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 for all sensors
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
Programmer with 10 segments, bandwidth and „end“ signal
RS 422/485 Modbus RTU interface
Built-in transmitter power supply
Splash-water proof front (IP 65)

**APPLICATIONS**
- Furnaces and ovens
- Burners and boilers
- Plastics processing
- Hot runners
- Driers
- Climatic chambers
- Heat treatment plants

**DESCRIPTION**

The universal temperature controller KS 50-1 is intended for universal, precise, and cost-effective control tasks in all branches of industry. For this, the unit provides simple 2-point (on/off) control, continuous PID control, or 3-point stepping control. 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 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. Optionally 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 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 KS 50-1 determines the best control parameters at the actual setpoint. This function does not require oscillation, and performs a minimal deviation of the process value.

**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. By the flexibly applicable function key an external switch can be omitted in many cases, because one can start now e.g. the boost function directly.

**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. Off 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 set-point SP.2, external set-point SP.E, fixed correcting variable Y2, manual operation, controller off, disable auto/manual function, reset of stored alarms, boost, parameter set 1 ↔ 2</td>
</tr>
<tr>
<td>di2 (option)</td>
<td></td>
</tr>
<tr>
<td>di3 (option)</td>
<td></td>
</tr>
</tbody>
</table>

**PROCESS VALUE INPUT INP1**

- Resolution: > 14 bit
- Decimal point: 0 to 3 decimals
- Limiting frequency: 2 Hz
- Digital input filter: adjustable 0,000...9999 s
- 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 (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe-CuNi (DIN)</td>
<td>-100...900 °C</td>
<td>≤ 2 K</td>
<td>0.1 K</td>
</tr>
<tr>
<td>Fe-CuNi</td>
<td>-100...1200 °C</td>
<td>≤ 2 K</td>
<td>0.1 K</td>
</tr>
<tr>
<td>NiCr-Ni</td>
<td>-100...1350 °C</td>
<td>≤ 2 K</td>
<td>0.2 K</td>
</tr>
<tr>
<td>Nichrome/Nisil</td>
<td>-100...1300 °C</td>
<td>≤ 2 K</td>
<td>0.2 K</td>
</tr>
<tr>
<td>PtRh-Pt 10%</td>
<td>0...1760 °C</td>
<td>32...3200 °F</td>
<td>≤ 2 K</td>
</tr>
<tr>
<td>PtRh-Pt 13%</td>
<td>0...1760 °C</td>
<td>32...3200 °F</td>
<td>≤ 2 K</td>
</tr>
</tbody>
</table>

**Resistance (Table 2)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Sensor current</th>
<th>Range</th>
<th>Accuracy</th>
<th>Resolution (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt100</td>
<td>0.2 mA</td>
<td>-200...950 °C</td>
<td>-328...1562 °F</td>
<td>≤ 1 K</td>
</tr>
<tr>
<td>Pt1000</td>
<td>0.2 mA</td>
<td>-200...200 °C</td>
<td>-328...392 °F</td>
<td>≤ 2 K</td>
</tr>
</tbody>
</table>

**Resistance 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 Ω**

**Linearization segments: 16**

**Electrical connections:**

```
+24V DC +24V GND
DATA B TXD-B DATA A RXD-A
8 7 6 5 4 3 2 1
16 15 14 13 12 11 10 9
```

**Galvanic isolations:**

- Safety isolation
- Functional isolation

**Table 1 Thermocouple ranges**

<table>
<thead>
<tr>
<th>Thermocouple</th>
<th>Range</th>
<th>Accuracy</th>
<th>Resolution (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Fe-CuNi (DIN)</td>
<td>-100...900 °C</td>
<td>-148...1662 °F</td>
</tr>
<tr>
<td>J</td>
<td>Fe-CuNi</td>
<td>-100...1200 °C</td>
<td>-148...2192 °F</td>
</tr>
<tr>
<td>K</td>
<td>NiCr-Ni</td>
<td>-100...1350 °C</td>
<td>-148...2462 °F</td>
</tr>
<tr>
<td>N</td>
<td>Nichrome/Nisil</td>
<td>-100...1300 °C</td>
<td>-148...2372 °F</td>
</tr>
<tr>
<td>S</td>
<td>PtRh-Pt 10%</td>
<td>0...1760 °C</td>
<td>32...3200 °F</td>
</tr>
<tr>
<td>R</td>
<td>PtRh-Pt 13%</td>
<td>0...1760 °C</td>
<td>32...3200 °F</td>
</tr>
</tbody>
</table>

**Table 2 Resistance transducers**

<table>
<thead>
<tr>
<th>Type</th>
<th>Sensor current</th>
<th>Range</th>
<th>Accuracy</th>
<th>Resolution (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt100</td>
<td>0.2 mA</td>
<td>-200...950 °C</td>
<td>-328...1562 °F</td>
<td>≤ 1 K</td>
</tr>
<tr>
<td>Pt1000</td>
<td>0.2 mA</td>
<td>-200...200 °C</td>
<td>-328...392 °F</td>
<td>≤ 2 K</td>
</tr>
</tbody>
</table>

**Table 3 Current and voltage**

<table>
<thead>
<tr>
<th>Range</th>
<th>Input resistance</th>
<th>Accuracy</th>
<th>Resolution (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10 Volt</td>
<td>110 Ω</td>
<td>≤ 0.1 %</td>
<td>0.6 mV</td>
</tr>
<tr>
<td>0-20 mA</td>
<td>4.9 Ω (voltage requirement ≤ 2.5 V)</td>
<td>≤ 0.1 %</td>
<td>1.5 µA</td>
</tr>
</tbody>
</table>

**Dimensions (mm):**

- **Height:** 96 (3.78’’)
- **Width:** 48 (1.89’’)
- **Max. depth:** 118 (4.65’’)
- **Min. depth:** 45 (1.77’’)

**Mains supply**
- Process value input INP1
- Supplementary input INP2
- Digital input di1

**Relay outputs OUT1,2**
- RS 422/485 interface
- Universal outputs di2, 3

**Transmitter supply UT**
- OUT5, OUT6
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
Resolution: > 14 bit
Scanning cycle: 100 ms
Accuracy: better 0,1 %

Heating current measurement
via current transformer
Measuring range: 0...50 mA AC
Scaling: adjustable -1999.000.9999 A

Current measurement range
Input resistance approx. 120 Ω
Span: configurable within 0 to 20mA
Scaling: adjustable -1999...9999
Input circuit monitor: 12,5% below span start (4.20mA → 2mA)

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 μA

CONTROL INPUTS DI2, DI3 (OPTION)
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 (OPTION)
Output: 22 mA / ≥ 18 V
If the universal output OUT3 is used there may be no external galvanic connection between measuring and output circuits!

OUT3 AS UNIVERSAL OUTPUT
Galvanically isolated from the inputs.
Freely scalable
DA-converter limiting frequency T90: 50 ms
Limiting frequency of the complete continuous controller: > 2 Hz
Resolution: 11 bits

Current output
0/4...20 mA, configurable.
Signal range: 0...approx. 21,5 mA
Load: ≤ 500 Ω
Load effect: 0,02 % / 100 Ω
Resolution: ≤ 22 μA (0,1%)
Error: ≤ 40 μA (0,2%)

Voltage output
0/2...10V, configurable
Signal range: 0...11 V
Load: ≥ 2 kΩ
Load effect: no effect
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 Ω
Load > 500 Ω

OUTPUTS OUT5, OUT6 (OPTIONAL)
Galvanically isolated opto-coupler outputs.
Grounded load:
common positive control voltage.
Output rating: 18...32 VDC; ≤70 mA
Internal voltage drop: =1 V with Imax
Protective circuit: built-in against short circuit, overload, reversed polarity
(free-wheel diode for relay loads).

OUTPUTS SURVEY OF THE OUTPUTS

<table>
<thead>
<tr>
<th>Output</th>
<th>Used for</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT1</td>
<td>Control output heating/cooling or Open/Close, limit contacts, alarms, programmer end</td>
</tr>
<tr>
<td>OUT2</td>
<td>(relay)</td>
</tr>
<tr>
<td>OUT3</td>
<td>Control output, process value, set-point, control deviation, transmitter supply 13 V / 22 mA</td>
</tr>
<tr>
<td>OUT5</td>
<td>(continuous)</td>
</tr>
<tr>
<td>OUT6</td>
<td>(Optocoupler) 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: 6 V, 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: 5 V, 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.
FUNCTIONS

Control behaviour

- Signaler with asymmetric 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 10 segments (set-point/section time)

Example of the linkage of the internal functions:

- setpoint processing with programmer, boost function and start-up circuit
- controller function with loop monitoring
- limit monitoring, configurable with latch and suppression
- heating current monitoring
- output processing with logic or-combination and inverting
- analog inputs with logical sensor fail signal
- digital inputs, function key and key with lock function

Modbus Master function supports setpoint changes e.g. in extruder applications

Master
KS 50-1

Slaves
KS 90-1, KS 50-1, KS 40-1

Behaviour with sensor break or short circuit:

- Control outputs switched off
- Switch-over to a safe output value
- Switch-over to a mean output value (PID controller)

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.
SPECIAL FUNCTIONS

Boost-Function
The boost function provides a short-term increase of the set-point, e.g. with hot runner control, in order to clear nozzles of “frozen” rests of material.

Start-up circuit
For temperature control, e.g. with hot runners. High-performance heating elements with magnesium oxide insulation must be heated slowly, to remove any humidity and to prevent destruction.

Modbus Master
The KS 90-1 can be configured as Modbus Master. This enables it to transmit user-specified signals or parameters cyclically to all connected Slave controllers. For example, the following applications are possible:
- Set-point shifting relative to the set-point adjusted in the Slave (see picture)
- matching of control parameters, limit contacts, etc.
- Limiting the output value (override control OVC)
- ...

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)
- Adjustable discriminator time of 0...9999 seconds

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

Display and operation:
3 yellow LEDs for the output states
second or external setpoint ramp is active
manual operation
automatic/manual-key
configurable function-key
BluePort front interface

green “OK”-LED
process value
programm run
selftuning is active
error list
setpoint, actuating value, parameter
enter-key
operation keys

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, ...)

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 key and the key are configurable:

<table>
<thead>
<tr>
<th>Function</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote (no front operation)</td>
<td>X</td>
</tr>
<tr>
<td>SP.2 (2nd setpoint)</td>
<td>X</td>
</tr>
<tr>
<td>Y.2 (2nd output value)</td>
<td>X</td>
</tr>
<tr>
<td>SP.E (external setpoint)</td>
<td>X</td>
</tr>
<tr>
<td>Manual operation</td>
<td>X</td>
</tr>
<tr>
<td>C.OFF (controller function off)</td>
<td>X</td>
</tr>
<tr>
<td>Lock of manual key</td>
<td>X</td>
</tr>
<tr>
<td>Reset of latched limits and error list</td>
<td>X</td>
</tr>
<tr>
<td>Boost</td>
<td>X</td>
</tr>
<tr>
<td>Parameter set ½</td>
<td>X</td>
</tr>
<tr>
<td>Programmer run/stop</td>
<td>X</td>
</tr>
</tbody>
</table>

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

Depending on version:

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

**UNIVERSAL SUPPLY 24 V UC**
AC voltage: 20.4...26.4 VAC
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.

**BUS INTERFACE (OPTION)**
Galvanically isolated
Physical: RS 422/485
Protocol: Modbus RTU
Transmission speed: 1200, 4800, 9600, 19,200 bits/s
Address range: 00...99
Number of controllers per bus: 32
Repeaters must be used to connect more controllers.

ENVIRONMENTAL CONDITIONS

**Protection modes**
Front panel: IP 65
Housing: IP 20
Terminals: IP 00

**Permissible temperatures**
For specified accuracy: 0...60°C
Warm-up time: < 15 minutes
Temperature effect: < 100ppm/K
For operation: -20...85°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
- Complies with the immunity requirements for continuous, unattended operation
- Complies with the emission requirements class B for rural areas
- Surge disturbances may increase the measurement error

GENERAL

**Housing**
Material: Makrolon 9415,
flame-retardant
Flammability class: UL 94 V0, 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 VAC
- Protection class II

**Certifications**
Type test to DIN 3440
With certified sensors it can be used in:
- Heat generating plants with outflow temperatures up to 120°C to DIN 4751
- Hot-water plants with outflow temperatures above 110°C to DIN 4752
- Thermal transfer plants with organic transfer media to DIN 4754
- Oil-heated plants to DIN 4755

UL certification (applied for)
Electrical connections
Depending on version:
- Flat-pin connectors 1 x 6,3 mm or 2 x 2,8 mm to DIN 46 244
- Screw terminals for conductor cross-section from 0,5 to 2,5 mm²

Mounting
Panel mounting with two fixing clamps at top/bottom or left/right
Close mounting possible
Mounting position: not critical
Weight: 0,27 kg (9.52 oz)

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 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 mask
The BlueControl software can be used to blind out parameters in the instrument. Thus, only allowed parameters can be changed on side. Safety relevant parameters are invisible!

Two parameters are blinded out:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Visible</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP.LD</td>
<td>lower setpoint range</td>
<td></td>
</tr>
<tr>
<td>SP.HI</td>
<td>upper setpoint range</td>
<td></td>
</tr>
<tr>
<td>rSP</td>
<td>2nd setpoint ramp /[min]</td>
<td></td>
</tr>
<tr>
<td>tSP</td>
<td>timer dwell time [min]</td>
<td></td>
</tr>
</tbody>
</table>

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

Software requirements

Configurations that can only be implemented via the BlueControl software (not via the front-panel keys):
- Customer-specific linearizations
- Enable „forcing“ for inputs/outputs. Forcing allows to write the analog and digital inputs and outputs via Modbus interface.
- 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

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>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>online mode / visualisation</td>
<td></td>
<td></td>
<td></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>
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<td>program editor</td>
<td>SIM only</td>
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<td>data acquisition and trend function</td>
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<td>SIM only</td>
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<tr>
<td>network and multiuser licence</td>
<td>no</td>
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<tr>
<td>personal assistant function</td>
<td>no</td>
<td>no</td>
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<tr>
<td>extended simulation</td>
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<tr>
<td>extended diagnostic and service functions</td>
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### ORDERING INFORMATION

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<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>Current converter 50A AC</td>
<td>9404-407-50001</td>
</tr>
<tr>
<td>PC adapter, for connecting the BlueControl software to the BluePort®</td>
<td>9407-998-00001</td>
</tr>
<tr>
<td>Standard rail adapter</td>
<td>9407-998-00061</td>
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<tr>
<td>Adhesive set of physical dimension labels with 31 different dimensions and 4 empty labels</td>
<td>4012-140-66041</td>
</tr>
<tr>
<td>Operating manual German</td>
<td>9499-040-62818</td>
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<tr>
<td>Operating manual English</td>
<td>9499-040-62811</td>
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<tr>
<td>Operating manual French</td>
<td>9499-040-62832</td>
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<tr>
<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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<tr>
<td>BlueControl Basic German/English/French</td>
<td>9407-999-11001</td>
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<td>BlueControl Expert German/English/French</td>
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