JUMO

More than sensors + automation

Dairy Technology

Innovative solutions for your success

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Dear Reader,

Dairy products are a permanent part of our everyday life. But only manufacturers know just how much the production of food depends on reliable processes and accurate measurement technology.

Your reliable partner JUMO is always at your side to help when you have questions. We are also here for you to provide quick solutions whether you want to monitor and record pressure, temperature, conductivity, or pH value in your processes or control and document entire cleaning processes. JUMO can help you to lower production costs.

So how do we do it? By applying years of experience and professional expertise. JUMO has been a leading manufacturer of measurement and control systems for more than 70 years. For all this time we have been an expert partner for the food industry.

We place great value on regular new developments, constant improvement of existing products, and on increasingly economic production methods because only this path allows us to achieve the highest degree of innovation for you.

JUMO offers you only the best in dairy technology as well – a large number of solutions for a wide range of applications and support in the implementation of HACCP concepts or in the implementation of the IFS standard.

This brochure provides an overview of JUMO products and systems for the dairy industry. Of course we will also be happy to work with you to develop individual solutions that are tailored to your specific requirements.

PS: Further information about our products can be found under the product group number at **www.industry.jumo.info**.

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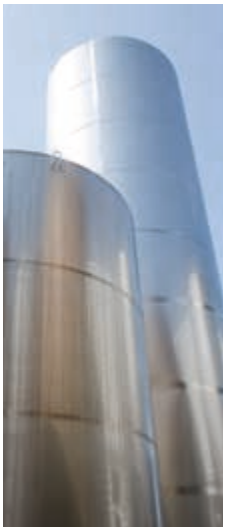


Milk Processing

Dairies place a major emphasis on hygiene. This is so because milk is a sensitive product that must be especially protected against germ contamination. The sensors for hygienic applications from JUMO support you in this task during all the stages of milk processing.

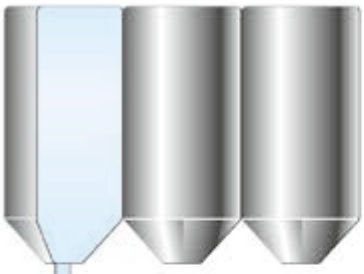
Milk Processing

Milk processing

Milk processing includes the basic processes storing, separating, homogenizing, and pasteurizing. These processes also play an important role in the production of yogurt, butter, and cheese. As a result, they are presented on the following pages as standard processes in dairy technology.

The process of yogurt production is described below as an example for the production of fermented products. Products such as firm yogurt or drinking yogurt are the result when different bacterial cultures are used or when the sequence of sub-processes are changed.

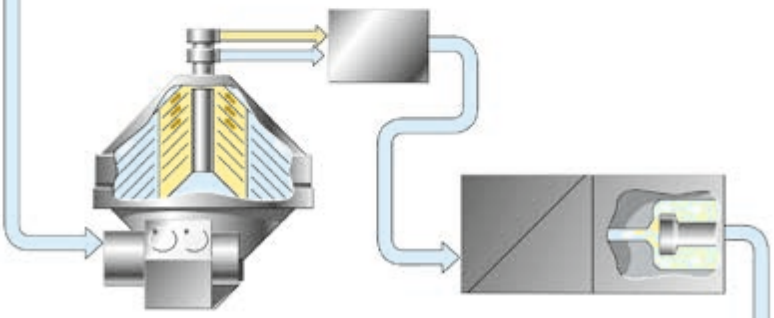
The presentation of cheese production serves as an example for all common types of cheese. Not every process is used for every product. Quark and cream cheese, for example, require pasteurization, but these varieties do not mature. For other types of cheese, such as pasta filata, the cheese curd is subjected to a cooking and drawing process to obtain an elastic cheese dough.



Storing raw milk

- Temperature
- Level
- Indicator
- Controller

Standardizing

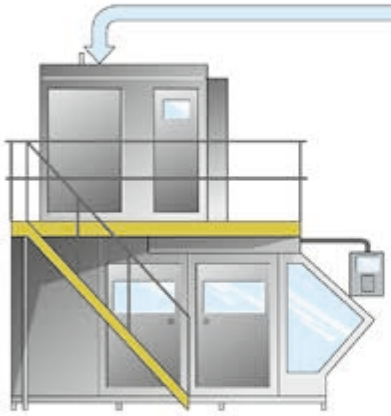


Separating

- Temperature
- Pressure
- Indicator
- Controller
- Flow

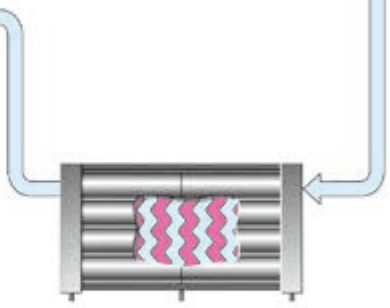
Homogenizing

- Temperature
- Pressure
- Controller
- Recorder



Filling

- Temperature
- Pressure
- Recorder



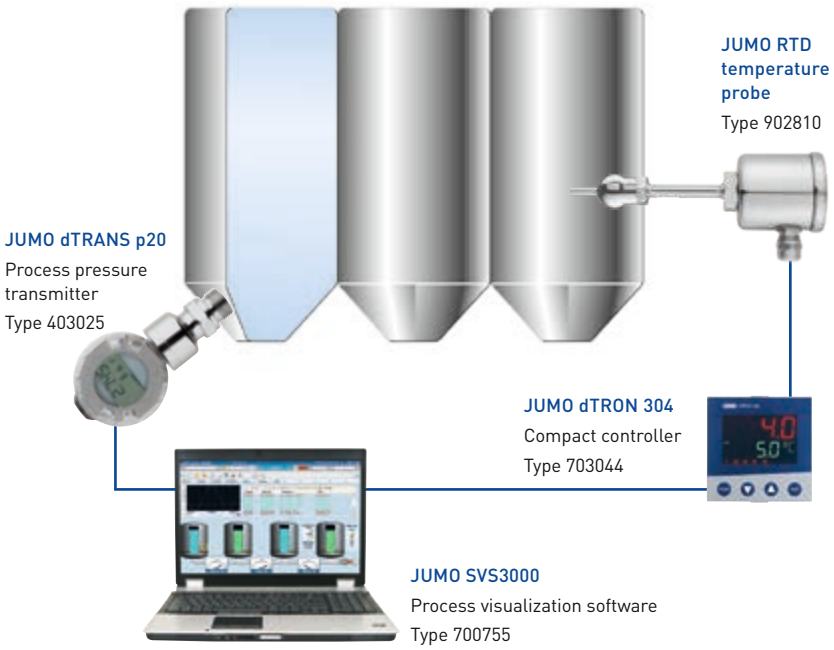
Pasteurizing, ultraheat-treatment, cooling

- Temperature
- Pressure
- Controller
- Recorder
- Flow

Storing

Level control with the JUMO dTRANS p20

In dairies, the level of the storage and sterile tanks is measured by the hydrostatic pressure. The JUMO dTRANS p20 process pressure transmitter combines maximum precision with simple operation due to the convenient and fast input via a rotary knob. The housing and sensors are manufactured from high-grade stainless steel. As a result, the pressure transmitter is ideally suited for use in hygienically sensitive areas. The compact housing with half the building depth enables use even in tight installation conditions. Hygienic process connections and a surface roughness of ⩽ 0.8 µm guarantee the highest process reliability.



Separating

Pressure monitoring in skim milk runoff with the JUMO DELOS SI after separation

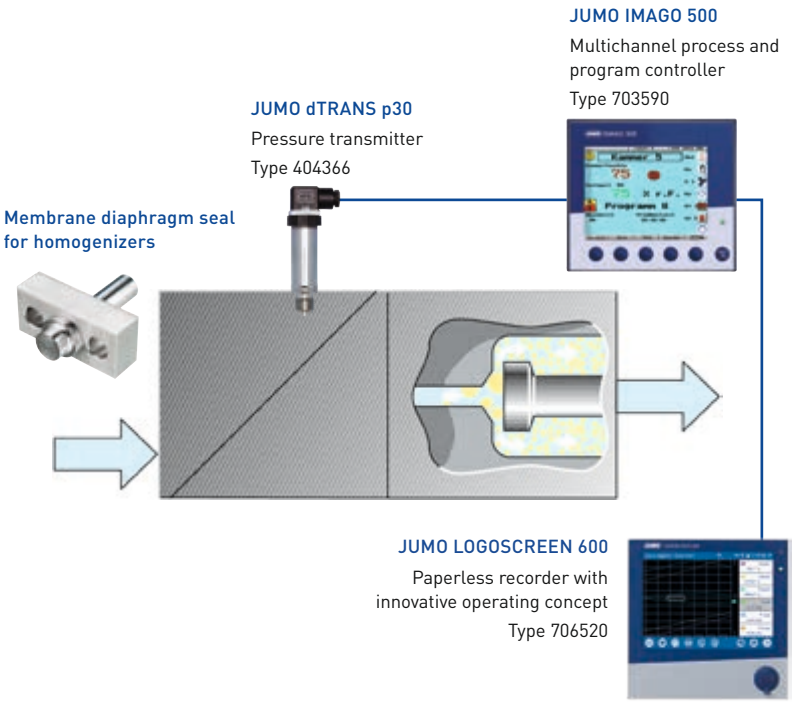
Control of the pressure in the skim milk runoff is important to ensure uniform standardization. Regardless of any pressure or flow fluctuations that may occur after passing through the separator, a constant pressure must be maintained in the skim milk runoff.

The electronic precision pressure transmitter JUMO DELOS SI is a true all-rounder with switching contacts, analog output, and a vibrant LCD display for visualizing the current process pressure and the switching contact status. Use of high-quality stainless steel and front-flush measuring systems without seals make this device ideally suited for use in hygienically sensitive areas.

Homogenizing

Pressure control with the JUMO IMAGO 500

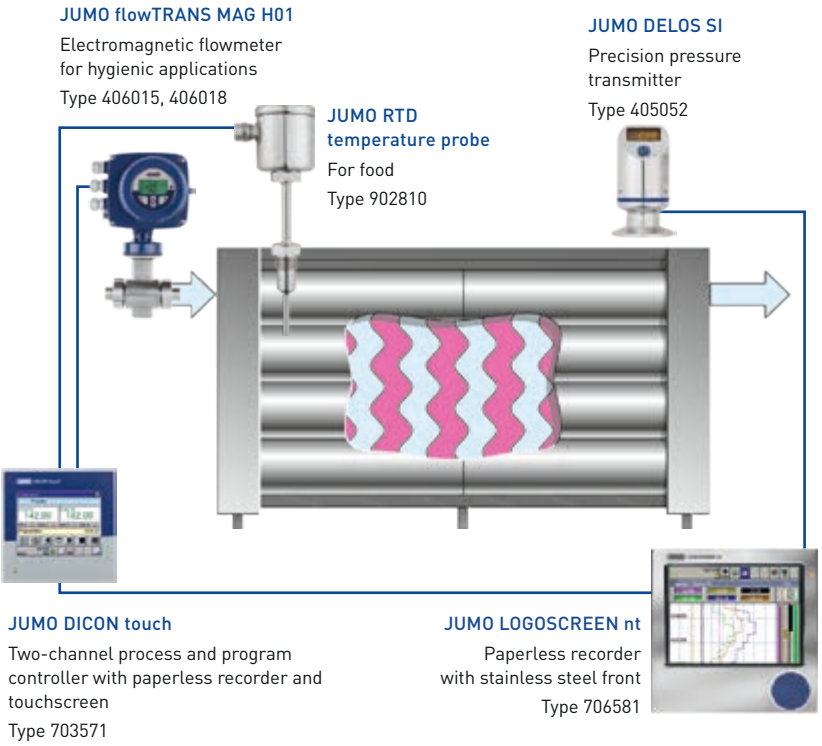
The precise control and monitoring of the pressure during homogenization guarantees that this process is always efficient enough to achieve the required result. When producing cream, for example, the viscosity is adjusted by homogenization. The JUMO IMAGO 500 is the simplest solution for controlling the measurand pressure during this stage of production as several homogenizers can be connected at the same time.



Pasteurizing and heat treatment

Temperature monitoring with JUMO LOGOSCREEN nt

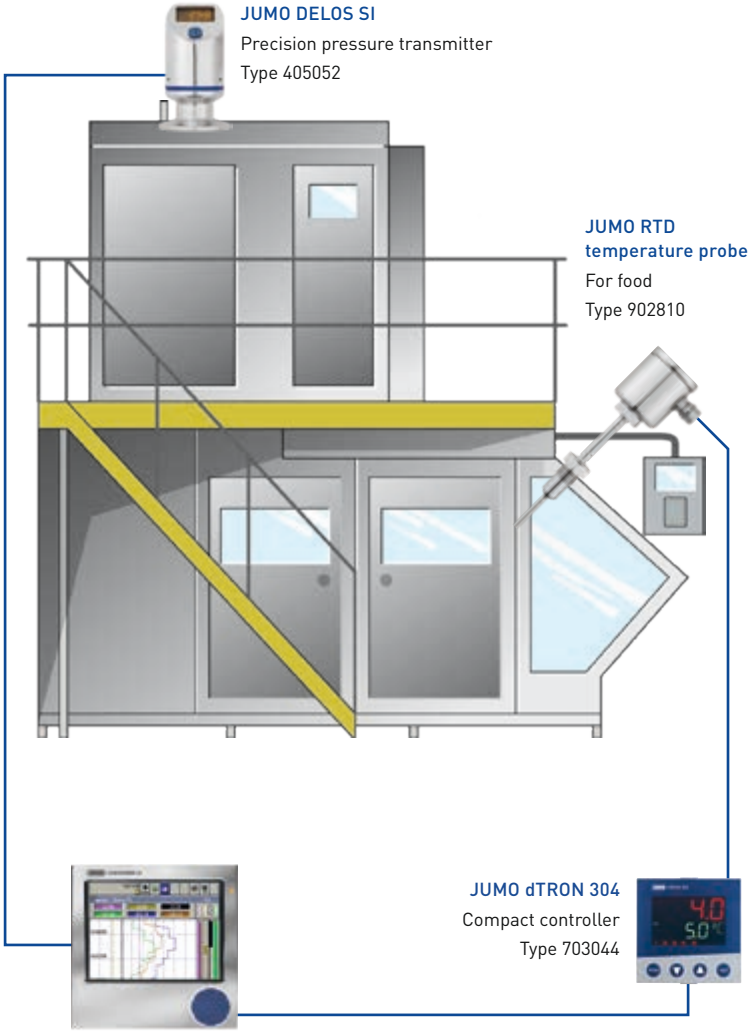
JUMO LOGOSCREEN nt is ideal for recording the temperature during pasteurization. The device complies with the heating committee's guideline regarding measuring, control, monitoring, and safety equipment for milk heating plants. (EU regulation EC nos. 852/2004 and 853/2004). Equally impressive is the high protection type provided by the JUMO LOGOSCREEN nt stainless steel case.



Filling

Recording filling conditions with JUMO LOGOSCREEN nt

Filling plants in a dairy mostly work aseptically. This means that the applied measurement technology must comply with the highest hygiene standards. Aseptic filling plants produce according to the HTST principle (high temperature short time). This means that precise control must be accompanied by reliable recording to guarantee the traceability of the aseptic filling process. JUMO LOGOSCREEN nt can record all the parameters. Should the plant stop, the integrated web server function immediately generates and sends an email. The JUMO LOGOSCREEN nt meets the hygiene requirements of the food industry and at the same time it is resistant to aggressive cleaning agents.



JUMO DELOS SI
Precision pressure transmitter
Type 405052

JUMO RTD temperature probe
For food
Type 902810

JUMO dTRON 304
Compact controller
Type 703044

JUMO LOGOSCREEN nt
Paperless recorder with stainless steel front
Type 706581

The Yogurt Production Process

Yogurt production is a sensitive process. The quality of the final product depends on the temperature. JUMO's reliable sensors help you to produce a high-quality product.

The Yogurt Production Process

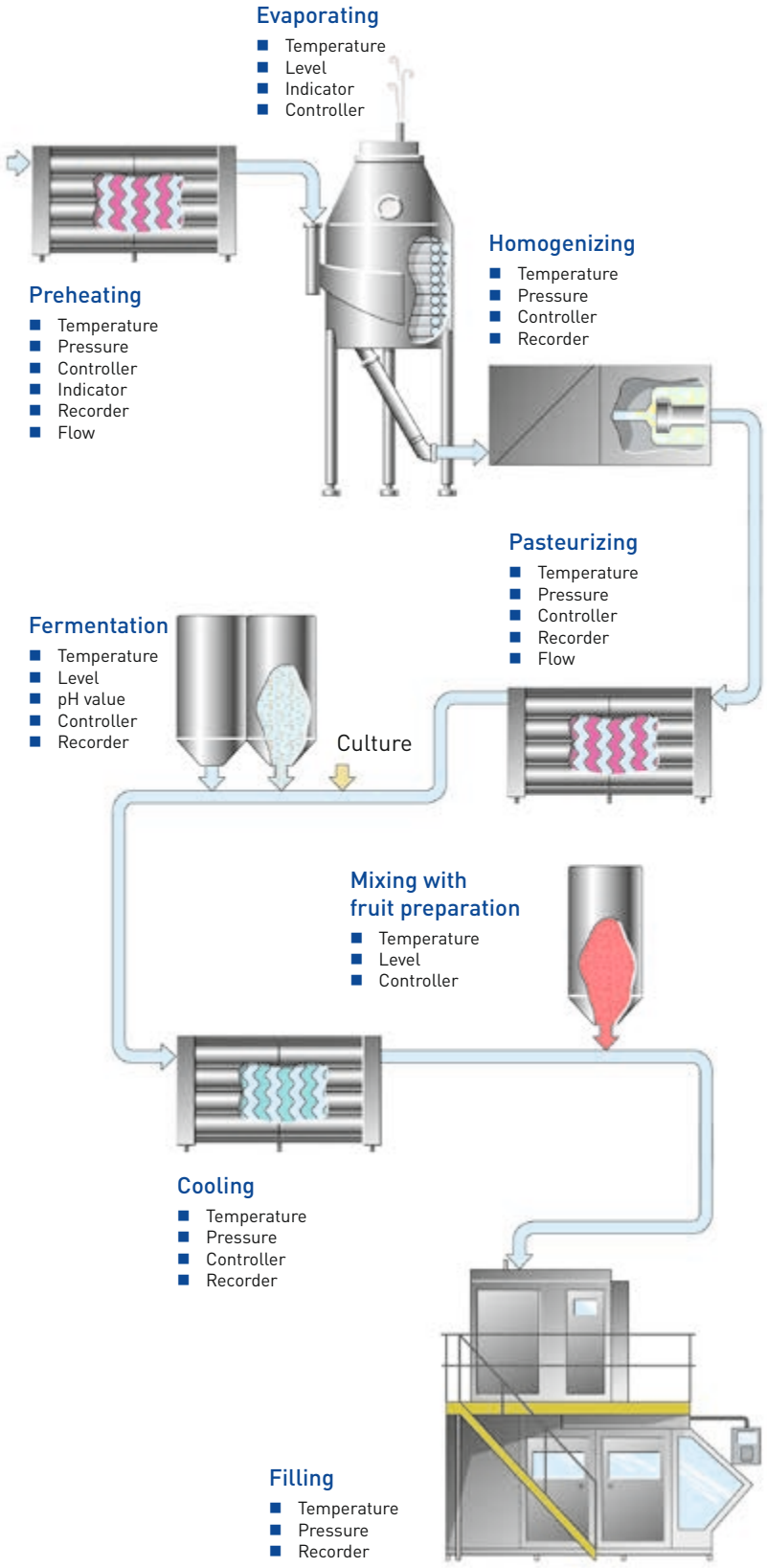
Yogurt production

Yogurt production is used as an example of production for all fermented products. The yogurt type defines the standardized fat content of the processed milk.

The core process is the same whether you are making firm yogurt, stirred yogurt, drinking yogurt, or any other fermented product such as sour cream, crème fraîche, kefir, buttermilk, or soured milk. The milk is adjusted to the required fat content depending on the requested end product. After homogenization and pasteurization the bacterial culture specific to the particular product is added to the milk and incubated. Once products reach the optimum pH value they are cooled, combined with a fruit mixture if required, and then usually filled aseptically to avoid recontamination.

Note:

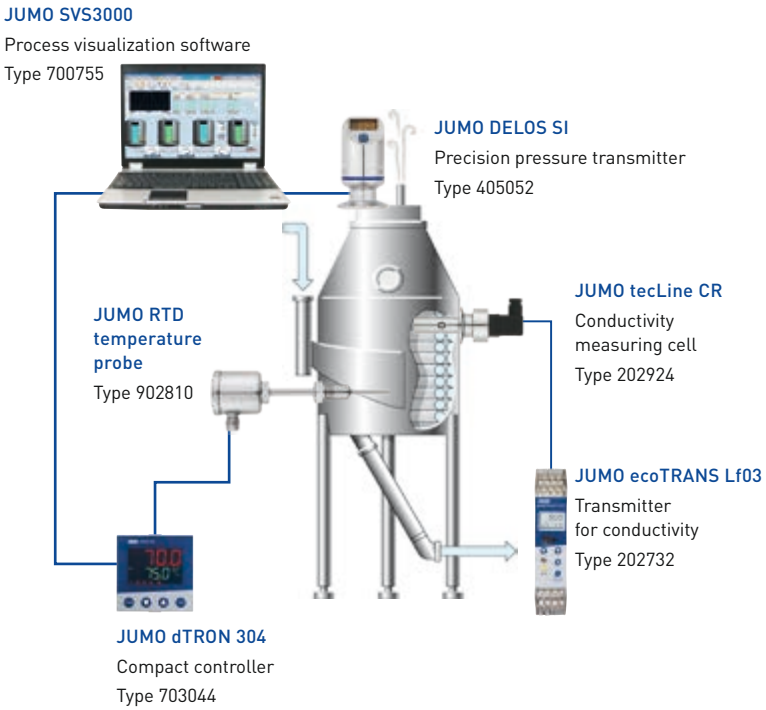
The following pages only show the processes that have not yet been described during milk processing (p. 4-9).



Evaporating

Controlling the increase in dry matter through temperature

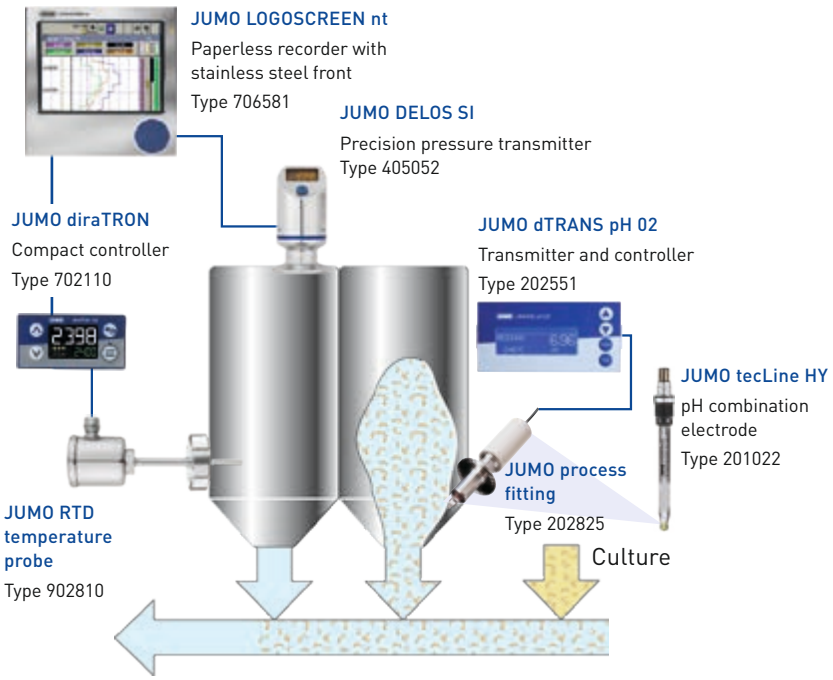
The fat content and dry matter of the milk used in yogurt production are standardized. Standardizing the dry matter improves the yogurt gel. This standardization can be carried out in various ways. The most common method is to increase the dry matter of the milk by evaporation in a vacuum tank. This process is controlled by the temperature at the inflow. The degree of evaporation is determined by the covered distance of the heated milk in the vaporizer.



Fermentation

Monitoring of fermentation

After the milk has been mixed with the appropriate yogurt culture the incubation follows. The end of the incubation phase is often controlled by the pH value. As soon as the pH value reaches 4.2 to 4.5, the yogurt must be cooled from the incubation temperature to between 15 °C and 22 °C to interrupt acid formation. JUMO tecLine pH electrodes with a hygienic process fitting can safely monitor this process.

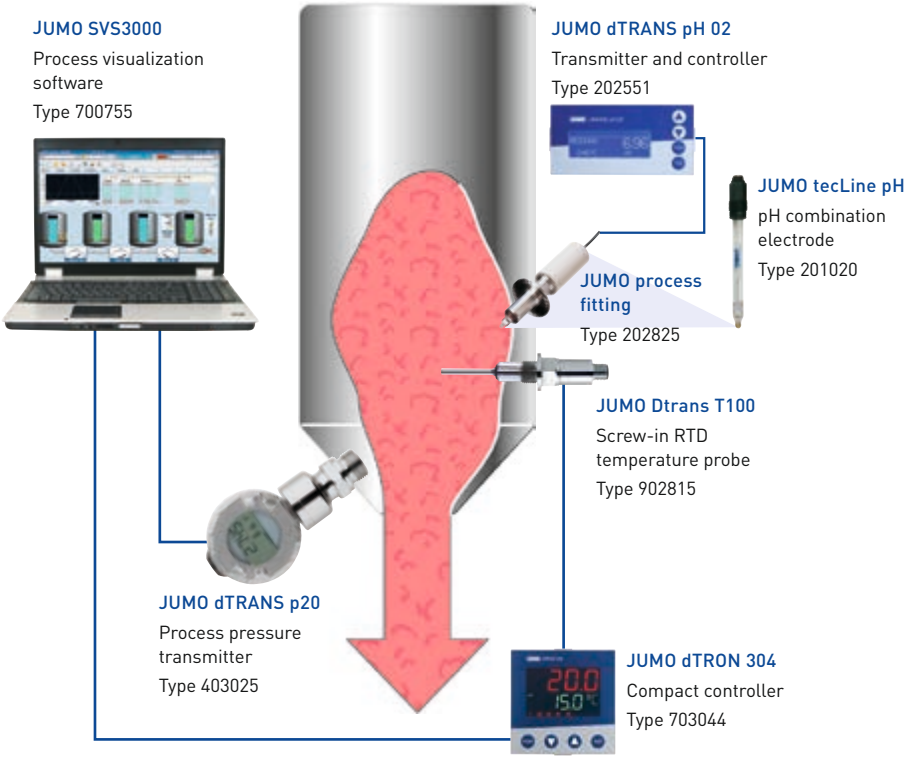


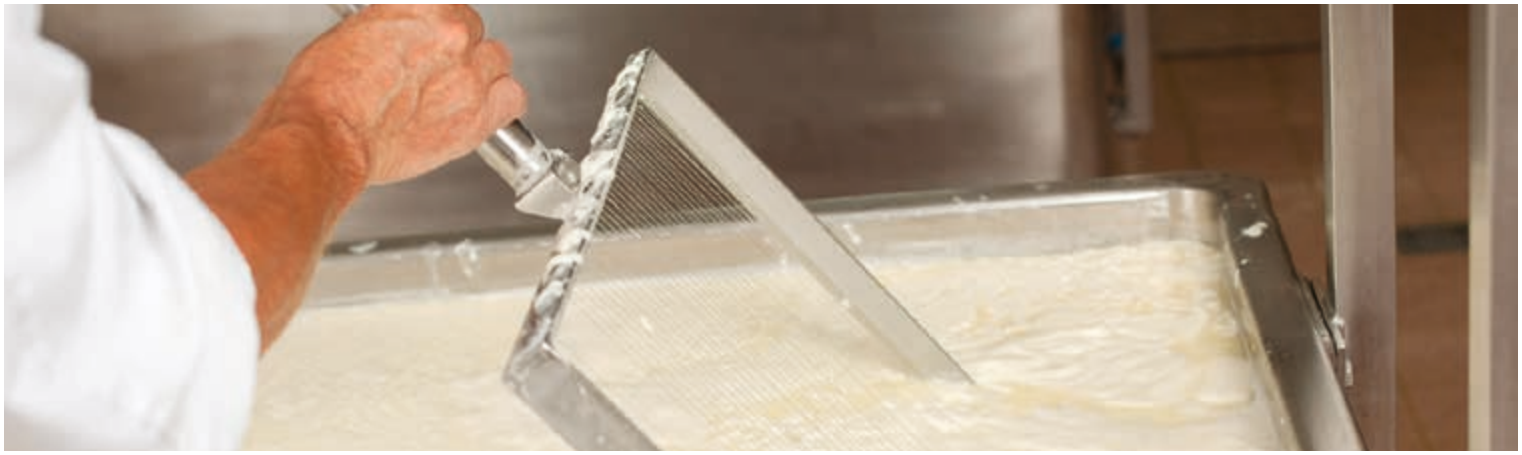
Mixing

Mixing the yogurt with the fruit preparation

The fruit preparation is mixed into the finished yogurt before filling takes place. As this process involves a high risk of recontamination, the fruit preparation must be sufficiently heat-treated in advance to kill all vegetative microorganisms without affecting the taste and texture of the fruit preparation.

A pH value control of the different fruit preparations is crucial as a pH value that is too low afterwards can have a negative effect on fermentation.





The Cheese Production Process

Measurands temperature and pH value play an important role in cheese production. JUMO solutions allow you to perfectly control and monitor your production process.

The Cheese Production Process

Cheese production

The simplified cheese production process that is described here is used as an example for all common cheese varieties (e.g. hard cheese, sliced cheese, soft cheese, cream cheese, or quark). Of course, the manufacturing processes vary. For example, quark and cream cheese do not mature.

After the milk is delivered it is first thermized if it cannot be processed immediately. Thermization inhibits the growth of bacteria which allows a longer time for processing. Depending on which cheese is to be produced the milk is standardized, pasteurized, and, in the case of special semi-hard cheeses, sometimes partially homogenized before coagulation. In the cheese vat, coagulation is carried out with the appropriate bacterial culture or rennet. The cheese curd is then cut up with a so-called cheese harp so that the whey can escape more easily. After the whey has escaped the cheese curd is shaped, pressed, salted, and stored for maturing.

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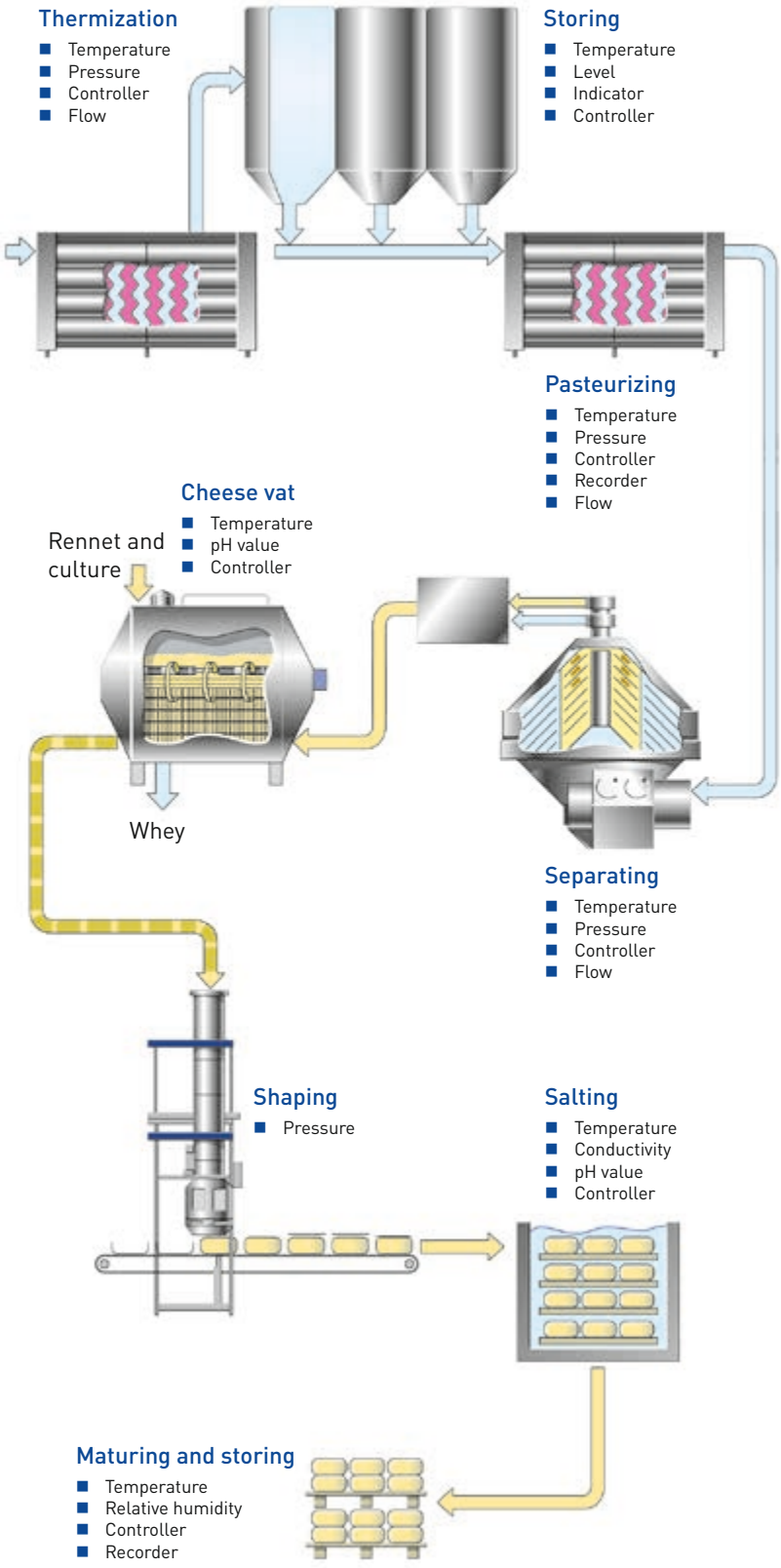


Cheese vat

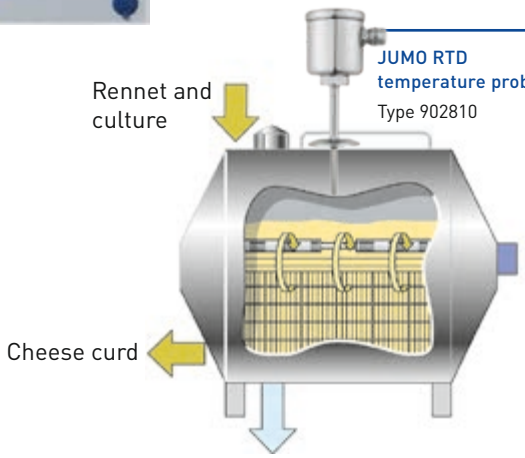
pH value and temperature control in the cheese vat

The pH value and temperature must be controlled and recorded in the cheese vat. Both measurands are parameters for the subsequent cheese quality and determine the process steps to follow. For example, the duration of the stirring period depends on the required acidity level. The temperature-time diagram is determined by the heating method and the cheese type. The combination of a hygienic temperature probe and the JUMO dTRON compact controller allows fast temperature acquisition and optimized control. This way energy can be saved because unnecessarily long switching and heating periods are avoided.

JUMO LOGOSCREEN 700
Highly-scalable paperless recorder
Type 706530

JUMO dTRON 304
Compact controller
Type 703044

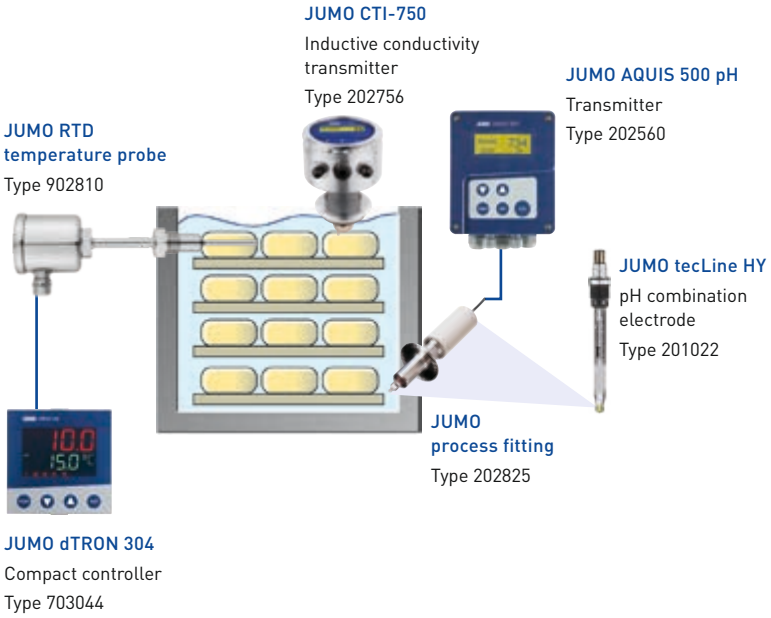
JUMO RTD temperature probe
Type 902810



Salting

Monitoring salt concentration in the salt bath via conductivity with the JUMO CTI-750

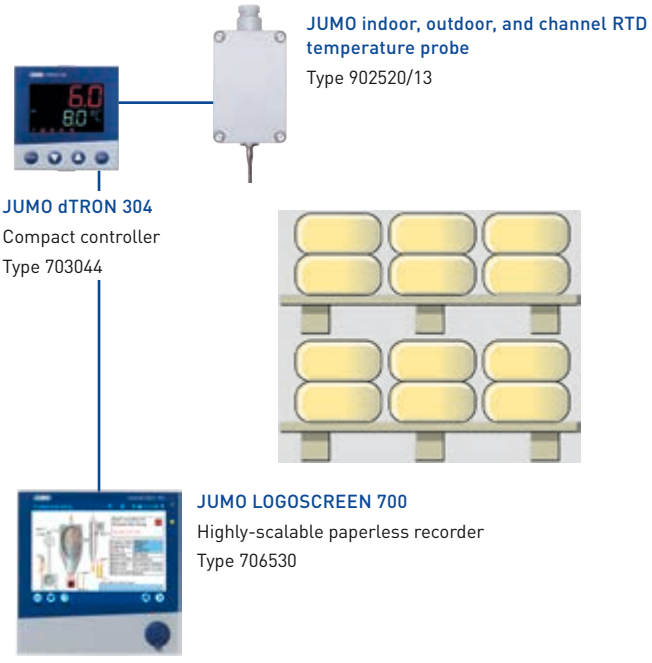
Measuring salt concentration in the salt bath via conductivity with the JUMO CTI-750. The cheese loaf is salted for several reasons. Achieving the correct product consistency is the most important one. During this process the cheese stores sodium from the salt which consistently changes the salt concentration in the brine. This process must be monitored, which can be done with the inductive conductivity transmitter JUMO CTI-750. The temperature is measured at the same time here as the duration of the cheese loaf in the brine also depends on this measurand.



Maturing and storing

Temperature and humidity control during maturing

Different storage conditions are required for different cheese types. The measurands during maturing are temperature, relative humidity, and time. To guarantee optimum and reproducible maturing, the above measurands must be constantly monitored and recorded.



CIP Cleaning

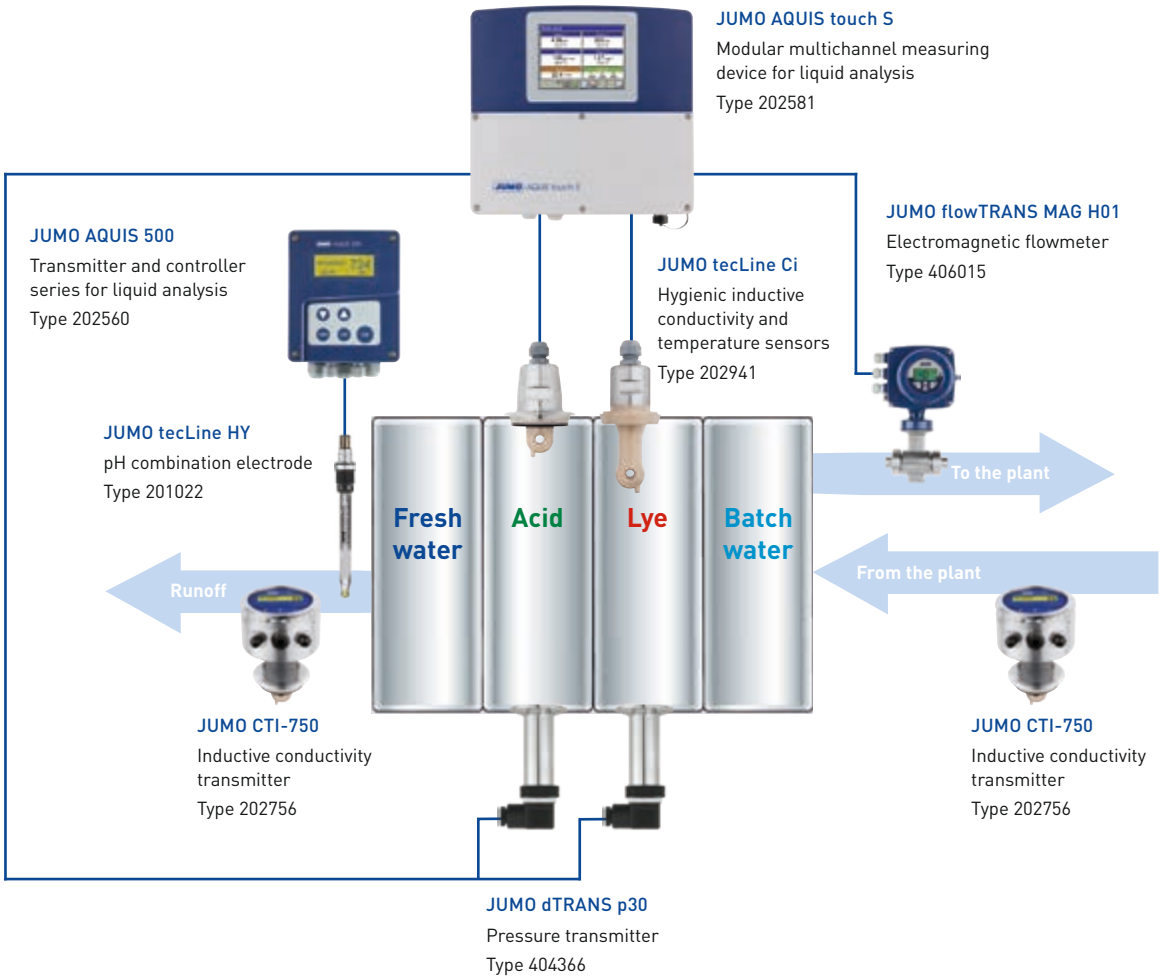
Hygienic, perfectly cleaned plants form the basis of every good process. This is ensured by CIP – Cleaning in Place. JUMO also offers first-class systems and solutions in this area.

Measuring – Controlling – Displaying – Recording
New possibilities with the JUMO AQUIS touch S

The JUMO AQUIS touch S is a modular multichannel measuring device that provides new approaches in CIP cleaning. For example, the concentration setting of the acid and lye solutions, the level of both tanks, and the flow velocity can be measured, controlled, and displayed as well as registered on-site – all with one device. Essentially, a maximum of 4 analog analysis sensors can be used while a total of up to 10 parameters can be measured and managed simultaneously. In addition to numerous alarm, limit value, or time-controlled switching functions up to 4 higher-order loops can be defined simultaneously in the JUMO AQUIS touch S.

Conserve resources – reduce maintenance costs

The function of the plant determines whether the application will be implemented with the modular multichannel measuring device JUMO AQUIS touch S or the tried-and-tested inductive conductivity transmitter JUMO CTI-750. Both systems have proven themselves through the benefits they provide. For example, the JUMO CTI-750 is the ideal solution when working with a PLC in the background. The JUMO AQUIS touch S on the other hand functions as a stand-alone solution. The low-maintenance sensor and highly accurate measurement of inductive conductivity help preserve resources and reduce the maintenance costs for your plant.



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