



Waveguide Arc Detector

Series No: ARC

Part Description

An Arc Detector is used to protect expensive RF power source and high-power waveguide devices from the Arcing process, which can occur in waveguide systems. Power breakdown in waveguides can occur as a result of an excessive voltage gradient at some point where there is a discontinuity in the wall surface. A minor imperfection, a junction where the coupling flanges do not meet properly, or improper positioning of tuning elements in waveguide device cavities can all contribute to the problem. In any event, such a breakdown is accompanied by arcing, i.e. an electrical discharge producing visible light, as well as a change in the transmission characteristics of the waveguide which reflects a corresponding change in the loading on the microwave power source. The breakdown may be progressive, with the arc being small at first, then rapidly becoming larger as the air or other gas in the vicinity become ionized. If the resulting load change becomes large enough, the power source will be damaged

In response to a visible arc in the waveguide facing the detector device, the Arc detector produces a signal (“Alarm”) which may be used to shut down the system.

The Arc detectors are normally mounted in the 90 degree E-plane or H-plane bends of waveguide transmission lines. Other configurations are available upon request, including a configuration for a straight waveguide unit, used when a system might not have space for a more traditional bend. Arc Detectors for Rigid Coaxial Transmission Lines are also available.

The Arc Detector can be incorporated into one assembly with other waveguide devices such as waveguide directional couplers, magic tees, circulators, waveguide combiners, hybrid, waveguide filters, diplexers, power source’s waveguide launcher, etc.

Integration of the Arc Detector and Components for Rigid Coaxial Transmission Lines is also available. Please call us to discuss your needs with one of our design engineers.

Ordering Data

Ordering Information Waveguide Arc Detector	WR	-Mod	-M	-F1	-F2	-P	/OPT
Example part number: ARC	137	-E	-B	-2	-2	-G	/TL
Waveguide Size: (WR) WR28 thru WR284 available							
Basic Model No.: (-Mod) E=E-Bend configuration H=H-Bend configuration							
Material (M): A=Aluminum, B=Copper/Brass							
Flange 1 (-F1): 1=CPRG, 2=CPRF, 6=Cover, 7=Choke							
Flange 2 (-F2): 1=CPRG, 2=CPRF, 6=Cover, 7=Choke							
Plating (P): I -iridited; <u>Painted</u> : B -black , G -grey, W -white, X -customer to specify							
Options (/OP) TL-TTL output/Latched, TN-TTL/non-latched, OL-open drain/Latched, ON- open drain/non-latched.							



- Option 1 “TTL”. When no arc is present in the waveguide, the output level is TTL 0 (0-0.8 volts). When armed, the arc detector will develop a TTL 1 (2.4 - 5.0 volts) alarm signal. In the Latched Arc Detector model, the TTL 1 signal will remain in this status until a reset (TTL 0) is applied to pin 3. In the Non-Latched Arc Detector model, the TTL 1 signal will remain at this level until the arc in the waveguide is no longer present.
- Option 2 “Open drain”. The output of this Arc Detector model is an open-drain MOSFET circuit. This permits it to drive devices, which require a higher operating voltages and current than the regular TTL output. In the initial state (NO ARC present), the output has a high impedance. When the arc detector is armed, the output is in a Logic 0 (0.1-0.35V) state and pulls the line voltage toward ground.

The Arc Detector includes a built in self-test circuit for checking the optical detector and the latching circuitry. The “Alarm” status LED (Red) indicator is located on the front panel.



Specifications

ELECTRICAL SPECIFICATION		
Spectral Responsivity	320nm – 1050nm (visible light and near-infrared spectrum, peak at λ_{red} =640-750nm)	
DC Supply Voltage	Typical +12V (Min=7V /Max=18V)	
Supply Current	35 mA	
Output Voltage	TTL	Fault/Fired Alarm (Vo)= TTL 1 (5 volts)
	Open-drain	Fault/Fired Alarm (Vo) = 0.1+0.35Volts (Imax=400mA, Vmax=60V)
Response Time	less than 10 μ sec.	
Pressure Sealed to:	30 PSI	

Waveguide Arc Detector - Standard Models						
WG Size	Freq. (GHz)	VSWR (max)	Insertion Loss (max)	Peak Power (max)	Model No.*	Outline Drawing
WR284	2.60 - 3.95	1.10	0.05	1 MW	ARC284-X-X-X-X-X/XX	Dwg
WR229	3.30 - 4.90	1.10	0.05	900 KW	ARC229-X-X-X-X-X/XX	Dwg
WR187	3.95 - 5.85	1.10	0.05	800 KW	ARC187-X-X-X-X-X/XX	Dwg
WR159	4.90 - 7.05	1.10	0.05	700 KW	ARC159-X-X-X-X-X/XX	Dwg
WR137	5.85 - 8.20	1.10	0.05	600 KW	ARC137-X-X-X-X-X/XX	Dwg
WR112	7.05 - 10.0	1.10	0.05	500 KW	ARC112-X-X-X-X-X/XX	Dwg
WR90	8.20 - 12.4	1.10	0.05	400 KW	ARC90-X-X-X-X-X/XX	Dwg
WR75	10.0 - 15.0	1.10	0.05	325 KW	ARC75-X-X-X-X-X/XX	Dwg
WR62	12.4 - 18.0	1.10	0.05	250 KW	ARC62-X-X-X-X-X/XX	Dwg
WR51	15.0 - 22.0	1.10	0.05	200 KW	ARC51-X-X-X-X-X/XX	Dwg
WR42	18.0 - 26.5	1.10	0.05	150 KW	ARC42-X-X-X-X-X/XX	Dwg
WR34	22.0 - 33.0	1.10	0.05	100 KW	ARC34-X-X-X-X-X/XX	Dwg
WR28	26.5 - 40.0	1.10	0.05	50 KW	ARC28-X-X-X-X-X/XX	Dwg

Note: The Arc Detector can be incorporated into one assembly with other waveguide devices such as **waveguide directional couplers, magic tees, circulators, waveguide combiners, hybrid, waveguide filters, diplexers, power source's waveguide launcher**, etc.

Integration of **the Arc Detector and Components for Rigid Coaxial Transmission Lines** is also available. Please call us to discuss your needs with one of our design engineers.

Typical Application:

The Arc Detector is used to protect expensive RF power source and high-power waveguide devices from the Arcing process, which can start in waveguide systems. The Arc detectors are normally mounted in the 90 degree E-plane or H-plane bends of waveguide transmission line. Other configurations are available upon request, including a configuration for a straight waveguide unit, used when a system might not have space for a more traditional bend. The Arc Detectors for Rigid Coaxial Transmission Lines are also available. Please call UBS to discuss your needs with one of our design engineers.



Arc Detector assembly with incorporated Waveguide Crossguide Directional Coupler.