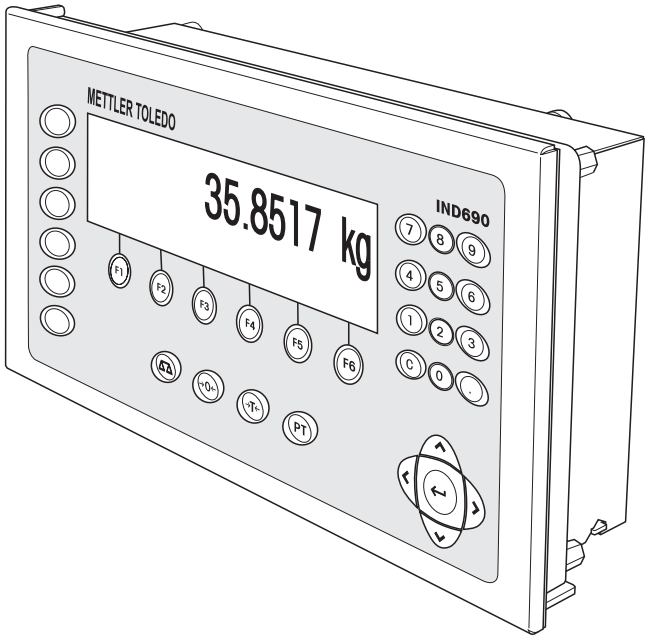
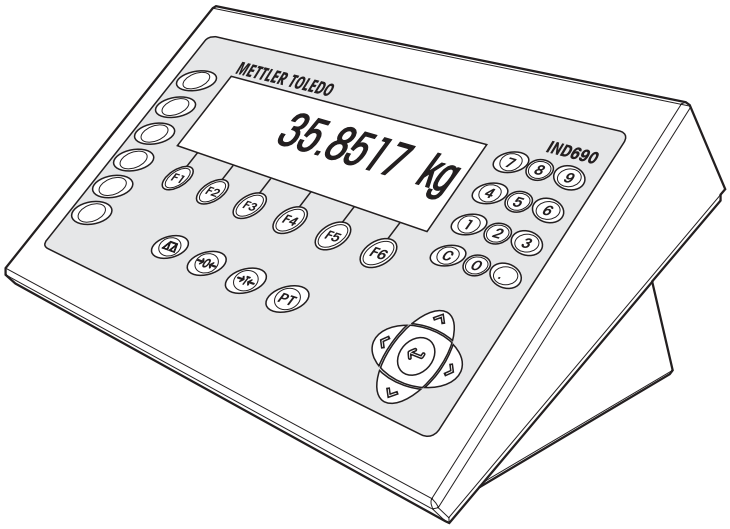
Operating instructions

METTLER TOLEDO MultiRange
Application software IND690-Batch





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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-Batch.
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-Batch pasty, powdery or grainy weighing samples can be dispensed according to a formula specified in the master mode. Each of the maximum 50 formulas may consist of a maximum of 32 individual components.
With the function keys the IND690-Batch makes the following functions available:

N	**SUM**	**MAN**	**FORM**	**STOP**	**START**
Enter item counter	Display and print sum of lot weights	Manual redispensing	Load formula	Interrupt or cancel dispensing	Start dispensing; after formula is complet-ed, print lot weight

➜ Select the function by pressing the function key.

Example

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

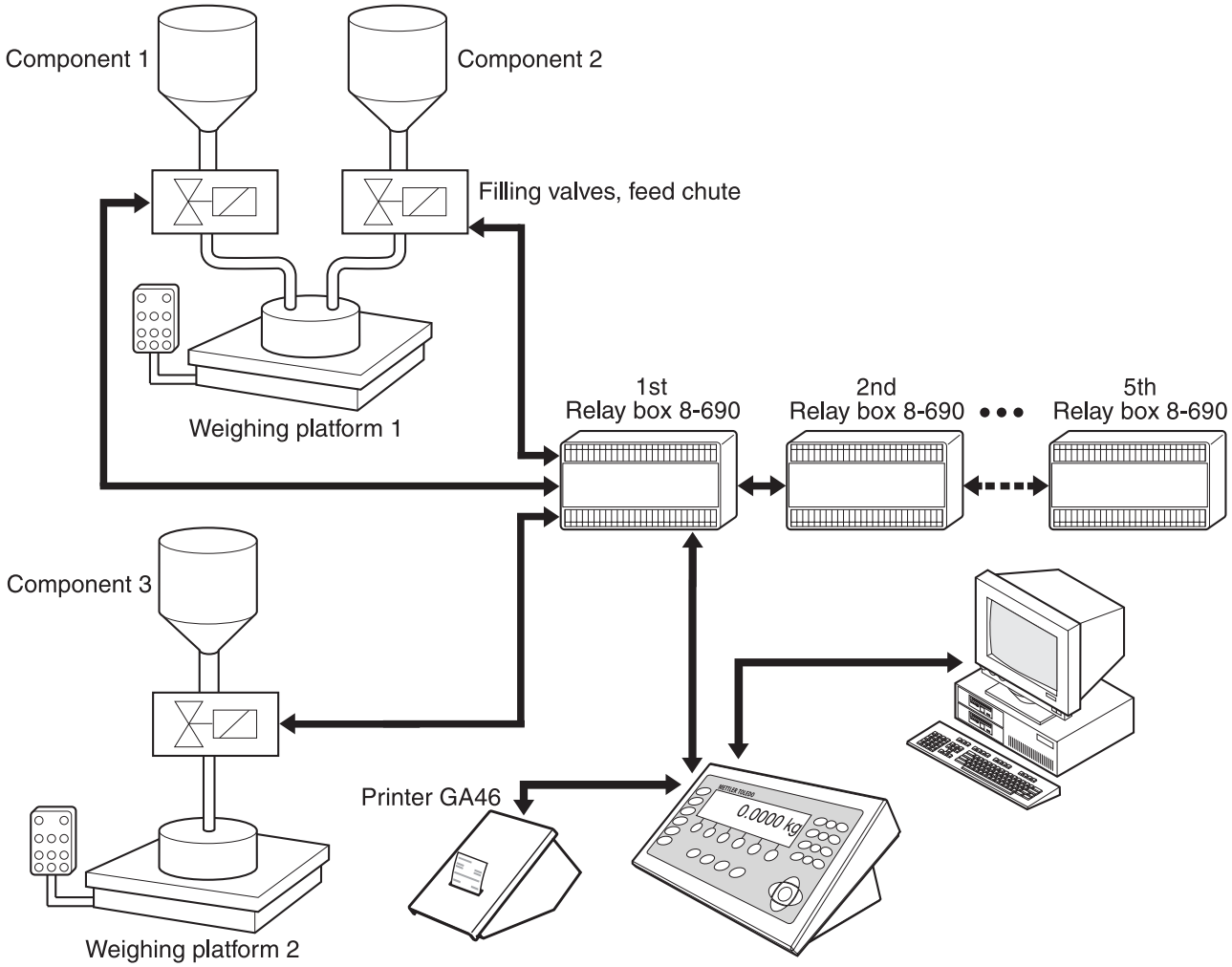
CAUTION

Danger of injury when keys are pressed 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

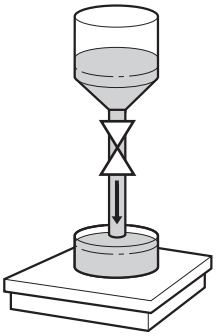
With feed valves or feed chutes controlled with coarse and fine feed, the dispensing material of the respective components is automatically fed until the specified target weight is reached.
With the dispensing system a maximum of 32 components can be dispensed. The following example shows a 3-component dispensing system in which the components 1 and 2 are dispensed into a container on weighing platform 1. Component 3 is dispensed separately on weighing platform 2.



The control signals for the dispensing valves of the individual components are transmitted via the RS485-690 interface to up to five 8-690 relay boxes. The 8-690 relay boxes control the dispensing system either directly or via an additional external control unit (PLC). The components can be picked up directly or with binary coding (see section 6.1).
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.

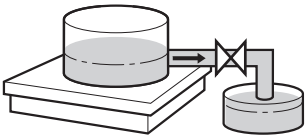
In the case of overloading or underloading of the weighing platform, all valves are closed immediately. With the "electronic fingers" the IND690-Batch can be remote controlled. These electronic fingers actuate various keys on the terminal with interface commands, see section 3.1.
All formula processes should be logged on a serial printer, e.g. GA46.
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



1.4.1 Dispensing in

For dispensing in an empty dispensing container is placed on the weighing platform and the dispensing container is filled from a reservoir.



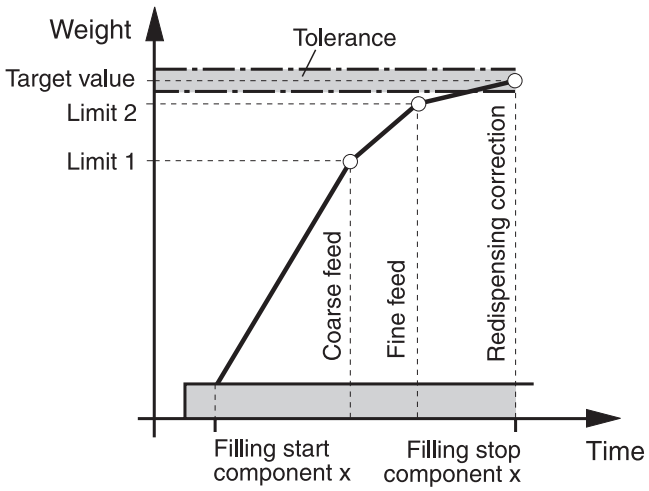
1.4.2 Dispensing out

For dispensing out a filled reservoir is placed on the weighing platform and fed into the dispensing container.
The display shows the weight value with a negative sign during dispensing out.

1.4.3 Dispensing process

After the start of dispensing, the container is automatically tared and each component of the formula fed in 4 consecutive steps:

- **Coarse feed** – Dispensing with coarse feed up to coarse/fine changeover point (Limit 1)
- **Fine feed** – Dispensing with fine feed up to shutoff point of fine feed (Limit 2)
- **Redispensing correction** – Redispensing correction of fine feed beyond Limit 2
- **Redispensing** – If at the end of dispensing the weight value is not within the tolerance of the target value, automatic or manual redispensing up to the target value



If no limits are entered for an individual component, the IND690-Batch automatically determines Limit 1 and Limit 2 in the LEARN MODE, see section 2.2. The target weight of the component is then exactly achieved.
To optimize the dispensing process of an individual component, Limit 2 can automatically be readjusted, see REDISPENSING CORRECTION block in section 2.2.
If the container is underfilled, manual or automatic redispensing can be carried out in dependence on the settings in the master mode, see section 1.9.

Note
For the dispensing process for several components, see section 6.2.

1.5 Display 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 3.1.
- 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 Dispensing formulas

1. Place container on the weighing platform.

CAUTION
If several weighing platforms are connected, the IND690-Batch may select a different weighing platform than the one you wish to dispense on.
Which weighing platform is activated at the moment can also be picked up at the outputs 1 and 2 of relay box 2.

2. Press FORM key and enter formula number.
   The display briefly shows the formula name, then LOT and the lot weight as the sum of the target weights of all individual components.
   These formula parameters are printed.
3. Confirm batch weight with ENTER without making an entry.
   The display shows READY FOR DISPENSING.
   – or –
   Enter lot weight in the displayed unit and confirm with ENTER.
   The target values of the components such as Limit 1, Limit 2 and the tolerance are adjusted in percent.
4. Press START key.
   The 1st component is dispensed, the dispensing result is printed and the next component is loaded.
   If the next component has the same phase no., it is dispensed without interruption.
5. If the next component has a different phase no., repeat Step 4.
   When all components have been dispensed, the lot weight is printed.

Notes

- The display READY FOR DISPENSING may be overwritten by a first message assigned to the component.
- If the display UNDERFILLED or OVERFILLED appears after dispensing a component, this dispensing result must be confirmed with the START key or an external acknowledgement signal.
- If PASSWORD BLOCK ON is set in the master mode, a personal code must be entered after pressing the FORM key.

1.7 Interrupting formulas

1. Press STOP key.
   The dispensing of the current component is interrupted.
2. To continue the formula, press START key.

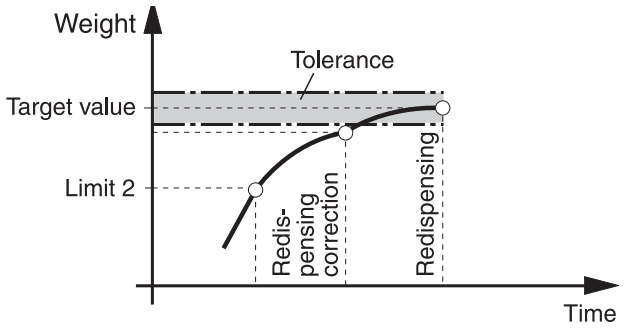
1.8 Cancelling formulas

➜ Press STOP key twice.
Dispensing is cancelled and the current lot weight is displayed.

Note
Dispensing can also be cancelled via a signal at Input IN7 of the first 8-690 relay box, see section 6.1. The IND690-Batch is then in the basic state (Status 000).

1.9 Redispensing

If, for example, the weight value briefly exceeds the target value, the fine feed is switched off prematurely and the weight value (actual value) of the current component is below the target value.
When redispensing the components, 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 automatically or manually, see section 2.2.



Manual redispensing

Prerequisite

MANUAL REDISPENSING is set in the master mode.

➜ If the display shows UNDERFILLED, press MAN key and hold down.
The fine feed is switched on in pulses as long as the key remains pressed.When the weight value of the component has reached the target value, the display shows DISPENSING GOOD and dispensing is continued with the next component.

1.10 Manual recorrection

When MANUAL CORRECTION ON is set in the master mode and the current final weight of a component is outside the tolerances, the display shows MANUAL CORRECTION after the target-actual comparison of the component.

➜ Manually place dispensing product of the current component on weighing platform and confirm with START key.
– or –
Manually remove dispensing product of the current component and confirm correction with START key. When doing so, make sure that only the current component is removed!

1.11 Automatic totalizing

Several lots of a formula can be totalized automatically. In addition, an item counter can be entered which determines the number of dispensings of a formula. When the item counter reaches its final value, the dispensing system automatically stops. The item counter can, for example, be used when the reservoir is to be refilled after a certain number of lots.

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. Dispense formula, see section 1.6.
3. After formula is completed, change container.
4. To dispense additional formulas, repeat steps 2 and 3.
   When the item counter reaches its stop value, the dispensing system stops automatically.
5. End totalizing:
   – Press SUM key. The display shows the total sum of the lot weights.
   – To print the total sum, press ENTER key.
   – To clear the total sum, press CLEAR key.

Notes

- Cancelled lot weights are not totalized during automatic totalizing.
- If PASSWORD BLOCK ON is set in the master mode, a personal code must be entered after pressing the SUM and N keys.
- If NEXT ITEM AUTOMATIC is set in the master mode, the formula need only be started once with the START key. Then the formula will automatically be worked through repeatedly until the item counter has reached its stop value.

1.12 Multi-scale operation

If dispensing is carried out on several weighing platforms with a different resolution, the lot weights will be rounded off in accordance with the weighing platform with the coarsest resolution.
How the weighing platform is changed is dependent on the settings in the master mode.

MULTI-SCALE OPERATION ON

If MULTI-SCALE OPERATION ON is set in the master mode, the IND690-Batch automatically switches to the weighing platforms entered in the formula after loading a component, see section 2.1.

MULTI-SCALE OPERATION OFF

If MULTI-SCALE OPERATION OFF is set in the master mode, all components of the formula are dispensed on one weighing platform.
If the weighing platform is to be changed while weighing out the current formula, the weighing platform must be switched over manually after loading the component, see chapter "Basic functions" in the operating instructions for the IND690-Base weighing terminal.

1.13 Recalling application-specific information

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

INFO, SUM	Display current sum of lot weights.
INFO, N	Display item counter.
INFO, FORM	Display dispensing parameters of current components.

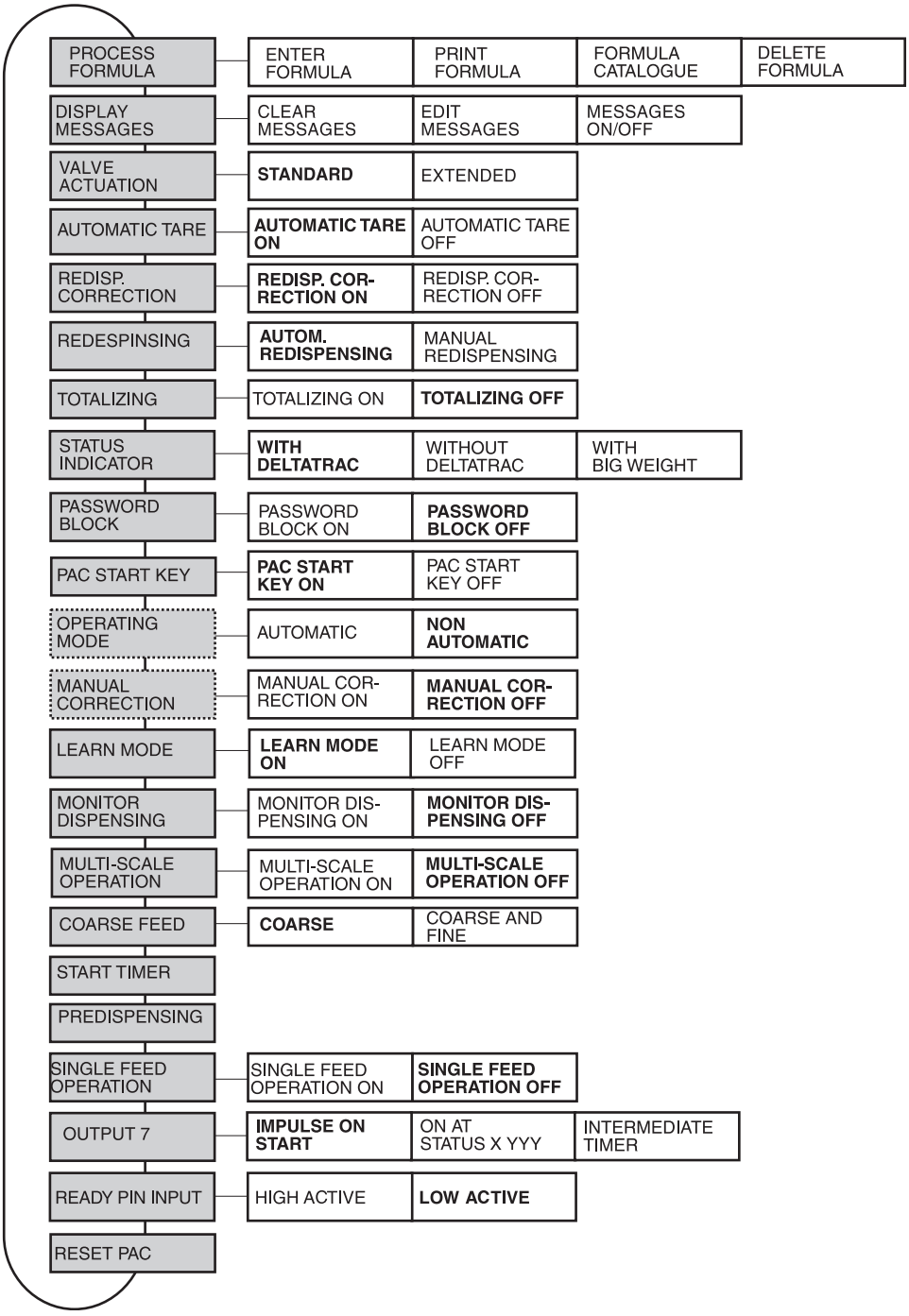
Notes

- 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

In this block the following system settings can be carried out:



Legend

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

2.2 Settings in the PAC master mode block

PROCESS FORMULA	**Store dispensing parameters for the components of a formula safe from a power failure in formula memories**
ENTER FORMULA	Up to 50 formulas with a maximum of 32 components each can be entered or modified (see next page).
PRINT FORMULA	Enter formula number and print formula.
FORMULA CATALOG	Print catalog of all formulas. The printout can be SIMPLE or DETAILED. In addition, the number of component memories not used in the formulas up to this point is printed.
FORMULA PRINTOUT	Set up printout of the formula in dispensing mode.
EXTENDED	Printout of all formula data and the dispensing result.
STANDARD	Printout of formula header and component header.
OFF	No formula printout; only the dispensing result is printed.
DELETE FORMULA	• DELETE INDIVIDUAL FORMULA • DELETE ALL FORMULAS

Enter/change formulas

After ENTER FORMULA has been selected, the entry of a formula number is requested.

➜ Enter formula number and confirm with ENTER.
The entry mode is activated for the selected formula.

Function keys

In the entry mode the function keys are assigned as follows:

↓↑	**<**	**>**	**F>**	**EDIT**	↑
Select parameters	Scroll: Down	Scroll: Up	Select assignment of function key F5	EDIT INSER INFO DELET	Return to higher level

EDIT Changes to input mode for selected parameters.
INSERT Inserts a new component before the displayed component.
INFO Shows the specification of the displayed components.
DELET Clears the displayed component.

Formula overview

After the formula number has been entered, the formula overview for the selected formula is shown on the display:

F01 : LEMONADE	
C3/4 : 002 SUGAR	
PHASE: OTHER	
TMIN : 0.4 kg	TMAX : 0.6 kg

F01	Formula number (01)
LEMONADE	Formula name
C3/4	Component position in formula (3)/total number of components (4)
002 (SUGAR)	Component number (000...999, is assigned chronologically) and the component name (sugar)
PHASE	Entry eliminated for the first component (C1/x). SAME: The component is dispensed without a break after the preceding component. OTHER: Before the component is dispensed, a stop is carried out.
TMIN, TMAX	If tare monitoring is used: TMIN: Lower limit of the permissible tare range TMAX: Upper limit of the permissible tare range TMAX ≥ TMIN.

Set dispensing parameters of a component

If entry has been opened for a component with EDIT, an overview with the dispensing parameters for this component appears on the display:

PM002 : SUGAR			MSG: 005
TARGET : 1.000 KG		TOL : 0.050 KG	
LIM1 : 0.500 KG		LIM2 : 0.800 KG	
E TIMER: 000 S	SCALE: 0	V#: 02	OP2

PM002	Component number: (000...999, is chronologically assigned)
SUGAR	Component name
Msg	Number of the message shown on the display prior to working through this component: 001 ... 200
TARGET	Target weight of the component
TOL	Tolerance of the component in the displayed unit: - minimum tolerance: 1 digit - maximum tolerance: Target weight - Target weight + tolerance ≤ maximum load
LIM1	Switchover point for coarse/fine feed
LIM2	Shutoff point of the fine feed: LIM2 ≥ LIM1 To determine Limit 1 and Limit 2 automatically, do not enter a value. To do this LEARN MODE ON must be set.
E TIMER	Following dispensing of the component the end timer runs out: 0 ... 999 seconds (factory setting: 0 sec) When the end timer is activated, the display shows the time still remaining. The end timer can be stopped or cleared with the STOP key.

SCALE Number of the scale on which the component is to be dispensed. This parameter only appears in the multi-scale mode.
V# Number of the valve that dispenses the component: 01 ... 32
OP2 With OUTPUT 2 various additional devices can be actuated for each component.

Notes

- With the < or > cursor key the unit of the parameters can be changed during entry.
- The parameters for components and formulas are available in the following application blocks: 323_001 ... 323_999 or 323 … 347, 364_001 ... 364_050 or 364 … 375, 376_001 ... 376_050 or 376 … 387; see section 3.

Configure function OUTPUT 2

With OUTPUT 2 various additional devices can be actuated. The IND690-Batch offers 3 different operating modes for this purpose:
MATERIAL AGITATION, REMAINING QUANTITY and FILL QUANTITY

OUTPUT 2: MATERIAL AGITATION

While a component is being dispensed, an agitator can be switched on for material agitation. The TYPE parameter specifies whether the agitator is controlled weight or time-dependent.

OUTPUT	:	MATERIAL AGITATION
REF	:	TARGET VALUE
TYPE	:	WEIGHT VALUE
ON: 0.080 kg		OFF: 0.020 kg

OUTPUT Current function of Output 2, here: MATERIAL AGITATION
REF Reference quantity (TARGET VALUE, LIMIT 1 or LIMIT 2)
TYPE Control quantity, here: WEIGHT VALUE
ON Switch-on value as difference to reference quantity
OFF Shutoff value as difference to reference quantity

OUTPUT	:	MATERIAL AGITATION
REF	:	TARGET VALUE
TYPE	:	WEIGHT+TIME
ON: 0.080 kg		TIME: 0010 sec

OUTPUT Current function of Output 2, here: MATERIAL AGITATION
REF Reference quantity (TARGET VALUE, LIMIT 1 or LIMIT 2)
TYPE Control quantity, here: WEIGHT+TIME
ON Switch-on value as difference to reference quantity
TIME Switch-on duration between 0 and 9999 seconds (here: 10). During the switch-on duration component dispensing is interrupted

OUTPUT	:	MATERIAL AGITATION
REF	:	TARGET VALUE
TYPE	:	PERCENT
ON: 0.1		OFF: 0.9

OUTPUT Current function of Output 2, here: MATERIAL AGITATION
REF Reference quantity (TARGET VALUE, LIMIT 1 or LIMIT 2)
TYPE Control quantity, here: PERCENT
ON Switch-on value relative to the reference quantity, setting range: 0.1 ... 0.9
OFF Shutoff value relative to the reference quantity, setting range: 0.1 ... 0.9

Application blocks The parameter values are available in the application blocks 354 ... 358, see section 3.

OUTPUT 2: REMAINING QUANTITY

In the REMAINING QUANTITY mode the IND690-Batch checks the remaining quantity of a component. When the gross weight of the filling container exceeds a specified value WEIGHT after filling a component, the output OUT 2 on the first 8-690 relay box is set to HIGH and the filling container is automatically emptied. The display shows EMPTY. When the weight WEIGHT is reached, OUT 2 is set to LOW again.
To fill the next component with the START key, output OUT 2 must be set to LOW.
The STOP key manually sets output OUT 2 to LOW.

OUTPUT	:	REMAINING QUANTITY
WEIGHT	:	0.050 kg

WEIGHT Absolute switch-on value of the remaining quantity check

Application block The absolute switch-on value is available in application block 356, see section 3.

OUTPUT 2: FILL QUANTITY

In the FILL QUANTITY mode the IND690-Batch checks the fill quantity when weighing out a component. When the gross weight of the supply vessel drops below a specified value ALARM after filling a component, the output OUT 2 on the first 8-690 relay box is set to HIGH and the supply vessel is automatically refilled. The display shows REFILL. When the specified weight value FULL is reached, the output OUT 2 is set to low.
To fill the next component with the START key, output OUT 2 must be set to LOW.
The STOP key manually sets output OUT 2 to LOW.

OUTPUT	:	FILL QUANTITY		
ALARM:	0.050 kg		FILL:	12.345 kg

ALARM Absolute switch-on value of fill quantity check
FILL Absolute shutoff value of fill quantity check

Application block ALARM VALUE and FILL QUANTITY are available in the application blocks 356 and 357, see section 3.

DISPLAY MESSAGES	**Edit display messages**
	While a formula is being worked through, messages with a length of up to 24 characters can be shown in the display. They support the operator guidance. Each component can be assigned a message. Different components can access the same message. A total of 200 messages can be stored. Messages are displayed for a few seconds before the related component is dispensed. With a first component or with a different phase the display lasts until the START key is pressed.
CLEAR MESSAGES	Clear all stored messages.
EDIT MESSAGES	Edit stored or create new messages, see below.
MESSAGES ON/OFF	Switch messages on or off centrally.

Editing messages

Messages to be edited are displayed as follows:

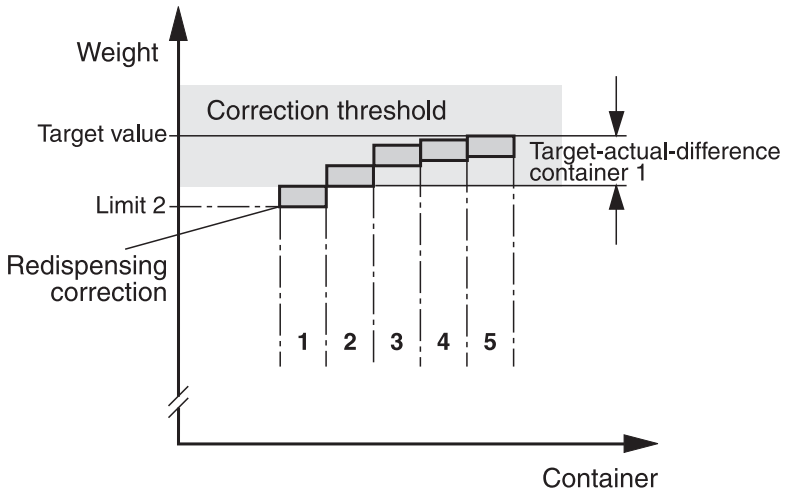
```
MESSAGE: 001                                        MAX: 200


          TEXT 1
```

001 Number of selected message
200 Note that a maximum of 200 messages can be stored
TEXT 1 Contents of the selected message

VALVE ACTUATION	**Configure valve actuation**
	The valves can be actuated directly via up to 5 8-690 relay boxes or with binary coding with a 2nd 8-690 relay box. For details, see section 6.1.
STANDARD	Direct actuation of the valves 2nd 8-690 relay box Valves 1 ... 8 3rd 8-690 relay box Valves 9 ... 16 4th 8-690 relay box Valves 17 ... 24 5th 8-690 relay box Valves 25 ... 32 Only the active output is set to HIGH; all other outputs are set to LOW.
EXTENDED	The 2nd 8-690 relay box controls a maximum of 32 valves and a maximum of 4 weighing platforms with binary coding via the outputs 1 to 8. The combination of HIGH and LOW at the outputs 1 and 2 determines which weighing platform is active. The combination of HIGH and LOW at the outputs 3 to 8 determines which valve is actuated.

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

REDISP. CORRECTION	**Switch redispensing correction on or off**
	The redispensing correction optimizes the shutoff point of the fine feed (Limit 2) of a component in the formula. When CORRECTION ON is set, the target-actual difference is determined for the component and multiplied with a CORRECTION FACTOR. Target-actual difference x correction factor = Δ Limit 2 is automatically readjusted by the value Δ. **Example:** With a target-actual difference of 10 g and a factor of 0.5, Limit 2 is readjusted by 5 g.  Factory setting: REDISP. CORRECTION ON
CORRECTION FACTOR	Correction factor by which the target-actual difference is multiplied to determine the value Δ by which Limit 2 is readjusted. Possible values: 0.1 … 0.9 (factory setting: 0.5)
CORRECTION THRESHOLD	The correction threshold specifies the target-actual difference up to which the redispensing correction of Limit 2 is readjusted. When CORRECTION THRESHOLD OFF is set, Limit 2 is readjusted for all actual values (factory setting). When CORRECTION THRESHOLD ON is set, the tolerance is multiplied by a factor to be entered and the correction threshold calculated: Correction threshold = tolerance x factor Possible factors: 0 … 99 in multiples of the tolerance
Comment	With the redispensing correction switched off, optimized formulas or formulas changed with lot entry are not backed up, i. e. the formula appears in the original state again when it is called again. **Exception:** If the learn mode was active, the learned shutoff points are backed up to the component memory.

REDISPENSING	**Set automatic or manual redispensing**
	Factory setting: AUTOM. REDISPENSING
AUTOM. 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 totalizing of lot weights on or off** **Switch automatic repetition of formula processing on or off**
TOTALIZING OFF	Factory setting
TOTALIZING ON	The net values of the log weights are automatically totalized. An item counter can be specified which counts the fillings in accordance with the current formula. A new formula cannot be started until the sum is deleted.
NEXT ITEM MANUAL	A start signal is required for processing of the next item.
NEXT ITEM AUTOMATIC	The formula is processed repeatedly until the stop value of the item counter is reached.

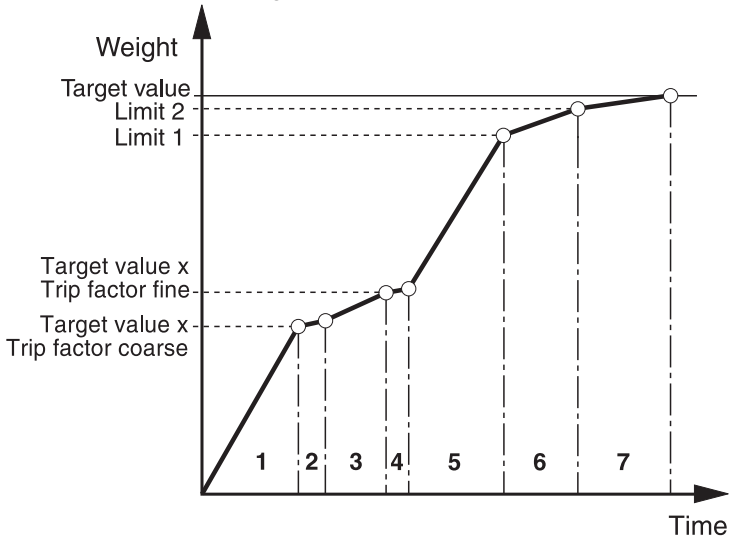
STATUS INDICATOR	**Set display of dispensing state on IND690-Batch**
WITH DELTATRAC	The dispensing state is displayed with tests, a 3-digit code and the DeltaTrac, see section 1.5 (factory setting). Further possible selections: ENLARGED COMP.NAME When a target memory was called up, the memory designation always appears with ENLARGED COMP. NAME ON in the display, even during the filling process. Factory setting: ENGLARGED COMP.NAME OFF
WITHOUT DELTATRAC	The dispensing process is displayed with texts and a 3-digit code.
WITH BIG WEIGHT	During the dispensing process, the weight display BIG 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.
Note	For all settings the following selections are also possible: • NOT EXTENDED (factory setting): When the weighing platform is ready for dispensing, the display indicates READY FOR DISPENSING. • EXTENDED: In the ready for dispensing state the memory designation appears in the display instead of READY FOR DISPENSING. However, in both cases the display may be overwritten by a message assigned to the first component.

PASSWORD BLOCK	**Switch password block on or off**
	Protect the keys SUM, FORM and N with a personal code which also protects the master mode, see chapter "master mode" 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**
	When PAC START KEY OFF is set, the START key is locked and dispensing can only be started via an external switch or a relay box. This prevents double operation with external operating elements (e.g. foot switch or button). Factory setting: PAC START KEY ON

OPERATING MODE	**Set operating mode with certified weighing platforms**
AUTOMATIC	Dispensing is carried out automatically (factory setting).
NON AUTOMATIC	Dispensing is not carried out automatically and the permissibility of the weight values must be monitored by the operator.
Comments	• Different national tolerances are taken into account. • For certification reasons, the operating mode can only be changed over in the non-certified mode of the weighing platform.

MANUAL CORRECTION	**Switch manual recorrection on or off**
	When MANUAL 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: MANUAL CORRECTION OFF
Comments	• It can be read off whether the dispensing lies within the tolerances (DISPENSING OKAY) or outside (DISPENSING POOR) at output OUT 4 and OUT 5 of the first 8-690 relay box, see section 6.1. • Manual correction is not possible in case of verifiable weighing platforms in the AUTOMATIC operating mode.

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-Batch determines the valve shutoff points Limit 1 and Limit 2. When LEARN MODE OFF is set, Limit 1 and 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; 0.9 is equal to 45 measuring cycles.
Comments	• When 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 390 and 391).

MONITOR DISPENSING	**Switch monitor dispensing on or off**
	The dispensing monitor monitors the weight increase in each measuring cycle. When MONITOR DISPENSING ON is set and the weight value exceeds or drops below the value SENSITIVITY, the dispensing monitor becomes active. Factory setting: MONITOR DISPENSING OFF
SENSITIVITY	AABBCCDDEEFF – Enter response behavior of the dispensing monitor as a 12-digit number. Possible settings: • WEIGHING-IN – Dispensing monitoring during weighing-in • SUBTRACTIVE WEIGHING – Dispensing monitoring during subtractive weighing **Response behavior of dispensing monitor** AA AA = 00 digit: The dispensing monitor becomes active 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. Dispensing can be ended with the STOP key or continued with the START key. AA = 01 digit: The dispensing monitor becomes active 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 the dispensing monitor: Weight increase per measuring cycle at which the dispensing monitor is activated after starting or interruption of dispensing: 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	• Increase the value BB in the case of valve or material sluggishness. • Increase the value CC in the case of uneven material feed. • 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.

MULTI-SCALE OPERATION	**Switch multi-scale operation on or off**
	When MULTI-SCALE OPERATION ON is set, the weighing platform automatically switches to the weighing platform specified in the formula after loading the component. When MULTI-SCALE OPERATION OFF is set and the weighing platform is to be changed, the weighing platform must be switched over manually after loading the component. Factory setting: MULTI-SCALE OPERATION OFF
Comment	To distribute the formulas among the weighing platforms, see application blocks 376_001 ... 376_050 or 376 ... 387 in section 3.

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 loading of the target values of a component 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 stopped or deleted with the STOP key.

PREDISPENSING	**Set time for predispensing of the components**
	The fine feed valve is actuated before each opening of the coarse feed. The display shows PREDISPENSING and the time TIME remaining.
TIME	Possible values: 0 ... 999 seconds (factory setting: 0)
Comment	Predispensing can be stopped or deleted with the STOP key. When Limit 1 is reached, predispensing is automatically cancelled.

SINGLE FEED OPERATION	**Switch single feed operation for the components on or off**
	When SINGLE FEED OPERATION ON is set and the target value of the component drop below the specified LIMIT, dispensing is only carried out with fine feed. This enables smaller quantities to be dispensed as well 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-Batch (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 in section 3. To end the entry of the dispensing states, press ENTER without making an entry.
INTERMEDIATE TIMER	Configure timer which runs out after each individual component is filled. Possible settings: 0 to 999 seconds Factory setting: 0
Notes	• ON AT STATUS X YYY and INTERMEDIATE TIMER can be used simultaneously. • When the intermediate timer is activated, the display shows the time still remaining. • The intermediate timer can be stopped or cleared with the STOP key.

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**
	DISPLAY MESSAGES	on
	VALVE ACTUATION	standard
	AUTOMATIC TARE	on
	REDISP. CORRECTION	on, factor = 0.5, correction threshold off
	REDISPENSING	autom. redispensing, pulse duration 5 s, pulse pause 5 s
	TOTALIZING	off, next item manual
	STATUS INDICATOR	with DeltaTrac; not extended; enlarged comp.name off
	PASSWORD BLOCK	off
	PAC START KEY	on
	OPERATING MODE	automatic
	MANUAL CORRECTION	off
	OUTPUT 2	output 2 off
	LEARN MODE	on, trip factor coarse = 0.5, trip factor fine = 0.5
	MONITOR DISPENSING	off, sensitivity 00 03 10 01 01 01; weighing-in
	MULTI-SCALE OPERATION	off
	COARSE FEED	coarse
	START TIMER	0
	PREDISPENSING	0
	SINGLE FEED OPERATION	off
	OUTPUT 7	impulse on start; intermediate timer = 0
	READY PIN INPUT	LOW active

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.

3.1 PAC application blocks

No.	Content	Format
301	Pac version	Response: `A B _ IND690-Batch_Vx.xx_`
302	Program number	Response: `A B _ IP68-0-xxxx_`
305	Keyboard 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 _`
		Keys for the electronic finger
		Write: **Actuate keys for the electronic finger**
		`A W 3 0 6 _ $ $ Number (1 ... 12; integral)`
		Each number is assigned a key:
		1: N key 7: STOP key
		2: SUM key 8: CODE C key
		3: CODE A key 9: START key
		4: MAN key 10: CODE D key
		5: FORM key 11: CLEAR key
		6: CODE B key 12: ENTER key
		Correct actuation of a key is confirmed with a beep tone.
		Call formula memory
		`A W 3 0 6 _ $ $ Number`
		Number: 64 _001 … 64_050:
		Call formula memory 1 … 50 ;
		64 …75:
		Call formula memory 1 … 12 ;
		A new formula can only be loaded in the basic state (code 000).
		If Block 388 is assigned a weight value when the formula is called, this value is used as the lot specification.
		If Block 388 is not assigned when the formula is called, the sum of the individual components is used as the lot specification.
		The formula memories are available in the application blocks 364_001 ... 364_999 or 364 … 375.

310	Item counter	Response: `A B _ Number_4`

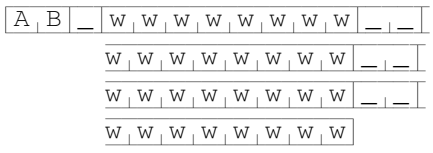
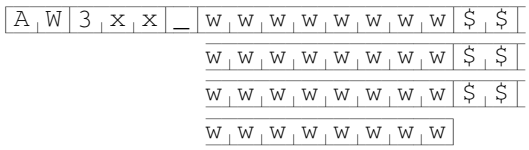
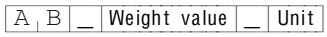
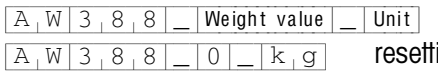
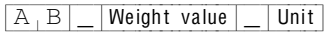
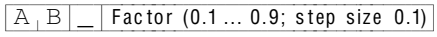
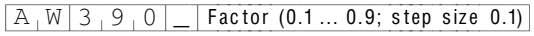
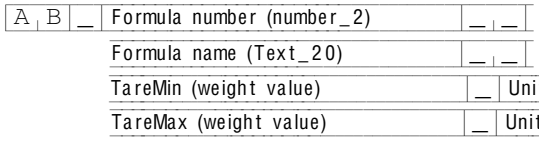
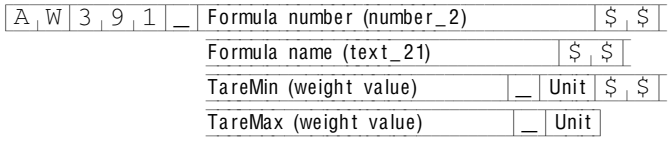
No.	Content	Format
311	Start value item counter	Response: A B _ Number_4 Write: A W 3 1 1 _ Number_4
312	Stop value item counter	Response: A B _ Number_4 Write: A W 3 1 2 _ Number_4
313	Sum net weight	Response: A B _ Weight value _ Unit
314	Sum gross weight	Response: A B _ Weight value _ Unit
315	Correction 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	Current weight value (actual value)	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 … 097
322	Dispensing parameters of current component	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 _ _

No.	Content	Format
323_001 … 323_999	Component memory 1 … 999	Response: A B _ Name (Text_20) _ _ Target weight (weight value) _ Unit _ _ Limit 1 (weight value) _ Unit _ _ Limit 2 (weight value) _ Unit _ _ Tolerance (weight value) _ Unit _ _ Valve (Number_2) _ _ End timer (sec) (Number_3) _ _ Message (Number_3) _ _ Function OUTPUT 2 (Number_4) _ _ Rel. switch-on value (factor (0.0 ... 0.9) _ _ Rel. switch-on value (factor (0.0 ... 0.9) _ _ Absolute switch-on value (weight value) _ Unit _ _ Absolute shutoff value (weight value) _ Unit _ _ Switch-on duration in seconds (Number_4) Write: A W 3 x x _ Name (Text_20) $ $ Target weight (weight value) _ Unit $ $ Limit 1 (weight value) _ Unit $ $ Limit 2 (weight value) _ Unit $ $ Tolerance (weight value) _ Unit $ $ Valve (Number_2) $ $ End timer (sec) (Number_3) $ $ Message (Number_3) $ $ Function OUTPUT 2 (Number_4) $ $ Rel. switch-on value (factor (0.0 ... 0.9) $ $ Rel. shutoff value (factor (0.0 ... 0.9) $ $ Absolute switch-on value (weight value) _ Unit $ $ Absolute shutoff value (weight value) _ Unit $ $ Switch-on duration in seconds (Number_4) Note: xx = 23_001 … 23_999 Function OUTPUT 2: **Code Meaning** 0000 Output 2 off 0001 Remaining quantity 0002 Fill quantity 0013 Material agitation – Target weight – Percent 0014 Material agitation – Target weight – Weight value 0015 Material agitation – Target weight – Weight + Time 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
323 … 347	Component memories 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

No.	Content	Format
350	Minimum x_{Min}	Response: A B _ Weight value _ Unit
351	Maximum x_{Max}	Response: A B _ Weight value _ Unit
352	Start/Stop	Response: A B _ x Write: A W 3 5 2 _ x Comment: Start: x = 1, Stop: x = 0
354	Current component, 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 The value is only valid as long as the component for dispensing is loaded. The block can only be written in the ready for dispensing state (010).
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 The value is only valid as long as the component for dispensing is loaded. The block can only be written in the ready for dispensing state (010).
356	Absolute switch-on value for output 2	Response: A B _ Weight value _ Unit Write: A W 3 5 6 _ Weight value _ Unit Comment: The value is only valid as long as the component for dispensing is loaded. The block can only be written in the ready for dispensing state (010).
357	Absolute switch-off value for output 2	Response: A B _ Weight value _ Unit Write: A W 3 5 7 _ Weight value _ Unit Comment: Only for output 2 = material agitation, fill quantity The value is only valid as long as the component for dispensing is loaded. The block can only be written in the ready for dispensing state (010).
358	Switch-on time for output 2	Response: A B _ Number_4 Write: A W 3 5 8 _ Number_4 Comment: Only for output 2 = material agitation The value is only valid as long as the component for dispensing is loaded. The block can only be written in the ready for dispensing state (010).

No.	Content	Format
359	Status of output 2	Read: A B _ Code (Number_4) **Code Meaning** 0000 Output 2 off 0001 Remaining quantity 0002 Fill quantity 0013 Material agitation – target weight – percent 0014 Material agitation – target weight – weight value 0015 Material agitation – target weight – weight + time 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) Comment: The value is only valid as long as the component for dispensing is loaded. The block can only be written in the ready for dispensing state (O10).
360	Items poor (Items outside tolerance)	Response: A B _ Number_4
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 (formula loaded) 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 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 070 End dispensing of a component: Wait for stability 072 Temporary 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 STOP VALUE REACHED 088 Display of net weight sum 090 End timer running

No.	Content	Format
361	Dispensing state	**Code Meaning** 101 Display DISPENSING OKAY 111 Display OVERFILLED 130 Empty during remaining quantity 140 Redispensing for fill quantity 187 Item counter has reached stop value 200 Formula start: 1st component loaded and ready for dispensing, End of formula: Display of the lot sum 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 possible carried out, e.g. deleting the sum, when TOTALIZING ON is set.
362	Sensitivity of monitor dispensing	Read: A B _ Number_12 Write: A W 3 6 2 _ Number_12
363	Trip factor coarse feed in learn mode	Read: A B _ Factor (0.1 ... 0.9; step size 0.1) Write: A W 3 6 3 _ Factor (0.1 ... 0.5; step size 0.1)
364_001 ... 364_050	Formula memory 1 ... 50	Response: A B _ Formula name (Text_20) _ _ TareMin (weight value) _ Unit _ _ TareMax (weight value) _ Unit _ _ Components 1...8 (Number_31) _ _ Components 9...16 (Number_32) _ _ Components 17...24 (Number_32) _ _ Components 23...32 (Number_32) _ _ Write: A W 3 x x _ Formula name (Text_20) $ $ TareMin (weight value) _ Unit $ $ TareMax (weight value) _ Unit $ $ Components 1...8 (Number_31) $ $ Components 9...16 (Number_32) $ $ Components 17...24 (Number_32) $ $ Components 23...32 (Number_32) Comment: xx = 64_001 ...64_050 Comp. 1 ... 8 cccPcccPcccPcccPcccPcccPcccPccc Comp. 9 ... 32 PcccPcccPcccPcccPcccPcccPcccPccc ccc Component memory No.: 001 ... 999, (application blocks 323_001 ... 323_999) P Phase number 0 = same phase, 1 = different phase

No.	Content	Format
364 … 375	Formula memory 1 … 12	Response: equal to 364_001 Write: equal to 364_001 Comment: xx = 64 … 75
376_001 … 376_050	Weighing platform No. for the components of formula 1 … 50	Response:  Write:  Note: xx = 76_001 … 76_050 w = Weighing platform No.: 1 ... 4, 0 = any desired weighing platform
376 … 387	Weighing platform No. for the components of formula 1 … 12	Response: equal to 376_001 Write: equal to 376_001 Comment: xx = 76 … 87
388	Lot weight	Response:  Write:  resetting to "not in use"
389	Sum of lot weights	Response: 
390	Trip factor fine feed in learn mode	Response:  Write: 
391	Current formula	Response:  Write: 

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
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
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
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

Error / Display	Possible causes	Remedy
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
BUFFER IS FULL	• Buffer has reached capacity limit	➜ Delete buffer
VALVE ERROR	• Configured valve number does not exist	➜ For valve actuation select the EXTENDED setting ➜ Install additional 8-690 relay box(es) ➜ Enter lower valve number
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 or 4 I/O-690, confirm the message with ENTER. ➜ Otherwise connect Relay box 8-690 or 4 I/O-690 correctly
TIMEOUT RELAY BOX: X	• IND690-Batch can no longer access Relay box-8 because, for example, the connecting line has been interrupted	➜ Confirm the message with ENTER, IND690-Batch goes into the basic state ➜ Connection to Relay box-8 re-established. A new dispensing process can now be started.

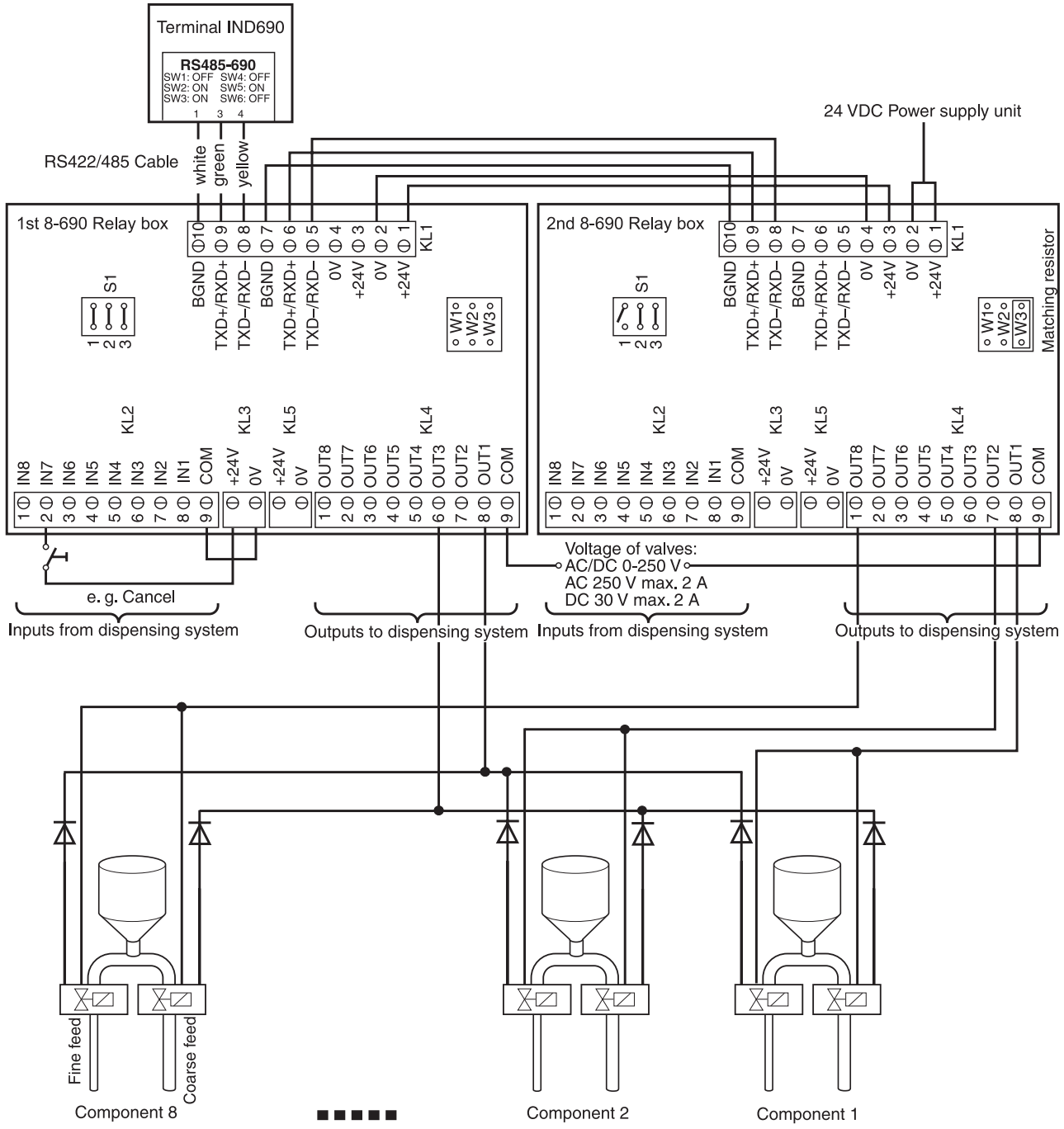
5 Technical data

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: Optimisation of the fine-feed shutoff point (Limit 2) • Tolerance check with automatic redispensing • Manual redispensing via keypad
Dispensing parameters	• Entry of formula parameters either directly via keyboard, by calling from one of 50 formula memories or via serial data port • 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 taring during start of dispensing process for the 1st component • Tare monitoring in accordance with specified value
Component memory	Memories for a maximum of 999 components over all 50 formulas
Formula memory	Memories for 50 formulas with up to 32 components each
Status display	Documentation of current dispensing process either with clear text or analog weigh-in aid DeltaTrac
Item counter	Up to 9999, start value and stop value can be set as desired
Totalizing	Net sum, gross sum, item counter, standard deviation, mean value, x_{min}, 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

The following terminal diagram is a wiring suggestion for an 8-component dispensing system without an external controller (PLC). All valves (coarse and fine feed of each component) are controlled directly by the IND690-Batch for STANDARD valve actuation. The isolating diodes are required for decoupling the individual solenoid valves.



First 8-690 relay box

Terminal KL2	Assign-ment	Inputs from dispensing system	Meaning
8	IN1	Not assigned	–
7	IN2	Start	For starting dispensing
6	IN3	Stop	For stopping dispensing
5	IN4	Confirm	Confirmation of underfilling/overfilling/acceptable dispensing
4	IN5	Tare	Manual external taring
3	IN6	Not assigned	–
2	IN7	Cancel	Immediate cancelling of dispensing (emergency stop), then IND690-Batch returns to READY FOR DISPENSING status
1	IN8	Lock keypad	When IN 8 is set to HIGH, the keypad of the IND690-Batch 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 configurating OUTPUT 2, see page 15
6	OUT3	Coarse feed	For connecting coarse feed valve/ coarse feed chute, etc.
5	OUT4	Poor	Reporting of poor dispensing result (UNDERFILLED, OVERFILLED)
4	OUT5	Acceptable	Reporting of acceptable dispensing result
3	OUT6	End of dispensing	Dispensing completed
2	OUT7	Start/output 7	Start pulse for OUTPUT 7, see page 25
1	OUT8	Ready	Ready to start dispensing

Second 8-690 relay box

Terminal KL2	Assign-ment	Inputs from dispensing system	Meaning
8	IN1	not assigned	–
7	In2	not assigned	–
6	IN3	not assigned	–
5	IN4	not assigned	–
4	IN5	not assigned	–
3	IN6	not assigned	–
2	IN7	not assigned	–
1	IN8	not assigned	–

The setting for VALVE ACTUATION, see section 2.2, determines the behaviour of the outputs to the dispensing system on terminal KL4. There are two possible settings:

- STANDARD Actuate a maximum of 32 components
- EXTENDED Actuate a maximum of 32 components and 4 scales with binary coding

STANDARD valve actuation			
Terminal KL4	**Assign-ment**	**Outputs to dispensing system**	**Meaning**
8	OUT1	Component 1	Control of 1st component
7	OUT2	Component 2	Control of 2nd component
6	OUT3	Component 3	Control of 3rd component
5	OUT4	Component 4	Control of 4th component
4	OUT5	Component 5	Control of 5th component
3	OUT6	Component 6	Control of 6th component
2	OUT7	Component 7	Control of 7th component
1	OUT8	Component 8	Control of 8th component

Corresponding actuation of additional components with additional 8-690 relay boxes

3rd 8-690 relay box Component 9 ... 16
4th 8-690 relay box Component 17 ... 24
5th 8-690 relay box Component 25 ... 32

Binary coding for the actuation of scales and components with the 2nd 8-690 relay box, EXTENDED VALVE ACTUATION	**Terminal KL4**							
	8	**7**	**6**	**5**	**4**	**3**	**2**	**1**
	Assignment							
	OUT1	**OUT2**	**OUT3**	**OUT4**	**OUT5**	**OUT6**	**OUT7**	**OUT8**
Scale								
1	1	0	–	–	–	–	–	–
2	1	1	–	–	–	–	–	–
3	0	1	–	–	–	–	–	–
4	0	1	–	–	–	–	–	–
Component								
1	–	–	0	0	0	0	0	1
2	–	–	0	0	0	0	1	0
3	–	–	0	0	0	0	1	1
4	–	–	0	0	0	1	0	0
5	–	–	0	0	0	1	0	1
6	–	–	0	0	0	1	1	0
7	–	–	0	0	0	1	1	1
8	–	–	0	0	1	0	0	0
9	–	–	0	0	1	0	0	1
…	…	…	…	…	…	…	…	…
31	–	–	0	1	1	1	1	1
32	–	–	1	0	0	0	0	0

6.2 Sequence chart

Formula with 2 components	1st relay box							2nd relay box	
	OUT1	OUT3	OUT4	OUT5	OUT6	OUT7	OUT8	OUT1	OUT2
	Fine feed	Coarse feed	Poor	Accept-able	End of dispens-ing	Output 7	Ready	Com-ponent 1	Com-ponent 2
1st component loaded									
Start pulse output, 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									
2nd component loaded									
Start pulse output, 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									
End of formula: lot sum evaluated and printed									

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