HAVER

MEC III

Electronic Evaluation Instrument

Operating Instructions

Rotopacker

Version 24.6

Contents

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Functional Overview 1

MEC III is an electronic evaluation instrument with up to 6000 parts, which can be calibrated and is combined with a control system that supports all the functions of a filling spout.
A Rotopacker that is equipped with MEC III has a weigher fitted to each spout on the rotating portion.

The operation and display of all functions is performed through an operating terminal.
The entire adjustment of the converter card is made through the dialog.
A multi-scale weigher with 3 partial weighing ranges can be set up, and each range can be individually adjusted.

The weigher controls all the spout functions independently.
The definition of up to 99 different sorts is carried out from the integral keypad and the built-in LCD graphics display, in English, German and various other languages. These settings are saved in non-volatile memory.

The changeover to a different sort can be made with a selector switch on the stationary section of the machine, or by selecting the sort with the keypad. When the bag that was most recently filled has been discharged, the machine automatically sets itself to the newly selected sort, and is immediately ready for operation again.
The controls are linked together through an Ethernet network.

In a further stage of expansion, a central input/output unit – the server – is connected to the network and so linked to all the spouts.
Weigher data, control signals, error messages and warning signals are sent from the individual spouts to the MECIII server, via the network. This displays the messages that have been received, and establishes the connections to other peripheral units and systems.

Two check-weighers and a higher-level (supervisory) computer can be connected to the server.
Parallel inputs and outputs provide the connections to the system.

One check-weigher per discharge belt can be connected to the MECIII server, as a higher-level bag-weight correction system. From here, a new adjustment can be made for a spout that has produced a bag that was too light or too heavy. The check-weigher can initiate the ejection of bags that have an incorrect weight.

If a check-weigher is not available, then the server can control one ejection device per output belt instead.

Both the weigher/control system and the server have been designed as a compatible system of modules, with components that can be exchanged with one another. This means that even a layman is able to search for a fault, if necessary, by swapping modules, a facility that increases the availability of the machine.

2.1 Parameter summary

2.1.1 Weigher parameters

On each spout, several parameters can be set that do not depend on the sort. These parameters are called *Weigher parameters.*

Weigher parameters	**Possible entries**	**Validity**
Spout number	1 - 50	
Line number	1 - 199	
Pulses per turn	0 - 9999	1)
Offset	0 - 359.9 degrees	1)
Auto Place Start Belt1	0 - 359.9 degrees	1)
Auto Place Stop Belt1	0 - 359.9 degrees	1)
Operate bag holder Belt1	0 - 359.9 degrees	1)
Manual placing Belt1	0 - 359.9 degrees	1)
Empty-bag position Belt1	0 - 359.9 degrees	1)
Broken-bag position Belt1	0 - 359.9 degrees	1)
Start discharge position Belt1	0 - 359.9 degrees	1)
Stop discharge position Belt1	0 - 359.9 degrees	1)
Auto Place Start Belt2	0 - 359.9 degrees	1)
Auto Place Stop Belt2	0 - 359.9 degrees	1)
Operate bag holder Belt2	0 - 359.9 degrees	1)
Manual placing Belt2	0 - 359.9 degrees	1)
Empty-bag position Belt2	0 - 359.9 degrees	1)
Broken-bag position Belt2	0 - 359.9 degrees	1)
Start discharge position Belt2	0 - 359.9 degrees	1)
Stop discharge position Belt2	0 - 359.9 degrees	1)
Start switch	on / off	
Network monitoring	on / off	

1 = Packers with position determination based on angle measurement

2.1.2 Sort parameters

The sort-dependent parameters can be set up individually for each sort.

Sort parameters	Possible entries	Validity
Product name	_____	
Function	gravimetric - volumetric	
Target weight	0,000 - 9000,0 Kg	
Classification	0.2 / 0.5 / 1 / 2 / 5 / x	
Underweight	depends on classification	
Overweight	depends on classification	
Fine-feed quantity	0.00 - target weight	
Fine-feed cross-section	0 - 999	
Filling break (pause)	0.0 - 9.9 sec	
Correction	0.0 - 9.9 Kg	
Fine-feed dosing time	0.0 - 9.9 sec	
Lead	dynamic / static	
Fixed value	yes / no	
Static lead	0.0 - 9.9 Kg	
Machine constant	0.0 - 5.0 sec	
Turbine delay	0.0 - 2.0 sec	
Start aeration	0.0 - 9.9 sec	
Initial air	0 - 99 sec	
Maximum pause time	0 - 99 minutes	
Filling interruption	on / off	
Maximum filling time	0 - 250 sec	
Turbine speed, coarse feed	0 - 7	
Turbine speed, fine feed	0 - 7	
Saddle height	0 - 999 pulses	
Standstill time	0.0 - 5.0 sec	
Fine-feed dead-time	0.0 - 1.9 sec	
Blow-out delay	0.5 - 9.9 sec	
Blow-out time	0.0 - 9.9 sec	
Inflation time	0.0 - 9.9 sec	
Inflation threshold	0,000 - 9000,0 Kg	
Bag venting 1	0.0 - 25.0 sec	
Bag venting 2	none, coarse feed, fine feed coarse + fine	
Bag venting 3	0.0 - 25.0 sec	
Number of bags in residue removal	0 - 99	
Settling time	0.0 - 9.9 sec	
Speed duration	0.0 - 5.0 sec	
Minimum speed	0,0 - 8.3 Kg/sec	
Speed delay	0.0 - 9.9 sec	
Aeration threshold: coarse feed	0,0 - 50,0 Kg/sec	
Aeration threshold: fine feed	0,0 - 50,0 Kg/sec	
Aeration duration	0 - 99 sec	
Dosing-time regulator	on / off	
Dribble-feed regulator	on / off	

Sort parameters	Possible entries	Validity
Dribble-feed regulator delay	0.1 - 9.9 sec	
Regulator factor	0 - 150%	
Additional dosing	none, fine feed, coarse feed	
Pulse length (duration)	0.1 - 9.9 sec	
Broken-bag position	2 - 5	
Broken-bag position	Broken-bag position, belt, spout, empty-bag/waste	
Minimum weight	0.0 - 80.0 Kg	
Discharge lead: Belt 1	0 - 999	
Discharge lead: Belt 2	0 - 999	
Discharge duration	0.0 - 9.9 sec	
Discharger running time	0.0 - 9.9 seconds	
0/taring frequency	0 - 99	
Taring delay	0.0 - 9.9 sec	
Empty limit	0.0 - 9.9 Kg	
Empty damping	0-6	
Full damping	0-6	
Coarse damping	0-6	
Fine damping	0-6	
Bag-OK check for	start, empty level, none, always	
Bag-OK delay	0.0 - 9.9 sec	
Bag-OK check	yes / no	
Bag-OK blow-out	yes / no	
Spout selection	Bag holder at front, at back	
Control output 1	none, coarse feed, fine feed, coarse + fine, always	
Control output 2	none, coarse feed, fine feed, coarse + fine, always	
Control output 3	0,0 - 45.0 Kg/sec	
Control output 4	none, coarse feed, fine feed, coarse + fine, always	
Welding delay	0.0 - 5.0 sec	
Welding time	0.0 - 0.7 sec	
Anvil delay	0.0 - 9.9 sec	
Tipper saddle limit 1	0.0 - 80.0 Kg	
Tipper saddle limit 2	0.0 - 80.0 Kg	
Bag clamp, limit 1	0.0 - 80.0 Kg	
Bag clamp, limit 2	0.0 - 80.0 Kg	
Inflation threshold	0.0 - 80.0 Kg	
Spillage rejection	0.0 - 80.0 Kg	
Spillage rejection delay	0.0 - 9.9 sec	
Silo vibration pulse	0.0 - 9.9 sec	
Silo vibration pause	0.0 - 9.9 sec	
Suction nozzle delay	0.0 - 9.9 sec	
Suction nozzle on	0.0 - 9.9 sec	
Suction nozzle off	0.0 - 9.9 sec	
Fast-empty delay	0.0 - 9.9 minutes	
Fast-empty duration	0.0 - 9.9 minutes	
Fast-empty aeration	0.0 - 9.9 minutes	
Placing position	1 - spout number	
Empty-bag position	1 - spout number	
Waste position 1	1 - spout number	

Sort parameters	Possible entries	Validity
Waste position 2	1 - spout number	
Discharge position 1	1 - spout number	
Discharge position 2	1 - spout number	
Pressure release time	0.0 - 9.9 sec	
Lower cone delay	0.0 - 9.9 sec	
Cone always open	yes / no	
Coarse feed delay	0.0 - 9.9 sec	
Cone aeration	0.0 - 9.9 sec	
Cleaning mode	scissors, cone, scissors + cone	
Cleaning air	blower air, compressed air	
Closure time	0.0 - 9.9 sec	
Opening time	0.0 - 9.9 sec	
Fast-empty cycle	0 - 99 sec	
Placing lead 1	0 - 999	
Placing lead 2	0 - 999	
Sort enabled	yes / no	

2.1.3 Calibration parameters

Adjustment parameter	**Possible entries**
Dimensional unit	kg, lb, t, klb
Weighing range	1-3
Display division(s)	1000g / 500g / 200g / 100g / 50g / 20g / 10g / 5g / 2g / 1g
Range limit	0,0 - 9000,0 kg
Calibration weight	0.000 - range limit kg
Minimum weight	0.1kg / 20e - lowest range limit
R61 mode	yes / no
Operating mode	multi-scale weigher / multi-range weigher
Zeroing range	-24,5% - +25%
Warm up	0 - 60 minutes

2.1.4 Display values

Parameters that are displayed for information only can be found in the menu item *Display values* and cannot be edited.

Display values

0 - memory
Tare memory
Zeroing range
Coarse speed
Fine speed
Filling time C+F
Calibration counter
Fine-feed quantity
Static lead
Machine constant
R61 mode
Vibration

2.2.1 Automatic function test

To ensure reliable filling operation, the following system components are checked:

- Measurement channel
- ROM area
- RAM area
- Parameters
- Weight display
- Interfaces
- Program sequence

If an error is detected, then the controls produce a corresponding error message in the text display, and filling operation is blocked.

Measurement channel
The measurement channel is tested once after switching on the electronics, and then cyclically every 5 minutes during operation. The test is made by applying a test voltage to the measurement channel input, and comparing this with a test value that is stored in the EEPROM. This test voltage corresponds to about 90% of the full-scale value for the A/D converter. If the difference is larger than ½ d, then the converter is recalibrated for zero and full scale. Afterwards, if the difference is larger than 2 d, then (in R61 mode) the error message *Check value error* appears in the text display.

ROM area
A checksum is recorded for the entire ROM area, that is checked once at switch-on and then cyclically, in the background, during operation.

RAM area
The entire RAM area is checked once at switch-on and then cyclically, in the background, during operation. The RAM test consists of the writing and reading of bit patterns.

Parameters
All parameters (weigher, sort and adjustment/calibration parameters, I/O-assignment tables, configuration tables) are checked once after switch-on, and then cyclically in operation or each time they are accessed, using checksums.

Weight display
After switch-on, the weight display within the graphics display will show **88888888** for a short time.

Interfaces
The data on the interfaces are checked for errors. The data sets thermselves are provided with checksums, to verify correct reception. In addition, each byte is checked through a parity bit. Important messages are acknowledged. Collisions are detected.

Program sequence
In order to be able to recognise a possible program crash and then re-initialize the system, there is an internal watchdog timer that must be regularly re-triggered by writing to a memory location. If this is missing, the watchdog interrupt carries out a reset.

2.2.2 Functional sequence

Switch-on:
After switching on, the electronics carries out an initialization and checks all the battery-buffered parameters. After this, the *Warm-up* time will run, if it has been set up.
Finally, the weigher automatically selects the sort that was last selected. The weigher will signal its presence to the server, if one is connected, so that it can obtain the current sort number from the server.

Place empty bag:
Various different configurations must be distinguished for applying (placing) bags.

1) Continuously rotating packer, no bag placer available:
   The bags are placed by hand. The bag holder is operated at Position 1 or 2. This depends on the input *Placing: manual/automatic*. If a 24V signal is applied to the input, the bag holder is operated at Position 2.
   However, a start switch can also be installed. In this case, the bag holder will only be operated when the switch has been activated by the empty bag.

2) Continuously rotating packer, bag placer installed, but out of operation:
   A 24V signal is applied to the *Manual/automatic* input, so that the bag holder is operated at Position 2, in order that the operator can place the bag by hand.

3) Continuously rotating packer, bag placer in operation:
   A 0V signal is applied to the *Manual/automatic* input, so that the bag holder is operated at Position 1, in order that the automatic placer can apply the bag.

4) Intermittently rotating packer:
   On these machines, the bag is placed while the packer is at standstill. An optical switch is installed, that switches when the bag is in position.
   The bag holder is operated at this moment. The optical switch is wired to the *Start switch* input.

After the bag holder has been operated, a check is made that the bag is hanging properly on the spout. If there is no *Bag-OK* signal by the time the *Bag-OK delay* time runs out, then the empty bag is ejected to a special empty-bag/waste position. If the *Bag-OK* signal is already present before the time has elapsed, then filling will start immediately.

Standstill
Standstill has been reached if the measured values do not go outside a given range of variation during the time given by *Standstill duration*. If this condition is fulfilled, then the icon for the standstill display will be displayed. At the same time, the status will be given out at the *Standstill* output. The range limits for normal operation are +/- ½ a display division, and +/- ¼ a scale division for the zeroing/taring function.

Taring
The zeroing range is 4% of the maximum weighing range, whereby the position can be adjusted around the zero point in the adjustment dialog. The taring range is the maximum weighing range minus the target weight. If the weight display becomes zero or negative during taring, then the weigher will be zeroed.

The automatic zeroing/taring function is performed
- as a result of the taring frequency setting in automatic filling operation (after a maximum of 500 fillings)
- at the latest, after 15 minutes in automatic filling operation

The semi-automatic taring function is performed on request
- after the corresponding action in the short dialog *Taring local*
- after the corresponding action in the short dialog *Taring network*, via the MEC network

The semi-automatic zeroing function is performed
- after the corresponding action in the short dialog *Zeroing*

The weigher must be in a status that permits this function at the time. The preconditions for a zeroing/taring are: weigher standstill (+/- 1/4 d) and a weight in the zeroing or taring range.
The empty damping for the currently valid sort is set as the damping. During zeroing/taring, the status LED *Zeroing/Taring* is switched on.
If the conditions are not fulfilled, then operation is stopped and an appropriate error message is generated.
After successful zeroing/taring, the weight display shows the value zero in the relevant display section, and there is a small circle in the 1st position if the deviation is not more than +/- 1/4 d for this display section. The tared weight is saved in the tare memory and subtracted from the current weight. For orientation, the designation **NET** (for net weight) is presented in the display after every tare operation.

If the tare value exceeds the preset value for the empty level, the *Error* output will be set, and the message *EMPTY ERROR* will appear in the LCD display. The weigher will not request any new bags until the spout weight has fallen below the empty level.
Even without taring, the weight of the empty bag carrier is checked before filling starts. If the tare value exceeds the preset value for the empty level, the system assumes that the bag carrier is too dirty to allow proper operation of the weigher.

Initial aeration
If the *Maximum interrupt time* between two fillings is exceeded, then *Initial air* is started before the filling begins. After detection of *Bag-OK* and before filling starts, the *Hopper aeration* and the *Blow out spout* output are switched on for the time that is set in the dialog. This function is not available for the air filling system.

Start pulse
On turbine machines, if a start pulse duration has been set, the initial aeration will be switched on after the slide-valve is opened and before the filling turbine starts. This activates the *Start pulse* output. On turbine packers the turbine delay time starts at the same time. The filling turbine will be switched on after this time has elapsed. Since the delay time is usually not longer than 0.5 sec, the initial aeration runs in parallel with the coarse feed. After elapse of the initial aeration time, the *Start pulse* output is switched off.

On air-filling machines the Start pulse output is switched on after the pressure chamber has been filled, after *Bag-OK* is detected and after taring, if the start pulse duration is above 0.0 sec. The *Hopper aeration* output is switched on in any case. At the same time, the *Coarse feed delay* starts. After this has elapsed, the slide-valve is opened and coarse feed starts. After elapse of the start pulse duration, the *Start pulse* output is switched off.

Coarse feed
After taring, the filling damping is switched on, the coarse feed slide-valve is opened, and the spout is blown out, if this function has been fitted. After the end of the *Turbine delay* time the filling turbine is started up. In an air filling system, the delayed opening of the coarse feed slide-valve is set in the menu item *Coarse feed delay*.
During the filling process, the increase in weight is continuously measured and used to calculate the dynamic lead, if this function is switched on.
The actual increase in weight is compared with a preset minimum value, the *Minimum speed,* until the *Empty limit* has been reached. This monitoring function is activated when filling starts, but can be delayed by the *Speed delay* parameter.
If the increase in weight does not reach the minimum value, the conclusion is that the bag is broken, so filling is aborted and the bag is rejected as a broken bag.
Bags that have exceeded the maximum filling time are treated in the same way.
After passing the empty weight limit, a broken bag will only be signalled if a reduction in weight is measured. The minimum duration of this weight reduction is set in the dialog item *Speed duration*.

Tipper saddle
If a value large than 0.0 is set in the dialog item *Tipper saddle threshold 1*, then the tipper saddle is lifted directly at the start of filling, and lowered again when the preset value has been reached. If the value is 0.0, then the saddle stays down at first.
When the *Tipper saddle threshold* 2 is reached, the saddle is raised, and remains in this position until discharge. If the *Tipper saddle threshold* 2 is large than the target weight, then the saddle will only be raised when the discharge sequence is initiated.

Broken bags
The treatment of broken bags can be set up:
either they remain on the spout, or they are rejected to the broken-bag position, or discharged onto the output belt, to be ejected at a later point. Broken bags that have a weight below the empty limit will generally be ejected at the empty-bag waste position. Bags that have a weight below the minimum weight will be ejected at the broken-bag position, regardless of the broken-bag discharge position that has been set. This is to ensure that underweight bags do not cause a pile-up on the belt.
If the maximum filling time is exceeded three times in a row, or a bag is ejected to the broken-bag position, then the spout is switched off and a fault signal is generated. The fault signal must be acknowledged. This is done by switching the spout off and on again with the knob-operated switch.

Spillage rejection
If the spillage-rejection weight limit is reached, then the spillage rejector is activated.

Filter valve technology
When the *Suction nozzle delay* time has elapsed, then the *Injector nozzle* output is switched on. This output is required by filter valve technology, in order to suck the bag valve free. The suction pulses can be set up in the dialog. Here *Suction nozzle on* defines the suction duration, and *Suction nozzle off* defines the pause duration. The injector nozzle is activated for up to three seconds after the end of filling, but switched off earlier if the bag-discharge position has been reached.

Fine feed
The coarse/fine changeover point is set up in the dialog. If the actual weight (taking the lead into account) has reached this changeover point, then the coarse feed is stopped. If the dosing time regulator is switched on, then the changeover point is shifted, depending on the fine-feed duration that has been set. *Fine damping* is activated at the start of fine feed.
A *Filling break* can be inserted between the coarse and fine feeds. In this case, the slide-valve is closed completely and the filling turbine is switched off. This break can be used to vent the bag.
With fine feed, the response to broken bags, filling time overrun, etc. is the same as for coarse feed.
On machines that are appropriately equipped, the fine-feed cross-section can be set up according to the sort. The adjustment is then made automatically during the change of sort.

Filling interruption
If *Filling interruption* is switched on, it is monitored whether the spout passes the application/placing position during filling. If so, then the filling is interrupted until the spout reaches the empty-bag waste position. Operation then continues as described under *Additional dosing*.

Filling end
After the filling is finished, the *Blow out delay* time starts. After this time has elapsed, the spout pipe is blown out for the time set as *Blow out duration*.
When these times have ended, the system switches back to *Full damping*.
The *Inflation time* also starts at the end of filling. At the end of this time, the inflation of the spout pipe is stopped.
At the same time, the additional hopper aeration is turned on until either the preset *Aeration time* is ended, or the bag is discharged.

Dosing-time regulator
During filling, the weigher measures the duration of fine feed. After the end of filling, the dosing time regulator corrects the coarse/fine changeover point to ensure that the preset fine feed time is maintained.
After packing pauses that are longer than the *Maximum pause duration*, the coarse/fine changeover point is reset to the initial value that is set in the dialog. This is to compensate for the altered flow characteristics of the material resulting from the lengthy pause. It is therefore recommended that the coarse/fine changeover point should be set at a relatively low level in the dialog.

Dribble-feed regulator
If the dribble-feed regulator is switched on, then a check-weighing is carried out after the *Blow-out delay*, the blow-out itself, and the *Dribble-feed regulator delay*.

If the result of the check-weighing shows a deviation from the target weight,
then an adjustment is made to the setting for the machine constant (when dynamic lead is switched on) or the static lead.
The regulator increment size depends on the deviation that is measured, and the regulator factor.
This is set in the weigher parameter menu, under the item *Regulator factor*.

Classification
If classification is turned on, the actual weight will be registered after a check-weighing, and compared with the preset limits X(x) as per R61. These limits must not be tighter than the weigher class Ref(x), according to the following table:

Weight of the load	**Class X(1)**
500g < M ≤ 1,000g	15g
1000g < M ≤ 10000g	1,5%
10,000g < M ≤ 15,000g	150g
15000g < M	1%

The limits for the (x) classes that are set up in the sort parameter ***Classification*** must in each case be multiplied by the X(1) values from the table, for instance: **X(2) => 2* X(1)**. For each setting of the classification limits, the values for the overweight and underweight limit parameters will automatically be adjusted. These can then subsequently be edited within the limits that have been set (e.g. reduced). The X(x) parameter can be used to set up free limits.
Classification switches on the ↤ sign if the weight being checked is too low. Likewise, if the weight is too high, then the LED is switched on. If it is within the limits, then both symbols are switched on.
If the weight is outside the limits, then the bag is treated as a broken bag, as defined in the dialog.
If broken bags are to be discharged onto the output belt, then the *Wrong weight* signal will be given out. The system controls can then intiate the ejection of the bag.

Additional dosing

In the operating mode *Additional dosing,* the bag is not immediately rejected if it is below the underweight limit. Instead, the bag receives a further filling. The additional dosing is ended at the latest at the end of the maximum filling time.
When the deviation from the target weight is less than 1kg, the bag is given an additional dosage in pulses. The pulse duration can be set in the dialog item *Pulse time*. After each pulse, the system waits for the time set in the menu item *Standstill duration*, then switches to standby damping and waits again. A check weighing is then carried out. The filling hopper aeration remains switched on during the pulsed additional dosing.
If the difference is larger than 1 kg, then the additional dosing is continuous. The spout cross-section for the continuous additional dosing is set in the dialog item *Additional dosing* to either coarse feed or fine feed. The cross-section remains unaltered until the target weight is reached. After the discharge of the bag that has received additional dosing, the correction signals for overweight bags from the check-weigher are ignored for the next two turns of the packer.

Digital filter

The digital filter is a series circuit of two filter sections, each creating a moving average value of the A/D-converter values. The calculated number of values per filter section, the throughput times that are derived, and the measured machine constant MC in the simulator, are all listed in the following table, according to the possible damping values (0 – 6).

Damping	Values per filter	Throughput time	MC
0	1	0.5	0.106
1	4	0.6	0.166
2	8	0.8	0.246
3	16	1.0	0.406
4	32	1.6	0.727
5	64	2.5	1.163
6	100	4.0	1.861

The throughput time is the time taken for the value at the output of the filter to reach 100% of the input value.
The display values for the weight display on the operating terminal are additionally damped by a 3rd filter section that is not discussed here.

Bag discharge

On continuously rotating machines, the discharge point is determined automatically by the control system, depending on the rotational speed of the packer. However, the bag must only be discharged if the output belt is switched on. The discharge can be prevented if the *Discharge enable* input is switched to logical 0 by the external controls, via the slip ring.
On a packer with two output belts, the *Bag from Radimat 2* output is set if the relevant bag was placed on the second half of the packer. This information can be used by an external control system to define the belt onto which the bag is to be discharged. The discharge can also be prevented, as described above.

On machines that have a welding device on the spout, the ejector moves out before the discharge point is reached. This is Position 4, when welding is activated, or Position 5 if welding is not activated. If the discharge enable is removed after the ejector is operated, the spout must nevertheless drop the bag onto the belt and then move the ejector back in. This is necessary to avoid the extended ejector colliding with the automatic placer. This situation must be taken into account in the control system for the output belts.

For operation in environments with an explosion hazard, it is necessary to check that the safety functions on the welding station are operating correctly. To achieve this, **ATEX** mode can be activated in the configuration. In this case, at the start of filling and after every 20th bag, the anvil jaws will be closed and the safety devices will be tested. If there is a fault, **ATEX ERROR** will be generated and the system waits for acknowledgement. After acknowledgement, the test will be repeated. Welding/sealing can only be continued after a successful test.

On intermittently rotating machines, the bag is discharged to a sealing device at the discharge position. The transfer takes place when a 24V signal is applied to the *Discharge enable* input. If a tipper saddle is installed on such a machine, it will be raised before the transfer.
Simultaneously with the operation of the ejector, a bag-count pulse is given out for a duration of 0.5 sec.

After the successful discharge, a message is sent to the server via the network, for the next reference position. The message contains the spout number, actual weight, and the currently valid limits.

If filter-valve technology is used, the timing for the ejector operation can be advanced, by adjusting the *Discharge lead* and the *Ejection duration*. In this case, a guide plate must be installed inside the packer covering, on the stationary section, to prevent the bag falling down when the ejector is moved out. In this area, the injector nozzle is activated once more, to provide suction before and during the discharge. The activation of the nozzle takes place after the end of the *Ejector time* that was started when the ejector was activated.

If *Bag-OK blow-out* is switched on, then the bag holder will be activated again for about 0.5 sec. after the discharge and after the expiry of *Ejector time*. This is to ensure that the filling spout is blown out during the Bag-OK detection phase.

Saddle height adjustment
Each one of the 99 possible sorts can have a saddle height assigned to it. The programming is performed in the sort menu.
The saddle height can be entered directly. Another possibility is the teach-in procedure. First of all, select the menu item *Move to reference*. The saddle then moves down to the reference point. The next step is to move the saddle, using the menu item *Manual move* with the > and < keys, until the height that is set meets the requirements. Then operate the ↵ key to accept the saddle height that is now set up in the current sort memory. If any other key is operated, apart from these three, then this mode will be cancelled, without the saddle height being stored.
When the sort is changed at a later time, then after discharging the bag the system moves first of all to the reference position, and then to the new saddle height.

When using stepped saddle height with a cylinder, a check is made, when the cylinder is activated, whether or not a continuous saddle height is fitted. This procedure takes a few seconds. If the stepped saddle height has been set incorrectly, then it will automatically be corrected.
If continuous adjustment is used and it is detected that the motor that is being used is not rotating, then an error message is generated. The continuous adjustment is also switched off internally, to prevent mechanical damage. The continuous adjustment can only be re-enabled by switching the supply voltage off and on again.

Regulation by check-weigher
If a check-weigher and an MEC III server are installed, then the check-weigher can initiate the transmission of a regulation signal from the server to a spout. The size of the control/regulation increment is entered in the server. The regulation has the effect of altering the value in the correction memory of the weigher.
If the check-weigher detects an overweight bag, and the spout has received the regulating signal, then the amount of the regulation increment is subtracted from the value in the *Correction* memory. In the same way, if the bag is too light, this amount is added to the correction memory.
The internal target weight, weight limits and the changeover weight are increased by the value in the correction memory. The correction value cannot be negative. If a control/regulator tries to achieve this, a *Regulator error* message will be produced.

Fast-empty
Continuously rotating machines with a turbine filling system
Three different versions can be selected in the configuration. With the *Normal* version, after the start of fast-empty, each spout waits for the length of time set by *Fast-empty delay*. When this time has elapsed, the fast-empty channel is ventilated, the fast -empty valve is opened and the turbine is switched on. The duration of fast-empty ventilation is set in the dialog. At the same time, *Fast-empty duration* is started. At the end of this time, the turbine is switched off again and the slide-valve is closed.
The setting of different delay times prevents all the spouts starting the fast-emptying simultaneously, which could block the material return path.
On the other hand, all the spouts should stop fast-emptying at the same time. This is to prevent material from segments of the packer silo that are not yet empty falling back into segments where the fast-empty is already finished.
So the desired switch-off sequence can be achieved by entering correspondingly different times for the fast- empty duration.
Each spout reports the start and end of its fast-empty to the server. The *Fast-empty running* output on the server remains set, as long as fast-empty is still running for at least one spout.

The application of a 24V signal to the *Cancel fast-empty* input on the server causes a cancellation of fast-empty on all the spouts at the same time.

A second method is, to empty the spouts through the filling pipe for as long as the *Fast-empty request* is present at the input. In this case, the *Bag-OK* input is not monitored. At the same time, the *Blow out spout* output is activated. This variation can be selected by using *Stationary fast-empty* in the configuration dialog, and is normally applied in conjunction with a folding hose for residue removal in front of the filling spout. For this reason, the anvil is closed when the reference position is reached, if *Fast-empty* is initiated in the stationary state. To do this, 24V must be applied to the *Fast-empty check* input when the *Fast-empty* is started.

The third method also uses settings for the *Fast-empty delay* and *Fast-empty duration*. But in this case, no material is emptied during the fast-empty; the vibrators are activated instead.

Continuously rotating machines with an air filling system
In this case, fast-empty is started by the application of a *Fast-empty request* signal, and the placing of a bag or a hose on the filling pipe. Not only is the pressure chamber emptied, but also the silo which is located above it. First of all, the cone is opened until the material sensor in the pressure chamber is covered. Then the cone is closed and the scissors valve is opened, to let the material into the filling pipe. The scissors stay open until the material sensor is uncovered and the *Cycle time*, which then starts, has finished. Then the cone is opened again. When no more material comes through, the opening times for the cone and the scissors are determined by the cycle time that has been set. The fast-empty carries on for as long as 24V is applied to the *Fast-empty request* input. After fast-empty has finished, the cone remains open to provide new material. If, however, it is desirable to close the cone when fast-empty has finished, then the residue removal should be started before fast-empty is switched off. The cone will only open again when the residue removal is switched off.

Intermittently rotating machines
On these machines, the fast-empty is carried out in the same way as for the stationary version with continuously rotating turbine machines or air machines.

Residue removal

This function is used to fill any remaining material into bags, even though the packer silo has been reported as “empty”. In this condition, turbine machines would normally not request any more bags, and air-operated machines would not start a filling.
If *Residue removal* is started, this is in effect an override of the Silo min. signal.
In the dialog item *Number of bags in residue removal* you can define how many fillings can be started in this mode, before the the spout stops.
If this value is set to **99**, then the spout will stop when a filling is terminated by the *Maximum filling time* message. The spout will remain stopped until the *Residue removal* function has been ended.
On air-operated machines, the pressure chamber will not be refilled in the residue removal mode, and the cone remains closed.

Clean
In machines with an air filling system, the pressure chamber can be cleaned automatically. There is a basic difference between cleaning with air from the blower and cleaning with compressed air.
During cleaning with air from the blower, the cone and slide-valve are shut for an adjustable time. Aeration and silo vibration (shaker) are switched on. At the end of this time the air can escape through the open cone, the open scissors-valve, or both. At the end of the preset opening time, the scissors-valve and cone are closed again. This cycle is repeated for as long as the function is selected.
During cleaning with compressed air, the cone and scissors-valve remain open all the time. Simultaneously, compressed air is blown into the pressure chamber or front chamber from special cleaning nozzles. At the end of the opening time, the compressed air is shut off for the preset closing time. This cycle is also repeated until the function is switched off.

An automatic flap-valve control is available as an option. In this case, the cleaning flap is opened automatically after the cleaning cycle, and closed again by operating a pushbutton when the cleaning procedure is finished.
If the cleaning flap is opened during normal operation, the spout will cease operating and close the cone.

Welding the bag valves
A welding station can be installed at each spout. This can then seal up the bags before they are discharged. During welding/sealing, the welding generator drives an oscillator device, the Sonotrode, which heats up the clamped bag valve through very high frequency oscillations, thus melting the adhesive in the bag valve.
If this is required, the option must be selected in the configuration dialog. Furthermore, the welding time must be set up in the sort dialog. A 24V signal must be applied to the *Sealing On* input, otherwise the bags will not be welded after filling.
The bag clamp is operated after *Blow out spout*. The filling at Position 4 must be finished when 24V is applied to the *Sealing ON* input. If the *Sealing head up* input is activated and the discharge to the output belt is enabled, then the ejector is operated and the sealing head is lowered after the *Ejector run-time*. If the *Sealing head down* input is at logical 1, then the *Close anvil* and *Prepare welding* outputs can be activated. After a fixed time has elapsed with 24V applied to the *Anvil closed* input, the *Weld* output is activated.
After the preset welding time (0.1 to 0.7 sec.) has elapsed, the *Weld* output is de-activated. After a further fixed time, the *Start welding* output is de-activated. When the welding time is finished, the variable *Anvil delay* time is started. At the end of this time, the anvil is opened, the bag clamp is released and the sealing/welding head is raised. When the discharge position has been reached, the tipper saddle is released. When the *Discharge time* is over, the ejector is moved in again.

If, in the configuration dialog, *Queuing*: *YES* has been set, then the discharge must be carried out in every case when the discharge position is reached. The mechanism must not pass the placer with the ejector in the extended position.
If, in the configuration dialog, *Queuing*: *No* has been set, then the discharge does not have to be carried out in every case.

During sealing, the fault-signal outputs of the welding generator and the short-circuit detector of the welding station are monitored. The short-circuit detector checks whether the Sonotrode touches the anvil (short-circuit) when the anvil is closed. This should not happen if a bag valve is clamped in position. When welding/sealing is turned on, the weigher makes a functional test of the short-circuit detector after every 20 sealing operations. This is done by briefly closing the anvil while the spout is at the output belt position.
The *Generator fault* output produces a 0V signal if the generator has a fault. The *Generator overload* signal indicates an overload of the welding generator by producing a 24V output.

On continuously rotating machines, the welding/sealing cycle starts at the broken-bag position. On intermittently rotating machines, the welding/sealing cycle starts at broken-bag position 2.

On machines that have a external welding station, the ejector also moves out at position 4. At the same time, an ejector pulse is generated, to synchronize the Uniseal. The welding is carried out by the UNISEAL.

Bag guide
If especially long bags are filled with particularly light material, and then sealed, it may be necessary to provide additional fixing for the bags after they have been pushed in to the sealing position, to prevent them folding. This is done by a special mechanism, the bag handler.
Before the ejector is activated, the bag handler is swung round, waits for the *lowering delay* time, and is then lowered, while the suction vacuum is simultaneously switched on. After the *lowering duration* time, the bag holder is released. When the bag is discharged after sealing, the vacuum is switched before the tipper saddle is released. The *Ejector time* starts running at the same time that the saddle is released. When the time has elapsed, the bag handler is lifted again, and swung back.
If the bag handler is not in the initial position at the start of a filling, an error signal is generated.
If a bag handler is fitted, the anvil is automatically closed when the sealing head is up.

Airstream monitor
For operation in an area with an explosion hazard (Ex area), the flow velocity of the suction/extraction must be monitored to prevent creating a hazard. The flow velocity must not only be monitored externally, but also on every spout. Every time the system passes the extraction position, the flow monitor sends a signal to the spout if the flow is satisfactory. This signal is stored until the next time the system passes the sealing position. Sealing can commence if the signal has been stored. If not, the bag is discharged without being sealed, and a message is generated.

Service filling
In test operation it may be useful to fill a bag at a spout, without rotating the packer. To do this, the spout must be switched off by the knob-operated switch, and on again. After switching on, the bag carrier is operated. A filling is started when an applied bag is detected. The spout is not tared before filling so that also partly filled bags can be placed. The tare value is taken from the last bag that was filled in the normal manner. The service filling is not started if the operation of the knob-switch acknowledges an error message.

Volumetric filling
For materials with very variable filling weights, it may make sense to fill up to a defined volume, instead of filling up to a fixed target weight. This means that the filling continues until the bag is full. It will be switched off when no further increase in weight is measured, **and** the preset target weight has been exceeded.
If the dosing time controller is switched on, then the filling will be switched off if the mass flow is below an adjustable preset level **and** the preset target weight has been exceeded at the same time. The value for the mass flow threshold is set in the dialog *Control output 3*. In this case, the control output is out of action during filling.

Reverse venting
On some machines, excess air can sucked out during the filling. To this end, you can select whether the suction should be active during coarse feed, fine feed or throughout the filling. Furthermore, you can determine how long suction should continue after the ejector has been activated. This is used to clean the bag valve from within. Before filling starts, the suction channel into the bag can be blown through, to prevent stoppages.

2.3 Positions on the packer periphery

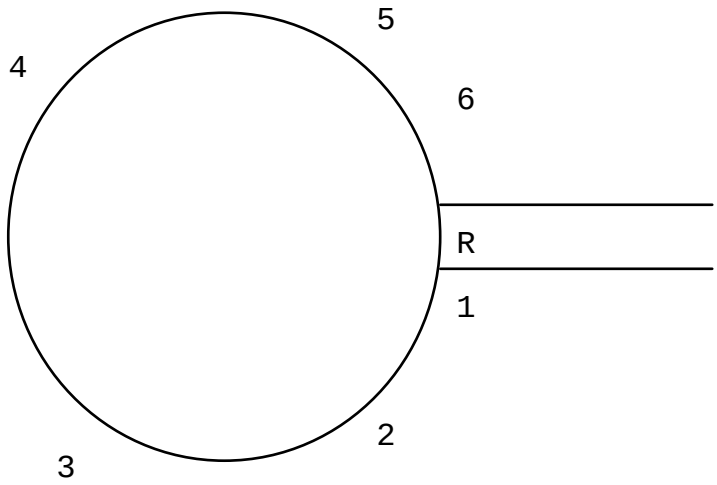
Position counter

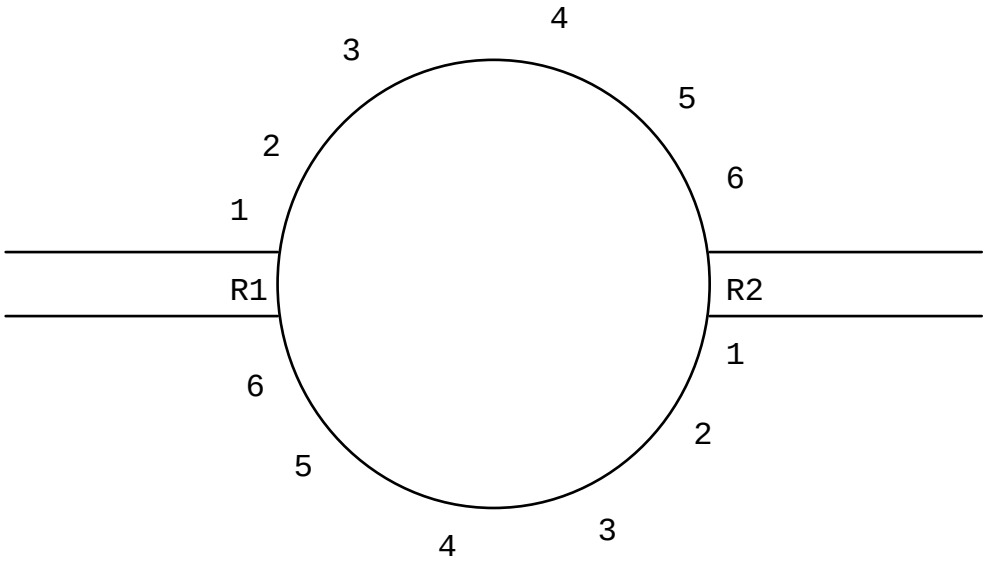
On machines with continuous rotation, seven positions that are important for the functioning of the Rotopacker are marked by signal flags on the periphery of the machine (see following page).
The bag is placed automatically at Position 1, manually at Position 2. Position 3 is the waste position for empty bags, Position 4 for partially filled bags. Positions 5 and 6 are used to determine the discharge point. The seventh position is the reference position [R]. This is where the internal counter is reset.
On packers with two output belts, this count applies to each half of the periphery. The two halves are distinguished by two different reference positions.

On machines with intermittent rotation, the position pulses are generated by the controller for the rotary drive. The number of positions corresponds to the number of spouts that are installed. The assignment of the actions to the position numbers is made in the dialog.

On machines with angle measurement, the individual positions are assigned to specific angles. This is done in the weigher dialog.
In this case, the 0.0 degree angle is the position of the reference position sensor.
An angle of 5 degrees is roughly the placing position in automatic operation,
so the angle increases in the direction of rotation.

Positions on the packer periphery of continuously rotating machines **2.3**
==========





Position	Meaning
1	Place empty bag: automatic
2	Place empty bag: manual
3	Empty-bag/waste position
4	Broken-bag/waste position
5	Start of discharge point determination
6	Discharge point determination
R1	Reset counter, Belt 1
R2	Reset counter, Belt 2

Continuously rotating machines with angle measurement 2.4

Machines that use angular measurement are not fitted with initiators (proximity switches) around the periphery of the packer. Instead, each spout measures its actual position with the help of rotary pulses that are provided externally. So the placing, empty bag, waste bag and discharge positions are set up in degrees in the dialog. The only initiator that is used is one for the reference position.
When the packer is commissioned, each spout has to undergo a learning period. First of all, the light-barrier switch that is supplied must be fixed onto the placer. Next, the dialog item *Learn position* in the *Adjust weigher* dialog should be simultaneously activated for all possible spouts. The packer must now be rotated until the text *Learn position - finished* has appeared for all the weigher terminals. The angles for defining the automatic placing have now all been determined and stored. All other positions are given by standard values, and they can be edited in the subsequent dialog items. The light-barrier switches can now be removed.

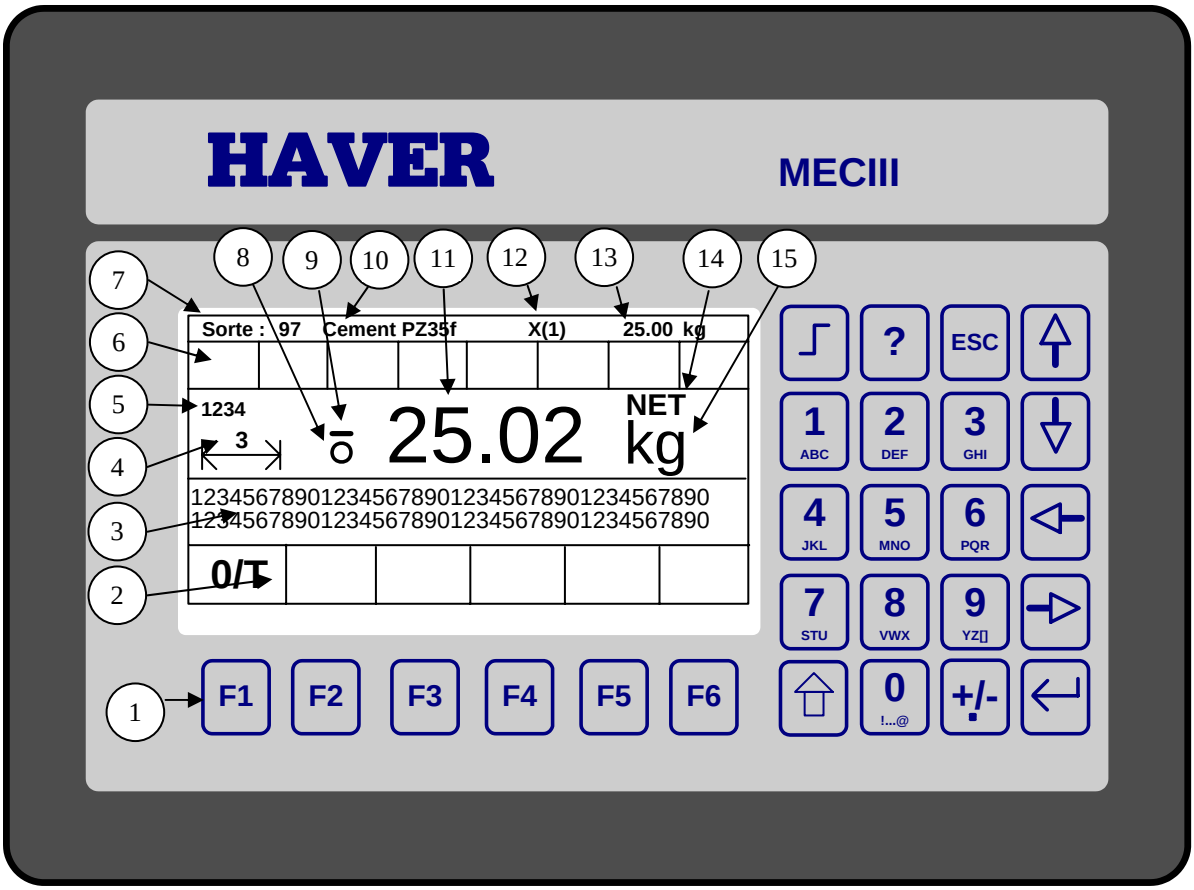
On angle-controlled packers with two output belts, the learning phase must also be run through for the second band. To this end, the light-barrier switch must be fixed onto the second placer.

The determination of the placing and discharge points can be optimized by separately adjusting the corresponding leads on each individual spout for each sort, during operation.

All other functions correspond to those for a packer using continuous rotation and position initiators.

3.1 Controls and display elements

MECIII terminal



1) Function keys
2) Function key assignments
3) Field for plain text messages
4) Weighing range
5) Bag (fillings) counter
6) Fields for status displays
7) Sort number
8) Zero point display
9) Sign
10) Material designation
11) Actual weight
12) Accuracy class
13) Target weight
14) Net weight mode indication
15) Weight unit

Explanation of the graphics display:

The first line of text shows the active sort number, product name, classification limit (accuracy class) and target weight.

Below this are 8 fields to display the weigher status (as pictograms).

NET dargestellt.

The middle field shows the weight, with the appropriate dimensional unit, the weighing range, the bag counter and **NET** if net operation is being used.

Below this is a text field with 2 x 40 characters, for conducting dialogs and showing error messages.

The bottom line contains 6 fields for showing pictograms of the function keys F1-F6.

Status pictograms with the functions:

 Below empty level

 Above overweight limit

 Below underweight limit

 Weight within valid range

 Welding/sealing permitted

 Malfunction or error has occurred

 Standstill has been detected

 Zeroing

 Taring

 Coarse feed is on

 Fine feed is on

Keypad, with the functions:

0-9 Digits for parameter setting

 Move on through the dialog, **without** changes, move the cursor in editing mode, acknowledge error messages

 Move back through the dialog, **without** changes, move the cursor in editing mode

 Select menu item, edit parameter (editing mode), close editing and confirm

ESC End current menu, close editing **without** changes, start short dialog (external to the dialog)

 Language changeover

 Move cursor up

 Move cursor down

? Help function

3.2 Terminal dialog

The terminal is equipped with its own dialog, in which several settings can be made.

To access the dialog, you have to press the ⇧ (shift) key and then **ESC**.

The function keys can be used to set the parameters listed below. Use the ⌐ key (language changeover key) to switch between the different function key assignments:

Function key Pictogram Meaning

Menu 1 (use the language changeover key ⌐ to switch menus)

==========

F1	0	Entry of the single-digit terminal number (not used at present)
F2	Test ON Test OFF	A strip section of the LCD Display is always inverted, so that faulty pixels can be discovered.
F3		Inverse display: Change from black lettering on white background to white lettering on black background.
F4		Reduce contrast/background lighting
F5		Increase contrast/background lighting
F6		The values that have been set are saved in the EEPROM. (applies to: terminal number, terminal network, contrast setting , inverse display)

Function key Pictogram Meaning

Menu 2 (use the language changeover key ⌐ to switch menus)

==========

F1	 	The terminal can be switched between single-weigher andmulti-weigher operation: up to 8 control systems can be connected to a single terminal. this function must also be installed on these control systems, e.g. (e.g. linear packers from Version 26.2a).
F2		Key-lock function OFF (**Enter** key is not locked) Key-lock Function ON (**Enter** key is locked) The change is made by using the code input **1 5 9** (This is saved automatically!)
F6		The values that have been set are saved in the EEPROM. (applies to: terminal number, terminal network, contrast setting , inverse display)

In order to leave the dialog, press the ⇧ (Shift) (shift) key and then the **ESC** key (within 1 second).
The dialog will automatically be terminated if there is no key action within 45 seconds.

3.3 Short dialog

The short dialog is started in weigher operation by pressing the **ESC** key. You can leave it again at any time, by pressing the same key.

Sort number **D : Sortennummer**
The currently valid sort number can be set here. The number is also transmitted to other spouts via the MEC network.

Taring, local **D : 0/T lokal**
If the ↵ key is pressed when this text appears, then this spout will tare the next bag that is applied.

Taring - all **D : 0/T - Alle**
If the ↵ key is pressed when this text appears, then all spouts will tare the next bag that is applied.

Zeroing **D : Nullstellen**
Generates a zeroing request for this weigher.

Bag place counter D : Aufsteckzähler
This shows the value up to which the count could run when the placing point is determined.

Correction D : Korrektur
This displays the contents of the temporary correction memory. If *Fixed value* is set in the sort dialog, then the temporary correction memory will have a different value to the sort correction memory.

Static lead **D : Stat. Vorhalt**
Shows the present value for the static lead.

Speed, coarse feed **D : Speed, Grobstrom**
Shows the rate of flow [kg/sec] for filling online during coarse feed.

Speed, fine feed **D : Speed, Feinstrom**
Shows the rate of flow [kg/sec] for filling online during fine feed.

Filling time C+F **D : Füllzeit G+F**
Shows the total filling time [sec] online for coarse and fine feeds.

Coarse filling time **D : Füllzeit Grob**
Shows the filling time [sec] online for coarse feed.

Fine filling time **D : Füllzeit Fein**
Shows the filling time [sec] online for fine feed.

Present position **D : Aktuelle Position**
Shows the contents of the position counter.

High resolution **D : Hohe Aufloesung**
Shows the weight values (every 0.5 sec) in the internal resolution (at least 10x) in the second LCD text line.

3.3 Short dialog

Tipper saddle **D : Kippsattel**
The tipper saddle can be raised and lowered by operating the *Enter* key.

Bag holder **D : Sackhalter**
The bag holder can be operated and released by operating the *Enter* key.

Discharger **D : Abstosser**
The discharger can be moved in and out by operating the *Enter* key.
If a spillage rejector is fitted, this will be activated at the same time.

Coarse feed **D : Grobstrom**
Coarse feed can be opened and shut by operating the *Enter* key.

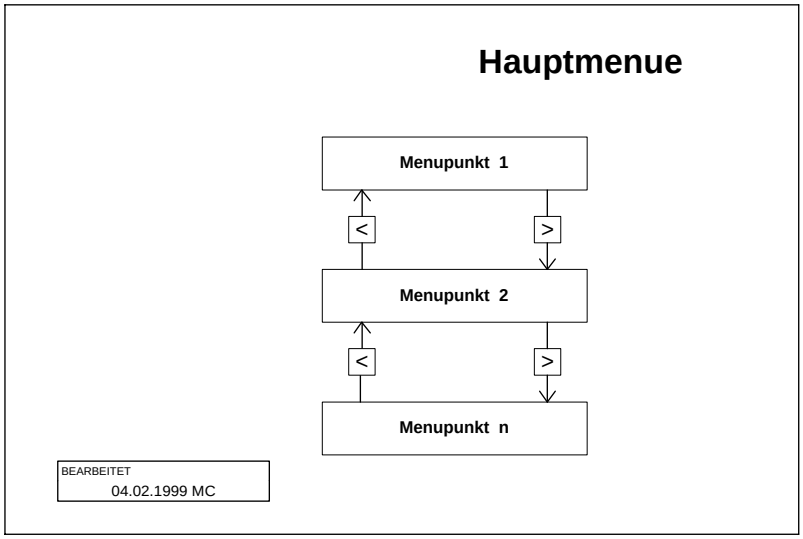
Reference turn **D : Referenzfahrt**
After operating the *Enter* key, the spout carries out a reference rotation, as it does on switch-on. No bags are filled during this period.

3.4 Main dialog

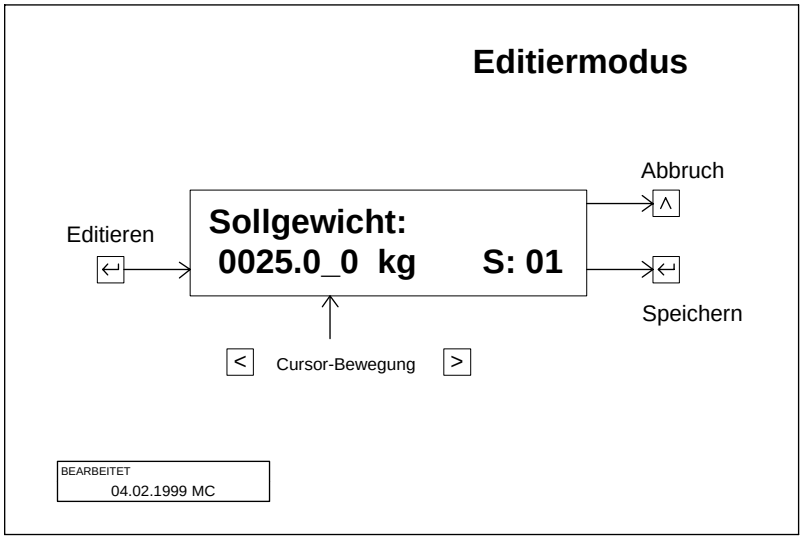
In order to be able to alter parameters, the correct code must first be entered from the keypad.

1 2 3 ↵

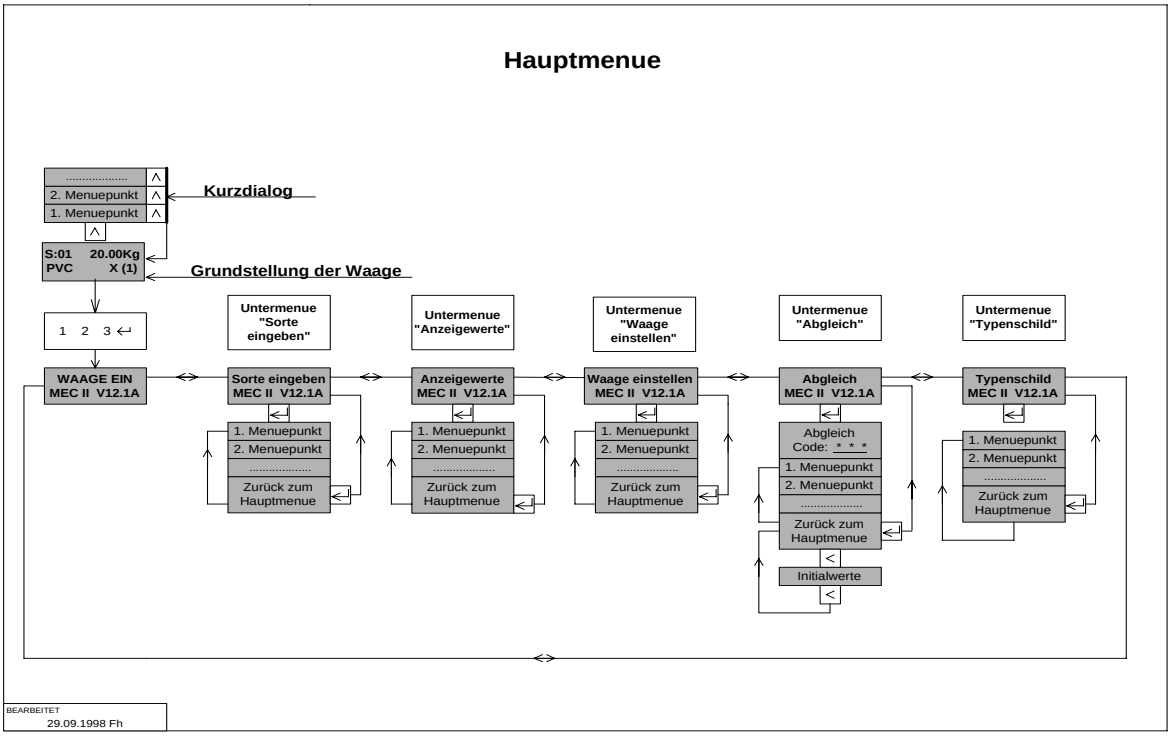
This provides access to the main menu. Here you can select between various submenus. Only one menu item is displayed at a time. By pressing the > key you can access the next menu item; by pressing the < key you can access the previous menu item:



To edit a numerical parameter, first press the ↵ key. The digit that is to be altered can be selected with the > and < keys, and then edited with the number keys. After this, the parameter can be accepted with the ↵ key, or you can leave the editing mode, by using the **ESC** key.



3.4.1 Main menu



Weigher ON **D : Waage EIN**
Packing operation is switched off. This is the starting point for the entry menu. When the ↵ key is operated, the packing operation is switched on again.

Enter sorts **D : Sorten eingeben**
This item accesses the menu for setting up the sort parameters. It can be selected with the ↵ key.

Display values **D : Anzeigewerte**
The parameters in this menu item cannot be edited, but are for information only. So, for example, you can look at the result of a dribble-feed regulation or dosing-time regulation at the end of a filling.

Set up weigher **D : Waage einstellen**
When you select this menu item, by using the key, you access the submenu for setting the weigher parameters.

Calibration **D : Abgleich**
The calibration parameters and the calibration itself are included in this dialog item. If the switch [**s**] on the front of the converter card is set to the “down” position, then this menu is inhibited. In the “up” position, you can access this menu after entering the numerical code **159**. As a check, a calibration counter is also active, which increases the count by one every time this dialog item is accessed, and which can be read out in the menu item *Display values*. The damping and standstill times have a fixed setting (filter is 4 and standstill time is 0.3 seconds).
Exit the test menu by using the “^” key for at least 30 minutes before calibration!

3.4.2 Sort parameters

Sort number **D : Sortennummer**
Enter the number of the sort for which the parameters should now be determined. Entries will be accepted in the range from 1 to 99. First, the number of the currently active sort is entered.

Product name **D : Sortennummer**
A five-character product name can be entered for each sort. In editing mode, the **6** and **9** keys can be used to select the desired character from the ASCII table.

Function **D : Funktion**
You can switch between ***Gravimetric*** and ***Volumetric*** filling modes.
In the gravimetric filling mode, the weight is continuously monitored and compared with the target weight. When the target weight has been reached, the weigher switches off the filling.

In the volumetric filling mode, the weight increase is continuously monitored. When the increase in weight declines to zero and the actual weight reaches the set target value, the weigher switches off the filling.

Target weight **D : Sollgewicht**
The target weight is the weight that should be achieved at the end of filling.

Classification **D : Sollgewicht**
In order to be able to evaluate (classify) the weight after a check-weighing, the limits must be entered here. The available classes are X(**0.2 / 0.5 / 1 / 2 / 5 / x**) according to R61, whereby **x** is a freely definable classification. The overweight/underweight limits are automatically calculated for each classification, and these limits can still be altered at a later stage.
The result of a classification is presented on the terminal, using the status pictograms ***Above overweight limit*** and ***Below underweight limit*** as follows:
- Weight is **within** the limits: both pictograms are on.
- Weight is **above** the limit: the *Above overweight limit* pictogram is on.
- Weight is **below** the limit: the *Below underweight limit* pictogram is on.

The result is held until the bag is discharged.

Underweight **D : Untergewicht**
Enter the smallest actual weight that is permissible for the current target weight. All the bags that are below this weight limit are given an additional dosing (if additional dosing is permitted) or treated as bad bags.

Overweight **D : Übergewicht**
Enter the largest actual weight that is permissible for the current target weight. All the bags that are above this weight limit are treated as bad bags.

Fine-feed quantity **D : Feinstrommenge**
The value that is set here is deducted from the target weight. This therefore determines the coarse/fine changeover point, where the coarse feed is switched off, taking the lead into account. When the dosing-time controller is switched on, the changeover point can still be altered after a filling. The result of a dosing-time regulation can only be seen in the menu item *Display values*.

Fine-feed cross-section **D : Feinstromquerschnitt**
On machines that are appropriately equipped, the fine-feed cross-section can be set up according to the sort. The adjustment is then made automatically during the change of sort.

Filling break (pause) **D : Füllpause**
A ***Filling break*** can be inserted between the coarse and fine feeds. During this break, the slide-valve is closed and the motor is stopped. This time allows the material in the bag to vent the air content, so that the internal pressure is reduced and there is more volume for the fine feed.

Correction **D : Korrektur**
When operating with a check-weigher, this memory location shows the sum of all correction signals.

Fine-feed dosing time **D : Feindosierzeit**
At the end of filling, the measured fine feed dosing time is compared with the setting for fine dosing time. If there is any deviation, the coarse/fine feed changeover point is adjusted by the dosing time regulator.

Lead **D : Vorhalt**
Here you can choose between static lead and dynamic lead.
When dynamic lead is switched on, the increase in weight is measured throughout the entire filling time, and multiplied by a machine constant. The result of this calculation is the lead for changeover and switch-off. If the dribble-feed regulator is switched on, the machine constant is updated after the end of filling.

The static lead is not altered during a filling. Its value is entered in the following dialog item. If the dribble-feed regulator is switched on, the static lead is updated after the end of filling.
On machines that are subjected to strong vibrations and shocks, or where the material that is to be packed cannot be filled into the bag evenly, static lead is recommended.

Fixed value D : Wert fixiert
The values described here for static or dynamic lead will be modified by the dribble-feed regulator, if it is switched on. This dialog item can be used to determine whether the dribble-feed regulator should only make temporary alterations, or should store the altered values in the sort memory.
If the setting is ***Fixed value: Yes***, then the dribble-feed regulator will only make temporary alterations. This means that, after a packing pause, wherby the duration is set in the dialog item *Maximum packing pause*, the values that were set originally will be used for the lead on starting. This is advantageous if the material changes its flow characteristics significantly during a pause. If the values have been fixed, then the values that were set originally will be used for starting, even if the sort was deselected and a different sort is then set.

Static lead **D : Stat. Vorhalt**
The value for the static lead is entered here. During filling, it is added to the measured weight, to calculate the switch-off weight for coarse and fine feed.

Machine constant **D : Maschinenkonstante**
A machine constant is entered, that compensates for the mechanical and electrical delay when the filling is switched off. This machine constant is only active if the dynamic lead is switched on.

Turbine delay **D : Turbine Verzoeg.**
At the start of filling, the slide-valve is initially opened. After an adjustable delay time, the turbine is turned on. This is intended to prevent blockages at the start of filling.

Start aeration **D : Startbelüftung**
For some sorts, it may be necessary to aerate the material independently from the regulated filling hopper aeration at the start of filling. The duration is set in this menu item. When initial aeration is switched on, a special *Start aeration* output is activated. On turbine packers, the aeration output is activated simultaneously with the slide-valve. On air packers, the aeration output is activated before the slide-valve is opened. Afterwards, the coarse feed delay time runs.

Initial air **D : Initialluft**
If the maximum pause duration is exceeded, the first bag after the pause will not be filled immediately. After the bag holder has been operated, the output *Hopper aeration* is activated for the length of time set for *Initial air*. At the end of this time, the output is switched off again and the filling starts.

Max. pause time **D : Max. Pausendauer**
After packing pauses that are longer than the *Maximum pause duration*, the coarse/fine changeover point is reset to the initial value that is set in the dialog. This is to compensate for the altered flow characteristics of the material resulting from the lengthy pause. The initial air will also be started before filling begins.

Filling interrupt **D : Füll.-Unterbr.**
When this function is active, a filling that is in progress on the output belt is interrupted, and then continued in additional-dosing mode at the empty-bag waste position.

Max. filling time **D : Max. Füllzeit**
The maximum permissible running time for the filling turbine during a filling operation. Filling will be stopped after this time has elapsed.

Turbine speed, coarse feed **D Turbinendrehzahl Grobstrom**
When a frequency inverter is available for the filling turbine, the weigher can provide a numbered speed value (0 - 7) for the inverter, via three control cables. The actual speeds that have been defined for the individual numbers are stored in the frequency inverter.
In this case, the polarity of the signal input from the motor cutout is reversed. This means, that the motor cutout produces a 0V signal if it has been tripped.

Turbine speed, fine feed **D Turbinendrehzahl Feinstrom**
When a frequency inverter is available for the filling turbine, the weigher can provide a numbered speed value (0 - 7) for the inverter, via three control cables. The actual speeds that have been defined for the individual numbers are stored in the frequency inverter.
In this case, the polarity of the signal input from the motor cutout is reversed. This means, that the motor cutout produces a 0V signal if it has been tripped.

Saddle height **D : Sattelhöhe**
On a packer with stepped saddle height adjustment, only two different saddle heights are possible. **0** is entered for the lower level, a different number for the higher level.
With continuous adjustment, the system first moves to the reference point at every change of the sort. This prevents an accumulation of positioning errors.
If no rotate pulse appears after about 2 seconds during the movement, then an error message is generated and the adjustment motor is stopped. Another attempt will be made to move the saddle at the next change of sort.
The saddle height that has been selected in the dialog will only be activated after leaving the entry dialog. If the sort is changed during a filling, the new saddle height will only be activated after the bag has been discharged.

Move to reference **D : Refer. anfahren**
When using continuous saddle height adjustment, the dialog can be used to move the saddle down to the lower reference position. The function is initiated by the ↵ key.

Manual move **D : Man. anfahren**
With continuous saddle height adjustment, the saddle can be moved manually, by using the > and < keys. If the ↵ key is then operated, the present saddle height will be stored as the set value for the current sort. Pressing any other key quits this mode without saving.

Standstill time **D : Stillstandsdauer**
The standstill time determines the period during which the change in weight must remain within a certain range in order for this to be interpreted as standstill. We recommend setting the value to 0.3 seconds, since experience shows that this is an adequate value. If this value is increased or decreased, there may be problems with the weigher standstill.

Fine-feed dead-time **D : Feinsperrzeit**
When coarse feed is switched off, the weight will not be monitored until the time set here has elapsed. This avoids an overshoot of the weigher, which would lead to underweight bags.

Blow-out delay **D : Ausblasverzöger**
This time starts when the filling ends. The blowing out of the spout starts after this delay (settling time). If the bag weight is going to be evaluated by the weigher or the server after filling has finished, then the sum of the blow-out delay and blow-out duration must be at least 0.5 sec. When the dribble feed regulator is turned on, the blow-out delay will automatically be lengthened, if necessary.
The dribble-feed regulation is carried out after the end of the blow-out delay.

Blow-out time **D : Ausblasdauer**
The entry is the time during which the spout is blown out.

Inflation time **D : Aufblasdauer**
The entry, in seconds, is the time during which the spout is inflated after the end of filling. If the time has not yet elapsed when the discharge position is reached, the discharge will **not** be carried out.

Inflation time **D : Aufblasdauer**
The entry, in seconds, is the time during which the spout is inflated after the end of filling. If the time has not yet elapsed when the discharge position is reached, the discharge will **not** be carried out.

Bag venting 1 **D : Sackentlueftg. 1**
The time for cleaning the bag venting channel before filling is set here.

Bag venting 2 **D : Sackentlueftg. 2**
The venting method can be set in this dialog.

Bag venting 3 **D : Sackentlueftg. 3**
Even while the ejector is being operated, venting can be carried out for the time set here.

Number of bags in residue removal NO. Anzahl Säcke im Restentleeren
This is the setting for the number of bags that should be filled in the residue removal mode. When the required number of bags has been reached, the spout will stop until the residue removal mode is switched off. If **99** is entered, then bags will keep on being filled until a filling is terminated by a time-out.

Settling time **D : STABILIZAT. TIME**
On packers with a tipper saddle, this time period elapses after the ventilation of the inflatable collar (inflate spout) before the bag can be discharged.

Speed duration **D : Speed Dauer**
In order to be able to detect a possible broken bag, the increase in weight is monitored. As soon as this weight increase becomes negative (i.e. actually a decrease), a broken bag is assumed. However, when the weight increase is small, it is possible for an apparent weight loss to appear briefly, caused by the vibration of the packer. For this reason, the minimum time during which the weight loss must be present can be adjusted in this menu item.

Minimum speed **D : Minimum Speed**
A minimum increase in weight must be achieved up to the empty weight limit. If this value is not reached, the filling is stopped and the bag is treated as a broken bag. Entering the value **0.0** turns off the monitoring.

Speed delay **D : Speed Verzoeger.**
Since no increase in weight can be measured immediately on starting, the monitoring of the minimum increase in weight can be delayed.

Coarse aeration **D : Belueftung Grob**
A value for the increase in weight is entered in this menu item. If the value goes below this level during coarse feed, then the filling hopper aeration is turned on.
The aeration is turned off if the value exceeds this level.

Fine aeration **D : Belueftung Fein**
A value for the increase in weight is entered in this menu item. If the value goes below this level during fine feed, then the filling hopper aeration is turned on.
The aeration is turned off if the value exceeds this level.

Aeration Duration **D : Belueft. Dauer**
When the blowing-out of the spout is finished, the filling hopper can be aerated for a set time. Regardless of the time that is set, the aeration will end at the latest on discharge.

Dosing-time regulator **D : Dosierzeitregler**
The dosing-time regulator compares the set time for fine feed with the actually measured time. If there is any deviation, the coarse/fine feed changeover point is adjusted.

Dribble-feed regulator **D : Nachstromregler**
When the dribble-feed regulator is turned on, the weigher makes a check-weighing after the spout blow-out delay. If there is a deviation from the target weight and dynamic lead is switched on, the machine constant will be adjusted. Otherwise, the static lead will be altered.
The size of the regulator increment depends on the deviation and the regulator factor.

Dribble-feed regulator delay **D : Nachstromregler**
After the *Spout blow-out delay*, the system waits for the time set here before activating the dribble-feed regulator.

Regulator factor **D : Regelfaktor**
The dribble feed regulator multiplies the measured weight deviation by the regulator factor, to calculate the regulator/control increment. The regulator factor can be adjusted in 10% steps from 0% to 200%.

Additional dosing **D : Nachdosieren**
After the end of filling, the weight of the filled bag is compared with the minimum weight. If the weight is below this limit, then the bag receives an additional dosing. This filling cycle starts in the second turn, at the empty-bag waste position.
If the bag weight at this moment is more than 1 kg below the target weight, then the additional dosing is made continuously, in fine feed. If the discrepancy is smaller, then the filling turbine is operated in bursts (pulsed). After each filling pulse the system waits for the weigher standstill, an actual-value / target-value comparison is made and the procedure is repeated, if necessary.
Additional dosing is ended in all cases at the end of the maximum filling time. The filling hopper is continuously ventilated during pulsed additional dosing.

Pulse length (duration) **D : Impulsdauer**
The pulse duration for pulsed additional dosing can be set in this menu item.

Broken-bag position **D : Bruchposition**
Six positions are distributed around the periphery of the packer. This parameter can be used to decide which position is used for the broken-bag position.

Bad bags ON **D : Müllsäcke auf**
This item is used to set up the handling of those bags that have the wrong weight, or those for which the filling was terminated early, and thus have failed to reach the empty level. These bags can be left hanging on the spout, or at the broken-bag position, at the empty bag/waste position, or dropped onto the output belt.

Minimum weight **D : Mindestgewicht**
Bags that do not reach the minimum weight on discharge are normally ejected to the broken-bag position. This is to avoid underweight bags snagging on the belt and causing a pile-up.

Discharge lead 1+2 **D : Abwurfvorhalt 1+2**
The discharge point is determined automatically by the control system, so that the output belt is always met correctly, even if the packer is rotating at a different speed.
However, when the packer is installed, a reference point must be entered that suits the mechanical setup. This value is established by testing. The larger the value, the earlier the discharge. This value is determined individually for each output belt.

Discharge duration **D : Abwurfdauer**
On discharge, the ejector is activated for the length of time that is set.
For discharging to the empty-bag/waste position, the duration is fixed at 1.5 seconds.

Disch. Oper.Time **D : Abst. Laufzeit**
This is the time that elapses after the operation of the ejector, before the injector nozzle is activated (filter-valve technology). If there is no suction during ejection, this time can be set to 9.9 seconds. If bag-welding is available, the sealing head is only lowered after the elapse of the *Ejector time* when the ejector has been operated.

Taring frequency **D : Tarierfrequenz**
This value defines how often taring should be carried out. For example, **07** means that taring will be performed before every seventh bag. The entry **00** turns off the taring.

Taring delay **D : Tariervezögerung**
After detecting the *Bag-OK* signal, the system waits for the time set here before starting the taring procedure.

Empty limit **D : Leerschwelle**
If the weight of the bag carrier at the start of filling exceeds the preset empty weight limit, then filling will not proceed, but an error message will be generated.
If the bag weight on the output belt has not yet gone above the empty limit, the filling will be stopped. Broken-bag monitoring does not take place for bags below the empty limit. Filled bags that have a weight below the empty limit will generally be rejected to the empty-bag waste position.

Empty damping **D : Leerdämpfung**
This is the preset filter variable for zeroing/taring. Recommended value: 2.

Full damping **D : Volldämpfung**
Preset filter variable during check-weighing / dribble-feed regulation. Recommended value: 2.

Coarse damping **D : Grobdämpfung**
Preset filter variable during the coarse feed of a filling. Recommended value: 1

Fine damping **D : Feindämpfung**
Preset filter variable during the fine feed of a filling. Recommended value: 2.

Check bag **D : Sack überwachen**
In most packer machines, the seating of the applied bag is monitored. Here you can determine the duration of active monitoring during filling. If this monitoring is switched off, then an antenna switch or start switch must be installed.

Bag-OK delay **D : Sack-ok Verzögerung**
There is a time delay after operating the bag holder. The *Bag-OK* signal must be present by the end of this delay time. If not, the bag holder is drawn back and the ejector moves to the empty-bag waste position.

Bag-OK check **D : Sack-OK Kontrolle**
After the ejector ahs been activated, the system waits for the preset *Ejector time*, Then the bag holder is operated and a check is made whether the bag has really been discharged. If not, the spout generates an error signal.

Spout selection **D : Füllrohrauswahl**
Selection of what filling pipe type to assign to the sort

Control output 1-4 **D : Steuerausgang 1-3**
The state of the three control outputs can be set individually for each sort. The outputs can be enabled for coarse feed, fine feed, coarse + fine feed, or for as long as the specified sort is valid. Control output 3 is assigned to a weight-increase threshold. If the actual increase in weight exceeds this level, the output will be switched off. If it is below the level, it is accordingly switched on. Output 3 is only activated if the filling is switched on.

Spillage rejector **D : Rueckmehlabweis.**
If a spillage rejector is installed, then it is activated when the weight that has been set in this menu item is reached, or at the latest when the discharge procedure starts. It is de-activated when the ejector is moved back.

Spill.rej.delay **D : Rueckm.Abw.Verz.**
During the bag discharge, the spillage rejector is moved in with a delay with respect to the ejector, to prevent a collision.

Welding delay **D : Schweissverzögerung**
On packers with a welding station, the welding procedure will start at Position 4. This parameter can be used to delay welding, to provide more time for filling.

Welding time **D : Schweissdauer**
On packer machines that have welding stations on the spouts, the welding time must be entered.

Anvil delay **D : Amboss Verzoeg.**
After the end of welding, this time must pass before the anvil jaws are opened.

Lowering delay **D : SF Senkverzoeger.**
When the bag handler has started to swing round, this waiting time must pass before the bag handler can be lowered.

Bag guide lowering time **D : SF Senkdauer**
When the lowering of the bag handler has started, this waiting time must pass before the bag holder can be released and the bag can be pushed off the spout.

Tipper saddle limit 1 **D : Kippsattelschwelle 2**
If a value large than 0 is assigned to this parameter, then the tipper saddel is raised immediately after the placing. When the set weight threshold has been reached, it is lowered again.

Tipper saddle limit 2 **D : Kippsattelschwelle 2**
When the weight threshold has been reached, the tipper saddle is raised. If the weight threshold is above the target weight, it is raised again at the end of filling.

Bag clamp, limit 1 **D : Kippsattelschwelle 1**
When the weight threshold has been reached, the bag clamp is operated.

Bag clamp, limit 2 **D : Kippsattelschwelle 2**
When the set weight threshold has been reached, the bag clamp is released.

Inflation threshold **D : Aufblasschwelle**
When the set weight threshold has been reached, the inflatable coller is inflated.

Silo vibration pulse **D : Siloruettelimp.**
During fast-empty, vibration pulses can be applied to the silo. This menu item is used to set the duration of the vibration.

Silo vibration interval **D : Siloruettelpause**
This menu item is used to set the pause duration for vibration during fast-empty.

Suct nozzle del. **D : Saugdüse Verz.**
When a filter-valve system is used, this delay time runs at the start of filling. The injector nozzle can be operated after this delay.

Suction nozzle ON **D : Saugdüse EIN**
The injector nozzle is operated in pulses. The length of the suction pulses is set in this menu item.

Suction nozzle OFF **D : SUCT. NOZZLE OFF**
The length of the pause between suction pulses is set in this menu item.

Fast-empty delay **D : Schn.Entl.-Verz.**
When ***Fast-empty*** is started, this preset delay time must elapse at each spout before the fast-empty slide-valve is opened. This can be used to program any desired switch-on sequence.

Fast-empty time **D : Schn.Entl.-Dauer**
The ***Fast-empty*** that has started runs for the time that is set here. This means that, even though the starting times are staggered, ***Fast-empty*** can be stopped on all spouts at the same time.

Fast-empty aeration **D : Schn.Entl.-Bel**
The duration of the aeration of the fast-empty channel can be set here.

Placing position **D : Aufsteckposition**
The application (placing) position can be set on intermittently rotating packers.

Empty-bag position **D : Leersackposition**
The empty-bag position can be set on intermittently rotating packers.

Waste position 1 **D : Müllposition 1**
The waste position 1 can be set on intermittently rotating packers.

Waste position 2 **D : Müllposition 2**
The waste position 2 can be set on intermittently rotating packers.

Discharge pos. **D : Abwurfposition**
The discharge position can be set on intermittently rotating packers.

Pressure release time **D : PRESS. RELIEF DUR.**
Air packer: Before the cones can be opened, the pressure in the pressure chamber must be released. The pressure relief duration can be set here.

Pressure chamber aeration **D: Druckkammer Belueftg**
Air packer: This parameter can be used to set the time during which the pressure in the pressure chamber is maintained after the end of filling, if enough material is available for another filling.

Lower cone delay **D : Unt.Kegel Verz.**
Air packer: On machines with double cones, the upper cone is closed first, and then the lower cone after this delay time.

Cone always open **D : Kegel immer auf**
Air packer: For some products, it may be advisable to keep the cone permanently open. This mode of operation can be enabled here.

Coarse feed delay **D : Grobstrom Verzögerung**
Air packer: The time that should elapse between the detection of a correctly placed bag and the opening of the scissors-valve.

Cone aeration **D : Kegelbelüftung**
Air packer: If the packer silo is full, the cone is open, and the pressure chamber is not filled within 5 seconds, then the *Pressure chamber input aeration* output is activated.
When the pressure chamber has filled up, the adjustable *Cone aeration* time is started. When it is finished, the ventilation is switched off.

Cleaning mode **D : Reinigungsmodus**
Air packer: For automatic cleaning, it can be selected whether the air escapes through the spout or the open cone, or both.

Cleaning air **D : Reinigungsluft**
Air packer: There is an option for cleaning with air from the blower or with compressed air. For blower-air cleaning, the scissors-valve and cone are closed and opened in an adjustable rhythm. There are additional nozzles in the pressure chamber for compressed-air cleaning, through which the compressed air is blown into the chamber. The chamber must not be closed during this procedure, otherwise an excessive pressure will build up. Instead, the compressed air is turned on and off in an adjustable rhythm.

Closing time **D : Schliessdauer**
Air packer: With blower-air cleaning, this is the time during which the scissors-valve and cone are closed. With compressed-air cleaning, the compressed air is turned on for this time.

Opening time **D : Öffnungsdauer**
Air packer: When cleaning with blower air, the scissors-valve and cone are opened for this time. With compressed-air cleaning, the compressed air is turned off for this time.

Fast-empty cycle **D : Schnellentleerzyklus**
Air packer: In ***Fast-empty***, the pressure chamber is filled with material. Afterwards, the chamber is emptied for this preset time.

Tip. saddle limit 1 **D : Kipps.Schwelle 1**
If a value above 0.0 kg is set here, the tipper saddle is raised immediately at the start of filling. This helps the bag to fold out. When the weight threshold has been reached, the tipper saddle is released again.

Tip. saddle limit 2 **D : Kipps.Schwelle 2**
When the weight threshold has been reached, the tipper saddle is raised again.
If the tipper saddle is mounted on the fixed section, it must only be raised after the end of filling. For this, the value that is set must be above the target weight,

Placing lead 1+2 **D : Aufsteckvorhalt 1+2**
On machines that use angle measurement, the placing signal is generated by the spout and sent to the placer. The determination of the point for placing is carried out in the same way as for the discharge point. Here too, a count limit must be set, and the signal is generated when this limit is reached. This value is determined individually for each placer.

Copy to sort **D : Kopieren zu Sorte**
The values for the sort that is currently being processed can be copied to other sorts. This results in a considerable time saving for setting up the spouts.
The number of the target sort must be entered.

Copy to spout **D : Kopieren zu Stutzen**
The values for the sort that is currently being processed can be copied to other spouts. This results in a considerable time saving for setting up the spouts.
The number of the target spout must be entered. After the end of the transfer, the number of the source spout will be shown again, instead of the target spout number. If there was an error in the copy transfer the *Not possible* message will be displayed. In this case, the connection between the weighers and their settings must be checked.
If **99** is entered for the target spout, then the values are copied to all the spouts, one after another.

Copy all sorts to weigher **D : Alle Sorten kopieren zu Waage**
All the sort parameters stored for this spout will be copeid to the selected spouts. The entry of 99 as a target has no function.

Sort enabled **D : Sorter freigegeben**
Each sort can be enabled or inhibited. If an attempt is made to select an inhibited sort, then a corresponding error message will appear in the LCD text display, and there will be a pause until either the specific sort is enabled or another sort is selected.

Return to main menu **D : Zurück zum Hauptmenü**
If the key is operated, you will leave this submenu and return to the main menu.

3.4.3 Display values

In this dialog, some parameters can only be read, but not edited.
They are those values that can automatically be altered by the machine, or time measurements.

0 - memory

Tare memory

Zeroing range

Coarse speed

Fine speed

Filling time C+F

Calibration counter

Fine-feed quantity

Static lead

Machine constant

R61 mode

Type & Version

Vibration

3.4.4 Set up weigher

Configuration **D : Konfiguration**
The configuration of the machine is set in this subsidiary dialog, which is protected by a secret code. As a rule, this dialog is only used by
Haver & Boecker.

Weigher number **D : Waagennummer**
In network operation, each weigher must have an individual address assigned to it.

Learn positions **D : Position lernen**
In machines with angle measurement, this menu item starts the program for measuring the packer periphery and calculating the placing positions. The optical (light-barrier) switches which are delivered must be mounted before the correct placing positions can be determined. The learning program should be activated for all spouts at the same time.

Learn positions 2 **D : Aufst.2 lernen**
The placing positions for the second placer are calculated here.

Pulses per turn **D : Impulse / Runde**
The number of pulses measured per turn is shown here. The value can also be altered by hand. But each editable angle should be confirmed again afterwards.

Offset **D : Offset**
This shows the offset relative to spout 1. On a packer with six spouts the offset for spout 2 is 60° (360/6)*1, for spout 3 it is 120° (360/6)*2, and for spout 4 it is 180° (360/6)*3.

Positions, 1st half D : Positionen 1. Hälfte
When this dialog item is selected, the positioning points described below are determined for the first half of a packer with 2 output belts.

Positions, 2nd half D : Positionen 2. Hälfte
When this dialog item is selected, the positioning points described below are determined for the second half of a packer with 2 output belts.

Auto-place start **D : Auto.Aufst.Start**
This shows the calculated angle for the starting point for determining the placing positions.

Auto-place stop **D : Auto.Aufst.Stop**
This shows the calculated angle for the starting point for determining the placing positions.

Bag holder automatic **D : Sackh.Pos.Autom.**
This shows the calculated angle of the point for operating the bag holder when using automatic placing.

Bag holder manual **D : Sackh.Pos.Hand**
This shows the calculated angle of the point for operating the bag holder when using manual placing.

Empty-bag position **D : Leersackposition**
This shows the calculated angle for the empty-bag/waste position.

Broken-bag position **D : Bruchsackposition**
This shows the calculated angle for the broken-bag/waste position.

Discharge position Start **D : Abwurfpos. Start**
This shows the calculated angle for the start point for determining the discharge position.

Discharge position Stop **D : Abwurfpos. Stop**
This shows the calculated angle for stopping the determination of the discharge position.

Start switch **D : Startschalter**
A start switch is installed on some machines. If the filling is not going to be started at Position 1 or 2, but by operating the start switch, then this must be set as being available in this menu item.
If the *Bag-OK* monitoring is to be switched off, then the monitoring of the start switch will automatically be activated on leaving the dialog.

Network monitoring **D : Netzwerk überwachen**
If the monitoring function is active, the spout checks that it is in continuous contact with the MECIII server or a PC. If this is not the case, then the spout carries out a RESET.

Parameter - RESET **D : Parameter-RESET**
Enter the **RESET** code **159** in this position to get the default settings of all the weigher, sort and air parameters. The weigher will then be re-initialized.

Terminal programming **D : Terminal programmieren**
Operating the ↵ key sets the weigher to a mode in which the terminal firmware can be replaced.

I/O test **D : E/A-Test**

A test menu with the following sub-menus:

- **Outputs**, for testing the digital control outputs, whereby the current states of the individual output-port bits are displayed with *ON* or *OFF*.
- **Outputs**, for testing the digital control outputs, whereby the current states of the individual output-port bits are displayed with *ON* or *OFF*.
- **Interrupts**, to test the digital interrupt inputs of the first I/O module. After a transition at one of the inputs, an interrupt is generated and displayed as a 0/1 transition at the corresponding position.
- **Welding test,** to check the settings for welding/sealing the bag valves. The code that is required for manual activation of the welding/sealing station is: '159357'. After the code has been entered, an instruction to press the ENTER key appears in the display. Before pressing the key. the bag that is to be sealed must be moved into position. **CAUTION!** As soon as the ENTER key is pressed, the anvil is closed and the sealing cycle is carried out.
- **Control word,**for testing the control signals received from the MECIII server or a visualization PC. Operating the ↵ key results in the state of 16 signals being displayed as a **0** or **1**. Exit this mode by using the **ESC** key.

Control-word 1 :

Bit	Assignment	Display position
		upper line left block
0	Request cleaning	1 from left
1	Residue-removal request	2 from left
2	Cancel fast empty (turbine packers)	3 from left
3	Fast empty start, stationary for air + turbine/ general fast empty start for turbine	4 from left
4	Filling time monitoring OFF	5 from left
5	Broken bag monitoring OFF	6 from left
6		7 from left
7	Inhibit spout dialog if no input	8 from left

Bit	Assignment	Display position
		upper line right block
0	Discharge enable for Belt 1 if no input	1 from left
1	Automatic placing for Belt 1 if no input	2 from left
2	Discharge enable for Belt 2 if no input	3 from left
3	Automatic placing for Belt 2 if no input	4 from left
4	Broken bag, external, linked to position	5 from left
5	Tare request	6 from left
6	Placing OFF	7 from left
7	Enable welding/sealing if no input	8 from left

Control-word 2 :

Bit	Assignment	Display position lower line left block
0	Control bits 1	1 from left
1	Control bits 2	2 from left
2	Control bits 3	3 from left
3	Control bits 4	4 from left
4	Broken bag, external, not linked to position	5 from left
5	Packer rotating	6 from left
6		7 from left
7		8 from left

Bit	Assignment	Display position lower line right block
0		1 from left
1		2 from left
2		3 from left
3		4 from left
4		5 from left
5		6 from left
6		7 from left
7		8 from left

Exit the test menu by using the **ESC** key.

Return to main menu **D : Zurück zum Hauptmenü**
If the key is operated, you will leave this submenu and return to the main menu.

3.4.5 Calibration

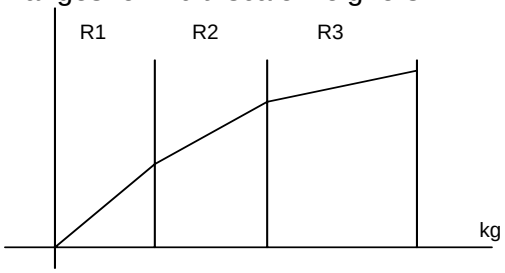
The calibration parameters and the calibration itself are included in this dialog item. If the switch [**s**] on the front of the converter card is set to the “down” position, then this menu is inhibited. In the “up” position, you can access this menu after entering the numerical code **159**. As a check, a calibration counter is also active, which increases the count by one every time this dialog item is accessed, and which can be read out in the menu item *Display values*. The damping and standstill times have a fixed setting (filter is 4 and standstill time is 0.3 seconds).
Exit the test menu by using the “^” key for at least 30 minutes before calibration!
The calibration should be performed in the following sequence:

Dimensional unit **D : Einheit**
This parameter is used to choose between **kg**, **lb**, **t** and **klb** for the display.

Pre-load adjustment **D : ZERO CALIBRATION**
This compensates for the pre-load, outputs the current weigher-cell loading in %, and also indicates a higher resolution in the text display.

Weighing range **D : Wägebereich**
Select the weighing range that is to be calibrated (in a multi-scale weigher it is possible to adjust the ranges 1/2/3 independently).

Range limit **D : Bereichsgrenze**
The limit for the selected weighing range is entered here.
Ranges for multi-scale weighers:



The separate adjustment of the ranges makes it possible to linearize the weigher-cell curve, if (as shown here in exaggerated form) it has a non-linear characteristic.
On a multi-scale weigher, the ranges must be adjusted and parameterized in sequence, starting with range 1. In all ranges, the smallest display division is shown in the weight display.
In order to set up a multi-scale weigher as a single range weigher again, the upper ranges must be deleted. This is done by entering zero as the range limit.

Scale division **D : Scale division**
The display division for the selected weighing range is entered here.

Calibration weight **D : Abgleichgewicht**
The weight is entered and applied. It should be at least 10% of the current weighing range.

Range calibration **D : Bereichsabgleich**
Here, the adjustment of the selected range is made with the calibration weight. The momentary weigher-cell loading is output in %, and an increased resolution is displayed in the text display. As a check: zero again, apply the calibration weight, and read the weight display.

R61 mode **D : R61 Modus**
If **Yes**: calibration-capable. If **No**: no check number message, doubled threshold for the standstill criterion.

Operating mode **D : Betriebsart**
You can switch between a ***multi-scale weigher*** and a ***multi-range weigher***.

Zeroing range **D : Nullstellbereich**
If the weigher is not operated in the R61 mode, the zero range can be set freely. In the R61 mode, this range is fixed to 4% of the weighing range.

Warm up **D : Warm up**
The warm-up time after switching on the weigher.

Initial values **D : Initialwerte**
After entering the code **159** this sets all the adjustable data to the initial (default) values. This is only used for test purposes in the Haver & Boecker electronics workshop.
Caution: Any calibration that had previously been made will be overwritten!
On ending the calibration, all the adjustable parameters are checked for plausibility. If an error occurs here, then an error message is generated and the calibration will **not** be saved in the EEPROM. In the event of an error, you can only leave the adjustment operation by using the **ESC** key.
When the **calibration has been successfully ended**, all the settings are saved to the non-volatile memory in the EEPROM on the converter module.

Error Handling 4

==========

The following section describes the error messages and methods of dealing with them.

Empty error **D : Leerfehler**
Weight above the empty limit at start.
- Clean the bag support
- Check the bag support for friction
- Check the calibration.
- Check the load-cell cable and connector

Motor cutout **D : Motor cutout**
The motor cutout of the filling turbine, the thermostat, or the motor cutout of the vibrator, has been tripped.
- Search the filling hopper for foreign bodies
- Check the motor
- Check the wiring
- Check the mechanism

Silo minimum **D : Silo minimum**
The packer silo is empty.
- Check the material feed
- Test the sensor

Discharge error **D : Abwurffehler**
The discharge lead is too big.
- Reduce the discharge lead,
  or increase the distance between Positions 5 and 6.

Initiator error 1,2 **D : Initiatorfehl 1,2**
A wrong number of position initiators (proximity sensors) has been detected.
- Check the sensor <-> sensor flag spacings
- Check the wiring

Regulator error **D : Regler fehler**
The dribble-feed regulator has gone outside the permissible control range.
- Check the target weight
- Check the bag support for friction
- Switch the controls off and on again
- Check the calibration.

Fast-empty error **D : Schn.Ent.-Fehler**
The fast-empty valve did not open/close.
- Check the valve
- Test the initiator (proximity switch)
- Then switch the spout-enable off and on again

Sort not enabled **D : Sorte nicht frei**
The selected sort has not been enabled in the sort dialog.
Define the sort and enable it
Check the sort selection.

Disch.disabled 1, 2 **D : Abwurf verr. 1,2**
A count position was not recognized. Disch.disabled 1 can also mean that discharge is generally inhibited by the corresponding input. The bag could not be discharged for this reason. If the discharge was enabled, then there is an initiator fault.

Saddle blocked **D : Satel klemmt**
The motor is not rotating for a continuous saddle height adjustment.
- Check the motor
- Check the spindle
- Test the initiator (proximity switch)
- After eliminating the error: switch the controls off and on again.

MECNW.-Interface **D : MECNW.-Interface**
The server or the weigher is not connected to the network.
- Check that the transmit/receive cables
- are connected on the terminal strip
- Replace the interface card

Bag-OK error **D : Sack-ok Fehler**
The *Bag-OK* signal is present, without the bag carrier being operated, or no bag was detected when the bag carrier was operated.
- Check the wiring
- Check the P/E converter
- Check the bag holder

Start switch **D : Startschalter**
The start switch is activated between the reference position
and the placing position.
- Check the wiring
- Test the switch

Correction error **D : Korrekturfehler**
The maximum value of 10 kg for the correction memory of the check-weigher has been exceeded.
- Compare the target weights at the check-weigher and the spout
- Check the spout for friction
- Check the calibration.

Not operating **D : Kein Betrieb**

There is no 24V signal on the *Operation enabled* input.

Switch over the knob-switch to enable the spout

Check the wiring

The spout has been switched off from the server.

Check the server settings

Check bag weights

The spout has switched itself of, because an error was repeated three times.

Look for the root cause (exceeded filling time, wrong weight, cable break /short-circuit detected in the sealing unit).

Filling time **D : Füllzeit**

The maximum filling time was exceeded. After three successive infringements, the error must be acknowledged by switching the spout enable off and on again.

Maximum filling time is too short

No material

Filling cross-section is too small

Material needs stronger aeration

Bag is too small

Broken bag **D : Sackbruch**

The increase in weight was negative for the time set in the *Speed duration* menu item.
The minimum weight increase had not been achieved by the end of the *Speed delay* time at the start of filling.

If erroneous messages occur, alter the *Speed duration*, *Minimum Speed*, or *Speed delay*.

Check the aeration.

Adjust filling cross-section.

Check the bag quality.

Minimum weight **D : Mindestgewicht**

A bag did not reach the minimum weight at discharge, and has been rejected to the broken-bag position.

Wrong weight **D : Fehlgewicht**

The bag weight is outside the permissible range. This range is determined by the settings for *Underweight* and *Overweight*.

Sonotrode error **D : Fehler Sonotrode**

No paper was detected between the welding plates during welding of the bag valve.

EEPROM error **D : EEPROM error**

All calibration data and settings are stored in non-volatile memory in an EEPROM on the converter card. This error message is produced if a write or read access results in an error.

Replace the A/D-converter card

Replace the faulty EEPROM

Test value error D : Prüfzahlfehler

The measurement channel on the converter module is cyclically tested during operation. For this test, a test voltage is applied to the input, and compared with a stored *Check value*. If an error occurs here,

Check the load-cell cable and connector
Switch the weigher off and on again
Test the PSU card, or replace it
Check or replace the converter module.

Parameter error D : Parameterfehler

All the parameters in the battery-buffered RAM (weigher and sort parameters) are provided with checksums, which are periodically checked during operation. If a parameter is faulty or not initialized (in a new RAM), then this error message appears and filling operation is inhibited.

Check each parameter (weigher and sort parameters)
Use parameter RESET (in *Weigher setup*)
Check the weigher installation site for sources of interference

Calibration error D : Kalibrierung fehler

All calibration data in the memory are provided with checksums, which are periodically checked during operation. If an error occurs here, operation is blocked and this error message is produced.

Check the calibration data
Re-calibrate the weigher.

I/O assignment D : E/A-Belegung

The assignment of the program-internal logical inputs and outputs to the physical ones on the I/O modules is made through assignment tables in the weigher memory (non-volatile storage in the EEPROM). Like all parameters, these are provided with checksums that are periodically tested. If an error occurs here, filling operation is blocked and this error message is produced.

Switch the weigher off and on again
Check the CPU module

RAM error D : RAM-Fehler

The entire RAM area is periodically tested in the background. If an error message appears, only the following options are available:

Replace the RAM
Check or replace the CPU module.
Redefine the sorts
Carry out a parameter reset

ROM error D : ROM-Fehler

The entire EPROM area is periodically tested in the background. If an error message appears, only the following options are available:

Replace the CPU module

Load-cell missing D : Messdose fehlt

The evaluation instrument detects the presence of a load-cell by a link in the connector. If this link is missing, or the connector is unplugged, then this message appears.

Test the load-cell connector
Check the converter module.

Bag guide **D** **: Sackfuehrung**
The bag guide is not in the initial position when the filling is started.
Test the initiator
Test the mechanism

Airflow monitor **D** **: Stroemungswaechter**
The airflow monitor has detected that the flow of air is insufficient for extraction.
Test the airflow monitor
Test the suction/extraction

Anvil jaw error **D** **: Stoerung Amboss**
The test of the short-circuit monitoring unit has detected that there must be a cable break.
Check the short-circuit monitoring system on the anvil.

Three seconds after the command was given to close the anvil, it was still not closed.
Test the initiator.
Check the pneumatic components
Check the cabling
Check the output card.

Generator overload **D** **: Generator Überlast**
The welding generator was overloaded during the previous sealing operation. A possible cause is excessive pressure between the Sonotrode and the anvil.
Test the welding generator
Check the pressure that is applied.

Generator fault **D** **: Störung Generator**
A welding generator error occurred during the previous sealing operation.
Test the welding generator

Placing error 1 **D** **: Aufsteckfehler 1**
The lead for the placing position on a packer using angular measurement is too large.
Reduce the lead for the placing position.
Make a fresh determination of the placing position.

Placing error 2 **D** **: Aufsteckfehler 2**
The lead for the position detection on a packer using angular measurement is too small.
Increase the placing lead.
Make a fresh determination of the placing position.

No standstill **D** **: Kein Stillstand**
No weigher standstill was detected during taring.
Reduce the standstill duration.
Increase the empty damping.
Check the site.

Config. error **D** **: Konfig.-Fehler**
This error can occur when the software version is changed. The standard I/O assignment (defaults) will be loaded:
Check or replace the CPU module.

0/taring error **D** **: 0/Tarierfehler**
The weight is outside the 0/taring range.
Check the weight value, and clean or empty the weigher machinery
Check the calibration.

Calibration **D** **: Kalibrierung fehler**
All calibration data in the memory are provided with checksums, which are periodically checked during operation. If an error occurs here, operation is blocked and this error message is produced.
Check the calibration data
Re-calibrate the weigher.

Out of range **D** **: Ausser Bereich**
If the weight exceeds the maximum weighing range, then the weight display will go dark and this error message will be produced. Possible measures are:
Check the coarse lead
Check the damping (overshoot occurs if the damping is too high)
Check the adjustment (weighing range, pre-load adjustment ...)
Check the load-cell cable and connector.

Converter error **D** **: Wandler-Fehler**
If the weigher can no longer access the converter module, then operation is stopped and this message is generated.
Check the converter module

Dialog disabled **D** **: Dialog gesperrt**
The dialog has been disabled through hardware.
Remove the 24V from the *Dialog disable* input.

ATEX error **D** **: ATEX-Fehler**
For operation in environments with an explosion hazard, it is necessary to check that the safety functions on the welding station are operating correctly. To achieve this, **ATEX** mode can be activated in the configuration. In this case, at the start of filling and after every 20th bag, the anvil jaws will be closed and the safety devices will be tested. If there is a fault, **ATEX ERROR** will be generated and the system waits for acknowledgement. After acknowledgement, the test will be repeated. Welding/sealing can only be continued after a successful test.
Check the short-circuit monitoring system on the anvil.

No Working Area **D** **: Kein Arbeitsbereich**
The spout is at present outside the normal operating area, so that activation of the ejector, anvil and welding head must be forbidden, for safety reasons.

Initiator working area **D** **: Initiator Arbeitsbereich!**
Although the ' IN_WORKING_RANGE input has been configured, no signal was detected within one turn. The conclusion is that the initiator is faulty, and the spout must be switched off.

Door is open! **D** **: Tür offen!**
The door of the packer covering is open. The spouts have therefore been switched off.

Connector Assignments **5**

==========

ST1, Supply voltage

CPU module		ST1, Pin
GND	Ref. point	1
+24V	Supply voltage	2
Earth (ground)		linked to ref. point 3

ST2 Ethernet interface

CPU module		ST2, Pin
TxD+	Transmit line	1
TxD-	Transmit line	2
RxD+	Receive line	3
RxD-	Receive line	6
Earth (ground)		housing

At present, there are only 2 data sets that can be entered into the evaluation instrument as a command:

Command	**Function**	
CRTL-F (6)	AD-converter output	on/off
CRTL-A (1)	Filtered digital output	on/off

ST3 RS485 universal interface

CPU module		ST3, Pin
A	Data line	1
B	Data line	2
Earth (ground)		3

ST4 RS485 universal interface

CPU module		ST4, Pin
Earth (ground)		housing
A	Data line	1
B	Data line	6

ST4 RS232 universal interface

CPU module		ST4, Pin
Earth (ground)		housing
TxD	Transmit line	3
RxD	Receive line	2
GND	Ref. point	5,9

ST5, Terminal interface

CPU module		ST5, Pin
Earth (ground)		housing
+24V	Supply for terminal	1
A	Data line	7
B	Data line	8
GND	Ground / return line	9

Interface Assignments

Strain-gauge load-cell connection

Converter module		ST1, Pin
+5V	Supply	4
-5V	Supply	5
+M	Measurement signal	2
-M	Measurement signal	3
+S	Sense	6
-S	Sense	1
	Link	8+9
GND	Screen	housing

Module 1:

E_ABWURFFREI1	= 1;	Discharge enable, Belt 1
E_REF1	= 2;	Reference, Belt 1
E_FREIGABE	= 3;	Spout ON
E_AUFST_AUTOMATIK1	= 4;	Automatic placing, Belt 1
E_PKZ	= 5;	Filling turbine fault, 1 = Fault
E_RESTENTANF	= 6;	Residue removal
E_POS_IMPULS	= 7;	Position pulse
E_SILOMIN	= 8;	Material available
E_Lichtschranke	= 9;	Setup light barrier for angle
E_REF2	= 10;	Reference, Belt 2
E_SPUELANF	= 11;	Cleaning alternative:
E_SICHERHEITSSCHALTER	= 11;	Safety switch, Hopper 1 = fault
E_SACK_OK 1	= 12;	Bag-OK, Bag holder 1
E_SCHWEISSEN_EIN	= 13;	Welding ON
E_VERSCHLIESSKOPF_OBEN	= 14;	Welding head UP
E_VERSCHLIESSKOPF_UNTEN	= 15;	Welding head DOWN
E_AMBOSS_GESCHLOSSEN	= 16;	Anvil jaws closed
E_KURZSCHLUSS	= 17;	Sonotrode error
E_ GENERATOR_OK	= 18;	Generator status
E_OVL_GENERATOR	= 19;	Generator overload
E_ABSCHIEBER_AUSGEF.	= 20;	Cylinder switch, only for tipper saddle
E_SCHNELLANF	= 21;	Fast-empty, start
E_SCHNELLKON	= 22;	Fast-empty, check
E_SATTELZAEHLER	= 23;	Adjustment, saddle count pulse
E_SATTREF	= 24;	Adjustment, saddle DOWN

Module 2:

E_SF_GRUNDSTELLUNG	= 1;	Bag guide in initial position
E_STROEMUNGSWAECHTER	= 2;	Airstream monitor
E_ABWURFFREI2	= 3;	Discharge enable, Belt 2
E_HAND_AUTOMATIK2	= 4;	Automatic placing, Belt 2
E_TARIERANF	= 5;	Tare request
E_PACKSILO_MAX	= 6;	Packer silo max
E_DIALOG_SPERRE	= 7;	Dialog inhibit
E_FEINQUER_OFFEN	= 8;	Fine-feed cross-section: stop open
E_FEINQUER_IMPULS	= 9;	Fine-feed cross-section: count pulse
E_FUELLBODEN_ZU	= 10;	Bottom flap closed
E_RIEGEL_ZU	= 11;	Lock closed
E_RIEGEL_OFFEN	= 12;	Lock open
E_KLAPPE_ZU_TASTE	= 13;	Close bottom flap
E_KLAPPE_ZU_ERLAUBT	= 14;	Automatic closing of bottom flap permitted
E_SACK_OK 2	= 15;	Bag-OK, Bag holder 2
E_ROHR_SELECT	= 16;	0 = spout 1; 1 = spout 2
E_STARTSCHALTER	= 17;	Start switch
E_SICHERHEIT	= 18;	
E_ZUORDUNG_FEST	= 19;	Discharge control 2 Belt
E_EINE_UMDREHUNG	= 20;	Discharge control 2 Belt
E_DREHANTRIEB_EIN	= 21;	Packer rotating
E_STATUS_1	= 22;	To Server
E_STATUS_2	= 23;	To Server
E_FEINQUER_ZU	= 24;	Fine-feed cross-section: stop closed

Unassigned input signals:

E_IM_ARBEITSBEREICH	=	Spout is in the working area for manual placing
E_SICHERHEITSTUER_ZU	=	Safety door is closed

Outputs **7**

==========

Module 1:

A_FEIN	= 1;	Fine feed
A_GROB	= 2;	Coarse feed
A_SACKHALTER_1	= 3;	Bag holder
A_ABSTOSSER	= 4;	Ejector
A_FUELLBEL	= 5;	Hopper aeration
A_AUSBLASEN	= 6;	Blow out spout
A_SACKANFORD1	= 7;	Bag request, Belt 1
A_KIPPSATTEL	= 8;	Raise tipper saddle
A_TURBINE	= 9;	Filling turbine
A_MOTOR_FU	= 10;	Motor inverter
A_ROHR_AUFBLASEN	= 11;	Spout, inflatable collar
A_RUECKABW	= 12;	Spillage rejection
A_SATMOTDN	= 13;	Lower saddle
A_SATMOTUP	= 14;	Raise saddle
A_SCHNELLBEL	= 15;	Fast-empty aeration
A_SCHNELLSCHIEBER	= 16;	Fast-empty valve
A_SILORUETT	= 17;	Vibrate silo
A_STOERUNG	= 18;	General fault
A_STARTBEL	= 19;	Start aeration
A_STEUER1	= 20;	Control output 1
A_STEUER2	= 21;	Control output 2
A_STEUER3	= 22;	Control output 3
A_STEUER4	= 23;	Control output 4
A_FUELLWELLBEL	= 24;	Filling shaft aeration

Module 2:

A_DRUBEL	= 1;	Pressure chamber aeration
A_DRUENT	= 2;	Pressure chamber venting
A_KEGELBEL	= 3;	Vent cone
A_UKEGEL	= 4;	Open lower cone
A_SPUELLUFT	= 5;	Cleaning air
A_SCHWEISSEN_EIN	= 6;	Ultrasonic generator ON
A_STILLSTAND	= 7;	Standstill
A_SCHWEISSKONTAKT	= 8;	HF relay
A_VERSCHLIESSKOPF	= 9;	Lower welding head
A_AMBOSS_SCHLIESSEN	= 10;	Close anvil jaws
A_SCHWEISSPANNUNG	= 11;	Start ultrasonic generator
A_SACKKLEMME	= 12;	Full-bag clamp
A_SF_SENKEN	= 13;	Lower bag guide
A_SF_SCHWENKEN	= 14;	Swing bag guide round
A_SF_VAKUUM	= 15;	Bag guide vacuum
A_FUELLBODEN_OEFFNEN	= 16;	Open bottom flap
A_FUELLBODEN_SCHLIESSEN	= 17;	Close bottom flap
A_RIEGEL_OEFFNEN	= 18;	Open lock
A_RIEGEL_SCHLIESSEN	= 19;	Close lock
A_TSPEED1	= 20;	Turbine speed BIN 1
A_TSPEED2	= 21;	Turbine speed BIN 2
A_TSPEED3	= 22;	Turbine speed BIN 4
A_SACKENTL_REINIG	= 23;	Bag venting, clean
A_SAUGER	= 24;	Bag venting, injector

Unassigned output signals:

A_AUSSERBER	= 99;	Wrong weight
A_OKEGEL	= 99;	Open upper cone
A_SACKHALTER_SPIEGEL	= 99;	Bag holder mirroring
A_SACK_OK_OUT	= 99;	Bag applied correctly
A_SACKRAD2	= 99;	Bag from Radimat, Belt 2
A_SACKZI1	= 99;	Bag counter, Belt 1
A_SACKZI2	= 99;	Bag counter, Belt 2
A_FEINQUER_AUF	= 99;	Enlarge fine-feed cross-section
A_FEINQUER_ZU	= 99;	Reduce fine-feed cross-section
A_SACKHALTER_2	= 99;	Bag holder
A_LEERMELDUNG	= 99;	Empty signal
A_STUTZENLEER	= 99;	Spout empty
A_Abschieber_Impuls	= 99;	Pulse for Uniseal
A_SACKANFORD2	= 99;	Bag request, Belt 2
A_SERVER_STEUERBIT 1	= 99;	Control bit 1 from server
A_SERVER_STEUERBIT 2	= 99;	Control bit 2 from server
A_SERVER_STEUERBIT 3	= 99;	Control bit 3 from server
A_SERVER_STEUERBIT 4	= 99;	Control bit 4 from server

8.1 Description of the input signals

Bag-OK The output of the P/E converter is connected here. This produces a **1** signal when pressure builds up.

Start switch If the bag carrier should not be operated in a certain position, the *Start switch* option must be enabled in the dialog. In this case, the bag carrier is activated when a 24V signal is applied to the input.

Fast-empty check A fast-empty slide-valve is opened for fast-emptying on continuously rotating packers. An initiator (position sensor) is attached here. If the initiator is not covered within about 1 second after the valve is opened, the procedure is cancelled and an error message is generated. Likewise, the initiator must be uncovered again when the valve is closed.
When using stationary fast-empty in connection with a bag sealing station this input is used to close the anvil when the spout passes the reference position.

Fast-empty request On continuously rotating turbine packers, a pulse on this input starts the fast-empty.
On continuously rotating air packers, the fast-empty process runs as long as there is a signal on this input.
On intermittently rotating packer machines, the spout which is at the reference position and has the signal applied to this input always carries out a fast-empty.

Flushing request On air machines, the pressure chamber can be flushed out (cleaned) with air. The cleaning cycle continues as long as this input is activated.

Tare request If the tare frequency is set to **0** in the dialog, automatic taring will not be performed. The taring procedure can be triggered by applying a pulse to this input.

Saddle height, lower reference
At a change of sort or on switching on the weigher, the continuously variable saddle moves down to the lower reference position. An initiator (proximity switch) is attached here. When the position is reached, 24V is applied to the input.

Motor cutout On turbine machines, the output of the motor cutout is wired to this input. If the cutout is tripped, the present filling is interrupted, and no new filling is started.

Residue-removal request As long as 24V is applied to this input, residue removal is carried out on air packers.

Silo minimum

As long as the packer silo is filled up above a certain level, a 24V signal is applied to this input. A new filling can only be started in this state. Fillings in progress will not be interrupted by this state.
On air packers, each spout has its own initiator to monitor the level of material in the pressure chamber. If necessary, the cones are opened to refill the pressure chamber. The cones will only be closed when the initiator is covered up again.

Dialog inhibit
As long as this input is activated, the dialog with the controls is locked (it is not possible to alter the parameter settings). The short dialog is an exception.

Cleaning flap closed
When 24V is applied to this input, the control system detects that the cleaning flap is closed.

Cleaning flap locked
When 24V is applied to this input, the control system detects that the cleaning flap is locked.

Cleaning flap unlocked
When 24V is applied to this input, the control system detects that the cleaning flap is unlocked.

Close cleaning flap close
When 24V is applied to this input, the control system detects that the cleaning flap is to be closed.

Automatic placing 1
If the bag holder is to be operated at the automatic placing position, a 24V signal must be applied to this input. Otherwise, the bag holder is operated at the manual placing position. This input is valid for the placing mode on Belt 1.

Discharge enabled 1
If 24V is applied to this input when the spout is at the discharge position, the bag can be discharged onto Belt 1.

Spout enabled
With 24V on this input, the spout operates as described. With 0V, the spout is switched off. If the enable is removed during a filling, the filling will be cancelled.
When the enable returns, the bag carrier is operated first. If the spout detects a bag, a *Service filling* will be started. Basically, this runs just like a normal filling, but the packer does not rotate. At the start of the filling there is no taring, since partially filled bags are possibly being filled up. For this reason, the tare value is taken from the last normal filling.

Reference, Belt 1
On continuously rotating packers there is a reference position. It is situated at the output belt. Each spout that rotates past this position receives a short pulse on the input. The internal position counter is now checked and then reset. If the check shows that the count did not reach six, then an *Initiator error* message is generated.

Saddle height, rotation pulses
For continuous saddle height adjustment, a pulse generator is mounted on the spindle. It produces four pulses per turn, which are counted at this input.

Position counter A proximity switch is connected to this input. This produces a 24V signal when the spout rotates past a signal flag. There are six signal flags around the periphery, so six positions are counted. The correct sequence of these positions is:
Automatic placing, manual placing, empty-bag waste position, broken-bag waste position, determine discharge point 1,
determine discharge point 2

Reference, Belt 2 On packer machines with two output belts, the periphery is usually divided into two halves. Each half then has all the positions of a packer with a single output belt. The position counter can be used for both halves. The second reference signal is used to distinguish between the two halves.

Discharge enabled 2 If 24V is applied to this input when the spout is at the discharge position, the bag can be discharged onto Belt 2.

Automatic placing 2 If the bag holder is to be operated at the automatic placing position, a 24V signal must be applied to this input. Otherwise, the bag holder is operated at the manual placing position. This input is valid for the placing mode on Belt 2.

Valve in position If 24V is applied to this input, on continuously rotating packers with a tipper saddle and an internal sealing mechanism, then automatic sealing is started.

Sealing on The internal sealing mechanism is only active if this input is activated.

Welding head up On machines with an internal sealing mechanism, a filling can only be started when a 24V signal is applied to this input.

Welding head down On machines with an internal sealing mechanism, the anvil is closed started when a 24V signal is applied to this input.

Anvil closed On machines with an internal sealing mechanism, welding can only be started when a 24V signal is applied to this input.

Short-circuit On machines with an internal sealing mechanism, the welding process is interrupted if a 24V signal is applied to this input.

Packer silo max On air-operated machines, the cone aeration is activated when the cone has been open for at least five seconds, and 24V is applied to this input. The aeration time can be adjusted in the dialog.

Flap shut auto. permitted If a flap control is fitted, the cleaning flap can be closed automatically after the weigher has been cleaned, if a signal is applied to this input.

Generator fault The welding generator produces 0V at this input if a fault is present.

Generator overload The welding generator produces 24V at this input if it is overloaded.

Bag guide intial position A 24V signal is applied to this input if the bag guide is in the initial position. If this is not the case at the start of filling, the filling will not be started.

Airstream monitor A 24V signal is applied to this input if the airflow monitor detects an adequate airflow in the vicinity of the extractor. If this is not the case, bag sealing will be deactivated.

Fixed assignment
1 filling round With these two inputs you can decide, which system is used to reaquest and discharge the bags:

1) **Fixed assignment** = 1 / **Filling for complete turn** = 1
The even-numbered spouts have empty bags applied from Placer 1 and discharge the full bags exclusively onto Band 2.
The odd-numbered spouts have empty bags applied from Placer 2 and discharge the full bags exclusively onto Band 1.
If a bag is placed on the wrong spout (e.g. from Placer 1 onto an odd-numbered spout),
then the spout will drop the bag at the empty-bag position.

2) **Fixed assignment** = 0 / **Filling for complete turn** = 1
The spouts request empty bags from each placer.
Bags from Placer position 1 are discharged onto the output Belt 2,
Bags from Placer position 2 are discharged onto the output Belt 1.

3) **Fixed assignment** = 1 / **Filling for complete turn** = 0
The spouts request empty bags from each placer.
Bags from Placer position 1 are discharged onto the output Belt 1, bags from Placer position 2 are discharged onto the output Belt 2.

4) **Fixed assignment** = 0 / **Filling for complete turn** = 0
The spouts request empty bags from each placer. The bags are discharged onto the next available output belt

Pipe-Selection

The spout regocnizes via this input what filling pipe type is installed.. To this end, there is an initiator in the area of the filling pipe fastening.. The filling pipes differ from each other by whether they have a switching lug or not..
If „bag holder in front“ is selected in the sort dialog „Filling pipe selection“, it is only possible to fill bag if there are filling pipes installed without switching lug.. If „bag holder at the rear“ is selected, the filling pipes must have a switching lug.

Rotation drive ON

The spouts recognize by means of this input if the machine is rotating, fort he purpose of increasing the security of the operators. All movements like „actuate bag holder“, welding of „push-off bag“ are realized while the machine is rotating. The service filling ist the exception. It can also be carried out while the machine is standing still since it has to be started intentionally by the service personnel.

Spout in working area

When the spout is in the working area for manual placing, a 24V signal is applied to this input. This means that the ejector, welding head and anvil outputs must not be activated.

Safety door closed

When the safety door is closed, a 24V signal is applied to this input. If the 24V signal is missing, none of the outputs can be activated.

Error message
This output is activated if a fault occurs in the spout. The designation of the fault is displayed by the LCD.
Most messages are automatically acknowledged. Only the messages *Saddle blocked*, *Motor cutout*, *Not operating* have to be acknowledged, after the cause of the fault has been removed.

Hopper aeration
This output is used to control aeration nozzles, to aid the material flow. The output is controlled according to the current rate of increase in weight. If the increase is below an adjustable ***Aeration threshold***, this output is activated. If it goes above the threshold, the output is switched off again.
If the aeration threshold is set to **0.0**, there is no aeration.
On turbine packers, this output is also activated if the ***Maximum pause*** that was set is exceeded. In this case, the next filling will only be started after the bag has been applied and the *Initial aeration* is finished. This initial aeration is intended to loosen the material in the silo.
On air machines, this output is also switched on for cleaning the pressure chamber, and continuously for fast emptying.
On all machines, the hopper aeration is activated with the start pulse.

Fast-empty aeration
For fast-empty, first of all the fast-empty channel is blown out. To do this, this output is activated for a short time at the start of fast-empty.

Lower cone
On air machines, this output is activated to open the lower cone. On most machines, the lower cone is the only cone there is.

Saddle height, motor down
When using continuous saddle-height adjustment, this output is used to move the bag carrier down. If no saddle-height rotation pulses are detected while it is moving down, then the procedure is cancelled and an error message is generated.

Saddle height, motor up
With continuous saddle-height adjustment, this output is used to move the saddle up.
With stepped adjustment, this switches between the ***Up*** and ***Down*** positions.

Filling turbine
For filling, the slide-valve is opened first, the filling turbine is switched on afterwards. The time-delay can be adjusted. The turbine is also turned on for fast-empty and additional dosing.

Upper cone When the pressure chamber is full, the upper cone is closed first. After the *Lower cone delay time*, the lower cone will then be closed.

Blow out spout When the filling is finished, the spout can be blown out, so that as little material as possible falls onto the bag when it is discharged.

Fast-empty valve This output is used with continuously rotating turbine machines. It is switched on during fast-empty.

Vent pressure chamber The pressure chamber is vented before the cone is opened. The duration can be adjusted.

Ejector On continuously rotating packer machines, the ejector is operated when the discharge-point determination has counted down to the preset *Discharge lead* and the *Discharge enable* input signal is present.
The length of time for which the output remains set is defined in the dialog item *Ejector duration*.
On intermittently rotating machines, the ejector is operated when the preset ejection position has been reached and the *Discharge enable* input signal is present.

Bag request An empty bag is requested when the spout is ready for a new filling. On continuously rotating packer machines, the request is made between the reference position and the position for automatic placing.
On intermittently rotating machines, the empty bag request is made at the preset placing position.

Bag holder The bag carrier is operated at the application/placing position that is enabled by the *Automatic placing* input. If there is no *Bag-OK* signal present after the end of the *Bag-OK* delay time, then the bag holder is raised again and the wrongly placed bag is rejected to the empty-bag/waste position.
The bag holder is also activated during fast-empty.

Spillage rejection This output is activated when the preset weight limit for *Spillage rejection* is exceeded during the filling. If this does not happen, the spillage rejection is activated at the latest with the initiation of the discharge procedure. After discharge, the spillage rejection is turned off 0.5 sec. after the ejector.

Coarse feed
The output is switched on during the first phase of filling. It is switched off when the ***Coarse/fine changeover*** point is reached. This changeover point is adjusted by the dosing time regulator, depending on the ***Fine feed duration***.
The mechanical construction of the coarse/fine cylinder means that even when fine feed only is required, it is still necessary to activate the coarse feed. After reaching the coarse feed position, the coarse feed output is switched off again, to bring the slide-valve into the fine feed position.

Wrong weight
This output is activated when the check-weighing just before discharge shows that the weight is outside the limits that are set in the dialog items *Overweight* and *Underweight*.

Fine feed
This output is activated throughout the filling.

Vibrate silo
During fast-empty, and also (for air machines) during cleaning, the silo is vibrated. The duration is set in the dialog item *Silo vibrate pulse*, the pause is set in the dialog item *Silo vibrate pause*.

Saddle-height brake
On intermittently rotating machines with a continuously adjustable saddle height, a brake can be fitted for the saddle-height adjustment. This brake is always activated when the saddle is not moving.

Inflate spout
The collar on the filling spout is inflated when the inflation threshold is reached. The *Inflation time* starts at the end of filling. When the time has elapsed, the output is switched off again.

Start pulse
The start pulse is switched on when the *Bag-OK* signal is detected. When the *Start pulse* time is over, the output is switched off again.

Cleaning air
On air machines, the *Cleaning air* is turned on during cleaning.

Bag status
The output is controlled in parallel with the *Bag holder* output.

Close bag clamp
On machines with an internal sealing mechanism, this output operates the bag clamp that fixes the bag in position for sealing.

Spout empty
On air machines, this output is activated when the pressure chamber is empty.

Lower welding head
On machines with an internal sealing mechanism, this output lowers the sealing/welding head.

Bag request 2

On machines with two output belts and two automatic placers, this output produces the empty-bag request for the second automatic placer.

Cone ventilation

The output is activated when the lower cone has been opened for the filling of the pressure chamber for at least 5 seconds. This output remains activated for the duration of the time set in the dialog item *Cone ventilation*.

Injector nozzle

An injector nozzle can be fitted to turbine machines. This is activated at the start of filling, after a delay time: *Suction nozzle delay*. This is done in pulses, whereby the switch-on time is set by *Suction nozzle ON* and the switch-off time by *Suction nozzle OFF*. When the ejector is operated, the *Ejector time* starts running. During this time, the injector nozzle is turned off.

This output is also used for the *Reverse venting* function.

Reverse venting, clean

This output is used to blow out the reverse venting channel before filling starts.

Vent pressure chamber

This output is switched on during fast-empty and cleaning. For normal filling, the output remains switched on until the lower cone is open, to fill the pressure chamber. The pressure chamber is vented again at the start of the next filling.

Control output 1,2,4

These control outputs are available for free use. They can be configured in the corresponding dialogs, so that, separately for each sort, they are not switched on, or only in coarse feed, or only in fine feed, or during the entire filling, or for as long as the sort is selected.

Control output 3

This control output is activated if the increase in weight falls below the set limit during filling.

Tipper saddle

On intermittently rotating machines, the tipper saddle is operated when the discharge position is reached. The tipper saddle is released again after the bag transfer.

Motor ON

This output is activated when the spout is enabled and the motor cutout has not been tripped. The output is required for operating the filling turbine with a frequency inverter.

Bag-OK

On intermittently rotating machines, this output is used to inform the external controls that the bag was properly placed and that the placer arm can be withdrawn.

Unlock cleaning flap

Before the cleaning flap can be opened, the interlock must be released by a pulse at this output.

Lock cleaning flap

After the cleaning flap has been closed, by operating a manual button, 24V is applied to the *Cleaning flap locked* input. A pulse is then generated at this output, to activate the lock of the cleaning flap.

Open cleaning flap

A cleaning flap can be fitted to air machines. This is controlled by a pulsed valve. The pulse for opening the flap is applied to this output when the cleaning program has finished, after the lock has been released.

Close anvil jaws On machines with an internal sealing mechanism, this output closes the anvil.

Prepare welding On machines with an internal sealing mechanism, this output operates the HF relay that connects the Sonotrode to the welding generator.

Welding ON This output can be used to switch on the welding generator. The output is active if the *Welding ON* input is de-actived and the signal is made as a serial transmission.

Bag from Radimat 2 On machines with two discharge belts, a signal will be produced at this output until the bag is discharged, if the bag was placed by the second placer.

Bag count pulse 1 A pulse will be produced at this output when a bag is discharged onto the first discharge belt.

Bag count pulse 2 A pulse will be produced at this output when a bag is discharged onto the second discharge belt.

Standstill A 24V signal is applied to this output if the weigher is at standstill.

Close bottom flap This output closes the bottom flap of the filling hopper.

Lower bag guide This output lowers the bag guide.

Swing bag guide round This output swings the bag guide around.

Bag guide vacuum This output switches on the vacuum for the bag guide.

Turbine speeds 1-3	On machines with an integral frequency inverter for the filling turbine, these outputs produce a binary coded number from 1 to 7 for the speed at which the turbine should run. Each number has a speed assigned to it in the frequency inverter.
Turbine speeds 1-3	On machines with an integral frequency inverter for the filling turbine, these outputs produce a binary coded number.
Discharge pulse	ON machines with an external bag welding system (UNISEAL), an approximately 0.2 second pulse is generated when the ejector is activated.
Control bits 1-3	The MECIII server has four generally valid control bits. Their status is transmitted to all the spouts. In the spouts, each one of these signals can be assigned to an output.

9.1 Enclosure rating

- Operator terminal, at front IP65
- Electronics modules IP20

9.2 Ambient conditions

- Operating temperature –10°C to 40°C with guaranteed accuracy
  -10°C to 50°C with full functionality
- Storage temperature -20°C to 70°C
- Humidity 0 to 95% relative humidity, no condensation,
  for max. 30 days p.a. (to DIN 40040/ OIML)
- EMC insensitive to HF radiation and
  mains supply interference according to EN 45501 or
  EN 50081 (interference emission) and
  EN 50082 (interference immunity)

9.3 Instrument design

- Modular layout with:
  - Converter module
  - CPU module with power supply and interfaces
  - I/O module with 24 I/Os
- Operating terminal, for remote operation

9.3.1 Modular units

- CPU module
  - Power input: 24V DC +/– 20% at max. 5% ripple
  - Power consumption: 6 VA
  - CPU 32-bit, RAM memory, battery-buffered, min. 11 yrs battery buffering
  - Ethernet interface, RS232/RS485 interfaces
- I/O module
  - Digital inputs 24V DC, electrically isolated
  - Digital outputs for 0.5 A 24V DC, electrically isolated, short-circuit proof
- A/D-converter module
  - Dialog adjustment
  - Sigma/Delta conversion process
  - Load-cell supply 10V DC
  - Connection of 1 to 4 strain-gauge load-cells, each 350 Ohms in parallel circuit, with a nominal characteristic of 2mV/V
  - Max. cable length: 150 meters (0.34 mm²)
  - Sampling rate: 50 per second
  - Internal resolution: 20-bit
  - External maximum resolution: 6000 d / weighing range
  - for up to 3 partial ranges, calculated from ZERO to MAX i
  - Minimum analog resolution: 1.33µV/d
  - Accuracy class III to 90/384/EEC

9.3.2 Operator terminal

- LCD graphics display
  - LCD technology
  - Background-lit
  - Adjustable contrast
  - Resolution: 240 x 128
  - Weight display
  - 8-digit, floating point
  - Weight dim. unit selectable (kg/t/lb/klb)
  - 8 fields for status pictograms
  - 6 function-key pictograms
- Membrane keypad
- Interface
  - RS485 interface, with 100 meters permissible cable length
  - 57600 bps

Installation Requirements 10

Dust protection	The equipment must be kept closed.
Air	The surrounding air should not contain anything that could cause damage to the equipment.
Vibration	Strong vibration affects the weighing accuracy, and can cause mechanical and electrical damage.
EMC	Weigher electronics should not be installed in the immediate vicinity of electrical equipment with strong electromagnetic fields. The electronics conforms to the guidelines of EN 45 501. The minimum distance between mobile phone equipment and a weigher is 1 meter.
Mains power supply	Poor quality of the supplied power can make it necessary to use a voltage stabilizer, or possibly an additional mains supply filter to suppress interference. When operating off a supply without an earth, a technical earth must be provided.
Earthing	The equipment must be earthed via the protective earth (PE) to the earthing bus of the building. When using supplies without a protective earth, a technical earth must be provided. The system (signal) ground must be grounded to the case in the instrument. The module housing of the MEC II must be earthed by a 6 mm cable. When installed in a switchgear cabinet, all the cover sheets and doors of the cabinet and all the mounting devices for the MEC III must be earthed by short cables.

Cabling	During assembly and installation, care must be taken to route interference-generating and interference-sensitive cables separately. All measurement and data cables must be screened, whereby the screens must be grounded at both ends with large-area connections. The minimum spacing between signal cables and power cables should be about 0.5 m. If it is not possible to keep to this minimum distance, these cables must be screened.
External data cables	For Rotopackers, Ethernet cables for serial data transmission are laid between the slip-ring and the server or PCs; for linear machines they are laid between the spouts and PCs. CAT5 cables are installed, for a maximum cable length of 100 meters. Larger distances require the use of intermediate hubs.
Internal data cables	For Rotopackers, cable type LiYCY 14 x 0.75 is required for the internal signal cabling from the slip-ring to the individual spouts.
Outputs	All inductive loads must be fitted with freewheel diodes.
CAUTION:	During welding operations on the machine, it is vital that the weigher cells (load-cells) and electronics are adequately protected. Otherwise the load-cells and/or the electronics may be damaged.