

HYDAC INTERNATIONAL

Plate Heat Exchangers



HYDAC HEX Sxxx



Hxxx-LIQUID

General

Plate heat exchangers are used wherever thermal energy (heat) has to be transferred from one fluid to another.

The advantage is that they can maintain the fluid temperature at a very low and stable level – depending on the temperature of the coolant.

Plate heat exchangers consist of a stack of stamped heat exchange plates which are either brazed together or bolted together in a frame with gaskets.

Medium flows in the channels between the plates where hot medium (which will be cooled) alternates with cold medium (which will be heated). The design of the plates induces the turbulent flow required for efficient heat transfer.

Brazed Plate Heat Exchangers HYDAC HEX Sxxx

The design and construction of the **brazed plate heat exchangers** are particularly compact and efficient. The heat transfer plates are made in stainless steel and are brazed with copper as standard. For use with aggressive media, nickel braze can also be used.

Copper brazed plate heat exchangers are pressure resistant up to 30 bar, nickel brazed up to 10 bar. Special models are however also suitable for higher pressures.

Gasketed Plate Heat Exchangers Hxxx-LIQUID

Gasketed plate heat exchangers are particularly suitable for large flows and high cooling capacities. The stack of heat transfer plates and gaskets is clamped together with bolts in a frame.

This means that the plate heat exchanger can also be dismantled for cleaning and maintenance. Furthermore it is possible to add more plates at a later date to achieve a higher capacity.

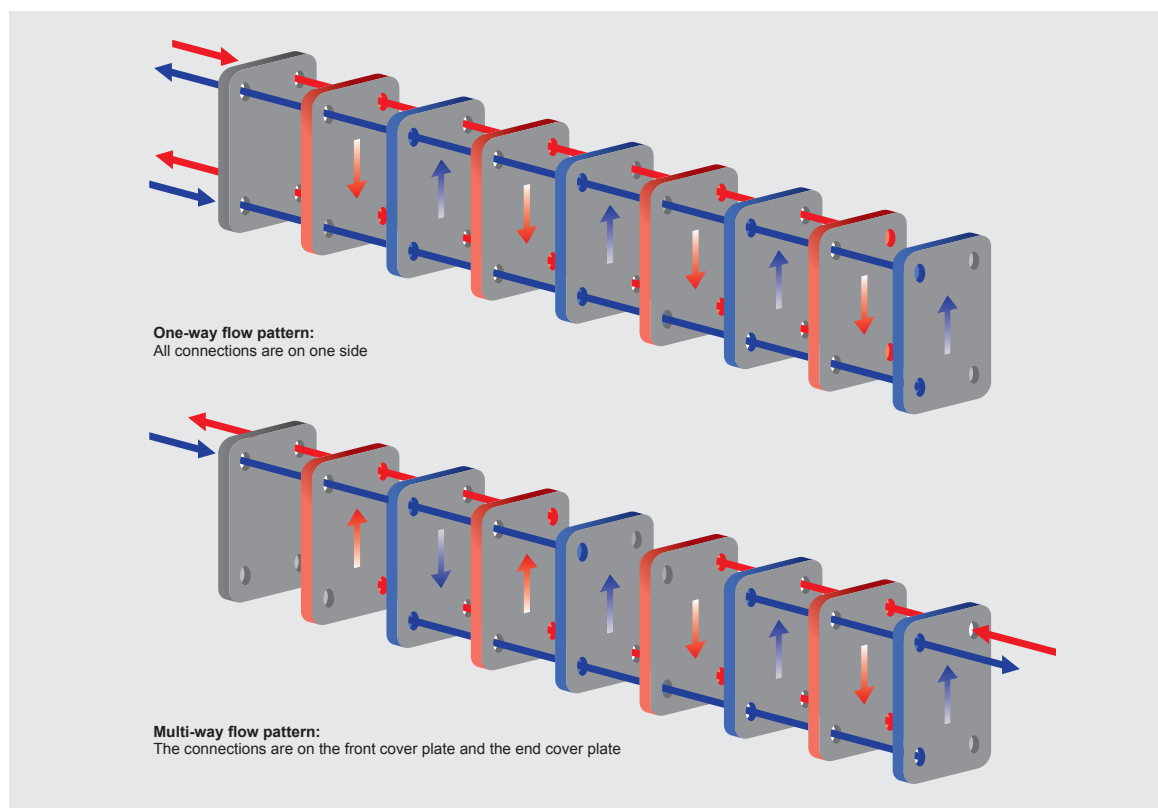
For applications with seawater, the plate heat exchangers can also be supplied with titanium heat transfer plates.

Various stamp designs can cater for heavily contaminated or high viscosity fluids to suit particular applications, or even if the temperature difference between the hot and cold medium is only minimal.

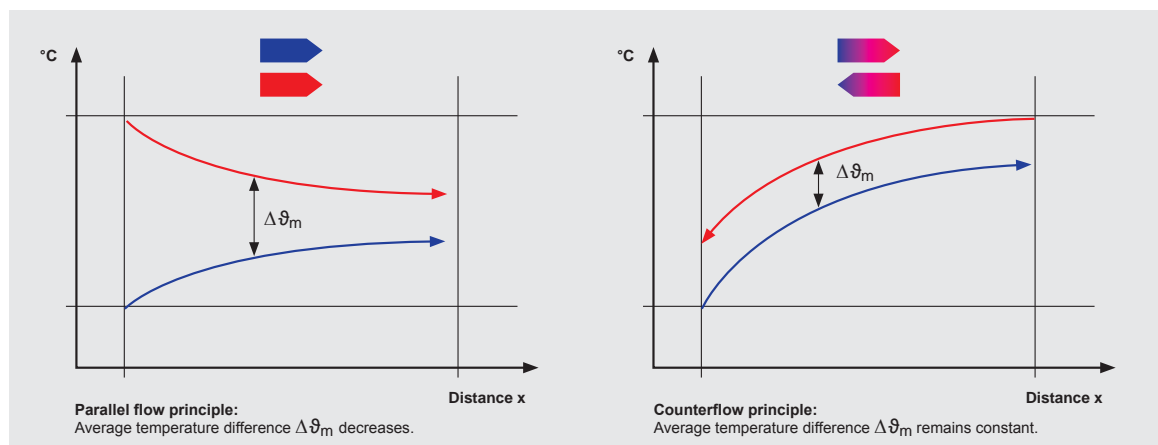
Safety heat exchangers with double-walled plates are used in situations where different media must be strictly isolated.

Function

Fluids flow in counterflow through the plate heat exchanger:



In counterflow, the hot medium is cooled more rapidly than in parallel flow because the cold medium flows in the opposite direction to the hot fluid.



With **brazed plate heat exchangers** it is possible to reverse the inlet and outlet connections of a medium without adversely affecting the function. However, to guarantee the counterflow principle, the inlet and outlet of the other medium must also be changed. However, changing the cold and hot side is not recommended. The plate heat exchangers are designed to have hot fluid always flowing through the outer plate. If cold medium flows through, condensation could form on the outside of the heat exchanger.

With **gasketed plate heat exchangers** it is not possible to change the connections because of the more complex plate stamp pattern. In this case the connections can be selected before manufacture of the plate heat exchanger. Please consult our technical sales department.

Application Field

A plate heat exchanger can be used wherever there should be heat transfer between two media.

Typical applications are:

- Hydraulic systems
- Presses
- Lubrication systems
- Test rigs
- Motors/engines

Sectional View



Cross-section of a brazed plate heat exchanger

Cooling Capacity

The maximum **cooling capacity** of a plate heat exchanger depends on several factors:

- the inlet temperature of the hot and cold medium
- the flow rate of the hot and cold medium
- the media used.

Sizing Program

The sizing program for **brazed plate heat exchangers** helps you to select the right size and number of plates.

Please ask for the latest version from the technical sales department.

| Type | Plate No. | Series | Parallel | Required heat load kW | Margin % | Press. drop of side 1 bar | Press. drop of side 2 bar | Note |
|----------|-----------|--------|----------|--------------------------|-------------|------------------------------|------------------------------|-------------|
| HEX S400 | | | | | | | | No Solution |
| HEX S610 | 110 | 1 | 1 | 10,0 | -1,6 | 0,01 | 0,03 | |
| HEX S615 | 30 | 1 | 1 | 10,0 | 2,0 | 0,07 | 0,19 | |
| HEX S522 | 30 | 1 | 1 | 10,0 | 30,7 | 0,01 | 0,06 | |
| HEX S722 | 30 | 1 | 1 | 10,0 | 15,3 | 0,01 | 0,06 | |

PHE: **HEX S615** PDF Drawing

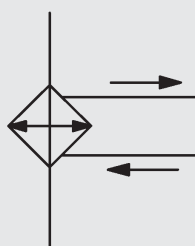
Previous Next

For **gasketed plate heat exchangers** please fill in the Specification Sheet in this brochure and send it to the technical sales department. We will help you to find the appropriate plate heat exchanger for your specific application.

HYDAC INTERNATIONAL



Symbol



General

With plate heat exchangers, the heat from the fluid being cooled is transferred to a cooling fluid. The advantage is that they can maintain the fluid temperature at a very low and stable level – depending on the temperature of coolant. Brazed heat exchangers therefore ensure efficient heat transfer combined with compact dimensions and low weight.

Product Features

Brazed heat exchangers consist of a stack of stamped heat transfer plates with connections in stainless steel. The plates are vacuum brazed with copper or nickel.

The plates have smoothed edges and the end plate is provided with edge protection.

The special stamp pattern of the plates induces a turbulent flow which is necessary for optimum heat transfer and which in addition has a self-cleaning effect because the high level of wall friction reduces deposits on the surface.

Brazed Plate Heat Exchangers HYDAC HEX Sxxx

Operating data

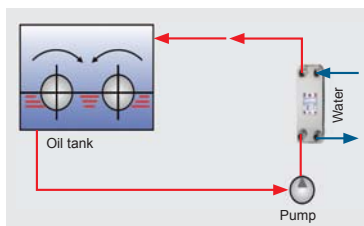
| | |
|-------------------|---|
| Plate material | Stainless steel 1.4401 (AISI 316) |
| Braze material | Copper (standard), nickel |
| Pressures | Copper braze: max. 30 bar (test pressure 45 bar) Nickel braze: max. 10 bar Other pressures on request |
| Media | <ul style="list-style-type: none"> Hydraulic oil, lubrication oil, rolling oil, engine oil HFC, HFA, HFD, pressure fluids Water, water glycol Refrigerant Use nickel-brazed plate heat exchangers with corrosive fluids: e.g. ammonia, sulphides and sulphates, deionised or demineralised water Other fluids on request |
| Temperature range | up to +200 °C (freezing point and boiling point must be taken into consideration) |
| Contamination | The quantity of particles in suspension should be less than 10 mg/l Particle size <0.6 mm (spherical) Thread-like particles cause a rapid rise in pressure drop |
| Water quality | The following ions are not corrosive under normal conditions: phosphate, nitrate, nitrite, manganese, sodium and potassium See table on water quality |
| Connections | Female thread (standard) Optional: male thread, soldered connection, SAE connection |
| Accessories | Installation: HYDAC clamping bands (standard), optional: bolts on the front plate or the end plate Insulation |

Application Field

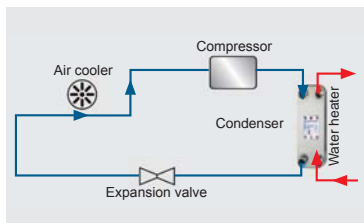
Cooling circuits operated using water, coolant, HFC operating fluid or oil.

Typical applications are:

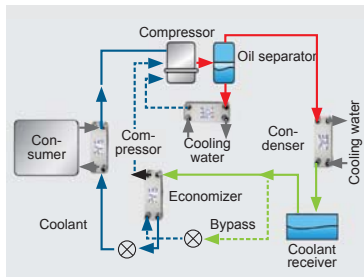
- Machine tools
- Presses
- Injection moulding machines
- Motors/engines
- Test rigs
- Generators



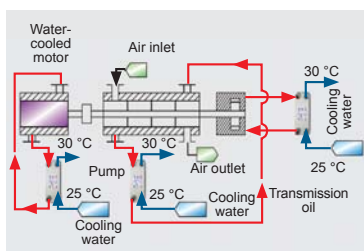
Oil cooling



Heat pump



Chiller



Vacuum pump

Model Type

HYDAC HEX S400 -10 -00NI / G3/4"

Size

HYDAC HEX S400
HYDAC HEX S610
HYDAC HEX S615
HYDAC HEX S522
HYDAC HEX S722
HYDAC HEX Z800

Other sizes on request

Number of plates

| | 10 | 14 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 150 | 160 | 180 | 190 |
|----------------|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| HYDAC HEX S400 | • | • | • | • | • | | | | | | | | | | | |
| HYDAC HEX S610 | • | | • | • | • | • | • | • | • | • | • | • | • | • | | |
| HYDAC HEX S615 | • | | • | • | • | • | • | • | • | • | • | • | • | • | | |
| HYDAC HEX S722 | | | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| HYDAC HEX S522 | | | • | • | • | • | • | • | • | • | • | • | • | • | • | • |

Version with nickel braze (optional)

Connections (standard)

HYDAC HEX S400: 4 x G $\frac{3}{4}$ " female thread

HYDAC HEX S610 and HYDAC HEX S615: 4 x G1" female thread

HYDAC HEX S722: 4 x G1 $\frac{1}{2}$ " female thread

HYDAC HEX S522: 4 x G1 $\frac{1}{2}$ " female thread

Male threaded, soldered and SAE connections are also available as an option.

The pipes must be connected so that connections are stress-free.

Linear expansion and vibrations from the pipes to the heat exchanger must be avoided.

Water Quality

The following limits refer to copper-brazed plate heat exchangers and a water temperature of + 60°C:

| Substances dissolved in water | Concentration (ppm) | Stainless steel | Copper |
|-------------------------------|---|-----------------|-------------|
| pH value | <6.0 6.0 – 9.0 >9.0 | 0 + + | 0 + 0 |
| Electrical conductivity | <10 [μ S/cm] 10 – 500 [μ S/cm] >500 [μ S/cm] | + + + | 0 + 0 |
| Cl ⁻ | <300 | + | + |
| SO ₄ ⁻² | <50 50 – 300 >300 | + + 0 | + 0 0 |
| CaCO ₃ | <50 | + | + |
| Fe | <0.3 >0.3 | + + | + 0 |
| NH ₃ | <2 >2 | + + | + 0 |
| NO ₃ | <100 >100 | + + | + 0 |
| S ⁻² | | Not suitable | |
| SiO ₂ | <30 | + | + |
| NH ₄ ⁺ | <0.1 | + | + |
| Free chlorine | <0.1 | + | + |
| CO ₃ ⁻² | <0.4 | + | + |
| H ₂ S | <0.05 >0.05 | + + | + 0 |

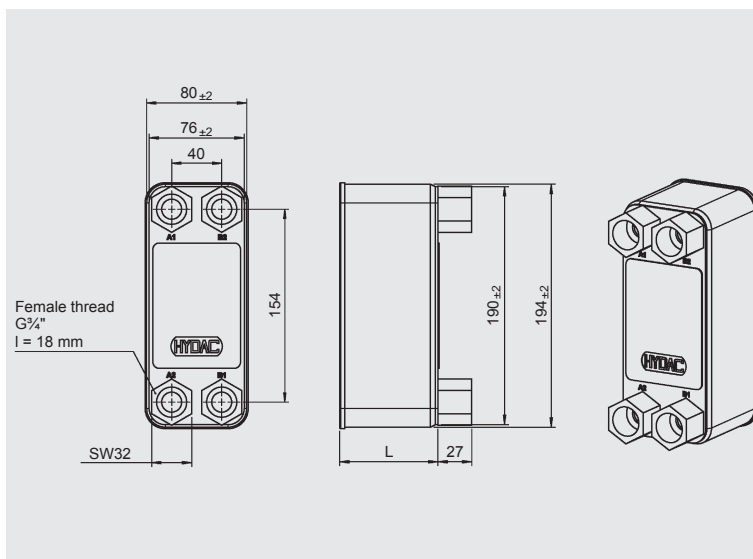
0: Corrosive

+: Suitable

For nickel-brazed versions, please contact the technical sales department.

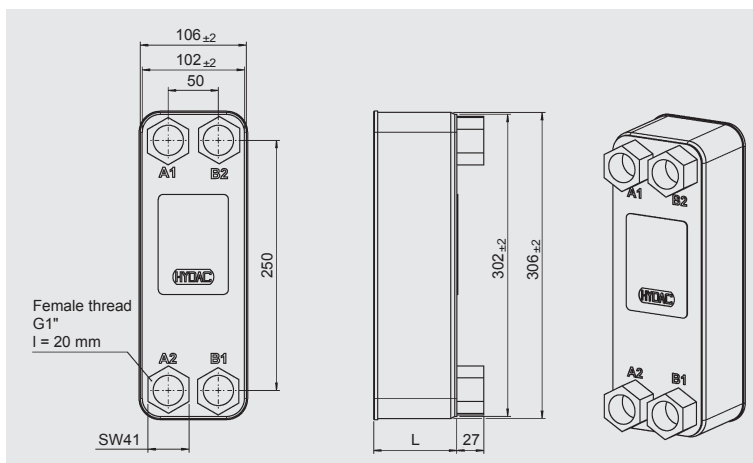
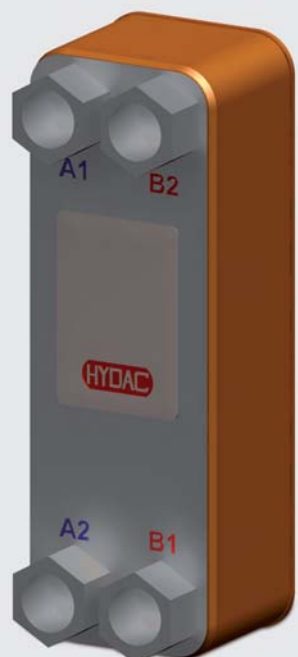
Dimensions

HYDAC HEX S400



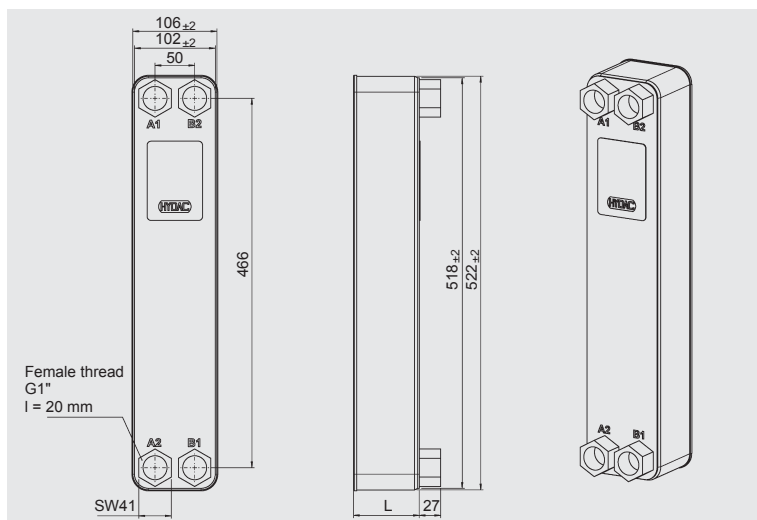
| HYDAC Part No. | HYDAC Type Code | Dimension L [mm] | Weight [kg] |
|----------------|----------------------------|------------------|-------------|
| 3455621 | HYDAC HEX S400-10-00/G3/4" | 33 | 1.3 |
| 3383847 | HYDAC HEX S400-14-00/G3/4" | 42 | 1.5 |
| 3455623 | HYDAC HEX S400-20-00/G3/4" | 55 | 1.8 |
| 3399435 | HYDAC HEX S400-30-00/G3/4" | 78 | 2.3 |
| 3455655 | HYDAC HEX S400-40-00/G3/4" | 101 | 2.8 |

HYDAC HEX S610



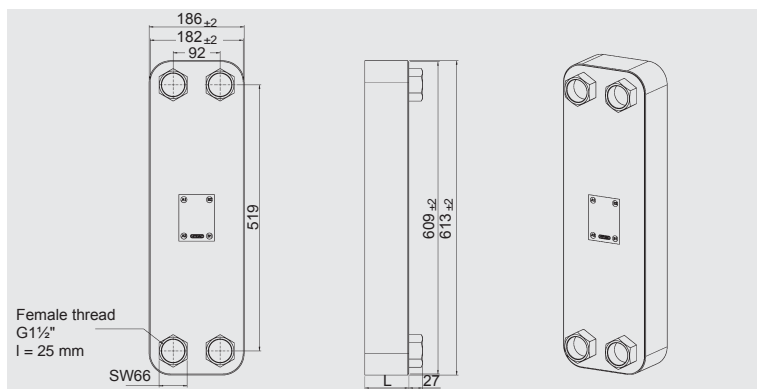
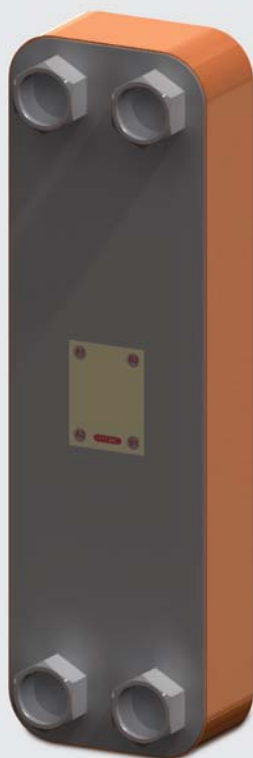
| HYDAC Part No. | HYDAC Type Code | Dimension L [mm] | Weight [kg] |
|----------------|---------------------------|------------------|-------------|
| 3366746 | HYDAC HEX S610-10-00/G1" | 34 | 2.5 |
| 3361012 | HYDAC HEX S610-20-00/G1" | 58 | 4.2 |
| 3366754 | HYDAC HEX S610-30-00/G1" | 82 | 5.5 |
| 3366759 | HYDAC HEX S610-40-00/G1" | 106 | 6.9 |
| 3366760 | HYDAC HEX S610-50-00/G1" | 130 | 8.25 |
| 3366761 | HYDAC HEX S610-60-00/G1" | 154 | 9.6 |
| 3366762 | HYDAC HEX S610-70-00/G1" | 178 | 10.9 |
| 3527300 | HYDAC HEX S610-80-00/G1" | 202 | 11.0 |
| 3366763 | HYDAC HEX S610-100-00/G1" | 250 | 14.2 |
| 3366764 | HYDAC HEX S610-120-00/G1" | 298 | 16.6 |

HYDAC HEX S615



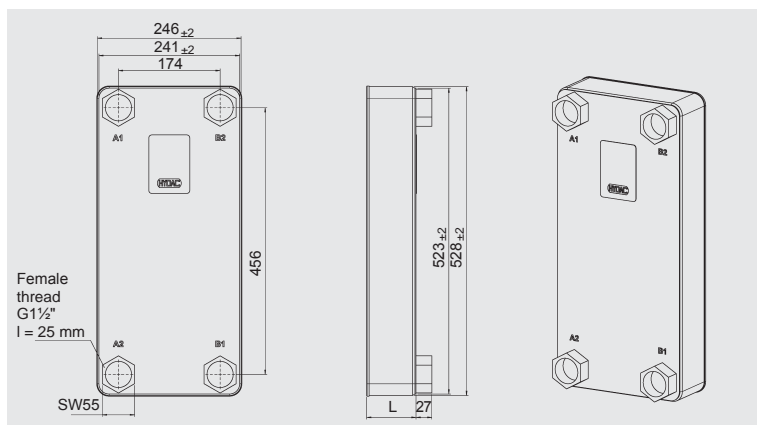
| HYDAC Part No. | HYDAC Type Code | Dimension L [mm] | Weight [kg] |
|----------------|---------------------------|------------------|-------------|
| 3366787 | HYDAC HEX S615-10-00/G1" | 34 | 5.3 |
| 3366788 | HYDAC HEX S615-20-00/G1" | 58 | 7.5 |
| 3366790 | HYDAC HEX S615-30-00/G1" | 82 | 9.7 |
| 3366792 | HYDAC HEX S615-40-00/G1" | 106 | 11.9 |
| 3366793 | HYDAC HEX S615-50-00/G1" | 130 | 14.1 |
| 3366794 | HYDAC HEX S615-60-00/G1" | 154 | 16.3 |
| 3366815 | HYDAC HEX S615-80-00/G1" | 202 | 20.7 |
| 3383853 | HYDAC HEX S615-100-00/G1" | 250 | 25.7 |

HYDAC HEX S722



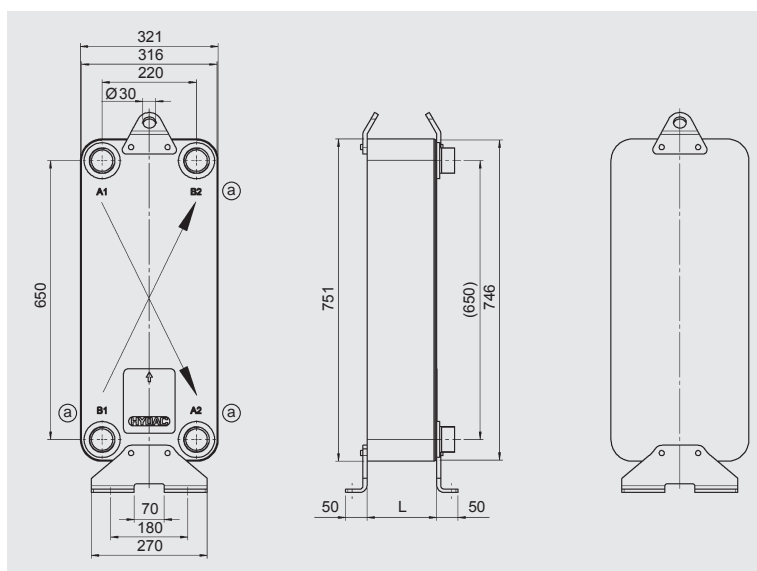
| HYDAC Part No. | HYDAC Type Code | Dimension L [mm] | Weight [kg] |
|----------------|-------------------------------|------------------|-------------|
| 3457465 | HYDAC HEX S722-20-00/G1 1/2" | 62 | 15.3 |
| 3457473 | HYDAC HEX S722-30-00/G1 1/2" | 86 | 19.4 |
| 3457474 | HYDAC HEX S722-40-00/G1 1/2" | 110 | 23.5 |
| 3457486 | HYDAC HEX S722-50-00/G1 1/2" | 134 | 27.6 |
| 3457489 | HYDAC HEX S722-60-00/G1 1/2" | 158 | 31.7 |
| 3457490 | HYDAC HEX S722-70-00/G1 1/2" | 182 | 35.8 |
| 3457491 | HYDAC HEX S722-80-00/G1 1/2" | 206 | 40.0 |
| 3457493 | HYDAC HEX S722-90-00/G1 1/2" | 230 | 44.0 |
| 3457494 | HYDAC HEX S722-100-00/G1 1/2" | 254 | 48.0 |
| 3457495 | HYDAC HEX S722-120-00/G1 1/2" | 302 | 53.4 |
| 3457496 | HYDAC HEX S722-150-00/G1 1/2" | 374 | 69.0 |
| 3673112 | HYDAC HEX S722-160-00/G1 1/2" | 394 | 72.7 |
| 3463069 | HYDAC HEX S722-190-00/G1 1/2" | 470 | 84.8 |

HYDAC HEX S522



| HYDAC Part No. | HYDAC Type Code | Dimension L [mm] | Weight [kg] |
|----------------|-------------------------------|------------------|-------------|
| 3383854 | HYDAC HEX S522-20-00/G1 1/2" | 60 | 17.6 |
| 3383906 | HYDAC HEX S522-30-00/G1 1/2" | 84 | 22.8 |
| 3383908 | HYDAC HEX S522-40-00/G1 1/2" | 108 | 28.0 |
| 3383909 | HYDAC HEX S522-50-00/G1 1/2" | 132 | 31.2 |
| 3383910 | HYDAC HEX S522-60-00/G1 1/2" | 156 | 38.4 |
| 3383911 | HYDAC HEX S522-70-00/G1 1/2" | 180 | 43.6 |
| 3383913 | HYDAC HEX S522-80-00/G1 1/2" | 204 | 48.8 |
| 3383914 | HYDAC HEX S522-100-00/G1 1/2" | 252 | 59.2 |
| 3651724 | HYDAC HEX S522-110-00/G1 1/2" | 276 | 60.8 |
| 3383925 | HYDAC HEX S522-120-00/G1 1/2" | 300 | 69.6 |
| 3383926 | HYDAC HEX S522-150-00/G1 1/2" | 372 | 85.2 |
| 3738950 | HYDAC HEX S522-160-00/G1 1/2" | 396 | 84.8 |
| 3383927 | HYDAC HEX S522-190-00/G1 1/2" | 468 | 106.0 |

HYDAC HEX Z800

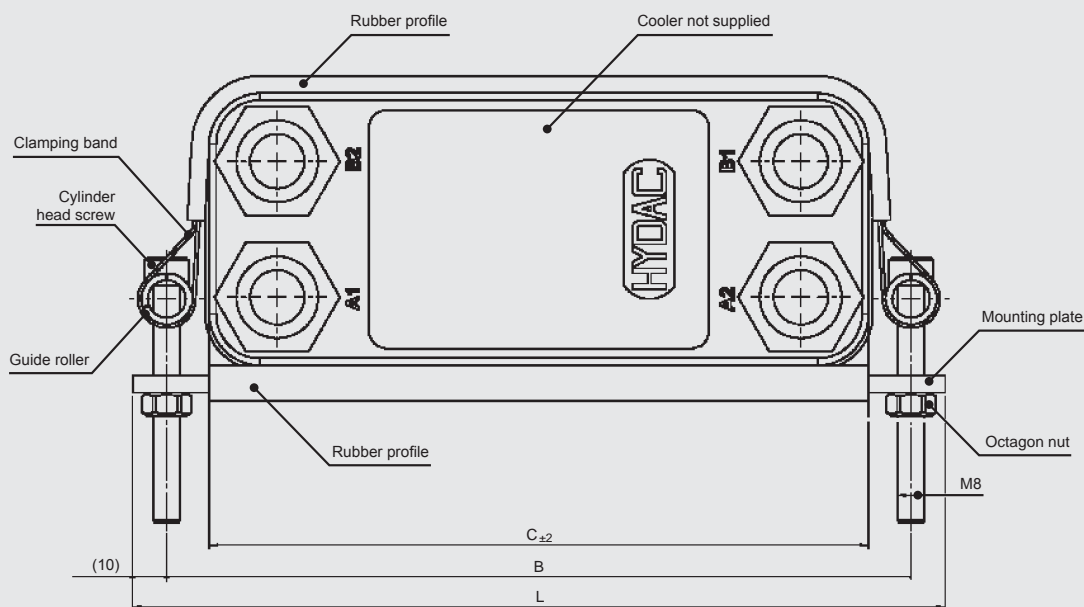


Special size for high cooling capacities and large volumes:

- Diagonal flow pattern
- Connections: threaded bolts with female or male threads, flange, soldered or SAE connections

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Installation



| HYDAC Part No. | HYDAC Type Code | c [mm] | d [mm] | l [mm] | b [mm] |
|----------------|-----------------|--------|--------|--------|--------|
| 3092917 | HYDAC HEX S400 | 194 | 80 | 239 | 219 |
| 3014028 | HYDAC HEX S610 | 306 | 106 | 351 | 331 |
| 3014029 | HYDAC HEX S615 | 522 | 106 | 566 | 546 |
| 3343306 | HYDAC HEX S522 | 528 | 246 | 573 | 553 |
| 3013884 | HYDAC HEX S722 | 613 | 186 | 658 | 638 |

Please note:

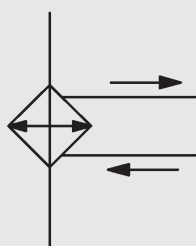
For mounting heat exchangers with 60 plates and above, two clamps are recommended.

HYDAC

INTERNATIONAL



Symbol



General

With plate heat exchangers, the heat from the fluid being cooled is transferred to a cooling fluid. The advantage is that they can maintain the fluid temperature at a very low and stable level – depending on the temperature of coolant.

Gasketed plate heat exchangers are particularly suitable for large flows and high cooling capacities and are therefore a useful supplement to the brazed range.

Product Features

Gasketed plate heat exchangers consist of a stack of individually stamped heat transfer plates and gaskets. The plate stack is clamped using bolts in a frame consisting of a fixed cover and a moveable cover. The advantage is that the plate heat exchanger can also be dismantled for cleaning and maintenance. Furthermore it is possible to add more plates at a later date to achieve a higher capacity.

There are several sizes with varying numbers of plates and different stamp designs available to cover the capacity range. In this way they can cater for heavily contaminated or high viscosity fluids, or even if the temperature difference between the hot and cold medium is only minimal.

Gasketed Plate Heat Exchangers Hxxx-LIQUID

Operating Data

| | |
|-----------------------|---|
| Plate material | Stainless steel 1.4401 (AISI 316), 1.4306 (AISI 304) SMO Titanium |
| Plate thickness | 0.4 – 0.6 mm |
| Seals | NBR (HT) EPDM Viton |
| Connections | Threaded pipe, male Flange (up to DN300) Note: The connection interface can only be altered before manufacture. |
| Paint colour | RAL 5010 Corrosion class: C2L Other paint finishes on request |
| Media | Hydraulic oil, lubrication oil, rolling oil, engine oil HFC, HFA, HFD, operating fluids water, water-glycol, seawater (with titanium plates) Limited possibility: steam applications |
| Operating temperature | up to 140 °C |
| Pressure ranges | 10 bar, 16 bar, 25 bar Note: Pressure surges must be avoided |
| Flow rate | up to 2,000 m³/h |
| Cooling capacity | up to 30,000 kW (dependent on the inlet temperature of the media and the flow rate) |
| Contamination | The level of particles in suspension should be less than 10 mg/l Particle size: <0.6 mm (spherical); thread-like particles cause a rapid rise in pressure drop. |
| Water quality | See table on water quality |
| Options | Safety heat exchanger Dual unit with change-over valve Insulation |

Depending on the individual situation, special models using higher grade materials are available, e.g. titanium plates are used for seawater applications.

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Application Field

Cooling circuits in counterflow which are operated using water, coolant, HFC operating fluids or oil. For applications using other fluids please contact the specialist department.

Typical applications are:

- Hydraulic systems
- Presses
- Lubrication systems
- Test rigs
- Motors/engines

Model Type

Size _____ **H-38 A - IG 10 - 12 - TKT33 - LIQUID**

Modification code _____

Frame type _____

Pressure range _____

Number of plates _____

Plate type _____

Fluid _____

Water Quality

| Substances dissolved in water | Concentration of substance in mg/l | Notes below relate to 1.4401 |
|--|--|------------------------------|
| Aluminium (Al) – in solution | <0.2 >0.2 | A A |
| Ammonia NH ₃ | <2 2 – 20 >20 | A A A |
| Chloride Cl ⁻ (max. +60 °C) | <250 >250 | A B |
| Electrical conductivity | <10 µ S/cm 10 – 500 µ S/cm >500 µ S/cm | A A A |
| Iron Fe – in solution | <0.2 >0.2 | A A |
| Free aggressive carbonic acid CO ₂ | <5 5 – 20 >20 | A A A |
| Total hardness | 4.0 – 8.5 °dH | A |
| Glycol percentage | <20 % 20 – 50 % >50 % | A A A |
| HCO ₃ ⁻ SO ₄ ⁻² | <1.0 >1.0 | A A |
| Hydrogen carbonate HCO ₃ ⁻ | <70 70 – 300 >300 | A A A |
| Manganese Mn – in solution | <0.1 >0.1 | A A |
| Nitrate – in solution NO ₃ | <100 >100 | A A |
| pH value | <6 6.0 – 7.5 7.5 – 9.0 >9 | B A / B A A |
| Sulphate SO ₄ ⁻² | <70 70 – 300 >300 | A A C |
| Sulphite SO ₃ / Free chlorine gas Cl ₂ | <1 1 – 5 >5 | A A A / B |
| Hydrogen sulphide (H ₂ S) | <0.05 >0.05 | A A |

A = under normal circumstances, good resistance
B = danger of corrosion, especially if several B substances are present
C = not suitable

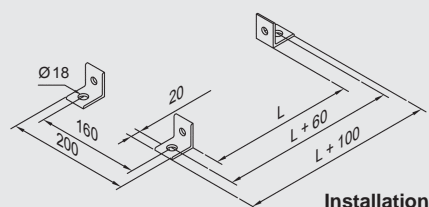
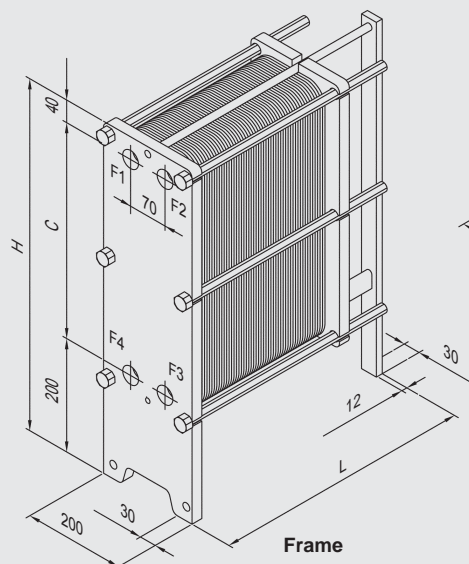
| Chloride content | Max. wall surface temperature | | | |
|------------------|-------------------------------|----------|----------|----------|
| | 60 °C | 80 °C | 120 °C | 130 °C |
| ≤10 ppm | W 1.4301 | W 1.4301 | W 1.4301 | W 1.4401 |
| ≤25 ppm | W 1.4301 | W 1.4301 | W 1.4401 | W 1.4401 |
| ≤50 ppm | W 1.4301 | W 1.4401 | W 1.4401 | Ti |
| ≤80 ppm | W 1.4401 | W 1.4401 | W 1.4401 | Ti |
| ≤150 ppm | W 1.4401 | W 1.4401 | Ti | Ti |
| ≤300 ppm | W 1.4401 | Ti | Ti | Ti |
| >300 ppm | Ti | Ti | Ti | Ti |

Note: This table is not exhaustive and serves only as a guide.

Dimensions

The dimensions can vary according to the frame type. Gasketed plate heat exchangers are calculated individually according to the application. You will find the relevant frame length L on the data sheet for your calculation.

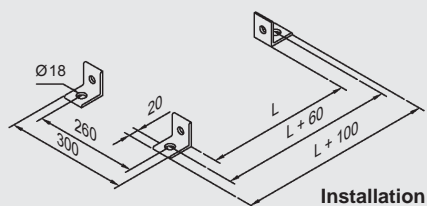
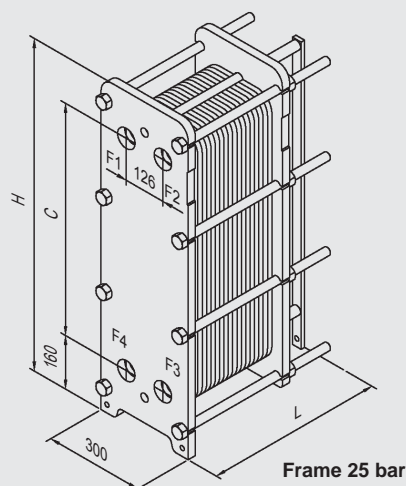
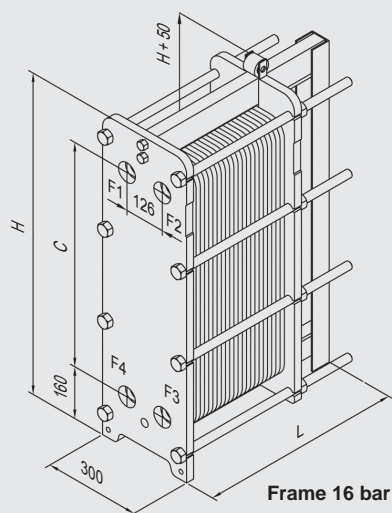
H8 / H16



Pressure ranges: 16 bar, 25 bar

| Size | Dimension H | Dimension C |
|------|-------------|-------------|
| H8 | 621 mm | 381 mm |
| H16 | 896 mm | 656 mm |

H14 / H28 / H40

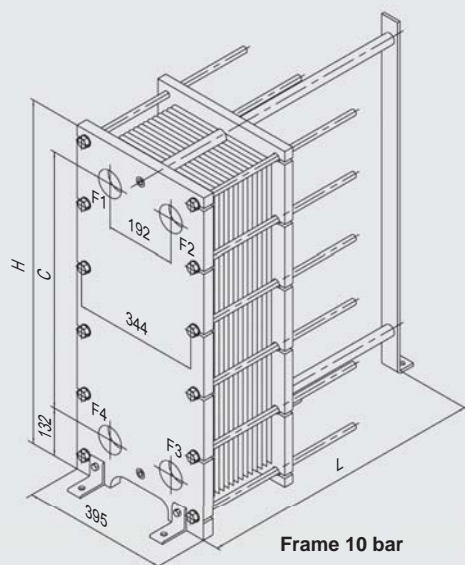


Pressure ranges: 16 bar, 25 bar

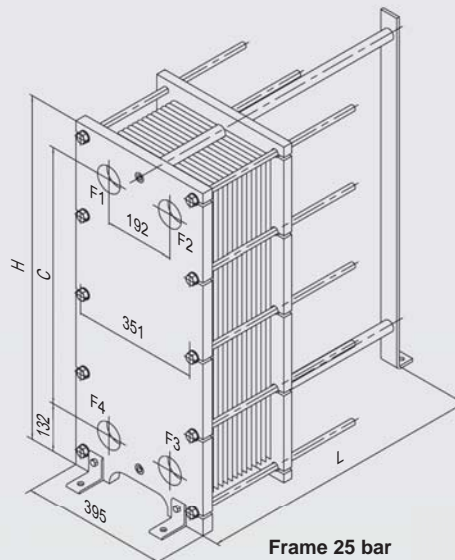
| Size | Dimension H | Dimension C |
|------|-------------|-------------|
| H14 | 694 mm | 394 mm |
| H28 | 994 mm | 694 mm |
| H40 | 1,194 mm | 894 mm |

E 5.815.1/08.16

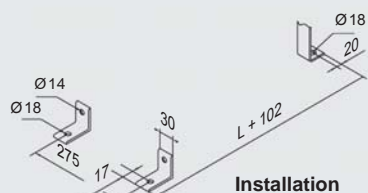
H18 / H38 / H62



Frame 10 bar



Frame 25 bar

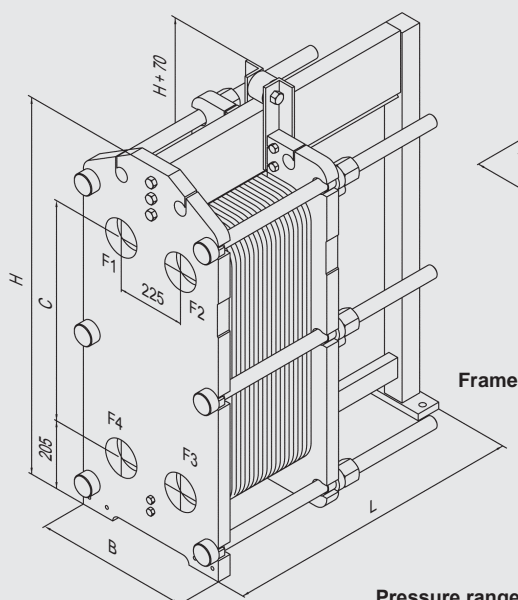


Installation

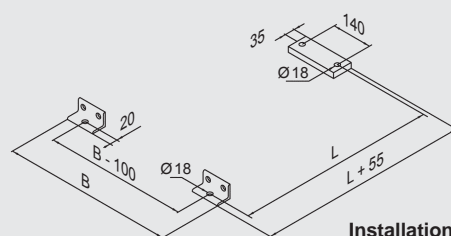
Pressure ranges: 10 bar, 16 bar

| Size | Dimension H | Dimension C |
|------|-------------|-------------|
| H18 | 626 mm | 380 mm |
| H38 | 946 mm | 700 mm |
| H62 | 1,296 mm | 1,050 mm |

H42 / H44 / H94 / H128



Frame

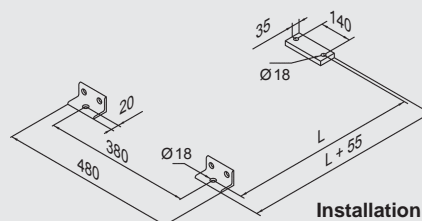
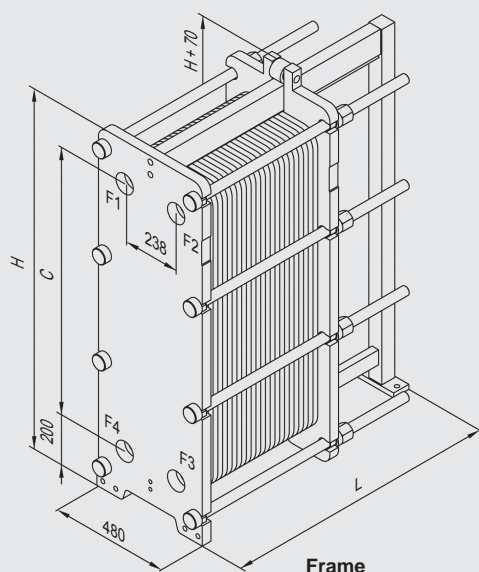


Installation

Pressure ranges: 10 bar, 16 bar, 25 bar

| Size | Dimension H | Dimension C | Dimension B |
|-----------|-------------|-------------|-------------|
| H42 / H44 | 1,238 mm | 719 mm | 495 mm |
| H94 | 1,884 mm | 1,365 mm | 480 mm |
| H128 | 2,291 mm | 1,771 mm | 480 mm |

H74 / H102

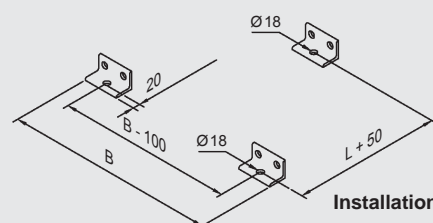
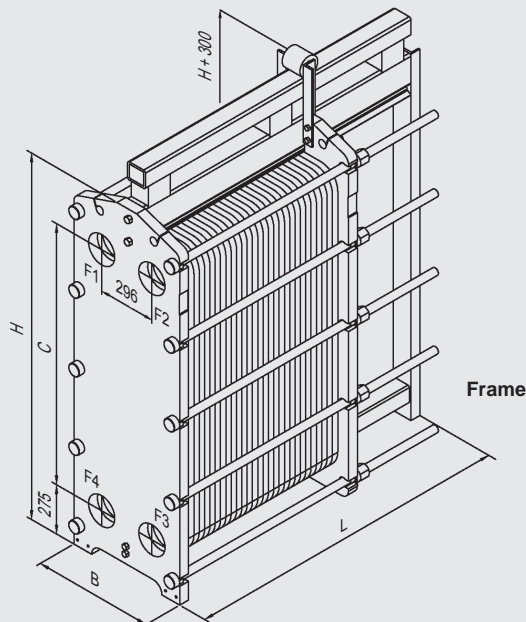


Installation

Pressure ranges: 10 bar, 16 bar

| Size | Dimension H | Dimension C |
|------|-------------|-------------|
| H74 | 1,441 mm | 1,070 mm |
| H102 | 1,855 mm | 1,484 mm |

H82 / H84 / H124 / H172 / H220



Installation

Pressure ranges: 10 bar, 16 bar, 25 bar

| Size | Dimension H | Dimension C | Dimension B 10, 16 bar | Dimension B 25 bar |
|-----------|-------------|-------------|---------------------------|-----------------------|
| H82 / H84 | 1,450 mm | 890 mm | 608 mm | 640 mm |
| H124 | 1,852 mm | 1,292 mm | 608 mm | 640 mm |
| H172 | 2,254 mm | 1,694 mm | 608 mm | 640 mm |
| H220 | 2,654 mm | 2,094 mm | 608 mm | 640 mm |

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