

UBEP

User's Manual

Introduction

UBEP (PACHOM® Electronic Zoning protection unit) is a patented device used for the PACHOM® collision prevention system. The purpose of UBEP unit is to create the protection zone in specific areas around trucks and machinery (front, rear, sides, etc.) defining the area very precisely. Configuration (Preset, Standard or Custom) of this unit is done with UCP unit.

UBEP can be used as a system together with UPI units to alert both pedestrians and drivers/operators that they are located within the protection zone. On the other side it can be used as a standalone device to alert only drivers/operators in case of alert condition.

UBEP device comes in two power source configurations – with and without the battery. In case of the version without the battery, the device has to be powered with External power supply. On the other hand in case of the version with the battery UBEP can work autonomously but without alarm output which requires the External voltage to be supplied.

In this User's Manual we will explain all the parts of UBEP device together with installation instructions.

Front Side

On the front side of UBEP unit there are several sections divided by function:

1. Display section
2. Camera section
3. PES section
4. RF section



Figure 1: Front Side

Back side

On the Back side of UBEP unit there are two items available:

1. Power Switch
2. External Connector

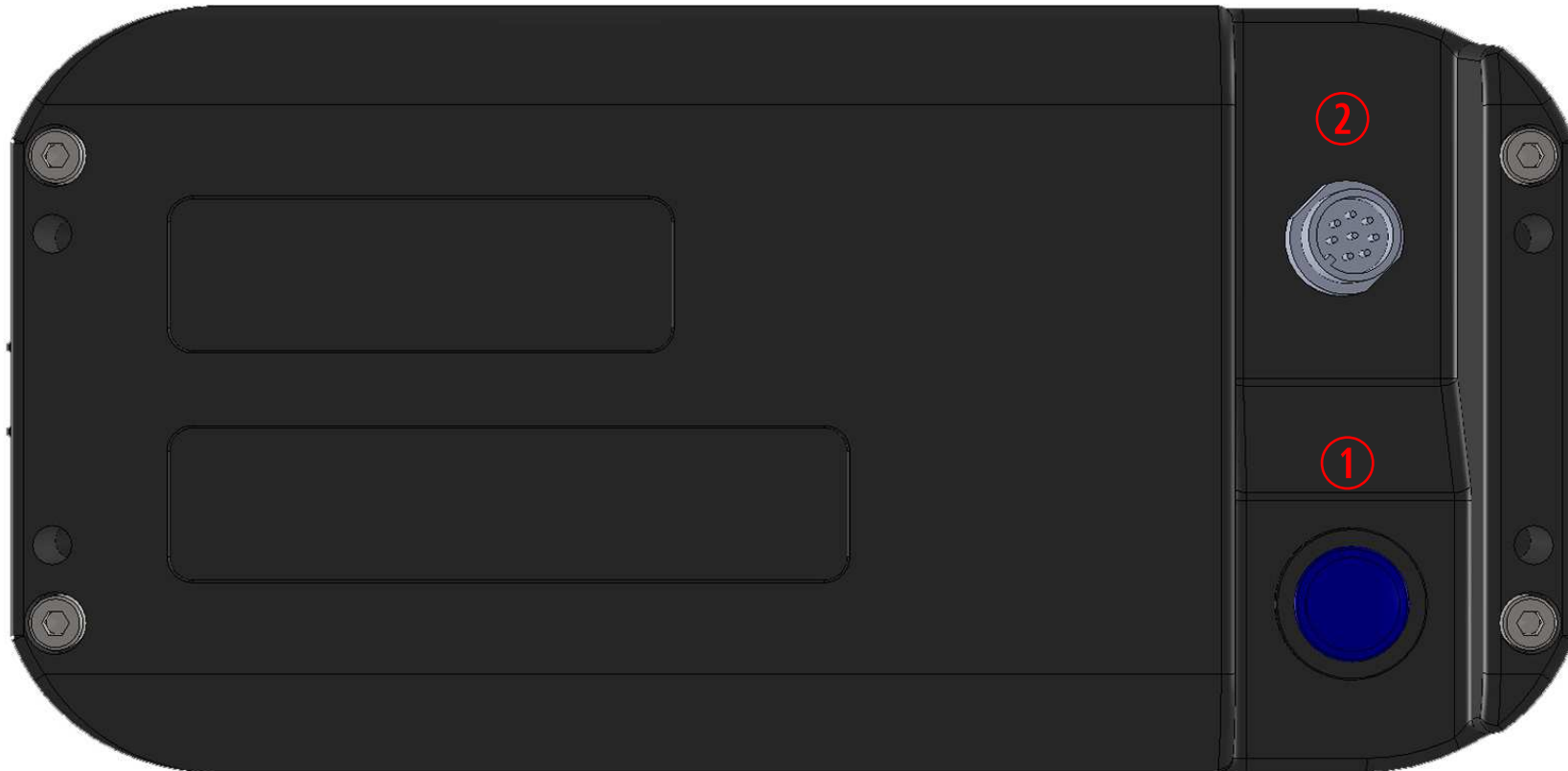


Figure 2: Back Side

Display Section

Display section contains monochromatic OLED display with resolution of 128x32px, Red Color Charging LED and RGB Status LED. OLED display has a big advantage compared to a commonly used TFT displays because it has very high contrast and can be read even on a sunlight.

Red Color Charging LED is located on the Top-Right side of the Display section. In case of the UBEP version without the battery this LED will be “On” whenever the device is connected to External Power Supply. In case of the UBEP version with the battery this LED will blink with 1 sec pace during battery charging and will be always “On” when charging is finished.

RGB Status LED is located on the Bottom-Right side of the Display section. This LED is capable of creating a variety of different colors and we use this colors in combination with OLED Display to provide a feedback to the user on the current status of device.

During UBEP unit start-up OLED Display will show the PACHOM® logo together with firmware revision number. During this period of 1 second UBEP unit will transmit its ID and will show a Green light on Status LED (refer to Figure 3.).



Figure 3: System Start-up

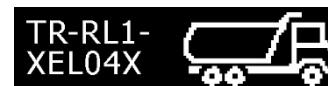
After the startup is finished if UBEP unit is blank (not yet configured) PACHOM® logo with revision number will remain on OLED Display and Status LED will blink with Red color every 2-3 seconds.

In order to configure UBEP unit operator must use UCP unit. There are four simple steps that operator should follow in order to perform this. Step 1, Pair UCP with UBEP unit. Step 2, Make custom configuration or select one of many Standard configurations available. Step 3, Send the configuration to the UBEP. Step 4, perform the test. For more information on this subject refer to UCP User’s Manual.

After the start-up is finished in case that UBEP is programmed with Custom Configuration you will see it written on OLED Display together with this image:



After the start-up is finished in case that UBEP is programmed with one of the Standard Configurations you will see the corresponding Configuration Code and Configuration Image presented on OLED Display. This is one of the possible Configuration Codes and Configuration Images that can be shown:







In next two pages we will explain the meaning of variety of colors that can be shown on Status LED and we will also explain the meaning of Configuration Codes.

Status LED

As we mentioned earlier Status LED can show a variety of different colors. Same colors can have different meaning depending if they are shown in continuous mode (operation), in slow pace blinking mode (system “hearth-beat”, passive mode) or in high pace blinking mode (system active mode).

Status LED in Continuous mode – Operation:


Duration: between 0.5sec and 5sec





-  Green Light in continuous mode means that UBEP is transmitting its ID, programming status or test mode status.
-  Blue Light in continuous mode means that UBEP is receiving configuration data.
-  Yellow Light in continuous mode means that UBEP is performing erase or write operation.
-  White Light in continuous mode means that UBEP is responding on “Check ID” command or entering test mode.

Status LED in slow pace blinking mode – System “hearth-beat”, passive mode:

Interval: every 2-3sec

Passive mode: This is the mode where UBEP is either not yet configured or it is monitoring the input conditions following the configuration but none of the conditions are yet met.





-  Blue Light in slow pace blinking mode means that UBEP unit is in passive mode and Power level is good.

-  Purple Light in slow pace blinking mode means that UBEP unit is in passive mode and Power level is in middle range.
-  Yellow Light in slow pace blinking mode means that UBEP unit is in passive mode and Power level is low.
-  White Light in slow pace blinking mode means that UBEP unit is in Test mode.
-  Red Light in slow pace blinking mode means that UBEP unit is blank (not yet configured).

Status LED in high pace blinking mode – System active mode:

Interval: several times per second

Active mode: This is the mode where UBEP is either in Alarm mode, transmitting the RF protection zone or both.

-  Purple Light in high pace blinking mode means that UBEP unit is in active mode or Test mode and transmitting RF protection zone based on On-Start condition.
-  Yellow Light in high pace blinking mode means that UBEP unit is in active mode and transmitting RF protection zone based on Condition 0, Condition 1, Condition 2 or Condition 3.
-  White Light in high pace blinking mode means that UBEP unit is in Test mode and transmitting RF protection zone based on Condition 0, Condition 1, Condition 2 or Condition 3.
-  Red Light in high pace blinking mode means that UBEP unit is in Alarm mode – holding active one of the alarm output lines either on Condition event or on Reply from UPI event. Red light has a priority over other active mode colors.

Configuration Codes

A A - P I # - M M M R F R F

APPLICATION NAME	POSITIONING	INPUT	SEQ NUMBER	10M MOTION	5M MOTION	2M MOTION	FIRST RF ZONE DISTANCE	SECOND RF ZONE DISTANCE
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- Application Name** Example: TR (Truck), FL (Forklift), GT (Gantry), DM (Demo) - Can be two letters only
- Positioning** Example: F (Front), R (Rear), S (Side), W (Warehouse), O (Open), B (Base), T (Table) - Can be only one letter
- Input** Example: L (Line-In), A (Accelerometer), X (Not used) - Can be only one letter
- 10M Motion** Example: X (Not used), C (standalone, continuous reading), L (conditioned with Input, Loop reading), E (conditioned with Input, Edge reading) - Can be only one letter
- 5M Motion** Example: X (Not used), C (standalone, continuous reading), L (conditioned with Input, Loop reading), E (conditioned with Input, Edge reading) - Can be only one letter
- 2M Motion** Example: X (Not used), C (standalone, continuous reading), L (conditioned with Input, Loop reading), E (conditioned with Input, Edge reading) - Can be only one letter
- 1st RF ZONE** Precision of the distance is 0.5m. If the distance is round number, mark it with number only. If the distance is not round number, use letter H to describe Half meter. If value is above 10 meters, the precision is 1meter. If RF zone is not used we must mark it with X. Can be only two letters/numbers
Example: X (Not used), 02 (2 meter), 2H (2.5 meter), 0H (0.5 meter), 10 (10 meter), 20 (20 meter)
- 2nd RF ZONE** Precision of the distance is 0.5m. If the distance is round number, mark it with number only. If the distance is not round number, use letter H to describe Half meter. If value is above 10 meters, the precision is 1meter. If RF zone is not used we must mark it with X. Can be only two letters/numbers
Example: X (Not used), 02 (2 meter), 2H (2.5 meter), 0H (0.5 meter), 10 (10 meter), 20 (20 meter).

Camera Section

Sony Wide Dynamic Range Eiffo CCD Sensor is equipped in the camera chamber inside the UBEP for sharp day and night imaging.



Figure 4: Camera

1. Day/Night Sensor
2. Available Lens angle: 17°, 32°, 54°, 78°, 115°
3. 4 High-Power Infra-red LEDs for night vision

Camera Specification:

- T.V. system PAL Standard, 1 Vtt composite video into 75Ω
- Light sensitivity <0.01 lux or 0 lux with IR
- Fixed focal, minimum object distance 0.3m
- NTSC system also available when requested

PES Section

PES (Pyroelectric sensor) is Pyroelectric Human motion detection sensor. UBEP unit is equipped with three Pyroelectric sensors each one specialized for detection within a defined range: 10 meter, 5 meter and 2 meter.

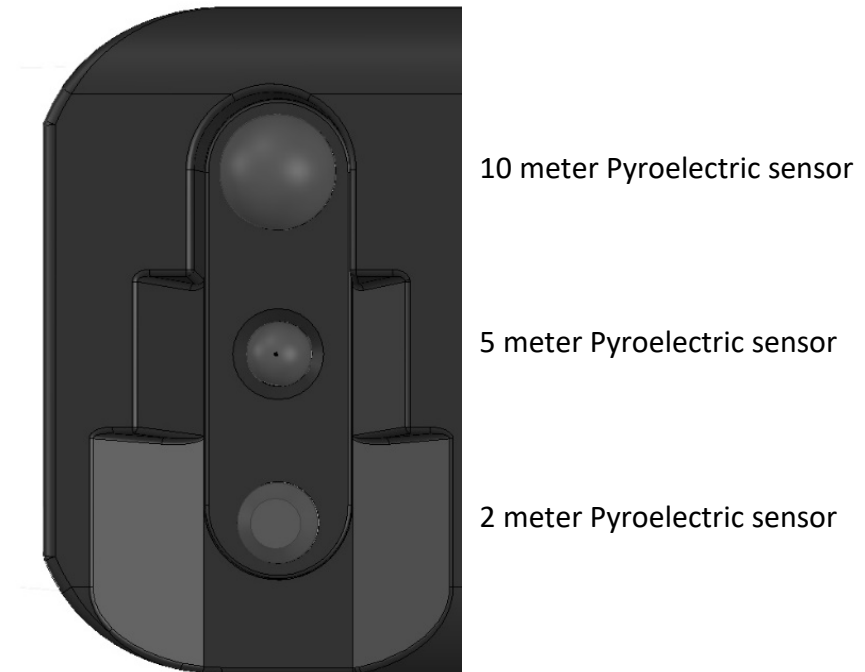


Figure 5: PES Sensors

Each Pyroelectric sensor can be selected to be used as trigger source for Alarm output or as a part of a condition combined with other inputs (Line-In for example).

RF Section

RF section is one of the most important parts of UBEP device since it is the one creating the protection zone in front of the device with a highly tuned size and precision.

UBEP device is operating with RF frequency of standard 2.4GHz ISM band, handled to avoid typical WIFI, Bluetooth and Zigbee channels FCC ID No. 2AKO2UBEP-C.

It is capable of creating the RF protection zone with various geometric proportions depending on model and adjustable size set by soft configuration. This give the UBEP unique feature of adjusting the size of protection zone between 0.5m and 25m in front of the unit for the standard version and up to 50m with the long range version.

By creating the protection zone UBEP unit is transmitting the coded commands that is interpreted by the UPI and TAG units on what kind of alert to execute to warn the pedestrian worker carrying UPI and weather UPI should Reply upon the reception of this command or not.

UBEP unit is capable of transmitting up to four different sizes of protection zones simultaneously with the shorter zone having the higher execution priority on UPI and TAG. This is excellent feature if you want to have different levels of protection within the working site.

For example, you can set up a high alert zone being active between the UBEP unit and 2 meter and low alert zone being active between 2 meter and 5 meter in front of the UBEP. Within high alert zone UPI can react with vary long and strong vibration showing RED color while within low alert zone UPI can react with vary short and mild vibration showing Yellow color.

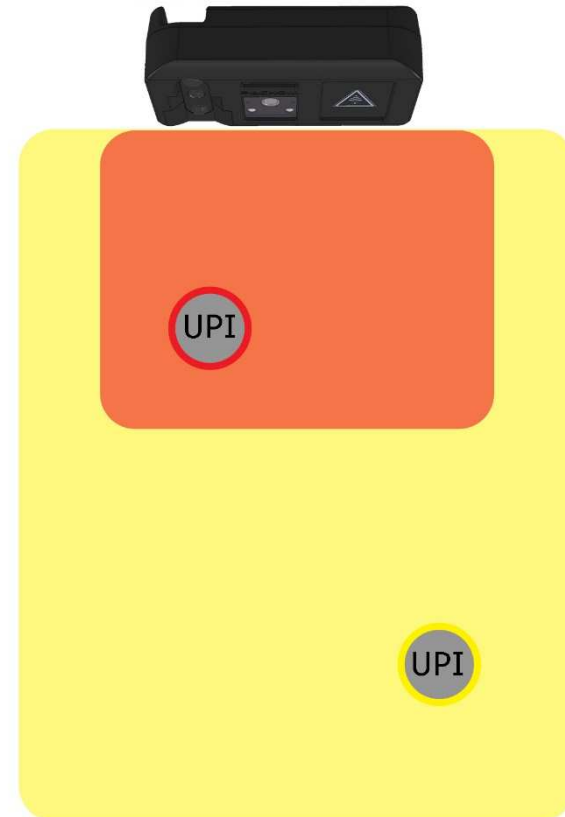


Figure 6: Two Zone Protection

Power Switch

Power Switch is located on the back side of UBEP unit. It can be used regardless if UBEP unit is powered from External Source or from the battery.

You can turn on UBEP unit by shortly pressing Power Switch. You can turn it off by pressing and holding Power Switch for 1 second. Use power off-on procedure to get UBEP to transmit its ID to the UCP during the pairing procedure.

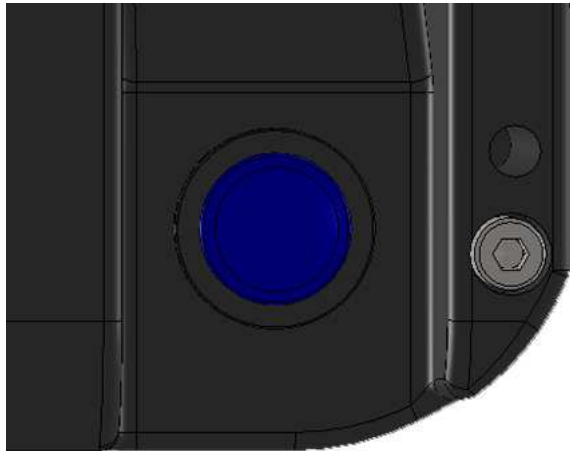


Figure 7: Power Switch

UBEP unit without the battery will be automatically powered up and down when connected/disconnected from the External Power Supply.

UBEP unit with the battery will also be automatically powered up and down when connected/disconnected from External Power Supply in case that unit is not already powered up by using Power Switch.

External Connector

External connector provides industrial grade connectivity to the UBEP unit giving access to any of the 8-pins supporting:

1. Video Signal Output: Composite Video
2. GND: Ground Level
3. External Power Supply Input: +9V to +58V DC
4. Alarm OUT3 Line: Outputs same level as External Power
5. Alarm OUT2 Line: Outputs same level as External Power
6. Alarm OUT1 Line: Outputs same level as External Power
7. Line-In 1 detection: +9V to +58V DC detection supported
8. Line-In 2 detection: +9V to +58V DC detection supported

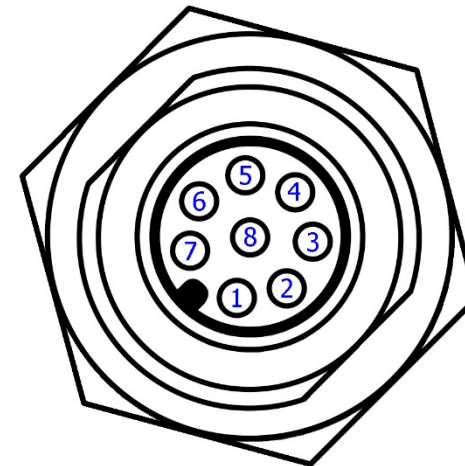


Figure 8: External Connector

External Power Supply Input is protected against reverse polarity connection.

Testing and Maintenance

In order to test the functionality of UBEP device it must be configured with either Custom or any of the Standard Configurations that you want to use.

If UBEP unit is blank it must be configured by using UCP unit. There are four simple steps that operator should follow in order to perform this. Step 1, Pair UCP with UBEP unit. Step 2, Make custom configuration or select one of many Standard configurations available. Step 3, Send the configuration to the UBEP. Step 4, perform the test.

Testing UBEP with UCP and UPI

Test can be performed by opening Test Menu on UCP and sending either Active UBEP Test mode or Passive UBEP Test mode command to paired UBEP.

The difference between those two is that in Active UBEP Test mode unit will transmit RF Protection zone with UPI vibration set according to programmed configuration while in Passive UBEP Test mode unit will transmit RF Protection zone with disabled UPI vibration.

After the UBEP unit enters the Test mode you can execute any of the programmed conditions by pressing the appropriate button in Test Menu on UCP. If Condition is set and enabled on UBEP it will be executed.

Execution of Condition will either activate alarm output on UBEP or transmit RF Protection zone toward UPI or both.

Testing only with UPI

If you want to perform UBEP Test only by using UPI (no UCP unit) again UBEP device must be configured.

In order to perform the test you must simulate real life Conditions and apply them to UBEP.

In other words if UBEP is set to create RF Protection zone with Line-In as a trigger you must connect UBEP to the Power Source and Connect high voltage to Line-In input. Or if UBEP is set to activate alarm on output 2 line as a trigger to 5m PES Sensor you must walk in front of the UBEP.

General Specifications

Dimensions of UBEP device: 60mm (L) x 206mm (W) x 101mm (H)

Weight of UBEP device: 1600gr

Operational temperature range:

- bare UBEP setup: -40 – 85 °C
 - + Power Switch: -20 – 65 °C
 - + PES Sensors: -20 – 60 °C
 - + Battery while discharging: -10 – 60 °C
 - + Battery while charging: 0 – 45 °C

Ingress Protection:

- IP67 - Dust Tight, Waterproof
- IP69K - Dust Tight, High temperature - pressured water proof

External Power supply Input:

- +9V to +58V DC
- Supports +12V, +24V and +48V DC industrial power standards
- Reverse polarity protection

Alarm OUT lines:

- Outputs same level as External Power: +9V to +58V DC
- Maximum continuous current 200mA
- Protected with automatic fuse

Line-In detection:

- +9V to +58V DC detection supported
- Can be connected directly to Forward or Reverse Gear Signal Wire

Maximum Power Consumption:

- with battery; while charging: 6.6W
- with or without battery; while discharging: 1.7W