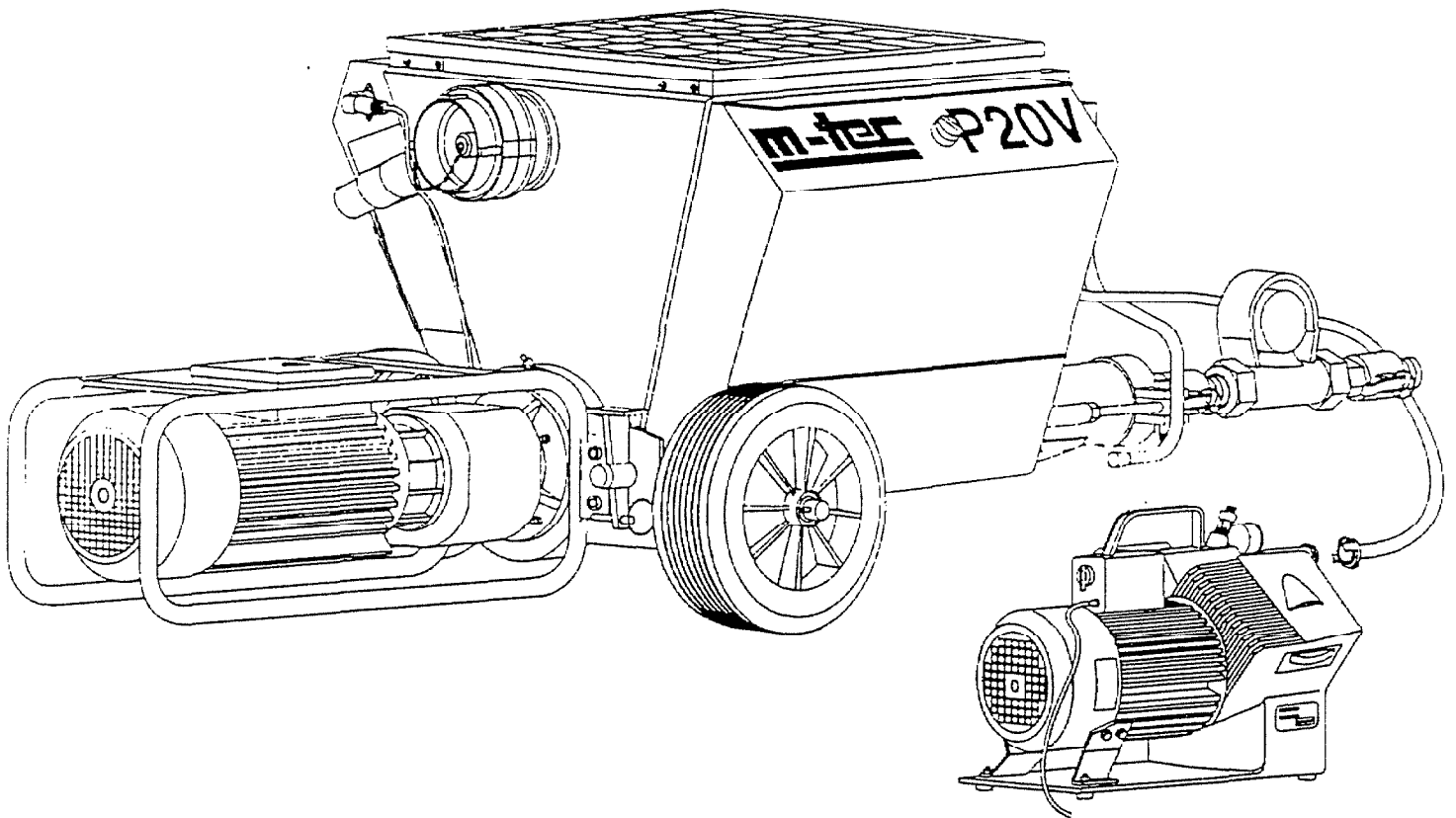


# Operating instructions

## Pump P20V





# Dear Customer,

this machine conforms to the latest technical developments as well as to the general norms and specifications of the EC. This can be seen from the CE mark and the enclosed declaration of conformity which can be found in an envelope at the machine.

## **Please take the latter out before the appliance is put into operation**

and fill the form in beforehand. In this way you get to know the most important data of your appliance and later you have it ready to hand at any time without having to refer to the manufacturer's plate on the machine.

Furthermore, we kindly ask you to keep the following data of this page ready to hand when contacting us for information.

The data you have to fill in can be found on the manufacturer's plate on your machine.

Type

Serial-No.

Year of construction

Running load

V / 50 Hz /

Ph.

Total current drawn

A

Commissioned

For use/processing of

---

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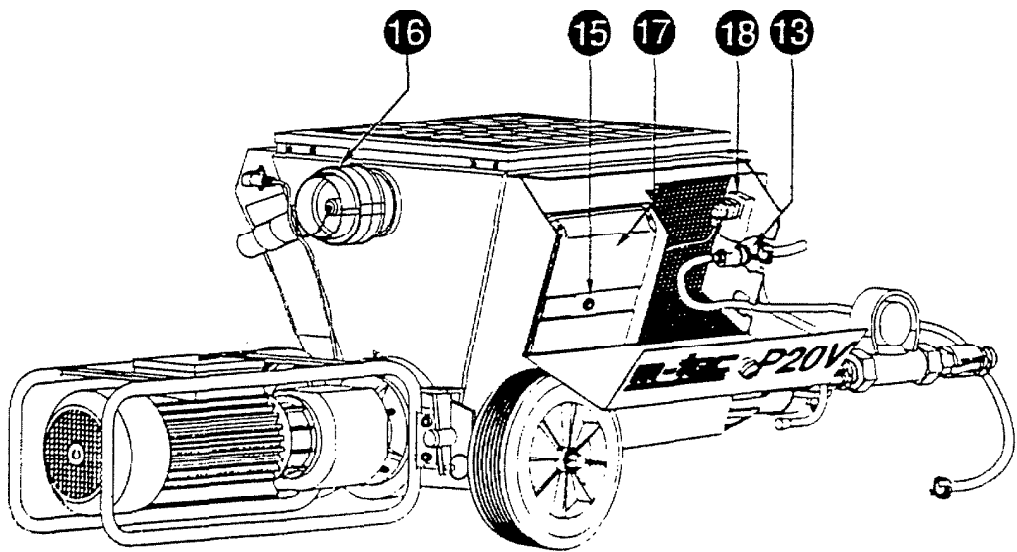
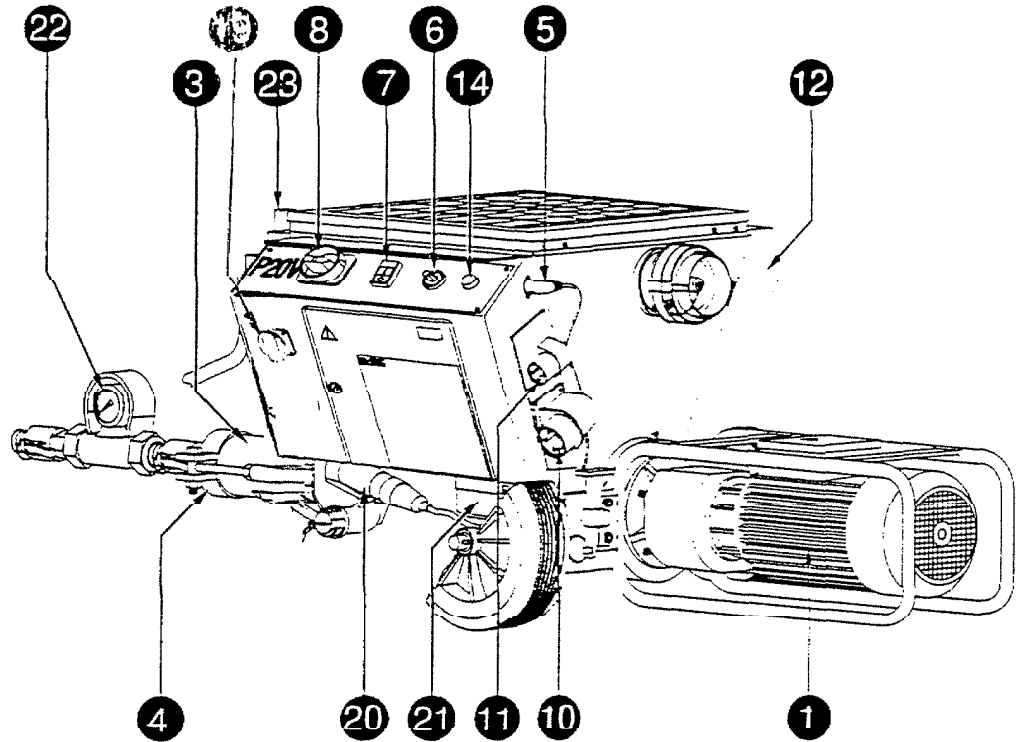
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# 1. Machine description

## 1.1 P20V Universal complete machine overview

- 1 Pump motor
- 2 Conveyor worm
- 3 Eccentric worm pump
- 4 Pump end piece
- 5 Remote control / air pressure monitor
- 6 Rotation speed control
- 7 Double push-button pump ON/OFF
- 8 Main switch
  
- 11 Input socket 230V/50 Hz
- 12 Tool box
- 13 Air connection
- 14 Indicator lamp « frequency converter fault »
- 15 Connection manual control gear (special accessory)
- 16 Coupling for silo transfer pipe
- 17 Frequency converter
- 18 Air pressure switch
- 19 Socket 230 V/50 Hz
- 20 Pump motor connection
- 21 Frequency converter connection
- 22 Hose pressure gauge
- 23 Support for wet mortar probe

## 1.2 Machine description

The P20V Universal is an universally employable appliance that may be used to pump any pumpable material such as wall mortar, plaster, pointing mortar, etc.

The material can be fed into the mortar tank via a continuous mixer. From there, the material is transported by a conveyor worm to the eccentric worm which pumps it to the required job site through mortar hoses.

The pump is driven by a geared motor.

The conveyor worm is designed so that turbulence is created in the material within the mortar tank, thus providing additional mixing.

The complete machine can be operated from various work panels, either directly from the switchboard of the machine or from a place away from it, either on the spraying unit or using the remote control.

### 1.2.1 Machine description with gluing gun

The P20V Universal can also be used to handle glue in insulation systems with the m-tec gluing gun (item n° 606486) and the worm pump *m-tec star*

The complete machine is switched on and off with the gluing gun.

### 1.2.2 Machine description with extruder

When equipped with an extruder (item n° 549450) the P20V Universal can be used to process small quantities, such as quartz earth, liquid rubble and cover coat.



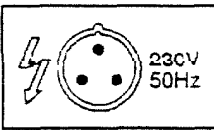
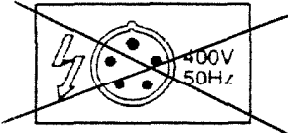
## 1.2.3 Control elements



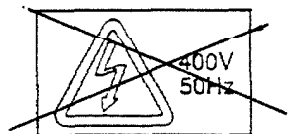
Keeping place of the instructions for use



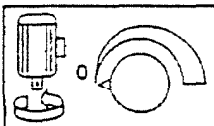
Points for load suspension



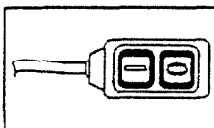
Device input socket 230V/50Hz



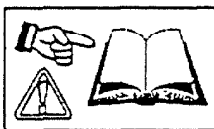
Contact box 230V/50Hz  
(e.g. continuous mixer D20)



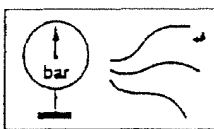
Speed regulator pump motor



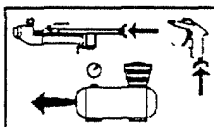
Contact box remote control or  
pressure switch



Indicator lamp frequency converter fault<sup>N</sup>



Air pressure switch



Air supply (if compressor connected)

### 1.3 Technische Daten

#### Pump sector

Geared motor:	Voltage:	3 x 230 V
	Frequency:	50 Hz
	Power:	4 kW
	Nominal speed:	n = 38 - 190 rpm

Conveyor performance: (with respect to plaster and mortar)	Conveyor pressure:	up to 30 bar
	Conveyor capacity:	approx. 1 - 17 l/min
	Conveyor distance:	up to 30 m
	Conveyor height:	up to 20 m

Conveyor performance: (with respect to glue)	max. permitted	
	Conveyor pressure:	40 bar
	Conveyor capacity:	10 l/min
	Conveyor distance:	up to 30 m
	Conveyor height:	up to 20 m

The conveyor capacity, distance and height are depending on the material to be conveyed as well as on the condition of the employed rotors and stators.

**A pressure of 40 bar must not be exceeded during operation (visual check at hose pressure gauge).**

**The hose pressure gauge is prescribed by the accident prevention regulation of the profession. It ensures the safety of the operators.**

#### Air supply

The pump can be operated with an additional compressor (to be ordered separately)

The membrane compressor supplies the compressed air required for spraying. Together with the pressure monitor, the P20V Universal is automatically controlled by the spraying unit.

If the compressor is not required, it must be switched off with the OFF switch on the compressor or the motor circuit breaker in the control box.

- Air pressure monitor	switch on pressure 1.4 bar
	switch off pressure 1.8 bar

### Electrical control

All electrical equipment conform to VDE specifications and are fitted into a maintenance-friendly housing.

Connectors on control box:	230V
- Appliance input connector	16A 3pole 6h
- Pump	16A 4pole 9h
- Compressor	
- Remote control/ air pressure monitor	4pole
- 230V- connection	shock-proof plug (not active)

#### - Main switch

In position -0- the voltage is cut off from the complete appliance.  
In position -1- the pump is ready for operation.

#### - Double push-button

When the main switch is positioned on « 1 », pressing the double push-button allows the pump to be switched ON or OFF. With any switching on the pump rotates backwards for 2 seconds and then automatically forwards.

In the case of blockages, operate the pump in impulse mode backwards for 2 seconds, then stop it in order to suppress the pressure in the hose.

#### - Potentiometer

The rotation speed is continuously adjustable with the potentiometer.

### Accessories

The P20V Universal is fitted with the following accessories in the factory:

- Eccentric worm pump m-tec star
- Pump end piece P20V, 35th Abg.
- Red.-piece V35/V25
- Connection cable 3 x 2,5mm<sup>2</sup> length approx.: 25m
- Hose pressure gauge V35/M35

**P20V general**

- Dimensions	Length:	1400 mm
	Width:	650 mm
	Height:	540 mm
- Weight complete with accessories		approx. 95 kg
- Accessories		5.0 kg
- Small compressor		22 kg
- Geared motor		35 kg
- Conveyor worm		2.5 kg
- Pump end piece complete		4.0 kg
- Noise level	66 dB(A) * (with continuous mixer)	
	61 dB(A) * (without continuous mixer)	

\* Sound level at 1 m distance,  
Free field measurement during operation.

**2. Safety****2.1 Hazards dues to non-observance of safety instructions**

The P20V Universal is built using the latest state-of-the-art technology and is reliable in operation. Nevertheless, the machine may be a source of danger if it is incorrectly used, put to improper use or operated by untrained personnel.

**Specified use**

The specified use of the P20V Universal is the pumping of pre-mixed materials such as wall mortar, good quality plasters, pointing mortar, bonding bridge and other pumpable materials with a grain size of up to 5 mm, as well as adhesives of up to 1 mm grain size.

**Non-specified use**

Using the machine for any other purpose than that for which it is intended may result in bodily or even fatal injury, damage the machine or other valuable property or endanger the efficient functioning of the machine.

For this reason, all personnel involved in putting the machine into operation or its operation and maintenance must first have read through and properly understood the operating instructions, especially the chapter on safety. The pertinent accident prevention regulations as well as other generally recognized rules and regulations pertaining to industrial safety and medical care must be observed. Arbitrary modifications made on the machine will nullify all liability on the part of the manufacturer for resultant damage.

## 2.2 General information on hazards

### Job safety symbol

This symbol will be found in connection with all important job safety instructions given in this operating manual where persons may be exposed to bodily or fatal injury. Be sure to pay careful attention to these instructions and act with extreme care in these cases. Pass on all information relating to job safety to other users. Apart from the instructions given in this operating manual, general safety regulations and regulations for the prevention of accidents must also be observed.

This « Attention » sign appears in this operation manual wherever passages call for extra careful attention so that guidelines, regulations and information as well as the proper sequence of operations may be adhered to and damage to or destruction of the machine and/or other system parts may be prevented.

This symbol indicates that environmental protection regulations are to be observed.

**Danger on contact : Do not reach into the machine while it is running!**

This symbol points out information that is important or helpful for the operator.

## 2.3 Job safety instructions

- If the machine is automatically switched off after actuation of the air cock on the spray head, it is still ready for operation and can start up independently if the air cock is actuated again.
- If the machine is switched off by actuation of the remote control, it is still ready for operation and can start up independently if the remote control is actuated again.
- Always remove the mains plug from the socket when carrying out any maintenance operations on the machine, because certain parts remain live even when the machine is switched off.
- Feed hoses may only be uncoupled when the pressure in them is at zero. This can be seen on the hose pressure gauge. If the hoses are still under pressure, the direction of rotation is to be changed with the switchover switch, the machine started with the double ON/OFF switch and run in reverse until the pressure reaches zero.
- Only use original m-tec spare parts.
- The mains cable must be protected by a fuse via an FI circuit breaker (building site power distribution point).

## 2.4 Mortar spraying machines safety regulations extract

### Operation

The machines may only be operated in the specified manner and according to the manufacturer's operating instructions.

The machines may only be operated by suitable, reliable persons (appliance operators) that are selected by the employer, trained in the operation and maintenance of the machines and are familiar with their functioning.

The machines are to be installed on a stable base and secured against unintended movement.

Electrically operated machines are to be connected to a special supply point (normally a building site power distribution point) according to VDE 0100/5.73, para. 55.

The machine is to be installed outside of the danger zones when there are work sites situated above it, or the machine site is to be protected against falling objects with protective roofing.

Conveyor pipes are to be routed such that they cannot be damaged. Bends may not be more acute than 6 times the outer pipe diameter.

When the machine is put into operation, it must be ensured that the conveyor pipe is adequately pre-lubricated, mortar consistency that can be pumped without difficulty is used and that no leakages occur at connection points.

If safety devices are actuated or fail on the machines, their operation is to be interrupted until the fault is eliminated.

Before the conveyor pipe connections or any other part of the pressurized system is opened, the appliance operator must ensure that the pressure is bled off until it is at zero throughout the complete system.

Blockages are to be cleared as described in the operating instructions. The persons instructed to clear the blockages must place themselves such that they cannot be hit by escaping mortar. Other persons must be cleared from the immediate area.

### Monitoring and inspection

The machines are to be inspected for visible defects by the appliance operator before each work shift.

The machines are to be inspected by a competent authority for safe operating condition as required, but at least once per year.

Competent authorities are persons that, because of their professional training and experience, have sufficient knowledge in the field of mortar conveyance and spraying machines and are also conversant with the relevant state work protection regulations, accident prevention regulations, guidelines and generally recognized rules of this field of technology, are qualified to judge the safe working condition of these machines.

Compressors and compressed air vessels are subject to the test specifications of the accident prevention regulations that apply to them, « Compressors » (VGB 16) and the Compressed Air Vessels regulations from 1981.

## 2.5 Personal protection equipment

The employer is required to provide a suitable means of personal protection against noise whenever the rated noise level exceeds 85 dB(A) at the site.

The employees are required to use these when the rated noise level exceeds 90 dB(A).

Suitable safety goggles are to be worn when clearing blockages and when spraying.

Safety goggles are considered to be suitable if their frame complies with DIN 58211 part 2, and their safety lenses comply with DIN 4647 page 5.

In addition, a protective helmet and safety boots are to be worn when spraying.

## **3. General**

### **3.1 Introduction**

This information is intended to be read and observed in all points by those who are responsible for the machine.

The complete technical documentation should therefore remain permanently at the machine.

We recommend that the operating manual be read carefully prior to putting the machine into operation as we decline all liability with respect to damage or breakdown resulting from non-observance of these operating instructions. We reserve the right to make changes to the descriptions and data in the operating instructions when these are considered to be in the interest of technical progress.

### **3.2 Copyright**

Copyright of this operating manual is owned by the m-tec mathis technik gmbh. These operating instructions are intended for use by the assembly and operating personnel.

They contain technical specifications and drawings that may not, either in whole or in part, be duplicated, distributed, evaluated or divulged to third parties for competitive purposes.

### **3.3 Spare parts and accessories**

We expressly point out that original parts and optional extras not supplied by us are not tested or approved by us. Consequently the installation and/or use of such products can result in changes of the specified design properties of the P20V Universal and thus jeopardize active and/or passive safety.

The manufacturer declines all liability with respect to damage arising through the use of non-original parts. All orders must contain the order number of the desired article.

Urgent orders for spare parts can be placed directly by telephone to:

m-tec sales service:	Tel.:	07631 / 709-112 or131
		07631 / 709-133 or216
	Fax:	07631 / 709-116



## 4. Set up and transport

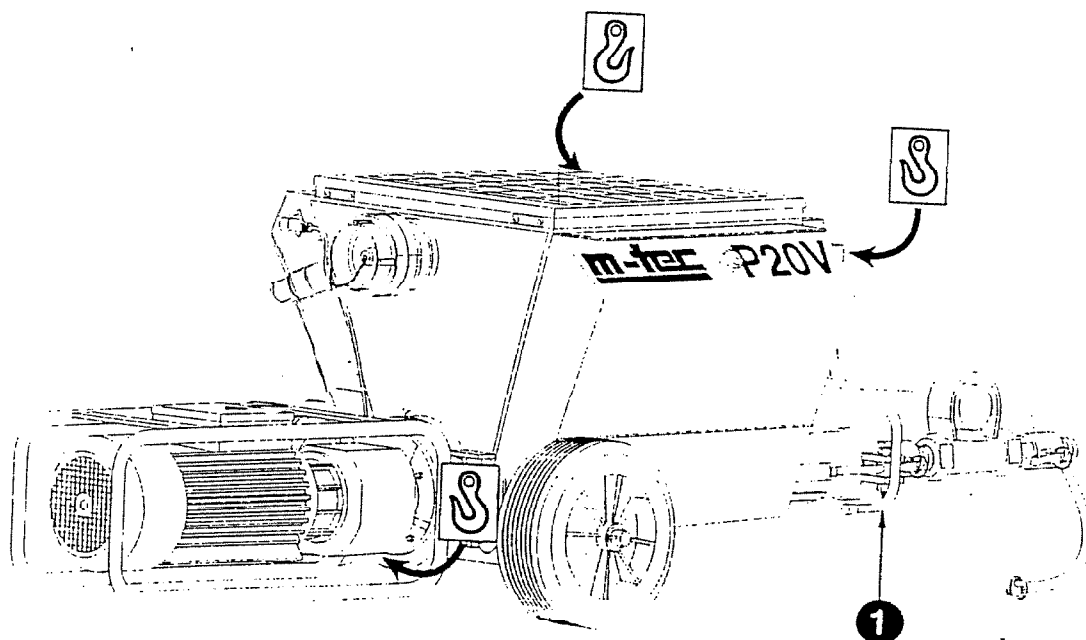
### Setting up the machine

- The machine is to be set up on a stable base and to be secured against unintended movements.
- The machine is to be installed outside of danger zones when there are work sites situated above it, or the machine site is to be protected against falling objects with protective roofing.
- The work site on the control box as well as the area around the pump part must be readily accessible.

### Machine transport

When the machine is lifted using a crane or similar hoisting devices onto building floors or trucks, the following is to be observed:

- Residue material is to be removed from the mortar trough in the machine.
- Use load carriers (e.g. cables, belts) with a minimum capacity of 400 kg.
- Attach belts so that they cannot slip (see picture).



- When you move the machine manually, use the handles on the frame.

## 5. Installation and startup

### 5.1 P20V Universal installation

**It is imperative that the safety regulations for mortar spraying machines be observed when any work is carried out.**

**The machine operator is to visually check the machine for any defects before each work shift. He should especially pay attention to electrical input connections, plugs, couplings, conveyance and air hoses.**

#### **Fitting the conveyor worm**

After ensuring that the voltage is disconnected from the machine, the protection screen can be removed and the conveyor worm connected to the motor coupling.

Subsequently, the protection screen must be refitted with a screw, plain washer and spring washer.

#### **Fitting the worm pump**

Mount the worm pump onto the mortar skip flange and secure it to the mortar trough with the pump end piece via studs and wedges.  
The flange faces must be clean.

If the tension is not sufficient, it must be adjusted using the tension nut and the reserve nut.

#### **Mains connection**

The machine must only be connected to building site power distribution points with FI circuit breakers that comply with regulations.

The P20V Universal can be operated with an input voltage of 230V/50 Hz one phase or 400V/50Hz three-phase.

#### **Respect the following:**

##### **a) Connection 230V 50Hz one phase**

- use a connection cable of 3 x 2.5 sq.mm fitted with a 16A 3 pole 6H shock-proof plug
- prefuse 16A

**Before starting operation of P20V Universal, the FI circuit breaker must be checked, motor running, because the FI circuit breaker can be destroyed by the inverter.**

**Only FI circuit breakers with the sign may be used.**

### **Motor rotation direction**

The correct motor rotation can be checked during operation with the rotation direction arrows.

### **Connection of hoses**

- A hose pressure gauge is specified to enable the mortar pressure to be checked. This ensures prevention of excessive wear of the eccentric worm pump. In addition, the pressure in the mortar hose can be checked at any time in case of blockage.

**Conveyor hoses can only be disconnected under zero pressure conditions.**

- For safety reasons, only specified mortar hoses with an approved operating pressure of 40 bar and a bursting pressure of 120 bar may be used.

**To avoid unnecessary strain on the machine and to prevent excess wear on the eccentric worm pump, only as much mortar hose should be laid out as is really necessary.**

- Connect mortar hoses securely together.

**When NW 25 mortar hoses are used, the V35/V25 reducing piece must be connected between them.**

**When working with spraying machines**

- Attach air hose to the correspondingly marked GEKA coupling on the machine.
- Connect the spraying unit to the mortar and air hoses.

**The air cock must be opened, because otherwise it is not possible to start the machine when the compressor is running.**

**When working with remote control**

Connect the remote control cable on the flange box (4 pole) to the air pressure monitor.

**The switch on the remote control must be set to ON.**

**Moisten hoses with lime sludge**

- Moisten the mortar hoses with lime sludge before starting operating to avoid blockages.
- Fill the mortar trough with approximately 6 liters of lime sludge.
- Run the pump using the ON/OFF switch until the lime sludge is pumped out of the conveyor hose.
- Switch the pump off using the double push-button.

**5.2 Setup of the P20V Universal in the gluing gun version**

**It is imperative that the safety regulations for mortar spraying machines be observed when any work is carried out.**

- **Connection of remote control cable**
- Disconnect the coupler plug for the air pressure monitor at the control box (back side) and connect the extension cable for the gluing gun.

**The remote control cable of the gluing unit is to be connected to the air pressure monitor coupler socket of the machine, both when gluing and when reinforcing concrete or spraying.**

The other setup work is to be carried out in accordance with the instructions in section 5.1 « P20V Universal installation ».

- Insert worm pump m-tec star (see 5.1).

### 5.3 P20V Universal operation

**It is imperative that the safety regulations for mortar pumping machines and mortar spraying machines be observed when any work is carried out.**

#### **Filling the machine with the continuous mixer**

**See the separate operating instructions for continuous mixer.**

Before the P20V Universal is filled, the consistency of the material must be set at the continuous mixer. Check that the protection screen is firmly mounted on the P20V Universal. Subsequently, the P20V Universal is to be positioned under the continuous mixer so that the material flows into the front third of the trough.

#### **Filling the machine with the feeder cap**

- Mount the feeder cap on the P20V Universal pump and secure it using the snap fasteners.

**Make sure seal edge of the pump and feeder cap are clean.**

- Mount the hose for the feeder cap between the P20V and the silo using rapid action hose coupling.
- Open the ball valve on the silo.

## Pumping and spraying

**Only fill the P20V Universal material trough after the consistency at the continuous mixer is set correctly.**

### Pumping

- Switch main switch on.
- Switch pump or double push-button on.

The pump runs for 2 sec. in reverse direction, then it changes the direction of rotation and conveys the material to the job site.

**The automatic change of the direction of rotation may release fixed worm pumps prior to work start. In impulse mode this function allows the pressure to be suppressed in the mortar hose at the end of the work (checked via hose pressure gauge).**

When working with a remote control cable, the pump can be switched on and off with the main switch on the remote control.

**When the P20V Universal is switched off with the remote control, the machine is still ready for operation and can be restarted by actuating the switch again.**

**The machine should only be continuously switched on and off with the remote control. If the pump is switched on and off a number of times with the main switch, this can result in damage to the frequency converter.**

In such a case, the power supply of the machine should be cut off using the main switch, and then it should be switched on again after waiting for at least 1 minute.

### Spraying (only if compressor is present)

- Connect the air pressure monitor to the bottom of the control box.
- Press the green button on the compressor motor circuit breaker.
- Open the air cock on the spray head.
- Action main switch and double push-button.

The pump can be switched on and off by means of the air cock on the spray head.

**When the P20V Universal is switched off by means of the air cock, the machine is still ready for operation and can be restarted by renewed actuation.**

## 5.4 P20V Universal operation with gluing gun

- After the mortar hoses and the extension cable have been connected to the machine, the gluing gun can be put into operation.
- Double push-button on ON

The machine starts running and conveys mixed material. When you press the lever on the gluing gun, the material begins to flow and the device is switched on. When you release the lever, the device is switched off and the material flow is stopped.

### Work breaks

Work breaks must not last more than 10 minutes due to the rapid bonding time of the glue. After a break, approx. 10 to 20 l of material are to be emptied into a bucket so that the thickened material in the hose and the gun can be replaced by fresh material. When the breaks exceed 10 minutes, the hoses and the gun are to be cleaned using water.

## 5.5 P20V Universal operation with extruder

The extruder for P20 (item n° 549450) allows small quantities of material (e.g. quartz earth, liquid rubble and cover coat) to be pumped.

- Disassemble the worm pump.
- Assemble the extruder in place of worm pump.
- Assemble worm pump on extruder.

The operation of the P20V Universal depends on the treatment (gluing gun refer to 5.4, pumping and spraying refer to 5.3).

### Work breaks

- If the work breaks exceed 10 minutes, switch the device off using the main switch.
- In the case of longer spraying breaks, respect the bonding time of the mortar to be processed.
- In the case of high external temperature or if work breaks exceed 30 minutes, the conveyor hoses should be emptied.
- In the case of longer work breaks, switch the installation off using the main switch (position -0-).

### 5.5.1 Extruder cleaning

- Uncouple the filling hopper and clean.
- Rinse the extruder housing thoroughly out.

## 5.6 Clearing blockages

- Run the pump in reverse direction in impulse mode using the double push-button (ON for 2 sec., then OFF), until there is no more pressure in the conveying hoses. Check with the hose pressure gauge.
- Wear suitable goggles when uncoupling the hoses.
- Cover the couplings and the conveyor hoses with plastic foil and face away while carefully opening.
- Clean the conveyor hoses.

## 6. Cleaning

### 6.1 Cleaning the P20V Universal

- Switch the pump ON with the main switch or remote control until the trough is empty.
- Run the pump in reverse direction in impulse mode using the double push-button (ON for 2 sec., then OFF), until there is no more pressure in the conveying hoses. Check with the hose pressure gauge.
- Uncouple the conveyor hoses and clean with sponge rubber ball and water.gun.

**Conveyor hoses must only be uncoupled when no pressure remains in them.**

- Remove the pump end piece and clean it.
- Fill the trough with water and run the pump forwards until the eccentric worm is clean.
- Remove the GEKA coupling on the trough and clean the trough and the conveyor worm with water.
- Refit the pump end piece.



### **Cleaning the conveyor hoses**

- If several different hose diameters are used, these are to be cleaned separately.
- Place a rubber sponge ball in the conveyor hose and connect the latter to the purging cock of the water fittings using the M35/GEKA reducant piece.
- Repeat the procedure at least one time until clear water comes out of the conveyor hose.

**When cleaning the machine, residue mortar is to be disposed of properly in a rubbish container for construction material.**

## **6.2 Cleaning the m-tec gluing gun**

The gluing gun is cleaned through a connection to the water hose with GEKA coupling:

- Remove the hose for gluing at gluing gun outlet and connect the water hose.
- Remove the mortar hose from the gluing gun.
- Run water under pressure into the water hose (min. 3-6 bar) and completely open and close the lever several times until clear water comes out.

The following jobs must be done every day after work has been completed.

- Remove the nozzle using a SW 30 wrench and completely clean the inside. Then clean the gluing gun thoroughly.
- As soon as the gluing gun is dry, it must be sprayed with light crude oil (e.g. m-tec article n° 545089).
- Reassemble the gluing gun and spray it completely again.

**Pay attention to the special operating instructions for the m-tec gluing gun.**

- See chapter 6.1 for other cleaning work procedures.

## 7. Faults, causes and trouble-shooting

### 7.1 Faults before startup

Fault	Cause	Remedy
Pump motor fails to start	- no power	- Check fuses and cable
	- circuit breaker defect/has released	- Check circuit breaker
Pump fails to start	- Worm pump seized	- Run pump backwards/ forwards a few times (impulse mode)
	- Inverter fault caused by switching on and off several times	- see 7.4
	- Remote control cable or air pressure monitor not connected to control box	- Connect cable
	- 400V neutral conductor not connected	- Connect neutral conductor

### 7.2 Faults during operation of P20V Universal

Fault	Cause	Remedy
Pump motor does no longer start up  (only if Handy fitted)	- Air hose clamped	- Check air hose
	- Air jet blocked	- Clean jet
	- Air pressure monitor set too low	- Set pressure monitor to 2,5 - 2,8 bar switch off pressure
Pump cannot be switched off with the air  (only if Handy fitted)	- Handy safety valve does not close	- Clear fault on safety valve
	- Safety valve set too low	- Set valve to 3,2 - 3,5 bar
	- Air pressure monitor set too high	- Set pressure monitor to 2,5 - 2,8 bar switch off pressure
	- Handy supplies too little air	- Check membranes and valve plates and replace if necessary

<b>Fault</b>	<b>Cause</b>	<b>Remesy</b>
Circuit breaker trips out	- Consistency too thick - Pump end piece blocked	- Set consistency - Clean pump end piece
Compressor motor circuit breaker trips out continuously	- Intake filter dirty, compressor heats	- Replace intake filter

### 7.3 Faults during operation with gluing gun

<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
Material does not come out of gluing gun	- Gluing gun clogged (breaks too long) - Limit switch defect	- Clean gluing gun - Check or replace limit switch
Material flow not completely stopped when device closed	- Level mechanism dirty - Cakings between jet and vent plugs - Closing device wear	- Clean lever mechanism - Clean gluing gun - Replace closing device

### 7.4 Frequency converter fault

In the case of a frequency convertor fault, the red lamp on the control box lights up. The machine does not start.

<b>Cause</b>	<b>Remedy</b>
The overload safety device has released (consistency too thick; too much hoses)	- set consistency - reduce the hose length

Cause	Remesy
Machine too much switched ON/OFF with main switch	Switch the machine on only with remote control, pressure switch or double push-button
Frequency converter overheated, cooler defect	Replace/repair cooler on frequency converter

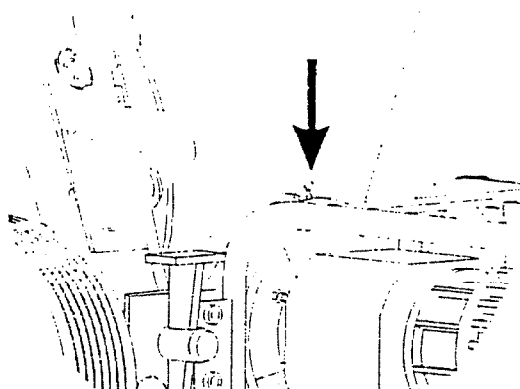
After any fault, wait a short time (approx. 1 minute) after the fault has been cleared before the frequency converter is again ready for operation.

## 8. Maintenance

### 8.1 P20V Universal maintenance

Before carrying out any work on electrical equipment, always be sure to disconnect the mains plug first because voltage is still present on certain parts, even when the machine is switched off.

- Mortar residue on the conveyor and eccentric worm, pump end piece and trough is to be removed at regular intervals.
- Fill the rubber sleeve on the gearing regularly with a grease gun.



- The filters on the compressor (if fitted) are to be cleaned regularly. Change the filter if the contamination is too heavy.
- The electric motor and the gearing are supplied ready for operation and are maintenance free for up to 8000 operating hours. After this time, the gearing must be cleaned with a suitable flushing oil and checked.

When lubricant has to be changed, we recommend the following :

For gearing	Oil Shell Tivela Oil 82, filling quantity 800 ccm.
For gearing roller bearings:	Grease Aral Aralub HL 3 Fill bearing space to 1/3 full

**When disposing oil, grease or detergents, the applicable environmental protection regulations are to be observed.**

Topping up is not required, because overfilling could lead to inadmissible overheating. We strongly advise against mixing different varieties of oil as this can cause lubricant decomposition.

If the variety of oil or grease recommended by the manufacturer is not available, the corresponding lubricants listed under 10.1 may be used.

*Observance of the lubrication regulations is a prerequisite for guarantee claims.*

## 8.2 Monitoring and inspection

The machines are to be inspected for visible defects by the appliance operator before each work shift.

The machines are to be inspected by a competent authority for safe operating conditions as required, but at least once per year.

Competent authorities are persons who, because of their professional training and experience, have sufficient knowledge in the field of mortar conveyance and spraying machines and are also conversant with the relevant state work protection regulations, accident prevention regulations, guidelines and generally recognized rules of this field of technology, are qualified to judge the safe working condition of these machines.

Compressors and compressed air vessels are subject to the test specifications of the accident prevention regulations that apply to them, « Compressors » (VGB 16) and the Compressed Air Vessels regulations from 1981.

## 9. Accessories

### 9.1 Accessories available separately

The following accessories are also available for the P20V Universal:

- Mortar hose NW 35 V35/M35, 13.3 m long
- Mortar hose NW 25 V25/M25, 10.0 m long
- Handy compressor 380 V, 250 l/min intake performance
- V-Meko 400 compressor 380 V, 250 l/min intake performance
- Remote control cable 50 m
- Air hose  $\frac{1}{2}$ " , 11 m
- Various spraying devices (see overview 10.2)
- Rubber sponge ball D = 45
- Rubber sponge ball D = 35
  
- Feeder cap P10/P20V
- Hose for feeder cap
- Attachment holder P10/P20V
- Extruder

## 10.0 Appendix

### 10.1 Reference lubrication chart

If the recommended oil or grease type is not available, the following lubrication materials can be employed.

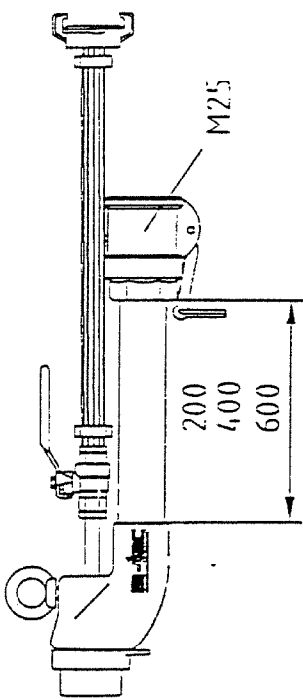
Note that different lubrication materials may not be mixed.

The gears are to be thoroughly cleaned and rinsed before lubrication.

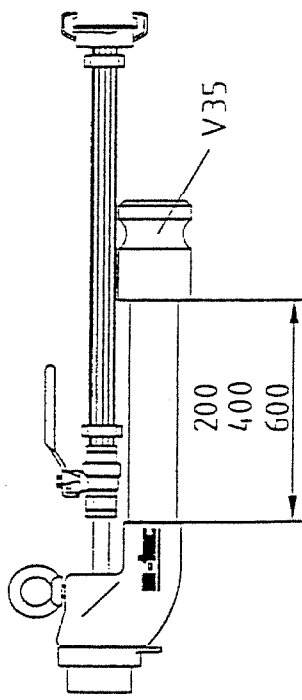
Grease:		Oil:	
Aral	FDP 00	Aral	Degol BG 220
BP	Energrease HTO	BP	Energol GR-xP 220
Esso	Fibrax EP-370	Calypsol	Bison Oel MSR 114
Mobil	Mobilplex 44	Esso	Sparton EP-220
Shell	Special gear grease H	Houghton	Molygear 115
		Mobil	Mobilgear 630
		Shell	Omala 220

10.2 Spraying unit overview

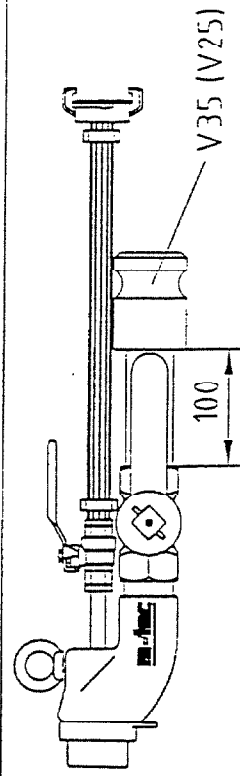
List of the spray guns



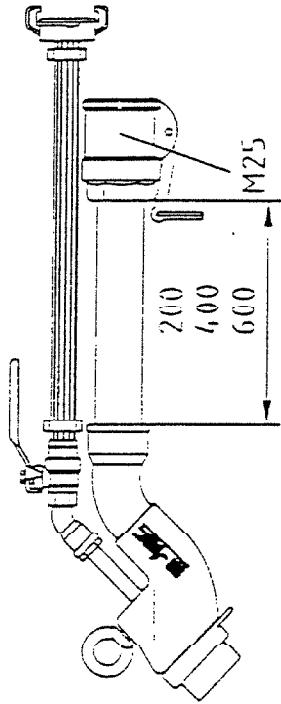
- 605145 Spraying device M25 200mm long straight
- 605146 Spraying device M25 400mm long straight
- 605147 Spraying device M25 600mm long straight



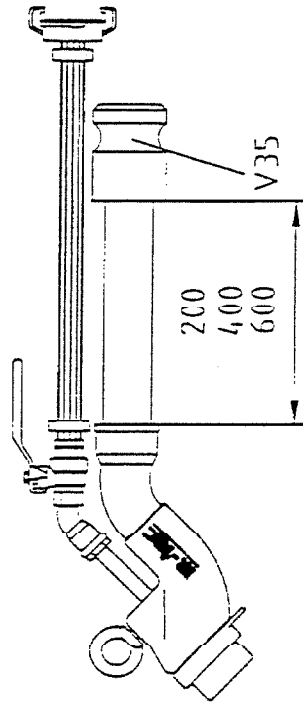
- 605165 Spraying device V35 200mm long straight
- 605166 Spraying device V35 400mm long straight
- 605167 Spraying device V35 600mm long straight



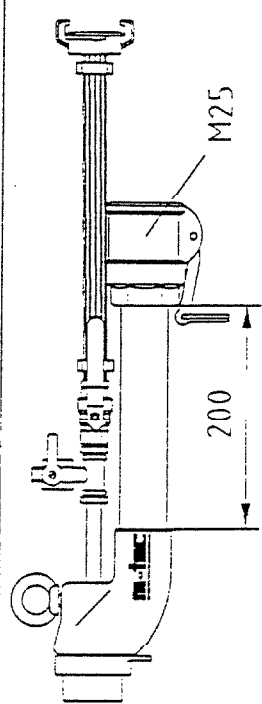
- 545155 Spraying device V35 100mm long straight with shut off fancel
- 545156 Spraying device V25 100mm long straight with shut off fancel



- 605148 Spraying device M25 200mm long cranked
- 605149 Spraying device M25 400mm long cranked
- 605150 Spraying device M25 600mm long cranked



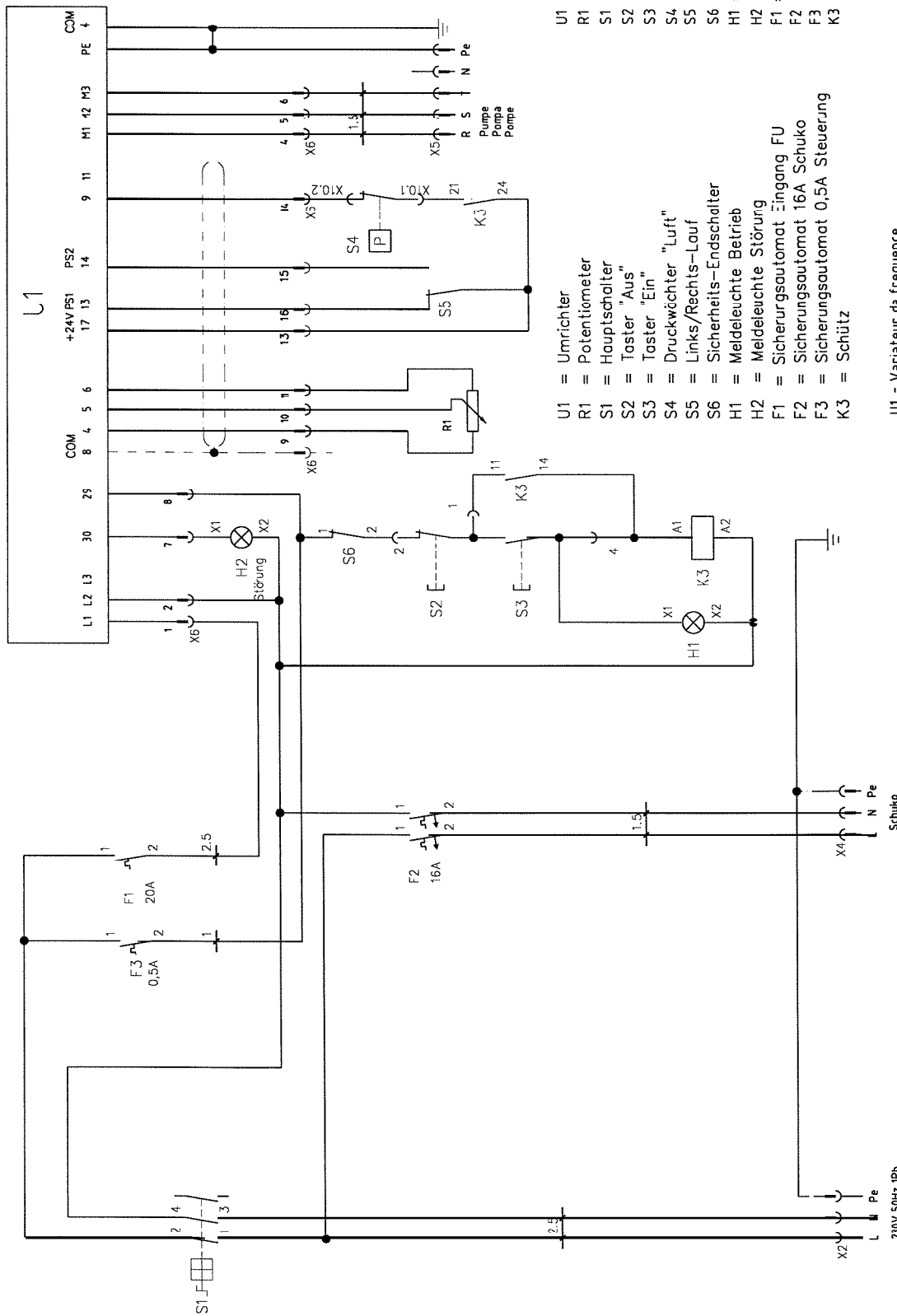
- 605168 Spraying device V35 200mm long cranked
- 605169 Spraying device V35 400mm long cranked
- 605170 Spraying device V35 600mm long cranked



- 605160 Spraying device M25 200mm long straight with bypass



# 10.3 Circuit diagram



- U1 = Variatore di frequenza  
 R1 = Potenzimetro  
 S1 = Interruttore principale a min. tensione  
 S2 = Commutatore "spento"  
 S3 = Commutatore "acceso"  
 S4 = Segnalatore di pressione "aria"  
 S5 = giro sinistra/destra  
 S6 = Interruttore di sicurezza  
 H1 = Lampadina di segnalazione "funzionamento"  
 H2 = Lampa di segnalazione "disturbo"  
 F1 = Fusibili ingresso "FU"  
 F2 = Fusibili ingresso 16A Schuko  
 F3 = Fusibili ingresso 0,5A di Comando  
 K3 = Contattore

- U1 = Umrichter  
 R1 = Potenziometer  
 S1 = Hauptschalter  
 S2 = Taster "Aus"  
 S3 = Taster "Ein"  
 S4 = Druckwächter "Luft"  
 S5 = Links/Rechts-Lauf  
 S6 = Sicherheits-Endschalter  
 H1 = Meldeleuchte Störung  
 H2 = Meldeleuchte Störung  
 F1 = Sicherungsautomat Eingang FU  
 F2 = Sicherungsautomat 16A Schuko  
 F3 = Sicherungsautomat 0,5A Steuerung  
 K3 = Schütz

- U1 = Variateur de fréquence  
 R1 = Potentiometre  
 S1 = Interrupteur principal  
 S2 = Touche "arrêt"  
 S3 = Touche "marche"  
 S4 = Controleur de pression "air"  
 S5 = rouie gauche/droite  
 S6 = le fin decourse  
 H1 = Voyant de signalisation "marche"  
 H2 = Voyant de signalisation "defauts"  
 F1 = Fusible Conuit d'alimentation "FU"  
 F1 = Fusible 16A Schuko  
 F1 = Fusible 0,5A de Commande  
 K3 = Contacteur

230V, 50Hz 1Ph  
 Eingang 3pol 16A 6h  
 Ingresso 3pol 16A 6h  
 Entrée 3pol 16A 6h

Art.Nr.391309	Stand 10/99
22156 a	230V, 50Hz mit FU

