

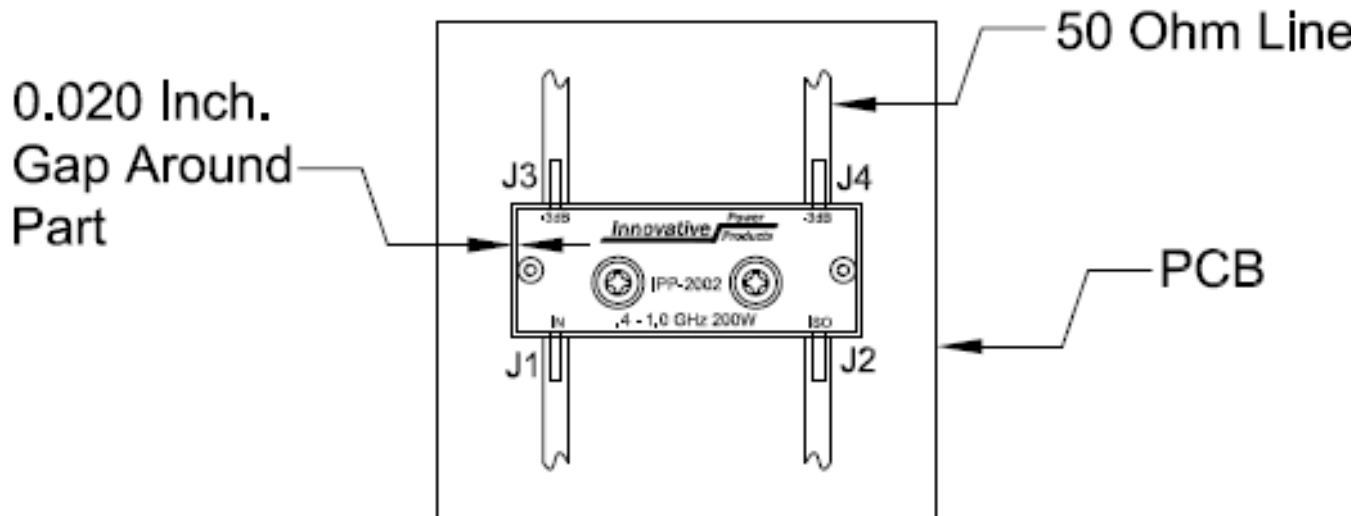
IPP 90 Degree, Drop-In, 3dB Hybrid Application Note

❖ General Notes:

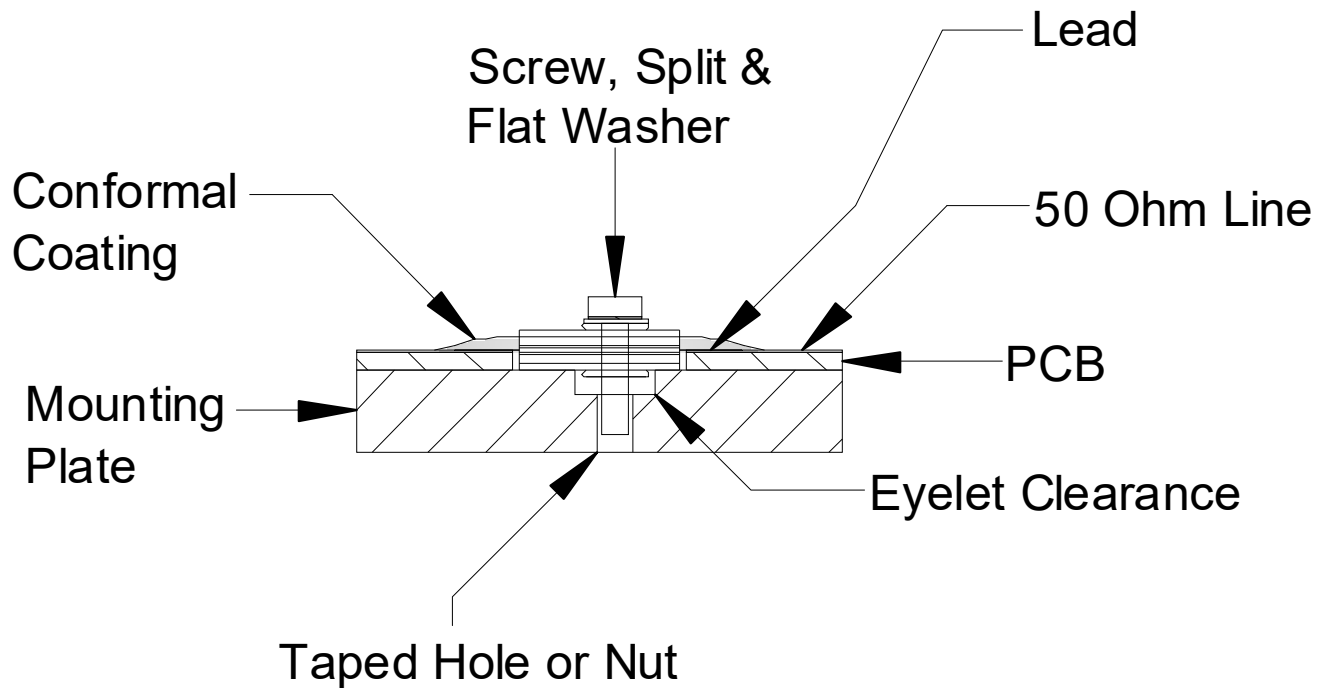
- Data and specifications apply when part is mounted in IPP test fixture and terminated into 50 Ohms with >30dB return loss.
- Conformal coating is recommended at the lead/50Ω line interface for high power applications to prevent voltage arcing.
- To insure proper grounding the bottom plate of coupler must lay flat on mounting surface. Please allow clearance for all eyelet projections in base plate.
- Solder leads to 50 ohm lines using lead free or Sn63 alloy.
- Torque #2-56 stainless steel machine screw, split and flat washer to 2.5 in-lbs.
- Operating temperature is -55°C to +85°C base plate, non-condensing.
- Storage Temperature is same as the operating temperature stated on the parts outline drawing. The moisture sensitivity level (MSL) is 1. Normal precautions should be taken to prevent surface oxidation.

Input Output Relationships for -3dB, 90° Hybrid Couplers

INPUT	OUTPUT			
	J1	J2	J3	J4
J1	N/A	Isolation Port	-3dB <0°	-3dB <-90°
J2	Isolation Port	N/A	-3dB <-90°	-3dB <0°
J3	-3dB <0°	-3dB <-90°	N/A	Isolation Port
J4	-3dB <-90°	-3dB <0°	Isolation Port	N/A



Mounting, Top View



Mounting, Side View

Electrical Specifications

❖ VSWR (Voltage Standing Wave Ratio)

- The voltage standing wave ratio is a measure of how well a load is impedance-matched to a source. The value of VSWR is always expressed as a ratio with 1 in the denominator (2:1, 3:1, 10:1, etc.) It is a scalar measurement only (no angle). A perfect impedance match corresponds to a VSWR 1:1 meaning you will get all the power from source to load.

- $VSWR (\sigma) = V_{max}/V_{min}$

❖ Insertion Loss (IL)

- The insertion loss is the amount of power (P) lost when transmitted through the coupler from the input port to the other ports.

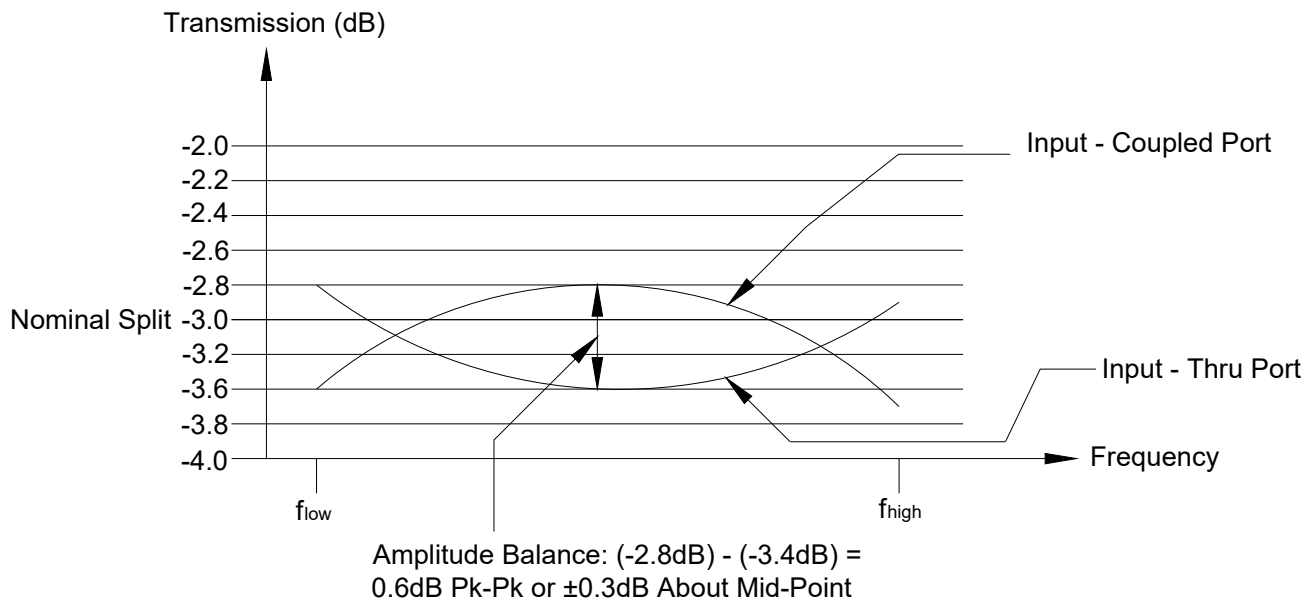
- $IL (dB) = 10 \log (P_{in} / (P_{thru} + P_{coupled} + P_{iso}))$

❖ **Isolation (ISO)**

- The isolation is the amount of power at the input port divided by the amount of power at the isolation port when the other two ports are terminated into 50 Ohms.
 - $ISO(dB) = 10\text{Log}(P_{in}/P_{iso})$

❖ **Amplitude Balance (AB)**

- The amplitude balance is the difference in the power levels at any given frequency for the same input level when measured at the coupled and thru ports.
 - $AB(dB) = |10\text{Log}(P_{coupled}/P_{thru})|$



Typical Amplitude Balance Response for 1-Section Coupler

❖ **Phase Balance (PB)**

- The phase balance is the difference in phase angle between the power at the thru port and the power at the coupled port. The nominal difference being 90° .
 - $PB(^\circ) = \angle P_{coupled} - \angle P_{thru}$

❖ **Power (P)**

- The maximum total CW input power is the sum of the CW input power at each port.
 - $P_{total\ Max} = P_{in} + P_{thru} + P_{coupled} + P_{iso}$