

# Couplers with Connectors (H Type)

## HDH Series



HDH-00803GHD(31)



HDH-01503GHD(31)



HDH-01503GH(40)



HDH-03003GHD(31)



HDH-09003GHD(40)



HDH-12803CHD(31)

### ■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.Minature 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 14.5GHz<br>50Ω<br>2 to 50 W | Operating temperature range<br>Operating relative humidity | -10°C to +65°C<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 2000Hz, overall amplitude of 1.52mm, acceleration of 98m/s <sup>2</sup> for 2 hours in each of 3 directions |
| 2.Shock             | No damage, cracks, or parts dislocation    | Acceleration of 490m/s <sup>2</sup> , sine half-wave waveform, 3 cycles in each of the 3 axis                                  |
| 3.Temperature cycle | No damage, cracks, or parts dislocation    | Temperature : -55°C → +15°C to +35°C → +85°C → +15°C to +35°C<br>Time : 30 → 15 max. → 30 → 15 max. (Minutes)<br>5 cycles      |

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

### ■Materials / Finish

| 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 |

## Product Number Structure

Refer to the chart below when determining the product specifications from the product number.  
Please select from the product numbers listed in this catalog when placing orders.

**HD H - 008 03 G H D (31)**  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

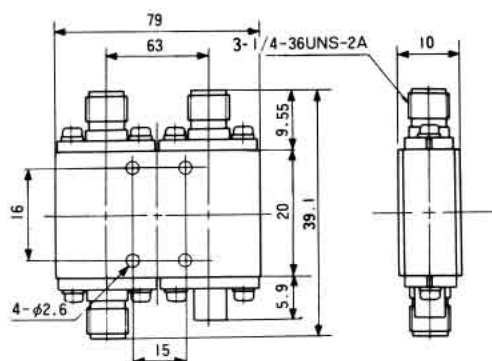
|                                                                                                                                                      |                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| ① Series Name : HD (Directional Couplers)                                                                                                            | ④ Coupling<br>03 : 3dB                                                                                                                            |
| ② Type of Connector<br>H : Indicates the HRM (SMA) Series                                                                                            | ⑤ Frequency 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% |
| ③ Center 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>090 : 9.0GHz<br>128 : 12.8GHz | ⑥ Form<br>H : H Type                                                                                                                              |
|                                                                                                                                                      | ⑦ D : With Termination                                                                                                                            |
|                                                                                                                                                      | ⑧ (31), (40) : RoHS Compliant                                                                                                                     |

## Specifications

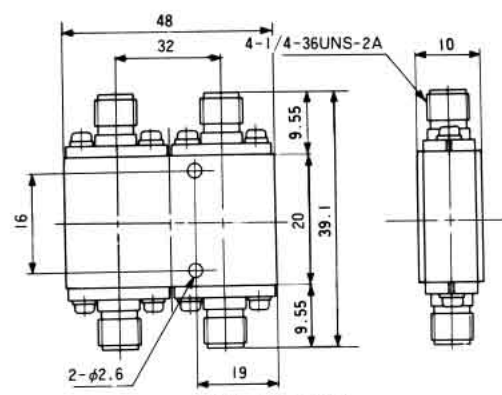
| Part Number      | Frequency Range (GHz) | Coupling (dB)                  | Frequency Sensitivity | Directivity (dB Min) | Primary Line V.S.W.R. (Max) | Secondary Line V.S.W.R. (Max) | Weight (g) | Power (W) |
|------------------|-----------------------|--------------------------------|-----------------------|----------------------|----------------------------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

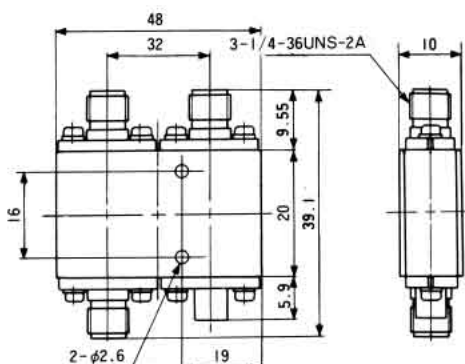
## External Dimensions



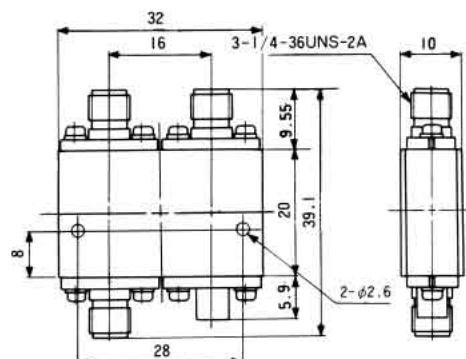
HDH-00803GHD (31)



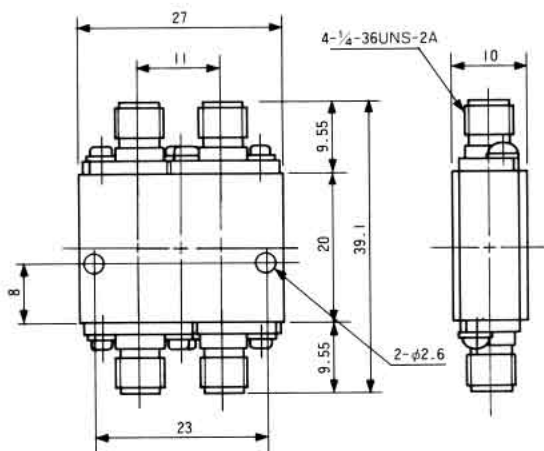
HDH-01503GH (40)  
HDH-01703CH (40)



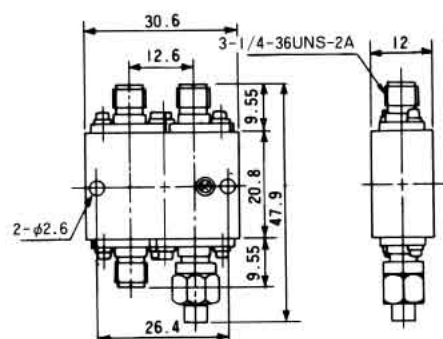
HDH-01503GHD (31)  
HDH-01703CHD (31)  
HDH-02003DHD (40)



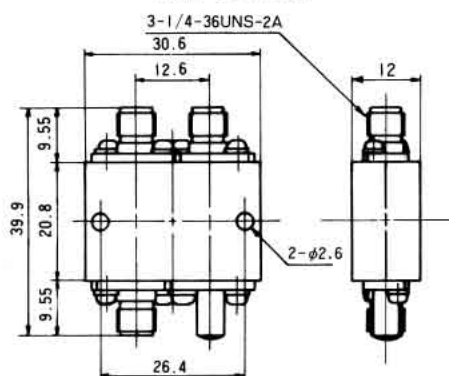
HDH-03003GHD (31)



HDH-04003BH (40)

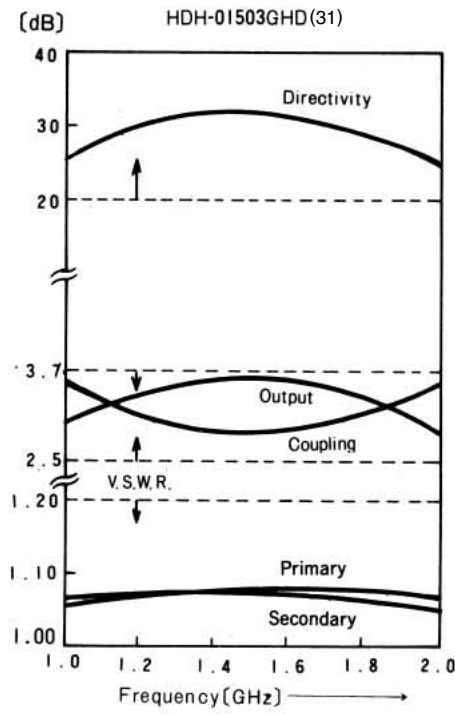
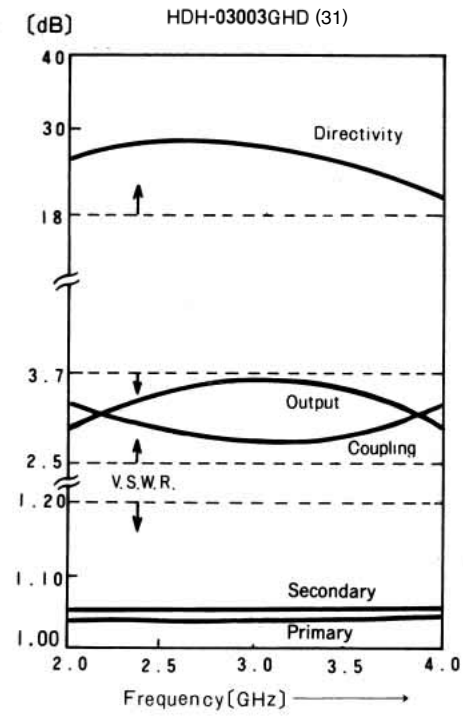


HDH-09003GHD (40)



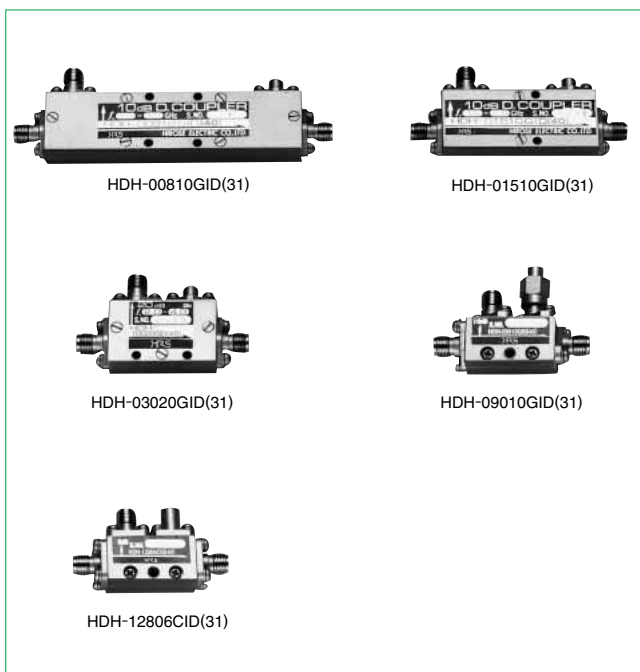
HDH-12803CHD (31)

## Typical Data



# Couplers with Connectors (I Type)

## HDH Series



### ■Features

#### 1.High Performance

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

#### 2.Minature 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 14.5GHz<br>50Ω<br>4 to 50 W | Operating temperature range<br>Operating relative humidity | -10°C to +65°C<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 2000Hz, overall amplitude of 1.52mm, acceleration of 98m/s <sup>2</sup> for 2 hours in each of 3 directions |
| 2.Shock             | No damage, cracks, or parts dislocation    | Acceleration of 980m/s <sup>2</sup> , sine half-wave waveform, 3 cycles in each of the 3 axis                                  |
| 3.Temperature cycle | No damage, cracks, or parts dislocation    | Temperature : -55°C → +15°C to +35°C → +85°C → +15°C to +35°C<br>Time : 30 → 15 max. → 30 → 15 max. (Minutes)<br>5 cycles      |

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

### ■Materials / Finish

| 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 |

## Product Number Structure

Refer to the chart below when determining the product specifications from the product number.  
Please select from the product numbers listed in this catalog when placing orders.

**HD H - 008 10 G I D (31)**  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

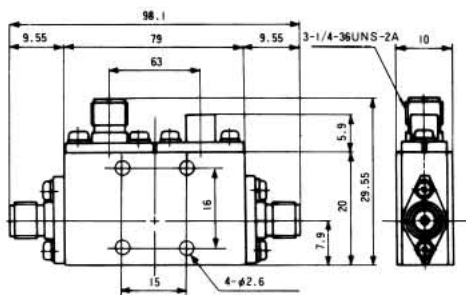
|                                                                                                                                     |                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| ① Series Name : HD (Directional Couplers)                                                                                           | ④ Coupling<br>06 : 6dB<br>10 : 10dB<br>20 : 20dB<br>30 : 30dB<br>37 : 37dB<br>49 : 49dB                  |
| ② Type of Connector<br>H : Indicates the HRM (SMA) Series                                                                           | ⑤ Frequency Relative Bandwidth<br>C : From 10% to below 15%<br>G : From 30% to below 35%                 |
| ③ Center Frequency<br>008 : 0.8GHz<br>009 : 0.9GHz<br>015 : 1.5GHz<br>017 : 1.7GHz<br>030 : 3.0GHz<br>090 : 9.0GHz<br>128 : 12.8GHz | ⑥ Form<br>I : I Type, H : H Type                                                                         |
|                                                                                                                                     | ⑦ D : With Termination<br>Isolation port with termination is designated as D at the end of each part No. |
|                                                                                                                                     | ⑧ (31), (40) : RoHS Compliant                                                                            |

## Specifications

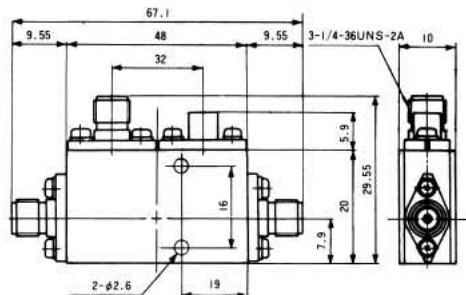
| Part Number      | Frequency Range (GHz) | Coupling (dB) | Frequency Sensitivity (dB) | Insertion Loss (dB MAX) | Directivity (dB MIN) | Primary Line V.S.W.R. (MAX) | Secondary Line V.S.W.R. (MAX) | Weight (g) | Power (W) |
|------------------|-----------------------|---------------|----------------------------|-------------------------|----------------------|-----------------------------|-------------------------------|------------|-----------|
| HDH-0810GID(31)  | 0.5~1.0               | 10±1.0        | ±0.75                      | 0.3                     | 20                   | 1.15                        | 1.15                          | 49         | 10        |
| HDH-00820GID(31) | 0.5~1.0               | 20±1.0        | ±0.75                      | 0.3                     | 18                   | 1.15                        | 1.15                          | 50         | 50        |
| HDH-01510GID(31) | 1.0~2.0               | 10±1.2        | ±0.75                      | 0.4                     | 20                   | 1.20                        | 1.20                          | 34         | 10        |
| HDH-01520GID(31) | 1.0~2.0               | 20±1.2        | ±0.75                      | 0.4                     | 18                   | 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-03010GID(31) | 2.0~4.0               | 10±1.2        | ±0.75                      | 0.5                     | 18                   | 1.20                        | 1.20                          | 25         | 10        |
| HDH-03020GID(31) | 2.0~4.0               | 20±1.2        | ±0.75                      | 0.5                     | 18                   | 1.20                        | 1.20                          | 25         | 50        |
| HDH-09010GID(31) | 8.0~11.0              | 10±1.2        | ±0.75                      | 0.5                     | 15                   | 1.30                        | 1.30                          | 24         | 10        |
| HDH-09020GID(31) | 8.0~11.0              | 20±2.0        | ±0.75                      | 0.5                     | 13                   | 1.30                        | 1.30                          | 24         | 10        |
| HDH-12806CID(31) | 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(31) | 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)

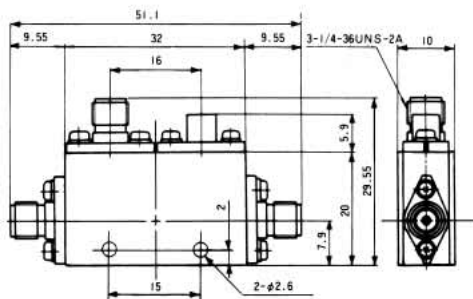
## External Dimensions



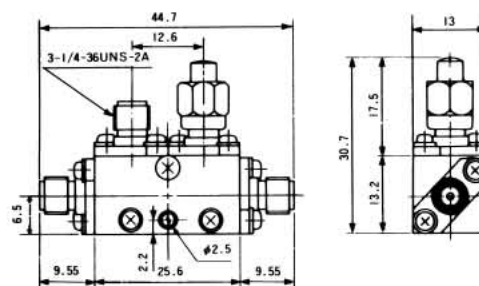
HDH-00810GID(31)  
HDH-00820GID(31)



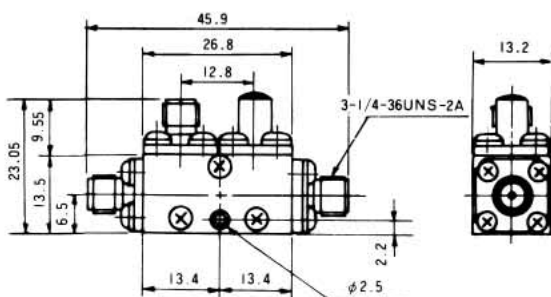
HDH-015<sup>10</sup><sub>20</sub>GID(31) HDH-01710CID(40) HDH-01730C(40)  
HDH-01706CID(40) HDH-01720CID(40)



HDH-030<sup>10</sup><sub>20</sub>GID(31)



HDH-09010GID(31)  
HDH-09020GID(31)



HDH-12806CID(31)  
HDH-12810CID(40)  
HDH-12820CID(31)

Typical Data

