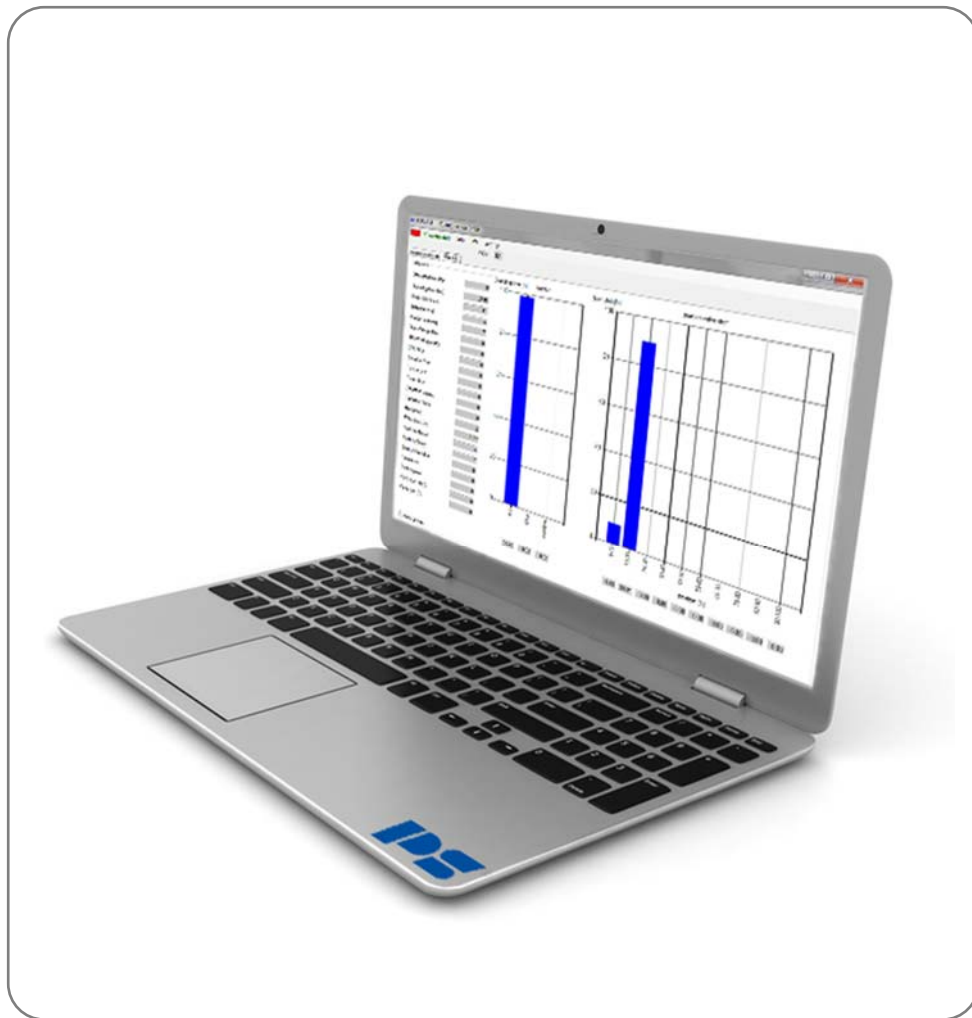


# Operating Instructions

## Process controller PSIC for PS-AMS®



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# 1. Function

In conjunction with the optional integrated PI process controller PSIC and an external process sensor, the PS-AMS actuator can perform process control independently without additional control technology. The actual process value (Y) for a process sensor is compared to the set value (W) and the difference corrected.

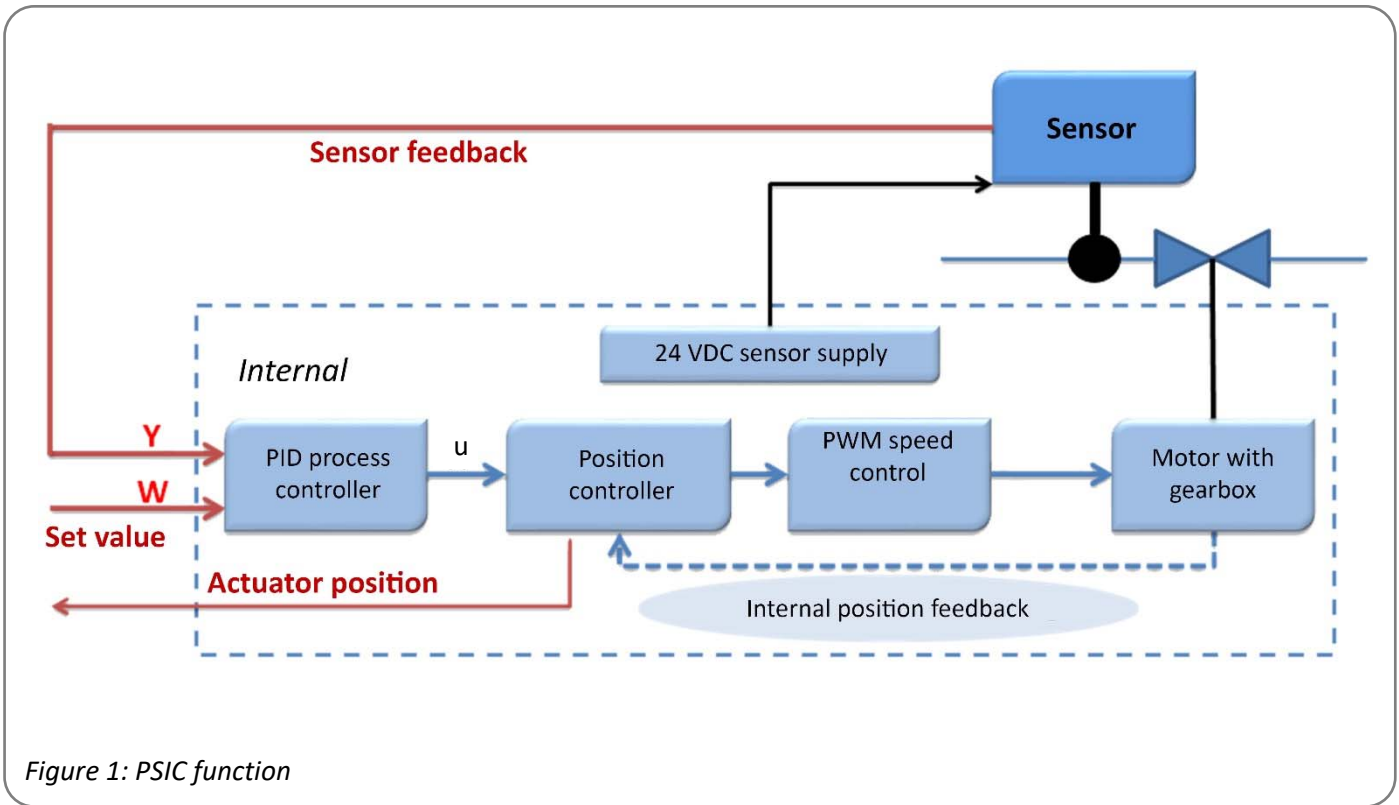


Figure 1: PSIC function

The set value can either be specified by an analogue signal, digitally via a field bus or using a fixed value.

Note: If the process sensor is activated, the position confirmation value continues to correspond to the actuator position and not the actual process value.

# 2. Electrical connection

In order to operate the PS-AMS actuator with an external process sensor, the sensor must be connected to the actuator as follows.

## 2.1 Electrical connection on the main board

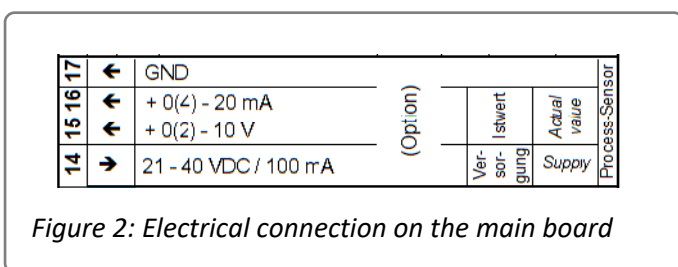


Figure 2: Electrical connection on the main board

## 2.2 Electrical connection in the plug box

9	➔	21 - 40 VDC / 100 mA	Supply	Process Sensor (Option)
10	➔	+ 0(2) - 10 V	Actual Value	
11	➔	+ 0(4) - 20 mA		
12	➔	GND		

Figure 3: Electrical connection in the plug box

## 3. Setting the parameters for the process controller PSIC

Set the parameters for the process controller PSIC in the parametrisation software PSCS.

The setting for the set value and the actual process value must be in the same value range. Different settings are not possible.

The binary input signals (terminals 9-11 or 17-19) and the failsafe port (terminals 12-13 or 25-26) always have a higher priority than the set values so that process control can be overridden by this.

### 3.1 Analogue actual process value

The signal specification corresponds to the setting for the set value. The actual process value must have the correct operating direction that corresponds to the control circuit for closed control.

### 3.2 Field bus actual process value

If “Digital set value” is activated, a field bus (see the process illustration) can be used to specify a set value with a value range of 0-100 % or 0-1000‰.

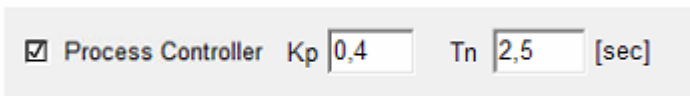
### 3.3 Fixed value

If “Digital set value” is activated, a fixed value in the value range of 0-100 % can be entered into the input box.



### 3.4 Activation

If the process controller PSIC is installed in the actuator, it can be activated on the “Set and actual value signals” tab page by ticking “Process controller”.



The process controller must be deactivated in order to check the actuator on the valve after commissioning.

### 3.5 Control parameters

The “Set and actual value signals” PSCS tab page or the monitor can be used to set the Kp and Tn control parameters.

#### 3.5.1 Kp - Gain factor

Value range of 0.01-100 (normal setting 0.2)

#### 3.5.2 Tn - Reset time

Value range of 0.01-100 sec (normal setting 2.5)

### 3.6 Control function

The PI process controller determines the control value  $u(t)$  from the control deviation  $e(t)$  as follows:

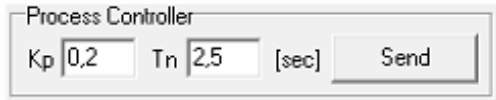
$$u(t) = K_p(e(t) + \frac{1}{T_N} \int_0^t e(\tau) d\tau).$$

The P part attempts to quickly catch a control difference that has occurred.

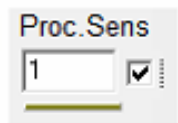
The I part then rectifies the remaining control difference.

## 4. Adjusting and optimising

The effect of the process parameters and the signals can be illustrated best using the PSCS monitor. Kp/Tn can be adjusted directly in the monitor. The values are saved directly in the actuator when “Send” is clicked and are effective immediately so that the reaction can be observed in the monitor.



The actual process value is shown in the monitor if the field next to “Proc.Sens” is ticked.

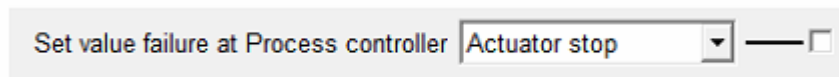


The Kp/Tn settings are highly dependent on the process and they must therefore be adjusted individually. Starting from the pre-adjusted initial parameters Kp = 0.2 and Tn = 2.5 sec, first increase Kp until the control circuit pulsates. Start from this point and reduce Kp until the control circuit remains stable.

Adjust Tn to optimise the control deviation so that it is acceptable for the process.

## 5. Diagnostic message

If the process controller is active and the actual process value is set to 2-10 V or 4-20 mA, the wire break monitor is active. The “Safety and fault message” PSCS tab page can be used to define positions in order to move to a safe valve position if the sensor fails.



The fault is reported by an LED flashing code (Error no. 6) or via an optional fault message relay.

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