

Directional Coupler Terminology

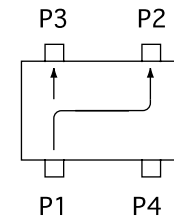
NOTES

1 3 dB Coaxial Hybrids and 3 dB 90° Card Couplers

Degree of Coupling ● expressed by nominal value (3 dB) + insertion loss (dB)

Insertion Loss ● This refers to the power lost when the signal passes through the product and is expressed as below.

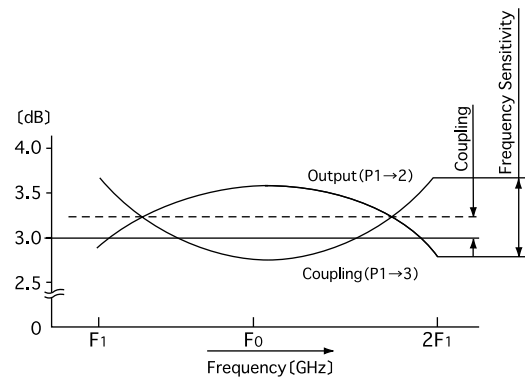
$$\text{Insertion Loss (dB)} = 10 \log \frac{\text{P2 Output power} + \text{P3 Output power}}{\text{P1 Input power}}$$



P1 : Input port
 P2 : Output port
 P3 : Coupling port
 P4 : ISO port

Directivity ● 3 dB Coaxial Hybrids

This expresses the value that results from subtracting the nominal coupling value (3 dB) from the isolation value.



Frequency Sensitivity ● Expresses the difference at the frequency of usage between the maximum value (dB) of the P2 output or the P3 output and the minimum value (dB) of the P2 output or the P3 output.

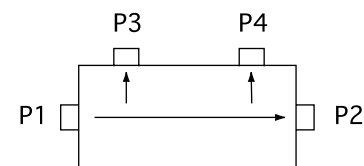
Primary Line V.S.W.R. — The V.S.W.R. when input is from P1

Secondary Line V.S.W.R. — The V.S.W.R. when input is from P3

2 Directional Couplers, Directional Card Couplers

Degree of Coupling ● Expresses the ratio of the P3 output power with respect to the P1 input power.

$$\text{Coupling (dB)} = 10 \log \frac{\text{P3 Output power}}{\text{P1 Input power}}$$



P1 : Input port
 P2 : Output port
 P3 : Coupling port
 P4 : ISO port

Insertion Loss ● This refers to the power lost when the signal passes through the product.

- When the coupling loss is included,

$$\text{Insertion Loss (dB)} = 10 \log \frac{\text{P2 Output power}}{\text{P1 Input power}}$$

- When the coupling loss is not included,

$$\text{Insertion Loss (dB)} = 10 \log \frac{\text{P2 Output power}}{\text{P1 Input power}} - 10 \log \frac{\text{P1 Input power} - \text{P3 (nominal value) Output power}}{\text{P1 Input power}}$$

$$= 10 \log \frac{\text{P2 Output power}}{\text{P1 Input power} - \text{P3 (nominal value) Output power}}$$

The expression of $10 \log \frac{\text{P1 Input power} - \text{P3 (nominal value) Output power}}{\text{P1 Input power}}$

at this time is called the coupling loss.

This is the loss in theory (in terms of calculation) that is brought about by the coupling to P3.

Please note that in the specifications some items include this coupling loss and others do not.
(Refer to the specifications of each Series for details.)

Directivity ● This expresses the value (in dB) that results from subtracting the (nominal) coupling value from the isolation value.

Frequency Sensitivity ● This is included in the coupling.

This expresses the difference between the maximum value and the minimum value within the frequencies used.

Primary Line V.S.W.R. — The V.S.W.R. when input is from P1

Secondary Line V.S.W.R. — The V.S.W.R. when input is from P3

※Unit of power : Watt (W)