

Product Description

In order to facilitate the design of this product, an explosion proof housing was obtained from Audale Corporation of Cleveland Ohio. The housing meets the requirements of both NEC and ATEX standards for use in areas where explosive gases or dust may exist. Southwest Microwave has taken one of its standard products, the Model 310B microwave link, which has been in production for over 20 years and repackaged it to fit within the enclosure. The Model 310B is a K-Band sensor operating at 24.125 GHz and uses a simple square wave modulation scheme. The standard Model 310B incorporates a nine inch diameter reflector on both the transmitter and the receiver antenna assemblies and packaging each assembly would have required an enclosure weighing over 100 pounds. Marketing determined that the weight would add excessive shipping and handling costs so the decision was made to reduce the design range of the system in order to utilize a smaller reflector and therefore utilize a lighter and less costly enclosure.

As shown in the exhibits, the enclosure utilizes a two-part assembly: the main rear section and a hinged cover containing a $\frac{1}{2}$ inch glass window. All of the electronic and RF assemblies are connected to the front cover by means of a specially designed mounting bracket which serves two purposes; to minimize interconnection wiring and to maintain the spacing between the antenna and the glass window. A thin ABS matching disk is added between the glass and the antenna to improve match and to reduce the amount of mismatch loss of the glass. The only circuit addition is a small analog circuit board and a LED display added to the receiver which is used to provide a measure of the alignment signal used for link setup and operating condition.

Exhibits G and H show the antenna profiles taken through the enclosure window on a 3 meter test range using a Narda 638 Standard gain horn and a power meter as the detector. The transmitter was operated in a CW mode in order to obtain stable antenna plots; the system is always operated with a square wave modulation so the average power is 3dB less than that shown. The 3 dB beam width is approximately 7.1 degrees due to the lower gain of the antenna ($G=26$ dB). Based on these measurements, the maximum allowable transmitter power can not exceed 5 mW in order to meet the 2500 mV/m at 3 meters as specified in part 15.245 of the FCC regulations.