Automotive High Voltage Waterproof Connector
HVH-280 Series (Waterproof)

Features

1. Rated current : 30A
   Rated voltage : 600V AC/DC

2. Low profile and small size
   Miniaturization by using two screws greatly reduces the mounting area. Rated current is 30A with a 40% height reduction compared to competitive products.

3. High Heat Resistance
   Ambient temperature up to 120°C.

4. High Vibration Resistance
   Can be used in severe environments such as inside vehicles where strong vibration is present.

5. IPXXB (finger protection)
   (Compliant with JIS C0920)

6. IPX9K (high pressure washing) waterproof (Compliant with JIS D 5020)
   Suitable for harsh high pressure washing environments such as an interface connector for automobiles and industrial equipment.

7. Reinforced EMI Prevention
   The metal shield and ground provide complete EMI protection.

8. CPA (Half-Fit Prevention Mechanism)
   The use of a CPA (Connector Position Assurance) mechanism ensures a secure fit and prevents malfunctions due to poor mating.

9. Mating Detection Circuit
   A mating detection circuit ensures worker safety. The connector is designed so that no current flows to the power terminal unless the detection circuit’s signal terminal contacts it (interlock mechanism) to prevent electric shocks.

When using the interlock mechanism, it is necessary for the customer to build the circuit.
## Product Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated Current</strong></td>
<td>30A (Note 1)</td>
<td></td>
</tr>
<tr>
<td><strong>Rated Voltage</strong></td>
<td>600V AC/DC</td>
<td></td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>-40°C to +120°C</td>
<td></td>
</tr>
<tr>
<td><strong>Storage Temperature Range</strong></td>
<td>-10°C to +60°C (Note 2)</td>
<td></td>
</tr>
<tr>
<td><strong>Storage Humidity Range</strong></td>
<td>Relative humidity 85% or less (No condensation)</td>
<td></td>
</tr>
<tr>
<td><strong>Contact resistance</strong></td>
<td>Power 3mΩ/ Signal 10mΩ/Shield 50mΩ max.</td>
<td>Measured at 10A DC</td>
</tr>
<tr>
<td><strong>Insulation resistance</strong></td>
<td>100MΩ min</td>
<td>Measured at 1000V DC</td>
</tr>
<tr>
<td><strong>Withstanding Voltage</strong></td>
<td>There shall be no flashover or dielectric breakdown.</td>
<td>Apply 2500V AC for 1 minute.</td>
</tr>
<tr>
<td><strong>Mating Durability</strong></td>
<td>Contact Resistance: Power 5mΩ/ Signal 20mΩ Max.</td>
<td>30 mating cycles (insertion/extraction)</td>
</tr>
<tr>
<td><strong>Vibration Resistance</strong></td>
<td>No electrical discontinuity of 1μs or more.</td>
<td>Frequency: 20 to 200Hz (acceleration: 88m/s²) 3 minutes per cycle (Repeated) 3 directions, 3 cycles each.</td>
</tr>
<tr>
<td><strong>Lock Strength</strong></td>
<td>98N Min.</td>
<td>Breaking strength of the lock is measured while tensile in the direction of the mating axis</td>
</tr>
<tr>
<td><strong>Breakage torque</strong></td>
<td>No breakage</td>
<td>Tightened at 2.88N·m (Max.) using an M4 screw</td>
</tr>
<tr>
<td><strong>Humidity Resistance</strong></td>
<td>Contact resistance: Power 5mΩ/ Signal 20mΩ Max. Insulation resistance: 100MΩ Min.</td>
<td>Left at a temperature of 85°C for 96 hours with a relative humidity of 90 to 95%</td>
</tr>
<tr>
<td><strong>Thermal shock</strong></td>
<td>Contact Resistance: Power 5mΩ Max. Insulation Resistance: 100MΩ Min.</td>
<td>Temperature -40°C → Room temperature → 120°C → Room temperature Time: 30 → 5 → 30 → 5 minutes for 1000 cycles</td>
</tr>
<tr>
<td><strong>Heat resistance</strong></td>
<td>Contact Resistance: Power 5mΩ/ Signal 20mΩ Max.</td>
<td>Left at a temperature of 125°C for 300 hours</td>
</tr>
<tr>
<td><strong>Cold resistance</strong></td>
<td>Contact Resistance: Power 5mΩ/ Signal 20mΩ Max.</td>
<td>Left at a temperature of ~40°C for 120 hours</td>
</tr>
<tr>
<td><strong>Sulfurous Acid Resistance</strong></td>
<td>Contact Resistance: Power 5mΩ/ Signal 20mΩ Max.</td>
<td>Left unmated in sulfurous acid gas for 96 hours at a room temperature with a concentration of 25ppm and a humidity of 75% RH or higher</td>
</tr>
<tr>
<td><strong>Water resistance</strong></td>
<td>No water immersion</td>
<td>After leaving the panel assembled in 125°C, flooding and cooling</td>
</tr>
</tbody>
</table>

**Note 1:** Ambient temperature of 105°C and 12 AWG used for operating current listed. The rating current depends on operating temperature and cable used. Please contact a Hirose Sales Office for inquiries.

**Note 2:** This storage temperature is for long-term storage of unused products.
HVH-280 Series (Waterproof) ⚫ Automotive High Voltage Waterproof Connector

■ Materials / Finish

<table>
<thead>
<tr>
<th>Product Component</th>
<th>Part</th>
<th>Material</th>
<th>Finish</th>
<th>UL Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug</td>
<td>Housing</td>
<td>PBT resin</td>
<td>Orange</td>
<td>UL94V-0</td>
</tr>
<tr>
<td></td>
<td>Holder</td>
<td>PBT resin</td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seal</td>
<td>Silicone rubber</td>
<td>White</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shield Terminal</td>
<td>Stainless steel</td>
<td>Tin plating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Terminal</td>
<td>Copper alloy</td>
<td>Tin plating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Collar</td>
<td>SWCH</td>
<td>Nickel plating</td>
<td></td>
</tr>
<tr>
<td>Socket</td>
<td>Housing</td>
<td>PBT resin</td>
<td>Orange</td>
<td>UL94V-0</td>
</tr>
<tr>
<td></td>
<td>CPA</td>
<td>PBT resin</td>
<td>Red</td>
<td>UL94V-0</td>
</tr>
<tr>
<td></td>
<td>Holder</td>
<td>PBT resin</td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seal</td>
<td>Silicone rubber</td>
<td>Blue, rouge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shield terminal</td>
<td>Stainless steel</td>
<td>Tin plating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Terminal</td>
<td>Copper alloy</td>
<td>Tin plating</td>
<td></td>
</tr>
</tbody>
</table>

■ 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.

● Plug Housing

HVH - 280 - 2 / 2 P - HU

1. Series Name : HVH
2. Series No. : 280
3. Number of contacts Power : 2
4. Signal : 2
5. Connector type P : Plug type
   S : Socket type
6. Form type HU : Housing
   HO : Holder

● Socket Holder

HVH - 280 - 2 / 2 S - HO

1. Series Name : HVH
2. Series No. : 280
3. Connector type P : Plug type
   S : Socket type
4. Form type HU : Housing
   HO : Holder

● Terminal

HVH - 280 - 1214 SCF

1. Series Name : HVH
2. Series No. : 280
3. Applicable Wire size 1214 : 12 to 14 AWG
4. Form Type PCF : Plug crimp terminal/reel
   SCF : Socket crimp terminal/reel
**Product Configurations**

- **Plug connector**
  - HVH-280 2/2P-HO
  - HVH-280-1214PCF
  - ZE05-2022SCF (※)

- **Socket connector**
  - HVH-280-2/2S-HU
  - HVH-280-1214SCF
  - HVH-280-4.2CF
  - HVH-280-2/2S-WS

- **Plug connector (assembled)**
  - HVH-280-2/2P-HO

- **Socket connector (assembled)**
  - HVH-280-2/2S-HO

**HVH-280 Series Mating Table**

<table>
<thead>
<tr>
<th>Plug connector</th>
<th>Socket connector</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Configuration Product Name</strong></td>
<td><strong>Configuration Product Name</strong></td>
</tr>
<tr>
<td>HVH-280 2pos. Plug connector</td>
<td>HVH-280 2pos. Socket Connector</td>
</tr>
<tr>
<td>HVH-280-2/2P-HU</td>
<td>HVH-280-2/2S-HU</td>
</tr>
<tr>
<td>HVH-280-2/2P-HO</td>
<td>HVH-280-2/2S-HO</td>
</tr>
<tr>
<td>HVH-280-1214PCF</td>
<td>HVH-280-2/2S-WS</td>
</tr>
<tr>
<td>ZE05-2022SCF (※)</td>
<td>HVH-280-1214SCF</td>
</tr>
<tr>
<td></td>
<td>HVH-280-4.2CF</td>
</tr>
</tbody>
</table>

※Required only for when using the mating detection feature.
HVH-280 Series (Waterproof) ● Automotive High Voltage Waterproof Connector

**Plug**

- **Part No.** HVH-280-2/2P-HU
- **HRS No.** 778-0500-0
- **Key Position** Standard key

- **Part No.** HVH-280-2/2P-HU (A)
- **HRS No.** 778-0510-0
- **Key Position** (A) Key

- **Part No.** HVH-280-2/2P-HU (B)
- **HRS No.** Under development (Note 2)
- **Key Position** (B) Key

*Note 1:* The product is sold in sets (100 pieces per set) so please order based on number of sets.

*Note 2:* (B) Key is currently under development. Please contact Hirose sales representative for the details.

*Note 3:* Please contact Hirose sales representative for panel cut-out dimensions.

**Plug Holder**

- **Part No.** HVH-280-2/2P-HO
- **HRS No.** 778-0506-0

*Note 1:* The product is sold in packs (100 pieces per pack) so please order based on number of packs.

*Note 2:* This product is compatible with wires that have an outer diameter of Ø4.0 to 4.4mm. Interface cable: Ø1.5mm max. Please contact a Hirose sales representative regarding other cables.
### Socket

**Part No.** HVH-280-2/2S-HU  
**HRS No.** 778-0504-0  
**Key Position** Standard Key

**Part No.** HVH-280-2/2S-HU(A)  
**HRS No.** 778-0508-0  
**Key Position** (A) Key

**Part No.** HVH-280-2/2S-HU(B)  
**HRS No.** Under development  
**Key Position** (B) Key

*Note 1:* The product is sold in sets (100 pieces per set) so please order based on number of sets.  
*Note 2:* (B) Key is currently under development. Please contact Hirose representative for the details.

### Socket Holder

**Part No.** HVH-280-2/2S-HO  
**HRS No.** 778-0507-0

*Note 1:* The product is sold in packs (100 pieces per pack) so please order based on number of packs.  
*Note 2:* This product is compatible with wires that have an outer diameter of Ø5.0 to 5.4mm.  
Please contact a Hirose sales representative regarding other cables.
HVH-280 Series (Waterproof) • Automotive High Voltage Waterproof Connector

■ Seal

Note 1: The product is sold in packs (100 pieces per pack) so please order based on number of packs.
Note 2: This product is compatible with wires that have an outer diameter of Ø5.0 to 5.4mm.
Please contact a Hirose sales representative regarding other cables.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVH-280-2/2S-WS</td>
<td>778-0505-0</td>
</tr>
</tbody>
</table>

21.45±0.2
9.5±0.2
12.55±0.2
7.85±0.5
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- Plug Crimp Terminal (Power)

![Illustration of Plug Crimp Terminal (Power)]

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
<th>Material</th>
<th>Finish</th>
<th>Core cable size</th>
<th>Outer Diameter</th>
<th>Sales Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVH-280-1214PCF</td>
<td>778-0501-0</td>
<td>Copper Alloy</td>
<td>Tin plating</td>
<td>12 to 14 AWG</td>
<td>2.176 to 3.619mm²</td>
<td>1 Reel (2,000 rolls)</td>
</tr>
</tbody>
</table>

Note 1: The core cable cross-sectional area is a reference value. Please reference it when selecting electrical wires. Contact a Hirose sales representative for cross-section areas of cables other than those listed above.

Note 2: Please contact a Hirose sales representative regarding whether crimping tools made by other companies can be used.

- Plug detection crimp terminal (Signal)

![Illustration of Plug detection crimp terminal (Signal)]

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
<th>Material</th>
<th>Finish</th>
<th>Core cable size</th>
<th>Outer Diameter</th>
<th>Sales Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZE05-2022SCF</td>
<td>752-2001-0</td>
<td>Copper alloy</td>
<td>Tin plating</td>
<td>20 to 22 AWG</td>
<td>0.35 to 0.517mm²</td>
<td>1 Reel (10,000 rolls)</td>
</tr>
</tbody>
</table>

Note 1: The core cable cross-sectional area is a reference value. Please reference it when selecting electrical wires. Contact a Hirose sales representative for cross-section areas of cables other than those listed above.

Note 2: Please contact a Hirose sales representative regarding whether crimping tools made by other companies can be used.
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- **Socket crimp terminal**

![Diagram of socket crimp terminal]

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
<th>Material</th>
<th>Finish</th>
<th>Core cable size</th>
<th>Outer Diameter</th>
<th>Sales Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVH-280-1214SCF</td>
<td>778-0502-0</td>
<td>Copper alloy</td>
<td>Tin plating</td>
<td>12 to 14 AWG 2.176 to 3.619mm²</td>
<td>Ø3.6 to 4.4</td>
<td>1 reel (1,700 rolls)</td>
</tr>
</tbody>
</table>

Note 1: The core cable cross-sectional area is a reference value. Please reference it when selecting electrical wires. Contact a Hirose sales representative for cross-section areas of cables other than those listed above.

Note 2: Please contact a Hirose sales representative regarding whether crimping tools made by other companies can be used.

- **Ground crimp terminal for socket**

![Diagram of ground crimp terminal for socket]

<table>
<thead>
<tr>
<th>Part No.</th>
<th>HRS No.</th>
<th>Material</th>
<th>Finish</th>
<th>Braided Outside Diameter</th>
<th>Outer Diameter</th>
<th>Sales Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVH-280-4.2CF</td>
<td>778-0503-0</td>
<td>Copper alloy</td>
<td>Tin plating</td>
<td>Approx Ø4.3</td>
<td>Ø5.0 to 5.4</td>
<td>1 reel (1,400 rolls)</td>
</tr>
</tbody>
</table>

Note 1: Please contact a Hirose representative regarding the use of cables other than the sizes listed above.

Note 2: Please contact a Hirose sales representative regarding whether crimping tools made by other companies can be used.

- **Applicable Adapter Tool**

<table>
<thead>
<tr>
<th>Type</th>
<th>Part No.</th>
<th>HRS No.</th>
<th>Applicable contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicator</td>
<td>AP105-HVH-280-1214P</td>
<td>901-5245-0</td>
<td>HVH-280-1214PCF</td>
</tr>
<tr>
<td></td>
<td>AP105-HVH-280-1214S</td>
<td>901-5244-0</td>
<td>HVH-280-1214SCF</td>
</tr>
<tr>
<td></td>
<td>AP105-HVH-280-4.2CF</td>
<td>901-5246-0</td>
<td>HVH-280-4.2CF</td>
</tr>
<tr>
<td></td>
<td>AP105-ZE05-2022S</td>
<td>901-5239-0</td>
<td>ZE05-2022SCF</td>
</tr>
<tr>
<td>Extraction tool</td>
<td>HVH-280-ZE05/RE-MD</td>
<td>902-5158-0</td>
<td>ZE05-2022SCF</td>
</tr>
</tbody>
</table>

Note 1: Please use a press machine of 2t or more.

Note 2: Please contact a Hirose sales representative regarding whether crimping tools made by other companies can be used.

Note 3: Crimping work shall be conducted in accordance with the "Crimping Standard" and "Crimping Conditions Table".
How to Extract the Terminal

- Terminal extraction tools: Precision screwdriver (flathead screwdriver), HVH-280-ZE05/RE-MD
- Applicable crimp terminals: HVH-280-1214 PCF, HVH-280-1214SCF, ZE05-2022SCF

Repair Method
To repair, press the mold lance with the terminal extraction tool in the direction shown in the diagram below. While pressing extract the terminal. Make sure not to deform the terminal lock part or contact part.

Caution: Do not push the terminal locking part or contact. It may lead to deformation or damage to the housing and other parts. When damaged, please replace it with a new one.

Usage Precautions
1. Pulling out the connector with force may result in damage. If it is difficult to pull out, lightly push it once and then operate the lock to pull it out.
2. When inserting or extracting the terminal, always disconnect from the power source first.
3. Do not touch the terminals while the power is on since it is very dangerous.
4. Contact a sales representative for harness instructions and handling manuals.
5. Do not perform insertion or extraction with a live wire. (Live wire insertion/extraction refers to inserting/extracting while electricity is running)

Usage Environment
Please consult with your Hirose Electric sales representative if your system environmental conditions repeat high and low temperatures.
MEMO: