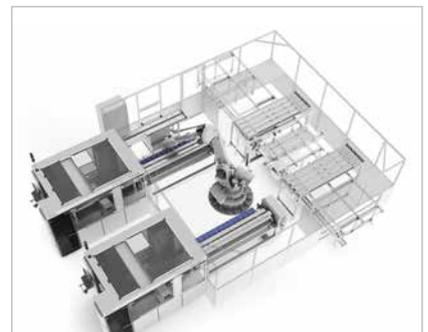


INTELLIGENT PRODUCTION TECHNOLOGY

STRINGER TT2100 i8 AND 145 MW SYSTEM

teamtechnik's HIGH VOLUME PRODUCTION
STRINGER WITH 72.5 MW CAPACITY FOR LARGE
SOLAR CELL SIZES



STRINGER TT2100 i8

- _ Up to 12 busbars possible
- _ Designed for solar cell sizes M6, M10 and M12
- _ High throughput at 1.71 seconds cycle time
- _ Low breakage rate < 0.1 – 0.3 %
- _ Separation of handling steps from soldering process
- _ Non-contact IR light soldering process
- _ Homogeneous temperature distribution on cell
- _ Very precise ribbon handling and positioning
- _ Industry leading availability and uptime
- _ Cost-effective and economical production
- _ Compact footprint
- _ Full cells for M6 possible
- _ Half cells for M6 (166 x 83 mm), M10 (182 x 91 mm) and M12 (210 x 105 mm) possible
- _ Third cells for M12 (210 x 70 mm) possible

145 MW SYSTEM

- _ One 6-axis robot for one or two STRINGER TT2100 i8
- _ Vacuum gripper for string handling
- _ Positioning station for glass panel
- _ Safety guarding
- _ Control cabinet and operating panel
- _ Maximum glass panel size of 2500 x 1400 mm possible

TECHNICAL DATA OF STRINGER TT2100 i8

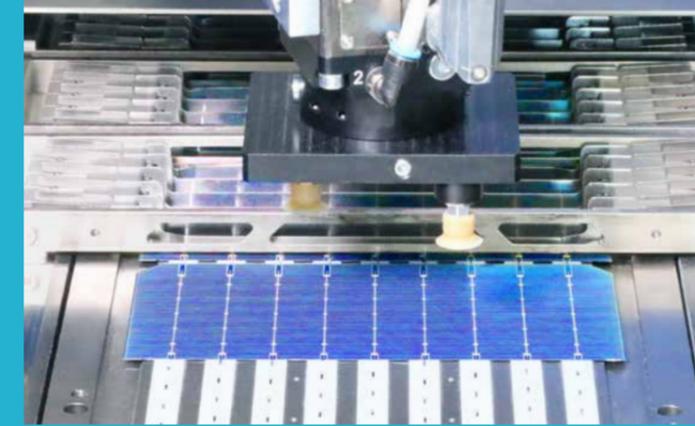
	STRINGER TT2100 i8	145 MW System (2 STRINGER TT2100 i8 + Layup)
Soldering technology	IR light	
Cell technology, types	mono-/poly-crystalline, front & back side contacted, bi-facial, all commercially available types	
Cell alignment	optical alignment via camera & robot for busbar or edge positioning	-
Cell inspection	vision system (camera), detection of accuracy for cracks, broken edges and scratches: 0.5 x 0.5 mm, grid-completeness check	-
Suitable for lead-free (Pb) ribbons	yes	
Number of interconnection ribbons	9, 10 and 12 (as an option)	
Range of solar cells	M6 half cells (166 x 83 mm) with 9 busbars as a standard M6 full cells (166 x 166 mm) with 9 busbars as an option M10 half cells (182 x 91 mm) with 10 busbars and M12 half cells (210 x 105 mm) as well as M12 third cells (210 x 70 mm) with 12 busbars as an option	
Cell thickness processing capability	160 - 250 µm, 180 µm as standard	
Busbar spacing	Standard: M6: 18.0 mm; M10: 17.3 mm; M12: 17.45 mm (+/- 0.15 mm); others on request	
Cell spacing (varies with cell size)	Standard: 1.6 - 8 mm; others on request	-
Positioning accuracy, string on matrix	-	± 0.8 mm as standard
Max. length of strings	max. 2138 mm, accuracy in length ± 1 mm	
Throughput (5 W per cell, 22.5 h, 300/325/350 days p.a.)	max. 2100 cycles/h, 1938 cells/h for a 12 cell-string including cell fluxing, 62/67/72.5 MW p.a.	max. 4200 cycles/h; 3876 cells/h for a 12 cell-string, 124/134/145 MW p.a.
Module size	-	max. up to 2500 x 1400 mm min. 1700 x 900 mm others on request
Flux application method for cells	cells fluxed with adjustable, metered micro spray; top and bottom side	
Breakage rate	on cell thicknesses down to 180 µm < 0.3 % (varies according to cell quality)	-
Ribbon sizes	flat ribbon width ≥ 0.4 mm or round wire diameter ≥ 0.4 mm; changeover parts are required for flat ribbon and round wire as well as different sizes	
Technical availability	> 95 % (VDI 3423)	Layup: > 98 % (VDI 3423)
Noise level	max. 69 dB(A)	max. 75 dB(A)
Dimensions	6.2 x 2.0 x 2.3 m	10.0 m x 6.6 m x 3.5 m
Weight	3500 kg	Layup: 3800 kg
Electrical power requirement	22 kVA	Layup: 30 kVA
Average power consumption (p. hour)	13.5 kWh	Layup: 9 kWh
Compressed air requirement	600 - 800 kPa (6 - 8 bar)	
Compressed air consumption (at 1 bar)	0.5 Nm ³ /min	Layup: 0.25 Nm ³ /min
Operator interface (HMI)	color touch screen with German/English/Spanish/Chinese and other language options	
Unloading system (Layup)	flipping unit	automatic with 6-axis robot
Warranty	12 months	

STRINGER TT2100 i8 High flexibility and technical availability

Extensive practical experience with string soldering machines at teamtechnik led to the development of the STRINGER TT2100 i8, a highly flexible production system with a compact footprint for large solar cell sizes.

teamtechnik uses hold-down devices in its systems to separate the soldering process from the cell handling process. This guarantees 2100 cycles/hour on a single-track – a technology that is already being used successfully in over 800 systems throughout the world. At the same time the devices ensure safe and reliable process steps and minimal breakage rates as well as precise positioning and alignment of cells and ribbons. The resulting strings offer impressive geometrical quality, linearity, length tolerance and cell gaps with excellent cell and ribbon positioning.

All teamtechnik STRINGER feature non-contact, controlled soldering technology using IR light. The closed loop controlled process technology compensates for variations in cell material to minimize breakage while ensuring consistent string quality. This gentle processing guarantees the lowest possible breakage rate.



Precise cell and ribbon handling with hold-down device system



Closed loop IR light soldering process



145 MW – the powerful package



String flipping

145 MW SYSTEM High performance system with only one 6-axis robot

The flexible complete system consists of two STRINGER TT2100 i8 single-track and a Layup station. The system is equipped with optimized automation and proven technology and processes. The integrated 6-axis robot allows the system to be adapted quickly to different applications or cell and glass sizes.

Layup station

- _ One 6-axis robot for 2 STRINGER TT2100 i8
- _ Vacuum gripper for string handling
- _ Positioning station for glass panel
- _ Safety guarding
- _ Control cabinet and operating panel

Features and options

- _ Buffer trays
- _ Rejected strings sorted into buffer trays, standard: 2 trays
- _ Optional buffer trays can be provided
- _ Infeeding of repaired strings via trays
- _ Additional infeed and outfeed conveyors for glass panels as an option
- _ Adapted Ribbon Length System: Cost reduction due to production of strings with defined and varied ribbon length of first and last cell (depending on string position in the module layup). This System will avoid the waste of ribbons, since no additional cutting will be required.

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