GIG Quality Management System System Zarządzania Jakością PN-EN ISO 9001 Certyfikat nr QS/14/07

GWARANCJA PRODUCENTA **3 LATA**

CE

PCA POLSKIE CENTRUM AKREDYTACJI CERTYFIKACJA SYSTEMÓW ZARZĄDZANIA AC 083 QMS

MLEx-ic

Ex ATEX

TWO-WIRE 4÷20 mA LINE MONITOR
for explosion hazardous area
- **supplied by 4÷20 mA line current,**
- **configurable range of physical units,**
- **range of measured current: 3÷24mA,**
- **LCD indicator with backlight, 4 digits,**
- **intrinsically safe alarm output.**

FEATURE ⟨Ex⟩ **II 3G Ex ic IIC T6**

⟨Ex⟩ **II 3D Ex ic IIIA or IIIB or IIIC T=85°C**

Category 3 device for use in "area 2 and 22" in explosion hazardous zones.
Housing's elevation side protection level: IP54
Overall housing protection level: IP40   Operating temperature: -20…+60°C

The monitor is allowed to be mounted it in explosion hazardous "areas 2 and 22":
- input circuit "INPUT" (terminals 1,2) and output circuit "ALARM" (terminals 3,4) can work with intrinsically safe circuits after agreement regarding safety parameters.
- input circuit "INPUT" (terminals 1,2) and output circuit "ALARM" (terminals 3,4) can work with intrinsically safe circuits of any accompanying device installed in safe zone after agreement regarding safety parameters.

The monitor must be protected against access by persons untrained in its maintenance and exploitation.

MLEx-ic monitor measures the current in automation system's 4÷20 mA current loop. It is supplied by measurement line current and does not require any additional power supply. Measurement result can be displayed in %, mA or any physical units from the user defined scale.
Alarm threshold switching level with hysteresis can be freely programmed.
User can program the smoothing time constant of the indication.

TECHNICAL SPECIFICATION:

INPUT safety parameters	-	**Ui=30V, Ii=100mA, Pi=0,9W, Ci=0, Li=0**
ALARM safety parameters	-	**Ui=30V, Ii=40mA, Pi=0,4W, Ci=0, Li=0**
Dimensions	-	72 x 72 x 61 mm
Panel section	-	68 x 68 mm
Measurement signal	-	2,30 ÷ 23,40mA
lower range limitation	-	< 2 mA indicator turns off
upper range limitation		> 24 mA
	-	overcurrent protection
Voltage drop on the Indicator:	-	
with terminals polarization	-	3,3V/4mA; 4,1V/20mA
without terminals polarization	-	< 4,6 V/20mA
Precision class	-	0,1 %+1digit
Resolution	-	< 0,025%
Time constant	-	0,5..32 s, programmable
Operation cycle	-	250 ms

Screen	-	LCD - 4 digits, with backlight
digit height	-	14 mm
range and dot position	-	programmable
Programming method	-	with four buttons on the faceplate
Alarm signalization	-	**type OC (NPN)**
output		2Vdc ÷ 30Vdc / 20mA
OC voltage drop		< 2 V
thresholds values	-	programmable
Calibration	-	automatic up and down
Reprogramming protection	-	permanent password: 99
Object's cables connections	-	0,5..1,5mm² disjoint pair of terminals for input 0,5…1mm² disjoint pair of terminals for OC

ambient temperature	-	-20 ÷ +55°C
relative humidity	-	up to 90%
Safety requirements	-	PN-EN 61010-1:2002
EMC requirements	-	PN-EN 61000-6-1
	-	PN-EN 61000-6-3

Harmonized standards: PN-EN 60079-0, PN-EN 60079-11, PN-EN 61326-1:2009
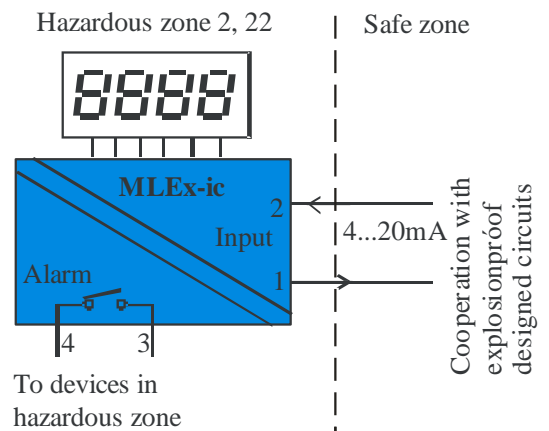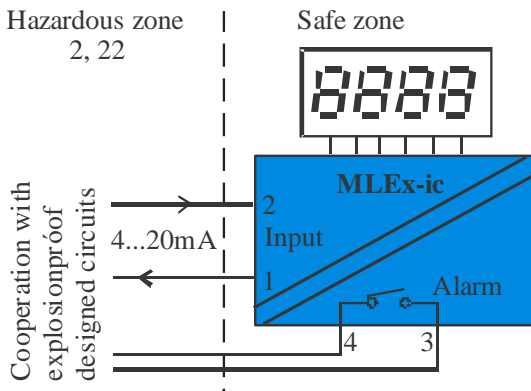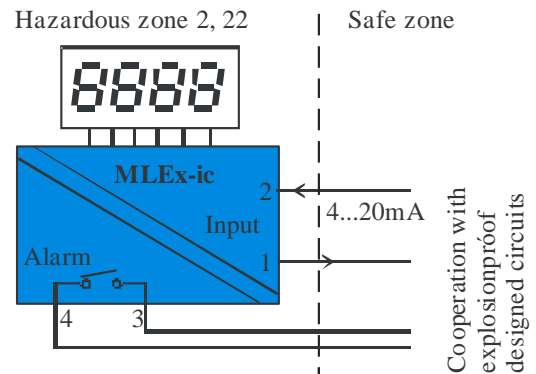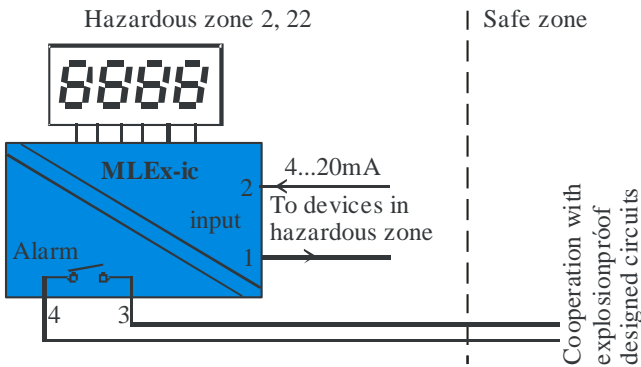
Four ways of connecting the MLEx indicator.

PROGRAMMABLE PARAMETERS LIST

P0. Screen segments test/line current value indication (mA)

P1. Lower range of physical units and dot position

P2. Upper range of physical units

P3. Digital filter selection

P4. Lower alarm threshold

P5. Upper alarm threshold

P6. Calibration start (**Lo -** down and **Hi -** up)

P7. Factory reset

P8. Backlight on/off

P9. Password active/inactive

MONITOR DESIGN

monitor is designed for panel mounting.
Mounting the monitor in the table is done using two tightening screws. Panel composition:

- Four-digit indicator of measured value
- **AL -** alarm signalization LED
- **Prg** – programming mode LED
- Δ, ∇, OK , MENU - four buttons for monitor's programming.

Object's cables terminals are located on the back plate of the monitor.
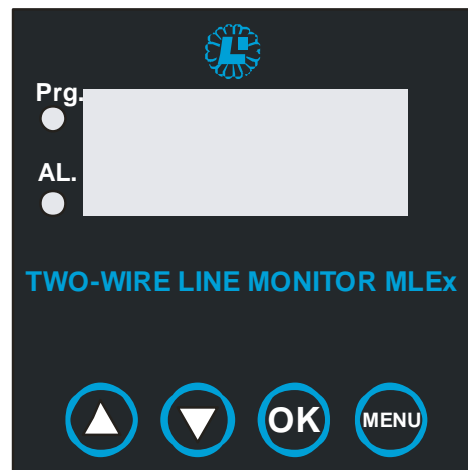
Front panel of the monitor.

ALARM SIGNALIZATION

Alarm thresholds are programmed by **P4** and **P5** parameters.
Thresholds values are set using physical units.
Programming thresholds **P4 = P5** turns off the alarm.
Programming thresholds **P4 > P5** sets maximum alarm (exceeding **P4** triggers it and it is turned off when measurement is below **P5**).
Programming thresholds **P4 < P5** sets minimum alarm (falling below **P4** triggers it and it is turned off when measurement is over **P5**).
Triggering the alarm will result in setting the OC alarm output in conductive state and **AL** LED flashing.

PROGRAMMING THE PARAMETERS USING KEYBOARD

o Pressing **MENU** button sets the parameters programming mode and the device asks for password (**H0**, if active) or goes straight to parameter selection (**P0**).

o Password is typed using ∇Δ buttons. Each digit must be accepted by **OK**. The monitor will go into parameter selection mode (**P0**).

o Parameter is selected by ∇Δ buttons and accepted by pressing **OK**.

o By using ∇Δ buttons each parameter's digit is being set, beginning with the youngest digit and accepted with **OK** button. After the last digit is set the monitor goes into parameter selection mode.

o For parameter **P1** decimal dot is programmed first.

o **F0…..F7** display signalizes the digital filter selection (**P3** parameter).

o Selecting parameter **P0** triggers the display segments test mode (all segments turn on). Current measurement in mA can be turned on using ∇Δ lub **OK** buttons.

o Ranges calibration procedure is called by selecting **P6** parameter and then **Lo** for lower 4 mA range calibration or **Hi** for upper 20 mA range calibration. Monitor asks for confirmation by flashing **?**. After pressing **OK**, monitor will start counting 32 measurement cycles, write measurement result into memory and go into measurement mode. **Before calling this procedure one must be sure that the input signal is correct (precise 4 mA or 20 mA). Wrong signals will ruin the monitor's calibration.**

o Selecting parameter **P7** will result in loading the factory settings:
  - ➢ Lower range   **000.0**
  - ➢ Upper range   **100.0**
  - ➢ filter   **F2**
  - ➢ Lower alarm   **050.0**
  - ➢ Upper alarm   **045.0**
  - ➢ Backlight on
  - ➢ Password inactive

o Selecting parameter **P8** allows to turn on (**on ?**) or turn off (**off ?**) the LCD backlight.

o Selecting parameter **P9** allows to activate (**on ?**) or deactivate (**off ?**) the password for parameter's protection.

o **Pressing MENU button while in programming mode cancels the current action.**

The monitor goes back to its default operation after 30 seconds of no action.

VALUES OF TIME CONSTANT OF DIGITAL FILTERS

F0	Filter off	0,25 s
F1		0,5 s
F2		1s
F3		2s
F4		4 s
F5		8 s
F6		16 s
F7		32 s
F8	Peak value measurement (deleted by pressing **OK**)	

.

Ordering method:

Monitor for installation in explosion hazardous zone – with terminals polarization type MLEx-ic-4,1V

– without terminals polarization type MLEx-ic-4,6V

In general cables and wires of intrinsically safe circuits should be led separately regarding to non-intrinsically safe cables and wires. If intrinsically safe cable is shielded and is blue it can be in cable trays together with other non-intrinsically safe cables. Shield of the cable should be connected to the ground PE only from one side e.g. only in safe zone with a wire of 2,5mm^2 diameter. Maintain a distance of 50mm from the end of the shield braid to the stripped ends of the cable cores in both the hazardous and safe zones. Put the crimping sleeves on the stripped ends of the cable cores. If in a multicore intrinsically safe cable are several intrinsically safe circuits the cables must be of A or B type with insulation test of 500V and the insulation cannot be thinner than 0.2mm. Cables and wires must be permanently fixed and protected against the possibility of mechanical damage. It is recommended to use blue cables. Compare the parameters U_o, I_o, P_o, C_o, L_o, U_i, I_i, P_i, C_i, L_i (L, C of the cable and L_i, C_i of the device installed in the hazardous area).

If the L, C clustered parameters in the connected circuit (and this is how the L_i, C_i parameters of the connected device should be treated) exceed 1% of the L_o, C_o value, for the calculation should be taken of the L_o, C_o parameters given in the certificate for the clustered values. If such parameters are not provided, then half of the C_o, L_o value from the certificate should be taken for calculations with the assumption that the C_o value cannot exceed 1 µF for groups I, IIA, IIB and III and 0.6 µF for IIC.

If a "simple device" made of plastic is installed in the hazardous area, the risk of electrostatics should be assessed. In the case of cable routes with high energy (power grid) or interferences, cables with measurement signals susceptible to the impact of interferences, apart from the use of shielded twisted-pair cables, should be led at a distance, e.g. in a separate tray, and the routes crossing each other should be at right angles.