

## INTRINSICALLY SAFE SUPPLY UNITS

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## SAFETY


All operations described in this instruction manual have to be carried out only by trained personnel or an accredited person. Assembly, installation, commissioning, operation and maintenance of the intrinsically safe power supply units have to be carried out in accordance with this instruction manual and provisions of valid standards for installation of electrical equipment have to be adhered to.


Improper use or installation of the units can result in crashes in the application (overfilling of the tank or damage of sensors etc).

The manufacturer is not responsible for improper use, losses of work caused by either direct or indirect damage, and for expenses incurred during installation or use of the intrinsically safe units.

Warranty and post warranty service must be exclusively carried out by the manufacturer.

 **II (1) G [Ex ia Ga] IIC** can be used in non-explosive area or in the fixed enclosure "d". Its external intrinsically safe circuits with the intrinsic safety level ia can be used in areas zone 0, zone 1, zone 2 according to EN 60079-10-1 (Explosive gas atmospheres).

 **II (1) G [Ex ia Ga] IIC** can be used in non-explosive area or in the fixed enclosure "d". Its external intrinsically safe circuits with the intrinsic safety level ia can be used in areas zone 20, zone 21, zone 22 according to EN 60079-10-2 (Combustible dust atmospheres).

 **I (M1) [Ex ia Ma] I** can be used in non-explosive area or in the fixed enclosure "d". Its external intrinsically safe circuits can be used in underground parts of mines and in surface mine installations with probable risk methane or flammable dust explosion.

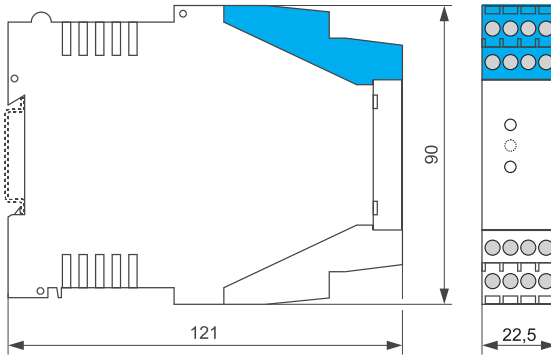
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## FEATURES OF VARIANTS

- **NSSU-811** **Single channel unit without additional functions** for supply and state detecting of one NAMUR sensor. Output in version "T" (transistor switch) or "R" (relay contact).
- **NSSU-812** **Single channel unit with LFD\* system** for supply and state-detecting of one NAMUR sensor. Function LFD for evaluation of cable faults. Output in version "R" (relay contact).
- **NDSU-822** **Dual channel unit without additional functions** for supply and state detecting of two NAMUR sensors. Output in version "T" (transistor switch) or "R" (relay contact).
- **NLCU-821** **2-state level regulation unit** by means of two connected limit NAMUR sensors.  
Output in version "R" (relay contact).
- **NLCU-822** **2-state level regulation unit with LFD\* system and alarm output** by means of two connected NAMUR sensors. Function LFD for evaluation of cable faults. Protection against non-logical states of level sensors (which can occur in fail or wrong connection of sensors). Output in version "R" (relay contact).

\* LFD – Line Fault Detection (detection of short circuit or line break)

## DIMENSIONAL DRAWINGS



## INSTALLATION INSTRUCTIONS

The power supply units are designed to be mounted in distribution panels on the DIN rail 35 mm. By pressing the front side, snap it on the DIN rail. To demount, use a screwdriver and release the flap. It is recommended to install the units in the vertical position.

Make the electric connection in **voltage-free state**. The supply voltage (terminals 9 and 13) can be connected to the power supply line only through a **fuse or a circuit breaker** (max. 16A)! Only approved sensors with NAMUR output that comply with conditions of the given dangerous area may be connected to the terminals 5, 6 and 7, 8 (blue terminal block). The sensors are supplied from these terminals as well. The device output consists of working contacts (10, 11, 12 and 14, 15, 16) that may be connected into the circuit only with the same supply voltage as the power supply of the unit.

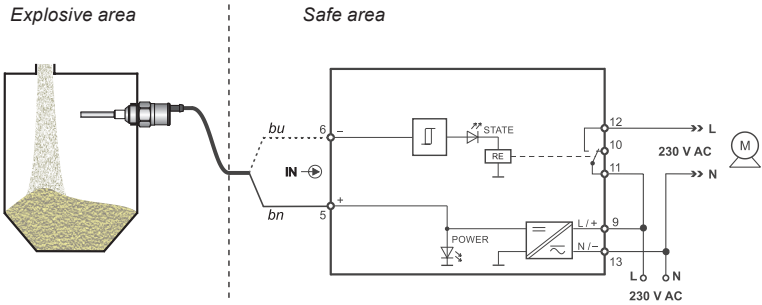
## WIRING EXAMPLES

The above connections are examples how it is possible to connect the individual variants of the Intrinsically safe supply units. The final connection of the contact outputs can be changed in accordance with valid standards. The variants for 24V or "T" output are analogical to the above examples. For safety reasons, it is possible to connect relay contacts only to the same voltage level as the supply voltage has. The relay to signal faults (variant NSSU-812 and NLCU-822) is closed in the normal mode (terminals 15 and 16) and opened in case of a failure (terminals 14 and 15).

### NSSU-811-230V-R

Connection of single switch-sensor for level detection.

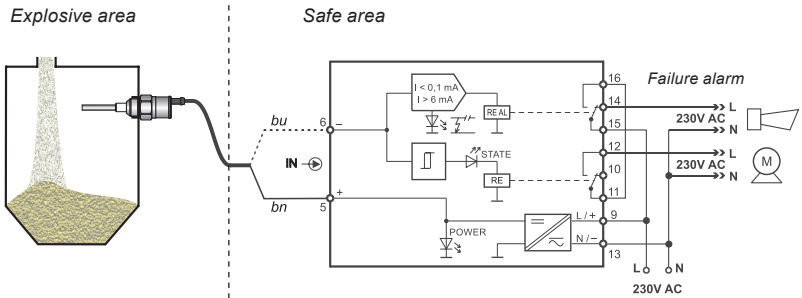
Function table		
IN	RE	LED
$I < 1.55 \text{ mA}$		●
$I > 1.55 \text{ mA}$		☀



### NSSU-812-230V-R

Connection of single switch-sensor for level detection with LFD (Line Fault Detection) which blocks the output.

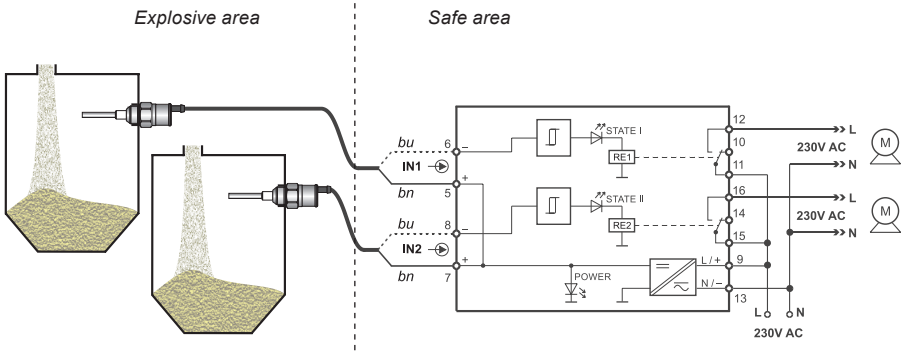
Function table				
IN 1/2	RE	LED	RE AL	LED
$I < 0.1 \text{ mA}$		●		☀
$I > 0.1 \text{ mA}$ $I < 1.55 \text{ mA}$		●		●
$I > 0.1 \text{ mA}$ $I < 6 \text{ mA}$		☀		●
$I > 6 \text{ mA}$		☀		☀



### NDSU-822-230V-R

Connection of two independent level switches

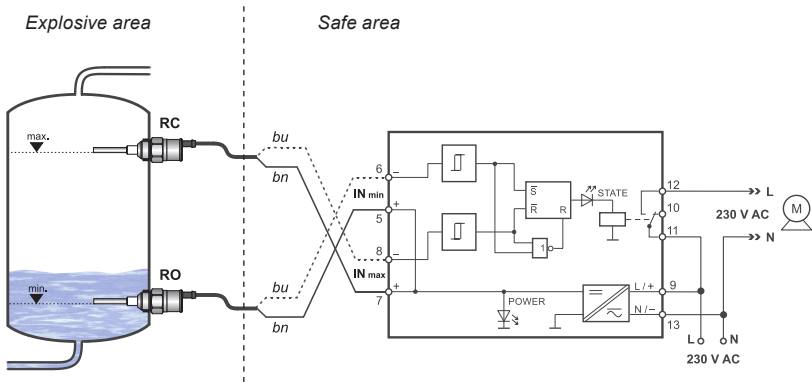
Function table		
IN 1/2	RE 1/2	LED
$I < 1.55 \text{ mA}$		●
$I > 1.55 \text{ mA}$		☀



### NLCU-821-230V-R

Wiring for automatic filling of material by pump-up control.

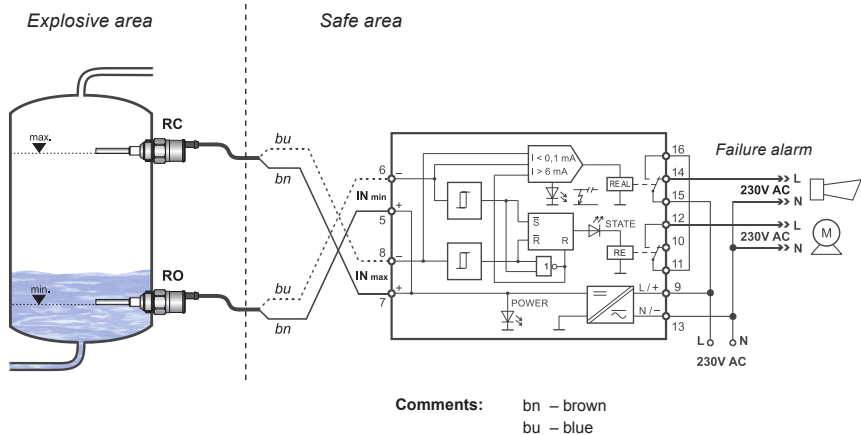
Function table			
IN min	IN max	RE	LED
$I < 1.55 \text{ mA}$	$I < 1.55 \text{ mA}$		●
$I < 1.55 \text{ mA}$	$I > 1.55 \text{ mA}$		☀
$I > 1.55 \text{ mA}$	$I < 1.55 \text{ mA}$		●
$I > 1.55 \text{ mA}$	$I > 1.55 \text{ mA}$	not changed	



### NLCU-822-230V-R

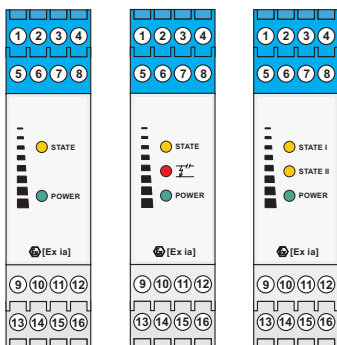
Wiring for automatic filling of material by pump-up control with LFD system (Line Fault Detection) which blocks the output.

Function table					
IN min	IN max	RE	LED	RE AL	LED
$I < 1.55 \text{ mA}$	$I < 1.55 \text{ mA}$		●		☀
$I < 1.55 \text{ mA}$	$I > 1.55 \text{ mA}$		☀		●
$I > 1.55 \text{ mA}$	$I < 1.55 \text{ mA}$		●		●
$I > 1.55 \text{ mA}$	$I > 1.55 \text{ mA}$	not changed			●
$I > 0.1 \text{ mA}$ $I < 6 \text{ mA}$	$I < 0.1 \text{ mA}$ $I > 6 \text{ mA}$	not defined			☀



## FRONT PANEL AND TERMINAL BLOCK

NSSU-811      NSSU-812  
NLCU-821      NLCU-822      NDSU-822



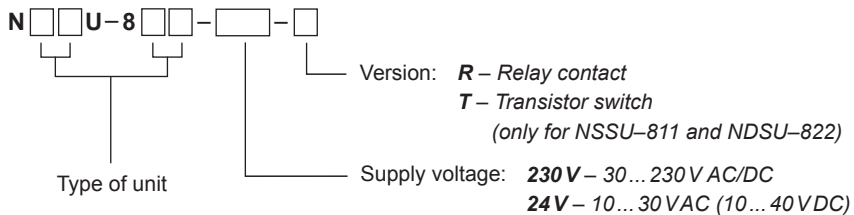
	NSSU-811	NSSU-812	NDSU-822	NLCU-821	NLCU-822
1					
2					
3					
4					
5	+ IN	+ IN	+ IN1	+ IN <sub>min</sub>	+ IN <sub>min</sub>
6	- IN	- IN	- IN1	- IN <sub>min</sub>	- IN <sub>min</sub>
7			+ IN2	+ IN <sub>max</sub>	+ IN <sub>max</sub>
8			- IN2	- IN <sub>max</sub>	- IN <sub>max</sub>
9	L / +	L / +	L / +	L / +	L / +
10	RE	RE	RE1	RE	RE
11	RE / T	RE	RE1 / T1	RE	RE
12	RE / T	RE	RE1 / T1	RE	RE
13	N / -	N / -	N / -	N / -	N / -
14		RE AL	RE2		RE AL
15		RE AL	RE2 / T2		RE AL
16		RE AL	RE2 / T2		RE AL

## STATUS AND FAILURE SIGNALIZATION

LED indicators	Color	Function
STATE I,II	Orange	<b>Shines</b> - Sensor is activated and output relay (transistor) is closed. <b>Dark</b> - Sensor is not activated and output relay (transistor) is in open state.
	Red	<b>Shines</b> - Line short circuit of failure of the sensor, for NLCU-822 further non-logical combination of connected sensors <b>Dark</b> - Line and combination of inputs respectively are OK (NSSU-812, NLCU-822)
POWER	Green	<b>Shines</b> - Device connected to supply voltage, correct function <b>Dark</b> - Internal failure



## ORDER CODE



## SAFETY, PROTECTION, COMPATIBILITY AND EXPLOSION PROOF

Connection to the supply line can be realised only through a fuse or a circuit breaker (max. 16A). NSSU-811-T and NSSU-812-T units (with transistor switch) are equipped with protection against reverse polarity and current overload output terminals.

Working areas according to EN 60079-10 without risk of explosion, or in the fixed enclosure "d".

Electrical equipment of protection class II. Electrical safety according to EN 61010-1.

Electromg. compatibility according to EN 55022, EN 61000-6-2, EN 61000-4-2,-3, -4, -5, -6 and -11.

The intrinsic safety of input terminals of the unit according to EN 60079-0 and EN 60079-11.

Explosion proof of Intrinsically safe supply units examined by FTZÚ-AO 210 Ostrava-Radvanice, certificate No.: FTZÚ 04 ATEX 0136X.

### **Special conditions for safe use:**

When applied in mining conditions the Intrinsically safe supply units NxxU-8xx must be installed in non-hazardous area or must be installed inside of flameproof enclosure „d“.






## USE, MANIPULATION AND MAINTENANCE

The operator can check the function of the unit (shining of the LED indicator POWER and other LEDs according to the state of the sensors). The maintenance of the device includes removal of dust from the surface of the device and checking of the box and terminal blocks for integrity. If you find out any visible faults, inform the manufacturer or seller of the device immediately.

It is forbidden to carry out any modifications or interventions on the device without manufacturer's approval. Potential repairs must be carried out only by the manufacturer or by a service organization authorized by the manufacturer.

Assembly, installation, commissioning, operation and maintenance have to be carried out in accordance with these specifications and provisions of valid standards regarding installation of electrical equipment have to be adhered to.

## MARKING OF LABEL

- Unit type, logo and internet address of the manufacturer
- Performance:  II (1) G [Ex ia Ga] IIC,  II (1) D [Ex ia Da] IIIC,  I (M1) [Ex ia Ma] I
- Number of certificate of intrinsically safety: FTZÚ 04 ATEX 0136X
- Limit operating parameters:  $U_0 = 10,5V$  ;  $I_0 = 10,4mA$  ;  $P_0 = 27,3mW$  ;  $C_0 = 1,8\mu F$  ;  $L_0 = 150mH$
- Ambient temperature range:  $t_a = -20 \dots +60^\circ C$
- Max. loading of output contacts
- Range of supply voltages
- Functional block diagram and table of functional states
- 230V version: symbol of double insulation (device of protection class II): 
- Symbol  and number of authorized person examining control of system quality: 1026

TECHNICAL SPECIFICATIONS					
	<i>NSSU-811</i>	<i>NSSU-812</i>	<i>NDSU-822</i>	<i>NLCU-821</i>	<i>NLCU-822</i>
Number of connectable sensors	1	1	2	2	2
Failure signalization (LFD system)	NO	YES	NO	NO	YES
Nominal supply voltage	Version 230 V Version 24 V	30 ... 230 V AC/DC (+10%) 50 + 60 Hz 10 ... 30 V AC (+10%) 50 + 60 Hz; 10 ... 40 V DC (+10%)			
Nominal power demand (AC / DC)	4 VA / 4 W				
Output open – Circuit voltage	9.2 VDC				
Output current – Treshold	1.55 mA ( $\pm 0.1$ mA)				
Current limits for LFD system	–	< 0.1 mA > 6 mA	–	–	< 0.1 mA > 6 mA
Allowable short-circuit time in input terminals	Unlimited				
Limit parameters	$U_0 = 10.5$ V; $I_0 = 10.4$ mA; $P_0 = 27.3$ mW; $C_0 = 1.8$ $\mu$ F; $L_0 = 150$ mH				
Safe isolation voltage $U_m$ (term. 9 - 16)	253 V				
Contact voltage drop (output transistor is closed)	2 V (Variant "T")				
Dynamic parameters* (Triggering / Gap pulse)	Variant "R" Variant "T"	Min. 50 ms Min. 250 $\mu$ s	–	Min. 50 ms Min. 250 $\mu$ s	–
Max. switching frequency (Max. load / Without load)	Variant "R" Variant "T"	0.1 Hz / 10 Hz 2 kHz / 2 kHz			–
Output characteristic	Version 230 V Version 24 V	250 V AC / 2 A / 100 VA; 250 V DC / 2 A / 50 W 40 V AC / 2 A / 80 VA; 40 V DC / 2 A / 80 W			
Output characteristic (Variant "T")	40 V / 50 mA	–	40 V / 50 mA	–	–
Relay contact life (Variant "R")	Min. $30 \times 10^6$				
Ambient temperature	$-20^\circ C \dots +60^\circ C$				
Protection	IP20				
Housing material	Polycarbonate				
Material of terminals	CuBe				
Max. conductor size	1 x 2.5 mm <sup>2</sup>				
Isolating voltage (mains terminal / output)	3500 V				
Weight	Approx. 0.2 kg				

\* Dynamic parameters are valid by connection to contact on input unit (impulse transmitting from gas-meter, etc.)



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