sesino

HEAT EXCHANGING EXCELLENCE SINCE 1919

GENERAL CATALOGUE

CATALOGO GENERALE

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OUR PHILOSOPHY
FILOSOFIA AZIENDALE

SESINO philosophy has its grounding on the following principles.

1. **Full quality**, meant to be product's quality, assistance and organization quality, quality of our raw materials and our measuring and checking instruments, everything according to ISO 9001:2008 Regulation.

2. **Occupational safety**, a commitment to our staff, in order to grant them no risks while working. A policy for which we obtained BS OHSAS 18001:2007 Certification.

3. **Proactive Skills**, Sesino aptitude to support and cooperate with customers in order to optimize the development of their projects. SESINO can offer custom-made products, produced according to our client's needs, using our experience, knowledge, human resources and technology.

4. **Competitiveness**, which means to be able to face our competitors and believe that we can succeed. This feature is the result of corporate growth, increase in the sales volume, expense reduction and the possibility to invest in technology and marketing research.

La filosofia aziendale della SESINO pone le sue basi sui seguenti fondamenti.

1. ***Qualità totale**, intesa come qualità del prodotto, qualità del servizio, qualità dell'organizzazione, qualità degli strumenti di controllo, qualità delle materie prime, ma non solo a parole, bensì certificata secondo le norme ISO 9001:2008.*

2. ***Sicurezza sul lavoro**, un impegno che ci siamo assunti nei confronti di tutti i nostri collaboratori perché possano lavorare senza rischi di incidenti, anche qui, non solo a parole, bensì certificata secondo la Norma BS OHSAS 18001:2007*

3. ***Capacità propositiva**, intesa come un preciso impegno della SESINO a essere vicina in modo particolare ai costruttori allo scopo di collaborare con gli stessi per l'ottimizzazione e lo sviluppo dei loro progetti. È inoltre una caratteristica produttiva della SESINO quella di poter offrire prodotti fuori standard, costruiti in funzione delle specifiche esigenze della clientela; questo naturalmente presuppone conoscenza, esperienza, risorse umane e tecnologiche per affrontare e risolvere i problemi.*

4. ***Competitività**, che significa doversi e potersi misurare con tutti gli antagonisti, con la consapevolezza di poter anche essere vincenti. La competitività è senza dubbio il risultato di diversi componenti quali la crescita aziendale, l'incremento del fatturato, il contenimento delle spese, la possibilità di finanziare investimenti tecnologici per la ricerca, per il marketing e così via.*

Quality Management System

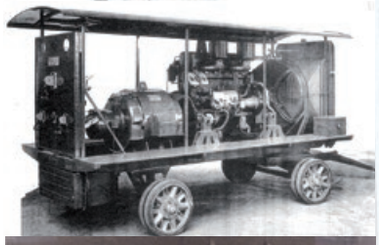
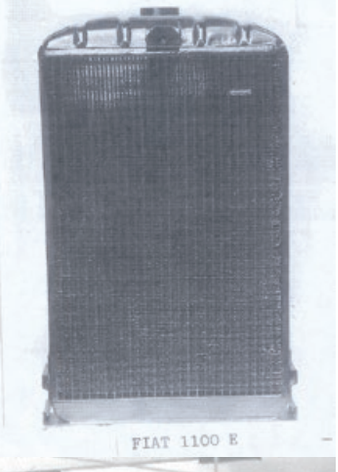
Gost-R Certificate

Occupational Health and Safety Assessment Series

HISTORY
STORIA









1919

The Sesino brothers founded the company F.lli Sesino & C., having as its main activity the production and maintenance of grills and radiators for vehicles. *I fratelli Sesino costituiscono la F.lli Sesino & C., avente come attività la costruzione e riparazione di mascherine e radiatori per automobili.*

1920

F.lli Sesino & C. took part into the first Exhibition in Milan and got several statements and rewards for its activity.
La F.lli Sesino & C. partecipa alla prima FIERA DI MILANO e ottiene attestazioni e riconoscimenti per l'attività svolta.

1922

F.lli Sesino & C., after having received a big order for the production of car radiators from company Edoardo Bianchi, moved from the old workshop to the new place in Via Noè, Milan. Until the II World War, the company got several orders for grills and radiators from Bianchi and FIAT. Then, in the new site began the production of gas and electric unit heaters, condensers and evaporators for the first refrigerating systems. *La F.lli Sesino & C., acquisita una fornitura di radiatori per la casa automobilistica EDOARDO BIANCHI, si trasferisce dalla bottega artigiana degli esordi in una nuova sede in Via Noe a Milano. Fino allo scoppio della seconda guerra mondiale, vengono acquisiti ordini per forniture di mascherine e radiatori, oltre che dalla EDOARDO BIANCHI, dalla FIAT. In questa nuova sede inizia la produzione di aerotermi a gas ed elettrici, condensatori ed evaporatori per i primi impianti frigoriferi.*

1934

With the resignation of brother Alfredo the company became Costante Sesino & C. *Con le dimissioni del fratello Alfredo, la Società si trasforma in Costante Sesino & C.*

1945

Finished the II World War, among the several difficulties, Costante Sesino & C. restarted the production of radiators, evaporators and condensers. *Terminata la seconda guerra mondiale, tra le mille difficoltà dei tempi, la Costante Sesino & C. ricomincia a produrre radiatori, evaporatori e condensatori.*

1948

Began the production of radiators for cars, trucks and tractors for the spare parts market. This activity absorbed entirely Costante Sesino production for more than a decade. *Inizia la produzione di radiatori per auto, autocarri e trattori destinata al mercato del ricambio, che occupa la Costante Sesino & C. in maniera esclusiva per oltre un decennio.*

1954

Construction of the new company headquarter in Via Doberdò, Milan, which after further enlargements reached a covered area of 2500 m^2. *Costruzione della nuova sede di Via Doberdò, sempre a Milano che, con vari successivi ampliamenti, raggiunge una superficie coperta di oltre 2500 m^2.*

1955

Against request of a producer of injection presses for plastic material, who was forced to supply in the USA, Costante Sesino & C. started the production of tube-bundle heat exchangers for oil cooling in oleo hydraulic systems. *Su sollecitazione di un costruttore di presse a iniezione per materie plastiche, costretto ad approvvigionarsi degli scambiatori di calore a fascio tubiero negli Stati Uniti, la Costante Sesino & C. inizia la produzione di scambiatori di calore a fascio tubiero per il raffreddamento dell'olio di impianti oleoidraulici.*

1960

Using the experience in the construction of radiators, Costante Sesino & C. began producing air-oil heat exchangers intended to cool mobile and industrial machine's systems, combined radiators for the cooling of water and oil, exchangers for compressors and radiators for power units. *Sfruttando l'esperienza precedente nella costruzione di radiatori, la Costante Sesino & C. inizia la produzione di scambiatori di calore aria-olio destinati al raffreddamento di macchine mobili e industriali, alla costruzione di radiatori combinati per raffreddamento acqua e olio, al raffreddamento di compressori, alla costruzione di radiatori per gruppi elettrogeni.*

1970

The production of radiators for the spare parts market was definitely abandoned in order to concentrate exclusively on the oleo hydraulic market. *Viene deciso di abbandonare la produzione di radiatori per il mercato del ricambio per dedicarsi esclusivamente al mercato oleoidraulico.*

1988

Began the production of aluminium air-oil heat exchangers, which will onwards substitute the brass/copper production. *Inizia la produzione di scambiatori aria-olio in alluminio che andrà progressivamente a sostituire negli anni successivi quella in ottone/rame.*

1999

The Company changed its name in Costante Sesino S.p.A., becoming part of Tognella Group. This event gave the company a fresh new start, granting the possibility to count on cooperation and financial support. This union brought to new investments aimed at improving the company efficiency. *La Società cambia la ragione sociale nell'attuale Costante Sesino S.p.A. ed entra a far parte del Gruppo Tognella . Avrà quindi la possibilità di attingere a nuova linfa vitale, di poter usufruire di tutti quei benefici che derivano dalle sinergie, dalle collaborazioni e dal reciproco sostentamento economico/finanziario. Negli anni successivi vengono effettuati molti investimenti per migliorare l'efficienza produttiva.*

2003

Costante Sesino S.p.A. moved to the current seat in Gessate (Milan): a modern place with a 4000 m^2 producing area and 400 m^2 offices. *Trasferimento della Costante Sesino S.p.A. nell'attuale sede di Gessate in provincia di Milano: si tratta di una moderna sede industriale di oltre 4000 m^2 di superficie produttiva, oltre a 400 m^2 di uffici.*

2009

Introduction of custom-made heat exchangers with different materials and size, addressed mainly to the energy market. *Introduzione di una produzione di scambiatori speciali, destinati al mercato energetico, costruiti con materiali diversi dallo standard, e fornibili con specifiche certificazioni richieste dai clienti.*

2011

Costante Sesino obtained the Centification EN ISO 9001/2008. *Raggiungimento della certificazione di qualità ISO 9001/2008.*

2012

Costante Sesino obtained the OHSAS 18001/2007 Certification for occupational health and safety management system. *Raggiungimento della certificazione OHSAS 18001/2007 per la salute e la sicurezza sul lavoro.*

LEGENDA

P = power of the plant [kW] *potenza dell'impianto*
Q̇ = thermal power [kWt] *potenza termica*
Q̇d = adjusted thermal power [kWt] *potenza termica effettiva*
F = correction factor *fattore di correzione*
$\dot{m}v_{oil}$ = oil flow rate [l/min] *portata volumetrica olio*
$\dot{m}v_{H2O}$ = water flow rate [l/min] *portata volumetrica acqua*
T_{inH2O} = inlet water temperature [°C] *temperatura entrata acqua*
T_{outH2O} = outlet water temperature [°C] *temperatura uscita acqua*
T_{inoil} = inlet oil temperature [°C] *temperatura entrata olio*
T_{outoi} = outlet oil temperature [°C] *temperatura uscita olio*
ΔTm_{oil} = oil temperature difference [°C] *salto termico olio*
ΔTm_{H2O} = water temperature difference [°C] *salto termico acqua*
ΔTm = arithmetic mean temperature difference [°C] *differenza di temperatura media aritmetica tra i due fluidi*
Δp_{maxoil} = maximum oil pressure drop [bar] *perdite di carico max lato olio*
Cp_{oil} = oil specific heat [KJ/KgK] *calore specifico olio*
Cp_{H2O} = water specific heat [KJ/KgK] *calore specifico acqua*
ρ_{oil} = oil density [Kg/l] *densità olio*
ρ_{water} = water density [Kg/l] *densità acqua*

HEAT EXCHANGING: GENERAL INFORMATION
GENERALITÀ SULLA TRASMISSIONE DEL CALORE

How heat is transferred

The term heat transmission means the processes through which heat is transferred from one body to another or from different points of the same body, because of the presence of temperature differences. The transmission way changes according to the nature of the body.
In a solid body, heat is transferred by conduction, in a liquid by convection, while the third method, radiation, depends on the electromagnetic properties of the bodies involved. This last case is not particularly relevant in the heat exchangers field and thus, only the first two phenomena will be briefly described.

Conduction

Let us suppose to have a flat plate and that the two faces of the plate are in some way kept at two different temperatures: T1 and T2.
There will be a flow of heat from the face with an higher temperature T1 to the one with a lower temperature T2, without any movement of matter. We say that heat is transmitted from one point to another by conduction.

Convection

Now let us consider the case of a body immersed in a fluid. If the temperature of the body is higher than that of the fluid, heat will flow from the former to the latter. Since the temperature of the fluid in contact with the wall is higher than the one of the fluid distant from the wall, a movement is established because of the different densities at the two points. The phenomenon of heat transmission related to this state of motion is called convection.
While conductivity depends exclusively on the material, heat exchange by convection depends on the type of fluid, its condition of motion and the shape of the surface.

General information on heat exchangers and their sizing

Heat exchangers are devices, which allow the exchange of heat between two moving fluids at different temperatures. The two fluids are generally separated by a solid surface, which is usually metal. Heat exchangers can be divided into three groups according to the motion of the two fluids inside.

a) parallel current heat exchanger, when the two fluids move in parallel and in the same direction at all points of the exchanger;
b) counter current heat exchangers, where the two fluids move in parallel but in opposite directions;
c) crosscurrent heat exchangers, where the two fluids move at right-angles to each other.

Sizing a heat exchanger means to calculate the needed exchange surface which is a function of the quantity of heat to dissipate, of the temperatures and the oil flow rates of the two fluids.

Problems regarding oil cooling

The viscosity of oil increases as its temperature decreases. When oil encounters a cold surface in a heat exchanger, it forms an isolating stratum. The thickness of this stratum is inversely proportional to the possibility of heat exchange.
To obtain optimal thermal efficiency, the flow rate of the oil over the exchange surface must be such as to ensure that the thickness of this stratum is as low as possible. In practice, this means that it is essential to ensure that the flow rate of the oil inside the heat exchanger is higher than the minimum indicated on the catalogues.

Sizing of water-oil heat exchangers to be installed on hydraulic systems

While choosing a heat exchanger it is necessary to consider two features related to the plant: the thermal power to dissipate and the pressure drops that derives from the friction forces produced by the fluid's motion. We suggest therefore taking into account the following aspects:

- Considering that the total efficiency into the oleo hydraulic plants is about 70-80%, in order to establish the thermal power, we adopt a 30-20% of the power installed.
- To count the fouling factor inside the heat exchanger and the uncertainty with which the film coefficients are established, we adopt an appropriate overdesign.
- As concern the sizing of the plant, the maximum allowable pressure drops on both exchanger's side are related to the head of the pump and to the piping system. In most cases, an increase of the maximum allowable pressure drops entails a reduction in the exchanger dimensions and an increase of the pump size.

We report here following an example, useful to guide while choosing a heat exchanger.

Example: sizing a tube-bundle heat exchanger to cool hydraulic oil with water. The oil is an ISO VG 46 type and has an inlet temperature T_{inoil}=50 [°C] with flow rate $\dot{m}_{voil}$=150 [l/min]. The power installed is 42[kW] we have water with inlet temperature T_{inH2O}=20 [°C] and flow rate m_{vH2O}=60 [l/min]. The maximum oil side pressure drop is Δp_{maxoil}=1 [bar].

Determine the thermal power with the following relation:
$\dot{Q} = P*0,5 = 42\ [kW] \bullet 0,5 = 21\ [kWt]$

The factor 0,5 is an empirical value that take account of both the efficiency of the plant and the fouling.

Define the outlet oil temperature and the oil temperature difference:

$$\Delta T_{oil} = \frac{\dot{Q}}{Cp_{oil} \bullet mv_{oil} \bullet \rho_{oil}} = \frac{21\ [kW]}{2[KJ/KgK] \bullet 150/60[l/s] \bullet 0,84[kg/l]} = 5\ [°C]$$

$T_{outoil} = T_{inoil} - \Delta T_{oil} = 50\ [°C] - 5\ [°C] = 45\ [°C]$

Determine the outlet water temperature and the water temperature difference:

$$\Delta T_{H2O} = \frac{\dot{Q}}{Cp_{H2O} \bullet mv_{H2O} \bullet \rho_{H2O}} = \frac{21\ [kWt]}{4.186[KJ/KgK] \bullet 60/60[l/s] \bullet 1[kg/l]} = 5\ [°C]$$

$T_{outH2O} = T_{inH2O} + \Delta T_{H2O} = 25\ [°C]$

Remark: in the event that the water flow rate is unknown we suggest the following steps

if $T_{inH2O} < 20\ [°C]$ suppose $\Delta T_{H2O} = 10\ [°C]$
if $T_{inH2O} > 20\ [°C]$ suppose $\Delta T_{H2O} = 5\ [°C]$

Consequently, we establish the water flow rate as follow:

$$\dot{mv}_{H2O} = \frac{\dot{Q}}{Cp_{H2O} \bullet \rho_{H2O} \bullet \Delta T_{H2O}}$$

Calculate the arithmetic mean temperature difference and the adjusted thermal power $\dot{Q}d$ (refer to the correction factor table in the event that the arithmetic mean temperature difference is different from 25[°C]).

$$\Delta Tm_{olio} = \frac{T_{outolio} + T_{inolio}}{2} = 47,5\ [°C]$$

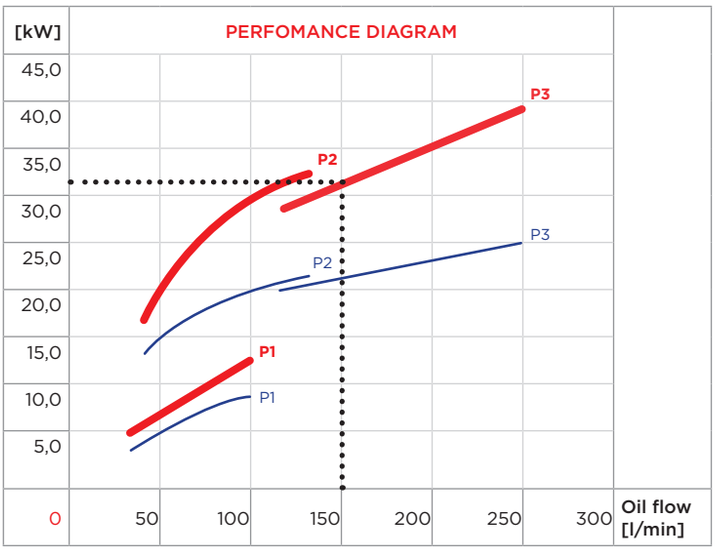
$$\Delta Tm_{H2O} = \frac{T_{outH2O} + T_{inH2O}}{2} = 22,5\ [°C]$$

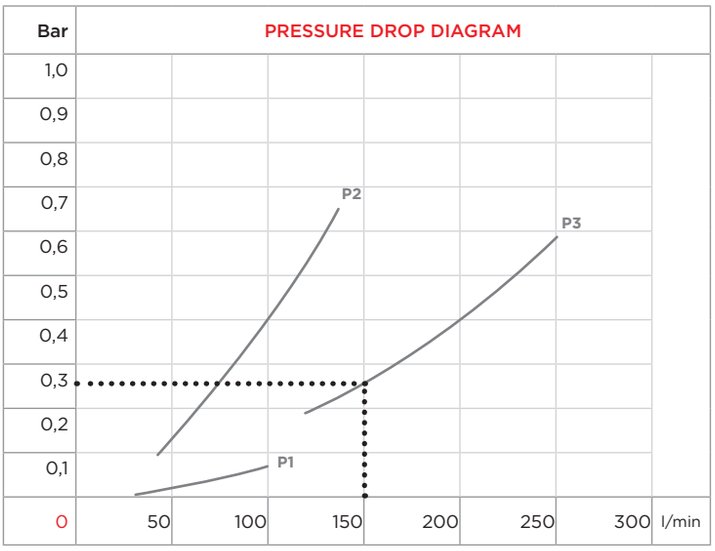
$\Delta Tm = \Delta Tm_{olio} - \Delta Tm_{H2O} = 25\ [°C]$

$\dot{Q}d = \dot{Q} \bullet F$

Consult the performance curves, cross-check the values of the adjusted thermal power $\dot{Q}d$, of the oil flow rate and the water flow rate

Check the oil pressure drop using the "pressure drop" curves.





Sizing of air-oil heat exchangers to be installed on hydraulic system

The technical data required are the same of water-oil heat exchangers, as well as the ambient temperature at which the heat exchanger has to work.
Sizing an air-oil heat exchanger consists, practically, in calculating the needed specific performance, called Kr, and choosing the heat exchanger having the higher specific performance.
Kr = Q/ΔT where ΔT is the difference between oil inlet temperature and maximum summer ambient temperature, while Q is the quantity of heat to be dissipated which can be easily calculated considering 20-30% of installed power.
To choose the right cooler you must check the diagrams into the technical catalogue.

Example

N = 20 kW
q = 80 lpm
To = 50°C
Tamb = 30°C

Q = 30% 20 = 6 kW = 5.160 kcal/h
ΔT = 50 - 30 = 20°C
Kr = 5.160/20 = 258 kcal/h°C

Drawing a vertical line on the diagram in correspondence with the flow rate 80 l/min, the intersection of this line with the curves gives on ordinates the Kr that each heat exchanger is able to grant in that condition.

Le vie del calore

Tutti sanno che per "trasmissione del calore" si intendono i processi attraverso cui, a causa di differenze termiche esistenti, il calore si trasferisce da un corpo ad un altro o a punti diversi dello stesso corpo.
Queste modalità, ovviamente, cambiano a seconda che si verifichino in un solido(conduzione), in un liquido (convezione) o per le proprietà elettromagnetiche dei corpi (irraggiamento).
Quest'ultimo caso non riveste particolare rilevanza nel campo degli scambiatori di calore e perciò riteniamo utile accennare solo ai primi due fenomeni.

La conduzione

Supponiamo di avere una lastra piana e di mantenere con qualsiasi artificio le due facce a due temperature diverse: T1>T2. Vi sarà un flusso di calore dalla faccia a temperatura superiore a quella a temperatura inferiore senza movimento di materia; diremo che il calore si trasmette da un punto ad un altro per conduzione.

La convezione

Consideriamo di avere un corpo immerso in un fluido; se la temperatura del corpo è superiore a quella del fluido, vi sarà un flusso di calore dal primo al secondo.
Poiché la temperatura del fluido a contatto con la parete è più alta di quella di un punto lontano dalla parete, si stabilisce un movimento causato dalle diverse densità nei due punti: il fenomeno di trasmissione del calore che è legato a questo stato di moto si chiama convezione.
A differenza della conducibilità che dipende esclusivamente dal materiale, il calore scambiato per convezione trova le sue ragioni, oltre che nel tipo di fluido, nelle condizioni di moto di questo e nella forma della superficie.

Generalità sugli scambiatori di calore e loro dimensionamento

Gli scambiatori di calore sono apparecchi che consentono lo scambio del calore tra due fluidi in movimento a diverse temperature. I due fluidi sono generalmente separati tra loro da una superficie solida, quasi sempre metallica.
Gli scambiatori di calore, in relazione al moto dei due fluidi all'interno dell'apparecchio, si possono dividere in tre gruppi:

a) scambiatori in equicorrente, se i due fluidi si muovono in ogni punto dell'apparecchio parallelamente e nella stessa direzione;
b) scambiatori in controcorrente, se i due fluidi si muovono parallelamente, ma in direzioni opposte;
c) scambiatori a correnti incrociate, se il flusso dei fluidi è ortogonale.

Dimensionare uno scambiatore significa calcolare la superficie di scambio necessaria, che è funzione della quantità di calore da disperdere, delle temperature e delle portate dei due fluidi.

Problemi inerenti al raffreddamento dell'olio

L'olio è un fluido che, con il diminuire della temperatura, aumenta la sua viscosità. Quando in uno scambiatore di calore esso viene a contatto con una superficie fredda, esso forma uno strato isolante il cui spessore è inversamente proporzionale alla possibilità di scambiare calore.
Per ottenere una resa termica ottimale bisogna fare in modo che la velocità di scorrimento dell'olio sulla superficie di scambio sia tale da rendere il più basso possibile lo spessore di tale strato; ciò in pratica si traduce nella assoluta esigenza che negli scambiatori circoli una portata d'olio superiore alla minima indicata sui cataloghi.

Dimensionamento degli scambiatori di calore acqua-olio da installare su impianti oleoidraulici

Nella scelta dello scambiatore bisogna considerare due aspetti legati all'impianto, la potenza termica da trasferire al fluido di raffreddamento e le perdite di carico all'interno dello scambiatore dovute alle inevitabili forze d'attrito indotte dal moto dei fluidi. Consigliamo di tener conto dei seguenti aspetti:

- considerando che il rendimento totale negli impianti oleoidraulici si aggira intorno al 70-80%, per determinare la potenza termica da trasferire al circuito di raffreddamento, si adotta un 30%-20% della potenza installata in centralina.

- per tenere conto dello sporcamento all'interno dello scambiatore e delle incertezze con le quali si determinano i coefficienti di scambio si adotta un opportuno overdesign.

- *dal punto di vista del dimensionamento dell'impianto, le perdite di carico massime ammissibili su entrambi i circuiti dello scambiatore sono correlate alla prevalenza della pompa di circolazione e al sistema di raccordi e tubazioni; nella maggior parte dei casi un aumento delle perdite di carico massime ammissibili implica una diminuzione delle dimensioni dello scambiatore a scapito di un aumento delle dimensioni del sistema di pompaggio.*

Di seguito si illustra un esempio utile al fine di guidare la scelta dello scambiatore.
Esempio: Si dimensioni uno scambiatore di calore a fascio tubiero per raffreddare olio idraulico con acqua di rete. L'olio è classificato come ISO VG 46 e ha una temperatura in ingresso allo scambiatore pari a T_{inolio}=50 [°C] con portata volumetrica m_{volio} =150 [l/min]. La potenza installata in centralina è pari a 42 [kW] mentre si ha a disposizione acqua alla temperatura T_{inH2O}=20 [°C] con portata volumetrica m_{vH2O}= 60[l/min]. La massima perdita di carico sull'olio è pari a $\Delta p_{maxolio}$ = 1 [bar].

*Si determina la potenza termica da smaltire tramite la seguente relazione $\dot{Q}$ = P*0,5 = 42 [kW] • 0,5 = 21 [kWt]*

Il fattore 0,5 è un valore empirico che tiene conto sia del rendimento dell'impianto che dello sporcamento.

Si determina la temperatura d'uscita dell'olio dallo scambiatore e il salto termico dell'olio:

$$\Delta T_{olio} = \frac{\dot{Q}}{Cp_{olio} \cdot mv_{olio} \cdot \rho_{olio}} = \frac{21\ [kW]}{2[KJ/KgK] \cdot 150/60[l/s] \cdot 0{,}84[kg/l]} = 5\ [°C]$$

$$T_{outolio} = T_{inolio} - \Delta T_{olio} = 50\ [°C] - 5\ [°C] = 45\ [°C]$$

Si determina la temperatura d'uscita dell'acqua e il salto termico dell'acqua di raffreddamento:

$$\Delta T_{H2O} = \frac{\dot{Q}}{Cp_{H2O} \cdot mv_{H2O} \cdot \rho_{H2O}} = \frac{21\ [kWt]}{4.186[KJ/KgK] \cdot 60/60[l/s] \cdot 1[kg/l]} = 5\ [°C]$$

$$T_{outH2O} = T_{inH2O} + \Delta T_{H2O} = 25\ [°C]$$

NOTA: nel caso in cui non si conosca a priori la portata volumetrica d'acqua consigliamo il seguente criterio
se T_{inH2O} < 20 [°C] allora ipotizzare ΔT_{H2O} =10 [°C]
se T_{inH2O} > 20 [°C] allora ipotizzare ΔT_{H2O}=5 [°C]

Di conseguenza, la portata d'acqua volumetrica si determina come di seguito:

$$\dot{mv}_{H2O} = \frac{\dot{Q}}{Cp_{H2O} \cdot \rho_{H2O} \cdot \Delta T_{H2O}}$$

Si determina la temperatura media aritmetica e il fattore di correzione da applicare alla potenza termica Q, in maniera tale da determinare la $\dot{Q}d$ (consultare la tabella corrispondente nel caso in cui la differenza di temperatura media aritmetica tra i due fludi sia differente dai 25 [°C]).

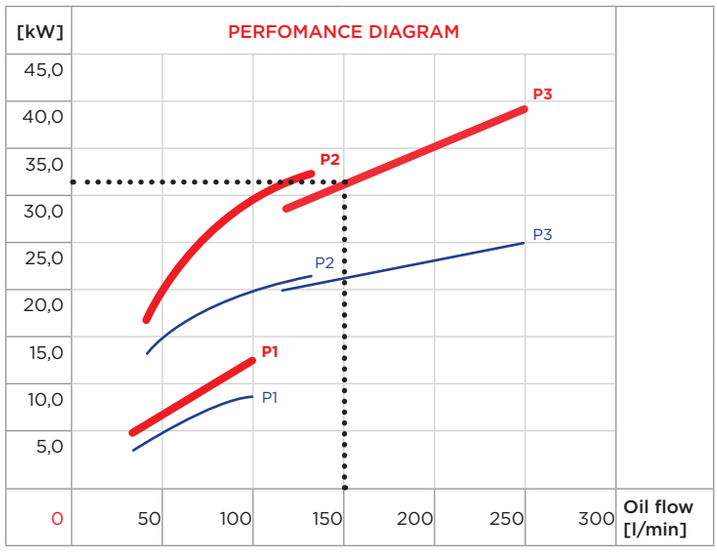
$$\Delta Tm_{olio} = \frac{T_{outolio} + T_{inolio}}{2} = 47{,}5\ [°C]$$

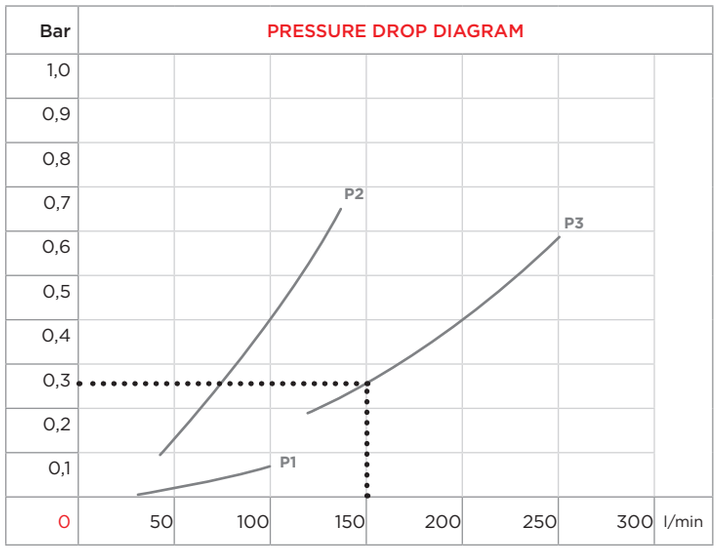
$$\Delta Tm_{H2O} = \frac{T_{outH2O} + T_{inH2O}}{2} = 22{,}5\ [°C]$$

$$\Delta Tm = \Delta Tm_{olio} - \Delta Tm_{H2O} = 25\ [°C]$$

$$\dot{Q}d = \dot{Q} \cdot F$$

Calcolata la $\dot{Q}d$ si consultano i diagrammi di performance incrociando i valori della potenza termica corretta $\dot{Q}d$, della portata volumetrica d'olio e della portata volumetrica d'acqua (vedere grafico).
Si verificano che le perdite di carico siano entro i limiti ammissibili utilizzando il grafico 'pressure drop' (vedere grafico).





Dimensionamento degli scambiatori di calore aria-olio da installare su impianti oleoidraulici

I dati da richiedere sono gli stessi dello scambiatore acqua-olio, oltre, naturalmente, alla temperatura dell'aria ambiente a cui deve funzionare lo scambiatore.
Il dimensionamento dello scambiatore consiste essenzialmente nel calcolo della potenzialità specifica necessaria, chiamata Kr, e scegliere lo scambiatore avente potenzialità specifica immediatamente superiore.

Kr = Q/ΔT, dove ΔT è la differenza tra la temperatura entrata olio e la temperatura ambiente massima estiva e Q è la quantità di calore da disperdere che si calcola considerando il 20-30% della potenza installata.

Per scegliere lo scambiatore idoneo bisogna consultare i diagrammi del catalogo tecnico. Tracciando sui diagrammi una retta verticale in corrispondenza della portata 80 l/min, l'intersezione di tale retta con le curve fornisce in ordinate il Kr che ogni scambiatore è in grado di garantire in quella condizione.

Esempio: N = 20 kW; q = 80 lpm; To = 50°C; Tamb = 30°C

Q = 30% 20 = 6 kW = 5.160 kcal/h
ΔT = 50 - 30 = 20°C
Kr = 5.160/20 = 258 kcal/h°C

La scelta dello scambiatore si esegue utilizzando le curve presenti sul catalogo tecnico. Tracciando una retta verticale in corrispondenza della portata di 80 lpm, l'intersezione con le varie curve di resa fornisce in ordinate il Kr dei diversi scambiatori.

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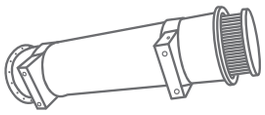
SCAMBIATORI ACQUA-OLIO

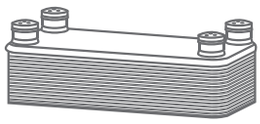
with tube bundle
a fascio tubiero

INSPECTABLE WATER SIDE
LATO ACQUA ISPEZIONABILE



INSPECTABLE WATER SIDE AND
REMOVABLE TUBE BUNDLE
LATO ACQUA ISPEZIONABILE
E FASCIO TUBIERO ESTRAIBILE

NOT INSPECTABLE WATER SIDE
LATO ACQUA NON ISPEZIONABILE



WATER-OIL HEAT EXCHANGERS
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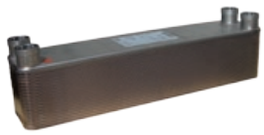

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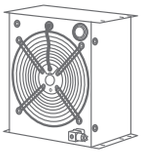

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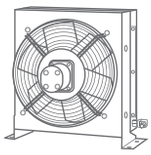
WITH ALTERNATING CURRENT ELECTRIC FAN
CON VENTILATORI A CORRENTE ALTERNATA



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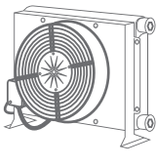

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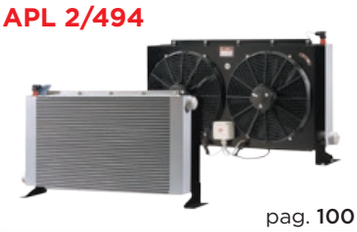

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WITH DIRECT CURRENT ELECTRIC FAN
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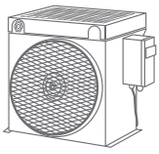
CONCRETE MIXER COOLER
SCAMBIATORE PER AUTOBETONIERE



COOLING UNITS
UNITÀ DI RAFFREDDAMENTO

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As the name itself suggests, the cooling fluid of this type of exchanger is water. Water has different features depending on its provenience: industrial water coming from close circuit's plants (cooling towers, chiller, etc.), river water, lake water or seawater.
Currently the use of water coming from the water main is no more allowed for ecologic reasons and resource saving.

According to the type of construction, the heat exchangers commonly used into the oleo hydraulic field are the tube-bundle heat exchangers and the brazed plate heat exchangers.
The firsts are made up of tubes with little diameter that constitutes the tube-bundle. Water circulates inside and oil circulates outside the tubes. The tube-bundle is installed into another container called shell that along with the baffles directs the oil to the outside surface of the tube-bundle.

The distance between the baffles have to be proportioned to the flow rate of the circulating oil, in order to have a greater flow velocity.
The materials commonly used are copper, copper nickel and stainless steel for the tubes, steel or brass for the shell, cast iron and bronze for the heads.

The material of plate heat exchangers is stainless steel. They are made up of a number of overlapped plates, whose superimposition generates sliding channels of hot and cold fluids, which pass through the plate's surface in opposite direction. This generates a countercurrent flow with a high thermic performance.
The plate heat exchangers can be dismountable or braze-welded.
With the first type, it is possible to dismount the exchanger to clean it, to add or remove plates if it results to be undersized or oversized.
The second ones offer greater resistance to inside pressure and have lower dimensions and prices than the first ones.

Water-oil heat exchangers are employed in cooling oleo hydraulic systems of machine tool, injection presses for rubber and plastic materials, machines and industrial systems in general.

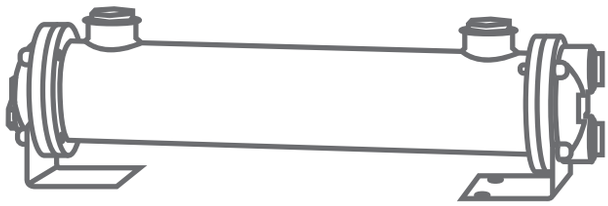
Come suggerisce la definizione, questa tipologia di scambiatori utilizza l'acqua come fluido di raffreddamento; essa può avere caratteristiche diverse a seconda della sua provenienza: acqua industriale proveniente da impianti in circuito chiuso (torri di raffreddamento, refrigeratori a ciclo frigorifero, ecc), di fiume, lago o mare. Attualmente l'acqua potabile, proveniente quindi da acquedotto, non viene e non può più essere utilizzata per evidenti ragioni ecologiche e di risparmio di una risorsa così preziosa.

A seconda del tipo di costruzione, gli scambiatori di calore comunemente utilizzati in oleoidraulica sono di due tipi: a fascio tubiero o a piastre.
I primi sono costituiti essenzialmente da tubi di piccolo diametro, costituenti appunto il fascio tubiero, all'esterno dei quali scorre l'olio ed all'interno l'acqua; il fascio di tubi è contenuto in un tubo esterno di diametro opportuno chiamato mantello, che ha la funzione, insieme ai diaframmi, di guidare l'olio nel suo fluire in modo che lambisca tutta la superficie esterna del fascio tubiero.
La distanza tra i diaframmi deve essere proporzionata alla portata dell'olio circolante, in modo da ottenere una maggiore velocità di scorrimento. I materiali più comunemente usati sono rame, cupronickel, acciaio inossidabile per i tubi, acciaio o ottone per il mantello, ghisa o bronzo per le testate.

Gli scambiatori a piastre sono normalmente in acciaio inossidabile.
Essi sono costituiti da un numero di piastre sovrapposte l'una all'altra; la loro sovrapposizione genera dei canali di scorrimento dei fluidi caldo e freddo che attraversano la superficie delle piastre in senso alternato e su facce opposte. Si viene quindi a stabilire nello scambiatore un flusso in controcorrente ad alta turbolenza e conseguentemente ad alta resa termica.
Gli scambiatori a piastre possono essere smontabili o saldobrasati.
Con i primi è possibile smontare periodicamente lo scambiatore per la pulizia, aggiungere o togliere piastre nel caso lo scambiatore fosse stato sotto o sovradimensionato.
I secondi offrono una maggiore resistenza alla pressione interna e hanno dimensioni e costi inferiori rispetto ai primi.

Gli scambiatori acqua-olio sono utilizzati per il raffreddamento degli impianti oleoidraulici su macchine utensili, presse ad iniezione per materie plastiche e gomma, macchinari e impianti industriali in genere.

WATER-OIL HEAT EXCHANGERS WITH TUBE BUNDLE
SCAMBIATORI DI CALORE ACQUA-OLIO A FASCIO TUBIERO



WATER-OIL HEAT EXCHANGER WITH TUBE BUNDLE TYPE MS 84 P, MS 134 P, MS 134 CF, MS 84 CF, MS 134 B, MS 84/2 B

They consist of smooth tubes with little diameter; this allows the best compromise between high thermic performance and low pressure drops.

The flow rates shown in the tables are the ones recommended for the exchanger proper working. Going down the lowest flow rate indicated in the tables, the low oil speed causes a great loss in performance, whereas a flow rate that is superior to the maximum indicated causes great pressure drops and does not considerably increase the thermic performance.

The efficiency diagrams indicate the heat quantity (kW) each exchanger can disperse according to ΔT=25°C between oil and water depending on the oil flow of the exchanger.

The maximum work pressure allowed in the oil and water circuits is 12 bar

For the right calculation of tube bundle exchangers, we supply our customers with a CD-ROM calculation program; by filling in some data, it is possible to establish the right exchanger and to obtain all the working parameters on a data sheet.

The tube bundle heat exchangers can be used with other kind of fluids, which must be compatible with copper and its alloys. However, for each use, with the exception of oil cooling, we recommend to consult our Technical Department.

Exchange surface from 0,2 to 3,6 m^2

SCAMBIATORI DI CALORE ACQUA-OLIO A FASCIO TUBIERO MS 84 P, MS 134 P, MS 134 CF, MS 84 CF, MS 134 B, MS 84/2 B

Sono costruiti con tubi lisci di piccolo diametro, raggiungendo in questo modo il miglior compromesso tra elevata resa termica e basse perdite di carico.

Le portate olio indicate nelle tabelle sono quelle consigliate per il buon funzionamento dello scambiatore. Andando al di sotto della portata minima indicata, la bassa velocità dell'olio causa un forte calo di rendimento, mentre una portata superiore alla massima causa perdite di carico notevoli, senza peraltro aumentare la resa termica in maniera apprezzabile.

I diagrammi di rendimento forniscono la quantità di calore in kW che ogni scambiatore è in grado di disperdere con ΔT=25°C tra olio e acqua in funzione della portata olio circolante nello scambiatore.

La pressione di esercizio massima ammessa in entrambe i circuiti è 12 bar.

Per il calcolo esatto degli scambiatori a fascio tubiero possiamo fornire un programma di calcolo su CD-rom; mediante il semplice inserimento di alcuni dati è possibile stabilire lo scambiatore necessario e ottenere tutti i parametri di funzionamento su un data-sheet.

Gli scambiatori a fascio tubiero possono essere utilizzati con altri tipi di fluidi, a condizione che essi siano compatibili con il rame e le sue leghe. Consigliamo comunque, per qualsiasi impiego che non sia il raffreddamento dell'olio, di consultare il nostro Ufficio Tecnico.

Superficie di scambio da 0,2 a 3,6 m^2

Selection procedure

The curves are based on the following data:

1) Oil viscosity ISO VG 46
2) Arithmetic mean temperature difference between oil and water 25 [°C] (*ΔTm)*

If your application parameters are different, follow these steps:

1) Define the arithmetic mean temperature difference [see the technical example on page 7] and select the correction factor from the table

CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

2) Calculate the adjusted thermal power $\dot{Q}d = \dot{Q} \bullet f$

3) Select the model from the curve
Cross-check on the diagram the values of the oil flow, of the water flow and of the thermal adjusted power.

Procedura di selezione dello scambiatore

Le curve riportate sono basate sulle seguenti assunzioni:

1) *Viscosità cinematica dell'olio pari a 46 [cSt]*
2) *Differenza di temperatura media aritmetica tra i due fluidi pari a 25 [°C] (ΔTm)*

Se si ha una differenza di temperatura media aritmetica differente da 25 [°C], seguire la procedura sottostante:

1) *Determinare la differenza di temperatura media aritmetica tra i due fluidi [vedere esempio a pagina 9 per effettuare il calcolo] e selezionare il fattore di correzione appropriato dalla tabella*

CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

2) *Determinare la potenza termica da smaltire opportunamente corretta $\dot{Q}d = \dot{Q} \bullet f$*

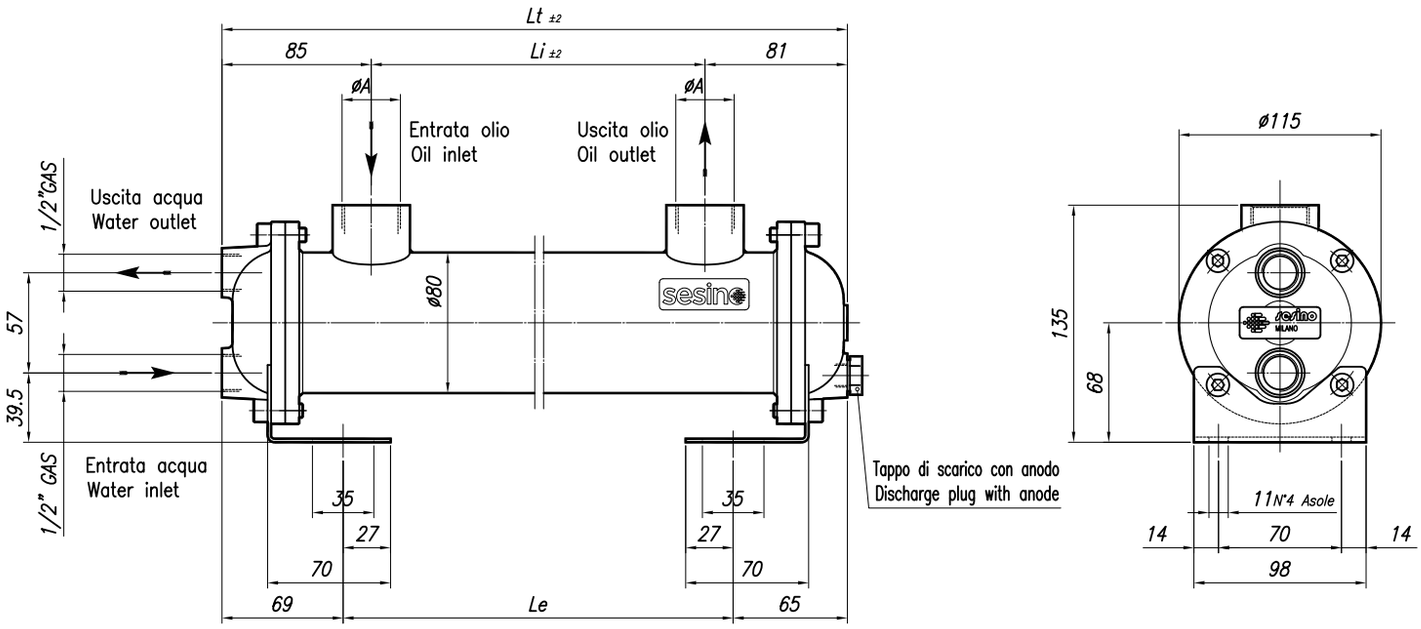
3) *Selezionare il modello*
Incrociare i valori di portata volumetrica d'olio, d'acqua e della potenza termica corretta sull'apposito grafico

MS 84 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL

*standard

- Dimensions and technical characteristics are not binding



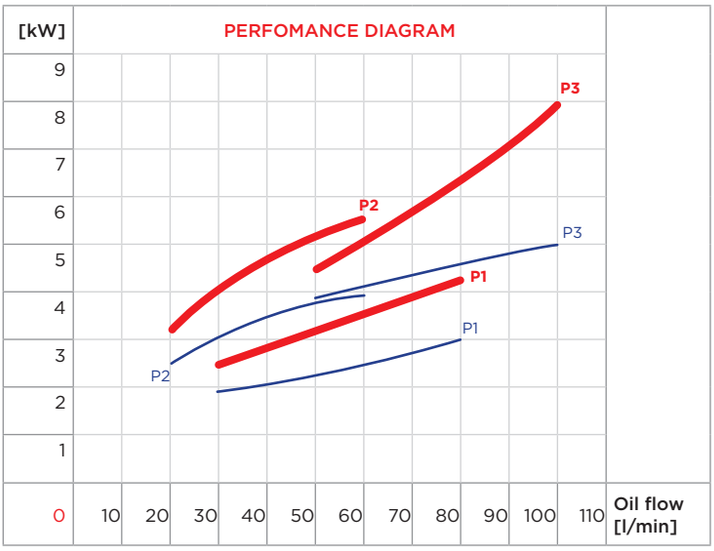
TYPE	CODE	WATER FLOW	OIL FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS			
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	F	Li	Le	Lt
MS 84 P1	2SC84P1	7,5 - 30	30-80	2	3	2,6	4,2	4,5	1" gas	150	150	308
MS 84 P2	2SC84P2	7,5 - 30	20-60	2,6	4	3,25	5,6	6,3	1" gas	310	310	468
MS 84 P3	2SC84P3	7,5 - 30	50-100	3,6	4,4	4,6	8	6,5	1 1/2" gas	310	325	478
MS 84 P4	2SC84P4	7,5 - 30	30-80	4,8	7	6	10	9,0	1" gas	560	560	718
MS 84 P5	2SC84P5	7,5 - 30	80-130	6	7	7	9	9,0	1 1/2" gas	560	575	728
MS 84 P6	2SC84P6	7,5 - 30	40-90	9	12	12	18	10,8	1 1/2" gas	715	730	883
MS 84 P7	2SC84P7	7,5 - 30	100-160	11	14	15	21	10,8	1 1/2" gas	715	730	883
MS 84 P8	2SC84P8	7,5 - 30	60-110	12	16	16	24	12,3	1 1/2" gas	870	885	1038
MS 84 P9	2SC84P9	7,5 - 30	140-190	15	17	21	27	12,3	1 1/2" gas	870	885	1038

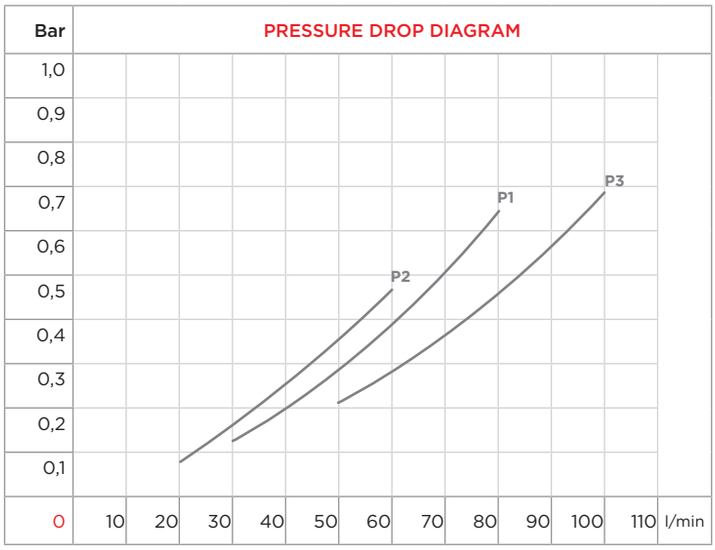
WATER FLOW RATE:

7,5 l/min

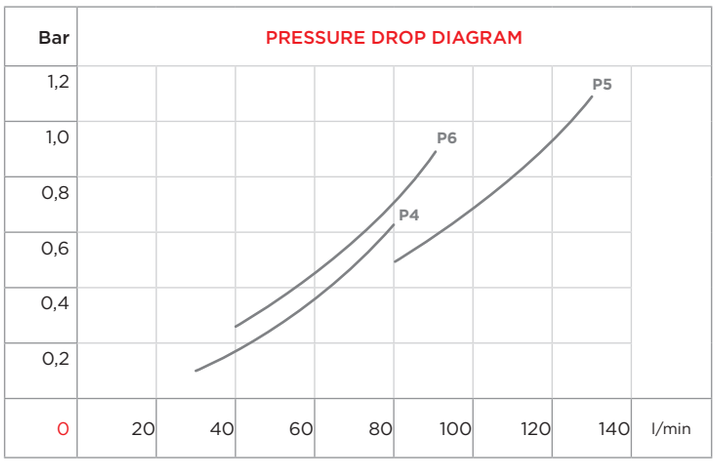
30 l/min

P1 P2 P3

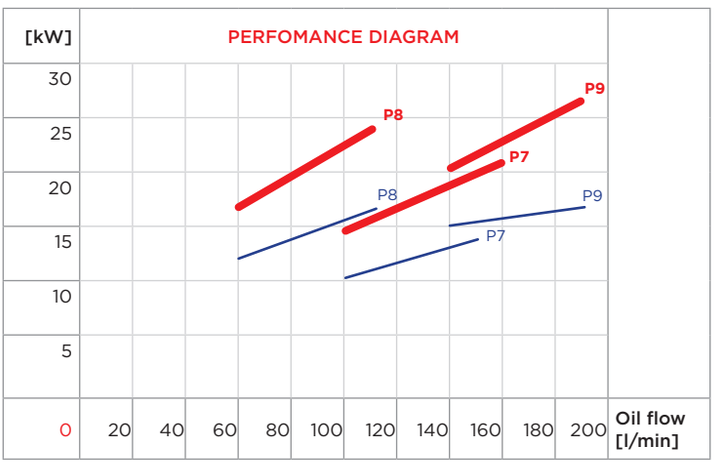


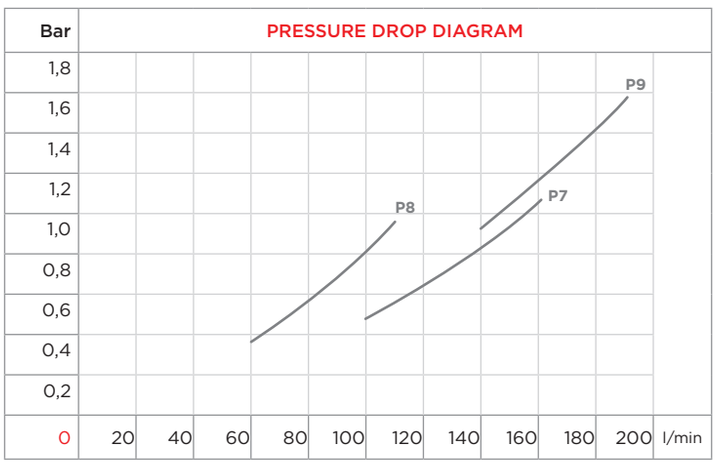


P4 P5 P6



P7 P8 P9

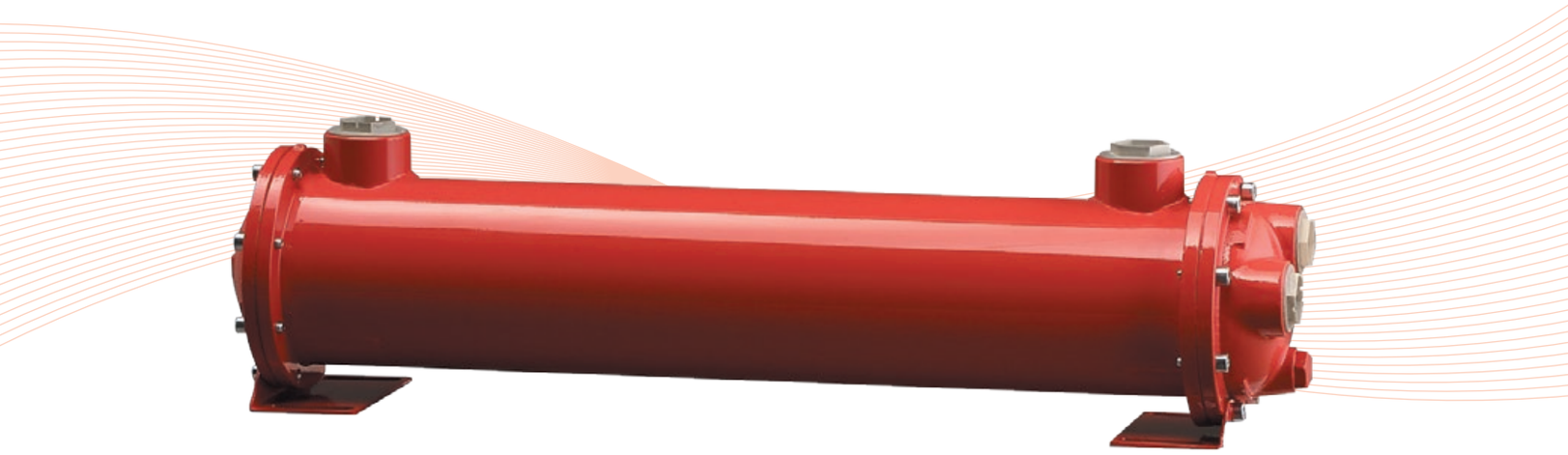




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

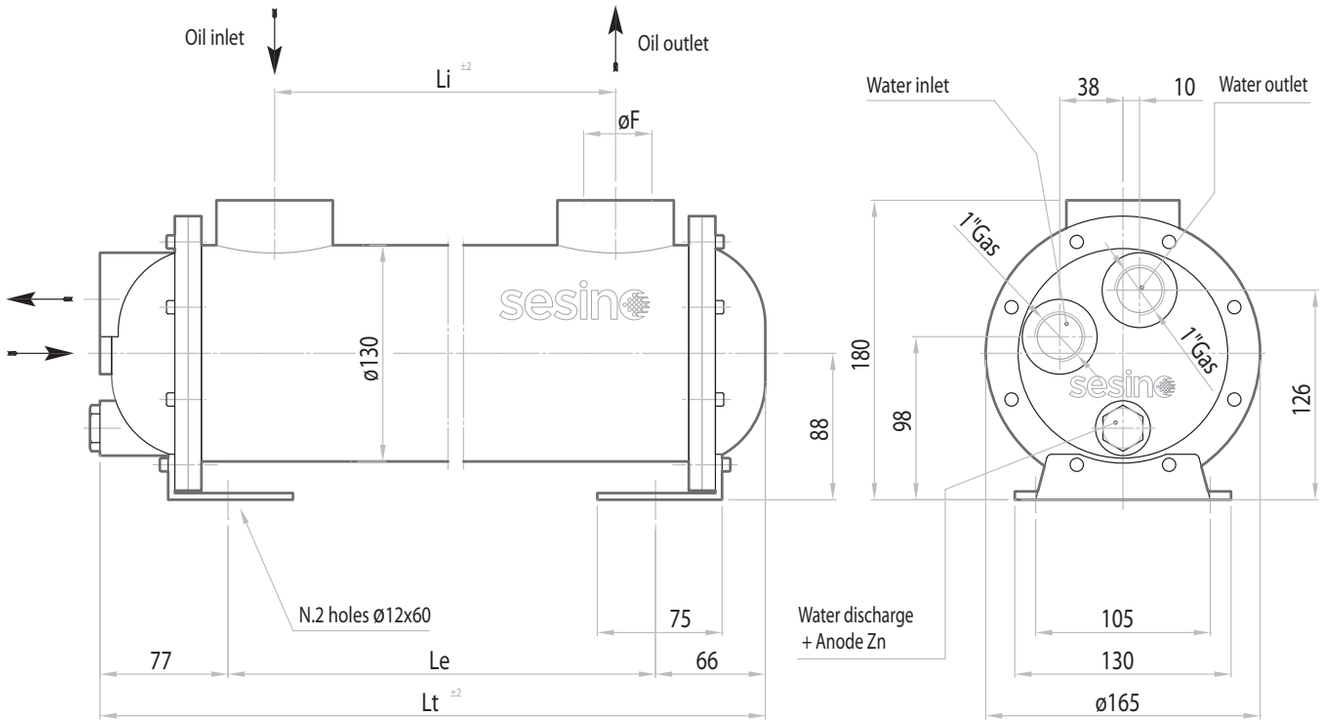
MS 134 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (marine use)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



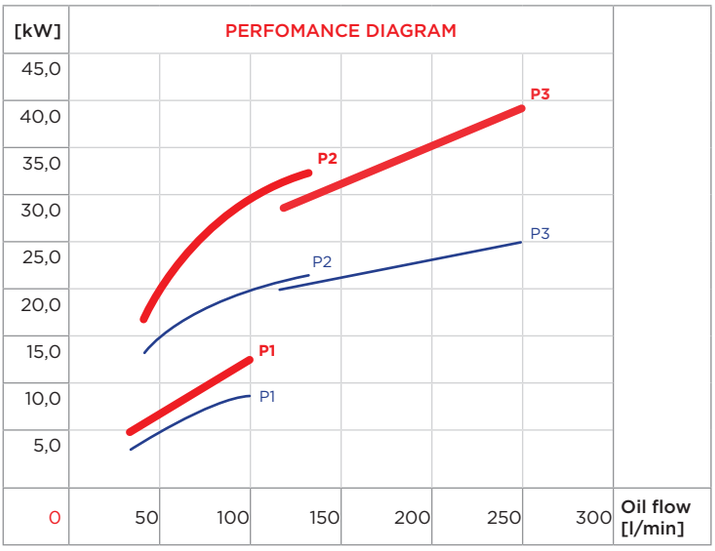
TYPE	CODE	OIL FLOW	WATERFLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS			
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	F	Li	Le	Lt
MS 134 P1	2SC134P1	30-100	15-60	4	9	4	12	16,4	1 1/2" gas	285	286-384	480
MS 134 P2	2SC134P2	40-130	15-60	13	22	17	33	22,6	1 1/2" gas	535	536-634	730
MS 134 P3	2SC134P3	120-250	15-60	20	25	29	39	23,0	2" gas	520	536-634	730
MS 134 P4	2SC134P4	80-250	15-60	8,5	21	9	29	30,7	1 1/2" gas	845	846-944	1040
MS 134 P5	2SC134P5	200-400	15-60	31	39	48	70	30,9	2" gas	830	846-944	1040
MS 134 P6	2SC134P6	30-170	15-60	11	26	12	36	40,0	1 1/2" gas	1145	1146-1244	1340
MS 134 P7	2SC134P7	200-500	15-60	32	64	41	95	39,5	2" gas	1130	1146-1244	1340

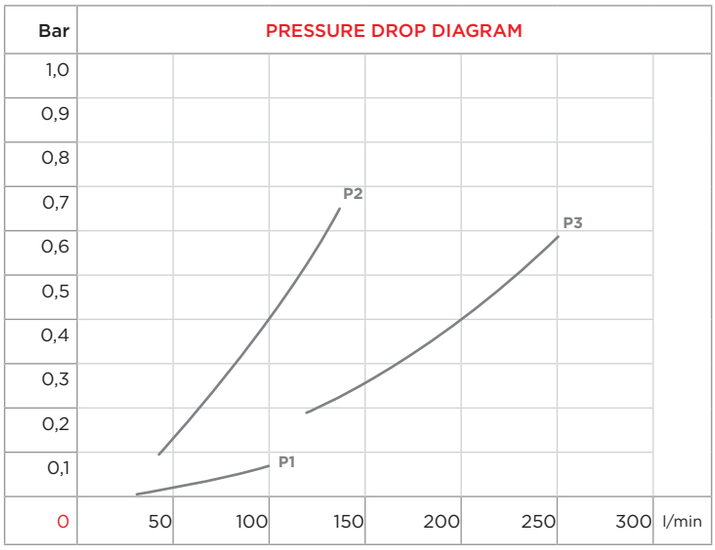
WATER FLOW RATE:

15 l/min

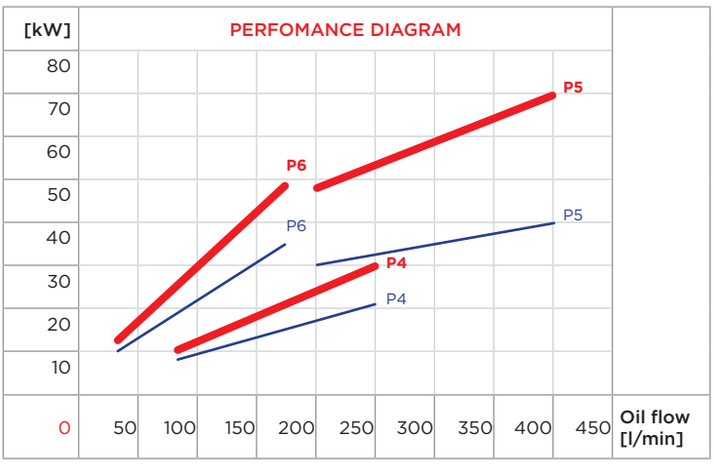
60 l/min

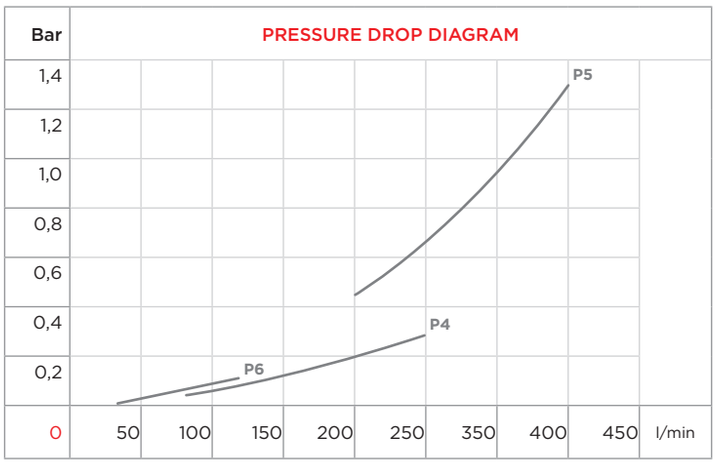
P1 P2 P3



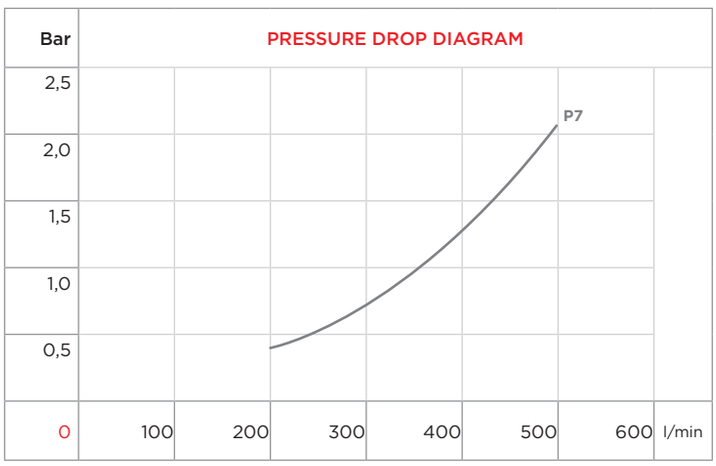


P4 P5 P6





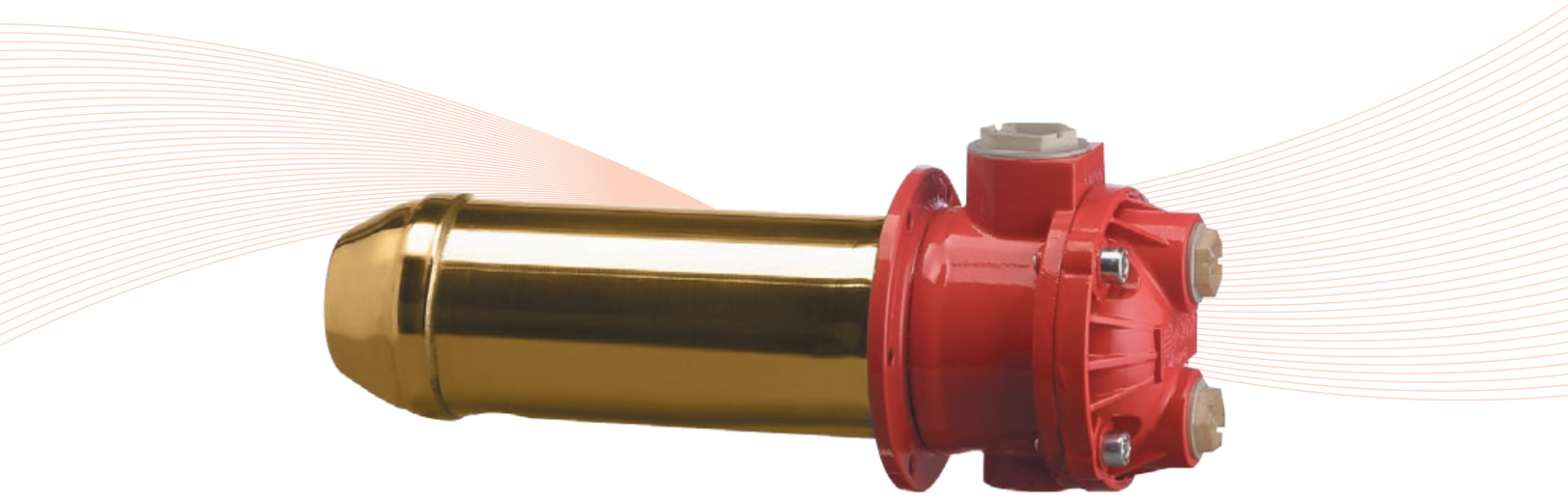
P7



CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

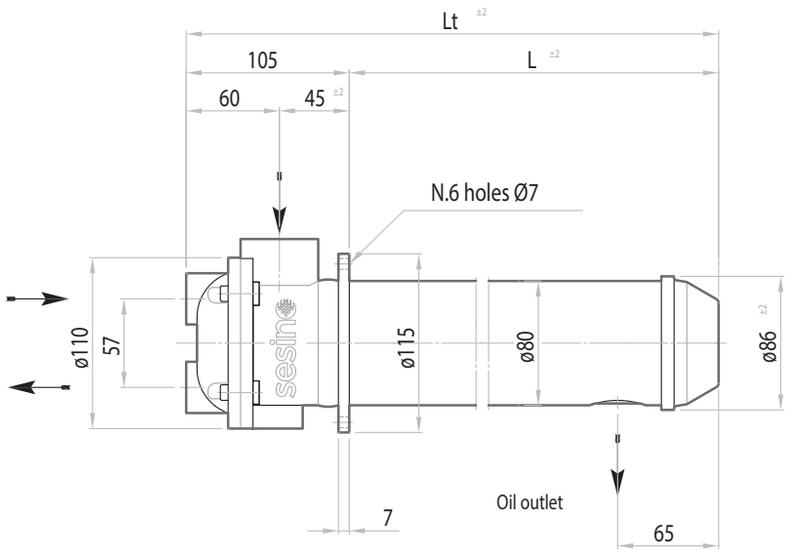
MS 84 CF

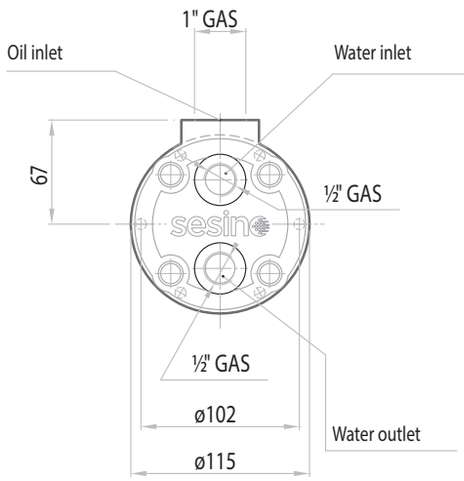


CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS*	COPPER*	CAST IRON*

*standard

- Dimensions and technical characteristics are not binding





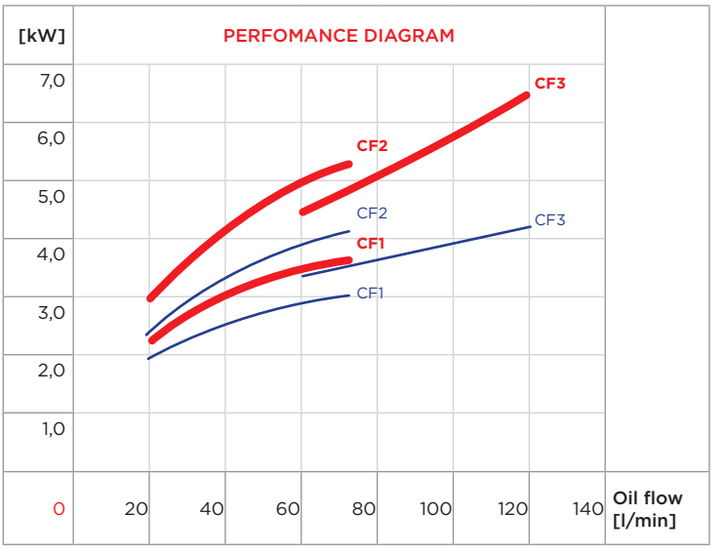
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS	
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	L	Lt
MS 84 CF1	2SC84CF1	25-70	7,5-30	2	3	2,5	4	3,5	145	250
MS 84 CF2	2SC84CF2	25-70	7,5-30	2	4	4	5	4,3	215	320
MS 84 CF3	2SC84CF3	60-120	7,5-30	3	4	5	7	5,2	290	395
MS 84 CF4	2SC84CF4	40-100	7,5-30	4,2	5,3	5	8	6,1	365	470
MS 84 CF5	2SC84CF5	80-200	7,5-30	6	9	8	17	7,3	465	570
MS 84 CF6	2SC84CF6	60-150	7,5-30	10	13	13	18	8,6	620	725

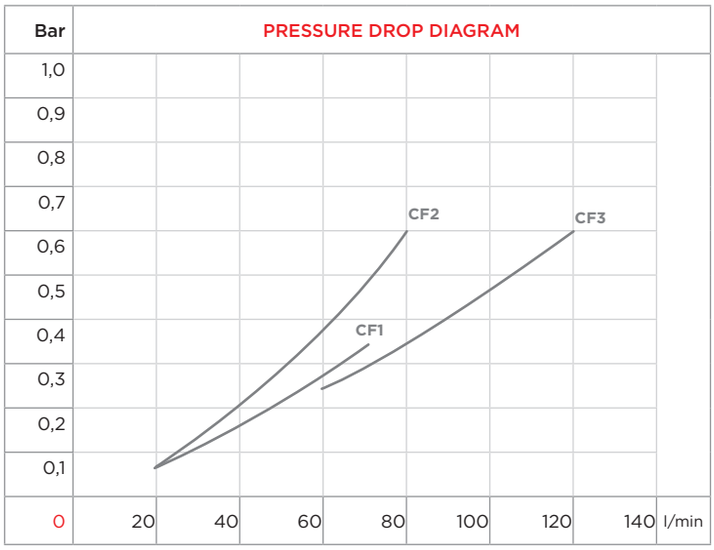
WATER FLOW RATE:

7,5 l/min

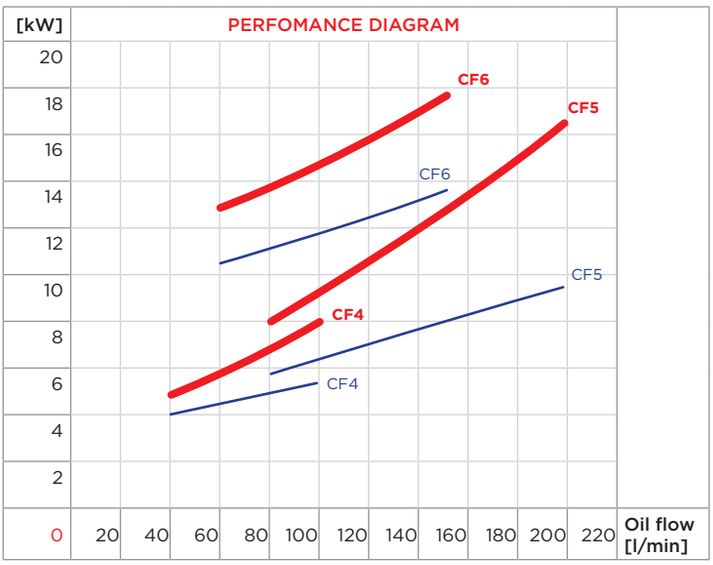
30 l/min

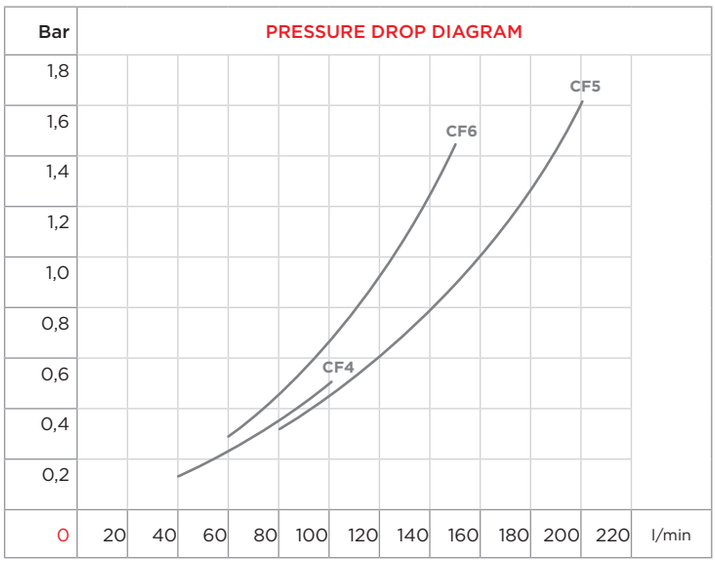
CF1 CF2 CF3





CF4 CF5 CF6

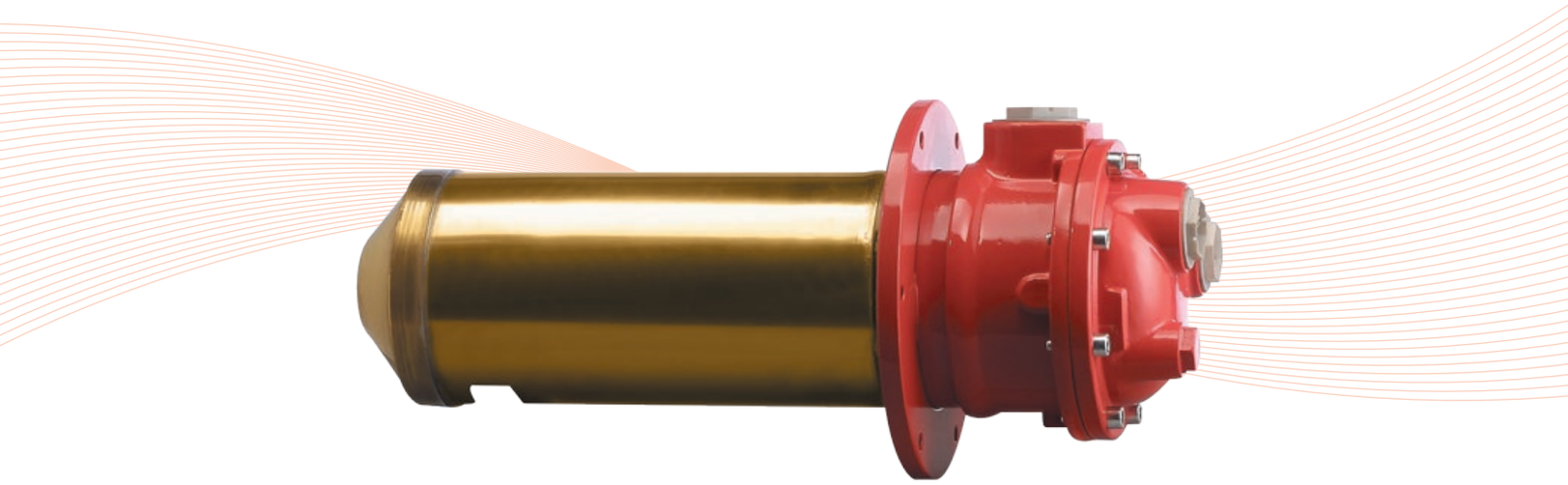




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

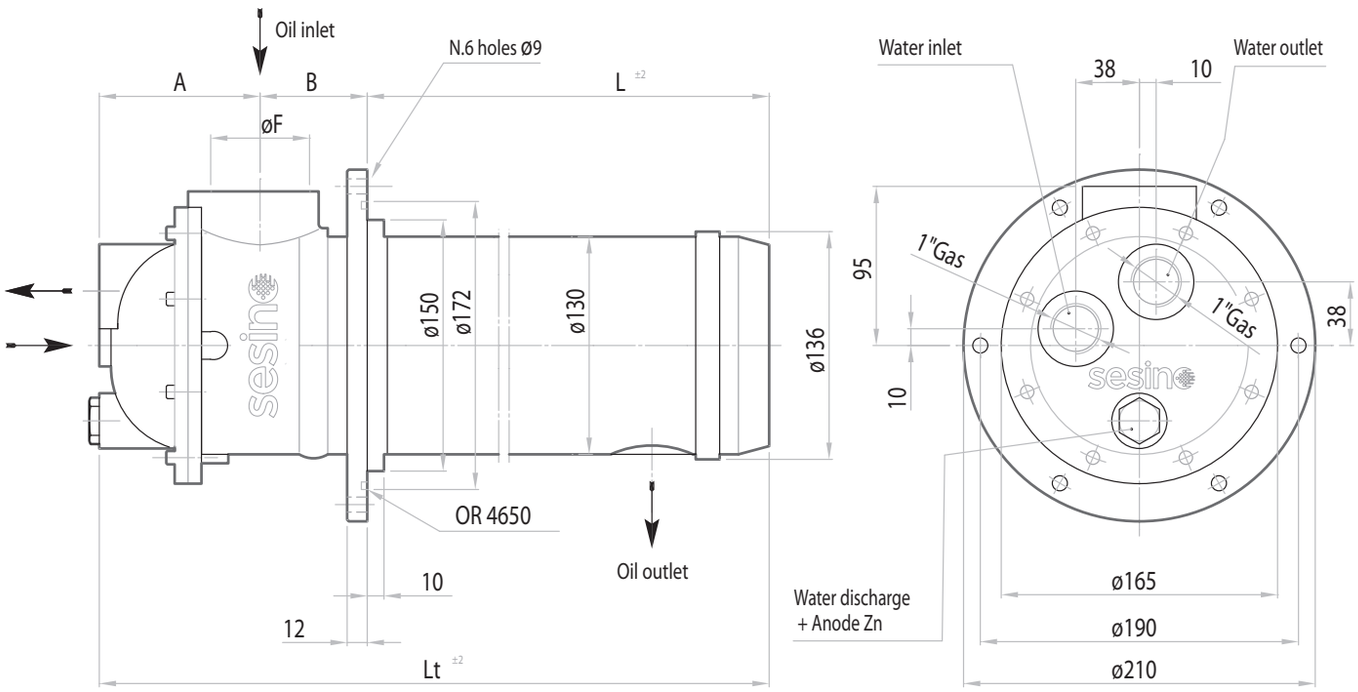
MS 134 CF



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS*	COPPER*	CAST IRON*

*standard

- Dimensions and technical characteristics are not binding



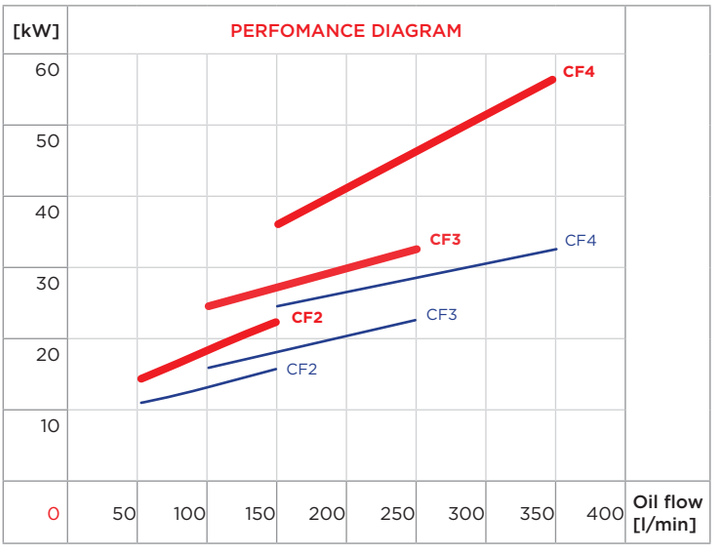
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS				
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	F	A	B	L	Lt
MS 134 CF2	2SC134CF2	50-150	15-60	11	16	14	23	16,7	1 1/2" gas	80	60	314	462
MS 134 CF3	2SC134CF3	100-250	15-60	18	24	25	34	20,8	2" gas	88	60	465	613
MS 134 CF4	2SC134CF4	150-350	15-60	25	33	37	56	24,8	2" gas	88	60	635	783
MS 134 CF5	2SC134CF5	80-250	15-60	25	34	37	59	29,3	2" gas	88	60	817	965
MS 134 CF7	2SC134CF7	200-400	15-60	35	47	54	78	41,6	2" gas	88	60	1135	1283

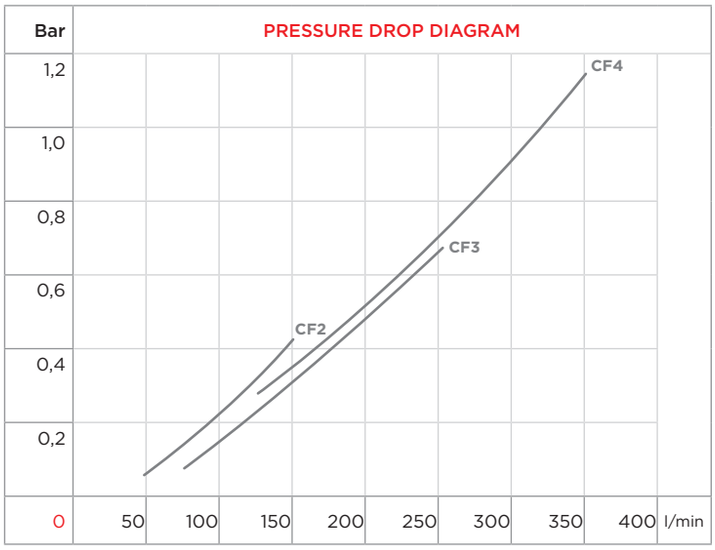
WATER FLOW RATE:

15 l/min

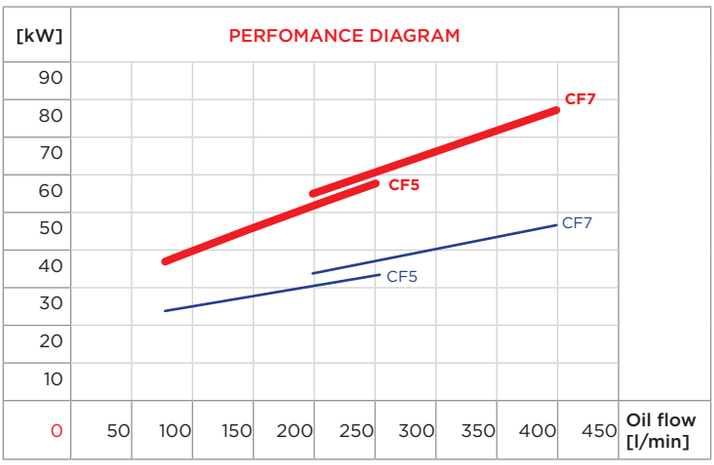
60 l/min

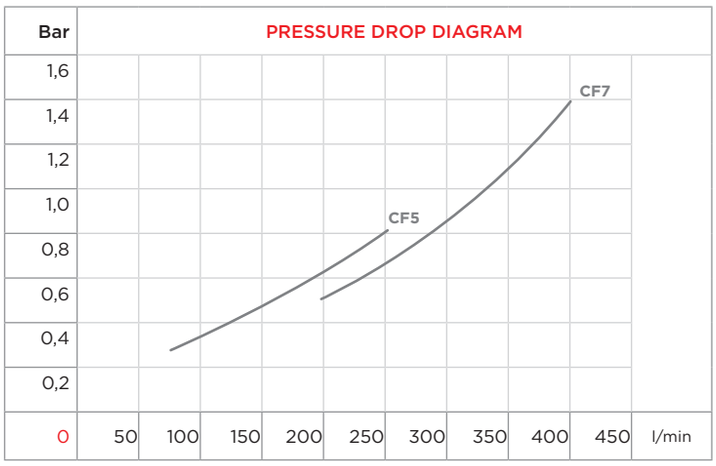
CF2 CF3 CF4





CF5 CF7





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

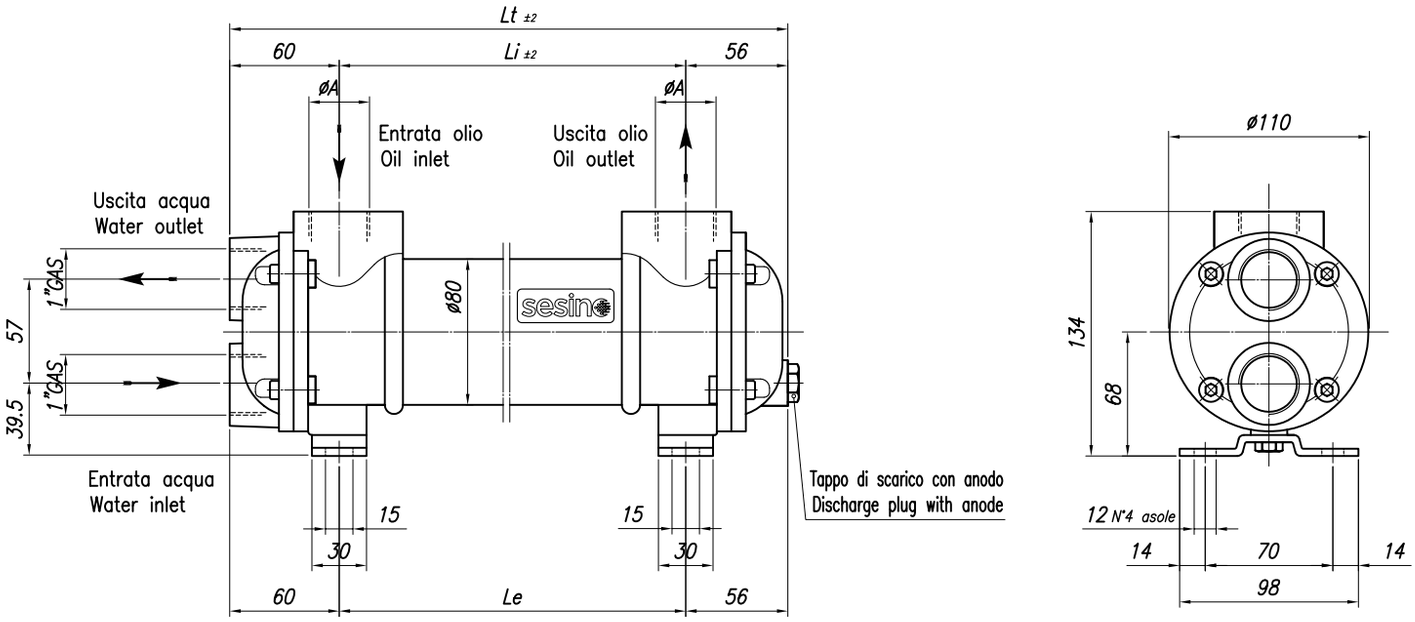
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

MS 84/2B

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS	CuNi (marine use)	BRONZE
CARBON STEEL	COPPER	CAST IRON
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL

*standard

- Dimensions and technical characteristics are not binding



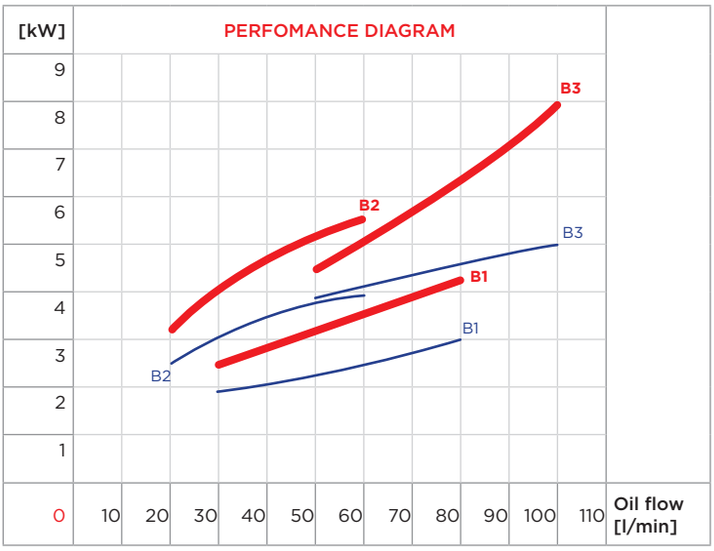
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS			
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	øA	Li	Le	Lt
MS 84/2 B1	2SC84/2B1CNA	30-80	7,5 - 30	2	3	2,6	4,2	4,5	1" gas	150	150	266
MS 84/2 B2	2SC84/2B2CNA	20-60	7,5 - 30	2,6	4	3,25	5,6	6,3	1" gas	310	310	426
MS 84/2 B3	2SC84/2B3CNA	50-100	7,5 - 30	3,6	4,4	4,6	8	6,5	1 1/2" gas	310	325	441
MS 84/2 B4	2SC84/2B4CNA	30-80	7,5 - 30	4,8	7	6	10	9,0	1" gas	560	560	676
MS 84/2 B5	2SC84/2B5CNA	80-130	7,5 - 30	6	7	7	9	9,0	1 1/2" gas	560	575	691
MS 84/2 B6	2SC84/2B6CNA	40-90	7,5 - 30	9	12	12	18	10,8	1 1/2" gas	715	730	846
MS 84/2 B7	2SC84/2B7CNA	100-160	7,5 - 30	11	14	15	21	10,8	1 1/2" gas	715	730	846
MS 84/2 B8	2SC84/2B8CNA	60-110	7,5 - 30	12	16	16	24	12,3	1 1/2" gas	870	885	1001
MS 84/2 B9	2SC84/2B9CNA	140-190	7,5 - 30	15	17	21	27	12,3	1 1/2" gas	870	885	1001

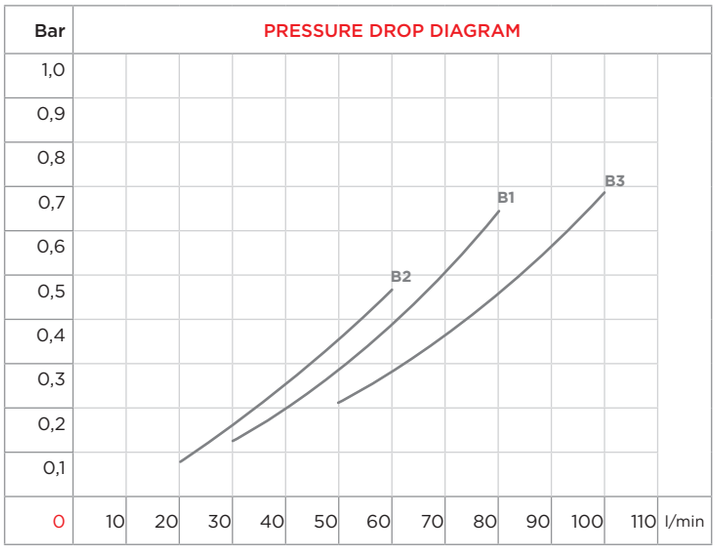
WATER FLOW RATE:

7,5 l/min

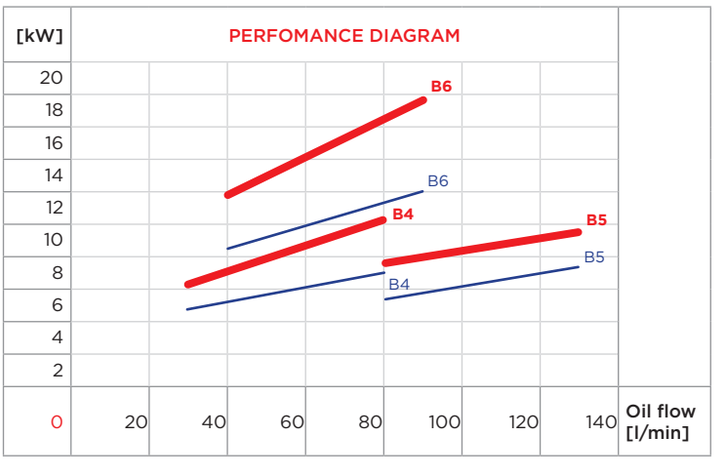
30 l/min

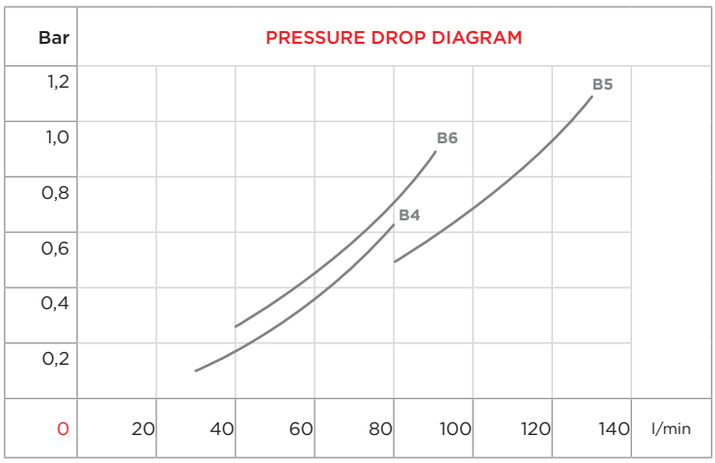
B1 B2 B3



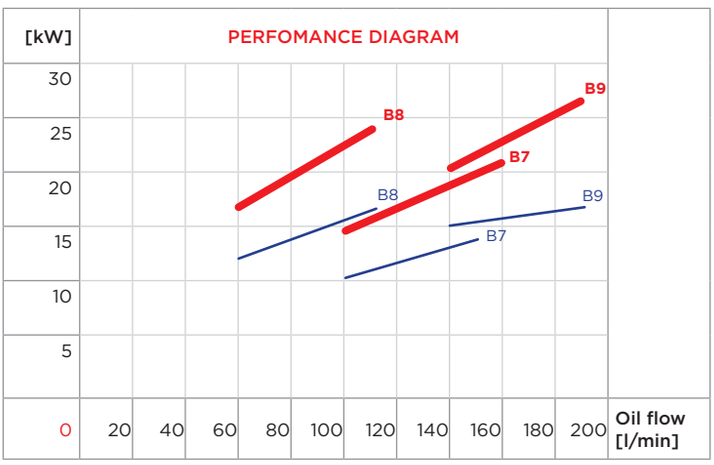


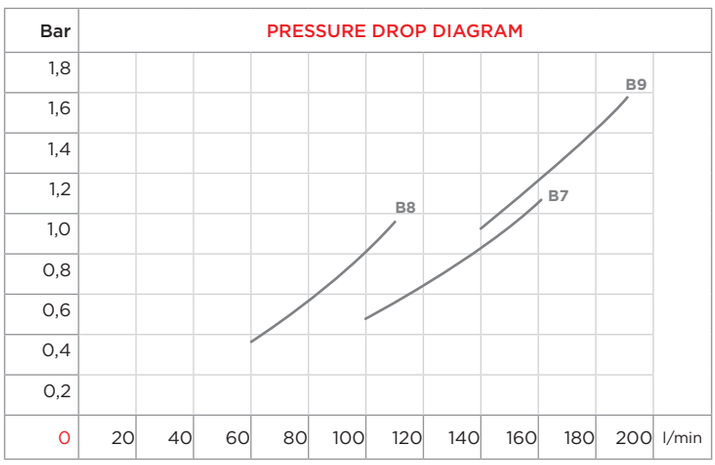
B4 B5 B6





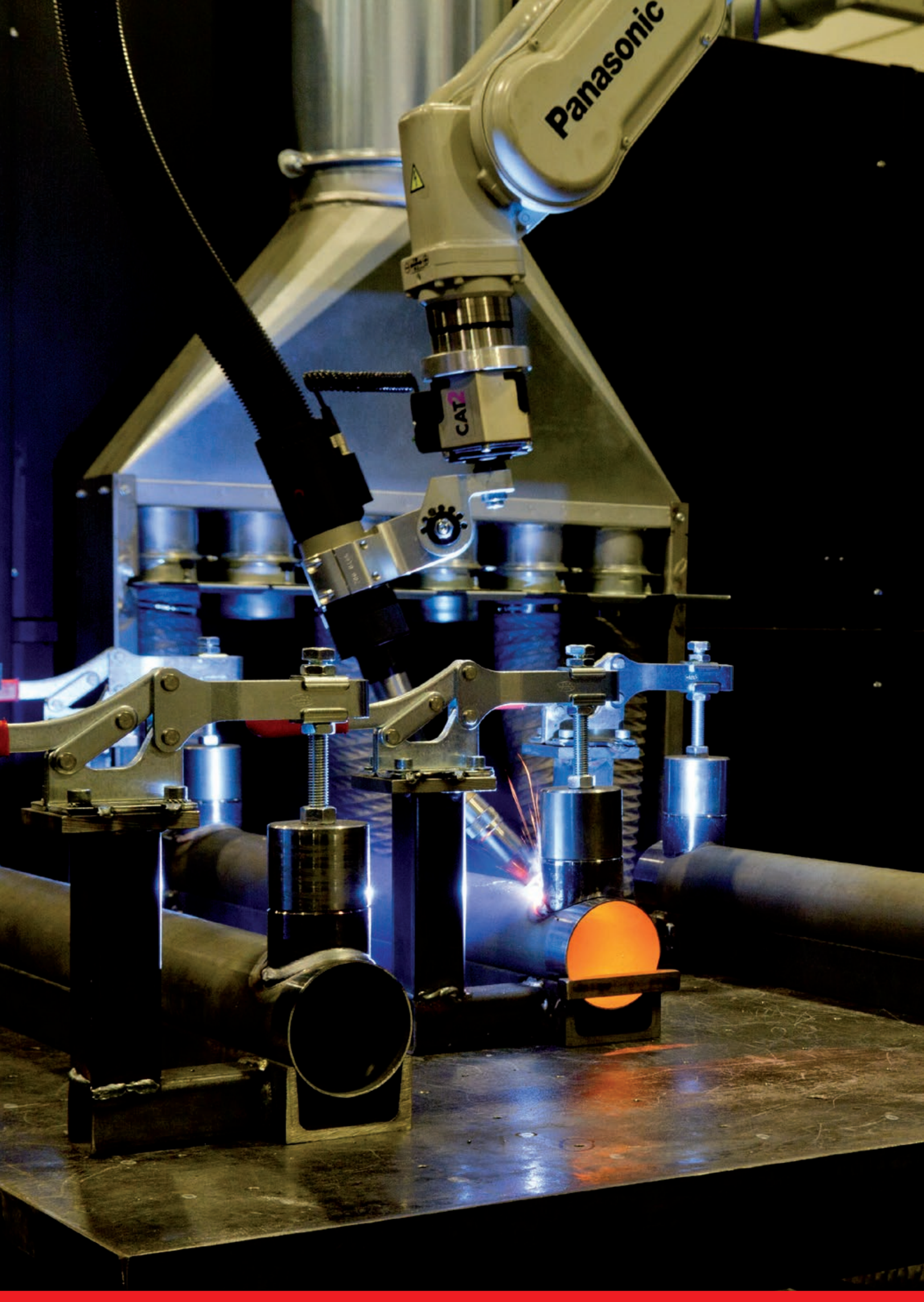
B7 B8 B9



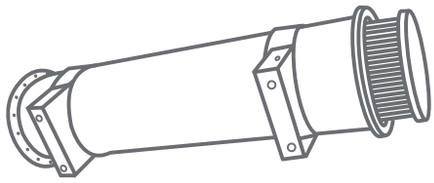


CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6


Panasonic
CAT2

WATER-OIL HEAT EXCHANGERS WITH REMOVABLE TUBE BUNDLE
SCAMBIATORI DI CALORE ACQUA-OLIO A FASCIO TUBIERO ESTRAIBILE



WATER-OIL HEAT EXCHANGERS WITH REMOVABLE TUBU BUNDLE MS 152, MS 172, MS 202, MS 272, MS 352

This type of exchangers have a dismountable tube bundle that is, for this reason, inspectable both oil and water side and is particularly fit for not filtered liquids.

The material of the tube bundle can be copper for soft water, copper nickel for seawater and stainless steel for other corrosive fluids or gas

They consist of smooth tubes with little diameter; this allows the best compromise between high thermic performance and low pressure drops.

The flow rates shown in the tables are the ones recommended for the exchanger proper working. Going down the lowest flow rate indicated in the tables, the low oil speed causes a great loss in performance, whereas a flow rate that is superior to the maximum indicated causes great pressure drops and does not considerably increase the thermic performance.

The maximum working pressure allowed in the oil and water circuits is 12 bar

For the right calculation of tube bundle exchangers, we supply our customers with a CD-ROM calculation program; by filling in some data, it is possible to establish the right exchanger and to obtain all the working parameters on a data sheet.

The tube bundle heat exchangers can be used with other kind of fluids, which must be compatible with copper and its alloys. However, for each use, with the exception of oil cooling, we recommend to consult our Technical Department.

Exchange surface from 1 to 30 m^2 approximately.

SCAMBIATORI ACQUA-OLIO A FASCIO TUBIERO ESTRAIBILE SERIE MS 152, MS 172, MS 202, MS 272 e MS 352

Queste serie di scambiatori hanno il fascio tubiero smontabile che è pertanto ispezionabile sia lato olio che lato acqua, ciò li rende idonei all'impiego anche con liquidi non filtrati.

Il materiale di costruzione del fascio tubiero può essere rame, per utilizzo con acqua dolce, cupronickel, per utilizzo con acqua di mare, acciaio inossidabile, per impieghi con fluidi corrosivi e gas.

Sono costruiti con tubi lisci di piccolo diametro, raggiungendo in questo modo il miglior compromesso tra elevata resa termica e basse perdite di carico.

Le portate olio indicate in tabella sono quelle consigliate per il buon funzionamento dello scambiatore. Andando al di sotto della portata minima indicata, la bassa velocità dell'olio causa un forte calo di rendimento, mentre una portata superiore alla massima causa perdite di carico notevoli, senza peraltro aumentare la resa termica in maniera apprezzabile.

La pressione di esercizio massima ammessa in entrambe i circuiti è 12 bar.

Per il calcolo esatto degli scambiatori a fascio tubiero possiamo fornire un programma di calcolo su CD-rom; mediante il semplice inserimento di alcuni dati è possibile stabilire lo scambiatore necessario e ottenere tutti i parametri di funzionamento su un data-sheet.

Gli scambiatori a fascio tubiero possono essere utilizzati con altri tipi di fluidi, a condizione che essi siano compatibili con il rame e le sue leghe. Consigliamo comunque, per qualsiasi impiego che non sia il raffreddamento dell'olio, di consultare il nostro Ufficio Tecnico.

Superfici di scambio da 1 a 30 m^2

Selection procedure

The curves are based on the following data:

1) Oil viscosity ISO VG 46
2) Arithmetic mean temperature difference between oil and water 25 [°C] (ΔTm)

If your application parameters are different, follow these steps:

1) Define the arithmetic mean difference temperature [see the technical example on page 7] and select the correction factor from the table

CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

2) Calculate the adjusted thermal power $\dot{Q}d = \dot{Q} \bullet f$

3) Select the model from the curve
Cross-check on the diagram the values of the oil flow, of the water flow and of the thermal adjusted power.

Procedura di selezione dello scambiatore

Le curve riportate sono basate sulle seguenti assunzioni:

1) Viscosità cinematica dell'olio pari a 46 [cSt]
2) Differenza di temperatura media aritmetica tra i due fluidi pari a 25 [°C] (ΔTm)

Se si ha una differenza di temperatura media aritmetica differente da 25 [°C], seguire la procedura sottostante:

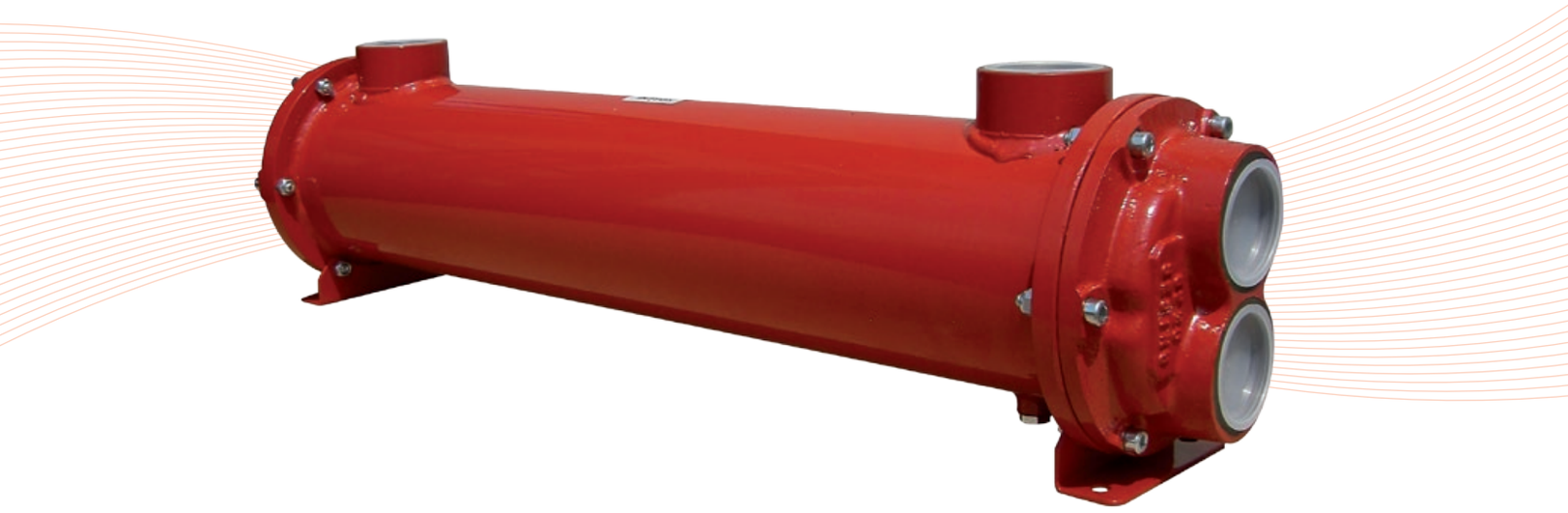
1) Determinare la differenza di temperatura media aritmetica tra i due fluidi [vedere esempio a pagina 9 per effettuare il calcolo] e selezionare il fattore di correzione appropriato dalla tabella

CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

2) Determinare la potenza termica da smaltire opportunamente corretta $\dot{Q}d = \dot{Q} \bullet f$

3) Selezionare il modello
Incrociare i valori di portata volumetrica d'olio, d'acqua e della potenza termica corretta sull'apposito grafico

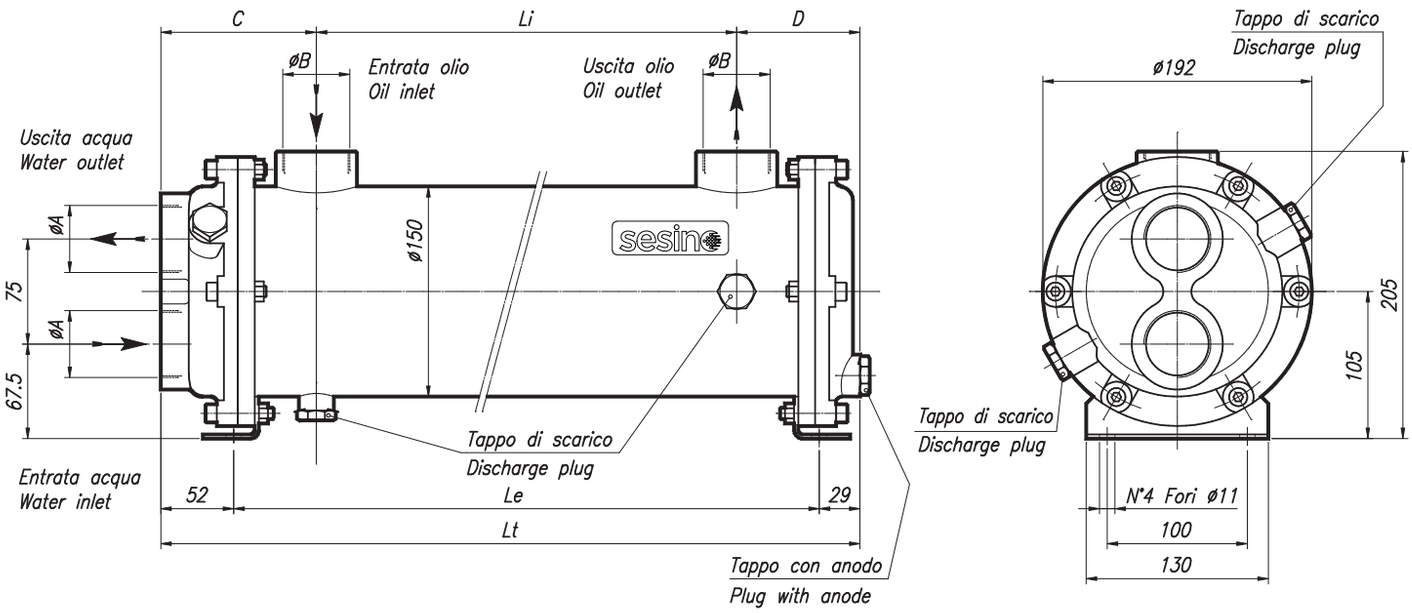
MS 152/7 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



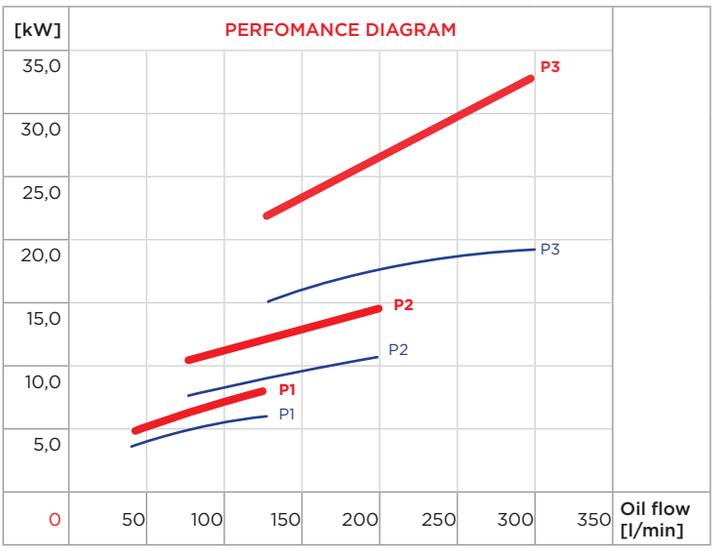
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS						
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	øA	øB	C	D	Li	Le	Lt
MS 152/7 P1	2SC152/7P1	40-120	40-160	4,5	6,9	5,1	8,3	17	1" gas	3/4" gas	101	78	80	178	259
MS 152/7 P2	2SC152/7P2	80-200	40-160	8	10	10	15	21	1" gas	1" gas	111	88	150	268	349
MS 152/7 P3	2SC152/7P3	130-300	40-160	15	19	23	33	26,5	1 1/2" gas	1 1/2" gas	111	88	300	418	499
MS 152/7 P4	2SC152/7P4	150-330	40-160	10	20	15	30	32	2" gas	2" gas	121	98	430	568	649
MS 152/7 P5	2SC152/7P5	200-400	40-160	30	42	45	65	38,5	2" gas	2" gas	121	98	590	728	809
MS 152/7 P6	2SC152/7P6	100-300	40-160	21	42	35	65	44	2" gas	2" gas	121	98	720	858	939
MS 152/7 P7	2SC152/7P7	250-500	40-160	39	47	69	98	54	2" gas	2" gas	121	98	970	1108	1189
MS 152/7 P8	2SC152/7P8	250-500	40-160	48	55	88	118	62	2" gas	2" gas	121	98	1170	1308	1389
MS 152/7 P9	2SC152/7P9	250-500	40-160	55	70	97	130	70	2" gas	2" gas	121	98	1370	1508	1589

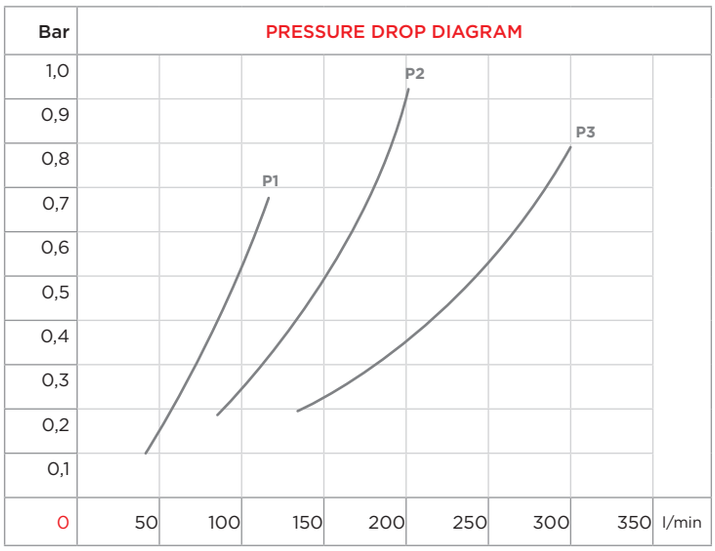
WATER FLOW RATE:

40 l/min

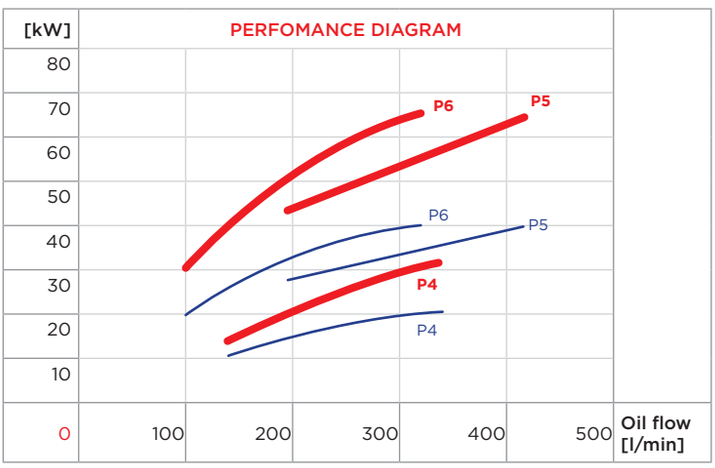
160 l/min

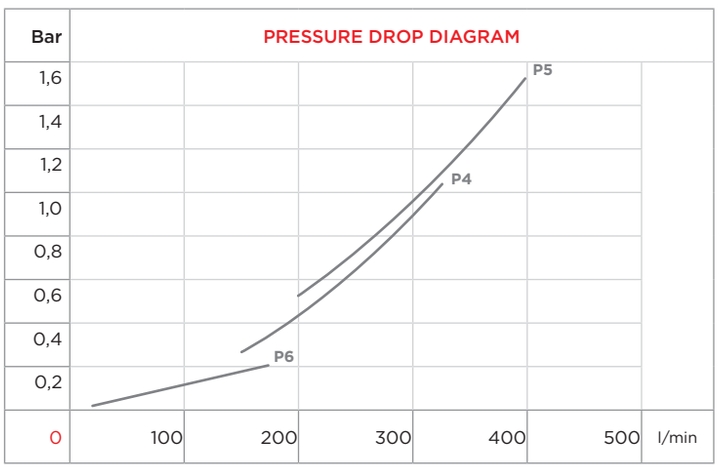
P1 P2 P3



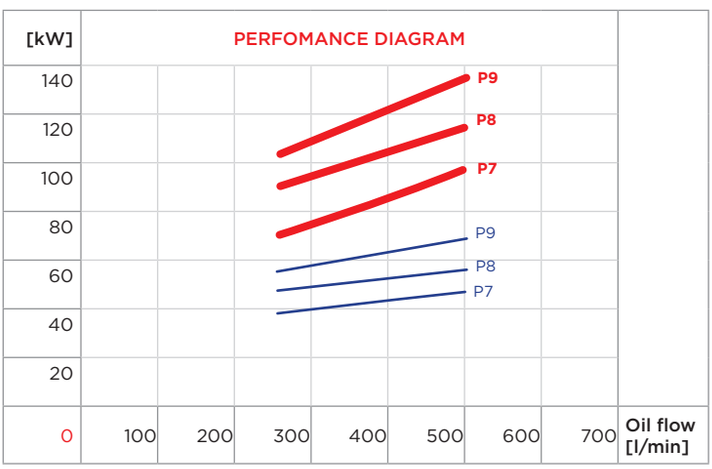


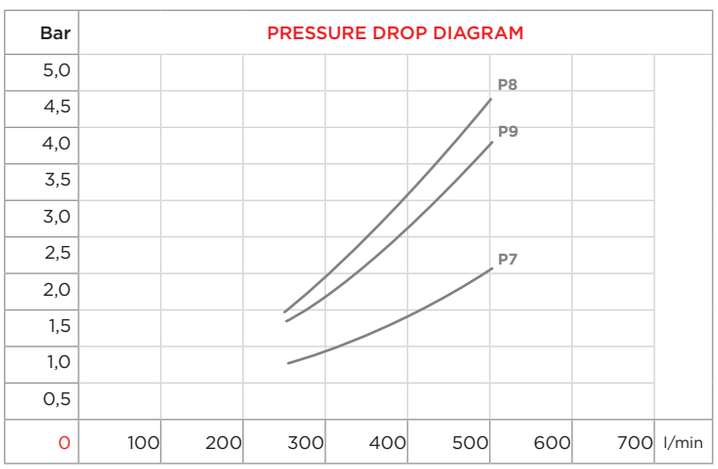
P4 P5 P6





P7 P8 P9

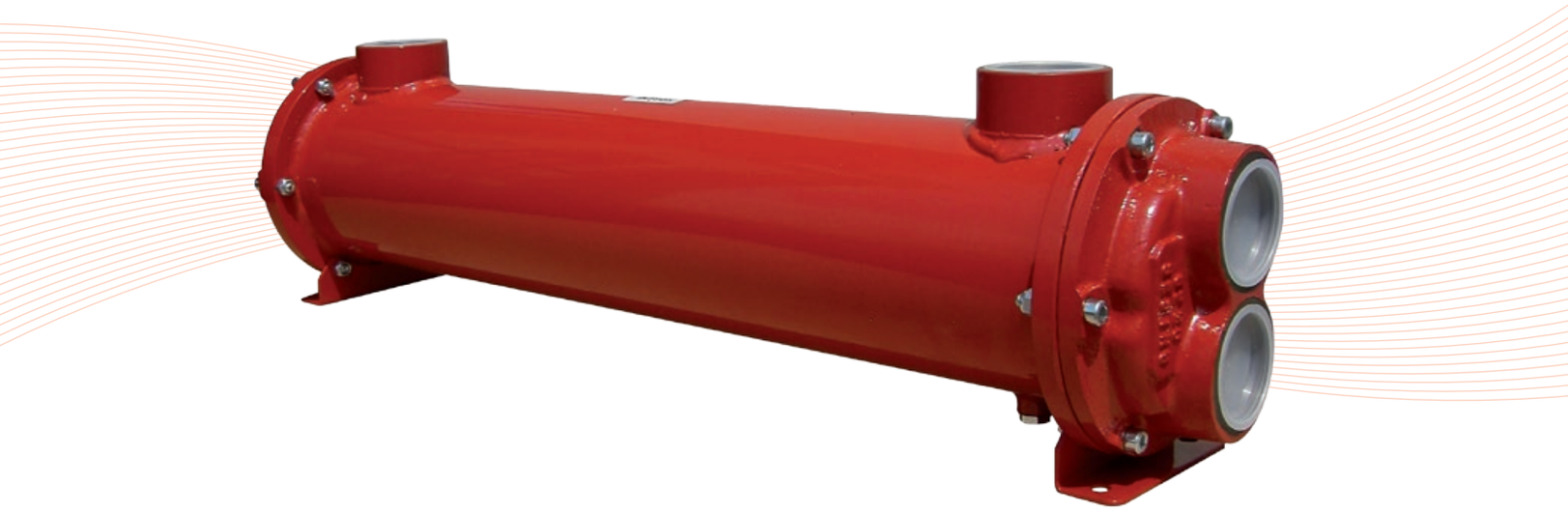




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

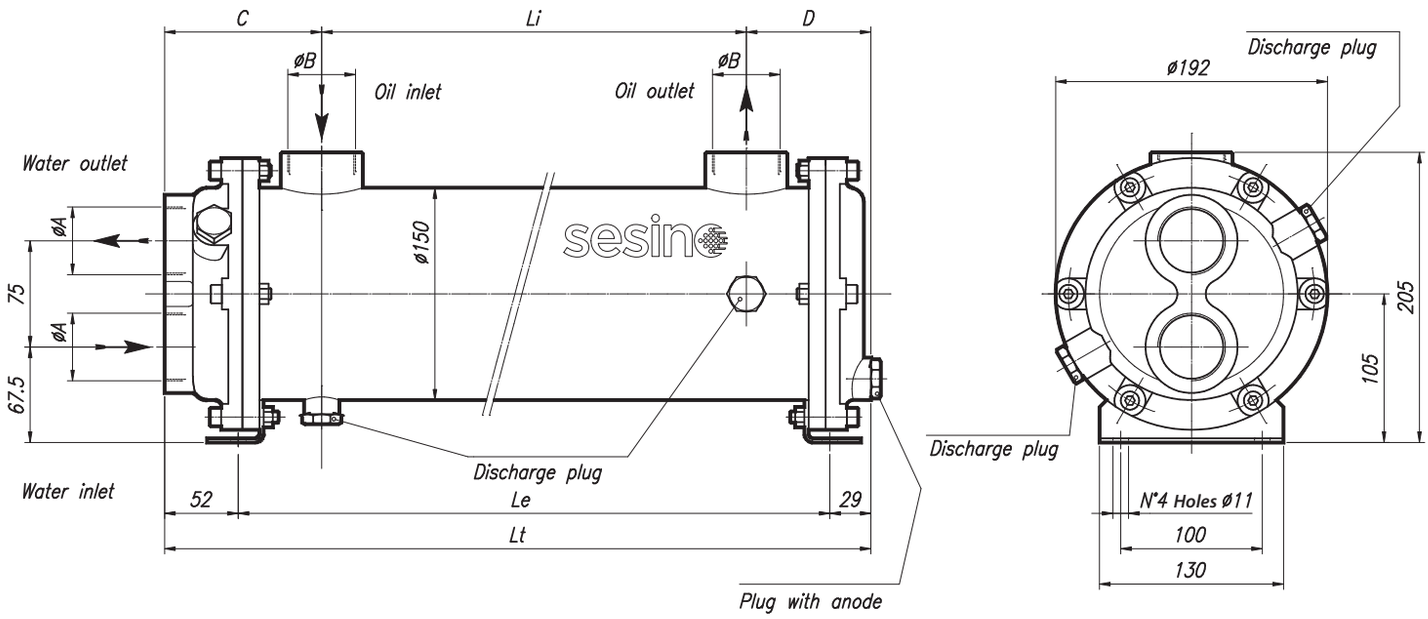
MS 152/10 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



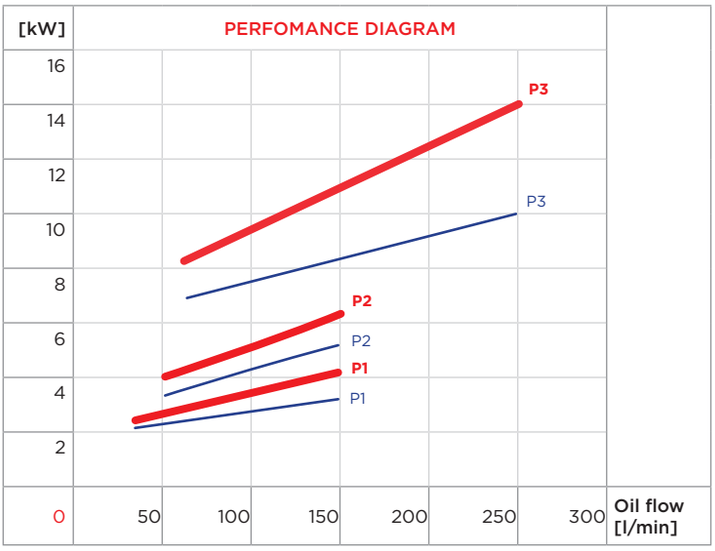
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS						
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	øA	øB	C	D	Li	Le	Lt
MS 152/10 P1	2SC152/10P1	30-150	40-160	2,1	3,5	2,5	4,5	16	1" gas	3/4" gas	101	78	80	178	259
MS 152/10 P2	2SC152/10P2	50-150	40-160	4	5	4,6	6	19	1" gas	1" gas	111	88	150	268	349
MS 152/10 P3	2SC152/10P3	60-250	40-160	7	10	8,5	14	24	1 1/2" gas	1 1/2" gas	111	88	300	418	499
MS 152/10 P4	2SC152/10P4	90-200	40-160	12	17	16	21	29	2" gas	2" gas	121	98	430	568	649
MS 152/10 P5	2SC152/10P5	140-260	40-160	15	20	21	30	34	2" gas	2" gas	121	98	590	728	809
MS 152/10 P6	2SC152/10P6	160-300	40-160	19	26	27	37	39	2" gas	2" gas	121	98	720	858	939
MS 152/10 P7	2SC152/10P7	100-300	40-160	15	19	31	42	47	2" gas	2" gas	121	98	858	1108	1189
MS 152/10 P8	2SC152/10P8	100-250	40-160	29	35	41	52	54	2" gas	2" gas	121	98	1108	1308	1389
MS 152/10 P9	2SC152/10P9	200-380	40-160	43	46	64	72	61	2" gas	2" gas	121	98	1308	1508	1589

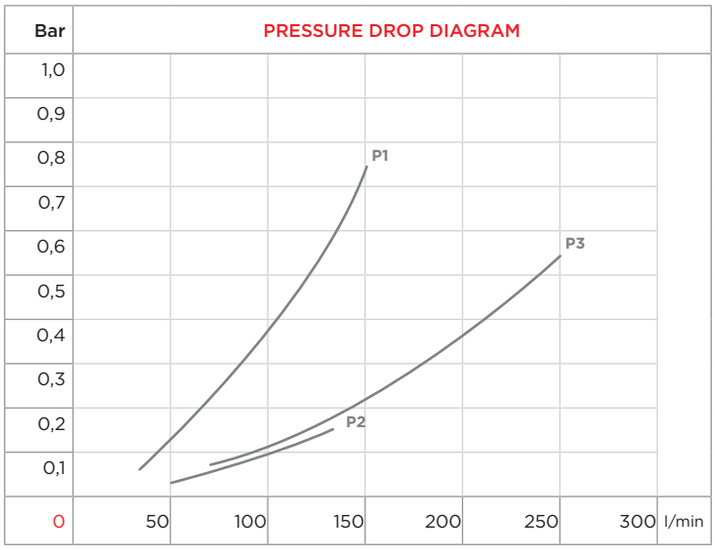
WATER FLOW RATE:

40 l/min

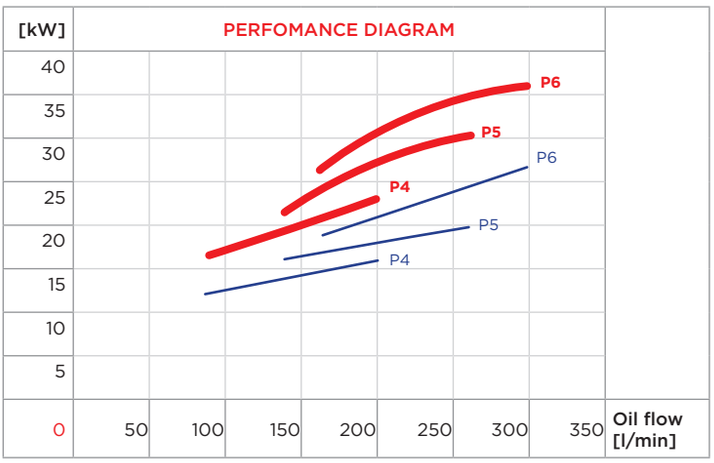
160 l/min

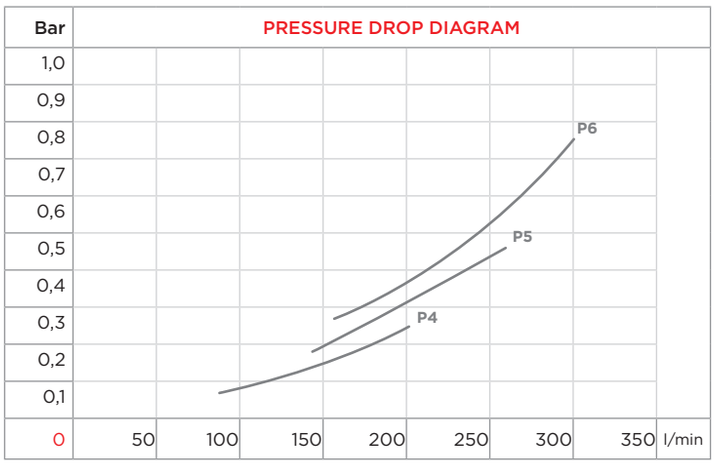
P1 P2 P3



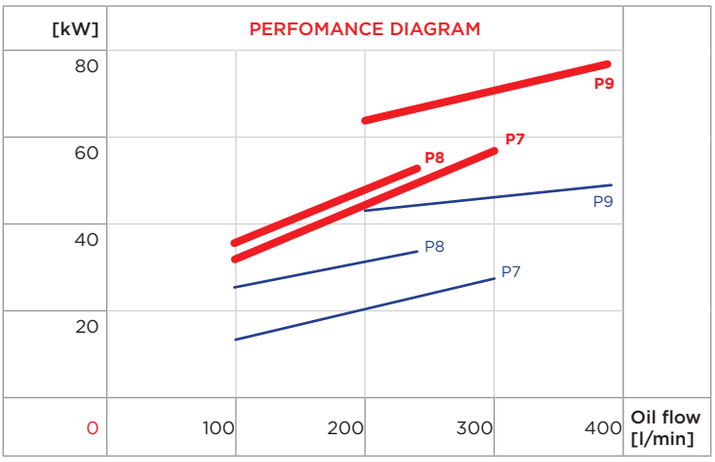


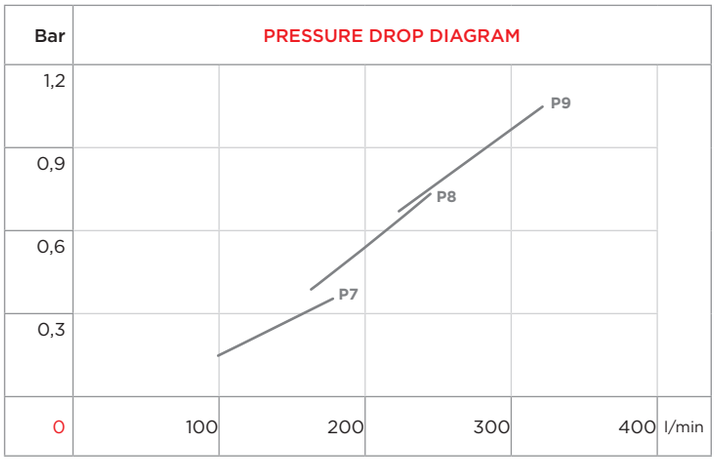
P4 P5 P6





P7 P8 P9

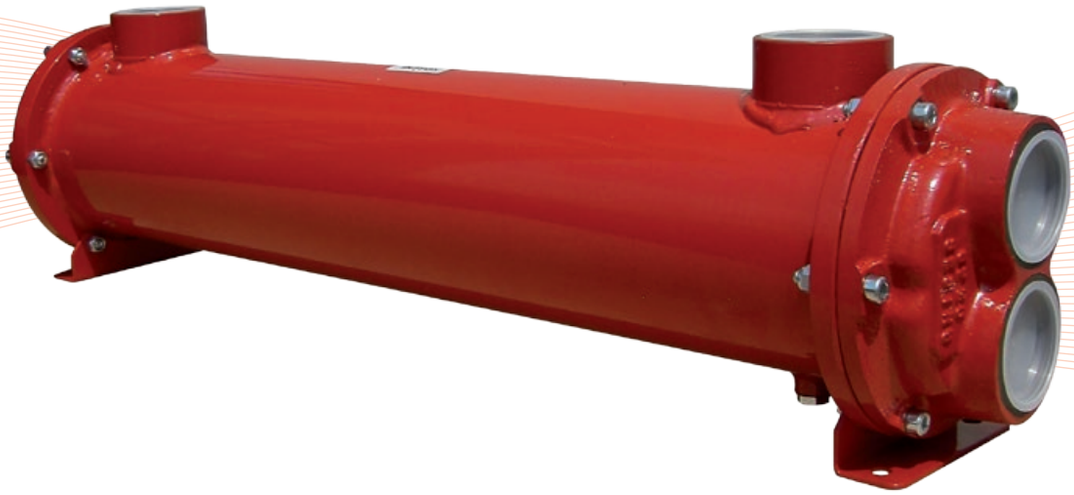




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

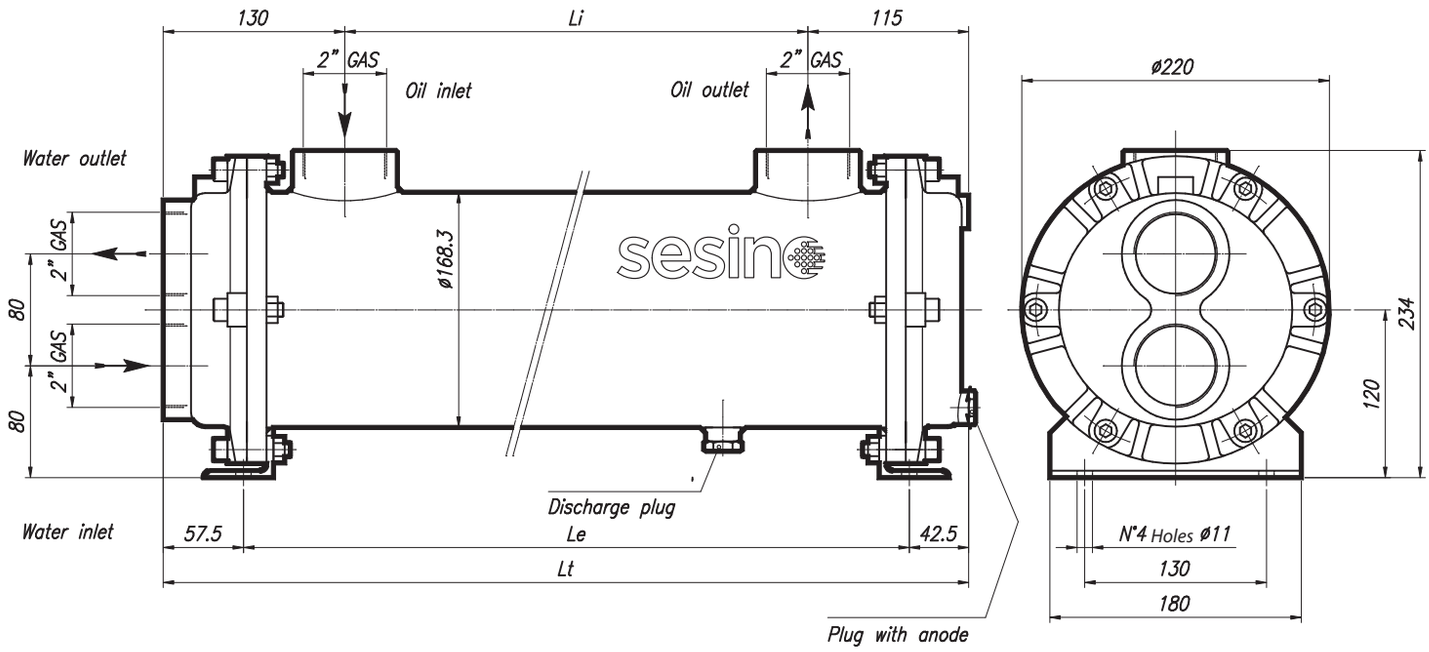
MS 172/7 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



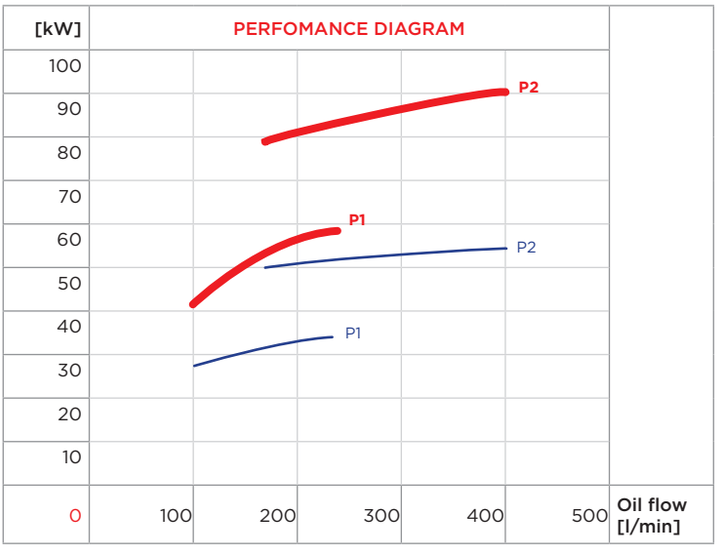
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 172/7 P1	2SC172/7P1	100-240	67,5-270	28	34	42	60	42	355	500	600
MS 172/7 P2	2SC172/7P2	160-400	67,5-270	50	57	78	92	50,5	505	650	750
MS 172/7 P3	2SC172/7P3	260-420	67,5-270	63	71	110	136	59	655	800	900
MS 172/7 P4	2SC172/7P4	340-500	67,5-270	76	92	136	171	68,5	830	975	1075
MS 172/7 P5	2SC172/7P5	180-320	67,5-270	88	96	143	170	78	1005	1150	1250
MS 172/7 P6	2SC172/7P6	140-500	67,5-270	89	117	148	230	86	1155	1300	1400
MS 172/7 P7	2SC172/7P7	250-550	67,5-270	113	138	200	267	97	1355	1500	1600

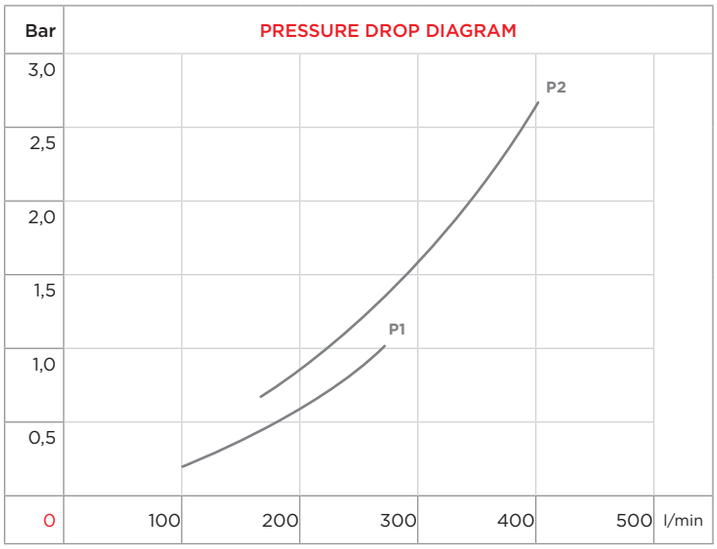
WATER FLOW RATE:

67,5 l/min

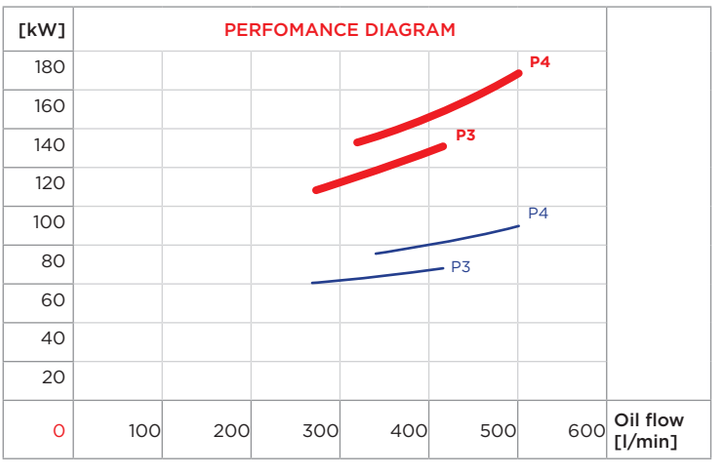
270 l/min

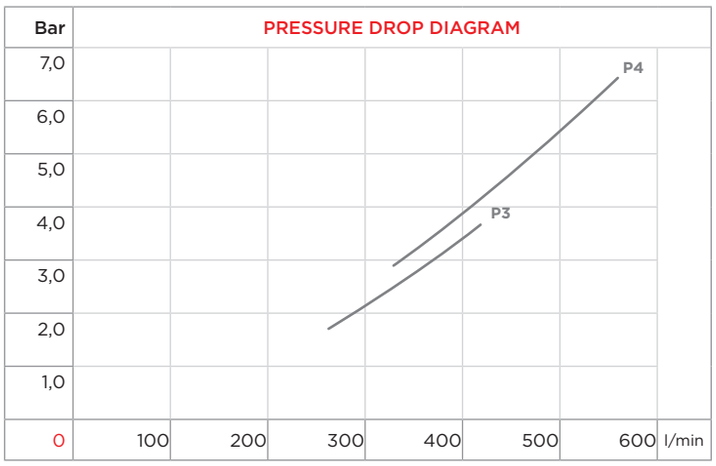
P1 P2



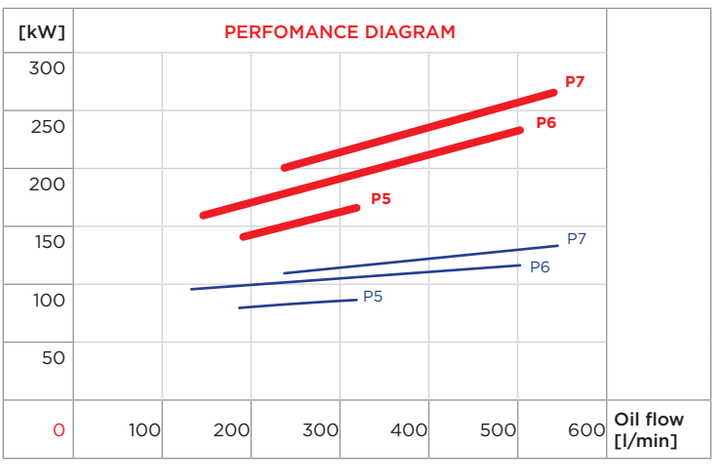


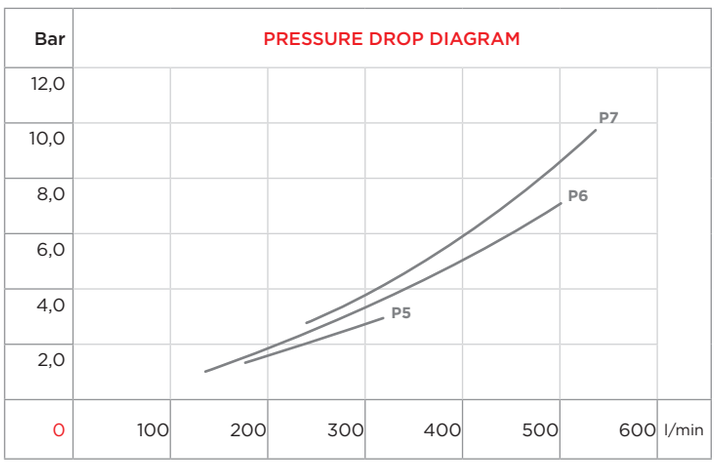
P3 P4





P5 P6 P7

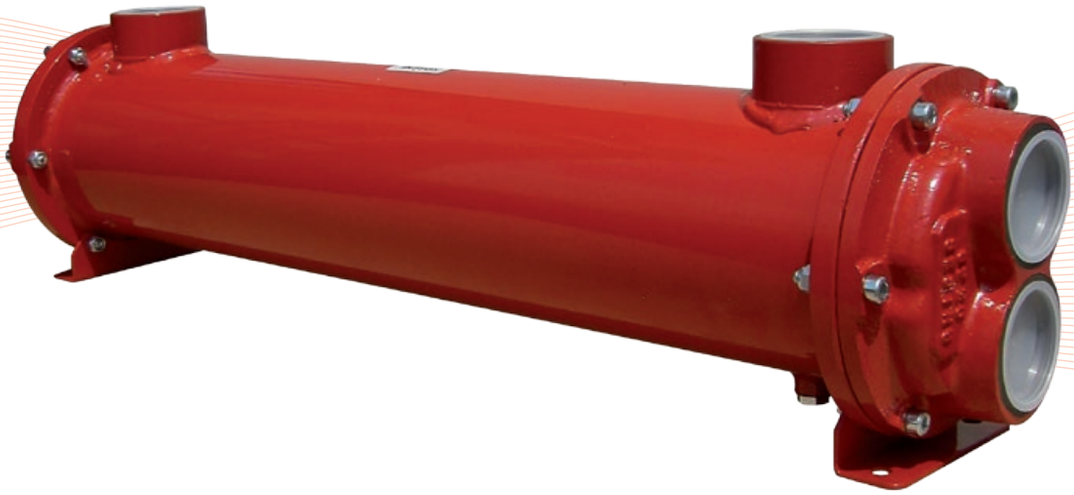




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

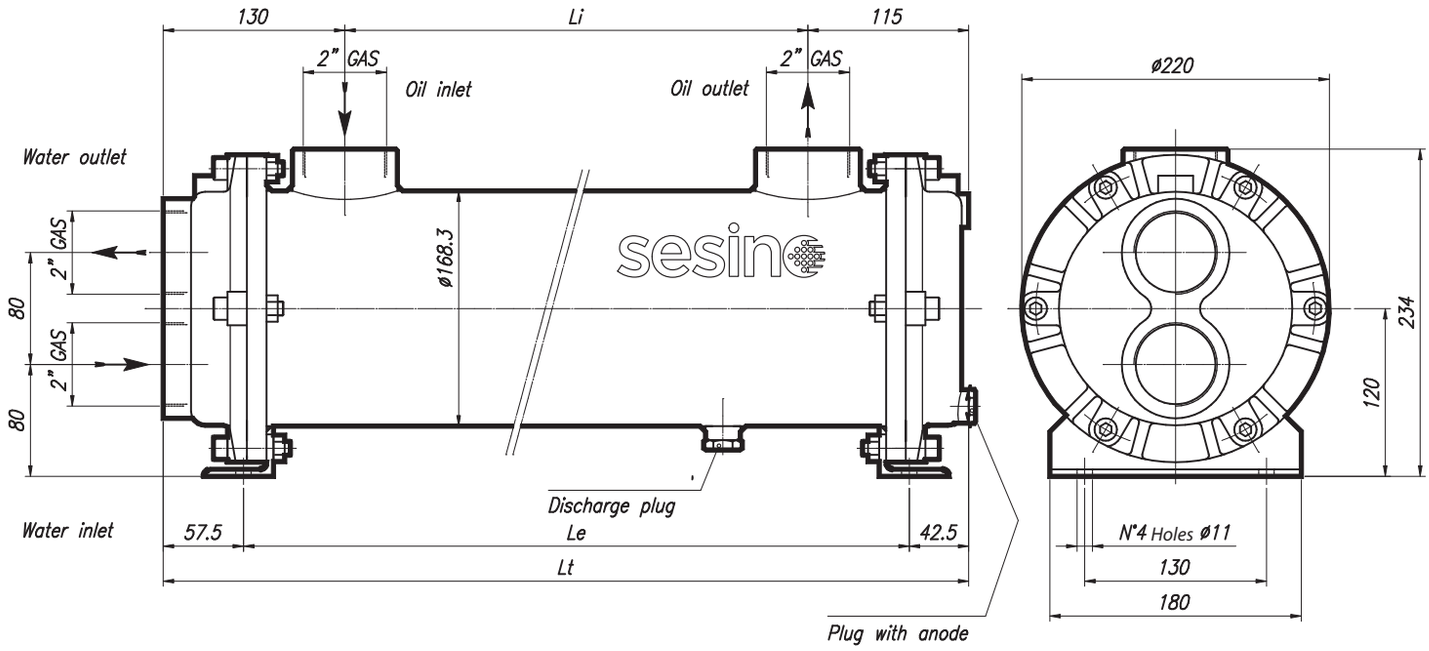
MS 172/10 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



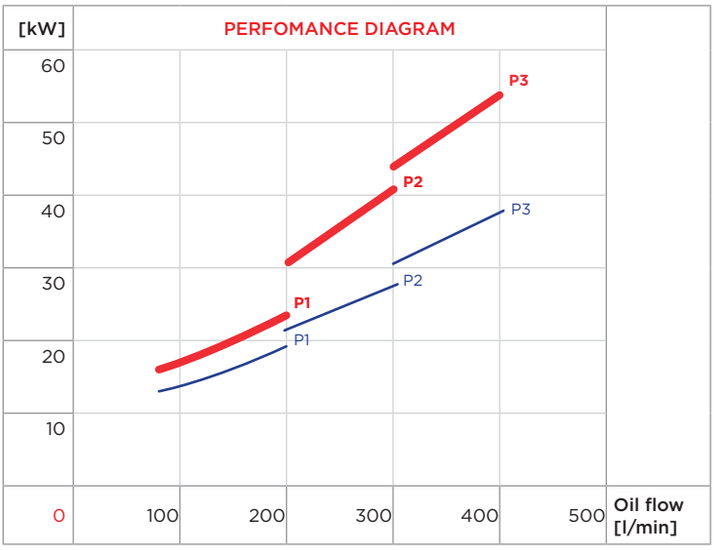
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 172/10 P1	**2SC172/10P1**	80-200	67,5-270	13	18	16	24	36	355	500	600
MS 172/10 P2	**2SC172/10P2**	200-300	67,5-270	22	28	31	41	42,5	505	650	750
MS 172/10 P3	**2SC172/10P3**	300-400	67,5-270	31	38	44	55	54,5	655	800	900
MS 172/10 P4	**2SC172/10P4**	120-280	67,5-270	26	39	35	56	63	830	975	1075
MS 172/10 P5	**2SC172/10P5**	280-400	67,5-270	51	57	69	88	71,5	1005	1150	1250
MS 172/10 P6	**2SC172/10P6**	100-300	67,5-270	46	61	61	85	79	1155	1300	1400
MS 172/10 P7	**2SC172/10P7**	300-500	67,5-270	69	89	90	115	88,5	1355	1500	1600

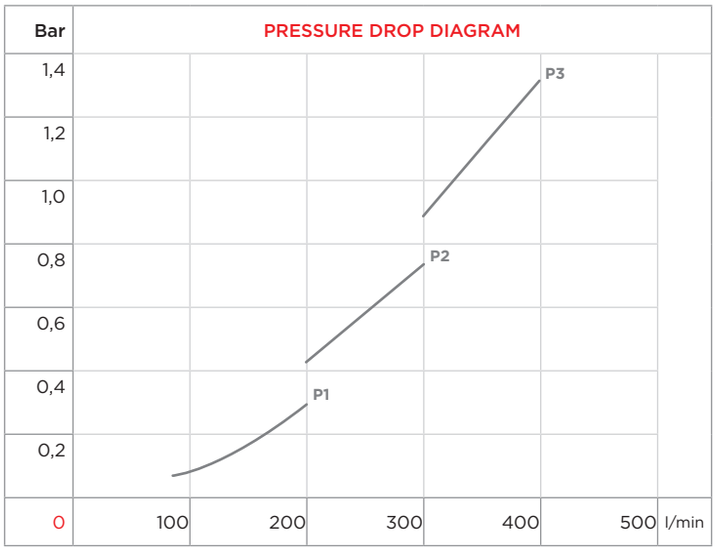
WATER FLOW RATE:

67,5 l/min

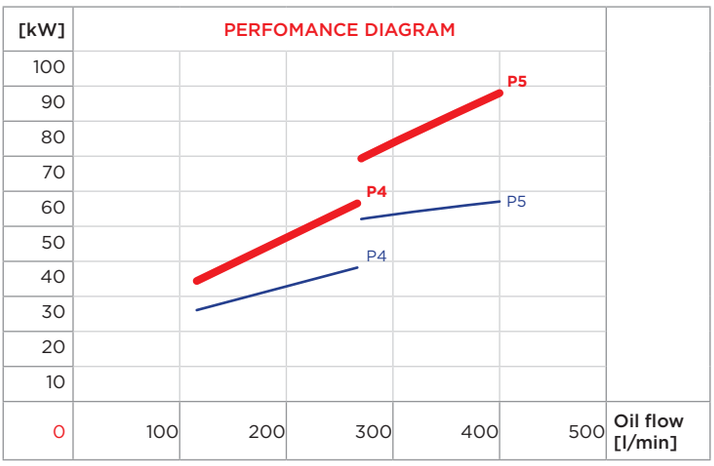
270 l/min

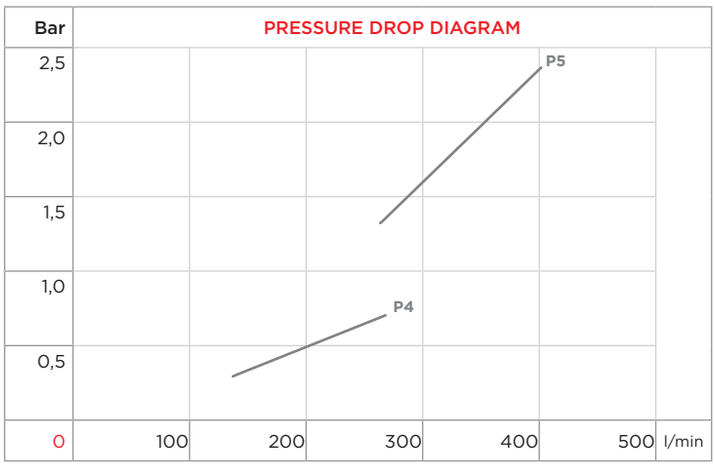
P1 P2 P3



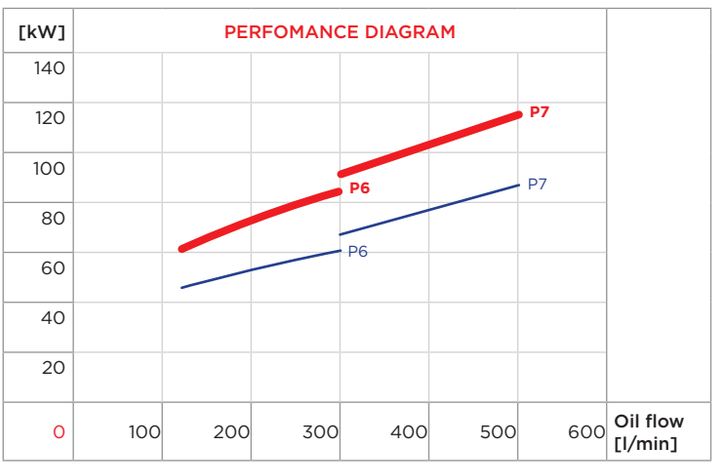


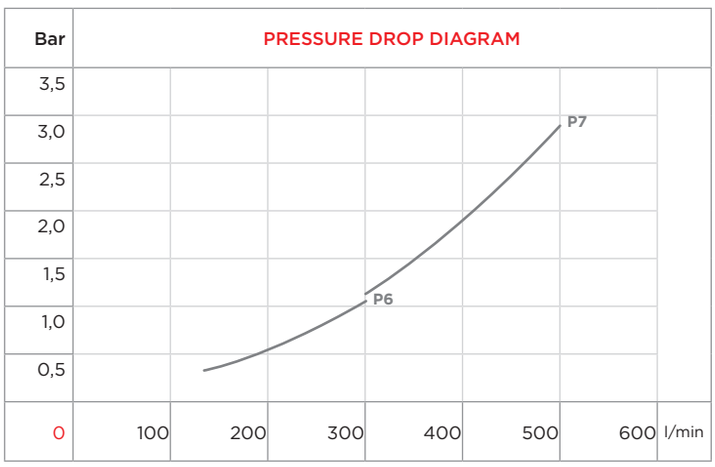
P4 P5





P6 P7





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

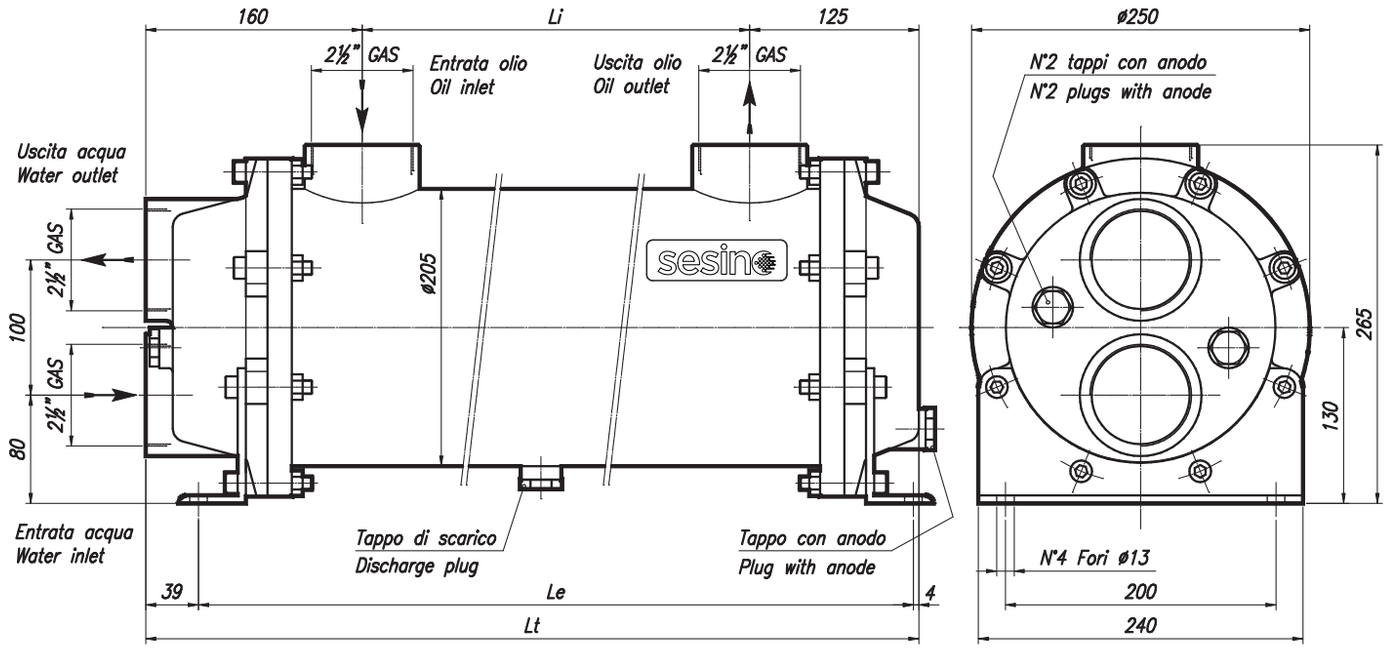
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

MS 202 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



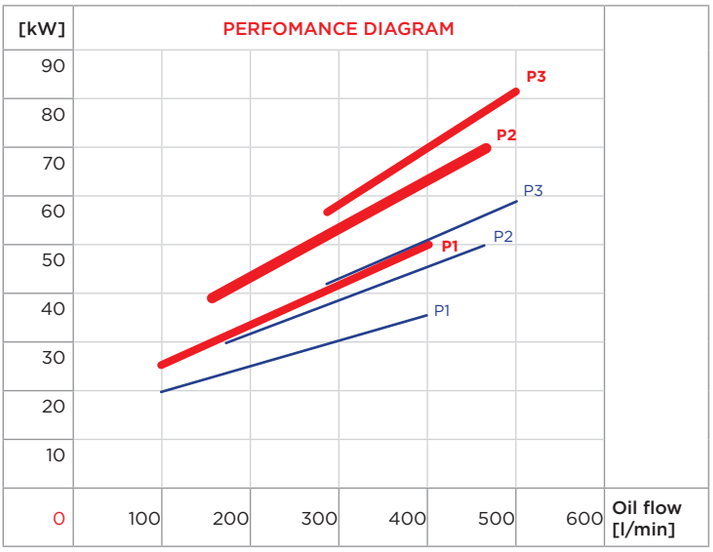
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 202 P1	2SC202P1	100-400	105-420	20	35	24	51	47	340	582	630
MS 202 P2	2SC202P2	160-460	105-420	29	50	39	69	56	500	742	790
MS 202 P3	2SC202P3	280-500	105-420	42	57	56	82	72,5	660	902	950
MS 202 P4	2SC202P4	260-560	105-420	46	76	67	109	84	820	1062	1110
MS 202 P5	2SC202P5	300-600	105-420	56	78	79	125	94	980	1222	1270
MS 202 P6	2SC202P6	340-600	105-420	73	98	98	148	104	1140	1382	1430
MS 202 P7	2SC202P7	280-600	105-420	68	90	92	123	114	1300	1542	1590
MS 202 P8	2SC202P8	200-600	105-420	102	134	141	177	124,5	1460	1702	1750
MS 202 P9	2SC202P9	460-800	105-420	132	168	176	221	135	1620	1862	1910
MS 202 P10	2SC202P10	520-800	105-420	145	197	191	260	145,5	1780	2022	2070

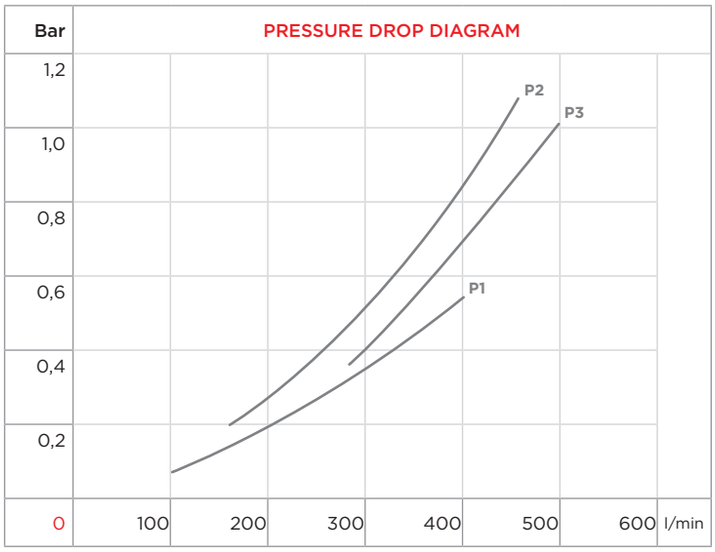
WATER FLOW RATE:

105 l/min

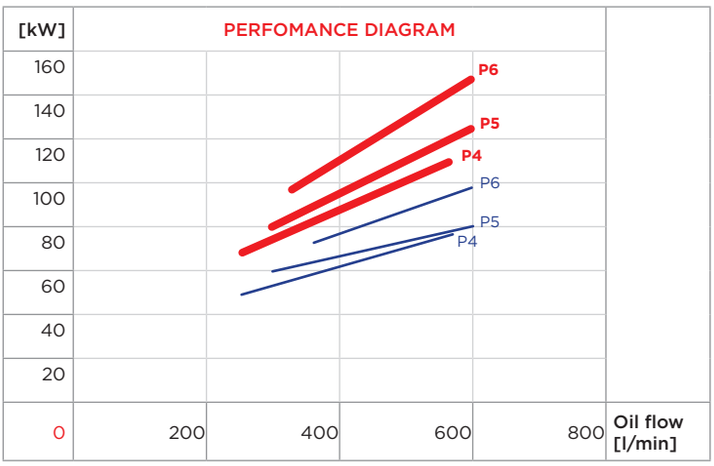
420 l/min

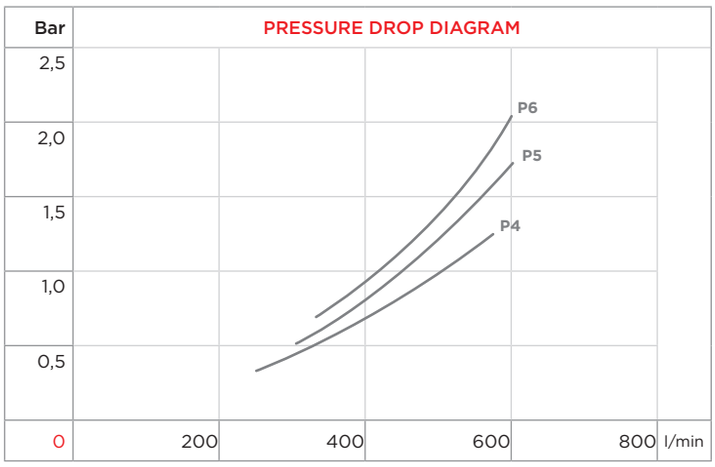
P1 P2 P3



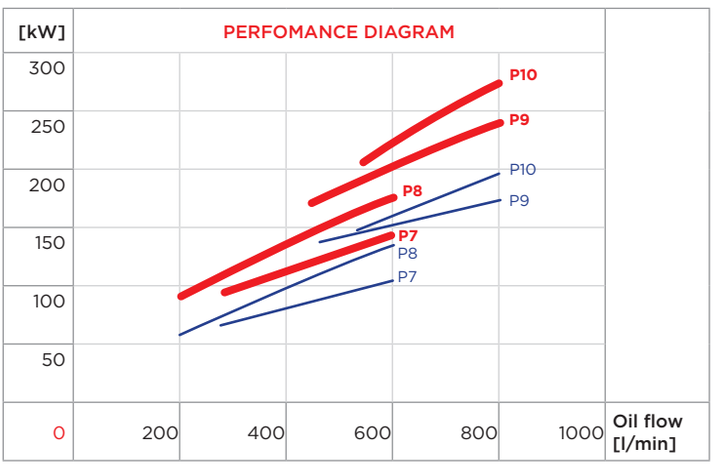


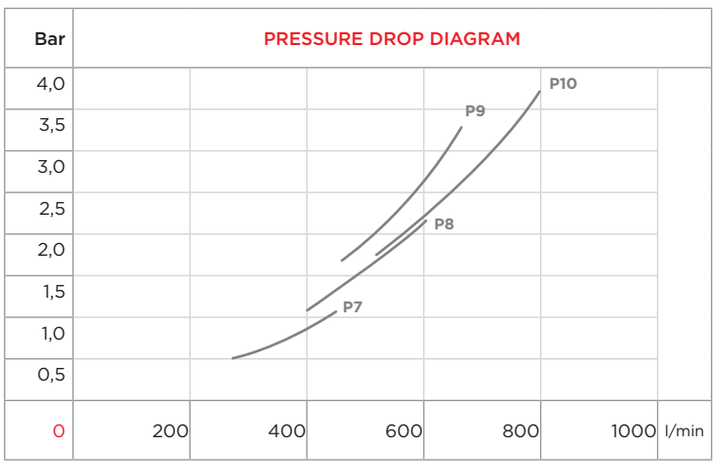
P4 P5 P6





P7 P8 P9 P10





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

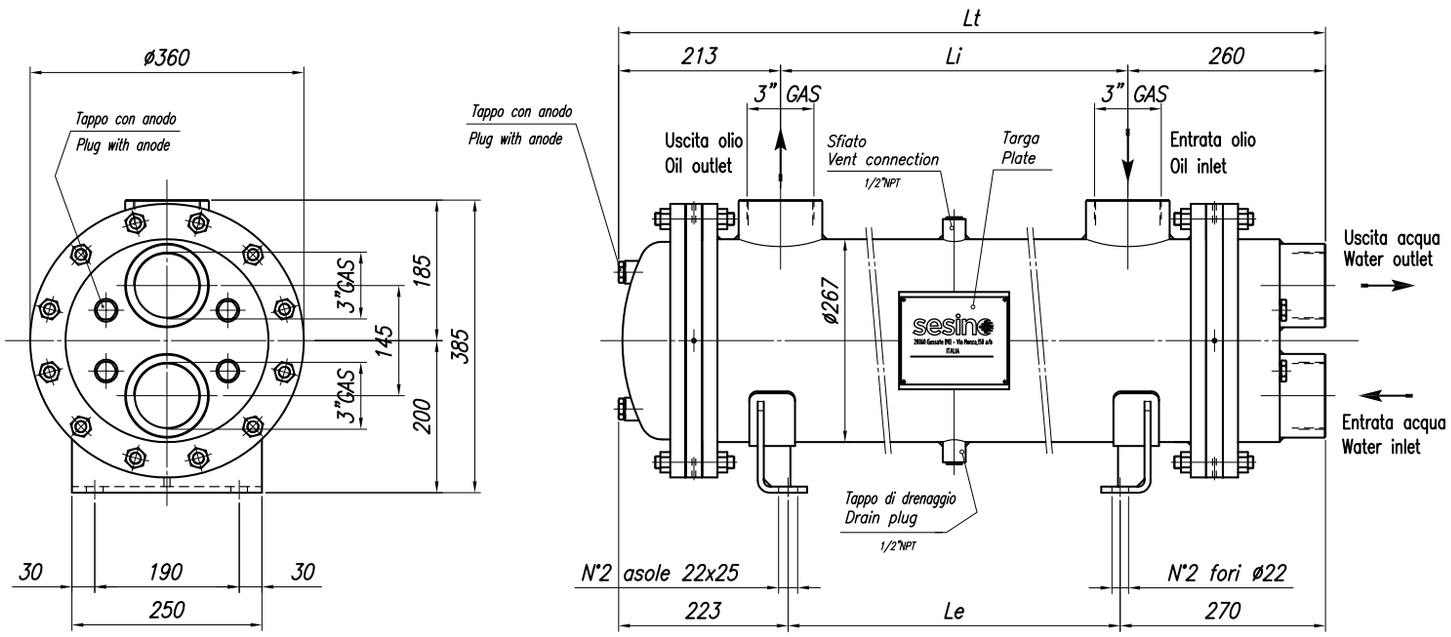
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

MS 272 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



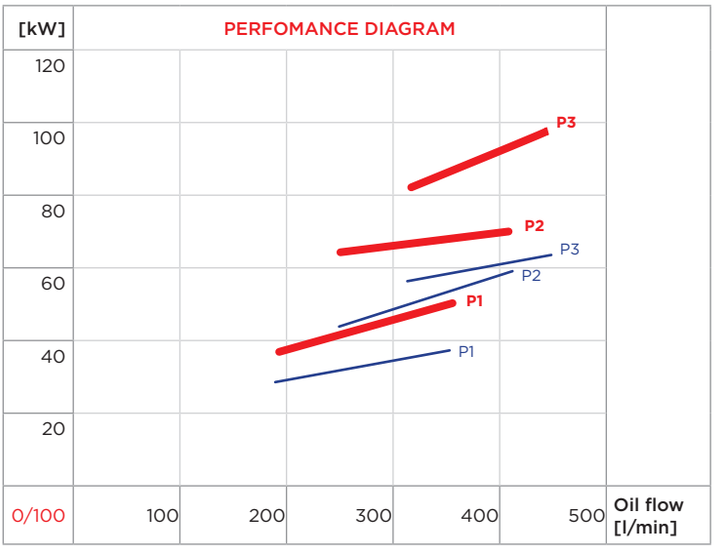
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 272 P1	2SC272P1	190-350	146-583	28	36	37	51	142	255	235	728
MS 272 P2	2SC272P2	250-410	146-583	48	60	64	78	160	385	365	858
MS 272 P3	2SC272P3	310-450	146-583	56	66	81	97	172	505	485	978
MS 272 P4	2SC272P4	250-500	146-583	93	114	135	166	214	850	830	1323
MS 272 P5	2SC272P5	300-560	146-583	124	146	181	204	236	1040	1020	1513
MS 272 P6	2SC272P6	300-600	146-583	158	182	239	277	273	1360	1340	1833
MS 272 P7	2SC272P7	460-740	146-583	214	242	335	376	327	1825	1805	2298

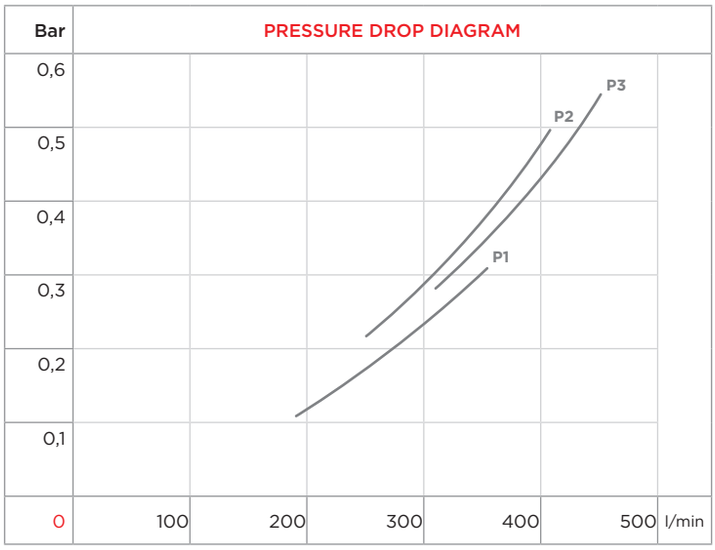
WATER FLOW RATE:

146 l/min

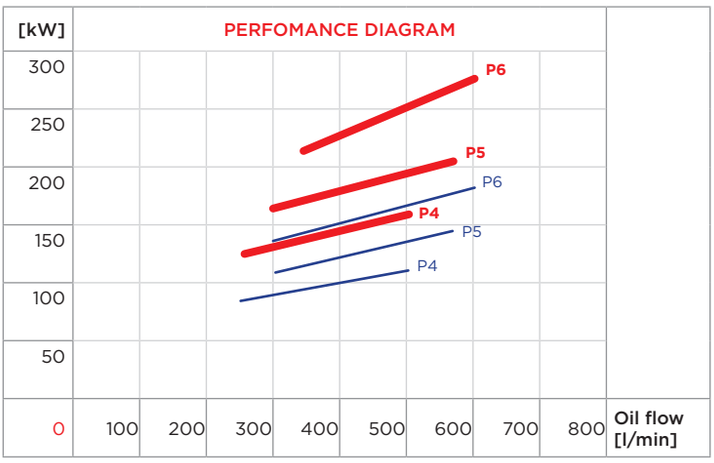
583 l/min

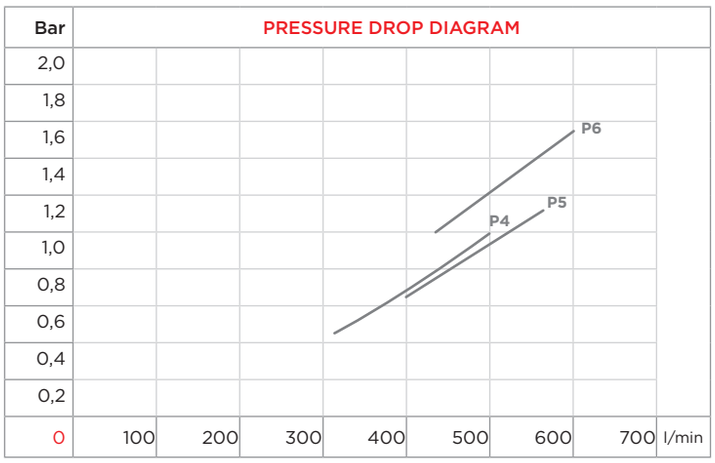
P1 P2 P3



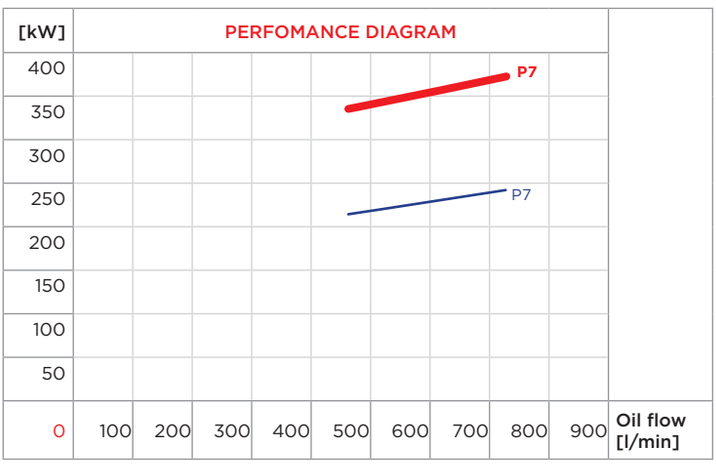


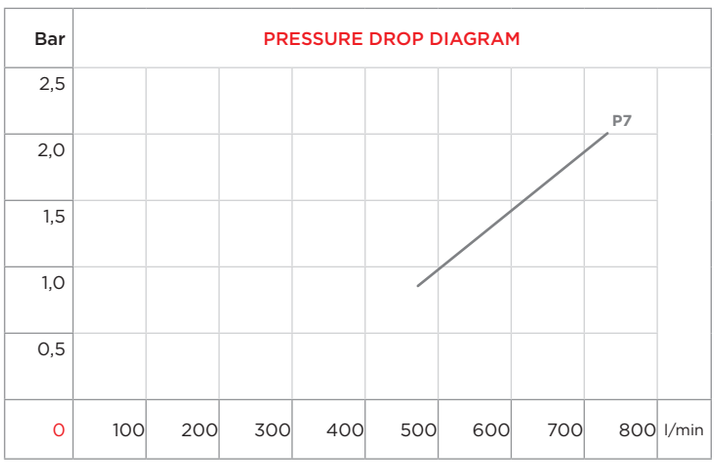
P4 P5 P6





P7





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

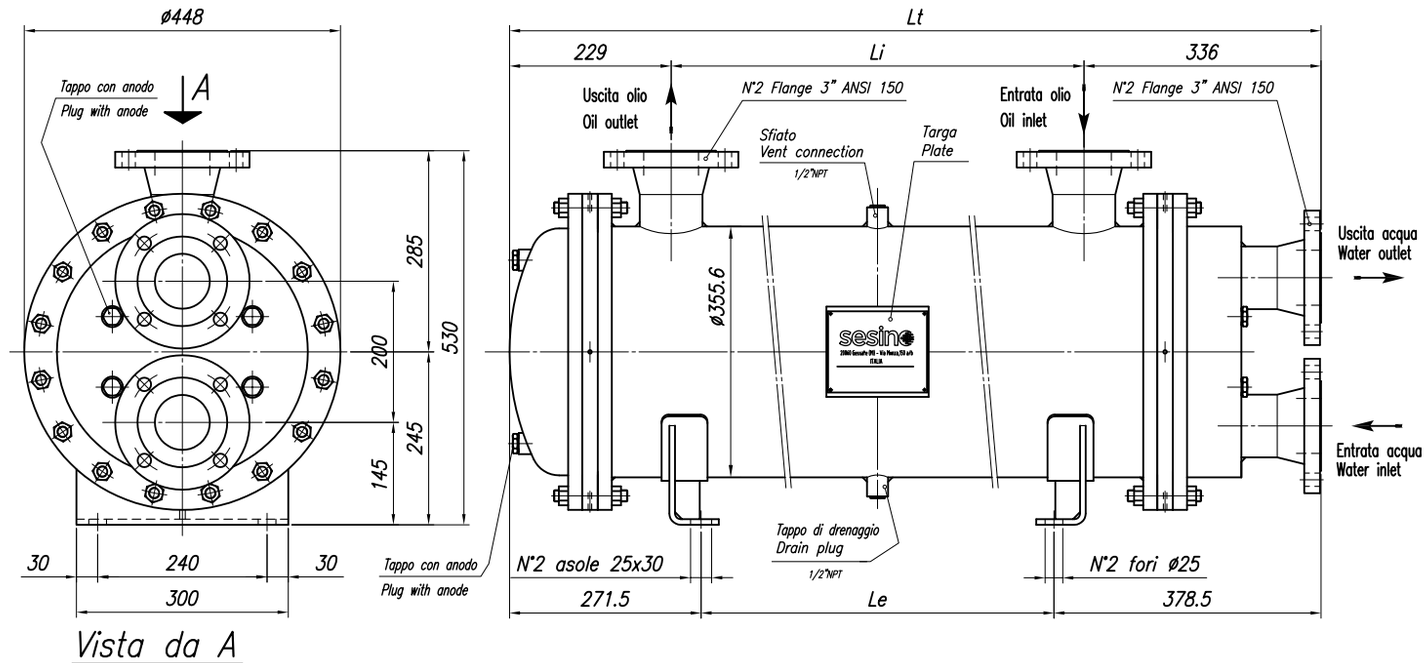
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

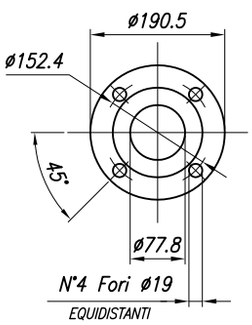
MS 352 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding





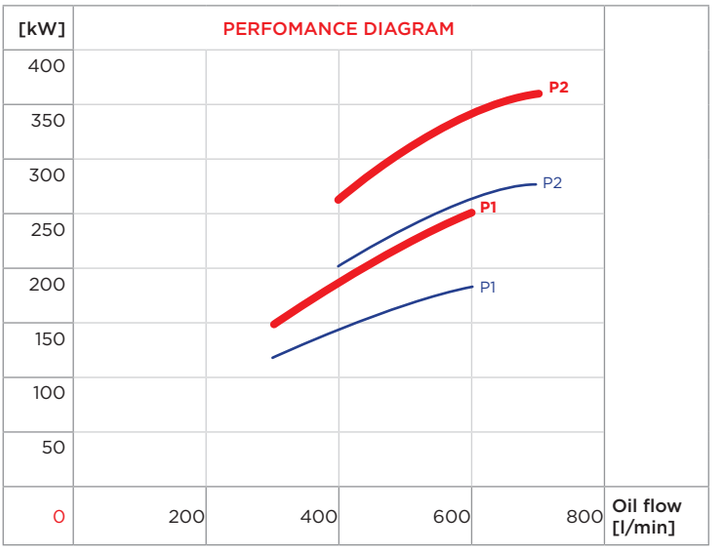
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 352 P1	2SC352P1	300-600	292-1166	117	180	148	258	400	985	900	1550
MS 352 P2	2SC352P2	400-700	292-1166	202	278	261	360	460	1280	1195	1845
MS 352 P3	2SC352P3	500-800	292-1166	247	310	333	415	525	1600	1515	2165
MS 352 P4	2SC352P4	300-680	292-1166	214	328	273	451	577	1845	1760	2410
MS 352 P5	2SC352P5	300-680	292-1166	232	370	295	513	640	2140	2055	2705

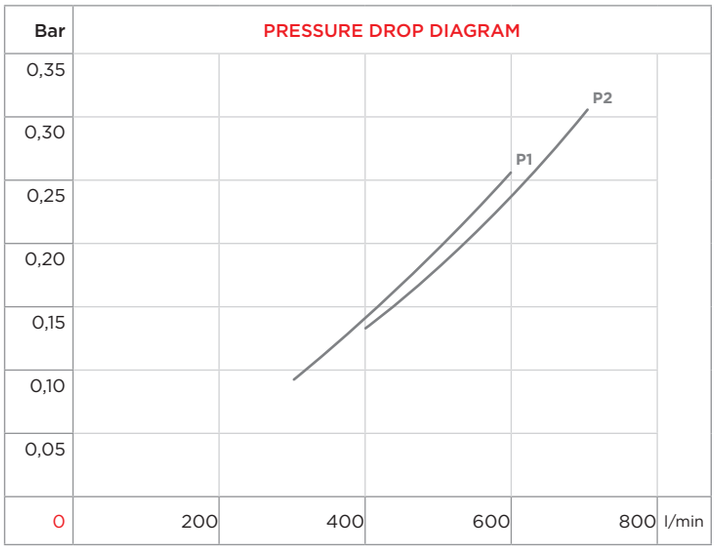
WATER FLOW RATE:

292 l/min

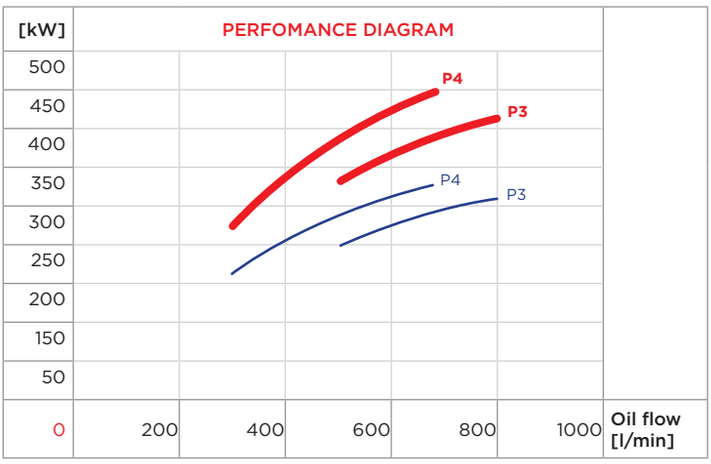
1166 l/min

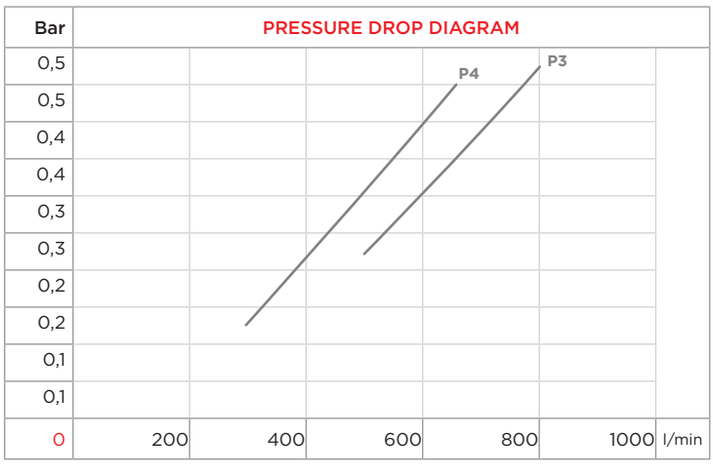
P1 P2



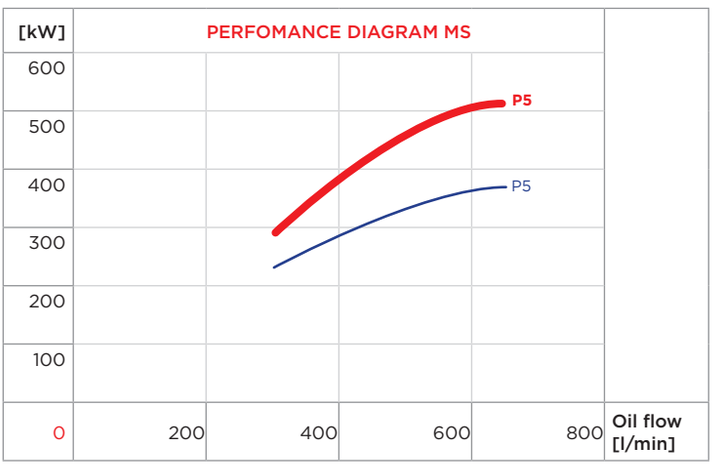


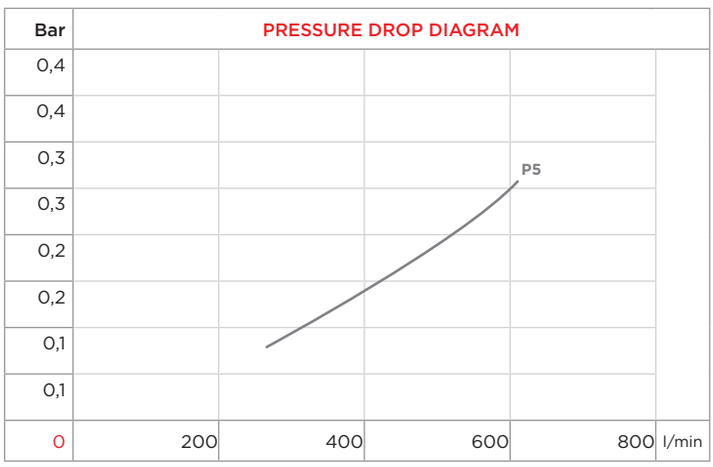
P3 P4





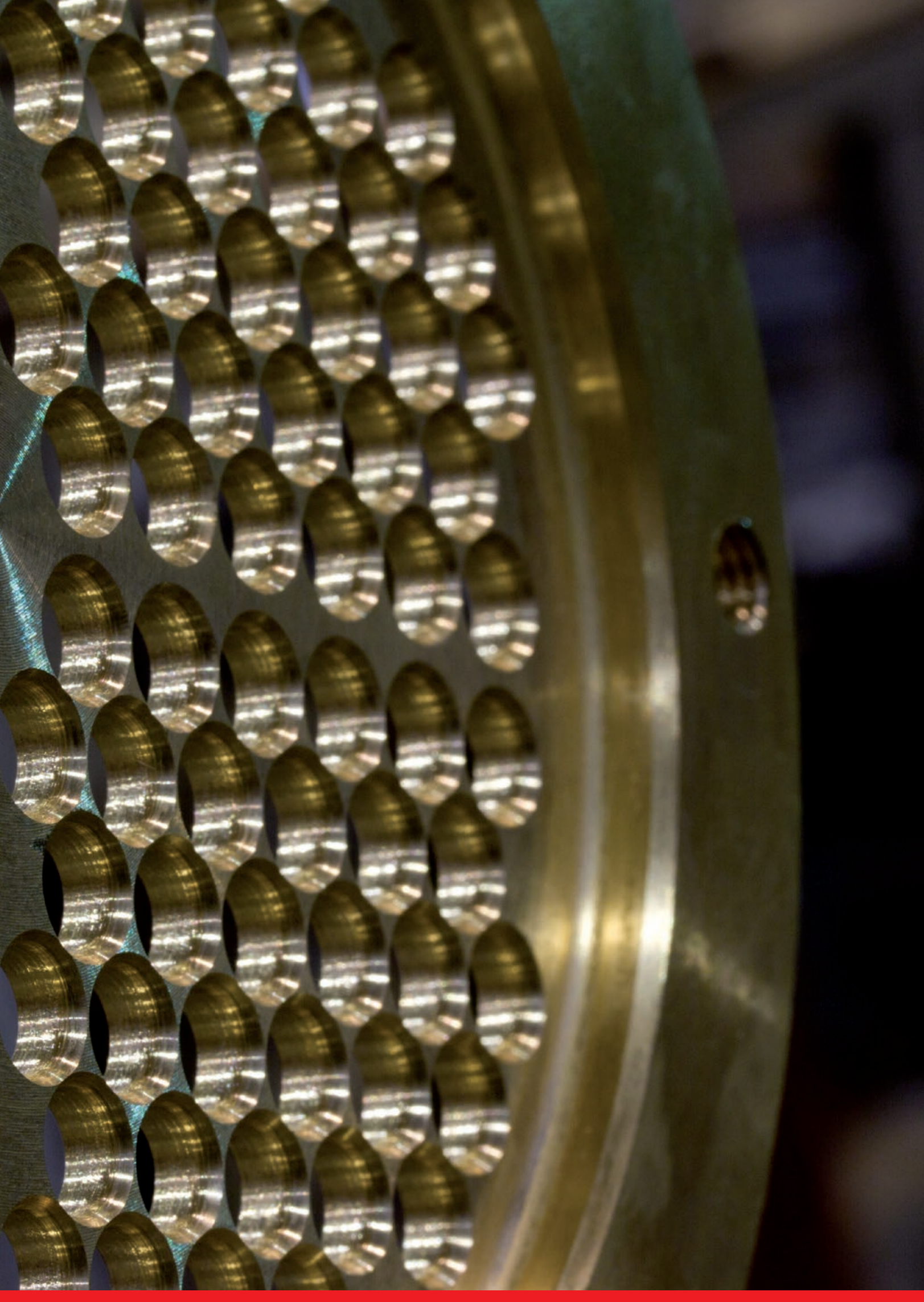
P5





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6



NOT INSPECTABLE WATER SIDE OUTSIDE/INSIDE THE TANK
NON ISPEZIONABILI LATO ACQUA ESTERNI/INTERNI AL SERBATOIO

HEAT EXCHANGERS WITH NOT INSPECTABLE WATER SIDE TUBE BUNDLE, OUTSIDE/INSIDE THE TANK

They are exchangers with a maximum exchange surfaces of 0,7 m^2, fit to cool little powerful plants.

The fixing of this kind of exchanger, can be carried out through tubes for oil inlet and outlet, if rigid; or, upon request, through clamps of our production.

They cannot be checked neither from the water side nor from the oil side and therefore cannot be used with dirty or not filtered fluids.

Thanks to their simple structure, their price is very competitive. They are chosen when the cheapness of the plant is very important.

SCAMBIATORI DI CALORE A FASCIO TUBIERO NON ISPEZIONABILI LATO ACQUA ESTERNI/ INTERNI AL SERBATOIO

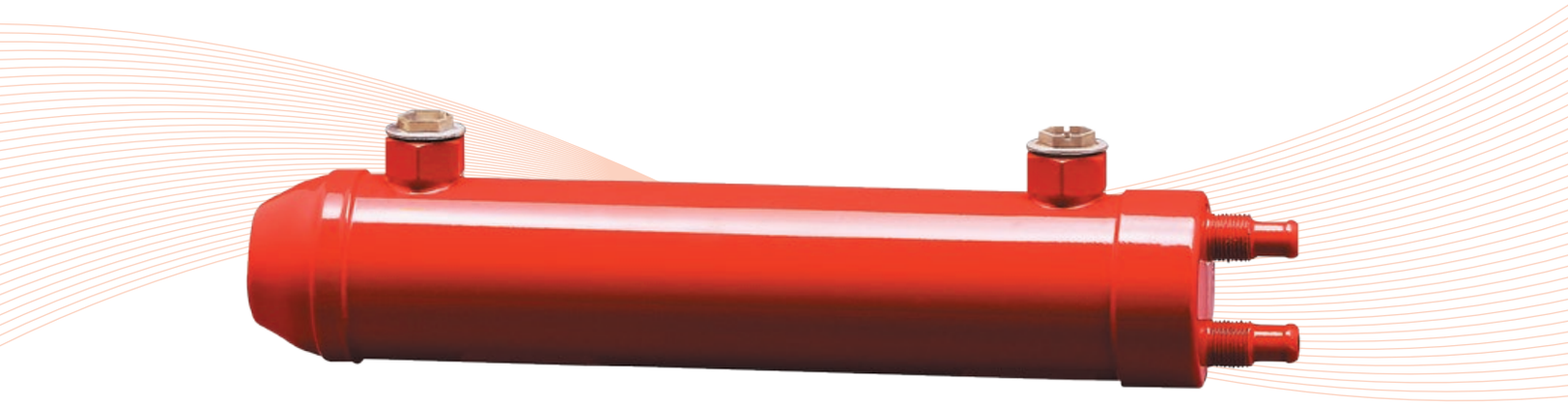
Sono apparecchi con una superficie massima di 0,7 m^2, adatti quindi a raffreddare impianti di piccola potenza.

Il fissaggio di questi scambiatori alla centralina può essere effettuato per mezzo dei tubi di entrata e uscita olio, se rigidi, oppure per mezzo di fascette di nostra fornitura, su richiesta.

Non sono ispezionabili né lato acqua né lato olio e pertanto non possono essere impiegati con fluidi sporchi, o comunque non filtrati.

Data la loro semplicità costruttiva, il prezzo di questi scambiatori è estremamente competitivo e ciò li fa preferire nei casi in cui è preminente l'economicità dell'impianto.

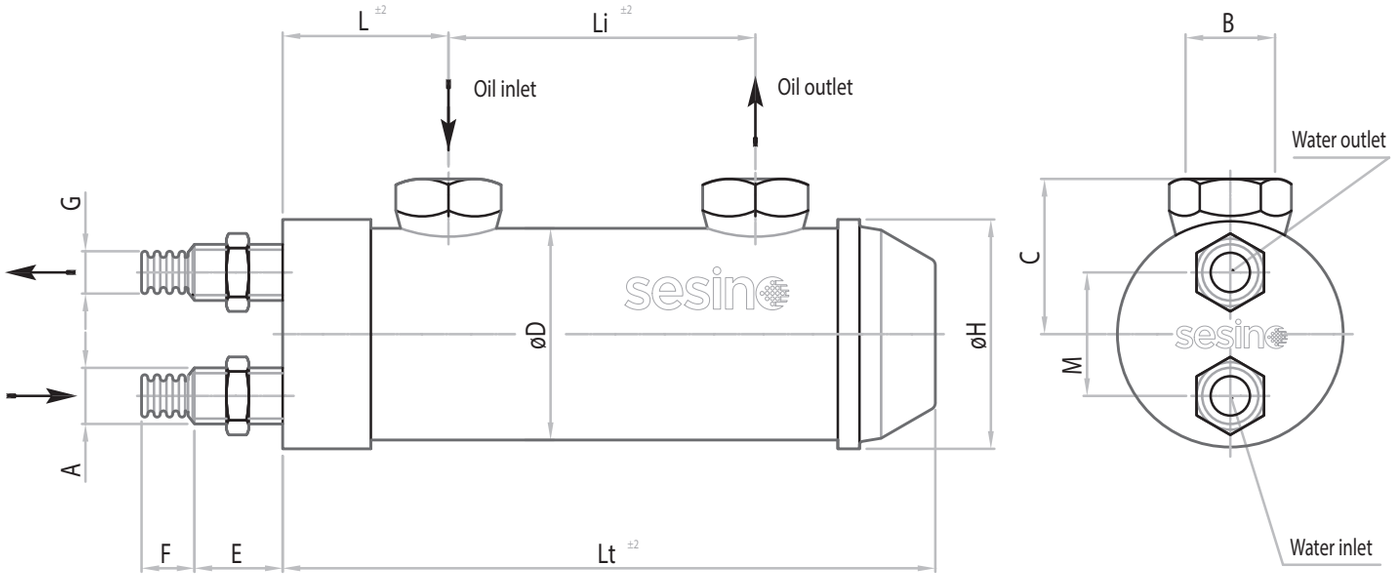
T60-80 CB



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS*	COPPER*	/

*standard

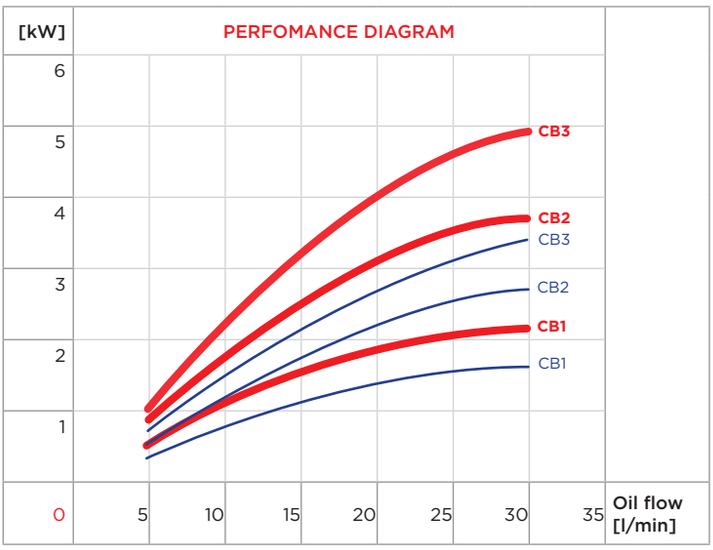
- Dimensions and technical characteristics are not binding

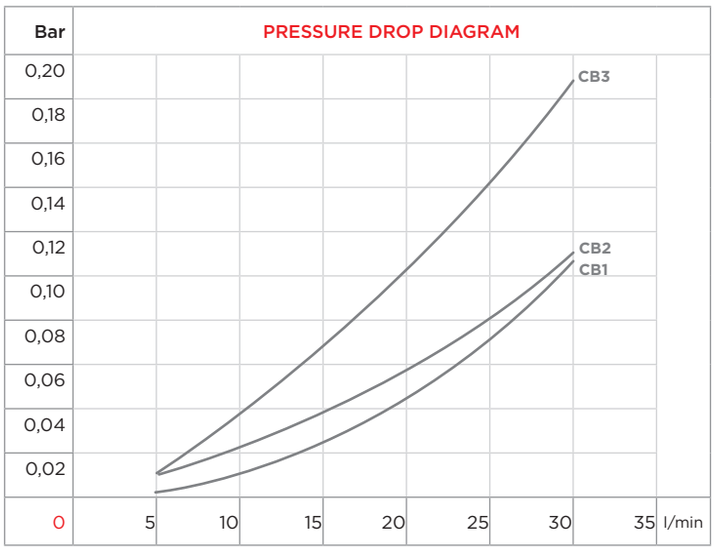


TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS											
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Lt	D	A	B	H	Li	G	M	C	L	F	E
T60 CB1	2SC60CB1	5-30	7,5 - 30	0,3	1,57	0,3	2,24	1,9	235	60	3/8" gas	1/2" gas	65	140	12	35	47	47	17	20
T60 CB2	2SC60CB2	5-30	7,5 - 30	0,4	2,44	0,61	3,48	2,6	355	60	3/8" gas	1/2" gas	65	260	12	35	47	47	17	20
T60 CB3	2SC60CB3	5-30	7,5 - 30	0,7	3,4	1	5,3	3,8	535	60	3/8" gas	1 1/2" gas	65	440	12	35	47	47	17	20
T80 CB1	2SC80CB1	25-50	7,5 - 30	2,33	2,94	2,9	3,89	3,2	255	80	1/2" gas	3/4" gas	85	120	17	45	65	60	20	20
T80 CB2	2SC80CB2	25-60	7,5 - 30	3,4	4,49	4,43	6,12	5,1	415	80	1/2" gas	3/4" gas	85	280	17	45	65	60	20	20
T80 CB3	2SC80CB3	30-80	7,5 - 30	5,95	7,3	8,13	10,5	8,0	665	80	1/2" gas	3/4" gas	85	530	17	45	65	60	20	20

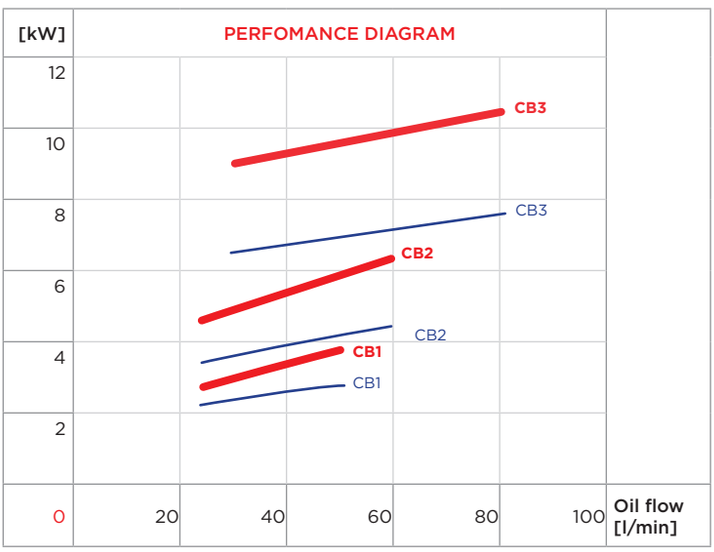
WATER FLOW RATE:

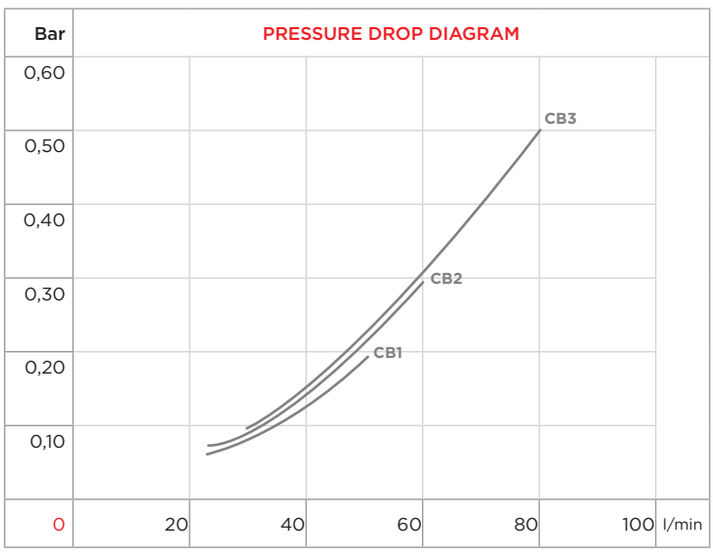
T60: CB1 CB2 CB3





T80: CB1 CB2 CB3

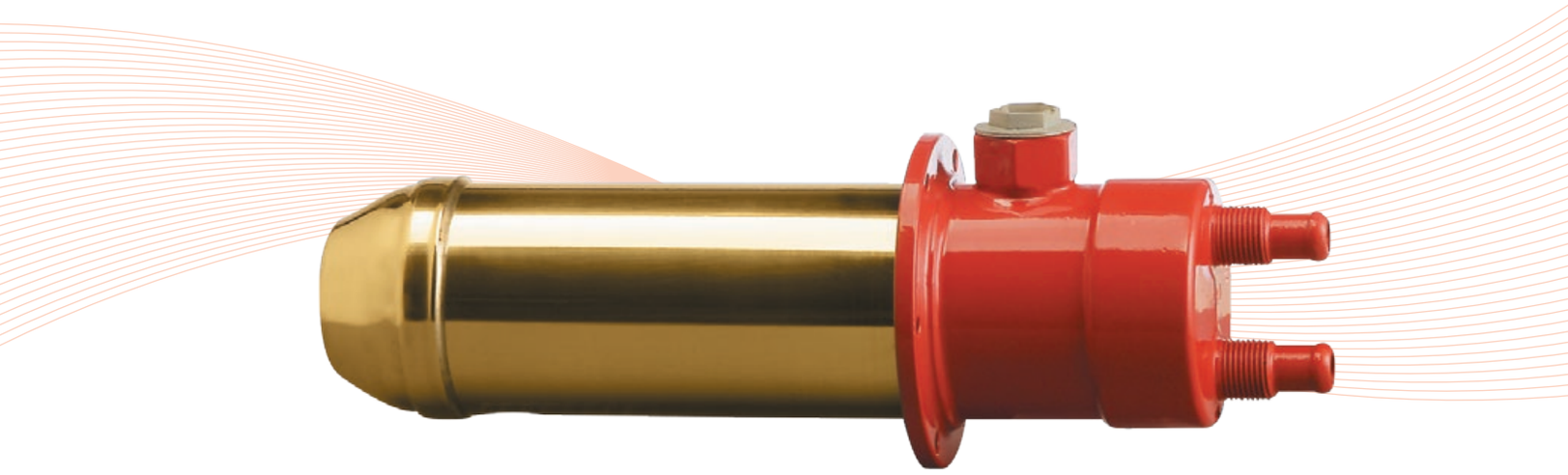




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

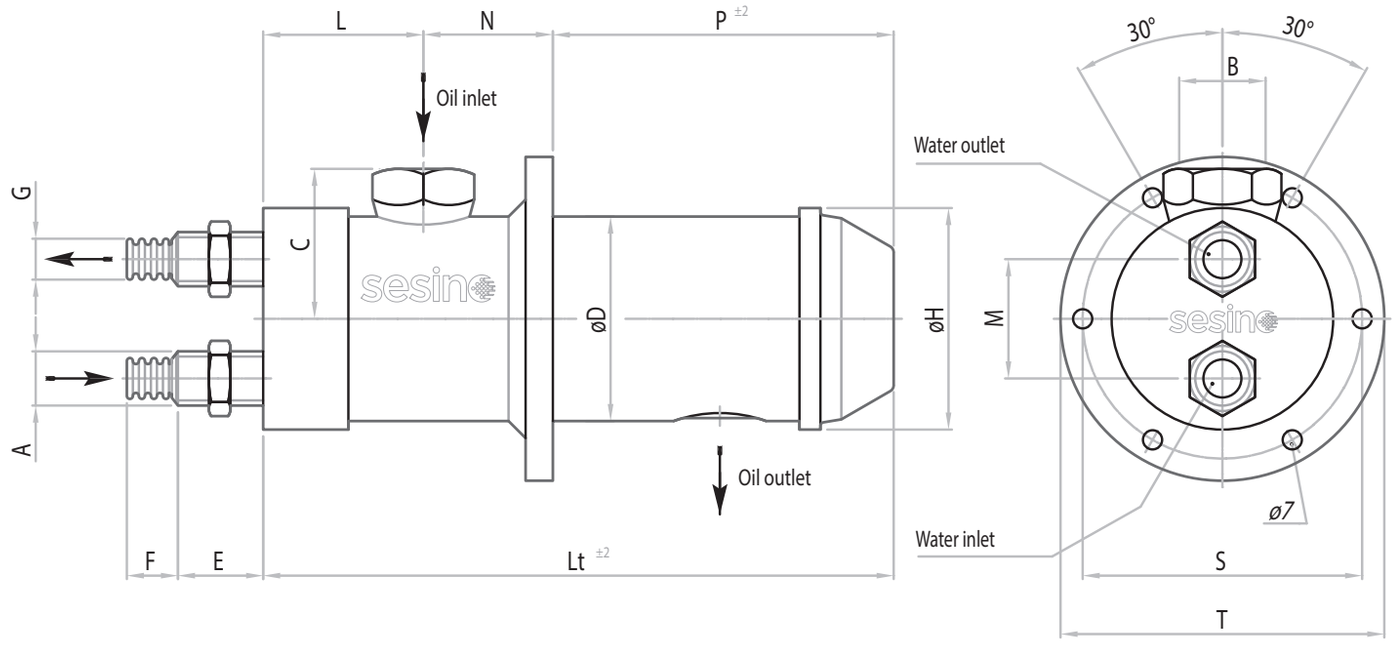
T60 CF2



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS*	COPPER*	/

*standard

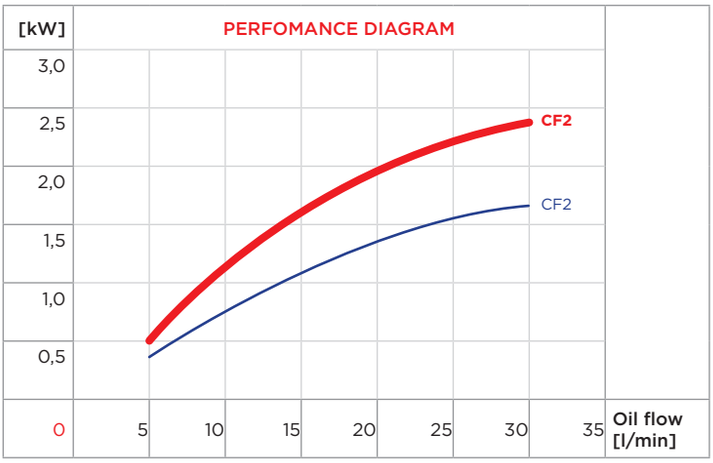
- Dimensions and technical characteristics are not binding

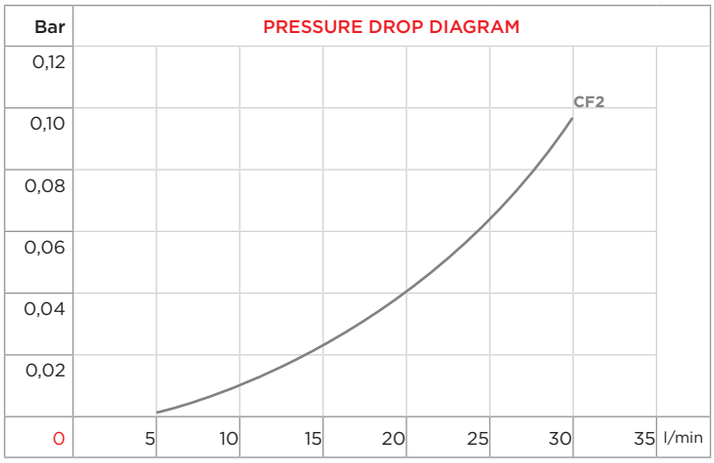


TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS															
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Lt	D	A	B	H	P	G	S	T	N	M	C	L	F	E
T60 CF2	2SC60CF2	5-30	7,5 - 30	0,35	1,6	0,5	2,4	2,1	285	60	3/8" gas	1/2" gas	65	100	12	82	95	38	35	47	47	17	20

WATER FLOW RATE:

CF2





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

ASSEMBLING AND MAINTENANCE INSTRUCTIONS OF THE TUBE BUNDLE HEAT EXCHANGERS

Assembling

The water-oil heat exchangers are generally fixed in the return circuit. It is also possible to carry out a separate circuit through a self-contained pump. This is recommended when the outlet oil rates are variable. In this way, it is possible to obtain a better thermic performance.
In the hydraulic systems is probable to encounter some pressure peaks that could approach or exceed the maximum allowable pressure of the exchanger. In this case, it is recommended to supply it with a self-contained pump.

Note! These pulsations move inside the oil at the sound velocity, therefore they cannot be gauged with standard manometers, but only with a proper electronic instrumentation. The connection of the oil-water fittings must be carried out so that air can be easily blown out with the normal fluid circulation. This means that, if the exchanger is installed horizontal, water must flow in the lowest fitting and the oil fittings must be turned upwards; if otherwise it is vertical, the water fittings must be placed on the upper side and oil must flow in the lowest fitting.

MAINTENANCE OF NOT ISPECTABLE TUBE BUNDLE HEAT EXCHANGERS WATER SIDE

Oil side cleaning

The exchanger must be disassembled.
To remove the impurities it is necessary to let a detergent circulate for a time, which can vary from 10 to 30 minutes. Later proceed removing the detergent through the circulation of hot water.
During this operation, it is recommended to comply with the anti-pollution standards.

Water side cleaning

It is recommended to check the exchanger every 2 or 3 months to avoid that calcareous sediments completely close the little tubes inside which water flows. In this case the exchanger must be replaced.
If the exchanger is slightly obstructed, it is recommended to use a solution with water and 15% hydrochloric acid or similar fluids, and let it circulate into the water side of the exchanger, but in the opposite direction of the normal water flow.
Remove afterwards any trace of the corrosive product letting some hot water flow for some minutes.

MAINTENANCE OF INSPECTABLE TUBE BUNDLE HEAT EXCHANGERS WATER SIDE

Oil side cleaning

The exchanger must be disassembled.
To remove the impurities it is necessary to let a detergent circulate for a time, which can vary from 10 to 30 minutes. Later proceed removing the detergent through the circulation of hot water.
During this operation, it is recommended to comply with the anti-pollution standards.

Water side cleaning

It is recommended to check the exchanger every 2 or 3 months to avoid that calcareous sediments completely close the little tubes inside which water flows. In this case, the exchanger must be replaced.
To carry out the check it is necessary to disconnect the exchanger from the water inlet and outlet tubes and remove the two heads, which stop the water circuit. If the exchanger is slightly obstructed, it is recommended to assemble both the heads and to use a solution with water and 15% hydrochloric acid or similar fluids, and let it circulate in the opposite direction of the normal water flow.
Remove afterwards any trace of the corrosive product letting some hot water flow for some minutes.
Otherwise if the exchanger is obstructed not by calcareous sediments but by mud or by other solid sediments, it is enough to use a pig inside the tubes and then rinse with a water jet. In any case, before reassembling the two heads, it is necessary to check that the zinc anode is clean and not damaged; otherwise, it must be replaced.
If the zinc anode is worn out in a short time, it is recommended to check the efficiency of the earthing of the machine on which the exchanger is assembled; wandering currents could cause corrosion.

ISTRUZIONI MONTAGGIO E FUNZIONAMENTO SCAMBIATORI A FASCIO TUBIERO

Montaggio

Gli scambiatori acqua-olio sono generalmente installati nel circuito di ritorno. E' possibile anche realizzare un circuito separato con una pompa autonoma e ciò è consigliabile nel caso in cui le portate olio allo scarico siano molto variabili; ciò facendo si ottiene un miglioramento di resa termica. Nei sistemi idraulici possono verificarsi dei picchi di pressione che potrebbero avvicinarsi o superare la pressione massima ammissibile dello scambiatore; in questo caso è indispensabile alimentare lo stesso con una pompa autonoma.

Attenzione! Queste pulsazioni percorrono l'olio alla velocità del suono e non sono pertanto misurabili con normali manometri, ma solo con un'adatta strumentazione elettronica. Il collegamento dei raccordi acqua e olio deve essere eseguito in modo che l'aria possa essere agevolmente espulsa con la normale circolazione dei fluidi Ciò significa che, se lo scambiatore è installato in posizione orizzontale, l'acqua deve entrare nel raccordo posto più in basso ed i raccordi olio devono essere rivolti verso l'alto, mentre, se installati in posizione verticale, i raccordi acqua devono essere nella parte superiore e l'olio deve entrare nel raccordo posto più in basso.

MANUTENZIONE SCAMBIATORI A FASCIO TUBIERO NON ISPEZIONABILI LATO ACQUA

Pulizia lato olio

Per tale tipo di pulizia lo scambiatore deve essere smontato. Lo sporco può essere asportato con la circolazione di un prodotto detergente; la durata di questa operazione può variare dai 10 ai 30 minuti. Dopo questo procedimento il prodotto resta all'interno e bisognerà quindi procedere alla sua espulsione mediante circolazione di acqua calda. Durante questa operazione si raccomanda di rispettare le norme antinquinamento.

Pulizia lato acqua

E' sempre buona norma controllare lo scambiatore ogni 2 o 3 mesi di lavoro per evitare che il calcare otturi completamente i tubetti all'interno dei quali scorre l'acqua, nel qual caso lo scambiatore sarebbe da sostituire.
In caso di modesto intasamento è consigliabile far circolare nel lato acqua dello scambiatore, in senso opposto alla normale circolazione della stessa, una soluzione al 15% di acido cloridrico in acqua, oppure altri fluidi simili reperibili in commercio.
Terminata tale operazione è necessario espellere dallo scambiatore la benché minima traccia di prodotto corrosivo; per fare ciò è sufficiente far circolare acqua calda per qualche minuto.

MANUTENZIONE SCAMBIATORI A FASCIO TUBIERO ISPEZIONABILI LATO ACQUA

Pulizia lato olio

Per tale tipo di pulizia lo scambiatore deve essere smontato. Lo sporco può essere asportato con la circolazione di un prodotto detergente; la durata di questa operazione può variare dai 10 ai 30 minuti. Dopo questo procedimento il prodotto resta all'interno e bisognerà quindi procedere alla sua espulsione mediante circolazione di acqua calda. Durante questa operazione si raccomanda di rispettare le norme antinquinamento.

Pulizia lato acqua

E' sempre buona norma controllare lo scambiatore ogni 2 o 3 mesi di lavoro per evitare che il calcare otturi completamente i tubetti all'interno dei quali scorre l'acqua, nel qual caso lo scambiatore sarebbe da sostituire.
Per l'ispezione è necessario scollegare lo scambiatore dai tubi di entrata ed uscita acqua e togliere le due testate che chiudono il circuito acqua.
Nel caso di modesto intasamento dovuto al calcare è consigliabile rimontare le due testate e far circolare, in senso opposto al normale flusso, una soluzione al 15% di acido cloridrico in acqua, oppure altri fluidi simili reperibili in commercio.
Terminata tale operazione, è necessario espellere dallo scambiatore ogni traccia di prodotto corrosivo; per fare ciò è sufficiente far circolare acqua calda per qualche minuto.
Nel caso invece dall'ispezione risultasse che lo scambiatore fosse intasato non da sedimenti calcarei, ma da fango o da altre particelle solide contenute nell'acqua, è sufficiente agire con uno scovolo all'interno dei tubi e sciacquare successivamente con un getto d'acqua.
In ogni caso, prima di rimontare le testate, bisogna controllare che l'anodo di zinco sia integro e pulito; in caso contrario, non potendo svolgere la sua funzione sacrificale, deve essere sostituito.
Nel caso il suddetto anodo si fosse consumato in breve tempo, è indispensabile controllare l'efficienza della messa a terra della macchina sulla quale è installato lo scambiatore, perché la presenza di correnti vaganti potrebbe provocare rapidi fenomeni corrosivi.

CONSTRUCTIVE AND WORKING PRINCIPLES

The heat exchanger with brazed plates consists of pressed stainless steel plates, which are brazed with copper alloy during a vacuum process.
During the brazing process, the plates are packed by turning them to 180° one to each other in order to create two separate flow chambers, where the fluids, which must exchange heat, flow in opposite directions.
The pressing on the plates causes a great turbulence in the fluids; this increases the thermic exchange coefficients even in case of little volumetric flows.

ADVANTAGES

- Compact and light unit
- High thermic exchange coefficient thanks to the particular structure of the plates
- High working temperature and pressure
- High corrosion strength (the plates are made of stainless steel)
- Simple installation and repair; it does not need maintenance
- Cheapness thanks to the possibility to automate the production

RESISTANCE TO INCRUSTATIONS

The brazed plate heat exchangers are much more resistant to the incrustations that occur on the water-side of the tube bundle heat exchangers.
This depends on the following factors:

- There is always a turbulent flow also in case of low water flows
- There are no areas with low speed, because water is distributed uniformly inside the exchanger
- The calcareous sediments cannot adhere on the plate surfaces, thanks to their accurate finishing.

PRINCIPI COSTRUTTIVI E DI FUNZIONAMENTO

Lo scambiatore di calore a piastre saldobrasate è costituito da piastre di acciaio inossidabile stampate che vengono brasate con lega di rame in un processo sottovuoto.
Nel processo di brasatura le piastre vengono impacchettate ruotandole di 180° l'una con l'altra in modo da produrre due camere di flusso separate nelle quali i fluidi che si devono scambiare il calore scorrono in direzioni opposte.
Le stampature presenti sulle piastre generano un intensa turbolenza nei fluidi che incrementa i coefficienti di scambio termico anche in presenza di scarsi flussi volumetrici.

VANTAGGI

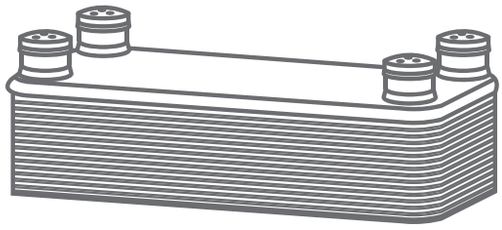
- *Unità compatta e leggera*
- *Coefficiente di scambio termico elevato grazie al particolare disegno delle piastre*
- *Temperatura e pressione di esercizio elevate*
- *Essendo le piastre di acciaio inossidabile, alta resistenza alla corrosione*
- *Semplicità di installazione e di riparazione; non richiede praticamente manutenzione*
- *Economicità grazie alla possibilità di automatizzarne la produzione*

RESISTENZA ALLE INCROSTAZIONI

Gli scambiatori a piastre saldobrasati sono molto meno sensibili alle incrostazioni, che si verificano soprattutto nel lato acqua, degli scambiatori a fascio tubiero. Questo grazie ai seguenti fattori:

- *Si è sempre in presenza di flusso turbolento anche con portate d'acqua basse*
- *Non esistono aree di bassa velocità perché l'acqua viene distribuita uniformemente all'interno dello scambiatore*
- *Le particelle di calcare non possono aderire alla superficie delle piastre essendo la loro finitura superficiale molto accurata*

WATER-OIL HEAT EXCHANGERS WITH BRAZED PLATES
SCAMBIATORI DI CALORE ACQUA-OLIO A PIASTRE SALDO BRASATE



The maximum working pressure is 30 bar. The working temperature is included between –160° and +225°C. The maximum difference between the temperatures of the fluids is 100°C. For each type of exchanger, the thermic performance's curves, as a function of the oil rate, show the heat quantity in kW or in kcal/h that the exchanger is able to dissipate for each degree of difference between the inlet temperatures of water and oil.

The performance diagrams have been calculated with a ratio between the oil and the water flow rates of 2/1; for higher ratios, therefore for lower water consumptions, it is necessary to multiply the factors obtained from the curves by the following Ka coefficients.

La pressione massima di funzionamento è di 30 bar. La temperatura di funzionamento è compresa tra –160° e +225°C. La massima differenza tra le temperature dei due fluidi è di 100°C. Le curve di resa termica, in funzione della portata olio, forniscono per ogni tipo di scambiatore la quantità di calore in kW o in kcal/h che lo stesso è in grado di disperdere per ogni grado di differenza tra le temperatura di entrata dell'olio e dell'acqua.

I diagrammi di resa sono stati calcolati con un rapporto tra le portate olio e acqua di 2/1; per rapporti superiori, quindi per consumi d'acqua inferiori, occorre moltiplicare i valori ricavati dalle curve per i seguenti coefficienti Ka

Ratio	2/1	3/1	4/1	5/1	6/1	7/1	8/1	9/1	10/1
Ka	1	0,92	0,85	0,75	0,7	0,65	0,6	0,55	0,5

The pressure drop and performance diagrams are valid for oil ISO VG46; for different types of oil, it is necessary to multiply the value obtained from the curves for the Kc coefficients, by the performance diagrams, and Kp by the pressure drop diagrams.

I diagrammi di resa e perdite di carico sono validi per olio ISO VG46; per oli di tipo diverso è necessario moltiplicare il valore ricavato dalle curve per i coefficienti di correzione Kc, per i diagrammi di resa, e Kp per quelli di perdita di carico.

Oil type	ISO VG22	ISO VG32	ISO VG46	ISO VG68	ISO VG100	ISO VG150	ISO VG200
Kc	1,1	1,05	1	0,9	0,8	0,7	0,5
Kp	0,7	0,75	1	1,3	1,7	2,3	3,3

For the exact calculation of the exchangers with brazed plates into the oleohydraulic field, Sesino SpA is able to supply the customer with a calculation program on CD-rom, containing all the above mentioned variables. By filling in some data, it is possible to choose the necessary exchanger and to obtain on a data sheet all the working parameters.

The exchangers with plates can be used with other types of fluids, but these must be compatible with copper, which is the metal used for the brazing of the plates.

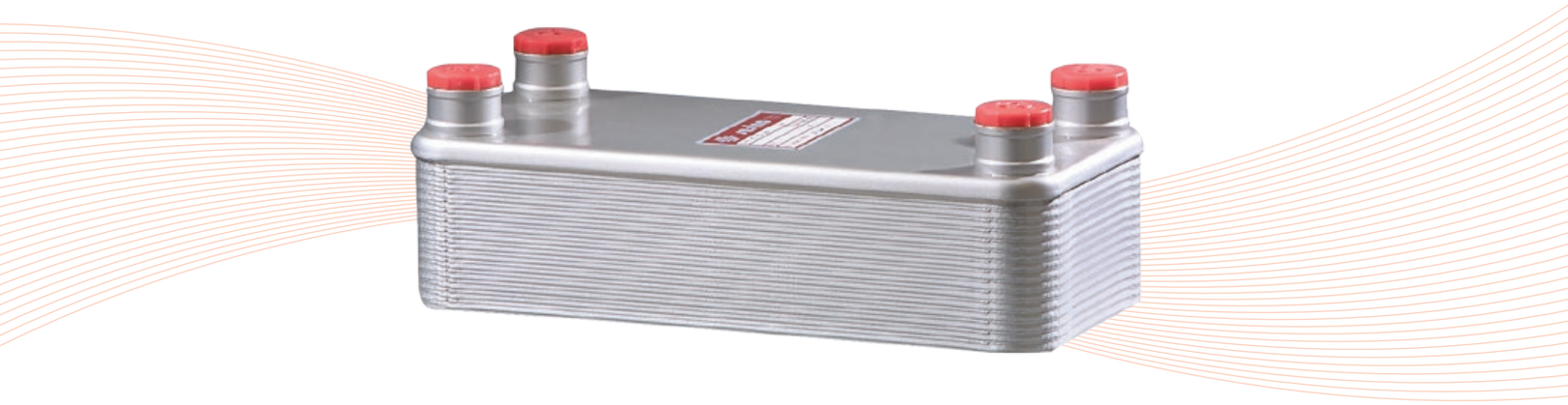
For each use, with the exception of oil cooling, it is recommended to consult our Technical Department.

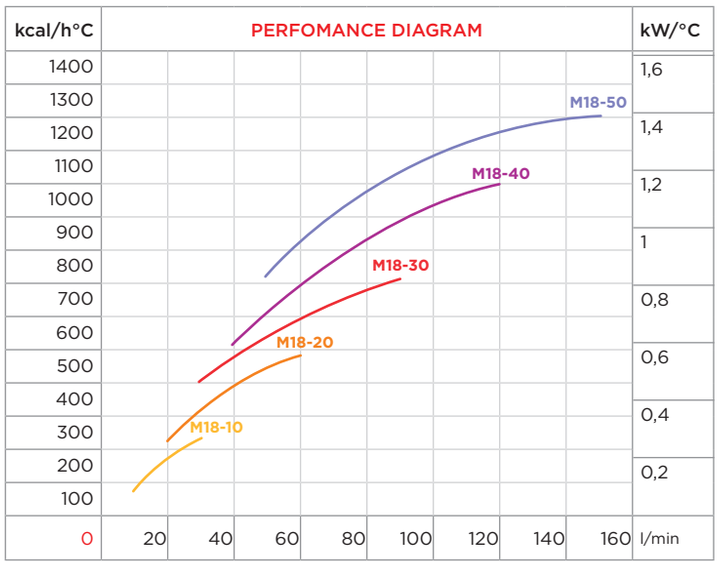
Per il calcolo esatto degli scambiatori a piastre saldobrasati per uso in oleoidraulica, la Sesino SpA può fornire un programma di calcolo su CD-rom che tiene conto di tutte le variabili sopra citate. Mediante il semplice inserimento di alcuni dati è possibile stabilire lo scambiatore necessario ed ottenere tutti i parametri di lavoro su di un data-sheet.

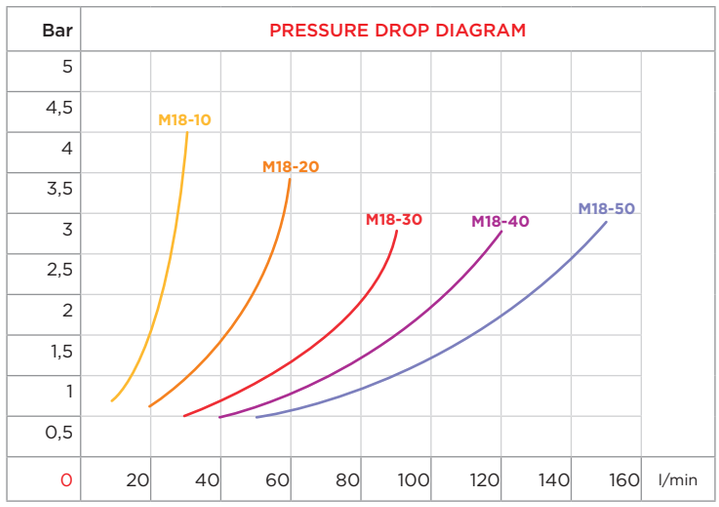
Gli scambiatori a piastre possono essere utilizzati con altri tipi di fluidi, a condizione che essi siano compatibili con il rame, che è il metallo utilizzato nel processo di brasatura per unire le piastre.

Consigliamo comunque, per qualsiasi impiego che non sia il raffreddamento dell'olio, di consultare il nostro Ufficio Tecnico.

M18

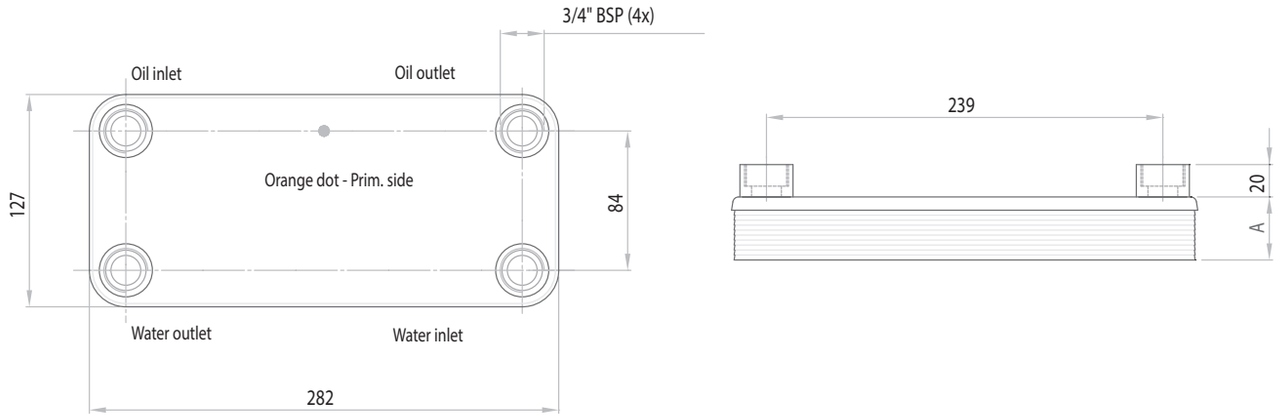






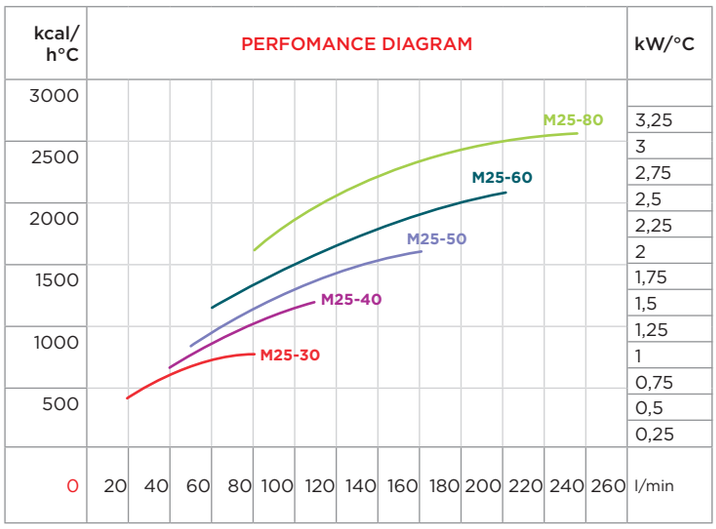
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

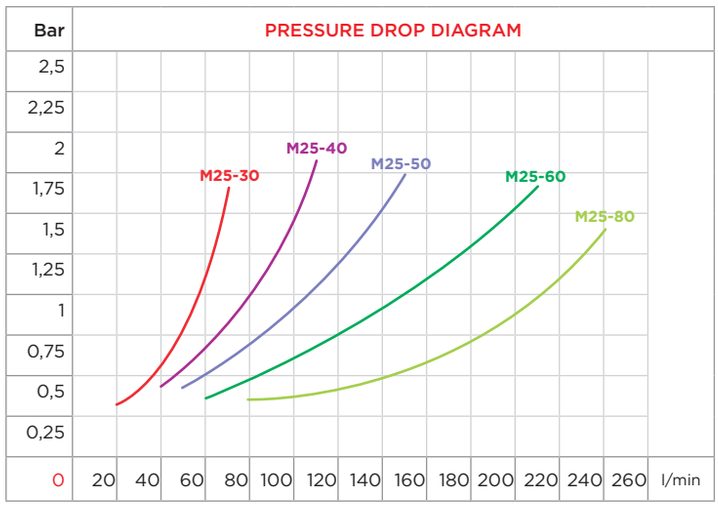
- Dimensions and technical characteristics are not binding



TYPE	SURFACE	OIL FLOW	COOLING CAPACITY	WEIGHT	DIMENSIONS
	m²	l/min	kW/°C	kg	A
M18-10	0,195	10÷30	0,09÷0,27	2,5	28
M18-20	0,390	20÷60	0,25÷0,55	3,7	47
M18-30	0,585	30÷90	0,45÷0,83	4,8	66
M18-40	0,780	40÷120	0,60÷1,17	6,0	85
M18-50	0,975	50÷150	0,85÷1,40	7,2	104

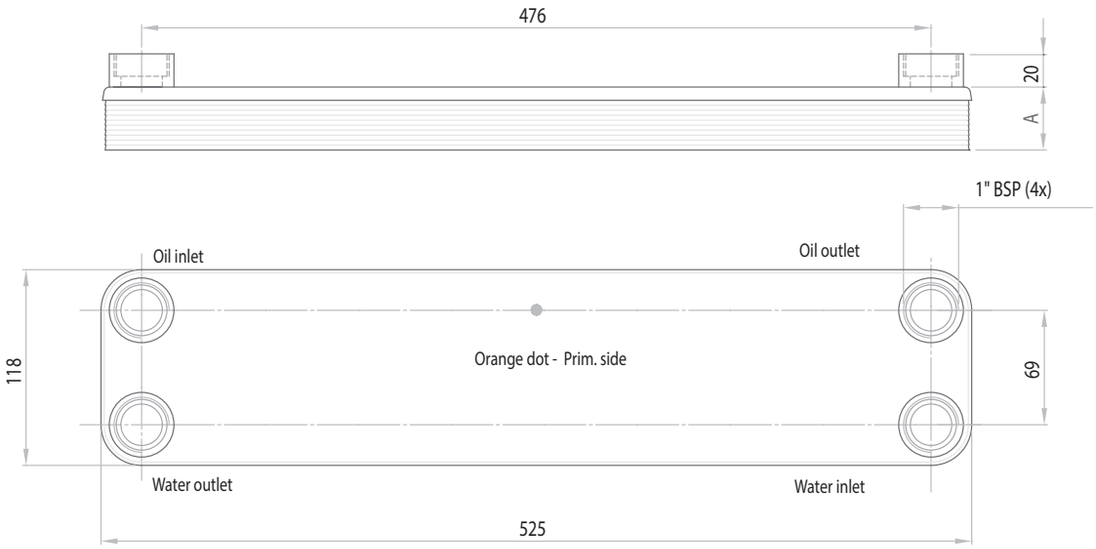
M25





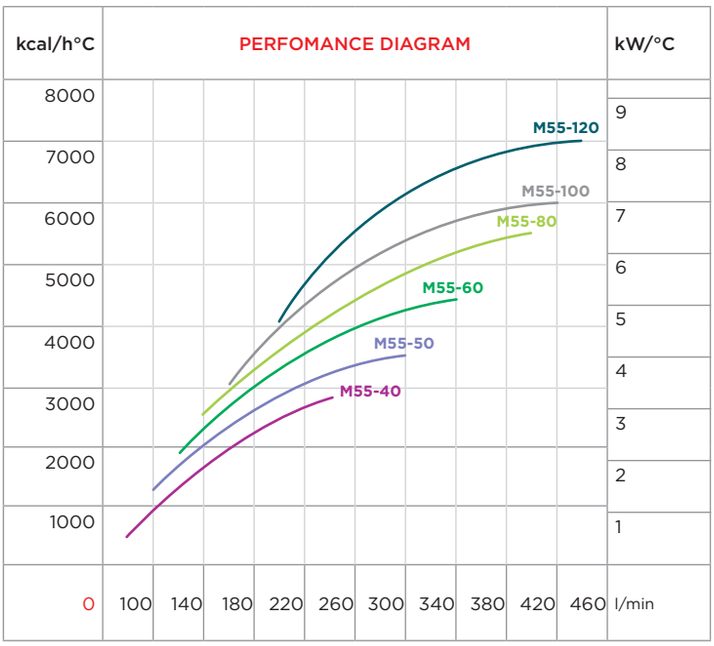
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

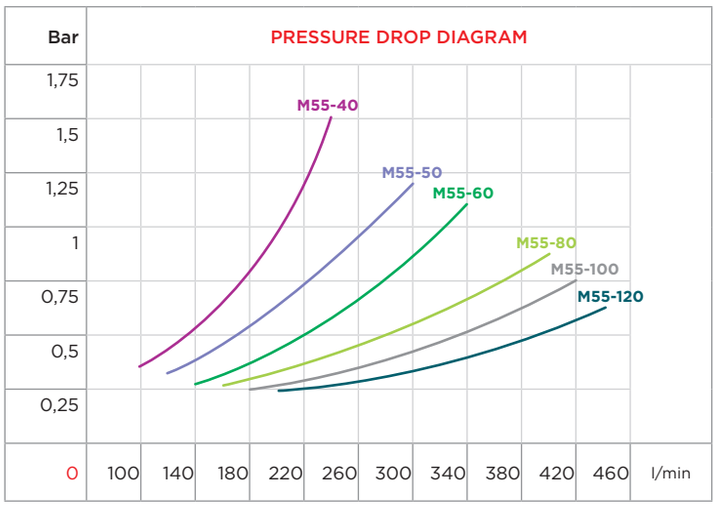
- Dimensions and technical characteristics are not binding



TYPE	SURFACE	OIL FLOW	COOLING CAPACITY	WEIGHT	DIMENSIONS
	m²	l/min	kW/°C	kg	A
M25-30	1,05	20÷80	0,49÷0,91	8,3	87
M25-40	1,40	40÷120	0,80÷1,49	10,3	112
M25-50	1,75	50÷160	1,00÷2,00	12.3	138
M25-60	2,10	60÷200	1,30÷2,50	14,3	164
M25-80	2,80	80÷240	1,90÷3,00	18,3	215

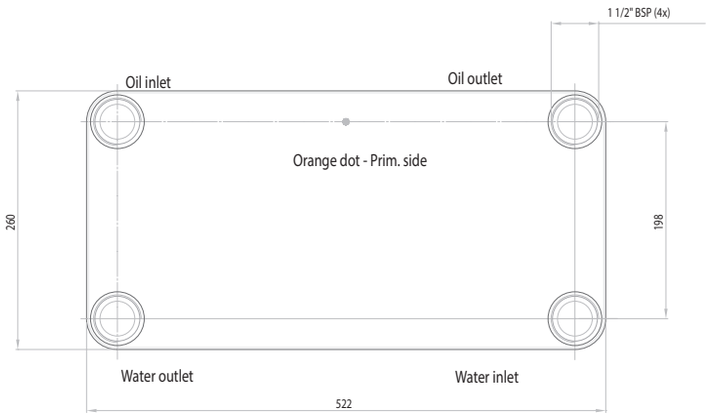
M55

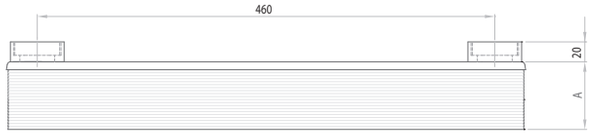




CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

- Dimensions and technical characteristics are not binding





TYPE	SURFACE	OIL FLOW	COOLING CAPACITY	WEIGHT	DIMENSIONS
	m²	l/min	kW/°C	kg	A
M55-40	2,8	80÷240	0,68÷3,24	25,7	115
M55-50	3,5	100÷300	1,47÷4,13	30,1	141
M55-60	4,2	120÷340	2,03÷5,20	34,5	167
M55-80	5,6	140÷400	2,77÷6,25	43,3	219
M55-100	7,0	160÷420	3,43÷7,00	52,1	271
M55-120	8,4	200÷440	4,41÷8,00	60,9	323

ASSEMBLING AND MAINTENANCE INSTRUCTIONS OF THE EXCHANGERS WITH BRAZED PLATES

ASSEMBLING

Although the maximum working static pressure is 30 bar, the exchangers of this series do not stand pressure peaks.
This means that they can be connected to the return line of the system they must cool, only if there are no pressure peaks. Otherwise, they must be supplied with a self-contained pump.
The BPHE exchanger must be placed in vertical position. The oil inlet is down on the left, the outlet is up, on the left.

On the contrary, water flows into the upper fitting on the right and must flow out through the lower one on the right, in this way the fluids circulate in counter-current.
If the system transmits any vibration or tension, it is necessary to use flexible connections.

It is recommended to fix the exchanger on a support or on the wall.

MAINTENANCE

Oil side cleaning

The exchanger must be disassembled.
To remove the dirt it is necessary to let a detergent circulate for a time, which can vary from 10 to 30 minutes. Later proceed removing the detergent through the circulation of hot water. During this operation, it is recommended to comply with the anti-pollution standards.

Water side cleaning

The BPHE exchangers do not need a particular maintenance because the turbulent flow and the accurate finishing of the plates prevent the calcareous sediments to adhere on the plates.
Each 6 working months it is recommended to let a lightly acid solution (5-10%) or a suited detergent flow inside the exchanger with a direction that is opposite to the working one.
After this operation, it is recommended to rinse with clean water to remove the detergent.

ISTRUZIONI PER IL MONTAGGIO E LA MANUTENZIONE DEGLI SCAMBIATORI A PIASTRE SALDOBRASATE

MONTAGGIO

Nonostante la massima pressione statica di funzionamento sia di 30 bar, gli scambiatori di questa serie non sopportano picchi di pressione. Questo significa che essi possono essere collegati allo scarico dell'impianto che devono raffreddare solo se si è certi dell'assenza di picchi di pressione.
In caso contrario, lo scambiatore deve essere alimentato con una pompa autonoma.
Lo scambiatore BPHE deve essere montato in posizione verticale.

L'ingresso dell'olio è in basso a sinistra, mentre l'uscita è in alto a sinistra. Viceversa, l'acqua deve entrare nel raccordo in alto a destra e deve uscire da quello in basso a destra; in questo modo è garantita la circolazione dei fluidi in controcorrente.
Nel caso il sistema possa trasmettere vibrazioni o tensioni, è necessario prevedere delle connessioni flessibili.

E' buona norma montare lo scambiatore fissandolo ad un supporto o a parete.

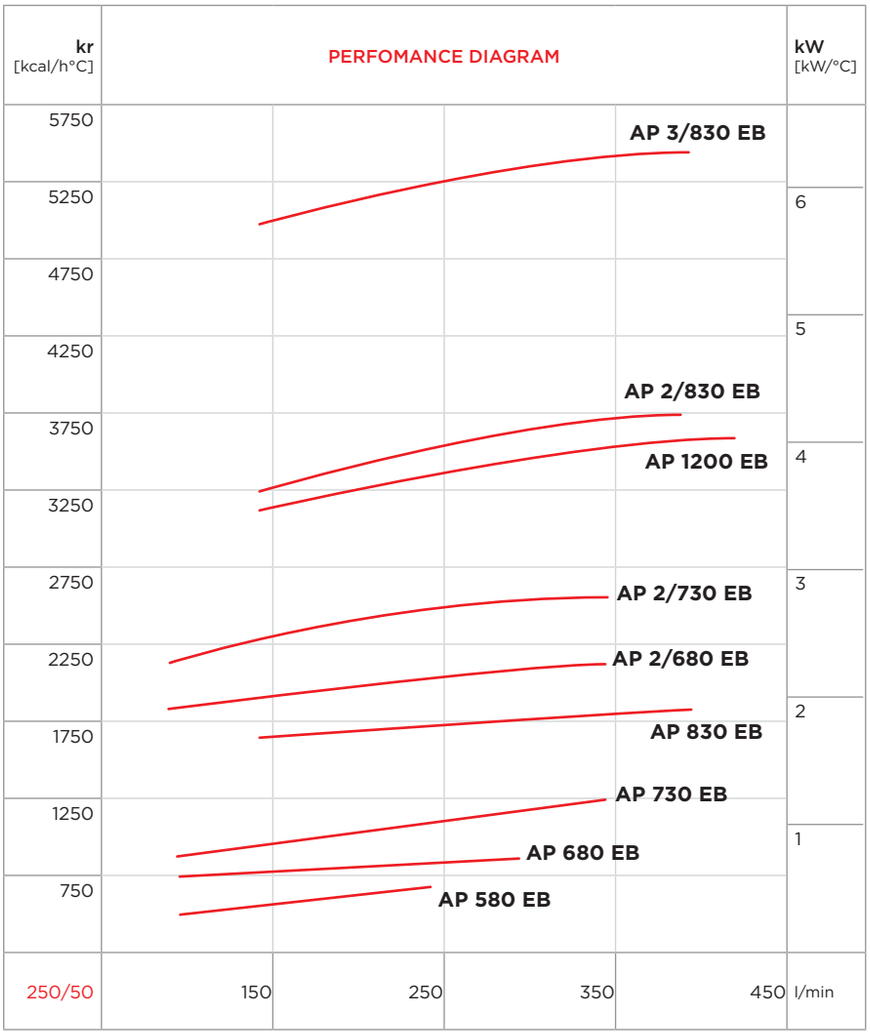
MANUTENZIONE

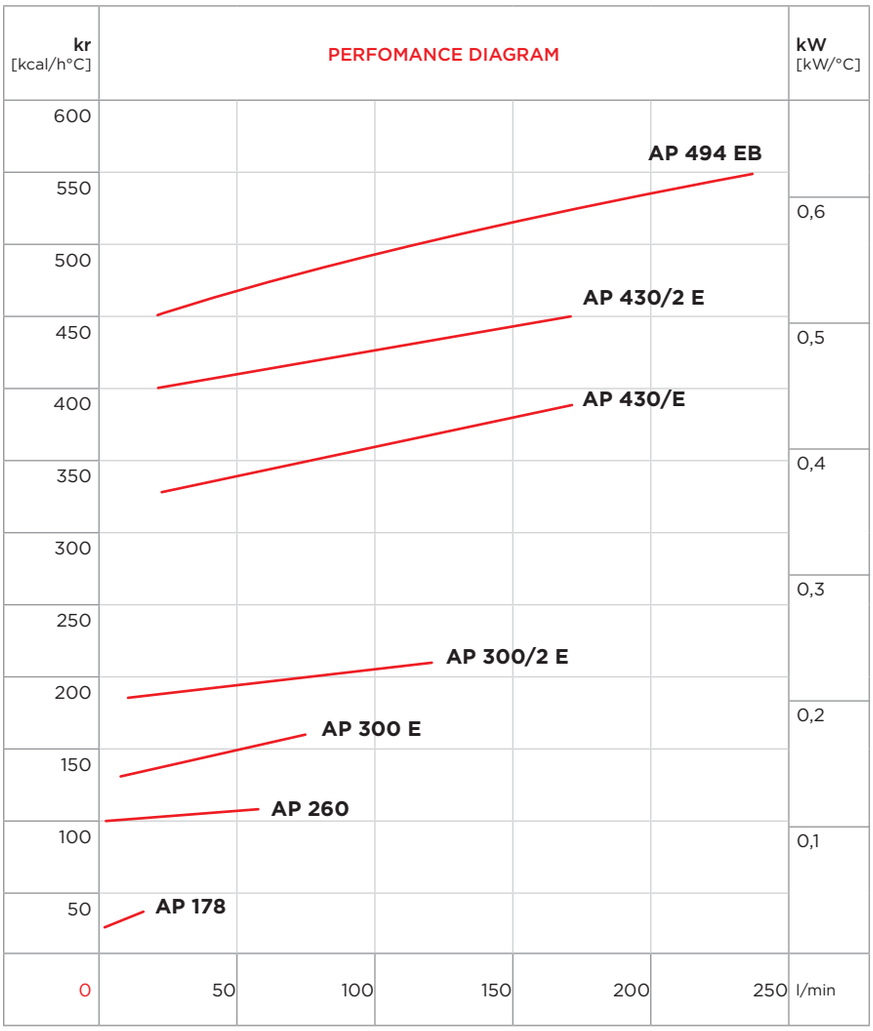
Pulizia lato olio

Per tale tipo di pulizia lo scambiatore deve essere smontato.
Lo sporco può essere asportato con la circolazione di un prodotto detergente; la durata della pulizia può variare dai 10 ai 30 minuti.
Dopo questa operazione il prodotto resta all'interno e bisognerà quindi procedere alla sua espulsione mediante circolazione di acqua calda. Durante questa operazione si raccomanda di rispettare le norme antinquinamento.

Pulizia lato acqua

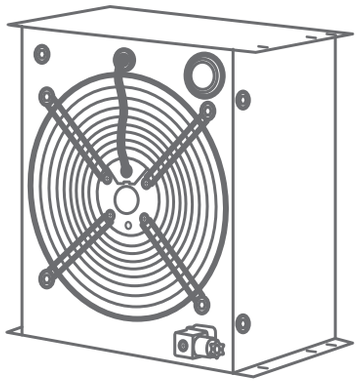
Gli scambiatori a piastre non necessitano di grande manutenzione poiché il flusso turbolento e l'accurata finitura superficiale delle piastre impedisce ai sedimenti calcarei si aderire alle piastre stesse.
Ogni 6 mesi di lavoro è comunque buona norma far circolare nello scambiatore, con senso del moto inverso a quello di lavoro, una soluzione leggermente acida (5-10%) o un detergente reperibile in commercio per questi scopi.
Ad operazione terminata, risciacquare con abbondante acqua pulita per togliere ogni traccia del detergente.


kr
[kcal/h°C]
PERFOMANCE DIAGRAM
kW
[kW/°C]
5750
5250
4750
4250
3750
3250
2750
2250
1750
1250
750
AP 3/830 EB
AP 2/830 EB
AP 1200 EB
AP 2/730 EB
AP 2/680 EB
AP 830 EB
AP 730 EB
AP 680 EB
AP 580 EB
6
5
4
3
2
1
250/50
150
250
350
450
l/min


kr
[kcal/h°C]
PERFOMANCE DIAGRAM
kW
[kW/°C]
600
550
500
450
400
350
300
250
200
150
100
50
AP 494 EB
AP 430/2 E
AP 430/E
AP 300/2 E
AP 300 E
AP 260
AP 178
0,6
0,5
0,4
0,3
0,2
0,1
0
50
100
150
200
250
l/min

AC MOTOR AIR-OIL HEAT EXCHANGERS

SCAMBIATORI DI CALORE ARIA OLIO CON VENTILATORE A CORRENTE ALTERNATA



The advantage of using air into the cooling of oleo hydraulic systems has its bases on the following facts:

- There is no need of water
- The system is independent of the connection to the water main
- Lower working costs in comparison with the water-oil exchangers, even if the starting investment is higher
- Possibility to use warm air to heat the room in winter.

The particular structure of the cooling element allows great thermic performances and pressure resistance. **Maximum working static pressure: 20 bar; test pressure: 35 bar.**

Out technical Department is available to suggest and find the better solution in case of particular working conditions, pressures, frequencies, vibrations, etc.
It is always recommended to assemble in parallel with the exchanger a by-pass valve to avoid extreme counter-pressures, particularly when the machine is started with cold oil. On the contrary, it is not useful to use a check valve as by-pass to protect the exchanger from pressure's peaks, since the inertia of the valve itself is too high in comparison with the speed of the pressure waves that occur into the oleo hydraulic systems.
The flow rates shown in the tables are the ones recommended for the exchanger proper working.

The efficiency curves show the specific exchange capacity in kcal/h°C or in kW/°C according to the different oil rates. To calculate the heat quantity the different exchangers are able to dissipate it is enough to multiply such capacity by the difference between the requested oil temperature and the summer room temperature.
The electric system of these exchangers is already wired, according to EN 20204 Regulation.

Starting from the type AP 300, all the exchangers of this series are equipped with an adjustable thermo switch, which allows keeping the oil temperature between 30°C and 90°C, according to the different needs.

Particular attention is paid to the noise of our fans that, working into industrial factories and close to the operators, should have low noise levels but at the same time should have the proper exchange efficiency.

For the right calculation of air-oil heat exchangers, we supply our customers with a calculation program on CD-ROM or that can be downloaded from our website.
The air-oil heat exchangers can be used to cool other kind of fluids, which must be compatible with aluminium and its alloys.

However, for each use, with the exception of oil cooling, we recommend to consult our Technical Department.

Il vantaggio dell'utilizzo dell'aria nel raffreddamento di impianti oleoidraulici trova le sue ragioni nei seguenti fattori:

- *Non necessità l'utilizzo di acqua*
- *Indipendenza della macchina dalle tubazioni di allacciamento alla rete idrica*
- *Inferiore costo di esercizio rispetto agli scambiatori acqua-olio, anche se maggiore è l'investimento iniziale*
- *Possibilità di utilizzare l'aria calda in uscita per riscaldare l'ambiente nella stagione invernale*

La particolare costruzione del radiatore consente di ottenere notevoli rese termiche e forte resistenza alla pressione. ***Pressione massima statica di funzionamento: 20 bar; pressione di collaudo: 35 bar.***

Il nostro Ufficio Tecnico è a disposizione per valutare la soluzione più opportuna in presenza di particolari condizioni di lavoro, pressioni, frequenze, vibrazioni, ecc..
È sempre consigliabile montare in parallelo allo scambiatore una valvola di by-pass per evitare eccessive contropressioni soprattutto al momento dell'avviamento della macchina con olio freddo. Non è invece conveniente utilizzare una valvola di ritegno come by-pass per proteggere lo scambiatore dai picchi di pressione in quanto l'inerzia della valvola stessa è troppo alta rispetto alla velocità delle onde di pressione che si sviluppano all'interno dell'olio degli impianti oleoidraulici.

Le portate olio indicate nelle tabelle sono quelle consigliate per il buon funzionamento dello scambiatore.
Le curve di rendimento forniscono la potenzialità di scambio specifica in kcal/h°C o in kW/h°C in funzione della portata olio; per calcolare la quantità di calore che i vari scambiatori sono in grado di disperdere, è sufficiente moltiplicare tale potenzialità per la differenza tra le temperature dell'olio desiderata e dell'aria ambiente massima estiva.
Gli scambiatori sono forniti con impianto elettrico già cablato, eseguito secondo la norma europea EN 20204.

Dal tipo AP 300 in su, gli scambiatori sono dotati di termostato regolabile che consente di mantenere l'olio a qualsiasi temperatura tra i 30 e i 90°C, a seconda delle esigenze dell'utilizzatore.
Notevole attenzione è stata posta alla rumorosità dei ventilatori in quanto, dovendo funzionare all'interno di capannoni industriali e quindi a contatto con gli operatori, è molto importante che il loro livello sonoro sia il più basso possibile, compatibilmente con l'esigenza di ottenere rese termiche accettabili.

Per il calcolo degli scambiatore aria-olio è disponibile un programma su CD-rom o scaricabile dal nostro sito internet.
Gli scambiatori aria-olio possono essere utilizzati per raffreddare altri tipi di fluidi, a condizione che essi siano compatibili con l'alluminio e le sue leghe.

Consigliamo comunque, per qualsiasi impiego che non sia il raffreddamento dell'olio, di contattare il nostro Ufficio Tecnico.

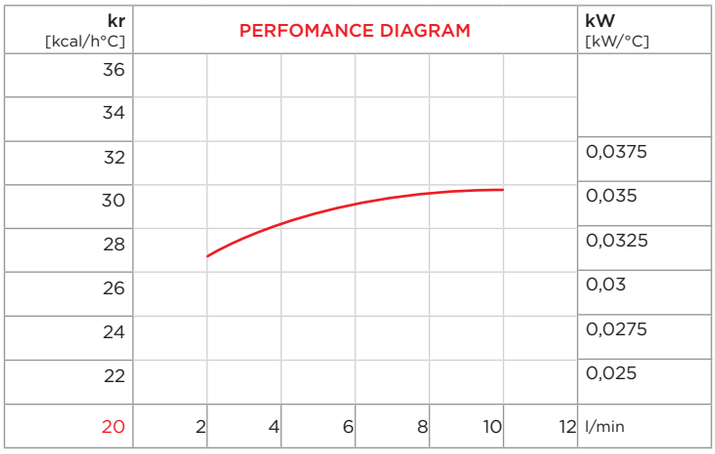
AP 178 E

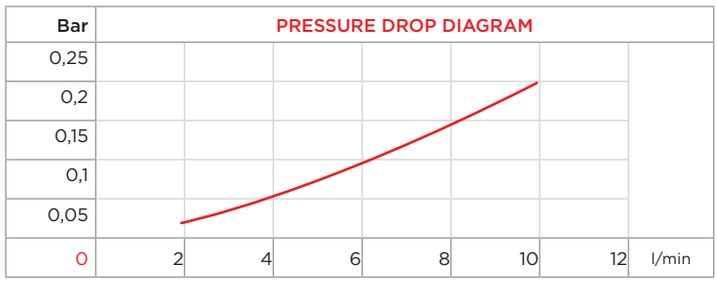
PURCHASE CODES

AP 178 E single-phase	3RAP178

SPARE PARTS

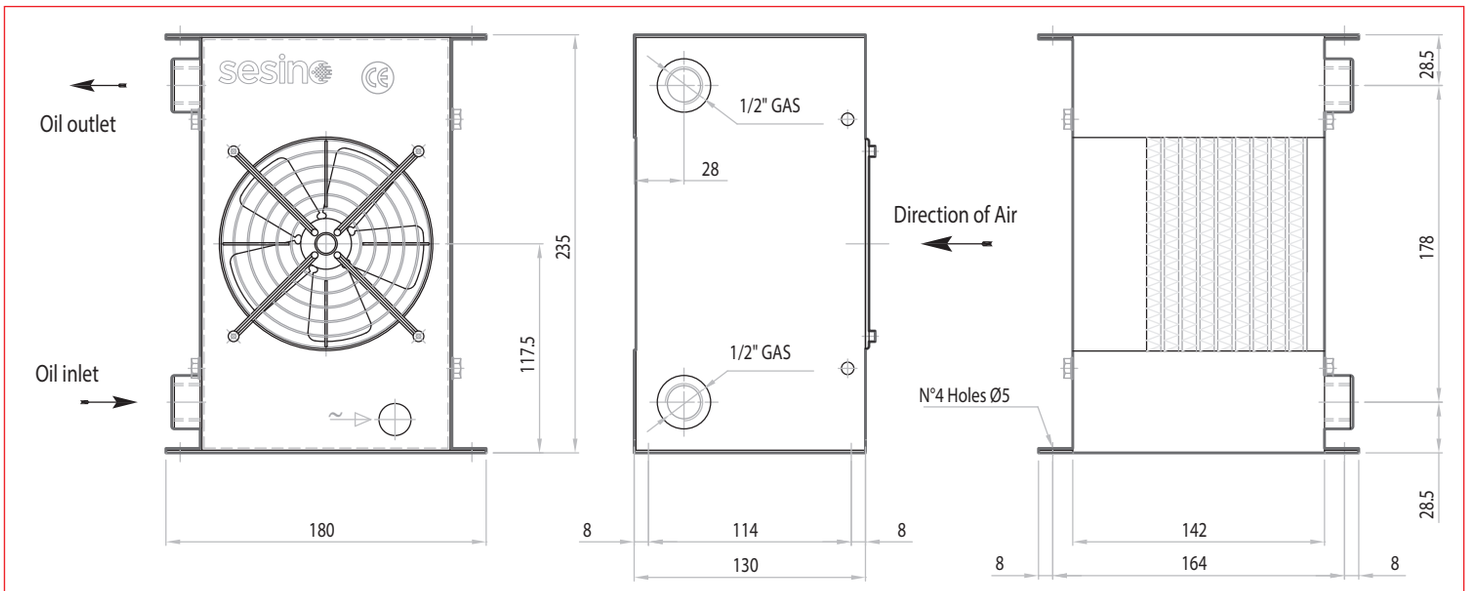
Cooling element	1RO92302
Fan grill	1GPR178
Frame	3CN178.1
Housing	3TL178.1
Electric Fan for 3RAP178	1VNAP178230





CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding

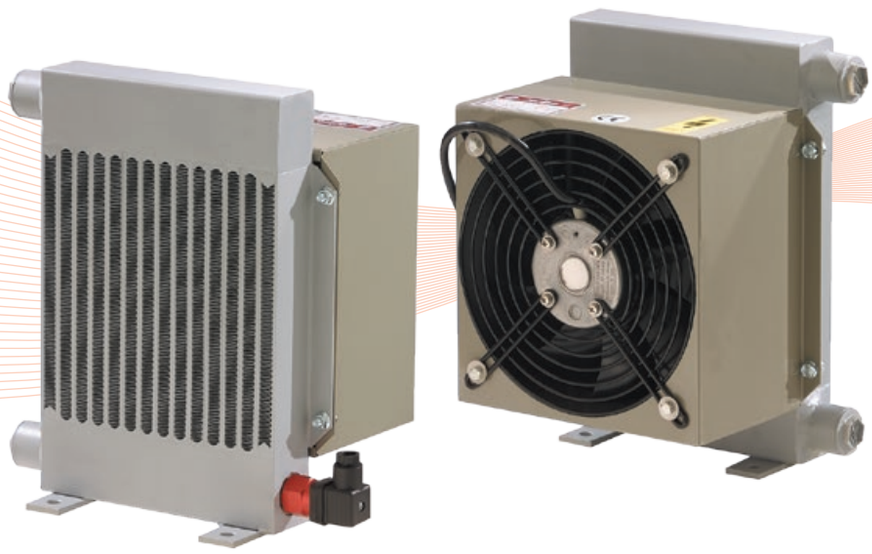


OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
1-10	0,5	230	50/60	19/18	1,2/1,1	125	54	55	4	125

AP 260

PURCHASE CODES

AP 260 E single-phase	3RAP260T1
AP 260 E three-phase	3RAP26038T1



SPARE PARTS

Cooling element	3RNAP260
Thermo-switch 55-42 IP54	1TRM55-42
Frame	3CNAP260CA.1
Electric Fan for 3RAP260T1	1VNA2E200.1
Electric Fan for 3RAP26038T1	1VNA2D200

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
120	0,14
118	
116	0,135
114	
112	0,0325
110	
108	0,13
106	
104	0,125
102	
100	0,12
98/0	l/min

5 15 25 35 45 55 65

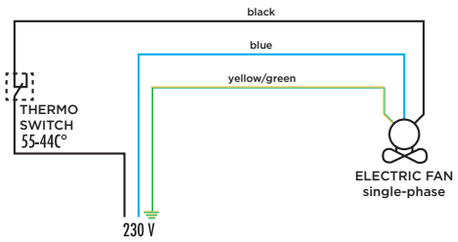
PRESSURE DROP DIAGRAM

Bar	
1,2	
1	
0,8	
0,6	
0,4	
0,2	
0	l/min

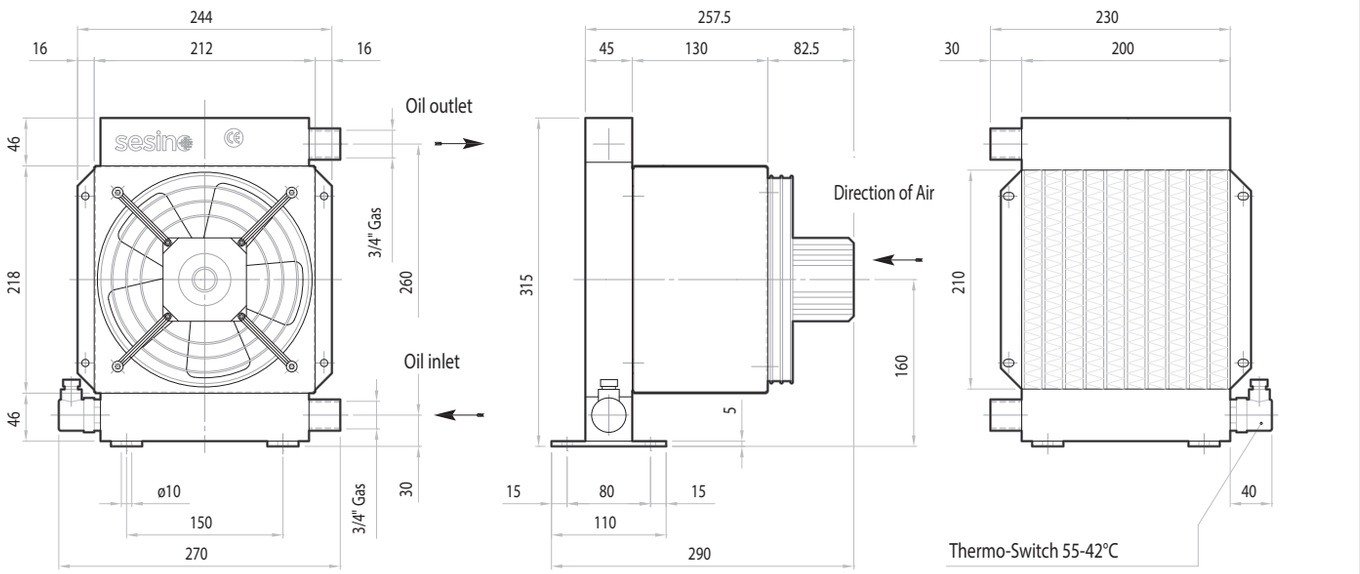
5 15 25 35 45 55 65

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7



- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
50-60	1,2	230/240	50/60	18/62	0,27	630	54	55	6	200
50-60	1,2	400	50/60	68/70	0,17/0,13	630	54	55	6	200

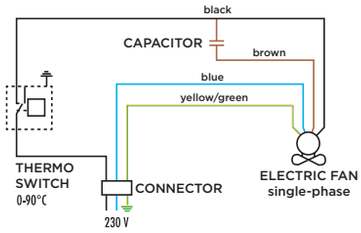
AP 300 E

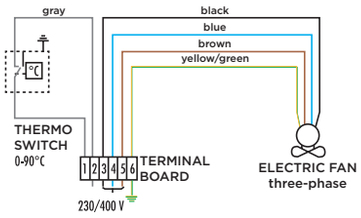
PURCHASE CODES

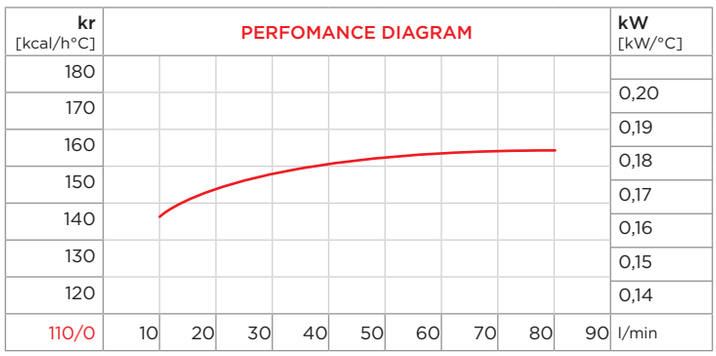
AP 300 E single-phase	3RAP300
AP 300 E three-phase	3RAP30038

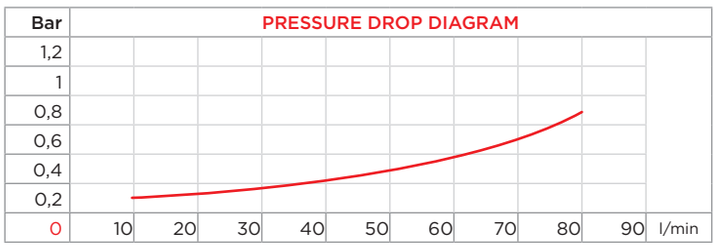
SPARE PARTS

Cooling element	3RNAP300
Frame	3CNAP300
Housing	1300TLV
Adjustable thermo-switch	1TRM0-90
Electric fan for 3RAP300	1VNA2E250G
Electric fan for 3RAP30038	1VNA2D250.2
Electric junction box for 3RAP30038	1CSSDSAREL



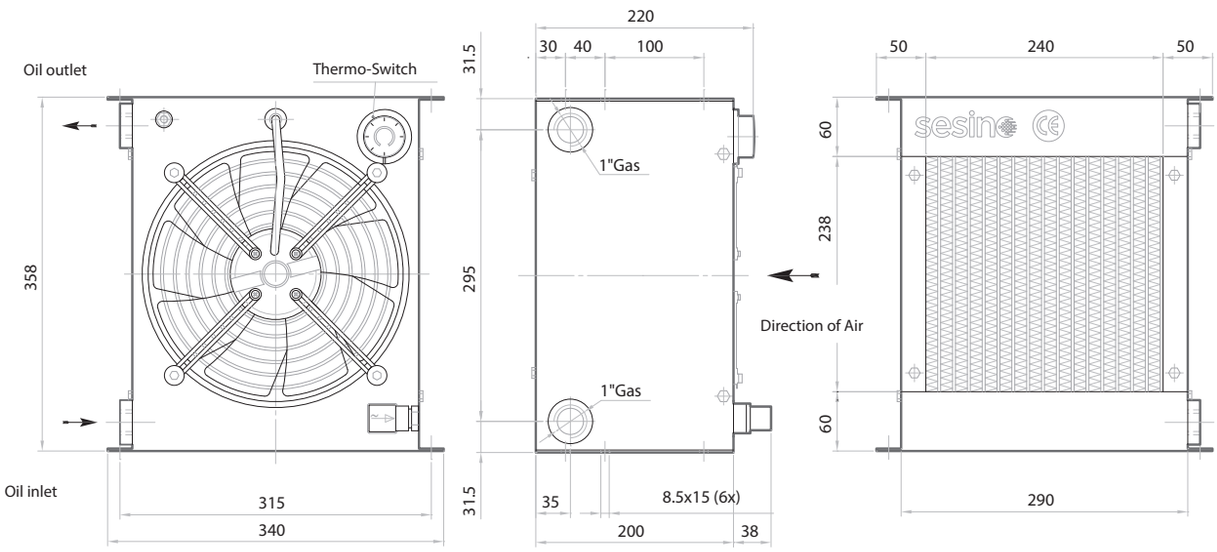






CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
10-80	2	230	50/60	115/150	0,51/0,66	910	54	74	12	250
10-80	2	400	50/60	0,20/0,23	100/140	950	54	73	12	250

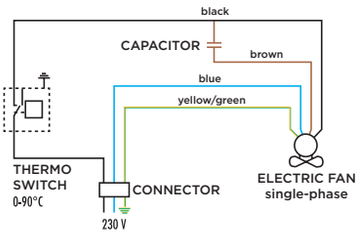
AP 300 2/E

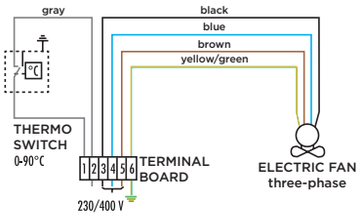
PURCHASE CODES

AP 300/2 E single-phase	3RAP302
AP 300/2 E three-phase	3RAP30238

SPARE PARTS

Cooling element	3RNAP302
Frame	3CNAP302
Housing	1302TLV
Adjustable thermo-switch	1TRM0-90
Electric fan for 3RAP302	1VNA2E250G
Electric fan for 3RAP30238	1VNA2D250.2
Electric junction box for 3RAP30038	1CSSDSAREL



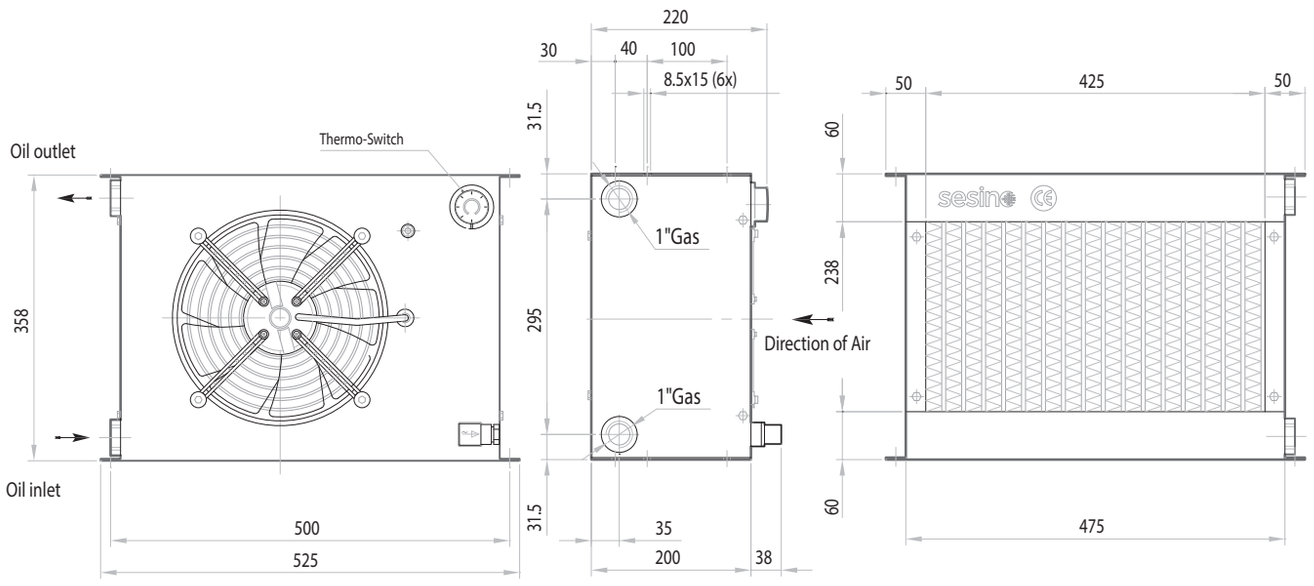


kr [kcal/h°C]	PERFOMANCE DIAGRAM									kW [kW/°C]
230										0,26
220										0,25
210										0,24
200										0,23
190										0,22
180										0,21
170										0,2
160/0	20	40	60	80	100	120	140	160	180	l/min

Bar	PRESSURE DROP DIAGRAM									
0,9										
0,75										
0,6										
0,45										
0,3										
0,15										
0	20	40	60	80	100	120	140	160	180	l/min

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
20-160	3,6	230	50/60	115/150	0,51/0,66	1.300	54	75	17	250
20-160	3,6	400	50/60	0,20/0,23	100/140	1.300	54	73	12	250

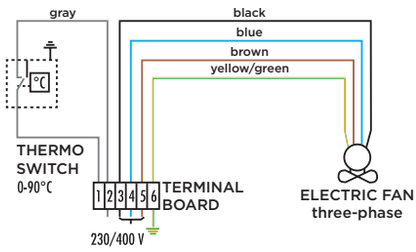
AP 430 E

PURCHASE CODES

AP 430 E three-phase	3RAP430

SPARE PARTS

Cooling element	3RNAP430E
Frame	1430CNV
Adjustable thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4511
Electric Fan for 3RAP430	1VNELCO43038DV
Electric junction box for 3RAP430	1CSSDSAREL

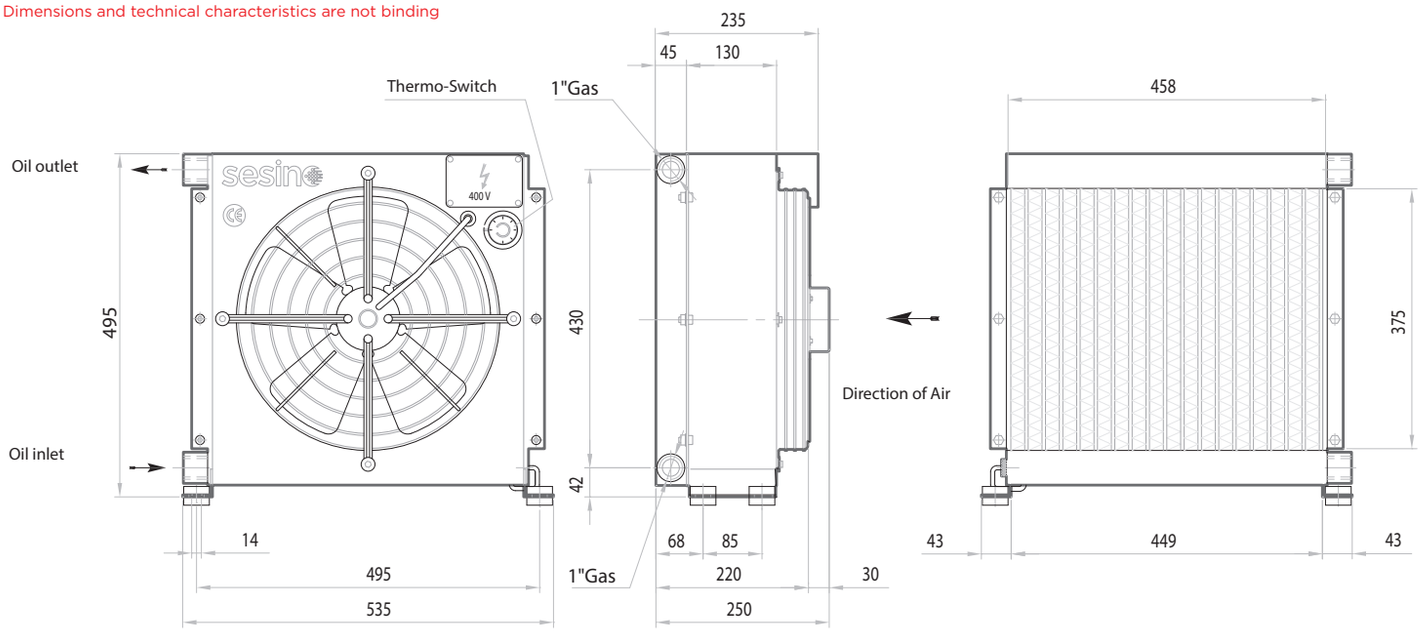


kr [kcal/h°C]	PERFOMANCE DIAGRAM								kW [kW/°C]
420									0,475
400									0,45
380									0,425
360									0,4
340									0,375
320									0,35
280/0	30	60	90	120	150	180	210	l/min	

Bar	PRESSURE DROP DIAGRAM							
3								
2,5								
2								
1,5								
1								
0,5								
0	30	60	92	120	150	180	210	l/min

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding

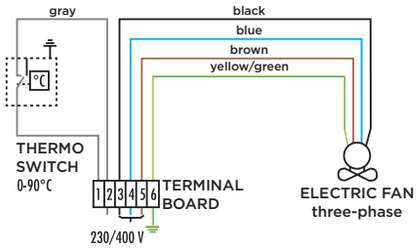


OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
30-180	3,6	Δ 230 Y 400	50	110/205	0,67/0,39	2.750	55	73	18	350
30-180	3,6	Δ 265 Y 460	60	110/200	0,57/0,33	2.750	55	73	18	350

AP 430 2/E

PURCHASE CODES

AP 430 2/E three-phase	3RAP432.1



SPARE PARTS

Cooling element	3RNAP432E
Frame	1432CNV
Adjustable thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4511
Electric Fan for 3RAP432.1	1VNELCO43238DV1
Electric junction box for 3RAP432.1	1CSSDSAREL

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
500	
475	0,55
450	
425	0,5
400	
375	0,45
350	0,4

325/0	30	60	90	120	150	180	210	l/min

PRESSURE DROP DIAGRAM

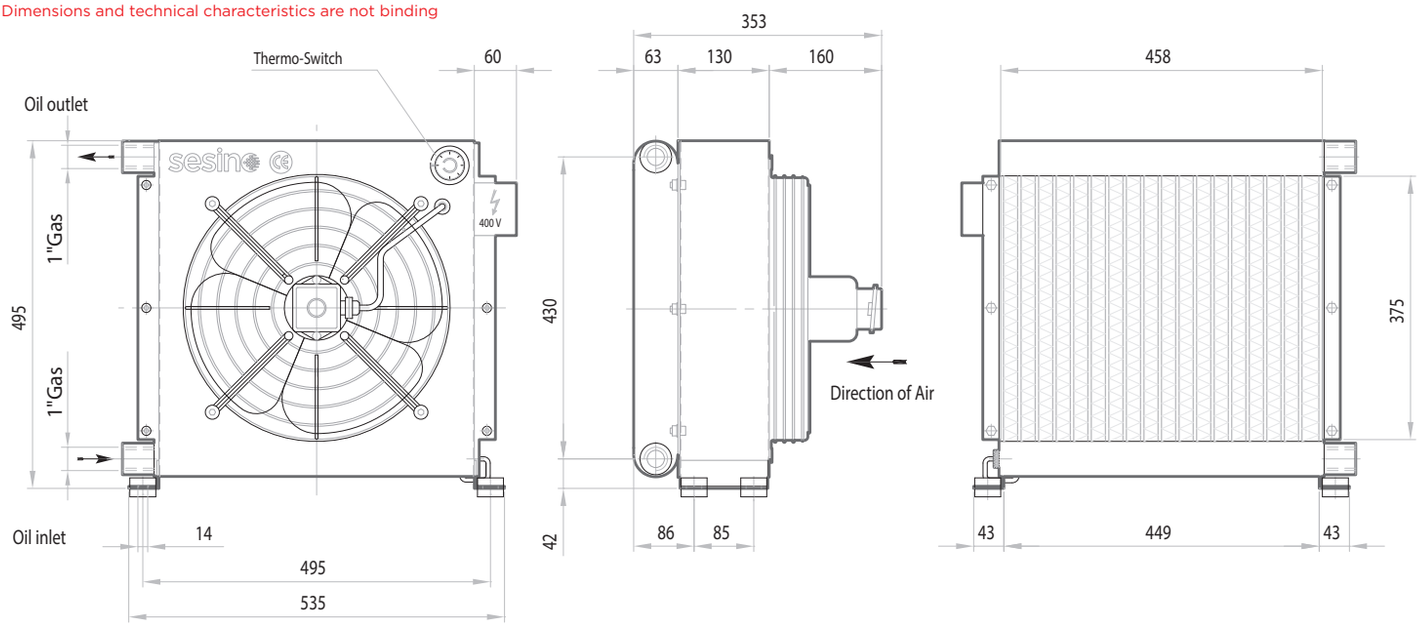
Bar	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	

0	30	60	92	120	150	180	210	l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m^3/h	IP	dB(A)	kg	mm
30-180	5,5	Δ 230 Y 400	50	110/180	0,57/0,33	2.700	55	72	24	400
30-180	5,5	Δ 265 Y 460	60	145/260	0,68/0,39	3.500	55	72	24	400

AP 494 EB

PURCHASE CODES

AP 494 EB three-phase	**3RAP494EB**

SPARE PARTS

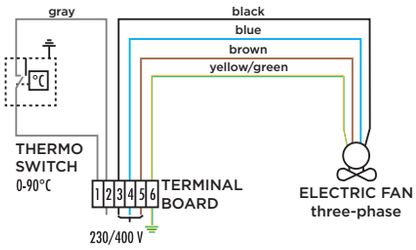
Adjustable thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4135
Electric junction box	1CSSDSAREL
Frame	3CNAP494EB.1
Cooling element	1RO99332
Electric fan	1VNELCO43238DV1

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
625	
575	0,7
525	0,65
475	0,6
425	0,55
375	0,5
	0,45
	0,4
325/0	50 100 150 200 250 300 l/min

PRESSURE DROP DIAGRAM

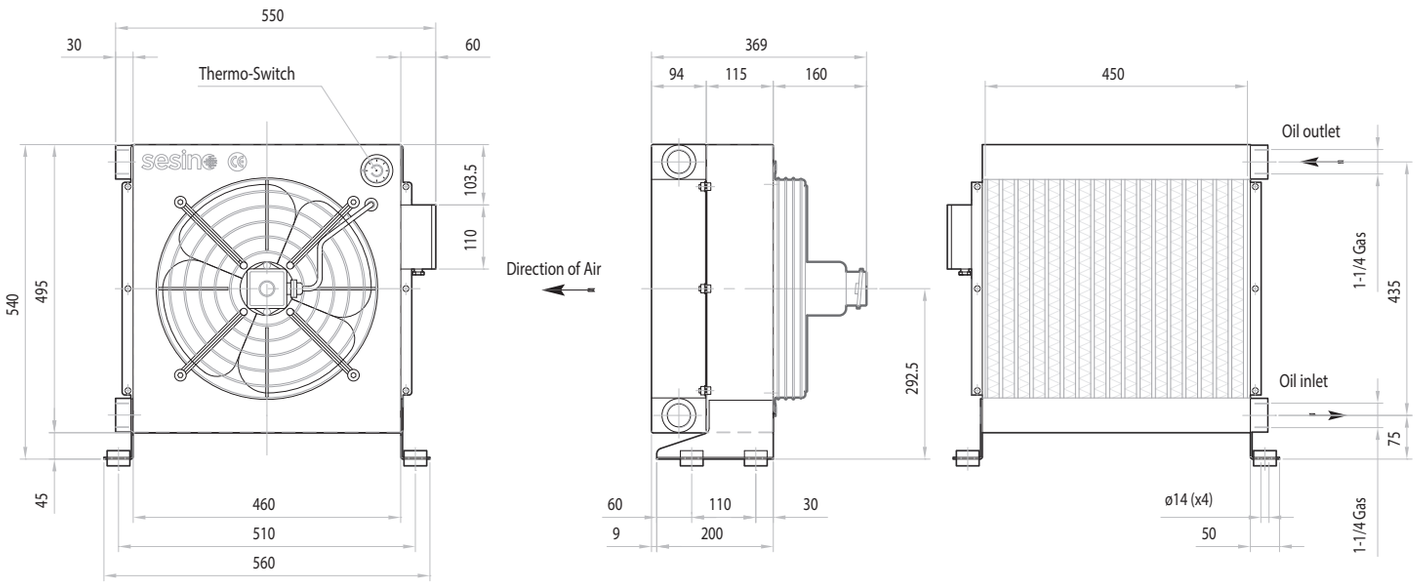
Bar	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	
0	50 100 150 200 250 300 l/min



CORRECTION FACTOR

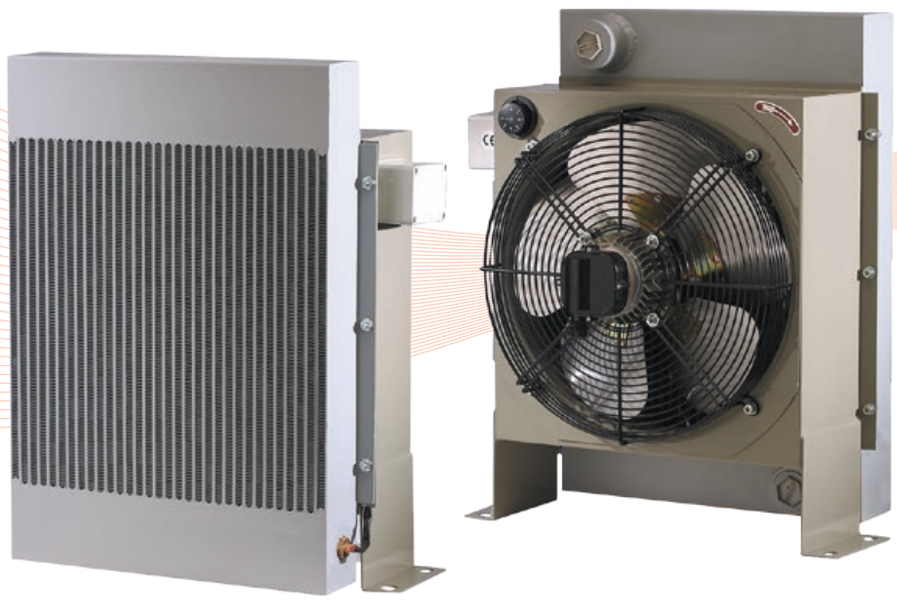
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
30-240	8	Δ 230 Y 400	50	110/180	0,57/0,33	2.750	55	72	28	400
30-240	8	Δ 265 Y 460	60	145/260	0,68/0,39	3.300	55	73	28	400

AP 580 EB

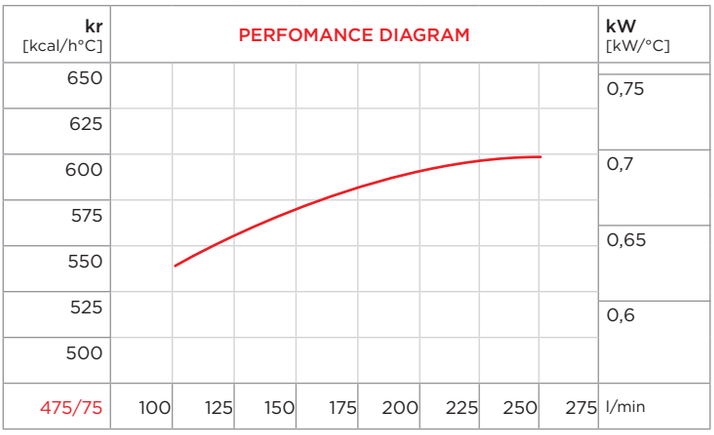


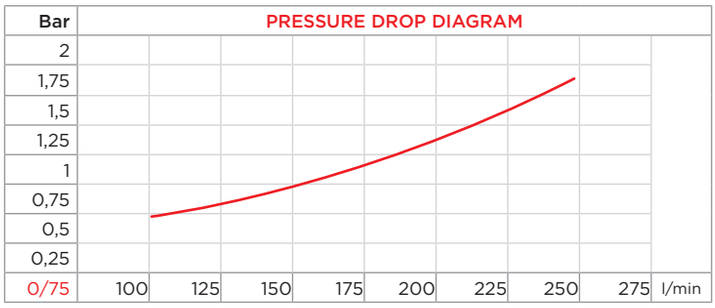
PURCHASE CODES

AP 580 EB three-phase	**3RAP580EB**

SPARE PARTS

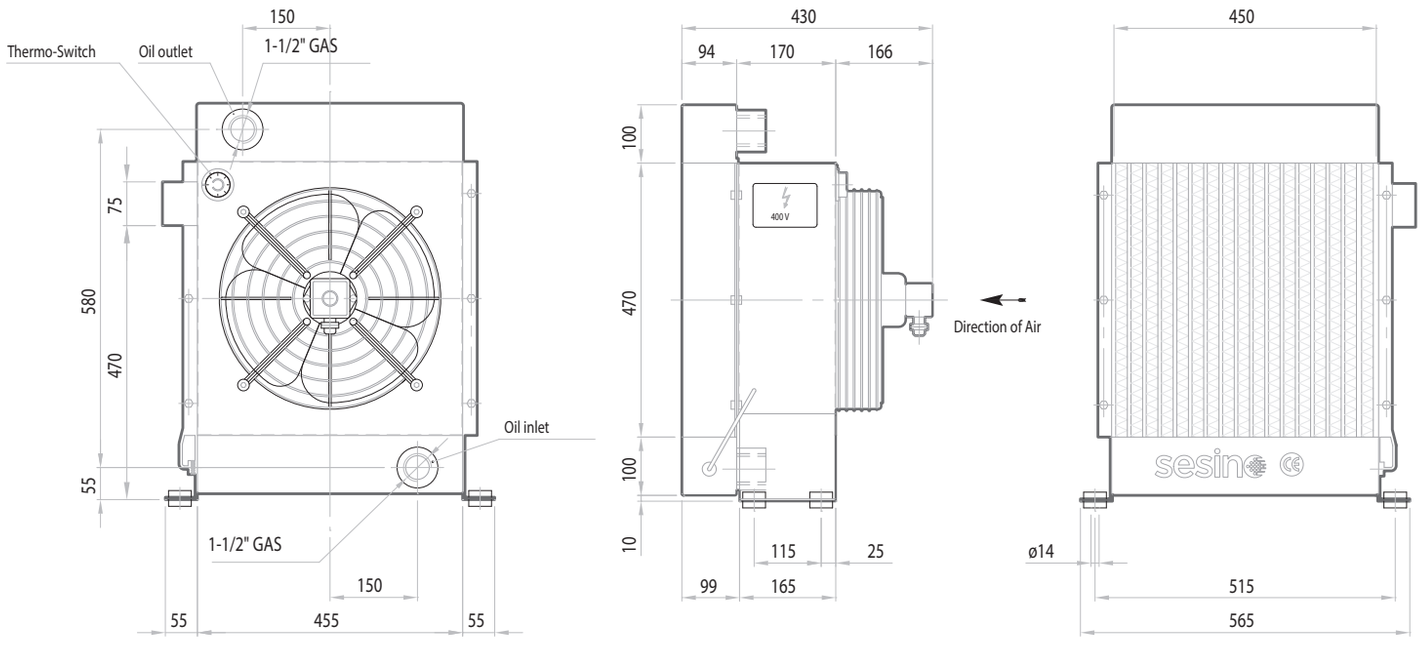
Adjustable thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4135
Electric junction box	1CSSDSAREL
Cooling element	3RNAP580E
Electric fan	1VNELCO43238DV1
Frame	3CNAP580EB.1





CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m^3/h	IP	dB(A)	kg	mm
100-250	11,5	Δ 230 Y 400	50	110/180	0,57/0,33	3.500	55	72	40	400
100-250	11,5	Δ 265 Y 460	60	145/260	0,68/0,39	4.800	55	72	40	400

AP 680 EB

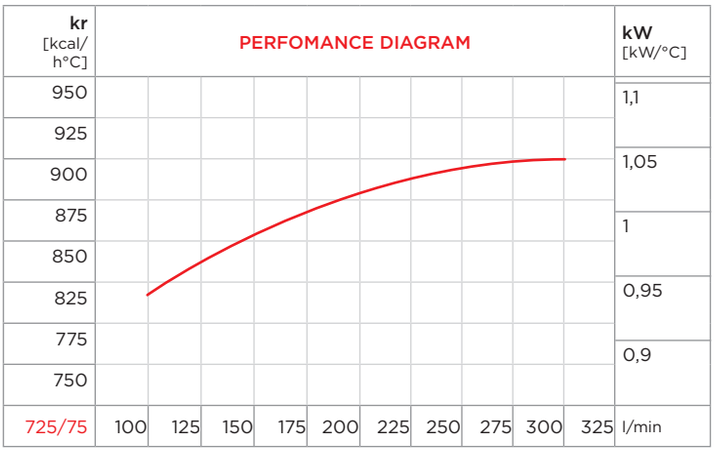
PURCHASE CODES

AP 680 EB three-phase	**3RAP680EB**

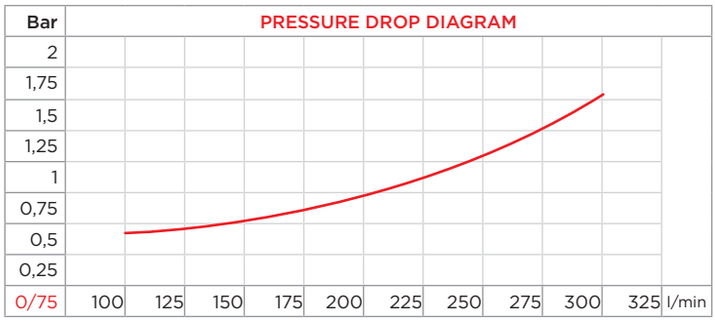
SPARE PARTS

Adjustable thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4135
Electric junction box	1CSSDSAREL
Cooling element	3RNAP680E
Electric fan	1VNA4D500DV
Frame	3CNAP680EB.1

PERFOMANCE DIAGRAM



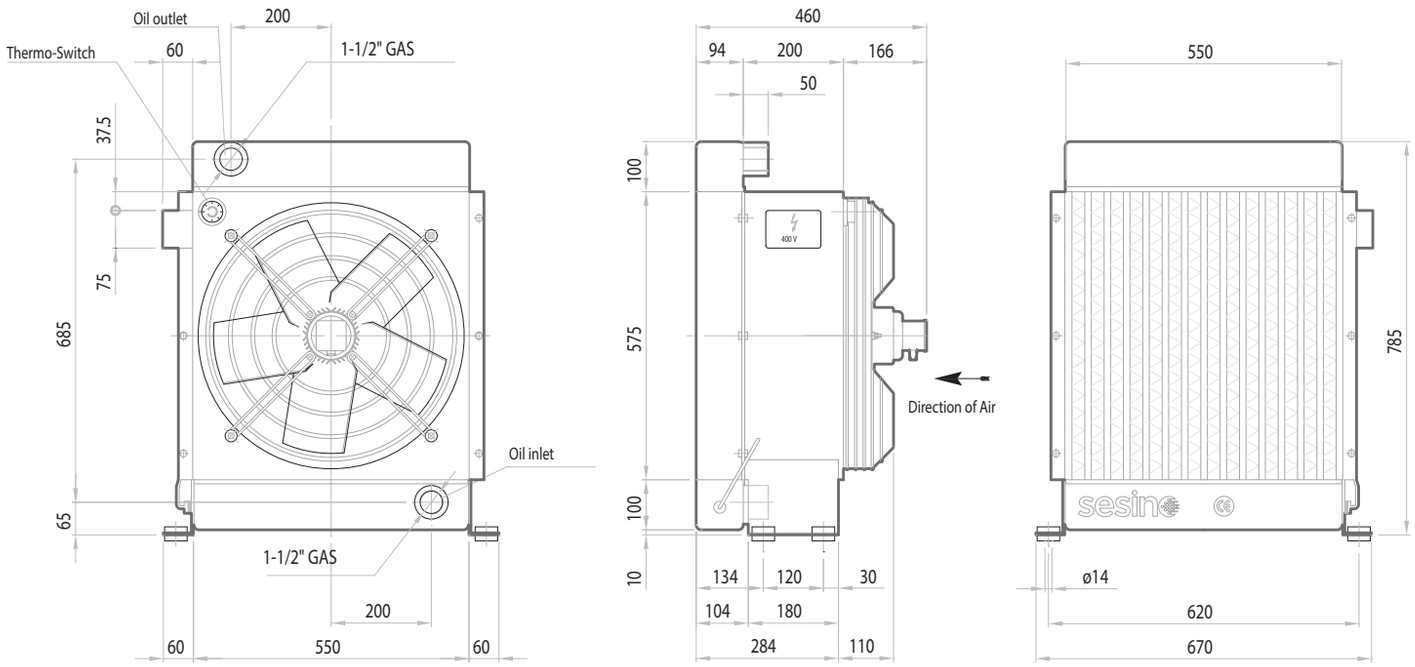
PRESSURE DROP DIAGRAM



CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
100-300	15	230/400	50	690	2,34	6.300	54	72	62	500
100-300	15	277/480	60	1050	2,72	8.800	54	75	62	500

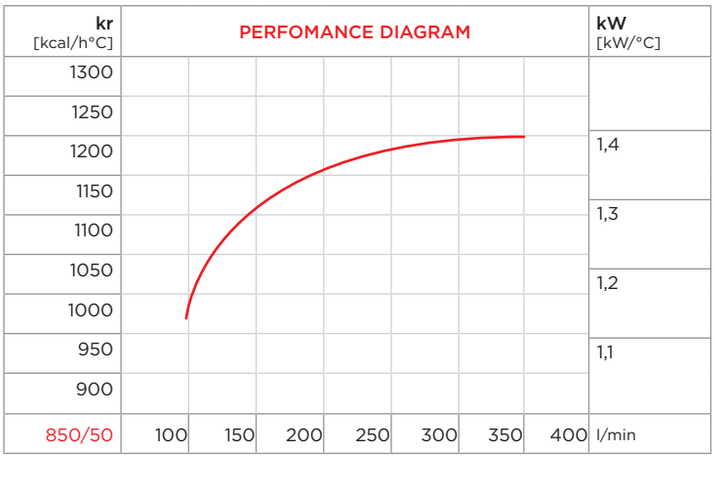
AP 730 EB

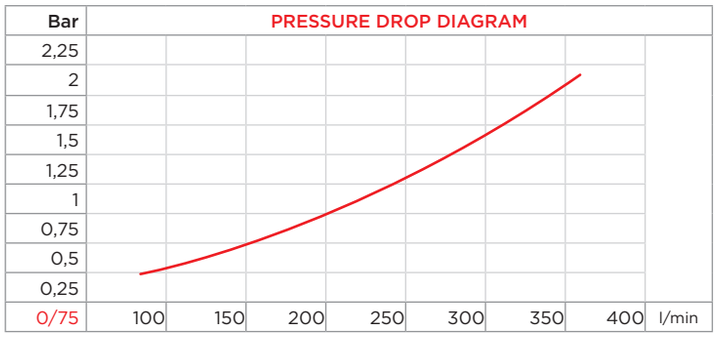
PURCHASE CODES

AP 730 EB three-phase	**3RAP730EB**

SPARE PARTS

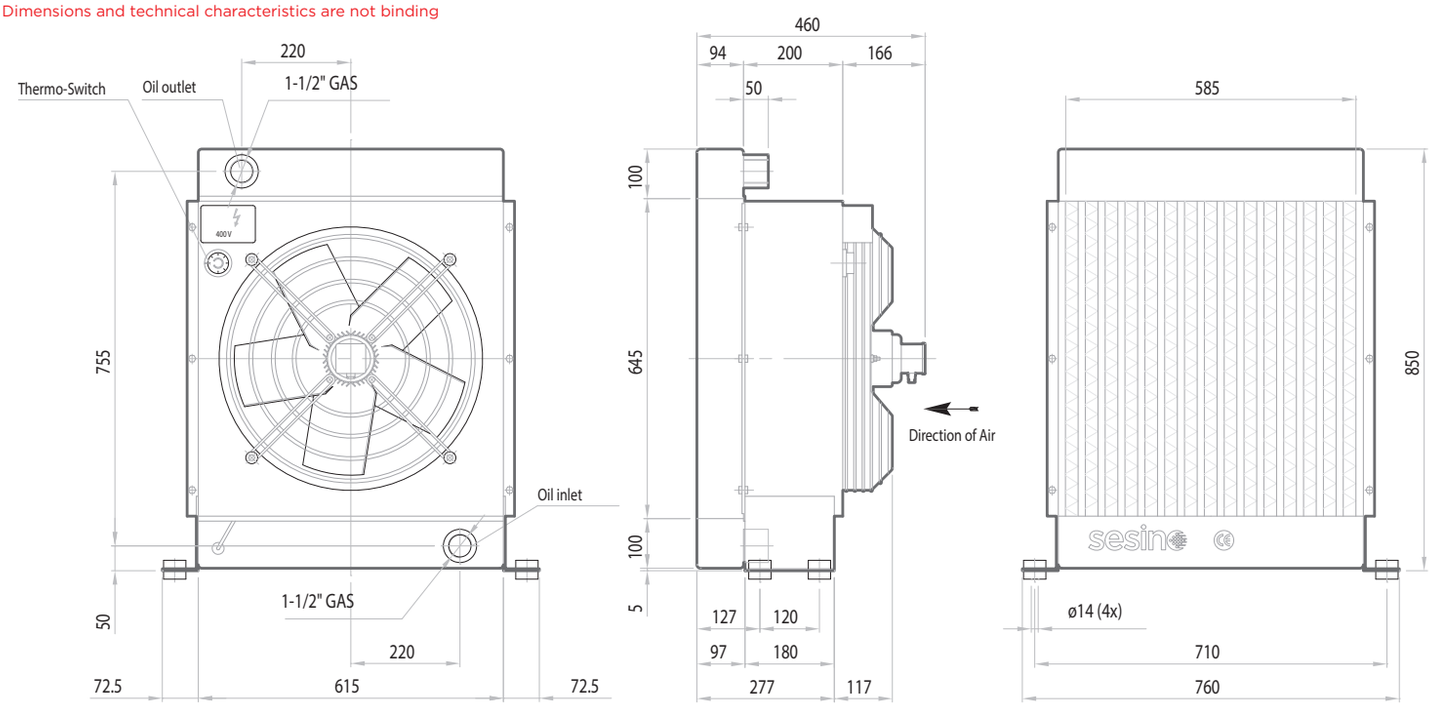
Adjustable thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	3RNAP730E
Electric fan	1VNA4D500DV
Frame	3CNAP730EB.1





CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
100-300	15	230/400	50	690	2,34	6.300	54	72	62	500
100-300	15	277/480	60	1050	2,72	8.800	54	75	62	500

AP 830 EB

PURCHASE CODES

AP 830 EB three-phase	**3RAP830EB**

SPARE PARTS

Adjustable thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	3RNAP830E
Electric fan	1VNA4D560DV
Frame	3CNAP830EB.1

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
2000	
1925	2,2
1850	2,1
1775	2
1700	1,9
1625	1,8
1550	1,7
1475	

140/100	150	200	250	300	350	400	450	l/min

PRESSURE DROP DIAGRAM

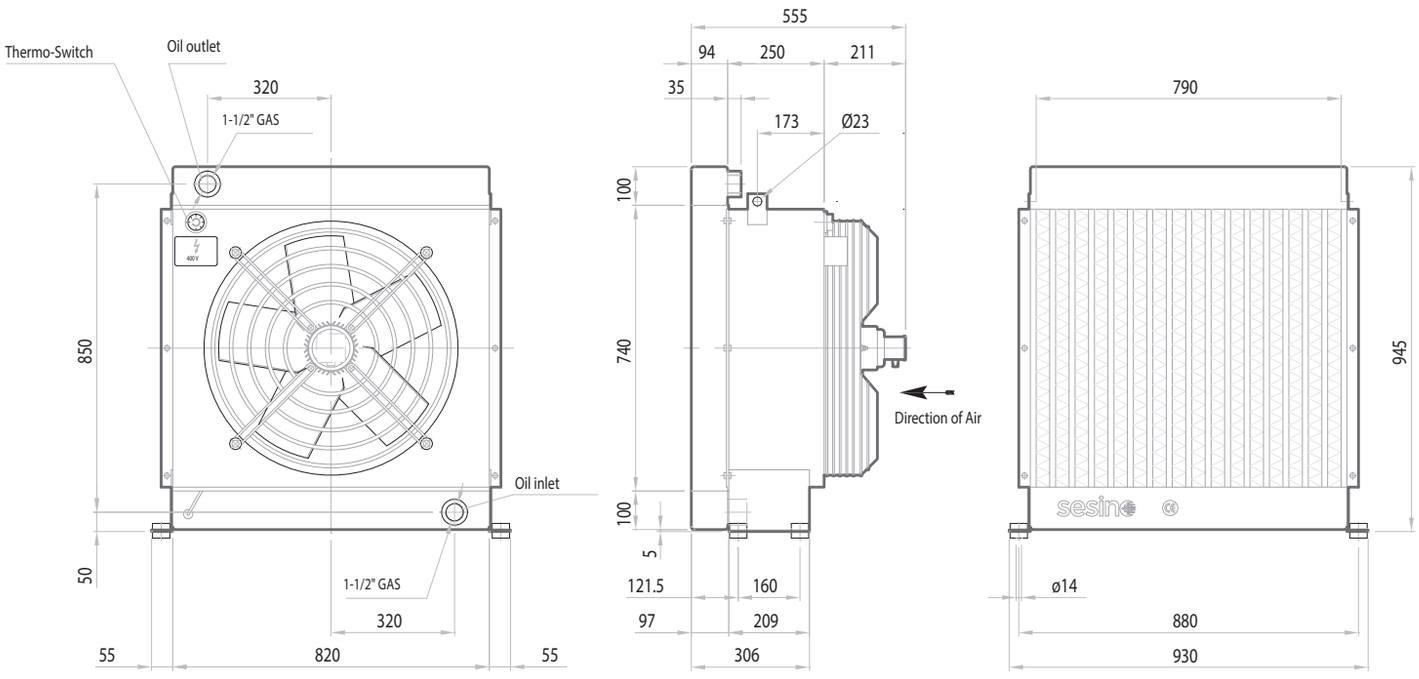
Bar
2,25
2
1,75
1,5
1,25
1
0,75
0,5
0,25

0/100	150	200	250	300	350	400	450	l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
150-400	20	400	50	810	1,54	9.500	54	73	83	560
150-400	20	480	60	1300	1,94	11.500	54	75	83	560

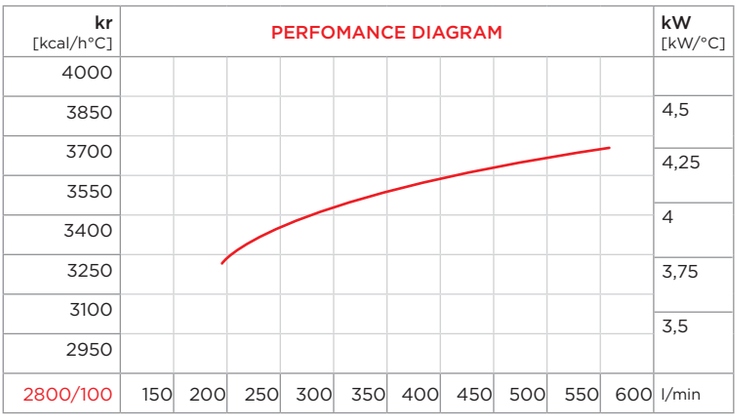
AP 1200 EB

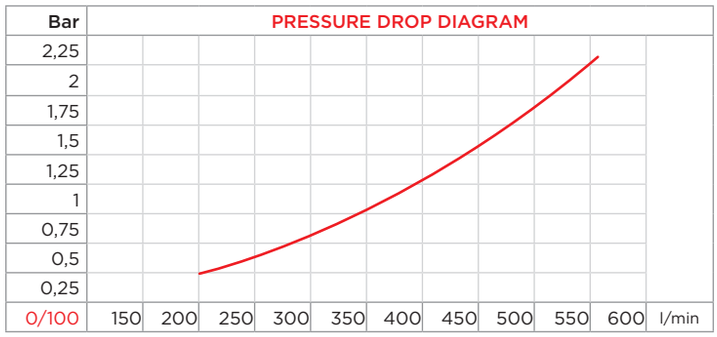
PURCHASE CODES

AP 1200 EB three-phase	**3RAP1200EB**

SPARE PARTS

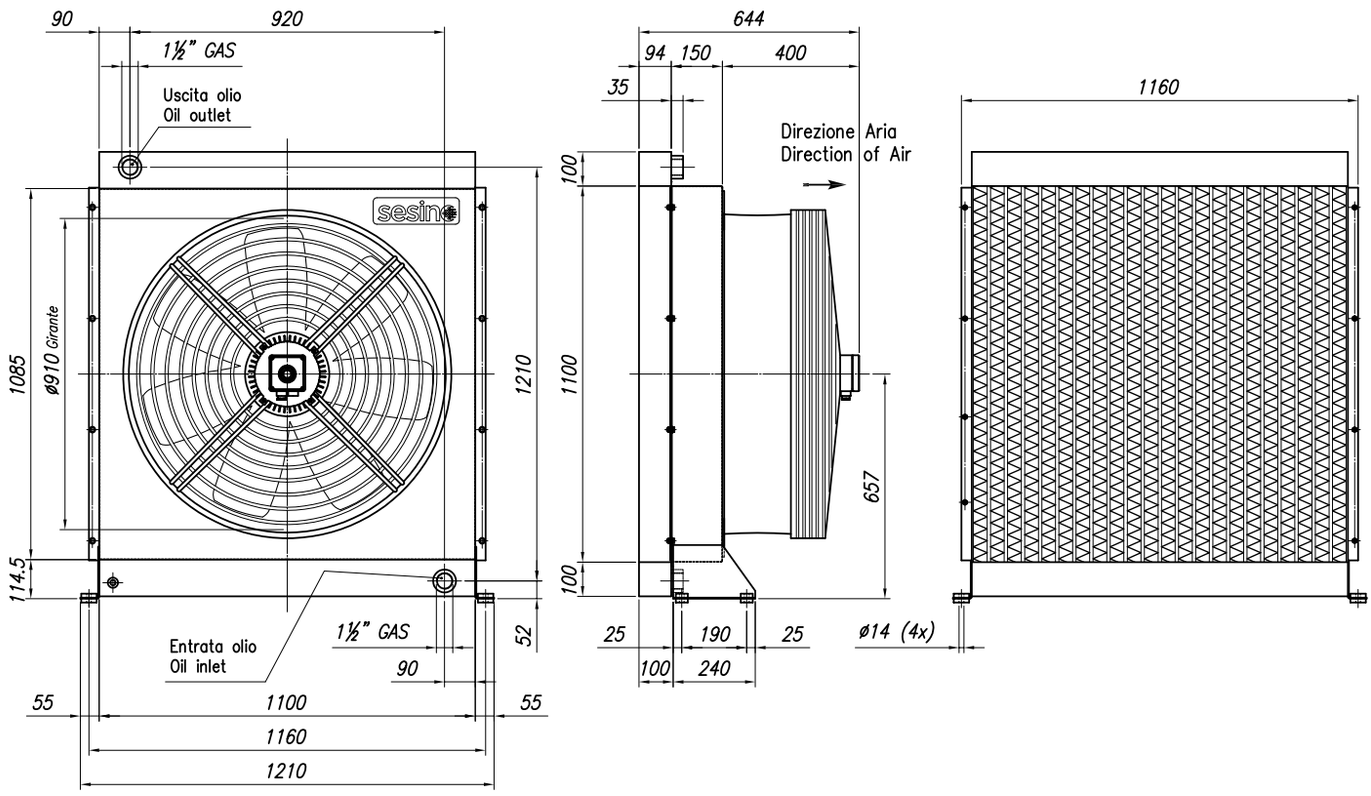
Frame	3CNEO08586.1
Shock isolating mounting (4 pcs)	3KIT4232
Cooling element	1RO08423
Electric fan	1VNEO08586





CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m^3/h	IP	dB(A)	kg	mm
200-550	35	400	50	2100	5,2	20.000	54	76	135	910

AP 2/680 EB

PURCHASE CODES

AP 2/680 EB three-phase	**3RAP2/680EB**

SPARE PARTS

Thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	1RO01339
Electric fan	1VNA4D500DV
Frame	3CNAP2/680EB.1

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
2100	
2025	2,37
1950	2,25
1875	
1800	2,12
1725	2
1650	
1575	1,87
1500/0	l/min

50 100 150 200 250 300 350 400

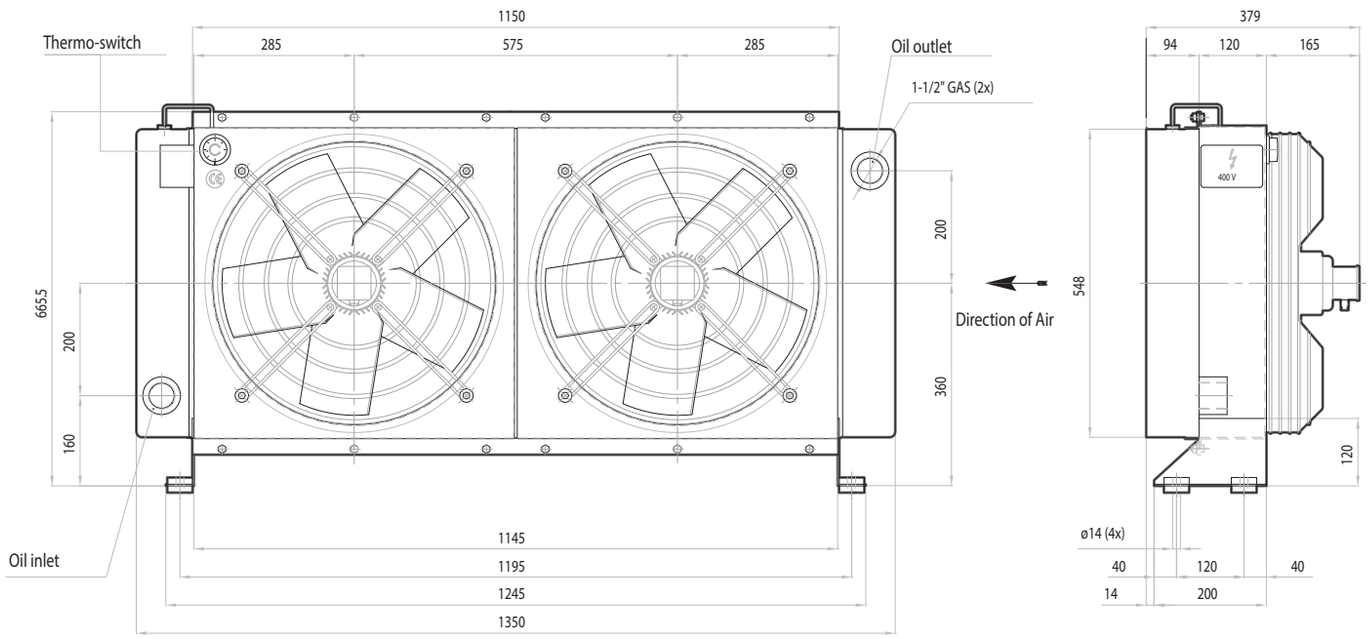
PRESSURE DROP DIAGRAM

Bar	
3	
2,75	
2,5	
2,25	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,50	
0,25	
0	50 100 150 200 250 300 350 400 l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m^3/h	IP	dB(A)	kg	mm
100-300	28	230/400	50	2x 690	2x 2,34	2x 6.300	54	75	120	500
100-300	28	277/480	60	2x 1050	2x 2,72	2x 8.800	54	77	120	500

AP 2/730 EB

PURCHASE CODES

AP 2/730 EB three-phase	**3RAP2/730EB**

SPARE PARTS

Thermo-switch	1TRM0-90
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	1RO02357
Electric fan	1VNA4D500DV
Frame	3CNAP2/730EB.1

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
2750	
2650	
2550	3
2450	
2350	2,75
2250	
2150	2,5
2050	
1950	2,25
1850/0	l/min

50 100 150 200 250 300 350 400

PRESSURE DROP DIAGRAM

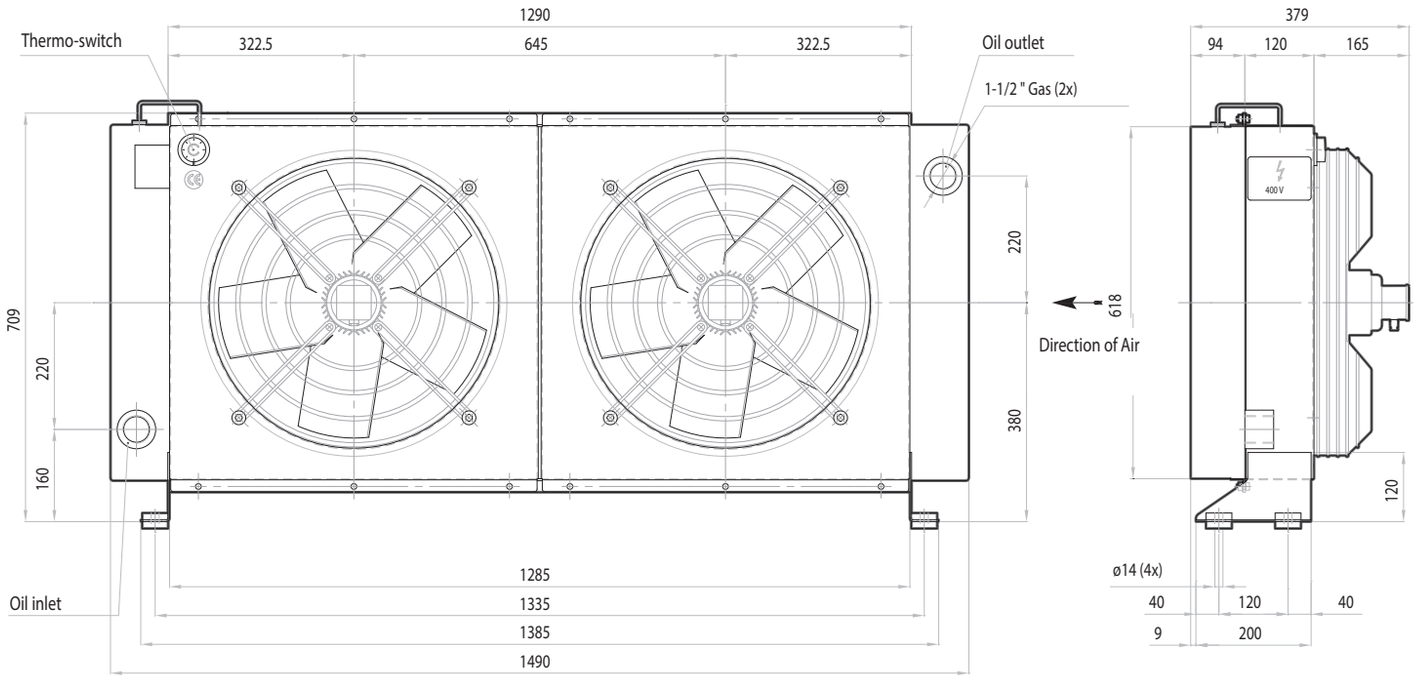
Bar	
3,5	
3	
2,5	
2	
1,5	
1	
0,50	
0	l/min

50 100 150 200 250 300 350 400

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m^3/h	IP	dB(A)	kg	mm
100-350	30	230/400	50	2x 690	2x 2,34	2x 6.300	54	75	140	500
100-350	30	277/480	60	2x 1050	2x 2,72	2x 8.800	54	77	140	500

AP 2/830 EB

PURCHASE CODES

AP 2/830 EB three-phase	**3REO91247**

SPARE PARTS

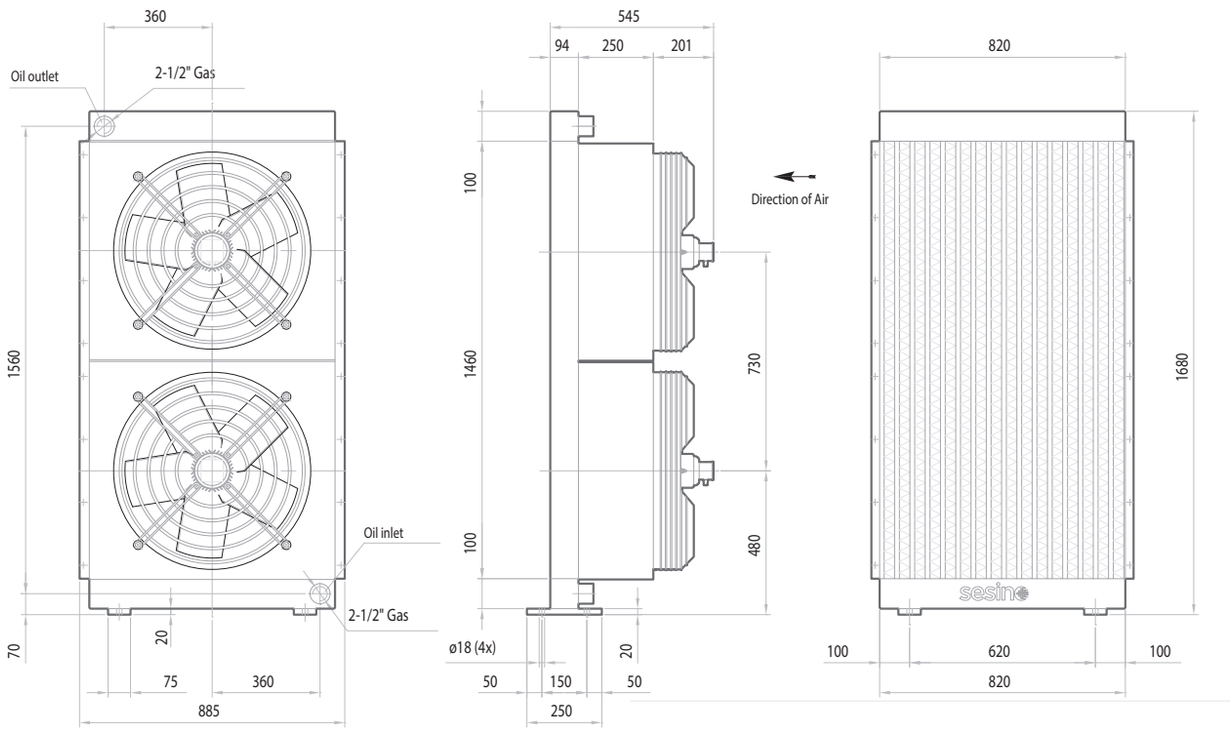
Frame	3CNE091247.1
Cooling element	3RNEO91247
Electric fan for 3REO91247	1VNA4D560DV

kr [kcal/h°C]	PERFOMANCE DIAGRAM							kW [kW/°C]
4000								
3850								4,5
3700								4,25
3550								4
3400								
3250								3,75
3100								3,5
2950								
2800/100	150	200	250	300	350	400	450	l/min

Bar	PRESSURE DROP DIAGRAM									
5										
4										
3										
2										
1										
0/50	100	150	200	250	300	350	400	450	500	l/min

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
150-400	40	400	50	2x 810	2x 1,54	2x 9.500	54	73	180	560
150-400	40	480	60	2x 1300	2x 1,94	2x 11.500	54	75	180	560

AP 3/830 EB

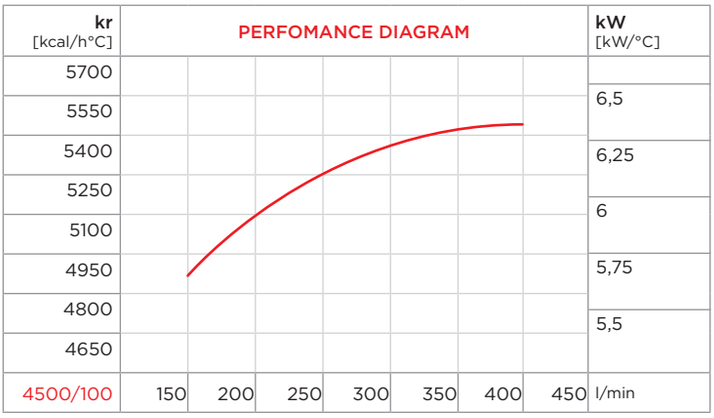
PURCHASE CODES

AP 3/830 EB three-phase	**3REO91278**

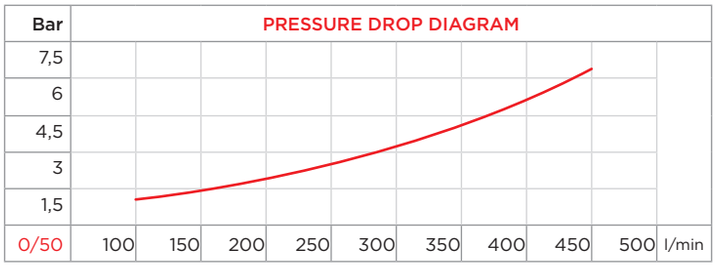
SPARE PARTS

Frame	3CNE091247.1 3CNE091278.1
Cooling element	3RNEO91278
Electric fan	1VNA4D560DV

PERFOMANCE DIAGRAM



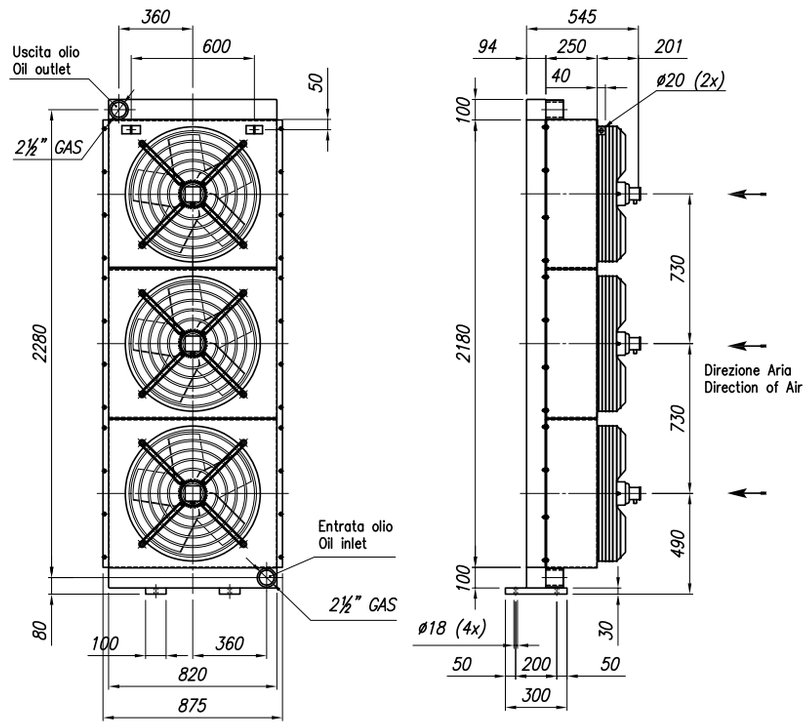
PRESSURE DROP DIAGRAM



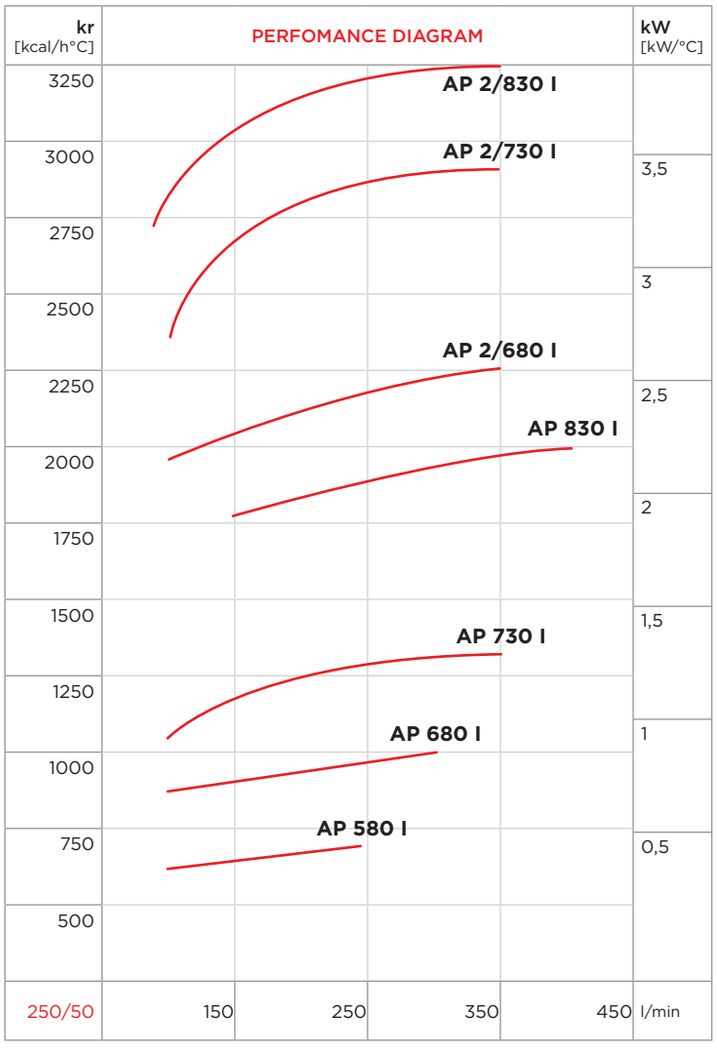
CORRECTION FACTOR

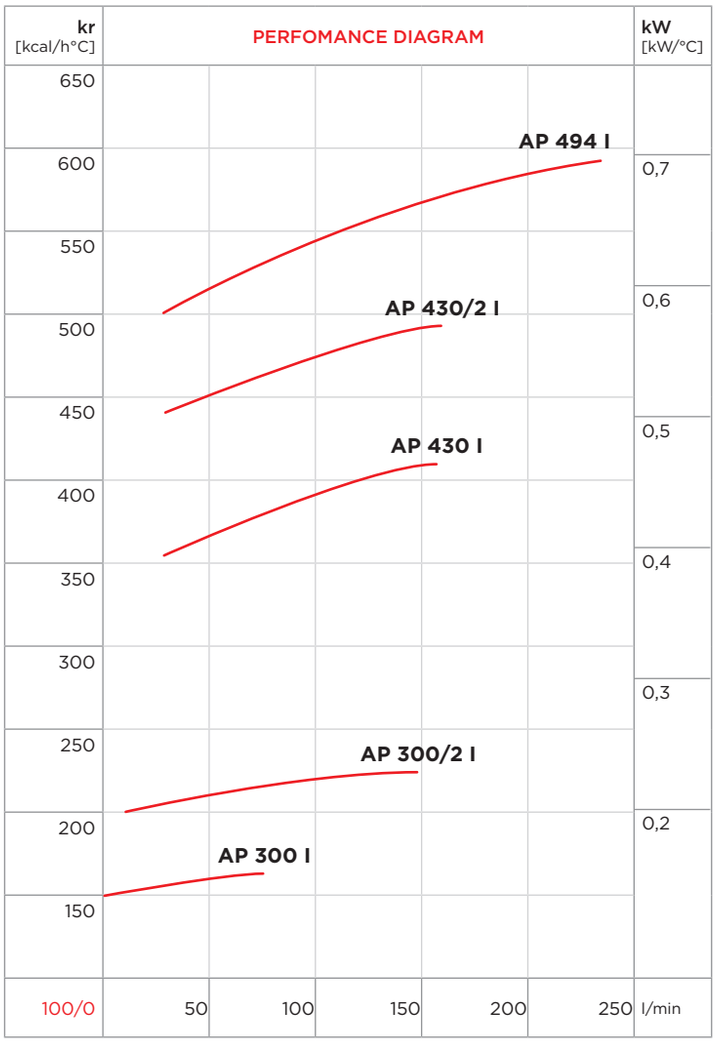
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



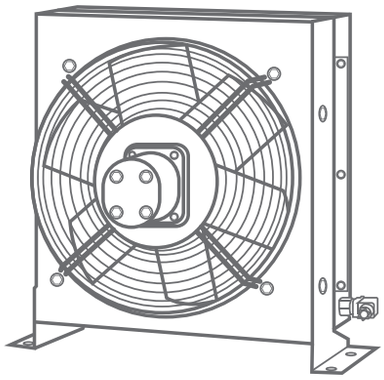
OIL FLOW	CAPACITY	VOLTAGE	FREQUENCY	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	hz	W	A	m³/h	IP	dB(A)	kg	mm
150-400	60	400	50	3x 810	3x 1,54	3x 9.500	54	78	260	560
150-400	60	480	60	3x 1300	3x 1,94	3x 11.500	54	78	260	560


kr
[kcal/h°C]
PERFOMANCE DIAGRAM
kW
[kW/°C]
3250
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
500
AP 2/830 I
AP 2/730 I
AP 2/680 I
AP 830 I
AP 730 I
AP 680 I
AP 580 I
3,5
3
2,5
2
1,5
1
0,5
250/50
150
250
350
450
l/min


kr
[kcal/h°C]
PERFOMANCE DIAGRAM
kW
[kW/°C]
650
600
550
500
450
400
350
300
250
200
150
AP 494 I
AP 430/2 I
AP 430 I
AP 300/2 I
AP 300 I
0,7
0,6
0,5
0,4
0,3
0,2
100/0
50
100
150
200
250
l/min

AIR-OIL HEAT EXCHANGERS WITH HYDRAULIC MOTOR

SCAMBIATORI DI CALORI ARIA-OLIO CON VENTOLA AZIONATA DA MOTORE IDRAULICO



These kind of exchangers have been designed for mobile machines when the battery cannot supply enough electric energy to the motor of the DC fan or when the DC exchanger is not able to produce high thermic exchanges.
The particular structure of the cooling element allows great thermic performances and pressure resistance. **Maximum working static pressure: 20 bar; test pressure: 35 bar.**

Out technical Department is available to suggest and find the better solution in case of particular working conditions, pressures, frequencies, vibrations, etc.

It is always recommended to assemble in parallel with the exchanger a by-pass valve to avoid extreme counter-pressures, particularly when the machine is started with cold oil. On the contrary, it is not useful to use a check valve as by-pass to protect the exchanger from pressure's peaks, since the inertia of the valve itself is too high in comparison with the speed of the pressure waves that occur into the oleo hydraulic systems.

The flow rates shown in the tables are the ones recommended for the exchanger proper working.

The efficiency curves show the specific exchange capacity in kcal/h°C or in kW/°C according to the different oil rates. To calculate the heat quantity the different exchangers are able to dissipate it is enough to multiply such capacity by the difference between the requested oil temperature and the summer room temperature.

We pay particular attention to the choice of our components in order to supply the customer with a reliable product.
The fans are metallic, and metallic are the protection grills used also to fix the hydraulic motor. Upon request, it is possible to receive the motor support, which helps the driving shaft absorbing radial stresses. Upon request, it is also possible to receive a thermo switch with IP 65 protection degree and different temperature ranges, 47°C or 60°C.

For the right calculation of air-oil heat exchangers, we supply our customers with a calculation program on CD-ROM or that can be downloaded from our website.

The air-oil heat exchangers can be used to cool other kind of fluids, which must be compatible with aluminium and its alloys.

However, for each use, with the exception of oil cooling, we recommend to consult our Technical Department.

Questi tipi di scambiatori sono stati progettati per essere utilizzati su macchine mobili quando la batteria della stessa non può fornire l'energia elettrica necessaria al motore a corrente continua del ventilatore, oppure quando la necessità di ottenere scambi termici elevati non può essere soddisfatta dagli scambiatori a corrente continua.
La particolare costruzione del radiatore consente di ottenere notevoli rese termiche e forte resistenza alla pressione. ***Pressione massima statica di funzionamento: 20 bar; pressione di collaudo: 35 bar.***

Il nostro Ufficio Tecnico è a disposizione per valutare la soluzione più opportuna in presenza di particolari condizioni di lavoro, pressioni, frequenze, vibrazioni,ecc..

È sempre consigliabile montare in parallelo allo scambiatore una valvola di by-pass per evitare eccessive contropressioni soprattutto al momento dell'avviamento della macchina con olio freddo. Non è invece conveniente utilizzare una valvola di ritegno come by-pass per proteggere lo scambiatore dai picchi di pressione in quanto l'inerzia della valvola stessa è troppo alta rispetto alla velocità delle onde di pressione che si sviluppano all'interno dell'olio degli impianti oleoidraulici.

Le portate olio indicate nelle tabelle sono quelle consigliate per il buon funzionamento dello scambiatore.

Le curve di rendimento forniscono la potenzialità di scambio specifica in kcal/h°C o in kW/h°C in funzione della portata olio; per calcolare la quantità di calore che i vari scambiatori sono in grado di disperdere, è sufficiente moltiplicare tale potenzialità per la differenza tra le temperature dell'olio desiderata e dell'aria ambiente massima estiva.
Particolare attenzione è stata posta nella scelta dei componenti per fornire alla clientela un prodotto estremamente affidabile. Le ventole sono in metallo, così come le reti di protezione che fungono anche da fissaggio del motore idraulico. A richiesta può essere fornito il supporto motore, per assorbire sollecitazioni radiali sull'albero del motore; sempre a richiesta possiamo fornire un termostato avente protezione IP65 con tarature a 47 o 60°C a scelta.

Per il calcolo degli scambiatore aria-olio è disponibile un programma su CD-rom o scaricabile dal nostro sito internet.
Gli scambiatori aria-olio possono essere utilizzati per raffreddare altri tipi di fluidi, a condizione che essi siano compatibili con l'alluminio e le sue leghe.

Consigliamo comunque, per qualsiasi impiego che non sia il raffreddamento dell'olio, di contattare il nostro Ufficio Tecnico.

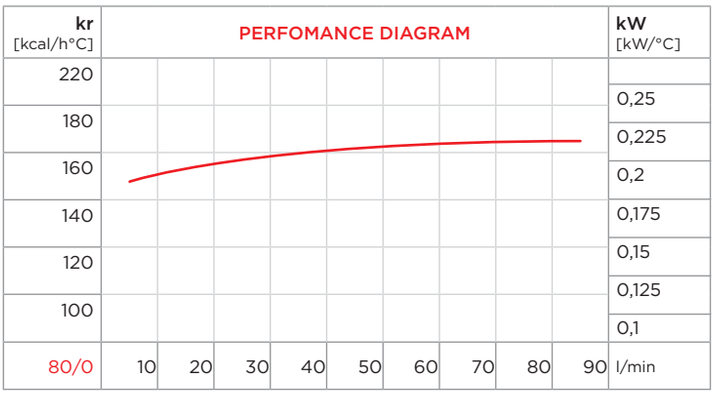
AP 300 I

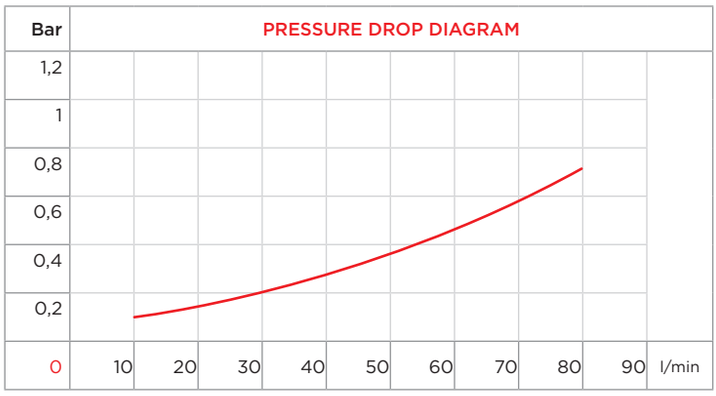
PURCHASE CODES

AP 300 I With hydraulic motor	3RAP300IA
AP 300 I Prepared	3RAP300I4A

SPARE PARTS

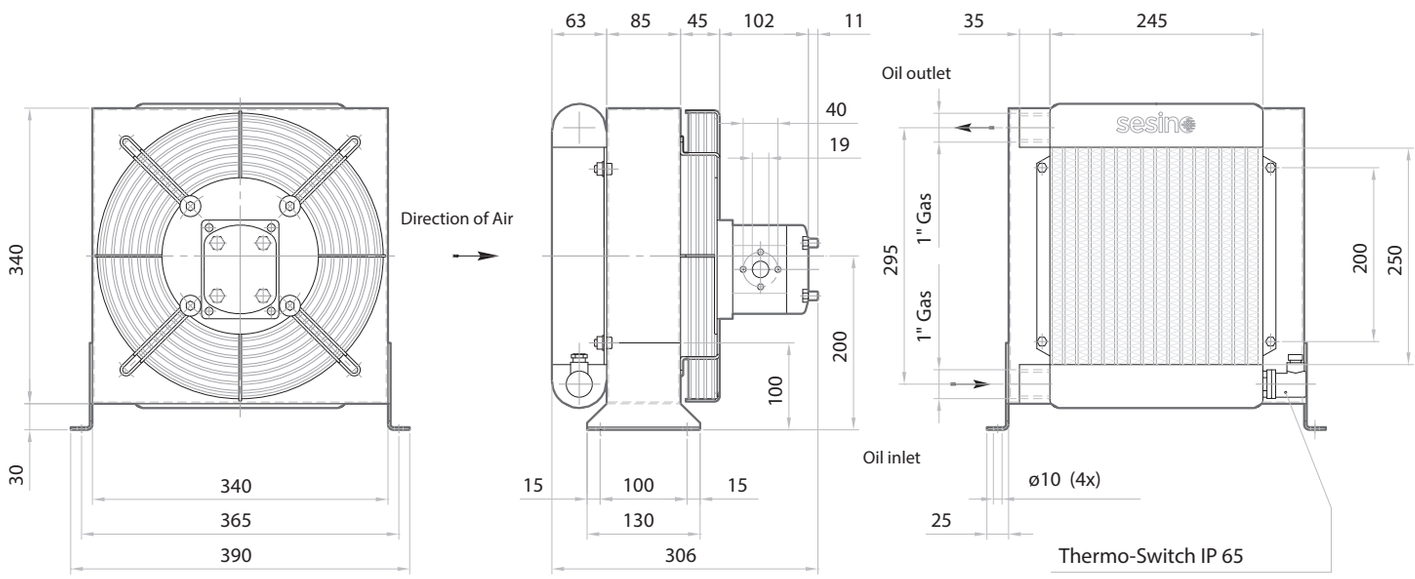
Cooling element	3RNL300
Housing	1300TLV
Frame	3CNAP300I.1
Fan	1G300I
Fan Grill	1RTAP300I
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36





CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m³/h	dB(A)	kg	lt.	mm
10-80	2300	200	11,3	26	2.000	68	14	2	255

AP 300/2 I

PURCHASE CODES

AP 300/2 I With hydraulic motor	3RAP302IA
AP 300/2 I Prepared	3RAP302I4A

SPARE PARTS

Cooling element	3RNL302
Housing	1302TLV
Frame	3CNAP302I.1
Fan	1G300I
Fan Grill	1RTAP300I
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
250	
240	0,28
230	0,27
220	0,26
210	0,25
200	0,24
190	0,23
180	0,22
	0,21

170/0	20	40	60	80	100	120	140	160	180	l/min

PRESSURE DROP DIAGRAM

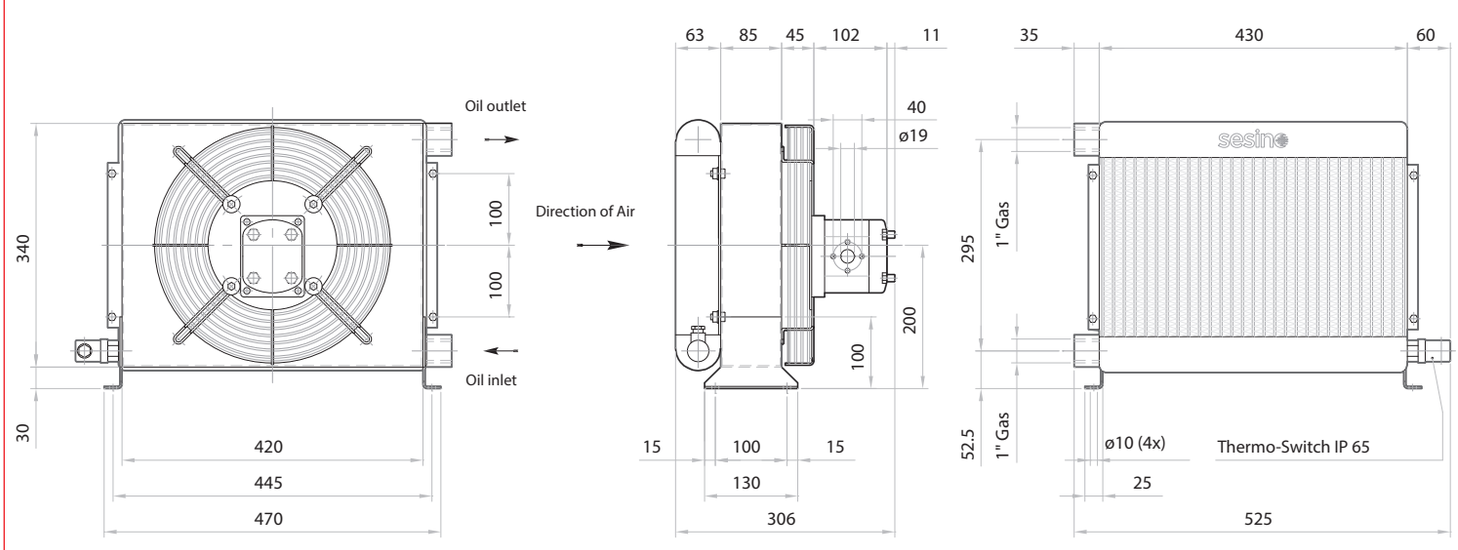
Bar
0,9
0,75
0,6
0,45
0,3
0,15

0	20	40	60	80	100	120	140	160	180	l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m³/h	dB(A)	kg	lt.	mm
20-50	2300	200	11,3	26	2.500	70	19	3,6	255

AP 430 I

PURCHASE CODES

AP 430 I with hydraulic motor	3RAP430I1A
AP 430 I prepared	3RAP430I4A

SPARE PARTS

Cooling element	3RNL430
Frame	3CN430I.1
Shock isolating mounting (4 pcs)	3KIT4511
Fan	1G430I
Fan grill	1RTAP430I
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
450	
425	0,5
400	0,475
375	0,45
350	0,425
325	0,4
300	0,375
275/0	0,35

30	60	90	120	150	180	210	l/min

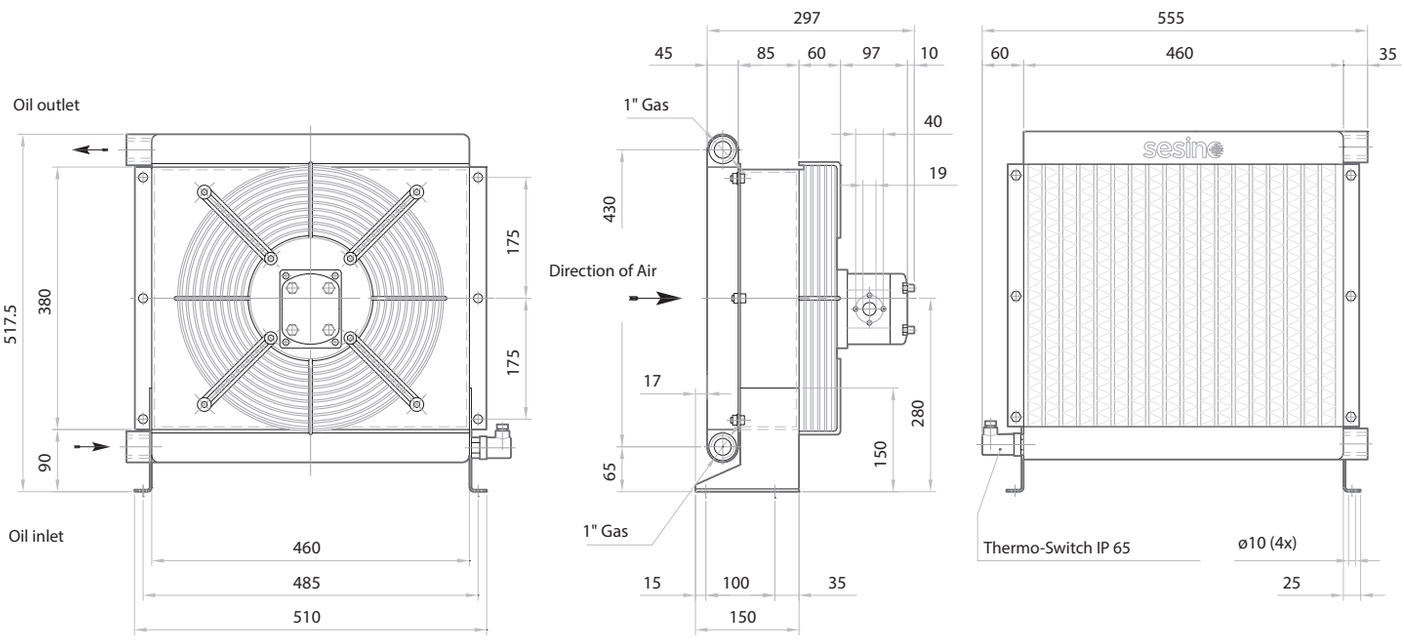
PRESSURE DROP DIAGRAM

Bar	
1,75	
1,5	
1,25	
1,5	
1	
0,75	
0,5	
0,25	
0	30 60 92 120 150 180 210 l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m^3/h	dB(A)	kg	lt.	mm
50-150	2.700	770	11,3	31	7.000	73	21	3,6	355

AP 430/2 I

PURCHASE CODES

AP 430/2 I with hydraulic motor	3RAP432I1A
AP 430/2 I prepared	3RAP432I4A

SPARE PARTS

Cooling element	3RNAP432TP
Frame	3CN430I.1
Shock isolating mounting (4 pcs)	3KIT4511
Fan	1G430I
Fan grill	1RTAP430I
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
550	
525	0,62
500	0,59
475	0,56
450	0,53
425	0,5
400	0,47
375/0	l/min

30 60 90 120 150 180 210

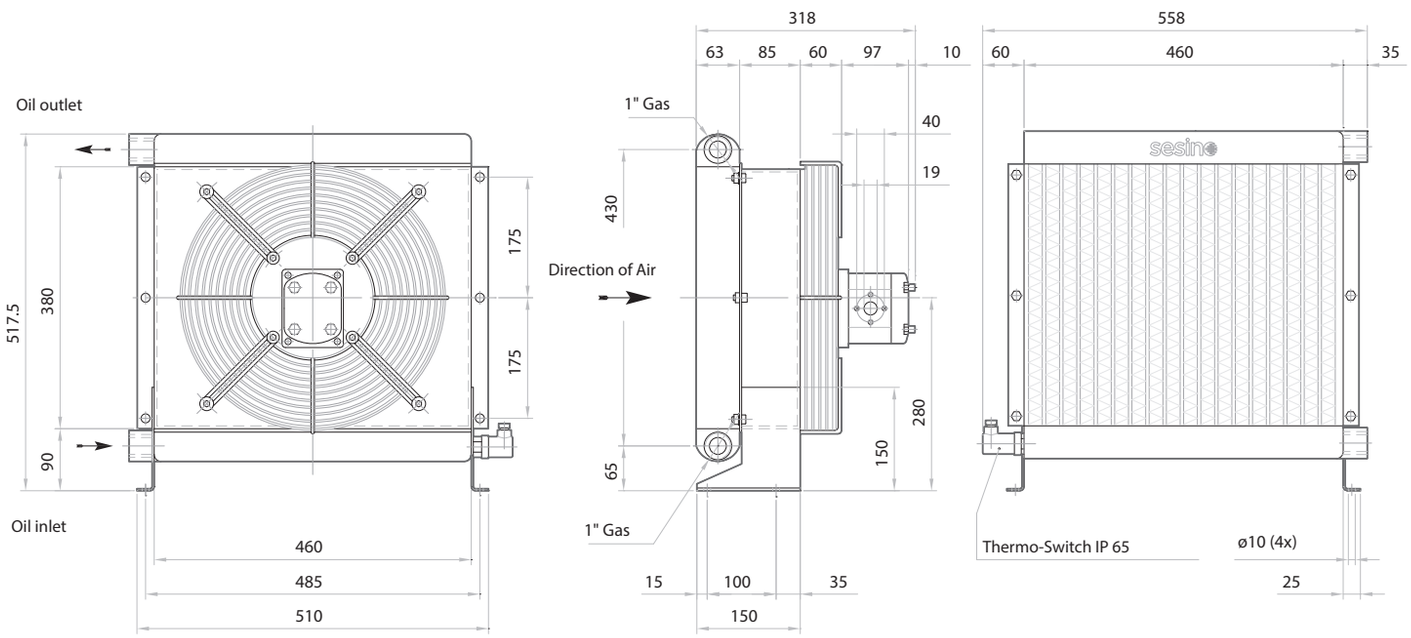
PRESSURE DROP DIAGRAM

Bar	
3	
2,5	
2	
1,5	
1	
0,5	
0	30 60 92 120 150 180 210 l/min

CORRECTION FACTOR

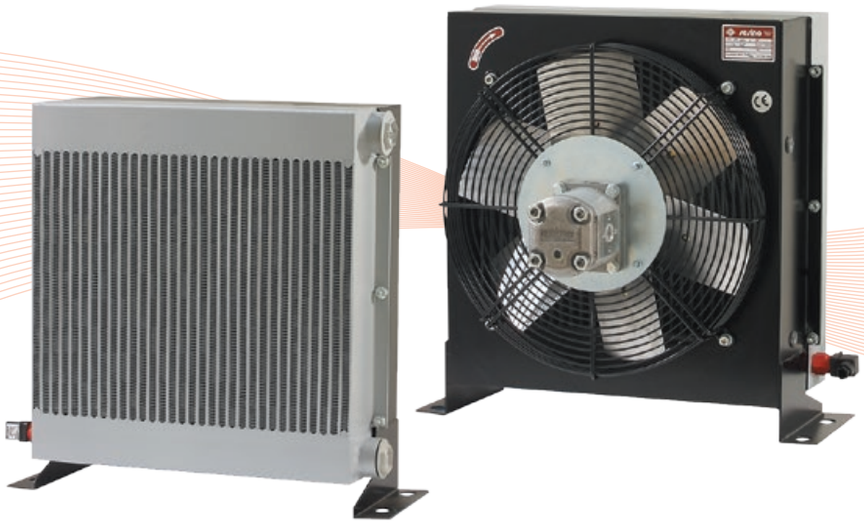
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m^3/h	dB(A)	kg	lt.	mm
30-180	2.700	830	11,3	31	7.000	74	23	5,5	400

AP 494 I



PURCHASE CODES

AP 494 I with hydraulic motor	**3RAP494I1A**
AP 494 I prepared	**3RAP494I4A**

SPARE PARTS

Frame	3CNAP494I.1
Shock isolating mounting (4 pcs)	3KIT4135
Electric junction box for	1CSSDSAREL
Fan	1G580I
Cooling element	1RO99332
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Fan Grill	1RTAP580I

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
700	0,8
650	0,75
600	0,7
550	0,65
500	0,6
450	0,55
400	0,5
	0,45
0 50 100 150 200 250 300	l/min

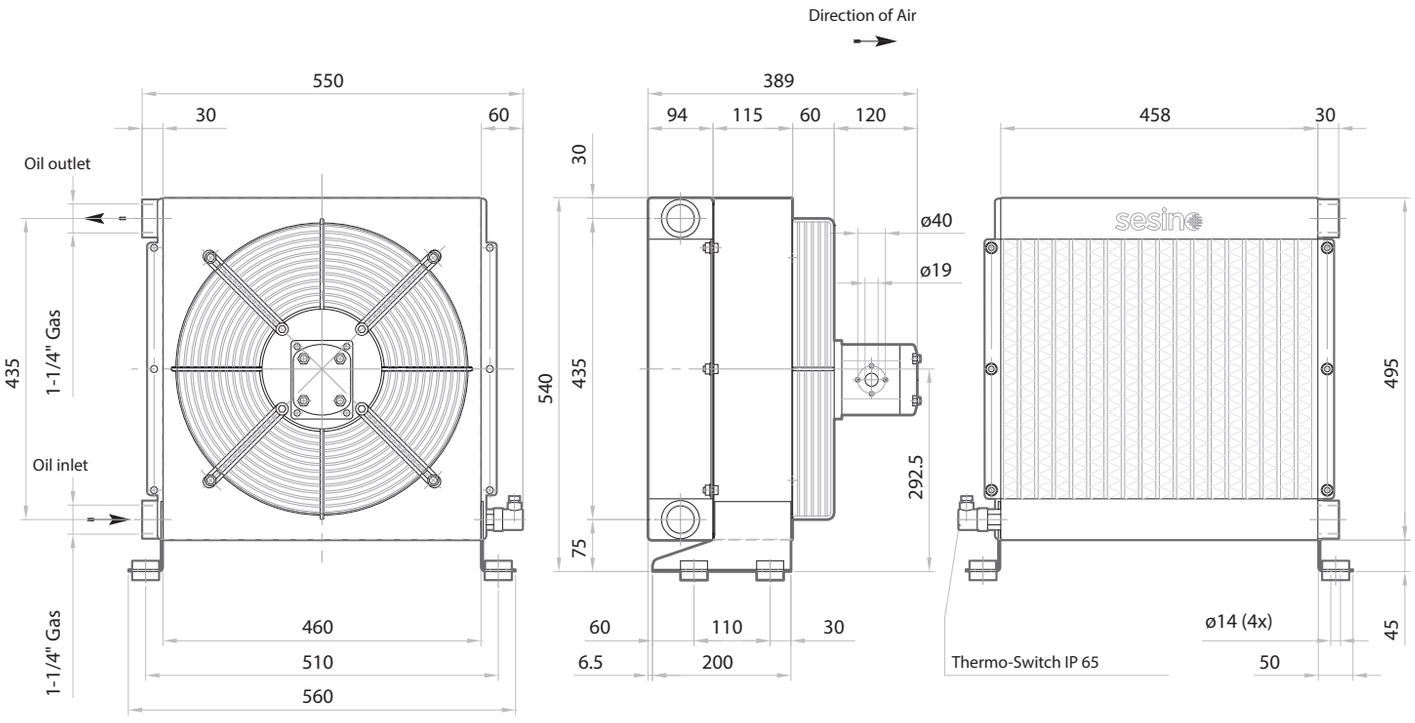
PRESSURE DROP DIAGRAM

Bar	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	
0 50 100 150 200 250 300	l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m^3/h	dB(A)	kg	lt.	mm
30-240	2.400	1100	11,3	27	8.000	75	26	8	400

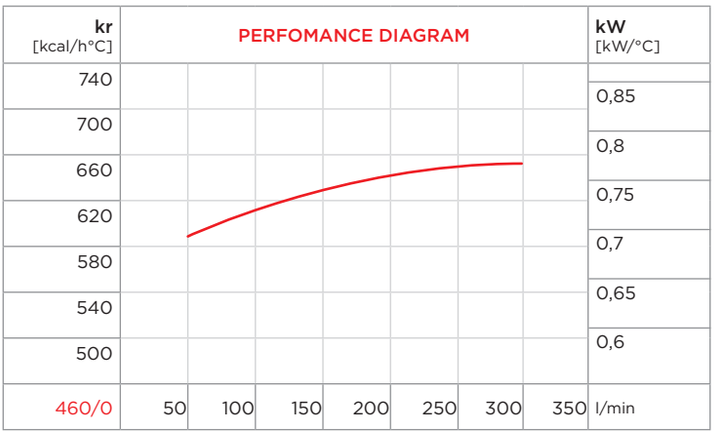
AP 580 I

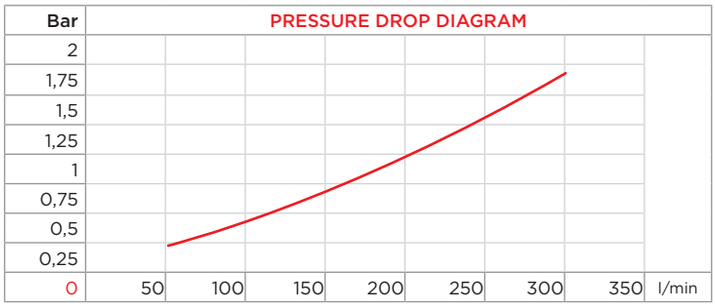
PURCHASE CODES

AP 580 I with hydraulic motor	**3RAP580I1A**
AP 580 I prepared	**3RAP580I4A**

SPARE PARTS

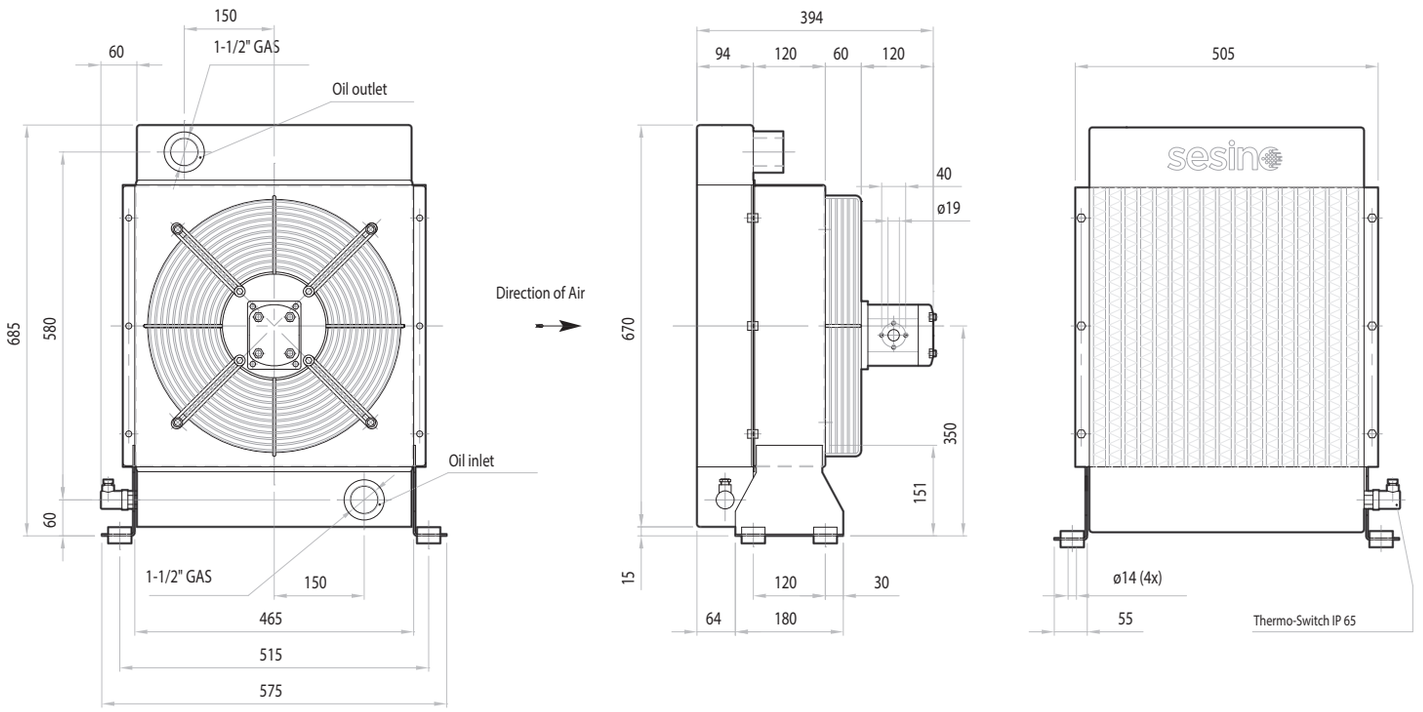
Frame	3CNAP580.1
Shock isolating mounting (4 pcs)	3KIT4135
Electric junction box for	1CSSDSAREL
Cooling element	3RNL580
Fan	1G580I
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Fan Grill	1RTAP580I





CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m^3/h	dB(A)	kg	lt.	mm
100-250	2.250	880	11,3	26	8.000	78	38	11,5	400

AP 680 I

PURCHASE CODES

AP 680 I with hydraulic motor	**3RAP680I1A**
AP 680 I prepared	**3RAP680I4A**

SPARE PARTS

Frame	3CNAP680.1
Shock isolating mounting (4 pcs)	3KIT4135
Electric junction box	1CSSDSAREL
Cooling element	3RNAP680E
Electric fan	1G680I
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Fan Grill	1RTAP680I

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
1100	
1050	1,25
1000	1,19
950	1,13
900	1,07
850	1,01
800	0,95
750/50	100 150 200 250 300 350 l/min

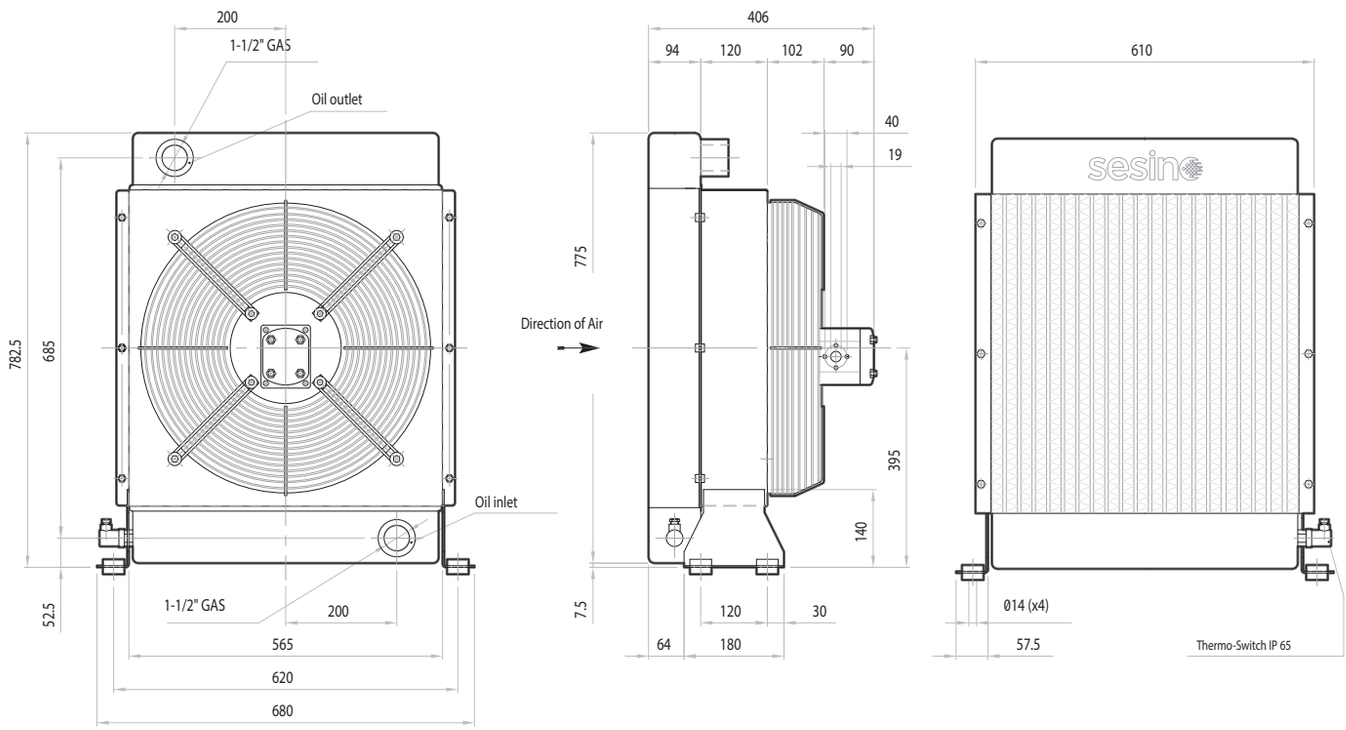
PRESSURE DROP DIAGRAM

Bar	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	
0/75	100 150 200 250 300 350 l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m³/h	dB(A)	kg	lt.	mm
100-300	1.450	750	11,3	17	10.000	80	48	15	500

AP 730 I

PURCHASE CODES

AP 730 I with hydraulic motor	**3RAP730I1A**
AP 730 I prepared	**3RAP730I4A**

SPARE PARTS

Frame	3CNAP730IA.1
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	3RNAP730E
Electric fan	1G680I
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Fan Grill	1RTAP680I

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
1550	
1450	1,6
1350	1,5
1250	1,4
1150	1,3
1050	1,2
950	1,1
850	
750/50	100 150 200 250 300 350 400 l/min

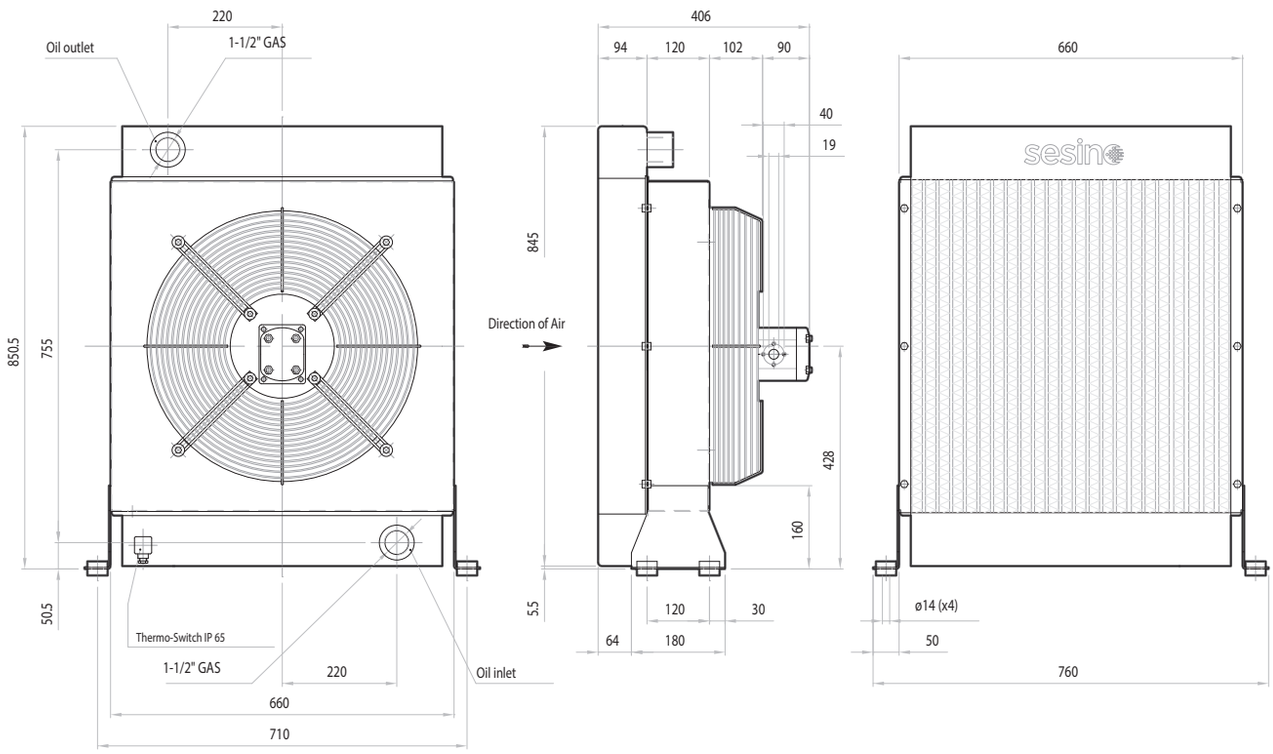
PRESSURE DROP DIAGRAM

Bar	
2,25	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	
0/75	100 150 200 250 300 350 400 l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m³/h	dB(A)	kg	lt.	mm
100-350	1.450	1.000	11,3	17	12.000	80	56	16	600

AP 830 I

PURCHASE CODES

AP 830 I with hydraulic motor	**3RAP830I2A**
AP 830 I prepared	**3RAP830I4A**

SPARE PARTS

Frame	3CNAP830IA.1
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	3RNAP830E
Electric fan	1G830I
Hydraulic motor	1MO2/M25
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Fan Grill	1RTAP830I

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
2200	2,5
2100	2,4
2000	2,3
1900	2,2
1800	2,1
1700	2
1600	1,9

1500/50	100	150	200	250	300	350	400	450	l/min

PRESSURE DROP DIAGRAM

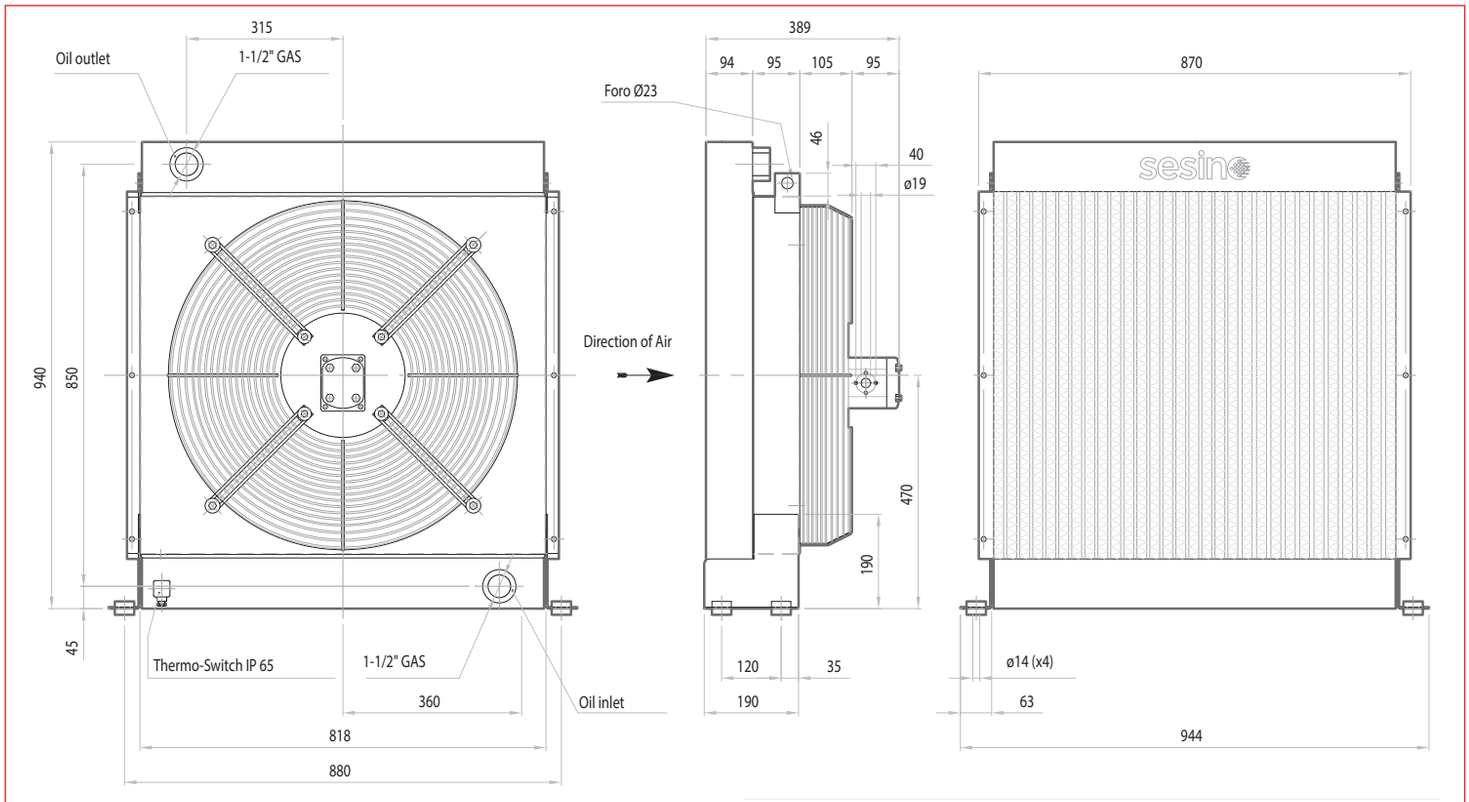
Bar	
2,25	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	

0/100	150	200	250	300	350	400	450	l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m³/h	dB(A)	kg	lt.	mm
150-400	1.300	1.300	17,5	23	15.000	82	74,5	20	680

AP 2/680 I

PURCHASE CODES

AP 2/680 I with hydraulic motor	3RAP2/680I1A
AP 2/680 I prepared	3RAP2/680I4A

SPARE PARTS

Frame	3CNAP2/6800.1
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	1RO01339
Electric fan	1G680I
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Fan Grill	1RTAP680I

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
2352	
2250	2,6
2175	2,5
2100	2,4
2025	2,3
1950	2,2
1875	

1800/50	100	150	200	250	300	350	400	l/min

CORRECTION FACTOR

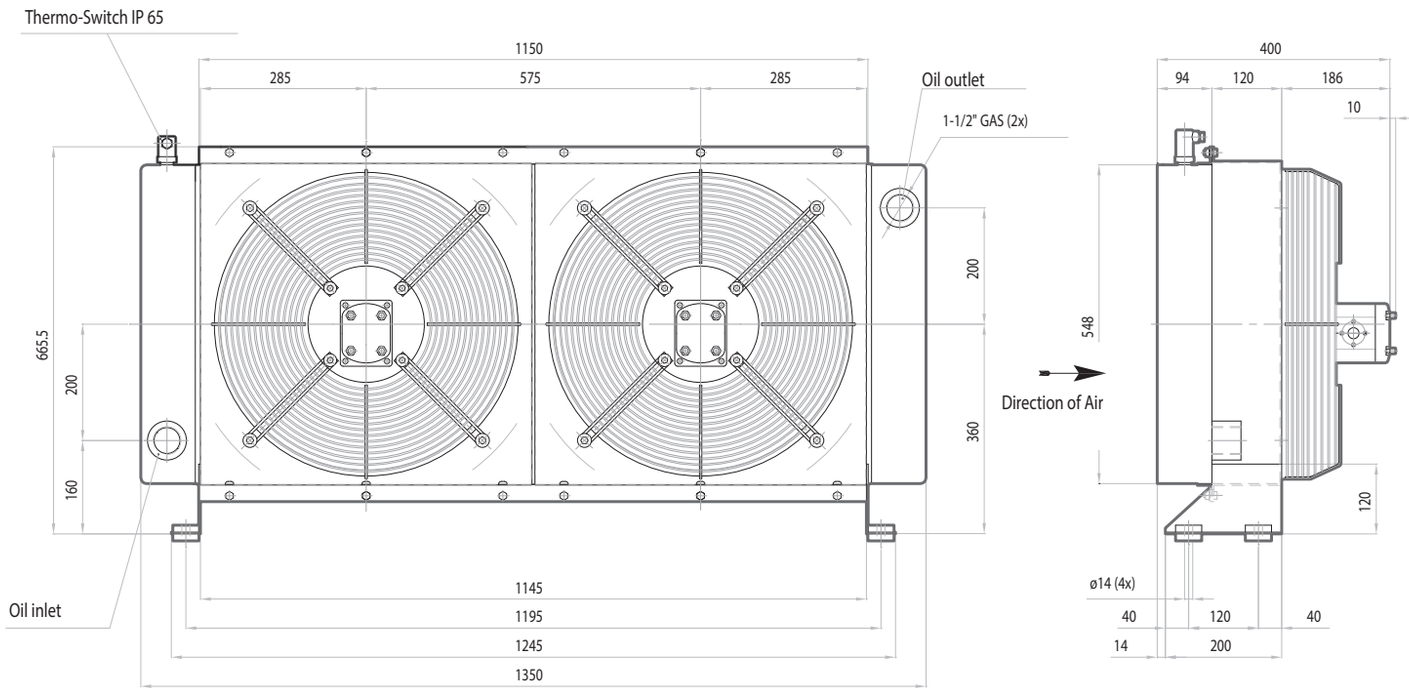
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

PRESSURE DROP DIAGRAM

Bar	
3	
2,75	
2,5	
2,25	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	

0	50	100	150	200	250	300	350	400	l/min

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m³/h	dB(A)	kg	lt.	mm
100-300	2x1.450	2x750	2x11,3	2x17	2x10.000	82	100	28	2x500

AP 2/730 I

PURCHASE CODES

AP 2/730 I with hydraulic motor	**3RAP2/730I1A**
AP 2/730 I prepared	**3RAP2/730I4A**

SPARE PARTS

Frame	3CNAP2/730I.1
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	1RO02357
Electric fan	1G680I
Hydraulic motor	1MO2/M16
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Fan Grill	1RTAP680I

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
3000	
2900	3,37
2800	3,25
2700	3,12
2600	3
2500	2,87
2400	2,75
2300	
2200/50	100 150 200 250 300 350 400 l/min

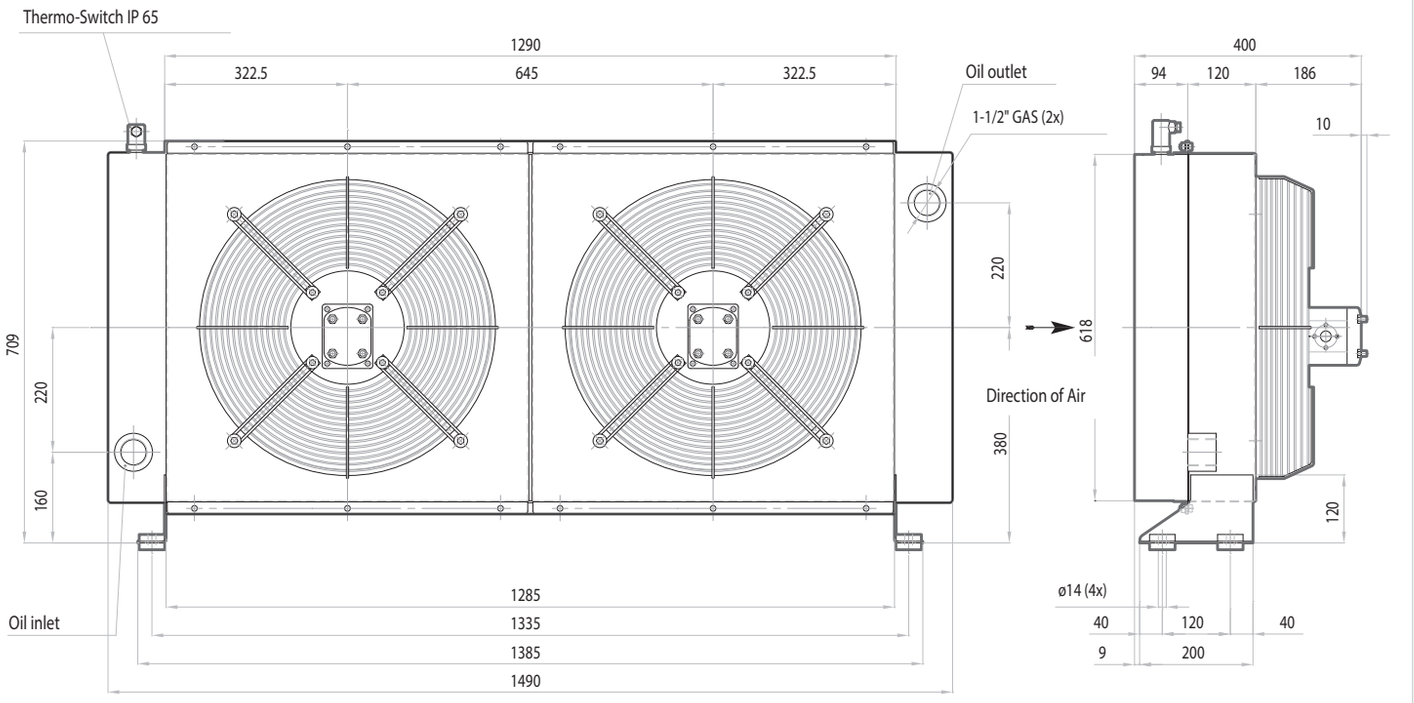
PRESSURE DROP DIAGRAM

Bar	
3,5	
3	
2,5	
2	
1,5	
1	
0,5	
0/50	100 150 200 250 300 350 400 l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m^3/h	dB(A)	kg	lt.	mm
100-350	1.450	2x1.000	2x11,3	2x17	2x12.000	82	120	30	2x600

AP 2/830 I

PURCHASE CODES

AP 2/830 I with hydraulic motor	**3RAP830I2A**
AP 2/830 I prepared	**3RAP830I4A**

SPARE PARTS

Frame	3CNAP2/830I.1
Shock isolating mounting (4 pcs)	3KIT4232
Electric junction box	1CSSDSAREL
Cooling element	3RNEO91247
Electric fan	1G830I
Hydraulic motor	1MO2/M25
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Fan Grill	1RTAP830I

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
4000	
3850	4,5
3700	4,25
3550	
3400	4
3250	3,75
3100	
2950	3,5

2800/100	150	200	250	300	350	400	450	l/min

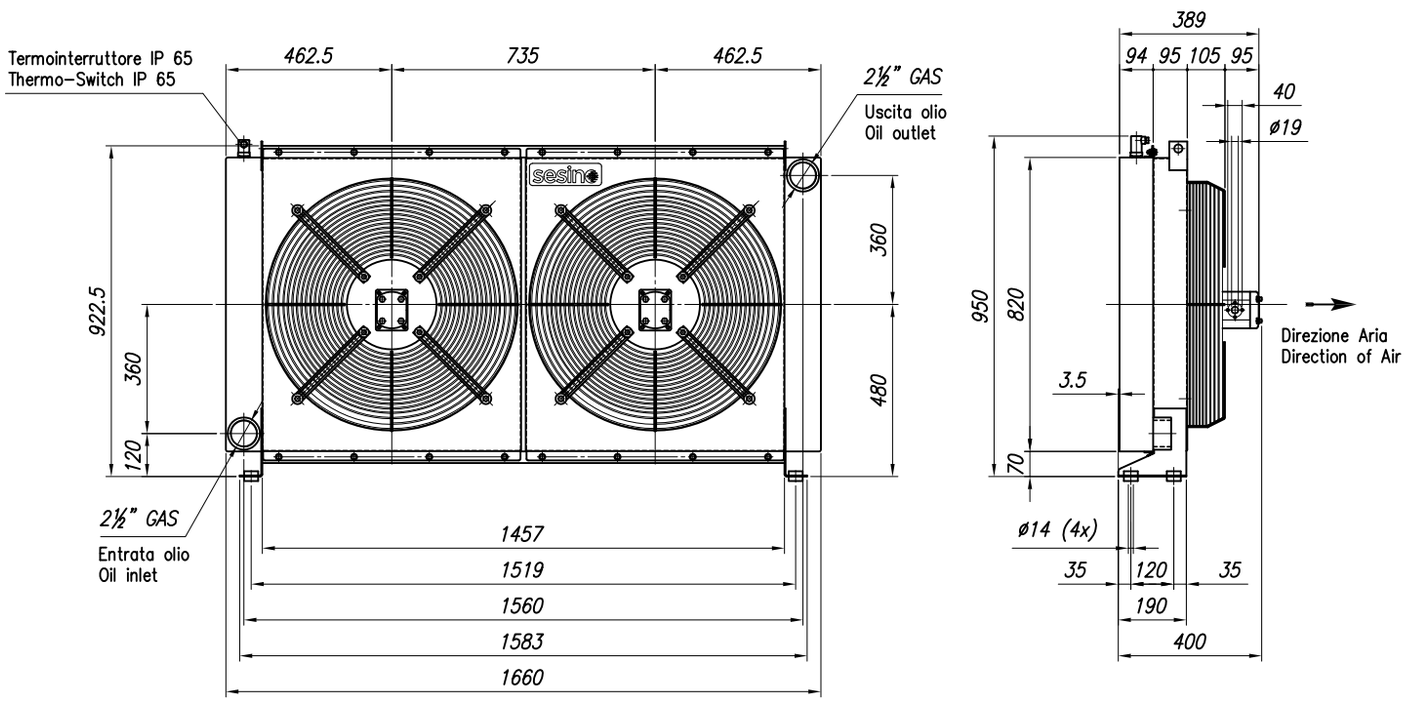
PRESSURE DROP DIAGRAM

Bar										
5										
4										
3										
2										
1										
0/50	100	150	200	250	300	350	400	450	500	l/min

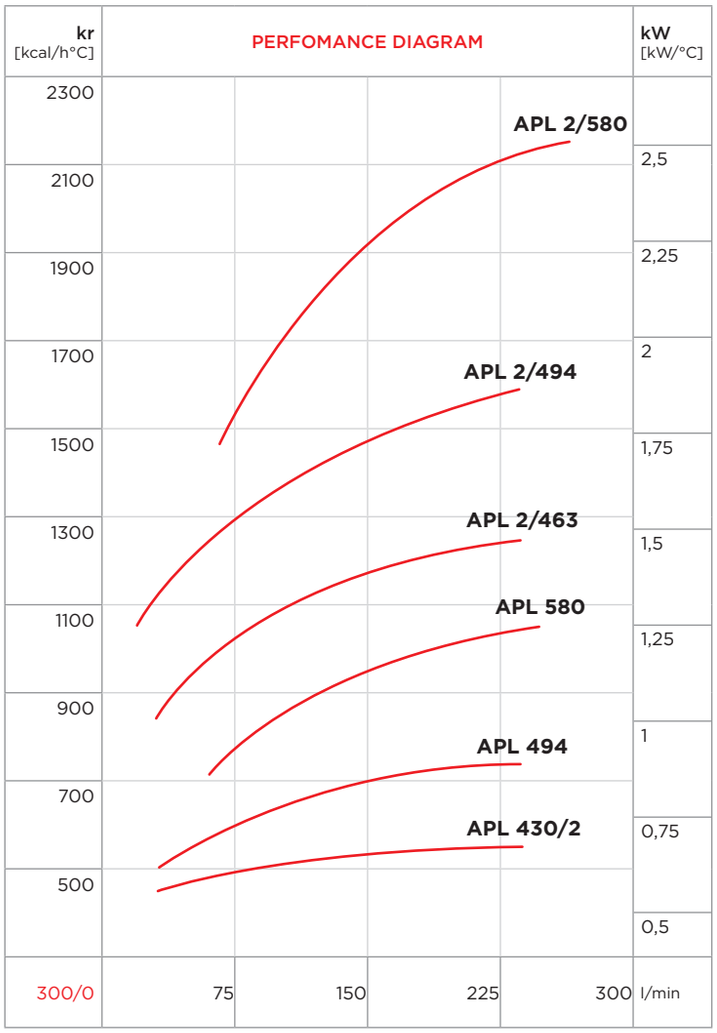
CORRECTION FACTOR

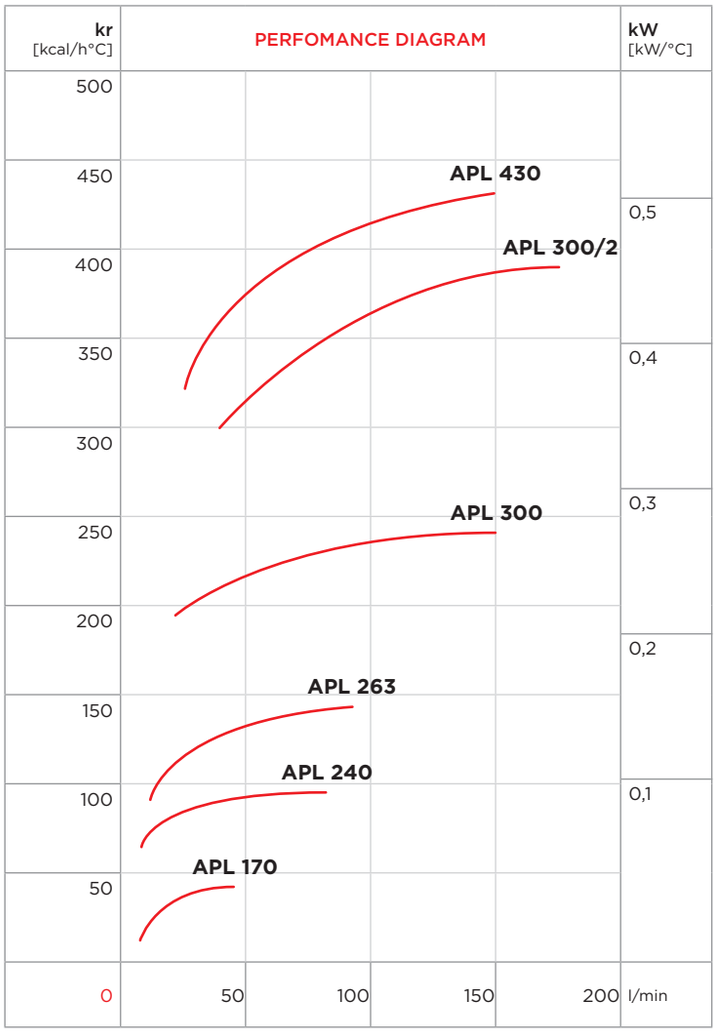
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding

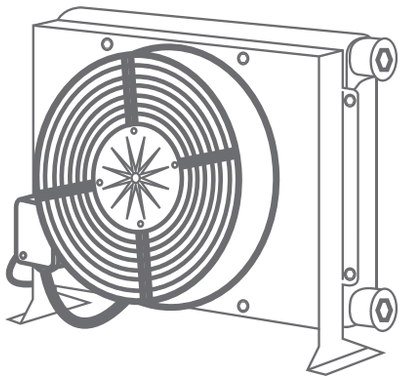


OIL FLOW	FAN SPEED	POWER	DISPLACEMENT	MOTOR FLOW	AIR FLOW	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	rpm	W	cc/r	l/min	m^3/h	dB(A)	kg	lt.	mm
150-400	2x1.300	2x1.300	2x17,5	2x23	2x15.000	82	148	40	2x680


kr
[kcal/h°C]
PERFOMANCE DIAGRAM
kW
[kW/°C]
2300
2100
1900
1700
1500
1300
1100
900
700
500
APL 2/580
APL 2/494
APL 2/463
APL 580
APL 494
APL 430/2
2,5
2,25
2
1,75
1,5
1,25
1
0,75
0,5
300/0
75
150
225
300
l/min


kr
[kcal/h°C]
PERFOMANCE DIAGRAM
kW
[kW/°C]
500
450
400
350
300
250
200
150
100
50
APL 430
APL 300/2
APL 300
APL 263
APL 240
APL 170
0,5
0,4
0,3
0,2
0,1
0
50
100
150
200
l/min

DC MOTOR AIR-OIL HEAT EXCHANGERS
SCAMBIATORI DI CALORE ARIA-OLIO CON VENTILATORI A CORRENTE CONTINUA



These type of exchangers are particularly suitable to cool oleo hydraulic systems of mobile machines, having fans at 12V or 24V to be connected to the battery of the machine.
The particular structure of the cooling element allows great thermic performances and pressure resistance. **Maximum working static pressure: 20 bar; test pressure: 35 bar.**

Out technical Department is available to suggest and find the better solution in case of particular working conditions, pressures, frequencies, vibrations, etc.

It is always recommended to assemble in parallel with the exchanger a by-pass valve to avoid extreme counter-pressures, particularly when the machine is started with cold oil. On the contrary, it is not useful to use a check valve as by-pass to protect the exchanger from pressure's peaks, since the inertia of the valve itself is too high in comparison with the speed of the pressure waves that occur into the oleo hydraulic systems.

The flow rates shown in the tables are the ones recommended for the exchanger proper working.
The efficiency curves show the specific exchange capacity in kcal/h°C or in kW/°C according to the different oil rates. To calculate the heat quantity the different exchangers are able to dissipate it is enough to multiply such capacity by the difference between the requested oil temperature and the summer room temperature.
We pay particular attention to the choice of our components in order to supply the customer with a reliable product.
Long lasting fans with IP68 electric protection and thermo switches with IP67 protection, available with two temperature ranges, 47°C or 60°C.

The thermo switch calibration shows the initial temperature of the fans, while the stop temperature is 11°C lower. We must consider that the tolerance on the above mentioned operating temperatures is 35°C.

The electric system of these exchangers is already wired.
If the exchanger is equipped with thermo switch, the electric system has a relay integrated into the thermo switch itself.

The carbon steel parts are powder painted in order to resist to corrosive phenomena.

For the right calculation of air-oil heat exchangers, we supply our customers with a calculation program on CD-ROM or that can be downloaded from our website.
The air-oil heat exchangers can be used to cool other kind of fluids, which must be compatible with aluminium and its alloys.

However, for each use, with the exception of oil cooling, we recommend to consult our Technical Department.

Questi tipi di scambiatori trovano impiego per il raffreddamento di impianti oleoidraulici su macchine mobili, essendo equipaggiati da ventilatori a 12 o 24 V, da collegare quindi alla batteria della macchina.
La particolare costruzione del radiatore consente di ottenere notevoli rese termiche e forte resistenza alla pressione. ***Pressione massima statica di funzionamento: 20 bar; pressione di collaudo: 35 bar.***

Il nostro Ufficio Tecnico è a disposizione per valutare la soluzione più opportuna in presenza di particolari condizioni di lavoro, pressioni, frequenze, vibrazioni,ecc..

È sempre consigliabile montare in parallelo allo scambiatore una valvola di by-pass per evitare eccessive contropressioni soprattutto al momento dell'avviamento della macchina con olio freddo.
Il radiatore può essere eventualmente fornito con una valvola di by-pass integrata o esterma.
Non è invece conveniente utilizzare una valvola di ritegno come by-pass per proteggere lo scambiatore dai picchi di pressione in quanto l'inerzia della valvola stessa è troppo alta rispetto alla velocità delle onde di pressione che si sviluppano all'interno dell'olio degli impianti oleoidraulici.

Le portate olio indicate nelle tabelle sono quelle consigliate per il buon funzionamento dello scambiatore.
Le curve di rendimento forniscono la potenzialità di scambio specifica in kcal/h°C o in kW/h°C in funzione della portata olio; per calcolare la quantità di calore che i vari scambiatori sono in grado di disperdere, è sufficiente moltiplicare tale potenzialità per la differenza tra le temperature dell'olio desiderata e dell'aria ambiente massima estiva.
Particolare attenzione è stata posta nella scelta dei componenti per fornire alla clientela un prodotto estremamente affidabile. In particolare, i ventilatori sono stati scelti a lunga durata e con una protezione elettrica IP68, così come il termostato fisso, disponibile nelle due diverse tarature 47° e 60°C e con una protezione elettrica IP67.
La temperatura dei termostati indica la temperatura di partenza dei ventilatori; quella di arresto è di 11°C inferiore.
Bisogna inoltre considerare che la tolleranza sulle temperature di intervento di cui sopra è di 35°C

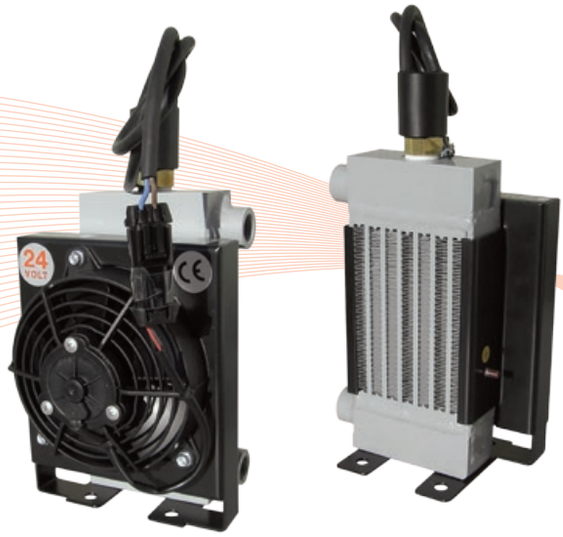
Gli scambiatori di questa serie sono forniti con l'impianto elettrico già cablato.

Nel caso lo scambiatore sia munito di termostato, l'impianto elettrico è sempre completato da un relè incorporato nel termostato stesso.
Le parti in lamiera d'acciaio al carbonio, per resistere ai fenomeni corrosivi presenti nell'applicazione su macchine mobili, sono verniciate con vernice a polvere e successivamente passate in forno.

Per il calcolo degli scambiatore aria-olio è disponibile un programma su CD-rom o scaricabile dal nostro sito internet.
Gli scambiatori aria-olio possono essere utilizzati per raffreddare altri tipi di fluidi, a condizione che essi siano compatibili con l'alluminio e le sue leghe.

Consigliamo comunque, per qualsiasi impiego che non sia il raffreddamento dell'olio, di contattare il nostro Ufficio Tecnico.

APL 170

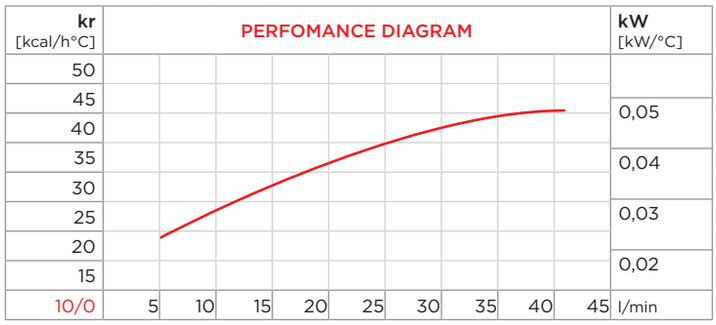


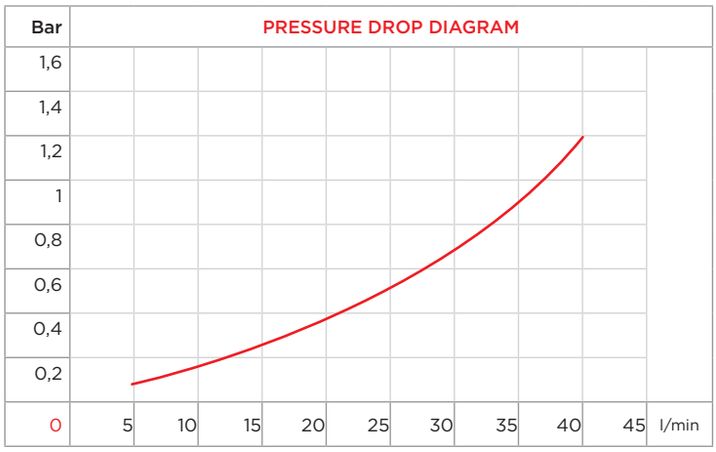
PURCHASE CODES

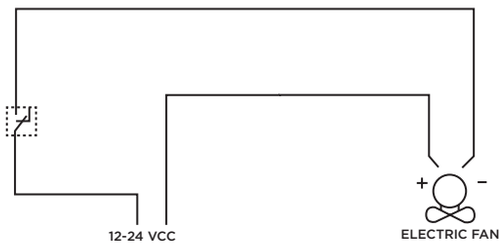
APL 170 12/24V without thermo switch	3RL17012 / 3RL17024
APL 170 12/24V with thermo switch	3RL17012T247 / 3RL17024T247 3RL17012T260 / 3RL17024T260

SPARE PARTS

Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	1RO92302
Frame	3CNL170.1
Frame support	3STFL170.1
12VDC Electric fan	1MCVA-37A101A
24VDC Electric fan	1MCVA-37B101A

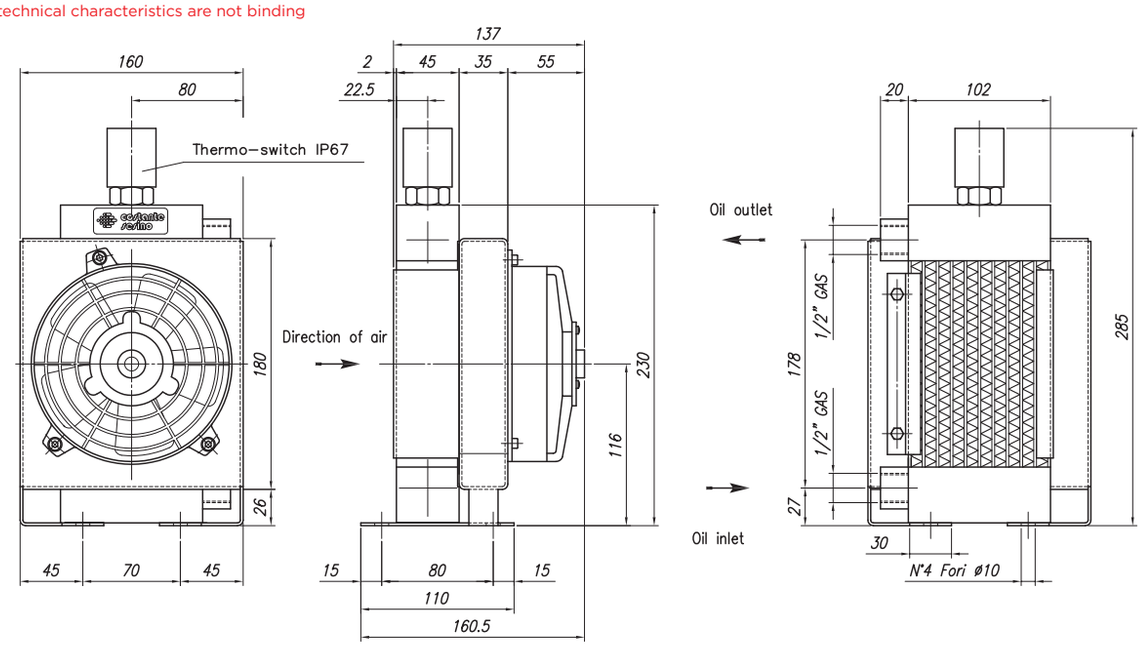






CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
5-40	12	65	5,4	400	65	70	3	0,5	130
5-40	24	65	2,7	400	65	70	3	0,5	130

APL 240

PURCHASE CODES

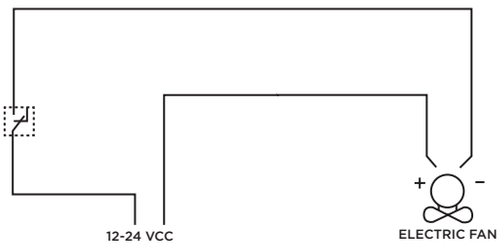
APL 240 12/24V without thermo switch	3RL24012 / 3RL24024
APL 240 12/24V with thermo switch	3RL24012T247 / 3RL24024T247 3RL24012T260 / 3RL24024T260

SPARE PARTS

Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	3RNAP260
Frame	3CNAP260.1
12VDC Electric fan	1MCVA14AP7AC
24VDC Electric fan	1MCVA14BP7AC

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
135	
120	0,14
105	0,12
90	0,10
75	0,08
60	0,06
45	0,04
30	
15/0	10 20 30 40 50 60 70 80 90 l/min



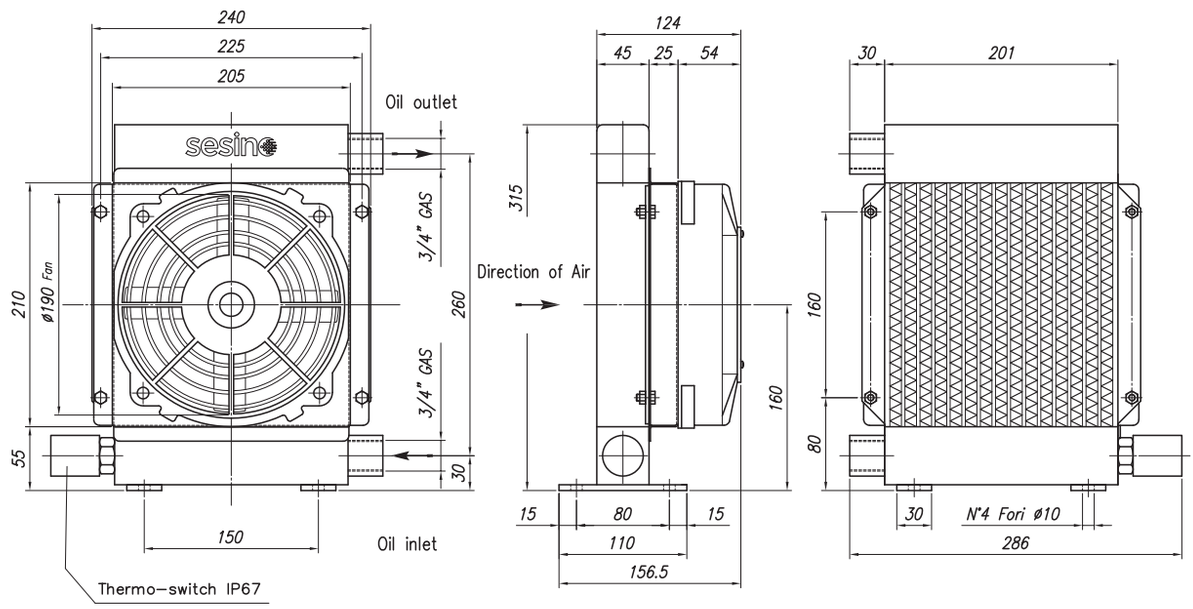
PRESSURE DROP DIAGRAM

Bar	
2,7	
2,4	
2,1	
1,8	
1,5	
1,2	
0,9	
0,6	
0,1	
0	10 20 30 40 50 60 70 80 90 l/min

CORRECTION FACTOR

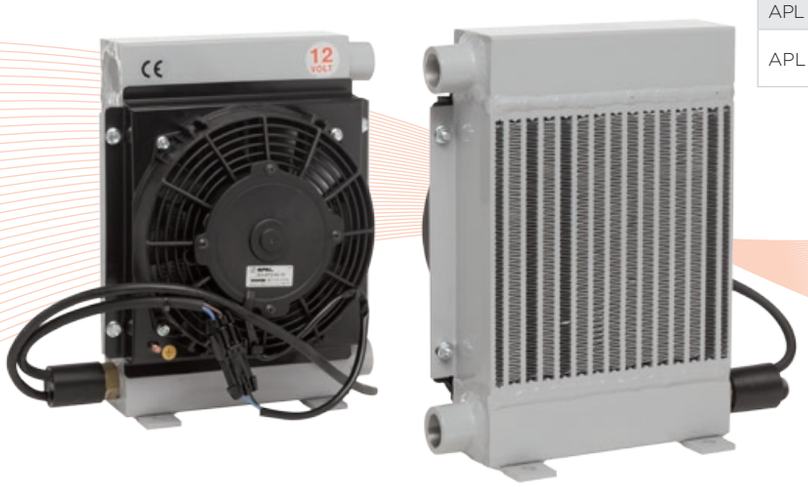
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
10-80	12	65	5,4	500	64	72	5	1	190
10-80	24	65	2,7	500	64	72	5	1	190

APL 263



PURCHASE CODES

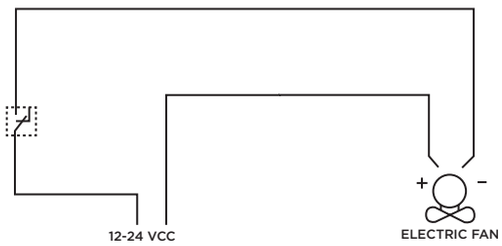
APL 263 12/24V without thermo switch	3RL26312 / 3RL26324
APL 263 12/24V with thermo switch	3RL26312T247 / 3RL26324T247 3RL26312T260 / 3RL26324T260

SPARE PARTS

Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	3RNL263
Frame	3CNAP260.1
12VDC Electric fan	1MCVA14AP7AC
24VDC Electric fan	1MCVA14BP7AC

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
200	0,22
180	0,2
160	0,18
140	0,16
120	0,14
100	0,12
80	0,1
60	0,08
	0,06
40/0 10 20 30 40 50 60 70 80 90 100	l/min



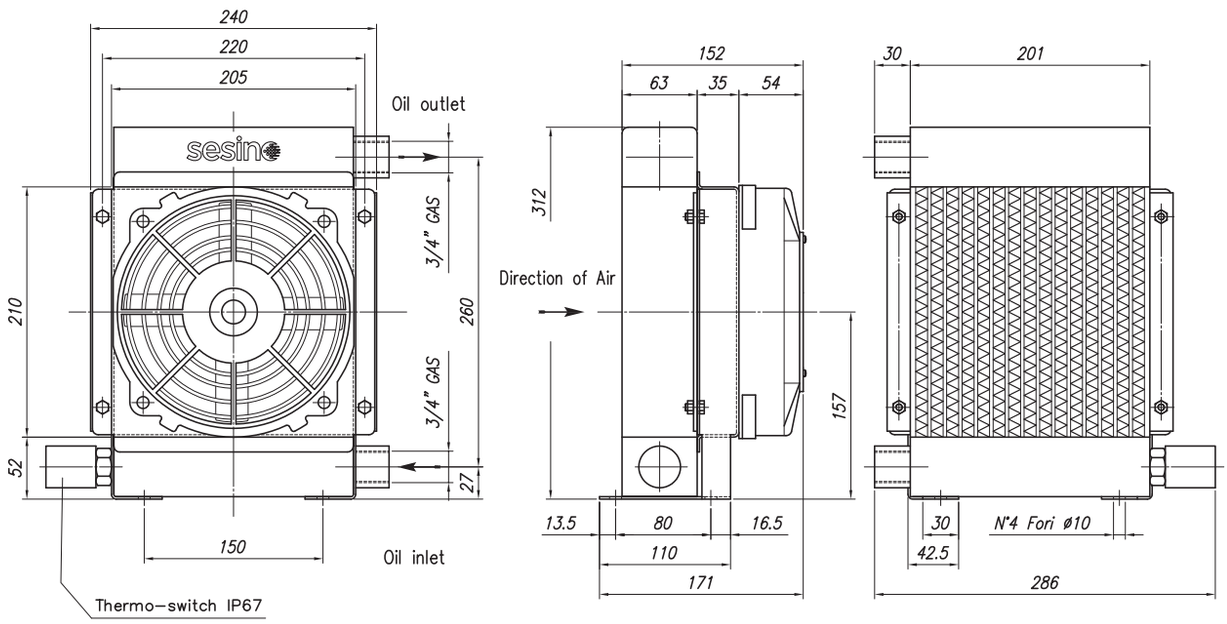
PRESSURE DROP DIAGRAM

Bar	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	
0 10 20 30 40 50 60 70 80 90 100	l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
10-80	12	65	5,2	500	64	72	5	1	190
10-80	24	65	2,6	500	64	72	5	1	190

APL 300

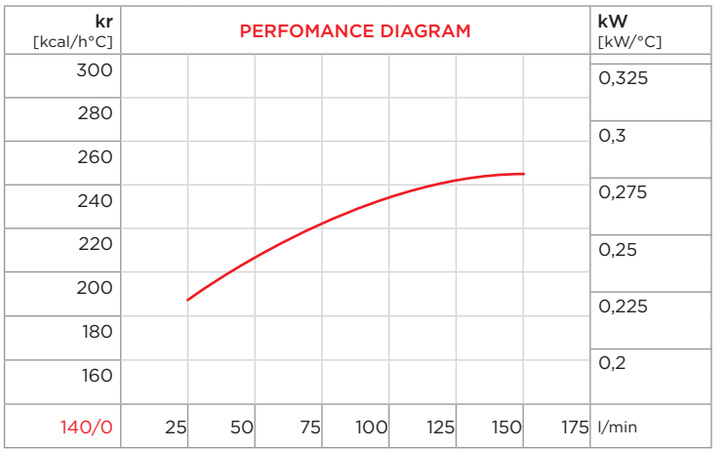
PURCHASE CODES

APL 300 12/24V without thermo switch	3RL30012 / 3RL30024
APL 300 12/24V with thermo switch	3RL30012T247 / 3RL30024T247 3RL30012T260 / 3RL30024T260

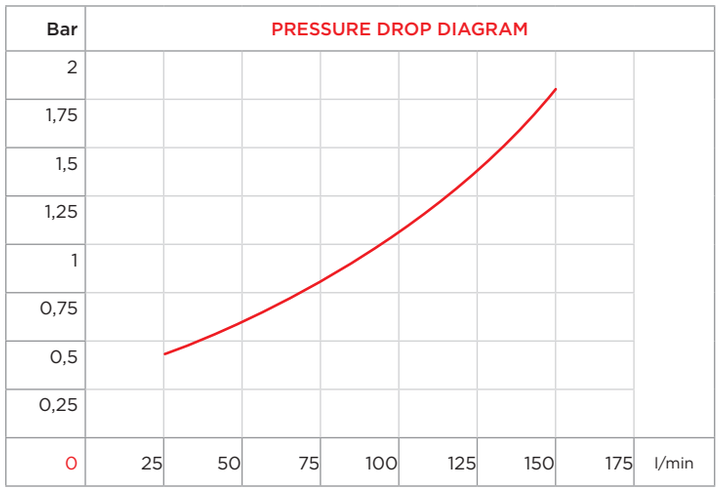
SPARE PARTS

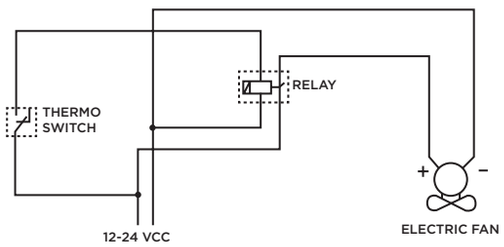
Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	3RNL300
Frame	3CNL300.1
12VDC Electric fan	1VNAPL30012C
24VDC Electric fan	1VNAPL30024C

PERFOMANCE DIAGRAM



PRESSURE DROP DIAGRAM

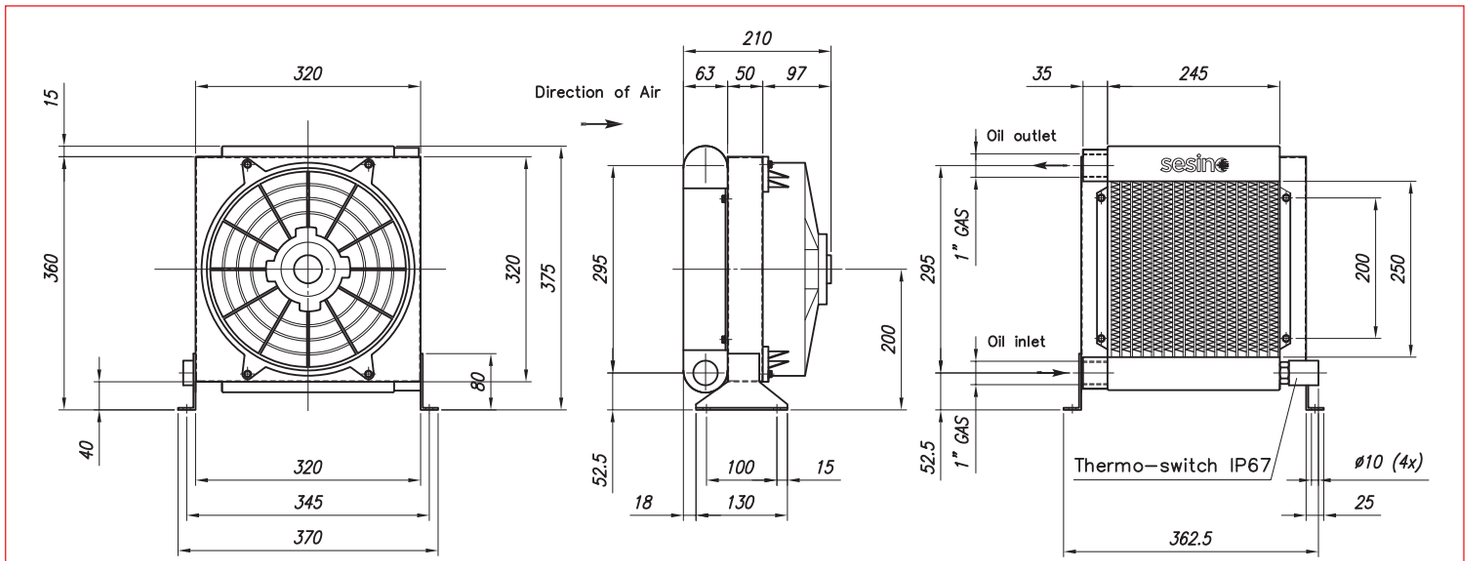




CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
20-150	12	190	14,8	1.700	68	79	10	2	280
20-150	24	190	7,4	1.700	68	79	10	2	280

APL 300/2

PURCHASE CODES

APL 300/2 12/24V without thermo switch	3RL30212 / 3RL30224
APL 300/2 12/24V with thermo switch	3RL30212T247 / 3RL30224T247 3RL30212T260 / 3RL30224T260

SPARE PARTS

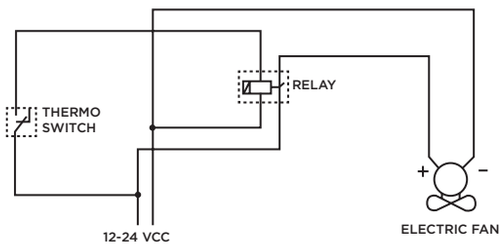
Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	3RNL302
Frame	3CNL302.1
12VDC Electric fan	1VNAPL30012C
24VDC Electric fan	1VNAPL30024C

PERFOMANCE DIAGRAM

kr [kcal/h°C]								kW [kW/°C]
420								
400								0,45
380								0,425
360								0,4
340								0,375
320								0,35
300								
280								
260/0	30	60	90	120	150	180	210	l/min

PRESSURE DROP DIAGRAM

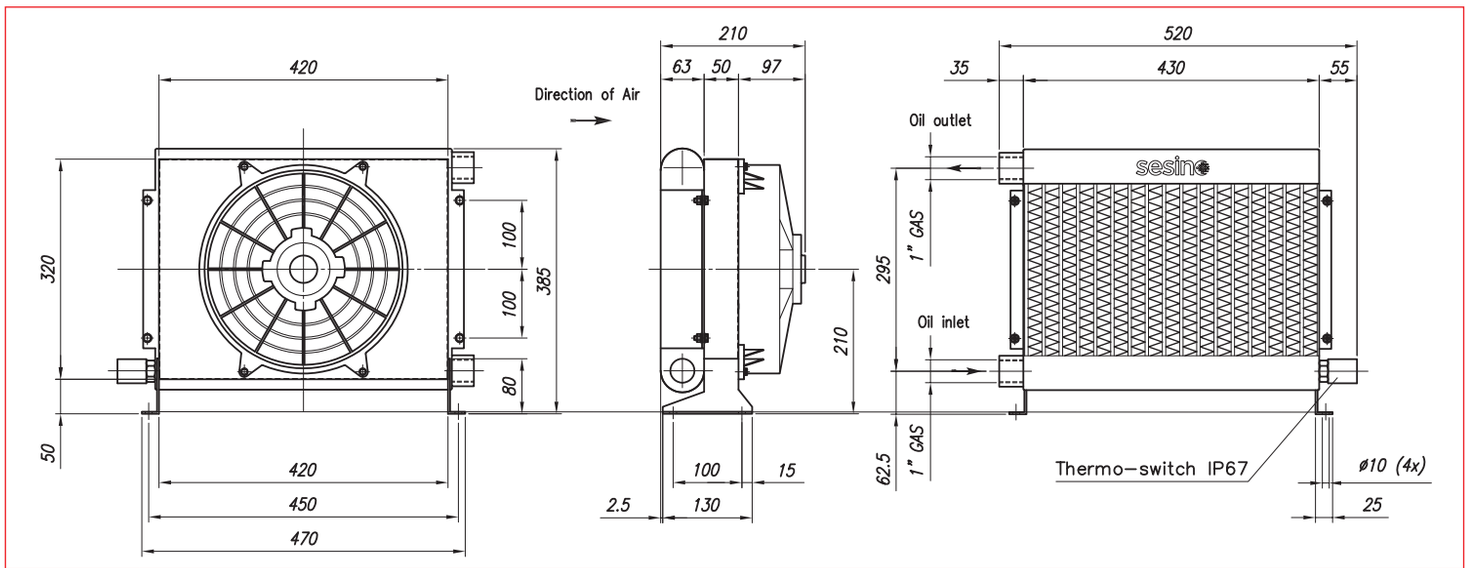
Bar								
2								
1,75								
1,5								
1,25								
1								
0,75								
0,5								
0,25								
0	30	60	90	120	150	180	210	l/min



CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
30-180	12	180	15,0	2.200	68	83	14	3,6	280
30-180	24	180	7,5	2.200	68	83	14	3,6	280

APL 430

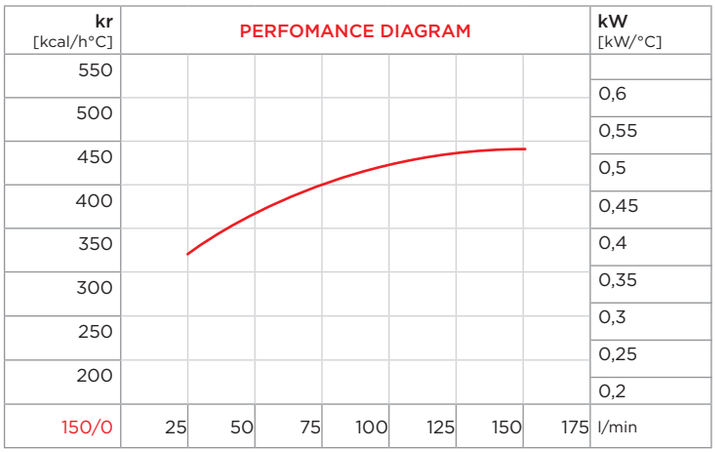
PURCHASE CODES

APL 430 12/24V without thermo switch	3RL43012 / 3RL43024
APL 430 12/24V with thermo switch	3RL43012T247 / 3RL43024T247 3RL43012T260 / 3RL43024T260

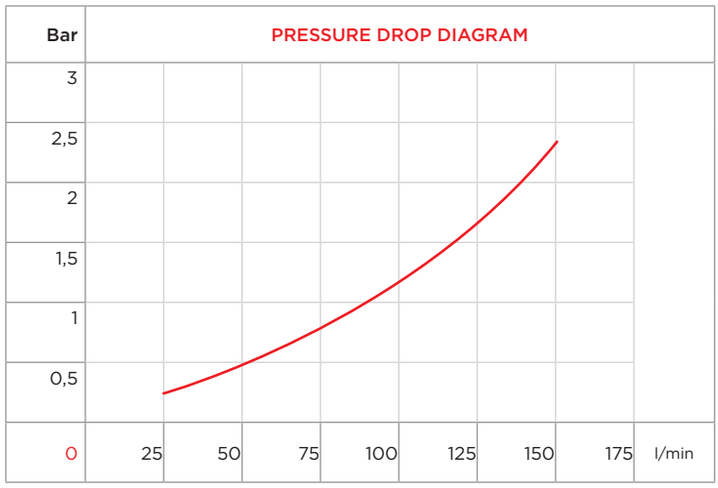
SPARE PARTS

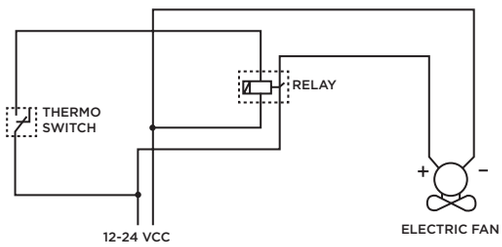
Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	3RNL430
Frame	1430LCNV
12VDC Electric fan	1VNAPL43012C
24VDC Electric fan	1VNAPL43024C

PERFOMANCE DIAGRAM



PRESSURE DROP DIAGRAM

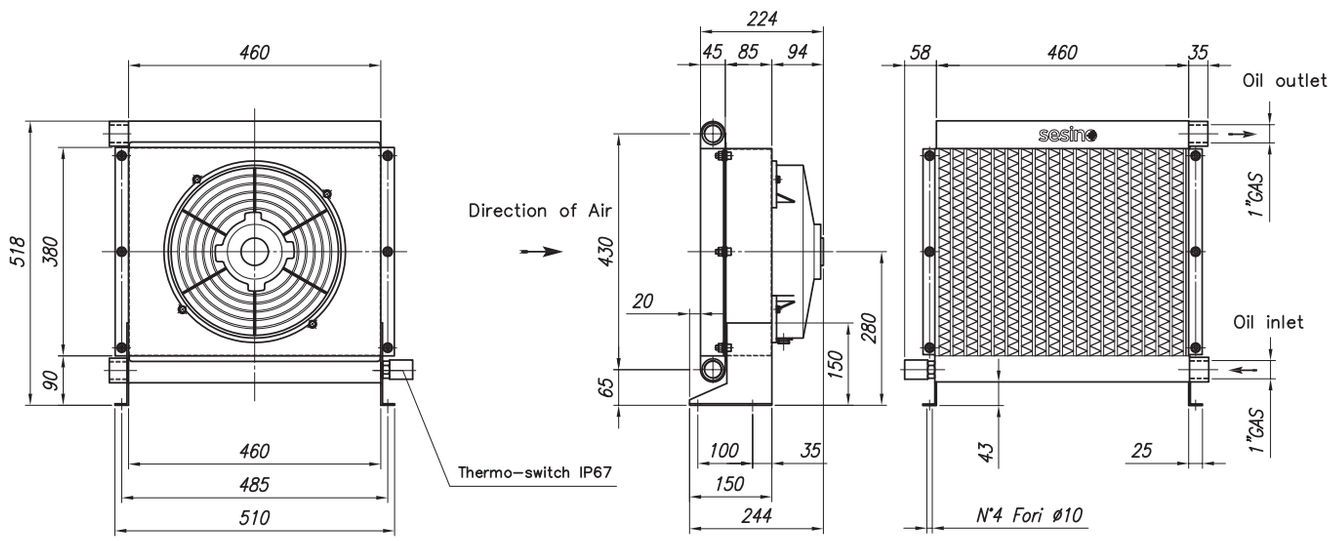




CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
20-150	12	210	17	2.500	68	82	16	3,6	310
20-150	24	210	8,5	2.500	68	82	16	3,6	310

APL 430/2

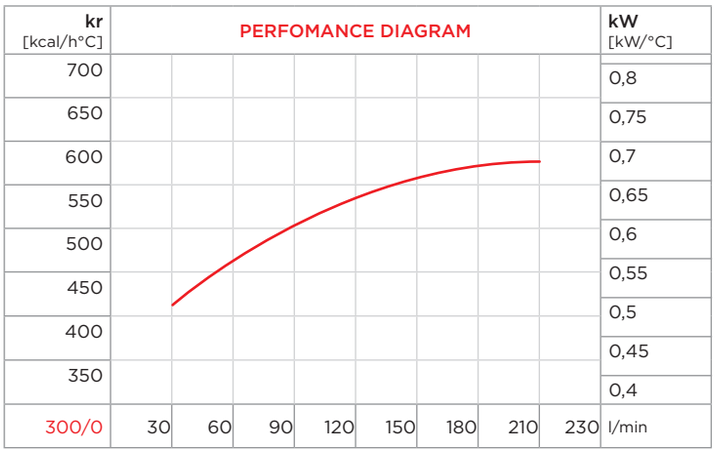
PURCHASE CODES

APL 430/2 12/24V without thermo switch	3RL43212 / 3RL43224
APL 430/2 12/24V with thermo switch	3RL43212T247 / 3RL43224T247 3RL43212T260 / 3RL43224T260

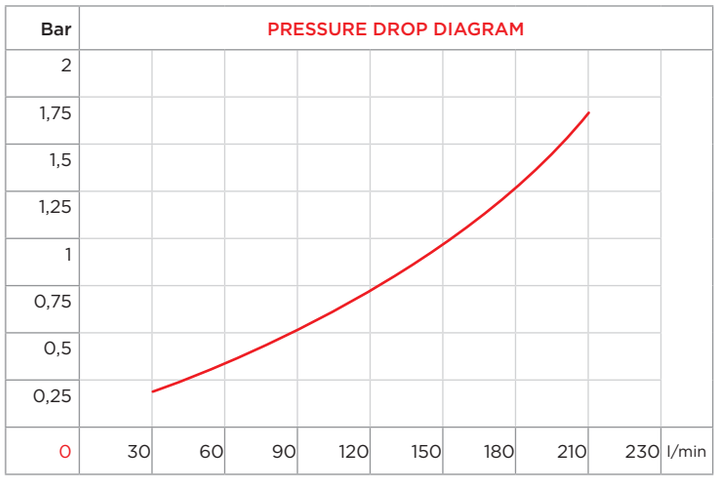
SPARE PARTS

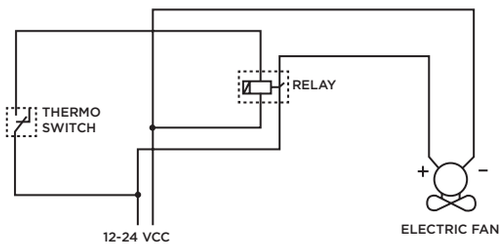
Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	3RNAP432TP
Frame	1430LCNV
12VDC Electric fan	1VNAPL43012C
24VDC Electric fan	1VNAPL43024C

PERFOMANCE DIAGRAM



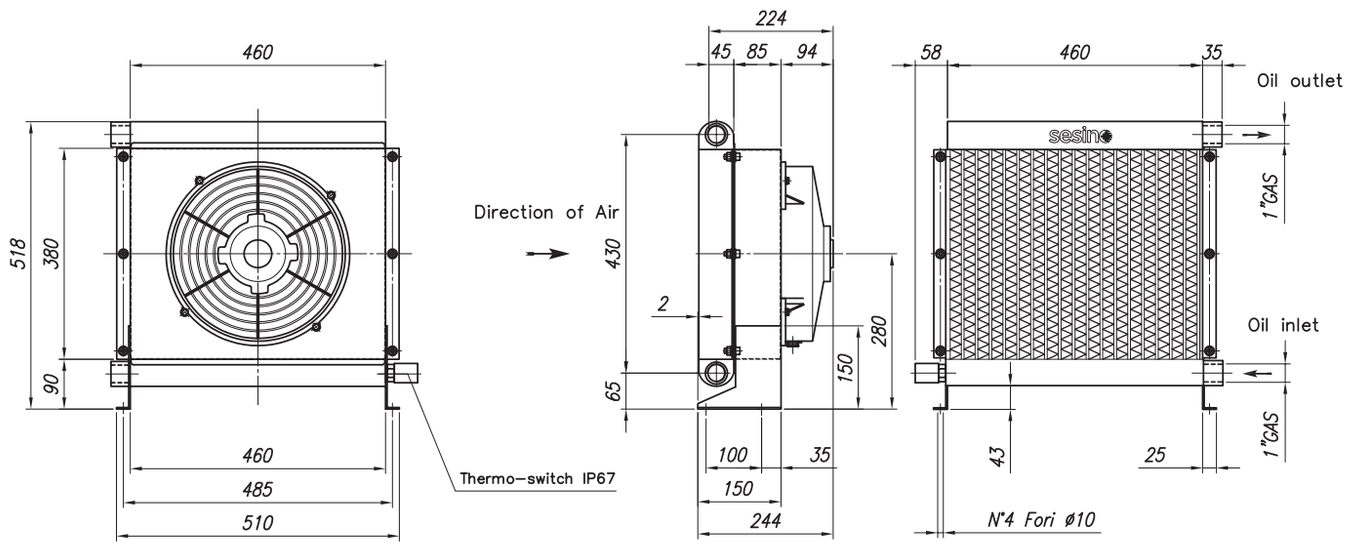
PRESSURE DROP DIAGRAM





CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
30-200	12	210	17	2.400	68	82	20	5,5	310
30-200	24	210	8,5	2.400	68	82	20	5,5	310

APL 494

PURCHASE CODES

APL 494 12/24V without thermo switch	3RL49412 / 3RL49424
APL 494 12/24V with thermo switch	3RL49412T247 / 3RL49424T247 3RL49412T260 / 3RL49424T260

SPARE PARTS

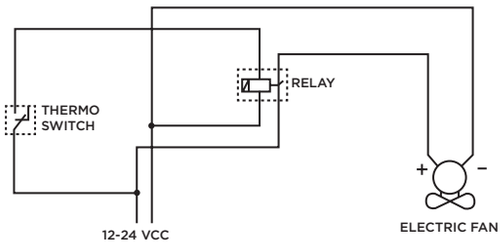
Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	1RO99332
Frame	3CNL494.1
12VDC Electric fan	1MCVA18AP70AC
24VDC Electric fan	1VNAPL58024C

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
1000	
900	1,125
800	1
700	0,875
600	0,75
500	0,625
400	0,5
300	0,375
200	0,25
100	0,125
0 30 60 90 120 150 180 210 240 270	l/min

PRESSURE DROP DIAGRAM

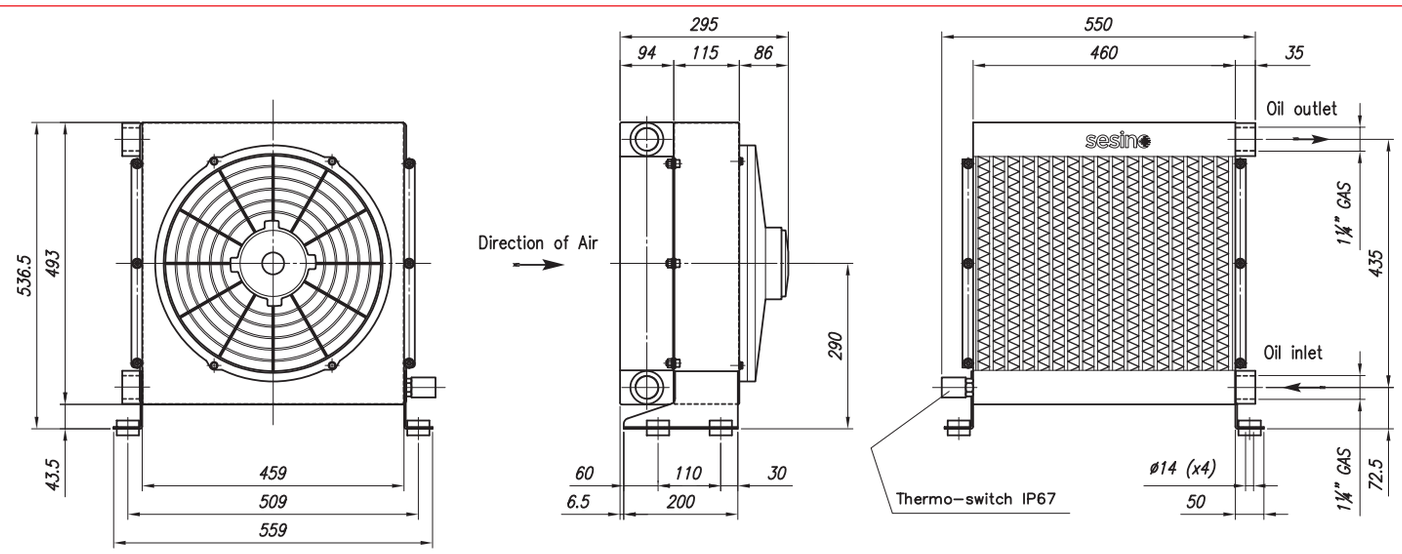
Bar	
2	
1,75	
1,5	
1,25	
1	
0,75	
0,5	
0,25	
0 30 60 90 120 150 180 210 240 270	l/min



CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
30-240	12	240	20	2.800	68	85	25	8	380
30-240	24	240	10	2.800	68	85	25	8	380

APL 580

PURCHASE CODES

APL 580 12/24V without thermo switch	3RL58012 / 3RL58024
APL 580 12/24V with thermo switch	3RL58012T247 / 3RL58024T247 3RL58012T260 / 3RL58024T260

SPARE PARTS

Thermo-switch 47-36 12V IP 67	1TRM47-36/12V
Thermo-switch 47-36 24V IP 67	1TRM47-36/24V
Thermo-switch 60-49 12V IP 67	1TRM60-49/12V
Thermo-switch 60-49 24V IP 67	1TRM60-49/24V
Cooling element	3RNL580
Frame	3CNL580.1
12VDC Electric fan	1MCVA18AP70AC
24VDC Electric fan	1VNAPL58024C

PERFOMANCE DIAGRAM

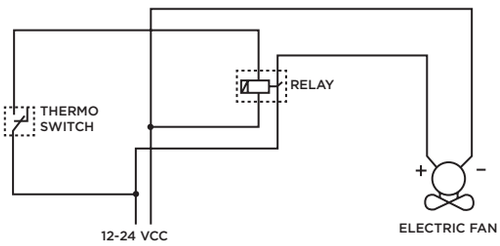
kr [kcal/h°C]	kW [kW/°C]
1300	
1200	1,4
1100	1,3
1000	1,2
900	1,1
800	1
700	0,9
600	0,8
500/0	0,7

50 100 150 200 250 300 l/min

PRESSURE DROP DIAGRAM

Bar
2
1,75
1,5
1,25
1
0,75
0,5
0,25
0

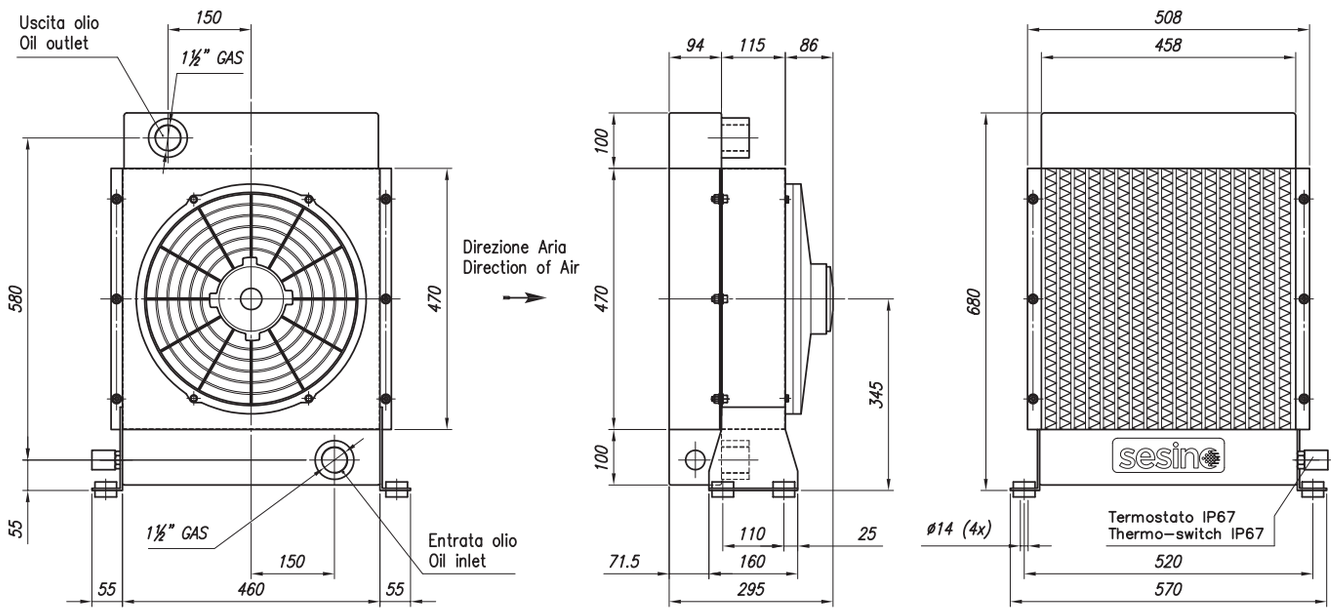
50 100 150 200 250 300 l/min



CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
50-250	12	240	20	2.900	68	85	33	11,5	380
50-250	24	240	10	2.900	68	85	33	11,5	380

APL 2/463

PURCHASE CODES

APL 2/463 12/24V without thermo switch	3RL2/46312 / 3RL2/46324
APL 2/463 12/24V with thermo switch	3RL2/46312T247 / 3RL2/46324T247 3RL2/46312T260 / 3RL2/46324T260

SPARE PARTS

Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Electric junction box	1CSSDBOPLA
12VDC Relay	1RLCOPAT12
24VDC Relay	1RLCOPAT
Shock isolating mounting (4 pcs)	3KIT4135
Cooling element	1RO01341
Frame	3CNL2/463.1
12VDC Electric fan	1VNAPL43012C
24VDC Electric fan	1VNAPL43024C

PERFOMANCE DIAGRAM

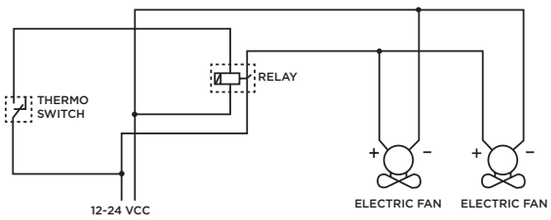
kr [kcal/h°C]	kW [kW/°C]
1600	
1400	
1200	1,75
1000	1,5
800	1,25
600	1
400	0,75
200	0,5
0	0,25

0 — 30 — 60 — 90 — 120 — 150 — 180 — 210 — 240 — 270 l/min

PRESSURE DROP DIAGRAM

Bar
2
1,75
1,5
1,25
1
0,75
0,5
0,25

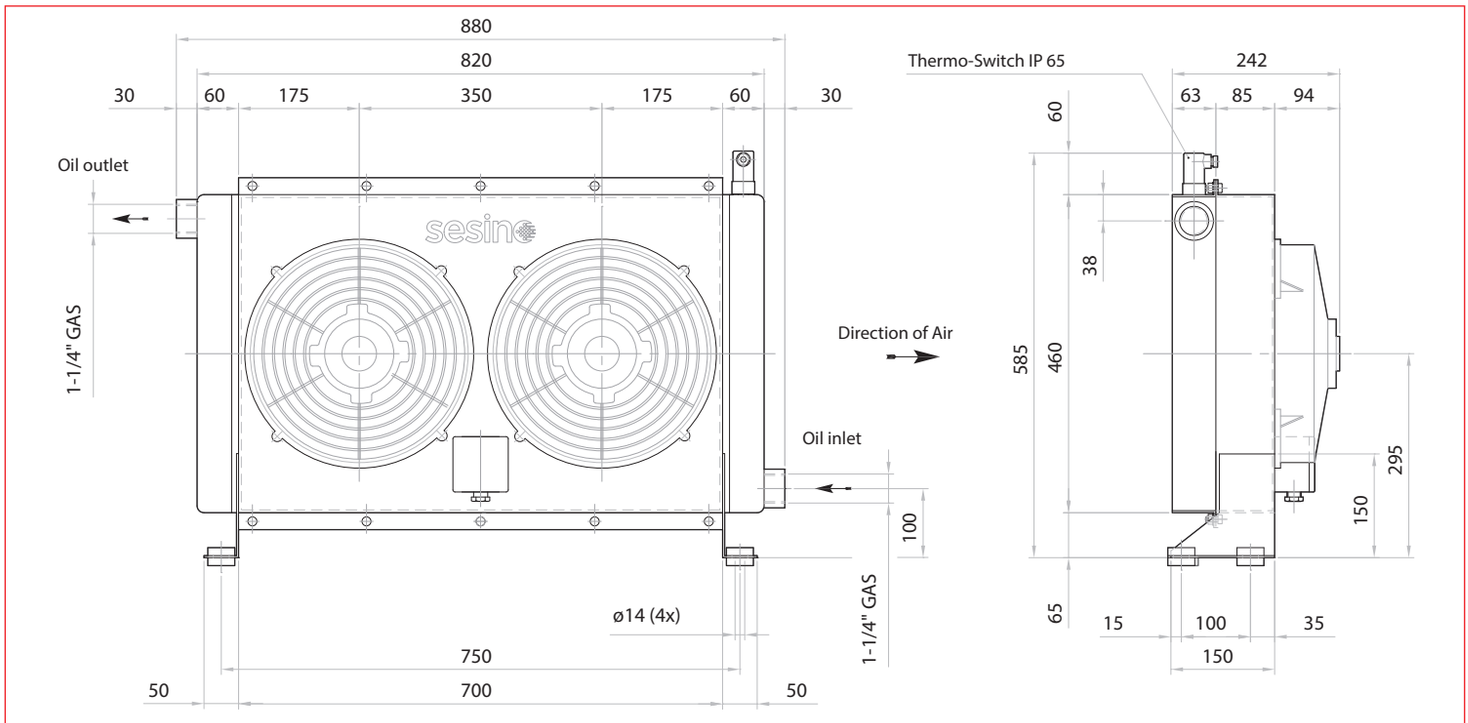
0 — 10 — 20 — 30 — 40 — 50 — 60 — 70 — 80 — 90 — 110 l/min



CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
30-240	12	420	34	4.800	68	85	40	8	310
30-240	24	420	17	4.800	68	85	40	8	310

APL 2/494

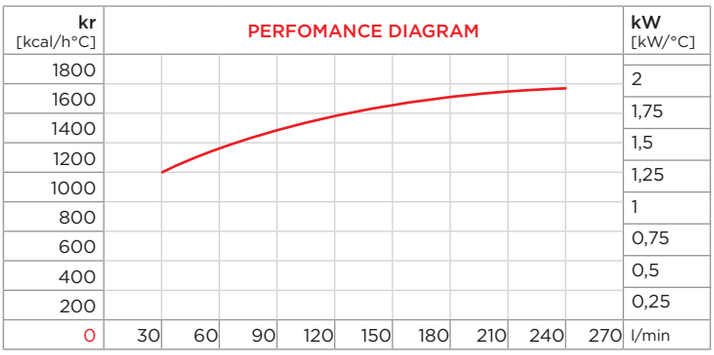
PURCHASE CODES

APL 2/494 12/24V without thermo switch	3RL2/49412 / 3RL2/49424
APL 2/494 12/24V with thermo switch	3RL2/49412T247 / 3RL2/49424T247 3RL2/49412T260 / 3RL2/49424T260

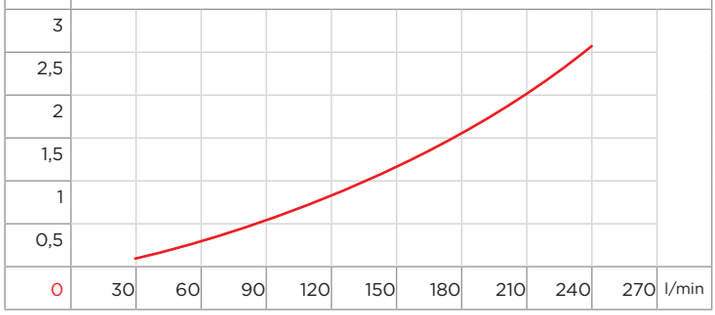
SPARE PARTS

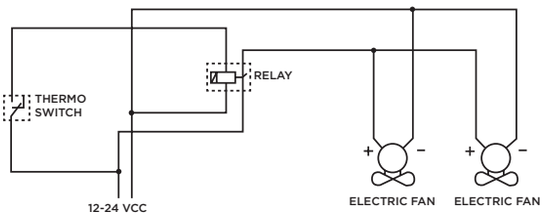
Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Electric junction box	1CSSDBOPLA
12VDC Relay	1RLCOPAT12
24VDC Relay	1RLCOPAT
Shock isolating mounting (4 pcs)	3KIT4135
Cooling element	1RO01342
Frame	3CNL2/494.1
12VDC Electric fan	1MCVA18AP70C
24VDC Electric fan	1VNAPL58024C

PERFOMANCE DIAGRAM



PRESSURE DROP DIAGRAM

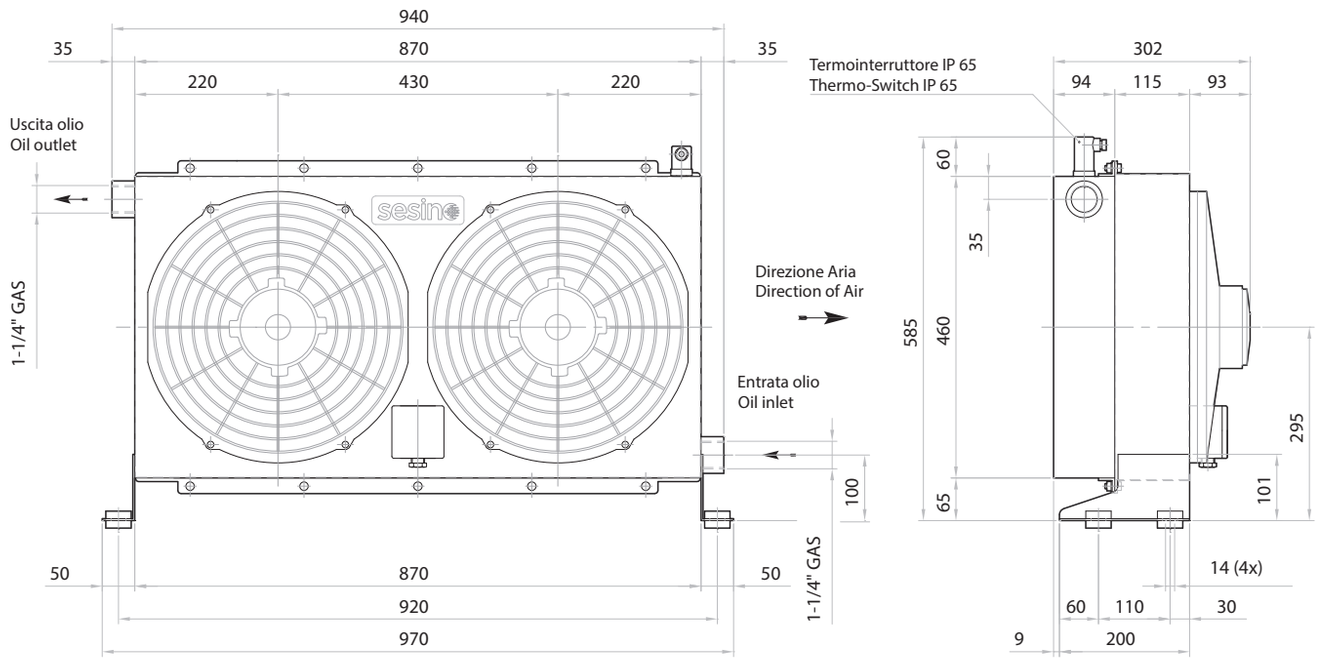




CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
30-240	12	480	40	5.600	68	88	50	16	380
30-240	24	480	20	5.600	68	88	50	16	380

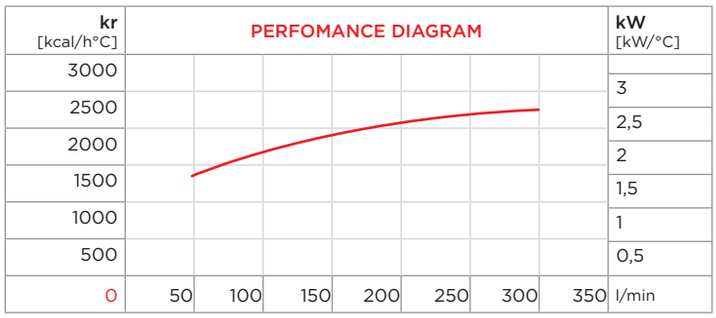
APL 2/580

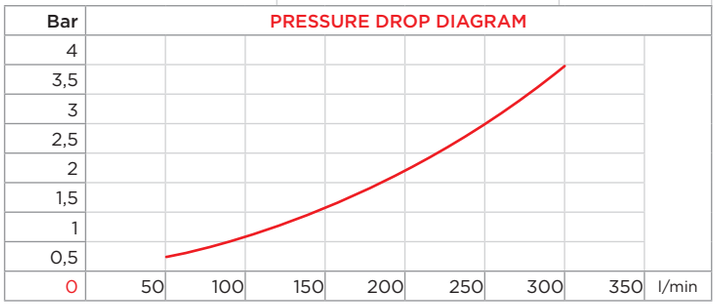
PURCHASE CODES

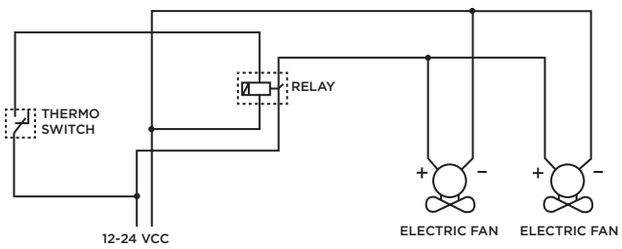
APL 2/580 12/24V without thermo switch	3RL2/58012 / 3RL2/58024
APL 2/580 12/24V with thermo switch	3RL2/58012T247 / 3RL2/58024T247 3RL2/58012T260 / 3RL2/58024T260

SPARE PARTS

Thermo-switch 60-49 IP 65	1TRM60-49
Thermo-switch 47-36 IP 65	1TRM47-36
Electric junction box	1CSSDBOPLA
12VDC Relay	1RLCOPAT12
24VDC Relay	1RLCOPAT
Shock isolating mounting (4 pcs)	3KIT4135
Cooling element	1RO00336
Frame	3CNL2/580.1
12VDC Electric fan	1MCVA18AP70AC
24VDC Electric fan	1VNAPL58024C

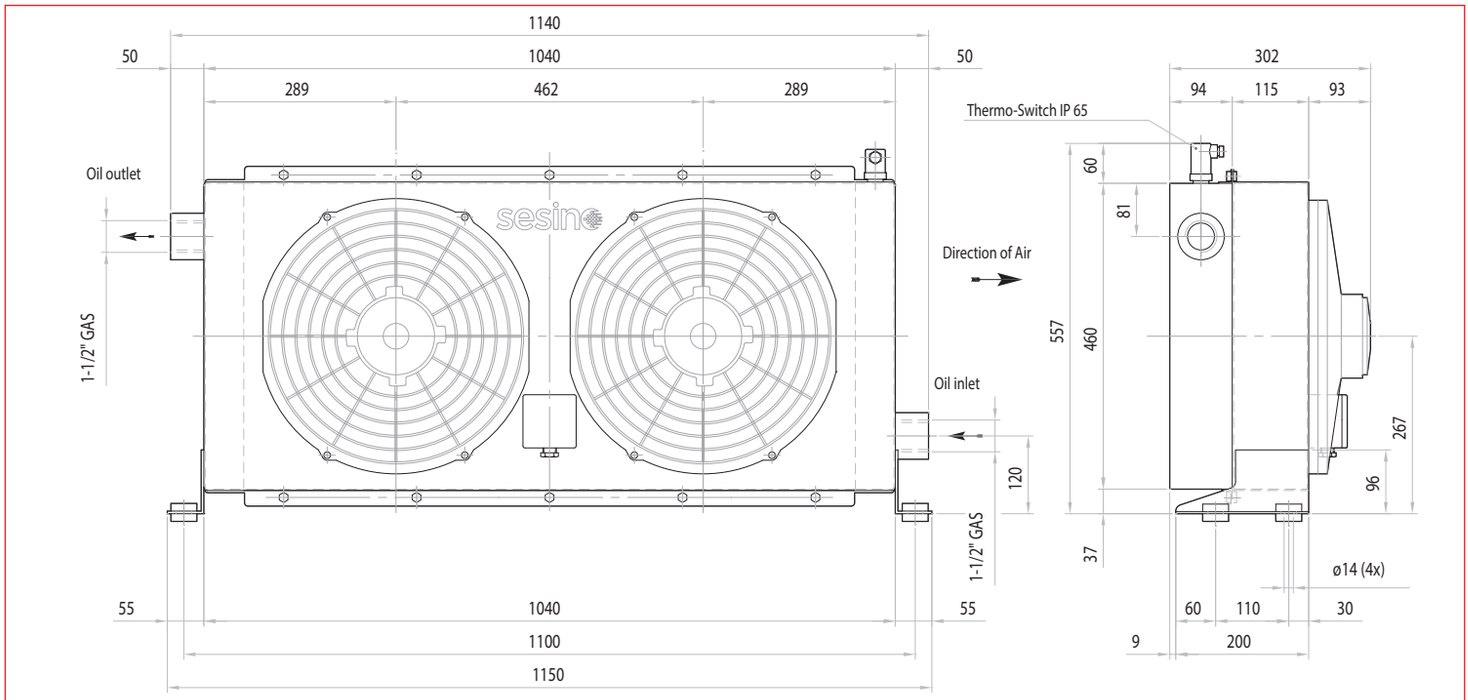






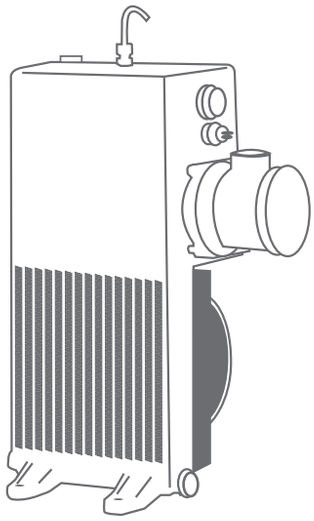
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE	POWER	CURRENT	AIR FLOW	ELECTRIC PROTECTION	NOISE LEVEL	WEIGHT	CAPACITY	ø FAN
l/min	V	W	A	m³/h	IP	dB(A)	kg	lt.	mm
30-350	12	480	40	5.800	68	88	60	23	380
30-350	24	480	20	5.800	68	88	60	23	380

AIR-OIL HEAT EXCHANGER FOR CONCRETE MIXERS
SCAMBIATORE DI CALORE PER AUTOBETONIERE



This is a special type of heat exchanger with incorporated tank and filter. It is suitable for the cooling of hydrostatics transmissions in off-line circuits, above all on concrete mixers, and allows simplifying the hydraulic system and reducing in this way its cost.

Besides the standard aluminium cooling element with DC fan 12 or 24V, this exchanger is equipped with tank with capacity 18 l. with suction filter, level gauge, condensate drainage system and a thermo switch with a fixed calibration of 65°C.

The flow rates shown in the tables are the ones recommended for the exchanger proper working.

Going down the lowest flow rate, the low oil speed causes a great efficiency decrease, whereas a flow rate, which is superior to the maximum indicated, causes great pressure drops and does not considerably increase the thermal performance.
The efficiency curves show the specific exchange capacity in kcal/h°C or in kW/°C according to the different oil rates. To calculate the heat quantity the different exchangers are able to dissipate it is enough to multiply such capacity by the difference between the requested oil temperature and the summer room temperature.

As these exchangers are assembled on machines working in the open air, the steel parts are subjected to a chemical treatment, which prevents from rust. On this treatment, the customer can use each kind of painting.

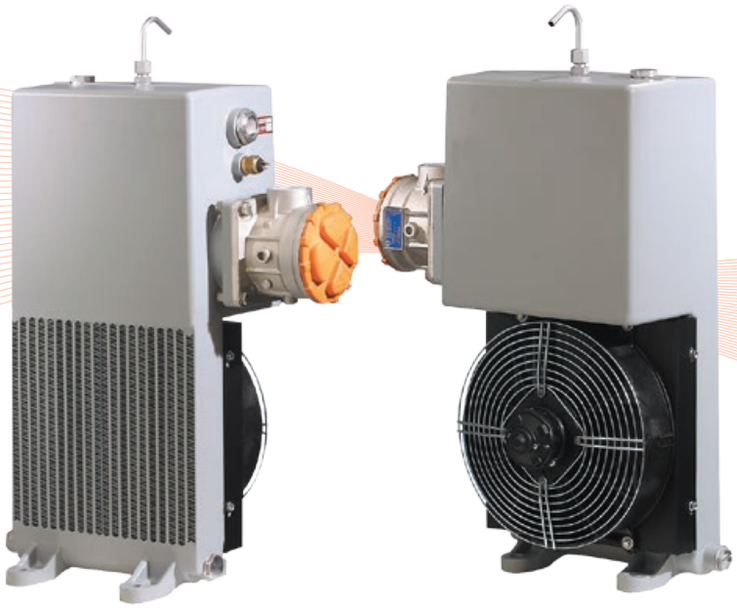
Questo è un particolare tipo di scambiatore con serbatoio e filtro incorporato. È indicato per il raffreddamento di trasmissioni idrostatiche in circuito chiuso, soprattutto su mescolatori di calcestruzzo e consente una notevole semplificazione dell'impianto idraulico e una notevole riduzione di costi dello stesso.

Oltre al normale pacco radiante in alluminio con ventilatore a corrente continua 12 o 24 V, questo scambiatore è munito di serbatoio avente capacità 18 litri con filtro in aspirazione, livello visivo, scarico condensa e termostato fisso taratura 65°C.

Le portate olio indicate in tabella sono quelle consigliate per il buon funzionamento dello scambiatore: andando al di sotto della portata minima la bassa velocità dell'olio causa un forte calo di rendimento, mentre con una portata superiore alla massima aumentano le perdite di carico senza che il rendimento migliori in maniera apprezzabile.

La curva di rendimento fornisce la potenzialità di scambio specifica in kcal/h°C o in KW/°C in funzione delle diverse portate olio; per calcolare la quantità di calore che lo scambiatore è in grado di disperdere è sufficiente moltiplicare tale potenzialità per la differenza tra la temperatura dell'olio desiderata e quella dell'aria ambiente estiva. Poiché questi scambiatori sono installati su macchine che lavorano all'esterno, esposte quindi alle intemperie, le parti in lamiera di acciaio vengono sottoposte a un trattamento chimico particolare che inibisce la formazione di ruggine; su tale trattamento può essere effettuato qualsiasi tipo di verniciatura da parte del cliente.

ELRO/91261



PURCHASE CODES

ELRO 91261 with filter	**3REO91261C**
ELRO 91261 without filter	**3REO91261**

SPARE PARTS

Frame	3CNEO91261.1
Cooling element	3RNEO91261
Electric fan	1VNEO91261
Inlet plug	1T TC6
Level gauge	1LIVTLA56
Thermo-switch 55-44 °C	1TRM55-44
Thermo-switch 65-54 °C	1TRM65-54
Oil Filter	1FTREO91261
Breather pipe	3TBSFEO91261.1
Filter element	1CRTEO91261

PERFOMANCE DIAGRAM

kr [kcal/h°C]	kW [kW/°C]
250	
225	0,287
200	0,237
175	0,187
150	0,137
125	
100	
75/0	5 10 15 20 25 30 35 40 45 50 55 60 l/min

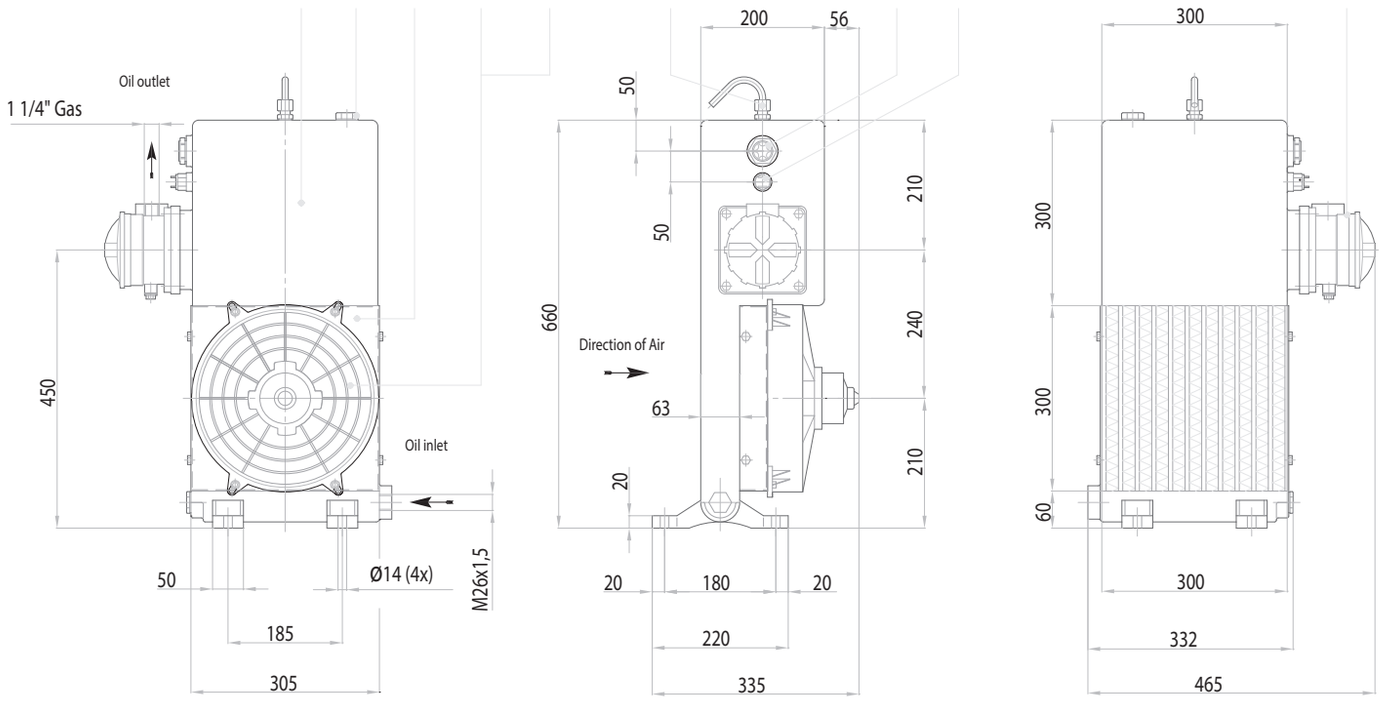
PRESSURE DROP DIAGRAM

Bar	
0,7	
0,6	
0,5	
0,4	
0,3	
0,2	
0,1	
0	5 10 15 20 25 30 35 40 45 50 55 60 l/min

CORRECTION FACTOR

cSt	22	30	46	68	100	150	220
f	0,6	1	1,5	2,3	3,5	5	7

- Dimensions and technical characteristics are not binding



OIL FLOW	CAPACITY	VOLTAGE	POWER	CURRENT	AIR FLOW	PROTECTION	NOISE LEVEL	WEIGHT	ø FAN
l/min	l	V	W	A	m³/h	IP	dB(A)	kg	mm
upon request only		12	180	15	1.600	68	74	18	280
5-60	18	24	180	7,5	1.600	68	74	18	280

ASSEMBLING AND MAINTENANCE INSTRUCTIONS OF THE AIR-OIL HEAT EXCHANGERS

Assembling

The exchanger must be assembled so that the airflow is not obstructed.
To obtain a better efficiency it is important to avoid any recycling of warm air between outlet and inlet.

In case of long downtime at cold temperatures, the oil temperature becomes very low and its viscosity increases.
When the machine starts again, the pressure drop can become superior to the maximum allowable pressure; in this case, the exchanger must be equipped with a by-pass valve with proper calibration.
Sesino Air-oil heat exchangers are generally installed in the return circuit.

It is also possible to realize a separate circuit with an autonomous pump and this is recommended when the outlet oil flows are variable. In this way, it is possible to obtain a better heating performance. Oil must flow in from the bottom.

The inlet and outlet fittings must be connected without any tension and must not transmit any vibration to the exchanger.
The pressure peaks must never exceed the maximum allowable dynamic pressure of the exchanger.

Operating

As first check that the tension correspond to the one on the heat exchanger nameplate.
The oil temperature can be adjusted by stopping or starting the electric fan and to do that, the thermo-switch must be adjusted on the required temperature.
If there is a need of a continuous working of the fan, turn the thermo switch knob on the minimum.
In the hydraulic systems, some pressure peaks can occur; they could approach or exceed the maximum allowable pressure of the exchanger. These pulsations move inside the oil at the sound velocity and therefore they cannot be gauged with standard manometers, but only with a proper electronical instrumentation.
If these peaks exceed the value of 20 bar, it is necessary to supply the exchanger with a self-contained pump.

The maximum allowable static pressure is of 2 bar.

MAINTENANCE

Oil side cleaning

For this kind of cleaning, the heat exchanger must be disconnected.
In order to remove the dirt, let a detergent circulate from 10 to 30 minutes, then proceed removing the detergent with compressed air.

Air side cleaning

It can be carried with compressed air or water. The direction of the stream must be parallel to the fins to avoid damaging them. It is possible to use some detergent but only if it does not deteriorate the aluminum. If the dirt consists of oil or grease, it is possible to use a stream of steam or hot water. During the cleaning the electric motor has to be adequately protected.

ISTRUZIONI DI MONTAGGIO, FUNZIONAMENTO E MANUTENZIONE DEGLI SCAMBIATORI ARIA-OLIO SESINO

Montaggio

Lo scambiatore deve essere installato in modo che l'aria non sia ostacolata nel suo fluire sia in aspirazione che all'uscita del pacco radiante.
Per una resa termica ottimale bisogna evitare qualsiasi riciclaggio d'aria calda tra uscita ed aspirazione.

In caso di fermo macchina prolungato a temperature rigide invernali, la temperatura dell'olio diventa molto bassa e quindi aumenta molto la sua viscosità. Alla rimessa in marcia, la perdita di carico può diventare superiore alla massima pressione ammissibile; in questo caso bisogna dotare lo scambiatore di una valvola di by-pass di taratura appropriata.

Gli scambiatori aria-olio Sesino SpA sono generalmente installati sul circuito di ritorno; è possibile anche realizzare un circuito separato con una pompa autonoma e ciò è consigliabile nel caso in cui le portate allo scarico siano molto variabili; ciò facendo si ottiene anche un miglioramento di resa termica.

L'entrata dell'olio deve avvenire preferibilmente dal basso.
I raccordi di entrata ed uscita olio devono essere collegati senza tensioni e non dovranno trasmettere alcuna vibrazione allo scambiatore.
Per quanto riguarda i colpi di pressione, essi non devono mai superare la pressione dinamica massima ammessa dallo scambiatore.

Funzionamento

Si deve innanzi tutto verificare che la tensione e la frequenza di alimentazione corrisponda a quella indicata sulla targhetta.
La temperatura dell'olio può essere regolata mediante l'interruzione o l'azionamento dell'elettroventola; per fare ciò viene utilizzato il termostato impostandolo sulla temperatura desiderata.
Nel caso si desiderasse un funzionamento continuo del ventilatore, è sufficiente ruotare la manopola del termostato sul valore minimo.
Nei sistemi idraulici possono verificarsi dei picchi di pressione che possono avvicinarsi o superare la pressione massima ammissibile dello scambiatore. Poiché tali pulsazioni viaggiano nell'olio alla velocità del suono, esse non sono misurabili con normali manometri, ma solo con un'adatta strumentazione elettronica.
Nel caso in cui questi picchi superino il valore di 20 bar, è indispensabile alimentare lo scambiatore con una pompa autonoma.

La pressione statica massima ammessa è di 2 bar.

MANUTENZIONE

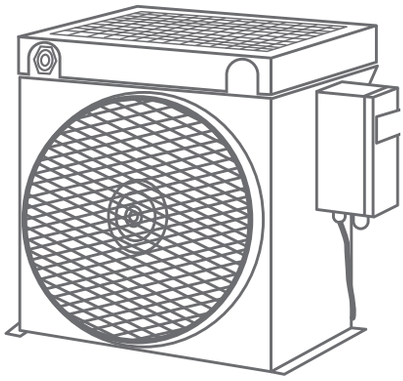
Pulizia lato olio.

Per tale tipo di pulizia lo scambiatore deve essere smontato.
Lo sporco potrà essere eliminato con la circolazione di un prodotto detergente. La durata di questa operazione dipende naturalmente dal grado di sporco; può variare da 10 a 30 minuti.
Dopo questa operazione il prodotto resta all'interno e bisognerà quindi procedere alla sua espulsione tramite aria compressa.

Pulizia lato aria.

Essa potrà essere eseguita mediante aria compressa o acqua. La direzione del getto dovrà essere parallela alle alette per non danneggiarle. Il risultato potrà essere migliore con l'aggiunta di un prodotto detergente, ma bisogna essere certi che esso non intacchi l'alluminio.
Se l'accumulo di sporco è causato da olio o da grasso, la pulizia potrà essere effettuata con un getto di vapore o di acqua calda.
Durante le operazioni di pulizia il motore elettrico dovrà essere convenientemente protetto.

SELF CONTAINED COOLING UNITS
UNITA DI RAFFREDDAMENTO A CORRENTE ALTERNATA SERIE RAS



There are some applications where, because of the presence of high pressure peaks or extremely variable flow rates that can compromise the exchanger efficiency, it is not recommended to use a simple air-oil heat exchanger.

In such cases it is useful to feed the air-oil exchanger with an off-line pump, to make it independent from the primary oleo hydraulic plant. To satisfy this request, we have designed and realized the **self-contained cooling units type RAS.**

These exchangers consist of an air-oil heat exchanger and a double shaft electric motor that sets on an oil gear pump and a cooling fan. Maximum allowable working pressure: 10 bar.
In order to make the assembling easier, the electric connection is carried though an electric junction box fixed on the frame of the cooling unit.

Upon request, we can supply the unit with an adjustable thermo switch with a thermo switch probe to be placed into the tank to cool.

Always upon request, we can supply an oil filter to connect to the pump in suction.

The efficiency diagrams show the heat quantity each cooling unit is able to dissipate kW according to the difference between the requested oil temperature and the summer room temperature.

In alcune applicazioni non è possibile o consigliabile utilizzare un semplice scambiatore di calore aria-olio a causa della presenza di colpi d'ariete di elevata intensità o di portate olio estremamente variabili, tali da pregiudicare la resa termica dello scambiatore.

In questi casi è utile alimentare lo scambiatore con una pompa off-line per renderlo indipendente dall'impianto oleoidraulico primario.
Per soddisfare questa richiesta abbiamo realizzato le ***Unità di Raffreddamento RAS.***

Esse sono composte da uno scambiatore aria-olio e da un unico motore elettrico bialbero che aziona una pompa di circolazione olio a ingranaggi e una ventola di raffreddamento.

La pressione massima di funzionamento ammessa dello scambiatore è di 10 bar.

Per agevolarne il montaggio, il collegamento elettrico viene effettuato tramite una cassetta di derivazione fissata esternamente sul telaio dell'Unità di Raffreddamento.

Su richiesta queste unità possono essere completate con un termostato elettronico regolabile munito di sonda da inserire all'interno del serbatoio da raffreddare.

Sempre su richiesta può essere fornito anche un filtro olio da collegare in aspirazione alla pompa.

I diagrammi di rendimento indicati qui di seguito, forniscono la quantità di calore che ogni Unità di Raffreddamento è in grado di disperdere in kW in funzione della differenza tra la temperatura dell'olio desiderata e la massima temperatura ambiente estiva.

RAS 1000

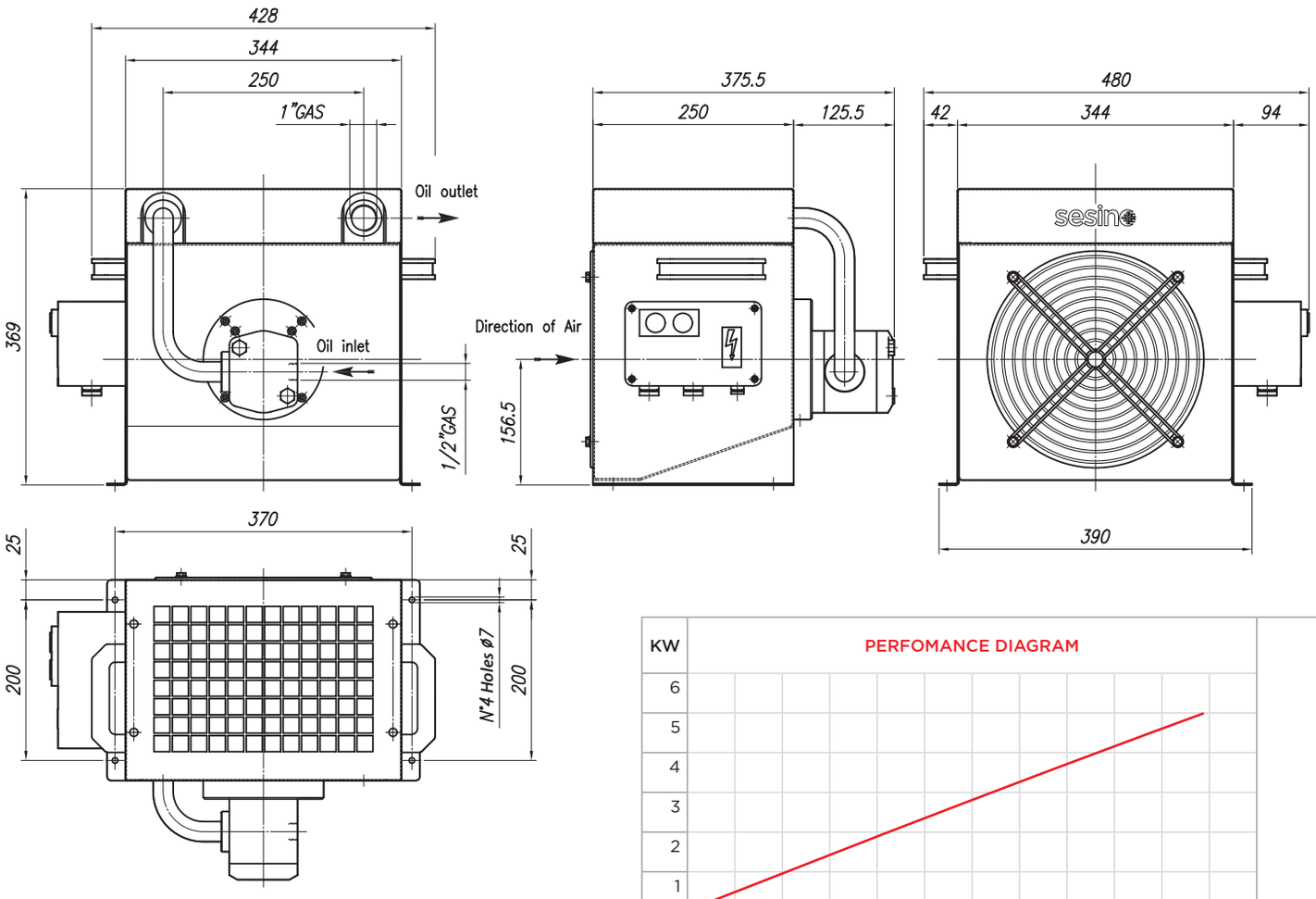
PURCHASE CODES

RAS 1000 without thermo-switch	**3RRAS1000**
RAS 1000 with thermo-switch	**3RRAS1000T**

SPARE PARTS

Electronic thermo-switch	1TRM RAS
2m thermo-switch probe	1SND RAS
4m thermo-switch probe	1SND ROC4M
Oil filter	1FTR MPS50
Electric junction box	1CSSDSAR336
Cooling element	1RO03378
Cooling element protection grill	3TLPRAS1000.1
Housing	3TLRAS1000.1
Fan	1GRAS1000
Fan grill	3RTRAS1000.1
Pump	1PORAS3000
Electric motor	1MRAS3000

- Dimensions and technical characteristics are not binding



OIL FLOW	VOLTAGE		HZ	POWER	CURRENT	ELECTRICAL PROTECTION	AIR FLOW	NOISE LEVEL	WEIGHT
l/min	Δ	Y		W	A	IP	m³/h	dB(A)	kg
13	220-240	380-420	50	550	2,80-1,60	55	850	68	18
13		440-480	60	640	2,80-1,60	55	850	68	18

RAS 3000

PURCHASE CODES

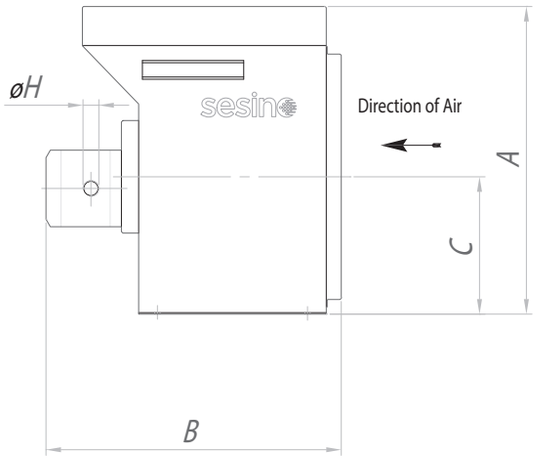
RAS 3000 without thermo-switch	**3RRAS3000**
RAS 3000 with thermo-switch	**3RRAS3000T**

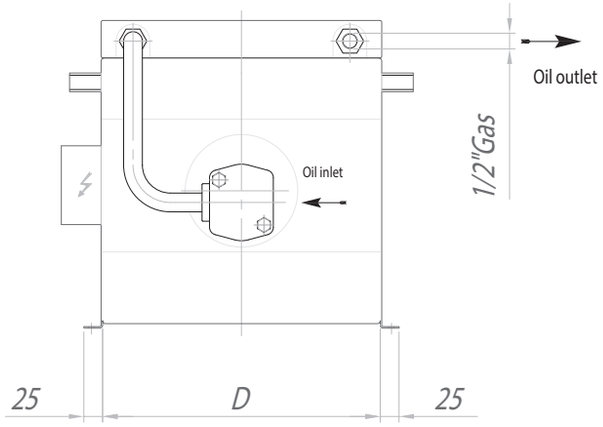
SPARE PARTS

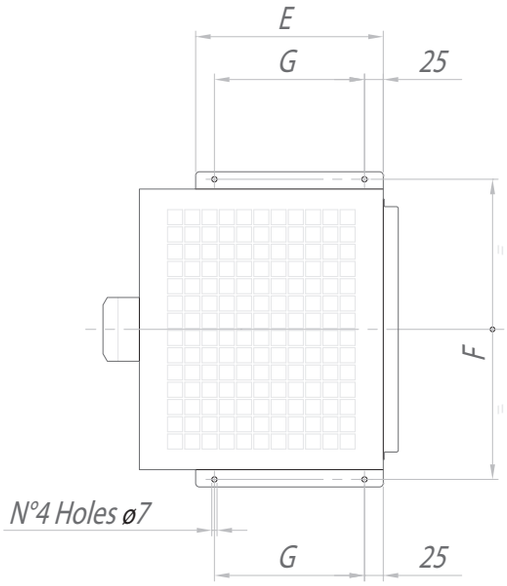
Electronic thermo-switch	1TRM RAS
2m thermo-switch probe	1SND RAS
4m thermo-switch probe	1SND ROC4M
Oil filter	1FTR MPS50
Electric junction box	1CSSDSAR336
Cooling element	1RONO1
Cooling element protection grill	3TLPRAS3000.1
Housing	3TLRAS3000.1
Fan	1GRAS3000
Fan grill	3RTRAS3000.1
Pump	1PORAS3000
Electric motor	1MRAS3000

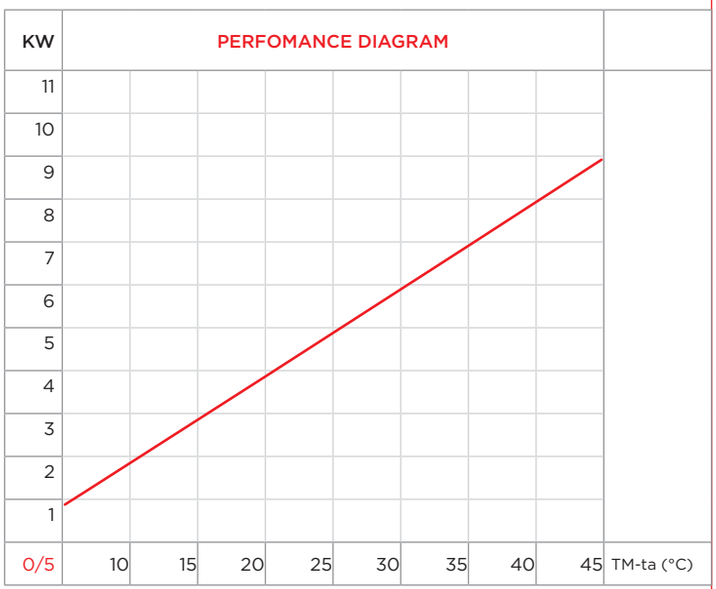
DIMENSIONS							
A	B	C	D	E	F	G	H
410	395	193	370	250	400	200	1/2"Gas

- Dimensions and technical characteristics are not binding









OIL FLOW	VOLTAGE		HZ	POWER	CURRENT	ELECTRICAL PROTECTION	AIR FLOW	NOISE LEVEL	WEIGHT
l/min	Δ	Y		W	A	IP	m³/h	dB(A)	kg
13	220-240	380-420	50	550	2,80-1,60	55	850	68	24
13	254-480	440-480	60	640	2,80-1,60	55	850	68	24

RAS 5000

PURCHASE CODES

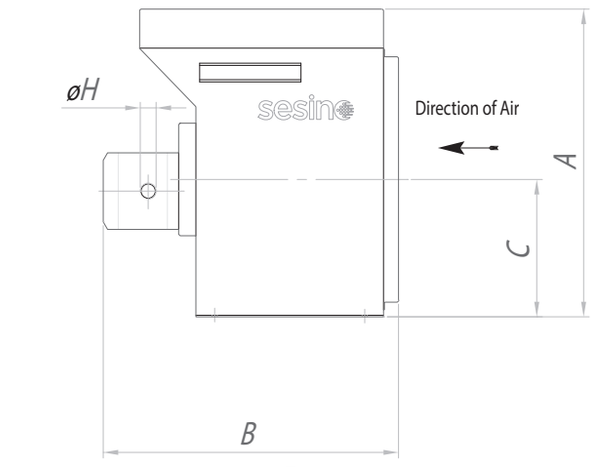
RAS 5000 without thermo-switch	**3RRAS5000**
RAS 5000 with thermo-switch	**3RRAS5000T**

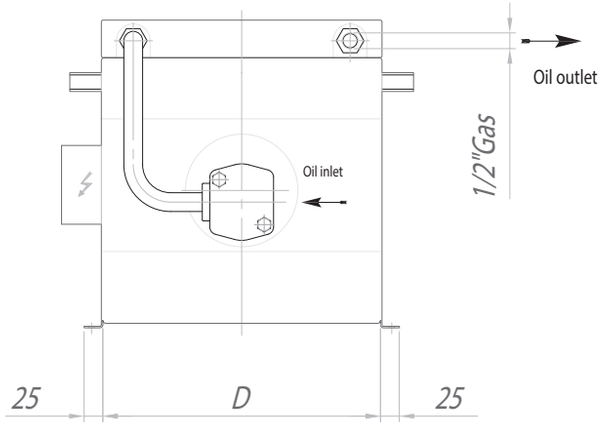
SPARE PARTS

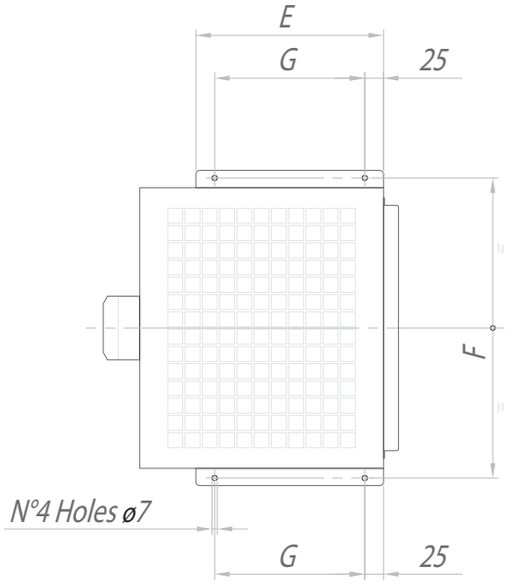
Electronic thermo-switch	1TRM RAS
2m thermo-switch probe	1SND RAS
4m thermo-switch probe	1SND ROC4M
Oil filter	1FTR MPS50
Electric junction box	1CSSDSAR336
Cooling element	1RONO3
Cooling element protection grill	3TLPRAS5000.1
Housing	3TLRAS5000.1
Fan	1GRAS5000
Fan grill	3RTRAS5000.1
Pump	1PORAS5000
Electric motor	1MRAS5000

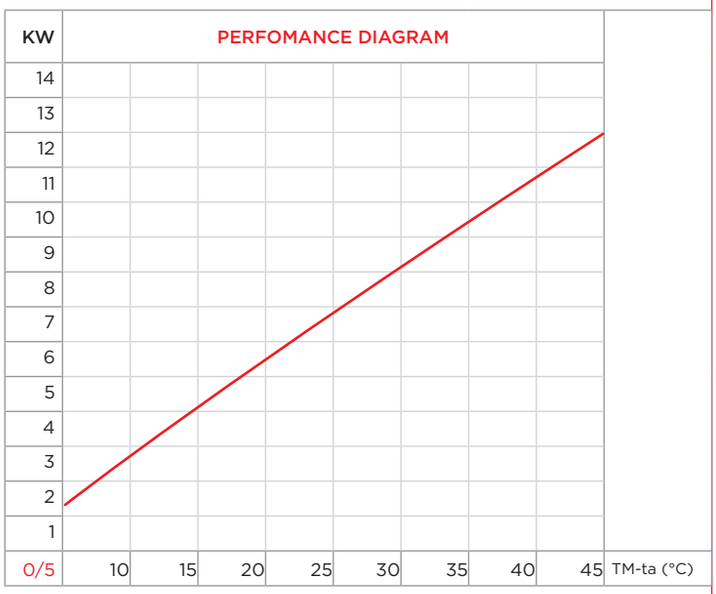
DIMENSIONS							
A	B	C	D	E	F	G	H
450	405	203	470	250	500	200	3/4"Gas

- Dimensions and technical characteristics are not binding









OIL FLOW	VOLTAGE		HZ	POWER	CURRENT	ELECTRICAL PROTECTION	AIR FLOW	NOISE LEVEL	WEIGHT
l/min	Δ	Y		W	A	IP	m³/h	dB(A)	kg
22	230-240	380-420	50	750	3,5-2,0	55	1.500	70	36
22	254-280	440-480	60	750	3,5-2,0	55	1.500	70	36

RAS 7000

PURCHASE CODES

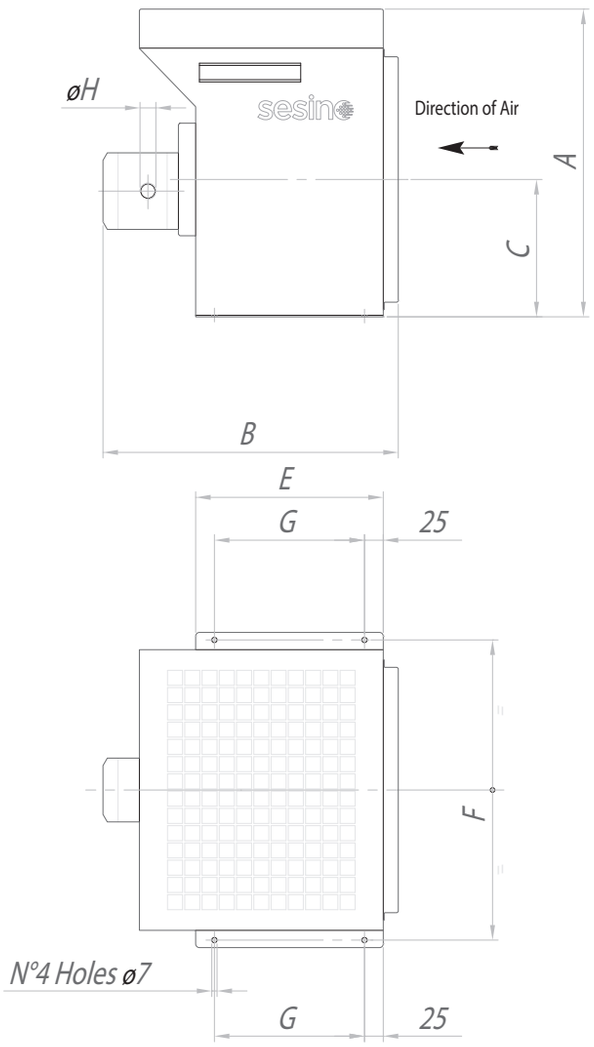
RAS 3000 without thermo-switch	**3RRAS7000**
RAS 3000 with thermo-switch	**3RRAS7000T**

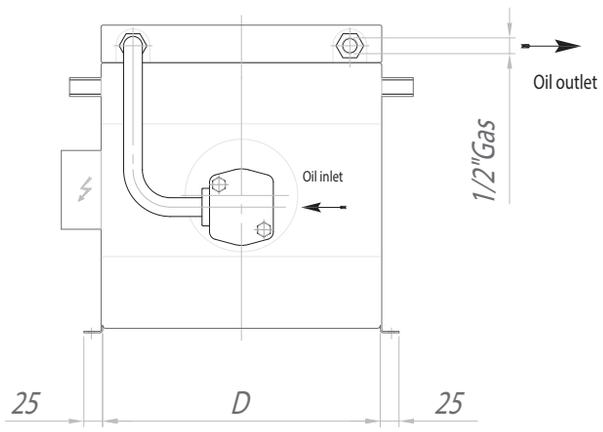
SPARE PARTS

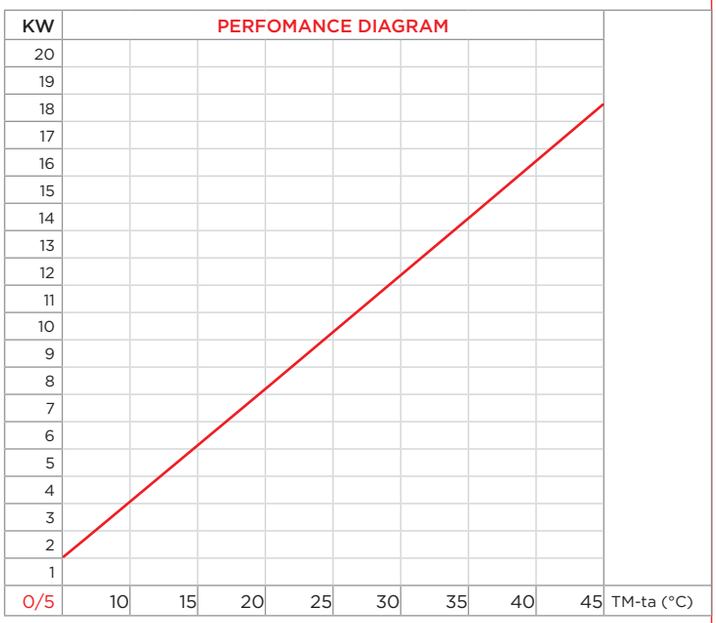
Electronic thermo-switch	1TRM RAS
2m thermo-switch probe	1SND RAS
4m thermo-switch probe	1SND ROC4M
Oil filter	1FTR MPS50
Electric junction box	1CSSDSAR336
Cooling element	1RONO4
Cooling element protection grill	3TLPRAS7000.1
Housing	3TLRAS7000.1
Fan	1GRAS7000
Fan grill	3RTRAS7000.1
Pump	1PORAS7000
Electric motor	1MRAS7000

DIMENSIONS							
A	B	C	D	E	F	G	H
495	455	225	520	290	550	240	3/4"Gas

- Dimensions and technical characteristics are not binding







OIL FLOW	VOLTAGE		HZ	POWER	CURRENT	ELECTRICAL PROTECTION	AIR FLOW	NOISE LEVEL	WEIGHT
l/min	Δ	Y		W	A	IP	m³/h	dB(A)	kg
34	230	400	50	1100	4,5-2,6	55	2.000	75	58
34	254	440	60	1300	4,6-2,7	55	2.000	75	58

ASSEMBLING AND MAINTENANCE INSTRUCTIONS OF THE SELF CONTAINED COOLING UNITS

Assembling

The exchanger must be assembled so that the airflow is not obstructed. To obtain a better efficiency it is important to avoid any recycling of warm air between outlet and inlet.
It is important to have enough air-recycle into the area where the unit is installed, in order to avoid that the air itself became warm, compromising this way the functioning of the exchanger.
The air flow have to be guided to avoid bothering the operator.
The self-contained cooling unit has to be connected with flexible tubes to the tank to cool. It is indispensable that the suction tube has the same or a bigger diameter that the one of the fitting existing on the unit. Otherwise, it is possible to encounter cavitation phenomena that could cause high noise or could break the pump.
For the same reason, the suction tube do not have to offer extreme pressure drops and it is better to avoid winding way, diameter reductions, etc.
Avoid outlet obstructions of the pump to avoid, consequently, putting the cooling element, that has a max. working pressure of 2 bar, under high pressures.
If the unit has to be placed higher that the oil level, using a self-priming gear pump allows positioning the unit to a max. height of 2 meters between the pump and the oil level, on exceeding heights the pump could cavitate.

Operating

As first check that the tension correspond to the one on the heat exchanger nameplate. Before operating, it is necessary to check that the fan rotate to the direction shown by the arrow, in this way also the pump will rotate to the right direction.

MAINTENANCE

Oil side cleaning

For this kind of cleaning, the unit must be disassembled from the machine and the cooling element from the exchanger.
In order to remove the dirt, let a detergent circulate from 10 to 30 minutes, then proceed removing the detergent with compressed air.
During the circulation of the detergent pay attention that its pressure does not exceed the maximum allowed pressure of the exchanger.

Air side cleaning

It can be carried with compressed air or water. The direction of the stream must be parallel to the fins to avoid damaging them. It could be more efficient to use a detergent.
If the dirt consists of oil or grease, it is possible to use a stream of steam or hot water, paying attention always to the stream direction.
During the cleaning the electric motor has to be adequately protected.

ISTRUZIONI DI MONTAGGIO, MESSA IN MARCIA E MANUTENZIONI GRUPPI AUTONOMI DI RAFFREDDAMENTO

Montaggio

Il gruppo deve essere installato in modo che l'aria non sia ostacolata nel suo fluire sia in aspirazione che in uscita dal pacco radiante.
E' indispensabile che nel locale in cui funziona esista un ricambio d'aria sufficiente in modo che l'aria stessa non venga riscaldata pregiudicando la resa termica dello scambiatore.
Si deve inoltre fare in modo che il flusso d'aria non vada ad infastidire l'operatore.
I Gruppi Autonomi devono essere collegati con tubi flessibili al serbatoio che devono raffreddare.
E' indispensabile che il tubo di aspirazione sia di diametro uguale o superiore al diametro del raccordo esistente sul gruppo; in caso contrario si potrebbero verificare fenomeni di cavitazione che causerebbero rumorosità elevata e possibile rottura della pompa.
Per lo stesso motivo il tubo di aspirazione non deve offrire eccessive perdite di carico e si devono pertanto evitare percorsi tortuosi, riduzione di diametri, ecc..
Si devono anche evitare ostruzioni in mandata per non mettere in pressione il pacco radiante, la cui massima pressione di funzionamento è di 2 bar.
Nel caso si debba posizionare il Gruppo più in alto del livello dell'olio, l'impiego di una pompa a ingranaggi autoadescante consente di posizionarlo ad un'altezza massima di 2 metri tra la pompa e il livello dell'olio; ad altezze superiori la pompa potrebbe cavitare.

Funzionamento

Si deve innanzitutto verificare che la tensione e la frequenza di alimentazione corrispondano a quella indicata sulla targhetta.
All'atto della messa in marcia è indispensabile verificare che la ventola ruoti nella direzione indicata dalle freccia; in questo modo anche la pompa ruoterà nel senso giusto.

MANUTENZIONE

Pulizia lato olio

Per tale tipo di pulizia il gruppo deve essere smontato dalla macchina, così come il pacco radiante dal gruppo. Lo sporco potrà essere eliminato con circolazione di prodotto detergente.
La durata di questa operazione dipende naturalmente dal grado di sporco: può variare dai 10 ai 30 minuti. Dopo questa operazione il prodotto resta all'interno e bisognerà quindi procedere alla sua espulsione tramite aria compressa.
Nel corso della circolazione del prodotto di pulizia bisogna fare attenzione che la sua pressione non superi quella massima ammessa dallo scambiatore.

Pulizia lato aria

Essa potrà essere effettuata mediante aria compressa o acqua. La direzione del getto dovrà essere parallela alle alette per non danneggiarle.
Il risultato può essere migliore con l'aggiunta di un prodotto detergente.
Se l'accumulo di sporco è causato da olio o da grasso, la pulizia potrà essere effettuata con un getto di vapore o di acqua calda, facendo sempre attenzione alla direzione del getto.
Durante le operazioni di pulizia, i motori elettrici dovranno essere convenientemente protetti.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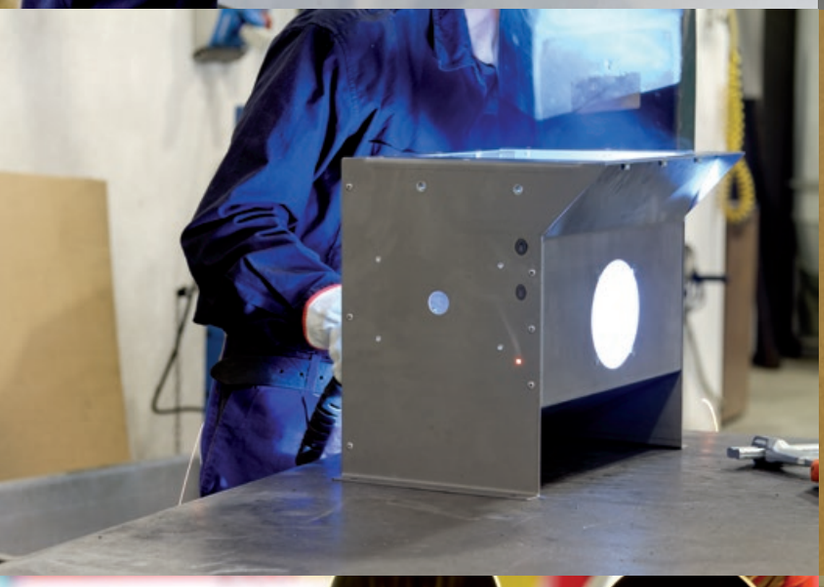


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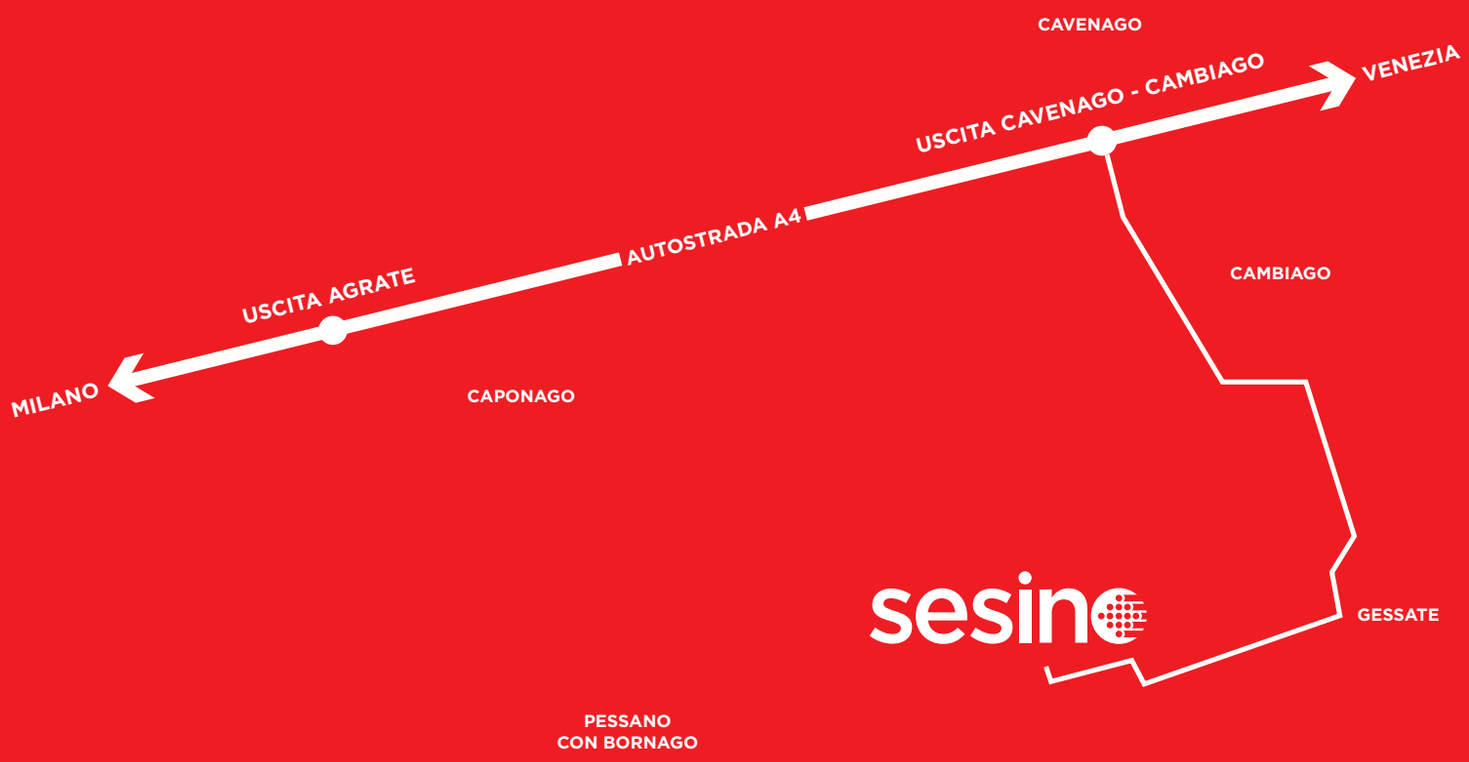

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