

pi4_robotics GmbH
Gustav-Meyer-Allee 25
D -13355 Berlin
Germany
+49 (30) 700 96 94 0
+49 (30) 700 96 94 69
sales@pi4.de
www.pi4.de

pi4_robotics

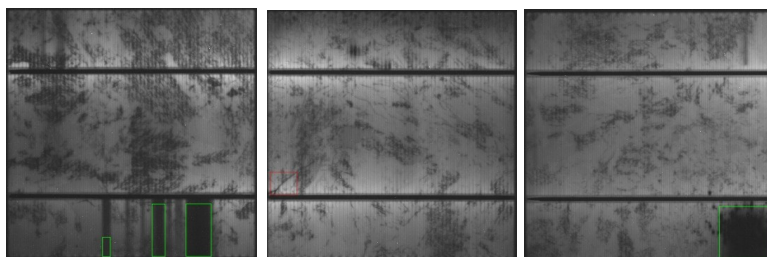
EL Module Inspection Systems



EL Inspection System for PV Modules

by pi4_robotics are designed for installation in an automated production line or for use offline. Inspection may be implemented before or after lamination.

EL Images are evaluated by visual operator inspection, or fully automatic by comprehensive algorithms of advanced software pi4_control .



Grid Finger Breakage

Micro Crack

Inactive Area

Optional features data base storage of results, MES interface, alerts to operator on upstream machine problem, as well as classification of results according to customer quality guidelines.

System Features

- **Inline or Offline Systems**
manual loading of modules or fully automatic loading and contacting available
- **Choice of Application**
before or after lamination, laminates or framed modules
- **Four Software Packages**
visual inspection by operator, automatic defect search and annotation or fully automatic identification of defects like micro cracks, broken grid fingers and others defects and automatic classification to customer quality guidelines
- **Adjustable to Module Size**
1000x645 to 2000x1000mm
- **Low Conveyor Level**
adjustable 930 mm up
- **Module Feeding**
short or long edge leading
- **High Optical Resolution**
up to 64 Mpixel (72 cells)
- **Short Cycle Time**
10s to 90s depending on model selected
- **Data Base Storage**
SQL data base and MES interface optional

Overview

pi4_robotics EL Module Inspection Systems



EL Module Inspection System	Automatic High Speed	Automatic Highres	Automatic	Economic Highres	Economic
System Design for Application	In-line	in-line	in-line	off-line/manual loading	off-line/manual loading
Item No. for module entering short edge leading	PBAES-S-MD0258	PBAES-S-MD0256	PBAES-S-MD0254	PBAES-S-MD0253	PBAES-S-MD0252
Module Size min. with short edge leading	1000 x 670 mm	1000 x 670 mm	1000 x 670 mm	1000 x 670 mm	1000 x 670 mm
Module Size max. with short edge leading	2000 x 1000 mm	2000 x 1000 mm	2000 x 1000 mm	2000 x 1000 mm	2000 x 1000 mm
Item No. for module entering long edge leading	PBAES-S-MD0259	PBAES-S-MD0257	PBAES-S-MD0255		
Module Size min. with long edge leading	1312 x 820 mm	1312 x 820 mm	1312 x 820 mm		
Module Size max. with long edge leading	2000 x 1000 mm	2000 x 1000 mm	2000 x 1000 mm		
Optical Resolution: (6x12 cell module)	31 Mpixel	64 Mpixel	31 Mpixel	64 Mpixel	31 Mpixel
Pixel Resolution	< 0.23 mm	< 0.17 mm	< 0.23 mm	< 0.17 mm	< 0.23 mm
Smallest defect detectable	> 0.5 mm ²	> 0.2 mm ²	> 0.5 mm ²	> 0.2 mm ²	> 0.5 mm ²
Cycle Time 60 cell module (including loading and unloading modules) *	30 s	40 s	40 s	Manual loading	Manual loading
Cycle Time (inspection only)	10 s	20 s	20s	20 s	20 s
Number of special el-cameras (moving on axis)	6	6	3	6	3
Software Packages: (x indicates compatibility)					
Visual Inspection by Operator PBAES-S-MD0146	included	included	included	included	included
Fully Automatic Inspection PBAES-S-MD0148	X	X	X	X	X
Automatic Inspection with Classification PBAES-S-MD0219	X	X	X	X	X
Options:					
Data Base	X	X	X	X	X
In-line code reader	X	X	X	X	X
UL-certified components	X	X	X	X	X
Repair Station Manager	X	X	X	X	X