# Couplers with Connectors (H Type)

## HDH Series


HDH-00803GHD(40)


HDH-01503GHD(40)


HDH-01503GH(40)


HDH-03003GHD(40)


HDH-06003GHD(40)


HDH-09003GHD(40)


HDH-12803CHD(40)

## ■Features

### 1.High Performance

The high frequency characteristics feature extremely low loss, a high degree of matching, and high isolation.

### 2.Power Uniform Distribution and 90°Phase Difference Type

This is a one input, two output (or two input, one output) power uniform distribution type having a 90°phase difference between the two outputs (or two inputs).

### 3.Miniature and Lightweight

Corrosion-resistant aluminum is used for the case and the Hirose Electric original pattern design, which uses a stripline triplate method, enables the couplers to be miniature and lightweight.

### 4.Couplers with SMA Connectors

Use of SMA connectors (Hirose Electric HRM Series) which feature stainless steel for the exterior cladding make these couplers durable.

## ■Product Specifications

| | | | | |
|---|---|---|---|---|
| Ratings | Frequency range (Note)<br>Characteristic impedance<br>Maximum Input Power (Note) | 0.5 to 14.5 GHz<br>50 ohm<br>2 to 50 W | Operating temperature range<br>Operating relative humidity | -10℃ to +65℃<br>95% Max. |

Note: The frequency range and the maximum input power will differ depending on the products.

| Item | Standard | Conditions |
|---|---|---|
| 1.Vibration | No electrical discontinuity of 1 μs or more | Frequency of 10 to 2000 Hz, overall amplitude of 1.52 mm, acceleration of 98 m/s² for 2 hours in each of 3 directions |
| 2.Shock | No damage, cracks, or parts dislocation | Acceleration of 490 m/s², sine half-wave waveform, 3 cycles in each of the 3 axis |
| 3.Temperature cycle | No damage, cracks, or parts dislocation | Temperature : −55℃ → +15℃ to +35℃ → +85℃ → +15℃ to +35℃<br>Time : 30 → 15 max. → 30 → 15 max. (Minutes)<br>5 cycles |

●The test method conforms to MIL-STD-202.

## ■Materials

| Part | Material | Finish |
|---|---|---|
| Connector Body | Stainless steel | Passivated |
| Connector female contacts | Beryllium copper | Gold plating |
| Connector Insulator | PTFE | —— |
| Case | Aluminum | Coating |
| Board | Dielectric | Gold plating |

## ■Ordering Information

**HD H - 008 03 G H D (40)**
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

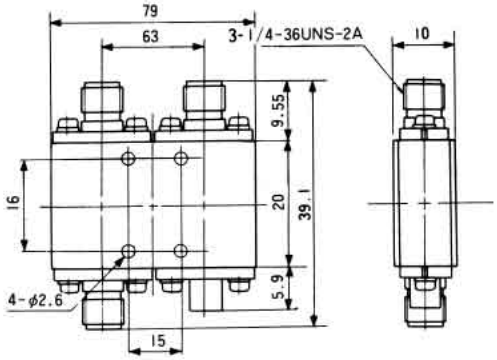
| | |
|---|---|
| ❶Series Name: HD (Directional Couplers) | ❹Coupling<br>03:3dB |
| ❷Type of Connector<br>H: Indicates the HRM (SMA) Series | ❺Frequency Relative Bandwidth<br>B:From 5% to below 10%<br>C:From 10% to below 15%<br>D:From 15% to below 20%<br>G:From 30% to below 35% |
| ❸Center Frequency<br>008: 0.75GHz<br>015: 1.5GHz<br>017: 1.7GHz<br>020: 2.0GHz<br>030: 3.0GHz<br>040: 4.0GHz<br>060: 6.0GHz<br>090: 9.0GHz<br>128: 12.8GHz | ❻Form<br>H:H Type |
| | ❼D:With Termination |
| | ❽(40):RoHS Compliant |

## ■Specifications

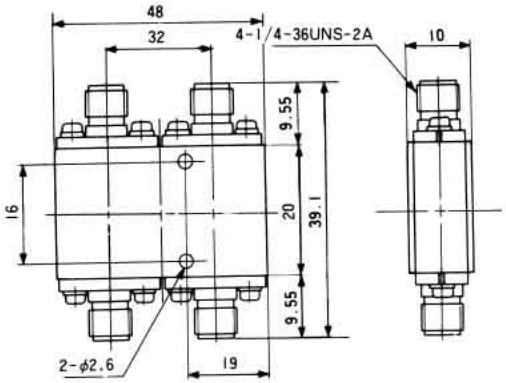
| Part Number | Frequency Range (GHz) | Coupling (dB) | Frequency Sensitivity | Directivity (dB Min) | Primary Line V.S.W.R. (Max) | Secondary Line V.S.W.R. (Max) | Weight (g) | Power (W) | RoHS |
|---|---|---|---|---|---|---|---|---|---|
| HDH-00803GHD(40) | 0.5~1.0 | $3^{+0.2}_{0}$ | ±0.5 | 20 | 1.15 | 1.15 | 49 | 2 | YES |
| HDH-01503GH(40) | 1.0~2.0 | $3^{+0.2}_{0}$ | ±0.5 | 20 | 1.20 | 1.20 | 34 | 50 | |
| HDH-01503GHD(40) | 1.0~2.0 | $3^{+0.2}_{0}$ | ±0.5 | 20 | 1.20 | 1.20 | 34 | 2 | |
| HDH-01703CH(40) | 1.5~1.9 | $3^{+0.2}_{0}$ | ±0.3 | 20 | 1.20 | 1.20 | 34 | 50 | |
| HDH-01703CHD(40) | 1.5~1.9 | $3^{+0.2}_{0}$ | ±0.3 | 20 | 1.20 | 1.20 | 34 | 2 | |
| HDH-02003DHD(40) | 1.7~2.3 | $3^{+0.2}_{0}$ | ±0.3 | 18 | 1.20 | 1.20 | 34 | 2 | |
| HDH-03003GHD(40) | 2.0~4.0 | $3^{+0.2}_{0}$ | ±0.5 | 18 | 1.20 | 1.20 | 25 | 2 | |
| HDH-04003BH(40) | 3.7~4.2 | $3^{+0.2}_{0}$ | ±0.3 | 20 | 1.20 | 1.20 | 23 | 50 | |
| HDH-06003GHD(40) | 4.0~7.8 | $3^{+0.3}_{0}$ | ±0.5 | 17 | 1.25 | 1.25 | 23 | 2 | |
| HDH-09003GHD(40) | 8.0~11.0 | $3^{+0.3}_{0}$ | ±0.5 | 15 | 1.30 | 1.30 | 31 | 2 | |
| HDH-12803CHD(40) | 10.5~14.5 | $3^{+0.6}_{0}$ | ±0.5 | 12 | 1.40 | 1.40 | 31 | 2 | |

●Directivity have had the coupling (nominal value of 3 dB) subtracted.
●There is a phase difference of 90°between the output and the coupling.

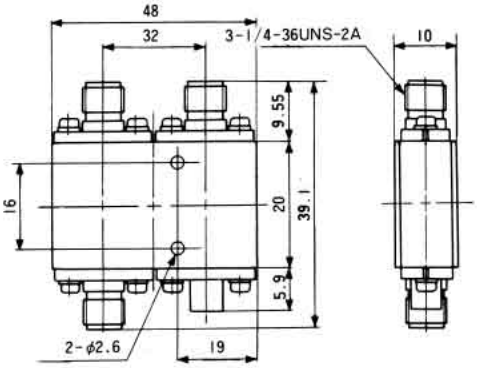
## ■External Dimensions



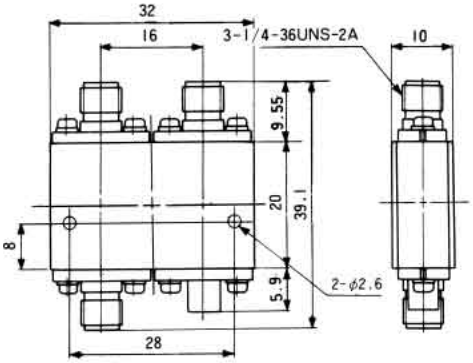

HDH−00803GHD(40)



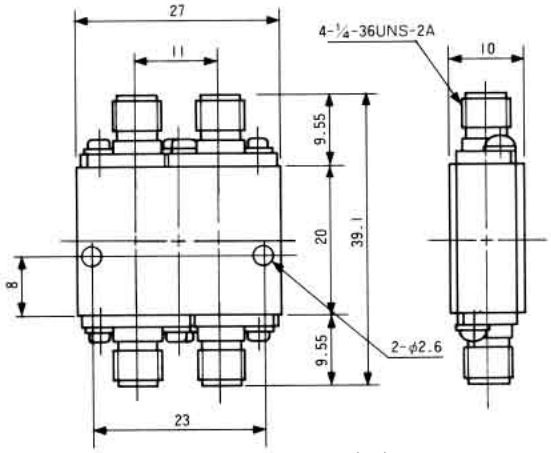

HDH−01503GH(40)
HDH−01703CH(40)



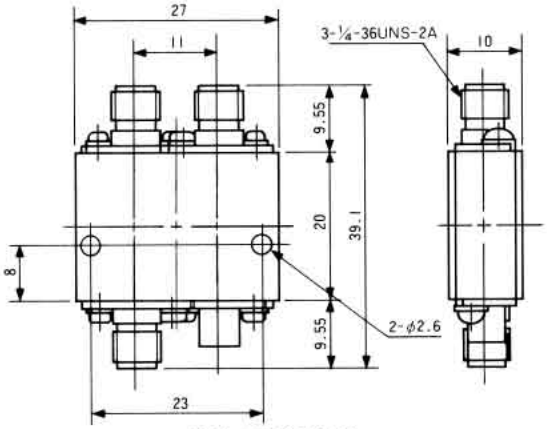

HDH−01503GHD(40)
HDH−01703CHD(40)
HDH−02003DHD(40)



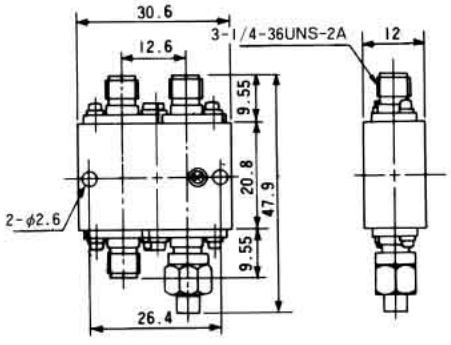

HDH−03003GHD(40)



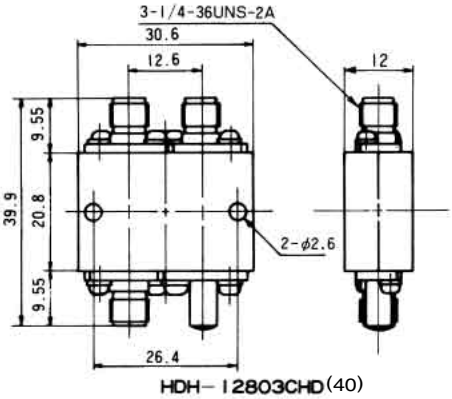

HDH−04003BH(40)




HDH−06003GHD(40)

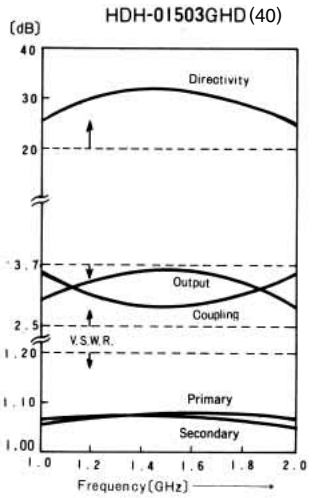


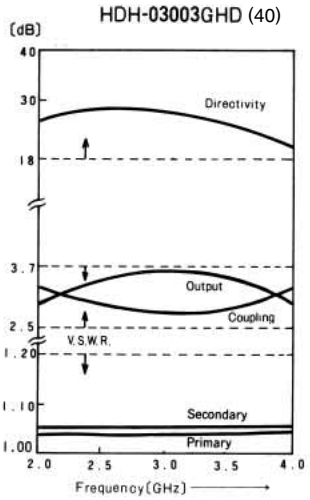

HDH−09003GHD(40)




HDH−12803CHD(40)

## ■Typical Data



# Couplers with Connectors (I Type)

## HDH Series


HDH-00810GID(40)


HDH-01510GID(40)


HDH-02249AI(40)


HDH-03020GID(40)


HDH-06020GID(40)


HDH-09010GID(40)


HDH-12806CID(40)

## ■Features

### 1.High Performance

The high frequency characteristics feature. Extremely high degree of matching, and high isolation.

### 2.Miniature and Lightweight

Corrosion-resistant aluminum is used for the case and the Hirose Electric original pattern design, which uses a stripline triplate method, enables the couplers to be miniature and lightweight.

### 3.Couplers with SMA Connectors

Use of SMA connectors (Hirose Electric HRM Series) which feature stainless steel for the exterior cladding make these couplers durable.

### 4.Full Coupling Variations

Full variations of coupling over 6 dB are available.

## ■Product Specifications

| | | | | |
|---|---|---|---|---|
| Ratings | Frequency range (Note)<br>Characteristic impedance<br>Maximum Input Power (Note) | 0.5 to 14.5 GHz<br>50 ohm<br>4 to 50 W | Operating temperature range<br>Operating relative humidity | -10℃ to +65℃<br>95% Max. |

Note: The frequency range and the maximum input power will differ depending on the products.

| Item | Standard | Conditions |
|---|---|---|
| 1.Vibration | No electrical discontinuity of 1μs or more | Frequency of 10 to 2000 Hz, overall amplitude of 1.52 mm, acceleration of 98 m/s² for 2 hours in each of 3 directions |
| 2.Shock | No damage, cracks, or parts dislocation | Acceleration of 980 m/s², sine half-wave waveform, 3 cycles in each of the 3 axis |
| 3.Temperature cycle | No damage, cracks, or parts dislocation | Temperature : −55℃ → +15℃ to +35℃ → +85℃ → +15℃ to +35℃<br>Time : 30 → 15 max. → 30 → 15 max. (Minutes)<br>5 cycles |

●The test method conforms to MIL-STD-202.

## ■Materials

| Part | Material | Finish |
|---|---|---|
| Connector Body | Stainless steel | Passivated |
| Connector female contacts | Beryllium copper | Gold plating |
| Connector Insulator | PTFE | —— |
| Case | Aluminum | Coating |
| Board | Dielectric | Gold plating |

## ■Ordering Information

**HD H - 008 10 G I D (40)**
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

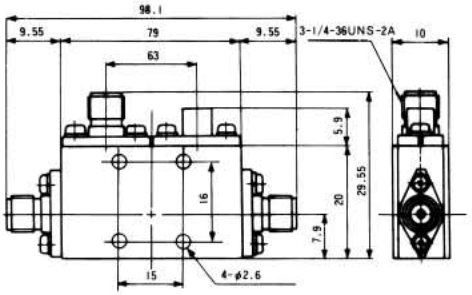
| | |
|---|---|
| ❶Series Name: HD (Directional Couplers) | ❹Coupling<br>06 : 6dB<br>10 : 10dB<br>20 : 20dB<br>30 : 30dB<br>37 : 37dB<br>49 : 49dB |
| ❷Type of Connector<br>H: Indicates the HRM (SMA) Series | ❺Frequency Relative Bandwidth<br>C: From 10% to below 15%<br>G: From 30% to below 35% |
| ❸Center Frequency<br>008 : 0.8GHz<br>009 : 0.9GHz<br>015 : 1.5GHz<br>017 : 1.7GHz<br>022 : 2.2GHz<br>030 : 3.0GHz<br>060 : 6.0GHz<br>090 : 9.0GHz<br>128 : 12.8GHz | ❻Form<br>I: I Type, H: H Type |
| | ❼D: With Termination<br>Isolation port with termination is designated as D at the end of each part No. |
| | ❽(40): RoHS Compliant |

## ■Specifications

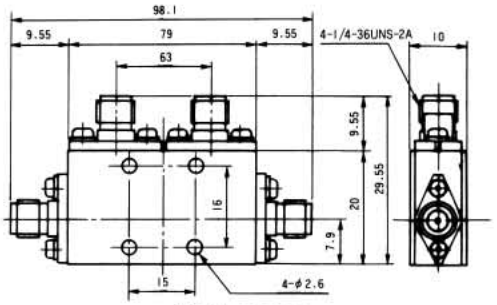
| Part Number | Frequency Range (GHz) | Coupling (dB) | Frequency Sensitivity (dB) | Insertion Loss (dB MAX) | Directivity (dB MIN) | Primary Line V.S.W.R. (MAX) | Secondary Line V.S.W.R. (MAX) | Weight (g) | Power (W) | RoHS |
|---|---|---|---|---|---|---|---|---|---|---|
| HDH-0810GID(40) | 0.5~1.0 | 10±1.0 | ±0.75 | 0.3 | 20 | 1.15 | 1.15 | 49 | 10 | YES |
| HDH-00820GID(40) | 0.5~1.0 | 20±1.0 | ±0.75 | 0.3 | 18 | 1.15 | 1.15 | 50 | 50 | |
| HDH-00937CI(41) | 0.8~1.0 | 37±1.0 | ±0.5 | 0.3 | 20 | 1.20 | 1.20 | 50 | 50 | |
| HDH-01510GID(40) | 1.0~2.0 | 10±1.2 | ±0.75 | 0.4 | 20 | 1.20 | 1.20 | 34 | 10 | |
| HDH-01520GID(40) | 1.0~2.0 | 20±1.2 | ±0.75 | 0.4 | 18 | 1.20 | 1.20 | 34 | 50 | |
| HDH-01530CI(40) | 1.4~1.6 | $30^{+1.0}_{-2.0}$ | ±0.25 | 0.5 | 20 | 1.20 | 1.20 | 34 | 50 | |
| HDH-01537CI(40) | 1.4~1.6 | $37^{+1.0}_{-1.5}$ | ±0.3 | 0.5 | 20 | 1.20 | 1.20 | 34 | 50 | |
| HDH-01706CID(40) | 1.5~1.9 | 6±1.0 | ±0.3 | 0.4 | 18 | 1.20 | 1.20 | 34 | 5 | |
| HDH-01710CID(40) | 1.5~1.9 | 10±1.2 | ±0.3 | 0.4 | 20 | 1.20 | 1.20 | 34 | 10 | |
| HDH-01720CID(40) | 1.5~1.9 | 20±1.2 | ±0.4 | 0.4 | 20 | 1.20 | 1.20 | 34 | 50 | |
| HDH-01730CID(40) | 1.5~1.9 | 30±1.5 | ±0.4 | 0.4 | 18 | 1.20 | 1.20 | 34 | 50 | |
| HDH-02210AI(40) | 2.11~2.2 | 10±1.0 | ±0.25 | 0.8※ | 18 | 1.20 | 1.20 | 42 | 50 | |
| HDH-02220AID(40) | 2.11~2.2 | 20±1.0 | ±0.25 | 0.3 | 16 | 1.20 | 1.20 | 42 | 50 | |
| HDH-02249AI(40) | 2.11~2.2 | 49±1.0 | ±0.25 | 0.3 | 15 | 1.20 | 1.20 | 42 | 50 | |
| HDH-03010GID(40) | 2.0~4.0 | 10±1.2 | ±0.75 | 0.5 | 18 | 1.20 | 1.20 | 25 | 10 | |
| HDH-03020GID(40) | 2.0~4.0 | 20±1.2 | ±0.75 | 0.5 | 18 | 1.20 | 1.20 | 25 | 50 | |
| HDH-06010GID(40) | 4.0~7.8 | 10±1.2 | ±0.75 | 0.5 | 17 | 1.25 | 1.25 | 23 | 10 | |
| HDH-06020GID(40) | 4.0~7.8 | 20±1.2 | ±0.75 | 0.5 | 17 | 1.25 | 1.25 | 23 | 50 | |
| HDH-09006GID(40) | 8.0~11.0 | 6±1.2 | ±0.75 | 0.5 | 15 | 1.30 | 1.30 | 24 | 4 | |
| HDH-09010GID(40) | 8.0~11.0 | 10±1.2 | ±0.75 | 0.5 | 15 | 1.30 | 1.30 | 24 | 10 | |
| HDH-09020GID(40) | 8.0~11.0 | 20±2.0 | ±0.75 | 0.5 | 13 | 1.30 | 1.30 | 24 | 10 | |
| HDH-12806CID(40) | 10.5~14.5 | 6±1.0 | ±0.5 | 2.1※ | 15 | 1.30 | 1.35 | 28 | 4 | |
| HDH-12810CID(40) | 10.5~14.5 | 10±1.25 | ±0.5 | 1.1※ | 15 | 1.30 | 1.35 | 28 | 10 | |
| HDH-12820CID(40) | 10.5~14.5 | 20±1.25 | ±0.5 | 0.6 | 15 | 1.30 | 1.35 | 28 | 50 | |

●The coupling loss component is not included in the insertion loss (unless the item is marked with an ※ symbol)

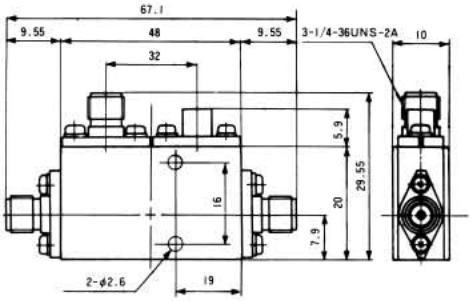
## External Dimensions



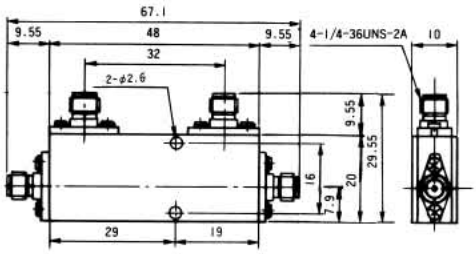

HDH-00810GID (40)
HDH- 00820GID (40)



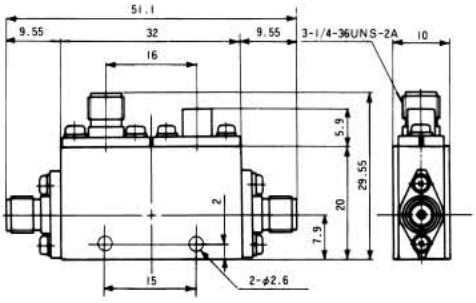

HDH-00937CI(41)



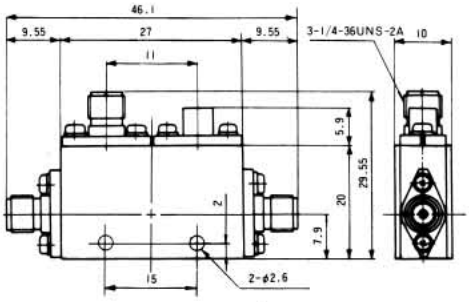

HDH-015$^{10}_{20}$GID(40) HDH-01710CID(40) HDH-01730CID(40)
HDH-01706CID(40) HDH-01720CID(40)



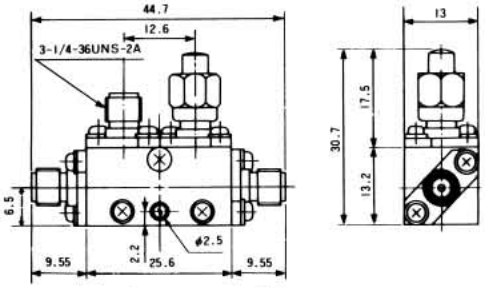

HDH-015$^{30}_{37}$CI(40)



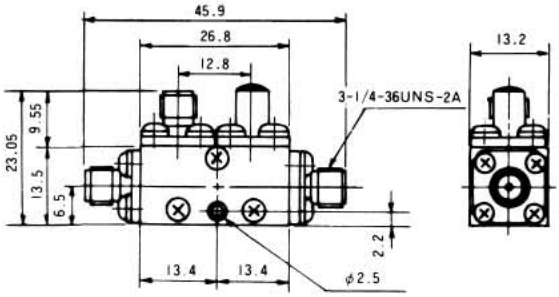

HDH-030$^{10}_{20}$GID(40)




HDH-060$^{10}_{20}$GID(40)




06
HDH-09010GID(40)
20

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HDH-12810CID(40)
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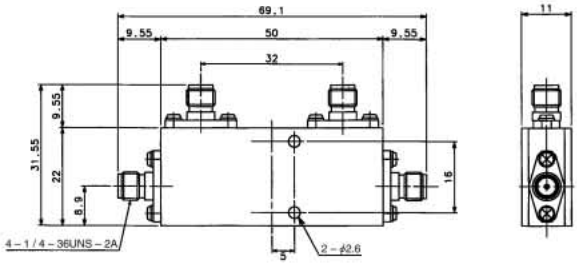
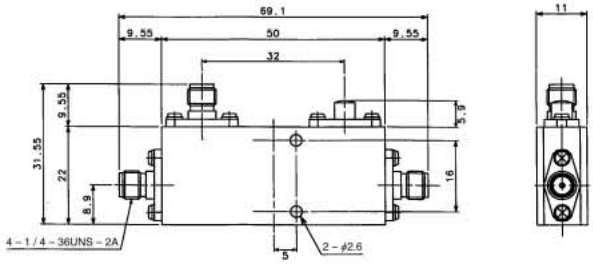


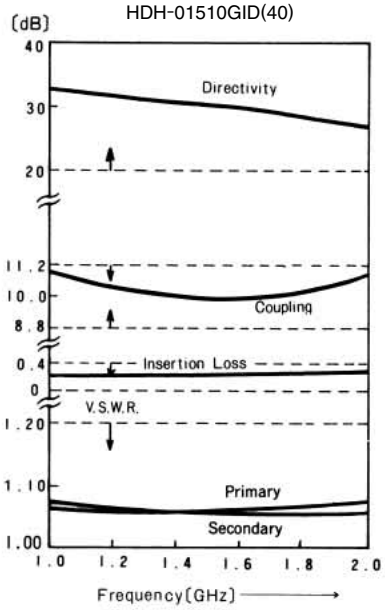

HDH-02210AI(40)
HDH-02249AI(40)



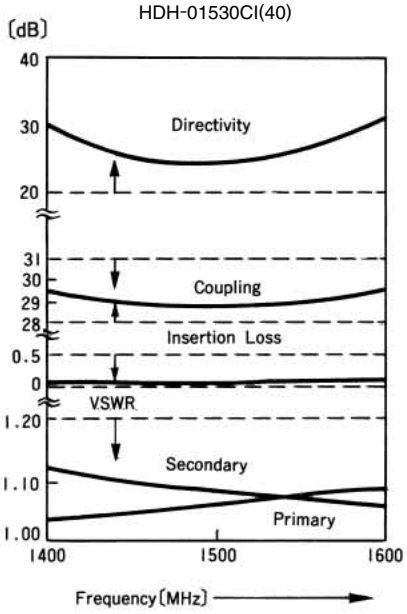

HDH-02220AID(40)

## ■Typical Data

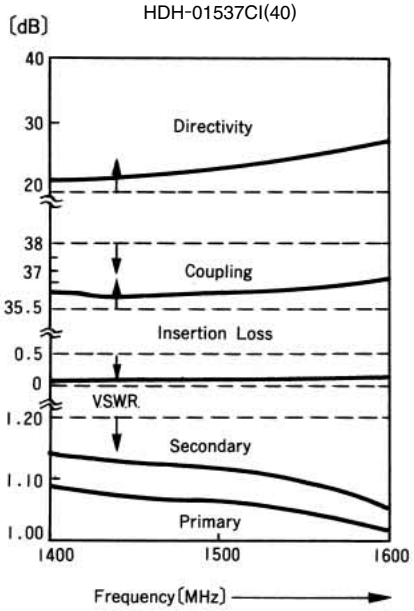
HDH-01510GID(40)




HDH-01530CI(40)




HDH-01537CI(40)

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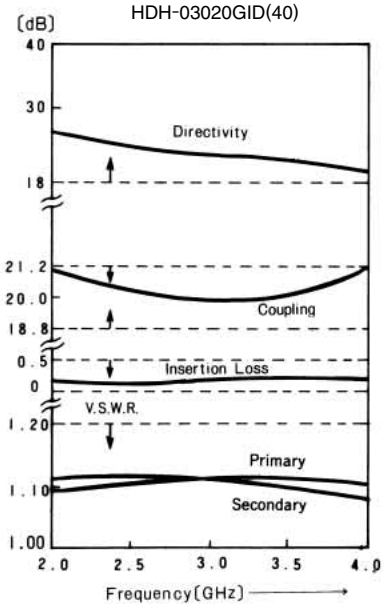


HDH-09010GID(40)