



**LISTING OF BASIC
PRODUCTS AND
ACTIVITIES BY
G-MAR PLUS, s.r.o.
COMPANY**

www.g-mar.cz



PLATE HEAT EXCHANGERS



BRAZED PLATE EXCHANGERS



**PLATE AND SHELL
EXCHANGER**



**ASSEMBLY OF HEATING
STATIONS**



**EMERGENCY BALL CONTROL
AND SHUT-OFF VALVES**



**SERVICING OF PLATE
EXCHANGERS**



**COMPACT HEAT PUMP
G-PUMP 03**

PLATE HEAT EXCHANGERS

Our company has been on the heat exchangers market for twelve years and so we are experienced with both common and custom-made applications of these products. We provide designs and calculations for plate heat exchangers according to the required parameters and assist our customers in designing and installing the equipment. Our exchangers are manufactured at our production plant in Karlovy Vary and technical support is provided by a network of our branches in the Czech Republic (Karlovy Vary, Prague, Brno, and Ostrava) as well as abroad (Nitra, Kosice, and Moscow).

Currently, we offer exchangers of two different designs – types VT and NT.

VT plates with LOCK-IN gaskets are more stable in terms of design; the gaskets are placed in the 5 mm grooves of the stainless plate, enduring the disassembling of the exchanger as many as 5–6 times. On our market, we have exchangers which have been in service without gasket replacement for over ten years.

NT plates with EcoLoc gaskets are lighter, have a simpler design and better thermal transmission efficiency. This preserves the stainless material and reduces investment costs.

WORKMANSHIP (design)

Basic components of plate heat exchangers:

- The arrangement and number of plates depend on the required thermal transmission.
- The sealing of the plates ensures that the flow channels are sealed off one another. The gaskets also define the direction of flow inside the exchanger.
- The frame containing a set of plates is tightened with clamping bolts.
- The flanges for the primary and secondary circles are usually part of the exchanger's fixed frame.

Structure and basic components

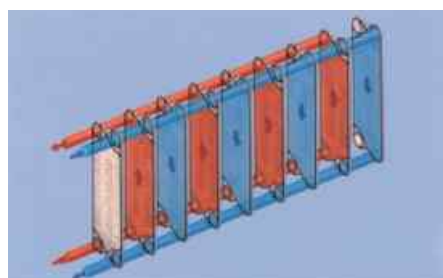


- | | |
|-----------------------------|--------------------------|
| 1) Assembly of plates | 5) Guiding profile |
| 2) Fixed plate of the frame | 6) Lower guiding profile |
| 3) Frame-end plate | 7) Beam |
| 4) Clamping bolt | |

DIFFERENT EXCHANGER FLOW RATES

Neighbouring plates define the shape of channels, with every other channel conducting the hot medium while the remaining channels conducting the cold medium through a bundle of plates. Commonly used one-way plate exchangers use a 100% flow rate on either side of the exchanger.

All holes are situated in the fixed plate of the frame, providing easier installation. If the temperature differences between the primary and secondary side are small, it is better to use a multi-way plate heat exchanger.



BENEFITS

NO STICK-ON GASKETS

Gea Ecoflex has developed a sealing that needs not to be glued by the LOC-IN System. The optimum fitting of the gasket in its groove and the fixing by means of making jags in the groove provide a high pressure-resistance and allow the gasket to be replaced quickly and easily.

A novelty system of EcoLoc has been introduced in the market. This system provides mechanical fixing of the gasket to the new NT-type plates.



LOWER COSTS

The G-MAR PLUS plate heat exchangers **reduce your costs by high-efficiency performance, low investments, compact installation, and simple maintenance.**

Plate heat exchangers provide a high thermal transmission by the turbulence achieved by the shape of the plates. The specialized arrangement of gaskets inside the plates prevents any mixing of the media. Double gaskets separate both media in the hole area. Should any of the two gaskets get damaged, you will know this by leaking gaps.

FLEXIBILITY

The G-MAR PLUS plate heat exchangers **can accommodate circumstances in a changing process.** If process conditions change, plates can be just added or removed. If this was not possible, you would need to invest extra money.

COMPACT DESIGN

The design of G-MAR PLUS plate heat exchangers is **compact.** Given the same output is required, a plate exchanger of 200 m² of heat exchange surface is only 3 meters long, 2 meters high, and 1 meter wide. Shell or tube exchangers need about 600 m² of heat exchange surface and much larger coverage area to achieve the same performance.

MAINTENANCE

Any maintenance of the G-MAR PLUS plate heat exchangers is very simple. Just loosen the bolts and take the plates apart for check or manual cleaning. Also, you can clean the exchangers a different way that does not require disassembling, such as back flushing or chemical cleaning.

MATERIAL

The G-MAR PLUS plate heat exchangers are manufactured of a wide range of materials according to the required application.

PLATE MATERIAL

Stainless: standard material DIN 1.4401 (AISI 316) Czech National Standard 17.346; material DIN 1.4301 (AISI 304); material DIN 1.4439 (AISI 317); material DIN 1.4571 (AISI 316 Ti); material DIN 1.4529; (corresponding to AVESTA SMO 254).

SPECIALIZED MATERIALS

Hastelloy, Incoloy

ENHANCED-QUALITY MATERIALS

Titan, Titan enforced with Palladium, Nickel, Tantalum

SEALING MATERIALS

Nitrile Rubber (NBR) for up to 140°C, Butyl Rubber (Butyl) for up to 140°C, Ethylene Propylene Rubber (EPDM) for up to 175°C, Silicone Rubber for up to 175°C, Viton for up to 180°C, heavy duty gaskets, asbestos-free for up to 220°C, maximum operating temperatures of up to 2.5 Mpa.



SMALL COMPACT HIGH-EFFICIENCY EXCHANGERS

FUNCTION

Brazed plate heat exchangers are made of embossed stainless plates copper-brazed by means of vacuum technology. In assembling, each other plate is turned by 180 degrees in symmetrical plane. This results in two separated spaces where, in conjunction with counter current, the exchanging of heat takes place. The embossed parts support high-efficient exchange of heat even under weak currents.

PRODUCT RANGE

We will supply a complete computing program for the design of a specific exchanger type for a given application to be made in a shorter time. We offer a wide range of brazed exchangers of various outputs demanded on the current market.

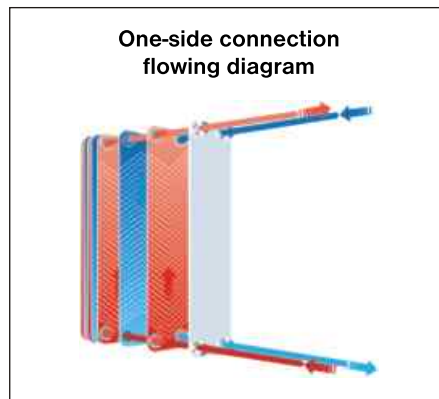
We manufacture our brazed plate heat exchangers in five sizes and five type lines 12, 18, 25, 57, and 100. The type lines 25 and 57 provide plates 'H', 'M', and 'L', the line 18 plates 'M' and 'L', and the lines 100 and 12 plates 'M' only.

Different types of embossing and a variable number of plates provides a wide range of possible versions. Our exchangers can have connections on either one side only or both sides. Both sides connections provide easier installation and are used with special applications for water heating and refrigerating engineering.

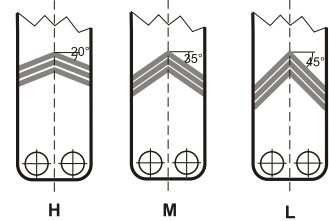


HEAT EFFICIENCY

The temperature change depends on the angle of the V-embossing of the plates. The circulation caused by this supports turbulence of different intensity, with the turbulence influencing the temperature change. We offer three different types of V-embossing: H, M, and L.



Display of flowing profiles



- H** – great temperature change with a relatively high loss of pressure
- M** – medium temperature change and a medium loss of pressure
- L** – small temperature change and a low loss of pressure

Operating parametres

- Operating pressures: up to 40 bar
- Operating temperature: minimum -160°C/
maximum +200°C
- Outputs: 0.5 to 2000 kW
- Plate material: AISI 316 (W.-1.4401)
- Brazing Copper (Cu) 99.9%

ACCESSORIES

All type lines can be supplied with fixed foam insulation or dismantlable mineral insulation with a plastic cover.

We can supply 3/4 " to 2" screwed connections (PN 40) for the exchangers of type lines 12 to 57. The type line 57 exchangers can be supplied with flanges DN 50 (PN 40), while those of the 100 type line with flanges DN 65 (PN 40).



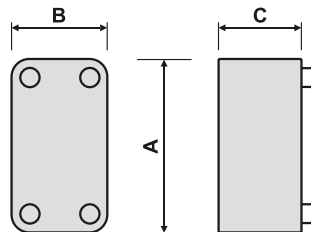
Variants of dismantlable insulation



PN 40 exchangers screw connections resistant to great changes in temperature

ASSETS

- a small, compact building unit of low weight
- advanced technology of the plates provides a high thermal efficiency
- high operating temperature and operating pressure
- stainless material ensures a good resistance to rust
- simple installation, very simple maintenance and servicing
- cheap serial equipment



Basic dimensions

Type	A (mm)	B (mm)	C (mm)
M12	192	74	32 - 147
L/M 18	282	127	21 - 112
L/M/H 25	525	118	24 - 228
L/M/H 57	543	281	91 - 541
M100	779	314	90 - 522



APPLICATIONS

Heating / distance heating

- distance heating interchange stations
- heat separation
- heating of water
- heating equipment (central, solar, floor, or pool heating)
- thermodynamic heating

Air handling systems

- air-conditioning in rooms and buildings

Freezing technology

- condensation
- evaporation

Industrial applications

- cooling of machinery
- cooling of engines
- block thermal power plants
- cooling of hydraulic oils
- cooling of fuel oils
- heat recuperation
- thermal process technology

WARNING! Do not use for ammoniac and sea water.



PLATE AND SHELL EXCHANGER

Is your application non-standard: Temperature over 180°C, Pressure over 2.5 MPa, or the medium corrosive to gaskets?

Then we can offer you round stainless plates in a tube shell – either a fully welded or dismantlable Vahterus heat exchangers.

Benefits: compact, efficient, lasting, gasket-free, temperatures -200°C to +600°C

A new remarkable VAHTERUS heat exchanger has been developed using rich experience and practical knowledge of the heat exchanging process. The plate and shell exchanger is a big step forward in the heat exchange technology.

DESIGN

The product combines all the best features of the traditional plate and tube exchanger in a single, efficient, and compact product.

At the heart of the exchanger is a fully welded pack of circular embossed plates welded together by laser technology. A unique welded structure is successfully used to achieve a better pressure resistance. Dimension of DN 25 – 300 connection. The shell is a technology similar to that used in common tube exchangers. The shell connection dimension can be DN 20 – 1000, according to a given type.

The shell is either fully welded (applications for dangerous gases, high pressures, etc.) or dismantlable (the welded pack of plates can be taken out and cleaned, for instance). Both the shell and the plates can be made in various materials according to your needs (see the back). The exchanger has no gaskets subject to maintenance or copper and fragile joints that might get damaged by mechanical stress. The fully welded structure is uniquely protected with a shell that ensures a long service life and a maximum safety for our customers with a maximum protection to the environment.

APPLICATIONS

The plate and shell Vahterus technology is particularly suitable for a wide range of industrial applications – heaters, coolers, condensers, vacuum applications, and evaporators. It has been especially designed for chemical industry applications. These exchangers can be used for as variable applications as classic liquids, oils, ammonium, compressed air, condensed water condensers, partial condensers, and evaporators. No application is too difficult, given the exchanger's available pressure and temperature ranges. The hybrid plate and tube exchanger is particularly suitable for the providing of heat exchange in the chemical, refrigerating, paper, power generation (power plants and heating plants), oil processing, and gas engineering industries.

OPERATING PARAMETERS

Output – up to 100 MW / unit
Temperature range: -200°C to +600°C (+900°C)
Pressure range: standard workmanship 16, 25, and 40 bar (up to 100 bar for custom-made products)

PLATE AND SHELL EXCHANGER



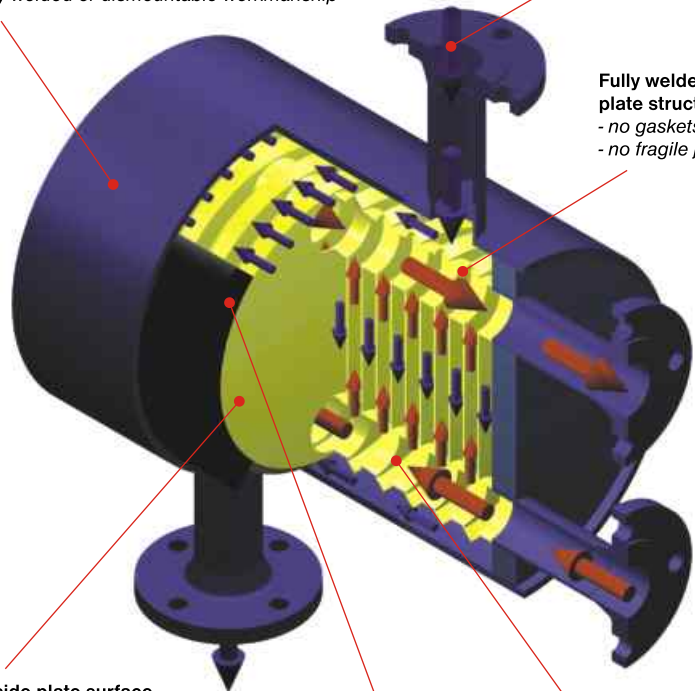
Installation of PSHE 9 exchangers as steam heaters (dismountable design, 2 x 16 MW output) at the Vresova plant, Sokolovska uhelna, a.s.

Exchanger shell

- Benefits:
- low weight
 - structure designed to protect plates
 - high operating pressure
 - fully welded or dismantlable workmanship

Inlet branches:

- shell DN 20 – DN 1000
- plates DN 25 – DN 300



- Fully welded plate structure
- no gaskets
 - no fragile joints

Outside plate surface (flowing medium in shell)

- Benefits:
- low maintenance costs
 - no costs of sealing material
 - minimum servicing
 - can be cleaned

Expansion bar

Many plate materials available:

- stainless steel
- titanium
- nickel

BENEFITS AND SATISFACTION

of our customers are attributable to the fact that the equipment is:

- an extremely compact, fully welded structure resistant to high pressures and temperatures
 - special materials can be used for any of the applications
 - low maintenance costs, no gaskets
 - can be dismantled and cleaned
- Vahterus exchangers are environmental friendly.

This compactness consists in an effective design and the fact that the design needs fewer materials than those by other world manufacturers.

Our equipment may take up just 10 % of the room required for classic tube heat exchangers. The fully welded structure and the unique shell shape guarantee no leakage.

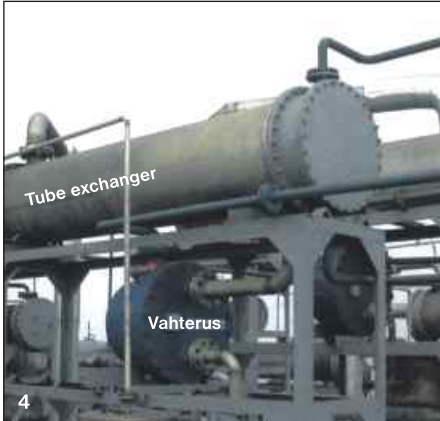
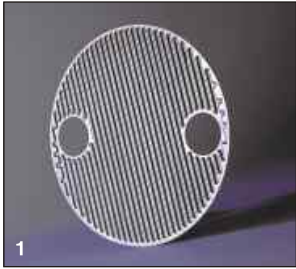
WE ARE THE LEADING COMPANY IN CUSTOMER INNOVATION

Our equipment is based on the needs and expectations of our customers. Every exchanger is designed according to accurate requirements. Our computing program helps us optimize exchanger designs. Standard appearance and customer design enable us to promptly introduce other specialized and individual applications to the heat exchanger market.

NUMBER ONE IN RELIABILITY

We hold certificates from recognized inspection auditors, who have tested our products in the world market. This, along with a highly automated production and our quality system based on ISO 9001, gives credit to the reliability and efficiency of our products.

Customer needs and strict laboratory tests and field trials have been combined for the success of our equipment.



- 1 Plate embossing type
- 2 Vahterus dismantlable exchanger
- 3 Welded workmanship for ammonium (evaporator - condenser)
- 4 Comparison of a tube exchanger with a Vahterus exchanger
Tube exchanger (8.5 m)
Vahterus (1.2 m)

SPECIFICATIONS

Output: Up 100 MW / unit

Range: -200°C - +600°C
(premium range +900°C)

Certifikates: ABS Europe Ltd
ASME U Stamp
Bureau Veritas
CBPVI, China
Det Norske Veritas
Germanischer Lloyd
KHK Japan
Lloyd's Register
R.I.N.A.
UDT, Poland
GOST, Russia

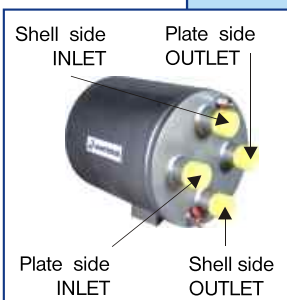
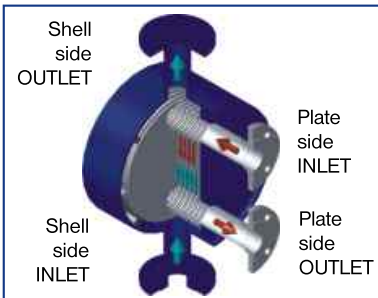
Quality systems: ISO 9001:2000;
EN 729 Quality Control;
PED Module D

Materials:

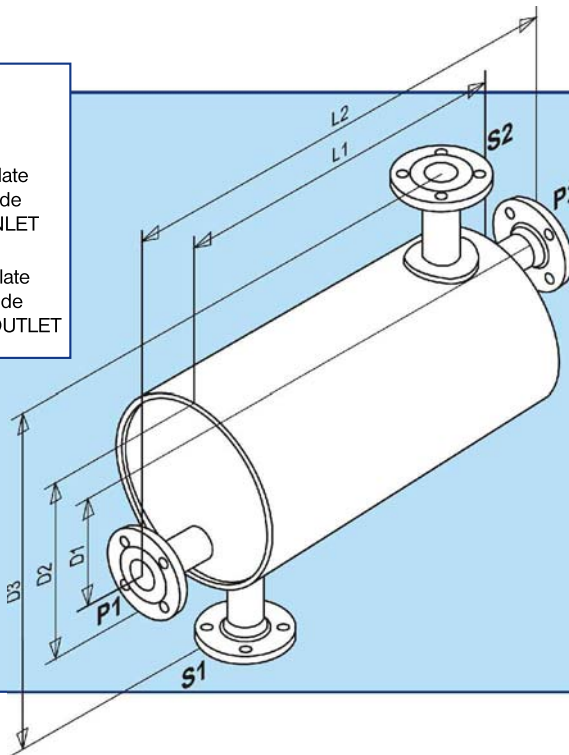
Shell: St 35.8; AISI 316L, AISI 904L;
254 SMO and other materials

Plates: AISI 316L, AISI 904L; 254 SMO;
Hastelloy; Duplex; Titan;
Nikl and other materials

FULLY WELDED TYPE



COMPACT TYPE



DISMOUNTABLE TYPE

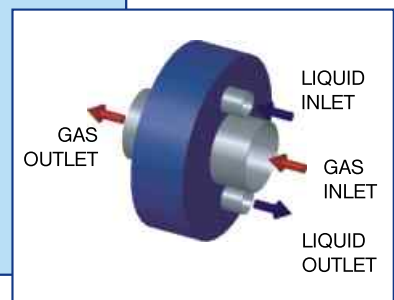
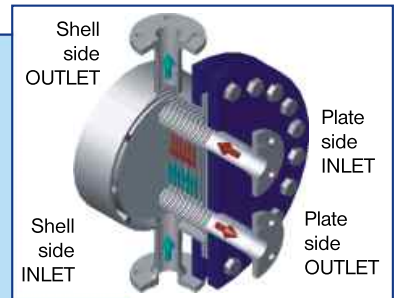


PLATE AND SHELL EXCHANGER

Plate type	Plate diameter (mm)	Plate thickness (mm)	Plate area (m ²)	Max. no. of plates	D1 (mm)	D2 (mm)	D3	L1 (max) (mm)	L2	P1 .. P2 DN	S1 .. S2 DN
PSHE 2	190	0,7 - 0,8	0,032	130	139	219	As required	580	As required	25	20 - 80
PSHE 3	300	0,7 - 0,8	0,076	340	216	356		1040		50	25 - 250
PSHE 5	556	0,7 - 0,8	0,26	500	423	610		1700		100	25 - 350
PSHE 9	998	0,7 - 0,8	0,80	650	750	1200		2100		200	25 - 700
PSHE 14	1358	0,8	1,55	500	1000	1600		3200		300	25 - 1000
PRHE 12	1214/600	0,8	1,00	---	---	---		---		200	600

For more information please contact our sales department.

EMERGENCY BALL CONTROL AND SHUT-OFF VALVES

Control and shut-off valves are well fit to control warm-water, hot-water, and steam pipes as well as shutting such pipes off in case of emergency.

The main asset is that these valves can provide a complete closing of pipes even after a rather long period of operation; another great advantage is the unlimited difference of pressures before and after the valve.

STEEL BALL VALVE

Both the ball valve body and the axis are made of stainless steel. The sealing material is teflon enriched with carbon. This ensures longevity of the sealing surfaces. The ball cross-section of the valve ensures a low hydraulic friction under a high flow rate, and good regulating properties. Valve shafts are sealed off by two Teflon tapered ring gaskets. These expand by tightening of the nut. Transmission of the electric drive's torque is provided by a shaft with a protector and a cooler. The apparatus is driven by Belimo or Honeywell-type electric control and shut-off servo drives with a counter spring. These drives ensure a reliable control and shutting off in case of emergency.



WORKMANSHIP: The entire shut-off ball is stainless for all valve types.

a) Body – all stainless	„N“	DN 10 – DN 50	PN 40	220°C
		DN 65 – DN 80	PN 25	220°C
b) Body – carbon steel	„C“	DN 15 – DN 50	PN 16, 40	180°C
		DN 65 – DN 80	PN 16, 25	180°C

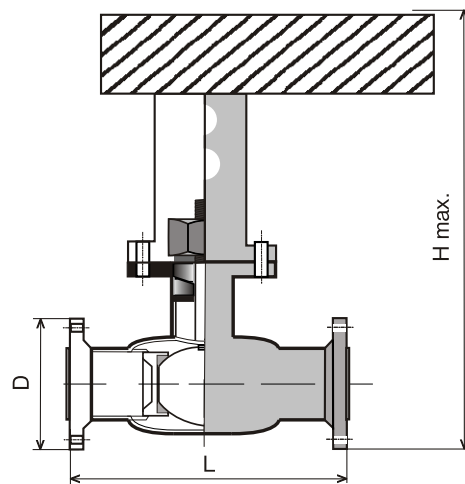
Maximum operating temperature:
'N' +220°C, 'C' +180°C, 'S' +280°C

Input voltage:
24V / 50Hz, 230V / 50Hz

Control:
0 – 10 V; 3-point increments; open – closed

BENEFITS

- 100% shut-off capability
- very competitive price
- regulating body made of stainless steel
- simple maintenance of teflon gaskets (in case of leakage, just tighten the packing nut or replace the teflon ring gaskets)
- shut-off capability is ensured even with a medium-due wear of the regulating body under 3 mm



DN	D	L	H max	KV*	KV**
10	95	130	320	6	6,8
15	95	130	320	8	10
20	105	150	330	12,5	26
25	115	160	340	20	38
32	140	180	360	32	67
40	165	200	380	50	99
50	185	230	390	84	103
65	200	270	430	127	-
80	200	280	460	220	-

* applicable to the N- and C-type valves
** applicable to the S-type valves

DETAILED INFORMATION AT WWW.G-MAR.CZ

EMERGENCY BALL CONTROL AND SHUT-OFF VALVES



SERVICING OF PLATE EXCHANGERS

With rising sales of our plate heat exchangers, we have always made sure to provide our customers and users with comprehensive warranty and post-warranty service, which consists of:

- Revision
- Regular inspections, plate wear detection (using transilluminators)
- cleaning – manual cleaning of dismountable exchangers
– chemical cleaning of brazed exchangers
- supply and replacement of gaskets
- supply of spare parts and other exchanger accessories
- providing advice
- designing

As a producer of heat exchangers, we have a sufficient stock of the basic components.

We provide service 24 hours a day and 7 days a week. Custom-made service terms and conditions may be arranged under a separate service agreement.

As a result of the rising demand for our products, we have broadened the range of our services to provide both manual and chemical cleaning, supply and replacement of gaskets, advice, and spare parts for plate exchangers by other producers such as: Alfa Laval, API Schmitt, Swep/Re-Heat, Vicarb, APV, Fischer, Sondex, and GEA.

We believe our repair and maintenance service contributes to the satisfaction of every customer.

SERVICING OF ...



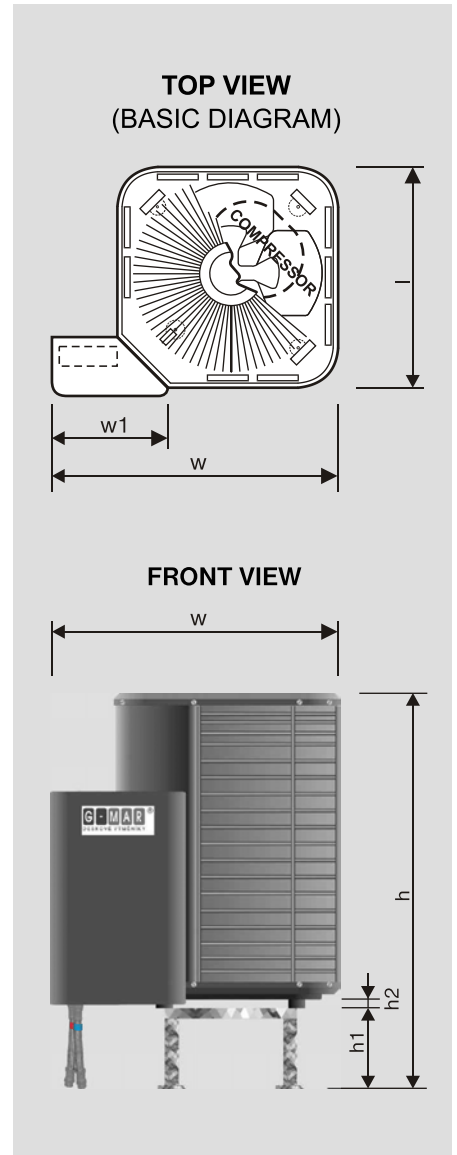
COMPACT HEAT PUMP G-PUMP 03

A compact model of a heat pump (HP) outdoor unit, collecting primary energy from ambient air. Thanks to its technology, an HP can absorb the energy contained in the air and use it for low-cost and environmentally-friendly heating. HP's work in a temperature range of -10 °C to +30 °C. They have an automatic defrosting mode to melt the ice on the evaporator that is collected at lower ambient temperatures and high relative air humidity. With an average annual air temperature of +3,8 °C, the average coefficient of performance of G-PUMP 03 is 3,3 at an outlet water temperature of 45 °C. This means that from one input kilowatt, the HP is able to generate more than three times as much energy on average. Thanks to these parameters, an HP dramatically lowers the cost of house, pool water or DHW heating. The G-PUMP 03 compact works with an environmentally-friendly coolant, R407C.

G-PUMP 03 TECHNICAL DATA	HP 40-060/065	HP 40-048	HP 40-036
Maximum capacity	24 kW	20 kW	16 kW
Capacity at A7/W35	16 kW	13 kW	11 kW
Working current	9,8 A	9,8 A	7 A
Starting current	76,1 A	66,1 A	47 A
Starting current when using Soft starter	38 A	33 A	23,5 A
Voltage and phases (50 Hz)	380/420 V, 3 ph.	380/420 V, 3 ph.	380/420 V, 3 ph.
Working voltage range (min - max)	342 - 462 V	342 - 462 V	342 - 462 V
Noise level at 5m distance	48 dB	48 dB	47 dB
Dimensions incl. stand-w/l/h/w1(mm)	950/760/1380/245	910/610/1300/245	910/610/1300/245
h1/h2 (mm)	410/40	410/40	410/40
Total weight	164 kg	129 kg	130 kg
Compressor type	Fitted with Copeland SCROLL compressor		

A G-PUMP 03 compact UNIT INCLUDES

- Outdoor unit HP40-060/065 (alternatively 048, 036) with Copeland Scroll compressor
- New-generation stainless insulated condenser G-MAR L 29 - 24 L2G2X with safety drain
- Switchboard + wiring between switchboard and G-PUMP 03
- Switchboard inspection report
- Phase protector Elco or Carel RSF077
- Electronic weather compensation ETX-TC for HP and auxiliary source control
- Safety current relay
- Zinc-coated outdoor unit stand incl. condenser mounting frame
- Set of rubber pads to be mounted between HP and stand
- Enclosure for condenser part painted in the same colour as HP
- Antifreeze flow detector
- Combined pressure safety cut-out Ranco/equiv. Danfoss (HP - LP control)
- Closed cooling circuit with electronically weighed R407C medium
- Cooling and water side insulation + inspection hole installed
- Vibration balancers on water side
- Vibration balancer on cooling side
- Compressor body (oil) heating
- Delivery thermostat - monitors coolant vapour temperature to prevent overheating
- Coolant collector - operation optimization for different temperatures
- Liquid coolant separator - prevents hydraulic impact
- Automatic bleding valve on water side



G-PUMP 03 compact HP OPERATING PARAMETERS

Outside temperature	+18°C			+7°C			-4°C			-10°C		
Heating water outlet temperature	+35°C			+35°C			+50°C			+50°C		
Outside unit type	Power consumption (kW)	Heat output (kW)	Heating factor	Power consumption (kW)	Heat output (kW)	Heating factor	Power consumption (kW)	Heat output (kW)	Heating factor	Power consumption (kW)	Heat output (kW)	Heating factor
HP 40-036	3,38	13,2	3,90	3,10	10,5	3,39	2,8	8	2,9	2,3	6	2,6
HP 40-048	3,90	15,3	3,92	3,50	12,1	3,43	3,5	10	2,9	2,7	7	2,6
HP 40-060/065	4,79	19,3	4,03	4,27	15,5	3,63	4	12	3,0	3,5	9	2,6

IMPLEMENTATION



COMPACT HEAT PUMP G-PUMP 03

Pricelists and further information can be found at www.g-mar.cz



DESIGN AND CONSULTANCY ACTIVITY IN POWER SUPPLY

**DESIGNS AND ASSEMBLIES TECHNICS OF COOLING
PRODUCTIVE UNITS AND MACHINES**

**ASSEMBLY OF HEATING STATIONS, PLATE HEAT EXCHANGERS
AND HEATING DISTRIBUTIONS**

ASSEMBLY AND PRODUCTION OF HEATING STATIONS

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