Appendix operating instructions

ASP Station 2000

Option Faeces 2000

with special software LDA90Xa

Endress+Hauser

People for Process Automation
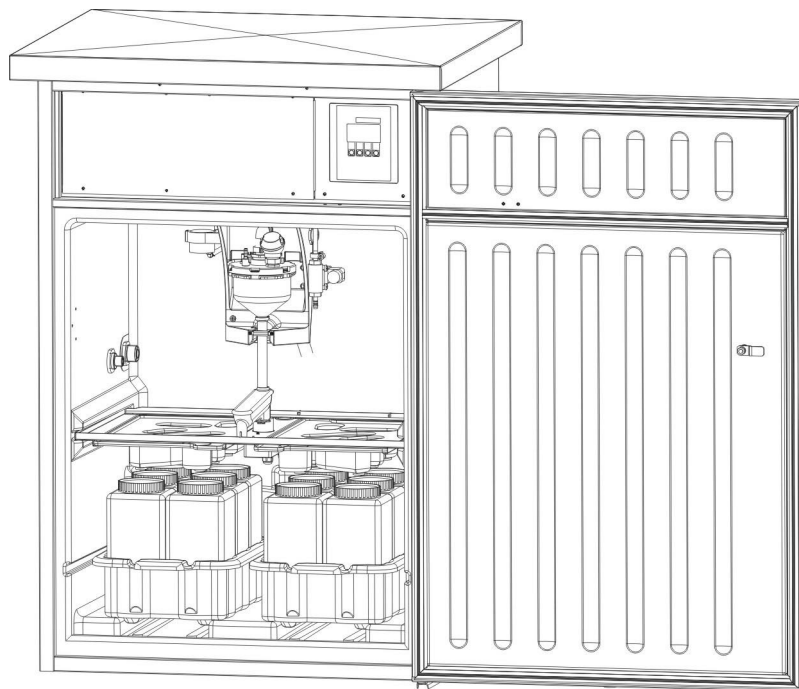
Appendix operating manual
for the ASP Station 2000 with faeces 2000 option

1   General information

The enhanced water sampler fulfils all the requirements of the standard product. All the basic information such as technical data, installation and commissioning notes, electrical connections, set-up, safety notes and others can be found in the standard product operating manual.

All technical changes and expansions to the standard product are described in this appendix manual.

2   Option Faeces 2000 system description

The following functional expansions can be achieved using the Faeces 2000 option:

- Sampling up to 0.8 bar pressure
- Suction hose rinse
- Dosing chamber rinse
- 4 additional relays for valve control, all standard functionality can be selected
- All functions of the standard device

3 Software set-up and expansion functionalities

3.1   Sampling sequence:

Before starting the sampling cycle, at first pressure is built up in the dosing chamber and suction hose. Then the suction hose is connected to the pressurised pipe line using a opened blocking valve, so liquid can flow into the dosing chamber.
Once the level in the dosing chamber is recognised by the capacitive level switch the purge or dosing sequence can be started. For this air must be blown into the dosing chamber this overpressure has the effect of blowing the excess liquid back into the pressurised line.
After a presettable dosing time the blocking valve is closed, and the desired amount released into one of the sample bottles. The distribution tap is driven to an emptying position and the suction hose as well as the dosing chamber are rinsed step by step. In order to equalise any pressure build up in individual pipe lines the vacuum pump is switched on for a short period.
Once the rinse sequence has been completed the distribution tap return to its last bottle position.
When the sample cycle is finished, the digital output signal with functionality "Sample" is deactivated.

3.2   Sequence Diagramm for all options selected
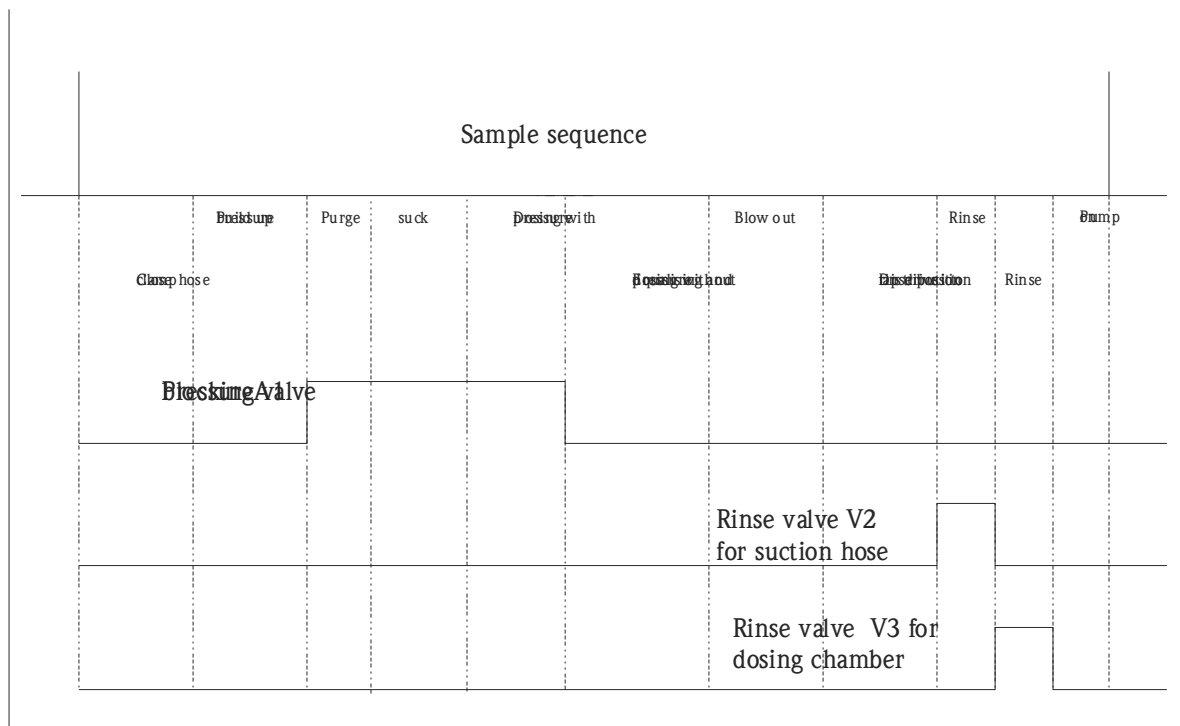
3.3   Pressurized sample up to 0,8 bar

When sampling from a pressurised pipe line an external blocking valve is used as the actuator in order to protect the water sampler from the pressure within the pipe line. In order to activate pressurised sampling in the software the digital output for the blocking valve must first be set up. Common blocking valves are f.e. a ball valve, or a membrane/clamp valve.

The blocking valve is closed when not powered; this means that is not possible for the medium to enter the sampler under fault or failure conditions.

– Activate digital output for controlling the blocking valve:

Setup>
Unit settings>
Outputs>
Output 4> function: pressure A1

– Activate sequence pressurised water sampling:

Setup>
Unit settings>
Sampling>
pressSamp: active

Here two individual times can be adjusted:

Pressure build up:	Pressure build up time, water sampler purges the suction hose and activates the actuator after a preset time thus releasing the liquid for sampling. After sampling the external actuator is closed.
Equalisation:	Now the dosing chamber is still under pressure thus a equalisation of pressure must be done. Therefore the pump must be switched on for a short time to push the medium out of the hose.

3.4 Flushing the dosing chamber and suction hose, rinse function

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In order to be able to rinse both the dosing chamber and the suction hose two further valves must be used for control.

– **Activate digital output for flushing the suction line:**

```
       Output 5

function :Rinse V2
operation:standard

 Esc        ↓          ↵
```

Setup>
Unit settings>
Outputs>
Output 5> function: Rinse V2

– **Activate digital output for flushing the dosing chamber:**

```
       Output 6

function :Rinse V3
operation:standard

 Esc        ↓          ↵
```

Setup>
Unit settings>
Outputs>
Output 6> function: Rinse V3.

– **Adjust wait cycle of distribution tap before rotating to next bottle:**

```
      Sampling
time set.:automatic.▲
release  :  010 sec
delay    :   00 sec
CS 1/2   :standard
dosing   :pressure
no flow  :counting  ▼
 Esc    ↓      ↑     ↵
```

Setup>
Unit settings>
Sampling>
Release: xx sec

– **Setup flushing time:**

Once all the rinse valves have been set up the rinse option can be set up in the sampling unit settings and presettable times for the individual rinse phases can be set up.

Setup>
Unit settings>
Sampling>
Rinsing: active

Two parameters can be set:

tube:	Rinse time for controlling the suction line rinse valve, Works default set–up: 10 sec.
Dosing ch:	Rinse time for controlling the dosing chamber rinse valve, Works default set–up: 10 sec.

When this times are set to 0sec, there is no rins function active.

3.5   Further function expansions of the water sampler station

A air bleed function is built in for pressurised sampling.

An internally fitted valve is used for bleeding the pressurised vacuum pipe lines. During the dosing sequence the medium flows into the bottle free of pressure. This valve does not need to be set up.

When the parameter pressurised sampling is active, the medium is dosed under pressure, this means that the pump assists in forcing the medium to be discharged through the suction hose.

Due to the high suspended solids content the medium detection system is a capacitive level switch.

The capacitive level switch is inactive during the rinse sequence; this means that the switch itself can also be cleaned. Because the hose clamp is open during this sequence there is no danger of damage to the vacuum circuit.

A special release position for the distribution tap has been fitted in the rear of the distribution frame (at the 180° position) for the rinse function. When the rinse cycle has been completed the distribution tap returns to the last sample bottle position.

The rinse process is part of the sample sequence, this means that the sample output signal remains in an active position (HIGH) during the rinse time as well.

4   ASP Station 2000 set up in combination with a PLC

The set-up of a water sampler in combination with a PLC controller f.e. within a Faeces station.

The following set-up must be made on the water sampler (otherwise fault free system operation cannot be guaranteed):

Setup>Unit settings> Outputs	Set-up	Description
Output 1	Sequence end	Signal for sampler programme end. All bottles are filled. The positive edge must be used by the PLC.
Output 2	Bottle	Successful bottle change message to the PLC, once the selected bottle change has been completed. The signal negative edge should be used. The pulse is active from the start of the sequence until the new bottle position is reached.
Output 3	Error	Sampler fault
Output 4	PressureA1	Control for the pressurised sample actuator (internal signal)
Output 5	RinseV2	Suction hose rinse valve control (internal signal)
Output 6	RinseV3	Dosing chamber rinse valve control (internal signal)
Output 7	StartAUT	Signal for water sampler programme start at bottle 1. If a selection of the bottle position is to be made by the PLC then this signal can be used as a reset of the bottle counter.
Setup>Unit settings> Digital inputs		
Digital input 1	Sample	Sample is externally controlled
Digital input 2	Bottle	Bottle change is externally controlled
Digital input 3	Switch active	Capacitive switch off is activated
Setup>Unit settings> Sampling		
Pressurised sampling	Active	Pressurised sampling is active
Rinse	Active	Rinse sequence is active
Setup>Change Programmes> Programme X		Programme is freely selectable
Sample	Ext. signal	Sampling controlled by the PLC
Distribution	Ext. signal	Distribution controlled by the PLC

5   Reset behaviour

In the case of a serious fault (e.g. RAM error) all operating parameters are reset to the factory settings, if however outputs 4 – 7 are defined as pressure or rinse valves this remains as default settings in the control unit.