Hydro Lync

Air Oil Coolers

HLA2 Series - AC Motor Driven

HLD Series - DC Motor Driven

HLH2 Series - Hydraulic Motor Driven

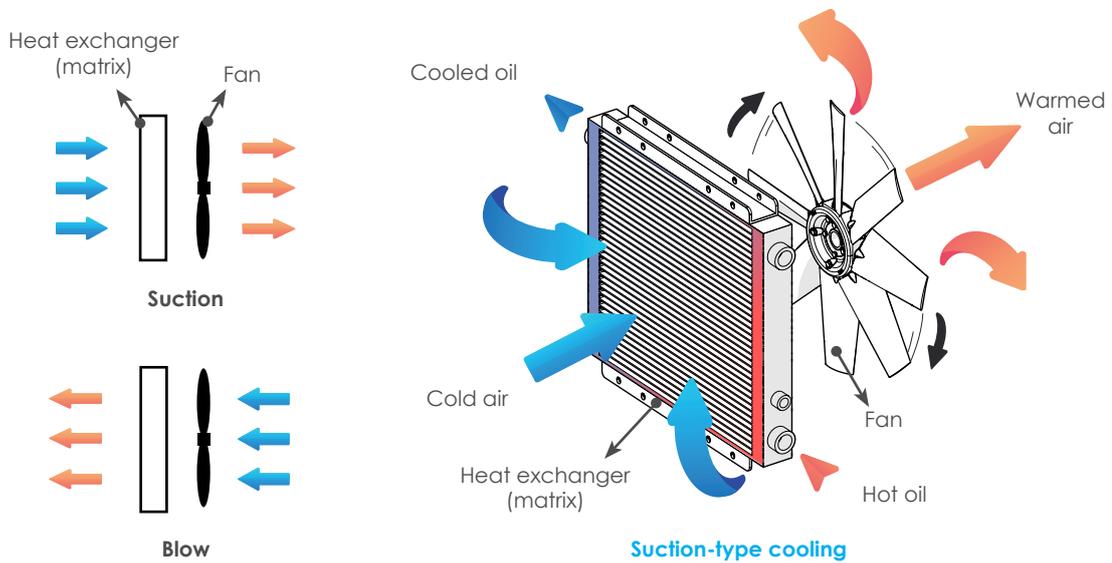HLO3 Series - Offline Circulation Pump Driven

HLAX Series - Axial Motor Driven

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.

Air Oil Coolers

Heat exchanger (matrix) Fan

Suction

Blow

Cooled oil

Warmed air

Cold air

Heat exchanger (matrix)
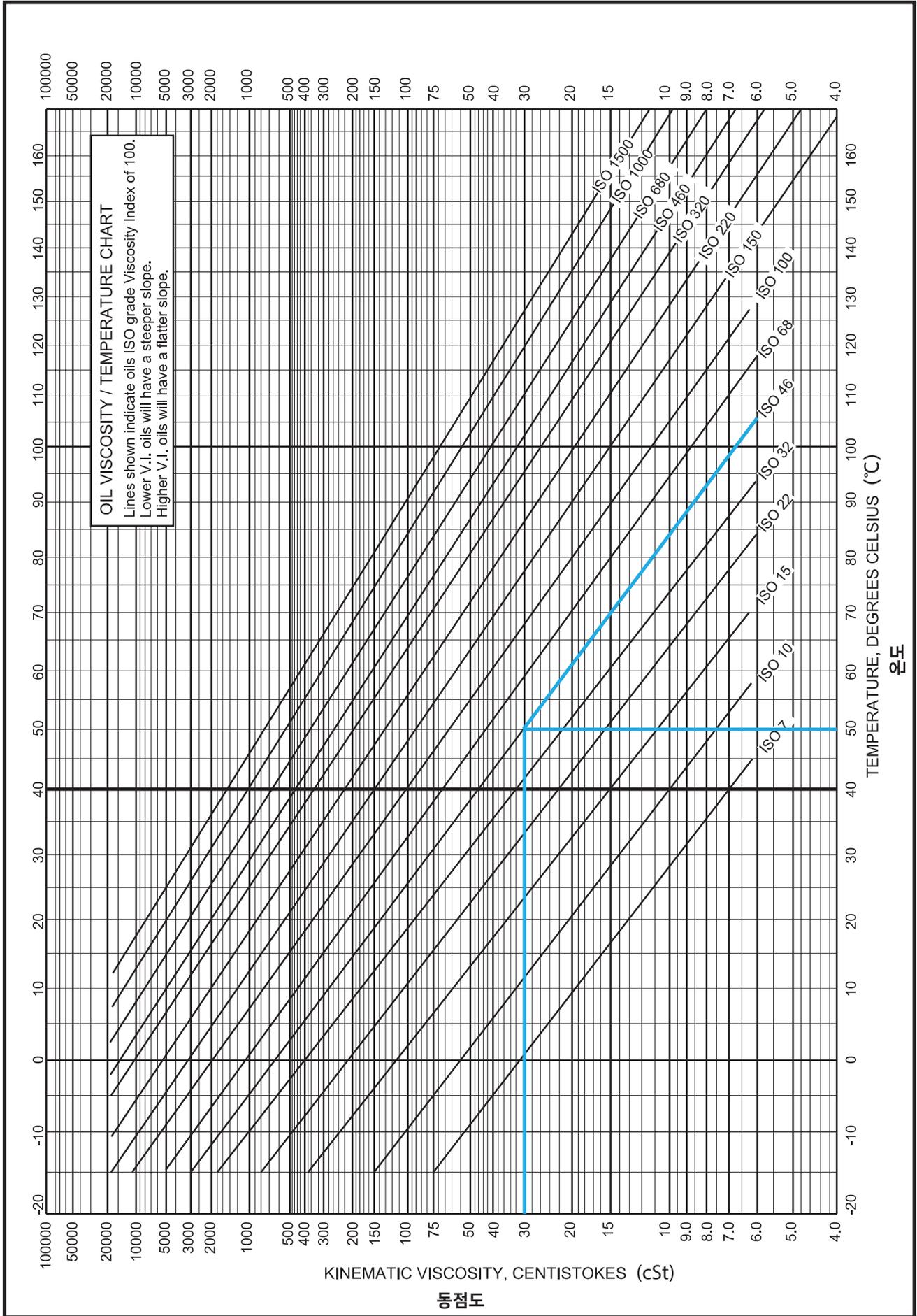
Fan

Hot oil

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.

동점도

KINEMATIC VISCOSITY, CENTISTOKES (cSt)
동점도

TEMPERATURE, DEGREES CELSIUS (°C)
온도

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

Air Oil Coolers

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.
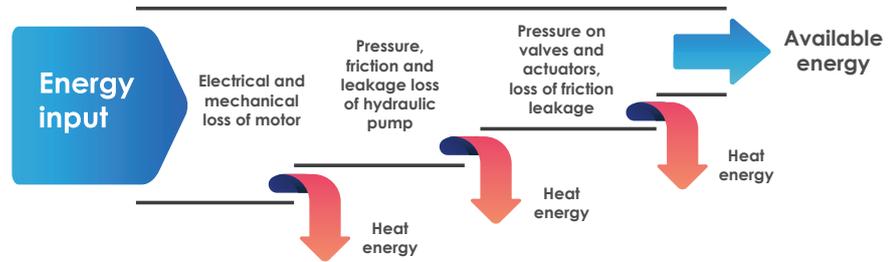
The purpose of using a cooler is to maintain the heat generated by the energy loss at a constant level, thereby increasing the efficiency of the system and reducing maintenance costs. The heat generated by the loss of energy can damage the pump, hose, sealing, and bearings installed in the hydraulic 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:

Air Oil Coolers

Hydro Lync

When the specific heat unit is (kJ/kg°C)	$P_H = (T_2 - T_1) \times SG \times SH \times Q /60 \quad [kW]$

When the specific heat unit is (Kcal/kg°C)	$P_H = (T_2 - T_1) \times SG \times SH \times Q /60 \quad [Kcal/h]$

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

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

When the specific heat unit is (Kcal/kg°C)	$P_C = (T_{in} - T_{out}) \times SG \times SH \times Q_C /60 \quad [Kcal/h]$

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

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.

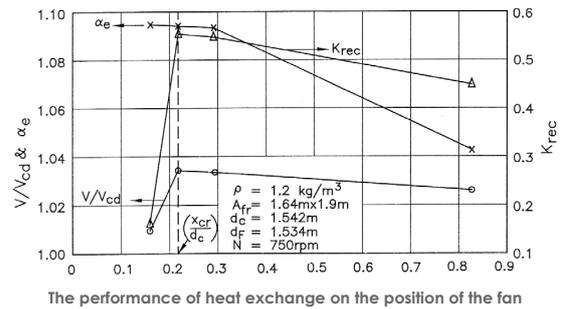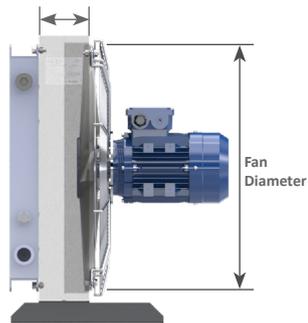$$\textbf{Cooling Capacity} = P_C / ETD \quad (kW/ °C)$$

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.

Distance between matrix and fan

Fan Diameter

The performance of heat exchange on the position of the fan

$\rho = 1.2 \ kg/m^3$
$A_{fr} = 1.64m \times 1.9m$
$d_c = 1.542m$
$d_F = 1.534m$
$N = 750rpm$

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.

2/3   1/3

Shroud   Fan
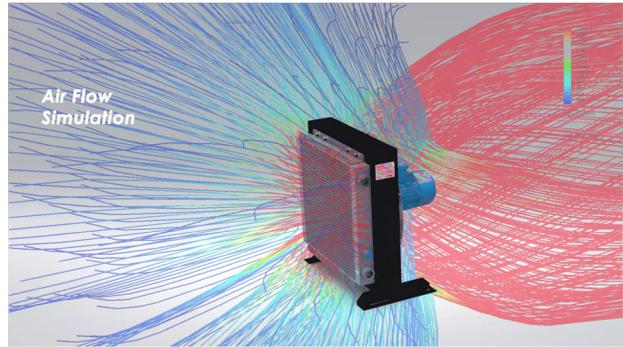
Air flow   2/3
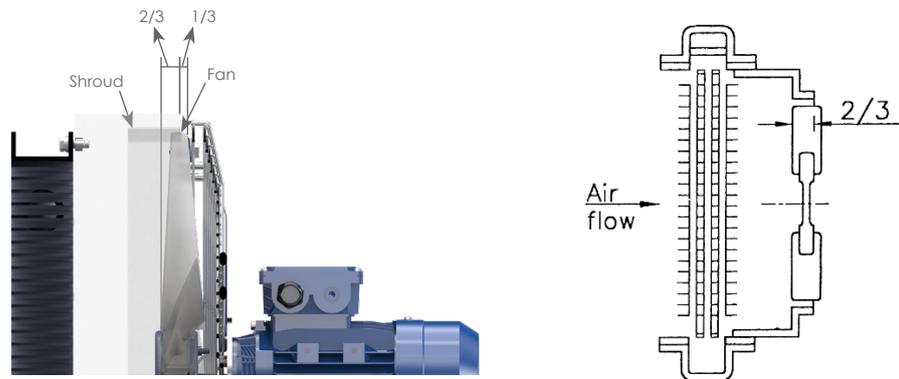
Tip Clearance

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

Fan Blade Diameter

Shroud Internal Diameter

**Air Oil Coolers**

Air Oil Coolers
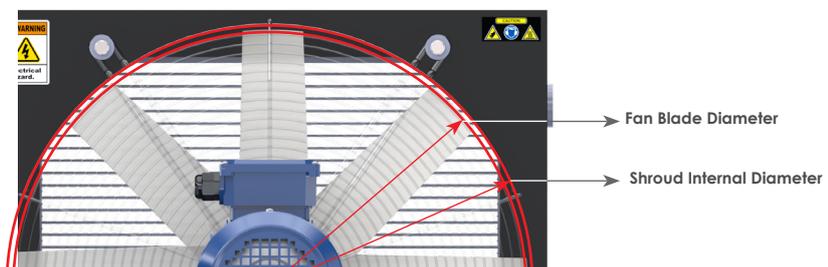
Simulation Analysis

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.
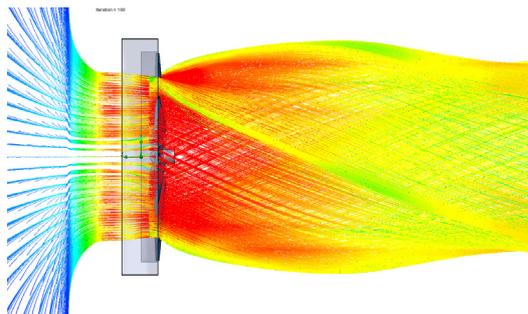

The ideal airflow shape formed by the rotation of the fan blades should be streamlined, as shown on the left side of the image. The shape shown below is the result of incorrect positioning of the fan and blade settings, resulting in significant turbulence in the airflow, which leads to increased power consumption and decreased cooling performance.
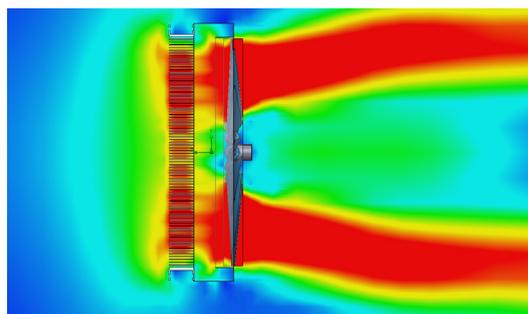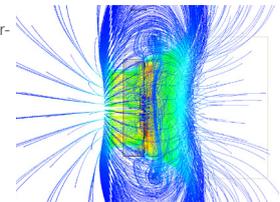
A fast airflow helps to quickly dissipate heat from the matrix, resulting in improved cooling performance. By setting the fan in an ideal position, the airflow can be formed as quickly as possible over the entire surface of the matrix. On the other hand, incorrect settings result in uneven airflow over the matrix, leading to decreased cooling performance.
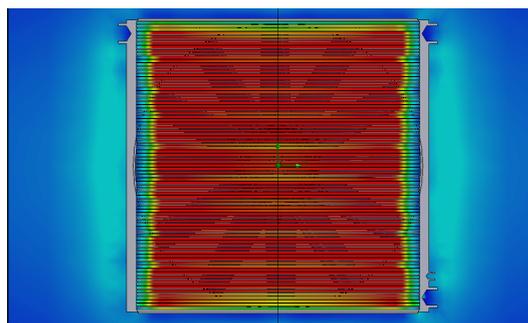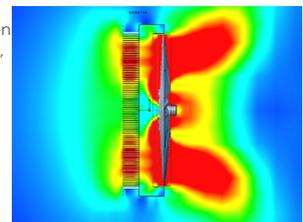
When the fan is not ideally positioned, a dead zone can occur where little or no airflow is formed over some areas of the matrix. The ideal state is to minimize the dead zone over the entire surface, as shown on the left side of the image. However, if the fan position is incorrectly set, a dead zone can occur as shown below, leading to decreased cooling performance of the cooler.
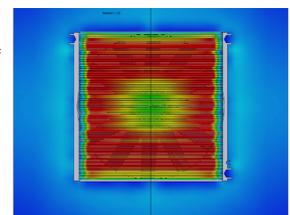
HLD Series

DC Motor Driven

Features

- **Applied 3rd generation DMC**
- **Applied PTO on/off control function**
- **Intelligent DC motor controller for energy saving**
- **iDMC configuration and monitoring software**

Quick Overview

Hydraulic mobile oil cooler, HLD 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-DC Power_Cooling Performance(KW/℃) (Heat Dissipation KW, Kcal/h) / Max. Flow rate(LPM)
1	HLD 015-12V / 24V _ 0.048KW/℃ (1.92KW, 1,651Kcal/h) / Max.40LPM
2	HLD 03-12V / 24V _ 0.080KW/℃ (3.20KW, 2,752Kcal/h) / Max.100LPM
3	HLD 04-12V / 24V _ 0.125KW/℃ (5.00KW, 4,300Kcal/h) / Max.100LPM
4	HLD 07-12V / 24V _ 0.19KW/℃ (7.60KW, 6,536Kcal/h) / Max.125LPM
5	HLD 11-12V / 24V _ 0.31KW/℃ (12.40KW, 10,664Kcal/h) / Max.150LPM
6	HLD 16-12V / 24V _ 0.39KW/℃ (15.60KW, 13,416Kcal/h) / Max.200LPM
7	HLD 23-12V / 24V _ 0.60KW/℃ (24.00KW, 20,640Kcal/h) / Max.200LPM
8	HLD 33-12V / 24V _ 0.72KW/℃ (28.80KW, 24,768Kcal/h) / Max.300LPM
9	HLD 35-12V / 24V _ 0.81KW/℃ (32.40KW, 27,864Kcal/h) / Max.350LPM

[Remark] RPM for 12V, 24V
DC Motor = 3,060RPM   * Based On ETD 40℃ / ISO VG 46 *
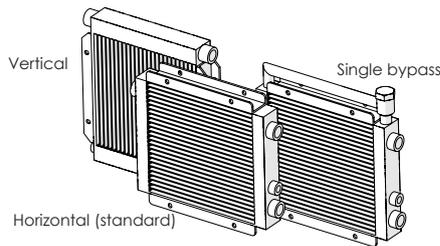
Ordering code

Example: HLD ☐ 07 - 24V - W50 - DMC - BC - ☐ - ☐
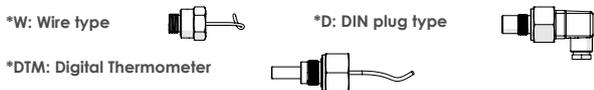   1   2   3   4   5   6   7   8

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

Vertical — Single bypass — Horizontal (standard)

2	Matrix size	
Code	**Size**	**Port**
015	176x175x45	G3/8
02	148x245x45	PT3/8
03	248x216x63	G1
04	272x244x63	G1
07	335x322x63	G1
11	405x390x63	G1
16	464x458x63	G1
23	545x540x63	G1
33	640x648x63	G1
35	640x648x83	G1 1/2

3	DC Voltage	
12V	12V	DC Power
24V	24V	DC Power

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℃
DTM	Sensor	-55°C to +125°C

*W: Wire type   *D: DIN plug type

*DTM: Digital Thermometer

Note: This can only be used with products equipped with iDMC.

5	DC Motor Controller (DMC)
	None (standard)
DMC	DC Motor Controller
iDMC	Intelligent DC Motor Controller

6	Battery power cable
	None (standard)
BC	Battery power cable - 8m

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

Matrix
Dust guard
Stone guard
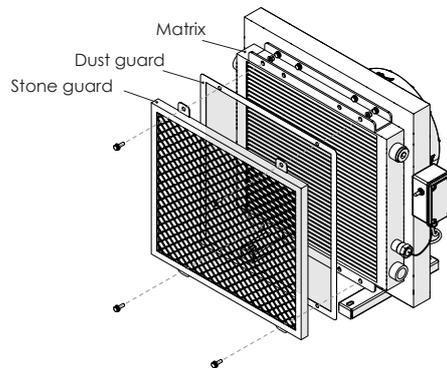
8	Production type
	Standard
C	Customization

HLD 015
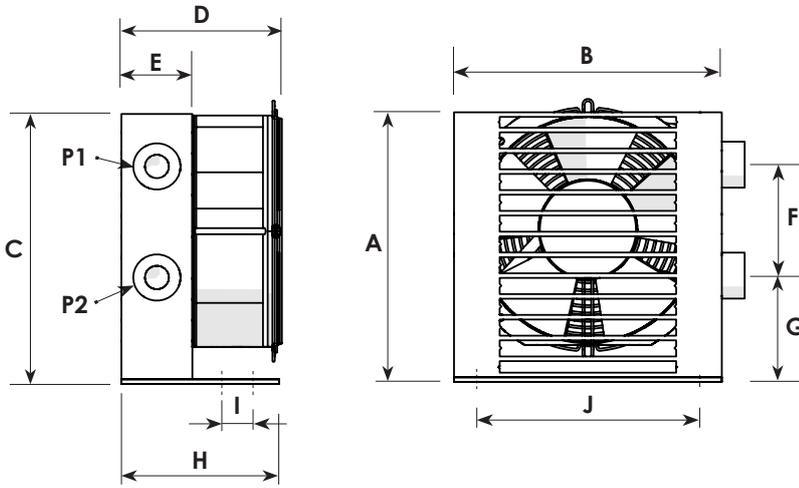
HLD Model	A	B	C	D	E	F	G	H	I	J	K	P1, 2	Bracket Hole
HLD 015	175	176	175	104.3	45	72	69	100	30	138	-	PT3/8"	4xø6
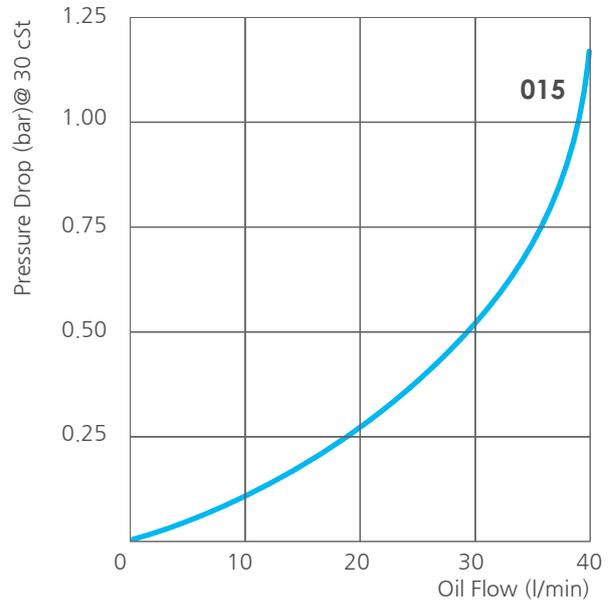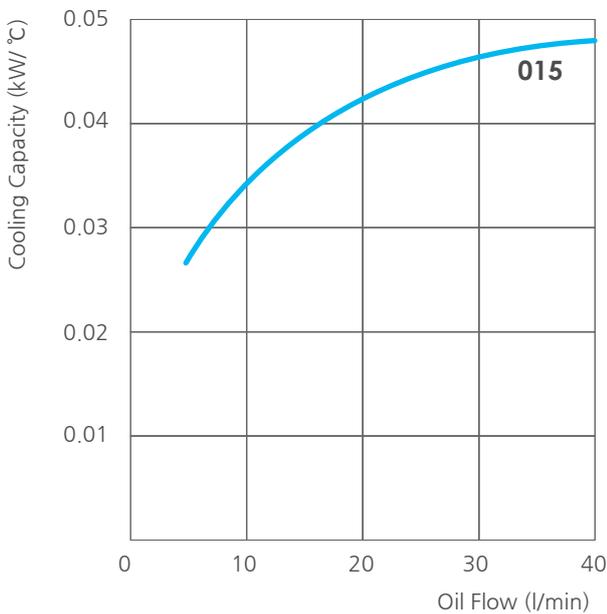
Flow rate:	10 ~ 40 l/min (< ΔP=1.2 bar)
Test pressure:	21 bar
Max. Working pressure:	Max. 14 bar
Ingress protection rating:	IP 44
Noise:	< 52dB(A) 1m

DC motor:	12V / 1.1A @3,200 rpm
	24V / 0.6A @3,200 rpm
Ambient Temp. of Motor / Operating:	-10 ℃ ~ +80 ℃
Ambient Temp. of DC / Storage:	-10 ℃ ~ +70 ℃
Net Weight:	2.6 Kg

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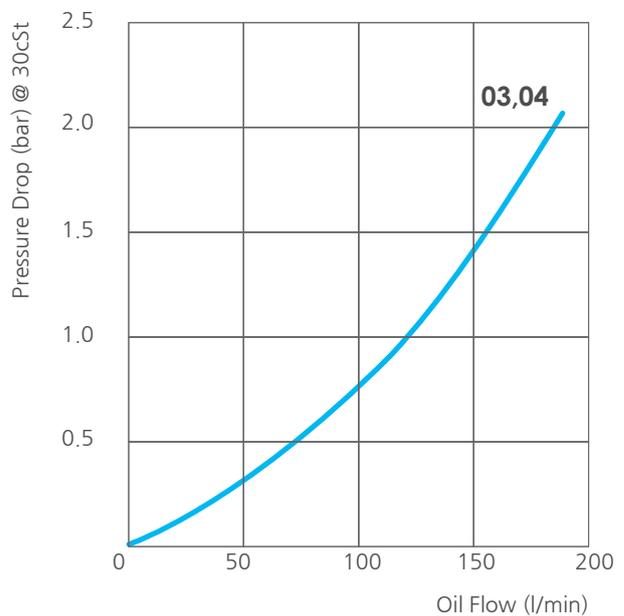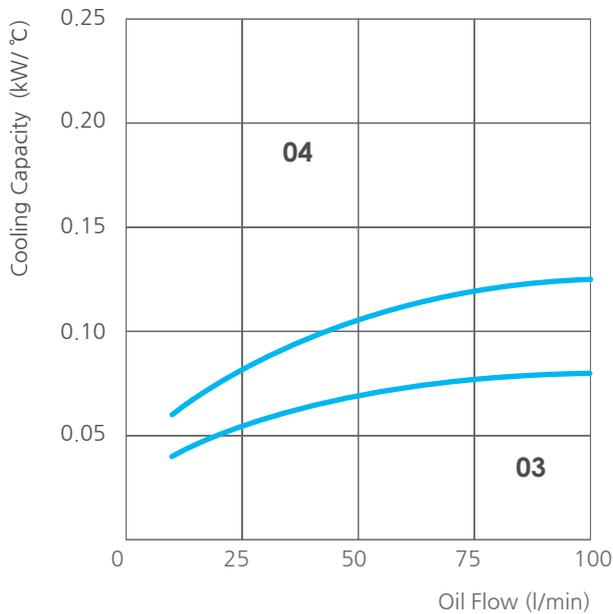
$$ETD = T_{inlet} - T_{ambientmax} \quad \text{Cooling performance (kW/℃) x ETD (℃) = Cooling capacity (kW)}$$

HLD 03, 04
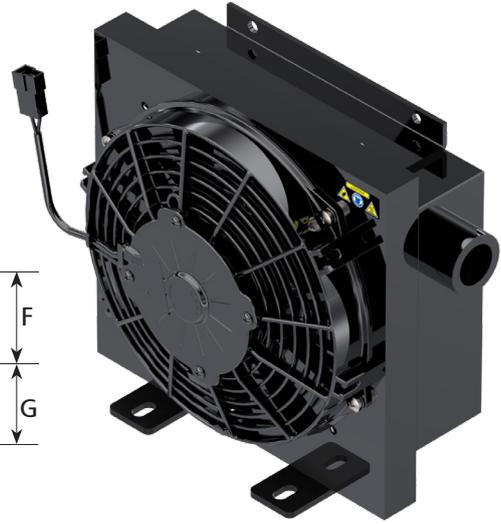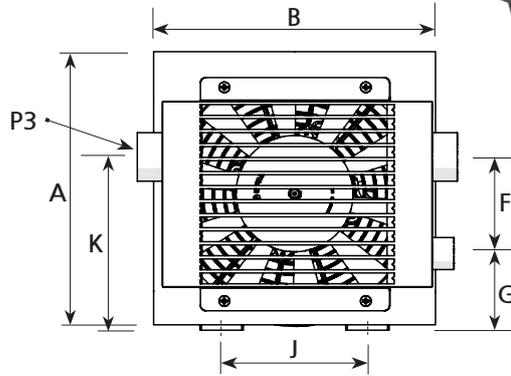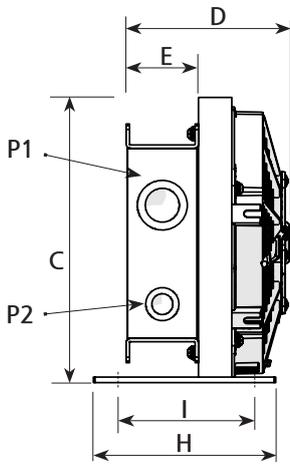
HLD Model	A	B	C	D	E	F	G	H	I	J	K	P1, 3	P2	Bracket Hole
HLD 03	253	259	258	160.2	63	89.5	71	164	133	134	160.5	G1"	G1/2"	4x(ø10x19)
HLD 04	266	273	271	160.2	63	90	105	164	133	134	195	G1"	G1/2"	4x(ø10x19)

Oil flow rate:	Max. 100 l/min	**DC Motor :**	12V / 8A @3,350 rpm
Working Pressure:	Max. 14 bar		24V / 4A @3,350 rpm
Insulation Class:	H (180 ℃ 356 ℉)	**Net Weight:**	03 5 Kg
Ingress Protection:	IP 68		04 6 Kg
Noise Level:	< 68 dB(A)		

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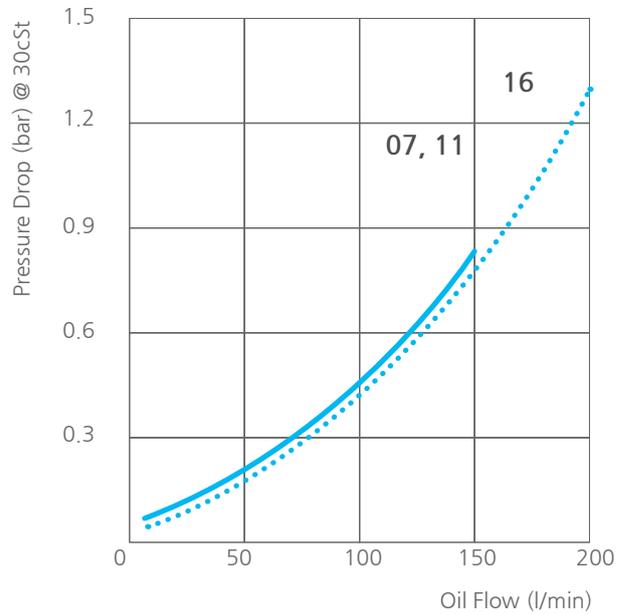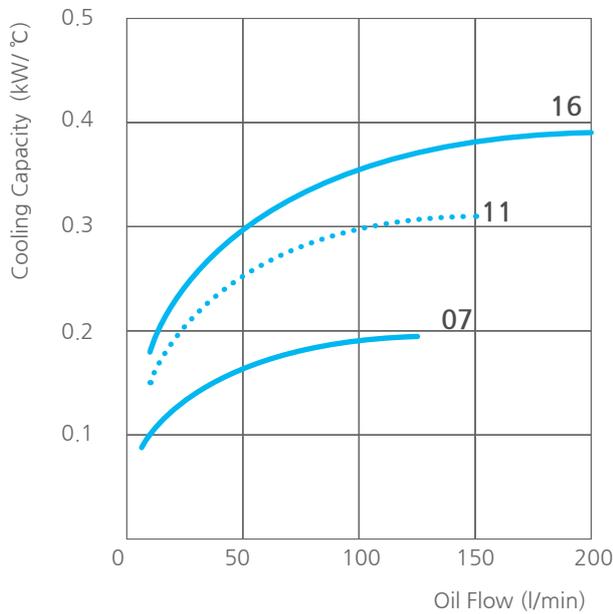
$$ETD = T_{inlet} - T_{ambientmax} \quad \text{Cooling performance (kW/℃) x ETD (℃) = Cooling capacity (kW)}$$

Air Oil Coolers

HLD 07 ~ 16

HLD Model	A	B	C	D	E	F	G	H	I	J	K	P1, 3	P2	Bracket Hole
HLD 07	340	340	335	198	63	160	94	120	90	300	254	G1"	G1"	11 x 22
HLD 11	398	410	402	218	63	228	89	140	100	360	317	G1"	G1"	11 x 22
HLD 16	466	466	470	218	63	296	92	140	100	416	388	G1"	G1"	11 x 22

Flow rate:	07 - Max. 130 l/min	**Ingress Protection:**	IP 68
	11 - Max. 150 l/min	**Noise Level:**	< 74 dB(A)
	16 - Max. 200 l/min	**DC Motor :**	12V / 20A @3,060 rpm
Max. Working Pressure:	Max. 14 bar		24V / 10A @3,060 rpm
Insulation Class:	H (180 ℃ 356 ℉)	**Net Weight:**	07 (9 Kg), 11(12 Kg), 16(15 Kg)

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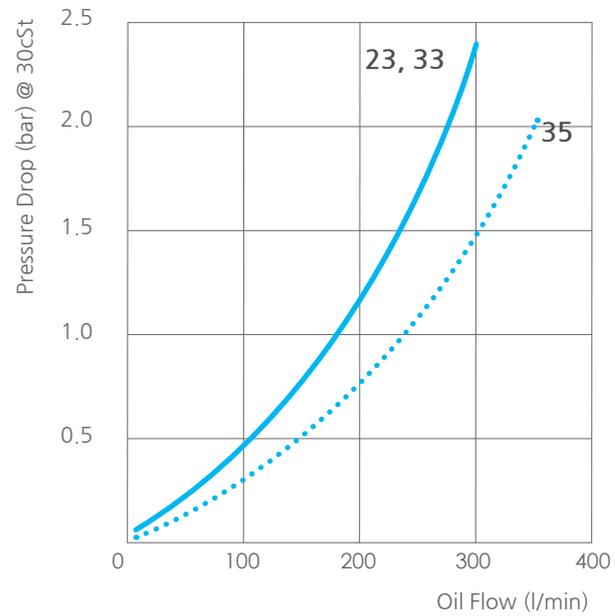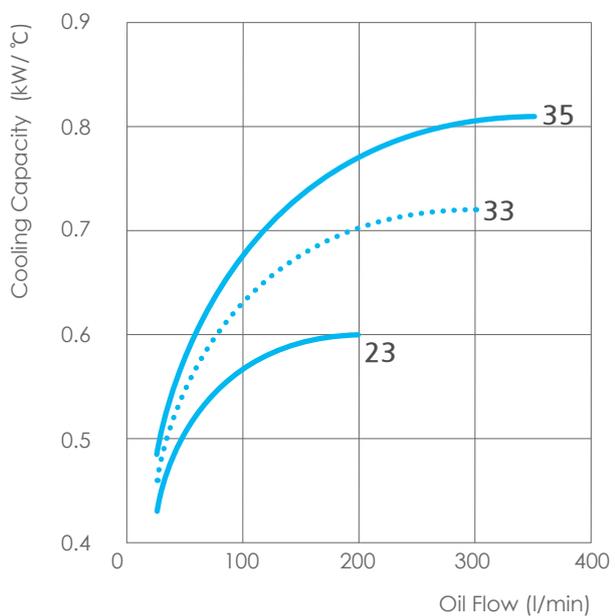
$$ETD = T_{inlet} - T_{ambientmax}$$ Cooling performance (kW/℃) x ETD (℃) = Cooling capacity (kW)

HLD 23 ~ 35
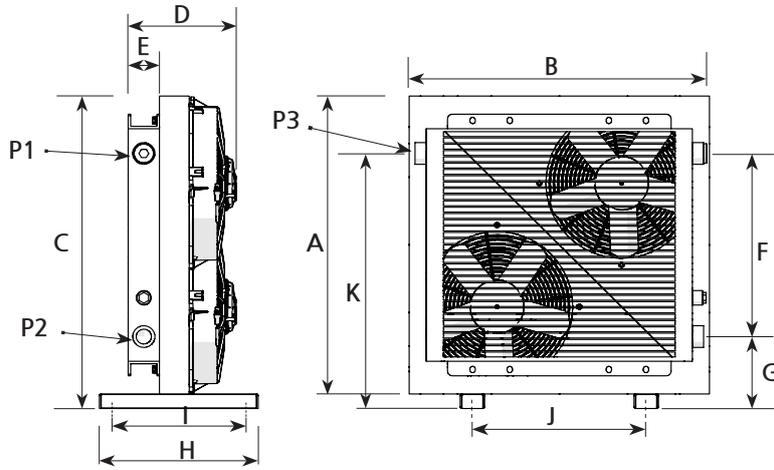
HLD Model	A	B	C	D	E	F	G	H	I	J	K	P1, 3	P2	Bracket Hole
HLD 23	615	615	645	218	63	378	149	320	280	356	527	G1"	G1"	12 x 22
HLD 33	690	680	720	218	63	482	136	320	280	356	618	G1 1/4"	G1 1/4"	12 x 22
HLD 35	690	680	720	238	83	482	136	320	280	356	618	G1 1/2"	G1 1/2"	12 x 22

Air Oil Coolers

Flow rate:	23 - Max. 200 l/min
	33 - Max. 300 l/min
	35 - Max. 350 l/min
Ma. Working pressure:	Max. 14 bar
Insulation class:	H (180 ℃ 356 ℉)

|	
Ingress Protection:	IP 68
Noise Level:	< 77 dB(A)
DC Motor :	12V / 2x20A @3,060 rpm
	24V / 2x10A @3,060 rpm
Net Weight:	23(25 Kg), 33(30 Kg), 35(34 Kg)

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:

$$ETD = T_{inlet} - T_{ambientmax} \quad \text{Cooling performance (kW/℃) x ETD (℃) = Cooling capacity (kW)}$$
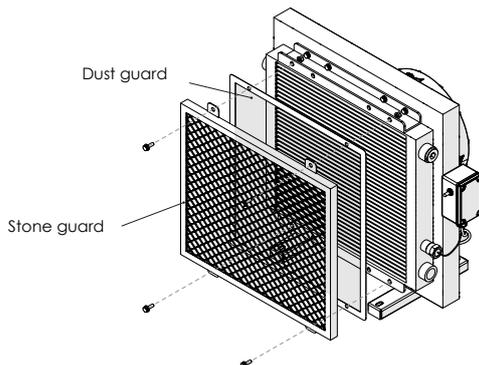
Specifications
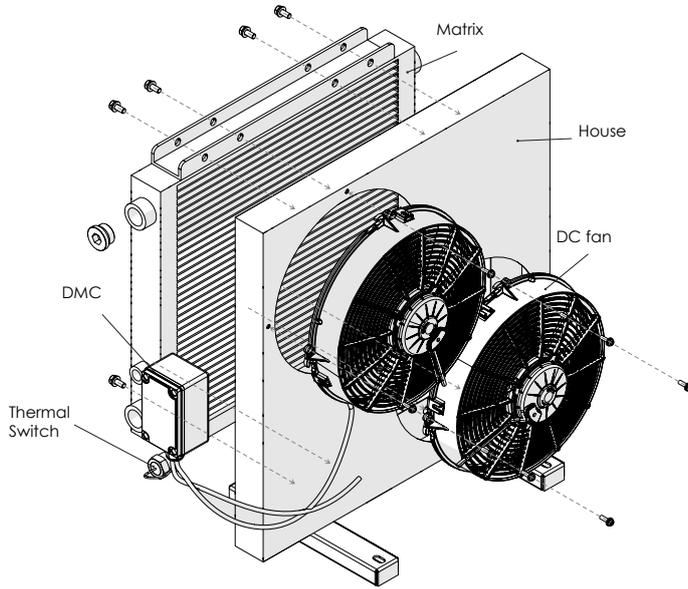
Model 23~35
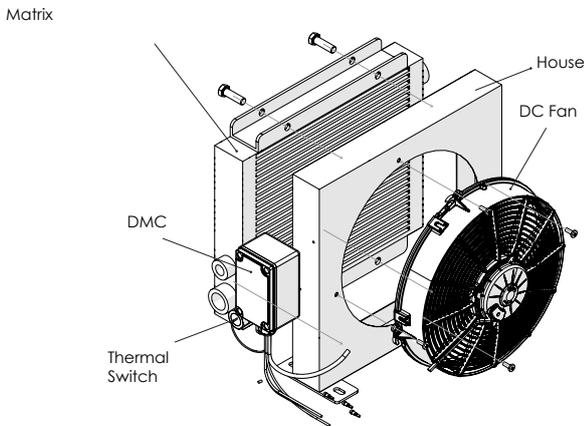
Model 03~16

### 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:015~04 RAL 9005 / black
  Applied model:07~200 RAL 9006 / silver
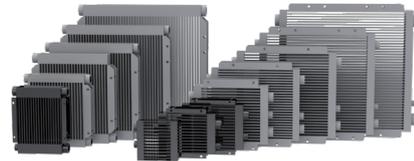
DC Fan Motor -12/24V

- All IP68 certified DC motors have waterproof capabilities and are completely sealed to protect against infiltration of solids and liquids.
- Ingress protection rating : IP68
- Max. Fan speed: 3,060 RPM

House

- Material: steel
- Paint: powder coating
- Paint color: black, silver(optional)

Thermal Switch

- Material: Aluminum house
- Finishing: Oxidation treatment
- Ingress protection rating: IP68
- Temperature contact: 40~90 °C ±5 °C

DC Motor Controller

- The third-generation DMC has reinforced protection circuits against standing current and spike voltage to match commercial vehicle electrical systems.
- Controlling the operation of a cooler with a PTO signal
- Energy-saving iDMC model with environmental setup software and communication connector (sold separately).

Stone Guard / Dust Guard

- Protect components and systems from harsh environments.
- Extend service life and reduce maintenance costs.

Introduction of the new HLD3 product

"More powerful, longer-lasting!"
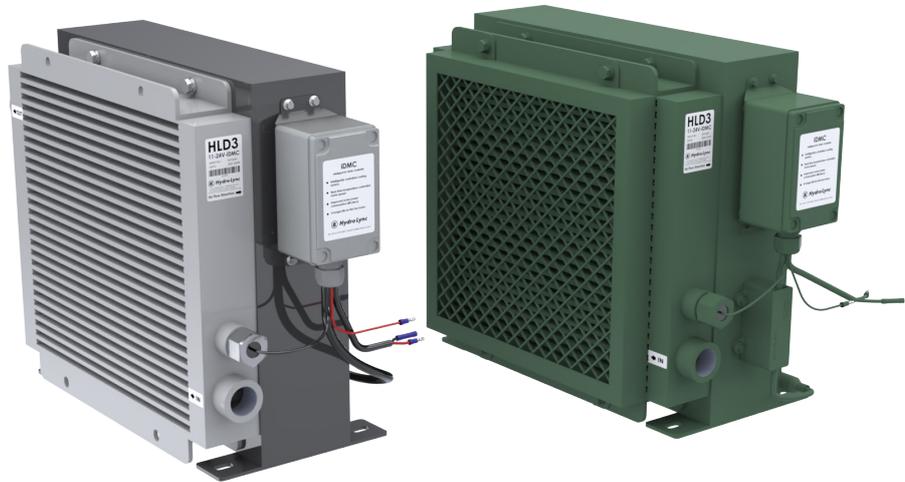
- Application of SPAL BLDC fan motor.
- Application of iDMC 3rd generation controller.

The HLD3 product is the next-generation oil cooler from HydroLync, incorporating advanced core technologies. Below are the key features of the HLD3 product:.

1. The HLD3 product maximizes energy efficiency and extends the operational lifespan by using a Brushless fan motor, instead of the commonly used Brushed fan motor.

2. Additionally, the application of the iDMC 3rd generation controller further optimizes the performance of the oil cooler.

3. Utilizing HydroLync design principles, the cooling performance is further enhanced, ensuring superior efficiency.

Comparison Item	HLD	HLD3
Rated Voltage	DC 24V	DC 24V
Motor Power	250W	300W
Airflow	2,770 m3/h @26V	3,100 m3/h @26V
Max. RPM	3,060	3,650
Motor Lifespan	Approx. 10,000 hours	Minimum 40,000 hours
Control Method	ON/OFF Control	PWM/Voltage Control/ON-OFF Control
Cooling Power (at 40°C ETD)	Max. 0.31 kW/ °C	Max. 0.33 kW/ °C

**Product Specifications Comparison Table**

Air Oil Coolers

Introduction of the new HLD3 product

"Evolution continues!"

The HLD3 product has been completely redesigned from scratch to achieve more precise control of oil viscosity. Temperature sensors used in the HLD3 product are DALLAS's digital temperature sensors, providing a precision of ±0.5°C. Additionally, the sensor housing has been newly designed to minimize the time lag between the actual oil temperature changes and the temperature sensor.
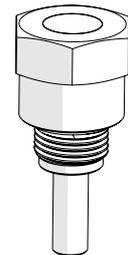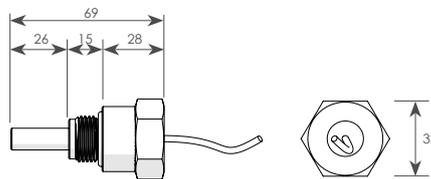
Items	Specification
Working range	-55°C ~ +125°C
Accuracy	±0.5°C
Speed	750ms (Convert 12 bit temperature to digital word)
Standby power	0 (Zero standby power required)
Port size	G 1/2"

RS485 Connector

Monitoring Software

The HLD3 product comes with monitoring software, enabling users to configure the cooler's operating conditions and analyze its performance through RS485 communication. It allows users to set operating parameters, monitor the operational status, and output relevant data for analysis.

Accessories

DC Motor Controller (DMC)

Patented product. Patent number: 10-2039595

- Circuit design optimized for electric systems in cargo vehicles
- Energy-saving controller for the era of electric and hydrogen vehicles
- PTO signal control

3rd G. DMC

DMC (DC Motor Controller) is a controller that controls the DC oil cooler of a mobile hydraulic system. HydroLync supplies the 3rd generation DMC that enhances stability from PTO signal control and surge voltage in the length measuring system through continuous development. In addition, to prepare for the era of electric and hydrogen vehicles in special vehicles, HydroLync has developed iDMC, which can save up to 60% energy using PID control technology.

iDMC is an intelligent controller that detects the trend of changes in oil temperature and controls the speed of the fan motor to increase energy efficiency, thereby also extending the life of the fan motor. In addition, it is equipped with a program that allows users to set and monitor the operating temperature, standby temperature, and stop temperature of the cooler according to their usage environment.
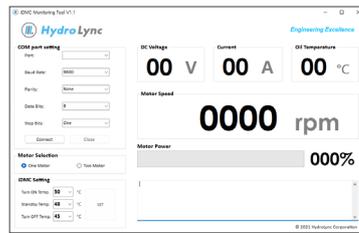
Patented product. Patent number: 10-2458187

iDMC

Air Oil Coolers

RS485 Connector

Monitoring Software

DTM (Digital Thermometer)

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),

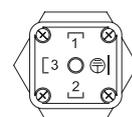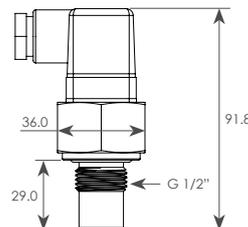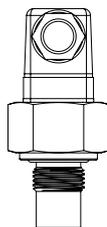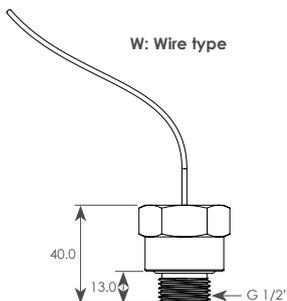**Connection Thread** : G 1/2,   **Cable Length** : 350mm

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

40.0

13.0 — G 1/2"

36.0

91.8

29.0 — G 1/2"

2	Available
3	N/A
GND	N/A

DIN Plug Wiring

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
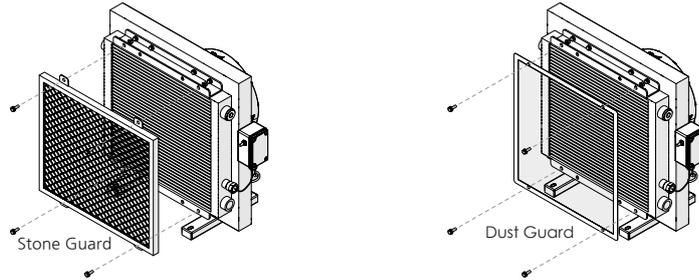
⚠ **Attention**

- 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.

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.
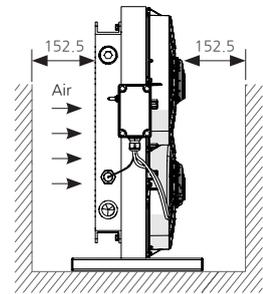

HLD Models	1/2 Fan Diameter
07 ~ 33.35	152.5 mm

Cleaning matrix

It is recommended to keep the matrix clean to prevent degradation of cooling performance.

1. To clean the inside of the matrix, connect the cooler to a closed circuit and circulate perchloroethylene. After cleaning, clean the inside of the radiator with oil before reconnecting to the hydraulic system.

2. The easiest way to clean the fins is to use compressed air or wash them with water. You can also remove debris using a degreaser or high-pressure cleaning system. When using a high-pressure cleaning system, make sure the water stream is aimed parallel to the fins from a distance of at least 3cm away from the fins. Strong water streams can damage the fins.

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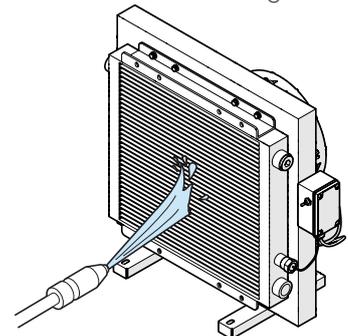
"Engineering Excellence! We are always prepared to promptly address our customers' needs."

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

Water Oil Coolers

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