# Water Cooled Aftercooler
# *Series HAW*

**Series HAW can cool high temperature compressed air from compressors down to 40°C or less and efficiently remove moisture from the air.**

**As series HAW is water-cooled, it can be used where there is high temperature, high moisture and heavy foreign particles.**

**25 times heat transfer area**
As compared to shell and bare tube, the flower fin tube has 25 times the heat transfer area.

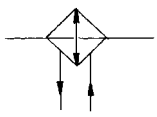
**Even heat exchange**
Sharp edge of flower fin causes air turbulence resulting in even heat exchange and high cooling efficiency.

**Compact size (1/2 to 1/3)**
Compared to conventional coolers, the size is cut by 1/2 to 1/3, resulting in reduced installation space.

**High efficiency drain**
Drainage is efficiently removed by built-in drain separator.

**Visible outlet air temperature**
Outlet air temperature is easily checked by thermometer, resulting in easy maintenance.

**JIS Symbol**



## Model/Standard Specifications

| Model | | | HAW2 | HAW7 | HAW22 | HAW37 | HAW55 | HAW75 | HAW110 |
|---|---|---|---|---|---|---|---|---|---|
| Applicable compressor (kW) | | Screw type compressor | 2.2 | 7.5 | 22 | 37 | 55 | 75 | 110 |
| | | Reciprocating type compressor | 2.2 | 7.5 | 15 | 22 | 37 | 55 | 75 |
| Rated performance | Air flow rate (1) ℓ/min(ANR) | Screw type compressor | 300 | 1000 | 3300 | 5700 | 8600 | 12000 | 18000 |
| | | Reciprocating type compressor | 300 | 1000 | 2100 | 4300 | 5600 | 8000 | 11000 |
| | Inlet air temperature (°C) | Screw type compressor | 70 | | | | | | |
| | | Reciprocating type compressor | 70 | | 180 | | | | |
| | Inlet air pressure dew point (°C) | | 67 | | | | | | |
| | Inlet air pressure (MPa) | | 0.7 | | | | | | |
| | Cooling water flow (ℓ/min) | | 5 | 5 | 17 | 25 | 36 | 40 | 45 |
| | Cooling water inlet temperature (°C) | | 30 | | | | | | |
| | Outlet air temperature (°C) | | 40 | | | | | | |
| | Cooling water pressure drop (MPa) | | 0.002 | | 0.02 | | 0.03 | 0.06 | 0.03 |
| Operating range | Fluid | | Air: Compressed air, Cooling water: Industrial water/Fresh water | | | | | | |
| | Inlet air temperature (°C) | | 5 to 100 | | 5 to 200 | | | | |
| | Inlet air pressure (MPa) | | 0.05 to 1.0 (With auto-drain: 0.15 to 1.0) | | 0.05 to 0.97 (With auto-drain: 0.15 to 0.97) | | | | |
| | Ambient temperature (°C) | | 2 to 50 | | | | | | |
| Proof pressure (MPa) | | | 1.5 | | | | | | |
| Port size | | Air side | Rc 1/2 | Rc 3/4 | Rc 1 1/2 | | Rc 2 | | 3B flange |
| | | Cooling water side | Rc 1/2 | | Rc 3/4 | Rc 1 | | | Rc 1 1/4 |
| | | Drain side | Rc 1/2 | | Rc 3/4 | | | | Rc 1 |
| Weight (kg) | | | 9.7 | 11.5 | 32 | 59 | 67 | 78 | 95 |
| Coating color | | | Silver | | | | | | |
| Accessory (2) | | Drain valve (1 pc.) | Rc 1/2 | | Rc 3/4 | | | | Rc 1 |
| | | Outlet air thermometer (1 pc.) | ● | | | | | | |

Note 1) ANR indicates the flow rate converted to the value at 20°C under the atmospheric pressure and the state of relative humidity 65%.
Note 2) The accessories should be mounted by user.

## Accessory (Option)

| Applicable model | HAW2 | HAW7 | HAW22 | HAW37 | HAW55 | HAW75 | HAW110 |
|---|---|---|---|---|---|---|---|
| Screw flange (With companion flange) | — | — | HAWF-141 | HAWF-142 | HAWF-200 | HAWF-200 | — |
| Auto-drain | AD402-04 | | AD600-06 | | | | AD600-10 |

## Model Selection (Flow Capacity ℓ/min (ANR))

| Model | | HAW2-04 | HAW7-06 | HAW22-14 | HAW37-14 | HAW55-20 | HAW75-20 | HAW110-30 |
|---|---|---|---|---|---|---|---|---|
| Inlet air temperature | 50°C | 1000 | 2000 | 6000 | 12000 | 15000 | 22000 | 30000 |
| | 70°C | 300 | 1000 | 3300 | 5700 | 8600 | 12000 | 18000 |
| | 100°C | 150 | 700 | 2500 | 5000 | 7000 | 10500 | 14000 |
| | 180°C | — | — | 2100 | 4300 | 5600 | 8000 | 11000 |

Conditions: • Supply pressure 0.7 MPa, Outlet air temperature 40°C, Cooling water inlet temperature 30°C.
• Inlet air temperature 50°C is saturated air. At 70°C or more, it is humid air with dew point 67°C.

# Series HAW

## How to Order

**HAW 22 – 14 D**

**Basic size (Applicable compressor kW)**

| Symbol | Screw type | Reciprocating type |
|---|---|---|
| **2** | 2.2 | |
| **7** | 7.5 | |
| **22** | 22 | 15 |
| **37** | 37 | 22 |
| **55** | 55 | 37 |
| **75** | 75 | 55 |
| **110** | 110 | 75 |

**Port size**

| | | |
|---|---|---|
| **04** | Rc 1/2 | HAW2 |
| **06** | Rc 3/4 | HAW7 |
| **14** | Rc 1 1/2 | HAW22/37 |
| **20** | Rc 2 | HAW55/75 |
| **30** | 3B flange | HAW110 |

**Accessory (Option)**

| | |
|---|---|
| **F** | With screw flange |
| **D** | With auto-drain |

## How to Calculate Outlet Air Temperature

Outlet air temperature can be calculated with inlet air temperature, cooling water temperature and amount of air in the following procedure.

(Example) Inlet air temperature: 100°C, Cooling water temperature: 20°C, Cooling water flow: 17 ℓ/min

Air flow: 2000 ℓ/min (ANR), Air pressure: 0.7 MPa, Model: HAW22-14

**Outlet air temperature at above conditions**

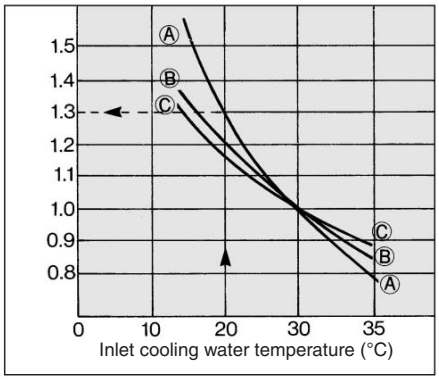
(1) Use outlet air temperature of 37°C from outlet air temperature table. At this time correction factor line becomes Ⓐ.

(2) To get correction factor of 1.3 use cooling water temperature correction factor Ⓐ at 20°C.

(3) To get outlet air temperature divide 37°C from (1) by 1.3 from (2).
Outlet air temperature = 37 ÷ 1.3 = 28.5°C

**Correction Factor by Cooling Water Temperature**

Air pressure 0.7 MPa




### Outlet Air Temperature

| Model | Cooling water (ℓ/min) | Correction factor | Air flow (ℓ/min (ANR)) | Inlet air temperature 50°C | 70°C | 100°C | 180°C |
|---|---|---|---|---|---|---|---|
| **HAW2** | 5 | Ⓐ | 200 | 35.5 | 38.5 | 41.5 | — |
| | | Ⓑ | 300 | 36 | 40 | 43 | — |
| | | Ⓒ | 400 | 36.5 | 42 | 45.5 | — |
| **HAW7** | 5 | Ⓐ | 500 | 33.5 | 36 | 37 | — |
| | | Ⓑ | 1000 | 36 | 40 | 43 | — |
| | | Ⓒ | 1500 | 38 | 45.5 | 49.5 | — |
| **HAW22** | 17 | Ⓐ | 2000 | 33.5 | 36 | 37 | 37.5 |
| | | Ⓑ | 3300 | 36 | 40 | 43 | 47 |
| | | Ⓒ | 4000 | 36.5 | 42.5 | 45.5 | 51 |
| **HAW37** | 25 | Ⓐ | 4000 | 33.5 | 36 | 37 | 38 |
| | | Ⓑ | 5700 | 35 | 40 | 42 | 44.5 |
| | | Ⓒ | 7000 | 36 | 41 | 43.5 | 48 |
| **HAW55** | 36 | Ⓐ | 7000 | 34.5 | 38 | 40 | 43 |
| | | Ⓑ | 8600 | 36 | 40 | 44 | 49 |
| | | Ⓒ | 10000 | 37 | 42.5 | 46 | 54 |
| **HAW75** | 40 | Ⓐ | 10000 | 34.5 | 38 | 39.5 | 42 |
| | | Ⓑ | 12000 | 35.5 | 40 | 43 | 47 |
| | | Ⓒ | 14000 | 36 | 41.5 | 44.5 | 49.5 |
| **HAW110** | 45 | Ⓐ | 15000 | 34.5 | 39 | 41 | 45 |
| | | Ⓑ | 18000 | 35.5 | 40 | 43 | 48.5 |
| | | Ⓒ | 20000 | 36 | 42.5 | 45.5 | 52 |

Conditions: • Air pressure 0.7 MPa, Cooling water temperature 30°C
• Inlet air temperature 50°C is saturated air. At 70°C or more, it is humid air with dew point 67°C.

## ⚠ Precautions

**Be sure to read before handling. Refer to pages 14-21-3 to 14-21-4 for Safety Instructions and Common Precautions on the products mentioned in this catalog, and refer to pages 14-14-6 to 14-14-8 for precautions on every series.**

### Caution on Design

#### ⚠ Warning

1. If the supply of coolant water is disrupted, the system will overheat, creating a dangerous situation. Therefore, make sure to take safety measures against water failure.
2. An excess or insufficient flow of coolant water can damage the heat exchanger tube. Therefore, design within the rated water flow range (refer to the model column).

#### ⚠ Caution

1. Design the piping for coolant water and compressed air with a bore that is greater than the bore of the piping connections.
2. The quality of the coolant water to be used must exceed the water quality that has been specified by the Japan Refrigeration and Air Conditioning Industry Association. (Refer to the instruction manual.)
Poor quality coolant water damages the heat exchanger and reduces performance. Therefore, inspect the water quality and replace the circulating water on a regular basis.
3. Never use sea water for cooling.

### Mounting

#### ⚠ Caution

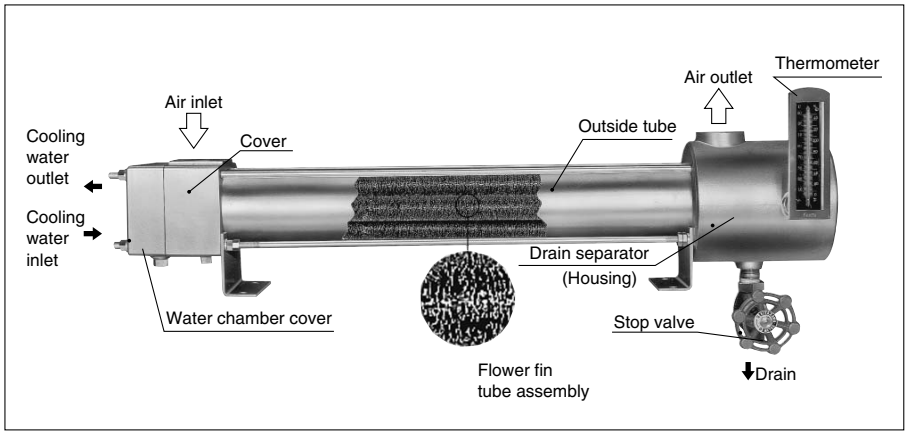
1. Install the unit horizontal with pipe line.
2. Make sure to correctly connect the compressed air inlet/outlet and the coolant water inlet/outlet.
3. Use union joints to connect the coolant water pipes so that they can be easily removed during maintenance.
4. Connect a drain pipe because a large amount of drainage is created when the compressed air is cooled.
The drain pipe must have a minimum pipe bore of 10 mm, and a maximum length of 5 m (when installing an optional auto drain).

### Maintenance

#### ⚠ Caution

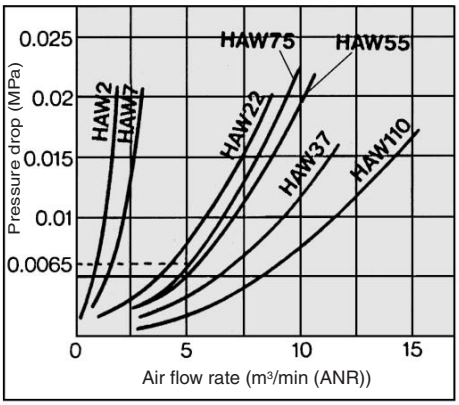
1. Inspect the quality of the coolant water and replace the circulating water on a regular basis. If the coolant water is cooled in a cooling tower, it is susceptible to the adhesion of water scale.
2. If there is a likelihood that the coolant water will be frozen, drain the coolant water to prevent damage. Also, drain the coolant water when the equipment will not be used for a long period of time.
3. If the cooling performance has been reduced, clean the inside of the coolant water pipes. (Refer to the instruction manual for details on the cleaning.)

## Construction Principle




## Flow Characteristics

Air pressure 0.7 MPa

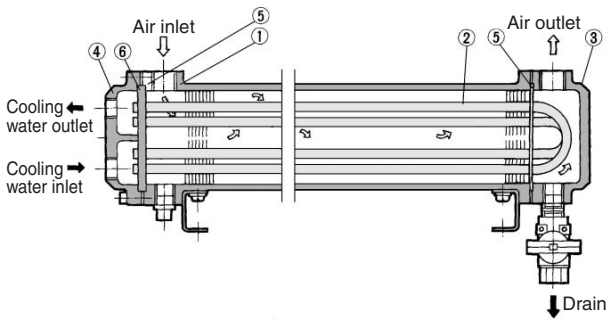



(Example) To get pressure drop at 0.3 MPa of air pressure, 5 m³/min (ANR) of air flow and model HAW75-20, use 0.0065 MPa at 0.7 MPa from the table and convert P1 to 0.3 MPa.

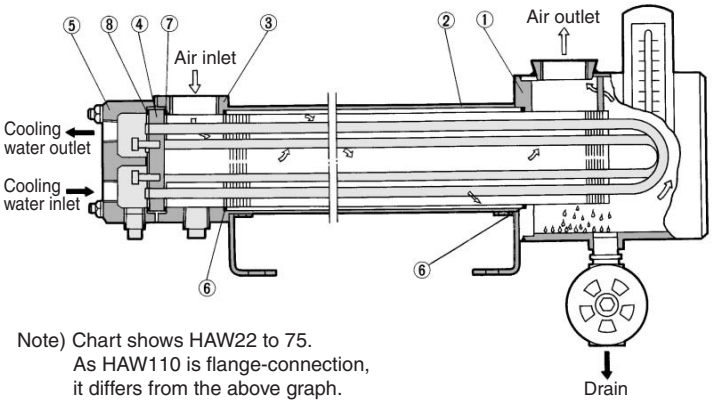
$$\text{Pressure drop} = \frac{(0.7 + 0.1013) \times \Delta P}{P_1 + 0.1013} = \frac{0.8013 \times 0.0065}{0.3 + 0.1013} = 0.013 \text{ MPa}$$

## Construction

### HAW2/7




### HAW22 to 110




Note) Chart shows HAW22 to 75.
As HAW110 is flange-connection, it differs from the above graph.

### Component Parts (HAW2/7)

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Outside tube | AC2A-F | — |
| ② | Flower fin tube assembly | C1220T | Flower fin |
| ③ | Housing | AC2A-F | — |
| ④ | Water chamber cover | FC200 | — |

### Replacement Parts

| No. | Description | Material | HAW2 | HAW7 |
|---|---|---|---|---|
| ② | Flower fin tube assembly | Aluminum Copper, Carbon steel | 42012 | 42022 |
| ⑤ | Packing | Non-asbestos | 42013 | 42013 |
| ⑥ | Packing | Non-asbestos | 42015 | 42015 |

### Component Parts (HAW22 to 110)

| No. | Description | Material | Note |
|---|---|---|---|
| ① | Housing | SGP, SS400 | — |
| ② | Outside tube | STK | — |
| ③ | Body | FC200 | — |
| ④ | Flower fin tube assembly | C1220T | Flower fin |
| ⑤ | Water chamber cover | FC200 | — |

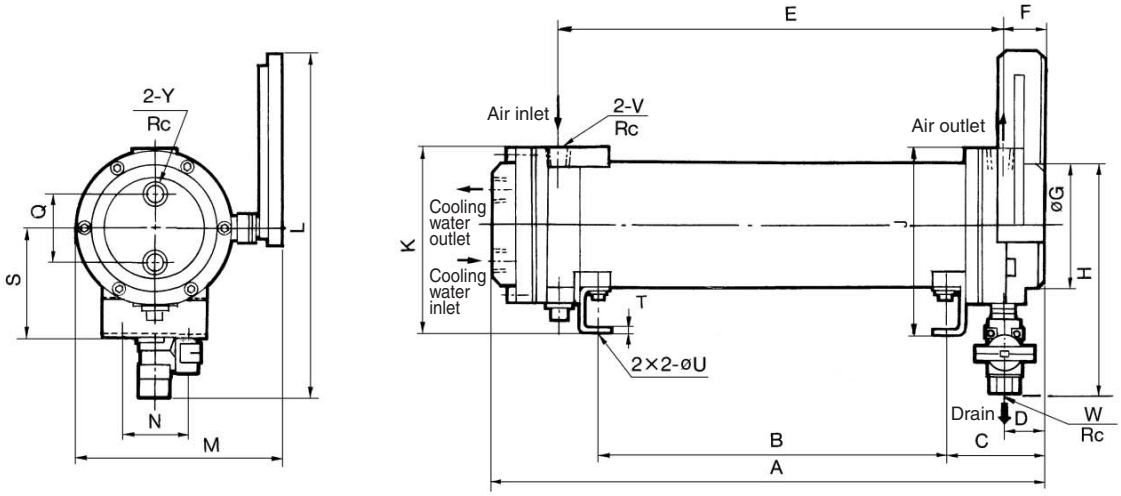
### Replacement Parts

| No. | Description | Material | HAW22 | HAW37 | HAW55 | HAW75 | HAW110 |
|---|---|---|---|---|---|---|---|
| ④ | Flower fin tube assembly | Aluminum Copper Carbon steel | 42036 | 42046 | 42054 | 42062 | 42073 |
| ⑥ | Packing | V # 6401 | 42032 | 42042 | 42042 | 42042 | — |
| ⑦ | Packing | V # 6401 | 42035 | 42045 | 42045 | 42045 | 42072 |
| ⑧ | Packing | V # 6401 | 42037 | 42047 | 42047 | 42047 | 42074 |

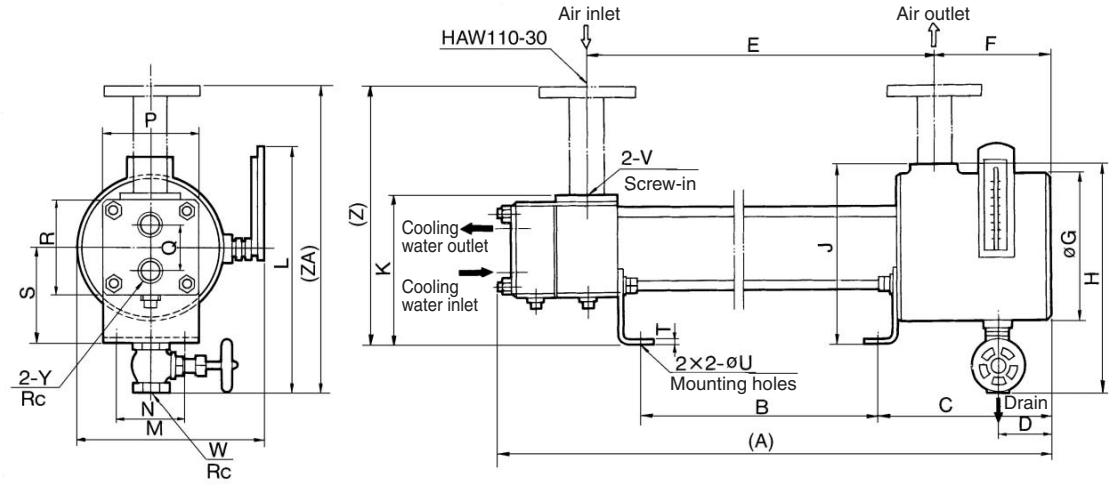
# Series HAW

## Dimensions

### HAW2/7




### HAW22 to 110




| Model | A | B | C | D | E | F | øG | H | J | K | L | M | N | P | Q | R | S | T | øU | V | W | Y | Z | ZA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HAW2-04** | 360 | 190 | 83 | 35 | 270 | 35 | 130 | 203 | 159 | 159 | 293 | 193 | 60 | — | 60 | — | 94 | 4.5 | 10 | 1/2 | 1/2 | 1/2 | — | — |
| **HAW7-06** | 570 | 390 | 83 | 35 | 480 | 35 | 130 | 203 | 159 | 159 | 293 | 193 | 60 | — | 60 | — | 94 | 4.5 | 10 | 3/4 | 1/2 | 1/2 | — | — |
| **HAW22-14** | 948 | 575 | 212 | 37 | 704 | 138 | 165 | 266 | 245 | 215 | 326 | 238 | 90 | 120 | 60 | 120 | 150 | 4.5 | 12 | 1 1/2 | 3/4 | 3/4 | — | — |
| **HAW37-14** | 1354 | 893 | 258 | 80 | 1056 | 170 | 216 | 324 | 264 | 219 | 354 | 289 | 100 | 140 | 66 | 140 | 139 | 6.0 | 18 | 1 1/2 | 3/4 | 1 | — | — |
| **HAW55-20** | 1612 | 1038 | 366 | 150 | 1203 | 276 | 216 | 324 | 264 | 219 | 354 | 289 | 100 | 140 | 66 | 140 | 139 | 6.0 | 18 | 2 | 3/4 | 1 | — | — |
| **HAW75-20** | 2112 | 1538 | 366 | 150 | 1703 | 276 | 216 | 324 | 264 | 219 | 354 | 289 | 100 | 140 | 66 | 140 | 139 | 6.0 | 18 | 2 | 3/4 | 1 | — | — |
| **HAW110-30** | 1724 | 950 | 500 | 72 | 1210 | 365 | 267.3 | 473 | — | — | 428 | 357 | 200 | 220 | 70 | — | 195 | 8.0 | 18 | 3 | 1 | 1 1/4 | 395 | 473 |