CLARA 80

High-performance clarification system
for wine, coffee, tea, fruit juice and other beverages.

Operator manual

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Contents

1 Introduction

Important! Read the "Safety Information" before you put the separation module into service!

Important! All aqueous liquids must be drained off carefully from all parts of the system if there is risk for freezing!

1.1 Scope of this book

These Installation and Operating Instructions are designed as a key to the separation module Clara 80.
Here you will find:

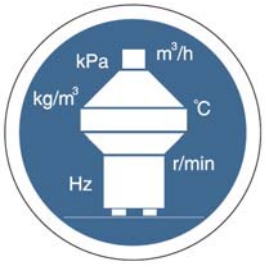
- a **description** of the entire system including **flow chart, operator communication and alarm handling**
- **operating routine** which is organized according to the system's different operating conditions and can be used as running instruction directly at the machine
- **parameter tables** and other comprehensive **system information**
- general aspects on **safety, transport and installation**

The Operating Instructions should enable you to run the system safely and efficiently, and help you to manage faults.
The Operation Instructions cover two slightly different separator types, which are clarifiers with belt drive and timer controlled discharge:

- Clara 80 with product outlet paring disk.
- Clara 80S with hermetic seal above the product outlet paring disk.

If not especially mentioned in the instructions, the operation of the two machine types is identical.

For general information about the separator, please consult the Instruction book for the machine.



Note: We assume that you ask your Alfa Laval representative to install and start-up the separation system, if you are in any way uncertain how to do that. The Alfa Laval service engineer will also provide training of your personnel concerning operation and regular maintenance.

This system is designed for the duty specified by the 'Instruction Book' of the corresponding separator.
This system must NOT be used for any other duty!
This system must NOT be used in potentially explosive atmospheres!

1.2 Safety information

In **addition** to the safety instructions stated in the 'Instruction Book' of the corresponding separator, the following safety instructions apply:

- Ensure power is off before installation, inspection, assembling and disassembling.
- Follow local regulations for electrical installation and grounding.
- All electrical installation work must be done by authorized personnel.
- Never work on electrical equipment with the main power supply on.
- Connect modules and units to earth in accordance with local regulations and if suitable.

- For inspection and maintenance of the separator or any other component: strictly follow the corresponding technical documentation.

- Ensure all lines (product, air, and water) are de-pressurized and emptied before installation, inspection, assembling and disassembling.
- Never work on mechanical equipment such as valves or pumps with the electric power or instrument air supply on.

- If the local safety regulations prescribe that the installation has to be inspected and approved by responsible authorities before the separation system is put into service, consult with such authorities before installing the equipment and have the projected installation approved by them.

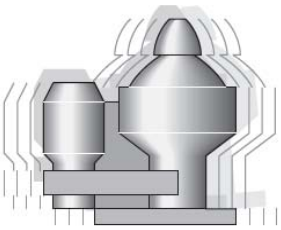
- Parts of the equipment coming in contact with hot process liquid can cause grave burns if touched. Be careful when working near pipes, valves and the separator.

- For lifting and installation of the system, follow the instructions in this manual (appendix A).
- For lifting and installation of the separator, please see the instructions in the documentation of the corresponding separator.

- When installing, assembling, disassembling and inspecting the machine, following protection must be worn: safety shoes, safety glasses, safety hand gloves.
- When operating the machine, following protection must be worn: safety shoes, safety glasses, ear protection.

- Liquids or vapors may emerge from ventilation outlets of the separation system. Install the outlets in such a way that personnel or environment could not be harmed. Make sure that the outlets are not blocked and that the condensate can drain away.

- Sharp edges can cause cuts.



- If the separator begins to vibrate excessively during operation, stop it immediately by pushing the emergency stop button. Evacuate the room. The separator should be stopped with flow through the process lines. This to ensure better balance of the bowl in case of uneven solids built-up. Valve V340-1 should be opened, but only if this can be done in a quick and safe way.

- The separator my be hazardous when passing its critical speeds during the run-down.
- After a safety stop the cause of the fault must be identified. If all parts have been checked and the cause remains unclear, contact Alfa Laval for advice.
- Do not discharge an excessive vibrating separator. Out-of-balance vibration can become worse if only part of the sediment is discharged. Proceed as described above.

- NEVER operate a separator unless it is properly mounted
- NEVER neglect an alarm. Find out what caused the alarm and remedy it before the alarm is reset.

- Before introducing the process liquid, check that the discharge interval time is set at a suitable rate and the discharge volume, if adjustable, is set at a suitable size.
- Operating time between discharges has a maximum limit determined by the compacting of the solids and a minimum limit for mechanical reasons or motor overload.

- ALWAYS stop the separator with the bowl full of liquid.

- NEVER feed any liquid to a stationary bowl.

1.3 System description

The flow chart (see appendix C) shows the separation system which is designed for clarification of beverages.

The system consists of the following main parts:

Separator

The separator is a high speed separator with a solids discharge mechanism, discharging a part of the bowl content at certain intervals from the periphery of the bowl through the solids outlet.
The separator has a feed inlet and a clarified liquid outlet.
The separator has an inlet for discharge and bowl closing (operating) water and an inlet for flushing/sealing water. There is also an outlet to drain.
The separator is equipped with speed sensor and vibration sensor (option).

Process and service liquid components

The process liquid components are used for flow control through the separator. There is a process liquid inlet (201) with an automatic feed valve and an optional feed pump.
There is also an outlet for the clarified liquid (220). The product flow rate is supervised.

The service liquid components supply water for operating, sealing/cooling (80S-machine) and flushing (80-machine) of the separator. A water pump **(P300-2)** ensures sufficient water pressure in the lines to the separator.

The solids coming from the solids outlet of the separator can be handled by a solids pump, which is available as an option.

Electric system

The electric system consists of the control/starter unit with frequency converter for the separator motor.
The EPC 60 control unit controls and supervises the complete system and gives alarms and actions if anything goes wrong.

The supervision includes the following:

- Separator motor and VFD
- Vibration level (option)
- Product flow
- Water pump
- Feed and solids pumps (option)
- Separator bowl speed
- Discharge performance

The operator communicates with the separation system through pushbuttons, messages and indicators on the control equipment. The control program has been divided into different well defined operation modes (e.g. STAND BY, PRODUCTION or CLEANING).

See chapter	**for a description of**
2	control system and operator interface
3	alarm handling
4	operating conditions
5	operating routine

See also appendix D for a description of process and instrument components in the flow chart.

2 The control equipment

In the following sections the operator interface and the control and supervision functions of the system are described.

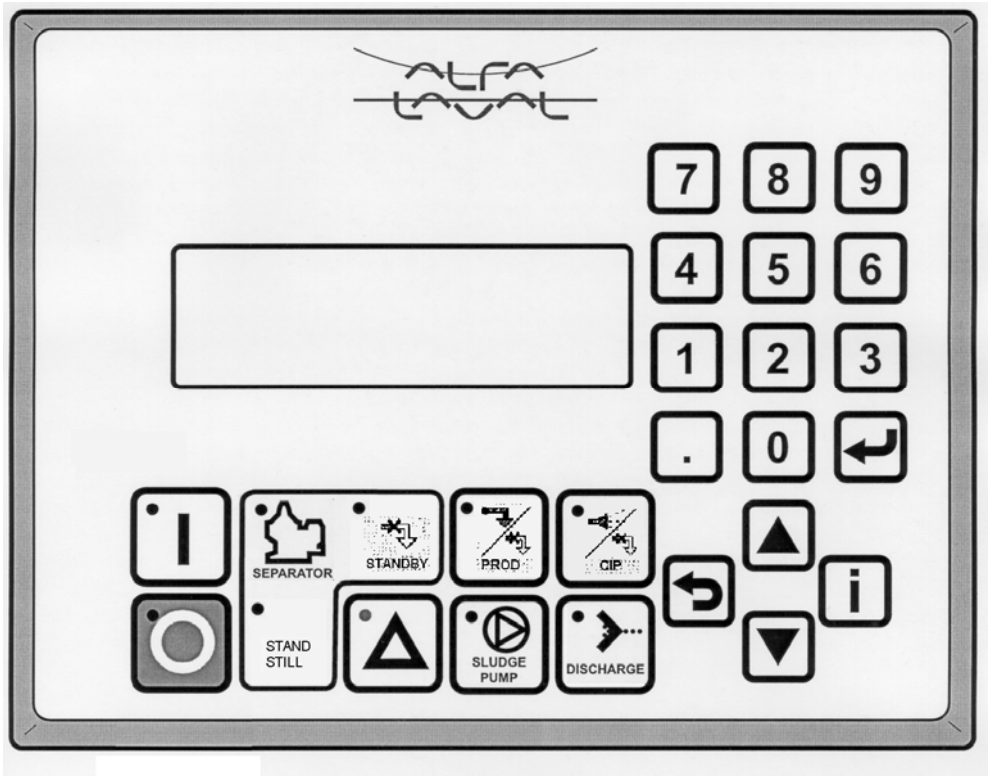
2.1 The control/starter unit

The control/starter cabinet contains the PLC, relays, circuit breakers, contactors for pumps and separator motor, and the VFD.

The control panel contains the main switch, an emergency stop button and the EPC 60 operator panel.

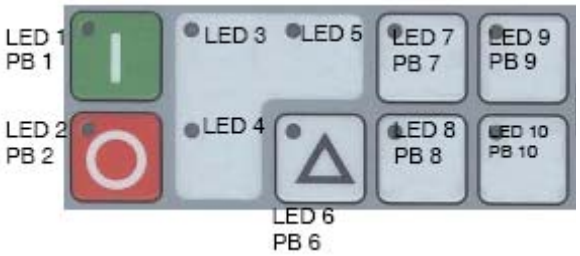
2.1.1 The operator panel

The EPC 60 operator panel is shown in the following figure:



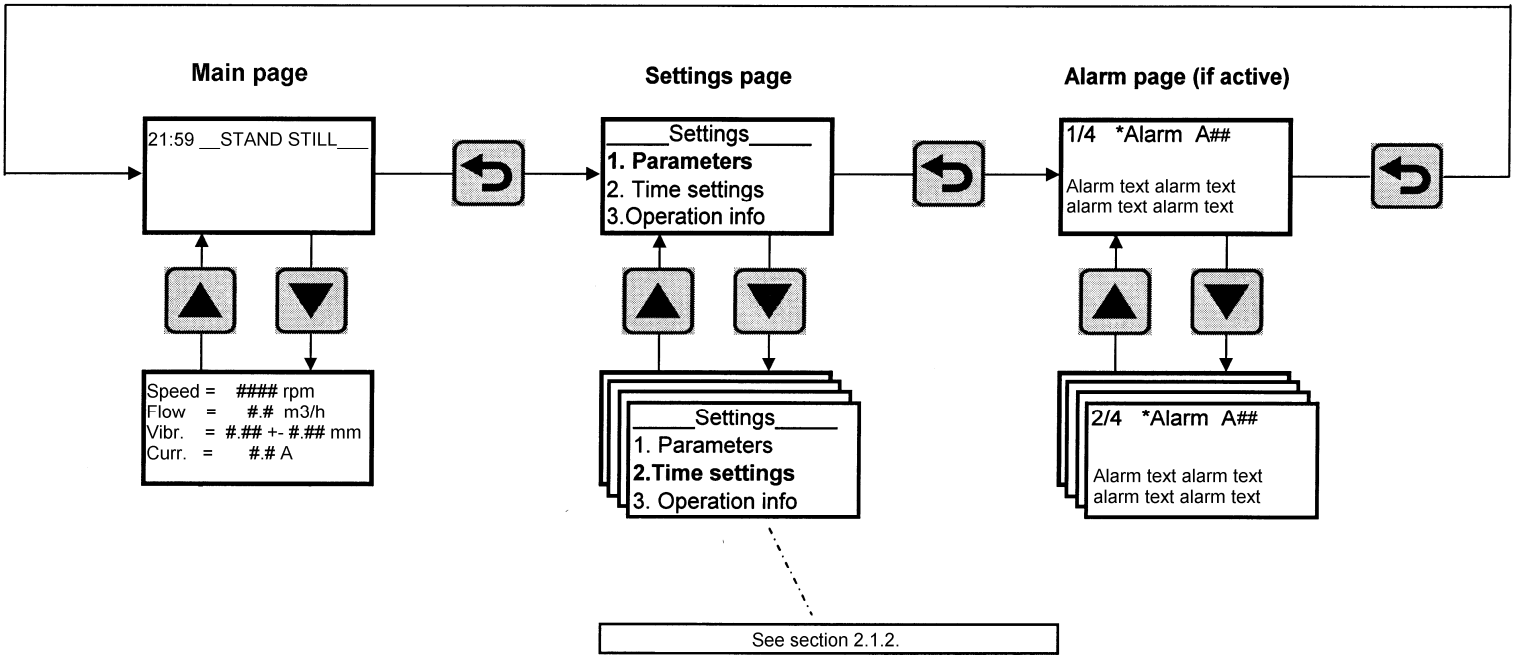
The operator panel consists of:

- Alfanumeric display and numeric keyboard with <enter> button
- four special keys <arrow up>, <arrow down>, <escape> and <information>



- Ten information Led's and seven function buttons
  upper row from left: Start, separator motor running indication, Standby indication, Production/Standby toggle, Cleaning/Standby toggle
  lower row from left: Stop, Stand still indication, Alarm, Sludge pump, Discharge

Scroll between three different pages using the <escape> key:



Main page

The main page, together with the function buttons and LED indicators, is used for **process control**. This page is automatically reached after power on. Scroll between operation info and process values using the arrow keys. See chapter 4. and 5. for detailed information about display and use of function buttons for different operation modes.

Settings page

Nine different **menus** are available. Scroll with the arrow keys, and enter the selected menu, which is flashing, with the <enter> key of the numeric keyboard.
See section 2.1.2. For a detailed description of the settings menus.

Alarm page

This page contains information about any **active alarms** in the system. The list of active alarms can be scrolled using the arrow keys. See chapter 3. for detailed information about alarm handling and the supervised functions in the system.
Note: The alarm history is found. "in menu 5 alarm history

2.1.2 Settings menus

Nine different menus are available on the settings page:

1 Parameters
2 Time settings
3 Operation info
4 I/O test
5 Alarm History
6 Disch History
7 System info
8 IP Settings
9 Password/Login

Select using the arrow keys, and enter using the <enter> key.

Parameters

On entering **1 Parameters**, a list of available parameters (depends on password level) is displayed.
One parameter/row: P### Description
See also the parameter table with all parameters and their protection levels in appendix E. Password handling see below in this section.

Use the arrow keys to select a parameter. Or type the parameter number on the numeric keyboard and press <enter>.

Press the <info> key to see a more detailed description for the selected parameter, if available. After 4 seconds you will return automatically to previous page or exit the information page by pressing the <info> key again.

Press <enter> to view/adjust the settings of the selected parameter.

<u>If the parameter has a numerical value:</u>
P### ##### [unit]
Max: ###
Min: ###
New: ### [unit]

”New” is flashing; type the new value and press <enter>.

<u>If the parameter has different alternatives:</u>
P### <current alt.>

New <first alt.> flashing
Setting <second alt.>

Select with the arrow keys and press <enter>.

Press <escape> to return to the main menu. Changed value become active after pressing <escape>.

Time settings

On entering **2 Time settings**, the following menu appears:

____ SET _ TIME ____
Year: #### Hour: ##
Month: ## Min: ##
Day: #

Adjust the value where the cursor > is located.

Press <enter>  to acknowledge and step to the next input field.

Exit using the <escape>  key.

Operation info

3 Operation info consists of two parts:

1 Timers, counters
2 Reset op info

Select and enter 1 to inspect e.g. the accumulated number of discharges and separator running time, the actual and maximum CPU temperature, or the number of hours which the CPU has been above 65 °C.

Select and enter 2 to reset these timers and counters. This is only possible on password level 2.

Select "Yes" with the arrow keys and press <enter>  .

I/O test

Via this menu, the status of all outputs and inputs in the system can be **inspected** at any time.

The outputs can be activated for testing purposes **in STAND STILL only**, and only on protection level 2.

Step through the list with available outputs and inputs using the arrow keys.

Toggle digital outputs 0/1 with the <enter>  key. If there is a feedback (input) signal available, e.g. for the pumps, it will be displayed together with the output.
The output to the separator motor (running signal) is activated only as long as the <enter>  key is pressed. This function can be used to test the rotation direction of the motor.

The outputs remain in the position as set during the output test, as long as the I/O test menu is active. When the menu is left using the <escape>  key, the system will enter the STOP mode and all outputs are reset to follow the program. STAND STILL is reached when
0 rpm has been detected for 30 seconds.

Alarm History

On entering **5 Alarm History** a ring buffer containing the last 50 alarms with date and times are displayed.
Step through the list using the arrow keys.

Additional information is available pressing the <info>  key for the selected alarm.

Discharge History

On entering **6 Disch History** a ring buffer containing the last 20 discharges with date and time are displayed.
Step through the list using the arrow keys.

x/y Disch-History
<time/date> z
<Reason for discharge>

x = discharge number (1: latest)
y = number of discharges
z = status: OK, Rep. (repeated and OK), Fail (repeated P224 times and still failed)
Reason for discharge: e.g. CIP Manual or Prod Timer

System info

On entering **7 System info** the following information is displayed:

___ SYSTEM INFO ___
Clara 80
Program: 9699 6308 00
Version: ###

Exit using the <escape>  key.

IP Settings

This menu is needed if the PLC is installed in a network and consists of three parts:

1 Current settings
2 Change IP address
3 Change subnet mask

The default settings are:

IP: 192.168.0.1
Mask: 255.255.0.0
Node: 1

Password/Login

On entering **9 Password/Login** the following menu is displayed:

__ Password handling __
1 Login
2 Logout

On delivery, user password and service password are set, please refer to appendix L. The user password corresponds to protection level 1, and the service password corresponds to protection level 2. Protection level 0 means that no password is required.

Access to resp. protection level is given when the operator enters the right password using procedure 1 Login. The password is then valid for 20 minutes, or until procedure 2 Logout is used.

2.1.3 The frequency converter for the separator motor

The frequency converter for the separator motor is located in the control/starter unit. All parameters are at delivery pre-adjusted for the system and **should not be altered**.
A parameter table with adjustments made for this application is found in appendix I.

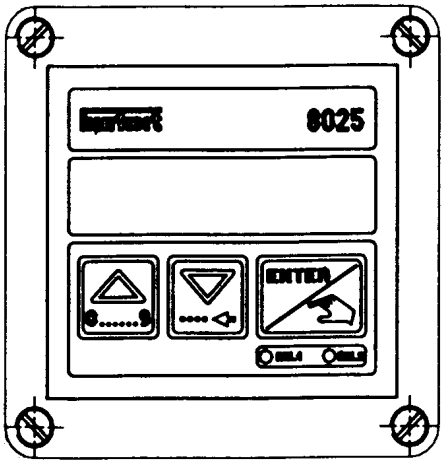
The separate operator panel on the VFD will display actual process values like frequency, motor current etc.

For detailed information, please refer to the user manual for the equipment.

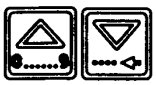
2.2 The flow meter operator panel

Flow meter FIT220-3 in the product outlet has its own operator panel. Some features of the panel are relevant for normal operation and are therefore described below.
For complete details please refer to the instruction manual for the equipment.
A parameter table with adjustments made for this application is found in appendix H.

The operator panel is shown in the following figure:



Pushing the  button repeatedly, the display will show the following process values in normal operation mode:

- actual flow rate in m^3/h
- output signal 4 - 20 mA proportional to the flow according to the selected measuring range
- main totalizer in litres (L) (can be reset in a special procedure, see below)
- daily totalizer in litres. There is a point behind the unit (L.) in order to distinguish it from the main totalizer.
- Reset by simultaneously pressing the  buttons for 2 seconds.

To **reset the main totalizer**, enter the calibration mode:

- Press  and  simultaneously for 5 seconds.
- Push the  button repeatedly until "TOTAL" is displayed.
- Push  , "RES NO" is displayed.
- Change to "RES YES" by pushing the  button.
- Push  repeatedly until the normal operation mode is reached again. **Note:** The daily totalizer will also be reset by this procedure!

3 Alarm management

Certain functions of the separator and its ancillary equipment are supervised by the control system. If one of the system components does not function as assigned an alarm is given and in some cases some action is taken.

New alarm

You are alerted to the alarm by the flashing Alarm LED on the operator panel, and an optical or acoustical signal (if connected, normally supplied by the customer). The reason for the alarm is indicated on the Alarm page. Press the Alarm button to access the page.

Reset of new alarm

This will also reset the new alarm. The Alarm LED is still flashing.

The Alarm page displays the number of active alarms in the system, the alarm code, a description of the selected alarm and its status.
More information may be available using the <info> key.

Step through the list of active alarms using the arrow keys.

Acknowledge the alarm

To acknowledge the alarm press the Alarm button again.
The Alarm LED is steadily lit when all alarms have been acknowledged.
Now the operator is responsible for taking remedial measures against the fault(s).

If the fault persists when the alarm has been acknowledged, the symbol "A" will be displayed behind the alarm code.
In this case search for the reason of the alarm and eliminate the fault. The message disappears automatically when the fault has been corrected.

If the fault has disappeared, the symbol "R" will be displayed behind the alarm code. The message disappears automatically when you acknowledge the alarm.

The Alarm LED will go out when there is no active alarm in the system.

The Alarm page can also be reached pressing the <escape> key.

The Alarm History is accessed via the Settings page, see section 2.1.2.

Start blocking

If a start blocking is active at start attempt, the corresponding alarm showing the reason will be given. Reset new alarm and acknowledge the alarm. Remove the start blocking and then return to STAND STILL by pressing the Stop button.

How to read the alarm action diagram

The control program for the system handles several operation modes where control and supervision functions are well defined (see chapter 4.). Section 3.1., "Alarm action diagram", lists all supervised functions in the system and gives an explanation of the different alarm codes used. Furthermore, for each supervised function the appropriate alarm action in each operation mode is shown. A blank field means no supervision in this mode, "Alarm" means just alarm and no automatic action, the name of a mode like "Stop" or "STB" means the system will issue an alarm and change automatically to that mode, e.g. STOP or STAND BY.

3.1 Alarm activation diagram

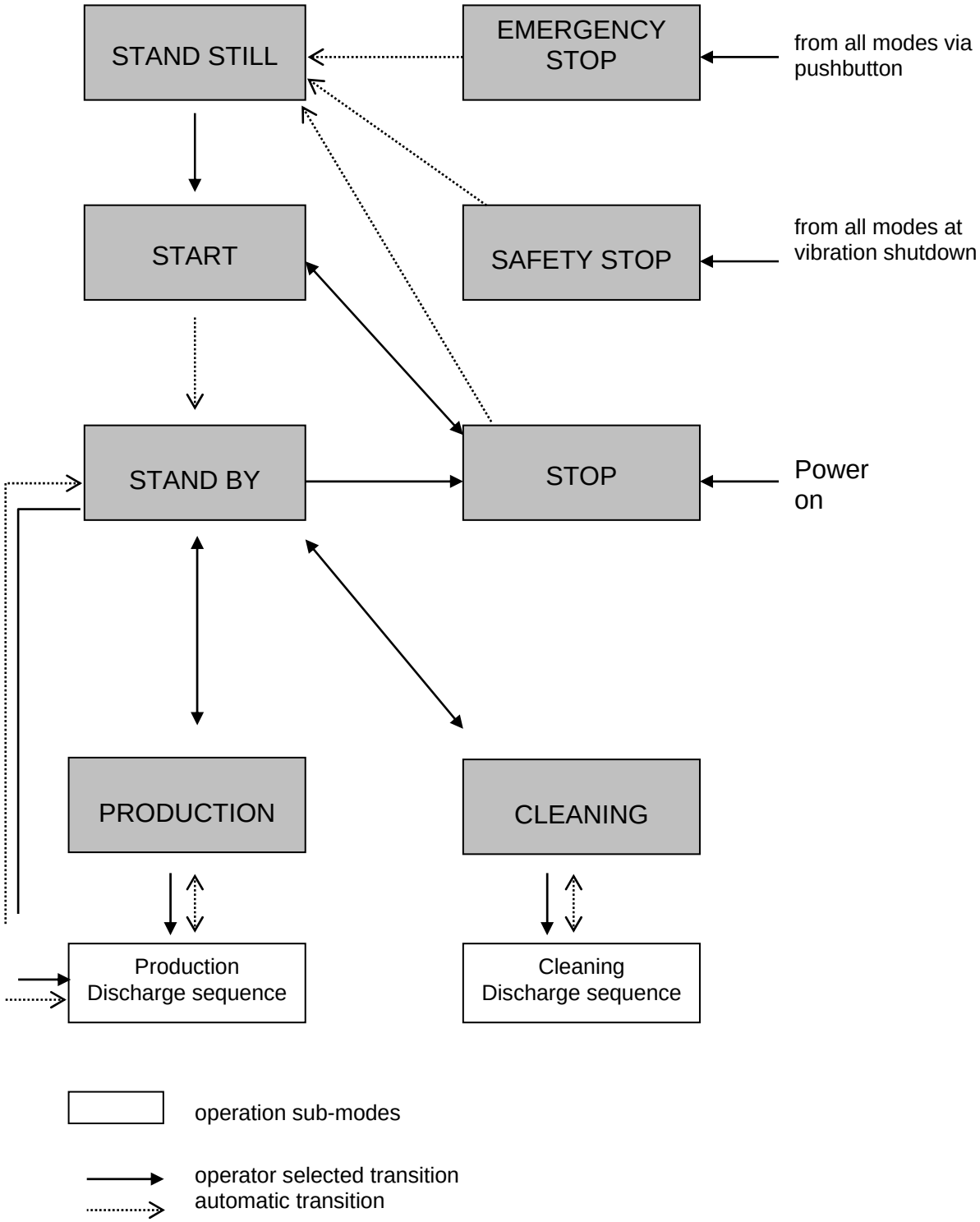
Alarm code	Description	Stand Still	Start	Standby	Produc-tion	Clean.	Stop	Safety stop	E-Stop	Comments
A01	VFD fault	Alarm	Stop	Stop	Stop	Stop	Alarm	Alarm	Alarm	Start blocking. Alarm delayed 5s. VFD reset at alarm reset: 1 pulse with 1s duration.
A02	Overfrequency VFD	Alarm	Stop	Stop	Stop	Stop	Alarm	Alarm	Alarm	Start blocking. Alarm delayed 2s.
A10	Speed system fault	Alarm *	Stop	Stop	Stop	Stop	Alarm *	Alarm *	Alarm *	No pulse during 10 s. If STOP with this fault, stop-timer P200 keeps the system in STOP as long as timer runs (timer stop). * Signal out of range. This alarm is also given if the bowl speed decreases more than 1000 rpm during 5s (supervision interval) under deceleration.
A11	Slow start acceleration		Stop							100 rpm has to be reached within time in P201.
A12	Start time too long		Stop							Full speed (P203) has to be reached within time in P204.
A13	Low speed			Alarm	STB	STB				Bowl speed < P206 for time in P207. Blocked during discharge.
A14	High speed	Alarm	Stop	Stop	Stop	Stop	Alarm	Alarm	Alarm	Start blocking. Limit in P202. Alarm delayed 10s.
A20	Vibration system fault (if P111 = yes)	Alarm	Alarm*	Alarm*	Alarm*	Alarm*	Alarm	Alarm	Alarm	Start blocking. Alarm delayed 3s. Signal out of range (4-20 mA). * This alarm is also given if the vibration signal does not change with at least 0.01 mm for more than 60s within signal range.
A21	Vibration prewarning (if P111 = yes)	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Start blocking. Alarm delayed 3s. Alarm limit in P227. Supervision blocked during discharge and below speed setpoint P226.
A22	Vibration shutdown (if P111 = yes)	Alarm	Sstop	Sstop	Sstop	Sstop	Sstop	Alarm	Alarm	Start blocking. No restart. Alarm delayed 3s. Alarm limit in P228. Supervision blocked during discharge and below speed setpoint P226.
A30	Solids pump fault (if P113 = yes)	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm delayed 5s.
A31	Water pump fault	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm delayed 5s.
A32	Feed pump fault (if P114 = yes)	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm delayed 5s.
A40	Current sensor fault	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm delayed 10s. Signal out of range (4-20 mA).
A41	Unsatisfactory discharge				STB	STB				Number (P224) of automatic discharges before alarm. Alarm limit in P222. Display number of repeat discharges in alarm history.
A42	High motor current				STB	STB				Alarm limit in P223. One discharge before alarm. Delay 3s.
A43	High discharge frequency				STB					Average interval of last 5 discharges is < time in P225 (alarm limit).
A60	Flow sensor fault (FIT220-3)	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm delayed 3s. Signal out of range (4-20 mA). This alarm is also given if the flow signal does not decrease with 5% of P216 at changeover from Prod/Clean to Standby.
A61	Low flowrate (FIT220-3)				STB	STB				No action if "override" ON. Alarm delayed by P219. Alarm limit in P218.
A62	Flow alarm override on	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Selected with P121. Reminder only.

Alarm code	Description	Stand Still	Start	Standby	Produc-tion	Clean.	Stop	Safety stop	E-Stop	Comments
A64	High flowrate				Alarm	Alarm				No action if "override" ON. Alarm delayed by P219. Alarm limit in P217.
A70	Long time in STANDBY			Alarm						Alarm delayed by P220.
A71	Too long time in STANDBY			Stop						Alarm and action delayed by P221.
A72	Timer stop						Alarm	Alarm *	Alarm	If STOP with this fault, stop-timer P200 keeps the system in STOP mode as long as timer runs. No restart. * Feed valve open and feed pump running until P200 has elapsed.
A73	Emergency stop activated	Alarm	EStop	EStop	EStop	EStop	EStop	Alarm	Alarm	Start blocking. No restart. Alarm delayed 2s.
A74	External Prod. trip to Standby				STB					External signal via digital input. Alarm delayed 2s.
A75	Power failure		Alarm	Alarm	Alarm	Alarm	Alarm			Black-out has occurred during operation.
A76	CPU temp too high	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm		Alarm	Reminder only. CPU temperature > 85°C.
A100	I/O module hardware fault	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	Alarm	

4 Description of operating conditions

Note: References underlined in the text refer to detailed descriptions found in section 4.1.

The following main operation modes are defined:



Power On/Stand Still

At **power on** the separation system enters the STOP mode.
The system passes on to STAND STILL when 0 rpm has been detected for 30s. The VFD is reset: 1 pulse with 1s duration.

In STAND STILL all equipment is deactivated, but it is possible to run the solids pump manually, when installed. The pump will be running for the time set in P157 and then stop automatically.

If STAND STILL is reached after STOP coming from PRODUCTION or CLEANING, the solids pump, when installed, is running for 20s.

During STAND STILL certain system functions are supervised (refer to chapter 3, Alarm management).

From STAND STILL it is possible to start the system.
START is only possible if no start blocking is active (refer to chapter 3, Alarm management).

Start

START can be selected from STAND STILL or STOP if no alarms or start blockings are active. STARTING is indicated and the separator motor and the water pump begin to run. Sealing water is supplied if
P110 = yes.

If the speed does not reach 100 rpm within the time set in P201, the system goes to STOP and alarm A11 is given.

If the speed does not reach speed setpoint P203 within the time in P204, alarm A12 is given and the system goes to STOP.

When full speed (P203) has been reached, a start discharge is initiated after a delay (P205). Then the system changes automatically to STANDBY.

It is possible to interrupt the start sequence by selecting STOP.

Stand by

In STAND BY mode the separator is running at full speed. Flushing and discharge water valves are closed. Nothing is fed to the separator.

The time for the system to be in STAND BY is limited by P220. Prewarning alarm A70 is given. After the time in P221 alarm A71 is given and the system enters the STOP mode automatically.

In STAND BY mode it is possible to initiate a discharge sequence manually. For supply of make-up water and sealing water while separator running, see appendix F, Activation diagram.

It is possible to select PRODUCTION, CLEANING or STOP from STANDBY.

Production

PRODUCTION means that the separator is running at full speed and is fed with product from the process inlet line. The feed pump is running, the feed valve is open. The clarified product leaves the separator through the product outlet. The discharge interval (P150) is counted down.

The discharge sequence can be initiated automatically (interval timer), manually or via a digital input.

PRODUCTION is terminated by selecting STANDBY. The transition to STANDBY can include a number of discharges, select with P158. All discharge settings and counters are reset.

Alarm A71, low flow rate is given after the time in P219 when flow is below P218. The system enters the STANDBY mode automatically

Cleaning

CLEANING means that the separator is running at full speed and is fed with cleaning liquid from the process inlet line. The feed pump is running, the feed valve is open. The cleaning liquid leaves the separator through the product outlet. The discharge interval (P151) is counted down.

The discharge sequence can be initiated automatically (interval timer) or manually.

CLEANING is terminated by selecting STANDBY. All discharge settings and counters are reset.

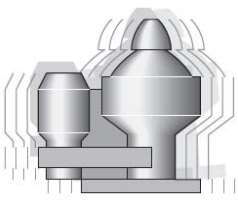
Alarm A71, low flow rate is given after the time in P219 when flow is below P218. The system enters the STANDBY mode automatically

Stop

STOP means that the separator motor is deactivated. Nothing is fed to the separator. The bowl speed is decreasing. Flushing and discharge water valves are closed. Sealing water is supplied if
P110 = yes.
In STOP it is possible to re-start the separator as long as no unacknowledged alarm or start blocking is active. The system it will end up in STAND STILL when 0 rpm has been detected for 30 seconds.

In case of speed system failure (A10) the system is kept in STOP mode as long as P200 is running in order to ensure that the bowl has come to stand still before STAND STILL is indicated. Alarm A72 “Timer stop” is given.

Safety Stop



In case of vibration shutdown (A22, if P111 = yes) the system goes to SAFETY STOP.
The feed valve is open and the feed pump is running until the bowl speed has reached 300 rpm. All other equipment is controlled as in normal STOP mode. Restart is not possible.

After completed Safety-stop-sequence the system will end up in STAND STILL.

Emergency Stop

When you press the EMERGENCY STOP button on the control panel the system goes to EMERGENCY STOP mode. Separator and pump contactors are deactivated. The feed valve is closed. **Restart is not possible**.

After completed Emergency-stop-sequence the system will end up in STAND STILL.

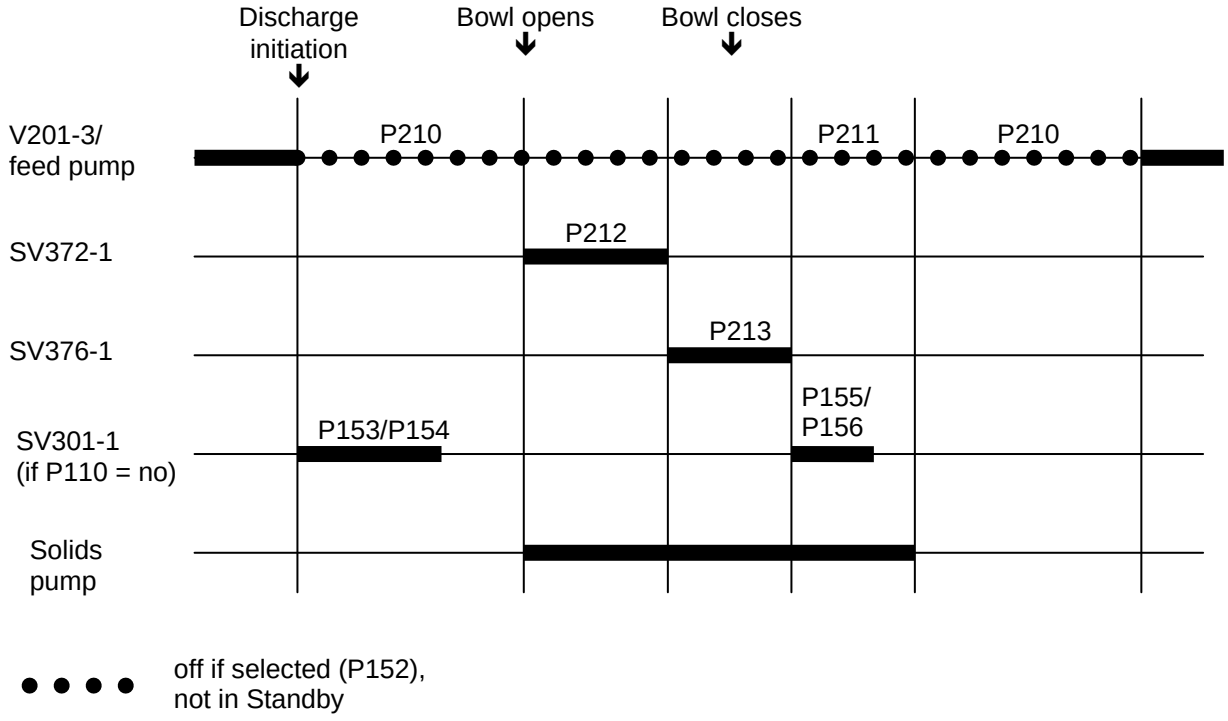
> For default values and detailed descriptions of the above mentioned parameters and timers, please refer to
> **Appendix E, "Parameter table" and Appendix F, "Activation diagram"**.
> Supervised system functions and alarm activations are described in chapter 3.

4.1 Subsequences

Discharge sequence

The discharge sequence can be initiated by:

- discharge interval time in Production (P150) or Cleaning (P151) expired
- pushbutton (manually) in Standby (enabled with P123), Production and Cleaning
- external control equipment (option), via digital input in Production (discharge delayed by P209)



Start discharge

The start discharge sequence is initiated at the end of the start phase when speed setpoint P203 has been reached and P205 has elapsed.

SV372 is activated for the time in P229, and SV376 for the time in P230. Repeat as many times as set in P231.
The solids pump runs all the time. The sequence is not activated at restart.

5 Operating routine

Contents

5.1 POWER ON/STAND STILL

<u>Before you turn on the power:</u> Make sure that the separator is assembled completely (please consult the Instruction book for the machine). Make sure that all electrical and liquid connections are made correctly and that all couplings are tightened.

Before POWER ON:

The wheels are only intended for positioning and moving the system over short distances. When the system is not being moved, it must stand on its 4 supports. These must be adjusted in such a way that the frame is positioned horizontal and that all wheels are elevated between 5 and 30 mm above the floor.

- Open the mains for service water. The self-priming water pump might need some help with priming after longer shutdown/service, if the pressure of the water supply is insufficient.
- Check that the manual brake on the separator is released.

POWER ON

- Set the main switch on the control panel ON.

If alarm A75 is given, just reset and acknowledge the alarm by pressing the Alarm button twice. It is likely that the system has been switched OFF in another condition than STAND STILL. STOP is indicated. Wait until STANDSTILL displayed (you may also start the system from STOP mode).

- Check rotation sense of the service liquid pump. This should be clockwise, seen from above. Activate P300 in the IO-test menu to check and check visual rotation.

5.2 START

- Press the Start button on the operator panel.

The display indicates STARTING and the green Start LED is flashing. The separator motor begins to run and the bowl speed increases.

The system automatically enters the STAND BY mode when the start-sequence is completed. At the end of the start period a number of start discharges are performed.

5.3 STAND BY

In STAND BY mode the separator is running at full speed.
The yellow Standby LED is on.

In STAND BY you can select PRODUCTION or CLEANING by pressing appropriate function button.
You may also change to STOP by pressing the Stop button.

In STAND BY mode you may run a discharge cycle manually (if enabled) by pressing the Discharge button.

NOTE

Note: Make sure that the manual regulating valve V220-5 for the back pressure in the product outlet line is fully open.

5.4 PRODUCTION

- Press the Production button. 

The green Production LED is lit.
This button is a toggle button. Press once for production, when in production mode press again to leave production.

NOTE

PRODUCTION means that the separator is running at full speed and is fed with product from the process line. The feed pump is running, the feed valve is open. The clarified product leaves the separator through the product outlet.

- Adjust the back pressure in the product outlet line with the manual regulating valve. Avoid too high back pressure!

  During PRODUCTION the solids discharge sequence is automatically initiated each time when the preset discharge interval has elapsed.

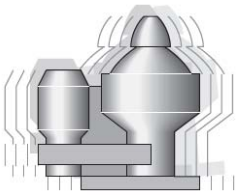
  You may also run a discharge cycle manually by pressing the Discharge button.

  You may also trigger a discharge cycle by using the appropriate digital input. Check electrical drawings in order to use.

- Leave the PRODUCTION mode by pressing the Production button once again. The system returns to STAND BY mode where the Standby LED is lit.

In case of excessive vibrations:

- Press the emergency stop button on the starting panel.
- Leave the area around the machine.



Do not discharge.

At SAFETY STOP the separator should be stopped with flow through the process lines. This to ensure better balance of the bowl in case of uneven solids built-up.

5.5 CLEANING

 Press the CIP button. 
The green CIP LED is lit.

This button is a toggle button. Press once for CIP, when in production mode press again to leave CIP.

CLEANING means that the separator is running at full speed and is fed with cleaning agent from the process line. The feed pump is running, the feed valve is open. The cleaning liquid leaves the separator through the product outlet.

- Release the back pressure in the product outlet line with the manual regulating valve.

During CLEANING the solids discharge sequence is automatically initiated each time when the preset discharge interval has elapsed.

You may also run a discharge cycle manually by pressing the Discharge button.

You may also trigger a discharge cycle by using the appropriate digital input. Check electrical drawings in order to use.

- Leave the CLEANING mode by pressing the CIP button once again. The system returns to STAND BY mode where the Standby LED is lit.

5.6 NORMAL STOP

From STAND BY or START:

- Press the Stop button.

STOP means that the separator motor is off and nothing is fed to the separator. The supervision functions are still activated. The bowl speed is decreasing.

In STOP mode you may re-start the system by pressing the Start button, if no start blocking is active.

If you do not re-start the system, it will end up in STAND STILL when the stop-sequence is completed.

5.7 EMERGENCY STOP

- Press the emergency stop pushbutton on the control panel.
- If possible from safety point of view: Apply the manual brake on the separator.

The separator motor and all other equipment is turned off.

- Wait, until the separator has stopped and danger no longer occurs.
- Reset the emergency stop pushbutton by turning it.

NOTE

It is not possible to re-start the system before STAND STILL mode has been reached.

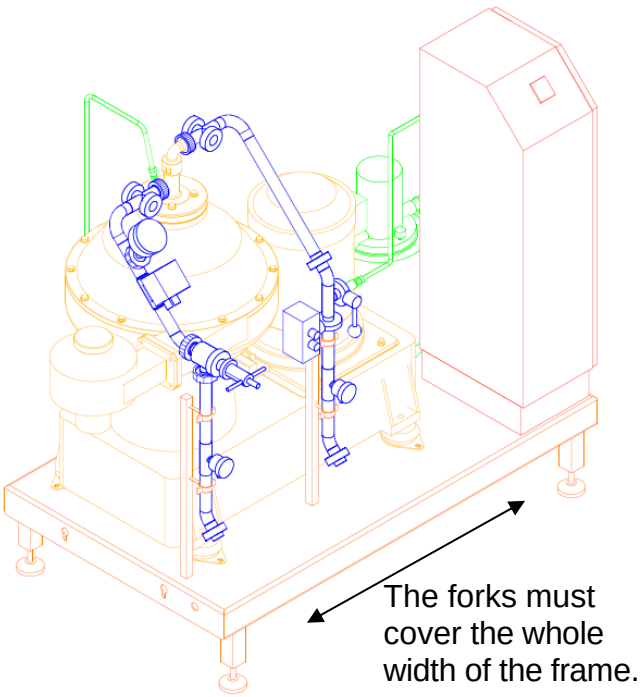
Appendix

Appendix A: Lifting instructions

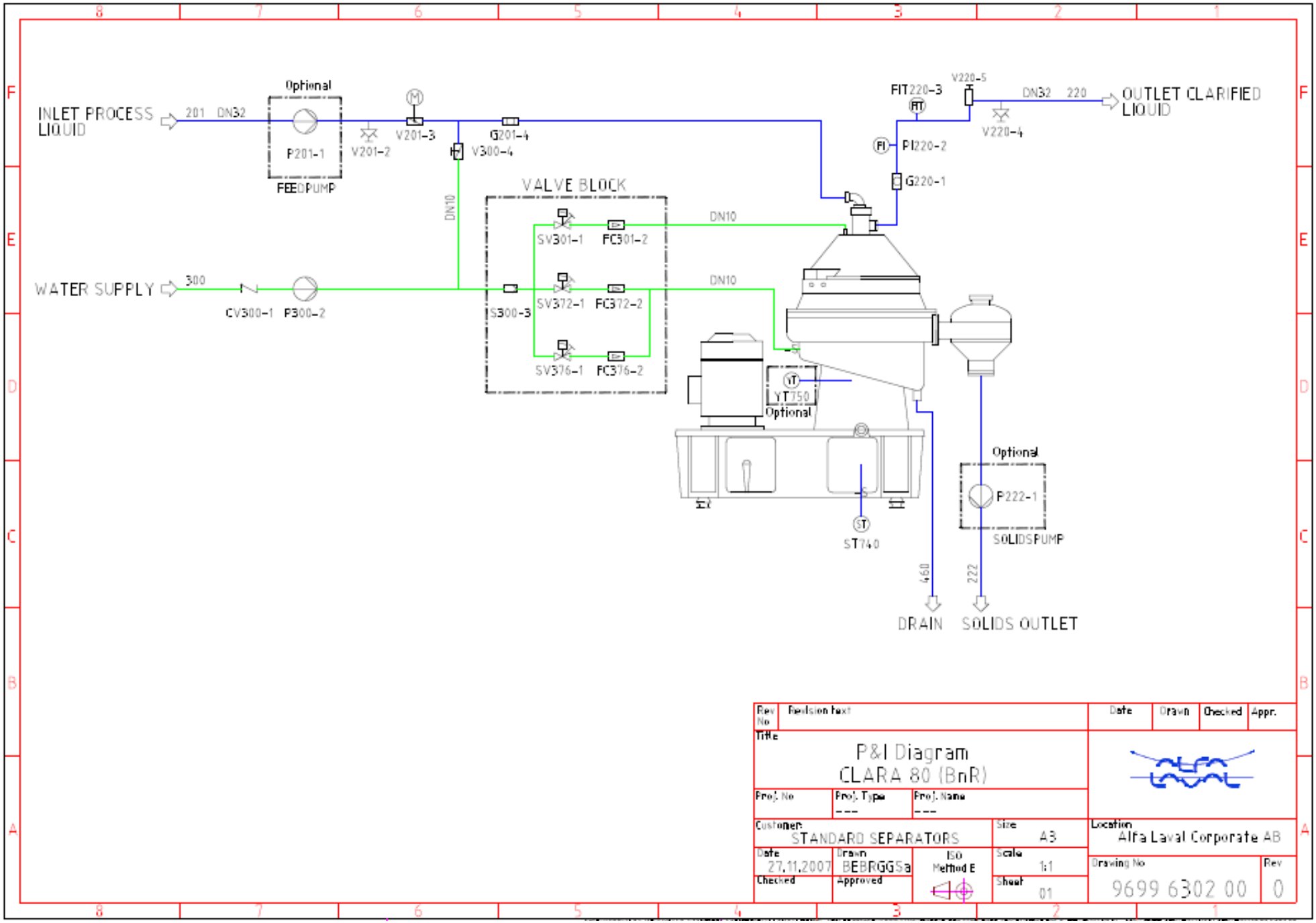
- Always check with an Alfa Laval representative that the installation is properly planned. Things that should be considered are, e. g.: A clear area around the equipment is required for servicing.

- The system must be lifted using a forklift with sufficient load capacity. Weight of the system is about 1200 kg. The forks must have a length of at least 1000 mm. When lifting the system, the forks must be placed as far as possible at the bottom of the frame (see illustration below). The forks must be inserted completely and cover the whole width of the frame (see illustration below). The system must not be lifted in any other way. The operator of the forklift must be trained and certified.

- The wheels are only intended for positioning and moving the system over short distances. When the system is not being moved, it must stand on its 4 supports. These must be adjusted in such a way that the frame is positioned horizontal and that all wheels are elevated between 5 and 30 mm above the floor.



Appendix C: Flow chart and connection list



Connection list Clara 80 / Clara 80 S

For connections to the separator, please see the connection list in the instruction book for the separator.

PROCESS CONNECTIONS		
Connection	**Description**	**Requirements**
201	Inlet process liquid	● allowed temperature: 0 - 100°C ● max allowed density: 1100 kg/m^3 ● flow range: 500 - 8 000 l/h ● pressure: 30 - 200 kPa
220	Outlet clarified liquid	● flow: 500 - 8 000 l/h ● available pressure: 0 - 700 kPa
222	Outlet solids	● volume/discharge: 2.2 litres
300	Water supply	● required pressure: 30 - 300 kPa, ● flow, momentary: 1.5 l/minute ● consumption: 0.8 l/discharge ● max allowed density: 1000 kg/m^3 ● quality requirements: see 553406
460	Drain outlet	● no back pressure allowed

Electrical power supply: 3x380-500V 50/60Hz Min 25A. Max 32A

CONNECTION LIST		Clara 80, Clara 80 S					Document:		
Rev. No:	Date:	Complementary information:	Project:	Dept:	Design:	Appr:	Date:	Page:	Total:
0	13/06/2008	Flowcharts 9699 6302 00	STANDARD	E&S	AHK	AHK	13/06/2008	30	1

Appendix D: Description of process and instrument components

The enclosed flow chart contains valves and instruments of several different types.
The table below gives some comments about their main functions.

Equipment no.	Comments
V201-2 V220-4	Manual sampling valve.
CV300-1	Check valve.
V201-3	Motor valve for feed supply.
FIT220-3	Indicating flow meter.
G201-4 G220-1	Sight glass.
PI220-2	Pressure indicator.
V220-5	Manual regulating valve for product backpressure.
S300-3	Strainer.
P300-2	Water pump.
V300-4	Manual shut-off valve for water supply to the feed line.
SV301-1	Solenoid valve for flushing water (34G-machine) or sealing water (34GS-machine), deactivated = closed.
SV372-1	Solenoid valve for discharge initiation. Deactivated = closed.
SV376-1	Solenoid valve for bowl closing water. Deactivated = closed.
FC301-2 FC372-2 FC376-2	Constant flow valve.
P201-1	Feed pump (option).
P222-1	Solids pump (option).
YT 752	Vibration transmitter (option).
ST 740	Speed transmitter.

Appendix E: Parameter table

You will find instructions for parameter handling in section 2.1.2.

Para-meter	Prot. level	Denomination	Default value	Unit	Min. value	Max. value
P100	0	Display language (English, Italiano, Español, E^^HNIKA, Português, Francais, Deutsch)	English			
P101	2	Reset parameters to default values 0 = no, 1 = yes	0		0	1
P110	1	Hermetic yes/no	no			
P111	1	Vibration sensor installed yes/no	no			
P113	1	Solids pump installed yes/no	no			
P114	1	Feed pump installed yes/no	no			
P120	1	Remote control enabled/disabled	disabled			
P121	1	Flow alarm override on on/off	off			
P123	1	Allow discharge (manual) in STANDBY yes/no	yes			
P150	1	Discharge Interval Time Production	15	min	1	60
P151	1	Discharge Interval Time Cleaning	2	min	1	60
P152	1	Feed during discharge on/off	on			
P153	1	Flush time before discharge Production/ Standby (SV301-1), only if P110 = no	5	s	0	60
P154	1	Flush time before discharge Cleaning (SV301-1), only if P110 = no	5	s	0	60
P155	1	Flush time after discharge Production/ Standby (SV301-1), only if P110 = no	5	s	0	60
P156	1	Flush time after discharge Cleaning (SV301-1), only if P110 = no	5	s	0	60
P157	1	Run time solids pump P222 when manually started	10	s	0	60
P158	1	Transition Discharge when going from Production to Standby.(Stopped by operator)	1		0	2
P200	2	Stop time if speed system fault	30	min	30	60
P201	2	Max. start time to reach 100 rpm	30	s	0	300
P202	2	Max bowl speed	8400	rpm	0	8400
P203	2	Limit for full speed (% of P202)	96	%	0	100
P204	2	Max. start time to reach full speed	12	min	0	20
P205	2	Delay start discharge after P203 % of full speed reached	10	s	0	60
P206	2	Low speed limit (% of P202)	94	%	0	100
P207	2	Low speed alarm delay	45	s	0	120
P208	2	Motor current range	38.4	A	0	100
P209	2	Delay on acceptance of external demand for a discharge, disabled if 0.0	0.2	s	0.0	10.0
P210	2	Open/Closing time V201-3	15	s	0	60
P211	2	Speed Recovery time after Discharge	30	s	0	60
P212	2	Discharge valve open time SV372	0.4	s	0.0	5.0
P213	2	Bowl closing time SV376	2.0	s	0.0	10.0
P214	2	Make up water interval time SV376	15	min	0	60

Para-meter	Prot. level	Denomination	Default value	Unit	Min. value	Max. value
P215	2	Make up water valve open time SV376	2	s	0	10
P216	2	Measuring range FIT220-3	10.0	m3/h	0.0	10.0
P217	2	Max for FIT (in % of P216)	97	%	0	100
P218	2	Low limit flowrate in Production/Cleaning (in % of P216)	10	%	0	100
P219	2	Delay Flow Alarm	20	s	0	120
P220	2	Alarm delay long time in standby	50	min	0	120
P221	2	Alarm delay too long time in standby	60	min	0	120
P222	2	Min motor current increase at discharge	3.0	A	0.0	10.0
P223	2	Max current between discharges	25	A	0	50
P224	2	Number of discharges at unsatisfactory discharge	1		0	5
P225	2	Alarm limit high discharge frequency	70	s	0	120
P226	2	Speed setpoint vibration supervision in start/stop	3000	rpm	0	8400
P227	2	Alarm limit vibration prewarning	0.30	mm	0.00	3.00
P228	2	Alarm limit vibration shutdown	0.60	mm	0.00	3.00
P229	2	Discharge valve open time start discharge	1.0	s	0.0	5.0
P230	2	Bowl closing time start discharge	5.0	s	0.0	10.0
P231	2	Number of start discharges	1		1	4
P240	2	Sensor check: Speed decrease test limit during discharge	75	rpm	0	900
P241	2	Sensor check: Vibration change test limit during discharge	0.03	mm	0	1.00
P242	2	Sensor check: Flow change test limit relative during Prod/CIP	0.01	m^3	0	1.00

* P240 till P242 can be disabled by setting value to 0

Appendix F: Activation diagram

You will find a verbal explanation of this diagram in chapter 4. "Description of operating conditions".

Operation mode	Sep. Motor start/ stop	Feed valve V201-3	Feed pump P201-1 (option, P114=yes)	Solids pump P222-1 (option, P113=yes) c)	Water pump P300-2	Discharge valve SV372-1	Bowl closing water valve SV376-1	Sealing/flush water valve SV301-1 e)
STAND STILL		closed		i)				
START	•	closed		h)	•	h)	h)	f)
STANDBY	•	closed		♦	•	♦	♦ d)	f) g)
PRODUCTION	•	open a)	• b)	♦	•	♦	♦ d)	f) g)
CLEANING	•	open a)	• b)	♦	•	♦	♦ d)	f) g)
STOP	l)	closed			•			f)
SAFETY STOP	l)	open k)	• k)		•			f)
E-STOP		closed						

Operation mode	Rel. output “stand still”	Rel. output “startingl”	Rel. output “standby”	Rel. output “production”	Rel. output “cleaning”	Rel. output “stopping”
STAND STILL	•					
START		•				
STANDBY			•			
PRODUCTION				•		
CLEANING					•	
STOP						•
SAFETY STOP						•
E-STOP						•

- • Equipment activated.
- ♦ Equipment activated during discharge.
- a) Valve open or closed during discharge depending on value in P152.
- b) Pump activated or deactivated during discharge depending on value in P152.
- c) Pump can be started manually via pushbutton on the operator panel. Runtime in P157.
- d) Valve alternately closed during P214 and open during P215, if not in discharge sequence.
- e) Sealing water valve if hermetic machine (P110 = yes),
  flush water valve if non-hermetic machine (P110 = no).
- f) If hermetic machine (P110 = yes), valve open if flow on FIT220-3 outside range
  (<P218, >P217).
- g) If non-hermetic machine (P110 = no), valve activated during discharge.
- h) Equipment activated at start discharge.
- i) Pump running for 20 s if STAND STILL is reached from STOP after any wet full speed mode
  (PRODUCTION or CLEANING).
- k) Close valve and stop feed pump at 300 rpm.
- l) Brake function activated.

Appendix H: Flow meter parameter settings

The following parameters have been adjusted prior to start-up of the separation system. All other parameters have default values, please refer to the flow meter manual.

Parameter		Alternatives	Adjusted value
Language		English, Deutsch, Francais, Italiano	English
Unit	Flow	m3/H, US GAL/S, US GAL/M, US GAL/H, IMP GAL/S, IMP GAL/M, IMP GAL/H, LIT/SEC, LIT/MIN. LIT/H, M3/MIN	m3/H
	Total	M3, US GAL, INMP GAL, LITRE	M3
	DEC	PT 0, 1, 2, 3	2
K-factor	TEACH	NO, Y	NO
	K		49,03
Current	4		00,00
	20		10,00
Pulse	LITRE	M3, US GAL, IMP GAL	M3
	PU		not used
Filter		0 till 9	5
Total	RES	NO, YES	YES to reset the total throughput.
Code		0000	Do not change! You always have to use the code, if different from ”0000”.
End			Press ENTER to leave programming.

Appendix I: VFD parameter settings

The following parameters have been adjusted prior to start-up of the separation system. All other parameters have default values; please refer to the frequency converter manual. xxx

All parameters are at delivery pre-adjusted for the system and should not be altered.

Drive Series: FC-302
Drive Type: 11.00KW 380V-500V
SW Version: 05.55
Option A: No option
Option B: No option
Option C0: No option
Option C1: No option

Parameters

ID	Name	Value
2	Motor speed unit	Hz
419	Max Output Frequen	61.0
190	Motor Thermal Prot	ETR trip 1
24	Display Line 3 Lar	Torque [Nm]
40	[Hand on] Key on L	Disabled
41	[Off] Key on LCP	Disabled
42	[Auto on] Key on L	Disabled
43	[Reset] Key on LCP	Disabled
123	Motor Frequency	60
124	Motor Current	19.60
125	Motor Nominal Spee	3530
139	Motor Poles	2
150	Motor Magnetisatio	60
151	Min Speed Normal M	18
152	Min Speed Normal M	0.3
153	Model Shift Freque	7.2
160	Low Speed Load Com	60
162	Slip Compensation	0
166	Min. Current at Lo	75
173	Flying Start	Enabled always
181	Min Speed for Func	0
201	DC Brake Current	80
202	DC Braking Time	60.0
203	DC Brake Cut In Sp	240
204	DC Brake Cut In Sp	4.0
210	Brake Function	AC Brake
215	Brake Check	AC brake

216	AC brake Max. Curr	80
217	Over-voltage Contr	Enabled
222	Activate Brake Spe	24.0
300	Reference Range	Min - Max
302	Minimum Reference	60.000
303	Maximum Reference	60.000
315	Reference Resource	No function
316	Reference Resource	No function
317	Reference Resource	No function
319	Jog Speed RPM	300
341	Ramp 1 Ramp up Tim	350.00
342	Ramp 1 Ramp Down T	300.00
414	Motor Speed High L	60.0
417	Torque limit gener	3
510	Terminal 18 Digita	Coast inverse
511	Terminal 19 Digita	Reset
512	Terminal 27 Digita	Start
513	Terminal 29 Digita	No operation
650	Terminal 42 Output	Motor current
1410	Mains Failure	Kinetic back-up
156.1	U/f Characteristic	60.0
156.2	U/f Characteristic	60.0
156.3	U/f Characteristic	60.0
156.4	U/f Characteristic	60.0
156.5	U/f Characteristic	60.0
540.0	Function Relay	VLT running
540.1	Function Relay	Above speed, hig

Appendix K: Modbus TCP addresses for remote control

Caution: Via the communication interface it is possible to monitor the separation process from a remote location. It is possible to send and receive commands and values to the system. Therefore design the communication link in such a way that unpredictable system functions which could impair safety are not possible.
Do not alter data/values of other addresses than those mentioned below, this could result in unpredictable machine operation or injury to personnel.

The Default settings are:
IP:192.168.0.1
Mask: 255.255.0.0
Unit Number:0

The remote connection is enabled/disabled from the EPC60 via Parameter P120 and then the info-button and arrow up/down. All buttons on the EPC 60 are frozen while this remote connection is active. Currently only one slave is allowed per EPC60. All values can be read even If the remote connection is not active, but no commands can be carried out.

For safety reasons is remote starting not possible after power up. The operator is obligated to check the machine and start from the control panel. After first start up, remote control is fully enabled.

The coils are read/write variables, which means commands for the EPC60. The commands are recognized only after remote connection is enabled - discrete input 10001.
Exceptions are coils8,9,10,11,12,14,15,16 and 17which always can be accessed.
(we need to be able to read parameter / alarm info even if not in remote)
Note: These "LOAD" Coils need to be sent prior to each read of the data.
(Data are only loaded once when flag been detected, so to update information send Load coil again)
Note: The message length is limited to 60 words.

Address	Name	Description
1	Input.Command.Start	Same as Panel
2	Input.Command.Stop	Same as Panel
3	Input.Command.Production	Same as Panel
4	Input.Command.CIP	Same as Panel
5	Input.Command.Discharge	Same as Panel
6	Input.Command.StartSolidspump	Same as Panel
7	Input.Command.AckAlarm	Same as Panel
8	Input.Parameters.LoadValue	Load input registers 30100 - 30300 with current parameter values
9	Input.Parameters.LoadMin	Load input registers 30100 - 30300 with minimum parameter values
10	Input.Parameters.LoadMax	Load input registers 30100 - 30300 with maximum parameter values
11	Input.Parameters.LoadDefault	Load input registers 30100 - 30300 with default parameter values
12	Input.Parameters.LoadUnit	Load input registers 30100 - 30300 with unit types of the parameters
13	Input.Parameters.LoadDecimals	Load input registers 30100 - 30300 with number of parameter decimals
14	Input.Parameters.SetValue	Set Parameter Value 40002 of parameter number 40001 (holding registers)
15	Input.Alarms.LoadStatus	Load discrete inputs 10100 - 10249 with current alarm status
16	Input.Alarms.LoadAck	Load discrete inputs 10100 - 10249 with current alarm acknowledge status
17	Input.Alarms.LoadActivation	Load discrete inputs 10100 - 10249 with current alarm activation status

Discrete Inputs (10001 - 19999)

Discrete Inputs are read only bit values. These contain machine and I/O- as well as alarm status..

Address	Name	Description
10001	Output.RemoteEnabled	Remote Connection Enabled. EPC60 react on Coil Commands
10002	Output.Status.Standstill	
10003	Output.Status.Starting	
10004	Output.Status.Stopping	
10005	Output.Status.EStop	
10006	Output.Status.Saftystop	
10007	Output.Status.TimerStop	
10008	Output.Status.Standby	
10009	Output.Status.Transtion	(Start Production)
10010	Output.Status.Production	
10011	Output.Status.CIP	
10012	Output.Status.Discharge	
10013	Output.Status.SolidsPumpRunning	
10014	Output.Status.ActiveAlarm	
10015	Output.Status.NewAlarm	
10016	Output.Status.Waiting for start Prod	(Start Production pressed during a Standby Discharge)
10017	Output.Status.Waiting for start CIP	(Start CIP pressed during a Standby Discharge)
10018	Output.Status.Waiting for start Standby	(Stop Production/CIP pressed during a Discharge)
10019	Output.Status.Waiting for Stop	(Stop pressed during a Standby Discharge)
10020		
10024		
10025	Output.ActValues.Input.FeedPump	
10026	Output.ActValues.Input.SolidsPump	
10027	Output.ActValues.Input.Waterpump Output.ActValues.Input.A3_3	Clara80 Clara20,200
10028	Output.ActValues.Input.A3_4	
10029	Output.ActValues.Input.DriveNoAlarm	
10030	Output.ActValues.Input.OverSpeedAlarm	
10031	Output.ActValues.Input.Estop	
10032	Output.ActValues.Input.SafetyStop	Not used
10033	Output.ActValues.Input.CoverInterlock Output.ActValues.Input.A11_2	Clara 20, 200 Clara 80
10034	Output.ActValues.Input.ExtTriggDischarge	
10035	Output.ActValues.Input.ExtAlarm	
10036	Output.ActValues.Input. A10_5 Output.ActValues.Input.Levelswitch	Clara 20, 80 Clara 200
10037	Output.ActValues. Input.A10_6	
10038	Output.ActValues.Input.LevelSwitch	Clara 20
10039		
10042	Output.ActValues.Output.InletVale	
10043	Output.ActValues.Output.DisplacementWater Output.ActValues.Output.A4_2 Output.ActValues.Output.Discharge OWN	Clara 20 Clara 80 Spare Clara200
10044	Output.ActValues.Output.FeedPump	
10045	Output.ActValues.Output.SolidsPump	
10046	Output.ActValues.Output.Waterpump Output.ActValues.Output.A5_3	Clara80 Clara20, 200
10047	Output.ActValues.Output.A5_4	
10048	Output.ActValues.Output.M701_0	(Run Motor)

Address	Name	Description
10049	Output.ActValues.Output.M701_1	(VFD Reset)
10050	Output.ActValues.Output.FlushSealingWater Output.ActValues.Output.Sealingwater	Clara 20, 80 Clara 200
10051	Output.ActValues.Output.ClosingWater Output.ActValues.Output.Operatingwater	Clara 20, 80 Clara 200
10052	Output.ActValues.Output.DischargeWater Output.ActValues.Output.Flushing	Clara 20, 80 Clara 200
10053	Output.ActValues.Output.AlarmOutput	
10097	Status alarm loaded	Coil 15
10098	Ack alarm loaded	Coil 16
10099	Activation alarm loaded	Coil 17
10100	Output.Alarm[0]	Status, Ack or Activation of A0. Loaded with coil 15-17
…	…	
10249	Output AIarm[149]	Status, Ack or Activation of A149. Loaded with coil 15-17

Input registers (30001-39999)

Input registers are read only integer variables. These contain actual sensor values as well as parameters.

Address	Name	Description
30001	Output.Response	Response value from Coil commands 1-16. 0: Ok, 1: call again, 2: Command Not allowed <0: error
30002	Output.Mode	Operating mode
30003	Output.Version	Software version
30004	Clara type	20,80 or 200
30005	ParameterChgNb	Last changed parameter
30006	ParameterChgVal	Value for last changed parameter
30007	Output.Runtime.Hours	
30008	Output.Runtime.Minutes	
30009	Output.Runtime.Seconds	
30010	Output.ActValues.Q1	
30011	Output.ActValues.Value.Current	
30012	Output.ActValues.Turbidity	Clara 200
30013	Output.ActValues.Opwater Press.	Clara 200
30014	Output.ActValues.TT1	Not used
30015	Output.ActValues.Value.TT2	Not used
30016	Output.ActValues.Value.SS	
30017	Output.ActValues.Value.VibrAmpl	Clara 80 or Clara 200
30018	Output.ActValues.Value.VibrDist	Clara 80
30019	Output.ActValues.CurrFBSpeed	Clara 200
30020	Output.ActValues.IPConvOWM	Clara 200
30030	Limits.HighSpeed	
30031	Limits.FullSpeed	
30032	Limits.LowSpeed	
30033	Limits.HighFlow	
30034	Limits.LowFlow	
30035	Limits.FlowChange	

Address	Name	Description
30036	Limits.VibrPrew	Clara 200
30037	Limits.VibrShutd	Clara 200
30038	Limits.TurbiditySetp	Clara 200
30039	Limits.TurbidityRef	Clara 200
30040	SensorFault.Speed	
30041	SensorFault.vibration	
30042	SensorFault.flow	
30043	SensorFault.current	
30044	SensorFault.Turbidity	Clara 200
30045	SensorFault.OPWaterPress	Clara 200
30046	Reserved	
30047	Reserved	
30048	Reserved	
30049	Reserved	
30099	Parameter Load type	1= Actual value (Coil 9), 2 = Coil10 ……
30100	Output.Parameter[0]	Default, Min/Max Current value.. of P0. Loaded with coil 7 - 12.
…	…	(ex: 30101 = parameter 1 , 30211 = Parameter 111)
30399	Output.Parameter[299]	Default, Min/Max Current value.. of P299. Loaded with coil 7 - 12.

Holding Registers (40001-49999)

Holding registers are read/write. For now its only parameter value and number. These variables are reset if the remote connection is deactivated - discrete input 10001.

Address	Name	Description
40001	Input.Parameters.Number	Pararameter number which should be set with coil 13
40002	Input.Parameters.Value	Value of the parameter which should be set with coil 13
40009	Reserved AlfaLaval	Debug variable

Appendix L: Passwords

User password
The password needed for access to protection level 1 is **0592**.

Service password
The password needed for access to protection level 2 is **2760**.

Remove this page and store it in a safe place if you do not want unauthorized persons to change the settings.