

## COMBO SMART SV

### Single View Full Body X-ray Scanner

#### Features

Detects Contraband On & In Body  
7 Seconds Process Time  
Remotely Controlled  
Footwear Does Not Have  
To Be Removed

## Key Features



Detects Contraband  
On & In Body



Conveyor Traverses  
Person Through Scanner



7 Seconds Scanning  
Process



Contact Free



Remotely Controlled



#### Overview

The COMBO SMART SV Single View Full Body X-ray Scanner provides a very high level of security in compliance with the requirements for prisons, airports, border areas and government facilities.

Single View – The system utilises one fixed X-Ray generators operating at 170 kV, that provides a full body image.

It has been designed using the latest technology, the low dose of X-rays combined a process time of just 7 seconds of the inspection system. It provides excellent detection of contraband items such as liquids, explosives, drugs, mobile phones, sim cards, metallic wire, and plastics etc on the body, in body cavities and inside the abdomen, the system is ideal for use at Airports & Prisons.

A person is inspected by a very low intensity X-ray transmission system, due to its extremely low dose of radiation, it is the only technology that can be applied constantly for inspection personnel with the ability to detect objects hidden on or inside the body.

## Features

### Advantages

The system uses a moving platform used by other manufacturers, this system uses a motorised conveyor belt to transport the person through the system. Other manufactures platform systems do not allow the operator to scan the shoes, anything inside the shoes will not be seen by the operator, the advantage of using conveyer belt enable the operator to see everything inside the shoes.

The body scanner runs on a Linux-based operating platform, providing excellent stability and reliability over other manufactures scanners that run on Microsoft Windows. The long-life X-ray generator design employs a hermetically sealed oil bath and combined with advanced high-resolution detector boards provides exceptional image quality.

The Technology of the system is based on the principle of the person is inspected by a very low intensity X-ray transmission system. Due to its extremely low dose of radiation, it is the only technology that can be applied constantly for inspection personnel with the ability to detect objects hidden inside and on the body.

The system utilises one fixed X-Ray generators operating at 170 kV, that provides a full body image.

With this technology, prohibited items under their clothes, on the surface of the body, can be detected with greater efficiency from the top of the head to the shoes, as well as inside the human body.

The system has pre-adjusted inspection levels allowing inspection with dosage Differentiation NS: Low, medium and high, ensuring application doses according to the profile of every individual. The advantage of this technical feature is not to subject any individual to unnecessary dosages, treating profile differences to choose the best inspection technique.

**Integrated dosimeter** – The system has a dosimeter integrated into the one / two x-ray generators, allowing measurement and monitoring of the dose in the chest generator and the whole-body generator in all the scans. The dosimeter in addition to providing the actual measurement of the dose exposed in each individual and the number of inspections of each individual, ensuring full compliance with all international and local standards. It also monitors the performance of the x-ray generator in real time alerting the operator if any parameter is changed.

### Options

**Optional - Ready Integration Existing Network** - The real-time recording option offers instant video recording of the inspected persons during the entire inspection process, from the entrance, to stepping on the belt, to exit.

The video images can be directed to the security managers and potentially integrated with the access control systems and the system can be accessed at any time by the security manager or the operator.

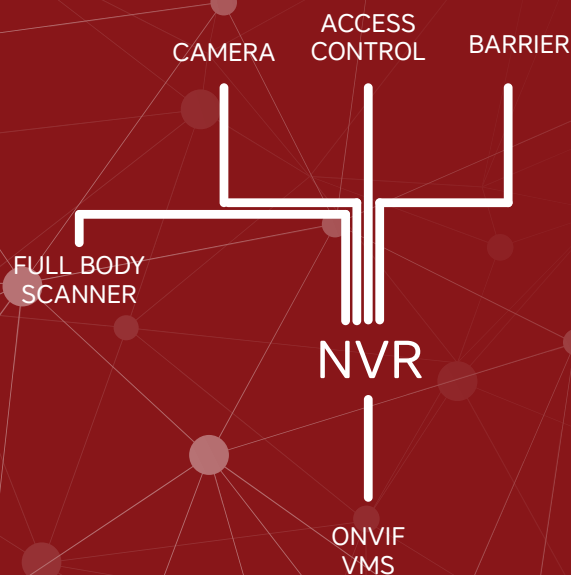
**Optional – Operator Integrated Fingerprint Reader** - The system has one biometric reader for operator identification With "false finger" technology.

**Optional - Visitor Registration** - The system has an integration capability for the registration of visitors and prison agents to the prison complex. The system is prepared to receive information from the visitors, duly associated with the incarcerated and the prison officers. This software makes it possible to centralise dose control and alerts connected to visitors who are associated with an incarcerated person with more dangerous profiles, demanding a better evaluation in the inspection process.

**Optional - Intercom** - Between the inspected individual and the operator.

**Optional - Identification Camera** - The Identification camera: allows the acquisition of a photo of the subject's face at each inspection enabling recording of the person being scanned in real time.

## COMBO SMART SV Single View Full Body X-ray Scanner



📍 128-124 City Rd London EC1V 2NJ

✉ info@batlion.com

🌐 www.batlion.com

## Options Contd

**Optional Inspection Camera** - The Inspection camera provides recording of the inspection process

**Optional Inspected Person Integrated Fingerprint Reader** - The system has a biometric reader for automatic identification of the individual to be inspected. With "false finger" technology.

**Optional - Dual Workstation** - During the daily operation in the prison, it may be necessary for the inspection of male and female individuals. Equipment with a single workstation can cause constraints on the inspection process.

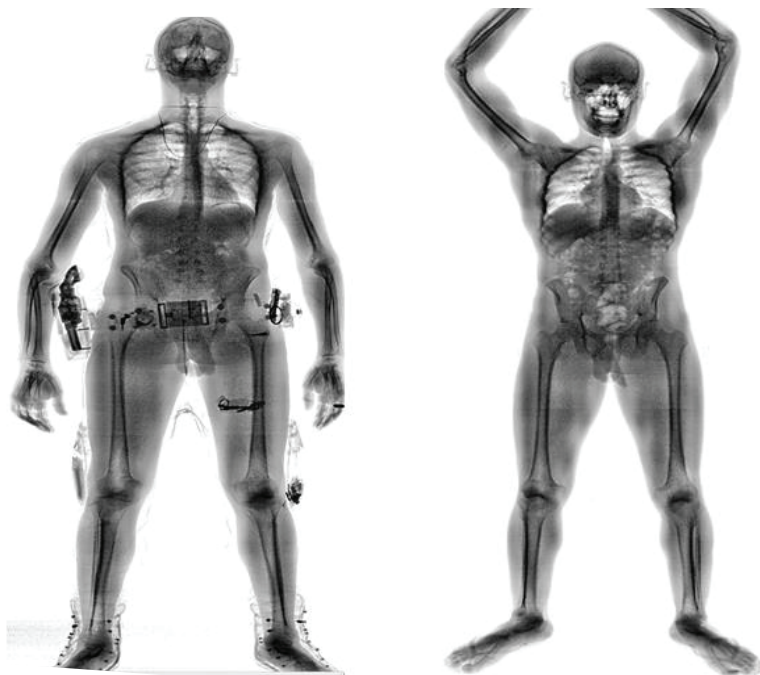
The operation with one or two workstations simultaneously, allows the image to be directed to the same-sex operator of the inspected individual.

**Optional - Lead Lined Radiation Shielding Cabin** - The Lead Lined Radiation Shielding Cabin improves the protection against radiation produced by the body scanner. Its lead construction reduces the X-ray leakage to  $<1\mu\text{Sv/h}$  to the distance of 10 cm away from the body scanner unit.

This is ideal application for use in confined and restricted areas.

- Material: Non-biohazard lead
- Lead thickness: 0.04"
- Safe distance after applying the cabin: 10cm
- External radiation of the cabin:  $<1\mu\text{Sv/h}$

## Typical Scanned Images



# COMBO SMART SV Single View Full Body X-ray Scanner



📍 128-124 City Rd London EC1V 2NJ

✉ info@batlion.com

🌐 www.batlion.com

## Image Processing Tools



To facilitate the identification of the items contained in an individual inspected, the system has 11 types of filters: -

Zoom / Pan	Image Comparison
Contrast	Pseudo Colourisation
Gamma Correction	Printing Images
Edge Highlight	Possibility to Add Annotations
Smoothing	JPG, TIFF, BMP, & Image Import
Black / White Inversion	Entire Body Scan Including Sole of Shoe

Which can be combined and generate different types of image processing, in addition to zoom adjustments. In the image below you can see an image of an individual inspected without a filter or treatment. This image will be used as an example to explain the functionality of each of the image processing capabilities.

The image is displayed in gray tones according to the thickness and density of the material inspected. The higher the density or thickness of the material, the darker the shades of gray. When the x-ray beam is unable to go through the material in a given region, this is displayed in dark gray or black (region of lower x-ray penetration), in this case, we can have a high density or low-density material/medium with great thickness, enough to prevent the detection of the x-ray wave.

### Classification of shades of gray or black

Category	Color	Typical Material
High or intermediate penetration region		Low density materials or materials with low thickness.
Low penetration region		High density materials or materials with great thickness.

Inverse Light - Displays the image with inverse light, below is the effect of this filter on the image.

Multi-Absorption (Gamma Correction) - The multi-absorption or gamma correction allows you to adjust the difference in contrast between the light and dark tones. Range changes affect primarily the midtones of the image (shades too light or too dark suffer little change). A gamma adjustment equal to 1.0 means that no correction is being made in the image. For values less than 1.0, the half tones become clearer; and the midtones appear darker for gamma values greater than 1.0. The software allows a correction range from 0.1 to 5.0.

Edge Enhancement - Enhances image contrast changes, highlighting the edges of materials, which are darker.

Sharpness - Enhances the details in the image by increasing the contrast by region to provide a sharper image.

Antialiasing - Attenuates the small variations of contrast and color, image filtering and imperfections making smoother transitions.

High penetration - Improves the contrast of materials with hard penetration, allowing to show details originally hidden.

Facilitates the visualisation of objects hidden behind other hard penetration objects. The easy penetration materials may become less visible.

Low penetration - Improves the contrast of materials of low density, allowing to show details originally hidden. Hard penetration materials become darker.

Pseudo-colourisation - Applies a pseudo-colourisation filter to easily view the image details. The system has 13 different combinations of pseudo-colourisation.

Global Zoom - function is used to magnify the image, the operator can use this step by step.

# COMBO SMART SV Single View Full Body X-ray Scanner

📍 128-124 City Rd London EC1V 2NJ

✉ info@batlion.com

🌐 www.batlion.com



## Specifications

### ANSI Classification

- Dual view mode: Class: Full-Body Scanner, General Use
- Conforms to ANSI 43.17-2009

### Radiation Safety

- LED panels that light up in red to indicate the emission of x-rays
- Emergency buttons that allow immediate switching off the x-ray generator set and the electricity that powers the moving parts
- Safety interlocking keys mounted on the covers of the equipment, which when activated will automatically turn off the xray generator set and the electricity that powers the moving parts
- Optional Operator shielding cabin
- Optional - Integrated dosimeter
- Optional - Intercom between the inspected individual and the operator

### Database Resources

- Automated backup and recovery
- Image identification of the person who is being inspected
- Automatic recording of the accumulated dose for each individual inspected
- Alert's individuals exceeding number of acceptable scans or dosage limits
- Individual operator secure login with password
- Operator access according to operator profile
- Separate database, containing positive threats

### Image Processing Features

- Automatic contrast adjustment
- Availability of multi-operator operation update
- Black / White inversion
- Control and brightness and contrast
- Edge enhancement
- Enables scanning of the entire body including the sole of the shoe
- Gamma correction
- Image export
- Possibility to trigger text annotations
- Printing images
- Zoom / Pan

The system has a thermo-circuit breaker that protects the equipment against overcurrent and short circuit, a residual current circuit breaker (DR) for personal protection and fuses which prevent damage to the internal components. The scanner does not cause electrostatic and electromagnetic interferences in equipment and metal structures located at a distance equal to or greater than one metre.

# COMBO SMART SV

## Single View Full Body

## X-ray Scanner



NARCOTICS  
AND DRUGS



ELECTRONICS  
AND CELL PHONES



ELECTRONICS  
AND CELL PHONES



CERAMIC  
AND PLASTICS



WEAPONS  
GUNS AND KNIVES



PRECIOUS  
STONES

📍 128-124 City Rd London EC1V 2NJ

✉ info@batlion.com

🌐 www.batlion.com

## Specifications

### General

Conveyor: Roller driven rubber mat  
Scan time: 7 Seconds  
Throughput Capacity: Up to 25 persons per hour  
Generators: 1 x 170 kV  
Anode Current: 1.2 mA  
Wire Resolution: 38 AWG  
Penetration Steel: 34 to 38 mm depending on scanning module  
Monitor: 19" for full body abdomen  
Inspection Radiation Dose: 0.5 a 4.0  $\mu$ Sv (fully adjustable)  
Inspection Dose Graduations: : High, Medium & Low  
Film Safety: In accordance with standard ASA/ISO 1600  
Operating Mode: 24/7  
Operating Temperature: 0 °C to 50°C at 95% non-condensing  
Storage Temperature: -40°C to 60°C at 95% at non-condensing  
Electrical: 110V, 120V, 220V or 230V  $\pm$  10%, single phase, 50 / 60 Hz  
Power: 1.0 kVA  
Start Up Time: Down time 24 hours = 1 minute, 2 days to 30 days = 3 minutes, 1 to 3 months = 5 minutes  
Image Storage: 50,000

Default Features: Date/time, number of inspections of person, record of annual individual dose (optional), identification code of the operator, maintenance records, system activation timers records/x-ray activation, visualisation operating mode, self-diagnosis, self-calibration, service menu, image search

# COMBO SMART SV

## Single View Full Body

### X-ray Scanner

📍 128-124 City Rd London EC1V 2NJ

✉ [info@batlion.com](mailto:info@batlion.com)

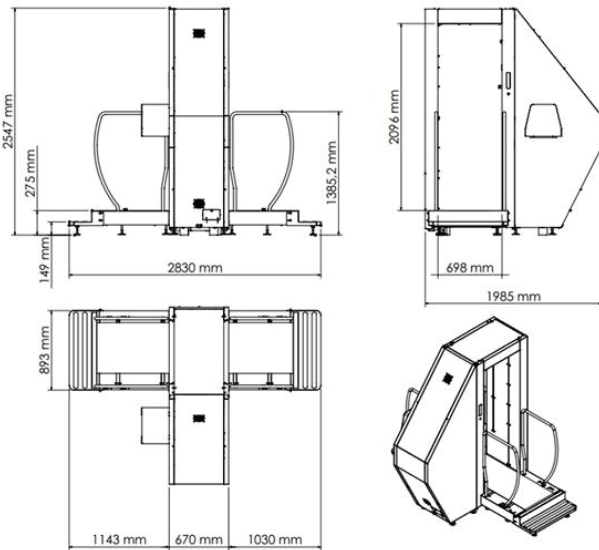
🌐 [www.batlion.com](http://www.batlion.com)

## Dimensions & Weights

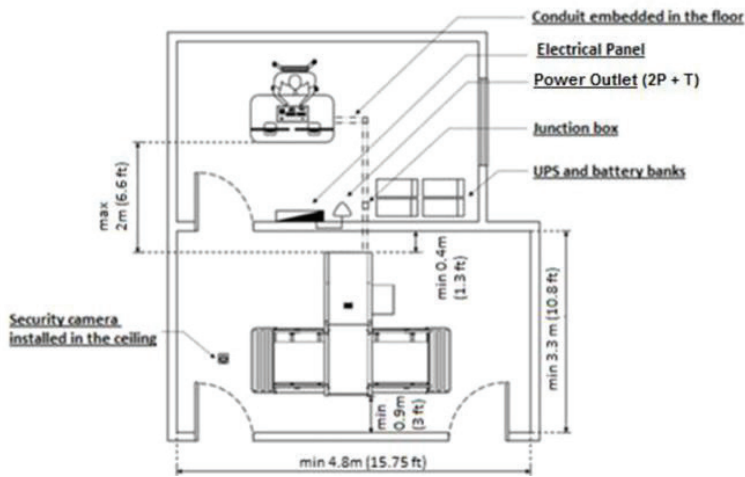
	Length	Width	Height	Weight
Single View	2,830 mm	1,985 mm	2,547 mm	990 kg
Single View C/W Cabin	2,830 mm	2,047 mm	2,618 mm	1,830 kg
Inspection Channel		2,096 mm	719 mm	200kg
Conveyor Load Capacity				

# COMBO SMART SV Single View Full Body X-ray Scanner

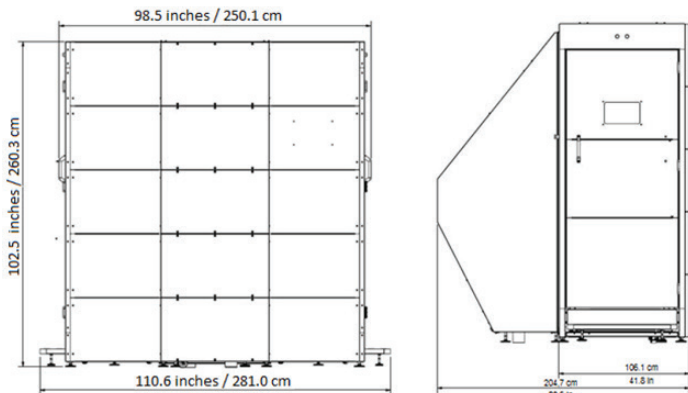
## Body Scanner without Lead Lined Radiation Shielding Cabin Layout



Typical System Layout



## Body Scanner with Optional Lead Lined Radiation Shielding Cabin Layout



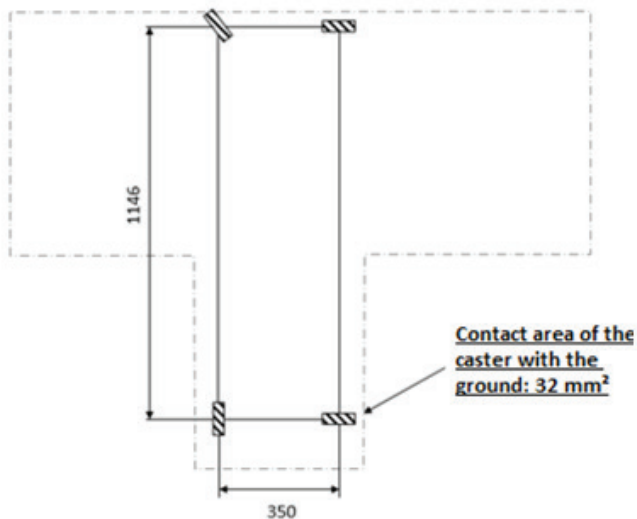
📍 128-124 City Rd London EC1V 2NJ

✉ info@batlion.com

🌐 www.batlion.com

### Structural Requirements

The floor where the body scanner is to be installed, must be flat, without steps or uneven areas. The Single view body scanner without the Lead Lined Radiation Shielding Cabin weighs 1,106 Kg and the Dual View body scanner 1,336 kg and occupies an area of 0.4 m<sup>2</sup> when supported on the casters



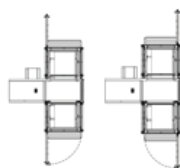
- The scanner has a load capacity of 272 Kg.
- The lead lined safety cabin, when used, weighs an additional 650 Kg.
- The doors & corridors where the disassembled equipment will pass through must have minimum width 0.80 x height 2.10m.
- The body scanner must be installed at least 90 cm away from the walls, or as indicated in the following installation layouts, in order to ensure there is enough space for maintenance, operational safety, & ventilation.
- The operation desk must be installed at a maximum distance of 2 metres from the body scanner.
- Due to operational security concerns, the body scanner operator must preferably be in a separate room, avoiding visual contact with the persons being inspected. If this is not possible, a partition may be used to separate the operator. A security camera must be installed so that the operator can observe the examined person during the whole procedure.
- For radiological safety concerns, if the equipment is installed without the Lead Lined Radiation Shielding Cabin, the operator and others that are assisting during the examination process must stand at a minimum distance of 2 metres from the scanner when emitting X-Rays. This distance may be reduced if it is proven that the facilities & the operational procedure contain radiological protection factors that make it unlikely that the operator or other involved personnel may receive a yearly dose higher than the dose limit for the general public (1mSv/year).
- For body scanners with the Lead Lined Radiation Shielding Cabin, the operator & other assisting personnel may stand at any distance from the equipment during inspection. According to the needs & the available space to the installation of the equipment, the cabin doors may be assembled in any of the side walls, allowing either side to be opened, as shown below.

# COMBO SMART SV Single View Full Body X-ray Scanner



## Installation

- Installation position and opening of the Lead Lined Radiation Shielding Cabin doors.
- The installation area be free from water ingress that could enter the body scanner.
- The scanner also may not be installed in areas with corrosive gas, dust or excess humidity above 95%
- Relative storage temperature/humidity: -40°C to 60°C 5% to 95% no condensation
- Relative operating temperature/humidity: 0°C to 40°C 5% to 95% no condensation
- The computer monitor must be protected against direct exposure to sunlight



### Electrical Requirements

- The body scanner must be supplied by a single-phase or two-phase system of 127V or 220V with 3 wires (phaseneutral-ground or phase-phase-ground), at a frequency between 50 to 60Hz.
- To ensure a voltage of 220V at the input of the body scanner from 127V electrical supplies, the body scanner is equipped with a 127V / 220V, 1.5kVA isolator converter.
- It is recommended to use a UPS with a 127/220V input and 220V, 2.0kVA 3-pin plug 10A output, compliant to regional regulations.
- Ideally, the equipment must be supplied by a fuse board with a 16A circuit breaker single-pole for single-phase supply and double pole for two phase supply and a 25A or higher / 20 mA Residual-Current Device (RCD). The length of the body scanner's power cord is 5 metres so the distance between the power outlet and the equipment should be shorter than this.
- If it is necessary to connect the body scanner to a network, the access point must be installed at a maximum distance of 60 metres from the body scanner.
- The grounding resistance at the installation area for the body scanner must be below 5Ω.
- In order to ensure the body scanner operates at its rated power, it is important that the module of the network's impedance,  $|Z_r|$ , associated with the impedance of the cables up to the body scanner's connection point,  $|Z_c|$ , does not exceed 0.10 Ω for the 127V network and 0.30Ω for the 220V network to ensure there is a maximum voltage drop of 1%.
- The fuse board must be at an easily accessible location and identified as a power supply device for the scanner.

### Shipping Crates & Weight

	Length	Width	Height	Net Weight	Gross Weight
Crate 1	2,160 mm	1,050 mm	2,170 mm	594 kg	717 kg
Crate 2	2,330 mm	970 mm	850 mm	200 kg	291 kg
Crate 3	2,690 mm	1,400 mm	690 mm	204 kg	270 kg

# COMBO SMART SV

## Single View Full Body

## X-ray Scanner

📍 128-124 City Rd London EC1V 2NJ

✉ info@batlion.com

🌐 www.batlion.com