Special Documentation
MCS200HW, MCS200HW-MP

Sample point switching and Master-Redundant-Setting

Endress+Hauser
People for Process Automation

Described product
Product name: MCS200HW, MCS200HW-MP

Manufacturer
Endress+Hauser SICK GmbH+Co. KG
Bergener Ring 27
D-01458 Ottendorf-Okrilla
Germany

Legal information

Original document
This document is an original document of Endress+Hauser SICK GmbH+Co. KG.

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Inhalt

1 About this document

1.1 Function of this document

This document describes the operation of the MCS200HW/MCS200HW-MP with several sample points or in a master-redundant network.

1.2 Additional documentation/information

This document is an addendum to the Operating Instructions of the MCS200HW/ MCS200HW-MP multi-component analysis system.

It supplements the Operating Instructions with all the information required for using the sample point switching or the master-redundant network.

Observe the MCS200HW/MCS200HW-MP Operating Instructions provided.

1.3 Scope of application

This document is only applicable for the measuring device described in the product identification.

It is not applicable for other Endress+Hauser SICK GmbH+Co. KG measuring devices.

The standards referred to in these Operating Instructions are to be observed in the respective valid version.

2 For your safety

2.1 Main operating information

Observe the following safety precautions:

NOTICE: This document is only valid in combination with the MCS200HW/ MCS200HW-MP Operating Instructions.

▶ Observe all operating and safety instructions in the MCS200HW/ MCS200HW-MP Operating Instructions!

2.2 Intended use

The sample point switching enables operation of several sample points.

3 Product description

3.1 Product identification

Product name	MCS200HW
Type plates	Type plates are located outside on the right of the enclosure.
Product name	MCS200HW-MP
Type plates	Type plates are located outside on the right of the installation plate.
Manufacturer	Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27 · DD-01458 Ottendorf-Okrilla · Germany

4 Operation with sample point switching

4.1 Function

The MCS200HW/MCS200HW-MP can be operated with several sample points. However, measurements cannot be made simultaneously at the sample points.

4.2 Operating modes

Passive mode

- Device is in purge state by default.
- Measuring: Only as long as an external or internal measuring request is present
  - External request: Modbus®, digital inputs, user interface
  - Internal request: Cyclic trigger

Automatic mode

- Device measures permanently at all available sample points in turn.
- An individual measuring time can be specified for each sample point.
- When measuring requests are present: Automatic mode is exited for the duration of the measuring requests and the measuring request processed.

Setting the operating mode

Menu: Tasks → Sample points → (*Arrow right*)

Set automatic mode:

▶ Select **Sample point automatic**.

Set passive mode:

▶ Deselect **Sample point automatic**.

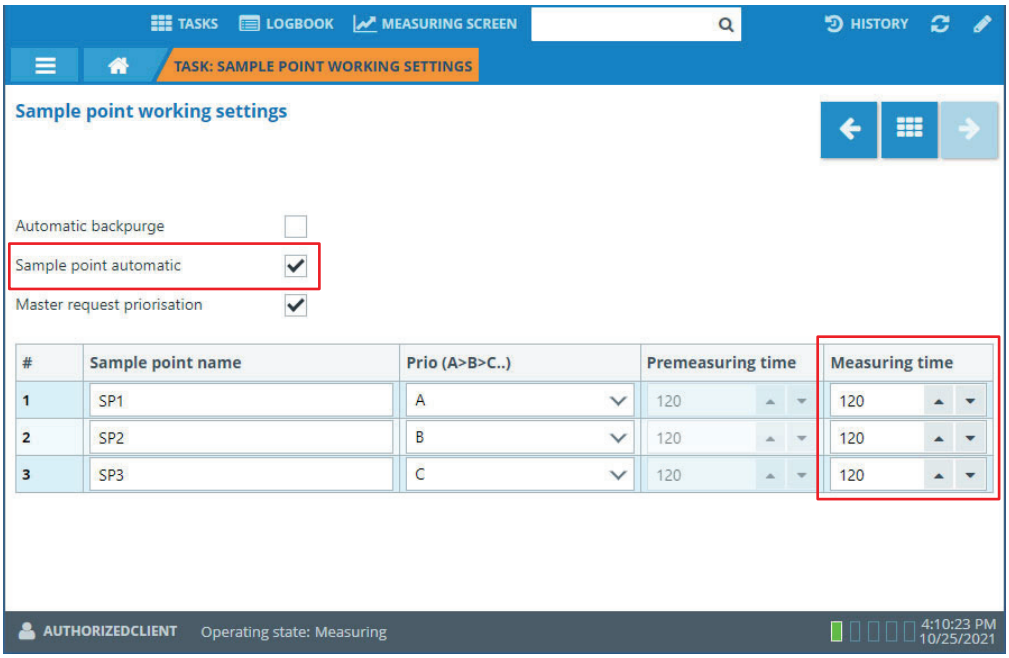

Fig. 1: Switching automatic sample point switching on

4.3 Creating measuring requests and blocking sample points

Create a measuring request

- The operator can create measuring requests via the interface.
- This is ignored in standby, during calibration procedures and in the event of an error.

Block a sample point

- Even if there are measuring requests present, the operator can command the device to stop using a sample point.

Procedure

Menu: Task → Sample points

Create a measuring request:

▶ Select **Activate** for the respective sample point.

Block a sample point:

▶ Deselect **Enable** for the respective sample point.

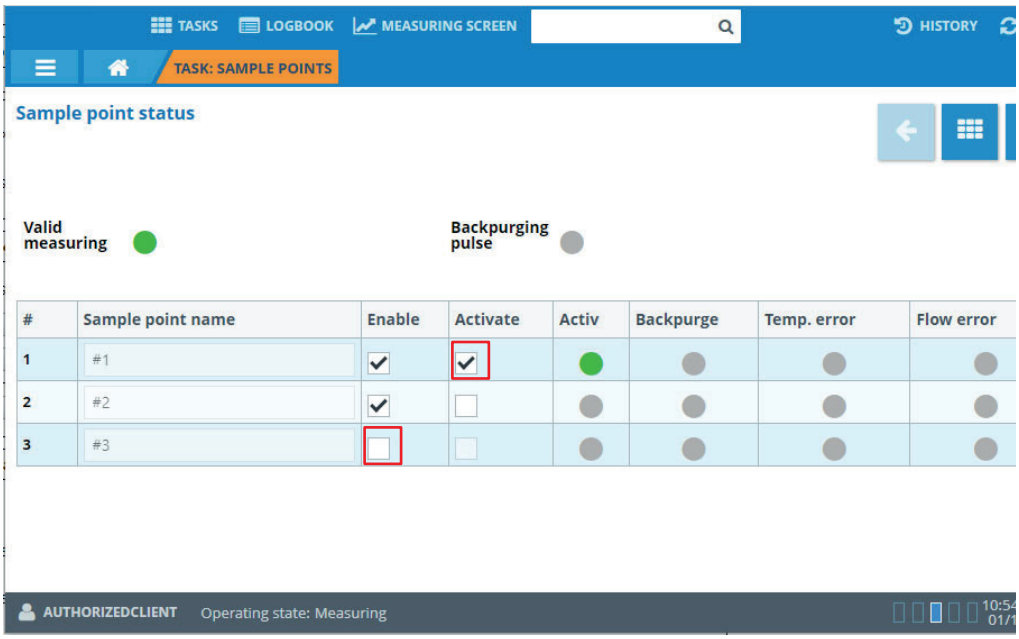

Fig. 2:
SP1: Create a measuring request
SP3: Block a sample point

4.4 Behavior in the event of request conflicts

If there are several simultaneous measuring requests for different sample points, several criteria are used in sequence to decide which sample point is to be served.

4.4.1 Highest criterion: Requesting channel

Priorities are set as follows when simultaneous measuring requests are present from **different** requesting channels:

1 User interface (highest priority)
2 Digital input (to the customer)
3 Modbus® (to the customer)
4 Master error request (only in master-redundant network)
5 Master function control request (only in master-redundant network)
6 Cyclic triggers (Service user group)

4.4.2 Medium criterion: Sample point priority

The priority settings of the user interface apply when several measuring requests are present at the same time within **one** requesting channel.

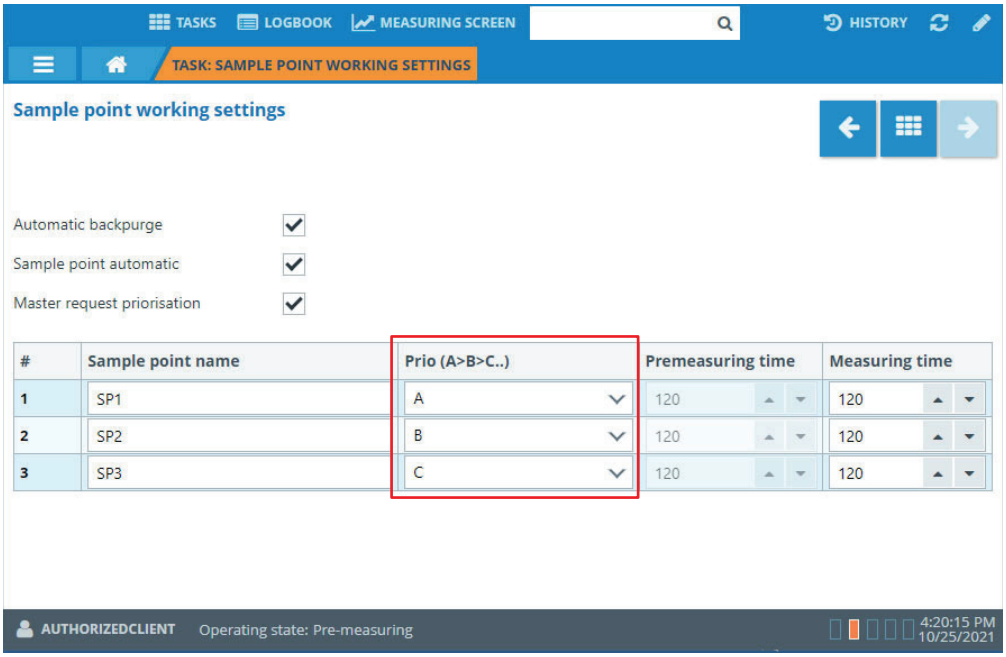

Fig. 3: Setting the sample point priority

4.4.3 Low criterion: Time multiplexing or first request permanent

When there are several measuring requests from sample points within **one** requesting channel with the **same** priority setting, the **Time multiplexing at same prio** setting decides the behavior:

Time multiplexing at same prio is selected:

– As long as the conflict exists, measurements are taken in turn at all equally prioritized sample points.

Time multiplexing at same prio is not selected:

– Only the measuring request that arrived first will be considered.
– Sample point requests that arrive later are processed when the measuring request that arrived first is no longer present.

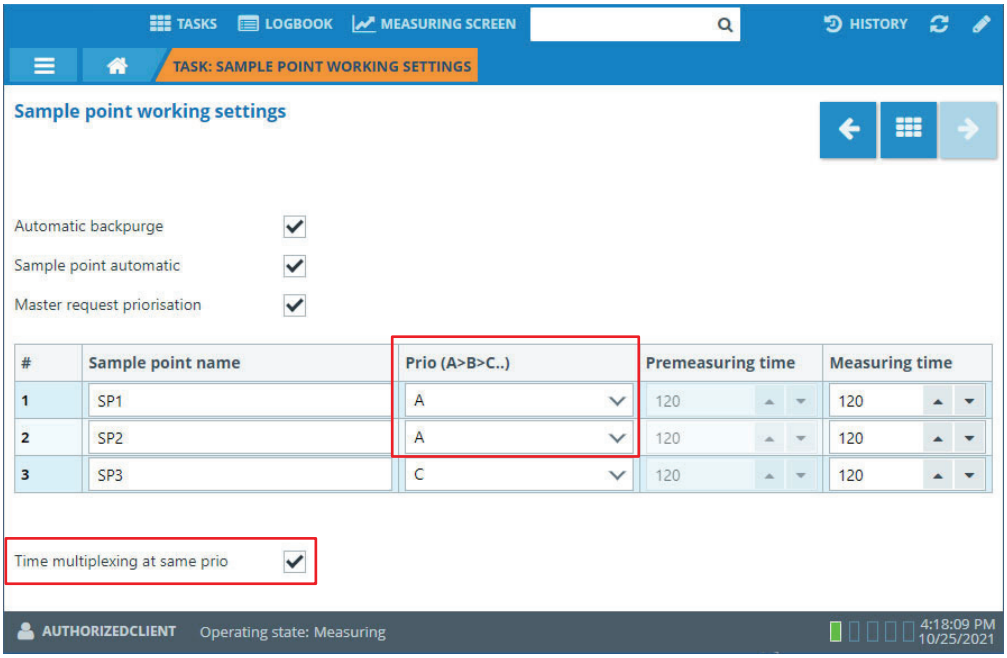

Fig. 4: Setting time multiplexing at same prio

4.5 Automatic backpurging

A sample point can be backpurged automatically after use.The associated sampling probe including the sampling filter is then blown free.

Automatic backpurge is selected:

- The sample point is backpurged according to the specifications of the global backpurge settings (Service user group).
- Factory setting: For the duration of 5 minutes, a backpurge pulse of 10 seconds is performed every 60 seconds.

Automatic backpurge not selected:

- The sample point is not backpurged.

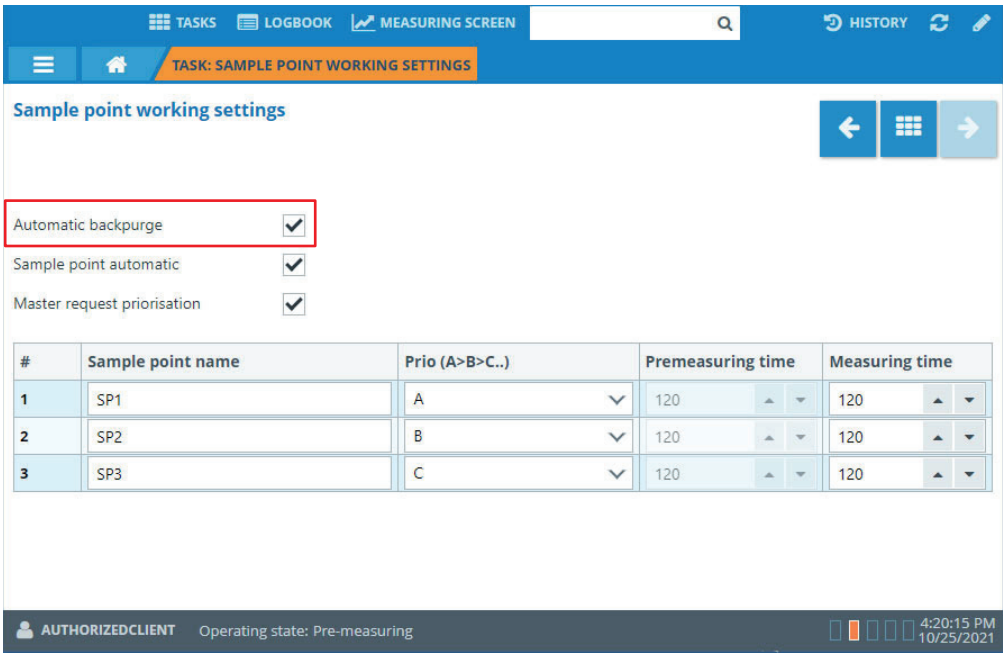

Fig. 5: Setting automatic backpurge

Ensuring measurement availability during automatic backpurging

Automatic backpurging does not reduce the measurement availability of the device because backpurging at one sample point can be performed in parallel with measurement at another sample point.

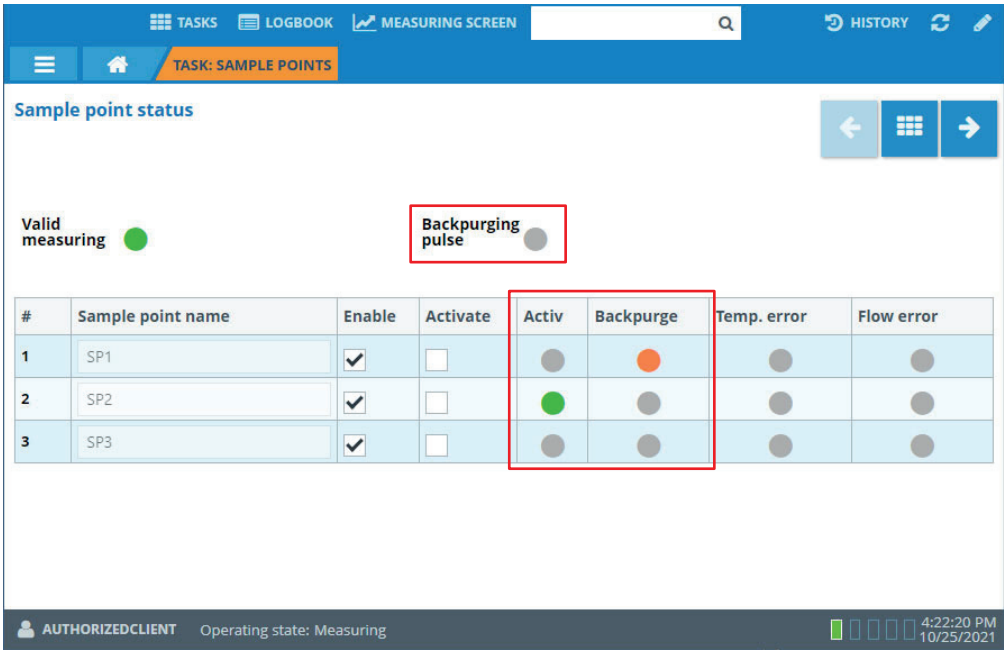

Fig. 6: Setting parallel backpurge and measurement

Note:
When **Automatic backpurge** is deselected (e.g. to reduce instrument air consumption), Endress+Hauser recommends performing backpurging in parallel during the daily zero point adjustment. This ensures the service life of the sampling filter.
▶ This setting must be configured by Endress+Hauser Service during commissioning.

Procedure

User group: Service

Menu: SOPAS ET → Parameterization → State control → Backpurge

Activating backpurge parallel to zero point adjustment:
▶ Select **Backpurge at zero**.

4.6 Sample point specific errors

The sample point involved is blocked when a sample point-specific error occurs. It is no longer possible to measure at the sample point even when the sample point is activated.

All unaffected sample points remain available and in operation.

Table 1: Sample point specific errors

Type	Error source	Cause	Device behavior when error occurs	Device behavior when error cleared
Temperature error	Heating controller of the respective heating line or the sampling probe	The heating controller cannot set the required nominal temperature	The affected sample point is blocked. The device enters purge mode for 3 minutes (default) to prevent damage to the heating line by cooling sample gas.	As soon as the temperature error no longer exists, the blocking is automatically released again (without user intervention).
Flow error	Sampling probe of the respective sample point	The sampling probe is not able to provide the required gas flow from the sample point	The affected sample point is blocked.	Without user intervention, the sample point remains permanently blocked. The block can only be removed by manually acknowledging all error messages via the user interface (or by restarting the device).

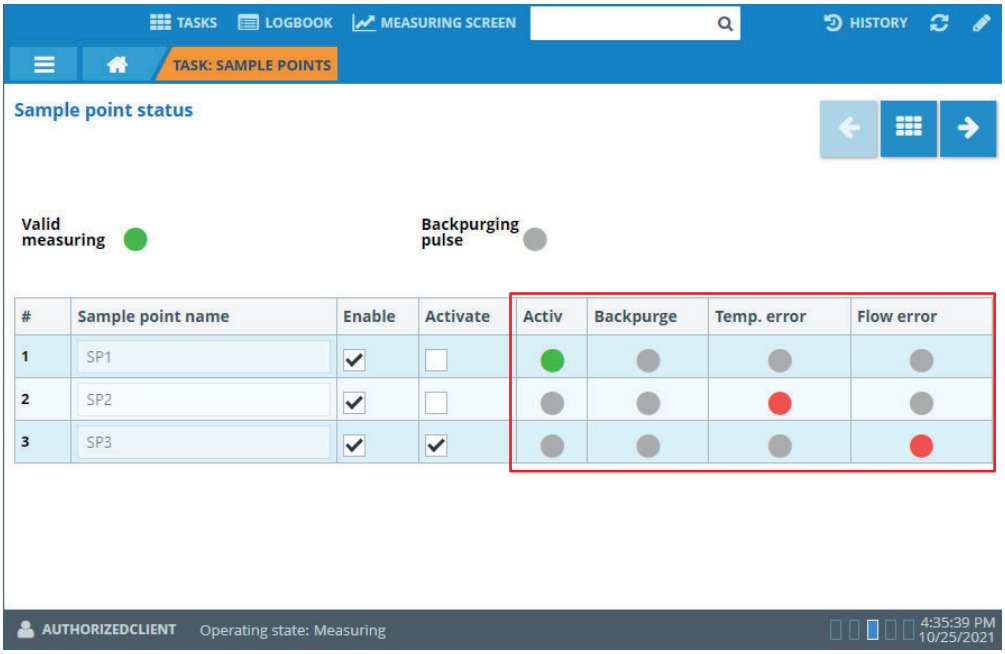

Fig. 7: Sample point specific errors display

5 Master-Redundant-Setting

To increase the availability of a measurement, several devices can be connected to form a master-redundant network. In normal operation, the master provides the measurement.

However, the master cannot perform the measurement in the following cases:

- Error
- Function control, e.g. through adjustment
- Maintenance
- Device switched off

In these cases, the master requests the redundant device to take over the measurement. As soon as the redundant device provides valid measured values (after the premeasuring time has elapsed), this is confirmed to the master.

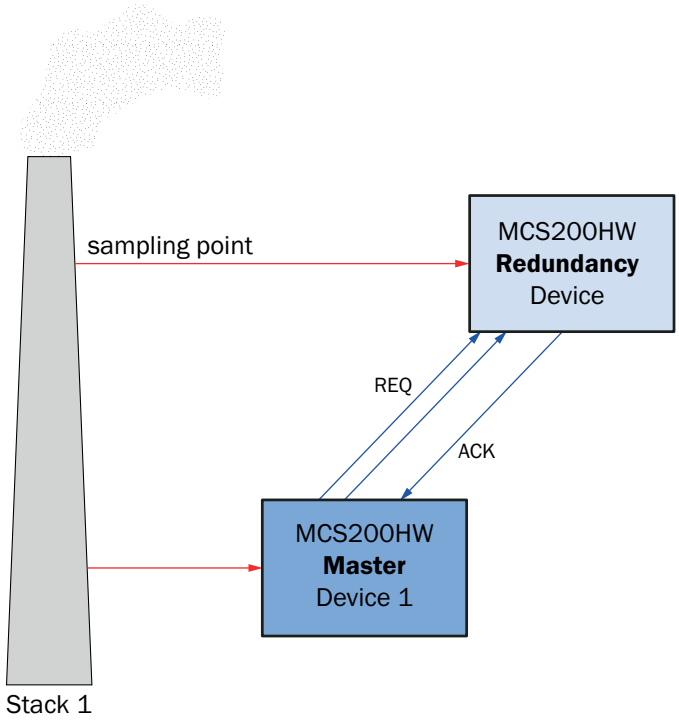

Fig. 8: Master-Redundant-Setting

Red: Heated gas lines
Blue: Digital I/O signals

Redundant device with multiple masters

A single redundant device can be connected to multiple masters. The redundant device then has one sample point per connected master.

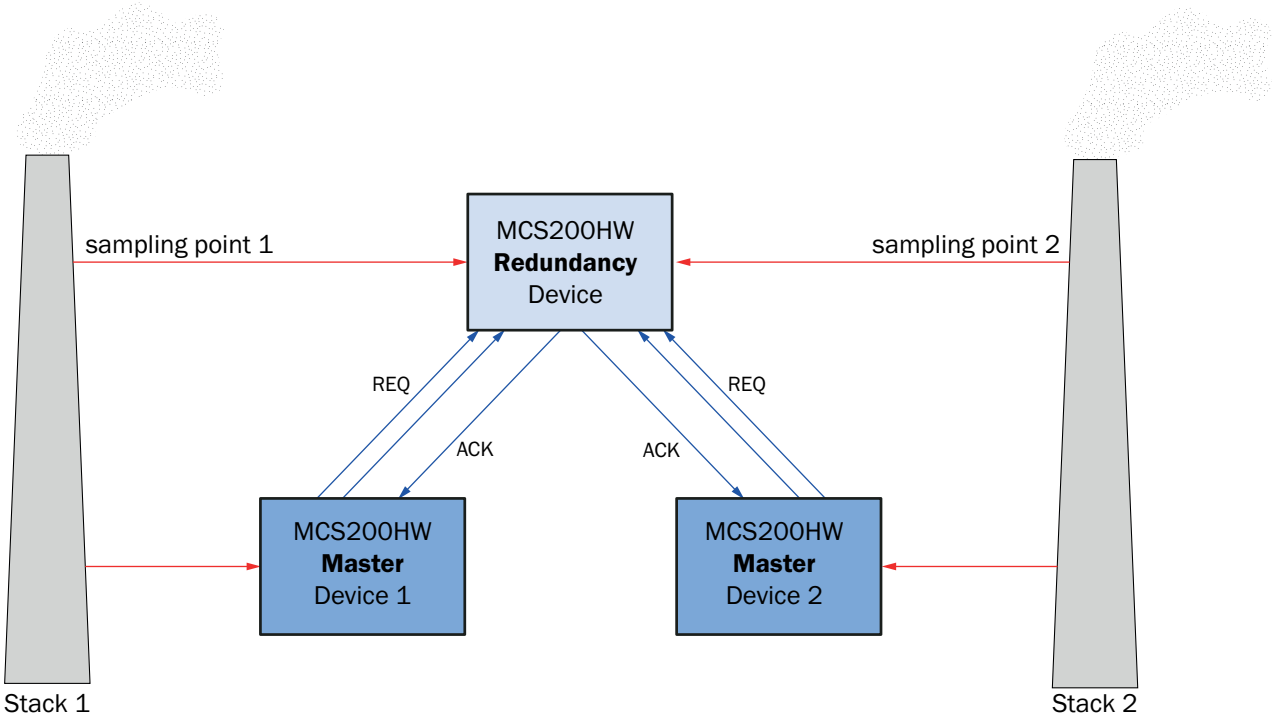

Fig. 9: Redundant device connected with several masters

Red: Heated gas lines
Blue: Digital I/O signals

A distinction is made between planned (triggered by cyclic trigger) and unplanned sample point takeover (all other triggers).

5.1 Unplanned sample point takeover

If the master cannot generate a valid measured value, a measuring request is sent to the redundant device. When the redundant device is capable of measurement (Purge state), the redundant device will not provide a valid measured value until the premeasuring time has elapsed. This means that no valid measured value is available for the duration of the premeasuring time - neither from the master nor from the redundant device.

The following Figure shows the time sequence.

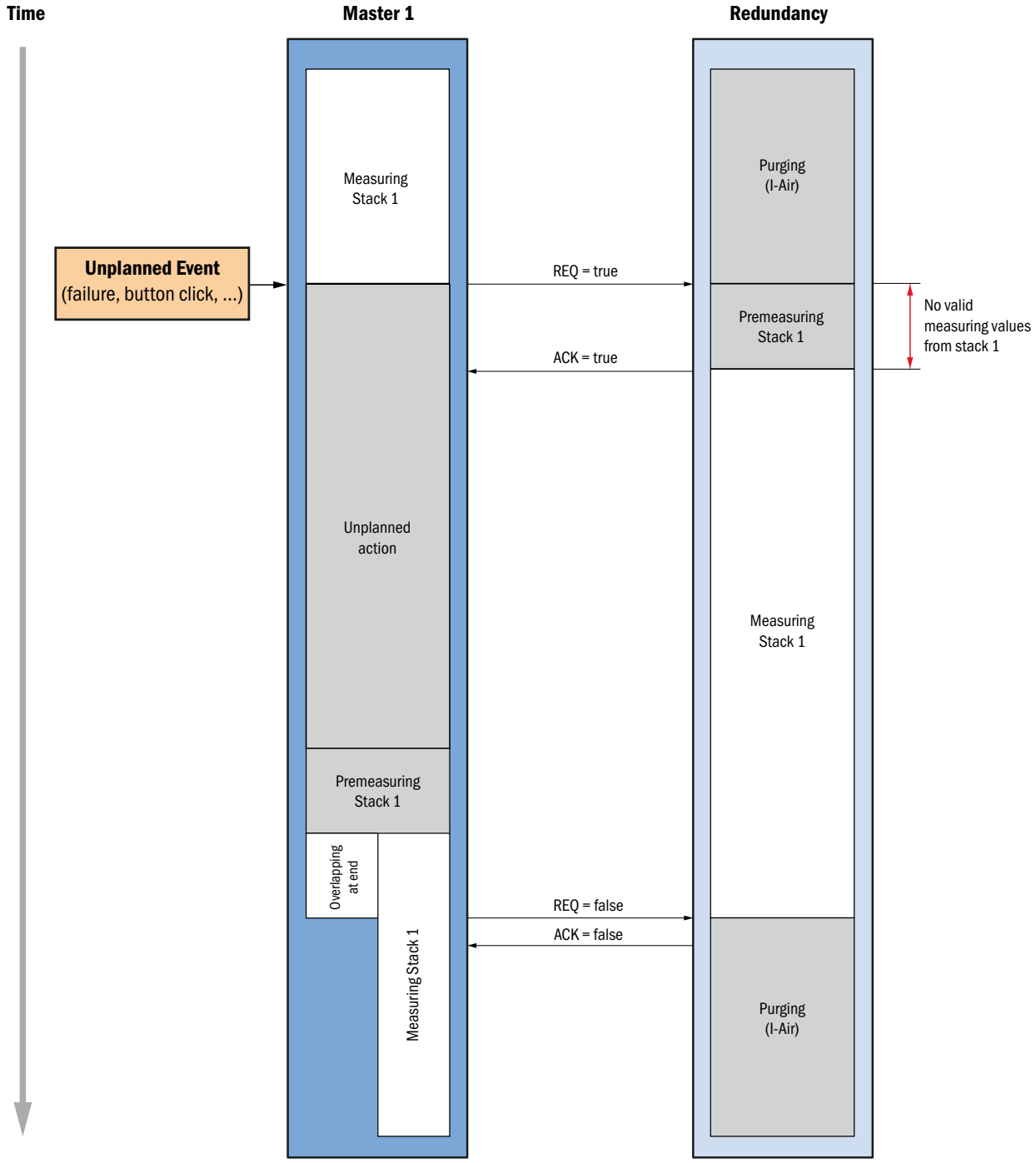

Fig. 10: Unplanned sample point takeover- time sequence

5.2 Planned sample point takeover

With the planned sample point takeover, a valid measured value is available from at least one device at any time. For this purpose, the master prematurely triggers a measuring request (triggered by the cyclic trigger), but initially continues to supply valid measured values itself. When the master receives a confirmation signal from the redundant device, the master exits the measurement state and performs the requested action (e.g. daily zero adjustment). The action required by the cyclic trigger can thus be postponed by up to 12 hours. At the latest, however, the action will then be performed, regardless of whether the confirmation signal was delivered or not.

The following Figure shows the time sequence.

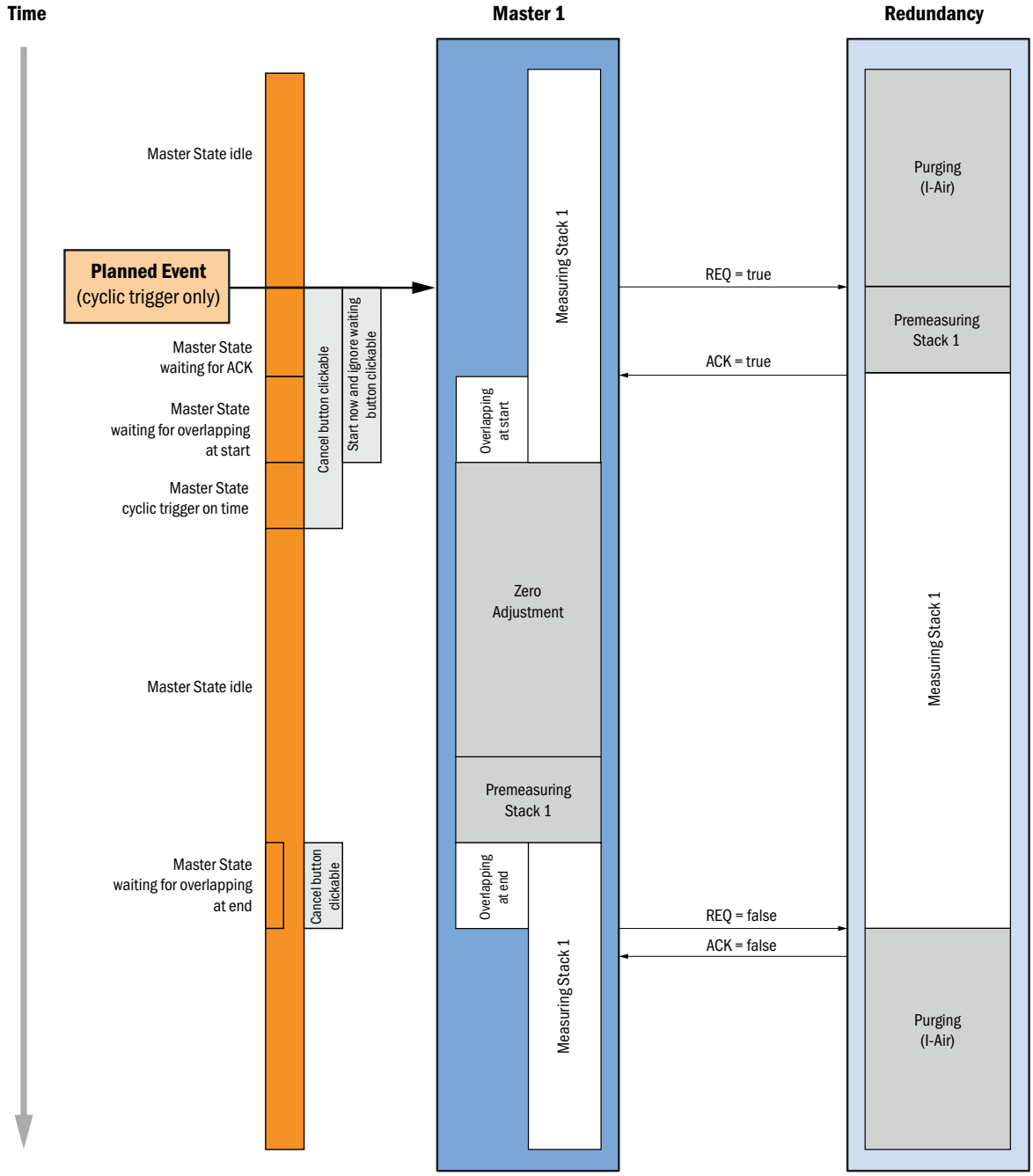

Fig. 11: Planned sample point takeover - time sequence

Skip waiting and start zero point adjustment immediately

While the master is waiting for the confirmation signal, the user can skip the wait and have the zero point adjustment start immediately. An adjustment can also be canceled manually.

Procedure

Menu: Tasks → Master sample point takeover

Skip waiting and start zero point adjustment immediately:

▶ Press **[SKIP WAITING AND START NOW]**.

Canceling adjustment:

▶ Press **[Cancel]**.

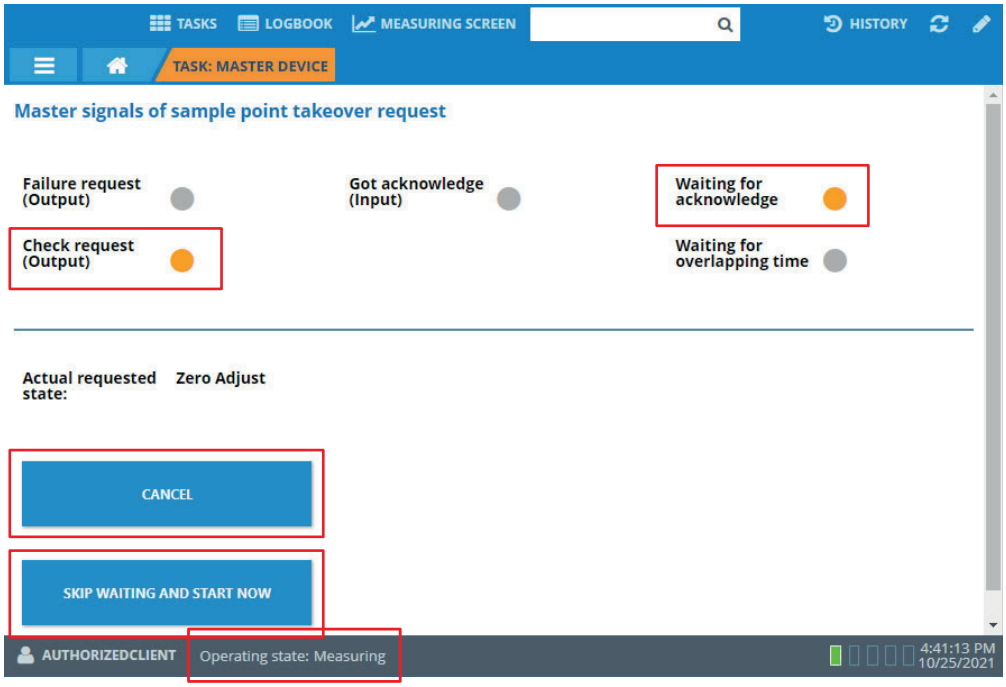

Fig. 12: Display - Master waiting for acknowledgment signal

Setting the overlapping time

In addition, an overlapping time can be set for the master device during which both devices deliver valid measured values simultaneously. This setting must be configured by SICK Service during commissioning.

Procedure

User group: Service

Menu: SOPAS ET → Parameterization → Master-Redundant-Setting/Sample Point → Basic settings

Setting the overlapping time:

▶ Enter the **Overlapping time**.

5.3 Distinction between failure and function control

Each Master transmits the measuring request to the redundant device via two separate channels:

- Measuring request due to an error
- Measuring request due to a function control

When an error measuring request from Master 1 and a function control measuring request from Master 2 are present at the same time, Master 1 is activated (see “Highest criterion: Requesting channel”, page 7). This will delay any planned action on Master 2 by up to 12 hours. Meanwhile, an error correction can be performed on Master 1.

Using option **Master request priorisation** on the redundant device, both requesting channels can be set to one priority level. **No** distinction is then made between the two channels. The sample point priority set by the customer decides which master is served (see “Medium criterion: Sample point priority”, page 7):

- **Master request priorisation** is selected: Sequence as for Highest criterion: Requesting channel
- **Master request priorisation** is not selected: Following sequence:
  - User interface (highest priority)
  - Digital input
  - Modbus®
  - Master error and function control request at the same level
  - Cyclic trigger (Service user group)

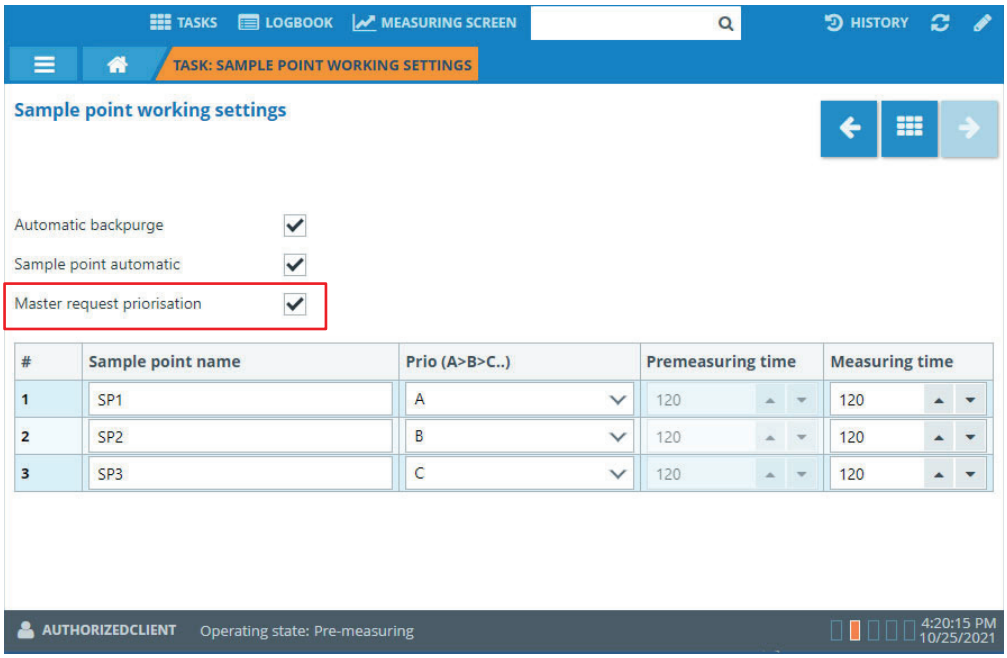

Fig. 13: Setting master request priorisation

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