

JUMO DICON 1000 Universal Process Controller



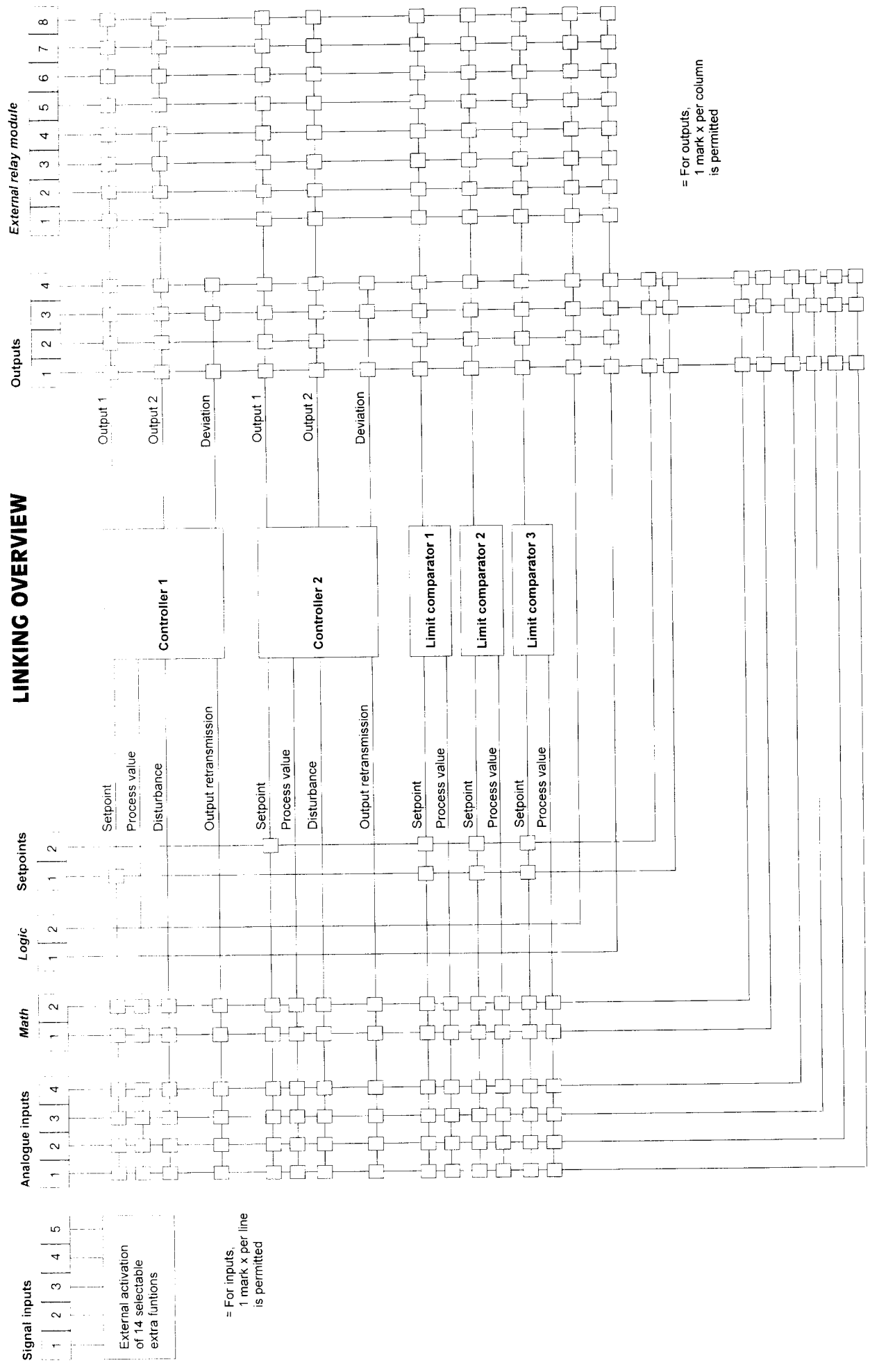
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Specification Manual

A B C D E F G

LINKING OVERVIEW



FOLD-OUT

NOTES FOR USE

Please fold out this page.



NOTES FOR USE

You use this Specification Manual to select the specification for the controller which we supply factory-programmed in accordance with **your** information.

Factory-programming is subject to an additional charge (see Price Sheet 70.3560).

Where there is no information the standard factory settings apply.

The Specification Manual consists of:

Page

■ LINKING OVERVIEW

The overview shows, in the form of a matrix, all inputs and outputs and their interaction with the controllers.

Mark an x to indicate the configuration of your controller.

The following are permitted:

– on inputs: 1 mark x per line

– on outputs: 1 mark x per column

The letters along the top are provided for guidance and will be found again on the configuration levels C1 and C2. _____

Fold-out

■ FEATURES of the **JUMO** DICON 1000

The essential features at a glance _____

2

■ OPERATING LEVEL

At this level you determine the setpoint _____

3

■ PARAMETER LEVEL

At this level you determine up to 4 parameter sets for each controller _____

4 – 5

■ CONFIGURATION LEVEL C1

At this level you determine the **data relating to the controller** _____

6 – 17

■ CONFIGURATION LEVEL C2

At this level you determine the **data relating to the system** _____

18 – 24

■ EXTRA CODES

Here you determine **your** extra Codes _____

25

■ GLOSSARY

Terms shown in *italics* can be found in the glossary in alphabetic order _____

26

Please return this Specification Manual fully completed.

Name: _____
Position: _____
Organisation: _____
Address: _____

If you have any questions about specifying your instrument:



Germany: (0661) 60 03 - 0
Abroad: (int + 49) 661 60 03 - 0



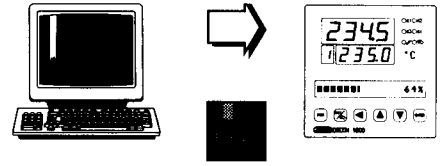
The configuration of your controller will be based entirely on the information which you give under operating level, parameter level, and configuration levels C1 and C2.

FEATURES

Features of the **JUMO** DICON 1000

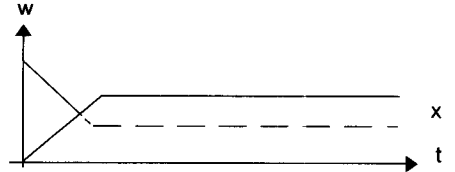
Set-up program

The set-up program for configuring the controller is available in English, French and German. A PC can be used to write and edit data sets, transfer them to the controller or read them out of the controller. The data sets are stored and archived.



Ramp function

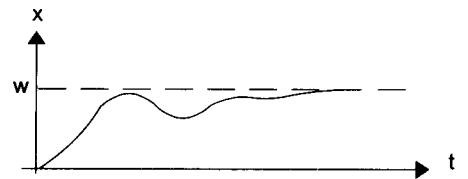
This function is used to produce a defined approach of the process to the setpoint, using a rising or falling ramp at a set gradient. A green LED indicates that the ramp function is activated.



Self-optimisation

The standard specification includes an auto-tuning facility which permits adjusting the controller to the process without involving any knowledge of control engineering. Auto-tuning evaluates the reaction of the process to certain output changes. The controller parameters X_{p1} , T_n , T_v and $Cy1$ are calculated. On the double-setpoint controller the controller parameters X_{p2} (separate from X_{p1}) and $Cy2$ are also calculated.

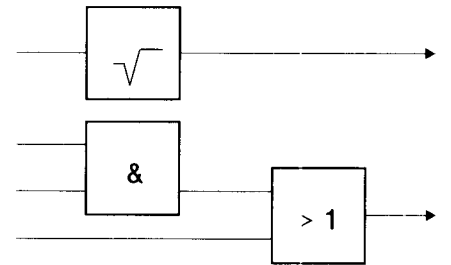
The fuzzy parameters $Fc1$ and $Fc2$ are set to standard values after self-optimisation. All parameters can be called up and modified at the parameter level.



Maths and logics module

The maths module permits linking the analogue inputs through a mathematical formula. A formula can be freely input in accordance with the usual mathematical rules for each of the two outputs of the maths module, using the set-up program.

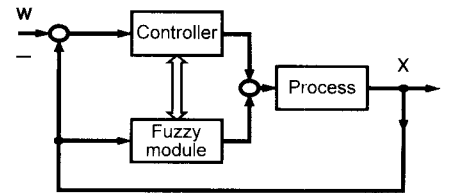
The logics module can be used to realise logic links between the logic inputs and the limit comparator outputs (e.g. combined alarm). Difference, ratio and humidity control are set through implemented standard formulae of the maths and logics module.



Fuzzy logic

In addition to auto-tuning the controller also contains a fuzzy logic module. This can be used to improve both the control action and the disturbance action.

The parameter $Fc1$ alters the intensity of the fuzzy signal. The parameter $Fc2$ affects the action on the controller parameters.



Interfaces

JUMO DICON 1000 incorporates two serial interfaces.

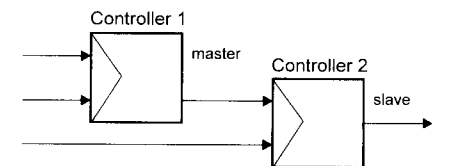
The **RS422/RS485 interface** is used for communication with host systems. Jbus / MODbus are used as transfer protocol.

The **set-up interface** (provided as standard) is used for configuring the controller from a PC.



Cascade controller

The use of cascade control can achieve an appreciable improvement in control action. This applies in particular to the dynamic action of the control loop, i.e. the variation in process value with setpoint changes or disturbances.



Parameter set switching

Four parameter sets are available for each of the two integrated controllers. The required parameter set is selected through logic inputs.



OPERATING LEVEL

Setpoint sets for external switching

	Setpoint 1	Setpoint 2	Setpoint 3	Setpoint 4
Controller 1	Value * ____	Value * ____	Value * ____	Value * ____
Controller 2	Value * ____	Value * ____	Value * ____	Value * ____

Explanation:
* = write in
= factory setting

Value range: -1999 to +9999
factory-set: 0

Time for *automatic channel scrolling*

Value *

Value range: 0 to 9999
factory-set: 0
0: switched off
(10 = 10 sec approx.)



A value consists of up to 4 digits
(places before and after the decimal point).

PARAMETER LEVEL

Parameter sets Controller 1

Parameter	Value range	Factory-set	Set 1	Set 2	Set 3	Set 4
Controller structure 1	P, I, PD, PI, PID	PID				
Controller structure 2	P, I, PD, PI, PID	PID				
Xp1 Proportional band	0 — 9999 digit	0 digit				
Xp2 Proportional band	0 — 9999 digit	0 digit				
Tv1 Derivative time	0 — 9999 sec	80 sec				
Tv2 Derivative time	0 — 9999 sec	80 sec				
Tn1 Reset time	0 — 9999 sec	350 sec				
Tn2 Reset time	0 — 9999 sec	350 sec				
Cy1 Switching cycle time	0 — 9999 sec	20 sec				
Cy2 Switching cycle time	0 — 9999 sec	20 sec				
Xsh Contact spacing	0 — 999 digit	0 digit				
Xd1 Differential	0 — 999 digit	1 digit				
Xd2 Differential	0 — 999 digit	1 digit				
TT Stroke time	5 — 3000 sec	60 sec				
Y0 Working point	-100 to +100 %	0 %				
Y1 Maximum output limit	0 — 100 %	100 %				
Y2 Minimum output limit	-100 to +100 %	-100 %				
Tk1 Minimum relay ON time	0 — 60 sec	0 sec				
Tk2 Minimum relay ON time	0 — 60 sec	0 sec				
Fc1 Fuzzy intensity	0 — 100 %	0 %				
Fc2 Fuzzy parameter adjustment	0 — 100 %	30 %				

PARAMETER LEVEL

Parameter sets Controller 2

Parameter	Value range	Factory-set	Set 1	Set 2	Set 3	Set 4
Controller structure 1	P, I, PD, PI, PID	PID				
Controller structure 2	P, I, PD, PI, PID	PID				
Xp1 Proportional band	0 — 9999 digit	0 digit				
Xp2 Proportional band	0 — 9999 digit	0 digit				
Tv1 Derivative time	0 — 9999 sec	80 sec				
Tv2 Derivative time	0 — 9999 sec	80 sec				
Tn1 Reset time	0 — 9999 sec	350 sec				
Tn2 Reset time	0 — 9999 sec	350 sec				
Cy1 Switching cycle time	0 — 9999 sec	20 sec				
Cy2 Switching cycle time	0 — 9999 sec	20 sec				
Xsh Contact spacing	0 — 999 digit	0 digit				
Xd1 Differential	0 — 999 digit	1 digit				
Xd2 Differential	0 — 999 digit	1 digit				
TT Stroke time	5 — 3000 sec	60 sec				
Y0 Working point	-100 to +100 %	0 %				
Y1 Maximum output limit	0 — 100 %	100 %				
Y2 Minimum output limit	-100 to +100 %	-100 %				
Tk1 Minimum relay ON time	0 — 60 sec	0 sec				
Tk2 Minimum relay ON time	0 — 60 sec	0 sec				
Fc1 Fuzzy intensity	0 — 100 %	0 %				
Fc2 Fuzzy parameter adjustment	0 — 100 %	30 %				

Controllers

C1
Controllers
Limit comparators
Inputs
Outputs
External relay module
Special functions

Explanation:

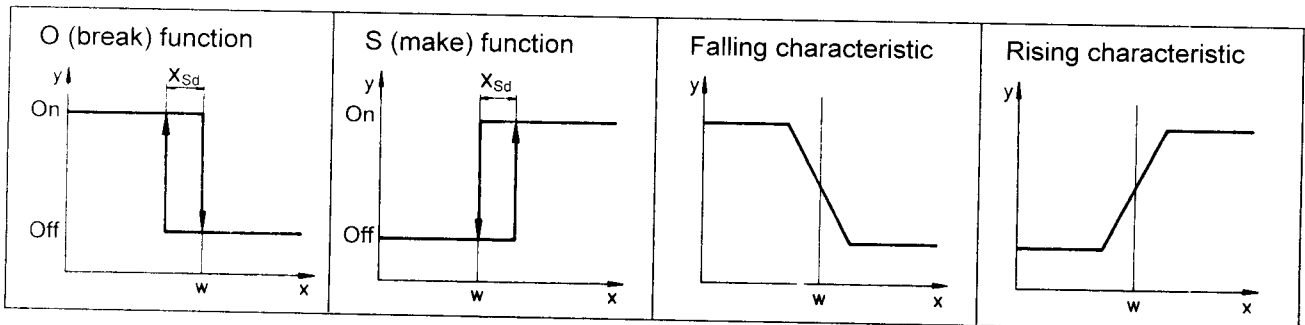
= mark with x

* = write in

= factory setting

	Controller mode controller 1	Controller mode controller 2
Controller mode controller 1	Single-setpoint controller O (break) function	no function
Controller mode controller 2	Single-setpoint controller S (make) function	Single-setpoint controller O (break) function
	Double-setpoint controller switching / switching	Single-setpoint controller S (make) function
	Double-setpoint controller falling characteristic / switching	Double-setpoint controller switching / switching
	Double-setpoint controller switching / rising characteristic	Double-setpoint controller falling characteristic / switching
	Double-setpoint controller falling characteristic / rising characteristic	Double-setpoint controller switching / rising characteristic
	Modulating controller	Double-setpoint controller falling characteristic / rising characteristic
	Proportional controller with integral driver for motorised actuators	Modulating controller
	Proportional controller falling characteristic	Proportional controller with integral driver for motorised actuators
	Proportional controller rising characteristic	Proportional controller falling characteristic
		Proportional controller rising characteristic
Time constant for control loop monitoring controller 1	Value * <input type="text"/>	
	Value range: 0 — 9999 sec factory-set: 0 sec 0 sec = switched off	
Time constant for control loop monitoring controller 2		Value * <input type="text"/>
		Value range: 0 — 9999 sec factory-set: 0 sec 0 sec = switched off

Controller functions



y = control output, w = setpoint, x = process value, X_{Sd} = switching differential

Limit comparators

C1

Controllers
Limit comparators
 Inputs
 Outputs
 External relay module
 Special functions

Explanation:

= mark with x

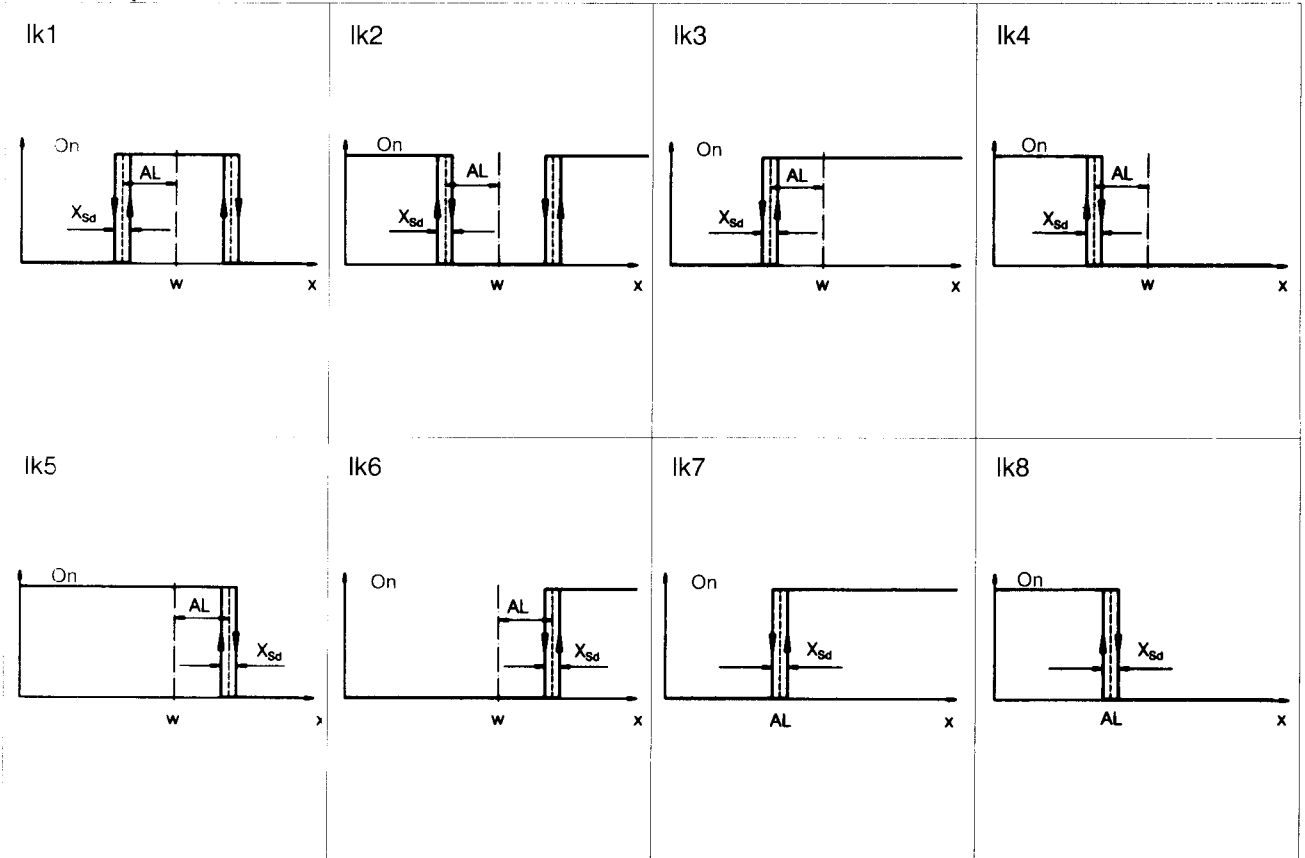
* = write in

= factory setting Value range: 0 — 9999 digit factory-set: 1

Value range: 0 — 9999 digit factory-set: 0

	Limit comparator 1 Function:	Limit comparator 2 Function:	Limit comparator 3 Function:
	no function	no function	no function
	lk1	lk1	lk1
	lk2	lk2	lk2
	lk3	lk3	lk3
	lk4	lk4	lk4
	lk5	lk5	lk5
	lk6	lk6	lk6
	lk7	lk7	lk7
	lk8	lk8	lk8
	Switching differential:	Switching differential:	Switching differential:
	Value * <input type="text"/>	Value * <input type="text"/>	Value * <input type="text"/>
	Limit:	Limit:	Limit:
	Value * <input type="text"/>	Value * <input type="text"/>	Value * <input type="text"/>

Limit comparator functions




AL = limit, X_{sd} = switching differential, w = setpoint, x = process value

Inputs

C1

Controllers
Limit comparators
Inputs
Outputs
External relay module
Special functions

Explanation:

 = mark with x

* = write in

= factory setting


Function	Inputs controller 1	Inputs controller 2																
	Process value:	Process value:																
	<table border="1"> <tr><td>Analogue input 1</td></tr> <tr><td>Analogue input 2</td></tr> <tr><td>Analogue input 3</td></tr> <tr><td>Analogue input 4</td></tr> <tr><td>Math 1</td></tr> <tr><td>Math 2</td></tr> </table>	Analogue input 1	Analogue input 2	Analogue input 3	Analogue input 4	Math 1	Math 2	<table border="1"> <tr><td>Analogue input 1</td></tr> <tr><td>Analogue input 2</td></tr> <tr><td>Analogue input 3</td></tr> <tr><td>Analogue input 4</td></tr> <tr><td>Math 1</td></tr> <tr><td>Math 2</td></tr> </table>	Analogue input 1	Analogue input 2	Analogue input 3	Analogue input 4	Math 1	Math 2				
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Inputs

C1

Controllers
 Limit comparators
Inputs
 Outputs
External relay module
 Special functions

Explanation:

-  = mark with x
- * = write in
- = factory setting

Function	 Inputs Limit comparator 1 lk process value:	 Inputs Limit comparator 2 lk process value:	 Inputs Limit comparator 3 lk process value:
	Analogue input 1	Analogue input 1	Analogue input 1
	Analogue input 2	Analogue input 2	Analogue input 2
	Analogue input 3	Analogue input 3	Analogue input 3
	Analogue input 4	Analogue input 4	Analogue input 4
	<i>Math 1</i>	<i>Math 1</i>	<i>Math 1</i>
	<i>Math 2</i>	<i>Math 2</i>	<i>Math 2</i>
	Setpoint controller 1	Setpoint controller 1	Setpoint controller 1
	Setpoint controller 2	Setpoint controller 2	Setpoint controller 2
	Ramp end controller 1	Ramp end controller 1	Ramp end controller 1
	Ramp end controller 2	Ramp end controller 2	Ramp end controller 2
	 lk setpoint:	 lk setpoint:	 lk setpoint:
	Analogue input 1	Analogue input 1	Analogue input 1
	Analogue input 2	Analogue input 2	Analogue input 2
	Analogue input 3	Analogue input 3	Analogue input 3
	Analogue input 4	Analogue input 4	Analogue input 4
	<i>Math 1</i>	<i>Math 1</i>	<i>Math 1</i>
	<i>Math 2</i>	<i>Math 2</i>	<i>Math 2</i>
	Setpoint controller 1	Setpoint controller 1	Setpoint controller 1
	Setpoint controller 2	Setpoint controller 2	Setpoint controller 2
	Ramp end controller 1	Ramp end controller 1	Ramp end controller 1
	Ramp end controller 2	Ramp end controller 2	Ramp end controller 2

B


CONFIGURATION LEVEL C1

Inputs


C1

Controllers
Limit comparators
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External relay module
Special functions


Explanation:

-  = mark with x
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Type

 **Analogue inputs 1**
Transducer:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Resistance thermometer
<input type="checkbox"/>	Thermocouple internal CJ
<input type="checkbox"/>	Thermocouple external CJ
<input type="checkbox"/>	Thermocouple constant CJ
<input type="checkbox"/>	Resistance transmitter
<input type="checkbox"/>	0 — 50 mV
<input type="checkbox"/>	0 — 1 V
<input type="checkbox"/>	0 — 10 V
<input type="checkbox"/>	0 — 20 mA
<input type="checkbox"/>	10 — 50 mV
<input type="checkbox"/>	0.2 — 1 V
<input type="checkbox"/>	2 — 10 V
<input type="checkbox"/>	4 — 20 mA

 Linearisation:


<input type="checkbox"/>	linear
<input type="checkbox"/>	Pt 100
<input type="checkbox"/>	Fe-Con J
<input type="checkbox"/>	NiCr-Con E
<input type="checkbox"/>	NiCr-Ni K
<input type="checkbox"/>	NiCrSi-NiSi N
<input type="checkbox"/>	Cu-Con T
<input type="checkbox"/>	Pt30Rh-Pt6Rh B
<input type="checkbox"/>	Pt13Rh-Pt R
<input type="checkbox"/>	Pt10Rh-Pt S
<input type="checkbox"/>	Cu-Con U
<input type="checkbox"/>	Fe-Con L
<input type="checkbox"/>	Customized linearisation

Process value correction:


Value *

Constant cold junction temperature:

Value *

 External cold junction temperature:

<input type="checkbox"/>	Analogue input 1
<input type="checkbox"/>	Analogue input 2
<input type="checkbox"/>	Analogue input 3
<input type="checkbox"/>	Analogue input 4

 Heater current monitoring:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Output 1
<input type="checkbox"/>	Output 2
<input type="checkbox"/>	Output 3
<input type="checkbox"/>	Output 4

Display start:

Value *

Display end:

Value *

Range start:

Value *

Range end:

Value *

Filter time constant:

Value *

Value range: -1999 to +9999
factory-set: 0

Value range: 0 — 100
factory-set: 50


Value range: -1999 to +9999
factory-set: 0

Value range: -1999 to +9999
factory-set: 100


Value range: -1999 to +9999
factory-set: -1999

Value range: -1999 to +9999
factory-set: 9999

Value range: 0 — 100 sec
factory-set: 0.15 sec

 **Analogue inputs 2**
Transducer:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Resistance thermometer
<input type="checkbox"/>	Thermocouple internal CJ
<input type="checkbox"/>	Thermocouple external CJ
<input type="checkbox"/>	Thermocouple constant CJ
<input type="checkbox"/>	Resistance transmitter
<input type="checkbox"/>	0 — 50 mV
<input type="checkbox"/>	0 — 1 V
<input type="checkbox"/>	0 — 10 V
<input type="checkbox"/>	0 — 20 mA
<input type="checkbox"/>	10 — 50 mV
<input type="checkbox"/>	0.2 — 1 V
<input type="checkbox"/>	2 — 10 V
<input type="checkbox"/>	4 — 20 mA

 Linearisation:


<input type="checkbox"/>	linear
<input type="checkbox"/>	Pt 100
<input type="checkbox"/>	Fe-Con J
<input type="checkbox"/>	NiCr-Con E
<input type="checkbox"/>	NiCr-Ni K
<input type="checkbox"/>	NiCrSi-NiSi N
<input type="checkbox"/>	Cu-Con T
<input type="checkbox"/>	Pt30Rh-Pt6Rh B
<input type="checkbox"/>	Pt13Rh-Pt R
<input type="checkbox"/>	Pt10Rh-Pt S
<input type="checkbox"/>	Cu-Con U
<input type="checkbox"/>	Fe-Con L
<input type="checkbox"/>	Customized linearisation

Process value correction:


Value *

Constant cold junction temperature:

Value *

 External cold junction temperature:

<input type="checkbox"/>	Analogue input 1
<input type="checkbox"/>	Analogue input 2
<input type="checkbox"/>	Analogue input 3
<input type="checkbox"/>	Analogue input 4

 Heater current monitoring:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Output 1
<input type="checkbox"/>	Output 2
<input type="checkbox"/>	Output 3
<input type="checkbox"/>	Output 4

Display start:

Value *

Display end:

Value *

Range start:

Value *

Range end:

Value *

Filter time constant:


Value *

Inputs

C1

Controllers
Limit comparators
Inputs
Outputs
External relay
module
Special functions

Explanation:

-  = mark with x
- * = write in
- = factory setting

Type

Analogue inputs 3 Transducer:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Resistance thermometer
<input type="checkbox"/>	Thermocouple internal CJ
<input type="checkbox"/>	Thermocouple external CJ
<input type="checkbox"/>	Thermocouple constant CJ
<input type="checkbox"/>	Resistance transmitter
<input type="checkbox"/>	0 — 50 mV
<input type="checkbox"/>	0 — 1 V
<input type="checkbox"/>	0 — 10 V
<input type="checkbox"/>	0 — 20 mA
<input type="checkbox"/>	10 — 50 mV
<input type="checkbox"/>	0.2 — 1 V
<input type="checkbox"/>	2 — 10 V
<input type="checkbox"/>	4 — 20 mA

Linearisation:

<input type="checkbox"/>	linear
<input type="checkbox"/>	Pt 100
<input type="checkbox"/>	Fe-Con J
<input type="checkbox"/>	NiCr-Con E
<input type="checkbox"/>	NiCr-Ni K
<input type="checkbox"/>	NiCrSi-NiSi N
<input type="checkbox"/>	Cu-Con T
<input type="checkbox"/>	Pt30Rh-Pt6Rh B
<input type="checkbox"/>	Pt13Rh-Pt R
<input type="checkbox"/>	Pt10Rh-Pt S
<input type="checkbox"/>	Cu-Con U
<input type="checkbox"/>	Fe-Con L
<input type="checkbox"/>	Customized linearisation

Process value correction:

Value *

Constant cold junction temperature:

Value *

External cold junction temperature:

<input type="checkbox"/>	Analogue input 1
<input type="checkbox"/>	Analogue input 2
<input type="checkbox"/>	Analogue input 3
<input type="checkbox"/>	Analogue input 4

Heater current monitoring:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Output 1
<input type="checkbox"/>	Output 2
<input type="checkbox"/>	Output 3
<input type="checkbox"/>	Output 4

Display start:

Value *

Display end:

Value *

Range start:

Value *

Range end:

Value *

Filter time constant:

Value *

Value range: -1999 to +9999
factory-set: 0

Value range: 0 — 100
factory-set: 50

Value range: -1999 to +9999
factory-set: 0

Value range: -1999 to +9999
factory-set: 100

Value range: -1999 to +9999
factory-set: -1999

Value range: -1999 to +9999
factory-set: 9999

Value range: 0 — 100 sec
factory-set: 0.15 sec

Analogue inputs 4 Transducer:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Resistance thermometer
<input type="checkbox"/>	Thermocouple internal CJ
<input type="checkbox"/>	Thermocouple external CJ
<input type="checkbox"/>	Thermocouple constant CJ
<input type="checkbox"/>	Resistance transmitter
<input type="checkbox"/>	0 — 50 mV
<input type="checkbox"/>	0 — 1 V
<input type="checkbox"/>	0 — 10 V
<input type="checkbox"/>	0 — 20 mA
<input type="checkbox"/>	10 — 50 mV
<input type="checkbox"/>	0.2 — 1 V
<input type="checkbox"/>	2 — 10 V
<input type="checkbox"/>	4 — 20 mA

Linearisation:

<input type="checkbox"/>	linear
<input type="checkbox"/>	Pt 100
<input type="checkbox"/>	Fe-Con J
<input type="checkbox"/>	NiCr-Con E
<input type="checkbox"/>	NiCr-Ni K
<input type="checkbox"/>	NiCrSi-NiSi N
<input type="checkbox"/>	Cu-Con T
<input type="checkbox"/>	Pt30Rh-Pt6Rh B
<input type="checkbox"/>	Pt13Rh-Pt R
<input type="checkbox"/>	Pt10Rh-Pt S
<input type="checkbox"/>	Cu-Con U
<input type="checkbox"/>	Fe-Con L
<input type="checkbox"/>	Customized linearisation

Process value correction:

Value *

Constant cold junction temperature:

Value *

External cold junction temperature:

<input type="checkbox"/>	Analogue input 1
<input type="checkbox"/>	Analogue input 2
<input type="checkbox"/>	Analogue input 3
<input type="checkbox"/>	Analogue input 4

Heater current monitoring:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Output 1
<input type="checkbox"/>	Output 2
<input type="checkbox"/>	Output 3
<input type="checkbox"/>	Output 4

Display start:

Value *

Display end:

Value *

Range start:

Value *

Range end:

Value *

Filter time constant:


Value *


Outputs

C1


Controllers
Limit comparators
Inputs
Outputs
External relay module
Special functions

Explanation:


-  = mark with x
- * = write in
- = factory setting

 **Output 1**
Function:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Output 1 controller 1
<input type="checkbox"/>	Output 2 controller 1
<input type="checkbox"/>	Output 1 controller 2
<input type="checkbox"/>	Output 2 controller 2
<input type="checkbox"/>	Output limit comparator 1
<input type="checkbox"/>	Output limit comparator 2
<input type="checkbox"/>	Output limit comparator 3
<input type="checkbox"/>	Logic 1
<input type="checkbox"/>	Logic 2
<input type="checkbox"/>	Math 1
<input type="checkbox"/>	Math 2
<input type="checkbox"/>	Analogue input 1
<input type="checkbox"/>	Analogue input 2
<input type="checkbox"/>	Analogue input 3
<input type="checkbox"/>	Analogue input 4
<input type="checkbox"/>	Setpoint controller 1
<input type="checkbox"/>	Setpoint controller 2
<input type="checkbox"/>	Deviation controller 1
<input type="checkbox"/>	Deviation controller 2

 **Output 2**
Function:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Output 1 controller 1
<input type="checkbox"/>	Output 2 controller 1
<input type="checkbox"/>	Output 1 controller 2
<input type="checkbox"/>	Output 2 controller 2
<input type="checkbox"/>	Output limit comparator 1
<input type="checkbox"/>	Output limit comparator 2
<input type="checkbox"/>	Output limit comparator 3
<input type="checkbox"/>	Logic 1
<input type="checkbox"/>	Logic 2

 **Output signal:**

<input type="checkbox"/>	0 — 10 V
<input type="checkbox"/>	2 — 10 V
<input type="checkbox"/>	-10 / 0 / +10 V
<input type="checkbox"/>	0 — 20 mA
<input type="checkbox"/>	4 — 20 mA
<input type="checkbox"/>	-20 / 0 / +20 mA

Zero:

Value * _____

Full scale:

Value * _____

Output signal on overrange/underrange:

Value * _____

Output signal on overrange/underrange:

Value * _____

Value range: -1999 to +9999
factory-set: 0

Value range: -1999 to +9999
factory-set: 100


Value range: 0 to +100 %
factory-set: 0 % sec
101: the output is the current output signal

Outputs

C1

Controllers
Limit comparators
Inputs
Outputs
External relay
module
Special functions

Explanation:

 = mark with x

* = write in

= factory setting

Output 3 Function:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Output 1 controller 1
<input type="checkbox"/>	Output 2 controller 1
<input type="checkbox"/>	Output 1 controller 2
<input type="checkbox"/>	Output 2 controller 2
<input type="checkbox"/>	Output limit comparator 1
<input type="checkbox"/>	Output limit comparator 2
<input type="checkbox"/>	Output limit comparator 3
<input type="checkbox"/>	Logic 1
<input type="checkbox"/>	Logic 2
<input type="checkbox"/>	Math 1
<input type="checkbox"/>	Math 2
<input type="checkbox"/>	Analogue input 1
<input type="checkbox"/>	Analogue input 2
<input type="checkbox"/>	Analogue input 3
<input type="checkbox"/>	Analogue input 4
<input type="checkbox"/>	Setpoint controller 1
<input type="checkbox"/>	Setpoint controller 2
<input type="checkbox"/>	Deviation controller 1
<input type="checkbox"/>	Deviation controller 2

Output signal:

<input type="checkbox"/>	0 — 10 V
<input type="checkbox"/>	2 — 10 V
<input type="checkbox"/>	-10 / 0 / +10 V
<input type="checkbox"/>	0 — 20 mA
<input type="checkbox"/>	4 — 20 mA
<input type="checkbox"/>	-20 / 0 / +20 mA

Zero:

Value *

Full scale:

Value *

Output signal on
overrange/underrange:

Value *

Value range: -1999 to +9999
factory-set: 0

Value range: -1999 to +9999
factory-set: 100

Value range: 0 to +100
factory-set: 0 % sec
101: the output is the current
output signal

Output 4 Function:

<input type="checkbox"/>	no function
<input type="checkbox"/>	Output 1 controller 1
<input type="checkbox"/>	Output 2 controller 1
<input type="checkbox"/>	Output 1 controller 2
<input type="checkbox"/>	Output 2 controller 2
<input type="checkbox"/>	Output limit comparator 1
<input type="checkbox"/>	Output limit comparator 2
<input type="checkbox"/>	Output limit comparator 3
<input type="checkbox"/>	Logic 1
<input type="checkbox"/>	Logic 2
<input type="checkbox"/>	Math 1
<input type="checkbox"/>	Math 2
<input type="checkbox"/>	Analogue input 1
<input type="checkbox"/>	Analogue input 2
<input type="checkbox"/>	Analogue input 3
<input type="checkbox"/>	Analogue input 4
<input type="checkbox"/>	Setpoint controller 1
<input type="checkbox"/>	Setpoint controller 2
<input type="checkbox"/>	Deviation controller 1
<input type="checkbox"/>	Deviation controller 2

Output signal:

<input type="checkbox"/>	0 — 10 V
<input type="checkbox"/>	2 — 10 V
<input type="checkbox"/>	-10 / 0 / +10 V
<input type="checkbox"/>	0 — 20 mA
<input type="checkbox"/>	4 — 20 mA
<input type="checkbox"/>	-20 / 0 / +20 mA

Zero:

Value *

Full scale:

Value *

Output signal on
overrange/underrange:


Value *

External relay module

C1

Controllers
Limit comparators
Inputs
Outputs
External relay module
Special functions

Explanation:

 = mark with x

* = write in

= factory setting

External output 1 (K5) Function:

no function
Output 1 controller 1
Output 2 controller 1
Output 1 controller 2
Output 2 controller 2
Output limit comparator 1
Output limit comparator 2
Output limit comparator 3
Logic 1
Logic 2

Function on overrange/underrange:

Relay de-energised
Relay energised

External output 2 (K6) Function:

no function
Output 1 controller 1
Output 2 controller 1
Output 1 controller 2
Output 2 controller 2
Output limit comparator 1
Output limit comparator 2
Output limit comparator 3
Logic 1
Logic 2

Function on overrange/underrange:

Relay de-energised
Relay energised

External output 3 (K7) Function:

no function
Output 1 controller 1
Output 2 controller 1
Output 1 controller 2
Output 2 controller 2
Output limit comparator 1
Output limit comparator 2
Output limit comparator 3
Logic 1
Logic 2

Function on overrange/underrange:

Relay de-energised
Relay energised

External output 4 (K8) Function:

no function
Output 1 controller 1
Output 2 controller 1
Output 1 controller 2
Output 2 controller 2
Output limit comparator 1
Output limit comparator 2
Output limit comparator 3
Logic 1
Logic 2

Function on overrange/underrange:

Relay de-energised
Relay energised

External relay module

C1

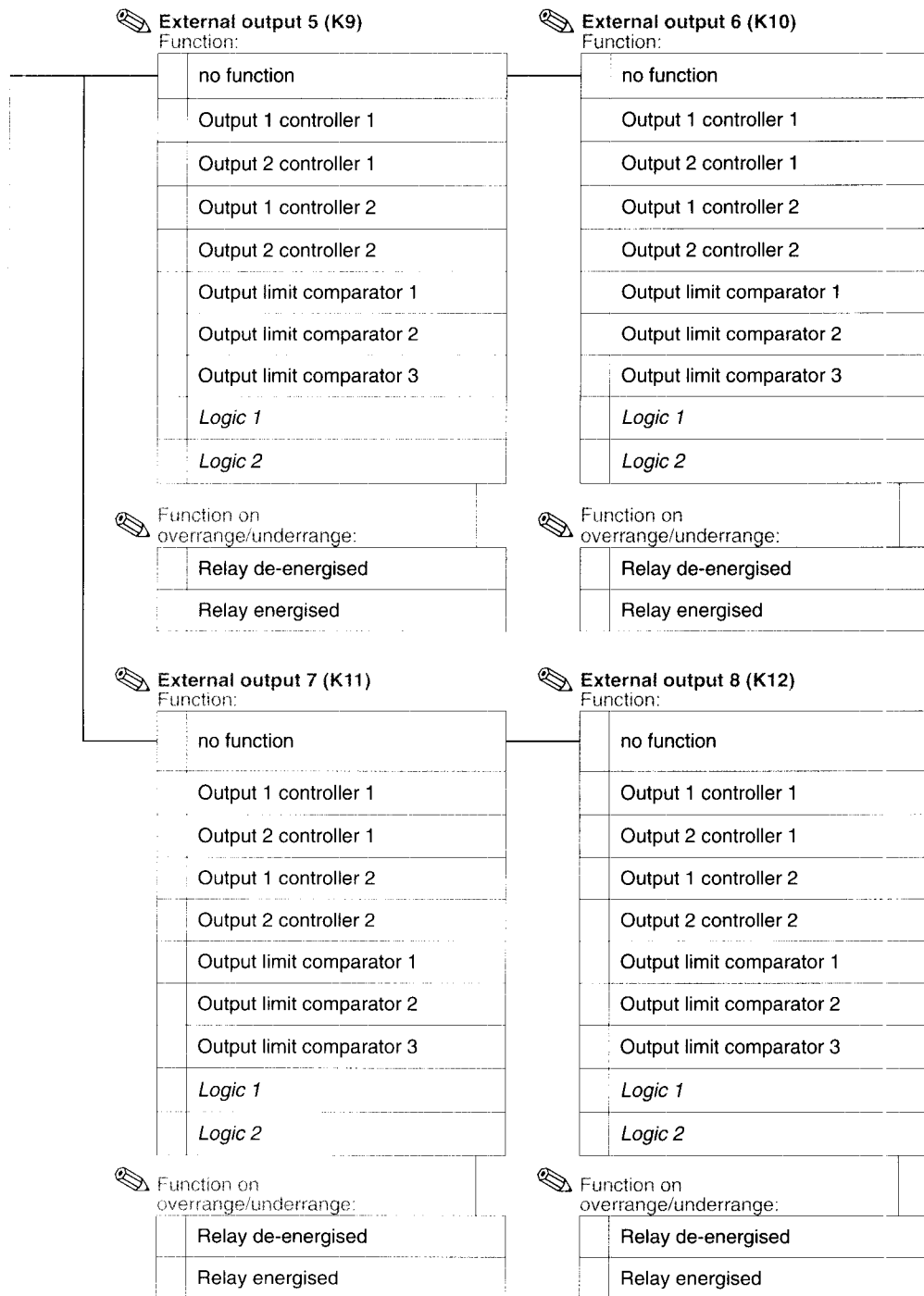
Controllers
Limit comparators
Inputs
Outputs
External relay module
Special functions

Explanation:

 = mark with x

* = write in

= factory setting




CONFIGURATION LEVEL C1

Special functions

C1

Controllers
Limit comparators
Inputs
Outputs
External relay module
Special functions

Explanation:

 = mark with x

* = write in

= factory setting


Ramp	Ramp controller 1 Function:	<input type="checkbox"/> Ramp not activated <input type="checkbox"/> Ramp activated	Ramp controller 2 Function:	<input type="checkbox"/> Ramp not activated <input type="checkbox"/> Ramp activated
	Slope: Value * _____ Value range: 0 --- 999 factory-set: 0		Slope: Value * _____ Value range: 0 --- 999 factory-set: 0	
Manual output	Manual output controller 1	Value * _____ Value range: -100 to +100 % factory-set: 101 %	Manual output controller 2	Value * _____ Value range: -100 to +100 % factory-set: 101 %
	101: the current output before switch-over is retained.			
Manual operation	Manual operation controller 1	<input type="checkbox"/> inhibited <input type="checkbox"/> not inhibited	Manual operation controller 2	<input type="checkbox"/> inhibited <input type="checkbox"/> not inhibited
	Self-optimisation	Self-optimisation controller 1	<input type="checkbox"/> inhibited <input type="checkbox"/> not inhibited	Self-optimisation controller 2
Setpoint limits		Setpoint limits controller 1 Setpoint start: Value * _____ Value range: -1999 to +9999 factory-set: 0		Setpoint limits controller 2 Setpoint start: Value * _____ Value range: -1999 to +9999 factory-set: 0
	Setpoint end: Value * _____ Value range: -1999 to +9999 factory-set: 400		Setpoint end: Value * _____ Value range: -1999 to +9999 factory-set: 400	

Special functions

C1

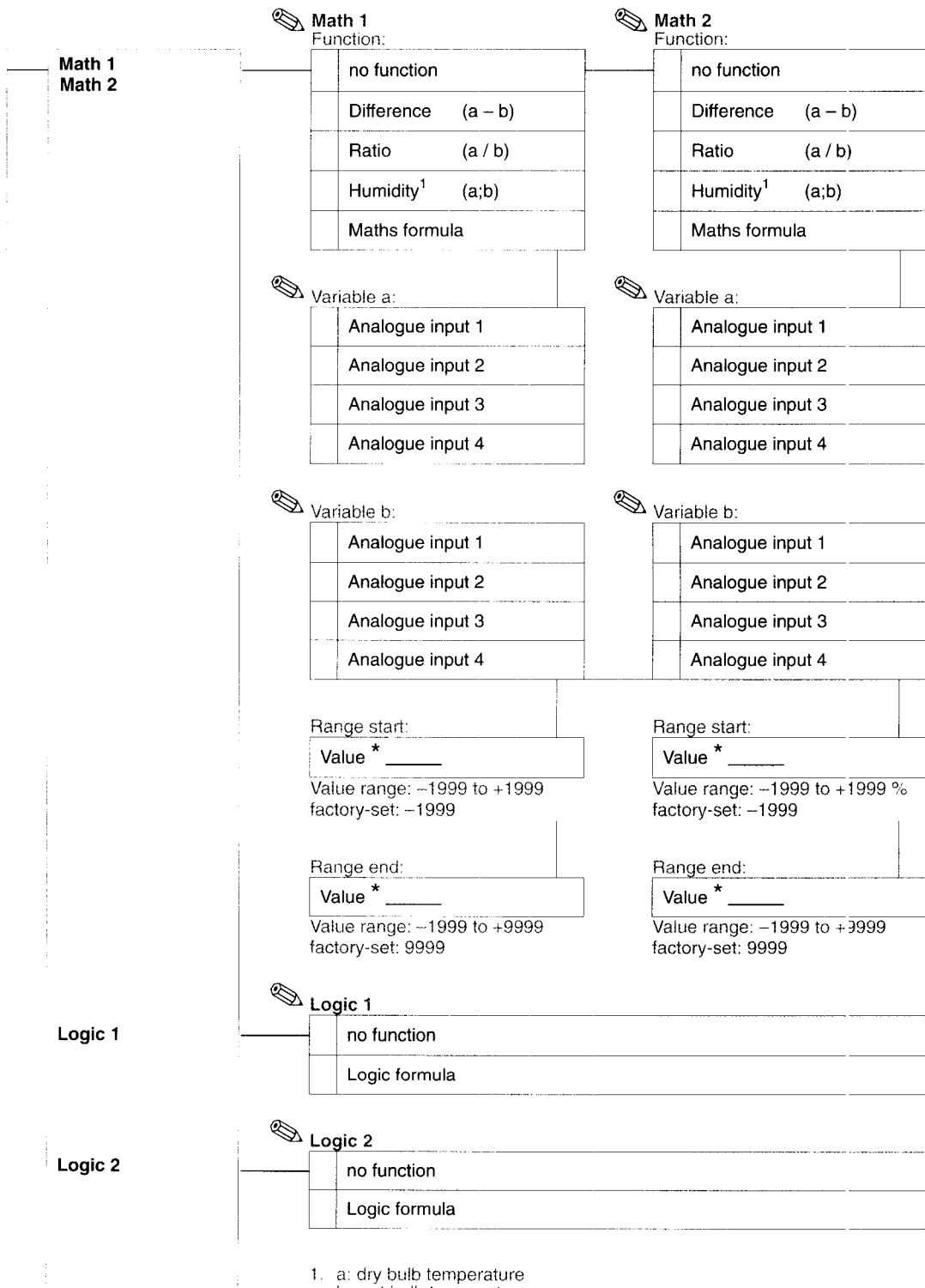
Controllers
Limit comparators
Inputs
Outputs
External relay module
Special functions

Explanation:

 = mark with x

* = write in

= factory setting



CONFIGURATION LEVEL C2

Display

C2

Display

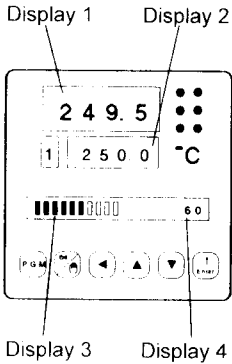
Logic inputs
 Cascade controller
 Limit comparator
 Customized recalibration
 Time-out
 Unit
 Supply frequency
 Interface

Explanation:

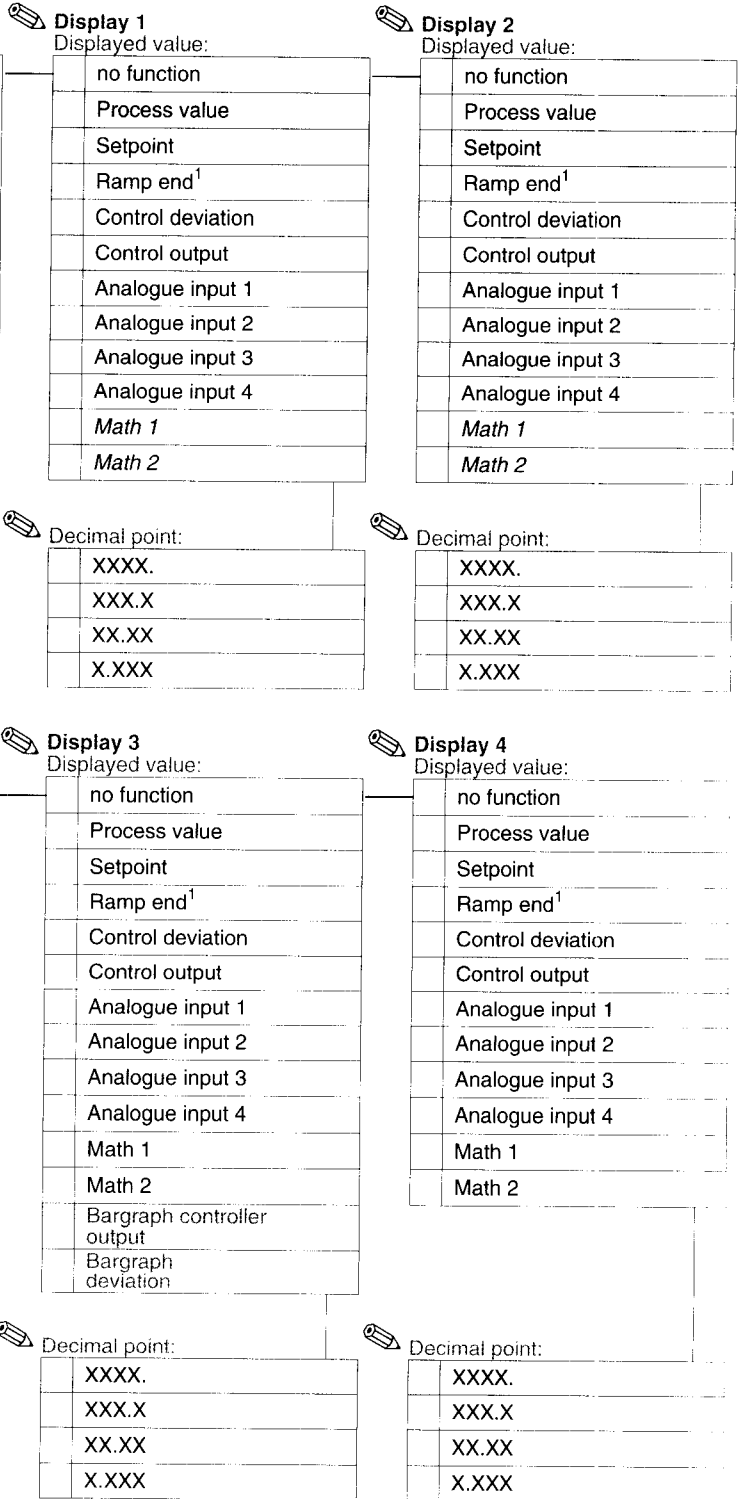
= mark with x

* = write in

= factory setting



Display controller 1



1. or ratio setpoint

CONFIGURATION LEVEL C2

Display

C2

Display

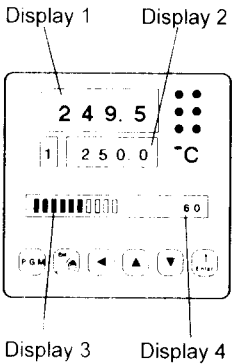
Logic inputs
 Cascade controller
 Limit comparator
 Customized recalibration
 Time-out
 Unit
 Supply frequency
 Interface

Explanation:

= mark with x

* = write in

= factory setting



Display controller 2

Display 1 Displayed value:	Display 2 Displayed value:
<input type="checkbox"/> no function	<input type="checkbox"/> no function
<input type="checkbox"/> Process value	<input type="checkbox"/> Process value
<input type="checkbox"/> Setpoint	<input type="checkbox"/> Setpoint
<input type="checkbox"/> Ramp end ¹	<input type="checkbox"/> Ramp end ¹
<input type="checkbox"/> Control deviation	<input type="checkbox"/> Control deviation
<input type="checkbox"/> Control output	<input type="checkbox"/> Control output
<input type="checkbox"/> Analogue input 1	<input type="checkbox"/> Analogue input 1
<input type="checkbox"/> Analogue input 2	<input type="checkbox"/> Analogue input 2
<input type="checkbox"/> Analogue input 3	<input type="checkbox"/> Analogue input 3
<input type="checkbox"/> Analogue input 4	<input type="checkbox"/> Analogue input 4
<input type="checkbox"/> Math 1	<input type="checkbox"/> Math 1
<input type="checkbox"/> Math 2	<input type="checkbox"/> Math 2

Decimal point:
<input type="checkbox"/> XXXX.
<input type="checkbox"/> XXX.X
<input type="checkbox"/> XX.XX
<input type="checkbox"/> X.XXX

Decimal point:
<input type="checkbox"/> XXXX.
<input type="checkbox"/> XXX.X
<input type="checkbox"/> XX.XX
<input type="checkbox"/> X.XXX

Display 3 Displayed value:
<input type="checkbox"/> no function
<input type="checkbox"/> Process value
<input type="checkbox"/> Setpoint
<input type="checkbox"/> Ramp end ¹
<input type="checkbox"/> Control deviation
<input type="checkbox"/> Control output
<input type="checkbox"/> Analogue input 1
<input type="checkbox"/> Analogue input 2
<input type="checkbox"/> Analogue input 3
<input type="checkbox"/> Analogue input 4
<input type="checkbox"/> Math 1
<input type="checkbox"/> Math 2
<input type="checkbox"/> Bargraph controller output
<input type="checkbox"/> Bargraph deviation

Display 4 Displayed value:
<input type="checkbox"/> no function
<input type="checkbox"/> Process value
<input type="checkbox"/> Setpoint
<input type="checkbox"/> Ramp end ¹
<input type="checkbox"/> Control deviation
<input type="checkbox"/> Control output
<input type="checkbox"/> Analogue input 1
<input type="checkbox"/> Analogue input 2
<input type="checkbox"/> Analogue input 3
<input type="checkbox"/> Analogue input 4
<input type="checkbox"/> Math 1
<input type="checkbox"/> Math 2

Decimal point:
<input type="checkbox"/> XXXX.
<input type="checkbox"/> XXX.X
<input type="checkbox"/> XX.XX
<input type="checkbox"/> X.XXX

Decimal point:
<input type="checkbox"/> XXXX.
<input type="checkbox"/> XXX.X
<input type="checkbox"/> XX.XX
<input type="checkbox"/> X.XXX

Display brightness display 3 + 4

<input type="checkbox"/> 6
<input type="checkbox"/> 5
<input type="checkbox"/> 4
<input type="checkbox"/> 3
<input type="checkbox"/> 2
<input type="checkbox"/> 1

1. or ratio setpoint

Logic inputs

C2

Display
Logic inputs
 Cascade controller
 Limit comparator
 Customized recalibration
 Time-out
 Unit
 Supply frequency
 Interface

Explanation:



= mark with x

*

= write in



= factory setting



Logic input 1



Logic input 2

	no function		no function
	Start of self-optimisation controller 1		Start of self-optimisation controller 1
	Start of self-optimisation controller 2		Start of self-optimisation controller 2
	Aborting self-optimisation controller 1		Aborting self-optimisation controller 1
	Aborting self-optimisation controller 2		Aborting self-optimisation controller 2
	Changeover manual/auto controller 1		Changeover manual/auto controller 1
	Changeover manual/auto controller 2		Changeover manual/auto controller 2
	Inhibit manual operation controller 1		Inhibit manual operation controller 1
	Inhibit manual operation controller 2		Inhibit manual operation controller 2
	Ramp stop controller 1		Ramp stop controller 1
	Ramp stop controller 2		Ramp stop controller 2
	Ramp OFF controller 1		Ramp OFF controller 1
	Ramp OFF controller 2		Ramp OFF controller 2
	Setpoint switch-over controller 1		Setpoint switch-over controller 1
	Setpoint switch-over controller 2		Setpoint switch-over controller 2
	Process value switch-over controller 1		Process value switch-over controller 1
	Process value switch-over controller 2		Process value switch-over controller 2
	<i>Parameter set switch-over</i> controller 1		<i>Parameter set switch-over</i> controller 1
	<i>Parameter set switch-over</i> controller 2		<i>Parameter set switch-over</i> controller 2
	Key inhibit		Key inhibit
	Parameter and configuration levels inhibit		Parameter and configuration levels inhibit
	<i>Text display</i>		<i>Text display</i>
	All displays OFF		All displays OFF



Logic input 3



Logic input 4



Logic input 5

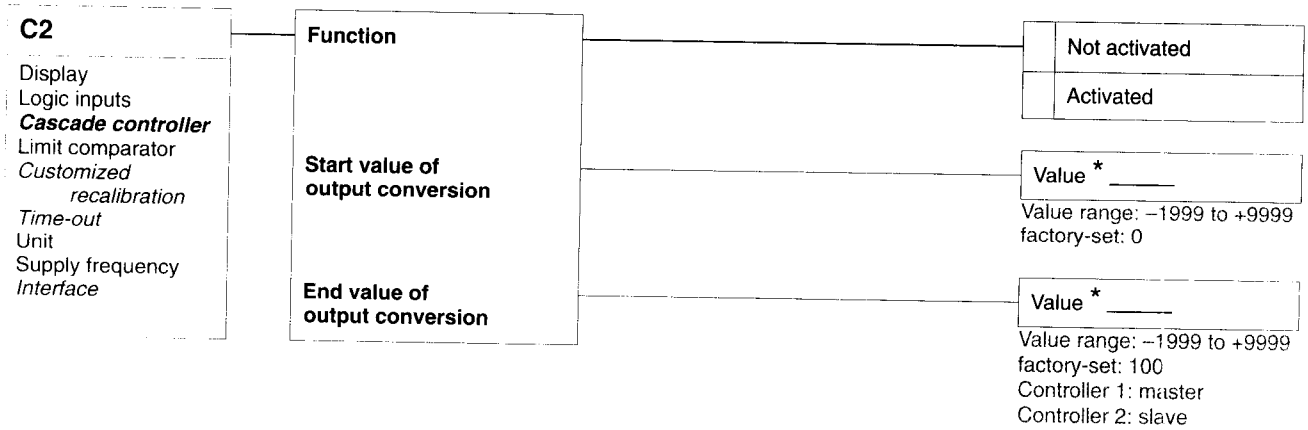
no function
Start of self-optimisation controller 1
Start of self-optimisation controller 2
Aborting self-optimisation controller 1
Aborting self-optimisation controller 2
Changeover manual/auto controller 1
Changeover manual/auto controller 2
Inhibit manual operation controller 1
Inhibit manual operation controller 2
Ramp stop controller 1
Ramp stop controller 2
Ramp OFF controller 1
Ramp OFF controller 2
Setpoint switch-over controller 1
Setpoint switch-over controller 2
Process value switch-over controller 1
Process value switch-over controller 2
<i>Parameter set switch-over controller 1</i>
<i>Parameter set switch-over controller 2</i>
Key inhibit
Parameter and configuration levels inhibit
<i>Text display</i>
All displays OFF

no function
Start of self-optimisation controller 1
Start of self-optimisation controller 2
Aborting self-optimisation controller 1
Aborting self-optimisation controller 2
Changeover manual/auto controller 1
Changeover manual/auto controller 2
Inhibit manual operation controller 1
Inhibit manual operation controller 2
Ramp stop controller 1
Ramp stop controller 2
Ramp OFF controller 1
Ramp OFF controller 2
Setpoint switch-over controller 1
Setpoint switch-over controller 2
Process value switch-over controller 1
Process value switch-over controller 2
<i>Parameter set switch-over controller 1</i>
<i>Parameter set switch-over controller 2</i>
Key inhibit
Parameter and configuration levels inhibit
<i>Text display</i>
All displays OFF

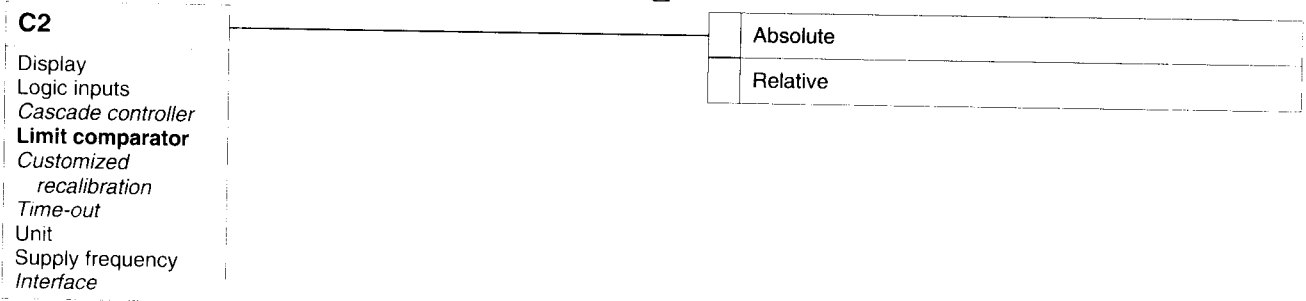
no function
Start of self-optimisation controller 1
Start of self-optimisation controller 2
Aborting self-optimisation controller 1
Aborting self-optimisation controller 2
Changeover manual/auto controller 1
Changeover manual/auto controller 2
Inhibit manual operation controller 1
Inhibit manual operation controller 2
Ramp stop controller 1
Ramp stop controller 2
Ramp OFF controller 1
Ramp OFF controller 2
Setpoint switch-over controller 1
Setpoint switch-over controller 2
Process value switch-over controller 1
Process value switch-over controller 2
<i>Parameter set switch-over controller 1</i>
<i>Parameter set switch-over controller 2</i>
Key inhibit
Parameter and configuration levels inhibit
<i>Text display</i>
All displays OFF

CONFIGURATION LEVEL C2

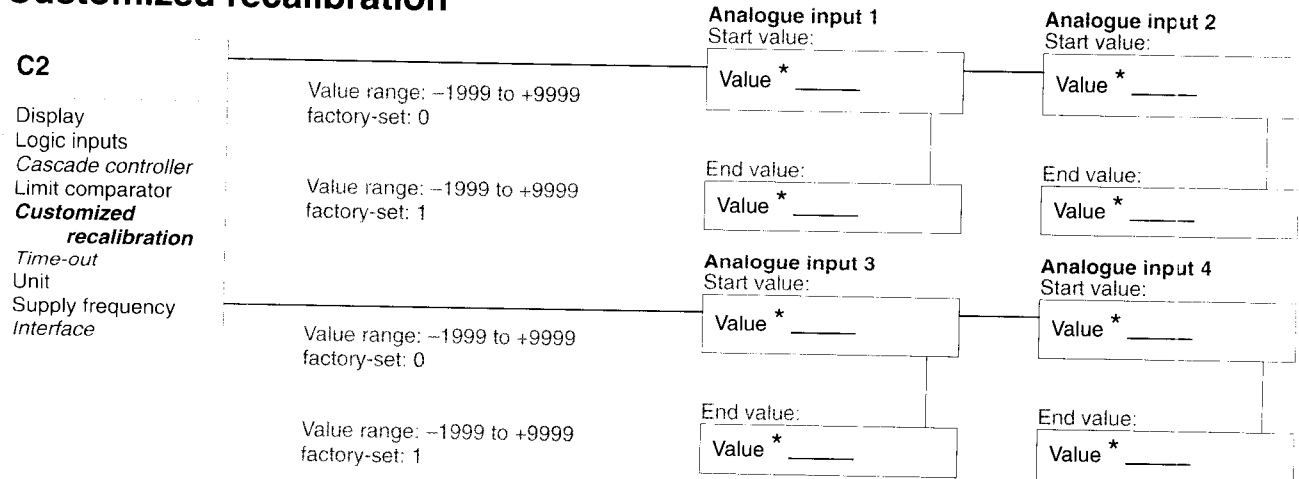
Cascade controller




Limit comparator



Customized recalibration



Explanation:

-  = mark with x
- * = write in
- = factory setting

CONFIGURATION LEVEL C2

Time-out

C2

Display
Logic inputs
Cascade controller
Limit comparator
Customized
recalibration
Time-out
Unit
Supply frequency
Interface

Value *


Value range: 0 — 9999
factory-set: 30 (= 30 sec approx.)

0: switched off

Unit

C2

Display
Logic inputs
Cascade controller
Limit comparator
Customized
recalibration
Time-out
Unit
Supply frequency
Interface

 Degree Celsius

Degree Fahrenheit

Supply frequency

C2

Display
Logic inputs
Cascade controller
Limit comparator
Customized
recalibration
Time-out
Unit
Supply frequency
Interface

 50 Hz

60 Hz

Explanation:

 = mark with x

* = write in


= factory setting





CONFIGURATION LEVEL C2

Interface

- C2**
- Display
 - Logic inputs
 - Cascade controller
 - Limit comparator
 - Customized recalibration
 - Time-out
 - Unit
 - Supply frequency
 - Interface**

Explanation:

-  = mark with x
- * = write in
- = factory setting

Protocol		<input type="checkbox"/> SETUP	
		<input type="checkbox"/> MODbus	
		<input type="checkbox"/> Jbus	
	Data format		Parity:
			<input type="checkbox"/> No parity
			<input type="checkbox"/> Odd parity
			<input type="checkbox"/> Even parity
			<input type="checkbox"/> Null parity
			Stop bit:
		<input type="checkbox"/> 1 Stop bit	
	<input type="checkbox"/> 2 Stop bits		
		Baudrate:	
	<input type="checkbox"/> 9600 baud		
	<input type="checkbox"/> 4800 baud		
	<input type="checkbox"/> 2400 baud		
	<input type="checkbox"/> 1200 baud		
	<input type="checkbox"/> 600 baud		
	<input type="checkbox"/> 300 baud		
	<input type="checkbox"/> 150 baud		
	<input type="checkbox"/> 19200 baud		
	<input type="checkbox"/> 38400 baud		
	<input type="checkbox"/> 125000 baud		
	<input type="checkbox"/> 187500 baud		
Instrument address		Value * <input style="width: 100px;" type="text"/>	
		Value range: 0 - 255 factory-set: 0	
Minimum response time		Value * <input style="width: 100px;" type="text"/>	
		Value range: 0 - 999 msec factory-set: 0 msec	

EXTRA CODES

Output 1



Relay
Solid state relay
Logic 0/24 V
Analogue output

Output 2

X Relay

Output 3¹



Relay
Solid state relay
Logic 0/24 V
Analogue output

Output 4¹



Relay
Solid state relay
Logic 0/24 V
Analogue output

Operator guidance



English
French
German

Supply



93 — 263 V AC 48 — 63 Hz
20 — 53 V DC/AC 0/48 — 63 Hz

Additional ordering data¹



Analogue inputs 3 and 4
PC interface with TTL/RS232 converter for SETUP program
Interface RS422/485
External relay module
Second controller
Maths and logics module

Explanation:

= mark with x

1. extra charge

GLOSSARY

ASCII

American Standard Code for Information Interchange (ANSI X3.4-1968)

Automatic channel scrolling

Automatic change of display from controller 1 to controller 2 and vice versa

Cascade controller

Linking of controller 1 (master) and controller 2 (slave)

Control loop monitoring

Recognition of a short-circuit or break in the load circuit

Customized linearisation

Programming a special linearisation table using the setup program

Customized recalibration

Manipulation of the process value curve using offset and gain

Display start, display end

Assignment of the physical signal to the display in the case of standard signals and resistance transmitters

External relay module

Extension by 8 relay outputs

Interface

For communication with host systems (RS422 or RS485)

Limit comparator absolute

An alteration of limit value or setpoint can produce an alarm

Limit comparator relative

An alteration of limit value or setpoint can not produce an alarm

Logic

Result of a logical linkage

Math

Result of a mathematical calculation

Minimum response time

Adjustable delay of the controller response when integrated into a data network

MODbus, Jbus

Communication protocol for serial interface

Parameter set

Controller parameters required for a particular application

Parameter set switching

Activation of a parameter set:
– by an external contact (logic input)
– depending on setpoint ranges

PC interface for setup

Connection for the link between PC (RS232) and controller (separate RS232 setup interface) for exchanging parameter or configuration data

Process value correction

Manipulation of the process value curve using offset

Protocol mode

Standard data interchange via interface

Range start, range end

Assignment of the limits for overrange and underrange

Setup program

Program for convenient setting of parameters and for configuring the controller using a PC

Setup protocol

Interface protocol defined by JUMO

Text display

Display of a 16-character text using an external contact (logic input)

Time-out

After this time the controller automatically returns to the standard display



Ordering **JUMO** DICON 1000

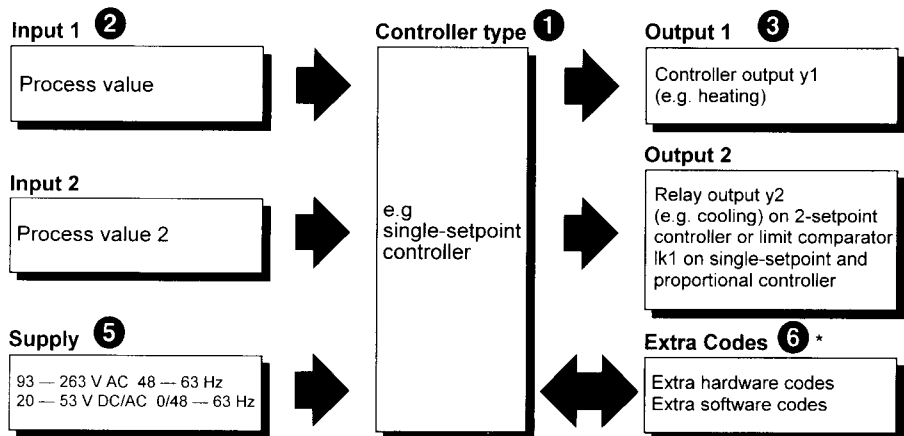
A version covering most standard applications is available from stock; this is intended to simplify the selection and ordering of your controller. You can set the controller parameters and configuration data yourself.

For special user requirements where controller parameters and configuration data are to be set to your requirements we have provided a specification manual (for ordering details see on the right).

Mark a cross against the **stock version**, or enter the code numbers for the blocks 1 to 6 for **your version**.

You can use this page also to fax your order. The fax numbers of our head office in Fulda and of our offices in the UK and the USA are given at the top of this sheet.

Arrangement of controller



* list in sequence separated by a comma

Type designation

1 Controller type	Code
Single-setpoint controller with O function (relay de-energised above setpoint), controller structure can be configured	10
Single-setpoint controller with S function (relay de-energised below setpoint), controller structure can be configured	20
Double-setpoint controller, controller structure can be configured	30
Modulating controller, controller structure can be configured	40
Proportional controller, controller structure and output signal can be configured	50
Proportional controller with integral driver for motorised actuator	80

2 Input 1 Probe type	Code
Pt 100 resistance thermometer	001
NiCrSi-NiSi N	038
Cu-Con T	039
Fe-Con J	040
Cu-Con U	041
Fe-Con L	042
NiCr-Ni K	043
Pt10Rh-Pt S	044
Pt13Rh-Pt R	045
Pt30Rh-Pt6Rh B	046
NiCr-Con E	047
Standard linear signals	
0 — 20 mA	052
4 — 20 mA	053
0 — 50 mV	061
0 — 1 V	062
0 — 10 V	063

Please send me the Specification Manual B 70.3560.3

Stock version: **703560 / 10 - 001 - 1 - 1 - 01 / 00**

Sales No. 70/00309863

Your version: **703560 / .. - ... - . - . - .. / ..***

* list in sequence and separate by a comma

3 Output 1 Output signal	Code
Relay	1
Solid-state relay 1 A	2
Logic 0/24 V	3
Analogue output	
0 — 20 mA	4
4 — 20 mA	5
-20 / 0 / +20 mA	6
0 — 10 V	7
2 — 10 V	8
-10 / 0 / +10 V	9

4 Operator guidance	Code
German	1
English	2
French	3

5 Supply	Code
93 — 263 V AC 48 — 63 Hz	01
20 — 53 V DC/AC 0/48 — 63 Hz	17

6 Hardware extras	Code
No extra	00
Analogue inputs 3 + 4 ¹ (A/D converter II)	01
Output 3	3.*
Output 4	4.*
* digits as output 1	
RS422/RS485 interface, isolated	52

1. probe type, input or output signals to be specified in full.

6 Software extras	Code
Second controller (channel)	02
Maths and Logics module (incl. difference, ratio, and psychrometric humidity)	03

Accessories
External relay module ER8 with 8 relays (to special order)
PC interface with TTL/RS232 converter Sales No. 70/00301315
Set-up program for configuration and parameter setting, 3.5" diskette Sales No. 70/00310800