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1.2 Group directory

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1.3 Menu level index

The menu level index guides you through the manual on hand in order to facilitate the search for the required information about the individual menu functions.

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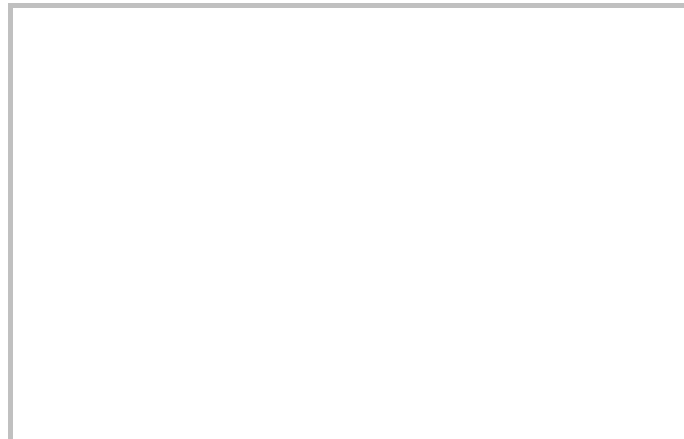
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1.4 Publisher

For questions regarding the operation and running of the LEIBINGER-JET 2 as well as in service case please contact the listed dealer address.

Dealer address



Paul Leibinger GmbH & Co. KG
Special factories for numbering machines
Daimlerstraße 14
D-78532 Tuttlingen
Federal Republic of Germany

Phone + 49 74 61/92 86-0
Fax + 49 74 61/92 86-1 99
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Service hotline e-mail: service@leibinger-numbering.com

American Branch Office
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We reserve the right to make alterations to the scope of delivery at any time in the form of technology, hardware, software as well as the corresponding materials (and manual extracts) as a result of innovative further development of our devices.

Texts, illustrations and technical drawings have been compiled with the greatest of care. Nevertheless errors cannot be excluded. Consequently no guarantee can be assumed for the correctness of the content of this manual and no claims can be asserted against Paul Leibinger GmbH & Co. KG.

We shall be grateful for information regarding possible printing errors as well as for suggestions for the further optimisation of the device manual.

Authoritative for the scope of delivery is not the manual but rather the written order confirmation.

1.5 Introduction

We are pleased that you have decided in favour of a LEIBINGER-JET 2 device and welcome you as one of our customers.

You now own a LEIBINGER-JET 2 device that has been developed and constructed on the basis of many years of experience and using the latest Leibinger technology. This results in a high degree of quality and the renowned Leibinger reliability.

This manual shows you the fundamental advantages of the Leibinger Jet system manufactured by us, such as for example the fully automatic working, low maintenance etc..



The manual must be read thoroughly prior to first start up in order to ensure that no damage to the device and/or endangering of the operating personnel results from a defective electrical connection and/or from incorrect operation.



Please pay particular attention to the safety instructions of the groups **Safety instructions** and **accident prevention** when handling consumables (ink and solvent).

Our devices are subjected to a quality control in our plant prior to delivery. If despite this the device or parts of it should be damaged or their function disturbed please advise us of this as fast as possible.

The guarantee conditions can be seen from the confirmation of order. The warranty presupposes that the device or the installation is operated correctly in accordance with the available guarantee manual and any possible additional manuals and descriptions prepared by us.

It is only through the use of inks and solvents from Paul Leibinger GmbH & Co. KG that optimum operating characteristics can be achieved. **Should other inks and solvents be used all guarantee claims will expire.**



Product liability!

No alterations whatsoever must be carried out on the entire LEIBINGER-JET 2 device. No liability will be accepted for damage or dangers resulting from inadmissible alterations.



Caution – risk of explosion!

The device must not be operated in rooms where there is a risk of explosion!

1.6 Document information

The instruction Release 3.00 of 17th February 2006 is valid for Leibinger-Jet 2 se+ machines from the software-version V30.1.00.00.

2. Safety

2.1 Scope of risks

The high performance printer LEIBINGER- JET 2 has been built in accordance with state-of-the-art standards and recognized safety requirements and has been equipped with protective devices.

Operational and safety checks of the installation were carried out before it left the factory. In case of improper handling or misuse, however, there are dangers for

- the health of the operating staff
- the LEIBINGER-JET 2 and other real assets of the plant operator
- the efficient operation of the high performance printer

All persons entrusted with the putting into service, the operation, the maintenance and the overhauling of the high performance printer must

- have the necessary qualification and
- strictly comply with this operating manual.

YOUR safety matters!

2.2 Safety instructions and recommendations

This operating manual use the following SYMBOLS with DANGER WARNINGS:



Indicates impending electrical danger!

Failure to observe this instruction can lead to **serious** injuries or to **death!**



Indicates a dangerous situation through pressurised media!

Failure to observe this instruction can cause injuries!



Indicates a dangerous situation!

Failure to observe this instruction can lead to material damage or to injuries!



Indicates a dangerous situation!

Failure to observe this instruction can cause **serious** hand injuries!



Indicates a dangerous situation through flammable materials!

Failure to observe this instruction can lead to material damage, to **serious** burns or to **death**!



Indicates a dangerous situation through irritating materials!

Failure to observe this instruction can lead to poisoning and to irritation of the eyes, the skin as well as of the respiratory organs!



Indicates the necessity of personal protective clothing!

Sufficient protective equipment must be worn. Failure to observe this instruction can lead to injury!



Indicates the necessity of observing the device manual and other instructions!

Failure to observe this instruction can lead to material damage, the loss of guarantee and to injury!



Indicates service activities!

This work must only be carried out by trained personnel or by Leibinger service technicians!



Indicates important user information
for safe and effective working.



Indicates recommendations for use
and other useful pieces of information.

2.3 Intended use

The high performance printer LEIBINGER-JET 2 serves exclusively the contact-free marking, inscribing and coding of surfaces using the continuous ink jet process.

The high performance printer can be used on the most varying materials (e.g. metal, synthetic material, glass, paper, wood, pressed materials, rubber etc.) with both, smooth as well as uneven, rough and stepped surfaces.



The intended use of this device also includes the observance of all instructions in this manual.

Using the installation for other purposes is considered contrary to its intended use!



For safety reasons conversions and alterations are only admissible following consultation with the manufacturer. Repairs to the device must only be carried out with original replacement parts.

The manufacturer shall not be liable for damage resulting from use for other than the intended purpose or misuse.

2.4 Sources of danger

Protective devices must neither be removed nor put out of operation. Defects discovered must be rectified immediately.



Mains connection!

The device has no mains switch and must only be connected to a plug socket in the direct vicinity of the place of setting up!



Installation of the device

The device must be installed in a well ventilated room only and must be kept away from any source of heat, flame or sparks, e.g. radiant heater, etc.



Installation of the print head

The operating staff must not be exposed to danger due to the installation of the device in a production plant. Moving products under the print head may cause risk of crushing/cutting. The instructions of the machines directive must be strictly adhered to

**Caution – risk of explosion!**

Risk of explosion in the event of incorrect replacement of the battery. Replace only with an identical battery or with an equal value battery type in accordance with the recommendations of the manufacturer! The instructions of the battery manufacturer must be observed when disposing of the battery!

**Caution – risk of explosion!**

The device must not be operated in rooms where there is a risk of explosion!

**Attention – risk of injury!**

Your fingers could get caught between the frictional wheel and the production line. Keep your hands outside the danger area.

**Dangerous electrical voltage!**

Contact causes serious damage through an electric shock! Disconnect the device from the mains supply prior to opening. **Remove mains plug!**

**Dangerous electrical voltage!**

Contact causes serious damage through an electric shock! The print head must close automatically. Work on the head must only be carried out in a closed state!

**Dangerous electrical voltage!**

Parts of the device are still under voltage after blowing the protecting device! Disconnect the device from the mains supply prior to opening. **Remove mains plug!**

**Dangerous electrical voltage!**

Measurement under voltage has carried out only by electrical experts!

**Risk of crushing/piercing!**

During the closing movement of the print head your fingers could get caught between deflector unit or nozzle plate and gutter or during the opening movement between housing and gutter. Keep your hands outside of the danger area!

**Risk of crushing/piercing!**

During the closing movement of the print head your fingers could get caught between deflector unit or nozzle plate and gutter or during the opening movement between housing and gutter. Only carry out cleaning and service work with the machine placed idle. **Remove mains plug!**

**The content is under pressure even if the device has been disconnected from the mains supply!**

Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and let off the pressure!

**Risk of fire!**

Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!

Dangerous material in the machine!

Danger of serious damage through burns, skin irritation and poisoning!

**Warning!**

Read and understand the device manual before using this machine. Incorrect operation can lead to injury or damage to the device!

**Dangerous material in the machine!**

Read the safety leaflets and the regulations on personal safety equipment!

**Risk of injury!**

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!

**Risk of injury!**

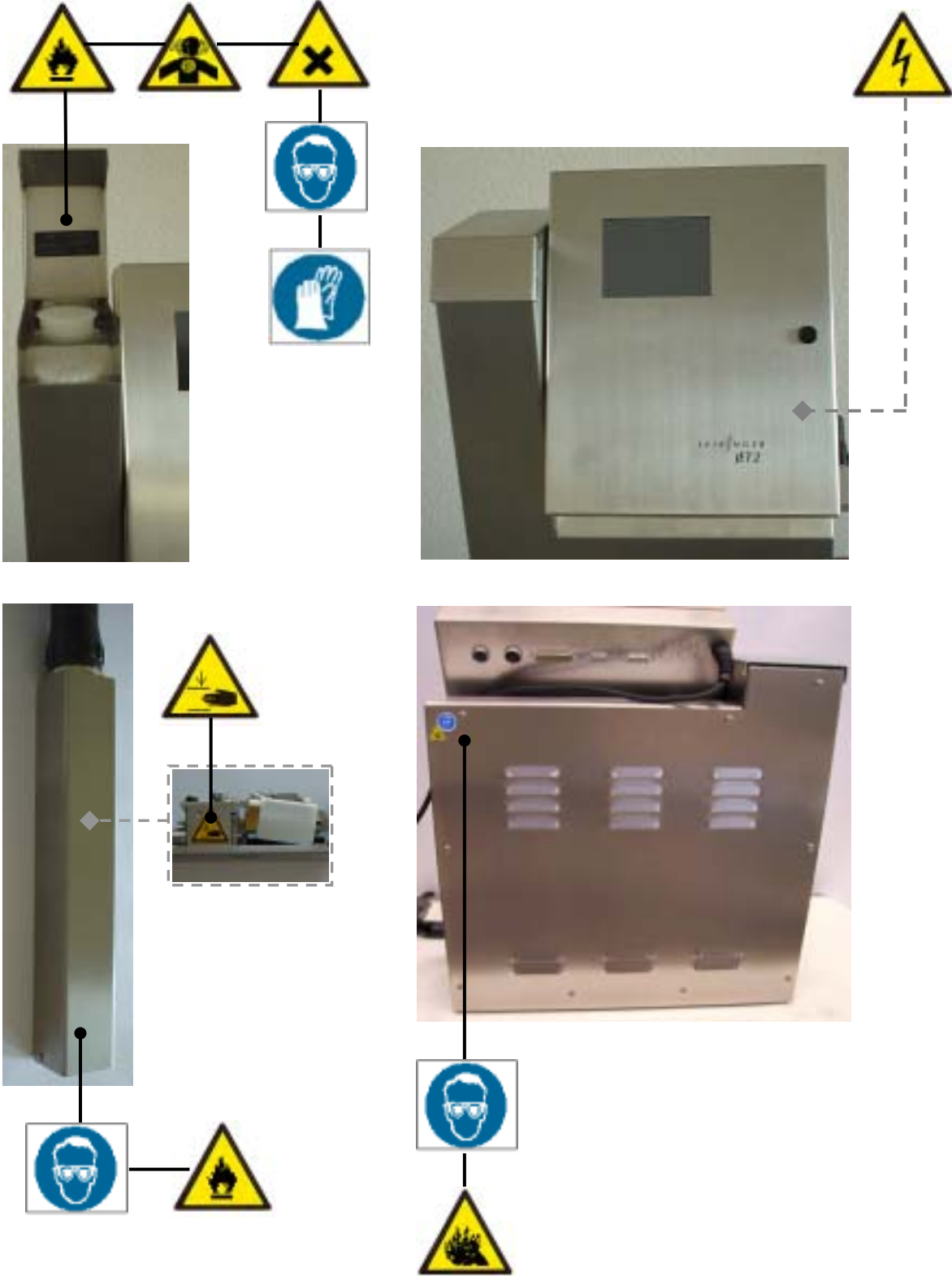
Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. **Eye protection is necessary!**

**Risk of injury!**

Upon contact the contents causes skin irritation. **Protective equipment is necessary!**

2.5 Safety sticker

Figure 1



2.6 Operating staff

Only trained personnel must operate the device. The personnel must have appropriate training to enable them to be able to operate the LEIBINGER-JET 2 high performance printer professionally.

Within the working area of the LEIBINGER-JET 2 device the operator is responsible with regard to third parties.

The operator must

- put this operating manual at the operating staff's disposal and
- make sure that they have read and understood them.

2.7 Dangers due to electric energy



The electrical and electronic components of the high performance printer are under voltage. The device must only be opened by trained personnel or by Leibinger service technicians.

Prior to the opening of the device the device must be switched off and the mains plug removed.

Further information on this subject can be found in the groups **Trouble shooting** and **Equipping/maintenance**.

2.8 Personal protective equipment

Materials are processed in this device that cause irritations and which are under pressure. In order to avoid injury and damage the personnel must wear the following personal protective equipment during certain work procedures:

- suitable work clothing
- suitable eye protection
- suitable hand protection

More detailed information can be found in the corresponding chapters of this manual as well as possibly in information and data leaflets of consumables.

2.9 Protective devices

In **an emergency** the device is placed idle by removal of the mains plug.

2.10 Safety measures at the place of installation



Mains connection!

The device has no mains switch and must only be connected to a plug socket in the direct vicinity of the place of setting up!



Caution – risk of explosion!

The device must not be operated in rooms where there is a risk of explosion!



Installation of the device

The device must be installed in a well ventilated room only and must be kept away from any source of heat, flame or sparks, e.g. radiant heater, etc.

A place of setting up must be selected with sufficient load bearing capacity and stability. When setting up it must be observed that sufficient movement space is available for the operating and service personnel. Solvents are processed in the device, sufficient room ventilation must be ensured!



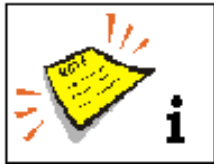
Prior to assembly the place of setting up must be cleaned of dirt and contamination (residue of lubricants etc.). The working place surroundings should be kept clean at all times in order to ensure unrestricted access to the LEIBINGER-JET 2 device.

2.11 Dangers through consumables

Inks are coloured liquids on a water or solvent basis. The safety instructions on the containers of the consumables as well as the instructions in the group **Accident prevention** must be especially adhered to in order to exclude dangers for persons and the surroundings. Further instructions can be found in the Safety Data Sheets.



When handling consumables (inks/solvents) the danger instructions and safety advice on the containers (transport, storage, distribution and correct disposal) must be observed!



In addition we recommend **observance of the DIN safety information leaflets 52900** of the inks and solvents used.

Upon written request we shall be pleased to send you a copy. Please indicate the Leibinger article no. in all cases.

In the following you will find examples for the marking of inks and solvents.

Figure 2

Examples: Labels for the marking of inks and solvents.

| | |
|---|---|
| <p>P. Leibinger GmbH & Co. KG Ink-Jet Markierungs-Systeme Daimlerstr.14 D-78532 Tuttlingen Tel. 07461/9286-0, Fax. 9286-199</p> <p>TINTE INK 70000-00001 ENCRE</p> <p>R 11 LEICHT ENTZÜNDBAR R 36/37 REIZT DIE AUGEN UND DIE ATEMORGANE S 7/8 BEHALTER DICHT GESCHLOSSEN AN EINEM GUT BELÜFTETEN ORT AUFBEWAHREN S 16 VON ZUNDEBLÄSEN FERNSHALTEN - NICHT RAUCHEN S 22 SAUF NICHT FEUERSTÄTTE S 25 BERÜHRUNGEN MIT DEN AUGEN VERMEIDEN S 26 BERÜHRUNGEN MIT DEN AUGEN KOMMT SÖFTESTEN MIT WASSER WEGSPÜLEN UND ARZT KONSULTIEREN</p> <p>R 11 HIGHLY FLAMMABLE R 36/37 IRRITATING TO EYES AND RESPIRATORY SYSTEM S 7/8 KEEP CONTAINER TIGHTLY CLOSED AND IN A WELL VENTILATED PLACE S 16 KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING S 22 DO NOT SMOKER NEAR BY S 25 AVOID CONTACT WITH EYES S 26 IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE</p> <p>R 11 TRÈS INFLAMMABLE R 36/37 IRRITANT POUR LES YEUX ET LES VOIES RESPIRATOIRES S 7/8 CONSERVER LE RÉCIPIENT BIEN FERMÉ ET DANS UN ENDROIT BIEN VENTILÉ S 16 GARDER À L'ÉCART DE TOUTE SOURCE D'IGNITION - NE PAS FUMER S 22 NE PAS RESPIRER LES VAPEURS S 25 ÉVITER LE CONTACT AVEC LES YEUX S 26 EN CAS DE CONTACT AVEC LES YEUX, L'AVERIR IMMÉDIATEMENT ET NON DÉMARRER À L'EAU ET CONSULTER UN SPÉCIALISTE</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> F+ LEICHT ENTZÜNDBAR HIGHLY FLAMMABLE TRÈS INFLAMMABLE </div> <div style="text-align: center;"> Xi REIZEND IRRITANT </div> </div> <p>VbF: A1 950 ml</p> <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> +20°C -10°C </div> <div style="text-align: center;"> EMPFOHLENE LAGERTEMPERATUR: RECOMMENDED STORAGE TEMPERATURE: TEMPÉRATURE DE STOCKAGE PRÉCONISÉE </div> </div> <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> STEHEND LAGERN STORE UPRIGHT STOCKER DEBOUT </div> <div style="text-align: center;"> </div> </div> | <p>P. Leibinger GmbH & Co. KG Ink-Jet Markierungs-Systeme Daimlerstr.14 D-78532 Tuttlingen Tel. 07461/9286-0, Fax. 9286-199</p> <p>VERDUNNER SOLVENT 77001-00001 SOLVANT</p> <p>R 11 LEICHT ENTZÜNDBAR R 36/37 REIZT DIE AUGEN UND DIE ATEMORGANE S 7/8 BEHALTER DICHT GESCHLOSSEN AN EINEM GUT BELÜFTETEN ORT AUFBEWAHREN S 16 VON ZUNDEBLÄSEN FERNSHALTEN - NICHT RAUCHEN S 22 SAUF NICHT FEUERSTÄTTE S 25 BERÜHRUNGEN MIT DEN AUGEN VERMEIDEN S 26 BERÜHRUNGEN MIT DEN AUGEN KOMMT SÖFTESTEN MIT WASSER WEGSPÜLEN UND ARZT KONSULTIEREN</p> <p>R 11 HIGHLY FLAMMABLE R 36/37 IRRITATING TO EYES AND RESPIRATORY SYSTEM S 7/8 KEEP CONTAINER TIGHTLY CLOSED AND IN A WELL VENTILATED PLACE S 16 KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING S 22 DO NOT SMOKER NEAR BY S 25 AVOID CONTACT WITH EYES S 26 IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE</p> <p>R 11 TRÈS INFLAMMABLE R 36/37 IRRITANT POUR LES YEUX ET LES VOIES RESPIRATOIRES S 7/8 CONSERVER LE RÉCIPIENT BIEN FERMÉ ET DANS UN ENDROIT BIEN VENTILÉ S 16 GARDER À L'ÉCART DE TOUTE SOURCE D'IGNITION - NE PAS FUMER S 22 NE PAS RESPIRER LES VAPEURS S 25 ÉVITER LE CONTACT AVEC LES YEUX S 26 EN CAS DE CONTACT AVEC LES YEUX, L'AVERIR IMMÉDIATEMENT ET NON DÉMARRER À L'EAU ET CONSULTER UN SPÉCIALISTE</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> F+ LEICHT ENTZÜNDBAR HIGHLY FLAMMABLE TRÈS INFLAMMABLE </div> <div style="text-align: center;"> Xi REIZEND IRRITANT </div> </div> <p>VbF: A1 950 ml</p> <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> +20°C -10°C </div> <div style="text-align: center;"> EMPFOHLENE LAGERTEMPERATUR: RECOMMENDED STORAGE TEMPERATURE: TEMPÉRATURE DE STOCKAGE PRÉCONISÉE </div> </div> <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> STEHEND LAGERN STORE UPRIGHT STOCKER DEBOUT </div> <div style="text-align: center;"> </div> </div> |
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3. Accident prevention

The following presentation shows the measures in the event of an accident with **ink** and **solvent** with the **danger marking**

- slightly ignitable
- irritates the eyes and the respiratory organs.

3.1 Storage and handling (normal use)

GENERAL

These products must only be used at points that are free from open flames and other ignition sources. Do not use pressure for emptying – the container is not a pressure vessel. Good household practice and regular, safe removal of the waste materials restrict the danger of self-ignition and other risks of fire to a minimum. The product can charge statically. When pouring from one container to another use a mass lead. The workers must wear anti-static shoes and clothing and the floors must be conductive.

STORAGE

Observe the marking information. Store at 5 to 25°C in a warm, well ventilated location at a safe distance from heat and ignition sources and direct sunlight.

Do not smoke! Do not grant access to unauthorised persons. Open containers must be properly closed and stored upright in order to avoid leakage.

Smoking, eating and drinking must be forbidden in the storage and working areas. Always keep in containers from the same material as the delivery containers.

HANDLING

The development of combustible or explosive vapour concentrations must be prevented and vapour concentrations avoided that are above the threshold values of the employers liability insurance association. Keep containers closed tightly.

Keep sources of heat and sparks as well as open flames well away.

Use only spark-free tools. Electrical devices must be protected in accordance with the corresponding standard.

Avoid contact with the skin and eyes. Do not inhale vapours and spray mist.

3.2 First aid measures

| | |
|----------------------|--|
| EYES | Contact lenses must be removed. Rinse thoroughly with pure, fresh water for at least 10 minutes, keep eyelids spread and call a doctor. |
| SKIN | Remove contaminated clothes. Wash skin thoroughly with soap and water or with a branded skin cleansing agent. DO NOT use solvents or thinners. |
| INHALING | Take patient into the fresh air and keep warm and calm. In the event of irregular breathing or of breath being missed resuscitate artificially. Do not give anything orally, place unconscious patients on their side and call a doctor. |
| MISCELLANEOUS | In case of doubt or with persistent symptoms call a doctor. Never give anything orally to unconscious patients. |

3.3 Fire fighting measures

| | |
|-----------------------------------|--|
| EXTINGUISHING AGENTS | <u>Recommended:</u> Alcohol-resistant foam, spray water/mist, CO ₂ or powder DO NOT use water jets. Cool closed containers exposed to the fire with spray water. |
| RISK OF FIRE AND EXPLOSION | As the product contains combustible organic constituents, a thick, black smoke develops in the event of fire that contains dangerous combustion products. Decomposition products can constitute a danger to health. Extinguishing waste water must not enter the waste water channels or waters. |
| PROTECTIVE MEASURES | If necessary suitable, independent breathing apparatus is required. |

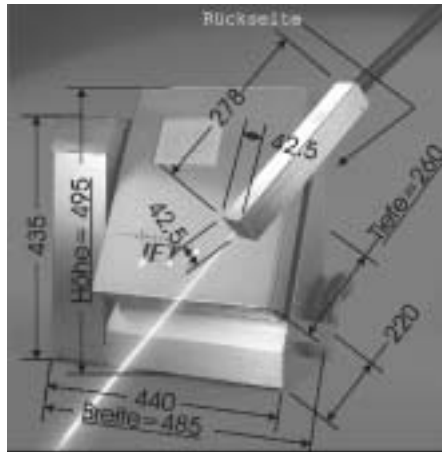
3.4 Measures in the event of accidental release (spillage)

| | |
|--|---|
| PRECAUTIONARY MEASURES | Switch off sources of ignition and ventilate room. Keep personnel that is not absolutely necessary away. Do not inhale any vapour. Observe the protective measures listed. |
| ENVIRONMENTAL PROTECTION MEASURES | DO NOT allow to enter waste water channels or waters. Should the product enter waste water channels or the drainage system the local water supply authority must be informed immediately. In the event of contamination of streams, rivers or lakes inform the national water authorities. Vapour is heavier than air and can spread out on the ground. In combination with air it can form an explosive mixture. |
| RESTORATION | Restrict and suck up spilled substances with a non-combustible absorbent material (<i>e.g. sand, earth, vermiculite, infusorial earth</i>) and collect in a suitable container for removal. Preferably clean areas with spilled substances with a detergent. Avoid solvents. |

4. Technical data

4.1 Dimensions, weights, connections

Figure 3



| | |
|-------------|--|
| Cabinet: | High grade steel Width 440 mm, depth 280 mm, height 480 mm |
| Weight: | 22 kg |
| Print head: | High grade steel housing Length 278 mm, width 42.5 mm, height 42.5 mm Length of the print head lead 3 m, available up to 12 m as an option |
| Weight: | 1 kg |

| | |
|-----------------------------------|--|
| Print head installation position: | Any installation position of the print head |
| Print head securing: | Screw thread M4 (2x) in the print head with interval 85 mm |
| Electrical connection values: | 115 - 230 V AC ,47-60 Hz |
| Power consumption: | Max. 50 VA, mains part reactive current compensated |
| Form of protection: | IP 54 (higher form of protection possible on request) |

4.2 Ambient conditions

| | |
|--------------------|---|
| Temperature range: | + 5° C to + 45° C (no rapid change of temperature) |
| Relative humidity: | Max. 90 % relative humidity (non-condensating) |

4.3 System interfaces

| | |
|---|---|
| Product sensor: | 5-pole connection bush, 24 V, 100 mA, for optical, inductive, capacitive proximity switch NPN/PNP types |
| Pressure synchronisation: (optional) | Digital incremental shaft encoder with 12-pole bush on the rear side of the cabinet (5 V, EIA 422 A) |

| | |
|------------------------|--|
| Potential free inputs: | Optional 12 for special functions |
| Outputs: | NPN 24 V, 500 mA, e. g. for device status and error notifications |
| Data entry: | Standard ASCII characters via V 24/RS 232 Data buffering in the event of voltage failure Transmission speed 38400 Baud |

4.4 Power parameters

| | |
|-------------------|--|
| Printing power | Character height: approx. ■ min.: 0.8 mm ■ max.: 12 mm, depending on form of font, head distance, nozzle diameter, ink and product surface (e.g. 40 prints/sec with 10 characters) |
| Writing speed | max. 2700 characters/s (at 96 kHz) |
| Character density | e.g. 26 characters/80 mm at 140 m/min product speed (5x5 matrix) (see calculation of the inscription speed in the group Appendix) |

4.5 Font forms

All type forms can be combined as desired in the writing
Printing of 1-4 lines or 24 dot matrix
Double spaced type, rapid
Micro type
Chimney type 5x7 matrix
Negative type
Capitals and non-capitals, umlauts, special characters
Matrix forms: 5x5, 7x5, 9x5, 9x7, 16x10, 11x8,
12x8, 14x10, 24x24,
Bern 16 (16x11-matrix),
Bern 24 (24x18-matrix)
Barm 16 (16x12-matrix)

Graphics
Graphics character record
Graphics 1 to 24 dot
Bold print
Contrast type

Bar code 1 to 24 dot
Bar code 39 without plain type
Bar code 39 with plain type
Bar code 2 from 5 interleaved without plain type
Bar code EAN 8 with plain type
Bar code EAN 13 with plain type
Bar code UPC A with plain type
Bar code UPC E with plain type
Code128 B
Code128 C
Postnet
Data Matrix
Kanji 7x 8 / italics 7x5, Kanji 9x 9,
Kanji 16x16, Kanji 24x24
Pers 9x 9, Pers 16x11
Double spaced rapid, 7x5
Double spaced: 1st line 7x5, 2nd line 16x10
Double spaced: 1st line 16x10, 2nd line 7x5
Double spaced rapid, 5x5
Double spaced: 1st line 9x5, 2nd line 5x5
Double spaced: 1st line 5x5, 2nd line 9x7

4.6 Forms of printing

Double interval
Texts backwards
Symbols mirror inverted
Symbols mirror inverted and upside down
Symbols mirror inverted, upside down and text backwards
Reciprocally legible type matter, reverse
Bold print, inverse

4.7 Font combinations

All type forms can be shown in any form desired in one type matter in the desired matrix.

4.8 Manner of working

Fully automatic manner of working through:

- Automatic jet closure, the print head is ready for writing immediately following starting up
- Automatic, electronic drop call-off regulation for compensating changing ambient and operating temperatures.
- Automatic viscosity regulation
- Ability to refill ink and solvent during writing operation

4.9 Software

- Selectable print delay or print repetition
- Any desired combination of constant and variable texts within a print line
- Continuous counter numbering with selectable increment or decrement, starting value, limit value
- Current date and time inscription, original date
- Freely programmable presentation of graphics, Japanese or Chinese characters with a high resolution
- Job administration allows the storage and the calling up of texts and of all print relevant parameters
- Bar codes (e.g. bar code 39, EAN 8/13 and code 2/5 interleaved)
- Text organiser
- Counter marking
- Shift operation

5. Transport/Start up (Putting into service)

5.1 Transport, storage, shipping

In order to avoid damage during transport the following instructions must be observed.

The LEIBINGER-JET 2 must only be transported in a standing position. It is packed in a cardboard box with special polystyrene inserts for safe dispatch during delivery. Transport of the device must only be made in this packing in order to avoid damage.

Note! Storage temperatures below +5°C and above +50°C as well as storage at outside are not admissible and can lead to damage!

5.2 Mounting



Caution – risk of explosion!

The device must not be operated in rooms where there is a risk of explosion!

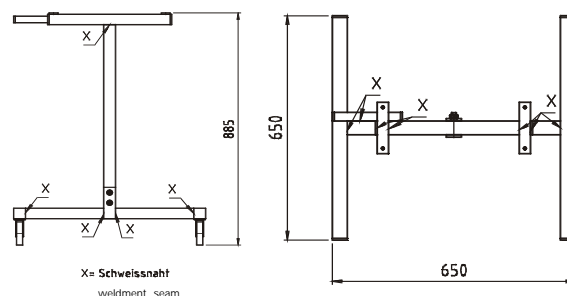


Installation of the device

The device must be installed in a well ventilated room only and must be kept away from any source of heat, flame or sparks, e.g. radiant heater, etc.

Check device for damage! When determining a suitable place of setting up, the necessary additional space requirement for the movement room of the operating and service personnel must be taken into consideration. Solvents are processed in the device, adequate room ventilation must be ensured!

Figure 4

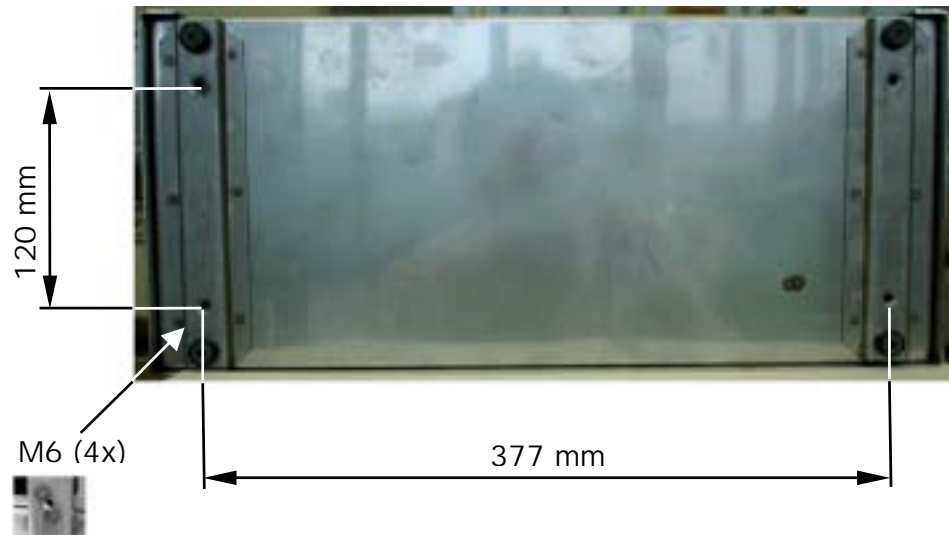


*Movable underframe
for LEIBINGER-JET 2:
54-002 601 KA*

For this it is expedient to place the device on a device support.

The device has four fastening possibilities for secure setting up and should be screw connected at the place of setting up.

Figure 5



A place of setting up with sufficient load bearing capacity and stability must be chosen. Prior to assembly the place of setting up must be cleaned of dirt and contamination (residue of lubricants etc.) .

5.3 Installation

For the adaptation to a production line various work must be carried out prior to commissioning and operating parameters set.

5.3.1 Mains connection



Mains connection!

The device has no mains switch and must only be connected to a plug socket in the direct vicinity of the place of setting up!

The LEIBINGER- JET 2 must be connected to alternating current 115 - 230 V AC, 47 – 60 Hz with a corresponding plug. **The plug socket should be equipped with a clear marking (e.g.: LEIBINGER-JET 2).**

5.3.2 Data interface X2

The operation of the LEIBINGER-JET 2 is normally done via the LCD touch display. The RS 232 input on the rear side of the device (9-pole plug, female, interface X2) can be used as an external data interface for connection to a PC, notebook or host. The standard baud rate is 38400 Baud.

For older software versions the baud rate can be reduced to 9600 baud with the help of a special bridge plug. Further more a special plug to increase the transmission rate to 115200 is obtainable on request.

The interface enables the downloading/running of software, of jobs and of graphic symbols. A special connection cable and the Leibinger LJ-FLASH program is required to use this function.

Further more this interface can be used via a PC for a comfortable programming of one or more Leibinger-Jet 2. For this you would need additionally the Leibinger-software Win Jet.



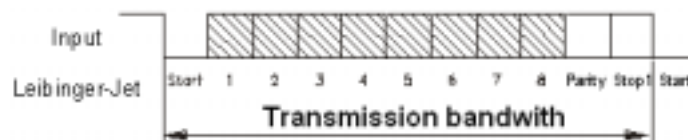
When using a personal computer with RS 232 C interface a maximum connection cable length of 10 metres should not be exceeded, with greater transmission distances the use of an RS 422 connection is recommended.

5.3.2.1 Transmission protocol for operating system L JOS

The programming device that is connected to the LEIBINGER-JET 2 must work with the following transmission protocol:

- Asynchronous Mode
- 1 stop bit
- 8 bit/character
- Parity = no parity, no parity calculation

Figure 6



5.3.3 Print Go interface X5 (print triggering)

For the creation of the print triggering (print go signal) a 5-pole plug socket **X5** is assembled on the rear side of the device on which an external print go signal can be fed in.

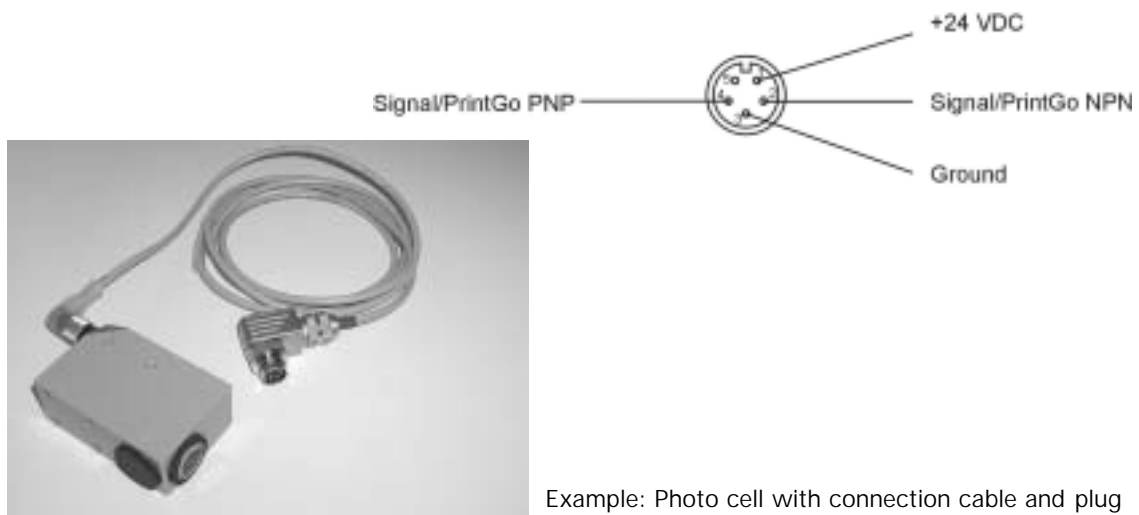
The signal can be created with a bounce free and potential free contact (inner resistance $\leq 1 \text{ k}\Omega$) or with electronic PNP/NPN proximity switches (observe Pin assignment in the connection plug).

A supply voltage of 24 V DC, 100 mA for sensors can also be taken from the plug socket (**X5**) on the rear side of the device.

The print go signal is created through a signal jump. A shaft encoder must be used in addition for the synchronisation of the print speed with the product speed (with variable speed).

Figure 8

Plug X5 for product sensor at the backside of the electronics cabinet.



5.3.4 Shaft encoder

5.3.4.1 Description and pin assignment

With a variable product speed a shaft encoder must be used for the synchronisation of the print speed with the product speed or for the regulation of the constant type width. Shaft encoders with 5 volt logic and line drivers as per EIA 485 A or EIA 422 A can be used. The transmission ratio between product and shaft encoder speed should be selected in such a manner that a maximum output frequency of 150 kHz is not exceeded.

Shaft encoders with 1000, 2500, 5000 and 10000 impulses/revolution are available.

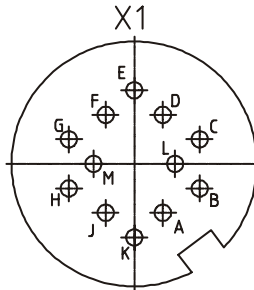
Leibinger ordering number: see group replacement parts

With more difficult operating conditions (dust or humidity) shaft encoders with IP 66 form of protection should be used.

Figure 9



Pin assignment



| Pin | Signal | Colour |
|-----|-------------------|------------------------|
| A | + 5V | BN 0,5mm ² |
| B | GND | WH 0,5mm ² |
| C | | free |
| D | A | BN 0,14mm ² |
| E | \overline{A} | GN 0,14mm ² |
| F | B | GY 0,14mm ² |
| G | \overline{B} | PK 0,14mm ² |
| H | ZERO | RD 0,14mm ² |
| J | \overline{ZERO} | BK 0,14mm ² |
| K | | free |

Example: Shaft encoder with connection cable and plug

Should alternative shaft encoders be used, the minimum impulse issued should be 3 impulses /mm in order to achieve a sufficient resolution!

5.3.4.2 Mechanic installation



With mechanic installation of the shaft encoders in all cases attention must be paid to ensuring that the encoder is protected from axial and radial burdening during assembly and in continuous operation. For this a folding bellows or synthetic material coupling is used.

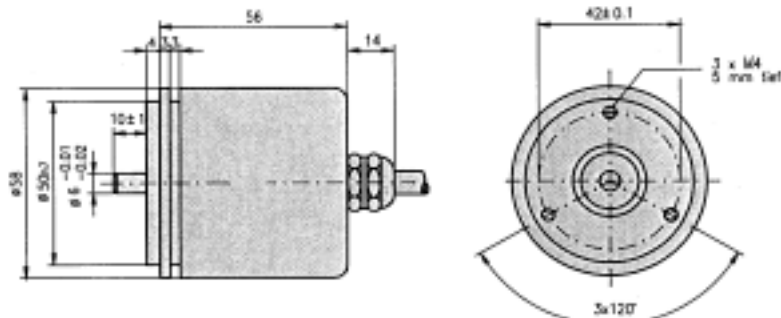
If the circumstances allow the shaft encoder can also be adapted to a production line with a frictional wheel.



Attention – risk of injury!

Your fingers could get caught between the frictional wheel and the production line. Keep your hands outside the danger area.

Figure 10



Leibinger ordering number: see group replacement parts

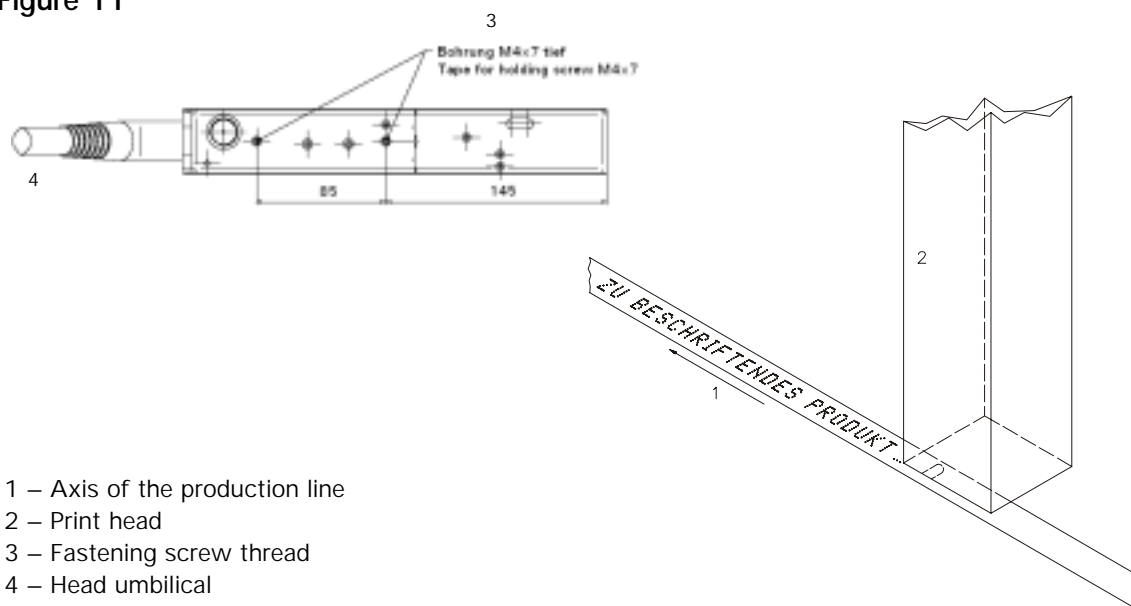
5.3.5 Print head

The print head must be assembled to the product to be inscribed in such a manner that the opening in the head cover is vertical to the direction of movement of the product. It can be installed horizontally, vertically, from above or from below.

In the event of installation from below the penetrating of dirt into the print head must however be prevented (head ventilation – option/article no.: 54-002 322 SA).

The print head assembly unit should be designed in such a manner that rapid separation of the print head from the machine is possible for cleaning purposes. Two screw threads M4 x 7.00 deep are available for secure fastening!

Figure 11



- 1 – Axis of the production line
- 2 – Print head
- 3 – Fastening screw thread
- 4 – Head umbilical



The print head must be secured vibration free. The head umbilical of the print head must not go statically below a radius of R35 and dynamically below a radius of R90!

The distance of the print head to the product depends on the print height. The lower the required print height the smaller the distance of the print head to the product must be (type quality better with lesser interval). **Recommended is a distance of ≈ 8 mm!**



Installation of the print head

The operating staff must not be exposed to danger due to the installation of the device in a production plant. Moving products under the print head may cause risk of crushing/cutting. The instructions of the machines directive must be strictly adhered to.

5.4 Start up (Putting into service)

5.4.1 Initial start up in an empty condition



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***



Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!



This work must only be carried out by trained personnel or by Leibinger service technicians!

Check device for dirt! More detailed information on the components described below can be found in the group **Operation** in the chapters **Structure and description of the device**.

Print head

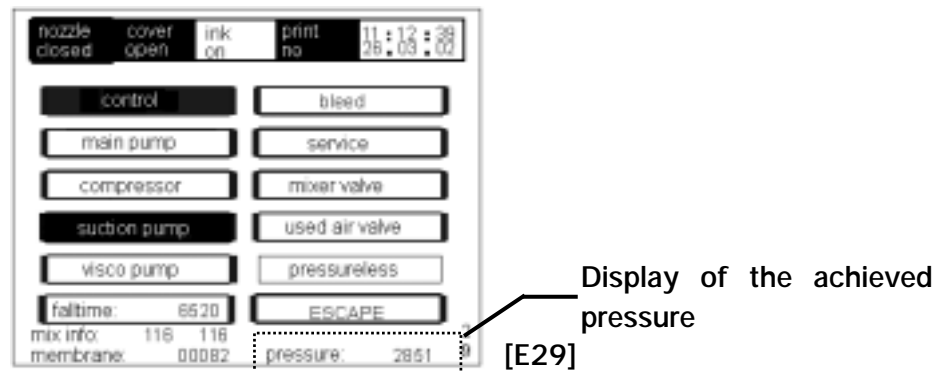
Remove the head cover. Check the deflector unit as well as the charging electrode for dirt or transport dust and if necessary blow out with compressed air. Switch on ink switch (ink on – switch upwards).

Refilling unit

The storage containers were emptied before dispatch so as to prevent the flowing out of ink and solvent and as a result damage during transport. Consequently the device must be filled before the initial start up. Details of the filling process can be found in the group **Equipping/maintenance** in the chapter **Refilling of ink and solvent!**

Recreate mains connection and switch on the LEIBINGER-JET 2 with the LCD touch display. Details on the switching on procedure can be found in the group **Operation** in the chapter **Operating procedures and operating elements!** Following switching on the device is bled automatically i.e. the ink is automatically pumped from the storage container into the pressure tank. This procedure can last up to 5 minutes.

The operating pressure must rise to the value set in the menu level <E43> ("Main menu ► service/test/system parameter ► /service/test & diagnostics ► hydraulic test & parameter ► service menu"). The operating pressures are approx. 3 bar/70µm jet or approx. 4 bar/40 mm jet. The pressure achieved can be read in the menu level <E29> ("Main menu ► service/test/system parameter ► service/test & diagnostics ► hydraulic test & parameter").



Should the operating pressure not be built up after approx. 30 seconds, if necessary the function of the main pump and of the compressor must be checked!



In the display the pressure is shown in mbar i.e. a display value of 3000 stands for 3 bar.

An error notification that may possibly be displayed "*Ink tank is low level please refill ink!*" must be confirmed by tapping on the status field or ink refilled. The filling procedure has been concluded when no refill error appears.

Place on the head cover of the print head and press the status field <nozzle closed>. The jet opens and the status display changes.

If the notification "Print Yes" appears in the status field <print> the LEIBINGER-JET 2 is ready for operation. The data can now be entered as described in the group **Operation** in the chapter **Operating procedures and operating elements** as well as in the group **Data entry**.

5.4.2 Initial start up in a full condition



Dangerous electrical voltage!

*Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!*



Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!



This work must only be carried out by trained personnel or by Leibinger service technicians!

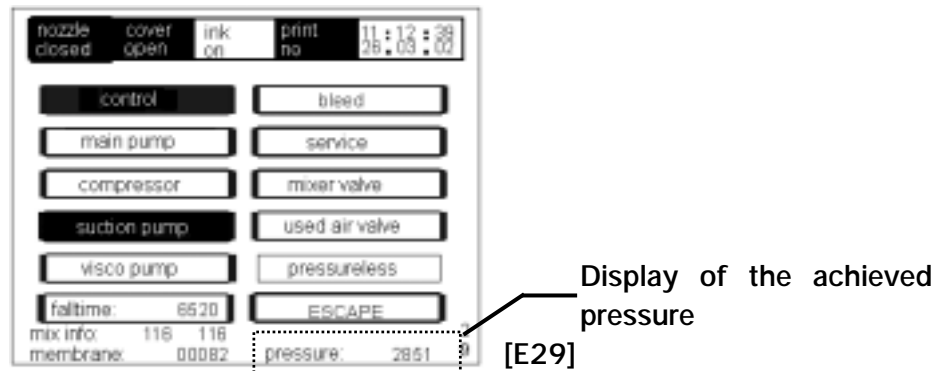
Check device for dirt! More detailed information on the components described below can be found in the group **Operation** in the chapters **Structure and description of the device**.

Print head

Remove the head cover. Check the deflector unit as well as the charging electrode for dirt or transport dust and if necessary blow out with compressed air. Switch on ink switch (ink on – switch upwards).

Recreate mains connection and switch on the LEIBINGER-JET 2 with the LCD touch display. Details on the switching on procedure can be found in the group **Operation** in the chapter **Operating procedures and operating elements!** Following switching on the device is bleed automatically i.e. the ink is automatically pumped from the storage container into the pressure tank. This procedure can last up to 5 minutes. The operating pressure must rise to the value set in the menu level **<E43>** ("Main menu ► service/test/ system parameter ► service/test & diagnostics ► hydraulic test & parameter ► service menu"). The operating pressures are approx. 3 bar/70µm jet or approx. 4 bar/40 mm jet. The pressure achieved can be read in the menu level **<E29>** ("Main menu ► service/test/ system parameter ► service/test & diagnostics ► hydraulic test & parameter").

Should the operating pressure not be built up after approx. 30 seconds, if necessary the function of the main pump and of the compressor must be checked!



In the display the pressure is shown in mbar i.e. a display value of 3000 stands for 3 bar.

Press the status field < **nozzle closed** > . The jet opens and the status display alters. A check must ensue as to whether the ink jet escapes or enters the gutter. Otherwise switch off ink by pressing the ink switch and clean jet as described in the chapter **Cleaning of the jet**.

Place the head cover of the print head back on again.

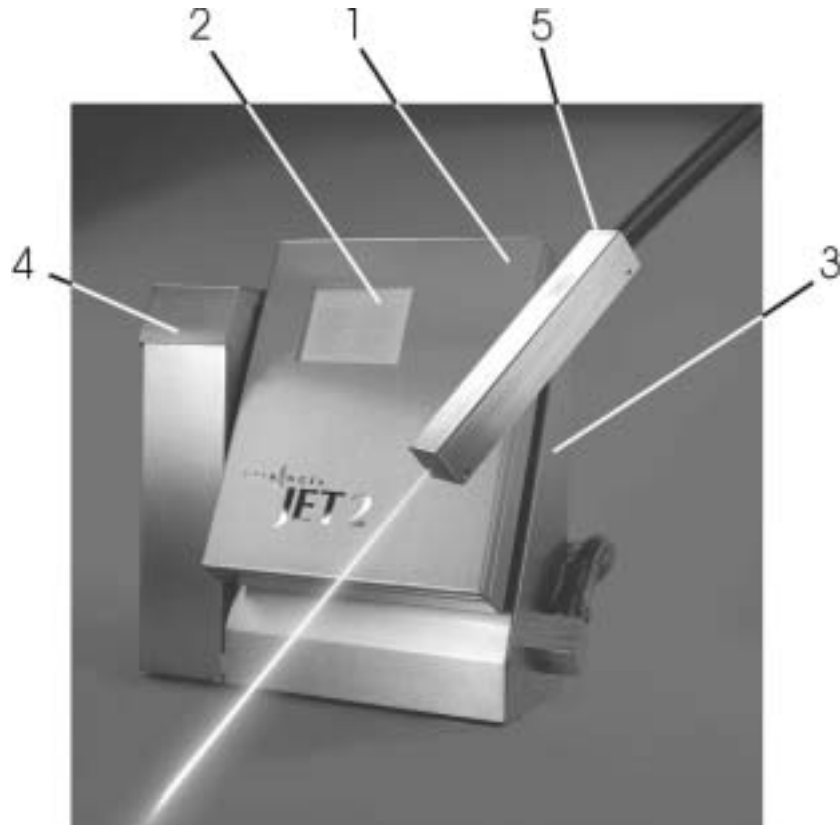
If the notification "Print Yes" appears in the status field < **print** > the LEIBINGER-JET 2 is ready for operation. The data can now be entered as described in the group **Operation** in the chapter **Operating procedures and operating elements** as well as in the group **Data entry**.

6. Operation

6.1 Construction/Structure

The LEIBINGER-JET 2 high performance printer is manufactured from a solid high grade steel cabinet. It consists of the following main components.

Figure 12



- 1 – Electronics cabinet
- 2 – LCD touch display
- 3 – Hydraulics cabinet
- 4 – Refill unit
- 5 – Print head with head umbilical

The fundamental electronic components of the LEIBINGER- JET 2 such as the mains part, the LCD touch display and the controller board are accommodated in the **electronics cabinet**.

The **LCD touch display** serves the display of the system conditions of the LEIBINGER-JET 2 and the operation of the device.

All components that are necessary for the conveying and preparation of the ink are accommodated in the **hydraulics cabinet**.

The **refill unit** serves the supply of the consumables. It contains two separate storage containers for ink and solvent.

The **print head** contains all mechanical, electronical and hydraulic components that are necessary for the creation of an inscription. It is connected to the hydraulics cabinet via a flexible tube. Screw threads for secure fastening are integrated into the cabinet of the print head.

6.2 Functional principle

6.2.1 Method of working

The Leibinger-Jet 2 works in accordance with the continuous ink jet process. In this a constant ink jet is emitted from a jet nozzle which is broken down into a series of equal size drops under the influence of mechanical oscillations.

If required these drops are individually charged up electrostatically and deflected into a constant electrical field depending on the charge. As a result not just one point but rather a line of points can be applied contact-free with one jet. If the product used is moved vertically to the drop deflection two-dimensional patterns (characters) can be created.

The drops that are not required for a programmed inscription are not charged and flow uninfluenced through the electrical deflection field into a gutter. In the gutter the drops are sucked up by a suction pump and fed back into the ink tank. Depending on the application alphanumeric data can be entered with the LCD touch display.



Data for font and texts are stored in the device (even in the event of power failure). If required it can be called up, altered or deleted quickly and easily.

6.2.2 Drop creation

During the drop creation the ink is pressed through a jet nozzle under pressure and at the same time modulated in such a way by highly frequent sinus oscillations that are imposed on the drop that it attaches itself to the nodal points of the oscillations and breaks down into individual drops at a specific distance l_A (*please see the following figure "Creation of a character"*) from the jet. The oscillations are created with an oscillatory system that is excited by a Piezo oscillator.

6.2.3 Drop charging

In order to be able to charge the drops it is necessary for the ink to have electrical conductivity. This is possible through the use of specific salts that dissociate in the solvent used. The drop brake-off point of the modulated jet is automatically set in such a manner that this happens inside the charging electrode.

The drops can now be charged up by creation of voltage between jet and charging electrode, because they are given a negative charge through the charge shift resulting in the charge electrode gap. A specific charge voltage is clearly allocated for each drop charge.

6.2.4 Drop deflection

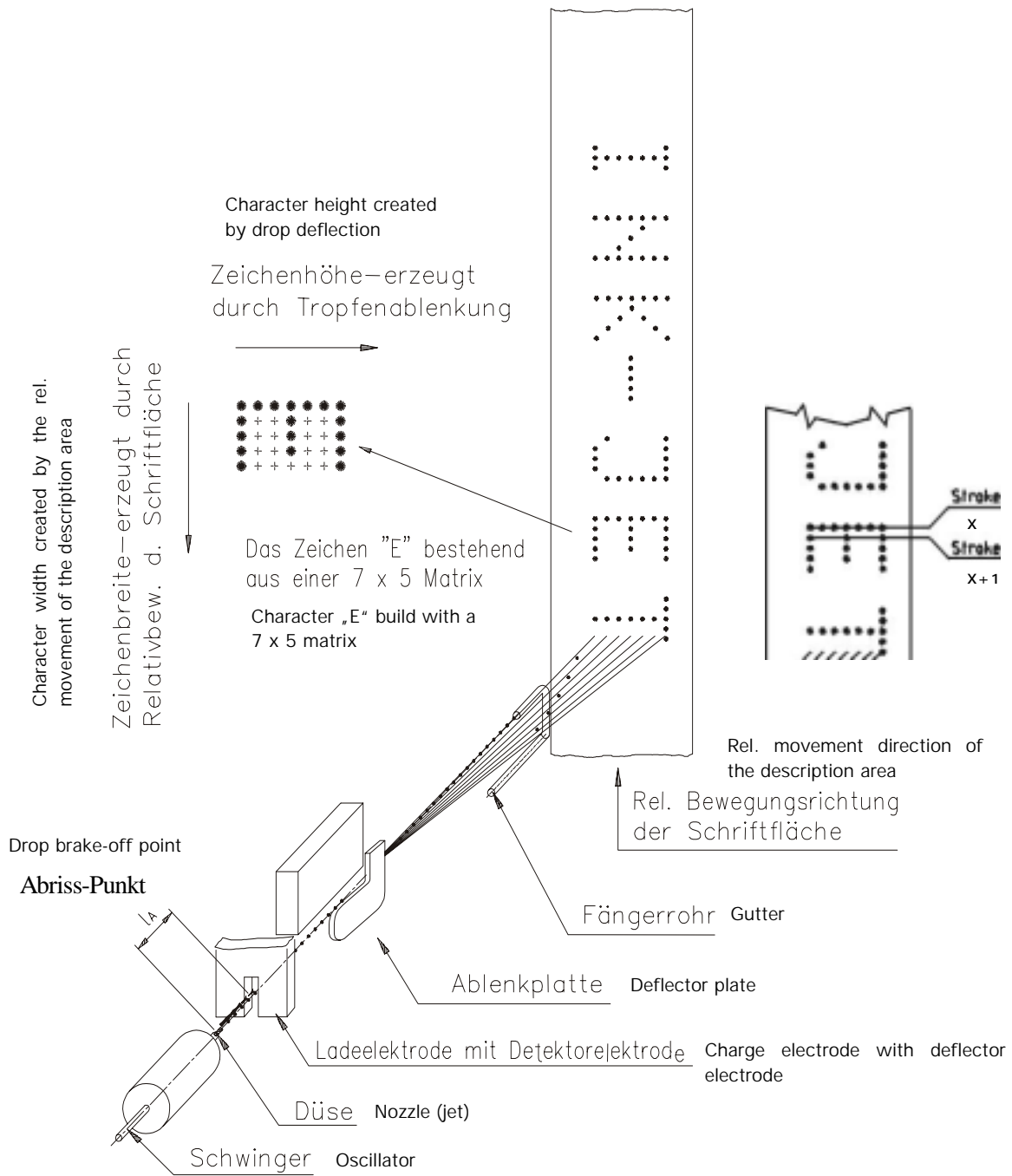
After the drops have left the charging electrode they fly through an electrical field. Here, those droplets that were previously charged in the charging electrode are deflected. The drops that have not been charged fly straight ahead into the gutter. Here they are sucked up and fed back to the circular flow of ink. The charged drops are only deflected in one direction, the other direction is performed by the product to be inscribed.

6.2.5 Creation of a character

Each character is defined by a two-dimensional matrix, e.g. 7 x 5. An ink drop can be assigned to every point of intersection. The character is formed by deflecting the ink drops in a vertical direction and by moving the product which is to be imprinted horizontally. The ink drops which are not to be positioned are not given electrostatic charges in the charging electrode, and pass through the electrical field without being deflected and on into the gutter tube. The values needed for generating the charge voltages for each individual character are stored in memory devices (FPROMS) on the controller board.

6.2.6 Summary of the individual procedures

Figure 13



Creation of a character

6.3 Operating procedures and operating elements

6.3.1 LCD touch display

6.3.1.1 Switching on/switching off procedure

Figure 14

The LEIBINGER-JET 2 is switched on by touching any point of the touch display (1) that is still dark. Contact duration approx. 2 sec.

The start screen with the software-version number (2) and the execution identification (3) are displayed for 3 sec..

Information about execution identification:

64 = Actual frequency 64 KHz

96 = Actual frequency 96 KHz

n = for non-pigmented ink

p = for pigmented ink

The entire control is performed via the touching of the touch fields. The fields are activated by light touching with the finger or the touch pen (included in the scope of delivery) whereby the precision and not the pressure is decisive.

Only fields with **bold** frames are active and operable. Thinly edged fields (buttons) are currently not operable.

Now the device starts automatically with the bleeding of the system. The bleeding lasts between 1-5 minutes. During the procedure the notification "**BLEED**" flashes in the **status line** (4). The bleeding procedure is ended by pressing the **status line**. Following ending or after cancellation of the bleeding the **status display** (3) of the device alters (*see following figure*).

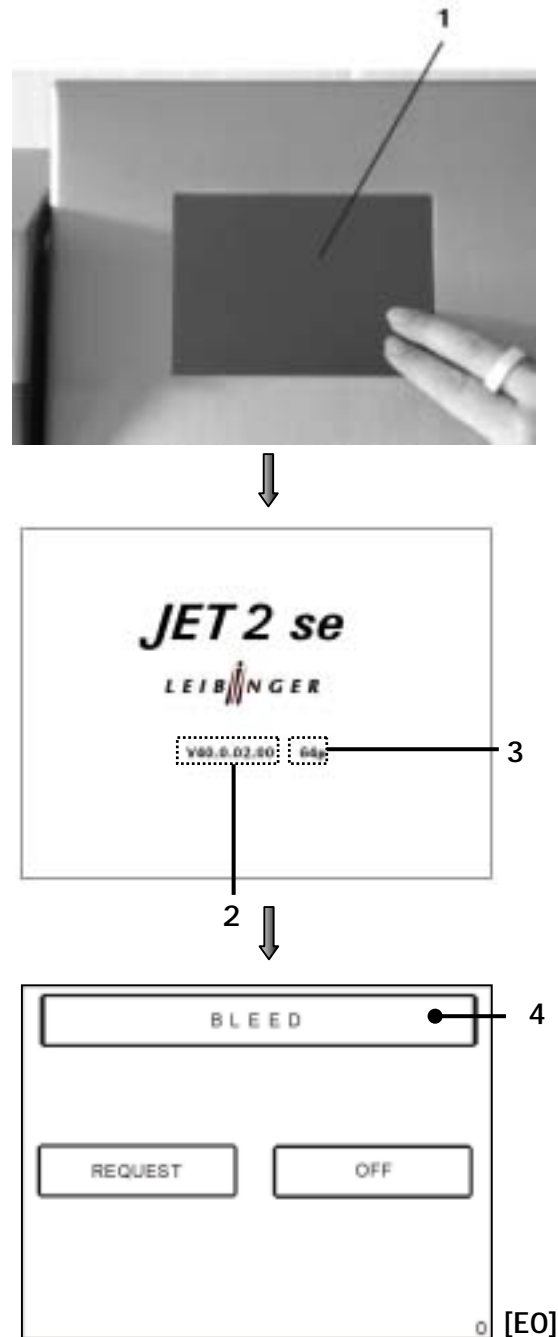
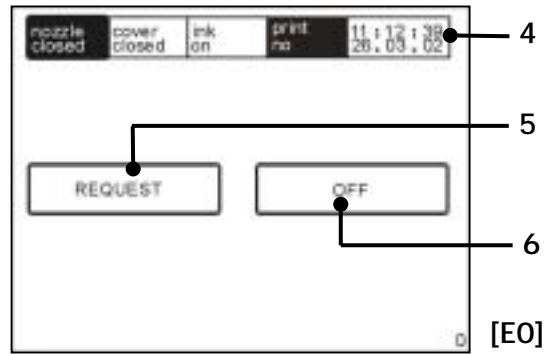


Figure 15

The touch field <request> (5) calls up the basis level <E1> .

The device can be switched off with the touch field <off> (6).



Unintentional touching can trigger undesired device conditions.

After switching off approx. 5 seconds must pass before the device can be switched on again.

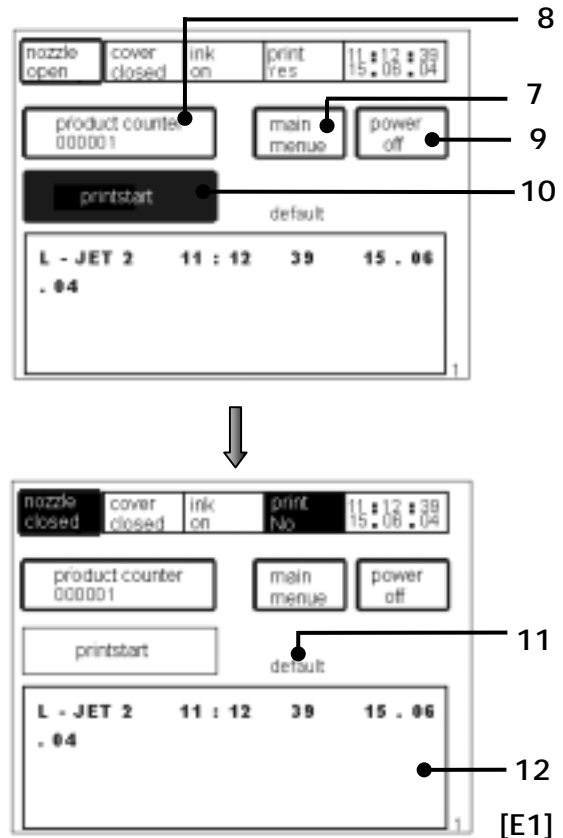
Figure 16

The following functions and displays are available in the basic level.

The touch field <main menu> (7) opens the programming level <E2> for the selection of print jobs etc.. More detailed information on this subject can be found in the group **Data entry**.

In the touch field <product counter> (8) the current values of the product counter are displayed. The counter can be reseted by pressing on this field (8).

<Power off> (9) leads back to the level <E0>. Switching off of the device is only possible after carrying out of a print stop and with the nozzle closed.



With the touch field <printstart> (10) the print order is released for performance. It is printed as soon as a Print Go is triggered. When a print procedure is running the display of the field changes to <printstop>. To be able to perform a print order a text must have been entered or an existing job selected. Further information on this subject can be found in the group **Data entry** in the chapters **Text administration and job administration!**

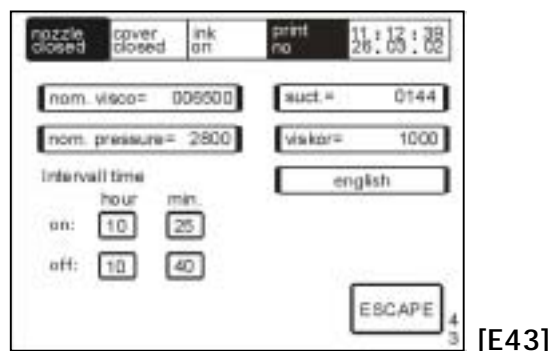
The display (11) shows the name of the active job. The text to be printed is shown in the field (12). The display of the text shown is updated when printing is started (e.g. when printing counters).

6.3.1.2 Interval operation



The device must be connected to the electricity mains.

The device switches itself on automatically independently of the ambient conditions!



In the switched off state the integrated interval function activates the LEIBINGER-JET 2 automatically in accordance with the times set in the menu level <E43> ("Main menu ► service/test/ system parameter ► service/test & diagnostics ► hydraulic test & parameter ► service menu").

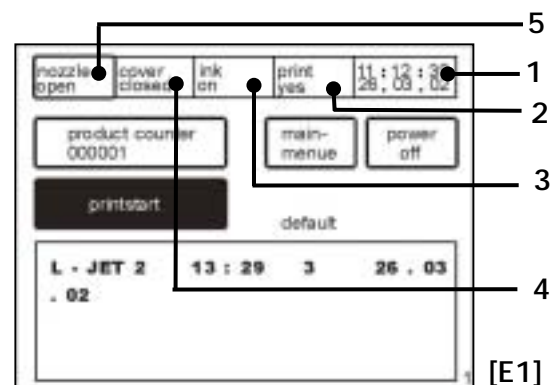
By means of the circulation of the ink it is ensured that in cases of extended idle periods no drying of the ink or depositing of ink constituents results. The viscosity of the ink remains constant.

Further information about the entry of the interval times can be found in the chapter **Hydraulic test and parameters!**

6.3.1.3 Status line in normal operation

Figure 17

In normal operation the status line indicates notifications on device condition and processes, date and time. The active processes are shown deposited (inversely). The following status fields are shown:



Date/time <1> the upper line shows the time, the lower line the date.

Print <2> displays the readiness for printing (YES/NO).

Ink <3> displays the position of the ink switch (on/off). The ink switch is installed on the print head.

Cover <4> signals whether the cover of the print head (open/closed) is closed or open.

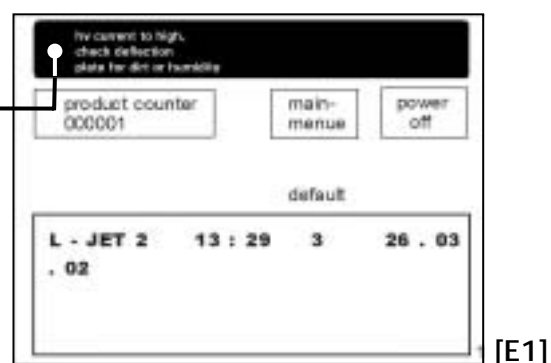
Nozzle <5> indicates the current operating status of the nozzle (open/opens/closes/closed). The field also functions as a touch field for opening and closing the nozzle (jet).

6.3.1.4 Status line in error condition

The error notifications are shown flashing in the status line of the LCD touch display. The error notification texts contain the error denomination, the possible cause of the error or the possible error removal measures. The error is acknowledged by touching the touch field <Error notification> (status line).

Figure 18

Status line with error notifications
(specimen illustration)

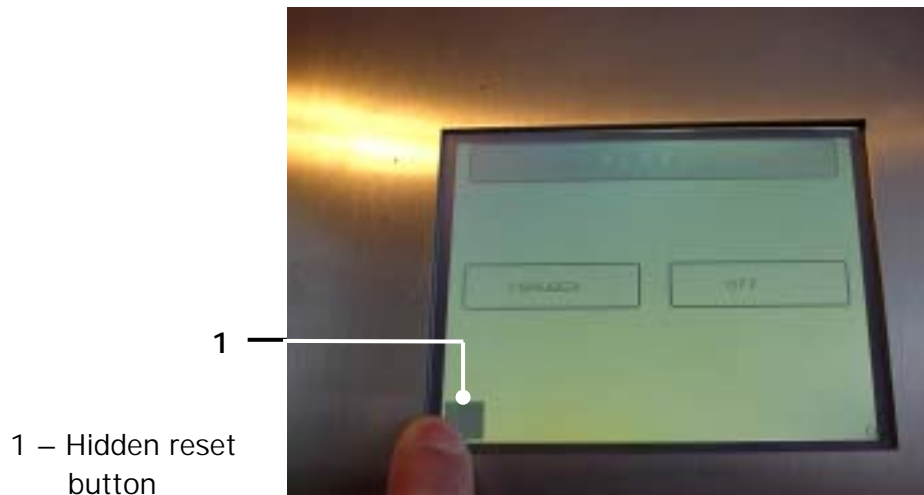


6.3.1.5 Software Reset

Hidden reset button (defined position on the touch screen):

With this hidden reset button a factory setting can be carried out when switching on the device. The device is started with the standard settings and a default job, i.e. type height/width, bar code and print start parameters are reseted.

Figure 19



The consequences of a reset must be observed!

Manner of proceeding:

- On the printer that is switched off, you have to touch the LCD touch display on the left bottom corner until the printer will switch on (*please see figure above*).
- After some seconds a small black square will appear exactly under your finger and will disappear again after some more seconds.
- The finger has to stay in this position until the square has disappeared and must not taken away before!



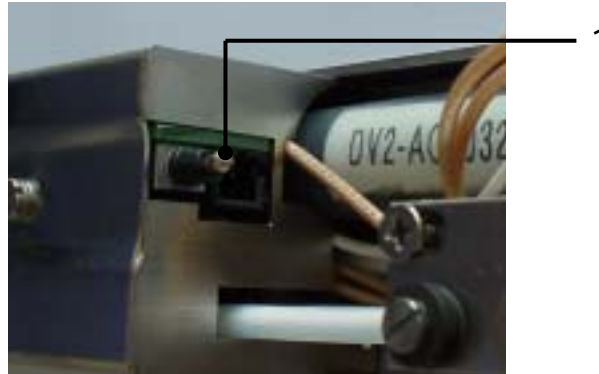
Attention!

Keep the square pressed until it has disappeared.

6.3.2 Ink switch

The ink switch is installed in the print head and serves the switching on and off of the ink conveying.

Figure 20



1 – Ink switch

6.3.3 Hardware Reset

Reset switch:

Enables the resetting of the electronics in the event of an error. It is accommodated in the electronics cabinet.

Figure 21



1 – Reset switch

6.3.4 Potentiometer – Display illumination

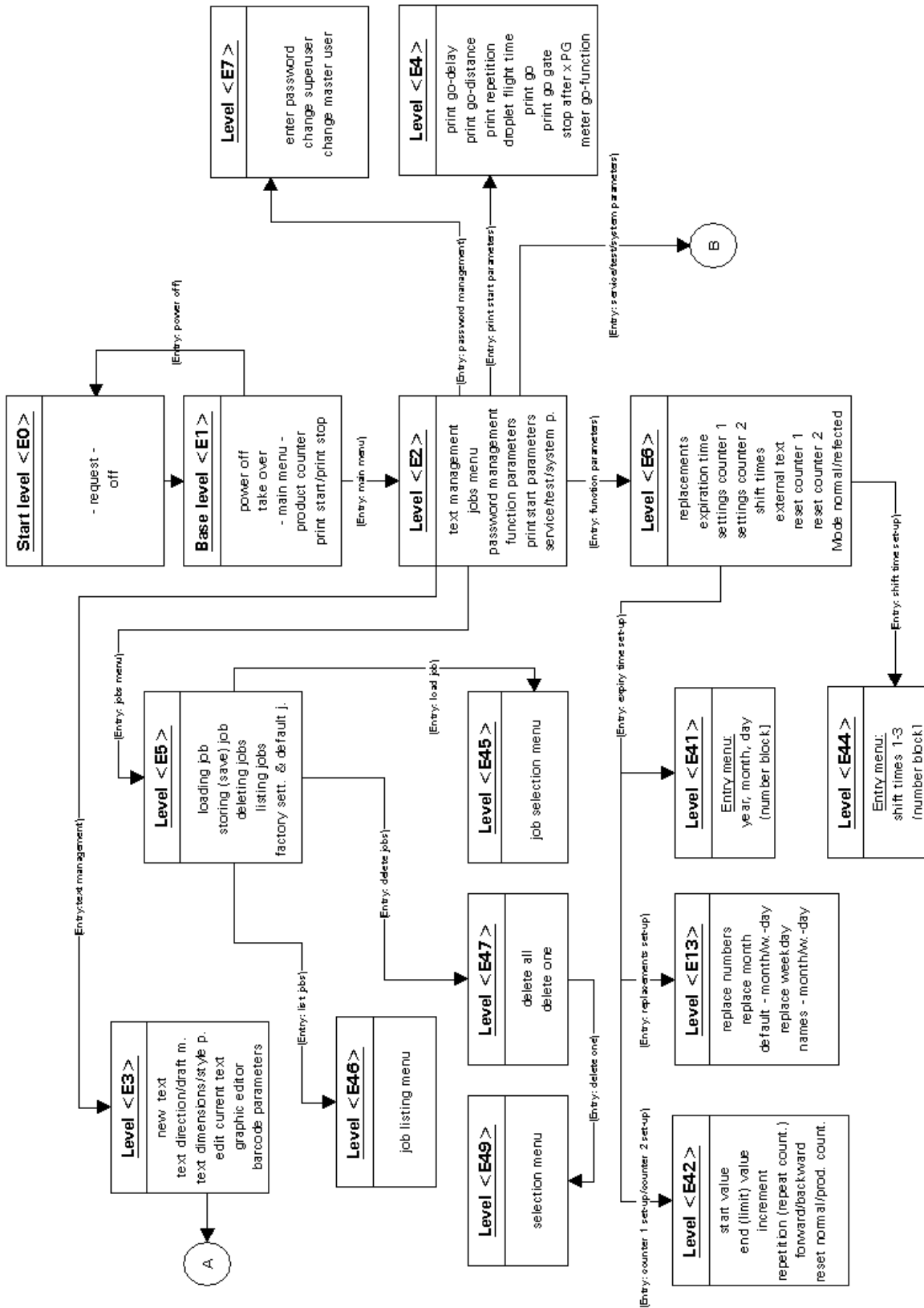
Allows for the adjustment of the display brightness. By means of turning the adjusting screw the brightness can be adapted to the ambience condition in order to ensure optimum readability. The potentiometer is located in the electronics cabinet on the controller board (*also see figure in chapter 6.5.2*).

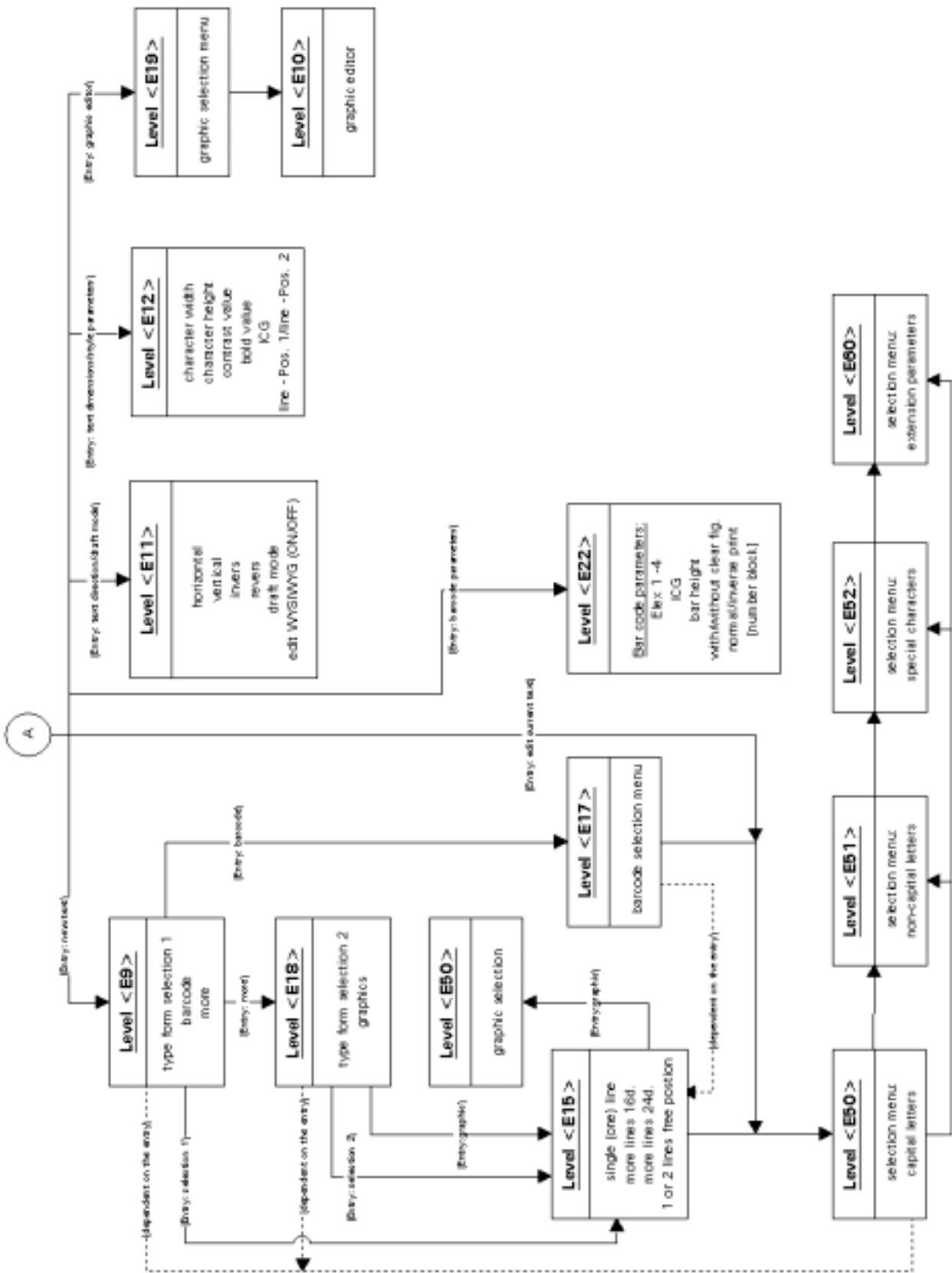
Figure 22



1 – Potentiometer
- Display illumination

6.3.5 Menu structure



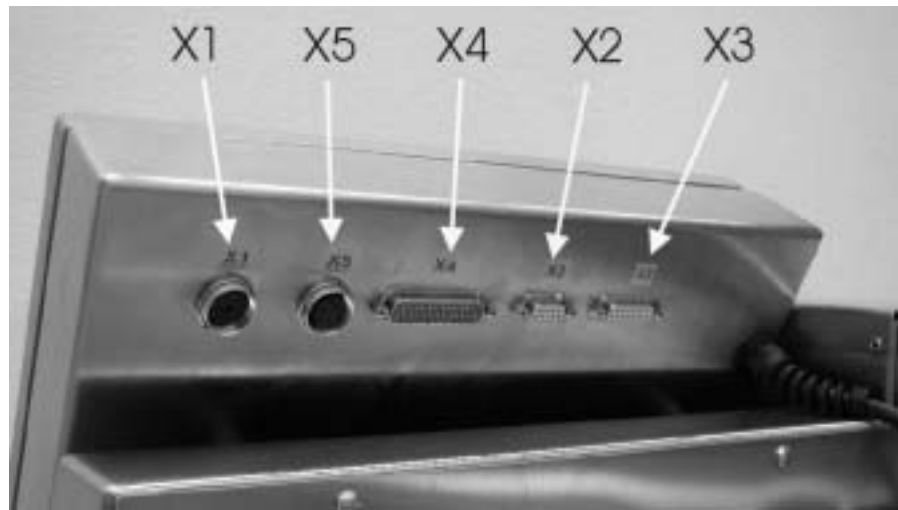


6.4 Interfaces

The following interfaces are available on the rear side of the electronics cabinet.

Figure 23

- X1 – Shaft encoder
- X2 – Data RS 232
- X3 – Outputs
- X4 – Inputs
- X5 – PrintGo



6.4.1 Data interface X2

On the **9-pole SUB-D bush** an external PC can be connected for data entry using a corresponding connection cable.

6.4.2 PrintGO interface X5

Figure 24

On the **5-pole diode bush**, depending on the PIN occupation, PNP or NPN product sensor or potential-free contact can be connected for triggering the print.

Article no.: see group **Replacement parts - periphery**



6.4.3 Shaft encoder interface X1

Figure 25

On the **12-pole diode bush** a shaft encoder can be connected for the synchronisation of the product speed with the print speed.

Article no.: see group **Replacement parts - periphery**



Should alternative shaft encoders be used the minimum impulse issue should be 3 impulses/mm in order to achieve an efficient resolution!

6.4.4 Optional outputs X3

7 outputs NPN 24 V, 500 mA are available (*please see chapter 12.2 "Interface layout plan"*).

6.4.5 Optional inputs X4

12 potential-free inputs are available for special functions (*please see chapter 12.2 "Interface layout plan"*).

6.5 Description of the device

6.5.1 Electronics cabinet with LCD touch display

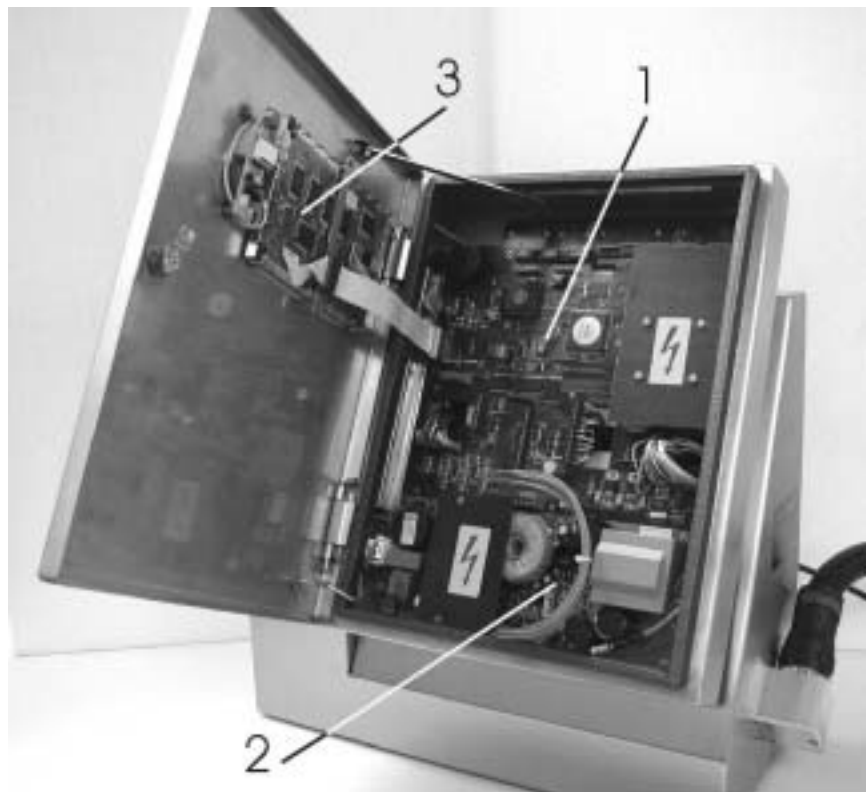


Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the power supply system prior to opening. Remove mains plug!***

The fundamental electronic components of the LEIBINGER-JET 2 such as the mains part, the LCD touch display and the controller board are accommodated in the electronics cabinet.

Figure 26



- | | |
|-----------------------|----------------|
| 1 – Controller board | (54-004 444 S) |
| 2 – Power supply | (54-001 949 K) |
| 3 – LCD touch display | (54-001 948 S) |

For service purposes the housing can be opened from the front. Following undoing of the securing screws the individual structural components can be replaced.



This work must only be carried out by trained personnel or by Leibinger service technicians!

6.5.2 Controller board

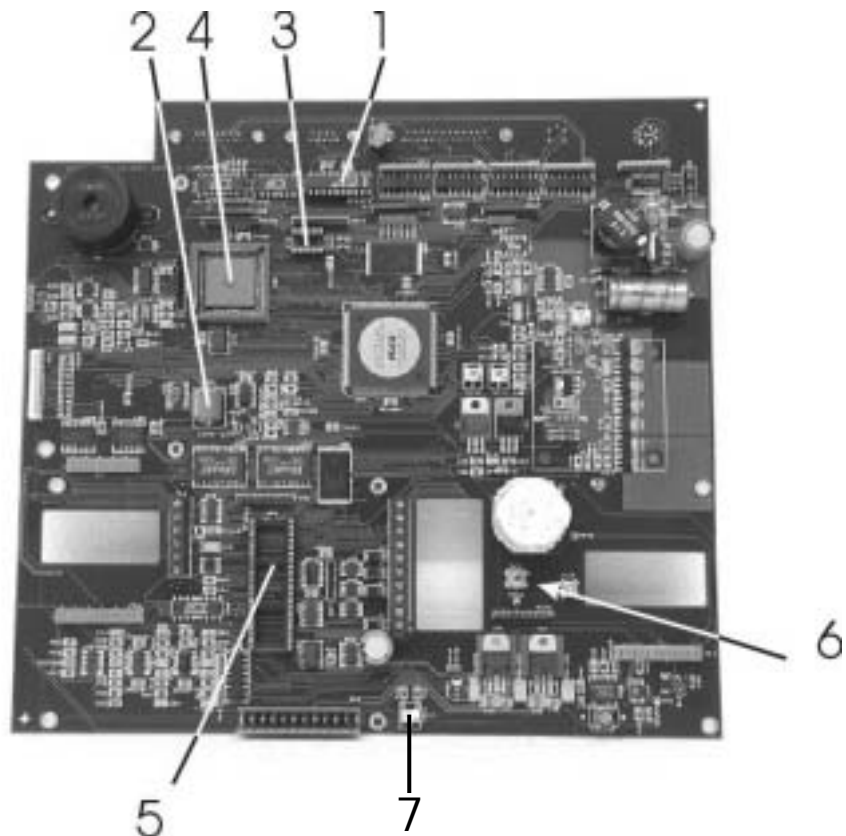


Dangerous electrical voltage!

*Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!*

The controller board contains the logic (CPU) and the power switching circuits of the LEIBINGER-JET 2.

Figure 27



- Controller board (conductor plate) LEIBINGER-JET 2 (54-004 444 S)
- 1 – Data interface RS 232 (RS 422 optional)
 - 2 – Battery, lithium, 3.2 VDC (54-003 032 KA)
 - 3 – PROM for FPGA module
 - 4 – CPU with PROM
 - 5 – Hydraulic processor
 - 6 – RESET button
 - 7 – Potentiometer for display illumination



It is imperative that the instructions on the subject of battery changing in the group **Equipping/maintenance** are observed!

Functions of the controller

- Control of the operating process and of the print text issue
- Storage of the job data, via battery buffered memory in the event of mains power failure
- Regulation of the drop charging (phasing) and of the drop brake-off point
- Storage of the character definition and of the corresponding charging values for all printable characters
- Drive of the voltage creations
- Data interfaces to the periphery
- Setting of the required character height, character width and type positions
- Synchronisation of the print text issue with variable product speed by means of shaft encoder
- Control and position monitoring of the automatic nozzle sealing
- Administration of date, time and expiration date with the clock module
- Creation of the oscillator voltage and of the charging voltage
- Drive of the hydraulic components

6.5.3 DC power supply



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***

The direct currents of the LEIBINGER-JET 2 are achieved through a power supply with automatic input voltage recognition. It has "Power Factor Compensation" and is permanently short circuit resistant or switches off independently in the event of overload. It is protected by a safety fuse. The output voltages cannot be altered.

The mains part provides the following output voltages:

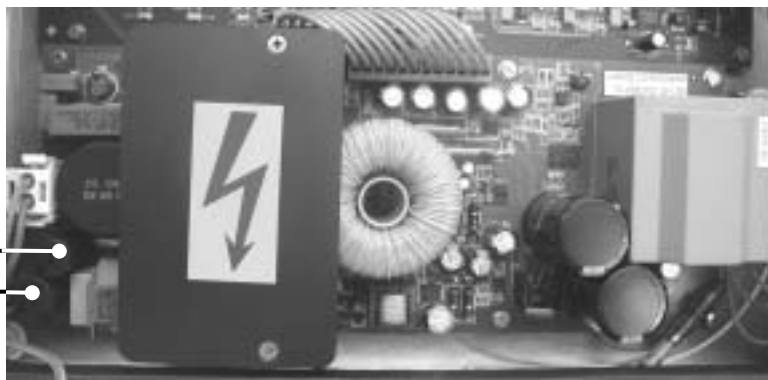
| | | |
|-----|-------------|--------------------------|
| V1: | + 5,0 Volt | |
| V2: | + 5,0 Volt | (standby supply voltage) |
| V3: | + 18,0 Volt | |
| V4: | - 18,0 Volt | |
| V5: | + 24,0 Volt | |
| V6: | + 2- 8 KV | |

Figure 28

1 – Main fuses (2x)
F1,6 H
(54-003 339 KA)

1

Ink jet power supply
(54-001 949 SB)



For service purposes the power supply and the fuses are accessible from the front side of the device.



This work must only be carried out by trained personnel or by Leibinger service technicians!



It is imperative that you observe the instructions on the subject of fuse changing in the group **Equipping/maintenance** in the chapter **Other service work!**

6.5.4 Hydraulics part



The content is under pressure even if the device has been disconnected from the mains supply!

Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and let off the pressure!

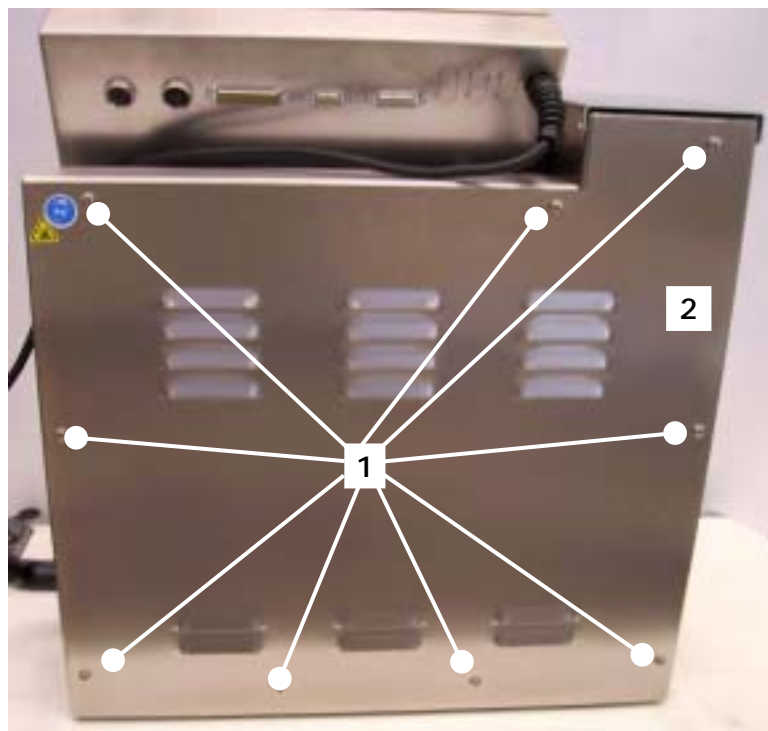


Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!

All components that are necessary for the conveying and preparation of the ink are accommodated in the **Hydraulics part**. This is situated in the rear section of the device.

Figure 29



1 – Rear wall fastening screws

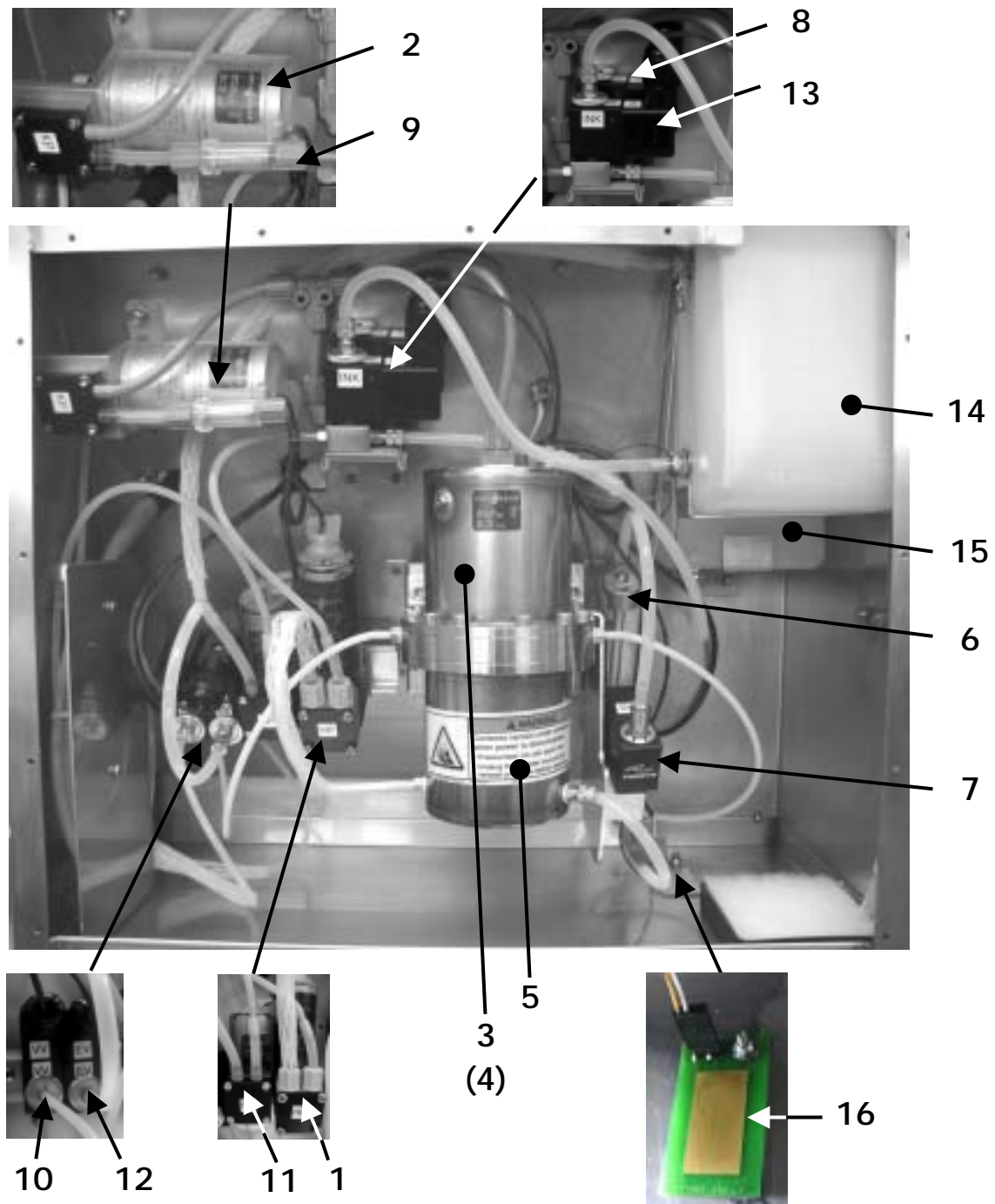
2 – Rear wall

The hydraulic parts are made accessible for service purposes through opening of the fastening screws and removal of the rear wall (see illustration).



This work must only be carried out by trained personnel or by Leibinger service technicians!

Figure 30



- 1 – Main pump
- 2 – Compressor
- 3 – Pressure tank
- 4 – Pressure sensor
(integrated in pressure tank)
- 5 – Filter
- 6 – Viscometer
- 7 – Viscosity pump
- 8 – Air discharge (used air) valve
(with choke)

- 9 – Suction filter
- 10 – Forward flow valve "Ink"
- 11 – Suction pump
- 12 – Bleed valve
- 13 – Mixing valve "Ink/solvent"
- 14 –Storage tank "Ink"
- 15 – Storage tank "Solvent"
- 16 – Leak sensor



The content is under pressure even if the device has been disconnected from the mains supply!

Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and release the pressure!



Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!

6.5.4.1 Main pump

Figure 31



In the LEIBINGER-JET 2 a main pump with geared motor is used to generate the pressure.

The current operating pressure can be read in the sub-menu <E29> "Hydraulics test & parameters".

Main pump
(54-002 001 S)



The function of the LEIBINGER-JET 2 or the creation of the ink pressure presupposes the **functioning of the compressor**.

6.5.4.2 Suction pump

Figure 32



The suction pump is a membrane pump and is used for sucking up the ink from the gutter.

The underpressure of the suction pump is ≥ 0.3 bar.

Suction pump
(54-002 002 S)

6.5.4.3 Viscosity control



The content is under pressure even if the device has been disconnected from the mains supply!

Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and let off the pressure!



Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!

For process-safe functioning of the LEIBINGER-JET 2 it is necessary to keep the viscosity of the ink constant. During operation the ink gives off solvent into the ambient air. The dosing of ink or solvent is performed via the refill valve. The condition of the viscosity is recorded through a drop ball viscometer.

If the viscosity has increased solvent is conveyed from the storage container into the circular flow of ink via the valve control during the next necessary refilling procedure.

Figure 33

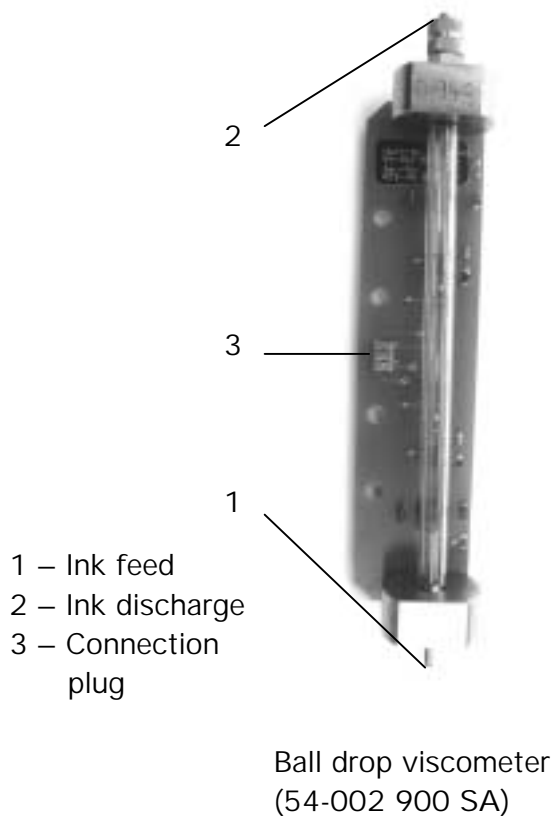


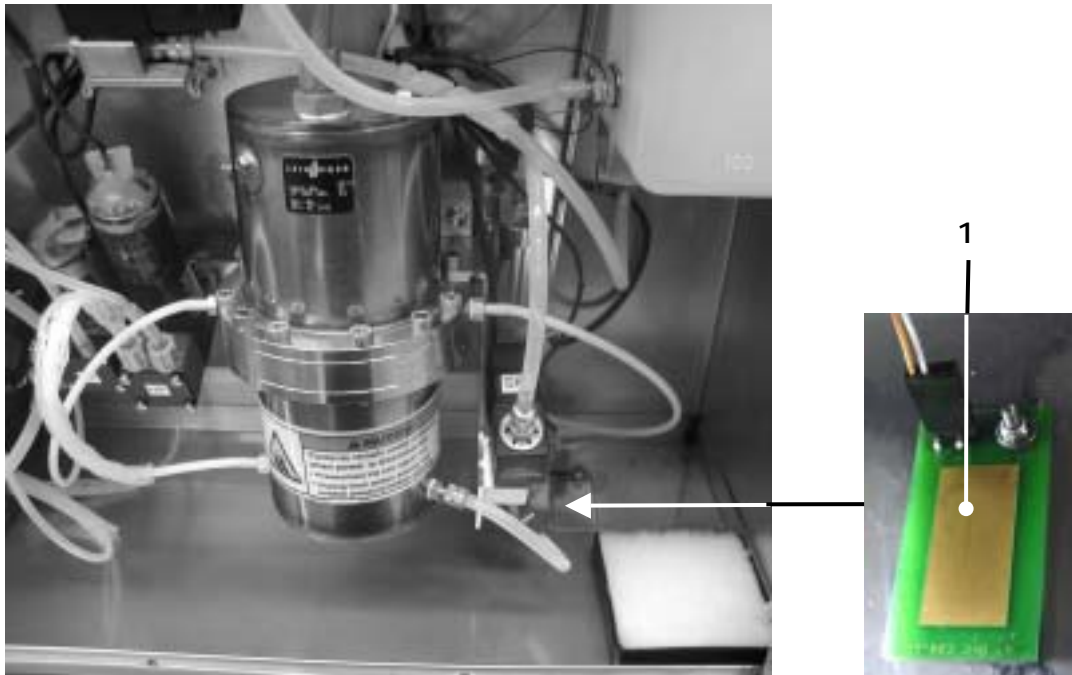
Figure 34



6.5.4.4 Leak detection

An additional safety measure in the LEIBINGER-JET 2 is the leak detection. To detect a leak in the hydraulic part i.e. if ink or solvent on the basis of slightly combustible solvents escape, the operation of the device is aborted and an acoustic alarm triggered.

Figure 35



Leak detection

1 – Leak sensor (54-003 340 SA)

6.5.5 Print head



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***



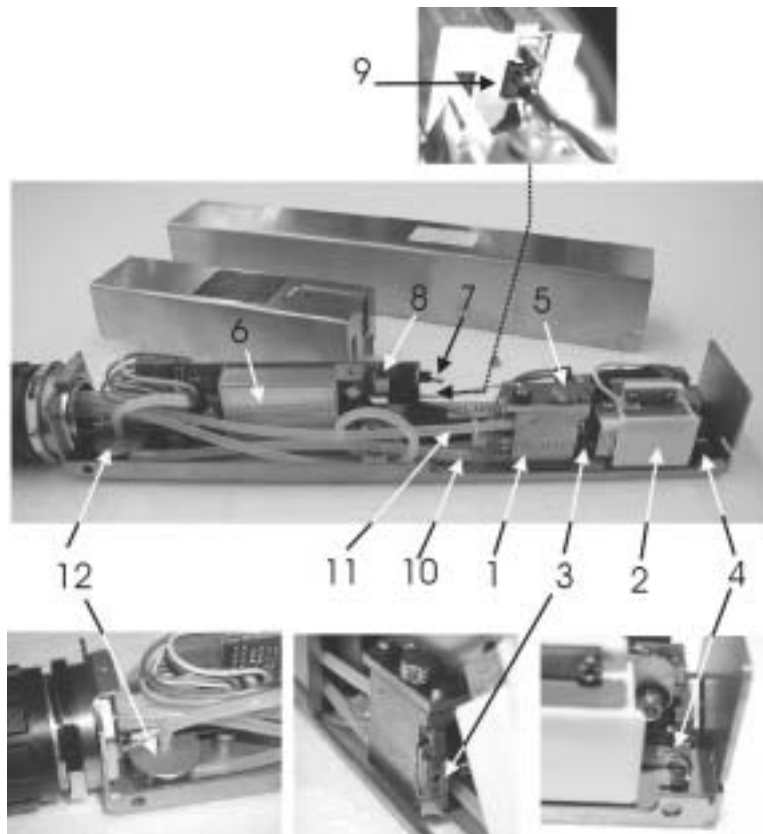
The content is under pressure even if the device has been disconnected from the mains supply!

Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and let off the pressure!

**Risk of injury!**

Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!

The **Print head** contains all mechanical, electronic and hydraulic components that are necessary for the creation of an inscription. It is connected to the hydraulics housing via a flexible tube.

Figure 36

Print head
(without cover)

- | | |
|---|--|
| 1 – Drop production unit with oscillator | 7 – Ink switch |
| 2 – Deflector unit with deflector plates and charging electrode | 8 – Sensor for switching off the high voltage with open head cover |
| 3 – Nozzle plate | 9 – Connection for LED (stroboscope) |
| 4 – Gutter (catcher pipe) | 10 – Ink feed tube |
| 5 – Jet fixing screw with bar | 11 – Bleeding tube |
| 6 – Head electronic | 12 – Head filter |

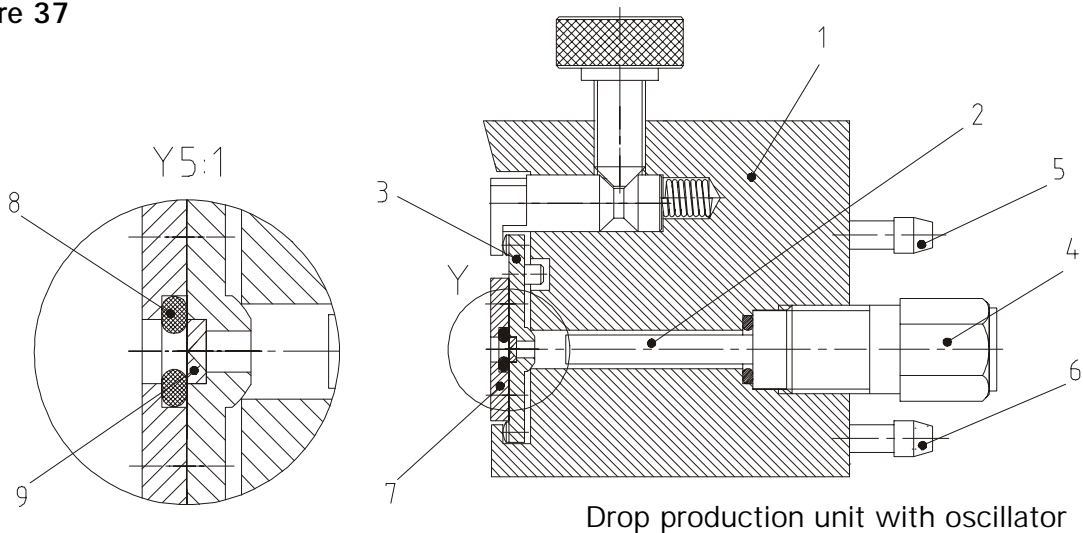


This work must only be carried out by trained personnel or by Leibinger service technicians!

6.5.5.1 Drop production unit with oscillator

Together with the oscillator and the jet the drop production unit creates the ink jet or the ink drops. The oscillator is built into the drop production unit with the oscillator cover and sealed against the ink with an O-ring.

Figure 37

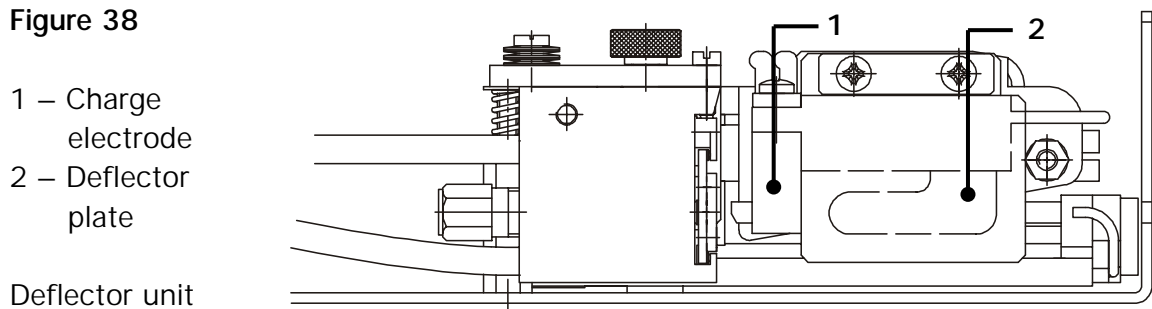


- | | | |
|--------------------------|----------------------|-----------------------------|
| 1 – Drop production unit | 4 – Oscillator cover | 7 – Clamping plate |
| 2 – Oscillator | 5 – Bleeding tube | 8 – Nozzle sealing (O-ring) |
| 3 – Nozzle plate | 6 – Ink tube | 9 – Nozzle stone |

6.5.5.2 Deflector unit

The deflector unit is made up of the charging electrode and the deflector plate. The drops are charged with the charging electrode and deflected with the deflector plate.

Figure 38



- 1 – Charge electrode
- 2 – Deflector plate

Deflector unit



Replacement and changings at the deflector unit!

This work must only be carried out by trained personnel or by Leibinger service technicians!

6.5.5.3 Nozzle plate

The jet is made up of a precious stone with the actual jet bore. The precious stone is held in a steel plate in order to enable simple replacement and adjustment of the ink jet. The diameter of the bore is between 40-70 micrometers depending on the design of the jet.

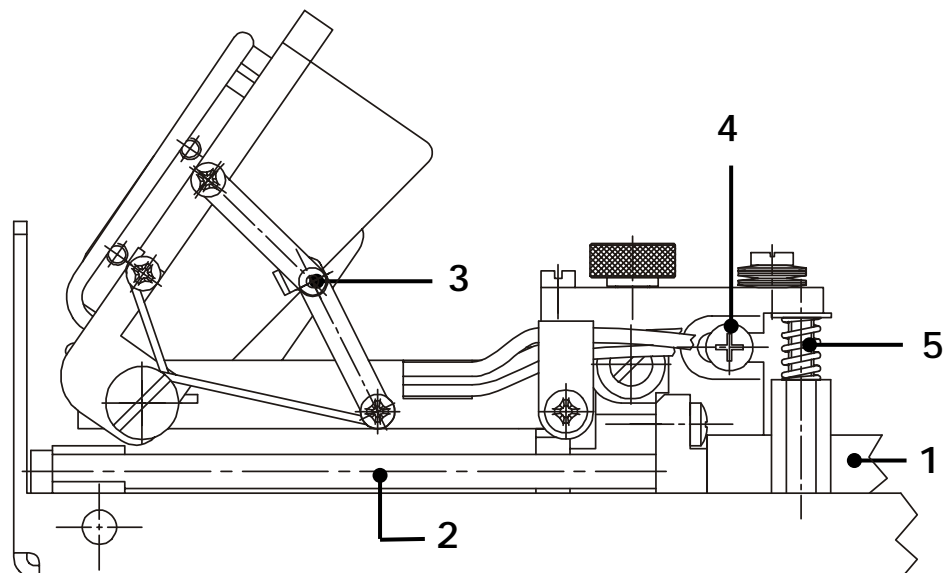
An O-ring is secured to the nozzle plate with a clamping plate and two slotted screws to seal the gutter when the jet is closed. The jet is pressed against the drop production unit with a fixing screw. This produces a liquid-tight and yet movable connection (see illustration drop production unit with oscillator).

6.5.5.4 Nozzle seal with gutter

The nozzle seal prevents the drying of the ink in the jet, the gutter (catcher pipe) and the suction pump during operational standstill.

This is achieved with an electrical spindle drive which moves the gutter in the direction of the jet from the writing position to the jet and in the reverse direction when switching on. The nozzle seal is a unit which can be completely replaced in case of need.

Figure 39



Nozzle seal

- 1 – Drive motor
- 2 – Guide shaft
- 3 – Toggle lever for arresting for cleaning purposes
- 4 – Jet (nozzle) adjustment screw (left/right)
- 5 – Jet (nozzle) adjustment screw (up/down)

7. Data entry/programming

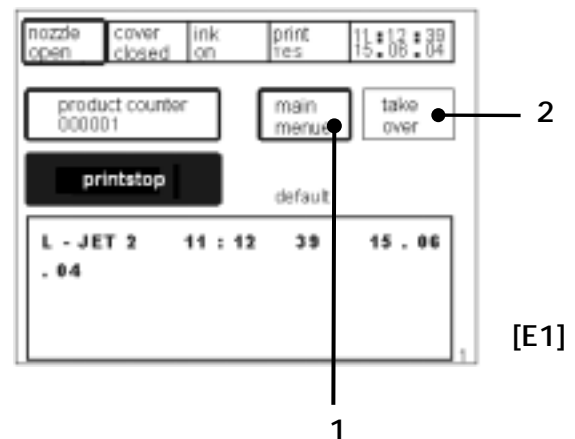
7.1 General

Data that is to be printed by the Leibinger-Jet 2 can be entered, called-up, altered and stored with various programming devices, PC's etc..

Below is a description of the programming with the LCD touch display.

Figure 40

By means of touching the touch field <main menu> (1) the programming level <E2> is called up. During printing the touch field (2) changes to "take over" instead of "power off". New jobs can be created while the printer is in print mode or when it's offline. When a Job was created in print mode, you have to press "take over". The new job will be printed immediately. If you edit a job while printing, the methodology is the same.



The following data entries can be performed:

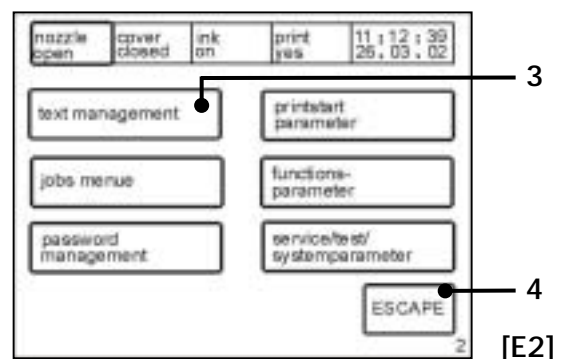
- Text administration (text management)
- Job administration (Jobs menu)
- Password administration (p. management)
- Print start parameters
- Function parameters
- Service/test/system parameters

7.2 Text administration

Figure 41

With the touch field <text management> (3) the text administration surface <E3> is called up.

The touch field <ESCAPE> (4) ends the menu and leads back to the previous operation level.



7.2.1 Text entry

Figure 42

The touch field **<new text>** (5) enables the entry of new texts. The "font menu" **<E9>** is now called up.

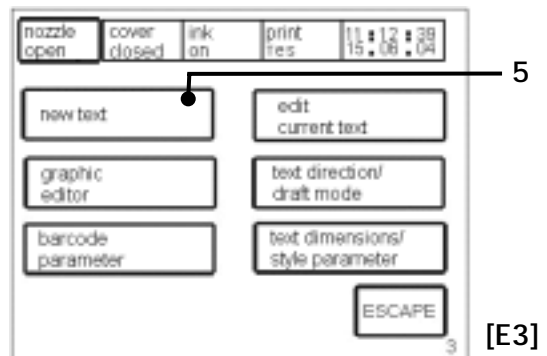


Figure 43

The desired font can be selected.

Entry; e.g.: 9 x 7 = **<9 x 7>** (6)

The touch field **<more >** (7) opens the menu level **<E18>** in which you can choose further fonts and via the touch field **<graphic >** (8) you can choose given graphic symbols. You will find further information regarding graphics in the chapter **Graphic input/graphic selection**.

The touch field **<Barcode >** (9) enables the input of various bar codes. You will find further information regarding barcodes in the chapter **Barcode entry**.

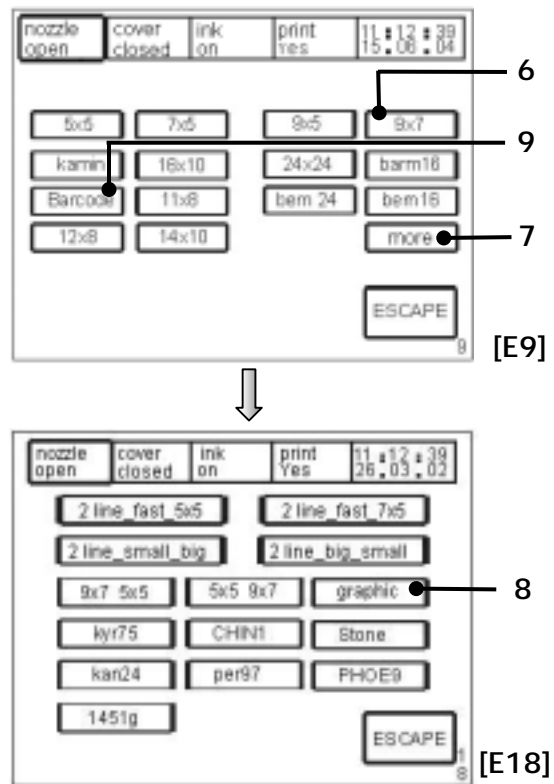


Figure 44

Following the selection of the font, the line menu **<E15>** is opened. By means of pressing the corresponding touch field the number of lines or the desired line position can be selected.

entry e.g. single line = **<one line>** (10)

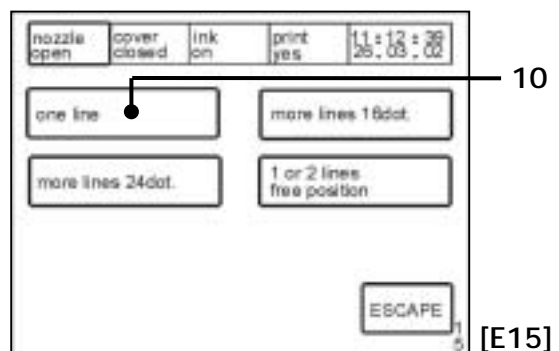
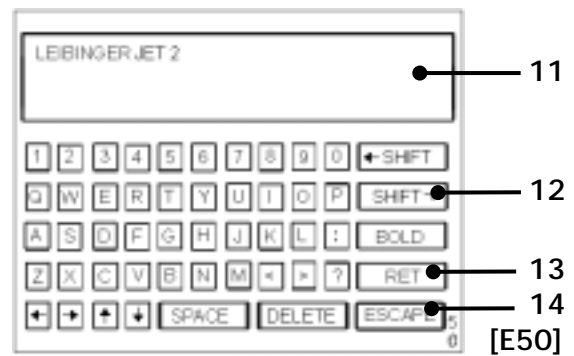


Figure 45

Following the selection of the line(s), the keyboard field <E50> opens. By means of pressing the corresponding symbol the text is entered. In the **display field** (11) the illustration of the characters entered is made in capital letters.



By means of tapping on or repeated tapping on the <SHIFT> fields (12) further menus are called up for the entry of non-capital letters, special characters and extension parameters.



With the touch field <RET> (13) the next line is selected for several lines (e.g. for a matrix of 5x5 or 7x5).

Using the <ESCAPE> (14) touch field, you can exit the menu and the entered text is saved.



Non-capital letters [E51]

Special characters [E52]

Extension parameters E60]

In the extension´s menu <E60> expiration data, shift data, external texts etc. can be integrated into the texts to be issued. There are two expiry dates available (expday1...+ expday2...), which can be programmed any way.

If the Leibinger-Jet 2 is used in shift operation the function <shift > (15) will be available. You will find further information regarding this topic in the chapters **Shift code input and Expiration-and shift times.!**

With the field <ex. text> (16)) place holders are set for the importing of external text data via the interface.

7.2.1.1 Bold print

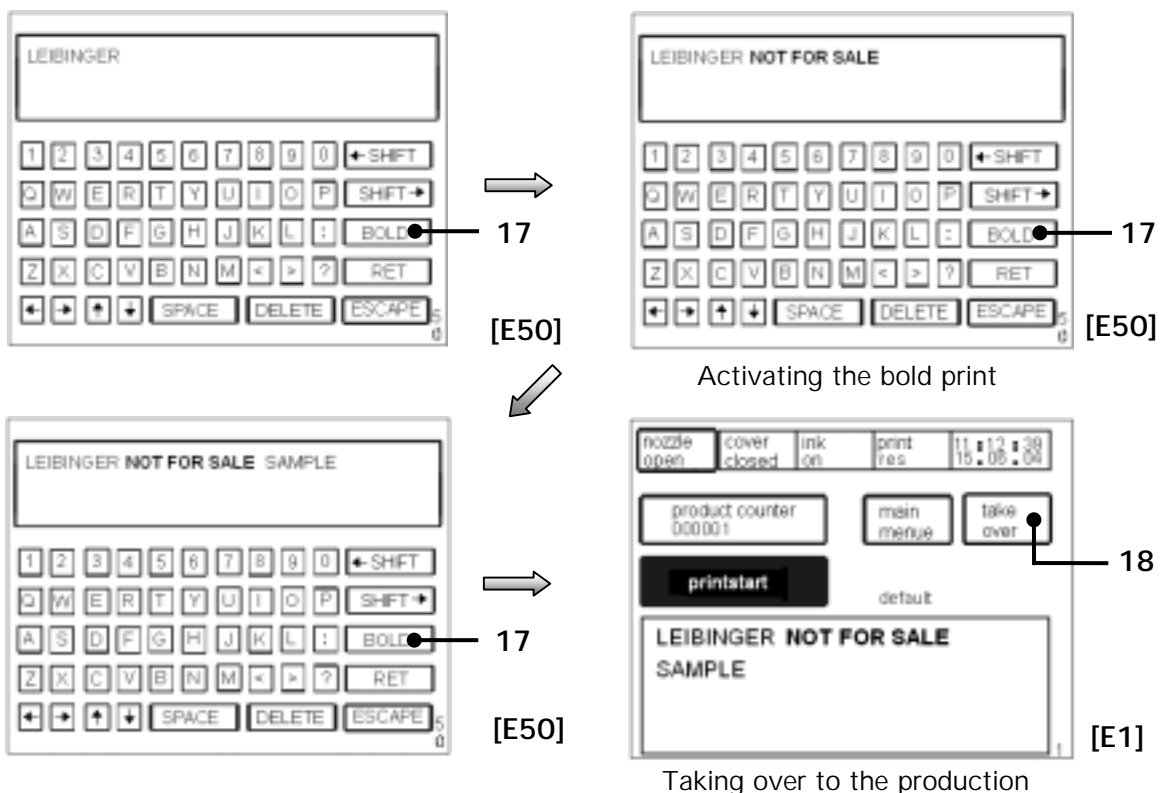
To display a text in the imprint bold it has to be marked accordingly during the text will be entered.

Manner of proceeding:

Example: It should be written „LEIBINGER SAMPLE **NOT FOR SALE**“.

- Press the touch field <Text new> in the menu level <E3> .
- The „font menu“ <E9> will be called up.
- After choosing the font the line menu <E15> either the keyboard field <E50> will be displayed if necessary.
- Enter the text „LEIBINGER“ and one blank.
- Press the touch field <BOLD> (17). The bold print is activated for the further input.
- Enter the text „ NOT FOR SALE“.
- Press the touch field <BOLD> (17) again. The bold print is now deactivated.
- Enter one blank and the text „SAMPLE“.
- By the <ESCAPE> -button you can leave the menu and you can change to the menu level <E1> .
- With the touch field <take over > (18) in the menu level <E1> the data are taken over to the production.

Figure 46



You will find further information regarding set up of the bold value in the chapter **Font parameter**.

7.2.2 Font parameters

Figure 47

The touch field **<text direction/draft mode>** (20) enables the adaptation of the position of the font to the "layout" of the product and to the product movement. The "selection menu" **<E11>** is activated. With the touch field **<text dimensions/style parameter>** (21) the text layout is controlled in the menu **<E12>**.

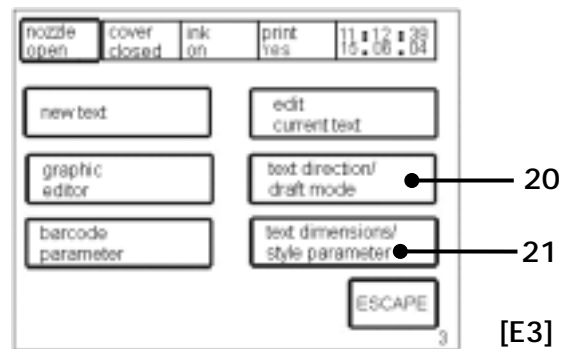
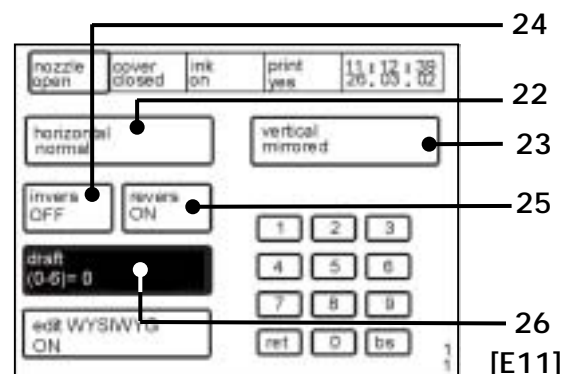


Figure 48

The following presentation options are available in the menu **<E11>**.

Touch field **<invers>** (24): Inverse presentation off or on.



Touch field **<horizontal>** (22): Normal or reflected (mirrored) presentation.

Example: normal presentation/horizontally reflected

ABC 123 ƆBƆ 123

Touch field **<vertical>** (23): Presentation normal or reflected (mirrored).

Example: normal presentation/vertically reflected

ABC 123 ʌBC 123

Touch field **<revers>** (25): The reverse presentation is switched off or on. With each print-out (Print Go) the text is vertically and horizontally reflected or rotated through 180°.

Example: normal presentation/reverse presentation

ABC 123 ABC 123

Touch field **<draft mode>** (26): Selection of the draft mode. The draft mode 0 ensures the maximum font quality with the lowest possible print speed. Higher print speeds are possible in draft mode 1 (up to 16 dot) and in draft mode 2 (up to 9 dot). Draftmode 3 (up to 24 dot) for fast barcode printing and draftmode 4 (24 dot) for extremley small fonts. Draftmode 5 was specially customized for fast printing of graphics and fonts with a height of 11 dots (e.g. chinese characters).

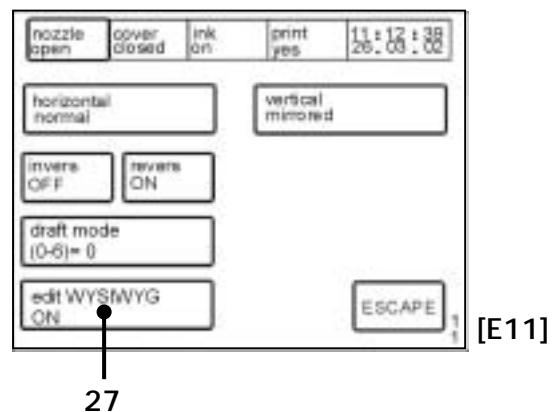
The draftmode 6 has been especially developed for fast printing of graphics and fonts with a height of 24 dots.

Note: The draftmode 6 allows a higher printing speed by up to 250% for fonts with the matrix height of 24 dots.

Figure 49

Touch field <edit WYSIWYG> (27):
With this function you can switch on either off the WYSIWYG-display during the text input for fonts with a height of ≥ 16 dots.

If the WYSIWYG-function will be switched off the text is displayed in the matrix 7x5 and therefore you can reach a faster display mode on the LCD-touch display and therefore a faster text input as it would be possible on the WYSIWYG -display-mode. The display of the text which should be printed in the basis menu happens in the selected matrix even if the WYSIWYG-function is switched off.



Note: WYSIWYG = What you see is what you get

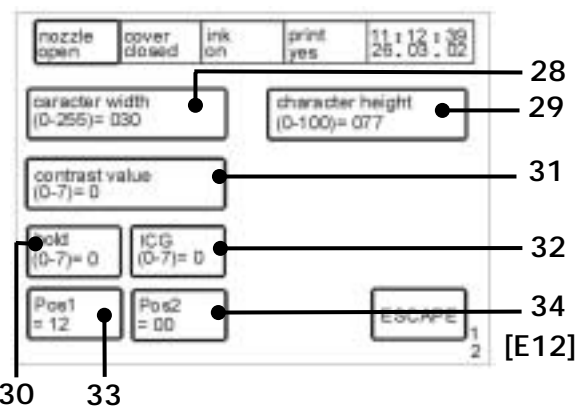
Figure 50

In the menu <E12> the following text layout options are available.

Touch field <character width> (28):
Selection of the print width from 0- 255.

Touch field <character height> (29):
Selection of the print height from 0- 100.

Touch field <bold> (30):
Selection of the boldness value from 0-7.



Note! The set-up has only consequences on text elements which have been pre-defined with the <BOLD> - function during the text was entered!

Further informations can be found in the chapter **Bold print**.

To reach a bold print several drops are placed next to each other, that means e.g. if the bold value is set to „1“ on the print-out 2 drops will be placed next to each other.

Touch field < **contrast value** > (31): Selection of the font contrast from 0 - 7.

To reach an increase of the contrast of the print-out several drops will be placed on top of each other, that means e.g. if the contrast value is set to „1“ on the print-out 2 drops will be placed on top of each other.

Description examples:



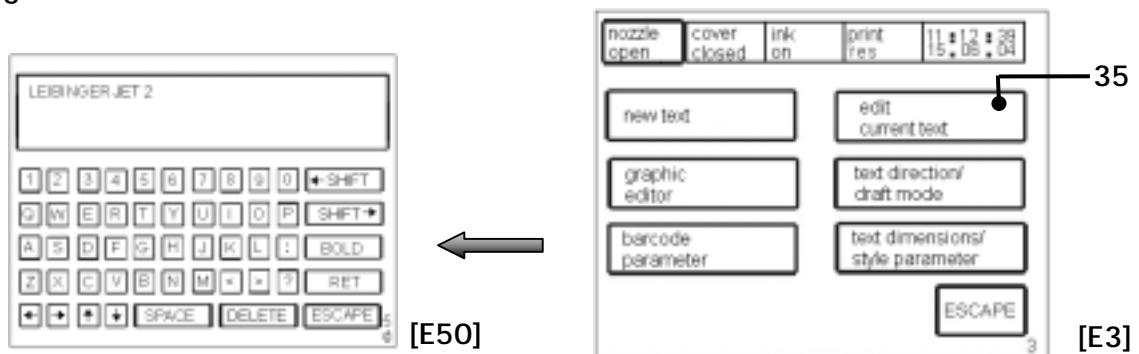
Touch field < **ICG** > (32): Selection of the gap between the individual characters from 0 – 7 (calculated in single drops).

With the touch fields < **pos1** > (33) and < **pos2** > (34) the items of the first and second lines can be defined. This function is only available if the option < **1 or 2 lines free position** > has been selected in the line menu < **E15** >. For the first line graphics or text can be selected, in the second line only text can be entered.

In all selection fields the current status or the current values are shown simultaneously!

7.2.3 Text editor

Figure 51

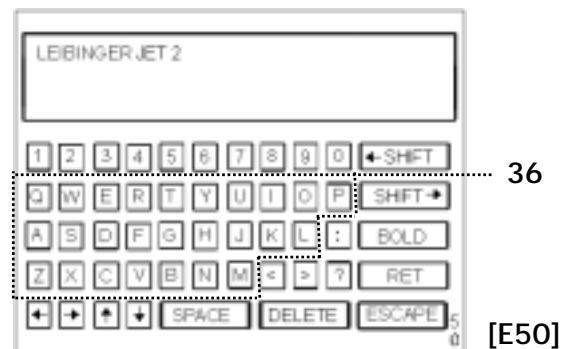


The touch field <edit current text> (35) enables the alteration of a text module already entered. The “keyboard field” <E50> is called up for editing.

7.2.4 Graphics entry/graphics selection

Figure 52

After choosing the graphic input in the menu level <E18> the „line selection menu“ <E15> and afterwards the “key-board field” <E50> will be activated for input.



A graphic is defined behind each letter [A-Z] (36) of the keyboard field. The defined graphic is adopted in the print-out by pressing a symbol. In the display only the letter is shown. The real graphic will be only shown in the menu level <E1> .

You will find a list with the saved graphics with it's reference in the enclosure of this manual!

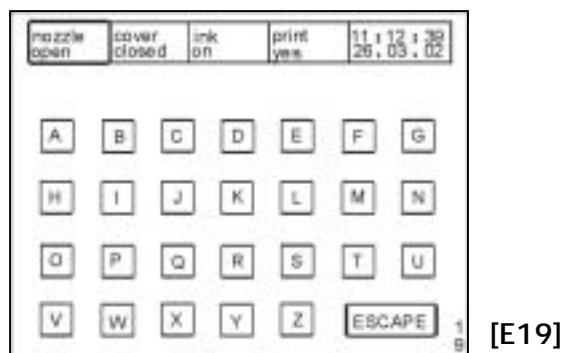
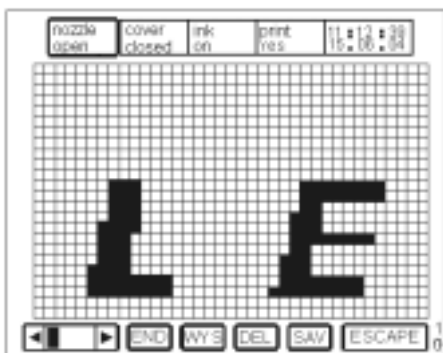
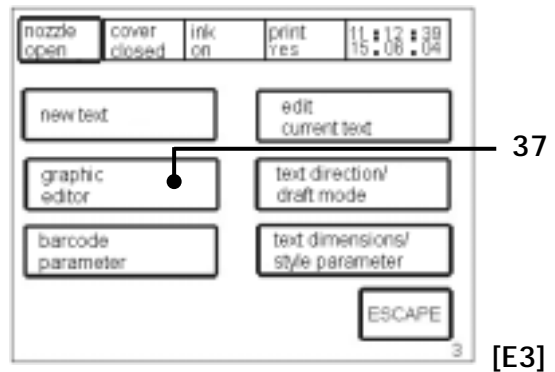


The max. height of graphics is 24 dots.

7.2.5 Graphics editor

Figure 53

With the field <graphic editor> (37) the graphics menu <E19> is superimposed. Graphics are deposited behind each letter [A-Z]. By means of pressing of a symbol the deposited graphic is displayed. The graphic displayed can now be deleted, altered or stored.



To alter graphics the grid on the corresponding screens is tapped on. As a result pixels are added or deleted.

7.2.6 Shift code input

With this function the printer can print automatically a predefined text depending on a predefined time period. This changing text can also be combined with a fixed text that will not change depending on the time.

To input a shift code you have to proceed like following:

E.g.: „LJET“ should be written.

In the first shift at 6.00 am „LJET 001“.

In the second shift at 12.00 am „LJET 002“.

In the third shift at 8.00 pm „LJET 003“.

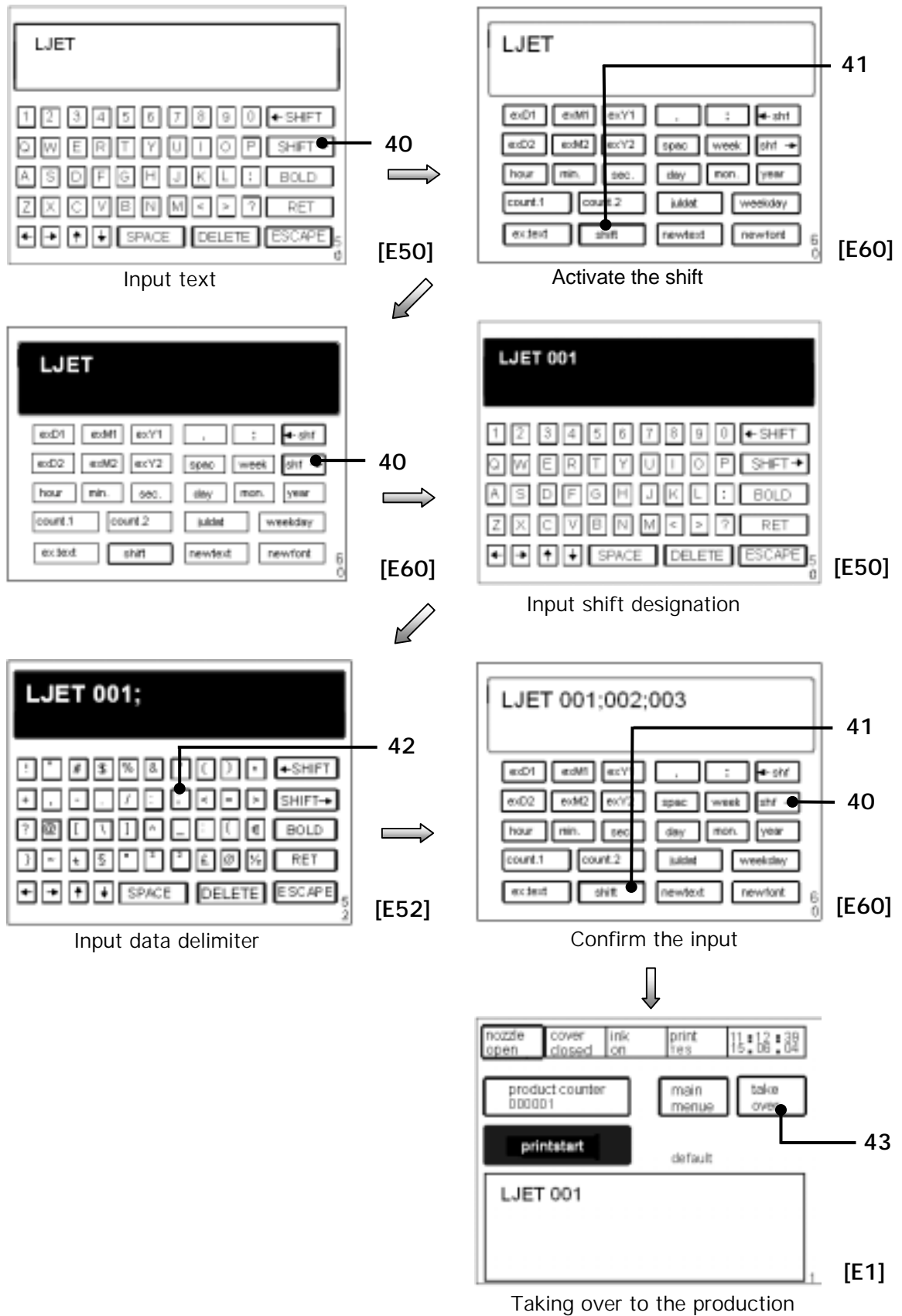
- Press the touch field < **new text** > in the menu level < **E3** > .
- The “type face menu (font menu)” < **E9** > is called up.
- After choosing the font the line menu < **E15** > either the keyboard field < **E50** > will be displayed if necessary.
- Enter the text “LJET”.
- By the touch field < **Shift** > (40) scroll as long as the menu level < **E60** > appears.
- Press the touch field < **Shift** > (41). The Leibinger-Jet 2 changes to the shift definition mode. To indicate that the shift definition mode is active, the display background will be colored black.
- Go back to the keyboard field < **E50** > with the < **Shift** >-button (40).
- Input 001 followed by; 002 ; 003 (*so 001;002;003*).
- **Pay attention!** The „;“ causes the separation between the several shifts. You will find the „;“ – character (42) on the menu level < **E52** > .
- Go back to the menu level < **E60** > again with the < **Shift** >-button (40) and confirm the input by pressing the touch field < **Shift** > (41) again.
- By the < **Shift** >-button (40) you can leave the menu and you can finish the process in the next possible menu level by pressing the touch field < **ESCAPE** > .
- With the touch field < **take over** > (43) in the menu level < **E1** > the set ups will be taken over to the production.

Observation:

The touch field < **take over** > will be only displayed if the nozzle is open!

In the menu level < **E44** > you can input the shift times. Further information can be found in the chapter **Expiry date and shift times!**

Figure 54



7.2.7 Barcode input

7.2.7.1 Barcode information



Note! The Leibinger-Jet 2 does not carry out any check digit calculations generally.

This has to be carried out external in advance!

Code 128c:

- is essentially shorter than code 128b
- only numeric characters are valid (no punctuation symbols, letters or spaces are valid (only numbers from 0-9 can be displayed))
- only an even amount of digits is valid

Code 128b:

- is longer than the C-variante
- can display complete ASCII-sentences
- can also display an odd amount of digits

2 of 5 interleaved (Code 25):

- only numerical code (only numbers from 0-9 can be displayed)
- only an even amount of digits is valid

Code 39:

- alphanumerical code
- (is available with or without Gothic character (clear figure) for the Leibinger-Jet 2.)

EAN 8:

- (only numbers from 0-9 can be displayed)
- has to be always 8-digits (7 performance characters and 1 check digit)
- (is available with or without clear figure for the Leibinger-Jet 2)

EAN 13:

- numeric code (only numbers from 0-9 can be displayed)
- has to be always 13-digits (12 performance characters and 1 check digit)
- (is available with or without clear figure for the Leibinger-Jet 2)

UPC A: (American equivalent to EAN13)

- numeric code (only numbers from 0-9 can be displayed)
- has to be always 12-digits (11 performance characters and 1 check digit)
- (is available with or without clear figure for the Leibinger-Jet 2)

UPC E: (American equivalent to EAN8)

- numeric code (only numbers from 0-9 can be displayed)
- has to be always 8-digits
(6 performance character, 1 check digit and 1 system character)
- (is available with or without clear figure for the Leibinger-Jet 2)

Datamatrix-Code (2D-Code):

- up to 50 numerical numbers can be displayed **or** up to 36 letters can be displayed (the combination of numbers and letters is allowed).
- The form has to be always set that it corresponds with a square.

7.2.7.2 Barcode selection

Figure 55

To make a choice of the Barcode you have to open the „barcode selection menu“ <E17>.

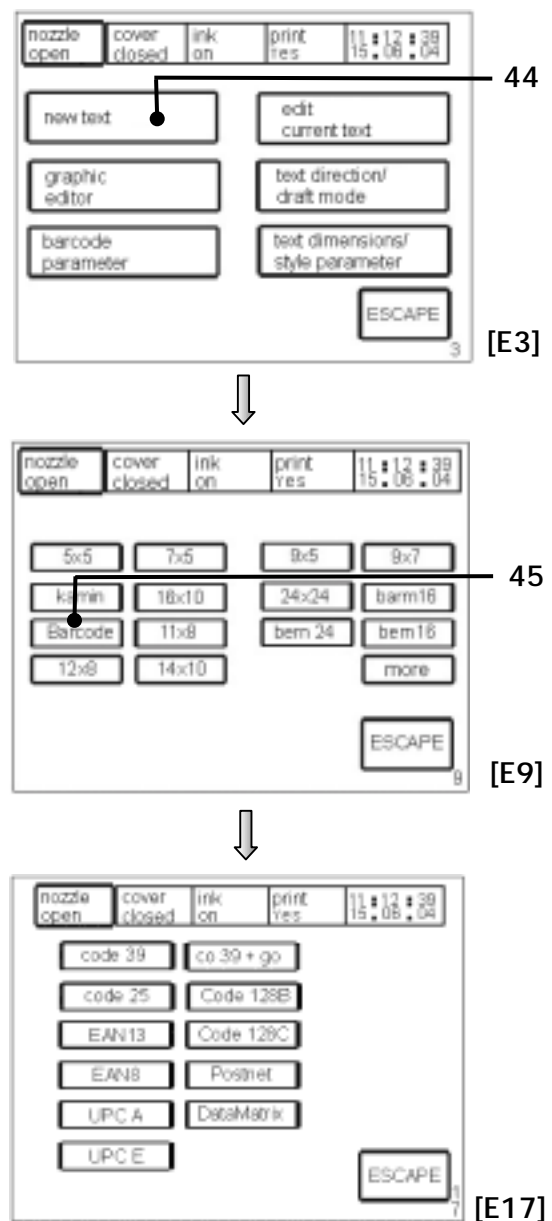
Manner of proceeding:

By pressing the touch field <new text> (44) the “font menu” <E9> will be called up in the menu level <E3>.

The touch field <Barcode> (45) activates the „barcode selection menu“ <E17> in which you can choose the requested Barcode.

The further process corresponds with the procedure of the text input.

You will find further information in the chapter **Text entry**.



Note! The Leibinger-Jet 2 does not carry out any check digit calculations generally.

This has to be carried out external in advance!

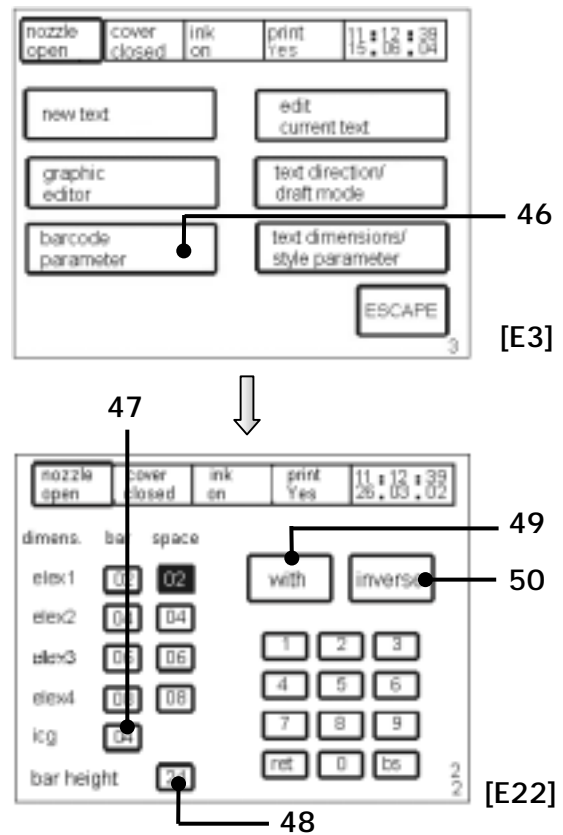
7.2.7.3 Barcode parameter

Figure 56

The touch field <barcode parameter> (46) opens the menu for defining the bars and gaps (between 01-12) with barcodes. EAN has 4 bar widths.

In the field <icg> (47) the desired gap between the elements is set and in the field <bar hight> (48) the desired height entered. The bar height can be selected as desired between 1 and 24.

The touch field <with/without> (49) activates the barcode display with or without clear figure under the Barcode.

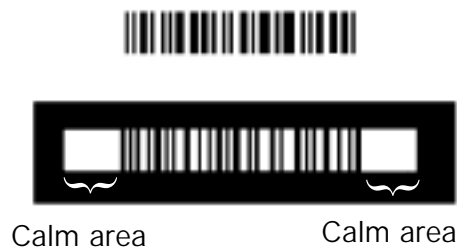


Clear figure is only available for the following Barcodes:

EAN 13, EAN 8, UPC A, UPC E, C128 b, C128 c, C39 and 2 of 5 interleaved

The touch field <normal/inverse> (50) activates the normal or the inverse print-out of the Barcode. This enables e.g. the print-out of a Barcode with white ink on dark background.

Example: 2 of 5 interleaved



normal (print-out with dark ink on light background)

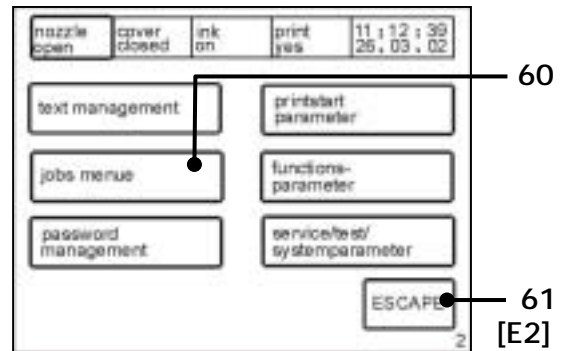
inverse (print-out with light ink on dark background)

7.3 Job administration

Figure 57

With the touch field <jobs menu> (60) the job administration surface <E5> is called up.

The touch field <ESCAPE> (61) ends the menu and leads back to the previous operating level.



7.3.1 Opening job

Figure 58

The touch field <load job> (62) enables the loading (opening) of a job already stored. The "job administration menu" <E45> is now called up.

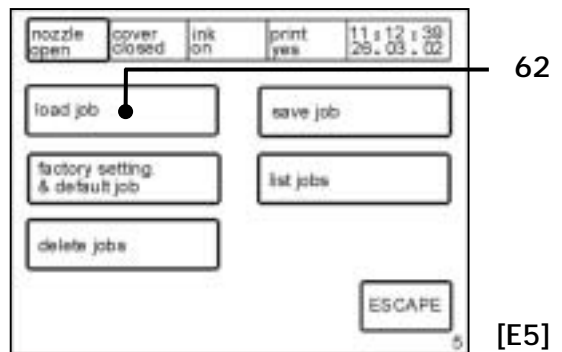
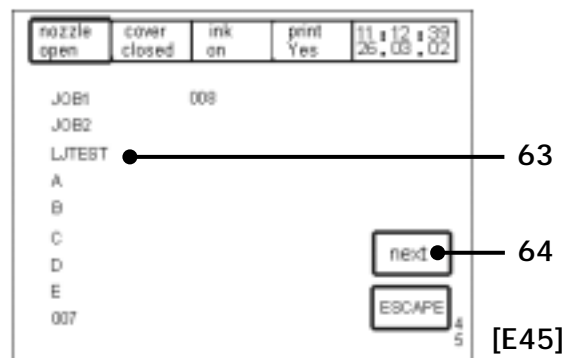


Figure 59

The stored jobs are listed and the desired job can be selected for a print order.

128 Jobs can be saved. In the job – list 32 jobs are shown per page. The job – pages can be leafed through with the touch field <next> (64).

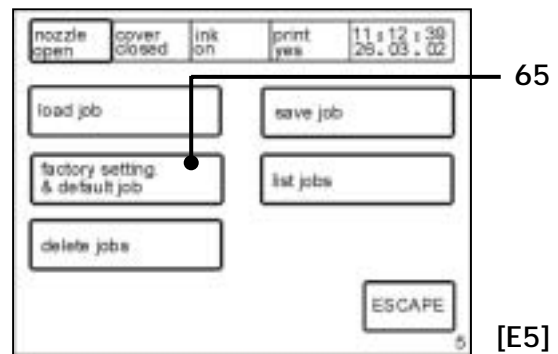
Entry; e.g.: LJTEST = <LJTEST> (63)



7.3.2 Factory setting & default jobs

Figure 60

The touch field <factory setting & default job> (65) resets the device to the standard settings and a default job i.e. type height/width, bar code and print start parameters are reset, is then loaded into the working storage.



If all jobs deposited have been deleted in advance then all jobs (up to "E") will automatically be loaded as illustrated in the job administration menu <E45> (main menu – jobs menu – load job).

7.3.3 Deleting jobs

Figure 61

The touch field **<delete jobs>** (66) enables the deletion of existing jobs. The "deletion menu" **<E47>** is called up.

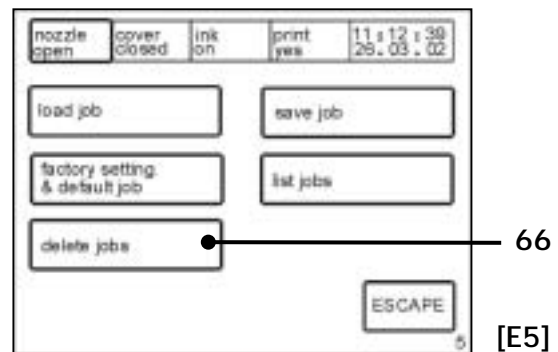
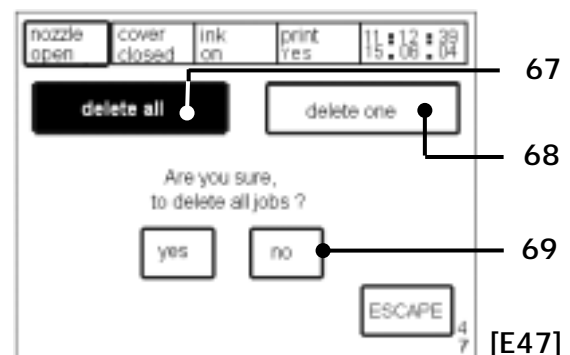


Figure 62

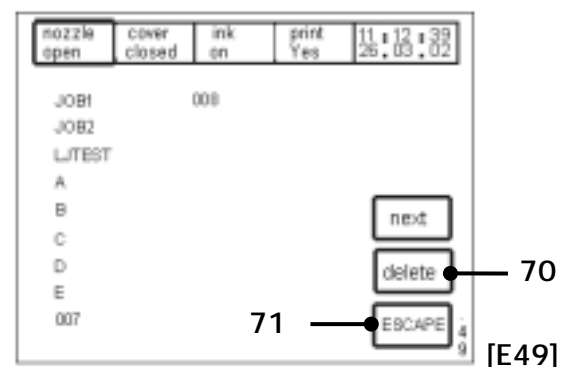
The touch field **<delete all>** (67) causes the deletion of all jobs created. The safety inquiry with the two touch fields **<No>** and **<Yes>** (69) is displayed.

The touch field **<delete one>** (68) enables the selection of one job for deletion. The menu level **<E49>** is displayed. A job selected for deletion is shown with a black colored background.



The following options can be carried out:

- A different job can be selected.
- By means of touching the touch field **<Delete>** (70) the job is effectively deleted and the display is updated.
- Further jobs can be selected for deletion.
- By means of touching the touch field **<ESCAPE>** (71) the menu can be ended without making alterations.

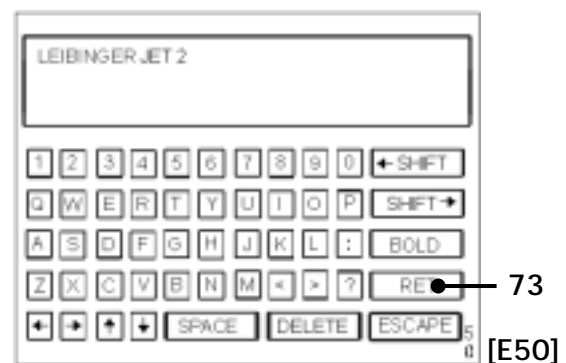
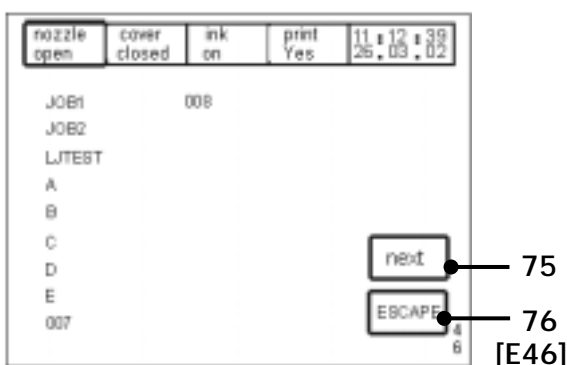
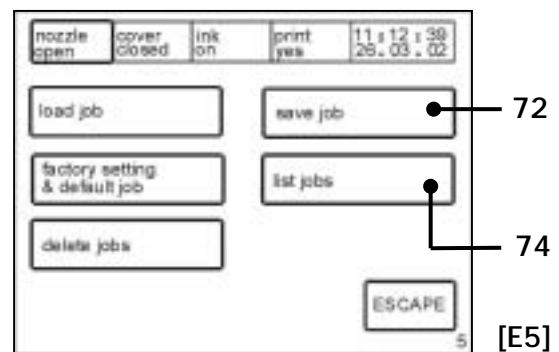


7.3.4 Storing and listing jobs

Figure 63

The touch field <**save job**> (72) serves the storage of a newly created/entered job.

The <**E50**> menu is called up to input the job/memory name. The entry is saved by means of the <**RET**> (73) touch field.



The touch field <**list jobs**> (74) The touch field <**list jobs**> (74) activates a listing [menu level <**E46**>] of all jobs present.

The following options can be carried out:

- Further jobs, if available, can be displayed by pressing the touch field <**next**> (75).
- By means of touching the touch field <**ESCAPE**> (76) the menu can be ended.



Further more there is also the optional possibility to download all jobs to a PC for protection of saved data!

For this you will need a special connection cable as well as the Leibinger program "LJ-Flash".

7.4 User-/ Password administration

The LEIBINGER-JET 2 offers the possibility to assign different access rights with different user groups to minimize malfunctions during the production process.



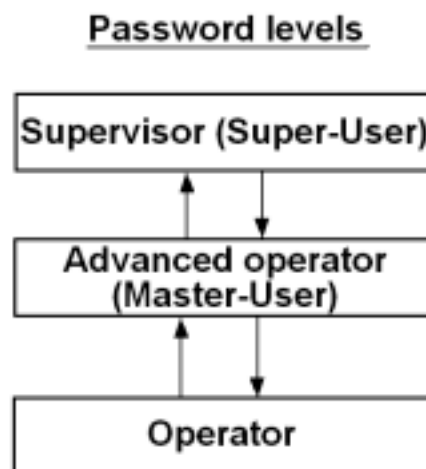
Note! For delivery is no password given therefore all functions are released.

7.4.1 Password levels (User groups) and user rights

There are three password levels available:

- **Password level 1 (Supervisor):** Also called Super-User. He has the full access rights to all functions. A password is required to login as supervisor.
- **Password level 2 (Advanced Operator):** Also called Master-User. He has only limited rights. The user has access to the following functions.
 1. Print (Start/Stop)
 2. Load, change and save jobs
 3. Create graphics and texts
- **Password level 3 (Operator):** He has only limited rights. The user has access to the following functions:
 1. Print (Start/Stop)
 2. Load jobs

Figure 64

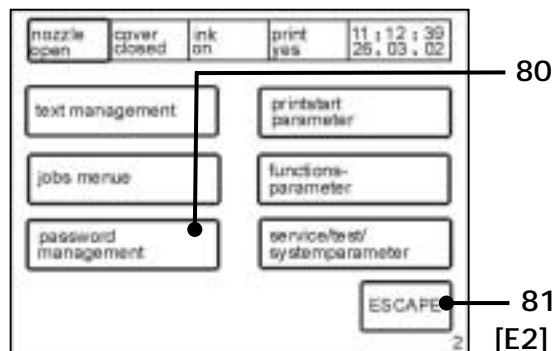


7.4.2 Call up password administration

Figure 65

With the touch field <password management> (80) the password administration surface <E7> is called up.

The touch field <ESCAPE> (81) ends the menu and leads back to the previous operation level.

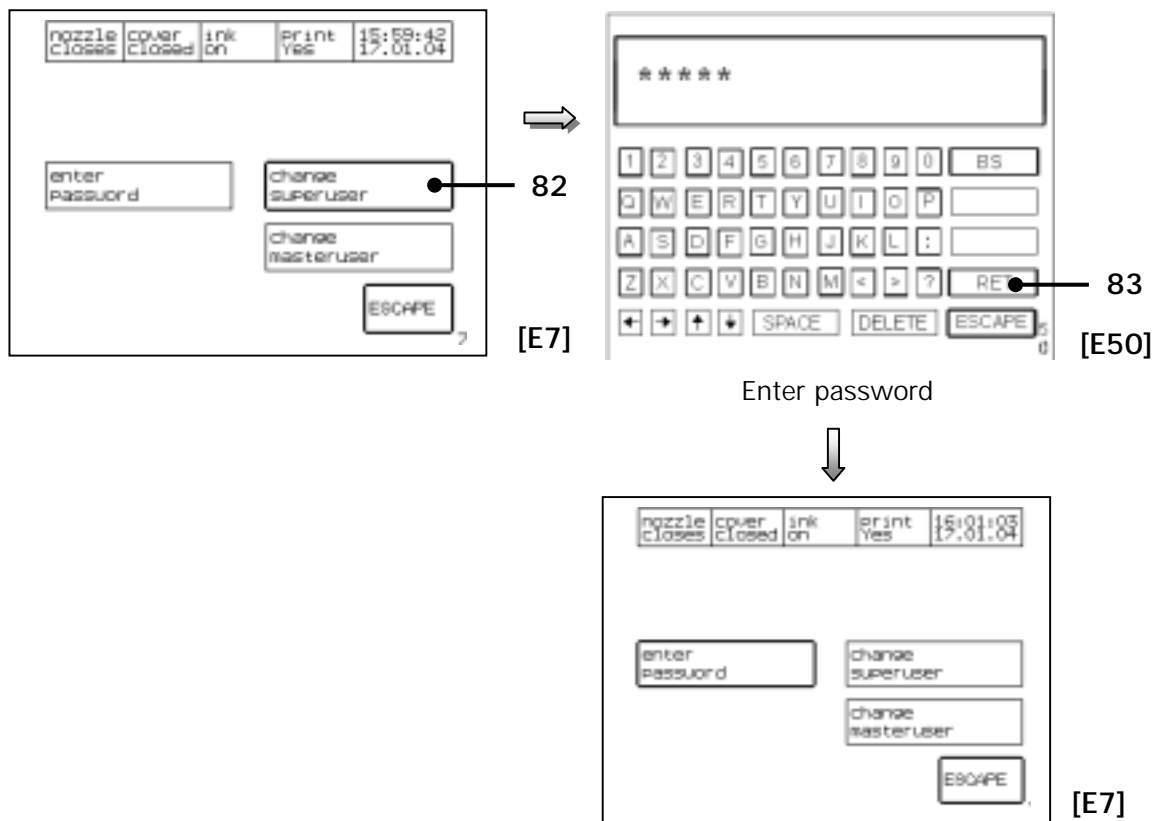


7.4.3 Activate user administration (first password input)

To activate the user administration the password for the Supervisor has to be entered. The passwords should have min. 4 characters. The max. amount of the characters is limited to 10 characters.

Manner of proceeding

Figure 66



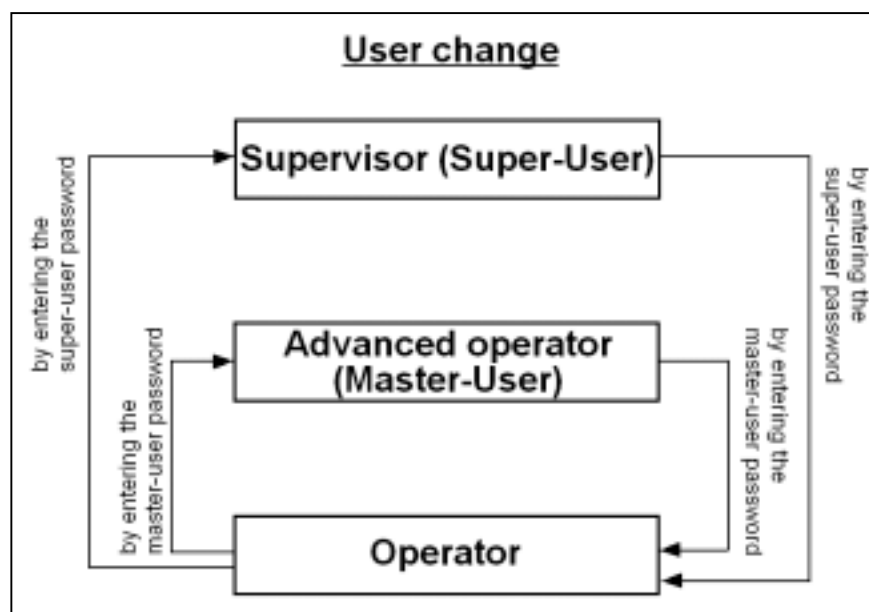
- Press the touch field < **change superuser** > (82) to commit the password for the supervisor.
- The keyboard field < **E50** > opens to enter the password.
- Enter the requested password and confirm it with the touch field < **RET** > (83).
- The LEIBINGER-JET 2 changes back to the password administration menu < **E7** > .



The device starts always with the password level 3 (operator-mode)! The device is on the operator level at first even after the first input of the supervisor password!

7.4.4 User change and password change

Figure 67



7.4.4.1 Login as supervisor or advanced operator

If the user administration is activated the supervisor and the advanced operator have always to enter the password because the device is on the operator-level at first.

Manner of proceeding

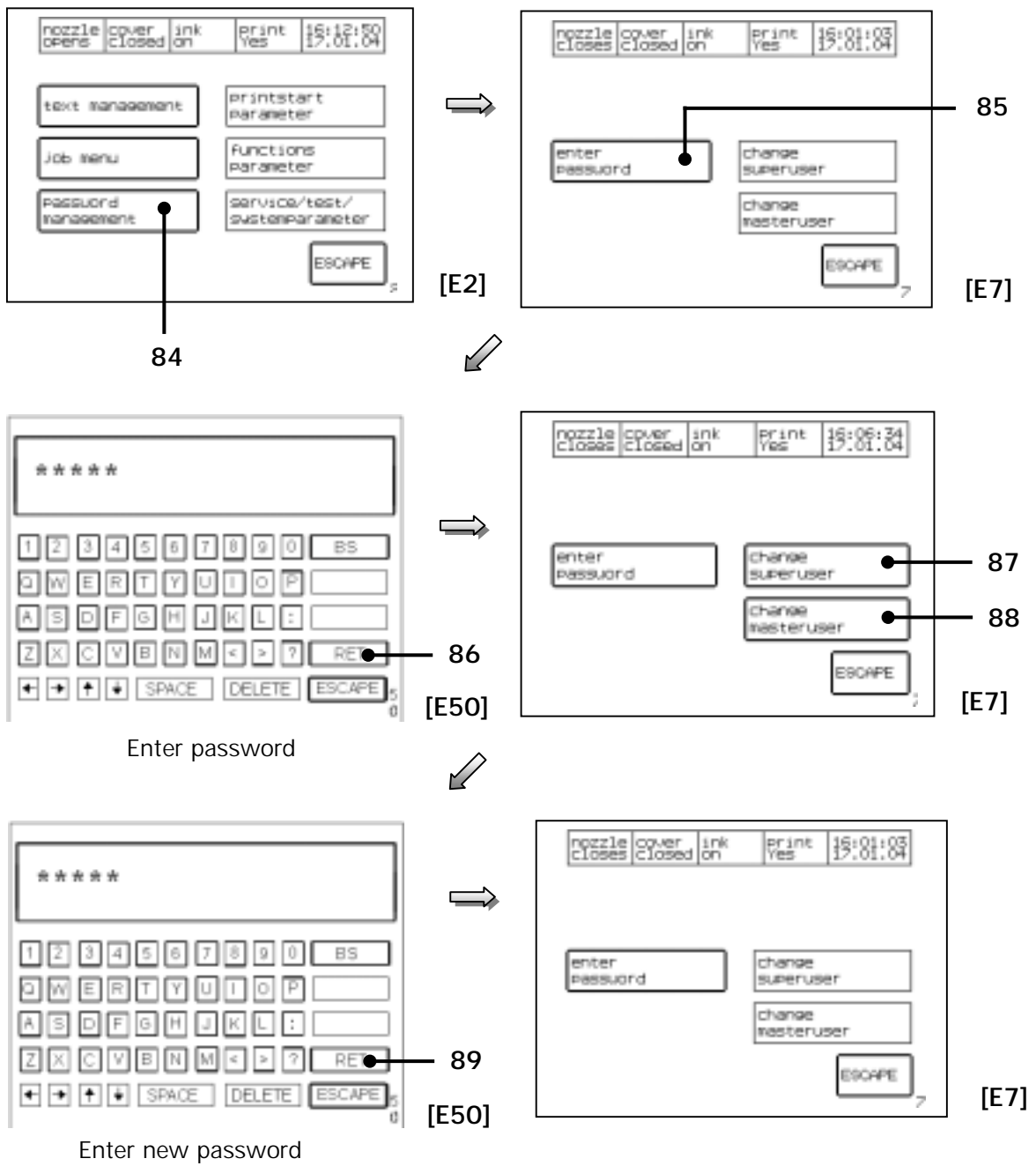
- Press the touch field **<password management>** (84) in the menu level **<E2>**.
- The surface of the password administration **<E7>** will be called up.
- Press the touch field **<enter password>** (85).
- The keyboard field **<E50>** opens to enter one of the given passwords.
- Enter the required password and confirm it with the touch field **<RET>** (86).
- The selected user will be logged in and the LEIBINGER-JET 2 changes back to the password administration menu **<E7>**.

7.4.4.2 Change passwords

To change existing passwords or to award a password for the advanced operator (masteruser) you have to proceed as following:

- Press the touch field **<password management>** (84) in the menu level **<E2>**.
- The surface of the password administration **<E7>** will be called up.
- Press the touch field **<enter password>** (85).
- The keyboard field **<E50>** opens for input. You have to enter the supervisor-password.
- Enter the required password and confirm it with the touch field **<RET>** (86).
- The LEIBINGER-JET 2 changes back to the password administration menu **<E7>**.
- Press the touch field **<change superuser>** (87) or **<change masteruser>** (88) to change the certain password.
- The keyboard field **<E50>** opens to enter a new password.
- Enter the requested password and confirm it with the touch field **<RET>** (89).
- The LEIBINGER-JET 2 changes back to the password administration menu **<E7>**. The password is now active.

Figure 68



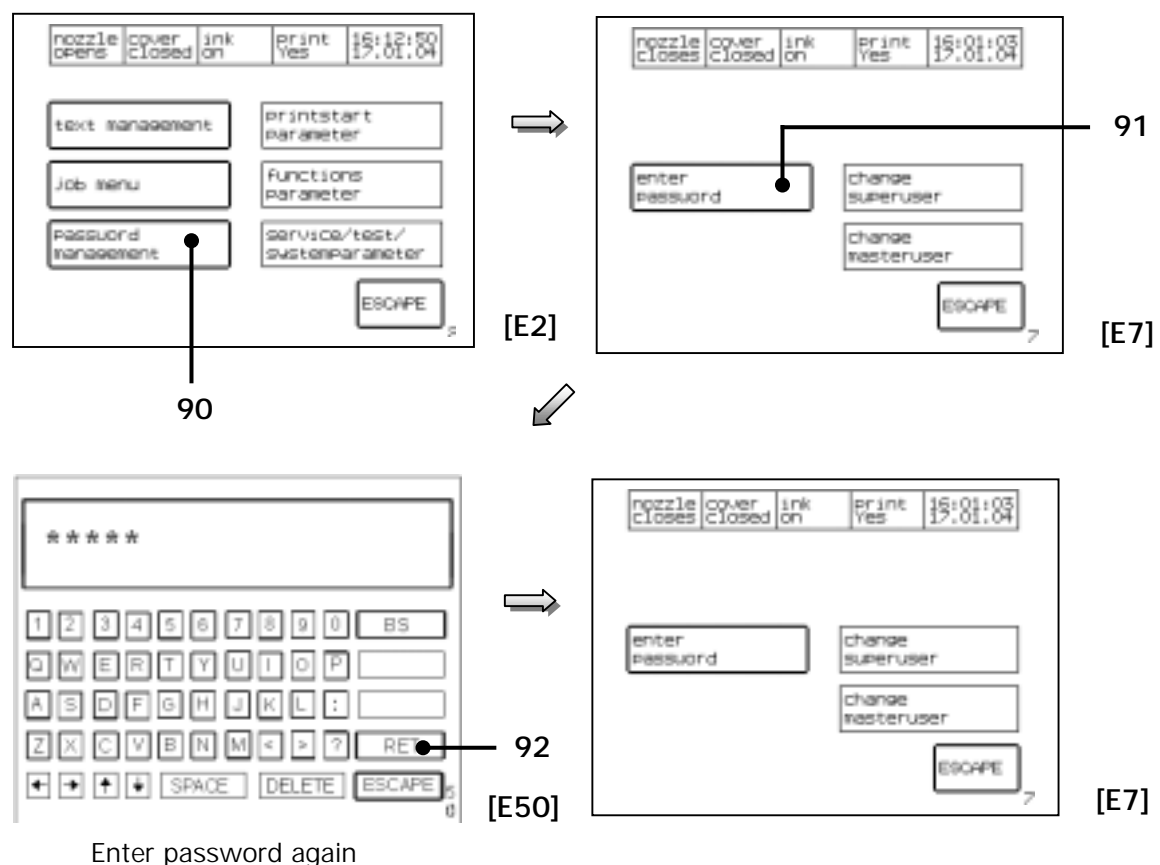
The password should have at least 4 characters and should not exceed 10 characters.

7.4.4.3 Logoff as supervisor or advanced operator

To log off as supervisor or advanced operator either to reset the LEIBINGER-JET 2 to the operator-mode you have to proceed as following:

- Press the touch field <password management> (90) in the menu level <E2> .
- The surface of the password administration <E7> will be called up.
- Press the touch field <enter password> (91).
- The keyboard field <E50> opens to enter the password.
- Enter the password of the active user again and confirm it with the touch field <RET> (92).
- The LEIBINGER-JET 2 changes back to the password administration menu <E7> and the password level 3 (operator-mode) will be activated.

Figure 69



7.4.5 Password forgotten

If the password of the supervisor has been forgotten special proceedings are required. Please contact the dealer address which is listed in the **Chapter Publisher**.

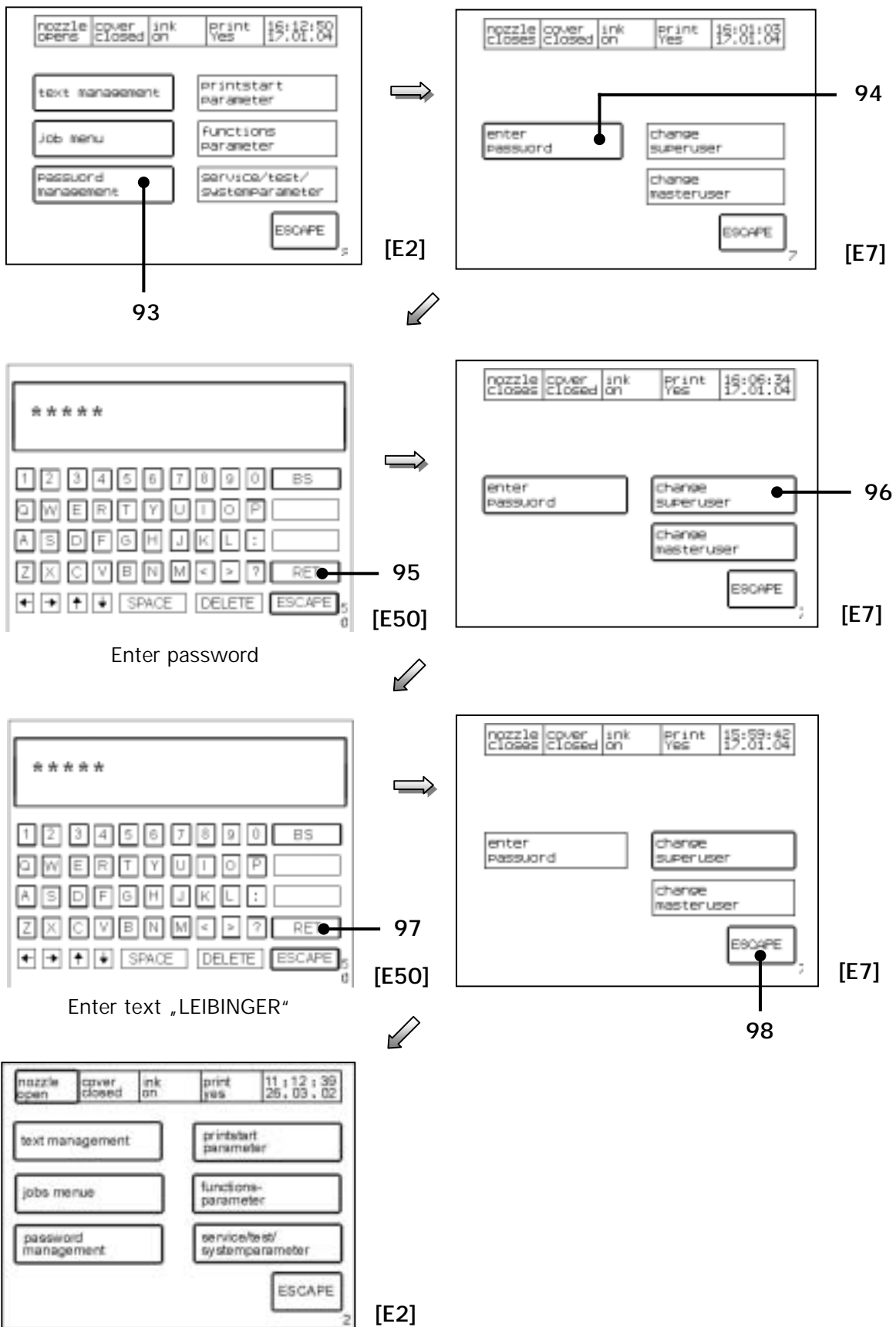
7.4.6 Deactivate user-/password administration

If the password-/user administration of the LEIBINGER-JET 2 is not required anymore it can be deactivated any time.

Manner of proceeding

- Press the touch field **<password management>** (93) in the menu level **<E2>**.
- The surface of the password administration **<E7>** will be called up.
- Press the touch field **<enter password>** (94).
- The keyboard field **<E50>** opens to enter the password.
- The password of the supervisor (super user) has to be entered and has to be confirmed with the touch field **<RET>** (95).
- The LEIBINGER-JET 2 changes back to the password administration menu. **<E7>**.
- Press the touch field **<change superuser>** (96).
- Enter the text „LEIBINGER“ and leave the menu level with the touch field **<RET>** (97).
- The user administration will be deactivated and the LEIBINGER-JET 2 changes back to the password administration menu **<E7>**.
- With the **<ESCAPE>**-button (98) you can get back to the menu level **<E2>**. All functions are displayed with a bold frame again because they are available without password protection.

Figure 70

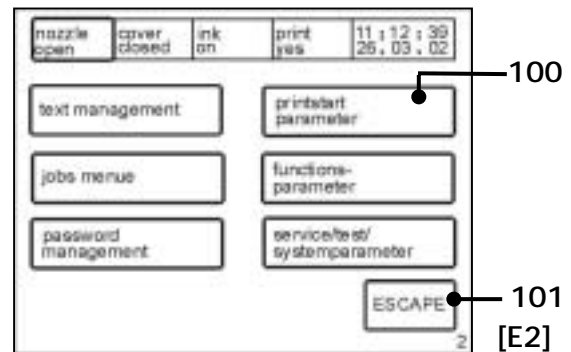


7.5 Print start parameters

Figure 71

With the touch field <printstart parameter> (100) the form of the print-out is determined. The print parameter administration surface <E4> is called up.

The touch field <ESCAPE> (101) ends the menu and leads back into the previous operation level.



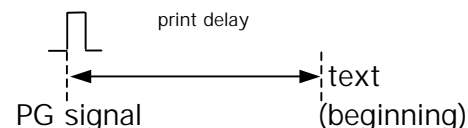
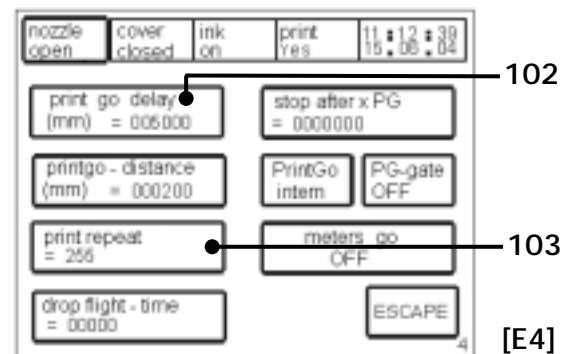
7.5.1 Print delay and print repetition

Figure 72

The touch field <print go delay> (102) enables the delay of the print-out by the value entered in mm. At the same time the current value is displayed in the field in addition.

The higher the value entered the later the print-out begins.

The basic setting, for the entry of the values in mm, is carried out in the programming level <E14> with the touch field <Pulses per mm>.



The touch field <print repeat> (103) enables the entry of the number of print-outs, at the same time the current value is also displayed in the field. Values between 0-255 are admissible.

Example: 000 = single print-out
001 = double print-out

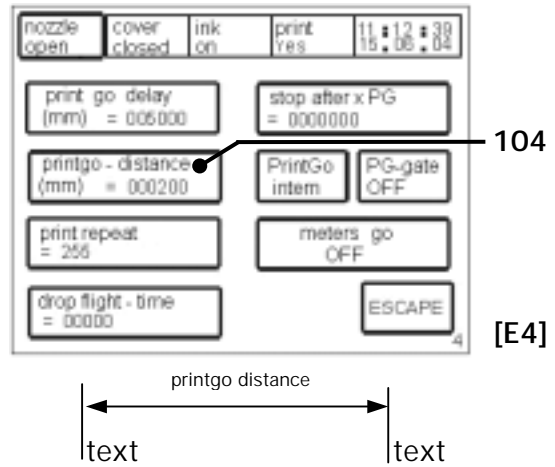
255 = endless repetition

7.5.2 Printgo distance

Figure 73

The touch field <printgo-distance> (104) determines the gap between the individual print-outs by the value set, at the same time the current value is displayed in addition in the field. Values between 0 – 99999.9 are admissible. The entry is done in mm.

The greater the value entered the greater is the gap between the individual print-outs.

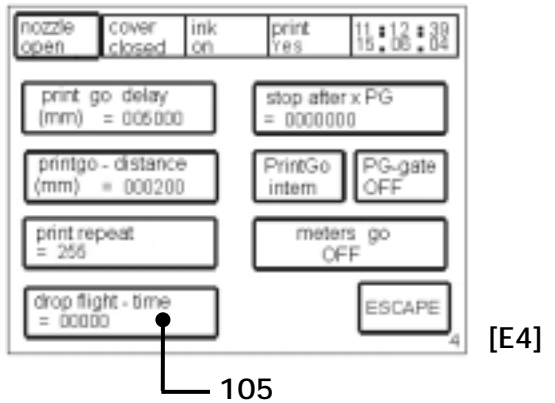


7.5.3 Droplet flight time

Figure 74

The touch field <drop flight-time> (105) causes an alteration to the droplet loading.

Major speed alterations require the droplet flight time compensation for the prevention of text item variances. A precondition is the setting of a greater print delay because at higher speeds the droplet loading must start earlier.

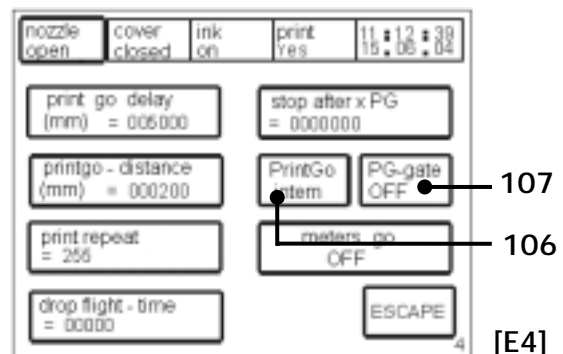


7.5.4 Print Go and Print Go Gate

Figure 75

The touch field <PrintGo> (106) toggles between "intern" and "sensor" to select the source of the print go signal.

With the "Sensor" setting the print go signal will be generated through an external sensor. With the "Internal" setting the connected sensor is not queried (the print go signal will be generated by the printer).



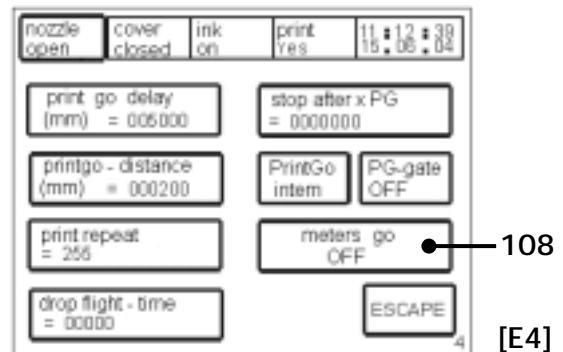
With the touch field <PG-gate> (107) a further print start condition can be activated, at the same time the current status "ON" or "OFF" is shown in the field in addition. With the setting "ON" activated the print procedure is only carried out for as long as the queried sensor is under voltage.

Example: Endless print-out of pipes with interrupts between the end of the previous pipe and the beginning of the next pipe.

7.5.5 Meter go function

Figure 76

With the touch field <Meter-Go> (108) the Leibinger-Jet 2 function will be activated or deactivated. At the same time the current status „ON“ or „OFF“ is displayed.



Function:

The function enables to continue the running production for the printing of continuous goods during a printing stop and enables to continue the print with the correct status after the stop.

For this the method steps of the product (entering encoder signals) are displayed in the background. An internal counter in the background calculates therefore the current counter status of the length marking.

If a new printing start signal is generated after the print stop by pressing the touch field <printstart>, you will get automatically the correct counter status of the length marking.

Typical applications:

- Length marking of continuous cables
- Length marking of continuous tubes.



Note! Already by activating the function <meters go> entering encoder signals (method steps) will be displayed in the background. To guarantee the correct start value for the first „printing start“ with the function it is absolutely necessary that all counters are reset accordingly.



Pay attention! A correct printing can be only guaranteed if the printer is **not** switched off during a printing stop/trouble shooting!

Manner of proceeding:

- Choose the function < **With Encoder** > (110) in the menu level < **E8** > .
- Activate the function < **meters go ON** > (111) in the menu level < **E4** > . The set up < **PrintGo** > (102) changes automatically to the set up „**sensor**“ and should be not changed anymore!
- Press the touch field < **printgo-distance** > (113) to enter the certain value (distance from printing start to printing start) in mm.
- With the < **ESCAPE** >-button you can leave the menu and you can go back to the menu level < **E1** > .
- With the touch field < **take over** > (114) in the menu level < **E1** > the set up will be taken over to the production.

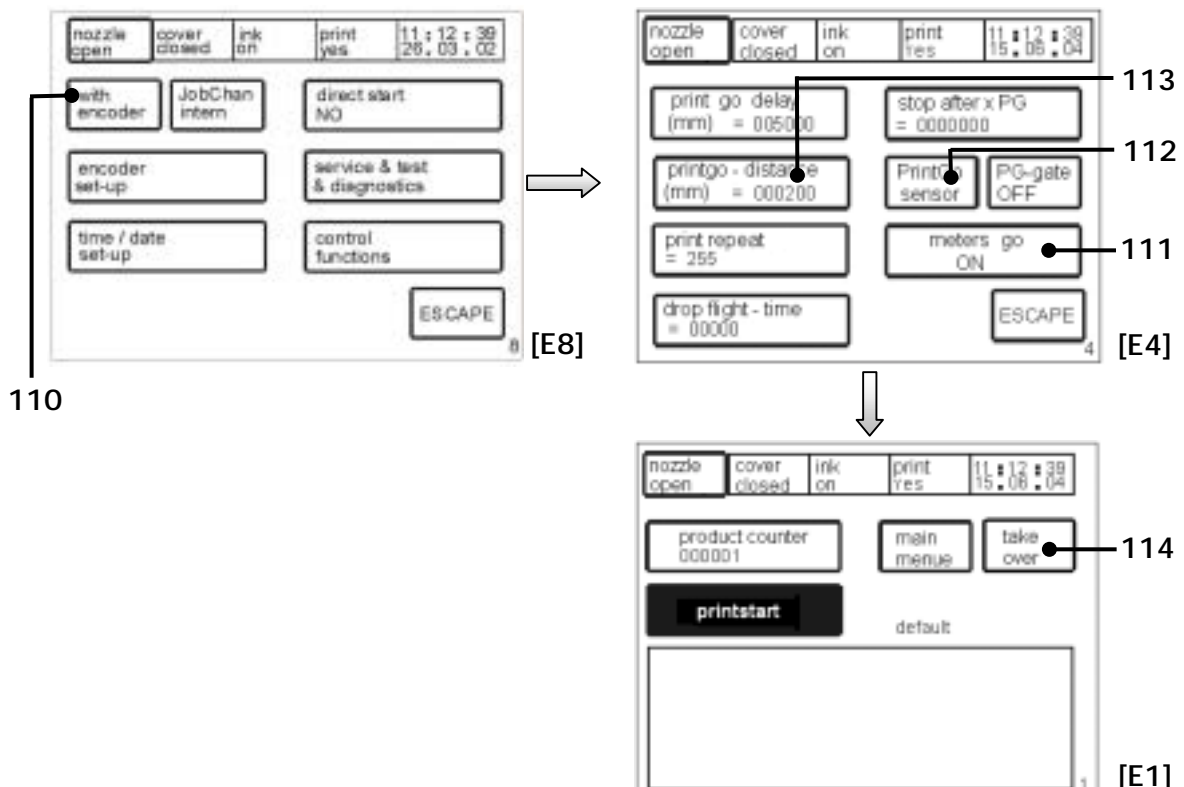
Observation:

The touch field < **take over** > (114) will be only displayed during open nozzle!



Note! To guarantee the correct start value for the **first** „printing start“ with the function it is absolutely necessary that all counters are reset accordingly.

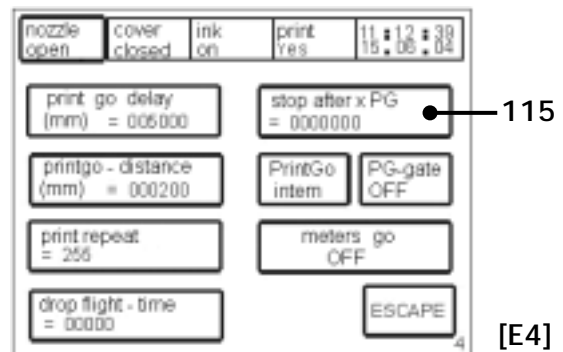
Figure 77



7.5.6 Pre-defined print stop

Figure 78

With the touch field <stop after x PG> (115) the amount of print-outs are pre-defined and according to this the Leibinger-Jet 2 will release an automatic printing stop. At the same time the entered value is displayed in the field.



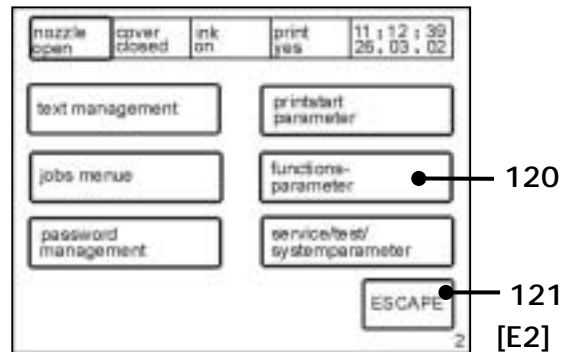
Note! Before the restart of the production the product counter has to be absolutely reset to get a correct result.

7.6 Function parameters

Figure 79

The touch field <functions parameter> (120) controls the setting of various function parameters. The parameter administration surface <E6> is called up.

The touch field <ESCAPE> (121) ends the menu and leads back to the previous operation level.

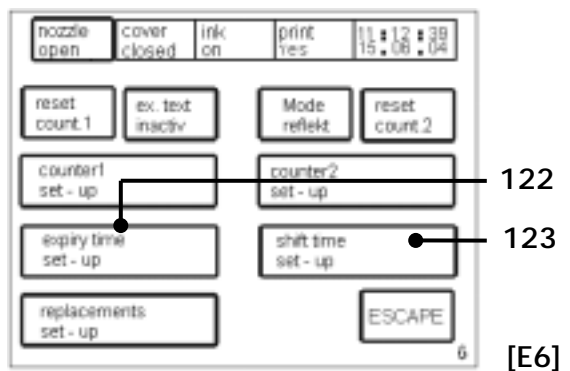


7.6.1 Expiration time and shift times

Figure 80

The touch field <expiry time set-up> (122) activates the level <E41> for entry of an expiration time.

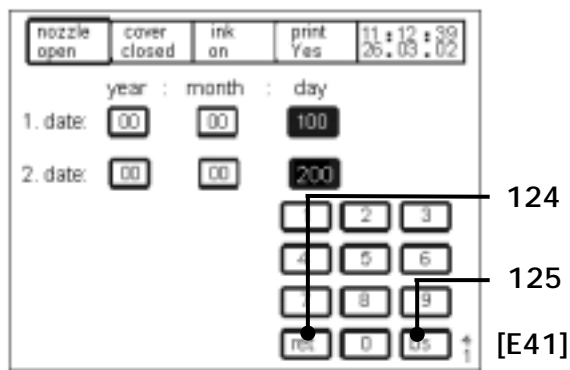
The touch field <shift time set-up> (123) activates the level <E44> for adaptation of the individual shift times.



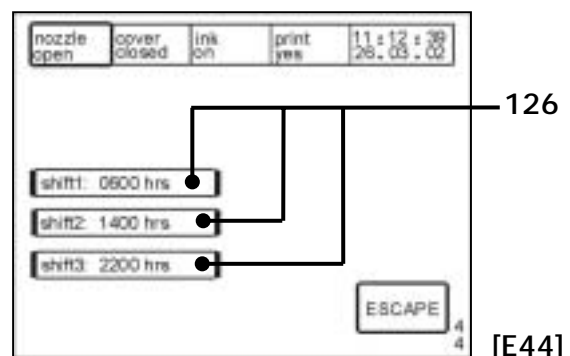
Expiration time is understood as meaning the time that elapses until the product is no longer usable. Enter the desired shelf life period via the number block. (This is added to the current date.) Two times can be entered.

Return <ret> (124)= take over entry

Backspace <bs> (125)= delete the last entry



By activation of the corresponding <touch field> (126) the times can be entered via the number block appearing.



7.6.2 Replacements and text sources

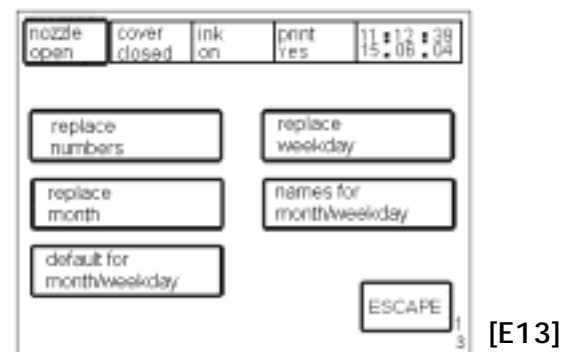
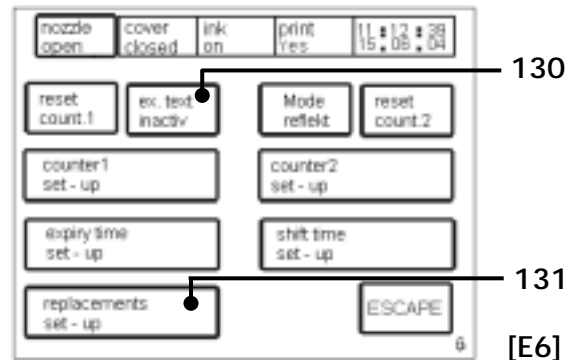
Figure 81

The touch field <ex. text> (130) controls the text source. At the same time the current status "inactive" or "active" is displayed in the field.

With the **active setting** the text is imported from a connected external data source. If the status **inactive** has been selected external sources will be ignored.

The touch field <replacements set-up> (131) activates the selection level <E13>.

The selection menu <E13> enables the replacement of the date values entered by letters or names so as to enable a company-specific illustration or coding of the information. The alterations carried out are saved after the entry.



7.6.2.1 Printing with the function "ex. text"

By the usage of the function "external text" an easy possibility is provided to send variable data via the serial interface RS232 without any additional software- or programming works.

Function principle:

Variable data of a fixed text length (string length/field length) can be sent via the RS232 which are placed to the predefined wildcards within the text. Within a text you can define several variable fields of wildcards; ore the wildcards can stand alone also (without additional text).

The maximum length of all wildcards is 64 characters; that means for each print-out (PrintGo-signal) you can send and print maximum 64 variable data bytes.

For every print-out (PrintGo-signal) always the constant amount of characters have to be transferred which have been also defined as the amount of wildcards (e.g. 4 wildcards are defined ► always necessary to send 4 data bytes per print-out).

The characters can include letters and numbers, but should not include control characters as "carriage return" or "line feed".

Inside the printer there is a input buffer of totally 256 characters available.

For every "PrintGo" the printer will check, if the amount of characters have been entered on the input-buffer, which are given by the amount of the wildcard characters. If enough characters have been received, they will be taken over to the data-buffer and will be printed.

If not enough characters have been received, the characters are printed which are taken over to the data-buffer at last (the previous text will be printed again).

Example for text input:

| | | |
|----------------|---------------------------------|-----------------|
| Fix text | <i>Variable text/data field</i> | <i>Fix text</i> |
| Content | XXXX | pieces |

The input of the fix text (the non-variable part of the text) can be done as usual. After the input of the first text part, the definition of the wildcards for the variable data is carried out:

By touching either several touching of the <SHIFT> button, further menus to enter small letters, special characters and additional parameters are called-up.

In the menu "Additions" <E60> and with the button <ExText> you can set the required wildcards to implement the variable external data via the interface (wildcards can be any alphanumeric characters; in the shown example the "x" has been used as wildcards).

Print-out of our example:

After pressing the button <Printstart> the first four data bytes have to be sent via the RS232 interface => e.g. "1000"

After the first "PrintGo"-signal the following text will be printed out:

Content 1000 pieces

Now the second data record has to be transferred via the interface (this transmission can already happen during the first print-out) => e.g. "2345"

After the next "PrintGo"-signal the following text will be printed out:

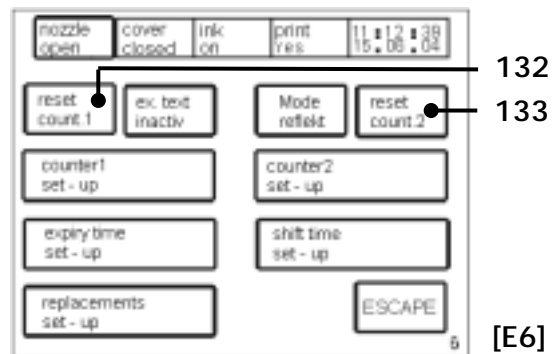
Content 2345 pieces

7.6.3 Reset counters

Figure 82

With the touch fields <reset count. 1> (132) and <reset count. 2> (133) the respective counter is reset.

(Resetting of counters actually printed out.)



The "counter 1" can also be reseted by an external 24V-signal on a pin 15/X4 (please see *chapter 12.2 "Interface layout plan"*)

7.6.4 Counter settings

Figure 83

With the two touch fields <counter 1 set-up> (134) and <counter 2 set-up> (135) the basic settings of the respective counters are defined.

The setting level <E42> is activated.

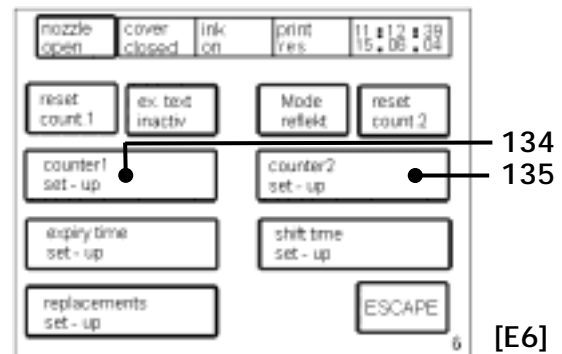
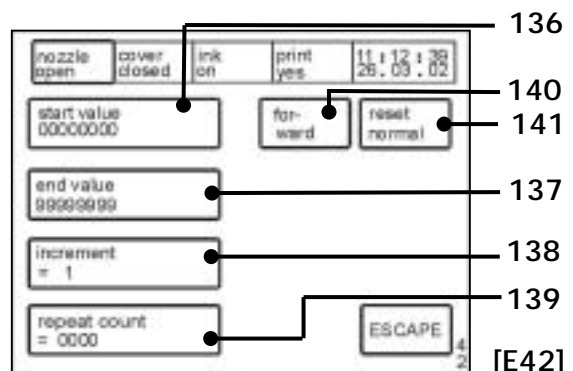


Figure 84

The touch field <start value> (136) enables the entry of the starting value. Following reaching of the limit value the counter is reset to the starting value.



With the touch field <end value> (137) the limit value can be defined. The starting value can be increased to any limit value desired.

The touch field <increment> (138) defines the increase between the individual print issues. The increase of the counter can be selected between 1-9.

The touch field <repeat count> (139) determines the number of prints to be repeated. If no repetition is desired "0" must be entered. The counter can print up to 9999 repetitions.

At the same time the values are displayed in addition in the above mentioned fields.

The touch field <forward/backward> (140) controls the direction of the counting process i.e. whether the counter is incremented (+) or decremented (-).

The touch field <reset> (141) controls the form of the reset. At the same time the activated status „normal“ or „Prod. C.“ is displayed in the field. If the function „Prod. C.“ (with product counter) is activated the counter will be reset when the product counter is reset.

7.6.5 Counter programming

To programm a counter you have to proceed as following:

(E.g.: A counter with 4 digits should be defined)

- Press the touch field < **new text** > in the menu level < **E3** > .
- The "font menu" < **E9** > is called up.
- After choosing the font the line menu < **E15** > either the keyboard field < **E50** > will be displayed if necessary.
- By the touch field < **Shift** > scroll as long as the menu level < **E60** > appears.
- Press the touch field < **Counter** > (142). The Leibinger-Jet 2 changes to the counter definition mode. To indicate that the counter definition mode is active, the display background will be colored black.
- Return with the < **Shift** > -button (143) to the keyboard field < **E50** > .
- Input wildcard for the counter. The amount of the wildcards is determined by the number of digits of the counter. The wildcards are already the so-called "start value" of the counter (*so e.g. 0005*).
- Return with the < **Shift** > -button (143) to the menu level < **E60** > again and confirm the input by pressing the touch field < **counter** > (144) again.
- Escape the menu with the < **Shift** > -button (143) and you can finish the process in the next possible menu level by pressing the touch field < **ESCAPE** > .
- With the touch field < **take over** > (145) in the menu level < **E1** > the counter will be taken over into the production.
- A safety inquiry with which counter you should go on will be faded-in.

Observation:

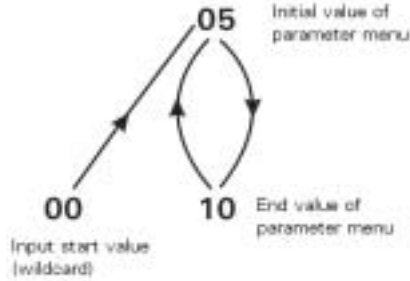
The touch field < **take over** > will be only displayed during open nozzle!

The parameters of the counter can be selected in the menu level < **E6** > .

The value of the entered wildcards determines also the "start value" of the counter. For the first start of the production it will be only once from the "start value" (wildcard) to the "initial value". Afterwards it will be only counted recurrently from the "initial value" to the "end value".

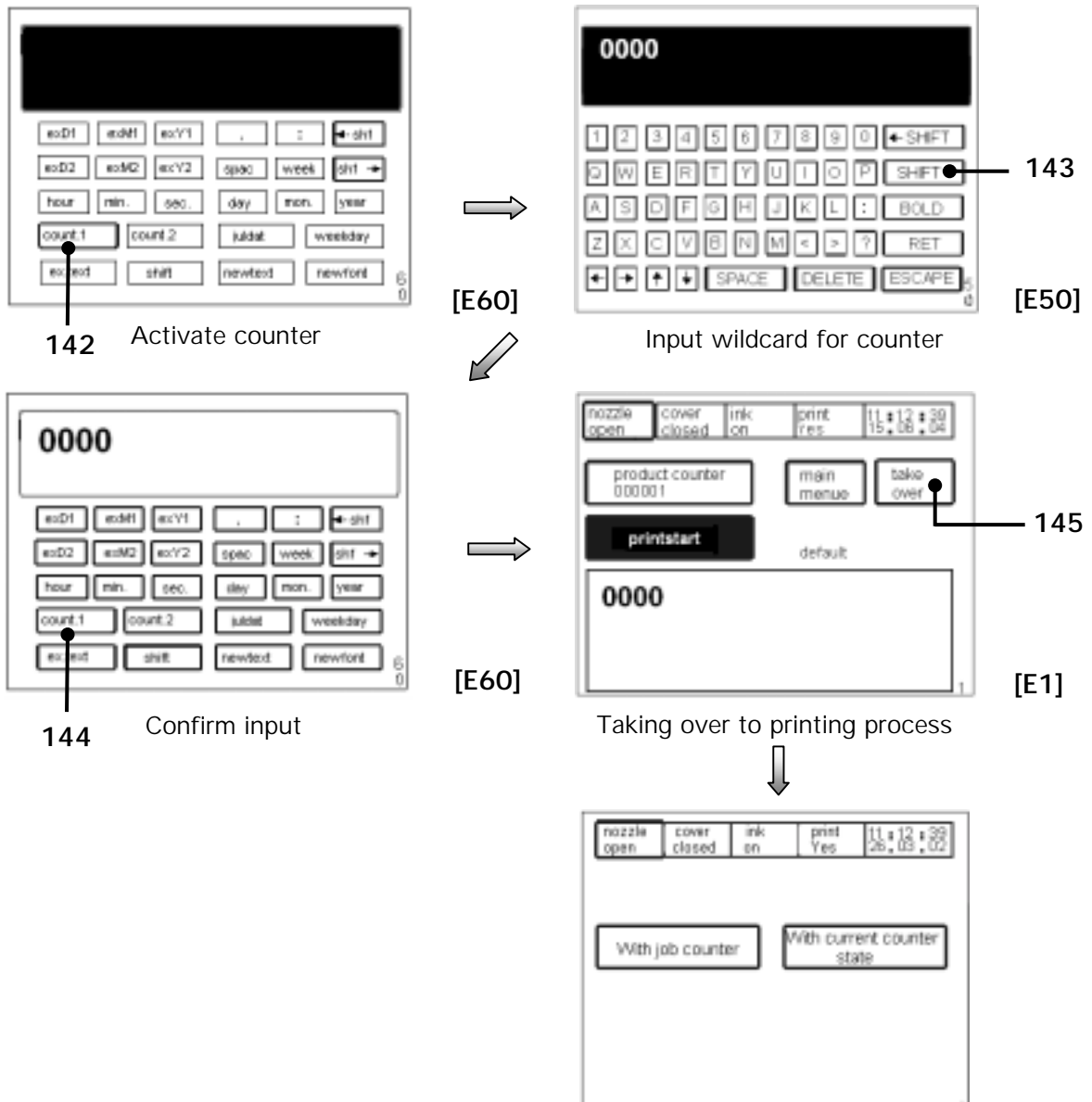
Example:

Start value 00 initial value (parameter) 05 end value (parameter) 10
Print: 00;01;02;03;04;05;06;07;08;09;10;05;06;07;08;09;10;05;06.....



If the counter should start counting from the beginning from the initial value (e.g. 05) the wildcard has to correspond with the initial value (wildcard value = 05).

Figure 85

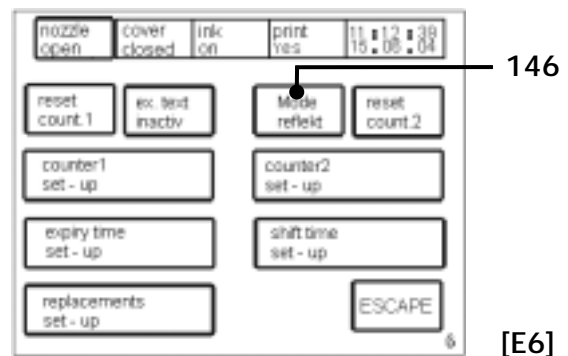


7.6.6 Mode normal and reflected

Figure 86

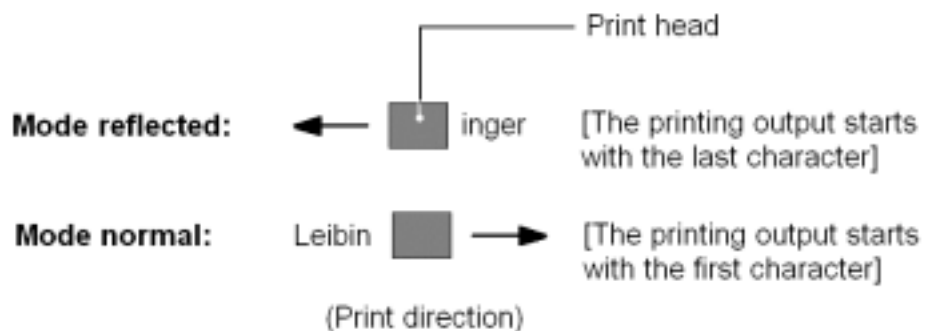
The touch field <Mode> (146) controls the printing direction, that means if the text should be printed from forward to behind or from behind to forward.

At the same time the current status „normal“ or „reflected“ is displayed.



The mode „reflected“ is used if the back movement of the print head or of the product is used during the printing process.

Example:



Note! If the button <mode reflected> is activated, it is cogent necessary to enter also a <print go delay> (see chapter 7.5.1 (print dely and print repetition)). The necessary length of the **print go delay** is depended of the printing speed and has to be find out by some trials.

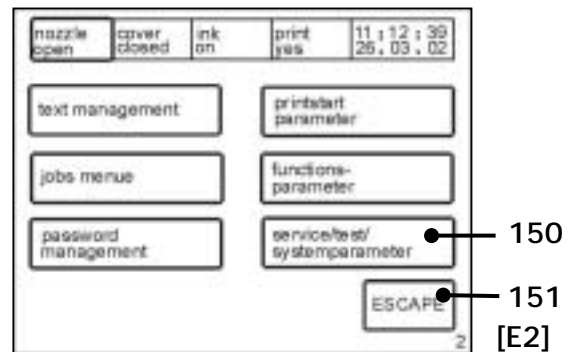
Recommended is a default value of 5 mm!

7.7 Service/test/system parameters

Figure 87

With the touch field <service/test/ system-parameter> (150) the system administration surface <E8> is called up.

The touch field <ESCAPE> (151) ends the menu and leads back to the previous operating level.

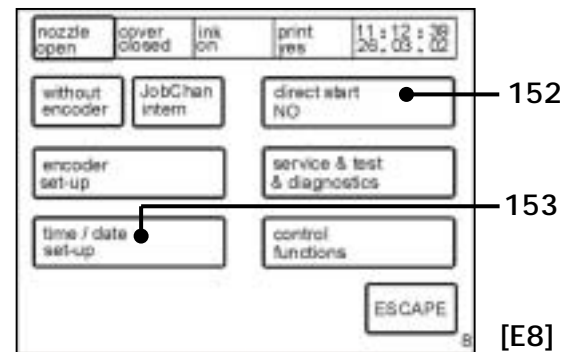


7.7.1 Direct start and time/date

Figure 88

With the touch field <direct start> (152) the independent print start of the device can be switched on and off.

At the same time the current status "YES" or "NO" is displayed in the field.



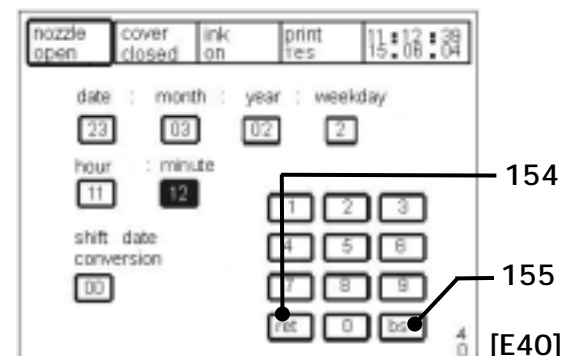
I.e. when the print head is opened, the oscillator voltage and the phase set, the ink jet printer is ready for printing and the LEIBINGER-JET 2 begins the print procedure independently upon receipt of a print start signal.

The touch field <time/date set-up> (153) enables the import of date and time. The "entry level" <E40> is called up.

The entry of the current settings of date, weekday and time can be made.

Return <ret> (154) = take over entry

Backspace <bs> (155) = deletes the last entry



Observation: The postponement of the date setting is done in hourly steps. The maximum possible postponement is 23 hours.

7.7.2 Monitoring functions (Control functions)

7.7.2.1 Printgo- and strokego monitoring

Monitoring functions are particularly necessary with high printing speeds.

Examples: A Print Go is triggered and is printed. The next Print Go is triggered. However if the writing procedure has not yet been ended an error notification will be made on the display:

„error!!, a printgo occured while a print, was in progress. Prints will be lost. Check also PG-distance.“

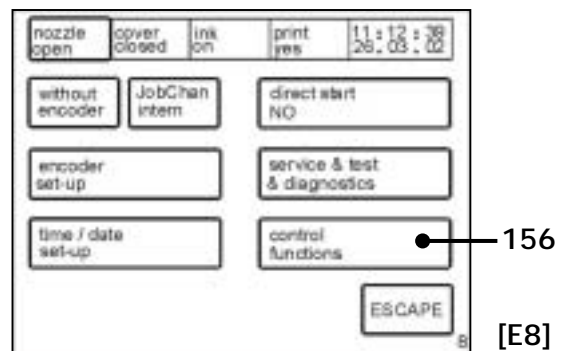
If the print speed is too high with the parameters set, stroke errors can occur. The following error notification appears on the display:

„error!!, a strokego occured while a stroke, was in progress so strokes will be lost.“

The speed must be reduced or device parameters altered!

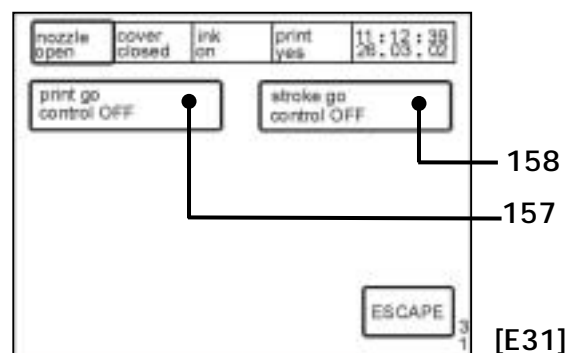
Figure 89

With the touch field <control functions> (156) various monitoring functions (control functions) can be activated. The "activation level" <E31> is called up.



With the touch fields <print go control> (157) and <stroke go control> (158) the functions can be activated or deactivated.

At the same time the current status "OFF" or "ON" is shown in the fields.



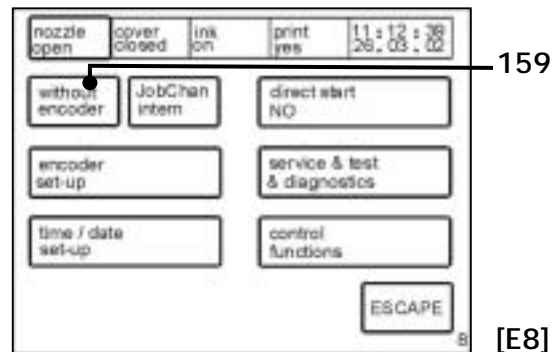
7.7.3 Encoder

Figure 90

The touch field <encoder> (159) de-activates or activates this.

At the same time the current status „with“ or „without“ is displayed.

With encoder print is possible in one or in both directions.



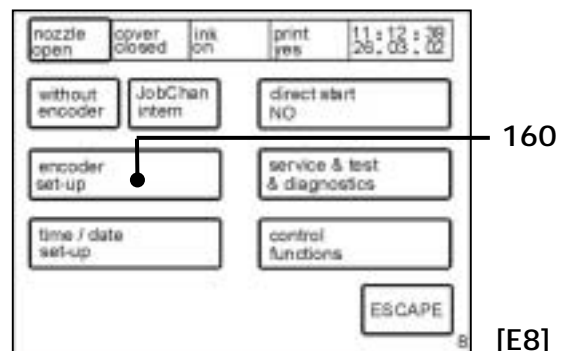
[E8]

7.7.4 Encoder parameters

Figure 91

The current status is displayed in all fields.

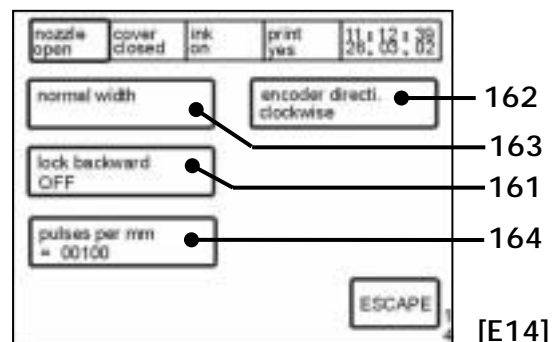
The touch field <encoder set-up> (160) controls the basic settings of the encoder. The "selection level" <E14> is opened.



[E8]

With the touch field <lock backward> (161) the return barring is activated or deactivated.

If the return barring is switched on the strokes that are created during any backwards movement are taken into consideration in ensuing forwards movement to control the correct insertion of the text print-out.



[E14]

With the touch field <encoder directi.> (162) a choice can be made between direction of rotation to the left or to the right. Encoder signals are only evaluated with a correctly set direction of rotation.

The touch field <width> (163) controls the print width of the print-out. The modes "normal" and "extra" are available for selection. In the "extra" mode the print width is doubly wide. Only possible with the "without encoder" setting.

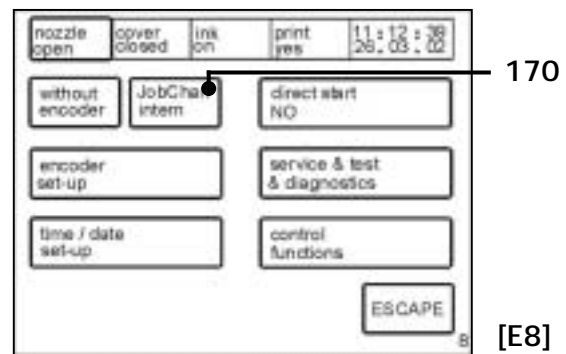
Observation: In the "normal width" mode the device works at a rapid stroke rate, with "extra width" (extra wide) at a lower stroke rate.

With the touch field <Pulses per mm> (164) the pulses/revolution indicated on the encoder can be multiplied by the factor 4 and following the multiplication they can be divided by the distance determined for one revolution.

7.7.5 Job change

Figure 92

By switching over to the touch field <JobChan> (170) from "internal" to "external" the possibility is given of changing between 128 jobs during production by means of an external signal. If the "internal" mode is activated external signals for a job change are ignored.



Observation: With activated external job change, jobs can only be edited with a closed nozzle. To change a job by external signals the head must be open. A corresponding signal from the SPC is required.

At the same time the current status "internal" or "external" is displayed in the field.

7.7.5.1 Printing with the function "external job selection"

For the usage of the function "external job selection" the printer has to be prepared as follows:

1.) Delete all jobs:

Please push the following order of buttons: ► "main menu" ► "job management" ► "delete jobs" ► "all jobs" ► "YES"

2.) Create 128 Default-jobs:

Please push the following order of buttons: ► "main menu" ► "function parameter" ► "replacements" ► "replace figures" ► "ESC" ► "Job management" ► "Factory setting & default job".

After these steps 128 default-jobs have been created automatically (see under "main menu" ► "job management" ► "list all jobs").

The jobs are numbered all the way through with names from "001" up to "128" and the function "external job change" is activated in the single jobs.

(This is necessary that no undefined job can be selected by switching over the inputs and that in every job the function "external job change" is already activated).

The jobs can be adjusted and overwritten accordingly (= edit and save under the same name again). They should be saved under a number between "001" and "128".



Attention!

- If a job is deleted, all other jobs are shifted by one digit (if e.g. job 031 is deleted, job 032 would be then on position 031 afterwards!!!). An afterwards insert of a new job on this digit where job 31 has been is unfortunately not possible anymore; that means that the arrangement of the job has been always shifted by the amount of the deleted job.
- As the inputs of the jobselect-lines have a very high priority, the head has to be always closed during editing of the job. Otherwise it can happen that the change of a job will be saved in a wrong job (not in the requested job, but in a job which is called by the select inputs right now). If the device is operated by an external software an additional control character can ignore the select lines (please see "interface description of the LJ2"). Due to this the head has not to be closed to edit or save a job as usual.

Overview (Extract) about the signal-state on connector "X4" and the selected number of the job:

| | | Seljob 6 | Seljob 5 | Seljob 4 | Seljob 3 | Seljob 2 | Seljob 1 | Seljob 0 |
|-----|-----|----------|----------|----------|----------|----------|----------|----------|
| ... | ... | | | | | | | |
| Job | 18 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| Job | 17 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| Job | 16 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Job | 15 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| Job | 14 | 1 | 1 | 1 | 0 | 0 | 1 | 0 |
| Job | 13 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| Job | 12 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| Job | 11 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| Job | 10 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Job | 9 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| Job | 8 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| Job | 7 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| Job | 6 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| Job | 5 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| Job | 4 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| Job | 3 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| Job | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| Job | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

0 = Optocoupler not activated

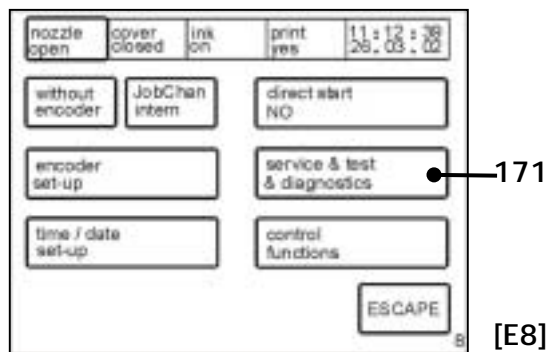
1 = Optocoupler activated

For further information about the connection and the pin numbers, please see *group12 chapter Interface layout plan*.

7.7.6 Service/test- and diagnosis functions

Figure 93

The field <service/test & diagnostics> (171) activates the „service menu“ <E16>.



7.7.6.1 Summary graph (oscillator voltage curve)

In this menu the control of the oscillator voltage regulation can be read. Its presentation is made in the form of a summary graph.

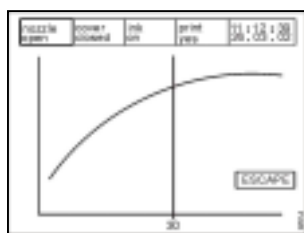


Settings and alterations!

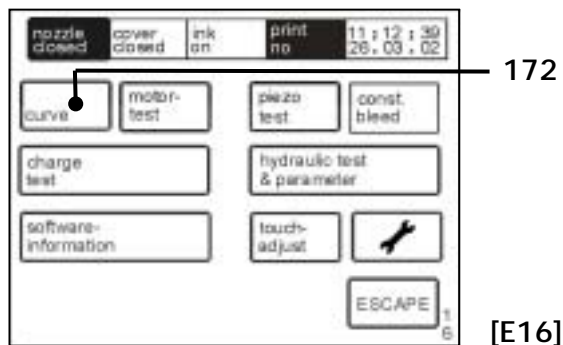
This work must only be carried out by Leibinger service technicians!

Figure 94

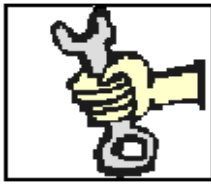
The touch field <curve> (172) activates the presentation.



[E25]



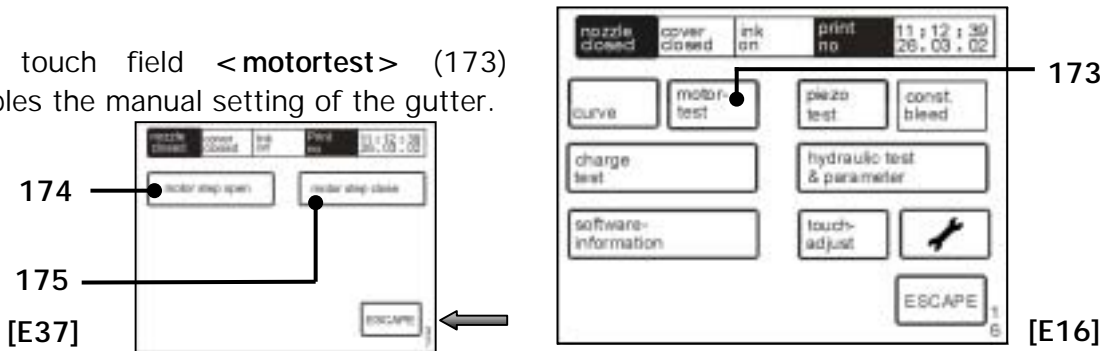
7.7.6.2 Motor test



This work must only be carried out by trained personnel or by Leibinger service technicians!

Figure 95

The touch field <motortest> (173) enables the manual setting of the gutter.



By means of tapping on <motor step open> (174) or <motor step close> (175) the gutter motor is driven and the gutter moves forwards or backwards.

7.7.6.3 Charging voltage test/Piezo test



Dangerous electrical voltage!

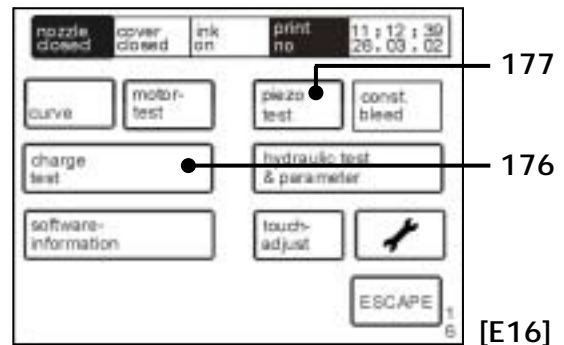
Measurement under voltage has carried out only by electrical experts!



This work must only be carried out by trained personnel or by Leibinger service technicians!

Figure 96

The touch field <charge test> (176) serves the setting of the charging voltage, the field <piezo test> (177) the setting of the oscillator voltage.

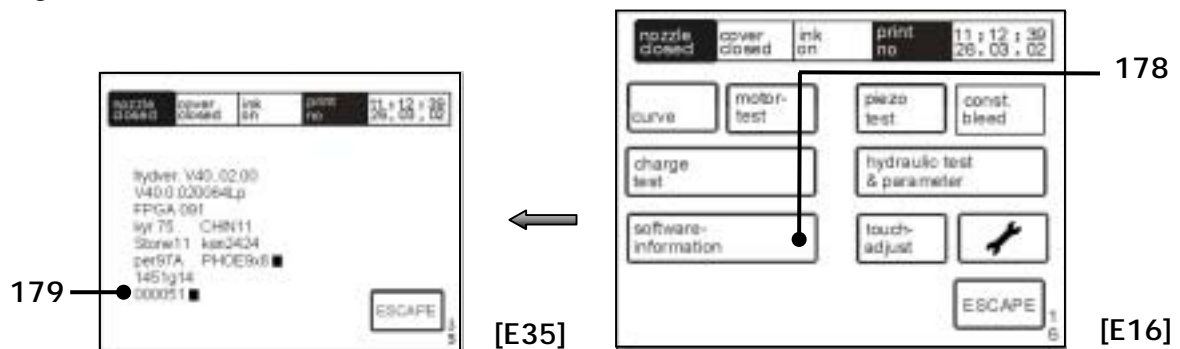


Oscillator voltage setting: issue of a constant oscillator voltage that serves reconciliation with the oscillation voltage booster (Poti TRM 1).

Charging voltage setting: issue of a constant charging voltage for the adjustment of the charging voltage booster (Offset TRM 2, boost TRM3).

7.7.6.4 Software information

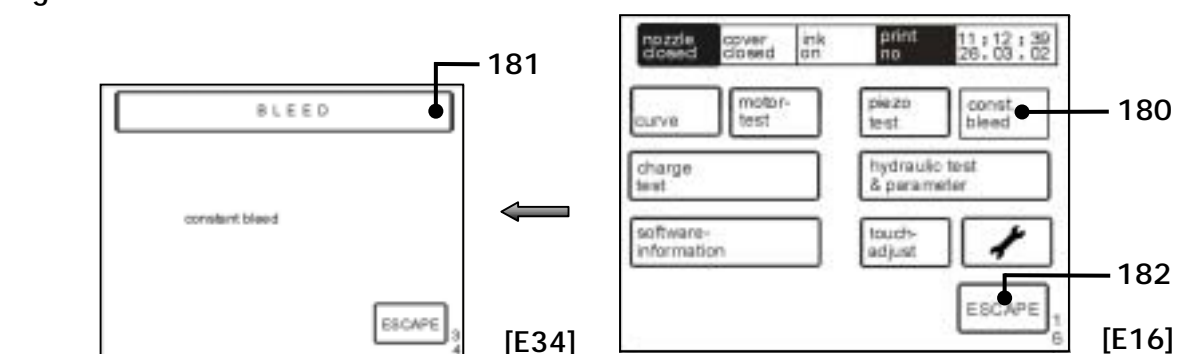
Figure 97



The touch field <**software information**> (178) displays the software statuses and the operating hours counter (179).

7.7.6.5 Permanent bleeding

Figure 98



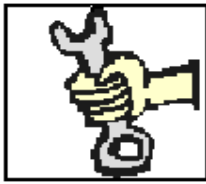
The touch field <**const. bleed**> (180) starts the permanent bleed of the device. The status field (181) blinks during the procedure and the notification "**Bleed**" is displayed. The bleeding can be cancelled at any time by pressing on the touch field <**ESCAPE**> (182). During this process the visco pump will be activated for 3 sec. every minute to guarantee that the pump will be flushed.



The function permanent bleed can be only activated if the device is working under the following conditions:

- the ink supply is switched on
- the head cover has been removed.

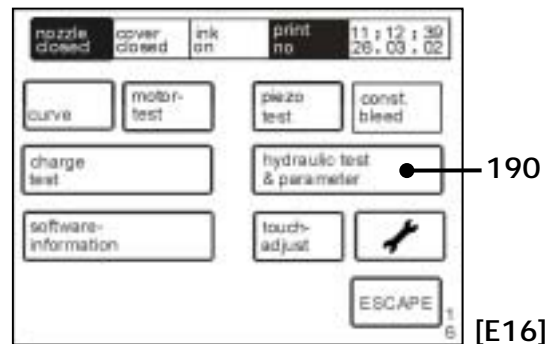
7.7.6.6 Hydraulic test & parameters



This work must only be carried out by trained personnel or by Leibinger service technicians!

Figure 99

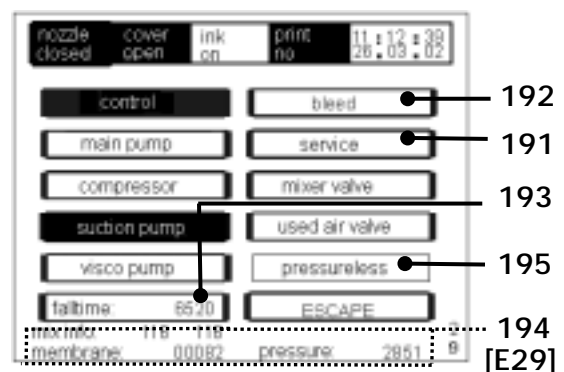
The touch field **<hydraulic test & parameter>** (190) activates the hydraulic menu **<E29>**.



If the regulation **not inverted** is shown, i.e. is switched off, each individual component can be driven individually.

Storage of the values is only possible in the **<service >** area (191).

(for further information see the following page)



With the touch field **<bleed>** (192) the device can be bled. The bleeding is only carried out as long as the button is active.

With the touch field **<pressureless>** (195) the device can be set in a pressureless operating mode. The function is only available for a deactivated control!

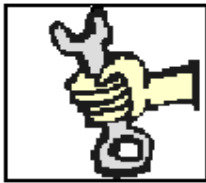
The touch field **<falltime>** (193) starts a new measurement of the current fall time. After approx. 15 seconds the value is updated. The issue of the value is made in milliseconds.

In the **<display zone>** (194) the current system pressure in mbar, the current position of the membrane as well as the mix information (values on the addition of ink and solvent) are shown.



Before exiting with **<ESCAPE>** it is imperative that the regulation again be switched on.

Incorrect operation can lead to major disturbances to the device!



This work must only be carried out by trained personnel or by Leibinger service technicians!

Figure 100

The touch field **<nom. visko>** (196) serves the entry of the target fall time in milliseconds, the parameters are ink and device specific.

The touch field **<nom. pressure>** (197) the print values can be changed. The entry is in mbar.

The touch field **<suct.>** (198) alters the settings of the suction pump. The standard values are "144" for devices without head ventilation and "240" for devices with head ventilation.

Observation: The value must be entered in four digit form (e.g.: "0240").

The field **<viskor>** (199) is required for the entry of the viscosity metre correction value. The entry is necessary following the replacement of the viscosity metre pipe. The value engraved on the Viskosity meter must be entered here. Viscosity meters without a engraving have the Value 1000. See group **Equipping/maintenance**.

Language change-over

In the **field** (200) the menu language of the device is displayed! The alternative menu language of the device is displayed in the **field** (201). If required you can change to another alternative menu language online (e.g. in case of service) to simplify the communication with the dealer or the LEIBINGER Service – Hotline. The change happens by pressing the touch field **<english>** (201). You can go back to the standard-menu language with the touch field (200).

Observation: If the device will be switched off after a change of the menu language the standard-menu language will be loaded automatically if you switch on the high-speed printer again!



Alterations to the parameters already pre-set can lead to serious functional disturbances!

The **<Intervall time>** mode (202) enables the entry of start and limit times at which the LEIBINGER-JET 2 switches itself on or off automatically for circulation of the ink (e.g.: at 10.25 hours the device switches **on** / at 10.40 hours the device switches **off**).

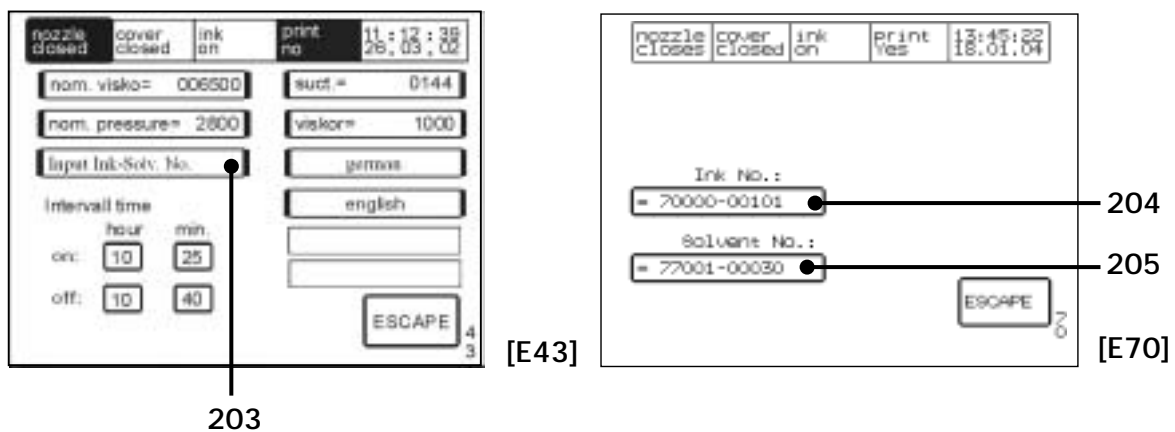
This function prevents the drying of the ink and the jets becoming stuck up during operation interruptions.

At the same time the set values are displayed in all above mentioned fields.

Entry of ink- and solvent number:

For a correct TAG-aquisition it is absolutely necessary to enter the numbers of the used ink and solvent.

Figure 101



The touch field **<Input Ink-Solv. No.>** (203) activates the entry menu **<E70>**.

By activation of the corresponding **<touch field>** (204 or 205) the ink-no. respectively the solvent no. can be entered via the number block appearing.

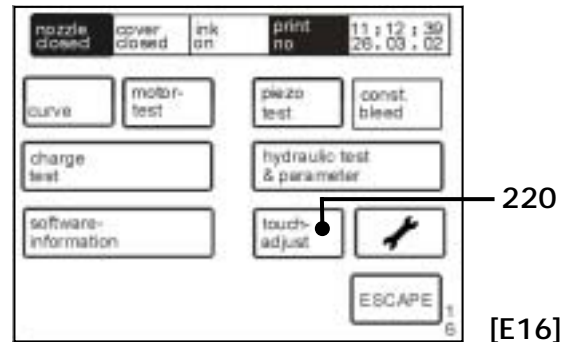


Alterations to the parameters already pre-set can lead to serious functional disturbances!

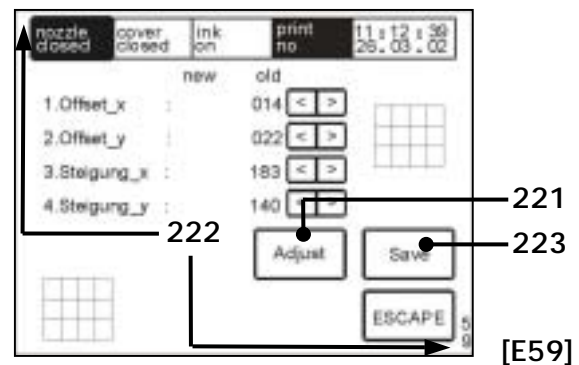
7.7.6.7 Touch screen calibration

Figure 102

The touch field <touch adjust> (220) opens the calibration menu <E59> .



The display is adjusted with the <adjust> field (221) and by tapping on the upper calibration point (222) and by subsequent tapping on the lower calibration point (222). The storage is performed with the touch field <save> (223).

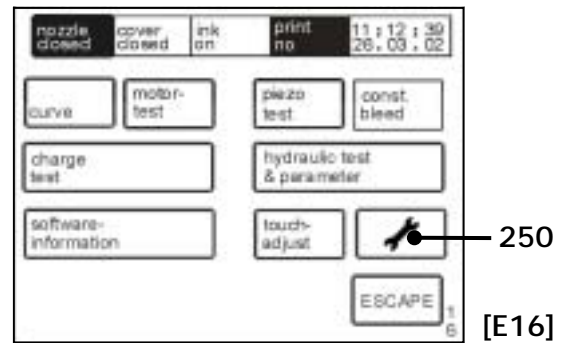


The calibration points are shown as small squares □.

7.7.6.8 Service interval

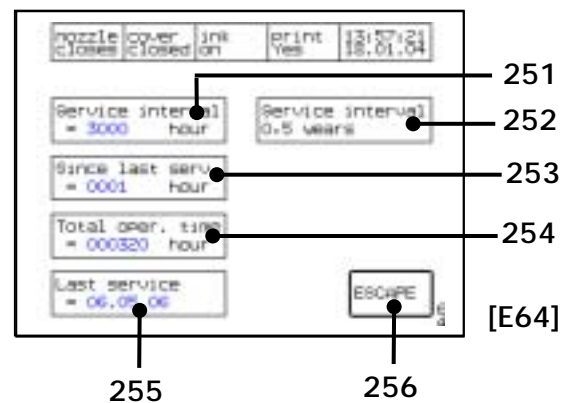
Figure 103

The touch field <service interval> (250) opens the service interval menu <E64>.



The following parameters are displayed in the menu:

- the max. period between two inspections in working hours (251) either as a period of time (252)
- the working hours since the last inspection (253)
- the total amount of working hours (254) of the device
- the date of the last inspection (255)



The touch field <ESCAPE> (256) ends the menu.

8. Trouble shooting

8.1 General

With the help of the error diagnosis the operating personnel should be given the possibility of removing lesser defects. Should it not be possible to achieve a satisfactory result despite the measures carried out or should a lack of clarity prevail please contact the service department or a service technician of your dealer.



Dangerous material in the machine!

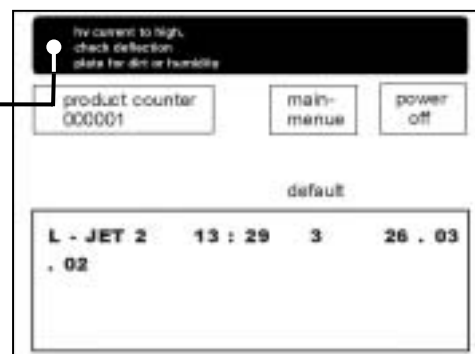
Danger of serious damage through burns, skin irritation and poisoning!

8.2 Error notification

The error notifications are shown flashing in the status line of the LCD touch display. The error notification texts contains the error denomination, the possible cause of the error or the possible error removal measure. The error is acknowledged by means of touching the touch field **<error notification>** (status line).






Figure 104


Status line with error notifications
(specimen illustration)










[E1]

8.3 Error messages

| Description of the malfunction | Trouble shooting activity |
|---|---|
|  | <p>Risk of fire!</p> <p><i>Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!</i></p> |
|  | <p>Risk of crushing/piercing!</p> <p><i>During the closing movement of the print head your fingers could get caught between deflector unit or nozzle plate and gutter or during the opening movement between housing and gutter. Keep your hands outside of the danger area!</i></p> |
|  | <p>Dangerous electrical voltage!</p> <p><i>Contact causes serious damage through an electric shock! The print head must close automatically. Work on the head must only be carried out in a closed state!</i></p> |
|  | <p>Risk of injury!</p> <p><i>Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!</i></p> |
|  | <p>This work must only be carried out by trained personnel or by Leibinger service technicians!</p> |
| <p>Opening/closing of the gutter not carried out correctly. Closing mechanism could be dirty or defective.</p> | <p>Check closing mechanism. Remove ink residue and other contamination with a cleaning brush.</p> |
| <p>Display message: „an error occurred when head moved, gutter moved not correct. Check the mechanics for gutter-movement“</p> | |
| <p>Drop brake-off error! The charging electrode could be dirty. If necessary please clean.</p> | <p>Check charging electrode and clean.</p> |
| <p>Display message: „not able to adjust drop generation, please check charge electrode for dirt accumulation. Clean, if necessary“</p> | |
| <p>Charging electrode dirty/defective. Please clean or replace.</p> | <p>Check charging electrode and clean or replace.</p> |
| <p>Display message: „charge elect. Dirty please check charge electrode for dirt accumulation, clean, if necessary“</p> | |

| | |
|--|---|
| Phasing error! The charging electrode could be dirty. If necessary please clean. | Check charging electrode and clean. |
| Display message: „phasing-error, please check charge electrode for dirt accumulation. Clean, if necessary“ | |
|  | <p><i>Risk of crushing/piercing!</i></p> <p><i>During the closing movement of the print head your fingers could get caught between deflector unit or nozzle plate and gutter or during the opening movement between housing and gutter. Only carry out cleaning and service work with the machine placed idle. Remove mains plug!</i></p> |
| High voltage current too high. Please check the deflector plates for dirt or dampness. | Check deflector plates. |
| Display message: „hv-current to high check deflection plate for dirt or humidity“ | |

| Description of the malfunction | Trouble shooting activity |
|---|---|
|  | <p><i>Dangerous material in the machine!</i></p> <p><i>Read the safety leaflets and the regulations on personal safety equipment!</i></p> |
|  | <p><i>Risk of injury!</i></p> <p><i>Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!</i></p> |
|  | <p><i>Risk of injury!</i></p> <p><i>Upon contact the contents causes skin irritation. Protective equipment is necessary!</i></p> |
|  | <p>It is imperative that the instructions on the subject of handling inks and solvents (thinners) in the groups Safety instructions and Accident prevention are observed!</p> |
| <p>Ink will soon be empty! Please refill.</p> | <p>Refill ink.</p> |
| <p>Display message: „Ink tank is low level please refill ink“</p> | |
| <p>Solvent will soon be empty! Please refill.</p> | <p>Refill solvent.</p> |
| <p>Display message: „Solvent tank is low level please refill solvent“</p> | |
| <p>Ink/solvent not from Leibinger. Please remove bottle!</p> | <p>Only use original ink and solvent made by Leibinger.</p> |
| <p>Display message: „ Leibinger Ink/Solvent not detected! Please remove bottle.“</p> | |
| <p>Wrong ink/solvent! Please remove bottle.</p> | <p>The selected ink or solvent may not be used in this device!</p> |
| <p>Display message: „ Wrong Ink/Solvent! Please remove bottle.“</p> | |
| <p>Ink/solvent already decremented on, please activate with new bottle.</p> | <p>The selected consumable medium has already been decremented.</p> |
| <p>Display message: „ Expiration date reached! To activate the Ink/Solvent, place the bottle to the TAG-Reader and press “Activate”.“</p> | |

| Description of the malfunction | Trouble shooting activity |
|---|--|
|  | <p><i>The content is under pressure even if the device has been disconnected from the mains supply!</i></p> <p><i>Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and let off the pressure!</i></p> |
|  | <p><i>Risk of injury!</i></p> <p><i>Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!</i></p> |
|  | <p>This work must only be carried out by trained personnel or by Leibinger service technicians!</p> |
| <p>Leak in the hydraulics, please check hydraulics immediately!</p> | <p>Disconnect device from the mains supply and check hydraulics for leaks!</p> |
| <p>Display message: „leakage found in the hydraulic area, please check hydraulic immediately“</p> | |
| <p>Defective viscosity measurement! Please check viscosity pump and metre or call the Leibinger service department.</p> | <p>Disconnect device from the mains supply! Check the viscosity pump and the viscometer. Observe the instructions in the group Servicing!</p> |
| <p>Display message: „faulty visco-measurement please check visco-pump and –meter or call our perfect Leibinger service“</p> | |
| <p>Ink conveying defective. Please check main pump, pressure tank and their connections.</p> | <p>Disconnect device from the mains supply! Check the main pump, the pressure tank and the connections. Check the position of the ink switch!</p> |
| <p>Display message: „pressure fault please check air pump and all connections“</p> | |
| <p>Pressure disturbance! Please check compressor, pressure tank and all connections.</p> | <p>Disconnect device from the mains supply! Check the compressor, the pressure tank and the connections.</p> |
| <p>Display message: „pressure fault“ please check air pump and all connections“</p> | |

| Description of the malfunction | Trouble shooting activity |
|--|---------------------------|
| Bleeding | Carry out bleeding. |
| Display message: „pressure fault“ please check air pump and all connections“ | |
| Blade synchronisation | |
| Display message: „knife-synchronisation“ | |
| Printgo error/printgo distance error! No new print must be started during the printing process. | Alter setting parameters. |
| Display message: „error!!, a printgo occured while a print was in progress. Prints will be lost. Check also PG-distance“ | |
| Strokego error! Strokes were lost during the printing process. | Alter setting parameters. |
| Display message: „error!!, a strokego occured while a stroke was in progress so strokes will be lost.“ | |

8.4 Other causes of errors

The following list illustrates additional possible sources of errors that are not shown in the display with any error notification.

| Description of malfunction | Trouble shooting activity |
|--|---|
| Device cannot be switched on | <ul style="list-style-type: none"> ■ Touch display pressed for too short a time (min. 2 sec.) ■ Mains plug not plugged in ■ Mains cable or display defective ■ Mains fuse(s) defective (Observe the instructions in the group Equipping/maintenance!) |
| Data transmission from PC not possible | Connection cable not connected or defective |
| Print head not working although no error displayed | <ul style="list-style-type: none"> ■ Status field < Print > is on “No” ■ No data entry present ■ Head cover of the print head not assembled or incorrectly assembled ■ Product sensor not connected or set incorrectly ■ Basic settings incorrect |
| Suction pump achieving no power | <ul style="list-style-type: none"> ■ Value incorrectly set -menu level < E43 > ■ Cleaning is necessary, see chapter Miscellaneous cleaning work |

9. Equipping/maintenance

9.1 Equipping/operation

9.1.1 Refilling of ink and solvent

9.1.1.1 General information

Dangerous material in the machine!

Danger of serious damage through burns, skin irritation and poisoning!



Dangerous material in the machine!

Read the safety leaflets and the regulations on personal safety equipment!



Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!



Risk of injury!

Upon contact the contents causes skin irritation. Protective equipment is necessary!

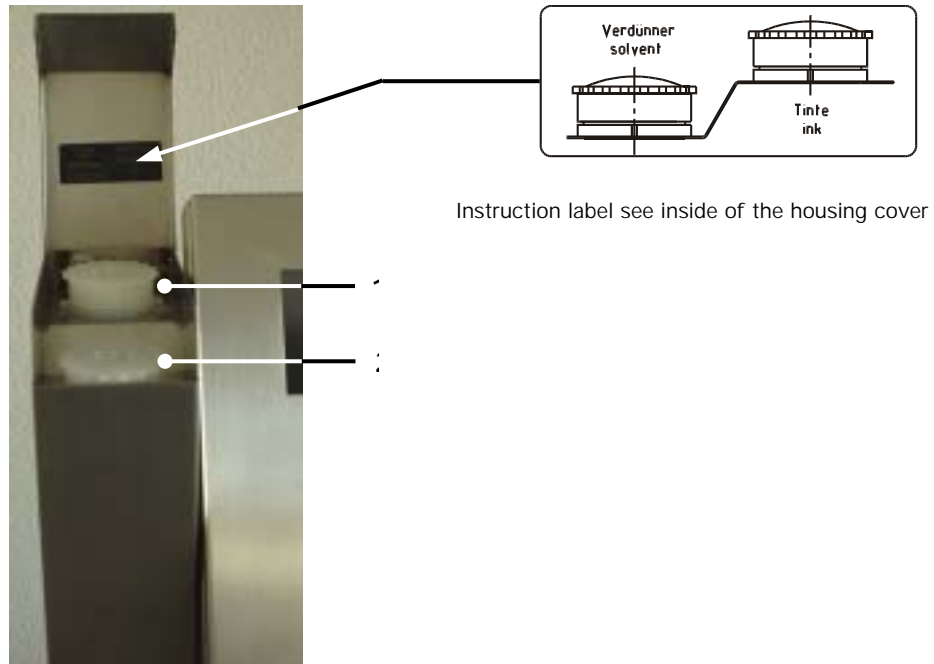
The storage containers for ink and solvent are installed beneath the cover flap of the refill unit (see illustration below).

The containers are always without pressure and can be opened in any condition of the device including during production. Following refilling the containers must be closed again carefully.



Important! The containers are monitored by filling level sensors. In the event of the minimum filling level being under-achieved an optical and acoustic request to refill is made. If no acknowledgement of the refill alarm is made within 10 minutes, the LEIBINGER-JET 2 will stop the production and close the jet and the device will switch off.

Figure 105



Storage containers (view with cover folded back)

- 1 – Storage container "Ink"
- 2 – Storage container "Solvent"



**The storage containers must not be overfilled!
Only fill up to max. 2/3!**

Following filling the containers must again be closed carefully.

For 8 hour operation the storage containers should be at least half filled as with most applications the ink consumption is low (1 litre enables the printing of up to 100 million characters depending on the matrix and the diameter of the jet).

Depending on the ink, ambient temperature and humidity the consumption of LEIBINGER solvent can be between 20-100 ml/8 hours. With higher temperatures in shift operation LEIBINGER solvent should therefore be checked or refilled daily.



At this point we wish to make explicit reference to the fact that it is only when using solvent and ink from Paul Leibinger GmbH & Co. KG that the optimum operating characteristics can be achieved. In the event of use of other inks and solvents all guarantee entitlements shall cease to apply.

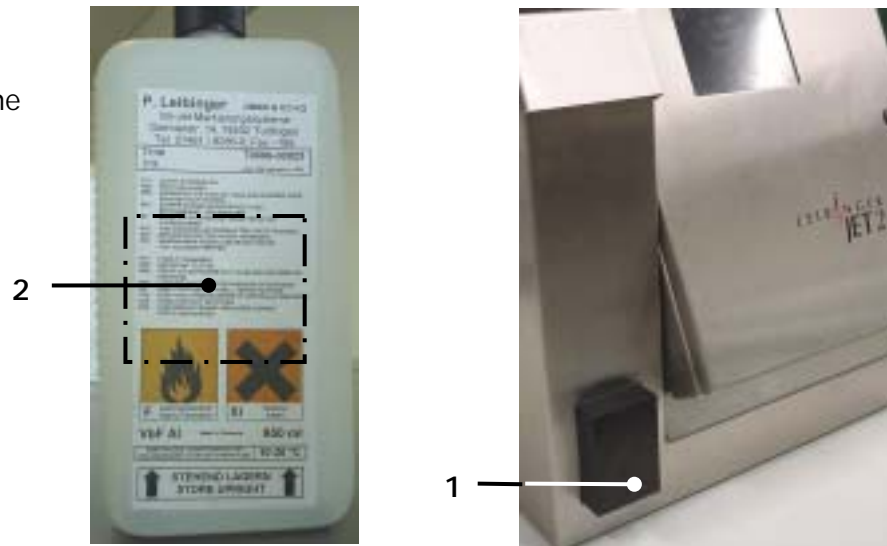
9.1.1.2 TAG reader and TAG identifier

Inks and solvent made by Paul Leibinger GmbH & Co. KG are identified by TAGs. The TAG is located below the label of each re-fill bottle (see fig. below).

The LEIBINGER-JET 2 is equipped with a TAG reader to read the TAG codes.

Figure 106

- 1 – TAG reader
- 2 – TAG area of the Re-fill bottle



TAG reader and TAG identifier

9.1.1.3 TAG reading, TAG information, TAG activating and filling the device

Figure 107

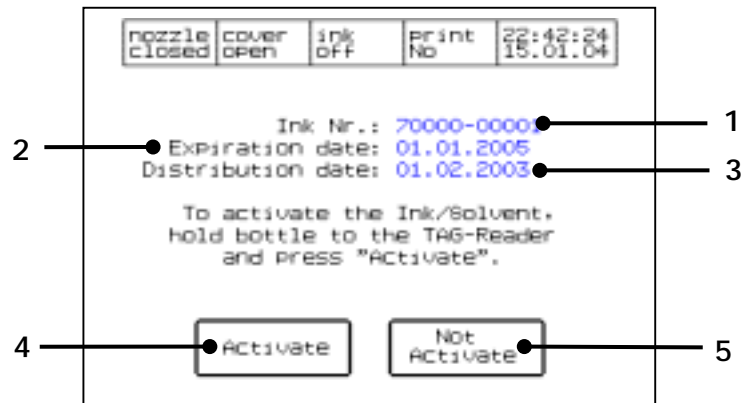


TAG reading

1. TAG reading, TAG information and TAG activating:

- Place the re-fill bottle (ink or solvent) with the label side in front of the TAG reader.

- If necessary, slowly move the re-fill bottle back and forth in front of the TAG reader until TAG reading is complete.
- After a successful acquisition the following message appears on the LCD-Touch display. (The following displayed messages refer to the filling up of the LEIBINGER-JET 2 with ink. For the filling up with solvent the messages are changed accordingly).



- The message provides information on the contents of the re-fill bottle:
 1. The item no. of the ink or solvent
 2. The use-by date of the ink or solvent
 3. The delivery date of the ink or solvent
- If the wrong re-fill medium was selected, the procedure can be ended by pressing the < **Not Active** > (5) touch field.
- If the selected medium is to be poured in, the < **Activate** > (4) touch field must be pressed. For this the bottle has to stay in front of the TAG-reader.
- If the activation has been carried out successfully the TAG of the bottle will be devaluated. The successful activation is indicated with two short acoustic signals and the following display message.



2. Filling the device with solvent:

- Carry out the filling up of the solvent reservoir as described in chapter **9.1.1.1 Refilling of ink and solvent (General information)** and confirm the filling up with the touch field <OK> (6).



Note! For the solvent you have absolutely to fill in the complete bottle because the bottle will be devaluated and can be not activated anymore !

3. Filling the device with ink:

- Carry out the filling up of the ink reservoir tank as described in the chapter **9.1.1.1 Refilling of ink and solvent (General information)** and confirm the filling up with the Touch field <OK> (6). **You have to fill in only the half of the bottle.**

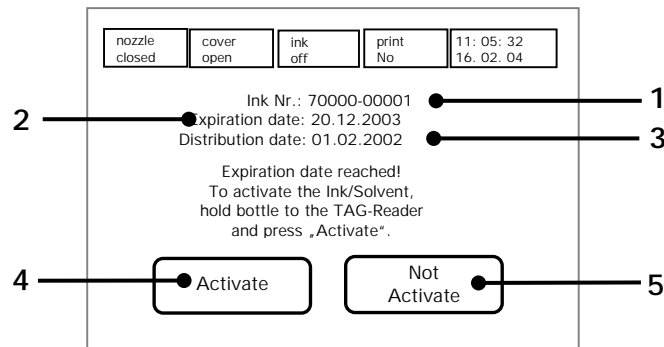


Note! To fill up the ink you should only fill in the half of the bottle because the content of the ink reservoir is lower than the content of the ink bottle. Due to this the ink reservoir tank could overflow!



9.1.1.4 Consumable medium with elapsed use-by date

- If the expiry date of a consumable medium has been reached the following message appears on the LCD-Touch display. (The following displayed message refers to the filling up of the LEIBINGER-JET 2 with ink. For the filling with solvent the message is changed accordingly).
- The message provides information on the contents of the re-fill bottle:
 1. The item no. of the ink or solvent
 2. The use-by date of the ink or solvent
 3. The delivery date of the ink or solvent



- If a different re-fill medium is to be used, the procedure can be ended by means of the **<Not Active>** (5) touch field.
- If the selected medium should be filled in even if the expiry date has been reached you have to press the touch field **<Activate>** (4). For this the bottle has to stay in front of the TAG-reader.
- The bottle will be now activated and the TAG devaluated. The following message is indicated on the display.



- Carry out the filling up of the reservoir tank as described in the chapter **9.1.1.1 Refilling of ink and solvent (General information)** and confirm the filling with the touch field **<OK>** (6).



Note!

To fill up solvent you have to fill in the complete tank because the bottle will be devaluated and can be not activated anymore!

To fill up ink you have to fill in only the half of the bottle because the content of the ink tank is lower than the content of the bottle!

Filling the device with elapsed ink or solvent can lead to poor printing results and production down-time!

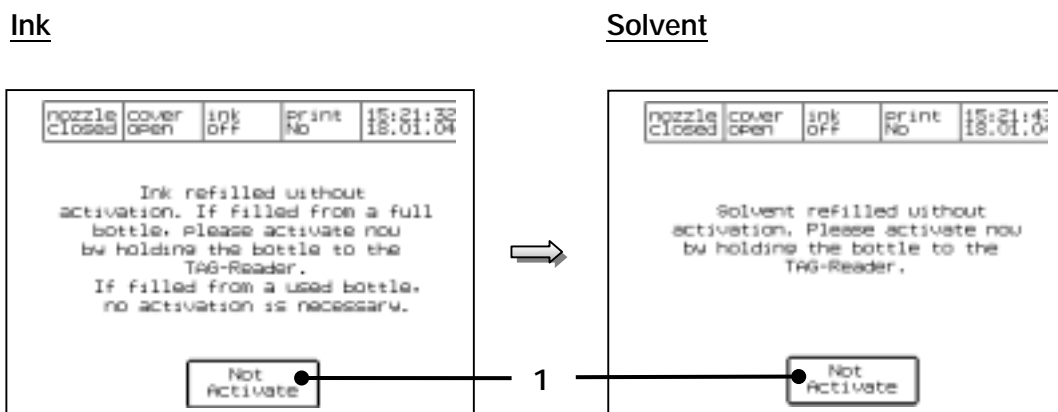
9.1.1.5 TAG Error messages

More detailed information on this subject can be found in the chapter entitled **Error messages/error notifications**.

9.1.1.6 Other TAG messages and Repair TAG

1. Refilling without TAG activation:

- If ink or solvent has been filled in without activating the bottle the following message appears on the LCD-Touch display.



- If the subsequent activation should not be carried out you can finish the process by pressing the button **<Not Activate>** (1). If ink has been filled in of an already used or activated bottle no further activation is required !

Note: *If a required activation will be not carried out the LEIBINGER-JET 2 carries on working at the moment but will be shut down after process of given criterions. **This consequences should be noted!***

- If the activation should be carried out the used bottle should be put in front of the TAG-reader.
- The certain bottle will be activated subsequently and the TAG will be devaluated. The succesful activation is indicated by two short acoustic signals and the certain display message.

2. Devaluated refill bottle:

- If ink or solvent has been filled in without activating the bottle the following message appears on the LCD-Touch display. (The following displayed message refers to a bottle with ink. For a bottle of solvent the solvent No. is indicated instead of the ink No.).



3. Repair-TAG:

A repair-TAG will be available if a bottle has been devaluated by mistake or if the LEIBINGER-JET 2 has been shut down. You find the repair-TAG under the cover flap of the refilling unit by delivery of the device.



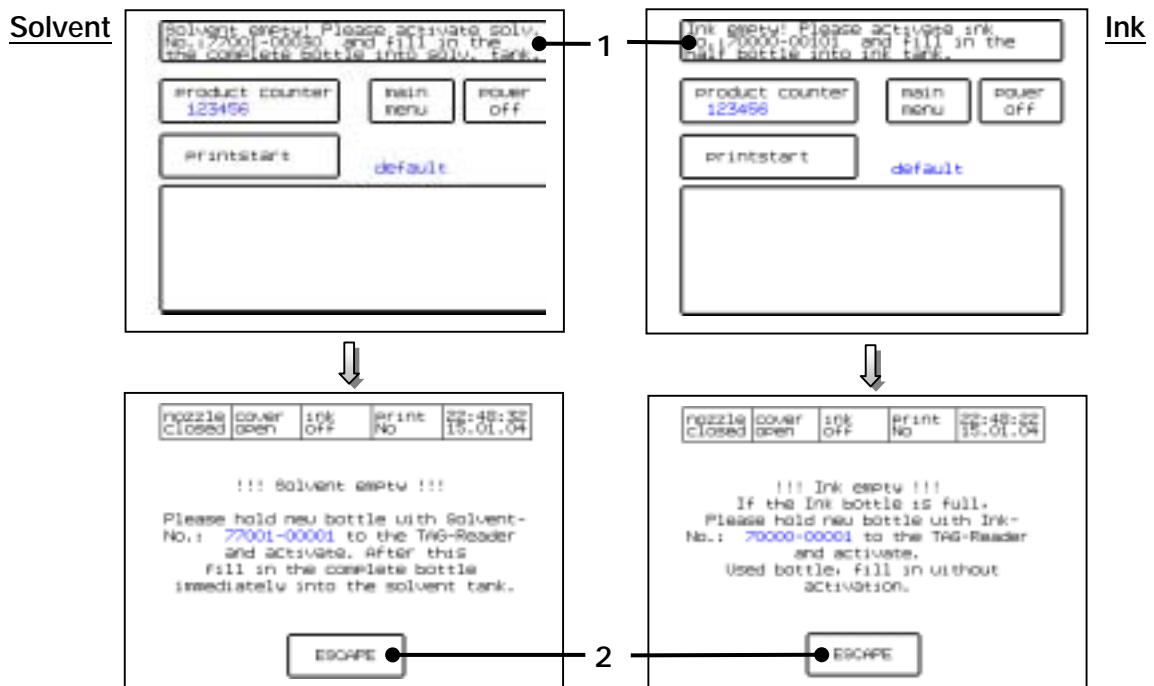
Note! The repair-TAG can only be activated once!

9.1.2 Refill messages

The refill tanks of the LEIBINGER-JET 2 are checked by level sensors. If the minimum level is reached, an optical and acoustic signal asks you to refill.

9.1.2.1 Messages in the standard operation

If a refill message has been generated, the production menu will be called up automatically and the refill message is shown flashing in the status line of the display (1).



After acknowledgement of the message, additional information is indicated on the display. By pressing the Touch-field <ESCAPE> (2), the production menu is indicated again.



You will find further information regarding the TAG-handling, filling the reservoir tanks, as well as regarding further TAG-messages in the chapter **9.1.1 Refilling of ink and solvent and so on.**



Note!

To refill the solvent, you have to fill in the complete bottle because the bottle is devaluated and can be not activated anymore!

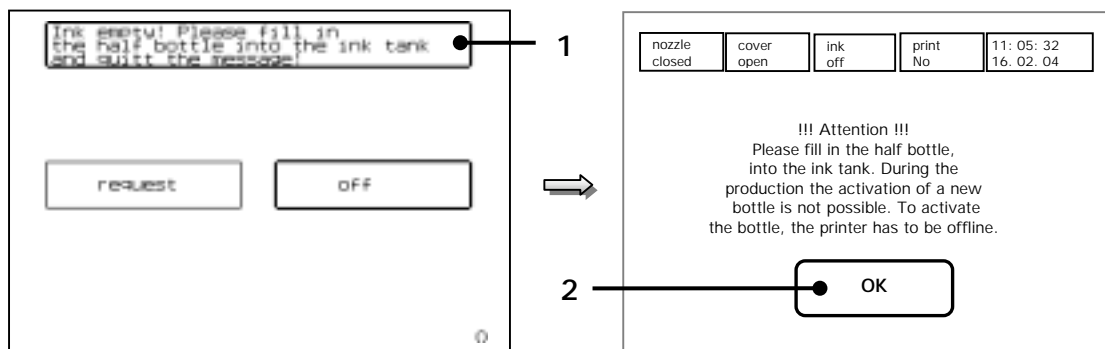
To refill the ink, you have to fill in only the half of the bottle because the content of the ink tank is lower than the content of the bottle!

9.1.2.2 Messages in the "host operation"

If the LEIBINGER-JET 2 is in the "host operation" (external control via the interface RS232) the refill messages are different because no TAG-activation has been carried out in this operating mode. That means the user can only refill ink or solvent but cannot carry out any activation of the refill tank(s). This process will be identified and saved.

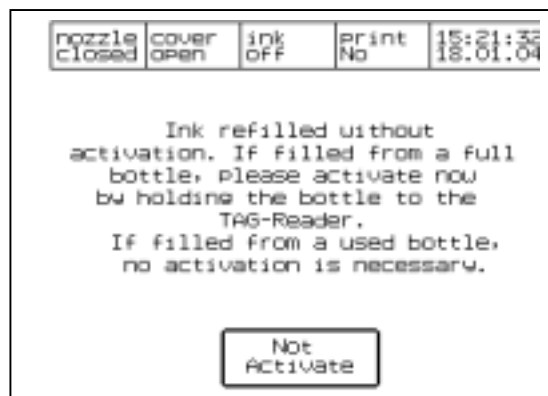
If a refill message has been generated it is indicated flashing in the status line of the display (1).

Example view: Ink refilling message



After acknowledgement of the message an additional information is indicated on the display. By pressing the touch field <OK> (2) you can change again to the host menu.

If the device will be started again after such refilling process a certain message to activate the TAG will be indicated.



You will find further information regarding TAG-handling, refilling the reservoir tank as well as regarding further TAG-messages in the chapter **9.1.1 Refilling of ink and solvent and so on.**

**Note!**

If ink of an already used and activated bottle has been filled in no further activation is required!

To refill solvent you have to fill in the complete bottle because the tank is devaluated and can be not activated anymore!

To refill ink you have only to fill in the half of the bottle because the content of the ink tank is lower than the content of the bottle!

9.2 Guarantee

The guarantee conditions for the LEIBINGER-JET 2 can be seen from the order confirmation.

At this point we wish to make explicit reference to the fact that it is only when using solvent and ink from Paul Leibinger GmbH & Co. KG that the optimum operating characteristics can be achieved. **In the event of use of other inks and solvents all guarantee entitlements shall cease to apply.**

9.3 Service/maintenance



Dangerous material in the machine!

Read the safety leaflets and the regulations on personal safety equipment!

9.3.1 Daily servicing work

The daily servicing work includes the checking of the print head and in particular of the deflector unit, the charging electrode as well as of the guides for dirt. If necessary the components must be cleaned as described in the chapter **Cleaning**.

Likewise the filling level of the two storage containers for LEIBINGER ink and LEIBINGER solvent must be checked. Information on the **Refilling of ink and solvent** can be found in the chapter **Equipping**.

9.3.2 Weekly servicing work

The weekly servicing work includes the checking of the spindles and of the guides of the nozzle seal for dirt. If necessary the components must be cleaned as described in the chapter **Cleaning**. Likewise the nozzle seal must be checked.

9.3.2.1 Lubrication



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***

***Risk of fire!***

Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!

***Risk of injury!***

Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!



This work must only be carried out by trained personnel or by Leibinger service technicians!

The lubrication of the spindles and of the guides of the nozzle seal is not absolutely necessary, however it ensures easier movement of the gutter. Lubrication with oil also prevents the depositing of ink that can block the gutter during opening or closing of the nozzle seal. A commercially available oil can be used for lubrication. **Oil must not get into the cgutter (back absorption)!**

9.3.2.2 Nozzle sealing

***Dangerous electrical voltage!***

Contact causes serious damage through an electric shock! Disconnect the device from the mains supply prior to opening. Remove mains plug!

***Risk of fire!***

Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!

***Risk of injury!***

Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!



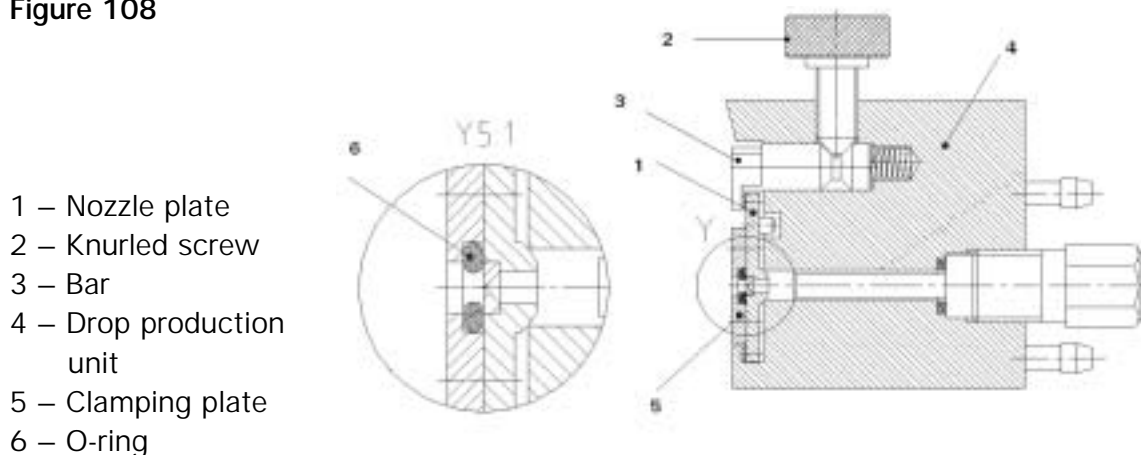
This work must only be carried out by trained personnel or by Leibinger service technicians!

The sealing point between nozzle and gutter should be checked in particular before extended idle periods. A non-tight nozzle seal leads to blocking of the suction extraction lead during extended idle periods.

Testing procedure

With the nozzle seal closed, apply a couple of drops of solvent to the sealing point with the spray bottle. If the seal is not tight, the solvent will be sucked into the suction extraction lead. In this case damage to the O-ring must be assumed. To replace the O-ring the cross head screws of the clamping plate must be loosened. Subsequently the screws must be tightened again and the tightness must be checked again as described above.

Figure 108



Removal and installation or replacement of the nozzle plate

You should proceed as follows when removing or installing the nozzle:



Risk of crushing/piercing!

During the closing movement of the print head your fingers could get caught between deflector unit or nozzle plate and gutter or during the opening movement between housing and gutter. Keep your hands outside of the danger area!

- Close the nozzle.
- Switch off the ink using the ink switch in the print head (switch downwards).
- Swivel deflector unit upwards and secure with toggle lever.
- Open the nozzle (move gutter forwards).
- The nozzle plate can be removed following undoing of the knurled screw and swivelling away of the bar.

- Cleaning of the nozzle only with LEIBINGER solvent against and in the direction of the current or with the help of an ultrasound bath and subsequent blowing out with compressed air. Further information on this subject area can be found in the chapter **Cleaning**.
- Installation of the cleaned or new nozzle plate.
- The bar that fixes the nozzle plate must be swivelled downwards so that the nozzle plate is fixed centrally.
- The knurled screw can be tightened as far as the stop (by hand only, without tools).
- The ink can be switched on with the ink switch (switch upwards). When so doing, attention should be paid to the fact that in the event of incorrect installation ink can spray out. **Observe safety instructions!**
- If the ink jet enters the gutter, the correct position of the jet in the gutter must be checked and if necessary a fine adjustment must be done with the adjusting screws. Insufficient or incorrect cleaning leads to jet jumping with repeated switching on and off of the ink switch. Only if the cleaning has been carried out correctly will the ink jet always enter the gutter at the same point. Further information on the adjustment of the ink jet can be found in the chapter **Other servicing work**.
- Following the check of the above mentioned points the gutter can be closed and the deflector unit swivelled downwards carefully by release of the toggle lever.
- Prior to starting the print operation the print head should be checked once again and possibly cleaned. Further information on this subject area can be found in the chapter **Cleaning**. Following an extended idle period it is expedient to switch the device on and off again in order to trigger a bleeding procedure.

9.3.3 Annual servicing work

The manufacturer recommends a regular servicing interval of 6–12 months. Integral parts of this servicing are:

- Replacement of filter elements and ink
- Replacement of the O-rings for filter and nozzle seal

9.3.3.1 Filter replacement and ink change



The content is under pressure even if the device has been disconnected from the mains supply!

Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and let off the pressure!

Dangerous material in the machine!

Danger of serious damage through burns, skin irritation and poisoning!



Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!



This work must only be carried out by trained personnel or by Leibinger service technicians!

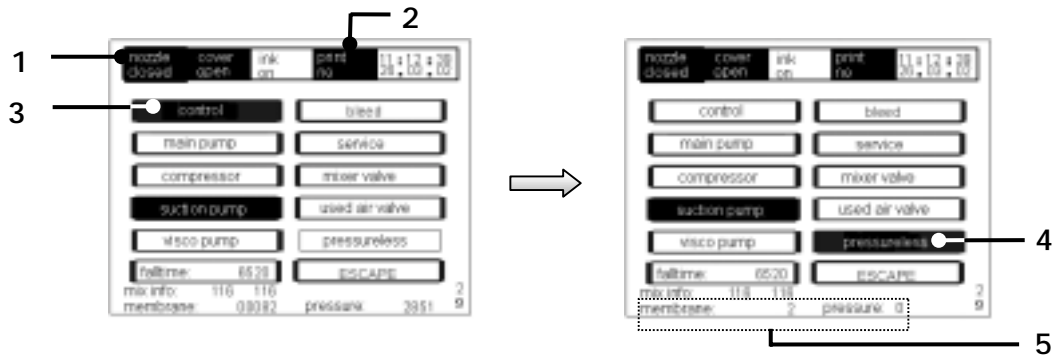
With **non-pigmented** inks the filter insert must be replaced annually, with **pigmented** inks every six months.

Filter insert, order no: 54-002326 KA

With the filter change the entire ink content of the device must be replaced and disposed of properly. **The corresponding safety information leaflets DIN 52900 and the country specific disposal regulations must be observed!**

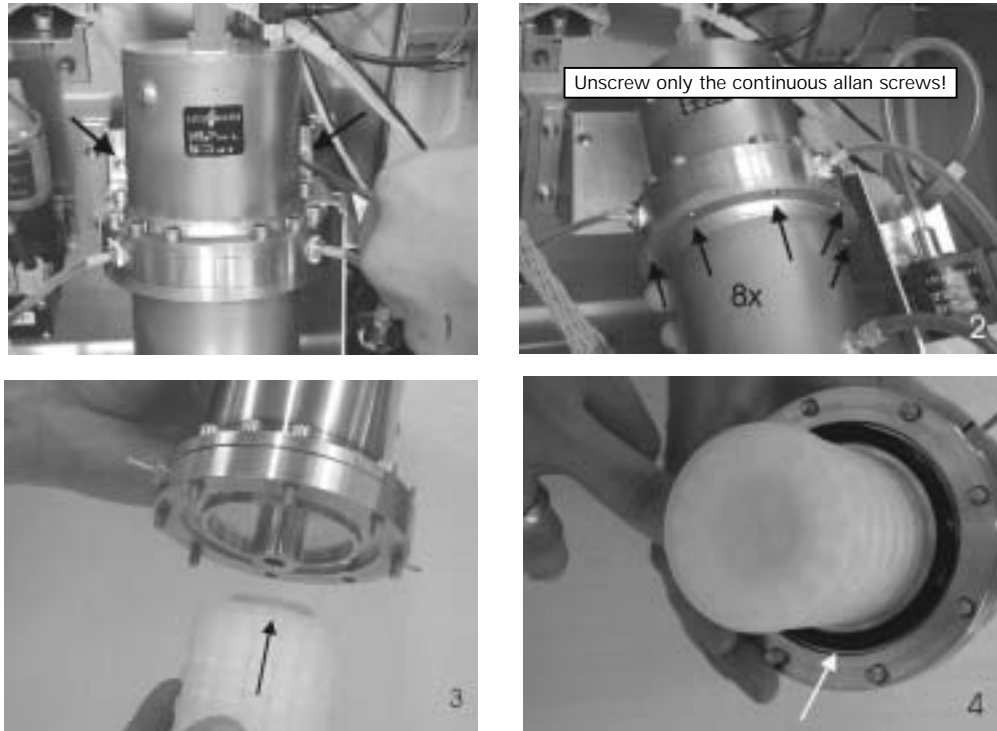
Manner of procedure:

- Place the LEIBINGER- JET 2 in operating mode "Nozzle closed" (1) and "Ink switch on" (2).
- Deactivate the regulation (3) in the menu level <E29> (main menu ► service/test/system parameter ► service/test & diagnostics ► hydraulic test & parameter).
- Press the button "pressureless" (4) in the menu level <E29> and wait for a while until the values for the "membrane" and "pressure" (5) moving towards ~ "0".



- The LEIBINGER- JET 2 is without pressure and **must** be disconnected from the mains supply. **Remove mains plug!**

Figure 109



- Undo the 2 Allan screws and remove the entire pressure tank if the tube connections allow this (picture sequence 1).
- Place the collection tub underneath the tank and remove both connections for the viscosity regulation. The ink will run out. If necessary all hydraulic connections can be removed.
- Unscrew the 8 **continuous** Allan screws that hold the pressure tank together (picture sequence 2) and remove the lower half of the housing downwards. **The membrane flange must not be loosened!**
- Pull off the filter and slide on the new filter (picture sequence 3).
- Clean any possible dirt in the filter housing with thinner. Examine the O-ring for damage and clean. If necessary replace.

- Before closing pay attention to the correct seat of the O-ring and check whether the agitator rod in the lower part is lying on the floor (picture sequence 4).
- Close pressure housing and tighten with the corresponding screws.
- Again insert the pressure tank and attach the tube connections.
- The further steps are carried out in an empty condition as with the initial commissioning. Further information can be found in the chapter **Start up!**

9.3.4 Other servicing work

9.3.4.1 Adjusting the ink jet in the gutter



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***



Risk of fire!

Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!



Risk of injury!

Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!



This work must only be carried out by trained personnel or by Leibinger service technicians!

If you use a new nozzle, it is necessary to readjust the ink jet. This can be carried out with adjusting screws (cross head) located on the holder of the deflector unit by screwing in or out (swivelling upwards or downwards or to the left or right) (see following illustration). In order to achieve a better contrast in poor light it is helpful if you first of all clean the gutter and the print head chassis with Leibinger solvent and hold white paper behind or below the gutter. Further information on this subject area can be found in the chapter **Cleaning**.



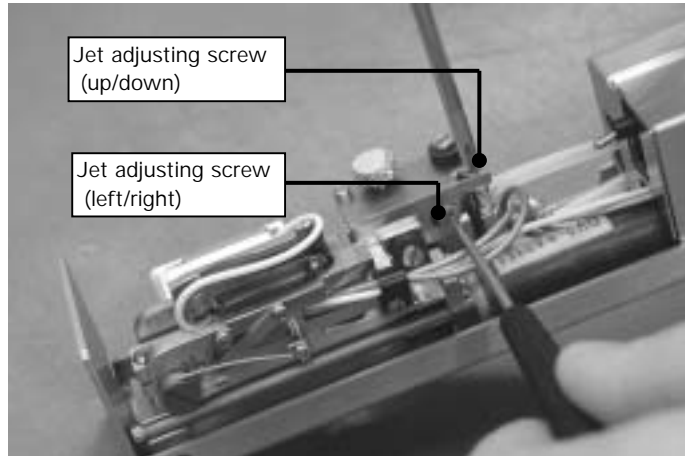
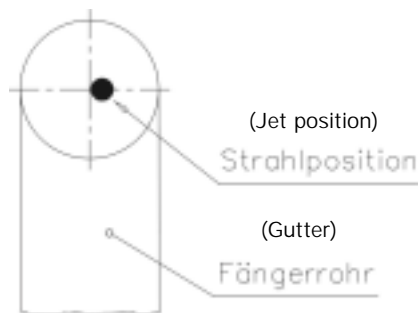
The adjustment of the ink jet must first of all be performed vertically then horizontally!

The correct jet position can be seen from the following illustration!

The correct position of the ink jet must be checked in order to ensure that no deposits develop in the gutter.

Figure 110

Jet position in the gutter
(seen from the direction of the jet)



Should deposits develop on the gutter without print operation, the ink jet is too tight against the outside of the gutter in the horizontal direction.

Should deposits develop on the gutter with print operation, the ink jet is too far in the middle of the gutter in the horizontal direction.

With special applications, e.g. very small fonts, the position can be readjusted following consultation with the manufacturer.

9.3.4.2 Replacement of the main pump



The content is under pressure even if the device has been disconnected from the mains supply!

Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and let off the pressure!

Dangerous material in the machine!

Danger of serious damage through burns, skin irritation and poisoning!



Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!



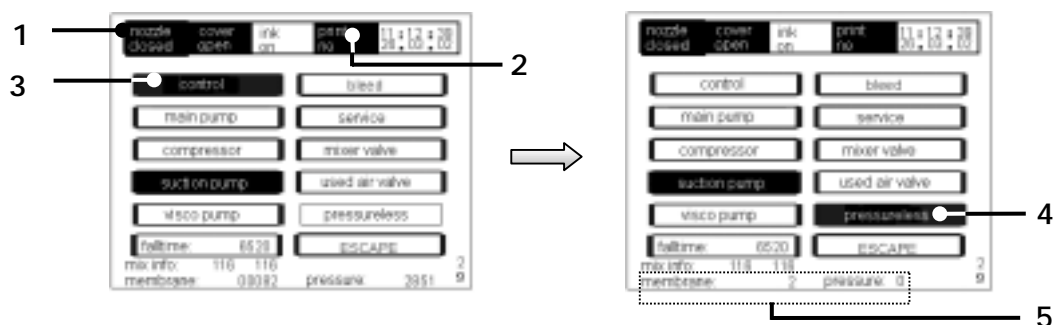
This work must only be carried out by trained personnel or by Leibinger service technicians!

Figure 111



Main pump (54-002-001 S)

- Place the LEIBINGER-JET 2 in the operating mode "Nozzle closed" (1) and "Ink switch on" (2).
- Deactivate the regulation (3) in the menu level <E29> (main menu ► service/test/system parameter ► service/test & diagnostics ► hydraulic test & parameter).
- Press the button "pressureless" (4) in the menu level <E29> and wait for a while until the values for the "membrane" and "pressure" (5) moving towards ~ "0".



- The LEIBINGER-JET 2 is now without pressure and **must** be disconnected from the mains supply. **Remove mains plug!**
- Place a collection tub underneath and detach the tube connections. Escaped ink must be disposed of properly. **The corresponding safety leaflets DIN 52900 and the country specific disposal regulations must be observed!**
- Detach electrical connection cable and remove main pump.
- Place the new main pump in again and attach the tube connections as well as the electrical connection cable.
- As with the initial commissioning the further steps are performed in the empty condition. Further information can be found in the chapter **Start up!**

9.3.4.3 Replacement of the battery and fuse



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***



Dangerous electrical voltage!

Parts of the device are still under voltage after blowing the protecting device! Disconnect the device from the mains supply prior to opening. Remove mains plug!



Caution – risk of explosion!

Risk of explosion in the event of incorrect replacement of the battery. Replace only with an identical battery or with an equal value battery type in accordance with the recommendations of the manufacturer! The instructions of the battery manufacturer must be observed when disposing of the battery!



Replacement of the battery!

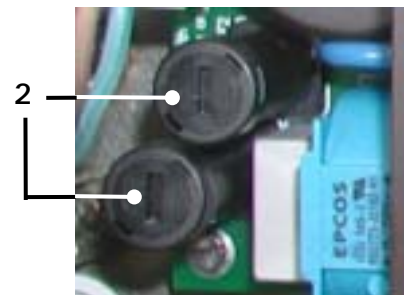
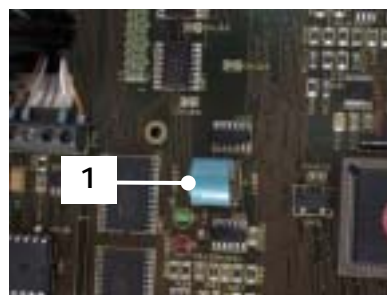
This work must only be carried out by trained personnel or by Leibinger service technicians!

The battery and the fuse are situated in the electronics housing on the controller board or on the mains part. If necessary the fuse and the battery must be replaced. When changing the battery it is imperative that the **Safety instructions** as well as the **Disposal instructions** of the battery manufacturer are observed!

Figure 112

1 – Battery,
lithium, 3.2 VDC
(54-003 032 KA)

2 – Fuse 1,6 H
(54-003 339 KA)



9.3.5 Servicing work with more difficult operating conditions

With more difficult operating conditions such as extremely high or low ambient temperature, heavy dust levels or high humidity etc., some servicing work should be carried out earlier. The time must however be estimated on the basis of experience values. This applies above all for:

- Changing the ink (high water content or destruction of the binding agent)
- Replacement of the filter insert

9.4 Cleaning

9.4.1 Daily cleaning work

9.4.1.1 Cleaning the print head



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***



Risk of fire!

Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!



Risk of injury!

Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!



Risk of injury!

Upon contact the contents causes skin irritation. Protective equipment is necessary!

The print head must be checked daily and cleaned in the event of recognisable dirt through penetrating dust or ink. In this respect high release of solvent vapours should be avoided through the economical use of Leibinger solvent (corresponding to the Leibinger ink). This is achieved through applying the Leibinger solvent to fluff-free paper with the spray bottle and wiping off the parts to be cleaned with this. Direct spraying off of the print head with solvent should only be carried out with very major dirt and should be limited to the front part of the print head. Following intensive cleaning the nozzle seal must be lubricated with a commercially available oil (spindle and guide). **Oil must not get into the gutter (back absorption)!** Solvent dropping down must be collected using a solvent resistant metal vessel and disposed of properly.



This work must only be carried out by trained personnel or by Leibinger service technicians!

9.4.1.2 Cleaning the deflector unit and gutter



Dangerous electrical voltage!

Contact causes serious damage through an electric shock! Disconnect the device from the mains supply prior to opening. Remove mains plug!



Risk of fire!

Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!



Risk of injury!

Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!

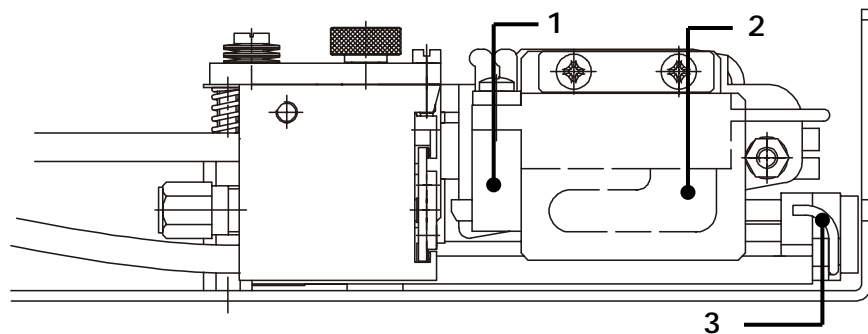


Risk of injury!

Upon contact the contents causes skin irritation. Protective equipment is necessary!

Figure 113

- 1 – Charging electrode
- 2 – Deflector plate
- 3 – Gutter



Deflector unit

Clean gutter (3) carefully with solvent! The deflector unit consists of a charging electrode (1) and a deflector plate (2). To clean the deflector plate the gutter must first of all be closed in order to prevent damage to the nozzle seal. **Only close head with clean gutter!**



Risk of crushing/piercing!

During the closing movement of the print head your fingers could get caught between deflector unit or nozzle plate and gutter or during the opening movement between housing and gutter. Keep your hands outside of the danger area!

After this the deflector unit can be swivelled upwards and secured with the toggle lever. The cleaning of the deflector unit can then be started. In this respect it is helpful to first of all position the dry cleaning cloth between the parts to be cleaned and only then to spray with LEIBINGER solvent. After cleaning dry the deflector unit (e.g. with compressed air). Subsequently the deflector unit can again be swivelled carefully downwards following release of the toggle lever. It is not necessary to use tools for this.



This work must only be carried out by trained personnel or by Leibinger service technicians!

9.4.2 Weekly cleaning work

9.4.2.1 Cleaning of the spindle and guides of the nozzle seal



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***



Risk of fire!

Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!



Risk of injury!

Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!



Risk of injury!

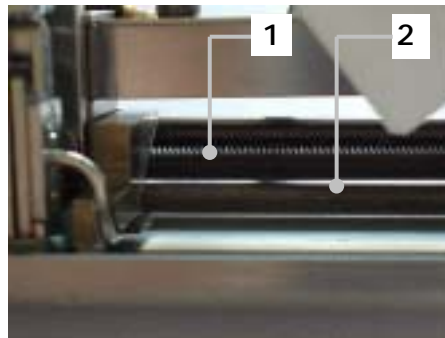
Upon contact the contents causes skin irritation. Protective equipment is necessary!



This work must only be carried out by trained personnel or by Leibinger service technicians!

The spindle (1) and the guides (2) of the nozzle seal should be cleaned at least once per week with the corresponding solvent.

Figure 114



1 – Spindle
2 – Guides

9.4.3 Other cleaning work

9.4.3.1 Cleaning the nozzle



Dangerous electrical voltage!

***Contact causes serious damage through an electric shock!
Disconnect the device from the mains supply prior to opening.
Remove mains plug!***



Risk of fire!

Combustible gases and liquids cause serious burns. Sources of ignition must be kept away from the print head!



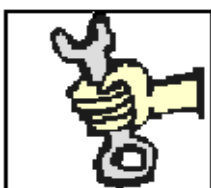
Risk of injury!

Ink escapes from the head aperture. Spraying of ink into the eyes can cause blindness. Eye protection is necessary!



Risk of injury!

Upon contact the contents causes skin irritation. Protective equipment is necessary!



This work must only be carried out by trained personnel or by Leibinger service technicians!

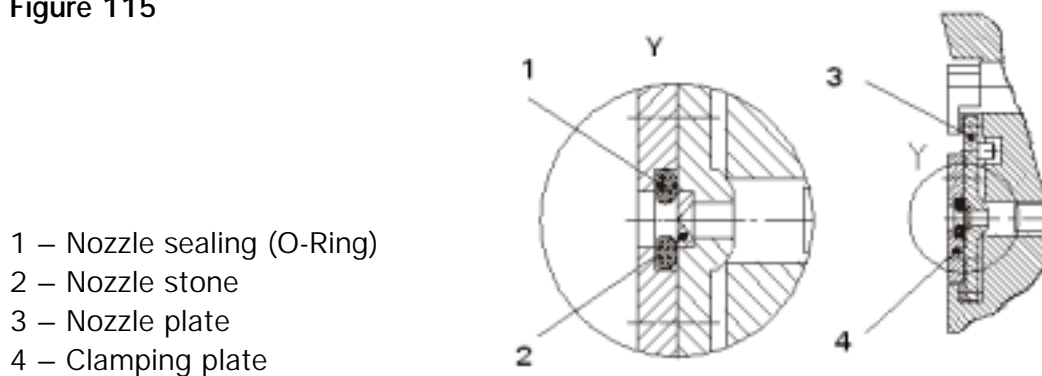
Should ink dry in the nozzle as a result of operating errors or should the nozzle be blocked with dirt particles or the ink jet not enter the gutter, the nozzle must be dismantled and cleaned.

Experience shows that the cleaning of the nozzle with LEIBINGER solvent and blowing out with compressed air against the direction of the current is sufficient to free the nozzle. Should this not be possible, the nozzle must be cleaned in an ultrasound bath (covered with LEIBINGER solvent) for at least 5 minutes and subsequently again blown out with LEIBINGER solvent and compressed air.

Ultrasonic bath, order no: 54-002 347 K

In this respect it should be noted that the adjusted position of the ink jet cannot alter suddenly. If the ink jet no longer enters the gutter this is usually due to the fact that dirt particles or dried ink are situated in the nozzle intake.

Figure 115



In case of stubborn ink residue it can be permitted to remove the residue with a tooth-pick (wooden only).

Caution: Risk of damage!

For this the nozzle is first of all rinsed out with LEIBINGER solvent and the jet is blown dry from both directions with compressed air. Thereafter you move to the nozzle stone (2) from both sides with a tooth-pick (wooden only). By means of light pressure and turning the ink remains are detached from the nozzle stone. Subsequently the nozzle is again rinsed with LEIBINGER solvent and blown out with compressed air.



Nozzle adjustment: once set correctly the nozzle retains its position.

In the event of the jet varying from the normal position: Clean nozzle until old position sets itself again automatically.

Checking of the jet cleaning carried out

With repeated switching of the ink flow valve (by pressing of the ink on/off switch) the ink jet must always assume the same position. If this is not the case, renewed cleaning is necessary.

9.4.3.2 Cleaning the suction pump



The content is under pressure even if the device has been disconnected from the mains supply!

Ink under pressure can spray out. Prior to opening disconnect the device from the mains supply and let off the pressure!



Risk of injury!

Spraying of ink into the eyes can cause blindness. Prior to the opening of the device eye protection must be put on!



Risk of injury!

Upon contact the contents causes skin irritation. Protective equipment is necessary!



This work must only be carried out by trained personnel or by Leibinger service technicians!

Figure 116

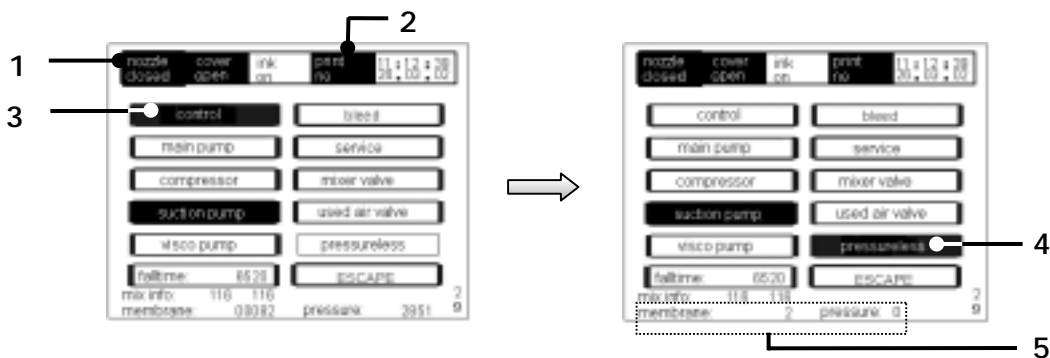


Suction pump
(54-002 002 S)

The suction pump works with an underpressure > 0.3 bar. If this is not achieved, dirtying of the valve needs or damage to the working membrane can be present.

Manner of proceeding:

- Place the LEIBINGER-JET 2 into the operating mode “Nozzle closed” (1) and “Ink switch on” (2).
- Deactivate the regulation (3) in the menu level <E29> (main menu ► service/test/system parameter ► service/test & diagnostics ► hydraulic test & parameter).
- Press the button “pressureless” (4) in the menu level <E29> and wait for a while until the values for the “membrane” and “pressure” (5) moving towards ~ “0”.



- The LEIBINGER- JET 2 is now without pressure and **must** be disconnected from the mains supply. **Remove mains plug!**
- Detach tube connections and connection cable and dismantle suction pump.
- Rinse out suction pump with solvent.
- Assemble pump again, create tube connections and electrical connection.
- As with the initial commissioning the further steps are performed in the empty condition. Further information can be found in the chapter **Start up!**
- If the measure is not successful, the working membrane may be damaged and the suction pump must be replaced.

9.5 Further maintenance measures (Service intervals)

The LEIBINGER-JET 2 has to be subjected additional to the normal maintenance- and service works to an inspection in regular intervals by authorized qualified personnel to guarantee a safe and trouble-free operation.

For this the printer is equipped with a service-interval counter. If the following message is shown in the status line of the LCD-touch display, an inspection of the device is required.

Figure 117



In this case please contact the dealer address which is listed in the **Chapter Publisher**.



You will find further information regarding this topic service interval also in the **group 7** in the **chapter Service interval**.

9.6 Taking out of operation

Switch off the high performance printer and disconnect from the electricity mains as well as the connections of any possible additional devices connected. The connection facilities are to be found on the rear side of the device. **Observe the instructions of the individual devices!**



Dangerous material in the machine!

Read the safety leaflets and the regulations on personal safety equipment!

Remaining ink and solvent must be removed from the device. More detailed information on this subject matter can be found in the **chapter Filter replacement and ink change**. **The corresponding safety information leaflets DIN 52900 and the country specific disposal regulations must be observed!**

The device must be cleaned of dirt, ink residue etc. as described in the chapter **Cleaning**.

9.7 Dismantling/disposal

The LEIBINGER-JET 2 has been developed and built with materials that ensure problem-free dismantling and disposal. When dismantling, the information in the chapter **Taking out of operation** as well as the respective country specific disposal regulations (e.g. for inks and solvents) must be taken into consideration.

10. Replacement parts



The **construction condition list** attached to each LEIBINGER-JET 2 is authoritative for the most important components and structural components used.

Whenever ordering replacement parts please quote the series number of the device.

10.1 Replacement parts electronics

| | |
|---|---------------|
| Controller | 54-004 444 S |
| Power supply unit | 54-001 949 SC |
| Battery lithium, 3.2 VDC | 54-003 032 KA |
| Fuse F 1.6 H, 250 V for power supply unit | 54-003 339 KA |
| Touch display | 54-001 948 KB |

10.2 Replacement parts hydraulics

| | |
|--|---------------|
| Air release valve with choke | 54-001 998 SC |
| Pressure tank, complete (with filter) | 54-001 404 SE |
| Air discharge valve | 54-002 325 SA |
| Filter element short, 10 µm for all types of ink (for pressure tank) | 54-002 326 KA |
| Main pump, complete | 54-002 001 SB |
| Compressor | 54-001 997 SA |
| Ball drop viscosimeter | 54-002 900 SB |
| Refill valve, complete | 54-001 999 SA |
| | |
| Suction pump, complete | 54-002 002 SA |
| Tube Ø2/4 Teflon/PTFE | 54-002 328 KA |
| Tube Ø4/6 PE | 54-002 330 KA |
| Tube Ø4/6 Teflon/PTFE | 54-002 332 KA |
| Tub adapter Ø2 mm to Ø4 mm | 54-002 329 TA |
| Ink tank complete, 1.0 l | 54-002 281 SA |
| Flow control valve, complete (ink) | 54-002 003 SA |
| Viscosity pump, complete | 54-002 309 SA |
| Solvent tank, complete 1.0 l | 54-002 278 SA |
| Screw kit for LJ2 machines without print head | 54-002 799 SA |

10.3 Replacement parts print head SK2

| | |
|---|---------------|
| Deflection plate complete | 54-000 059 SE |
| Shaft for deflection unit | 54-000 108 SB |
| Outer cover, complete with magnet | 54-000 955 SA |
| Compression spring for tensioning bolt | 54-000 190 KA |
| Nozzle complete, 50 µm | 54-000 209 SD |
| Nozzle complete, 60 µm | 54-001 158 SB |
| Nozzle complete, 70 µm | 54-000 815 SD |
| Automatic nozzle seal cpl. with motor and control shaft | 54-000 297 SB |
| Screw-in cover for head filter | 54-000 017 TB |
| Filter insert for head filter | 54-000 016 TA |
| Mounting plate for O-ring for nozzle plate | 54-000 206 TG |
| Toggle lever for swivel plate | 54-000 622 SA |
| Head electronic board, complete | 54-000 311 SC |
| Charging electrode complete | 54-000 140 SC |
| LED complete with connector | 54-000 394 SA |
| O-ring for nozzle | 54-000 771 KA |
| O-ring for head filter | 54-000 019 KA |
| O-ring for oscillator | 54-000 161 KA |
| Leg spring for swivel plate | 54-000 547 TA |
| Screw for nozzle plate M1.6x2.5 (flathead) | 40025-00009 |
| Swivel plate deflector unit | 52-000 100 TE |
| Oscillator 64 kHz with bush | 54-000 702 SB |
| Oscillator 96 kHz with bush | 54-000 612 SB |
| Swivel screw for O-ring nozzle plate | 54-000 295 SA |
| Drop production unit, complete 64 kHz, with oscillator | 54-000 707 SA |
| Drop production unit, complete 96 kHz, with oscillator | 54-000 300 SB |
| Drop production unit housing, complete 64 kHz | 54-000 708 SA |
| Drop production unit housing complete 96 kHz | 54-000 198 SA |
| Assorted fastener kit print head SK2 | 54-002 798 SA |

10.4 Special tools

| | |
|--|---------------|
| Wrench set, consisting of: | |
| 8 / 13 / 4.5 / 5.5 / 6 / 7 | 54-002 331 SA |
| | |
| Angled screwdriver for TORX screws | 54-002 333 KA |
| Set of hexagon socket screw keys, 4mm and 5 mm | 54-002 360 SA |
| | |
| Set of Screwdrivers, solvent resistant | 54-002 361 SA |
| consisting of: | |
| PH 1 x 60 cross, PH 00 x 40 cross, PH 3.0 x 50 blade | |

10.5 Cleaning/servicing accessories

| | |
|--|---------------------|
| Cleaning set for LJ 2 | 54-002 335 S |
| Consisting of: | |
| Disposable syringe 50 ml | 54-002 336 KA |
| Hand washing paste 250 g tin | 54-002 338 KA |
| Magnifying glass (6-times enlargement) | 54-002 339 KA |
| Cleaning paper, 50 sheets | 54-002 083 KA |
| Wash tray | 54-002 340 KA |
| Commercially available oil | 77006-00001 |
| Cleaning bottle, 500 ml | 54-002 341 KA |
| Gloves (100 pieces) MEK resistant | 54-002 342 KA |
| Rubber bulb | 54-002 343 KA |
| Optional: | |
| Universal vise | 54-002 334 KA |
| Cleaning paper, box with 1000 sheets | 54-002 082 KA |
| Pocket microscope (50 times enlargement) | 54-002 346 KA |
| Ultrasonic bath | 54-002 347 KA |
| Special oil | 77006-00001 |

10.6 Periphery

| | |
|---|---------------|
| Sliding table, manual | 54-002 350 SA |
| Sliding table, automatic 3 axes with stepper motor drive | On request |
| Shaft encoder with mounting device, weight adjustment/m. wheel/coupling | 54-002 348 SA |
| Shaft encoder, 10000 pulse., with 6 m cable, with straight plug | 54-002 307 KA |
| Shaft encoder, 5000 pulse, with cable 6 m, with straight plug | 54-002 351 KA |
| Shaft encoder, 2500 pulse, with cable 6 m, with straight plug | 54-002 352 KA |
| Shaft encoder coupling | 54-002 349 KA |
| Further mountings for shaft encoder | On request |
| Product sensor, optical, plug with 5 m cable | 54-002 353 SA |
| Product sensor, inductive, with 5 m cable and plugable | 54-002 354 SB |
| Other holders for product sensors | On request |
| Cable guide unit for cable diameter 2-10 mm | 54-000 120 SC |
| Adjusting slide cpl. 2-axis (XY) LJ2 with quick separation and precise adjust | 54-000 903 SA |
| Universal bottom stand | 54-000 605 SB |
| PC → LJ2 connection cable | 54-002 295 SA |
| Moveable underframe | 54-002 601 KA |

10.7 Data entry devices

| | |
|--|------------|
| Win Jet data entry software for windows® 95/98/NT 4.0/2000/XP-Professional | On request |
| LJ-Flash Software for Windows® | On request |
| Personal Computer with data entry software | On request |
| Laptop with data entry software | On request |
| Industrial PC, 19" version | On request |

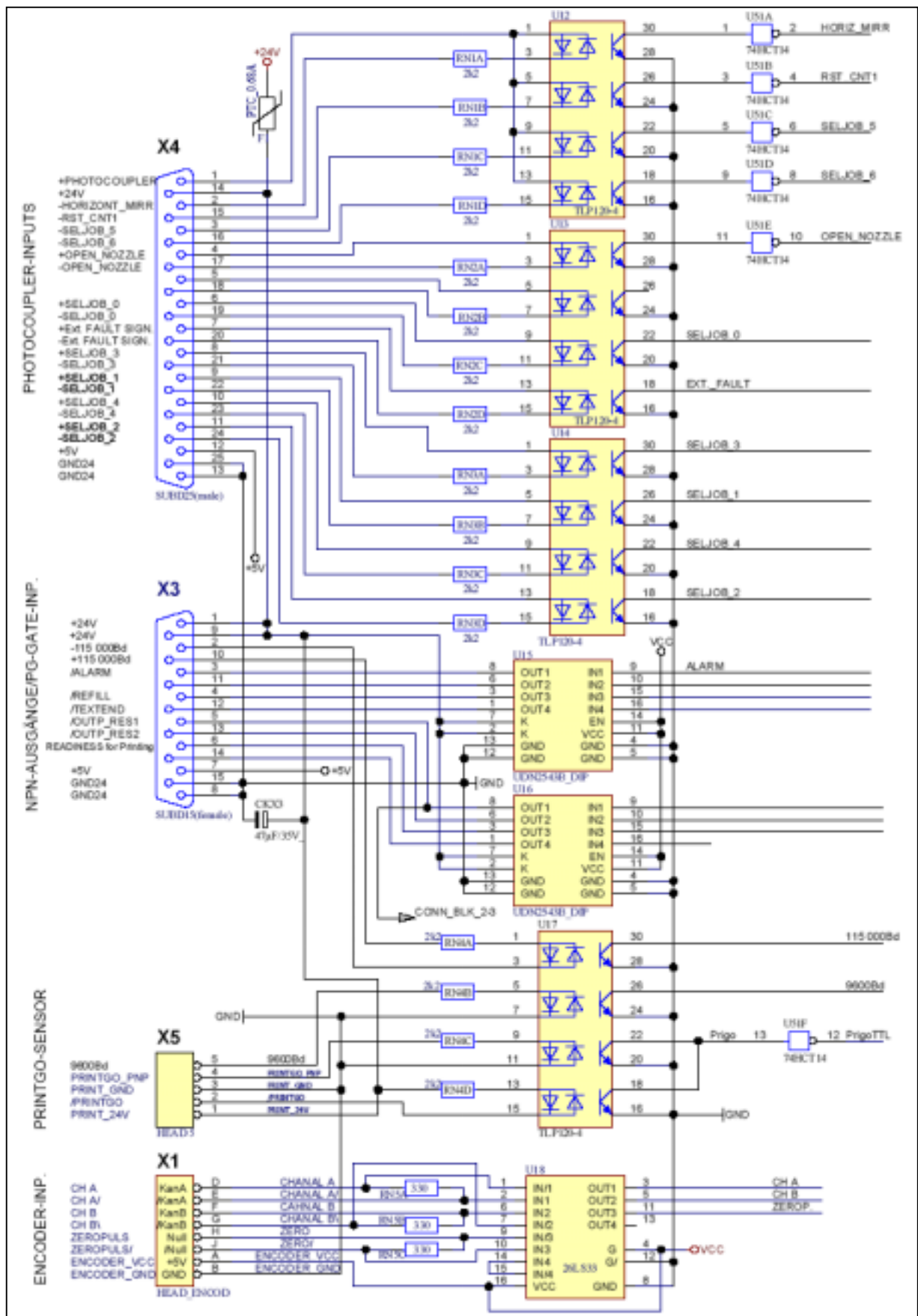
11. Consumables (Extract of our ink product range)

| Item | Ordering number ink | Ordering number of corresponding solvent | Description | Basis | Use with | Characteristics |
|------|---|--|--|--------------------|--|---|
| 1. | 70000-00101 black non pigmented | 77001-00030 | Ink, black, ketone, NPI, quick drying | Ketone | Plastic, PTFE paper, metal, aluminium, PET, PU, ceramic. | Quick drying good adhesion, good contrast. |
| 2. | 70000-00108 black non pigmented | 77001-00030 | Ink, black, ketone, NPI, alcohol resistant | Ketone | Rubber, Hytiel, PUR, PVC, glass. | Alcohol resistant |
| 3. | 70000-00031 black non pigmented | 77001-00030 | Ink, black, ketone, NPI, adhesive ink | Ketone | Metal, synthetic material, PP, PE, glass | Very good adhesion, very good contrast, sharp drop image. |
| 4. | 70000-00115 black non pigmented | 77001-00114 | Ink, black, MEC free, NPI, Black MEK free | MEK free | Paper, plastics, metals, glass. | Good adhesion, good contrast. |
| 5. | 70000-00118 black pigmented | 77001-00030 | Ink, black, ketone, PI, UV drying | Ketone | Cable, metals, synthetics, paper. | Very good resistance to various chemicals. Only dries with UV light. |
| 6. | 70000-00119 black non pigmented | 77001-00123 | Ink, black, ketone, NPI, can be washed off with water | Ketone/ alcohol | Metal, synthetic material, paper. | can be washed off with water |
| 7. | 70000-00120 black non pigmented | 77001-00103 | Ink, black, ketone, NPI, transfer printing resistant | Ketone | Paper, PVC, steel. | Transfer printing resistant, quick drying, good adhesion, light fast. |
| 8. | 70000-00121 black non pigmented | 77001-00117 | Ink, black, ethanol, NPI. | Ethanol | Paper, plastics, metal, ABS. | MEK free, resistant to steam sterilisation. |
| 9. | 72000-00102 red non pigmented | 77001-00030 | Ink, red, ketone, NPI, quick drying | Ketone | Paper, metals, synthetics, steel. | Ink red, fast drying. |
| 10. | 73000-00101 orange pigmented | 77001-00030 | Ink, orange, ketone, PI, quick drying | Ketone | PVC, ABS, paper, polystyrene, cable, tubes. | Very good contrast, optimum for black and white products. |
| 11. | 76000-00101 blue non pigmented | 77001-00030 | Ink, blue, ketone, NPI, PVC blue | Ketone | Paper, plastic, metals, aluminium, PE, PVC, PU, glass. | Quick drying, good adhesion. |
| 12. | 76000-00103 blue non pigmented | 77001-00030 | Ink, blue, ketone, NPI, fluorescent | Ketone | Paper, plastic | Fluorescent blue, only visible under UV light. |
| 13. | 76000-00109 blue-green non pigmented | 77001-00121 | Ink, blue-green, alcohol, NPI, food genuine | Alcohol | Food packaging, eggs, chesse postage stamps. | Food genuine |
| 14. | 76000-00110 medium blue non pigmented | 77001-00122 | Ink, medium blue, MEK-free, NPI, adhesive ink | MEK free | ABS, rubber, plastic, synthetics, metals, paper. | Very good adhesion, good contrast. |
| 15. | 76000-00111 blue non pigmented | 77001-00121 | Ink, blue, alcohol, NPI, food genuine | Alcohol | Food packaging, eggs, chesse postage stamps. | Food genuine, very good contrast. |
| 16. | 79000-00102 white pigmented | 77001-00102 | Ink, white, ketone/acetone, PI, PVC white transfer print resistant | Ketone/ acetone | PVC, plastic, PE. | Transfer print resistant |
| 17. | 79000-00104 white pigmented | 77001-00030 | Ink, white, ketone, PI, PVC white | Ketone | Synthetics, metals, aluminium | Very good contrast |
| 18. | 79000-00105 white pigmented | 77001-00030 | Ink, white, ketone, PI, silicone/rubber | Ketone | Silicone, rubber. | Good contrast |
| 19. | 79000-00106 white pigmented | 77001-00107 | Ink, white, MEK-free, PI, white MEK-free | MEK free | Rubber, PVC, ABS, PA. | Good contrast |
| 20. | 79000-00108 white pigmented | 77001-00030 | Ink, white, ketone, PI, white contrast | Ketone | PVC, ABS, CAB, PVdC, metals | Good contrast |

12.2 Interface layout plan

Figure 119

Interface layout plan part no. 1



12.3 Calculation of the print speed

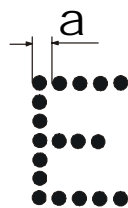
Calculation of the maximum possible **print speed** V_P depending on character width, font form, number of lines, 64 and 96 kHz drop frequency and various draft modes. The various draft modes are to be understood as meaning the use of various drop loading sequences which has a qualitative influence on print quality. The best print quality is achieved with the draft mode 0 (with the lowest character height), on the other hand the maximum print speed based on the font width is lower based.

The draft mode 2 enables the highest print speed (up to 9 dot character height), however it does not have the optimum drop distribution. The character height must be set up to 100. The draft mode 1 constitutes a compromise for for faster print speed (up to 16 dot, character height variably)

The Draftmode 3 is for fast barcode printing up to 24 dot. The character height is variably.

The Draftmode 4 (up to 24 dot) is for extremely small fonts. Character height variably.

Figure 121



a = stroke gap in mm on the character <E> in the 7x5 matrix

The **achievable character height** is of no significance for the calculation but rather must only be observed in the choice of font and for good legibility in accordance with the requirements.

The maximum and in particular the minimum character height depend to a very great extent on the ink used, the material and the surface.

| 96 KHz | | | | | | | |
|--------|-------|-----------------|-----|-----------------|----------------|--------------|--------------|
| Matrix | Draft | Number of lines | CPI | Stroke distance | V max in m/min | V max in m/s | Factor T=a/V |
| 5x5 | 0 | 1 | 10 | 0,4305 | 178,869 | 2,981 | 0,144 |
| 5x5 | 0 | 2 / 16 Dot | 10 | 0,4305 | 49,381 | 0,823 | 0,523 |
| 5x5 | 0 | 3 / 16 Dot | 10 | 0,4305 | 46,089 | 0,768 | 0,560 |
| 5x5 | 0 | 2 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 5x5 | 0 | 3 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 5x5 | 0 | 4 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 5x5 | 1 | 1 | 10 | 0,4305 | 249,100 | 4,152 | 0,104 |
| 5x5 | 1 | 2 / 16 Dot | 10 | 0,4305 | 71,328 | 1,189 | 0,362 |
| 5x5 | 1 | 3 / 16 Dot | 10 | 0,4305 | 65,841 | 1,097 | 0,392 |
| 5x5 | 2 | 1 | 10 | 0,4305 | 365,420 | 6,090 | 0,071 |
| 5x5 | 2 | 2 schnell | 10 | 0,4305 | 151,870 | 2,531 | 0,170 |
| 5x5 | 3 | 1 | 10 | 0,4305 | 249,100 | 4,152 | 0,104 |
| 5x5 | 3 | 2 / 16 Dot | 10 | 0,4305 | 71,328 | 1,189 | 0,362 |
| 5x5 | 3 | 3 / 16 Dot | 10 | 0,4305 | 65,841 | 1,097 | 0,392 |
| 5x5 | 3 | 2 / 24 Dot | 10 | 0,4305 | 47,186 | 0,786 | 0,547 |
| 5x5 | 3 | 3 / 24 Dot | 10 | 0,4305 | 47,186 | 0,786 | 0,547 |
| 5x5 | 3 | 4 / 24 Dot | 10 | 0,4305 | 46,089 | 0,768 | 0,560 |
| 5x5 | 4 | 1 | 10 | 0,4305 | 177,772 | 2,963 | 0,145 |
| 5x5 | 4 | 2 / 16 Dot | 10 | 0,4305 | 49,381 | 0,823 | 0,523 |
| 5x5 | 4 | 3 / 16 Dot | 10 | 0,4305 | 46,089 | 0,768 | 0,560 |
| 5x5 | 4 | 2 / 24 Dot | 10 | 0,4305 | 28,531 | 0,476 | 0,905 |
| 5x5 | 4 | 3 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 5x5 | 4 | 4 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 0 | 1 | 10 | 0,4305 | 127,294 | 2,122 | 0,203 |
| 7x5 | 0 | 2 / 16 Dot | 10 | 0,4305 | 49,381 | 0,823 | 0,523 |
| 7x5 | 0 | 2 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 0 | 3 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 1 | 1 | 10 | 0,4305 | 178,869 | 2,981 | 0,144 |
| 7x5 | 1 | 2 / 16 Dot | 10 | 0,4305 | 69,134 | 1,152 | 0,374 |
| 7x5 | 2 | 1 | 10 | 0,4305 | 310,552 | 5,176 | 0,083 |
| 7x5 | 2 | 2 schnell | 10 | 0,4305 | 136,500 | 2,275 | 0,189 |
| 7x5 | 3 | 1 | 10 | 0,4305 | 177,772 | 2,963 | 0,145 |
| 7x5 | 3 | 2 / 16 Dot | 10 | 0,4305 | 69,134 | 1,152 | 0,374 |
| 7x5 | 3 | 2 / 24 Dot | 10 | 0,4305 | 47,186 | 0,786 | 0,547 |
| 7x5 | 3 | 3 / 24 Dot | 10 | 0,4305 | 46,089 | 0,768 | 0,560 |
| 7x5 | 4 | 1 | 10 | 0,4305 | 127,294 | 2,122 | 0,203 |
| 7x5 | 4 | 2 / 16 Dot | 10 | 0,4305 | 49,381 | 0,823 | 0,523 |
| 7x5 | 4 | 2 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 4 | 3 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 9x5 | 0 | 1 | 10 | 0,4305 | 94,373 | 1,573 | 0,274 |
| 9x5 | 0 | 2 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 9x5 | 1 | 1 | 10 | 0,4305 | 136,072 | 2,268 | 0,190 |
| 9x5 | 2 | 1 | 10 | 0,4305 | 249,100 | 4,152 | 0,104 |
| 9x5 | 3 | 1 | 10 | 0,4305 | 136,072 | 2,268 | 0,190 |
| 9x5 | 3 | 2 / 24 Dot | 10 | 0,4305 | 48,284 | 0,805 | 0,535 |
| 9x5 | 4 | 1 | 10 | 0,4305 | 94,373 | 1,573 | 0,274 |
| 9x5 | 4 | 2 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 9x7 | 0 | 1 | 8 | 0,4032 | 88,886 | 1,481 | 0,272 |
| 9x7 | 0 | 2 / 24 Dot | 8 | 0,4032 | 27,434 | 0,457 | 0,882 |
| 9x7 | 1 | 1 | 8 | 0,4032 | 130,586 | 2,176 | 0,185 |
| 9x7 | 2 | 1 | 8 | 0,4032 | 229,348 | 3,822 | 0,105 |
| 9x7 | 3 | 1 | 8 | 0,4032 | 130,586 | 2,176 | 0,185 |
| 9x7 | 3 | 2 / 24 Dot | 8 | 0,4032 | 43,894 | 0,732 | 0,551 |
| 9x7 | 4 | 1 | 8 | 0,4032 | 88,886 | 1,481 | 0,272 |
| 9x7 | 4 | 2 / 24 Dot | 8 | 0,4032 | 27,434 | 0,457 | 0,882 |

| 64 KHz | | | | | | | |
|--------|-------|-----------------|-----|-----------------|----------------|--------------|--------------|
| Matrix | Draft | Number of lines | CPI | Stroke distance | V max in m/min | V max in m/s | Factor T=a/V |
| 5x5 | 0 | 1 | 10 | 0,4305 | 166,798 | 2,780 | 0,155 |
| 5x5 | 0 | 2 / 16 Dot | 10 | 0,4305 | 43,894 | 0,732 | 0,588 |
| 5x5 | 0 | 3 / 16 Dot | 10 | 0,4305 | 40,602 | 0,677 | 0,636 |
| 5x5 | 0 | 2 / 24 Dot | 10 | 0,4305 | 30,726 | 0,512 | 0,841 |
| 5x5 | 0 | 3 / 24 Dot | 10 | 0,4305 | 30,726 | 0,512 | 0,841 |
| 5x5 | 0 | 4 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 5x5 | 1 | 1 | 10 | 0,4305 | 166,798 | 2,780 | 0,155 |
| 5x5 | 1 | 2 / 16 Dot | 10 | 0,4305 | 44,992 | 0,750 | 0,574 |
| 5x5 | 1 | 3 / 16 Dot | 10 | 0,4305 | 41,700 | 0,695 | 0,619 |
| 5x5 | 2 | 1 | 10 | 0,4305 | 271,047 | 4,517 | 0,095 |
| 5x5 | 2 | 2 schnell | 10 | 0,4305 | 101,240 | 1,687 | 0,255 |
| 5x5 | 3 | 1 | 10 | 0,4305 | 166,798 | 2,780 | 0,155 |
| 5x5 | 3 | 2 / 16 Dot | 10 | 0,4305 | 44,992 | 0,750 | 0,574 |
| 5x5 | 3 | 3 / 16 Dot | 10 | 0,4305 | 41,700 | 0,695 | 0,619 |
| 5x5 | 3 | 2 / 24 Dot | 10 | 0,4305 | 41,700 | 0,695 | 0,619 |
| 5x5 | 3 | 3 / 24 Dot | 10 | 0,4305 | 30,726 | 0,512 | 0,841 |
| 5x5 | 3 | 4 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 5x5 | 4 | 1 | 10 | 0,4305 | 166,798 | 2,780 | 0,155 |
| 5x5 | 4 | 2 / 16 Dot | 10 | 0,4305 | 44,992 | 0,750 | 0,574 |
| 5x5 | 4 | 3 / 16 Dot | 10 | 0,4305 | 41,700 | 0,695 | 0,619 |
| 5x5 | 4 | 2 / 24 Dot | 10 | 0,4305 | 30,726 | 0,512 | 0,841 |
| 5x5 | 4 | 3 / 24 Dot | 10 | 0,4305 | 30,726 | 0,512 | 0,841 |
| 5x5 | 4 | 4 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 0 | 1 | 10 | 0,4305 | 118,515 | 1,975 | 0,218 |
| 7x5 | 0 | 2 / 16 Dot | 10 | 0,4305 | 40,602 | 0,677 | 0,636 |
| 7x5 | 0 | 2 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 0 | 3 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 1 | 1 | 10 | 0,4305 | 118,515 | 1,975 | 0,218 |
| 7x5 | 1 | 2 / 16 Dot | 10 | 0,4305 | 40,602 | 0,677 | 0,636 |
| 7x5 | 2 | 1 | 10 | 0,4305 | 203,011 | 3,384 | 0,127 |
| 7x5 | 2 | 2 schnell | 10 | 0,4305 | 91,000 | 1,520 | 0,284 |
| 7x5 | 3 | 1 | 10 | 0,4305 | 118,515 | 1,975 | 0,218 |
| 7x5 | 3 | 2 / 16 Dot | 10 | 0,4305 | 40,602 | 0,677 | 0,636 |
| 7x5 | 3 | 2 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 3 | 3 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 4 | 1 | 10 | 0,4305 | 118,515 | 1,975 | 0,218 |
| 7x5 | 4 | 2 / 16 Dot | 10 | 0,4305 | 40,602 | 0,677 | 0,636 |
| 7x5 | 4 | 2 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 7x5 | 4 | 3 / 24 Dot | 10 | 0,4305 | 29,629 | 0,494 | 0,872 |
| 9x5 | 0 | 1 | 10 | 0,4305 | 91,081 | 1,518 | 0,284 |
| 9x5 | 0 | 2 / 24 Dot | 10 | 0,4305 | 30,726 | 0,512 | 0,841 |
| 9x5 | 1 | 1 | 10 | 0,4305 | 92,178 | 1,536 | 0,280 |
| 9x5 | 2 | 1 | 10 | 0,4305 | 162,409 | 2,707 | 0,159 |
| 9x5 | 3 | 1 | 10 | 0,4305 | 91,081 | 1,518 | 0,284 |
| 9x5 | 3 | 2 / 24 Dot | 10 | 0,4305 | 30,726 | 0,512 | 0,841 |
| 9x5 | 4 | 1 | 10 | 0,4305 | 91,081 | 1,518 | 0,284 |
| 9x5 | 4 | 2 / 24 Dot | 10 | 0,4305 | 30,726 | 0,512 | 0,841 |
| 9x7 | 0 | 1 | 8 | 0,4032 | 85,594 | 1,427 | 0,283 |
| 9x7 | 0 | 2 / 24 Dot | 8 | 0,4032 | 28,531 | 0,476 | 0,848 |
| 9x7 | 1 | 1 | 8 | 0,4032 | 85,594 | 1,427 | 0,283 |
| 9x7 | 2 | 1 | 8 | 0,4032 | 151,435 | 2,524 | 0,160 |
| 9x7 | 3 | 1 | 8 | 0,4032 | 85,594 | 1,427 | 0,283 |
| 9x7 | 3 | 2 / 24 Dot | 8 | 0,4032 | 28,531 | 0,476 | 0,848 |
| 9x7 | 4 | 1 | 8 | 0,4032 | 85,594 | 1,427 | 0,283 |
| 9x7 | 4 | 2 / 24 Dot | 8 | 0,4032 | 28,531 | 0,476 | 0,848 |

| 96 KHz | | | | | | | |
|--------|-------|-----------------|-----|-----------------|----------------|--------------|--------------|
| Matrix | Draft | Number of lines | CPI | Stroke distance | V max in m/min | V max in m/s | Factor T=a/V |
| 11x8 | 0 | 1 | 7 | 0,4097 | 68,036 | 1,134 | 0,361 |
| 11x8 | 0 | 1 / 16 Dot | 7 | 0,4097 | 47,186 | 0,786 | 0,521 |
| 11x8 | 0 | 2 / 24 Dot | 7 | 0,4097 | 28,531 | 0,476 | 0,862 |
| 11x8 | 1 | 1 | 7 | 0,4097 | 93,275 | 1,555 | 0,264 |
| 11x8 | 3 | 1 | 7 | 0,4097 | 93,275 | 1,555 | 0,264 |
| 11x8 | 3 | 2 / 24 Dot | 7 | 0,4097 | 40,602 | 0,677 | 0,605 |
| 11x8 | 4 | 1 | 7 | 0,4097 | 68,036 | 1,134 | 0,361 |
| 11x8 | 4 | 2 / 24 Dot | 7 | 0,4097 | 28,531 | 0,476 | 0,862 |
| 12x8 | 0 | 1 | 7 | 0,4097 | 52,673 | 0,878 | 0,467 |
| 12x8 | 0 | 1 / 16 Dot | 7 | 0,4097 | 40,602 | 0,677 | 0,605 |
| 12x8 | 0 | 2 / 24 Dot | 7 | 0,4097 | 24,142 | 0,402 | 1,018 |
| 12x8 | 1 | 1 | 7 | 0,4097 | 68,036 | 1,134 | 0,361 |
| 12x8 | 3 | 1 | 7 | 0,4097 | 68,036 | 1,134 | 0,361 |
| 12x8 | 3 | 2 / 24 Dot | 7 | 0,4097 | 35,115 | 0,585 | 0,700 |
| 12x8 | 4 | 1 | 7 | 0,4097 | 52,673 | 0,878 | 0,467 |
| 12x8 | 4 | 2 / 24 Dot | 7 | 0,4097 | 25,239 | 0,421 | 0,974 |
| 14x10 | 0 | 1 | 6 | 0,3908 | 41,700 | 0,695 | 0,562 |
| 14x10 | 0 | 1 / 16 Dot | 6 | 0,3908 | 39,505 | 0,658 | 0,594 |
| 14x10 | 1 | 1 | 6 | 0,3908 | 54,868 | 0,914 | 0,427 |
| 14x10 | 3 | 1 | 6 | 0,3908 | 54,868 | 0,914 | 0,427 |
| 14x10 | 4 | 1 | 6 | 0,3908 | 41,700 | 0,695 | 0,562 |
| 16x10 | 0 | 1 | 6 | 0,3908 | 38,408 | 0,640 | 0,611 |
| 16x10 | 0 | 1 / 16 Dot | 6 | 0,3908 | 38,408 | 0,640 | 0,611 |
| 16x10 | 1 | 1 | 6 | 0,3908 | 52,673 | 0,878 | 0,445 |
| 16x10 | 3 | 1 | 6 | 0,3908 | 52,673 | 0,878 | 0,445 |
| 16x10 | 4 | 1 | 6 | 0,3908 | 38,408 | 0,640 | 0,611 |
| 24x24 | 0 | 1 | 3 | 0,3432 | 24,142 | 0,402 | 0,853 |
| 24x24 | 3 | 1 | 3 | 0,3432 | 37,310 | 0,622 | 0,552 |
| 24x24 | 4 | 1 | 3 | 0,3432 | 24,142 | 0,402 | 0,853 |
| BC 16 | 0 | 2 aus 5 | | 0,3432 | 39,505 | 0,658 | 0,521 |
| BC 16 | 1 | 2 aus 5 | | 0,3432 | 54,868 | 0,914 | 0,375 |
| BC 16 | 3 | 2 aus 5 | | 0,3432 | 54,868 | 0,914 | 0,375 |
| BC 24 | 0 | 2 aus 5 | | 0,3432 | 26,337 | 0,439 | 0,782 |
| BC 24 | 4 | 2 aus 5 | | 0,3432 | 26,337 | 0,439 | 0,782 |
| BC 24 | 3 | 2 aus 5 | | 0,3432 | 40,602 | 0,677 | 0,507 |
| G 16 | 0 | 1 | | 0,3432 | 27,434 | 0,457 | 0,751 |
| G 16 | 1 | 1 | | 0,3432 | 41,700 | 0,695 | 0,494 |
| G 16 | 3 | 1 | | 0,3432 | 39,505 | 0,658 | 0,521 |
| G 16 | 4 | 1 | | 0,3432 | 27,434 | 0,457 | 0,751 |
| G 24 | 0 | 1 | | 0,3432 | 27,434 | 0,457 | 0,751 |
| G 24 | 3 | 1 | | 0,3432 | 39,505 | 0,658 | 0,521 |
| G 24 | 4 | 1 | | 0,3432 | 27,434 | 0,457 | 0,751 |

| 64 KHz | | | | | | | |
|--------|-------|-----------------|-----|-----------------|----------------|--------------|--------------|
| Matrix | Draft | Number of lines | CPI | Stroke distance | V max in m/min | V max in m/s | Factor T=a/V |
| 11x8 | 0 | 1 | 7 | 0,4097 | 61,452 | 1,024 | 0,400 |
| 11x8 | 0 | 1 / 16 Dot | 7 | 0,4097 | 46,089 | 0,768 | 0,533 |
| 11x8 | 0 | 2 / 24 Dot | 7 | 0,4097 | 27,434 | 0,457 | 0,896 |
| 11x8 | 1 | 1 | 7 | 0,4097 | 61,452 | 1,024 | 0,400 |
| 11x8 | 3 | 1 | 7 | 0,4097 | 61,452 | 1,024 | 0,400 |
| 11x8 | 3 | 2 / 24 Dot | 7 | 0,4097 | 27,434 | 0,457 | 0,896 |
| 11x8 | 4 | 1 | 7 | 0,4097 | 61,452 | 1,024 | 0,400 |
| 11x8 | 4 | 2 / 24 Dot | 7 | 0,4097 | 27,434 | 0,457 | 0,896 |
| 12x8 | 0 | 1 | 7 | 0,4097 | 46,089 | 0,768 | 0,533 |
| 12x8 | 0 | 1 / 16 Dot | 7 | 0,4097 | 37,310 | 0,622 | 0,659 |
| 12x8 | 0 | 2 / 24 Dot | 7 | 0,4097 | 23,045 | 0,384 | 1,067 |
| 12x8 | 1 | 1 | 7 | 0,4097 | 46,089 | 0,768 | 0,533 |
| 12x8 | 3 | 1 | 7 | 0,4097 | 46,089 | 0,768 | 0,533 |
| 12x8 | 3 | 2 / 24 Dot | 7 | 0,4097 | 23,045 | 0,384 | 1,067 |
| 12x8 | 4 | 1 | 7 | 0,4097 | 46,089 | 0,768 | 0,533 |
| 12x8 | 4 | 2 / 24 Dot | 7 | 0,4097 | 23,045 | 0,384 | 1,067 |
| 14x10 | 0 | 1 | 6 | 0,3908 | 36,213 | 0,604 | 0,648 |
| 14x10 | 0 | 1 / 16 Dot | 6 | 0,3908 | 36,213 | 0,604 | 0,648 |
| 14x10 | 1 | 1 | 6 | 0,3908 | 36,213 | 0,604 | 0,648 |
| 14x10 | 3 | 1 | 6 | 0,3908 | 38,408 | 0,640 | 0,611 |
| 14x10 | 4 | 1 | 6 | 0,3908 | 38,408 | 0,640 | 0,611 |
| 16x10 | 0 | 1 | 6 | 0,3908 | 30,726 | 0,512 | 0,763 |
| 16x10 | 0 | 1 / 16 Dot | 6 | 0,3908 | 31,823 | 0,530 | 0,737 |
| 16x10 | 1 | 1 | 6 | 0,3908 | 31,823 | 0,530 | 0,737 |
| 16x10 | 3 | 1 | 6 | 0,3908 | 30,726 | 0,512 | 0,763 |
| 16x10 | 4 | 1 | 6 | 0,3908 | 31,823 | 0,530 | 0,737 |
| 24x24 | 0 | 1 | 3 | 0,3432 | 21,947 | 0,366 | 0,938 |
| 24x24 | 3 | 1 | 3 | 0,3432 | 21,947 | 0,366 | 0,938 |
| 24x24 | 4 | 1 | 3 | 0,3432 | 21,947 | 0,366 | 0,938 |
| BC 16 | 0 | 2 aus 5 | | 0,3432 | 37,310 | 0,622 | 0,552 |
| BC 16 | 1 | 2 aus 5 | | 0,3432 | 37,310 | 0,622 | 0,552 |
| BC 16 | 3 | 2 aus 5 | | 0,3432 | 38,408 | 0,640 | 0,536 |
| BC 24 | 0 | 2 aus 5 | | 0,3432 | 29,629 | 0,494 | 0,695 |
| BC 24 | 4 | 2 aus 5 | | 0,3432 | 29,629 | 0,494 | 0,695 |
| BC 24 | 3 | 2 aus 5 | | 0,3432 | 29,629 | 0,494 | 0,695 |
| G 16 | 0 | 1 | | 0,3432 | 26,337 | 0,439 | 0,782 |
| G 16 | 1 | 1 | | 0,3432 | 26,337 | 0,439 | 0,782 |
| G 16 | 3 | 1 | | 0,3432 | 26,337 | 0,439 | 0,782 |
| G 16 | 4 | 1 | | 0,3432 | 26,337 | 0,439 | 0,782 |
| G 24 | 0 | 1 | | 0,3432 | 26,337 | 0,439 | 0,782 |
| G 24 | 3 | 1 | | 0,3432 | 26,337 | 0,439 | 0,782 |
| G 24 | 4 | 1 | | 0,3432 | 26,337 | 0,439 | 0,782 |


12.4 Fonts

Examples (The fonts are described as matrix)

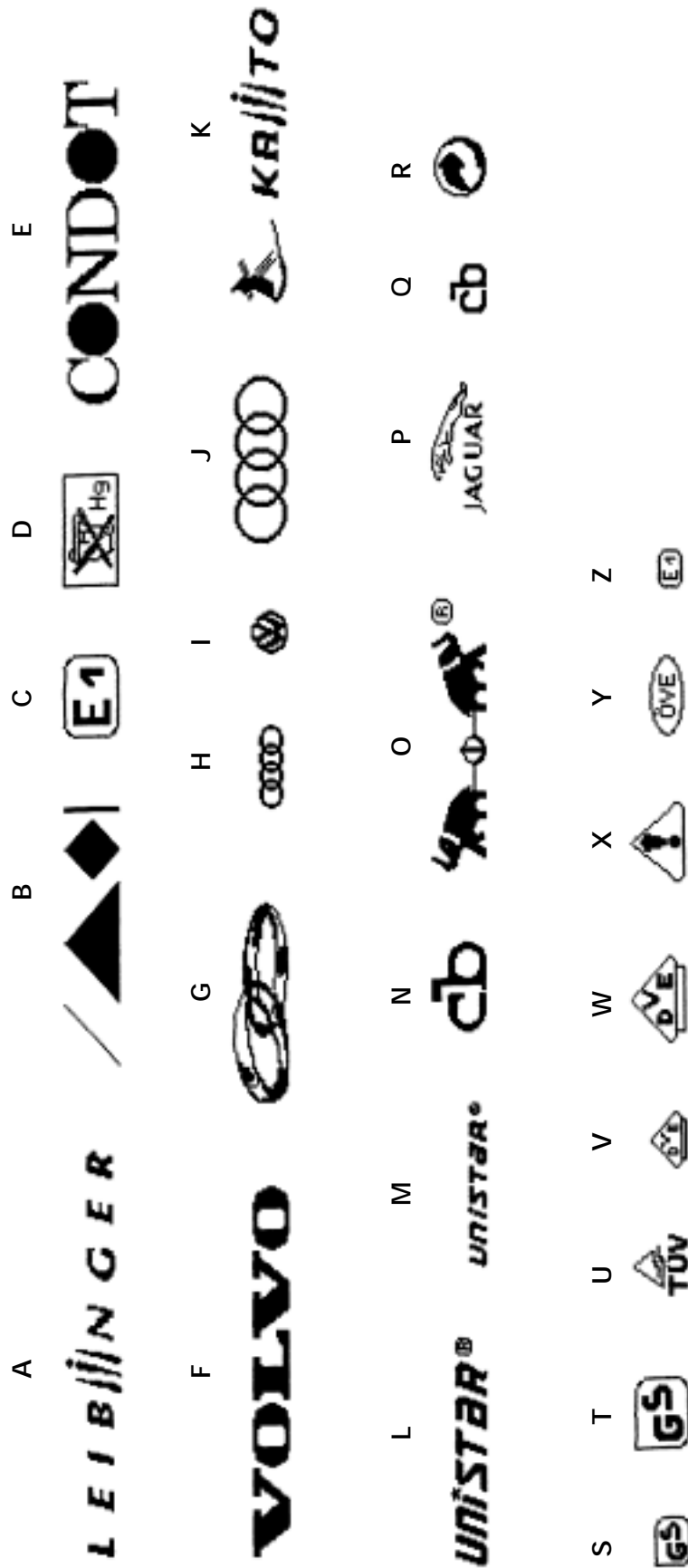
Beispiele (Die Schriftarten werden auch als Matrix bezeichnet)

| | Matrix: |
|---|--|
| 5x5 SINGLE LINE 1234567890 ABCDEF GHIJKL MNOPQRSTUWXYZ | Matrix 5x5 einzeilig (Matrix 5x5 single line) |
| 7x5 SINGLE LINE 1234567890 ABCDEF GHIJKL MNOPQRSTUWXYZ | Matrix 7x5 einzeilig (Matrix 7x5 single line) |
| 9x5 SINGLE LINE 1234567890 ABCDEF GHIJKL MNOPQRSTUWXYZ | Matrix 9x5 einzeilig (Matrix 9x5 single line) |
| 9x7 SINGLE LINE 1234567890 ABCDEF GHIJKL MNOPQRSTUWXYZ | Matrix 9x7 einzeilig (Matrix 9x7 single line) |
| 11x8 SINGLE LINE 1234567890 ABCDEF GHIJKL MNOPQRSTUWXYZ | Matrix 11x8 einzeilig (Matrix 11x8 single line) |
| 12x8 SINGLE LINE 1234567890 ABCDEF GHIJKL MNOPQRSTUWXYZ | Matrix 12x8 einzeilig (Matrix 12x8 single line) |
| 14x10 SINGLE SINGLE LINE 1234567890 ABCDEF GHIJKL MNOPQRST... | Matrix 14x10 einzeilig (Matrix 14x10 single line) |
| 16x10 SINGLE SINGLE LINE 1234567890 ABCDEF GHIJKL MNOPQRST... | Matrix 16x10 einzeilig (Matrix 16x10 single line) |
| 16x11 (BERN 16) 1234567890 ABCDEFG... | Matrix 16x11 einzeilig (Bern 16) |
| 16x12 (BARM 16) 1234567890 ABCDEFG... | Matrix 16x12 einzeilig (Barm 16) |
| 24x12 (BERN 24) 1234567890 ABC... | Matrix 24x12 einzeilig (Bern 24) |
| 24x18 MATRIX 1234567890 | Matrix 24x18 einzeilig (Matrix 24x18 single line) |
| 24x24 MATRIX 1234567890 | Matrix 24x24 einzeilig (Matrix 24x24 single line) |
| 9x7 MATRIX 1234567890 5x5 MATRIX 1234567890 ABCDEF GHI 5x5 MATRIX ABCDEF GHIJKL MNOP 9x7 MATRIX ABCDEF GHIJKL | Matrix 9x7 und 5x5 / 5x5 und 9x7 (Matrix 9x7 an 5x5 / 5x5 and 9x7) |
| 16x10 MATRIX 1234567890 7x5 MATRIX 1234567890 ABCDEF GHIJKL MNOP 7x5 MATRIX ABCDEF GHIJKL MNOPQRSTUWXYZ 16x10 MATRIX KLMN OPQRST | Matrix 7x5 und 16x10 / 16x10 und 7x5 (Matrix 7x5 and 16x10 / 16x10 and 7x5) |

Examples (The type forms are described as matrix)

| | | Matrix: |
|---|--|--|
| <p>Beispiele (Die Schriftarten werden auch als Matrix bezeichnet)</p>  | | <p>Matrix 5x7 Kaminschrift einzellig / mehrzellig (Matrix 5x7 chimney type single line, twin line, tri line)</p> |
|  | | <p>Grafik 24 dots (Graphic 24 dots)</p> |
| <p>5x5 SINGLE LINE TWIN LINE TRI LINE FOUR LINE</p> | | <p>Matrix 5x5 zweizeilig, dreizeilig, vierzeilig (Matrix 5x5 single line, twin line, tri line, four line)</p> |
| <p>7x5 TRI LINE 61234567890 ABCDEFGHIJKL</p> <p>9x7 TWIN LINE ABCDEFGHIJKLM</p> | | <p>Kombination: 24x24 einzellig / 7x5 dreizeilig 9x7 zweizeilig (Combination: 24x24 single line / 7x5 tri line 9x7 twin line)</p> |
| <p>12345 67890 ABCD EFG</p> | | <p>Fettdruck (alle Schriftarten können mit Fettdruck kombiniert werden) (Bold print (all fonts can be combined with black letters))</p> |
| <p>12345 ABCD Contrast efg hij Contrast</p> | | <p>Kontrastdruck (alle Schriftarten können mit Kontrastdruck kombiniert werden) (Contrast print (all fonts can be combined with contrast))</p> |
|  | | <p>Barcode EAN8 + EAN13 mit Klarschrift (Barcode EAN 8 + EAN 13 with clear figure)</p> |
|  | | <p>Barcode 39 mit und ohne Klarschrift (Barcode 39 with/without clear figure)</p> |
|  | | <p>Barcode 2 of 5 interleaved</p> |

12.5 List of graphics (standard)

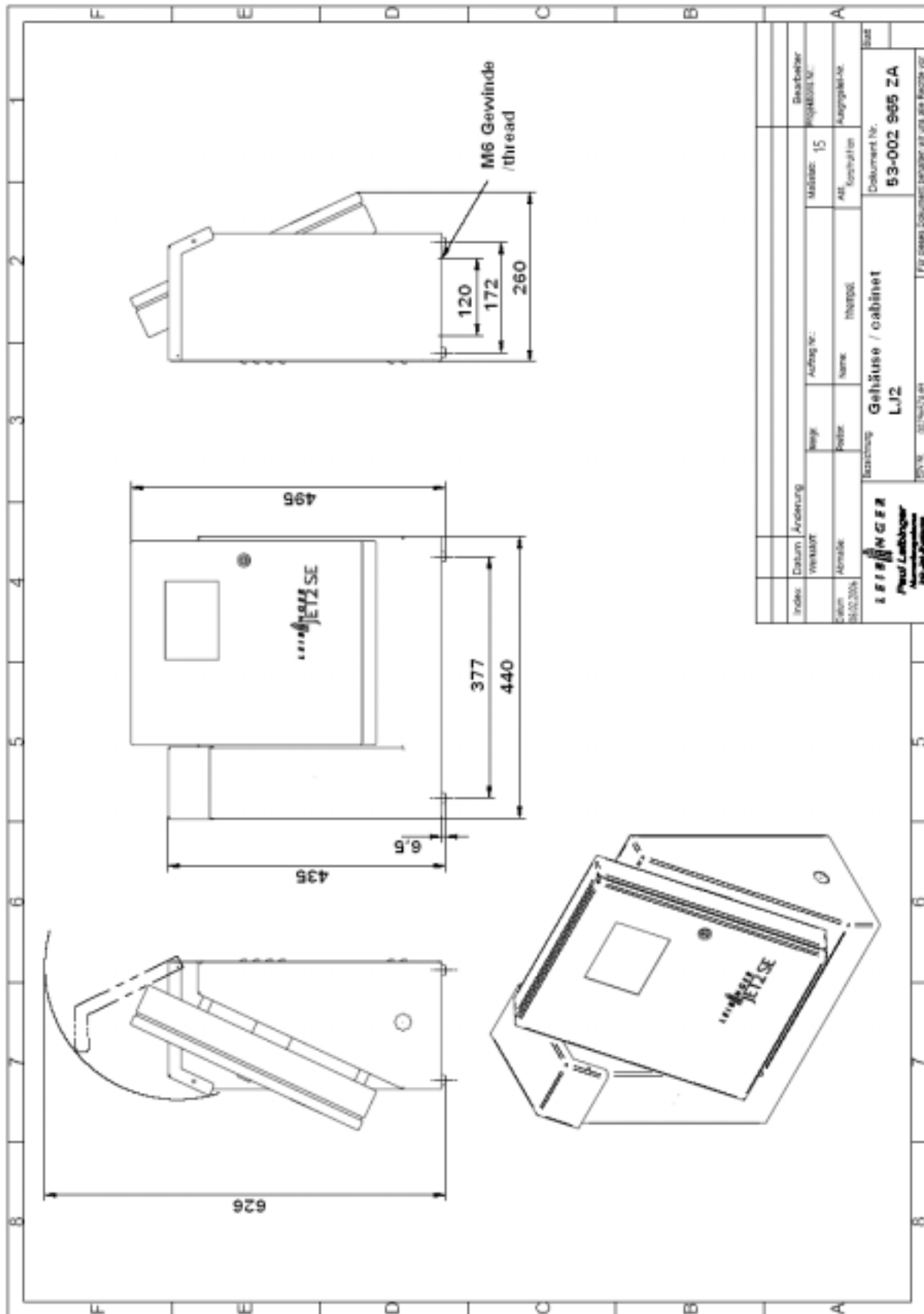


12.6 Technical drawings

Figure 122

Figure 123

Cabinet LJ 2



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