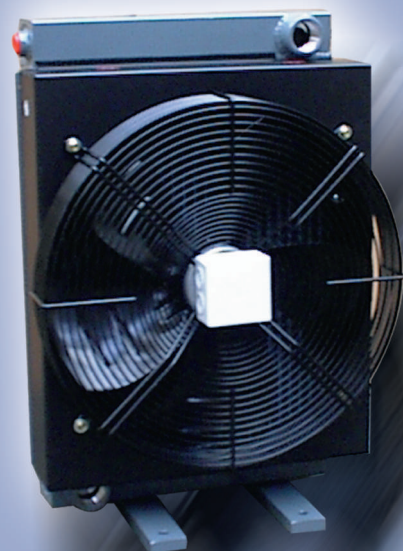




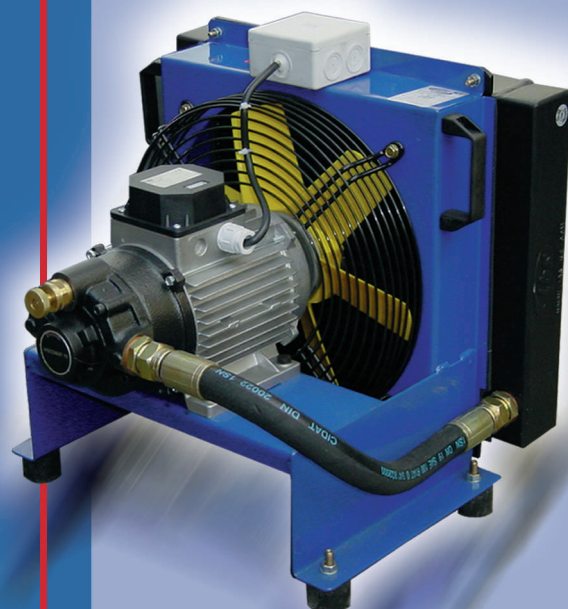
Serie L



Serie H

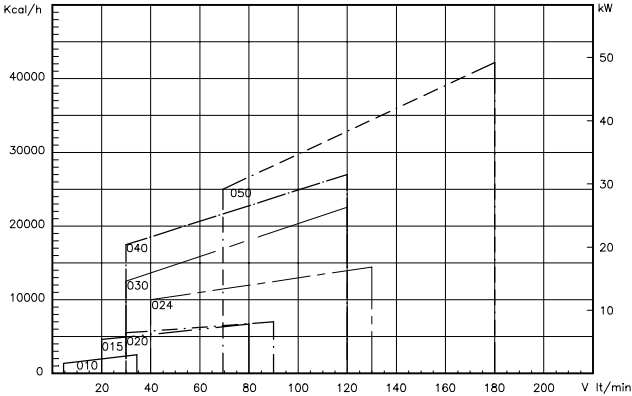
Oil Coolers

Industria
Bustese
Scambiatori

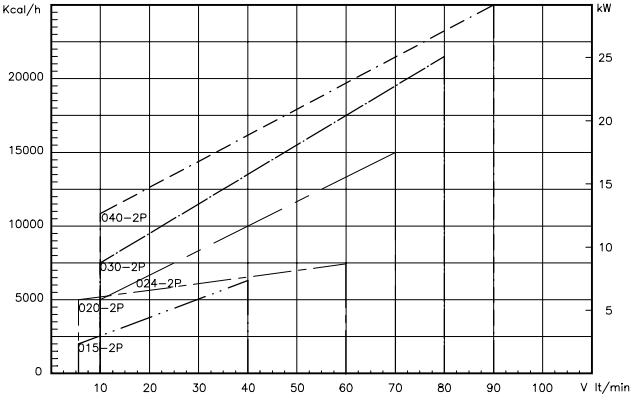


Serie A

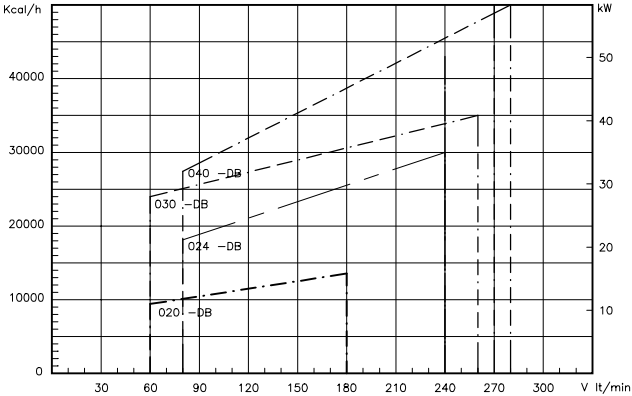
L serie



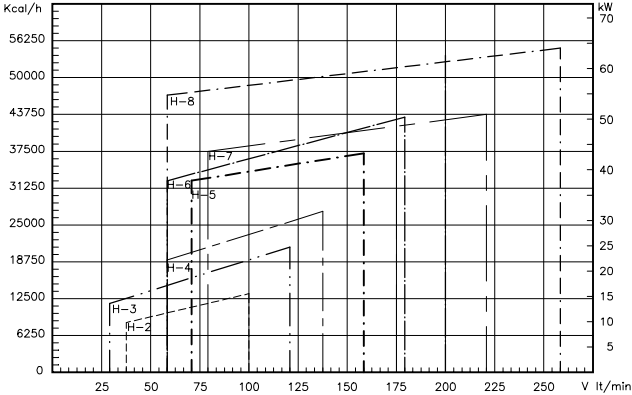
L-2P serie



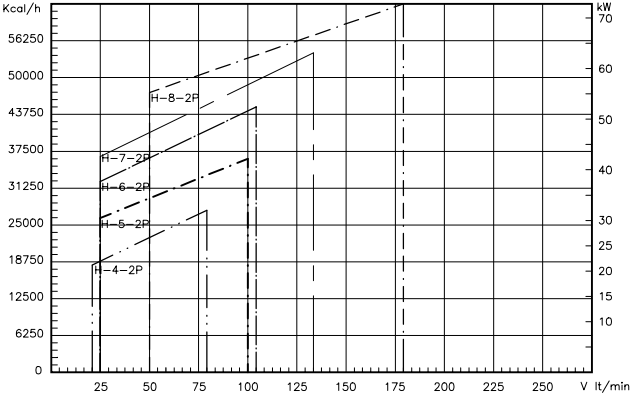
L-DB serie



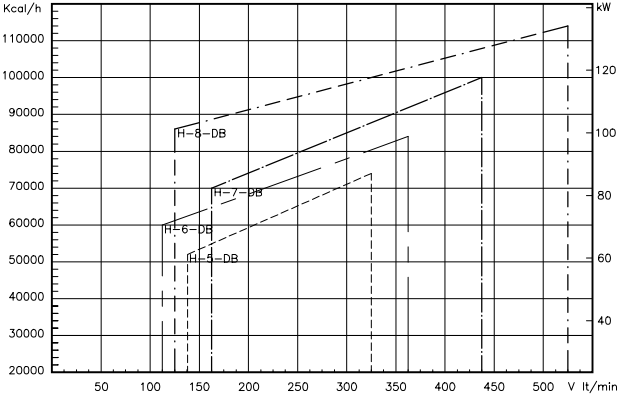
H serie



H-2P serie



H-DB serie



Oil coolers specifications and installations

Introduzione: Gli scambiatori di calore IBS sono costruiti totalmente in alluminio ed ogni parte è stata studiata nel dettaglio, partendo dai materiali, spessore e soprattutto design. Le alette aria sono realizzate con una speciale inclinazione che permette di aumentare la capacità di scambio e soprattutto di garantire una elevata pulizia nel tempo. Altro elemento fondamentale è il turbolatore olio che, dato il particolare profilo, conferisce una ottima resistenza e garantisce elevate performance. La protezione alla corrosione è garantita da un rivestimento superficiale a diffusione di zinco. Il processo innovativo con cui tutti gli elementi costituenti lo scambiatore vengono saldati in un unico corpo è denominato brasatura. Il processo avviene in un forno ad atmosfera controllata che garantisce un risultato tecnico e qualitativo ottimale. Per questo motivo gli scambiatori IBS hanno delle caratteristiche di resistenza e prestazioni tra le migliori sul mercato mondiale, garantendo pressione di esercizio di 25 BAR, pressione di collaudo di 35 BAR e temperatura max di esercizio pari a 120°C.

Serie standard IBS

In questo catalogo sono presentate tre linee di prodotto così divise:

- **Serie L** scambiatori in alluminio corredati di ventilatori AC,DC o predisposizione idraulica adatti per potenze e Portate medio basse
- **Serie H** scambiatori in alluminio corredati di ventilatori AC,DC o predisposizione idraulica adatti per potenze e Portate medio alte
- **Serie A** scambiatori in alluminio corredati di gruppo motopompa utilizzati per il raffreddamento autonomo off-line.

Fluidi compatibili: Oli minerali HL/HLP, DIN 51524, emulsioni acqua /olio HFA, HFB, CETOP, RP//H, acqua-glicole HFC, CETOP RP 77H, Esteri fosfati HFD-R, CETOP RP 77H. Per particolari atmosfere aggressive o fluidi con viscosità superiori a 100cst consultare IBS.

Installazione:

Assicurarsi di collocare lo scambiatore in modo che non ci siano ostacoli al flusso d'aria; la distanza dalla parete più vicina non deve essere inferiore a metà dell'altezza dello scambiatore. Per il montaggio è consigliato utilizzare degli elementi antivibranti idonei per evitare stress allo scambiatore in caso di forti vibrazioni.

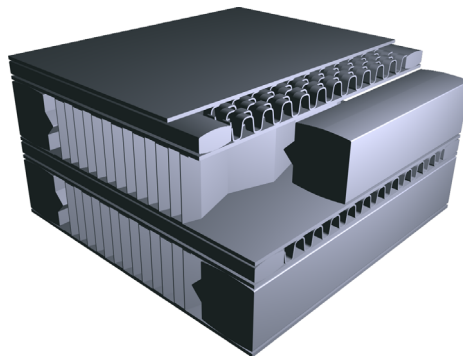
Manutenzione:

Controllare sempre che la massa radiante sia pulita per garantire la stessa efficienza nel tempo e soprattutto che le parti elettriche funzionino nel modo corretto.

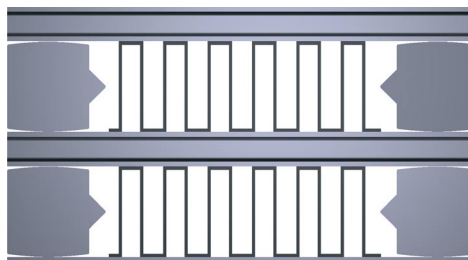
Pulizia alette aria: Utilizzare aria compressa o acqua, facendo attenzione a direzionare il getto parallelo alle alette per non danneggiarle. Importante che durante questa operazione il motore elettrico sia scollegato dalla tensione e adeguatamente protetto.

Pulizia passaggi olio: Smontare lo scambiatore per essere flussato in controcorrente con un prodotto detergente compatibile con l'alluminio.

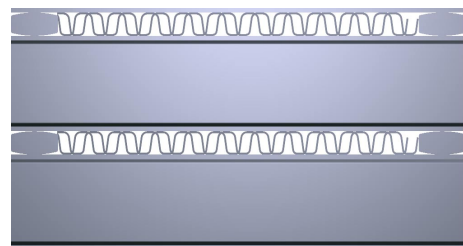
Collegamento all'impianto: Lo scambiatore è studiato per raffreddare l'olio di ritorno dal sistema. Per meglio preservare la vita e il funzionamento dello stesso è buona norma prevedere una valvola di by-pass per picchi di pressione o avviamento dell'impianto con olio freddo.



3D view



Air side



Oil side

Introduction: IBS all aluminium heat exchange products for oil cooling applications are based on comprehensive component design standards, specific assembly technology & optimised material selection and specification to satisfy the increasing demands of the heat transfer sector.

The production process employed at IBS ensures consistently manufactured products of high quality in respect of structural, thermal, external cosmetic, internal cleanliness and corrosion resistance requirements. IBS's heat exchangers are totally made by aluminium and all the parts are exactly designed starting from materials, thickness and design. Fins have a special inclination to increase the performances and to assure high cleanliness.

Another important element is the turbolator, that by its particular profile, gives high resistance and performances.

Corrosion proof is obtained by special superficial treatment. The innovative process to solder all the parts is named brazing. It develops in controlled atmosphere brazing furnace.

By this reason IBS's heat exchangers have high performances and resistance like the best exchangers in the world market and they assure working pressure 25 bar, test pressure 35 BAR and max working temp 120°C.

Standard IBS's series

In this catalog there are three product lines as follows described:

- **L series** aluminium exchangers with AC,DC fans or hydraulic presetting made for low-medium power and flow
- **H series** aluminium exchangers with AC,DC fans or hydraulic presetting made for high power and flow
- **A series** aluminium exchangers with electric motor, pump and fan used for autonomous off-line cooling.

Fluid compatibility: Mineral oil HL/HLP, DIN 51524, water/oil emulsion HFA, HFB, CETOP, RP//H, water-glycol HFC, CETOP RP 77H, Esteri fosfati HFD-R, CETOP RP 77H. For corrosive atmosphere or fluid with viscosity greater than 100cst, contact IBS.

Installation:

The IBS technical group would be pleased to advise customers on all aspects of their product range to ensure optimised installation is achieved for best in-service life. When installing heat exchanger, be sure to have the right air flow; minimum distance should be greater than half exchanger height.

It is recommended to use flexible units to preserve the exchanger from solicitations.

Maintenance:

Depending on each specific application attention must be paid to external and internal material surfaces to prevent unnecessary soiling and contamination build-up which in turn would adversely affect the thermal performance of the cooler. Cleaning of external surfaces to remove debris can usually be effected by controlled compressed air or low pressure water jetting. Care must be taken not to directly impinge onto the fin corrugations to prevent fin deflection damage. Internally a controlled flushing operation with a compatible biodegradable detergent is usually adequate to remove any residual surface build-up.

To preserve heat exchanger, it is suggested that a by-pass valve is inserted.

Procedura di selezione

Selection procedure

I dati indispensabili per la selezione del modello sono:

Q_{ex} → Calore da dissipare;
 $T_{oil\ in}$ → Temperatura di entrata dell'olio da raffreddare;
 $m_{oil\ in}$ → Portata dell'olio da raffreddare;
 T_{air} → Temperatura dell'aria ambiente;

Quindi:

$$\Delta t = T_{oil\ in} - T_{air}$$

Calcolato il Δt , si entra nel grafico incrociando la retta di portata che corrisponde a " $m_{oil\ in}$ " ed in orizzontale si trova il calore scambiato. Con lo stesso principio, entrando con la portata sull'apposito grafico, si ottiene la perdita di carico riferita ad un olio 32 cst. Il fattore di correzione (moltiplicativo) permette di ottenere le perdite di carico per oli a densità differente.

Esempio:

Olio 50 cst; portata ($m_{oil\ in}$) 90 lt/min; temperatura olio entrante ($T_{oil\ in}$) 80°C; temperatura aria ambiente (T_{air}) 35°C.

Soluzione:

$$\Delta t = T_{oil\ in} - T_{air} = 80 - 35 = 45^\circ C$$

Dai grafici si ottiene:

Calore scambiato: 17.400 Kcal/h.

Perd. di carico: 0,48 bar x 1,4 (fatt. correz. x 50 cst) = 0,672 bar

Altre formule utili:

$$Kw = Kcal/h : 860$$

Calore ceduto da un fluido → $Q = m \cdot c_p \cdot (t_{in} - t_{out})$

Dove: Q = calore in Kcal/h

m = portata in Kg/h

c_p = calore specifico in Kcal/(Kg °C)

$(t_{in} - t_{out})$ = differ. di temp. in °C

Calore scambiato attraverso una superficie → $Q = K \cdot S \cdot (t_1 - t_2)$

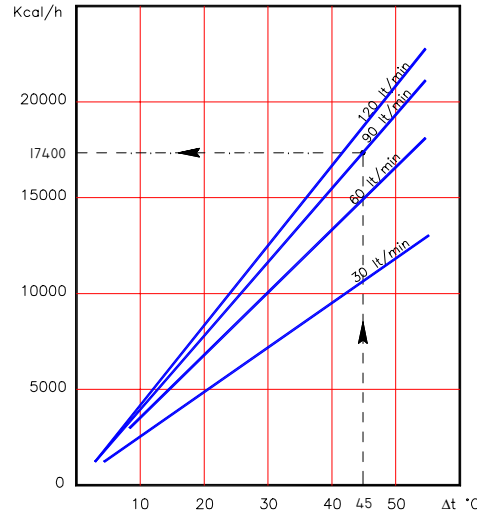
Dove: Q = calore in Kcal/h

K = coefficiente globale di scambio in KCal/(h m² °C)

S = area della superficie in m²

$(t_1 - t_2)$ = differ. di temp. sui due lati in °C

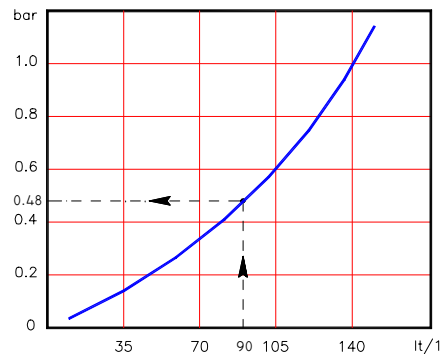
DIAGRAMMA RENDIMENTO - VENTILAZIONE AC ED IDRAULICA
 PERFORMANCES DIAGRAM - AC / HYDRAULIC FAN



FATTORE DI CORREZIONE (F) - PERDITE DI CARICO
 CORRECTION FACTOR (F) - PRESSURE DROP

CST	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

PERDITE DI CARICO (32 cst)
 PRESSURE DROP (32 CST)



The indispensable datas to for cooler selection are:

Q_{ex} → Heat to be exchanged;
 $T_{oil\ in}$ → Oil in Temperature;
 $m_{oil\ in}$ → Oil flow ;
 T_{air} → Ambient temperature;

Therefore:

$$\Delta t = T_{oil\ in} - T_{air}$$

When Δt is calculated, you should enter in the graph to intersect the right flow line ($m_{oil\ in}$). From this point, you can read on Y axis, the heat exchanged. With the same principle, entering with the flow on the dedicated graph, you can find the pressure drop for 32 cst oil. The correction factor (to be multiply) allow you to obtain oil pressure drop for different density.

Example:

Oil 50 cst; Flow ($m_{oil\ in}$) 90 lt/min; Oil in temperature ($T_{oil\ in}$) 80°C; Air temperture (T_{air}) 35°C.

Solution:

$$\Delta t = T_{oil\ in} - T_{air} = 80 - 35 = 45^\circ C$$

From graphs it is obtained:

Exchanged heat: 17.400 Kcal/h.

Pressure drop: 0,48 bar x 1,4 (correction factor. for 50 cst oil) = 0,672 bar

Other useful formulas:

$$Kw = Kcal/h : 860$$

Heat given from an hot fluid → $Q = m \cdot c_p \cdot (t_{in} - t_{out})$

In which: Q = Heat [Kcal/h]

m = flow [Kg/h]

c_p = Specific heat capacity [Kcal/(Kg °C)]

$(t_{in} - t_{out})$ = Temp. diffrential [°C]

Heat exchanged through a surface → $Q = K \cdot S \cdot (t_1 - t_2)$

In which: Q = heat [Kcal/h]

K = Global exchanging capacity [KCal/(h m² °C)]

S = exchanging area [m²]

$(t_1 - t_2)$ = Temp. diffrential [°C]

CODICE PRODOTTO ORDERING CODE

IBS-__-___.FAN.DIRECTION.THERMOSTAT

- 0 = No THERMOSTAT
- 1 = THERMOSTAT SETTED 40..48 °C
- 2 = THERMOSTAT SETTED 50..60 °C
- 3 = EXTERNAL REGULATION 0..90 °C
- 4 = INTERNAL REGULATION 0..90 °C
- 5 = THERMOSTAT SETTED 30..40 °C
- 6 = THERMOSTAT SETTED 60..70 °C

- 0 = No FAN
- 1 = SUCKING
- 2 = BLOWING

- 0 = No FAN
- 1 = 12V DC
- 2 = 24V DC
- 3 = 220V SINGLE-PHASE AC
- 4 = 380V THREE PHASE AC
- 5 = PREPARED FOR GR2 HYDRAULIC MOTOR
- 6 = PREPARED FOR GR3 HYDRAULIC MOTOR

COOLER SIZE

- L = LIGHT SERIE
- H = HEAVY SERIE
- A = AUTONOMOUS COOLING UNITS

EXAMPLE

IBS-L-024-2P.1.1.2

2 = THERMOSTAT SETTED 50..60 °C

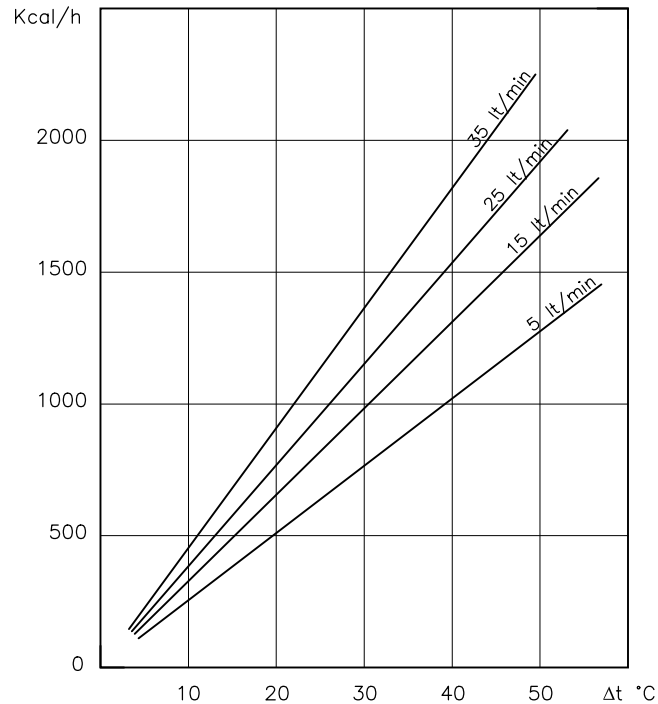
1 = SUCKING

1 = 12V DC

SIZE 024-2P (= 024, 2 PASS)

L = LIGHT SERIE

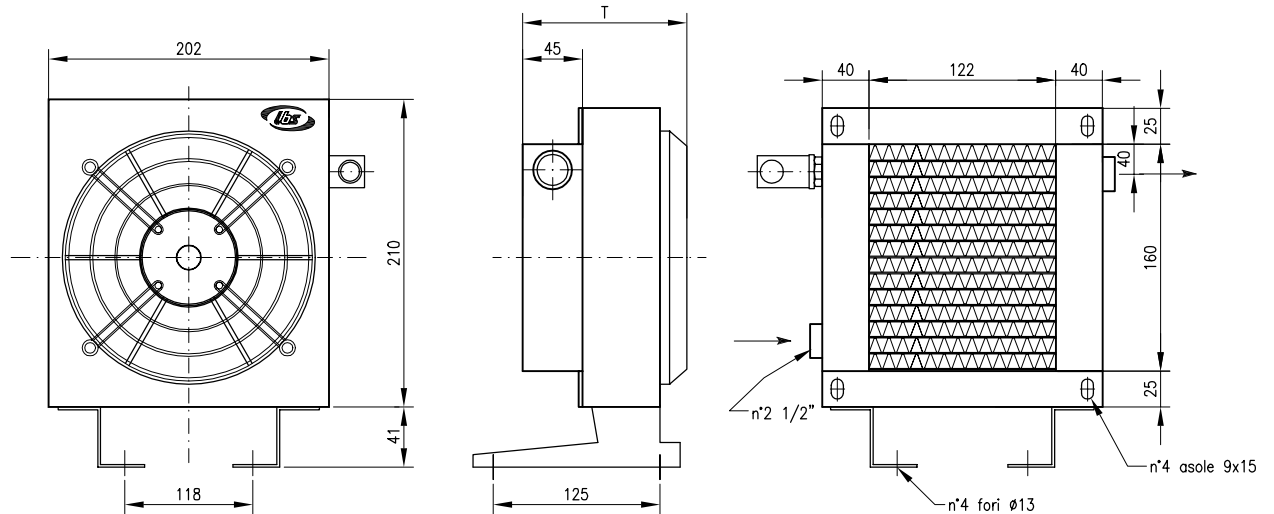
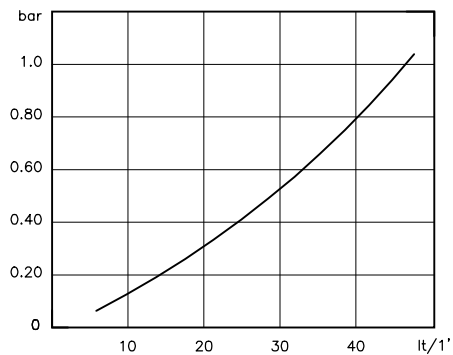
PERFORMANCES DIAGRAM - AC/ DC / HYDRAULIC FAN



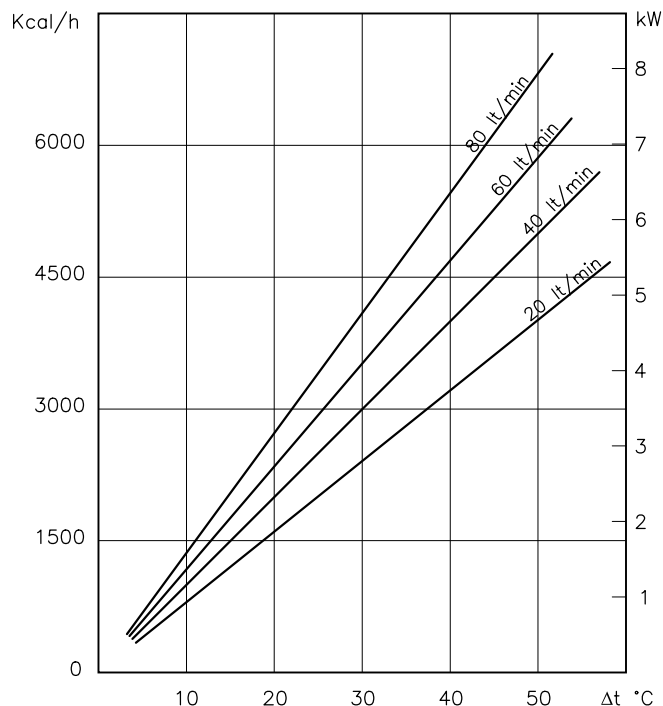
CORRECTION FACTOR (F) - PRESSURE DROP

CST	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

PRESSURE DROP (32 CST)

[illegible]

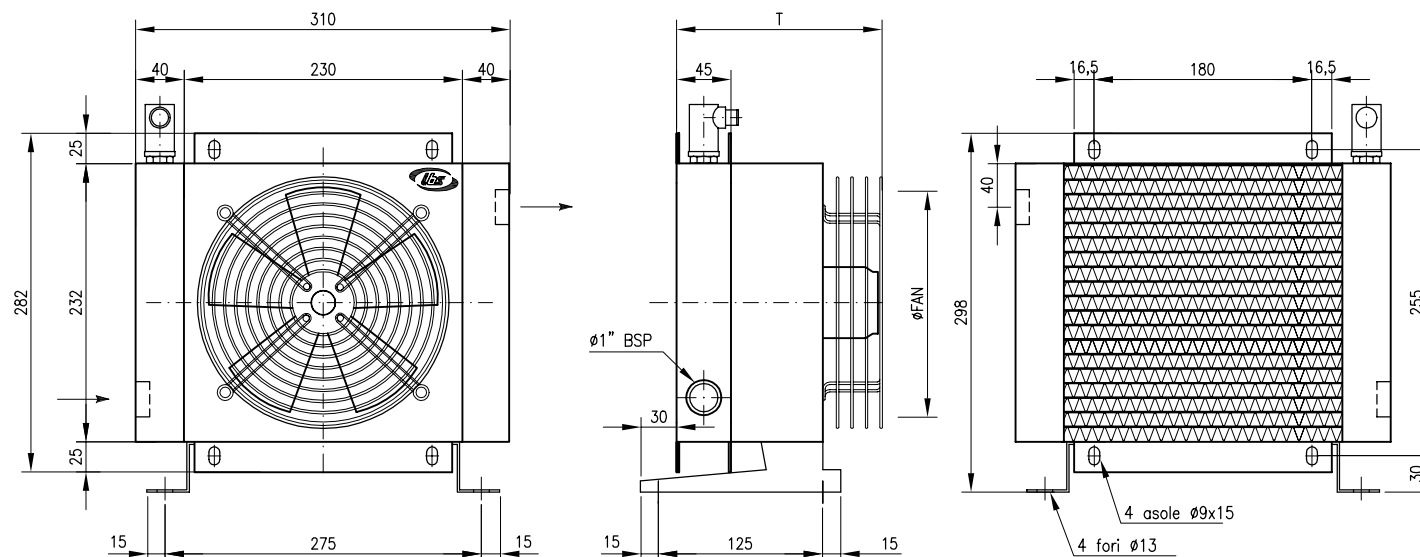
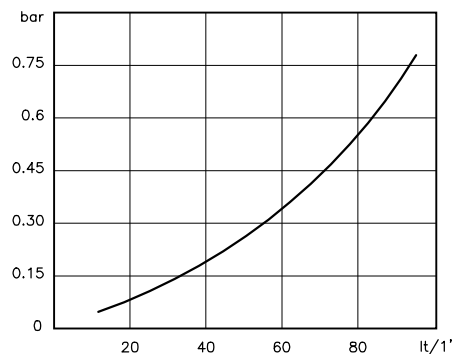
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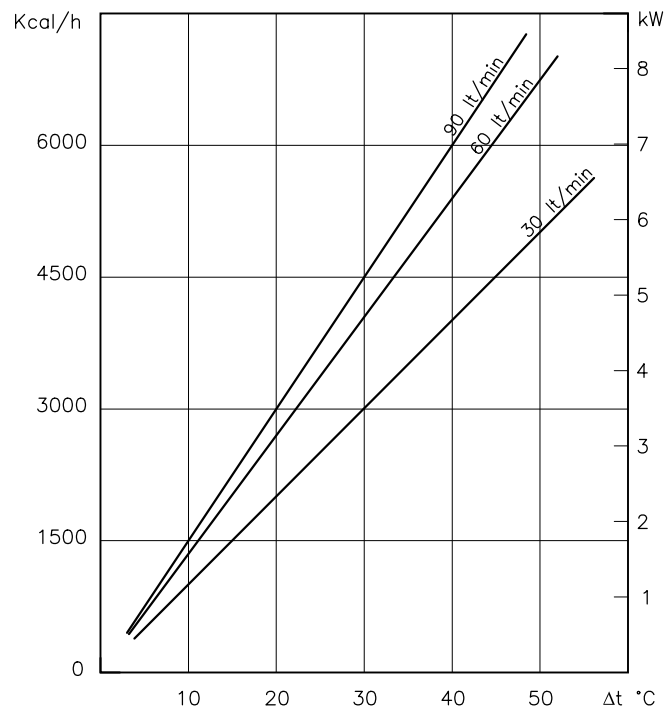
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PRESSURE DROP (32 CST)

[illegible]

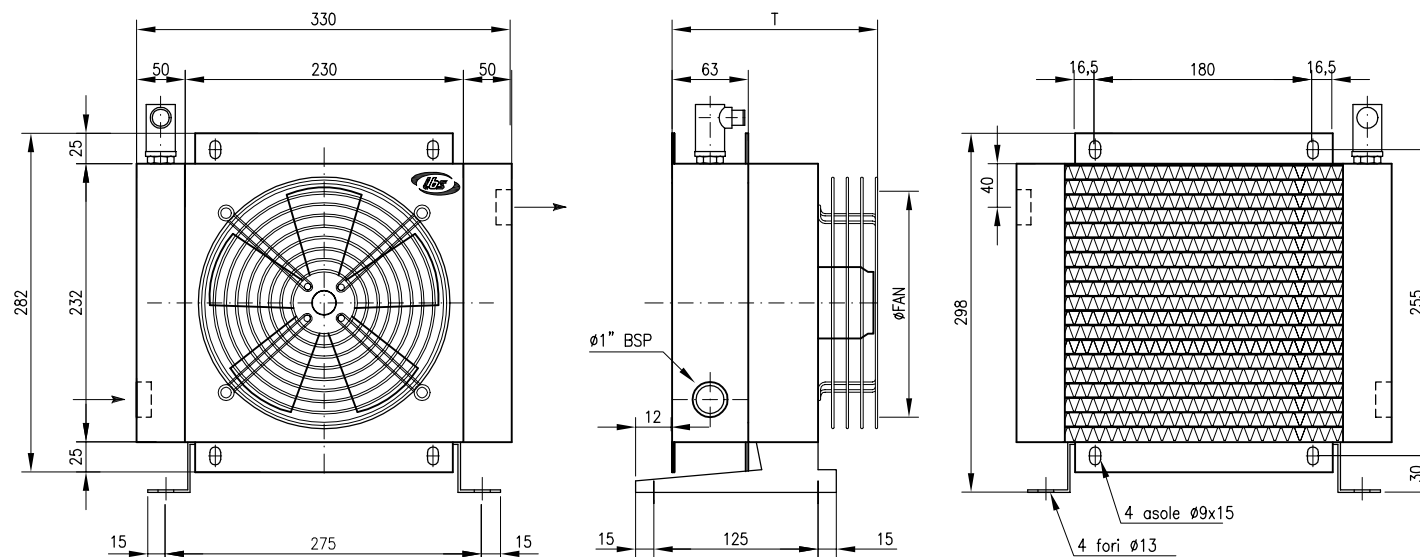
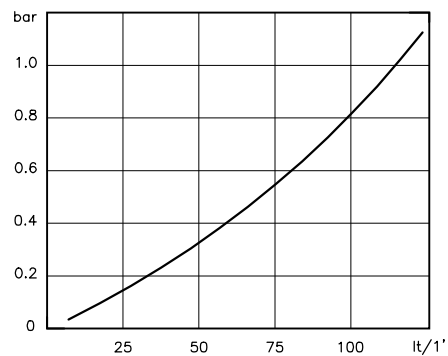
PERFORMANCES DIAGRAM - AC/ DC / HYDRAULIC FAN



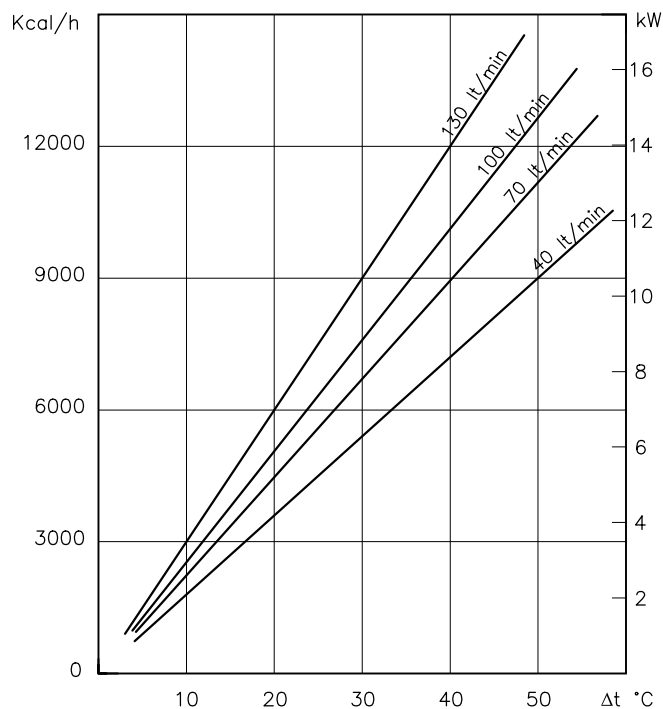
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PRESSURE DROP (32 CST)

[illegible]

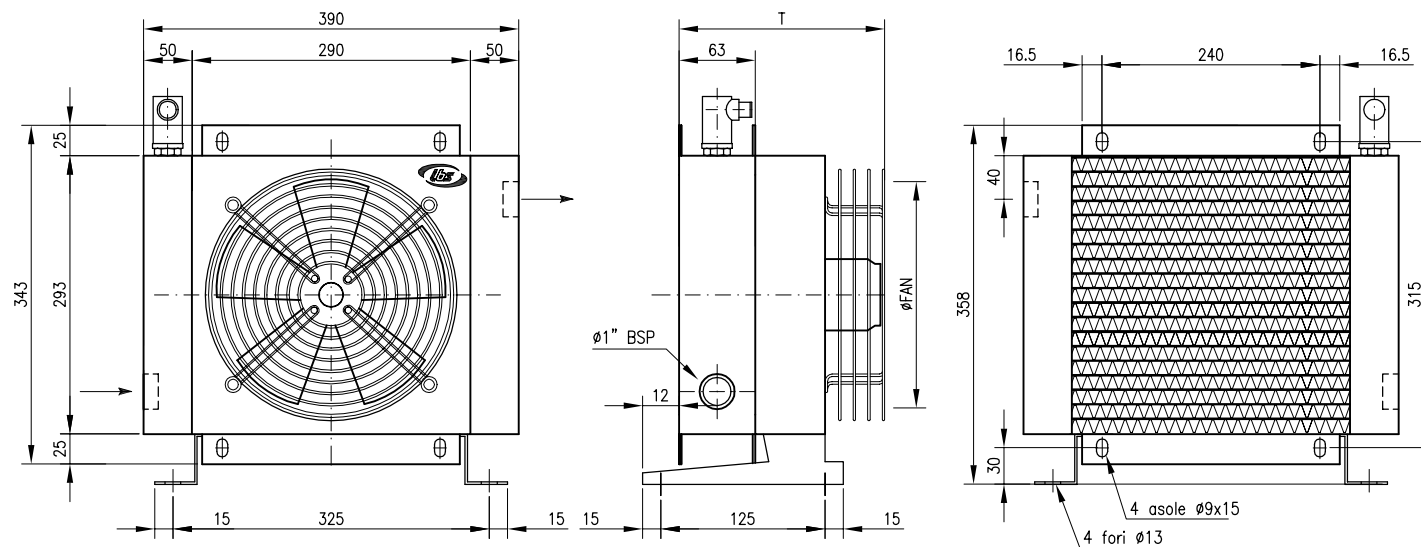
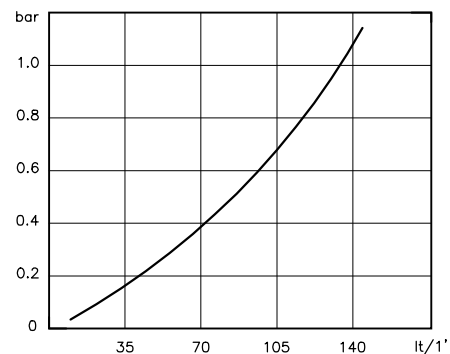
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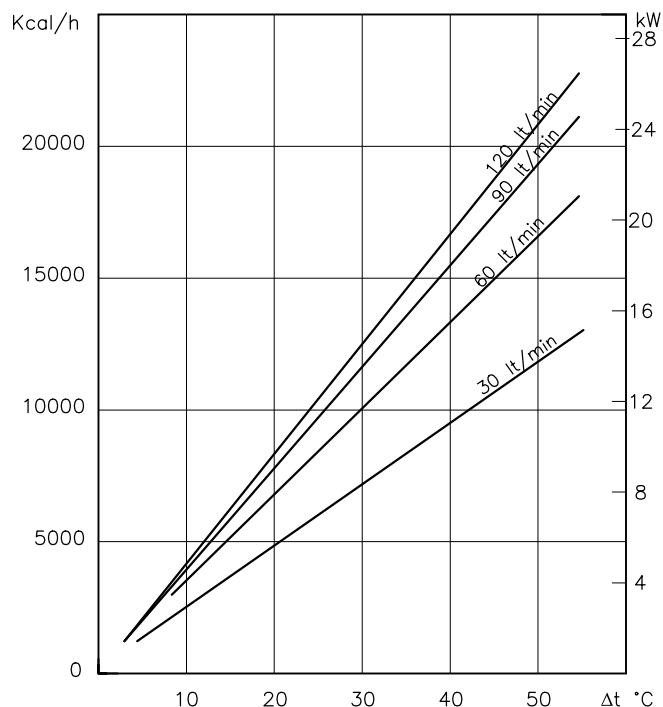
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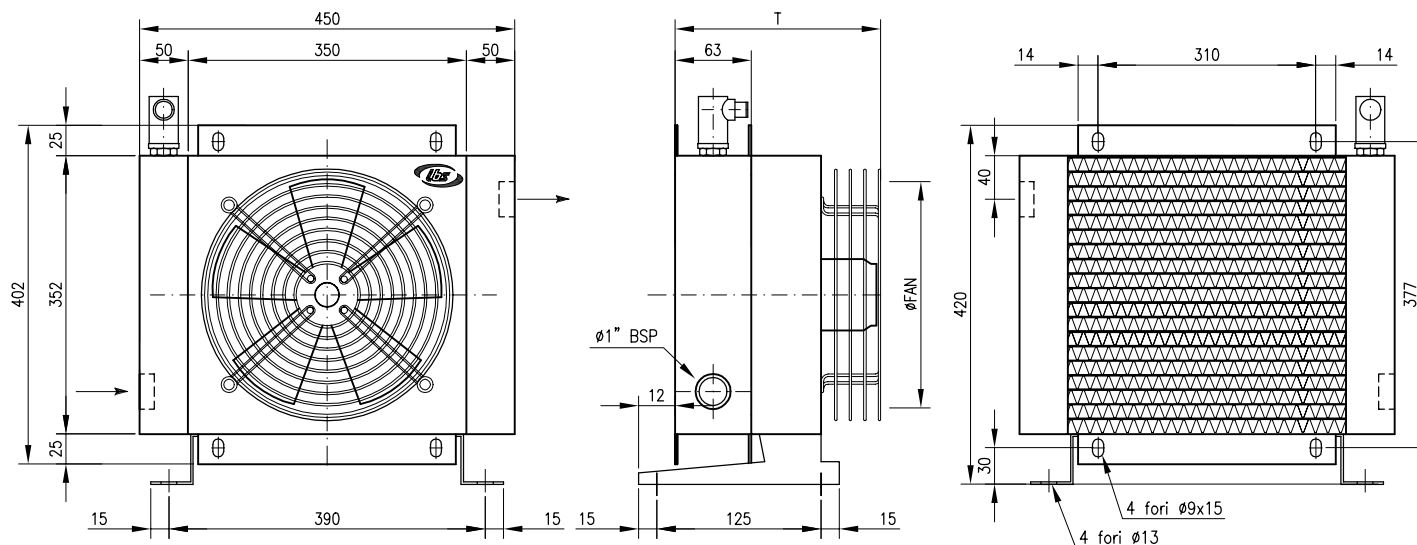
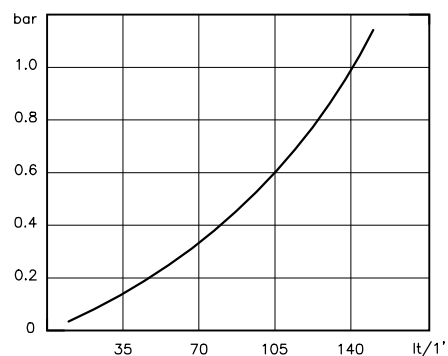
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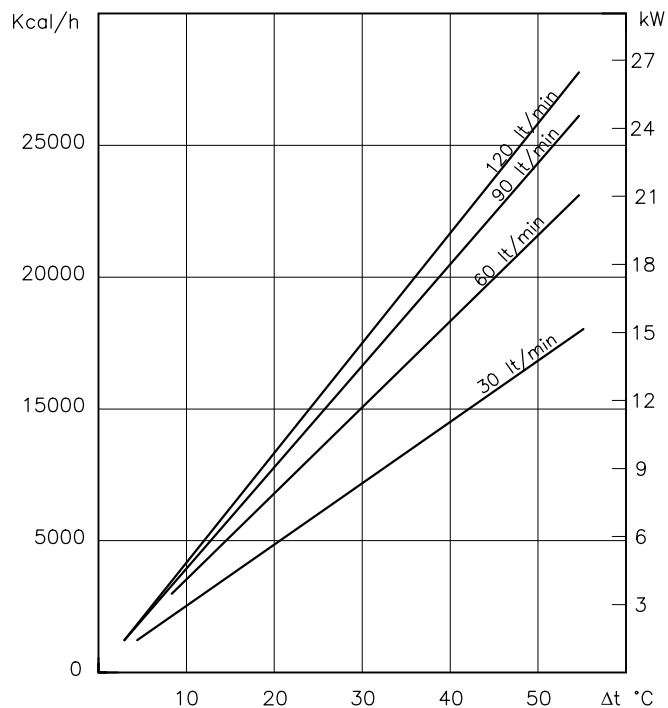
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PRESSURE DROP (32 CST)

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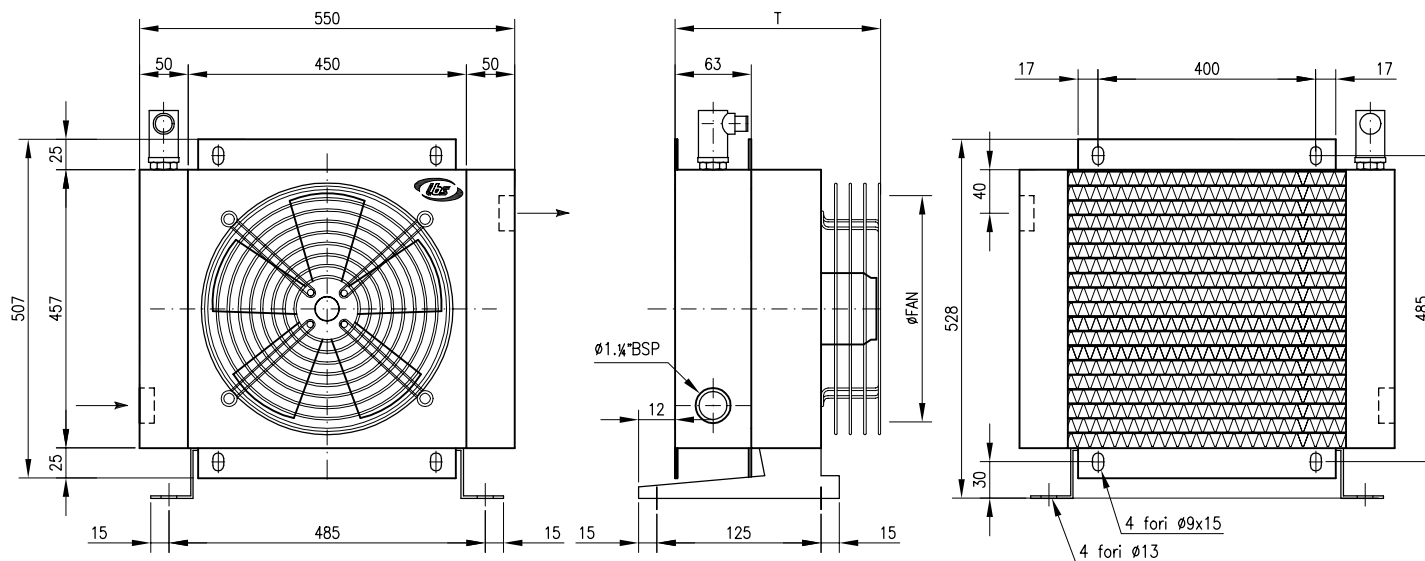
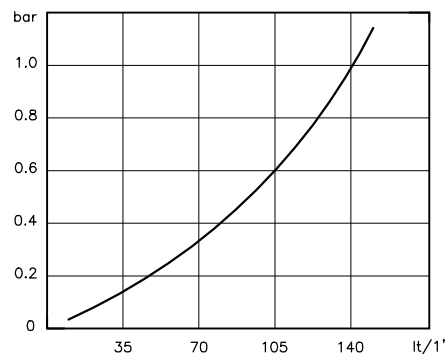
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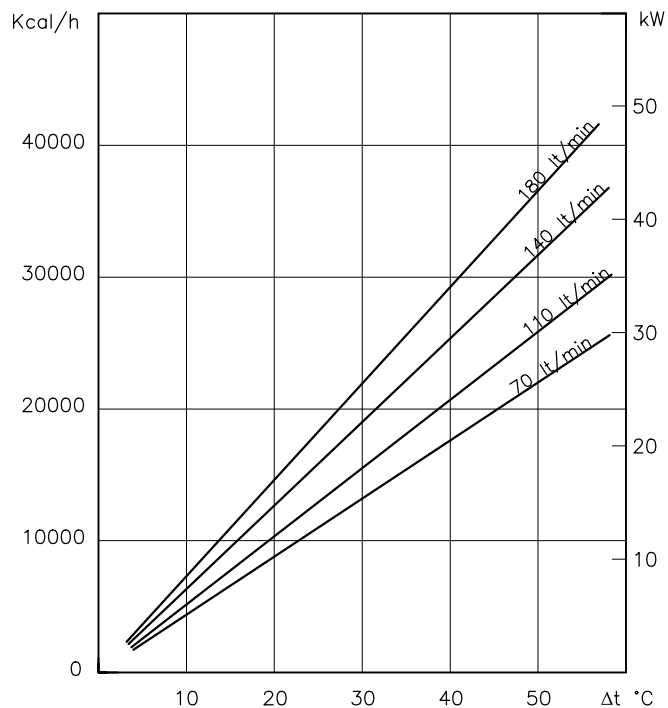
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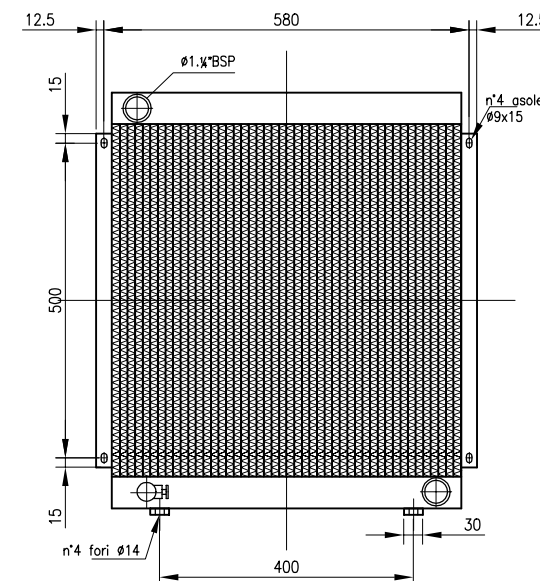
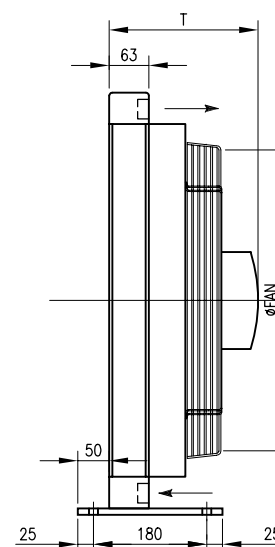
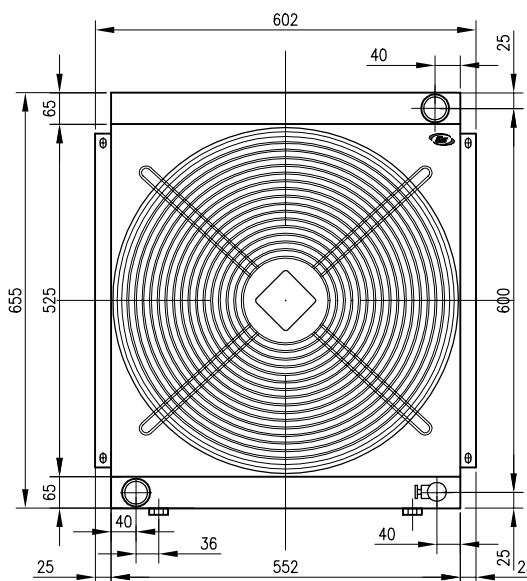
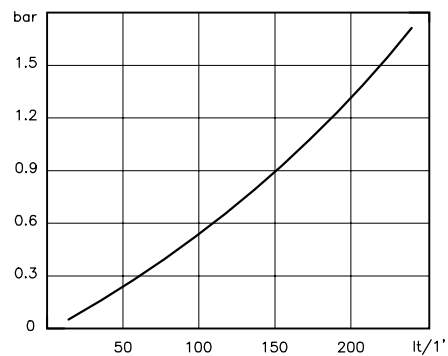
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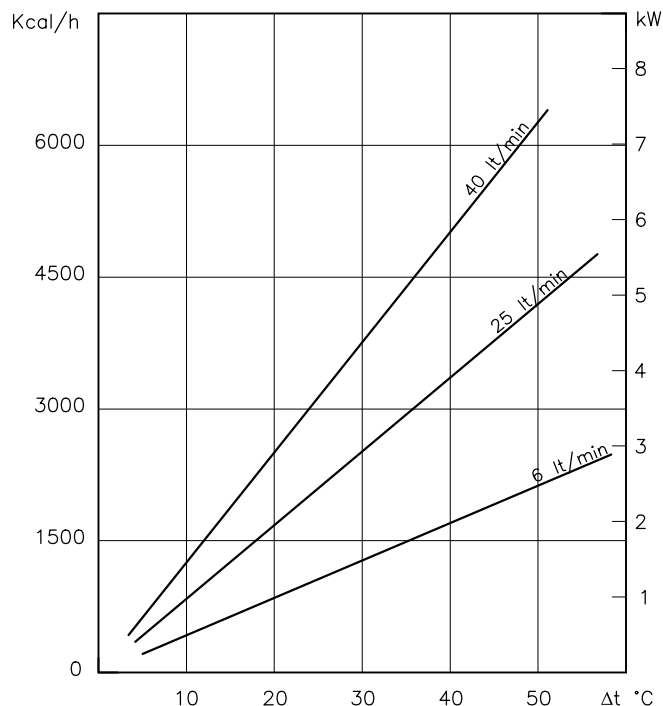
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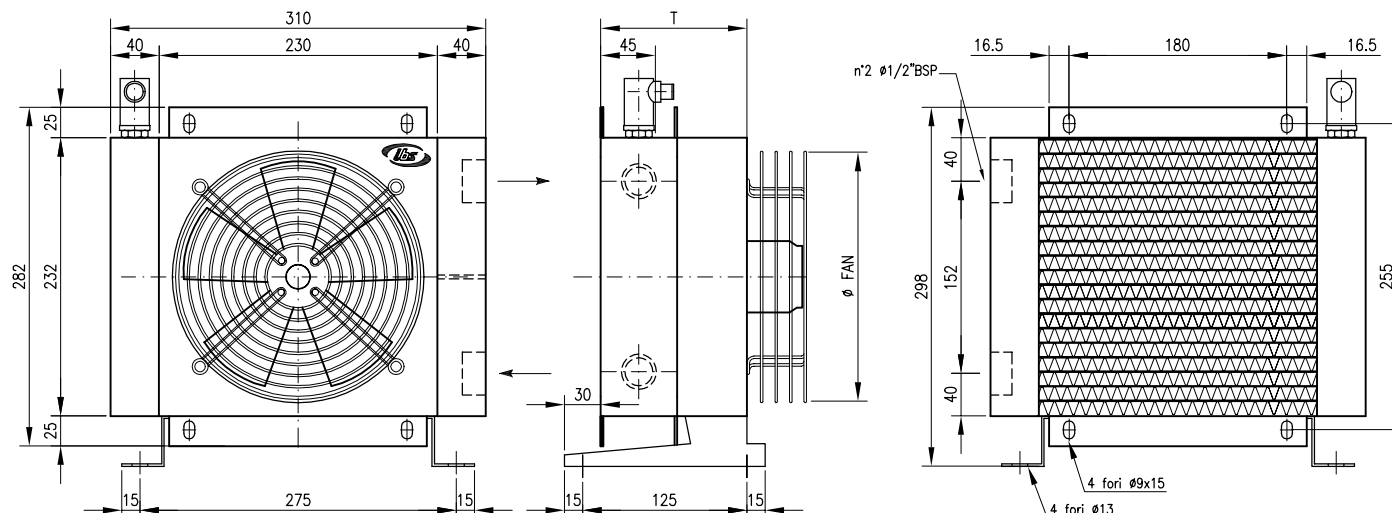
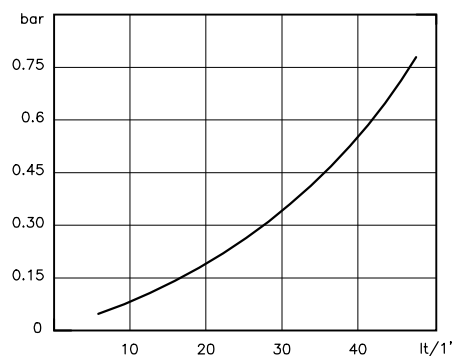
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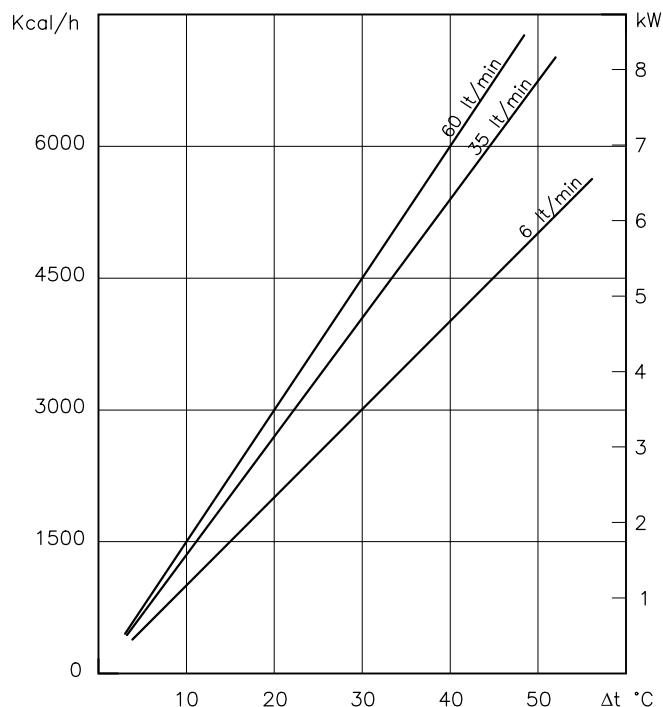
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PRESSURE DROP (32 CST)

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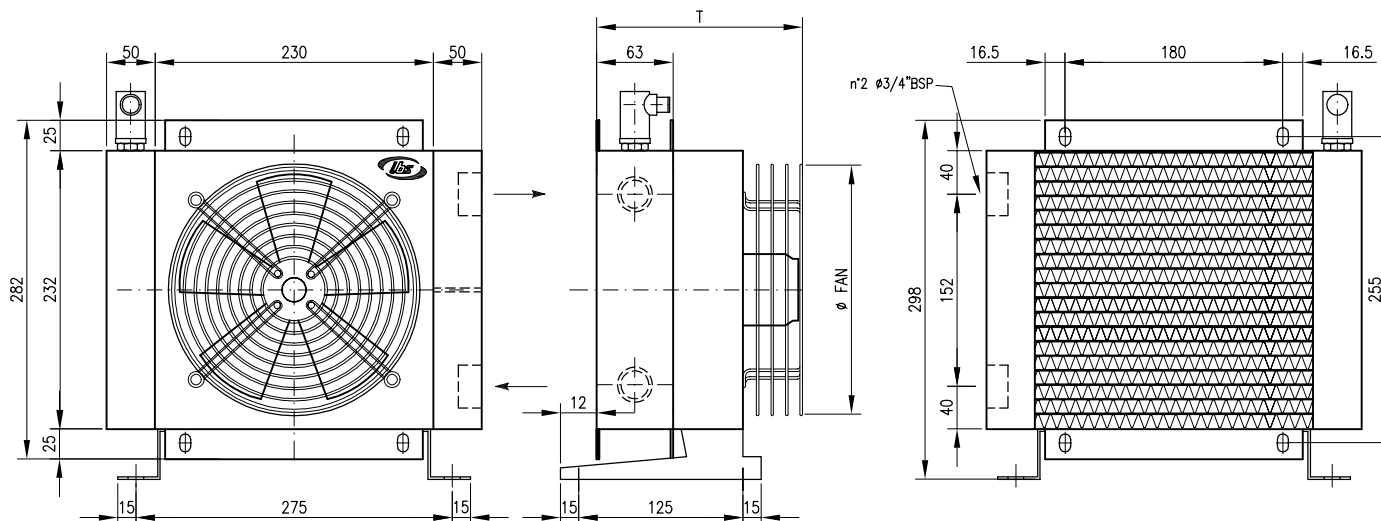
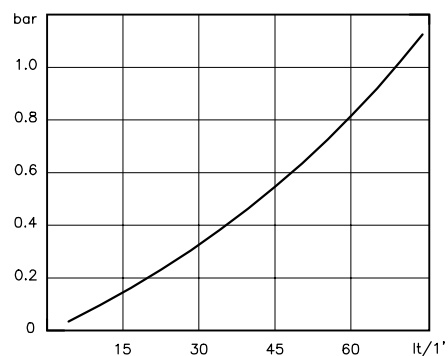
PERFORMANCES DIAGRAM - AC / HYDRAULIC FAN



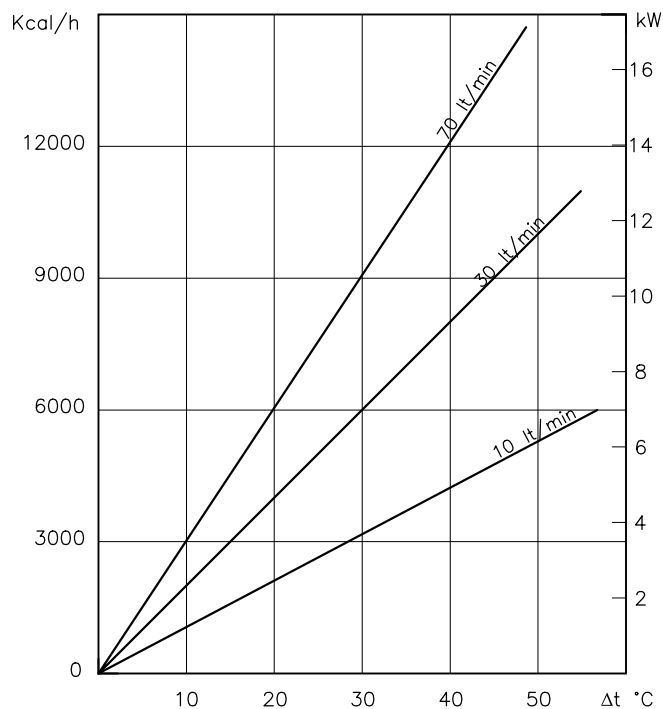
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PRESSURE DROP (32 CST)

[illegible]

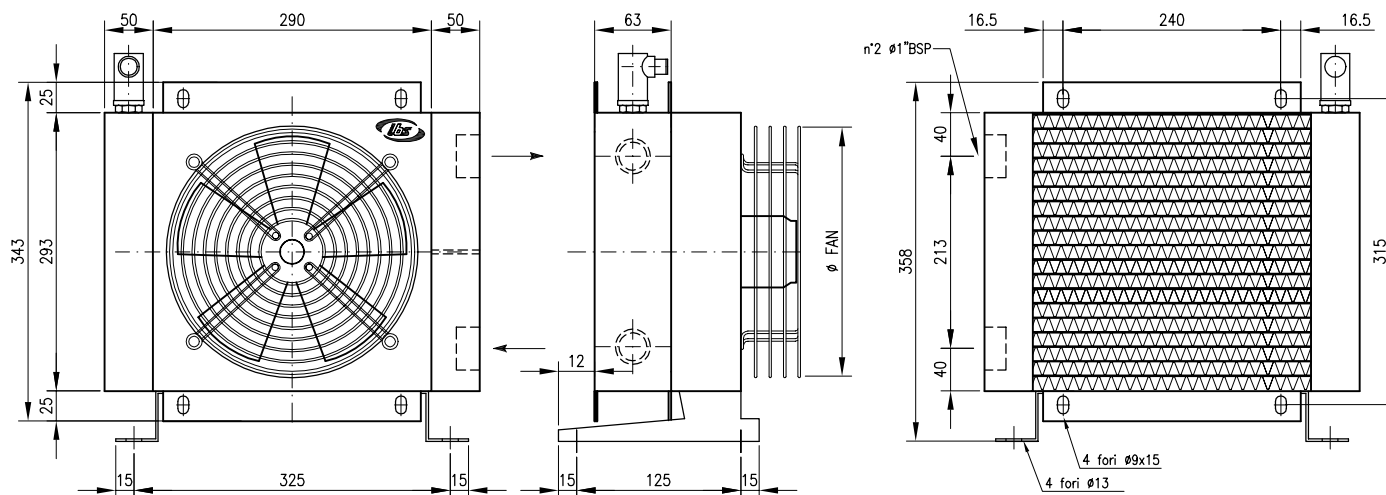
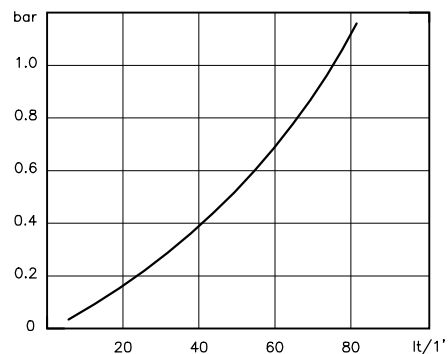
PERFORMANCES DIAGRAM - AC / HYDRAULIC FAN



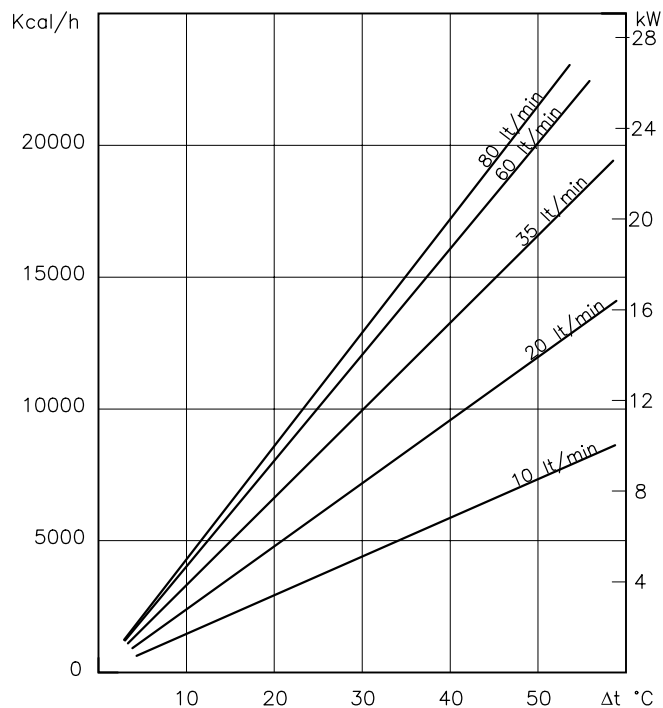
CORRECTION FACTOR (F) - PRESSURE DROP

CST	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

PRESSURE DROP (32 CST)

[illegible]

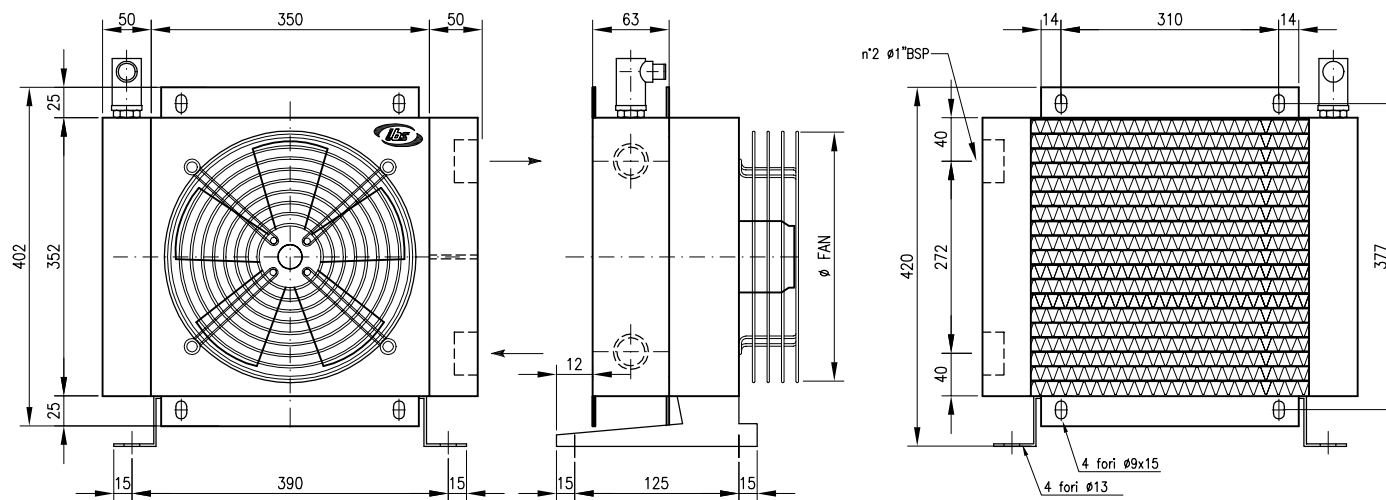
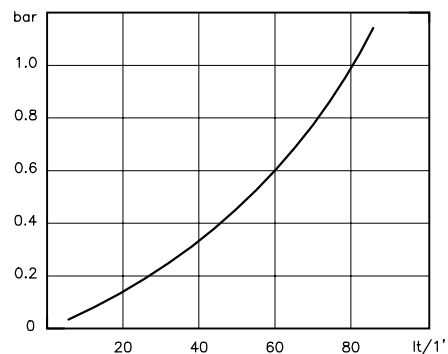
PERFORMANCES DIAGRAM - AC / HYDRAULIC FAN



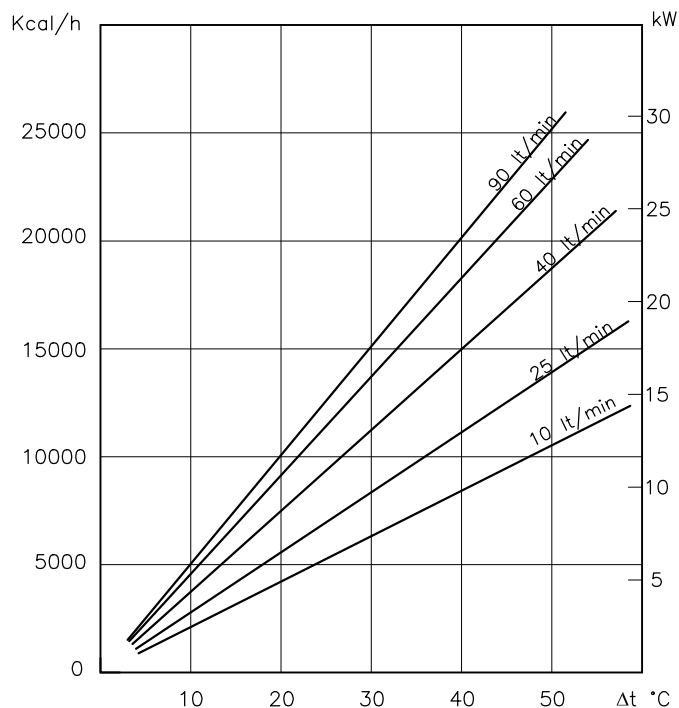
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PRESSURE DROP (32 CST)

[illegible]

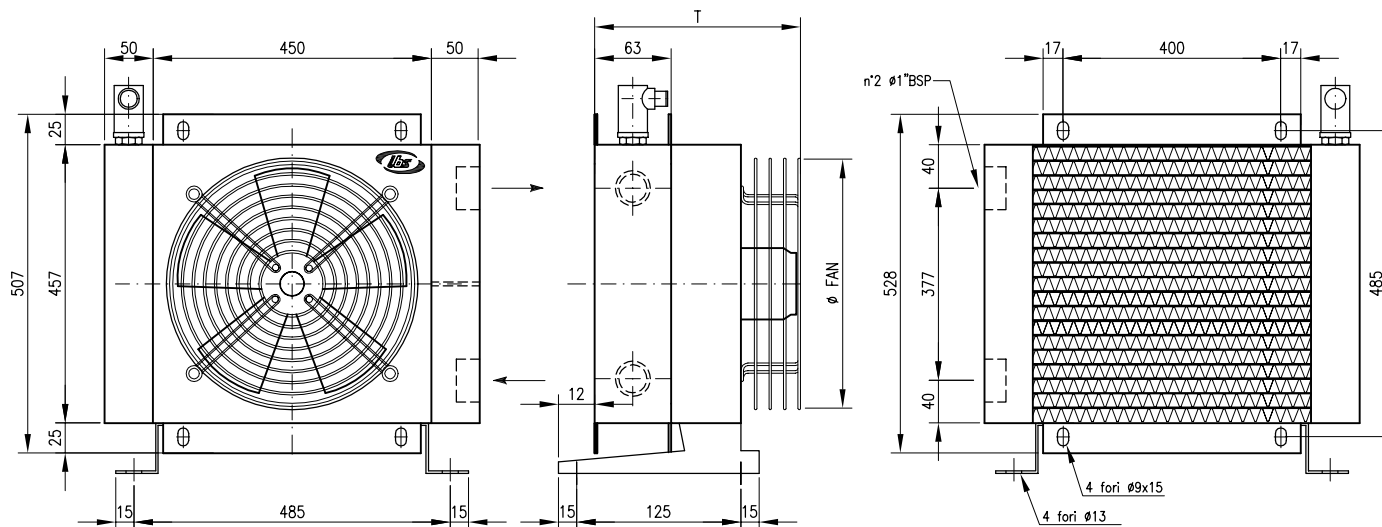
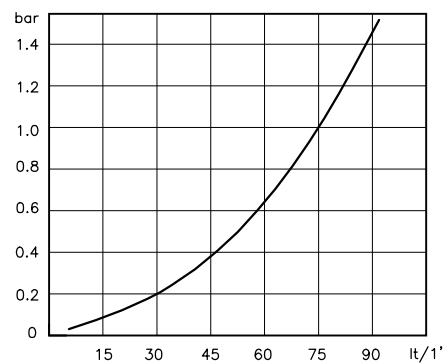
PERFORMANCES DIAGRAM - AC / HYDRAULIC FAN



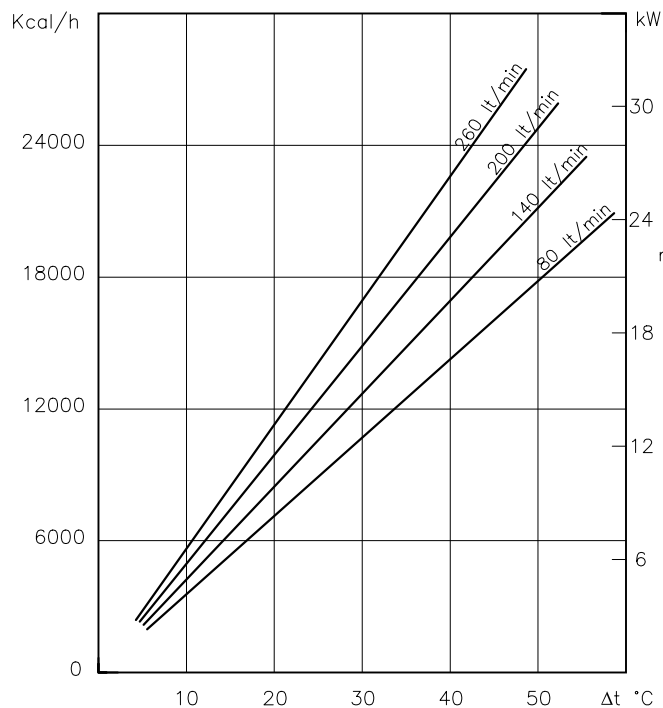
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PRESSURE DROP (32 CST)

[illegible]

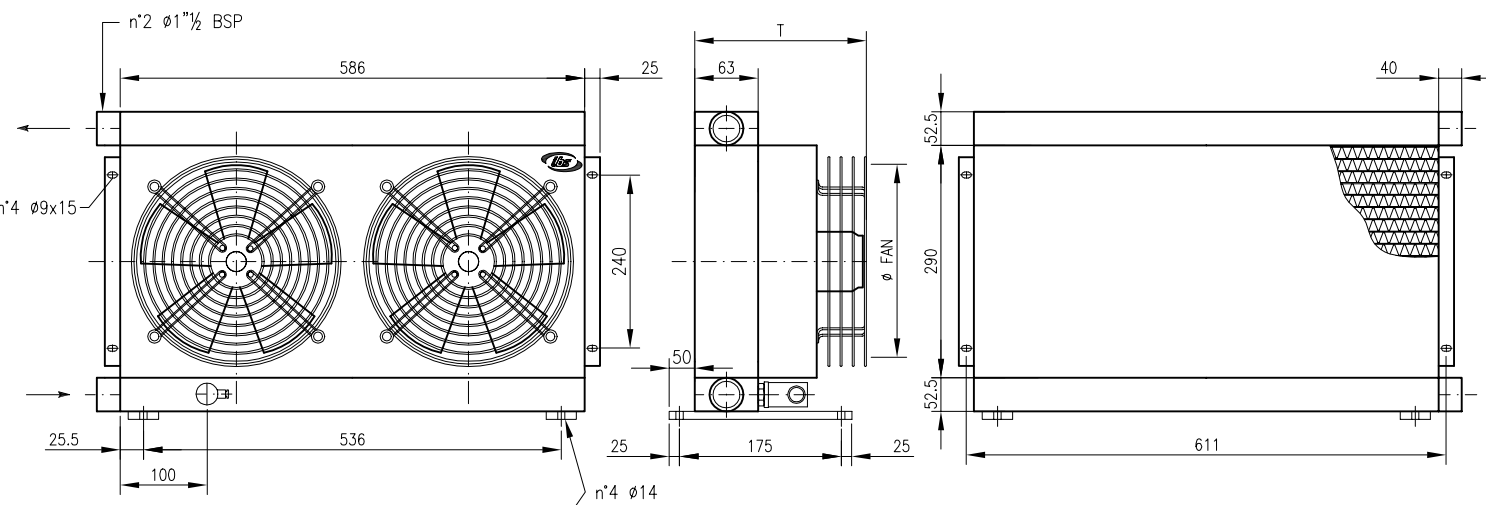
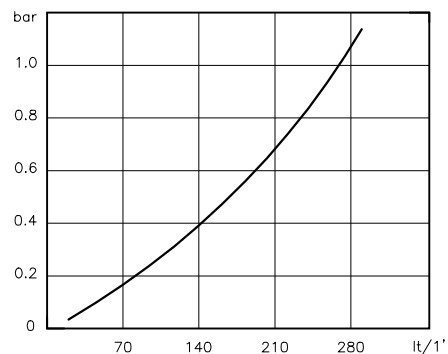
PERFORMANCES DIAGRAM – AC / HYDRAULIC FAN



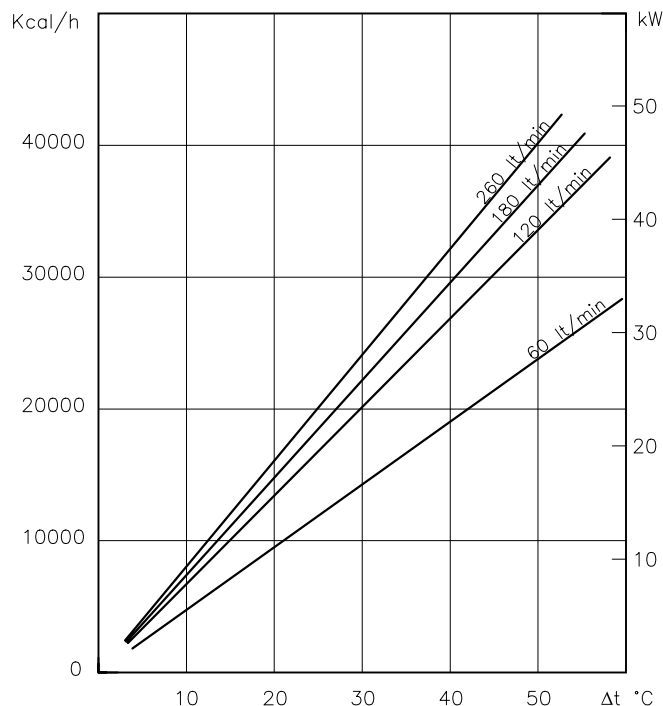
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PRESSURE DROP (32 CST)

[illegible]

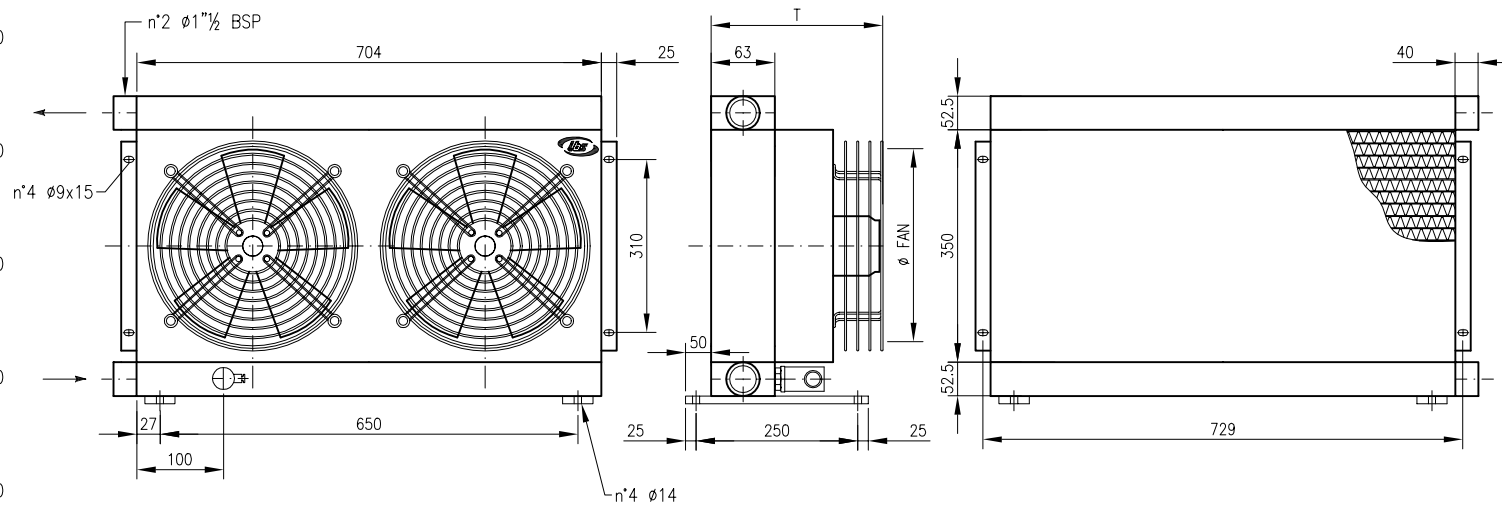
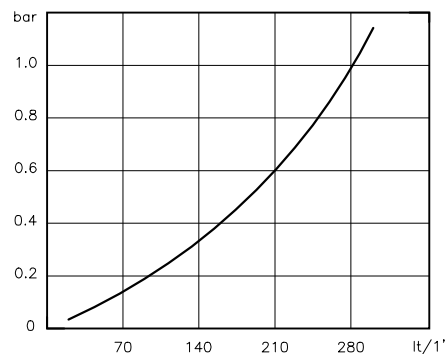
PERFORMANCES DIAGRAM – AC / HYDRAULIC FAN



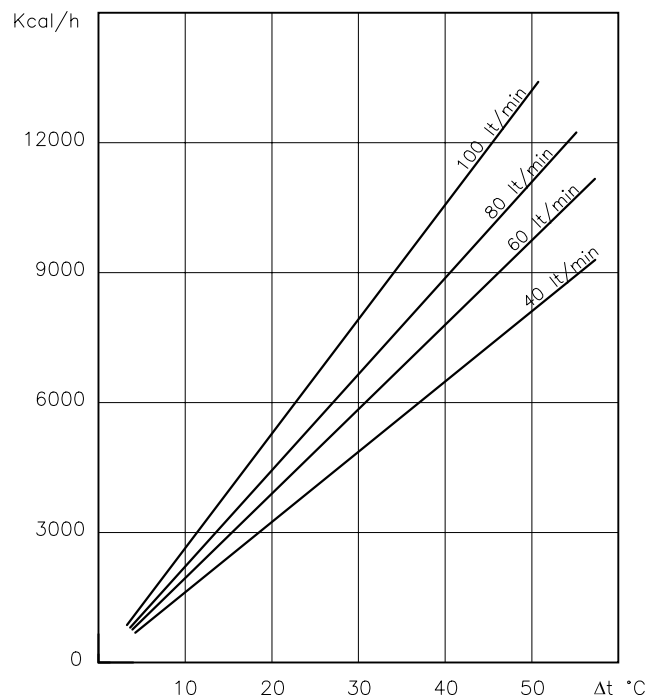
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PRESSURE DROP (32 CST)

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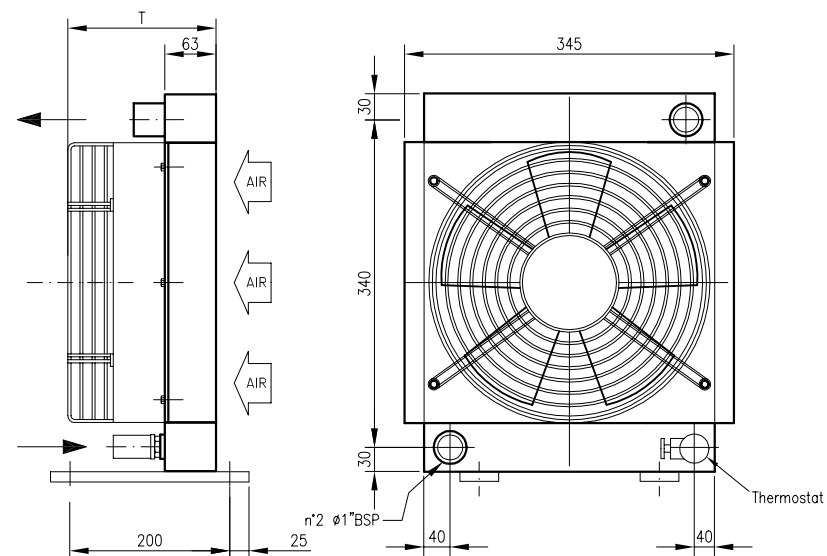
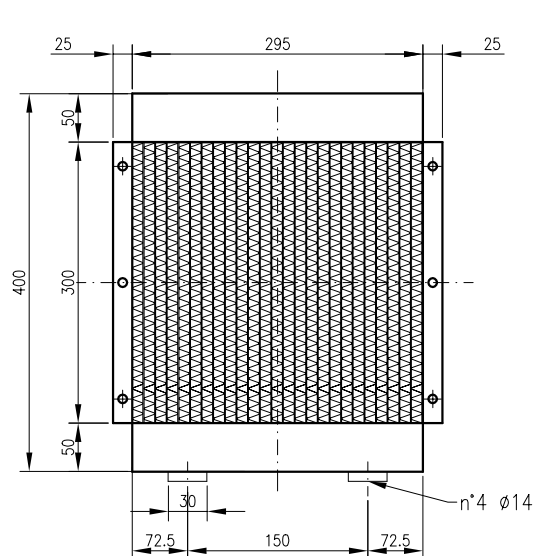
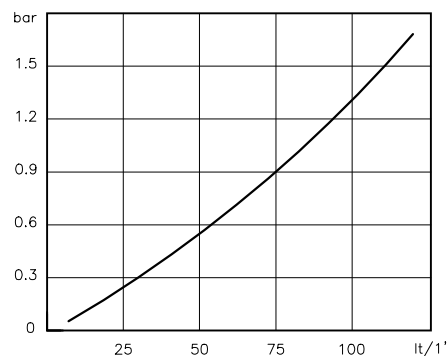
PERFORMANCES DIAGRAM – AC/ DC / HYDRAULIC FAN



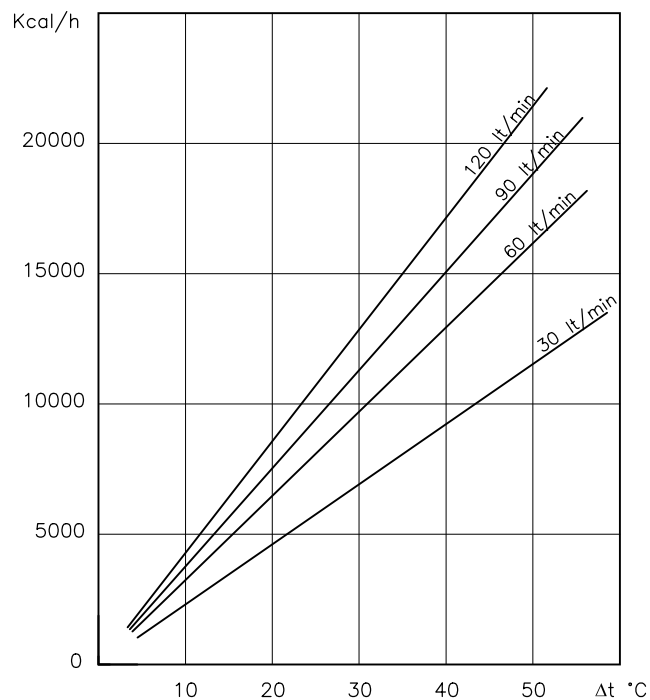
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PRESSURE DROP (32 CST)

[illegible]

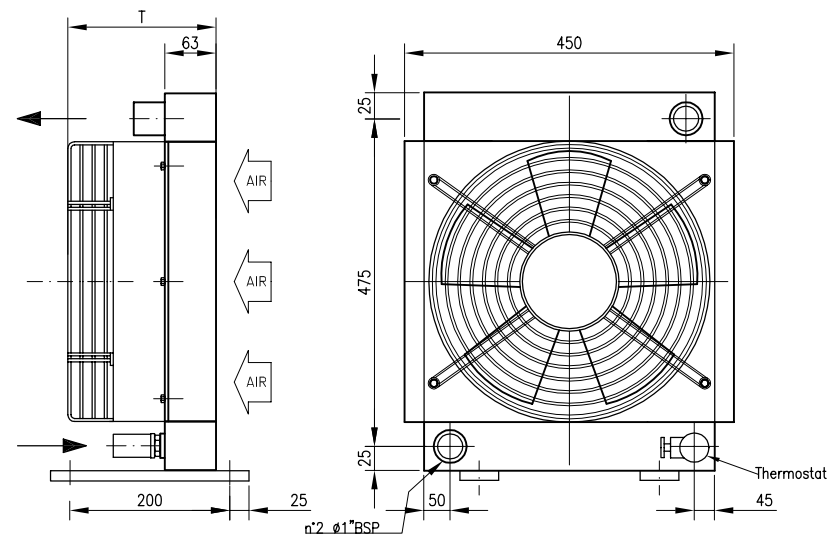
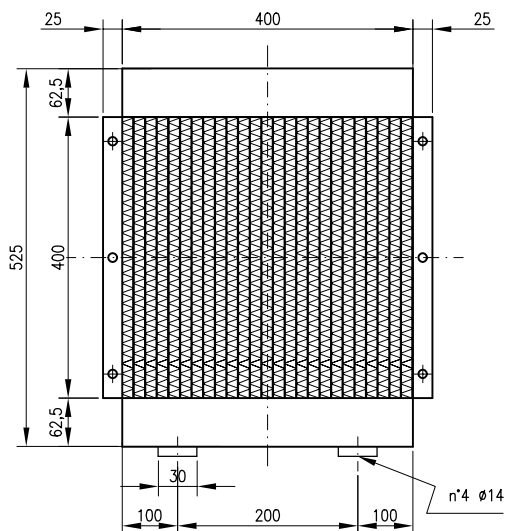
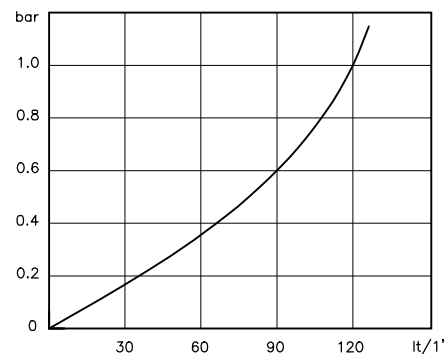
PERFORMANCES DIAGRAM – AC/ DC / HYDRAULIC FAN



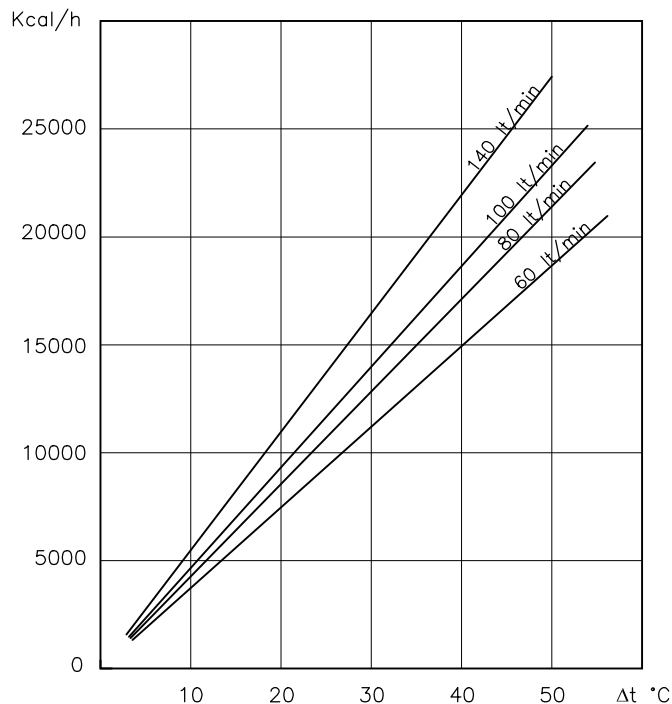
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PRESSURE DROP (32 CST)

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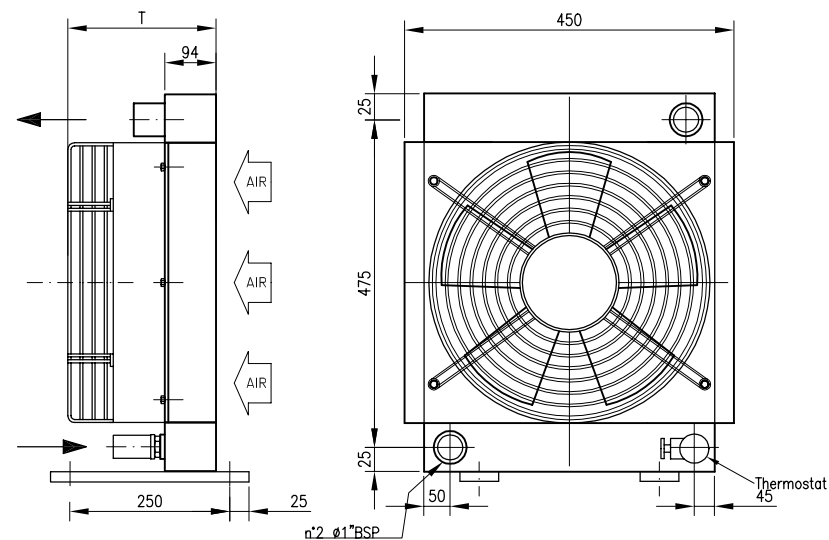
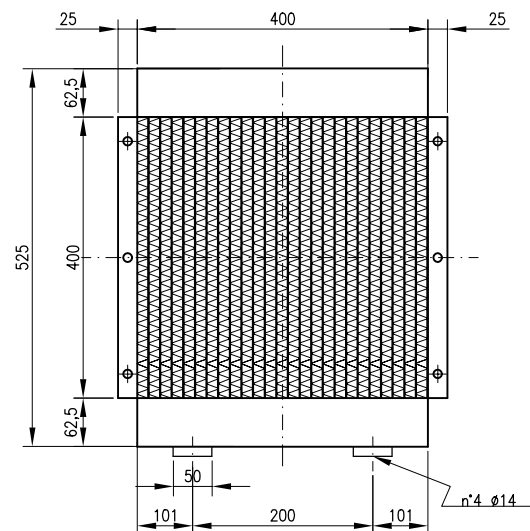
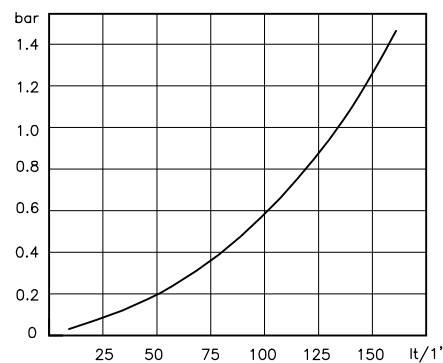
PERFORMANCES DIAGRAM - AC / DC / HYDRAULIC FAN



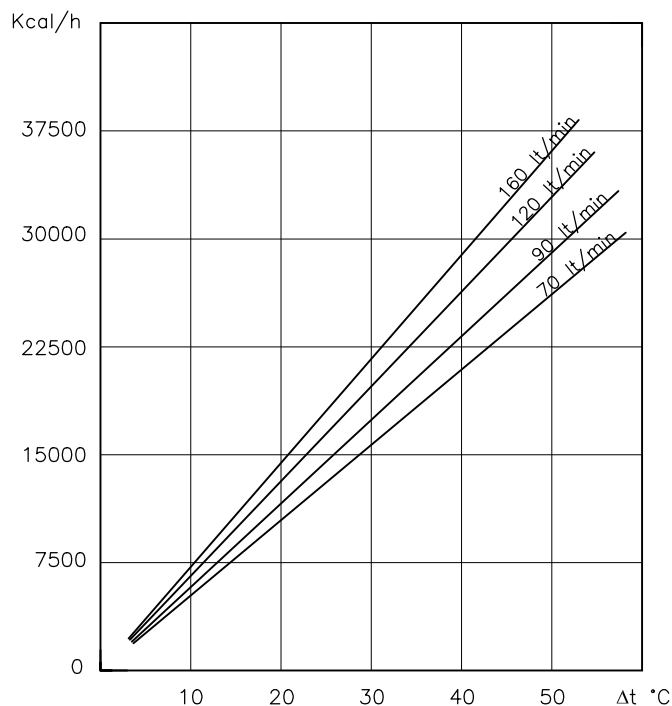
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PRESSURE DROP (32 CST)

[illegible]

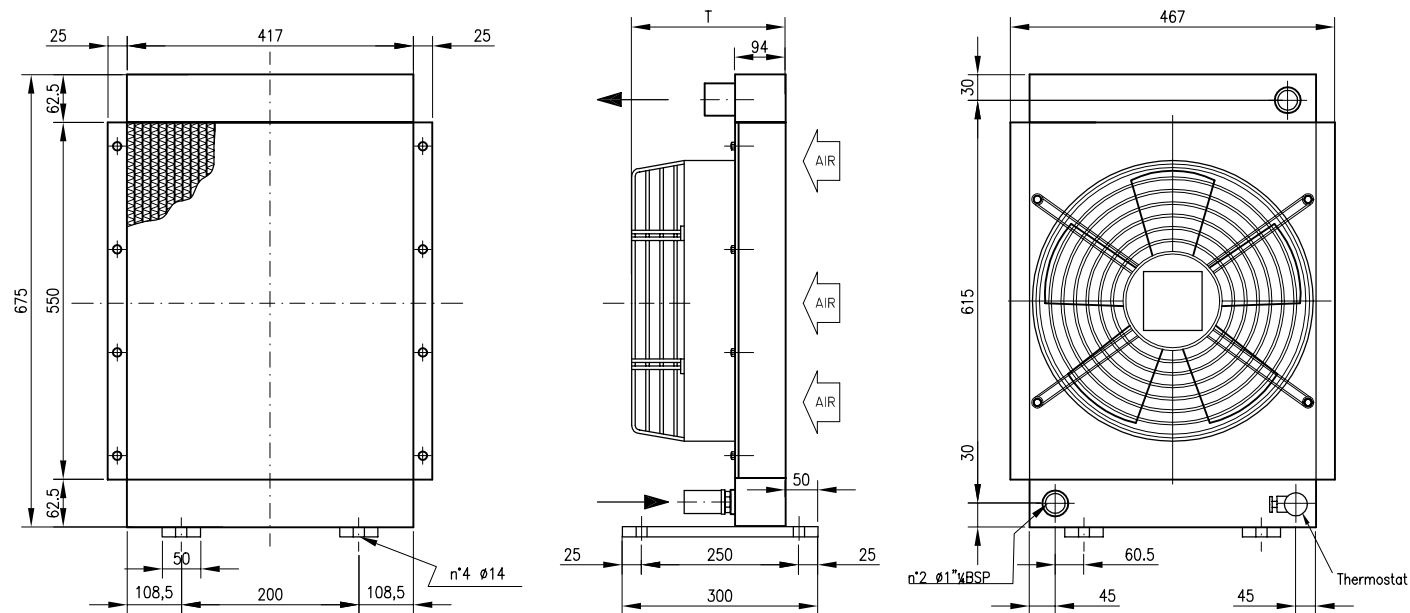
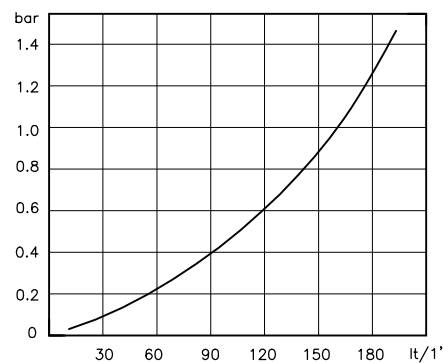
PERFORMANCES DIAGRAM - AC / DC / HYDRAULIC FAN



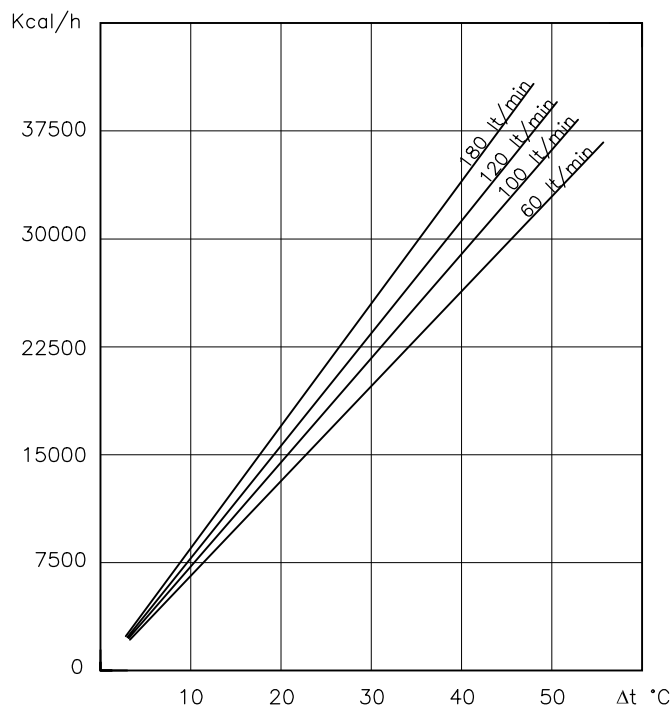
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PRESSURE DROP (32 CST)

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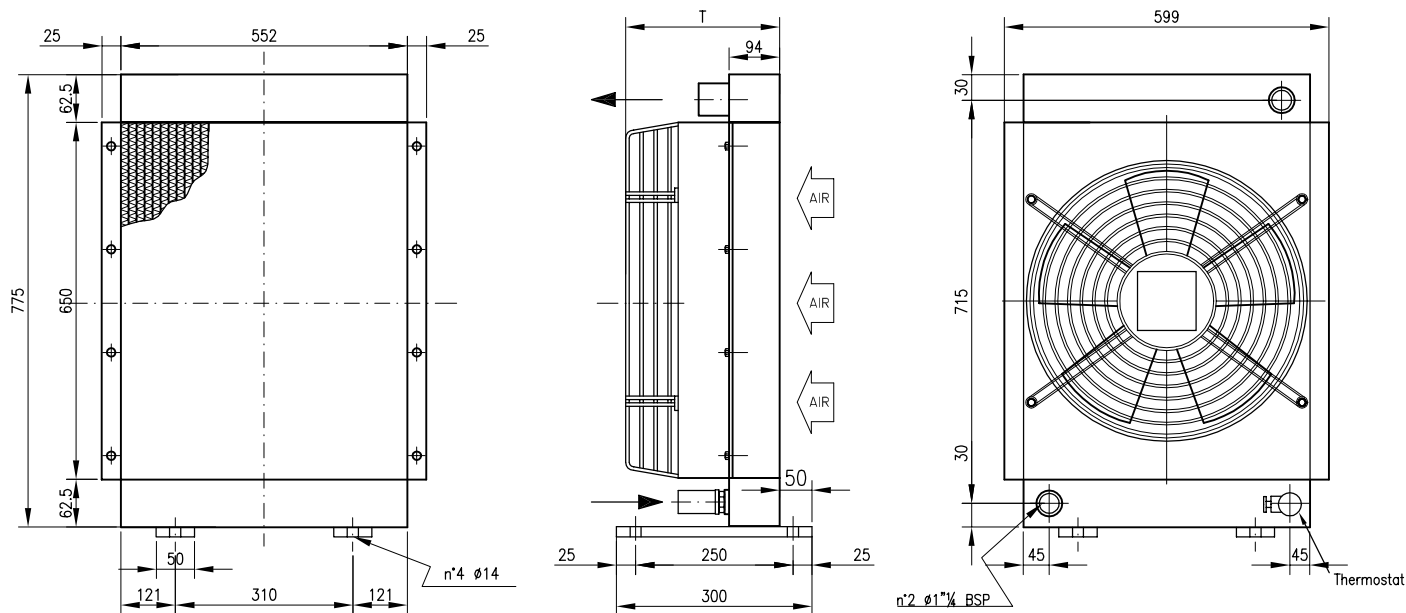
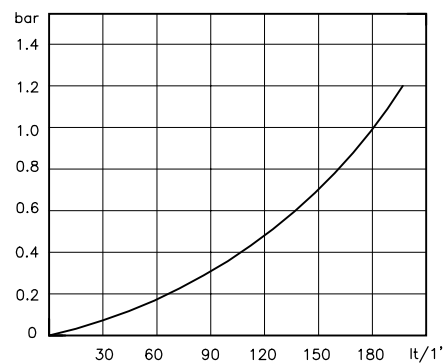
PERFORMANCES DIAGRAM - AC / DC / HYDRAULIC FAN



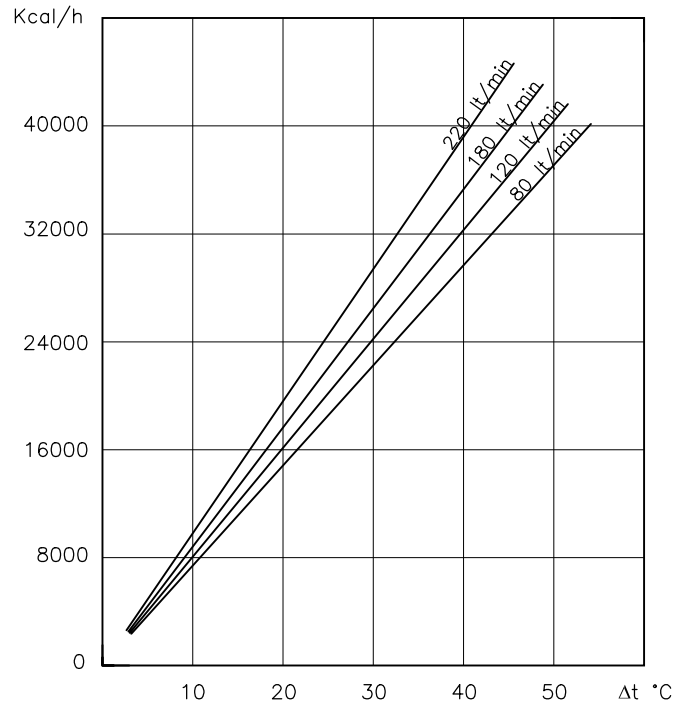
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PRESSURE DROP (32 CST)

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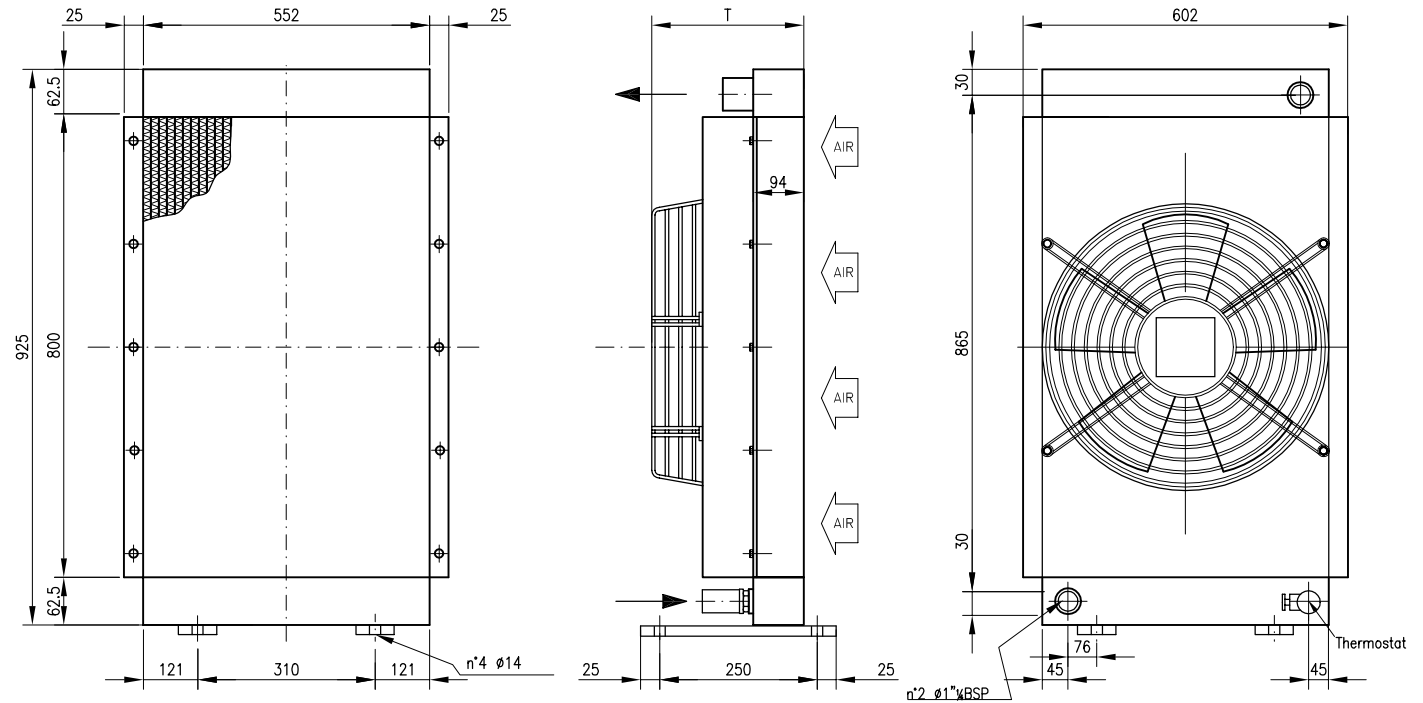
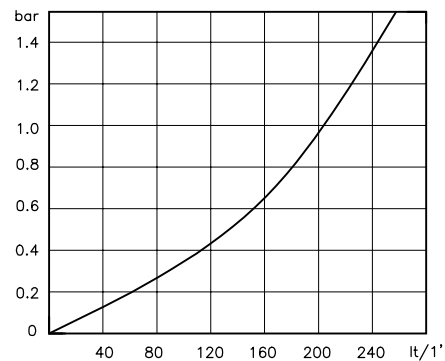
PERFORMANCES DIAGRAM – AC/ DC / HYDRAULIC FAN



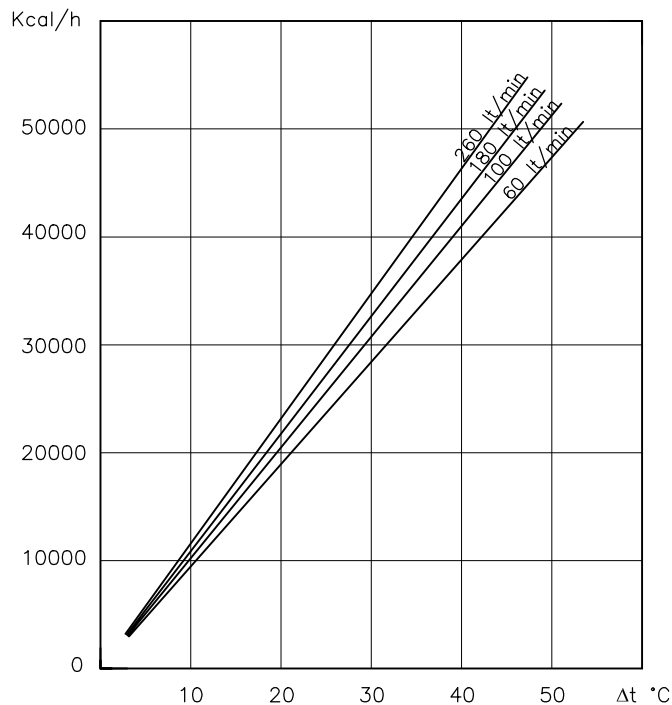
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PRESSURE DROP (32 CST)

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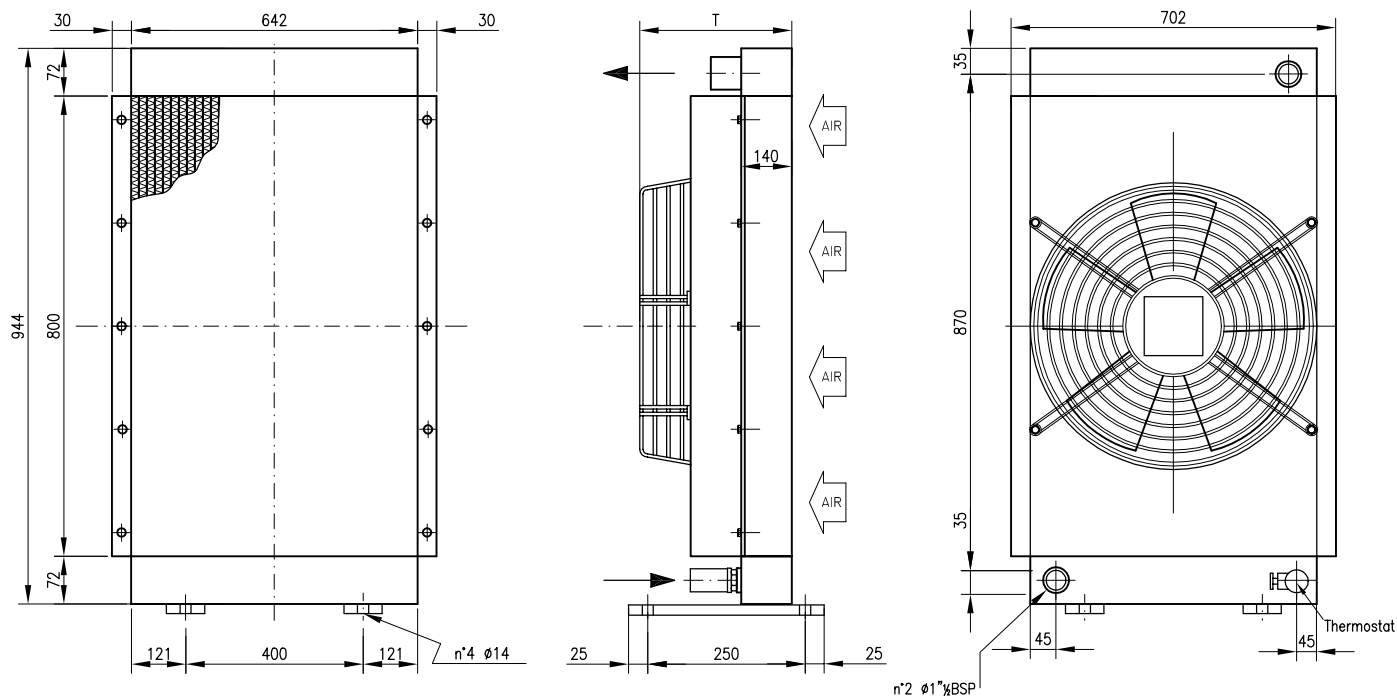
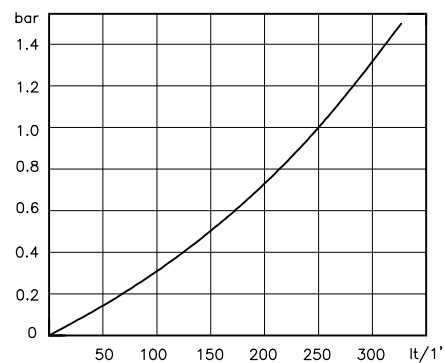
PERFORMANCES DIAGRAM - AC / DC / HYDRAULIC FAN



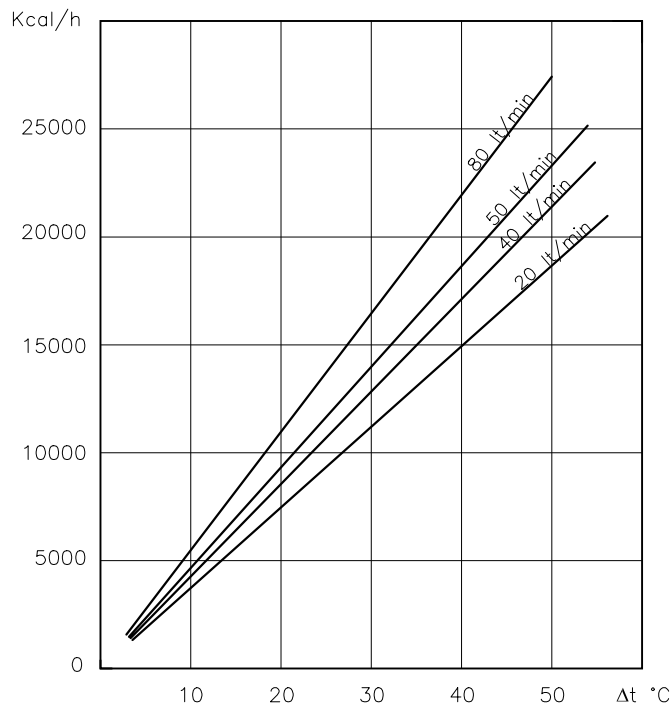
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PRESSURE DROP (32 CST)

[illegible]

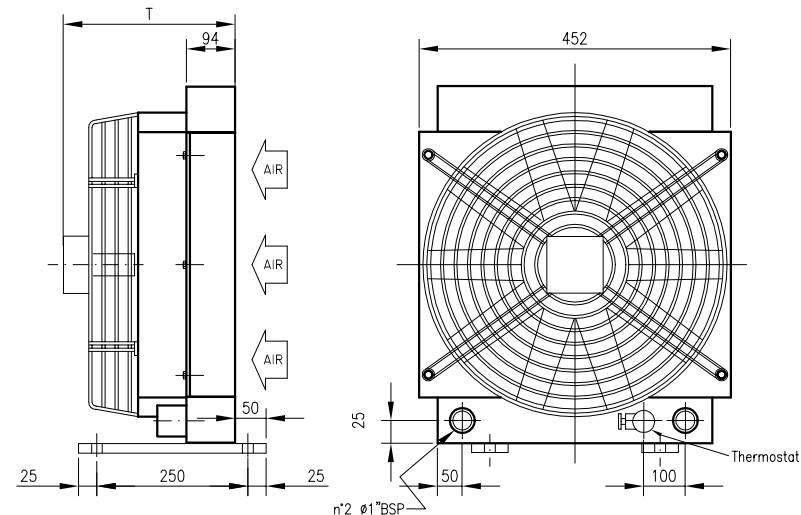
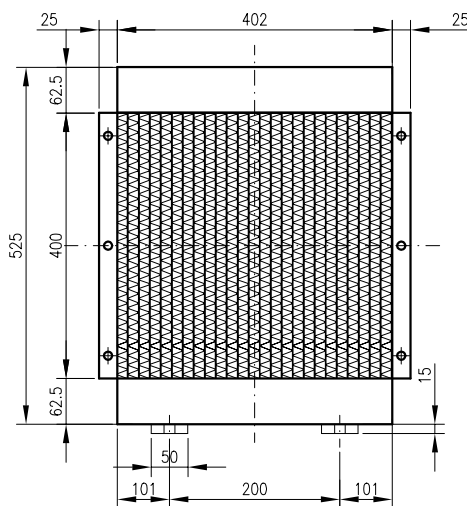
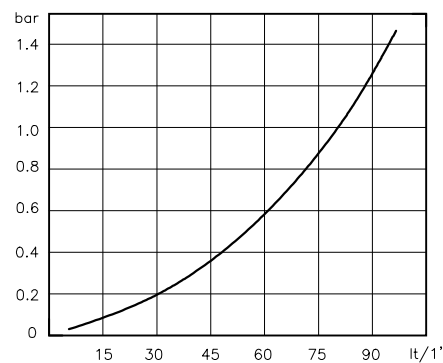
PERFORMANCES DIAGRAM - AC / DC / HYDRAULIC FAN



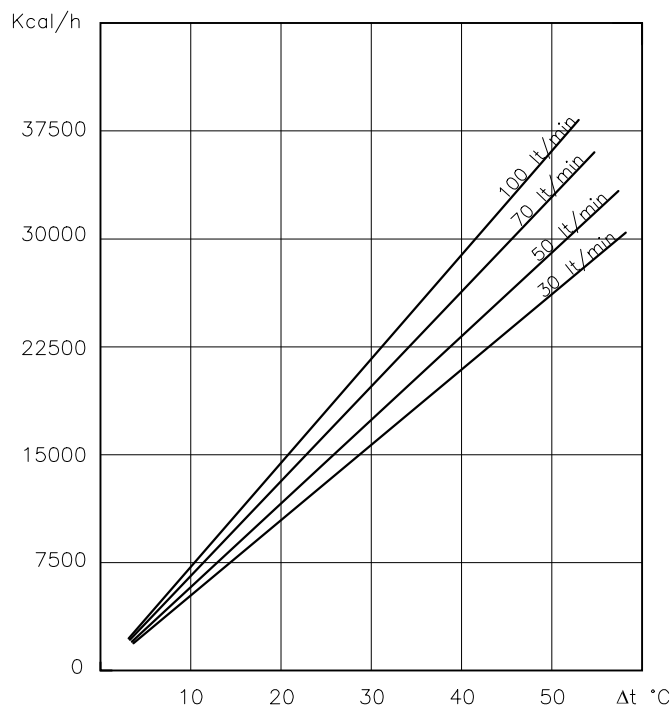
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PRESSURE DROP (32 CST)

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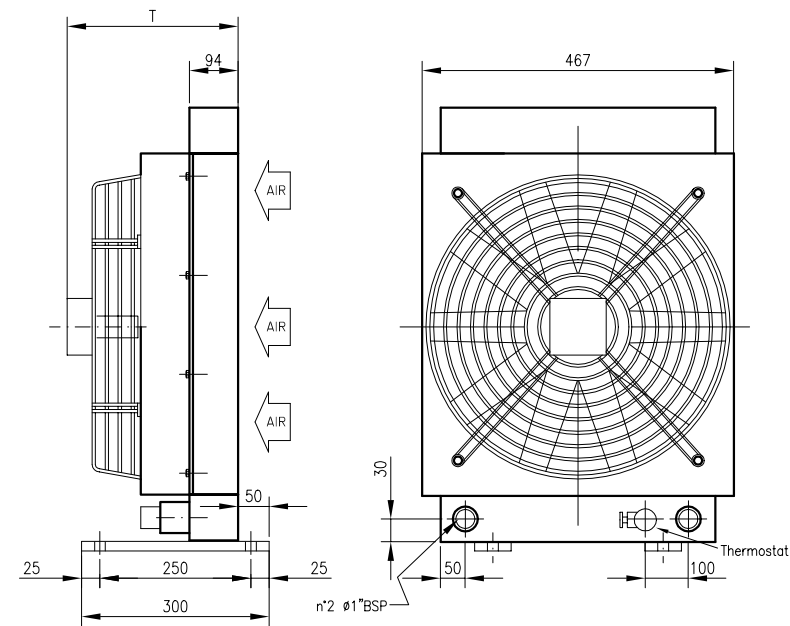
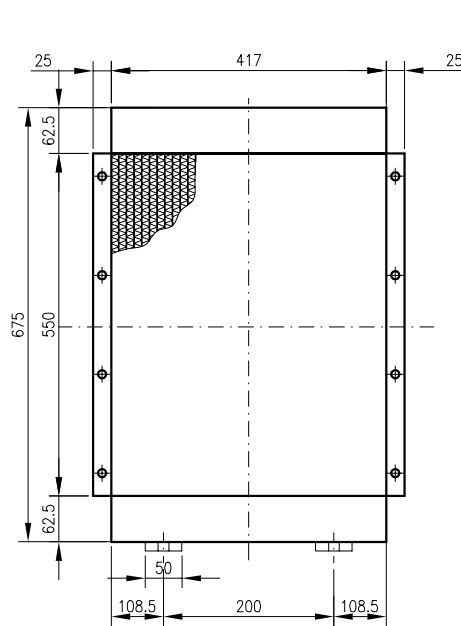
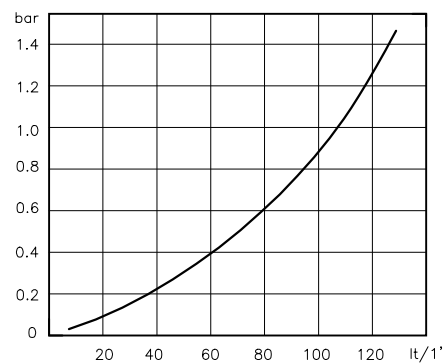
PERFORMANCES DIAGRAM - AC / DC / HYDRAULIC FAN



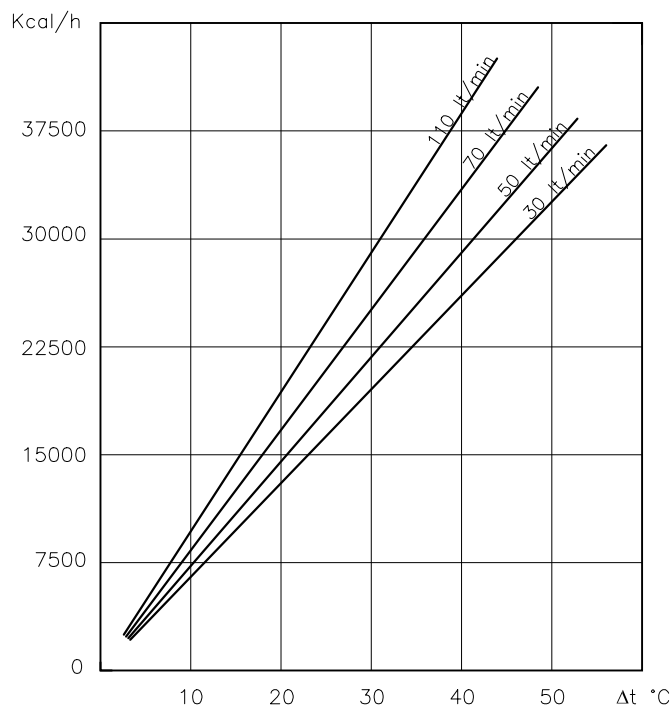
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PRESSURE DROP (32 CST)

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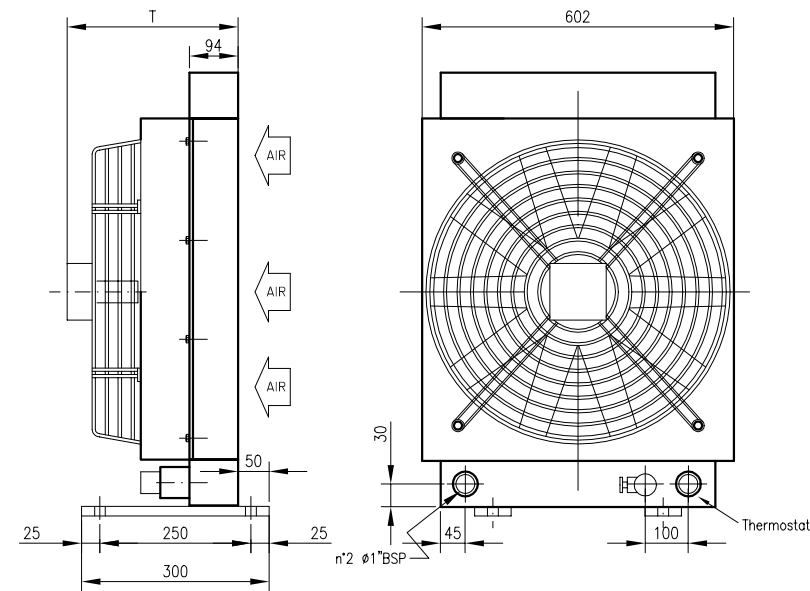
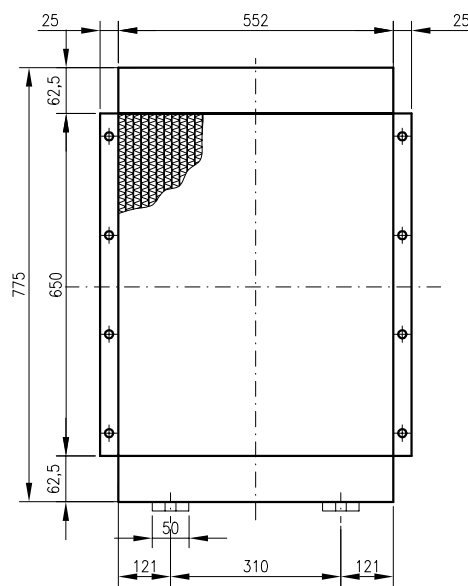
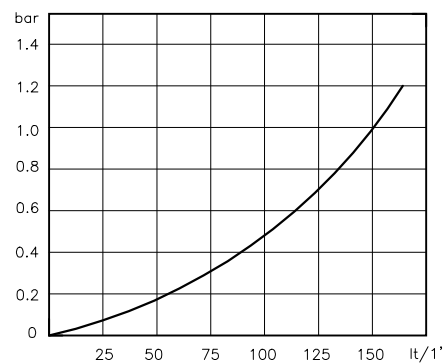
PERFORMANCES DIAGRAM - AC / DC / HYDRAULIC FAN



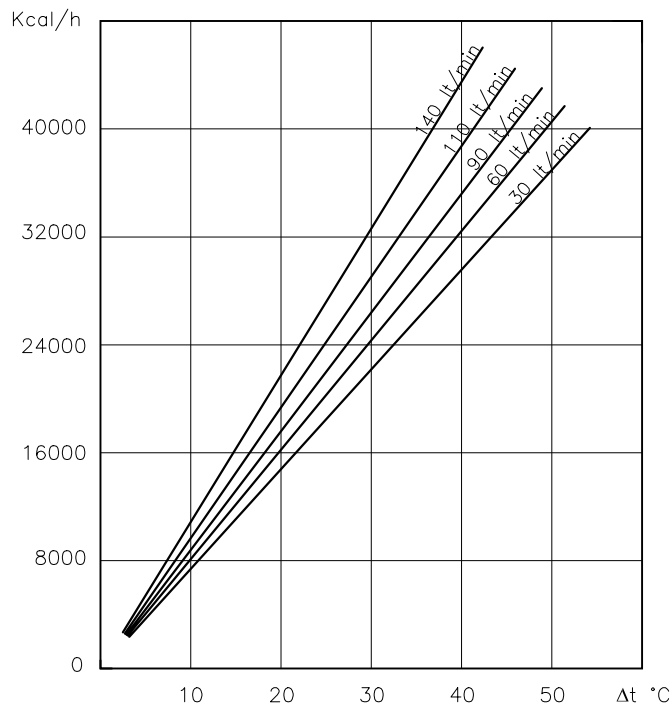
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PRESSURE DROP (32 CST)

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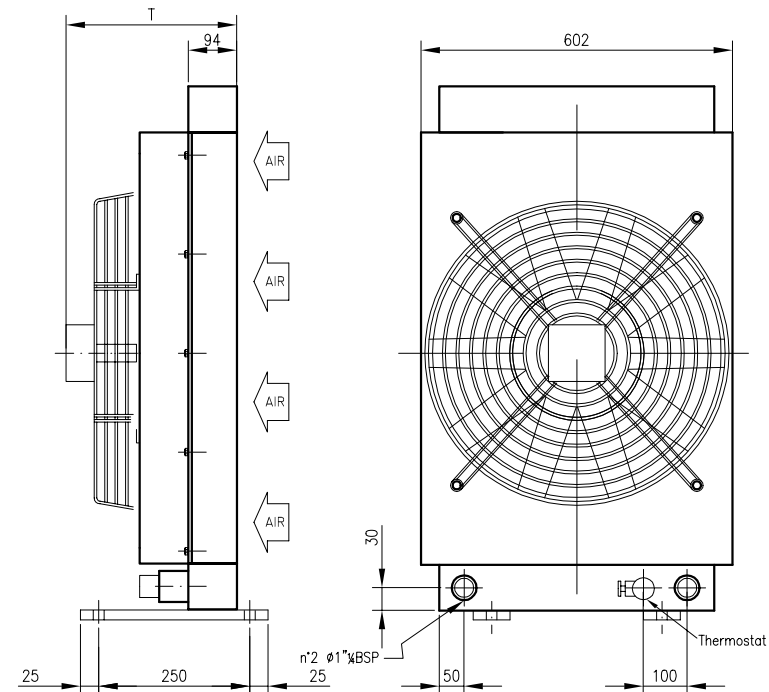
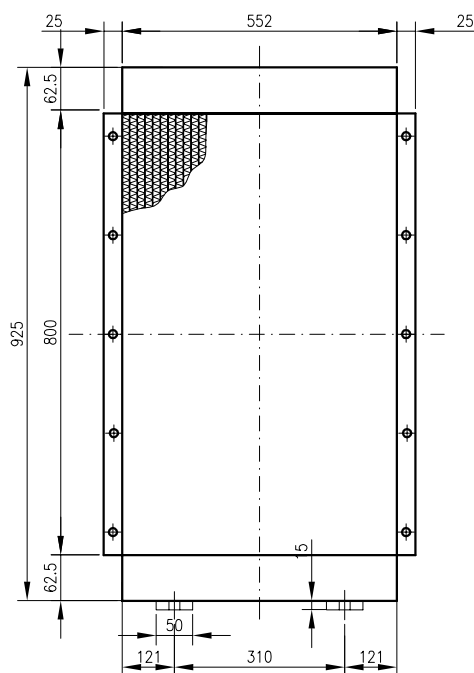
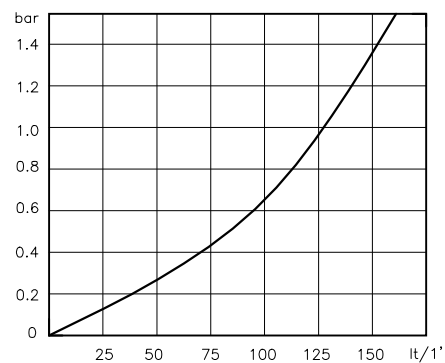
PERFORMANCES DIAGRAM – AC/ DC / HYDRAULIC FAN



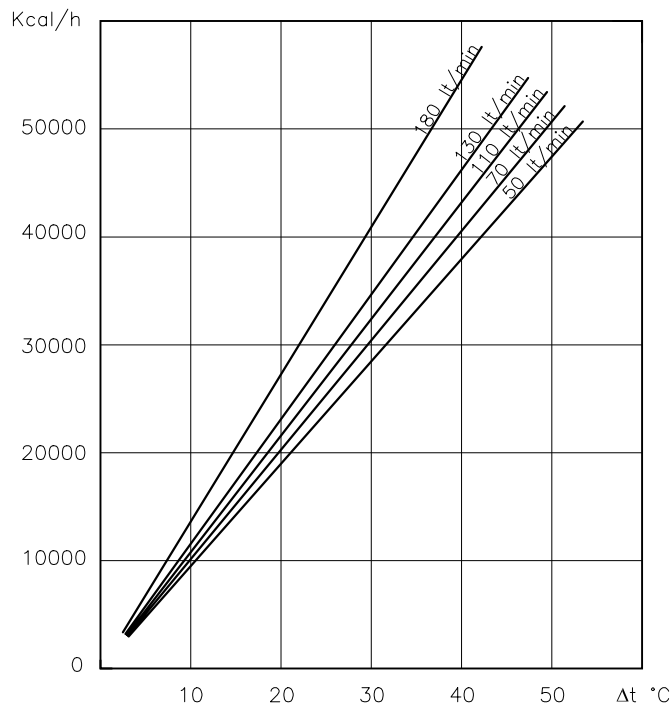
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PRESSURE DROP (32 CST)

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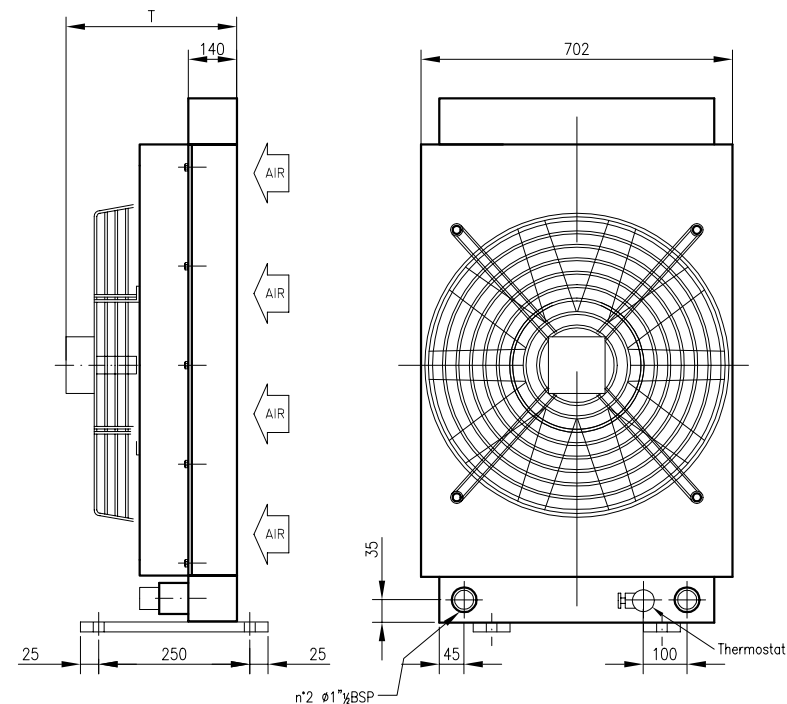
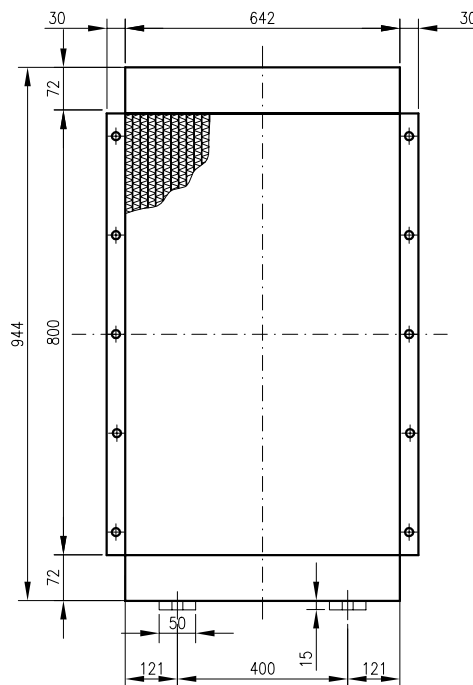
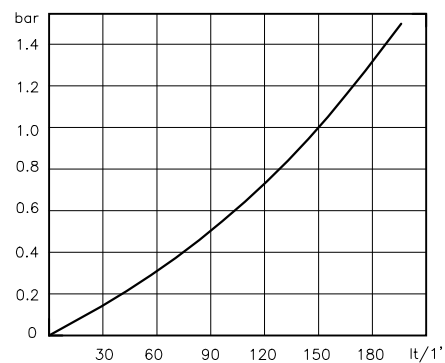
PERFORMANCES DIAGRAM – AC/ DC / HYDRAULIC FAN



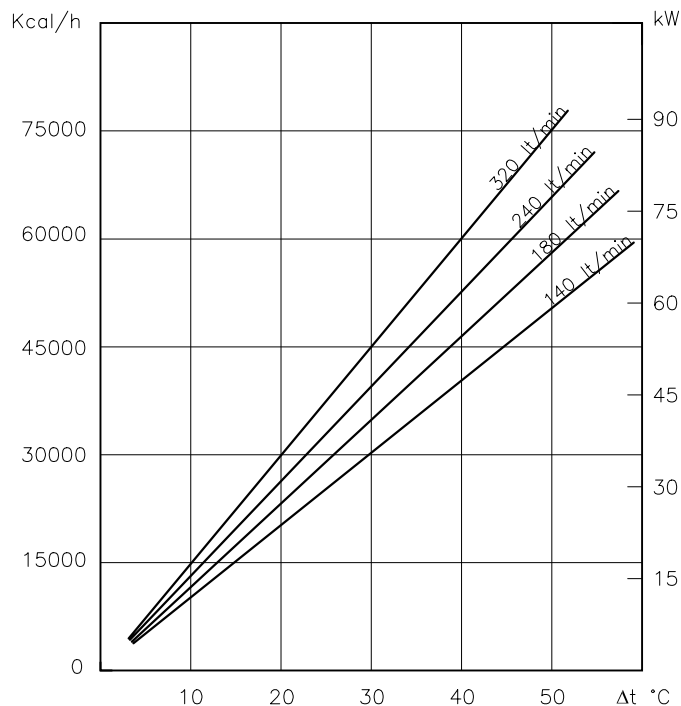
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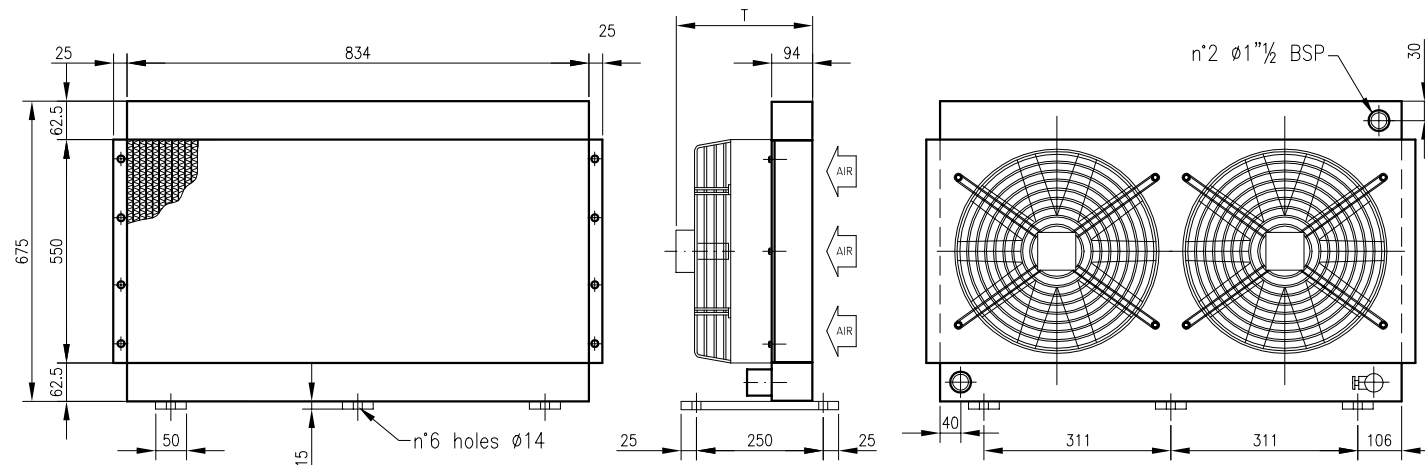
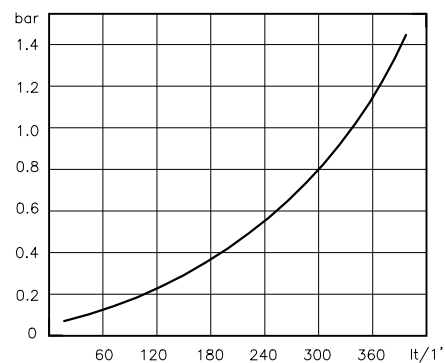
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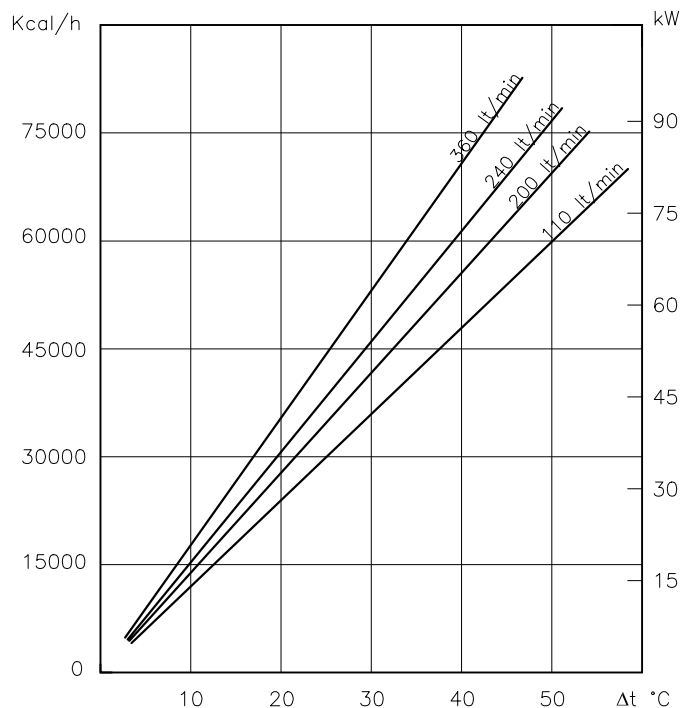
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PRESSURE DROP (32 CST)

[illegible]

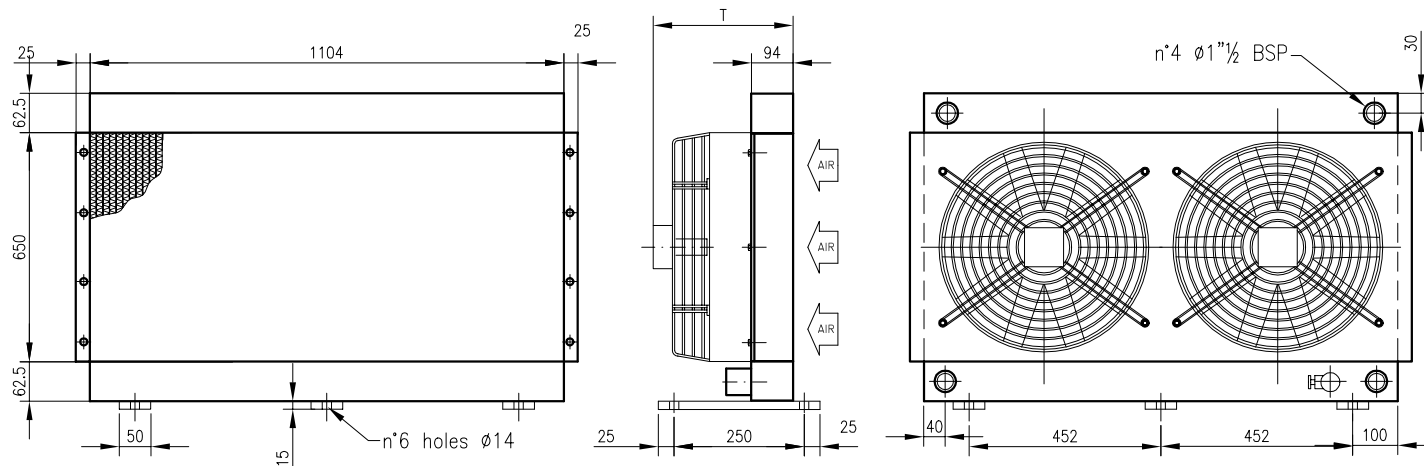
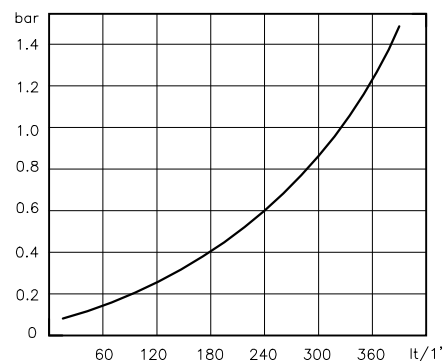
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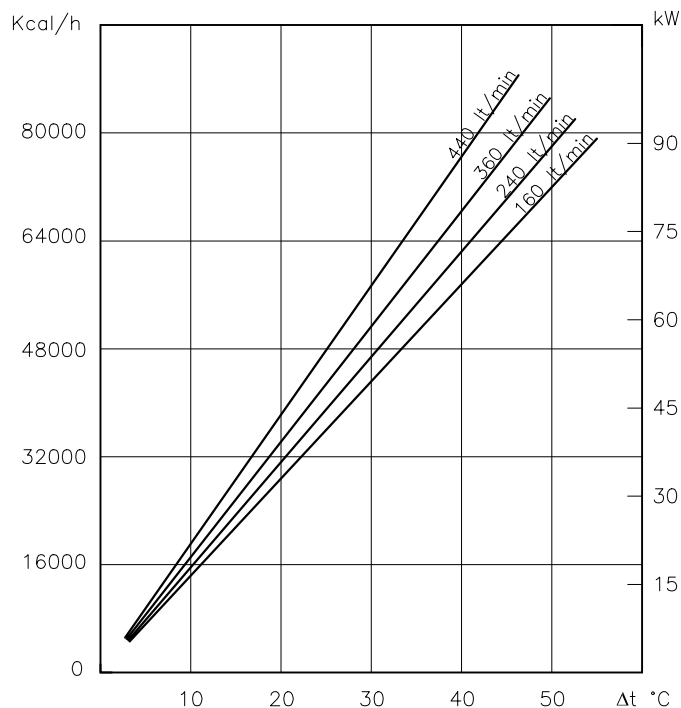
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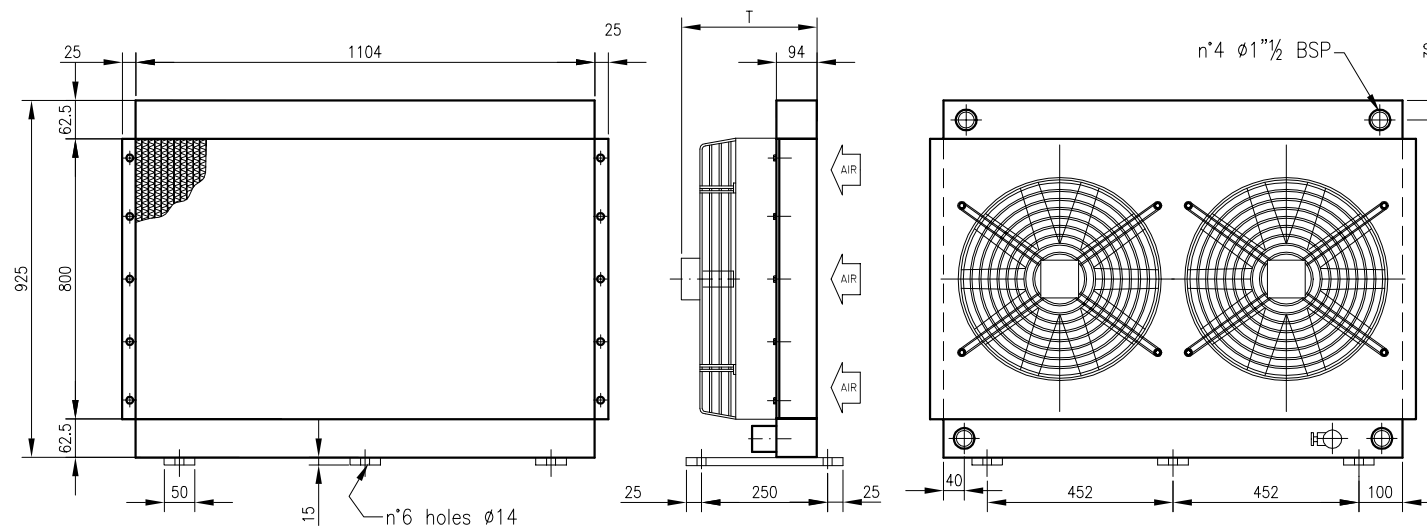
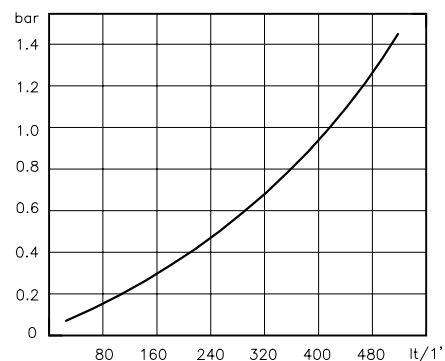
PERFORMANCES DIAGRAM - AC / DC / HYDRAULIC FAN



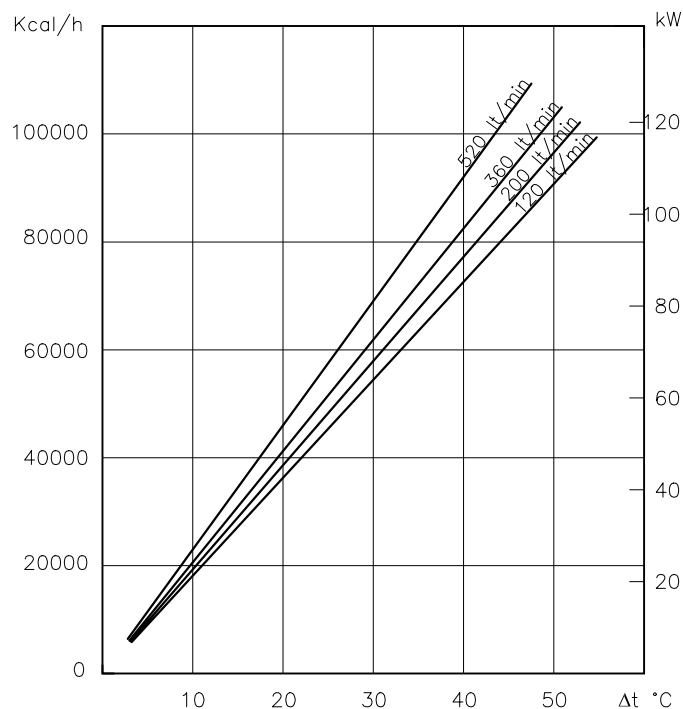
CORRECTION FACTOR (F) - PRESSURE DROP

CST	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

PRESSURE DROP (32 CST)

[illegible]

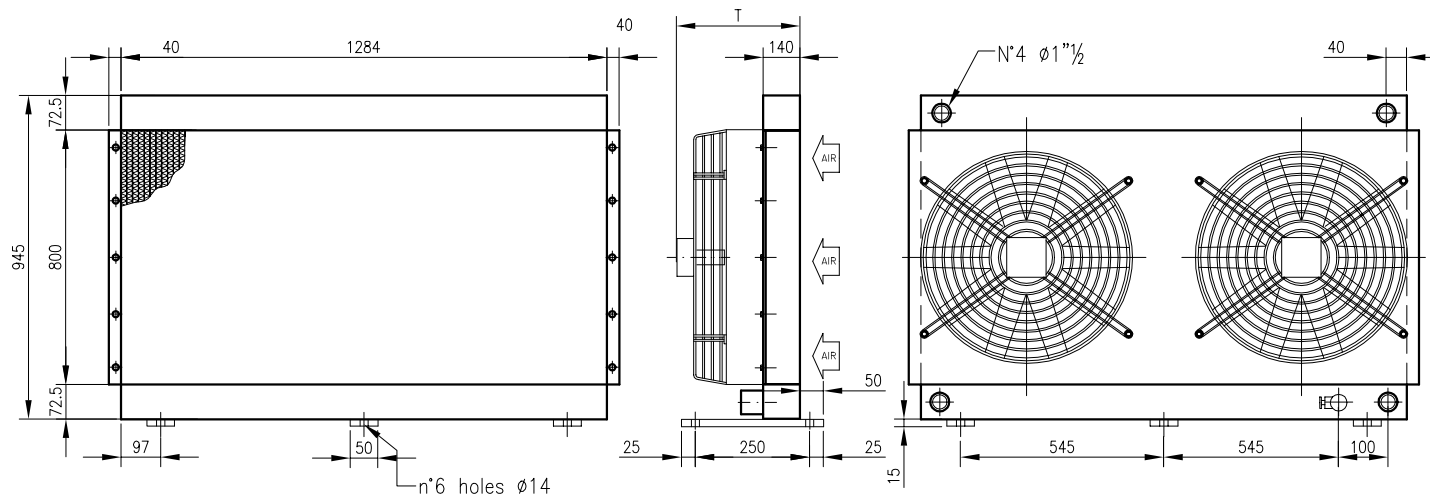
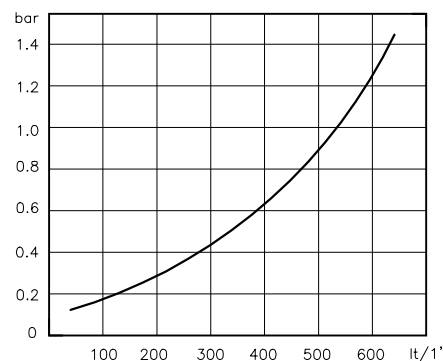
PERFORMANCES DIAGRAM – AC / DC / HYDRAULIC FAN

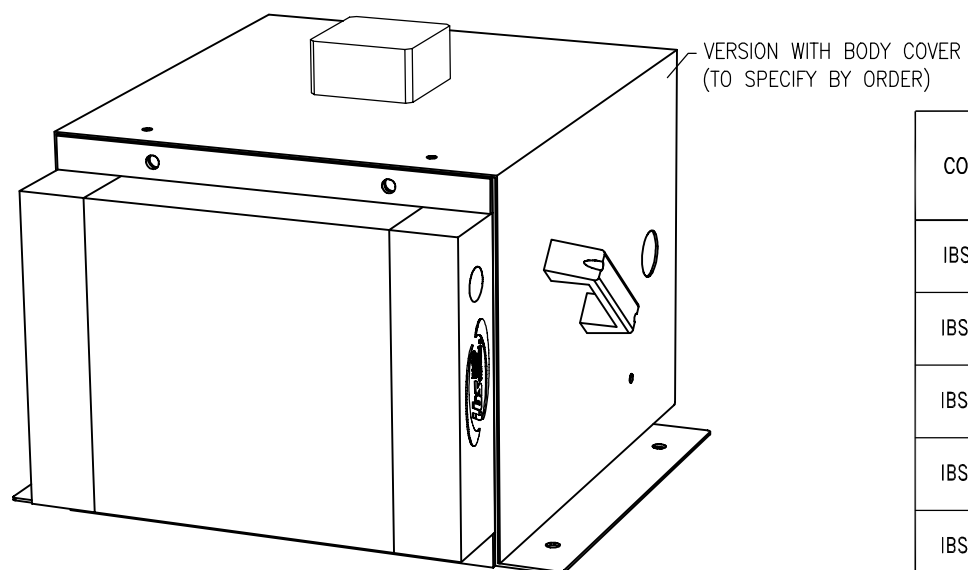
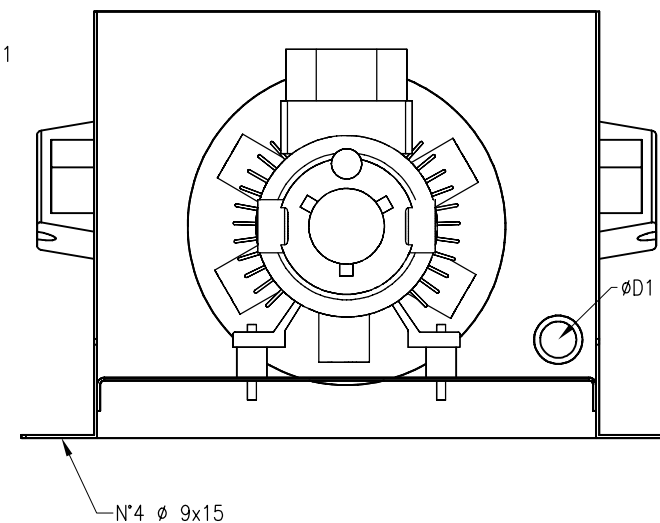
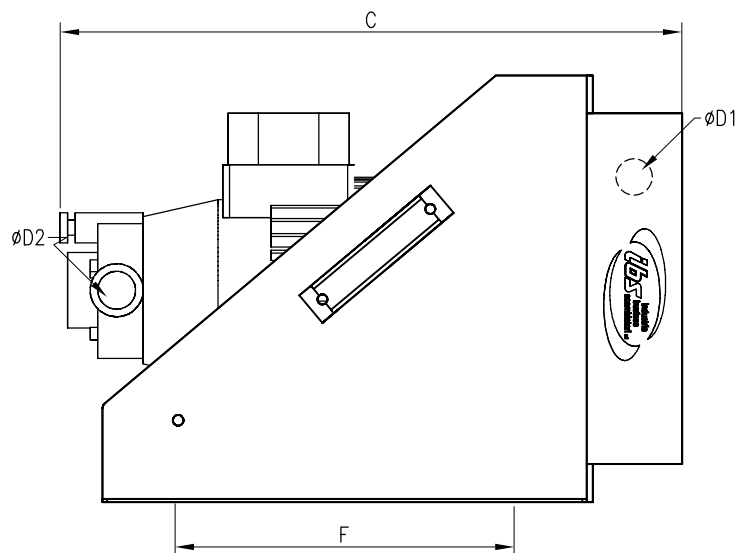
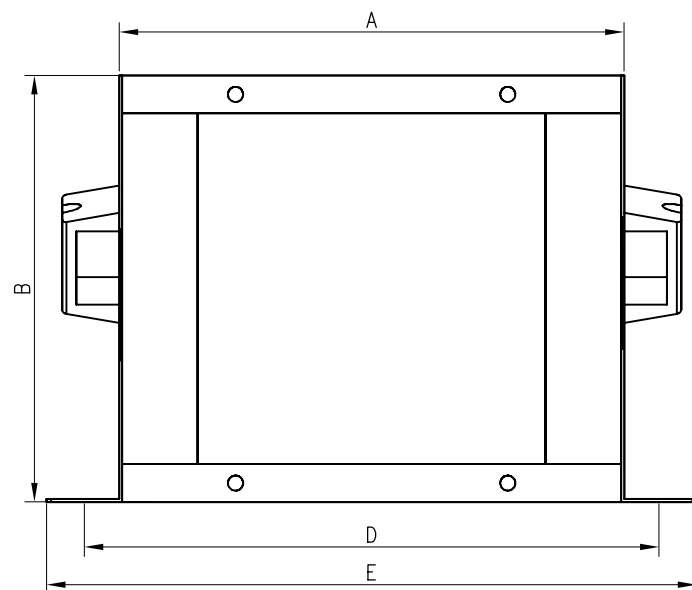


CORRECTION FACTOR (F) - PRESSURE DROP

CST	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

PRESSURE DROP (32 CST)

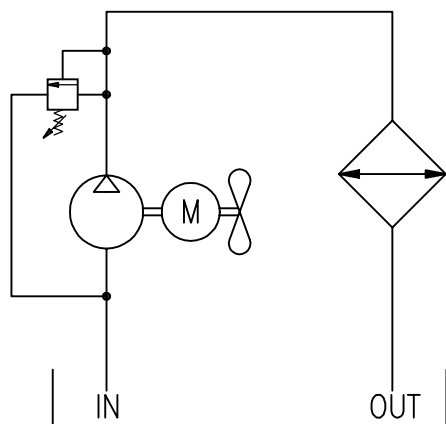
[illegible]



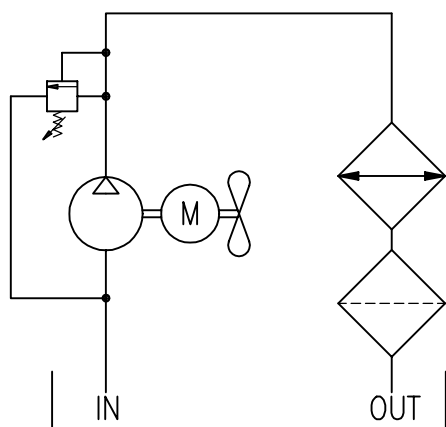
CODE NUMBER	A	B	C	D	E	F	ØD1/D2	ØFan	Power [kW]	Weight [Kg]
IBS-A-015.4.0.0	314	282	400	360	410	225	3/4"	200	0,75	27
IBS-A-020.4.0.0	314	282	415	360	410	225	3/4"	200	0,75	32
IBS-A-024.4.0.0	394	343	435	440	490	280	3/4"	250	0,75	38
IBS-A-030.4.0.0	450	397	435	496	546	290	3/4"	250	0,75	40
IBS-A-040.4.0.0	554	507	450	600	650	290	3/4"	400	0,75	43

NB: Oil pump max flow 30 lt/min

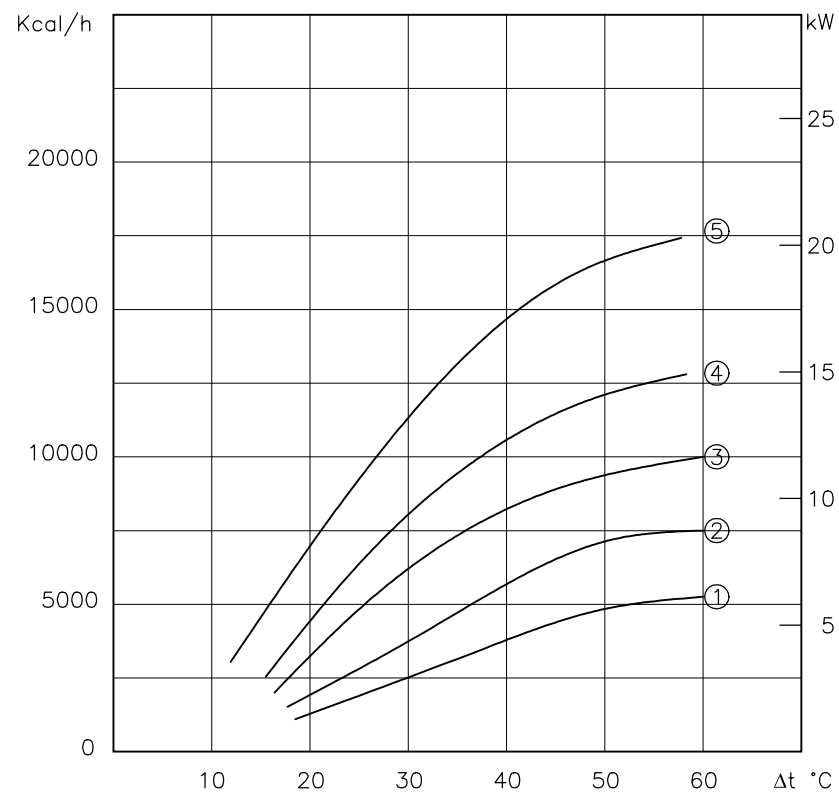
STANDARD "A"



STANDARD "AF"
with oil filter



PERFORMANCES DIAGRAM (30 L/1') - HYDRAULIC FAN



- ① IBS-A-015
- ② IBS-A-020
- ③ IBS-A-024
- ④ IBS-A-030
- ⑤ IBS-A-040

CLIENTE/ COMPANY RICHIEDENTE/ REFERENCE DATA/ Date

FOGLIO DATI/
Info Sheet

DATI GENERALI/ General informations	TIPO DI APPLICAZIONE/ APPLICATION TYPE			
	TIPO DI MOTORE/ ENGINE TYPE			
	VELOCITA' MOTORE/ ENGINE SPEED	<i>rpm</i>		
	POTENZA MOTORE/ ENGINE POWER	<i>kW</i>		
	POTENZA IDRAULICA/ HYDRAULIC POWER	<i>kW</i>		
OLIO/ Oil	CALORE DA SMALTIRE NELL'OILCOOLER/ REQUIRED OILCOOLER EFFICIENCY		<i>kW</i>	
	TEMPERATURA MASSIMA OLIO/ MAX OIL TEMPERATURE		<i>°C</i>	
	PORTATA OLIO/ OIL FLOW RATE		<i>l/min</i>	
	VISCOSITA' OLIO/ OIL VISCOSITY		<i>cst</i>	
ACQUA/ Water	POTENZA DA DISSIPARE ACQUA/ REQUIRED WATERCOOLER EFFICIENCY		<i>kW</i>	
	TEMPERATURA MASSIMA ACQUA/ MAX WATER TEMPERATURE		<i>°C</i>	
	PORTATA ACQUA/ WATER FLOW RATE		<i>l/min</i>	
	PERCENTUALE DI GLICOLE/ GLYCOLE PERCENTUAL		<i>%</i>	
ARIA/ Air	TEMPERATURA ARIA DI RAFFREDDAMENTO/ AIR INLET TEMP		<i>°C</i>	
	PORTATA ARIA/ AIR FLOW RATE		<i>mc/h</i>	
VENTOLA/ Fan	☐ ASPIRANTE/ Suction ☐ PREMENTE/ Pushing			
	MOTORE VENTOLA RICHiesto/ Fan traction required (electric/ hydraulic/ none)			
	NUMERO GIRI VENTOLA/ Fan Speed	<i>rpm</i>		
	DIAMETRO VENTOLA/ Fan diameter	<i>mm</i>		
	NUMERO PALE VENTOLA/ Blades number	<i>pcs</i>		
	ANGOLO PALE/ Blades inclination	<i>α °</i>		
NOTE/ Notes				

Fill this form and send it to IBS by Fax to obtain a quotation.



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