

EX LITE / EX PLUS

EN **AUTOMATION EX**
TECHNICAL DOCUMENTATION OPERATION MANUAL

PL **AUTOMATYKA EX**
DOKUMENTACJA TECHNICZNA

1. GENERAL INFORMATION

1.1. PRODUCT CODE AND FUNCTIONS

Dedicated control system for LEO EX heaters located in EX zones. Versions:

- EX LITE-1 - control cabinet mounted outside EX zone for LEO EX heater (1pc.), junction box dedicated for EX zone included (1pc.).
- EX LITE-2 - control cabinet mounted outside EX zone for LEO EX heater (2pcs.), junction box dedicated for EX zone included (2pcs.).
- EX LITE-3 - control cabinet mounted outside EX zone for LEO EX heater (3pcs.), junction box dedicated for EX zone included (3pcs.).
- EX LITE-4 - control cabinet mounted outside EX zone for LEO EX heater (4pcs.), junction box dedicated for EX zone included (4pcs.).
- EX PLUS-1 - control cabinet mounted outside EX zone for LEO EX heater (1pc.), junction box dedicated for EX zone (1pc.) and thermostat for EX zone (1pc.).
- EX PLUS-2 - control cabinet mounted outside EX zone for LEO EX heater (2pcs.), junction box dedicated for EX zone (2pcs.) and thermostat for EX zone (1pc.).
- EX PLUS-3 - control cabinet mounted outside EX zone for LEO EX heater (3pcs.), junction box dedicated for EX zone (3pcs.) and thermostat for EX zone (1pc.).
- EX PLUS-4 - control cabinet mounted outside EX zone for LEO EX heater (4pcs.), junction box dedicated for EX zone (4pcs.) and thermostat for EX zone (1pc.).

EX LITE features:

- START-STOP rotary switch
- phase asymmetry, sequence, failure detection
- overcurrent and short-circuit motor protection
- thermistor motor protection relay MSR220VA (ATEX)
- optional autotransformer regulator
- remote start signal via potential free contact
- remote thermocontact reset

EX PLUS features:

- regulation through thermostat located in EX zone (ATEX)
- START-STOP rotary switch
- phase asymmetry, sequence, failure detection
- overcurrent and short-circuit motor protection
- thermistor motor protection relay MSR220VA (ATEX)
- optional autotransformer regulator
- remote start signal via potential free contact
- remote thermocontact reset
- weekly programmable start/stop signal

In case of motor overheat fan stops automatically and sends an overheat information to MSR220VA (KB1) module. To start the heater user has to reset the module (additionally temperature of the fan needs to cool down). Fan motor has additional overcurrent protection. Auxiliary protection is ensured by phase asymmetry, sequence, failure detection.

1.2. SAFETY INSTRUCTIONS

- type of protection: IP 40
- allowed temperature: -5⁰ to +40⁰
- dedicated for appropriately trained personnel
- wall mounted

1.3. ELECTRICAL INSTALLATION

- humidity 100% for 25⁰C
- mains voltage: 3x400V
- frequency: 50Hz
- maximal rated current: 1 A – 4 A (depending on amount of heaters connected)
- EMC classification: environment A

1.4. DIMENSIONS AND WEIGHT

Name	Length [mm]	Height [mm]	Width [mm]
EX-LITE-1	304	408	149
EX-LITE-2	410	430	151
EX-LITE-3	303	642	118
EX-LITE-4	303	642	118
EX-PLUS-1	410	610	202
EX-PLUS-2	410	610	202
EX-PLUS-3	511	711	253
EX-PLUS-4	511	711	253

1.5. EX ZONE

Control system designed according to directive ATEX 2014/34/UE.

Junction box EX markings:



II 2 G EX e IIC T6 Gb

Thermostat EX markings:



II 2 G EX d e IIC T6 Gb

LEO EX markings:



II 2 G c EX e IIB T3

The devices are designed for indoor use. Leo EX fan heaters cannot be used in coal mines (unit classified in II Group equipment and protective systems). LEO EX can be used in explosive zone Z-2, where environment is created by: gas-air, vapor-air, fog. Leo EX units are suitable for use in an explosive mixture of subgroup: IIB - Ethylene group IIA - Propane group. LEO EX class temperature is T3 (maximum surface temperature of 200°C flash point of gases: 200°C to 300°C).

Cable connections for EX devices are similar to standard electric installation. Remember to power down the installation before connecting any devices. Wires should be crimped with cable shoes, wire type and size should match with documentation (chapter 4).

1.6. PRODUCT COMPOSITION

- Control cabinet
- Robust junction box dedicated for EX zone
- Technical documentation
- Thermostat for EX zone (included and compatible with PLUS)

2. INSTALATION

2.1. ELECTRICAL MODULES – FUNCTIONS

Lp.	Name	Symbol	Function
1	Main switch	Q1	Disconnects power supply
2	Rotary switch	S1	Work mode (heating, cooling, ventilation)
3	Rotary switch	S2	Work state (thermostatic, continuous)
4	Motor circuit breaker	F1,F2,F3,F4	Motor protection
5	Overcurrent circuit breaker	FC1	Control circuit protection
6	Voltage monitoring relay	KF1	Phase asymmetry, sequence, failure.
7	Relay	K1	Thermostat signal.
8	Relay	K2	Work mode logic
9	Relay	K3	Work mode logic
10	Relay	K4	Thermocontact failure
11	Power contactor	KM1,KM2,KM3,KM4	Motor control.
12	Signalization	P1, P3* , P5* , P7*	Work signal
13	Signalization	P2, P4* , P6* , P8*	Failure signal
14	PTC relay	KB1,KB2,KB3,KB4	Thermocontact signal.
15	Programmable control timer	KT1	Optional start signal. Weekly programmable.

* For EX PLUS version

2.2. TERMINAL BLOCKS

Terminal X1		
Terminal block	Function	Wire type/size [mm ²]
L1, L2, L3, N, PE	Power supply 3x400V 50Hz	YDY 2,5

Terminal X2		
Terminal block	Function	Wire size [mm ²]
1,2,3,4,5,6,7	Fan motor speed control	H07VV-F 2,5
8,9,10,11	Heater power supply (1)	(N)HXH-J FE 2,5
12,13	Fan thermocontact connection (1)	HDGS 1,0
14,15,16	Valve actuator power supply	YDY 1,0
17,18,19,20	Heater power supply (2)	(N)HXH-J FE 2,5
21,22	Fan thermocontact connection (2)	HDGS 1,0
23,24,25,26	Heater power supply (3)	(N)HXH-J FE 2,5
27,28	Fan thermocontact connection (3)	HDGS 1,0
29,30,31,32	Heater power supply (4)	(N)HXH-J FE 2,5
33,34	Fan thermocontact connection (4)	HDGS 1,0

Terminal X3		
Terminal block	Function	Wire size [mm ²]
1*,2*	EX Thermostat	HDGS / CY Min 1,0
3,4	External start signal 230V 50Hz	F-CY-JZ / CY Min 1,0
5,6	Failure signal (potential free)	F-CY-JZ / CY Min 1,0
7,8	External thermocontact alarm reset (shortcircuit)	F-CY-JZ / CY Min 1,0

* For EX PLUS version

3. WORK MODES

WORK MODE S1:

OFF (0) – OFF

HEATING (I) – valve actuator opens when reference temperature is lesser than room temperature.

COOLING (II) – valve actuator opens when reference temperature is greater than room temperature.

VENTILATION (III) - fan works continuously (disregarding thermostat)

WORK STATE S2:

THERMOSTATIC (0) – after attaining temperature in HEATING or COOLING fan stops working and valve actuator closes.

CONTINUOUS (I) - after attaining temperature in HEATING or COOLING fan works continuously and valve actuator closes.

3.1. OVERHEATING

In case of motor overheat fan stops automatically and sends an overheat information to **MSR220VA (KB1)** module. To start the heater user has to reset the module (additionally temperature of the fan needs to cool down).

- Manual reset: press button located on **MSR220VA (KB1)** module.
- Remote reset: short-circuit X3: 7-8

Every single overheat should be followed by optical investigation of the heater. If failure signal occurs frequently please contact the manufacturer's service department.

3.2. SHORT CIRCUIT AND OVERCURRENT

Inappropriate motor connection or excessive current consumption triggers motor circuit breaker (F1).

Default current value set on rotary knob: **0,9 A** (adjusted for LEO EX motor).

3.3. SYGNALIZATION

- Work signal for heater (1) – green light (module P1,P3,P5,P7)
- Failure signal for heater (1) – red light (module P2,P4,P6,P8)
- Temperature failure (thermocontact) – red light (module KF1, P1)
- Phase asymmetry, sequence failure – red light (K1)
- Phase asymmetry, sequence – green light (KF1)

Failure occurrence is signaled by potential free contact X3: 3-4.

Short-circuit – normal work ; Break – failure alarm

4. TERMS OF AGREEMENT

4.1. WARRANTY

Please contact your dealer in order to get acquitted 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 authorized for this, and for damage resulting from this!

Made in Poland

Made in EU

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4.2. GENERAL INFORMATION

Warranty and post-warranty repairs are performed by the manufacturer's service, or a specialized service unit authorized by the manufacturer.

4.3. DEKLARACJA / DECLARATION OF CONFORMITY

FLOWAIR GŁOGOWSKI I BRZEZIŃSKI SP.J.
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Deklaracja zgodności / Declaration Of Conformity / Декларация о соответствии

Niniejszym deklarujemy, iż zestawy automatyki/ *FLOWAIR hereby confirms that heating units* / Компания FLOWAIR deklaruje, что водяные воздухонагреватели:

zostały wyprodukowane i zaprojektowane zgodnie z wymaganiami następujących Dyrektyw Unii Europejskiej / *were produced in accordance to the following Europeans Directives* / произведены согласно требованиям Директива Европейского Союза:

1. **2014/35/UE** – Niskonapięciowe wyroby elektryczne / *Low Voltage Electrical Equipment (LVD)* / Низковольтное оборудование (LVD),
2. **2014/34/ATEX** – Dyrektywa ATEX dotycząca urządzeń i systemów ochronnych przeznaczonych do stosowania w przestrzeniach zagrożonych wybuchem / *equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)*

oraz zharmonizowanymi z tymi dyrektywami normami / *and harmonized with below directives norms* / а также в соединении с данными директивами стандартами:

PN-EN 61439-1:2011	Rozdzielnice i sterownice niskonapięciowe -- Część 1: Postanowienia ogólne / <i>Low-voltage switchgear and controlgear assemblies - Part 1: General rules</i>
PN-EN 61439-2:2011	Rozdzielnice i sterownice niskonapięciowe -- Część 2: Rozdzielnice i sterownice do rozdziatu energii elektrycznej / <i>Low-voltage switchgear and controlgear assemblies – Part 2: Power switchgear and controlgear assemblies</i>
PN-EN 60079-0:2014	Atmosfery wybuchowe -- Część 0: Sprzęt -- Podstawowe wymagania / <i>Explosive atmospheres -- Part 0: Equipment - General requirements</i>
PN-EN 60079-14:2014	Atmosfery wybuchowe -- Część 14: Projektowanie, dobór i montaż instalacji elektrycznych. Explosive atmospheres—Part 14: Electrical installations design, selection and erection
PN-EN 60079-11:2014	Atmosfery wybuchowe -- Część 11: Zabezpieczenie urządzeń za pomocą iskrobezpieczeństwa „i”. Explosive atmospheres. Electrical installations design, selection and erection
PN-EN 60079-25:2014	Atmosfery wybuchowe -- Część 25: Systemy iskrobezpieczne. Explosive atmospheres – Part 25: Intrinsically safe electrical systems

5. SCHEMATY ELEKTRYCZNE / ELECTRIC SCHEMES

Electrical schemes attached to product:

- Electrical diagram – supply (1)
- Electrical diagram– control (2)
- Mounting scheme
- Wiring diagram