

ROBUST

ERGONOMIC

SECURE



Gama

TRANSMITTER

For Ex-hazardous areas

Gama transmitter adapts to your application to make the process more efficient. This easy-to-use handheld module gives incomparable freedom of movement, precise and higher productivity while providing best high motion accuracy operators' safety. With Gama 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 exchanges information while adapting to the radio environment.
- > User-friendly screen for look-up, selection, validation, configuration...
- > Ergonomic casing and buttons, even when wearing thick gloves.
- > Function buttons designed to SIL 2 per EN 61508 and PL d per EN ISO 13849.
- > Quick and easy setup for application configuration thanks to **iDialog** software (labels, feedback, alarms, mapping actuators/outputs, interlocks, network features, access by PIN codes).
- > Easy to maintain thanks to its diagnosis aid system (on screen message, iDialog analysis software).

FULLY COMPLIANT WITH SAFETY AND SECURITY STANDARDS:

Machinery directive 2006/42/EC:

- 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



No 44 250 11 382580 002

Radio and telecommunication terminal equipment

(low voltage, electromagnetic compatibility, radio spectrum)
 FCC part 15
 ARCEP certificate
 Radio Equipment Directive (RED)

ATEX manufacturer
 2014/34/EU

EC type
 certificate
 issued by
 LCIE



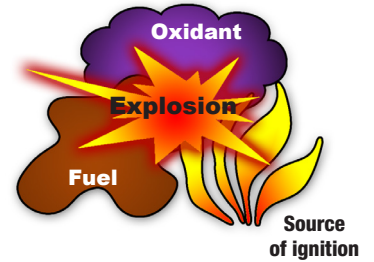


DEFINITION OF A POTENTIALLY EXPLOSIVE ATMOSPHERE

HOW AN EXPLOSION HAPPENS

An explosion is formed by an association of the following 3 elements:

- **An oxidant:**
 - ◆ in our case, the oxygen in the air.
- **A fuel:**
 - ◆ A gas (methane, acetylene, ...)
 - ◆ A fume (gasoline, solvent, ...)
 - ◆ A dust (wood, sugar, grain, ...).
- **A source of ignition:**
 - ◆ An electric arc
 - ◆ A mechanical spark
 - ◆ A high temperature



CONSEQUENCES OF AN EXPLOSION

Explosions are responsible every year for around 6 deaths and 387 persons with permanent disability (IP) out of 379 accidents. These can produce major catastrophes, such as the explosion at the «AZF» plant at Toulouse (France) in 2001 or the «Blaye silo» near Bordeaux (France) in 1997, resulting in a large number of deaths and injuries, and destruction of the sites.

PROTECTION AGAINST EXPLOSIONS

It is necessary to evaluate the specific hazards created by explosible atmospheres, keeping in mind :

- ◆ the probability that **explosible atmospheres will** occur and persist,
- ◆ the probability that **sources of ignition**, including **electrostatic discharges**, are present and will become active and effective,
- ◆ the **installations, substances and methods** used, and their possible **interactions**,
- ◆ the extent of the **foreseeable consequences**.

The explosion hazards must be evaluated globally.

In practice, this requires:

- ▣ Identification of zones representing a hazard and substances which could create explosible atmospheres.
- ▣ Classification of the explosive atmospheres in zones where there is an explosion hazard, assisted if necessary, by an outside organization.
- ▣ Definition of the equipment required to carry out the project.

With reference to user ATEX directive 99/92/CE.

The zones are standardised in accordance with their degree of dangerousness.

■ **Definition of explosion hazard zones linked to:**

GASES, FUMES AND FOG

ZONE 0: location where an explosive atmosphere, consisting of a mixture with the air of combustible material in the form of gases, fumes or fog, is present continuously or over extended periods of time, or frequently.

ZONE 1: location where an explosive atmosphere, consisting of a mixture with the air of combustible materials in the form of gases, fumes or fog, is likely to form occasionally under normal operation.

ZONE 2: location where an explosive atmosphere, consisting of a mixture with the air of combustible materials in the form of gases, fumes or fog, is not likely to form during normal operation, or should such a formation occur, is nonetheless only of short duration.

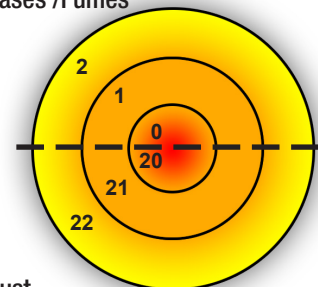
DUST

ZONE 20: location where an explosive atmosphere in the form of a cloud of combustible dust is present in the air continuously, or over extended periods of time, or frequently.

ZONE 21: location where an explosive atmosphere in the form of a cloud of combustible dust may occasionally form in the air during operation.

ZONE 22: location where an explosive atmosphere in the form of a cloud of combustible dust is not likely to form in the air during normal operation, or should such a formation occur, is nonetheless only of short duration.

Gases /Fumes



Dust


- Continuous hazard
- Hazard present during normal operating conditions
- Limited hazard in the event of failure of a system (limited in time)




DEFINITION OF MARKINGS ON
ATEX - IECEx PRODUCTS

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 Gama ATEX :



Gama 6+4 ATEX



Gama 10+4 ATEX

CE 0081 

1 2 3
II 1 G D

4 5 6 7
Ex ia IIB T4 or 145°C Ga (1)

8 9 10 7
Ex ia IIIC T135°C or T145°C Da (1)

1 2 3
II 2 G D

4 5 6 7
Ex ia IIIC T4 or 145°C Gb (1)

8 9 10 7
Ex ia IIIC T135°C or T145°C Db (1)

1
I M1

Ex ia I Ma

11
LCIE 15 ATEX 3055 X

12
IECEx LCIE 15.0045 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 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 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 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	21	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 susceptible 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 $10^3 \Omega.m$. Size < 500 μm
Group IIIC	Conductive dust	Combustible dust electrical resistivity at or below $10^3 \Omega.m$. Size < 500 μm

10 Maximum surface temperature for dusty atmospheres

11 LCIE : certificate of EC type examination number

12 LCIE : IECEx certificate number



2 ATTACHMENT POINTS FOR SHOULDER STRAPS

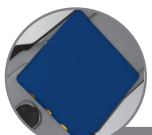
INTEGRATED REINFORCED ABS AND PROTECTION FOAM

SEALS

FUNCTION BUTTON SIL 2 - PL d

CASING SHAPED TO PREVENT UNINTENTIONAL ACTIONS

NAVIGATION BUTTON



HIGH-CAPACITY PLUG-IN BATTERY

EMERGENCY STOP PALMSWITCH SIL 3 - PL e

MULTIMODES OPTION



SEALED USB PORT FOR DIAGNOSIS, CONFIGURATION

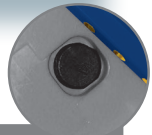
TOUGH BACKLIT SCREEN WITH ANTI-REFLECTION, SHOCK-PROOF, ANTI-SCRATCHING FEATURES



LARGE-SIZED EASY-TOUCH CONTROL BUTTONS: FOR EASY USE WITH GLOVES TO PREVENT MUSCULO-SKELETAL DISORDER (MSD)

OPTIONAL ANTI-ZAPPING FUNCTION

LABELS FOR IDENTIFYING FUNCTIONS



BREATHABLE MEMBRANE TO PREVENT CONDENSATION

ON / VALIDATION BUTTON

BIDIRECTIONAL RADIO LINK

6+4 MODEL

10+4 MODEL



DESCRIPTION

The transmitter comes in two housing versions:

> « **6 + 4** »^(a) transmitter with 6 function buttons^(b):

- 6 single-action pushbuttons
- OR** 6 double-action pushbuttons
- OR** 4 double-action pushbuttons + 2 single-action pushbuttons (under the display)

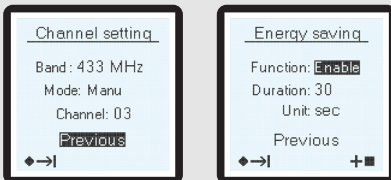
> « **10 + 4** »^(a) transmitter with 10 function buttons^(b):

- 10 single-action pushbuttons
- OR** 10 double-action pushbuttons
- OR** 6 double-action pushbuttons + 4 single-action pushbuttons (under the display)
- OR** 8 double-action pushbuttons + 2 single-action pushbuttons (under the display)

^(a) Each version has 2 navigation pushbuttons.

^(b) The single-action pushbuttons can be configured as selectors for 2, 3 or «n» positions with status indication on the screen.

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



- > 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)
- > operating modes of the equipment (32 max.)

It also displays:

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

Compatibility:

These transmitters work with **Elio, Alto, Timo, Nemo** receivers to be defined according the application.

TECHNICAL CHARACTERISTICS

MECHANICAL CHARACTERISTICS AND ENVIRONMENTAL WITHSTAND CAPACITY

Housing material	shock-resistant reinforced ABS with anti-static charge
Water tightness	IP65
Weight (with battery)	6+4 buttons: 768 g 10+4 buttons: 893g
Dimensions	6+4 buttons: 290 x 93 x 64 mm 10+4 buttons: 360 x 93 x 64 mm
Carried	by 2-point shoulder strap

ENVIRONMENTAL WITHSTAND CAPACITY

Operating temperature range	-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	Li-ion battery
Autonomy (25°C) with radio link activated	10 hours
100% time	
Frequency selection	64 frequencies for 433-434 MHz band
Manual / automatic	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 (endurance > 80%)	3 hr (20 mn of charge get 1 hr autonomy)
Charging temperature range	0°C to + 40°C

FUNCTIONAL CHARACTERISTICS

Display	Backlit LCD, 128 x 128 pixels 42 mm (W) x 40 mm (H)
USB interface for configuration and diagnosis	mini-B 5-contact USB connector Easy access in a compartment on the backside of transmitter
Operating indications	Visible on screen (radio link status, battery status, status of buttons, information feedback...)
Function buttons	6 or 10 pushbuttons (available as single or double-action buttons and configurable as selectors with n positions) Ø 14 mm - travel 7 mm Endurance : 1 million cycles for 1st level pushbutton action 500 000 cycles for 2nd level pushbutton action
Navigation and startup buttons	2 pushbuttons to configure the product (above the emergency stop palmswitch) On / Validation button (for startup and validation of menus on screen) Endurance: 500 000 cycles
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...).

ACCESSORIES



IMPORTANT
The battery shall not be charged in potentially explosive area.

Battery charger

Reference: PWC
Dimensions: 170 x 65 x 36 mm
Power supply: 12/24 Vdc
Power: 7 W

Plug-in battery for transmitter

Reference: PYB
Dimensions: 57 x 56 x 16 mm
Voltage: 3,7 V
Capacity: 1900 mAh
Technology: lithium Ion

Sheet of adhesive labels for mobile equipments



Mains power adapter for battery charger

Reference: UBCU
Dimensions: 41 x 72 x 39 mm
Power supply: 100-240 Vac
Output: 12 Vdc
Power: 7 W



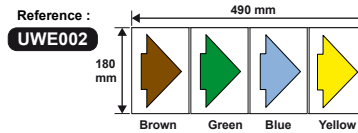
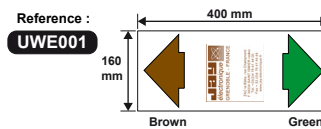
Cigarette lighter plug adapter for battery charger

Reference: PWA4
Dimensions: 90 x 20 x 20 mm
Power supply: 12-24 Vdc
Output: Power supply



Removable 2-point shoulder strap

Reference: PYM110

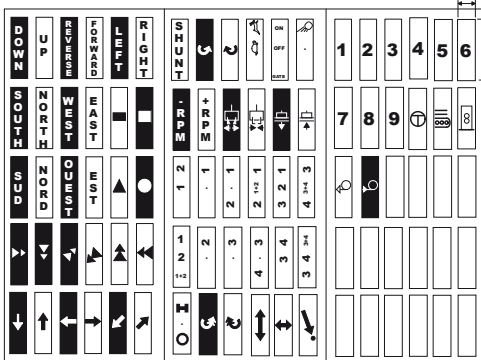


Sheet of adhesive labels for transmitters

The function buttons are identified by adhesive labels in the recesses in the transmitter casing next to the pushbuttons.

Reference :
UWE207 *

Kit containing 90 black/white labels for «movement, special functions, customization» controlled with pushbuttons and switches



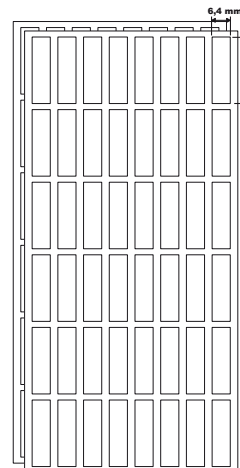
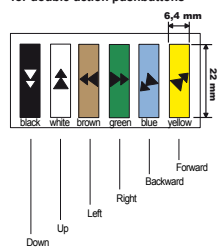
* = standard sheet of labels supplied with operator module

Reference :
UWE205

Kit containing 48 white blank labels + 48 transparent protecting labels for customised markings

Reference : *

UWE202
Kit of 6 colored labels «movements» for double-action pushbuttons



JAY

ZAC La Bâtie
Rue Champrond
F 38334 SAINT-ISMIER France
Tel. +33 (0)4 76 41 44 00
www.jay-electronique.com

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