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INSTALLATION

T-box controller has a built-in sensor for measuring air temperature in the room. To ensure proper measurements, the controller should be installed at a height of approx. 1.5 m above the ground in a place with good air circulation. Do not place it near heat sources, lighting, air inlets, windows and door openings, etc.

If temperature sensor was chosen in a T-Box menu as "installed in unit", T-box controller can be mounted out of area i.e. technical room.



NAVIGATION



TECHNICAL DATA

Name	Description		
Name	Description		
Power supply	24 VDC		
Way of control	touch screen		
Temperature adjustment range	+5 ÷ +45°C		
Operating temperature range	0 ÷ +60°C		
Temperature sensor	built-in		
Protection degree	IP20		
Installation	on the wall		
Casing	ABS plastic, RAL 9003		
Max. number of connected units	31		
Dimensions (HxWxD)	130 x 115 x 35 mm		

Adress:10 O SW I Adress:11 LIYCY-P min. 2x2x0,5 mm² A and B braided wire pair Adress:12 SW1 DRV control module Adress:13 BMS T-box SW1 T-box FIDDOOD O GND VCC Adress:14 1 2 4 8 16 Y1 SW2 Adress:15 Adress:16 max. 50 m screen In the case, when T-box in BMS network is the

last device, SW1 switch should be set in T120 position.

DRV - SW1 ADDRESS SETTING



FIRST RUN





active language







Setting of desired temperature.

14.01.2015

found. If not, check:

different address.

power supply of the unit,

A-A, B-B,

· correct connection of communication signal

· correct setting of addresses, each unit must have

• if in the last unit dip-switch SW2 is set in T120 position.

MAIN SCREEN



O^o long Main menu



Enter to the menu after entering the password: 2014









Setting of time

04-01 Date



Setting of date

🗟 Calendar

- · For each day you can set up to 20 on/off events,
- · Start time of new event is also the end time of previous event,
- For each event you can set any temperature for units, in the range of $5-45^\circ\text{C},$
- For each event you can set for KM an air flow and dampers opening degree, for OXeN an air flow,
- Events for each day can be set individually or can be copied from day, which was already set.

Activation of calendar is signalized on main screen via following icons:



calendar active – SYSTEM ON



calendar active – SYSTEM OFF



calendar active – settings forced.

There were ad hoc set other parameters than the settings programmed in the calendar:

- desired temperature,
- · air flow for OXeN,
- air flow or dampers opening degree for KM,
- system were OFF and was turned on (to turn on the system press and hold for 2 s the calendar icon on main screen),
- system were ON and was turned off (to turn off the system press and hold for 2 s the calendar icon on main screen).

Ad hoc settings stays as long as time of current event in calendar. With start of next event, units will operate according to programmed settings.







activation/deactivation of calendar



adding the event



copying events on the following days



removing the events



moving to the next day



event – system ON



event – system OFF





In given example SYSTEM will be turned on at 6:15 and the units will maintain temp. 12° C.

SYSTEM WILL OPERATE USING CURRENT SETTINGS UNTIL NEW EVENT WILL BE SET.

KM – additional settings for KM group OXeN – additional settings for OXeN group



For KM it is possible to set an air flow and dampers opening degree in current event.



When the dampers are closed (no ventilation), it is possible to select the operating mode of the Cont. fan after reaching desired temperature. Fan can operate continuously or be turned off.



For OXeN it is possible to set an air flow in current event.

Calendar – Adding the OFF event



In given example units will be turned off at 16:00. SYSTEM WILL BE TURNED OFF UNTIL THE NEXT EVENT, ACCORDING TO CALENDAR SETTINGS.

Calendar – Copying events



Calendar – Removing events



🖳 Language









searching for units integrated with system

- active unit
- deactivated unit – not operating

System information

LEO M 01 CURTAIN DRV-V 2.1 2.0.0-2d-....

1



long press displays the DRV software

MAIN





Restore default settings.





Automatic protection against too low temperature in the room. When temperature in the room drops below desired temperature, LEO and KM units are turned on:

- · valves (if installed) opens,
- fan is turned on at 100% of efficiency,
- · KM dampers are closed, unit operates using recirculating air.

Units operate until the temperature in the roomis higher of 1°C than antifreeze temperature, protecting the hall against too low temperature inside and freeze of heating medium in the exchanger.

Leading sensor





leading sensor is the sensor built in T-box controller



leading sensor is the local sensor. When it is selected, operation of each unit is regulated locally

The correction of sensor measurements is also possible.





To activate the lock:

- 1. Set password
- 2. Confirm OK

Free 4-digit password can be set.

After returning to main screen and 30s of inactivity, controller will be locked automatically.





SYSTEM enables cooperation with external detectors of CO₂ sensors, humidity sensors etc. – two-step alarm signal. Air flow setting of KM and OXeN and dampers settings of KM will be automatically changed depending on alarm signal.

Detectors should be connected to one of the DRV KM or DRV OXeN control module.

It should be noted in the menu to which DRV module detectors is connected.

In given example detectors is connected to DRV KM no. 7.



System information

System information



T-box 2.0.10 Compilation 2.0.10-0-gd25434f IDX 10799

25-05-2016

Basic information about software and hardware version.

BMS – settings



ID - setting unit adress: from 1 to 247 BAUD - setting data transmission speed: from 9600 to 230400 bit/s Physical layer: Modbus RTU Protocol: RS485



short **LEO-type fan heaters**



° Operating modes





active operating mode

heating – heating medium valve is opened when measured temperature is lower than desired temperature



cooling – heating medium valve is opened when measured temperature is higher than desired temperature



ventilation - valve is constantly closed, fan operates continuously at selected speed



Auto – automatic fan regulation depending on desired and measured temperature



Manual – fan operates with constant, selected speed

Air flow setting





air flow setting during operation in manual mode



In MANUAL mode after reaching desired temperature fan can operate continously on

selected step: 1, 2, 3 or be turned off - select OFF.



Automatic air flow regulation according to desired and measured temperature, manual air flow regulation is not possible - inactive menu.



In AUTO mode after reaching desired temperature fan can operate continously on selected step: 1, 2, 3 or be turned off - select OFF.



LEO Destratification			ON	Э
_	₿ °	5°C	+	
LEO				ок

LEO heaters can optionally operate in destratification mode (only heaters installed under the ceiling). When the measured temperature drops to the set temperature only fan starts. When the heat under the ceiling is not enough, and the temperature continues to decline (-1°C from the setpoint) valve will open.

The heater must be equipped with T3 sensor (optional equipment).

- ON
- activation of destratification mode
- **5°**℃
- setting of temperature difference (difference between temperature under the ceiling and temperature in the occupied zone), at which LEO heaters will be turned on



selection of heaters, which should operate in destratification mode





heater activated for operation in destratification mode





To read temperatures near the unit, external temperature sensors PT-1000 must be connected to DRV control module.

O short press	LEO COOL -type fan coo	oler / h	eater
LEO CO Settings			Ь
	2 2	O °	
LEO COOL			
4 2	air flow setting – 3-ste	ps	
O ^o selec	tion of operating mode	9	
🔋 readir	ngs		

° Operating modes





active operating mode

heating - heating medium valve is opened when Ш measured temperature is lower than desired temperature



cooling - heating medium valve is opened when measured temperature is higher than desired temperature



ventilation - valve is constantly closed, fan operates continuously at selected speed



Auto - automatic fan regulation depending on desired and measured temperature



Manual - fan operates with constant, selected speed

Air flow setting





air flow setting during operation in manual mode



In MANUAL mode after reaching desired temperature fan can operate continously on selected step: 1, 2, 3 or be turned off - select OFF.



Automatic air flow regulation according to desired and measured temperature, manual air flow regulation is not possible - inactive menu.



In AUTO mode after reaching desired temperature fan can operate continously on selected step: 1, 2, 3 or be turned off - select OFF.





To read temperatures near the unit, external temperature sensors PT-1000 must be connected to DRV control module.



LEO EL Setting				5		O EL perati
	4	2	0°			<u> </u>
LEO EL	<u> </u>	2				ર
4 2	air flow set	ting – 3-ste	eps			activ
<u>∭</u> 2	heating po	ower setting	9		<u> 111</u>	heati
O ^o selec	tion of ope	rating mod	e			•
🧮 destra	atification					
🔋 readir	ngs				ঝ	venti

° Operating mode



at selected speed continuously







air flow setting during operation in manual mode



In MANUAL mode after reaching desired temperature fan can operate continously on selected step: 1, 2, 3 or be turned off - select OFF.

Heating power w.









LEO heaters can optionally operate in destratification mode (only heaters installed under the ceiling). When the measured temperature drops to the set temperature only fan starts. When the heat under the ceiling is note nough, and the temperature continues to decline (-1°C from the setpoint) heaters are ON.

The heater must be equipped with T3 sensor (optionalequipment).

- ON
- activation of destratification mode



setting of temperature difference (difference between temperature under the ceiling and temperature in the occupied zone), at which LEO heaters will be turned on



selection of heaters, which should operate in destratification mode





heater activated for operation in destratification mode





Temperature under the ceiling

Temperature under the ceiling



Chosed of heating power

To read temperatures near the unit, external temperature sensors PT-1000 must be connected to DRV control module.



^{short} KM mixing chambers









active operating mode

- **heating** valve is opened when measured temperature is lower than desired temperature



cooling – valve is opened when measured temperature is higher than desired temperature



ventilation – valve is constantly closed, fan operates continuously at selected step

Air flow setting 2



air flow setting – 3-steps

Appearance of this icon informs that the air flow setting has been defined in the calendar. It is possible to change it ad hoc only. Change will only be active in given calendar zone.



When the dampers are closed (no ventilation), it is possible to select the operating mode of the fan Cont. after reaching desired temperature. Fan can operate continuously or be turned off.

Air flow setting – gas detector



Operation with gas detector should be activated - see point "External gas detector" on page 66.

Three values of air flow should be defined:

- normal operation status
- 1 first step of alarm from gas detector
- · 2 second step of alarm from gas detector

Campers setting



Ċ.

Appearance of this icon informs that the air flow setting has been defined in the calendar. It is possible to change it ad hoc only. Change will only be active in given calendar event.



When the dampers are closed (no ventilation), it is possible to select the operating mode of the fan after reaching desired temperature. Fan can operate continuously or be turned off.





Operation with gas detector should be activated – see point "External gas detector" on page 66.

Three values of air flow should be defined:

- normal operation status
- 1 first step of alarm from gas detector
- 2 second step of alarm from gas detector







NEDERLANDS РУССКИЙ ENGLISH

Filters operating time counter



After reaching the limit of working hours, there will be displayed an indication in alarm menu. Value must be reset. Alarm does not affect the operation of the unit.

Filters operating time limit



Value should be set according to building contamination level.







active temperature sensor

╔╗╧

Leading sensor is the ambient air temperature sensor (built in T-box or local, near the unit). When temperature in the room is not reached, SRX3d valve is open in 100%. When temperature in the room is reached, flow of heating medium is regulated in such way, that the supply air temperature is equal to set temperature.

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ß
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Leading sensor is the supply air temperature sensor. Controller will maintain supply air temperature set on the main screen, thanks to regulation of the flow of heating medium by SRX3d valve opening degree.

+ correction of air temperature set on main screen





active setting

- roof fan change air volume according to present dampers opening level and air flow of LEO heater
- roof fan change air volume according to present dampers opening level

Setting ",0%" means balance between air removed by roof fan and supplied by KM heater.

Positive value means that the roof fan removes more air than the KM supplies (under-pressure). Setting "+100%" means continuous operation of the roof fan.

Negative value means that the roof fan removes less air than the KM supplies (overpressure). Setting "-100%" means operation of the KM only.





Automatic setting of dampers opening level according to external air temperature.

Value set here is overriding normal damper setting and setting in calendar.







settings of manual operating mode

settings of auto operating mode





Auto – integration of operation of destratificators with LEO heaters and effective use of heat from upper zones of the room. Destratificators are turned on automatically, when there is suitable amount of heat accumulated in the upper zones of the room. Units press of warm air down to occupied zone. When amount of heat is insufficient, LEO heaters are turned on automatically.



Manual – destratificator operates in ON/OFF mode. It is turned on when temperature under the ceiling is higher than set temperature.





To read temperatures near the unit, external temperature sensors PT-1000 must be connected to DRV control module.





Setting of temperature difference (difference between temperature under the ceiling and temperature in the occupied zone), at which LEO D units will be turned on.

💒 Settings of manual operating mode



Destratificator operates in ON/OFF mode. It is turned on when temperature under the ceiling is higher than set temperature.



short press ROBUR gas heaters





operating modes



readings



thermal protection settings







active operating mode

<u>111</u>
Auto

heating mode – burner and fan is working according to temperature



power depending on the measured temperature

heating-manual – manual selection of the burner power



ventilation mode - fan is working continuously, burner is OFF

OFF unit is OFF




burner power setting in heating-manual mode

in heating operation mode after reaching the set A temp. the fan may work continuously - ON or be turned off - OFF Cont.

Readings



Thermal protection





temperature ready for restart





outlet air temp., STB protection.

temperature in the room



OK

Auto

Manual



burner power setting in heating-manual mode

in heating operation mode after reaching the set temp. the fan may work continuously - ON or be Cont. turned off - OFF

Readings

A



:0 Dampers setting



ting has been defined in the calendar. It is possibleto change it ad hoc only. Change will only be active ingiven calendar zone.



damper setting in heating mode



damper setting in heating-continues mode



outlet air temp., STB protection.

external temperature

temperature in the room



dampers opening degree

ON - automatic setting of dampers according to external temperature is active.



max. operating temperature

() temperature ready for restart

Filters operating time counter



After reaching the limit of working hours, there will bedisplayed an indication in alarm menu. Value must be reset. Alarm does not affect the operation of the unit.

Filters operating time limit



Value should be set according to building contamination level.





Setting "0%" means balance between air removed by roof fan and supplied by ROBUR KM heater.

Positive value means that the roof fan removes more air than the ROBUR KM supplies (under-pressure). Setting "+100%" means continuous operation of the roof fan.

Negative value means that the roof fan removes less air than the ROBUR KM supplies (overpressure). Setting "-100%" means operation of the ROBUR KM only.





Automatic setting of dampers opening level according to external air temperature. Value set here is overriding normal damper setting andsetting in calendar.



o^o short ELiS air curtains

-					
ELiS Settings					
		A	2	O°	
EL	.iS				
			<u>≯∭</u>	C	
ঝ	2	air flow se	etting – 3-st	eps	
O°	sele	ection of operating mode			
Ŀ	setting of delay times				
	readings				
<u>≯∭</u>	antifreeze				

Operating modes

ELiS Operating mode				С			
<u>}</u>	<u>}</u>	K1					
	ર	K2					
				ок			
active operating mode							
K1	K1 air curtain operates according to door sensor and thermostat, whose priority is equivalent						
K2	air curtain operates according to door sensor and thermostat. Door sensor has a priority. Without it's signal unit will not run						
<u> </u>	heating – valve is opened when measured temperature is lower than desired temperature						
ব	ventilation – valve is constantly closed, fan operates continuously at selected step						

Air flow setting





air flow setting



After the disappearance of signal from the door sensor (or thermostat if K1 mode is activated), fan of air curtain can operate on selected step for a specified period of time or be turned off - select OFF.

Setting of delay time



ENGLISH



Fan switch off delay time – it can be set in the range 0:00 - 10:00 minutes, every 0:30s. It is possible to set ∞ value, then fan operates continuously.



> Valve switch off delay time - it can be set in the range 0:00 - 10:00 minutes, every 0:30s. It is possible to set ∞ value, then valve is constantly open.

Valve delay time must be shorter than fan delay time.





Antifreeze protection of the heat exchanger. When temperature in the room drops below desired temperature fans stops and valve is open to 100%. The unit must be equipped with T3 sensor (optional equipment).

Readings



To read temperatures near the unit, external temperature sensors PT-1000 must be connected to DRV control module





- 2↓ 2 air flow setting for air curtain part – 3-steps
- **↓**→ 2 air flow setting for fan heater part – 3-steps



selection of operating mode



- readings
- 311 antifreeze





active operating mode

- k1 air curtain operates according to door sensor and thermostat, whose priority is equivalent
- K2 air curtain operates according to door sensor and thermostat. Door sensor has a priority. Without it's signal unit will not run
- **heating** valve is opened when measured temperature is lower than desired temperature
- ventilation valve is constantly closed, fan operates continuously at selected step

Fan heater operates always according to temperature set on the controller, regardless K1/K2 mode.

Air flow setting





OFF.

After the disappearance of signal from the door sensor (or thermostat if K1 mode is activated), fan of air curtain can operate on selected step for a specified period of time or be turned off - select





air flow setting



After reaching desired temperature fan of the heater can operate continously on selected step: 1, 2, 3 or be turned off - select OFF.

Setting of delay time





Generation off delay time can be set in the range 0:00 - 10:00 minutes, every 0:30s. Value ∞ - fan operates continuously.



Valve switch off delay time can be set in the range 0:00 - 10:00 minutes, every 0:30s. Value ∞ - valve is constantly open.





Antifreeze protection of the heat exchanger. When temperature in the room drops below desired temperature fans stops and valve is open to 100%. The unit must be equipped with T3 sensor (optional equipment).

Readings



To read temperatures near the unit, external temperature sensors PT-1000 must be connected to DRV control module.











active operating mode

₩ t

Operation with heat recovery – operation in this mode ensures heat or cool recovery from removed air



Operation without heat recovery – supply air is directed via by-pass without heat recovery ("freecooling"/"free-heating").



Automatic change of operating mode with or without heat recovery, depending on temperature

Air flow setting 2



Appearance of this icon informs that the air flow setting has been defined in the calendar. It is possible to change it ad hoc only. Change will only be active in given calendar event.

Air flow setting – gas detector



Operation with gas detector should be activated - see point "External gas detector" on page 66.

Three values of air flow should be defined:

- normal operation status
- 1 first step of alarm from gas detector
- 2 second step of alarm from gas detector

















Set the required alarm value, where 1 means an alarm a small filter pollution, 5 means an alarm a very pollution filter.





INGLISH

active temperature sensor

- Leading sensor is the ambient air temperature ਗਿ⁼ sensor (built in T-box or local, near the unit). When temperature in the room is not reached, SRX3d valve is open in 100%. When temperature in the room is reached, flow of heating medium is regulated in such way, that the supply air temperature is equal to set temperature.
- ମ୍ଚ

Leading sensor is the supply air temperature sensor. Controller will maintain supply air temperature set on the main screen, thanks to regulation of the flow of heating medium by SRX3d valve opening degree.

+ correction of air temperature set on main screen

O shor pres	t OXeN EL heat recovery units	O°	° Operating modes		
OXeN I Setting			eN EL erating mode		
	♣ 100% ()				
OXeN EL	<u>₹₹₹</u> 3	1			
			ок		
ર 100%	airflow setting - only 100%		Activ operating mode		
<u>₩</u> 3	heating power setting	~~	Operation with heat recovery – operation inthis mode ensures heat or cool recovery fromremoved air		
O°	operaing modes	X			
	readings	<u>ب</u> ارک	Operation without heat recovery – supply airis directed via by-pass without heat recovery("freecooling"/"free-heating").		
	filters operating status				
••	this icon inform that dampers are duringchange of position, fan are stopped this icon inform also that fans cooling the	NUTO	automatic setting of heating power		
	heater		manual setting of heating power		







Heating power



 Heating power setting: 3 − 8,5 kW 2 − 5,5 kW 1 − 3,5 kW

Control of the filters pollution



Control of the filters pollution



Set the required alarm value, where 1 means an alarm a small filter pollution, 5 means an alarm a very pollution filter.







warnings

- Gas sensor: level 1 signal from gas detector, level I
- Gas sensor: level 2 signal from gas detector, level II
- Antifreeze heat recover exchanger ON antifreeze mode of heat recovery exchanger is on
- Filter work time check filters contamination level
- Filter presure dirty filter of KM, change the filter, if pressure switch is not applied make a bridge (jumper) between PRDN IN and GND
- Forcing damper ON forcing damper settings depending on the outside temperature



alarms

- Real time clock error set the T-box time again
- Temperature sensor T1/T2/T3/T4/T5 check temperature sensor
- Roof fan fuse check fuse of roof fan in DRV module
- Roof fan TK thermal protection alarm of roof fan
- Fan 3V fuse check fuse of fan of LEO heater in DRV module
- Fan EC fuse check fuse of FC fan in DRV module
- Fan EC not connected check connection of EC fan
- Antifreeze water exchanger ON antifreeze mode of water heat exchanger is on

I ist of alarms

Alarms LEO 04

Filters

Connection error Temperature sensor T1

DRV group error

Addressing failure. Check binary address set in DRV and use search button again

Connection error

no communication between DRV and T-box, check connection and DRV power supply

 DUO heater not connected no communication between DRV of fan heater part of ELiS DUO, check connection between DRV of air curtain part and DRV of fan heater part



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Declaration Of Conformity UE

FLOWAIR hereby declare that the T-box controller were produced in accordance to the following Europeans Directives:

2014/30/UE – Electromagnetic Compatibility (EMC)

2014/35/UE – Low Voltage Electrical Equipment (LVD)

and harmonized norms ,with above directives:

PN-EN IEC 61000-3-2:2019-04 – Electromagnetic compatibility (EMC) — Part 3-2: Limits — Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

PN-EN 61000-3-3:2013-10 – Electromagnetic compatibility (EMC) — Part 3-3: Limits — Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection

PN-EN IEC 61000-6-2:2019-04 – Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments

PN-EN 61000-6-3:2008/A1:2012 – Electromagnetic compatibility (EMC) — Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments

PN-EN 60065:2015-08 – Audio, video and similar electronic apparatus — Safety requirements

PN-EN 55022:2010 – Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement

PN-EN 60068-2-1:2009 - Environmental testing

PN-EN 60068-2- 2:2009 - Environmental testing

Gdynia, 01.04.2020 Product Manager Wojciech Bednarczyk

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