



# KEKO EQUIPMENT NEWSLETTER

No. 8

20 Years

# KEKO EQUIPMENT, A TALK WITH TONE KONDA AND JOŽE ŠTUPAR

**Once again we talked to Director Tone Konda and Technical Director Jože Štupar. They shared their views on the business operation and development of Keko Equipment, the development of the field and the global economic situation.**

**The Company's investment cycle concluded this year. How do you think it went?**



**TK:** Yes. Since 2009, the market has been experiencing a dramatic growth. In the past three or four years, we essentially had too much work. We were experiencing major organisational difficulties and it was essential that we restructure the Company, both organisationally and technologically. Our sales volume and our orders required us to take a step forward.

**JŠ:** With the new investment, presented in greater detail in the following pages, we increased our physical production volume and efficiency, as well as enabled our clients to become more familiar with our machines before purchasing. We have a new showroom that offers the chance to try out materials or final products based on the client's specifications.

**Does the new investment mean an expansion of the Company's product portfolio or an expansion into other fields?**

**JŠ:** No, our main focus remains on multi-layered ceramics, but our clients' applications and ideas are developing and we have to keep pace.

**TK:** Standard machine models that are then adapted to the clients' needs and their desired final products still form the basis.

**Keko Equipment is also celebrating 20 years of successful business operation this year. How do you see these past two decades from today's perspective?**

**TK:** As the Company has its roots in the former Iskra Žužemberk, we prefer to say it has experienced 20 years on a 35 year-long foundation, a total of 55 noteworthy years of

tradition. At the time, Iskra was a major player on the global markets. Thus, we have been operating on an international, global level practically since the very beginning half a century ago.

Transitioning to a new company was, in a way, a risky move, without any guarantees for the future, but the Company has been growing all this time. It initially had 17 employees and today there are 55 of us.

**JŠ:** On the one hand, the number of years means nothing. On the other hand, however, it means we will probably survive another year or so, since we have nearly 55 of them behind us. But in business you also need a little bit of luck. Multi-layered ceramics offers numerous possibilities for application and we have been getting more and more clients from new fields outside the electronics industry.

**How have the reorganisation and investments in production affected the Company's sales methods?**

**TK:** Essentially, sales are still handled by our agents who are also involved in the projection or analysis of our clients' needs and propose the necessary machine solutions.

**JŠ:** But now we also have a new showroom that is essential for giving our clients the chance to test the basic principles of the production of their products and their materials, thereby getting the basic assurance that our machines are the right solution to meet the specifics of their production and products.



**TK:** Almost every client has its own particular requirements, often at the limit of technological possibility. We do not give in to temptations and do not enter into risky business transactions or make promises that we are not certain will work for the client. We cannot afford to find ourselves in a

situation where our solutions fail to deliver the required results, which means prior testing is crucial. One wrong, unsuccessful business can start driving you off the market.

**JŠ:** The right materials and the development of materials are almost as important as the machines, perhaps more so. But this development is on the client's side; it is important that the material and the machine are compatible.

**Despite certain constants in your field, you are still constantly moving forward with development?**

**JŠ:** Of course. In terms of development, we also work together with institutes and other organisations – mainly with the Jožef Stefan Institute. We are not searching for “the God particle”; we are interested in applicative development, concrete solutions, concrete materials, concrete ideas.

**TK:** We are also involved in the “Smart Specialisation” project, co-funded by the EU, and we participate in other research projects in other parts of the world, e.g. with China.

**Which way is your development headed?**

**TK:** A while ago, the clients' focus moved from multiplying existing production to searching for new ideas and new



products. Our development is also headed that way, finding new ideas and applications outside the electronics industry as well.

**What about copying, industrial espionage?**

**JŠ:** We let all our guests, our clients take pictures on our premises. We let them take pictures, let them copy us; meanwhile we're already ahead. It's not that simple, it's a complex know-how, a complex process of learning from your own and other people's mistakes, and you can't copy that. You have to go through the whole process yourself.



**A logical question regarding the previously mentioned aspect of materials presents itself: why don't you take on the development and sale of materials?**

**TK:** Such thinking would pose a business risk since we cannot compete with our clients. Developing materials is more about broadening our knowledge of processing them. And of course it allows us to provide considerable assistance to those clients who so far have nothing and can get to their product quicker if they work with us.

**What are your views on the situation on global markets?**

**JŠ:** There are new competitors with new ideas, with a greater desire for success. A poor man's future can only be better while a rich man's can only be worse. Just as it is hard to hold onto one's wealth, it is hard for a company to keep its market share. Failure is always guaranteed in the end while success is rarely guaranteed at the beginning. Even the greatest empires collapsed in the end. In this light, Europe needs to be aware of its limited creative power. Our sales levels on old EU and US markets remain constant, but more as a result of government subsidies than concrete development ideas. It shows when Russia has low oil prices, but then the dollar rises too, it's a catch 22 situation.

**TK:** In Russia, there is strategic government funding and

not much private investing. But our traditionally very strong market is still China. The Brazilian and Indian markets also looked very promising for a while. Iran with its automotive industry is another new market.

The fact that we can offer a comprehensive solution remains our advantage on all markets.

**From the side, it seems as though the 2009 crisis bypassed you?**

**JŠ:** I said then that it was mostly a crisis in Europe and the US, while our other markets, Russia and China, were on the rise.

**TK:** All this time, we have had too much work, thank god, but we remain realistic. Globally speaking, there are not many producers of these types of machines, but the competition is still fierce. Our portfolio mainly covers smaller and medium-sized enterprises and institutes.

**JŠ:** When there is a crisis, it fosters new ideas and that is what happened in Europe, which is a good thing, in a way. Technical and commercial know-how need to come in a package, you can't have one without the other.





# BRIEF HISTORY OF KEKO - EQUIPMENT LTD.

**1960** Beginning of the production of ceramic capacitors in Žužemberk

**1970** Production is moved to a new production facility at a new location where it still operates today



**1977** Investment in the first multi-layer-based ceramic capacitor production line



**1985** First sale of machines, equipment and technology on the global market



**Izdelali so stroj, vreden 120.000 dolarjev**



**ŽUŽEMBERK, 25. oktobra** – Pred časom so v Iskrinem tozdu Keko v Žužemberku po načrtih strojnega inženirja Jožeta Štuparja in njegovega sodelavca Toneta Slaka izdelali avtomat za spajkanje večplastnih kondenzatorjev, ki na svetovnem trgu stane prek 120.000 dolarjev. Prototip so že prodali na Kitajsko, zdaj izdelujejo nekoliko izpopolnjen stroj za lastne potrebe, da bi nato, če bo prišlo do podpisa poslovne pogodbe, nekaj takšnih strojev pripravili za NDR. Član inovacijske skupine strojni inž. Peter Bavdek je dejal, da je izdelava avtomata zahtevala veliko naporov in truda delavcev v konstrukcijskem oddelku. Gre za največji tehnični dosežek, ki so ga v tem Iskrinem obratu pripravili doslej. Na sliki: avtomat za spajkanje večplastnih kondenzatorjev, ki je plod dela Iskrinih strokovnjakov v Žužemberku. (Foto: Slavko Dokl).





**1995** The separation of equipment production, Keko - Equipment Ltd. embarks on an independent business path



**2001** The Company moves to its new premises and starts expanding the area of multi-layer-based applications to include areas outside electronic components



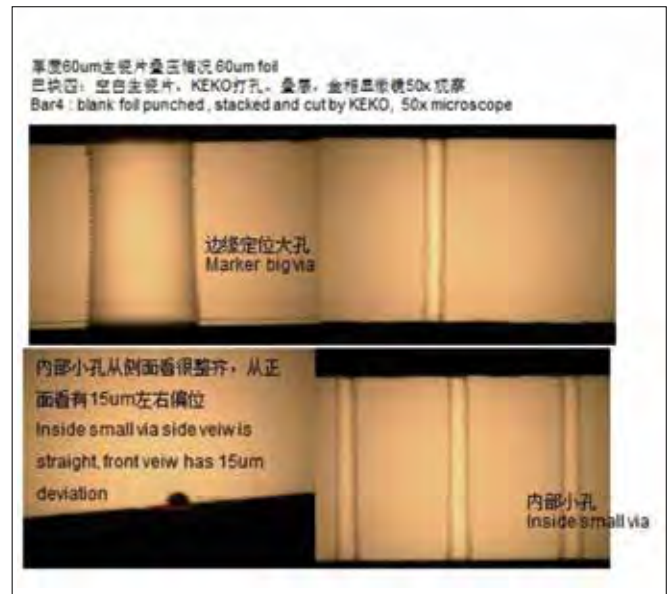
**2014** New investments continue - the expansion of production and moving the production of machine parts to a new location to enable larger assembly facilities and the construction of a showroom



# WORLD FIRST UNIVERSAL AUTOMATIC LTCC STACKER

**SW automatic stacker is world first LTCC stacker able to fulfilling all LTCC production requirements.**

- Can stack first layer with print face down
- Sheets can be stacked either with face down or face up, or mixed
- Programmable stacking pressure for each layer
- Using exchangeable pressing paper for each layer and each stack (Paper uniforms pressing pressure and minimize contamination)
- An optional vacuum press (pressing in vacuum) is available
- A gluing station is also available for difficult taking ceramic
- Different machine configuration possible

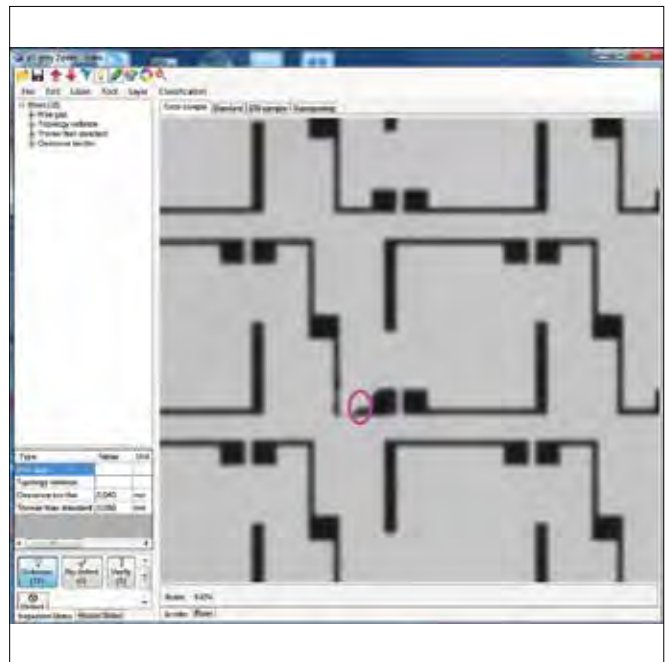
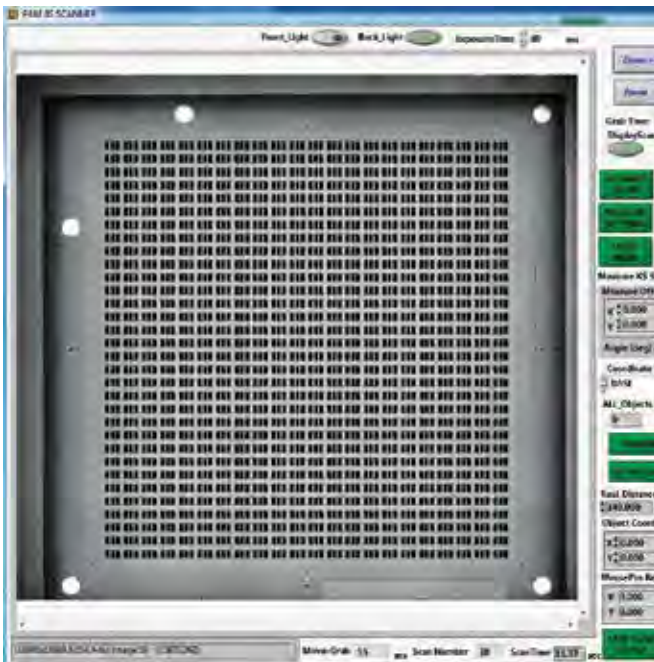


## Keko vision inspection system KVI

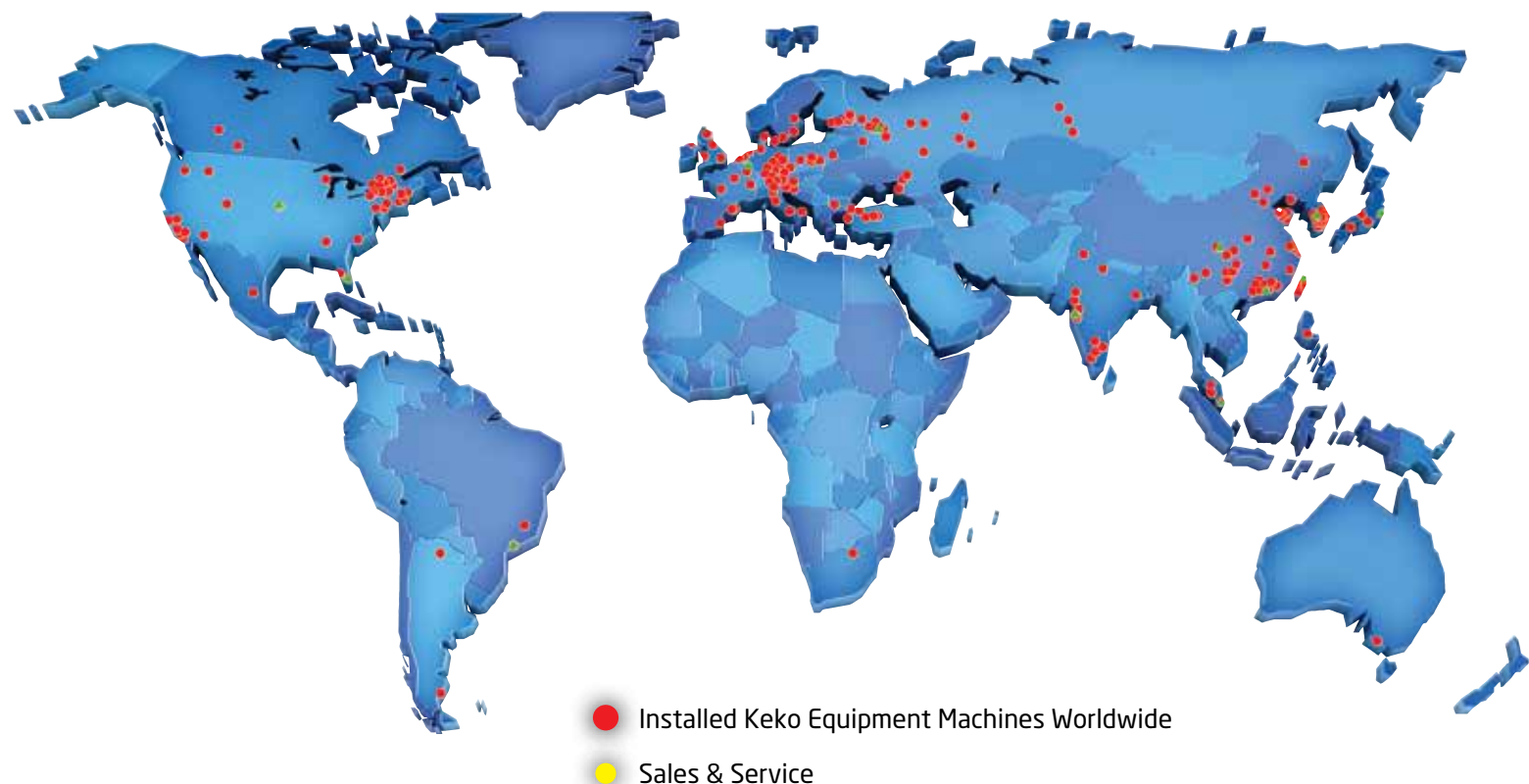
Has been developed for inspection punched and printed sheets in multilayer ceramic components production.

- Inspects quality of punched via holes in green ceramic tapes,
- Suitable for wet and dry conductive lines and vias inspection
- Deviations and contaminations on the tape and prints
- Alignment accuracy inspection between vias and print
- Statistic data acquisition
- Competitive price / performance value





## GLOBAL PRESENCE



# NEW INVESTMENTS

This year saw the conclusion of the investment cycle that allows us to increase our physical production capacities and ensure improved organisation. The new showroom gives our clients the



New facility for parts making, opened in the beginning of 2015



Parts making hall, opened in the beginning of 2015



Double column CNC milling machine



New show and testing room

chance to try out the basic principles, test materials and in some cases even do a test production of their desired products. Here is a brief tour of the new premises in pictures.



New show and testing room



Nagrada  
Gospodarske  
zbornice Slovenije

# AWARD OF THE CHAMBER OF COMMERCE

## Award of the chamber of commerce and industry of Slovenia for outstanding economic and entrepreneurial achievements for small and micro-enterprises, 2014

The CCIS Awards are the oldest and most prestigious awards for outstanding economic and entrepreneurial achievements in Slovenia. According to the Chamber, they are awarded to company managers who achieved outstanding business results in the past year, thus contributing to the promotion of excellence, competition, development and wider and more sustainable social change.

The Company's outstanding achievements are supported by a number of indicators – several years of growth in company revenue and profits, an added value exceeding the industry average by 72 percent, high revenue per employee and unindebtedness. Due to our highly specialised production based on our own know-how, the Company earmarks between 10 and 20 percent of its annual revenue for research and development.



The Award for Outstanding Economic and Entrepreneurial Achievements in 2014 was received by Keko Equipment Ltd., which has been successfully run by co-owners Anton Konda and Jože Štupar for 20 years.

The business results achieved will allow us to realise our vision and become one of the leading producers of machines for multi layer electronic components in the world.



# TRADE FAIRS & EXHIBITIONS

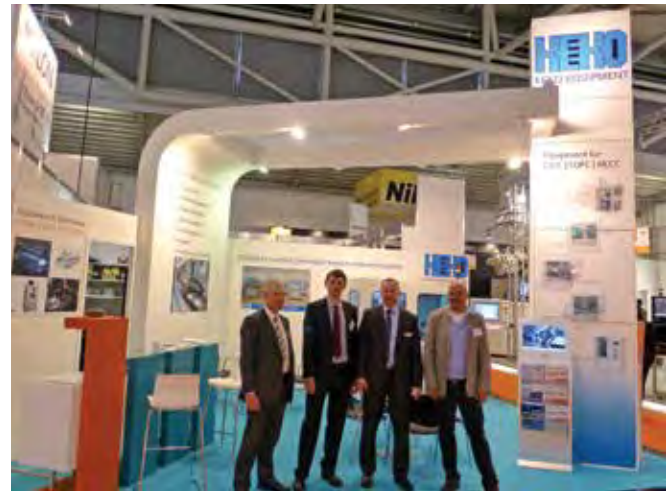
In 2013, 2014 and 2015 we were attending several Trade Fairs & Exhibitions:  
IMAPS 2014, San Diego, CA, USA, | IMAPS 2014, Dresden, Germany, | EXPO 2014, Moscow, Russia  
| EMPC Productronica 2013, Munich, Germany | Fuel Cells Science & Technology Conference



EMPC Productronica 2013, Munich, Germany



EMPC Productronica 2013, Munich, Germany



EMPC Productronica 2013, Munich, Germany



Munich 2014



IMAPS - San Diego, CA 2014

2014, Amsterdam, Netherlands | IACE 2014 - China (Shanghai) International Advanced Ceramics Exhibition & Conference | Messe Friedrichshafen 2015, Germany | Hannover Messe 2015, Germany.



Hannover Messe 2015



Shanghai ceramic conference 2014



EXPO Moscow 2014



EMPC Friedrichshafen 2015



Imaps Dresden 2015



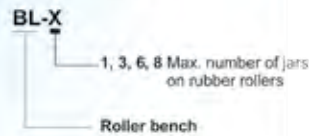
Grove fuel cell Amsterdam 2015

## Slurry preparing

### Roller benches BL - series

- adjustable rotation speed and time
- adjustable to different jar sizes

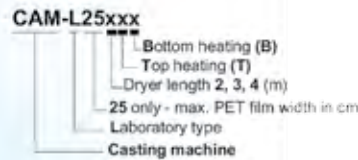
#### Models:



## Tape casting

### Laboratory tape casters L-series

- for laboratory or small production volume
- casting on PET film
- casting speed control
- gravity slurry feeding
- tape winding

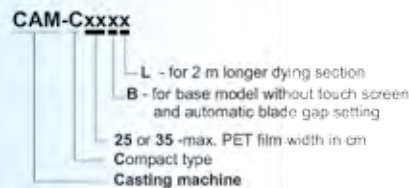


Tape casting on polyester film



### Compact tape casters C-series

- compact size requiring minimum floor size
- suitable for solvent and water based systems
- high accuracy in thickness control
- automatic tracking of carrier film
- automatic slurry feeding
- applicable for up to 100 micron tape thickness

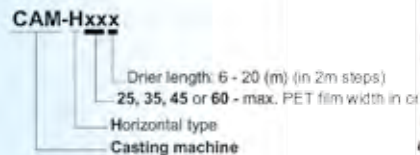


Tape casting on polyester film



### Horizontal drying zone tape casters H-series

- thickness 5-500 microns (0.2 - 2 mils)
- advanced drying regimes possible
- high accuracy in thickness control
- automatic tracking of carrier film
- automatic slurry feeding

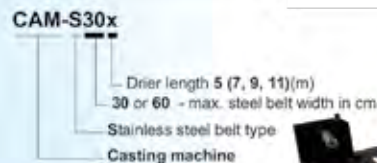


Tape casting on polyester film



### Steel belt tape casters S-series

- suitable for price sensitive applications
- different drying regimes
- high accuracy doctor blade
- automatic tracking of steel belt
- automatic slurry feeding
- tape winding



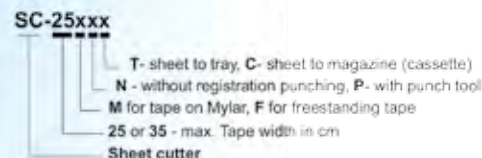
Tape casting on steel belt



## Tape blanking

### Automatic green tape blanker SC-series

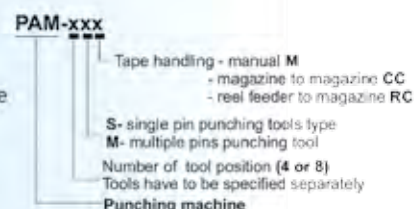
- blanks single sheets from a roll of green tape
- suitable for freestanding or Mylar based tapes
- trims sheet edges
- punch registration holes
- transfers blanked sheets to a magazine
- sorting blanked sheets according to their thickness



## Tape punching

### Punching machine PAM-series

- punch holes for vias and registration in green tape
- punch cavity rectangle or square holes
- manual, CAD, NcDrill and DXF file input
- tool breakage detection
- automatic sheets re-alignment
- vision inspection option



Especially suitable for LTCC production



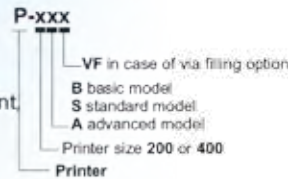
## Screen printing

### Screen printers

#### P - series

- Three models available to meet all requirements
- Fully programmable printing parameters
- Print/print, print/flood, flood/print, on contact print, stencil printing, via filling
- Extensive options for demanding advanced technology applications

#### Models:



### Automatic screen printers

#### P-series

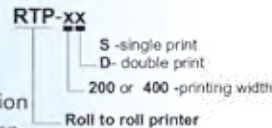
- Automatic sheet handling, printing, drying process
- Two models available to meet all requirements
- Fully programmable printing parameters
- Print/print, print/flood, flood/print, on contact print, stencil printing, via filling and screen cleaning
- Extensive options for demanding advanced technology applications



### Automatic roll to roll screen printers

#### RTP-series

- Automatic screen printing on to tape from a roll, suitable for different application
- Advanced print alignment feedback
- Double color printing with precise alignment version
- Specially designed for MLCC high layers production
- Efficient tape drying- ensure short cycle time
- Printed tape tracking control on winding side



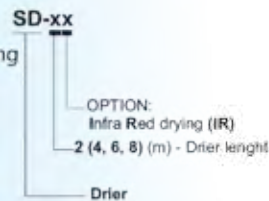
## Roll to roll printing

## Drying

### Drier

#### SD-series

- dry single sheets, substrates or wafers after printing
- air flow ensure high drying efficiency
- adjustable internal and fresh airflow circulation.
- sheets are transported by teflonized mesh belt
- IR fast drying version available
- height adapted to Keko manual screen printers



## Cover sheets making

### Cover sheets maker

#### CSM-series

- Makes cover sheets directly onto carrying palette from a roll of tape
- Glues the cover sheet to custom carrying palette
- Sheet blanker and press in one unit

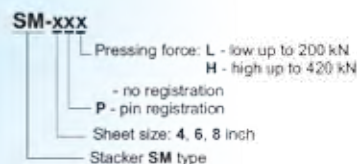


## Stacking

### Manual stacker

#### SM-series

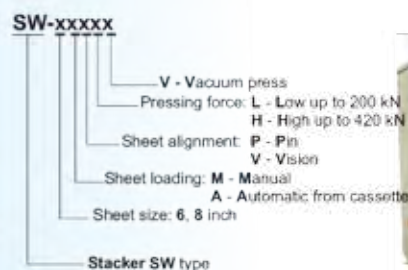
- Simplified manual stacker
- Uniaxial lamination possibility
- Registration can be done by registration pins



### Universal stacker

#### SW-series

- Manual or automatic stacking machine for low to medium LTCC or other similar component production
- Suitable for tapes with or without carrier film
- Process on vacuum plate
- Possible to start building stack from top or from bottom
- Vacuum press for bubbling sensitive foils

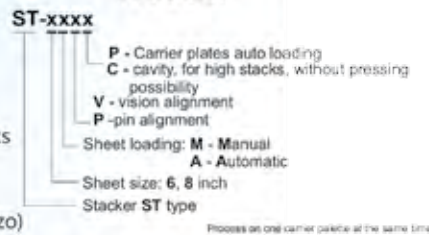


## Stacking

### Stacking machine ST-series

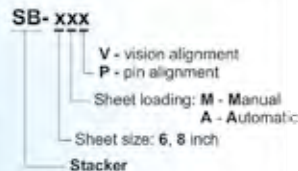
- Automatic sheet loading from cassettes
- Carrier palette automatic loading / unloading
- Automatically removes carrier film first, then stacks
- Pre-registration
- Automatic vision alignment
- Suitable also for very high layer count (MLCC, piezo)
- Not suitable for tapes with punched holes

#### Models:



### Stacking machine SB - series

- Automatic sheet loading from cassettes
- Carrier palettes automatic loading / unloading
- Pressing first than removing carrier film
- Pre-registration
- Automatic vision alignment
- Suitable for high volume production
- Suitable for various components (up to 50 layers stack), especially MLCI



Standard 24 carrier block ceramic transport

## Printing & stacking

Print on stack technology

### Printing and stacking machine PAL - series

- Universal system for components up to 100 layers
- High productivity = low cost per component
- Suitable for smallest components size
- Uses carrier film tapes, freestanding tapes and individual sheets
- Special configurations like:
  - several printers
  - sheet vision alignment
  - other special requirements

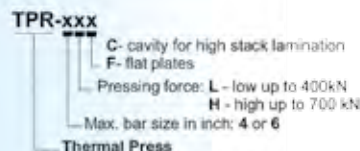


Contact supplier for particular application

## Laminating

### Uniaxial thermal press TPR - series

- Multiple stacks are laminated simultaneously
- High stack lamination possibility
- Simplified versions available
- Easy to operate, quick product turn-around time
- Rigid, compact design takes little floor space

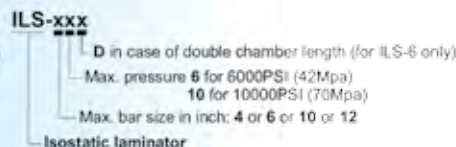


Higher forces in vacuum chamber on request



### Isostatic lamination press ILS - series

- Up to 40 stacks/substrates laminated simultaneously
- Wide selection range of bar size
- Easy to operate, quick product turn-around time
- Rigid, compact design takes little floor space
- Stores up to 99 pressure programs



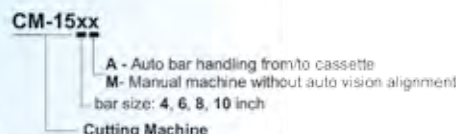
Vacuum sealing device included



## Cutting

### Cutting machine CM-series

- Cuts the most difficult high thickness green Ceramic Ware
- Automatically positions knife with high accuracy
- Automatically finds cutting markers
- Adjustable speed and cutting depth
- High productivity due to high cutting speed



Pre and post heating plates optionally



### Edge Trimmer ET-series

- Simple, flexible and accurate
- Bar Edge trimming and Splitting possibility
- Laser pointers installed for precise block positioning



## Ceramic machining

### CNC Milling machine

- Cuts any shape out of green ceramic
- Drills holes
- Automatically positions bar by vision system
- DXF file conversion
- Vacuum bar fixing
- Two spindle simultaneous operation option

CNC - MMx

1-8 - Number of tools  
Milling machine

Contact producer for detailed specification!



## Termination

### Dipping machine DM-series

- Fully programmable dipping conditions ensures accurate and excellent termination
- Simple programming, more than 50 dipping programs can be stored
- Truth chip leveling mode ensure uniform dipping height
- High speed, high accuracy servo motors positioning
- Easy cleaning features

DM - 6

Dipping machine

Contact producer for detailed specification!



## Inspection

### Print inspection KVI

- Designed for inspecting green ceramic sheets
- Inspect wet and dry prints, via holes
- High inspection resolution
- Detects shorts, opens, neck downs, mouse bites, screen stretch, screen misalignment, contamination



## Measuring

### Measuring microscope

- Travel(X, Y) : 300 x 300 mm Z : 120mm
- Resolution : 0.001mm Linear scales in 2-axes



## Vacuum generating

### Vacuum pump VP-series

- For vacuum supply
- Consist of: vacuum pump, reservoir, electrical control with vacuum level switch, switching pump on / off, vacuum filter

VP - X

300 l/min capacity  
1000  
1600  
Vacuum Pump



## Materials and Technology

Based on experiences and cooperation with institutes in field of material and technology development, Keko Equipment new strategy is offering complete solutions for multilayer ceramic products, including compatible materials, technology and machines. Please contact Keko equipment for particular solution.

## Custom designed machines

Our machines are developed, designed and produced in our house.

One of Keko Equipment strongest part is custom designed equipment based on custom requirements and our long term designing and machines production experiences.

Many customers are satisfied with our innovative solutions adapted to their needs.

Experienced production team is guaranty for quality and success.

Contact us, if you are looking for custom solution, which you can not find on the market.

11/15

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to know how to do it

# COMPANY PROFILE

KEKO Equipment Ltd. is a leader in the manufacture of machines for the production of multilayer passive ceramic components but also many other products, based on a tape casting process.

Thirty-five years of experience have given us the vast knowledge that is now marketed under our own brand in the European, Asian, American and Australian markets.

Our roots stretch a long way back to when we were a unit of the Iskra consortium. Since 1995 the company is in private hands and its philosophy today is formulated by a team of highly motivated engineers and designers.

In addition to the extensive range of proven products, we focus our specialized know-how into custom manufacturing.

In the development of specialized technological solutions we take into account our customers requirements and the needs of each individual buyer, thus providing the basis for a successful long-term relationship.

This is aided by our widespread sales network that spans all continents, where we always cooperate closely with knowledgeable local agents. They have helped us to provide very successful post-sales services and ensure customer satisfaction.

Knowledge, flexibility and innovation are our company's key competitive advantages and our brand name's good reputation now reaches all over the world.



*20 Years*

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