WR284 Arc Detector
ARC-284-E-A-7-T1-1-T1-x/TL

TYPICAL APPLICATIONS

- SATCOM
- Broadcast
- Radars
- Monitoring and Control of visible arcs inside High-Power Waveguide Systems

FEATURES

- Wide spectral responsivity
- Optics withstanding high temperature inside waveguide
- High electromagnetic coupling between waveguide and detectors' cavity
- Fast time response

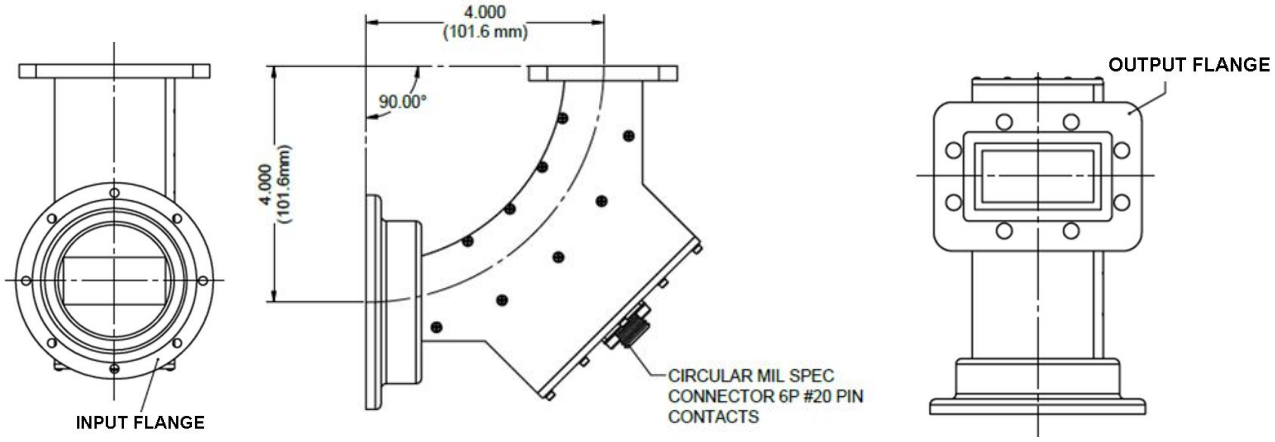

Figure 1. Outline dimensions (inch [mm])

GENERAL DESCRIPTON

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.

The Arc Detector is an opto-electronic device which detects infrared and visible arcs in high-power waveguide transmission lines. 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 Detector can be incorporated into one assembly with other waveguide devices such as waveguide directional couplers, magic tees, circulators, waveguide filters, diplexers, power source’s waveguide launcher, etc.

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Table 1

ELECTRICAL SPECIFICATION		
Waveguide Size	WR284	
Operating Frequency Range	2.60 – 3.95 GHz	
Peak Power	1 MW	
VSWR (typical)	1.05 : 1	
Insertion Loss	≤ 0.05 dB (within full range)	
Spectral Responsivity	320nm – 1050nm (visible light and near-infrared spectrum)	
Electromagnetic Coupling (between waveguide main line and detector's cavity)	> 95 dB	
Optical Sensitivity (typical)	Equal in both directions (toward Port 1 or Port 2)	
Flange 1 (port 1. INPUT)	CHOKE, through holes	
Flange 2 (port 2, OUTPUT)	CPRG, M6 helicoil holes	
Output (interface) connector	Circular MIL-DTL-26482 Spec Connector, 6 pin (male), Shell size 10	
DC Supply Voltage	Typical +15V (Min=5.7V /Max=20V)	
Supply Current	100 mA (max)	
Output Voltage	TTL 5V /or 3.3V	Fault/Fired Alarm (Vo) = 0~0.8Volts
Response Time	less than 10 µsec.	
Pressure Sealed to:	30 PSI	
Operating Temperature Range	- 40 ~ + 85°C	

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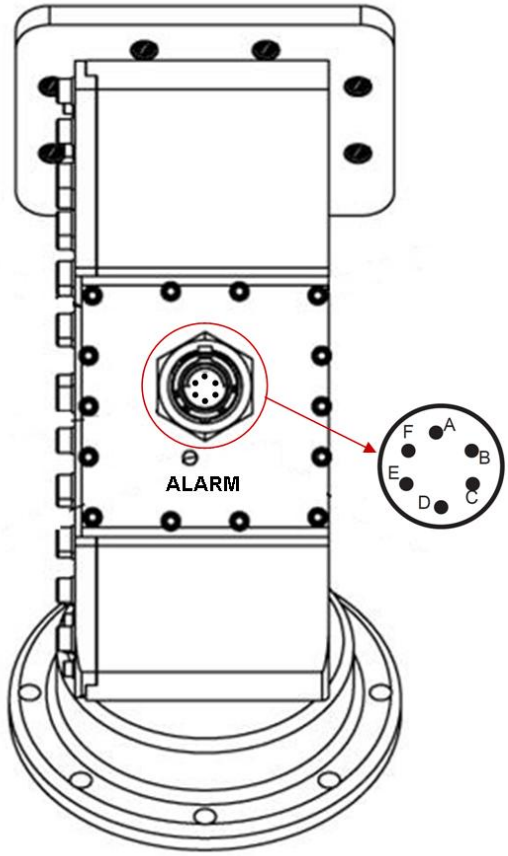

Figure 2. Pinout of Circular Connector

Table 2. Pin Function descriptions

Pin No	Function	Description
A	+V	Power voltage +15VDC (Min=+5.7V / Max= +20V), internal circuit can withstand -20V reverse voltage and +25V positive transients
B	TEST	Self Test Input (TTL 5V, ESD protected) is used for testing internal circuits' operation from optical receiver to output. If the TTL voltage 5V at “Self test” pin is applied, the output (pin D) is latched in an “Alarm” state until “Reset" signal is applied at pin C.
C	RESET	TTL Logic Input internally pulled-up to 5V/or 3.3V. Initial state “OFF” is used at Logic 0 (0-0.8V)/or connected to GND. Open circuit/ or pulse Logic 1 (2.4-5V) is to be applied for reset. Constant open circuit (Logic 1) can be used to disable function of Arc detector. RESET Input is ESD protected.
D	OUTPUT	Open drain output circuit with pulled-up resistor 10kOhm is used. In the initial state (NO ARC present), the output has a high logic level 5V/3.3V. When the arc detector is armed, the output is in Logic 0 state (0.1-0.4V, depends on output current).
E,F	GND	Ground

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