# SATEX5 - EMETTEUR - Pour zones à risques ATEX

SATEX5 transmitter adapts to the application to make your process more efficient. This easy-to-use remote control gives incomparable freedom of movement, high motion accuracy, and higher productivity while providing best operators' safety. With SATEX5 transmitter, experience today's cutting-edge technology.

This transmitter is designed for use in potentially explosive gases atmospheres classified 0, 1, 2 dust classified 20, 21, 22 and mines.

MAIN FEATURES:

- Configurable, smart bi-directional radio link to exchange information while adapting to the radio environment.
- User-friendly screen display for look-up, selection, validation, configuration...
- Modular unit with wide ranging choice of functions.
- Quick and easy setup for application configuration thanks to our software (labels, feedback, alarms, mapping actuators/outputs, interlocks, network features, access by PIN codes)..
- Easy to maintain thanks to its diagnosis aid system (information on screen display, analysis software).
- Plug-in battery and rugged industrial charger

## FULLY COMPLIANT WITH SAFETY AND SECURITY STANDARDS:

- Emergency stop
> SIL 3 per EN 61508
> Performance level PL e per EN ISO 13849-1 and -2
- EC type certificate issued by TÜV NORD

- Radio and telecommunication terminal equipment:
  (low voltage, electromagnetic compatibility, radio spectrum)
- FCC part 15
- ARCEP certificate
- Radio Equipment Directive (RED)

- Machinery directive 2006/42/EC:

Since April 20, 2016, all Ex products must satisfy the requirements of the directive ATEX 2014/34/UE, the evolution of the standard 60079-0 leads to a new product marking presented in the following tables:

| Operator modules | Operator modules + cable link |
|---|---|
| C€0081 ⟨Ex⟩ II 1 GD<br><br>Ex ia IIB T4 or 145°C Ga (1)<br><br>Ex ia IIIC T135°C or T145°C Da (1)<br><br>I M1<br><br>Ex ia I Ma<br><br>LCIE 14 ATEX 3014 X<br><br>IECEx LCIE 14.0015 X | C€0081 ⟨Ex⟩ II 1 GD<br><br>Ex ia IIB T4 or 145°C Ga (1)<br><br>Ex ia IIIC T135°C or T145°C Da (1)<br><br>I M1<br><br>Ex ia I Ma<br><br>Ui: 5.9V; Ii: 210mA; Pi: 310mW;<br><br>Ci: 96.2µF; Li: 0.54µH<br><br>LCIE 14 ATEX 3014 X<br><br>IECEx LCIE 14.0015 X |

**(1) Temperature classes depending on Tamb :**
-20°C ≤ Tamb ≤ +40°C, temperature classes are T4 for gas and T135°C for dust.
+40°C ≤ Tamb ≤ +50°C, temperature classes are 145°C for gas and T145°C for dust.

■ Below are the tables to understand the ATEX marquing:

**① Device group**

| Device group | Application |
|---|---|
| Group I | Electrical devices intended for use in firedamp mines. (underground work in the mines and parts of ground installations) => Protection against firedamp |
| Group II | Electrical devices intended for all other explosible atmospheres than firedamp mines (ground industries) => Protection against explosions |

**② ③ ATEX classification**

| Category of equipment | Flammable substances | Degree of protection | Description |
|---|---|---|---|
| 1 | G Gas<br>D Dust | Very high level | Devices capable of operating in the atmospheres where the risk of explosion is permanent or almost permanent (zones 0, 1, 2 and 20, 21, 22) |
| 2 | G Gas<br>D Dust | High level | Devices capable of operating in the atmospheres where the risk of explosion is frequent (zones 1, 2 and 21, 22) |
| 3 | G Gas<br>D Dust | Normal | Devices capable of operating in the atmospheres where the risk of explosion is occasional (zones 2 and 22) |

**4** **Protection modes for electrical equipment in gaseous atmospheres**

| Protection mode | | | Standard | Basic principle | Application in ZONE | | |
|---|---|---|---|---|---|---|---|
| | | | | | 0 | 1 | 2 |
| d | Explosion proof enclosure | | EN/IEC 60079-1 | The extremely heavy duty enclosure contains the explosion inside the device. The explosion proof seals of the device prevent any propagation of the flame outside the enclosure. The seals are regularly serviced. | | ● | ● |
| e | Enhanced safety | | EN/IEC 60079-7 | The components inside the enclosure must not produce arcs, sparks or dangerous temperatures under normal utilization conditions. The enclosure must be tight to IP 54 and withstand impacts. | | ● | ● |
| i | Intrinsic safety | ia | EN/IEC 60079-11 | The actual design of the circuit, where the energy is limited at the entry by a Zener barrier or a galvanic insulator makes it impossible for arcs or electrical sparks to form, subdivided into "ia" resists 2 defects: suitable for zone 0, and "ib" resists 1 defect: suitable for zones 1 and 2. | ● | ● | ● |
| | | ib | EN/IEC 60079-11 | The actual design of the circuit, where the energy is limited at the entry by a Zener barrier or a galvanic insulator makes it impossible for arcs or electrical sparks to form, subdivided into "ia" resists 2 defects: suitable for zone 0, and "ib" resists 1 defect: suitable for zones 1 and 2. | | ● | ● |
| m | Encapsulation | | EN/IEC 60079-18 | For this protection mode, all the electronics is encapsulated in an insulating material to prevent electrical arcs or electrical sparks. | | ● | ● |
| n | Zone 2 | | EN/IEC 60079-15 | This protection mode is only suitable for devices intended for zone 2 where the risk of explosion is low. It combines the enhanced safety mode "e" with lower protection requirements. | | | ● |
| o | Immersion in oil | | EN/IEC 60079-6 | The material or the electrical circuit is immersed in oil. The explosive mixture is located above the liquid and cannot be ignited by the electrical circuit. | | ● | ● |
| p | Internal overpressure | | EN/IEC 60079-2 | A pressurized gas is introduced in the enclosure to prevent the possibly-explosive surrounding atmosphere from entering the enclosure. | | ● | ● |
| q | Powdery filler | | EN/IEC 60079-5 | For this protection mode, all the electronics is encapsulated in an inert powdery material to prevent electrical arcs or electrical sparks. | | ● | ● |

**5** **Classification of gases and fumes by explosion groups** (non-exhaustive list)

| Group IIA | | Group IIB | | Group IIC |
|---|---|---|---|---|
| Propane | Acetone | Ethylene | Ethyl oxide | Acetylene |
| Ethane | Hexane | Diethylene | Sulphuretted hydrogen | Hydrogen |
| Butane | Methanol | Ethyl ether | Ethanol | Carbon disulfide |
| Benzene | Paint thinners | Cycloprodene | | |
| Pentane | Natural gas | Butadiene 1-3 | | |
| Heptane | | Propylene oxide | | |

**6** **Gas temperature classes**

The safe use of equipment in dangerous areas requires knowledge of the gas group and compare the temperature auto-ignition of gaseous mixtures treated to the temperature of equipment marking.

The maximum surface temperature of the material must always be less than the autoignition temperature of the gas present in the dangerous area.

| Temperature class | MAXIMUM surface temperature of electrical equipment | Ignition temperatures of FLAMMABLE materials |
|---|---|---|
| T1 | 450°C | > 450°C |
| T2 | 300°C | > 300°C |
| T3 | 200°C | > 200°C |
| T4 | 135°C | > 135°C |
| T5 | 100°C | > 100°C |
| T6 | 85°C | > 85°C |

## 7 Equipment protection level (EPL)

Traditional relationship between level of protection and areas / categories (without additional risk assessment).

| Equipment protection level (EPL) | Normal range of application | Category (2014/34/UE) |
|---|---|---|
| Ga | 0 (and 1 and 2) | 1G |
| Gb | 1 (and 2) | 2G |
| Gc | 2 | 3G |
| Da | 20 (and 21 and 22) | 1D |
| Db | 21 (and 22) | 2D |
| Dc | 22 | 3D |
| Ma / Mb | mines | M1 / M2 |

## 8 Protection modes for electrical equipment in dusty atmospheres

| Protection mode | | | Standard | Basic principle | Application in ZONE 20 | Application in ZONE 21 | Application in ZONE 22 |
|---|---|---|---|---|---|---|---|
| i | Intrinsic safety | ia | EN/IEC 60079-11 | The actual design of the circuit, where the energy is limited at the entry by a Zener barrier or a galvanic insulator makes it impossible for arcs or electrical sparks to form, subdivided into "ia" resists 2 defects: suitable for zone 0, and "ib" resists 1 defect: suitable for zones 1 and 2. | ● | ● | ● |
| | | ib | EN/IEC 60079-11 | The actual design of the circuit, where the energy is limited at the entry by a Zener barrier or a galvanic insulator makes it impossible for arcs or electrical sparks to form, subdivided into "ia" resists 2 defects: suitable for zone 0, and "ib" resists 1 defect: suitable for zones 1 and 2. | | ● | ● |
| m | Encapsulation | | EN/IEC 60079-18 | For this protection mode, all the electronics is encapsulated in an insulating material to prevent electrical arcs or electrical sparks. | | ● | ● |
| p | Internal overpressure | | EN/IEC 60079-2 | A pressurized gas is introduced in the enclosure to prevent the possibly-explosive surrounding atmosphere from entering the enclosure. | | ● | ● |
| t | Explosion proof enclosure | | EN/IEC 60079-31 | The extremely heavy duty envelope contains the explosion inside the device. The explosion proof seals of the device prevent any propagation of the flame outside the enclosure. The seals are regularly serviced. | | ● | ● |

## 9 Classification of dust by explosion groups

| Explosion groups | Type of dust | Fundamental principle |
|---|---|---|
| Group IIIA | Combustible dust in suspension | Very fine solid particles of nominal size of about 500 microns or less, can be suspended in the air, which can be deposited because of their own weight and that can burn or be consumed in the air and are suceptible to form explosive mixtures with air under conditions of atmospheric pressure and normal temperature. |
| Group IIIB | Non-conductive dust | Combustible dust electrical resistivity greater than $10^3$ Ω.m. Size < 500 μm |
| Group IIIC | Conductive dust | Combustible dust electrical resistivity at or below $10^3$ Ω.m. Size < 500 μm |

SATEC – MAI 2022

BIDIRECTIONAL
RADIO LINK

MULTIMODES
OPTION

EMERGENCY STOP
PALMSWITCH
SIL 3 - PL e

POSITIONS
FOR CONTROL DEVICES
IN THE CHOICE

TOUGH BACKLIT SCREEN
WITH
ANTI-REFLECTION,
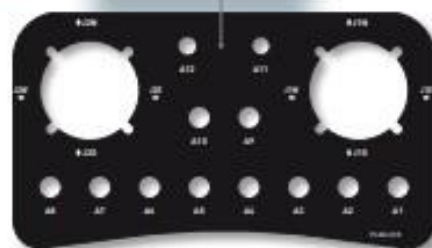SHOCK-PROOF,
ANTI-SCRATCHING
FEATURES

**2-JOYSTICK MODEL**

OPTIONAL
CROSS-LOCKING SYSTEM

STANDARD
JOYSTICKS WITH
1 TO 4 NOTCHES
OR PROPORTIONAL
CONTROL

OPTIONAL
INTENTIONAL-ACTION
JOYSTICKS

CUSTOMIZED
FACE PLATE

**3-JOYSTICK MODEL**

4 FUNCTION
BUTTONS

ON / VALIDATION BUTTON

NAVIGATION
BUTTON

OPTIONAL AUXILIARY
PUSHBUTTON

OPTION
C16 INDUSTRIAL
CONNECTOR 2 DRY
CONTACTS CONNECTION

OPTION
C16 INDUSTRIAL
CONNECTOR FOR CABLE
LINK

OPTIONAL
« DEADMAN »
DETECTION
OPTIONAL ISOLATED
WORKER ALARM
SYSTEM

**6-PROPORTIONAL LEVERS MODEL**

SEALED USB PORT
FOR DIAGNOSIS,
CONFIGURATION

HIGH-CAPACITY
PLUG-IN BATTERY

BREATHABLE MEMBRANE
TO PREVENT
CONDENSATION

## DESCRIPTION

The transmitter comes with:

> Transmitter[a] with 2 joysticks:
  4 function pushbuttons[b]
  + 12 positions for control components of your choice[c]

> Transmitter[a] with 3 joysticks:
  4 function pushbuttons[b]
  + 8 positions for control components of your choice[c]

> Transmitter[a] with 6 proportional levers:
  4 function pushbuttons[b]
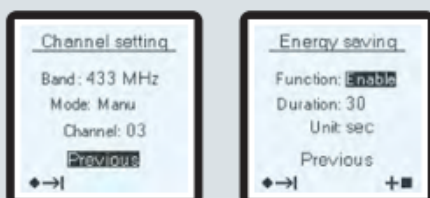  + 8 positions for control components of your choice[c]

[a] Each version has 2 navigation pushbuttons, 1 On / Validation» pushbutton and 1 emergency stop palmswitch.

[b] The pushbuttons can be configured as selectors for 2, 3 or «n» positions with status indication on the screen.

[c] Choose among the following control devices :
  - key selector switches
  - selector switches with 2 fixed positions
  - 2-position buttons with return to initial position
  - selector switches with 3 fixed positions
  - 3-position buttons with return to initial position
  - 3-position buttons with 2 fixed positions + 1 return to initial position
  - rotary selector switches with 4 to 12 positions
  - potentiometer (on operator module 2-joystick model)

The screen on the transmitter allows you to easily configure and choose items such as:

```
┌───────────────────┐   ┌───────────────────┐
│ Channel setting   │   │ Energy saving     │
│ Band : 433 MHz    │   │ Function: Enable  │
│ Mode: Manu        │   │ Duration: 30      │
│ Channel: 03       │   │ Unit: sec         │
│ Previous          │   │ Previous          │
│ ◆→|               │   │ ◆→|          +■   │
└───────────────────┘   └───────────────────┘
```

> Screen language
> Receiver which you want to use
> Radio transmit frequency and power
> Duration of the « standby » time delay (automatically stops transmitter and associated receiver if not used for a defined period of time)
> Various operating modes of the equipment (32 max.)

### It also allows you to view:

- Battery charge level
- Radio link status
- Equipment labels and controlled functions (max 96 different labels for selectors)
- Equipment feedback (16 feedbackx max with 10 labels / feedback - 48 labels max in total)
- Alarms (8 for the use + 8 for the system)

## TECHNICAL CHARACTERISTICS

### MECHANICAL CHARACTERISTICS AND ENVIRONMENTAL WITHSTAND CAPACITY

| | |
|---|---|
| Housing material | Modified shock-proof polyamide with anti-static charge |
| Water tightness | IP65 |
| Weight (with battery) | From 1700 g to 1800 g depending on configurations |
| Dimensions | 297 x 215 x 170  mm |
| Carried | by 2-point shoulder strap |

### ENVIRONMENTAL WITHSTAND CAPACITY

| | |
|---|---|
| Operating temperature | -20°C to + 50°C |
| Storage temperature without battery | -20°C to + 70°C |
| Battery storage temperature | -20°C to + 50°C |

### ELECTRICAL AND RADIO CHARACTERISTICS

| | |
|---|---|
| Power supply | Plug-in Li-ion battery |
| Autonomy (25°C) with radio activated | 10 hours |
| Frequency selection manual / auto | 64 frequencies for 433-434 MHz band |
| | 12 frequencies for 869 MHz band |
| | 64 frequencies for 911-918 MHz band |
| Emission power | < 10 mW (license free) |
| Range limitation | 10 selectable levels of power |
| Modulation | FM |
| Average range [1] | 100 m in industrial space [1] |
| | 300 m in open space [1] |
| Charging time (autonomy > 80%) | 3 hr (20 min of charge get 1hr autonomy) |
| Charging temperature range | 0°C to + 40°C |

### FUNCTIONAL CHARACTERISTICS

| | |
|---|---|
| Display | Backlit LCD display, 128 x 128 pixels |
| | 42mm (W) x 40mm (H) Black / White |
| USB interface for configuration and diagnosis | mini-B 5-point USB connector |
| | Easy access in a compartment on the back side of the transmitter |
| Operating indications | On screen (radio link status, battery status, status of buttons, information feedbacks...) |
| Function buttons | 4 pushbuttons (mounted around the screen) |
| | + up to 12 positions |
| | for switches depending on number of joysticks |
| Navigation and startup buttons | 2 pushbuttons to configure the product |
| | 1 On / Validation button (for startup and validation of menus on screen) |
| Emergency stop | 2 positions with rotary unlock system |
| Standby function | User-defined time delay |
| | (from 1 s to infinity) |

[1] Range varies according to environment conditions around transmitter and reception antenna (steel works, metal walls, etc.).

## ADDITIONAL OPTIONS

**C16 INDUSTRIAL CONNECTOR FOR CABLE LINK WITH ALTO ATEX RECEIVER**

- 7 connection terminals