

Product Data 905(P)/905(P)-E

Polarization Maintaining Variable Ratio Evanescent Wave Couplers



Model 905 SM non-PM version

Model 905P PM version

Model 905(P)-E Electrically controlled version

Precise Ratio Adjustment

Low loss

Low back reflection

Low polarization cross talk

Large operating bandwidth

Polarization Maintaining (PM) or non-PM types

Variable ratio couplers are made with optically contacted polished fibers mounted in substrate blocks that have transverse motion in the contact plane to adjust core-to-core separation distance. In the case of PM fiber, the orientation of the fast and slow axes is preserved during the motion. A negligibly thick oil layer is used to lubricate the substrate blocks and ensure smooth motion. Long term ratio stability is better than 1% under laboratory conditions.

Fine transverse motion is accomplished by means of a micrometer and lever system. The 25:1 lever ratio gives approximately one micron of motion at the coupler center per 0.001 inch division on the micrometer.

This motion however, is not free of hysteresis or backlash and a particular micrometer reading or selected voltage for the remote 905-E driver will not correspond to a particular fixed ratio, only to a nominal ratio. Accurate ratio settings can only be made by observation of the outputs. (X and Y if input A or B). Hysteresis and backlash tend to be reduced if the device is used repeatedly.

Available fibers have cutoff wavelengths ranging from 450 nm to 1550 nm. For a particular fiber used in a variable coupler the useful bandwidth extends from the single mode cutoff wavelength to approximately 1.3 times the cutoff wavelength, where losses begin to occur.

Model 905(P)-E is a variable ratio coupler which is remotely controlled using a piezo-electric actuator in addition to the micrometer to change coupling ratio.

It is a factory assembled unit composed of a 905 variable coupler and a piezo-electric drive module. The drive module cannot be removed and placed on a standard Model 905.

Piezo-electrically driven variable couplers are not intended for fast switching applications, nor are they calibrated for voltage vs. coupling ratio. The voltage applied is simply a method of remote adjustment. The micrometer is similarly not a calibrated device, the reading is nominal. The micrometer is used to set the initial coupling of the 905(E), (usually the peak) the voltage applied will then reduce the coupling from that peak. Significant hysteresis and backlash are present which require several initial cycles and adjustments for an applied repetitive waveform (e.g. a triangle) to settle down to constant operation.



905(P) / 905(P)-E Specifications

Polarization Isolation

(room temperature):

-24 dB typical

-22 dB guaranteed

Standard Coupling Ratio:

0-100% (other ranges upon request)

Excess Loss:

<0.1dB for wavelengths >980nm, <0.15dB for wavelengths 700 to 980, <0.2dB 590nm to 700nm

Pigtails:

1m standard length (longer available)

sleeved in 900 micron HYTREL or 3mm sleeving

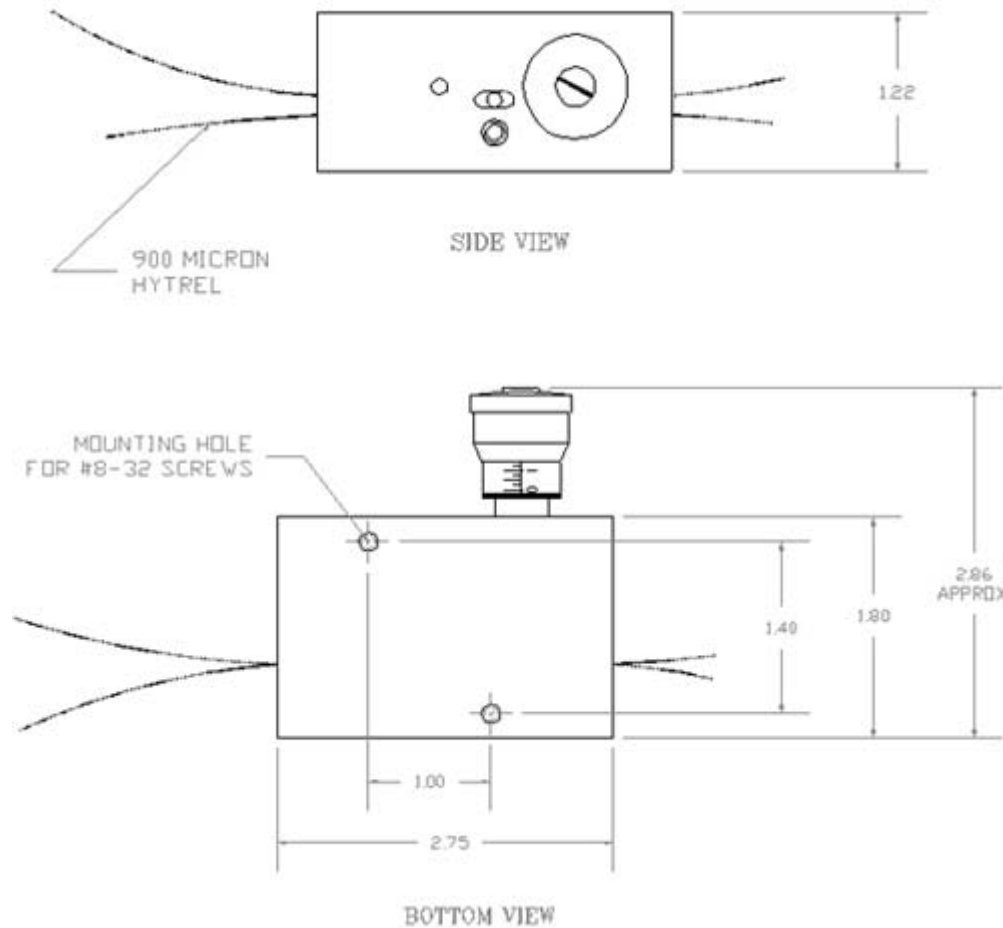
Wavelengths:

0.488 to 2.04um

Coupler Bandwidth

Package:

905(P): 25 mm x 38 mm x 63 mm aluminum case, with micrometer projecting 28 mm 905(P)-E: 25 mm x 38 mm x 63 mm aluminum case, with micrometer projecting 28 mm, 35mm projection opposite micrometer



Terminations:

FC/SPC, FC/APC, LC/APC, SC/APC, SC/PC

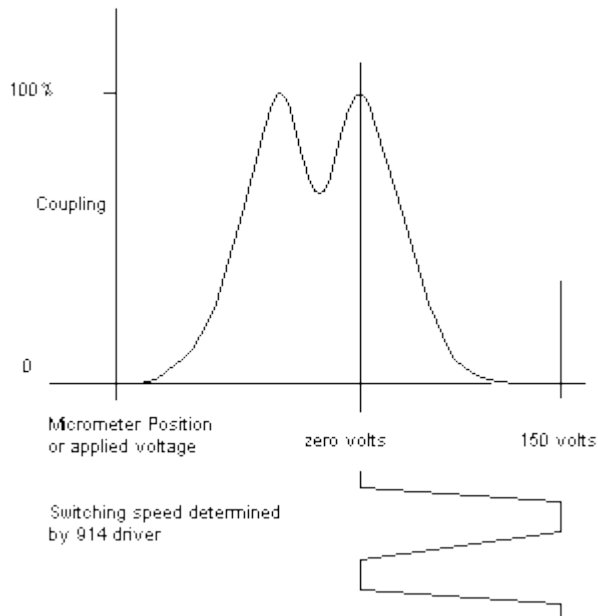
905(P)-E

Connections:

Power is through AC line cord input at rear. Connect jack from 905P-E to input labeled 916. Connect input signal to BNC labelled 916.

Coupling Characteristic

Coupling is shown with respect to micrometer setting or piezo-electric drive signal. With the micrometer set for maximum coupling at zero volts, changing to maximum signal (5 volts input signal) will take the unit outside coupling range to <0.1% coupling. The micrometer is used to preset coupling to a desired value at zero signal to the piezo actuator. Units are delivered with micrometers set at 100% coupling.



905/905P-E are tested for 24 hours with a triangle wave drive to switch at about 1 Hz. to confirm stability. The piezo drive card will accept a square wave input but will filter this to a 20 millisecond rise time. The driver card is deliberately made with a low frequency response to prevent excessive currents and overheating of the drive transistors. The piezo-actuator is a large capacitive load and takes large currents to change position in a short time and vice versa. High speed switching using other drivers may cause ringing as the piezo is a mechanically stiff element. The 905E coupling may also deteriorate with prolonged high duty cycle switching.