

Scambiatori Aria-olio Serie DRAIN 2000K

*Air-oil heat-exchangers
DRAIN 2000K Series*



ENNEMECI



Gli scambiatori di calore aria-olio **EMMEGI**, sono impiegati per il raffreddamento di circuiti oleodinamici usando, come fluido raffreddante, l'aria ambiente, convogliata sulla radiante da una ventola azionata da un motore elettrico o idraulico. La massa radiante, in lega d'alluminio ad alta resistenza, è ottenuta mediante un processo costruttivo di saldobrasatura sottovuoto. La particolare configurazione dei condotti aumenta la turbolenza del fluido e di conseguenza la capacità di scambio; inoltre, la presenza di speciali turbolatori sull'alettatura del pacco radiante, migliora ulteriormente il coefficiente di trasmissione totale. Il risultato è un prodotto tecnologicamente avanzato di dimensioni contenute, leggero e robusto. Gli scambiatori aria-olio serie DRAIN nascono dalle esigenze applicative, ad ampio raggio, espresse dal mercato.

Punto di forza di questi prodotti è l'elevata efficienza con basse portate di olio.

Fluidi compatibili

- . OIL MINERALI, HL, HLP.
- . EMULSIONI ACQUA-OLIO
- . ACQUA-GLICOLE
- . Per altri fluidi consultare EMMEGI.

Specifiche tecniche Masse Radianti

- . Materiale: alluminio "long life".
- . Pressione d'esercizio: 20 bar.
- . Pressione di collaudo: 35 bar.
- . Temperatura max d'esercizio: 120°C
- . Per particolari atmosfere aggressive consultare l'EMMEGI.

Installazione

Lo scambiatore può essere montato in posizione orizzontale o verticale, rispettando la distanza minima dalla parete (vedi fig. 1), in modo da assicurare un naturale afflusso e deflusso dell'aria di raffreddamento.

Lo scambiatore è installato, di norma, sulle tubazioni di ritorno dell'olio al serbatoio; deve, inoltre, essere protetto da urti e vibrazioni meccaniche mediante supporti e collegato all'impianto con tubazioni flessibili. È necessario evitare che sia sottoposto a brusche variazioni di portata, colpi d'ariete e pulsazioni continue che danneggiano in modo irreversibile la radiante.

Per preservare lo scambiatore dalla sovrappressione che si genera all'avviamento dell'impianto, per elevata viscosità dell'olio, si suggerisce l'inserimento di una valvola di by-pass (vedi fig.2).

EMMEGI air-oil heat exchangers are used for cooling oil hydraulic systems using as the coolant ambient air that passes over the radiant by means of a fan operated by an electric or hydraulic motor.

The cooler element, in high resistance aluminium alloy, is obtained by means of a braze-welding process carried out under vacuum.

The particular configuration of the cooling pipes increase the turbulence of the fluid consequently of the exchange capacity; moreover, the presence of special jets on the cooler finning further improves the total transmission coefficient.

The result is a very small, light and robust technologically advanced product.

The air-oil heat-exchangers DRAIN Series were born to answer the large application needs of the market.

The main characteristic of this heat exchanger is the high efficiency with low oil flows.

Compatible fluids

- . MINERAL OILS; HL; HLP.
- . WATER-OIL EMULSION.
- . WATER-GLYCOL.
- . Consults EMMEGI for other fluids.

Technical specification of Cooler Element

- . Material: "long life" aluminium.
- . Operating pressure: 20 bar
- . Test pressure: 35 bar.
- . Max operating temperature: 120°C.
- . For specially "aggressive" atmospheres contact EMMEGI.

Installation

The exchangers can be fitted in a horizontal position, respecting the minimum distance from the wall (see fig.1) so as to ensure a natural flow of cooling air.

The exchangers is usually installed on oil tank return piping; it must also be protected from impacts and mechanical vibrations by supports and must be connected to the plant with flexible pipes.

Avoid subjecting the exchanger to sudden changes in flow, hammering and pulsations that can cause irreversible damage to the element.

We recommend installing a by-pass valve (see fig.2) to protect the exchanger from over-pressure generated when the plants is started up due to high oil viscosity.

Manutenzione

È buona norma prestare particolare attenzione alla pulizia della massa radiante per garantire un naturale ricambio d'aria, ed evitare una diminuzione dell'efficienza termica.

Pulizia lato olio

Per eseguire la pulizia lato olio, lo scambiatore dovrà essere smontato. Lo sporco può essere rimosso flussando in controcorrente un prodotto sgrassante, compatibile con alluminio. Effettuare un lavaggio con olio idraulico prima di ricollegare il prodotto all'impianto.

Pulizia lato aria

La pulizia lato aria può essere effettuata con aria compressa o acqua, con direzione del getto parallelo alle alette per non danneggiare. Lo sporco oleoso o grasso può essere rimosso con getto di vapore o acqua calda. Durante questa operazione, il motore elettrico non deve essere scollegato dall'alimentazione, e dovrà essere adeguatamente protetto.

Esempio di scelta dello scambiatore

Per effettuare la scelta dello scambiatore si procede come segue:

Potenza da dissipare : 6,5 [KW]
Portata olio ISO VG 32 : 12 [lpm]
Temperatura ingresso olio : 60 [°C]
Temperatura ambiente : 30 [°C]
Ventola azionata da motore elettrico 230/400V-50Hz.

Si calcola la potenza specificata di scambio espressa in KW/°C, conoscendo la potenza da dissipare e il ΔT (differenza tra la temperatura olio ingresso e la temperatura ambiente).

$$P = \frac{6.5 \text{ KW}}{60^\circ - 30^\circ} = 0.22 \text{ KW/}^\circ\text{C}$$

Nota la portata olio (12 lpm) e la potenza specifica di scambio (0.23 KW/°C) si procede alla ricerca del prodotto avvalendosi dei grafici riportati a catalogo, relativi ai singoli modelli.

Maintenance

You should be particularly carefully in cleaning the cooler element to guarantee a natural exchange of air, in order to prevent a reduction in thermal efficiency

Cleaning oil side

The exchanger should be dismantled to clean on the oil side. The dirt can be removed by flushing, in counter-current, de-greasing substance, compatible with aluminium. Wash with hydraulic oil before re-connecting the product to the plant.

Cleaning air side

Cleaning on the air side can be done using compressed air or water, directing the jet parallel to the fins so as not to damage them. Oily dirt or grease can be removed with a jet of steam or hot water. During this operation, the electric motor must be disconnected from the voltage supply, and must be adequately protected.

Example of how to choose a heat exchanger

Proceed with sizing the exchanger, with a knowledge of the data as the example below shows:

Power to dissipate : 6,5 [KW]
ISO VG 32 oil flow : 12 [lpm]
Oil input temperature : 60 [°C]
Ambient temperature : 30 [°C]
Fan operating with an electric motor 230/400V-50Hz.

You can then calculate the specific heat exchange power KW/°C if you know the power to dissipate and the ΔT (the difference between the oil input temperature and the ambient temperature).

$$P = \frac{6.5 \text{ KW}}{60^\circ - 30^\circ} = 0.22 \text{ KW/}^\circ\text{C}$$

Note the oil flow (12 lpm) and specific exchange power (0.23 KW/°C), product research is made by referring to the graph in the catalogue which is relevant to each model.

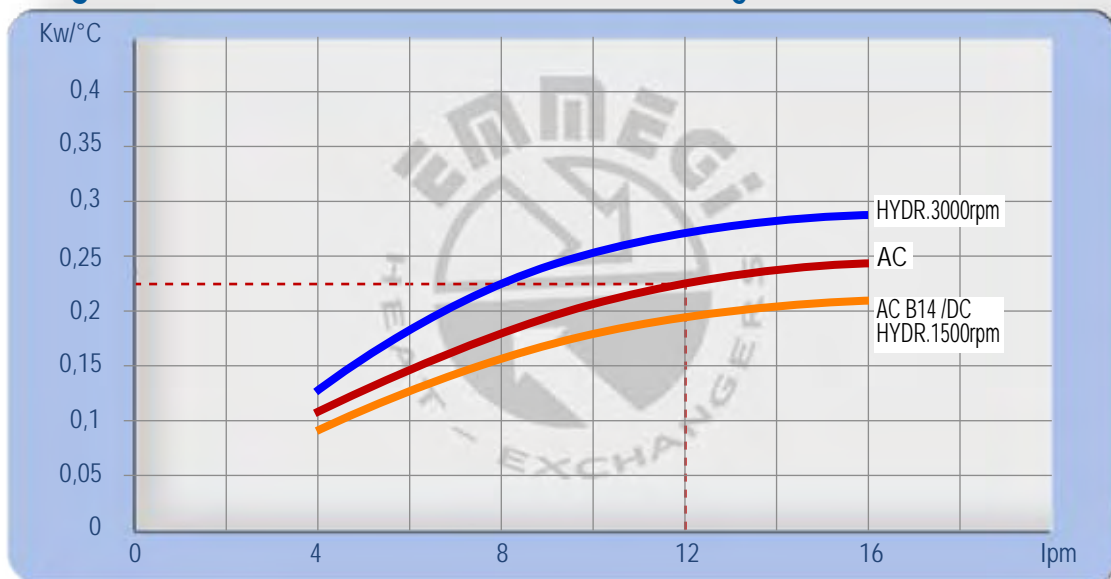
Dati tecnici Technical Data



P/N	V	Hz	kW	A	rpm	∅ Fan	dB(A)	(m³/h)	IP	It	Kg
2Z3001 ###	230AC	50/60	0,23/0,35	1,1/1,55	2700/3000	300	78	2220	44	1,6	15
2Z3003 ###	230-400 AC	50/60	0,21/0,30	0,62-0,36/0,84-0,48	2580/2750	300	76	2500	44		15
2Z3004 ###	230-400 AC B14 265-460 AC B14	50 60	0,37 0,44	2,2-1,25 2,2-1,25	1370 1640	300	70	1850	55	20	
2Z3012 ###	12 DC	/	0,16	13,3	2660	305	80	1675	68	14	
2Z3024 ###	24 DC	/	0,18	7,4	2870	300	83	1880	68	14	
253056 ###	Prepared for Gr.2 hydraulic motor					300			/	15	

Contattare EMMEGI Contact EMMEGI

Diagramma rendimento Performance diagram



Lo scambiatore selezionato risulta il modello:
DRAIN 2030K - 230/400 - 50Hz
cod. 2Z3003###.

The exchanger selected is the following model:
DRAIN 2030K - 230/400 - 50Hz
cod. 2Z3003###.

Per la completa identificazione dello scambiatore consultare la pagina "DENOMINAZIONE CODICE PRODOTTO". Nel caso non siano conosciuti tutti i dati, per la scelta prendere contatto **EMMEGI**.

For a complete description of the exchanger consult the "PRODUCT ORDERING CODE" page. If you do not know all the data required for selecting the model, contact **EMMEGI**.

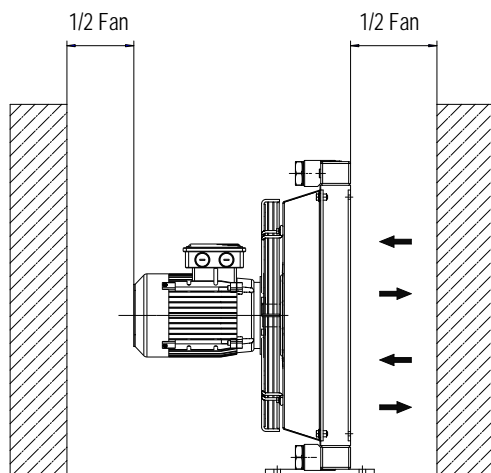


Fig.1

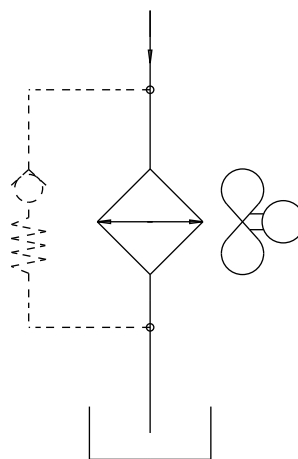
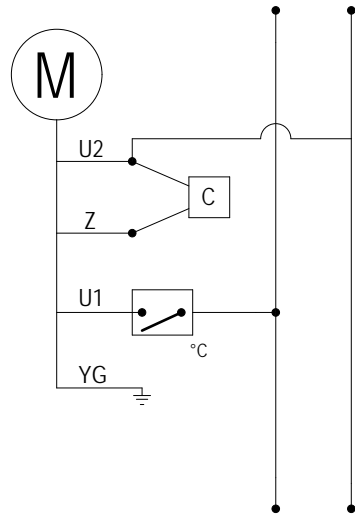


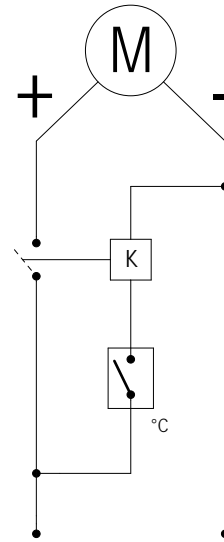
Fig.2

Collegamenti elettrici

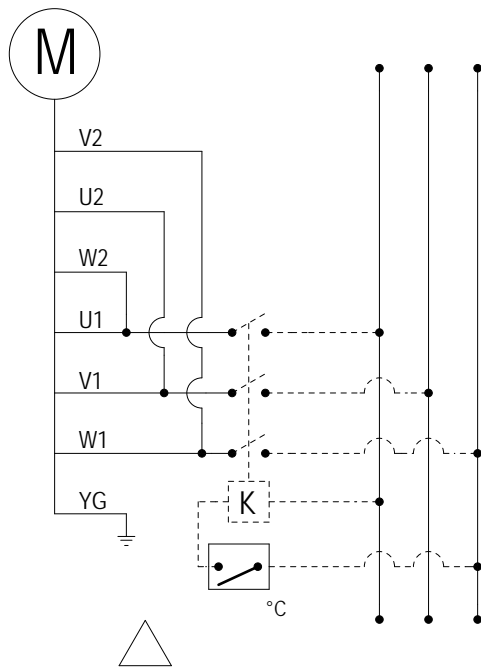
Electric Wiring



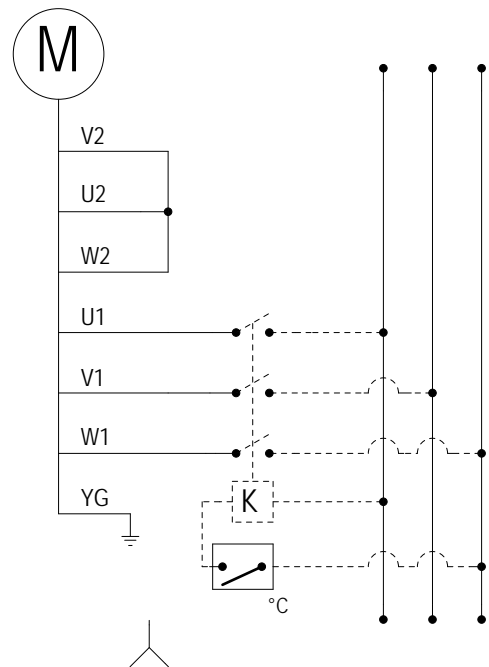
230V AC 1 PHASE



12-24V DC



230V AC 3 PHASE



400V AC 3 PHASE

°C = Termostato NA./Thermostat No.
K = Relè/Relay

Modulo richiesta dati

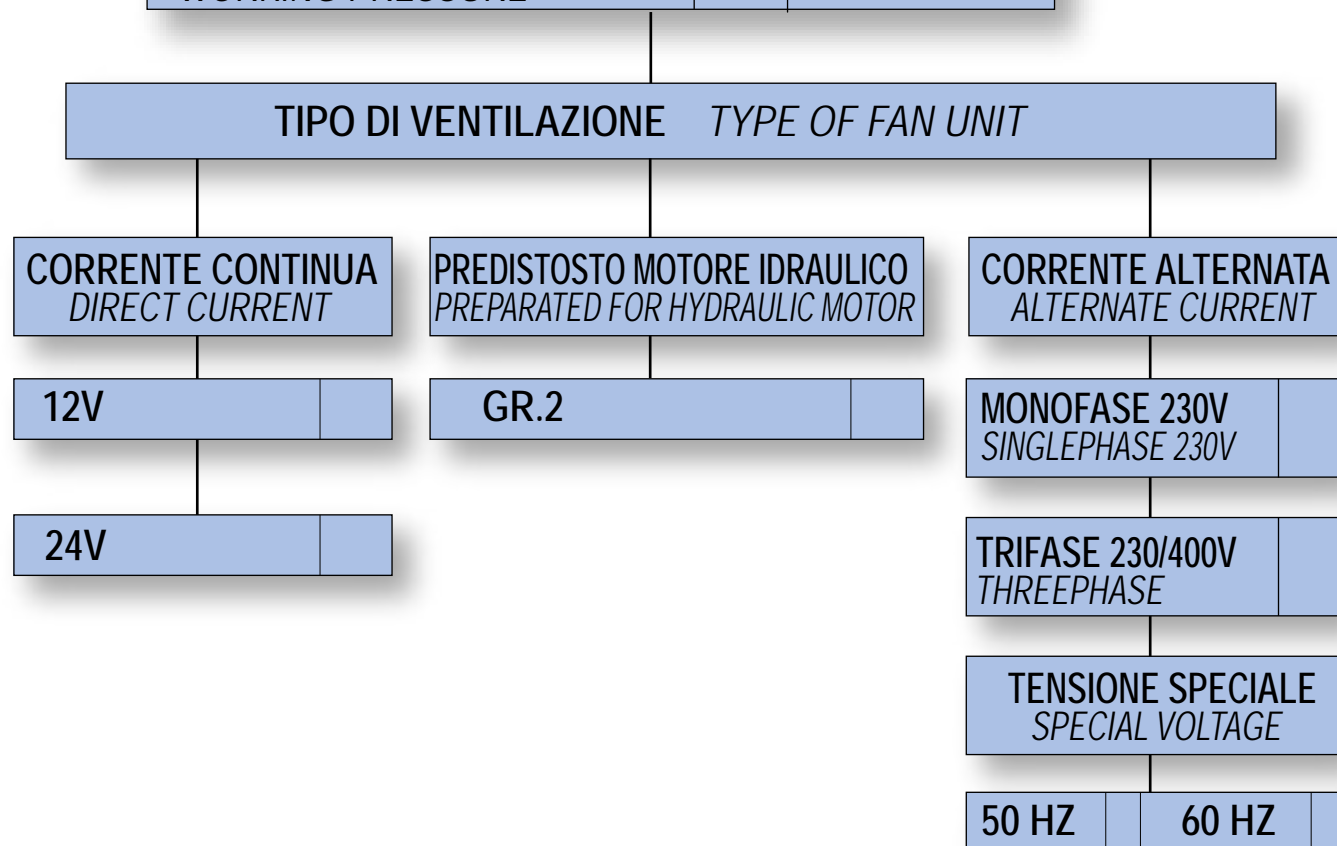
Sheet for cooler selection



CLIENTE <i>COMPANY</i>	
RICHIEDENTE <i>NAME</i>	

ARIA-OLIO *AIR-OIL*

PORTATA OLIO <i>OIL FLOW RATE</i>	Imp	
POTENZA INSTALLATA <i>TOTAL POWER</i>	KW	
POTENZA DA DISSIPARE <i>POWE TO BE DISSIPATED</i>	KW	
TEMPERATURA INGRESSO OLIO <i>OIL TEMPERATURE INLET</i>	°C	
TEMPERATURA ARIA MAX <i>MAX AMBIENT TEMPERATURE</i>	°C	
VISCOSITÀ OLIO <i>OIL VISCOSITY</i>	cst	
PRESSIONE DI LAVORO <i>WORKING PRESSURE</i>	bar	



2

Z24

03

2

01

TIPO DI SISTEMA *COOLER SERIES*

Z24 (*DRAIN 2024K*)

TIPO DI MOTORIZZAZIONE *FAN MOTOR TYPE*

- 01 AC 230V 50/60 Hz
- 03 AC 230V-400V 50/60Hz
- 04 AC 230V-400V-50Hz (B14) / AC 265V-460V- 60Hz (B14)
- 12 DC 12V
- 24 DC 24V
- 56 *Pred. per mot. idr. gr. 2 Prep. for hydr. mot. gr. 2*

TERMOSTATI *THERMOSTATS*

- | | | | |
|---|---------------------------------|--|--------------|
| 1 | Termostato fisso | <i>Fixed thermostat</i> | 40-28° |
| 2 | Termostato fisso | <i>Fixed thermostat</i> | 50-38° |
| 3 | Termostato fisso | <i>Fixed thermostat</i> | 60-48° |
| 4 | Termostato fisso | <i>Fixed thermostat</i> | 70-58° |
| 5 | Termostato fisso | <i>Fixed thermostat</i> | 80-68° |
| 6 | Termostato fisso | <i>Fixed thermostat</i> | 90-78° |
| 8 | Termostato regolabile | <i>Adjustable thermostat</i> | 0-90° (TC2) |
| 9 | Termostato regolabile collegato | <i>Connected adjustable thermostat</i> | 0-120° (TC2) |

TIPO DI VENTILAZIONE *VENTILATING TYPE*

- 01 *Aspirante Suction air flow*
- 02 *Soffiante Blowing air flow*

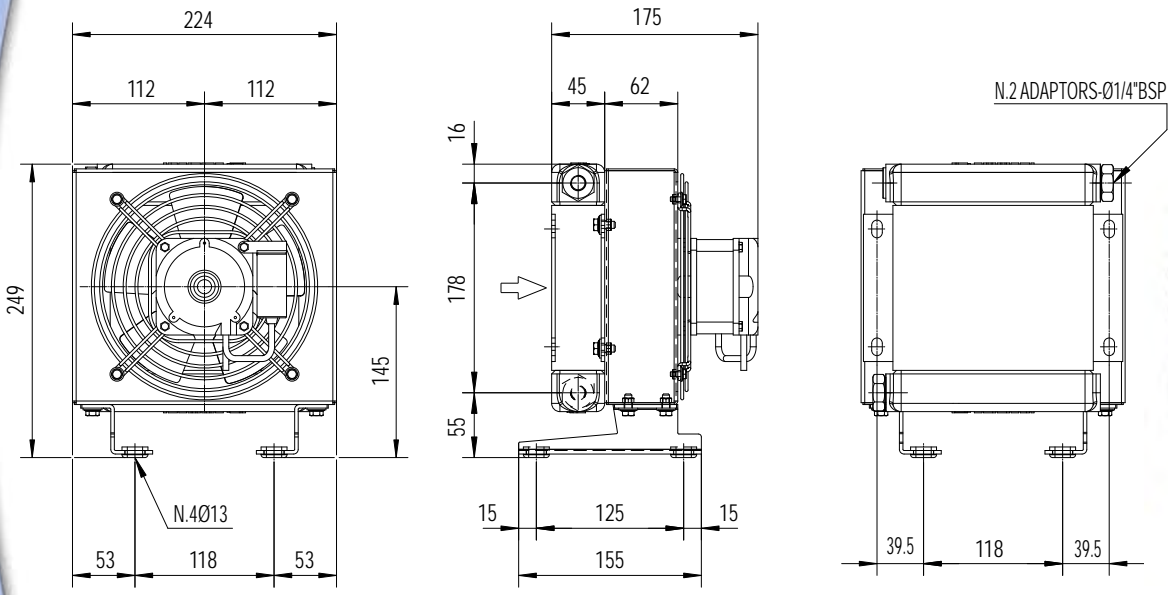
Serie DRAIN 2000K - *DRAIN 2000K Series*

DRAIN 2010K	pag. 08- 09
DRAIN 2015K	pag. 10 -11
DRAIN 2020K	pag. 12 -13
DRAIN 2024K	pag. 14 -15
DRAIN 2030K	pag. 16 -17
DRAIN 2040K	pag. 18 -19
DRAIN 2050K	pag. 20 -21

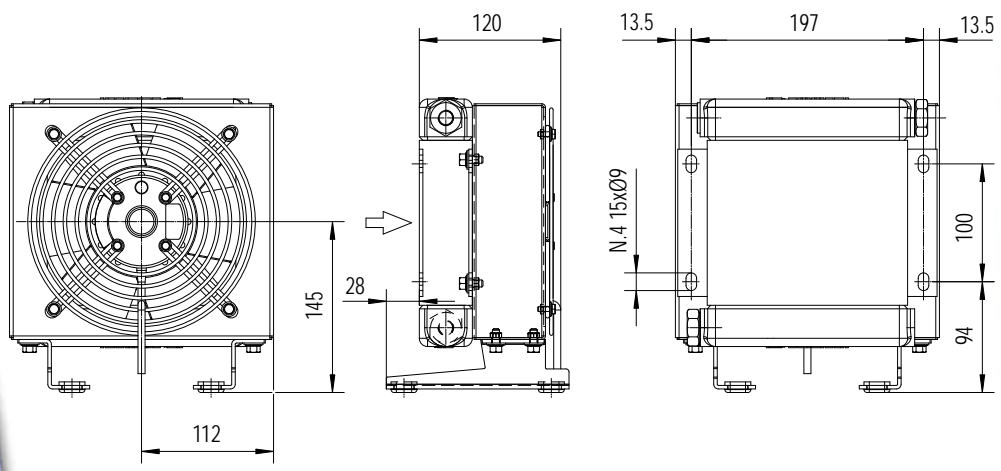


Dimensioni Dimensions

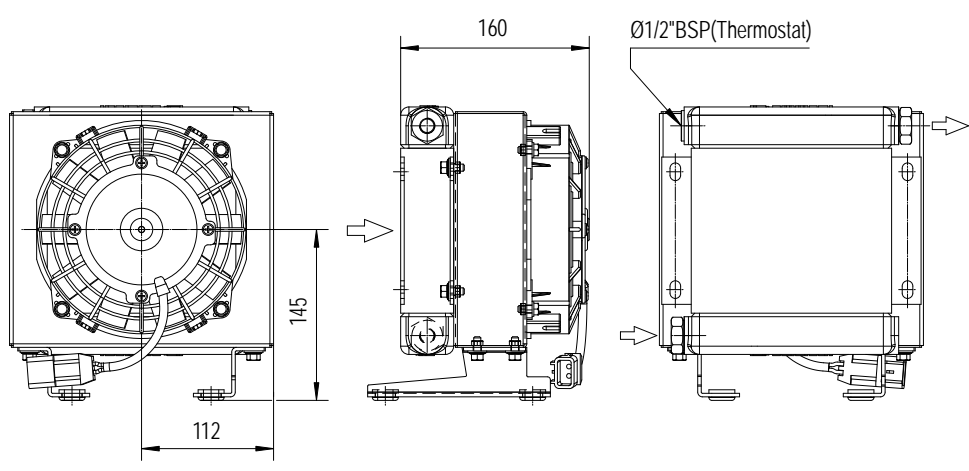
DRAIN 2010K



P/N 2Z1001###



P/N 2Z1003###



P/N 2Z1012###
P/N 2Z1024###

Le dimensioni di ingombro e le caratteristiche tecniche non sono impegnative
Over-all dimensions and technical characteristic are not binding

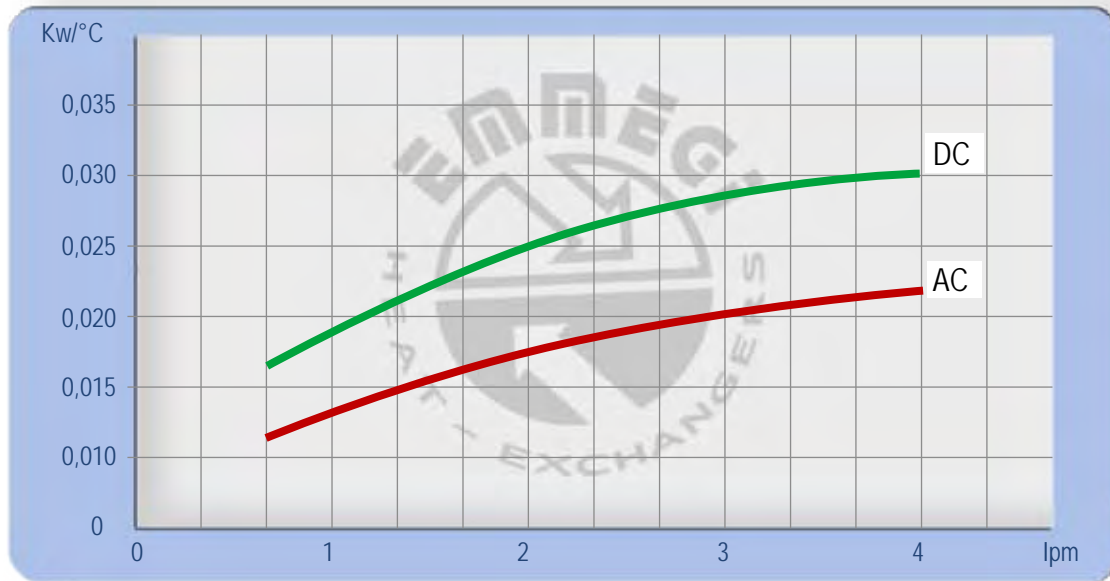
Dati tecnici Technical Data

P/N	V	Hz	kW	A	rpm	ø Fan	dB(A)	(m³/h)	IP	lt	Kg
2Z1001 ###	230AC	50/60	0,010/0,047	0,21	2500	175	67	235	54	0.3	6
2Z1003 ###	230-400 AC	50/60	0,045/0,043	0,13-0,09	2740/3100	175	63	190	54		6
2Z1012 ###	12 DC	/	0,06	5,2	3860	167	75	410	68		5
2Z1024 ###	24 DC	/	0,06	2,3	4045	167	75	410	68		5

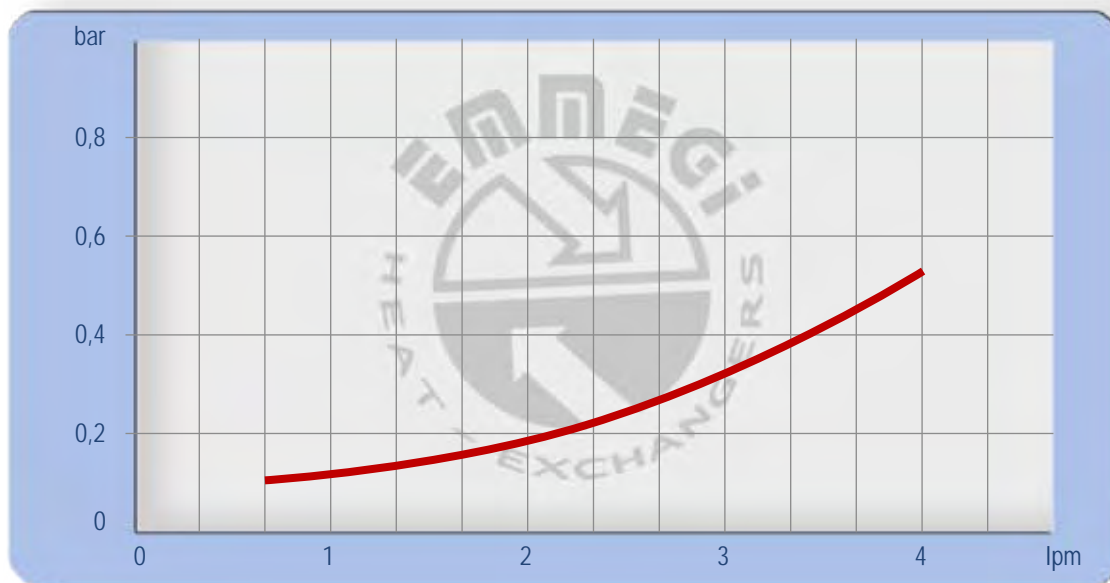


DRAIN 2010K

Diagramma rendimento Performance diagram



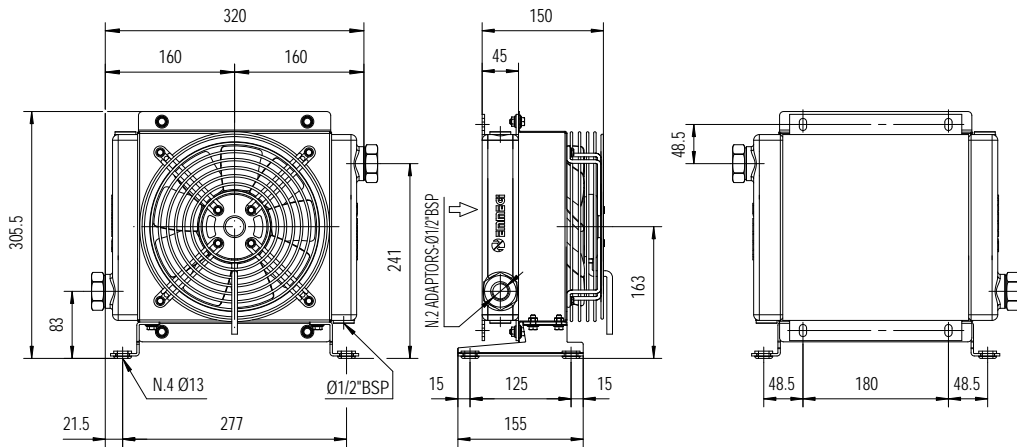
Perdite di carico Pressure drop (ISO VG 32)



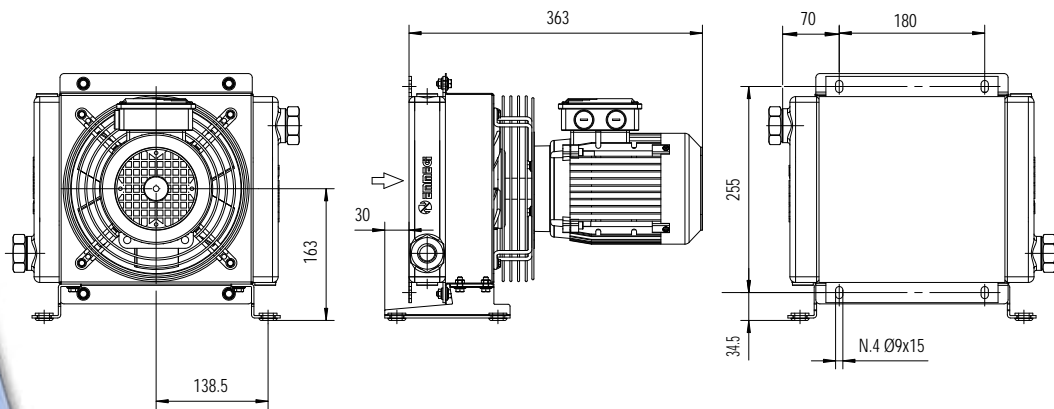
Fattore di correzione - F - (perdite di carico) Correction factor - F - (Pressure drop)

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

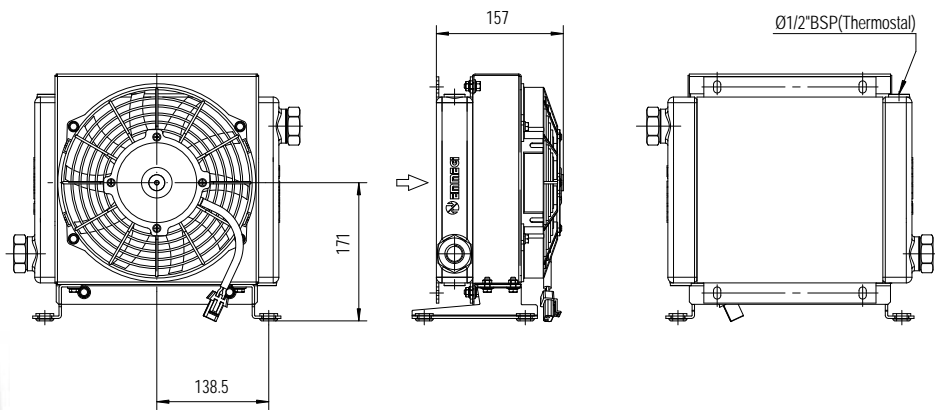
Dimensioni Dimensions



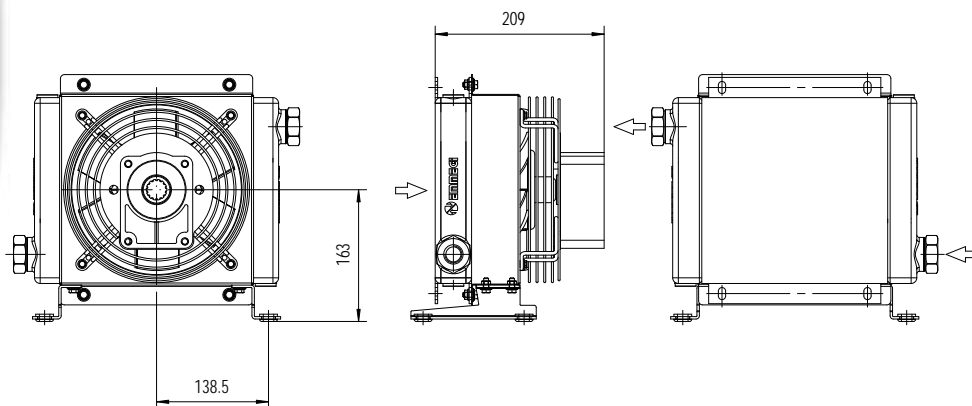
P/N 2Z1501###
P/N 2Z1503###



P/N 2Z1504###



P/N 2Z1512###
P/N 2Z1524###



P/N 2Z1556###

Le dimensioni di ingombro e le caratteristiche tecniche non sono impegnative
Over-all dimensions and technical characteristic are not binding

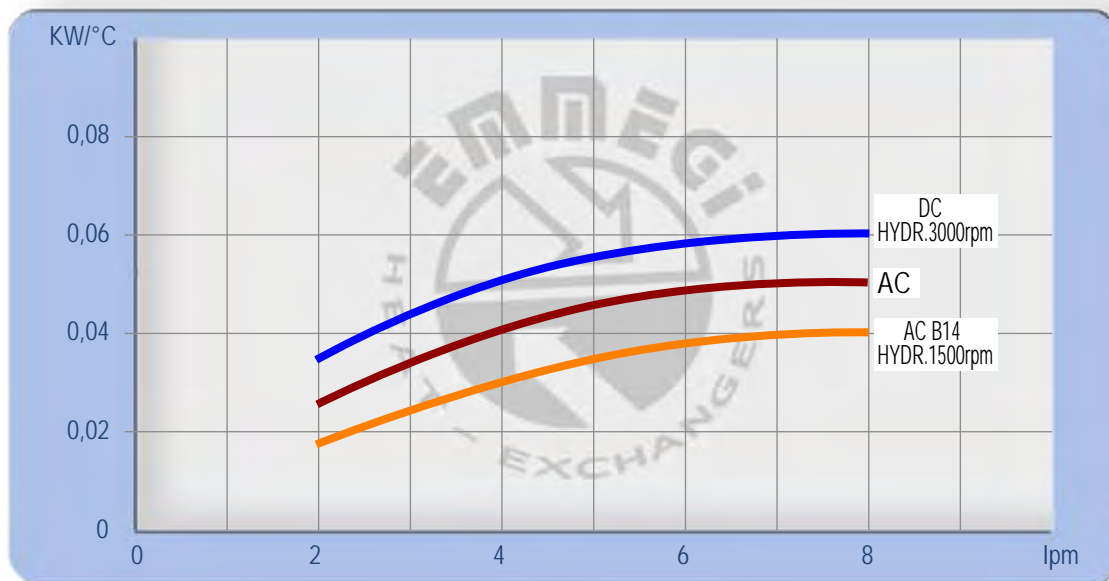
DRAIN 2015K

Dati tecnici Technical Data

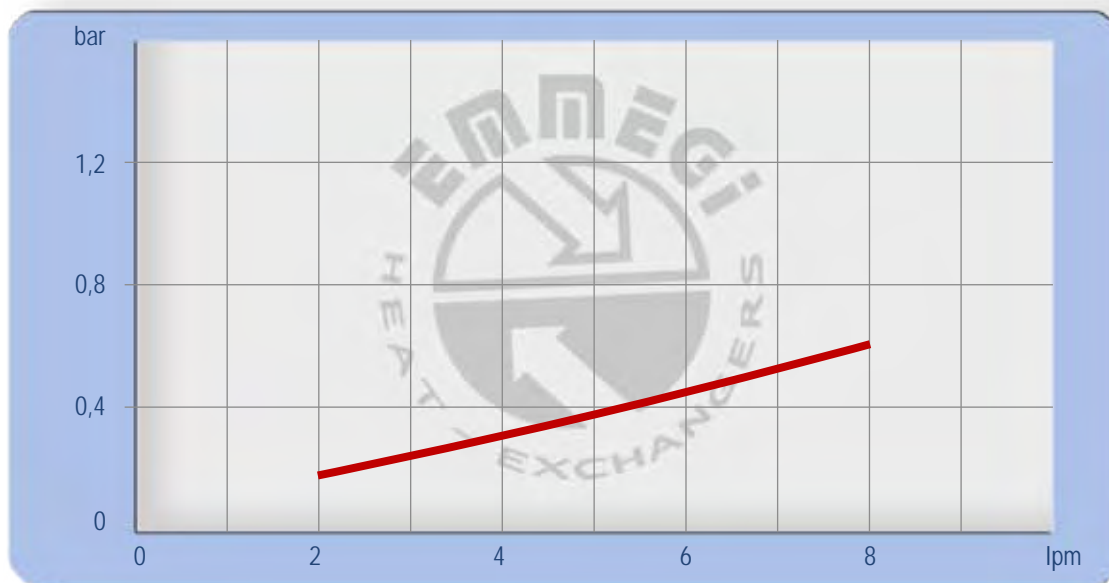
P/N	V	Hz	KW	A	rpm	ø Fan	dB(A)	(m³/h)	IP	lt	Kg
2Z1501 ###	230AC	50/60	0,050/0,061	0,24-0,28	2740/3120	200	68	700	44	0,5	7
2Z1503 ###	230-400 AC	50/60	0,068/0,070	0,17-0,13	2600/2900	200	69	720	44		7
2Z1504 ###	230-400 AC B14 265-460 AC B14	50	0,25	1,7- 1	1340	200	61	415	55	0,5	10
		60	0,30	1,7- 1	1610						
2Z1512 ###	12 DC	/	0,08	6,4	2770	225	72	790	68		6,5
2Z1524 ###	24 DC	/	0,09	3,9	2900	225	73	865	68		6,5
2Z1556 ###	Prepared for Gr.2 hydraulic motor					200			/		6

Contattare EMMEGI Contact EMMEGI

Diagramma rendimento Performance diagram



Perdite di carico Pressure drop (ISO VG 32)



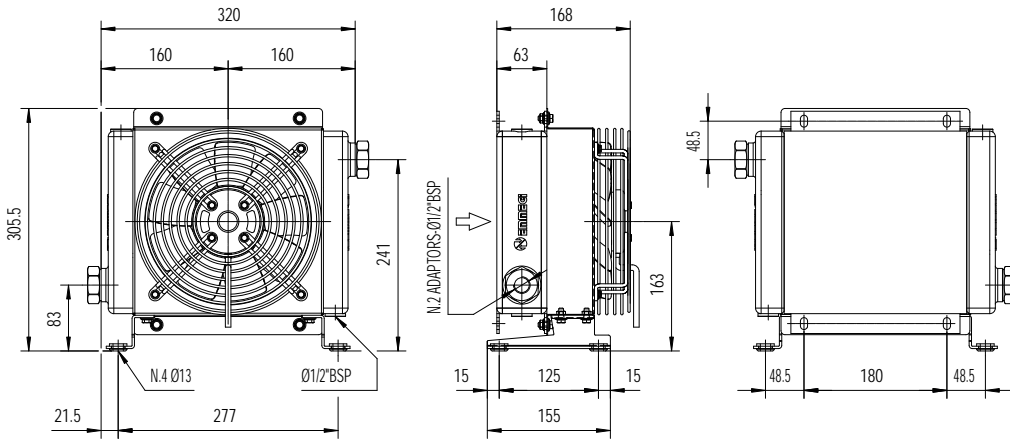
Fattore di correzione - F - (perdite di carico) Correction factor - F - (Pressure drop)

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

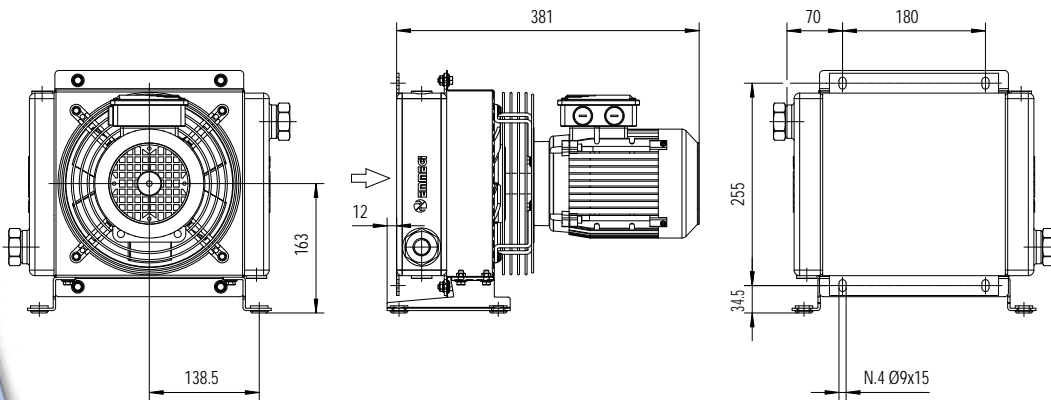


DRAIN 2015K

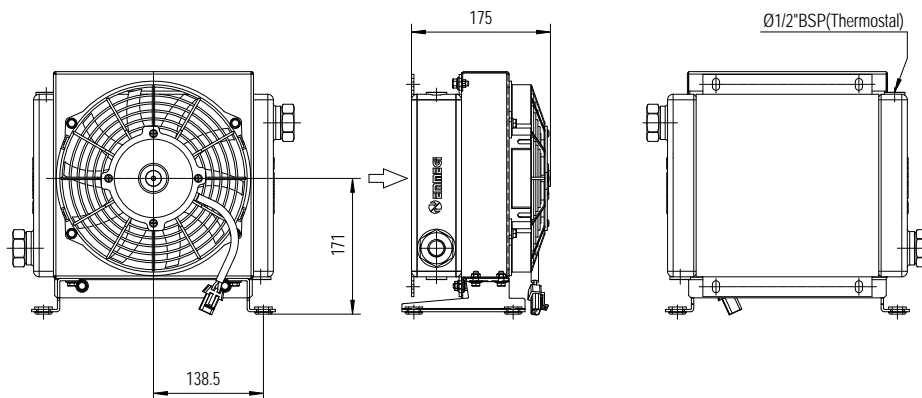
Dimensioni Dimensions



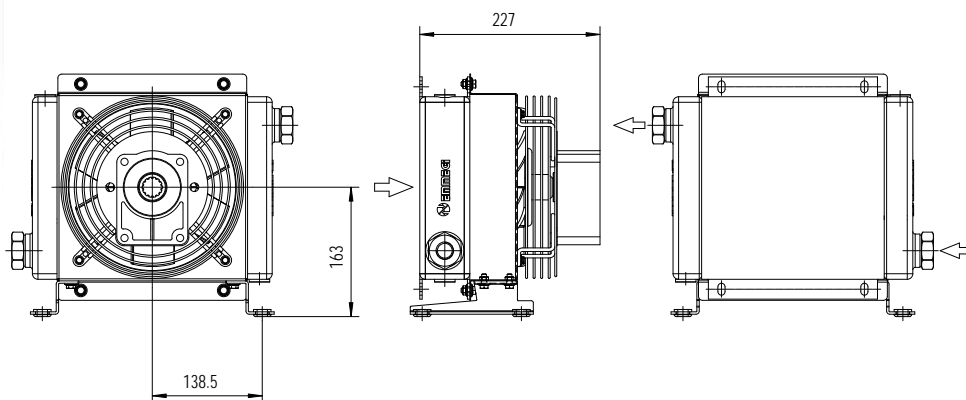
P/N 2Z2001###
P/N 2Z2003###



P/N 2Z2004###



P/N 2Z2012###
P/N 2Z2024###



P/N 2Z2056###

Le dimensioni di ingombro e le caratteristiche tecniche non sono impegnative
Over-all dimensions and technical characteristic are not binding

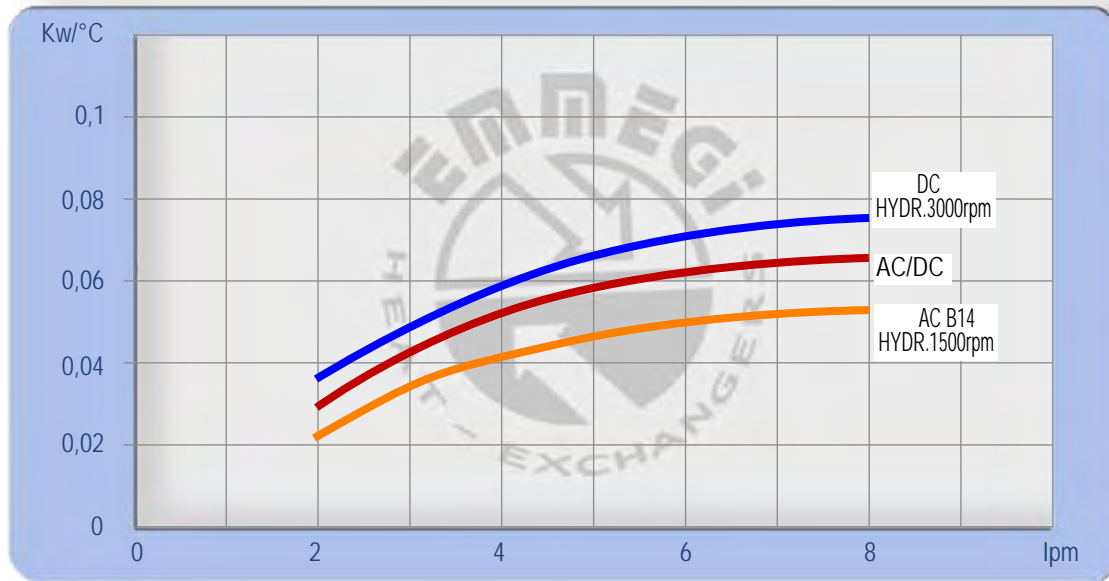
DRAIN 2020K

Dati tecnici Technical Data

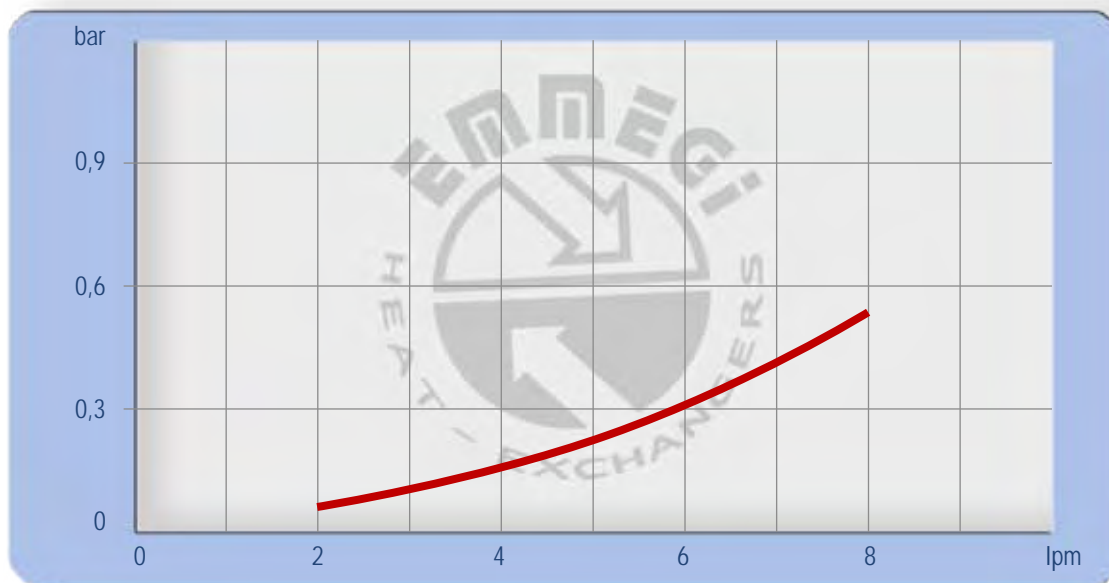
P/N	V	Hz	kW	A	rpm	∅ Fan	dB(A)	(m³/h)	IP	It	Kg	
2Z2001 ###	230AC	50/60	0,05/0,061	0,24-0,28	2740/3120	200	68	675	44	0,7	8	
2Z2003 ###	230-400 AC	50/60	0,068/0,07	0,17-0,13	2600/2900	200	68	645	44		8	
2Z2004 ###	230-400 AC B14	50	0,25	1,7- 1	1340	200	64	390	55		0,7	11
	265-460 AC B14	60	0,30	1,7- 1	1610							
2Z2012 ###	12 DC	/	0,08	6,4	2770	225	72	720	68			7
2Z2024 ###	24 DC	/	0,09	3,9	2900	225	72	750	68			7
2Z2056 ###	Prepared for Gr.2 hydraulic motor					200			/	7		

Contattare EMMEGI Contact EMMEGI

Diagramma rendimento Performance diagram



Perdite di carico Pressure drop (ISO VG 32)



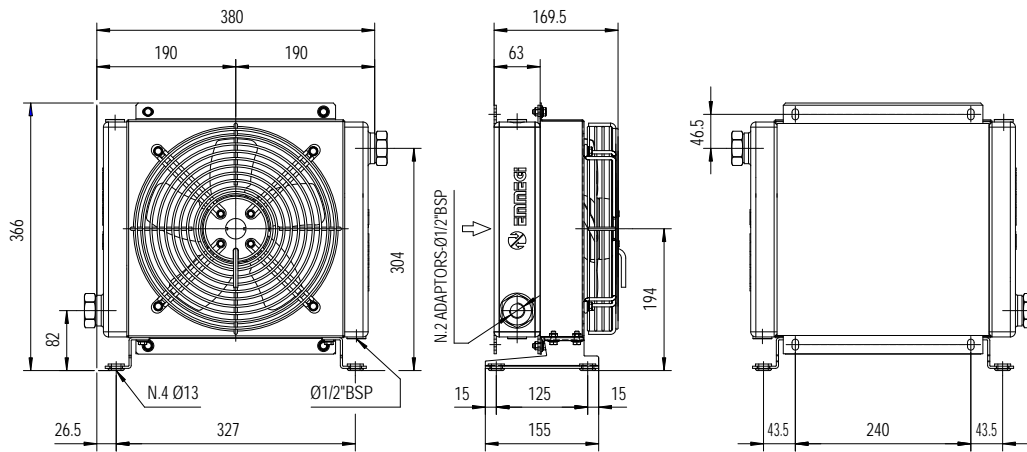
Fattore di correzione - F - (perdite di carico) Correction factor - F - (Pressure drop)

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

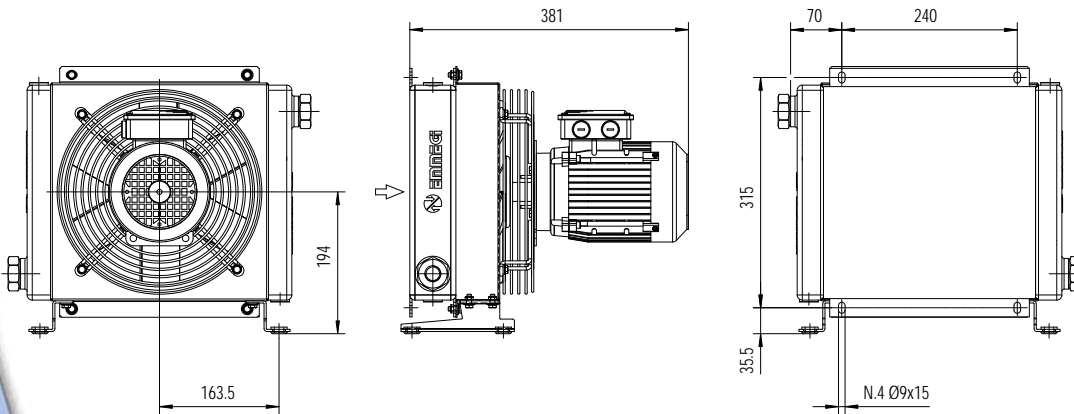


DRAIN 2020K

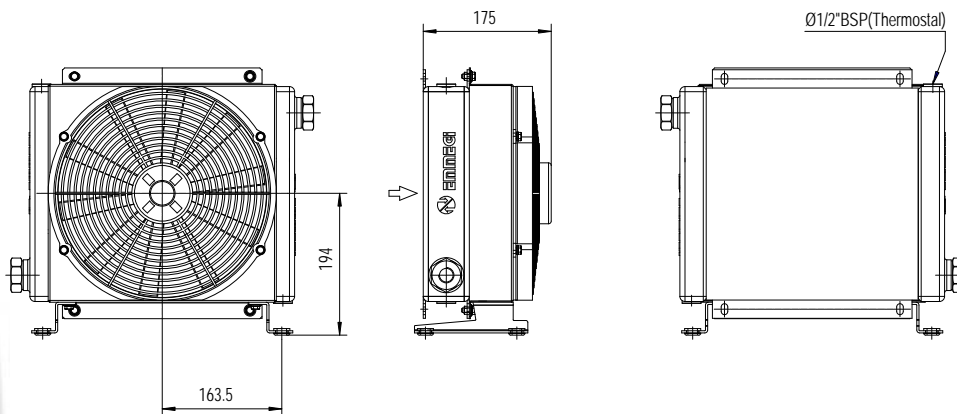
Dimensioni Dimensions



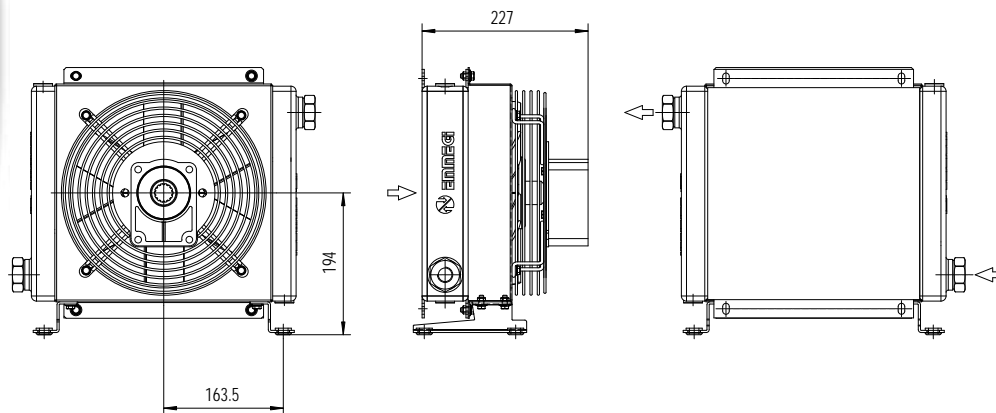
P/N 2Z2401###
P/N 2Z2403###



P/N 2Z2404###



P/N 2Z2412###
P/N 2Z2424###



P/N 2Z2456###

Le dimensioni di ingombro e le caratteristiche tecniche non sono impegnative
Over-all dimensions and technical characteristic are not binding

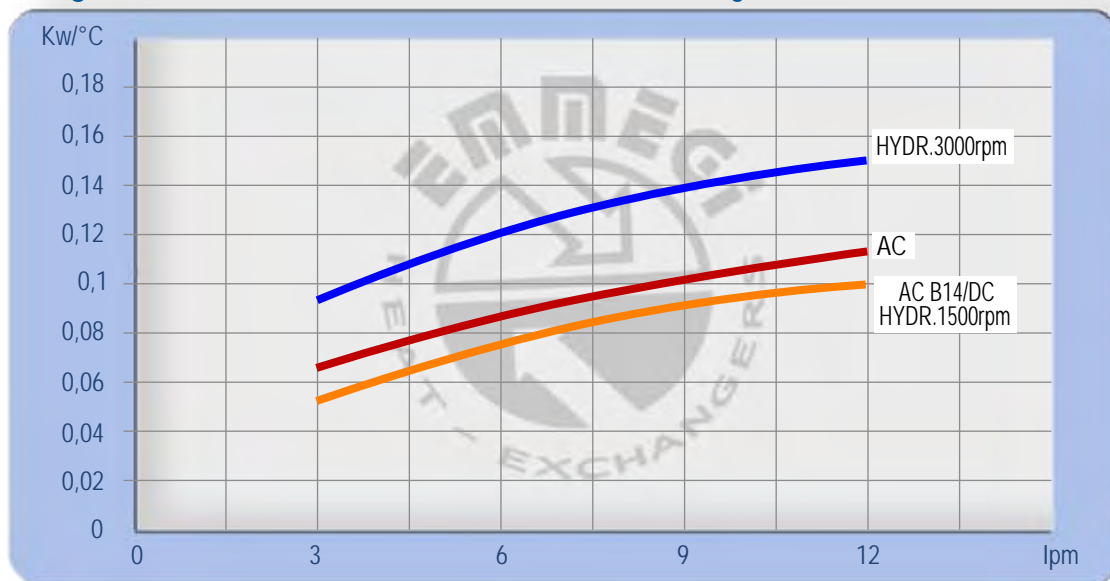
DRAIN 2024K

Dati tecnici Technical Data

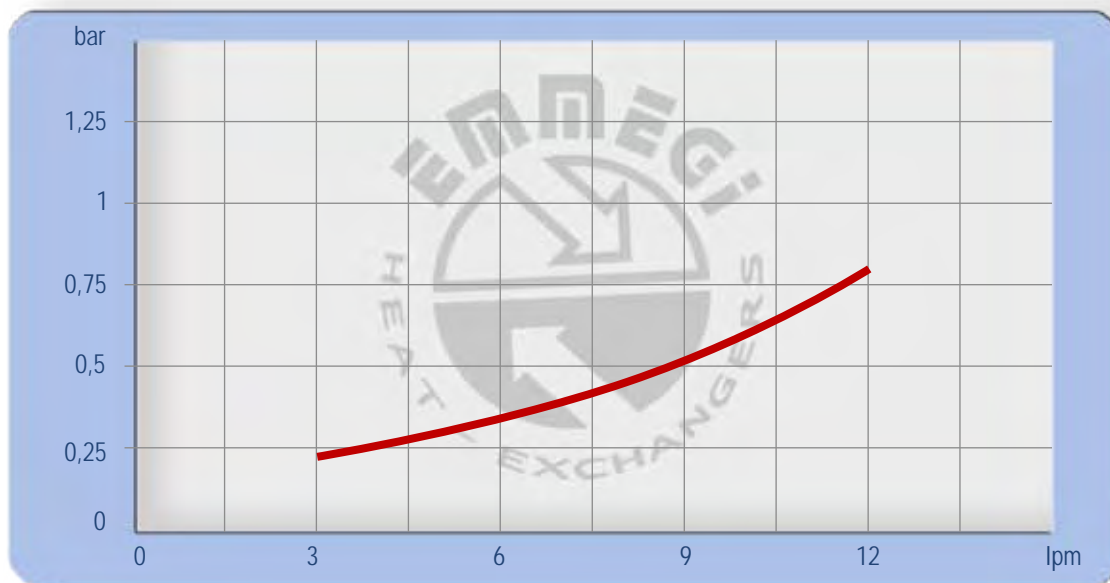
P/N	V	Hz	kW	A	rpm	∅ Fan	dB(A)	(m³/h)	IP	lt	Kg
2Z2401 ###	230AC	50/60	0,115/0,150	0,51/0,66	2450/2600	250	72	1350	44		11
2Z2403 ###	230-400 AC	50/60	0,105/0,145	0,19/0,23	2500/2650	250	72	1300	44		11
2Z2404 ###	230-400 AC B14 265-460 AC B14	50	0,25	1,7- 1	1340	250	64	1000	55	1	16
		60	0,30	1,7- 1	1610						
2Z2412 ###	12 DC	/	0,09	7,5	2710	280	72	950	68		10
2Z2424 ###	24 DC	/	0,10	4,3	2765	280	74	1030	68		10
2Z2456 ###	Prepared for Gr.2 hydraulic motor					250			/		10

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Diagramma rendimento Performance diagram



Perdite di carico Pressure drop (ISO VG 32)



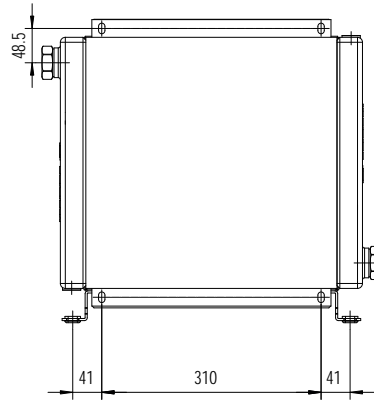
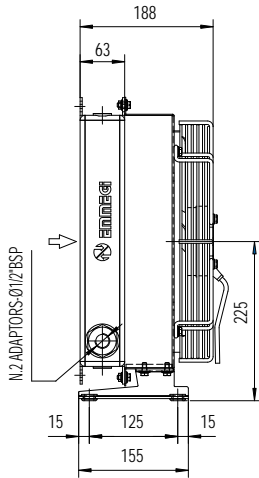
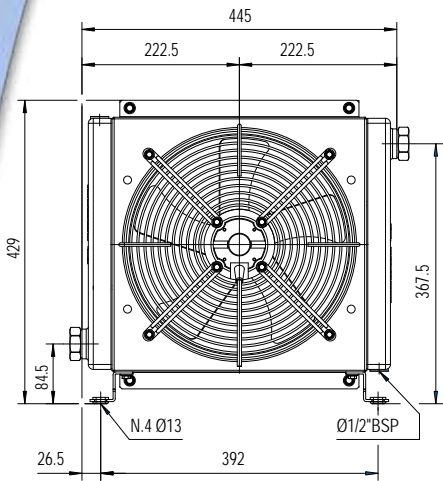
Fattore di correzione - F - (perdite di carico) Correction factor - F - (Pressure drop)

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

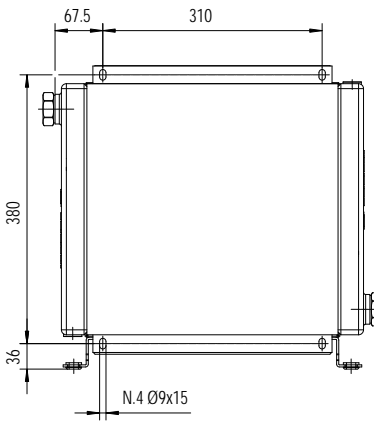
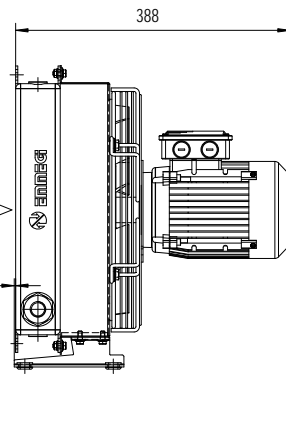
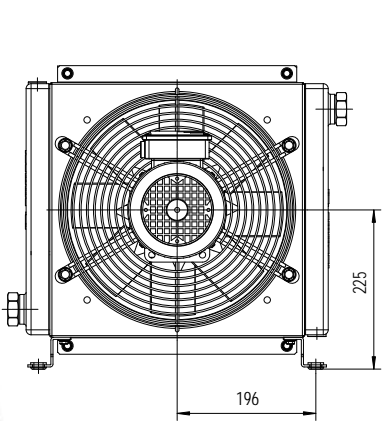


DRAIN 2024K

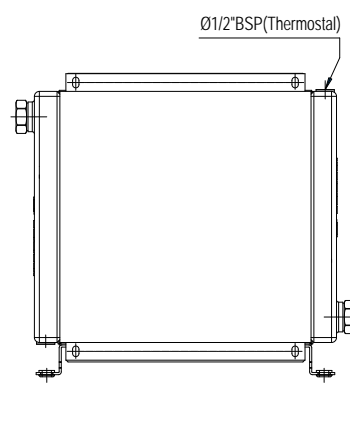
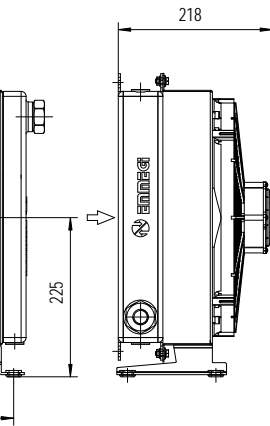
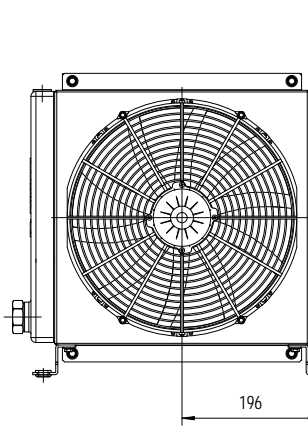
Dimensioni Dimensions



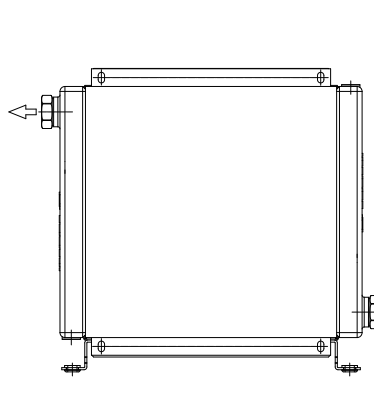
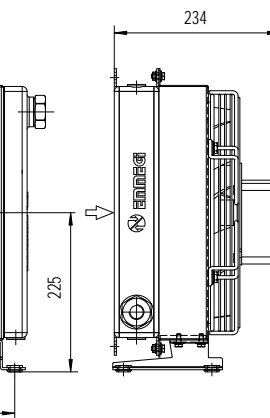
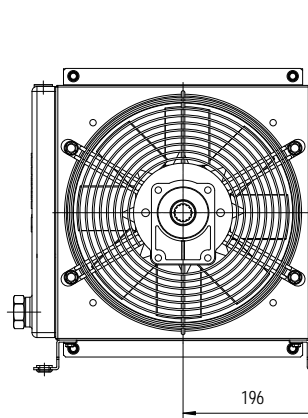
P/N 2Z3001###
P/N 2Z3003###



P/N 2Z3004###



P/N 2Z3012###
P/N 2Z3024###



P/N 2Z3056###

Le dimensioni di ingombro e le caratteristiche tecniche non sono impegnative
Over-all dimensions and technical characteristic are not binding

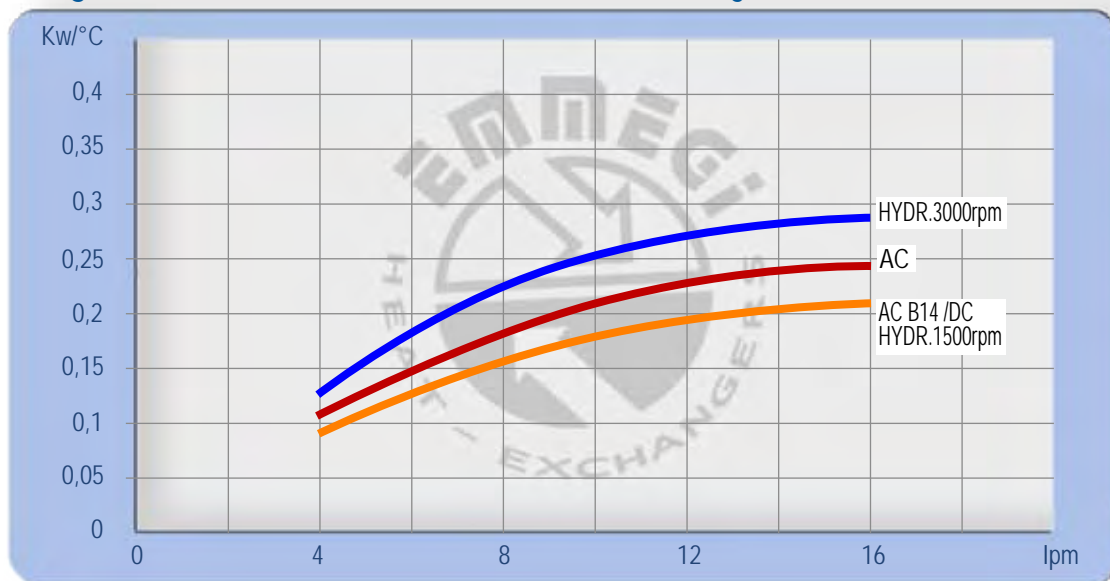
DRAIN 2030K

Dati tecnici Technical Data

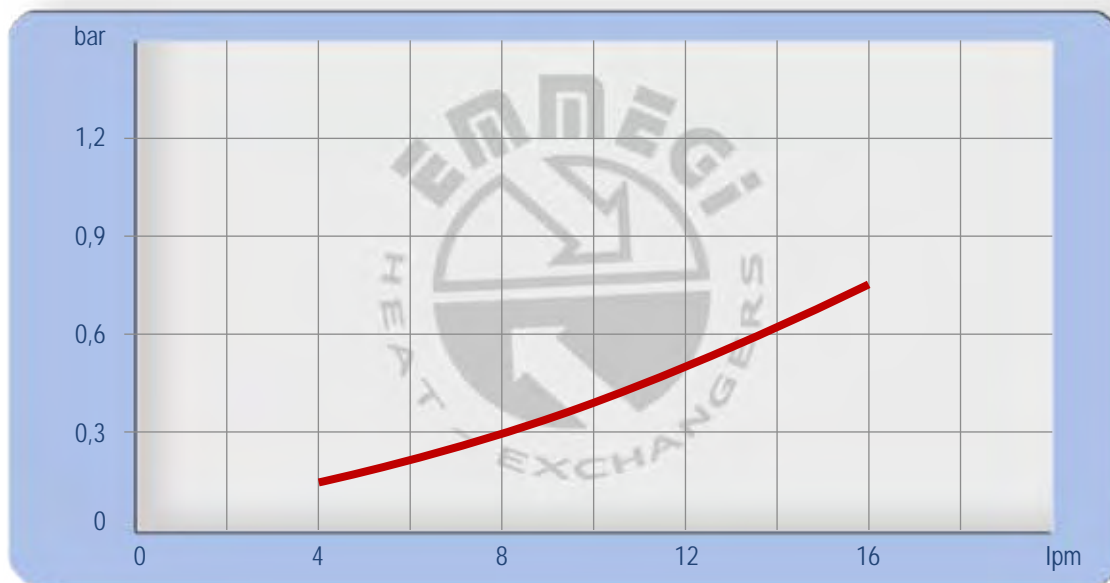
P/N	V	Hz	kW	A	rpm	∅ Fan	dB(A)	(m³/h)	IP	lt	Kg
2Z3001 ###	230AC	50/60	0,23/0,35	1,1/1,55	2700/3000	300	78	2220	44	1,6	15
2Z3003 ###	230-400 AC	50/60	0,21/0,30	0,62-0,36/0,84-0,48	2580/2750	300	76	2500	44		15
2Z3004 ###	230-400 AC B14	50	0,37	2,2-1,25	1370	300	70	1850	55		20
	265-460 AC B14	60	0,44	2,2-1,25	1640						
2Z3012 ###	12 DC	/	0,16	13,3	2660	305	80	1675	68		14
2Z3024 ###	24 DC	/	0,18	7,4	2870	305	83	1880	68		14
253056 ###	Prepared for Gr.2 hydraulic motor					300			/	15	

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Diagramma rendimento Performance diagram



Perdite di carico Pressure drop (ISO VG 32)



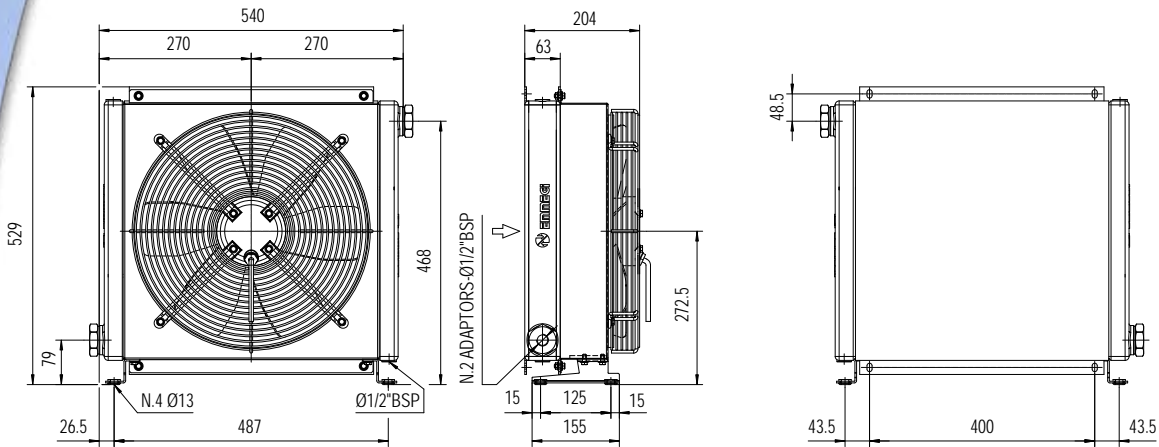
Fattore di correzione - F - (perdite di carico) Correction factor - F - (Pressure drop)

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

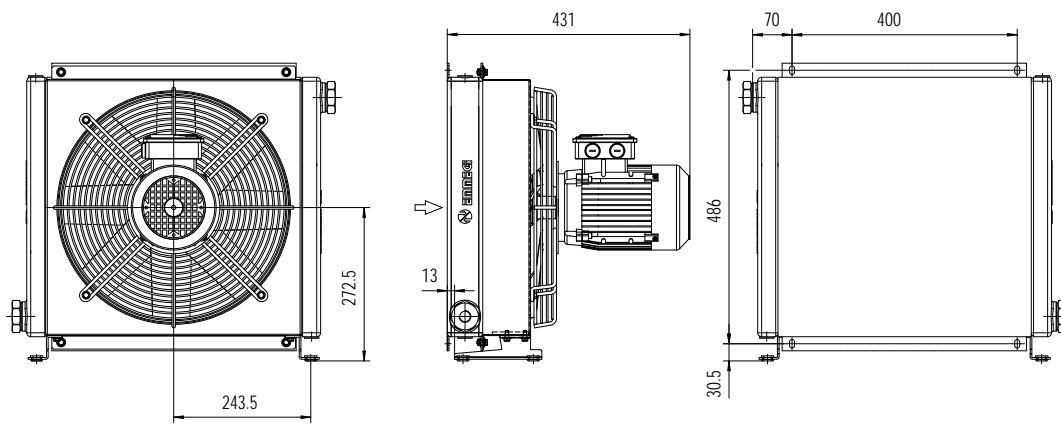


DRAIN 2030K

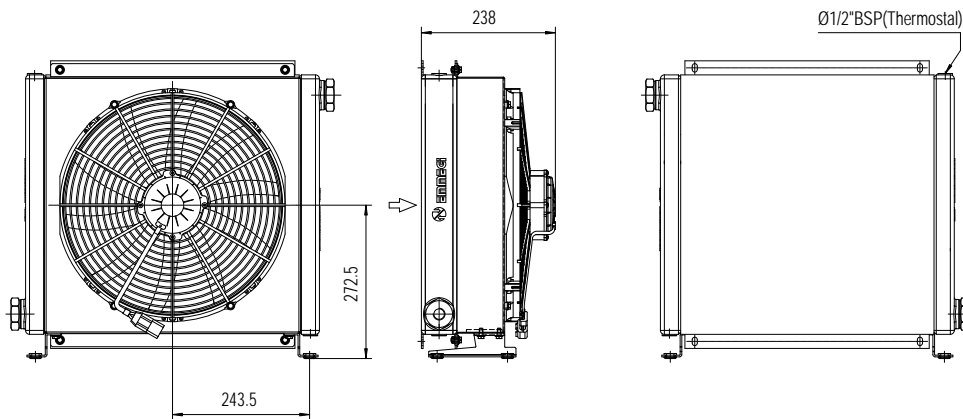
Dimensioni Dimensions



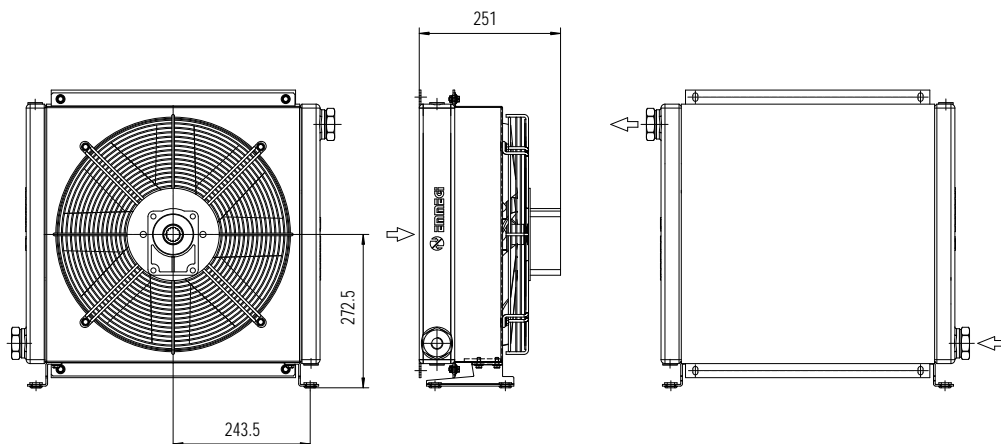
P/N 2Z4001###
P/N 2Z4003###



P/N 2Z4004###



P/N 2Z4012###
P/N 2Z4024###



P/N 2Z4056###

Le dimensioni di ingombro e le caratteristiche tecniche non sono impegnative
Over-all dimensions and technical characteristic are not binding

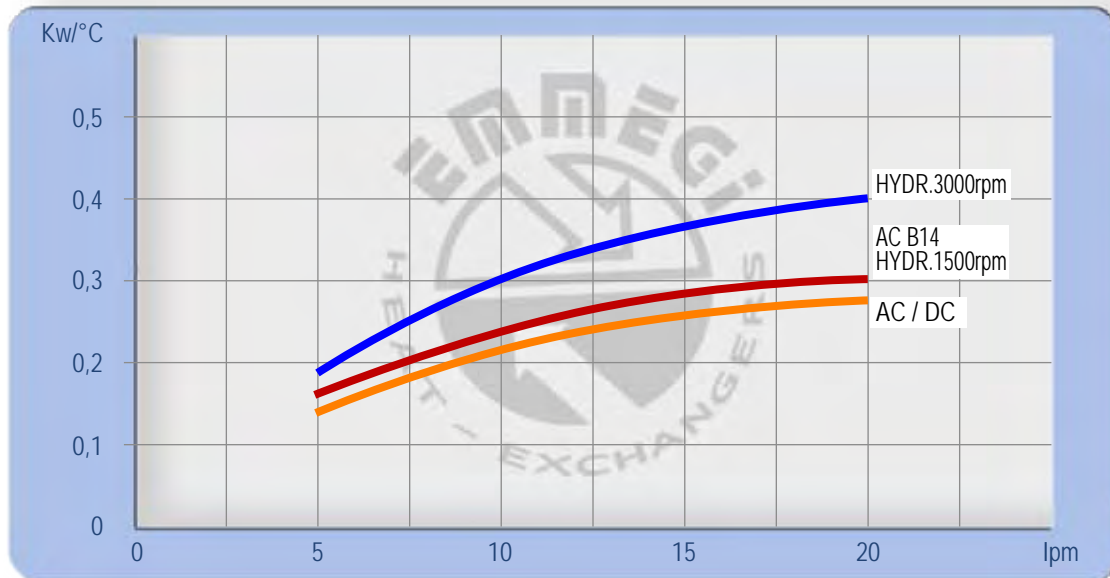
DRAIN 2040K

Dati tecnici Technical Data

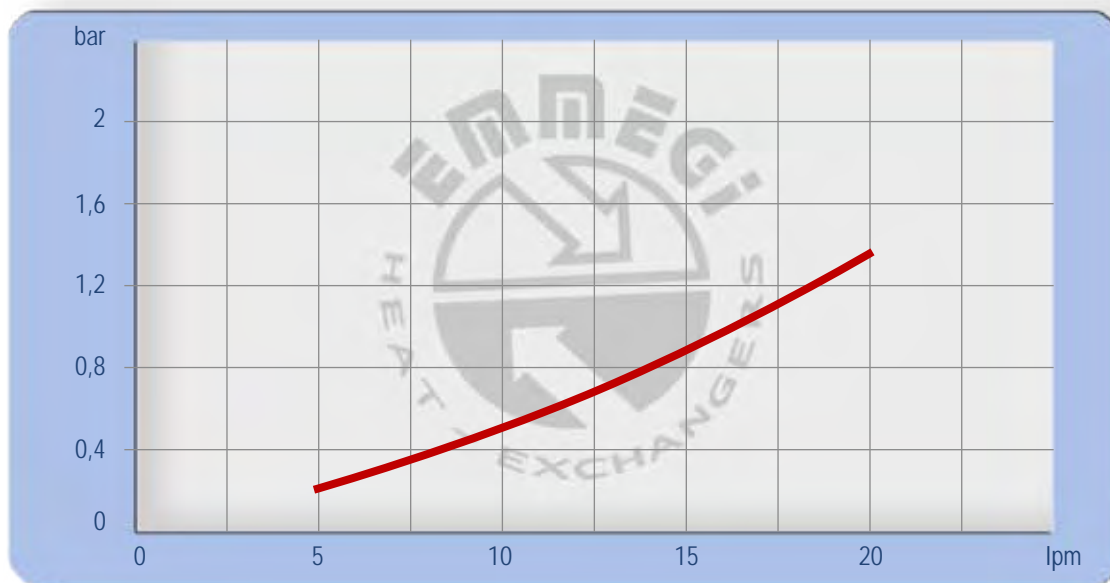
P/N	V	Hz	kW	A	rpm	∅ Fan	dB(A)	(m³/h)	IP	lt	Kg	
2Z4001 ###	230AC	50	0,16/0,24	0,73/1,06	1430/1700	400	71	3200	54	2,7	21	
2Z4003 ###	230-400 AC	50/60	0,135/0,185	0,44/0,39	1450/1690	400	71	3200	54		21	
2Z4004 ###	230-400 AC B14	50	0,55	2,9-1,7	1400	400	77	3740	55		20	
	265-460 AC B14	60	0,66	2,9-1,7	1680							
2Z4012 ###	12 DC	/	0,22	19,2	2310	385	76	2770	68			20
2Z4024 ###	24 DC	/	0,23	9,3	2380	385	79	2910	68			20
2Z4056 ###	Prepared for Gr.2 hydraulic motor					400			/	19		

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Diagramma rendimento Performance diagram



Perdite di carico Pressure drop (ISO VG 32)



Fattore di correzione - F - (perdite di carico) Correction factor - F - (Pressure drop)

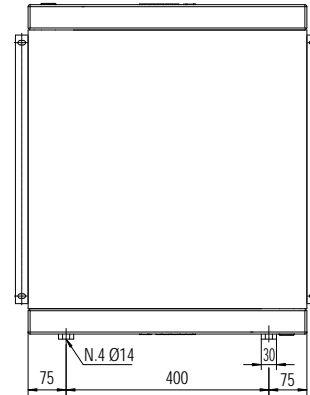
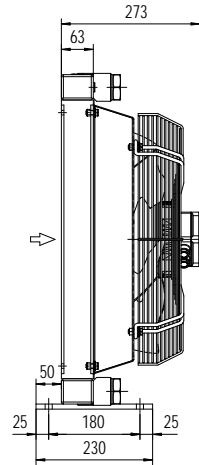
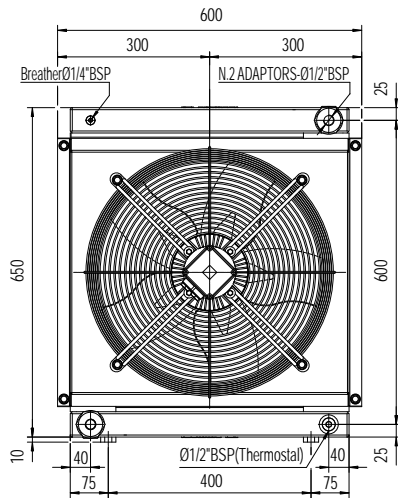
cst	10	15	20	30	40	50	60	80	100	200	300
F	0,5	0,65	0,77	1	1,2	1,4	1,6	1,9	2,1	3,3	4,3



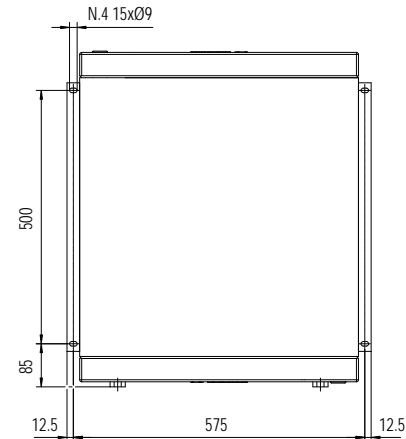
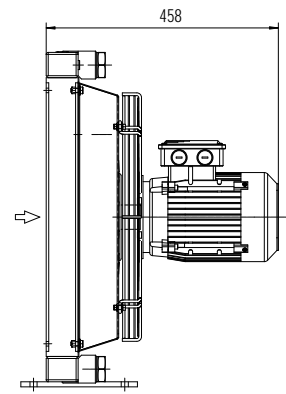
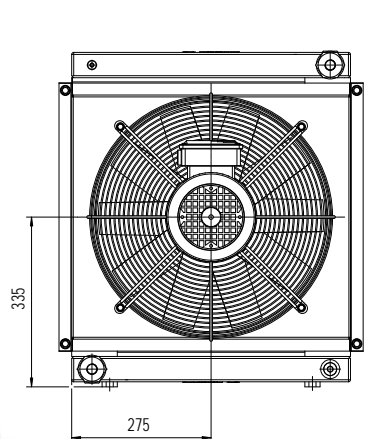
DRAIN 2040K

Dimensioni Dimensions

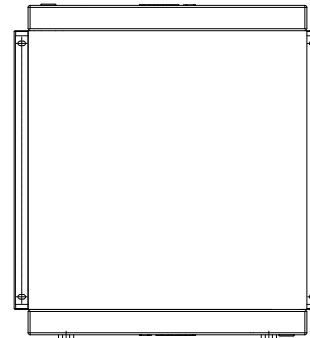
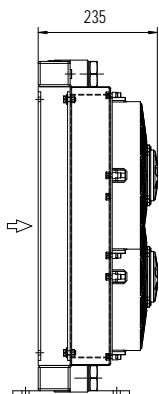
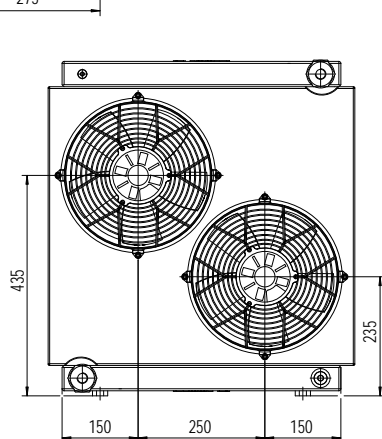
DRAIN 2050K



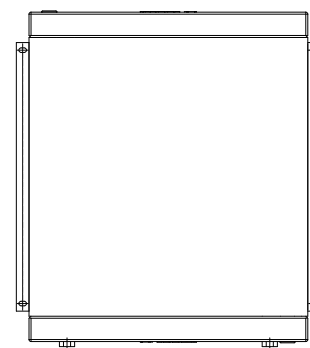
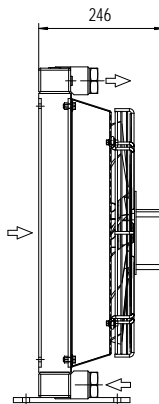
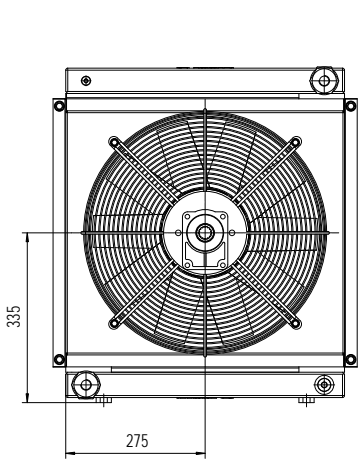
P/N 2Z5001###
P/N 2Z5003###



P/N 2Z5004###



P/N 2Z5012###
P/N 2Z5024###



P/N 2Z5056###

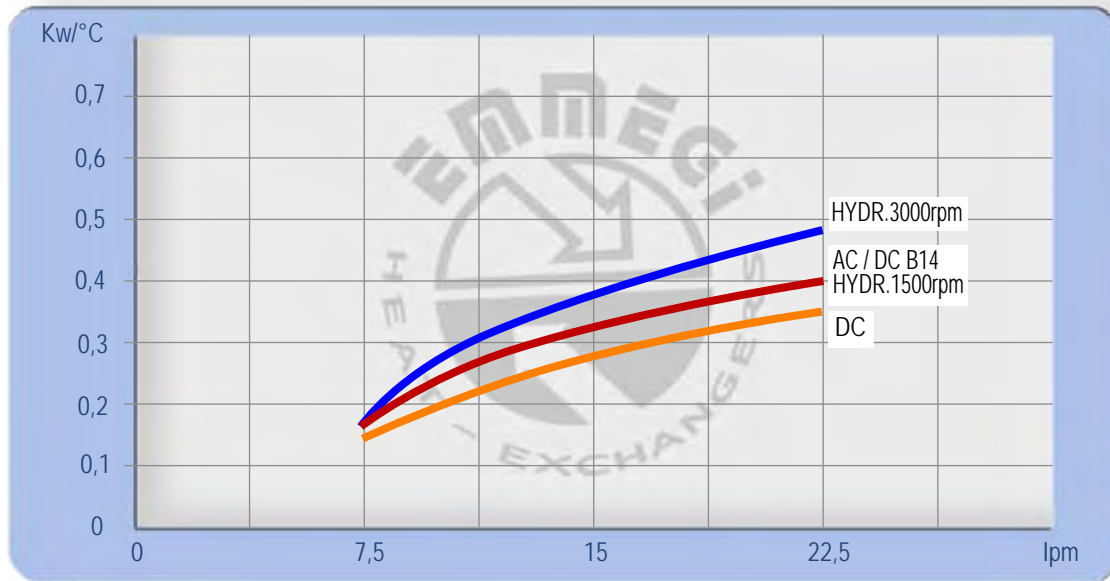
Le dimensioni di ingombro e le caratteristiche tecniche non sono impegnative
Over-all dimensions and technical characteristic are not binding

Dati tecnici Technical Data

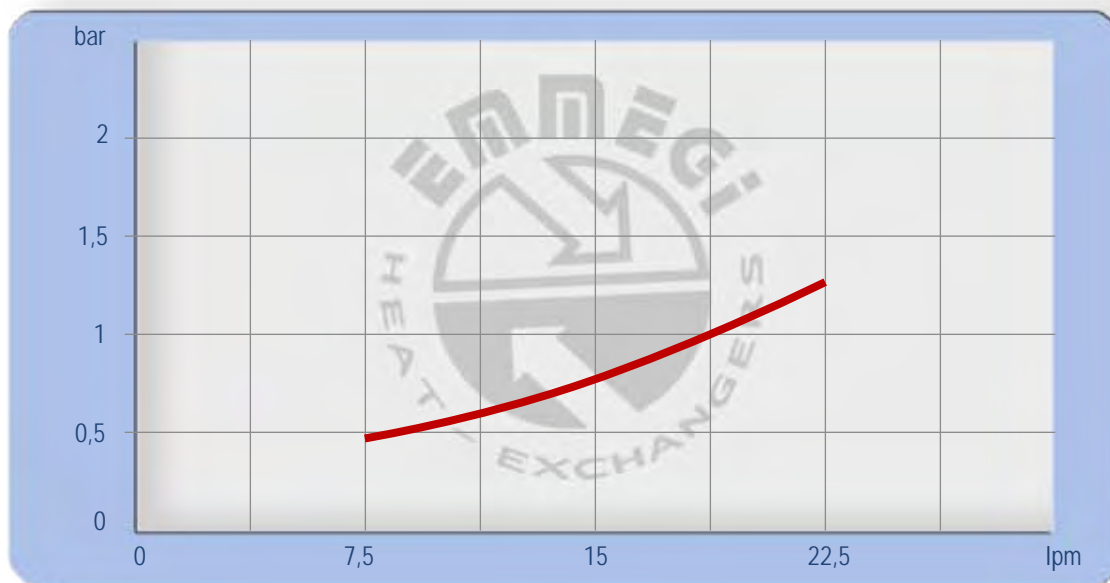
P/N	V	Hz	kW	A	rpm	ø Fan	dB(A)	(m³/h)	IP	lt	Kg
2Z5003 ###	230-400 AC	50/60	0,52/0,66	1,9/1,1	1420/1600	450	76	5000	54	5	27
2Z5004 ###	230-400 AC B14	50	0,75	3,0-1,7	1410	450	79	5200	55		30
	265-460 AC B14	60	0,90	2,6-1,5	1720				68		24
2Z5012 ###	12 DC	/	0,13 (2x)	11,0 (2x)	2340	280	76	1720(2x)	68		24
2Z5024 ###	24 DC	/	0,15 (2x)	6,2 (2x)	2600	280	79	1750(2x)	68		24
2Z5056 ###	Prepared for Gr.2 hydraulic motor					450			/	23	

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Diagramma rendimento Performance diagram



Perdite di carico Pressure drop (ISO VG 32)



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



DRAIN 2050K

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This catalogue replace all the previous one.

USA

EMMEGI HEAT EXCHANGERS Inc.

(Main Office and Manufacturing)
3606 E. Southern Ave. Suite 2
Phoenix, AZ 85040 USA
Ph. +1 602 438 7101
Fax +1 602 438 7127
<http://www.emmegiinc.com>
sales@emmegiinc.com

CHINA

EMMEGI HEAT EXCHANGERS

(Beijing) Co.,Ltd.
Unit 706,7/ F. Building A, China
Foreign Language Mansion,
89 West, 3 rd Ring (N) Road,
Haidian District,Beijing,
PR.China,Post code: 100089
Ph. + 86 10 88820971- Fax + 86 10 88820972
<http://www.emmegi-heat-exchangers.com>
stefano@emmegi-heat-exchangers.com

SWEDEN/FINLAND

EMMEGI HEAT EXCHANGERS

NORDIC AB.
Box 1136
262 22 ANGELHOLM
Visitors: Nybrovagen 4
Ph. + 46 (0) 431- 415096
Fax + 46 (0) 431- 415099
<http://www.emmegi-heat-exchangers.com>
info.nordic@emmegi-heat-exchangers.com

UK

EMMEGI UK

(Sales Office)
Evergreen, The Reddings
Cheltenham GL51 6RL
Ph. + 44 1242700151
Fax + 44 1452531475
<http://www.emmegi.co.uk>
sales@emmegi.co.uk

TURKEY

EMMEGI HEAT EXCHANGERS

Termal Sistemler Sanayi ve Ticaret Ltd.Şti
2823 Sok. Carfi İş Merkezi
117 Z10 35110 Konak- izmir/Turkey
Ph. +90 530 1113335
Fax. +90 850 2244594
<http://www.emmegi-turkey.com>
kudret@emmegi-turkey.com

ASIA / PACIFIC

EMMEGI HEAT EXCHANGERS Ltd

Unit 17.9/ F.Corporation Park,
11 On Lai Street, Siu Lek Yuen,
Shatin, Hong Kong
Ph. + 852-26032487- Fax + 852-26032119
<http://www.emmegi-heat-exchangers.com>
emmegi@biznetvigator.com

GERMANY

EMMEGI GmbH

Philipp-Reis-Straße 2
41516 Grevenbroich-Kapellen
Ph. +49 02182-570 18-0
Fax +49 02182-570 18-29
vertrieb@emmegi-gmbh.de
<http://www.emmegi-gmbh.de>

SLOVAKIA

EMMEGI HEAT EXCHANGERS s.r.o.

Ul. M.Razusa 1
95514 Topolcany
Ph. + 421 385320739
Fax +421 385320742
<http://www.emmegi-heat-exchangers.com>
sro@emmegi-heat-exchangers.com

INDIA

EMMEGI INDIA

1011, Vishal Tower, District Centre, Janakpuri
110058 NEW DELHI
+91 1141588779
<http://www.emmegi-heat-exchangers.com>
anil@emmegi-heat-exchangers.com

ITALIA

EMMEGI S.p.A.

Via Newton,52 - Zona Industriale
20062 Cassano d'Adda (MI) - Italy
Tel. +39 0363 360236 - Fax + 39 0363 360230
<http://www.emmegi-heat-exchangers.com>
info@emmegi-heat-exchangers.com

