magnetron based transmitter featuring a solid state Marx modulator that permits adjustment of the modulation pulse to optimize the RF output waveform for shape and spectrum.

DTI PowerMod™ High Power Solid State Magnetron Transmitters utilize next generation Marx topology, permitting change of the modulation pulse shape, optimizing the magnetron's RF output performance, at power levels from 250 to 1500 kW peak. The agile design is capable of driving magnetrons from S to X-band, making the transmitter highly configurable to customer's requirements.

Providing precise control of RF pulse parameters, with rise/fall time of < 120 ns and < 200 ns respectively, minimal lead edge overshoot and < 0.3 dB RF droop at wide pulse width. Pulse top amplitude variation is optimally flat. The transmitter supports pulse width agility, capable of change on a pulse-to-pulse basis, and supports pulse repetition frequencies up to 2 kHz. The innovative DTI PowerMod™ Magnetron based Transmitters are a "plug and play" with straight forward interconnection of Primary Power, Modulator Trigger, Remote/Local Control, Ethernet via copper path or fiber optic cable, and RF transmit sample of the Magnetron output frequency. The compact, single cabinet design provides ready replacement of legacy equipment in fixed, transportable or mobile configurations.

Designation	Function
Power and performance determined by selected Magnetron (S, C, & X-band supported)	
Frequency Range	5.4 to 5.9 GHz for SFD-313A
RF Peak Power	1000 kW min.
RF Average Power	1000 Watts
RF Pulse Width Range	0.2 to 5.0 µs, continuously variable
RF Pulse Burst Mode	Pulse Doublet using selected pulse width of 0.25, 0.50 or 1.0 µs with 2.0 µs interpulse spacing
PRF Range	0 to 2.0 kHz
Duty Cycle	0.001 max.
RF Rise Time	120 ns nom.
RF Fall Time	200 ns nom.
Droop	≤ 0.3 dB
Input Trigger Pulse	5 Volts peak into 50 ohms
Control I/O	Ethernet
Input Voltage	208 VAC Phase to Phase or 240 VAC Single Phase, 50/60 Hz
Operating Temperature	-10° to +50°C
Dimensions (L x W x H)	36 x 22 x 79 inches
Weight	W/o Magnetron, top figure 700lbs, lower figure 250lbs
Cooling	Internal Forced Air

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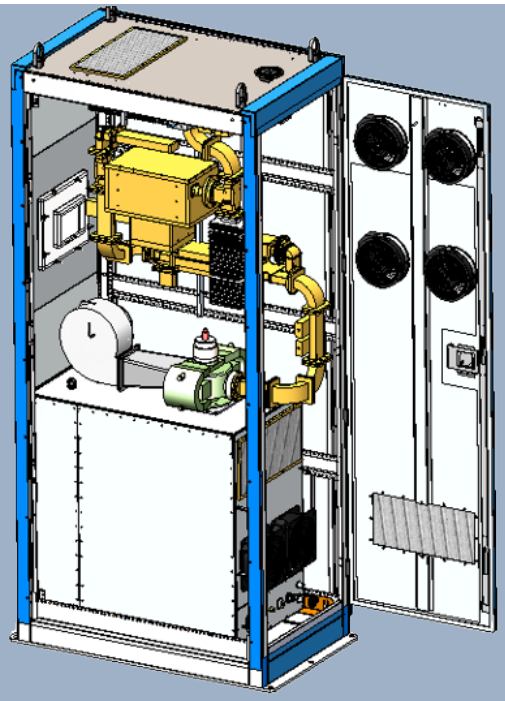
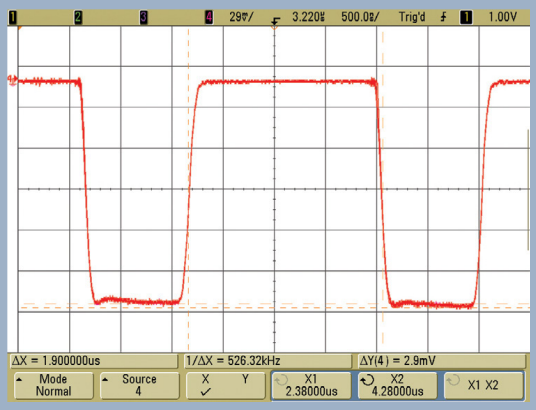
A front panel mounted touchscreen provides the graphical user interface (GUI) for the operator and is connected to a Programmable Logic Controller, used on nearly all DTI manufactured power supplies, modulators and transmitters. The GUI provides the ability to perform calibrations and observe in real time transmitter performance parameters. Fast Fault circuits shut the transmitter modulation down within microseconds, removing damaging energy from being delivered to the high cost Magnetron under fault conditions. The PLC handles the slow faults such as door interlocks, waveguide pressure monitoring, cabinet over temperature, etc.

The architecture of the DTI design allows the hardware to be readily supplied in various configurations with little or no modification.

- Packaged in a compact, stand-alone modulator/magnetron configuration for electromagnetic vulnerability testing or as a high power microwave source.
- Supplied as a transmitter system with the modulator/magnetron incorporated in a standard 35 x 22 x 79 inch (L x W x H) cabinet with waveguide transmission path customized to the customer's requirements.
- Offering features such as a high power waveguide isolator, waveguide switch and dummy load for test mode or RF Silence capability, and continuously variable, high power microwave attenuator (power programmer), with 0 to 30 dB of attenuation controlled in 1 dB steps.
- Waveguide design features bi-directional couplers to sample forward and reflected power for monitoring and system protection, facilitating calibrated RF power measurements using integrated power sensors.
- Features are typical for Instrumentation and Weather radar transmitters, and can be tailored for other applications.

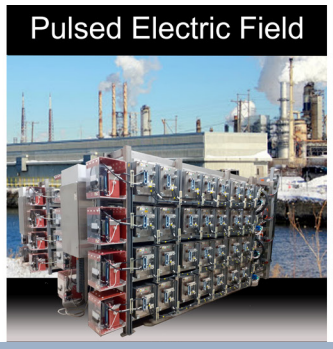
Systems In Action

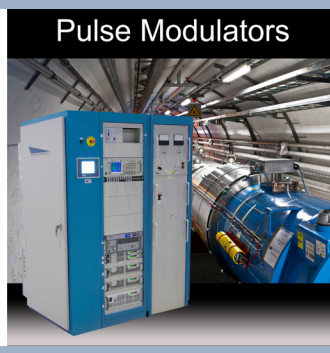




C-Band Modulator Operation. Negative detected RF at 38 kV cathode, 56 A, 640 Hz.

Nominal 1 µs pulses with two pulse code spaced at 2.9 µs lead-edge to lead-edge.





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