Flamco

Flamco-Fill PE

Appendix

Installation and operating instructions

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Installation and operating instructions appendix

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1 Commissioning

1.1 Commissioning Fill-PE

Before commissioning make sure that the unit and its items of equipment are in conformation with the regulations that apply at the place of erection and in respect of the field of application. The party erection and operating the unit will be responsible for making the checks and for carrying out commissioning.
For commissioning, the hydraulic and electric connections must be in place.

1.2 Parameterisation for commissioning

After the installation of the controller, “Fill PE” is shown on the display. Since the controller offers extensive options, it is necessary to change the parameters of the system settings. An option can be found by turning and pushing the control knob.
After pushing the control knob (system black stored), the option menu is opened. Under the option Enter, the operator can choose between Hardware menu, Parameter menu and Service menu for parameterization. In these menus, the operator has to do the setup of the controller step by step. See also in the drawing: menu items for the Hardware menu, the Parameter menu and Service menu etc.
To exit a menu, select Back. To exit a submenu completely and open the process screen, press and hold the control knob.
When the parameterisation of the controller is completed, press and confirm Start to open the process screen; the refilling process starts. Adjustment values are filed in the calculation examples of the system.

2 Items of the hardware and parameter menu

2.1 Control modes

2.1.1 Level-controlled [%]

Control takes place via an external floating signal or a non-floating signal (230 V). It depends on the used pressure-holding control and whether a pump-controlled or compressor-controlled diaphragm expansion automat is used. When the signal is applied, the pump switches on. The filling operation takes place until the level set on the control of the expansion automat is reached.

2.1.2 Pressure-controlled [P]

Control takes place via the pressure sensor that is integrated in the module. When the system pressure has dropped to the activation pressure ‘Fill command on’, the pump switches on and operates until ‘Fill command off’ is reached.

In both control modes, the running time and filling quantities (if the system is equipped with a pulse water meter) are monitored, as well as the current pressure in the system

2.1.3 Operating modes [AUTO] [FILL] [HAND]

The operator has the option to operate the system in the “Auto” mode (Automatic), the “Fill” mode ((Initial) Filling) and the “Hand” mode (manual operation).

For the Fill mode, extended monitoring limits are valid and overrule the Auto mode.

The manual operation is used to test the function of the pump and is only meant for service purposes.
In manual operation, the pump can be activated for max. 20 seconds. After the process it switches off automatically and the controller remains in manual operation. It is not possible to switch off the pump in manual operation if the maximum pressure alarm is on.

2.2 Monitoring

It is the primary purpose of the monitoring functions to detect errors in the system at an early point of time and to protect the system components to the largest possible extent by means of appropriate signals or by automatically shutting down the system. They are particularly intended for detecting leakages at an early stage and to limit leakages.

2.2.1 Run time monitoring (in “Auto” mode (Automatic))

The operator can freely parameterise the make-up quantity. If the conditions described below are not satisfying, the system will indicate an error; the floating error contact will be opened until the error is manually acknowledged.

- The actual run time must not exceed a maximum time per tripping (cycle).
- The minimum interval between two cycles (pause) must not be shorter than the time programmed.
- The maximum number of cycles per time window must not exceed the number programmed in the run time window (e.g., not more than 3 cycles in the last 8 hours.)

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2.2.2 Filling amount monitoring (in “Auto” mode (Automatic))

Requirement: a connected and activated Flamco FILL-PE impulse water counter (IWZ).
The operator can freely parameterise the filling amount. If the conditions below are not satisfied, the system will indicate an error; the floating error contact will be opened.

- The actual refilling amount must not exceed the maximum amount per activation (in one cycle) and simultaneously:
- The minimum interval between two cycles must not be shorter than the time programmed.
- The maximum number of cycles per time window must not exceed the number programmed in the run time window (e.g., not more than 3 cycles in the last 8 hours).

2.2.3 Initial filling process monitoring

To fill the system for the first time, the filling mode “Fill” can be used. The tighter monitoring limits of the Auto mode are overruled. The maximum amount initial filling process or the maximum time for initial filling process can be monitored. In order to monitor this, the impulse water counter must be activated and connected to the PE. After a successful initial filling, the system switches automatically to the Auto mode.
If the maximum amount/time initial filling process during the system filling is reached, the system will indicate an error; the floating error contact will be opened until a manual acknowledgment is carried out.

2.2.4 Monitoring pressure increase amount (in automatic mode “Auto”)

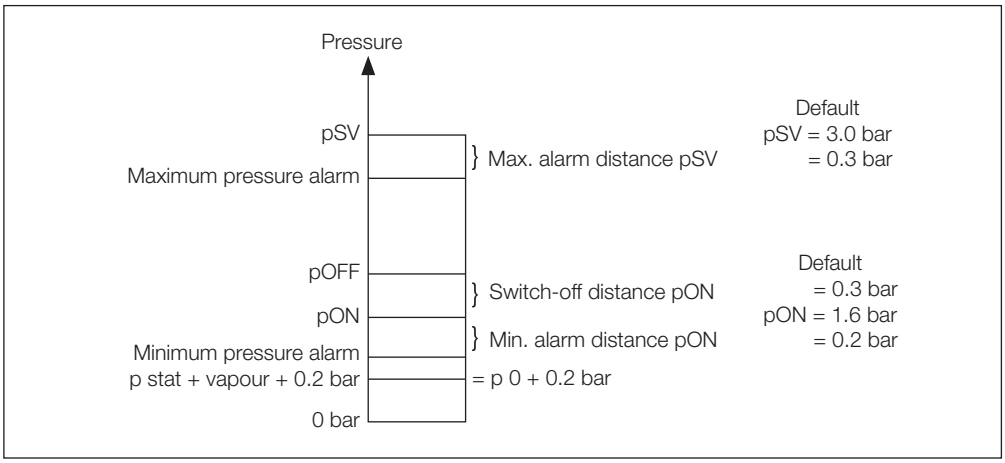
Requirement: a connected and activated Flamco FILL-PE impulse water counter (IWZ). Within this preset refill amount, the system pressure must rise by at least 0.1 bar. If this condition is not satisfied, the system will indicate an error; the floating error contact will be opened until a manual acknowledgment is carried out. Entering “0” can switch off this monitoring process (e.g., during the refilling process in pressureless expansion tanks).

2.2.5 Monitoring pressure increase time (in automatic mode “Auto”)

Within this preset refill time, the system pressure must rise by at least 0.1 bar. If this condition is not satisfied, the system will indicate an error; the floating error contact will be opened until a manual acknowledgment is carried out. Entering “0” can switch off this monitoring process (e.g., during the refilling process in pressureless expansion tanks).

2.3 Pressure monitoring

The maximum allowable pressure and level should not be exceeded. Therefore, pressure deviations are signalled.
Therefore, the operator must parameterise some of the pressure values:



- pSV - Set pressure of the safety valve.
- pON - Switch-on pressure (of the pump) for the refilling process.
- Switch-off distance of pON (switching difference)
- Max. alarm distance pSV - switching difference of the reaction pressure of the safety valve
- Min. alarm distance of pON – Operating distance of pON for the minimum pressure alarm (larger or equal to p0).

If pSV minus Max. alarm distance of pON is reached, the maximum pressure alarm is activated. The floating error contact will be opened, until the pressure has dropped under this value and the error has been acknowledged. As long the maximum pressure signal is on, a filling is not possible, nor in manual operation. By entering “0” bar for the maximum alarm distance of pON, the maximum pressure alarm can be switched off.

If pON minus Min. alarm distance of pON is reached, the minimum pressure alarm is activated. The floating error contact will be opened, until the pressure has risen above this value and the error has been acknowledged. In the first filling mode FULL, the minimum pressure alarm will not be shown on the display or the contact error alarm. If for any reason the minimum pressure alarm is activated in automatic mode, the low pressure area can be left automatically by changing the operation mode (FULL mode).

2.4 Monitoring of quantity of water to be treated

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If a water treatment module has been installed and the pulse water meter has been set to ON, the residual water quantity can be read at the lower right in the process menu. I.e.: if the residual water quantity has been correctly entered in the parameter menu 'Water treatment prior to commissioning'. If the quantity is zero litres, the centralised fault alarm will be tripped (if activated), and an error message will be initiated. Negative values mean that the permissible treated quantity (capacity) in litres has been exceeded. The Fill-PE continues to operate in such a case.

3 Menu descriptions

3.1 Hardware menu

ID number
Can be parameterised only by the manufacturer and service personnel.

Language
The operator can choose between 13 languages. German (G2_1) is the default setting on delivery.

Litres counter (IWZ)
Set this item to ON only if a pulse water meter (litres counter) is used. The pulse water meter can be used for directly controlling and monitoring the supplied make-up water.

Water treatment
If a water treatment module has been integrated in the make-up water branch and the litres counter has been set to ON, the residual water quantity that can be read in litres in the process menu. When a quantity of zero litres is reached, the centralised fault alarm is tripped, and an error message will be displayed. Negative values mean that the allowable treatment quantity (capacity) has been exceeded. The make-up unit continues to operate even if the centralised fault alarm has been tripped.

Control mode
(Make-up mode) The operator can operate the system in a level-controlled (controlled from an external pressure-holding control) mode or in a pressure-controlled mode (default setting for normal gas-cushioned diaphragm expansion automat).

Operating mode
The operator has the option to operate the system in automatic mode (AUTO), in the "Fill" mode (Filling) and the "Hand" mode (manual operation, for Flamco Service only). See also section: Flamco FILL-PE operating instructions.

Sensor / Motor protection
Already been parameterised. Factory setting.

Common failure
Collective malfunction message – The collective malfunction message is activated in the ON setting when the maintenance date is reached.

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3.2 Parameter menu

Item	Factory setting
System pressure	
- pSV = Set pressure of the safety valve in bar	3 bar
- pON = switch-on pressure of the filling process in bar	1.6 bar
- Switch-off distance pON: Switch-off pressure = pSV + switch-off distance pON. See also section: Monitoring – Pressure monitoring	0.3 bar
- Max. alarm distance pSV: Max. pressure alarm = pSV - max. alarm distance pON. See also section: Monitoring – Pressure monitoring Entering "0" bar switches off the maximum pressure monitoring! The value should be 10% of the set pressure of the safety valve!	0.3 bar
- Min. alarm distance pON: Min. pressure alarm = pON - min. alarm distance pON. Entering "0" bar switches off the minimum pressure monitoring. See also section: Monitoring – Pressure monitoring	0.2 bar
- Special system pressure (irrelevant for the operator)	Factory setting
Litres counter	
- Litre per impuls – Pulse rate of the impulse water counter	10 litre/pulse
Water treatment	
- Treatment capacity in case of integrated water softening module	100 litres

Filling quantity: applicable to the automatic operation
Based on a continually referenced preceding period of time (time window), the unit allows using a certain number of filling cycles that are separated by pauses from one another. Cycles, pauses and time windows (time spending) can be freely parameterised.

Example: (default setting)
In the last 480 minutes (time spending) the make-up water quantity per cycle must not exceed 150 litres. Moreover, it is not permissible to supply this quantity during this time more than three times, and the pauses between the cycles must be 5 minutes at a minimum.

Item	Factory setting
Max quantity/filling	
- Maximum allowable quantity per tripping (also per cycle) with integrated and configured pulse water meter. See section Monitoring: make-up quantity	150 litres
Max time/filling	
- Maximum allowable make-up time per tripping (also per cycle). See section Monitoring: monitoring of run time	20 minutes
Min. interval betw. 2 cycles	
- Minimum interval between two cycles (pause)	5.0 minutes
Max cycles/time spent	
- Maximum number of cycles per time window	3
Time spending	
- Size of time window	480 minutes

Item	Factory setting
Pressure increase amount	
- Mmax. refilling amount that must feed through the pressure increase of at least 0.1 bar. Entering "0" litre switches off the associated monitoring!	0 litres
Pressure increase time	
- Max. refilling time in which the pressure must increase by at least 0.1 bar. Entering "0" bar switches off the associated monitoring!	0 minutes
Max. initial filling amount	
- Maximum allowed initial filling amount with a connected and configured impulse water counter in a cycle; for filling mode only!	1500 litres
Max. initial filling time	
- Maximum allowed initial filling time in a cycle; for filling mode only!	480 minutes

Note that the values in the filling quantity menu are interdependent. Therefore, it may be necessary to first parameterise another value before the actual value becomes accessible within the intended limits.
Similarly, setting ranges may be limited by the dependencies. It is advisable, for instance, to first parameterise a sufficiently sized time window before defining the pauses and the number and length of cycles.

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Item	Factory setting
Time and date	Operator task
- Summer time on: starting month (summer time ON is 00 for regions without change between times)	03
- Summer time off: ending month (summer time OFF=00 for regions without change between times)	10
- Maintenance gap: maintenance interval 0 .. 800 days	365 days
- Pressure sensor min.value	0.0 bar
- Pressure sensor max.value	10.0 bar
Other internal	
- Factory settings (not visible). Not intended for use by operator.	

3.3 Service menu

Project number
Factory settings; not be programmed by the operator.

Software version
Readable entry made by manufacturer.

Start
Enter the time and date of the start (traceability) by pressing Start. Before pressing.

Maintenance
The date of the next maintenance is indicated in parentheses. When this time is reached, the centralised fault alarm is optionally tripped, and a fault message is displayed to remind the operator. If it is acknowledged, it will be displayed again after seven days unless 'Maintenance done' has been pressed, thus indicating that the maintenance has already been carried out. The time and date of the last maintenance as well as the code level are indicated in the upper two lines.

Error list
Shows the last acknowledged 250 errors together with time and date.

Value statistics
Display of various statistic data.

Refill statistics
Display of the last 200 make-up operations together with date, time and duration of the make-up operations and the number of litres supplied (if a pulse water meter is used).

Change entry code
Change to another access code.

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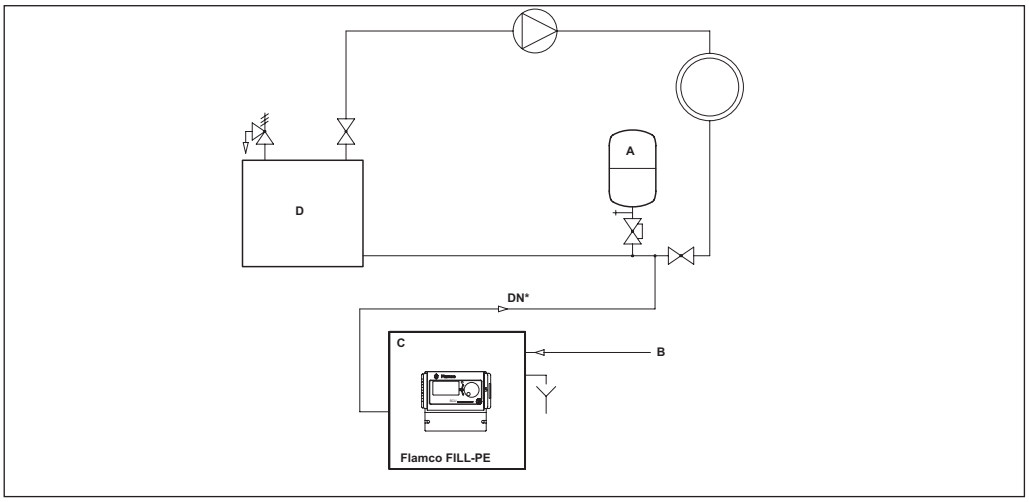
4 Examples

4.1 A pressure controlled refilling process

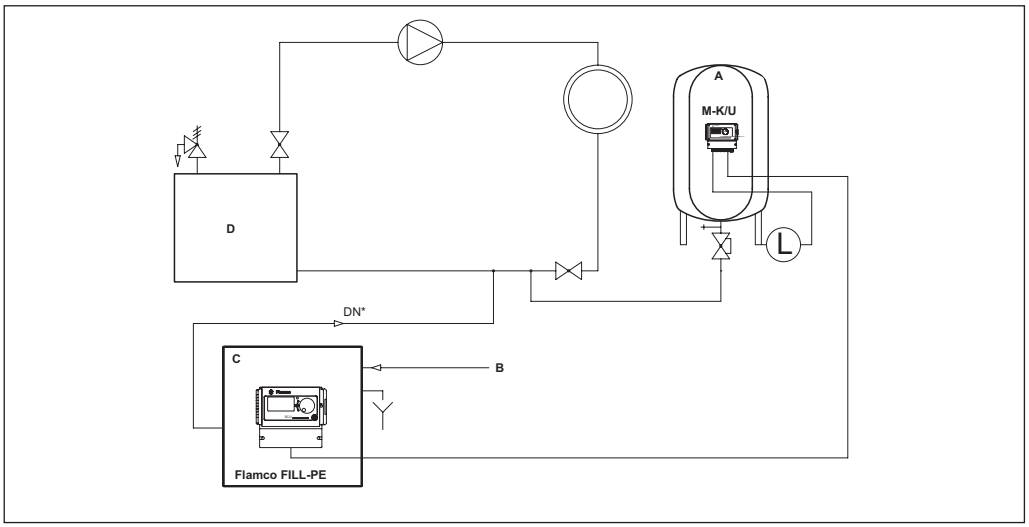


A	Diaphragm expansion automat
B	Make-up water inlet
C	Flamco FILL-PE
D	Heater

Do not use diamaters smaller than indicated for the lenghts of the lines concerned!
The lines should be as short as possible!

DN15 < 10 m
DN20 < 20 m
DN25 < 30 m

4.2 A level controlled refilling process



A	M-K/U Compressor with p.e SDS control
B	Make-up water inlet
C	Flamco FILL-PE (Ventil 3 pins 11 and 12 230V/50Hz
D	Heater

Do not use diameters smaller than indicated for the lenghts of the lines concerned!
The lines should be as short as possible!
DN15 < 10 m
DN20 < 20 m
DN25 < 30 m

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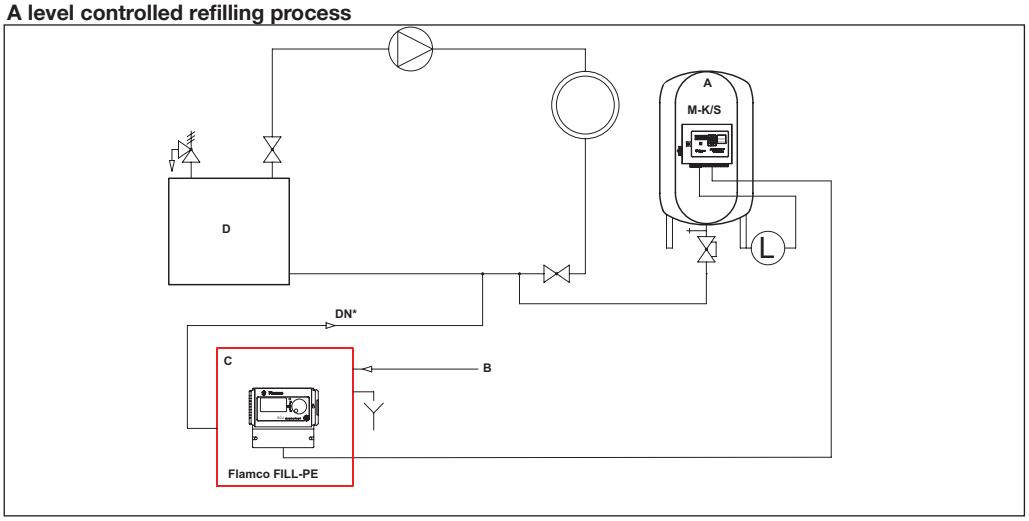
4.3 A level controlled refilling process



A	M-K/S Compressor automat
B	Make-up water inlet
C	Flamco FILL-PE (Extern NSP pins 21 and 22 (for potential free contact)
D	Heater

Do not use diameters smaller than indicated for the lenghts of the lines concerned!
The lines should be as short as possible!
DN15 < 10 m
DN20 < 20 m
DN25 < 30 m