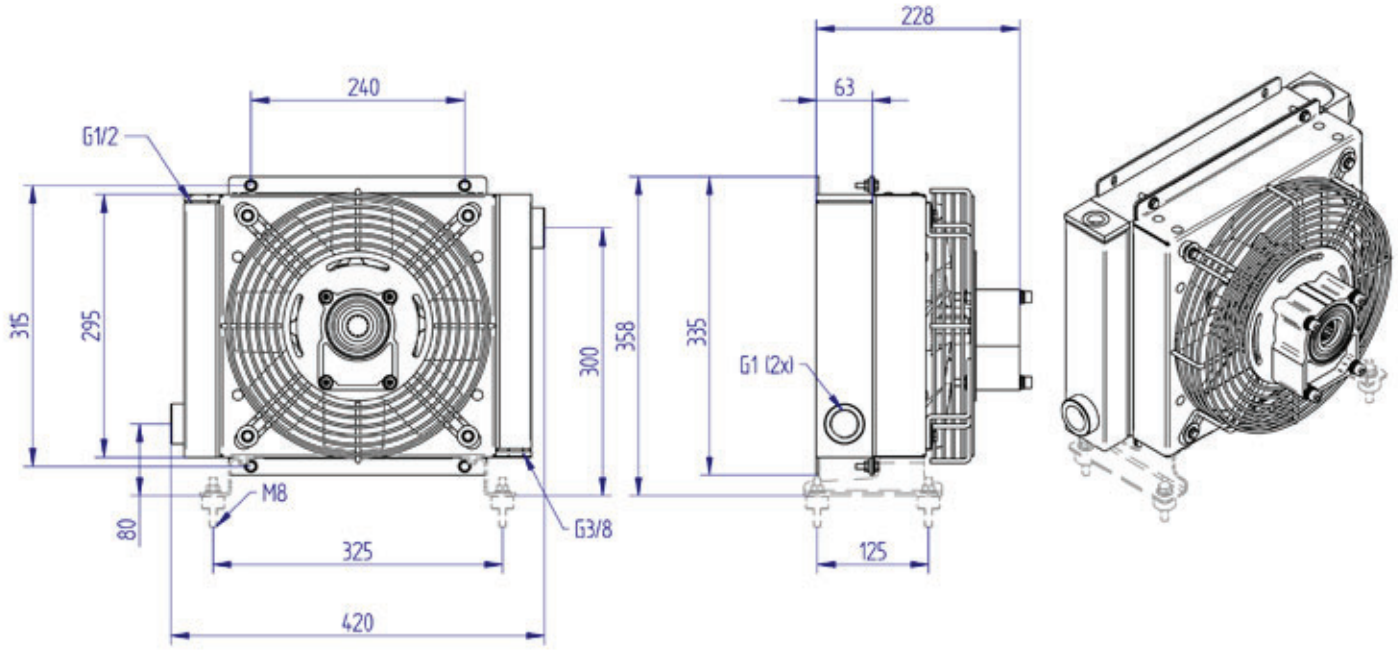
HY series

# HY024.1-05A

**AIR-OIL HEAT EXCHANGERS**

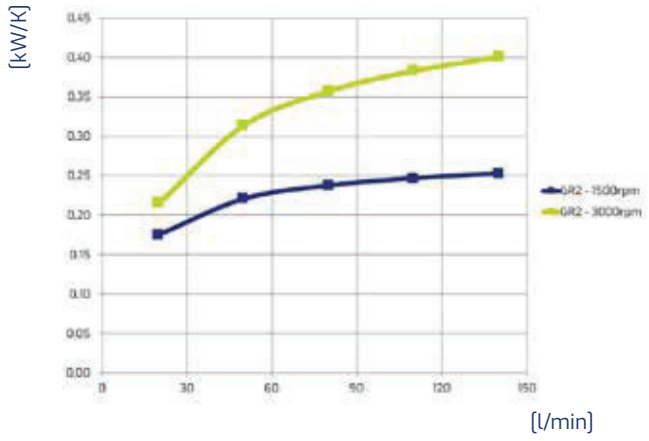
Suit. HY M — GR2




## Technical data

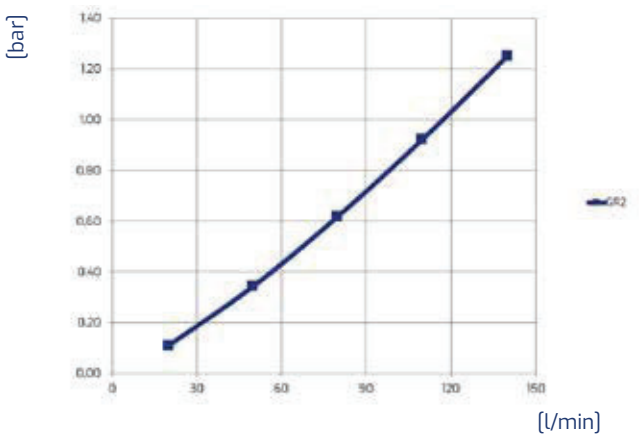
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY024.1-05A** | 20-140 | 2 | 12 | | | | 280 | 1020 | 76,3 | 1500 |
| **HY024.1-05A** | 20-140 | 2 | 12 | | | | 280 | 2090 | 91,3 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

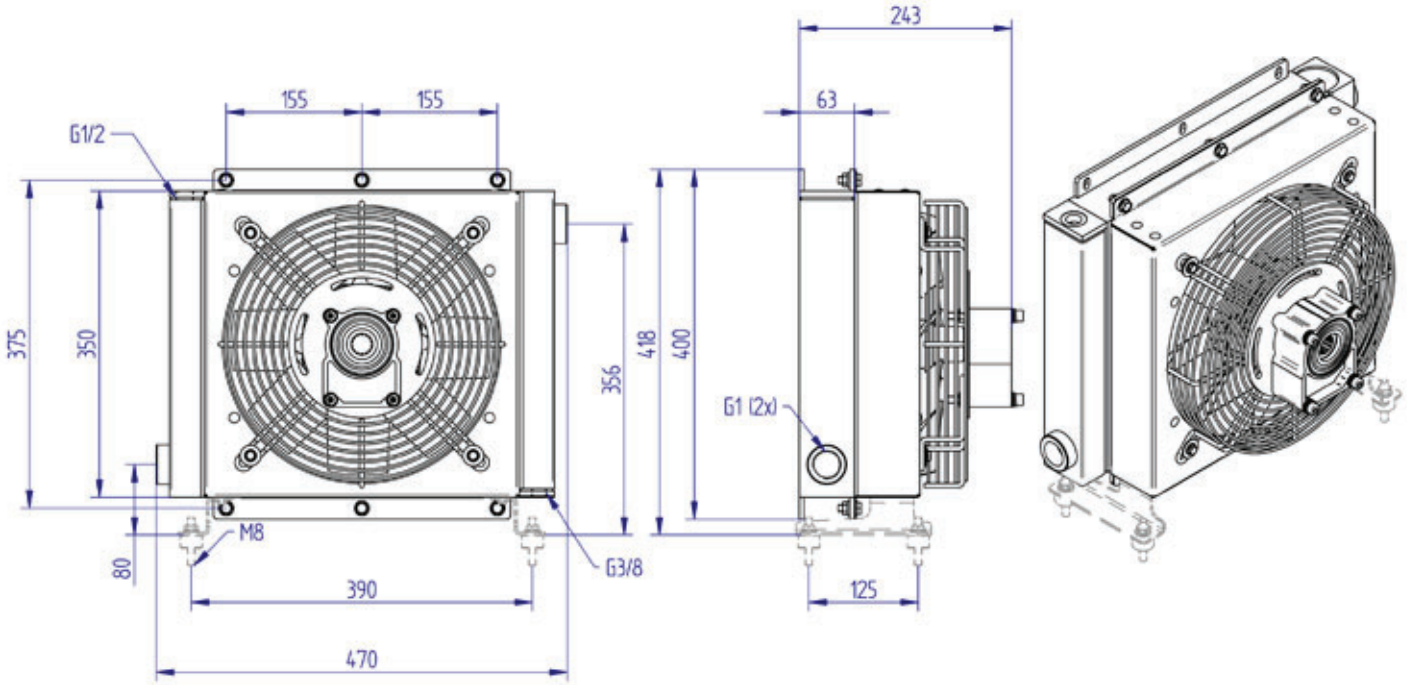
Technical data are not binding - The graphs show the central range of heat exchange data

HY series

# HY038.1-05A

## AIR-OIL HEAT EXCHANGERS

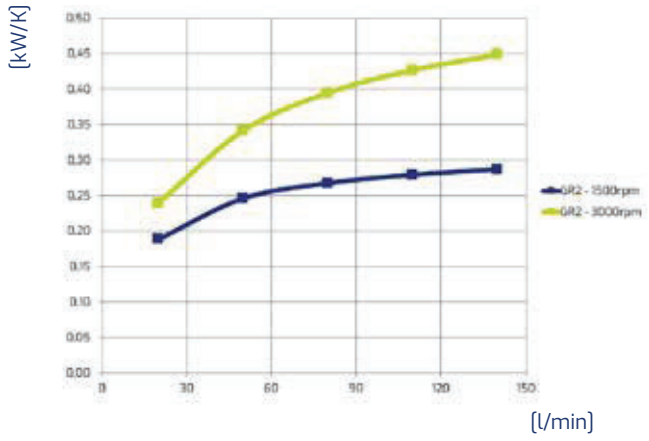
Suit. HY M | GR2




## Technical data

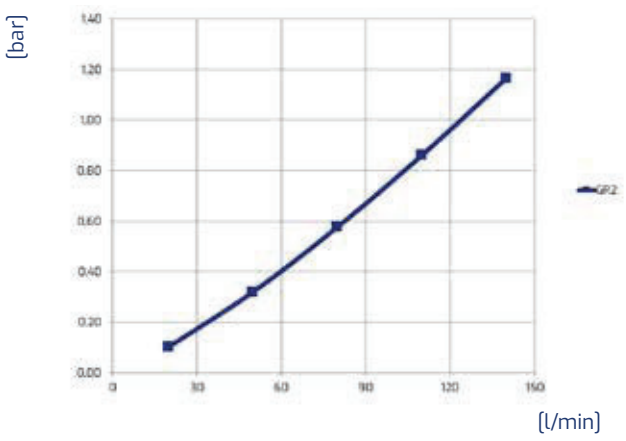
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY038.1-05A** | 20-140 | 2,5 | 13,5 | | | | 300 | 1291 | 74 | 1500 |
| **HY038.1-05A** | 20-140 | 2,5 | 13,5 | | | | 300 | 2658 | 88,8 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

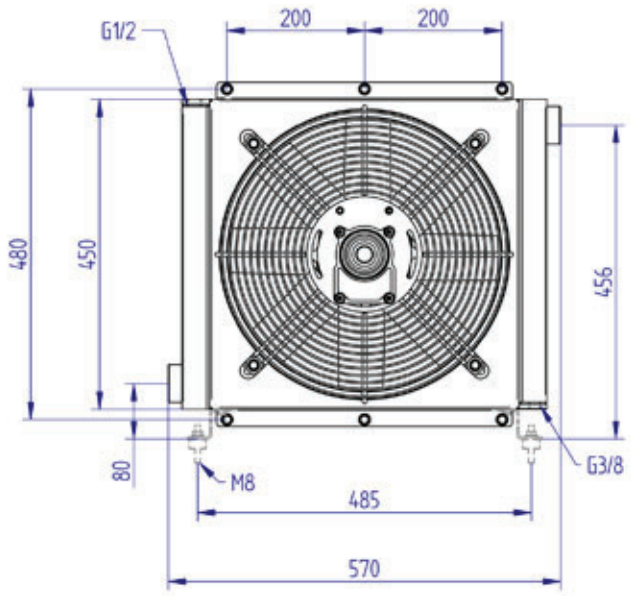
| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

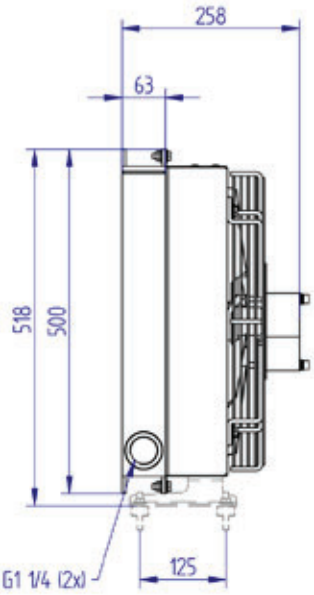
HY series

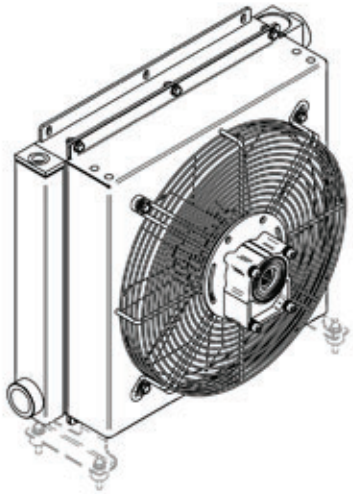
# HY057.1-05A

## AIR-OIL HEAT EXCHANGERS

Des. Hyd. M. | GR2



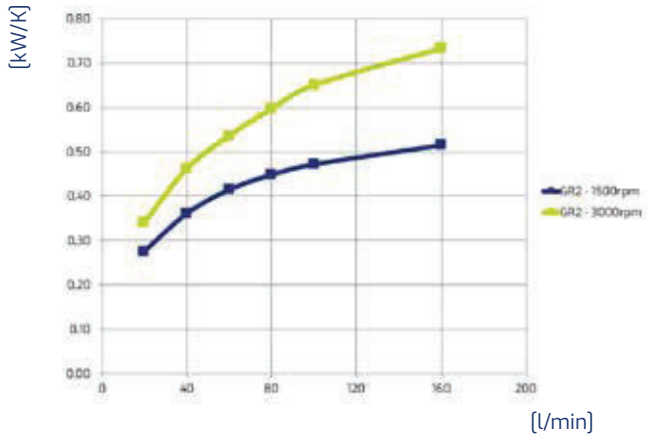



## Technical data

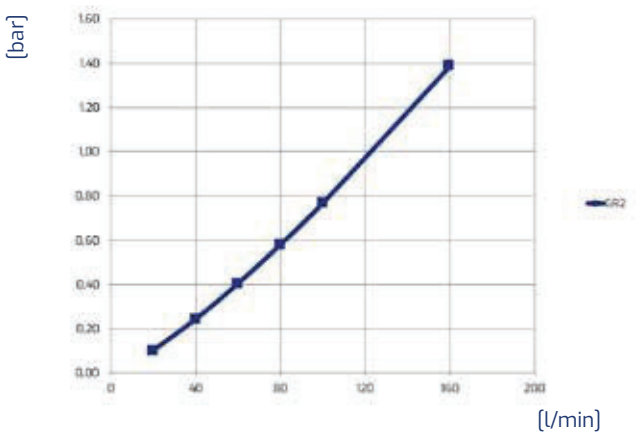
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (dB(A)) | |
| **HY057.1-05A** | 20-160 | 3,7 | 18 | | | | 390 | 2810 | 76,9 | 1500 |
| **HY057.1-05A** | 20-160 | 3,7 | 18 | | | | 390 | 5810 | 91,7 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

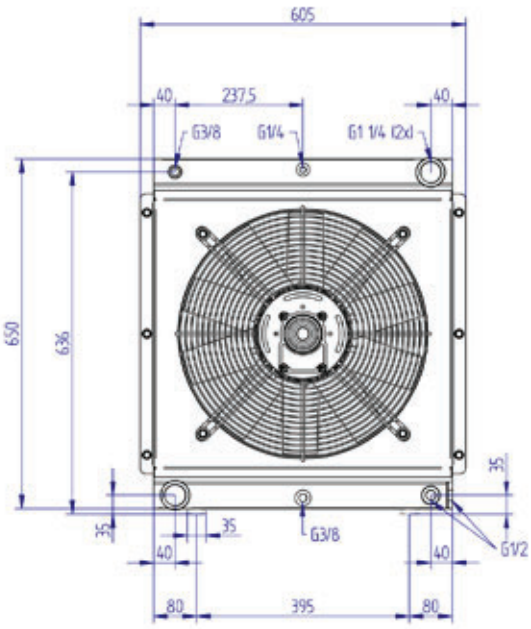
Technical data are not binding - The graphs show the central range of heat exchange data

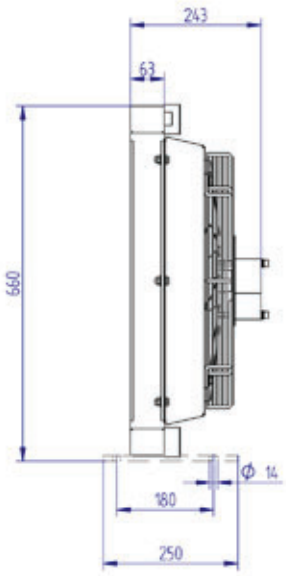
HY series

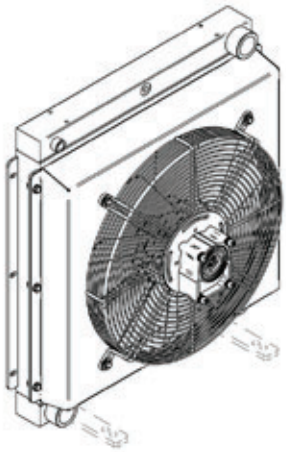
# HY090.1-05A

## AIR-OIL HEAT EXCHANGERS

Suit. HY M — GR2



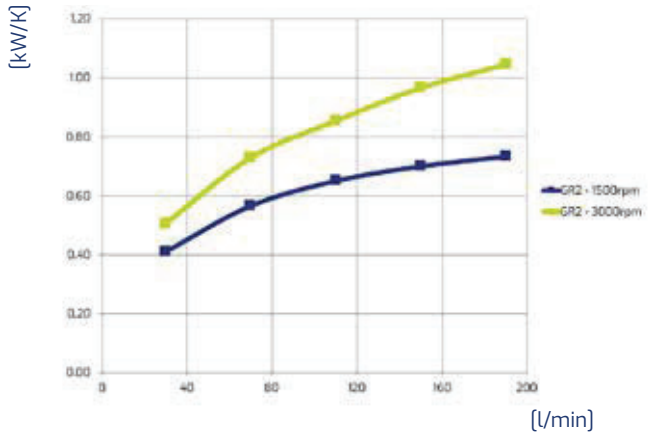



## Technical data

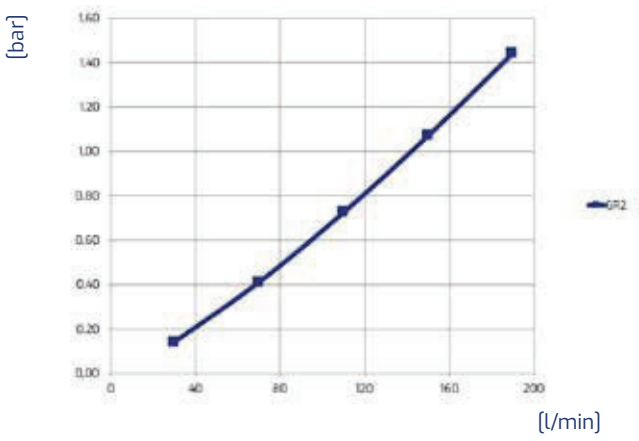
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY090.1-05A** | 30-190 | 5,3 | 29 | | | | 450 | 5400 | 82 | 1500 |
| **HY090.1-05A** | 30-190 | 5,3 | 29 | | | | 450 | 11300 | 97 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

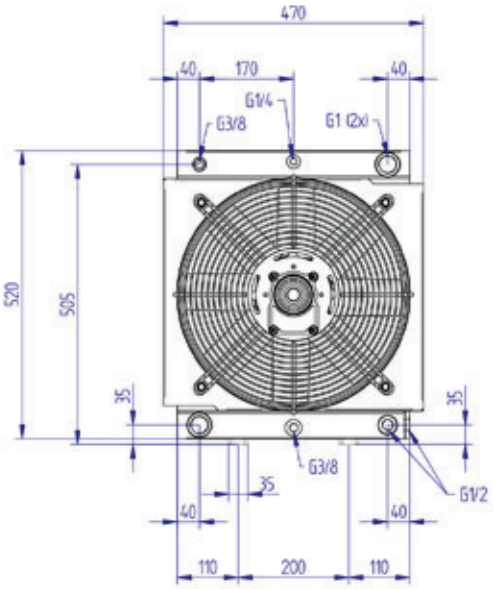
Technical data are not binding - The graphs show the central range of heat exchange data

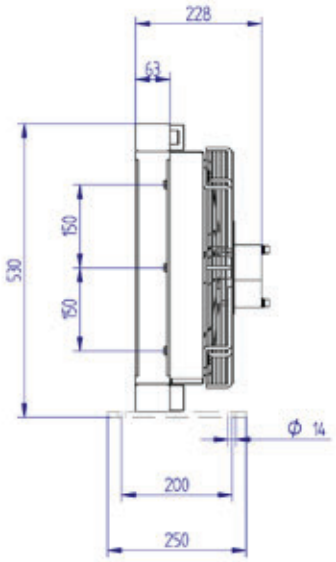
HY series

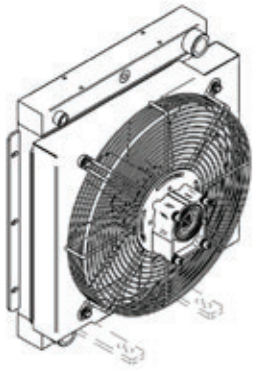
# HY210.1-05A

**AIR-OIL HEAT EXCHANGERS**

Suit. HY M — GR2



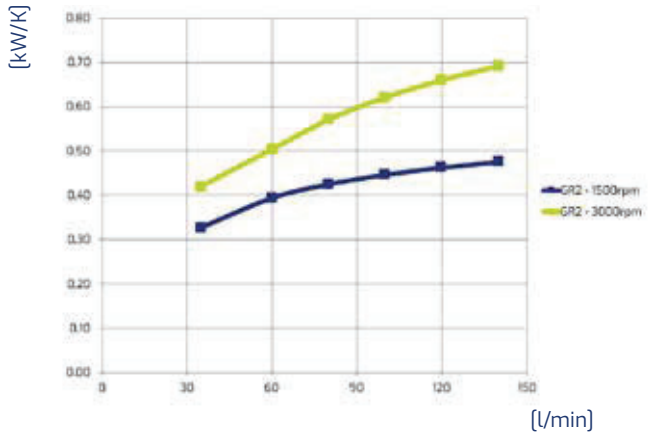



## Technical data

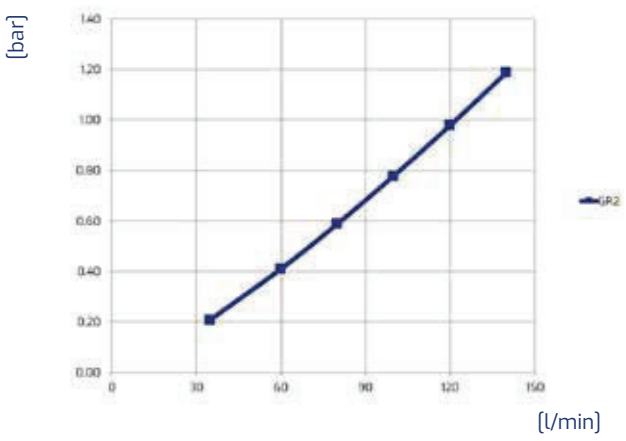
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY210.1-05A** | 35-140 | 3,3 | 20,5 | | | | 390 | 2554 | 78 | 1500 |
| **HY210.1-05A** | 35-140 | 3,3 | 20,5 | | | | 390 | 5402 | 92,5 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

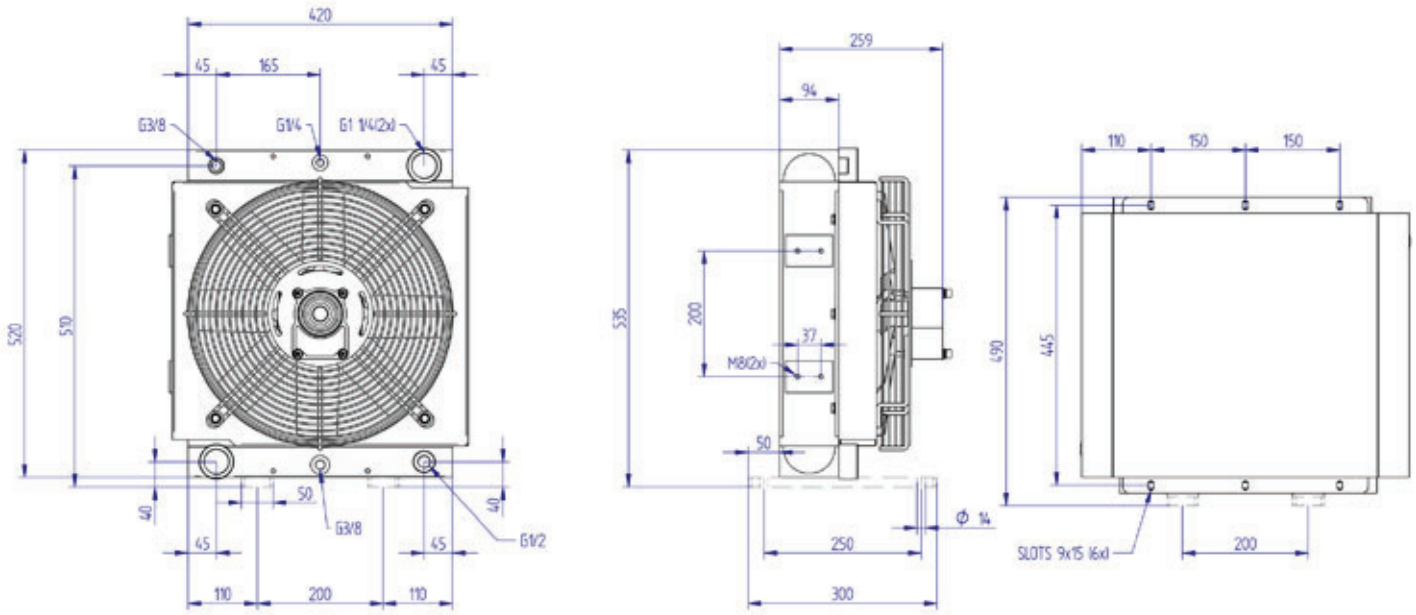
HY series

# HY215.1-05A

## AIR-OIL HEAT EXCHANGERS

Suit. HY M

GR2

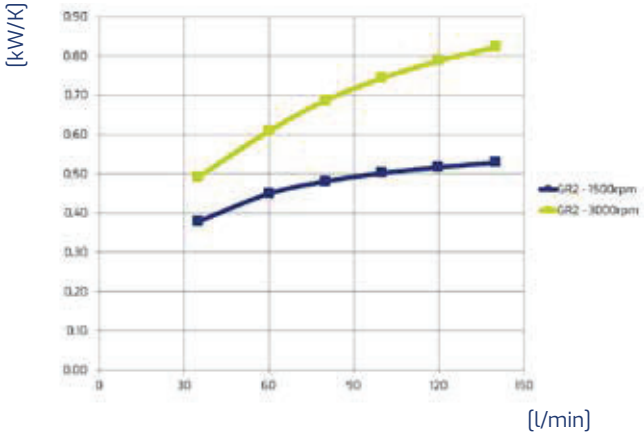



Vertical or horizontal mounting

## Technical data

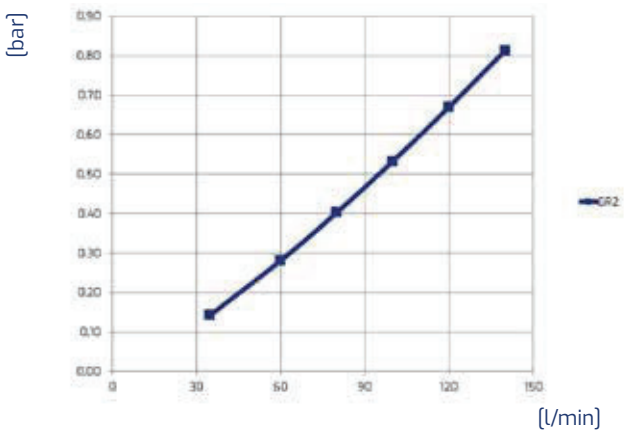
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY215.1-05A** | 35-140 | 5,3 | 26 | | | | 390 | 2281 | 79,1 | 1500 |
| **HY215.1-05A** | 35-140 | 5,3 | 26 | | | | 390 | 4860 | 92,5 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

Technical data are not binding - The graphs show the central range of heat exchange data

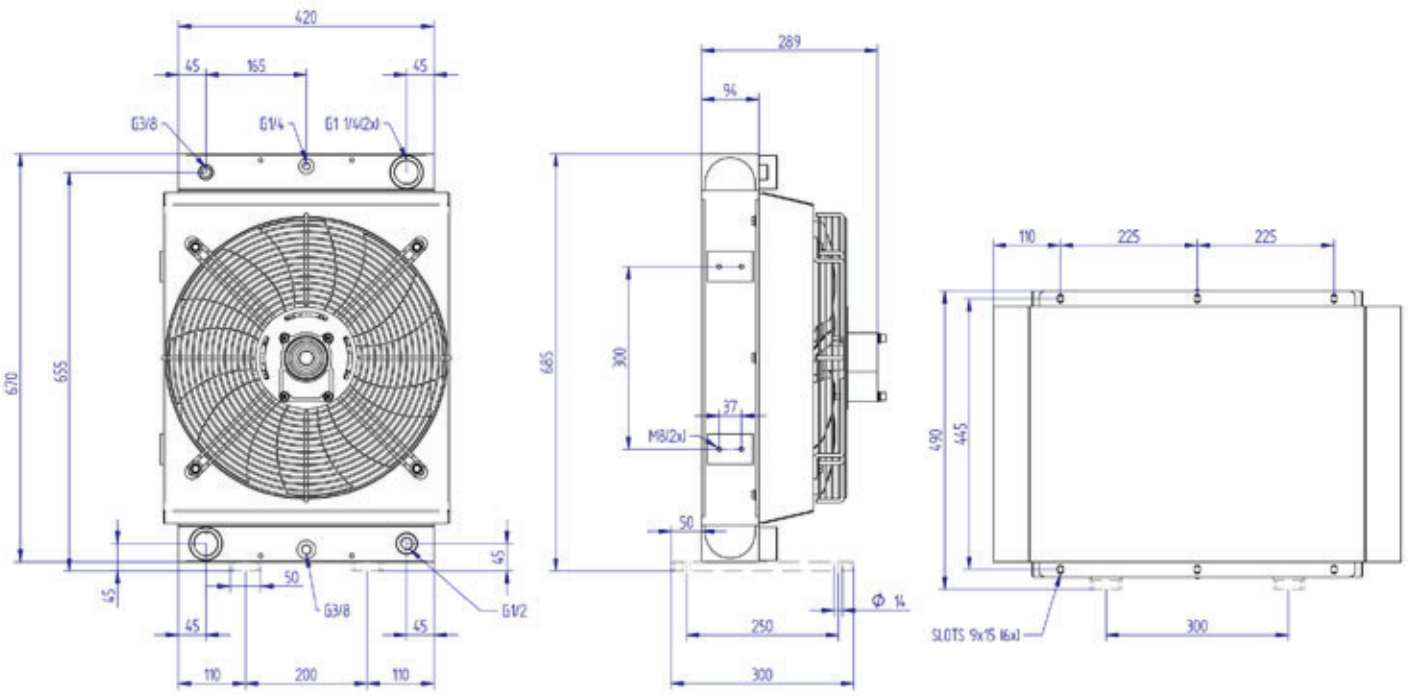
HY series

# HY220.1-05A

## AIR-OIL HEAT EXCHANGERS

Suit. HY M

GR2

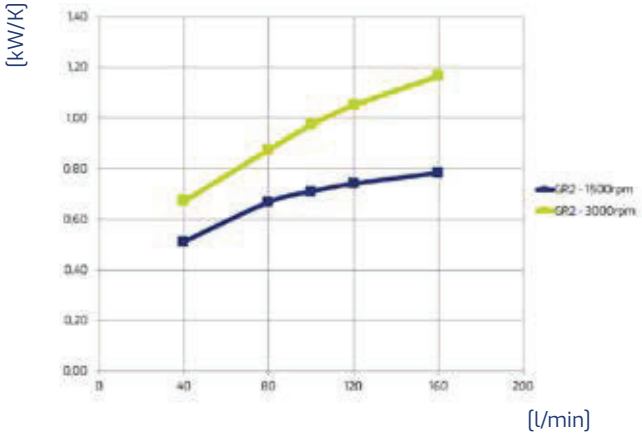



Vertical or horizontal mounting

## Technical data

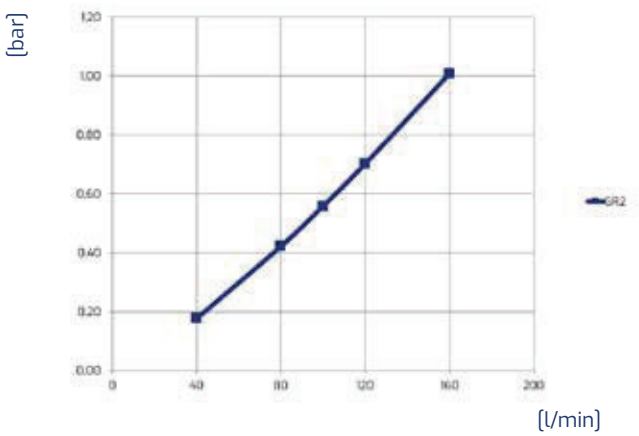
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY220.1-05A** | 40-160 | 6,8 | 34 | | | | 450 | 3778 | 84,4 | 1500 |
| **HY220.1-05A** | 40-160 | 6,8 | 34 | | | | 450 | 8461 | 102 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

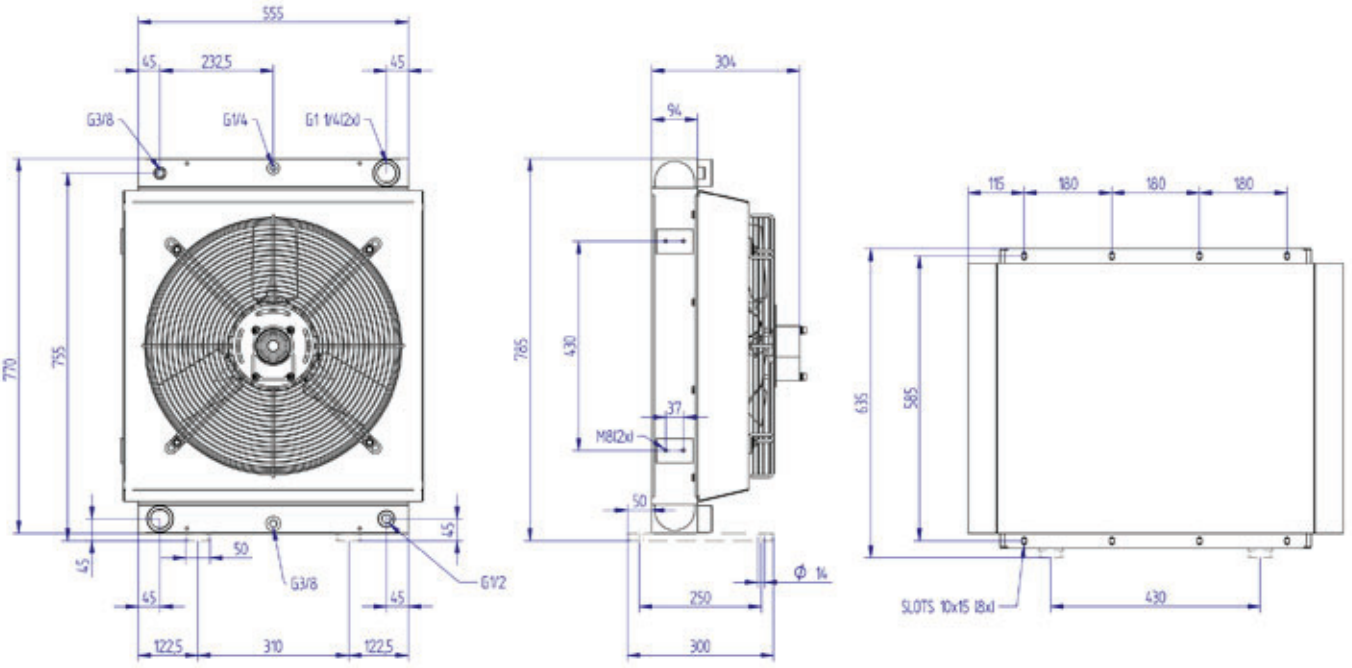
Technical data are not binding - The graphs show the central range of heat exchange data

HY series

# HY225.1-05A

## AIR-OIL HEAT EXCHANGERS

Suit. HY M | GR2

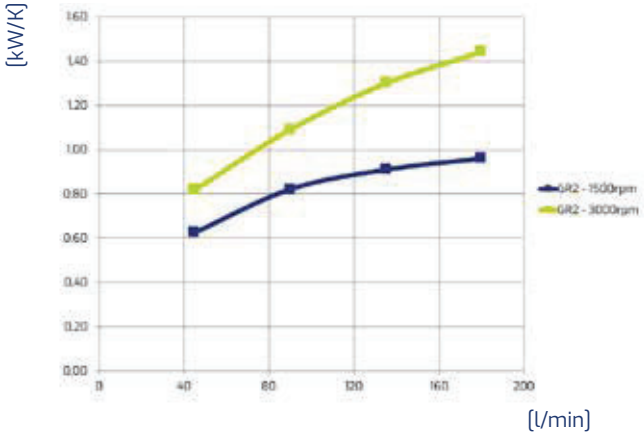



Vertical or horizontal mounting

## Technical data

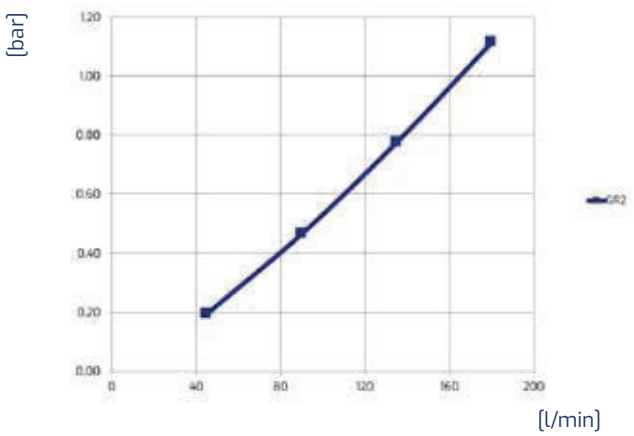
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY225.1-05A** | 45-180 | 10 | 46 | | | | 500 | 4566 | 78 | 1500 |
| **HY225.1-05A** | 45-180 | 10 | 46 | | | | 500 | 9641 | 94 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

Technical data are not binding - The graphs show the central range of heat exchange data

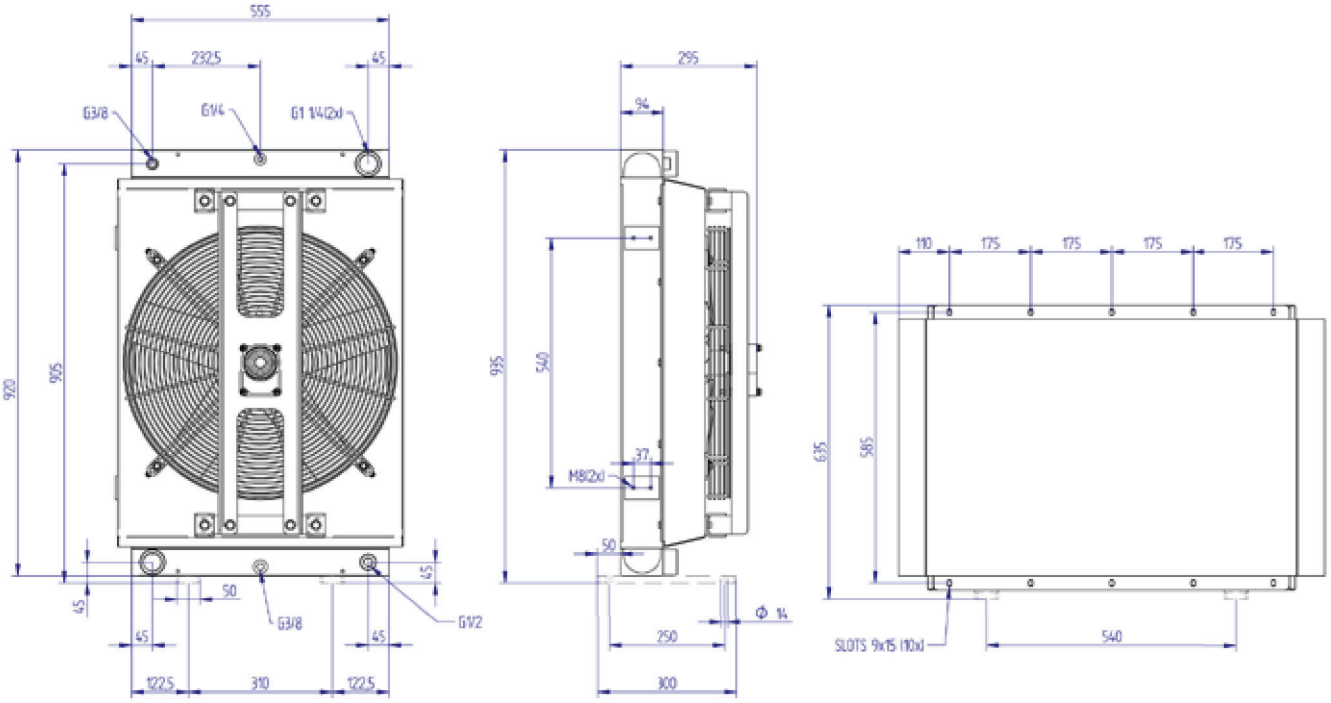
HY series

# HY230.1-05A

## AIR-OIL HEAT EXCHANGERS

Suit. HY M

GR2

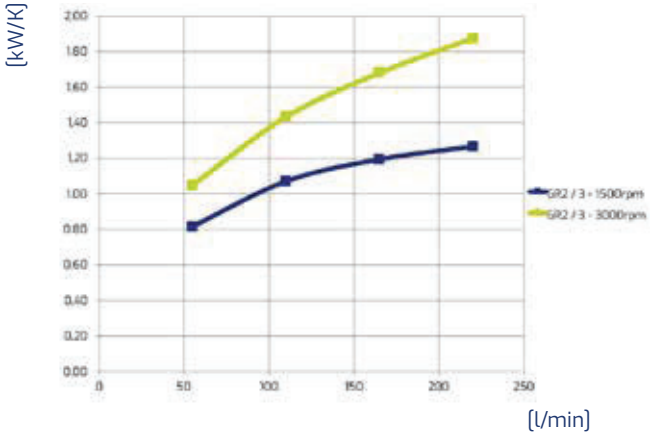



Vertical or horizontal mounting

## Technical data

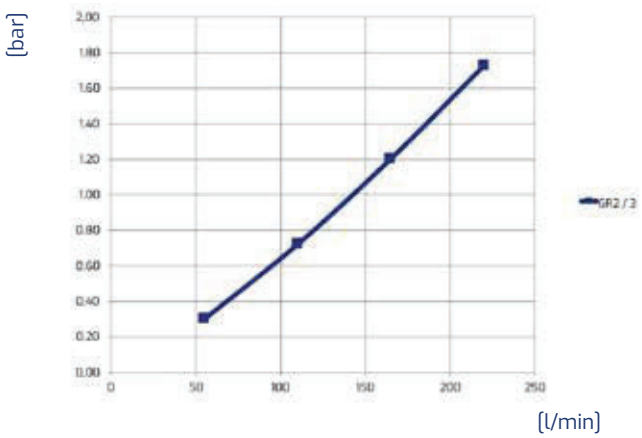
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY230.1-05A** | 55-220 | 11,5 | 55 | | | | 560 | 6264 | 80 | 1500 |
| **HY230.1-05A** | 55-220 | 11,5 | 55 | | | | 560 | 13151 | 95 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

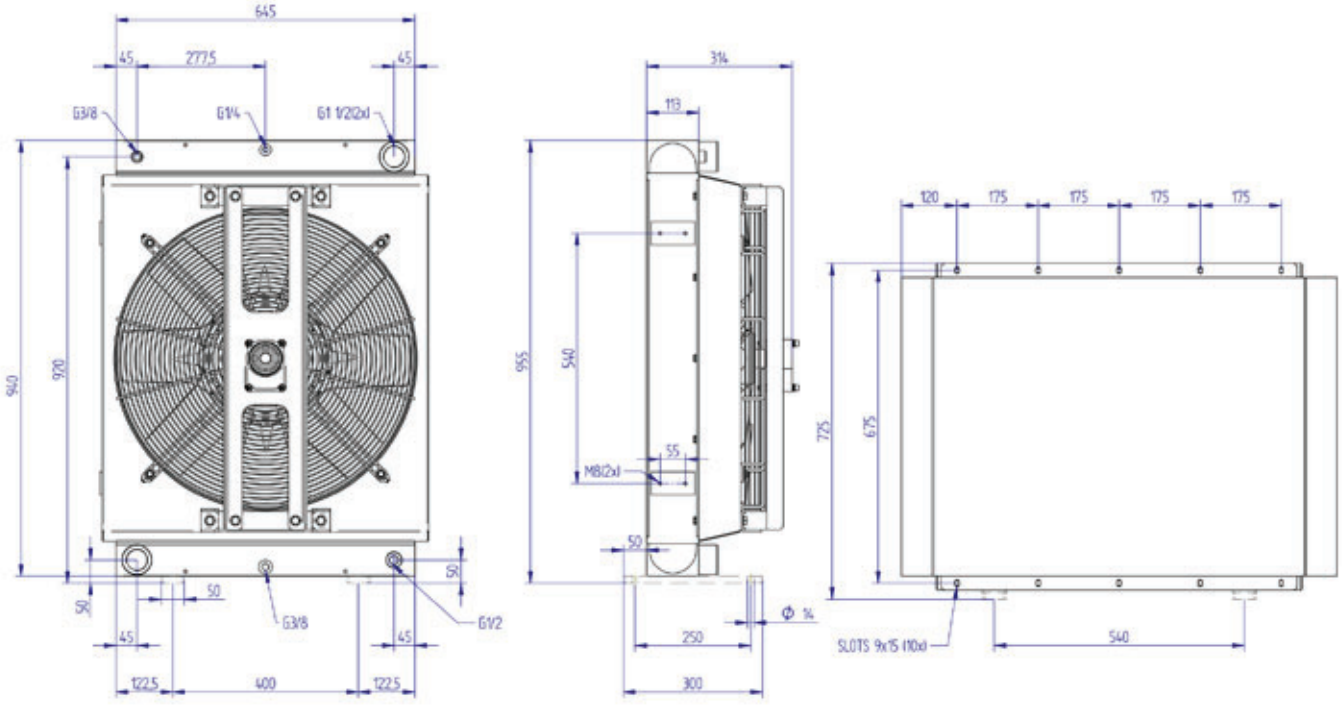
Technical data are not binding - The graphs show the central range of heat exchange data

HY series

# HY232.1-05A

## AIR-OIL HEAT EXCHANGERS

Des. | Hyd. M. | GR2

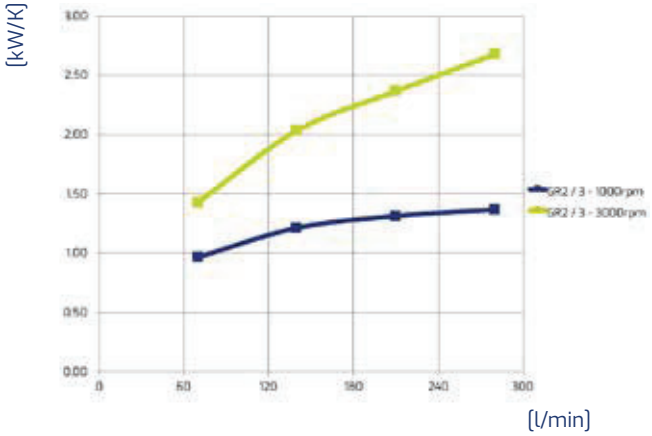



Vertical or horizontal mounting

## Technical data

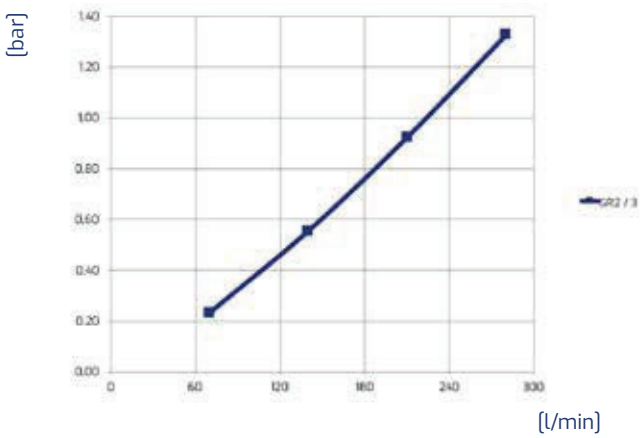
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (dB(A)) | |
| **HY232.1-05A** | 70-280 | 16,8 | 77 | | | | 630 | 5893 | 81 | 1000 |
| **HY232.1-05A** | 70-280 | 16,8 | 77 | | | | 630 | 19433 | 105 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

Technical data are not binding - The graphs show the central range of heat exchange data

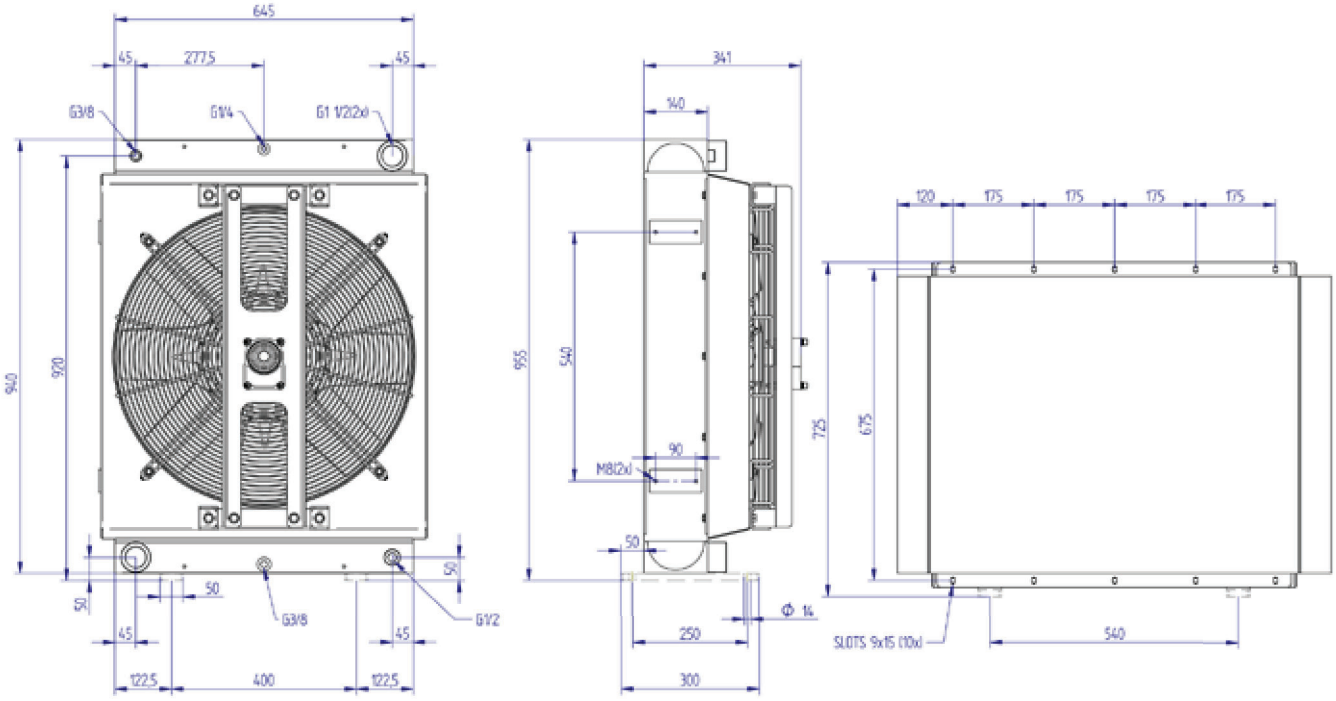
HY series

# HY235.1-05A

## AIR-OIL HEAT EXCHANGERS

Suit. HY M

GR2

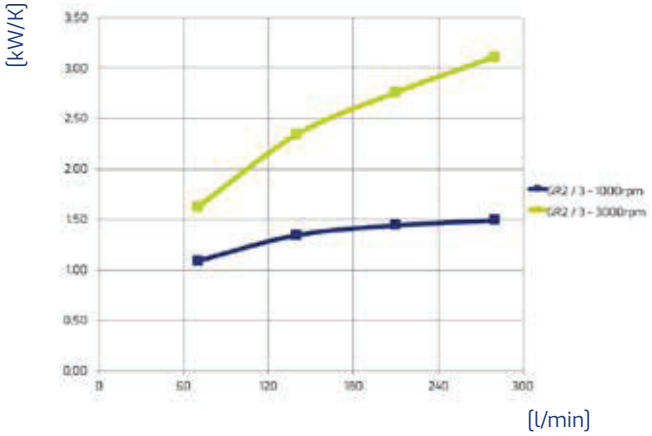



Vertical or horizontal mounting

## Technical data

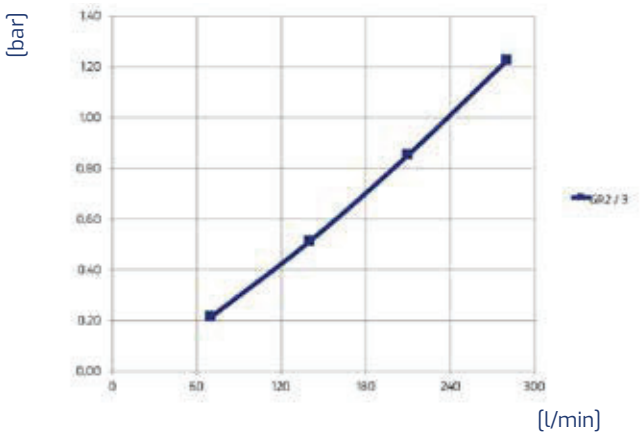
| Item | Oil flow | Capacity | Weight | Voltage | Frequency | Current absorption | Ø Fan | Air flow | Noise level | Rpm |
|---|---|---|---|---|---|---|---|---|---|---|
| | (l/min) | (l) | (kg) | (V) | (Hz) | (A) | (mm) | ($m^3$/h) | (db(A)) | |
| **HY235.1-05A** | 70-280 | 20,2 | 89 | | | | 630 | 5232 | 81 | 1000 |
| **HY235.1-05A** | 70-280 | 20,2 | 89 | | | | 630 | 17500 | 105 | 3000 |

## Performance




Oil T 80°C
T Amb. 40°C
1 kW = 860 Kcal/h – 1 HP = 0,75 kW

## Pressure drop




ISO VG 32 at 40°C

**Viscosity - ISO VG 32 Oil**

| Oil | 22 | **32** | 46 | 68 | 150 |
|---|---|---|---|---|---|
| Correction factor | 0,8 | **1** | 1,2 | 1,6 | 3 |

Technical data are not binding - The graphs show the central range of heat exchange data

# HY product code

The standard version of HY series includes a single-passage circuit and a sucking/ pulling fan; other versions are available on request.

HY 024 . 1 -04 A -1 6 1 5 -0 K

## Series

Air-oil heat exchanger

## Size / Size

**005, 010, 016, 018, 024, 038, 057, 090, 210, 215, 220, 225, 230, 232, 235**

## Passages

**1 – One single passage**
**2 – Two passages** (available on request)
**3 – Three passages** (available on request)
**L – Double core** (available on request)

Please check with the Engineering Department for avaiable sizes

## Fan Unit

**01 - AC single phase 230V**
**02 - DC 12V**
**03 - AC three phase 230/400V**
**04 - DC 24V**
**05 - Designed for hydraulic motor GR2**
**06 - Designed for hydraulic motor GR3**
**07 - With B14 electric motor**

## Fan Flow

**A - Sucking/pulling fan**
**P - Blowing/pushing fan** (available on request)

Please check with the Engineering Department for avaiable sizes

## Thermostat

**0 - Without thermostat**
**1 - Fixed**
**2 - Softstart**
**3 - Adjustable**
**4 - With speed regulation and reverse rotation**

## Thermostat degrees

**1 - From 40°C to 50°C**
**2 - From 40°C to 60°C**
**3 - From 30°C to 50°C**
**4 - 40°C**
**5 - 50°C**
**6 - 60°C**
**7 - 70°C**
**9 - From 0°C to 90°C**

## Thermostat thread

**1 - 1/2"G**
**3 - 3/8"G**

## Thermostat IP

**4 - IP40**
**5 - IP65**
**7 - IP67**

## Accessories

**DC Version**
**0 - Without WPC**
**1 - With WPC**

**Designed for hydraulic motor version**
**0 - Without splined coupling**
**1 - With splined coupling**

## Mounting Systems

**0 - Without bracket kit**
**K - With bracket kit**

# Heat exchange - basic concepts

Any transformation of energy from one system to another leads to a power loss that generates heat. In hydraulic systems, the transfer of energy is assigned to process fluids, which acquire the heat produced by the various components of the equipment or circuit.
To preserve the physical characteristics of the fluid and the proper functioning of each component, the use of a cooling system is recommended. Oesse's HY series cross flow air-oil heat exchangers are certainly among the most efficient tools.

Excessive heat affects the oil viscosity and lubricity, causing deterioration and longterm damage to the plant equipment. Density and viscosity are the most affected by temperature variation. One of the main properties of fluids involved in the heat exchange is the specific heat, an essential element to determine how much heat the cooling units should dissipate. Considering also the fluid mass flow rate it is possible to calculate the power to be dissipated:

**Technical Information**

$$m \times c_p \times (t_2 - t_1) = P$$
$$[kg/s] \times [J/kgK] \times [K] = [J/s]$$

| For a correct calculation, its recommended to apply the units of measurement as per table: | |
|---|---|
| **Oil flow** | Q [l/min] - m [kg/sec]<br>m = Q x 0,861 [kg/dm$^3$] |
| **Specific Oil heat** | Cp [J/kg K] |
| **Temperature** | $t_1$, $t_2$, $t_a$ [°C]<br>$\Delta t = t_1 - t_2$ [K] |
| **Heat exchanged** | P [J/s, W]<br>1 W = 1 J/sec = 0,2390585 (=1/4,186) cal/sec |

*values related to oil ISO VG 46, density 861 kg/m$^3$

For the conversion tables, refer to: **https://convert.it.softonic.com/**

A quick and useful approach is proposed below to calculate the power to be dissipated (P):

| Known Data | Symbol | Equation |
|---|---|---|
| **The main electrical power installed in the application system (kW) (e.g. pump)** | $P_m$ | $P = P_m \times 0{,}35$ |
| **Inlet temperature (°C)** | $t_1$ | $P = \frac{V \times (t_1 - t_2) \times 0{,}89 \times 2{,}09}{T \times 60}$ |
| **Outlet temperature (°C)** | $t_2$ | |
| **Time T needed by the oil to reach $t_2$ (minutes)** | T | |
| **Oil Volume in the Tank (l)** | V | |
| **Oil Flow (l/min)** | Q | $P = \frac{Q \times p \times 0{,}3}{612}$ |
| **Working pressure (bar)** | p | |
| **Inlet temperature (°C)** | $t_1$ | $P = \frac{(t_1 - t_2) \times Q \times 0{,}89 \times 2{,}09}{60}$ |
| **Requested temperature (°C) ($t_2 < t_1$)** | $t_2$ | |
| **Oil Flow (l/min)** | Q | |

Oil inlet temperature and cooling flow temperature are the working conditions that determine the specific cooling power.

P **Heat exchanged (kW)**

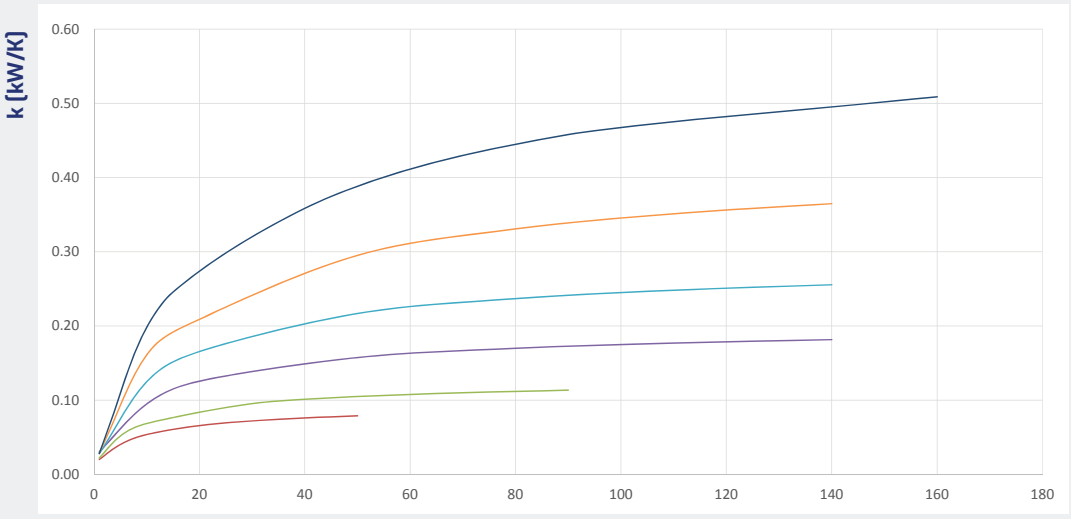
$$\frac{16}{80 - 30} = 0{,}32$$

**Specific cooling power** $\left[\frac{kW}{K}\right]$

$t_1$ **Inlet oil temperature (°C)**

$t_a$ **Ambient temperature (°C)**

**Performance** 12/24V DC




Select the performance curve according to the intersection between the oil flow and the calculated specific power of exchange.