

WAVEGUIDE CRYOGENIC TERMINATIONS (COLD LOADS)

MT70xx() Series

Features

- *Accurate Noise Temperature At Specified Calibration Frequencies*
- *Low VSWR Across The Full Frequency Range*
- *Liquid Nitrogen Cooled*
- *Metrology Grade Calibration For Solid State Noise Generators*
- *Low Noise Figure/Temperature Measurements*



Model MT7025J, a WR15-equipped Cryogenic Noise Termination with power supply and foam-lined wood instrument case.

General

Maury cryogenic terminations are liquid nitrogen cooled loads which provide accurately known noise power at a well matched output port. Used with ambient and/or thermal terminations and a noise figure meter, these terminations provide cold reference temperatures needed for highly accurate noise figure or effective input noise temperature measurements. Because of the accuracy of their noise output, cryogenic terminations are often used as a noise standard for calibration of solid state noise generators.

The accuracy achieved by these terminations is possible because they utilize the known temperature of boiling liquid nitrogen as a constant for calculating noise temperature. Because of this, measurements made with these terminations are traceable to the fundamental quantity, temperature and

NIST via temperature and network calibration standards. Each unit is provided with a calibration report, which includes VSWR and available output noise temperature data at listed standard frequencies. Options for additional user-selected frequencies are available (see Maury data sheet [4E-020](#)¹).

The cryogenic terminations require user-provided liquid nitrogen and dry helium gas at 2 psi. Maury's MT152A pressurization system is available as an optional accessory to regulate the helium pressure. The terminations include a heater circuit to prevent frosting on the output connector and to prevent the heat load of the device-under-test from affecting the output noise temperature.

¹ Maury data sheet 4E-020 provides specifics on the MT7250 series Noise Calibration Swept Data Module, a software tool that allows users to work with other non-standard data points in addition to, or in place of the factory standards.



Description

Maury offers waveguide cryogenic terminations in several styles and a wide range of waveguide sizes from WR430 through WR10. The chart below represents a typical sample of the available terminations.

Waveguide terminations are generally calibrated at three frequencies – high, low and arithmetic center – within the applicable frequency range; however, they can be calibrated at any user-specified frequency within the waveguide band (see Maury data sheet [4E-020](#)). Additional user-specified calibration frequencies are also available as an option.

In addition to liquid nitrogen, these terminations require pressurization with helium gas (not provided) at 2 psi. The MT152A pressurizing system (see Maury data sheet [4F-001](#)) is available to provide proper regulation of the helium supply.

The MT70xx series units come with a linear power supply that operates on line voltages of 100 – 240VAC and 47 – 63 Hz, while supplying 48 VDC to the device power input.

Calibration Uncertainty

Frequency Band (GHz)	Calibration Uncertainty
< 18.0	±1.5 K
18.0 — 40.0	±1.5 K
40.0 — 50.0	±1.8 K
50.0 — 110.0	±2.6 K



MT7025J

Available Model Series (Typical)

Model Series	Frequency Range (GHz)	EIA Waveguide Size	VSWR (maximum)
MT7040()	7.05 — 10.0	WR112 ² ³	1.08
MT7041()	10.0 — 12.4	WR90 ³	1.10
MT7042()	10.0 — 15.5	WR75 ⁴	1.08
MT7043()	13.0 — 15.0	WR62 ³	1.10
MT7044()	15.0 — 22.0	WR51 ⁴	1.10
MT7021()	18.0 — 26.5	WR42 ³	1.08
MT7022()	26.5 — 40.0	WR28 ³	1.10
MT7023()	33.0 — 50.0	WR22 ³	1.10
MT7025()	50.0 — 75.0	WR15 ³	1.12
MT7027()	75.0 — 110.0	WR10 ²³	1.12

² Flange mates with the applicable CPR flange.

³ Flange mates with the applicable military (UG) flange.

⁴ Flange mates with most applicable military and industrial flanges.