Meet Critical Pasteurization Control Requirements with Ease of Use Features and Safety Benefits

The DR4500 High Temperature Short Time (HTST) / Pasteurization Flow recorder and controller combines the broad capabilities of Honeywell’s recorders with the special features needed to serve the milk pasteurization requirements of the dairy industry. These features address the need for sanitary protection as well as:

- accurate temperature and flow measurement
- precise control
- comprehensive recording.

In addition to meeting these critical requirements, it offers valuable benefits of ease of use, reduced downtime for sensor replacement and savings in equipment and installation costs.

The pasteurization recorder/ controller complies with the strict health-protection regulations of the “Grade A Pasteurized Milk Ordinance” established by the U.S. Department of Health and Human Services, Public Health Service.

Controlling the Process

The DR45AH HTST model is designed to control milk temperature during the pasteurization process outlined in the diagram. Milk flows from the raw milk supply tank through the plate-type heat exchanger, where it is heated to pasteurization temperature prior to entering the holding tube.

The tube size ensures that the milk remains at the pasteurization temperature for the required time. Hot milk temperature is measured as it leaves the holding tube. If this temperature is above the pasteurization temperature, the DR45AH HTST allows milk flow to proceed to packaging or storage. If the milk is below pasteurization temperature, the DR45AH HTST diverts it to the raw milk tank for reprocessing.

Pasteurization temperature control consists of recording the information shown on the circular chart figure on the next page, and implementing the following strategies:

1. The first analog input is hot water temperature (if Digital Reference Temperature option is selected, then Input 3 is the Hot Water Temperature), which indirectly controls milk temperature in the plate heat exchanger. This temperature may be recorded.

2. The hot milk temperature is the second analog input. This temperature is recorded. The high-precision RTD sensor provides this temperature measurement. DR 45AH HTST uses 100-ohm (a = 0.00385) platinum bulb actuation to provide hot milk temperature measurement accuracy of ±0.3°F.
3. A switch on the flow diversion valve provides the digital input to activate the frequency pen that records the valve position on the outer portion of the chart. The user supplies and installs the two relays that connect to the pasteurizer system wiring.

You can also record the flow diversion temperature setpoint without an additional analog input.

The **DR45AP** model controls the flow rate in the pasteurization process. The flow is controlled from the flow input from a pressure transmitter or Magnetic flowmeter in the constant flow line.

The recorder uses PID control and a 4-20mA output to control a variable speed pump, which adjusts the flow in the system. The optional differential pressure function uses pressure inputs from Input 2 and Input 3 to measure and display the high and low system pressures (Input 2 - Input 3) and uses this value and the optional second 4-20mA control output to control the system back pressure.

Diverts are based on High Flow or Low Flow setpoints configured in the recorder/controller. Diversion to the Raw milk tank occurs when the flow rate is below the Low Flow setpoint or above the High Flow setpoint.

There is a Time Delay that can be configured to occur before forward flow will begin. The configurable range for this time delay is from 0 to 60 seconds.

For Pasteurization Flow, the DR45AP uses one analog input for flow, one digital input, one three mode controller and one On/Off controller to control both:

- process flow rate
- flow diversion valve position

If controlling system back pressure, two additional analog inputs and one 3-mode, 4-20mA controller with two additional relay outputs is required. Pasteurization flow control consists of recording the information shown on the circular chart for Input 1 flow and implementing the following strategies:

1. The first analog input is Process Flow.
2. Optional Inputs 2, Input 3 and Control 2 output can be set to record the system high and low pressure for differential pressure measurement and to control the system back pressure.
3. A switch on the flow diversion valve provides the digital input to activate the frequency pen that records the valve position on the outer portion of the chart. The user supplies and installs the two relays that connect the recorder/controller to the pasteurizer system wiring.

**Input Processing**

Each input is sampled at a rate of 3 times per second for 1 or 2 inputs, or 3 times in 2 seconds for 3 or 4 inputs. Each sample is amplified and then converted to a digital signal which is isolated and passed to the microprocessor. A digital filter with configurable time constants lets you apply input signal smoothing as desired. All non-linear inputs are linearized by the microprocessor. In the unlikely event of failure, you can easily and quickly replace the resistance bulb temperature sensor. Older, filled thermal systems typically take much longer to repair.

**DR 4500 HTST/Pasteurization Flow Recorder/Controller Provides Flexibility**

The DR45AH is easily configured to record and control milk temperature in a pasteurization process. The recorder utilizes a 3-A approved, sanitary high-speed RTD sensor to measure hot milk temperature. The DR45AH also has the capability to use a Digital Reference Thermometer when a dual element RTD sensor is used. When enabled, and a divert occurs, the value of the reference temperature will be printed. Once the forward condition is restored, the reference temperature will again be printed. Red and green lights on the front of the recorder provide a visual indication of forward flow or flow diversion.
The DR45AP is easily configured to record and control milk flow in a pasteurization process. In addition to the normal divert value control provided by the high and low of signal flow limit setpoints, optional inputs can be setup to display and record the raw and pasteurized pressures in the system as shown in the below figure.

The recorder/controller lower display will show the system high and low pressures from independent pressure transmitters. The system back pressure is controlled using the second control output. Additionally, a high pressure limit output can be set. Optional red and green lights are available on the front of the recorder that provide a visual indication of forward flow or diversion.

DR4500 HTST/Pasteurization Flow Recorder/Controller Is Easy to Use

Many unique features make the Honeywell DR4500 easy to use:

Installing a new chart is simple — the operator does not lose valuable time lining up preprinted replacement charts. This recorder/controller uses the exclusive Truline circular chart recorder feature to print its own chart with the timeline and time as it records the data. In addition to saving operator time, this innovative self-printing feature:

- assures accurate time on the charts
- improves the accuracy of the recorded data
- reduces chart inventory

A box of blank 12-inch circular Truline charts is all that is needed to have a virtually infinite selection of charts at your disposal.

Multiple measurements on a single chart reduce chart-changing requirements — unique Truline feature that allows recording of up to four variables on a timeline. Other circular chart recorders use multiple pens to track multiple inputs, making it impossible to show more than one variable on a timeline. Records made this way are often difficult to interpret and leave uncertainty about when an event occurred. Since the recorder/controller uses only one stylus to record data and print the chart, you can conveniently monitor up to four variables—all on the same timeline. This capability makes records exceptionally easy to read—an advantage when you must retrieve and review stored records.

Easy configuration and single-button initiation simplify operation — lets you enter configuration parameters for the High Temperature Short Time (HTST) or pasteurization flow process. You can easily modify these parameters if your pasteurization requirements change.

Automatic information reduces manual entries — the DR 4500 recorder with its Truline technology prints identifying information automatically on the chart. This data can include:

- listing of monitored variables in the header
- range of each variable
- time references
- alphanumeric messages
- diversion temperatures
Unique Digital Reference Capability — when configured to perform the Digital Reference measurement, the DR4500 automatically records the digital value of the divert and forward flow temperature next to the Frequency Pen Divert Event mark.

Compliance to Milk Ordinance Regulations

DR 45AH/AP fully complies with the strict regulations of the “Grade A Pasteurized Milk Ordinance”. Compliance features include:

Internal Configuration Switch

This security switch limits access to configuration parameters. In the switch “OFF” position, you can configure all the recorder/controller parameters to the desired value. The “ON” position locks the majority of the configurable parameters, including hot milk diversion setpoint, so that they may not be changed. The only parameters that may be changed in the “ON” (locked) position are:

- **Chart** – start the chart or place it in hold.
- **Man/Auto** – place the hot water temperature (DR45AH) or flow (DR45AP) controller in Manual or Automatic mode as defined below:
  - **MAN** – output signal to the valve is manually controlled.
  - **AUTO** – setpoint for the controller is adjustable.
- **Lowr/Disp** – scroll through the process variable inputs, outputs, setpoints and deviation from setpoint.
- **Configuration** – changes to Control 1 and Control 2 tuning parameters plus adjustments to time/date/day/year.

Diversion Valve Position Indication

Red and green lights, visible through the door, indicate flow diversion valve position. Red indicates flow diversion, green indicates forward flow.

Electronics Access Control

Chart Plate sealing provisions, using a wire lead seal, prevent access to the electronics and the internal configuration switch.

For More Information

Learn more about how Honeywell’s [product/solution name goes here] can [insert benefit here, for example, Improve plant performance.] visit our website [www.honeywellprocess.com](http://www.honeywellprocess.com) or contact your Honeywell account manager.

Honeywell Process Solutions

Honeywell
1250 West Sam Houston Parkway South
Houston, TX 77042

Honeywell House, Arlington Business Park
Bracknell, Berkshire, England RG12 1EB UK

Shanghai City Centre, 100 Junyi Road
Shanghai, China 20051

[www.honeywellprocess.com](http://www.honeywellprocess.com)