

**MANOMOTION**

*Vision-based Human-Hand Tracking and Gesture Control*



# SaferHands

Product Data Sheet  
November 2023

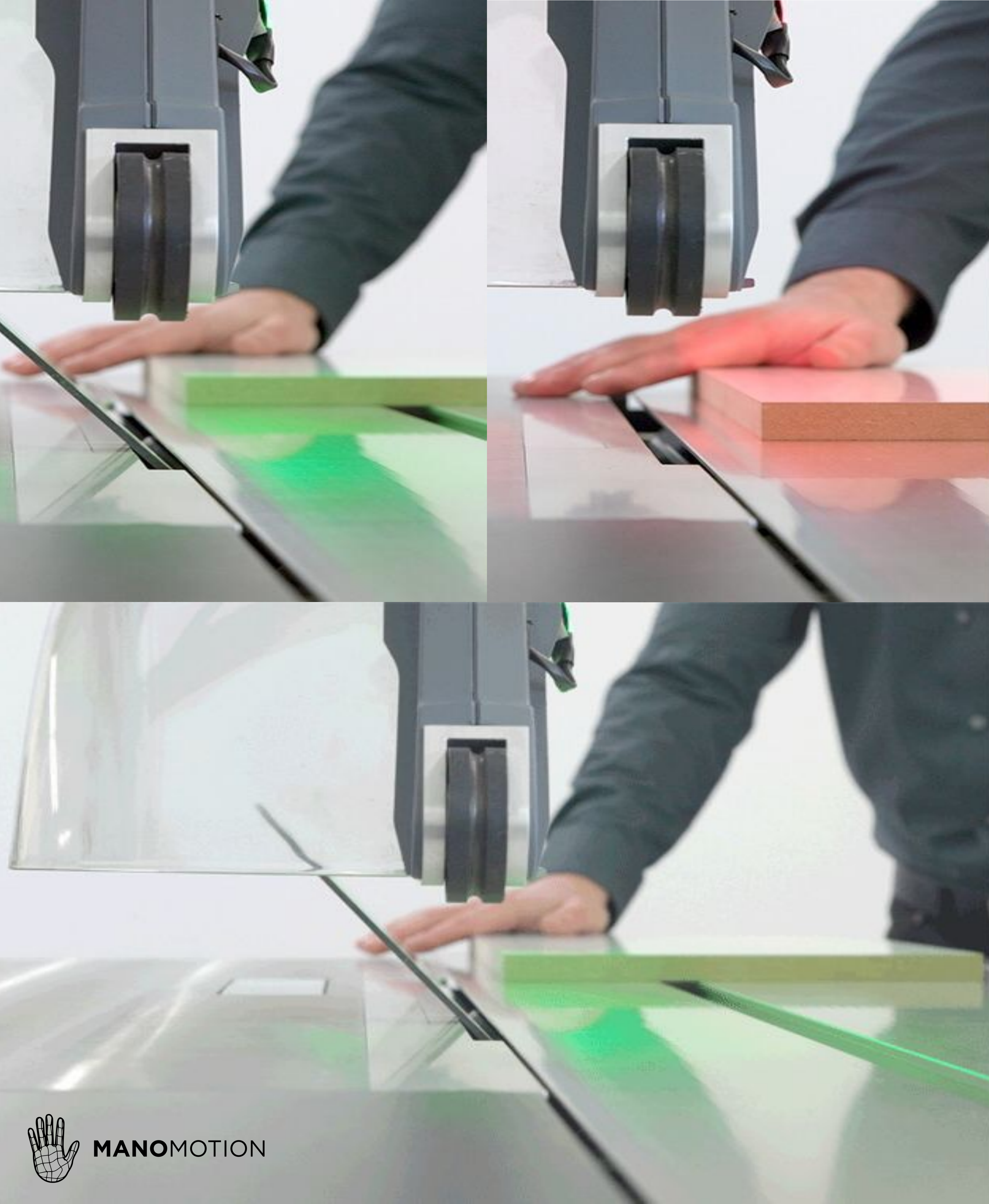
# SaferHands

SaferHands is ManoMotion's revolutionary product for saving hands in industrial scenarios. The product utilizes proprietary AI technologies, combined with standard cameras to drastically reduce industry-related hand injuries.

By detecting hands and anticipating their movements, an application leveraging hand tracking can generate signals to shut down machinery or alert the operators when their hands are in danger - while remaining compliant and introducing new level of safety.

SaferHands is the first AI-certified technology for human safety.





## Value Proposition:

- **Reduction of human injury to near zero**

The average cost per human injury ranges upwards of USD 600 to about USD 26,000 in industry today.

- **Reduction of maintenance costs**

Today damages to machines caused by accidents, broken parts, etc introduces high costs to repair or replace parts.

- **Downtime of machines to a minimum**

Prediction of accidents can reduce downtime of machines to few seconds to avoid accidents and restart smoothly.

- **Intelligent detection**

Existing technologies of laser beams and light curtains cannot distinguish humans from other objects and cause false detections.

- **Reaction time below 20 ms**

Customizable based on processor

## Use cases:

Any potentially dangerous machine with the possibility to mount a camera that can detect hands in dangerous situations and take appropriate action (shut off, flash lights, sound sirens etc) when a danger is detected.

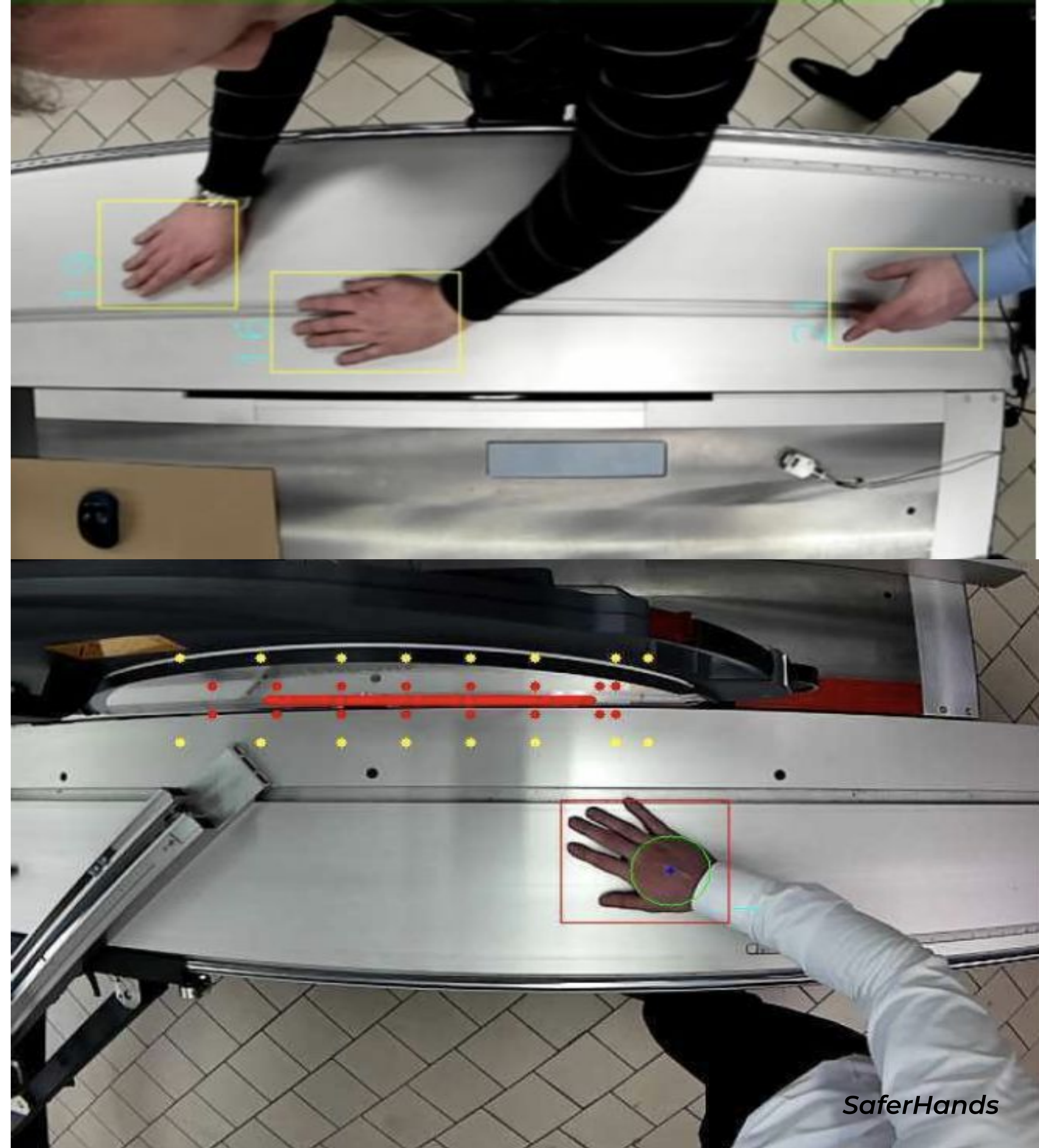
- Saw machines
- Cutting machines
- Industrial roller mills
- Press machines
- Collaborative robots



## Features of the standard package:

- Detection of multiple hands in the camera view
- Detection range from 30 cm up to 1.2 meters
- Tracking of bounding box and basic skeleton for each hand in real time
- Support of specific type of gloves
- Camera position on top of the machine looking downwards
- Single channel camera solution
- Accuracy 99%
- FPS 50+

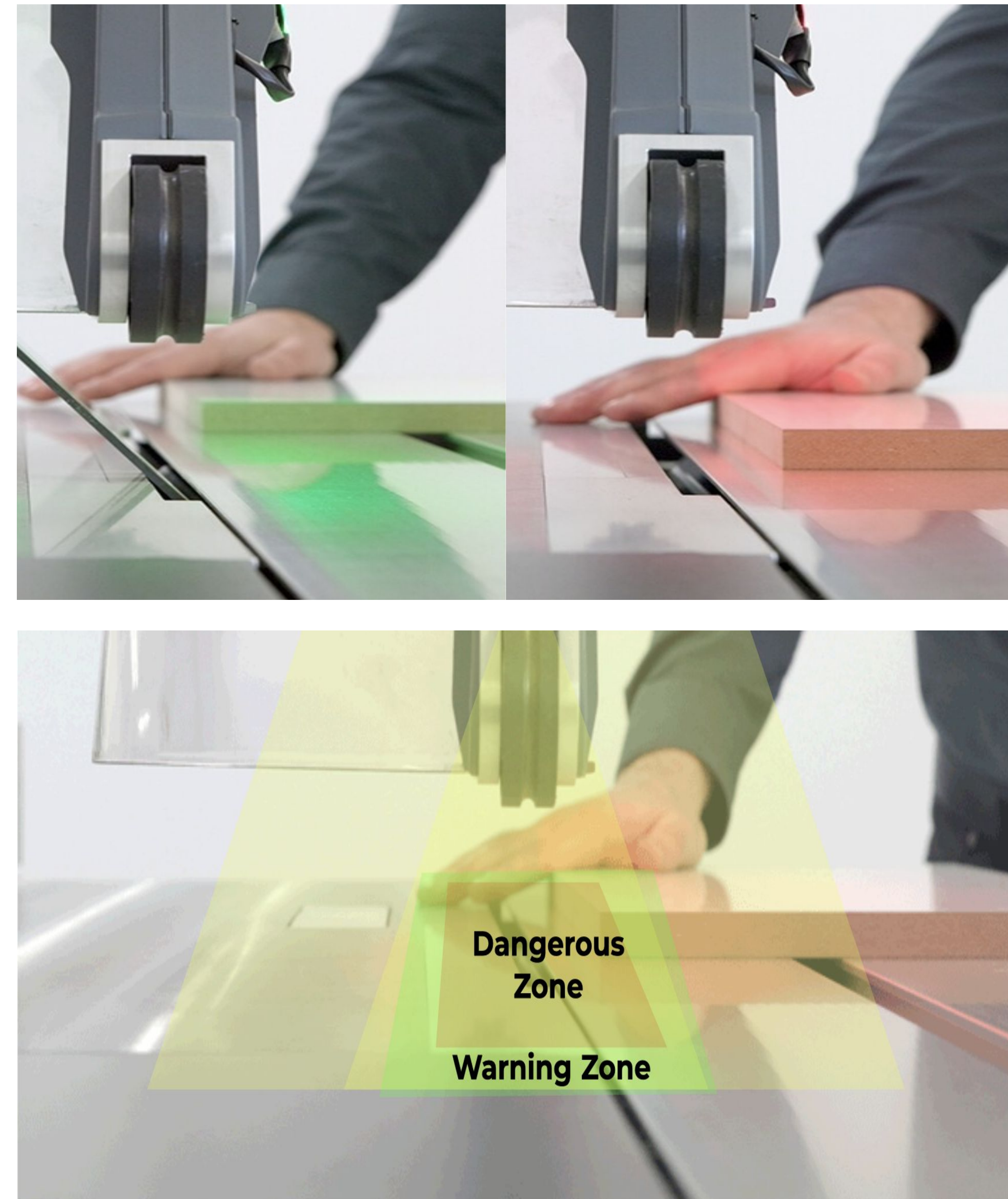
The solution is fully customizable for other hardware setups. Other cameras and boards can be used, and another board can be used to achieve double channel safety level.



## SaferHands kit overview

The SaferHands kit detects and tracks hands in the Safe Zone, Warning Zone and Danger zone. The three zones can be user defined and customizable by QR codes provided in the package.

The safety signals can be provided through a visual feedback on the screen, signal lights and standard I/O port of the Nvidia Jetson board.



## What is included in the SaferHands kit?

- *ManoMotion SaferHands software - pre-installed*
- *Nvidia Jetson Xavier package*
- *Camera mount and adjustable camera holder*
- *Signal lights (Green, Yellow, Red) connected to the I/O of the Nvidia Jetson*
- *QR codes for setting up the warning and emergency zones*
- *Display*

## Outputs

- *Safety signals: Safe, Warning, Emergency (Standard output provided through Nvidia Jetson I/O)*
- *Hand position, skeleton features (included and customizable)*
- *Predictive signals, hand speed, acceleration, etc. (Not available in the standard package)*



### Jetson Xavier NX board and cover box including LED signal lights

GPU 384-core NVIDIA Volta™  
8GB RAM  
19V power supply  
3x UART, 2x SPI, 2x I2S, 4x I2C, 1x CAN,  
PWM, DMIC & DSPK, GPIOs



### Camera

See3CAM\_CU30 (industry standard)  
3.4 MP onsemi AR0330 image sensor  
USB camera - Color  
Fixed Focus  
Rolling shutter  
Low light performance  
On-board high performance ISP



### Camera mount and holder

Standard S-mount cover for camera  
Adjustable camera holder for  
different heights and table mount



### QR codes

5 printed QR codes for calibration and customization of the safety zones. Needed for one time setup or modification of the safety zones with the startup software.



### Display

Standalone 7" display for visualization of the outputs  
Standard HDMI connection cable and power cable compatible with Nvidia Jetson board.

## How to setup and test SaferHands?

- Connect SaferHands package to power, connect display and mount the camera according to the instructions.
- Define and calibrate the warning and emergency areas using the provided QR markers and calibration instructions.
- System is ready to operate, see the visual output through the display and signal lights on the SaferHands box.
- Standard output is provided through the GPIO and can be connected to other control devices and switches.

