Operating Instructions

Laboratory mortar mixer
with consistency measurement

Model 1.0206.07

Significance of the operating instructions

Before operating the laboratory mortar mixer, the operating instructions must be read and understood.

Table of contents **Pages**

The notes have the following meaning:

Warning 	This warning applies to all procedures that need to be performed with care to avoid damage to the device.
Danger 	This warning applies to all procedures that represent a risk for the operator if the process cannot be performed with care.
Note 	provides practical information about handling the machine

Annexes:

4 pages Graphical representation of the installed programs
1 page Inspection record
Test and measurement report

1 Receipt, transport

1.1 Receipt

Check the external visible condition of the delivered shipment. If the delivered product is in good condition, the shipment can then be accepted from the forwarding agent (parcel service or carrier).

If there is no complaint or transport damage, check the completeness of the shipment against the delivery note.

If transport damage is detected after receipt, a report with an exact survey of the degree of damage with a photo must be created immediately. Forward the report to us immediately by fax. Please do not make any alterations to the delivered shipment.

Using this report, we should be able to assess whether the damage can be fixed
– by the supply of replacement parts
– by sending a specialist for assembly, or only
– by returning the device.

1.2 Transport

The mortar mixer is delivered in suitable cardboard packaging upright on a pallet.

The mortar mixer's weight is approx. 62 kg.

The mortar mixer can be left in the delivery packaging and transported to its destination using a forklift or another suitable industrial truck capable of grasping underneath the pallet.

Ropes or similar lifting gear may only be attached if it has been ensured that no lateral forces are applied to the packaging and thus possibly to parts of the mortar mixer as well.

1.3 Remove the transport packaging

To remove the transport packaging, proceed as follows:

- Open the transport packaging's cover
- Remove the cardboard or Styrofoam transport securing device (inlays)
- Cut open the sidewalls end-to-end at the vertical edges
- Cut off the side walls at the horizontal bottom edges
- Remove the cardboard with the sand inlet

Danger 	The packaging materials (plastics, polystyrene, screws, nails, wood etc.) must be kept away from children. They must be disposed of correctly.
Warning 	Before disposing of the packaging, please check to see whether there are any further components, instructions, documents or replacement parts in the packaging.

After you have finished unpacking the device, please make sure that the device has not been obviously damaged during transport. If there are any doubts, please do **not** connect the device and get in contact with the selling agent.

1.4 Transport by hand

The mortar mixer can be taken to its destination by hand.
Its weight is approx. 62 kg.

The lower handles affixed on the side in the load centre are used to lift the mortar mixer, which are designed to lift a load capacity of 40 kg each.
T-handles mounted on the side in the upper rear area are used to stabilise the load when carrying.

The mortar mixer can be picked up by the handles and easily transported to its final location and put down again.

The handles are only used to transport the mortar mixer by hand. They do not serve as suspension points for transport using hoists.

2. Scope of delivery

Item	Quantity	Designation	Article number
1.	1	Mortar mixer (including operating instructions)	1.0206.07
2.	1	Stainless steel mixer	1.0203.02EN
3.	1	Stainless steel bowl	1.0203.03EN
4.	1	Water pump unit	
5.	1	LCD display	
6.	1	Sand inlet (including 2 hexagon socket screws and the tool)	1.0203-05

3. Basic safety instructions

3.1 Obligations of the operator

The operating instructions must be easily accessible and kept in the immediate vicinity of the mortar mixer. Only sufficiently qualified operating personnel may work with the mortar mixer. The operating personnel must be trained before handling the mortar mixer. Check to see that the operating personnel have read and understood the operating instructions. Define the exact responsibilities for the operating personnel. Provide personal protective equipment to all operating personnel.

The person operating the device must ensure that both themselves and other people are not endangered.

If the operating safety of the mortar mixer is impaired by defects or damage, the mortar mixer should be taken out of operation immediately and used again only after all of the sources of danger have been eliminated.

3.2 Requirements for the operating personnel

Only qualified specialist personnel who have been instructed by the operator may work on the mortar mixer. The minimum age for the operator is 18 years. Individuals under the age of 18 may only operate the mortar mixer under the supervision of a qualified skilled worker. The operator is responsible for third parties in the working area.

3.3 Obligations of the operating personnel

The operating personnel must read the operating instructions carefully before handling the mortar mixer. Please always observe the safety instructions. Wear personal protective equipment when handling the mortar mixer.

3.4 Workplace

The workplace is located at the control panel in front of the mortar mixer. The workplace is intended to be used with the connected peripheral equipment provided by the customer. Accordingly, the operator must ensure that it is safe. The workplace's design is also based on the applicable requirements from the German Health and Safety at Work Regulations (Betriebs-Sicherheits-Verordnung, BetrSichV) and the analysis of workplace hazards.

3.5 Dangers when handling the mortar mixer

The mortar mixer is constructed in accordance with the latest technology and accepted technical rules. However, when it is used, it could lead to dangers for life and limb for the operator or for a third party, or to impairments or damage to machine technical components or to other material assets.
The mortar mixer must only be used

- for the intended purpose
- and in a technically faultless safe condition.

Faults that could impair safety must be eliminated immediately.

4. Basic information

4.1 Intended use

This description contains the required information for the intended use of the products they describe. It is intended for technically qualified personnel. The operator must define his staff's area of responsibility precisely.
Qualified personnel are persons who, based on their education, experience, and instruction as well as their knowledge of relevant standards, provisions, accident prevention regulations and operating conditions have been authorised by those responsible for the safety of the machine to execute their respectively required activities and who can recognise and prevent any possible dangers while doing so
(definition for specialist personnel according to IEC 364).

The specified requirements and limit values as well as safety warnings indicated in these operating instructions must always be adhered to. Any other use is not considered to be intended use. If special operation methods or conditions are required, then advice and permission must be obtained from the manufacturer.

The manufacturer accepts no responsibility for any damages caused due to non-observance of these 'safety and operating instructions'.

The mortar mixer is only intended to be used for the mechanical mixing of mortars and cement pastes for the manufacture of test specimens according to different standards.

The applications below pertain to the intended use:

- MANUAL – operation with selectable mixing speeds
- SAND INLET – for feeding standard sand (1350 g)
- PROGRAM AUTOMATIC – operation, 4 programs according to the standard

The requirements, threshold values, and safety warnings indicated in these operating instructions must always be observed.

Note	
	The mortar mixer is intended for use in dry rooms.

Any other use is not considered to be intended use. If special operation methods or conditions are required, then advice and permission must be obtained from the manufacturer.

Note	
	The instructions given in these operating instructions are valid only for the correct usage of the mortar mixer. The operator must observe the specific standards for the test to carry out operation correctly.

- These operating instructions are intended for dispatchers, fitters, operators, maintenance technicians and the disposal company.
- Please read these instructions carefully, as they describe how the mortar mixer is to be operated safely.
- These operating instructions should be considered a part of the product and relate only to the mortar mixer with which they were delivered.
- Keep these operating instructions in good order the entire time that the machine is in operation, so that they can be consulted whenever necessary.
- If the mortar mixer is sold, these operating instructions should be handed over together with all of the machine's attachments.
- The manufacturer shall accept no responsibility for any damage that has arisen from incorrect usage of the device.
- Subject to alterations: The manufacturer reserves the right to make alterations to the technical descriptions as well as the parts to which these descriptions refer to, without any prior notice.

4.2 Improper usage

The mortar mixer may only be used in a technically flawless condition.

Use the mortar mixer only for the described applications. Improper usage will void the warranty.

Manipulations and modifications to the mortar mixer (electrical, mechanical changes, etc.) that have not been approved in writing by the manufacturer shall be deemed inadmissible, and the manufacturer shall accept no claims for damages.
We recommend using only original replacement and accessory components; if this is not the case, then the manufacturer shall accept no liability.

Ensure that no dangerous situations arise during the work. Switch the mortar mixer off immediately if it is not functioning correctly and inform the manufacturer or the distributor's authorised service personnel immediately.

The following usage is deemed improper and thus prohibited:

- Mixing of substances other than those specified under 4.1
- Filling and processing of food
- Overfilling the mixing bowl
- Setting up and operating the mixer in environmental conditions other than those named under 6.1

4.3 Information about the CE marking

TESTING Bluhm & Feuerherdt GmbH testing equipment carry the CE marking.

The CE marking confirms that the product conforms to the EC Directives that must be taken into account for the product and that the product complies with the 'essential requirements' defined therein and the defined general relevant level of protection. The conformity-assessment procedure has in each case been carried out in accordance with the applicable EC Directives. Decisive here is Council Decision 93/465/EEC on the modules to be used in the technical harmonization directives for the various phases of the conformity-assessment procedure and the regulations for the affixing and use of the CE marking.

4.4 Requirements imposed on the operator

The person operating the device must ensure that both themselves and other persons are not endangered. Only persons who have been instructed on how to operate the device may operate the device on their own.
If the operating safety of the device is impaired by defects or damage, it must be taken out of operation immediately and used again only after all sources of danger have been eliminated.

Check to see whether the specification given on the identification plate corresponds with your mains voltage. Connect only to alternating current.

If the device or the power supply line is damaged, remove the mains plug immediately.

Danger 	Take all necessary safety precautions during mixing to prevent dust from getting into the eyes, mouth and nose when stirring.

- The usage, lifting, installation, maintenance and scrapping of the mortar mixer should only be carried out by qualified personnel. Qualified personnel are persons who, as a result of their experience and knowledge in relation to the operation of the mortar mixer and the regulations, guidelines and its handling, are authorised to work with the machine. The operator must be thoroughly trained in relation to the operation of the machine and the safety devices that the machine is equipped with so that incorrect usage is prevented. Safety devices must always be installed and checked daily.

- Manipulations and modification to the machine (electrical and mechanical alterations, etc.) that have not been authorised with the written agreement of the manufacturer shall be considered to be forbidden and the manufacturer shall accept no claims for damages.

- Ensure that no dangerous situations arise during the work. Switch the machine off immediately if it is not functioning correctly and inform the manufacturer or the distributor's authorised service personnel immediately.

- Do not place any wires or tools in the existing openings.

4.5 General safety instructions

Warning 	All of the instructions must be read. Failure to comply with the instructions that are described below could cause electric shocks, fires and/or serious injuries.

1) The workplace

- Keep your working area clean and tidy. Disorder and unlit working areas could lead to accidents.
- Do not work with the mortar mixer in potentially explosive environments in which flammable liquids, gasses or dusts are present. Power tools create sparks that could ignite dust or vapours.
- Keep children and other persons away from the device while it is in use. You could lose control over the device if you are distracted.

2) Electrical safety

- The connecting plug of the mortar mixer (CEE/ 16A) must fit into the corresponding socket. The plug must not be altered in any way. Do not use any adapter plugs together with the protected earthed devices. Unaltered plugs and correctly fitting sockets will reduce the risk of an electric shock.
- Avoid any body contact with earthed surfaces such as pipes, heating systems, stoves and refrigerators. There is a higher risk of electric shock when your body is earthed.
- Keep the device away from rain or moisture. Water penetrating into the electric device will increase the risk of an electric shock.
- Do not misuse or misappropriate the cable in order to carry the device, hang the device up or use it to pull the plug out of the socket. Keep the cable away from heat, oil, sharp edges and moving machinery parts. Damaged or tangled cables increase the risk of an electric shock.

3) The safety of personnel

- Be attentive and pay attention to what you are doing and work with prudence when at work. Do not use the device when you are tired or if you are under the influence of drugs, alcohol or medication. One moment of carelessness when using the device can lead to serious injuries.
- Wear personal protective equipment and always wear protective googles. Wearing personal protective equipment such as dust masks and non-slip safety boots will reduce the risk of injuries.
- Remove any installation tools or spanners before switching the mortar mixer on. A tool or spanner that is located in a part of the device that rotates could lead to injuries.

- Wear suitable clothing. Do not wear any baggy clothing or jewellery. Keep all hair, clothing and gloves away from moving parts. Loose clothing, jewellery or long hair could become tangled in moving parts.

4) Careful handling and usage of power tools

- Remove the mains plug from the socket before carrying out any device settings or changing accessory parts. These precautionary measures will prevent the device from being started unintentionally.
- Store unused power tools out of the reach of children. Do not allow persons to use the device who are not familiar with it or who have not read these instructions. Power tools are dangerous when they are used by inexperienced persons.
- Take careful care of the device. Check to see that moving parts of the device function correctly and do not jam, whether there are any parts that are broken, or are so badly damaged that the functioning of the device is impaired. Ensure that damaged parts are repaired before the device is used. Many accidents are caused by poorly maintained machines.
- Use power tools, accessories, insertion tools and so on in accordance with these instructions and in the manner that is prescribed for these special types of devices. Take account of the working conditions and the activity that is to be carried out. Using power tools for applications for which they were not intended can lead to dangerous situations.

5) Service

- Allow your device to be repaired only by qualified specialist personnel and only with original replacement parts. This will ensure that the device will remain safe.

4.6 Protective clothing

The operator must ensure that all personnel wear the appropriate protective clothing, for example:

- safety boots
- suitable outer clothing
- protective gloves
- a face mask
- respiratory protection

4.7 Regular checks

The mortar mixer must be checked for industrial safety at regular intervals. There are national regulations for this, which must be observed.

5. Description of the mortar mixer

5.1 Mechanical structure

The mortar mixer's housing consists of a stable light metal casting.

The stirrer is made of stainless steel and is connected with the planetary gear by a quick release fastener. It rotates on its own axis and is moved by an electric motor in a planetary motion around the bowl axis at 2 fixed speeds.

The mixing bowl is made of NIROSTA steel and can be removed from the working position after lowering.

The contours of the stirrer and mixing bowl match and guarantee a distance of 3.0 ± 1.0 mm between the mixing bowl and the stirrer.
This distance can be adjusted by loosening two clamping screws.

The electromechanical sand inlet is made of sheet steel. In the sand inlet's housing there is an electromagnet which moves the striker plate via a connecting rod. The striker plate is kept shut by a spring and can be opened if the machine is switched off or operated at low speed.

5.2 Electrical structure

The supply voltage for the mixer must be **3 x 230 V + N + PE, 50 Hz**.
The power is supplied by a 5-pin connector according to the CEE standard (the direction of rotation can be altered without opening the connector housing - see point 6.4).
The main switch, which disconnects the supply voltage of the mixer from all phases, is situated on the mortar mixer's right head side as seen from the front.

1) Components in the mortar mixer's rear area
   - I/O circuit board (on a fold-out assembly frame)

After folding out the assembly frame, the connecting terminals of the power supply cable and the fuses to protect the mixer against short circuiting are accessible.

2) Components in the mortar mixer's head room
   - Connecting terminals for the 3-pin main switch

3) Display and control unit for the mortar mixer

- 16 bit CPU, Hitachi H8 2646, 16 byte internal flash memory, 1 Kbyte RAM
- Display
- Multi-coloured signal lamps to indicate operational readiness
- 8 function buttons
- Buzzer
- Unlockable emergency stop button
- Programming interface

The display and control unit is connected to the I/O board on the fold-out assembly frame by a double-sided, pluggable, shielded control cable.

5.3 Safety devices

The mortar mixer is equipped with the following safety devices:

1. **EMERGENCY STOP switch**
   The drive motor is disconnected from the mains power supply by the 3-pin safety module when the EMERGENCY STOP switch is pressed.
   To reactivate the control system, the EMERGENCY STOP switch must be brought back to its home position again by rotating the switch in the direction of the arrow.

2. **Inductive, electronic proximity switch**
   The proximity switch in the mixing bowl mounting is energised by the mixing bowl's bottom flange and monitors its correct fit in the mounting.
   If the mixing bowl is not inserted into the mounting, the safety module prevents the mortar mixer from being operated. Acknowledgement via the display and control unit.

3. **Inductive, electronic proximity switch**
   The proximity switch in the mixing bowl lifting device is energised on reaching the mixing position and monitors the adherence to the correct mixing position.
   If the mixing bowl is not in the mixing position, the safety module prevents the mortar mixer from being operated. Acknowledgement via the display and control unit.

4. **Fixed protective cover**
   The mixing bowl is covered in the mixing position by a fixed protective cover which encloses the stirrer on all sides.

6. Preparations for start-up

6.1 Installation site/environmental conditions

Warning 	The operation of the mortar mixer is permitted only in dry rooms!

The following limit values apply in this regard:

Ambient temperature
DIN EN 60204-1, 4.4.2 +5°C to +40°C

Air humidity
DIN EN 60204-1, 4.4.3 30% to 95%

Note 	Install the mortar mixer on a load-bearing, level base.

6.2 Electrical connection

A **CEE 16A** power supply connection box **400 Volt 3Ph+1N+1PE, 50 Hz** must be used for the mortar mixer's power supply connection.
Plug the mortar mixer's 5-wire cable with the CEE plug (16A) in this power supply connection box.

6.3 Assembly of the sand inlet device

The sand inlet device for standard sand is assembled with 2 hexagon socket screws M6, as seen from the front on the left side of the mortar mixer above the mixing bowl. The electrical connection between the sand inlet device and the mortar mixer is established by a 3-pin connector also mounted on the left side of the mixer. The sand inlet device is ready for operation after establishing the electrical connection and locking.

6.4 Check the direction of rotation

Warning 	The direction of rotation must be checked as described below to prevent damage to the mortar mixer.

Process for checking the direction of rotation

1. Establish a connection between the mortar mixer and the mains power supply by inserting the 5-pin CEE mains plug into the corresponding socket.
2. Unlock the EMERGENCY STOP switch by turning it in a clockwise direction.
3. Bring the main switch into position ‘-I-’ or ‘-ON-’.
4. Insert the stirrer and clamp securely (see point 6.7).
5. Insert the mixer bowl into the bowl holder and clamp securely (see point 6.8).
6. Bring the mixer bowl into the mixing position (see point 6.9).
7. Press the F6 button on the operating module for the mixing speed ‘-62/140 rpm-’.
8. Set the gear head’s direction of rotation.
9. Stop the mortar mixer by pressing the F6 button on the operating module.
10. Bring the main switch into position ‘-O-’ or ‘-OFF’.
11. Pull out the CEE mains plug from the socket.

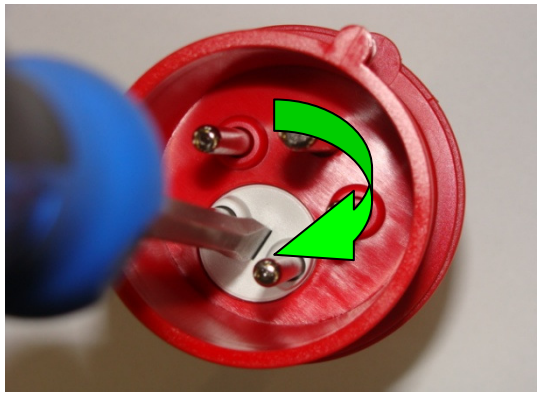
Warning 	The mixing head must rotate in the direction of the indicated arrow (in an anti-clockwise direction), whereby the mixer performs a movement in the opposite direction!

If the mixer head rotates **in the direction of the arrow** (in an anti-clockwise direction), the mortar mixer is ready for operation.

If the mixer head rotates **in the opposite direction to the arrow** (in a clockwise direction), the mortar mixer's direction of rotation must be changed (see point 6.4).

6.5 Change the direction of rotation

The direction of rotation can be altered without opening the connector housing.
After the mains connection plug has been removed from the socket, the phases on the contact side of the plug can be changed with an appropriate screwdriver.
To perform this, the screwdriver must be inserted into the slit provided on the contact side of the plug and rotated by 180°.



Warning	Safety notice! Work on electrical equipment must only be carried out by specialist personnel!

6.6 Lower and remove the mixing bowl

Disengage the hand lever on the right side of the mortar mixer by pushing it right and swivelling it forwards as far as it will go. The mixing bowl is lowered.

The container carrier is in the lowered position. Rotate the mixing pot using the handles in an anti-clockwise direction until the two arrows fixed to the mixing pot and the container carrier are vertically aligned. Lift the mixing pot upwards and slightly forward at an angle until the eccentric clamp is no longer in the container carrier. Now tilt the mixing pot backwards and remove.

6.7 Loosen and remove the mixer

Firmly grasp the mixer with the left hand and the mixer mounting's knurled ring with the right hand.
Loosen the knurled ring in an anti-clockwise direction until it can be shifted upwards. Now pull out the stirrer in a downward direction.

6.8 Insert the stirrer and clamp securely

Insert the stirrer in the agitator head's quick-action clamping release fastener with a slight rotary movement until you feel it reach the end stop. Hold the stirrer with the left hand and rotate the knurled ring until it falls downwards by approximately 10 mm. Now clamp the knurled ring securely with the right hand by rotating it in a clockwise direction.

6.9 Insert the mixing bowl and clamp securely

The container carrier is in the lowered position. Grasp the mixing pot by the side handles to insert it. The red arrow must point to the front. The mixing pot must now be inserted in such a way that both arrows attached to the mixing pot and the container carrier are aligned. Now tilt it slightly forward and let the mixing pot slide in effortlessly. The mixing pot is tightened in a clockwise direction to lock.

6.10 Bring the mixer bowl into the mixing position

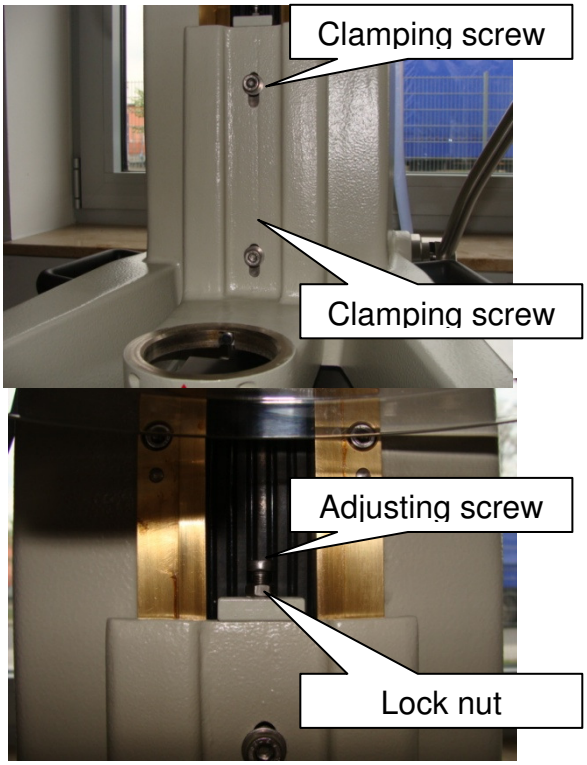
First swivel the hand lever to the right and then backwards as far as it will go and engage it to the left.
The mixing bowl is locked into place in the mixing position.

6.11 Check the distance between the mixing bowl and the stirrer

Lower the mixing bowl and remove (see point 6.5), then loosen the stirrer and remove (see point 6.6). The protective guard can now be removed from below by unscrewing the 3 hexagon socket screws on the protective guard's flange. Now reinsert the stirrer and clamp securely (see point 6.7), also insert the mixing bowl and clamp securely (see point 6.8), afterwards bring the mixer bowl into the mixing position (see point 6.9). With the distance gauge (TESTING art. No.: 1.0203.07) the distance can be checked (EN 196-T1 3 ± 1 mm) and adjusted as described in point 6.11. If the distance conforms to the standards, the protective guard is reassembled.

6.12 Set the distance between the mixing bowl and the stirrer

If the distance between the mixing bowl and the stirrer is greater than the applicable standard allows for, this can be adjusted. The mixing bowl must first be lowered and removed (see point 6.5). The two clamping screws can now be loosened on the holder for the mixing bowl by approximately 1 revolution. Now loosen the lock nut of the adjusting screw at the upper end of the mixing bowl holder, and then set the distance with the help of the adjusting screw from the mixing bowl mounting and check with the distance gauge.



- By turning the adjusting screw in a clockwise direction, the distance is reduced.
- By turning the adjusting screw in an anticlockwise direction, the distance is increased.

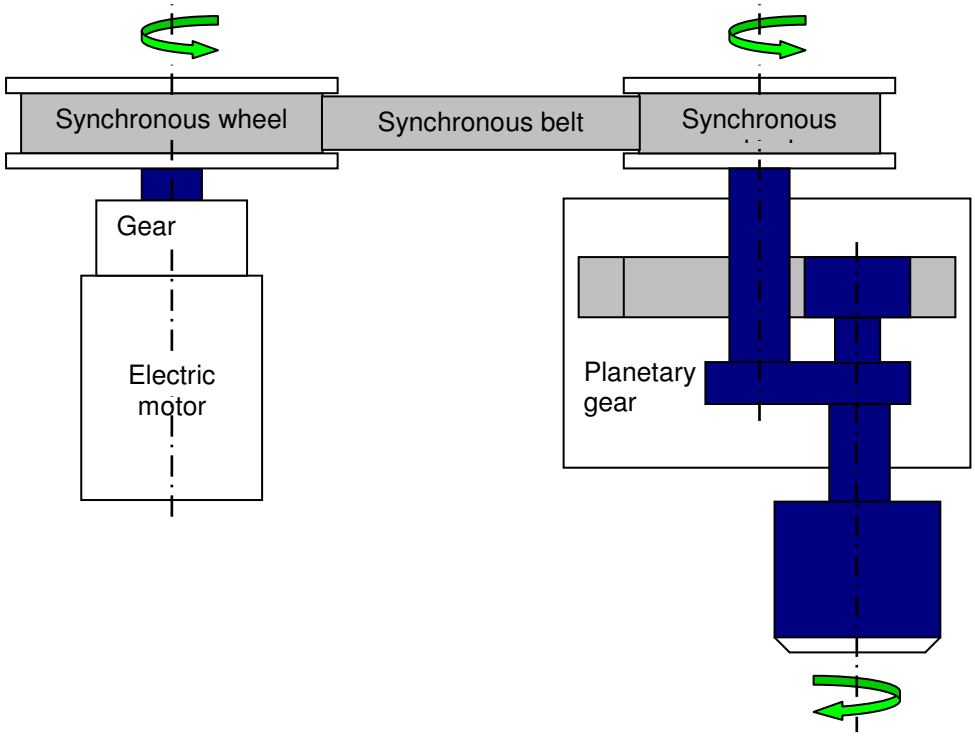
If the distance is set correctly, the lock nut, the adjusting screw and both of the clamping screws on the holder for the mixing bowl must be tightened. The protective guard must be reassembled, the mixing bowl and the stirrer must then be inserted.

7. Technical data

Footprint	approx. 300 x 550 mm	Power consumption	0.20/0.37 kW
Installation height	approx. 500 mm	Alternating current	400 V
Weight	approx. 62 kg	Frequency	50 Hz
		Number of phases	3
		Fine wire fuse time-lag	5 x 20 mm/250 V/2.5 A

Mortar mixer speeds (rpm) according to DIN EN 196-1		
	Rotation (min^{-1})	Planetary motion (min^{-1})
Low speed	140 ± 5	62 ± 5
High speed	285 ± 10	125 ± 10

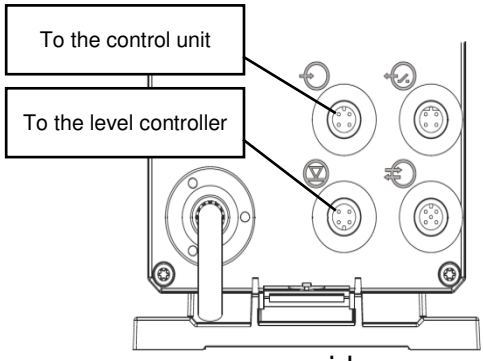
Schematic representation of the drive components
(Opposite direction of rotation)



8. Assembly/installation

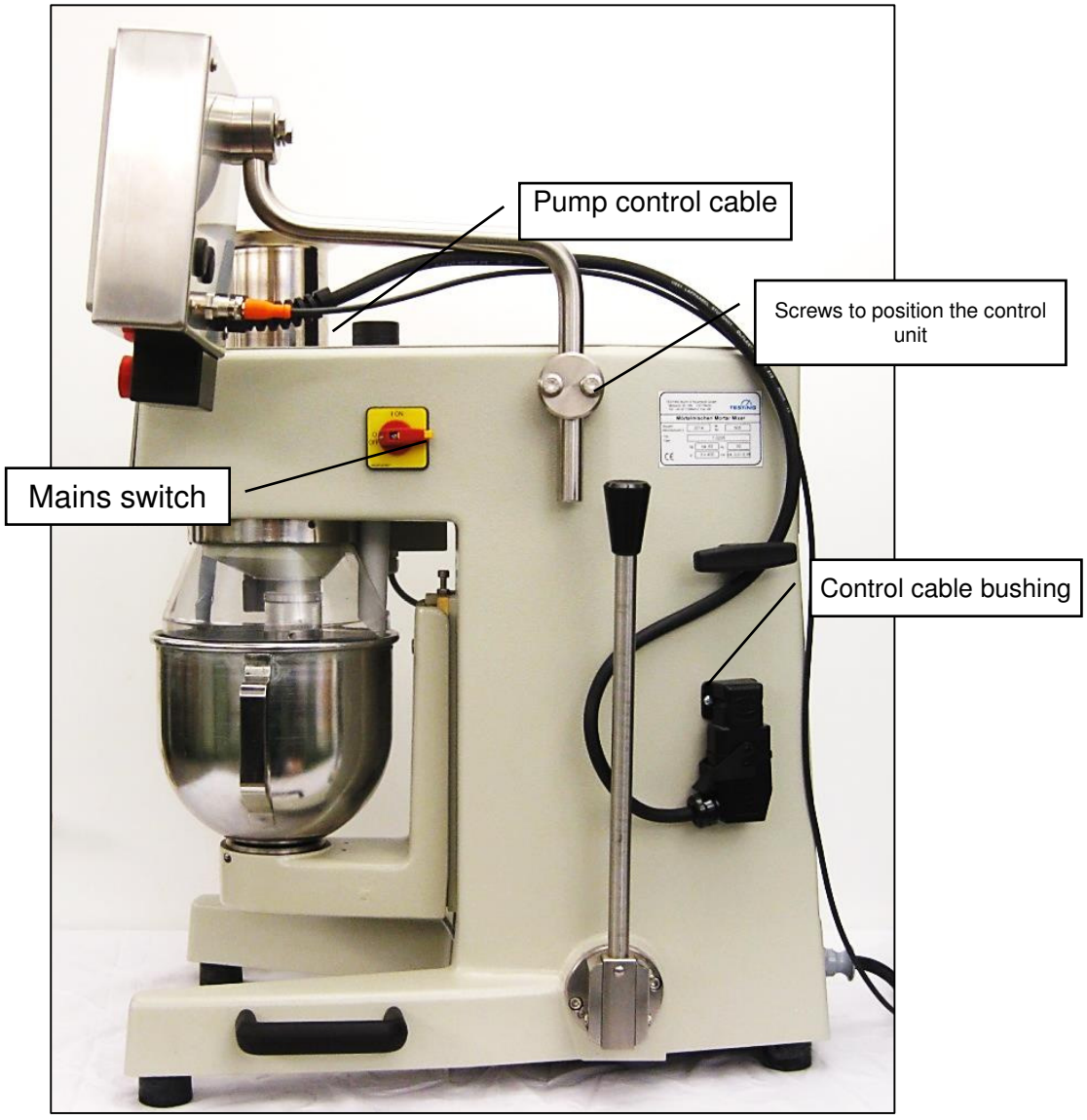
Assemble/install the mixer as shown in the image below.

- Place the device on a stable table.
- Assemble the separately delivered control unit on the adjustable mixer arm (13 mm key for hexagon bolts).
- Connect the control cable to the bushing on the side of the mixer.
- *Set up the metering pump next to the mixer
  (see assembly options in the pump handbook)
- *Connect the metering pump with the control unit
  (for the cable connections see the Fig. under ‘Pump rear side’)
- *Place the water tank near the pump
  (preferably under the table)
- *Fill the tank with distilled water or water of equivalent quality
- *Insert the adapter into the tank
- *Connect the cable of the level controller with the pump
- *Connect the suction hose with the tank adapter to the pump outlet
- *Connect the pressure hose to the pump outlet and nozzle
  (Pay attention to the non-return valve’s flow direction indicated by the arrow)
- *Connect the pump to the 230 V AC bushing on the left of the mixer
- Connect the mixer ((3 x 400 V AC+N+PE, CEE-16A plug)



rear side

**For mixer/pump combinations*



9. Operation

9.1 Switch on the mortar mixer

After the power connection has been established and the main switch has been switched on, the inductive proximity switch for monitoring the **'Mixer bowl is inserted', 'Mixer bowl is in the mixing position'** and the control and signalling unit are supplied with control voltage by the power supply unit.

9.2 Starting conditions

1. The power connection must be established and the direction of rotation has been checked (see point 6.3)
2. Switch on the mortar mixer, Bring the MAIN SWITCH into position '-I-' or '-ON-'.
3. The '-EMERGENCY STOP-' switch must be unlocked (rotate the red button in the direction of the arrow to unlock).
4. Insert the stirrer and clamp securely (see point 6.8)
5. Insert the mixer bowl into the bowl holder and clamp securely (see point 6.9)
6. Bring the mixer bowl into the mixing position (see point 6.10)

9.3 Introduction

The **laboratory mortar mixer is a combined mixing and measurement tool to assess the behaviour of the cement mortar during manufacturing.**
The software supports the conventional mixture and water metering according to EN standards, but also offers the possibility of determining the exact water demand for achieving a certain flow property and processability (comparable to the viscosity).
These mixers are normally used in the laboratories of cement/concrete manufacturing plants.

9.4 Safety

Consult the following documents:
(included in the scope of supply)

- Operating instructions for the testing mixer
- Grundfos pump handbook

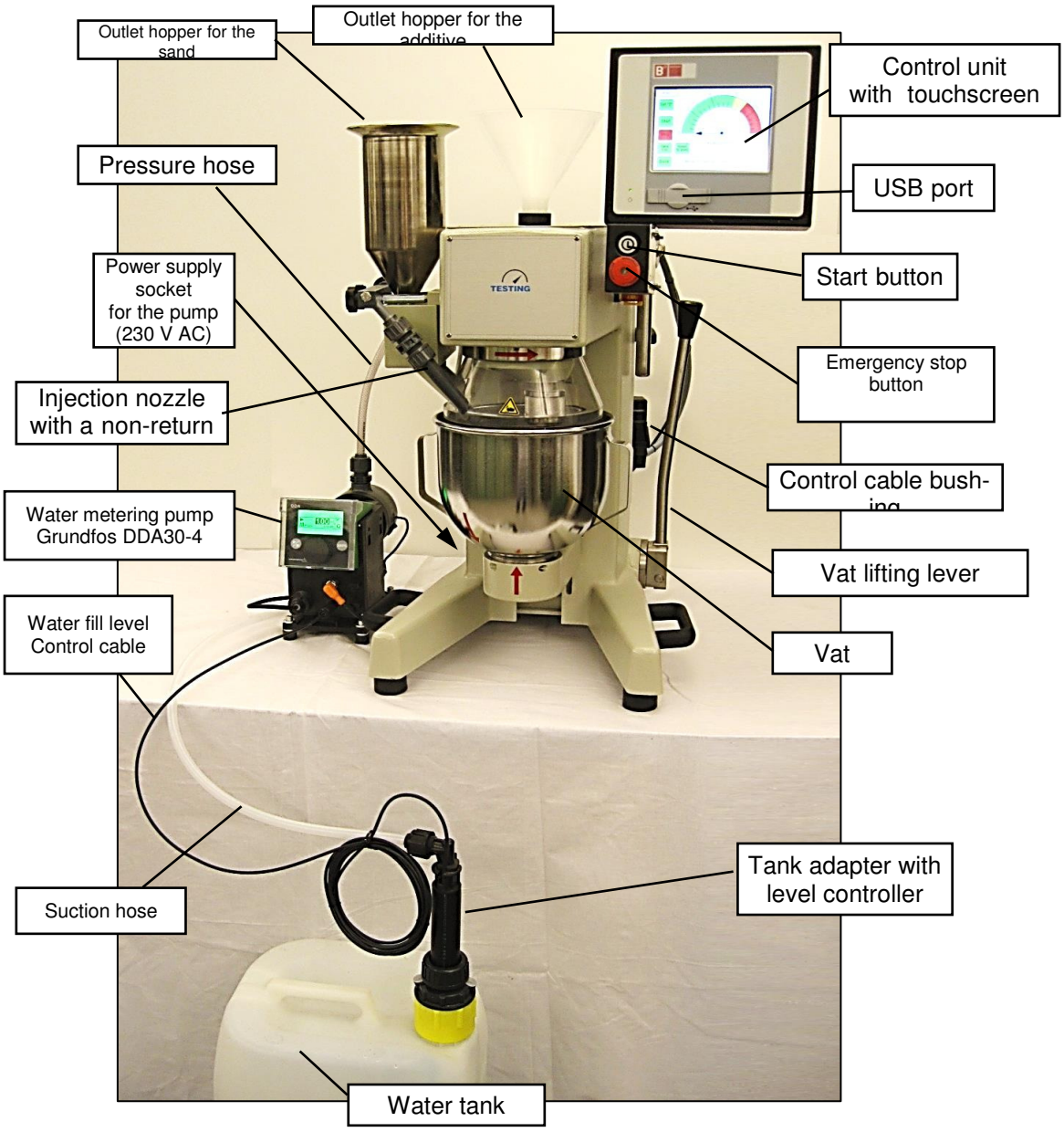
9.5 Special function: Consistency Based Water Demand (CBWD)

The laboratory mortar mixer is equipped with a torque sensor, a control unit and a water metering system.
The drum is filled with a certain quantity of sand or cement.
The entire content is mixed for a certain amount of time and water is added, thereby

increasing the mixing forces considerably.
These forces are continuously measured using the torque sensor.
The torque is reduced by adding water.
The **water demand** measured here refers to the total quantity of water that must be added to achieve a specific torque value.

9.6 Main components

The following image displays the typical configuration of the mixer with the water metering unit.



10. Sand specification

The mixer was designed for use with the following sand.

CEN standard sand according to DIN EN 196-1
(corresponds to ISO 679)

Bag contents: **1350 g** ± 5 g
Origin: Beckum, Germany

Sand with a finer grain size can also be used. However, the mixing process needs to be adapted if necessary.

! Warning!
Sand with a coarse grain size can damage the mixer!
Particles can get stuck between the paddle and drum in the process. This in turn leads to torque peaks that could damage the gear wheels.

Special paddle/drum combinations are available.

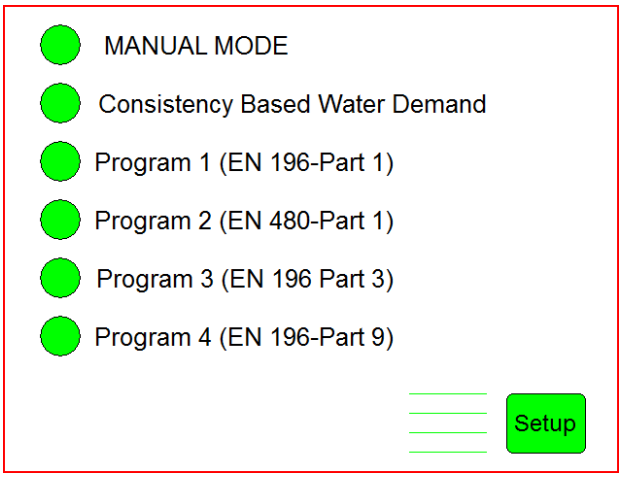
11. Control unit

The control unit consists of a programmable logic controller (PLC) with touchscreen. This is responsible for the following main functions:

- Control of the mixer
- Support provided to the operator during the manufacture of mortar samples
- Control of the water metering pump (optional)
- Measurement of the resistivity/flowability of the mortar sample

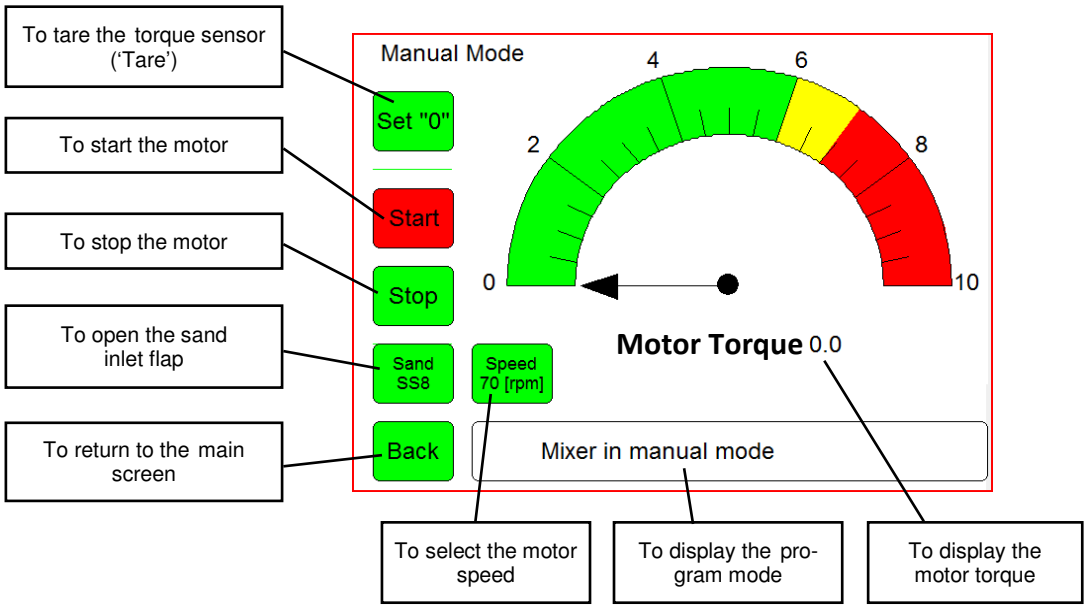
Start screen

The main screen is displayed when starting the mixer, which provides access to the different work programs and configuration settings.



Manual Mode screen

All mixer functions can be activated in **Manual Mode** screen.

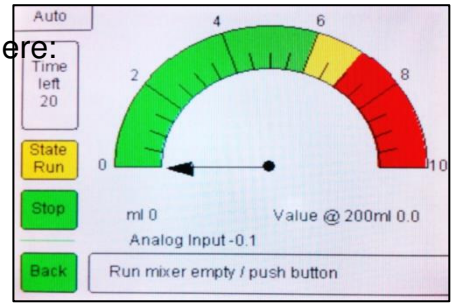


Window **Consistency Based Water Demand** (CBWD)

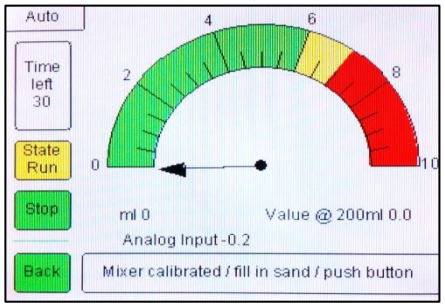
The CBWD mode is used to measure the quantity of water required to achieve a certain flow property and processability (comparable to the viscosity). Depending on the motor torque, the metering pump varies the water supply for the purpose of achieving the target value.

A description of the individual sequences is provided here:
To call up the function:
→Click on **Consistency Based Water Demand**
→Select **Start**
→Press the Start button

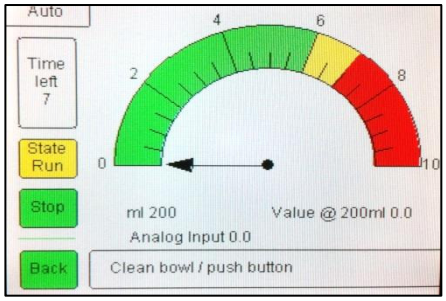
Note: The pump must be in operating mode (**Start**/**Stop** button)



1. 20 s
   Mixer runs with an empty drum
   for the purpose of taring the torque sensor

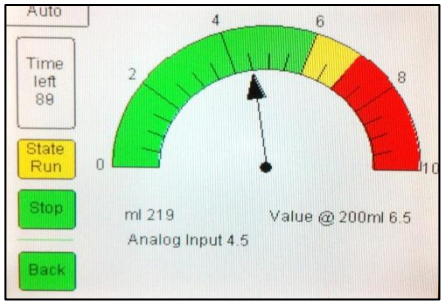


2. Fill 1 bag (1350 g) of standard sand plus cement into the drum



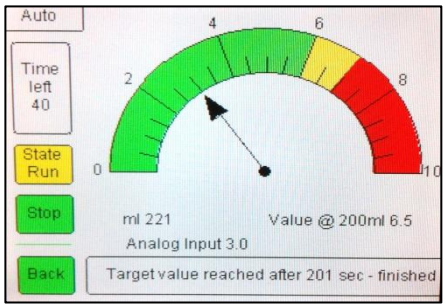
3. 30 s
   The sand and cement are mixed when dry

4. 60 s
   The metering pump adds 200 ml



5. 20 s
   Clean the drum
   (also the drum walls)

6. Press **Start** to restart the motor

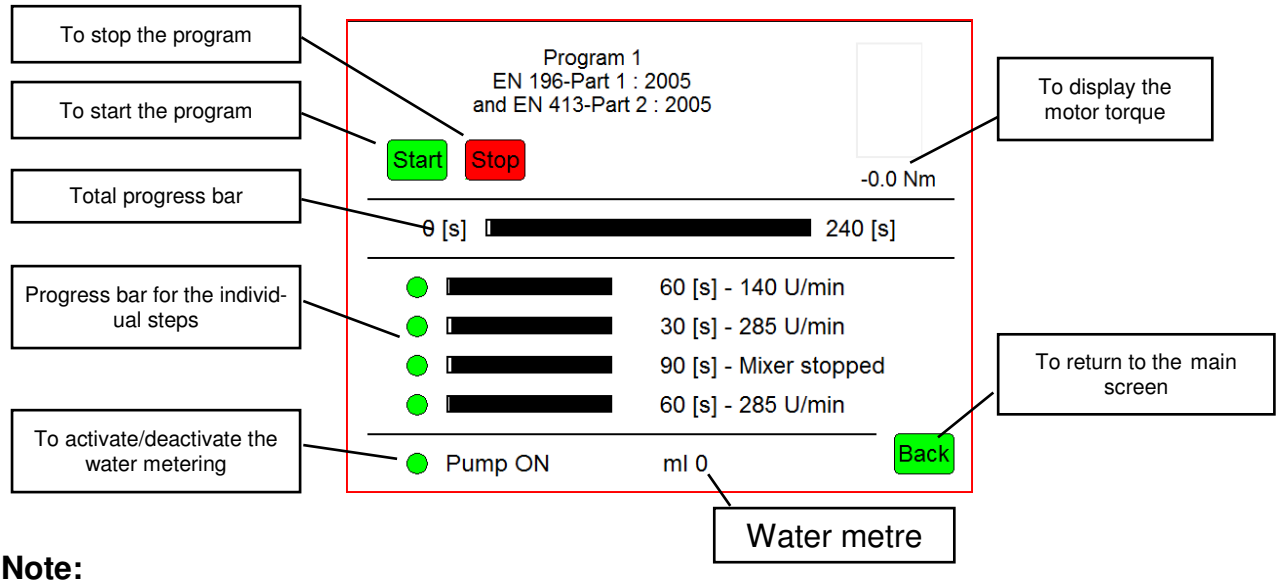


7. 180 s
   Mix continuously while adding water, until the pre-set torque is reached
   →Result: Water demand [ml]

Program 1

EN 196 Part 1 and EN 413 Part 2

This program mixes the mortar according to the European standard (EN). You can find further information in each respective EN description.

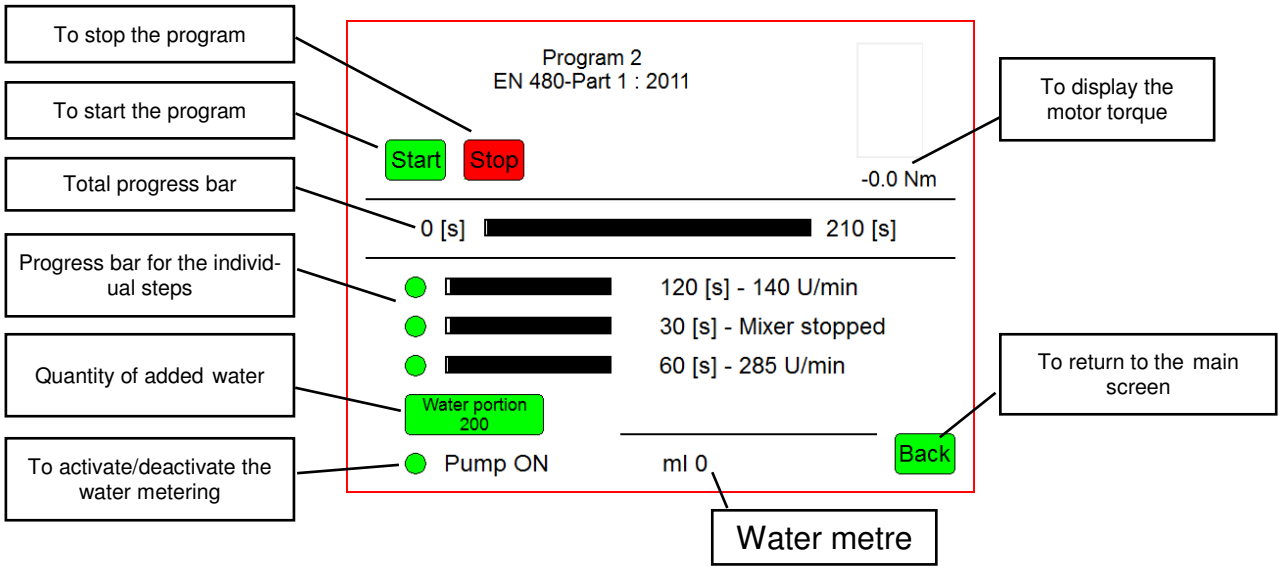


Note:
The phase **90 [s] Mixer stopped** provides the opportunity to scrape mortar from the drum walls. Mortar losses are to be avoided as far as possible, as these affect the accuracy of the mixing process. As soon as the stop sequence has elapsed, press **Start**.

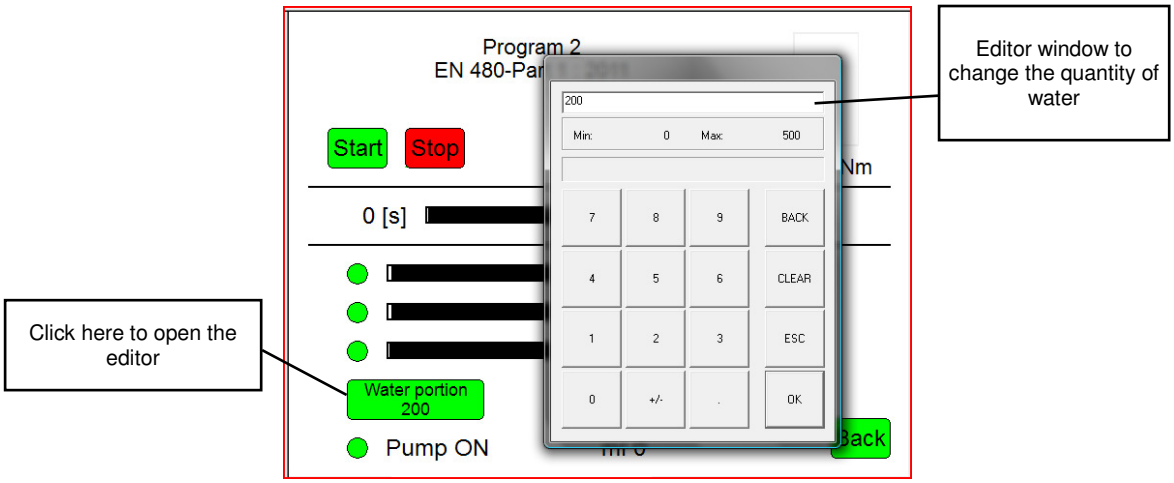
Program 2

EN 480 Part 1

This program mixes the mortar according to the European standard (EN). You can find further information in each respective EN description.

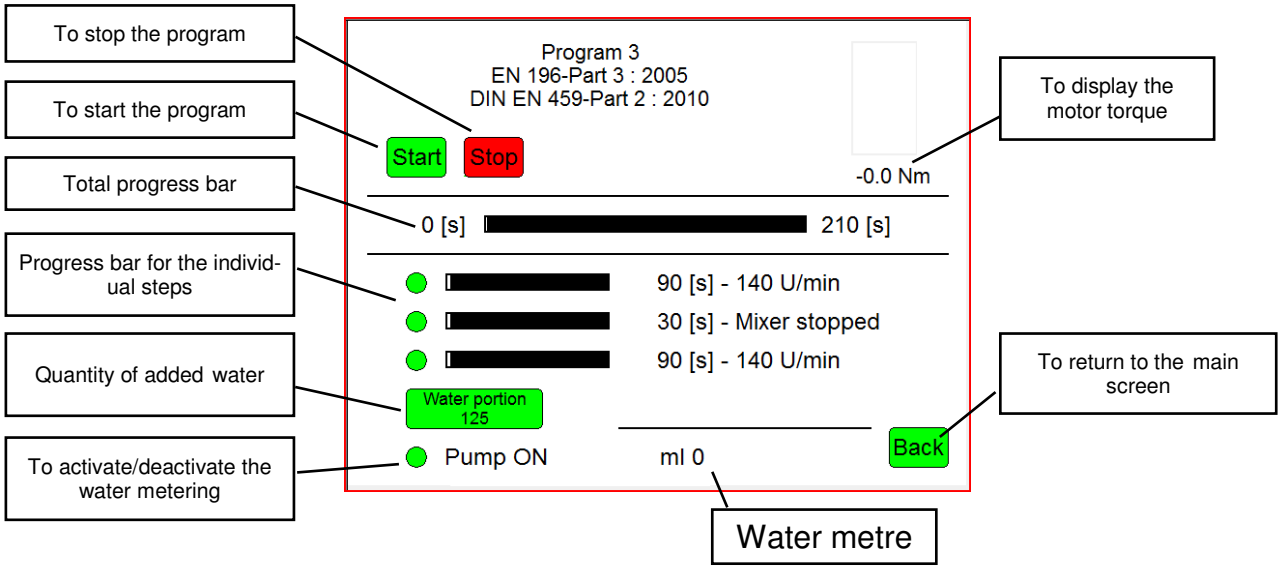


Note:
To change the quantity of water added to the mortar, click on **Water Portion** and enter the desired value.



Program 3
EN 196 Part 3 and EN 459 Part 2

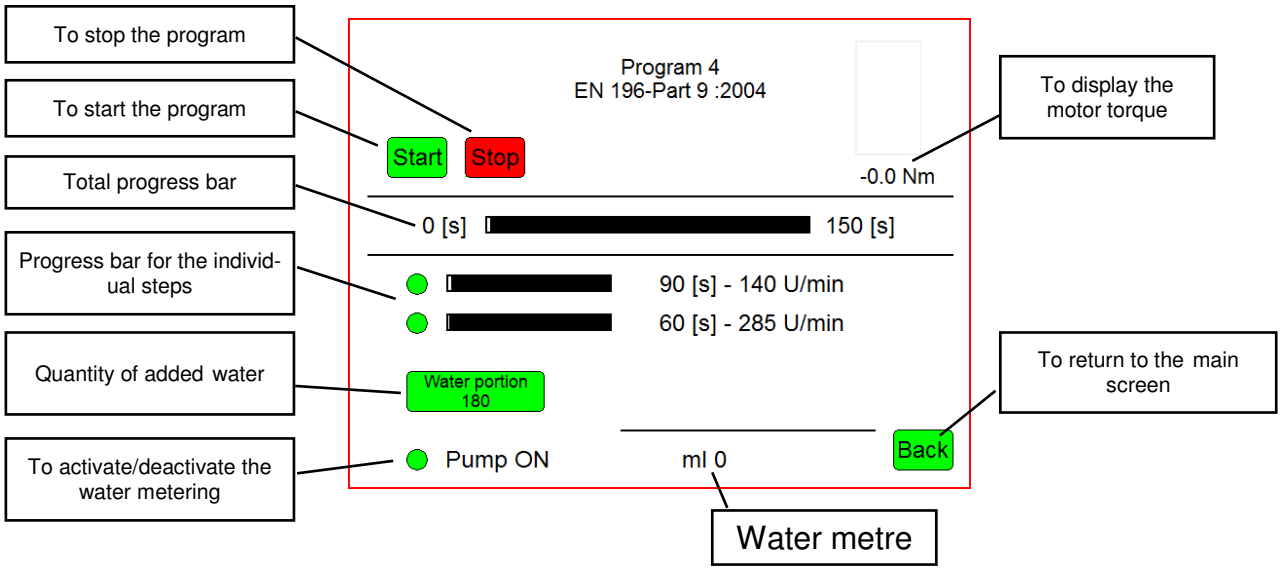
This program mixes the mortar according to the European standard (EN). You can find further information in each respective EN description.



Program 4

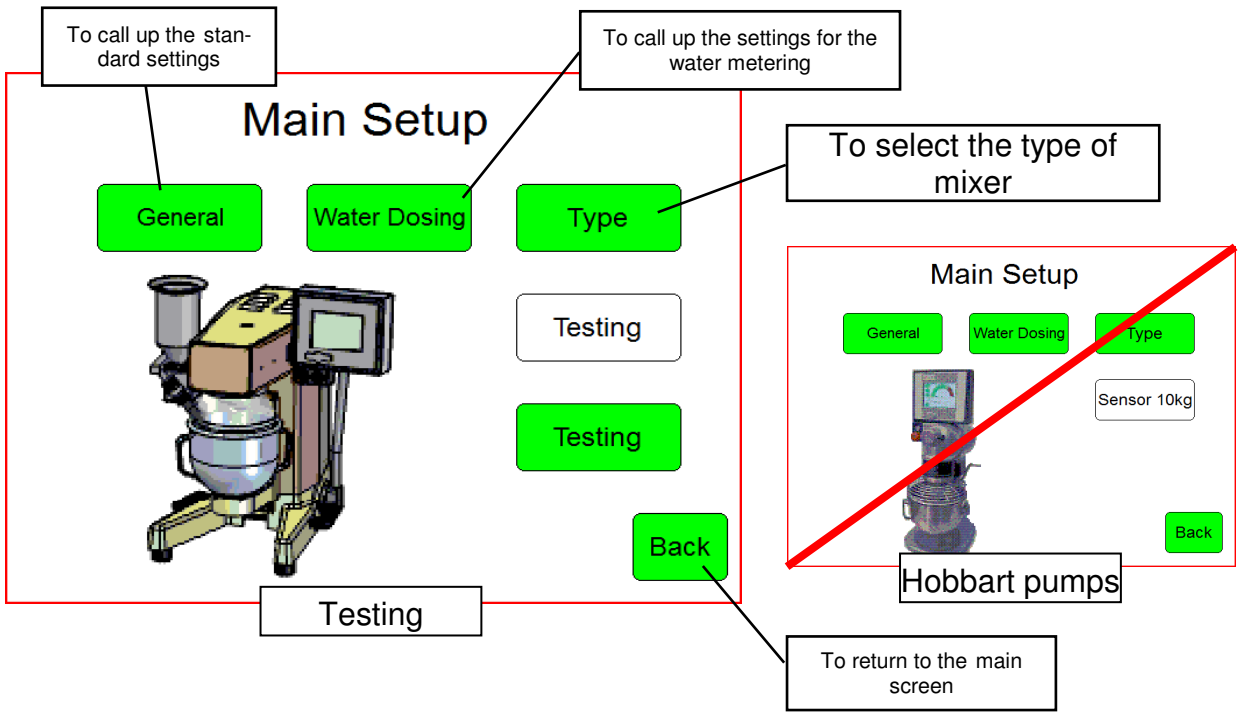
EN 196 Part 9

This program mixes the mortar according to the European standard (EN). You can find further information in each respective EN description.



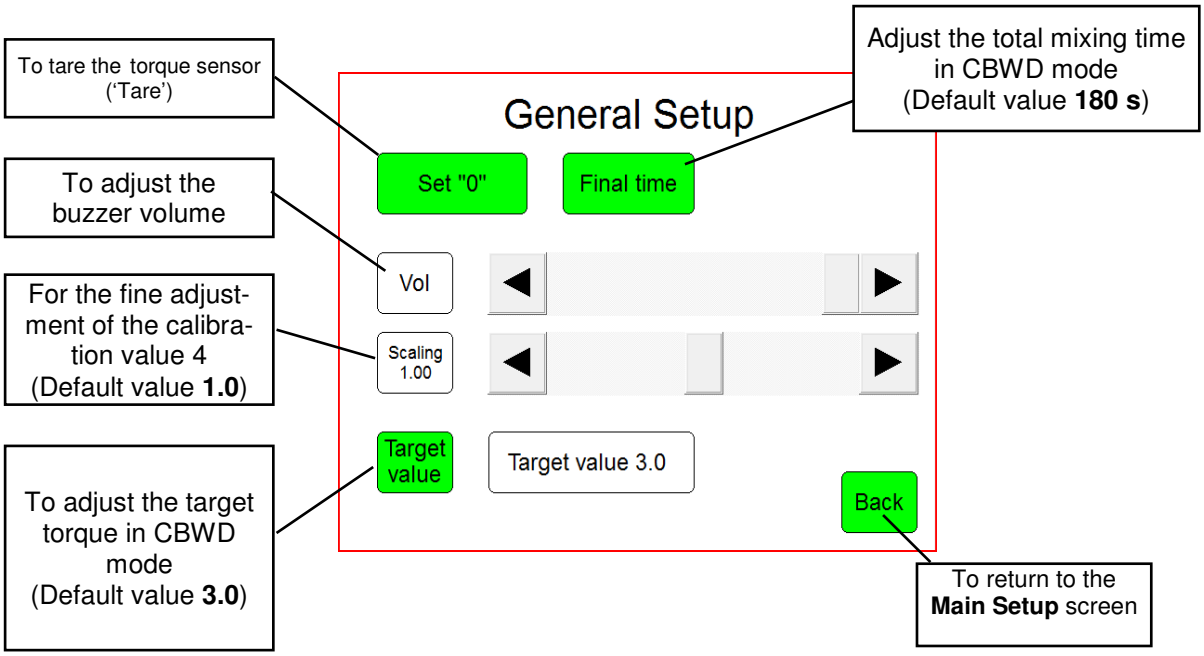
Setup screens

To open the **Main Setup** window, click **Setup** in the main screen.
The software is also suitable for use with another mixer (Hobbart mixer from TomTom Tools GmbH). The **Testing** option must be selected.



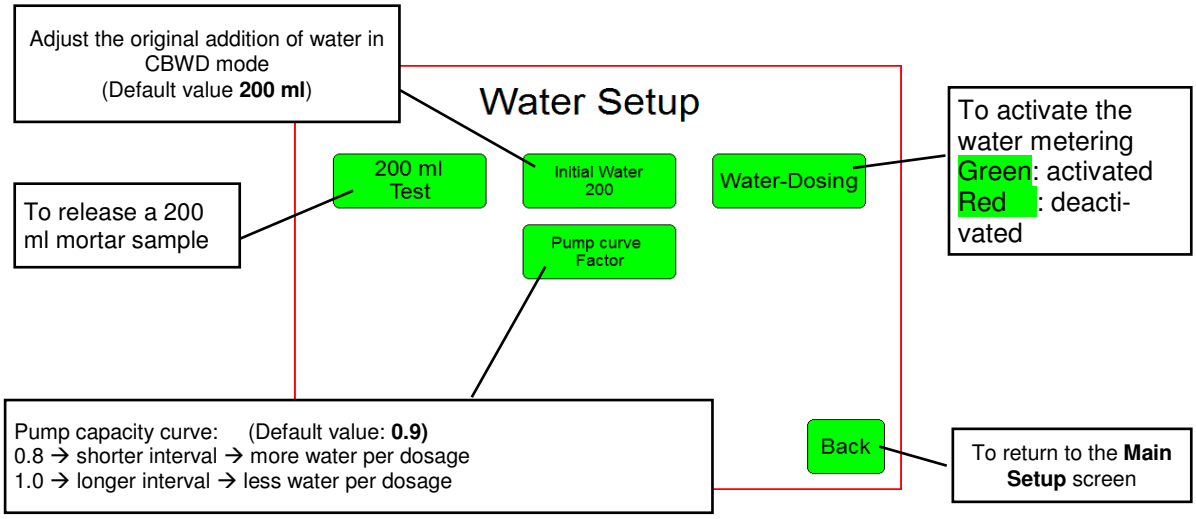
General Setup screen

The different mixer parameters can be set via this window.
For this you can adjust the operation to a certain extent to protect the drum and paddle.



Water Setup screen

The target values for the water metering system can be adjusted and tested via this window.
Some cement types demonstrate extreme behaviour regarding the relationship water/consistency. It may happen that the mixing time expires before the desired torque target value is achieved. In this case, the value under **Initial Water** must be increased. If the required quantity of water lies at or even below 200 ml, the value in the **Initial Water** must be reduced.
By changing the **Pump Curve Factor** (pump capacity curve), additional possibilities for adapting the water metering for extreme types of cement arise.



12. Calibration of the mixer for the CBWD measurement

The mixer is calibrated ex works for the CBWD measurement. In order to obtain consistent measurements, the calibration must be checked/repeated from time to time. This happens as follows:

- Let the mixer run empty for several minutes and set the torque to 0 (by pressing the **Set '0'** button)
- Stop the mixer
- Fill the 2 bags of standard sand into the drum (without cement and water)
- Start the mixer
  → The display should display **4.0** (± 0.1)
- If this is not the case, there are two corrective measures:

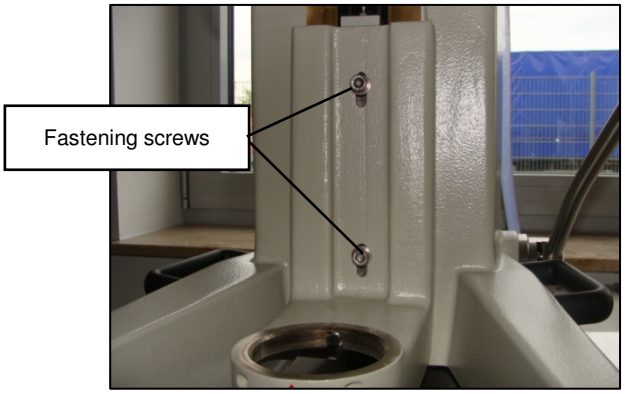
Adjust the distance between the paddle and the drum

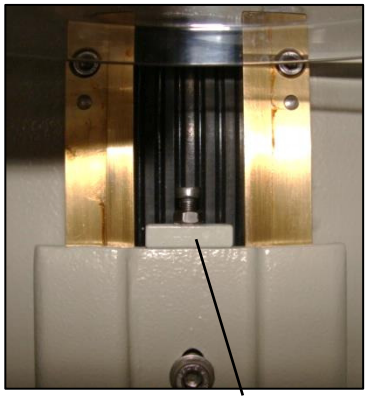
To achieve a proper mixture and the required accuracy of consistency measurement, the distance between the paddle and drum must be set to 3 mm (according to EN). The distance to the drum base can be changed by lifting/lowering the carrier structure.

- Loosen the fastening screws for this purpose and adjust the desired distance with the adjusting screw.
- Retighten the screws

Screw in the adjusting screw →The drum is lifted →The distance **increases**

Screw out the adjusting screw →The drum is lowered →The distance **decreases**



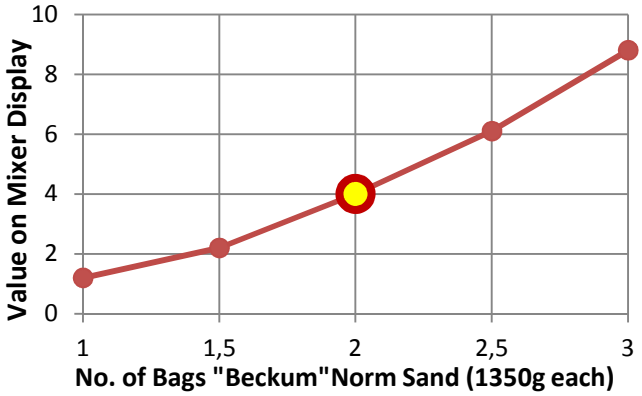


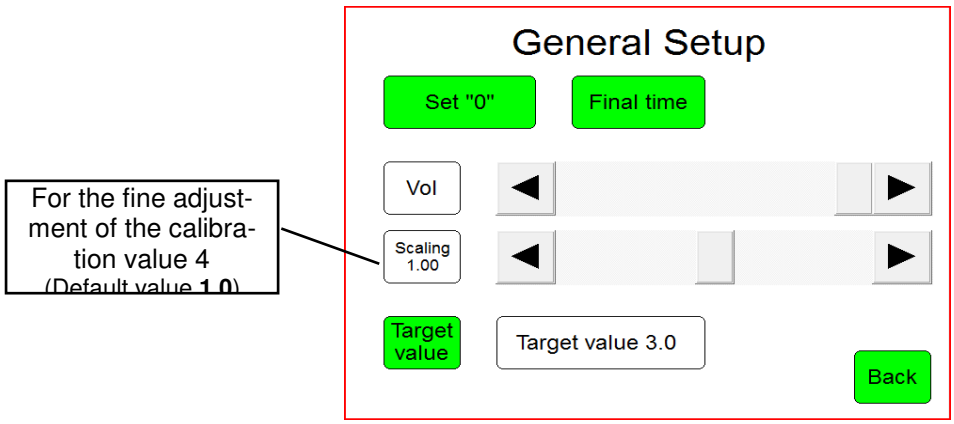
Note:
The paddle and drum are subjected to a certain amount of wear as the sand possesses abrasive properties. The torque resistance decreases with increasing wear to the agitator, which is why the abovementioned adjustments should be made. **If the distance is too large or if a torque of 4 cannot be achieved with 2 bags of Beckum standard sand, the paddle and drum must be replaced.**

Fine adjustment of the reference value

If the distance between the paddle and drum moves in the permitted range but the calibration value of the torque sensor lies just above or below 4, you can make a fine adjustment. Adjust the value under **Scaling** in the **General Setting** screen (see 4.7.1) for this purpose.

The relationship between the number of bags (Beckum standard sand) and the torque value are displayed in the following diagram. The yellow dot shows that a torque value of 4 should be achieved with 2 bags.





13. Calibration of the water metering unit

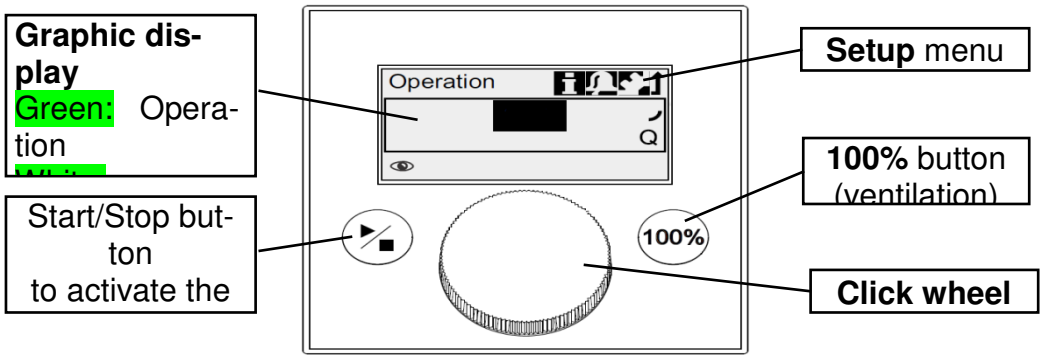
Ventilate the system

The water metering unit should preferably be installed so that the lines (particularly the suction hose) are inclined in the flow direction, whereby automatic ventilation is ensured. Due to the application properties, air pockets (for example, in front of the pressure regulator) can, however, not be avoided. For the purpose of ventilation, the pressure regulator can be removed from the control housing and lifted when the pump is running for the first time. Check the transparent hoses (especially the suction hose) for possible air pockets.
The pump is equipped with a button (**100%)** for manual ventilation.

Pump settings (DDA30-4)

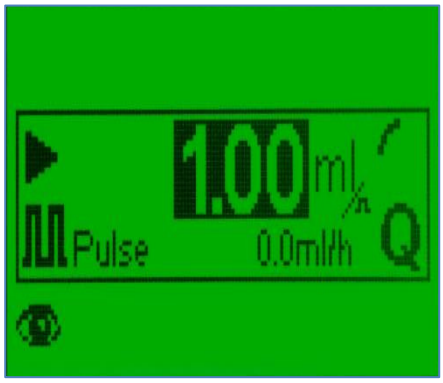
To control the pump via the mixing regulator, the following (normally carried out ex works) settings must be made:
Note:

- Rotate the click wheel until the setting symbol starts flashing
- Adjust the settings manually using the click wheel
- Select the **Pulse** mode under **Operation**
- Activate the **Pulse memory** option
- End the setup menu by pressing the back arrow
- Set the pulse volume to **1.00 ml**



Display of the menu setup
(Pump in standby mode)

Display for the pump's operational readiness
(Pump in operating mode)



(For further information see the pump handbook)

Pump calibration

Although the pump is calibrated ex works, slight deviations may occur for example, as a result of a change in sea level, which require a recalibration.
Follow these steps:

- Ensure that the pump has been vented and is installed as specified above
- Switch the pump to **OFF** mode by pressing the **START/STOP** button (blue display)
- Place a measuring jug under the injection nozzle (≥ 250 ml)
- Start the calibration via **Calibration** in the **Setup** menu
- Select **START** (pump starts and each stroke is counted)
- Select **STOP** after 60 to 70 strokes
- Weigh the quantity of water in the jug (with a precision balance)

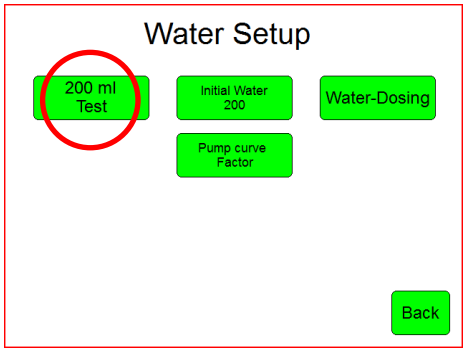
- Adjust the value **Calibrat. volume: ….ml** according to the determined weight value

- Save the value with the click wheel
  →The calibration is completed

200 ml test for the mixer

You can check the proper functioning of the pump with this function:
Note: The pump must be in the operating mode (**START/STOP** button)

- Switch on the mixer and
  call up the **Water Setup** screen



- Select the **200 ml test**
  The pump starts and dispenses 200 ml of water

- Check the quantity using a precision balance

- Repeat this procedure if the
  dispensed quantity lies below **199** or above **201 ml**

14 Warranty

Our **general terms of sale and delivery** apply in principle.

The manufacturer warrants that these operating instructions were compiled in accordance with the technical and functional parameters of the supplied mortar mixer.
The manufacturer reserves the right to add supplemental information to these operating instructions.

The manufacturer grants the statutory warranty.
Wear parts are excluded from this warranty.

The guarantee of the manufacturer that the machine will remain in perfect working order is contingent on compliance with the provisions of this operating manual and use of the equipment as intended.

The manufacturer disclaims liability for damage resulting from improper usage of the mortar mixer or failure to comply with the guidelines and suggested conduct in this operating manual.

Warranty claims to the manufacturer are excluded if the mortar mixer is subject to unauthorized changes in structure or in its functional design without the written agreement of the manufacturer.

15. Issue date of the operating instructions

3rd edition
May 2010

16. Copyright

The copyright remains with

TESTING Bluhm & Feuerherdt GmbH

These operating instructions are intended only for the operator and his/her personnel. It contains specifications and instructions that may not be

- replicated
- distributed or
- communicated by other means.

Infringements are punishable under criminal law.

17. Address of the manufacturer

TESTING Bluhm & Feuerherdt GmbH
Motzener Str. 26b
12277 Berlin
Telephone: + 49 (0)30 7109645-0
Fax: + 49 (0)30 7109645-98
e-mail: info@testing.de

18. Cleaning and maintenance

18.1 Cleaning the mortar mixer

If external cleaning of the mortar mixer is necessary depending on the frequency of use or the environmental conditions, then the following steps should be taken:

1. Switch off the MAIN SWITCH, Position '-0-' or '-OFF-'
2. Disconnect the mortar mixer from the mains power supply
3. Any loose lying dust should be removed using a brush or by vacuuming
4. If necessary, the mortar mixer can be cleaned externally
   with a damp towel.
   Normal household cleaning agents can be used as additives.

Warning 	Any cleaning using pressurized, sprayed or splashed water or applying water from dripping sponges or other similarly unsuitable tools or cleaning agents, will cause lasting damage to the mechanical and/or electrical and electronic components of the mortar mixer.

18.2 Maintenance of the mortar mixer

The mortar mixer is practically maintenance-free. The AC motor's spur gear and the mixer head's planetary gear are provided with lubrication sufficient for approx. 5000 operating hours.

After being in operation for a number of years, it is recommended to perform a thorough cleaning and to refill the gears with suitable lubricants.

Due to the mixer's very compact design, we advise you to take advantage of our maintenance service for this purpose.

18.3 Checking and adjustment

Depending on the mortar mixer's frequency of use, the distance between the stirrer and the mixing bowl may need to be checked (see point 6.10 and 6.11)

This distance increases as a result of the wear and tear to the stirrer and might need to be readjusted.

18.4 Take the mortar mixer out of operation

1. Switch off the MAIN SWITCH, Position '-0-' or '-OFF-'
2. Disconnect the mortar mixer from the mains power supply
3. Cover the mortar mixer with a protective dust cover
4. Store the mortar mixer in a dry place

18.5 Fault finding

Warning 	**Safety notice!** 1. Work on electrical equipment must only be carried out by specialist personnel! 2. Unplug the mains plug in case of failure and/or prior to disassembly of the covers!

Note 	The mortar mixer must be disconnected from the mains power supply in case of failure. After removing the top and bottom cover, the fuses of the individual modules are accessible. These can be checked and possibly replaced with new identical fuses. For further fault finding and the remedy of defects, please refer to our detailed description of the control system and the electric wiring diagram accompanying these operating instructions.

19. Spare parts – acquisition and customer service

Spare parts list		
Item	Designation	Article number
1.	Stainless steel bowl	1.0203.03
2.	Stainless steel mixer	1.0203.02
3.	Fine wire fuse	EI-0132

For technical queries and the supply of spare parts, please contact the following address directly:

TESTING Bluhm & Feuerherdt GmbH
Motzener Str. 26b
12277 Berlin

Telephone: + 49 (0)30 7109645-0
Fax: + 49 (0)30 7109645-98

20. Disposal

To prevent environmental damage, please only allow authorized specialist companies or the manufacturer to dispose of the mortar mixers.

EC Declaration of Conformity in accordance with the Machinery Directive 2006/42/EC Appendix II 1.A

The manufacturer/distributor

TESTING Bluhm & Feuerherdt GmbH
Motzener Str. 26b
12277 Berlin

hereby declares that the following product

Product designation:	Mortar mixer with program automation
Brand:	TESTING
Serial number:	continuous
Serial/type designation:	1.0206.07

complies with all of the relevant provisions of the above named guidelines as well as the additional applied guidelines (following) – including any of the amendments thereto that are in force at the time of the declaration.

The following additional EU Directives have been applied:

EMC Directive 2004/108/EC
Low Voltage Directive 2014/35/EU

The following harmonized standards have been applied:

EN 12151:2007	Machines and equipment for the preparation of concrete and mortar – Safety requirements
EN 349:1993+A1:2008	Safety of machinery – Minimum distances to avoid crushing body parts
EN ISO 12100-1:2011	Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology
EN ISO 12100-2:2011	Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles
EN ISO 14121-1:2007	Safety of machinery Risk assessment – Part 1: Principles (ISO 14121-1:2007)

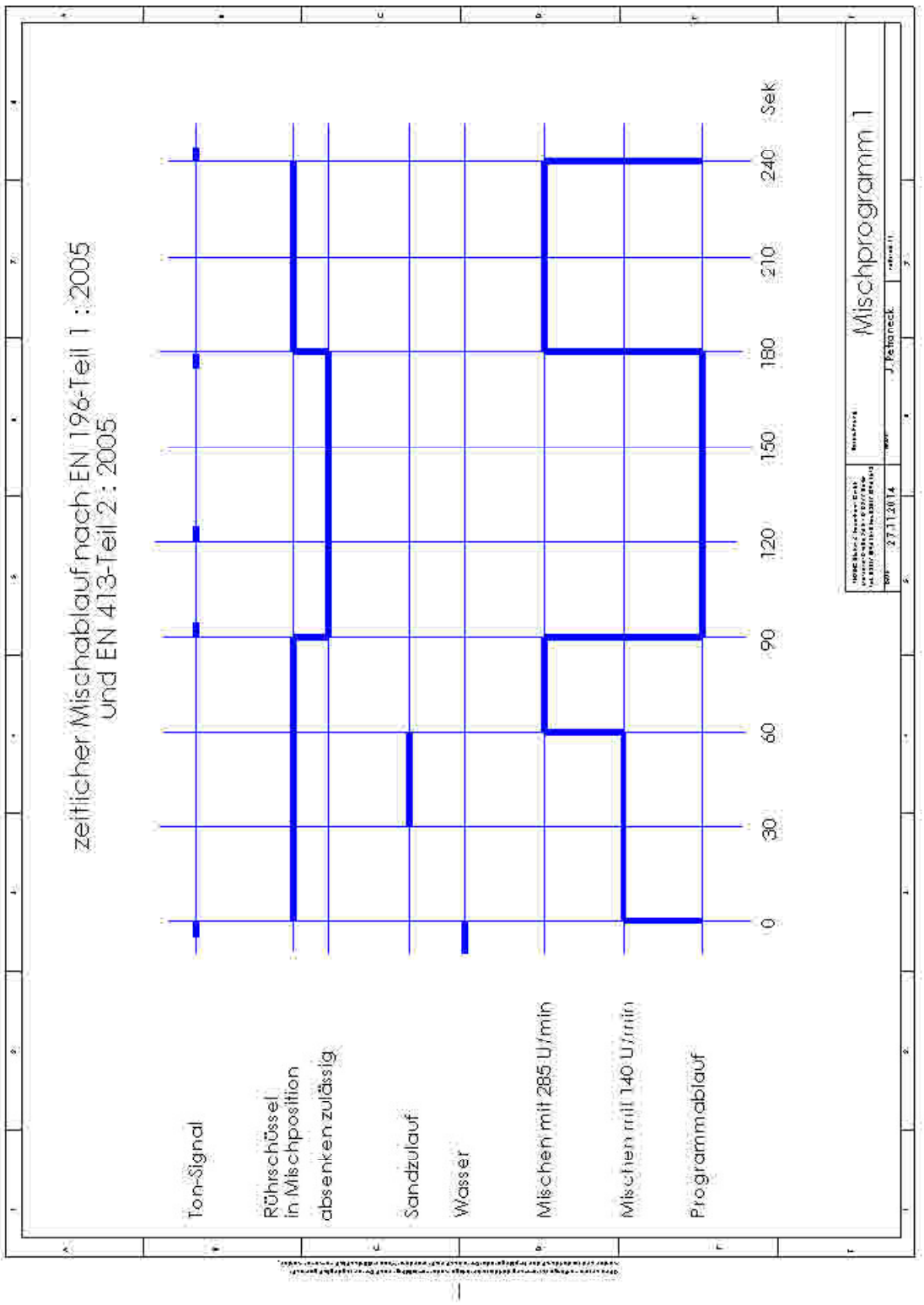
The following national or international standards (or parts/clauses thereof) and specifications have been applied:

Name and address of the person authorized to compile the technical documentation:
Jens Petraneck

Location: TESTING
Date: May 12, 2015

_____
(Signature)
Jochim Feuerherdt Managing Director

_____
(Signature)
Jens Petraneck Head of Manufacturing


Mischprogramm 1
zeitlicher Mischablauf nach EN 196-Teil 1 : 2005
und EN 413-Teil 2 : 2005
Sek
0
30
60
90
120
150
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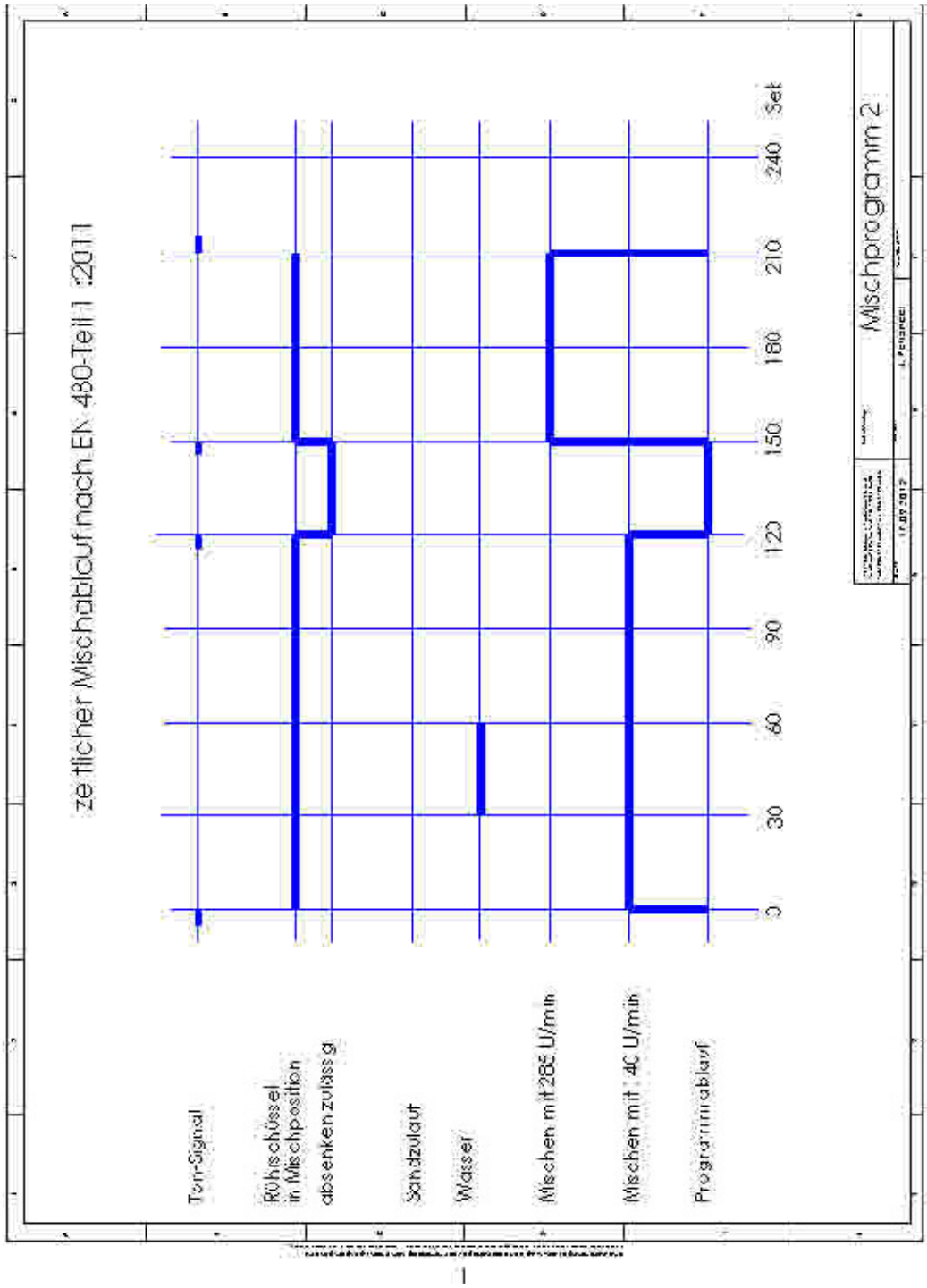
210
240
Ton-Signal
Rührschüssel
in Mischposition
absenken zulässig
Sandzulauf
Wasser
Mischen mit 285 U/min
Mischen mit 140 U/min
Programmablauf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Mischprogramm 2
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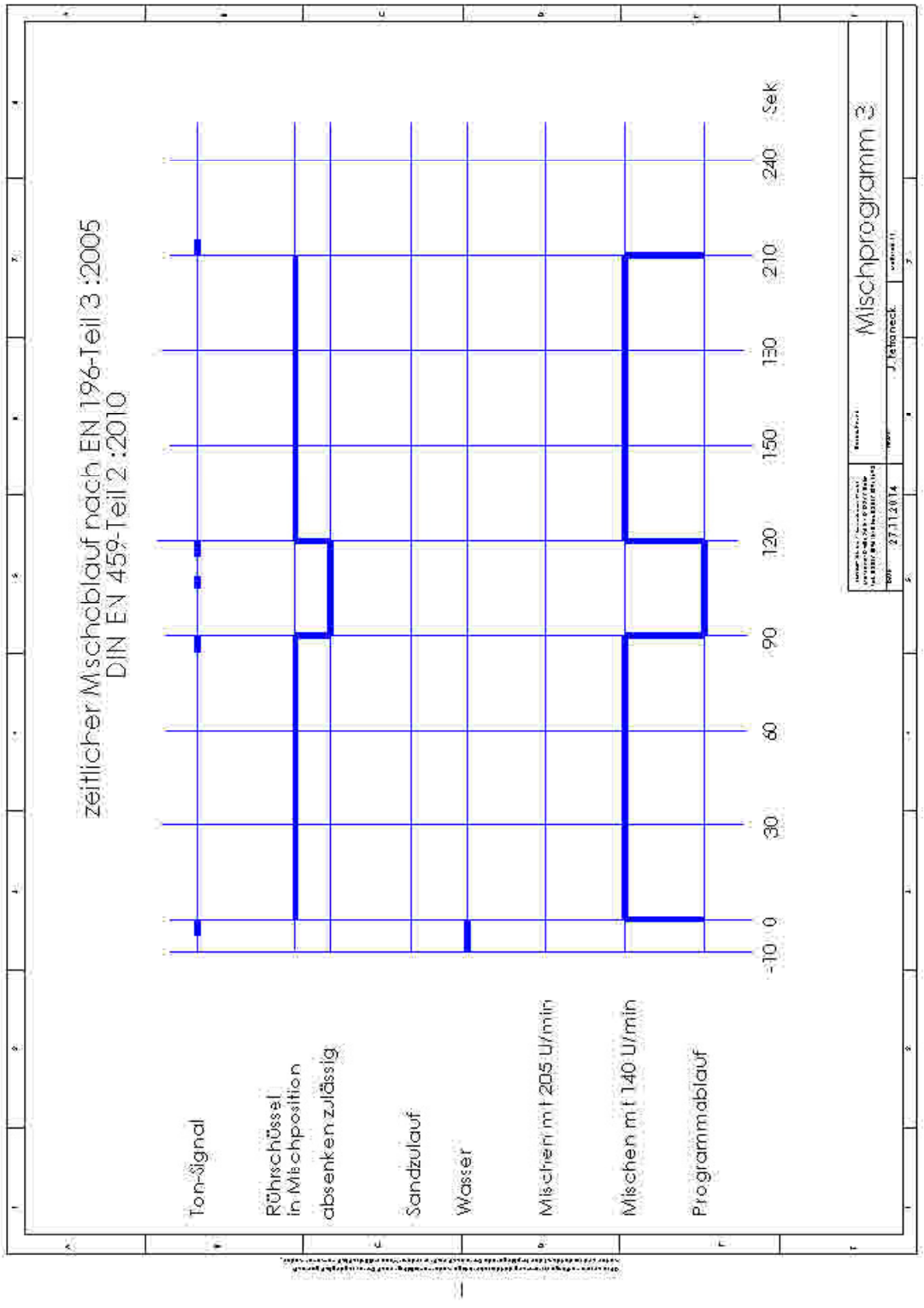
Ton-Signal
Rührschüssel
in Mischposition
absenken zulässig
Sandzulauf
Wasser
Mischen mit 285 U/min
Mischen mit 140 U/min
Programmablauf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DIN EN 459-Teil 2 :2010
Mischprogramm 3
J.Rehaneck
27.11.2014
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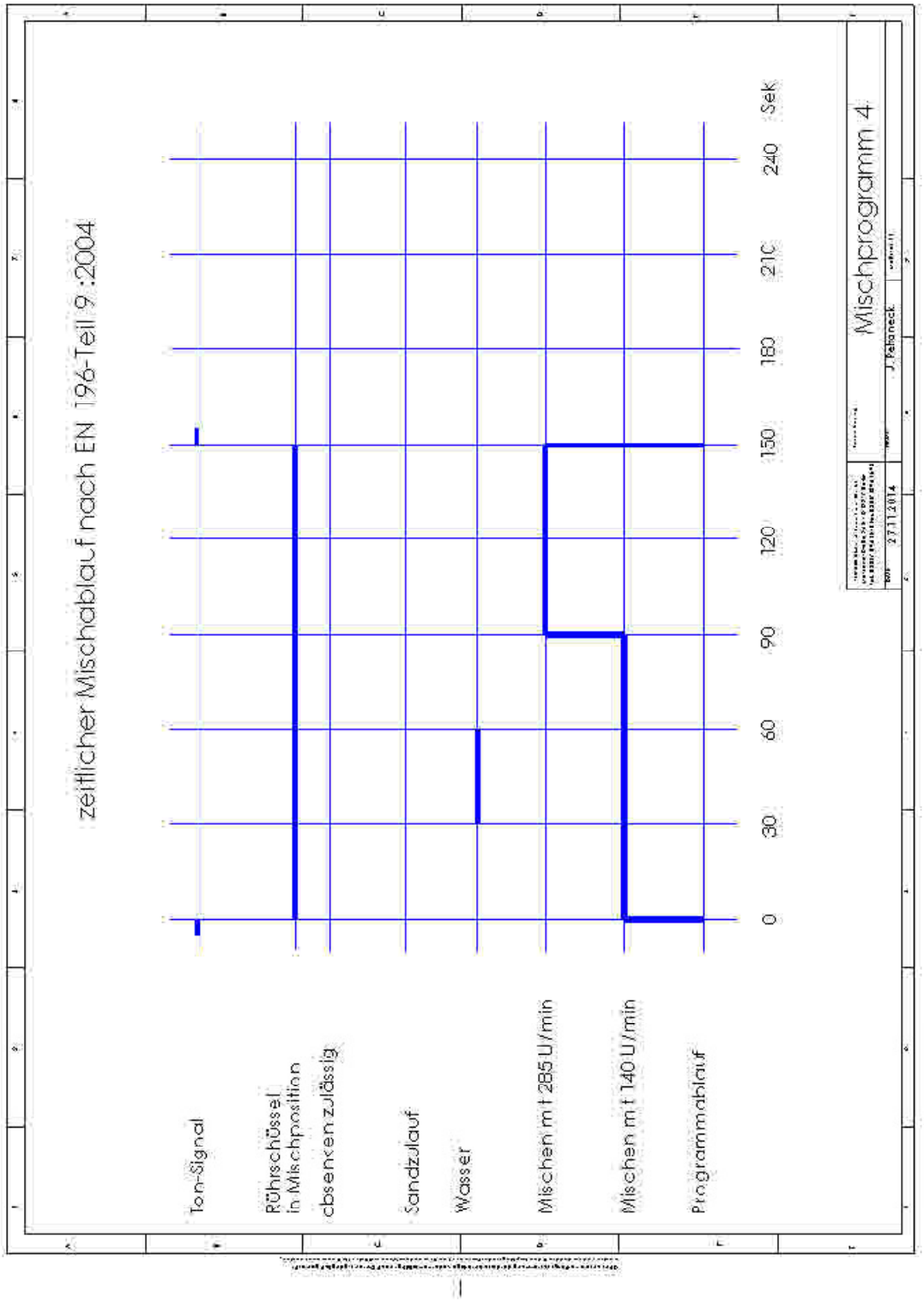
Ton-Signal
Rührschüssel in Mischposition absenken zulässig
Sandzulauf
Wasser
Mischen mit 205 U/min
Mischen mit 140 U/min
Programmablauf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Mischprogramm 4
J. Rehaneck
27.11.2014
Ton-Signal
Rührschüssel in Mischposition
absenken zulässig
Sandzulauf
Wasser
Mischen mit 285 U/min
Mischen mit 140 U/min
Programmablauf
0
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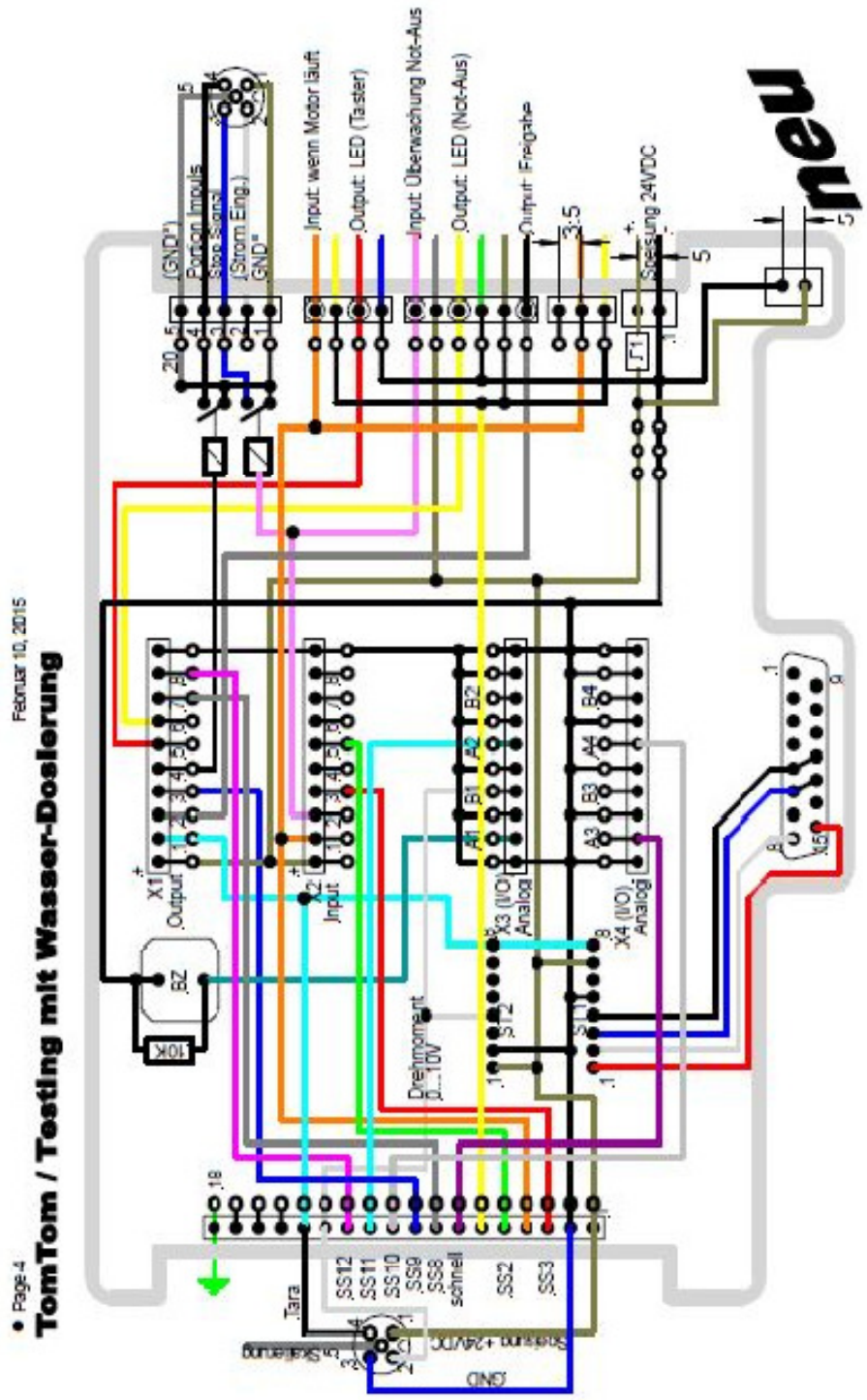
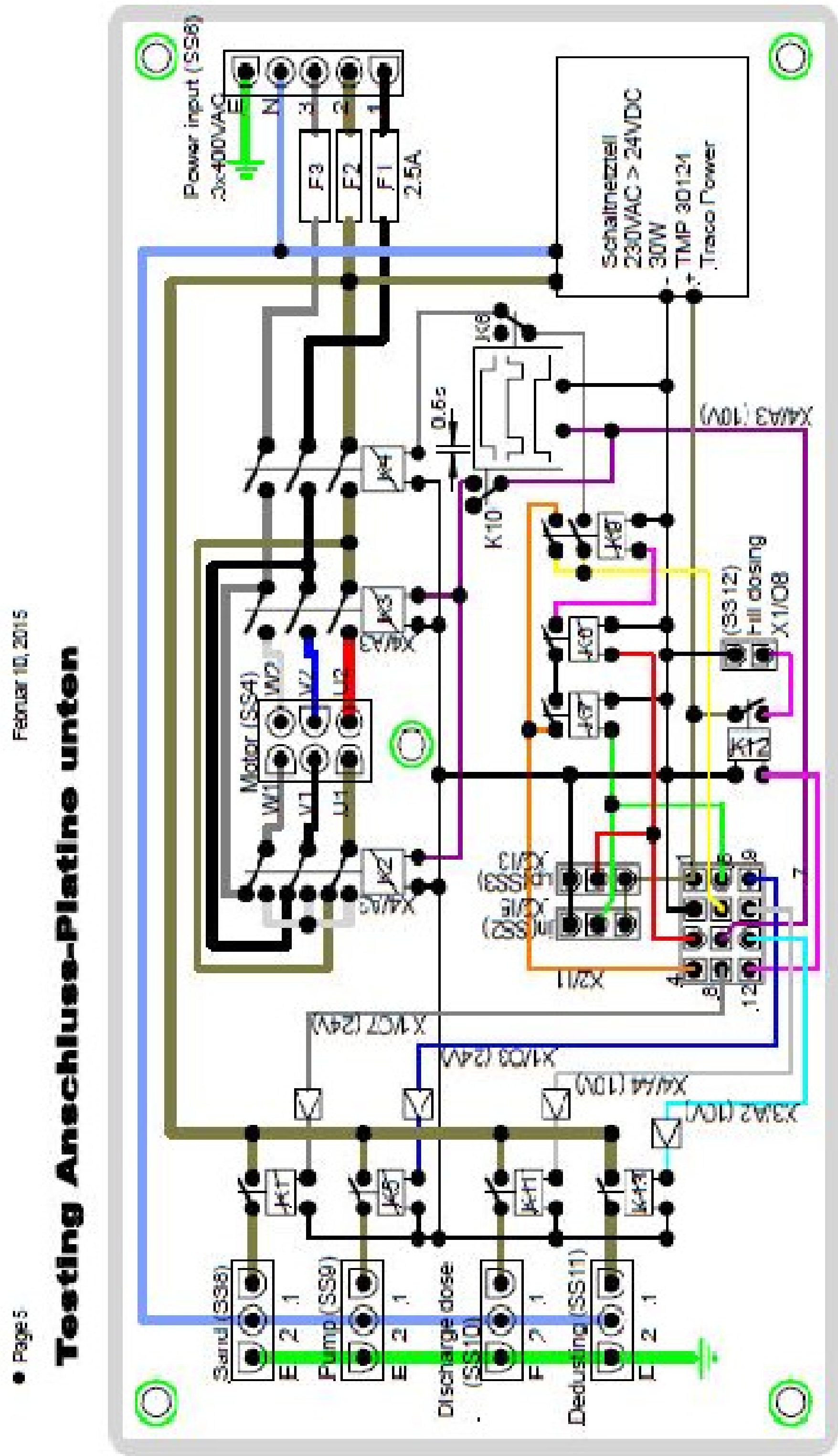
120
150
180
210
240
Sek


TomTom / Testing mit Wasser-Dosierung
Februar 10, 2015
Page 4
Input: wenn Motor läuft
Output: LED (Taster)
Input: Überwachung Not-Aus
Output: LED (Not-Aus)
Output: Freigabe
Versorgung 24VDC
Output
Input
Drehmoment
0...10V
Tara
SS12
SS11
SS10
SS9
SS8
schnell
SS2
SS3
GND


Page 5
Testing Anschluss-Platine unten
Februar 10, 2015
Power input (SS6)
3x400VAC
2.5A
Schaltnetzteil
230VAC > 24VDC
30W
TMP 30124
Traco Power
0.5s
K10
Motor (SS4)
X4/A3 (10V)
(SS12)
Fill dosing
X1/O8
X2/11
X1/O7 (24V)
X1/O3 (24V)
X4/A4 (10V)
X3/A2 (10V)
Sand (SS8)
Pump (SS9)
Discharge dose (SS10)
Dedusting (SS11)

Test report

for the final inspection of the laboratory mortar mixer
Model 1.0206.07

Mechanical testing criteria	
1. Pot lifting mechanics	OK
2. Mixing bowl location	OK
3. Distance between the stirrer and the pot (3 ± 1 mm)	OK
4. Sand throughput time in the mixing trough 30 s	OK
5. Stirrer location in the eccentric clamp	OK
6. Low planetary motion (TARGET STATE 62 ± 5 min^{-1})	
7. High planetary motion (TARGET STATE 125 ± 10 min^{-1})	
Electrical testing criteria	
1. Software Version	SV.:
2. Main switch	OK
3. Functional testing 'Manual operation'	OK
4. Functional testing 'Automatic operation'	OK
5. Query: 'Insert mixing vat'	OK
6. Query: 'Mixing trough in mixing position'	OK
7. Function: 'EMERGENCY STOP'	OK
Visual check	
1. clean paint and switch surfaces	OK
2. proper assembly of the control elements	OK
Final functional check	OK

Type of mixer: 1.0206.07
Device No. : 14
Testing date : _____
Tester : _____

Test and measurement report

DIN VDE (Association for Electrical, Electronic & Information Technologies) 57 100 – VDE 0701 DGUV (German Social Accident Insurance) Regulation 3

☐	Acceptance of the test	☐	Testing after repair

Device/type	Article number	Manufacturing number
Mortar mixer	1.0206.07	14 - 2016

Nominal data					
Voltage	Frequency	Current	kW	min^{-1}	Protection class
400 V	50 Hz	1.5 A	0.4	62/125	I (VDE 0100)

Item	Test/measurement	TARGET STATE	CURRENT STATE
1	Visually inspect protective conductor		☐ O.K.
2	Mains voltage during measurement		V
3	Contact resistance	< 300 mΩ	mΩ
4	Insulation resistance	≧ 1.0 MΩ	MΩ
5	Alternative leakage current	≦ 3.5 mA	mA
6	Functional testing		☐ O.K.

Measuring instruments used:	Digital multimeter (Voltcraft)	Device tester according to 0701

Repair findings/replacement parts/comments

Notes

A Use of a RESIDUAL CURRENT CIRCUIT BREAKER with 30 mA rated fault current resolution is recommended.

B The accident prevention regulation VBG 4 (German Institution for Statutory Accident Insurance and Prevention in the Administrative Sector) requires that measurements be carried out according to VDE 0701 (Association for Electrical, Electronic & Information Technologies) items 1-4 with a test cycle of about 6 months for portable electrical devices.

As manufacturer, we are obliged to inform you of this regulation.

Tests and measurements have been carried out	Date	Signature