Hydro Lync

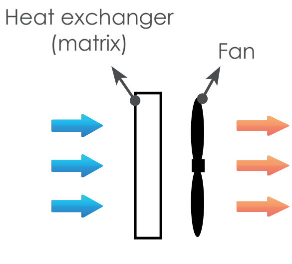
Air Oil Coolers

Air Oil Coolers

What is an air oil cooler?

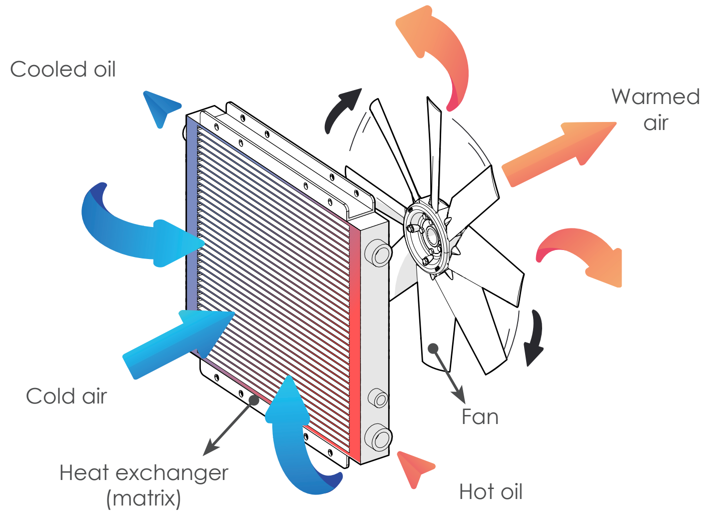
In a hydraulic system, managing the temperature of the working fluid is an important maintenance point that can affect system performance. If the temperature is too low, the viscosity increases, which can lead to damage to the hydraulic device due to increased friction. On the other hand, if the oil temperature rises above 60 °C, thermal degradation occurs, and viscosity changes as well. As a result, cylinder speed decreases, the life of the oil is shortened, and it can also affect the sealing, leading to leakage. In other words, if the temperature of the oil is not managed properly, the hydraulic system's performance can be degraded, and maintenance costs can increase.

An air-cooled cooler is a device that cools high-temperature oil to maintain proper viscosity in a hydraulic system. An air oil cooler consists of heat exchanger plates (matrix) through which high-temperature oil passes, and a fan that blows air over the matrix to cool them. Depending on the direction of the airflow over the matrix, they can be classified as suction or blow types, with the suction type generally having better cooling efficiency.



Suction

Blow



Suction-type cooling

Driving method

Depending on the method of driving the fan, the types of air oil coolers are determined, and typically include AC motors, DC motors, hydraulic motors, offline circulation pumps, and axial motor methods.

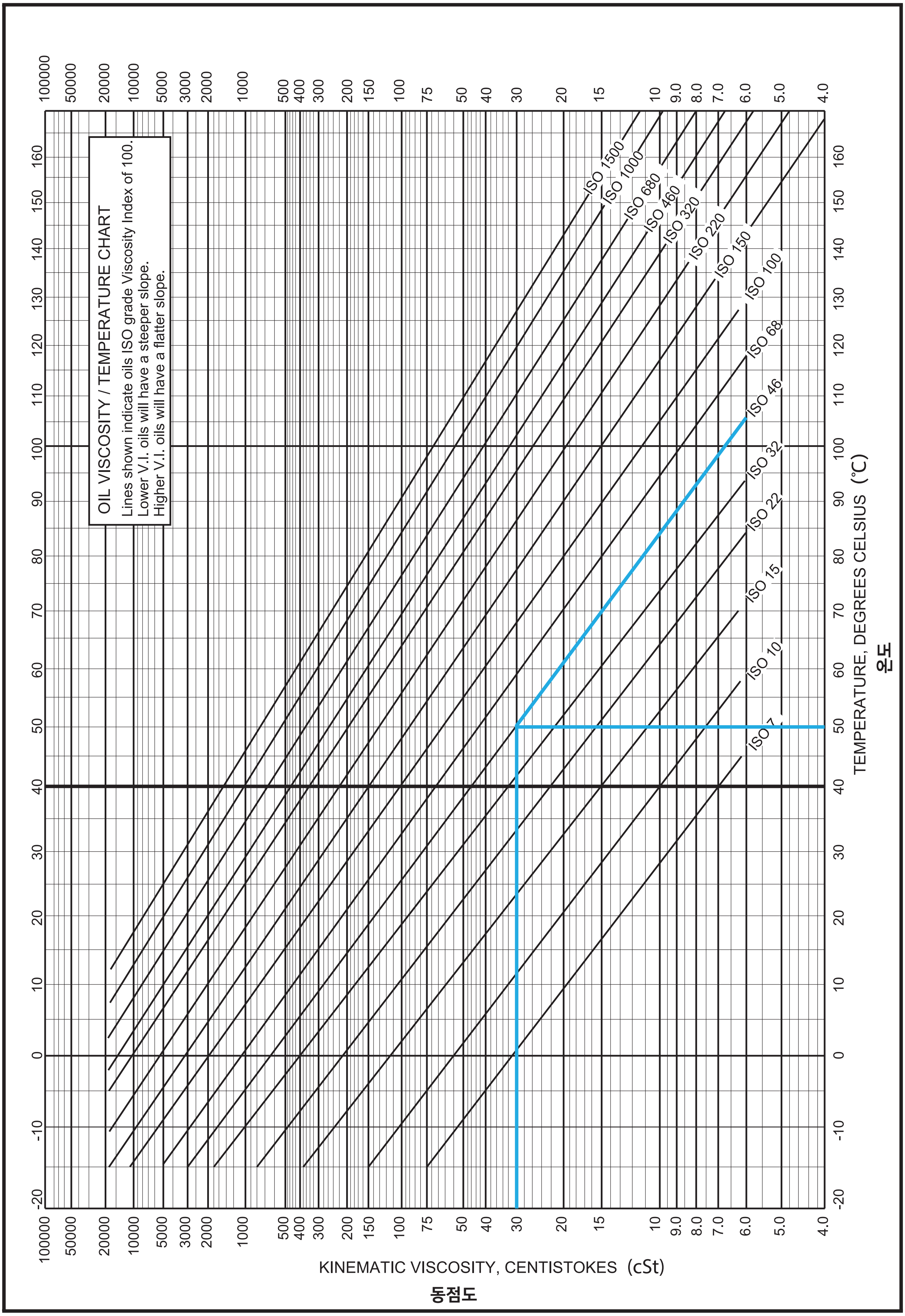
HLA2 Series
AC motor driven

HLD Series
DC motor driven

HLH2 Series
Hydraulic motor driven

HLO3 Series
Offline circulation pump driven

HLAX Series
Axial motor driven



OIL VISCOSITY / TEMPERATURE CHART
Lines shown indicate oils ISO grade Viscosity Index of 100.
Lower V.I. oils will have a steeper slope.
Higher V.I. oils will have a flatter slope.
ISO 1500
ISO 1000
ISO 680
ISO 460
ISO 320
ISO 220
ISO 150
ISO 100
ISO 68
ISO 46
ISO 32
ISO 22
ISO 15
ISO 10
ISO 7
100000 50000 20000 10000 5000 3000 2000 1000 500 400 300 200 150 100 75 50 40 30 20 15 10 9.0 8.0 7.0 6.0 5.0 4.0
-20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160
KINEMATIC VISCOSITY, CENTISTOKES (cSt)
동점도
TEMPERATURE, DEGREES CELSIUS (℃)
온도

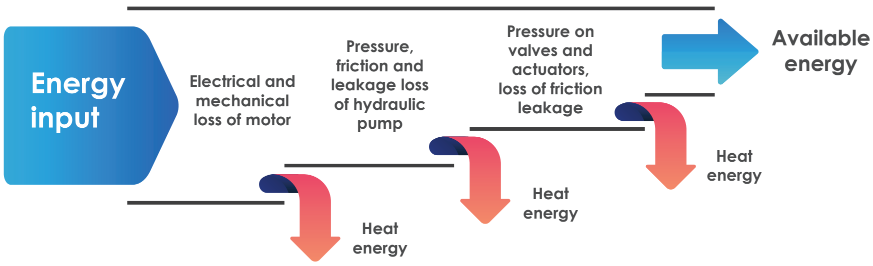
Management of oil viscosity

If the oil temperature is constant, the viscosity also remains constant, ensuring consistent valve response and cylinder speed. Please refer to the Kinematic Viscosity chart on the left page for the recommended kinematic viscosity and temperature control that should be maintained depending on the type of operating fluid used in the hydraulic system.

ISO Viscosity Grade (ISO VG)	Kinematic Viscosity @40 ℃ (cTs)		
	Minimum	Maximum	Mid-point
22	19.8	24.2	22.0
32	28.8	35.2	32.0
46	41.4	50.6	46.0
68	61.2	74.8	68.0
100	90.0	110	100
150	135	165	150
220	198	242	220
320	288	352	320
460	414	506	460
680	612	748	680

Purpose of use of cooler

In all hydraulic systems, there are various forms of energy loss, such as pressure, friction, and leakage to varying degrees. Energy is lost due to pressure drop in the lines caused by friction and flow bias, pressure drop in accessories such as valves, filters, and coolers, high throttling in pressure regulation systems, and leakage losses at sealing points. All of these losses are converted into heat that is absorbed by the oil and the housing.



The purpose of using a cooler is to maintain the heat generated by the energy loss at a constant level, thereby increasing the efficiency of the system and reducing maintenance costs. The heat generated by the loss of energy can damage the pump, hose, sealing, and bearings installed in the hydraulic system, shortening their lifespan. As mentioned earlier, the decrease in viscosity makes it difficult to control the valve and cylinder precisely, and the overall efficiency of the system decreases, resulting in a significant increase in maintenance costs.

Selection of Cooler

The selection of a cooler is to achieve the goal by using a cooler with a cooling capacity equal to or greater than the heat energy converted from the input energy, as shown in the figure above. Therefore, to select a cooler, it is necessary to first accurately understand the heat load factors generated in the system. Machinery and hydraulic systems are used to generate and transmit power, but mechanical efficiency, friction, pressure, and other power losses generate heat. If this heat energy is defined as P_H the formula for calculating it can be expressed as follows:

When the specific heat unit is (kJ/kg°C)

$$P_H = (T_2 - T_1) \times SG \times SH \times Q\ /60\ \ [kW]$$

When the specific heat unit is (Kcal/kg°C)

$$P_H = (T_2 - T_1) \times SG \times SH \times Q\ /60\ \ [Kcal/h]$$

$$P_H = \frac{(T_2 - T_1) \times SG \times SH \times Q\ /60}{860}\ \ [kW]$$

P_H	System heat dissipation (kW)
T_1	Oil temperature before system operation (°C)
T_2	Oil temperature after system operation (°C)
Q	Flow rate of oil(l/min)
SG	Specific gravity of the oil (kg/l)
SH	Specific heat of oil

To maintain a certain temperature in the system, the cooling heat exchange amount P_C of the cooler must be equal to or greater than the heat generated by the system P_H under the maximum temperature conditions of the flow rate flowing into the cooler and the surrounding environment. The cooling heat exchange amount of the cooler is defined by the calculation formula of the inlet and outlet temperatures of the cooler, the ambient air temperature, the flow rate, and the fluid properties, as shown below.

When the specific heat unit is (kJ/kg°C)

$$P_C = (T_{in} - T_{out}) \times SG \times SH \times Q_C\ /60\ \ [kW]$$

When the specific heat unit is (Kcal/kg°C)

$$P_C = (T_{in} - T_{out}) \times SG \times SH \times Q_C\ /60\ \ [Kcal/h]$$

$$P_C = \frac{(T_{in} - T_{out}) \times SG \times SH \times Q_C\ /60}{860}\ [kW]$$

P_H	Cooler heat dissipation (kW)
T_{in}	Cooler inlet oil temperature (°C)
T_{out}	Cooler outlet oil temperature (°C)
Q	Flow rate of oil(l/min)
SG	Specific gravity of the oil (kg/l)
SH	Specific heat of oil

ETD(Entrance Temperature Difference) refers to the difference between the cooler's maximum ambient temperature and the oil temperature at the cooler inlet. In other words, it is expressed as follows:

$$ETD = T_{inmax} - T_{ambientmax}$$

T_{inmax}	Cooler inlet max. oil temperature (°C)
$T_{ambientmax}$	Cooler max. ambient temperature (°C)

For example, if the oil temperature at the cooler inlet is 60°C and the maximum ambient temperature is 20°C, the ETD is 40°C. By dividing the cooling heat exchange amount PC defined above by the ETD, we define the cooling capacity (kW/°C). In this product selection guide, the cooling capacity is used as a unit to allow users to select the product.

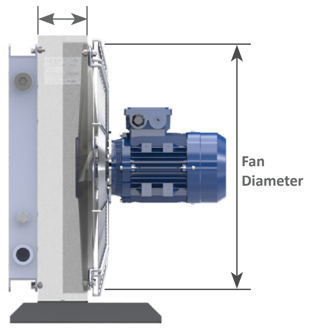
$$\textbf{Cooling Capacity} = P_C\ /\ ETD\ (kW/\ °C)$$

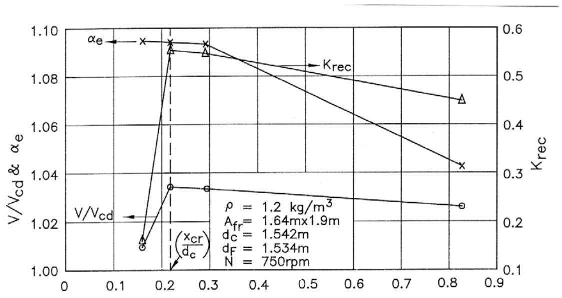
HydroLync Design Theory

HydroLync's product design is based on thoroughly proven scientific research and incorporates design concepts derived from that research. We strive to continuously create stable and optimized products by using CFD (Computational Fluid Dynamics) simulations to review both production efficiency and durability.

Fan Positioning

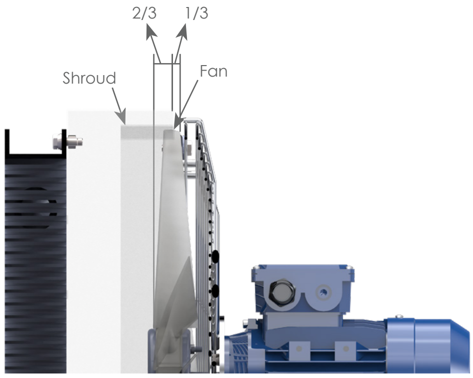
The main components of an air oil cooler are the heat exchanger, fan, and the driving mechanism that drives the fan. When designing the product, the shape and angle of the fan blade, as well as the distance between the heat exchanger and the fan, are important factors for maximizing the cooler's performance.

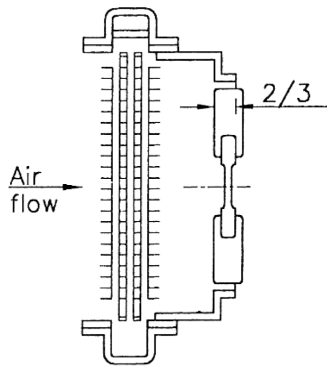




The performance of heat exchange on the position of the fan

The performance graph shows how heat exchange performance varies depending on the position of the fan. HydroLync's air oil cooler is positioned according to these calculations to optimize performance.

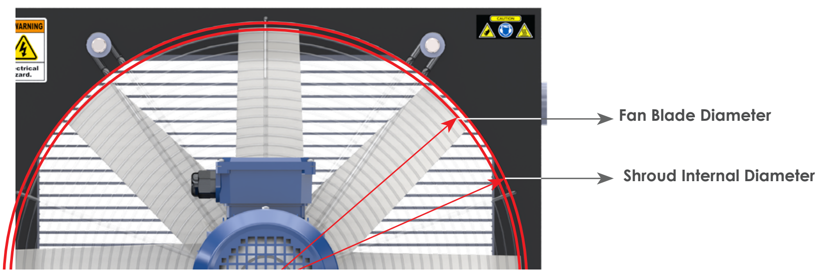




Tip Clearance

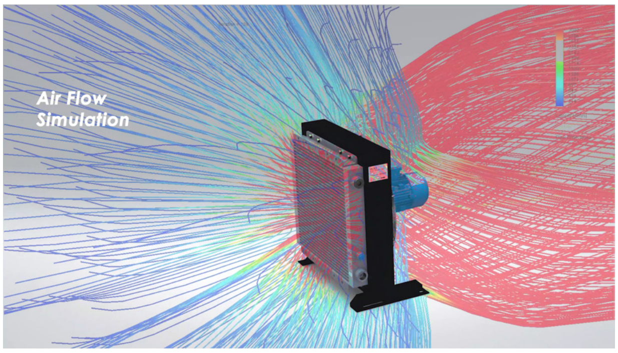
The distance between the surrounding surface and the blade tip of the fan called "tip clearance" around the fan called Shroud has a significant impact on the performance of the cooler. The design of the hydroLync applies the API (American Petroleum Institute) Standard 661, which states that the maximum airflow is achieved when the tip clearance is 0.5-1% of the fan blade diameter, and the theory that the fan blade should be located 1/3 outside of the shroud for optimal performance, as stated in the Military Vehicle Power Plant Cooling Handbook: AMCP 706-361 used by the US military.

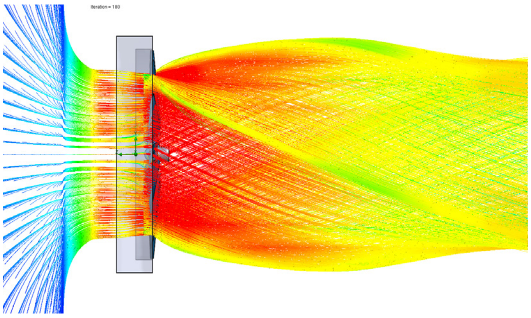
Tip Clearance = Shroud Internal Diameter - Fan Blade Diameter



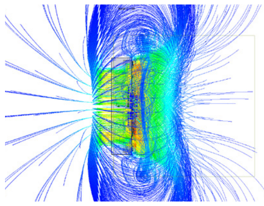
Simulation Analysis

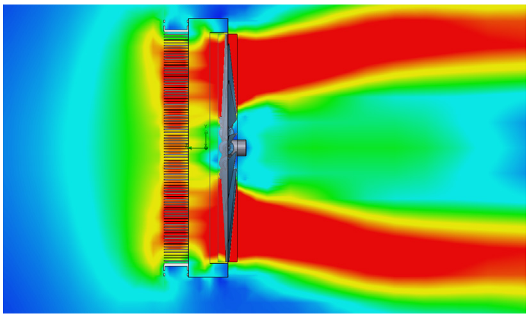
The use of CFD (Computation Fluid Dynamics) analysis has significantly reduced development costs by predicting the state of products under various conditions before applying them to mass production, and has greatly improved the productivity of developing new products. In an air oil cooler, the fan generates airflow, which passes through the oil flowing over the matrix, extracting heat and cooling it down. Therefore, the airflow is determined by the position of the fan, the shape of the blades, and their angles, which are directly linked to the performance of the cooler. During the product development phase, CFD simulation can be used to determine if the ideal performance is possible before creating a prototype. Any necessary improvements can be made immediately and reflected in the development process, allowing for a very rapid development process.



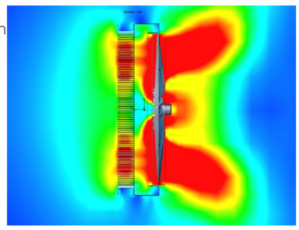


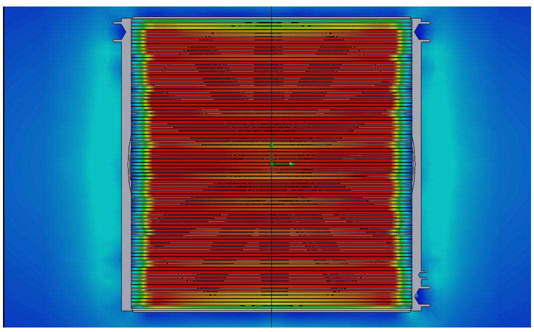
The ideal airflow shape formed by the rotation of the fan blades should be streamlined, as shown on the left side of the image. The shape shown below is the result of incorrect positioning of the fan and blade settings, resulting in significant turbulence in the airflow, which leads to increased power consumption and decreased cooling performance.



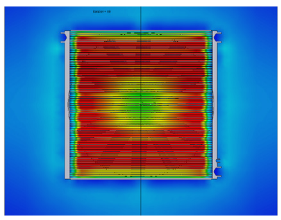


A fast airflow helps to quickly dissipate heat from the matrix, resulting in improved cooling performance. By setting the fan in an ideal position, the airflow can be formed as quickly as possible over the entire surface of the matrix. On the other hand, incorrect settings result in uneven airflow over the matrix, leading to decreased cooling performance.



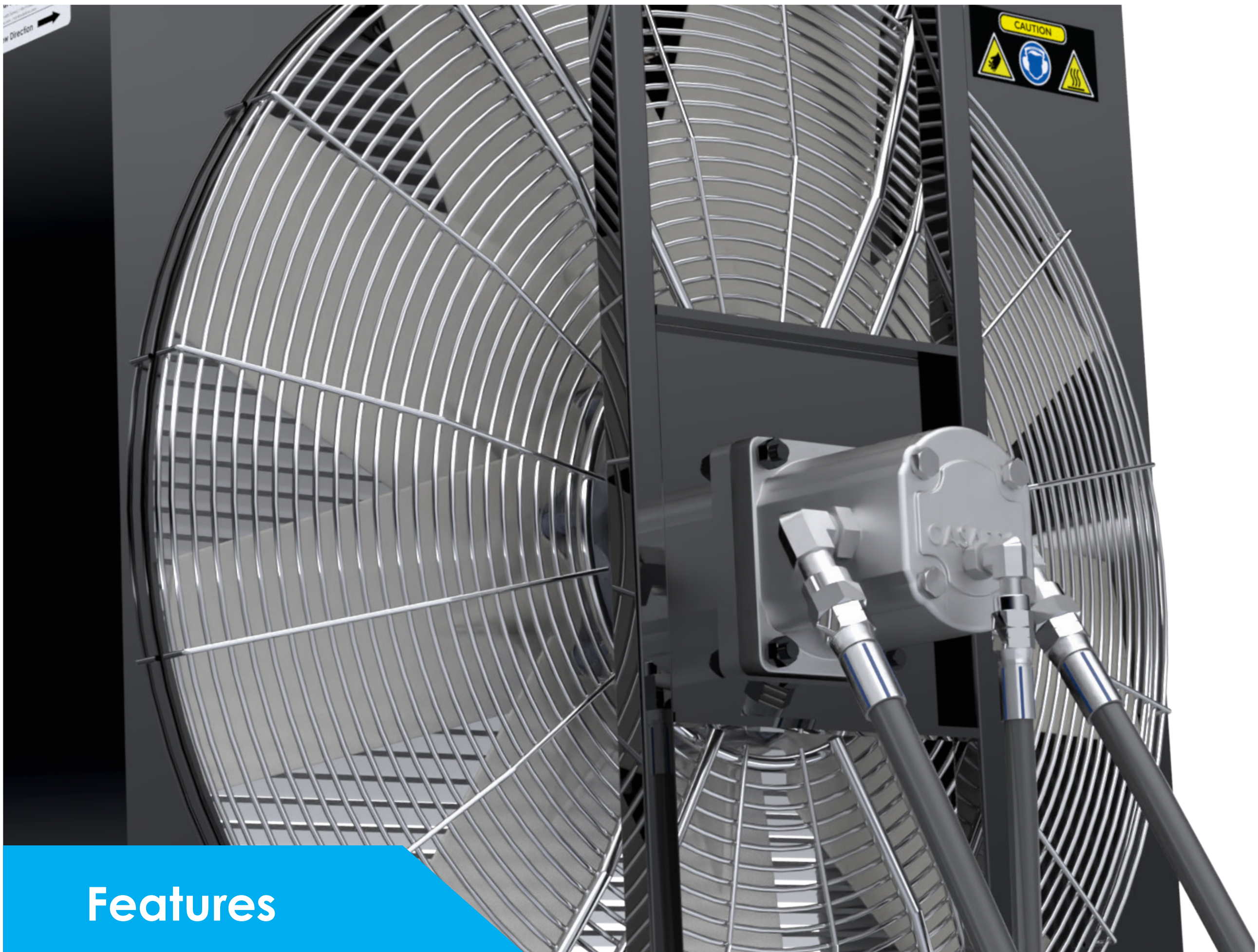


When the fan is not ideally positioned, a dead zone can occur where little or no airflow is formed over some areas of the matrix. The ideal state is to minimize the dead zone over the entire surface, as shown on the left side of the image. However, if the fan position is incorrectly set, a dead zone can occur as shown below, leading to decreased cooling performance of the cooler.



HLH2 Series

Hydraulic Motor Driven



Features

- Applied CASAPPA POLARIS hydraulic motor
- Low level of noise emission
- Integrated outboard bearings for heavy duty application

Quick Overview

Hydraulic motor oil cooler, HLH2 Series from HydroLync, provides a wide range of specifications. You can quickly check the cooling performance, heat dissipation, and maximum flow rate of each model in ISO VG 46 oil based on ETD 40℃.

No.	Model_Cooling Performance(KW/℃) (Heat Dissipation KW, Kcal/h) / Max. Flow rate(LPM)
1	HLH2 07 (Max 3,000RPM) _ 0.25KW/℃ (10KW, 8,600Kcal/h) / Max.125LPM
2	HLH2 11 (Max 3,000Rpm) _ 0.445KW/℃ (17.8KW, 15,308Kcal/h) / Max.150LPM
3	HLH2 16 (Max 3,000RPM) _ 0.625KW/℃ (25KW, 21,500Kcal/h) / Max.200LPM
4	HLH2 23 (Max 1,500RPM) _ 0.70KW/℃ (28KW, 24,080Kcal/h) / Max.200LPM
5	HLH2 33 (Max 1,500RPM) _ 1.10KW/℃ (44KW, 37,840Kcal/h) / Max.300LPM
6	HLH2 35 (Max 1,500RPM) _ 1.3KW/℃ (52KW, 44,720Kcal/h) / Max.300LPM
7	HLH2 56 (Max 1,000RPM) _ 1.5KW/℃ (60KW, 51,600Kcal/h) / Max.300LPM
8	HLH2 58 (Max 1,000RPM) _ 1.7KW/℃ (68KW, 58,480Kcal/h) / Max.300LPM
9	HLH2 76 (Max 1,000RPM) _ 1.95KW/℃ (78KW, 67,080Kcal/h) / Max.400LPM
10	HLH2 78 (Max 1,000RPM) _ 2.25KW/℃ (90KW, 77,400Kcal/h) / Max.500LPM
11	HLH2 110 (Max 1,000RPM) _ 2.35KW/℃ (94KW, 80,840Kcal/h) / Max.400LPM
12	HLH2 112 (Max 1,000RPM) _ 3.3KW/℃ (132KW, 113,520Kcal/h) / Max.500LPM
13	HLH2 113 (Max 1,000RPM) _ 4.27KW/℃ (170.8KW, 146,888Kcal/h) / Max.500LPM

[Remark] RPM for Hydraulic Motor = (q • 1000) / v
q : Inlet Oil Flow for Hydraulic Motor (Lit/min)
v : Hydraulic Motor Volume (cm3/rev)

* Based On ETD 40℃ / ISO VG 46 *

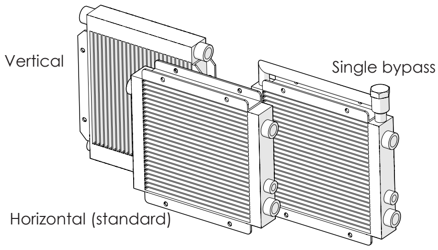
Air Oil Coolers

Ordering code

Example: HLH2 [ ] [35] - [19cc] - [W50] - [S] - [ ]

1 2 3 4 5 6

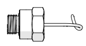
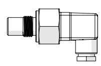
1	Matrix types
	Horizontal (Standard)
V	Vertical
SB	Single Bypass



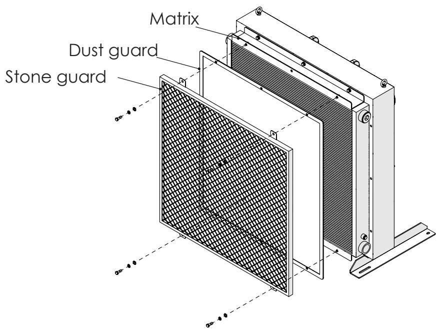
2	Matrix size	
Code	**Size**	**Port**
07	335x322x63	G1"
11	405x390x63	G1"
16	464x458x63	G1"
23	545x540x63	G1"
33	640x648x63	G1"
35	640x648x83	G1 1/2"
56	802x826x63	G1 1/4"
58	802x826x83	G2"
76	940x1019x63	G1 1/2"
78	940x1019x83	G2"
110	1120x1190x63	G2"
112	1120x1190x83	G2"
113	1120x1190x113	G2"

3	Discharge of the pump	
11cc	11.23	cm^3/rev
14cc	14.53	cm^3/rev
19cc	19.09	cm^3/rev

4	Thermal switch	
Code	**Temperature**	**Working range**
	None	
W/D	**30**	ON 35±5℃ / OFF 25±5℃
W/D	**40**	ON 45±5℃ / OFF 35±5℃
W/D	**50**	ON 55±5℃ / OFF 45±5℃
W/D	**60**	ON 65±5℃ / OFF55±5℃
W/D	**70**	ON 75±5℃ / OFF 65±5℃

***W: Wire type**  ***D: DIN plug type** 

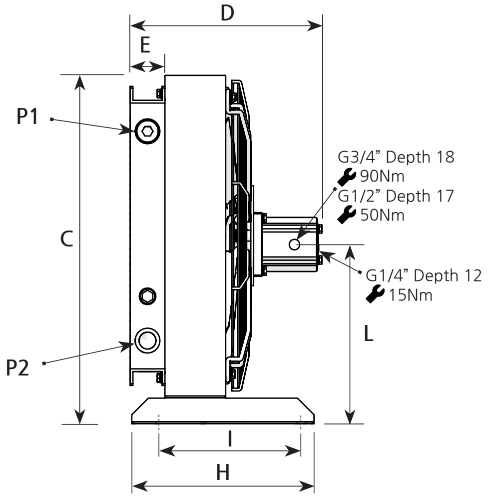
5	Matrix protection accessories
	None (standard)
D	Dust Guard
S	Stone Guard
A	Dust Guard + Stone Guard

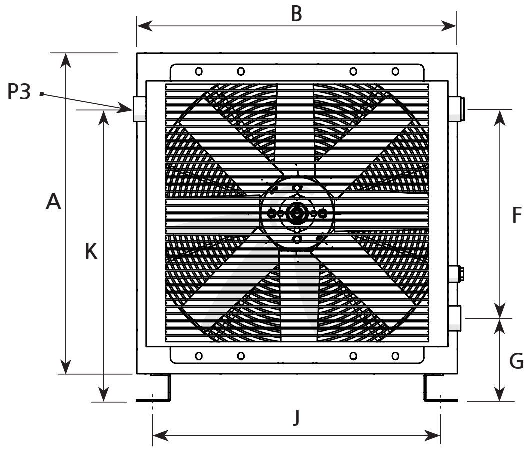


6	Production type
	Standard
C	Customization

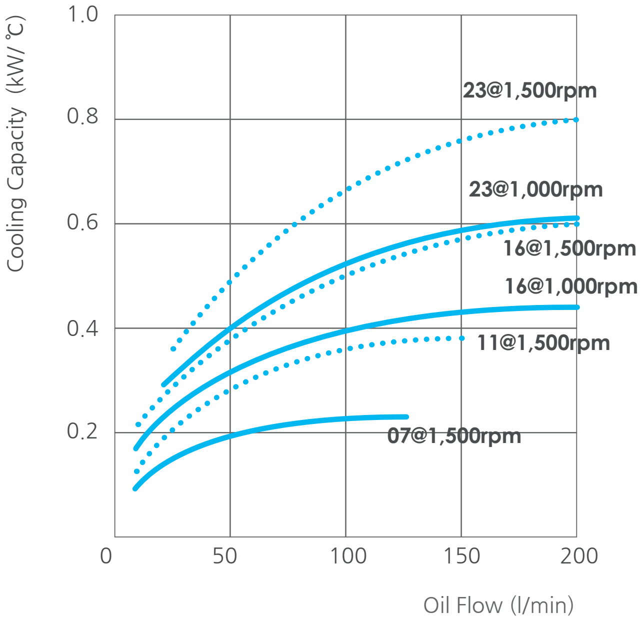
Air Oil Coolers

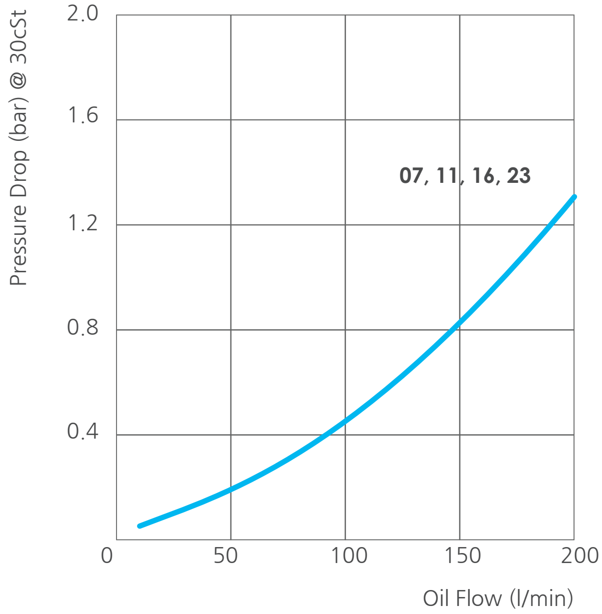
HLH2 07 ~ 113



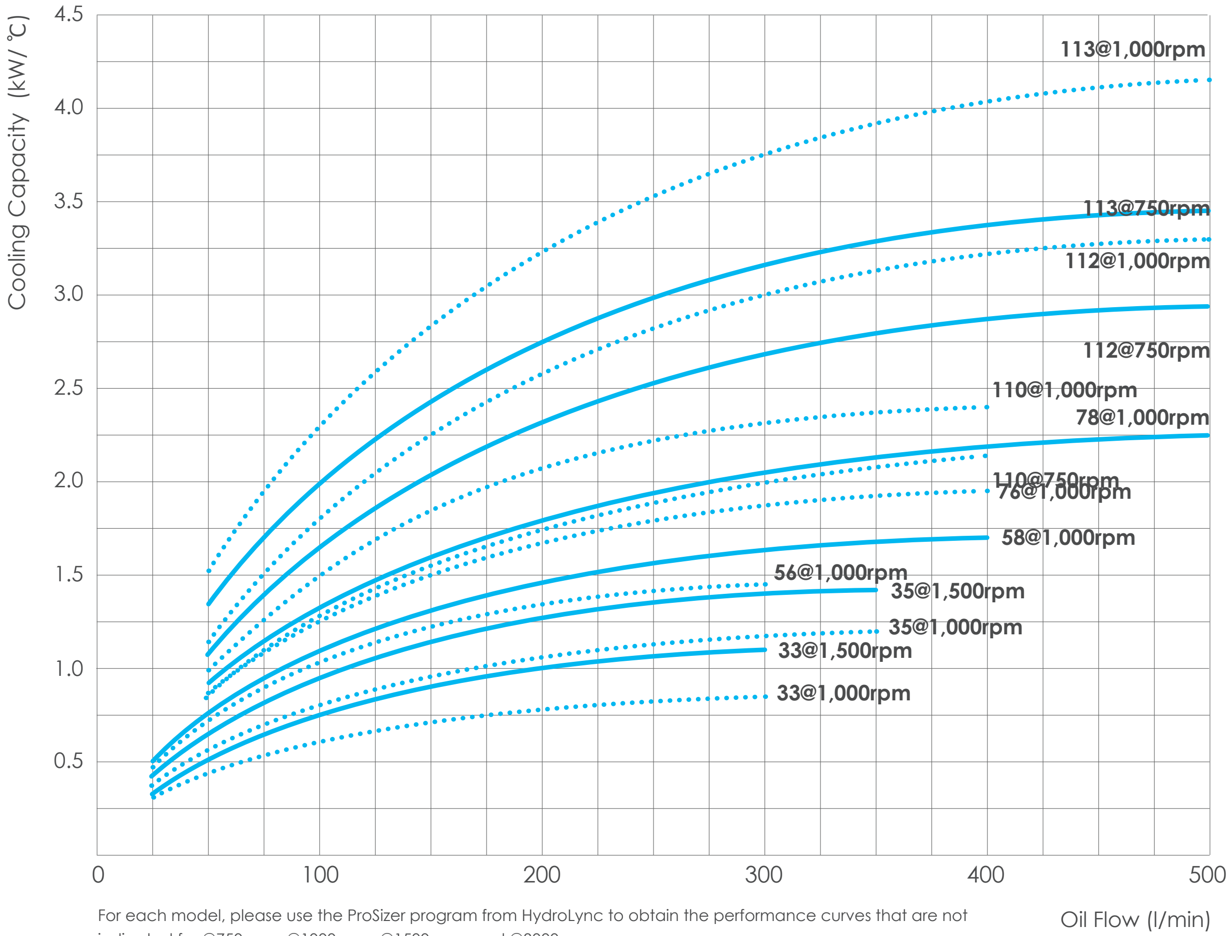


HLH2 Model	A	B	C	D	E	F	G	H	I	J	K	L	P1,2,3	Slot Hole	Weight kg	Noise Level (dB) 1m	Max. Speed (RPM)
07	365	365	408	(317)	63	160	145	270	(145)	297	305	209	G1"	ø10x90 ø10x19	12	79 @3,000 rpm	3,500
11	440	440	480	(332)	63	228	146	280	(170)	390	374	244	G1"	ø10x90 ø10x19	17	82 @3,000 rpm	3,500
16	496	496	536	(342)	63	296	143	305	(195)	436	484	272	G1"	ø10x90 ø10x19	20	86 @3,000 rpm	3,500
23	579	579	629	(354)	63	378	150	330	(220)	520	528	323	G1"	ø10x90 ø10x19	32	76 @1,500 rpm	2,840
33	692	692	742	(414)	63	482	157	400	(270)	620	639	380	G1 1/4"	ø12x92 ø12x21	42	85 @1,500 rpm	2,350
35	692	692	742	(434)	83	482	157	400	(270)	620	639	380	G1 1/2"	ø12x92 ø12x21	58	86 @1,500 rpm	2,350
56	868	868	928	(434)	63	664	163	430	(320)	796	827	478	G1 1/4"	ø12x92 ø12x21	73	82 @1,000 rpm	1,850
58	868	868	928	(454)	83	664	163	430	(320)	796	827	478	G2"	ø12x92 ø12x21	80	83 @1,000 rpm	1,850
76	1022	1022	1092	(440)	63	821	176	455	(325)	972	997	565	G1 1/2"	ø14x94 ø14x23	110	87 @1,000 rpm	1,690
78	1022	1022	1092	(460)	83	821	176	455	(325)	972	997	565	G2"	ø14x94 ø14x23	119	88 @1,000 rpm	1,690
110	1205	1185	1285	(460)	63	985	192	665	(550)	1115	1177	666	G2"	ø14x94 ø14x23	125	91 @1,000 rpm	1,440
112	1205	1185	1285	(480)	83	985	192	665	(550)	1115	1177	666	G2"	ø14x94 ø14x23	133	92 @1,000 rpm	1,440
113	1205	1185	1285	(510)	113	985	192	665	(550)	1115	1177	666	G2"	ø14x94 ø14x23	192	93 @1,000 rpm	1,440

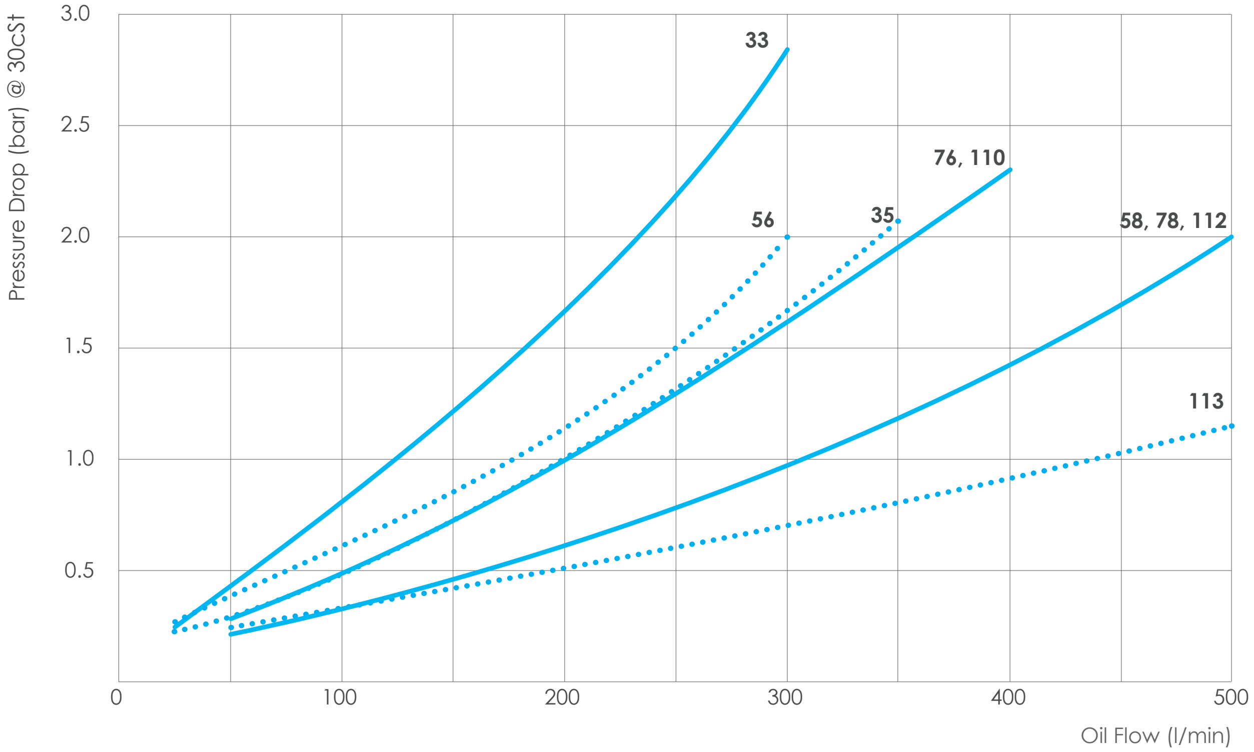




Air Oil Coolers



For each model, please use the ProSizer program from HydroLync to obtain the performance curves that are not indicated for @750 rpm, @1000 rpm, @1500 rpm, and @3000 rpm.



The cooling capacity curve is based on the oil temperature and the ambient air temperature entering the cooler. An oil temperature of +60℃ (T_{inlet}) and an ambient air temperature of +20℃ ($T_{ambientmax}$) provide a temperature difference (ETD) of +40℃. To obtain the total cooling capacity, multiply the cooling performance (kW/℃) by ETD (℃) as follows:

$ETD = T_{inlet} - T_{ambientmax}$ Cooling performance (kW/℃) x ETD (℃) = Cooling capacity (kW)

Air Oil Coolers

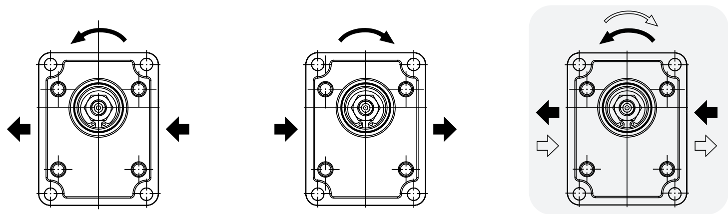
Technical Specifications

Features

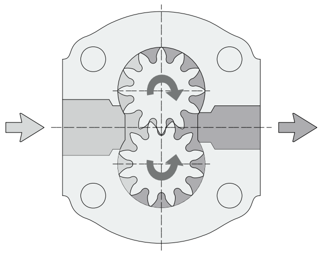
Construction	External gear type motor
Mounting	European
Line connections	Gerotor and flange
Direction of rotation	Clockwise
Max back pressure for single rotation motors and reversible internal drain motors	p_1 max 5 bar (Max. Continuous pressure)
	p_2 max 8 bar (Max. Intermittent pressure)
	p_3 max 15 bar (Max. Peak pressure)
Max drain line pressure on reversible rotation motors	5 bar
Fluid temperature range	-25 ~ 100 ˚C (NBR) / -25 ~125 ˚C (VITON)
Fluid	Mineral oil based hydraulic fluids to ISO/DIN. *For other fluids, please consult our sales department
Viscosity range	From 12 to 100 mm²/s (cSt) recommended
	Up to 750 mm²/s (cSt) permitted

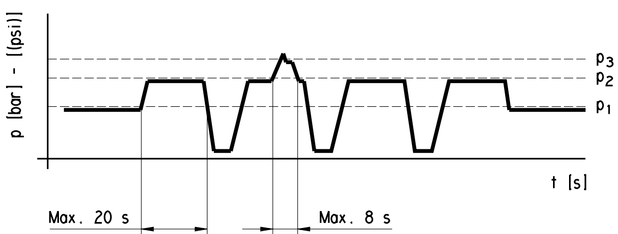
Filtering requirement			
Working pressure (bar)	Δp<140	140< Δp<210	Δp>210
Contamination class NAS 1638	10	9	8
Contamination class ISO 4406:1999	21/19/16	20/18/15	19/17/14
Achieved with filter β_{10}(c) ≥ 75 according to ISO 16889	-	10 μm	10 μm
Achieved with filter β_{25}(c) ≥ 200 according to ISO 16889	25 μm	-	-

Definition of rotational direction facing the drive shaft



Anti-clock rotation | Clockwise rotation | Reversible rotation **(Standard)**



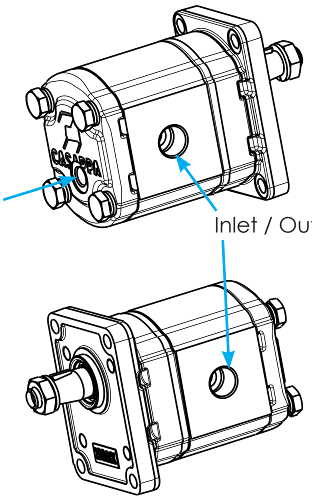


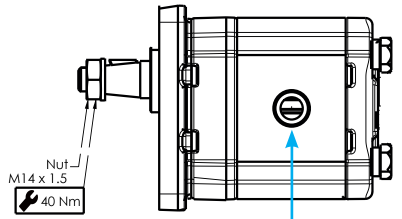
p_1=Max. Continuous pressure, p_2=Max. Intermittent pressure, p_3=Max. Peak pressure

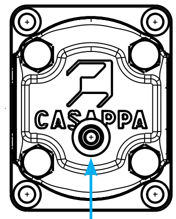
Motor Type	Displacement	Max. Pressure			Max. Speed	Min. Speed
		p_1	p_2	p_3		
	cm³/rev		bar		rpm	
A	11.23	250	280	300	3500	600
B	14.53	250	280	300	3500	500
C	19.09	200	220	240	3000	500

p_1=Max. Continuous pressure, p_2=Max. Intermittent pressure, p_3=Max. Peak pressure

The values in the table refer to unidirectional motors. Reversible motors max pressures are 15% lower than those shown in table. For different working conditions, please consult our sales department.







Motor Type	Displacement	Drain Port Size	🔧	Inlet & Outlet Port Size	🔧
	cm^3/rev	BSP	Nm	BSP	Nm
A	11.23	G 1/4	15	G 1/2	50
B	14.53	G 1/4	15	G 1/2	50
C	19.09	G 1/4	15	G 3/4	90

***Please refer to the tightening strength of each part when connecting pipes.**

Instructions

Installation
The direction of rotation of single-rotation motors must match circuit connections. Check that the coupling flange correctly aligns the transmission shaft and the motor shaft. Flexible couplings should be used (never rigid fittings which will not generate an axial or radial load on the motor shaft.)

Tank
Tank capacity must be sufficient for the system's operating conditions (~ 3 times the amount of oil in circulation) to avoid overheating of the fluid. A heat exchanger should be installed if necessary. The intake and return lines in the tank must be spaced apart (by inserting a vertical divider) to prevent the return-line oil from being taken up again immediately.

Lines
The lines must have a major diameter which is at least as large as the diameter of pump or motor ports, and must be perfectly sealed. To reduce loss of power, the lines should be as short as possible, reducing the sources of hydraulic resistance (elbow, throttling, gate valves, etc.) to a minimum. A length of flexible tubing is recommended to reduce the transmission of vibrations.
All return lines must end below the minimum oil level, to prevent foaming. Before connecting the lines, remove any plugs and make sure that the lines are perfectly clean.

Filters
We recommend filtering the entire system flow. Filters on suction and return line must be fitted in according to the contamination class as indicated on page 68.

Hydraulic Fluid
Use hydraulic fluid conforming to ISO/DIN standards. Avoid using mixtures of different oils which could result in decomposition and reduction of the oil's lubricating power.

Starting Up
Check that all circuit connections are tight and that the entire system is completely clean. Insert the oil in the tank, using a filter. Bleed the circuit to assist in filling. Set the pressure relief valves to the lowest possible setting. Turn on the system for a few moments at minimum speed, then bleed the circuit again and check the level of oil in the tank. In the difference between pump or motor temperature and fluid temperature exceeds 50°F (10 °C), rapidly switch the system on and off to heat it up gradually. Then gradually increase the pressure and speed of rotation until the pre-set operating levels as specified in the catalogue are attained.

Periodical Checks - Maintenance
Keep the outside surface clean especially in the area of the drive shaft seal. In fact, abrasive powder can accelerate wear on the seal and cause leakage. Replace filters regularly to keep the fluid clean. The oil level must be checked and oil replaced periodically depending on the system's operating conditions.

Using in cold weather - Cold start

When using in cold weather, "cold start" means using it in a non-loaded state for a short period of time. The following restrictions should be applied when doing a cold start..

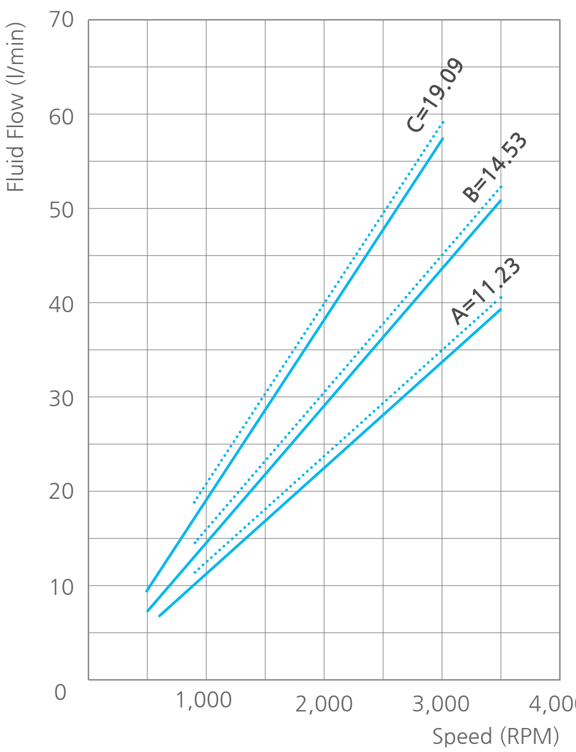
Min. Inlet pressure	0.5 bar (7 psi)
Outlet pressure (pump) / Inlet pressure (motor)	≤ 50 bar (725 psi)
Max. Drain pressure (Maximum back pressure when using a single rotation motor)	+50% higher than standard
Rotational speed	≤ 1500rpm
The lowest temperature	-40 ˚C (-40 ˚F)
Max. Viscosity	2000 mm²/s(cSt)[9100SSU]

If the ambient temperature is below -20°C (-4°F), the system speed and pressure should be limited until the hydraulic oil temperature exceeds -20°C (-4°F).

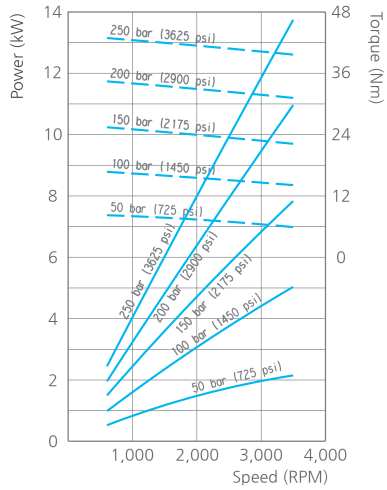
Air Oil Coolers

Hydraulic Motor Performance

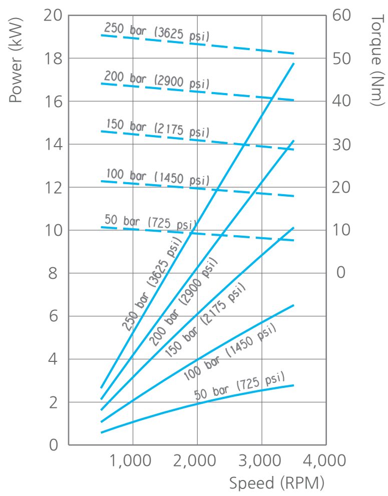
Each performance curve was obtained using oil VG46 (210 SSU) at 40°C (104°F) and 50°C (122°F).



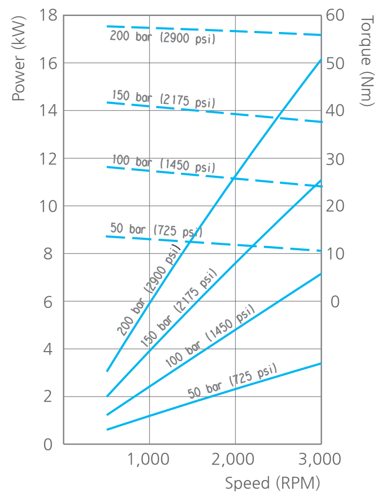
Type	Pressure
A	20 bar 250 bar
B	20 bar 250 bar
C	20 bar 200 bar



Type A=11.23

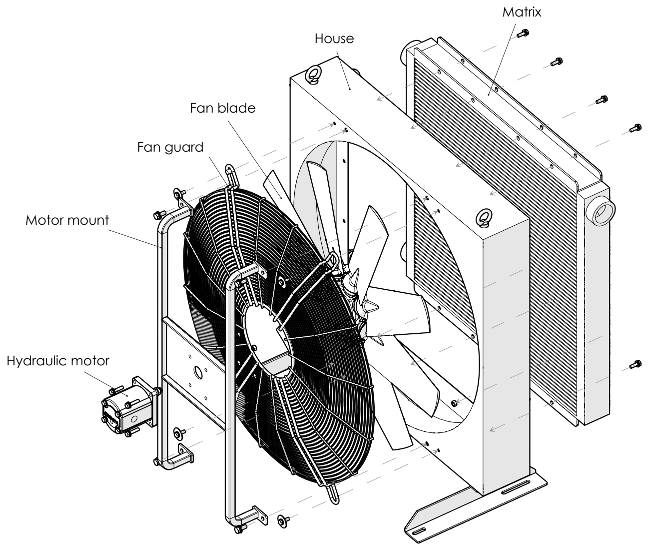


Type B=14.53

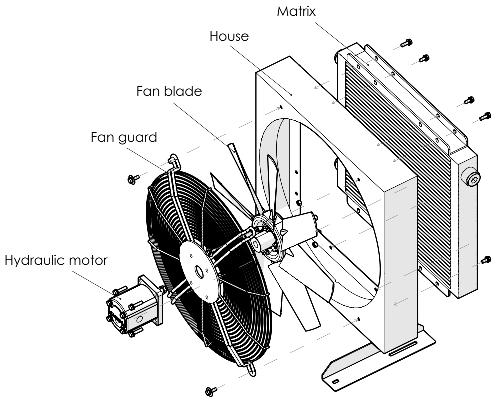


Type C=11.23

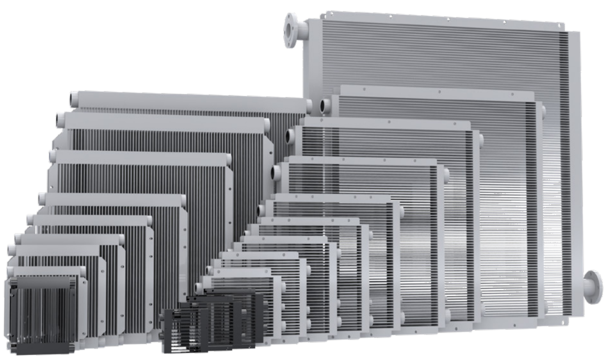
Specifications



Model 33~113



Model 07~23



Aluminum matrix

Hydrolync provides various aluminum matrices, and customers can choose between horizontal and vertical types to meet their requirements.

- Material: 3003/4004/5052
- Test pressure: 21 bar
- Test standard: ISO/DIS 10771-1
- Max. Working pressure: 14 bar
- Max. Working temperature: 120 ℃
- Paint: Epoxy / Polyester powder coatings - coating thickness 60 µm
- Paint color:
  Applied model:07~113 RAL 9006 / silver

Fan

- Fan blade material:
  Glass Reinforced Poly-amide (**PAG**)
  Working temperature: -40 ~ 120 ℃
- Fan boss material: Aluminum

House

- Material: steel
- Paint: powder coating
- Color: black, white (option)

Hydraulic motor

- CASAPPA POLARIS Series
- High-strength aluminum alloy body
- Max. Working pressure 300 bar (4,350 psi)
- Max. Speed: 3,000~3,500 rpm

Fan guard

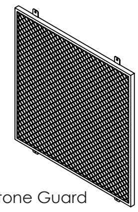
- Material: steel
- Surface treatment: zinc plating

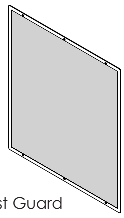
Air Oil Coolers

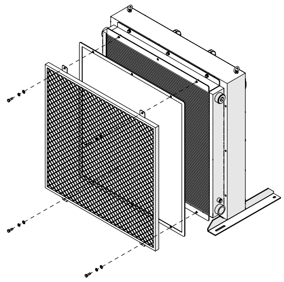
Accessories

Protection of the matrix

Coolers installed in harsh environments with dust, oil, and other contaminants may cause damage to the surface of the matrix or decrease heat exchange performance due to oil and dust sticking to the fins. In this case, if the surface is damaged or oil and dust cannot be cleaned from the fins, the matrix must be replaced. To reduce such losses, Stone Guard or Dust Guard can be installed on the matrix to protect it and reduce maintenance costs. It is important to note that when installing a Dust Guard, regular cleaning is necessary to maintain performance, as failure to do so may reduce the airflow and cause the motor to overload.


Stone Guard


Dust Guard



Attention

- To maintain the cooler's optimal cooling performance, the Dust Guard should be cleaned twice a week.
- The cleaning cycle for Stone Guard is approximately once every three months.
- If the environmental pollution conditions are severe, reduce the cleaning cycle.

Thermal Switch

The thermal switch controls the operation and stop of the cooler according to the temperature of the oil flowing through the matrix.

Material: Thermostat Cell _ Bi-metal / Cell Housing _ Aluminum

Lifespan ≥ 100,000 times, **Max. Rating** @ 24VAC 7.5A (Resistance load)

Type of Contact : Normally Open **Temp. Differential ΔT** : 10℃

Ingress protection rating : IP68 (Wire type), IP65(Din Plug type),

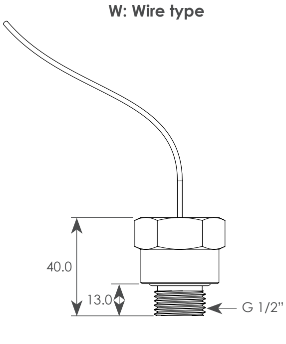
Connection Thread : G 1/2, **Cable Length** : 350mm

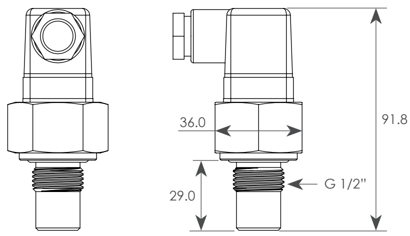

W: Wire type

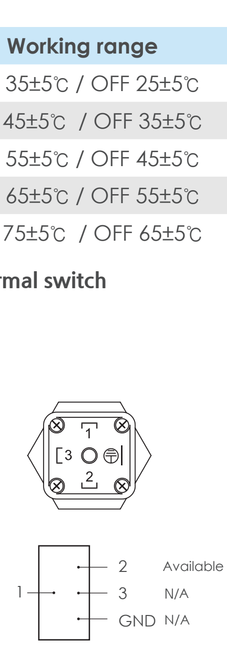

D: DIN plug type

Type	Temperature	Working range
W/D	30	ON 35±5℃ / OFF 25±5℃
W/D	40	ON 45±5℃ / OFF 35±5℃
W/D	50	ON 55±5℃ / OFF 45±5℃
W/D	60	ON 65±5℃ / OFF 55±5℃
W/D	70	ON 75±5℃ / OFF 65±5℃

Selection of the thermal switch







DIN Plug Wiring

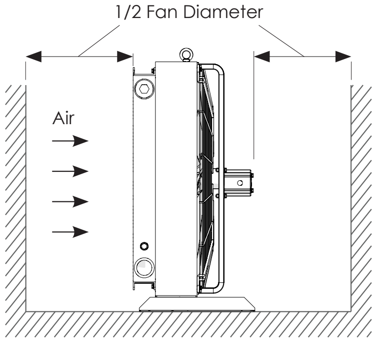
Installation and Maintenance

***Please refer to the product manual for more detailed information.**

Installation

The cooler has a very sturdy structure and can be mounted on both the face and foot. When installing it on the front of a duct or ventilation shaft, use the 4 to 8 mounting holes in the U-channel of the matrix. Place the cooler so that the airflow is not restricted. The distance to the nearest wall should be at least half the diameter of the fan.

HLH2 Model	1/2 Fan Diameter
07	162.5
11	200
16	228
23	269
33, 35	325
56, 58	412
76, 78	450
110, 112, 113	530

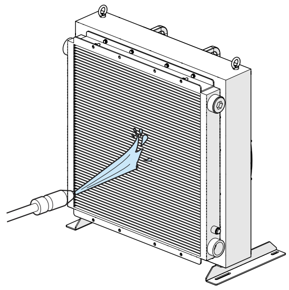


Cleaning the inside of the matrix

To clean the inside of the matrix, connect the cooler to a closed circuit and circulate perchloro-ethylene. After cleaning, flush the matrix with oil before reconnecting it to the hydraulic system.

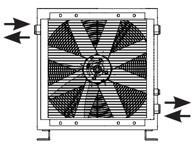
Cleaning the outside of the matrix

The easiest way to clean the fins is to use compressed air or wash them with water. Grease removers and high-pressure cleaning systems can also be used to remove foreign matter. When using a high-pressure cleaning system, make sure that the water stream is parallel to the fins and at least 3cm away from them. Be careful not to damage the fins with a strong water stream.



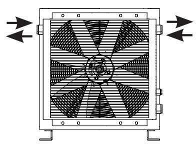
Connecting

A

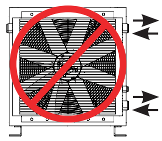


Model: 07-200

B



Model: 07-200



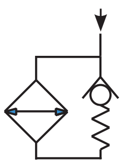
Incorrect connecting (No heat exchange)

⚠ **Attention**

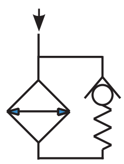
- Connect the pipes to the heat exchanger as shown in the diagram. Avoid incorrect connections that do not result in effective heat exchange.
- The air-oil cooler matrix is designed with a maximum operating pressure of 14 bar. If the cooler is installed in the return line, appropriate protective measures must be taken to prevent damage to the heat exchanger from pressure surges. Otherwise, an offline circulation pump-type cooling system (refer to HLO3 Series) may be necessary.
- Connecting the matrix with hoses is recommended. The appropriate size and type of hose will depend on the system pressure, flow rate, fluid, and temperature.

Applying Bypass

When a surge pressure occurs in the hydraulic system circuit, install a line check valve as shown in the right figure to protect the durability of the cooler matrix.



Correct



Incorrect

"Engineering Excellence! We are always prepared to promptly address our customers' needs."

Contact us

Republic of Korea
Headquarter

Tel +82 (31) 499 6682 Fax +82 (31) 499 6683 info@hydrolync.com
4, Emtibeui 25-ro 58beon-gil, Siheung-si, Gyeonggi-do, Republic of Korea zip: 15117
경기도 시흥시 엠티브이25로 58번길 4 우편번호: 15117

China

Mobile(Wechat): 138 6170 0580 info@hydrolync.com
240-3, Xidalu, Xinwu District, Wuxi, Jiangsu, China
中国江苏省无锡市新吴区锡达路240-3

YouTube

Hydro Lync

Engineering Excellence