

WE SAY:
UNDER PRESSURE
WE ARE BIG EVEN
IN SMALL SIZES!



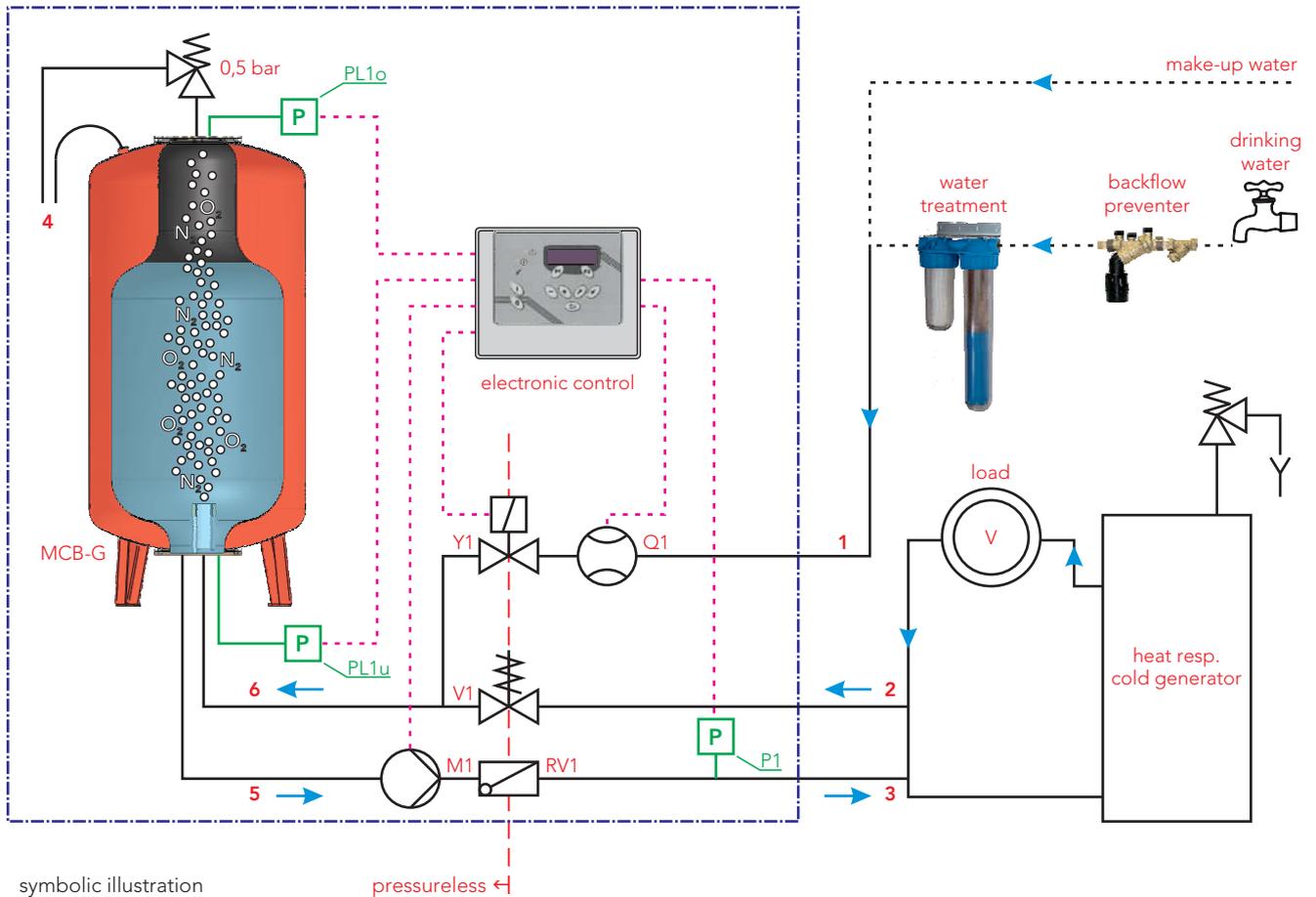
BETTER HEATING. SAFE BET.

PICOCONTROL
KOMPAKT PCK

Ver.03/2018-en

Operating principle

elko-mat eder pressure maintenance systems operate according to the principle of pump-controlled pressure maintenance with closed expansion vessels.



Legend

- 1 ... make-up
- 2 ... expansion overflow pipe (from system return)
- 3 ... expansion pressure pipe (to system return)

- M1 ... pressure maintenance pump
- RV1 ... check valve
- V1 ... overflow valve
- Y1 ... magnetic valve
- Q1 ... water meter
- MCB-G ... expansion vessel

- 4 ... drain of vessel safety valve *
- 5 ... suction pipe from expansion vessel
- 6 ... overflow pipe to expansion vessel

- PL1o ... vessel pressure transmitter top
- PL1u ... vessel pressure transmitter bottom
- P1 ... system pressure transmitter

* possibility for on-site installation of a discharge hopper

Expansion and pressure maintenance

If the pressure in the system (e.g. expansion of the system medium by heating) increases the overflow valve (V1) will open pressure proportional continuously controlled and the expansion volume will be stored within the flexible membrane of the expansion vessel (MCB-G) so that is separated from atmosphere.

The area outside of this membrane is associated with the ambient air, whereby within the expansion vessel no significant negative pressure or excessive pressure can arise (vessel is pressureless resp. max. 0.5 bar within the membrane).

Going below the lower working pressure (e.g. caused by cooling down) is realised by the system pressure transmitter (P1) thereupon the electronic control turns on the pressure maintaining pump (M1). As soon as the lower working pressure is exceeded by one differential gap, the so called follow-up time starts. During this time the pressure maintaining pump still delivers medium into the system to stabilise the built-up system pressure. Possibly too much pumped medium will be returned to the expansion vessel (MCB-G) via the overflow valve (V1), latest if the upper working pressure is reached.

Low pressure degassing

After first filling a closed system with the filling medium air inclusions are removed by venting. Often this is not completely successful so that occasionally residual air inclusions remain.

The enclosed air mainly consists of oxygen and nitrogen that cause the following problems:

- Corrosion (by oxygen)
Unique the oxygen of the enclosed air is consumed by reaction with the system materials quickly. However permanent oxygen input in the system must be avoided, to prevent corrosion damage.
- Malfunction (by nitrogen bubbles)
Nitrogen does not react with other materials and stays as free gas in the system where it forms "cushion gas". Thus e.g. flow interruptions, dry running of pumps or flow noises arise ongoing operation.

Therefore a continuous degassing of the medium in the system makes sense. With low pressure degassing the gas content in the medium is reduced based on the principle that the solubility of gases in water decreases with falling pressure (Henry's absorption law).

Thus the pressure maintaining pump (M1) pumps low-gas medium out of the pressureless expansion vessel (MCB-G) into the system, so that the system pressure is increased on purpose and the overflow valve (V1) opens. Gas enriched medium below system pressure flows from the system into the expansion vessel, which causes pressure release. Solubility in the pressureless expansion vessel (MCB-G) is much lower, so that there the elimination of dissolved gases takes place. The gases rise in the vessel and the pressure within the membrane increases. Elimination of the gases is carried out by the vessel overflow valve as soon as 0.5 bar are exceeded.

Additional gas input into the system (e.g. make-up medium and therein dissolved gases) is just as little welcome, but mostly not completely avoidable. Make-up via the pressure maintenance system is carried out directly into the pressureless vessel. Already at the solenoid valve (Y1) the expansion (from the pressure of the make-up pipe to max. 0.5 bar of the vessel) takes place. Contrary to a make-up directly into the system the medium is degassed before it reaches the system (compare „make-up“).

Make-up

Using a pump-controlled pressure maintenance system, losses in the system do not become directly noticeable, because they are compensated by the pressure maintenance system. Thereby the vessel level in the expansion vessel will decrease therefore make-up compensates the too low level in the expansion vessel.

Level measurement in the expansion vessel bases on pressure measurement inside the vessel membrane at the bottom and on top of the vessel by the pressure vessel transmitters PL1o and PL1u. Using both measurements the filling height (=vessel level) is calculated (also not by weight measurement or load cells at the vessel).

By undercutting the set minimum vessel level a controlled make-up is activated, the magnetic valve (Y1) opens. The make-up medium reaches the pressureless expansion vessel (MCB-G) with the inlet pressure of the fresh water supply, whereby it is already pre-degassed without having reached the system. The supplied water amount during make-up is measured by a water-meter and compared with the set maximum possible make-up amount. Is it exceeded, the make-up is stopped and make-up operation is locked. Only after verification and disengaging by the system support engineers the make-up can be reactivated. Beside the amount controlled operating mode also a time controlled operating mode is available, which is advantageous in case of known and regular necessary make-up amounts.

Especially in cold water systems, solar systems or similar usually special medium mixtures are used, so that simple make-up of fresh water is not possible. In this case a multicontrol autofill

MCA make-up unit can be employed. For details compare brochure "multicontrol autofill MCA".

If a possible prescribed system separation does not exist across the system, it can be done with an additionally available backflow preventer (compare brochure „multicontrol original accessory“).

Water treatment

If there is no water treatment across the system, in addition to the make-up module a water treatment may be combined. By means of the modules MWE (water softening), R-MWE (water softening, regenerative) and MVE (complete demineralisation) the make-up water is softened or completely demineralised by so called ion exchanger cartridges.

By using MWE resp. MVE the water meter (Q1) continuously monitors the make-up amount. Is the capacity of the ion exchanger resin running out further make-up is stopped and a cartridge exchange is requested.

R-MWE 28 (module water softening make-up, regenerating) is a fully automatic, microprocessor controlled water softening system, where the ion exchanger resin is regenerated autonomous depending on the actual water consumption.

For detailed information about the modules MWE, R-MWE and MVE compare the brochure „water treatment“.

Further products of our multicontrol series:



- press. maintenance devices **multicontrol kompakt MCK**, **multicontrol modular MCM**
- pressure maintenance device **topcontrol modular TCM**
- pressure maintenance device **multicontrol cool MCC**
- make-up device **multicontrol autofill MCA**
- suitable accessories can be found in the brochure „**multicontrol original accessory**“.

Details

electronic unit with possibility for installation of various communication modules :
 web module
 SMS module
 bus module

vessel pressure transmitter for differential pressure measurement

drain of vessel safety valve with possibility for on-site installation of a discharge hopper

expansion vessel, available in different sizes

2 potential free signalling contacts as standard equipment:
 - fault
 - warning

operator panel with four lines, illuminated plain text display

connection for make-up module PCF-1 (already installed in the picture)

continuous temperature control

connections executed as maintenance units with integrated shut-off, hydraulic disconnection and possibility for installation of a bypass set.



Operation

- Basic display individually adaptable
 Out of plenty possibilities six display values can be chosen and shown at the basic display.
- Display and operation eligible in many national languages*
- LEDs for status information at first sight

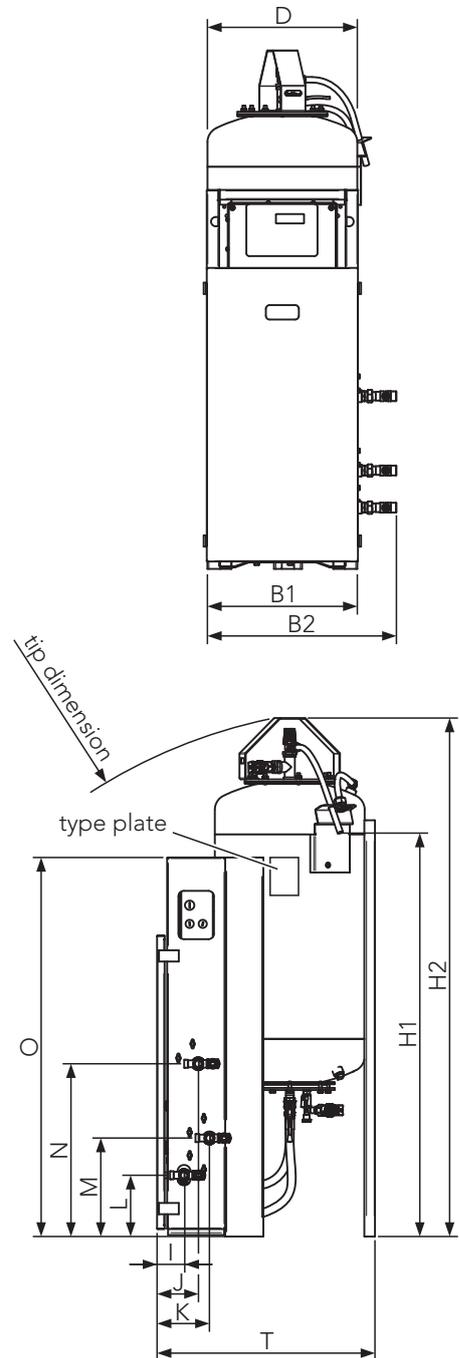
* Status 03/2018: German, English, Swedish, French, Dutch, Finnish, Italian, Russian, Romanian, Polish, Czech, Latvian, Croatia, Estonian

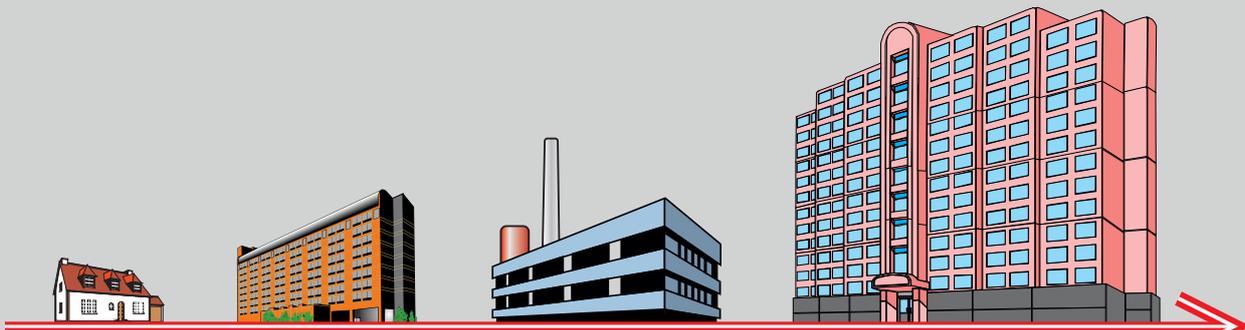
Technical data

type	elko-mat eder picocontrol kompakt PCK						
	PCK-S 45-4.0	PCK-S 75-4.0	PCK-S 125-4.0	PCK-S 200-4.0	PCK-S 300-4.0	PCK-S 500-4.0	
nominal content	liter	45	75	125	200	300	500
nominal pressure device (PN)	bar	6					
nominal pressure vessel (PN)	bar	0,5					
max. temperature at plant	°C	70					
insertion: tip dimension	mm	1500	1500	1500	1630	1700	2250
voltage	V/Hz	230/50					
max. electrical power	kW	0,22					
fuse protection	A	10 A slow-blow					
dimensions	B1 mm	400					
	B2 mm	505					
	D mm	400		500		600	
	H1 mm	1070	1090	1070	1190	1215	1770
	H2 mm	1375	1375	1405	1515	1577	2130
	T mm	505	585	715	715	805	805
	I mm	72					
	J mm	110					
	K mm	140					
	L mm	165					
	M mm	265					
N mm	465						
O mm	1070						
weight	kg	62	65	69	89	103	118
connections	1 "	R3/4					
	2 "	R3/4					
	3 "	R3/4					
	4 mm	PA hose 15x12,5 mm					

- 1 ... make-up
- 2 ... expansion overflow pipe
- 3 ... expansion pressure pipe
- 4 ... drain of vessel safety valve

Technical data subject to change without notice!





elko-flex eder



plant complexity
(generating capacity,
static height,
total content,
working pressure)

elko-mat eder picocontrol PCK



elko-mat eder multicontrol MCK



elko-mat eder multicontrol MCM



elko-mat eder topcontrol TCM



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