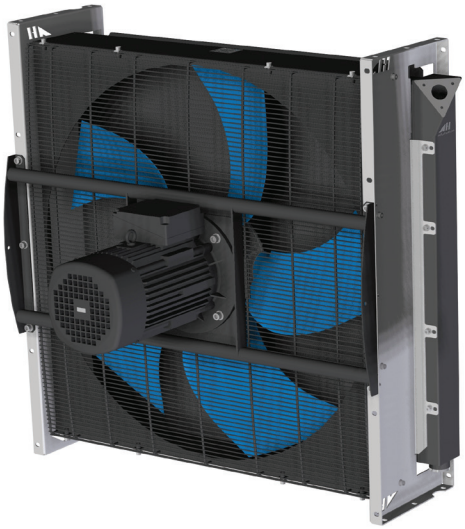
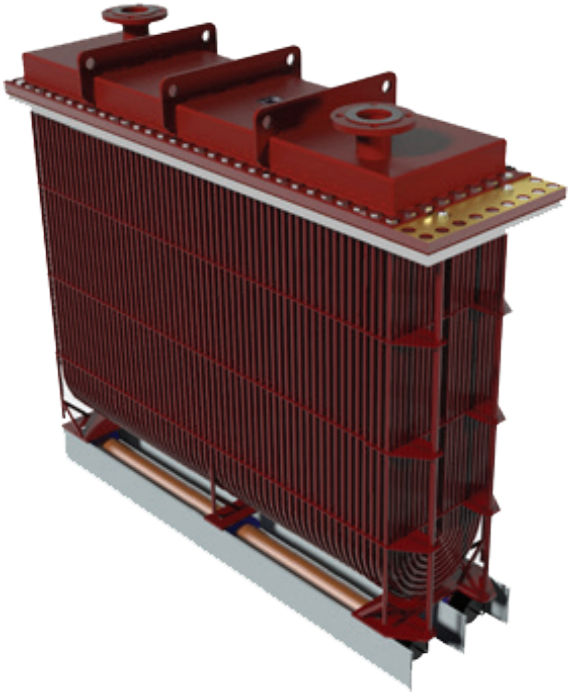
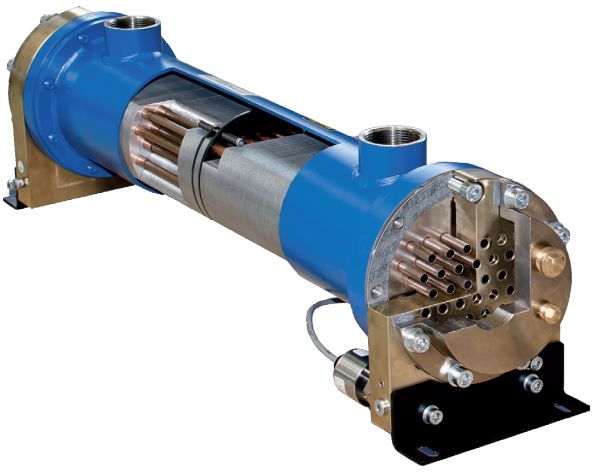
SERVI GROUP™

OIL COOLERS AND HEAT EXCHANGERS







WWW.SERVI.NO

Expert in fluid systems including thermal control

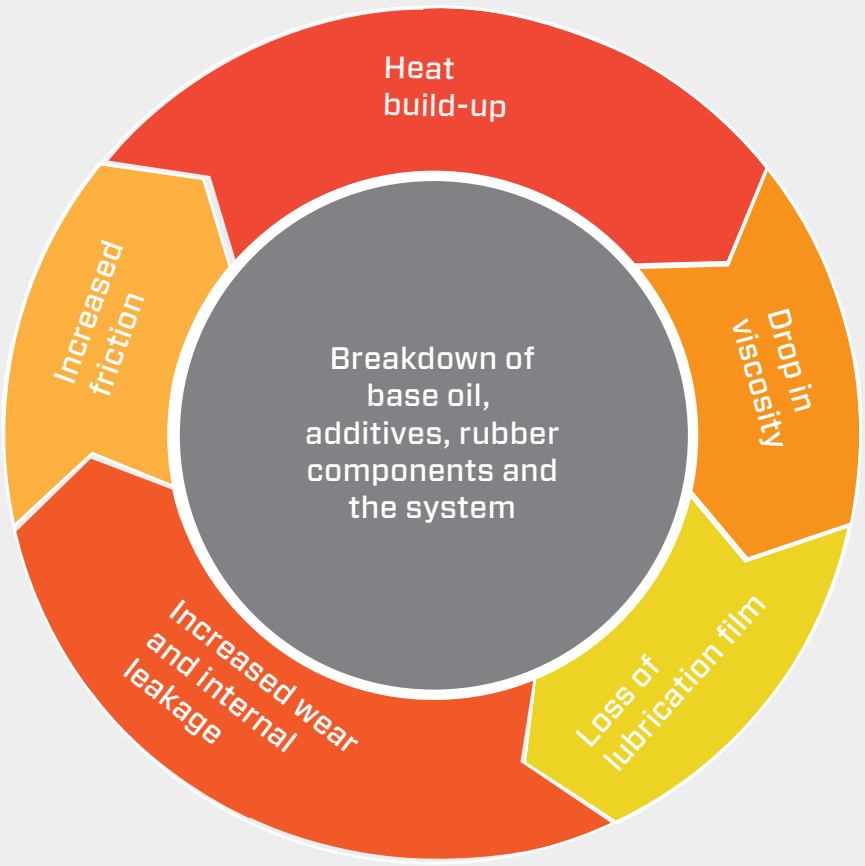
As the largest hydraulic company in Norway with more than 100 years' experience in hydraulics, SERVI is expert in the field of fluid systems, including thermally balanced systems.

With the support of our various, industry-leading partners, each with decades of experience in their fields, Servi has a wide product offering, with cutting edge technology and a range of innovative solutions. Servi has chosen partners with above average investments in R&D in their respective areas, ensuring that we bring the best suitable products to your applications.

Thermal balance is key to stable operation of your hydraulic system or other mechanical equipment. Normally, cooling down a system is the top priority, but in many systems, heating is also a requirement.

Maintaining the correct temperature through varying load cycles and flow patterns requires the right type of accessories, and Servi offers these as well.

Heat build-up
If the system temperature is not controlled, the fluid temperature will reach at levels that are far too high. This leads to lower viscosity and more internal leaks, which in turn may cause even worse problems. The heat buil-up reaches a point of no return, and breakdown of the system is only a matter of time.



Stable temperatures
Fluid temperature stability is Mission Critical. Great variation in temperature can be almost as harmful as temperatures being too high. A stable temperature means predictable fluid viscosity and system behavior. Too low oil temperatures will lead to cavitation in the pump and damaged hardware leading to unplanned breakdowns.

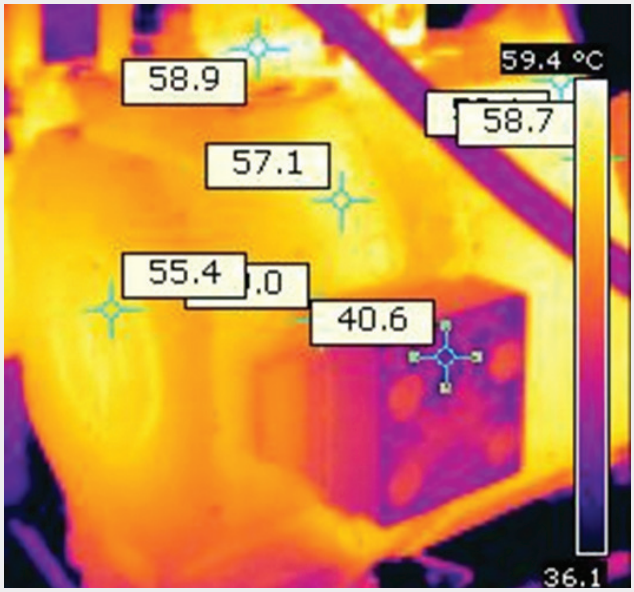
To ensure smooth and steady operation, it is important to keep the operating temperature, and thereby the viscosity, constant.

Heat and the effect on fluid and system
Gases and air will be absorbed or dissolved in hydraulic oil. Gas solubility increases significantly with a rising temperature for all petroleum products. The life time of hydraulic oil is typically reduced by 50% for every 10°C increase above 60°C. Below 60°, the reaction is comparatively slow.

Most hydraulic components are approved for operation with the 70° to 90°C range as the maximum temperature limit, but continuous operation at this temperature will lead to rapid deterioration of the hydraulic oil and especially its additives.

Heat and the effect on personnel
Surface heat on machinery is also a potential personal hazard, as hot surfaces can burn operators.
NASA (Unger/Stroud) suggests that 44°C should be used as the upper limit for human contact with hot objects.

This all adds to the importance of having the right equipment to properly ensure the correct operating temperature of hydraulic and other systems.



Proper thermal balance ensures longer lifetime, better operation and less maintenance costs for your hydraulic system

Energy loss
Most of the energy loss in a hydraulic system will be transformed to heat. If a 100kW system works with 75% efficiency, the heat produced is 25kW. This will quickly lead to excessive oil temperatures if unchecked.

Most any system will reach a thermal balance if left alone. Where this temperature limit and the resulting viscosity should be, is up to the designer.

Some of the heat load will be removed by tank surfaces, pipes and other components. However, this represents such a small percentage of the total heat load, that it should not be considered when deciding which cooler to use.

The effect of all coolers will decrease over time, and any extra safety margin from tank and components will come in handy. Servi can help choose the right cooler for any system.

SPECIAL COOLERS AND ACCESSORIES
In addition to the heat exchanger types presented in this brochure, Servi can also help with other special heat exchangers such as turbo coolers and condensers.

LCM, LIFE CYCLE MANAGEMENT
Servi performs service and/or maintenance work on heat exchangers of all types in Norway and around the globe.

Stable temperatures in cold surroundings
Hydraulic system should not be operated at (very) low temperatures. The surrounding temperature should be well above the fluid pour point, otherwise cavitation will damage pumps and other components.

A circulation heater should be installed in any system starting or operating at 15°C or lower.

Electric Oil Heaters 0 – 90 kW
Available effects: 5, 10, 15, 20, 30, 45, 60, 75 and 90 kW

Cold oil can be just as challenging as hot oil. Utilising one of Servi's electric heaters solves this problem. Can be installed like a shell & tube cooler, preferably in a separate circuit. Vertical or horizontal installation. Recommended flow: up to 300 l/min, depending on model.

Standard Version
- Heating capacity up to 90 kW
- Thermostat: Adjustable 0-90°C (except EDH-500)
- Temperature limiter: 100°C fixed (except EDH-500)
- Max. operating pressure: 16 bar
- Surface loading: 2W/cm^2
- Voltage: 3 x 400V
- Material of housing: St-37
- Material of heating elements: Stainless Steel 1.4541 (AISI 321)

Optional
- Thermostat and Temperature limit: Temperature range up to approx 220°C
- Operating pressures over 16 bar available on request
- Surface loading: 1 W/cm^2 (recommended when media has a viscosity from 1000 cSt
- Voltage: 3 x 690 V (other voltages available on request)
- Temperature control
- Customised solutions

See your local Servi representative or our website for a detailed data sheet for this product

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MANUFACTURER
Universal Hydraulik

Air Oil Coolers

Air is a very practical medium to cool hydraulic systems - it is always available.

Cooling oil with air has the following benefits over cooling with water:
- Installation costs are usually lower, only requires electricity or hydraulics to drive fan.
- Can be used where water is not available.
- Air blast coolers have low operating costs.
- There is no risk of contaminating the oil.

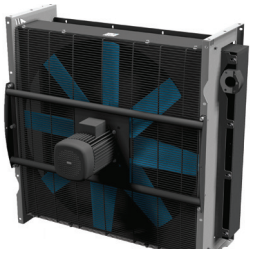
Some possible disadvantages to consider:
- The coolers usually require clean air to avoid clogging.
- If used in-doors, they require ventilation.
- Air coolers have a relatively high noise level

Servi offers a great variety of sizes and drives for our coolers:
- From 0.01 to 7.5 kW/°C
- Integrated bypass valve available on many models
- Flexible connection systems
- Easy application
- Pollution resistant air fins through the bar and plate design
- Customised accessories

Oil cooler series overview:
- LowLine... conventional female thread connections for minor cooling tasks
- TT rail... patented flexible mounting and connection system
- Patented Universal Connection system for easy connection
- HighLine...for heavy-duty cooling performance, equipped with SAE connections

The LL Series with AC or DC fan drives up to 0.11 kW/°C @ 100 l/min

The TT rail Series with the patented rail system AC, DC or hydraulic fan drive, up to 0.51 kW/°C & 300 l/min

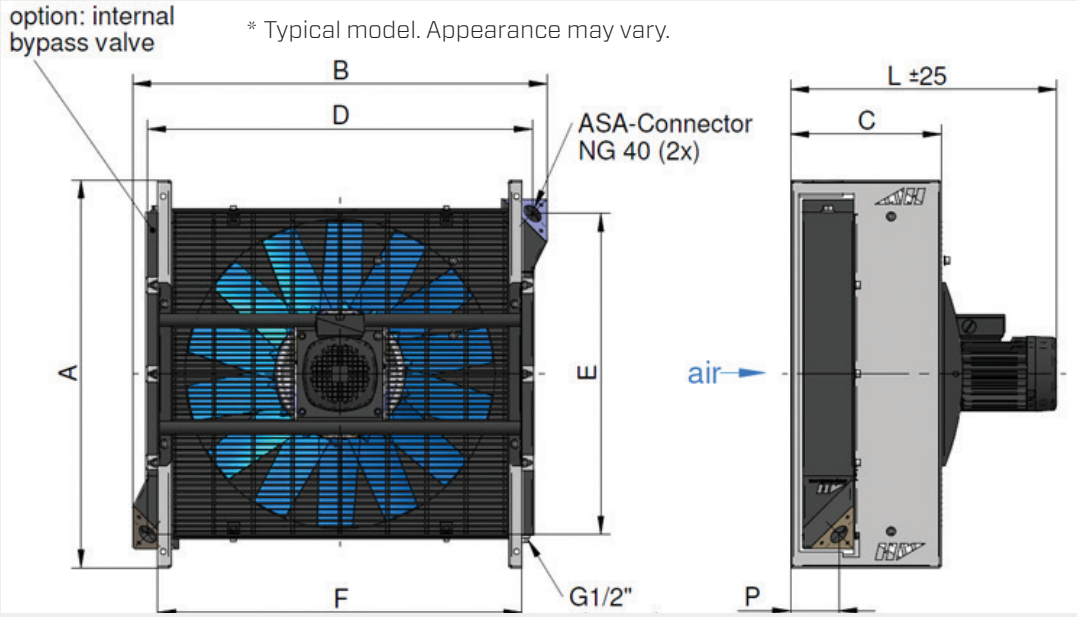


The standard range with the Universal connection system, and the HighLine range with flanges.
AC or hydraulic fan drive, up to 7 kW/°C & 800 l/min

Special Model, Servi size 2000. AC or hydraulic drive up to 7.5 kW/°C & 900 l/min at low pressure drop.

Some typical AC models

MODEL	A	B	C	L	WEIGHT (KG)	EL. MOTOR POWER
0177	530	582	260	460	41	0.18 – 0.55 kW
0257	635	682	270	480	49	0.37 – 0.55 kW
0367	720	770	280	515	64	0.37 – 0.75 kW
0467	765	837	290	634	80 – 106	0.37 – 2.2 kW
0567	860	920	290	524	80 - 92	0.37 - 2.2 KW
0927	1100	1165	320	612	140 - 180	1.5 – 4.0 kW
0929	1100	1210	380	724	174 - 212	1.5 – 4.0 kW
1247	1200	1220	479	825	200	1.5 – 4.0 kW
1508	1282	1350	514	960	290	9 kW
2000	1682	1480	500	1067	400	11 kW



The W Series coolers are designed to resist aggressive environments as found in offshore, marine and coastal applications. More than 30 years in heat transfer equipment has made us a global leader in advanced technologies. This ensures competitive pricing, consistent product performance and reliability. All units are tested according to SR ISO 7253 “salt spray test”. The coolers can be customised with various options such as internal bypasses, temperature switches, universal connectors, etc. Also available are different voltages and frequencies for the electric motors. Hydraulic coolers can also be supplied with these specifications. The hydraulic motor has no special protection class due to it's complex and varied applications.

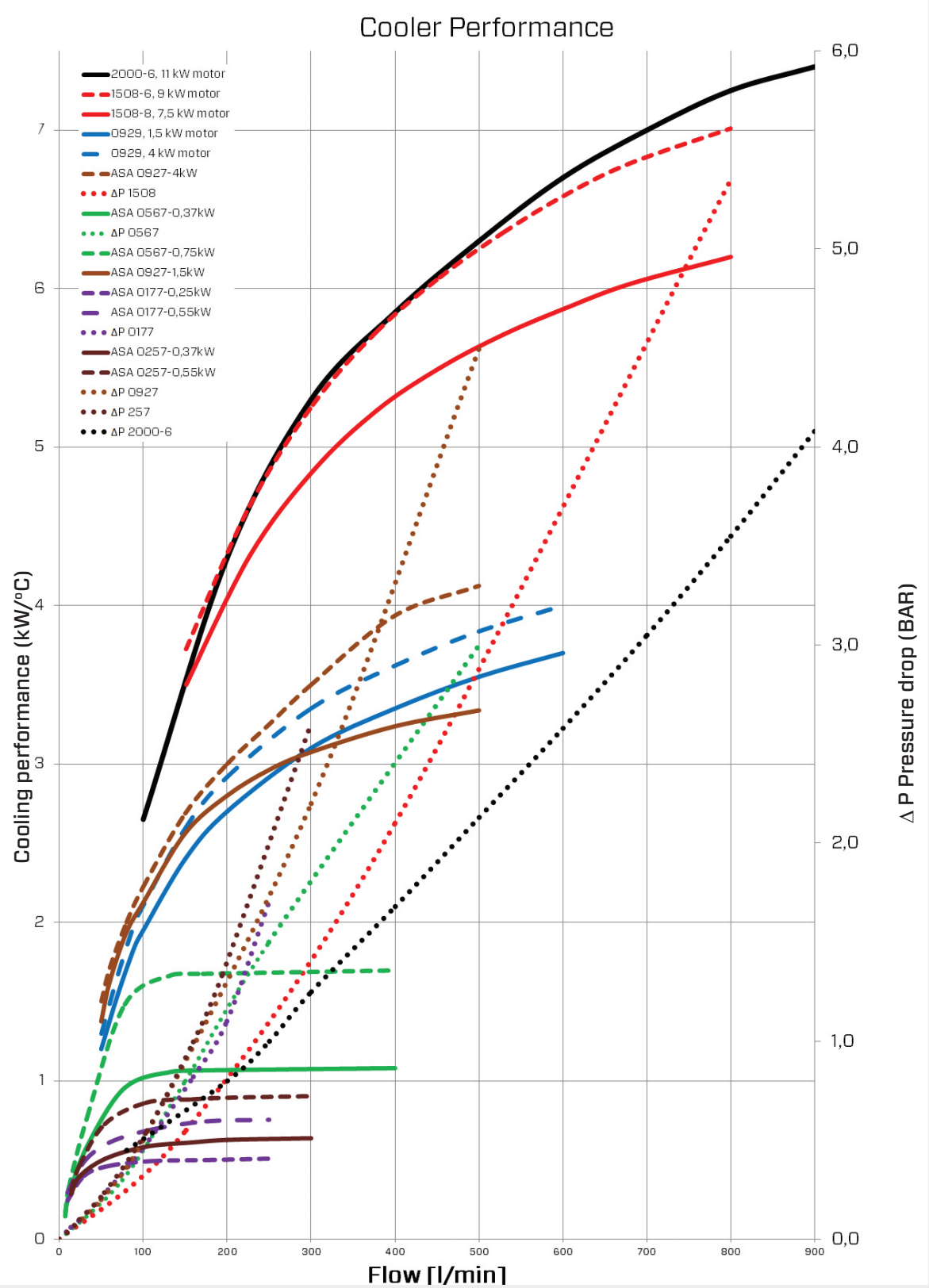
Coolers manufactured according to the ATEX Standard

General Data and Information:
The oil/air coolers delivered by Servi are available for ATEX zone 1, 2 and 22. Therefore, the coolers are certified for categories 2G and 3. ATEX certified coolers belong to cluster II.
The models are available with AC drives, but also with hydraulic motor drives. The ATEX coolers are equipped either with our well-established universal connectors or with the new rail system.

AC Coolers with variable fan speed

Servi supplies coolers with variable frequency drives for the fans - with following benefits:
- Improves temperature stability
- Reduces noise levels in normal conditions
- Reduces power consumption

Air Oil Coolers



MANUFACTURER
ASA Hydraulik

Cooling with water

Water is a highly efficient cooling medium - much more effective than air.

Cooling oil with water has the following benefits over cooling with air:
- Water coolers are generally much smaller and lighter.
- Costs are generally also lower than for an air blast cooler.
- There is no noise from a water oil cooler.
- The heated water can be utilised for other on-site purposes.

Some possible disadvantages to consider:
- The coolers usually require clean water to avoid clogging.
- There is risk of water contaminating the system fluid.
- Installation costs could be higher due to the need for water pipes to and from the cooler.

The problem of water quality
"Water is not just water" and – in contrast to the oil or air side – the machine designer has very little influence on the quality of the water being used. Every user deals with it in a different way, some use additives in the cooling circuit, others have open circuits resulting in very varying water quality. Quite often river water is used, which can contain many contaminants. Even if sample measurements of the water quality are made in advance, flood water can transport mud from the bottom upwards and significantly decrease the water quality. Substances such as chlorides or manganese dissolved in the water are not visible at first glance, but they will corrode even the best stainless steel. The situation is similar in ship building or the offshore sector where seawater is used, and any number of things may enter the heat exchanger: shells, wood, sand, stones. In this application, a water filter is much more complex and expensive than an oil filter. Unfortunately, companies often like to save costs in this area, and the cooling unit ends up being abused as a filter.

The main problem of unpredictable water quality is that it can damage the water tubes of the heat exchanger, and result in an oil-water intermixture. This means that oil flows into the water circuit or vice versa; water enters the oil circuit - with tremendous consequences for the system as well as the environment!

Servi will supply water filters if the water quality is poor. Servi will also supply coolers with double tubes or double wall plates to remove risk of contamination.

Available cooler types

Shell & Tube heat exchangers in various forms, compact/ hybrid, Failsafe and standard.

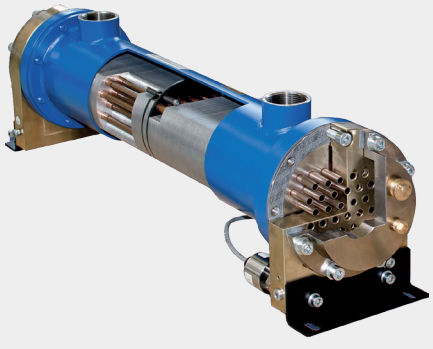
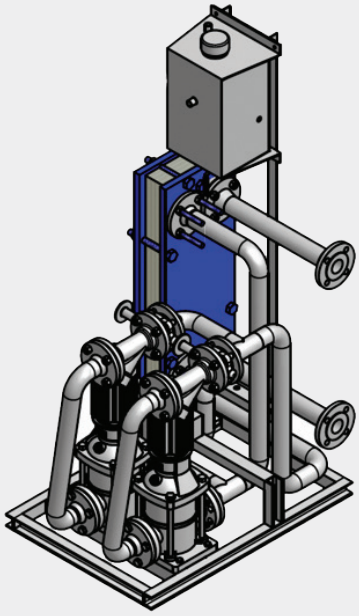


Plate & frame, gasket heat exchangers in various plate materials

Brazed plate heat exchangers in various plate materials

Cooling systems, complete cooling and/or filtration systems



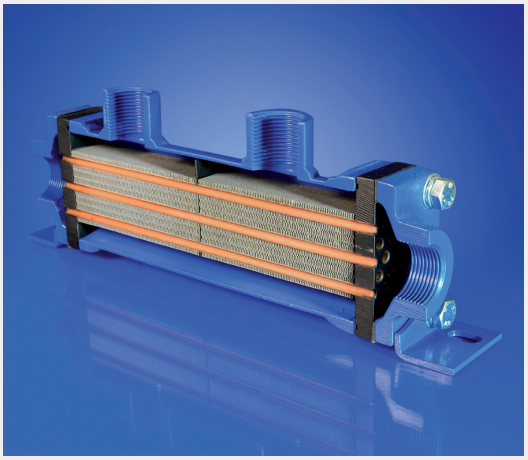
Shell and tube exchangers

Introduction
Our long experience in hydraulic systems enables us to evaluate every situation, and offer expert advise on installation of shell and tube excangers. Through the various Servi manufacturing sites, we offer a wide variety of standard types and options. This allows a flexible design, based on the operating conditions, taking into account any dimensional limitations of the installation.

Finned shell and tube coolers
- Proven cooler concept
- Strong focus on research and development work
- Compact coolers that are optimised to your design
- Available for fresh water or seawater

The cut-away perspective shows the shell with steel walls and high-performance cooling chamber, incorporating copper tubes and aluminium cooling fins.

The Shell & Tube coolers are easy to clean and maintain.
This makes them a preferred option in many marine applications. Servi offers a variety of sizes and models, such as the finned compact or hybrid model, and the safety version with double tubes and a pressurised intermediate medium ensuring that no mix of fluid occurs.



Product description
The EKM/SKM Series is a logical further development of the tube-bank heat exchanger for a wide range of industrial applications. This series is particularly effective due to the additional cooling area, and offers a heat exchange performance of 1000 kW. This is obtained by aluminium fins, which are pushed over the bank of tubes with metal-to-metal contact. The EKM/SKMS series of heat exchangers has a cooling surface ranging from 0.43 m2 to 56 m2 - and consists of 43 basic units.

Product features
- Aluminium fins maximising heat exchange
- Heat dissipation of up to 1000 kW
- Oil flow rates of up to 1200 l/min
- Removable end caps for easy cleaning of the tubes
- Flanges that allow the heat exchanger to be turned 90°
- Available with optional internal bypass check valve (patented)
- Max. pressure: oil 35 bar/ water 16 bar

Options
- Sea water version
- Certifications for marine applications
- Compressed-air application
- Water-Water application
- Stainless steel version or chemically nickel plated

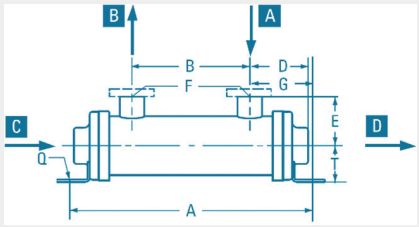
The hybrid heat exchangers combine the advantages of plate and tube-bundle heat exchangers: They have a greatly enlarged heat exchange surface on the oil side, which is achieved by fins (plates) that are drawn over and metalically connected to the water tubes. The result is a cooler which is about as compact as a plate heat exchanger, and substantially smaller than the classic bare tube heat exchanger.

If required, the tube diameter can be enlarged, and the material can be adapted to the water quality. Whether you prefer copper-nickel alloys (CuNi10 Fe), stainless steel (1.4571) or titanium, Servi has a solution for any application. But the biggest advantage is probably that the tube-bundle heat exchangers are very easy to clean - simply unscrew the end caps and brush through the tubes. In addition, the design of the connections is highly flexible due to the steel construction of the cooler housings. Customised versions can easily be modified.

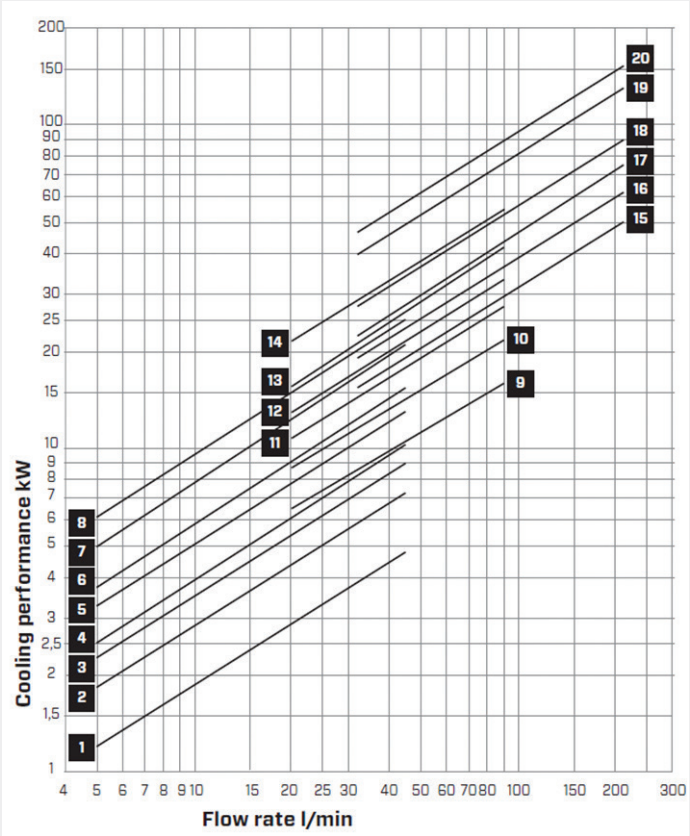
Servi's Shell & tube heat exchangers can be delivered with all applicable certificates (Germanischer Lloyd, DNV, Bureau Veritas, ABS - American Bureau of Shipment, CCS, China, Japan, etc.).

Shell and tube exchangers

MODEL DESIGNATIONS			
1	EKM-505-T	11	EKM-714-T
2	EKM-508-T	12	EKM-718-T
3	EKM-510-T	13	EKM-724-T
4	EKM-512-T	14	EKM-736-T
5	EKM-514-T	15	EKM-1012-T
6	EKM-518-T	16	EKM-1014-T
7	EKM-524-T	17	EKM-1018-T
8	EKM-536-T	18	EKM-1024-T
9	EKM-708-T	19	EKM-1036-T
10	EKM-712-T	20	EKM-1048-T



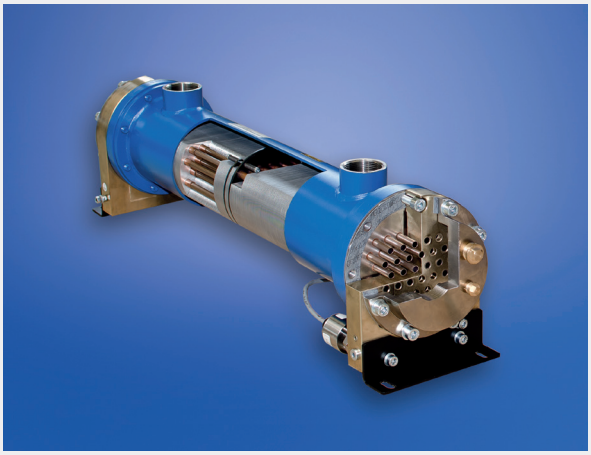
Typical models



	A	B	E	F	T	Q	X	Y	M²	WEIGHT (kg)
EKM-505-T	189	55	56	G 3/4	41	Ø 9 x 16			0.43	3.2
EKM-508-T	265	97	57	G 3/4	41	Ø 9 x 16			0.73	3.6
EKM-510-T	316	148	57	G 3/4	41	Ø 9 x 16			0.94	3.5
EKM-512-T	367	199	57	G 3/4	41	Ø 9 x 16			1.13	4.1
EKM-514-T	418	250	57	G 3/4	41	Ø 9 x 16			1.43	4.5
EKM-518-T	519	351	57	G 3/4	41	Ø 9 x 16			1.74	5.1
EKM-524-T	672	504	57	G 3/4	41	Ø 9 x 16			2.35	6.0
EKM-536-T	976	88	57	G 1 1/2	41	Ø 9 x 16			3.57	7.8
EKM-708-T	283	76	73	G 1 1/2	66	Ø 11 x 19	35.7	69.9	1.38	7.3
EKM-712-T	385	178	73	G 1 1/2	66	Ø 11 x 19	35.7	69.9	2.18	8.4
EKM-714-T	436	229	73	G 1 1/2	66	Ø 11 x 19	35.7	69.9	2.53	8.6
EKM-718-T	537	330	73	G 1 1/2	66	Ø 11 x 19	35.7	69.9	3.29	10.2
EKM-724-T	690	483	73	G 1 1/2	66	Ø 11 x 19	35.7	69.9	4.44	11.6
EKM-736-T	976	787	73	G 1 1/2	66	Ø 11 x 19	35.7	69.9	6.73	15.5
EKM-1012-T	397	157	92	G 1 1/2	102	Ø 11 x 25	42.9	77.8	4.38	15.4
EKM-1014-T	448	208	92	G 1 1/2	102	Ø 11 x 25	42.9	77.8	5.17	16.9
EKM-1018-T	549	309	92	G 1 1/2	102	Ø 11 x 25	42.9	77.8	6.73	19.8
EKM-1024-T	702	462	92	G 1 1/2	102	Ø 11 x 25	42.9	77.8	9.06	21.8
EKM-1036-T	1006	766	92	G 1 1/2	102	Ø 11 x 25	42.9	77.8	13.74	30.5
EKM-1048-T	1307	1067	92	G 1 1/2	102	Ø 11 x 25	42.9	77.8	18.41	39.8

Shell and tube exchangers - double tubes and added safety

Based on the existing oil/water heat exchangers in the CKM Series, we have developed the new oil/water safety heat exchangers CKM-FS & SCM-FS which, by means of a double tube, prevent the danger of mixing the cooling medium and the fluid to be cooled.
A sensor immediately detects and indicates any leaks in the bank of tubes.



The CKM/FS is a further developement of the traditional shell & tube cooler, while the SCM-FS is based on the compact/ hybrid version with fins on the oil side for increased cooling performance in a very compact housing/unit.

Based on the existing principles of hybrid and safety heat exchangers, Servi presents the innovative "hybrid safety heat exchanger" (SCM-FS Series) as a further development step. This new design is almost as small as the hybrid style heat exchangers. Until now, safety heat exchangers have only been available as bare tube heat exchangers, which is why they were about three times the size of a normal hybrid cooler with the same cooling capacity.

Now, almost every hybrid cooler can be supplied in the same size as a safety heat exchanger, because – in contrast to the previous solution – the safety function in the new hybrid safety heat exchanger is not associated with an efficiency reduction. If a leak occurs, the medium flows into a designated area and is detected by a sensor.

Why use safety heat exchangers?

The challenge is the water quality:
"Water is not just water" – see previous section.

Safety systems separate the medium to be cooled (often oil) from the cooling agent (water) through two separate circuits. The problem of space is solved with the safety heat exchanger by fitting two pipes inside each other. This double pipe system prevents the mixing of the two fluids .

The potential damage is very limited: In case of a leak, a small amount of fluid will flow from the hot side into the small intermediate circuit, and if the defect is on the water side, a small amount of the sealing fluid (which is not harmful to drinking water) flows into the water. In addition, the system automatically triggers an alarm which - depending on the application - will activate a stopcock, an alarm lamp, a loud noise, an emergency stop or a controlled shutdown of the system. This does not affect the functioning of the heat exchanger.

The well-proven double tube system is also used in the new safety heat exchanger, but now in an optimised form. Should a leak occur, the medium flows into a designated area, and is then detected by a special sensor. The latest IECEx Certificate of the sensor allows its use in potentially explosive environments, complementing the existing ATEX Approval..

Due to its compact design, the cost of the new hybrid safety heat exchanger is considerably lower than that of the previous bare tube safety heat exchanger.

Contact SERVI for detailed catalogues and data sheets.

MANUFACTURER
Universal Hydraulik, Kelvion (formerly GEA Bloksma)

Gasketed plate heat exchangers

The small footprint of our gasketed plate-and-frame heat exchangers is obtained by having one of the widest ranges on the market. SERVI works with world leaders in this field, and will always offer the best product for every application.

Improved efficiency means lower costs
The new OptiWave™ plate configuration takes heat transfer efficiency to a whole new level.
Conventional plates allow most media to flow directly from one port to the other, reducing the flow on the far side. This means that they don't make full use of the heat transfer area, and require more plates.
Optiwave plates insure even media flow across the entire width, making full use of the area, thus increasing efficiency with fewer plates.

The result? Plates with Optiwave deliver the same or better heat transfer efficiency with fewer plates. The NT Series uses Optiwave, requiring a smaller heat transfer surface to achieve the same capacity, and thus significantly reducing your cost without compromising performance.

Our wide selection means we always have the right heat exchanger to cover your needs.

The wide variety of sizes and plate shapes allows the design to exactly match your operating requirements
- Sizes range from 0.2m^2 to over 3000 m^2 of total heat transfer surface.
- Connection sizes start at 25 mm/1" and run all the way up to 500 mm/20", and we can provide any type of connection the job requires.
- Liquid volume flow ranges up to 75,000 litres per minute.
- Design pressure of up to 25 bar (higher on request) and operating temperature of up to 175°C (215°C in exceptional cases).
- Your choice of plate materials includes 316 and 304 Stainless Steel, C-276, titanium, Titanium-Palladium, and many others. Almost any material can be processed due to modern production facilities and well thought-out tool design.
- Extensive range of gasket materials.

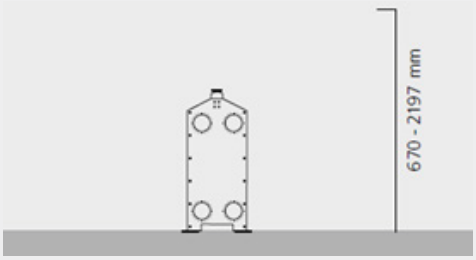
Easy maintenance minimises equipment down time
The proprietary EcoLoc™ tool-free gasket attachment system simplifies gasket and plate replacement, and ensures a perfect fit between the gasket and plate pack, making maintenance quick and easy.
The NT Series features PosLoc™ self-aligning plate system. Unlike conventional designs that rely only on the upper and lower beams for alignment, PosLoc adds self-alignment lead-ins that cause the plates to self-align as you tighten the pressure plates after maintenance. This provides a stable, perfectly aligned plate pack, with gaskets positioned quickly and accurately.

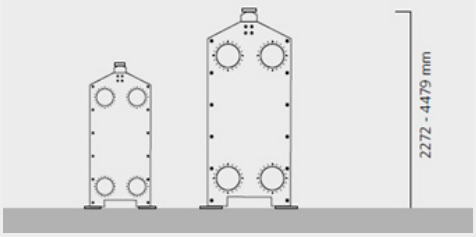
The NT500 model, with true 500 mm port and unique features
- Optiwave™ media distribution design makies full use of the entire heat transfer surface area, and delivers the same performance with fewer plates.
- Features EcoLoc™ tool-free gasket installation.
- PosLoc™ self-aligning plate system, ensures a tight fit the first time and every time.
- A full 500 mm plate port size. Where other suppliers may use a full 500 mm connection and then taper down to a smaller plate port size, our plate port is a full 500 mm reducing pressure drop in the unit to a minimum.
- Flow rates up to 75,000 l/min (4500 m^3/hr)

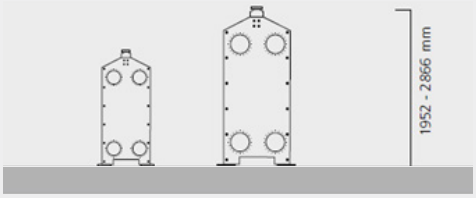
The NT500 is ideally suited for large volume applications, such as power plant cooling tower isolators, large scale desalination, and similar systems. Contact us to find out how the NT500 can help you.

Typical sizes of one of our ranges

TYPE	CONN. SIZE	HEIGHT	WIDTH
NT Series 50T - 150L			
NT 50T	50	670	323
NT 50M	50	930	300
NT 50X	50	1390	323
NT 100T	100	1110	540
NT 100M	100	1516	540
NT 100X	100	1952	540
NT 150S	150	1717	640
NT 150L	150	2197	640
NT Series 250S - 500X			
NT 250S	250	2272	895
NT 250M	250	2569	895
NT 250L	250	2866	895
NT 350S	350	2776	1135
NT 350M	350	3113	1135
NT 350L	350	3450	1135
NT 500T	500	3257	1415
NT 500M	500	3868	1415
NT 500X	500	4479	1415
NX Series 100X - 250L			
NX 100X	100	1952	540
NX 150L	150	2197	640
NX 150X	150	2377	640



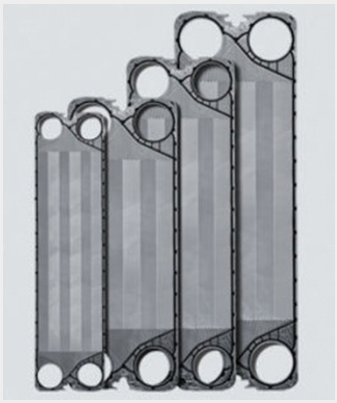




Contact SERVI for detailed catalogues and data sheets.

MANUFACTURER
Kelvion (formerly GEA)

Brazed plate heat exchangers



A wide range in a variety of sizes
Flexible sizes and sophisticated technology make GBS plate heat exchangers (from the EcoBraze product line) the perfect choice for even the most demanding conditions.

These brazed all-rounders are ideally suited for applications of any size – pressure-resistant up to 30 bar at temperatures up to ±200°C! This adds quality, economic efficiency and excellent thermal performance to your operations.

17 different sizes for use worldwide in the following fields
- Heating / service water systems
- Floor heating
- Sub-coolers and condensers
- Economisers
- Refrigerant evaporators
- Oil coolers and many more industrial applications

To sum it up: The GBS Series enables a wide range of applications at an excellent price/performance ratio.

Features and benefits

Safety Chamber™
The patented Safety Chamber™ absorbs the stress from thermal shocks and pressure pulsations that would damage other brazed plate heat exchangers. When overloaded, encapsulated contact points around the ports absorb the forces and stretch, protecting the unit against internal leaks and premature failure. A valuable safety factor.

Delta Injection™ for Advanced Evaporator - AE line
The patented Delta Injection™ refrigerant distribution system is specially developed for evaporator applications. It provides precise metering of refrigerant to the channels, guaranteeing the highest evaporator performance. The Delta Injection™ is fully integrated into the stainless steel heat-transfer plate.

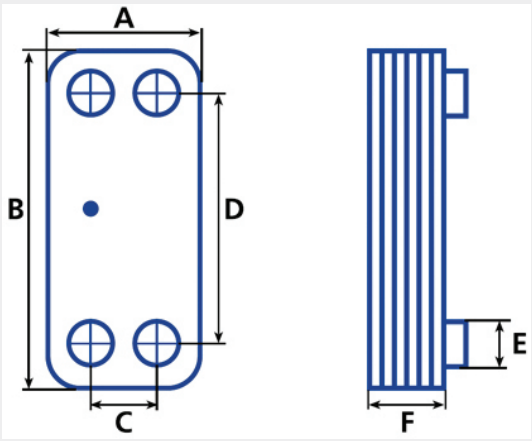
Robust plate design
A special plate design by GEA PHE Systems, the Rolled Edge Lock System™, guarantees a consistent braze joint at the plate overlap, and makes a stronger and more leak-proof heat exchanger. The large/extended contact points result in stronger braze joints between the plates, thus guaranteeing high heat exchanger strength.

Full-Flow System™
Every new plate design is now equipped with the Full-Flow System™. This unique flow system ensures continuous flow around the port area to prevent freezing, and also disperses the working fluid equally across the channel to guarantee maximum use of the heat transfer area. Additional protection and performance from SERVI.

MANUFACTURER
Kelvion (formerly GEA), Universal Hydraulik

GBS Series - Technical Data

Plate material: Stainless steel AISI 316 / 1.4401
Brazing material: Copper
Performance: Up to 30 bar at ±200°C
Third party approval: PED (CE), TÜV, further certifications upon request



Features

STAINLESS STEEL COPPER-BRAZED	A	B	C	D	E	F N = Number of plates	MASS N = Number of plates (Kg)	VOLUME (liter/ channel)	MAX WATER FLOW RATE	MAX NUMBER OF PLATES (N)
	STANDARD DIMENSIONS (MM)									
GBS 100	74	204	40	170	15	8.0+2.23xN	0.70+0.050xN	67	4	50
GBS 200	90	231	43	182	20	10.0+2.24xN	1.10+0.060xN	100	6	50
GBS 220	90	328	43	279	20	10.0+2.22xN	1.30+0.080xN	100	6	50
GBS 240	90	564	43	415	20	10.0+2.20xN	2.04+0.140xN	100	6	50
GBS 300	1245	173	73	120	25	10.0+2.22xN	1.20+0.060xN	167	10	50
GBS 400	124	335	73	281	25	9.5+2.24xN	1.60+0.130xN	167	10	100
GBS 418	127	282	84	239	20	9.0+2.05xN	1.35+0.118xN	100	6	50
GBS 420	127	282	68	223	32	9.0+2.76xN	1.35+0.118xN	167	10	100
GBS 500	124	532	73	478	25	9.5+2.23xN	1.76+0.210xN	167	10	100
GBS 525	118	525	69	476	25	7.5+2.76xN	2.55+10.210xN	167	10	100
GBS 700L	271	532	200	460	40	11.0+2.29xN	9.60+10.540xN	450	27	150
GBS 700M	271	532	200	460	40	11.0+2.25xN	9.60+10.540xN	450	27	150
GBS 757	281	543	198	460	60	11.5+2.65xN	13.2+0.500xN	450	27	160
GBS 760	257	519	138	416	80	13.5+23.45xN	12.6+0.400xN	1167	70	130
GBS 800	271	532	161	421	65	11.5+2.34xN	10.0+0.540xN	1167	70	260
GBS 900	271	802	161	690	65	11.3+2.31xN	11.5+0.800xN	1167	70	260
GBS 910	318	783	225	690	65	14.0+2.54xN	20.0+0.853xN	1167	70	200
GBS 1000H	386	875	237	723	100	20.3+2.31xN	39.5+1.250xN	2667	160	360

Box coolers - keep your engine room free of seawater

Long-term reliable machine cooling with Bloksma box coolers.

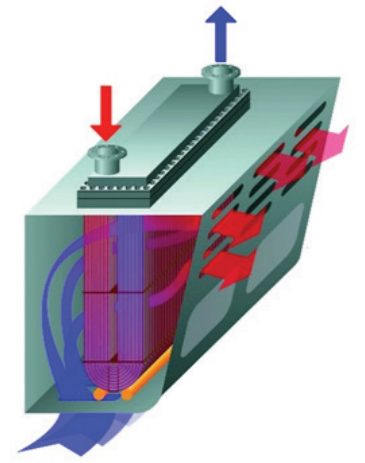
1) Rectangular box cooler 2) Round box cooler 3) Stepped box cooler 4) FlowBox

Box coolers allow the elimination of a complete outboard secondary cooling water circuit on board. Furthermore, they protect the sea-chest against galvanic corrosion by a coating covering all exposed surfaces.

SERVI has a long experience in delivering Box coolers. The manufacturer has supplied over 22,000 box coolers globally.

SERVI and our partner can evaluate every situation and offer expert advice on installation. The box coolers come in a wide variety of standard types with a multitude of options. This allows flexible design based on the operating conditions, taking into account the dimensional limitations on board.
The latest generation of Box coolers is the sum of wide-ranging experience and innovation. The result is low-maintenance box coolers boasting long service lives and high availability, which wins customers all over the world.

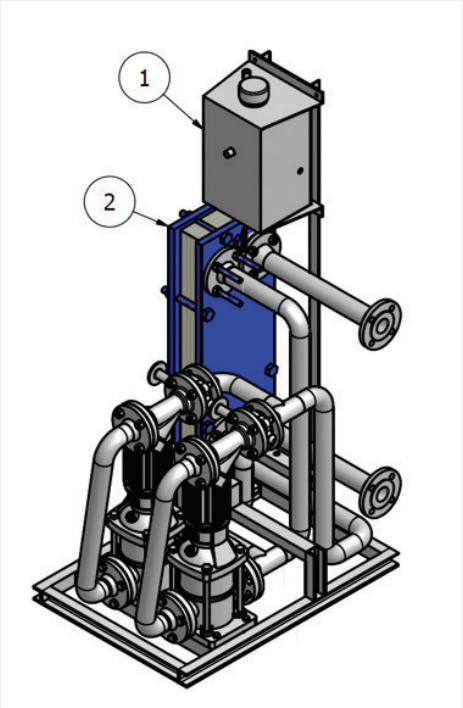
Features and benefits:
- Elimination of complete outboard water circuit on board.
- No need for seawater inlet, pumps, filters, valves, pipelines etc., or any parts made of seawater resistant material, which are expensive and require maintenance.
- Virtually maintenance-free, therefore operational costs are much lower than for any other cooling system.
- Space saving in the engine room.
- Not susceptible to corrosion and less sensitive to fouling.
- Ideally suited for operation in icy, sandy, shallow and silt polluted water.
- Require less piping and no electricity for seawater pumps.



MANUFACTURER
Kelvion (formerly GEA Bloksma)

Cooling systems

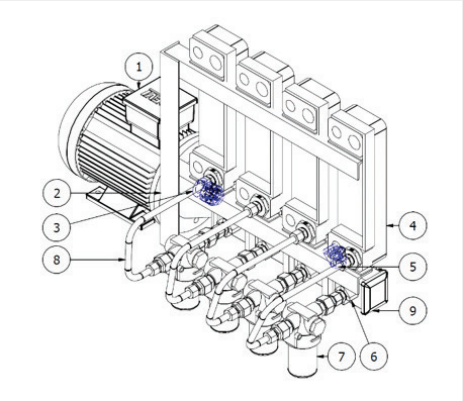
SERVI offers simple or complex cooling with fresh water, seawater or air - Complete systems incorporating pumps and motors, filters, level tank and shut-off valves.



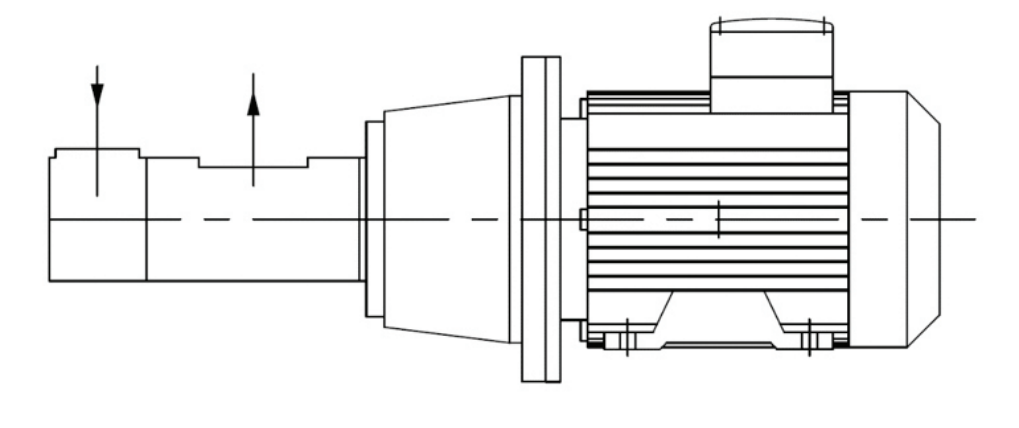
100 kW cooling system
- Cooling unit for frequency converters
- Dual circulation pumps
- Filters, non-return valves and shut-off valves
- Level tank in stainless steel
- Fresh water gasket plate heat exchanger
- Water glycol/fresh water

Quad pump/cooling unit
- Cooling unit for planetary gearboxes
- Multiple gear pumps with double sealing
- Welded plate coolers in stainless steel
- Mineral gear oil/fresh water

- Combined units for planetary gearbox and water cooled electric motors.
- Multiple gear pumps with double sealing
- Welded plate coolers in stainless steel
- Mineral gear oil/fresh water
- Water glycol/fresh water



SERVI also supplies complete pump/motor units for cooler and filtration circuits. Flow up to 3000 l/min.

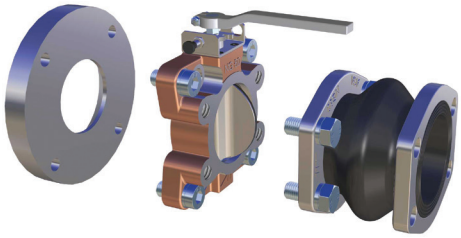


Cooler Accessories

Thermal switches to control stop/start of fans, IP 65, 50°C

Complete temperature control kits for DC fans, including variable speed

Various flanges and fasteners for air/oil coolers



Suction bellows

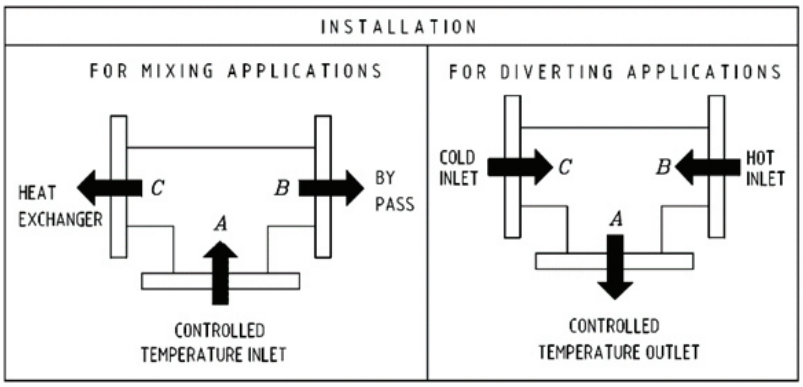
Large shut-off valves

Radiator guards for physical protection

Vibration absorbers

Thermal fluid control valves
- Temperature-dependent bypass control
- Integral pressure-relief function
- Rapid oil warm-up (cold-start phase)
- Direct-mounted in coolers or manifold blocks
- High flow rates
- Low head loss
- Various pressure settings available
- Excellent reproducibility
- Extreme reliability
- High operational stability
- All exposed parts covered with zinc-nickel plating
- Can be fitted in a line-mounting body

Large flow Thermal control valves



CONNECTION SIZE AND TYPE (T - threads, F - flange)	Δ P & Oil flow l/min (ISO VG 46 @ 49°C)									
	100	200	300	400	500	600	700	800	900	1000
1 1/2 T	0.04	0.16	0.35							
2 T	0.03	0.10	0.24	0.42						
2 F	0.03	0.10	0.24	0.42						
2 1/2 F		0.03	0.07	0.13	0.20	0.29	0.40			
3 F		0.03	0.06	0.11	0.17	0.24	0.33	0.43		
3* F			0.03	0.06	0.09	0.12	0.17	0.22	0.28	0.35
4 F					0.04	0.06	0.08	0.10	0.13	0.16

Cooler Accessories

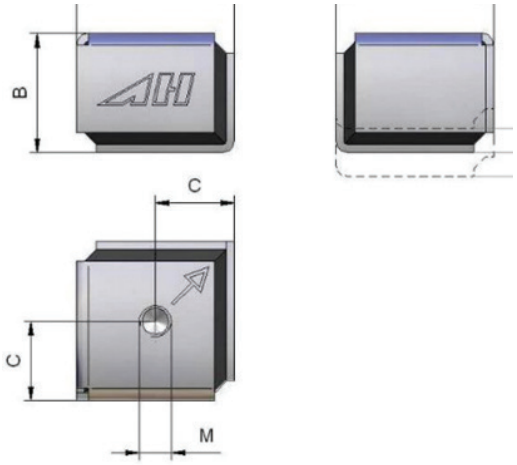
SERVI's coolers can be customised to suit your requirements with various options such as internal bypasses, temperature switches, universal connectors, etc.

Connector Accessories Rail Series: BSP, UNF
The TT Rail System is the first worldwide flexible mounting and connection system for air blast heat exchangers. The flexibility comes from free choice of port direction. Each port on the radiator has three possibilities.
This unique radiator design (concept) brings another flexible innovation to the standard cooler market and gives you choice between u-flow direction and diagonal oil flow on each TT Rail cooler! The radiator rail slots are not only for connecting the hydraulic ports, it is also possible to connect the system using e.g. bypass systems, or mount the cooler to an HPU, measurement device or a unit of your choice. Please contact us to discover the huge potential of this rail system for your application.

Universal Connection System, BSP, UNF
The Universal Connector is a patented system that offers many possibilities wher it comes to the dimension and direction of the hydraulic connection. With each connector, you can choose from 3 directions when installing it in the hydraulic circuit. The flow-optimised design reduces the total pressure drop through the cooler, and the omission of screwed fittings reduces the number of sealing surfaces. The connector dimensions depend on the cooler size. Available in G 1/2" or G 1/4".

Mounting/Installation Accessories for air/oil coolers and other products:
Rubber Vibration Absorber
Vibration absorbers are rubber-metal connected parts which absorb impact loads on components to protect and extend the lifetime of the system. This patented solution is especially designed for the highest shear loads. When assemblying the system, check the arrows on the metal parts to help optimise the function and raise the load capability of the vibration absorber.

See specialised brochure for more details.



PART NO	MODEL	DESCRIPTION (AxAxB thread)	WEIGHT (kg)
699040	MDGQ403008IIK	Vibration Damper (40x40x30 M8x10)	0.13
699041	MDGQ504510IIK	Vibration Damper (50x50x45 M10x12)	0.28
699042	MDGQ755512IIK	Vibration Damper (75x75x50 M12x15)	0.66
699043	MDGQ1007516IIK	Vibration Damper (100x100x75 M16x16,5)	1.92

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