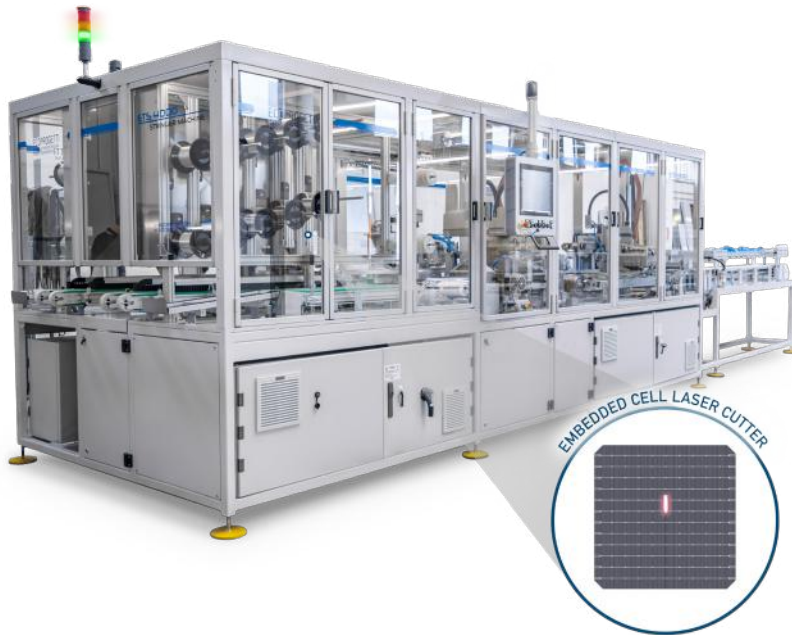


ETS 4000 - HIGH SPEED MBB STRINGER MACHINE



FROM 5 TO 12 BB

FULL CELL HALF-CUT

DOUBLE LANE SYSTEM
4000 CYCLES/HOUR

INFRARED SOLDERING

CHARACTERISTICS

- CELL BREAKAGE LESS THAN 0.2%
- UP TO 12BB, COMPATIBLE WITH 9-10-11-12 BUS BAR
- INFRARED SOLDERING TECHNOLOGY
- WORKS WITH P-TYPE PERC, N-TYPE TOPCON, N-TYPE HJT, FULL & HALF CUT
- LASER CUTTER UNIT EMBEDDED IN THE MACHINE (ON REQUEST)
- COMPATIBLE CELL SIZES: M6, M10, G12
- HIGHLY ACCURATE RIBBON HANDLING AND POSITIONING

CAPACITY
4000
CYCLES/HOUR

CELLS
P-TYPE PERC
N-TYPE TOPCON
N-TYPE HJT
FULL & HALF CUT

CELL INSPECTION

UP TO
12
BUS BAR
CELLS

OPTIONAL:

- LASER CUTTER UNIT EMBEDDED IN THE MACHINE
- STRING LENGTH > 2300 mm
- 16 BUS BAR

WORKS WITH
6 AXIS LAYUP STATION

ECOLAYUP R



TECHNICAL SPECIFICATIONS

THROUGHPUT	4000 cycles/hour, 3680 cycles/hour net* Speed decrease with Full cells. *According to raw material's grade and soldering process.
TECHNICAL AVAILABILITY	> 92%
CHANGEOVER KITS	Changeover kits necessary for flat ribbon
RANGE OF FULL SOLAR CELL DIMENSIONS	Full cells compatibility: M6 (166 x 166mm), M10 (182 x 182mm), G12 (210 x 210mm)
RANGE OF HALF-CUT SOLAR CELL DIMENSIONS	Half-cut cells compatibility: M6 (166x83mm), M10 (182x91mm), G12 (210x105mm)
RANGE OF TRIPLE-CUT SOLAR CELL DIMENSIONS	G12 (210x70mm) Only on specific request.
LASER ACCURACY	Positioning deviation: $\leq \pm 0.1$ mm Angular deviation: $\leq 0.04^\circ$ Cutting accuracy: ≤ 0.1 mm
LASER CUTTING UNIT (Optional)	Embedded laser cutting unit and auto breaking unit. Peak Power 50W. (Used only for half cut and triple cut cells)
LASER SCRIBING BREAKAGE RATE	Broken cells discarded $\leq 0,4\%$, Thickness $\geq 170 \mu\text{m}$
CELL BREAKAGE RATE	Without laser work $\leq 0.2 \%$
SOLDERING TECHNOLOGY	InfraRed soldering technology
CELL BASKET LOADING	Automatic, nos. 8 cell baskets included
SOLAR CELL THICKNESS	170 μm -300 μm
CELL INSPECTION	Vision system for alignment and for broken cell detection
ALIGNMENT OF CELLS	Performed optically
RIBBON POSITIONING ACCURACY	$\leq \pm 0.25$ mm. Centerline of ribbon must coincide with the centerline of solder pad
FLAT RIBBON SIZE	Width: 0.50 to 1.1 mm (± 0.05 mm) ; Thickness: 0.18 x 0.25 mm (± 0.05 mm)
CELL TO CELL GAP ACCURACY	$\leq \pm 0.25 \%$
ROUND WIRE SIZE (MBB) (OPTIONAL)	$\varnothing 0.30$ to $\varnothing 0.45$ mm (OPTIONAL)
BUS BAR COMPATIBILITY	From 9-10-11-12 BB
STRING LENGTH	Max 2300mm
STRING LENGTH ACCURACY	$\leq \pm 1$ mm
HEAD/TAIL EXTRA RIBBON	≥ 9 mm (The length of extra ribbon for the first and last string)
DISTANCE BETWEEN CELLS	From 1.5 mm to 8 mm (Adjustable upon request)
DISTANCE BETWEEN STRINGS	Minimum distance is >18 mm
OPERATOR INTERFACE	User friendly touch-screen with different languages available (English as standard, others on request)
REMOTE ASSISTANCE	Provided with ethernet connection
UNLOADING SYSTEM	Dual belt system, flipper unit included on the unloading belt
PREHEATING ZONE	5 heating zones
TEMPERATURE CONTROL ACCURACY	± 7.5 °C
PEEL FORCE STRENGTH (FRONT SIDE)	1 N/mm for flat ribbon;
PEEL FORCE STRENGTH (REAR SIDE)	1 N/mm for flat ribbon;
RIBBON SPOOL	Inner diameter ≥ 16 mm outer diameter ≤ 200 mm, width ≤ 180 mm, 8 kg max per spool
BAD SOLDERING STRING	$\leq 0.2\%$ (with machine in continuous work flow without any stop)
MODULE REWORK RATIO	Flat ribbon: $\leq 10\%$ (with laser 12%) [optional: Wire ribbon: $\leq 15\%$ (with laser 18%)]
STRING ALIGNMENT ACCURACY	± 0.5 mm
ENVIRONMENT TEMPERATURE	15 - 35 °C
ENVIRONMENT HUMIDITY	30 - 70 %
RIBBON PARAMETERS	AVERAGE THICKNESS OF TIN COATING (Sm60p640): ≥ 20 mm $\pm 5\mu\text{m}$ COPPER PURITY: $\geq 99.97 \%$ ELONGATION: $\geq 25\%$ TENSIL STRENGTH: ≥ 270 MPa YIELD STRENGTH: ≤ 90 MPa



UTILITY SPECIFICATIONS

ELECTRICAL CHARACTERISTICS	
LINE	3P+N+E
VOLTAGE	400 V
FREQUENCY	50/60 Hz
PEAK POWER	80 kW
AVG. POWER CONSUMPTION	40 kW
MAX CURRENT	140 A
PRE FUSE	160 A
AIR CHARACTERISTICS	
AIR PRESSURE	6-8 bar
AIR CONSUMPTION	700 NL/1'
AIR PEAK FLOW	1300 NL/1'
AIR CONNECTION	1/2"
EXHAUST FAN EXTRACTION CAPACITY	750 mc/h
DIMENSIONS	
HEIGHT	2300 mm
LENGHT	9000 mm
WIDTH	2200 mm
CE WEIGHT	6500 kg
WE SUGGEST TO USE AN EXTRACTOR FOR EXHAUST FUMES	EXTRACTOR'S LINE LENGTH DEPENDS ON YOUR CHOICE OF EXTRACTOR