

## Tabber and Stringer GTS18-K



Easily configurable Tabber and Stringer with state-of-the-art technology. Capacity of 60MW/year.

### Function

The main function of the Tabber and Stringer is to make cell strings, interconnection electrically the PV cells with ribbon by mean of contactless IR tech. Quality of both, cells and strings are checked during the process.

### Description

Mondragon Assembly's Tabber and Stringer is ergonomic, simple, and has a high production capacity.

Thanks to our knowledge and experience in technological processes and solar equipment, our team offers modular designs with advanced functions, low cost and high performance.

The Tabber and Stringer has four main remarkable elements: Cell quality control using artificial vision, advanced control of the IR soldering process, servo-drives and up to 5 bus bar ribbon power systems.

### Advantages

- Vision control systems to check the quality of the cells so that defective ones can be detected and rejected
- Control of cell temperature to ensure good soldering
- Time control for correct self-diagnostics
- Unlimited number of process formulas, where the same model or module can assume different process parameters, depending on the materials used
- Flexibility for processing different cell models or sizes with a very short change time. We work with cut cells. Up to  $\frac{1}{2}$  of 6" cells

### Main features

- Contactless IR soldering so that no stress is generated in the cell.
- Flux dispensing onto the bus bar without contact with the cell.
- Anti-camber systems to improve the ribbon's alignment.
- Artificial vision

### DATA SHEET

Product name	GTS-Series
	Automatic tabber & stringer
<b>Cell parameters</b>	
Cell size	5" or 6"
	$\geq 160\mu\text{m}$ (minimum value of tolerance)
Cell shape	Square or pseudo-square ( <i>others on request</i> )
<b>Cell loading</b>	
Number of cells (125mm/156mm) per stack	Max 200
Number of stacks	5pcs: working station (1) + buffer (4)
<b>Ribbon</b>	
Spool	Fast spool change Flexible for any spool size
Ribbon end detection	Included
Ribbon stretching	Included by tension force
Ribbon width	$\geq 0.9\text{mm}$
<b>Cell inspection system</b>	
Camera	High resolution, Dalsa or Cognex
Illumination	Front and Back light
Measured parameters	Cell size Number of busbars Busbar position on cell Main busbar breakage Cell edge chip detection (minimum 0.5 x 0.5mm) Differentiation between pin mark and chips Internal breakages (minimum 1 x 1mm)
Rejection box	Included
<b>Cell alignment system</b>	
Camera	High resolution
Illumination	Front and Back light
Robot	SCARA
Alignment methods	Edge alignment Busbar alignment Average between contour/busbar alignment
Cell positioning on string	Optional: - According to cell center - According to cell spacing
<b>Flux system</b>	
Characteristics	Applied over ribbon
<b>Tabbing/stringing process</b>	
Number of tabs per cell	2 and 3 (for 5"/6" cells), 4 and 5 for 6" cells
Tab spacing	Adjustable
Distance from tab end to cell edge	Adjustable
Ribbon Z marking system	YES (included in the cycle time of the machine)

Soldering process	
Pre-heating process	Progressive preheating table + 1 preheating station with table & IR lamp prior to
Welding process	IR Soldering Process Control by temperature close loop (PID) or Power Non-contact temperature measurement Temperature / Time adjustable curve
Number of welding points per tab	Continuous welding
Ribbon holding system	Pushing pins
Welding length	Adjustable separately: - Sunny side / back side - Soldering start / soldering end
Welding smoke exhaust system	Motor pump and carbon active filter. Optional
String parameters	
String length	1 to 12 cells
Cell spacing	
String first and last ribbon length	Adjustable (Min 10mm)
String unloading	
Options on request	- Manual - (GTS series)
	- Unloading to string box - (GTS-series+ GUT-series)
	- Unloading to tray with string with string flip-over - (GTS-series/FO+GUT-series)
	- Automatic Lay-Up by robot (flip-over included) - (GTS-series/FO+GLU-series)
	- Automatic Lay-Up by robot (flip-over included) for 2 stringers (2xGTS-series/FO+GLU-series)
Performance features	
Throughput	1800cells/hour
Yield	>99%
Uptime	>95%
Machine availability	>97%
Average cell breakage ratio	≤0.2% (with microcrack free cells)
Ribbon alignment tolerance	≤±0.2mm (with busbar alignment)
Cell positioning tolerance	≤±0.2mm
Electrical power supply	
Voltage	Ground, neutral and 3 phase 380/415Vac 50/60Hz
Nominal power consumption	26Kw/h
Air supply	
Air pressure	6 bar
Air consumption	1200 l/min (may be increased depending on machine configuration)
Connection pipe	16mm
Exhaust system	
Pipe dimension	DN150
Exhaust capacity	minimun 5m3/min
Physical specifications	
Length×Width×Height (mm)	5,870×2,000×2,050
Weight	4,100Kg
System control + software	
PLC	OMRON
Computer hardware	15" touch screen
Operation control and display	PC based
Remote operation via Windows	Included
Error diagnosis	Included