# Rotary Vane Attenuators
## Series 110 - The Industry Standard

For Programmable Vane Rotary Attenuators see page 6-9

## Features

- 1% accuracy
- 0 - 60 dB
- Direct Reading
- Unsurpassed Reliability

**Flann Precision Rotary Vane Attenuators are considered by many to represent the 'Industry Standard' in precision waveguide attenuators, offering high accuracy and unsurpassed repeatability and reliability.**

The Rotary Vane Attenuator is the ideal instrument for use in waveguide systems where broadband direct reading of attenuation is required, particularly as a standard for reflectometer and swept systems.

The Flann Rotary Vane Attenuator consists of a rotating circular waveguide section flanked by a pair of low VSWR rectangular to circular transitions. The three waveguide sections are fitted with stable high attenuation elements which ensure close agreement of the attenuation characteristic to the theoretical law. The attenuation is directly related to the relative angular position of the attenuating element in the centre section (Ø) and can be seen to follow the law 40 log (sec Ø). The attenuation is insensitive to frequency; variations of phase with attenuation are negligible. Choking of the rotating joints is employed to minimise RF leakage whilst sound mechanical design ensures the instruments are free from backlash. A precision 10 turn, 75 mm diameter helical drum scale provides extremely high resolution as the table below indicates:-

| Attenuation scale range | 1-4dB | 4-30dB | 30-40dB | 40-60dB |
|---|---|---|---|---|
| Scale increment | 0.01dB | 0.1dB | 0.2dB | 0.5dB |

**Discrimination of the drum scale over a 0 to 60 dB attenuation range**

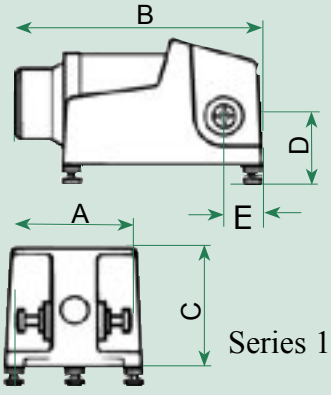
By using high value attenuation markings on the scale, symmetrically positioned about the maximum attenuation position, the user is able to verify the attenuation characteristic alignment which gives the highest confidence in the accuracy of subsequent measurements.

**Custom Built Units:-**

Special attenuators can be supplied with a calibration range in excess of 60 dB. Combined rotary vane attenuator and rotary vane phase changer units are also available; these units are usually coupled at the circular waveguide section thereby minimising mismatch errors at low attenuation settings.

Model 24110

**ORDERING INFORMATION**
Model: Description
Example: Model 16110 Rotary Vane Attenuator




Series 110

## Specifications

**Attenuation Range** 0 to 60 dB
**Attenuation Accuracy** 0.1 or 1% of reading, whichever is the greater
(except Model 06110 - 0.2 dB or 2%, whichever is the greater)

| Model | Frequency Range (GHz) | Waveguide | | | Maximum VSWR | Maximum Insertion Loss (dB) | Maximum Power (watts) | Dimensions (mm) | | | | | Weight (kg) | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | WG | R | WR | | | | A | B | C | D | E | | |
| 10110 | 2.60 - 3.95 | 10 | 32 | 284 | 1.15 | 0.5 | 12 | 935 | 358 | 198 | 88.2 | 108 | 28 | 10110 |
| 11A110 | 2.60 - 3.95 | 11A | 40 | 229 | 1.15 | 0.5 | 10 | 687 | 358 | 198 | 81.2* | 108 | 13 | 11A110 |
| 12110 | 3.94 - 5.99 | 12 | 48 | 187 | 1.15 | 0.5 | 10 | 560 | 244 | 149 | 66/75 | 58 | 8.5 | 12110 |
| 13110 | 3.94 - 5.99 | 13 | 58 | 159 | 1.15 | 0.5 | 9 | 520 | 244 | 149 | 66/75 | 58 | 8.0 | 13110 |
| 14110 | 5.38 - 8.18 | 14 | 70 | 137 | 1.15 | 0.5 | 8 | 420 | 244 | 149 | 66/75 | 58 | 6.0 | 14110 |
| 15110 | 6.58 - 10.0 | 15 | 84 | 112 | 1.15 | 0.5 | 6 | 340 | 226 | 119 | 45/54 | 44 | 4.0 | 15110 |
| 16110 | 8.20 - 12.5 | 16 | 100 | 90 | 1.15 | 0.5 | 4 | 300 | 226 | 119 | 45/54 | 44 | 3.8 | 16110 |
| 17110 | 9.84 - 15.0 | 17 | 120 | 75 | 1.15 | 0.5 | 3 | 276 | 226 | 119 | 45/54 | 44 | 3.8 | 17110 |
| 18110 | 11.9 - 18.0 | 18 | 140 | 62 | 1.15 | 0.5 | 2 | 250 | 226 | 119 | 45/54 | 44 | 3.4 | 18110 |
| 19110 | 14.5 - 22.0 | 19 | 180 | 51 | 1.15 | 0.5 | 2 | 250 | 226 | 119 | 45/54 | 44 | 3.4 | 19110 |
| 20110 | 17.6 - 26.7 | 20 | 220 | 42 | 1.15 | 0.8 | 1 | 250 | 226 | 119 | 45/54 | 44 | 3.3 | 20110 |
| 21110 | 21.7 - 33.0 | 21 | 260 | 34 | 1.15 | 0.8 | 1 | 225 | 226 | 119 | 45/54 | 44 | 3.2 | 21110 |
| 22110 | 26.4 - 40.1 | 22 | 320 | 28 | 1.15 | 1.0 | 0.7 | 174 | 227 | 119 | 55/64 | 36 | 2.5 | 22110 |
| 23110 | 33.0 - 50.1 | 23 | 400 | 22 | 1.15 | 1.0 | 0.7 | 140 | 227 | 119 | 55/64 | 36 | 2.5 | 23110 |
| 24110 | 39.3 - 59.7 | 24 | 500 | 19 | 1.15 | 1.0 | 0.7 | 134 | 227 | 119 | 55/64 | 36 | 2.3 | 24110 |
| 25110 | 49.9 - 75.8 | 25 | 620 | 15 | 1.15 | 1.0 | 0.5 | 100 | 227 | 119 | 55/64 | 36 | 2.3 | 25110 |
| 26110 | 60.5 - 92.0 | 26 | 740 | 12 | 1.15 | 1.5 | 0.3 | 89 | 227 | 119 | 55/64 | 36 | 2.3 | 26110 |
| 27110 | 73.8 -112.0 | 27 | 900 | 10 | 1.15 | 1.5 | 0.3 | 89 | 227 | 119 | 55/64 | 36 | 2.3 | 17110 |
| 28110 | 92.3 -140 | 28 | 1200 | 8 | 1.20 | 2.0 | 0.2 | 89 | 227 | 119 | 55/64 | 36 | 2.3 | 28110 |

**For standard flange types and recommendations see pages 108 onwards**

*** Non-adjustable mounting feet**