KERA*jet* S7

Instructions manual

MS7E. Rev: 170215

Translation of the original manual

This machine has been developed and manufactured by KERA*jet* and integrates the most advanced technology in ceramic pigments, soluble salts, effects, glazes, UV inks, water based inks, etc. During all the research, manufacturing, transport, start-up and discard processes of the machine safety regulations have been taken into great account.

Operational instructions of this machine must be near by the site of the machine at any time and must be read and known by every operator working with it.

Apart from the operational instructions and the legally biding norms regarding accident prevention, local safety rules in the final destination country must be observed.

Those set of instructions are only valid for the machine they are refered to. The machine should NEVER be started-up without having read the operational manual and without having understood how it works.

PLEASE, READ THIS MANUAL CAREFULLY.

FOLLOW KERA*jet* INSTRUCTIONS AT ANY MOMENT.

DO NOT UNPACK NOR START-UP THE MACHINE WITHOUT THE PRESSENCE OF A KERA*jet* TECHNICIAN OR HIS DIRECT CONSENT.

Manufacturer

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Technical requests and Spanish spare parts: sat@kerajet.com

Machine nomination

System: KERA*jet* S7 ☐ 700 ☐ 1400 ☐ 1800

Serial Number:.....

Direction:..... Date:.....

Other special elements/devices integrated in the machine: .....

.....

SUMMARY

1. CE Statement

CE CONFORMITY DECLARATION

According to Directive 2006/42/EC, Anex II, part A,

The manufacturer:

KERA*jet*, S.A.

Pol. Ind. Supoi-8, Avda. del Bovorot, 24

12550 Almazora (Castellón) ESPAÑA

Empowered to issue the technical file:

Manuel J. Villanova Dolz

C/ Estany Llarguer, 11, 2º I. Burriana 12530 (Castellón) ESPAÑA

DECLARES:

Under his own responsibility, the ink-jet machine for ceramic with the following features:

TRADE MARK:	KERA*jet*, S.A.
MODEL:	KERA*jet* S7 – 700/1400/1800

Is European Parliament and of the Council Directive 2006/42/EC compliant, 17th of May 2006, and is in accordance with the provisions of the following European directive too:

Directive 2014/30/EU

of the European Parliament and of the Council of 26th February 2014, on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

and that the following unified norms have been applied:

– EN ISO 12100:2010 Safety of machinery. General principles for design. Risk assessment and risk reduction. (ISO 12100:2010)

– EN 60204-1:2006. Safety of machinery - Electrical equipment of machines - Part 1: General requirements. (IEC 60204-1:2005, modified)

The legal representative:

José Vicente Tomás

KERA*jet*, S.A. General Manager

DCEI Rev. 160419

2. Machine description

2.1. General overview

This machine has been designed to be integrated in a production line and we'd like to suggest it to be installed in a suitable cabinet. By doing so, the machine and the operator will be allocated in a controlled working area (factory dusty enviroment, low/high temperatures, high noise levels or hit by chance).

The machine is basically comprised of main frame, moving system, conveyor, ink system, PLC, PC and dedicated software, boards, hood (safety barrier for the operator) and safety systems.

The interface of the machine are the touchscreen and a wireless keyboard..

The machine is provided with an industrial UPS, a chiller and a vacuum fan for the steam of the working area.

The KERA*jet* S7 machine is robust designed , with removable colour modules and multiple head technology. Its globally PC controlled active ink system and individually card monitoring and its elevated moving structure, achieves a high reliability level.

The KERA*jet* S7 machine may work in different ways, depending on the concrete requirements of each customer: tile by tile, continuous, roller mode, canvas and multiresolution.

Our specific software, developed by KERA*jet*, has been made as an intuitive and user friendly graphic setting which makes the operator get the best performance is a short time. It may manage up to 4 productions at the same time and arrange a new one while others are running. There's no need to stop production to load a new production or to make any correction on the same.

This set comprises three sizes:

- KERA*jet* S7 - 700 (up to 700mm)
- KERA*jet* S7 - 1400 (up to 1330mm)
- KERA*jet* S7 - 1800 (up to 1803mm)

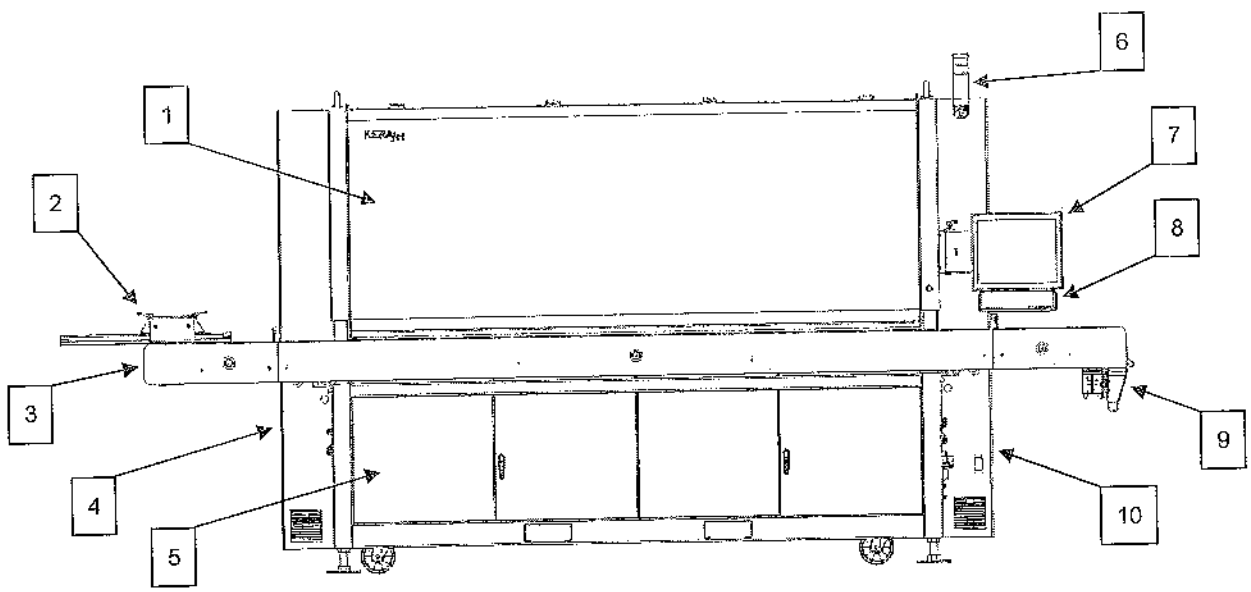
Real printing width depends on the sort of print unit.

The amount of print unit depends on its kind.

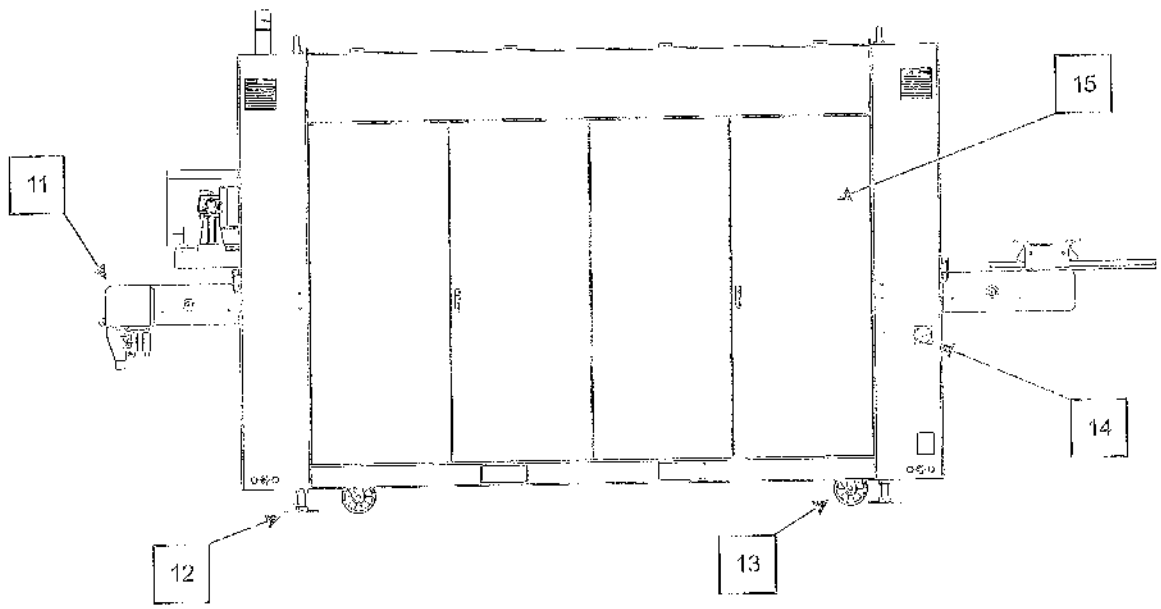
2.2. General description of the machine

In the following images the external parts of the machine are described.

Next, the main elements and their location are set.



1. Hood
2. Centraliser
3. Conveyor
4. Left electric panel
5. Front cabinet
6. Beacon
7. Screen
8. Keyboard
9. Scraper
10. Right electric panel



11. Conveyor motor
12. Support
13. Back panels
14. Main power switch
15. Wheel

2.3. Specifications

■ Main features:

- New distributed ink control system. PLC and electronic cards remote control.
- Up tp 12 different liquids working simultaneously while in operation. Quick ink change.
- Exclusive continuous ink recirculation system. Highest printing stability.
- Colour modules in frames with single or up to four units configuration.
- Removable module control for each frame.
- Automatic purge and cleaning system.
- Ink heating and cooling system with individual temperature control.
- Automatic maximum height barrier safety system for each module frame.
- Robust elevated moving system.
- Industrial UPS.
- Online tile temperature sensor.
- Exclusive meniscus-differential pressure controlling system.
- Maximum tile thickness: 46mm. It might be increased if requested.
- It may work with up to four independent production lines simultaneously in the same machine
- Online sampling without stop production
- Conveyor top speed depends on manufacturing process and the sort of print heads installed in the machine. Generally speaking, we may set it up to 90m/min.

■ Print head technology:

- Drop On Demand technology (DoD Printing).
- Available print heads: K4, K6, K8, K9, K12, etc.
- Nextwork connector: 10/100/1000 Base T.

■ Software:

- Image modes: CMYK, RGB, MULTICHANNEL.
- Specific colour management software: Colorjet, Colorjet pro, ColorDirect, etc.

■ Installation requirements:

- Input voltage: 400V 3P+N+TT.
- Frequency: 50-60hz.
- Nominal input power: 23kVA for K700, 35kVA for K1400 and 50kVA for 1800. It depens on the amount and kind of print heads installed in the machine.
- Compressed air: 1100 l/min, 6 bar pressure for 10 sec. every 30min (1,1 kw compressor 1,1kW, 200 litre tank).
- Optimal environment conditions: 25°C-35°C.
- Moisture: 30-60%.
- Suction installation: 140 mm flexible tube for steam evacuation.

■ Inks:

- Any KERA*jet* certified ink available in the market.

■ Weight:

- KERA*jet* S7 - 700:

Maximum weight: 2750kg. No ink included.

Maximum weight of the packaged machine, including accessories: 3650kg.

External package measurements: length 4960mm, width 1910mm, height 2270mm.

- KERA*jet* S7 - 1400:

Maximum weight: 3450kg. No ink included.

Maximum weight of the packaged machine, including accessories: 4450kg.

External package measurements: length 4960mm, width 2300mm, height 2270mm.

- KERA*jet* S7 - 1800:

Maximum weight: 4400kg. No ink included.

Maximum weight of the packaged machine, including accessories: 5460kg.

External package measurements: length 4960mm, width 2800mm, height 2270mm.

The UPS unit and the chiller are packed up in a box which weighs 460 kg.

Machine weight depends on the amount of print heads and accessories installed.

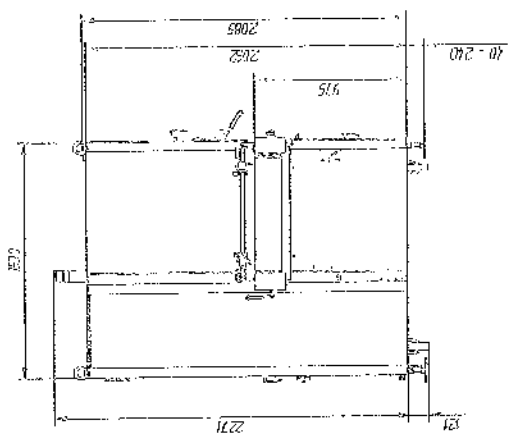
The ink of a circuit may have a 30 litres volume, which means that for a 1,3 kg/dm^3 density it weighs 39 kg. Therefore, a 12 inks machine might increase it weight by 468 kg.

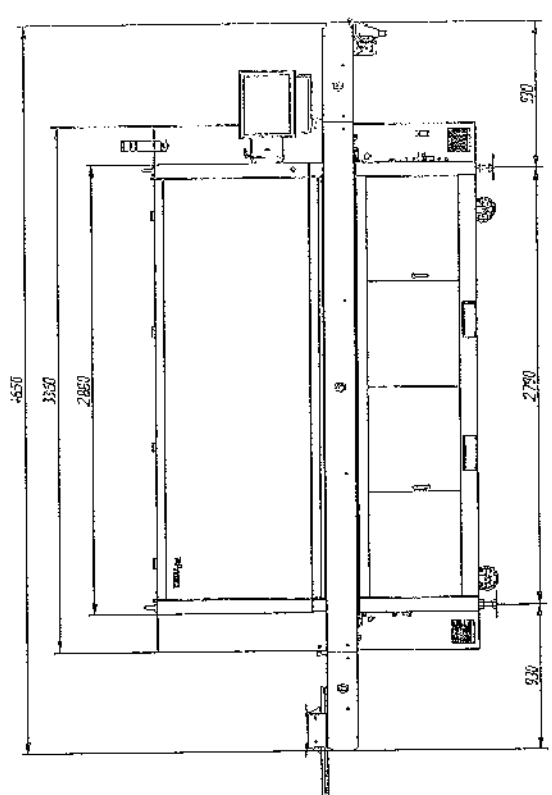
■ Management software:

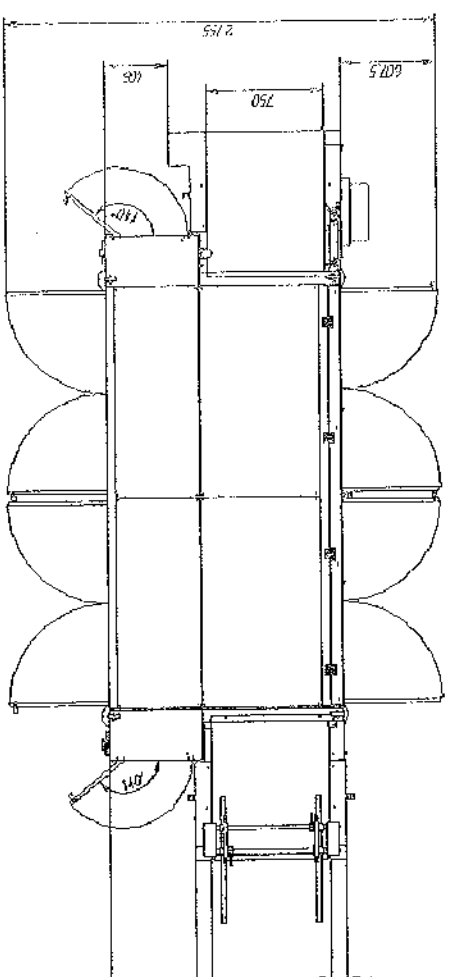
The machine is equipped with the software programmes that, among other functions, manage, load and show the designs, select the print heads and define the printing mode: image by image, roller or canvas. Working parameters monitoring: pressures, temperatures, pump %'s, etc. They also set the ink circuit pressures and check PLC scanned values, set the working routines managed by the PLC and the set-points, monitor the print units parameters, make printing settings, guided operations as IP address changes, etc. Some specific design tasks might also be carried out such as ripping or tone changes from the production line by generating new files.

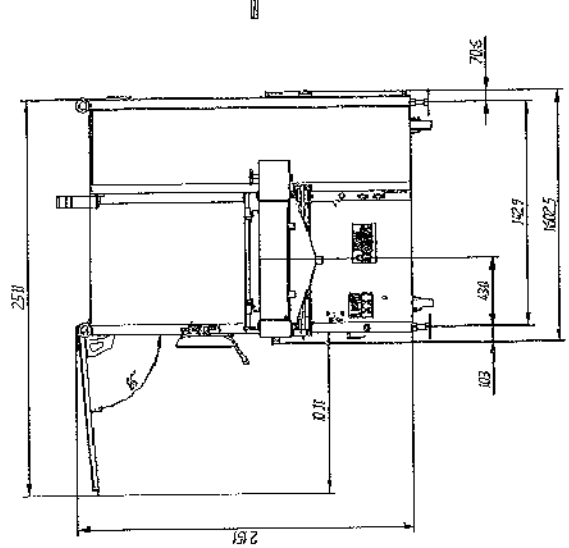
2.4. General dimensions

KERA*jet* S7 - 700 Dimensions.

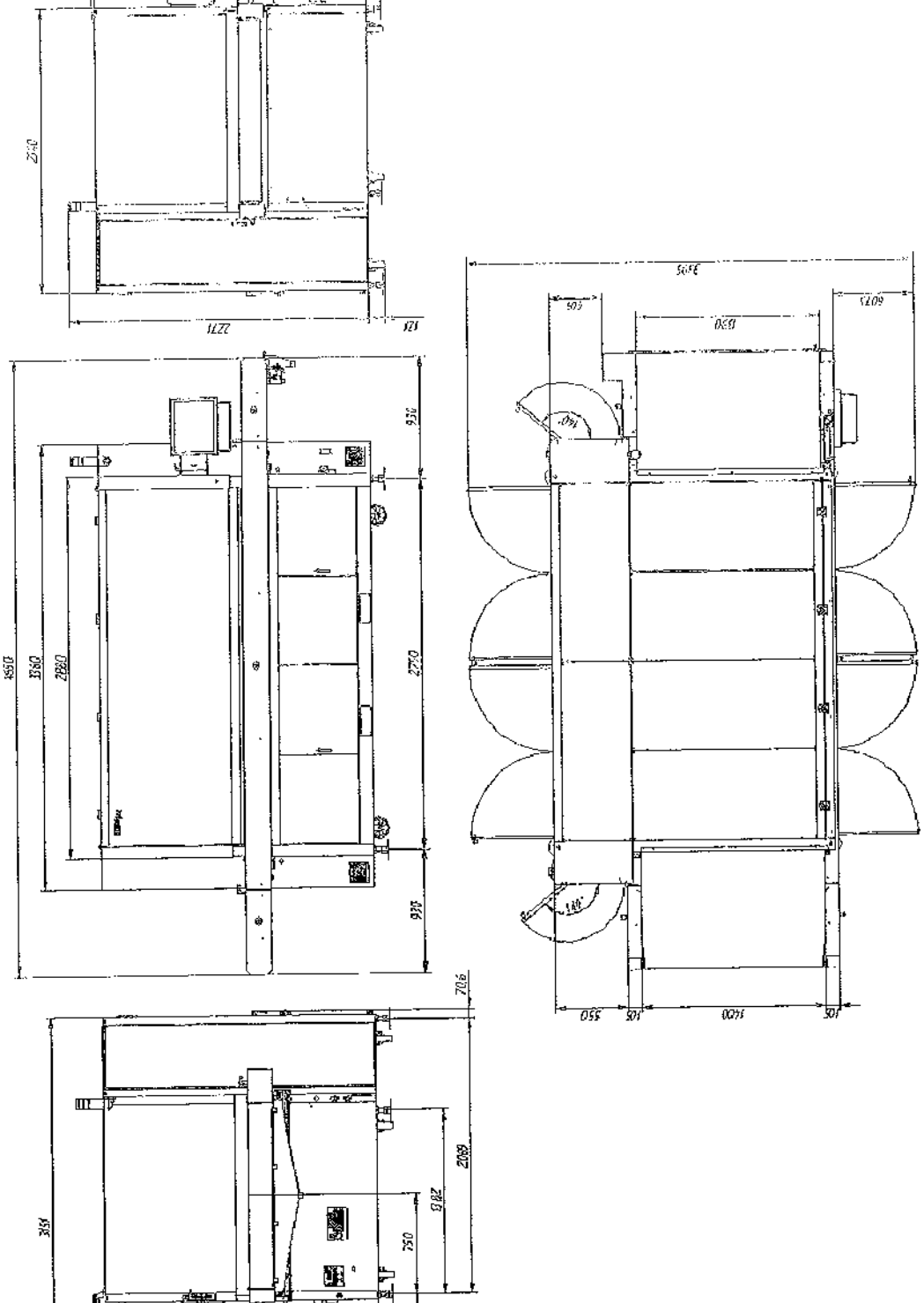








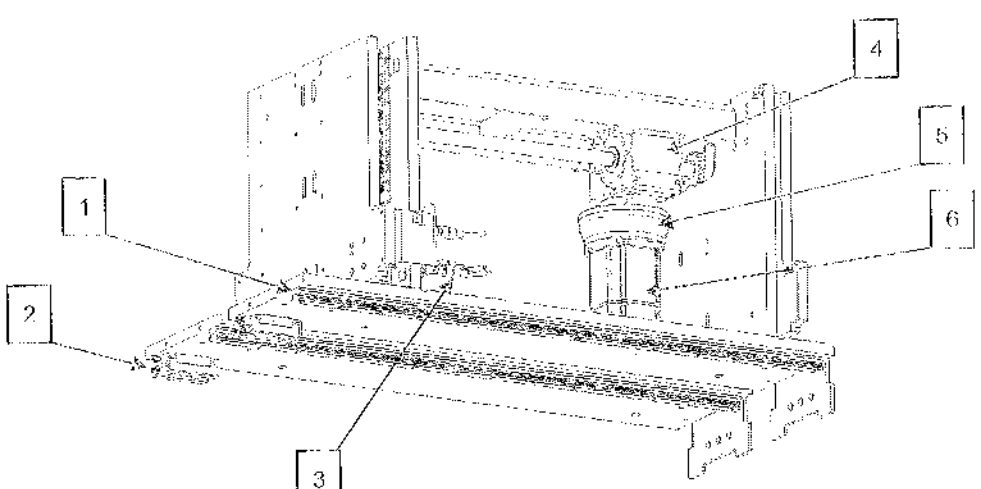
KERAyct S7 1400 Dimensions.



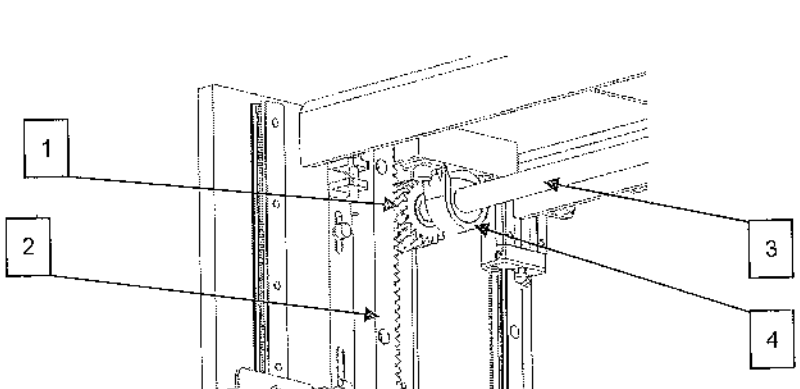
2.5. Moving parts

The user may find the rack guiding system of the Z Movement (up - down) by watching from the front of the machine (two sets of rack pinion for each colour module group moving at the same time).

Colour modules, while in rest, are positioned on the cleaning trays which are designed to collect the excess ink from the ink circuits and send it back into the main tanks or waste..



1	KJ18633	GUIDE
2	KJ16174	SLIDE
3	KJ14161	SPINDLE SENSOR
4	KJ22611	GEAR BOX R1/100
5	KJ10283	PRINT HEAD MOTOR BRACKET K-700
5	KJ22896	SERVOMOTOR BRACKET
6	KJ21588	SERVOMOTOR K700
6	KJ22993	SERVOMOTOR K1400



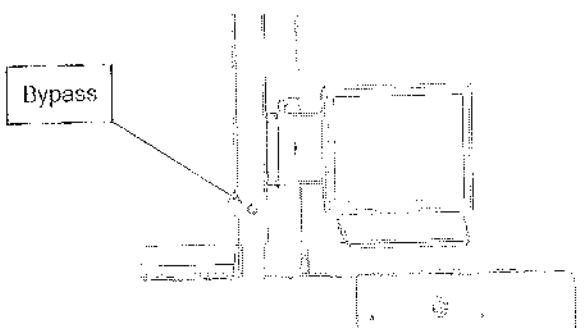
1	KJ16809	SPIRAL GEAR
2	KJ22989	Z MOV. TEETH RACK S7
3	KJ22162	Z MOV. SHAFT K700S7
3	KJ22598	Z MOV. SHAFT K1400S7
4	KJ22172	PLATE BEARING

X Movement: cleaning trays will move sideways, in order to let the colour modules come down to printing position, by a pneumatic transmission. Conveyor movement is also in the X direction.

Y Movement: cleaning racks when moving along the colour module.

It's been stated that ink circuits are numbered from right to left, therefore, the one on the right hand side is ink 1. The maximum ink capacity is up to 12 different liquids (inks or effects) in independent circuits.

The machine has a control button (bypass) at the front to make the conveyor run or stop. It keeps the line running while the machine is at rest. This option may also be controlled from the control panel.



2.6. Colour modules

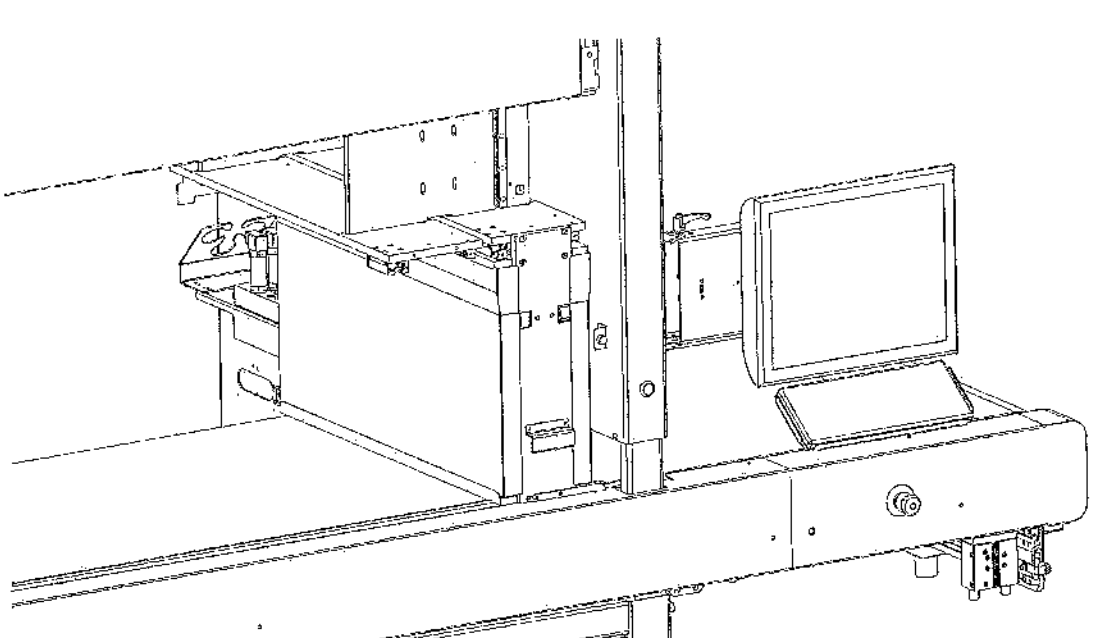
A colour module is a removable unit which has two independent ink circuits.

Features of the different colour modules, and how they are arranged, are configured to meet customer's production requirements. This means, type of print heads, amount of them and their layout and ink distribution.

Each circuit is provided with an ON/OFF switch which powers up or down each of them individually. Some types of print heads need a power off delay, so two different switches are installed in those colour modules.

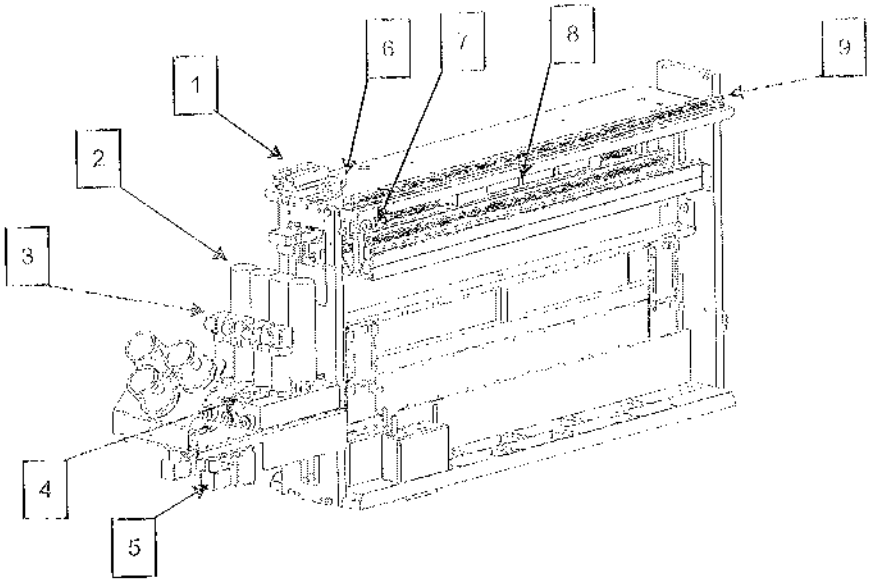
Colour modules, thanks to their modular and removable features, have a fast cleaning maintenance and a simple upgrade operation when a new colour module is installed in an existing running machine. This modularity gives the machine a great lot of advantages.

They are installed in frames which bundle them depending on the required printing height of each of the units.

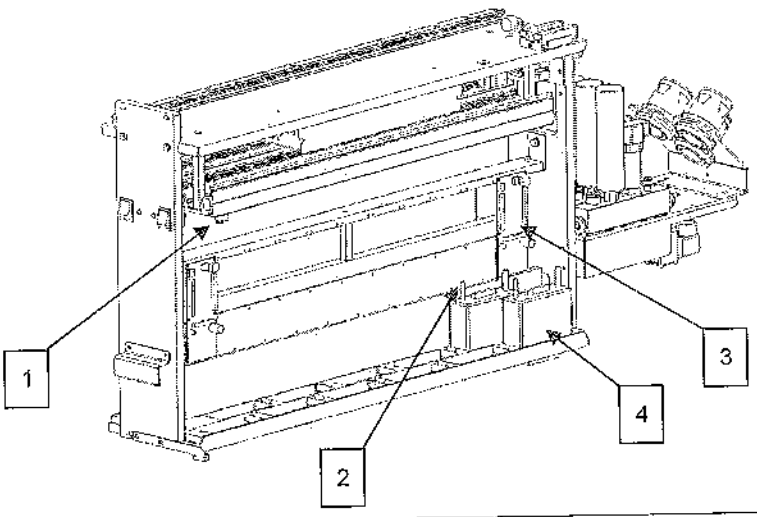


In order to remove a colour module, first of all, the operator has to press on "Print head access" option from the control panel. The module will rise and then the fixing screws have to be removed. Only one module at a time can be removed in order to prevent deformations and frame unbalancing.

The machine is provided with a set of safety sensors that prevent it from starting while any of the modules is out of place or the hood is open.



1	KJ16174	SLIDE
2	KJ19545	PRESSURE CYLINDER
3	KJ13259	PRESSURE SENSOR
4	KJ12245	TEMPERATURE SENSOR PT-100
5	KJ16775	ELECTROVALVE
6	KJ17144	SILENTBLOCK
7	KJ13674	INDUCTIVE SENSOR
8	KJ18145	SWITCH ETHERNET SW02C
9	KJ18633	GUIDE



1	KJ10379	PRINT HEAD TAP
2	KJ18887	K41K42CA40 PRINT HEAD INPUT INK SET
2	KJ18953	K6 PRINT HEAD INPUT INK SET
3	KJE0273	PCB PRINT HEAD CABLE
3	TAFS02	FS02 CARD
3	TAAN4030	AN4030 PRINT HEAD CARD
3	TA50P	CA50 PROGRAMMED CARD
3	TAAN4020	K6 PRINT HEAD ANALOGIC CARD
3	TAAN4021B	AN4021B CARD
4	PHK42	K42 PRINT HEAD
4	PHK6	K6 PRINT HEAD

2.7. Print units

Colour modules are basically the print head support of each ink circuit. The print units are installed in built-in spaces made in the bottom of the colour module frame. In the top you may find the ink collector tubes, a fraction of the cooling circuit and communication cables.

Regarding cables, each print unit is powered from one or two cables (K6 units need two power cables with different nominal load), which are connected directly to each control card, and a data cable which transfers the required information (data) to each card.

For each ink circuit, the customer requested units are installed, depending on tile size to manufacture (format) and its production typology.

USER HAS TO MAKE SURE THAT UNDER NO CIRCUMSTANCE, THE MACHINE WILL GET NO POWER INPUT (UNEXPECTED BLACKOUT, THUNDERSTORMS, ETC.). MAY THIS HAPPEN, INK RECIRCULATION WOULD STOP AND, THEREFORE, PRINT HEADS WOULD GET DAMAGED IRREVERSIBLY. IT'S HIGHLY ADVISABLE CONTACTING KERA*jet* SUPPORT IN CASE YOU MAY NEED TO STOP THE MACHINE FOR A PERIOD OF TIME IN ORDER TO CARRY OUT THE REQUIRED MAINTENANCE BEFORE THE HALT, OR WHEN INSTALLING A UPS DEVICE. IN MOST CASES, THE MACHINE IS PROVIDED WITH A UPS. A STEADY 6 BAR COMPRESSED AIR SUPPLY IS ALSO REQUIRED FOR THE AUTOMATIC CLEANING CYCLES.

2.7.1. Print units featuring

We call print head the printing device without any control card, cables, input pipes, information or power.

We call print head unit the print head and the control card set.

Print head units main features are amount of nozzles, printing width, resolution, drop size, dimensions, etc.

The area of the print head where nozzles are located is called "nozzle plate".

2.7.2. Communication of the print units with the machine

Print units parts are the required print head and the electronics. The kind of electronics depends of the sort of print head.

In general, these systems have their own control, power and information storage resources that control the nozzles of the print head along with the device self-management functions and data transfer from the main PC.

Electronic cards, for a correct operation, have to be configured and updated periodically: this is achieved by their own FW and HW (Firmware and Hardware) in each card. The main computer has an option in the control software (Config CA) designed for this task.

Please, contact KERA*jet* to make sure the most suitable version in your machine.

Each control card is linked to a print head and has an IP address, unique for each of them, which is connected to the control PC of the machine.

This communication is organised in a subnetworks system. This system identifies the location of each print head regarding its position in the colour module and the ink circuit where it is integrated. In order to have a print head or card replaced in a correct way, user must take into account the IP location where it's going to be installed and adapt the IP of the device to the correct IP address (directly linked to the location where it's going to be installed).

Please, bear in mind that whenever an electronic card is checked by KERA*jet*, it's handed on to the customer with a standard IP address which makes it very easy to identify so it may be quickly replaced. This IP is 192.168.0.81.

2.7.3. Colour module communication system

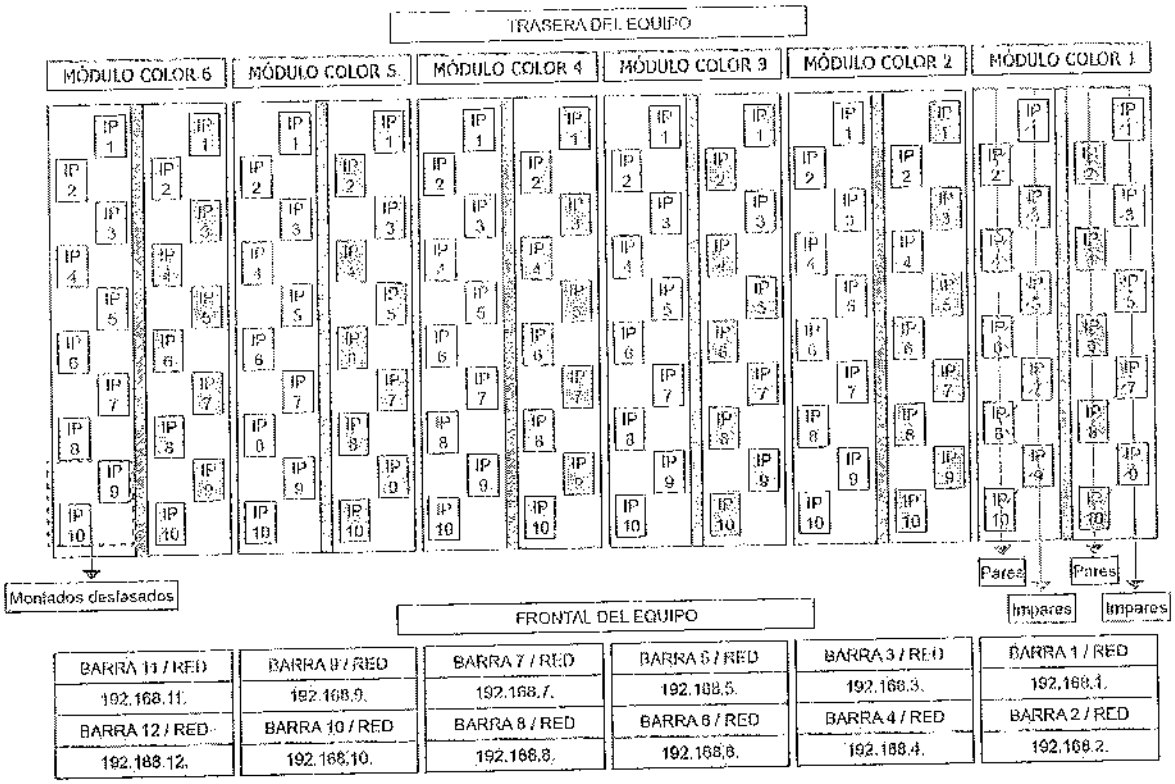
The subnetwork communication system allows the installation of colour modules with different print head typology in the very same machine.

Next, we'll explain which is the location of each print head inside the colour module and the rule that is used to find it.

From the different kind of print heads, we'll use the K4 configuration.

The name of each location inside the colour module is determined according to the following rule: each ink circuit will have at the front the 192.168.1 indication for bar number 1, followed by its position in the module. Please, always bear in mind that print heads are numbered starting from the inside of the machine towards the outside, and odd numbers are on the right side of the bar and even ones are on the left as you may see in the next picture.

Example of a K4 print head in a KERA*jet* S7 – 700:



In this way, ink circuit 1 is integrated by the following IP address: 192.168.1.1, 192.168.1.2, 192.168.1.3, 192.168.1.4, 192.168.1.5, 192.168.1.6, 192.168.1.7, 192.168.1.8, 192.168.1.9, 192.168.1.10, as set out in the line in dashes image.

Ink circuit number 2: 192.168.2.1, 192.168.2.2, 192.168.2.3, 192.168.2.4, 192.168.2.5, 192.168.2.6, 192.168.2.7, 192.168.2.8, 192.168.2.9, 192.168.2.10.

The same rule applies to the other circuits.

2.7.4. K8 glaze modules

K8 print heads are exclusively made by KERA*jet* and have been designed for digital printing on ceramic tiles.

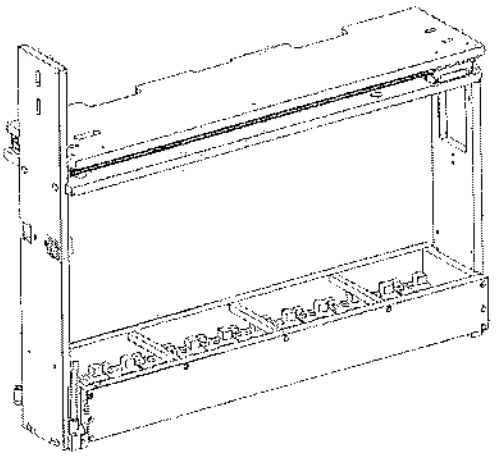
PC communication is made in the same way as in the standard colour modules.

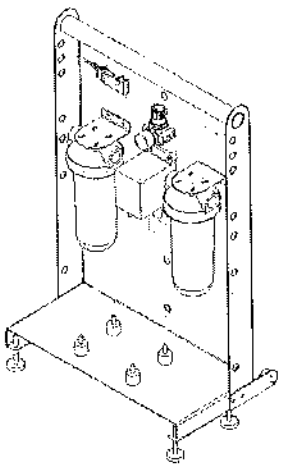
A pneumatic system is used to prepare and send the glaze from customer's tank into K8 modules and bring it back once it's collected by the cleaning tray.

Glaze preparation is made by two 50 and 20 microns filters in the same pipe.

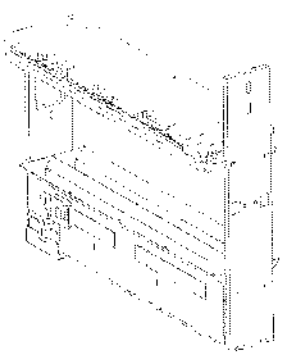
Pumps, filters and pipes are installed in a column. The frame has supports and wheels to make it easy to move and locate.

This column is located outside of the machine as close as possible to the K8 module and next to the glaze tank.





2.7.5. K9 powder modules



K9 print heads are exclusively made by KERA*jet* and have been designed for digital printing of powders and atomised products on ceramic tiles.

PC communication is made in the same way as in the standard colour modules.

Each module is made of two different systems so it may print using two different products.

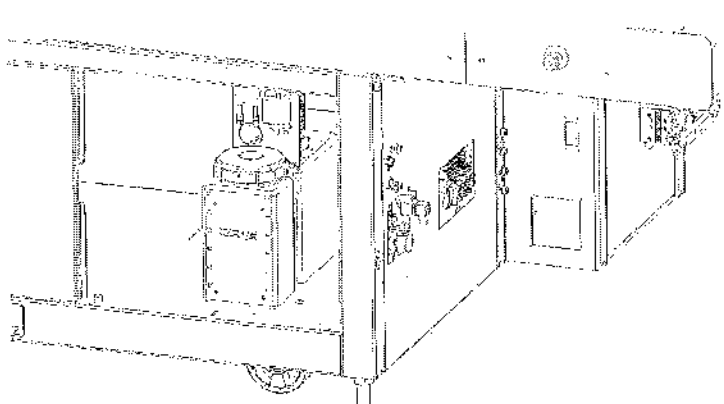
Powder is stored in a hopper on top of the print heads.

For low powder consuming products, refill may be carried out manually. For higher consumption an automatic device might be installed.

2.8. Main ink tanks

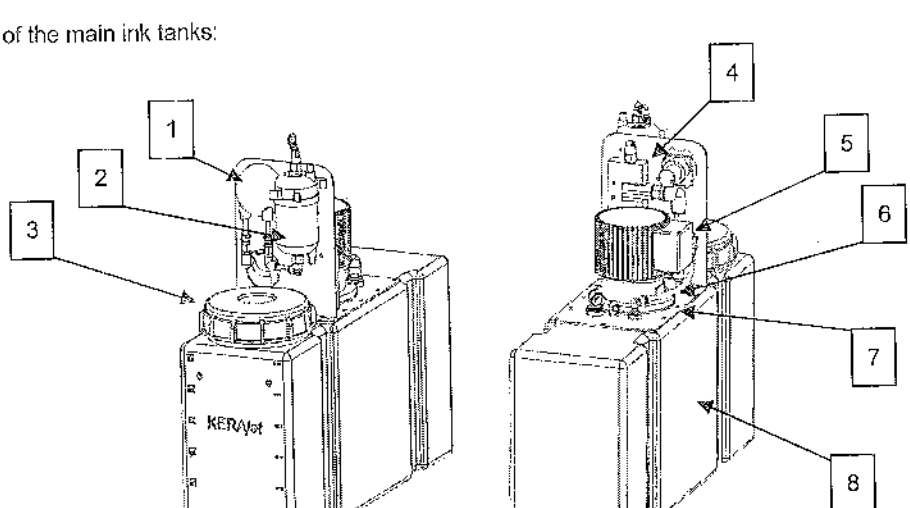
Main ink tanks are located inside the frontal panels of the machine. These tanks have user friendly refilling inlets.

Main tanks are made as a set of elements. They are comprised of:



- Suction pump. It's located at the back of the tank and it sucks ink back during cleaning cycles and purge from the cleaning trays into the main tank.
- Peristaltic pump. It refills the ink in the secondary tank from the main tank.
- Filter. It filters ink while in circulation.
- Ink stirring pump. The tank has a stirring pump that prevents the ink from hardening on the bottom and, therefore, keeps it in its best conditions. A programmable timer sets the on/off times of the pumps.

Front/back view of the main ink tanks:



1	KJ10023	PERISTALTIC PUMP
2	KJ10020	5 MICRONS FILTER SET
3	KJ17278	TOP + O-RING
4	KJ18955	VACUUM VALVE SET
5	KJ19047	STIRRING PUMP SET
6	KJ17438	STIRRING PUMP JOINT
7	KJ17289	NBR JOINT
8	KJ22420	3K MAIN INK TANK

2.9. Electric panels

Regulation, control and data acquisition devices are installed in the panels at both sides of the main frame of the machine and below each of the colour modules (inside the back panels of the machine).

The electric diagram is attached to this manual, along with the computer documents, for any query or maintenance question.

PLEASE, GET FAMILIAR THE BASIC ELEMENTS OF THE ELECTRIC PANEL, MAINLY THOSE RELATED TO SAFETY.

- Main panel:

You may find it in the side panels of the machine. It is comprised of the general operation and control devices:

- Main switch to cut input power.
- Main PC: controls the different elements of the machine. It's installed on the touchscreen support.
- Movement controlling drivers: they control servomotors operation (Z shaft and conveyor).
- Vacuum driver: controls fan speed.
- Power supplies: send DC into the print units depending of their typology.
- Different safety devices for operators and elements: differential switch, circuit breakers and thermal breakers.

- Independent control for each colour module:

They are located in the back panels of the machine. Each colour module is controlled individually.

2.10. Tile detection and height barrier systems

The machine has two similar detection systems which are comprised of an emiter-receiver, a mirror and a signal amplifier. Both systems let the operator get a controlled tile input and stop it in case there's any problem or maximum height is exceeded.

It is comprised of a high accuracy laser and a mirror which are installed one in front of the other.

Operators may access the amplifier from the panels at the back. You may find up to four amplifiers when the multiple entry system is installed. We'd like to suggest to have them identified so they can't be manipulated by unauthorized personnel.

Amplifiers can be set to have their sensitivity threshold increased. This option is very useful when mirror or laser emiter have lost their initial efficiency.

Tile detector amplifier has 2 channels: one of them is used as follows, channel A, and the other, channel B, is used for other applications such as tile counter.

- Tile detection system. It detects tiles coming from the line before they get to the printing area.

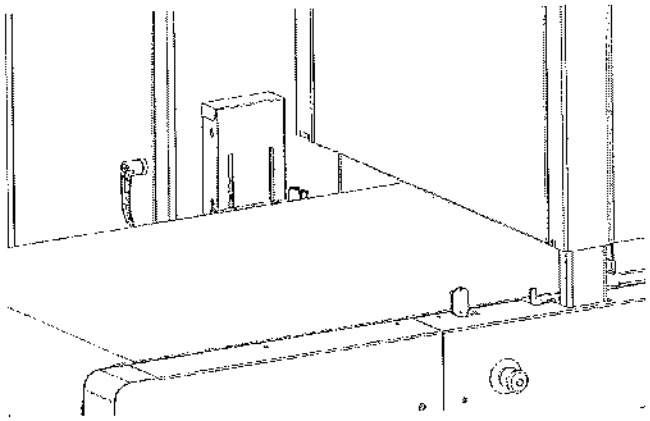
This device is installed on the conveyor frame.

Amplifier has to be set as D.on: Dark on.

- Maximum height stop system. It prevents thicker tiles than the lowest colour module from getting into the machine.

The emitter-receiver moves automatically to the suitable height depending on the colour modules heights.

It's got to be configured as L.on: Light on. It's connected to the conveyor driver so it can stop and get blocked immediately.



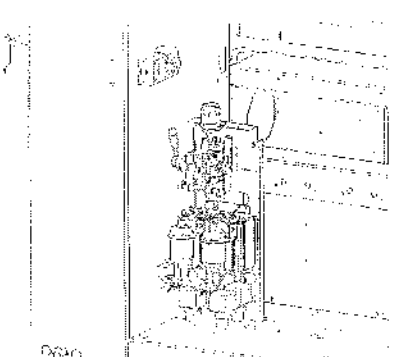
KJ14161	SPINDLE SENSOR
KJ18442	60x40mm MIRROR
KJ20808	7x7mm MIRROR
KJ21810	LASER EMITER
KJ21811	AMPLIFIER

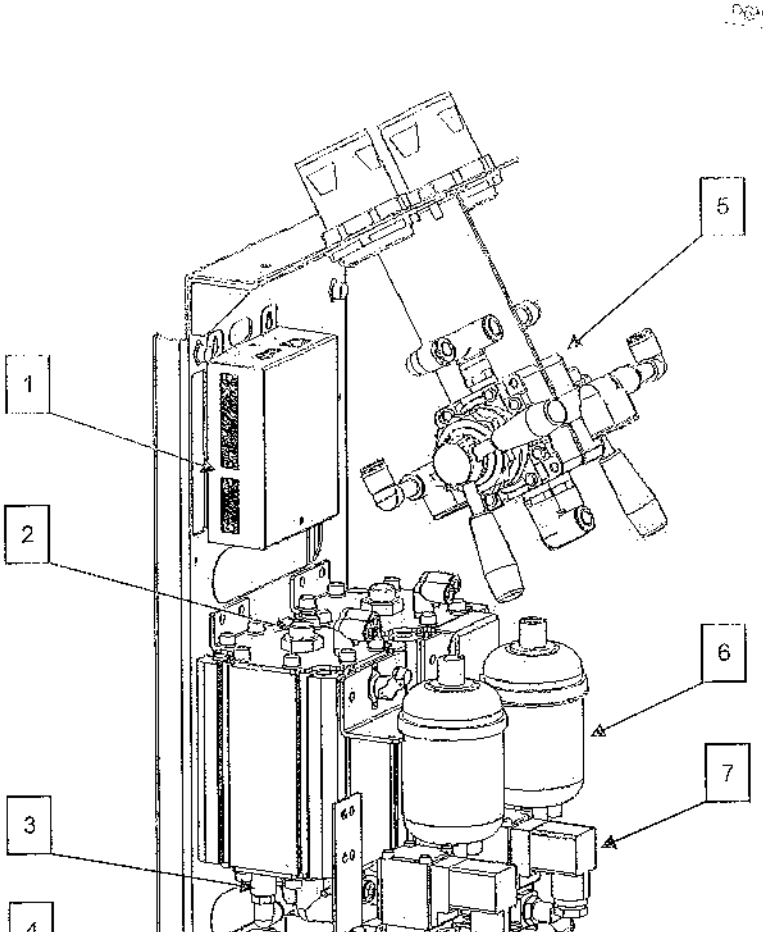
2.11. Active ink system

Ink circuits are comprised of a KERA*jet* exclusive control system.

Each circuit may be individually restarted or disabled, as in maintenance or inspection operations, from the control panel.

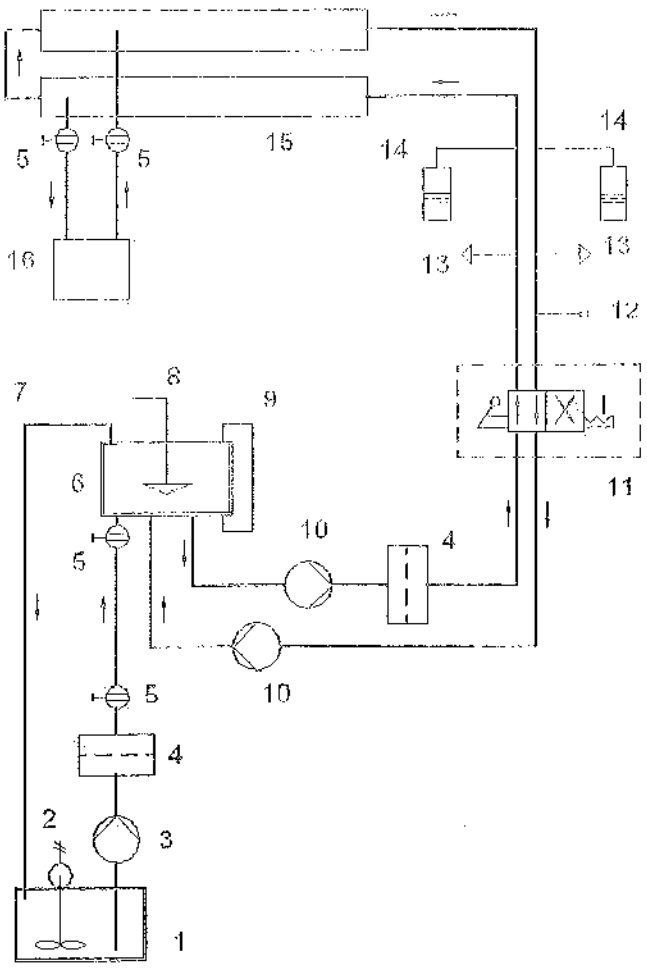
Each colour module has a system that is called "backpack" which is comprised of control, management and distribution of two ink circuits.





1	KJ20663	CT 01B CONTROL BOARD
2	KJ12463	LEVEL SENSOR
3	KJ13307	SPHERICAL VALVE
4	KJ20334	PUMP
5	KJ18521	FLOW REVERSING VALVE
6	KJ10020	5 MICRONS SET
7	KJ16775	ELECTROVALVE

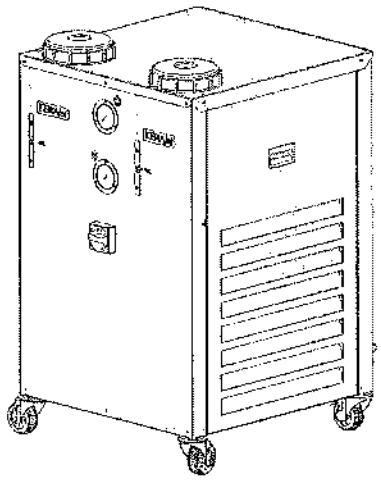
Ink circuit diagram:



1. Main tank
2. Stirrer
3. Peristaltic pump
4. Filter
5. Manual valve
6. Secondary tank
7. Excess collecting pipe
8. Level sensor
9. Level check
10. Pump
11. Flow rev. valve
12. Temperature sensor
13. Pressure sensor
14. Expansion cylinder
15. Collecting tubes
16. Print head

Flow reversing valve (11.) is only installed with K4 print heads.

2.12. Chiller



KERA*jet* B7 chiller, provided with the KERA*jet* machine, heats up or cools down inks and keeps print head electronics refrigerated.

From KERA*jet* software parameters, technicians set temperatures of each ink circuit individually during start-up, so may the customer choose inks from different suppliers or with different features, parameters are set to match them. One sensor in each ink circuit sends actual temperature back to the PLC.

It is comprised of two ink circuits:

- Cooling circuit equipped with a refrigerator. It brings temperatures down at the print head electronic cards and the inks.
- Liquid heating circuit equipped with a tank and an electric resistor. It brings ink temperatures up to 46ºC.

2.14. Cleaning systems

In order to keep a tidy ambient inside the machine and prevent any tile pollution, there are two cleaning systems:

Steam suction

The machine is provided with an ink vapour system that are generated while printing.

Due to tile high temperature, some ink vapour is produced which may affect printing quality.

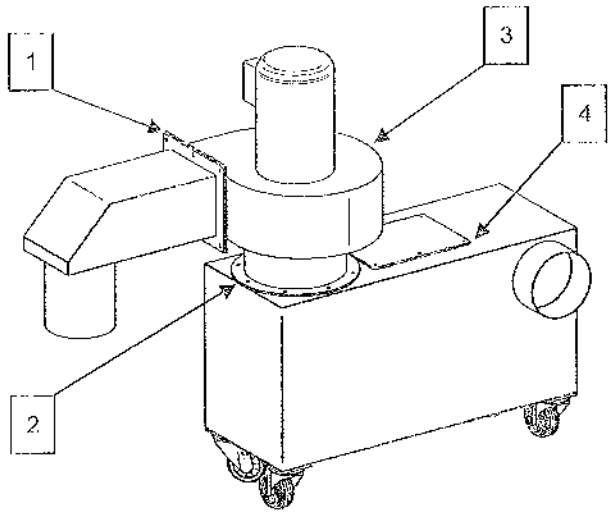
In order to get a healthy environment, that ink vapour has to be removed from the cabinet of the machine and processed.

Suction air is made by a centrifugal fan that is installed on top of a metallic filter. The vacuum flow is adjusted by the driver of the fan motor.

Below the cleaning trays you may find the vacuum tunnels, a few millimetres away from the tile.

The vacuum system prefilters the sucked vapour, so it has to be connected to the suction installation of the factory with a 140 mm diameter tube.

In the bottom of the filter there are two valves which have to be periodically open while the fan is off to remove any ink and deposits inside.



1	KJ19913	FAN OUTLET SEAL
2	KJ19914	CIRCULAR FLANGE SEAL
3	KJ16480	CENTRIFUGAL FAN
4	KJ17263	INK FILTER COVER SEAL

Print head cleaning trays

Cleaning trays collect ink drops produced in the colour modules when print heads purge or splash depending on the system installed.

All the elements are installed in a set that moves sideways, from the rest position of the colour modules to one side, in order to let the modules come down to their working position. This lateral movement is made by a 24 VDC motor.

Cleaning is made by wiping the bottom of the colour module with sponges moving along with the trays.

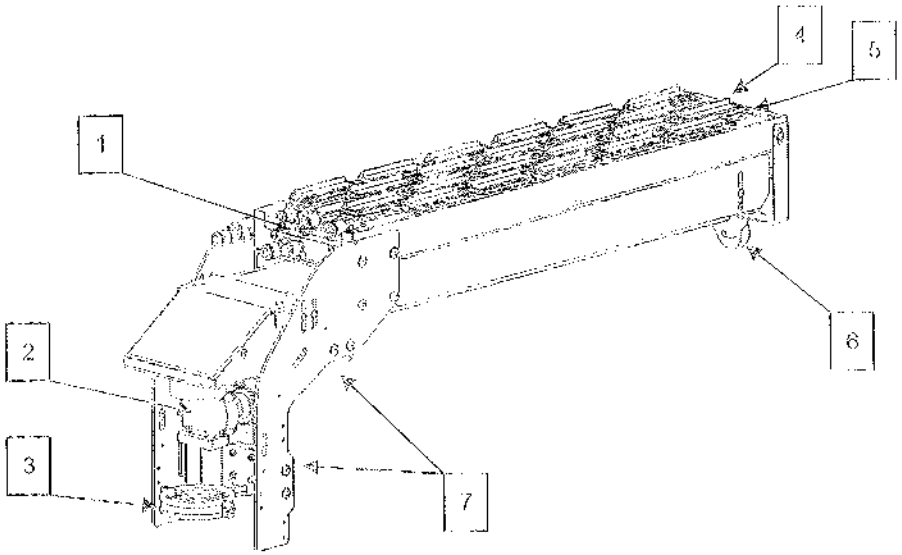
Print head purge is done on these sponges.

Apart from cleaning, sponges work as ink filters.

There's a pneumatic suction, from vacuum pumps, that sucks ink in the sponges and sends it back into the main tank.

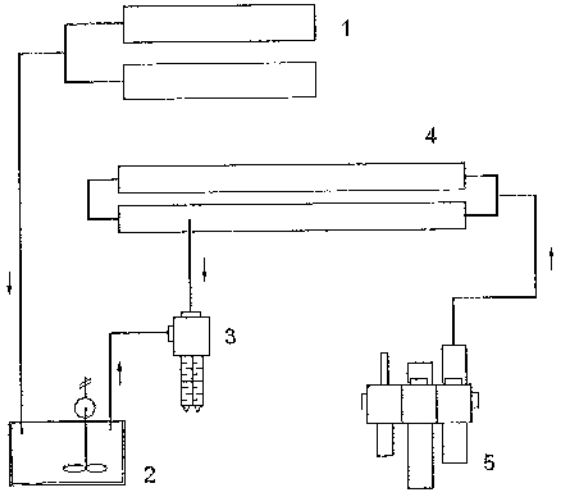
Ink falling on the trays is discarded by the steam suction system or is collected in a waste tank.

Each colour module has a cleaning tray that collects inks from two ink circuits.



1	KJ10369	SPRING
2	KJ24147	24 V DC MOTOR
3	KJ23445	CLAMP
4	KJ16291	SPONGE L
4	KJ19396	NIPPLE SPONGE 40 K6
5	KJ16644	TRANSPARENT NIPPLE 117X30X11
5	KJ17867	TRANSPARENT NIPPLE 40 K6
6	KJ21829	PULLEY
7	KJ16174	SLIDE

- Pneumatic diagram of the cleaning trays:



1. Cleaning trays.
2. Main tank.
3. Vacuum.
4. Collecting circuit.
5. Pneumatic unit.

2.15. Conveyor

As KERA*jet* S7 has been designed to get integrated into a production line, it's been manufactured with a conveyor so it may be installed into it. Speed may be synchronized with that of the production line.

It's been made of stainless steel to prevent corrosion. The conveyor withstands chemical and mechanical attacks from inkjet products.

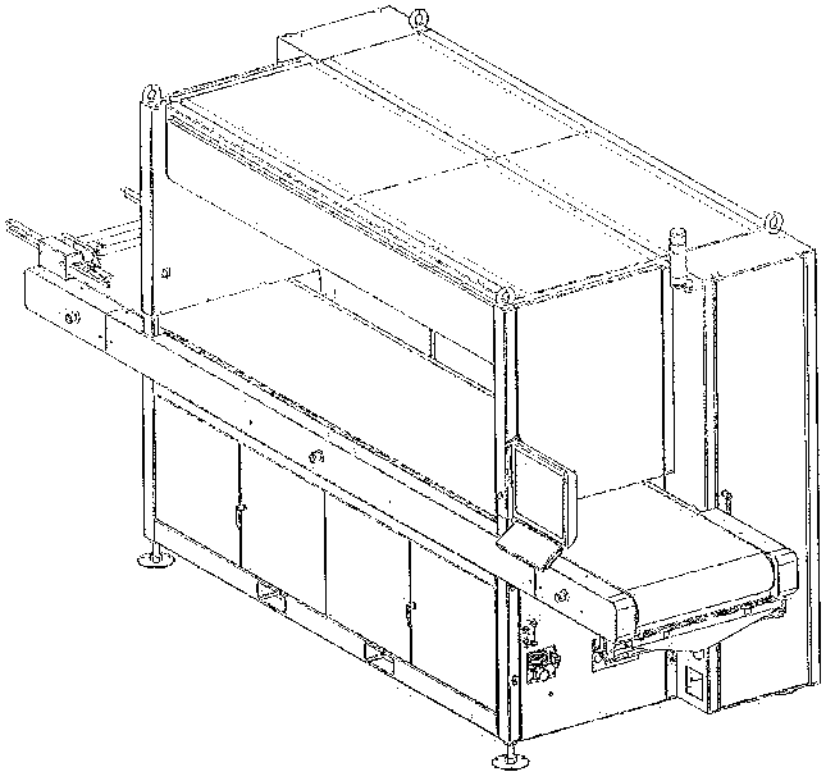
It can be removed easily from the front for replacement or maintenance. It has some spaces in case it has to be moved with a fork lift.

The conveyor has regulation systems which are used to have it levelled with the production line and the print units.

Centraliser, wiper, tile detector and relief detector are installed on it.

It's wrapped up with covers to prevent entrapments in the band, drums and motor.

Conveyor view where the centraliser at the entry and the wiper at the exit are displayed.



KJ12754	Ø30 DRUM BEARING SUPPORT
KJ17258	K1400 CONVEYOR SUPPORT ROLLER
KJ17259	S1 700 BAND SUPPORT ROLLER
KJ20878	SERVOMOTOR
KJ22226	K700S7 (750x9450mm) BAND
KJ22792	K700S7 MOTOR-DRUM
KJ22797	K700S7 TIGHTENING DRUM
KJ22924	K1400S7 (1390x9450mm) BAND
KJ22927	K1400S7 MOTOR-DRUM
KJ22930	K1400S7 TIGHTENING DRUM
KJ22935	PLANETARY GEARBOX

2.16. Conveyor wiper

It keeps clean and in perfect conditions the band of the conveyor. It's always located below the band and at the exit of the machine.

It's comprised of a soapy water recirculation circuit to have the band cleaned and a lift/descend system for the wiper.

The waste hopper may be easily removed for cleaning.

Soapy water in the tank has to be replaced whenever operator observes it's not cleaning effective.

From the control board, located on one side of the front cabinet, a switch turns on the recirculation of the cleaning water and a lever moves up or down the cleaning wiper.

Solid resistant recirculation pump.

Watering of the band from wide water jets to prevent blockages.

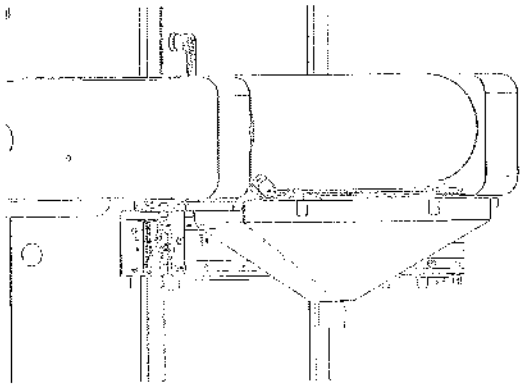
Safety system:

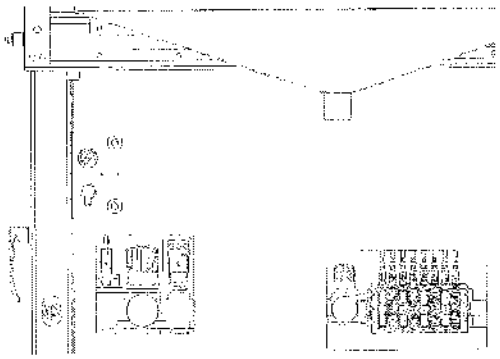
Cleaning position lock.

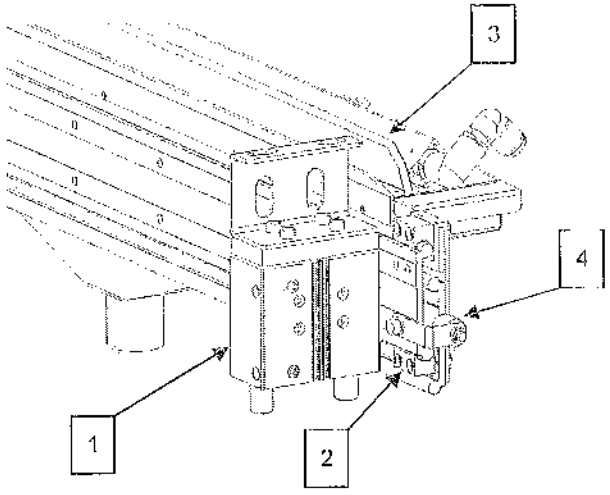
The pump only starts when in working position, never in access one (actuators down).

Configurable right/left system.

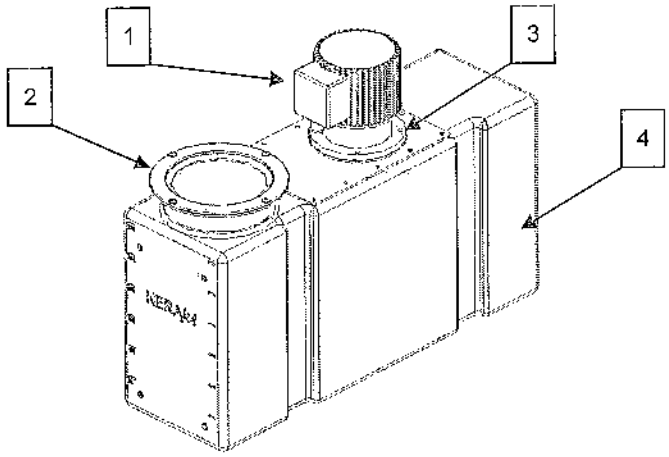
■ Hopper and controls view





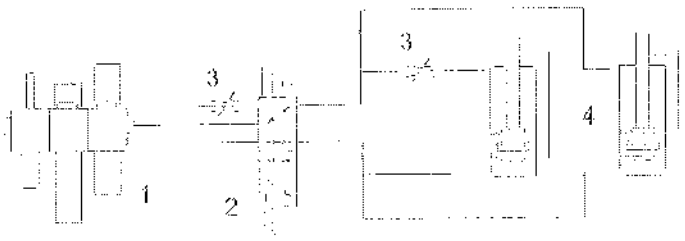


1	KJ10170	CYLINDER DETECTOR
1	KJ17950	GUIDED CYLINDER 25-40
2	KJ17951	SLIDE
3	KJ17954	K700S6 WIPER
3	KJ18054	K1400S6 WIPER
4	KJ17144	SILENTBLOCK



1	KJ18057	WIPER PUMP
2	KJ19661	PE TANK SIEVE
3	KJ17438	STIRRING PUMP SEAL
4	KJ22420	3K MAIN INK TANK

- Wiper pneumatic diagram:



1. Pneumatic unit.
2. Panel manual valve.
3. Shutter valve.
4. Guided cylinder.

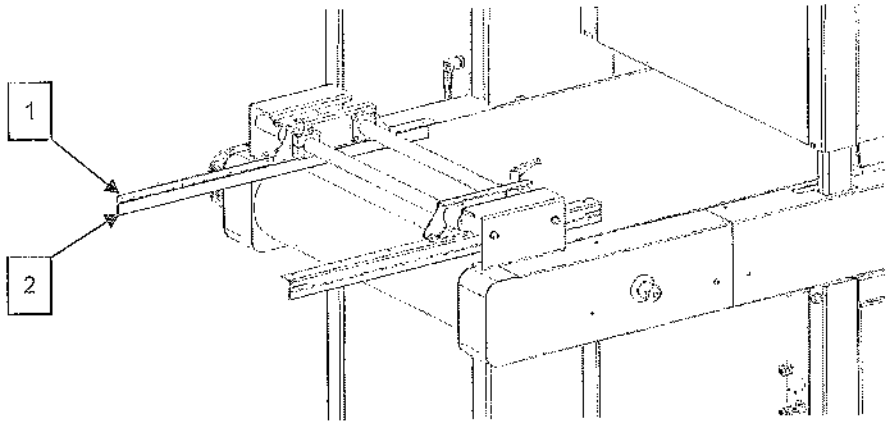
2.17. Tile centraliser

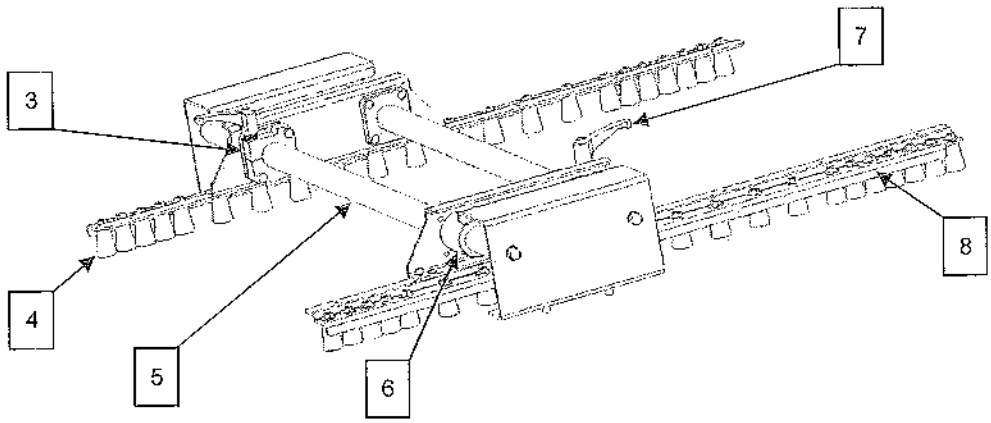
It is a device that aligns and centres the tiles on the production line before reaching the printing area.

It's an easily set and adjusted part. Operator may set the position of the tile on the conveyor belt depending on the needs and tile format.

It may be from single up to quadruple, depending on the amount of tiles to be centred at the same time.

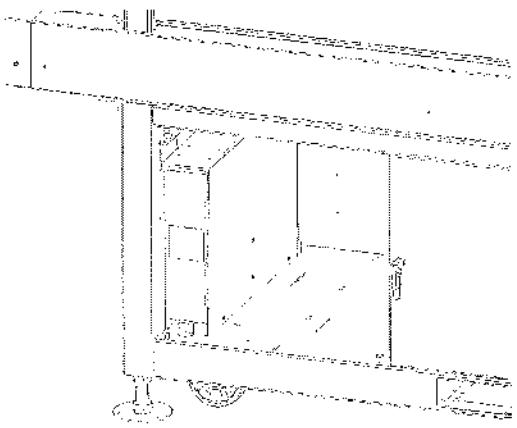
Also, it may be provided with cone rollers or wear resistant strip.





1	KJ20970	V7 ANGLED CENTRALISER GUIDE
2	KJ18731	CLAMP SHAPE
3	KJ20105	V7 CENTRALISER BRAKE
4	KJ19794	CONE ROLLER
5	KJ19346	K700 CENTRALISER CHROMIUM PLATING D30 SHAFT
6	KJ19357	LINE BEARING
7	KJ16387	ADJUSTABLE HANDLE
8	KJ21023	LEFT V7 CENTRALISER ROLLER GUIDE
8	KJ21024	RIGHT V7 CENTRALISER ROLLER GUIDE

2.18. UPS System



The UPS gives the reliability of a battery backed up for input power cuts. It keeps the machine powered on long enough to make the basic ink recirculation and automatic cleaning tasks.

Rectifier/Inverter combined technique.

User friendly display.

The device is refrigerated to matain batteries in good conditions.

User control interface with alarms settings.

Blackouts free for network transfers to UPS.

Inside installed for KERA*jet* S7 - - 700 and outside installed for 1400 and 1800

ONLY TRAINED TECHNICIANS MAY INSTALL, CHECK AND MAINTAIN UPS DEVICES (INCLUDING BATTERY REPLACEMENT).

MAY YOU HAVE ANY QUESTION ABOUT OPERATION, OPTIONS OR MAINTENANCE, PLEASE CONTACT KERA*jet*.

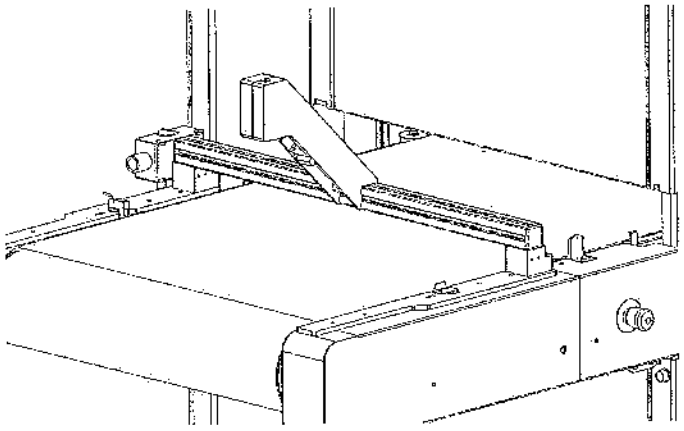
2.19. Optional elements

2.19.1. Relief detector

It is an artificial vision device which can recognise diferent reliefs and synchronise printing accordingly.

It is comprised of a 16 mm lens, mirror, high speed camera and a laser, installed on a support specifically designed for KERA*jet* machines.

It has a relief management software that can recognise from 9 up to 255 different reliefs. It is provided with a specific instructions manual.



KJ20808	7x7mm MIRROR
KJ21810	LASER UNIT
KJ21811	AMPLIFIER

2.19.2. Gap cleaning management

It's an available option in KERA*jet* equipments which coordinates the other elements of the production line with KERA*jet* machines so the operator can make gaps in the line acting on the press/dryer as he may wish.

This gaps may used for automatic cleaning.

An small electric installation with photocells and cables is required.

2.19.3. Multientry kit

This option increases machine productivity as the it might be working with up to 4 lines simultaneously. The only limit is the maximum printing width of the machine.

Only some mechanic modifications (centraliser and sensors for each line), software upgrade and Firmware and Hardware updates are required.

2.19.4. Moving printing units

This piece of equipment is specifically designed for vertical or inclined surfaces. It has a specific instructions manual.

2.19.5. Height barrier

This element detects tile height differences and automatically adapts printing height accordingly. It has a specific instructions manual.

2.19.6. KERA*jet* Modul

It's an optional equipment designed by KERA*jet* to print the tile backside, without any manipulation. Control marks may be made on tiles individually.

2.19.7. KERA*jet* Visio

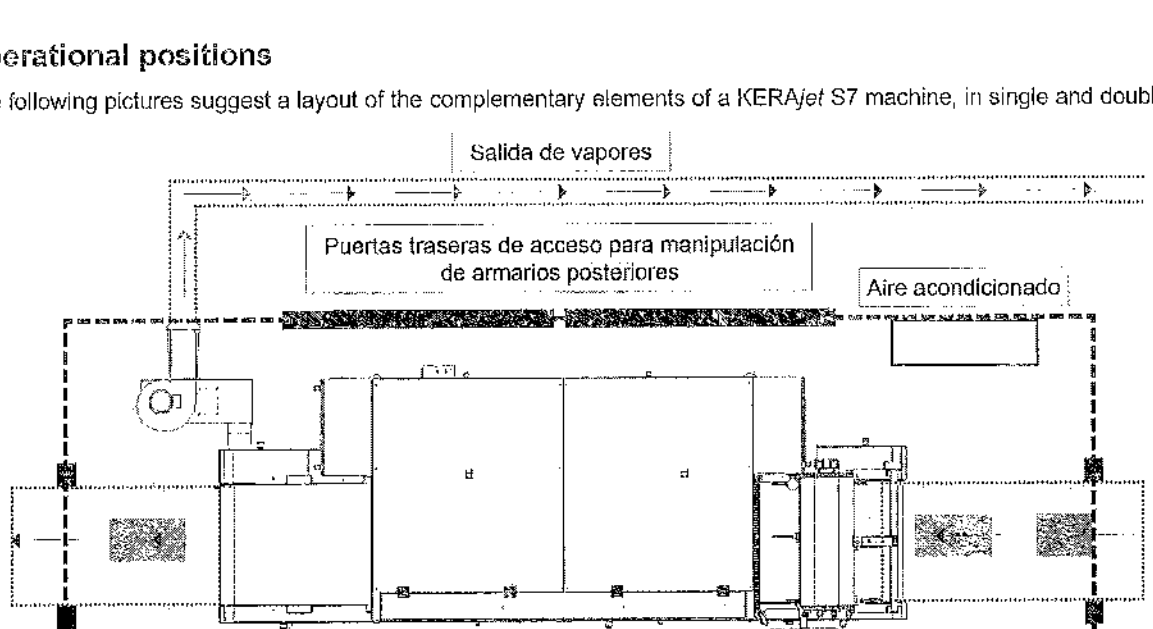
Optical tile control. It detects and warns about defects on printing.

2.19.8. Print head cleaning equipment

When a print head is not printing properly, after having tried what's suggested in the problem solving part, you may remove it and make a thorough cleaning with this equipment.

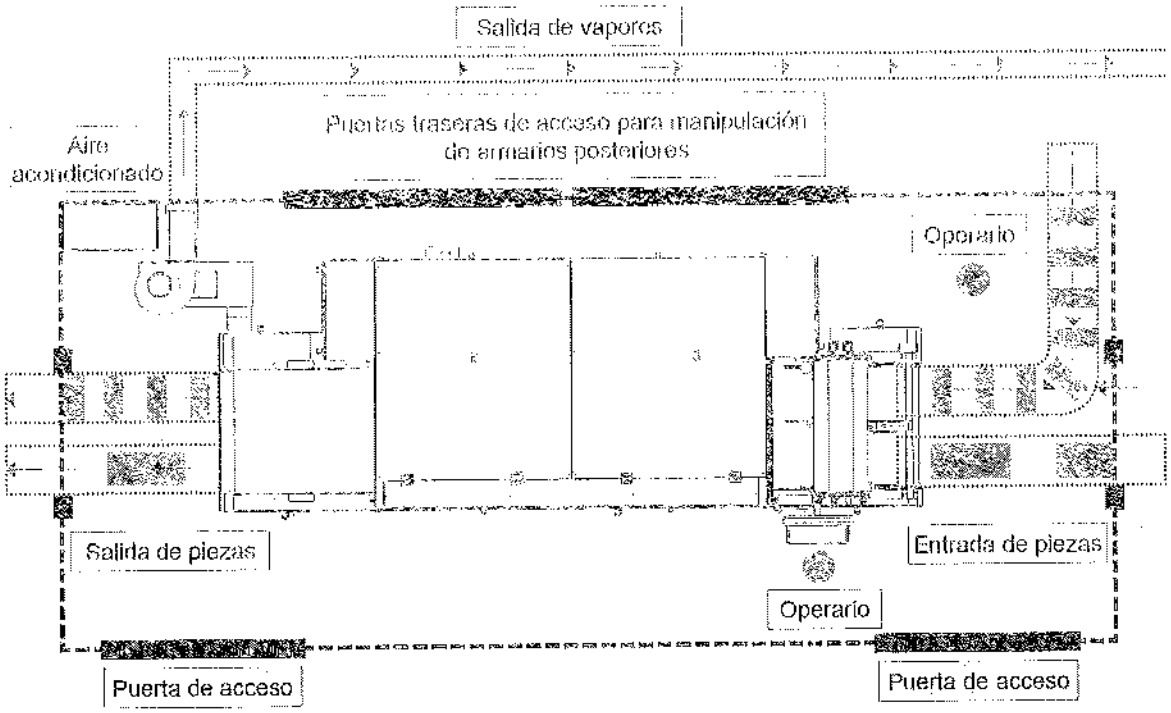
3. Operational positions

The following pictures suggest a layout of the complementary elements of a KERA*jet* S7 machine, in single and double entry.



We'd like to suggest having the machine installed in a protection cabinet. In this case, the operational position is defined by the cabinet. The operator is located inside. Tile flow of the production line runs through the cabinet and the machine.

The backside of the cabinet must have an access for the back doors for the maintenance operations. We suggest letting enough space between the protection cabinet and the elements around as some maintenance interventions need some room for manoeuvre.



At the front of the machine you may find the touchscreen and the keyboard to set the working parameters and the conveyor on button. You also have the main ink tanks which have to be kept filled at the correc level. As it works automatically, operators just have to check for unlikely anomalies in tile flow, ink failure or equipment cleaning.

There are three emergency mushroons at the front, two at the back and two inside the panels.

Please, bear in mind that the machine can only work while the hood and the back doors are closed.

For maintenance or inside cleaning you must stop printing.

Please, check cleaning elements and conveyor wiper.

Use personal protection equipment for a safety operation: please, avoid unsuitable clothing which may get trapped in the moving parts of the machine, wear rubber gloves, safety shoes and, whenever required, safety goggles.

4. Description of the intended use of the machine

KERA*jet* S7 is an industrial machine designed to print images on ceramic tiles, plastic, wood, cement, cardboard, glass, etc.

KERA*jet* S7 may work in different modes depending on customer's requirements: tile by tile, roller, canvas or multiresolution.

It digitally prints by using ceramic pigments, salts, effects, powders, glaze, UV inks, water based inks, etc.

Maximum printing widths depend on the kind of unit, which approximately are:

- KERA*jet* S7 - 700, 700mm.
- KERA*jet* S7 - 1400, 1330mm.
- KERA*jet* S7 - 1800, 1803mm.

Printing lengths depend on product mechanical features. They may change depending on tile curvature and finishing. It might be longer than 2 metres may the connection with production line be correct.

Maximum conveyor speed is 90 m/min. During machine start-up customer's printing quality requirements are checked at production speed and also tile reaction when and emergency mushroom is pressed.

Maximum tile thickness when printing is 46mm. Any thicker tile will collide with the frame and will stack it and bring about breaks in the elements of the machine.

As KERA*jet* S7 works in the same conditions as the production line and operators are trained on how to operate it, a misuse has never been observed.

Safety measurements to adopt are the same as those applied on customer's production line.

- Wheels and support installation. Lock wheel fixing screws. Leave supporting screws longer than the lower part of the wheels so they are those standing on the floor.
- Dismantling transport metallic supports. They're screwed and, generally, they'll be located at the front and back of the equipment.
- Set the machine in the line. Agree on level. Line consent.
- Turn off main switch and all the circuit breakers in the main electric panel and individually those in the colour modules (no voltage position).
- Check that all input phases are balanced and earth is correct.
- Connect the machine to the factory electric network. Power up general diferential switch and the circuit breakers in the main panel and in the "backpacks" of the KERA*jet* equipment.
- Check that the UPS is working fine.
- Fill main tanks with the ink supplied by the customer, up to the right level. Do not go above maximum level. We suggest labelling ink tanks with code and ink supplier.
- Refill chiller with transfer fluid and connect it to the machine. Open chiller output taps.
- The ink vapour exhaust device integrated in the machine has to be properly installed to the main suction facility of the plant for its final filtering and evacuation out of the factory. The device has a filter which pre-treats such air flow from ink waste. Close outlets at the bottom of the ink filter.
- Connect power and compressed air to the cleaning filters of the machine.
- The recirculation tank of the wiper has to be filled with 20 litres of water. Add 20cc of a dispersing mixture or a surfactant (if not, soap + anitfoaming).
- Equipment previous test.
- Active ink regulation regulation setting.
- Start-up.
- Printing check and setting.

PRECAUTIONS TO BE OBSERVED BEFORE THE START-UP OF THE EQUIPMENT.

YOU MAY PRESS ON THE EMERGENCY MUSHROOMS AT ANY MOMENT. PLEASE, OBSERVE WHERE THEY ARE INSTALLED. WHILE IN PRODUCTION, KEEP HOOD DOWN.

THE FIRST OPERATION OF THE MACHINE IS SEARCH FOR REFERENCES. THE OPERATOR, ONCE THE PROCESS IS ACCEPTED, HAS NO CONTROL ON THE MACHINE. HE MAY ALWAYS PRESS ON THE EMERGENCIES.

PLEASE, CHECK THAT THE METALLIC COVERS FOR TRANSPORT IN THE COLOUR MODULES HAVE BEEN REMOVED.

6.1. Colour management

Colour management means adapting KERA*jet* equipment resources to the specific products of each customer.

KERA*jet* designers install, configure and train users in a customized colour management.

Basically, this procedure involves:

- Graphic digitisation, taking pictures or file aquisition.
- Linearization file ripping with the technical data of the machine. Colorjet o Colordirect.
- Colorjet linearization acquisition.
- Ripping and printing of the colour test chart with the previously acquired information (.lut).
- Test chart acquisition and profile generation.
- Photoshop: profile installation and image processing.
- Colorjet (Multichanel, CMYK o RGB) or Colordirect (Multicanal o CMYK): Rip converted image with the suitable printing scheme.
- Print.

6.2. Regulation of the active ink system

Each ink circuit works with an active ink system(SRA as spelled in Spanish). Compared to others, this system has printing stability and less amount of elements in the circuit among other advantages.

The process is controlled and monitored by the PC and its controlling interfaces.

Each circuit has to be set for a correct operation. This task is carried out for the first time by KERA*jet* technicians.

Please, bear in mind that each ink circuit requires different parameter settings that depend on the features of the print units and of the ink rehology.

Remember that each colour module has 2 ink circuits.

Initial regulation procedure of the active ink system

- Visually check hydraulic, pneumatic and electric connections.
- Close all the print head taps, except those of one of them.
- Open bypass of the ink collector.
- Open peristaltic pump valve.
- Configure from ConfigCT: meniscus pressures, differential pressures, pressure sensor offsets, pump percentages startin values, purge pressure, pump percentages and each nominal ink temperature.
- Check ink level in the main tank.
- Close all doors and hoods.
- From control panel choose the ink to regulate and access "Regulation".

- Ink has to come up from the main tank, located inside the frontal panels of the machine, up to the secondary tank in the "backpack", in the back panel.

- It's likely that "ink level" alarm is triggered if the circuit has not been filled up completely. Stop regulation and start again.

- Check whether the system has reached the regulation set point set in the ConfigCT. This process may last for three minutes at least.
- Stop the system.
- Open print head valves.
- Restart regulation process and wait until regulation set point has been reached again.
- Check surface of the print head nozzle plate, may a small line of ink show up on every nozzle line that means that the system is properly regulated. In case of drops or ink accumulation, that means that the meniscus pressure is too positive. May the surface be dry, it's likely that meniscus pressure is too negative.
- Check if temperature has reached regulation set point.
- Repeat the process for every print module.
- Set conveyor speed as requested.
- Go to ink section and check pressure values of each active ciruit and pump percentages.
- Print a nozzle test on a paper. It will show you whether selected print heads match size and whether their control system work properly.
- May an alarm be triggered, please, check on the monitor what's the issue (check alarms section included in control panel manual).

Events which might occur

- May the IN pump working percentage get higher than 40% and meniscus pressure (pressure at the print heads) and differential pressure (flow) remain steady, filter needs replacement.
- May the OUT pump % increase, it's likely that air is getting in the circuit.
- Working % of one of the pumps is very high and the other is almost zero. Please, check pumps in manual individually as it's likely that one them failed and stopped operating. You may set maximum and minimum alarm triggering values so the SRA gets stopped.
- Meniscus and differential pressures can't go stable and the system gets stopped. There's an air bubble in the circuit. Change flow direction from the flow reversing valve. May values don't become stable, open two print head taps al least and check stability and close them again. These actions are intended to remove the air bubble from the circuit (purge the circuit). Please, bear in mind that for each print head there's an input and an output pipe.
- Pressures don't go stable even with the beforementioned actions. Calibrate pressure sensors of the circuit.
- It's very likely that in case the circuit does not go stable, there's an ink leakage which has to be detected and corrected. In this case, air is getting into the circuit.

Regulation procedure after a stop

This procedure is only suggested for an ink circuit regulation after a casual stop.

- First, check alarms.
- Restart ink system from "Regulation" option.
- Please, wait until consigned pressures and temperatures are reached.

May they get to the setting points, the system will work correctly.

May it not be so, regulate by checking pump % and what may go on with pressure values. Please, be aware of the alarms, check section "14. Problem solving" and contact KERAjet and report the data.

6.3. Introduction to control software

The equipment is provided with a software that comprises several programs, each of them have a specific role when controlling, monitoring and configuring KERA*jet* S7.

All this programs have a technician access level (not available for operators which saves all the critical parameters of the machine) and an operator one (designed for user's operation on a daily base).

- Carga. Design file management: load, close, centre, etc. Last released versions manage two productions at the same time, so one is active while the other is inactive. This means that the operator may arrange next production while the previous one is still running.

Operator may also print a test image or pick print a selected image in order to check that printing settings are correct and monitor on-line parameters in general, either those for production 1 or those for production 2: speed, printing height and production.

- ConfigCA. Edits and monitors print units parameters: print settings, status, software and hardware versions of the print units control cards, etc.

Furthermore, it has a very useful set of tools for the customer. Such tools, are small software programs which help the operator in strictly technical matters: print unit change, Firmware and Hardware card upgrade, save/recover previous backup, etc.

- ConfigPLC. This program sets the configuration parameters of the machine, in either technical level or user one (factory parameters). They are general parameters which set stable working routines.

It also enables the chiller and sets cooling circuit temperature and other factory parameters such as ink temperatures, etc.

You have to read the parameters when opening ConfigPLC, this is because the PLC is not connected all the time with the program, just when parameters are read from the software, the systems acquires running values which are being captured by the PLC from sensors.

THERE'S A FOLDER IN THE PC OF THE MACHINE WHICH HOLDS MANUALS IN FILES ALONG WITH OTHER INTERESTING INFORMATION.

C://COMPUTER/KERAJET/SOFTWARE/TECHNICAL SUPPORT/MANUALS

6.4. Start-up

- Start-up the machine and PC from the main switch.
- Turn on circuit breakers, press on reset button and switch on the colour module switches, one at a time and wait for each of them to turn on and cards start working.
- Open PC control-mangement programs in software folder of the desktop: ConfigPLC, CARGA, ConfigCA.
- ConfigPLC: Press on "Read params". The system is not logged in online, so, operator has to press on this button to acuire updated PLC values. Please, check critical operational parameters. Those really critical are in the "Factory params" tag and should be checked in "Technical" mode.
- ConfigCA: Finally, please, open this program and at "Select print units" select them all and check parameters in general: No communication error, no PZVolt set to zero, no PZT set zero or with a range very different from the rest, all FW/HW in the same version. Minimize.
- CARGA: Press on "Printhead selection" and select them all. May any print head go in error, locate it, unplug power and Ethernet cables, wait for a minute and plug them back. Open "Carga", press on "Open file" and select a test file in the right printing mode. Open file to be printed and load image.
- From control panel, start printing. Place a thinner than height settings tile at the KERA*jet* software and, may consent not be present, press on the black bypass button. The conveyor will run for a test at least.

Machine stop

- Bring all the bars to rest position and stop conveyor
- Stop printing from "Carga", close all the running programs and switch off the PC
- Turn off the module switches
- Finally, turn off the main power switch at the front of the machine

WARNING: TURNING OFF THE MAIN POWER SWITCH WITHOUT FOLLOWING THE ABOVE STEPS MAY DAMAGE THE ELECTRONICS OF THE MACHINE.

7. Operators training

Due to the operational sophistication level, during start-up and later setting up, KERA*jet* staff will train those operators designated by the customer to work on the machine.

This manual will be used as documentation of that operators' training.

Special attention will be paid on the safety systems of the machine.

8. Risks

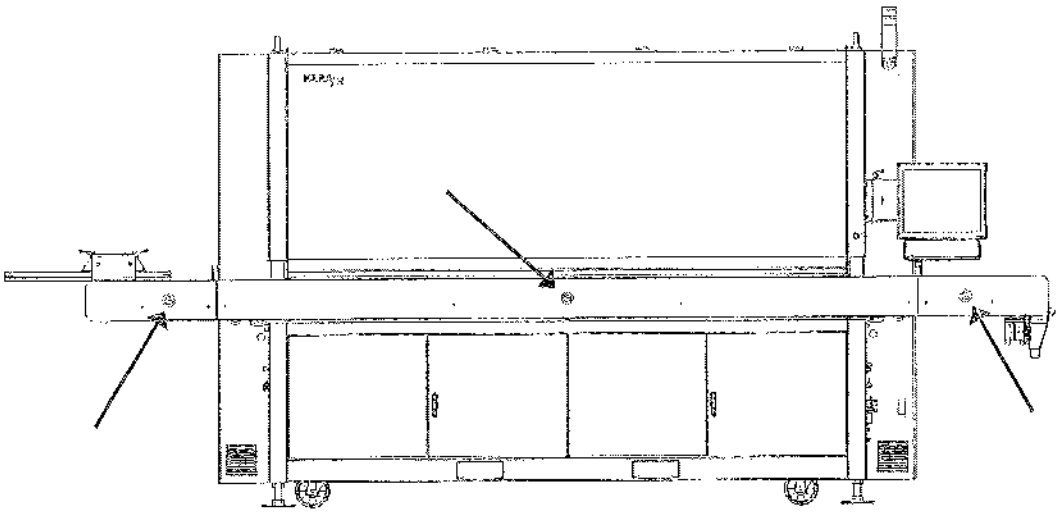
KERA*jet* ensures that its equipments are designed and manufactured according to current safety regulations and that, permanently, aims at reducing risks from operating the machine for all its lifespan, including transport, installation-start-up, operation, maintenance, disposal and dismantling.

A customer who's purchased a KERA*jet* machine, has to make sure, first of all, that operators identify emergency stop elements (emergency mushrooms), locate them, understand how they work and are responsible for their good condition, from the installation moment, till the equipment is dismantled.

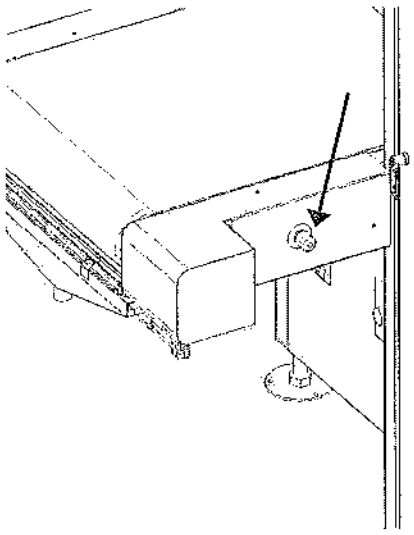
KERA*jet* eagerly uses the information in the Technical Orientation documents, and takes those harmonised norms which are related to the safety of its equipments.

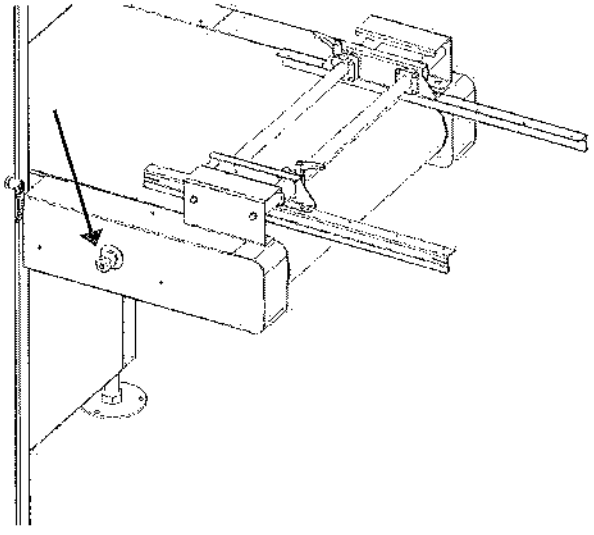
Emergency mushroom head buttons location.

- Front cover view:

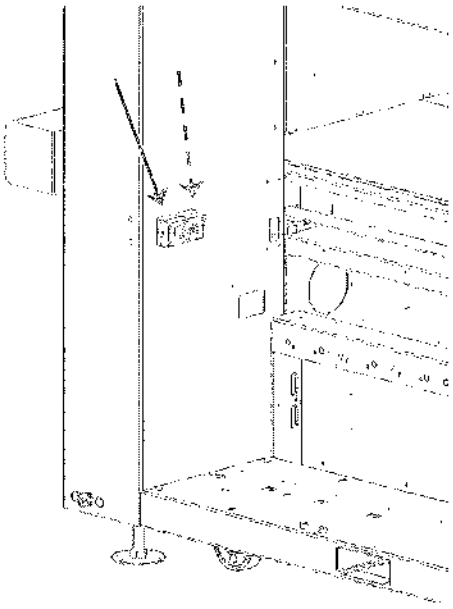


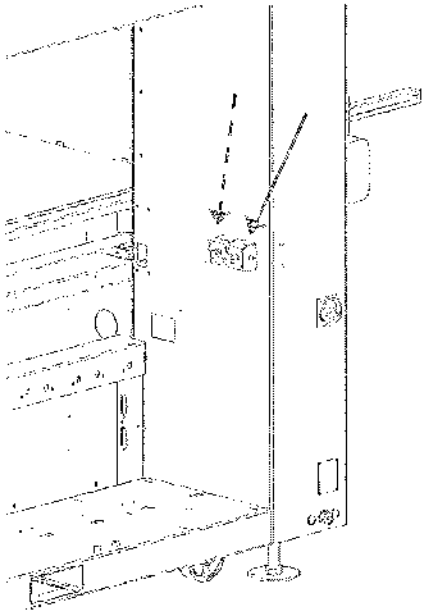
- Back covers views:





- Back panels views:





Yellow buttons next to the emergency ones disable all ink systems of the machine (all ink circuits). May you like to stop just one, please, do it from control panel.

8.1. General safety instructions

Next, general safety operations which have to be applied compulsory when operating a KERA*jet* S7 machine are described.

As a general rule, we recommend a suitable operation of the machine, paying high attention and using suitable personal protection equipment.

	Electrical hazard. Electric cabinets.
	Hands crushing. Crushing. Conveyor and scraper blade.

- Warning. It's compulsory to identify those parts in the machine singled out as dangerous by the manufacturer and to take great in order to avoid any mishap.
- Electric discharge risk. Please, keep panels closed and do not insert any item nor dismantle anything.
- It's utterly prohibited to remove protecting covers as well as to disable any safety element or system. Hood and panels must always be closed.
- Use of personal protection equipment which may be already in use in the production line where the machine is going to be installed is compulsory (gloves, goggles, safety shoes, etc.).
- We recommend reading this manual and keeping it nearby the machine as a reference book.
- Please, do not insert any item in the slots or joints of the machine.
- Please, do not lean on the machine nor any of its parts.
- Please, do not place any load on the machine.
- Please, do not access moving parts of the machine while it's running.
- Please, do not water the machine. Do not clean with hose.
- Please, do not clean nor remove any part of the machine while it's running.
- Fire hazard. Please, do not pour water, oil, nor any other product on the machine. Use emergency button in case of fire.
- May you detect that safety elements have been altered of disabled, please, do not start the machine.

- Please, take care when unloading and locating the machine as it's pretty heavy.
- Please, do not leave the machine unattended for long periods of time. Some tiles may get broken or stack and this may bring about a risky situation. A well trained operator intervention would be critical in hazardous situations.
- Please, keep a CO_2 fire extinguisher nearby the machine as this is the suitable one for fire in low voltage machines.
- Please, keep the machine in good cleaning conditions in order to prevent slip mishaps.

8.2. Specific safety instructions

KERA*jet* has reduced as much as possible any risk from using the machine. In order to achieve it, KERA*jet* has integrated safety in the design and manufacture stages by applying the required protection measurements and using materials or products harmless for people in contact with the machine.

When operating KERA*jet* S7 following safety laws and norms is compulsory.

Next, a set of important suggestions and safety norms are detailed for a correct and safe use of the machine:

- The machine has to be used and operated only by authorised personnel who has been properly trained by KERA*jet* technicians. Please, behave responsibly and operate the machine just for the porpuse it was designed for.
- The machine must only be starte up once KERA*jet* technicians finished their location and start up, and the operators at the factory had been properly trained.
- Please, keep hood alaways closed. Bear in mind that the machine makes some automatic movements and operators might get trapped or hit.
- The equipment might miss basic operational parameters or some elements might get damaged if software is altered in technician access mode.
- Chemical products inserted in the machine might be irritating or a hazardous for the enviroment if not handled or discarded according to the manufacturer. Please, request you ink supplier before using it. Read safety instructions. Take required personal protection measurements.
- Trapping risk. Please, don't wear garments or any other object which might be likely to get trapped with any part of the machine.
- Use emergency button for any anomalous situation: noise, smoke, collision, etc.
- Always use KERA*jet* original spare parts.
- May you detect any issue in the machine, please, follow support procedure and contact KERA*jet* support service.
- Please, do not allow sensor amplifiers to be altered as maximum height barrier might be disabled and this would bring about a collision.
- Detection systems integrated in the machine as well as the relief detector (only under request) have a laser. In order to use lasers in a safe way, do not expose eyes to it as this would damage your vision. Do not connect an altern current power supply to the sensor as it might explode or get burnt. Do not dismantle it from its place nor direct it to other persons or animals. Please, check and apply safety regulations in force in your country.
- Lasers integrated in the tile detection and height barrier systems are type 1. Please, check regulations and set safe working routines. They are regulated according to UNE-EN 60825-1:2008 norm. Type 1 lasers emit visible radiant energy which might produce glare effects, mainly in low light environments. Please, never change settings of the equipment as the machine will be unprotected from maximum height barrier; in that case, KERA*jet* is not liable for any spoilt material nor personal damages.
- Please, be careful as some surfaces are hot and may produce thermal burns if touched. For safety reasons, the machine has thermostats which stop heating when a given point is reached.
- May your machine have any K6 print head module, please, bear in mind that power supply to these units is around 150 VDC (per unit) and this might be a risk if handled unduly.
- May your machine have a water wiper, when supplying pneumatic pressure to the device (a double effect valve is installed), an automatic up/down movement will be produced by the pneumatic actuators. Please, be careful, risk of trappring. In order to avoid projecting water, and it may get inside the machine, there's a safety system that turns on the water jets pump only when wiper is up.
- Emergency button must not be used for normal stop.
- User must not modify the design and configuration of the machine without requesting KERA*jet* or its authorised dealer.
- Please, check periodically emergency beacon.

8.3. Secondary risks

	DETECTED RISK	RISK POINT/AREA	STATUS	PROTECTION AND DESIGN MEANS SET	SECONDARY RISK
1	FIRE RISK FROM SHORTCUT.	A) ELECTRIC OR ELECTRONICS ELEMENTS.	A) WHEN THE MACHINE IS POWERED, NOT JUST WHILE IN OPERATION.	A) SUITABLE WIRING DESIGN. B) HIGHLY FLAMABLE ELEMENTS ARE ISOLATED OR KEPT APART.	A) Fire risk from shortcircuit.
2	RIESGO DE APLASTAMIENTO POR LAS PARTES MÓVILES DEL EQUIPO DURANTE OPERACIÓN U OPERACIÓN PREVIA DE BÚSQUEDA DE REFERENCIAS.	A) ZONAS MÓVILES DE LA MÁQUINA. Movimentación Ejes X y Z.	A) OPERACIÓN. B) BÚSQUEDA DE REFERENCIAS.	MACHINE COVERS: A) MAIN HOOD. B) BACK DOORS. C) SAFETY OPTION THAT DISABLES MACHINE MOVEMENTS WHEN HOOD OR BACK DORS ARE OPEN. EMERGENCY BEACON GOES ON AND A WARNING MESSAGE APPEARS ON THE CONTROL PANEL. D) RESTRICTED SOFTWARE. E) MOVEMENT SPEEDS SLOWER THAN 5m/min.	Machine operation when hood and doors are open. The safety system which disables movements when hood is open might be disabled during start up. You may do it by accessing KERA*jet* software and disable this system deliberately. Safety elements will keep on working the same. This operation is only allowed to KERA*jet* technicians.
3	INHERENT RISK FROM USING IRRITANT AND HARMFUL CHEMICAL PRODUCTS.	A)ALL OVER THE MACHINE.	A) ACTIVE OR INACTIVE MACHINE.	A) INK VAPOURS SUCTION EMBEDDED IN THE MACHINE. HAS TO BE TURN ON FROM CONTROL PANEL. B) USE OF CHEMICAL RESISTANT MATERIALS THAT MINIMIZE INK LEAKAGE. C) LEAKAGE PROOF INK TANKS.	A) Risk from use of chemical products.
4	COLLISION RISK FROM IMPROPER HANDLING OF THE SIGNAL AMPLIFIER OF THE TILE DETECTOR DEVICE.	A) TILE DETECTION.	A) WHILE IN OPERATION.	A) THE AMPLIFIER HAS A PROTECTION COVER. B) SUITABLE TRAINING OF THE OPERATORS IN RELATED RISKS.	A) Collision between tile and machine because of improper handling.

	DETECTED RISK	RISK POINT/AREA	STATUS	PROTECTION AND DESIGN MEANS SET	SECONDARY RISK
5	RISKS FROM THE INSTALLED LASER SYSTEMS: ▫ TILE DETECTOR SYSTEM. *Low power laser, it might produce glare effects.* ▫ MAXIMUM TILE HEIGHT SYSTEM. *Low power laser, it might produce glare effects.*	A) TILE DETECTOR LASEAR EMITER. Type 1 laser, based on EN 60825-1. 660 nm. 1,35mW.	A) WHEN THE MACHINE IS POWERED UP (NOT JUST WHILE IN OPERATION).	A) MAIN HOOD. B) THE DEVICE IS ATTACHED WITH SCREWS WHICH FIX ITS WORKING POSITION. C) LASER EMITER HAS A WARNING AND INSTRUCTIONS TAG.	A) No restricted access: machine operation even with open hood and direct beam view. B) The emiter may be removed from its position and, by directing to the eyes, it may bring about glare effects, mainly in low light enviroments.
				A) MAIN HOOD. B) THE DEVICE IS ATTACHED WITH SCREWS WHICH FIX ITS WORKING POSITION.. C) LASER EMITER HAS A WARNING AND INSTRUCTIONS TAG.	A) No restricted access: machine operation even with open hood and direct beam view. B) The emiter may be removed from its position and, by directing to the eyes, it may bring about glare effects, mainly in low light enviroments.
6	COLLISION RISK AMONG MACHINE PARTS DUE TO CHANGES IN BASIC OPERATIONAL PARAMETERS OF THE MACHINE.	A) ALL OVER THE MACHINE.	A) DURING OPERATION.	A) OPERATIONAL PARAMETERS ARE PASSWORD PROTECTED IN THE SPECIFIC SOFTWARE PROGRAMS OF THE MACHINE.	A) Collision among machine parts and basic start up parameters. You may disable conveyor movement safety system when hood is open during start up. In order to take this option you'll need to access KERA*jet* restricted software mode and intentionally have it disabled.
7	RISK OF CUTS AND HITS FOR THE OPERATOR.	A) INK REMOVABLE MODULES.	A) IN CASE THERE'S ANY COLOUR MODULE OUR OF ITS POSITION WHEN THE MACHINE GOES ON, SEARCHES FOR REFERENCES OR IN AUTOMATIC CLEANING OPERATIONS.	A) EVERY MODULE HAS FIXING SCREWS AND HAVE TO BE INTENTIONALLY REMOVED TO BRING THE BAR OUT. B) THE MACHINE HAS A DETECTION SYSTEM THAT BLOCKS THE MACHINE WHEN ANY BAR IS OUT OF PLACE.	A) Operator may get hit because of system malfunction or misuse.
8	WET WIPER TRAPPING.	A) WIPER.	A) WIPER SWITCH CONNECTED TO THE MACHINE.	A) INDEPENDENT ON/OFF SWITCH. B) OPERATORS TRAINING.	A) Operator misuse of the double efect lifting cylinder.

	DETECTED RISK	RISK POINT/AREA	STATUS	PROTECTION AND DESIGN MEANS SET	SECONDARY RISK
9	RISK OF ELECTRIC DISCHARGE.	A) ELECTRIC PANEL. B) CHILLER. C) UPS. D) ALL OVER THE MACHINE.	A) THE MACHINE IS POWERED UP.	A) MAIN DIFFERENTIAL SWITCH IN THE GENERAL PANEL OF THE MACHINE.	A) While the machine is in operation, please, keep the panel unlocked so access to the main differentiall switch is free.
			B) CHILLER DISMANTLING WHILE STILL CONNECTED TO THE MACHINE.	A) INDIVIDUAL CIRCUIT BREAKERS FOR EACH GROUP OF ELEMENTS. B) THE CHILLER IS FULLY COVERED AND ANY INTERVENTION IS NOT ALLOWED.	A) Chiller under voltage. Chiller is under voltage as pump and the rest of the elements have to be on continously.
			C) INTERVENTION ON THE UPS, EVEN WHEN DISCONNECTED FROM POWER INPUT WITHOUT BASIC ELECTRIC TRAINING (E.G. WHILE REPLACING BATTERIES).	A) UPS IS FULLY COVERED AND CLOSED WITH SCREWS. B) THE UPS IS SENT FULLY COVERED AND SHOULD ONLY BE SUPPORTED BY KERA*jet* OR BY A QUALIFIED TECHNICIAN.	A) UPS handling and dismatling, batteries exchange included, is dangerous unless carried out by specialised technicians (EVEN WHEN IN UNPLUGGED FROM POWER).
10	RISK OF BURNS FROM CONTACT WITH HEATED SECONDARY TANKS.	A)SECONDARY TANKS.	A) WHEN THE MACHINE IS POWERED UP, NOT JUST WHILE IN OPERATION.	A) TRANSPARENT POLYMER COVER. B) THERMOSTAT SET TO 90 °C. TANK WORKING TEMPERATURE 55°C.	A) Risk of burns from contact with secondary heated tanks.
11	150 VDC DISCHARGE FROM WRONG HANDLING OF THE K6 POWER INPUT.	A) K6 PRINT HEAD POWER CABLES.	A) MACHINE ON.	A) HOOD. B) COLOUR MODULE SIDE COVERS. C) MAIN SWITCH OF THE COLOUR MODULE.	A) Operator wrongly handles input power of these print heads when power is still on.
12	CONVEYOR ABRASION.	A) CONVEYOR.	A) WHILE IN OPERATION.	A) CONVEYOR COVERS.	A) Leaning on the moving conveyor.
13	CONVEYOR CRUSHING.	A) LOWER DRUMS OF THE CONVEYORS.	A) WHILE IN OPERATION.	A) ROLLERS NEXT TO THE MACHINE.	A) May anyone try to cross under the machine his hair or clothes might get trapped.
14	TRAPPING BY THE COLOUR MODULE MOVEMENT.	A) RACK.	A) WHILE IN OPERATION. B) WHILE IN SEARCH FOR REFERENCES.	A) HIDDEN AND COVERED MECHANINSM BY COLOUR MODULES TOP COVERS.	A) May anyone try to work on the control sensors when moving.

	DETECTED RISK	RISK POINT/AREA	STATUS	PROTECTION AND DESIGN MEANS SET	SECONDARY RISK
15	NOISE AT THE SUCTION OR TURBINE.	A) FANS.	A) WHILE IN OPERATION.	A) INK FILTER AND TURBINE HAVE TO BE INSTALLED OUT OF THE CABINET.	A) Noise level of these devices is higher than 70 dB(A).
16	HAND TRAPPING IN THE HOOD.	A) HOOD.	A) WHEN CLOSING HOOD	A) HANDLE IN THE CENTRE OF THE HOOD WITH SLOT FOR FINGERS.	A) On the sides another operator might get crushed if leaning on the frame.
17	INK SPLASH FROM SUCTION DEVICE.	A) SUCTION. B) INK TANK COLLAPSE FROM SCUTION.	A) WHILE TRAY CLEANING.	A) TANKS HAVE MAXIMUM FILLING LEVEL MARKS. B) THICKER INK TANKS THAN REQUIRED.	A) Mistake when tank maufacturing of when installing closing elements.
18	SLIP FROM INK SPILL.	A) AROUND THE MACHINE.	A) ALWAYS.	A) CLEANING SYSTEMS, SUCTION, PANELS, ETC.	A) While filling up or hand cleaning some drops might fall on the floor.
19	PNEUMATIC MOVEMENTS TRAPPING.	A) PNEUMATIC CYLINDERS OF THE CLEANING TRAYS.	A) WHILE IN OPERATION. B) WHILE IN SEARCH FOR REFERENCES.	A) SAFETY SYSTEM THAT DISABLES MACHINE CONVEYOR IF THE HOOD OR BACK DOORS ARE OPEN. SWITCHIES ON EMERGENCY BEACON AND DISPLAYS AN ALARM IN THE CONTROL PANEL.	Machine operation when hood and doors are open. The safety system which disables movements when hood is open might be disabled during start up. You may do it by accessing KERA*jet* software and disable this system deliberately. Safety elements will keep on working the same. This action is only allowed to KERA*jet* technicians.
20	INK SPLASH FROM PERISTALTIC PIPE EXPLOSION.	A) PERISTALTIC PUMP.	A) WHILE FILLING INK CIRCUIT.	A) PUMP COVER. B) CLOSE FRONTAL PANELS.	A) There's a valve which prevents ink return when dismatling the pump. May you leave it closed, the pipe in the pump may explode.

9. Preventive measurements

- The machine must be operated after KERA*jet* technicians finish start up and operators in charge of the machine have been properly trained. The person in charge of the machine has to make sure that all the operators of the machine understand how to operate it, risks while operating it and, mainly, safety systems. Please, provide KERA*jet* support contact number and email address so request may be made.
- Please, keep hood closed and operator access level when in operation. The person in charge must not allow operators to disable safety systems nor keep hood open. These situations are only allowed under special conditions specifically approved by KERA*jet*.
- Keeping panels locked is compulsory. The key has to be kept by a supervisor. They can only be opened by authorised personnel, educated in electricity and trained by KERA*jet* technicians.
- Please, follow transfer fluid supplier instructions: handling, waste management and safety. Request and read safety documents of the supplied chemical products before handling. Set waste collecting protocols.
- Please, appoint persons in charge of the machine.

- Please, train operators on suitable machine operation, safety operating norms and risks before starting operating. May you have any doubt, please, contact KERA*jet* customer support service.
- Please, do not allow any misuse when operating any of the elements of the machine (neglected operation of some of the equipments of he machine may bring about an accident).
- Safety and technical sheets of the transfer fluid are attached. Please, check them before handling.
- Please, handle chemical products carefully. Ink and solvent manufacturers chosen by you must provide you with safety instructions before using them. Please, read carefully and provide operators with recommended PPE: gloves, suitable soap, etc., as well as how to handle waste and good practices.
- Please, check preventive maintenance section and set required maintenance routines.
- Please, provide KERA*jet* operators with suitable PPE: safety boots, powder-less gloves, cloth, general cleaning paper, safety goggles and hearing protector.

External safety

KERA*jet* S7 machine has user easy access safety systems (emergency buttons), located at the front, at the back and inside the back panels. Please, find location in section 8. Risks.

May you need to stop machine operation for any reason or emergency, please, press on any emergency button and the machine will stop working immediately. Automatically, the machine will wait until the emergency button is released. The machine will display in the control panel "Emergency button pressed".

Sound beacon is designed to warn when the machine goes in error. Yellow and noise stand for colour module and cleaning trays movements. Red stands for blockage when in alarm.

Whenever any of the colour modules is out of place, the machine won't start working.

Control panel messages can be splitted in error messages (the machine is stoped) and warning ones (once accepted when pressing on OK operation will carry on).

Stop SRA buttons stop ink recirculation systems (all the pumps) and are located in the back panels of teh machine.

The machine has a main switch which when in off position may be locked. This will bring 100% safety when maintenance.

PLEASE, BEAR IN MIND THAT IN CASE OF A DANGEROUS SITUATION, IF THE MACHINE HAS TO BE STOPPED, YOU MUST PRESS EMERGENCY BUTTONS, NOT SRA ONES AS THESE WON'T STOP THE MOVEMENTS OF THE MACHINE.

Safety while in operation

The KERA*jet* S7 machine is equipped with mechanical and electronics means: PLC, piezoelectric technology, robust UPS and state of the art electronics for print units control (among others).

Regarding software, operator has limited access to critical parameters of the machine (factory parameters). In this way, several basic operational parameters of the machine are always protected in order to prevent dangerous situations such as collisions among mechanical parts, innapropiate movements while in maintenance operations or basic parameters loss.

Regarding trap preventing covers, main hood must be closed when in operation, keeping operator away from machine moving parts and, therefore, preventing any mishap.

The hood and the cabinet back doors have a locking system which disables any colour module movement may the hood and doors be open while the machine is starting.

In this line of thought, other areas which may mean a risk if not covered, such as drums, bearings, electric panels, etc., are covered with specially designed covers which keep operator safe and, at the same time, protect parts from working conditions (dust, humidity, etc.).

The machine has a suction system which extracts, and previously filters, ink vapours when printing. This system sends vapour to the factory suction installation so it may be processed. It protects operator from particles and ink vapour produced in the cabinet.

Emergency stop system works like a positive mechanical action and has a redundant safety relay which ensures a good performance. It's located inside the main electric panel.

There's a low power protection system for the print heads. Reset is inside the operational panel and may only be possible once the issue is fixed.

10. Stability conditions

The machine has to be levelledly installed with production line.

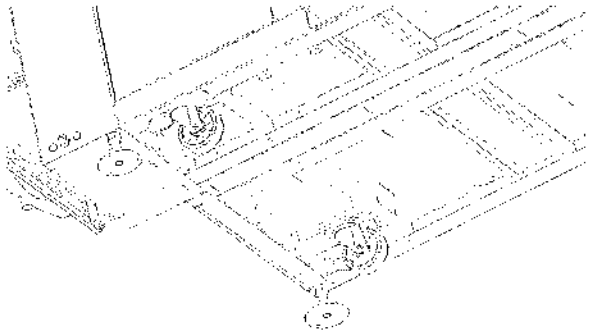
In order to achieve this, it has height adjustable supports and the conveyor has an adjustable screw system.

Machine stability is assured by these four supports on each of the corners of the machine.

Along with the supports, there are free wheels for maintenance and transport.

KERA*jet* S7 - 1400 has an extra couple of supports in the centre and the 1800 has other two more couples.

The wheels are heavy duty, equipped with ball bearings and polyurethane covered, that ensure soft and stable transport.



May any support or wheel get broken by chance, only a small tilt of the machine may happen as height from the ground is just a few centimetres. Furthermore, its gravity centre is always close to the geometric support centre, depending on the machine version.

11. Transport, handling and storage

The machine will be carried to the installation site specified by the customer. Both location and installation will be carried out by qualified KERA*jet* technicians.

Exported machines are packaged in a closed box, fixed to a wood or metal base and fully covered for protection. For national transports by lorry, they may be standing on their supports and fixed to prevent any slipping on the way to destination.

The machine includes the following independent parts: Water wiper tank, chiller (no transfer liquid in the inside tank), essential spare part kit, any other components requested by the customer (e.g. relief detector).

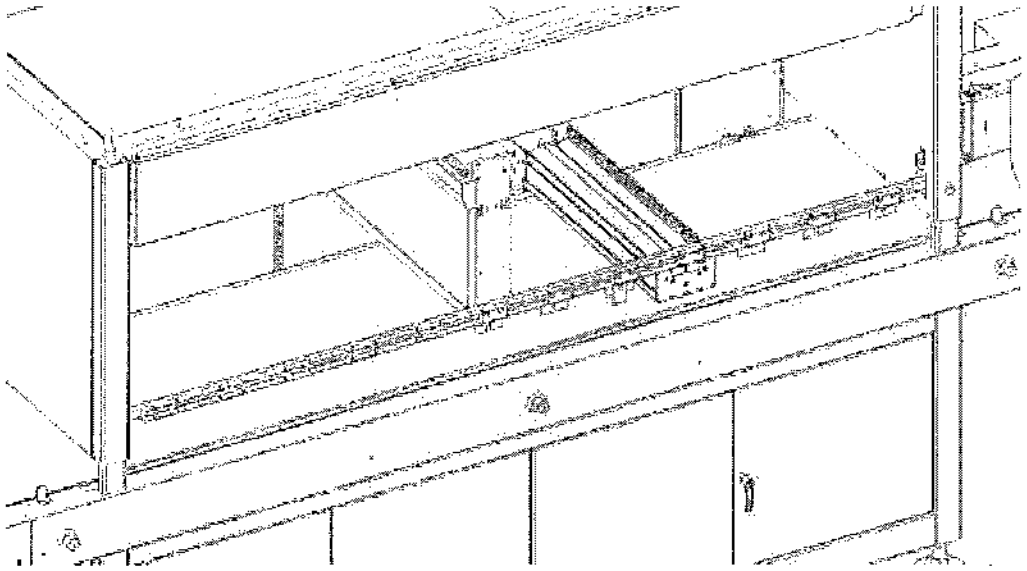
When unpacking the machine, please, check that it has not been damaged during transport. Also check accessories and tools which have to match shipping list. Please, let KERA*jet* know any inconvenience you may find as soon as possible.

IMPORTANT NOTICE:

WHEN DELIVERED, THE MACHINE IS CARRYING SEVERAL TRANSPORT REINFORCEMENTS: A BAR AT THE FRONT OF THE COLOUR MODULES AND SEVERAL FIXINGS AT THT BACK.

THESE FIXINGS HAVE TO BE REMOVED BEFORE STARTING UP THE MACHINE. MAY THEM NOT BE REMOVED, THE MACHINE MAY GET DAMAGED OR OPERATORS MIGHT GET HURT.

MAIN TANKS ARE ALSO FIXED TOGETHER AND TO THE MACHINE.

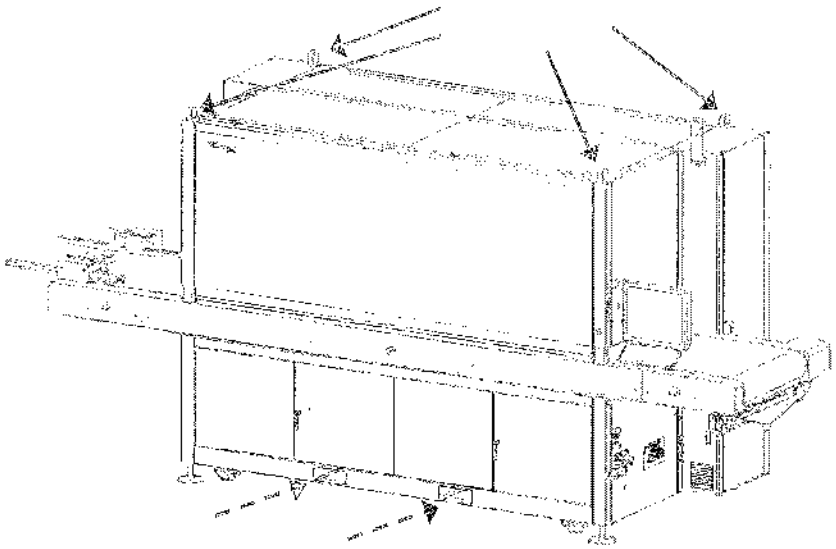


The machine has turning wheels for pusing it and adjustable supports.

The frame has slots for forklift transport.

It also has four lifting points on the top, one for each corner, to be lifted by crane using ropes. These lifting points are M24 DIN580, which may withstand a 1800kg axis load. 3 m long ropes have to be used from the lifting points to the crane hook. You may also use loading boom and shorter ropes as long as they are in vertical position. Please, do not compress the machine as it may affect inside parts.

KERA*jet* S7 - 1800 is not provided with lifting points as it can't be lifted by crane. Internal deformations may alter settings in the elements.



When wheels are touching ground, you may push it manually to its final location. Next, please, set height by adjusting supports.

The machine has to be moved horizontally.

For a safe moving of the machine, please, proceed as suggested:

- Unplug it and cut compressed air.
- Install safety reinforcements that lock colour modules together along with the frame which were installed initially when the machine was handed over to the customer.
- Remove or put apart those parts of the production line where it is installed.
- Unplug and take away the chiller, the suction filter and the wiper tank.
- Move the machine always in vertical position.
- Undo the operations above when installing it in its final position and set it as a new start up.

Please, pay attention to dimensions and weights mentioned in section 2.3. Specifications.

Wheels are located to the inside of the base in order to prevent crushing the supports when moving the machine manually.

Storage of the machine must be done with the same original package to have it protected from dust and casual hits.

May any production stop be shorter than a month, the machine must be kept on and all ink circuits running. However, may it be longer, please, empty and clean all ink circuits, purge and clean print heads and keep the circuits running with solvent. In any case, please, request KERA*jet* technicians for suggestions on how to proceed depending on the characteristics of your machine.

Anywhere the machine may be located, always use its supports as that's the system designed for a suitable and stable condition. Please, bear in mind that it's heavy and big. Never use other supports than the original ones, as it may tilt or bring about unstable conditions that may affect operators' safety.

12. Emergency procedures and reset modes

May any anomalous condition or risky situation for the operators, the machine or the environment occur, please, proceed as follows:.

- Stop all moving parts of the machine.

A collision has happended, there's a risk of trapping or may any other dangerous condition happen:

- Press on emergency button.

Such device has to be distinguished from the SRA stop which does not stop the conveyor.

- Reset the machine.

Unlock all the emergency buttons and restore them to the operational position (out).

- Please, stop all ink systems quickly.

E.G., when there's an ink leakage.

- Press SRA button

Movements of the machine won't stop.

Please, bear in mind that if ink stops flowing through the print heads for long they may get irreversibly damaged.

Use this action only if strictly needed.

SRA buttons will disable all ink systems of the machine (all ink circuits). May you like to stop just one, please, do it from control panel.

- Reset the machine

Restart ink regulation of all of the circuits, one by one, from the control panel.

- An alarm has appeared in the control panel and the machine has gone blocked.

When there's an error in the machine, a message for the operator appears on the screen.

At the same time, the machine goes blocked and the emergency beacon goes on.

Operators must fix the issue and press OK to carry on production in a safe way.

There are two different kinds of messages:

- ERROR message. The machine goes blocked.

- ALARM message. The machine carries on working, but, warns the operator about some issued which has to be fixed at the earliest. Any movement is disabled until the situation is fixed.

E.G., when a door is opened while in operation, an alarm will be rised, but the machine won't stop printing, however, may the door still be opened when printing is finished, colour modules won't get back to rest position (till the doors are closed) as the moving system is disabled.

- Reset the machine

- Smoke or fire comes out from any part of the machine.

For low voltage equipment fires you must use CO_2 fire extinguishers.

13. Fine tuning and maintenance

Machine setting is made while in start up, as detailed previously. It must be carried out by KERA*jet* technicians at least, for the first time.

Whenever the wear of any mechanical component affects printing quality, it has to be replaced.

Please, make safe maintenance interventions:

1. Move the machine to a safe position. Turn off any power, elements in postion, etc.
2. Block the position. Make completely sure that the machine will not move during the maintenance intervention.
3. Check that the machine has been moved to a safe position. Check power supplies.
4. Make the intervention on the machine.
5. Check safety systems and make sure there's nobody around the machine. Remove locks.
6. Start-up of the machine

13.1. Corrective maintenance

For any anomaly or unexpected stop, please, call KERA*jet* technical support.

For Spain, information is:

Office timetable. (08:30 -13.30/15.30-18.30). Phone: 0034 964 010 150 Requests.

Out of office timetable, weekends and holidays. 24/7 service: +34 678 280 381.

Contact email address: sat@kerajet.com

In case of stop-warning and light beacon, please, check control panel section and tell KERA*jet* support what's the error message on the screen. A phone call might be enough to fix the issue.

Please, do not take any action in case you do not understand what's going on as you may put yourself at risk or some other people.

13.2. Preventive maintenance. General instructions

Please, follow suggestions from KERA*jet* support team regarding suitable maintenance. Good maintenance will make your machine last longer. Technicians know the exact features of your working environment, machine, kind of production, etc. They may train you about how to carry out tasks in a completely safe way for you and for your machine.

- Please, check visually after every shift and write down any anomaly.
- Use a wet cloth when cleaning (never use it soaked in solvent) while the machine is not running (never in the print head zone).
- Check that all safety devices work correctly (emergency buttons and doors open sensors).
- Keep level of the transfer fluid in the chiller in the middle of its capacity.
- Keep ink tank levels in the middle of their capacity.
- We suggest carrying out a general check of the machine by KERA*jet* technicians once per year at least.
- Keep mirrors and emitters of the tile detection and height barrier system clean and aligned.
- Check differential circuit breaker once per month.

- Wheels need no maintenance as they are not used at all. May it be required, please, apply some grease in the turning bearing. The axis wheel bearing is sealed.
- Supports. Please, check fixings and nut supports. There should be no loose element.
- PC, keyboard and touchscreen. Clean every certain time removing dust and spots.
- Hood springs. Do not need any greasing nor oiling.
- Please, make sure that operators understand the water wiper and replace cleaning water periodically. May it not be so, the device won't be efficient. Wiper use with dirty water may damage irreversibly the pump.
- Request persons in charge to make periodical visual inspections and check the machine and cleaning (these routines may prevent production stops in the future).
- Don't leave the machine unattended for long periods of time. Always keep trained operators in the KERA*jet* machine while it is running.
- Do not remove those sealed elements provided by KERA*jet* unless direct permission from KERA*jet* to do it. Please, contact KERA*jet* and request.
- Please, do not dismantle on your own any of the sealed parts such as pumps nor any other elements that are so provided by KERA*jet* unless direct permission is given. If not, KERA*jet* won't accept any warranty on those parts nor any damage on the machine.
- Colour modules must only be removed from their position when in maintenance operation by a KERA*jet* technician or authorised person in charge. Once tasks are finished, modules must be returned to their original position and fixed again. A position sensor enables/disables module operation.
- In order to extract colour modules, always make a "Print heads access" previously from control panel or they may get damaged.

13.3. Preventive maintenance for each element

- Colour modules movement

- Slides and guides. Please, check grease every 6 months. Lithium grease mineral oil based. You may grease the slide and the line guide from the slide grease input.

- Teeth gear. Grease manually with sticking grease for gears. Grease may be applied with a brush or sprayed, please, always check that there's enough grease. Start with weekly checks on grease statues and increase frequency depending on experience (as it depends on environmental conditions).

- Servomotor. Completely covered and self-refrigerated. Please, use life span as a reference for periodic maintenance. Beargins: 20.000 hours. Oil seal: 5.000 hours. Encoder: 30.000 hours. They may be replaced for fixing.

- Servodrive. Please, use life span as a reference for periodic maintenance. Aluminium electrolytic condensers: 28.000 hours. Fan: from 10.000 up to 30.000 hours. Current protection: Aprox. 20.000 operations. Aluminium electrolytic condensers suffer from deterioration even when the device is stored upowered.

- Endless gearboxes are lubricated for life with a long life high quality synthetic oil, poliglicol based. This makes them maintenance-free.

- Panel bearing support. No grease required.

- Proximity inductive sensors. Please, make the following checks every 6 months in order to ensure a stable sensor condition for a long time. 1. Check installation position, fixing, or performance of the proximity sensor and of the detectable parts. 2. Search for loose connectors and cables, incorrect contacts and line disruptions. 3. Check there's no metallic fragments nor dust. 4. Check that temperatures do not rise too much nor there are other anomalous environment conditions. 5. Check lighting of the indicators (for products with a operational indicator). Please, never open nor fix the sensor on your own.

- Print units

- Print units. Please, do not allow any handling in the print heads. KERA*jet* has specific cloths for a correct nozzle plate cleaning. This area is very sensitive and might get irreversibly damaged. May the print head make some lines when printing which can't be removed by manual cleaning, you should make a complete cleaning with solvents. KERA*jet* has designed a device to carry out this sort of cleaning in a very easy way.

- Main ink tanks

- Polyethylene main tank. Every month, please, check for leakage while cleaning tray operation is on. Pressure value is negative and any leakage will make the sponge print head cleaning be less efficient. May you detect this issue, look for external cracks. Depending on ink composition, ink gases may affect the tank.

- 5 microns filter. Filters can't be open as they are thermally sealed. Ink filters must be replaced in case of specific alarm or whenever meniscus and differential pressures are stable but pump % are too high.

- Peristaltic pump. Replacing peristaltic pipes every three months is highly suggested or whenever cracks or leakage (life span will depend on ink features). Motor life span 5000 hours aproximatly. Never use soaps nor abrasive products when cleaning outside cover of the machine. Please, only use a wet cloth and neutral soap. May any splash of a reactive or corrosive product get the machine, clean it immediately with a wet cloth.

- Stirrer. No need to grease. Every year, please, check inside the stirrer and turbine so they are kept clean and free of solids.

- Suction. Keep outlet clean. Check every 3 months.

■ Electric panels and elements

- Light and noise beacon. Run it from time to time (six months) to check noise and lights.

- Cable chain. It's maintenance free, no need to grease and, practically, it has no erosion. It might long 10 million double courses.

- Proximity inductive sensors. Hood and doors. Check as follows every 6 months to ensure a long and stable operation of the sensor. 1. Check installation position, fixing, or performance of the proximity sensor and of the detectable parts. 2. Search for loose connectors and cables, incorrect contacts and line disruptions. 3. Check there's no metallic fragments nor dust. 4. Check that temperatures do not rise too much nor there are other anomalous environment conditions. 5. Check lighting of the indicators (for products with a operational indicator). Please, never open nor fix the sensor on your own.

- Power supply. Occasionally small electric discharges may happen, burns of product failures. Please, do not dismatle, modify, fix nor touch inside of it. Remove all power supply cables connected to the mother board.

- Fan. Please, check filter cleaning and fan operation. Depending on the amount of dust in the environment, you must check the filter more frequently; we suggest making a check after 2000 working hours and have it replaced if required. The fan is maintenance free; life span is no les than 40.000 use (L10, 40°C). Therefore, filter fan is almost maintenance free. Components may be cleaned from time to time, depending on cleaning conditions, using a vacuum or compressed air.

- PLC. Life span of the battery is 5 years at 25ºC, approximately.

- Infrared temperature sensor. Dust and dirt on the lens and scratched lens may bring about incorrect value acquisitions. When lens is dirty, remove dirt with a blowing device designed for lens cleaning or any other suitable device. May it not be possible to remove dirt by blowing, please, clean the lens softly with a wet cotton stick or a lens cleaning cloth wet with ethilic alcohol. Please, start with monthly controls and increase them depending on how you find lens cleaning.

■ Tile detection system and maximum height barrier

- Laser sensor. Please, always switch off power supply before setting or connecting/disconnecting it. Do not use solvents, nor similar products when cleaning the emitter. May any dust particles get stuck to the front of the emiter, please, use the same brushing blower as that of the camera lens. Do not blow dirt or dust with your mouth. When removing dirt or dust particles, clean it softly with a cloth (as those for lens) wet in alcohol. Do not clean too vigorously. Scratches in the filter might bring about acquisition mistakes. Please, check it every 6 months.

- Amplifier. Please, always keep protecting cover in its place when the amplifier is being used, may it not be so it may work incorrectly. Do not use solvents when cleaning. Please, clean it softly with a cloth wet in alcohol. Check it every 6 months.

■ Active ink system

- PT-100 temperature probe. Screwed and washer. Maintenance free device. Please, check acquisition mistakes every 24 months. May they occur, calibrate or have the probe replaced.

- 5 microns filter. The filter and the structure are thermally welded, can't be dismantled. Filters can't be open as they are thermally sealed. Ink filters must be replaced in case of specific alarm or whenever meniscus and differential pressures are stable but pump % are too high.

- Level sensor. Every year dismantle and remove solid ink depositions. Do not use chlorine based solvents. Do not tight nut too much.

- Gear pump. They are sealed and leak proof. Thanks to its magnetic coupling, it does not need mechanic seal. It works for long periods without any spare replacement required.

- Pressure sensor. They are maintenance free. We suggest calibrating them every year. Frontal membrane mustn't get deformed under any circumstance, even contacting it with your fingers may deform it too much. Never insert any item in the pressure hole. Do not jet any liquid on the membrane.

■ Chiller

- Maintenance of this device has to be carried out according to the specifications of its own manual.

- Electrovalves of the recirculation circuits. They must be set on at least once per month to prevent operational failures. Inspection of these valves is required every 6 months to check operation and cleaning.

■ Pneumatic circuit

- Maintenance pneumatic unit. Whenever condensed level reaches up to 10 mm below filtering part, please, open purging screw turning anticlokwise (bottom view orientation). Replace filtering cylinder when low flow is observed even when pressure setting remains unchanged.

Remove air from the device. Turn filter cylinder anticlockwise and remove the used filtering spare. Insert the new one in the cylinder and screw it by hand. Tight filter cylinder. Reset the device.

Clean the external side of the device with a soft cloth if required. The best cleaning products are soapy water (máx.+60 °C) petroleum ether (free from aromatic elements).

A good compressed air quality make pneumatic elements last longer.

Please, check thoroughly leaks in the pneumatic circuit, mainly in connectors, joints, extensions, pneumatic actuators, valves, filters, pressure gauges, etc.

Valves and electrovalves are maintenance free.

n Cleaning system

- Pneumatic actuator. May it be required, please, clean the cylinder with a soft cloth. Do not use any abrasive cleaner. On the other hand, cylinders are maintenance free as they are greased for life. Please, do not remove the grease on the shaft as you may shorten their life span.

- Centrifugal fan. Before handling the fan, please, make sure it isn't powered and that nobody may turn it on while you are working on it. Please, check the device periodically. Inspection frequency will depend on working conditions so no dirt gets on propeller, turbine, motor nor grid that would bring about hazards and would shorten life span of the device. When cleaning, please, take great care the propeller nor the turbine get unbalanced.

- Filter. Purge it every shift. In the bottom of the filter there are two valves which have to be open periodically while the fan is off, in order to remove dried and condensed inks from inside. Please, check sealants for leaks.

- Cleaning trays. Depending on production, temperature and type of material condensed water or ink may appear on the tray that may bring about production losses may drops fall on the tiles. Please, clean trays frequently to prevent this production loss. The internal side of the trays is equipped with a waste output that is purging continuously. Please, clean it whenever dirt and ink accumulation is observed.

- Cleaning sponge and support. Replace whenever clogged or deformed.

- Suction hopper supporting wheels. Bearing inside is greased for life and can't be greased again.

◙ Conveyor

- Servomotor. Completely closed and self-refrigerated. Please, use life span as a reference for periodical maintenance. Bearings: 20.000 hours. Oil sealant: 5.000 hours. Encoder: 30.000 hours. They may be replaced for fixing.

- Servodrive. Please, use life span as a reference for periodical maintenance. Aluminium electrolytic condenser: 28.000 hours. Axial fan: from 10.000 up to 30.000 hours. Current protection: Aprox. 20.000 operations. Aluminium electrolytic condensers deteriorate even while Servodrive is unused.

- Planetary gear. Patent pending sealing system, Titanium carbonitride covered surface (TiCN) that prevents leaks and increase life span above 30.000 hours. Grease with synthetic grease Nyogel792D for a soft operation, leak free sealed meeting IP65 grade and maintenance free.

- Conveyor band. Please, check wiper for a correct cleaning. Check sides in case there's any friction with a metallic part wearing them down. Check connection visually. Inside face of the conveyor has to be kept clean as well.

- Drums. Suface has to be kept clean to prevent conveyor pulling discontinuities.

- Bearing support. Lithic based bearing grease. Please, grease every 2.000 hours.

- Return roller. Bearings are greased for life with lithic based grease, water repellent, that ensure greasing for roller life span. Please, keep clean to prevent discontinuities in conveyor pulling and frame misaligment.

- Conveyor tensioning. Please, check conveyor tension when hot/cold seasons begin. Because of expansions in the conveyor frame, the band may get loose and, therefore, affect print or get too tighten and produce mechanic deformations.

- Silentblock. May any deformation or crack, please, replace them.

◙ Wiper

- Guided cylinder. Please, check actuation every 6 months to ensure correct operation. Check external damage, air leakage, or violent operation, and, if required, have it replaced. May you defect dry grease in the shaft, please, clean it with a soft cloth. In case of unbalanced operation, please, restrict output from strangling valves. Check guiding shafts and bearings regularly to ensure that they work correctly in the environmental conditions. In case of notches in the shaft, guiding quality of the bearing performance or noise increase, please, replace cylinder.

- Slide. No need for greasing and under normal circumstances. Please, replace them when worn.

- Rail. Please, do not grease, remove dust with a soft cloth. Rails need no greasing nor maintenance, as with slides.

- Pump. No need for greasing. Please, check annually that stirrers and turbine are kept clean and incrustation free.

- Polyethylene tank. Please, clean wiper tank at the end of every shift.

- Tank sieve. Please, clean it along with the polyethylene tank.

- Wiper. Please, replace wiper whenever cleaning is not correct. You may use its 4 edges (turning it around).

- Wiper hopper. Please, clean wiper edge, jet collector and box inside every shift depending on needs.

◙ Tile centraliser

- Line bearing and guides. Please, keep guides clean and greased. As there aren't so many movements to do, greasing might be for life. May it be required, you can grease the bearings from the inside as both sides are sealed.

- Cone rollers. Please, check that they roll when softly touched, each screwed shaft must be tighten accordingly. Keep clean so tiles are centered correctly.

- Clamp profile. Please, check wear in order to correct line bearing position so they keep on centering tile to be printed in a proper way. Whenever wear is too much, have it replaced.

◙ UPS

Any maintenance or repair must be carried out exclusively by authorised technicians. In the UPS, there aren't any part which may be fixed by the operator. Please, keep the UPS free from dust. May the enviroment be very dusty, please, use a vacuum cleaner. When the battery alarm is displayed on the screen, please, remove them. Please, take into account every warning, precaution measurements and notice before replacing batteries.

13.4 Tasks to be carried out by the operator

- Cabinet general cleaning
- Suck dust around the machine. Please, do not blow it.
- Please, check fans in the line are all on.
- Check that temperature in the cabinet is between 27°C and 30°C
- Please, check that average tile temperature at the machine entry is lower than 50° to prevent condensation issues.
- Check that suction hoppers under the cleaning trays have no leakages.
- Check that ink tank levels are between 5 lit. and 10 lit.
- Check that wiper water is clean, may it not be so, please, replace it.
- Check that wiper and its box are clean.
- Confirm that wiper is performing well on the band.
- When in bypass, please, turn on suction to remove heat from the inside of the machine.
- Check that the suction motor is on.
- Confirm that pneumatic pressure gauge is between 5 and 6 bars. When in purge, pressure should drop down to 4 bars but no more.
- Check that chiller is on and that transfer liquid is correct.
- Check band status.
- Empty suction filter every shift.
- Check that suction is doing well in the sponge supports.
- Check sponge cleaning and maintenance.
- Check that print head automatic cleaning is carried out according to settings.
- Check that tile detecting and height barrier photocells are clean. Check that amplifiers' reading values are greater than 500, if not, please, clean mirrors with a dry cloth or paper.
- Confirm that ink tank stirring is carried out according to settings.
- Check that secondary tanks are having enough ink from "ink levels" menu.
- Check that IN and OUT pump % are lower than 45% and that difference between them is lower than 15%.
- Please, write down pump working %. In case IN pump % is too high from its normal working value, it may mean that the filter is getting clogged. In case OUT pump % is too high from its normal working value, it may mean that there's an air leakage. Please check the person in charge of maintenance.
- Check that all inks are working fine from "Ink/Status" menu.
- Check that ink temperatures are +/- 1,5 °C from settings.
- Check that meniscus and differential ink pressures are steady (while in printing, maximum change should be +/- 5 mbar and in rest +/- 1 mbar).
- Check that card communications are ok (from ConfigCA--> make a read).
- Please, check that printing height is no more than 2 mm above maximum tile thickness.
- Check centralising and alignment. May they not be right, please, centre and align accordingly. Take once per month, a print head and overlap backup.
- Please, print a nozzles test tile to check whether there are printing flaws in the running product. May any print head affect production, please, contact the person in charge of maintenance, if not, keep it recirculating.

These operations must be carried out on regularly depending on production in the machine to ensure a correct performance.

14. Problem solving

Next, some issues that might be found when in production are described. Please, take into great account that in case the operator is not familiar with the suggested maintenance operations, does not have the required spares or is not suitably trained, he has to contact KERA*jet* before carrying out any intervention in the machine.

ISSUE	LIKELY REASON	SUGGESTION	ACTION
1. Print defects. Lines are detected.	1. Ink is cold.	1. Identify which is the module and circuit of the issue. 2. Check heating circuit of the secondary tank. 3. Check that displayed value is real	1. Ensure heating circuit performance in the secondary ink tank. 2. Ensure circuit valve is open. 3. Raise individual circuit temperature and wait. 4. Print a test file and check if the problem is still present.
2. Print defects. Overlaps.	1. Configuration.	1. Check whether the line is between two print heads.	1. Check overlaps from the "Carga" software
3. Print defects. Line in the middle of the print head.	1. Ink recirculation.	1. Ink circuit.	1. Purge ink circuit by reversing ink flow for 30 seconds and return to initial direction. 2. Raise print head RANK 3 points. 3. May it not work, proceed to issue 5.
4. Print defect. Different tones.	1. Tone is different between two print heads. 2. Tone is different in one part of the print head.	1. Check that print head temperatures are the same or very similar. 2. Print head sector voltages (PTRIMS).	1. Set RANK voltages. 2. Set print head sector voltages (PTRIMS). 3. Call KERA*jet* support.
5. Defects clearly seen on the design.	1. Dirty or damaged print heads.	1. Flush solvent through the print head with a syringe.	1. Call KERA*jet* support. 2. Replace print head.
6. Print unit is inactive and does not communicate nor print.	1. Control card failure. 2. Cable failure. 3. Switch failure. 4. IP configuration does not match the gap in the bar.	1. Check communication with card. Orange ON led 2. Check Ethernet cable. Exchange it with a working cable. 3. Change switch port of the cable, then check again. 4. Configuration.	1. Restart print head by disconnecting power and ethernet cables and having them connected again. 2. Make sure that print heads are selected from CARGA software. 3. Load image again. 4. Replace card by dismantling print head. 5. Contact KERA*jet* support.
7. One of the colours is not printing.	1. Ink circuit failure.	1. Ink circuits are open. 2. Ink expiry date. 3. SRA system is on. 4. Ink working temperature is correct. 5. Voltage values.	1. May all be ok, please, contact KERA*jet* support.
8. One of the main pumps goes off.	1. Check pump with issue. 2. Air is getting into the circuit. 3. Broken pump.	1. Check that all input and output connectors are correctly installed.	1. Check connectors. 2. At "Inks", select ink circuit, empty it and try to regulate the SRA system. 3. Please, contact KERA*jet*. 4. Replace pump.
9. Ink dropping.	1. Print head pressure is too positive.	1. Check values.	1. Set meniscus pressure from control panel.
10. Print heads run out of ink.	1.Print head pressure is too negative.	1. Check values.	1. Set meniscus pressure from control panel.

ISSUE	LIKELY REASON	SUGGESTION	ACTION
11. Pump system comes to a stop.	1. Air gets into the system. 2. Pressure sensors do not work correctly.	1. Check all pipes and pump connectors are correctly set and air is not getting into the system. 2. Check sensors' operation.	1. Remove all pressure sensor input pipes (calibrate in open air) and installed them back again. 2. Call KERA*jet* support.
12. Operator increases/decreases ink temperature of a bar but there's no change.	1. PLC is giving no answer. 2. Chiller neither heats nor cools down.	1. Chiller. 2. Transfer liquid recirculation circuits. 3. Check valve opening. 4. Check parameter settings.	1. Restart PLC from circuit breaker. (Check electric diagram)
13. The machine does not detect any tile.	1. Laser emitter and mirror are misaligned. 2. Laser emitter or mirror have decreased performance.	1. Dirt or laser alignment. 2. Locate amplifier at the back of the machine.	1. Clean mirror with tissue. DO NOT use any solvent. 2. Align emitter and mirror. Do not stare at the laser beam as it may damage your eyes. 3. May the issue not get fixed after restarting the machine, please, replace mirror. You may find a spare one in the kit that came along with the machine. 4. May emitter or mirror decrease performance, please, replace them.
14. Maximum height alarm.	1. Tile is thicker in one the areas than maximum height settings. 2. Mirror is dirty or misaligned with emitter. 3. Laser emitter or mirror have decreased performance.	1. Dirt or laser alignment. 2. Locate amplifier at the back of the machine.	1. Clean mirror with tissue. DO NOT use any solvent. 2. Align emitter and mirror. Do not stare at the laser beam as it may damage your eyes. 3. May the issue not get fixed after restarting the machine, please, replace mirror. You may find a spare one in the kit that came along with the machine. 4. May emitter or mirror decrease performance, please, replace them.
15. SRA stop. Stop of the recirculation and control system of a circuit.	1. Ink leakage somewhere in the circuit. 2. Failure in any component of the circuit.	1. From control panel, select Inks/Pressures and pumps. Meniscus pressure values have to be negative (concrete values depend on type of print head). Differential pressure should be around 100 mbar. Values should be steady. Pump %'s, shouldn't be above 25% and almost the same.	1. From main console access Inks/Regulate and press on empty. Once this process is finished, press on regulate again. Access from main console Inks/Pressures to monitor the process. May it come to a stop again, please, check that there's no ink leakage somewhere. When purging the circuit, we suggest opening 2 print head taps when the regulation is being carried out.
16. Water in the wiper is not working.	1. Sensors are not aligned and the pump won't start unless wiper is detected up. 2. Jets are clogged. 3. Pump is not working.	1. Check pneumatic actuator position sensors.	1. Set correctly pneumatic actuator position sensors.
17. Printing misalignments are detected when printing.	1. Printing misalignments.	1. Check printing settings.	1. Printing delays and overlaps have to be set.

Support procedure

May you detect any issue in the machine, please, FOLLOW SUGGESTED STEPS IN THIS TABLE:.

	PASOS A SEGUIR	DONDE MIRAR
1	Try to shorten the issue.	Element / System / Symptom
2	Warn the press if the machine is blocked or you need to stop.	Compenser / Press gap
3	Stop the machine from control panel. May any error message appear, please, fix it before pressing on OK (reset). Contact KERA*jet* in case you're not sure or you don't know how to fix the issure.	Control panel
4	Turn off the PC (close before all the programs) and switch off the machine.	
5	Restart PC and machine.	
6	Check whether the issue is still present.	Element / System / Symptom
7	Before calling technical support: - Try to explain what's happening in your machine in a short explanation. - Try to identify accurately what elements or systems might be bringing about the issue. Please, write down the following values: - Serial number of the machine, type of print head and printing mode. - Error message displayed on the control panel. - Print head temperature and ink systems. - Chiller temperature. YOU DO NOT NEED TO OPEN THE HOOD NOR PANELS TO CHECK ALL THIS DATA, NOR MANIPULATE IN THE TILE ENTRY/OUTPUT.	Read print head data at ConfigCA
8	Please, contact KERA*jet* and report all the data.	Direct phone 0034 964 010 150 Email: sat@kerajet.com

Remote support

KERA*jet* technical staff can get connected to the machine remotedly to control the machine or in case of any event on it.

The Teamviewer remote access and support freeware software is used.

This piece of software is already installed in the PC.

A good quality connection to the internet is required.

15. Noise emissions

In this machine noise emissions come from the electric motors of the colour modules and conveyor, pumps in the circuits and the gears of the systems. There's also a pneumatic circuit which moves the wiper, cleaning trays and suction. Electronics emit typical buzz of any electric equipment.

All these elements emit very low noise, so there's no need to take any special protection for operators.

The suction system is equipped with a centrifugal fan that has a 74dB(A) noise level when working at 2800 rpm (according to the manufacturer). Impeller blades are positioned forward, dynamically balanced according to ISO 1940 norm, to reduce noise and prevent vibrations. Depending on the amount and type of print heads a bigger fan may be installed but with a similar noise level.

Suction capacity is controlled from a driver that controls fan speed. Usually, it works slower than 2800 rpm so noise emission is lower than 74 dB(A).

Filtering system must be installed out of the cabinet so noise emissions should be set according to customer's requirements.

May the customer provide a powerful enough suction installation we might avoid this noise emission.

In the production lines where digital printing machines are installed, there are other louder equipments than KERA*jet* S7, such as transportation and material transformation/application machines.

16. Waste management

- Please, follow waste management instructions from the ink supplier.
- Once the machine will be discarded at the end of its life span, please, follow waste management regulations.
- This machine can't be treated as home waste. Handing it on to a regulated and registered waste managing company is compulsory.
- For any further information regarding recycling, waste treatment or discarding of this product, please, contact your local authorities or an authorised dealer.
- Please, check regulations and laws concerned.

17. Spare parts

17.1. Spare parts involved in oporational safety

- Elements in the machine involved in operator's health and safety are:

- Ink suction system.
- Conveyor covers, one at the front and two at the back.
- Ink "backpack" system electronics cover
- Hood
- Warning sign tags.
- Power supply connector covers.

All these elements are very robust and they shouldn't fail when in operation or misuse.

- Electric safety equipments in the panels are:

- Redundant safety relay
- Differential circuit breaker to prevent from indirect contacts
- Main switch
- Inductive sensors installed in the doors of the back panels and hood, which inhibit module and clean tray movements when activated.
- Emergency buttons, three at the front and two at the back, in the inside of the machine, two more and other two for the ink system.

- Suggested spare parts:

- Emergency button
- Two proximity sensors
- Warning signal tags

17.2. Suggested spares

Depending on the kind and amount of print heads in the machine you may be interested in a certain amount of spare. KERA*jet* technicians will suggest about amount and kind of the following spares.

Apart from those described in Section 2, we'd like to include:

- Several components:

KJ12452	TRAPPING WARNING TAG
KJ16877	VOLTAGE WARNING TAG 35mmx31mm
KJ16943	PRO BASIC 2 COLOURIMETER
KJ18318	TRANSPARENT POLYAMIDE TUBE PA126 HF 2,5x4
KJ18319	TRANSPARENT POLYAMIDE TUBE PA126 HF 4x6
KJ18320	TRANSPARENT POLYAMIDE TUBE PA126 HF 8x10
KJ18363	TRANSPARENT POLYAMIDE PA126 HF 6x8
KJ18364	TRANSPARETN POLYAMIDE PA126 HF 10x12

« Electric components:

KJ10012	COMPLETE ETHERNET SWITCH 8P
KJ10537	POWER SUPPLY 100 - 240VCA 5VDC 2,8A
KJ10541	PLC MODULE 16 INPUT 24Vc
KJ10574	TEMPERATURE PROBE PT-100
KJ11229	POWER SUPPLY 1000W 21A E:220V S:48V
KJ11857	PLC MODULE ANALOGIC INPUTS
KJ12120	EMERGENCY STOP
KJ12147	PLC MODULE 16 DIGITAL OUTPUTS PNP
KJ12468	CABLE M12 5M
KJ13674	NPN INDUCTIVE SENSOR
KJ14161	SPINDLE SENSOR
KJ14695	CABLE RJ45 STANDAR 2 m GRAY
KJ16799	INFRARED TEMPERATURE SENSOR
KJ16920	FAST INPUT/OUTPUT PLC MODULE
KJ16930	CABLE RJ45 550 mm
KJ16951	CABLE RJ45 GRAY 1,15 mt
KJ17582	CABLE RJ45 5,5 m
KJ17584	CABLE RJ45 7,5 m
KJ17657	SOLID STATE RELAY
KJ17779	PLC CONTROL MODULE
KJ18293	POWER SUPPLY 480W/24V/20A
KJ18528	POWER SUPPLY 24048
KJ19496	SD 05 MULTI TRIGGER BOARD SET
KJ20380	POWER SUPPLY- Reg. 35V
KJ20418	POWER SUPPLY 2000W 42 AMP E:220V S:48V
KJ21820	POWER SUPPLY 2000-24
KJ22833	SG SWITCH

All the elements in this manual might change their location in the machine.
PLEASE, KEEP THIS MANUAL FOR ANY FUTURE ENQUIRY.
ALTERING THIS MANUAL OR ANY PART OF IT IS COMPLETELY PROHIBITED.

KERA*jet*, S.A.

KERA*jet* B7

Instructions manual

MB7. Rev: 160720

Instructions manual in English.

This chiller has been designed and developed by KERA*jet* in order to keep steady ink temperatures and cool down printing unit cards in the machines. For all the development, manufacturing, transport, start-up and final retirement procedures all safety regulations have been observed.

Instructions for the operation of this piece of equipment have to be at hands reach near its location and have to be read and well known by every operator working with it.

Apart from operational instructions and the ruling and compulsory safety norms, all the legal requirements and laws in the final destination country have to be observed.

The present set of instructions are only valid for the refered equipment. This device NEVER has to be started up without thoroughly reading the instructions manual and without having understood how it works.

PLEASE, READ THIS MANUAL CAREFULLY.

FOLLOW KERA*jet* INSTRUCTIONS AT ANY MOMENT.

DO NOT START THE DEVICE UP ON YOUR OWN OR WITHOUT DIRECT CONSENT OF A KERA*jet* TECHNICIAN.

Manufacturer

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P.O. Box 446. 12540 Vila-real (Castellón) España.
Tlf. +34 964 500 018
www.kerajet.com e-mail:kerajet@kerajet.com

Technical support ACS +34 964 010 150.
For any emergency out of working time, please call: +34 678 280 381.
Technical requests: sat@kerajet.com

Equipment description

Equipment: KERA*jet* B7

Serial Number: .....

SUMMARY

1. Equipment description

1.1. Basic concepts

The KERA*jet* 87 chiller, provided along with a KERA*jet* machine, heats up/cools down inks and refrigerates printing unit cards.

From KERA*jet* software parameters, technicians may configure temperatures individually for every ink circuit during start up, so different requirements depending on ink supplier requirements are met according to their intrinsic features. A sensor for each of the inks sends back to PLC the running temperature.

It comprises two different circuits:

- Cooling system supported by a refrigerator. It's used to cool down printing unit cards and inks.
- Heating system supported by an electric resistor and a kettle. It may bring ink temperature up to 46°C.

Cooling circuit.

The heat removing system of the print unit cards comprises a refrigerated liquid which connects the chiller with the supports of the cards of each ink module. This circuit is continuously working and connected to those cooling required supports.

This circuit is also connected to the electrovalves that cool inks down.

Cooling is achieved by a refrigerating circuit

From KERA*jet* software, technician may set working temperature, which is 30° C normally.

There's a safety thermostat set to 0° C in the cooling circuit.

Heating circuit.

The ink heating system comprises a liquid filled circuit that connects the chiller with the secondary ink tanks of the printing machine.

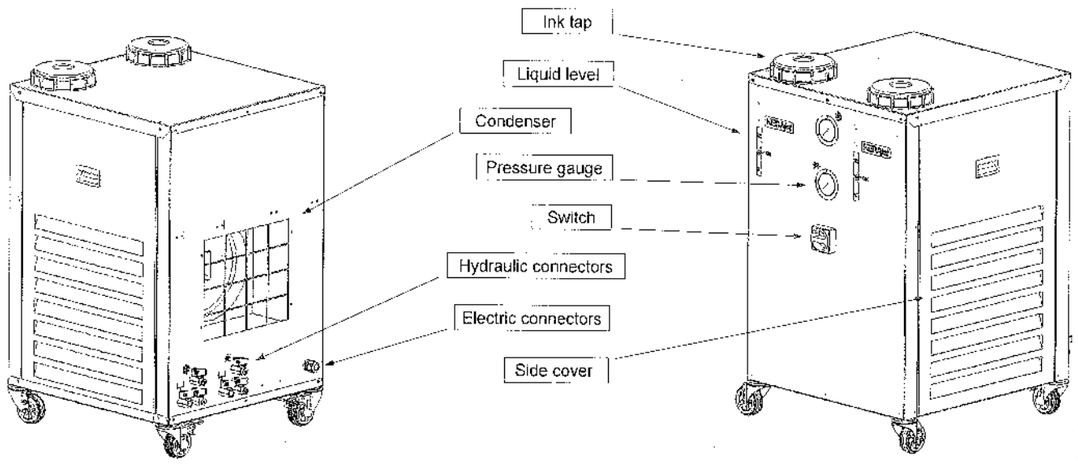
This circuit is continuously working.

Liquid temperature is controlled by the KERA*jet* software installed in the machine. It's normally set to 55° C

There's a safety thermostat set to 75°C.

On the back of the printing machine, there's a recirculation circuit that is connected to the electrovalves that control the liquid flow to each of the secondary tanks.

Every ink circuit has a temperature sensor which sends the signal back to the PLC controlling the electrovalves that will be opened or closed accordingly.



1.2. Specifications

- Main features:
  - Operational temperature range: 20 - 60 ° C
  - Cooling gas: R134a. Amount of cooling gas: 0,25 kg
  - Cooling circuit pressure: 1,5 - 2 bar
  - Liquid volume: 2 tanks, 5 litres each
  - Cooling power: 1863 W. Heating power: 1500 W
- Operational requirements:
  - Input power: 400 V 3P+N+Earth. Frecuency: 50-60 Hz
  - Nominal power: 3,5 kVA
  - Optimal operational conditions: 25°C-35°C. Moisture: 30-80%
- Maximum weight, liquid excluded: 80kg.
- Maximum dimensions: 627mm width, 602mm depth and 998mm height.

1.3. Cooling circuit operation

The chiller cools down the liquid in a refrigerating system.

The cooling gas is R134a.

The condensing assistant method is a heat exchanger provided with a fan.

The liquid to be refrigerated is the circuit liquid.

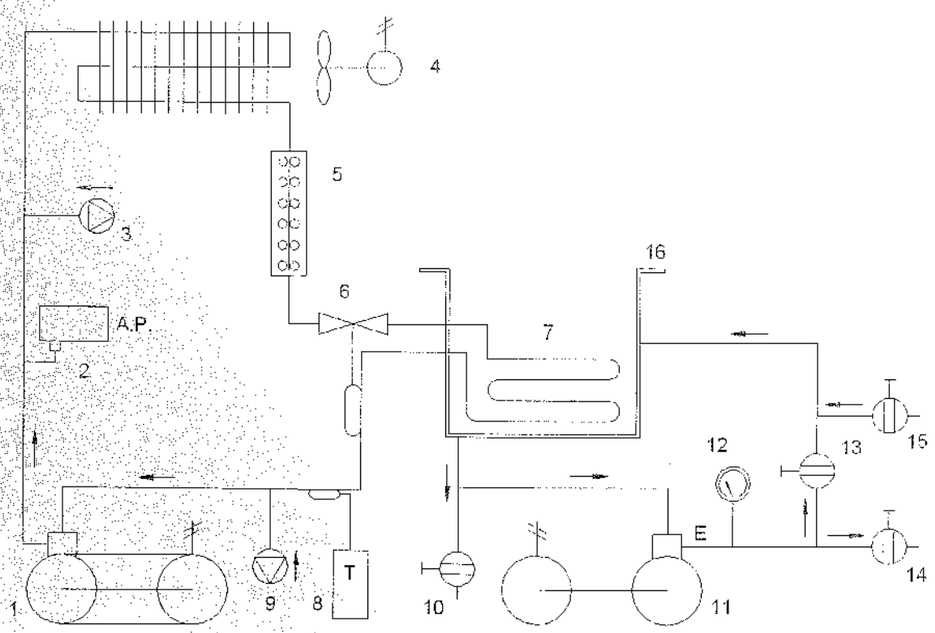
The evaporator is a metallic coil filled with refrigerating gas located inside the liquid tank.

The liquid is propelled to the main circuit in the printing machine by a pump. In a S7 machine, the circuit comprises the ink collectors and the electronic card supports.

The recirculation circuit keeps the temperature set from the PLC steadily by connecting/disconnecting the refrigerating circuit.

A safety thermostat set to 0° C keeps a low limit for temperature.

Diagram of the cooling and refrigerating circuits:



1.- Single phase hermetic compressor set.
2.- High pressure switch
3.- High pressure inspection valve.
4.- Air fan cooled condenser.
5.- Dryer.
6.- Thermostatic expansion valve.
7.- Submerged evaporator.
8.- Thermostat, Tmin. 0ºC.
9.- Low pressure inspection valve.
10.- Manual emptying valve.
11.- Direct coupling pump.
12.- Low pressure gauge.
13 - Manual diversion valve.
14.- Manual forward valve.
15.- Manual return valve.
16.- Liquid tank

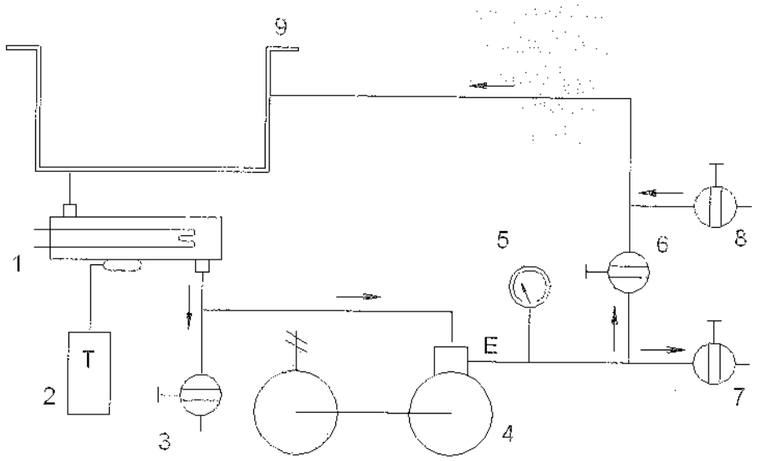
1.4. Heating circuit operation

Liquid is propelled by a pump in a recirculation circuit to the components of the equipment to be heated up. In a KERA*jet* B7 machine, these are the secondary ink tanks.

The liquid is heated by an electric resistor. The recirculation circuit keeps the temperature set from the PLC by connecting/disconnecting that resistor.

A safety thermostat limits top circuit temperature at 75ºC.

Heating circuit diagram:



1.- Electric heater
2.- Built-in thermostat, Tmáx. 75ºC.
3.- Manual emptying valve.
4.- Direct coupling pump.
5.- Low pressure gauge.
6- Manual diversion valve.
7.- Manual forward valve.
8.- Manual return valve.
9.- Liquid tank.

1.5. Electric board

Regulation and control is made by the machine PLC.

The KERA*jet* B7 electric diagram may be found in appendix I.

2. Operation description

The KERA*jet* B7 chiller heats up/cools down inks and refrigerates the printing unit cards.

It can only be used with KERA*jet* machine as the control system is provided by the main machine PLC. Hydraulic and electric connections must be done to a KERA*jet* machine.

3. Installation instructions

The KERA*jet* B7 device is completely finished when supplied to customers.

Only hydraulic and electric connections to the main machine are required.

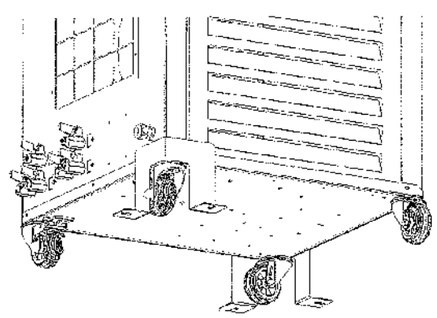
There's no specific instruction for noise and vibration reduction during installation.

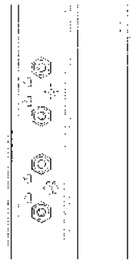
Installing the device in a ventilated and mild area is vital for a correct operation so a good refrigeration condition may be achieved.

Environment should be as dust free as possible so the condensor remains clean and, therefore, effective.

During transportation, anchoring supports may be used to have the device fixed to the box.

Floor anchoring and machine connectors:





4. Start-up and operation

Location, installation and start-up of the device will be made under KERA*jet* supervision.

THERE'S A FOLDER IN THE PC OF THE MACHINE THAT HOLDS THE TECHNICAL SHEETS FILES AND SOME OTHER INTERESTING INFORMATION:

C://COMPUTER/KERAJET/SOFTWARE/TECHNICAL SUPPORT/MANUALS

Steps to be followed during start-up:

- The start-up of the equipment, it must be at rest and upright a minimum of 6 hours.
- Make sure input, output and emptying taps are closed.
- Open diversion tap completely. The main aim of this valve is setting a minimum recirculation flow to protect the mechanic seal of the pump.
- Fill the liquid tank up to the right level.
- Fill the pump from the tap installed on it designed for this purpose.
- Connect the equipment to the KERA*jet* machine, both electric and hydraulic, taking great care in liquid flow direction to prevent electrovalves from stop working. Keeping its power switch off is very important so the chiller does not start working unexpectedly.
- Check manually that the pump rotates easily from the back fan blades. Sometimes, it might take a small effort in the beginning and even some **SOFT** strokes on the front side may be required. This block in the pump may come when it has been unused for long.
- Power up the equipment and check that the pump is working correctly by observing whether the liquid is flowing back into the main tank.
- Set diversion valve manually until gauge indicates 2 bar pressure. Under this condition, a small recirculation flow should be observed in the main tank.

- Open taps on the back of the equipment so liquid will flow into the KERA*jet* machine.

Liquid level should be checked by operator and, if needed, more liquid provided by KERA*jet* should be added from the tap on the top of the tank. Level may be checked from the peephole on the front of the chiller.

There's a pressure gauge for each recirculation circuit. The pressure valve has to be kept between 1,5 and 2 bars for normal operation. Inside the chiller, diversion valves should not be closed completely in order to ensure some recirculation flow in the pumps.

Make sure that:

- May fan stop working, chiller will lose efficiency very quickly. Contact KERA*jet* technical support service in this case. Blow the fan periodically. Please, prevent dust from settling on the blades of the heat exchanger fan.
- May the tank run out of liquid, the equipment will not cool down cards, so they will start malfunctioning and ink temperatures will get out of control. Please, check the device for leakages.
- Use exclusively KERA*jet* liquid as any other liquid may bring about efficiency losses from oxidifications in the circuit. Never use distilled or tap water.
- During installation, pipe connections between chiller and the main machine should be carried out properly. Both equipments have input and output signs. Please, check images.
- Liquid level has to be kept at the correct level shown on the side of the chiller. Too much of it would mean slow temperature control, on the other hand, too much would bring about serious and irreversible pump failure.
- May you need to close chiller valves, please, switch power off before. Even with diversion valve set properly, if power is not cut, major damage could be made in the pump in the long run if valves are closed.
- Recirculation pumps should never work without any liquid.
- The KERAjet B7 chiller should always be on in order to maintain ink temperatures and refrigerate printing units' cards.

5. Operator's training

During start-up and later settings, KERA*jet* staff will train the operators appointed by the customer as machine users.

This manual will be used as paperwork for operator's training.

Special attention is required for safety systems in the machine it's connected to and for unexpected hazards.

6. Safety instructions

KERA*jet* guarantees that its equipments are designed and manufactured attending to safety regulations and that it applies a continuous hazard reduction policy for the operation of them for all of their expected life cycle, including transportation, installation, start-up, operation, maintenance, discard and uninstallation.

KERA*jet* eagerly uses the information collected from the documents issued by safety involved authorities and applies it on the manufactured equipments.

6.1. General safety instructions

Find below the general safety measurements that have to be compulsory applied when operating KERA*jet* B7 equipments.

In general, please, use the equipment in an adequate way and wear the required personal protective equipment.

- Electric risk, please, keep the equipment closed and do not insert any object nor try to dismantle any element.
- Do not remove the covers nor disable any safety component. Always keep side covers on.
- During maintenance operations, it's compulsory required wearing personal protective equipment (gloves, goggles, safety shoes, etc.).
- Please, keep this manual nearby the equipment as an enquiry document.
- Do not insert any object in any of the slots or joints of the equipment.
- Do not lean on the equipment.
- Do not leave any load on the equipment.
- Do not water the equipment. Do not hose it.
- Do not clean or dismantle any part while in operation.
- Risk of fire. Do not pour any water, oil or any other substance on the equipment.
- Do not start the equipment if safety components have been altered or disabled.
- Take care during unloading and installation as it's a heavy piece of equipment.

- When in operation, do not leave the equipment unattended for long periods of time.
- Keep a fire extinguisher nearby the equipment. For electric fire in low voltage equipments use a CO_2 fire extinguisher.
- Keep equipments in good cleaning conditions to prevent slip accidents.

6.2. Specific safety instructions

Any safety risk from operating the equipment has been reduced as far as possible by KERA*jet* in order to do so, safety precautions have been taken into great account from design and manufacturing by introducing the required protective measurements and by using harmless products and materials for operators in contact with the equipment.

Please, find below a list of important suggestions and safety rules which are needed for a correct equipment operation:

- KERA*jet* B7 chiller has to be operated exclusively by authorised personnel who's been trained by KERA*jet* technicians. Please, use it only for its original purpose.
- The equipment can only start operating after installation and start-up by KERA*jet* technicians and personnel had been properly trained.
- The cooling circuit can only be maintained by certified technicians according to the European Parliament UE nº 517/2014 norm and to the 16/04/2014 rule for greenhouse fluorinated gases.
- The equipment contains Greenhouse Fluorinated Gases (GFG). Do not handle the cooling circuit because gas may leak out.
- Cooling gas leak risk. May you detect any leak, please, contact certified technicians.
- Freezing risk by direct contact: Please, do not handle the cooling circuit.
- May technical software be altered, the equipment could lose its basic setting parameters and cause burn or frostbite from contact.
- Do not change pressure switch settings.
- Do not change thermostat settings.
- Do not open side covers while in operation.
- Cut the power off in case of any anomaly.
- Always use KERA*jet* original spare parts.
- The liquid might be harmful when drunk, inhaled or in contact with skin. It might also be environmentally hazardous if it's not properly handled nor discarded as indicated by the manufacturer. Please, read the safety sheet before use and wear personal protective equipment.
- The technical sheet of the R134a cooling gas is attached to this manual so the certified technician may have it if required.
- The technical and safety sheets of the liquid are attached to this manual. Please, have a look at them before handling.
- Please, do not dismantle any element of the equipment without KERA*jet* authorisation. May you do it without consent, KERA*jet* will not bear any cost or warranty of the spares or responsibility for the damage brought about by this action.
- Please, be careful as some surfaces are hot and may cause burn, for example, secondary ink tanks. For your own safety, the device has thermostats that automatically stop the heating process above a certain point.
- User should not modify the equipment nor any setting without requesting KERA*jet* or the authorised dealer.
- May you detect any issue in the device, please, contact KERA*jet*.

6.3. Secondary risks

	DETECTED RISK	RISK AREA/POINT	SAFETY OR DESIGN MEASUREMENT	SECONDARY RISK
1	**FIRE RISK FROM ELECTRIC SHORTCUT.**	A) ELECTRIC COMPONENTS.	A) PROPER DESIGN OF ALL WIRING.	A) Fire risk from electric short cut.
2	**RISK FROM HARMFUL AND IRRITATING CHEMICAL PRODUCTS.**	A) LIQUID TANKS. B) COOLING CIRCUIT FILLED WITH GEFG.	A) CHEMICALLY RESISTANT MATERIALS TO PREVENT COMPLETELY ANY LEAK. B) HERMETIC TANKS TO PREVENT ANY LEAK. C) HERMETIC COOLING CIRCUIT.	A) Risk from chemical compounds. B) Pipe breaks.

	DETECTED RISK	RISK AREA/POINT	SAFETY OR DESIGN MEASUREMENT	SECONDARY RISK
3	RISK OF USER CUTS.	A) WHEN HANDLING COVERS. B) FAN BLADES.	A) COVERS ARE EQUIPPED WITH A HANDLE IN THE CENTRE TO HELP WHEN PULLING OUT. B) FAN INSIDE THE EQUIPMENT AND SORROUNDED BY A METALLIC SAFETY CAGE.	A) Cuts might come from the sides of the metallic covers. B) Involuntary contact when working inside the equipment.
4	RISK OF ELECTRIC DISCHARGE.	A) ELECTR C SYSTEM.	A) THE CHILLER IS SUPPLIED IN A CLOSED BOX AND HANDLING INSIDE IS NOT ALLOWED.	A) The chiller is electrically powered up to make the pumps and the rest of the components work
5	RISK OF CONTACT BURNS.	A) HEATING CIRCUIT.	A) THERMOSTAT IS SET TO 75 ºC. TANK TEMPERATURE IS AROUND 55ºC. WAIT A FEW MINUTES AFTER SHUTTING DOWN POWER BEFORE HANDLING.	A) Risk of contact burns from the heating circuit.
6	RISK OF CONTACT FROSTBITE.	A) COOLING CIRCUIT.	A) THERMOSTAT IS SET TO 0 ºC, WORK TEMPERATURE 10ºC AT THE EVAPORATOR OUTPUT. WAIT FOR SOME MINUTES AFTER SHUTTING DOWN THE DEVICE BEFORE HANDLING.	A) Risk of frostbite with the cooling circuit.
7	LIQUID SPLATTER	A) TANKS. B) CONNECTING PIPES.	A) TOP COVER. B) DEVICE BY THE MACHINE WITH AS SHORT AS POSSIBLE CONNECTING PIPES.	A) Risk of breaking in any of the elements of the equipment.
8	COOLING GAS LEAK	A) COOLING CIRCUIT	A) HERMETIC MANUFACTURING. STRONG WELDING JOINTS.	A) There is a risk of breakage of any component of the circuit.
9	SLIPPING FROM LEAKED LIQUID	A) AROUND THE DEVICE.	A) INLET ON TOP.	A) While filling up or cleaning, some liquid might leak.

7. Preventive measurements

- The device must be operated exclusively after the start-up had been carried out by KERA*jet* technicians and the operators had been suitably trained. The person in charge of the device must be sure that operators in contact with the device understand how it has to be operated, the risks involved when in operation and how to operate safety elements. Provide KERA*jet* support phone as well as email address for enquiry.

- Please, do not allow any uncontrolled intervention on any of the elements of the device (handling any of the systems of the device may cause accidents).

- Please, train suitably all the operators of your staff on how to operate the device, safety norms and risks before starting operation. May you have any question, contact KERA*jet* support service.

- Request operators to visually inspect the device and check operation and cleaning periodically. These routines will prevent unexpected stops.

- Please, follow liquid manufacturer instructions: handling, waste management and safety measurements. Request and read the safety documents of the chemical products before using them. Set waste collecting protocols.

- Have a check on the suggested preventive maintenance instructions and set the required maintenance routines.

8. Stability conditions

The device has to be set on a flat and stable area.

It stands on the four wheels on each corner. Two of them have locks for a better stability.

Each wheel supports 70 kg and consists of bearing, poliamix core and rubber band to provide a soft and stable operation.

May a wheel get broken, the device will only tilt a bit because height is short. Furthermore its centre of gravity will always be very close to the support geometric centres depending on the amount of the liquid in the tanks.

9. Transportation, maintenance and storage

The installation of the device will be carried out by qualified KERA*jet* staff.

When unpacking the chiller, please, check that there's been no damage during transportation. Also check that accessories and tools match the shipping list. May you find any issue, please, contact KERA*jet* as soon as possible.

May it be supplied in a wooden box along with some other equipments, it'll be locked to the ground by some fixing supports.

The KERA*jet* 87 chiller is equipped with wheels for moving.

It might be manually pushed or moved by forklift.

It has to be moved vertically so there's no leak and the cooling circuit is not altered.

For a safe operation of the equipment, please, proceed as follows:

- Unplug the socket of the device and disconnect the fluid pipes
- Move the device keeping it vertically at any time
- Once intervention is finished, please, proceed with the process as a new start-up

Please, mind dimensions and weights of the equipment.

Wherever you may locate the equipment, please, keep it always on its wheels as they are the right system for its suitable support and stability.

10. Emergency procedures.

In case of failure or any risky situation for operators or potentially harmful for the environment or the device, please, proceed as follows:

- May smoke start to come out from the device.

Cut power from the switch. For electric low voltage fires, please use CO_2 fire extinguisher.

- May you detect a gas leak.

Stop the device and contact a fridge technician so he may fix the leak and prevent the gas from leaking into the environment.

11. Fine tunning and maintenance

Machine fine tunning is set while in start-up as explained before. It's got to be made by our technicians, at least for the first time.

Suggested maintenance operations.

- Corrective maintenance:

In case of issue of unexpected stop, please, contact KERA*jet* support service.

In Spain, contact details are as follows:

Office timetable(08:30 -13.30/15.30-18.30, C.E.T.). Tel: 0034 964 010 150 requests and help line.

Any other time, weekends and holidays, please, contact the 24/7 service: 0034 678 280 381.

Contact: sat@kerajet.com

In case of PLC alarm, please, check the control panel instructions and tell the service technician what's the message on the display.

Issue might be fixed with a phone call. Please, do not do anything unless you know what's going on. You may put yourself in danger or someone else.

- Preventive maintenance.

- Please, make visual inspections after every shift and write down any issue in the device.

- Use stainless steel cleaning products when cleaning.

- Keep the right liquid level in the tank. May it get dirty, please, have it replaced and clean the tank.

- Please, take a complete check of the device at least once per year.

- Please, check regularly the condenser fan because may it work incorrectly, the cooling circuit will get damaged. Blow the fan periodically. Prevent dust from settling on the blades or the exchanger. Please, clean the laminates in the exchanger with compressed air. In order to get a correct energy exchange in the condenser, temperature difference between input and output air has to be between 10ºC and 20ºC. Check noises in the fan as dirt may get it unbalanced.

- Pumps in the recirculation circuits do not need any concrete maintenance. For long inactivity periods, please, remove the liquid in the pump and clean it.

- The cooling circuit has to be check by a certified technician. Operation has to be checked by measuring high and low pressures. A 2ºC temperature difference between input and output in the dehydrator means that it's clogging and should be replaced. A check has to be carried out annually.

- The compressor is hermetic and it's maintenance free.

12. Problem solving

Please, find below some problems that might be found during operation. In case the user does not know how to carry out any of the suggested maintenance operations, nor have suitable spare parts or is not properly training, please, contact KERA*jet* support service before any intervention.

ANOMALY	REASON	ACTION
Top liquid temperature has been surpassed.	Thermostat did not work.	Replace thermostat.
No cooling.	Defective pressure switch.	Replace pressure switch.
	Defective low temperature thermostat.	Replace low temperature thermostat.
	PLC failure.	Reset PLC.
Ink temperature doesn't drop.	Defective or closed electrovalve.	Check operation and flow direction of the liquid.
Ice building up in the exchanger or the tank.	Too low liquid flow in the exchanger.	Check whether the circuit is blocked. Check fluid pump.
Overpressure in the pressure switch.	Condenser is dirty.	Clean exchanger.
	Too hot environment.	Reduce environment temperature.
	The condenser unit is broken.	Check fan operation.
Liquid leak in the recirculation pump.	Broken mechanic clasp.	Replace clasp.
Heating circuit does not get hot.	Broken resistor.	Replace resistor.
Cooling gas is missing.	Cooling circuit leak.	Find leak and fix it.
Operator tries to increase/decrease temperature but one of the ink temperatures does not react.	PLC is not responding. Chiller is not working.	Restart PLC from circuit breaker (Check electric diagram). Check chiller.

13. Spares involved in safety

- The elements of the machine related to operator's safety and health are:

- Thermostat, Tmín. 0ºC.
- Thermostat, Tmáx. 75ºC.

- Electric safety equipments in the boards are:

- Differential switch for indirect contacts.
- Chiller circuit breaker and main power breaker in the main machine.

All these components are very robust and there's no reason for any malfunction nor misuse.

Operation of these elements must be checked when preventive maintenance.

14. Emitted noise

In this device emitted noise comes from the electric motors of the pumps, fan and compressor.

All these elements make low noise, below 70 dB(A), so there's no reason for any safety measurement for operators.

Actually, digital machines are installed in industrial noisy environments louder than the noise emitted by the KERA*jet* B7, as those other machines nearby are manufacturing products in the production lines.

15. Waste management

- Once operational life come to an end, when discarding the equipment, waste management rules and norms must be followed. Discarding the equipment inadequately means breaking environmental regulations. It must be carried out by waste management authorised personnel.

- Recirculation pumps have no polluting nor toxic material. Main components are properly indicated for a proper recycling.

- Please, follow waste management instructions of the liquid supplier.

- Cut power cables so they can't be plugged again.

- Please, remove moving covers so animals nor children get trapped.

- This device is not to be considered as home waste. Once cooling gas is removed, it must be compulsory handed over to a registered waste management company for electric and electronic equipments.

- Please, contact your local authorities or your waste collector company for more information about recycling, treatment or discard of this device.

- Please, check binding norms.

KEEP THIS MANUAL FOR ANY FUTURE ENQUIRY.

CHANGING ANY PART OF THIS MANUAL IS UTTERLY FORBIDDEN.

KERA*jet*, S.A.
Pol. Ind. Supoi-8. Avda. del Boverot, 24. 12550 Almazora (Castellón) España.
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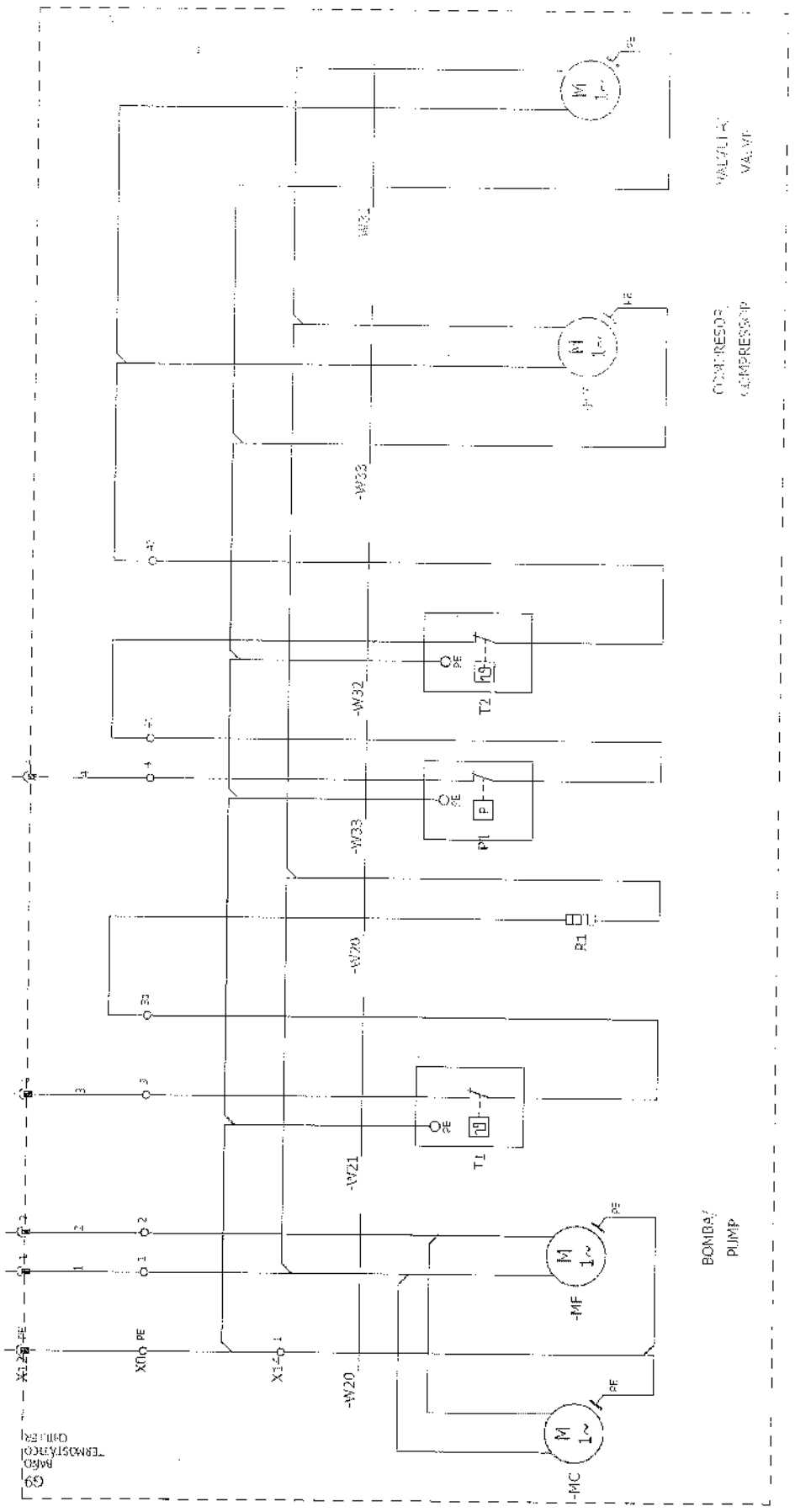
Technical support ACS +34 964 010 150.
24/7 service +34 678 280 381. ONLY FOR EMERGENCIES OUT OF OFFICE TIME.
Technical requests and spares in Spain: sat@kerajet.com

APPENDIX I: Electric diagram.

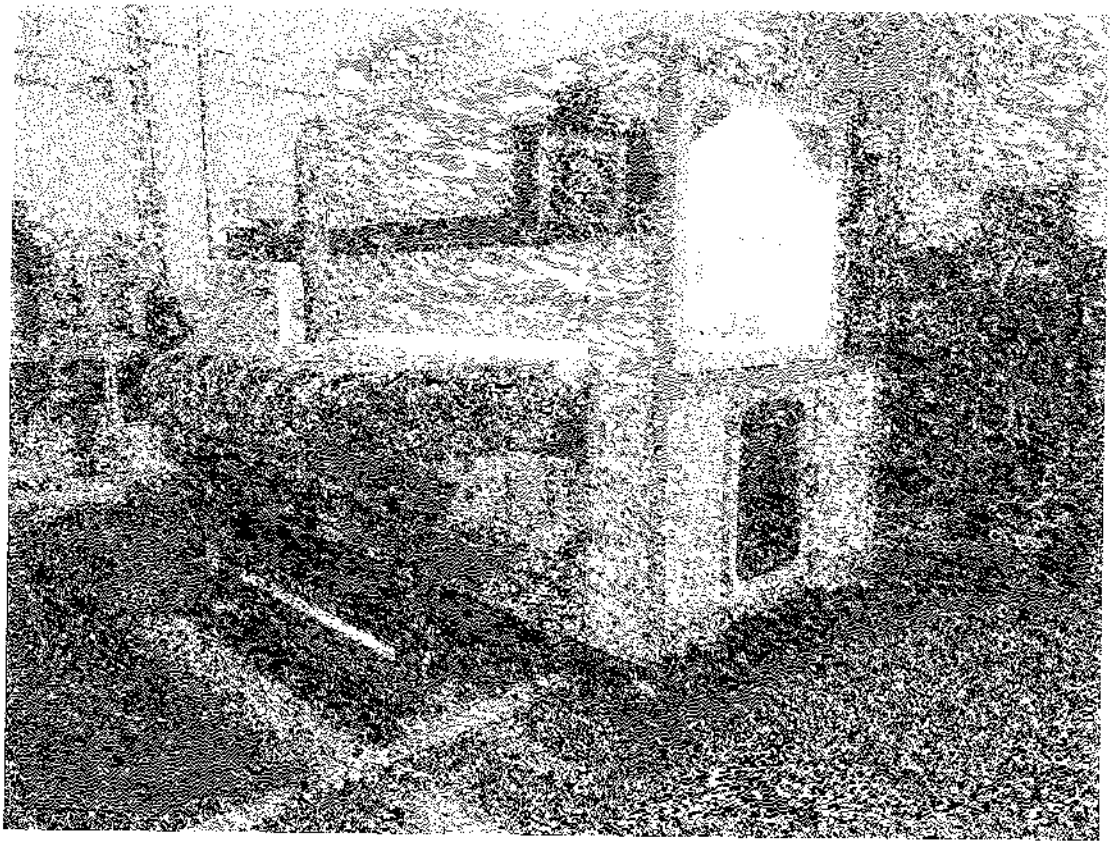


KERA*jet* B7

Instructions manual

MB7. Rev: 160720

BAS TECH
Solutions



KABINA BZC-1400

INSTRUKCJA UŻYTKOWNIKA

SPIS TREŚCI

1 INFORMACJA BEZPIECZEŃSTWA

1.1 Przed rozpoczęciem dokładnie przeczytaj niniejszą instrukcję

Obowiązkowym jest uważne przeczytanie niniejszej instrukcji zaraz przed rozpoczęciem operowania tą maszyną. Upewnij się że zrozumiałeś zarówno instrukcje bezpieczeństwa jak i punkty kluczowe aby uniknąć jakiekolwiek możliwe zagrożenie.

1.2 Wyjaśnienie symboli

NIEBEZPIECZEŃSTWO. Niniejsze uwagi winny być przestrzegane aby zapobiec jakimkolwiek szkodom dla użytkownika.

OSTRZEŻENIE. Niniejsze uwagi winny być przestrzegane aby zapobiec jakimkolwiek szkodom dla urządzenia.

UWAGA. Niniejsze uwagi dostarczają użytecznej informacji dot. instalacji i operowania maszyną.

ZAGROŻENIE ELEKTRYCZNE. Zagrożenie dot. prądu elektrycznego.

1.3 Instrukcja bezpieczeństwa

Właściwe i pewne operowanie kabiny BZ-1400 będzie tylko możliwe przy zastosowaniu się następujących instrukcji bezpieczeństwa:

- Używać to urządzenie tylko zgodnie z wyznaczonym przeznaczeniem tak jak jest to wyszczególnione w niniejszej instrukcji.
- Przed dokonaniem pierwszej operacji maszyny, wszystkie podłączenia winny być dokładnie sprawdzone i dociśnięte w złączach tak jak to jest wymagane. Niniejsza czynność przeglądu winna być przeprowadzana także co 6 miesięcy.
- Kratki i/lub filtry winny być czyszczone regularnie.
- Przeglądy, naprawy i konserwacja mogą być dokonywane tylko przez wykwalifikowanych techników.
- Operatorzy muszą zapoznać się z panelem kontroli i przyciskami które on zawiera. Operowanie kabiny BZ-1400 zostało opisane w *Sekcji 5*.

Operatorzy winni być zawsze ubrani w odzież adekwatną do wykonywanej pracy.

Przeczytaj Tabele Bezpieczeństwa dot. używanych produktów w kabinie BZ-1400.

1.4 Zagrożenie elektryczne

Zagrożenie porażenia prądem.

Zawsze odłączaj główny wyłącznik i jakikolwiek obieg wewnętrzny przed instalacją lub reperacją maszyny.

Nigdy nie operuj maszyną BZ-1400 z otwartą szafą elektryczną lub uszkodzonymi zabezpieczeniami.

1.5 Zagrożenie wciągnięcia przez pas

Zagrożenie wciągnięcia wyższych rzeczy nad pasem transportującym kiedy pas jest uruchomiony.

Operator nie powinien posiadać łańcuszków na szyi, branzoletek lub innych przedmiotów które mogłyby zostać wciągnięte podczas pracy pasa.

Nigdy nie wolno umieszczać rąk pod pasem kiedy maszyna jest w trakcie pracy.

Operator winien zawsze odłaczyć zasilanie przed dokonywaniem jakichkolwiek prac konserwacyjnych części ruchomych pasa transportowego.

1.6 Zagrożenie pożarowe

Niebezpieczeństwo pożaru i eksplozji.

Nie wolnoć palić ani zapalać płomieni w odległości mniejszej niż 15 metrów od kabiny.

Nigdy nie operuj maszyny BZ-1400 bez gaśnicy w bliskiej odległości.

2 GWARANCJA

DAS TECH SOLUTIONS, SLU gwarantuje wszystkie nowe komponenty kabiny BZ-1400, za wyjątkiem części zamocowanych podlegających zużyciu.

Okres gwarancji zaczyna się od daty dostarczenia urządzenia. Prosimy o zapoznanie się z naszymi Ogólnymi Warunkami Handlowymi, aby poznać więcej szczegółów dot. naszych usług warsztatowych.

Gwarancja straci ważność jeśli urządzenie będzie używane do innych celów niż te do których zostało wyprodukowane.

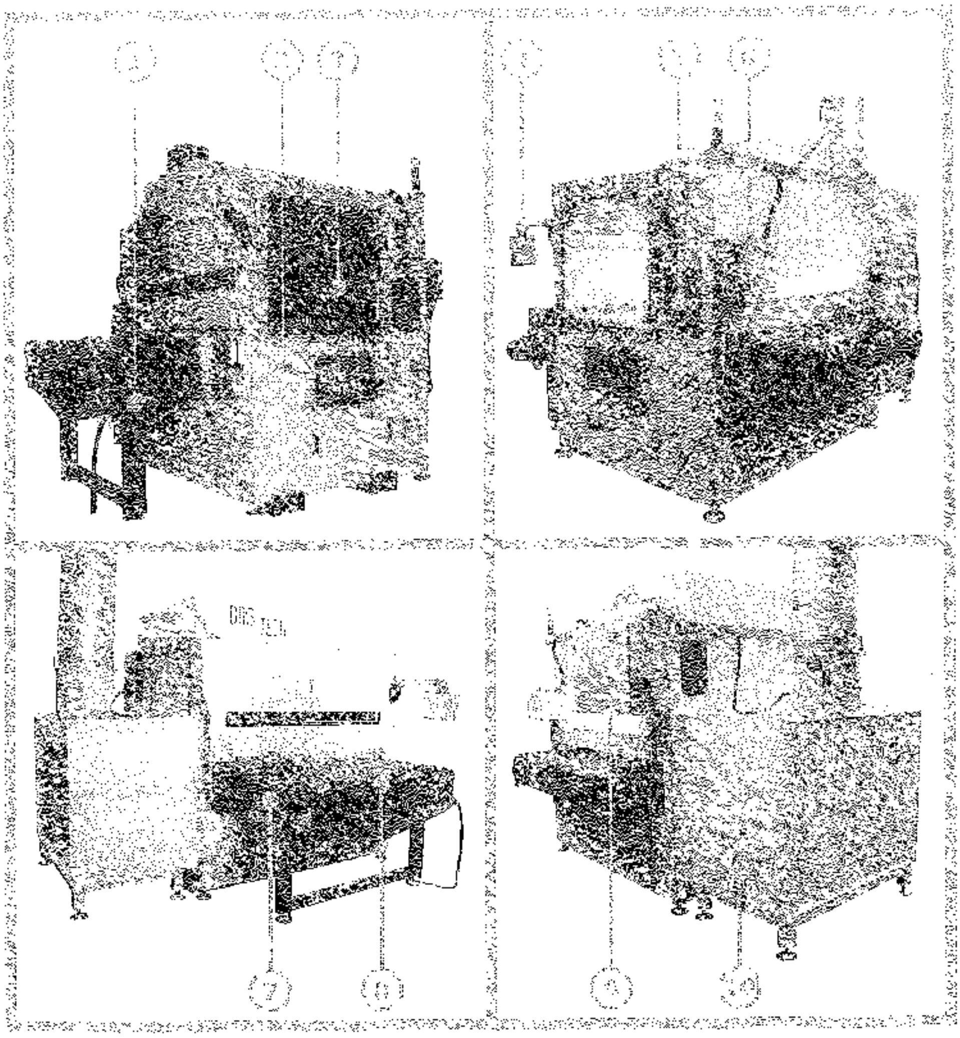
Ponadto, zamiany lub wymiany nie autoryzowanej jednej lub więcej części zamiennych maszyny i zastosowanie narzędzi lub akcesoriów nie wyszczególnionych przez producenta może spowodować niebezpieczeństwo lub wypadek. Takie przypadki zwalniają producenta z jakiejkolwiek odpowiedzialności i anulują gwarancję.

3 WPROWADZENIE

Kabina BZ-1400 została zaprojektowana do aplikacji lakierów, żywic i innych powłok pokrywczych w szerokiej gamie materiałów wspierających te produkty.

3.1 Opis

Kabina BZ-1400 składa się bazowo z następujących części (*Rysunek 1*):



Rysunek 1. Główne części kabiny BZ-1400

1. System czyszczenia pasa wraz ze skrobakiem i membranową pompą
2. Boczny pistolet do zraszania listew i części kątowych
3. Pistolet górny ruchomy wzdłuż liniowej prowadnicy dla płytek o szer. aż do 1400 mm
4. Panel dotykowy
5. Panel regulacji pneumatycznej
6. Panel kontrolny główny
7. Motoreduktor z ruchomym ramieniem
8. Pas transportujący
9. Tablica elektryczna
10. System filtracji 4 etapowy i wyciąg ATEX

4 INSTALACJA

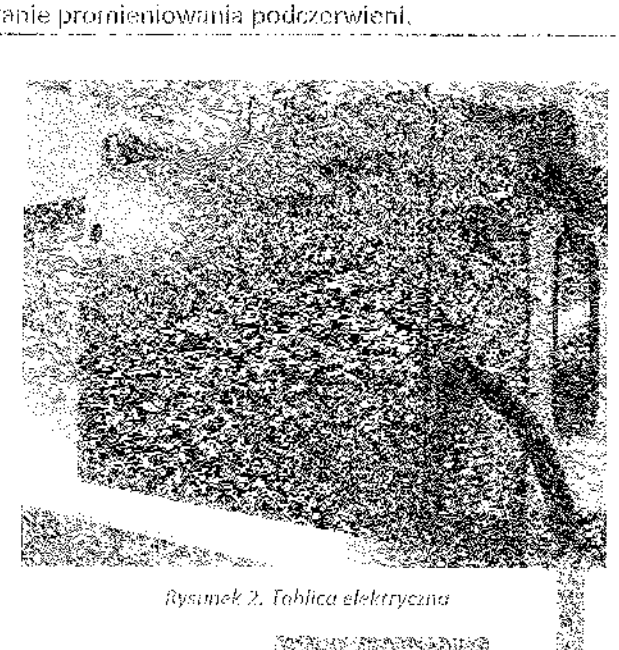
4.3 Instalacja elektryczna

Aby zapoznać się z danymi technicznymi dot. podłączenia zasilania elektrycznego, patrz *Aneks A* (Specyfikacje Techniczne). Prosimy mieć na uwadze następujące uwagi:

Podłączenie do sieci elektrycznej zakładu winno zostać przeprowadzone tylko przez wykwalifikowany personel.

Kabina wymaga zabezpieczenia zastosowania bezpieczników / iskrowodoporych ponieważ w momencie uruchamiania (~1min.) urządzenie może zużywać aż do 1.5 napięcia nominalnego. Rekomendowany układ kabla wykazany został w *Aneksie D* (Schematy elektryczne).

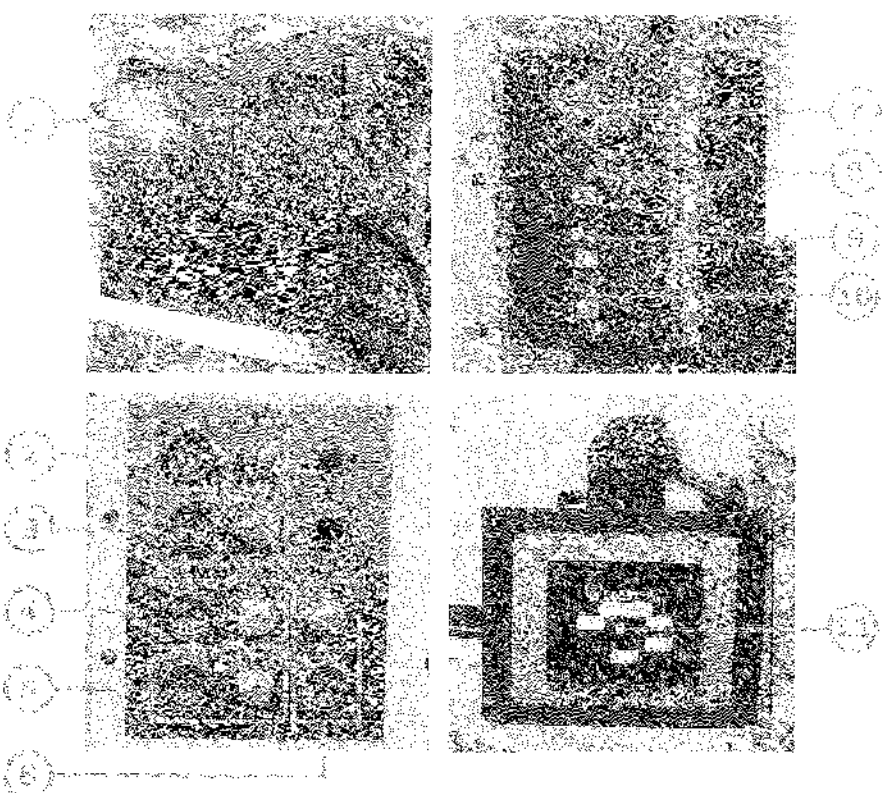
Kable zasilania winny być odpowiednio zamocowane i nie mogą być wystawione na działanie promieniowania podczerwieni.



Rysunek 2. Tablica elektryczna

5 OPEROWANIE URZĄDZENIEM

Jak tylko Kabina BZ-1400 zostanie odpowiednio zainstalowana, jest już w pełni przygotowana do użytkowania. Urządzenie kontroluje się poprzez panel kontroli (*Rysunek 3*).



Rysunek 3. Panele kontroli kabiny BZ-1400

ELEMENT	OPIS
1	***Odłącznik.*** Odłącza tablicę zasilania elektrycznego zakładu
2	***Regulator #1.*** Reguluje i pokazuje ciśnienie natrysku pistoletu nº 1
3	***Regulator #2.*** Reguluje i pokazuje ciśnienie wachlarza rozprysku pistoletu nº 1
4	***Regulator #3.*** Reguluje i pokazuje ciśnienie natrysku pistoletu nº 2
5	***Regulator #4.*** Reguluje i pokazuje ciśnienie wachlarza rozprysku pistoletu nº 2
6	***Regulator główny.*** Reguluje i pokazuje ciśnienie wejścia sprężonego powietrza
7	***Awaria stop.*** Zatrzymuje urządzenie w przypadku awarii
8	***Reset awarii.*** (Wstecznie) Winien być włączony przed uruchom. maszyny
9	***Natrysk.*** Selekcjonuje pistolet nº 1 lub pistolet nº 2 przed realizacją cyklu czyszczenia
10	***Czyszczenie.*** Rozpoczyna cykl czyszczenia wcześniej wybranego pistoletu
11	***Panel dotykowy.*** Kontroluje system i jego wskazania

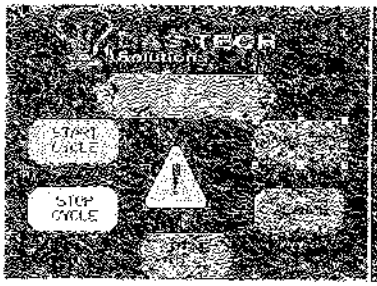
5.1 Rozpoczynając cykl

Prosimy o przestrzeganie poniższych wskazań (kroków) aby rozpocząć cykl pracy:

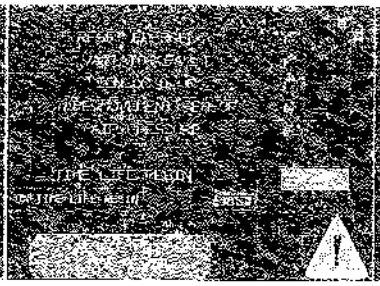
1. Zamknij odłącznik (1) w pozycji ON.
2. Sprawdź czy przycisk *Awaria stop* (7) nie jest uruchomiony.
3. Naciśnij przycisk *Reset awarii* (8). Panel dotykowy zacznie działać.
4. Na panelu dotykowym wybierz *Reset awarii*. Gdyby działał jakiś alarm, symbol alarmu (!) pojawi się. Należy wybrać w menu *Alarmy* aby sprawdzić informacje o alarmach i zresetować je. Menu panelu dotykowego są wyjaśnione w *Sekcji 5.2*.
5. Kiedy alarmy zostały zresetowane, należy wybrać *Start cyklu*.
6. Aby zatrzymać cykl pracy, wciśnij *Stop cyklu*.

5.2 Obsługa panelu dotykowego

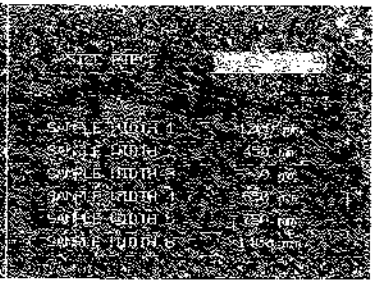
Ta sekcja wyjaśnia różnorodne menu aby skonfigurować system.



Rysunek 4. Menu Główne



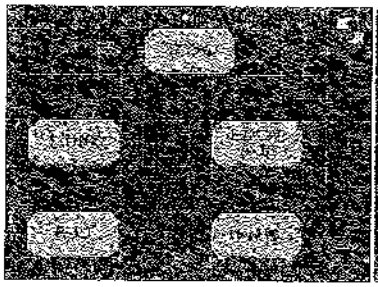
Rysunek 5. Menu Alarmy



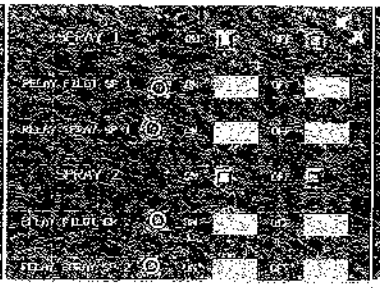
Rysunek 6. Menu Rodzaj kamienia

Kiedy system zostaje uruchomiony paneldotykowy pokazuje menu główne (*Rysunek 4*). Tak jak wspomniano wcześniej, jeśli istnieje jakiś alarm należy wejść w menu alarmów (Rysunek 5) aby wymazać je. Wciśnij zielone strzałki (górny prawy róg) aby wrócić do menu głównego.

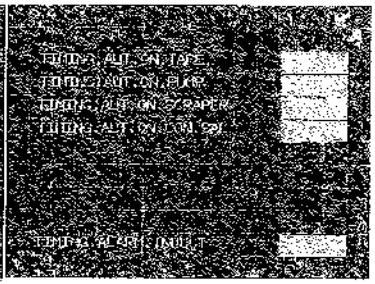
Następnie wybierz *Rodzaj kamienia* (*Rysunek 6*) aby wprowadzić lub modyfikować wymiary płytek które będą produkowane.



Rysunek 7. Menu Parametry



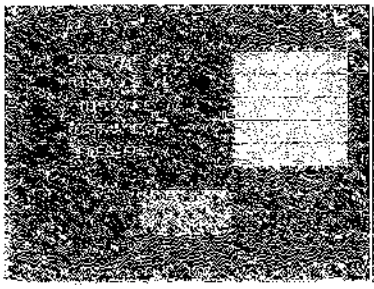
Rysunek 8. Menu Natrysk



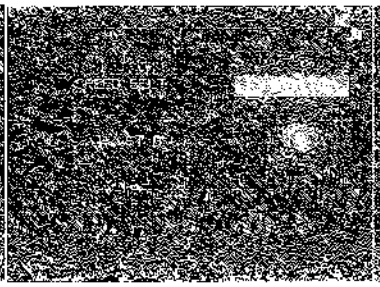
Rysunek 9. Menu Okresy czasu

Wejść do menu *Parametry* (*Rysunek 7*) aby skonfigurować różne parametry maszyny:

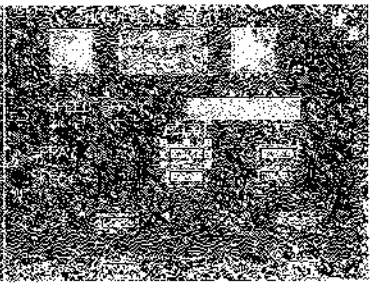
- Wybierz *Natrysk* (*Rysunek 8*) aby skonfigurować parametry dwóch pistoletów.
- Wybierz *Okresy czasu (Rysunek 9*) aby wprowadzić czas natrysku.
- Wybierz *Oś liniowa* (*Rysunek 10*) aby zdefiniować szybkość i zakres natrysku.
- Wybierz *Pas* (*Rysunek 11*) aby zdefiniować szybkość liniową pasa transportu.
- Wybierz *Obsługa ręczna* (*Rysunek 12*) aby ustawiać parametry kontroli ręcznie.



Rysunek 10. Menu OS liniowe



Rysunek 11. Menu Pro



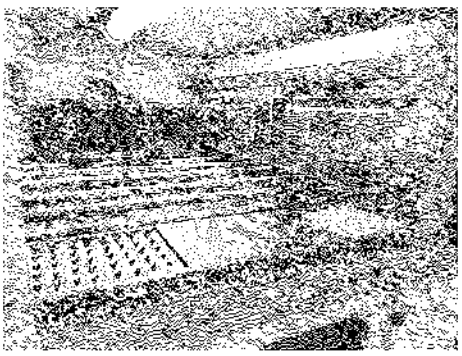
Rysunek 12. Menu dodatkowe

5.3 Cykl czyszczenia

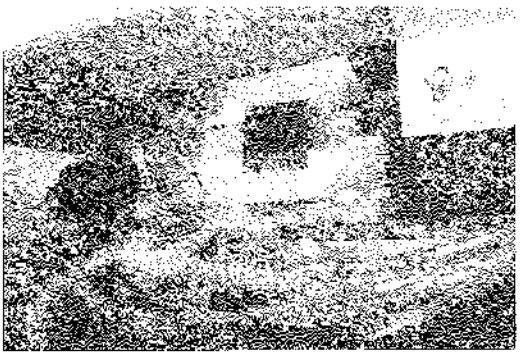
Należy dokonywać cyklu czyszczenia pistoletów w regularnych okresach aby wyeliminować resztki produktów natrysku i zapewnić optymalne funkcjonowanie systemu.

Prosze przestrzegać następujących czynności (kroków) aby dokonywać cyklu czyszczenia:

1. Wciśnij *Stop cuklu* na panelu dotykowym.
2. Wybierz pistolet nº 1 (pistolet górny) lub nº 2 (pistolet boczny) poprzez przełącznik *Natrysk* (9).
3. Wciśni przycisk *Czyszczenie* (10) aby rozpocząć proces czyszczenia wcześniej wybranego pistoletu.



Rysunek 13. Pistolet górny



Rysunek 14. Pistolet boczny

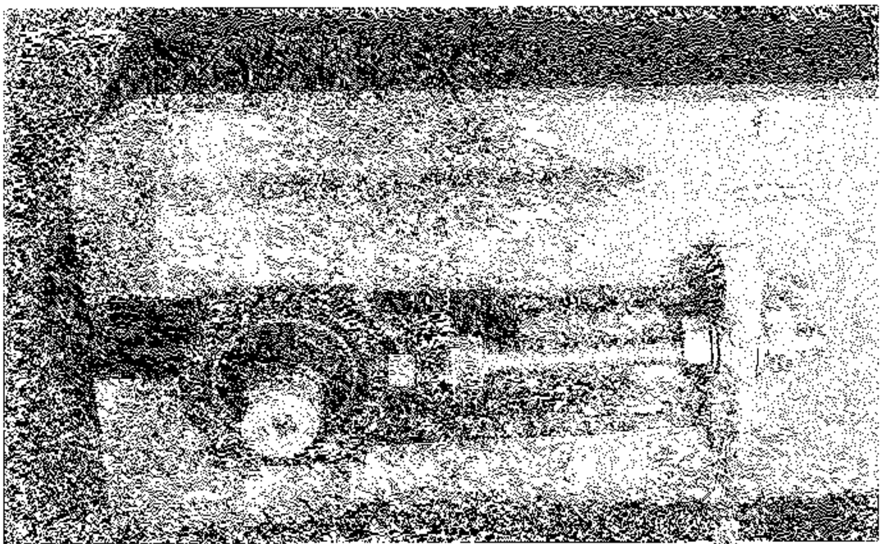
6 UTRZYMANIE

Pas transportowy i kabinę natryskową powinno się kontrolować i czyścić regularnie w środowiskach zapylonych aby zabezpieczyć optymalne funkcjonowanie maszyny i wydłużyć jego żywotność.

> Umieść odłącznik (umieszczony po prawej bocznej stronie szafy elektrycznej) w pozycji 0 (OFF) aby odciąć zasilanie przed realizowaniem jakichkolwiek prac konserwacyjnych.

6.1 Dopasowanie naprężenia pasa

Pas transportujący winien być regularnie doglądany i dopasowywany z racji tego że może tracić naprężenie podczas pracy. Oś ustawienia posiada dające się ustawić łożyska w celu ustawienia ich pozycji. Aby ustawić naprężenie pasa, dociśnij albo poluźnij nakrętki które pokazuje *Rysunek 15*:



Rysunek 15. Dopasowanie naprężenia pasa

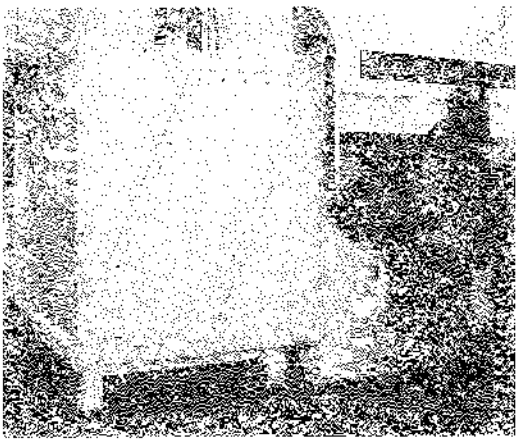
6.2 Rozmieszczanie materiału filtrującego

> Panele filtrujące są poddane zużyciu. moce filtracyjne zmniejszają się z użytkiem maszyny. Z tego względu, materiał filtrujący winien być wymieniany w regularnych okresach czasu, według użycia i warunków pracy. Zalecamy aby posiadać materiał filtrujący w zapasie.

> Używać tylko materiału filtrującego według zaleceń producenta. Użycie innego typu materiału może zmniejszyć moc filtrującą i zmniejszyć wydajność systemu filtrującego.

Przestrzegaj tych czynności do wymiany materiały filtrującego:

1. Zdjąć pokrywę filtra (*Rysunek 16*) zwalniając śruby które ją przytrzymują.
2. Wyciągnąć ramę filtrowania.
3. Usuń zużyty materiał filtracyjny.
4. Rozmieść nowy materiał filtr. na ramie i przytwierdź go zaczepami plastykowymi.
5. Rozmieść ramę ponownie w jego ówczesnym położeniu.
6. Umieść pokrywę na swoim miejscu i przytwierdź ją wcześniej odkręcanymi śrubami.



Rysunek 16. System filtracyjny