



**Manufacturing, installation and commissioning of a HEGLA -
Automatic Cutting Line for Float Glass and Laminated Glass**

Drawing no 1340370-08 copy attached

Max. sheet size: 6000mm x 3210mm

Glass thickness: 3 mm up to 12 mm float glass on Optimax
3mm up to 19mm float on the ProLam
2 x 3 to 2 x 10 mm laminated on the ProLam
0.38 to 3.8mm Interlayer

Glass flowing direction: from left to right

The machines are carried out for the GB-power supply of 415V / 50Hz / 3 Phases /
N / PE

Consisting of:

**Colour of the equipment: - RAL 5015 Sky Blue
RAL 1023 Traffic Yellow (safety equipment)**

Note: -

**The following document is made up of quotations SKG10000685, 686,
687, 688**



Gantry Loading System

- Running both sides on floor rails
- Including rotating (270 degree) Suction frame
- Designed for 47 pick up positions

Track: approx. 13.5 m

Runway: approx. 27 m

Pos 10: 60-5000-012 Double Girder Crane for Gantry Loader Running on Floor Rails

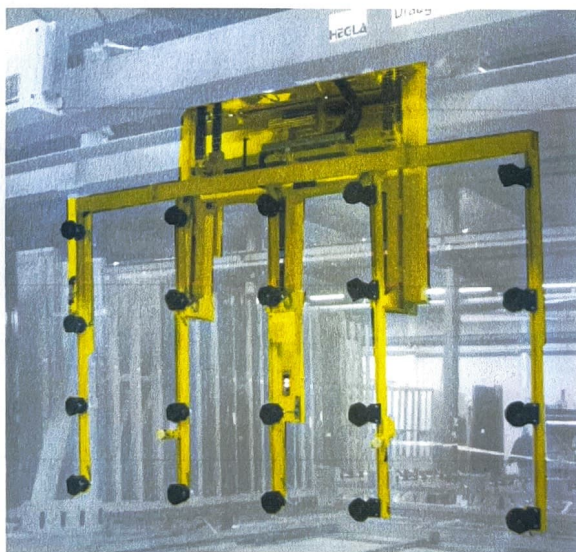
Track: approx. 13.5 m

Pos 20: 60-5000-0129 Drives and energy supply chain

For longitudinal and transversal movement including laser based positioning system

Pos 30: 60-5900-0006 Suction frame PB 6133 K

For automatic loading system gantry or Compact Loader for transfer of glass sheets from stock to up to three cutting lines



Single glass sheets - float glass as well as laminated glass - are picked up automatically from their storage position and transferred to a tilting table for feeding a cutting line.



Pick-up position and number of glass sheets is pre-selected at the control panel or - in automatic mode - by the cutting plan. The number and layout of glass stillages can be adjusted to changing requirements at any time. L-stillages can be implemented as well as compact storage systems, even in combination. The compact design of the suction frame allows glass pick-up from narrow service gaps also.

Handover to the cutting line is performed either on top or combing through which makes the Hegla gantry loading system also suitable for LOW-E glass.

Features

- trolley on cross bridge
- suction frame with 6 suction arms for glass hand over on top or combing through
- self activating suction cups without hold
- suction arms with trapezoid guiding for glass peel off from the bottom. This means the glass sheet first is pulled off the glass rack at the bottom before pulled off completely. This way the remaining glass sheets keep standing safely on the glass rack without being pulled over by the sheet being picked up.
- vertical movement to bridge height difference between the glass stillage and the tilting table
- all drives controlled by inverters
- centralized PLC-unit with interface for interlink to Hegla cutting line
- automatic pre-selection of pick up stillage (with Hegla cutting line)
- integrated position sensor with position memory in case of emergency stop
- offset operator panel with operator interface
- teach pad for manual controls
- painting: trolley and suction frame: RAL 1023 Traffic Yellow

Performance features

Thickness of glass 3 to 12 mm
Pick-up height 250 mm
Inclination for pick up 5°
Handover height 250 to 700 mm
Inclination for handover $\pm 5^\circ$
Load capacity 600 kg
Vertical range 600 mm
Lifting speed ,precision lifting speed 4.8 m/min, 1.2 m/min
Transversal velocity 0 to 40 m/min
Frequency controlled
Longitudinal velocity 0 to 60 m/min



Pos 40: 65-0000-0686 Rotating assembly

Rotation angle 270° electrically driven for pick-up of glass sheets from both sides of an A-stillage or from L-stillages facing each other



Pos 50: 65-0999-9999 Reinforced version – Gantry Loader

For laminated glass thickness up to 2 x 10mm 1.250kg

Pos 60: 65-0001-0010 Inventory Management System

Software System for managing the glass in and out transfers within a dedicated area covered by a Gantry Loader.

Displays the actual status of the current inventory; also it manages the loading orders (sequencing) depend on the production demands (type of glass, amount of sheets) and the amount of cutting machines connected to the Gantry loader.

It ensures continuous loading process, independently of the location of the spacers or the cover sheet of a soft-coat glass pack; i.e. when a spacer is detected, it will keep the Gantry Loader working from another rack location, what holds the same glass type, until the current job is completed. Thereafter, the Management system will display a message that the spacers on these certain locations have to be removed before continuing production.

A similar procedure is done for the cover sheet of soft-coat glass packs. Just after completion the current order, the cover sheet is automatically removed from its originally location and de-stacked on a dedicated rack location.

Complete glass packs, as well individual sheets what will be placed or removed manually to/from the stock, require manually interference to update the inventory.



Scope of supply is the Software licence including required Hardware (PC with interface card to the Gantry Loader control system, 19" TFT Monitor, Keyboard and Mouse)

Spacer recognition and cover sheet stacking options are included in the Warehouse Management

Pos 70: 65-0000-0661 Ultrasonic sensor

for glass detection with deep glass racks and for adjusting the approach speed of the suction frame to the distance to the glass

Pos 80: 65-0000-0656 Detection of packages (overweight lifting protection)

The lift off of glass is interrupted when the sensor detects a sealed (taped) LOW-E glass package. This protects the loading system against overload damage and avoids breakage of glass due to torn packages.

Pos 90: Automatic Gap control (one side)

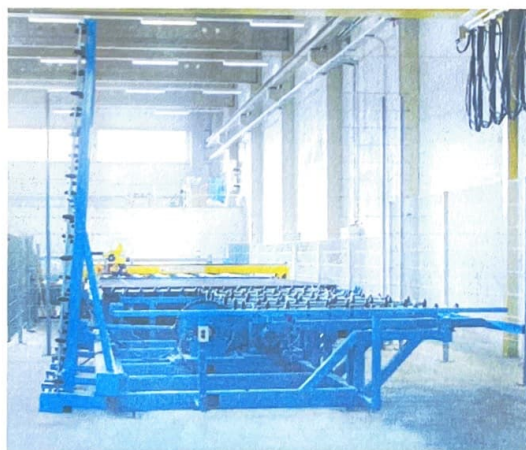
Strictly recommend in combination with automatic storage system KPL-A
This system check the required gap between the movable racks of the KPL-A

Pos 100: Modem

On line service for loader support

Pos 110: 60-4000-0007 Static Feeding Table ART 6133

Transfer and feeding table with motor driven rollers





The feeding table ART connects an automated cutting line to a gantry loading system by taking the glass provided by the gantry loading system and automatically transferring it to the cutting line. The glass can be loaded in comb through mode; so LOW-E glass can be loaded without damaging the coating.

Features

- Tilting arms with rubber reels
- Electro-mechanical tilt drive with torsion mandrill
- Motor driven strings of rubber reels
- Transport speed adjusted to the cutting line
- Interface for connection to HEGLA - cutting machine

Performance features

Thickness of glass 3 to 12 mm
Angle of inclination approx. 8°
Load capacity 600 kg

Pos 120: Motorised ART Loader Table

A mobile loader will also need to be used in the attached layout to move out from under the laminated Re-Master

Cross movement control including, motor, rails , cables, cable chains and interlocking

Pos 130; 65-0999-9999 Reinforced version – ART

For laminated glass thickness up to 10/10/10/ 1.200kg

Pos 140: Float L - racks, Type "FLE 1200-6 BM" 3 off

Pos 150: Float A - racks, Type "TL 50/6/3 380/380mm" 2 off

Pos 160: KPL-A Automatic Concertina Storage System

Technical Specification

- 20 off Sections 180mm deep to take 2 off 65mm 6 x 3 packs of glass with spacers
- Automatic selection system in combination with the machine cutting details, stock selection and on board database integrated to the compact gantry loading system



The concertina system is a fully automatic stock selector racking system integrated to the Gantry Loader. The KPL-A will open at the required stock type dependent on the article code within the imported cutting code or via manual optimisation.

Pos 170: Extra Safety Beam System

This option allows the gantry loader to load the cutting table while glass is being loaded from the float liner. The operators are protected by a light beam.

Automatic cutting system for Bi-laminated Glass "ProLam 46 LTR TD"

Consisting of:

Combined cutting machine for laminated and float glass

Pos 180: 60-4000-0177 Air cushion table with conveyor belts LTR 9237

The air cushion table LTR 9237 is designed for feeding glass to a cutting machine for laminated glass. The hallway is divided into two areas: Glass is conveyed to the cutting line on one segment of conveyor belts while the second array positions the glass for cutting in an overlapping function together with the positioning stops of the cutting machine. The remaining sheet can be hauled back to the first belt segment. Both belt arrays operate independently from one another so a separated sub plate can be turned and referenced for further cutting without interfering the remaining glass sheet.

Features

- high performance blower with sound absorber for the air cushion
- divided conveyor belts for feeding and positioning of glass sheets
- 4 submersible conveyor belts for glass transport forward and backward in feeding area
- 5 submersible conveyor belts for glass transport forward and backward in positioning area
- automatic recognition of glass edge
- 4 automatic alignment stops to the side for transversal glass alignment
- hardwood ledge all around
- electronic controls with interface for interlink to the cutting machine



**Pos 190: 60-3000-0503 Highly automated cutting machine for laminated glass
ProLam 46**



The cutting machine ProLam combines the process steps cutting - break out – separating of laminated glass to an integrated process within the cutting bridge.

After the glass sheet is positioned automatically against the alignment stops cutting is performed simultaneously on the upper and on the lower side of the glass by two special cutting heads. This results in a smooth cut without offset. For casual cutting of float glass or patterned glass the lower cutting head can be disabled. Diagonal cuts are possible as well with positioning of the glass sheet. A marker is integrated to the cutting machine to make manual positioning easy. While the cutting heads return to idle position the lower cut is broken by a break out reel. Subsequently the discharging table is lowered for break out of the upper cut. Then the glass sheet is extracted under thermal assistance to a defined opening. A knife passes through the opening to cut the film. This results in a smooth cut without fringes. This optimized process management allows short cycle times for cutting and high output with first class cutting quality.

Features

- Submersible conveyor belts for glass feeding and positioning integrated to the discharging table



- automatic alignment bridge with automatic alignment stops for longitudinal positioning integrated to the discharging table
- PLC control unit with 22" TFT-Monitor for status display
- integrated display of cutting plans
- automatic recall of product specific production parameters from integrated library
- 2 special cutting heads for cutting laminated glass
- lower cutting head can be disabled for cutting float glass
- cutting heads driven by servo motor
- automatic supply of cutting oil
- automatic breakout reel behind upper cutting head for breakout of lower cut
- discharging table lowered pneumatically for break out of upper cut
- separating device with suction cups as holding down devices, also suitable for coated glass
- special one piece heater pivoting to the cutting line from below
- heater switchable for different film thicknesses
- knife-cutting-technology MT for smooth cutting of films
- marker for diagonal cuts
- high performance blower for the air cushion



Performance features

max cutting length	3,700 mm
glass thickness	2x 3 to 2x 8 mm
thickness of interlayer film	0,38 to 3,8 mm
cutting speed	90 m/min
cutting accuracy	± 0,5 mm
range for automatic longitudinal positioning	230 to 3,700 mm
min width for automatic longitudinal positioning	800 mm

Pos 200: 65-0000-0510 Turntable

for turning sub plates
for further cutting of the sub plate in Y-direction

Features

- turning suction cup integrated to the alignment table of the cutting machine
minimum width for turning subplates: 450 mm
max size for turning subplates: 2,200 x 3,210 mm (with glass 2x 6mm thick)
- alignment stops integrated to the feeding table





Pos 210: 65-0000-0559 Grinding device TWIN

For edge deletion of LOW-E glasses before cutting

Including servo driven carrier bridge and guiding racks integrated to the feeding table

The grinding device deletes the LOW-E coating of a glass sheet along the cutting contours in a separate process before cutting. This guarantees permanently a high level deletion quality even with crossing cutting paths because there are no remnants of cutting oil to be grinded. The grinding device TWIN holds a second, narrower grinding wheel, which is used for edge deletion at the edge of the glass sheet to ensure an even abrasion of the grinding wheels.



Features

- toothed guiding racks for the carrier bridge
- carrier bridge with servo drives for longitudinal movement of the grinding bridge
- servo drive for transversal movement of the grinding head
- grinding wheel with working width: 20 mm
- second grinding wheel with working width: 10 mm
- grinding wheel speed automatically adapts to abrasion
- digital CNC servo drive for positioning
- grinding waste extracted by suction with filter
-

Pos 220: 65-0000-0558 Cutting head for float glass

Add-on to the grinding device for cutting user defined contours with float glass

With the upgraded controls the cutting head allows shape cutting with float glass at an industrial standard. Additionally, diagonal cuts can be marked for easier alignment of the glass sheet for cutting laminated glass.



Pos 230: Double cutting head "TWINCUT" including Second Oil Supply

This system allows two cutting heads with different angle Wheels for different glass thickness that are selected automatically by the cutting code/article code.



Pos 240: PVB Trimming Tool System for the leading and bottom Edge (Trim)

Automatic PVB excess trimming system to eliminate overhang of non accurately assembled laminated glass that can effect positioning accuracy

In conjunction with TWIN Edge Deletion Bridge only!

Pos 250: Automatic Aligning and positioning of Sub Plates Re-Master

This is a roller system with inverter drive and upgraded software to automatically position sub plates from the Re-Master System. The normal operation is for the glass to be transferred from the overhead storage by the finger grip system and position close to the zero point for manual positioning. This option makes it an automatic process.

Pos 260: Option for removing down to 50mm trims

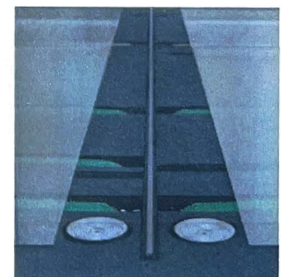
Minimum trim with glass 2 x 3 mm thick:	50mm
Minimum trim with glass 2 x 4 mm thick:	60mm
Minimum trim with glass 2 x 6 mm thick:	80mm
Minimum trim with glass 2 x 8 mm thick:	100mm
Minimum trim with glass 2 x 10 mm thick:	120mm

Pos 270: 65-0000-0568 Transversal break out bar

For break out of float glass sub plates on the feeding table

Features

- integrated in between the conveyor arrays
- automatic positioning of the glass for break out by the conveyor belts
- suction cups integrated to the table top to hold the glass during break out
also suitable for LOW-E glass
- foot switch for break out in manual mode



Performance features

Glass thickness (for automatic break out) 3 to 6 mm
(Thicker glass can be broken in manual mode)

Minimum width of sub plates 400 mm
(For automatic break out)

Minimum width of sub plates 800 mm
(For automatic transport through)



Pos 280: Laser Option

This option is for laser marking as part of the edge deletion and cutting process and is for toughening identification. The mark which can be alpha numeric is applied prior to cutting and for this reason guarantees the correct piece of glass has been marked prior to breakout, no other system works in this way and can guarantee the correct piece of glass has been lasered in sequence. The Synrad laser is widely used in the UK.

Pos 290: Automatic Height Adjustment of Twin Cutting Head

This options is a sensor system that acts in combination with the on board product database so that each change of product signals that the cutting head must re-set to the glass thickness being used so that it is just above the glass. The effect is that the overall time taken to cut the glass sheet is reduced because the cutting head travel is reduced.

Pos 300: Reinforcement for 2 x 10 mm glass

Pos 310: 65-0001-0001 Breakout Monitor - Cutshow

Software package for graphic display of cutting schemes

CutShow reads the cutting scheme and displays it on a graphical display. A variety of display modes allow viewing a single pane as well as sub plates or the complete glass sheet.

Includes:

- Software license
- Interface Card for Cutting Table PC
- 32" TFT Colour Monitor
- Installation materials

Pos 320: 65-0001-0002 Turn able Monitor stand for Cut Show

Pos 330: Network linkage

of ProLam 46 computer with the customer Network (LAN). Allows data-transfer (optimisation batches) between cutting line and the office.

Pos 340: Modem

Analogue or digital (please specify) incl. Remote control software package including PC-Anywhere



Pos 350: 2nd Hard Disc Drive

(As reserve in case of control breakdown)

Pos 360: Y Float Breaker Bar in Run out section

Pos 370: Conveyor belts in pro-Lam Run Out

Used in combination with sub plate return

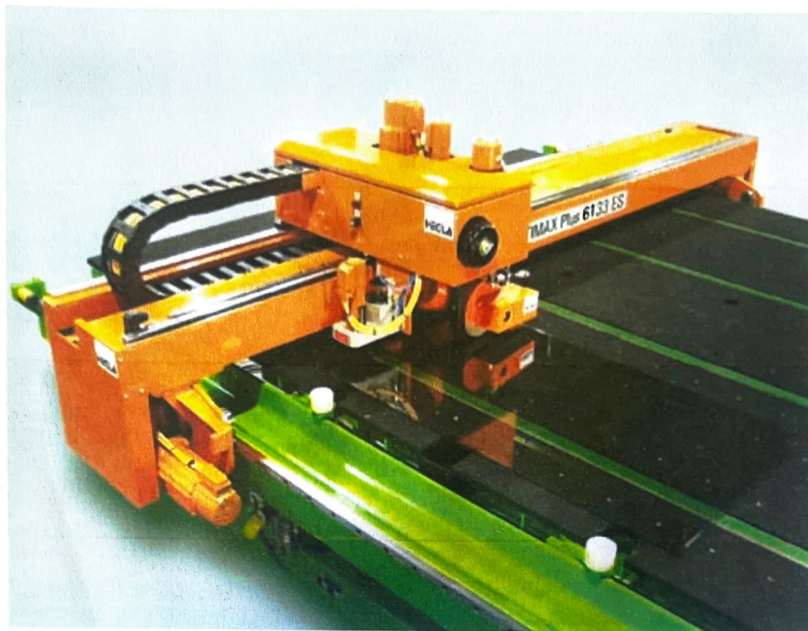
Pos 380: Air cushion add on Breakout Table, type "LKT 2850" 1L/1Q (ProLam 46)

Length: 2,800 mm
Width: 5,000 mm

- Unloading arms x 4 for large units
- Air cushion blower in a heavy duty execution equipped with a sound absorber
- Central air cushion activation
- Pneumatically throttle valve for cut the air cushion
- 1 longitudinal and 1 traversal break out bars
- Surrounding hardwood strip
- Electric Safety bar (squeeze protection)
- Table height: 940 mm +/- 25 mm
- Unload capacity 550 Kg at glass height 3000mm
- **Conveyor belts included**



Optimax Float Cutting Table Consisting of:



Pos 390: Full Automatic Shape Cutting Machine, Type "OPTIMAX 6133 ES Plus"

Glass flowing direction: from right to left

- Single cutting head system for contour and shape grinding and cutting, turn able 360°
- Max. glass dimension: 6.000 x 3.210 mm
- Min. glass dimension: 1.500 x 1.200 mm (for alignment versus the stops)
- Fully automatic shape and edge deletion cutting system with a CNC-controlled positioning drive (digital drives)
- Control cabinet incl. Pentium PC with 17" Colour Monitor, 3 1/2" Floppy Disk Drive and CD-ROM drive
- universal Backup Power Supply (UPS)
- snapping pattern optimisation via efficient and fully graphical software package
- storage possibility of 999 Customer models and 250 snapping patters in the long term memory.
- furthermore there can be 250 different sizes (type of glass, measurement, storage place) and appertaining cutting parameters deposited (removal of coating, cutting pressure, cutting speed).
- Windows 2000 control system
- Shape cuts according to the HEGLA-Shaping Catalogue.



- Max. cutting speed: $V = 160$ m/min.
- Cutting accuracy: $\pm 0,25$ mm considering a dimension of 1.000 x 1.000 mm
- electronic- pneumatically cutting pressure adjustment via proportional valve
- Glass thickness: 3 - 12 mm
- table height: 940 mm ± 25 mm
- Automatic aligning stops, (4x X-Axial and 1 Y-Axial) adjusting range 100 mm
- Air cushion generation via high-duty blower with sound muffler
- Central coolant supply (2 litres) - "Cutting oil supply"
- Belt transport (4 belts - belt speed: 40 m/min.)
- **automatic edge stripping with one grinding wheel**
- 4 Axle's for automatic edge deletion
- abrasion depending on adjustment of rpm of the abrasive disk
- max. grinding speed: $V = 120$ m/min
(depends on coating condition)
- vacuum removal of grinding residue (filter cartridge)

The above specification is twin motor drive with high speed cutting, the motors are synchronised for greater accuracy at high speed and offer higher output. The cutting speed and edged deletion speed are increased from standard 120/80m/min to 160 m/min cutting and 120m/min Edge Deletion

Pos 400: Double abrasive disk "TWIN" grinding

Width of abrasive disk:
1 x 20 mm for grinding inside the sheet
1 x 10 mm for trim cuts



Pos 410: Modem

Analogue or digital (please specify) incl. Software package "PC Anywhere".



Pos 420: 2nd Hard Disc Drive

As back up in case of control breakdown with an Image of the original Hard Disk, including License fees.

Pos 430: Snapping Pattern Display "CUTSHOW"

Incl. 32" Monitor and operating unit

Pos 440: Mechanical turning column with swivelling arm

Needed for the 32" CUTSHOW Monitor

Pos 450: Network Card and Setup

Network set up for in line data transfer

Pos 460: Twin Cutting Heads with twin oil supply

This offers two cutting heads that work in conjunction with the cutting code to change heads as the glass substances change

Pos 470: Automatic Height Adjustment of the Twin Cutting Heads

Pos 480: Guardian High Selective Edge Deletion Option

This is an option for edge deletion of the Guardian Range of High Selective products that have a protective plastic coating that needs to be removed before toughening. Edge deletion needs to take place on the cutting table or if available on edge deletion machine in front of Insulating glass line. This is currently a unique option for Hegla, which consists of modifications to the debris removal unit, a big bag debris collection system is added and diamond dressing of the edge deletion wheels is installed. The maximum speed of edge deletion is reduced to ca 20m/min but on the positive side is all shapes etc are easily produced as part of the normal manufacturing process as well as all standard rectangles etc. **The speed of debris removal is a slow process.**



Pos 490: Laser Option

This option is for laser marking as part of the edge deletion and cutting process and is for toughening identification. The mark which can be alpha numeric is applied prior to cutting and for this reason guarantees the correct piece of glass has been marked prior to breakout, no other system works in this way and can guarantee the correct piece of glass has been lasered in sequence. The Synrad laser is widely used in the UK.

Pos 500: - Break out table, Type "LKT 7237"

Length:	7.200 mm
Width:	3.700 mm
Height:	940 +/- 20 mm

- Air cushion blower in a heavy duty execution equipped with a sound absorber
- **Hydraulic Tilt Table**
- Central air cushion activation
- Pneumatic throttle valve
- Surrounding hardwood strip
- 1 longitudinal and 3 transversal break out bars
- Activation via knee switch
- Side safety switch bar for tilt up/down
- Glass thickness: 3 up to 12 mm

Pos 510: Extra Y Breakout Bar



Laminated Re-Master System

Pos 520: Laminated Re-Master

Horizontal glass storage, Basic Module with 20 slots mounted above the cutting table and Lifting and storage transfer device fitted to the glass run in system

Pos 530: On line through warehouse management

Pos 540: Multi Storage Positions

This is the upgrading of the Re-Master System to multi positions per level and can hold up to 5 pieces of glass per section dependent on the glass size

Float Re-Master System

Pos 550: Float Re-Master

Horizontal glass storage, Basic Module with 20 slots mounted above the cutting table and Lifting and storage transfer device fitted to the glass run in system

Pos 560: Additional rollers within Optimax Cutting Table

This is to zero the glass coming from the storage system

Pos 570: TW 6933 Buffer Conveyor

This is a buffer conveyor integrated to the Re-master lift system which is also integrated to the STB-Re 6032 for glass return to the Re-Master

Pos 580: STB-Re 6032 Breakout

This is the breakout return system for the Re-Master

Pos 590: On line through warehouse management

Pos 600: Multi Storage Positions

This is the upgrading of the Re-Master System to multi positions per level and can hold up to 5 pieces of glass per section dependent on the glass size



Pos 610: 1000Kg Sheet Lifter Type VHG 1000

The above sheet lifter will require power on the crane hook

The lifter has its own vacuum system with high speed release

Pos 620: Pack Lifter type LG3 Light

The lifter is to all current regulations and has side arms

Pos 630: Safety Fence

Yellow painted version to attached layout 1340370-08

Doors, fence and posts painted in RAL 1023 traffic yellow

**Pos 640: Version for Great Britain for a GB-power supply of
415 V / 50 Hz / 3 Ph. / N / PE**

Pos 650: Documentation

Consisting of instruction manual and eventually complementary documents in double fold in the English language.

1 print out for plus CD for the customer

Pos 660: Delivery and Installation are included

Pos 670: Delivery and Installation Schedule

Provisionally scheduled for the end of November/beginning December 2013

Pos. 680: Special agreed conditions

1/ Included in the project is a 4.6 heating element delivered with the machines

2/ The installation will carry a 24month warranty subject to a full service at the end of the first 12 months.