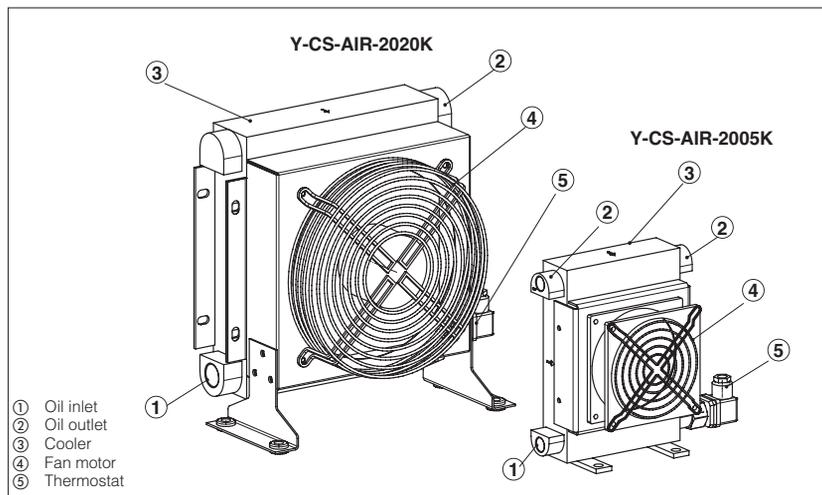


Heat exchangers

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 having similar lubricating characteristics.

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

1 MODEL CODE

Y-CS-AIR-20

20K

/

380

/

S

-

Y-CS-AIR-20 = Air-oil heat exchanger

Size:

05K, 10K, 20K, 30K

Other sizes available on request

Supply voltage:

24 DC = 24 Vdc

220 AC = 230 V_{AC} -50/60 Hz (monophase)

380 AC = 230/400 V_{AC} -50/60 Hz (three-phase) - (not available for 05K)

Options:

S = without thermostat

D = deflector (not available for 05K)

2 P = 2 way (not available for 05K and 10K)

Synthetic fluid:
Contact our technical office

Design number

2 MAIN CHARACTERISTICS

Installation position	Any position
Hydraulic connections	Size, see section 9. 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 51524...535; for other fluids contact our technical office
Recommended viscosity	15 ÷ 150 mm ² /sec a 40°C (ISO VG 15 ÷ 100)
Fluid contamination class	ISO 19/16, achieved with in line filters at 25 µm and β 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

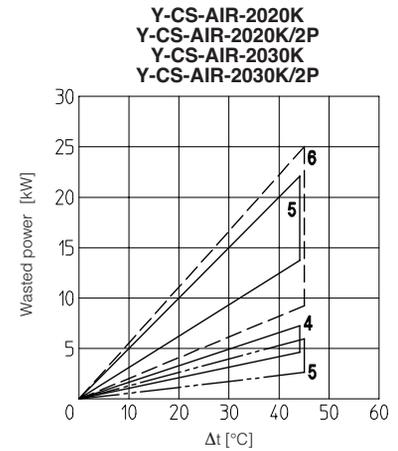
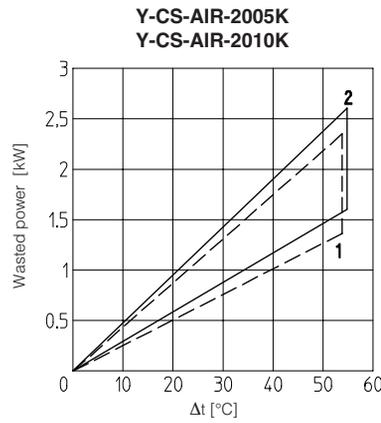
3 PERFORMANCE

Model	Recommended oil flow	Cooling power @ ΔT = 35°C	Warning
Y-CS-AIR-2005K	3 ÷ 20 l/min	0,8 ÷ 1,5 kW	Oil flow indicated in the table. permits to obtain the best performance. Lower oil flow than minimum reduces the efficiency while higher oil flow increase the pressure drop (Δp) whitout efficiency improving.
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	
Y-CS-AIR-2030K	40 ÷ 130 l/min	10,5 ÷ 17 kW	
Y-CS-AIR-2030/2P	12 ÷ 80 l/min	6,5 ÷ 20 kW	

4 DIAGRAMS based on mineral oil ISO VG 46 at 50°C

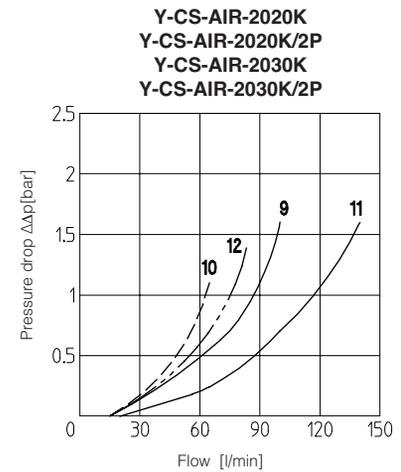
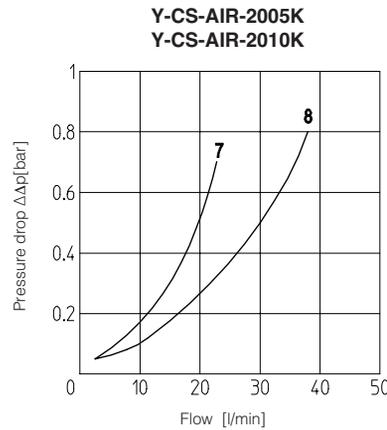
4.1 Performance diagrams at maximum and minimum oil flow

- 1 = Y-CS-AIR-2005K
- 2 = Y-CS-AIR-2010K
- 3 = Y-CS-AIR-2020K
- 4 = Y-CS-AIR-2020K/2P
- 5 = Y-CS-AIR-2030K
- 6 = Y-CS-AIR-2030K/2P



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	3,3 W	IP 20	45 dB [A]	160 m³/h
	230 AC - 50/60 Hz	19 W	IP 20		180 m³/h
Y-CS-AIR-2010K	24 DC	80 W	IP 64	65 dB [A]	560 m³/h
	230 AC - 50/60 Hz	45 W	IP 44		400 m³/h
	400 AC - 50/60 Hz	40 W	IP 44		400 m³/h
Y-CS-AIR-2020K Y-CS-AIR-2020K/2P	24 DC	100 W	IP 64	68 dB [A]	1200 m³/h
	230 AC - 50/60 Hz	50 W	IP 44		800 m³/h
	400 AC - 50/60 Hz	53 W	IP 44		800 m³/h
Y-CS-AIR-2030K Y-CS-AIR-2030K/2P	24 DC	125 W	IP 64	70 dB [A]	2410 m³/h
	230 AC - 50/60 Hz	160 W	IP 44		2680 m³/h
	400 AC - 50/60 Hz	180 W	IP 44		2680 m³/h

6 HOW TO CHOOSE THE HEAT EXCHANGER

The total efficiency 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 thermal efficiency.

Knowing the oil flow, the power to waste and the ΔT (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 ΔT value, draw a vertical line from the ΔT 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 regularly the cooler to avoid thermic efficiency 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.

8 ELECTRIC WIRING

400 AC THREE-PHASE

230 AC THREE-PHASE

24 DC

230 AC MONOPHASE

Thermostat characteristics		Electric wiring
Temperature setting	47 °C ± 36 °C other temperature available on request	
Max current	10 A 240 VAC 5 A 24 Vdc	
Protection degree	IP 65 DIN 40050	
Connector	PG 09 DIN 43650	

9 DIMENSIONS [mm]

Y-CS-AIR-2010K - 2020K - 2030K

Y-CS-AIR-2005K

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	IN	OUT	Mass Kg
Y-CS-AIR-2005K	9	40	213	133	-	-	137	23	60	110	178	185	120	100	218	G 3/8"	G 3/8"	2,3
Y-CS-AIR-2010K			240	150	90	177	145	59		121	190			260	230	274	G 1/2"	G 1/2"
Y-CS-AIR-2020K	12	45	290	200	140	278	247	56,5		170,5	245	294	310	280	324	G 3/4"	G 3/4"	8
Y-CS-AIR-2030K			440	350	290	375	346			190	395	394	410	380	474	G 1"	G 1"	15