**EXPERT FUNCTIONS**

- Start-up and shut-down of tempering units
- For operating hot-runner systems
- Serial TTY or RS 485/422 interface
- Start/stop functions for local and remote operation

**STANDARD FUNCTIONS**

- Universal continuous/switching version, i.e. reduced stocks
- 100 ms cycle time, i.e. also suitable for fast control loops
- Freely configurable analog output, e.g. as process value output
- Customer-specific linearization
- Settings can be blocked via password and internal switch for high security
- Extended temperature range up to 60 °C allows mounting close to the process
- Easy 2-point or offset measurement correction
- Emergency operation after sensor break by means of the “output hold” function
- Logical combination of digital outputs, e.g. for general alarm
- Built-in transmitter power supply
- Splash-water proof front (IP 65)

**APPLICATIONS**

- Plastics processing
- Tempering units
- Hot runners
- Driers

**DESCRIPTION**

The temperature controller KS 50-1 TCont is intended for precise and cost-effective control tasks, primarily with tempering units and hot runners. The process value signal is connected via a universal input. A supplementary analog input can be used for heating current measurement or as an external set-point input. Every KS 50-1 TCont has three process outputs that can be 3 relays or 2 relays plus a universal output. This universal output can be used for operating a solid-state relay, a continuous current/voltage output or to energize a two-wire transmitter. Additionally there are two additional opto coupler outputs.

The selectable function „start-up“ ensure increased lifetime of high-performance electrical heating elements (e.g. hot runner moulds).

**Plug-in module**

KS 50-1 TCont controllers are built as plug-in modules. This enables them to be replaced very quickly without tools, and without disturbing the wiring.

**Self-tuning during start-up and to the setpoint**

This new function determines the optimum settings for fast line-out without overshoot. With three-point controller configuration, the „cooling“ parameters are determined separately, thus ensuring an optimum match to the process. By pushing a button the KS50-1 TCont determines the best control parameters at the actual setpoint. This function does not require oscillation, and performs a minimal deviation of the process value. An automatic start of the self-tuning function can be disabled.

**Display and operation**

Clear information are given by ten indicator LEDs in the front panel that display operating mode, I/O states, and errors. The „-“key switches the controller into the manual mode directly. If required, the direct switch over can be disabled or the key can be configured e.g. reset the latched alarms. Due to the flexible use of the function key, an external switch or contact is not required in many cases, e.g. because remote/local switch-over can now be done directly.

KS 50-1 TCont
**Front interface and Engineering Tools**

Control parameter adjustment in seconds has now also been implemented in the KS 50 class of instruments. Via the BlueControl software incl. its simulation functions, and especially the convenient BluePort front panel interface, the required set-up for a specific control task can be determined without a detailed study of the operating instructions.

Of course almost all adjustments can be done comfortably over the instrument front. (see page 7, BlueControl)

**Password protection**

If required, access to the various operating levels can be protected with a password. Similarly, access to a complete level can be blocked.

**TECHNICAL DATA**

**INPUTS**

**SURVEY OF THE INPUTS**

<table>
<thead>
<tr>
<th>Input</th>
<th>Used for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>INP1</td>
<td>x (process value)</td>
</tr>
<tr>
<td>INP2</td>
<td>Heating current, ext. set-point</td>
</tr>
<tr>
<td>di1</td>
<td>Operation disabled, switch-over to second setpoint SP.2, external setpoint SP.E, fixed output value Y2, manual operation, controller off, disabling of manual key, reset of stored alarms, boost, parameters 1 / 2, safety temperature limiter, start/stop with local operation, sensor operating mode, level alarm, flow alarm</td>
</tr>
</tbody>
</table>

**PROCESS VALUE INPUT INP1**

- **Resolution:** > 14 Bit
- **Decimal point:** 0 to 3 decimals
- **Limiting frequency:** adjustable 0.000...9999 s
- **Scanning cycle:** 100 ms
- **Measured value correction:** 2-point or offset correction

**Thermocouples** (Table 1)

<table>
<thead>
<tr>
<th>Thermocouple</th>
<th>Range</th>
<th>Accuracy</th>
<th>Resolution (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L Fe-CuNi (DIN)</td>
<td>-100...900°C</td>
<td>2 K</td>
<td>0,1 K</td>
</tr>
<tr>
<td>J Fe-CuNi</td>
<td>-100...1200°C</td>
<td>2 K</td>
<td>0,1 K</td>
</tr>
<tr>
<td>K NiCr-Ni</td>
<td>-100...1350°C</td>
<td>2 K</td>
<td>0,2 K</td>
</tr>
<tr>
<td>N Nicrosil/Nisil</td>
<td>-100...1300°C</td>
<td>2 K</td>
<td>0,2 K</td>
</tr>
<tr>
<td>S PtRh-Pt 10%</td>
<td>0...1760°C</td>
<td>2 K</td>
<td>0,2 K</td>
</tr>
<tr>
<td>R PtRh-Pt 13%</td>
<td>0...1760°C</td>
<td>2 K</td>
<td>0,2 K</td>
</tr>
</tbody>
</table>

- special -25...75 mV 0,1% 0,01%

<table>
<thead>
<tr>
<th>Type</th>
<th>Sensor current</th>
<th>Range</th>
<th>Accuracy</th>
<th>Resolution (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt100</td>
<td>-200...850°C</td>
<td>-328...1562°F</td>
<td>1 K</td>
<td>0,1 K</td>
</tr>
<tr>
<td>Pt1000</td>
<td>-200...850°C</td>
<td>-328...1562°F</td>
<td>2 K</td>
<td>0,1 K</td>
</tr>
<tr>
<td>KTY 11-6*</td>
<td>-50...150°C</td>
<td>-58...302°F</td>
<td>2 K</td>
<td>0,05 K</td>
</tr>
</tbody>
</table>

* or special

**Table 1 Thermocouple ranges**

**Table 2 Resistance transducers**

**CURRENT AND VOLTAGE SIGNALS**

- **Span start, end of span:** anywhere within measuring range
- **Scaling:** selectable -1999...9999
- **Linearization:** 16 segments, adaptable with BlueControl
- **Decimal point:** adjustable
- **Input circuit monitor:** 12.5% below span start (2mA, 1V)

**Table 3 Current and voltage**

**Resistance thermometer**

- **Connection:** 3-wire
- **Lead resistance:** max. 30 Ohm
- **Input circuit monitor:** Break and short circuit

**Special measuring range**

The BlueControl software can be used to match the input to the sensor KTY 11-6 (characteristic is stored in the controller).

**Physical measuring range:** 0...4500 Ohm

**Linearization segments:** 16

**CURRENT AND VOLTAGE SIGNALS**

- **Span start, end of span:** anywhere within measuring range
- **Scaling:** selectable -1999...9999
- **Linearization:** 16 segments, adaptable with BlueControl
- **Decimal point:** adjustable
- **Input circuit monitor:** 12.5% below span start (2mA, 1V)

**SUPPLEMENTARY INPUT INP2**

- **Input impedance:** 1 M
- **Effect of source resistance:** 1 V/

**Cold junction compensation**

- **Max. additional error:** 0,5 K

**Sensor break monitoring**

- **Sensor current:** 1 A
- **Operating sense configurable** (see page 4)

**HEATING CURRENT MEASUREMENT**

via current transformer

- **Measuring range:** 0...50 mA AC
- **Scaling:** adjustable -1999...0.000..9999 A

**CURRENT MEASUREMENT RANGE**

- **Input resistance:** 10 Ohm
- **Span:** configurable within 0 to 20 mA
- **Scaling:** adjustable -1999...9999
- **Input circuit monitor:** 12.5% below span start (4.2mA, 2 mA)

**CONTROL INPUT DI1**

Configurable as direct or invers switch or push-button!

Connection of a potential-free contact suitable for switching „dry“ circuits.

- **Switched voltage:** 2,5 V
- **Switched current:** 50 A

**CONTROL INPUTS DI2, DI3**

Configurable as switch or push-button!

Optocoupler input for active triggering

- **Nominal voltage:** 24 V DC external
- **Current sink (IEC 1131 Type 1):**
- **Logic “0”** -3...5 V
- **Logic “1”** 15...30 V
- **Current requirement:** approx. 5 mA

**TRANSMITTER SUPPLY UT**

- **Output:** 22 mA / 18 V

If the universal output OUT3 is used there may be no external galvanic connection between measuring and output circuits!
**SURVEY OF THE OUTPUTS**

<table>
<thead>
<tr>
<th>Output</th>
<th>Used for</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT1 OUT2 (relay)</td>
<td>Control output for heating/cooling or open/close, limit contacts, alarms, end of program, pump control *</td>
</tr>
<tr>
<td>OUT3 (relay or logic)</td>
<td>as OUT1 and OUT2</td>
</tr>
<tr>
<td>OUT3 (continuous)</td>
<td>Control output, process value, set-point, control deviation, transmitter supply 13 V/22 mA</td>
</tr>
<tr>
<td>OUT5 OUT6 (optocoupler)</td>
<td>as OUT1 and OUT2</td>
</tr>
</tbody>
</table>

* All logic signals can be OR-linked!

**RELAY OUTPUTS OUT1, OUT2**

- Contacts: 2 NO contacts with common connection
- Max. contact rating: 500 VA, 250 VAC, 2A at 48...62 Hz, resistive load
- Min. contact rating: 6V, 1 mA DC
- Operating life (electric): 800,000 duty cycles with max. rating

**OUT3 USED AS RELAY OUTPUT**

- Contacts: Potential-free changeover contact
- Max. contact rating: 500 VA, 250 VAC, 2A at 48...62 Hz, resistive load
- Min. contact rating: 5V, 10 mA AC/DC
- Operating life (electric): 600,000 duty cycles with max. rating

Note: If the relays OUT1...OUT3 operate external contactors, these must be fitted with RC snubber circuits to manufacturer specifications to prevent excessive switch-off voltage peaks.

**OUT3 AS UNIVERSAL OUTPUT**

- Galvanically isolated from the inputs.
- Freely scalable
- Resolution: 11 Bit
- Time constant of the D/A converter $T_{90}$: 50 ms
- Limiting frequency of the continuous controller: > 2 Hz

**Galvanic isolations:**
- Safety isolation
- Functional isolation

**Current output**

- 0/4...20 mA, configurable.
- Signal range: 0...approx.21.5mA
- Load: 500
- Load effect: 0,02%/100
- Resolution: 22 A (0,1%)
- Error: 40 A (0,2%)

**Voltage output**

- 0/2...10V configurable.
- Signal range: 0...11 V
- Load: 2 k
- Load effect: none
- Resolution: 11 mV (0,1%)
- Error: 20 mV (0,2%)

**OUT3 used as transmitter supply**

- Output: 22 mA / 13 V

**OUT3 used as logic output**

- Load: 500
- Load > 500
- Load > 20 mA
- Load > 13 V

**OUTPUTS OUT5, OUT6**

Galvanically isolated optocoupler outputs.

- Grounded load: common positive control voltage.
- Output rating: 16...32 VDC; 70 mA
- Internal voltage drop: 1V with $I_{max}$
- Protective circuit: built-in against short circuit, overload, reversed polarity (free-wheel diode for relay loads).
FUNCTIONS

Control behaviour

- Signaler with adjustable switching differential (ON/OFF controller)
- PID controller (2-point and continuous)
- Delta / Star / Off or 2-point controller with switch over from partial to full load
- 2 x PID (heating/cooling)
- 3-point stepping controller

Two parameter sets for manual gain scheduling
Self-tuning control parameters or adjustable manually via front keys or BlueControl software.

Behaviour with 2- and 3-point controllers

- Standard behaviour:
  For precise matching of the required output value at the output signal limits, the controller changes the cycle times for heating and cooling automatically and continuously.
- With constant cycle times:
  The length of the shortest heating and cooling pulse is adjustable.
- Water cooling linear
  (heating=standard):
  To ensure a sufficient cooling effect, the cooling function starts only after reaching an adjustable temperature value. The pulse length is adjustable, too and remains constant for all output values.
- Water cooling nonlinear
  (heating=standard):
  The general function is described above but the controller additionally takes in consideration that the water cooling is usually much stronger than the heating (thus preventing unfavorable behavior when changing from heating to cooling).

Set-point functions

- Adjustable set-point gradient
  0,01...9999 °C/min
- Set-point control
- Set-point/cascade control
- Program controller with 4 segments
  (set-point/section time)

LIMIT SIGNALLING FUNCTIONS

Max., Min. or Max./Min. monitoring with adjustable hysteresis.

Signals which can be monitored:

- Process value
- Control deviation
- Control deviation with suppression during start-up or set-point changes
- Effective set-point
- Output signal Y
- Control deviation always compared to internal setpoint SP even if SP2 or SP.E is activated.

Functions

- Input signal monitoring
- Input signal monitoring with latch (reset via front key or digital input)

Several limit signals or alarms can be OR-linked before being output. Applications: Release of a brake with motor actuators, general alarms, etc

ALARMS

Heating current alarm
- Overload and short circuit
- Open circuit and short circuit
Limit value adjustable 0...9999 A

Control loop alarm
Automatic detection if there is no response of the process to a change of output value.

Sensor break or short circuit
Depending on selected input type, the input signal is monitored for break and short circuit.

MAINTENANCE MANAGER

Display of error signals, warnings, and latched limit messages in the error list. Signals are latched, and can be reset manually.

Possible signals in the error list:

- Sensor break, short circuit, reversed polarity
- Heating current alarm
- Control loop alarm
- Fault during self-tuning
- Latched limit messages
  e.g. re-calibration warning
  (If the adjusted operating hours are exceeded a message is displayed)
  e.g. maintenance interval of actuator
  (If the adjusted switching cycles are exceeded a message is displayed)
  Internal fault (RAM, EEPROM, ...)

Start-up circuit

When the process is controlled towards the start-up set-point, the output value is limited. The start-up set-point is kept constant during the start-up holding time. After that, the main setpoint SP is controlled. If a disturbance reduced the process value, the start-up circuit is activated again.
**OPERATION AND DISPLAY**

**Display**
- Process value: LED with 7 segments, 10,5 mm
- Lower display: LED with 7 segments, 7,8 mm

**Operating functions**
The functions of the Ò-key and the Ñ-key are configurable:

<table>
<thead>
<tr>
<th>Function</th>
<th>Ò</th>
<th>Ñ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote (no front operation)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SP.2 (2nd setpoint)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Y.2 (2nd output value)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>SP.E (external setpoint)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Manual operation</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>C.OFF (controller function off)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Lock of manual key</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Reset of latched limits and error list</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Boost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter set 1/2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Programmer run/stop</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Several functions can be combined e.g. SP.2 and parameter set switch-over (gain scheduling) with only one key.

**EXPERT FUNCTIONS**

**PROTOCOL**
The KS 50-1 TCont supports a protocol that is widely used in the plastics processing industry, with specifications according to Arburg, Engel, and others.

**TEMPERERING UNITS**

<table>
<thead>
<tr>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of controller operation (r)</td>
</tr>
<tr>
<td>Cooling to return flow temperature (k)</td>
</tr>
<tr>
<td>Switch-off (p)</td>
</tr>
<tr>
<td>Exchange of setpoint and process value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating, cooling</td>
</tr>
<tr>
<td>Pump control</td>
</tr>
<tr>
<td>Safety temperature limiter (STL)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switch-overs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote / Local</td>
</tr>
<tr>
<td>Local start / stop</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor operating mode internal/external</td>
</tr>
<tr>
<td>Level alarm</td>
</tr>
<tr>
<td>Flow alarm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Return flow temperature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustable via SP.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Limit value for STL:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustable via L, ë, f</td>
</tr>
</tbody>
</table>

**Display and operation:**
- 3 yellow LEDs for the output states
- Green "OK"-LED
- Process value
- Remote is active
- Self-tuning is active
- Error list
- Setpoint, actuating value, parameter
- Configurable function-key
- BluePort front interface
- Enter-key
- Operation keys

**HOT RUNNERS**

<table>
<thead>
<tr>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller operation (r)</td>
</tr>
<tr>
<td>Positioner operation (s)</td>
</tr>
<tr>
<td>Disabling a channel (a)</td>
</tr>
<tr>
<td>Exchange of setpoint and process value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating, cooling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switch-overs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote / Local</td>
</tr>
</tbody>
</table>

**POWER SWITCH-ON**

After power-up, the controller goes into the remote mode and then into the standby mode until the normal controller mode is activated.

**LOCAL OPERATION**

Starting / stopping the controller in the local mode is possible via the inputs di1…di3 or by switching the setpoint SP on and off.

**Connection example:**
POWER SUPPLY
Depending on version:

AC SUPPLY
Voltage: 90...260 V AC
Frequency: 48...62 Hz
Power consumption: approx. 7 VA

UNIVERSAL SUPPLY 24 V UC
AC voltage: 20.4...26.4 V AC
Frequency: 48...62 Hz
DC voltage: 18...31 V DC
Power consumption: approx. 7 VA (W)

BEHAVIOUR WITH POWER FAILURE
Configuration, parameters, and adjusted set-points, control mode: Non-volatile storage in EEPROM

BluePort FRONT INTERFACE
Connection of PC via PC adapter (see “Accessories”). The BlueControl software is used to configure, set parameters, and operate the KS 50-1 TCont.

BUS INTERFACE
RS 485/422
Screened cables must be used.
Galvanically isolated
Physical: RS 485/422
Transmission speed: 2400, 4800, 9600, 19.200 Bit/sec
Parity: Even, odd, none
Address range: 1...32
Number of controllers per segment: 32

TTY (20 MA CURRENT LOOP)
Screened cables must be used.
Galvanically isolated
Physical: 20 mA current loop
Transmission speed: 2400, 4800, 9600, 19.200 Bit/sec
Parity: Even, odd, none
Address range: 1...32
Voltage drop: 2V
Number of controllers per bus: 6

PROTOCOLS
Selection via parameter Prot:
- MODBUS RTU
- Protocol for tempering units*
- Protocol for hot runner systems*
* according to Arburg specification

ENVIRONMENTAL CONDITIONS
Protection modes
Front panel: IP 65
Housing: IP 20
Terminals: IP 00

Permissible temperatures
For specified accuracy:
- Warm-up time: 15 minutes
- Temperature effect: < 100ppm/K
- For operation: -20...65°C
- For storage: -40...70°C

Humidity
75% yearly average, no condensation

Shock and vibration
Vibration test Fc (DIN 68-2-6)
- Frequency: 10...150 Hz
- Unit in operation: 1g or 0.075 mm
- Unit not in operation: 2g or 0.15 mm
- Shock test Ea (DIN IEC 68-2-27)
- Shock: 15g
- Duration: 11ms

Electromagnetic compatibility
Complies with EN 61 326-1
- Meets the immunity requirements for continuous, unattended operation
- Meets the radiation requirements of Class B for rural areas
- In case of surge interference, increased measurement errors must be expected

GENERAL
Housing
Material: Makrolon 9415, flame-retardant
Flammability class: UL 94 VO, self-extinguishing
Plug-in module, inserted from the front

Safety tests
Complies with EN 61010-1 (VDE 0411-1):
- Over voltage category II
- Contamination class 2
- Working voltage range 300 V
- Protection class II

Certifications
UL certification (applied for)

Electrical connections
Flat-pin connectors 1 x 6,3 mm or 2 x 2,8 mm to DIN 46 244

Mounting
Panel mounting with two fixing clamps at top/bottom or left/right
Close mounting possible
- Mounting position: not critical
- Weight: 0.27 kg

Accessories supplied with unit
Operating instructions
2 fixing clamps
**ACCESSORY EQUIPMENT**

**BlueControl (Engineering Tool)**

PC-based program for configuring, setting parameters, and operating (commissioning) the KS 50-1 TCont controller. Moreover, all the settings are saved, and can be printed on demand. Depending on version, a powerful data acquisition module is available, complete with trend graphics.

**Visibility masks**

The BlueControl software can be used to hide any number of controller parameters and configuration settings. This ensures that only certain parameters can be changed on-site. All critical and safety-relevant parameters are invisible!

**Simulation**

The built-in simulation serves to test the controller settings, but can also be used for general training and observation of the interaction between controller and control loop.

**Software requirements:**


---

**BlueControl, versions and functionality:**

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Mini</th>
<th>Basic</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>parameter and configuration setting</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>controller and control loop simulation</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>download: writes an engineering to the controller</td>
<td>SIM only</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>online mode/visualisation</td>
<td>SIM only</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>creation of user defined linearizations</td>
<td>SIM only</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>configuration of extended operating level</td>
<td>SIM only</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>upload: reads an engineering from the controller</td>
<td>SIM only</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>basic diagnosis function</td>
<td>SIM only</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>file, save engineering data</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>printer function</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>online documentation, help system</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>measurement correction (calibration procedure)</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>program editor</td>
<td>SIM only</td>
<td>SIM only</td>
<td>yes</td>
</tr>
<tr>
<td>data acquisition and trend function</td>
<td>SIM only</td>
<td>SIM only</td>
<td>yes</td>
</tr>
<tr>
<td>network and multiuser licence</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>personal assistant function</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>extended simulation</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>extended diagnostic and service functions</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

**Configurations that can only be implemented via the BlueControl software (not via the front-panel keys):**

- Customer-specific linearizations
- Enable „forcing” for inputs/outputs.
- Adjustment of limits for operating hours and switching cycles
- Switch-over to 60 Hz mains frequency
- Master/slave configuration
- Disable operator actions and operating levels, plus password definition
- Prevent automatic optimization of cycle times T1, T2

**Hardware requirements:**

A PC adapter (see „Accessories”) is required for connecting the controller.

Updates and demo software can be downloaded from: [www.pma-online.de](http://www.pma-online.de)
### KS 50-1 TCont

<table>
<thead>
<tr>
<th>Description</th>
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<tr>
<td>90...250V AC, 3 relays</td>
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<tr>
<td>24VAC / 18..30VDC, 3 relays</td>
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<tr>
<td>90...250V AC, 2 relays + mA/V/logic</td>
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</tr>
<tr>
<td>24VAC / 18..30VDC, 2 relays + mA/V/logic</td>
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<tr>
<td>RS485/422 + U, + di2/3 + OUT5/6</td>
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<tr>
<td>TTY + U, + di2/3 + OUT5/6</td>
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<td>Standard configuration</td>
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<td>Configuration to specification</td>
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<td>manual german</td>
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<td>manual english</td>
<td>E</td>
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<td>Standard (CE certified)</td>
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<td>UL-certified</td>
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### ACCESSORIES

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<tbody>
<tr>
<td>Current converter 50A AC</td>
<td>9404-407-50001</td>
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<tr>
<td>PC adapter, for connecting the BlueControl software to the BluePort</td>
<td>9407-998-00001</td>
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<tr>
<td>Standard rail adapter</td>
<td>9407-998-00061</td>
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<tr>
<td>Operating manual KS 50-1 (Standard) German</td>
<td>9499-040-62818</td>
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<tr>
<td>Operating manual KS 50-1 (Standard) English</td>
<td>9499-040-62811</td>
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<td>Operation notes TCont German</td>
<td>9499-040-64418</td>
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<td>Operation notes TCont English</td>
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<td>BlueControl Mini German/English/French</td>
<td><a href="http://www.pma-online.de">www.pma-online.de</a></td>
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<td>BlueControl Expert German/English/French</td>
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