

LumiCenter PPE Channel Add-On Module

LCE-PPE



Key Features

- Receive alerts about PPE compliance
- Detects hard hats, helmets, reflective vests, and protective clothing

Certifications and Compliance

- NDAA Compliant

Supported by LumiCenter

- Plus
- Max

Overview

This add-on module enables LumiCenter Plus and Max to detect personnel with no personal protective equipment (PPE) such as helmets and reflective vests.

Key Technologies

LumiCenter leverages AI-driven computer vision and real-time video analytics to detect and classify safety gear such as hard hats, vests, and protective clothing. It automatically verifies worker compliance with safety standards and sends instant alerts if violations are detected. This enhances workplace safety, reduces risk, and supports compliance audits and safety record management.

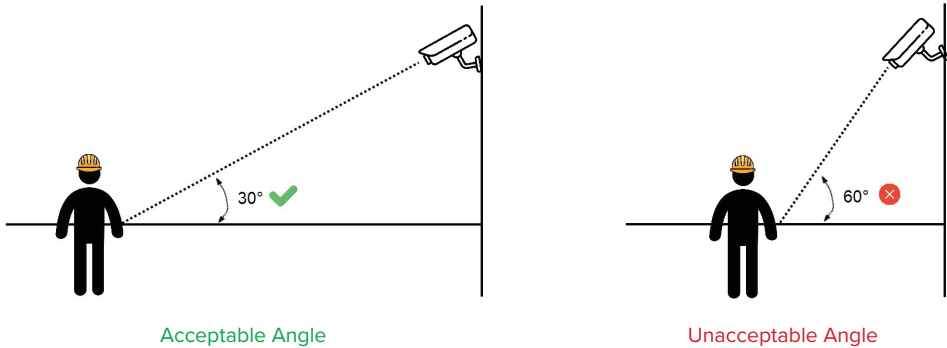
System Requirements and Technical Specifications

Consult the information below to verify the specifications and conditions the add-on module requires to perform properly.

Cameras

Below are the camera requirements for the add-on module to perform properly.

- The minimum required camera resolution is 640 × 360 pixels. The optimal resolution is 1280 × 720. Resolutions above 1920 × 1080 are not recommended due to significantly increased system resource usage.
- The camera's video stream must have a frame rate of at least 3 fps to handle standard tasks effectively.
- Detection-based analytics must be used with color images.
- The camera aerial tilt angle must not exceed 30°. Consult the diagram below for acceptable and unacceptable angles.



Lighting

Below are the lighting requirements for the add-on module to perform properly.

- The minimum lighting required is 200 lux. Artificial lighting may be used. If there is insufficient or excessive lighting, stable operation of the analytics is not guaranteed.
- Abrupt lighting changes may cause operational disruptions.

Scene and Camera Angle

Below are the scene and camer angle requirements for the add-on module to perform properly.

- Moving objects must be visually distinguishable from one another.
- The background cannot abruptly change and must remain static for the majority time.
- There are no rods in the detection area.
- Moving objects are minimally obscured by static objects (i.e., trees, columns).
- Reflective surfaces must be masked.
- Camera movement must not result in image offsets greater than 1% of the frame size.

Object Images

Below are the object image requirements for the add-on module to perform properly.

- The detected object must be clearly distinguishable to the human eye.
- The image has minimal noise and distortion from compression.
- The width or height of the equipment cannot exceed 75% of the frame size
- The duration of the object's visibility is at least three (3) to eight (8) frames. The minimum number of frames depends on the task.
- There must be no physical obstructions between the camera and analyzed object.
- Camera movement must not result in image offsets greater than 1% of the frame size.
- The minimum sizes of objects on body parts in pixels are observed. See the example table below.

Example of Object Dimensions on Body for a 1920 x 1080 Resolution	
Body Part	Dimension
Upper Body (Torso)	75 x 100
Legs	75 x 105
Head	60 x 65
Hands	65 x 60
Feet	45 x 40
Set of Equipment	165 x 295

Object Images (Cont.)

- The minimum value of pixel density per meter (ratio of the object width in pixels to the object width in meters) is observed. See the table below.

Image Resolution	Object Type	Minimum Pixel Density Per Meter	Minimum Object Size in Pixels (Width x Height)
640 x 360	Human	80	~ 48 x 145
1280 x 720	Human	128	~ 77 x 233
1920 x 1080	Human	170	~ 102 x 309

PPE Examples

Below are PPE examples that can be used to train the analytic engine.



Equipment Detection

Equipment detection (PPE) identifies individuals entering or remaining in restricted areas without required protective equipment or wearing PPE incorrectly. For optimal accuracy, use the detection tool in gateway conditions such as at entry points where employees pause and remain for a period of time to allow the system to verify proper equipment use.

Neural Networks

The equipment detection tool uses two separate neural networks.

- The **segmenting network** divides the human body into zones (head, shoulders, arms, hands, body, thighs, legs, and feet).
- The **classification network** detects equipment (PPE) on a specific body part and checks for proper compliance. Users must provide a list of equipment to train a classification neural network.

Ordering Information

LumiCenter License

Each license enables video capture, display, record, transmit and playback of one video channel from an IP camera or IP device. Additional functionality is included (I/O, audio, PTZ).

SKU	Product
LSC-PLSV	LumiCenter Plus Version
LSC-MAXV	LumiCenter Max Version

LumiCenter Add-On Modules

Each video channel requires a LumiCenter license to support add-on modules.

SKU	Add-On Module	Description
LCE-PPE	PPE Channel	Enables LumiCenter Plus and Max to detect personnel with no personal protective equipment (PPE) such as helmets and reflective vests.