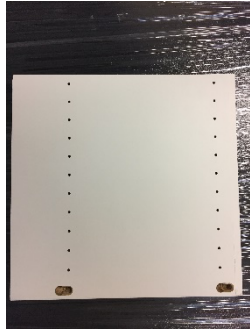


MONITOR Drill Hole Counter

MONITOR “Drill Hole Counter” is one product of a **PLC based measuring and control** family. The PLC design allows an outstanding **modular configuration**, allowing to grow with the application.



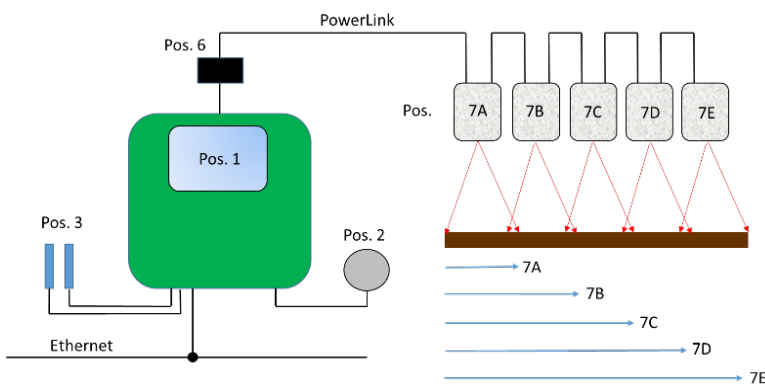
MONITOR “Drill Hole Counter” is designed to **identify and count any drill holes** on a panel. MONITOR is designed on a PLC based technology by using **SMART Sensors**. (No frame grabber) The CCD Cameras are equipped with **embedded LED full color illumination**. Each cameras covers 450mm field of view. Up to 12 Sensors can be operated on one line (with one cable - POWERLINK), 4 lines can be controlled with one PLC. No calibration of parts, only one time learning of Decor once with first startup.

Main Facts at a Glance

Transport speed	0 - 60 m/min, automatic adjustment on various speed, Encoder controlled
Transport media	Roller – Belt – Band Conveyor, only 80mm gap for detection required
Max. Panel Dimensions	W: 2600 L: 6000 H: 120 mm (standard)
Min. Panel Dimension	W: 10 L: 80 x 1 mm (standard, depending on transport system)
Surface	Unicolor and light pattern, vertical movement and slippage is compensated
Camera Focus, Distance:	Auto focus adjustment during calibration, sweet spot sensor to object 420mm
Illumination:	LED full color camera embedded, external LED illumination stroop light
Orientation	No orientation alignment required
Power / output	110/220V 250W, single phase / relays output: system OK and Alarm
Safety class	All sensors IP65
Temperature	0 – 45°C
PLC cabinet size	400 x 400 x 210mm
HMI – User Terminal	10.1” touch Display, external via Ethernet, no PC required
Possibilities of Detection	From top and bottom surface, left, right front and trailing edges. Automatic cleaning device included (Patent Pending- bottom only)
Integration, timing	Full integration into product lines with automatic article change - standard interface, evaluation in-between 0.5sec after passing
Calibration	Up to 9999 different articles by teach in, manual or automatic selection



Scope of Delivery



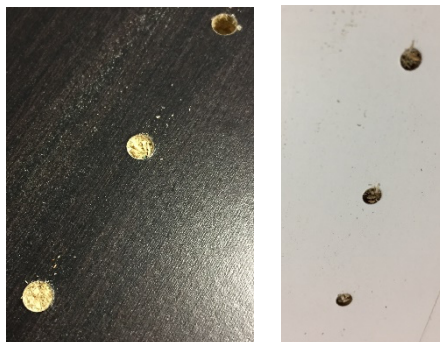
MONITOR Drill Hole Counter monitors **TOP, BOTTOM SURFACES** – optional also **LEFT, RIGHT, TRAILING and FRONT EDGES**. All parts used for MONITOR are off the shelf products (encoder, light barriers, PLC, Smart Sensor and Illumination) - always latest state of the art technology. All Service and part replacement can be done by in house personal.

Pos. 2	Encoder on wheel 160mm diameter, with 5.000 T/U, with cable 5m, resolution 0,1mm
Pos. 1	PLC cabinet, with terminals for light barriers, Encoder, Powersupply, Ethernet and POWERLINK, 2 x USB
Pos. 1	Touch Display, 10.1” with 2 x USB, Ethernet. 24V DC
Pos. 3	Light barriers, panel detection, with 5m cable
Pos. 7	Up to 12 pcs. SMART CAM Sensors, for 450mm field of view, POWERLINK Connector, LED embedded
Pos. 6	POWERLINK Adapter, 24VDC with 20m Power Link Cable



MONITOR Drill Hole Detection

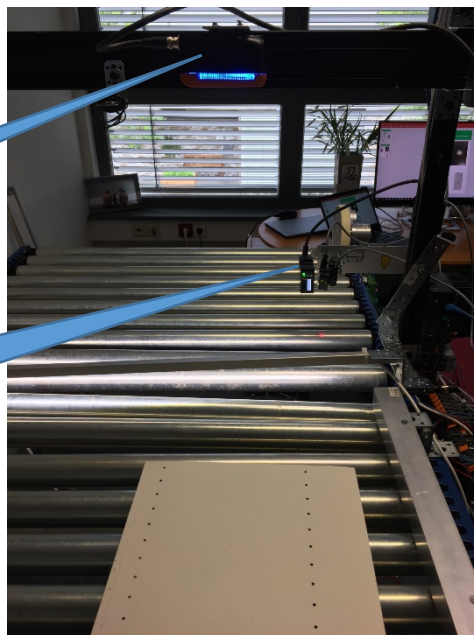
MONITOR "Drill Hole Detection" is one product of a PLC based measuring and control family. The PLC design allows an outstanding **modular configuration**, allowing to grow with the application.



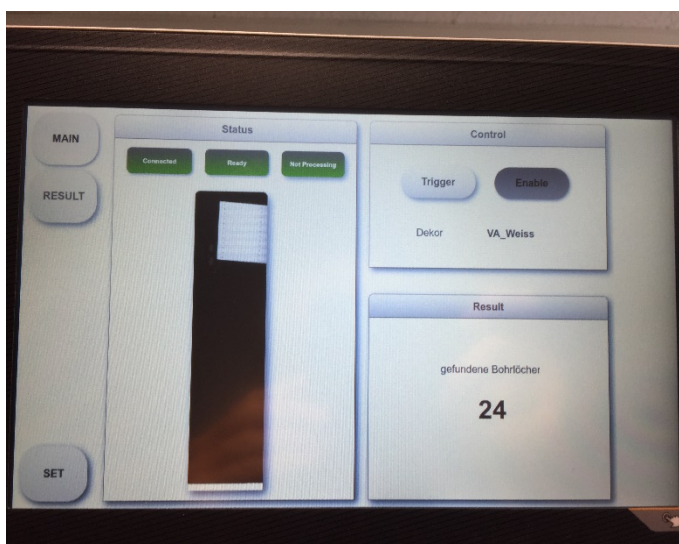
Pictures: samples of holes filled with dust and clean holes, darkest and brightest decors

CAMERA
SENSOR

THICKNESS
SENSOR



Application on roller conveyor, speed 30m/min. Inspection from top and bottom. One camera sensor for 500mm field of view. Maximum 12 cameras in one row (6m)



LIVE TEST with a sample with 24 holes, 2 holes full with dust. All 24 holes have been detected. The system detects holes with or without dust – from 3mm till 50mm.

No calibration of the pattern.

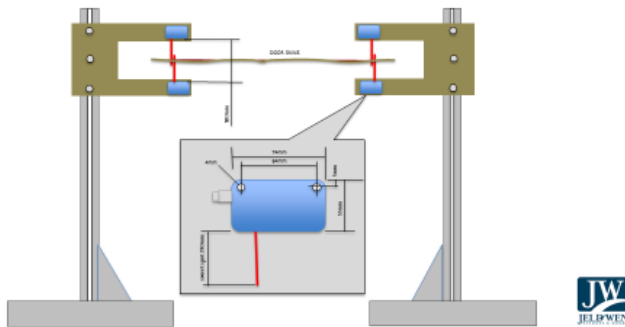
LIVE TEST with results: each detected hole identified with x and y coordinates, gray scale value and area which is related to the diameter of the hole.

No	Position X	Position Y	mit. Grauwert	Fläche	Model
1.0	91678.0	82494.0	36.0	6900.0	1.0
2.0	39790.0	92493.0	35.0	6500.0	1.0
3.0	92353.0	62504.0	42.0	6400.0	1.0
4.0	92850.0	42045.0	42.0	6200.0	1.0
5.0	93206.0	35312.0	35.0	6200.0	1.0
6.0	41127.0	44841.0	42.0	6200.0	1.0
7.0	91150.0	96100.0	36.0	6000.0	1.0
8.0	42057.0	24781.0	46.0	5900.0	1.0
9.0	91981.0	75789.0	38.0	5900.0	1.0
10.0	91337.0	89277.0	38.0	5800.0	1.0

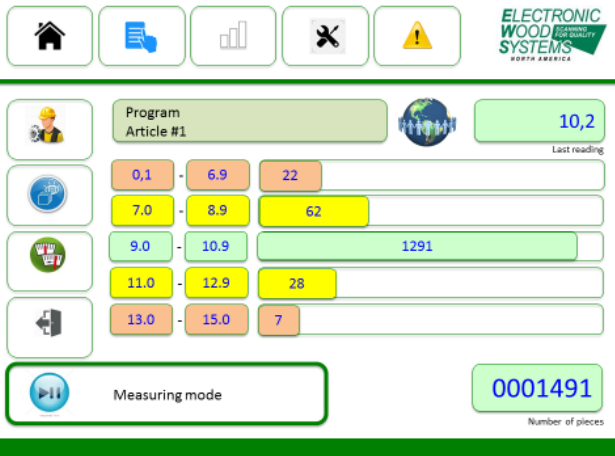
MONITOR Thickness

MONITOR can be adopted with thickness sensors. Typically TRIANGULATION sensors are used, with analog output.

MONITOR
Sensor and socket arrangement
thickness sensors, top and bottom, left and right ends,
front view, transport direction

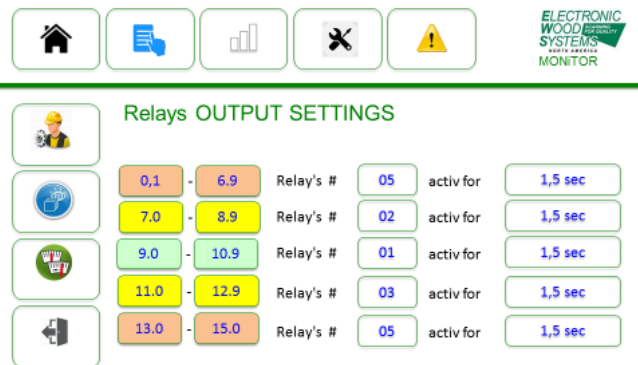


Setup example for US customer:
Thickness in 2 lines, left and right. Sensor from top and bottom. Accuracy better than 0,5mm. Conveyor speed 120m/min. Thickness from 0,1mm up to 120mm. Any color.



This screed shows the distribution of the single results in 5 ranges.

Every range can be dedicated to a relay output or an analog output 4-20ma.



Thickness can be measured as a stand-alone device or can be added into other applications as drill hole detection or moisture detection and much more.