

falma machines

HSL 4000 fully automatic production line

High speed line producing different types of incandescent lamps



montena
falma machines



Turning darkness into light

Montena machinery develops, builds and commissions machines and production lines for the manufacture of all kinds of light sources: incandescent or economical, traditional or the latest generation.

Working in close co-operation with montena lighting, montena machinery has acquired complete mastery over all the phases of lamp production. This synergy effect brings high benefits: for example, it enables montena machinery to make an objective and well-informed assessment of production tool quality.

Montena's foremost aim is to give you comprehensive service, dedicated to your satisfaction and success. Our customer advice focuses on research, development and engineering; we also provide on-site after-sales service, maintenance and monitoring of installations.

Montena summarises its objectives in a single declaration of intent: we can do it!

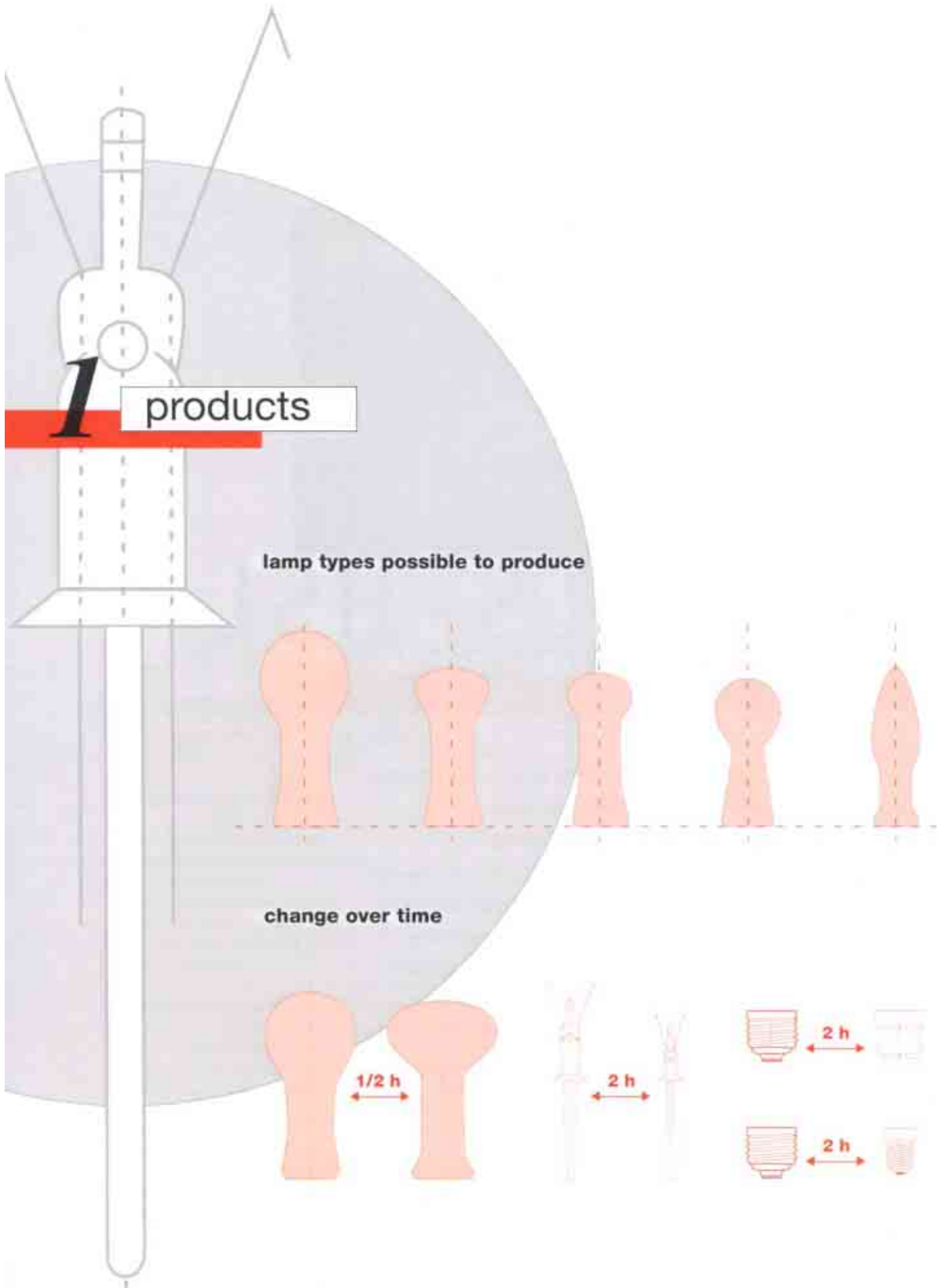
We will be happy to give you further information. Just contact us!



HSL 4000

Fully automatic high speed production lines for quality incandescent lamps

- ❑ Different lamp types possible
- ❑ Easy to operate
- ❑ High material efficiency
- ❑ Minimum of persons required
- ❑ Very short change over time
- ❑ Very short pay back time
- ❑ 3 shift operation possible
- ❑ Minimal floor space
- ❑ Easy control system of the line
- ❑ Minimum raw material waste





overview of the HSL line



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concept: process steps

The production of incandescent lamps bases on a turret system, which is proven montena machinery quality. Each turret is driven by indexing cams, connected with a storage system and automatically controlled by a supervision control system LSI.

Flare machine, Stem machine and Mount machine are the bases of the incandescent lamp production line. The bulb is put onto the stem on the Sealex machine, the EP, where as well the vacuum and argon filling is done. Different optional machines are available.

All the machines together are synchronised and automatically controlled.

Each machine has free access. The modular system of the design makes it possible to compose exactly the line required for your needs. One big advantage: you can adapt the line later at any time to produce new types according to the needs of the market.

On the following pages, you will find a short description of every individual machine.

In case you should have more questions or comments, please do not hesitate to contact us for further information.





TL - Flare making machine



GM - Stem making machine
(flare, lead-in wire and exhaust tube mounting)



MM - Mount machine
(filament mounting and applying the getter)



EP - Sealex machine first step
(set the glass bulb on the mount and seal it)



EP - Sealex machine second step (pumping and argon filling)



CT - Conveyor and threading machine



SM-Capping machine
(welding the contacts and baking out the cap paste)

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technology know how

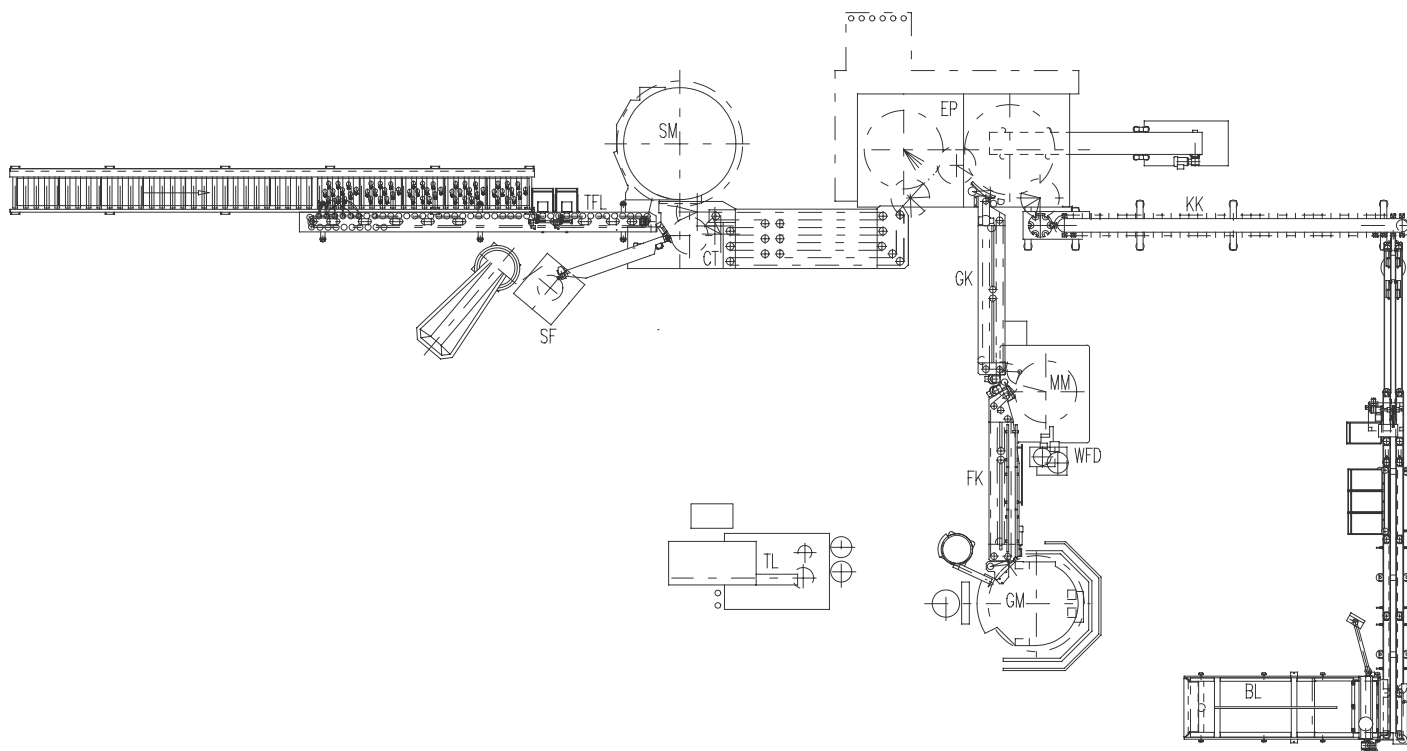
With a fully automatic high speed lamp production line montena machinery as well supply the know-how and the technology how to produce the incandescent lamps with a high efficiency, assuring a high product quality. Every single step from the beginning to the end is important and that is how we teach your personnel to solve daily problems and how to reduce raw material costs to a minimum and how to increase the overall efficiency.

To ensure the quality and the high efficiency of the lamp production line, the operators of the machines follow a specific training program. Along with our detailed documentation they will soon be able to handle the machines by their own. That is how you can ensure a good quality of the product and each step of the lamp production.

If later on, during operation of our installation you have questions and problems to be solved and answered, we will help you as well with our support at any time.

4 technical specifications of HSL line

Line type	Lamp types	Cap types	Index
HSL 4000	tubulars Ø 20-28 mm	E14	4'000/h
	bulbs Ø 35-95 mm	B15, B22 E14, E27	



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machine descriptions

Individual machines

- GM Stem machine
- FK Stem chain
- MM Mount machine
- WFD Filament feeder
- GK Mount chain
- EP Sealex machine
- VP10 Vacuum pump
- SF Cap filling machine
- CT Conveyor and threading machine
- SM Capping machine
- TFL Conveyor and storage boxes
- BL Bulb loader
- KK Bulb chain

Optional machines

- TL 83 Flare machine
- AM Aluminising machine
- EC Electrostatic coating machine
- PAT Cooling and storage tower
- FOX Oxygen final control system
- SSM Exhaust tube cutting machine
- PG Exhaust tube fire polishing machine
- PK Exhaust tube calibrating machine
- GP Gas tester
- HF High frequency tester
- Pirani Vacuum measuring gauge
- LT Lamp testing apparatus
- AP Photometer
- LR Life testing rack
- LA Lamp unloading unit



producing the pinched stems



Description

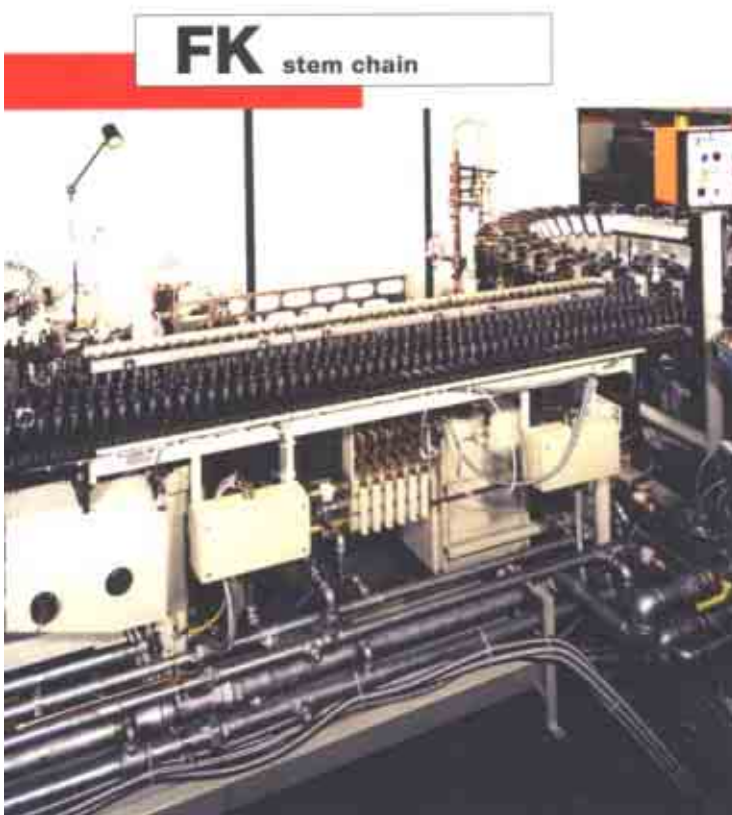
The machine has 36 positions. The construction of the jaws guarantees the production of concentric stems since one side of the jaw is fixed. The jaw and the lead wire holder can be opened completely so that the stem may be unloaded with a horizontal movement and in the case of a faulty loading the jaw will be unloaded before it enters the fires. The legs of the jaws are of heavy construction with strong bearings, thus no adjustment of the jaws is necessary.

Option

The jaws, or part of them, can be supplied for different stem dimensions. For the different loading and unloading devices, change parts can be supplied.



connecting the stem machine
with the mount machine MM



Description

The stem chain is arranged as a storage chain, its level of filling influences the production of the stem machine, its capacity allows stems to be stored in process in case the mount machine is stopped.

The stems are put into a pot holder one at a time and at the end of the storage chain they are unloaded directly into the jaws of the mount machine.

The pot holder to temper the stems are gas heated. The heating tracks can be regulated.

The drive of the storage chain is electrically synchronised with the corresponding machine. The loading and unloading positions are on the drive wheels.

Options

The holders on the storage chain are made to suit the stem dimensions.



mounting the filament on pinched stems



Description

The mount machine is used for mounting coils on pinched stems. The machine turret has 24 positions. The jaw holds the stem on the flare. It is a sturdy construction on which setting is not necessary. The coil drum has continuous grooves in which the coils are positioned. Each coil dimension has a corresponding drum. Special circular burners permit the heating of the exhaust tube ends over the whole

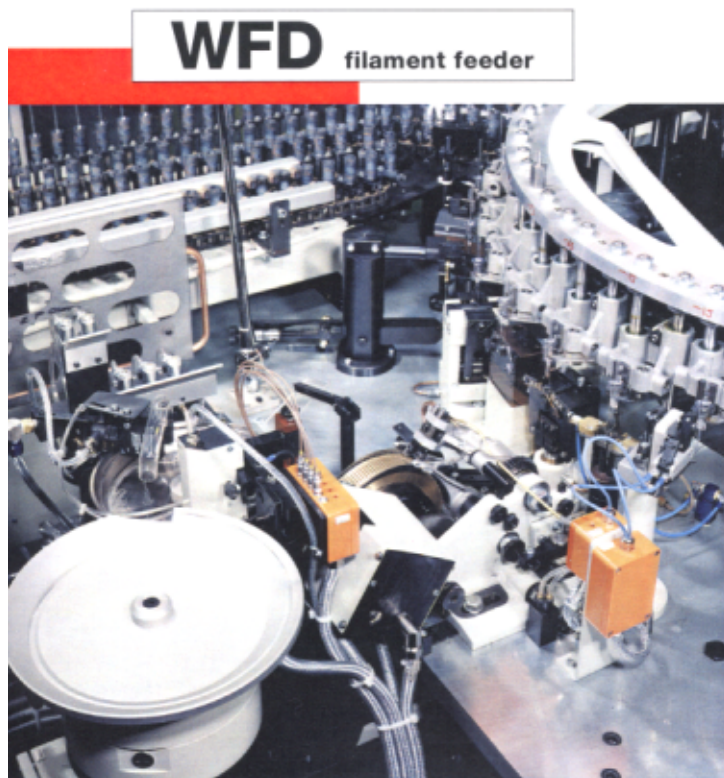
circumference which gives better insertion of the support wires. The insertion and eyelet forming elements are mounted on individual ring plates. This permits easy positioning of the insertion and roller elements. When unloaded on to the storage chain GK the stems are rotated and set upright on the chain.

Options

- ❑ Stems of different dimensions can be mounted. The jaws and devices can be adapted with change parts.
- ❑ The mount can be tangential or radial. The mounting devices can easily be adapted.
- ❑ For each coil dimension a coil drum is delivered. These drums can easily be exchanged.
- ❑ Coiled coils with 1 to 3 supports can be mounted. The devices to form these mounts can be supplied.
- ❑ The machine can be supplied with 32 positions, to add further devices as a Zirconium getter device.



feeds the filaments into the
mount machine



Description

The Filament Feeder WFD is used to separate and position coiled coil filaments. It is an independent unit.

- ❑ The machine consists of a pot vibrator with a system of four gates connected to a longitudinal vibrator which feeds the filaments on to the drum feed unit. An additional vibrator feeds filaments into the pot vibrator whenever required.
- ❑ The sorting elements and flaps for separating the coils are installed to suit coil data. They are easily exchanged.
- ❑ The machine is a compact unit, electronic controls and pneumatics are integrated.
- ❑ The machine is free standing on a single base and is positioned in front of the coil feed drum.



connecting the mount machine MM and the sealex



Description

The mount chain is constructed as a storage chain. Its level of loading influences the production of the mount machine. The capacity is sufficient to take up the mounts in process if the sealex machine EP is stopped.

When the mounts are unloaded from the mount machine they are placed in the holders and rotated upright. The drive on both sides of the storage chain is electrically synchronised with the corresponding machine.

The loading and unloading positions are on the drive wheels. The holders are designed as clamping jaws to maintain the stem / lead-in-wire position during the transfer.



The bulb is centered before loading. Bulbs are delivered to the loading position by transport chains connected to the bulb conveyor. Bulb transfers are effected through rotary index turret with vertical lift on the index positions. The machine has a filling unit consisting of pressure regulators, phosphorus pentoxide towers, gas testing apparatus. The machine is fitted with a high pressure filling system which mechanically pinches off the exhaust tubes. The valve plates can easily be replaced.

Description

The sealex machine EP is used to seal and exhaust incandescent lamps with pinched stems.

Technical features

The machine has 36 sealing positions and 36 exhaust positions. The sealing positions rotate with a constant speed. The positions can be tooled with change parts to receive various bulb types. The mount is loaded by a jaw, a two part funnel guides the lead wires into the mount pins.

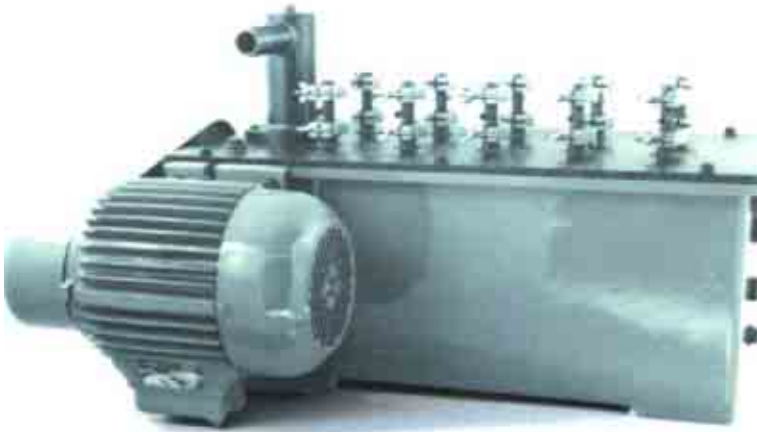
Accessories

- 2 Vacuum pumps VP 10.
- Primary and suction vacuum pumps.
- Pirani Instrument PI for the monitoring of the vacuum pumps
- Lamp testing instrument LT.
- Gas testing instrument GP
- Batteries for the connection of Ar and N₂.

Options

By means of change parts the machine can be adapted to different lamp types.

VP 10 vacuum pump



Description

The Vacuum Pump VP 10 was specially developed for the manufacture of incandescent lamps. Both performance and compact size are adapted to the needs. The compact housing contains 10 (or on request 5) rotating slide valve pumps. The housing is itself evacuated by a roughing pump, thus the pump VP 10 operates as a second exhausting step. Its low rotational speed guarantees a high reliability.

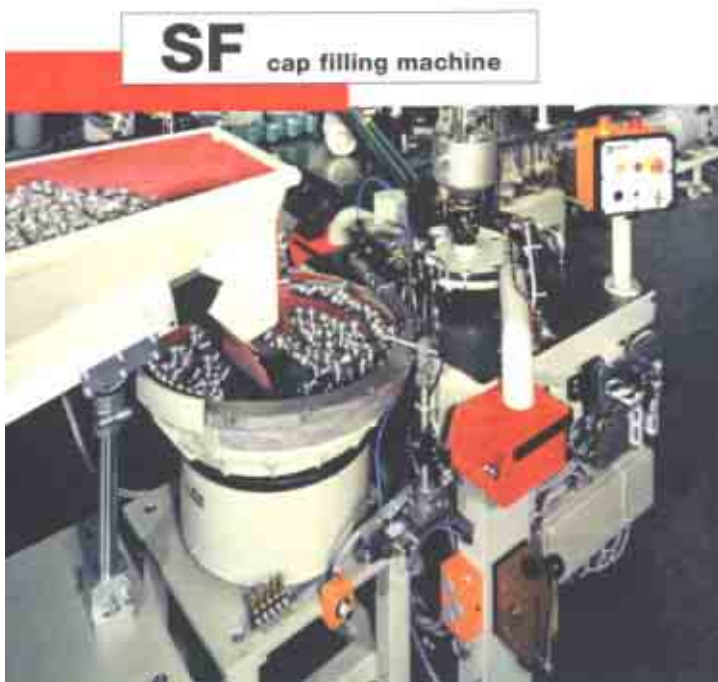
Because of its compact construction the VP 10 can be installed under the sealex machine, this makes it possible to use short connection lines. The vacuum pump VP 10 is space saving, very easy to connect and requires very little maintenance.

Options

- Oil temperature control.
- Primary vacuum control.
- Pirani Instrument PI.
- Device to pressurise with N₂ in case of power failure.



checking the caps and feeds them to the cap threading



Description

The cap filling machine SF checks the caps, fills and supplies them to the threading machine.

Technical features

The machine has 8 positions. A vibrator feeds the caps to the machine.

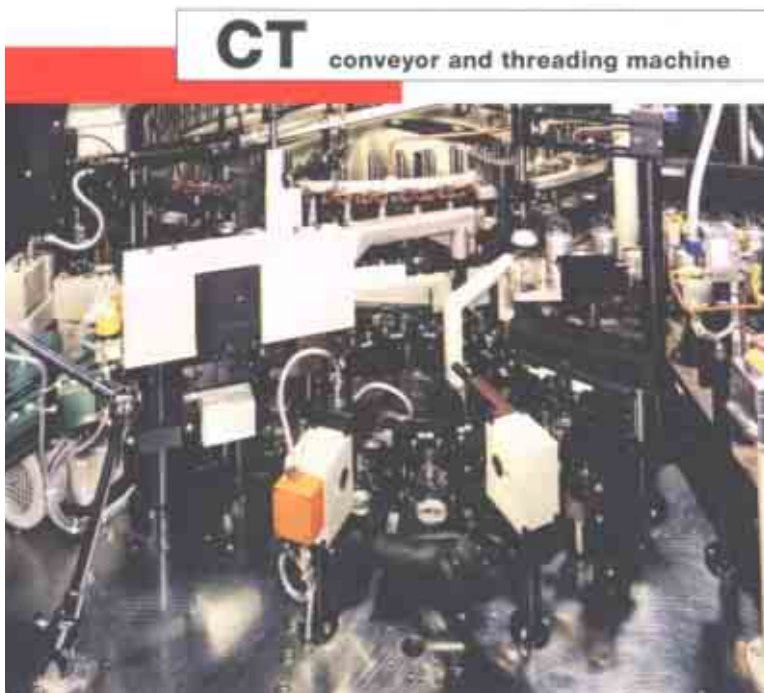
The caps are checked before filling. By changing the loading and unloading jaws, the filling head, the cap holder and the pot of the feed vibrator, it is possible to fill caps of various types on the same machine.

Options

with change parts the machine can be equipped for different cap types.



connecting the sealex machine EP with the capping machine



Description

The conveyor and threading machine is combined with a storage chain, its level of filling influences the production of the sealex machine. The conveyor capacity allows the storage of the lamps in process on the sealex machine in case of interruption of cap feeding. The cap threading is done on a turret with 15 positions.



The lamps are loaded into a holder of the conveyer which can easily be changed to take different lamp types.

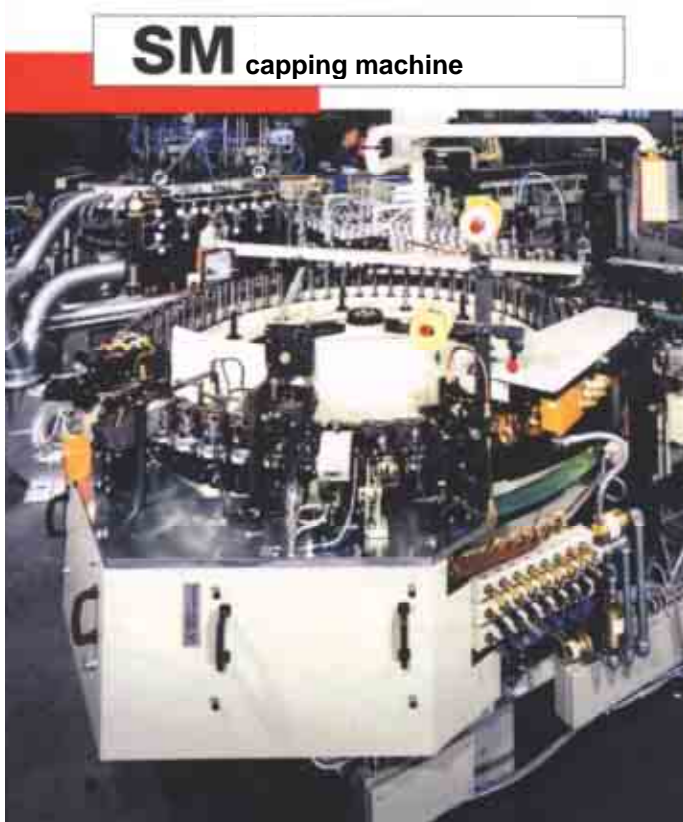
The drive of the conveyor is electrically synchronised with the corresponding machine. The loading and unloading positions are on the driven wheels. The lamps are unloaded into an inverter which transfers them into the threading turret. The lamps are positioned to compensate eventual variations in sealing length. The electrodes are formed, cut and checked before threading. The presence of both wires is checked after threading.

Options

Change parts to equip the machine for different cap and bulb types.



baking out the cap paste and
flash the lamps



Description

The capping machine has 54 positions, including 7 burning-in positions. The positions can be adapted for various cap types by use of changeable parts. They are electrically insulated from the machine. The cap is in a jaw having good conditions for the heat transmission. The machine has 7 contact positions for flashing gasfilled incandescent lamps.

The flashing is effected after the soldering. The cutting and soldering devices on the machine can be adjusted for different cap types. The cutting devices are equipped with wire control detector systems.

Filaments are conditioned through 5 programs of 7 flashing tensions. A built-in measuring instrument permits measurement of the individual voltages. They can be set at any voltage between 60 and 280V. Finished lamps are transferred into an indexed chain and are conveyed to the cooling and storage tower PA (option). Lamps with electrical values out of tolerance are automatically rejected.



BL bulb loader

Description

The boxes of bulbs are emptied into the bulb hopper manually, from where they proceed separately to the testing device, at this point the bulb neck is checked. After this the bulbs move over a storage track to the transfer jaws which operate synchronised with the bulb chain KK. The machine can be adapted to the available space.

The machine can be converted for use with bulbs of different types by means of a few changeable parts. The transfer unit can easily be adjusted for height and position to fit the various bulb chains.

Option

Change parts for different bulb types. The machine can be equipped with a carton feeding unit which delivers the bulbs automatically into the hopper.



conveys the bulbs
from the bulb loader



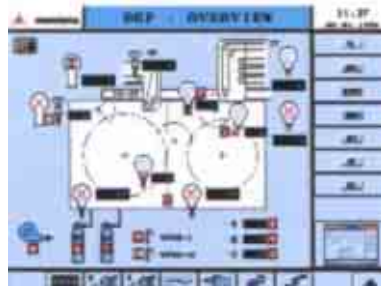
Description

The bulb chain KK conveys the bulbs from the bulb loader, or the manual loading extension to the sealex machine.

Options

- ❑ The bulb chain can be equipped with a gas fired furnace
- ❑ A bulb marking unit MU can be build on the bulb chain

Selection of the product type



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electronic and control LSI

The Line Supervision and Information System (LSI) fulfils the complete requirements for the control and the supervision of a HSL production line. The concept and design of the system has been based to cover the need of line personnel, and it should, with its instant presentation of all essential data and its possibility to save and restore all the settings, be an important tool for the line supervisor.

The LSI is based on a personal computer. Instead of the mouse, the LSI can be equipped with a touch screen which suits better to the environmental conditions. Under certain circumstances you may use the keyboard situated in the cabinet under the screen.

A printer is placed in the cabinet for protocols printing. To guide the personnel for trouble shooting, a large alphanumeric panel can be installed on the line. It is connected to the LSI by a serial link.