IBS BatchControl GmbH

Intrinsically safe PID- controller CTR 210i

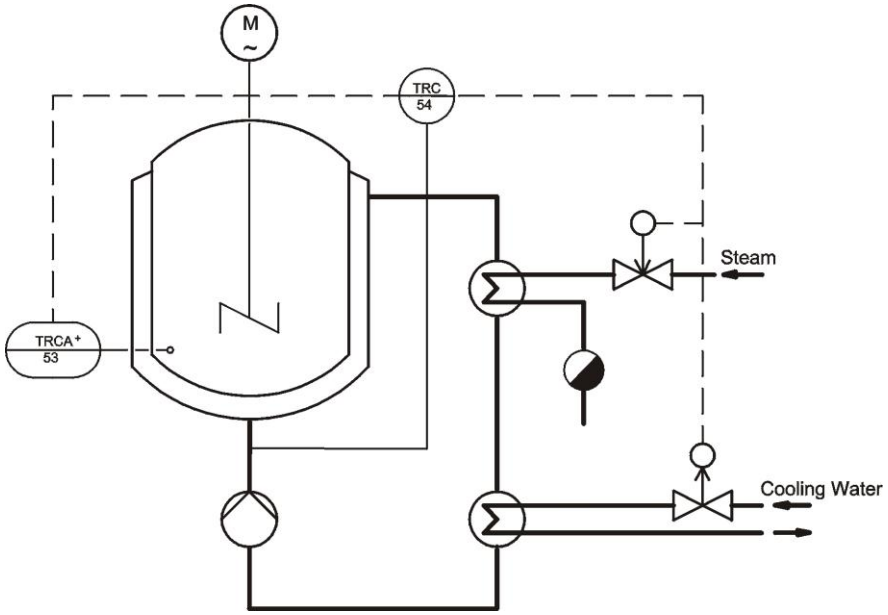
Features:

- Local set point controller
- Slave controller
- Ratio controller
- Difference controller
- Two-channel controller (option)
- Cascade controller (option)
- Automatic set point ramp / programmer function (option)
- Set point setter function
- Manual/Automatic station software
- Split-range output

Field housing, IP 65

Special control functions for batch reactors:

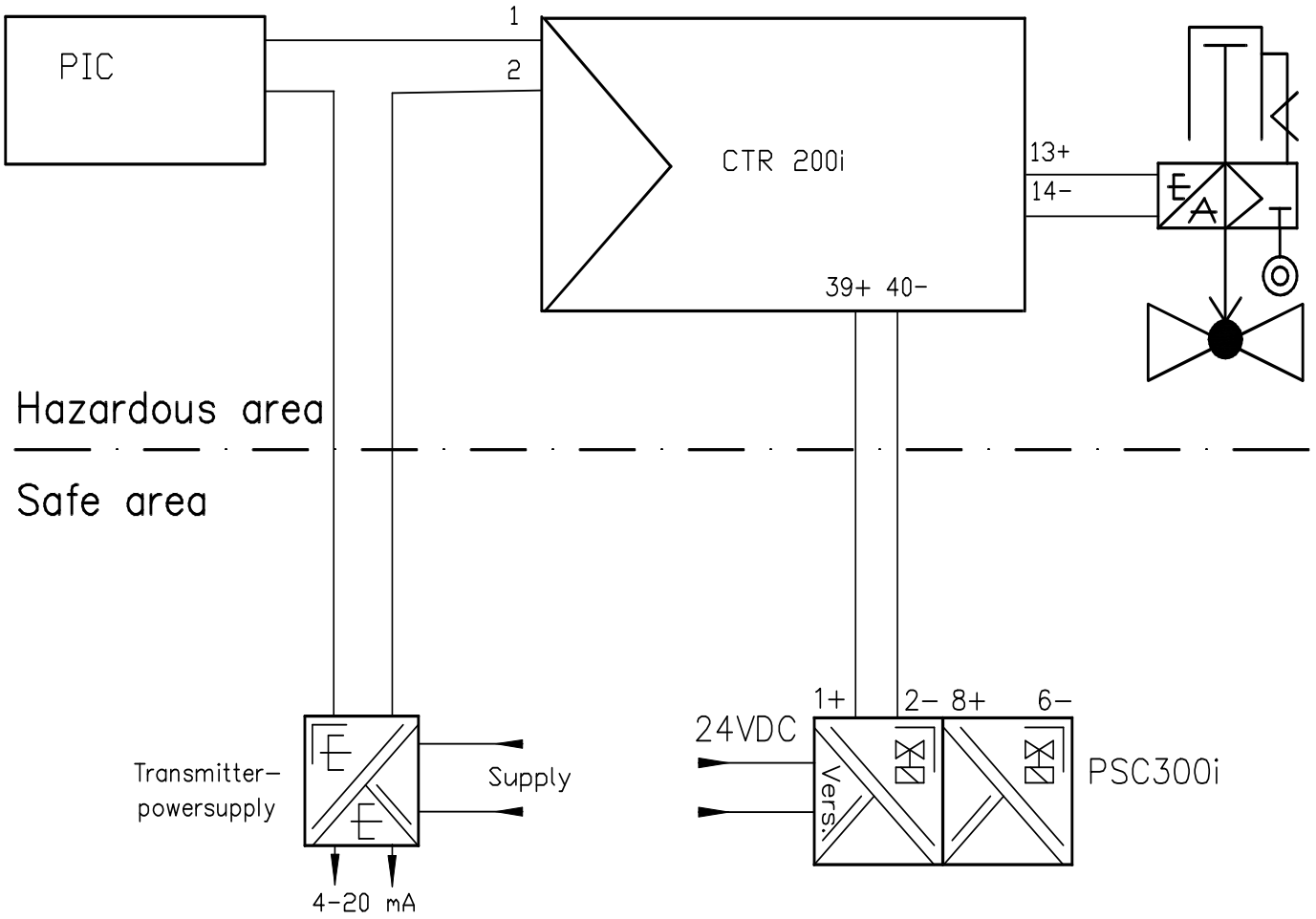
- Cascade control for product/jacket temperature
- 2-channel controller with a min-selection of the output signals
- Split range output for heating/cooling
- Automatic 16-step set point ramp
- Functions which avoid temperature overshoots of the product
- Dynamic limitation of the difference between product and jacket temperature
- Dynamic activating of the integral algorithm term
- Via six digital inputs it's possible, to activate different parameter sets, security outputs, set point ramps or the switching between product and jacket temperature control.



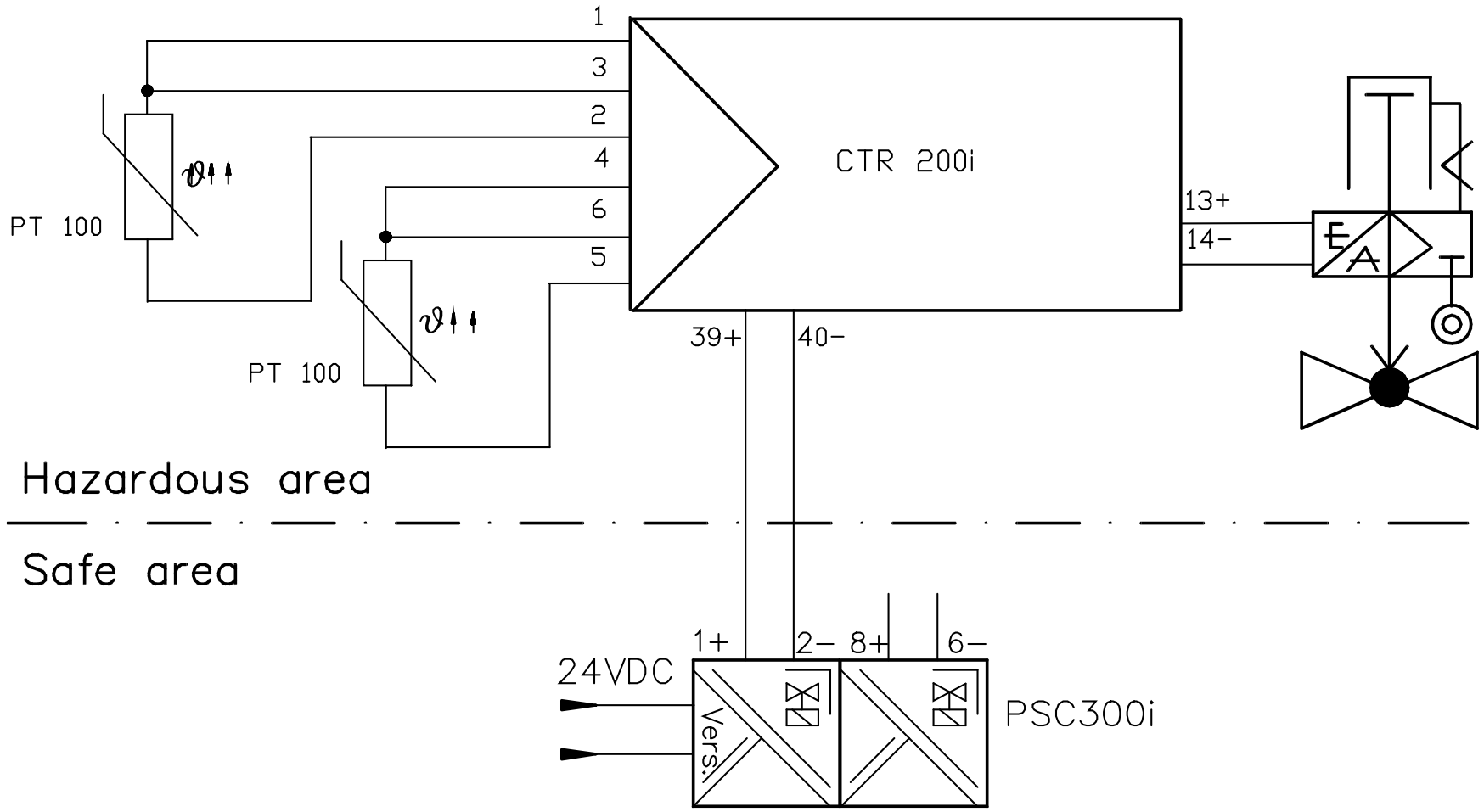
Technical data:

- DMT 02 ATEX E 148, EEx ib IIC T4
- For using in hazardous area zone 1
- Temperature range: -20°C to 60°C
- Panel mount housing, front IP65, 72 x 144 x 115 mm (W x H x D)
- Field housing, IP65 optional available, 113 x 173 x 205 mm (W x H x D)
- Two power supply inputs for the connection of the PSC 300i module
- Three analogue inputs 4 – 20 mA or optional Pt100 in 3 – wire technology
- Two analogue outputs: 4 – 20 mA, active
- Six passive digital outputs for alarms
- Six active digital inputs for switching functions
- One TTY – data interface with Modbus protocol (optional)

CTR 210i with 4-20 mA input from a 2-wire transmitter:



CTR 210i with two Pt 100 inputs:



Inputs / Outputs:

Power supply input 1

The first Ex (i) power supply output of the PSC 300i module has to be connected. It provides the power for the CTR 210i and for analogue output 1.

Power supply input 2

The second Ex (i) power supply output of the PSC 300i module has to be connected. It provides the power for analogue output 2

Analogue input 1 - 3

The 4-20 mA inputs are passive with an internal load of 25 Ω . Optional each analogue input can be delivered as a Pt 100 input in 3-wire technology.

Analogue output 1 and 2

The two active 4-20 mA output signals can be connected directly to the position controller of the control valve. These signals can work in split range function for the controlling of a heating and a cooling valve.

Inputs / Outputs:

Digital input 1 – 6

The digital inputs are active, for the connection of passive contacts.

The most important functions are:

- activating of security outputs or security set points
- switching between two parameter sets
- switching between product / jacket temperature controlling
- activating of the set point ramp

Digital output 1 - 6

The digital outputs are passive and galvanic isolated. They are used for alarms or the switching of on/of valves. Their signal can be transmitted into the safe area by switch repeaters.

Modbus interface (option)

This TTY-interface has to be connected to the IPC 300i module. This IPC 300i module has to be installed in the safe area. It has a RS 485 interface at the non-Ex side.

Functionalities:

Local set point controller:

The set point can be adjusted via the keyboard at the CTR 210i.

Slave controller:

An external set point is transmitted to the CTR 210i via a 4-20 mA signal at an analogue input.

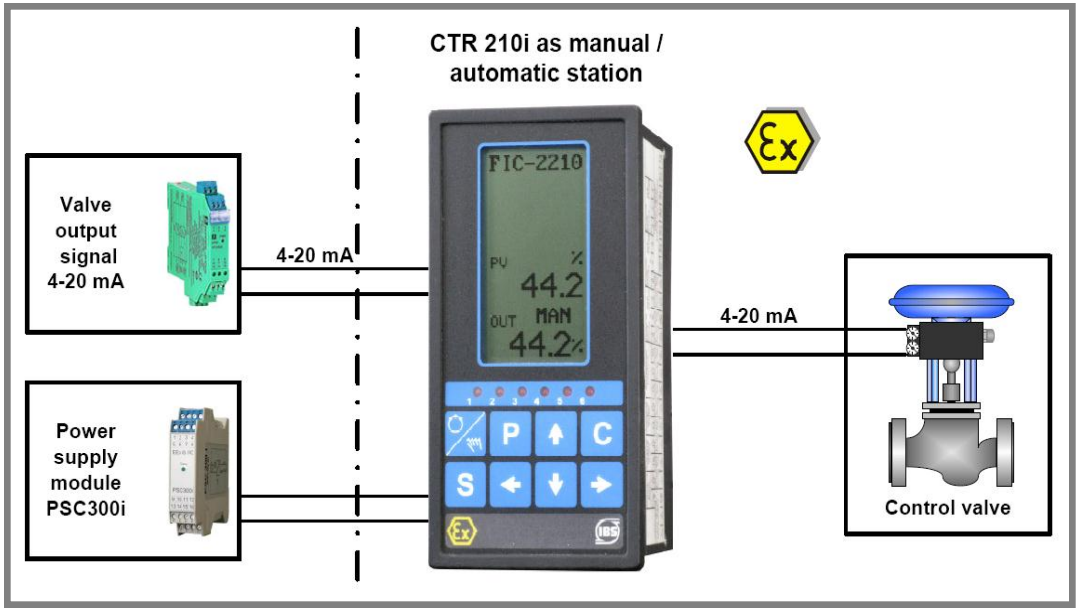
Ratio controller:

The CTR 210i controls the ratio between two flow signals.
The ratio is calculated by the deviation between analogue input 1 and analogue input 2.
One of the flow rates will be controlled by an analogue output of the CTR 210i.

Difference control:

The CTR 210i controls the difference between two temperatures.
Application: A slow cooling of a batch reactor for a crystallisation processes.

Manual- / Automatic station



Indication:

- output signal from the DCS
- output signal to the valve
- status indication “manual” or “automatic” mode

Application:

Realization of local access points for the manual control of valves in the field. (Useful for maintenance and tests)

Via the - key it is possible to switch between the manual and automatic mode.

Automatic mode:

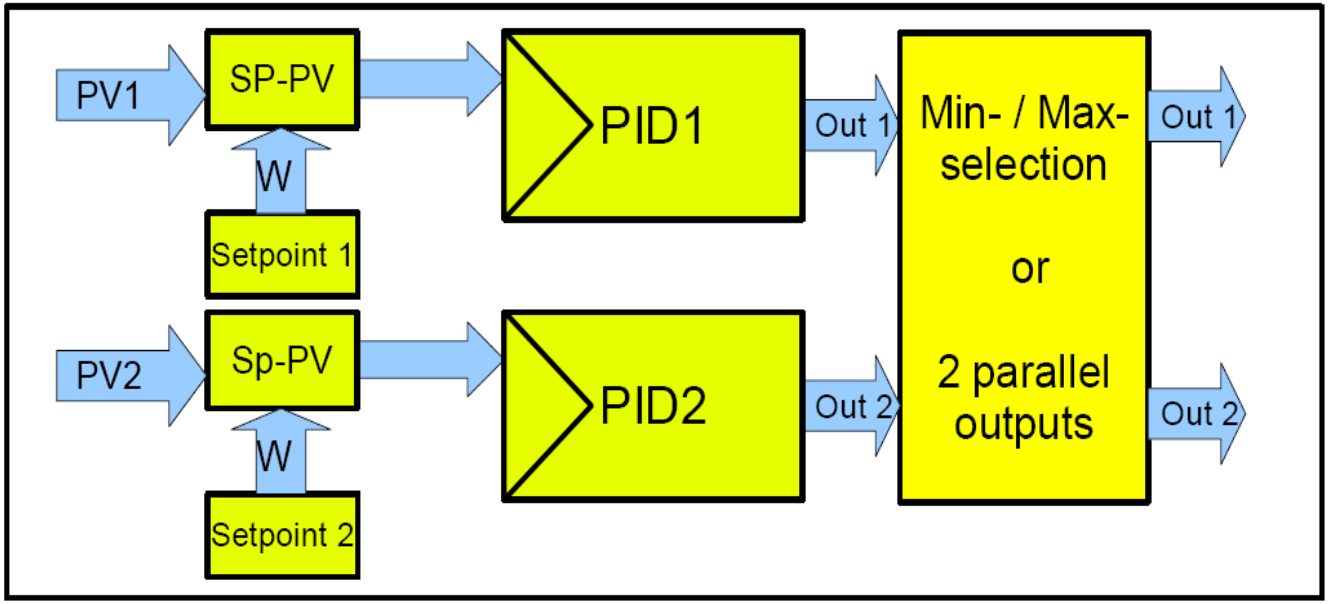
The output signal from the DCS will be transmitted to the valve in the field.

Manual mode:

The output signal to the valve can be adjusted via the key path of the CTR 210i.

Two channel controller (option):

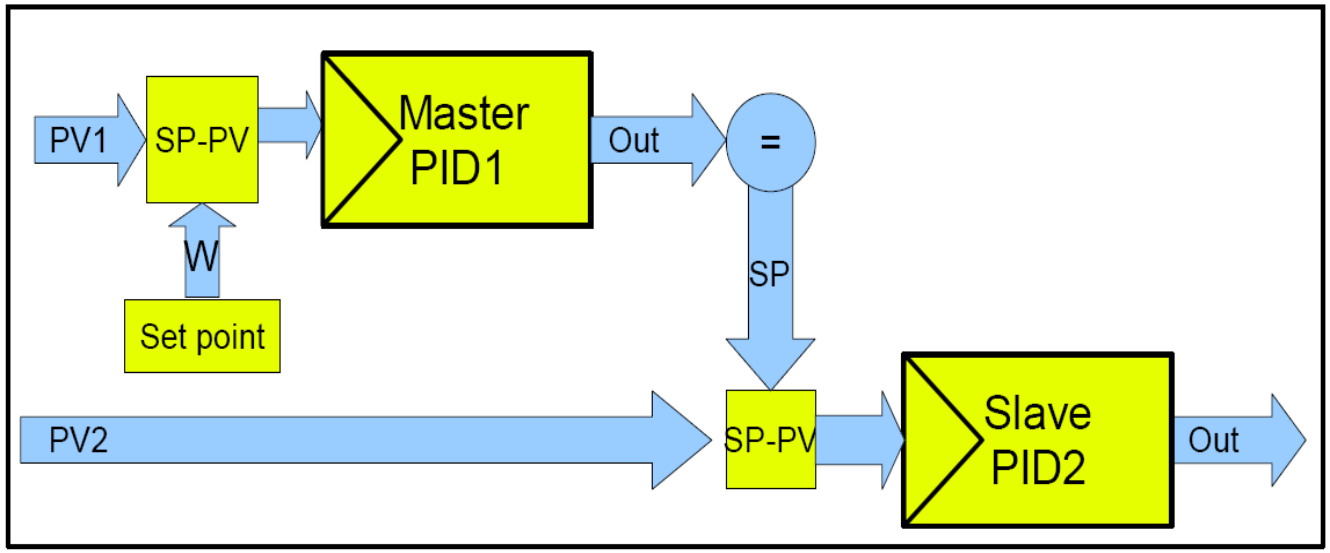
Two independent PID controllers are realised in one CTR 210i hardware.
It's possible to have two separate output signals or a min-selection of both.
The indication at the display can be switched between the two channels.
The Tag No. at the top of the display indicates which of the controllers is actual shown in the display



Cascade Controller (option)

Two software PID controller are realised in one CTR 210i hardware. The output signal of the first controller is the set point of the second one. The indication at the display can be switched between the master- and the slave controller.

The Tag No. at the top of the display indicates which of the controllers is actual shown in the display

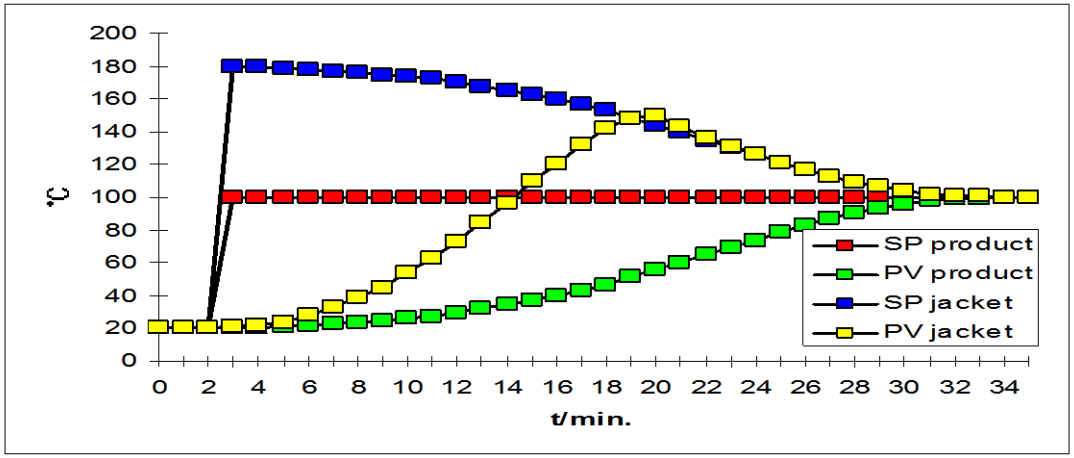


Heating processes without product temperature overshoots

At the temperature control of batch reactors it's important to reach the product temperature very quickly, without temperature overshoots and no oscillating around the set point.

The master of the cascade controls the product temperature. He works as a P-controller and his operating point has the same value like his set point.

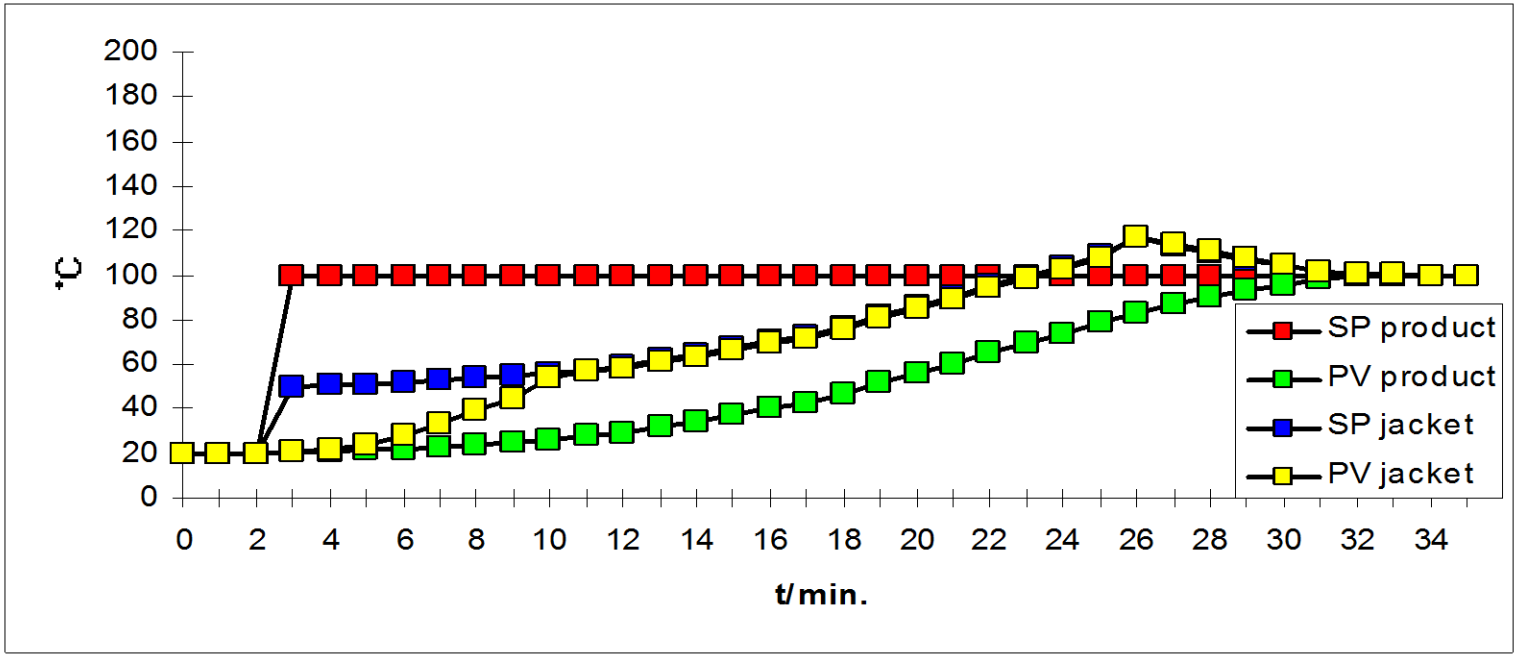
When the product temperature starts to rise, then the value of the control difference decreases and so the jacket temperature will be reduced. And so the product- and the jacket temperature meet each other at the required set point.



Dynamic limitation of the temperature difference at batch reactors

At the cascade controller function of the CTR 210i it's also possible to have a dynamic limitation between the product- and the jacket temperature.

This prevents chemical reactions of the product at the hot jacket and the enamel coating inside the reactor will not be damaged.

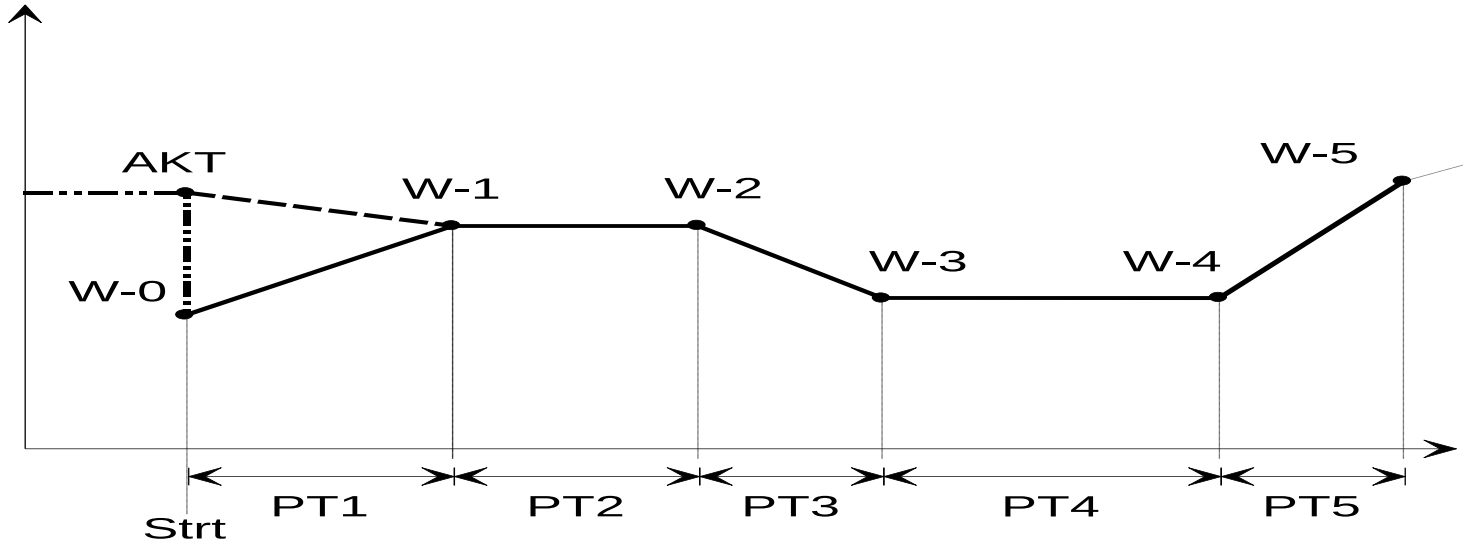


Automatic 16-step set point ramp function (option)

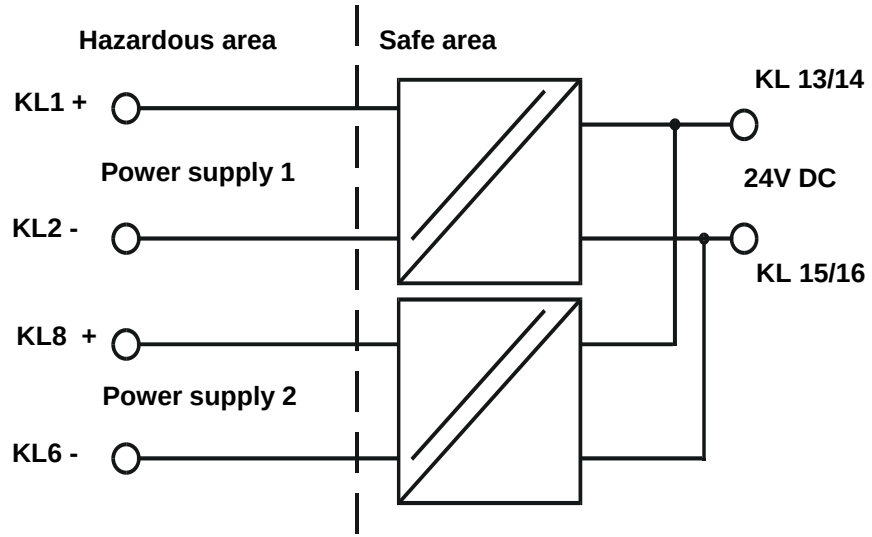
It is possible to program a set point curve with 16 set point steps and 16 time intervals. It's also possible to switch the digital outputs during each program step.

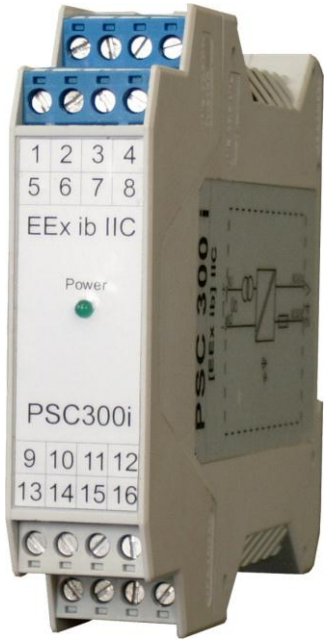
The start, stop and the reset of the program can be activated via a special user level without going into the programming menu.

Application: Realization of automatic temperature curves for batch reactors.



Power supply module PSC 300i





PSC 300i - one channel:

- DIN – rail housing
- Power supply: 24 V DC
- Ex (i) output 1:
  Power supply for the CTR 210i

PSC 300i - two channel:

- DIN – rail housing
- power supply: 24 V DC
- Ex (i) output 1: Power supply for the CTR 210i
- Ex (i) output 2: Power supply only for the 2. power supply input of the CTR 210i

Order code of the CTR 210i

Hardware:

200-0110	**CTR 210 i** Ex(i) device, panel mount
200-0130	**Pt100 input** Price for each analogue input as Pt-100 (3-wire)
200-0150	**Modbus-interface** TTY current loop data interface with Modbus protocol

Software functions:

200-0160	**Cascade controlle software**
200-0170	**Automatic set point ramp function, with 16 steps**
200-0180	**Double loop controller software**
200-0190	**Manual / automatic station software**
200-0200	**Set point setter software**

Order code of the CTR 210i

Accessories / Interface cards:

A-200-0210 **Field housing, IP 65**
(see picture on page 2)

A-200-0220 **Ex (i) power supply module, PSC 300i-one channel**
DIN-rail housing, power supply 24 V
- One Ex (i) power supply for the CTR 210i

A-200-0230 **Ex (i) power supply module, PSC 300i-two channel**
DIN-rail housing, power supply 24 V
- Channel one: for the first power supply of the CTR 210i
- Channel two: only for the second power supply of the CTR 210i

A-200-0240 **Ex (i) interface and power supply module, IPC 300i**
DIN-rail housing, power supply 24 V
- Interface from TTY, intrinsically safe to RS485, non-Ex
- One Ex (i) power supply for the CTR 210i

Intelligent Batch Solutions.....designed for you

Some main customers:

3M, France, Germany

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Astra Zeneca, England
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Bayer, Malaysia, Spain, Vietnam, Germany
Basell, Germany
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Clariant, China, Greece, Switzerland, Germany
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Uhde, China, Iran, Egypt, Ukraine, Germany

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Wacker Chemie, China, India, Germany

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IBS BatchControl GmbH

Ex (i) Indicators

Ex (i) PID Controllers

Ex (i) Batch Controllers

Ex (i) Interfaces

Ex (i) Chart Recorders

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Flow Computers