Operating Instructions

Type: **GM-50-FU**

Serial No.:

Article No.: K02912

⚠ **These operating instructions contain important information to be observed for extruder operation and maintenance.**
It is therefore imperative that they be read and their contents fully understood by the operators before the extruder is placed in service.

Extruder GM-50-FU

Scope of delivery:
Please check that the delivery is complete.
The delivery comprises:

1 extruder
1 control cabinet
1 welding shoe, machined
3 preheat nozzles
2 nozzles
2 compression nozzles
1 hot air hood

Contents

EG-Konformitätserklärung des Herstellers
nach der EG-Maschinenrichtlinie 2006/42/EG Anhang II, Nr. 1 A
EC-Declaration of Conformity by the Manufacturer
as defined by machinery directive 2006/42/EC, Annex II, No. 1 A

CE

MUNSCH Kunststoff-Schweißtechnik GmbH
Im Staudchen
D-56235 Ransbach-Baumbach
Germany

Mr. Johann Dausenau,
Kunststoffschweißtechnik GmbH,
is authorised to compile the technical documentation.

We hereby declare that the hand extruders

Machine type:	Hand extruder
Type designation:	GM-50-FU

are in accordance with all relevant provisions of the EC Machinery Directive.

The following harmonised standards (or parts of these standards) were applied:

☒	DIN EN ISO 12100-1: 2004	☒	DIN EN 13732-1: 2008
☒	DIN EN ISO 12100-2: 2004	☐	

In addition, the hand extruders are in accordance with the following EC-directives, standards, codes and regulations:

☒	EU Low-Voltage Directive 73/23/EC	☒	EU EMC Directive 89/336/EC
☒	EN 60204-1 (VDE 0113 Part 1): 2007	☒	DIN EN 55014-1: 2007
☒	EN 61029-1 (VDE 0740 Part 500): 2003	☒	DIN EN 55014-2: 2009
☒	VDE 0701 Part 1: 2008	☐	
☒	VDE 0702 Part 1: 2003	☐	

This industrial tool complies with the aforesaid standards insofar as it is used at the contractually agreed conditions. The operator is responsible for this.

In the event of any modifications to the machine/unit or use not as intended, this declaration becomes invalid unless the manufacturer's prior written approval has expressly been given.

Ransbach-Baumbach, 29.12.2009

Dipl.-Ing. Stefan Munsch
Managing Director

1 General

These operating instructions must always be available at the place of use of the extruder.
The objective of these operating instructions is to support operators in familiarizing themselves with the extruder and in using its functions for the intended service.

These operating instructions provide important information for the safe, workmanlike and economical operation of the extruder. Their observance helps avoid danger, minimize repair costs and downtimes, enhance reliability, and extend the service life of the extruder.

These operating instructions must be observed by all persons working with/on the extruder. Such work includes, for instance:

- operation,
- maintenance, inspection and repair
- transport.

The extruder may only be mounted, operated and maintained by trained personnel.

In addition to the operating instructions and the national and local accident prevention regulations applicable at the place of use, the acknowledged technical rules for safe and proper working practices must be observed.

These operating instructions provide basic information to be observed for operation and maintenance. For this reason, it is imperative that they be read by the specialist personnel/Operator prior to placing the hand extruder in service and that they always be available at the place of use.
Apart from the general safety instructions under section “Safety“, also the special safety instructions given under the respective sub-sections must be adhered to.

Non-observance of the safety instructions may cause hazards to persons and the environment or damage to the extruder.
Moreover, failure to observe the safety instructions may lead to the forfeiture of any damages.

Non-observance of the safety instructions may in particular involve the following risks:

- failure of important extruder functions,
- hazards to persons due to electrical and mechanical impacts including risk of burns,
- hazards to the environment due to vapour-phase hazardous substances,
- risk of fire.

2 Safety

These operating instructions provide basic information to be observed for operation and maintenance. For this reason, it is imperative that they be read by the specialist personnel/Operator prior to placing the extruder in service and that they always be available at the place of use.

Safe operation of the extruder presupposes that the instructions under section 1 – General – of these operating instructions are complied with. In no case must the limit values indicated be violated.

Intact and unaltered extruders conform to the applicable codes and standards and meet all regulatory limit values regarding EMC (electromagnetic discharges and interference immunity). For the country-specific limit values to be observed, the Operator should consult the local electric utility. Nevertheless, the extruders emit electromagnetic fields within the acceptable limits. Electromagnetic fields may interfere with the operation of vital electronic devices (e.g. cardiac pacemakers). Persons wearing a cardiac pacemaker should therefore consult their physician before using the machine.

In addition to the operating instructions and the national and local accident prevention regulations applicable at the place of use, the acknowledged technical rules for safe and proper working practices must be observed.

Apart from the general safety instructions under section “Safety“, also the special safety instructions given under the respective sub-sections must be adhered to.

Any working practices posing a safety risk are prohibited.

2.1 Identification of information in the operating instructions

In these operating instructions, safety instructions whose non-observance may cause hazards to persons are identified with

Hazard symbol according to DIN 4844 – W 9

for general hazards and with

Hazard symbol according to DIN 4844 – W 8

for electrical hazards.

Safety instructions whose non-observance may cause damage to the extruder and its functions are marked with

CAUTION

Instructions directly indicated on the extruder must be strictly followed and kept in a fully legible state.

2.2 Personnel qualification and training

The operating, maintenance and inspection personnel must possess appropriate qualification for the work to be performed. Functional and technical responsibilities and supervision of the operating personnel must be clearly regulated by the Operator. Where the personnel do not have the necessary skills and knowledge they must be trained and instructed (e.g. a DVS basic welder training in extrusion welding). A detailed instruction into extruder operation will be provided by the Manufacturer/Supplier on request. Furthermore, the Operator has to make sure that the contents of the operating instructions is fully understood by the operating personnel.

2.3 Risks resulting from non-observance of the safety instructions

Non-observance of the safety instructions may cause hazards to persons and the environment or damage to the hand extruder. Moreover, failure to observe the safety instructions may lead to the forfeiture of any damages.

Non-observance of the safety instructions may **in particular** involve the following risks:

- failure of important extruder functions,
- hazards to persons due to electrical and mechanical impacts including risk of burns,
- hazards to the environment due to vapour-phase hazardous substances,
- risk of fire.

2.4 Safe working practices

The safety instructions given in these operating instructions, the applicable national accident prevention regulations and any existing in-company work instructions, operating and safety procedures issued by the Operator must be followed.

2.5 Safety instructions for Operator / operating personnel

- Before placing the extruder in service, check the mains voltage and frequency against the data indicated on the type tag. The allowable tolerances are ± 5 % for voltage and/or ±2 % for frequency.
- According to VDE 0100 §55, the extruder must be operated via a residual current-operated circuit breaker or an isolating transformer.
- CAUTION During extruder operation (under load), a voltage of 400 V must be available at the connector of the hand extruder.
- When using an extension cable, make sure to observe the minimum conductor cross-section. Use extension cables with protective conductor only.

- Extension cables must be certified for the specific service conditions (e.g. outdoor service) and identified accordingly.

  Always handle the connecting cable with care.

  - Do not kink the connecting cable.
  - Do not place any objects on the cable.
  - Do not jam or squeeze the connecting cable, nor pull it over sharp edges.
  - Protect the connecting cable from moisture.

- ⚠ Do not touch the mains connector or connecting cable with wet hands. Hold the cable always at the connector when plugging or unplugging it.

- CAUTION Power generator sets used for power supply must be designed for the following rated output:

  ≥ 4 x rated output of hand extruder

- ⚠ Never allow the extruder to come into contact with water: Hazard to persons and equipment, short-circuit risk.

- CAUTION **Never operate the extruder without air supply; risk of extruder damage.**

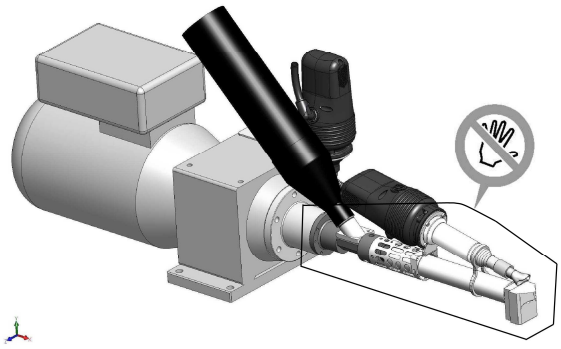
- ⚠ The extruder must not be used in explosion hazard areas or flammable atmospheres.

  Make sure that the extruder is firmly positioned during the extrusion welding job.

  The connecting cable must be freely movable and must not obstruct the operator or third parties in their work.

- ⚠

  - **Do not** touch bare metal parts (including hot air hood) either with or without gloves. These parts reach temperatures of up to 350 °C.
  - Attachments may be damaged or impaired in their function if subjected to the full weight of the extruder.
  - Bare metal parts must not come into contact with other items during the work or work breaks (e.g. cooling).

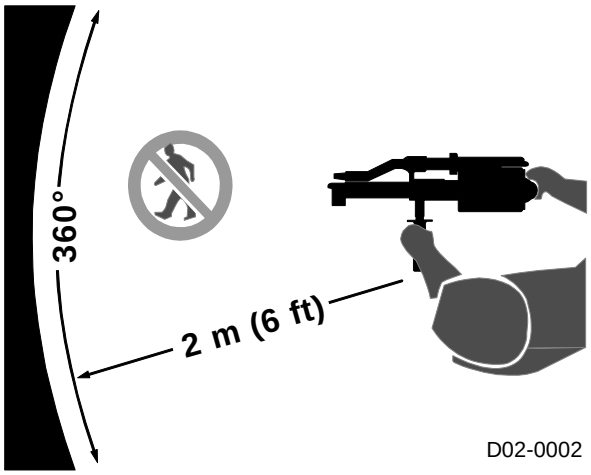


- ⚠ **Contact of combustible components with hot bare metal parts poses a risk of fire!**

  Do not use synthetic gloves!

- Do not direct the hot air jet of the extruder towards living beings or heat-sensitive items.

  Safety distance: 2 m radius



- Use suitable personal protection equipment for overhead work (e.g. hard hat, safety goggles, gloves, protective clothes …) to guard against falling items.

CAUTION The hot air hood must be remounted.

Make sure that the extruder is firmly positioned!

Deposit the extruder in a dry location.

After completion of the welding job, cool the extruder to safe-to-touch temperature, using the air supply system.

- Do not operate, dismantle or carry out any modifications on the extruder, if
  - the connecting cable or the mains connector is defective,
  - safety devices are damaged,
  - foreign matter or liquid has penetrated into the extruder,
  - the unit does not work properly or there are unusual changes in its operating behaviour.

- Never allow the extruder to come into contact with water: Hazard to persons and equipment, short-circuit risk.

2.6 Safety instructions for maintenance, inspection and mounting

The Operator is responsible for ensuring that maintenance, inspection and mounting activities are performed by authorized and **qualified personnel** who are thoroughly familiar with the operating instructions.

- As a rule, the extruder must be shut off and the connector unplugged before proceeding to any work on the unit. The shutoff procedure for the extruder described in the operating instructions must be strictly observed.
- Electrical hazards must be ruled out (for details, see VDE guidelines and the standards of your local electric utility, for instance).

- VDE 0701 (IEC 335) prescribes the measurement of the protective conductor resistance, insulation resistance and leakage current after each repair or modification to electrical equipment. Furthermore, a visual inspection of the unit and its connecting cable as well as voltage and current measurements and a function test must be carried out.
- Ensure the safe and environmentally compatible disposal of media, auxiliary materials and replaced parts!
- Remount and reactivate all safety and protective devices immediately on completion of the maintenance, inspection or repair work.

2.7 Unauthorized modifications and spare parts

Modifications or changes to the unit are only allowed after consultation with the Manufacturer. In the interest of safety, only original spare parts and accessories authorized by the Manufacturer should be used. The use of components other than the original spare parts may invalidate the Manufacturer's liability for any resulting damage.

3 Transport and Storage

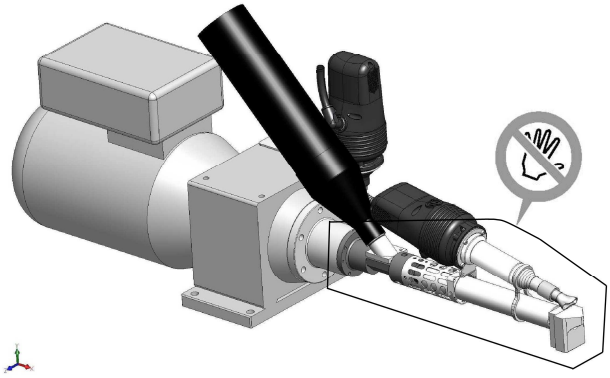
3.1 Transport

- ⚠ **Before transport and storage, make sure that the extruder has cooled down to safe-to-touch temperature.**

- ⚠

  Do not touch bare metal parts (including the hot air hood) – whether with or without gloves - before having made sure that they are safe to touch. These parts reach temperatures of up to 350 ℃ during operation.

-



- Always transport or store the extruder in such a way as to preclude any mechanical loads on the attachments.

  If parts have been removed for transport purposes, mount and fasten them carefully before restarting the extruder!

  Transport of the extruder in MUNSCH's original shipping case is recommended.

3.2 Storage

- Store the extruder in a dry and frost-free place.
- Protect the extruder from unauthorized access.
- Special preservation is not required

3.3 Return to Munsch

Should it become necessary to return the extruder to MUNSCH Kunststoff-Schweißtechnik GmbH, always use the original shipping case.

4 Product Description

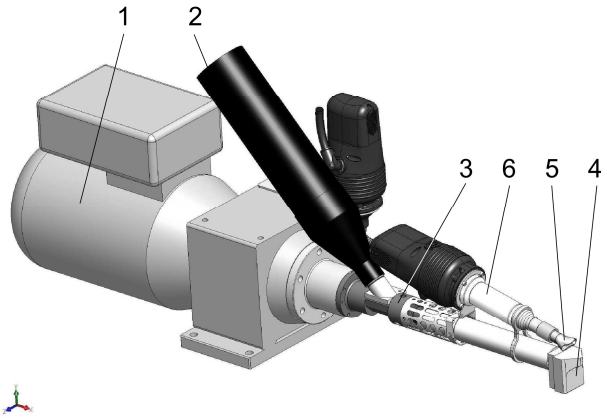
4.1 Application range

The application range of the extruder is defined by the data on the type tag and the service limits indicated in these operating instructions.

CAUTION Operation of the extruder outside the service limits stated in these operating instructions is subject to the manufacturer's prior approval.

4.2 General

Type **GM-50-FU** is a extruder with integrated air supply (Autoair).



The following operating parameters can be freely selected:

- welding rate,
- hot air temperature,
- melt temperature and throughput; the melt throughput can be varied within a range of 20 Hz to 70 Hz by decreasing or increasing the frequency set on the POTI on the control cabinet.
- Moreover, the composition and shape of the granulate have an influence on the melt throughput.

Driven by a powerful electric motor (1), the granulate is fed from hopper (2) into the extruder (3). The extruder screw forces the granulate into the extruder nozzle, melting it into a homogeneous, completely plastified mass. As the molten material exits the extruder nozzle, it is moulded by a welding shoe (4) to the geometry of the weld seam to be deposited.

Preheating of the base material to be joined is accomplished by a preheating nozzle (5) which is supplied with hot air from an integrated hot air unit (6).

Melt and preheat temperatures are controlled separately. The setpoint and momentary values are displayed concurrently.

The melt and hot air must have reached the preset **start interlock temperatures** for the drive to be released by the start interlock. The start interlock temperatures for the melt and hot air temperatures are separately preset.

The temperature-controlled start interlock prevents the drive from starting if there is still unmolten material in the extruder, thus precluding damage to the unit.

The output rate is variable so that the preheat time can be matched to the weld thickness.

5 Startup and Shutoff

5.1 General

In addition to the operating instructions and the national and local accident prevention regulations applicable at the place of use, the acknowledged technical rules for safe and proper working practices must be observed.

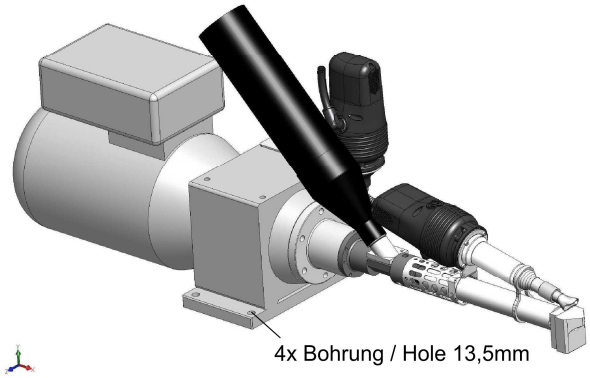
Any working practices posing a safety risk are prohibited.

Before starting / shutting off the extruder, make sure to carefully read the instructions under section “Safety”.

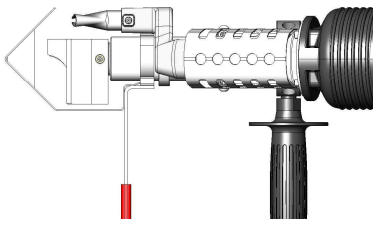
Only trained and qualified personnel may be assigned to the operation of the extruder.

5.2 Preparation

- Place the extruder on a firm support (minimum load bearing capacity: 100 kg) and secure it against toppling over. Next, secure the extruder to the support using the 4 screw holes provided on the gearbox.



- Mount hot air hood



- Mount welding shoe
  - Select the welding shoe required for the specific weld geometry or machine a welding shoe blank to the required geometry.
  - Observe DVS 2207 Guideline, Part 4 for machining welding shoe blanks.
  - Mount welding shoe to the hand extruder in the position required for welding.
    Observe welding direction!
    Tighten set screw (25).

- Mount preheat nozzle
  - Select and mount the preheat nozzle (4) required for the specific weld geometry.
  - Observe spacing A = 5 mm.
  - Tighten the preheat nozzle using mushroom head screw (125.22).

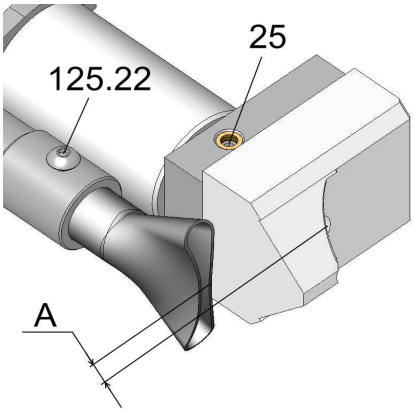
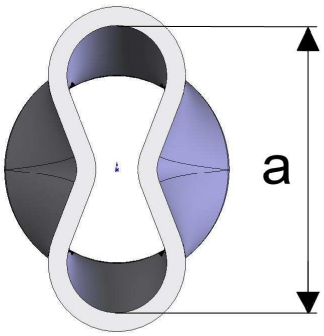


Table: Preheat nozzle



18 = K04379
23 = K04380
35 = K04381
50 = K04382
65 = K04383

Care must be taken to ensure that the preheat nozzle provides intensive and uniform preheating (melting) of the base material over the entire joint width at as low a hot air temperature as possible.

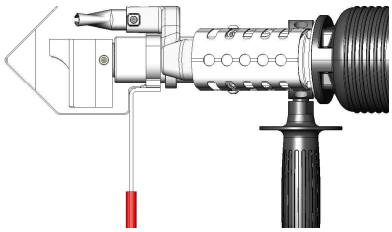
5.3 Starting the extruder

⚠ Observe section “Safety“.

- CAUTION Never operate the extruder without air supply. Otherwise the unit may suffer severe damage.

- CAUTION Before plugging in the mains connector, check that the drive unit is switched off.

- CAUTION The hot air hood must be in place.



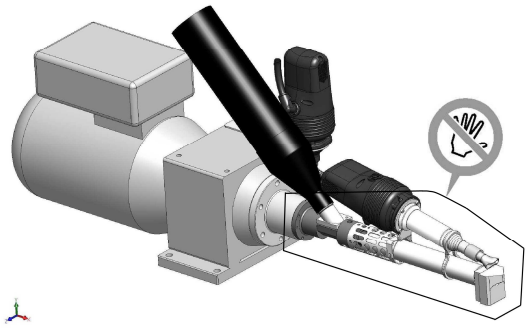
- CAUTION Plug in mains connector.

- CAUTION The on-board blower must start automatically.

- CAUTION Once air exits the preheat nozzle (4), the heating systems for the air/melt temperatures may be activated.

- For the operation of the temperature controller, see section 5.5 “Set temperatures“. For temperature settings, see page 12.
- **The hand extruder will reach its operating temperature after about 10 to 15 minutes.**

- ⚠ During extruder operation, these components reach temperatures of up to 350 °C.



- CAUTION Make sure not to press the drive start button before the operating temperature has been attained. Otherwise the extruder may me damaged by still solid granulate present in the machine. The extruder is equipped with a start interlock that prevents starting of the drive as long as the melt temperature of the granulate has not been reached. **Once the melt temperature has been reached, allow the extruder to heat up for 10-15 minutes.**

5.4 Welding with the extruder

⚠ Observe section “Safety” and the data sheet.

General
Welding is to be carried out in accordance with the guidelines of the German Association for Welding Technology (Deutscher Verband für Schweißtechnik DVS).

The parts to be joined and the granulate must be clean and dry.

5.4.1 Introducing the welding material

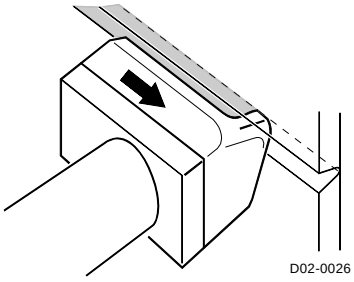
- The granulate is fed to the extruder via a hopper provided on the machine.

5.4.2 Replacement and aging of granulate

- If the granulate is to be replaced, make sure that any remaining material in the extruder is completely removed.
- For this purpose, operate the preheated hand extruder with the new granulate until clean new material discharges.
- The DVS guideline also recommends this procedure for extruders which have been out of service for prolonged periods while still being filled with granulate.
- ⚠ Ensure safe and environmentally compatible disposal of any waste generated.

5.4.3 Welding direction / rate

- The pressure of the discharging extrudate causes the welding shoe (and hence, the extruder) to move in welding direction.
- See DVS Guidelines for the welding rate.



5.4.4 Interruption of work

- ⚠ Observe section “Safety“.

  Do not leave the extruder unattended.
- When interrupting the welding job, always switch off the drive.

5.4.5 Shutoff

Observe section “Safety”.

- After completion of the welding job, switch off the drive unit.

Do not leave the extruder unattended.

5.4.5.1 Extruder with integrated air supply

- Switch off the heating circuits using the two rotary buttons.

- Maintain the air supply of the extruder until the unit has completely cooled down!
- Pull mains connector.

Never use water or another coolant to accelerate the cooling process!

5.4.6 Transport/Storage

Make sure to observe the instructions under section “Transport/Storage“.

5.5 Set temperatures on temperature controller

The default settings for the melt (PP, PE) and air temperatures of the extruder are shown in the following temperature chart.
(The values have been determined with the aid of reference materials.)

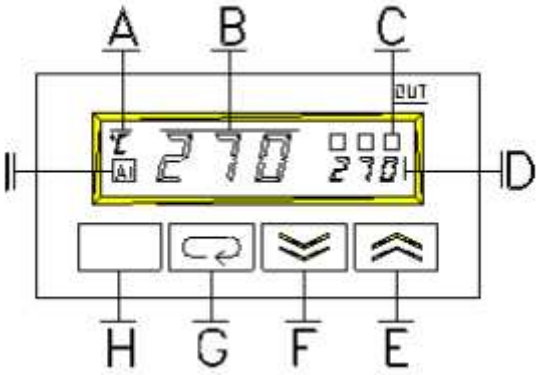
Temperature chart

Material	Melt temperature	Air temperature
PP	200 – 240 °C	250 – 300 °C
PE	200 – 240 °C	250 – 300 °C
PVDF	240 – 260 °C	280 – 350°C

If other temperatures are needed the corresponding settings can be made on the temperature controller.

5.5.1 Set temperatures

Controller = K02187



A Temperature display [°C] or [°F]
B Momentary value display (red)
C Controller output display “OUT“ (heating ON)
D Setpoint display (green)
E “Up key” (to raise the temperature setpoint value)
F “Down” key“ (to lower the temperature setpoint value)
G CAUTION Controller interlock (Do not press the key)
H CAUTION Controller interlock (Do not press the key)
I lights up when the start interlock temperature is reached.

Start interlock temperature LED (AL)
This LED lights up when the start interlock temperature is reached. The start interlock temperature is set to 30 °C below the setpoint valu e by default. The drive unit can be started once the preset air and melt temperatures have been reached.

Once the melt temperature is reached, allow the hand extruder to heat up for 10 to 15 minutes.

6 Maintenance/Inspection

Pull mains connector before carrying out any maintenance and repair work on the extruder.

Maintenance and repair work on electrical tools may only be carried out by qualified electricians.

The extruder together with the hot air hood must have cooled down to safe-to-touch temperature.

Observe the instructions under section “Safety“.

Maintenance and repair work may only be carried out by qualified personnel or by our service staff.

To ensure the proper function of the extruder over its entire service life for its intended service, we recommend:

- to have all maintenance, inspection and mounting work carried out by authorized and qualified personnel who are familiar with the operating instructions,
- to always shut off the unit before carrying out any work on it,
- to remount and reactivate all safety and protective devices immediately after completion of the maintenance/repair work.

During maintenance and repair work, make sure that the extruder and its individual components are firmly positioned.

In addition to the operating instructions and the national and local accident prevention regulations applicable at the place of use, the acknowledged technical rules for safe and proper working practices must be observed.

Any working practices posing a safety risk are prohibited.

Activities other than those described in this section may only be performed at the Manufacturer’s workshops!

6.1 Maintenance/inspection of extruder

- CAUTION After approx. 500 operating hours, the extruder including drive unit must be thoroughly cleaned and inspected. This work may only be carried out at the manufacturer’s workshops.
- CAUTION Cables, switches, plug-in connections must be inspected by qualified staff every three months (requirement according to VBG4); the inspection results must be documented!

6.2 Dismantling

Prior to dismantling the extruder, pull the mains connector.

The extruder must be at ambient temperature.

Damaged mains connection cables must be completely replaced. “Mended” cables pose a hazard to life and limb. Cable replacement is to be carried out by qualified electricians only.

The safety precautions described under sections “Safety“ and “Malfunctions, Causes and Remedies“ must be strictly adhered to.

6.2.1 Overview of spare parts/attachments

When ordering spare parts, always indicate the serial number of the extruder.

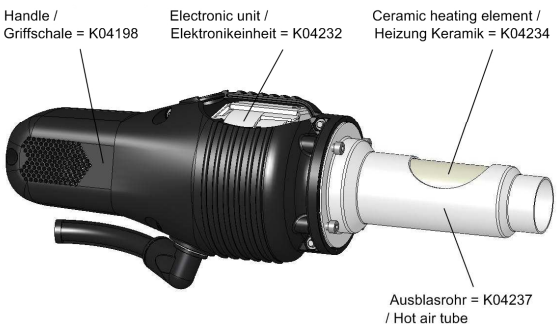
Make sure to use original spare parts only.

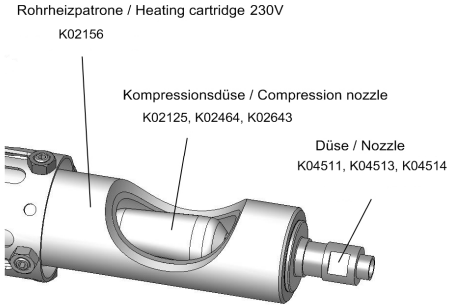
For spare parts supply, contact MUNSCH Kunststoff-Schweißtechnik GmbH.

Extruder screw bearing:

K00537 = Axial bearing (replace)
K01989 = Ball bearing (replace)
K00536 = Circlip (replace, if necessary)
K02532 = Spacer ring (replace, if necessary)
K02519 = Feather key (replace, if necessary)

Eigenluftgebläse / On-board blower
MEG-23, 230V = K04202





Warranty Certificate

.....

.....

.....
Name and address of Purchaser

Type of unit: Extruder

Type designation:

Serial No.:

P.O. date:

Your warranty

MUNSCH Kunststoff-Schweißtechnik GmbH hereby warrants the unit to be free from defects in materials and workmanship from the date of its first acquisition. Should deficiencies resulting from defects in materials or workmanship be identified during the warranty period, the dealers will, in accordance with the following terms and conditions, repair the unit or, at their discretion, replace either the complete unit or the defective components without charging labour or material costs.

.....
Dealer's stamp and signature

Warranty

1 The Manufacturer warrants freedom from defects in materials and workmanship and state-of-the-art performance of the purchased article for a period of six (6) months from the date of delivery.

2 The Purchaser shall check the article delivered for completeness and freedom from defects immediately after receipt.

3 The Purchaser shall be entitled to the making good of defects and any resulting damage to other parts of the purchased article (remedial work).
The procedure for claims under this warranty shall be as follows:

3.1 The Purchaser may assert claims under this warranty either with his dealer or with a company authorized by the Manufacturer to provide services for the purchased article. The Purchaser shall give written notice of defects to the respective company promptly after such defects have been identified or shall have such defects registered by the respective company.

3.2 Defects shall be promptly remedied in accordance with the technical requirements by either replacement or repair of the defective parts, the cost of the remedial work being for the account of the Manufacturer. Replaced parts shall become the property of the Manufacturer. If, as a result of the remedial work, additional maintenance measures are prescribed by the Manufacturer, the resulting costs including the costs of materials and lubricants shall be for the Manufacturer's account.

3.3 For replacement parts installed within the scope of the remedial work, a warranty will be provided under the purchase contract, the warranty period for such parts ending on expiry of the warranty period of the object purchased.

3.4 For the warranty to become effective, this warranty certificate must be produced for each repair.

4 If the defect cannot be remedied or if the Purchaser cannot be reasonably expected to accept any further attempts at making good the defect, the Purchaser may demand annulment (cancellation of the contract) or a price reduction (reduction of compensation) in lieu of remedial work. In such a case, the Purchaser shall not be entitled to any replacement.

5 Manufacturer's warranty obligations shall not be affected by a change in ownership of the purchased article.

6 Any damage incurred through the following acts or omissions of Purchaser shall be **expressly excluded** from this warranty:

6.1 Purchaser's failure to report a defect pursuant to subsection 3.1 or to promptly provide an opportunity to remedy the defect following Manufacturer's request, or

6.2 improper handling or overload operation of the purchased article, or

6.3 prior repair, maintenance and servicing of the purchased article by a company not authorized by the Manufacturer, if the Purchaser can be reasonable expected to have known that such company was not authorized, or

6.4 the installation of parts into the purchased article without having obtained Manufacturer's prior approval for such parts or the modification of the purchased article in a way not approved by the Manufacturer, or

6.5 Purchaser's failure to observe the instructions given in the user's manual accompanying the purchased article (e.g. operation, maintenance and care), or

6.6 Purchaser having removed the serial number or made it illegible.

7 Natural wear and tear shall be expressly excluded from this warranty.

8 Accidents, force majeure or other circumstances beyond the control of the Manufacturer, in particular damage caused by lightning, overvoltage, water, fire, etc. shall be excluded from this warranty.

9 All rights under this warranty shall become null and void on expiry of the warranty term pursuant to Section 1. For claims asserted within the warranty term but no settled by its expiry, the warranty shall remain effective until the respective defect has been remedied. The period of limitation shall be suspended for such claim.

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