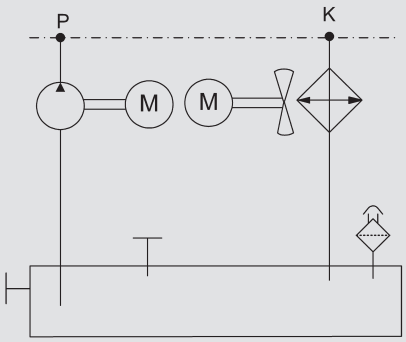
Fluid-Air Cooling Systems
FLKS-1H

Symbol



General

The **FLKS-1H** is a compact fluid/air cooling system with a plastic tank housing and integrated air duct.
This lightweight and robust design makes it suitable for diverse applications.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid.

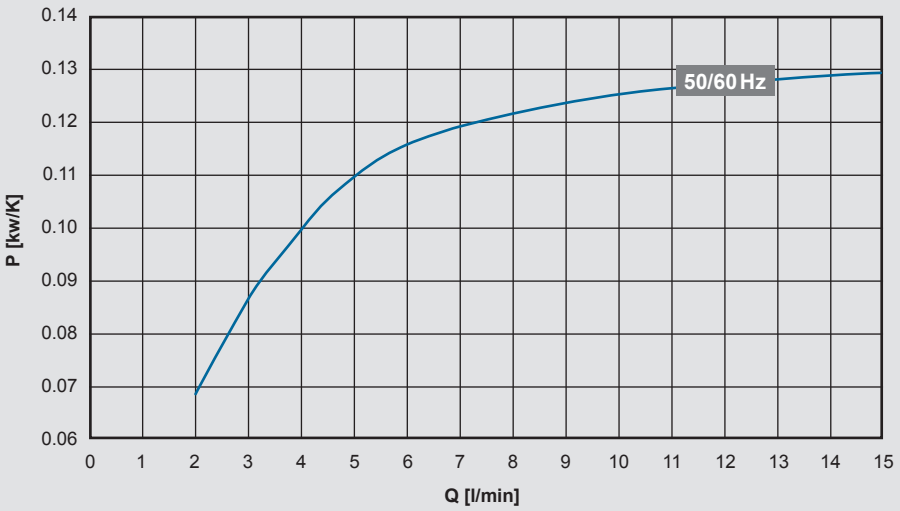
Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.13 kW/K (see cooling capacity diagram)
Flow rate	2 – 15 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40% ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available on request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	5.5 – 7.5 l
Weight	Max. 22 kg
Noise level (acoustic pressure)	70 / 72 dB(A) at 50 / 60 Hz (at 1 m)
Electrical connection	Pump P (flow): G¾" Heat exchanger K (return): G¾" If possible, refrain from reducing the size of the line required for the threaded connections.
Mounting position	The motors are usually electrically connected using a heavy-duty plug. Terminal boxes available upon request.
Accessories	● Air filter ● Air deflection ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

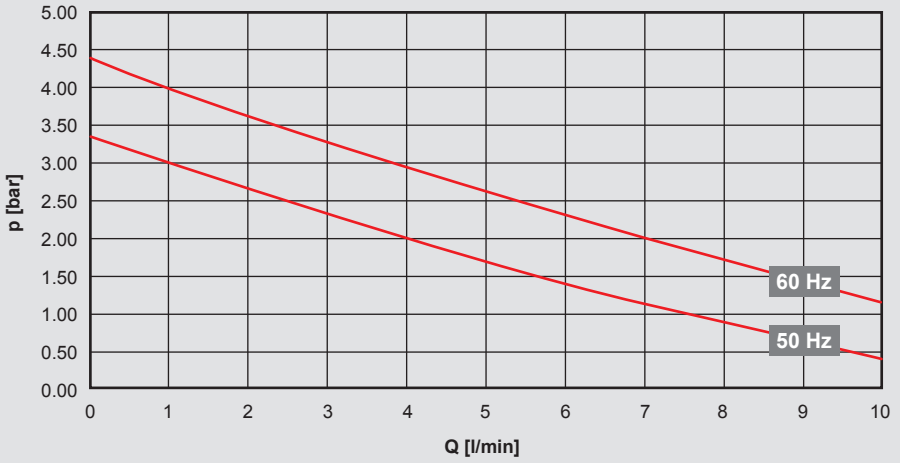
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

TKY pump version



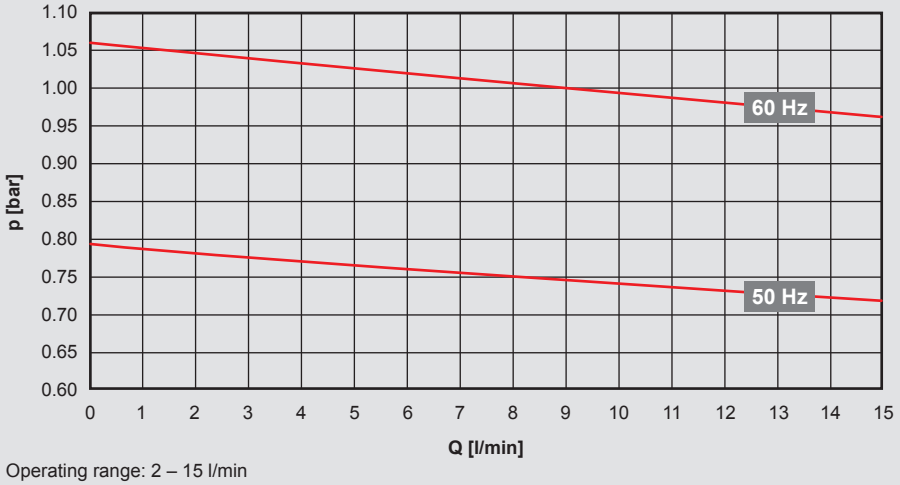
Operating range: 2 – 10 l/min

Electrical data:

Permitted voltage range:
380 - 420 V – 50 Hz – 3 PH
400 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.12 / 0.18 kW
Fan: 0.11 / 0.15 kW

MTA50 pump version



Operating range: 2 – 15 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

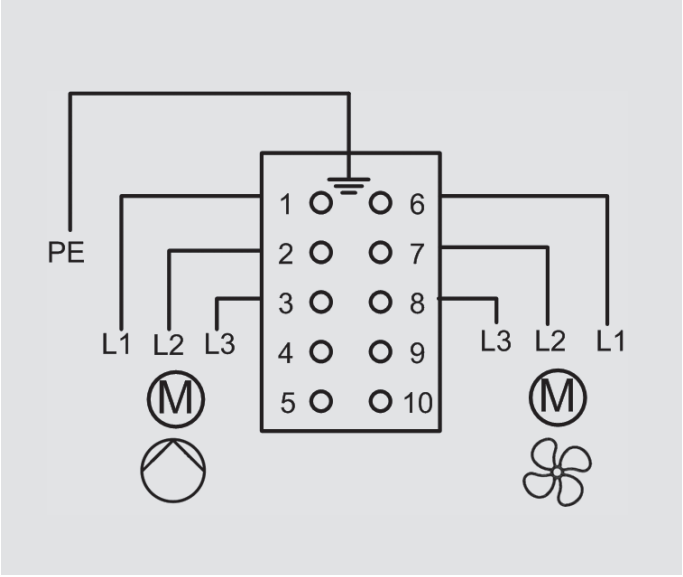
Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.17 / 0.27 kW
Fan: 0.11 / 0.15 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

Electrical Connection

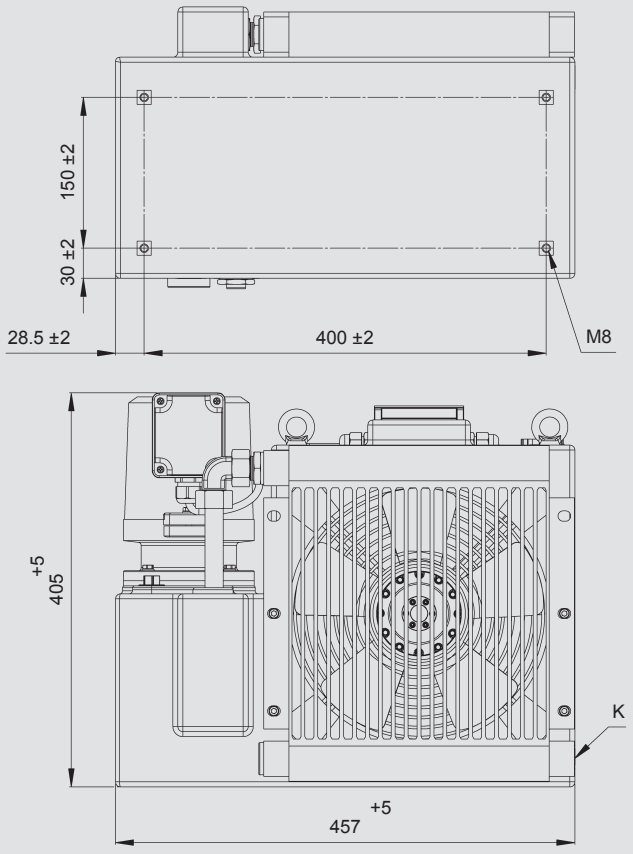


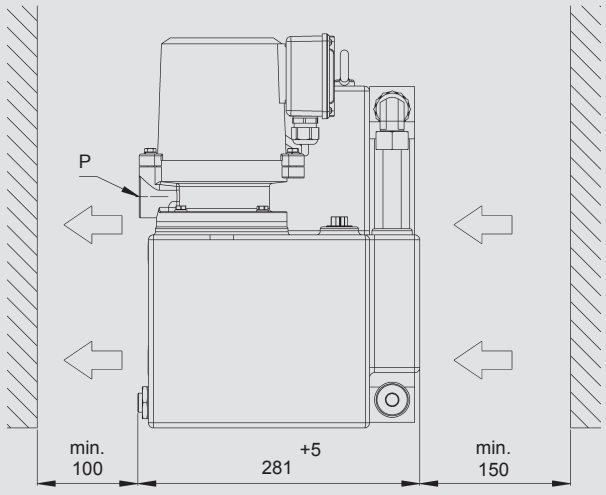
The motor is electrically connected by the customer using a heavy-duty plug.

For example: housing 09300101541 and insert 09330102716 by Harting

Dimensions

[mm]





Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 1H - 2.0 - W - YA0 - 0 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Type code

Operating fluid
W = Water-glycol (standard)

Pump
Y = Version with pump TKY
A = Version with pump MTA50
Other pumps on request.

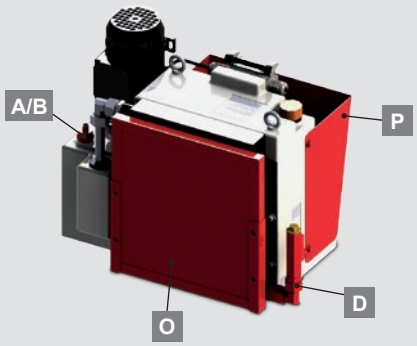
Motor voltage
A = 380-420 V – 50 Hz / 400-480 V – 60 Hz, 3PH (pump TKY and MTA50)
See also electrical data.

Position pump connection
0 = Standard

Color
0 = none
(FLKS-1: white plastic tank housing)

Accessories
0 = no acessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•									•
B	Filling level switch (2 switching points)			•					•			•	
D	Flow switch				•			•			•		
O	Air filter					•		•	•	•	•	•	•
P	Air deflection						•	•		•		•	
Accessory number		**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**

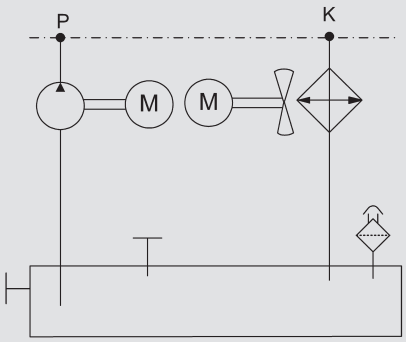
See also “Accessories for FLKS” for more information.

FLKS-1H Standard

Part no.	Designation	Pump	Version
3426850	FLKS-1H/2.0/W/YA0/0/0	TKY	no accessories, fixed speed
3322575	FLKS-1H/2.0/W/AA0/0/0	MTA50	no accessories, fixed speed

Fluid-Air Cooling Systems
FLKS-1H PLUS

Symbol



General

The **FLKS-1H PLUS** is a compact fluid/air cooling system with a plastic tank housing and integrated air duct.
This lightweight and robust design makes it suitable for diverse applications.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid.

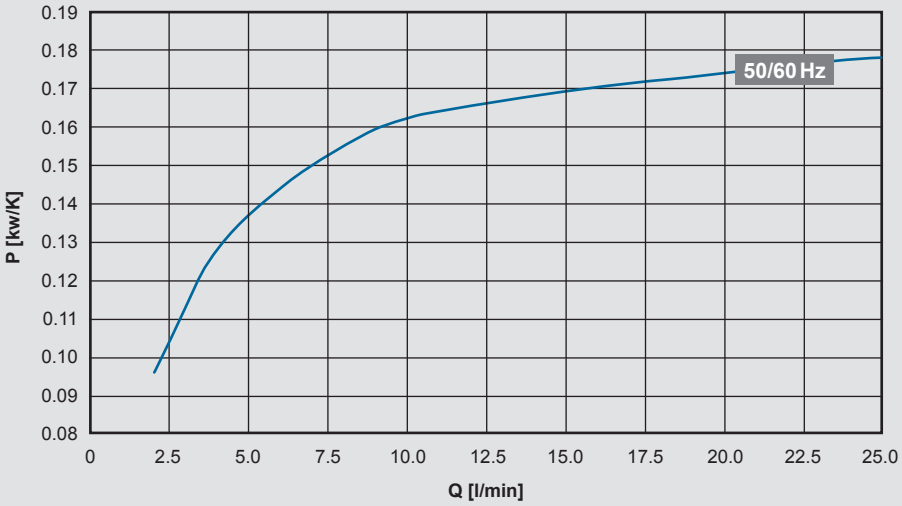
Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.18 kW/K (see cooling capacity diagram)
Flow rate	5 – 25 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available on request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	5.5 – 7.5 l
Weight	Max. 26 kg
Noise level (acoustic pressure)	69 / 71 dB(A) at 50 / 60Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G¾" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug. Terminal boxes available upon request.
Mounting position	Pump vertical
Accessories	● Air filter ● Air deflection ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

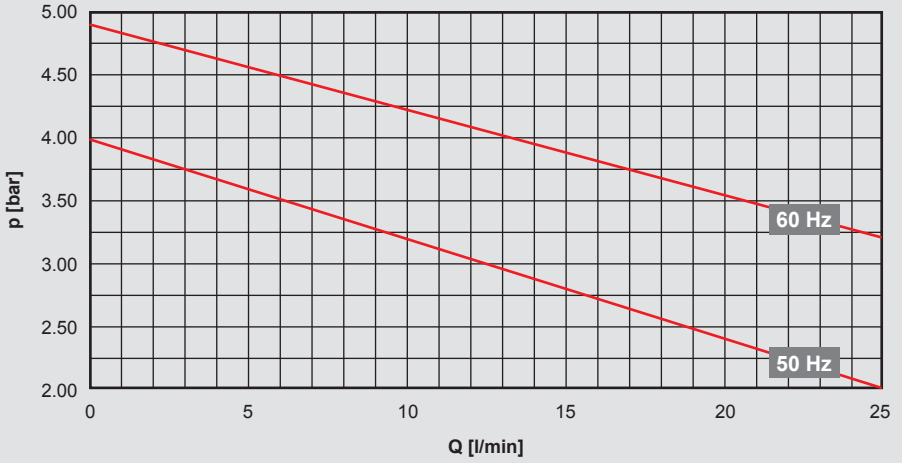
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

601 pump version



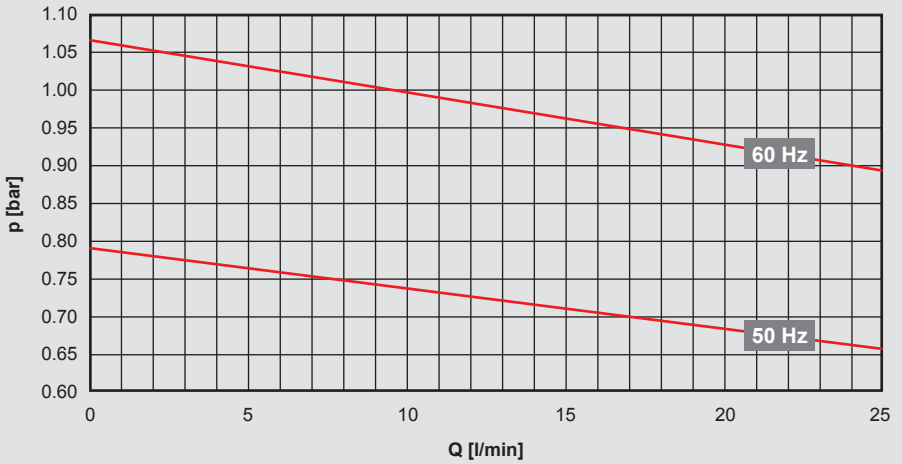
Operating range: 5 – 25 l/min

Electrical data:

Permitted voltage range:
380 - 420 V – 50 Hz – 3 PH
400 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0,50 / 0,70 kW
Fan: 0,11 / 0,15 kW

MTA50 pump version



Operating range: 2 – 15 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

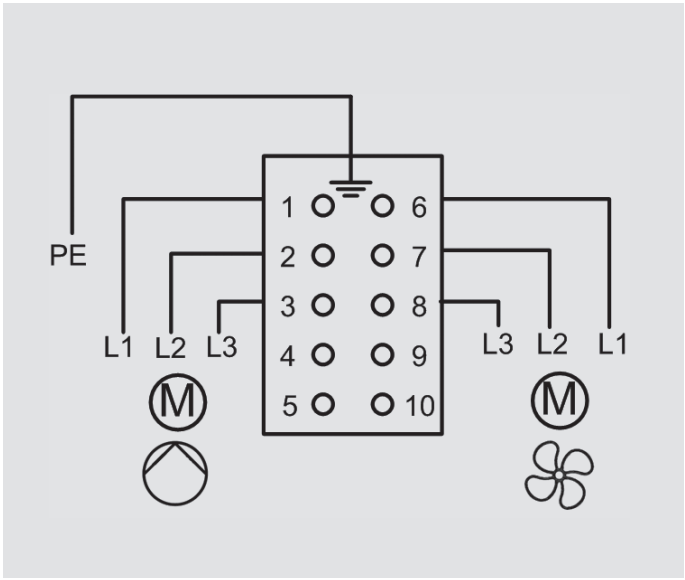
Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0,17 / 0,27 kW
Fan: 0,11 / 0,15 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

Electrical Connection

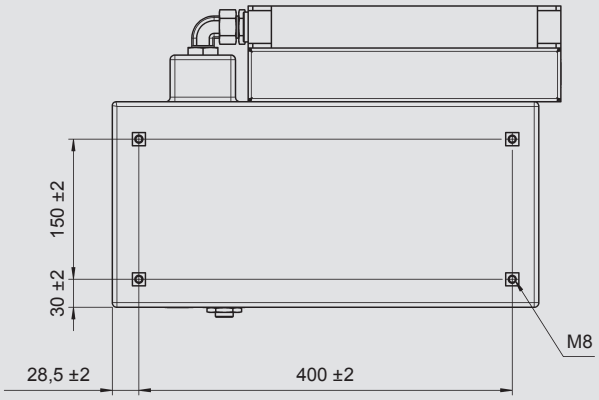


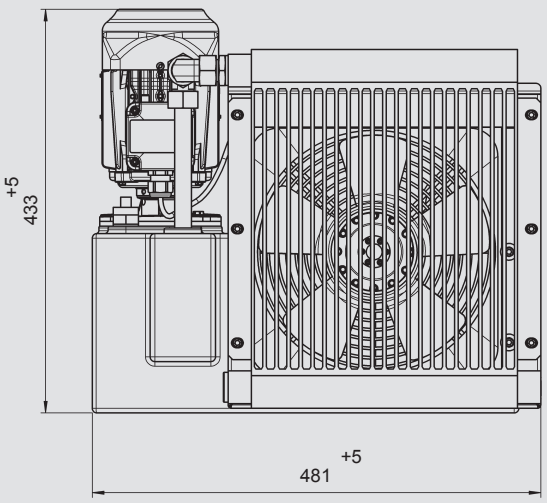
The motor is electrically connected by the customer using a heavy-duty plug.

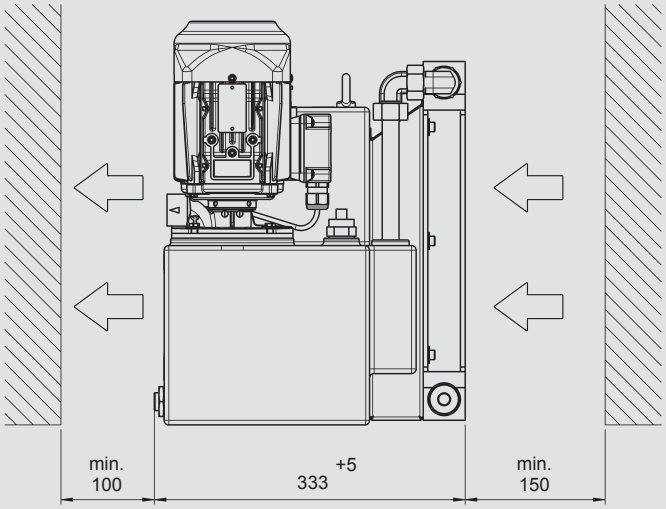
For example: housing 09300101541 and insert 09330102716 by Harting

Dimensions

[mm]







Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 1H PLUS - 2.4 - W - 601A2 - 0 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Type code

Operating fluid
W = Water-glycol (standard)

Pump
601 = Version with pump 601
A = Version with pump MTA50
Other pumps on request.

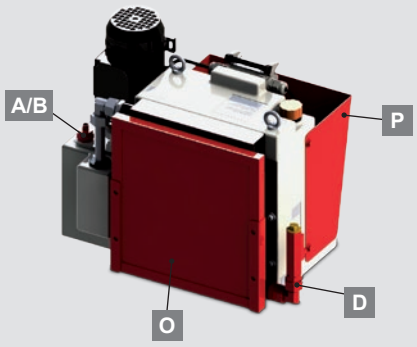
Motor voltage
A = 380-420 V – 50 Hz / 400-480 V – 60 Hz, 3PH (pump 601 and MTA50)
See also electrical data.

Position pump connection
0 = Standard
2 = turned by 180°

Color
0 = none
(FLKS-1: white plastic tank housing)

Accessories
0 = no acessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•									•
B	Filling level switch (2 switching points)			•				•			•	
D	Flow switch				•			•			•	
O	Air filter					•		•	•	•	•	•
P	Air deflection						•	•		•		•	
Accessory number		**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**

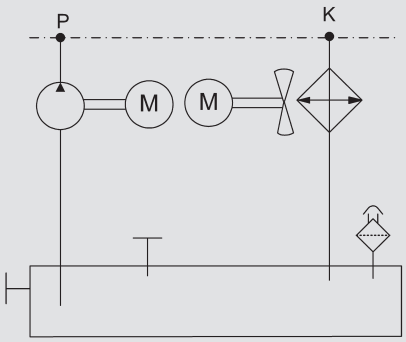
See also “Accessories for FLKS” for more information.

FLKS-1H PLUS Standard

Part no.	Designation	Pump	Version
3924557	FLKS-1H PLUS/2.4/W/601A2/0/0	601	no accessories, fixed speed
3908279	FLKS-1H PLUS/2.0/W/AA0/0/0	MTA50	no accessories, fixed speed

Fluid-Air Cooling Systems
FLKS-2S

Symbol



General

The **FLKS-2S** is a compact fluid/air cooling system with a plastic tank housing and integrated air duct.
This lightweight and robust design makes it suitable for diverse applications.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid.

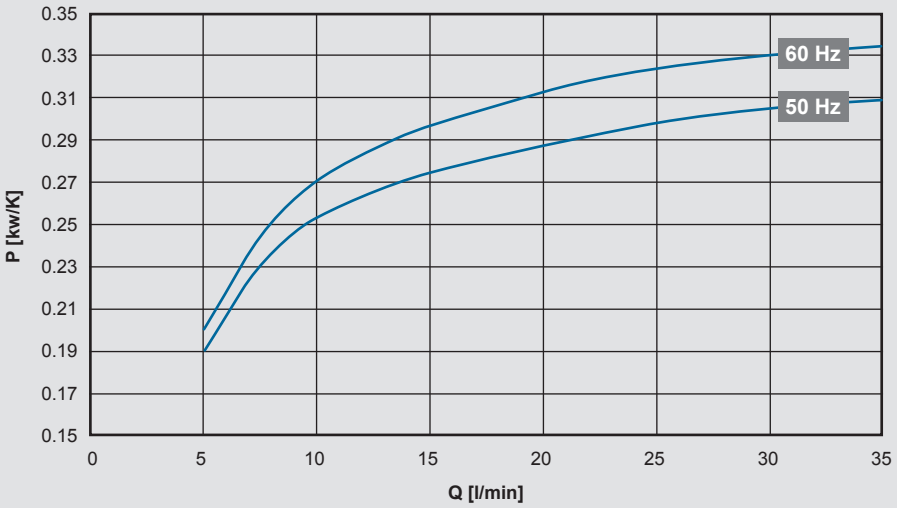
Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.31 kW/K (see cooling capacity diagram)
Flow rate	5 – 40 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available on request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	15.0 – 19.5 l
Weight	Max. 32 kg
Noise level (acoustic pressure)	62 / 63 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G¾" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug. Terminal boxes available upon request.
Mounting position	Pump vertical
Accessories	● Air filter ● Air deflection ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

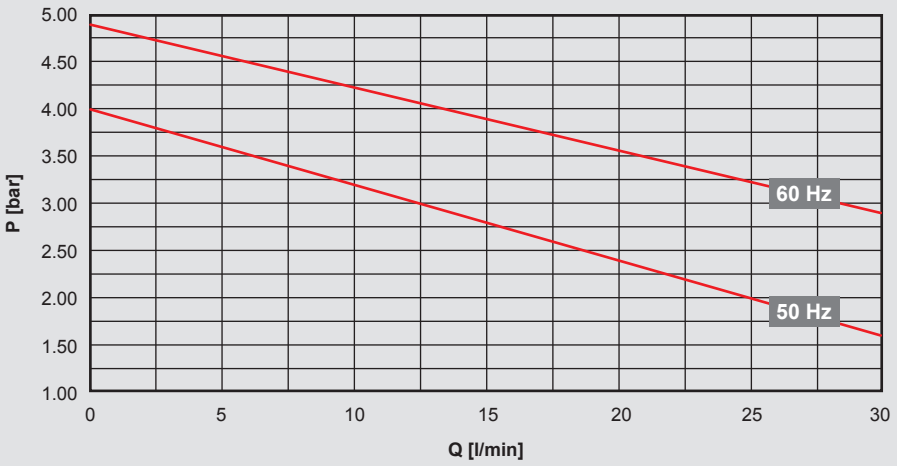
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

601 pump version



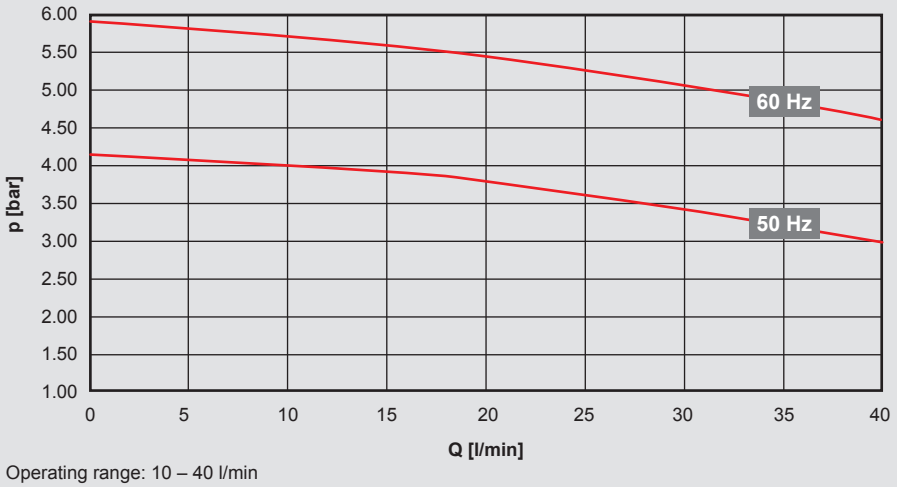
Operating range: 5 – 25 l/min

Electrical data:

Permitted voltage range:
380 - 420 V – 50 Hz – 3 PH
400 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.50 / 0.70 kW
Fan: 0.11 / 0.145 kW

MTH 2-4 pump version



Operating range: 10 – 40 l/min

Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

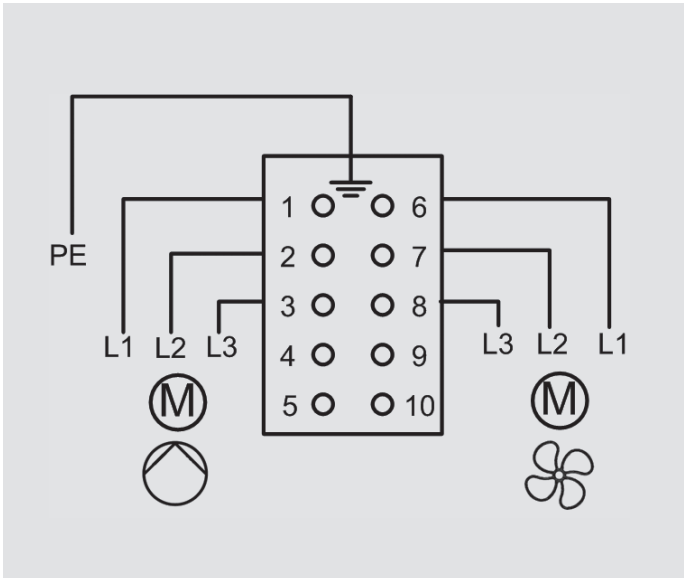
Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.62 / 0.90 kW
Fan: 0.11 / 0.145 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

Electrical Connection

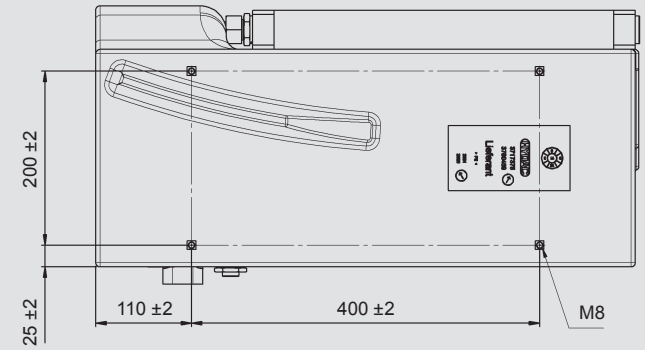


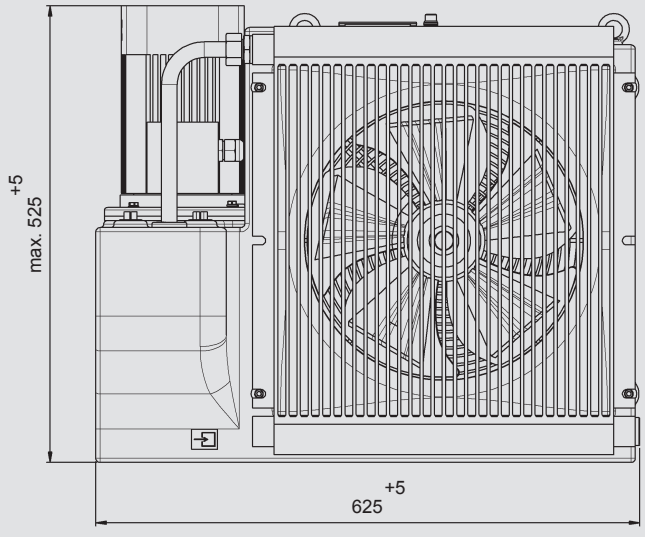
The motor is electrically connected by the customer using a heavy-duty plug.

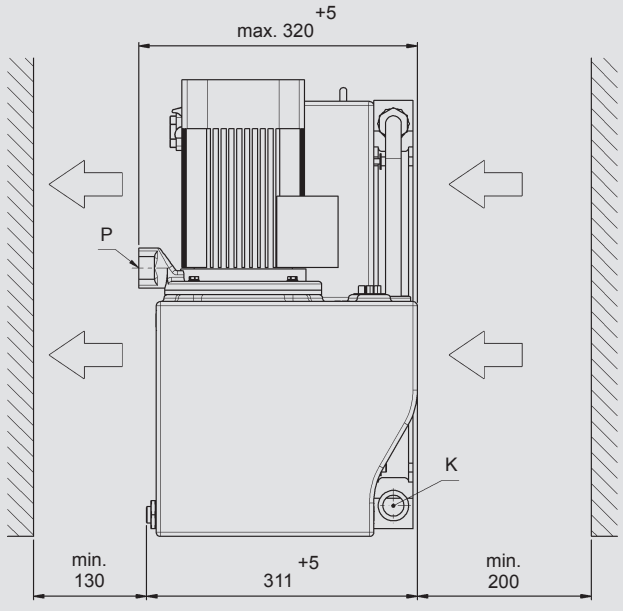
For example: housing 09300101541 and insert 09330102716 by Harting

Dimensions

[mm]







Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 2S - 1.0 - W - 601A0 - 0 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Type code

Operating fluid
W = Water-glycol (standard)

Pump
601 = Version with pump 601
H2-4 = Version with pump MTH2-4
Other pumps on request.

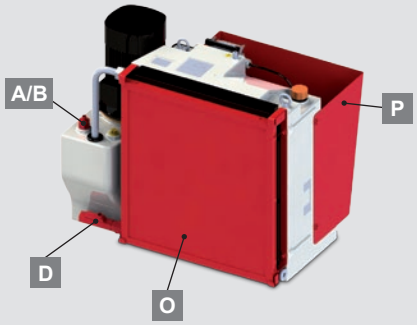
Motor voltage
A = 380-420 V – 50 Hz / 400-480 V – 60 Hz, 3PH (pump 601)
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH2-4)
See also electrical data.

Position pump connection
0 = Standard

Color
0 = none
(FLKS-2: white plastic tank housing)

Accessories
0 = no acessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•									•
B	Filling level switch (2 switching points)			•				•			•	
D	Flow switch				•			•			•	
O	Air filter					•		•	•	•	•	•
P	Air deflection						•	•		•		•	
Accessory number		**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**

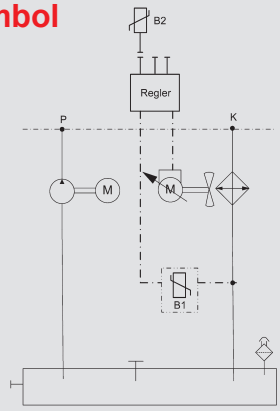
See also “Accessories for FLKS” for more information.

FLKS-2S Standard

Part no.	Designation	Pump	Version
3811499	FLKS-2S/1.0/W/601A0/0/0	601	no accessories, fixed speed
3905239	FLKS-2S/1.0/W/H2-4B0/0/0	MTH2-4	no accessories, fixed speed

Fluid-Air Cooling Systems
FLKS-2EC
with speed control

Symbol



General

The **FLKS-2EC** is a compact fluid/air cooling system with a plastic tank housing, integrated air duct, pump and variable-speed fan. This lightweight and robust design makes it suitable for diverse applications.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid. The speed can vary depending on the application.

Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.33 kW/K (see cooling capacity diagram)
Flow rate	5 – 40 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available upon request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	15.0 – 19.5 l
Weight	Max. 33 kg
Noise level (acoustic pressure)	< 64 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G¾" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug.
Mounting position	Pump vertical
Accessories	● Air filter ● Air deflection ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

Open-Loop Speed Control

The temperature sensor of the **FLKS-2EC5** measures the water-glycol outlet temperature from the cooling system. The 0 – 10 V analog signal of the sensor is assigned a temperature range of +25 up to +45 °C. The signal is forwarded to the EC fan according to the measured fluid outlet temperature to control the speed. The fan switches on at 1.5 V (= +28 °C) and reaches its maximum speed at 10 V (= +45 °C).

Even at low ambient temperatures, the fluid temperature cannot drop below +28 °C given constant power input. This prevents condensation on electrical components.

Application:

Specially suited for low air temperatures, e.g., outdoors

Closed-Loop Speed Control

The **FLKS-2EC3** also comes with a PID controller. The temperature sensor measures the fluid outlet temperature (variable). This temperature is continuously compared to the reference value (ambient temperature + set differential ΔT). The PID controller continuously adjusts the speed to keep the fluid temperature near the ambient temperature.

The outlet temperature remains at a set differential above the ambient temperature regardless of the input temperature of the fluid (power of the machine).

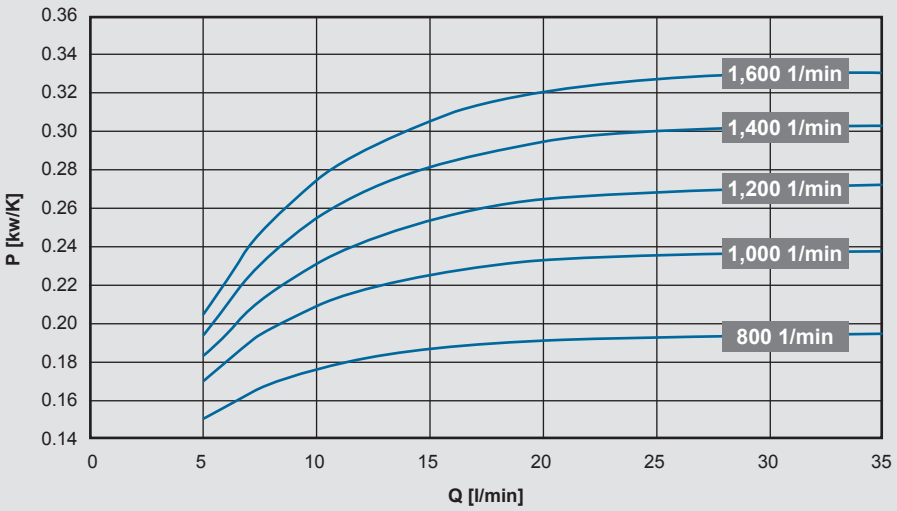
Application:

Primarily precision cooling (e.g., in machine tools)

Lower fan speed

= lower noise level
= lower energy consumption
= lower contamination level

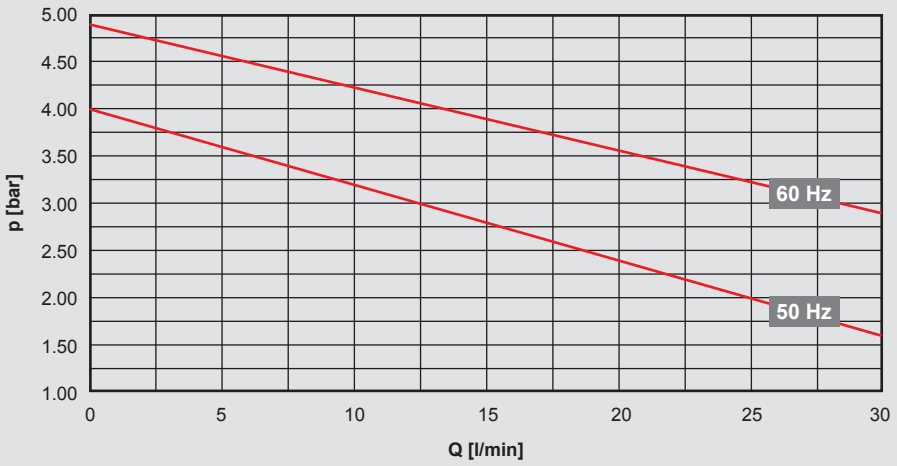
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

601 pump version



Operating range: 5 – 30 l/min

Electrical data:

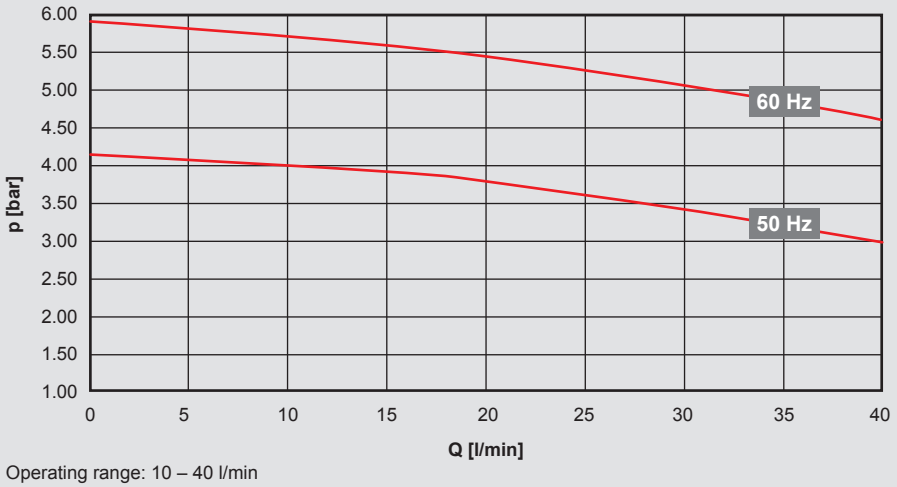
Permitted voltage range:

Pump:
380 - 420 V – 50 Hz – 3 PH
400 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Fan:
200 - 240 V – 50/60 Hz – 1 PH
Voltage tolerance: ±10 %

Motor output (50/60 Hz):
Pump: 0.50 / 0.70 kW
Fan: 0.14 kW

MTH 2-4 pump version



Operating range: 10 – 40 l/min

Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

Electrical data:

Permitted voltage range:

Pump:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Fan:
200 - 240 V – 50/60 Hz – 1 PH
Voltage tolerance: ±10 %

Motor output (50/60 Hz):
Pump: 0.62 / 0.90 kW
Fan: 0.14 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

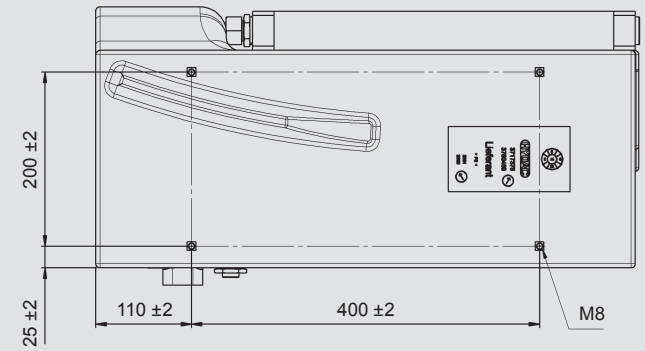
Electrical Connection

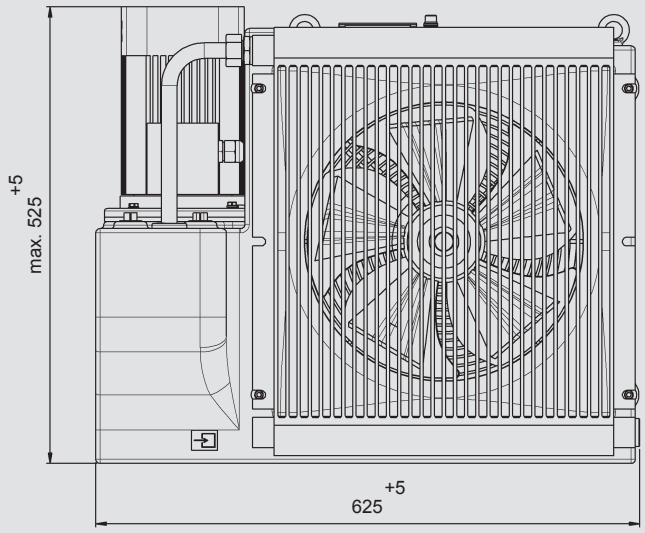
The motor is electrically connected by the customer using a heavy-duty plug.

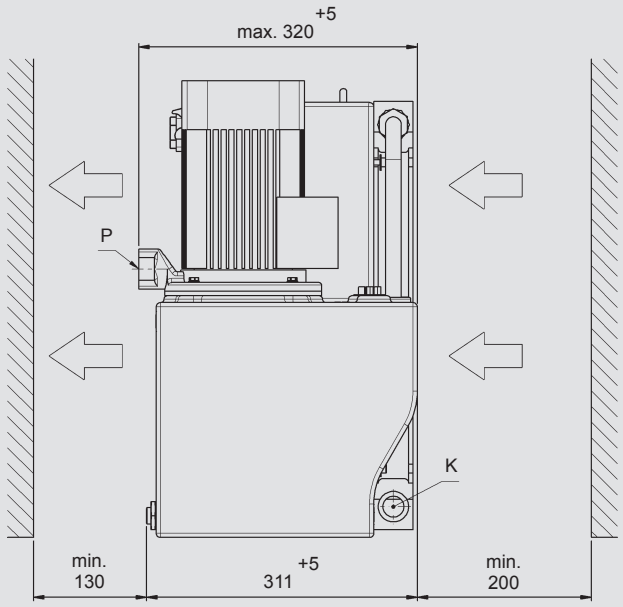
Additional 24 V DC control voltage, more information available upon request.

Dimensions

[mm]







Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 2 - EC3 - 1.0 - W - 601A0 - 0 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Open-loop / closed-loop speed control
EC3 = Closed-loop speed control (with PID controller)
EC5 = Open-loop speed control (with temperature sensor)

Type code

Operating fluid
W = Water-glycol (standard)

Pump
601 = Version with pump 601
H2-4 = Version with pump MTH2-4
Other pumps on request.

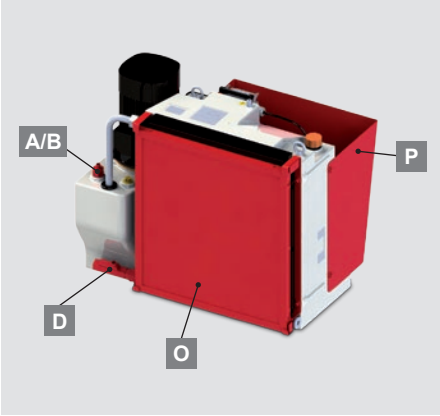
Motor voltage
A = 380-420 V – 50 Hz / 400-480 V – 60 Hz, 3PH (pump 601)
200 – 240 V – 50/60 Hz, 1PH (fan)
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH2-4)
200 – 240 V – 50/60 Hz, 1PH (fan)
See also electrical data.

Position pump connection
0 = Standard

Color
0 = none
(FLKS-2: white plastic tank housing)

Accessories
0 = no accessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•									•
B	Filling level switch (2 switching points)			•				•			•	
D	Flow switch				•			•			•	
O	Air filter					•		•	•	•	•	•
P	Air deflection						•	•		•		•	
Accessory number		**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**

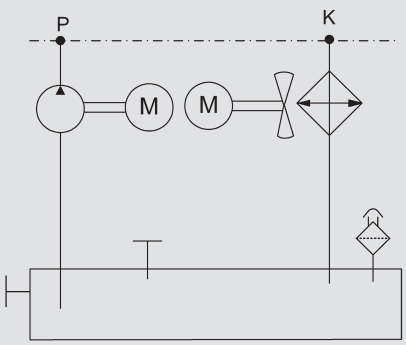
See also “Accessories for FLKS” for more information.

FLKS-2EC Standard

Part no.	Designation	Pump	Version
3900715	FLKS-2EC3/1.0/W/601A0/0/0	601	no accessories, closed-loop speed control
3951357	FLKS-2EC3/1.0/W/H2-4B0/0/0	MTH2-4	no accessories, closed-loop speed control

Fluid-Air Cooling Systems
FLKS-3S

Symbol



General

The **FLKS-3S** is a compact fluid/air cooling system with a plastic tank housing and integrated air duct.
This lightweight and robust design makes it suitable for diverse applications.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid.

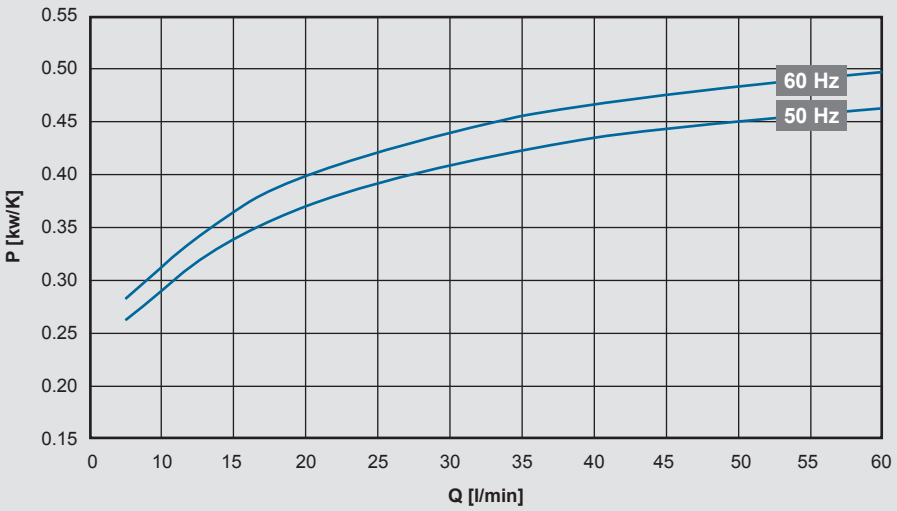
Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.46 kW/K (see cooling capacity diagram)
Flow rate	5 – 40 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available on request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	20.0 – 28.5 l
Weight	Max. 45 kg
Noise level (acoustic pressure)	64 / 67 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G¾" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug. Terminal boxes available upon request.
Mounting position	Pump vertical
Accessories	● Air filter ● Air deflection ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

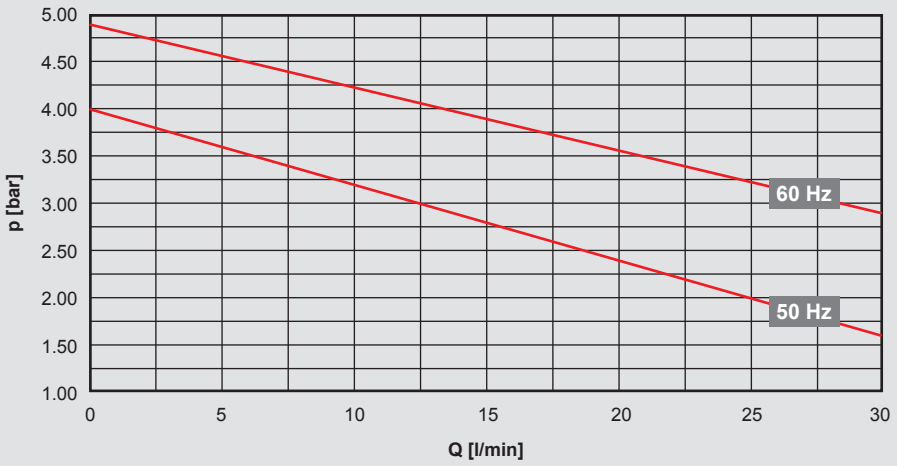
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

601 pump version



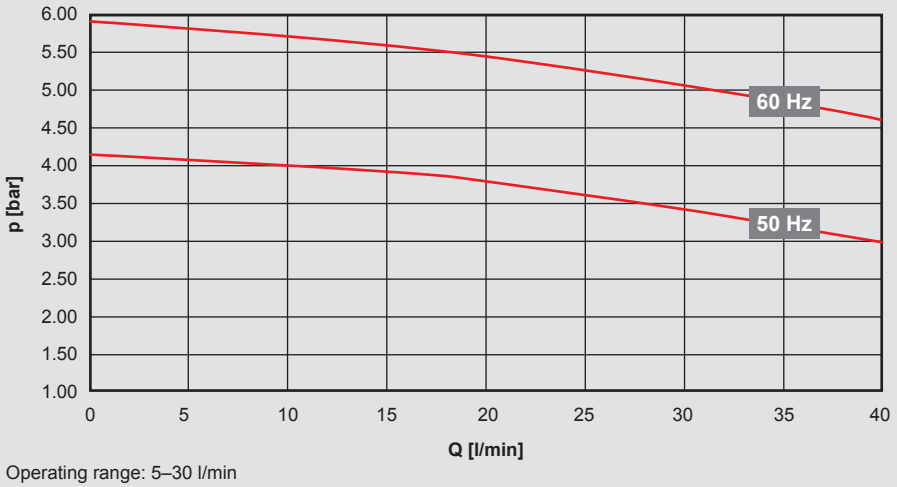
Operating range: 5 – 30 l/min

Electrical data:

Permitted voltage range:
380 - 420 V – 50 Hz – 3 PH
400 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.50 / 0.70 kW
Fan: 0.17 / 0.23 kW

MTH 2-4 pump version



Operating range: 5–30 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

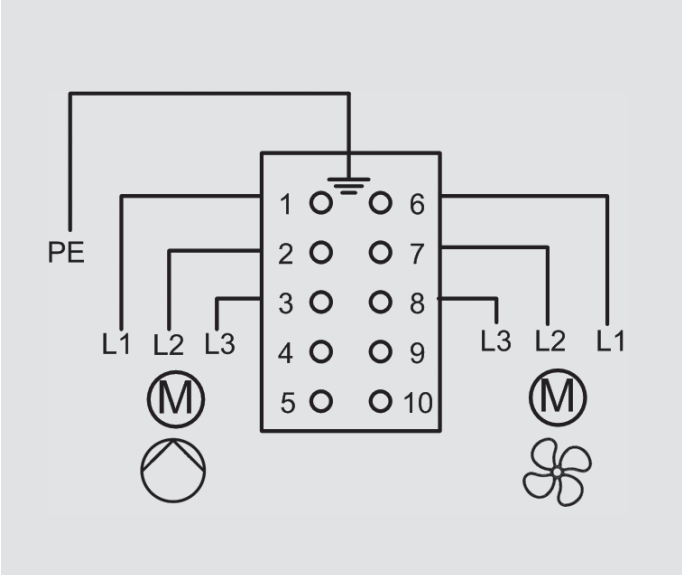
Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.62 / 0.90 kW
Fan: 0.17 / 0.23 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids,
as well as on special voltages or other pumps.

Electrical Connection

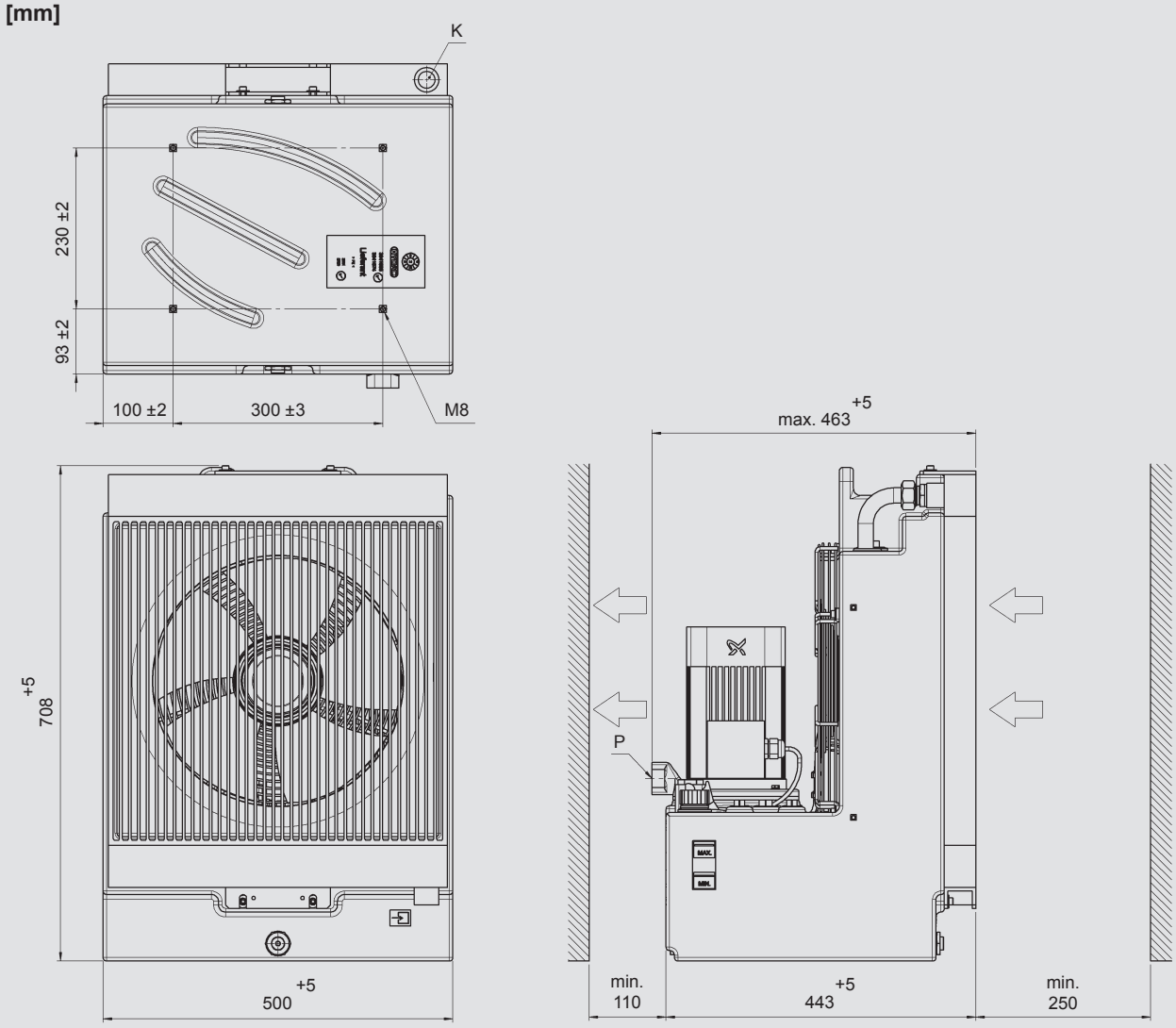


The motor is electrically connected by the customer using a heavy-duty plug.

For example: housing 09300101541 and insert 09330102716 by Harting

Dimensions

[mm]



Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 3S - 3.0 - W - 601A0 - 0 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Type code

Operating fluid
W = Water-glycol (standard)

Pump
601 = Version with pump 601
H2-4 = Version with pump MTH2-4
Other pumps on request.

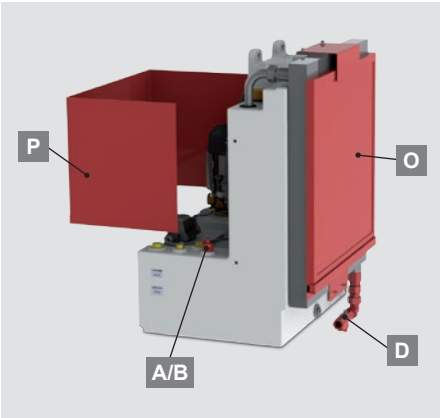
Motor voltage
A = 380-420 V – 50 Hz / 400-480 V – 60 Hz, 3PH (pump 601)
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH2-4)
See also electrical data.

Position pump connection
0 = standard

Color
0 = none
(FLKS-3: white plastic tank housing)

Accessories
0 = no accessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•									•
B	Filling level switch (2 switching points)			•				•			•	
D	Flow switch				•			•		•		
O	Air filter					•		•	•	•	•	•	•
P	Air deflection						•	•		•		•	
Accessory number		**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**

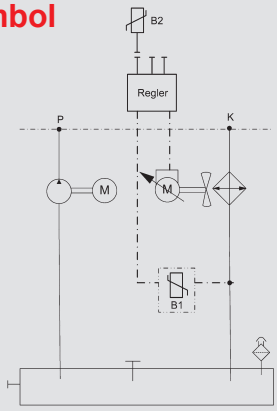
See also “Accessories for FLKS” for more information.

FLKS-3S Standard

Part no.	Designation	Pump	Version
3991017	FLKS-3S/3.0/W/601A0/0/0	601	no accessories, fixed speed
3991211	FLKS-3S/3.0/W/H2-4B0/0/0	MTH2-4	no accessories, fixed speed

Fluid-Air Cooling Systems
FLKS-3EC
with speed control

Symbol



General

The **FLKS-3EC** is a compact fluid/air cooling system with a plastic tank housing, integrated air duct, pump and variable-speed fan. This lightweight and robust design makes it suitable for diverse applications.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid. The speed can vary depending on the application.

Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.50 kW/K (see cooling capacity diagram)
Flow rate	5 – 40 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available upon request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	20.0 – 28.5 l
Weight	Max. 45 kg
Noise level (acoustic pressure)	< 67 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G¾" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug.
Mounting position	Pump vertical
Accessories	● Air filter ● Air deflection ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

Open-Loop Speed Control

The temperature sensor of the **FLKS-3EC5** measures the water-glycol outlet temperature from the cooling system. The 0 – 10 V analog signal of the sensor is assigned a temperature range of +25 up to +45 °C. The signal is forwarded to the EC fan according to the measured fluid outlet temperature to control the speed. The fan switches on at 1.5 V (= +28 °C) and reaches its maximum speed at 10 V (= +45 °C).

Even at low ambient temperatures, the fluid temperature cannot drop below +28 °C given constant power input. This prevents condensation on electrical components.

Application:

Specially suited for low air temperatures, e. g., outdoors

Closed-Loop Speed Control

The **FLKS-3EC3** also comes with a PID controller. The temperature sensor measures the fluid outlet temperature (variable). This temperature is continuously compared to the reference value (ambient temperature + set differential ΔT). The PID controller continuously adjusts the speed to keep the fluid temperature near the ambient temperature.

The outlet temperature remains at a set differential above the ambient temperature regardless of the input temperature of the fluid (power of the machine).

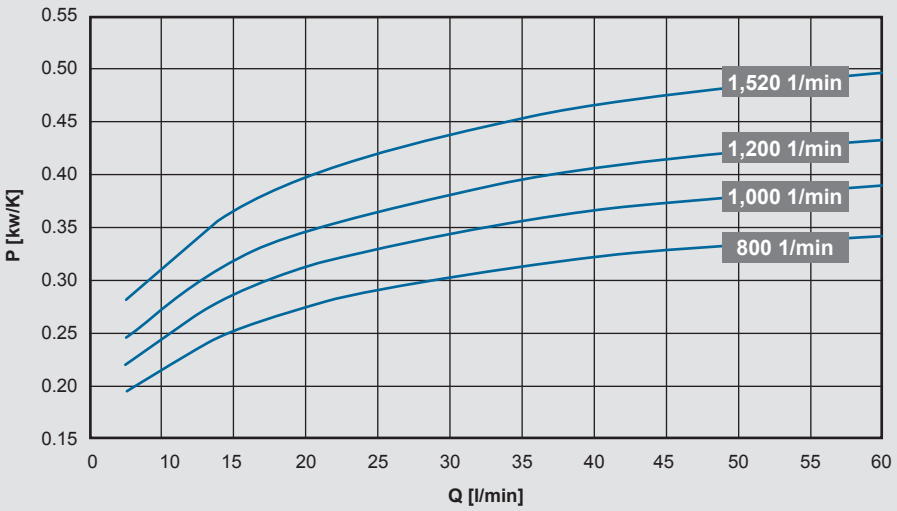
Application:

Primarily precision cooling (e. g., in machine tools)

Lower fan speed

= lower noise level
= lower energy consumption
= lower contamination level

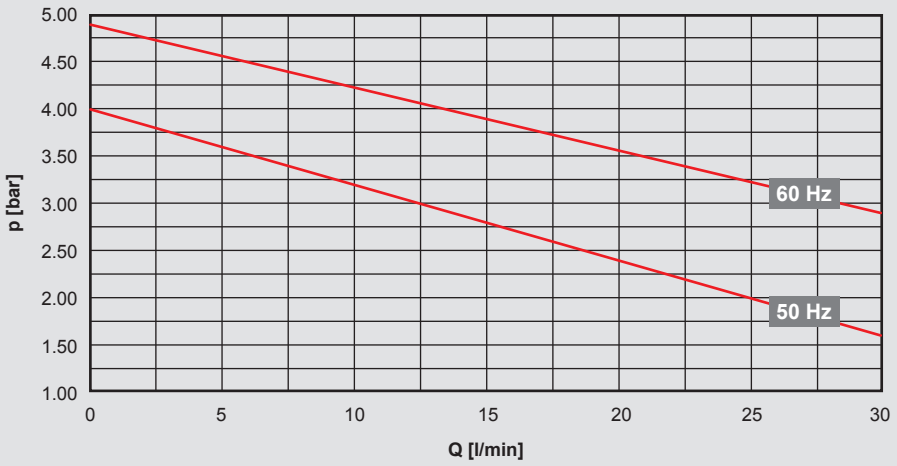
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

601 pump version



Operating range: 5 – 30 l/min

Electrical data:

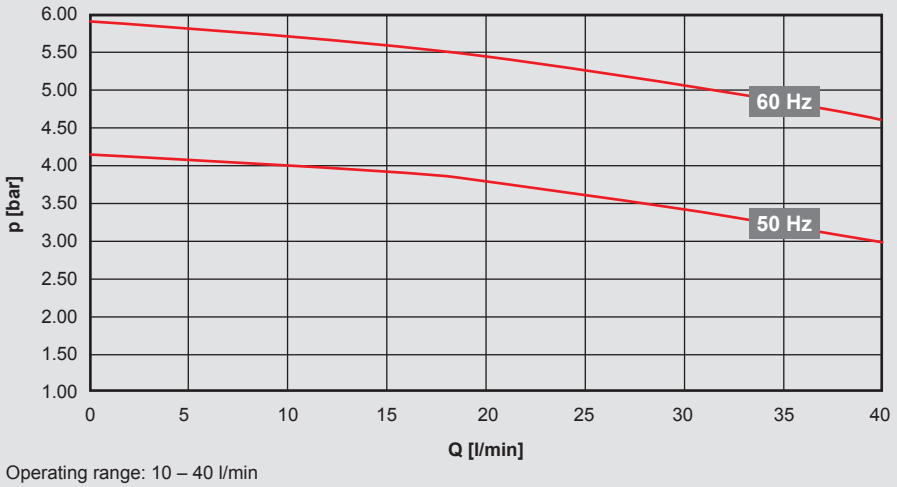
Permitted voltage range:

Pump:
380 - 420 V – 50 Hz – 3 PH
400 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Fan:
200 - 240 V – 50/60 Hz – 1 PH
Voltage tolerance: ±10 %

Motor output (50/60 Hz):
Pump: 0.50 / 0.70 kW
Fan: 0.165 kW

MTH 2-4 pump version



Operating range: 10 – 40 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

Electrical data:

Permitted voltage range:

Pump:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Fan:
200 - 240 V – 50/60 Hz – 1 PH
Voltage tolerance: ±10 %

Motor output (50/60 Hz):
Pump: 0.62 / 0.90 kW
Fan: 0.165 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

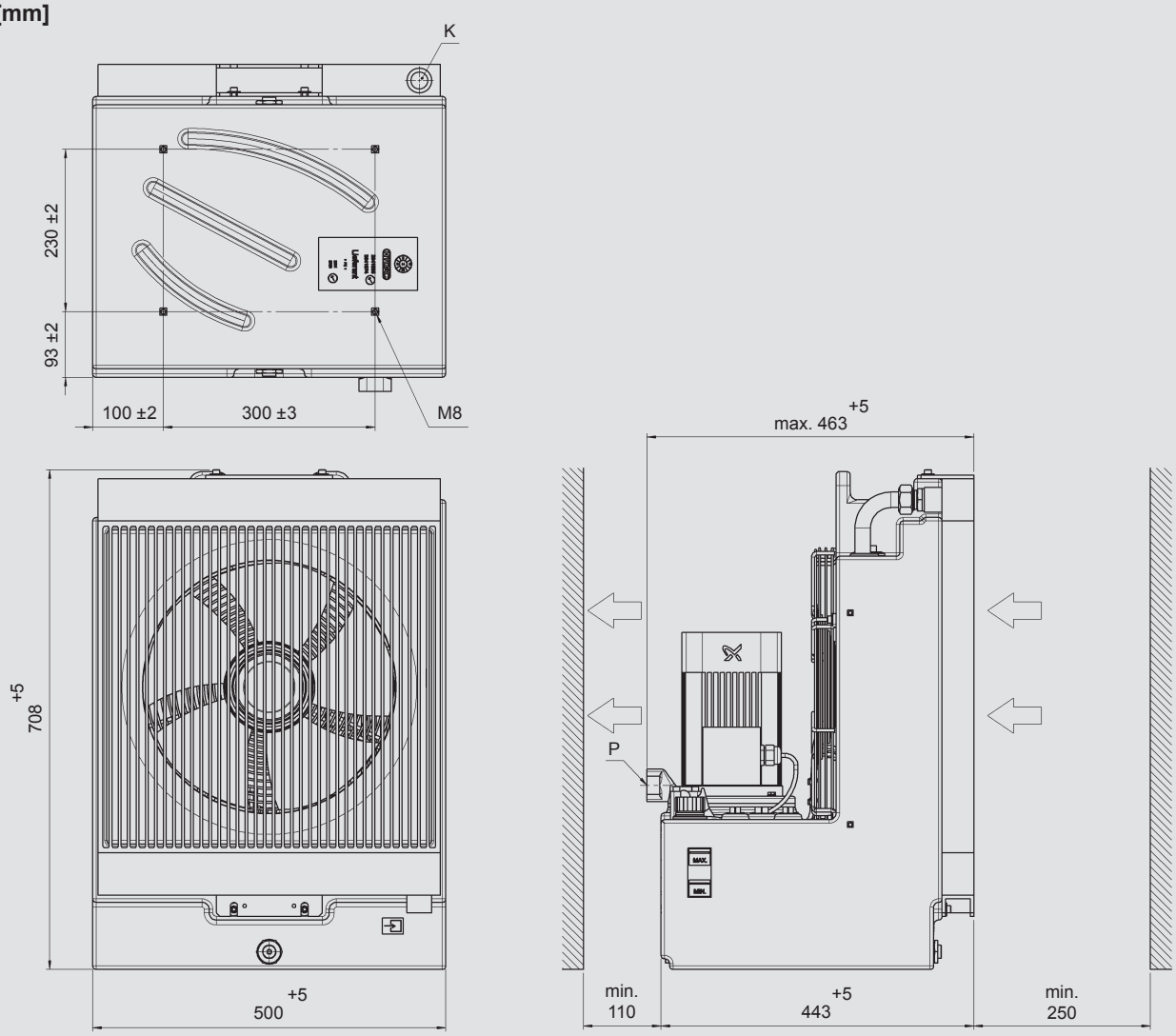
Electrical Connection

The motor is electrically connected by the customer using a heavy-duty plug.

Additional 24 V DC control voltage, more information available upon request.

Dimensions

[mm]



Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 3 - EC3 - 3.0 - W - 601A0 - 0 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Open-loop / closed-loop speed control
EC3 = Closed-loop speed control (with PID controller)
EC5 = Open-loop speed control (with temperature sensor)

Type code

Operating fluid
W = Water-glycol (standard)

Pump
601 = Version with pump 601
H2-4 = Version with pump MTH2-4
Other pumps on request.

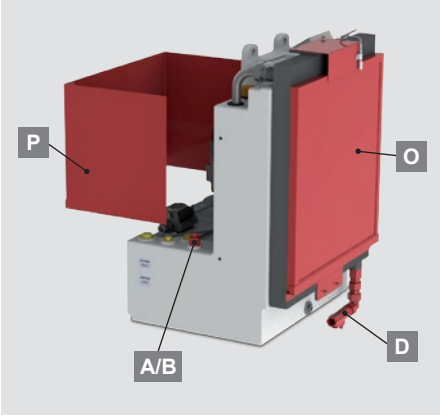
Motor voltage
A = 380-420 V – 50 Hz / 400-480 V – 60 Hz, 3PH (pump 601)
200 – 240 V – 50/60 Hz, 1PH (fan)
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH2-4)
200 – 240 V – 50/60 Hz, 1PH (fan)
See also electrical data.

Position pump connection
0 = standard

Color
0 = none
(FLKS-3: white plastic tank housing)

Accessories
0 = no accessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•									•
B	Filling level switch (2 switching points)			•				•			•	
D	Flow switch				•			•			•	
O	Air filter					•		•	•	•	•	•
P	Air deflection						•	•		•		•	
Accessory number		**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**

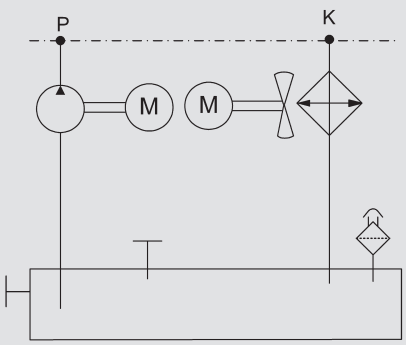
See also “Accessories for FLKS” for more information.

FLKS-3EC Standard

Part no.	Designation	Pump	Version
3980425	FLKS-3EC3/3.0/W/601A0/0/0	601	no accessories, closed-loop speed control
4009719	FLKS-3EC3/3.0/W/H2-4B0/0/0	MTH2-4	no accessories, closed-loop speed control

Fluid-Air Cooling Systems
FLKS-4S

Symbol



General

The **FLKS-4S** is a compact fluid/air cooling system with a plastic tank housing and integrated air duct.
This lightweight and robust design makes it suitable for diverse applications.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid.

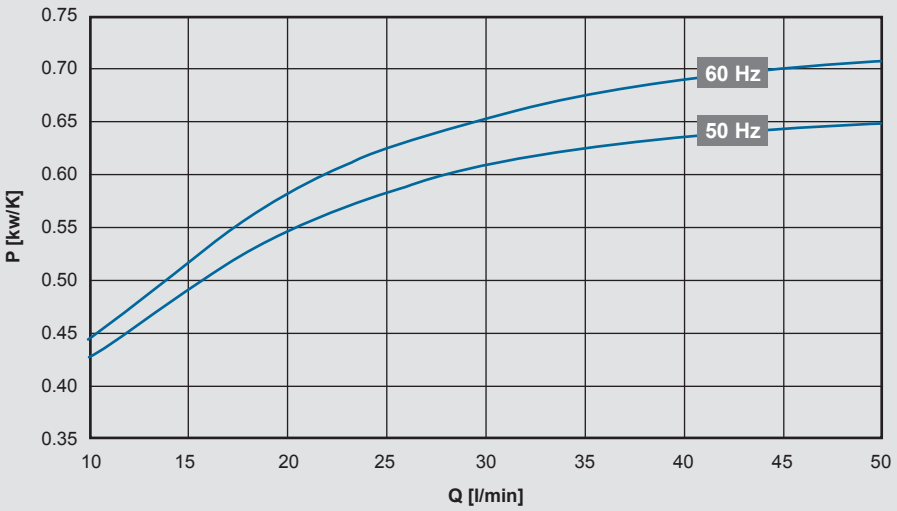
Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.65 kW/K (see cooling capacity diagram)
Flow rate	5 – 55 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40% ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available on request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	31.0 – 43.0 l
Weight	Max. 49 kg
Noise level (acoustic pressure)	69 / 72 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G¾" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug. Terminal boxes available upon request.
Mounting position	Pump vertical
Accessories	● Air filter ● Air deflection ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

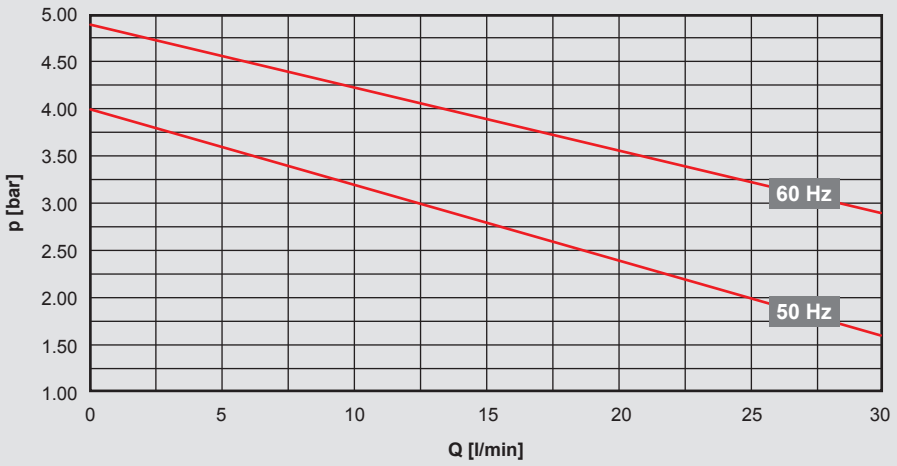
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

601 pump version



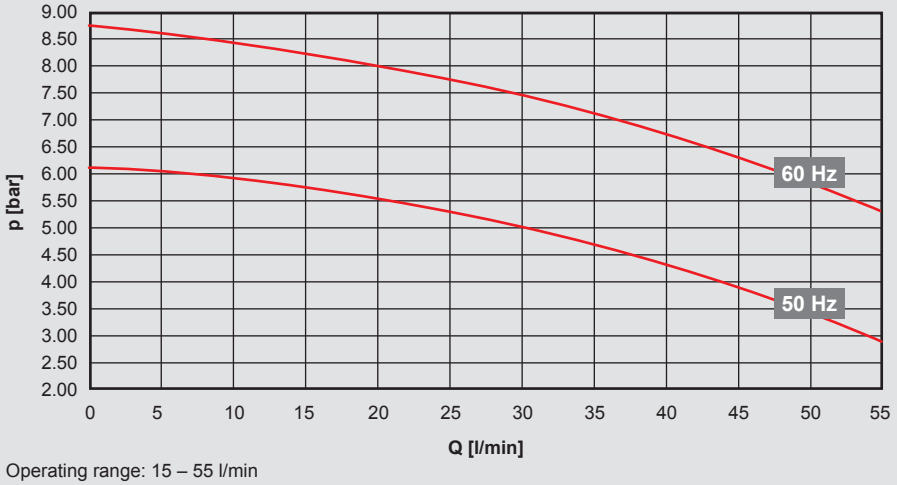
Operating range: 5 – 30 l/min

Electrical data:

Permitted voltage range:
380 - 420 V – 50 Hz – 3 PH
400 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.50 / 0.70 kW
Fan: 0.45 / 0.70 kW

MTH 2-6 pump version



Operating range: 15 – 55 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

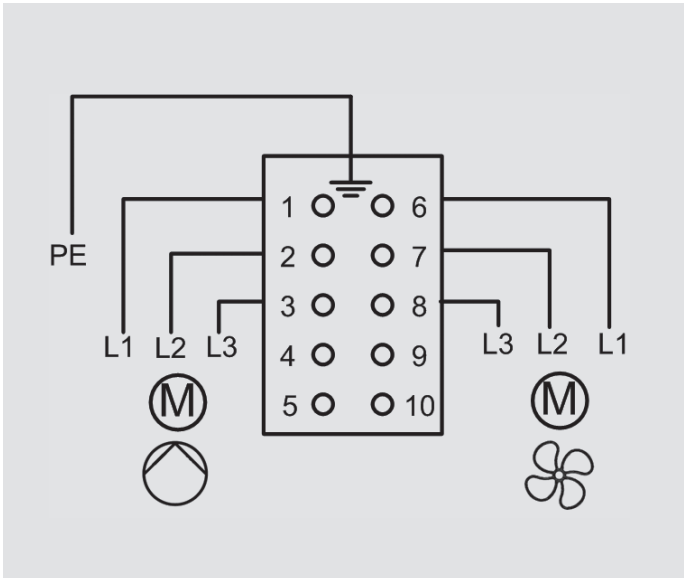
Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.845 / 1.28 kW
Fan: 0.45 / 0.70 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids,
as well as on special voltages or other pumps.

Electrical Connection

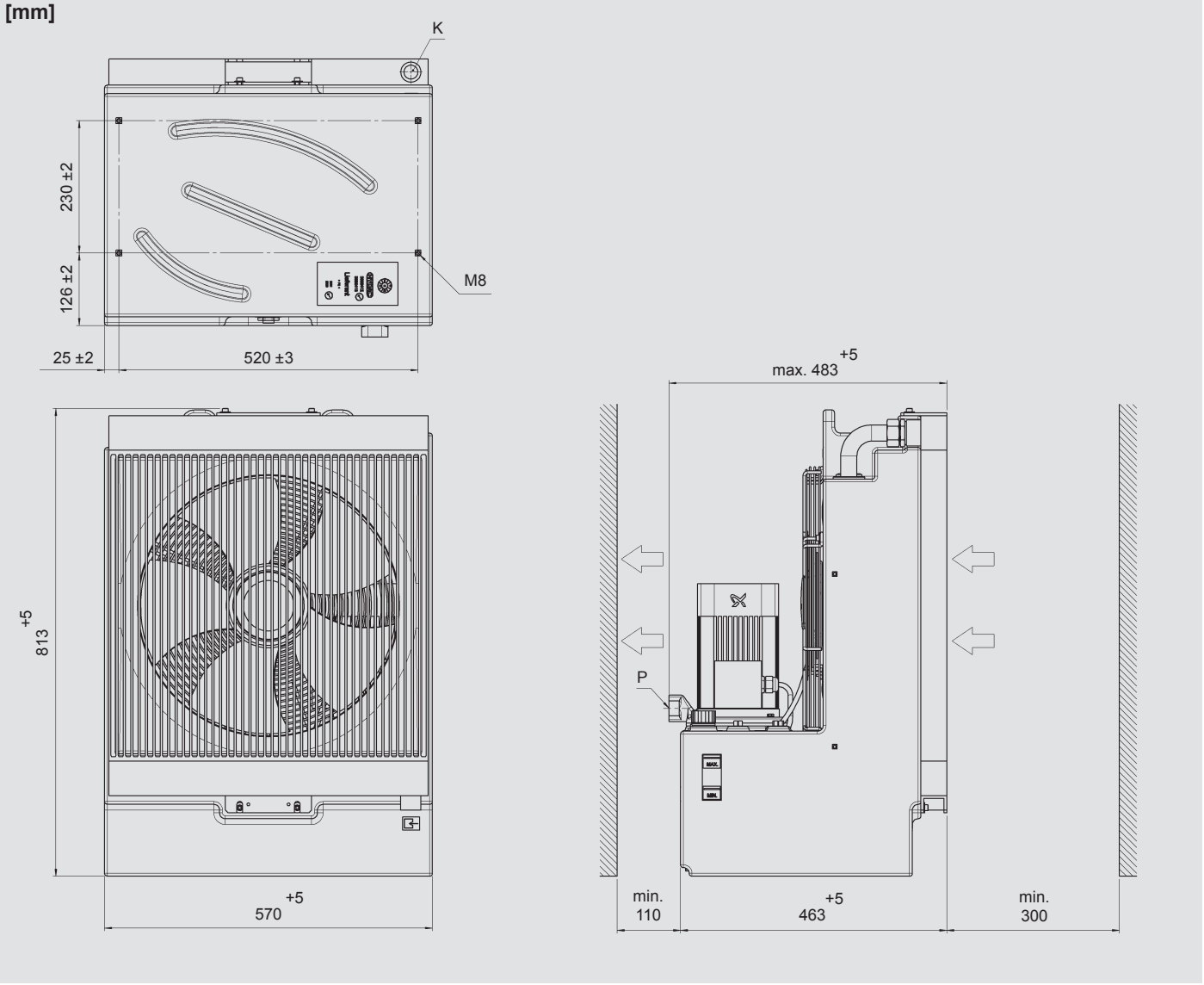


The motor is electrically connected by the customer using a heavy-duty plug.

For example: housing 09300101541 and insert 09330102716 by Harting

Dimensions

[mm]



Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 4S - 2.0 - W - 601A0 - 0 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Type code

Operating fluid
W = Water-glycol (standard)

Pump
601 = Version with pump 601
H2-6 = Version with pump MTH2-6
Other pumps on request.

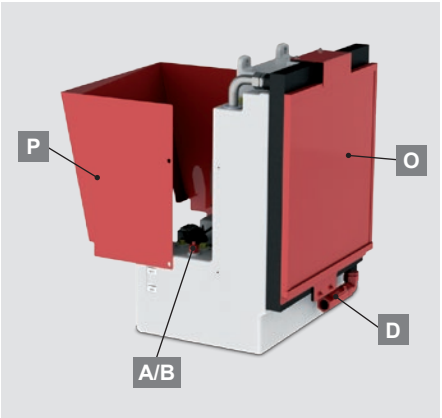
Motor voltage
A = 380-420 V – 50 Hz / 400-480 V – 60 Hz, 3PH (pump 601)
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH2-6)
Other pumps on request.

Position pump connection
0 = standard

Color
0 = none
(FLKS-4: white plastic tank housing)

Accessories
0 = no accessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•									•
B	Filling level switch (2 switching points)			•					•			•	
D	Flow switch				•			•			•		
O	Air filter					•		•	•	•	•	•	•
P	Air deflection						•	•		•		•	
Accessory number		**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**

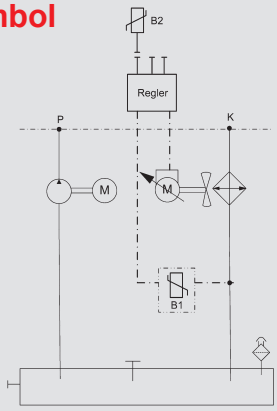
See also “Accessories for FLKS” for more information.

FLKS-4S Standard

Part no.	Designation	Pump	Version
3951597	FLKS-4S/2.0/W/601A0/0/0	601	no accessories, fixed speed
3932404	FLKS-4S/2.0/W/H2-6B0/0/0	MTH2-6	no accessories, fixed speed

Fluid-Air Cooling Systems
FLKS-4EC
with speed control

Symbol



General

The **FLKS-4EC** is a compact fluid/air cooling system with a plastic tank housing, integrated air duct, pump and variable-speed fan. This lightweight and robust design makes it suitable for diverse applications.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger. The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid. The speed can vary depending on the application.

Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.70 kW/K (see cooling capacity diagram)
Flow rate	5 – 55 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available upon request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	31.0 – 43.0 l
Weight	Max. 47 kg
Noise level (acoustic pressure)	< 71 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G¾" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug.
Mounting position	Pump vertical
Accessories	● Air filter ● Air deflection ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

Open-Loop Speed Control

The temperature sensor of the **FLKS-4EC5** measures the water-glycol outlet temperature from the cooling system. The 0 – 10 V analog signal of the sensor is assigned a temperature range of +25 up to +45 °C. The signal is forwarded to the EC fan according to the measured fluid outlet temperature to control the speed. The fan switches on at 1.5 V (= +28 °C) and reaches its maximum speed at 10 V (= +45 °C).

Even at low ambient temperatures, the fluid temperature cannot drop below +28 °C given constant power input. This prevents condensation on electrical components.

Application:

Specially suited for low air temperatures, e.g., outdoors

Closed-Loop Speed Control

The **FLKS-4EC3** also comes with a PID controller. The temperature sensor measures the fluid outlet temperature (variable). This temperature is continuously compared to the reference value (ambient temperature + set differential ΔT). The PID controller continuously adjusts the speed to keep the fluid temperature near the ambient temperature.

The outlet temperature remains at a set differential above the ambient temperature regardless of the input temperature of the fluid (power of the machine).

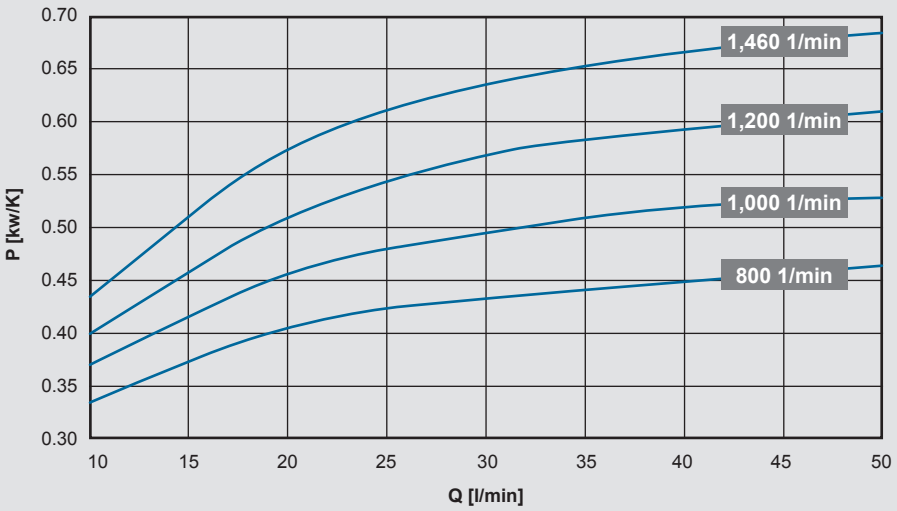
Application:

Primarily precision cooling (e.g., in machine tools)

Lower fan speed

= lower noise level
= lower energy consumption
= lower contamination level

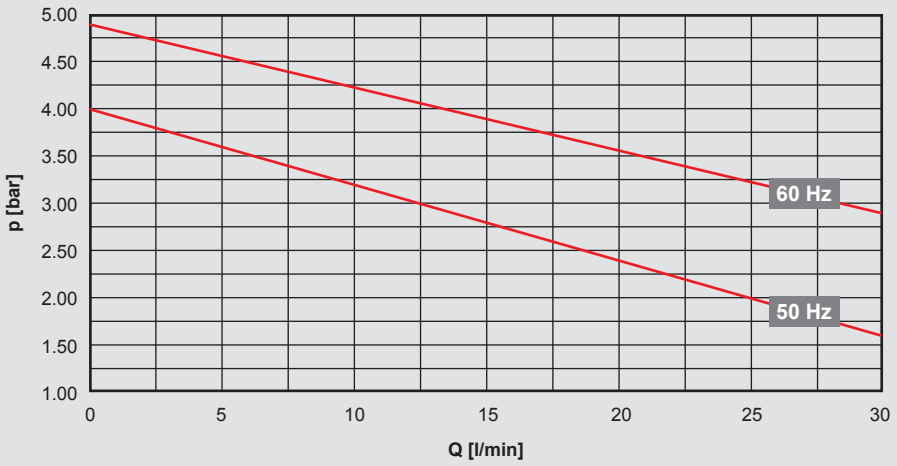
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

601 pump version



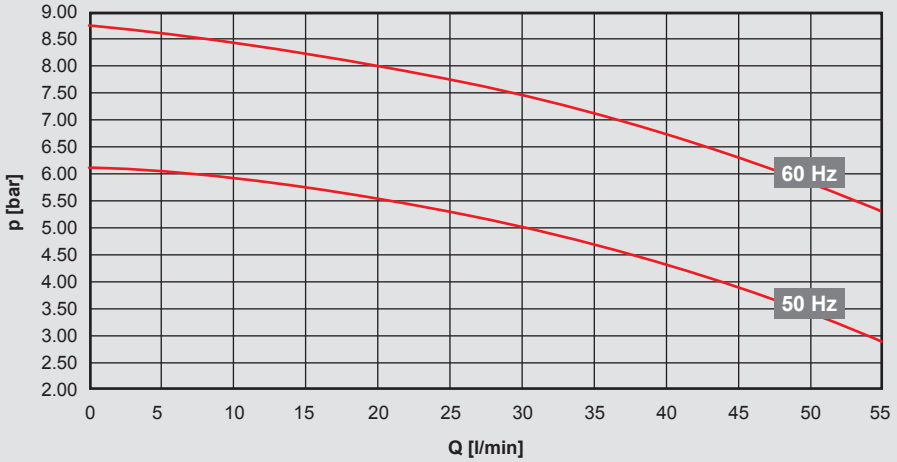
Operating range: 5 – 30 l/min

Electrical data:

Permitted voltage range:
380 - 420 V – 50 Hz – 3 PH
400 - 480 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.50 / 0.70 kW
Fan: 0.53 kW

MTH 2-6 pump version



Operating range: 15 – 55 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.845 / 1.28 kW
Fan: 0.53 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements). In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.

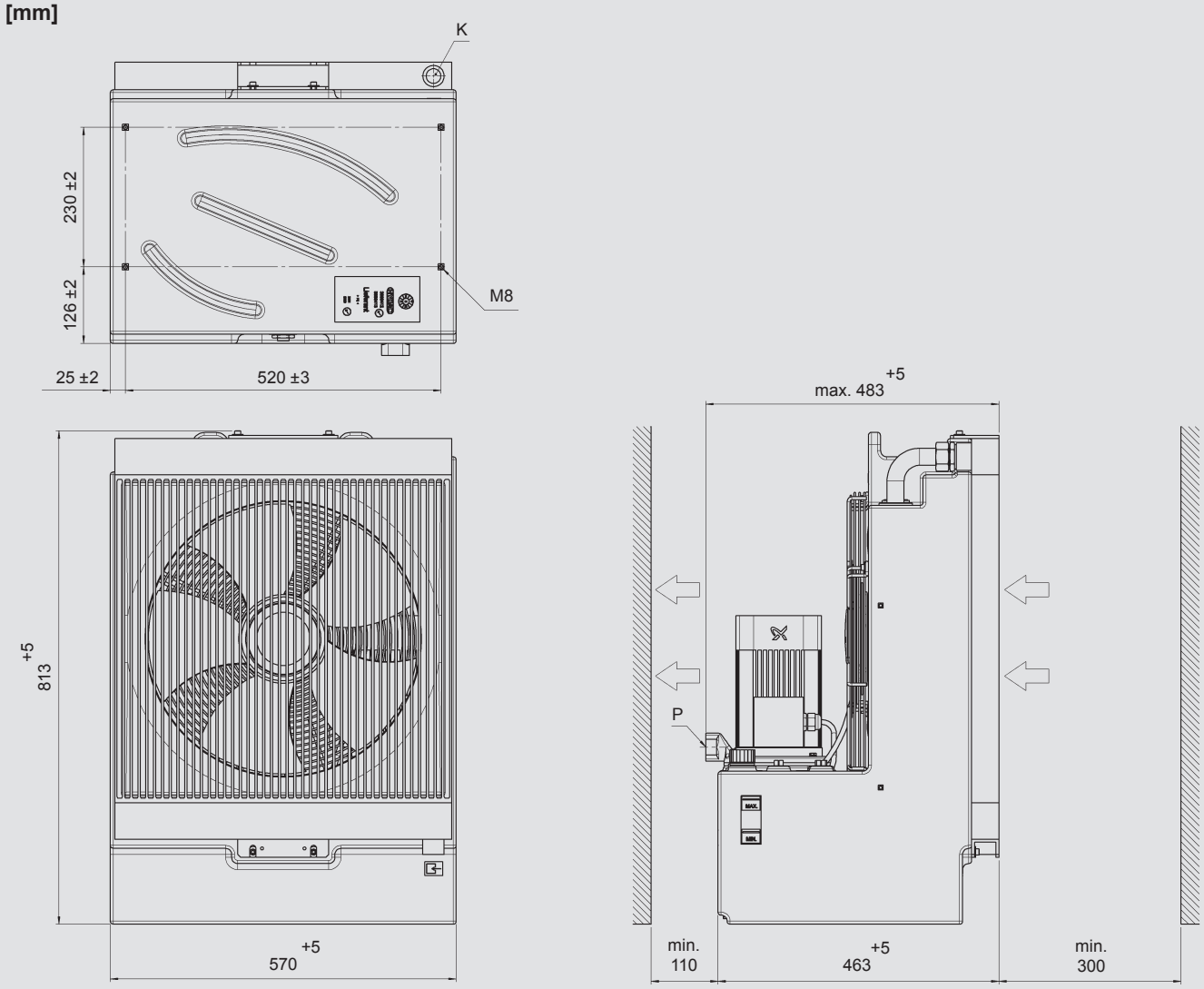
Electrical Connection

The motor is electrically connected by the customer using a heavy-duty plug.

Additional 24 V DC control voltage, more information available upon request.

Dimensions

[mm]



Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 4 - EC3 - 2.0 - W - 601A0 - 0 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Open-loop / closed-loop speed control
EC3 = Closed-loop speed control (with PID controller)
EC5 = Open-loop speed control (with temperature sensor)

Type code

Operating fluid
W = Water-glycol (standard)

Pump
601 = Version with pump 601
H2-6 = Version with pump MTH 2-6
Other pumps on request.

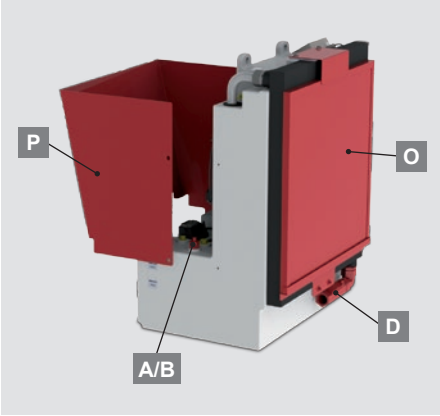
Motor voltage
A = 380-420 V – 50 Hz / 400-480 V – 60 Hz, 3PH (pump 601)
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH2-6)
See also electrical data.

Position pump connection
0 = standard

Color
0 = none
(FLKS-4: white plastic tank housing)

Accessories
0 = no accessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•									•
B	Filling level switch (2 switching points)			•				•			•	
D	Flow switch				•			•			•	
O	Air filter					•		•	•	•	•	•
P	Air deflection						•	•		•		•	
Accessory number		**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**

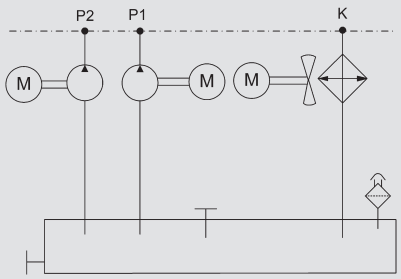
See also “Accessories for FLKS” for more information.

FLKS-4EC Standard

Part no.	Designation	Pump	Version
3902038	FLKS-4EC3/2.0/W/601A0/0/0	601	no accessories, closed-loop speed control
3901788	FLKS-4EC3/2.0/W/H2-6B0/0/0	MTH2-6	no accessories, closed-loop speed control

Fluid-Air Cooling Systems
FLKS-5S

Symbol



General

The **FLKS-5S** is a compact fluid/air cooling system with a standard upward air deflection and two separate pumps. The two pumps allow two cooling circuits with different characteristic curves (flow rate/pressure loss) to be operated.

Function

The pumps convey the operating fluid from the plastic tank over the parts being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid. The air is extracted through the heat exchanger and exhausted upward through the air deflection.

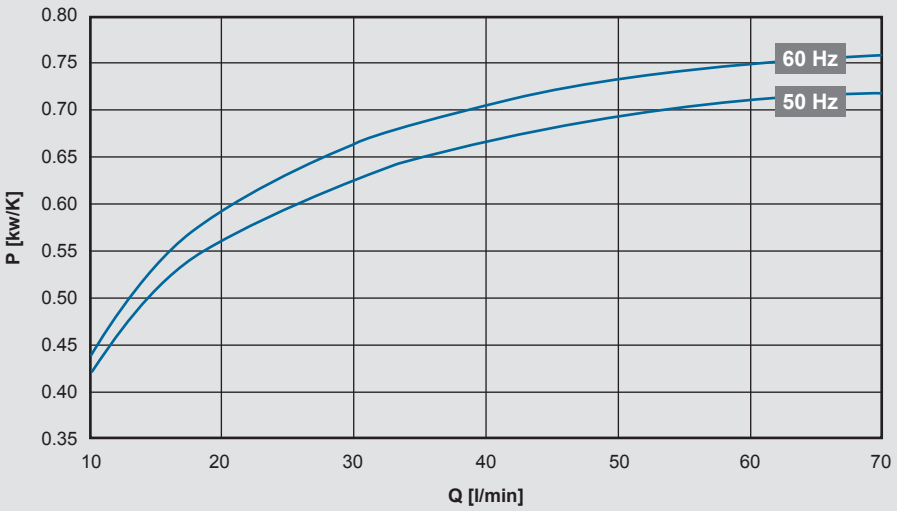
Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.72 kW/K (see cooling capacity diagram)
Flow rate	5 – 55 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available on request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	47.0 – 70.0 l
Weight	Max. 97 kg
Noise level (acoustic pressure)	70 / 72 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G1¼" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug. Terminal boxes available upon request.
Mounting position	Pump vertical
Accessories	● Air filter ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

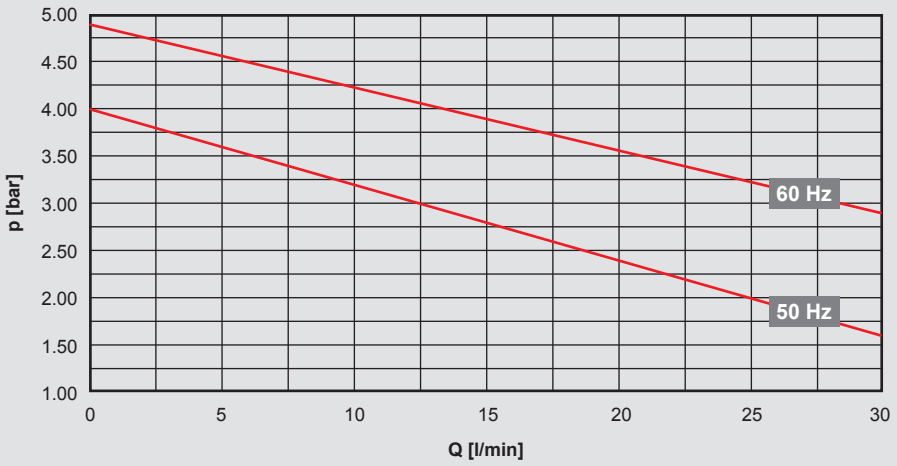
Cooling Capacity



Cooling capacity tolerance: ±5 %

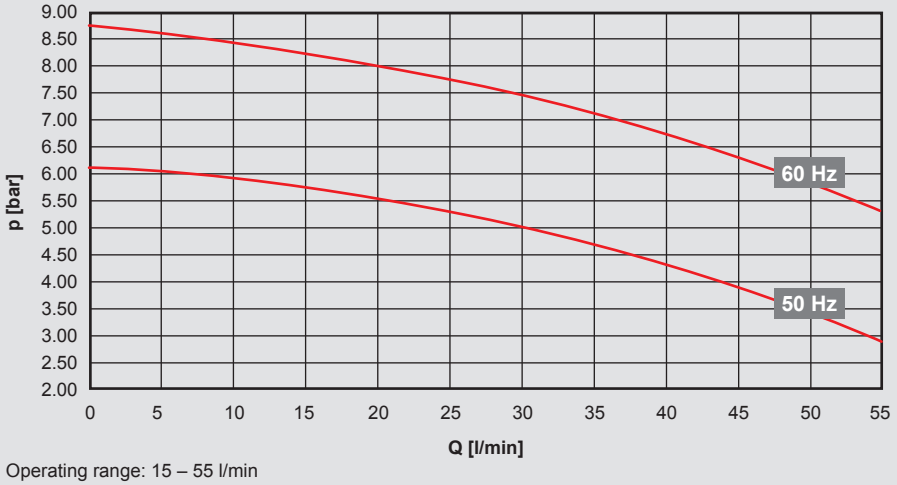
Flow Rate

601 pump version



Operating range: 5 – 30 l/min

MTH 2-6 pump version



Operating range: 15 – 55 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

Electrical Data:

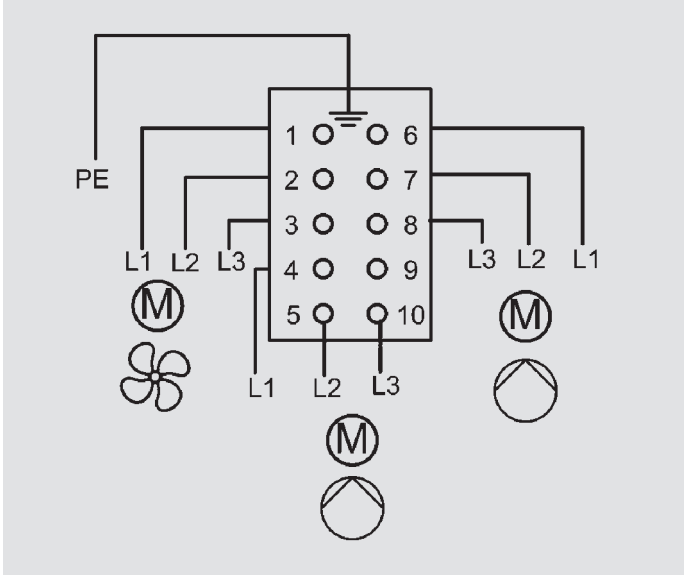
Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump 601: 0.50 / 0.70 kW
Pump MTH 2-6: 0.845 / 1.28 kW
Fan: 0.45 / 0.70 kW

Version with only one pump available on request.

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements). In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

Electrical Connection

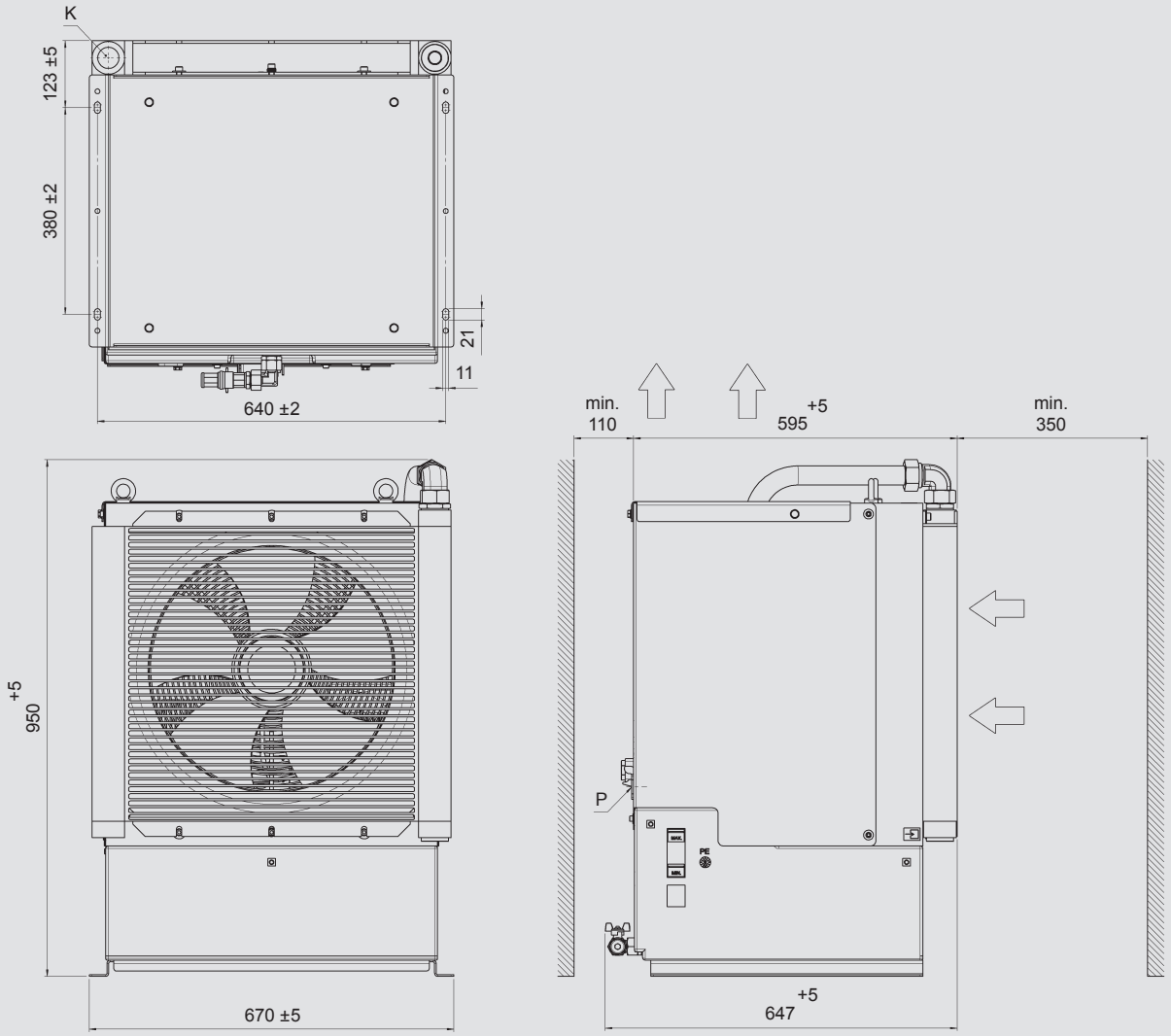


The motor is electrically connected by the customer using a heavy-duty plug.

For example: housing 09300101541 and insert 09330102716 by Harting

Dimensions

[mm]



Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 5S - 2.0 - W - H2-6B0+601B0 - 2 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Type code

Operating fluid
W = Water-glycol (standard)

Pump
Version with 2 pumps:
H2-6 = Pump MTH2-6
601 = Pump 601
Version with only one pump on request.

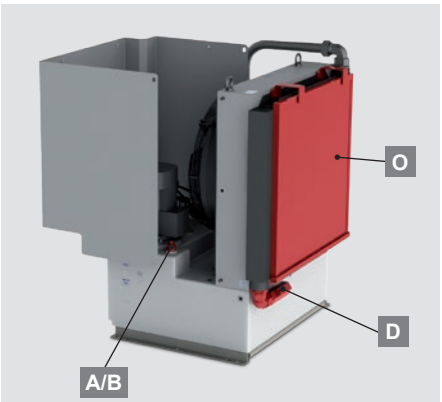
Motor voltage
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH2-6 + pump 601)
See also electrical data

Position pump connection
0 = Standard

Color
2 = light grey RAL 7035

Accessories
0 = no accessories (Standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•					•
B	Filling level switch (2 switching points)			•			•		
D	Flow switch				•			•	
O	Air filter					•	•	•	•
Accessory number		**0**	**1**	**44**	**30**	**14**	**59**	**122**	**105**

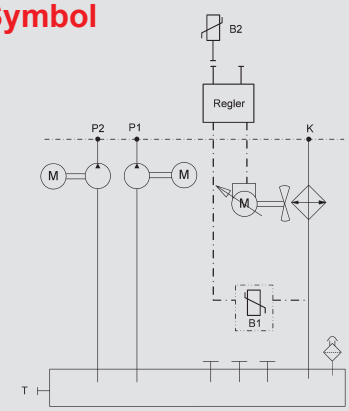
See also “Accessories for FLKS” for more information.

FLKS-5S Standard

Part no.	Designation	Pump	Version
3953543	FLKS-5S/2.0/W/H2-6B0+601B0/2/0	MTH2-6 + 601	no accessories, fixed speed
3956364	FLKS-5S/2.0/W/H4-6B0/2/0	MTH4-6	no accessories, fixed speed

Fluid-Air Cooling Systems
FLKS-5EC
with speed control

Symbol



General

The **FLKS-5EC** is a compact fluid/air cooling system with a standard upward air deflection, two separate pumps and variable-speed fan. The two pumps allow two cooling circuits with different characteristic curves (flow rate/pressure loss) to be operated.

Function

The pumps convey the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid. The speed can vary depending on the application.

Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 0.83 kW/K (see cooling capacity diagram)
Flow rate	5 – 55 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available upon request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	47.0 – 70.0 l
Weight	Max. 97 kg
Noise level (acoustic pressure)	< 72 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G1¼" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug.
Mounting position	Pump vertical
Accessories	● Air filter ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

Open-Loop Speed Control

The temperature sensor of the **FLKS-5EC5** measures the water-glycol outlet temperature from the cooling system. The 0 – 10 V analog signal of the sensor is assigned a temperature range of +25 up to +45 °C. The signal is forwarded to the EC fan according to the measured fluid outlet temperature to control the speed. The fan switches on at 1.5 V (= +28 °C) and reaches its maximum speed at 10 V (= +45 °C).

Even at low ambient temperatures, the fluid temperature cannot drop below +28 °C given constant power input. This prevents condensation on electrical components.

Application:

Specially suited for low air temperatures, e.g., outdoors

Closed-Loop Speed Control

The **FLKS-5EC3** also comes with a PID controller. The temperature sensor measures the fluid outlet temperature (variable). This temperature is continuously compared to the reference value (ambient temperature + set differential ΔT). The PID controller continuously adjusts the speed to keep the fluid temperature near the ambient temperature.

The outlet temperature remains at a set differential above the ambient temperature regardless of the input temperature of the fluid (power of the machine).

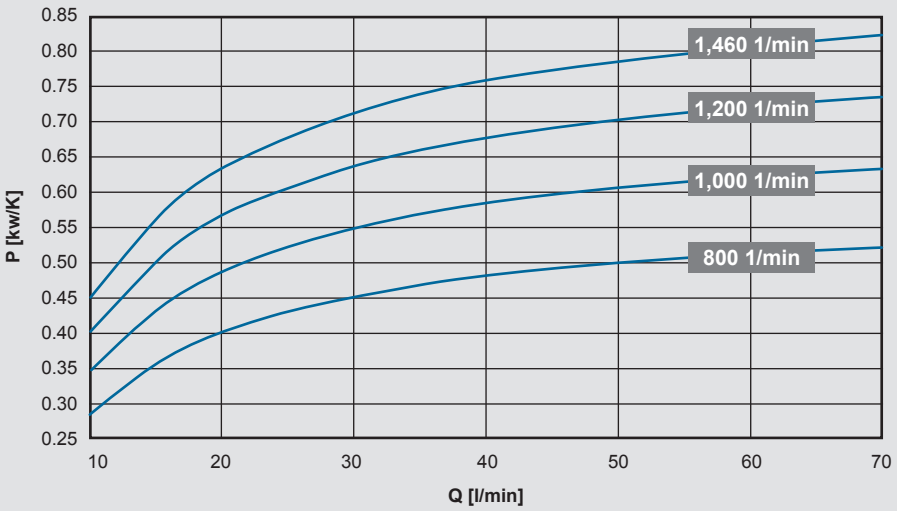
Application:

Primarily precision cooling (e.g., in machine tools)

Lower fan speed

= lower noise level
= lower energy consumption
= lower contamination level

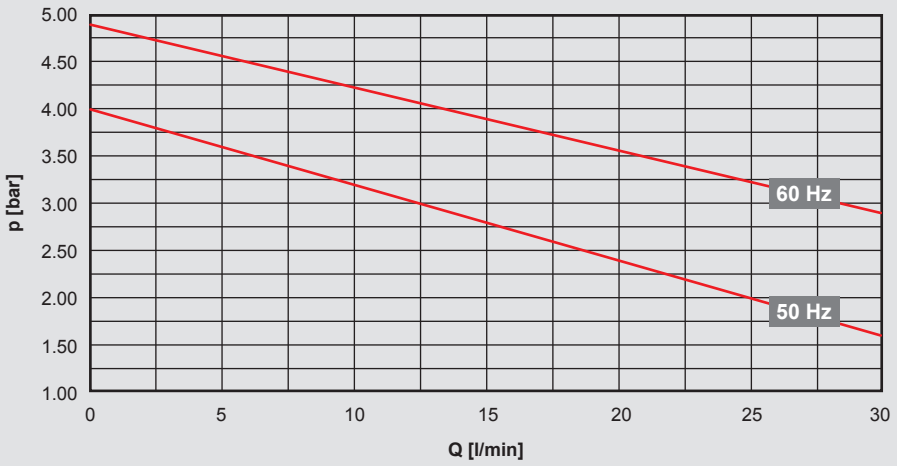
Cooling Capacity



Cooling capacity tolerance: ±5 %

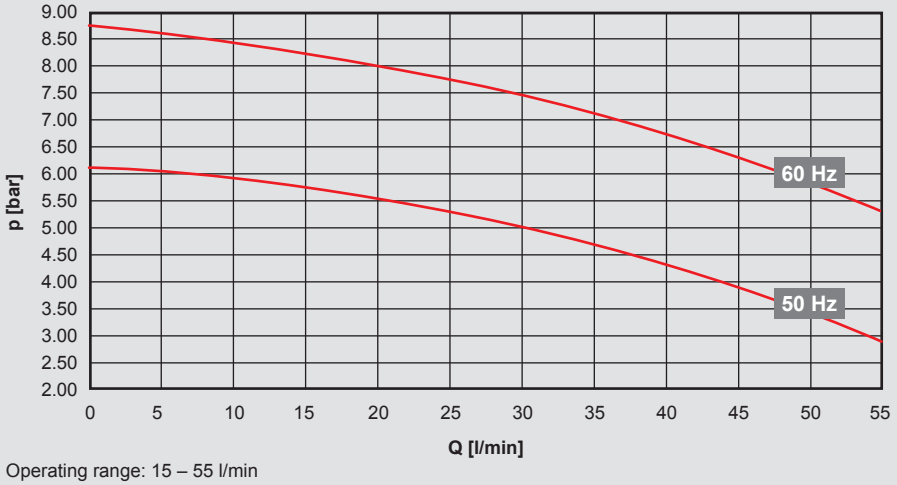
Flow Rate

601 pump version



Operating range: 5 – 30 l/min

MTH 2-6 pump version



Operating range: 15 – 55 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Spannungstoleranz +5 % / -10 %

Motor output (50/60 Hz):
Pump 601: 0.50 / 0.70 kW
Pump MTH 2-6: 0.845 / 1.28 kW
Fan: 0.53 kW

Version with only one pump available on request.

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

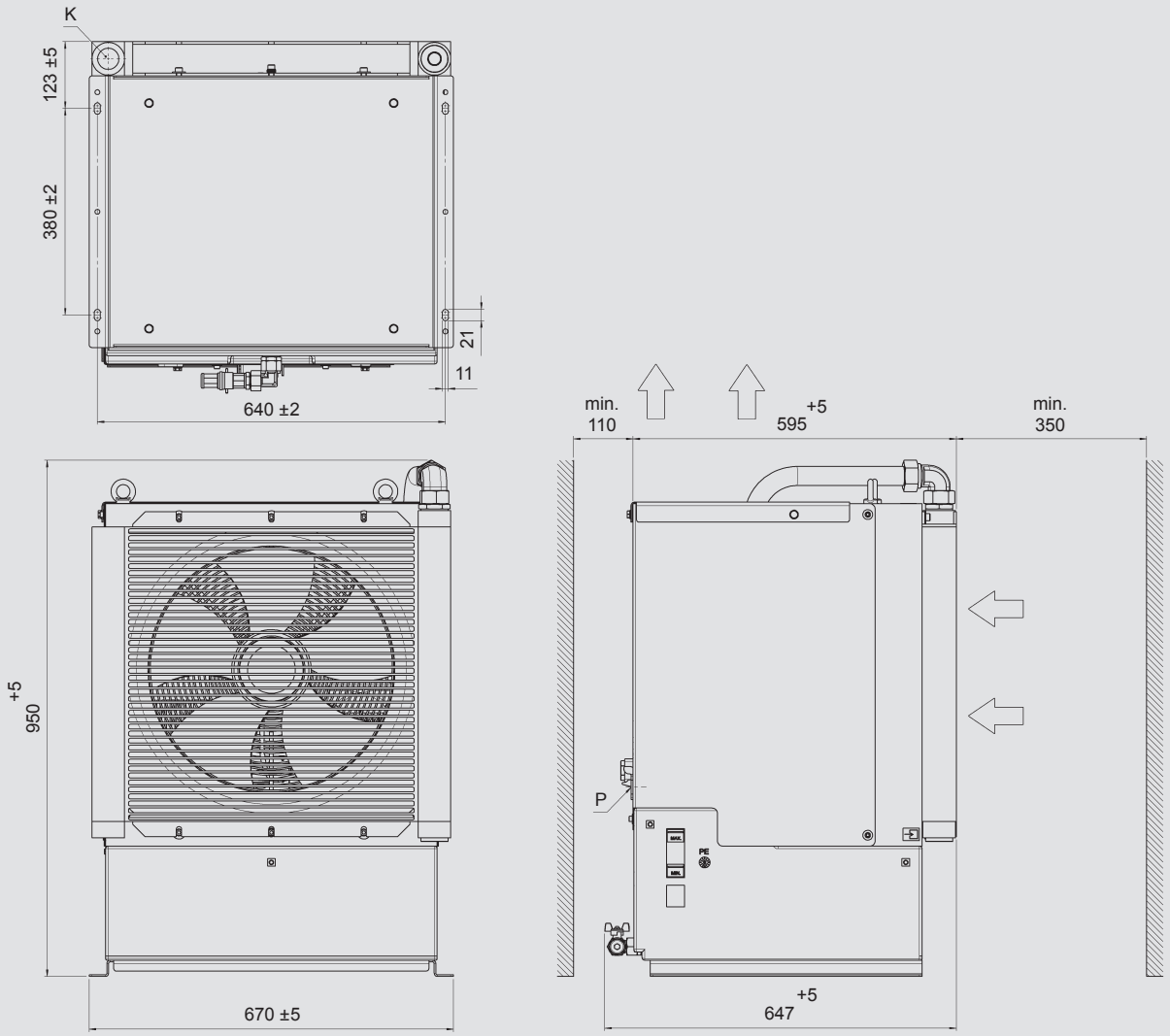
Electrical Connection

The motor is electrically connected by the customer using a heavy-duty plug.

Additional 24 V DC control voltage, more information available upon request.

Dimensions

[mm]



Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 5 - EC3 - 2.0 - W - H2-6B0+601B0 - 2 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Open-loop / closed-loop speed control
EC3 = Closed-loop speed control (with PID controller)
EC5 = Open-loop speed control (with temperature sensor)

Type code

Operating fluid
W = Water-glycol (standard)

Pump
Version with 2 pumps:
H2-6 = pump MTH2-6
601 = pump 601
Version with only one pump on request.

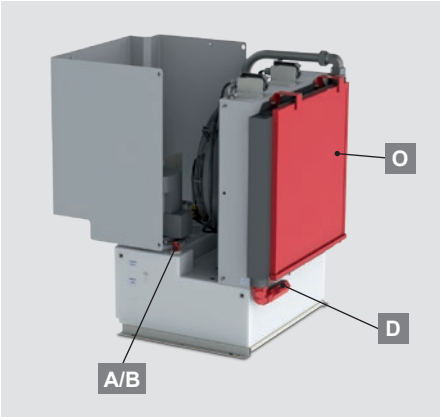
Position pump connection
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH2-6 + pump 601)
See also electrical data.

Position pump connection
0 = standard

Color
2 = light grey RAL 7035

Accessories
0 = no accessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		●					●
B	Filling level switch (2 switching points)			●			●	
D	Flow switch				●			●	
O	Air filter					●	●	●	●
Accessory number		**0**	**1**	**44**	**30**	**14**	**59**	**122**	**105**

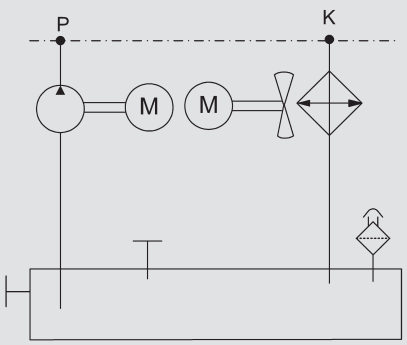
See also “Accessories for FLKS” for more information.

FLKS-5EC Standard

Part no.	Designation	Pump	Version
3956717	FLKS-5EC3/2.0/W/H2-6B0+601B0/2/0	MTH2-6 + 601	no accessories, closed-loop speed control
3956722	FLKS-5EC3/2.0/W/H4-6B0/2/0	MTH4-6	no accessories, closed-loop speed control

Fluid-Air Cooling Systems
FLKS-6S

Symbol



General

The **FLKS-6S** is a compact fluid/air cooling system with a circulating pump, plastic tank, heat exchanger and fan with a standard upward air deflection.

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid.

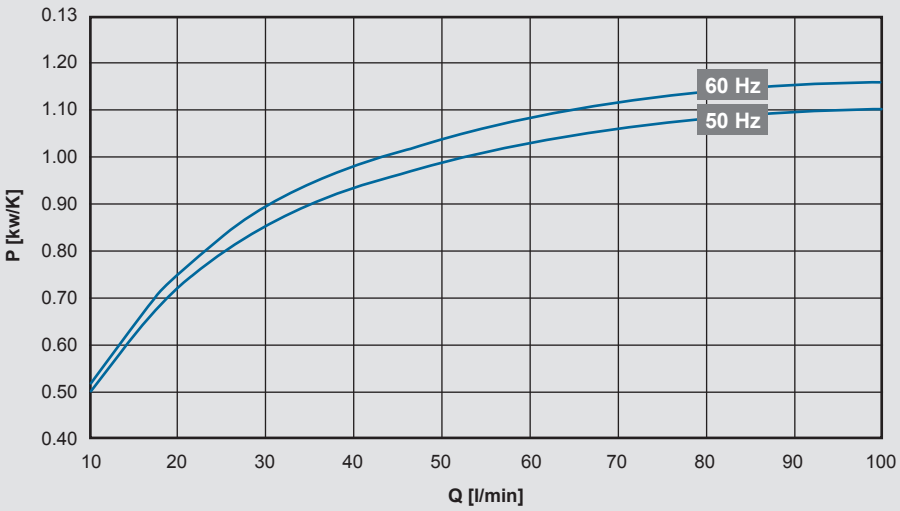
Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 1.10 kW/K (see cooling capacity diagram)
Flow rate	10 – 100 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available on request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	47.0 – 70.0 l
Weight	Max. 93 kg
Noise level (acoustic pressure)	73 / 75 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G1¼" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug. Terminal boxes available upon request.
Mounting position	Pump vertical
Accessories	● Air filter ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

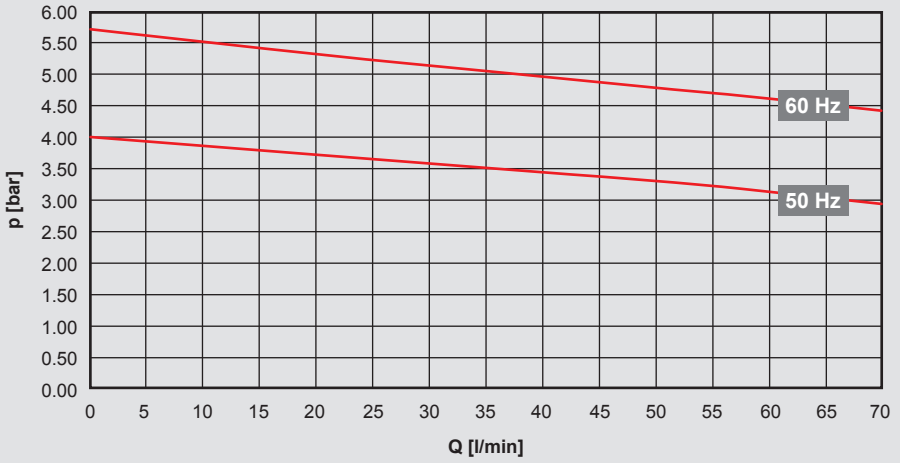
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

MTH 4-4 pump version



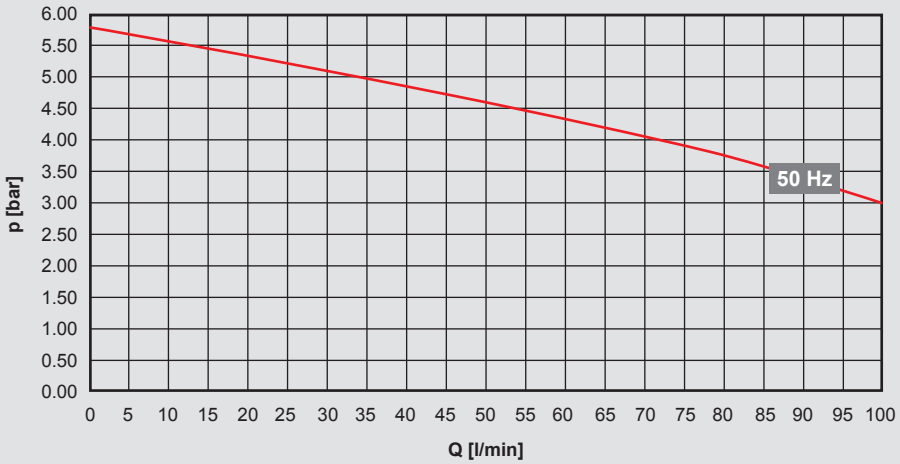
Operating range: 10 – 70 l/min

Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.96 / 1.51 kW
Fan: 0.69 / 1.05 kW

MTH 4-6 pump version



Operating range: 30 – 100 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

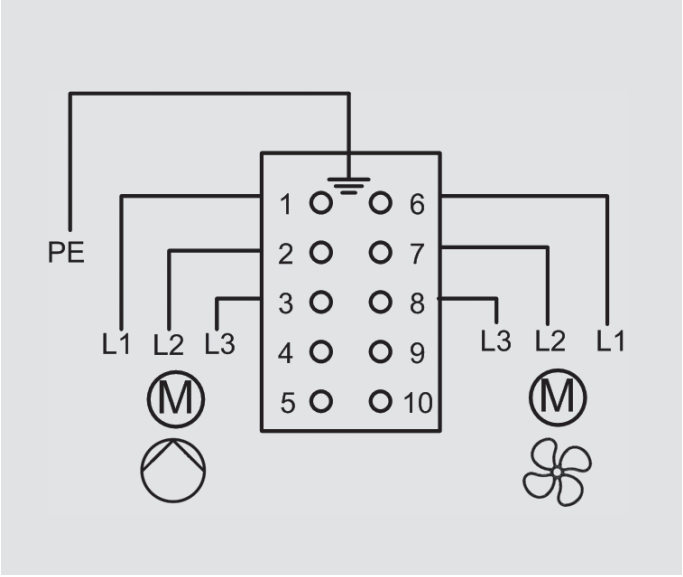
Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50 Hz):
Pump: 1.34 kW
Fan: 0.69 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

Electrical Connection

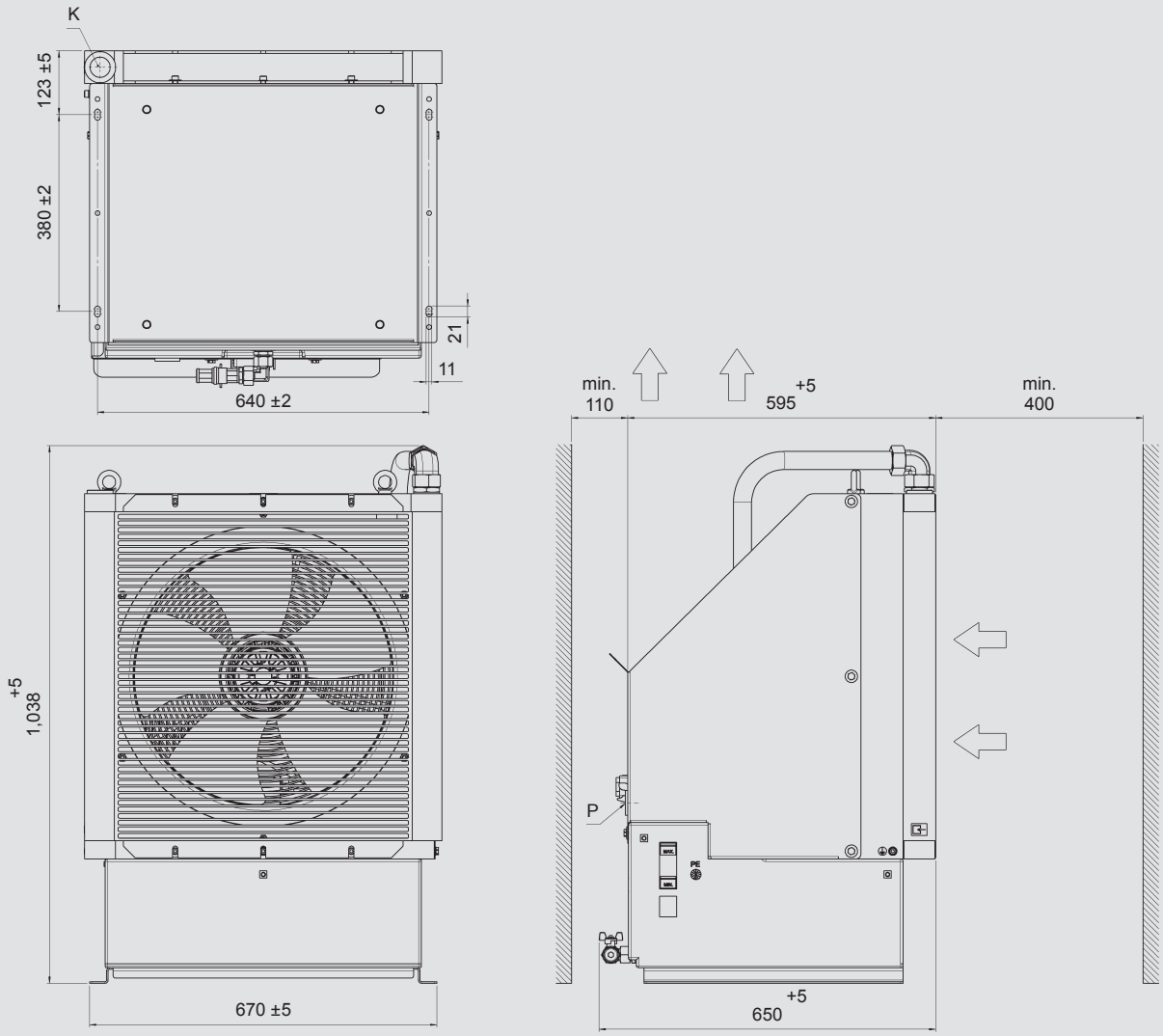


The motor is electrically connected by the customer using a heavy-duty plug.

For example: housing 09300101541 and insert 09330102716 by Harting

Dimensions

[mm]



Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 6S - 2.0 - W - H4-4B0 - 2 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Type code

Operating fluid
W = Water-glycol (standard)

Pump
H4-4 = Version with pump MTH4-4
H4-6 = Version with pump MTH4-6
Other pumps on request.

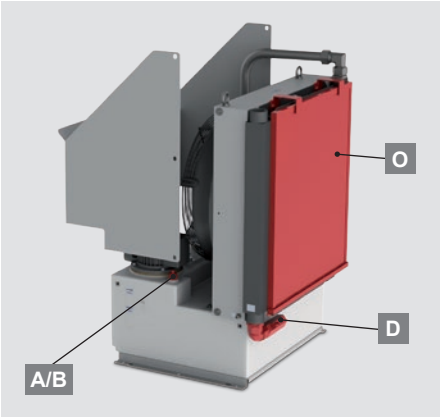
Motor voltage
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (pump MTH4-4)
C = 380-415 V – 50 Hz, 3PH (pump MTH4-6)
See also electrical data.

Position pump connection
0 = standard

Color
2 = light grey RAL 7035

Accessories
0 = no accessories (standard)
See table for corresponding accessory number.

Accessories



A	Filling level and 60 °C temperature switch		•					•
B	Filling level switch (2 switching points)			•			•		
D	Flow switch				•			•	
O	Air filter					•	•	•	•
Accessory number		**0**	**1**	**44**	**30**	**14**	**59**	**122**	**105**

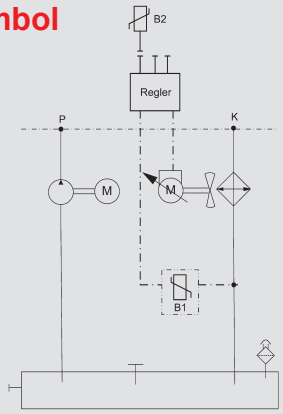
See also “Accessories for FLKS” for more information.

FLKS-6S Standard

Part no.	Designation	Pump	Version
3952152	FLKS-6S/2.0/W/H4-4B0/2/0	MTH4-4	no accessories, fixed speed
3952766	FLKS-6S/2.0/W/H4-6C0/2/0	MTH4-6	no accessories, fixed speed

Fluid-Air Cooling Systems
FLKS-6EC
with speed control

Symbol



General

The **FLKS-6EC** is a compact fluid/air cooling system with a circulating pump, heat exchanger and variable-speed fan with a standard upward air deflection

Function

The pump conveys the operating fluid from the tank through the part being cooled to the heat exchanger.
The axial fan provides the necessary air flow through the heat exchanger to cool the operating fluid. The speed can vary depending on the application.

Application Field

- Fluid-cooled drives:
  Motor spindles, torque motors, servomotors, linear motors
- Inverter cooling
- Gearbox cooling and lubrication
- Bearing cooling
- Tool cooling

Operation Data

Cooling capacity	up to 1.20 kW/K (see cooling capacity diagram)
Flow rate	10 – 100 l/min (see flow rate diagrams)
Operating fluid	Water-glycol mixture (W): Potable water with 35 – 40 % ethylene glycol-based or propylene glycol-based antifreeze and anti-corrosion concentration Other fluids available on request (e.g., mineral oil).
Permitted temperatures	Fluid temperature: max. +60 °C Ambient temperature: 0 up to +45 °C
Tank volume	47.0 – 70.0 l
Weight	Max. 93 kg
Noise level (acoustic pressure)	< 77 dB(A) at 50 / 60 Hz (at 1 m)
Hydraulic connection	Pump P (flow): G¾" Heat exchanger K (return): G1¼" If possible, refrain from reducing the size of the line required for the threaded connections.
Electrical connection	The motors are usually electrically connected using a heavy-duty plug. Terminal boxes available upon request.
Mounting position	Pump vertical
Accessories	● Air filter ● Filling level switch ● Filling level and temperature switch ● Flow switch Combinations and other accessories available upon request.

Open-Loop Speed Control

The temperature sensor of the **FLKS-6EC5** measures the water-glycol outlet temperature from the cooling system. The 0 – 10 V analog signal of the sensor is assigned a temperature range of +25 up to +45 °C. The signal is forwarded to the EC fan according to the measured fluid outlet temperature to control the speed. The fan switches on at 1.5 V (= +28 °C) and reaches its maximum speed at 10 V (= +45 °C).

Even at low ambient temperatures, the fluid temperature cannot drop below +28 °C given constant power input. This prevents condensation on electrical components.

Application:

Specially suited for low air temperatures, e.g., outdoors

Closed-Loop Speed Control

The **FLKS-6EC3** also comes with a PID controller. The temperature sensor measures the fluid outlet temperature (variable). This temperature is continuously compared to the reference value (ambient temperature + set differential ΔT). The PID controller continuously adjusts the speed to keep the fluid temperature near the ambient temperature.

The outlet temperature remains at a set differential above the ambient temperature regardless of the input temperature of the fluid (power of the machine).

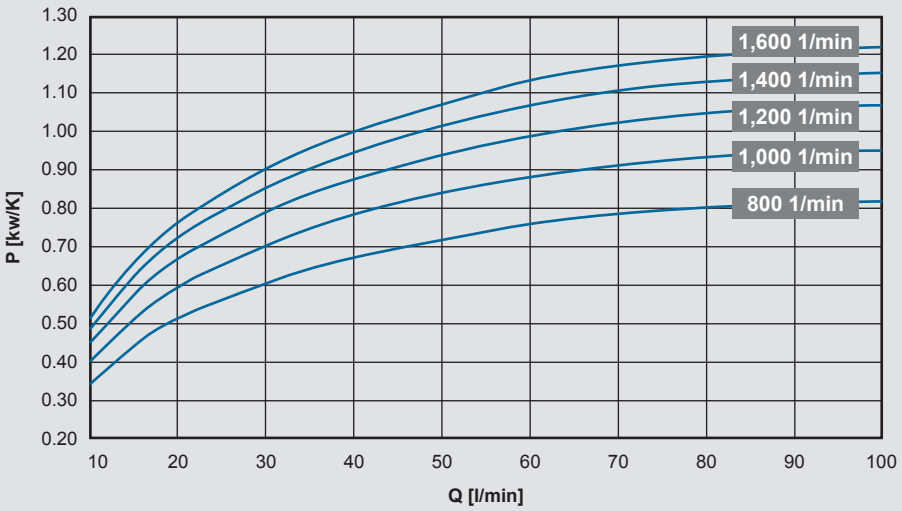
Application:

Primarily precision cooling (e.g., in machine tools)

Lower fan speed

= lower noise level
= lower energy consumption
= lower contamination level

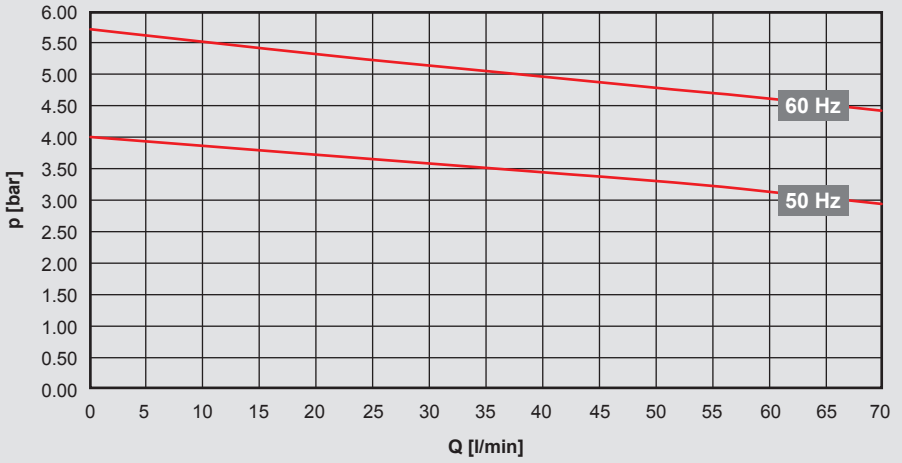
Cooling Capacity



Cooling capacity tolerance: ±5 %

Flow Rate

MTH 4-4 pump version



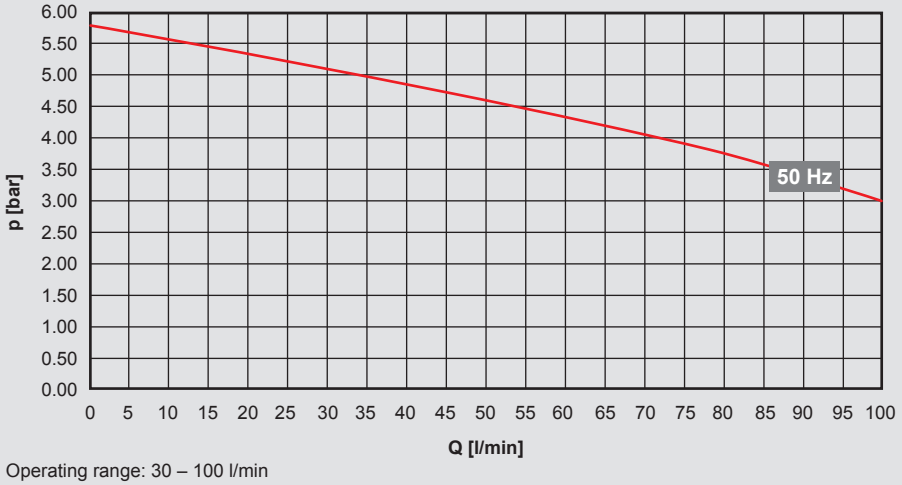
Operating range: 10 – 70 l/min

Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
380 - 440 V – 60 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50/60 Hz):
Pump: 0.96 / 1.51 kW
Fan: 0.98 kW

MTH 4-6 pump version



Operating range: 30 – 100 l/min
Flow rate tolerance: ±9 %, pumping head tolerance: ±7 % as per DIN EN ISO 9906 Cl. 2, App. A

Electrical data:

Permitted voltage range:
380 - 415 V – 50 Hz – 3 PH
Voltage tolerance: +5 % / -10 %

Motor output (50 Hz):
Pump: 1.34 kW
Fan: 0.98 kW

Note:
The operating point of the pump (flow rate) depends on the characteristic curve (line sizes, line lengths, screwing elements).
In general, the fewer the system losses, the greater the flow rate and the greater the cooling capacity.
Please contact Technical Sales with questions on cooling capacity and flow rate data with other operating fluids, as well as on special voltages or other pumps.

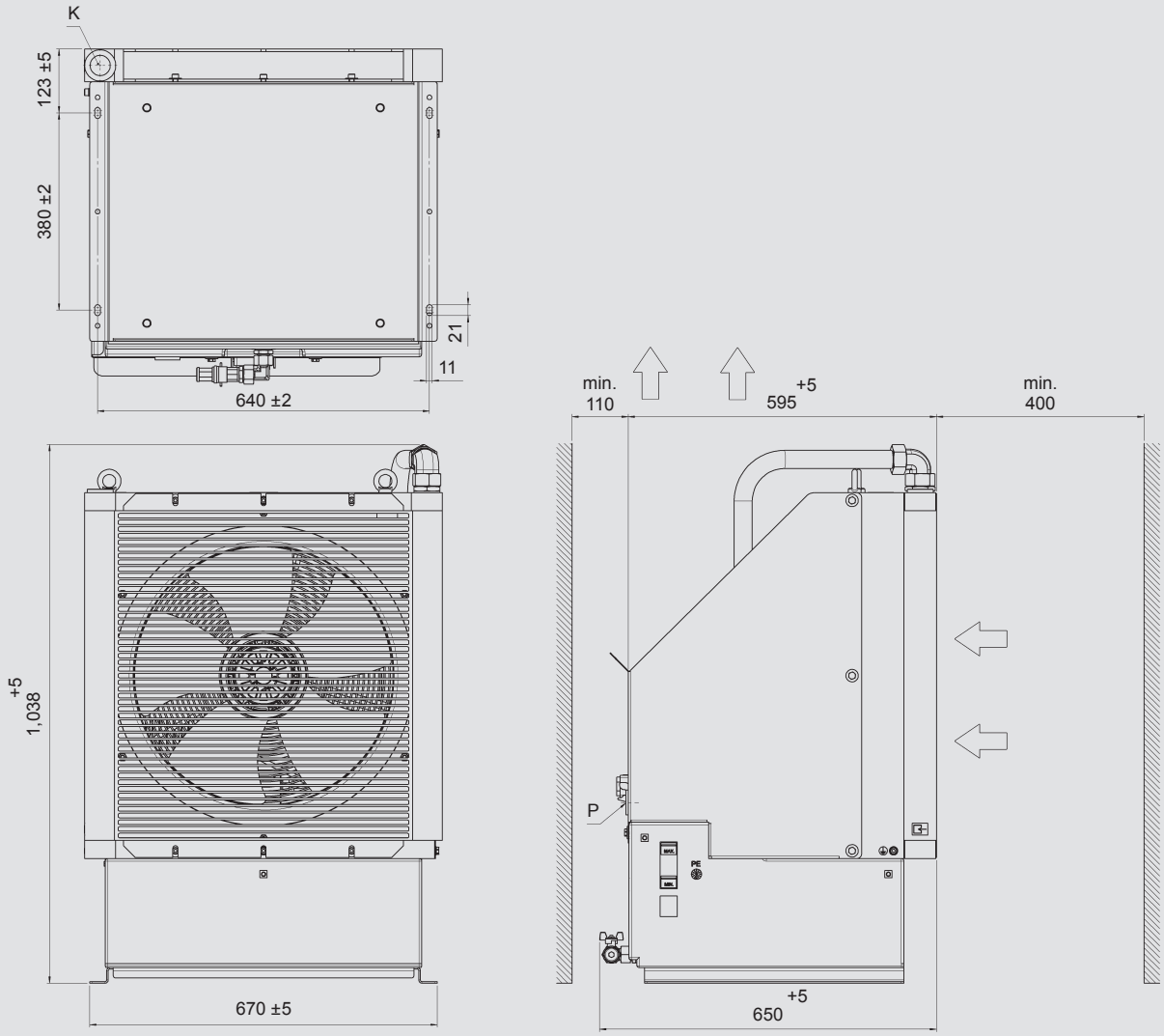
Electrical Connection

The motor is electrically connected by the customer using a heavy-duty plug.

Additional 24 V DC control voltage, more information available upon request.

Dimensions

[mm]



Note:
We recommend maintaining the specified minimum distance to ensure unimpeded air entry and exit.
Anything below the minimum distance can affect cooling capacity and noise emissions.

Model Type

FLKS - 6 - EC3 - 2.0 - W - H4-4B0 - 2 - 0

Model
FLKS = Fluid/Air Cooling System

Size

Open-loop / closed-loop speed control
EC3 = Closed-loop speed control (with PID controller)
EC5 = Open-loop speed control (with temperature sensor)

Type code

Operating fluid
W = Water-glycol (standard)

Pump
H4-4 = Version with pump MTH4-4
H4-6 = Version with pump MTH4-6
Other pumps on request.

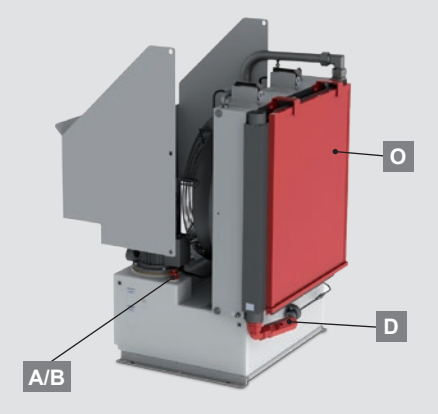
Motor voltage
B = 380-415 V – 50 Hz / 380-440 V – 60 Hz, 3PH (sump MTH4-4)
C = 380-415 V – 50 Hz, 3PH (sump MTH4-6)
See also electrical data.

Position pump connection
0 = standard

Color
2 = light grey RAL 7035

Accessories
0 = no accessories (standard)
See table for corresponding accessory number.

Accessories



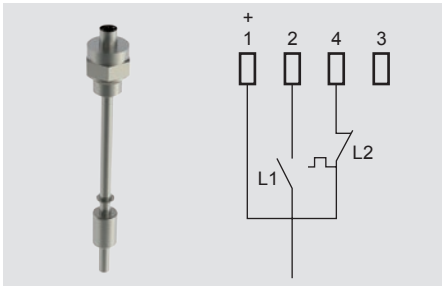
A	Filling level and 60 °C temperature switch		•					•
B	Filling level switch (2 switching points)			•			•	
D	Flow switch				•			•	
O	Air filter					•	•	•	•
Accessory number		**0**	**1**	**44**	**30**	**14**	**59**	**122**	**105**

See also “Accessories for FLKS” for more information.

FLKS-5EC Standard

Part no.	Designation	Pump	Version
3952994	FLKS-6EC3/2.0/W/H4-4B0/2/0	MTH4-4	no accessories, closed-loop speed control
3952889	FLKS-6EC3/2.0/W/H4-6C0/2/0	MTH4-6	no accessories, closed-loop speed control

FLKS Accessories

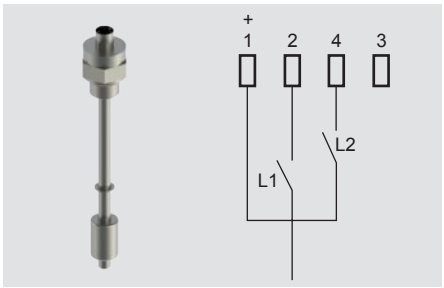


Filling Level and Temperature Switch

For monitoring the level and temperature of the operating fluid in the tank.

- 1 filling level switching point
- 1 fixed temperature switching point of +60 °C

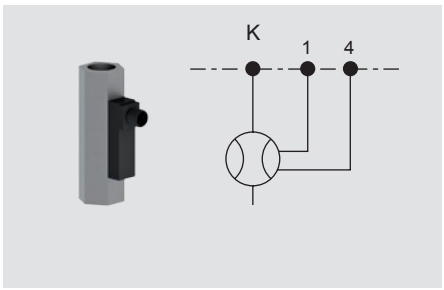
Accessory no.: 1



Filling Level Switch (2 Switching Points)

For monitoring the level of the operating fluid in the tank.

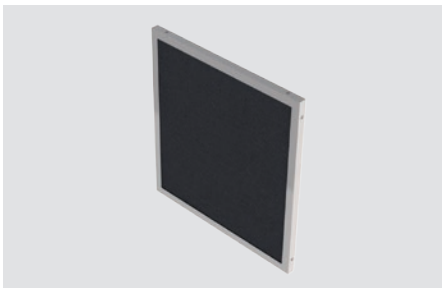
Accessory no.: 44



Flow Switch

For monitoring the continuous flow of the operating fluid.

Accessory no.: 30



Air Filter Grid

Mounted in front of the heat exchanger to prevent dust and dry particles that could contaminate the heat exchanger from entering.

Accessory no.: 14

Air Deflection

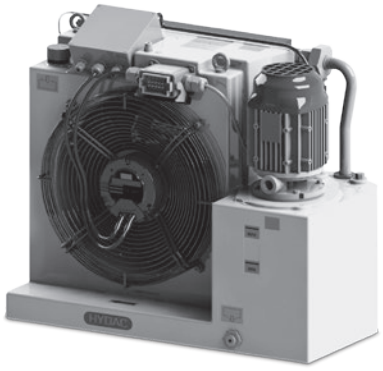
For directing the flow of air upward.

FLKS-5S/-5EC and FLKS-6S/-6EC come with an air deflection standard.

Accessory no.: 36

Possible Accessories Combinations:

Filling level and 60 °C temperature switch		•										•
Filling level switch (2 switching points)			•					•			•	
Flow switch				•			•			•		
Air filter					•		•	•	•	•	•	•
Air deflection						•	•		•		•	
Accessory number in model code	**0**	**1**	**44**	**30**	**14**	**36**	**43**	**59**	**82**	**122**	**124**	**105**



Fluid-Air Cooling Systems

Speed Controlled Systems FLKS-2EC, FLKS-3EC, FLKS-4EC, FLKS-5EC und FLKS-6EC

Lower speed

= lower noise level
= lower energy consumption
= lower contamination level
= no condensation in electrical components at low ambient temperatures

The FLKS-EC HYDAC Cooling series offers various possibilities for open-loop and closed-loop control. This means the right solution can be found for every application.

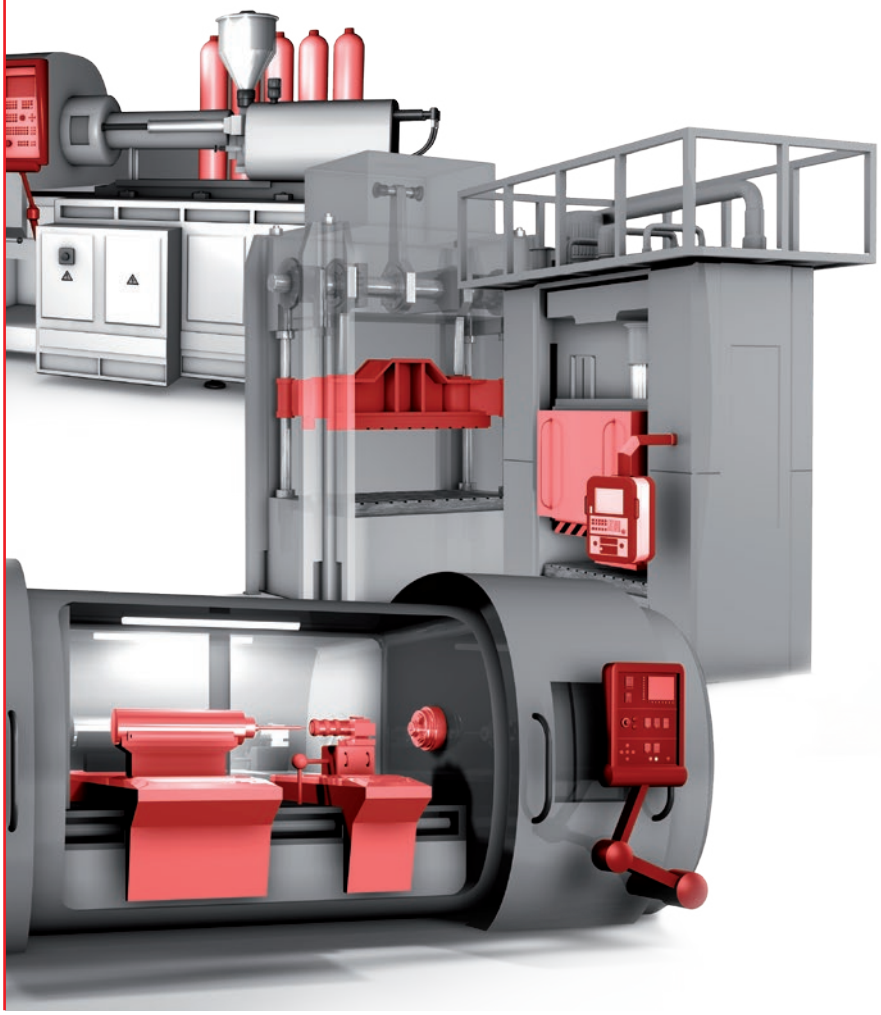
It is available in sizes FLKS-2EC, FLKS-3EC, FLKS-4EC, FLKS-5EC and FLKS-6EC.

FLKS – Systematic Control

Noise reduction and **energy savings** – these are two of the biggest issues of the future in mechanical engineering.

FLKS – Fluid-air cooling systems – cooling, as the name indicates, with air. A fan ensures that the necessary air flow is present to cool down the warm fluid in the cooling element. In a conventional fan with a fixed speed, the fan begins to run as soon as the cooling system starts up, irrespective of the ambient temperature and the power input from the actuator. This fan constantly uses energy and creates permanent noise.

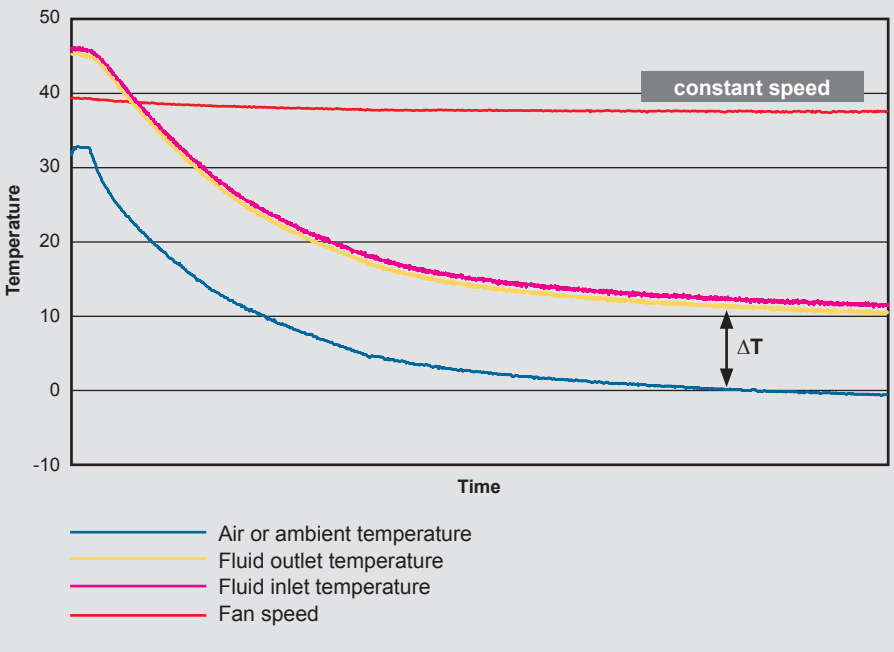
Systems with open-loop and closed-loop speed control can change this: at low ambient temperatures the fan still runs but at a low speed; if the inlet temperature to the cooler is only just over the needed outlet temperature (e.g. if the machine is at a standstill due to a tool change and therefore only a little heat is fed into the medium), the speed is also reduced.



FLKS with a Constant Speed (FLKS-xS)

The FLKS with AC fan drive operates with a constant speed and is therefore ideally suited to use in air conditioned machine halls.

1 AC fan



FLKS with AC fan drive:

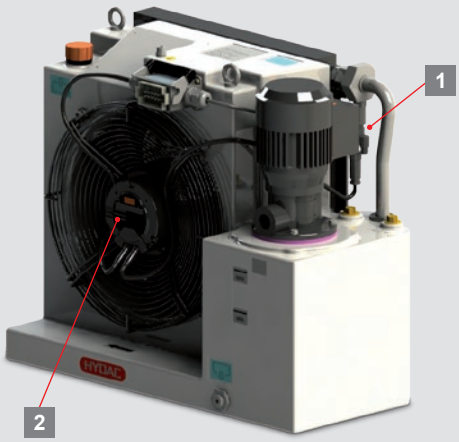
Temperature trend when ambient temperature reduces and power input stays constant.

The temperature curve of the fluid follows the ambient temperature curve (with a distance ΔT).

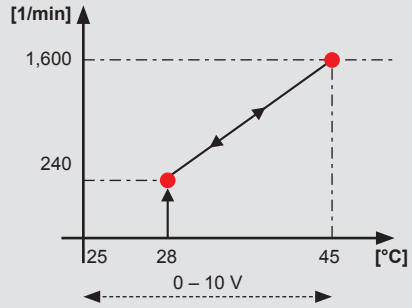
FLKS with Open-loop Speed Control (FLKS-xEC5)

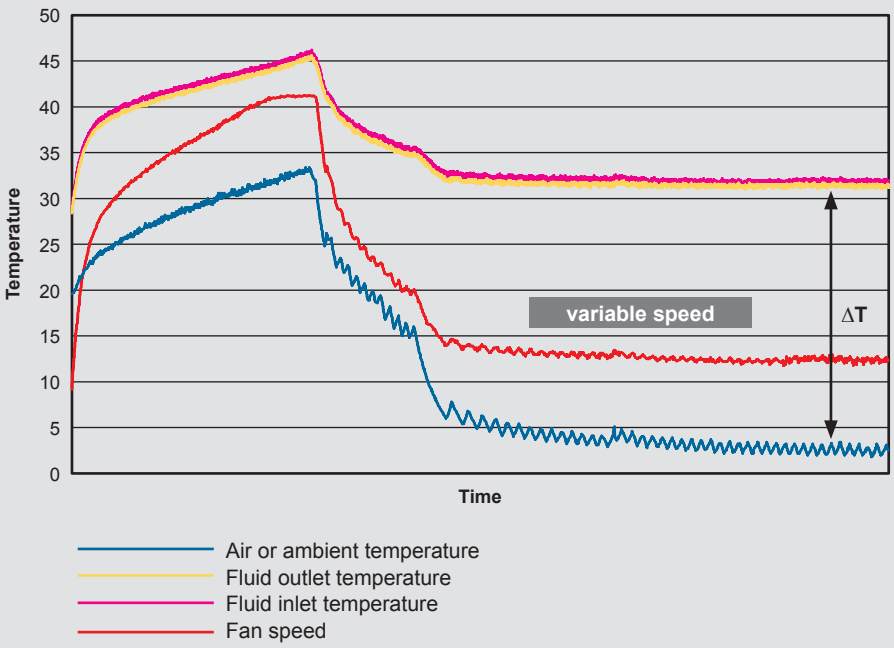
The FLKS with an EC fan drive is also equipped with a temperature sensor. The analog signal 0 – 10 V of the sensor is assigned a temperature range of +25 up to +45 °C. An analog signal is forwarded to the EC fan for open-loop control according to the fluid outlet temperature measured. The fan switches on at 1.5 V (= +28 °C) and reaches its maximum speed at 10 V (= +45 °C).

This FLKS is particularly suited to outdoor installation (e.g. for inverter cooling in cogeneration plants).



1 Outlet temperature sensor
2 EC fan





FLKS with open-loop control:

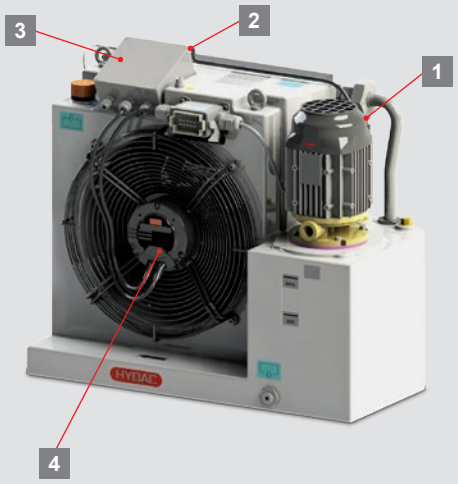
The fl uid temperature is maintained at a temperature above +28 °C by the fan control, even when the ambient temperature falls to approx. +3 °C as is shown in the diagram (ΔT).

FLKS with Closed-loop Speed Control (FLKS-xEC3)

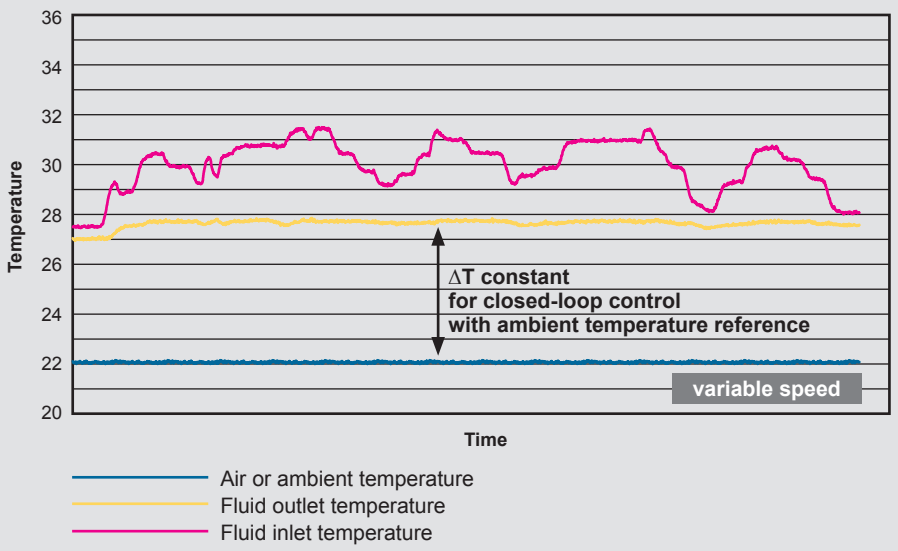
Closed-loop control is when measurements are continually taken to determine to what extent the control variable corresponds with the reference variable and – in contrast to open-loop control – a deviation automatically leads to adjustment of the control variable.

A temperature sensor measures the outlet temperature (control variable). This is continuously compared with the reference variable (ambient temperature + ΔT). The PID controller continually adjusts the speed of the fan, in order to align the outlet temperature with the ambient temperature.

The FLKS with closed-loop speed control is mainly used in machine tools where high fluid temperature accuracy is required.



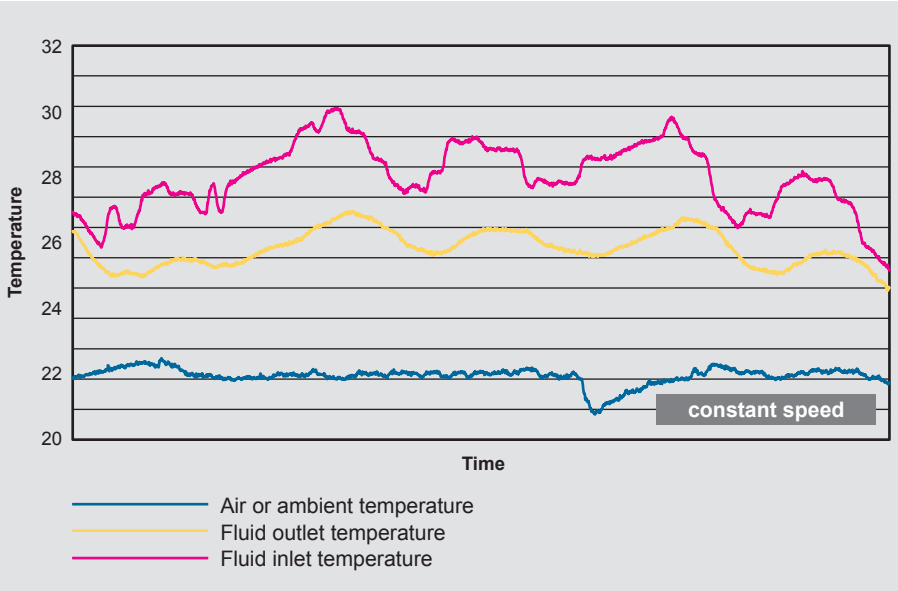
1 Outlet temperature sensor
2 Ambient temperature sensor
3 PID controller
4 EC fan



FLKS with closed-loop speed control:

Temperature trend with fluctuating power input.

The outlet temperature remains a fixed difference (ΔT) above the ambient temperature irrespective of the input temperature of the fluid (power of the machine).



FLKS without speed control:

Temperature trend with fluctuating power input.

The outlet temperature of the fluid fluctuates according to the power input. During machine downtimes it almost reduces to ambient temperature.

Note

Inlet and outlet of the fluid refer to the cooling system, i.e. inlet from the appliance to FLKS, outlet from FLKS to the appliance.

The diagrams on the FLKS with constant speed and with open-loop speed control were created from tests in the cold chamber; the diagrams on closed-loop speed control were created from measuring results from practical tests on a machine tool.

Fluid/Air Cooling System (FLKS) Design Sheet

Project: _____

Contact: _____

Phone: _____

E-mail: _____

Author: _____ Date: _____

Application: _____

_____

Operating fluid: ○ Water-glycol % glycol: _____ %

○ Mineral oil ISO VG: _____

Viscosity at +10 °C: _____ cSt

Viscosity at +40 °C: _____ cSt

○ _____

Operating fluid temperature: Flow to consumer: _____ °C

Return from consumer:
(if required) _____ °C

Required cooling capacity: _____ kW

Flow rate
of operating fluid: _____ l/min

Pressure differential
of operating fluid: _____ bar at flow rate: _____ l/min

Max. permitted pressure: _____ bar

Ambient temperature: min.: _____ °C max.: _____ °C

Altitude: _____ m.ü.NN

Site: ○ Indoors ○ Outdoors

Cavity: Height: _____ mm Width: _____ mm Depth: _____ mm

Electrical data: Voltage: _____ V Frequency: _____ Hz

Control options of
operating fluid temperature: ○ None

○ Open-loop speed control (FLKS-xEC5), e.g. for outdoors

○ Closed-loop speed control (FLKS-xEC3)

Accessories:

- ○ Filling level and temperature switche
- ○ Filling level switch
- ○ Flow switch
- ○ Air filter
- ○ Air deflection
- ○ Other _____

Other requirements:

_____

_____

_____

_____

_____

_____

Quantity required per year: _____

Note

The information in this brochure relates to the operating conditions.

For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

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