



**FLEXIHEAT UK LTD**

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**LEO**  
**S1 | S2 | S3 | S3 NP / BMS**  
**L1 | L2 | L3 | L3 NP / BMS**  
**XL2 | XL3 | XL3 NP / BMS**  
**(INOX / ST)**

**FAN HEATER**  
TECHNICAL DOCUMENTATION OPERATION MANUAL

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## 1. APPLICATION

LEO heaters make up a decentralized heating system. The air streaming through the heat exchanger filled with hot water is warmed up. Fan heaters are used for heating large volume buildings: general, industrial and public buildings etc.

The casing of LEO heaters is made from extended polypropylene EPP. LEO in special version ST has a casing made from powder coated steel. The devices LEO in special version INOX have casing and air blades made of austenitic stainless steel.

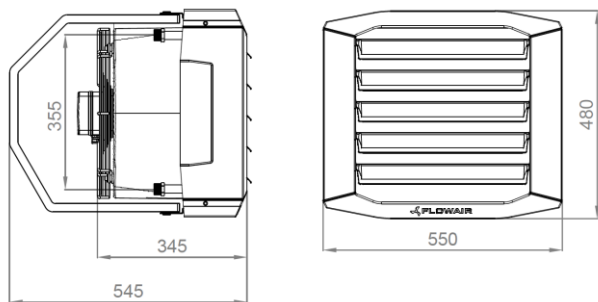
The devices are designed for indoor use where maximum air dustiness does not exceed  $0,3 \text{ g/m}^3$ . Units are built using copper, aluminum and galvanized steel. It is prohibited to install units in the areas where environment inside can causes in rusting. The devices can not be used in an environment where there is oil mist.

Water heat exchanger could be supply by water or glycol solution up to 60%. The heat exchanger tubes are made of copper. The feed medium should not cause corrosion of this material. In particular, the parameters as below should be provided.

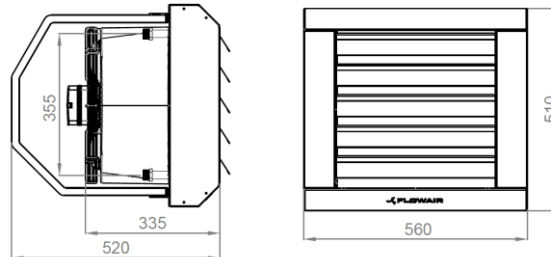
Parameter	Value
pH	7,5-9,0
Content of impurities	free of sediments/particles
Total hardness	$[\text{Ca}^{2+}, \text{Mg}^{2+}]/[\text{HCO}_3^-] > 0.5$
Oil and grease	<1 mg/l
Oxygen	<0.1mg/l
Bicarbonate, $\text{HCO}_3^-$	60-300 mg/l
Ammonium	< 1.0 mg/L
Sulphide	< 0.05 mg/L
Chloride, Cl	<100 mg/l

## 2. TECHNICAL DATA

### LEO S1 | S2 | S3 | S3 NP / BMS



### LEO S1 INOX / ST | S2 INOX / ST | S3 INOX / ST | S3 NP INOX / ST



	LEO S1			LEO S2			LEO S3   LEO S3 NP		
	III	II	I	III	II	I	III	II	I
Gear	III	II	I	III	II	I	III	II	I
Max airflow [m <sup>3</sup> /h]	2300	1900	1500	2000	1600	1250	1800	1400	1000
Power supply [V/Hz]	230/50								
Max current consumption [A]	0,5	0,4	0,3	0,6	0,4	0,3	0,6	0,4	0,3
Max power consumption [W]	120	90	70	130	90	70	130	90	70
IP/ Insulation class	54 /F								
Max acoustic pressure level [dB(A)]*	56,3	50,7	43,9	56,3	50,7	43,9	56,3	50,7	43,9
Horizontal range** [m]	16,0	13,0	10,0	14,0	11,0	8,5	12,5	9,5	7,0
Vertical range*** [m]	6,0	5,1	4,1	5,3	4,4	3,5	4,9	3,9	2,9
Max heating water temperature [°C]	120 (INOX / ST: 120) / LEO S3 NP: 70 (INOX / ST: 70)								
Max operating pressure [MPa]	1,6								
Connection	1/2"								
Installation	Indoor								
Max working temperature [°C]	60								
Device mass [kg]	9,5 (INOX: 13,1, ST: 13,1)			10,4 (INOX: 13,8, ST: 13,8)			10,8 (INOX: 14,3, ST: 14,3) LEO S3 NP: 10,5 (INOX: 14,0, ST: 14,0)		
Mass of device filled with water [kg]	10,2 (INOX: 13,8, ST: 13,8)			11,6 (INOX: 14,0, ST: 15,0)			12,2 (INOX: 15,7, ST: 15,7) LEO S3 NP: 11,5 (INOX: 16,4, ST: 16,4)		

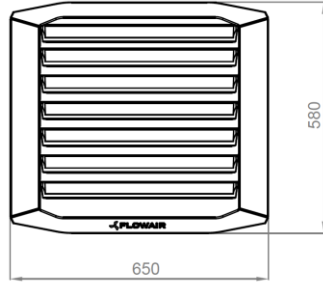
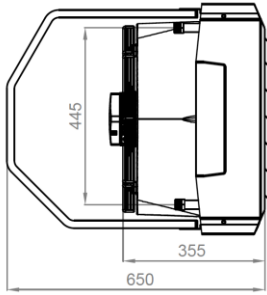
\* Acoustic pressure level has been measured 5m from the unit in a 1500m<sup>3</sup> space with a medium sound absorption coefficient

\*\* Horizontal isothermal range for 0,5 m/s border air stream speed

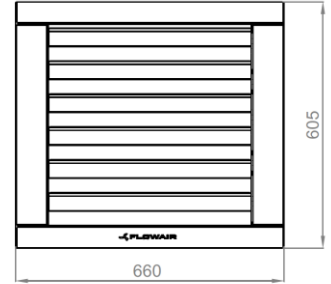
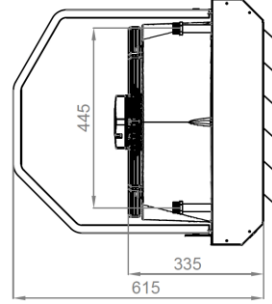
\*\*\* Vertical nonisothermal range for  $\Delta T = 5\text{°C}$  and for 0.5 m/s border air stream speed

## 2. TECHNICAL DATA

LEO L1 | L2 | L3 | L3 NP / BMS



LEO L1 INOX / ST | L2 INOX / ST | L3 INOX / ST | L3 NP INOX / ST



	LEO L1			LEO L2			LEO L3   LEO L3 NP		
	III	II	I	III	II	I	III	II	I
Gear	III	II	I	III	II	I	III	II	I
Max airflow [m <sup>3</sup> /h ]	4250	2800	1700	3800	2400	1400	3400	2100	1200
Power supply [V/Hz]	230/50								
Max current consumption [A]	1,4	1,2	0,6	1,5	1,2	0,6	1,5	1,2	0,6
Max power consumption [W]	330	240	120	340	240	120	340	240	120
IP/ Insulation class	54 / F								
Max acoustic pressure level [dB(A)]*	64,1	54,5	42,1	64,1	54,5	42,1	64,1	54,5	42,1
Horizontal range** [m]	24,0	15,0	9,5	21,5	13,0	8,0	19,0	11,5	6,5
Vertical range*** [m]	8,3	5,6	3,7	7,5	4,9	3,1	6,8	4,4	2,8
Max heating water temperature [°C]	120 (INOX / ST: 120) / LEO L3 NP: 70 (INOX / ST: 70)								
Max operating pressure [MPa]	1,6								
Connection	3/4"								
Installation	Indoor   Wewnętrzz pomieszczeń   Binnen   Внутри помещений								
Max working temperature [°C]	60								
Device mass [kg]	14,9 (INOX: 19,4, ST: 19,4)			16,2 (INOX: 20,8, ST: 20,8)			17,8 (INOX: 22,7, ST: 22,7) LEO L3 NP: 16,3 (INOX: 21,2, ST: 21,2)		
Mass of device filled with water [kg]	15,9 (INOX: 20,4, ST: 20,4)			18,2 (INOX: 22,8, ST: 22,8)			20,5 (INOX: 25,4, ST: 25,4) LEO L3 NP: 18,6 (INOX: 23,5, ST: 23,5)		

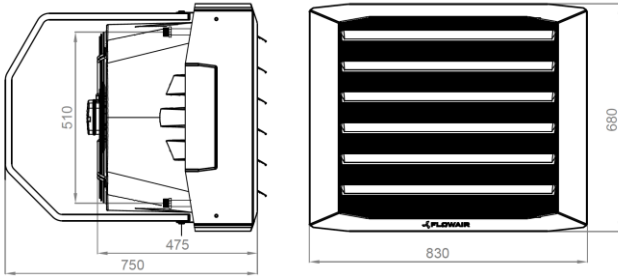
\* Acoustic pressure level has been measured 5m from the unit in a 1500m<sup>3</sup> space with a medium sound absorption coefficient

\*\* Horizontal isothermal range for 0,5 m/s border air stream speed

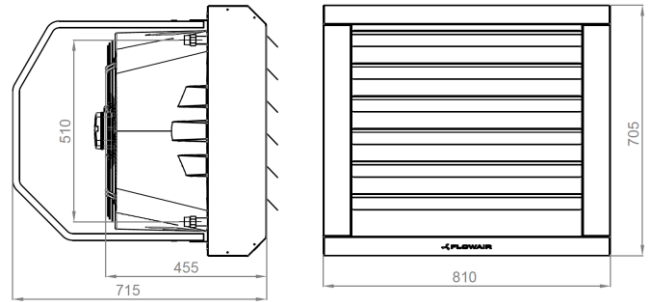
\*\*\* Vertical nonisothermal range for  $\Delta T = 5^{\circ}\text{C}$  and for 0,5 m/s border air stream speed

## 2. TECHNICAL DATA

### LEO XL2 | XL3 | XL3 NP / BMS



### LEO XL2 INOX / ST | XL3 INOX / ST | XL3 NP INOX / ST



	LEO XL2			LEO XL3   LEO XL3 NP		
	III	II	I	III	II	I
Gear	III	II	I	III	II	I
Max airflow [m <sup>3</sup> /h]	5800	4600	2900	5300	4100	2500
Power supply [V/Hz]	230/50					
Max current consumption [A]	2,3	1,8	1,4	2,4	1,8	1,4
Max power consumption [W]	520	370	270	550	370	270
IP/ Insulation class	54 /F					
Max acoustic pressure level [dB(A)]*	67,5	61,1	52,3	67,5	61,1	52,3
Horizontal range** [m]	26,0	20,5	13,0	23,5	18,0	11,0
Vertical range*** [m]	8,5	7,0	4,7	7,7	6,2	4,1
Max heating water temperature [°C]	120 (INOX / ST: 120) / LEO XL3 NP: 70 (INOX / ST: 70)					
Max operating pressure [MPa]	1,6					
Connection	3/4"					
Installation	Indoor					
Max working temperature [°C]	60					
Device mass [kg]	23,2 (INOX: 29,9, ST: 29,9)			26,2 (INOX: 34,2, ST: 34,2) LEO XL3 NP: 25,8 (INOX: 33,8, ST: 33,8)		
Mass of device filled with water [kg]	25,9 (INOX: 32,6, ST: 32,6)			30,3 (INOX: 38,3, ST: 38,3) LEO XL3 NP: 29,6 (INOX: 37,6, ST: 37,6)		

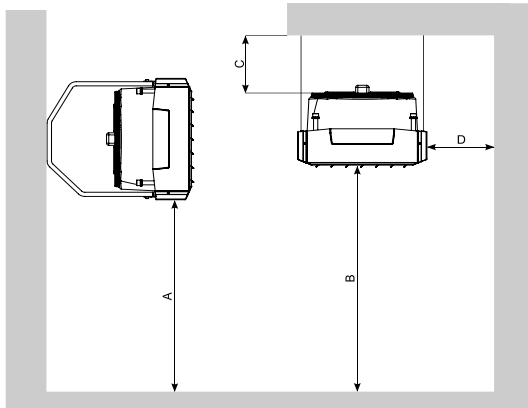
\* Acoustic pressure level has been measured 5m from the unit in a 1500m<sup>3</sup> space with a medium sound absorption coefficient

\*\* Horizontal isothermal range for 0,5 m/s border air stream speed

\*\*\* Vertical nonisothermal range for  $\Delta T = 5^{\circ}\text{C}$  and for 0,5 m/s border air stream speed

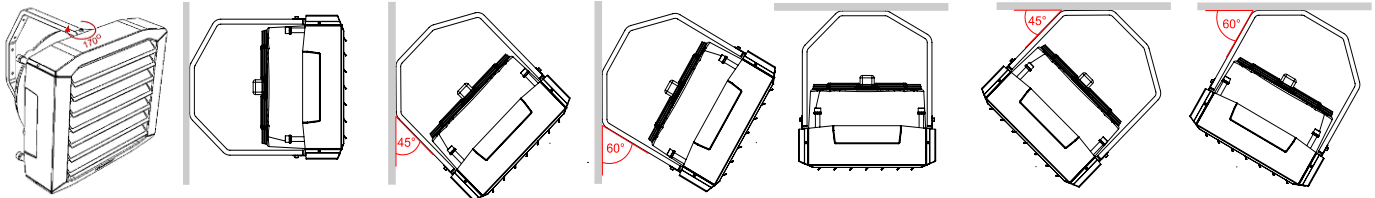
### 3. INSTALLATION

Fan heaters can be mounted to vertical or horizontal partitions in any position. During the montage, the minimal distances from the walls and ceiling have to be kept.

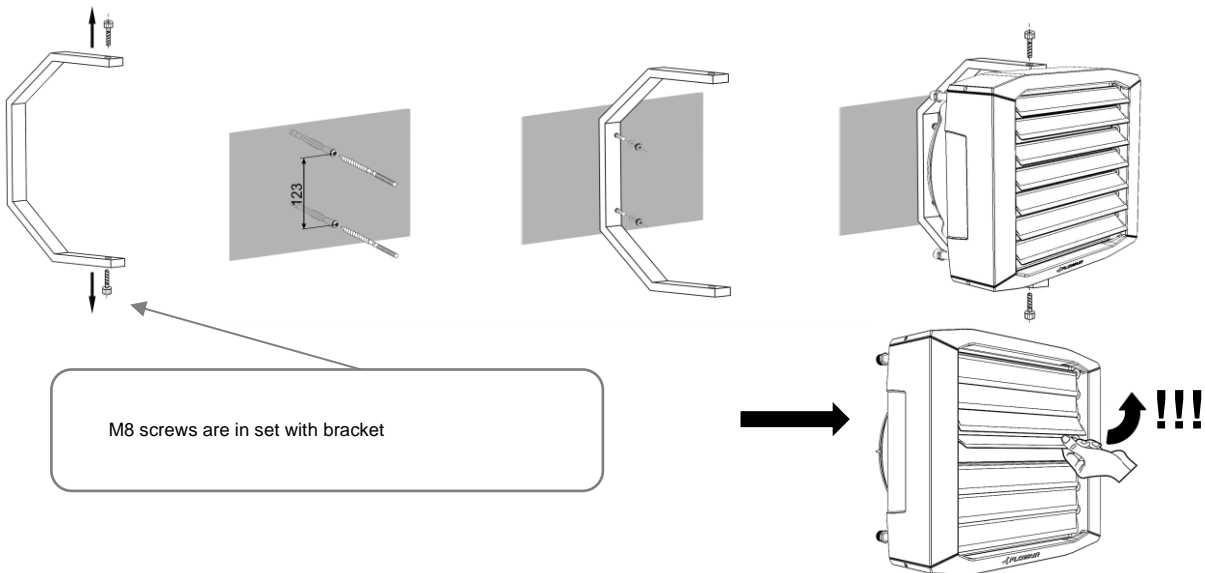


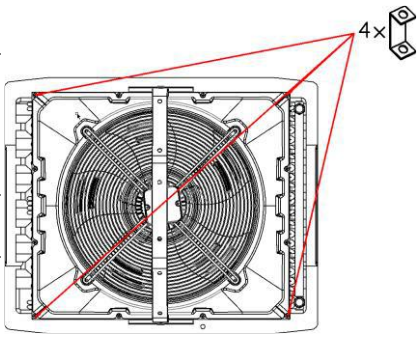
	S1	S2	S3   S3 NP	L1	L2	L3   L3 NP	XL2	XL3   XL3 NP
A	<3,0	<3,0	<3,0	2,5-8,0	2,5-8,0	2,5-8,0	2,5-8,0	2,5-8,0
B	2,5-7,0	2,5-6,0	2,5-6,0	2,5-9,5	2,5-8,5	2,5-8,0	2,5-9,5	2,5-9,0
C	>0,3	>0,3	>0,3	>0,3	>0,3	>0,3	>0,3	>0,3
D	>0,5	>0,5	>0,5	>0,5	>0,5	>0,5	>0,5	>0,5

#### 3.1. INSTALLATION –BRACKET



#### 3.2. ASSEMBLY INSTRUCTIONS



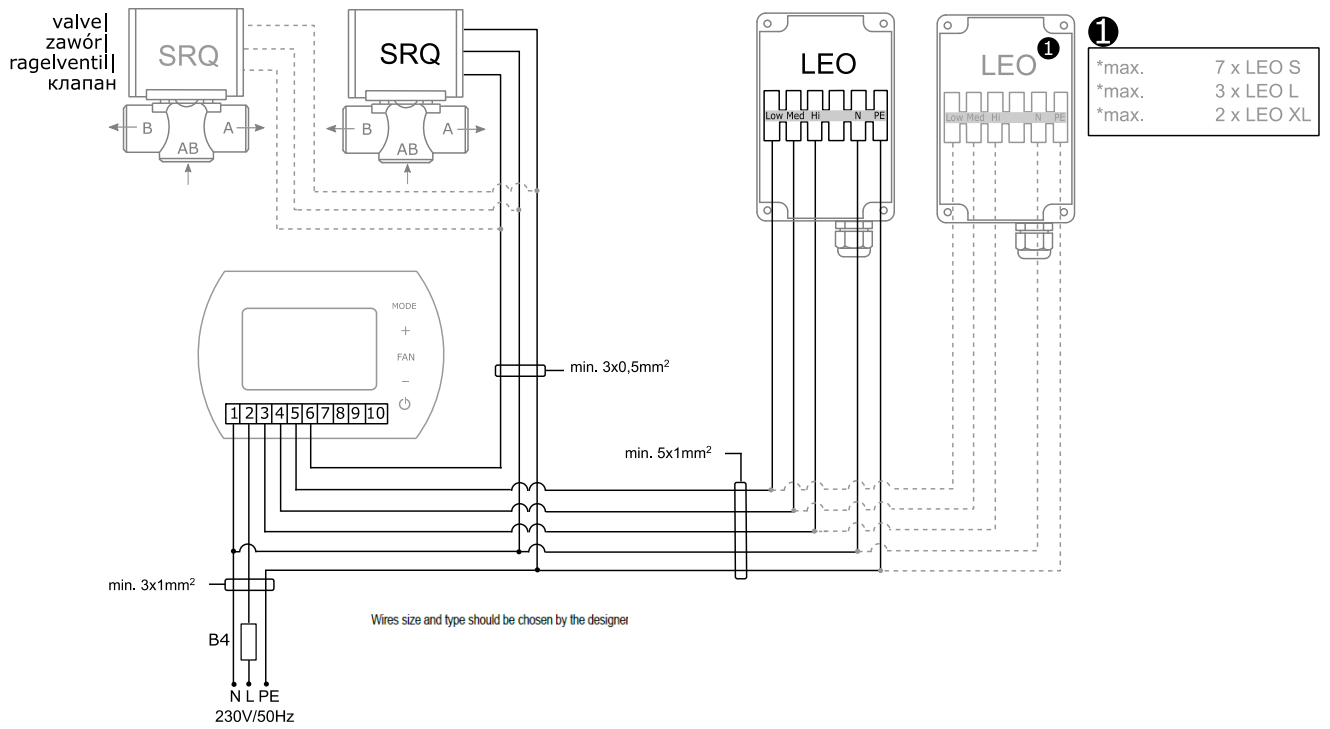
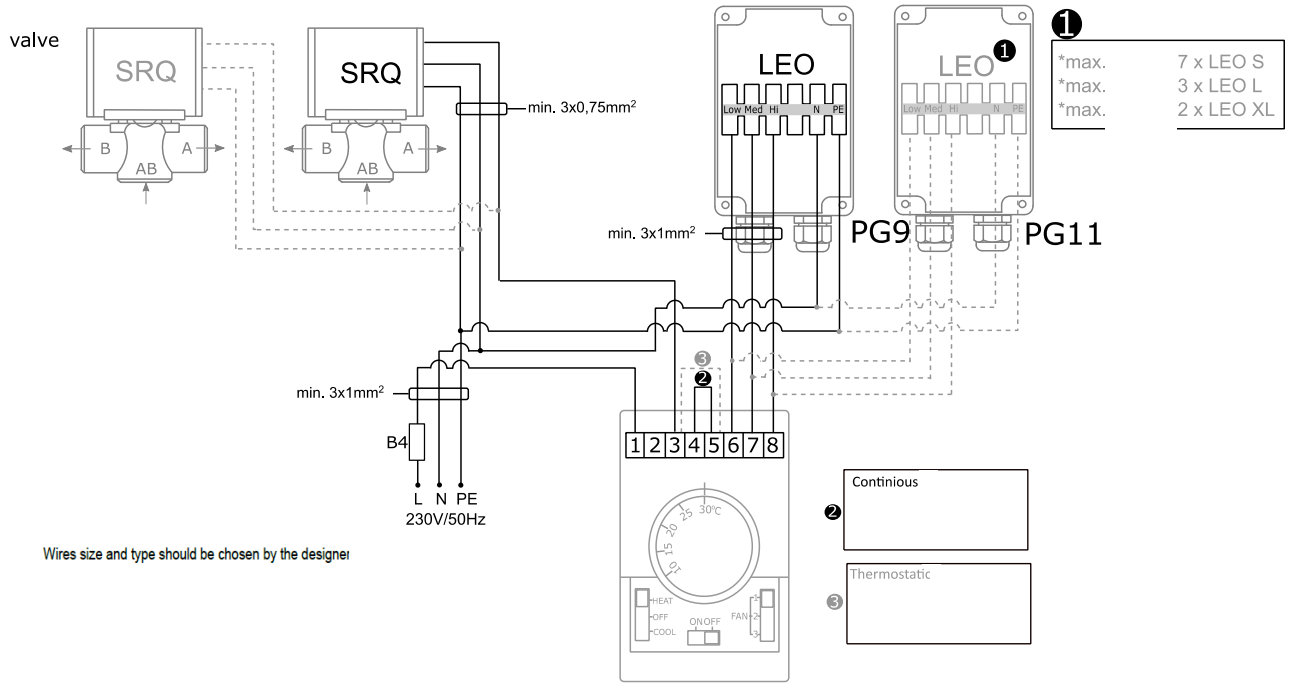


### 3.3 U-PROFILES (optional)

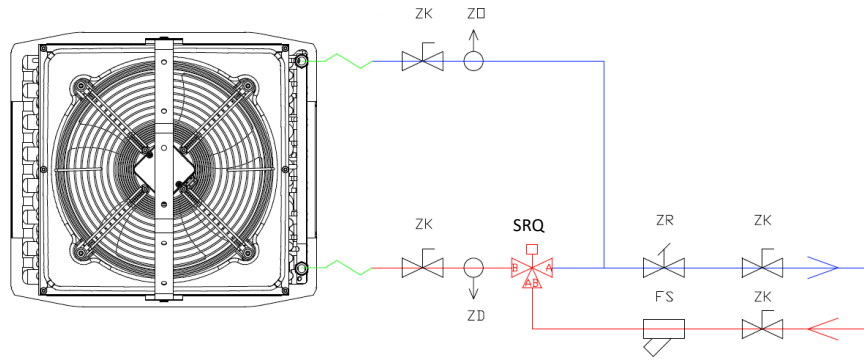
U-profiles should be mounted in corners as drawing shows. It is not allowed to screw profiles in other places.

## 4. CONNECTION DIAGRAMS

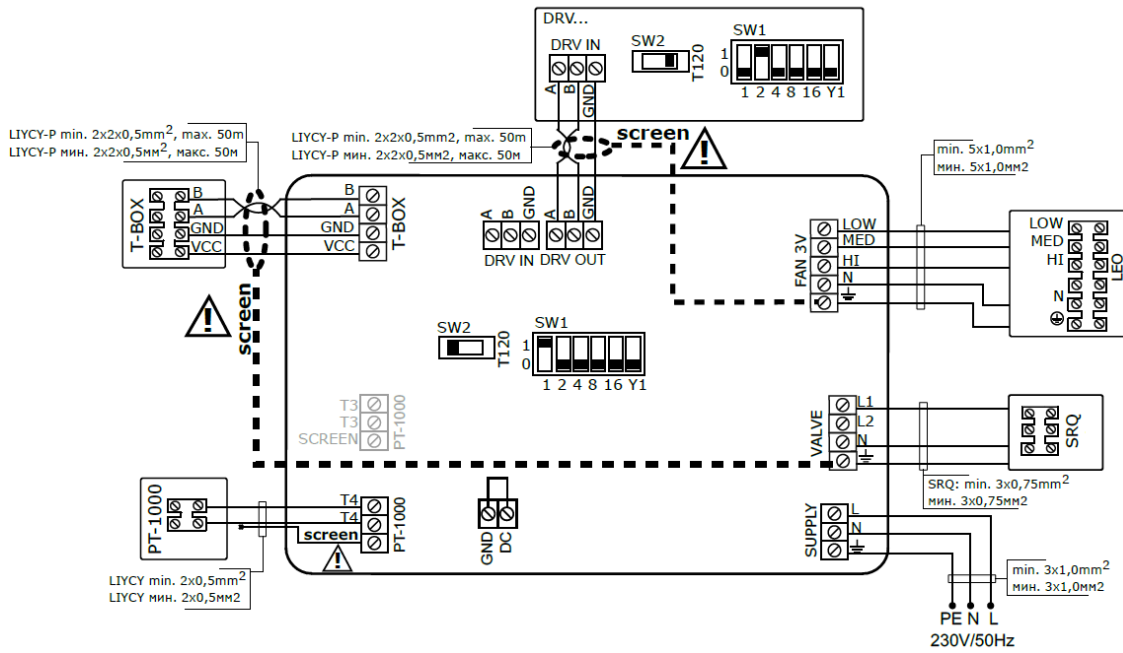
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#### 4. CONNECTION DIAGRAMS



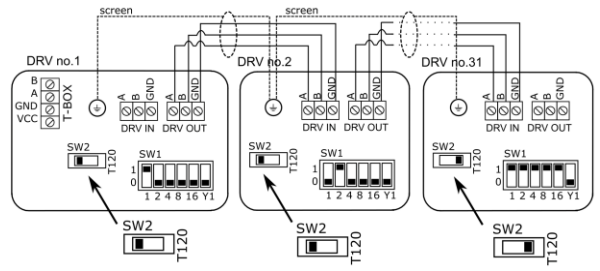
BMS

Glands	6 x PG9 + 2 x PG 11
Wires size and type should be chosen by the designer.	

When connecting DRV modules to the T-box controller or BMS, you have to binary set addresses on each (each DRV must have individual address) DRV module by DIP-switch SW1. To address modules check if the power supply is turned off, than set then the addresses as shown in the table, than turn on the power supply .]

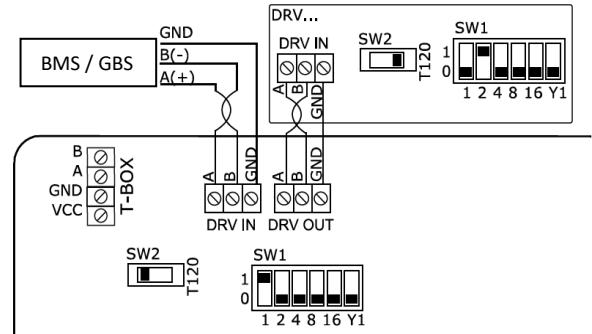
DRV no.	1	2	3	4	5	6
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
...						
31	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5	6
	1	2	4	8	16	Y1

It is possible to connect up to 31 modules DRV and control them with one T-box controller .]



DRV modules can be connected to the BMS (Building Management System).

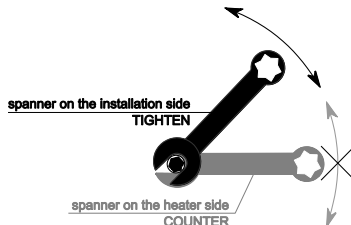
**WARNING:** The connection must be carried out with 3-wire (recommended UTP) to connectors DRV IN



## 5. START-UP AND OPERATION

### Guidelines for System Connection

- It is recommended to use flexible hoses on the water exchanger connections.
- It is recommended to install vent valves at the highest point of the system.
- The system should be executed so that, in the case of a failure, it is possible to disassemble the device. For this purpose it is best to use shut-off valves just by the device.
- The system with the heating medium must be protected against an increase of the heating medium pressure above the permissible value (1.6 MPa).
- While screwing exchanger to pipeline - connecting stubs has to be hold by wrench.



### Start Up

- Before connecting the power supply check the correctness of connection of the fan motor and the controllers. These connections should be executed in accordance with their technical documentation.
- Before connecting the power supply check whether the mains voltage is in accordance with the voltage on the device data plate.
- Before starting the device check the correctness of connection of the heating medium conduits and the tightness of the system.
- The electrical system supplying the fan motor should be additionally protected with a circuit breaker against the effects of a possible short-circuit in the system.
- Starting the device without connecting the ground conductor is forbidden.

### Operation

- The device is designed for operation inside buildings, at temperatures above 0°C. In low temperatures (below 0°C) there is a danger of freezing of the medium.

**The manufacturer bears no responsibility for damage of the heat exchanger resulting from freezing of the medium in the exchanger. If operation of the device is expected at temperatures lower than 0°, then glycol solution should be used as the heating medium, or special automatic systems should be used for protecting against freezing of the medium in the exchanger.**

- It is forbidden to place any objects on the heater or to hang any objects on the connecting stubs.
- The device must be inspected periodically. In the case of incorrect operation of the device it should be switched off immediately.

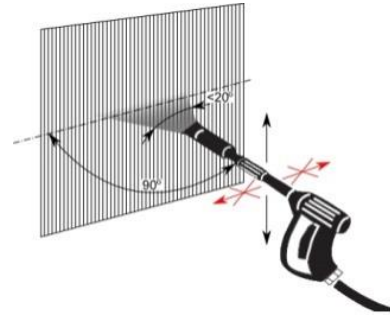
**It is forbidden to use a damaged device. The manufacturer bears no responsibility for damage resulting from the use of a damaged device.**

- If it is necessary to clean the exchanger, be careful not to damage the aluminium lamellas.
- For the time of performing inspection or cleaning the device, the electrical power supply should be disconnected.
- In case water is drained from the device for a longer period of time, the exchanger tubes should be emptied with compressed air.
- It is not allowed to make any modification in the unit. Any modification causes in warranty loss.
- 

### Periodic inspections

To keep proper technical parameters Flowair recommends periodic service (every 6 months) of fan heaters on behalf of the user. During inspections user should:

- Check heat exchanger, if is it filled with dirt or dust. If necessary - use pressurized air stream to clean the exchanger's lamellas,



- Check heat exchanger, if is it filled with dirt or dust. If necessary - use pressurized air stream to clean the exchanger's lamellas,
- Check fan blades, in case of dirt use damp cloth and remove dirt,
- Check bracket installation,
- Check heat exchanger and hydraulic connection correctness,
- Check wires insulation,
- Check power supply,
- Check medium flow,
- Check levelling of the unit.

## **6. SERVICE AND WARRANTY TERMS**

**Please contact your dealer in order to get acquainted with the warranty terms and its limitation.**

In the case of any irregularities in the device operation, please contact the manufacturer's service department.

**The manufacturer bears no responsibility for operating the device in a manner inconsistent with its purpose, by persons not authorised for this, and for damage resulting from this!**

**Made in Poland**

## 7. CONFORMITY WITH WEEE DIRECTIVE 2012/19/UE

Running a business without harming the environment and observing the rules of proper handling of waste electrical and electronic equipment is a priority for FLOWAIR.

The symbol of the crossed out wheeled bin placed on the equipment, packaging or documents attached means that the product must not be disposed of with other wastes. It is the responsibility of the user to hand the used equipment to a designated collection point for proper processing. The symbol means at the same time that the equipment was placed on the market after August 13, 2005.

**For information on the collection system of waste electrical and electronic equipment, please contact the distributor.**

### **R E M E M B E R :**

Do not dispose of used equipment together with other waste! There are financial penalties for this. Proper handling of used equipment prevents potential negative consequences for the environment and human health. At the same time, we save the Earth's natural resources, reusing resources obtained from the processing of equipment.

**COMMISSION REGULATION (EU) 2016/2282**
**Contact details:**

FLOWAIR GŁOGOWSKI I BRZEZIŃSKI SP.J., ul. Chwaszczyńska 135, 81-571 Gdynia

**Information relevant for disassembly, recycling and/or disposal at end-of-life:**

Unassembly should be carried out by a person with appropriate authorizations. After disassembly, waste should be segregated:

housing: made of EPP or steel or INOX - recyclable

heat exchanger: copper, aluminum, steel - recyclable

fan: dispose of in accordance with the rules for the disposal of electrical equipment"

**Unit name:** LEO

**Capacity control:** 3-speed

Model	Item	Symbol	Value	Unit
LEO S1	Heating capacity	$P_{\text{rated,h}}$	2,7**	kW
LEO S2			5,7**	
LEO S3			7,0**	
LEO S3 NP			7,1**	
LEO L1			6,9**	
LEO L2			10,8**	
LEO L3			13,9**	
LEO L3 NP			14,0**	
LEO XL2			20,2**	
LEO XL3			25,7**	
LEO XL3 NP			26,1**	

\*\* heating capacity for parameters: inlet water temp. 45°C, water temperature drop 5°C, room air temp. 20°C.

Model	Item	Symbol	Value	Unit
LEO S1	Total electric power input	$P_{\text{elec}}$	0,12	kW
LEO S2			0,13	
LEO S3   S3 NP			0,13	
LEO L1			0,33	
LEO L2			0,34	
LEO L3   L3 NP			0,34	
LEO XL2			0,52	
LEO XL3   XL3 NP			0,55	

Model	Item	Symbol	Value	Unit
LEO S1	Sound power level	$L_{\text{WA}}$	71,4	dB
LEO S2			71,4	
LEO S3   S3 NP			71,4	
LEO L1			79,2	
LEO L2			79,2	
LEO L3   L3 NP			79,2	
LEO XL2			82,6	
LEO XL3   XL3 NP			82,6	

