

Filter press

KS 94 application

Filter press control with 2 working pressures

Pressure control with 2 set-points and 2 gradients

Process value tracking

Clear display

Reliable control

KEY WORDS

Filter press, sludge filter, chamber filter press, membrane filter press, cloth filter, set-point gradient, process value tracking, holding tank

DESCRIPTION

Chamber filter presses and membrane filter presses are used to dewatering sludgy effluents, for example from foundries, metalworking plants, and sewage plants. Digesters, for instance, work according to the displacement principle, whereby old sludge is replaced by fresh sludge from the holding tank; the holding tank acts as a sludge buffer. The sludge only contains some 2 to 6 % of solids, which are separated from the liquid phase by adding flocculants. In most production sites, stationary plants are used to treat the waste water and remove as many solids as possible. Mobile installations are also used, mainly in refuse tips and landfills, and operated by commercial service enterprises.

Large volumes of waste mean high handling and treatment cost, so that efficient sludge dewatering can lead to considerable savings. In the long term, this can even justify the installation of a stationary plant or paying for the services of a commercial operator.



Fig. 1: Layout of a filter press installation

There still are very many mobile installations that are fitted with ancient control equipment and, as a consequence, a high risk of failure, quite apart from low efficiency.

With PMA's solution, BCD switches are used to select the set-points for pressure indicators and pressure monitors. These provide pulsed output signals that are changed into a continuous signal by a D/A converter before being connected to a PD controller.

Furthermore, a KS 94 controller is used, an extremely versatile device that offers high operating convenience. All of the above features are provided by a single piece of equipment.

IMPLEMENTATION

A chamber filter press consists of a pump that is controlled by a frequency converter, and the central part of the system, the cloth filter mats. These are mounted behind each other in a container through which the media is pumped, whereby they hold back the solids suspended in the media. The process continues until the filter mats are clogged.

Membrane filter presses have two pumps for different pressures. Following the charging stage, the second stage involves the actual pressing, whereby all the filter mats are pressed together by means of a cushion of water under pressure.



Very important during sludge de-watering is a slow pressure increase to prevent any restrained solids from being loosened again. This is achieved by the set-point gradient of the KS 94. Should any solids be pressed through the filter mats, this results in a sudden pressure drop. As a result of this control deviation, the pumping rate is increased even more. In such a case, the deviation-dependent process value tracking of the KS 94 soon brings the effective set-point "back to normal". For the charging stage, a relatively flat set-point gradient is required (0,5 bar/minute), whilst the increase during the pressing stage can be somewhat faster (2 bar/minute).

All sequencing control tasks such as pilot lamps, pump switching, on/off switching, etc. are usually executed by a small PLC. However, the entire control task can also be handled by a single KS 98 multi-function unit. Processing sequence with a membrane filter press

First, the set-point simply follows its gradient to the final value, because there is no pressure build-up yet. The peak pressing pressure (and thus the internal set-point W) is set to 13 bar. At a pressure of 5 bar (LimH), the controller switches to the second set-point W2, that is approached along its own gradient during charging. The second set-point lies at 9,5 bar, which is maintained until the pump speed falls below a low limit (LimL). Coupled with a process value tracking function, the pressing stage starts, and the set-point is increased to the initial value of 9,5 bar, whereby the other pump is put into operation. The process is terminated when the final pressure is reached.



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