WILKINSON FM TRANSMITTERS

WILKINSON RADIO DIVISION
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An International Company Serving Radio and Television

Wilkinson FM transmitters are housed in steel cabinets finished in a durable gray Rantex ™ enamel finish with brushed aluminum trim. Access to all transmitters is easily accomplished through either the front or rear interlocked doors. All operating controls are located on the front panel, and access to the power amplifiers is through the door of the PA compartment.

All transmitters are provided with the FME-10 exciter as standard equipment. The FME-10 is a Direct FM exciter capable of both monophonic and stereophonic operation. During monophonic operation two subcarriers can be used; during stereophonic operation only one subcarrier input is available. The exciter is comprised of three basic sections: the power supply, a Direct FM oscillator and automatic frequency control section, and the multiplier-power amplifier section. The latter two sections are contained in separate housings to eliminate interaction. The power supplies and control circuits are contained in the mainframe of the exciter.

Component ratings are very conservative to assure long-life, high reliability, and unattended operation. Functions such as starting and stopping, resetting, overload relays, metering of all PA circuits, and monitoring forward and reflected power can be performed at a remote location by adding the remote control interfact panel.

Tuning is accomplished by variable vacuum capacitors, eliminating the need for mechanical sliding contacts. The output inductor is fixed during factory test and vacuum capacitors vary the tuning and loading of the final.

All power supplies use the exclusive Wilkinson self-testing silicon rectifiers. These plug in units feature neon indicators across each diode. If the diode leaks or shorts, the indicator goes out, quickly showing which diode must be replaced.

The control ladder and time delay circuits are built on high quality, fiberglass printed circuit boards to reduce complexity, eliminate unnecessary wiring, and conserve space. Solid state time delay and recycling eliminates expensive relay replacement.

FM-5000E*
FM-7500E
FM-10000E*
FM-20000E*
FM-25000E*
FM-30000E*

Input and output reflectometers.
Self-testing Wilkinson silicon rectifiers provide more than 300% voltage and current protection.
Printed circuit control ladder conserves space, reduces complexity.
Solid state time delay and recycling increases reliability.
Conservatively rated, double duty plate transformer and filter reactor

The FME10 is a Direct FM Exciter capable of both monophonic and sterophonic operation. Two SCA subcarriers can be used. One SCA subcarrier can be transmitted during stereophonic operation, although there are no characteristics in the design of the exciter that prohibit more than one subcarrier during stereo operation.

The exciter consists of two sections. The first is the Direct FM Oscillator and Automatic Frequency Control section. The second is the Multiplier and Power Amplifier section. The two sections are contained in separate housings to eliminate interaction. The power supplies and control circuits are contained in the mainframe.

The heart of the exciter is a stable, free-running oscillator circuit. The oscillator operates at ¼ the operating frequency of the exciter. The exciter can be modulated more than 150% with less than 1% distortion. The usual distortion at up to 133% modulation is between 0.25% to 0.5%. This is considerably less than can be obtained by more complicated means. The frequency response of this system extends about 5 Hz to more than 5 MHz allowing little or no distortion in a stereo signal that contains components to only 53 kHz.

The output transistors are completely protected from short-circuits or open termination and will not be destroyed by mistuning or improper load. All power supplies are electronically regulated and are nonadjustable.

The Wilkinson SG-1E Stereo Generator is a high quality device to generate the composite signal for modulation of any FCC Type-Accepted exciter. Provisions are made for remote control of the Stereo/Mono function.

The audio input levels on both the right and left channels are approximately +10 dBm for 100% modulation. The pilot level is not adjustable and is used as the reference for setting the output level. (The output level control is adjusted for 10% pilot injection). This eliminates the possibility of "crossing" controls and makes sure the generator is always operated at levels that give the best signal to noise ratio and cross-talk characteristics.

In the monophonic mode, provisions are made to select one or both channels. This option allows the user to select any channel or combination of channels for mono operation. Normally, only one channel would be driven for monophonic operation and the units are shipped with that specification. There is an internal adjustment that allows the user to alter the gain of the unit in the mono mode to provide 100% modulation with both channels.

The SCG-1/SCG-2A subcarrier generator is a completely solid state high quality unit for use with any FCC Type Accepted exciter for SCA operation. The SCG-1 operates at either 41 kHz or 67 kHz. The SCG-2A is capable of operation at both frequencies, simultaneously. The unit is self contained to prevent interference from strong RF fields.

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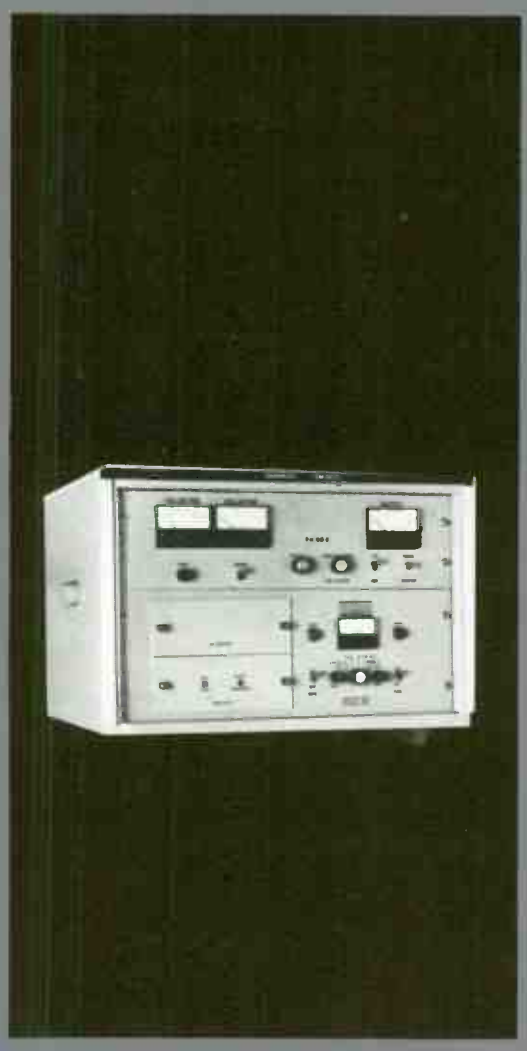
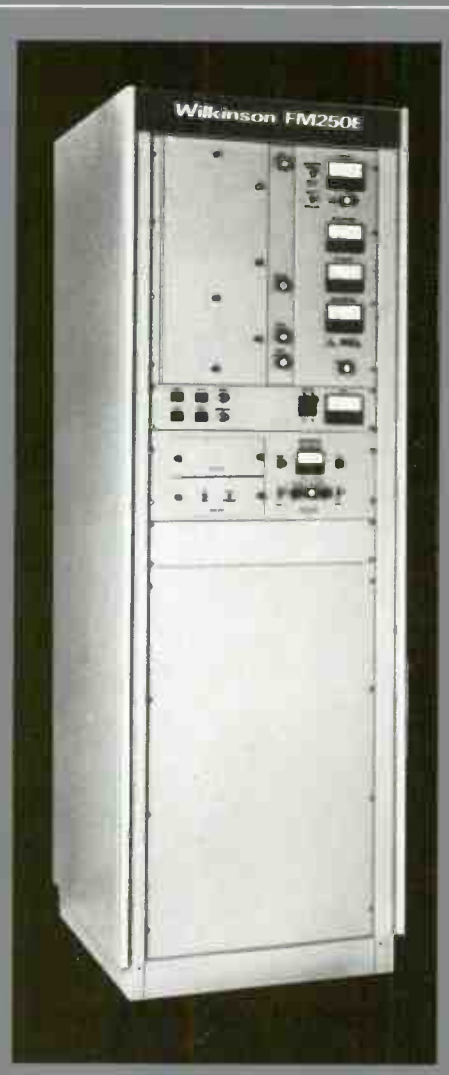
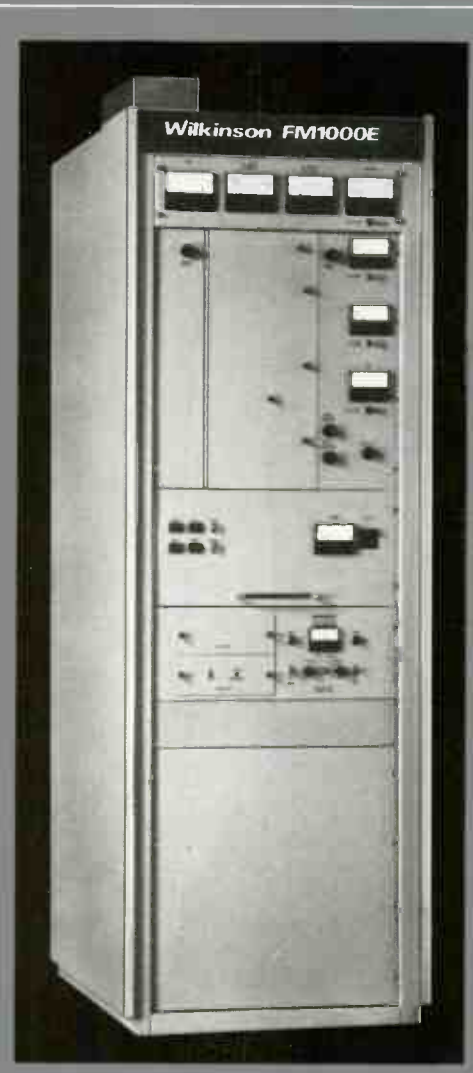


FM-60E



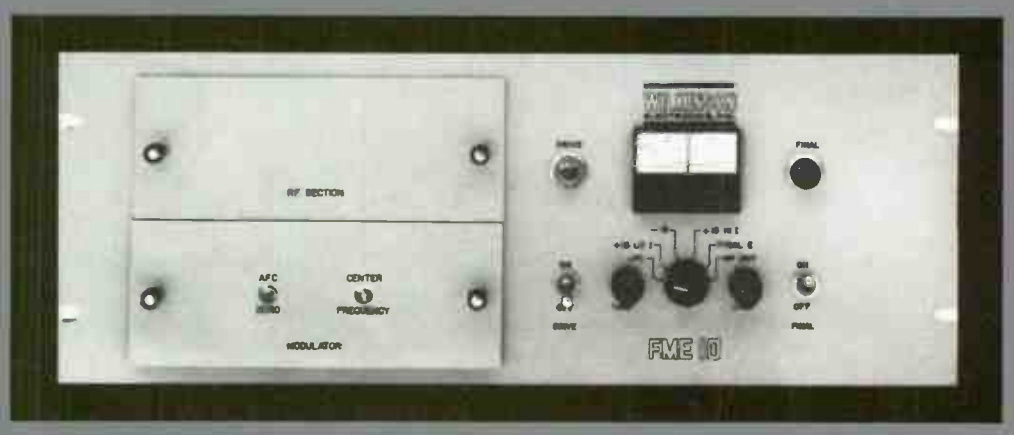
FM-250E



FM-500E*
FM-1000E

FM-1500E*
FM-2500E

GENERATORS & DRIVERS



FME-10
FM EXCITER

Frequency Response:
+0.25 dB 15 Hz to 350 kHz.
FM Noise Level:
65 dB below 100% modulation.
Harmonic Distortion: 0.5%.
Power Output: 20 watts.
Modulation Capacity: 200%
Immune to rumble and microphonics.

SG-1E
STEREO GENERATOR

60 dB separation: 50 Hz to 7.5 kHz.
55 dB separation: 7.5 kHz to 10 kHz.
50 dB separation: 10 kHz to 15 kHz.
Only one front panel adjustment.
Remote Stereo/Mono function.

SCG-1/SCG-2A
SUBCARRIER GENERATOR

No measurable crosstalk to sub or main channels.
Fully automatic muting with "program" logic.
No noise generated during the muting function.
Plug-in semiconductors.
Front panel metering of audio modulation and output.

TRANSMITTERS

	FM-60E	FM-250E	FM-500E	FM-1000E	FM-1500E	FM-2500E
RF Power Output	50 to 100 w.	100 to 275 w.	275 to 750 w.	750 to 1,100 w.	1,100 to 1,600 w.	1,900 to 2,800 w.
Output Connector	Type N, female		7/8" EIA Flange, female		1 5/8" EIA Flange, female	
Tube Complement	Solid-state	1 - 4CX250B	1 - 4CX1000A7		1 - 5CX1500A	
PA Efficiency	73%	71.5%	60%	60%	64%	64.9%
AC Power Requirements	117 VAC, single phase, 50/60 Hz	208/240 VAC, single phase, 50/60 Hz				
AC Power Consumed	250 w.	700 w.	2,000 w.	2,560 w.	3,000 w.	5,800 w.
Dimensions	21 3/4" wide 15 1/2" high 18 3/4" deep	23 1/4" wide 69 3/8" high 26 1/4" deep			25" wide 76" high 24" deep	
Weight	70 lbs.	300 lbs.	650 lbs.	680 lbs.	1,000 lbs.	1,200 lbs.

	FM-5000E	FM-7500E	FM-10000E	FM-20000E	FM-25000E	FM-30000E
RF Power Output	3,000 to 5,000 w.	5,000 to 7,500 w.	7,500 to 10,500 w.	10,000 to 23,000 w.	22,000 to 25,000 w.	25,000 to 30,750 w.
Output Connector	1-5/8" EIA Flange, female.			3-1/8" EIA Flange, female.		
Tube Complement	1 - 4CX250B 1 - 4CX5000A		1 - 4CX250B 1 - 4CX10000D	1 - 4CX250B 1 - 4CX15000A		1 - 4CX250B 1 - 8990
PA Efficiency	70%	70%	70%	76.5%	76.5%	76.5%
AC Power Requirements	208/240 VAC, three phase, 50/60 Hz					
AC Power Consumed	9,500 w.	13,000 w.	16,000 w.	32,000 w.	38,000 w.	45,000 w.
Dimensions	34 1/4" wide 76" high 38" deep			Main Cabinet: 34 1/4" wide, 76" high, 38" deep Power Supply: 30 1/4" wide, 39 1/4" high, 48 1/4" deep Vault		
Weight	1,750 lbs.	1,750 lbs.	1,750 lbs.	2,000 lbs.	2,000 lbs.	2,000 lbs.

GENERAL SPECIFICATIONS: Harmonic attenuation: At least 73 dB. AC regulation: 5%. Power factor: 0.90. Altitude rating: To 10,000 feet. Ambient operating temperature 14° to 122° F.

Specifications subject to change without notice.

GENERATORS & DRIVERS

FME 10
FM EXCITER
Operating Range: 88 to 108 MHz.
Type of Emission: F3 / F9.
Type of Modulation: Direct FM.
Frequency Control:
Crystal controlled AFC servo
Stability: ±1 kHz at 100 MHz.
AM Noise:
−60 dB below 75 kHz deviation.
FM Noise: −65 dB below 75 kHz deviation.
Modulation Capability:
200% modulation (±150 Hz).
Modulation Inputs: High Z composite stereo. High Z SCA. 600 ohm MONO (75 microsecond pre-emphasis).
Input Level: Approximately 1.0 V P-P composite. Nominal +10 dBm for 100%. 0.5 V P-P for 20% modulation SCA.
Response: Amplitude vs. frequency, within 1 dB 50 Hz to 15 kHz (75 microsecond pre-emphasis).
Harmonic Distortion: 0 35% THD, 50 Hz to 75 kHz.
Power Output: 5 to 20 watts.
AC Input: 117 VAC, 50/60 Hz.
AC Power Consumption: 117 watts, nominal.
Dimensions: 19"W x 7"H x 16¼"D.
Weight: 34 pounds.

SG-1E
STEREO GENERATOR
Separation:
60 dB separation, 50 Hz to 7.5 kHz.
55 dB separation, 7.5 kHz to 10 kHz.
50 dB separation, 10 kHz to 15 kHz.
Harmonic Distortion:
Less than 0.5%, 50 Hz to 15 kHz.
FM Noise: −75 dB.
Cross Talk: −50 dB.
Stereo Noise: −65 dB or better.
Crosstalk (Sub to Main):
−50 dB, 50 Hz to 15 kHz.
Crosstalk (Main to Sub):
−50 dB, 50 Hz to 15 kHz.
38 kHz Suppression: −50 dB or better.
76 kHz Suppression: −60 dB or better.
Frequency Response: Within +0.25 and −0.5 dB of 75 microsecond curve, 50 Hz to 15 kHz.
Input level: Approximately +10 dBm at 1 kHz for 100% modulation (500 to 600 ohms balanced).
Output level:
3 V P-P maximum (adjustable).
AC Input: 95 to 135 VAC, 50/60 Hz.
Power Consumption: 35 watts.
Dimensions: 19"W x 3½"H x 13½"D.
Weight: 16 pounds.

SCG-1/SCG-2A
SUBCARRIER GENERATOR
Operating Frequency: 41 or 67 kHz.
Frequency Stability: ±250 Hz.
Type of Modulation: Direct FM.
Harmonic Distortion: 67 kHz, 50 Hz to 2 kHz, 3%. 41 kHz, 20 Hz to 7.5 IHz, 4%.
FM Noise: −55 dB.
AM Noise:
−55 dB below 100% AM modulation.
Frequency Response:
±1 dB 30 Hz to 7.5 kHz.
Input Level: Approximately +10 dBm for 6 kHz deviation.
Output level: 1 V P-P into 5k ohm load.
Muting Sensitivity:
Adjustable 5% to 30%.
Muting Delay: 3 seconds, nominal.
Carrier Attentuation: −55 dB.
AC Input: 95 to 130 VAC 50/60 Hz.
AC Power Consumption: 25 watts.
Dimensions: 19"W x 3½"H x 13½"D.
Weight: 16 pounds.

FM SPECIFICATIONS

	AM-1000B	AM-2500B	AM-3000B	AM-5000D	AM-10000D	AM-20000C
Unique Features	Built in dummy load. Solid state modulator driver. Conservatively rated components (1400 w. capable).	Solid-state modulator driver. Solid-state RF exciter and IPA. Double duty plate and modulation transformers.		Solid-state exciter and modulator Single, compact cabinet. Cool, conservatively rated components.		Available as a 15 Kw, 20 Kw, or 25 Kw MW or SW outputs. Exceeds CCIR and FCC specifications
RF Power Output	1000/500/250 w.	2500/1000/500 w.	3000/1000 w.	5000/2500/1000 w.	10000/5000/2500 w.	25000/ 20000/15000 w.
Output Connector	LC connector	7/8" EIA Flange, male.		1-5/8" EIA Flange, male.		
Tube Complement	4 — 4-400C	4 — 4-1000A		1 — 4-400A 1 — 3CX2500F3 2 — 4CX1500A	1 — 4-400A 1 — 3CX10000A3 2 — 4CX3000	1 — 4-400A 2 — 6146B 2 — 4CX10000D 1 — 4CX20000B
Rated Efficiency	70%	75%	70%	80%	80%	85%
AC Power Requirements	208/240 VAC, single phase, 50/60 Hz	208/240 VAC, three phase, 50/60 Hz				208-240/380/460 VAC, three phase 50/60 Hz
AC Power Consumed						
0% modulation	3000 w.	5000 w.	7500 w.	10000 w.	19000 w.	33000 w.
100% modulation	4000 w.	7500 w.	9600 w.	14000 w.	27000 w.	60000 w.
Normal Program	3300 w.	6000 w.	8200 w.	12000 w.	23000 w.	47000 w.
Dimensions	34" wide 77" high 38" deep			40" wide 82" high 42" deep		Main Cab: PS Vault 114" wide 31" wide 70" high 37" wide 30" deep 31" deep
Weight	1200 lbs.	1400 lbs.		3500 lbs.		6284 lbs.

GENERAL SPECIFICATIONS: Type of emission: A3. RF output impedance: 30 to 250 ohms. Audio input impedance: 150/600 ohms. Audio input level: +10 dBm, +2 dBm for 100% modulation. Audio frequency response: +1 dB, 50 Hz to 7500 Hz, +1.5 dB, 40 to 10,000 Hz. Audio frequency distortion: Less than 4%, 50 Hz to 100 Hz; less than 3%, 100 Hz to 10,000 Hz. Carrier Shift (0 to 100% modulation): Less than 3%. Noise: -55 dB below 100% modulation. Altitude rating: Up to 10,000 feet. Ambient operating temperature: 14° to 122°F. Power factor: 0.90. AC regulation: ±5%.

Specifications subject to change without notice.

AM SPECIFICATIONS

WILKINSON AM TRANSMITTERS

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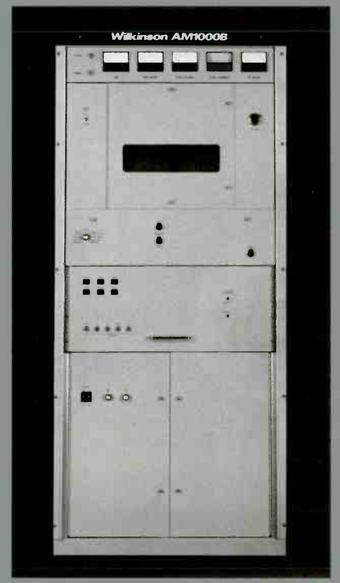
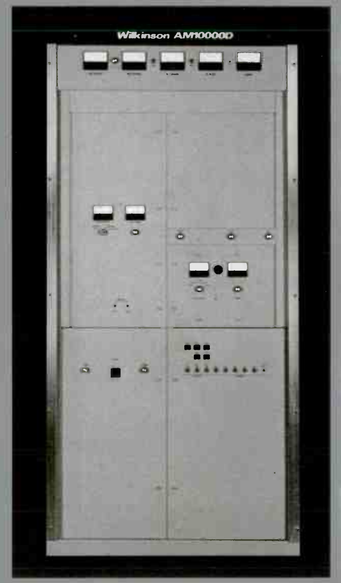


AM-1000B
AM-2500B*
AM-3000B*



AM-5000D*
AM-10000D

AM-20000C

Variable vacuum capacitor tuning eliminates sliding contacts.

Motorized variable capacitor loading for ease and precision of adjustment.

Solid state time delay and recycling increases reliability.

Solid state control circuitry conserves space and reduces complexity.

Complete metering.

* Indicates this model not shown, but is identical in appearance to unit in photo.

Wilkinson AM Transmitters are housed in steel cabinets, finished in a durable gray Rantex™ finish with brushed aluminum trim. All operating controls are located on the front panel and remote control capability is accomplished with the installation of an optional remote control interface panel.

All transmitters are extremely quiet due to oversized air intakes and the use of low noise, direct-drive blowers. These blowers eliminate unreliable belts and pulleys, pillow blocks, and bearings. All air intakes are filtered to assure cleanliness and long component life.

RF EXCITER

The solid state RF exciter generates a signal with sufficient voltage swing to drive the intermediate power amplifier. A precision crystal oscillator, of conventional design, operates at 2 or 4 times the final output frequency. This circuit is followed by a buffer amplifier which drives a divider circuit to provide the operating frequency. By using a precision crystal at the outset and dividing the frequency, any error in the frequency of the crystal is also divided, greatly increasing total stability and accuracy. Bulky crystal ovens are eliminated and strict frequency stability is maintained over a wide temperature range. In high frequency service, or when the synthesizer exciter is used, the exciter operates at the output frequency and the divider is deleted. Following the divider is an "on frequency" input to permit insertion of an external frequency source. This would be required for combining two transmitters in parallel operation. Following the external input are two amplifier stages which provide enough gain to drive the IPA.

POWER AMPLIFIER

Wilkinson AM transmitters incorporate heavy duty coils and vacuum capacitors in the final power amplifier to assure cool, reliable operation and long tube life. The output circuit is a conventional Pi-L network and is vacuum capacitor tuned. The load control is a motor driven air variable capacitor.

MODULATOR

High level plate modulation is employed in all transmitters because of its simplicity and reliability of operation. While it is more expensive to manufacture, it offers many advantages over other modulation techniques. High level plate modulation is familiar to virtually all levels of technical personnel. It also offers the advantage of higher, undistorted modulation capability. Maximum efficiency is also achieved, since the only real losses introduced are in the modulation transformer and reactor. These components are very conservatively rated.

POWER SUPPLIES AND CONTROLS

All high and low voltage power supplies incorporate Wilkinson self-testing silicon rectifiers. Visual inspection in operation determines proper operation. Each diode is shunted by an indicator light, which is lit by the back voltage of the diode. Should the diode short-circuit, back voltage is no longer present and the lamp is extinguished. All power supplies have a voltage and current safety factor of at least 300%.

Recycling is an integral part of the solid state power supply control system. Electronic timing circuits control the application of various voltages in the transmitter in a specific sequence. In the event of a momentary overload, the high voltage is removed and then reapplied automatically. If the condition has cleared, the transmitter will return to operation automatically. However, if the overload persists, the control circuit will prevent continued operation. High speed relays are used in the interlocks to protect personnel. The blower motors are also interlocked, and should they fail, all plate and filament voltages are immediately removed.

CONSTRUCTION

All Wilkinson transmitters are vertical panel construction for maximum accessibility. Control circuits are terminated in accessible places to simplify maintenance and servicing. Access to tubes is made through interlocked doors in the front panel. Components at the rear are easily reached by opening the interlocked rear doors.

Complete metering and front panel controls allow simple and easy adjustments for optimum operation. All filter capacitors, reactors, and transformers are very conservatively rated.

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