

# Enhanced-safety industrial radio remote control for use in explosible atmosphere

# XD Series



Typical applications in chemical, petrochemical, pharmaceutical, sugar, grain and iron industries:

## Industrial equipment

- Silos
- Hoppers
- Dust removers
- Grinding mills
- Conveyors
- Dryers
- Boiler plants
- Mixers
- Grinding machines
- Smoothing, sifting
- Loading arms
- Conveyor belts

## Industrial vehicles

- Transportation of bulk products (fluids, powders)
- Sanitation
- Gaz transport

## Industrial lifting

- Travelling cranes, gantry cranes
- Monorails, hoists, jib cranes



## 1- Description

➡ A radio remote control provides numerous advantages:

- Large freedom of movement
- Easy to use
- Precise, quality manoeuvres
- Visibility
- Productivity

➡ To meet the requirements for use in explosible atmospheres, JAY Electronique has developed a new line of radio remote controls: the XD series, designed for use in zone 1 and 2 explosible atmospheres and zone 21 and 22 dust explosible atmospheres.

With the XD radio remote controls, JAY Electronique provides solutions to the broad range of enhanced-safety industrial applications implementing button controls. By its modular design, JAY Electronique's XD system integrates a number of features in terms of:

- Number of function buttons
- Type of function buttons
- Position of function buttons
- Number of output relays
- Programming of relay / buttons assignments

➡ Special attention has been given to ensure operator comfort through the following features:

- Ergonomic transmitters enabling one-hand control
- Control button accessibility
- Button touch sensitivity
- Identification of controlled functions
- Light-weight compact transmitters
- Transmitter endurance, and fast, easy to replace plug-in battery pack
- Adaptability to all radio configurations of the environment by possibility for changing frequency by a trained operator
- Mechanical protection of function buttons to avoid any unintentional action

➡ To further enhance safety when using this equipment, technical solutions and innovative options are also proposed:

- Access is enabled by electronic key to an authorised operator only

➡ Easy maintenance:

- Customization entirely stored in electronic key
- Diagnostic aid indicator lights

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● Products compliant with European directives:

- Manufacturer ATEX 94/9/CE LCIE certificate
- Machinery Safety stop, Cat. 3 per EN954-1
- Microwave equipment and telecommunication terminals (low voltage, electromagnetic compatibility, radio spectrum) ART certificate



E810 H - 1011

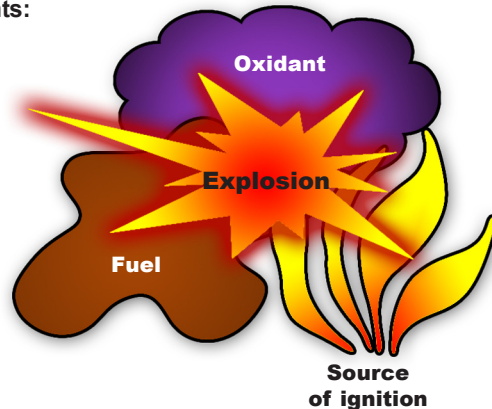
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## 2- Definition of a potentially explosive atmosphere

### 2.1 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



### 2.2 Consequences of an explosion

Explosions are responsible every year for around 6 deaths and 387 persons with permanent disability (PD) 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.

### 2.3 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)

### 3- Definition of markings on ATEX products

Since July 1st, 2003, all Ex products must satisfy the requirements of the directive ATEX 94/9/CE, the evolution of the standard 60079-0 leads to a new product marking presented in the following tables :

**Transmitter XDE :**

|   |   |   |                     |  |      |      |        |    |    |   |      |    |    |    |
|---|---|---|---------------------|--|------|------|--------|----|----|---|------|----|----|----|
| 1 | 2 | 3 | C €0081             |  |      | 4    | 5      | 6  | 7  | 8 | 9    | 10 | 11 | 12 |
|   |   |   | ⊕ <sub>x</sub>      |  |      | II 1 |        | GD |    |   |      |    |    |    |
|   |   |   | Ex ia               |  | IIB  |      | T5     |    | Ga |   |      |    |    |    |
|   |   |   | Ex ia               |  | IIIC |      | T100°C |    | Da |   | IP65 |    |    |    |
|   |   |   | LCIE 07 ATEX 6008 X |  |      |      |        |    |    |   |      |    |    |    |

**Receiver XDR :**

|   |   |   |                     |  |      |      |       |    |    |   |      |    |    |    |
|---|---|---|---------------------|--|------|------|-------|----|----|---|------|----|----|----|
| 1 | 2 | 3 | C €0081             |  |      | 4    | 5     | 6  | 7  | 8 | 9    | 10 | 11 | 12 |
|   |   |   | ⊕ <sub>x</sub>      |  |      | II 2 |       | GD |    |   |      |    |    |    |
|   |   |   | Ex d ia             |  | IIB  |      | T6    |    | Gb |   |      |    |    |    |
|   |   |   | Ex t                |  | IIIC |      | T80°C |    | Db |   | IP65 |    |    |    |
|   |   |   | LCIE 07 ATEX 6034 X |  |      |      |       |    |    |   |      |    |    |    |

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 => Protection against firedamp              |
| Group II     | Electrical devices intended for all other explosible atmospheres => 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 and 20) |
| 2                     | G Gas<br>D Dust      | High level           | Devices capable of operating in the atmospheres where the risk of explosion is frequent (zones 1 and 21)                      |
| 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  | Applicable in ZONE |   |   |
|-----------------|-----------------------|-----------------------------------|--|--------------------|---|---|
|                 |                       |                                   |  | 0                  | 1 | 2 |
| <b>d</b>        | Explosion proof       | CEI 60079-1                       | 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.  |                    | • | • |
| <b>e</b>        | Enhanced safety       | CEI 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.   |                    | • | • |
| <b>i</b>        | Intrinsic safety      | ia<br>EN 60079-11<br>CEI 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<br>EN 60079-11<br>CEI 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). |                    | • | • |
| <b>m</b>        | Encapsulation         | CEI 60079-18                      | For this protection mode, all the electronics is encapsulated in an insulating material to prevent electrical arcs or electrical sparks.   |                    | • | • |
| <b>n</b>        | Zone 2                | CEI 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.   |                    |   | • |
| <b>o</b>        | Immersion in oil      | CEI 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.  |                    | • | • |
| <b>p</b>        | Internal overpressure | CEI 60079-2                       | A pressurized gas is introduced in the enclosure to prevent the possibly-explosive surrounding atmosphere from entering the enclosure,   |                    | • | • |
| <b>q</b>        | Powdery filler        | CEI 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     |                       | Carbon disulfide |
| Benzene   | Ethanol        | Cycloprodene    |                       |                  |
| Pentane   | Paint thinners | Butadiene 1-3   |                       |                  |
| Heptane   | Natural gas    | 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 |
|-------------------|---|--|
| <b>T1</b>         | 450°C   | > 450°C                                      |
| <b>T2</b>         | 300°C   | > 300°C                                      |
| <b>T3</b>         | 200°C   | > 200°C                                      |
| <b>T4</b>         | 135°C   | > 135°C                                      |
| <b>T5</b>         | 100°C   | > 100°C                                      |
| <b>T6</b>         | 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 (94/9/CE) |
|----------------------------------|-----------------------------|--------------------|
| <b>Ga</b>                        | 0 (and 1 and 2)             | 1G                 |
| <b>Gb</b>                        | 1 (and 2)                   | 2G                 |
| <b>Gc</b>                        | 2                           | 3G                 |
| <b>Da</b>                        | 20 (and 21 and 22)          | 1D                 |
| <b>Db</b>                        | 21 (and 22)                 | 2D                 |
| <b>Dc</b>                        | 22                          | 3D                 |
| <b>Ma / Mb</b>                   | mines                       | M1 / M2            |

## 8 Protection modes for electrical equipment in dusty atmospheres

| Protection mode |                           | Standard                  | Basic principle  | Applicable in ZONE |    |    |
|-----------------|---------------------------|---------------------------|--|--------------------|----|----|
|                 |                           |                           |  | 20                 | 21 | 22 |
| <b>i</b>        | Intrinsic safety          | <b>ia</b> EN/CEI 61241-11 | 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). | •                  | •  | •  |
|                 |                           | <b>ib</b> EN/CEI 61241-11 | 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). | •                  | •  | •  |
| <b>m</b>        | Encapsulation             | EN/CEI 61241-18           | For this protection mode, all the electronics is encapsulated in an insulating material to prevent electrical arcs or electrical sparks.   | •                  | •  | •  |
| <b>p</b>        | Internal overpressure     |                           | A pressurized gas is introduced in the enclosure to prevent the possibly-explosive surrounding atmosphere from entering the enclosure.   | •                  | •  | •  |
| <b>t</b>        | Explosion proof enclosure | EN/CEI 61241-1            | 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  |
|-------------------|--------------------------------|--|
| <b>Group IIIA</b> | 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. |
| <b>Group IIIB</b> | Non-conductive dust            | Combustible dust electrical resistivity greater than $10^3 \Omega \cdot m$ . Size <500 microns   |
| <b>Group IIIC</b> | Conductive dust                | Combustible dust electrical resistivity at or below $10^3 \Omega \cdot m$ . Size <500 microns  |

## 10 Maximum surface temperature for dusty atmospheres

## 11 Ingress Protection Rating (IP) for dusty atmospheres

## 12 LCIE: Laboratory certifying approval in 2007, No. 6008

## 4- Product features

### 4.1 Transmitter XDE

The transmitter comes in 2 housing versions: **6** function nb buttons or **10** function buttons. Each version also has a «On/Horn» button and an emergency stop palm switch.

The two versions are characterised by a modular design allowing installation, in each button position, of 6 different types of function buttons, such as:

- One-step pushbutton (single speed)
- Two-step pushbutton (double speed)
- Rotary switch with 2 fixed positions
- Rotary switch with 3 fixed positions
- Rotary switch with 3 positions with automatic return
- Electronic switch with 3 fixed positions

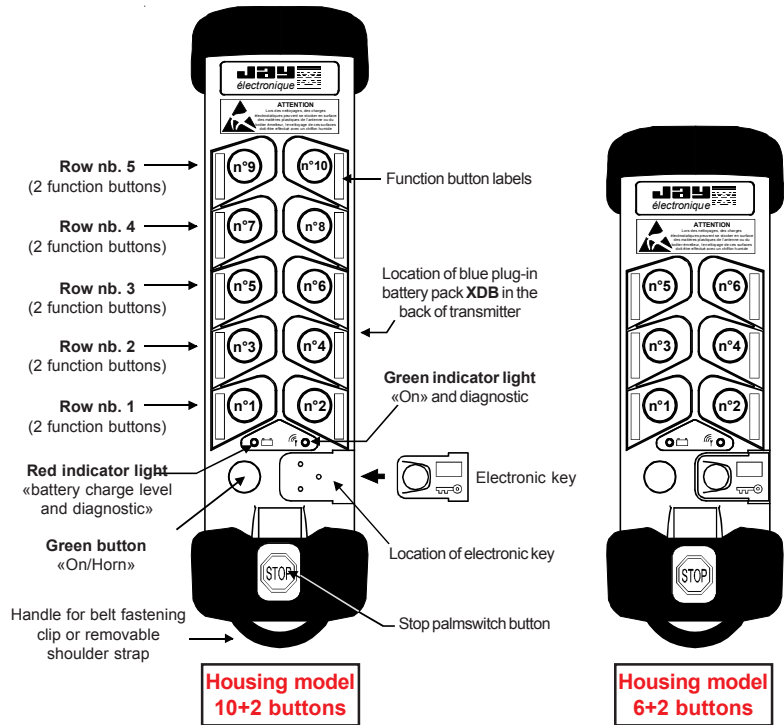
Two parameters can be easily adapted to the environment by a trained operator :

- Operating radio frequency
- Duration of temporization for «dead man» function (Automatic shutdown of remote control in case of prolonged non use)

These operations are performed by procedures implementing buttons nb.1, nb. 2, nb. 3, the emergency stop palm switch and the «On/Horn» button, with no need to open the transmitter or receiver.

The change of parameter can be however locked.

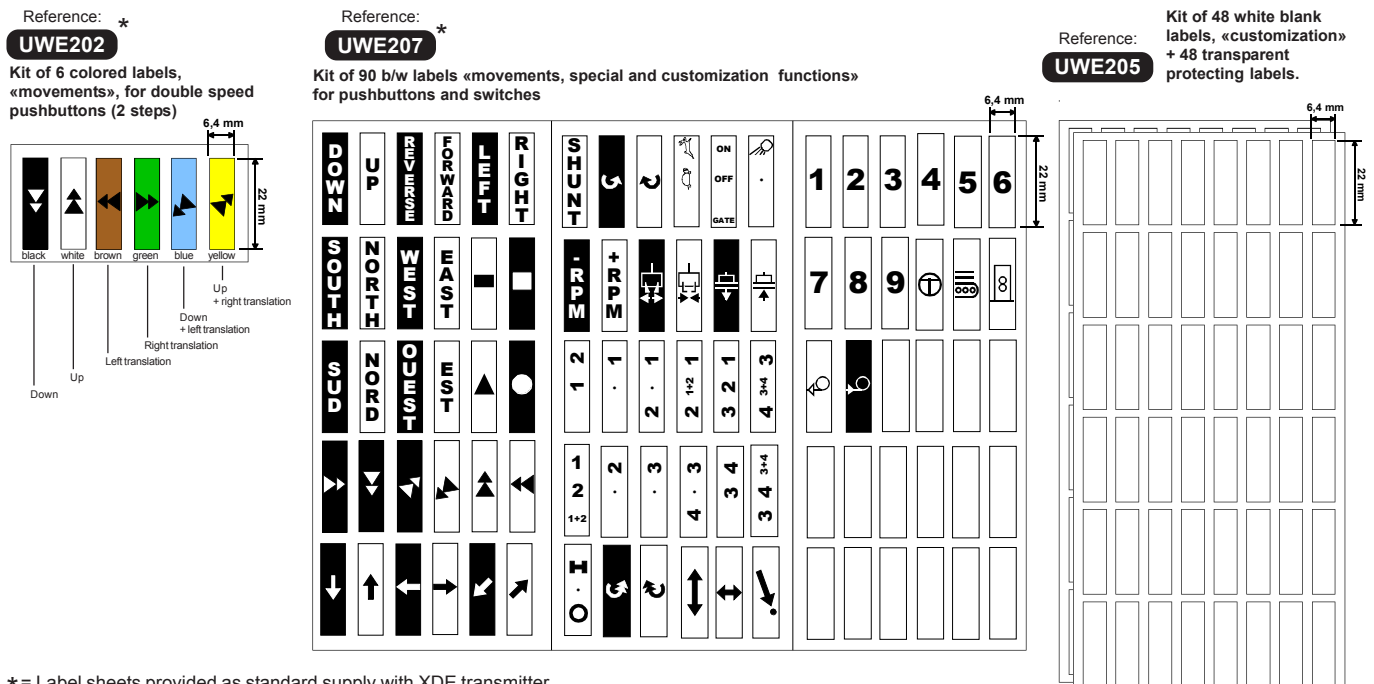
The electronic key contains all the parameters of the remote control, it is possible to use an auxiliary transmitter only with the electronic key and a validation procedure.



### 4.2 XDE transmitter function button labels

The various button functions are identified by means of adhesive labels placed in the recesses provided in the transmitter unit housing at each button location.

The labels are supplied in the form of sheets with the various labels you will need for your application. Simply choose the labels corresponding to your configuration.



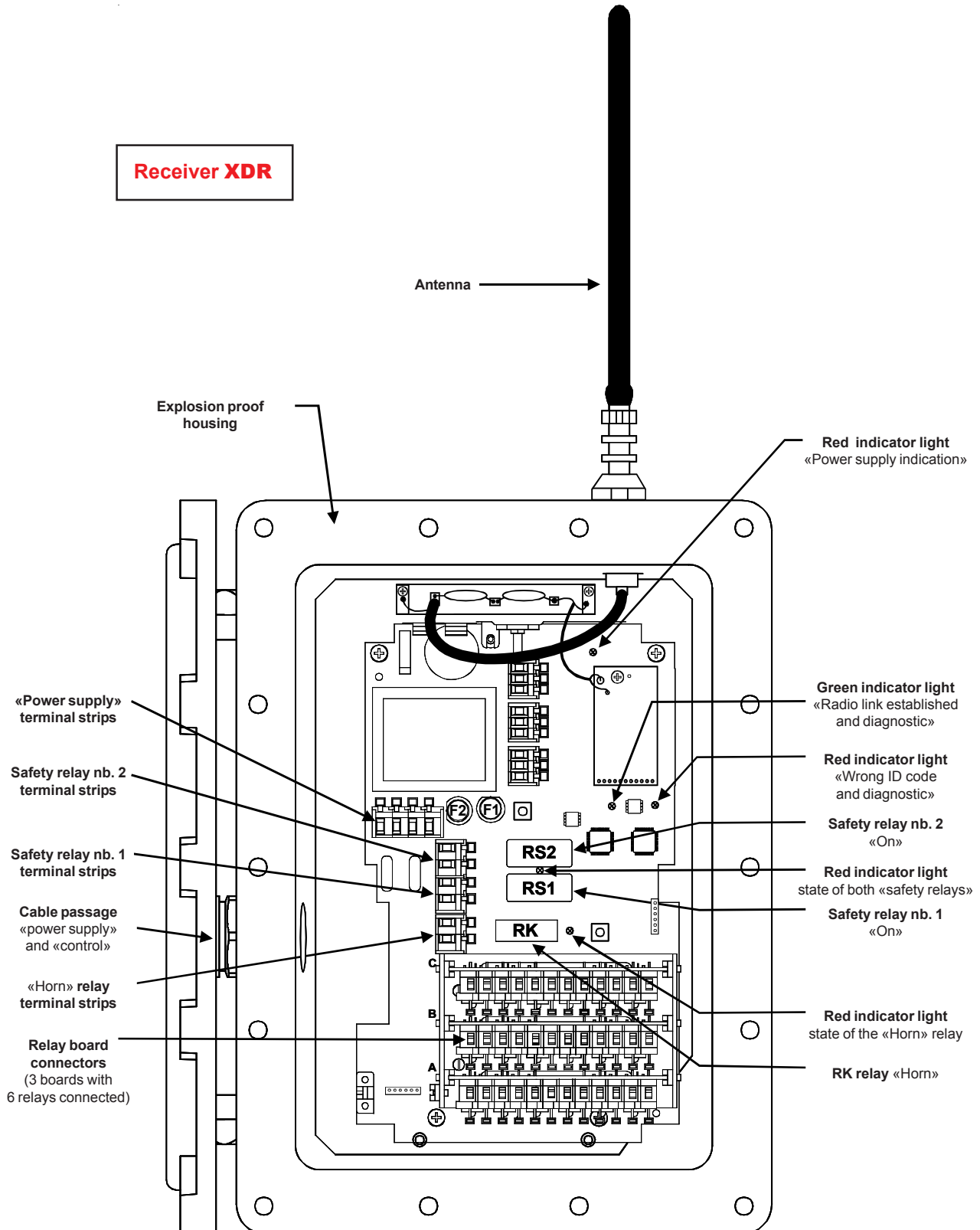
\* = Label sheets provided as standard supply with XDE transmitter

## 4.3 Receiver XDR

The receiver comprises a basic board on which **3 boards with 6 control relays** are connected.

The basic board systematically comprises:

- **1 «Horn» relay**  
(active when the transmitter «On/Horn» button is pressed, not auto-maintained)
- **2 safety relays**  
(active when the transmitter «On/Horn» button is pressed, auto-maintained until passive or active stop)

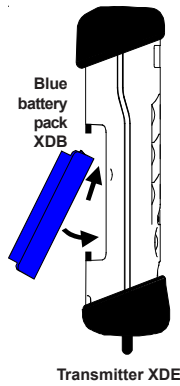


## 4.4 Battery pack XDB and charger UCCU

The blue battery pack **XDB** connects on the back of the transmitter **XDE**; the packs are thus quick and easy to change.

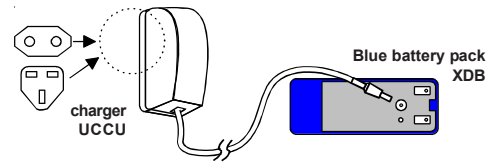
The battery pack is safely locked to the transmitter back by a mechanical locking system.

**Note :** the battery pack **XDB** can be connected and disconnected inside the **ATEX** area.



The blue battery pack **XDB** is re-chargeable using the charger **UCCU**.

**The charging operation must be performed outside the ATEX area.**



The indicator light on the blue battery pack allows you to monitor its charge status:

**Orange:** fast charge  
**Green:** slow and holding charge (level > 60%)

## 5- Safety aspects

The **XD** remote controls implement numerous safety features, in particular:

### Transmitter / receiver communication safety features:

- Permanent radio link : by its non-directional design and insensitivity to the presence of obstacles, the operator is protected from exposure to handling risks during precision manoeuvres and movements.
- Each transmitter+receiver pair has its own specific identity code.
- Hamming distance (minimum number of bits that differ between 2 messages that are different) of 4.

### Receiver safety features:

- A passive shutdown device shuts down the system if the radio link is jammed.
- Category 3 safety per EN 954-1 is ensured by redundant control of the emergency stop circuit and use of guided contact safety relays.
- Contradictory commands can be interlocked electrically.
- Use of an explosion proof housing and an intrinsic safety solution for compliance with ATEX rules in accordance with marking indicated.

### Functional safety features:

- Start-up sequences are implemented to ensure safe operation by a trained, experienced operator.
- 55 ms response time compatible with the movement speeds of equipment controlled.

### Transmitter safety features:

- An active priority general shutdown command is generated when the «stop palmswitch button» is pressed.
- An electronic key limits access to the system to authorised persons only.
- An indicator light indicates an alarm in the event of an insufficiently charged battery.
- A «dead man» function shuts down the transmitter after a pre-programmed time period (1 to 98 mn or 1 to 99s) when no controls have been generated. This function can be disabled at any time to meet specific needs.
- Buttons protected mechanically against unintentional actions.
- Use of an intrinsic safety solution for compliance with ATEX rules in accordance with marking indicated.

## 6- Programmable radio frequencies

Adjacent intervals : 0,025 MHz

### 433-434 MHz Bands

| Radio channel | Frequency MHz |
|---------------|---------------|
| 01            | 433.100 *     |
| 02            | 433.125       |
| 03            | 433.150       |
| 04            | 433.175       |
| 05            | 433.200       |
| 06            | 433.225       |
| 07            | 433.250       |
| 08            | 433.275       |
| 09            | 433.300       |
| 10            | 433.325       |
| 11            | 433.350       |
| 12            | 433.375       |
| 13            | 433.400       |
| 14            | 433.425       |
| 15            | 433.450       |
| 16            | 433.475       |

| Radio channel | Frequency MHz   |
|---------------|-----------------|
| 17            | 433.500         |
| 18            | 433.525         |
| 19            | 433.550         |
| 20            | 433.575 (1)     |
| 21            | 433.600         |
| 22            | 433.625 (1)     |
| 23            | 433.650         |
| 24            | 433.675 (1)     |
| 25            | 433.700         |
| 26            | 433.725 (1)     |
| 27            | 433.750         |
| 28            | 433.775 (1)     |
| 29            | 433.800 (2)     |
| 30            | 433.825 (1) (2) |
| 31            | 433.850 (2)     |
| 32            | 433.875 (1) (2) |

| Radio channel | Frequency MHz   |
|---------------|-----------------|
| 33            | 433.900 (2)     |
| 34            | 433.925 (1) (2) |
| 35            | 433.950 (2)     |
| 36            | 433.975 (1) (2) |
| 37            | 434.000 (2)     |
| 38            | 434.025 (1) (2) |
| 39            | 434.050 (2)     |
| 40            | 434.075 (2)     |
| 41            | 434.100 (2)     |
| 42            | 434.125 (2)     |
| 43            | 434.150 (2)     |
| 44            | 434.175 (2)     |
| 45            | 434.200 (2)     |
| 46            | 434.225 (2)     |
| 47            | 434.250 (2)     |
| 48            | 434.275 (2)     |

| Radio channel | Frequency MHz |
|---------------|---------------|
| 49            | 434.300 (2)   |
| 50            | 434.325 (2)   |
| 51            | 434.350 (2)   |
| 52            | 434.375 (2)   |
| 53            | 434.400 (2)   |
| 54            | 434.425 (2)   |
| 55            | 434.450 (2)   |
| 56            | 434.475 (2)   |
| 57            | 434.500 (2)   |
| 58            | 434.525 (2)   |
| 59            | 434.550 (2)   |
| 60            | 434.575 (2)   |
| 61            | 434.600 (2)   |
| 62            | 434.625 (2)   |
| 63            | 434.650 (2)   |
| 64            | 434.675 (2)   |

### 869 MHz Band

| Radio channel | Frequency MHz |
|---------------|---------------|
| 01            | 869.9875 *    |
| 02            | 869.9625      |
| 03            | 869.9375      |
| 04            | 869.9125      |
| 05            | 869.8875      |
| 06            | 869.8625      |
| 07            | 869.8375      |
| 08            | 869.8125      |
| 09            | 869.7875      |
| 10            | 869.7625      |
| 11            | 869.7375      |
| 12            | 869.7125      |

\* = The transmitters and receivers are supplied programmed in their standard configuration on channel No. 01

(1)= List of frequencies available for Denmark  
(2)= List of frequencies available for Singapore

# 7- Technical characteristics

## 7.1 Transmitter XDE

| ATEX characteristics  |  |
|---|--|
| Utilization zones: Zones 0, 1, 2, 20, 21 and 22   |  |
| Protection mode: intrinsic safety   |  |
| Markings:<br><div style="text-align: center;"> <p>CE 0081 Ex II 1 GD</p> <p>Ex ia IIB T5 Ga</p> <p>Ex ia IIIC T100°C Da IP65</p> <p>LCIE 07 ATEX 6008 X</p> <p>WARNING – POTENTIAL ELECTROSTATIC CHARGE</p> <p>HAZARD – SEE INSTRUCTIONS</p> </div>   |  |
| Mechanical, functional and environmental characteristics  |  |
| Housing: ABS Choc, yellow - IP65 - Mechanical button protection   |  |
| Weight (with battery pack)<br>6 function buttons: 400 g<br>10 function buttons: 490 g   |  |
| Dimensions<br>6 function buttons: 232x82x64 mm<br>10 function buttons: 288x82x64 mm   |  |
| Operating temperature range -20°C to +50°C  |  |
| Storage temperature range (without battery pack): -30°C to +70°C  |  |
| Storage temperature range (with battery pack): -30°C to +35°C   |  |
| Electrical and radio characteristics  |  |
| Power supply: Plug-in Li ion battery  |  |
| Endurance transmit time/buttons typical average use (at +25°C)<br>Frequency 433-434MHz bands: 24 hours / 50% transmit time<br>Frequency 869MHz band: 20 hours / 50% transmit time   |  |
| Transmit frequency<br>64 user-programmable in 433-434MHz bands (see list on page 7)<br>12 user-programmable in 869MHz band (see list on page 7)   |  |
| Transmit power: <10 mW (license not required) built-in antenna  |  |
| Modulation : FM   |  |
| Average range (XDR with antenna VUB084) (1)<br>100 m in typical industrial environment<br>300 m in unobstructed area  |  |
| Functional characteristics  |  |
| Functions<br>6 different kinds of function buttons :<br>- One-step pushbutton (single speed) "BPSV" (1)<br>- Two-step pushbuttons (double speed) "BPDV" (1,2)<br>- rotary switch with 2 fixed positions "COM2" (1,2)<br>- rotary switch with 3 fixed positions "COM3" (1,2)<br>- rotary switch with 3 positions with auto. return "COM3R" (1,2)<br>- electronic switch with 3 fixed positions "BPTR" (1)<br>1 pushbutton "On/Horn"<br>1 active priority emergency stop palmswitch<br>1 electronic key |  |
| "Dead man" function<br>Time is user-programmable  |  |
| Indicator lights<br>1 red "battery level" and diagnostic indicator light<br>1 green "On" and diagnostic indicator light   |  |

## 7.2 Battery pack XDB

| Mechanical, functional and environmental characteristics   |  |
|--|--|
| Housing : ABS Choc, blue, plug-in - IP40   |  |
| Dimensions : 40x96x23 mm   |  |
| Storage temperature range: -30°C to +35°C  |  |
| Slow charge temperature: 0°C to +45°C  |  |
| Fast charge temperature: 0°C to +35°C  |  |
| Complete charge time: 7 hours  |  |
| Resulting endurance in accordance with partial charges (at +20°C)<br>10 min. of charging provide around 1 hour of endurance (utilization at 100%)<br>1 hour of charging provides around 8 hours of endurance (utilization at 100%)<br>6 hours of charging provide around 12 hours of endurance (utilization at 100%) |  |
| Indicator lights<br>- 1 indicator light on battery pack (charging)<br>Orange = fast charge<br>Green = slow and holding charge<br>- 1 red indicator light on transmitter (battery low)  |  |
| Charge voltage: 5 VDC (by charger UCCU)  |  |

## 7.3 Receiver XDR

| ATEX characteristics   |  |
|--|--|
| Utilization zones: Zones 1, 2, 21 and 22   |  |
| Protection mode: Explosion proof + intrinsic safety  |  |
| Markings:<br><div style="text-align: center;"> <p>CE 0081 Ex II 2 GD</p> <p>Ex d ia IIB T6 Gb</p> <p>Ex t IIIC T80°C Db IP65</p> <p>LCIE 07 ATEX 6034 X</p> <p>WARNING – DO NOT OPEN WHEN ENERGIZED</p> <p>WARNING – DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT</p> </div>  |  |
| Mechanical and environment withstand characteristics   |  |
| Housing<br>Aluminium alloy – grey RAL7005<br>IP65  |  |
| Weight<br>20 kg (approx.)  |  |
| Dimensions<br>280x370x180 mm (Not including antenna)   |  |
| Operating temperature range<br>-20°C to +50°C  |  |
| Storage temperature range<br>-30°C to +70°C  |  |
| Cable lead-out<br>1 PE ¼" metal, with 3 seals 15-18, 18-21 and 21-24 mm  |  |
| Connection<br>Spring-type terminal strips for 0.08" to 2.5" section wires  |  |
| Electrical and radio characteristics   |  |
| Characteristics complying with ETS 300 220   |  |
| Frequency<br>64 programmable frequencies in 433-434 MHz bands (see list on page 7)<br>12 programmable frequencies in 869 MHz band (see list on page 7)   |  |
| Sensitivity<br>< -100dBm   |  |
| Electrical characteristics   |  |
| Power supply and consumption (2)<br>(with 2 safety relays and 10 control relays pulled in)<br>DC version<br>- 12VDC, 0 to +25%, 675mA and 188mA when idle<br>- 24VDC, -15% to +20%, 675mA and 188mA when idle<br>AC version n°1<br>- 24VAC, -15% to +10%, 850mA<br>- 48VAC, -15% to +10%, 400mA<br>AC version n°2<br>- 115VAC, -15% to +10%, 180mA<br>- 230VAC, -15% to +10%, 85mA |  |
| Control<br>1 "Horn" relay + 18 function relays   |  |
| Safety<br>2 relays with linked and guided contacts   |  |
| Outputs<br>Independent NO relays<br>- Category DC13 0,5A / 24VDC , AC15 2A / 230VAC<br>- Max. breaking capacity 2000VA<br>- Max. current 8A (control relay), 6A (safety relays)<br>- Min. current 10 mA (12 Vmin.)<br>- Max. voltage 250VAC<br>- Service life under 230VAC, 70VA, cosphi=0,75 : 3x10 <sup>6</sup> cycles   |  |
| Response time<br>- On start-up: 0,5s max.<br>- On control: 55 ms max.  |  |
| Active shutdown time<br>145 ms max.  |  |
| Passive shutdown time<br>1,1 s max.  |  |
| Indicator lights<br>- 1 red "power on" indicator light<br>- 1 red + 1 green indicator lights for diagnostic<br>- 1 red status indicator light per relay  |  |
| Protections<br>Power supply:<br>- Against polarity inversions for DC versions<br>- Against overcurrents by fuse  |  |

- (1)= Range will vary according to environment conditions of transmitter and reception antenna (metal frameworks, walls ... ).  
 (2)= The number of control relays controlled simultaneously is limited to 10 relays.



## 7.4 Compatibility with our **XD**, **UD** and **UR** remote controls

A transmitter **XDE** can be operated with a receiver **UDR** of our **UD** series (see sales brochure E330) or with a receiver **URR** of our **UR** series (see sales brochure E730).

A transmitter **UDE** of our **UD** series (see sales brochure E330) or a transmitter **URE** of our **UR** series (see sales brochure E730) can be operated with a receiver **XDR**.

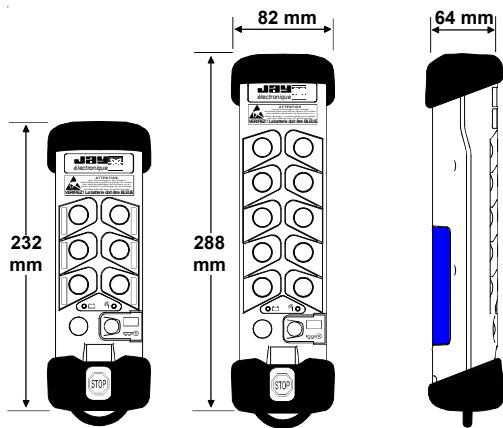


This utilization configuration implies that the transmitter or receiver of the UD or UR series is not located, under any circumstances, in an explosible atmosphere. Only the transmitter or receiver of the XD series (ATEX approved) can be used in this type of hazardous environment.

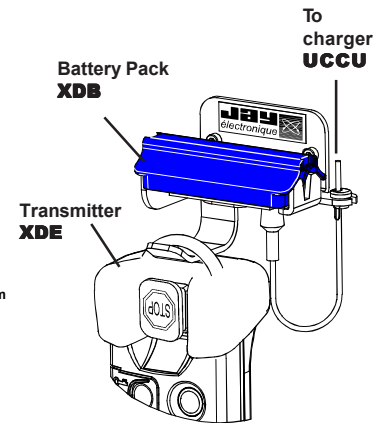
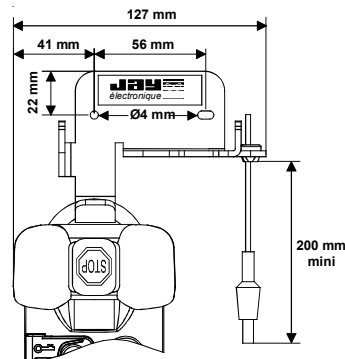
## 8- Dimensions

### Transmitter **XDE**

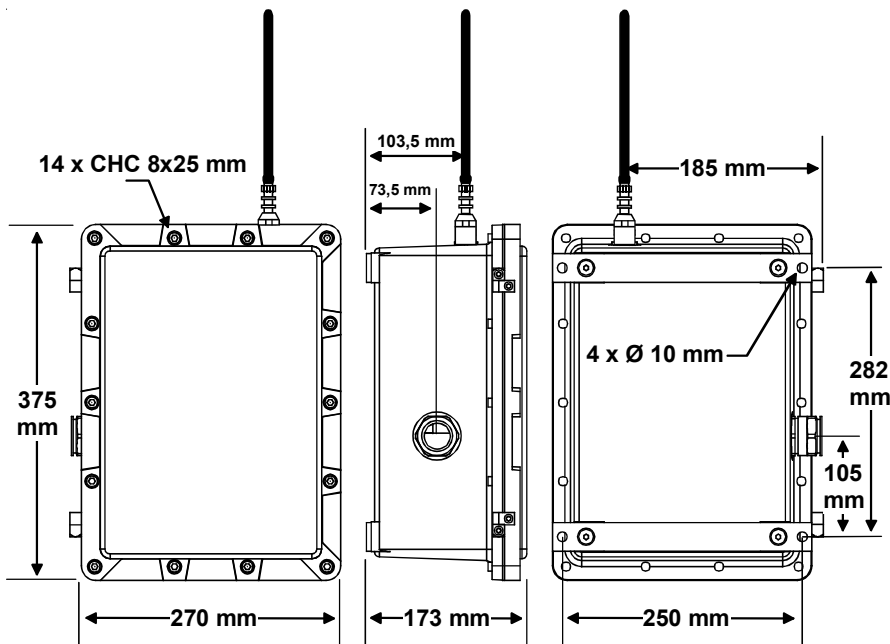
(6+2 and 10+2 button housing models)



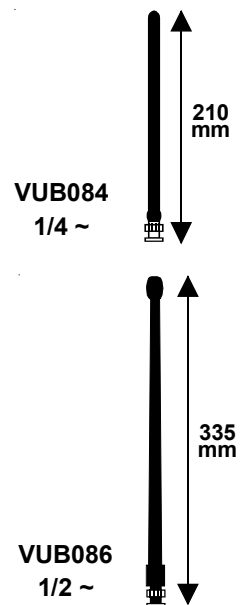
### Wall bracket **UDC1**



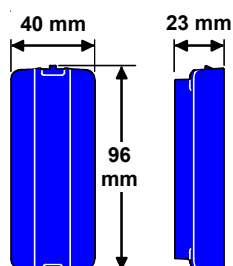
### Receiver **XDR**



### Antennas **VUB00**

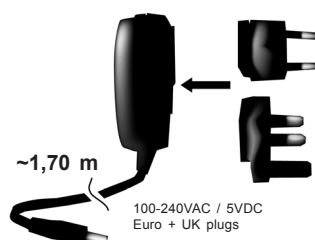


### Battery pack **XDB**

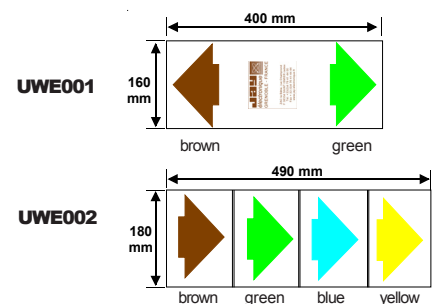


### Charger **UCCU**

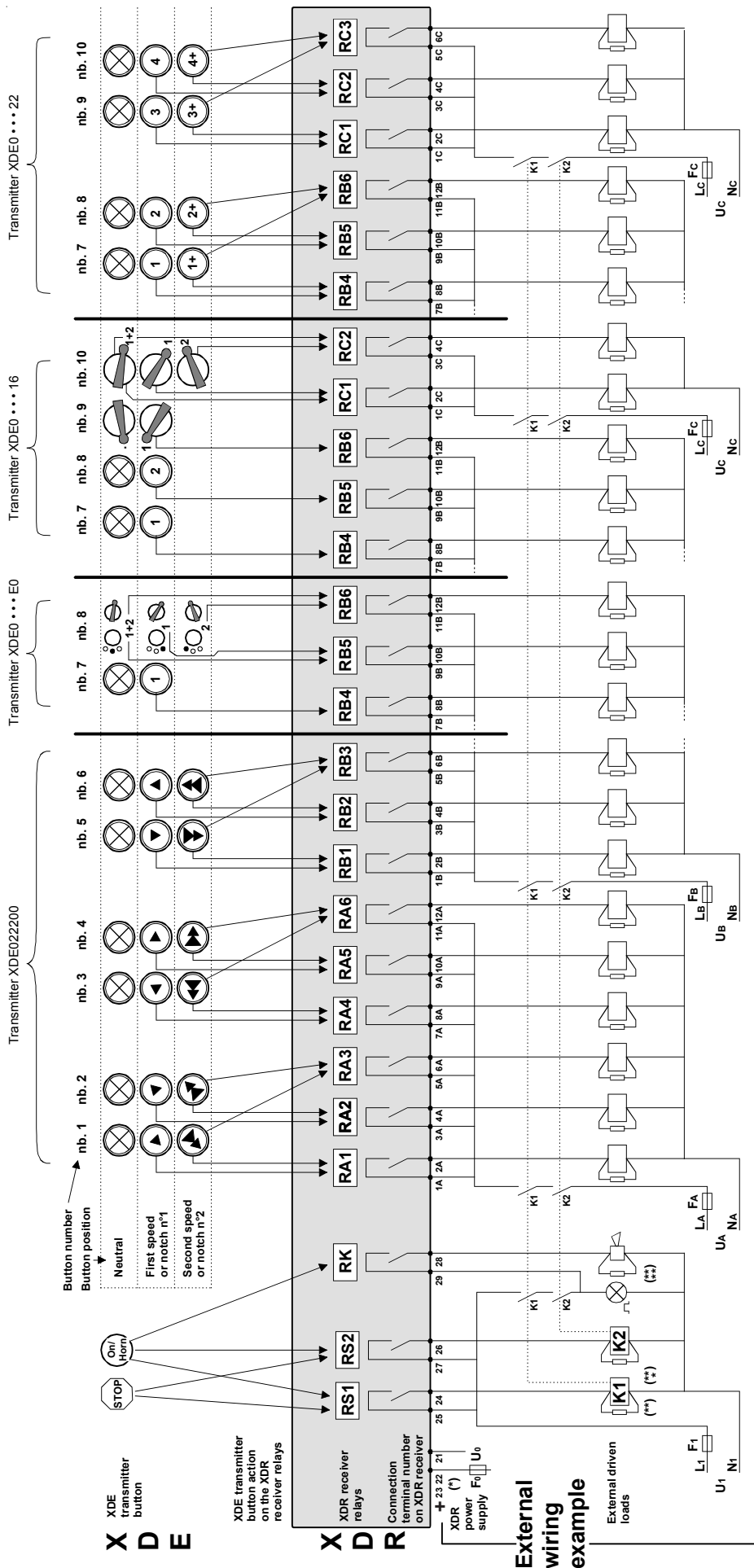
(to recharge battery pack **XDB**)



### Directional arrows **UWE00**



# 9- Example of wiring diagram



(\*)=The power supply connection depends on the type of receiver and the power supply required. (terminals 23-21 for power supplies 12VDC, 24VAC, 115VAC or 22-21 for power supplies 24VDC, 48VAC, 230VAC)

(\*\*)= Relay life is increased by the use of surge limiters (ex. RC network for AC, Zener + diodes for DC, etc...)

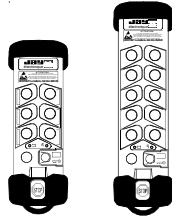
(\*\*\*)= K1 and K2 contactors must have guided contacts

(\*\*\*\*)= Elements which indicate start of remote controlled machines (ex. : horn, rotating/flashing light, etc...)

Safety relays RS1 and RS2 are switched on by the pushbutton "On/Horn", and held in position until the emergency stop palmswitch is pressed (active shutdown) or until the loss of the radio transmission (passive shutdown).

# 10- Selection guide, references for ordering

## 10.1 Transmitter XDE



Type of function buttons (2) on first row (starting from bottom of transmitter)

Type of function buttons (2) on second row

Type of function buttons (2) on third row

10+2 button version: Type of function buttons (2) on fourth row  
or  
6+2 button version: write 0 (zero)

Type of communication and version:  
0 = Radio 433-434MHz bands  
2 = Radio 433-434MHz bands without electronic key (1)  
A = Radio 869MHz band  
C = Radio 869MHz band without electronic key (1)

10+2 button version: Type of function buttons (2) on fifth row  
or  
6+2 button version: write 0 (zero)

(1)= Only for auxiliary transmitter.

**(2)= Types of function buttons per row :**

|                |         |                  |       |
|----------------|---------|------------------|-------|
| 1 = BPSV, BPSV | ① ①     | 8 = BPSV, COM3R  | ① ② ③ |
| 2 = BPDV, BPDV | ①,2 ①,2 | 9 = COM2, COM3R  | ① ② ③ |
| 3 = BPSV, COM2 | ① ② R   | A = COM3, COM3R  | ① ② ③ |
| 4 = BPSV, COM3 | ① ② R   | B = COM3R, COM3R | ① ② ③ |
| 5 = COM2, COM2 | ① ② R   | C = Cover, cover | ○ ○   |
| 6 = COM2, COM3 | ① ② R   | D = BPSV, BPTR   | ① ② ③ |
| 7 = COM3, COM3 | ① ② R   | E = COM2, BPTR   | ① ② ③ |

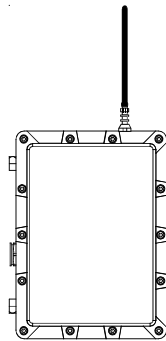
Contact us concerning programming restrictions due to the use of switches on row 1 and row 2.

**X D E** [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

### Example : XDE012600

Radio transmitter XDE (433-434MHz bands), radio channel nb.01 (433,100MHz), 6+2 button housing model, with electronic key, button configuration: 1<sup>st</sup> row BPSV-BPSV, 2<sup>nd</sup> row BPDV-BPDV, 3<sup>rd</sup> row COM2-COM3, supplied with label sheets ref.: **UWE202** and **UWE207**.

## 10.2 Receiver XDR



Power supply:  
4 = 12 - 24 VDC  
A = 24 - 48 VAC  
B = 115 - 230 VAC

Type of communication:  
0 = Radio 433-434MHz bands  
A = Radio 869MHz band

Match-up programming  
Transmitter XDE buttons – Receiver XDR relays:  
Number of relays controlled by type BPDV button pairs (double-action pushbuttons) of transmitter  
1 = 3 relays controlled or no BPDV on transmitter  
2 = 4 relays controlled

Match-up programming  
Transmitter XDE buttons – Receiver XDR relays:  
Type of control for BPTR, COM3, COM3R (3-position selector switch) buttons of transmitter  
1 = Type: 1/1 + 2/2 or no COM3/COM3R/BPTR on transmitter  
2 = Type: 1/OFF/2  
3 = Type: 1/2/1+2

**X D R** [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] - [ ] [ ] [ ]

Interlocking programming between pushbuttons (BPSV or BPDV type)  
nb. 1 and nb. 2, nb. 3-nb. 4, and nb. 5-nb. 6:  
0 = no interlocking or COM (selector switch) on each row  
1 = interlocking with deactivation of the output relays  
2 = interlocking with priority to Left button (i.e. button Nb. 1, Nb. 3 and Nb. 5)  
3 = interlocking with priority to Right button (i.e. button Nb. 2, Nb. 4 and Nb. 6)

### Example : XDR0CB00 - 012

Radio receiver XDR (433-434MHz bands), radio channel nb.01 (433,100MHz), 18+3 relays (18 function relays + 2 safety relays + «Horn» relay), 115-230VAC power supply, without programmed interlocking, without BPDV on transmitter; BPTR, COM3 and COM3R buttons, if present, on transmitter are type 1-OFF-2.

## 10.3 Accessories

### IMPORTANT



All other accessories for transmitter/receiver not listed on this page (case, strap, etc. ...) must be removed before entering ATEX zone.

#### ◆ Accessories for transmitter XDE:

| Reference | Description  |
|-----------|--|
| UCCU      | Charger 100-240VAC/5VDC (Euro and UK plugs) for XDB battery pack charging (1)  |
| XDB       | Plug-in blue battery pack (1) (2)  |
| UDC1      | Wall bracket for stowing and battery pack charging when idle (1)   |
| UDWE22 X  | Programmed electronic key (key number to be specified) (2)   |
| UWE202    | Kit with 6 colour "movement" labels for two-step pushbuttons (double speed) (2)  |
| UWE205    | Kit with 48 white blank labels for customised marking  |
| UWE207    | Kit with 90 black/white "movement, special functions and customisation" labels for selector switches and pushbuttons (2) |

#### ◆ Accessories for receiver XDR:

| Reference | Description   |
|-----------|---|
| VUB084    | 1/4 wave antenna straight, BNC (2)  |
| VUB086    | 1/2 wave antenna straight, BNC  |
| VUB060    | 90° BNC elbow for antenna VUB084 or antenna extension (3)                 |
| VUB105    | 2 m antenna extension BNC + bracket (4)                                   |
| VUB125    | 5 m antenna extension BNC + bracket (4)                                   |
| VUB131    | 10 m antenna extension BNC + bracket (4)                                  |
| UWE001    | Adhesive 2-way directional arrows, colour coded, for travelling crane     |
| UWE002    | Adhesive 4-way directional arrows, colour coded, for travelling crane (2) |
| UDWR12    | Common wiring accessory (2)   |

(1)= **CAUTION:** the blue battery pack XDB must only be charged outside the ATEX zone.

(2)= 1 accessory supplied with product

(3)= Not suitable for direct connection to antenna Ref.: VUB086; in this case, use an intermediate extension type VUB1\*\*

(4)= When using an antenna extension, make sure that the structure on which the support bracket is mounted has the same equipotential as the structure on which the receiver unit is mounted.

The products presented in this document are subject to change. Product descriptions and characteristics are not contractually binding. Please go to our internet site [www.jay-electronique.fr](http://www.jay-electronique.fr) to download the most recent updates to our documentation.

**E810 H - 1011**

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