

- 50-220 GHz operating frequency
- Low Insertion loss
- High directivity

Applications

- Power sampling
- Test equipment
- Subsystems



Description

ELVA series **DC-XX** 3-port directional couplers are available in six waveguide bands from 50 to 220 GHz. The standard coupling levels are 3, 6, 10, 20, 30 and 40 dB with full waveguide operational bandwidth. ELVA directional couplers have directivity of up to 40dB for frequencies below 110GHz and 30dB for upper frequencies.

Directional couplers are in common use for the purpose of transmitting power into a waveguide circuit without perturbing the operating characteristics of the circuit. These couplers are particularly suitable for frequency monitoring and measurement of RF power (transmitted or reflected) in circuits. Directional couplers are used for scalar network analyzers, and for signal sampling in instruments or subsystems.

The directional couplers can be used in different high-frequency equipments. They are used for dividing input signals into multiple output signals with minimum loss of power (forward direction). The standard directional couplers have 3 ports.



Fig. Scheme of 3-port directional coupler

Producing of other directional couplers is possible upon special request. Energy transfer can be done from any port to any directions (it depends on the purpose of the device). The examples are the following:

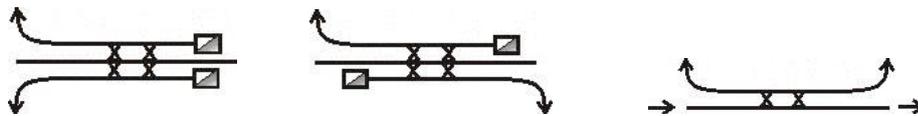
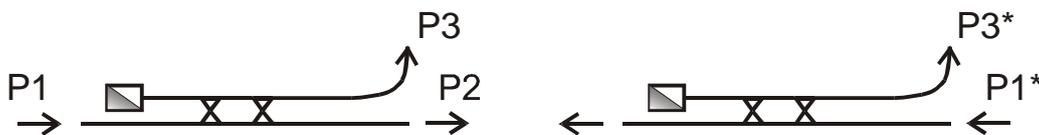


Fig. Scheme of 4-port directional couplers of different design

In practice, the most popular models have 3 ports. The basic function of a 3-port directional coupler is to operate on an input (P1) so that two output signals (P2 and P3) are available. The output signals are unequal in amplitude. The larger signal is at the mainline output port (P2). The smaller signal is at the secondary port (P3).

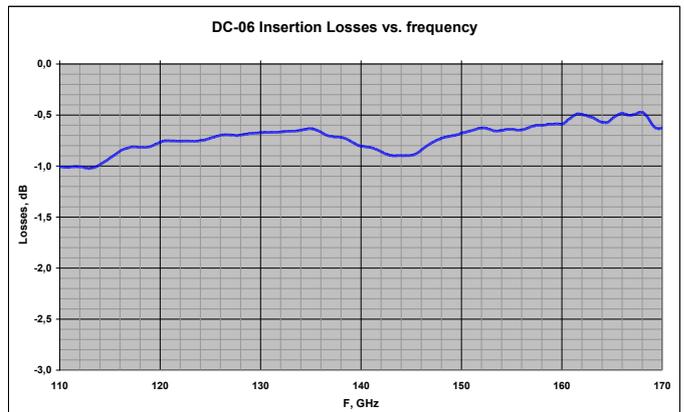
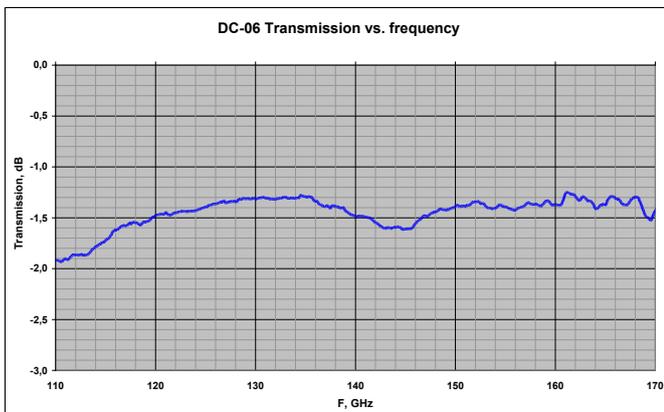


If the input signal (P1*) is applied to the opposite port (power is transmitted in the back direction) some part of the power is reflected to the opposite direction in secondary waveguide. It is possible to measure it as P3*. The difference in dB of the output power P3 and P3* is called directivity.

Main characteristics of the directional couplers

Transmission	= $10\text{Log}(P2/P1)$
Coupling value	= $10\text{Log}(P3/P1)$
Insertion losses	= $10\text{Log}((P2+P3)/P1)$
Directivity	= $10\text{Log}(P3/P3^*)$, $P1^*=-P1$

Typical directional couplers data presented in plots below



MODEL NUMBER	DC-15	DC-12	DC-10	DC-08	DC-06	DC-05
Frequency band, GHz	50-75	60-90	75-110	90-140	110-170	140-220
Waveguide	WR-15	WR-12	WR-10	WR-08	WR-06	WR-05
Coupling value dB	3, 6, 10, 20, 30, 40	3, 6, 10, 20, 30, 40	3, 6, 10, 20, 30, 40	3, 6, 10, 20, 30, 40	3, 6, 10, 20, 30	3, 6, 10, 20
Insertion losses dB	0.8	0.9	1.0	1.2	1.4	1.5
Directivity dB	30-40	30-40	30-40	30-35	30-35	25-30
VSWR	1.08:1	1.1:1	1.15:1	1.2:1	1.25:1	1.4:1

How to Order

Specify Model Number DC-XX /C, where

- XX – number of waveguide standard (Ex. 10 for WR-10 and 06 for WR-06)
- C- coupling value

Example

DC-10/10 (W-band directional coupler, WR-10, coupling value 10 dB

DC-06/20 (D-band directional coupler, WR-06, coupling value 20 dB