

Active SoliValve®

Software & HMI

Specification & Operating Manual

The screenshot displays the HMI interface for the SoliValve. At the top, the NOVARTIS logo and the identifier SG.TBP.202.M.5225/C001 are visible on the left, and the SoliValve logo is on the right. The main area is divided into several sections:

- Diagram:** A schematic of the SoliValve valve assembly. A green circle labeled "Security filter" is positioned above the valve. The valve body is labeled "SoliValve®" and "3 mm". Below the valve, a white circle labeled "Hopper full" is shown.
- Standby Panel:** A panel titled "Standby" containing three buttons: "Open cone", "Prot. hood", and "WIP cycle".
- Netweight Display:** A large yellow box displays "0.0" followed by "kg". The label "Netweight:" is positioned to the left.
- Grossweight:** A smaller yellow box displays "0.8" followed by "kg". The label "Grossweight:" is positioned to the left.
- Settings:** A button labeled "Settings" is located in the bottom left corner.
- Timestamp:** The date and time "08/04/2013 18:01:37" are displayed at the bottom.
- Connection Prompt:** A grey box contains the text "Press 'Continue' to start connecting SoliValve®". Below this are four buttons: "Cancel", "Retry", "< Back", and "Continue>".

Active SoliValve®
Software & HMI Specification & Operating Manual
for Siemens PLC S7 313C-2 DP & Touch Panel MP 277 8''

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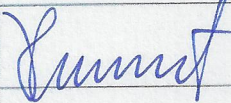
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1. Pre-approval

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2. General

The SoliValve® installation is equipped with a Siemens PLC Type “S7 313C-2 DP” and a Siemens HMI Type “MP 277-8” to control and operate the installation, display system statuses, introduce functional parameters, show and acknowledge error messages etc.

This document explains the functionality of the software and the operating within the screen menus available on the HMI for the production- and maintenance-mode of the installation. Please see separate binder “Touch Panel MP277 – Equipment manual” for more detailed information about the standard functions of the M277.

For the activity diagram and control logic, refer to document: Control Logic (M-00001).

2.1 Enter numeric values

2.1.1 Numeric screen keyboard

In order to enter numeric and hexadecimal values, the touch panel automatically displays a numeric screen keyboard directly after touching an input field on the touch screen. After completing the input, the screen keyboard is automatically hidden.

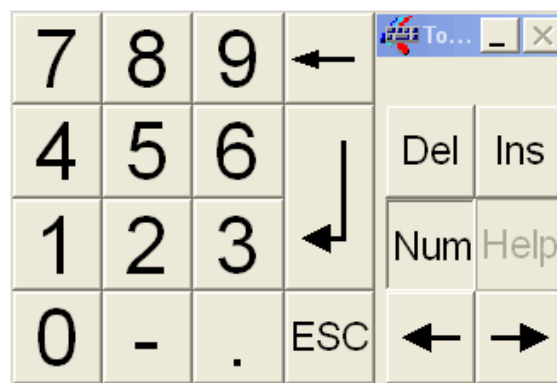


Figure 1: Numeric keyboard

2.1.2 Procedure

Numeric and hexadecimal values are entered character by character using the buttons provided on the screen keyboard. Confirm the value entered by pressing the Enter key or cancel the input by pressing ESC. The screen keyboard is closed in both cases.

2.1.3 Limit value check

If limit values are configured for the input field tags, the limit values (Min and/or Max) are indicated in top of the input field. In this case, the values entered are only accepted when they are within the configured limits.

If an attempt is made to enter a value which is outside the configured limits, it is rejected and the original value automatically reinserted. In this case, the operating unit issues a system message.

2.2 Enter alphanumeric values

2.2.1 Alphanumeric screen keyboard

In order to enter a character string, the touch panel automatically displays a full screen alphanumeric keyboard directly after touching an input field on the touch screen. After completing the input, the screen keyboard is automatically hidden.

The full screen keyboard has an alphanumeric layout providing normal and Shift levels.



Figure 2: Alphanumeric keyboard

2.2.2 Procedure

Alphanumeric values are entered character by character using the buttons provided on the screen keyboard. **Confirm the value entered by pressing the Enter key** or cancel the input by pressing ESC. The screen keyboard is closed in both cases.

2.3 Button

2.3.1 Function buttons

A button is a virtual key located on the operating unit screen. Functions which have been assigned to buttons can be triggered by pressing these buttons. As soon as the panel detects a valid operation, it responds with a visual acknowledgement.

This example illustrates the button "Continue" which are pressed (right).



2.3.2 Hidden buttons

Hidden buttons are transparent buttons which may lie over graphics, for example. This enables plant parts which are graphically on the operating unit to be operated easily. If a hidden button is selected, its contour becomes visible as long as the button remains selected. The contour enables the user to detect the operable area of the button. The contour is defined by the configuration.

2.4 Password protection

Password level 1 – Operator

At this level, a password must be entered (commissioning value: User:M5225C1 Opera/
Password:10000001).

The operator will use this level to perform current operations.

Password level 2 – Maintenance

At this level, a password must be entered (commissioning value: User:M5225C1 Maint/
Password:20000001).

The foreman will use this level to modify discharge or dosing parameters.

Password level 3 – Supervisor

At this level, a password must be entered (commissioning value: User:M5225C1 Superv/
Password:30000001).

The maintenance will use this level to modify installation parameters and to perform system operations.

Password level 4 – Administrator

At this level, a password must be entered (commissioning value: User:M5225C1 Admin/
Password:40000001).

Persons who are specially trained for the balances will use this level to calibrate the scales.

Please see separate [Operating Instructions "SIMATIC HMI device MP277"](#) downloadable from the Siemens WebSite at :

<http://support.automation.siemens.com/WW/llisapi.dll?func=cslib.csinfo&lang=en&objid=23337820&caller=viewer> for in-depth general and user management information.

2.4.1 Log on

The touch panel displays automatically the window "Log on" directly after touching an input field which request a password.

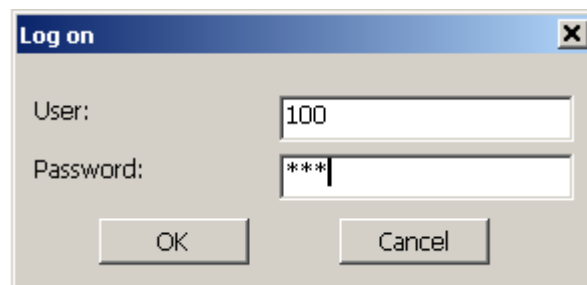


Figure 3: Log on keyboard

2.4.2 Log off

The touch panel will automatically log off after 15 minutes (configurable) without touching on the panel. The operator can log off on the service screen.

2.4.3 User Management

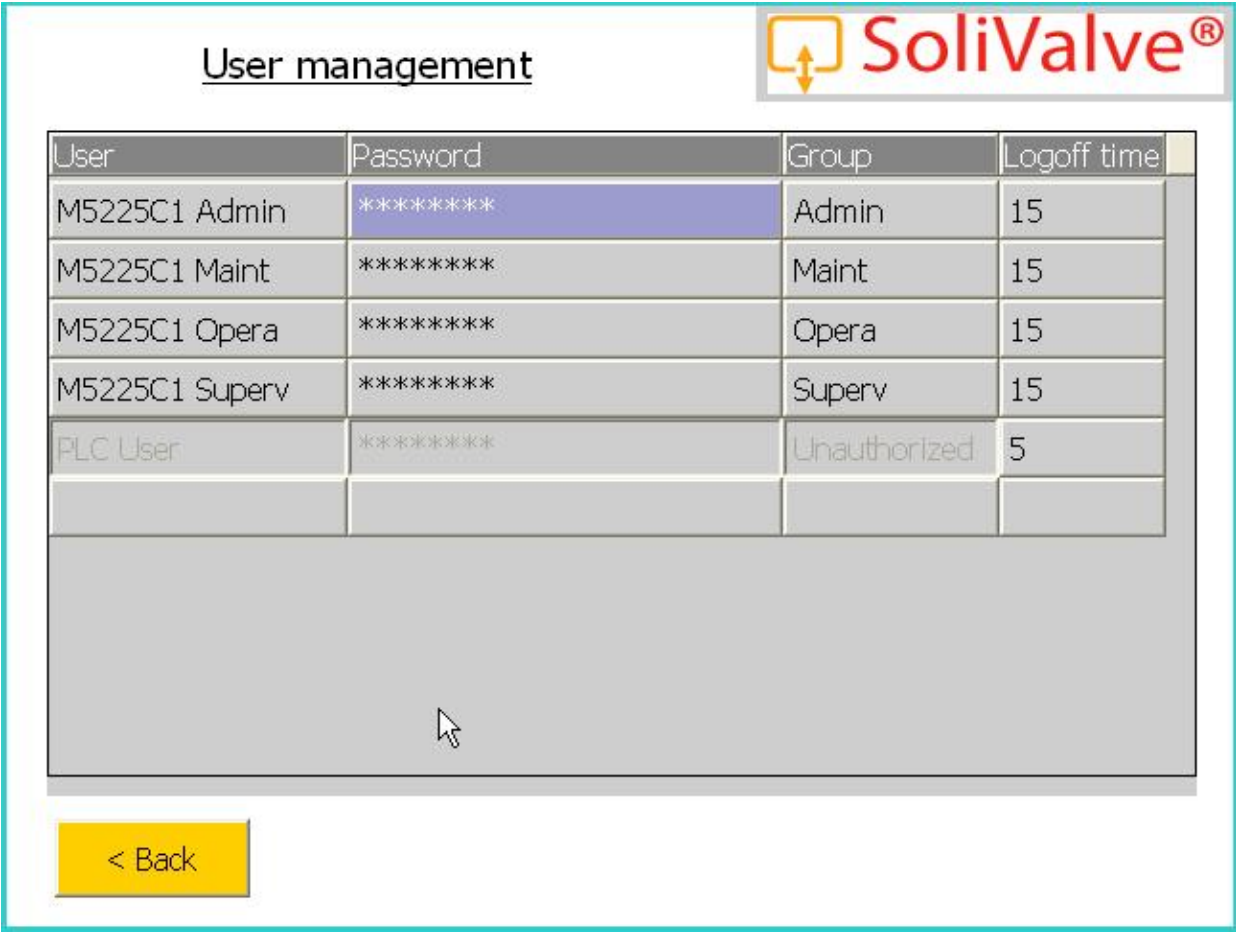


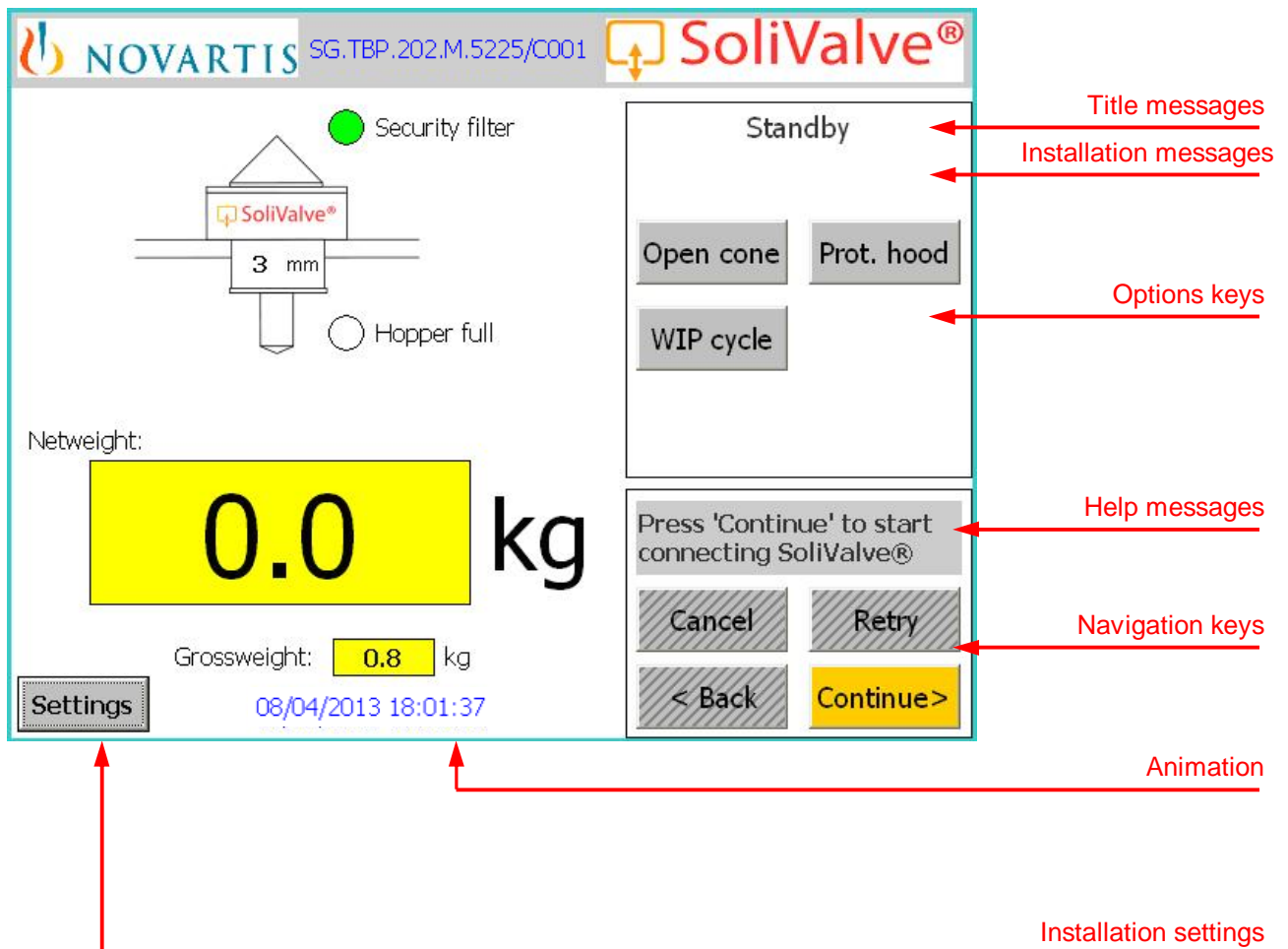
Figure 4: User management keyboard

3. Active SoliValve® Operation

3.1 Step-by-step instructions

Observe the technical documentation for your specific equipment regarding proper commissioning and installation directives of the Active SoliValve® Discharge or Filling unit. This chapter contains a step-by-step description detailing how to either discharge or fill an IBC equipped with a compatible passive SoliValve® cone valve assembly.

The main screen shows the following view in Standby, which can slightly vary according to the available hardware options:



Only the navigation keys leading to the next resp. the previous process step are enabled. Chapter **3.5 Option keys** describes all the option keys in detail. Chapter **4 Advanced settings** handles all the advanced settings.

The net weight value indicated the already discharge product from the IBC.

The "Open cone", "Prot. Hood", "WIP cycle" and "Continue" buttons are protected (Operator password level).

3.2 Attach IBC

- Position the IBC in line with the active SoliValve® discharge or filling station by means of a suitable lifting device. Make sure that the IBC does not touch the unit yet.
- Ascertain that the passive SoliValve® at the IBC is ready to be docked. The passive cone valve must not be obstructed by a lid, big-bag fabric or any other protective devices.
- Now press the function key labelled “Lock IBC” to activate the automatic IBC detection. Observe the status column for process information.
- As soon as the system is ready, the status column shows a request to lower (in case of a discharge station) or raise (in case of a filling station) the IBC. If you omit this step, the system will return to its standby state after a pre-set time. You will then have to start over from the very beginning to start a new docking attempt.
- Provided that your active SoliValve® unit disposes of an automatic IBC detection, the locking bolts will be automatically engaged as soon as the IBC touches the station and form a tight connection to the environment. Otherwise you have to activate this function manually by pressing the key labelled “Continue”.
- Active SoliValve® filling units always dispose of an automatic IBC detection.
- The system will now complete the docking process fully automatically. Observe the status column for process information. Proceed to the next step as soon as the keys in the navigation area have become active again.

3.3 Discharge IBC

- Double-check the discharge or filling settings and adjust them where necessary. Access these settings via the key labelled “Settings”.
- Start the discharge process by pressing the function key labelled “Continue”. The active SoliValve® now performs a fully automatic dosage of the weight specified out of or into the IBC. Observe the status column for process information.
- The system will proceed automatically until you either press the key labelled „Back“ or a stop signal is received from a connected scale, centralised control system or similar peripherals.
- In case the product does not flow as desired, the keys in the options area, in particular the ones labelled “Fluidisation” and “Vibrator On/Off”, may help to improve the product flow considerably. Chapter **4.1 Discharge parameters** describes all the discharge parameters in detail.

3.4 Remove IBC

After a completed discharge or filling process the following steps are to be carried out to remove the IBC:

- The discharge or filling process will end when you either press the key labelled „Back“ or a stop signal is received from a connected scale, centralised control system or similar peripherals.
- After that, press the key labelled „Back“ to start the fully automatic undocking sequence. Observe the status column for process information.
- As soon as the system is ready, the status column shows a request to remove the IBC. Remove the IBC from the discharge or filling station and place it away from the working area. Ascertain the correct safeguarding of the IBC according to your regulations, if applicable (for example by means of a protective lid).

3.5 Option keys

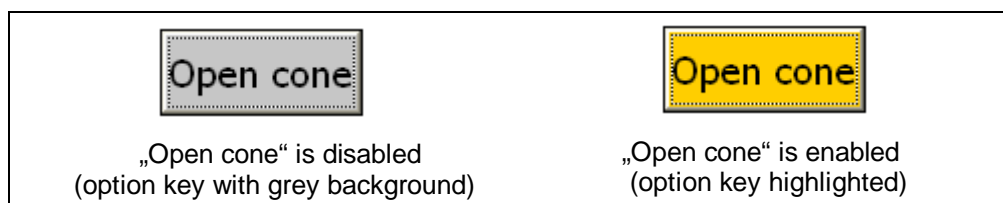
Different special functions of the active SoliValve® discharge or filling unit can be controlled with the keys in the options area (see image on page 1). The available options are changing according to the current state of the system, which means that it is not possible for example to suddenly start a WIP cycle (cleaning in place) in the middle of a discharge or filling process or to activate the fluidisation if no IBC is currently docked at all. In addition, availability of some of the options depends on the delivery scope of your system.

These option keys are divided into **impulse keys** and **toggle keys**, impulse keys being active as long as they are pressed and held. Toggle keys change into different states every time they are pressed and, if pressed again, they return to their original state.

3.5.1 Open cone

The toggle key labelled „Open cone“ can be used to open the active SoliValve® discharge or filling unit without a IBC being docked. This is useful for example for manual cleaning of the unit. After being activated, this function purges every opening of the unit with compressed air to prevent liquids from entering. At the same time, the cone is opened and provides access to the inside of the active SoliValve®. When the key is activated again, the system returns to its standby state.

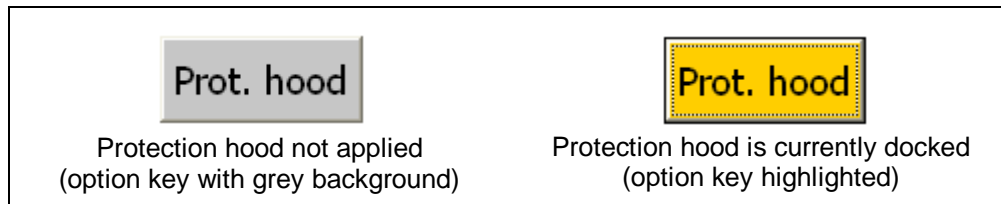
Caution: crushing hazard! Observe the technical documentation for your equipment regarding secure retention of the cone as well as competent cleaning of the active SoliValve®.



3.5.2 Protection hood

Activate the toggle key „Prot. hood“ and follow the on-screen instructions to dock a protection hood to the active SoliValve® discharge or filling station. The hood protects the unit from external mechanical and non-mechanical influences, seals the system mechanically and can also be used for easy transport of the unit.

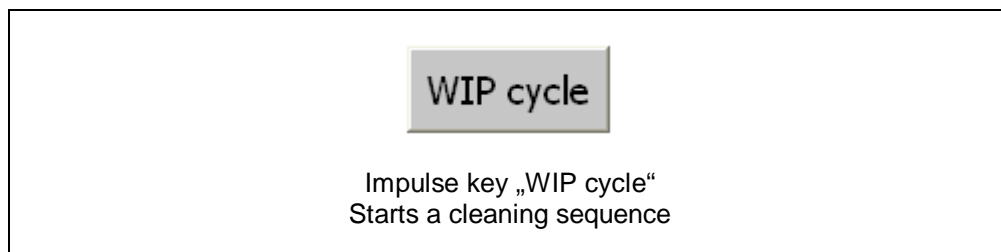
This option is only available if a protection hood was actually delivered with your active SoliValve® discharge or filling station.



3.5.3 WIP cycle

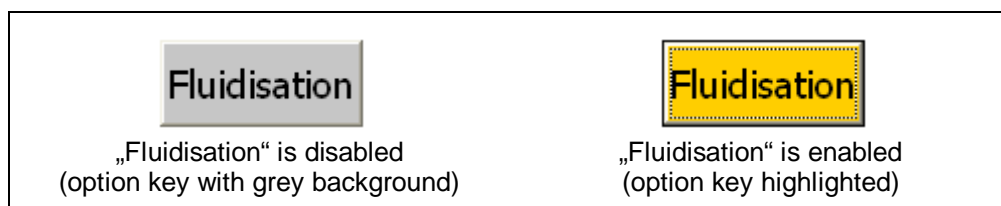
Activate the impulse key „WIP cycle“ (washing in place) and follow the on-screen instructions to dock a WIP hood to the active SoliValve® discharge or filling station and perform a cleaning sequence. For the washing parameters, observe chapter **3.4 Washing parameters**.

This option is only available if a WIP hood was actually delivered with your active SoliValve® discharge or filling station.



3.5.4 Fluidisation

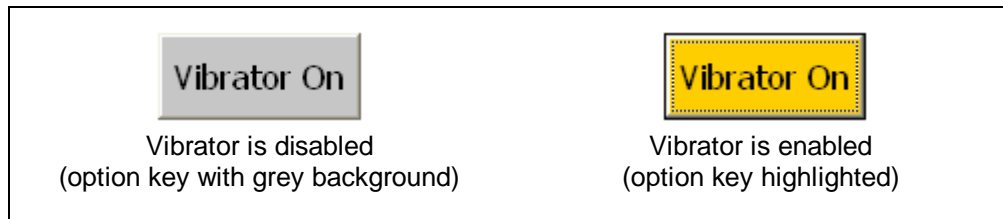
The impulse key „Fluidisation“ provides the possibility to insert compressed air or nitrogen into the IBC. This leads to a break-up (fluidisation) of the product in the area of the passive SoliValve® cone valve allowing the product to freely flow out of the IBC. For security reasons, this function is only active if the cone valve is currently open, which in pulsed mode (see chapter **4.1 Discharge parameters**) is not permanently the case. This option is only available if the delivery scope of your active SoliValve® discharge or filling station actually included it.



3.5.5 Vibrator

The toggle key „Vibrator On“ provides the possibility to manually switch on the integrated high frequency vibrator located inside the active SoliValve® unit. This function is only active if the cone valve is currently open, which in pulsed mode (see chapter **4.1 Discharge parameters**) is not permanently the case.

This option is only available if the delivery scope of your active SoliValve® discharge or filling station actually included it.



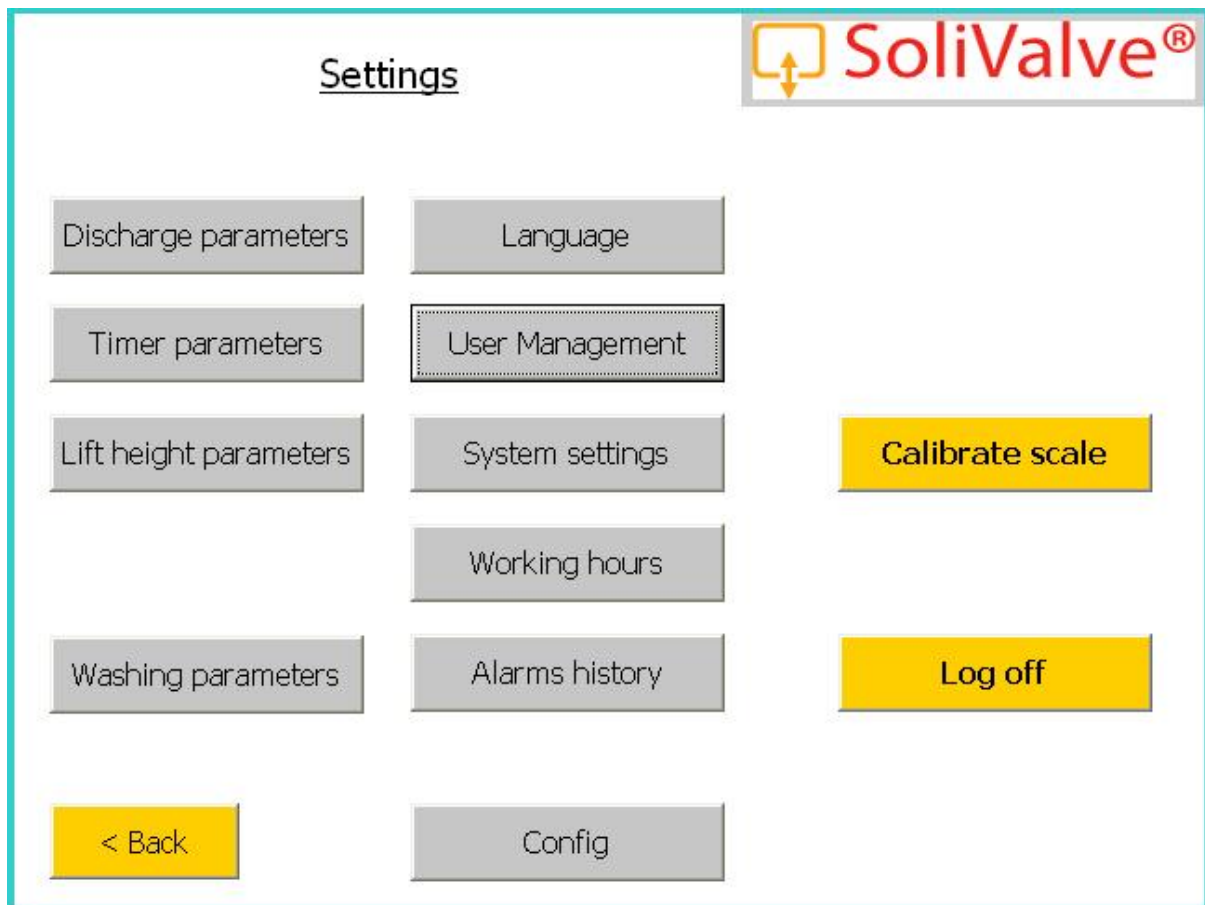
3.6 Missing oil for lift adjustment

When the small reservoir of oil "-X17.1" in the cabinet "+1A10" is empty, you can still proceed to 100 dockings. After each docking, the remaining docking value is decreased. When the remaining docking is of zero, you can not any more docked a container. You have to refill the oil reservoir.

The screenshot displays the SoliValve HMI interface. At the top, it shows the NOVARTIS logo, the identifier SG.TBP.202.M.5225/C001, and the SoliValve® logo. The interface is divided into several sections:

- User:** A diagram of the SoliValve assembly is shown with a 4 mm gap. To the right of the diagram are two radio buttons: "Security filter" (which is selected) and "Hopper full".
- Remain docking:** The value is 0. Below this, it says "Missing oil: Fill -X17.1 in cabinet +1A10".
- Netweight:** A large yellow box displays "0.0 kg". Below it, "Grossweight: 8.0 kg" is shown.
- Attaching IBC:** A red banner at the top of this section reads "Missing oil for lift adjust." Below the banner, it says "Continue: Dock cones" and "Back: Remove IBC".
- Buttons:** There are four buttons: "Cancel", "Retry", "< Back", and "Continue>".
- Settings:** A "Settings" button is located at the bottom left.
- Timestamp:** The date and time "02/05/2013 16:20:58" are displayed at the bottom center.

4. Advanced settings



Access to the settings overview shown alongside with the “Settings” key located on the main screen.

Available options vary according to the functional scope of the system. The advanced settings for the automatic lift height adjustment, for example, are only available if the delivery scope of the active SoliValve® system/installation actually included it.

The following paragraphs explain each individual setting in detail. The access rights are as follow:

- screen “Discharge parameters” (Maintenance password level)
- screen “Timer parameters” (Supervisor password level)
- screen “Lift height parameters” (Supervisor password level)
- screen “Washing parameters” (Maintenance password level)
- change language “Language” (Administrator password level)
- screen “User Mangement” (Administrator password level)
- screen “System settings” (Administrator password level)
- screen “Working hours” (Operator password level)
- screen “Alarms history” (Operator and above password level)
- screen “Config” installation options (Supervisor password level)
- screen “Calibrate scale” (Administrator password level)
- Press “Log off” to return to the level 0

4.1 Discharge parameters

The discharge parameters allow to define the time-intervals or the number of the indicated SoliValve® functions. Individual values can be edited using the numerical keyboard.

4.1.1 Screen 1

Discharge parameters

Lift

Lift On: 6.0 s Lift Off: 2.0 s

Lift height: 40 mm

Internal vibrator

Vibrator On: 6.0 s Vibrator Off: 0.0 s

Interval On: 1 Interval Off: 0

Fluidisation

Fluidisation On: 1.0 s Fluidisation Off: 10.0 s

Interval On: 0 Interval Off: 5

Fluidisation On delay: 1.0 s

< Back Advanced


The following parameters are available:

Parameter	Suggestion	Description
Lift On	5 s	Determines how long the cone will stay open before lowering again and before the next pulse cycle begins.
Lift Off	2 s	Determines the time to wait between the individual pulses during which the cone remains closed. Simply set this value to 0 for continuous operating mode without pulsing.
Lift height	40 mm (min:0 max:110)	This value determines the opening of the cone valve. An open annular gap will not form until a lift height of about 23mm is reached.

Parameter	Suggestion	Description
Vibrator On	5 s	Activates the integrated high frequency vibrator. Note that this setting also depends on the operating mode specified (pulsed or continuous, see above) since the system will only vibrate when the cone valve is open.
Vibrator Off	0 s	Specifies the waiting time between the individual vibration impulses.
Interval On/Off	0 / 0	This parameter defines if and for how many pulses the system vibrates in pulsed operating mode (see above). For example, a setting of 3 / 2 (On / Off) causes the respective function to be active during three cone opening cycles and then pause for the next two cycles. This parameter has no influence on the continuous operating mode.
Fluidisation On	1 s	This parameter defines the duration of compressed air or nitrogen insertion per fluidisation impulse. Note that this setting also depends on the operating mode specified (pulsed or continuous, see above) since the system will only fluidise when the cone valve is open.
Fluidisation Off	5 s	Specifies the waiting time between the individual fluidisation impulses.
Interval On/Off	0 / 0	This parameter defines if and for how many pulses the system fluidises in pulsed operating mode (see above). For example, a setting of 3 / 2 (On / Off) causes the respective function to be active during three cone opening cycles and then pause for the next two cycles. This parameter has no influence on the continuous operating mode.
Fluidisation On delay	2 s	This parameter defines the delay between the opening of the cone and the Fluidisation start.

4.1.2 Screen 2

Discharge parameters



Bridgebreaker

External vibrator

Vibrator On	5.0	s	Vibrator Off	10.0	s
Interval On	1		Interval Off	1	
Vibrator On delay	1.0	s	Start weight	-220.0	kg
Vibrator disable after	8				

End discharging

Time out discharging	30	s	Empty weight	-248.0	kg
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< Back

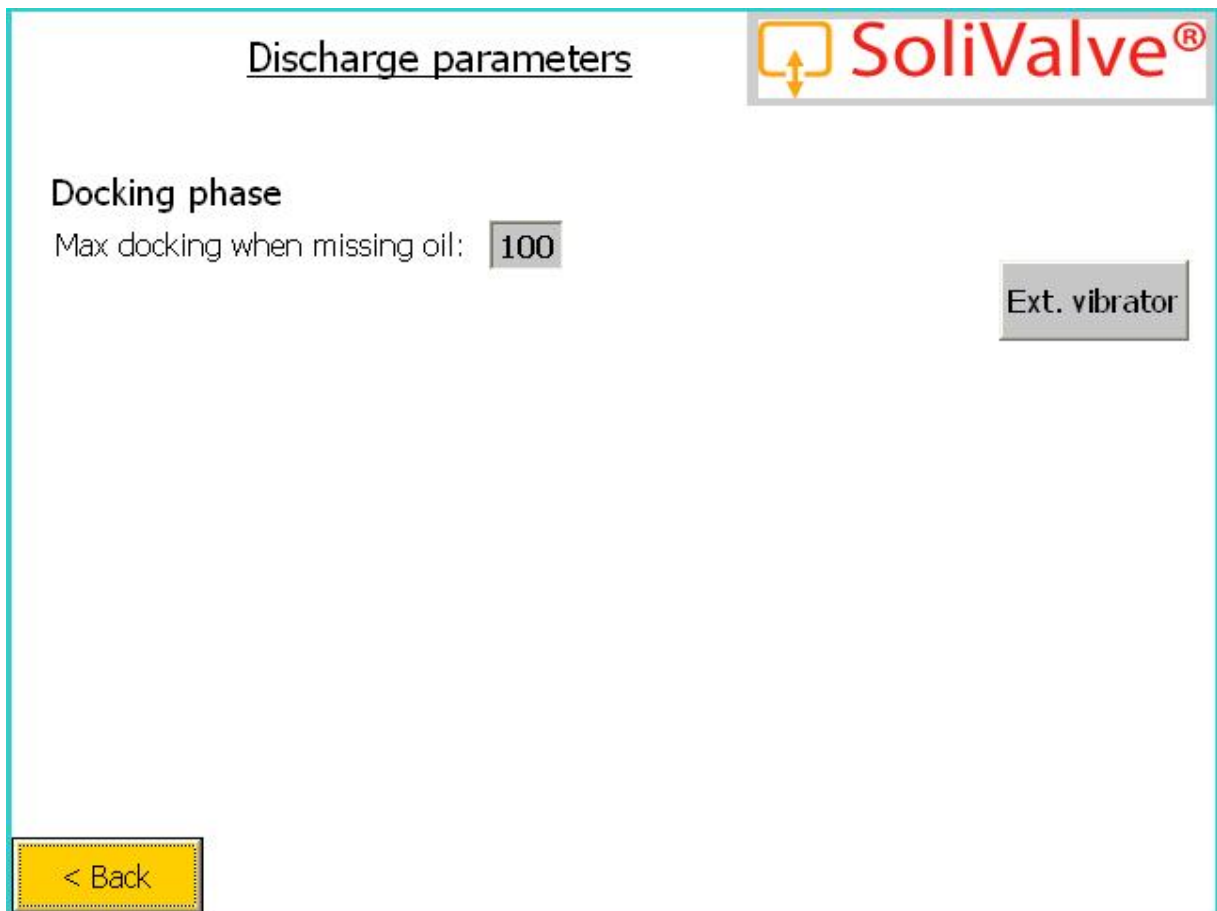
Advanced

The following parameters are available:

Parameter	Suggestion	Description
Vibrator On	5 s	Activates the external vibrators. Note that the external vibrators will only vibrate when the cone valve is open.
Vibrator Off	10 s	Specifies the waiting time between the individual vibration impulses.
Interval On/Off	1 / 1	This parameter defines if and for how many pulses the system vibrates in pulsed operating mode (see above). For example, a setting of 3 / 2 (On / Off) causes the respective function to be active during three cone opening cycles and then pause for the next two cycles. This parameter has no influence on the continuous operating mode.
Vibrator On delay	1 s	This parameter defines the delay between the opening of the cone and the external vibrators start.
Start weight	-220.0 kg	This parameter defines when the external vibrators will start to vibrate. In this example, the external vibrators will start when 220kg have been already discharge from the IBC.
Vibrator disable after	8	This parameter defines the maximum quantity of external vibration. In this example, the external vibrators will vibrate 8 times. After the message "External vibrators disable" will appear on the dosing screen.

Parameter	Suggestion	Description
Time out discharging	30 s	This parameter defines how long the discharging will continue after reached the bellow parameter "Empty weight". In this example, when 248kg have been discharge from the IBC, the discharging will continue 30s.
Empty weight	-248.0kg	This parameter defines when the IBC will be considered as emptied. In this example, when 248kg have been discharge from the IBC, the discharging will continue during the above parameter "Time out discharging" and after the discharging will stop and the question " Is the IBC empty? " will be displayed. With the button " Continue ", the operator decides to start the discharging ones more. With the button " Back ", the operator decides to undock the IBC.

4.1.3 Screen 3



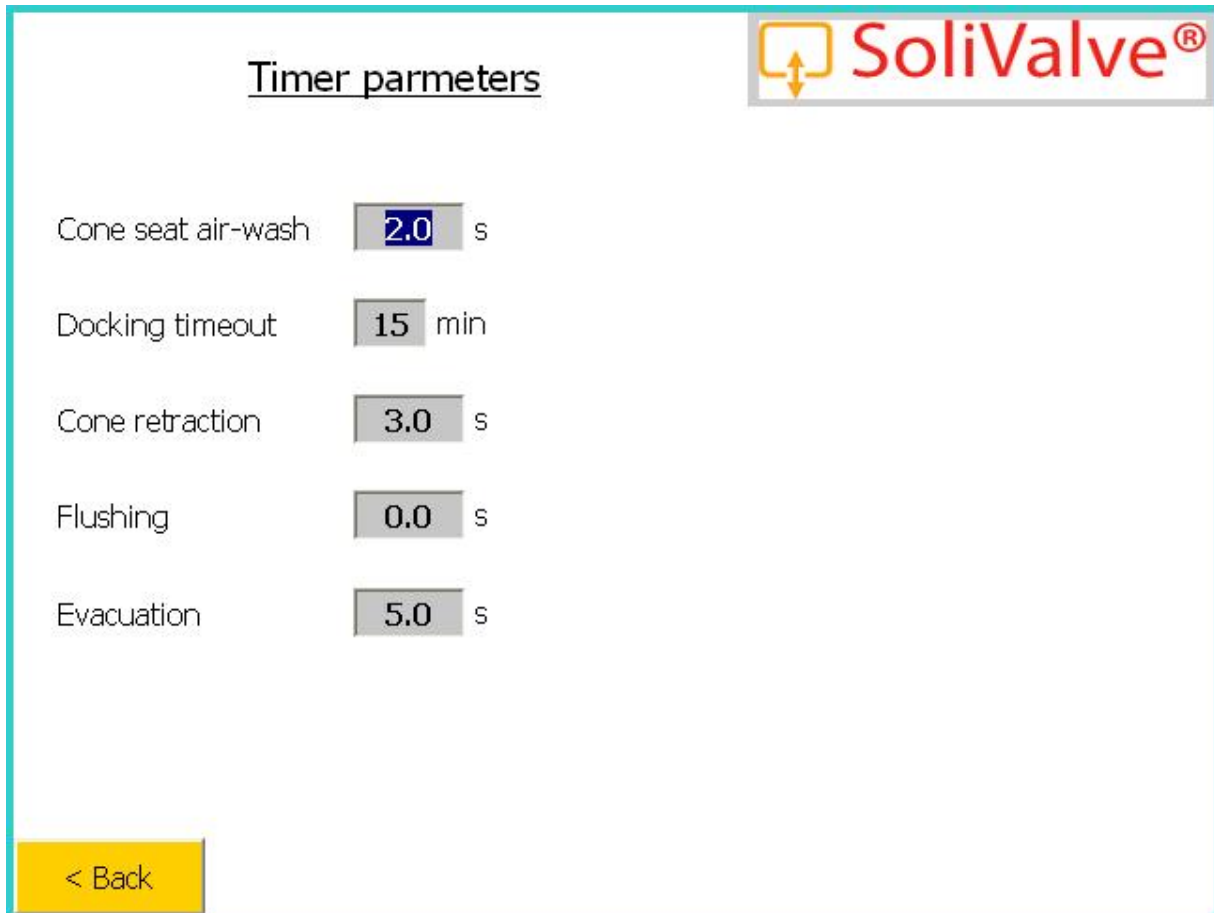
The following parameters are available:

Parameter	Suggestion	Description
Max docking when missing oil	100	When the small reservoir of oil "-X17.1" in the cabinet "+1A10" is empty, you can still proceed to 100 dockings.

The manual button "Ext. vibrator" will start the external vibrators in any case.
In automatic mode the external vibrators are started only when the cone is opened.

4.2 Timer parameters

The timer settings allow to define the time-intervals of the indicated SoliValve® functions. Individual values can be edited using the numerical keyboard.

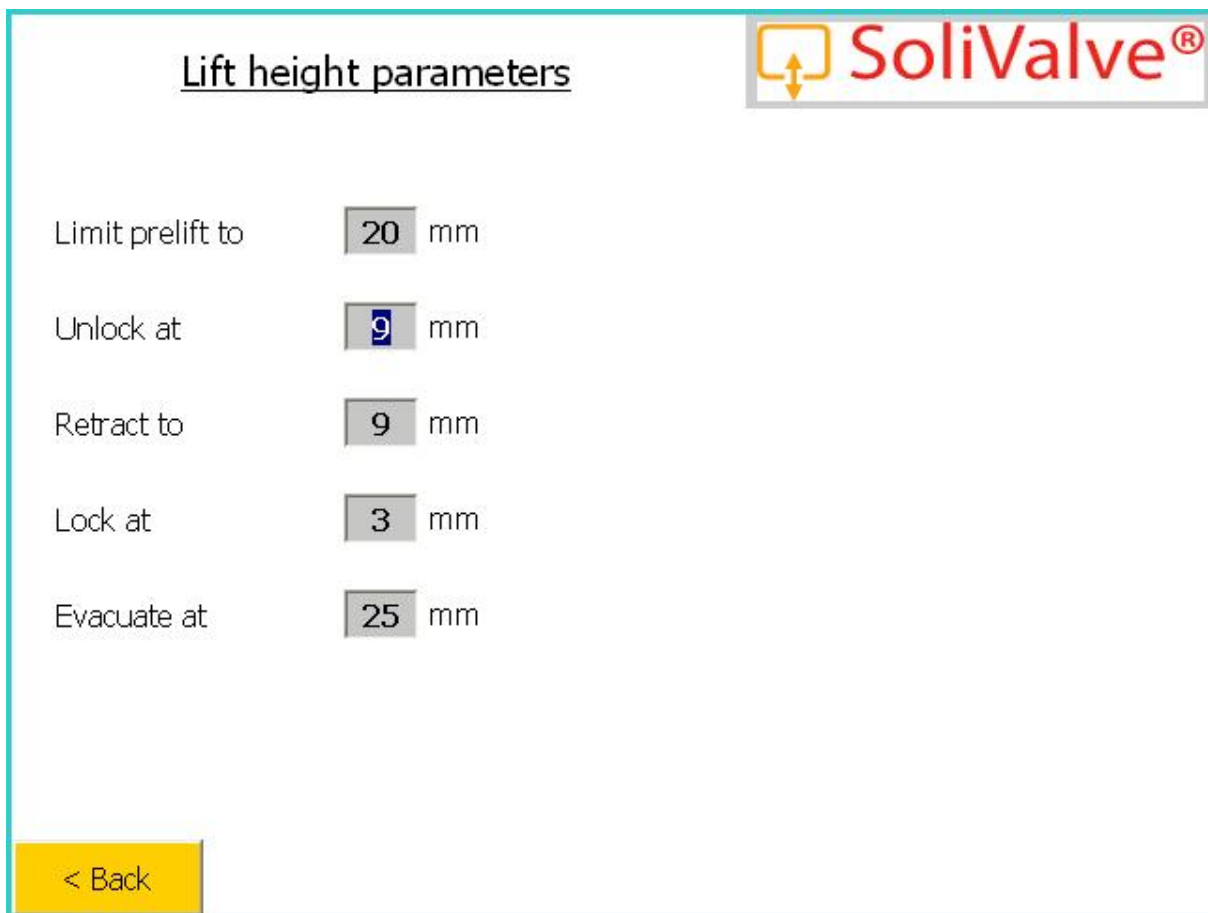


The following parameters are available:

Parameter	Suggestion	Description
Cone seat air-wash	2 s	This parameter defines for how long air or nitrogen will be activated to wash the seat of the cone valve during and after the clipping sequence.
Docking-Timeout	15 min	If after the docking sequence no discharging or filling sequence is started within the define time, then the system will switch to a power saving waiting mode. A value of 0 min will disable this function.
Cone retraction	2 s	Defines the retraction time of the cone probe by means of vacuum for an active SoliValve® unit without the automatic lift height adjustment functionality. Increase the value should the cone valve not clip properly.
Flushing (Purging)	Process dependent	Defines the duration of air or nitrogen introduction into the IBC before starting the filling (discharging) operation.
Evacuation	Process dependent	Defines the duration in which the cone valve remains open in order to allow extraction of the remaining air inside the IBC.

4.3 Lift height parameters

The lift height settings provide a precise control of important functions for active SoliValve® systems equipped with the automatic lift height adjustment option. Individual values can be edited using the numerical keyboard and can take values between 0 mm and 110 mm.



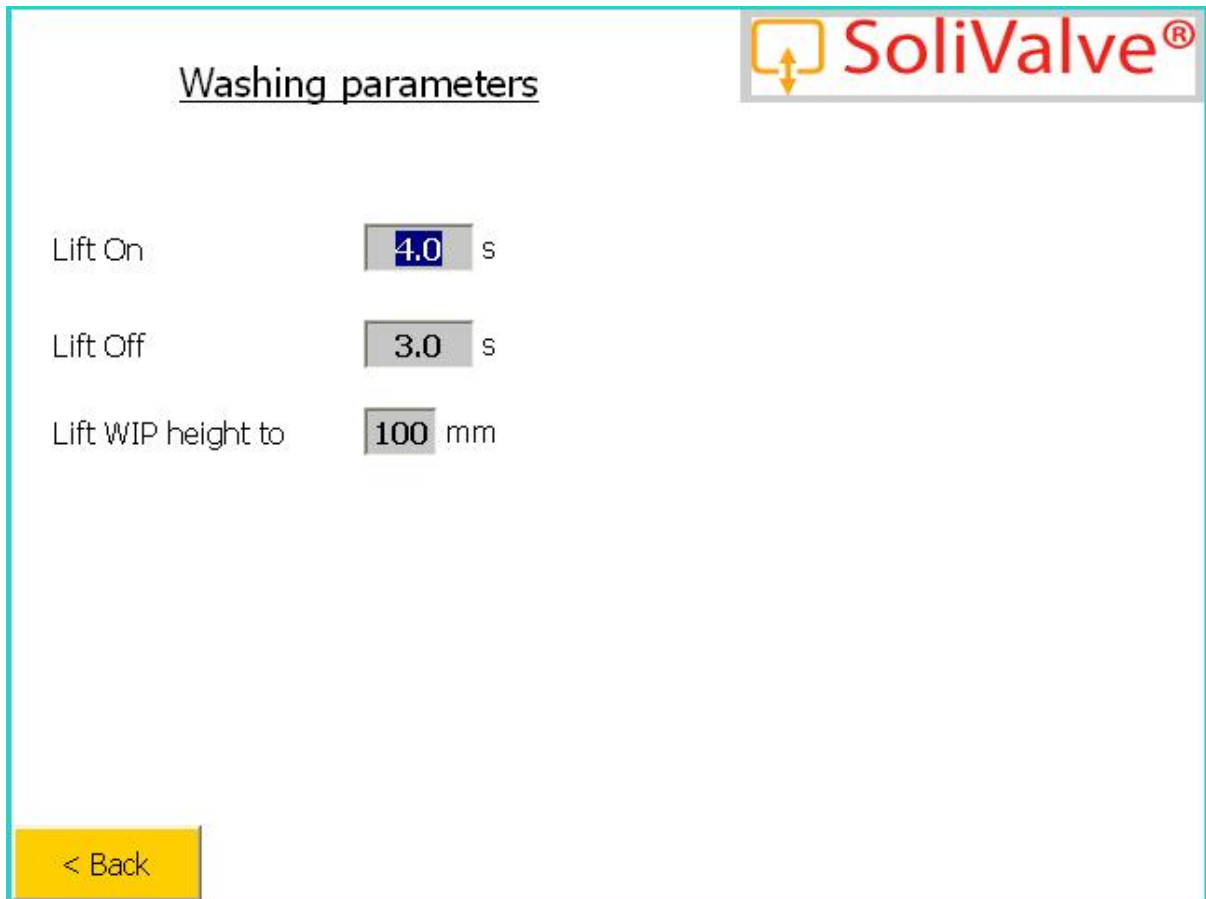
The following parameters are available:

Parameter	Suggestion	Description
Limit prelift to	20 mm (min:0 max:110)	This limit prevents the opening of the cone valve and product flow in case of a fault during the cone docking sequence. An open annular gap only starts at a lift height of about 23mm.
Unlock at	11 mm (min:0 max:110)	Inside the unit, here is a proximity sensor positioned at this setting which detects that the cone valve probe has actually unclipped and is open. This value can be adjusted in case of difficulties with the open detection.
Retract to	9 mm (min:0 max:110)	Defines the correct position of the cone valve probe for the air wash sequence following the filling or discharging operation.
Lock at	3 mm (min:0 max:110)	Defines the “closed” position of the cone valve probe. This value can be adjusted +/- 1mm if the passive cone valve does not properly close.
Evacuate at	25 mm (min:0 max:110)	Defines the annular gap opening through which the remaining air inside of the IBC can be extracted. When using FIBCs, this prevents the inliner or the bag fabric from being pinched by the

		cone valve.
--	--	-------------

4.4 Washing parameters

The washing settings allow to control the functions on the active SoliValve® unit during the WIP operation (Washing In Place). Individual values can be edited using the numerical keyboard.



The following parameters are available:

Parameter	Suggestion	Description
Lift On	5 s	Defines for how long the cone valve stays open before it lowers again (puls-mode).
Lift Off	2 s	Defines the waiting time between two lifting movements. The cone valve is closed during that time. For continuous open situation without puls-mode, this value must be set to 0.
Lift WIP height to	100 mm (max:110)	Defines the maximum lift height reachable by the cone probe during the wash cycle. To achieve optimum washing conditions on the cone probe and the telescopic cylinder, this value should always remain at the maximum of 115 mm.

4.5 Languages

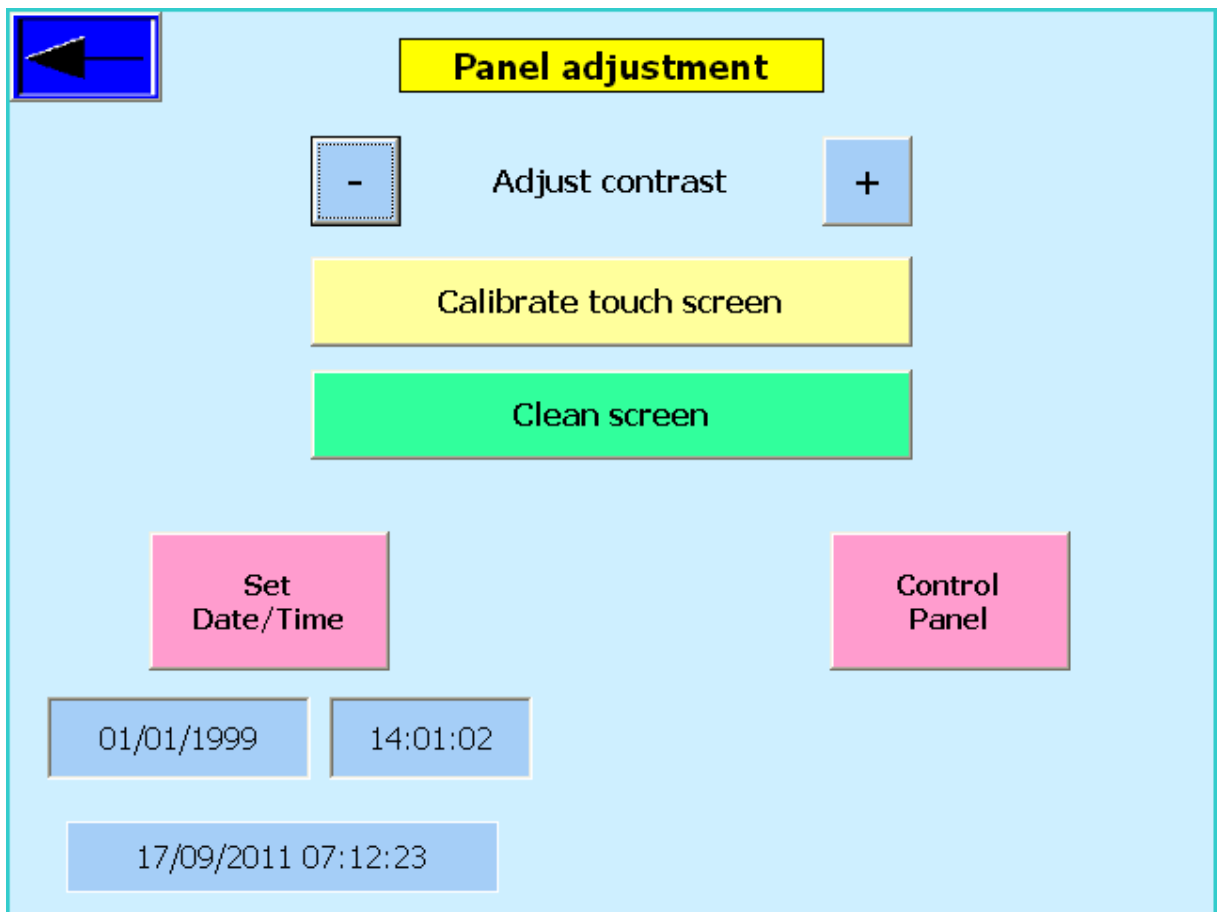
On the “Settings” window, the “Languages/Sprachen” button to access a list with the available languages. Select the required language for operating the panel by pressing the corresponding button.

4.6 User management

See chapter *2.4.3 User Management*.

4.7 System adjustment

Date and Time can be adjusted to the location and they will be synchronized between HMI and PLC.



4.8 Operating hours

These windows displays a summary of the total amount of movements/operations performed by the main components of the Active SoliValve® Unit.

Number of movements & Hours of work				
SoliValve functions	Total	SoliValve Nr.: 201300122-01		
-EV02.1 - Close locks:	7			
-EV04.1 - Fluidisation seal:	5			
-EV05.1 - Fluidisation seal retraction:	12	0	h	
-EV06.1 - Cone clamping:	15	0	h	
-EV07.1 - Cone cleaning:	6			
-EV08.1 - Cone vacuum:	24	0	h	
-EV09.1 - Neutralize vacuum:	25			
-EV10.1 - Quick air vent:	32			
-EV11.1 - Lift for discharging:	29	0	h	
-EV12.1 - Additional lift force:	4			

02/05/2013 12:14:34

Number of movements & Hours of work			
SoliValve functions	Total	SoliValve Nr.: 201300122-01	
-EV13.1 - Lift for docking:	3	3	
-EV14.1 - Air purge cleaning:	0	0	
-EV15.1 - Fluidisation:	5	5	
-EV16.1 - Retraction cone lock:	0	0 h	0 h
-EV17.1 - Decrease stroke:	30	0 h	0 h
-EV18.1 - Increase stroke:	9	0 h	0 h
-EV19.1 - Internal Vibrator:	24	0 h	0 h
-EV22.1 - External vibrators:	0	0 h	0 h

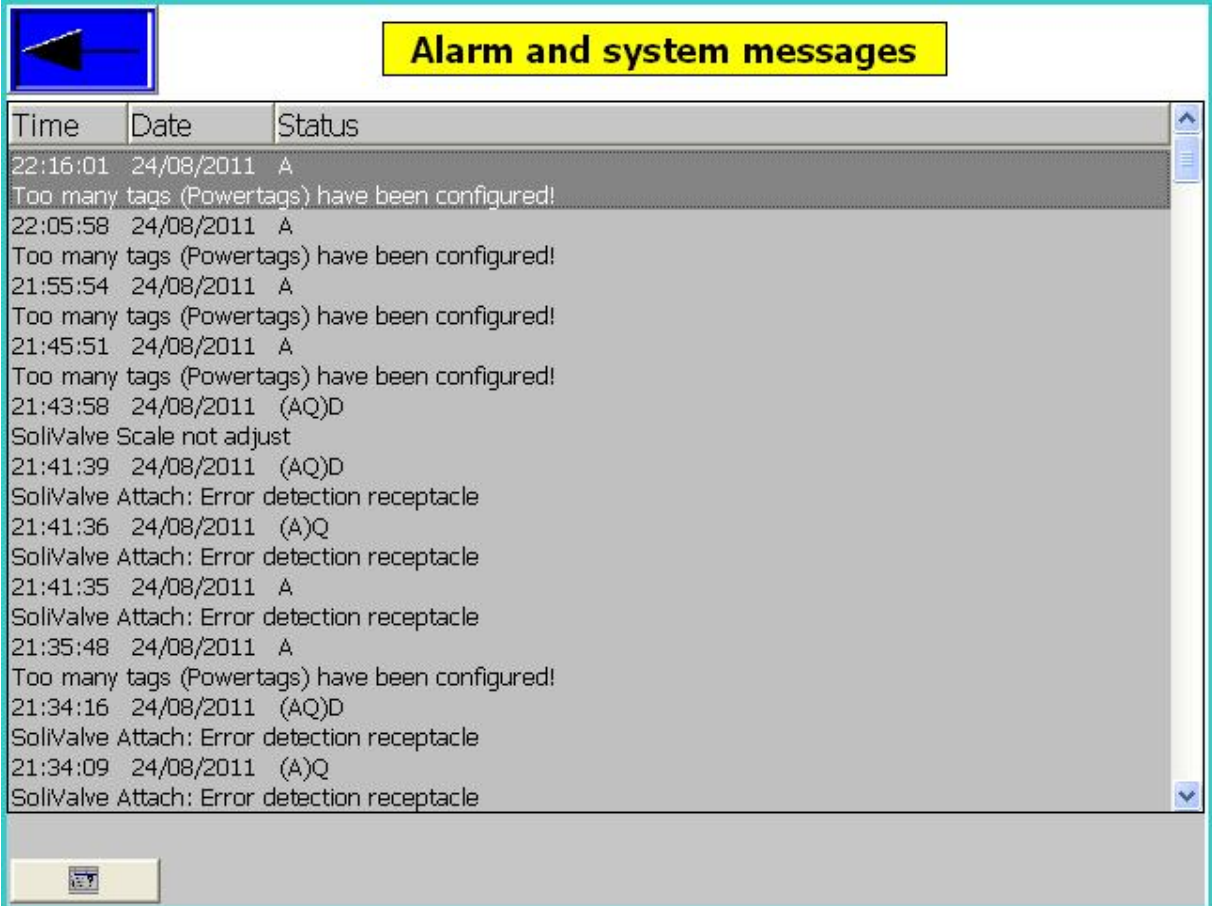
02/05/2013 12:16:15

4.9 Alarm and System Messages

In this window, the log file of the alarm and system messages is displayed.

Status of the alarm messages:

- A = Alarm message arrived
- (A)Q = Alarm message acknowledged
- (AQ)D = Alarm message deleted



The screenshot shows a window titled "Alarm and system messages" with a yellow header bar. Below the header is a table with three columns: "Time", "Date", and "Status". The table contains the following entries:

Time	Date	Status
22:16:01	24/08/2011	A
Too many tags (Powertags) have been configured!		
22:05:58	24/08/2011	A
Too many tags (Powertags) have been configured!		
21:55:54	24/08/2011	A
Too many tags (Powertags) have been configured!		
21:45:51	24/08/2011	A
Too many tags (Powertags) have been configured!		
21:43:58	24/08/2011	(AQ)D
SoliValve Scale not adjust		
21:41:39	24/08/2011	(AQ)D
SoliValve Attach: Error detection receptacle		
21:41:36	24/08/2011	(A)Q
SoliValve Attach: Error detection receptacle		
21:41:35	24/08/2011	A
SoliValve Attach: Error detection receptacle		
21:35:48	24/08/2011	A
Too many tags (Powertags) have been configured!		
21:34:16	24/08/2011	(AQ)D
SoliValve Attach: Error detection receptacle		
21:34:09	24/08/2011	(A)Q
SoliValve Attach: Error detection receptacle		

4.10 Installation options

This window is only accessible on Supervisor level and allows to activate/disactivate different additional functions of the Active SoliValve® system. This allows especially to continue or terminate an ongoing production cycle in case of external faults or communication dysfunctions. For example, in case of a missing signal from an external device, "Ext. Clearance" can be disabled in order to terminate the ongoing operation.

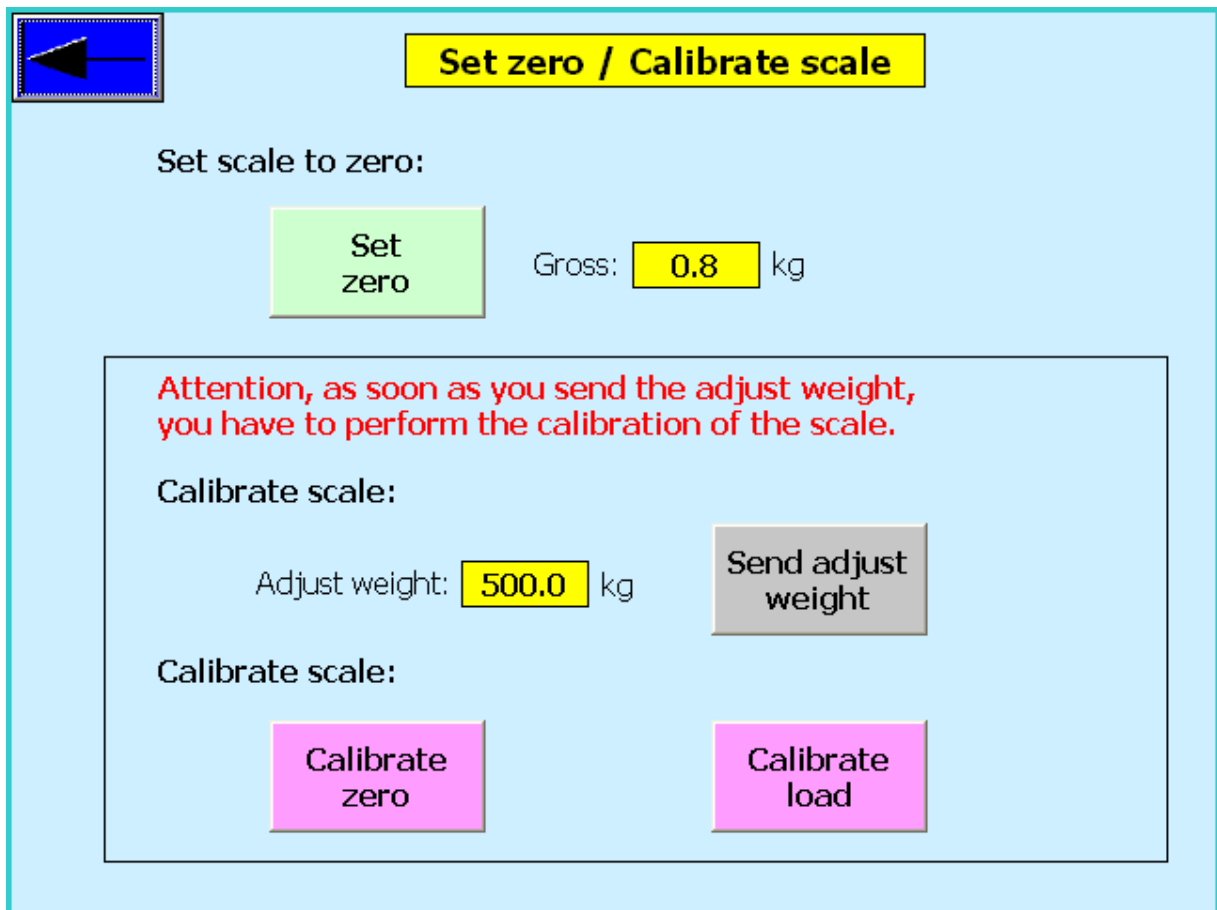
Installation options			
Autom. docking	Enabled	Flushing	Disabled
Ext. dedusting	Disabled	Check dosing tare	Disabled
Evacuation	Disabled	Bridgebreaker	Disabled
Evac. feedback	Disabled	Communication ME001	Enabled
Ext. clearance	Enabled		
Lift adjustment	Enabled	WIP hood	Enabled
Fluidisation	Enabled	WIP hood control	Disabled
Vibrator	Enabled	Protection hood	Enabled
(F)IBC detection	Enabled	Dosing	Disabled
Filling unit	Disabled	Negativ dosing	Disabled

Parameter	Description
Autom. docking	This function is Enabled by default and allow the automatic transition from the "Attach IBC" to the "Docking" operation (see Activity-Diagram) without operator interference. If this function is Disabled, then the operator needs to acknowledge it manually for any docking- and undocking operation (see the Help-button on the main window).
Ext. dedusting	Defines if the SoliValve® system requires external dedusting at critical points during the filling or discharging operation, e.g. to improve containment levels on the Active and Passive SoliValves®.
Evacuation	Defines if the SoliValve® system keeps the cone valve open after a filling or discharging operation and requests external dedusting in order to evacuate the

	remaining air inside the IBC.
Evac. Feedback	If this function is Enabled, the SoliValve® system performs an evacuation operation only if an external clearance from an supervision system (or similar) is available.
Ext. Clearance	If this function is Enabled, the SoliValve® system performs a filling or discharging operation only if an external clearance from an supervision system (or similar) is available. It is not possible for the Operator to manually override this safety function.
Flushing (Purging)	Defines if the SoliValve system request the flushing/purging of the IBC with nitrogen prior to each filling or discharging operation.
Communication ME001	If this function is Enabled, the SoliValve® system remains idle until the SCADA system sends a request signal.

5. Scale or Load cells

5.1 Calibration



Set zero

Press the button "Set zero" to set the weight of scale/load cells at zero (Maintenance password level)

Before performed this operation, check that nothing is placed on the scale / weighing U frame.
The maximum deviation accepted to set the scale at zero is $\pm 300.0\text{kg}$.

Calibration

On this screen you can introduce the adjust weight which you will use to calibrate the scale/load cells. When the adjusted weight is introduced and confirmed with the Enter key, you can send this value by pressing the button "Send adjust weight" to the Siwarex module.

Before performing this operation, check that the scale / weighing frame is empty and free.

Remark:

As soon as you have sent the adjust weight to the Siwarex module, you have to perform the calibration (see the following explanations).

Calibration steps:

1. Check that nothing is placed on the scale/frame
2. Check that the scale/frame is free (no external influence)
3. Introduce and send the adjust weight (see above)
4. Check that the gross weight has changed (*if not: wait 5s and send again the adjust weight*)
5. Calibrate the zero by pressing the button "Calibrate zero"
6. Check that the value of the gross weight is 0,0kg (*if not: wait 5s and press again the button Calibrate zero*)
7. Place the adjust weight on the scale/frame
8. Calibrate the load by pressing the button "Calibrate load"
9. Check that the gross weight correspond to the adjust weight (*if not: wait 5s and press again the button Calibrate load*)
10. Remove the adjust weight from the scale/frame
11. Load and unload the scale/frame to check if the assembly works correctly

6. Alarm messages

Alarm messages indicate an equipment failure.

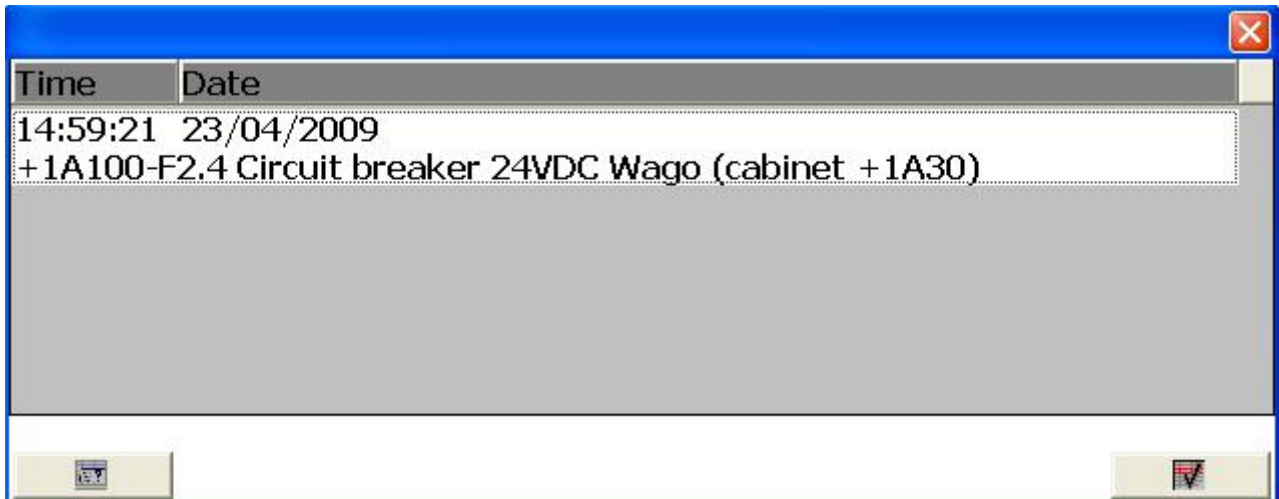


Figure 5: Alarm messages screen

6.2 Acknowledge alarm message

Due to their critical nature, alarm messages have to be acknowledged.



After reading the alarm message, the operator acknowledges the first time with the function key on the alarm window .



The operator has to acknowledge a second time for the PLC with the function key "ACK"

6.3 Lamp "Alarm" and message indicator



The lamp "Alarm" on the cabinet and the message indicator on the MP277 flashes when a new alarm occurs.

After the alarm messages have been acknowledged, the lamp "Alarm" and the message indicator change from flashing to permanently on.

Only when all the alarm messages have disappeared, the lamp "Alarm" turn off and the message indicator disappeared.

The number written on the message indicator indicates the actual total of alarms.



By pressing the message indicator you can read the present alarm messages.

6.4 List of alarms

6.4.1 List of general alarms

Alarm message	Cause	Remedy
+1A10-F2.4 Circuit breaker 24VDC In/Output	The circuit breaker is OFF	<ul style="list-style-type: none"> - Check the electrical wiring - Rearm the circuit breaker in the main electrical panel.
SoliValve Error asynchron Scale	Hardware errors which can be detected by the module	Check the electrical wiring
SoliValve Error synchron Scale	Plausibility errors which occur when parameters and pre-specified values are transferred	Switch off the power of the main panel to reset the Siwax module.
SoliValve Scale not adjust	The scale is not calibrated	Calibrate the scale (See chapter Calibrate scale)
+1A10-K5.4 Profibus Wago slave not present (addr:10)	<ul style="list-style-type: none"> - The electrical power is missing on the Wago I/O system - The Profibus is not connected on the Wago I/O system 	<ul style="list-style-type: none"> - Check the power supply 24VDC - Check if the profibus connectors - Check the status of the LEDs on the Wago coupler
+1A10-K5.4 Profibus Wago slave error (addr:10)	<ul style="list-style-type: none"> - Module of the Wago I/O system sends an error - The hardware doesn't correspond to the hardware configuration. 	<ul style="list-style-type: none"> - Check the modules of the Wago I/O system - Check the status of the LEDs on the Wago coupler
Missing communication with ME001	The communication with ME001 is missing	<ul style="list-style-type: none"> - Check if the Ethernet cable is correctly plug - Check the communication

6.4.2 List of attach alarms

Alarm message	Cause	Remedy
SoliValve Attach: Error detection IBC	<ul style="list-style-type: none"> - The two sensors on the SoliValve are not tight - An IBC or the WIP hood is placed on the SoliValve 	<ul style="list-style-type: none"> - Retry the operation and move the two sensors to clean the seat of the sensors - If an IBC is placed on the SoliValve, remove it or press the button "Continue" - Check the electrical and pneumatical connections on the SoliValve
SoliValve Attach: Error vacuum line blocked	<ul style="list-style-type: none"> - Vacuum hole of the SoliValve is blocked - Vacuum filter in the SoliValve is blocked 	<ul style="list-style-type: none"> - Retry the operation by pressed "Retry" - Clean vacuum hole with needle
SoliValve Attach: Error IBC not clamped	<ul style="list-style-type: none"> - The locks of the SoliValve are not closed - The air pressure is too low 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Cancel the operation by pressing the button "Cancel" and restart the attach procedure - Check the air pressure in the panel +1A10 - Try to attach an other IBC - Check the dimensions of the passive valve of the IBC - Check the electrical and pneumatical connections on the SoliValve
SoliValve Attach: Error IBC wrong clamped	<ul style="list-style-type: none"> - The IBC is not clamped correctly - The IBC passive valve is not flat - The IBC moved when the locks have closed 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Cancel the operation by pressing the button "Cancel" and restart the attach procedure - Try to attach an other IBC - Check the dimensions of the passive valve of the IBC

6.4.3 List of docking alarms

Alarm message	Cause	Remedy
SoliValve Docking: Error cone not clamped	<ul style="list-style-type: none"> - The air pressure is too low - There is an issue in the SoliValve 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" or continue to the next operation by pressing the button "Continue" - Check the air pressure in the panel +1A10 - Cancel the operation by pressing the button "Cancel" - Check the electrical and pneumatical connections on the SoliValve - if the alarm appears again call the maintenance person Test only for the maintenance person: - active manually the valve -EV06.1 in the panel +1A10 - check if the input E10.0 switches ON - enactive manually the valve -EV06.1 in the panel +1A10
SoliValve Docking: Error cone not vacuumed	<ul style="list-style-type: none"> - The air pressure is too low - There is an issue in the SoliValve - There is an issue in the electro-pneumatical panel +1A10 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Check the air pressure in the panel +1A10 - Cancel the operation by pressing the button "Cancel" - Check the electrical and pneumatical connections on the SoliValve - if the alarm appears again call the maintenance person Test only for the maintenance person: - active manually the valve -EV08.1 in the panel +1A10 - check if the input E10.1 switches ON - check the vacuum values - enactive manually the valve -EV08.1 in the panel +1A10
SoliValve: Error lift adjustment	<ul style="list-style-type: none"> - The air pressure is too low - There is an issue in the SoliValve - There is an issue in the electro-pneumatical panel +1A10 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Check the air pressure in the panel +1A10 - Cancel the operation by pressing the button "Cancel" - Check the electrical and pneumatical connections on the SoliValve Test only for the maintenance person: - active manually the valve -EV17.1 or -EV18.1 in the panel +1A10 - check if there are impulses on the input E11.0 - enactive manually the valve valve -EV17.1 and -EV18.1 in the panel +1A10

6.4.4 List of discharge or dosing alarms

Alarm message	Cause	Remedy
SoliValve Discharge: Error fluidisation seal leakage	<ul style="list-style-type: none"> - The air pressure is too low - The fluidisation seal is not correctly in place - The fluidisation seal is damage and not tight anymore - There is an issue in the electro-pneumatical panel +1A10 - There is an issue in the SoliValve 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Check the air pressure in the panel +1A10 - Cancel the operation by pressing the button "Cancel" - Check the fluidisation seal - Check the electrical and pneumatical connections on the SoliValve - if the alarm appears again call the maintenance person <p>Test only for the maintenance person:</p> <ul style="list-style-type: none"> - active manually the valve -EV04.1 in the panel +1A10 - check if the input E10.5 switches ON - check the pressure value - enactive manually the valve -EV04.1 in the panel +1A10
SoliValve Discharge: Error SoliValve not open	<ul style="list-style-type: none"> - The cone of the IBC is stuck - The material makes a too high pressure on the cone of the IBC - The air pressure is too low - There is an issue in the electro-pneumatical panel +1A10 - There is an issue in the SoliValve 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Check the air pressure in the panel +1A10 - Cancel the operation by pressing the button "Cancel" - Try to attach an other IBC - Check the electrical and pneumatical connections on the SoliValve
SoliValve: Error lift adjustment	<ul style="list-style-type: none"> - The air pressure is too low - There is an issue in the SoliValve - There is an issue in the electro-pneumatical panel +1A10 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Check the air pressure in the panel +1A10 - Cancel the operation by pressing the button "Cancel" - Check the electrical and pneumatical connections on the SoliValve <p>Test only for the maintenance person:</p> <ul style="list-style-type: none"> - active manually the valve -EV17.1 or -EV18.1 in the panel +1A10 - check if there are impulses on the input E11.0 - enactive manually the valve valve -EV17.1 and -EV18.1 in the panel +1A10

6.4.5 List of undock alarms

Alarm message	Cause	Remedy
SoliValve Undocking: Error cone clamping sensor still ON	- There is an issue in the electro-pneumatical panel +1A10	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Continue to the next operation by pressing the button "Continue" - if the alarm appears again call the maintenance person Test only for the maintenance person: - Check the adjustment in the panel +1A10 - active manually the valve -EV06.1 in the panel +1A10 - check if the input E10.0 switches ON - enactive manually the valve -EV06.1 in the panel +1A10 - check if the input E10.0 switches OFF
SoliValve Undocking: Error cone vacuumization sensor still ON	- There is an issue in the electro-pneumatical panel +1A10	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Continue to the next operation by pressing the button "Continue" - if the alarm appears again call the maintenance person Test only for the maintenance person: - Check the adjustment in the panel +1A10 - active manually the valve -EV08.1 in the panel +1A10 - check if the input E10.1 switches ON - check the vacuum values - enactive manually the valve -EV08.1 in the panel +1A10 - check if the input E10.1 switches OFF
SoliValve: Error lift adjustment	<ul style="list-style-type: none"> - The air pressure is too low - There is an issue in the SoliValve - There is an issue in the electro-pneumatical panel +1A10 	<ul style="list-style-type: none"> - Retry the operation by pressing the button "Retry" - Check the air pressure in the panel +1A10 - Cancel the operation by pressing the button "Cancel" - Check the electrical and pneumatical connections on the SoliValve Test only for the maintenance person: - active manually the valve -EV17.1 or -EV18.1 in the panel +1A10 - check if there are impulses on the input E11.0 - enactive manually the valve valve -EV17.1 and -EV18.1 in the panel +1A10

6.4.6 List of remove alarms

Alarm message	Cause	Remedy
SoliValve Remove: Error Locks not open	- The air pressure is too low	<ul style="list-style-type: none">- Retry the operation by pressing the button "Retry"- Check the air pressure in the panel +1A10- Press "Retry" and try to help to unlock by turning the bottom of the Big Bag- Press "Retry" and try to help to unlock with an adjustable key- Check the electrical and pneumatical connections on the SoliValve

7. Interface with external systems

7.1 Interface with K-Tron

Integration with K-Tron PTS via Discrete I/O for conveying of powder to K-Tron PTS whenever requested.

7.2 Interface with Melt Extruder

Integration with Melt Extruder via Industrial Ethernet for status monitoring of docking station. Additionally, in automatic mode, Visval will send an empty message to Melt Extruder PLC when the IBC has reached the empty weight limit.

This is applicable if 'Communication with ME001' is enabled.