NEW!

Controller

N-CONTROLS

Application

The NKS-4x is an universal temperature controller for all tasks, which can be solved with 2-point control, 3-point control, continous PID control or 3-point stepping control.
The NKS-9x is the specialist for all classic process control tasks

Application Example

- Climate chambers, dryer, heat threating plants, sterilisers, packing machines, food application, laboratory

Design

- NKS-4x: 3 formats 96x48, 48x96 and 96x96 for panelmounting
- NKS-9x: 2 formats 96x48 and 96x96 for panelmounting
- Front IP65
- Housing IP20
- Big display (19mm height of digit) bei 96x96 version NKS-42

Special Features of NKS-4x and NKS-9x

- 100ms cycle time
- Extended temperature range up to 60°C
- Limit function with latch
- Free configurable analog output
- Easy 2-point or offset measurement correction
- Logical combination of digital outputs
- Customer-specific linearisation for all sensors
- Build in transmitter power supply
- Monitoring of heating current and output circuit
- Service manager and error list
- Emergency operation after sensor break by means of "output hold" function
- Timer and programmer with end signal
- Manual/automatic key
- BluePort®-control port
- different approvals (DIN 3440, cUL, GL) therefore can be used in:
  - plants for heat generation acc. DIN 4751
  - plants for hot water acc. DIN 4752
  - plants for heat transfer acc. DIN 4754
  - plants for oil heated plants acc. DIN 4755

Additional Features NKS-9x

- Valve controller with position feedback
- Free programable function key
- Self tuning at set point
- Two universal inputs
- Day & night-display with bar graphs and plain text
- Additional in- / outputs
- Second set for control parameters
- Special function for water cooling
- O_2- measurement and regulation

Options / Accessories

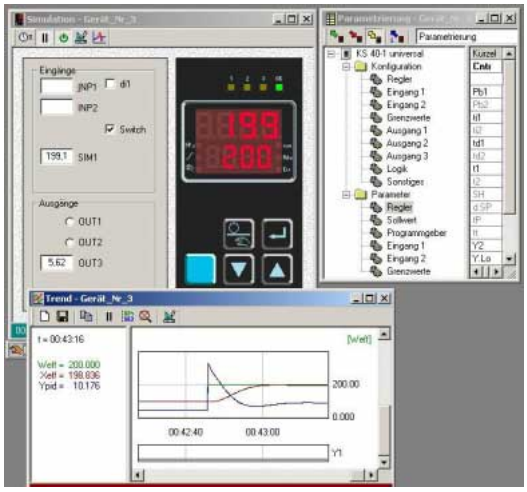
- BlueControl®-Software incl. PC-Adapter
- Field-BUS interface

NKS-42-1

NKS-40-1

NKS-41-1

NKS-90-1



BlueControl-Software

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Technical Data NKS-40 / NKS-90 (Deviations and additional features of NKS-90 are marked in red)

General

Housing	Material	Makrolon 9415 flame retardant
	Flammability class	UL 94 VO self-extinguishing
	Plug-in module	inserted from the front
Safety	complies with EN 61010-1 (VDE 0411-1)	
	Over voltage category II	
	Contamination class 2	
	Working voltage range 300 V	
	Protection class II	
Certifications	(for NKS-92-1 pending)	
	Type test to DIN 3440	
	cUL-certification	Type 4x, indoor use File: E 208286
Electrical connections	Flat-pin connectors	1x6,3mm or 2x2,8mm acc. DIN 46 244
	Screw terminals for conductor cross sections from	0,5 to 2,5mm²
Protection modes	Front panel	IP65
	Housing	IP20
	Terminals	IP00
Permissible temp.	For spec. accuracy	0...60°C
	Warm up time	≥ 15 minutes
	For operation	-20...65°C
	For storage	-40...70°C
Humidity	75% yearly average, no condensation	
Shock and vibration		DIN EN 60068-2-6
	Frequency	10...150 Hz
	Unit in operation	1g or 0,075 mm
	Unit not in operation	2g or 0,15 mm
		DIN EN 60068-2-27
	Shock	15g
	Duration	11ms
Electromagnetic compatibility		complies with EN 61 326-1 (for continuous unattended operation)
Power supply	(depending on version)	
	AC voltage	90...260VAC / 48...62Hz
	Universal supply 24VUC	20,4...26,4VAC / 48...62Hz 18...31VDC
	Power consumption	ca. 8,0VA
Behaviour with power failure		
Configuration, Parameter and adjusted set points, control mode: Non-volatile storage in EEPROM		
Mounting	Panel mounting	see page 4
	Close mounting possible	
	Mounting position	not critical
Weight		0,27kg

Analog Inputs

Process value input INP1		
Resolution		> 14 Bit
Decimal point	adjustable	0 to 3 decimals
Digital input filter	adjustable	0,0...100,0s
Scanning cycle		100ms
Measured value correction		2-point or offset correction
Thermocouples		see table 1
Temperature compensation		external
Input impedance		1MOhm
Effect of source resistance		1µV/Ohm
Internal temperature compensation		
Max. additional error		0,5K
Sensor break monitoring		
Sensor current		≤ 1µA
Operating sense configurable		
Special thermocouple		
Together with the linearisation, the measuring range -25...75mV can be used for connecting thermocouples that are not included in table 1!		
Resistance thermometer		see table 2
Connection		2- or 3-wire
Lead resistance		max. 30Ohm
Input circuit monitor		break and short circuit
Special measuring range		
With BlueControl® (Engineering-Tool) the characteristic for temperature probe KTY 11-6 can be adapted.		
Physical measuring range		0...4,5kOhm
Number of segements for linearisation		16
Current and voltage signals		see table 3
Span start, end of span		anywhere within measuring range
Scaling	selectable	-1999...9999
Input circuit monitor		12,5% below span start (2mA, 1V)
SUPPLEMANTARY INPUT INP2		
Resolution		> 14 bit
Scaning cycle		100ms
Heating current measurement		via current transformer
Masuring range		0...50mA AC
Scaling	adjustable	-1999...0,000...9999A
Current measurement range		tech. data see INP1
Potentiometer		see table 2
Connection		2-wire
Lead resistance		max. 30Ohm
Input circuit monitor		break
SUPPLEMENTARY INPUT INP3 (OPTION)		
Resolution		>14 bit
Scanning cycle		100ms
Technical data as for INP1, except the 10V range		

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Digital Inputs

CONTROL INPUT DI1, DI2
Configurable as direct or inverse switch or push-button!
Connection of a potential-free contact suitable for switching "dry" circuits

Switched voltage	2,5V / 5V
Switched current	50µA / 100µA

CONTROL INPUT DI2, DI3 (OPTION)
Configurable as direct or inverse switch or push-button!
Optocoupler input for active triggering

Nominal voltage	24VDC external
Current sink (IEC 1131 Typ 1)	
Logic "0"	-3...5V
Logic "1"	15...30V
Current requirement	approx. 5mA

Outputs

RELAY OUTPUTS OUT1...OUT4

Contact rating	max.	500VA, 250V, 2A at 48...62Hz, resisitve load
Contact rating	min.	6V, 1mA DC
Duty cycle elektr.	for I = 1A/2A at ~250V (resistive load)	800.000 / 500.000

OUT3, 4 AS UNIVERSAL OUTPUT
Galvanically isolated from the inputs.

Resolution		11 bit
Current ouptut	configurable	0/4...20mA
Signal range		0...ca.22mA
Load		≤ 500Ohm
Load effect		none
Resolution		≤ 22µA (0,1%)
Error		≤ 40µA (0,2%)
Voltage output	configurable	0/2...10V
Signal range		0...11V
Load		≥ 2kOhm
Load effect		none
Resolution		< 11mV (0,1%)
Error		< 20mV (0,2%)

OUT3, 4 used as transmitter supply

Output	22mA / 13V

OUT3, 4 used as logic output

Load ≤ 500 Ohm	0/ ≤ 20mA
Load > 500 Ohm	0/ > 13V

OUTPUTS OUT5, OUT6 (OPTION)
Galvanically isolated optocoupler outputs

Grounded load	common positive control voltage	
Output rating		18...32VDC; 70mA
Internal voltage drop		1V with Imax
Protective circuit	build in against	short circuit reversed polarity

TRANSMITTERSSUPPLY UT (OPTION)

Output	22mA / 18V

The analog outputs OUT3 / OUT4 and the transmitter supply UT have different voltage potentials. Therefore, with analog outputs, you must not set up an external galvanic connection between OUT3 / OUT4 and UT.

Communication

BLUEPORT Front Interfache
Connection of PC via PC-Adapter
(see „Accessories"). The BlueControl®-Software (Engineering-Tool) is used to configure, set parameters, and operate the NKS-xx-y.

BUS INTERFACE (OPTION)
Galvanically isolated

Physical	RS 422/485
Protocol	Modbus RTU
Transmission speed	2400, 4800, 9600, 19.200 Bit/sec
Adress range:	1...247
Number of controller per bus	32

Repeater must be used to connect more controllers

Table 1 Thermocouples ranges

Type of Thermocouple		Measurement range		Accuracy	Resolution (∅)
L	Fe-CuNi (DIN)	-100...900°C	-148...1652°F	≤ 2 K	0,1 K
J	Fe-CuNi	-100...1200°C	-148...2192°F	≤ 2 K	0,1 K
K	NiCr-Ni	-100...1350°C	-148...2462°F	≤ 2 K	0,2 K
N	Nicrosil/Nisil	-100...1300°C	-148...2372°F	≤ 2 K	0,2 K
S	PtRh-Pt 10%	0...1760°C	32...3200°F	≤ 2 K	0,2 K
R	PtRh-Pt 13%	0...1760°C	32...3200°F	≤ 2 K	0,2 K
T	Cu-CuNi	-200...400°C	-328...752°F	≤ 2 K	0,05 K
C	W5%Re-W26%Re	0...2315°C	32...4199°F	≤ 2 K	0,4 K
D	W3%Re-W25%Re	0...2315°C	32...4199°F	≤ 2 K	0,4 K
E	NiCr-CuNi	-100...1000°C	-148...1832°F	≤ 2 K	0,1 K
B*	PtRh-Pt6%	0(400)...1820°C	32(752)...3308°F	≤ 2 K	0,3 K

* Specifications are valid from 400°C

Table 2 Resistance transducers

Type	Meas. current	Measurement range		Accuracy	Resolution (∅)
Pt100	0,2 mA	-200...100°C (150)**	-140...212°F	≤ 1 K	0,1 K
Pt100		-200...850°C	-328...1562°F	≤ 1 K	0,1 K
Pt1000		-200...850°C	-328...1562°F	≤ 2 K	0,1 K
KTY 11-6*		-50...150°C	-58...302°F	≤ 2 K	0,05 K
Special		0...4500 Ω		≤ 0,1 %	0,01%
Special		0...450 Ω			
Poti		0...160 Ω			
Poti		0...450 Ω			
Poti		0...1600 Ω			
Poti		0...4500 Ω			

* or special
** Measurement range 150°C at reduced output resistance. 160W max. for measurement and output resistances. (150°C is equivalent to 157,33W).

Table 3 Current and voltage

Meas. range	Input resistance	Accuracy	Resolution (∅)
0-10 Volt	≈ 110 kΩ	≤ 0,1 %	0,6 mV
-2,5...115 mV	≥ 200 MΩ	≤ 0,1 %	6 mV
-25...1150 mV	≥ 200 MΩ	≤ 0,1 %	60 mV
0-20 mA	20 Ω	≤ 0,1 %	1,5 mA

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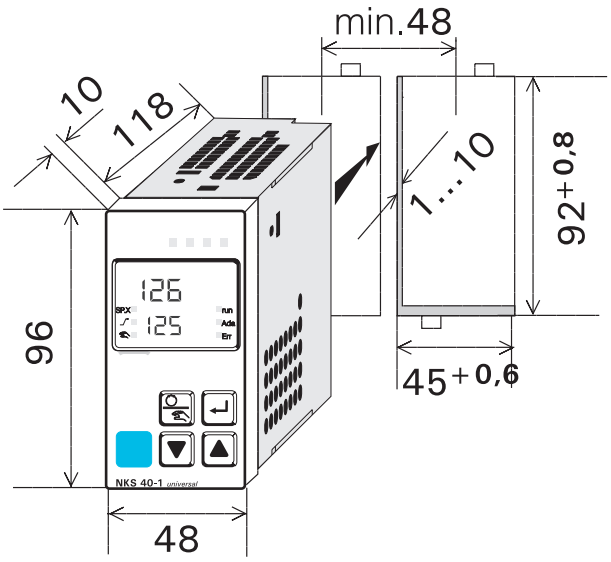
Notice:

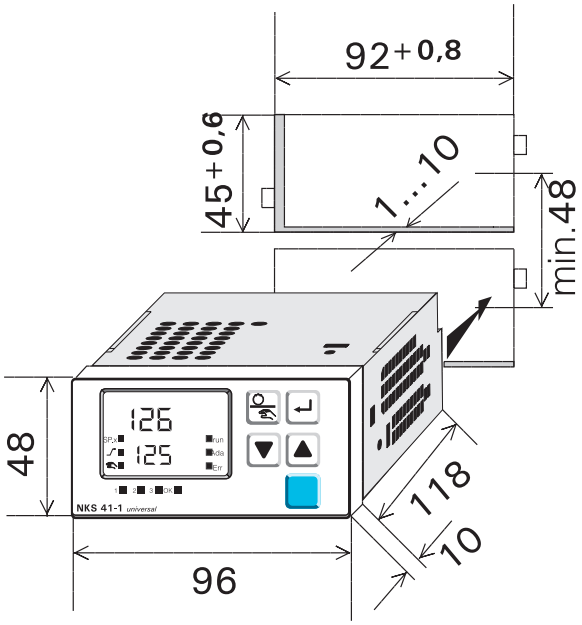
For compliance with cUL certificate, the following information must be taken into account:

- Use only 60 / 75 or 75°C copper (Cu) wire.
- Tighten the terminal-screws with a torque of 0,5 - 0,6 Nm.

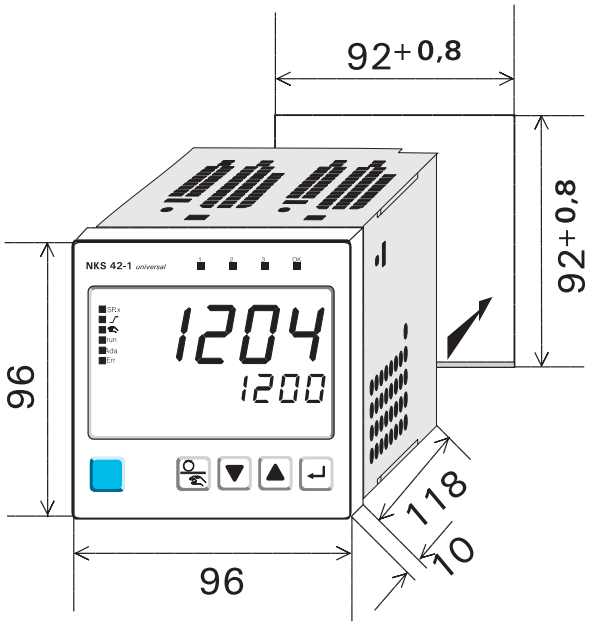
Dimensions



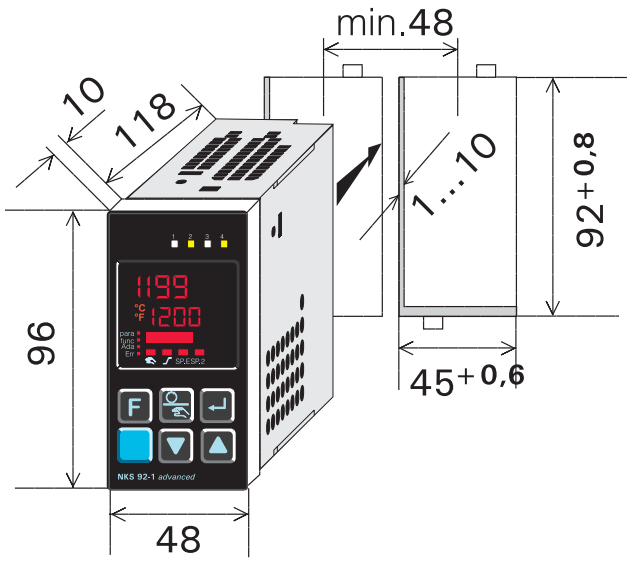
NKS 40-1



NKS 41-1



NKS 42-1



NKS 90-1

Additional Notes: see Manual

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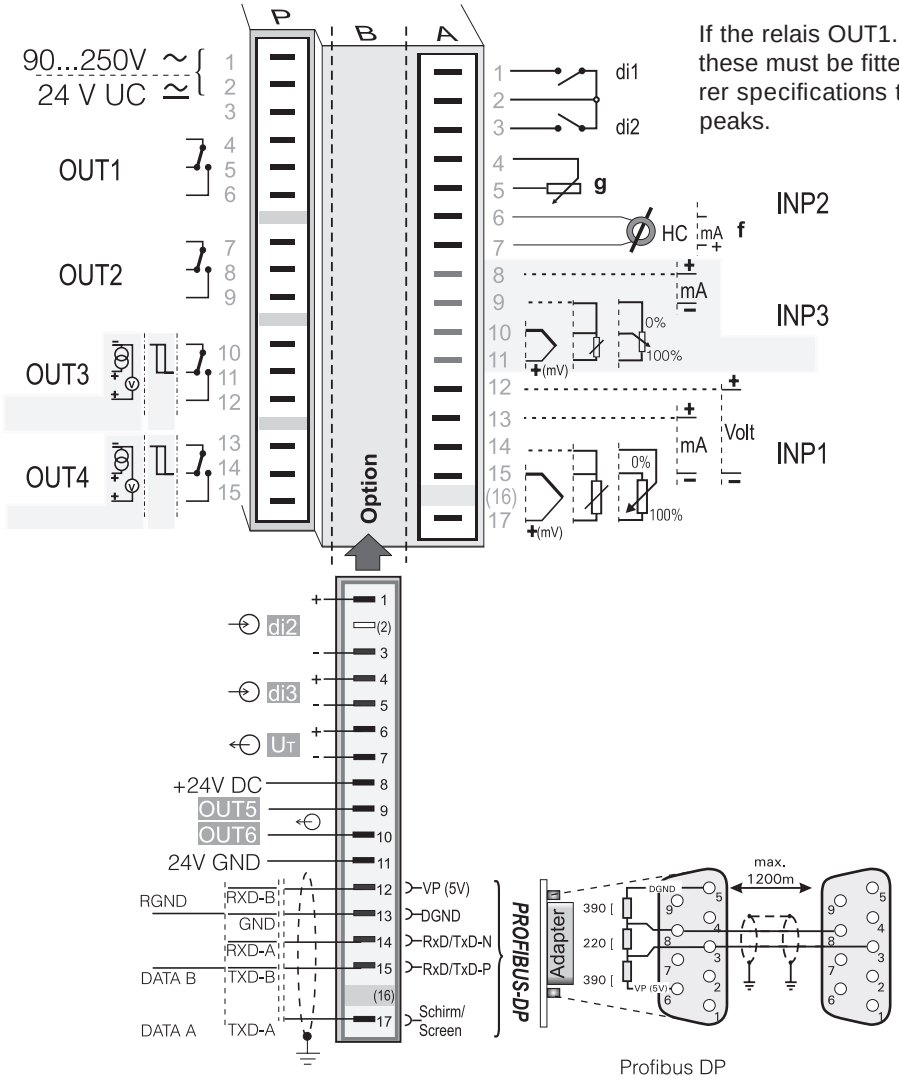
Electrical Connection NKS-9x

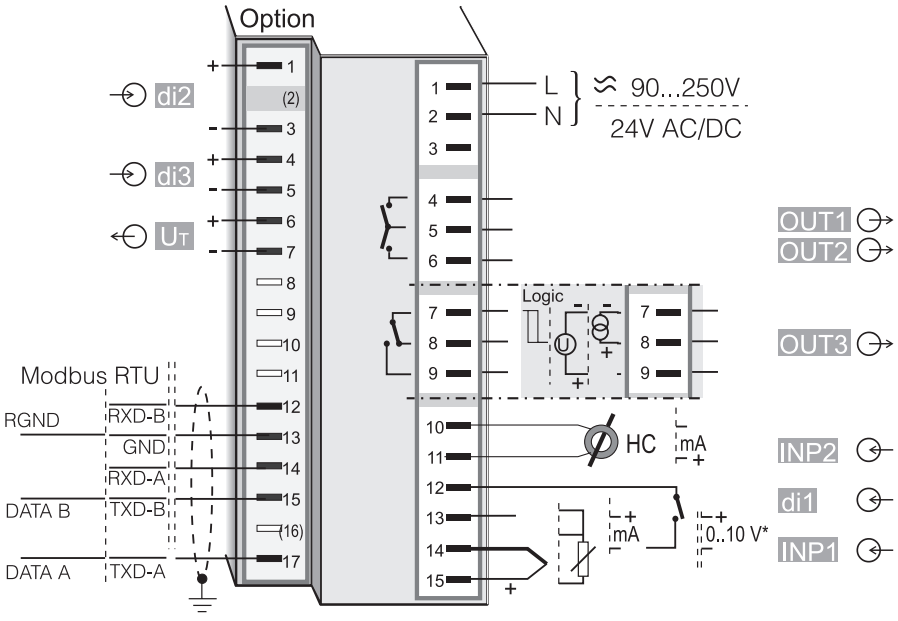


Profibus DP

Note:

If the relais OUT1...OUT4 operate external contactors, these must be fitted with RC snubber circuits to manufacturer specifications to prevent excessive switch-off voltage peaks.

Electrical Connection NKS-4x



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General

BlueControl® is a powerful tool for setting parameters, simulation, commissioning and diagnosing BluePort®-devices.

Description

The primary function of BlueControl® is parametrizing of control equipment with the assistance of plain texts, a clear structure, and online help, thus enabling the numerous options to be selected quickly and safely.
If BlueControl® is linked with an active device (online-mode), the most important process data and settings of the connected device can be monitored and changed, and the trend function also permits them to be recorded. The display is in real-time.

A completely risk-free procedure is provided by the detailed device and process simulation, primarily for testing control functions before comissioning, or for training purposes. This feature also permits the simulation of comprehensive functions and complex devices, without having to connect the device or process signals to the PC.

Versions

- Basic version: Functions and access to special device functions that are not available via front-panel operation.
- Expert version: provides additional special functions (see Table "Functions of BlueControl®-versions" page 7)

Functions

- Parametrizing: the primary task of BlueControl®
- Wizard for controller tuning
- Online-help
- Parameter-help (tool tips)
- Visibility of operation, extended operating level
- Upload / Download the data of an external device
- Simulation
- Online operation
- Export of a download list
- Linearisation export/import
- Print function
- Trend recording
- BluePort® maintenance manager
- Communication via Modbus, PROFIBUS or Ethernet

Prerequisites

Software

- BlueControl® runs under the operating systems Microsoft Windos 95, 98, ME, NT4, 2000 und XP

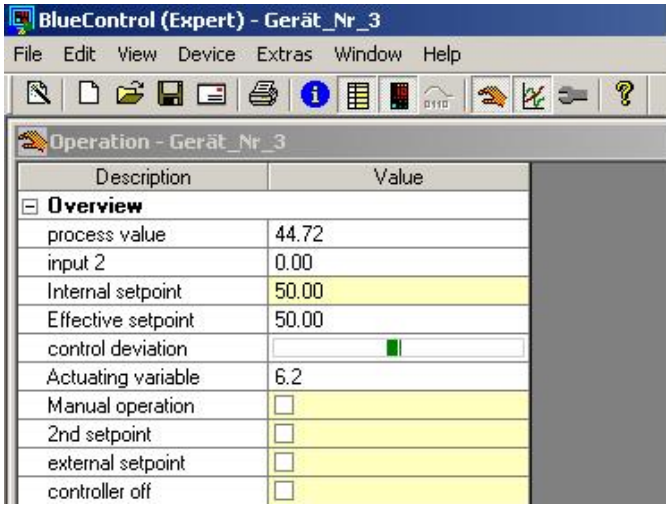
Hardware

- IBM-compatible PC, with Pentium processor
- at least 32MB working memory
- hard disk with at least 64MB free capacity
- VGA-graphics and a suitable monitor
- Floppy disk drive or CD-ROM drive
- Mouse or similar pointer device
- serial interface or USB adapter for connecting external devices

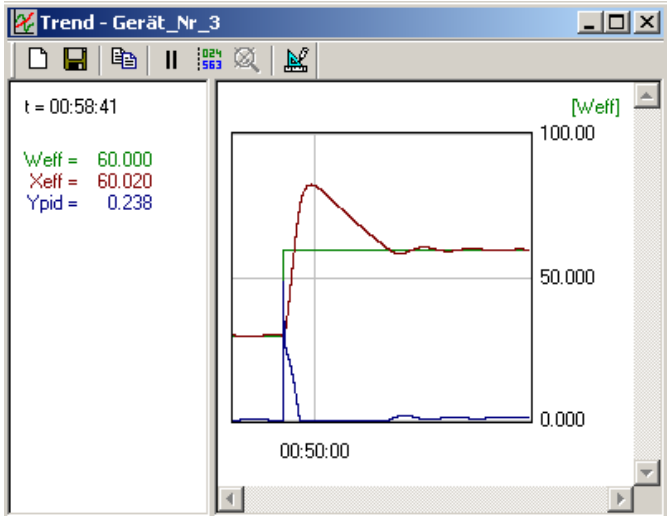
Ordering data

Engineering-Tool	Version	
BlueControl®	Basic	multi-language
	Expert	multi-language
Order example:	BlueControl®/ Basic	

Example operating



Example trend recording



Example diagnostic functions

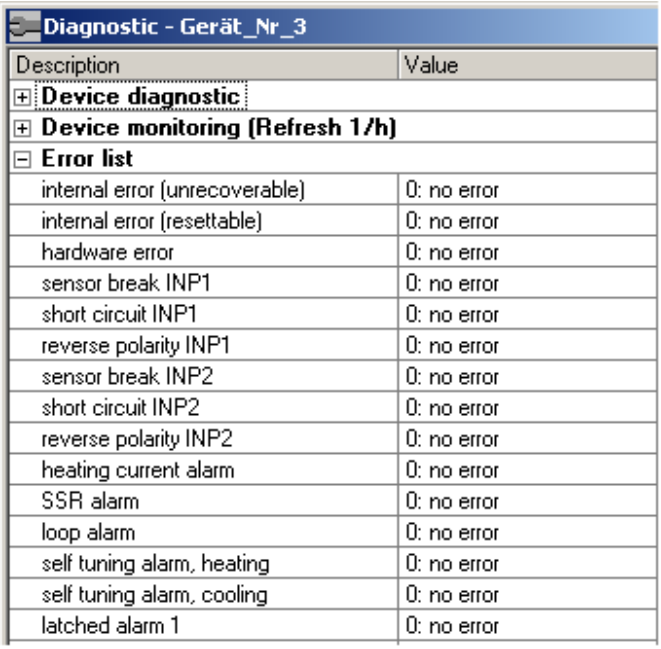


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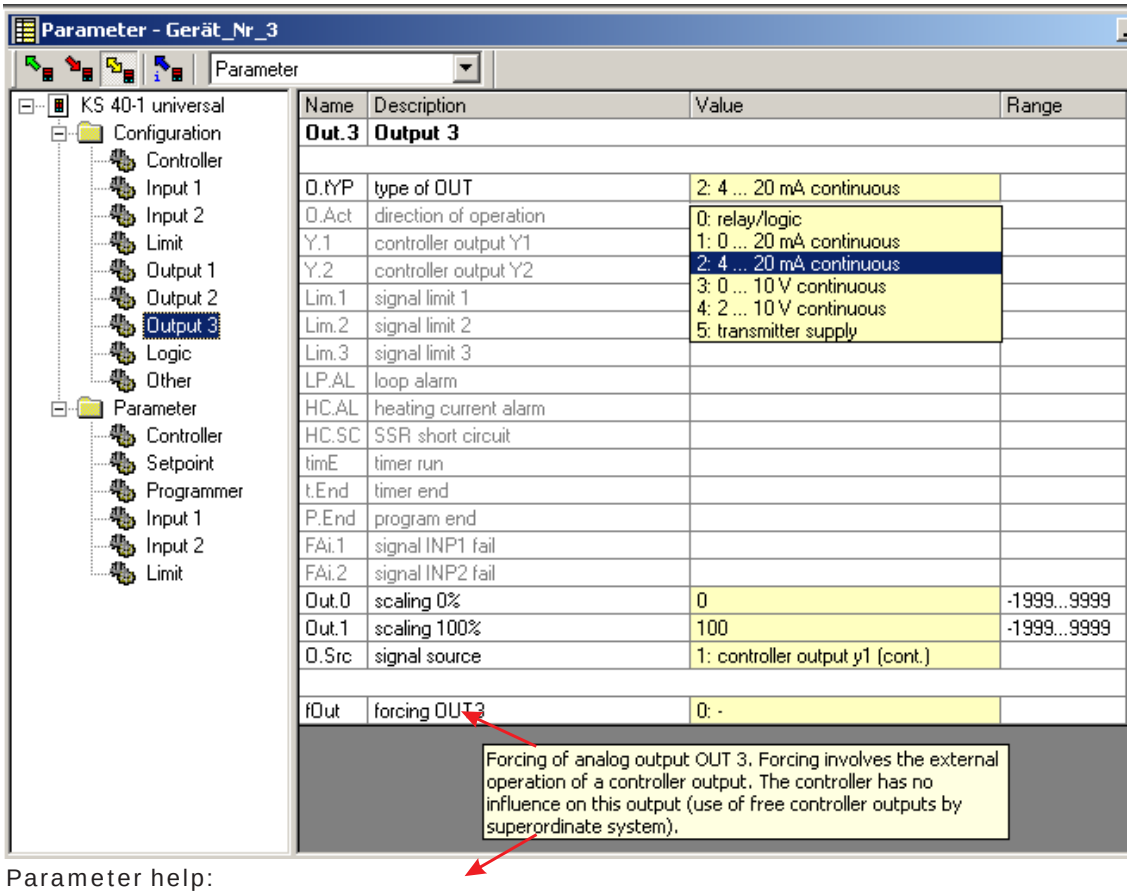
Table Funktios of BlueControl®-Versions

Functionality	Basic	Expert
parameter and configuration setting	yes	yes
controller and loop simulation	yes	yes
download: transfer of an engineering to the controller	yes	yes
online mode / visualisation	yes	yes
defining an application specific linearization	yes	yes
configuration in the extended operating level	yes	yes
upload: reading an engineering from the controller	yes	yes
basic diagnostic functions	no	yes
saving data file and engineering	yes	yes
printer function	yes	yes
online documentation, help	yes	yes
implementation of measurement value correction	yes	yes
data acquisition and trend display	yes	yes
wizard function	yes	yes
extended simulation	no	yes
customer-specific default data-set	no	yes
programeditor (NKS-90-1 programmer only	no	yes
Rail line system support	no	yes

Example setting of parameters



Parameter help:
moving the mouse over a data field, the precise description of the parameter is displayed.

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Order code NKS - 4x

NKS - 4 **Housing**
- 0-1 NKS-40-1 size 48x96
- 1-1 NKS-41-1 size 96x48 (landscape)
- 2-1 NKS-42-1 size 96x96

Connectors
- 0 Flat pin connectors
- 1 Screw terminals

Relais
- 0 90...250VAC, 3 relais
- 1 24VAC / 18...30VDC, 3 relais
- 2 90...250VAC, 2 relais + mA / V / logic
- 3 24VAC / 18...30VDC, 2 relais + mA / V / logic

- 000 no option
- 100 RS422 / 485 + transmitter supply + di2, di3

Configuration
- 0 Standard
- 9 Configuration to specification

Manual
- D Manual German
- E Manual English
- F Manual French

Certified
- 091 Standard (CE certified)
- U91 cUL-certified (with screw terminals only)
- D91 DIN 3440 certified
- G91 GL-certified

Example:

NKS - 4	0-1	0	0 -	100	0	D -	091

Order code NKS - 9x

NKS - 9 **Housing**
- 0-1 NKS-90-1 size 48x96
- 2-1 NKS-92-1 size 96x96

Connectors
- 0 Flat-pin connectors
- 1 Screw terminals

Relais
- 0 90...250VAC, 4 relais
- 1 24VAC / 18...30VDC, 4 relais
- 2 90...250VAC, 3 relais + mA / V / logic
- 3 24VAC / 18...30VDC, 3 relais + mA / V / logic
- 4 90...250VAC, 2 relais + 2x mA / V / logic
- 5 24VAC / 18...30VDC, 2 relais + 2x mA / V / logic

- 00 no option
- 10 Modbus RTU + U_T + di2/3 + OUT5/6

Inputs
- 0 INP1 and INP2
- 9 INP1, INP2 and INP3 incl. O_2-measuring

Configuration
- 0 Standard configuration
- 9 Configuration to specification

Manual
- D Manual German
- E Manual English
- F Manual French

Certified
- 091 Standard (CE certified)
- U91 cUL-certified (with screw terminals only)
- D91 DIN 3440 certified
- G91 GL-certified

Example:

NKS - 9	0-1	0	0 -	10	0	0	D -	091

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