MSDC
Satellite Communications Klystrons

CPI Canada is offering the latest in Satcom klystron technology, MSDC – Multi Stage Depressed Collector – klystrons. These klystrons are available for C and Ku-band commercial satellite uplink services. The MSDC klystron enables the same high output power capability as the standard klystrons but offers higher operating efficiencies dramatically reducing prime input power costs.

CPI
Communications & Power Industries

Unmatched Efficiency

Using technology that has been successfully employed for many years for UHF klystrons in the broadcast industry and for TWT's in the microwave industry, CPI is extending this cost-saving technology to microwave klystrons.

For digital traffic, many satellite earth stations require much lower RF output power. However, on some occasions, satellite earth stations still require amplifiers with high RF output capability to overcome severe atmospheric conditions.

The MSDC klystrons are designed to meet both requirements. The MSDC klystron is a four stage depressed collector klystron offering significantly higher operating efficiencies at lower RF output powers. However, for the rarer occasions when teleports have to burn through severe rain fade conditions, the MSDC klystrons can still offer the same higher output power capability ensuring that the transmission is never compromised.

Typical MSDC Power Consumption versus Standard Klystron

Prime Power Input

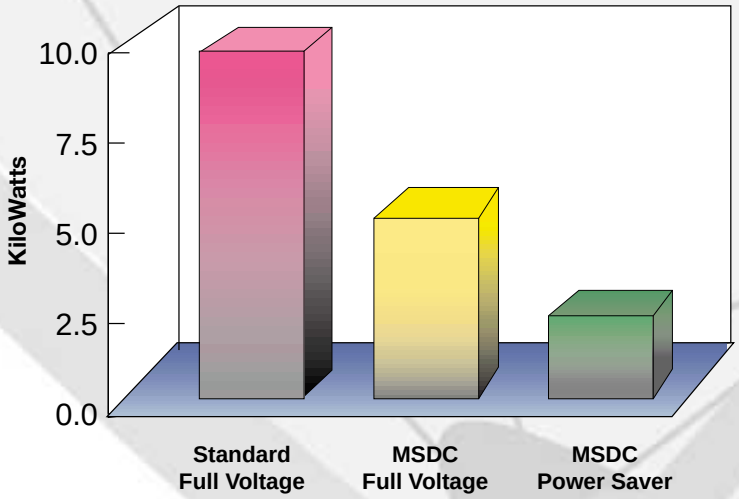
RF Output	MSDC	Standard	MSDC Power * Savings
0	3500	9000	5500
600	4100	9000	4900
2500	6600	9000	2400

All power levels are measured in Watts

* Significantly more power savings if Beam Voltage is reduced.

CPI Satcom Klystron

Power Consumption at 100 Watts Output



MSDC Klystron	STD Equiv. Klystron	Bandwidth MHz(-1dB)	Spec. Freq. Range GHz	Output Power kW (min.)
VKC2503B	VKC7936R	45	5.828 – 6.448	3.35
VKC2505B	VKC2486A	40	6.700 – 7.220	3.0
VKC2500B	VKC2489B	45	5.723 – 6.725	3.35
VKC2504A	VKC7980B	80	5.810 – 6.450	3.0
VKU2501A	VKU7820A	85	13.98 – 14.52	2.5
VKU2501B	VKU2455B	85	13.68 – 14.52	2.5
VKU2502A	VKU2454A	85	12.75 – 13.25	2.2

Other Models available. Contact CPI Canada for details.

MSDC Klystron Benefits

Utilizing four-stage collector depression, the MSDC klystrons offer collector efficiencies on the order of 60%. For DC conditions and lower RF operating points, this translates into significant power savings. For the satellite earth station, the benefits are smaller electrical distribution systems and UPS requirements. With collector depression, the collector heat dissipation is much less reducing the required cooling airflow. This enables smaller AC systems and increased power savings, especially in hot, humid environments.

Lower collector temperatures are key to enhancing the life of klystrons. Past experience has shown that high temperatures can compromise the normal klystron life expectancy. The low peak temperatures of the MSDC klystron means good reliability and long life.

Typical C-Band Operating Parameters

Typical Operation

Heater Voltage	6.0V
Heater Current	6.1
Beam Voltage	8.7kV
Beam Current	1.09A
Collector Voltages	0kV, 2.9kV, 5.8kV, 8.7kV
Collector Currents	=<1.1 Adc
Body Current	5mA
RF Input Power	200mW
RF Output Power	3.35kW
Gain	41dB

Physical Characteristics

Mounting Position	Collector Up
RF Input Connector	Mates with Coaxial type “N” Plug, YG-21D/U or equivalent
RF Output Connector	Waveguide CPR 137 Flange
Focusing	Permanent Magnet
Electrical Connectors	H.T. Connector
Weight	100 lb/45kg
Dimensions	See outline drawing
Collector Airflow Pressure Drop	3.0 inches Water at 750lb/hour (340 kg/hr), or less.

Typical Ku-Band Operating Parameters

Typical Operation

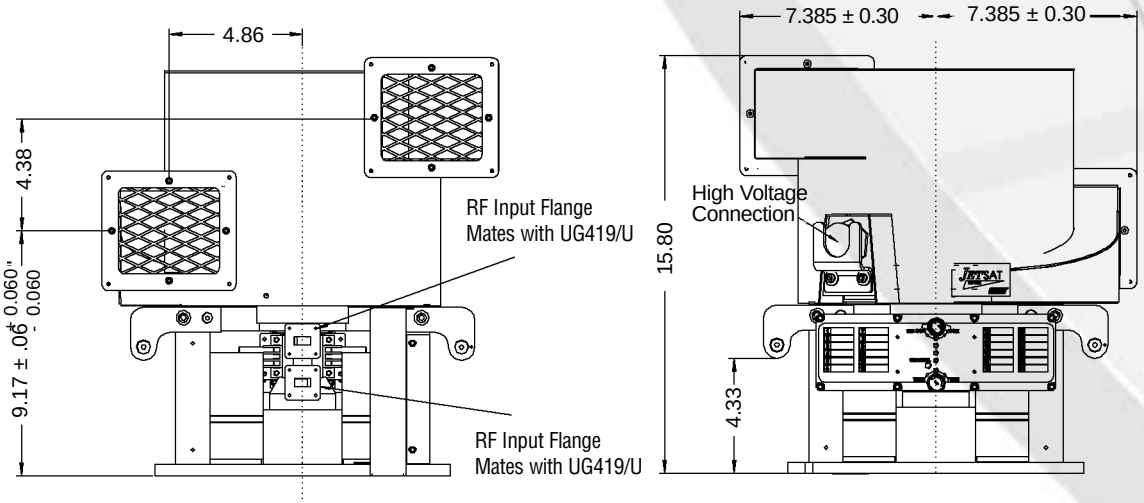
Heater Voltage	6.5V
Heater Current	4.2A
Beam Voltage	8.6kV
Beam Current	1.06A
Collector Voltages	0kV, 2.8kV, 5.7kV, 8.6kV
Collector Currents	=<1.06A
Body Current	7mA
RF Input Power	30mW
RF Output Power	2.50kW
Gain	49dB

Physical Characteristics

Mounting Position	Collector Up
RF Input Flanges	Mates with UG-419/U
RF Output Flange	Mates with UG-419/U
Focusing	Permanent Magnet
Electrical Connectors	H.T. Connector
Weight	80 lb/36kg
Dimensions	See outline drawing
Collector Airflow Pressure Drop	1.0 inch Water at 750lb/hour (340 kg/hr), or less.

Klystron Type	Output Power KW (min.)	Bandwidth MHz (- 1dB)	Spec. Freq. Range GHz (Centre Freq.)
VKC2500B	3.35	45	5.723 – 6.725
VKU2501A	2.5	85	13.98 – 14.52
VKU2501B	2.5	85	13.68 – 14.52
VKU2502A	2.2	85	12.75 – 13.25
VKC2503B	3.35	45	5.828 – 6.448
VKC2504A	3.0	80	5.810 – 6.450
VKC2505B	3.0	40	6.700 – 7.220

Other models available. Contact CPI Canada for details.



For complete information on the MSDC klystrons and other CPI klystrons used in satellite communications, please contact your local CPI office, or CPI Canada Inc.

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