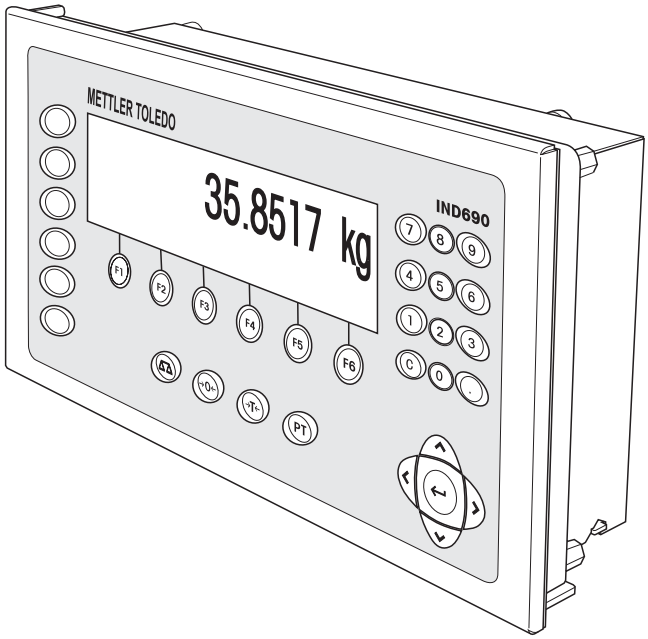
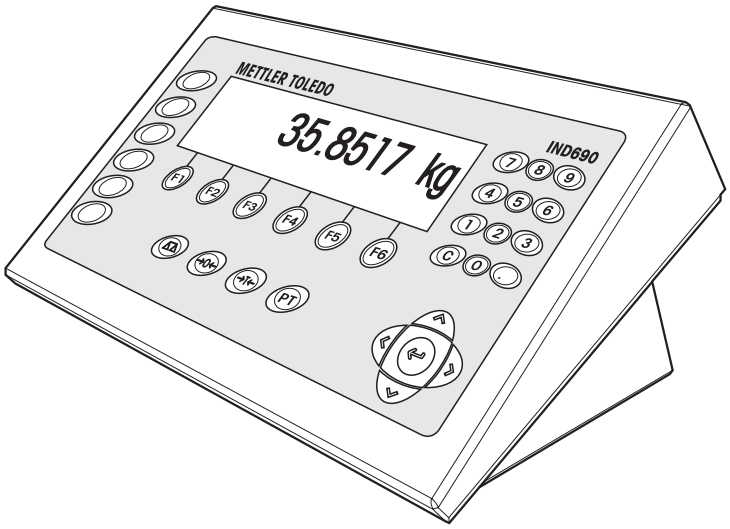
Operating instructions

METTLER TOLEDO MultiRange
Application software IND690-Fill





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Contents

1 Dispensing functions

1.1 Documentation

The weighing terminal IND690-… comes supplied with a CD containing all the documentation on the weighing system IND690.
These operating instructions describe the operation and configuration of the application software IND690-Fill.
The basic information for working with the weighing terminal IND690-… can be found in the operating instructions IND690-Base.

1.2 Introduction

With the IND690-Fill you can dispense liquid, pasty, powdery or grainy weighing samples in accordance with a specified target weight.
With the function keys the IND690-Fill makes the following functions available:

N	SUM	MAN	LIMIT	STOP	START
Enter item counter	Display and print total sum	Manual redispensing	Enter and print dispensing parameters	Interrupt or cancel dispensing process	Start dispensing process and print results of dispensing after the dispensing process is completed

➜ Select the function by pressing the function key.

Example

➜ Press the N key.
Then enter the start and stop value of the item counter manually with the keypad.

Note

When PASSWORD BLOCK ON is set in the master mode, a personal code must be entered after pressing the N key.

When the function keys are otherwise allocated

➜ Press the cursor keys < or > repeatedly until the function key assignment shown above appears.

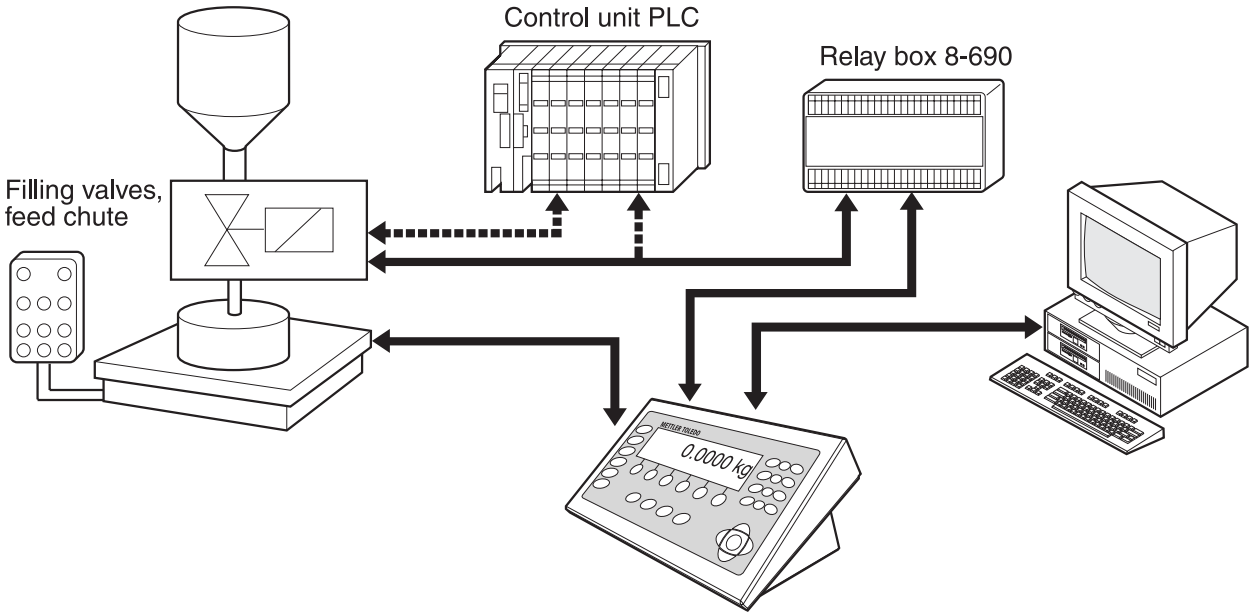
CAUTION

Danger of injury when pressing keys which start and stop the dispensing system or control the valves!

➜ Before pressing these keys, make sure that no one is in the area of moving system parts.

1.3 Dispensing system

With feed valves or feed chutes controlled with coarse and fine feed, the dispensing sample is automatically infed up to the specified target value.

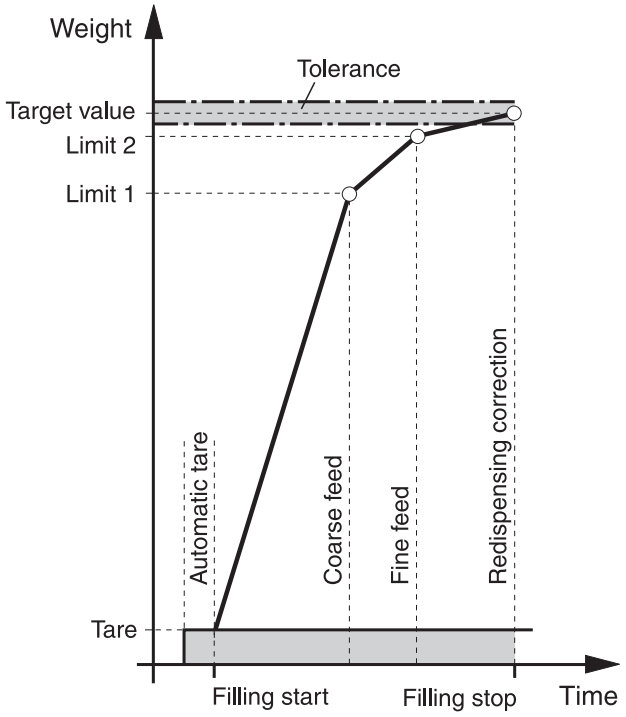


The control signals for the feed valves are transmitted to the 8-690 relay box via the RS485-690 interface. The 8-690 relay box controls the dispensing system either directly or via an additional external control unit (PLC). In the case of overloading or underloading of the weighing platform, all valves are closed immediately.
A maximum of two 8-690 relay boxes can be connected. With a second relay box a dispensing system with below-level dispensing can be controlled without a PLC ("nozzle control"). The IND690-Fill then assumes the function of a control unit with the moving of a filling nozzle or the switching of a drip pan and outputs signals to the nozzle correction, pregasing and postgasing.
The IND690-Fill can be remote controlled with "electronic fingers". These electronic fingers trigger various keys via interface commands on the terminal, see section 3.
Alternatively to the relay box 8-690 the dispensing system can also be controlled by using the interface 4I/O-690 and relay box 4-690 or by using ARM100.
Please note that the accuracy of the filling results and the filling speed are not only dependent on the scale, but also on the other system parts, and in particular on the filling device itself (valves, feed chutes etc.). Only the optimum co-ordination of all components with each other produces the best filling results.

1.4 Dispensing process

Dispensing is carried out in 5 consecutive steps:

- **Automatic tare** – Automatic taring of the container and dispensing start
- **Coarse feed** – Dispensing with coarse feed up to the coarse/fine-feed switch-over point (limit 1)
- **Fine feed** – Dispensing with fine feed up to the switch-off point of the fine feed (limit 2)
- **Redispensing correction** – Redispensing correction of fine feed beyond limit 2
- **Redispensing** – If the weight value does not lie within the tolerance of the target value at the end of dispensing, automatic or manual redispensing up to the target value



If not limits are entered, the IND690-Fill automatically determines Limit 1 and Limit 2 in a learn mode, see page 20. The target weight is then exactly reached already during the first dispensing.
To optimize the dispensing process, Limit 2 is automatically adjusted with the same component during the next dispensing process, see REDISP. CORRECTION block on page 16.
If the container is underfilled, manual or automatic redispensing can be carried out depending on the settings in the master mode.

1.5 Entering dispensing parameters

Entering numerically

1. Press LIMIT key.
2. Enter target weight and confirm with ENTER.
3. Specify limits: enter ENTER LIMIT 1 and LIMIT 2 and confirm with ENTER.
   To automatically determine the limits, press ENTER without making an entry.
4. Specify tolerance: enter TOL and confirm with ENTER.
5. If tare checking is to be used, specify tare values TMIN and TMAX and confirm with ENTER.

Notes

- The weight unit for entering the limits can be selected with the cursor keys < or >.
- The entry can be corrected one character at a time with the CLEAR key.
- If LEARN MODE OFF is set in the mastermode, Limit 1 and Limit 2 **must** be specified, and if the 3rd switch-off point is also activated (see section 2.2.5), Limit 0 as well.
- If PASSWORD BLOCK ON is set in the master mode, a personal code must be entered after pressing the LIMIT key.
- If ANALOG OUTPUT ON is set in the master mode, the throughput preflow (with additionally activated 3rd shutoff point), throughput coarse feed and throughput fine feed **must** be specified.
- Press the LIMIT key in order to display or correct dispensing parameters in the READY FOR DISPENSING state. The target weight cannot be entered in this case.

Copying constants

1. Enter number of target memory: 1 … 999.
2. Press LIMIT key.

Note
If PASSWORD BLOCK ON is set in the master mode, a personal code must be entered after pressing the LIMIT key.

1.6 Dispensing

The dispensing type is dependent on the application set in the master mode:

- ABOVE LEVEL: Dispensing above the filling level (without filling lance)
- BELOW LEVEL Dispensing lance below the dispensing level
  The filling process is not started unless the dispensing lance is recognised in the right position, meaning that the input signal NOZZLE DOWN has to be active.
- BELOW BUNGHOLE Dispensing lance below the bung hole
  The filling process is not started unless the dispensing lance is recognised in the right position, meaning that the input signal NOZZLE MIDDLE has to be active.

Notes

- For the application BELOW LEVEL/BELOW BUNGHOLE, NOZZLE CONTROL ON two 8-690 relay boxes must be connected.
- During the filling process exactly one of the signals NOZZLE DOWN / MIDDLE / UP has to be active. Otherwise the error message SEVERAL INPUTS ON or WAITING FOR INPUT is displayed. The filling process is not continued until exactly one of these signals is active.
- A new filling process can only be started if the input signal NOZZLE UP has been recognised beforehand.
- For sequence charts of the individual applications, see section 6.2.

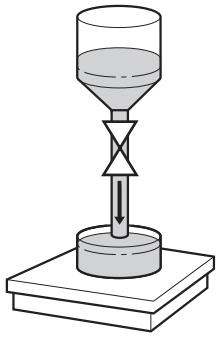
1.6.1 Displaying of dispensing state

The display shows the dispensing state with texts and a 3-digit code, e.g.:

Text	Code	Meaning
READY FOR DISPENSING	010	Dispensing parameters loaded
COARSE FEED	040	Dispensing with coarse feed
FINE FEED	050	Dispensing with fine feed
DISPENSING OKAY	101	Target value achieved
UNDERFILLED	084	Target value not achieved
OVERFILLED	111	Target value exceeded
EVALUATING	070	Evaluation of dispensing results

Notes

- The dispensing states are listed in application block 361, see section 3.
- If STATUS INDICATOR WITH DELTATRAC is set in the master mode, the display also shows the DeltaTrac as an analog weigh-in aid.

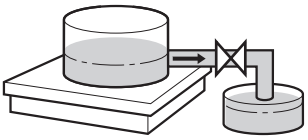


1.6.2 Dispensing with filling container on the weighing platform

During dispensing the filling container on the weighing platform is filled from a supply vessel.

1. Enter dispensing parameters, see section 1.5.
   The display shows READY FOR DISPENSING.
2. Place empty filling container on the weighing platform.
3. Press START key.
   The display shows the following: weight value, dispensing status and DeltaTrac.
   When the dispensing process is completed, the display indicates whether the weight value lies within the tolerance limits (DISPENSING OKAY) or outside (OVERFILLED, UNDERFILLED).
   The dispensing result is printed.
4. Relieve weighing platform.
   If ACKNOWLEDGE ON is set in the master mode, the dispensing process is acknowledged and the display shows READY FOR DISPENSING.

1.6.3 Dispensing with a supply vessel on the weighing platform



During dispensing the filling container is dispensed from a supply vessel on the weighing platform.

1. Enter dispensing parameters, see section 1.5.
   The display shows READY FOR DISPENSING.
2. Place filled supply vessel on the weighing platform.
3. Press START key.
   The display shows the following: weight value with negative sign, dispensing status and DeltaTrac.
   When the dispensing process is completed, the display indicates whether the weight value lies within the tolerance limits (DISPENSING OKAY) or outside (OVERFILLED, UNDERFILLED).
   The dispensing result is printed.
4. Acknowledge dispensing process.
   If ACKNOWLEDGEMENT ON is set in master mode, READY FOR DISPENSING is shown in the display. With ACKNOWLEDGEMENT OFF, the next dispensing process is started automatically.

1.7 Interrupting dispensing process

Same container

1. Press STOP key.
   The dispensing process is interrupted.
2. To continue the dispensing process, press START key.

New container

1. Press STOP key twice.
   The dispensing process is cancelled.
2. Place a new container on the weighing platform.
3. If TOTALIZING ON is set in the master mode, the sum can be displayed with the SUM key.
4. To continue the dispensing process, press START key.

1.8 Cancelling or ending the dispensing process

By pressing key on weighing terminal

➜ Press STOP key twice.
The dispensing process is cancelled or ended when the dispensing process is completed.

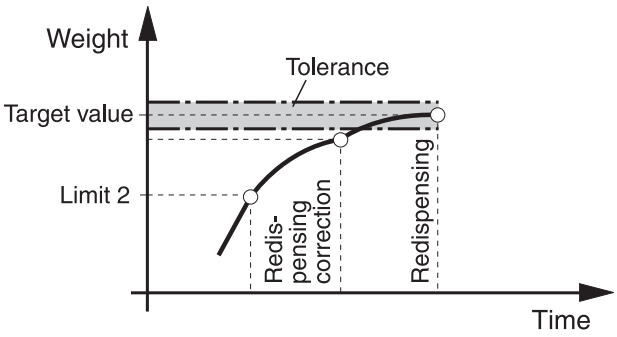
By external signal

➜ Cancel dispensing process with a pulse at input IN 7 of first 8-690 relay box. The IND690-Fill is then in the READY FOR DISPENSING (010) state.

Note
If TOTALIZING ON, CORRECT DISPENSINGS is set in the master mode, cancelled dispensing processes can be added to the sum by pressing the SUM key when CONTINUE WITH START is displayed.

1.9 Redispensing

If, for example, the weight value is briefly exceeded, the fine feed is switched off too early and the current weight value (actual value) is below the target value.
During redispensing the fine feed is opened in intervals until the target value is reached. Depending on the setting in the master mode, redispensing is carried out manually or automatically, see section 2.2.



Manual redispensing

Prerequisite

MANUAL REDISPENSING is set in the master mode.

➜ When the display shows MANUAL, press and hold down the MAN key.
The fine feed is switched on in pulses as long as the key is pressed and until the target value is reached.

1.10 Manual recorrection

If MANUAL CORRECTION ON is set in the master mode, the display shows MANUAL CORRECTION after the actual-target comparison if the final weight lies outside the tolerances.

➜ Recorrect manually and confirm correction with START key.

1.11 Totalizing automatically

To automatically totalize dispensing processes with the same dispensing samples, an item counter can be specified which determines the number of dispensing processes. When the item counter reaches its stop value, the dispensing system stops automatically.

Prerequisite

TOTALIZING ON is set in the master mode.

1. To set the item counter:
   – Press N key.
   – Enter start value of item counter and confirm with ENTER.
   – Enter stop value of item counter and confirm with ENTER.
2. Carry out 1st dispensing process, see section 1.6.
3. Relieve weighing platform.
4. Carry out additional dispensing processes, see section 1.6.
   When the item counter reaches its stop value, the dispensing system stops automatically.
5. To display and print the total sum, press the SUM, ENTER key sequence.
6. To carry out additional dispensing processes with the same dispensing sample, e.g. after redispensing the supply vessel, repeat steps 1 to 3.
   When doing so, make sure that the item counter continues to count.
   – or –
   To carry out dispensing processes with a different dispensing sample, or to end totalizing, press the SUM, CLEAR key sequence.

Notes

- If TOTALIZING ON, CORRECT DISPENSINGS is set in the master mode, cancelled dispensing processes can only be added to the total sum by pressing the SUM key when CONTINUE WITH START is displayed.
- If PASSWORD BLOCK ON is set in the master mode, a personal code must be entered after pressing the SUM and N keys.

1.12 Recalling application-specific information

Information on dispensing can be recalled with the following key combinations:

INFO, N	Display item counter.
INFO, SUM	Display current weight sum.
INFO, LIMIT	Display current dispensing parameters.
INFO, fixed target number, LIMIT	Display stored dispensing parameters.

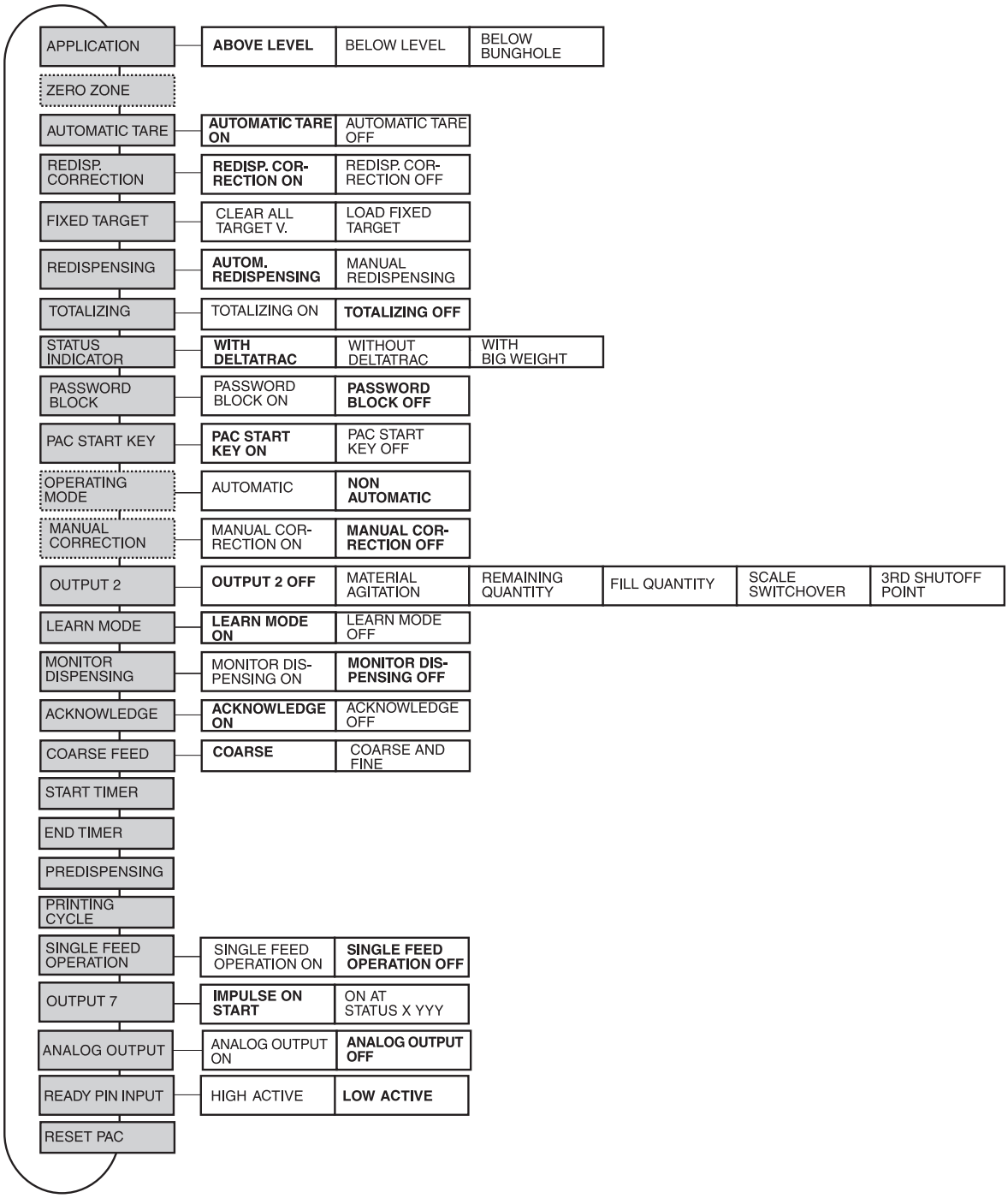
Notes

- If several pieces of information are recalled with one key, the display changes automatically after the set DISPLAY DURATION. It is also possible to switch back and forth between these pieces of information with the CLEAR key.
- No information can be displayed during the dispensing process (dispensing valves open).

2 Settings in the master mode

2.1 Overview of the PAC master mode block

The following system settings can be entered in this block:



Legend

- Blocks on a **grey** background are described in detail in the following.
- Factory settings are shown in **bold** print.
- Blocks which only appear under certain conditions appear with a **dotted** outline.

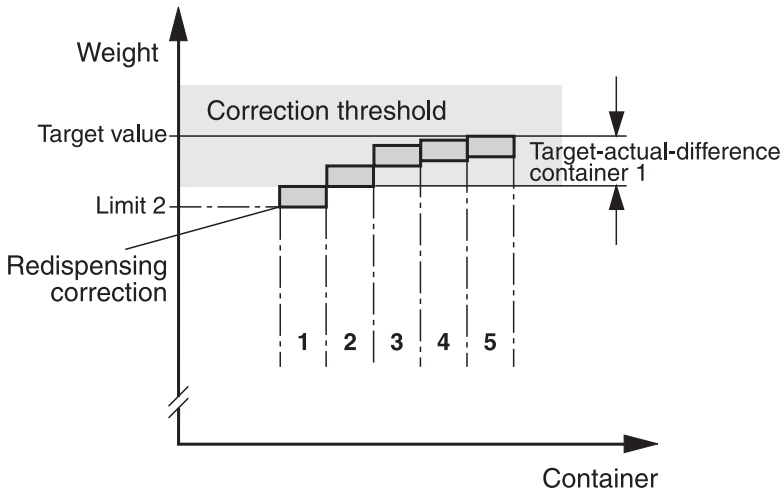
2.2 Settings in the PAC master mode block

Note
You can make all master mode adjustments conveniently with the PC using the FillTool software. Ask your METTLER TOLEDO sales partner. See section 2.2.6 for examples.

APPLICATION	**Select application**
ABOVE LEVEL	Dispensing above the filling level (factory setting)
BELOW LEVEL	Filling with dispensing lance below the dispensing level
NOZZLE CONTROL	Switch nozzle control on or off. Factory setting: NOZZLE CONTROL OFF Nozzle control operates best when 2 relay boxes 8-690 are connected. Addition settings with NOZZLE CONTROL ON: • DRIP PAN – working with or without drip pan control Factory setting: DRIP PAN OFF • EVALUATION POSITION: – NOZZLE MIDDLE (factory setting) – NOZZLE TOP • NOZZLE MONITORING – working with or without monitoring of the nozzle position Factory setting: NOZZLE MONITORING OFF
BELOW BUNGHOLE	Filling with dispensing lance below the bunghole
NOZZLE CONTROL	Switch nozzle control on or off. Factory setting: NOZZLE CONTROL OFF Nozzle control operates best when 2 relay boxes 8-690 are connected. Addition settings with NOZZLE CONTROL ON: • DRIP PAN – working with or without drip pan control Factory setting: DRIP PAN OFF
Comments	• Take terminal diagram and terminal assignment of 8-690 relay box into account, see section 6.1. • For example sequence charts for the three applications, see section 6.2.

ZERO ZONE	**Adjust weight monitoring while lowering the filling nozzle with the below level application**
	If the current weight value exceeds the threshold ZERO, the filling nozzle is moved back to the starting position. The cause may be poor positioning when the filling nozzle, e. g. scrapes the container rim or runs into the cover.
ZERO	Enter threshold weight value of the zero zone

AUTOMATIC TARE	**Switch automatic taring before dispensing on or off**
	Factory setting: AUTOMATIC TARE ON

REDISP. CORRECTION	**Switch redispensing correction on or off**
	The redispensing correction function optimizes the switch-off point of the fine feed (limit 2). If REDISP. CORRECTION ON is set, the target-actual difference is determined for each container and multiplied by a FACTOR. Target-actual difference x correction factor = Δ Limit 2 is automatically corrected by the value Δ when dispensing the next container: **Example:** For a target-actual difference of 10 g and a factor of 0.5, limit 2 is corrected by 5 g.  Factory setting: REDISP. CORRECTION ON
FACTOR	Correction factor by which the target-actual difference is multiplied. The result is the value Δ by which limit 2 is corrected. Possible values: 0.1 … 0.9 (factory setting: 0.5)
CORREC. THRESHOLD	The correction threshold specifies the target-actual difference up to which the redispensing correction corrects limit 2. • Possible values: 0 … 99 in multiples of the tolerance (Factory setting: 0, i. e. limit 2 is corrected for all actual values) • Limit 2 is not corrected when TOTALIZING ON is set and after at least 10 consecutive dispensings the actual value lies outside the correction threshold for the first time. This value is considered a freak value. If during the next dispensing the actual value lies outside the correction threshold, limit 2 is automatically corrected. If in the process limit 2 ≤ limit 1, then the learn mode is automatically activated.

FIXED TARGET	**Save dispensing parameters for various components in target memories protected against power failure**
LOAD FIXED TARGET	1. Enter FIXED TARGET NO. memory number: 1 … 999. 2. Enter article designation NAME, e.g. M8 SCREW. 3. Enter TARG target weight. 4. If OUTPUT 2 = 3RD SHUTOFF POINT: Enter switchover point preflow/coarse feed LIMIT 0. 5. Enter coarse/fine feed switchover point LIM 1. 6. Enter switch-off point of fine feed LIM 2: LIMIT 1 ≤ LIMIT 2. 7. Enter tolerance TOL in the displayed unit. – Minimum tolerance: 1 digit – Maximum tolerance: target weight; with DeltaTrac: 10 % of target weight – Target weight + tolerance ≤ maximum load 8. Enter lower limit of permissible tare range TMIN. 9. Enter upper limit of permissible tare range TMAX: TMIN ≤ TMAX. 10. If ANALOG OUTPUT = ON and OUTPUT 2 = 3rd SHUTOFF POINT: Enter THROUGHPUT PREFLOW. If ANALOG OUTPUT = ON: Enter THROUGHPUT COARSE FEED and THROUGHPUT FINE FEED 11. End entry: Confirm memory number without entry with ENTER.
CLEAR ALL TARGET V.	Clear all target memories.

REDISPENSING	**Set automatic or manual redispensing**
	Factory setting: AUTOMAT. REDISPENSING
AUTOMAT. REDISPENSING MANUAL REDISPENSING	Possible entries: • PULSE DURATION During the pulse duration the fine feed is opened. Possible values: 1 … 99 times a measuring cycle (factory setting: 5) • PULSE PAUSE During the pulse pause the fine feed is closed. Possible values: 0 … 99 times a measuring cycle (factory setting: 5)

TOTALIZING	**Switch automatic totalizing on or off**
	If TOTALIZING ON is set, the dispensings to be totalized can be selected. Factory setting: TOTALIZING OFF
CORRECT DISPENSINGS	Only totalize dispensings within the tolerances. Cancelled dispensings can be added to the total sum with the SUM key in the CONTINUE WITH START state.
ALL DISPENSINGS	Totalize all dispensings.

STATUS INDICATOR	**Set display of dispensing state on IND690-Fill**
WITH DELTATRAC	The dispensing state is displayed with text, a 3-digit code and the DeltaTrac, see section 1.6.1 (factory setting).
WITHOUT DELTATRAC	The dispensing process is displayed with texts and a 3-digit code.
WITH BIG WEIGHT	During the dispensing process the BIG WEIGHT DISPLAY weight display is switched on. Dispensing states such as READY FOR DISPENSING or DISPENSING OKAY continue to be displayed, and the display switches over to the normal weight display for this purpose.
	The following possibilities are also available for all settings: • NOT ENLARGED (factory setting): When the weighing platform is ready for dispensing, the display shows READY FOR DISPENSING. • ENLARGED: When a target memory has been recalled, the memory designation appears in the display in the ready for dispensing state. For manually entered dispensing parameters, READY FOR DISPENSING appears.

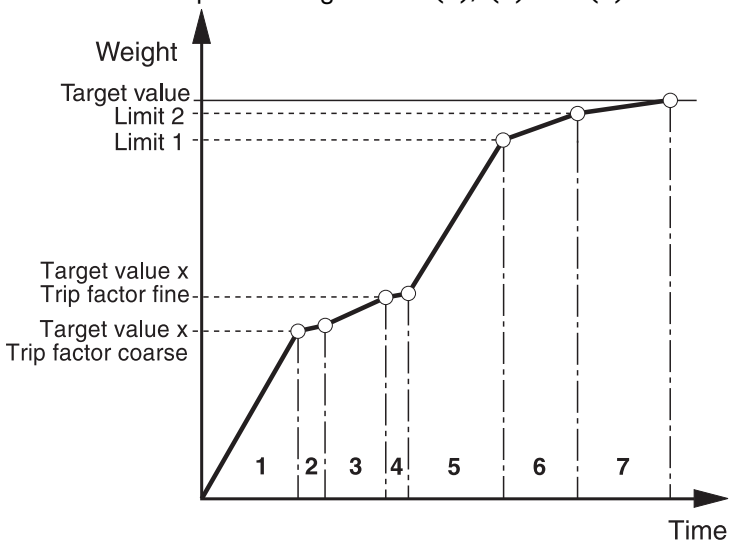
PASSWORD BLOCK	**Switch password block on or off**
	Protect SUM, N and LIMIT keys with the personal code which also protects the master mode, see "Master mode" section in the operating instructions for the IND690-Base weighing terminal. Factory setting: PASSWORD BLOCK OFF

PAC START KEY	**Switch locking of the START key on or off**
	If PAC START KEY OFF is set, the START key is locked and the dispensing process can only be started via an external switch or a 8-690 relay box. This prevents double operation with external operating elements (e.g. footswitch or key). Factory setting: PAC START KEY ON

OPERATING MODE	**Set operating mode with certified weighing platforms**
NON AUTOMATIC	The dispensing process does not run automatically and the permissibility of the weight values must be monitored by the operator.
AUTOMATIC	The dispensing process runs automatically (factory setting).
Comments	• Different national tolerances are taken into account. • For calibration reasons, the operating mode can only be switched over in the non-certified mode of the weighing platform.

MANUAL CORRECTION	**Switch manual recorrection on or off**
	When MAN. CORRECTION ON is set, the final weight can be manually recorrected, e.g. in the case of incorrect dispensing, see section 1.10. Factory setting: MAN. CORRECTION OFF
Comments	• At output OUT4 and OUT5 of the first 8-690 relay box, it can be read off whether dispensing lies within the tolerances (DISPENSING OKAY) or outside (DISPENSING POOR). • Manual correction is not possible in case of verifiable weighing platforms in the AUTOMATIC operating mode. • If REDISPENSING is set to AUTOMATIC, the MANUAL CORRECTION only becomes active in the case of overfilling (underfilled containers are automatically redispensed). If REDISPENSING is set to MANUAL, the MANUAL CORRECTION becomes active in the case of underfilling and overfilling.

OUTPUT 2	**Control various additional devices via output 2**
OUTPUT 2 OFF	Output 2 is not actuated (factory setting).
MATERIAL AGITATION	Control of an agitator during or after dispensing; for additional settings, see section 2.2.1.
REMAINING QUANTITY	Remaining quantity: Control of an emptying device on the filling container; for additional settings, see section 2.2.2.
FILL QUANTITY	Fill quantity: Control of a refilling valve during subtractive weighing; for additional settings, see section 2.2.3.
SCALE SWITCHOVER	Control of a signal which enables switching over between 2 weighing platforms; for additional settings, see section 2.2.4.
3RD SHUTOFF POINT	Control of a third valve; for additional settings, see section 2.2.5.
Comment	To read or set the status of output 2, see application block 359 on page 35.

LEARN MODE	**Switch Learn mode on or off**
	If LEARN MODE ON is set and the dispensing parameters are entered without limits or limit 2 ≤ limit 1, the IND690-Fill determines the valve switch-off points limit 1 and limit 2. If LEARN MODE OFF is set, limit 1and limit 2 must be entered manually. Factory setting: LEARN MODE ON • The coarse feed is opened (1) in the learn mode up to the value (target value x trip factor coarse feed) and the redispensing correction determined (2). Then the fine feed is opened (3) during the number of measuring cycles specified with the trip factor fine feed and its redispensing correction determined (4). Then limit 1 and limit 2 are calculated in dependence on the target value. Following this filling is carried out up to the target value (5), (6) and (7). 
TRIP FACTOR COARSE	The trip factor coarse feed determines when the coarse feed is switched off in the learn mode. • Possible values: 0.1 … 0.9 (factory setting: 0.5). • With high pressures and pulse forces or large mass feeds, reduce the trip factor.
TRIP FACTOR FINE	The trip factor fine feed specifies how long the fine feed is open in the learn mode. The larger the trip factor fine feed, the more accurately the fine feed run-on can be determined. Possible settings: TRIP FACTOR FINE FEED = 0.1 ... 0.9 (Factory setting: 0.5) The value 0.1 is equal to 5 measuring cycles, 0.5 is equal to 25 measuring cycles and 0.9 is equal to 45 measuring cycles.
Comments	• If SINGLE FEED OPERATION ON is set, limit 1 is set to zero in the learn mode. • TRIP FACTOR COARSE and TRIP FACTOR FINE are available as application blocks (blocks 363 to 367).

MONITOR DISPENSING	**Switch monitor dispensing on or off**
	Dispensing monitoring monitors the weight increase in each measuring cycle. If MONITOR DISPENSING ON is set and the weight value exceeds or drops below the SENSITIVITY value, dispensing monitoring is activated. Factory setting: MONITOR DISPENSING OFF
SENSITIVITY	AABBCCDDEEFF – Response behavior of dispensing monitoring as a 12-digit number Possible settings: • WEIGHING-IN – Dispensing monitoring during weighing-in • SUBTRACTIVE WEIGH. – Dispensing monitoring during subtractive weighing **Response behavior of dispensing monitor** AA AA = 00 digit: Dispensing monitoring is activated when the weight increase per measuring cycle **drops below** the corresponding value (DD, EE or FF) (negative monitoring). The corresponding valve (preflow, coarse or fine feed) is automatically switched off. The display alternately shows MONITOR DISPENSING and CONTINUE WITH START. The dispensing process can be ended with the STOP key or continued with the START key. AA = 01 digit: Dispensing monitoring is activated when the weight increase per measuring cycle **exceeds** the set value (DD, EE or FF) (positive monitoring). The corresponding valve (preflow, coarse or fine feed) is automatically switched off. Dispensing is first continued when the weighing platform is stabile. BB Switch-on value of dispensing monitoring: weight increase per measuring cycle for which dispensing monitoring is activated after starting or interrupting the dispensing process: 00 … 99 digit (factory setting: 03) CC Number of measuring cycles during which the dispensing monitor pauses and the weight increase takes place: 01 … 99 (factory setting: 10) DD Weight increase per measuring cycle for the fine feed: 01 … 99 digit (factory setting: 01) EE Weight increase per measuring cycle for the coarse feed: 01 … 99 digit (factory setting: 01) FF Weight increase per measuring cycle for the preflow: 01 … 99 digit (factory setting: 01)
Comments	• In the case of valve or material sluggishness increase the value BB. • In the case of uneven material feed increase the value CC. • With an increased material flow, increase the values DD, EE and FF (minus monitoring). • In application block 361 the dispensing state minus or plus monitoring is available, and the response behaviour is available in application block 362, see section 3.

MONITOR DISPENSING	**Switch monitor dispensing on or off**
Example	**Big bag emptying** If SUBTRACTIVE WEIGHING ON is selected, the dispensing monitor stops the emptying process as soon as the big bag is fully emptied. The last filling process is generally not yet complete here. The previously removed weight can be saved by pressing the TARE key. After inserting a new big bag and pressing the START key, the interrupted filling process is then completed. **Practical example** A big bag with 2,000 kg of bulk material is to be filled into sacks of 300 kg each. • IND690-Fill performs six filling processes (1,800 kg filled). • With the seventh filling process, only 200 kg can be filled. The dispensing monitor stops the filling process. • Press the TARE key to save the 200 kg already filled. • Insert a new big bag and press the START key. • The seventh sack is topped up to the required 300 kg.

ACKNOWLEDGE	**Switch acknowledgement of the next dispensing process on or off**
	After completing one dispensing process, the next dispensing process can be started with or without acknowledgement. Acknowledgement is triggered with the following actions: • Weight change > 30 digit • Pressing the START key • Interface command A W 3 5 2 _ 1 or A W 3 0 6 _ $ $ 9, see section • Signal at input IN 4 of the first 8-690 relay box
ACKNOWLEDGE ON	Moving the weighing platform by at least 30 digit or pressing the START key in the DISPENSING OKAY state results in the READY FOR DISPENSING state. The next dispensing process is started with the START key (factory setting).
ACKNOWLEDGE OFF	After the dispensing process is completed and the START is pressed, the next dispensing process is started immediately. READY FOR DISPENSING is not displayed.

COARSE FEED	**Set valves during coarse feed**
COARSE	Open coarse feed up to limit 1 (factory setting).
COARSE AND FINE	Open coarse and fine feed up to limit 1 simultaneously.

START TIMER	**Set delay time between the start of the dispensing process and opening of the coarse feed**
TIME	Possible values: 0 … 999 seconds (factory setting: 0)
Comments	• When the start timer is activated, the display shows the time remaining. • The start timer can be interrupted or cancelled with the STOP key. • If two 8-690 relay boxes are installed, the OUT7 output on the second 8-690 relay box is set to HIGH during the delay time. This signal can, for example, be used for pregasing when dispensing fruit juices.

END TIMER	**Set delay time between stabilization of the weighing platform after the end of dispensing and evaluation of the weighing data**
TIME	Possible values: 0 … 999 seconds (factory setting: 0)
Comments	• When the end timer is activated, the display shows the time remaining. • The stop timer can be interrupted or cancelled with the STOP key. • If two 8-690 relay boxes are installed, the OUT6 output on the second 8-690 relay box is set to HIGH during the delay time. This signal can, for example, be used for regasing when dispensing fruit juices.

PREDISPENSING	**Set time for predispensing**
	The fine feed valve is actuated before each opening of the coarse feed. The fine feed valve can be opened either for a specific period of time or up to a specific weight.
TIME	Possible values: 0 … 999 seconds (factory setting: 0)
WEIGHT	Weight limit for predispensing Possible values: 0 ... target weight (factory setting: 0 kg)
Comments	• Predispensing can be interrupted or cancelled with the STOP key. When limit 1 is reached, predispensing is automatically cancelled. • When predispensing is activated, the display shows the time still remaining.

PRINTING CYCLE	**Enter number of dispensings after which the dispensing result is automatically printed or a corresponding data string is transmitted**
	Possible values: 1 … 99 (factory setting: 1)

SINGLE FEED OPERATION	**Switch single feed operation on or off**
	If SINGLE FEED OPERATION ON is set and the target value of the specified LIMIT is dropped below, dispensing is then only carried out with fine feed. This also enables smaller quantities to be dispensed without switching over the dispensing system (valves, pumps). Factory setting: SINGLE FEED OPERATION OFF
LIMIT	Enter threshold value for single feed operation.

OUTPUT 7	**Set switch-on of the OUT 7 output to the first 8-690 relay box**
IMPULSE ON START	OUT 7 is briefly switched on during the start-up of the IND690-Fill (factory setting).
ON AT STATUS X YYY	Enter up to 30 dispensing states for which OUT 7 is switched on. X is the serial number (1 ... 30), YYY is the code for the various dispensing states (000 ... 254), see application block 361 on page 36. To end the input of the dispensing states, press ENTER without making an entry.

ANALOG OUTPUT	**Output throughput at analog output**
	When ANALOG OUTPUT ON is set, a respective throughput (0 ... 99 %) is output at an integrated analogue output during the opening of the preflow, coarse feed or fine feed. The size of the throughput can be entered manually with the LIMIT key or with a port via the application blocks 322 ... 347 or 323_001 ... 323_999. Factory setting: ANALOG OUTPUT OFF
Note	For this purpose, the analog output must be configured as follows: Start-Stop mode BLOCK NUMBER 366 START VALUE 0 kg STOP VALUE Maximum load of weighing platform START V/MA as required STOP V/MA as required

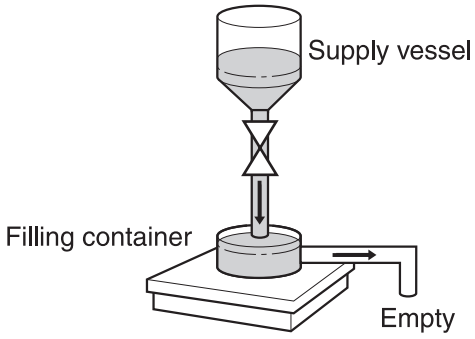
READY PIN INPUT	**Setting the logic for the stand-by signal**
LOW ACTIVE HIGH ACTIVE	The READY signal has to be configured for a digital input to this purpose. This signal is used to stop the filling process when the signal that can be switched in the logic between LOW ACTIVE (factory setting) and HIGH ACTIVE is no longer recognized. The stopped dispensing process has to be reactivated by pressing a key (START).

RESET PAC	**Reset all functions to the factory settings**	
	Block	**Factory setting**
	APPLICATION	above level
	AUTOMATIC TARE	on
	REDISP. CORRECTION	on; factor = 0.5; correction threshold = 0
	REDISPENSING	autom. redispensing; pulse duration 5 s; pulse pause 5 s
	TOTALIZING	off
	STATUS INDICATOR	with DeltaTrac; not enlarged
	PASSWORD BLOCK	off
	PAC START KEY	on
	OPERATING MODE	automatic
	MANUAL CORRECTION	off
	OUTPUT 2	output 2 off
	LEARN MODE	on; trip factor coarse feed = 0.5; trip factor fine feed = 0.5
	MONITOR DISPENSING	off; sensitivity 00 03 10 01 01 01; weighing in
	ACKNOWLEDGE	on
	COARSE FEED	coarse
	START TIMER	0 s
	END TIMER	0 s
	PREDISPENSING	0
	PRINTING CYCLE	1
	SINGLE FEED OPERATION	off
	OUTPUT 7	impulse on start
	ANALOG OUTPUT	off
	READY PIN INPUT	LOW active

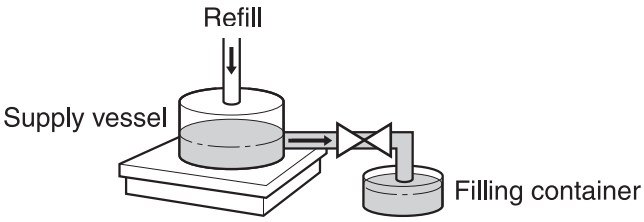
2.2.1 Material agitation

MATERIAL AGITATION	Switch agitator in dependence on weight and time
LIMIT 1, LIMIT 2, TARGET VALUE	LIMIT 1, LIMIT 2 or TARGET VALUE are reference quantities for the material agitation. Possible settings:
WEIGHT + TIME	• WEIGHT: Enter switch-on value as difference to the reference quantity. • TIME: Enter switch-on time between 0 … 9999 seconds; The dispensing process is interrupted during the switch-on time.
PERCENT	• SWITCH-ON VALUE: Enter switch-on value relative to the reference quantity: 0.1 ... 0.9. • SWITCH-OFF VALUE: Enter switch-off value relative to the reference quantity: 0.1 ... 0.9.
WEIGHT VALUE	• ON: Enter switch-on value as difference to the reference quantity. • OFF: Enter switch-off value as difference to the reference quantity.
Comment	The corresponding values are available in the application blocks 354 … 358, see section 3.

2.2.2 Remaining quantity

REMAINING QUANTITY	Set remaining quantity during weighing-in
	If the gross weight of the filling container exceeds a specified WEIGHT following a dispensing process, the output OUT2 on the first 8-690 relay box is set to HIGH. The filling container is automatically emptied and the display shows EMPTY. When the WEIGHT is reached, OUT2 is set to LOW again. 
WEIGHT	Enter absolute switch-on value of the remaining quantity as the weight value.
Comments	• The next dispensing process can only be started with the START key if output OUT2 is set to LOW. • With the STOP key output OUT2 can be manually set to LOW. • The absolute switch-on value is available in the application block 356, see section 3.

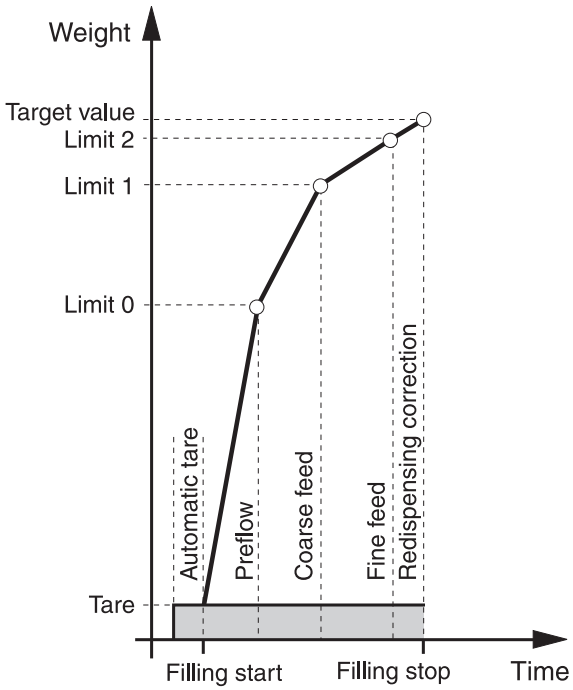
2.2.3 Fill quantity

FILL QUANTITY	**Set fill quantity control during weighing-out**
	If the gross weight of the filling container drops below a specified value ALARM VALUE after a dispensing process, output OUT2 on the first 8-690 relay box is set to HIGH. The supply vessel is automatically refilled and the display shows REFILL. When the specified weight value FILL QUANTITY is reached, output OUT2 is set to LOW. 
ALARM VALUE	Enter absolute switch-on value of fill quantity control as weight value.
FILL QUANTITY	Enter absolute switch-off value of fill quantity control as weight value.
Comments	• The next dispensing process can only be started with the START key if output OUT2 is set to LOW. • With the STOP key output OUT2 can be manually set to LOW. • The ALARM VALUE is available in the application block 356, the FILL QUANTITY in application block 357, see section 3.

2.2.4 Weighing platform switchover

SCALE SWITCHOVER	**Switch back and forth between two weighing platforms**
MANUAL	Manual switchover with a pulse at input IN 6 of the first 8-690 relay box.
AUTOMATIC	Switch over automatically.
WEIGHING-IN	If ACKNOWLEDGE OFF is also set and the output OUT6 (End of Dispensing) on the first 8-690 relay box is connected to the input IN 2 (Start), the dispensing process and change run automatically. To prevent valves from opening when no container is on the scale, the tare monitoring function must be used in this setting. Separate dispensing parameters can be entered for both weighing platforms. This enables the control of two dispensing systems. For weighing platform 1 the dispensing parameters must be saved to target memory 1, and for weighing platform 2 to target memory 2. If the same dispensing parameters are to be used for dispensing on both weighing platforms, target memory 1 and 2 may not be assigned.
SUBTRACTIVE WEIGH.	This function enables the quasi continuous dispensing from two supply vessels standing on weighing platforms 1 and 2. If the entered gross weight value WEIGHT is dropped below, the valves are closed, the stabilization of the weighing platform is waited for and the other weighing platform selected. The interrupted dispensing process is ended from the second container. With this alternative only one parameter set can be used.
Comments	• Output OUT2 shows which weighing platform is currently active during the dispensing process: LOW = weighing platform 1, HIGH = weighing platform 2. • The correct weighing platform number automatically appears on the printout. • The weight value WEIGHT required during WEIGHING OUT is available in the application block 356, see section 3.

2.2.5 3rd shutoff point

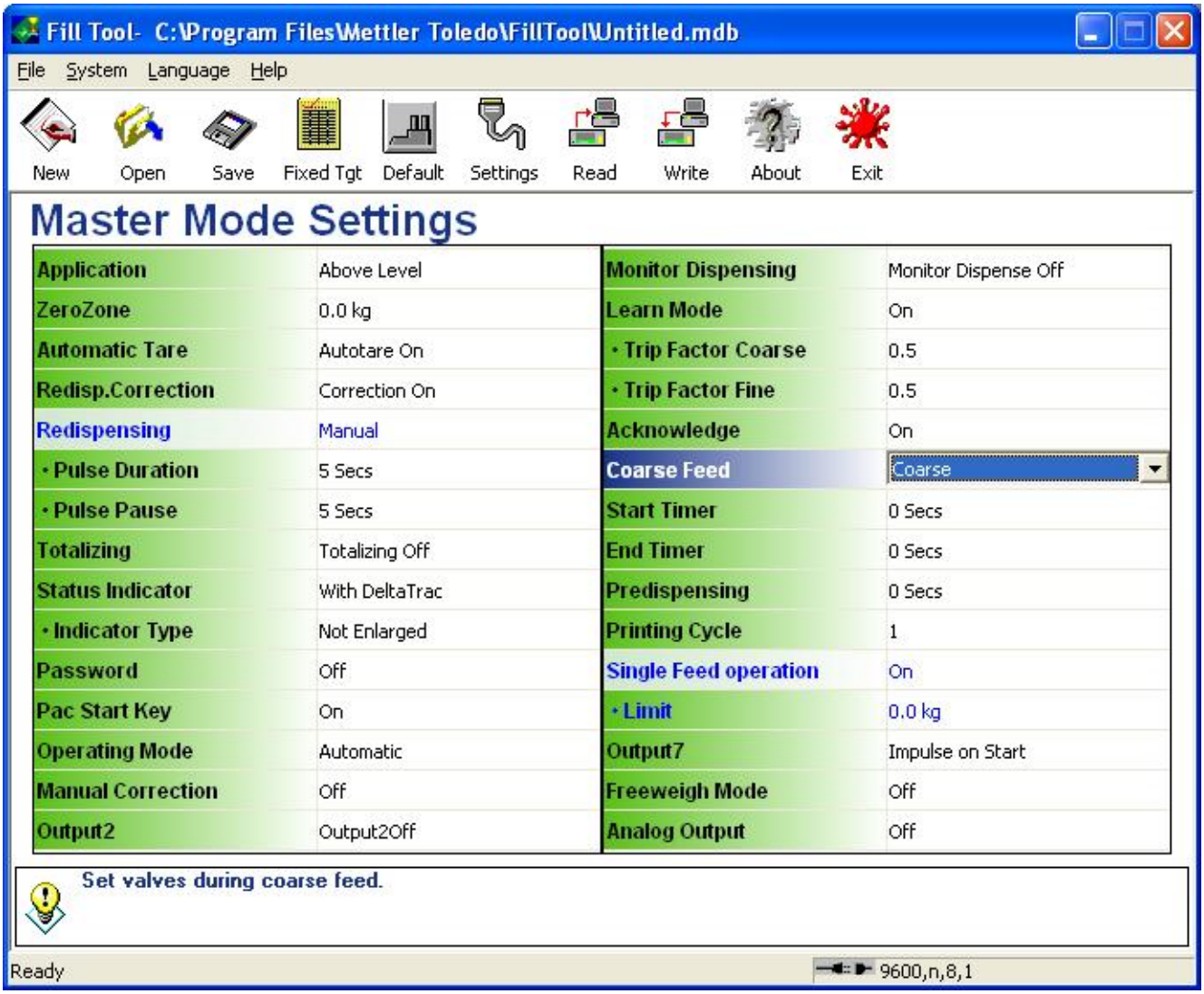
3RD SHUTOFF POINT	**Control of a third valve**
	Dispensing systems with 3 valves have a 3rd shutoff point (limit 0), which is controlled via output 2. Up to limit 0 (switchover point preflow/coarse feed) dispensing is carried out with preflow. 
Comments	• The learn mode is automatically switched off an all 3 limits must be manually entered. • Limit 0 may not be entered greater than limit 1.

2.2.6 FillTool

FillTool is a free configuration and editing tool for IND690-Fill which runs on every PC. It communicates with the IND690-Fill via a serial interface or Ethernet/WLAN and enables convenient configuration and data management, monitoring and conversion from and to ACCESS databases.
Please ask METTLER TOLEDO Customer Service about FillTool.

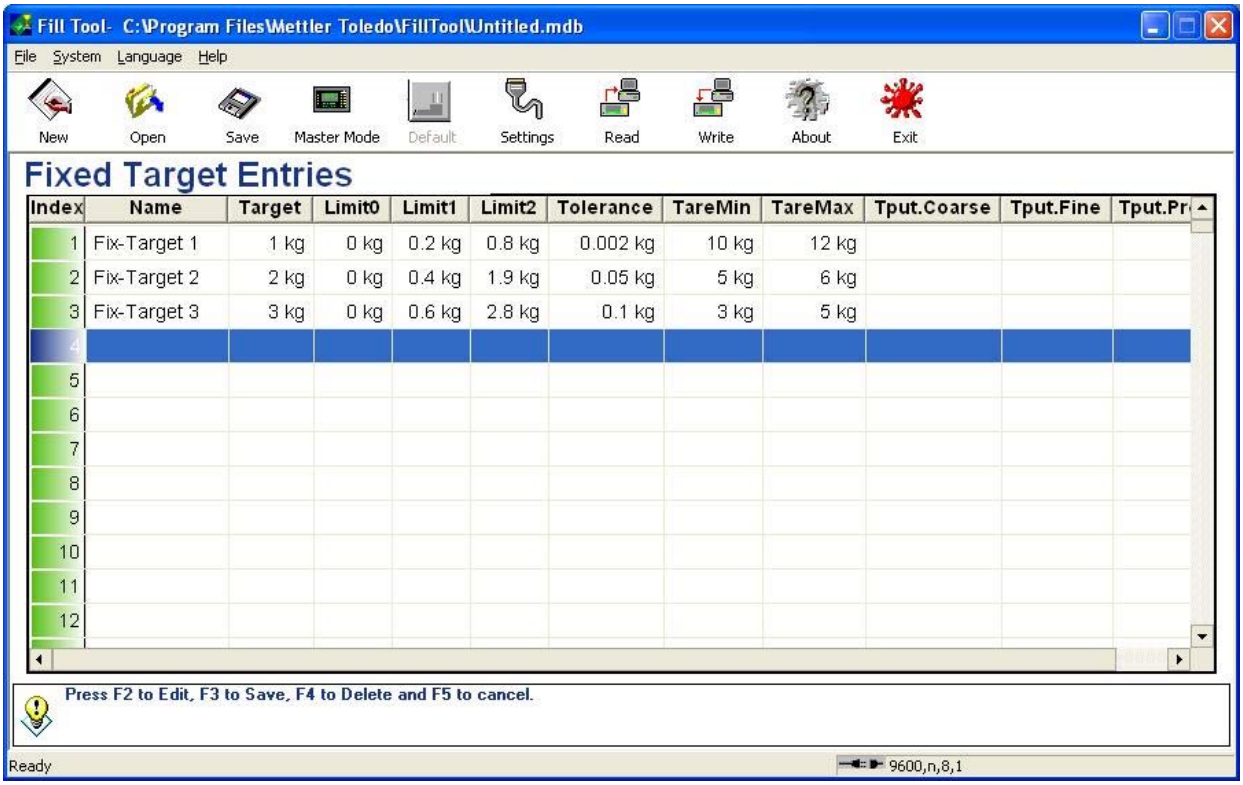
Setting parameters

All the master mode settings can be made on a screen with FillTool in a clear and concise manner.



Editing fixed target entries

Fixed target entries can be edited easily with FillTool.



3 Application blocks

In the following description, the application blocks are shown in the syntax for the MMR command set. When used with the SICS command set, please observe the SICS conventions, see Operating instructions for IND690-Base weighing terminal.

No.	Content	Format
301	Pac version	Response: `A B _ IND690-Fill_Vx.xx_`
302	Program number	Response: `A B _ IP64-0-0xxx_`
305	Keypad entry or read-in barcode	Response: `A B _ Entry` Write: `A W 3 0 5 _ $ $ Entry` Comment: Entry = Text_20, number or weight value

306	Electronic finger	Response: `A B _ K e y s _ _ _ _ 1 - 1 2 , 2 3 - 4 7`
		Write: **Trigger keys for the electronic finger**
		`A W 3 0 6 _ $ $ Number (1 ... 12; integral)`
		Each number is assigned a key:
		1: N key
		2: SUM key
		3: CODE A key
		4: MAN key
		5: LIMIT key
		6: CODE B key
		7: STOP key
		8: CODE C key
		9: START key
		10: CODE D key
		11: CLEAR key
		12: ENTER key
		Correct triggering of the key is confirmed with a beep tone.
		Recall target memory
		`A W 3 0 6 _ $ $ Number (1 ... 47; integral)`
		Number: 22: Display current dispensing parameters
		23_001 ... 23_999 or 23 … 47:
		Call up target memory 1 … 999 or 1 ... 25

310	Item counter	Response: `A B _ Number_4`
311	Start value item counter	Response: `A B _ Number_4` Write: `A W 3 1 1 _ Number_4`
312	Stop value item counter	Response: `A B _ Number_4` Write: `A W 3 1 2 _ Number_4`
313	Sum net weight	Response: `A B _ Weight value _ Unit`
314	Sum gross weight	Response: `A B _ Weight value _ Unit`

No.	Content	Format
315	Correction factor for redispensing correction	Response: A B _ Factor (0.0 ... 0.9; step size 0.1) Write: A W 3 1 5 _ Factor (0.0 ... 0.9; step size 0.1)
316	Weight value (actual value) of last filling	Response: A B _ Weight value _ Unit
317	Target – actual difference of last filling	Response: A B _ Weight value _ Unit
318_001 … 318_006	Identification data Code A … Code F	Response: A B _ Name (text_20) _ _ Identification (text_20) Write: A W 3 x x _ Name (text_20) $ $ Identification (text_20) Comment: xx = 18_001 … 18_006; corresponds to the application blocks 094 … 099
318 … 321	Identification data Code A … Code D	Response: equal to 318_001 Write: equal to 318_001 Comment: xx = 18 … 21; corresponds to the application blocks 094_001 … 094_004
322	Current dispensing parameters	Response: A B _ Name (text_20) _ _ Target weight (weight value) _ Unit _ _ Limit 0 (weight value) _ Unit _ _ Limit 1 (weight value) _ Unit _ _ Limit 2 (weight value) _ Unit _ _ Tolerance (weight value) _ Unit _ _ Tare min (weight value) _ Unit _ _ Tare max (weight value) _ Unit _ _ Throughput preflow (number_2) _ _ Throughput coarse feed (number_2) _ _ Throughput fine feed (number_2) Write: A W 3 x x _ Name (text_20) $ $ Target weight (weight value) _ Unit $ $ Limit 0 (weight value) _ Unit $ $ Limit 1 (weight value) _ Unit $ $ Limit 2 (weight value) _ Unit $ $ Tolerance (weight value) _ Unit $ $ Tare min (weight value) _ Unit $ $ Tare max (weight value) _ Unit $ $ Throughput preflow (number_2) $ $ Throughput coarse feed (number_2) $ $ Throughput fine feed (number_2) Comment xx = 22
323_001 … 323_999	Target memory 1 … 999	Response: equal to 322 Write: equal to 322 Comment: xx = 23_001 … 23_999

No.	Content	Format
323 … 347	Target memory 1 … 25	Response: equal to 322 Write: equal to 322 Comment: xx = 23 … 47
348	Mean value $\bar{x}$	Response: A B _ Weight value _ Unit
349	Standard deviation s	Response: A B _ Weight value _ Unit
350	Minimum x_{Min}	Response: A B _ Weight value _ Unit
351	Maximum x_{Max}	Response: A B _ Weight value _ Unit
352	Start/Stop of dispensing	Response: A B _ x Write: A W 3 5 2 _ x Comment: Start: x = 1, Stop: x = 0
353	Zero threshold value of zero zone	Response: A B _ Weight value _ k g _ Write: A W 3 5 3 _ Weight value _ k g _
354	Relative switch-on value for output 2	Response: A B _ Factor (0.0 … 0.9; step size 0.1) Write: A W 3 5 4 _ Factor (0.0 … 0.9; step size 0.1) Comment: only for output 2 = material agitation
355	Relative switch-off value for output 2	Response: A B _ Factor (0.0 … 0.9; step size 0.1) Write: A W 3 5 5 _ Factor (0.0 … 0.9; step size 0.1) Comment: only for output 2 = material agitation
356	Absolute switch-on value for output 2	Response: A B _ Weight value _ Unit Write: A W 3 5 6 _ Weight value _ Unit Comment: with material agitation, fill quantity
357	Absolute switch-off value for output 2	Response: A B _ Weight value _ Unit Write: A W 3 5 7 _ Weight value _ Unit Comment: with material agitation, fill quantity
358	Switch-on time for output 2 in seconds	Response: A B _ Number_4 Write: A W 3 5 8 _ Number_4 Comment: only for output 2 = material agitation

No.	Content	Format
359	Status of output 2	Response: A B _ Code (Number_4) , e.g.: **Code** **Meaning** 0000 Output 2 off 0001 Remaining quantity 0002 Fill quantity 0003 Scale switchover – manual 0004 3rd shutoff point – absolute weight value 0006 Scale switchover – automatic 0013 Material agitation – target value – percent 0014 Material agitation – target value – weight value 0015 Material agitation – target value – weight + time 0023 Material agitation – limit 1 – percent 0024 Material agitation – limit 1 – weight value 0025 Material agitation – limit 1 – weight + time 0033 Material agitation – limit 2 – percent 0034 Material agitation – limit 2 – weight value 0035 Material agitation – limit 2 – weight + time Write: A W 3 5 9 _ Code (number_4)
360	Items poor (items outside tolerance)	Response: A B _ Number_4

No.	Content	Format
361	Dispensing state	Response: `A B _ Code (number_3)` , e.g.: **Code** **Meaning** 000 Basic or switch-on state 005 Material agitation, weight + time, output 2 = HIGH 010 Ready for dispensing (dispensing parameters loaded) 020 Zero monitoring 022 Overload or underload during redispensing 030 Taring with automatic tare 037 Display WRONG TARE 040 Coarse feed on 042 Coarse feed off with STOP key 044 Below level application cancelled: Wait until nozzle is up 046 Learn mode: Coarse feed off through overload or underload 050 Fine feed on 052 Fine feed off with STOP key 056 Fine feed off through overload or underload 060 Fine feed off: Wait until nozzle is up 070 Dispensing ended: Evaluation of the dispensing results 072 Dispensing ended: Intermediate stop with STOP key 074 Redispensing: During the pulse duration fine feed off with STOP key 075 Redispensing: During the pulse duration fine feed on 076 Redispensing: During the pulse pause fine feed off 078 Redispensing: During the pulse pause fine feed off with STOP key 084 Display UNDERFILLED 085 Display OVERFLOW SUM REACHED 087 Display END VALUE REACHED 088 Display of net weight sum 090 End timer running 101 Display DISPENSING OKAY 111 Display OVERFILLED 130 Empty during remaining quantity 140 Redispensing for fill quantity 150 Preflow on 152 Preflow off with STOP key 235 Coarse feed off through overload or underload 242 Learn mode: Coarse feed off 245 Learn mode: Fine feed on 246 Learn mode: Fine feed off through overload or underload 250 Learn mode: Fine feed off with STOP key 253 Monitor dispensing: Positive monitoring 254 Monitor dispensing: Negative monitoring Write: `A W 3 6 1 _ 0 0 0` Reset to basic state. In the process the current dispensing parameters are deleted and impermissible steps may be carried out, e.g. deleting the sum when TOTALIZING ON is set.

No.	Content	Format	
362	Sensitivity of dispensing monitoring	Read: Write:	A B _ Number_12 A W 3 6 2 _ Number_12
363	Trip factor coarse feed in learn mode	Read: Write:	A B _ Factor (0.1 ... 0.9; step size 0.1) A W 3 6 3 _ Factor (0.1 ... 0.9; step size 0.1)
364	Dispensing result: Gross weight	Response:	A B _ Weight value _ Unit
365	Dispensing result: Net weight	Response:	A B _ Weight value _ Unit
366	Transfer block for analog output	Response:	A B _ Weight value _ Unit
367	Trip factor fine feed in learn mode	Read: Write:	A B _ Factor (0.1 ... 0.9; step size 0.1) A W 3 6 7 _ Factor (0.1 ... 0.9; step size 0.1)

4 What to do if …?

Error / Display	Possible causes	Remedy
– EMPTY –	• Output 2 = Remaining quantity, container is automatically emptied	➜ Wait until the container is empty
– REFILL –	• Output 2 = Fill quantity, container is refilled	➜ Wait until the fill quantity is reached
– TARE –	• Automatic taring during start of dispensing process	➜ Wait until scale is stabilized and tared
NOT ZERO	• Below-level dispensing: Nozzle has run dry	➜ Prevent nozzle from running dry, acknowledge and restart
READY FOR DISPENSING	• Filling process may be started	➜ Press START key
ENDVALUE REACHED	• Item counter has reached end-value	➜ Recall sum and delete
MANUAL	• Underfilled, manual redispensing possible	➜ Press MAN key until target weight is reached
LEARN MODE IS OFF	• Learn mode switched off and limit 1 and/or limit 2 not entered	➜ Switch on learn mode or enter limit
LIMIT 2 TOO LARGE	• Value for limit 2 too large	➜ Decrease limit 2
LIMIT 0 TOO LARGE	• Limit 0 greater than limit 1entered	➜ Enter limit 0 less than limit 1
LIM 2 EXCEEDS MAXLOAD	• Limit 2 is greater than the maximum load of the active weighing platform	➜ Select limit 2 less than the maximum load of this weighing platform
MANUAL CORRECTION	• Container overfilled or underfilled	➜ Manually remove or add dispensing product
MAX LIM	• Limit 1 or limit 2 too large	➜ Decrease limit 1 or limit 2
MAX TOL	• Tolerance too large	➜ Decrease tolerance
ZERO NOT ALLOWED	• Entered value smaller than 1	➜ Increase value
CLEAR SUM	• Totalizing function switched on	➜ Clear sum
MEMORY FULL	• Memory has reached maximum value	➜ Clear sum
WRONG TARE	• Container on weighing platform outside entered tare limits	➜ Place correct filling container on weighing platform
TMAX EXCEEDS MAXLOAD TMIN EXCEEDS MAXLOAD	• Entered tare limits above weighing platform maximum load	➜ Decrease values for tare min. and tare max. accordingly

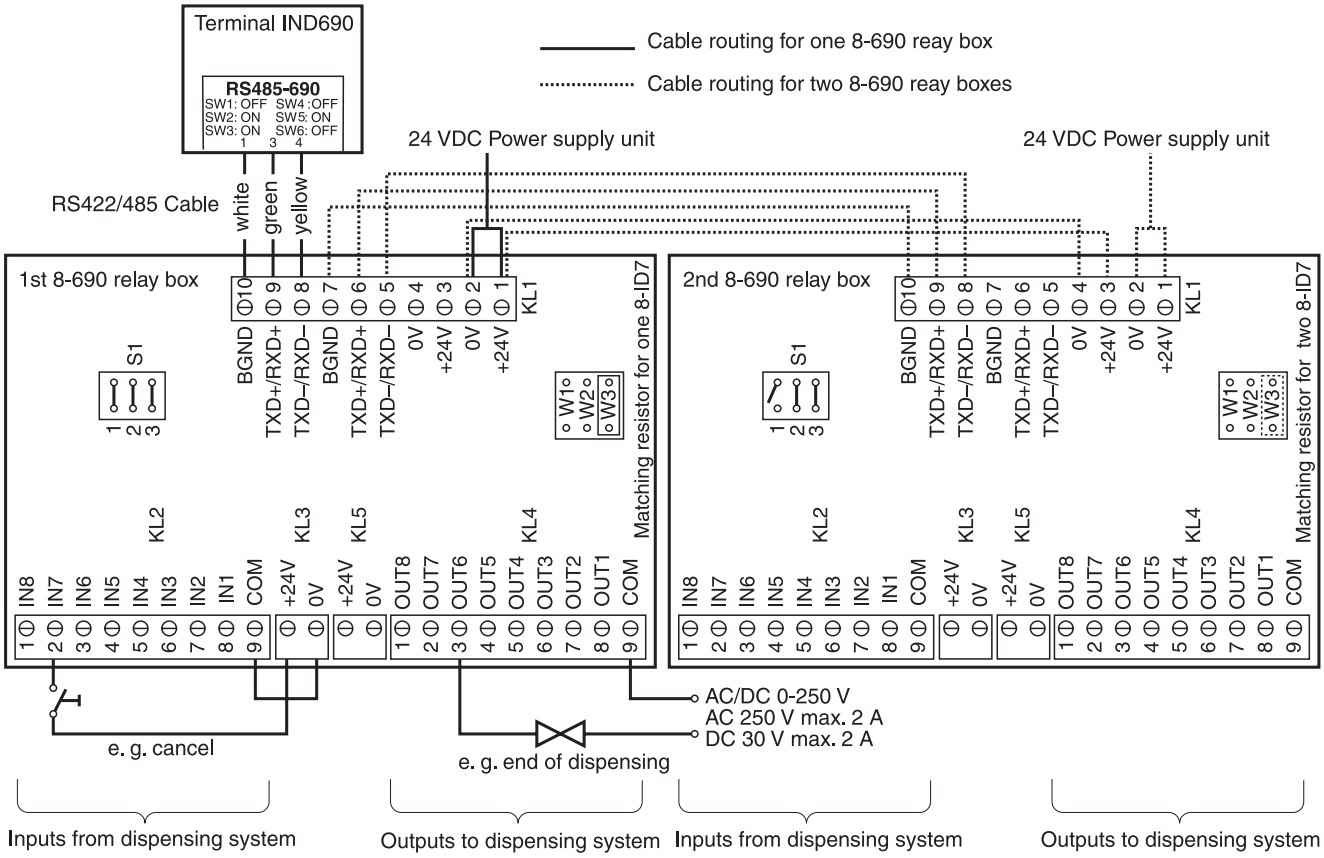
Error / Display	Possible causes	Remedy
TMAX LESS THAN TMIN	• Maximum tare value is less than minimum tare value	➜ Increase max. tare value and decrease min. tare value
TOLERANCE INADMISS.	• Tolerance too small for weighing platform or too large for tolerance table	➜ Enter tolerance in permissible range
OVERFILLED	• Filling container overfilled	➜ Confirm or correct manually
UNDERFILLED	• Filling container underfilled	➜ Confirm or correct manually
CONTINUE WITH START	• Filling process interrupted with STOP key	➜ START key continues dispensing process, STOP key ends dispensing process
NO VALUE	• 0 was entered for a dispensing parameter	➜ Enter value greater than 0
NO RELAY BOX-8	• Dispensing process started without Relay box 8-690 or 4 I/O-690	➜ If dispensing is to be carried out without relay box 8-690, 4 I/O-690 or ProfibusDP-690, confirm the message with ENTER. ➜ Otherwise connect Relay box 8-690 or 4 I/O-690 correctly
TIMEOUT RELAY BOX: X	• IND690-Fill can no longer access Relay box-8 because, for example, the connecting line has been interrupted	➜ Confirm the message with ENTER, IND690-Fill goes into the basic state ➜ Connection to Relay box-8 re-established. A new dispensing process can now be started.

5 Technical data

Dispensing functions	
Dispensing	• Controlling of coarse and fine flow of material feed for liquid, pasty and pourable weighing samples • Learn mode: automatic determination of dispensing parameters (coarse and fine feed) • Redispensing correction: Optimization of the fine-feed shutoff point (limit 2) • Tolerance check with automatic redispensing • Manual redispensing via keypad • Differentiation between below- and above-level dispensing • Control of elements of a below-level dispensing system
Dispensing parameters	• Entry of dispensing parameters either directly via keypad, by recalling from one of 999 fixed memories or via serial data interface • Input format: up to 8 places including decimal point • Tolerance input for certified scales ≤ national calibration regulations, for non-certified scales up to maximum target value
Tare functions	• Automatic tare compensation at start of dispensing • Tare monitoring in accordance with specified value
Memory	999 target memories for frequently dispensed components
Status display	Documentation of current dispensing process either with clear text or analog weigh-in aid DeltaTrac or BIG WEIGHT DISPLAY
Item counter	Up to 9,999, start value and stop value can be set as desired
Totalizing	Net sum, gross sum, item counter, standard deviation, mean value, x_{min} and x_{max}
Sum memory	Up to 8 places including decimal point

6 Appendix

6.1 Connection diagram and terminal assignment for 8-690 relay box



Note

The first 8-690 relay box can also be replaced with 4 I/O-690 interfaces and 4-690 relay boxes.

1st relay box 4-690 on COM6	IN1 … IN4	Terminal 2, IN0 … IN3
	OUT1 … OUT4	Terminal 3, OUT0 … OUT3
2nd relay box 4-690 on COM5	IN5 … IN8	Terminal 2, IN4 … IN7
	OUT5 … OUT8	Terminal 3, OUT4 … OUT7

First 8-690 relay box

Assignment with factory setting. For individual assignment, see CONFIGURATION OF INPUTS AND OUTPUTS in master mode of relay box 8 or 4 I/O.

Terminal KL2	Assign-ment	Inputs from dispensing system	Meaning
8	IN1	Nozzle	With the application BELOW LEVEL WITHOUT NOZZLE CONTROL: Signal with which the IND690-Fill carries out zero monitoring or before the start of the dispensing process, or waits with the evaluation until the nozzle is no longer in the liquid
7	IN2	Start (PLC)	For starting dispensing
6	IN3	Stop (PLC)	For stopping dispensing
5	IN4	Confirm	Confirmation of underfilling/overfilling/acceptable dispensing
4	IN5	Ready	Dispensing system ready
3	IN6	Scale switchover	Manual switchover between several weighing platforms, e.g. for SCALE SWITCHOVER
2	IN7	Cancel	Immediate cancelling of dispensing (emergency stop), then IND690-Fill returns to the basic status
1	IN8	Lock keypad	When IN 8 is set to HIGH, the keypad of the IND690-Fill is locked

Terminal KL4	Assign-ment	Outputs to dispensing system	Meaning
8	OUT1	Fine feed	For connecting fine feed valve/feed chute, etc.
7	OUT2	Output 2	For various settings of OUTPUT 2, see section 2.2
6	OUT3	Coarse feed	For connecting coarse feed valve/feed chute, etc.
5	OUT4	Poor	Reporting of poor dispensing result (UNDERFILLED, OVERFILLED) or of another error status (WRONG TARE; NOT ZERO)
4	OUT5	Acceptable	Reporting of acceptable dispensing result
3	OUT6	End of dispensing	Filling completed
2	OUT7	Start/output 7	Start pulse for external control for BELOW LEVEL WITHOUT NOZZLE CONTROL application or for settings of OUTPUT 7, see section 2.2
1	OUT8	Ready	Ready to start dispensing

Second 8-690 relay box

Assignment with factory setting. For individual assignment, see CONFIGURATION OF INPUTS AND OUTPUTS in master mode of relay box 8 or 4 I/O.

Terminal KL2	Assign-ment	Inputs from dispensing system	Meaning
8	IN1	Nozzle up	Only with NOZZLE CONTROL ON: detection of basic nozzle position
7	IN2	Nozzle down	Only with NOZZLE CONTROL ON: detection of bottom nozzle position
6	IN3	Nozzle middle	Only with NOZZLE CONTROL ON: detection of middle nozzle position
5	IN4	Drip pan back	Only with DRIP PAN ON: checking of retracted drip pan prior to lowering nozzle
4	IN5	not assigned	–
3	IN6	not assigned	–
2	IN7	not assigned	–
1	IN8	not assigned	–

Terminal KL4	Assign-ment	Outputs to dispensing system	Meaning
8	OUT1	Nozzle down	Only with NOZZLE CONTROL ON: move nozzle down
7	OUT2	Nozzle up	Only with NOZZLE CONTROL ON: move nozzle up
6	OUT3	Drip pan forward	Only with DRIP PAN ON: move drip pan under nozzle
5	OUT4	Nozzle on	Only with NOZZLE CONTROL ON: move nozzle up or down
4	OUT5	Nozzle correction	Only with NOZZLE CONTROL ON: prefeed, coarse-feed or fine-feed valve open
3	OUT6	Regasing	Output signal while stop timer running
2	OUT7	Pregasing	Output signal while start timer running
1	OUT8	not assigned	–

6.2 Sequence chart

6.2.1 Below-level application

NOZZLE CONTROL OFF and DRIP PAN OFF

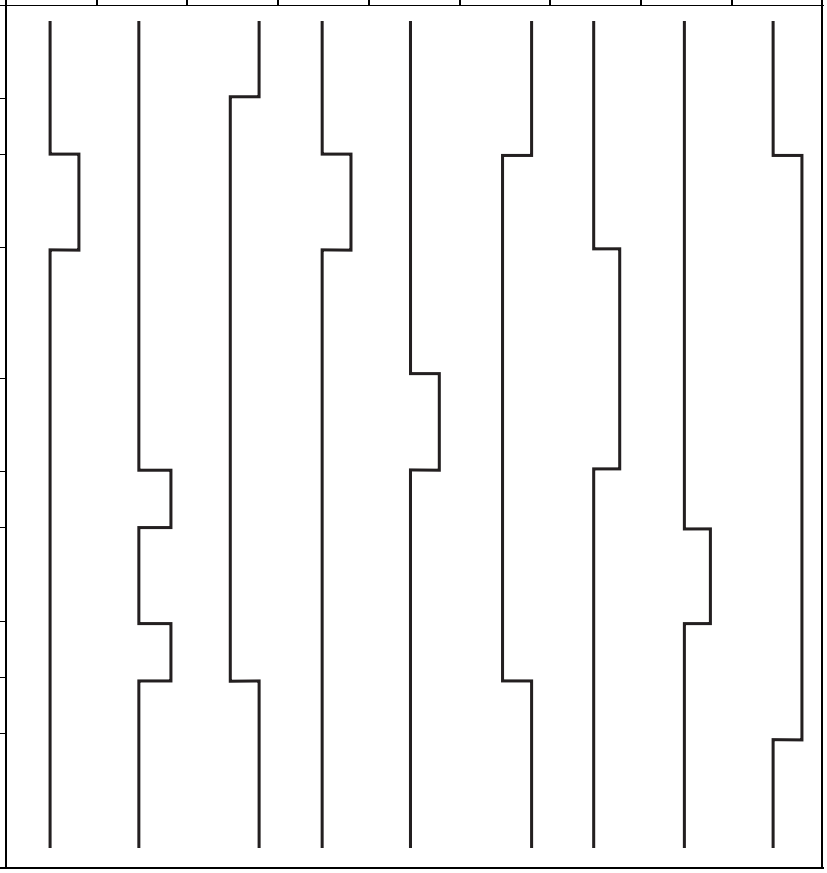
	OUT1	OUT3	OUT4	OUT5	OUT6	OUT7	OUT8	IN1	IN2	IN4
	Fine feed	Coarse feed	Poor	Accept-able	End of dispens-ing	Start/ output 7	Ready	Nozzle	Start (PLC)	Confirm
Target value entered										
Pulse output started, nozzle moves down, sequence monitoring active										
Nozzle down, PLC outputs start pulse, coarse feed switched on				Autotara						
Limit 1 reached: coarse feed switched off, fine feed switched on										
Limit 2 reached: fine feed switched off, nozzle moves up										
Nozzle up, wait for stabilization of weighing platform										
Stabilization of weighing platform, feed result evaluated and printed out										
Movement > 30 or confirmation Ready for next dispensing										

NOZZLE CONTROL ON and DRIP PAN ON

The following sequence chart shows the assigned inputs and outputs of the second 8-690 relay box.

The first 8-690 relay box is assigned in accordance with the flow chart "NOZZLE CONTROL OFF and DRIP PAN OFF", with the exception of the sequence monitoring for the nozzle (IN1, IN2).

	OUT1	OUT2	OUT3	OUT4	OUT5	IN1	IN2	IN3	IN4
	Nozzle down	Nozzle up	Drip pan forward	Nozzle on	Correct nozzle	Nozzle up	Nozzle down	Nozzle middle	Drip pan back
Basic position: nozzle up and drip pan at front									
Start of dispensing: drip pan moves back									
Drip-pan limit switch reached: nozzle moves down									
Lower limit switch reached: nozzle stops, weighing platform is tared, dispensing procedure starts									
While coarse or fine feed is switched on: correct nozzle									
Limit 2 reached: nozzle moves up									
Middle position of nozzle: evaluation or refilling									
Nozzle moves back to upper end position									
Nozzle up: drip pan moves forward again									
Basic position: nozzle up and drip pan at front Ready for next dispensing									



6.2.2 Below-bunghole application

The same sequence charts apply to the below-bunghole application as for the below-level application, however the middle end position is moved to instead of the bottom end position.

6.2.3 Above-level application

	OUT1 Fine feed	OUT3 Coarse feed	OUT4 Poor	OUT5 Accept-able	OUT6 End of dispensing	OUT7 Start/ output 7	OUT8 Ready	IN4 Acknow-ledge
Target value entered								
Pulse output started, coarse feed switched on								
Limit 1 reached: coarse feed switched off, fine feed switched on								
Limit 2 reached: fine feed switched off, wait for stabilization of weighing platform								
Stabilization of weighing platform, dispensing result evaluated and printed out								
Movement > 30 digit or acknowledgement Ready for next dispensing								

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