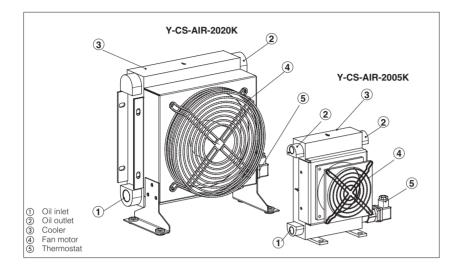


# **Heat exchangers**

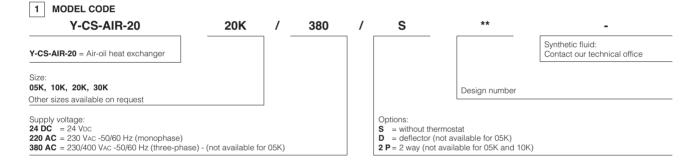
air-oil



Air-oil heat exchangers are cooler type with suction fan motor and they permit to cool the heat in hydraulic plants. They can operate on exhaust line of the main hydraulic circuit, or on a separate circuit dedicated to cooling. Heat exchangers are designed to work in hydraulic systems with mineral oil or synthetic fluids baying similar lubricating

synthetic fluids having similar lubricating characteristics.

Max flow up to 130 lt/min Pressure up to 20 bar

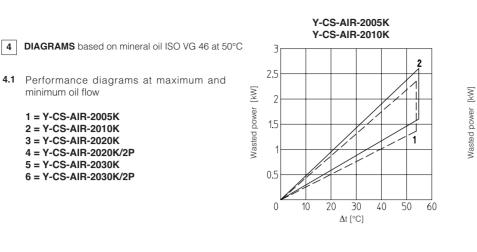


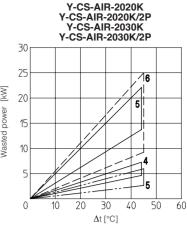
## 2 MAIN CHARACTERISTICS

| Installation position     | Any position   |
|---------------------------|--|
| Hydraulic connections     | Size, see section 9.<br>Protect the heat exchanger against pressure peaks on exhaust line with a by pass check valve setted at 4 ÷ 5 bar |
| Fluid                     | Hydraulic oil as per DIN 51524535; for other fluids contact our technical office   |
| Recommended viscosity     | 15 ÷ 150 mm²/sec a 40°C (ISO VG 15 ÷ 100)  |
| Fluid contamination class | ISO 19/16, achieved with in line filters at 25 $\mu$ m and $\beta$ 25 ≥ 75 (recommended)   |
| Max working temperature   | Cooler: + 120°C Fan motor: + 75°C  |
| Ambient temperature       | from -20°C to +70°C  |
| Max pressure              | 20 bar   |
| Materials                 | Cooler: aluminium Fan motor: carbon steel / fiberglass   |

## 3 PERFORMANCE

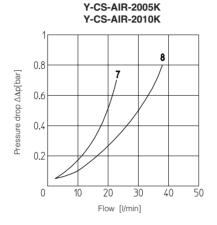
| Model            | Recommended oil flow | Cooling power @ ∆T = 35°C | Warning  |
|------------------|----------------------|---------------------------|--|
| Y-CS-AIR-2005K   | 3 ÷ 20 l/min         | 0,8 ÷ 1,5 kW              | Oil flow indicated in the table. permits to<br>obtain the best performance. Lower oil<br>flow than minimum reduces the efficency |
| Y-CS-AIR-2010K   | 5 ÷ 35 l/min         | 1 ÷ 1,7 kW                |  |
| Y-CS-AIR-2020K   | 5 ÷ 100 l/min        | 2,5 ÷ 4 kW                |  |
| Y-CS-AIR-2020/2P | 8 ÷ 65 l/min         | 3 ÷ 6,3 kW                | while higher oil flow increase the pressure  |
| Y-CS-AIR-2030K   | 40 ÷ 130 l/min       | 10,5 ÷ 17 kW              | drop ( $\Delta$ p) whitout efficency improving.  |
| Y-CS-AIR-2030/2P | 12 ÷ 80 l/min        | 6,5 ÷ 20 kW               |  |

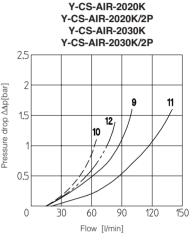




4.2 Pressure drop diagrams referred to oil flow

- 7 = Y-CS-AIR-2005K 8 = Y-CS-AIR-2010K 9 = Y-CS-AIR-2020K
- 10 = Y-CS-AIR-2020K/2P
- 11 = Y-CS-AIR-2030K
- 12 = Y-CS-AIR-2030K/2P





#### 5 FAN MOTOR CHARACTERISTICS

| Model                               | Voltage   | Power consumption       | Protection degree       | Noise level | Air flow                            |
|-------------------------------------|---|-------------------------|-------------------------|-------------|-------------------------------------|
| Y-CS-AIR-2005K                      | 24 DC<br>230 AC - 50/60 Hz                      | 3,3 W<br>19 W           | IP 20<br>IP 20          | 45 dB [A]   | 160 m³/h<br>180 m³/h                |
| Y-CS-AIR-2010K                      | 24 DC<br>230 AC - 50/60 Hz<br>400 AC - 50/60 Hz | 80 W<br>45 W<br>40 W    | IP 64<br>IP 44<br>IP 44 | 65 dB [A]   | 560 m³/h<br>400 m³/h<br>400 m³/h    |
| Y-CS-AIR-2020K<br>Y-CS-AIR-2020K/2P | 24 DC<br>230 AC - 50/60 Hz<br>400 AC - 50/60 Hz | 100 W<br>50 W<br>53 W   | IP 64<br>IP 44<br>IP 44 | 68 dB [A]   | 1200 m³/h<br>800 m³/h<br>800 m³/h   |
| Y-CS-AIR-2030K<br>Y-CS-AIR-2030K/2P | 24 DC<br>230 AC - 50/60 Hz<br>400 AC - 50/60 Hz | 125 W<br>160 W<br>180 W | IP 64<br>IP 44<br>IP 44 | 70 dB [A]   | 2410 m³/h<br>2680 m³/h<br>2680 m³/h |

#### 6 HOW TO CHOOSE THE HEAT EXCHANGER

The total efficency of modern hydraulic plants is about 70 - 80%, so 20 - 30% of installed power become heat and must be wasted by the heat exchanger.

Generally an air-oil heat exchanger , it's a good rule to overdimension it by 15 - 20%, because the flow in the circuit is not constant and on the cooler, dust reducing the thermical efficency.

Knowing the oil flow, the power to waste and the  $\Delta T$  (the difference between oil inlet temperature and air inlet temperature), it's possible to determine the best heat exchanger on the diagrams. Proceed as follows:

- knowing the  $\Delta T$  value, draw a vertical line from the  $\Delta T$  axis

- knowing the power to waste, draw an horizontal line from the wasted power axis

Intersection point determines the appropriate heat exchanger.

#### 7 MAINTENANCE

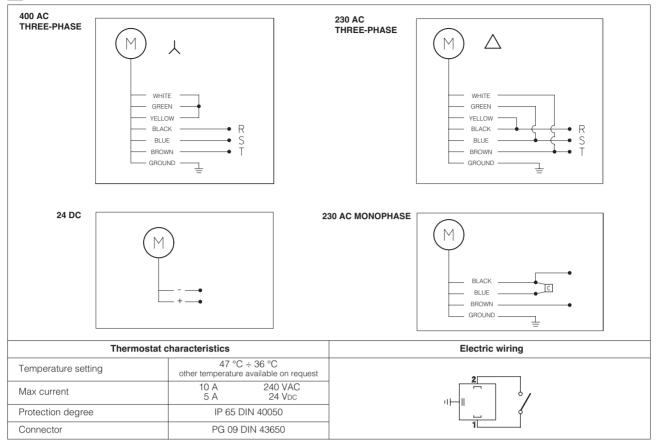
OIL SIDE CLEANING : on this side of the circuit , dirt can be removed with a detergent cleaner (aluminium compatible) circulating against the stream: this operation takes from 10 to 30 minutes. During this operation it's recommended to respect anti-pollution norms.

AIR SIDE CLEANING: it's a good rule to clean regurarly the cooler to avoid thermic efficency reducing.

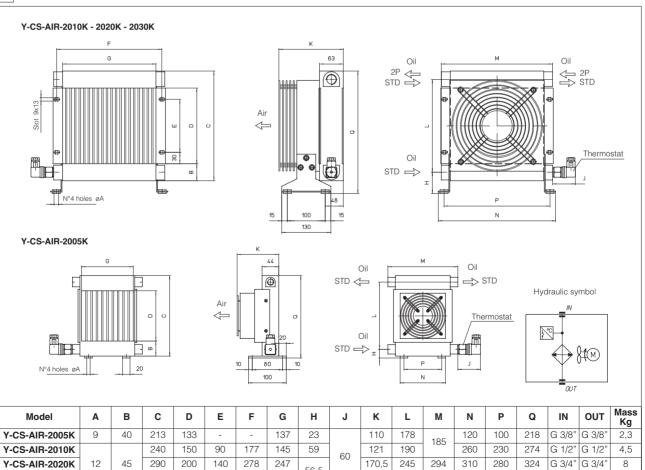
Dust can be removed with compressed air, while oily dirty can be removed with steam jet or warm water. Jet direction must be parallel to the cooler fin to avoid to damage them.

During this operation the electric motor must not be connected to the power supply and must be properly protected.





## 9 DIMENSIONS [mm]



56,5

G 1"

G 1"

Y-CS-AIR-2030K