

Thermal processing solutions

Fulfilling regulatory needs in the
Food & Beverage industry

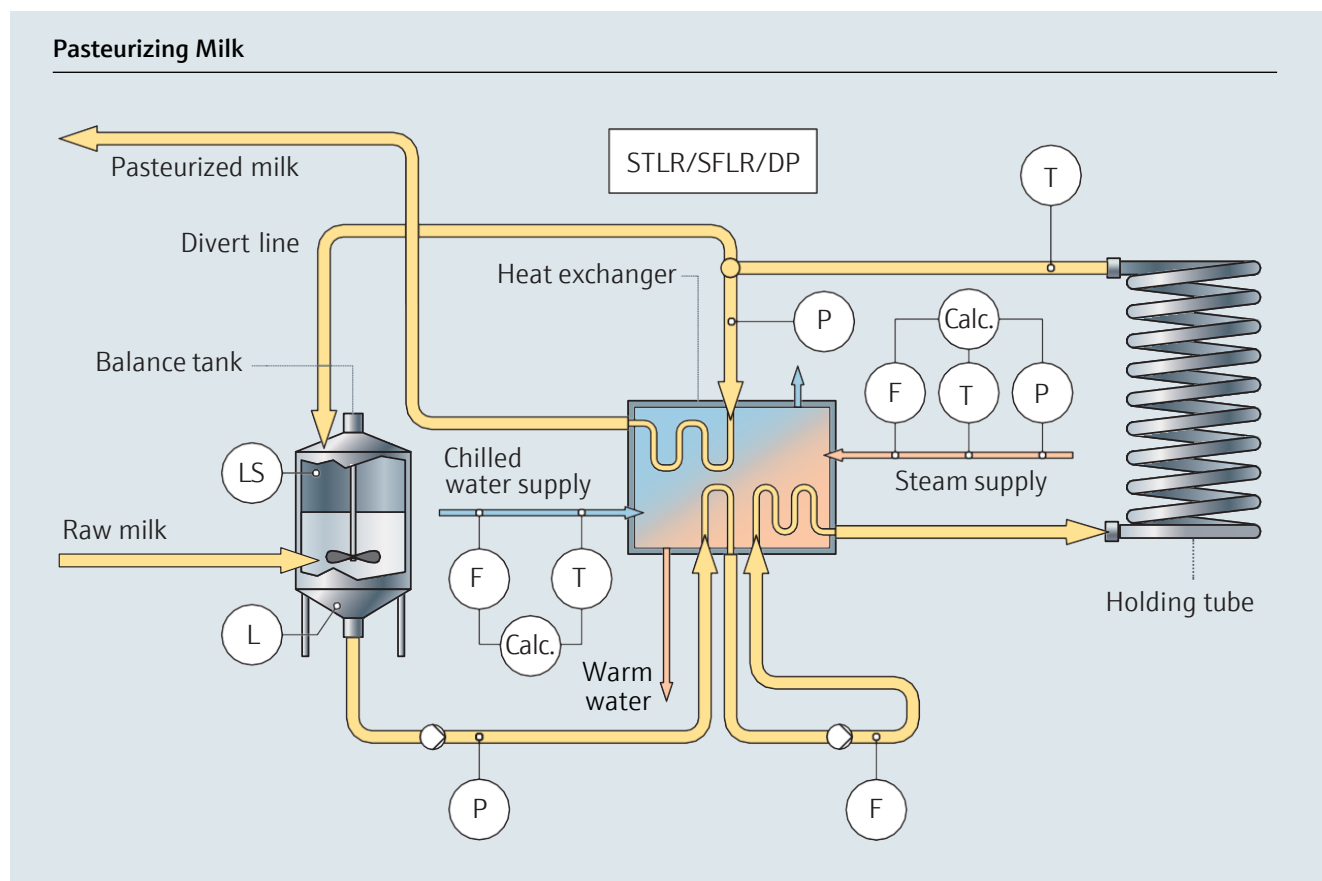


Compliant products and solutions

Endress+Hauser offers products and solutions compliant with health authority requirements outlined in 2023 revision of *Pasteurized Milk Ordinance* for HTST, UHT or aseptic processing systems per 21CFR.113

To ensure food safety of the product, it is essential to monitor the time and temperature relationship to ensure that pathogens in the product are removed. Therefore, it is

critical to food safety that the hold temperature, flow velocity and differential pressure across the regeneration of the product are controlled and recorded (see process map).



Legal controls and records

Recorder/controller (STLR/SFLR) Safety Thermal Limit (flow) Recorder

Memograph M RSG45 data manager and Field Data Manager (FDM) Software are used to record hot product temperature (hold tube), flow velocity and flow diversion valve (FDD) status. Memograph M RSG45 data manager also acts as a controller for forward/divert signal to FDD. Measured values are retransmitted to legal PLC via 4-20mA or EtherNet/IP .

Flow

Proline Promag H 100/300/500 all meet requirements for meter-based timing (universal, compatible with all STLR/SFLR manufacturers).

Temperature

iTHERM CompactLine TM311 with M12 tamper seal or iTHERM ModuLine TM402 hygienic modular thermometer with PP housing accommodating regulatory seal and response time (universal, compatible with all STLR/SFLR manufacturers).

Differential pressure switch

Incorporated into the Memograph M RSG45, eliminating the need for a separate differential pressure switch (function not included in current M-b).

Differential pressure sensors

Two independent Cerabar PMP43 hygienic pressure transmitters for differential pressure across the regenerator (heat exchanger). M12 tamper seal must be in place to accommodate the regulatory seal (universal, compatible with all STLR/SFLR manufacturers).

Digital Reference Thermometer (DRT)

Not currently available from Endress+Hauser.



Recorder/controller (STLR/SFLR)

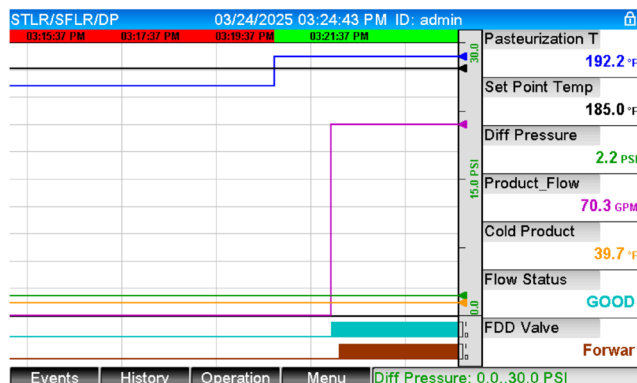
The Memograph M RSG45 data manager and Field Data Manager (FDM) software by Endress+Hauser enables reliable, secure data recording, electronic record management, archiving and transmission per 21 CFR Part 11 and compliance with PMO recorder/controller and process authority requirements (M-b-385).

Recorded data is stored on the Memograph M RSG45 in internal memory. The internal memory holds approximately 24 weeks of data when used as STLR/SFLR with a one-second recording interval. The FDM reporting software is installed on a local server and connected to Memograph M RSG45 data manager via LAN (Ethernet TCP/IP) for automatic transfer and access to current values and recorded data.

Operators enter annotations directly on the recorder's touchscreen or the local server workstation. Records and annotations are available on Memograph M RSG45 data manager and in FDM for review and approval. The FDM provides a platform for supervisors, regulatory, quality etc.,



Memograph M RSG45
with 7" touchscreen,
Nema4x SS front



Example of the screen for all variables; each control point can be visualized individually or grouped as STLR or SFLR, respectively, with up to 10 customizable screens available

to access records, annotations and workflow to approve and save records securely on company servers. Printing of records is available.

Typical applications are:

- Continuous pasteurization in HTST, UHT and aseptic
- ESL applications
- Raw silo temperatures
- Juice pasteurization
- Egg pasteurization
- Cold product recording
- Product tank/silo temperature and level, such as raw milk or aseptic tanks
- Clean-in-place (CIP)
- Clean-out of-place (COP)
- Retort, low acid
- General process recording and monitoring

The Memograph M RSG45 data manager is available with up to 20 universal input channels, based on application: 14 digital inputs, 12 relays, two independent 4-20mA or EtherNet/IP for retransmission. A preferred configuration is RSG45-AA*BBBBDB1E2+GA H9 (*select power supply and any extra inputs).

The Field Data Manager software MS21-ABA3 is installed on the local server for records and review. Field Data Manager Software MS21 supports unlimited Memograph M RSG45 data managers and five concurrent users (unlimited workstations): annotations, review and sign-off.



Back cover for terminals for application of regulatory seal; operator sign-in is via username/password or employee RFID badge reader (RDR-805W1BKU + Panel Mount IP67 Kit: KT-IP67)

Electromagnetic flow



Proline Promag H

The U.S. Food and Drug Administration (FDA) has issued “M-b” letters of compliance (M-b-379, 380 and 381) verifying that the Proline Promag H 100/300/500 series meet the intent of the Pasteurized Milk Ordinance (PMO) for meter-based timing. The letter, which has been distributed to all FDA dairy branches, is also available for download on www.us.endress.com product pages under respective model certificates. The letter outlines the model, allowable options and programming required for implementing the Proline Promag H for electromagnetic flowmeter-based timing systems for HTST pasteurizer or aseptic processing systems by PMO 2017 revision.

The flow velocity is a direct indication of the time at which the product has been held at the required temperature. Some systems use a positive displacement (timing) pump that is set at a constant speed. In electromagnetic flowmeter-based systems, the flowmeter measures the flow rate (velocity) and the corresponding output signal is sent to the SFLR (Safety Flow Limit Recorder). This recorder/controller regulates a control valve or a variable speed drive on the centrifugal pump to maintain a constant product rate. The signal is also used to divert product if flow velocity set-point(s) are violated. Coriolis mass flow is not permitted per PMO as it is not a direct velocity measurement.

The M-b compliance letter defines how the Proline Promag H should be installed and programmed. All Proline Promag H 100/300/500 electromagnetic flowmeters can be adapted to fulfill PMO requirements by applying the locking kit.

The locking kit can be applied to the Proline Promag H series with the stainless-steel enclosures for Proline Promag H 100/300 or the remote wall-mounted electronics version (Proline Promag H 500). The locking kit for the Proline Promag H PMO regulatory seal contains screws and a display key cover (Endress+Hauser Part #71433963; DTSP-AT1XZ8 - TSP 71417487).

Temperature

The temperature of the hold tube (hot product) is measured using an ultra-fast, tip-sensitive thin film RTD element that far exceeds the response time requirement of PMO. The iTHERM CompactLine TM311 meets the requirements.

The iTHERM CompactLine TM311 is a fully welded style RTD with an M12 electrical connection; this requires the M12 tamper seal to accommodate the regulatory seal. Generally, a direct 4-wire RTD connection is used for direct wiring to the recorder/controller. 4-20mA is also permitted. M-bs are not issued for temperature sensors.

- iTHERM CompactLine TM311-CAA0B**BBX5A2+LB (*select process connection and immersion length, typical 5.5 inches): the M-12 tamper seal

(Part #TTSP-AT1642) is required to accommodate the regulatory wire seal; also available with 1/2" tube diameter reduced to 1/4" tip. Cold product temperature: the chilled product is also monitored; the iTHERM CompactLine TM311 meets these measurements



iTHERM CompactLine TM311

Differential pressure

In the HTST pasteurization system, measuring the pressure across the regenerator section of the heat exchanger or equivalent measurement points on UHT and aseptic is required. These individual signals are sent to the Memograph M RSG45 data manager, which does the math to calculate the differential pressure across a regenerator section of the heat exchanger, steam injector, etc. A positive pressure must be maintained on the pasteurized side to ensure that the raw milk will not contaminate the milk in case of a pinhole or gasket leak or to maintain proper pressure across the steam injector. Incorporating differential pressure in the Memograph M RSG45 data manager provides benefits vs. separate differential pressure box: pressures are recorded, and pressure sensor failure results in divert condition.

For pressure transmitters to be compliant, they must provide a functional lock that regulatory agents can use to seal the transmitter to prevent tampering and replacement. M-b's are not issued for temperature sensors.

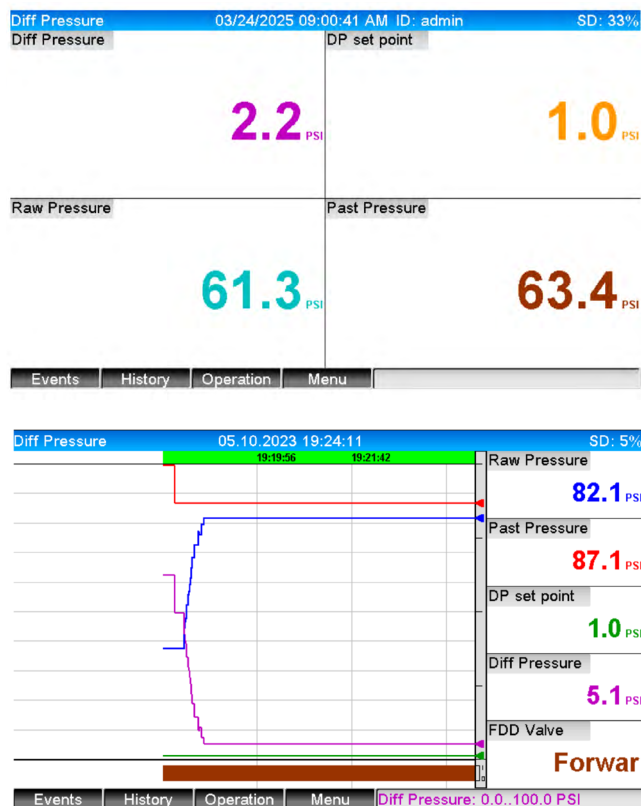


Cerabar PMP43

Please use the following part numbers for pressure transmitters and select a preferred pre-set range (generally 100 or 200 psi; can be adjusted later via HART):

- Cerabar PMP43-CABAGFN6C3RAJTA***A4+LB (**select process connection); the M-12 tamper seal is required to accommodate the regulatory wire seal; Part #TTSP-AT1642
- Where remote seal transmitters are desired, the Cerabar PMP55-CD 1 2 Q x xx G x xxx E 4 x LB 09, with lock mechanism for regulatory wire seal TSP# 71169673

Aseptic systems use direct steam injection or infusion to reach temperatures of >275 °F instantly. To monitor the steam and back pressure in the system, Cerabar PMP43 or Cerabar PMP55 pressure transmitters are used.



Differential pressure screen allows users to decide which operator view is preferred, traditional or with recorded values. The Memograph M RSG45 provides an alarm if either PMP43 pressure transmitter fails. They can be set to divert in the event of failure.

Other common measurements

Level

The balance tank level must be controlled to ensure constant feed to the system. Inaccurate readings can lead to overspill or air pulled into the system. The balance tanks are generally small, with approximately 24" to 48" H₂O levels. The rapid temperature changes caused by mixing cold products with heated products during divert conditions or clean-in-place (CIP) make this a demanding application.

The Deltapilot FMB50, with its advanced temperature compensation, makes this ideal for the application. Other alternatives are vibronic point-level switches (Liquiphant FTL33 or Liquipoint FTW33) for high and low levels. Capacitance continuous level using the Liquicap FMI51 is also an option.

Level measurement in the flash cooler (vacuum chamber) in UHT/aseptic systems is best done with a Deltabar S FMD78 or the Deltabar FMD71/72 electronic differential pressure transmitter. Due to the small level to be controlled – about 24" to 40" H₂O – the recommended diaphragm seals should be no smaller than 2-½". Be sure to order long enough capillaries to reach the top installation point with the transmitter mounted at or below the height of the lower seal. This is required to protect the seals from damage that otherwise may occur when operating at vacuum in combination with elevated temperatures. Using the electronic DP Deltabar FMD71/72 eliminates these potential challenges and makes installation easier. The FMD71 with a ceramic measuring cell eliminates any errors or premature failure associated with vacuum and elevated temperatures.



Liquiphant FTL33



Liquiphant FTL43



Deltapilot FMB50



Deltabar S FMD78

Documentation

Scan the QR codes for direct access to PMO or visit our website at www.us.endress.com



Promag H 100



Promag H 300



Promag H 500



Memograph
M RSG45

www.addresses.endress.com

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