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JUMO DICON 1001 Universal profile controller



Housing for flush-panel mounting to DIN 43 700

Brief description

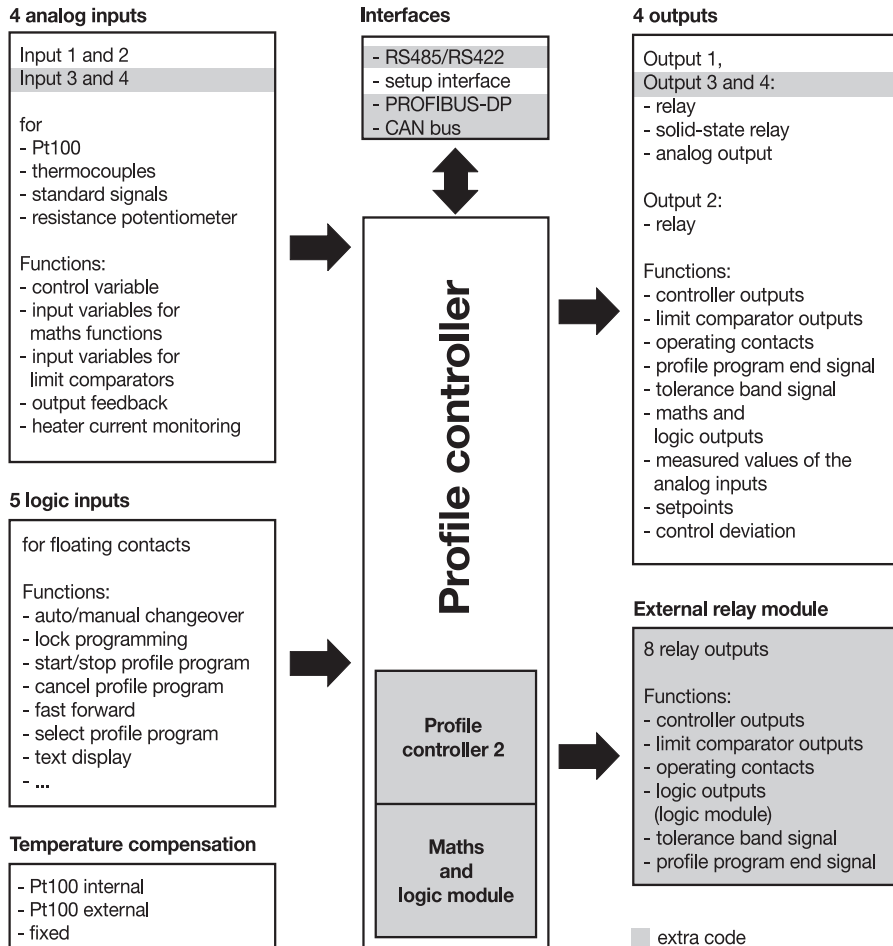
The Type 703565 is a universal, freely programmable profile controller with one or two channels for different physical control parameters, with a bezel size of 96mm x 96mm. The profile controller has two 4-digit and one 1-digit 7-segment display, switching and status indicators, as well as a 16-character matrix display. Operation, parameter setting and configuration can all be carried out from the six keys at the front.

The unit can be used as a single and double setpoint controller, as a modulating and proportional controller, and also as a proportional controller with integral actuator driver. The two profile channels can each be programmed with 25 profiles of up to 100 segments. The profiles run in synchronism. In addition, eight operating functions are available. A maths and logic module can be supplied as an extra. The plug-in controller chassis permits problem-free retrofitting of additional modules. The controller can be integrated into a data network via the serial interface. A setup program and a PC profile program editor are available for easy programming from a PC. The number of outputs can be increased through an external relay module with eight relay outputs.



Type 703565/10-001-1-1-01/00

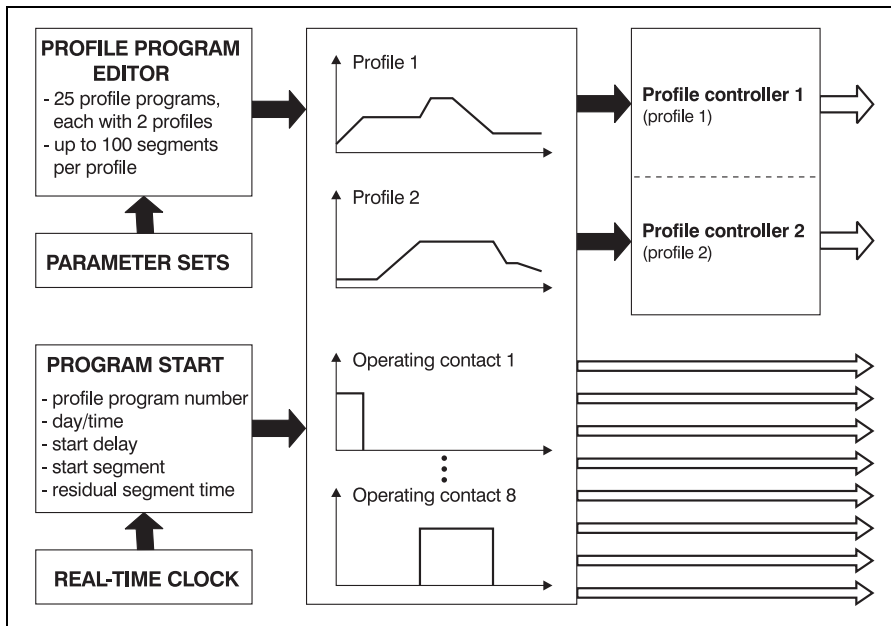
Block structure



Features

- 8 limit comparators
- 4 parameter sets
- 8 operating contacts
- Self-optimization
- Fuzzy logic
- Cascade controller
- Maths and logic module
- Real-time clock
- Interface (RS485/RS422)
- PROFIBUS-DP interface
- CAN bus interface
- Setup program for PC
- Profile program editor for PC

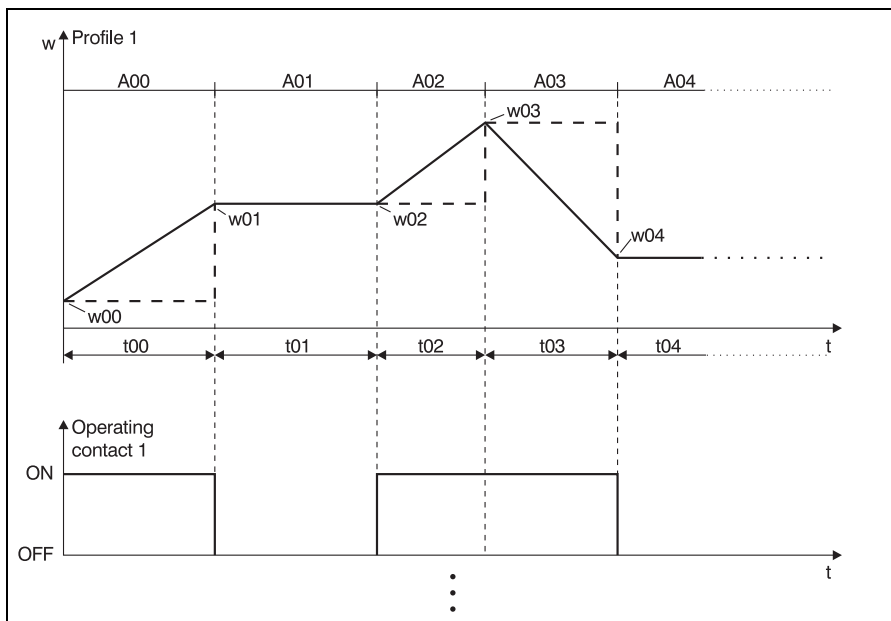
Profile controller



25 programs with one or two profiles can be set up. The profiles run synchronously and can consist of up to 100 segments. Altogether 500 segments can be programmed.

Additionally, eight operating contacts are programmable, which can be assigned to the profiles and also run in synchronism.

A profile program can be started manually by pressing a key (on the unit or externally) or by programming the start conditions. When programming the start conditions, the time can be set either by defining a start delay or by programming the weekday and time.



Profiles consist of a series of segments with definable segment setpoints. The individual segment setpoints can be linked either by ramp or by step functions.

The state of the eight operating contacts can be modified at each segment.

Furthermore, one of the four programmable parameter sets can be assigned to each segment, as well as an upper and a lower limit (tolerance band) for monitoring the process value.

Continuous loops can be implemented through programmable repeat cycles.

Segments are defined by the segment setpoint and the segment time or the ramp slope (gradient).

On the unit itself, it is possible to create, edit, copy and delete segments.

Self-optimization

Self-optimization (auto-tuning) is a standard feature, which permits adjusting the controller without any control engineering know-how.

Auto-tuning evaluates the reaction of the control loop to certain output changes. The controller parameters X_p , T_n , T_v und C_y are calculated.

The fuzzy parameters $Fc1$ and $Fc2$ are set to standard values after self-optimization, i.e. the fuzzy function is deactivated.

All parameters can be called up at the parameter level and modified.

Fuzzy logic

In addition to self-optimization, the controller software also includes a fuzzy logic.

This can be used to improve both the control and the disturbance action.

Custom linearization

As well as the linearizations for the usual transducers, one or two custom linearizations can be implemented.

Programming is carried out through the setup program in the form of a table of values.

The maths module enables the integration of setpoints, control outputs and the measured values of the analog inputs, as well as logic signals, into a mathematical formula.

The logic module serves to logically link logic inputs, limit comparators and operating contacts.

For each of the two modules, two formulae can be entered via the setup program and the result of the calculation produced via the outputs.

Furthermore, difference, ratio and humidity control can be implemented through established standard formulae.

Text display

The functions of the logic inputs, the limit comparators, the logic outputs of the logic module and the operating contacts can have customer texts assigned to them. It is also possible to allocate profile program names.

Depending on the state of the function or the configuration of the displays, the programmed text is shown in the matrix display (16 characters max.).

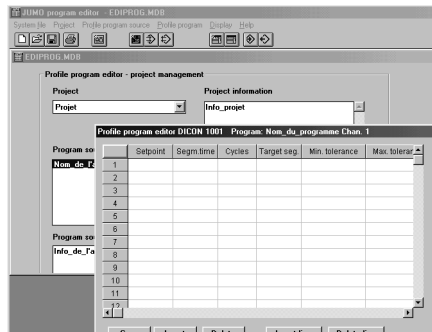
The custom texts and the profile program names are produced using the setup program.

Setup program

The setup program for configuring the unit is available in English, German and French. A PC is used to create data sets, edit them, transfer them to the controller and read them out of the unit. The data sets are stored and archived.

PC profile program editor

The PC profile program editor is available for creating and editing profile programs with ease.



RS422/RS485 interface

The serial interface is used for communication with higher-level systems.

MODbus/Jbus are used as transmission protocols.

PROFIBUS-DP/CAN bus

The controller can be integrated into a fieldbus system in accordance with the PROFIBUS-DP/CANopen standard, via the PROFIBUS-DP or CAN interface.

The PROFIBUS variant has been designed specifically for the communication between automation systems and distributed peripheral devices at the field level, and is speed-optimized. Data are transmitted serially according to the RS485 standard.

Using the project design tool included in the delivery (GSD generator; GSD = Device Base Data), a standardized GSD file is created with which the profile controller can be integrated into the fieldbus system, through the selection of characteristic controller data.

Cascade controller

For demanding control tasks, the profile controller (in the 2-channel version) can be configured as cascade or trim cascade controller.

C-level controller

The profile controller can be used as a C-level controller to control the carbon activity in the atmosphere of gas carburizing furnaces. A zirconium sensor is employed as a transducer.

Operation, parameters, configuration

Operation, the setting of controller parameters and configuration of the controller are arranged on different levels.

Operating level

Different process variables (measured values of the analog inputs, program times ...) can be displayed and operating modes activated.

Profile program start

The conditions for the start of the profile program are defined here.

Profile program editor

Profile programs are created and edited at this level.

Parameter level

The controller parameters are set here.

Configuration level C1

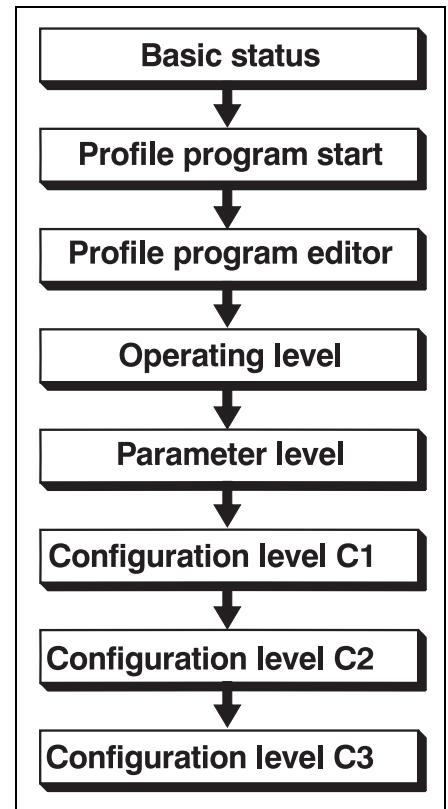
Controller-specific settings (controller type, limit comparators ...) are made here.

Configuration level C2

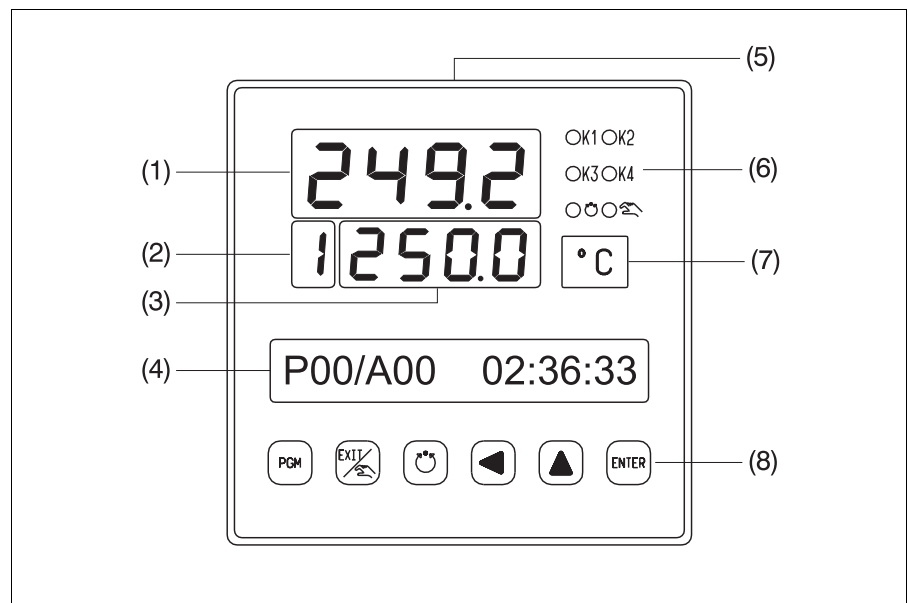
System-specific settings (interface, displays ...) are made at this level.

Configuration level C3

The hardware/software codes corresponding to the equipment status of the controller are indicated here.



Displays and controls



(1)	7-segment display, configurable 4-digit, 13mm high, red factory-set: process value	(5)	Setup interface
(2)	Channel display 1-digit, 7 mm high, red	(6)	Status indicators 4 yellow LEDs for switching status indication of the outputs 2 green LEDs to indicate the operating modes "manual" and "automatic"
(3)	7-segment display, configurable 4-digit, 10mm high, green factory-set: setpoint	(7)	Basic unit can be altered by using the unit labels supplied
(4)	Dot-matrix display, configurable 16 places, 5 mm high, green	(8)	Keys

Parameter level

All the parameters and their meaning are listed in this table. Depending on the controller type, certain parameters are not applicable or are irrelevant. For specific applications, four parameter sets can be stored for each controller.

Parameter	Display	Value range	factory-set	Meaning
Controller structure	Structure 1	P, I, PD, PI, PID	PID	The controller structure can be switched between P, I, PD, PI and PID structure (structure 2 refers to the second output of a double-setpoint controller).
	Structure 2	P, I, PD, PI, PID	PID	
Proportional band	Xp1	0 – 9999 digit	0 digit	Size of the proportional band
	Xp2	0 – 9999 digit	0 digit	If Xp1,2 = 0, the controller structure is ineffective!
Derivative time	Tv1	0 – 9999 sec	80 sec	Influences the differential component of the controller output signal.
	Tv2	0 – 9999 sec	80 sec	
Reset time	Tn1	0 – 9999 sec	350 sec	Influences the integral component of the controller output signal.
	Tn2	0 – 9999 sec	350 sec	
Cycle time	Cy1	0 – 9999 sec	20 sec	For a switching output, the cycle time should be selected so that the energy supply to the process is virtually continuous, while, at the same time, not overloading the switching devices.
	Cy2	0 – 9999 sec	20 sec	
Contact spacing	Xsh	0 – 999 digit	0 digit	Spacing between the control contacts for double-setpoint, modulating and proportional controllers with integral actuator driver.
Switching differential	Xd1	0 – 999 digit	1 digit	Differential for switching controllers with Xp = 0.
	Xd2	0 – 999 digit	1 digit	
Actuator run time	TT	5 – 3000 sec	60 sec	Utilized run-time range of the control valves for modulating controllers and proportional controllers with integral actuator driver.
Working point	Y0	-100 to +100 %	0 %	Output on P and PD controllers ($y = Y0$ at $x = w$).
Output limiting	Y1	0 – 100 %	100 %	Maximum output limiting
	Y2	-100 to +100 %	-100 %	Minimum output limiting
Minimum relay ON time	Tk1	0 – 60 sec	0 sec	Limitation of the switching rate for switching outputs.
	Tk2	0 – 60 sec	0 sec	
Fuzzy intensity	Fc1	0 – 100 %	0 %	Intensity of the fuzzy signal that is added to the controller output, to improve the control quality.
Fuzzy parameter adjustment	Fc2	0 – 100 %	30 %	Influences the controller parameters with activated fuzzy module, to improve the control quality.

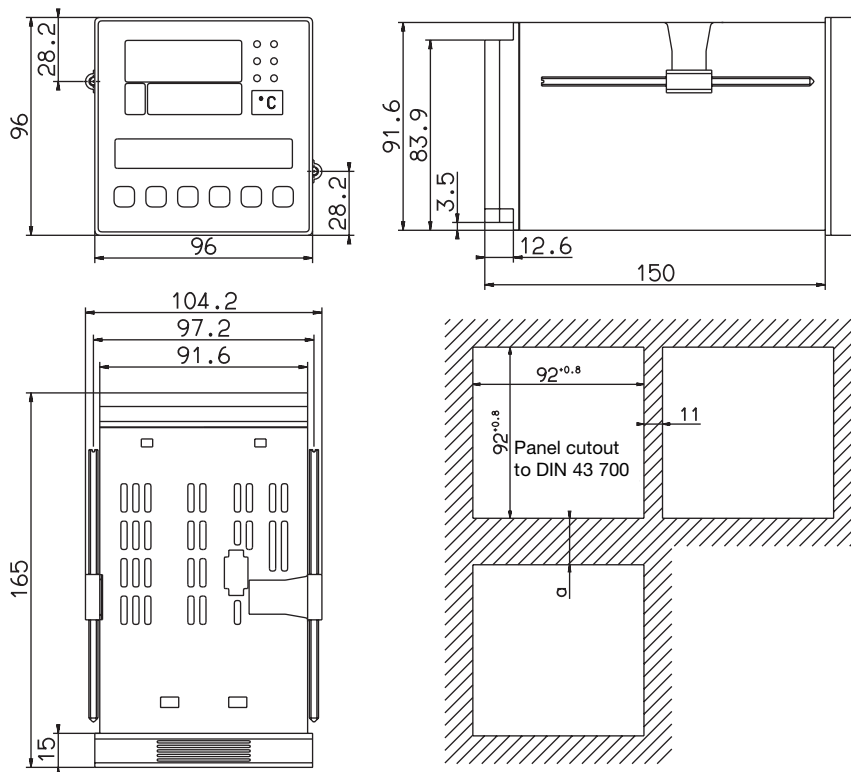
Configuration level C1

Controller	→ controller type controllers 1 + 2 time constant for control-loop monitoring controllers 1 + 2		
Limit comparators	→ limit comparator 1 – 8	→ function action switching differential limit function on out-of-range	
Inputs [controllers and limit comparators (lk)]	→ input function input type	→ inputs controllers 1 + 2 inputs of the limit comparators 1 – 8 → analog input 1 – 4	→ process value external setpoint predefinition output feedback additive disturbance multiplying disturbance → lk process value lk setpoint → transducer linearization process value correction constant cold junction temperature external cold junction temperature heater current monitoring display start display end range start range end filter time constant
Outputs	→ output 1 – 4	→ function output signal zero point full scale output signal on out-of-range	
External relay module	→ external output 1 – 8	→ function function on out-of-range	
Special functions	→ profile controller manual output self-optimization setpoint limits maths and logic module	→ restart program start setpoint predefinition time/gradient programming controller function when no profile program is available operating mode: automatic/ manual on tolerance band signal function control process value deviation profile program end time delete profile program → manual output controllers 1 + 2 → self-optimization controllers 1 + 2 → setpoint limit controllers 1 + 2 → mathematics 1 + 2 → logic 1 + 2	→ controllers 1 + 2 limit comparator 1 – 8 → setpoint start setpoint end → function variable a variable b range start range end

Configuration level C2

Display	→ display controllers 1 + 2 display brightness display 3 + 4	→ display 1 – 4	→ display value decimal point
Logic functions	→ logic input 1 – 5 limit comparator output 1 – 8 logic 1 + 2 operating contact 1 – 8		
Cascade controller	→ function start value of output conversion end value of output conversion		
Customized recalibration	→ analog input 1 – 4	→ start value end value	
Time-out			
Unit			
Supply frequency			
Interface	→ protocol type data format instrument address minimum response time	→ parity stop bit baud rate	

Dimensions



Side-by-side mounting

Minimum spacing	a
with PC interface	65mm
without PC interface	30mm

Input for thermocouple

Type	Measuring range	Measuring accuracy ¹	Ambient temperature error
NiCrSi-NiSi N	-100 to +1300 °C	≤ 0.25 %	0.05 % / 10 °C
Cu-Con T	-200 to + 400 °C	≤ 0.25 %	0.05 % / 10 °C
Fe-Con J	-200 to +1200 °C	≤ 0.25 %	0.05 % / 10 °C
Cu-Con U	-200 to + 600 °C	≤ 0.25 %	0.05 % / 10 °C
Fe-Con L	-200 to + 900 °C	≤ 0.25 %	0.05 % / 10 °C
NiCr-Ni K	-200 to +1372 °C	≤ 0.25 %	0.05 % / 10 °C
Pt10Rh-Pt S	0 — 1768 °C	≤ 0.25 %	0.05 % / 10 °C
Pt13Rh-Pt R	0 — 1768 °C	≤ 0.25 %	0.05 % / 10 °C
Pt30Rh-Pt6Rh B	-55 to +1820 °C	≤ 0.25 %	0.05 % / 10 °C
NiCr-Con E	-200 to + 915 °C	≤ 0.25 %	0.05 % / 10 °C
Lead resistance: ≤ 300 Ω			

Input for resistance thermometer

Type	Connection circuit	Measuring range	Measuring accuracy ¹	Ambient temperature error
Pt100	3-wire	-200 to +850 °C	≤ 0.05 %	≤ 0.025 % / 10 °C
Lead resistance: ≤ 40 Ω				
Measuring current: 150 μA				

Input for standard signal

Type	Measuring range	Measuring accuracy ¹	Ambient temperature error
Voltage	0 — 50mV; $R_i > 1\text{M}\Omega$	≤ 0.05 %	≤ 0.1 % / 10 °C
	0 — 1V; $R_i > 100\text{k}\Omega$	≤ 0.05 %	≤ 0.1 % / 10 °C
	0 — 10V; $R_i > 100\text{k}\Omega$	≤ 0.05 %	≤ 0.1 % / 10 °C
	0.2 — 1V; $R_i > 100\text{k}\Omega$	≤ 0.05 %	≤ 0.1 % / 10 °C
	2 — 10V; $R_i > 100\text{k}\Omega$	≤ 0.05 %	≤ 0.1 % / 10 °C
Current	0 — 20mA; $\Delta U_e < 1\text{V}$	< 0.05 %	≤ 0.1 % / 10 °C
	4 — 20mA; $\Delta U_e < 1\text{V}$	< 0.05 %	≤ 0.1 % / 10 °C
Heater current (for connection to a current transformer)	AC 50/60Hz ± 1 %, 0 — 20mA	< 0.25 %	≤ 0.1 % / 10 °C
Resistance transmitter	min. 100Ω, max. 10kΩ	< 0.15 % ²	≤ 0.025 % / 10 °C
Measuring current (resistance transmitter): ≤ 2mA			
max. permissible input voltage: 12V			

R_i = internal resistance; ΔU_e = voltage drop

Measurement circuit monitoring³

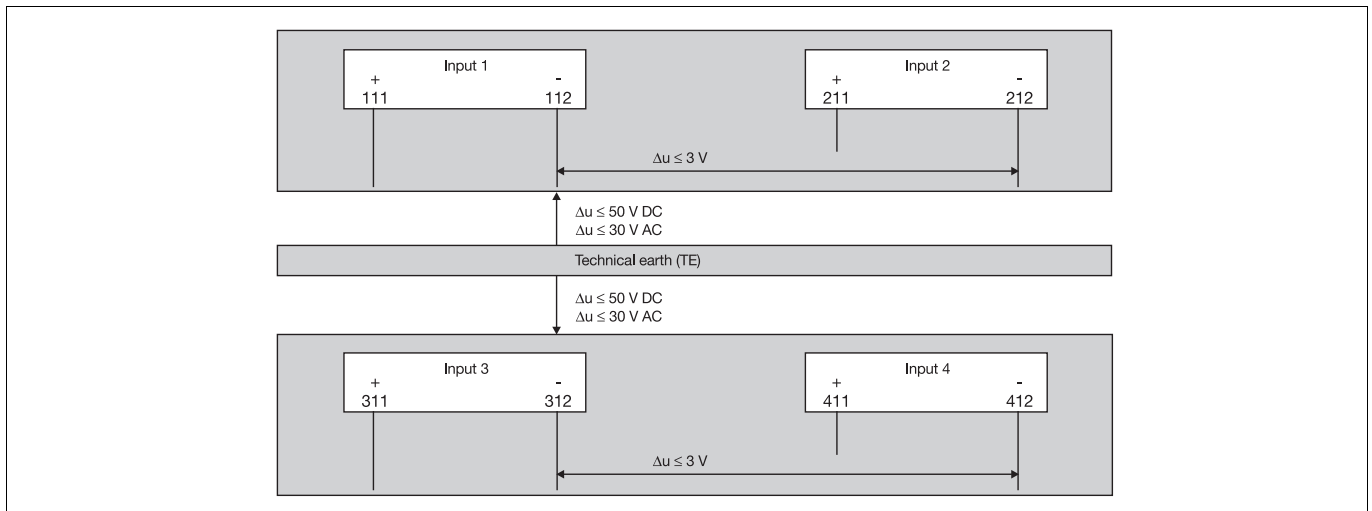
Transducer	Out-of-range	Probe/lead short-circuit ¹	Probe/lead break
Thermocouple	•	-	•
Resistance thermometer/transmitter	•	•	•
Voltage	2 — 10V	•	•
	0 — 50mV	•	•
	10 — 50mV	•	•
	0.2 — 1V	•	•
Current	4 — 20mA	•	•

• = recognized

- = not recognized

1. The data include the linearization tolerances.
2. After compensation of the lead resistance.
3. In a fault condition, the outputs move to a defined state.

Electrical isolation



Logic inputs

Signal	<ul style="list-style-type: none"> - floating contact (standard feature) - 0/24V (on request)
Functions	<ul style="list-style-type: none"> - start/cancel self-optimization - automatic/manual changeover - manual operation locked - setpoint switching - process value switching - parameter set switching - locking the parameter or configuration level - text display - all displays off - locking the profile program editor - profile program start/stop - cancel program - fast forward - profile program selection

Outputs

Four outputs are available. Output 2 is always a relay output, the others can be either switching or analog outputs.

Relay contact rating contact life	<p style="text-align: center;">changeover contact 3A at 230V AC resistive load 10^6 operations at rated load (with contact protection circuit)</p>
Logic internal resistance	<p style="text-align: center;">0/24V $R_i = 1.2 \text{ k}\Omega$</p>
Solid-state relay (TRIAC) contact rating	<p style="text-align: center;">1 A at 230V</p>
Voltage output signals load resistance	<p style="text-align: center;">-10 to +10V / 0 – 10V / 2 – 10V $R_{load} > 500 \Omega$</p>
Current output signals load resistance	<p style="text-align: center;">-20 to +20 mA / 0 – 20 mA / 4 – 20 mA $R_{load} < 500 \Omega$</p>
Supply for 2-wire transmitter voltage current	<p style="text-align: center;">electrically isolated 18V 45 mA</p>

Controller

Controller type	1-setpoint controller: <ul style="list-style-type: none"> - O function¹ (heating); relay de-energized at $x>w$ - S function² (cooling); relay de-energized at $x<w$ 2-setpoint controller: <ul style="list-style-type: none"> - switching (heating) / switching (cooling) - falling characteristic (heating) / switching (cooling) - switching (heating) / rising characteristic (cooling) - falling characteristic (heating) / rising characteristic (cooling) Modulating controller: <ul style="list-style-type: none"> - CW / CCW Proportional controller: <ul style="list-style-type: none"> - falling characteristic (heating) - rising characteristic (cooling) Proportional controller with integral actuator driver for motor actuators: <ul style="list-style-type: none"> - CW / CCW
Controller structures	P/I/PD/PI/PID (on modulating controller PI and PID)
A/D converter	resolution 15bit
D/A converter	resolution 13bit
Sampling time	1-channel controller: 70msec at 50Hz, 75msec at 60Hz 2-channel controller: 110msec at 50Hz, 125msec at 60Hz When calculating a maths formula, the sampling time increases with the complexity of the formula.

Electrical data

Supply	93 – 263V AC 48 – 63Hz, 20 – 53V AC/DC 48 – 63Hz on 93 – 263V AC, operation with zener barriers is not permissible!
Test voltages (type test)	to EN 61 010, Part 1 overvoltage category II, pollution degree 2
Power consumption	< 20VA
Data backup	EEPROM
Electrical connection	at the rear via screw terminals, conductor cross-section up to 2.5mm ² and core end sleeve (length: 10mm)
Electromagnetic compatibility	EN 61 326
Electrical safety	to EN 61 010, overvoltage category II, protection Class I (rear), protection Class II (front, through panel mounting)
Ambient/storage temperature range	0 – 50°C / -40 to +70°C
Climatic conditions	rel. humidity ≤ 75% annual mean, no condensation

Housing

Housing type	housing in conductive plastic for flush-panel mounting to DIN 43 700, base material ABS, with plug-in controller chassis
Bezel in mm	96 x 96
Mounting depth in mm	150
Panel cutout	$92^{+0.8} \times 92^{+0.8}$
Operating position	any
Protection	to EN 60 529, front IP65, rear IP20
Weight	approx. 850g

Profile controller

Profile programs	25, with 2 profiles each
Segments	up to 100 per profile, a total of 500 max.
Operating contacts	8

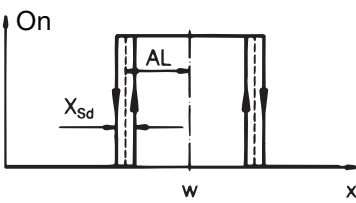
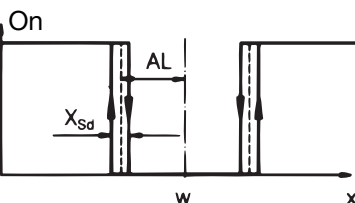
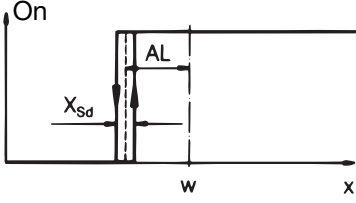
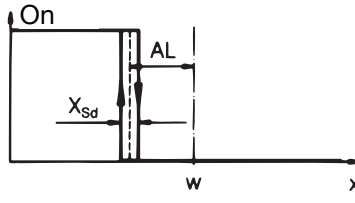
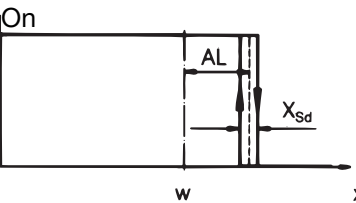
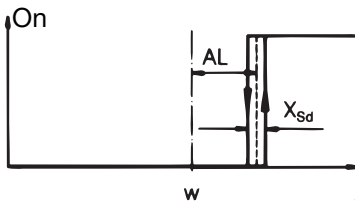
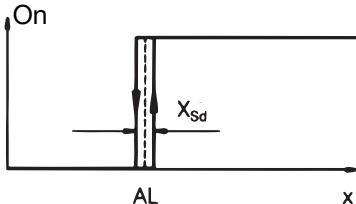
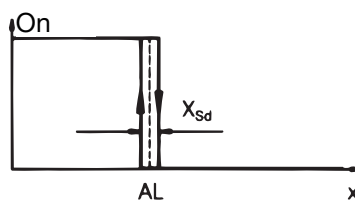
Maths and logic module

Maths module	analog and logic signals are linked through a mathematical formula
Logic module	linking of the logic inputs, operating contacts and limit comparators
Difference, ratio and humidity control	implemented through established standard formulae

Interfaces

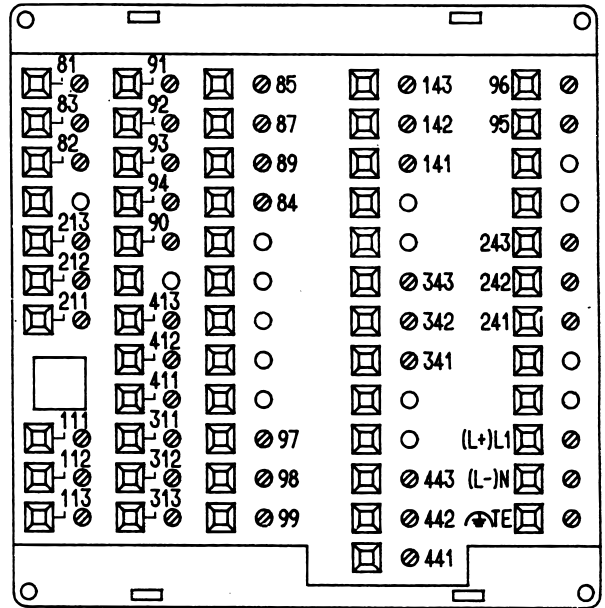
RS422 / RS485	
Transmission rate	187.5kbps max.
Transmission protocol	MOD/Jbus
Setup interface	
Connection	via PC interface with TTL/RS232 converter; plug connector on top of housing
PROFIBUS-DP	
Transmission rate	12Mbps max.
CANopen master	
CANopen slave	

Limit comparators

Number	The controller incorporates eight limit comparators which are linked internally or switched to physical outputs	
Function Ik1 Window function: relay is energized when the process value lies within a window around the setpoint.	Ik1 	Ik2 
Function Ik2 as for Ik1, but with inverted relay function.		
Function Ik3 Lower limit signalling Function: relay is de-energized when the process value is below (setpoint - limit).	Ik3 	Ik4 
Function Ik4 as for Ik3, but with inverted relay function.		
Function Ik5 Upper limit signalling Function: relay is de-energized when process value is above (setpoint + limit).	Ik5 	Ik6 
Function Ik6 as for Ik5, but with inverted relay function.		
Function Ik7 Switching point is independent of the controller setpoint; only the limit value AL determines the switching point. Function: relay is energized when process value is above limit.	Ik7 	Ik8 
Function Ik8 as for Ik7, but inverted relay function.		
Switching differential X _{Sd}	0 to 9999 digit	
Limit value AL	-1999 to 9999 digit	

Connection diagram

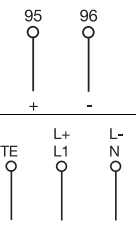
Rear view with screw-clamp terminals



Output	Relays ¹	Solid-state relays	Logic outputs	Analog outputs	Terminals
Relays, solid-state relays, logic or analog outputs	1	141 (O) n.c. (break) 142 (P) common 143 (S) n.o. (make)	142 - 143 +	142 - 143 +	141 142 143
	2	241 (O) n.c. (break) 242 (P) common 243 (S) n.o. (make)	-	-	241 242 243
	3	341 (O) n.c. (break) 342 (P) common 343 (S) n.o. (make)	342 343	342 - 343 +	341 342 343
	4	441 (O) n.c. (break) 442 (P) common 443 (S) n.o. (make)	442 443	442 - 443 +	441 442 443
External relay module ER8	97 RxD/TxD (+) 98 RxD/TxD (-) 99 GND	communication with external relay module			97 98 99
Interfaces					
RS422 interface	RxD	91 RxD (+) 92 RxD (-)	receive data		91 92 93 94 90
	TxD	93 TxD (+) 94 TxD (-)	transmit data		
	GND	90 GND			
RS485 interface	RxD/ TxD	93 RxD/TxD (+) 94 RxD/TxD (-)	receive/transmit data		93 94 90
	GND	90 GND			
PROFIBUS-DP		92 VP 93 RxD/TxD-P 94 RxD/TxD-N 90 DGND	supply voltage-Plus (P5V) receive/transmit data-P, B-cable receive/transmit data-N, A-cable data transmission potential		92 93 94 90
CAN bus		90 CAN-H 91 GND 92 VDD 93 CAN-GND 94 CAN-L			91 92 93 94 90

1. contact protection circuit 22nF/56Ω between common and make contact

Supply			
Supply source for external 2-wire transmitter	95 + 96 -	18V 45mA	
Supply as per nameplate	TE technical earth L1 line N neutral	AC	L+ L- DC



Analog inputs	Input 1	Input 2	Input 3	Input 4		Terminals
Thermocouple	111 + 112 -	211 + 212 -	311 + 312 -	411 + 412 -		
Resistance thermometer in 3-wire circuit	111 112 113	211 212 213	311 312 313	411 412 413		
Resistance thermometer in 2-wire circuit	111 112 113	211 212 213	311 312 313	411 412 413	$R_{comp} = R_{lead}$	
Current input	111 + 113 -	211 + 213 -	311 + 313 -	411 + 413 -		
Voltage input	111 + 112 -	211 + 212 -	311 + 312 -	411 + 412 -		
Resistance transmitter	111 112 113	211 212 213	311 312 313	411 412 413	.11 start (A) .12 slider (S) .13 end (E)	

Logic inputs				
Logic input 1	81 82	through floating contacts or 0/24V switching voltage (on request)		
Logic input 2	83 82			
Logic input 3	85 84			
Logic input 4	87 84			
Logic input 5	89 84			

Ordering the

JUMO DICON 1001

A version which covers most standard applications is available ex-stock. This will make it easier for you to select and order your profile controller. You can then set the controller parameters, configuration data and profile programs yourself.

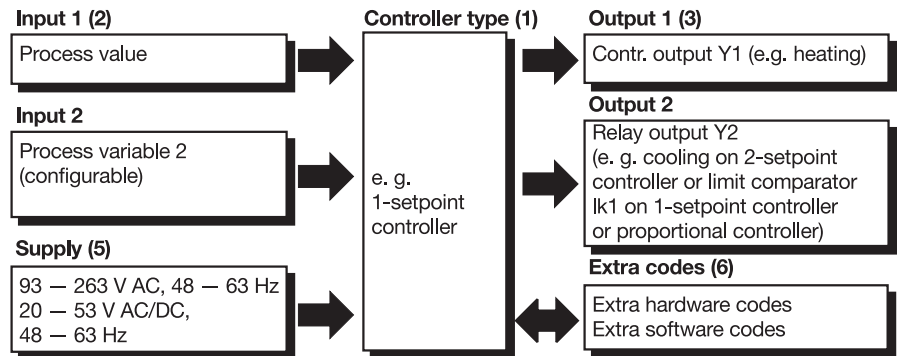
Mark the **stock version** with a cross, or enter the code number of the blocks (1) – (6) for **your version**.

You can use this page to **fax** your order:

Fax No. +49 (0) 661 6003- 607

The fax numbers of our offices in the UK and USA are given at the top of page 1 of this Data Sheet.

Arrangement of the profile controller



Type designation

(1) Controller type	Code
1-setpoint controller, O function (relay de-energized at x > w), configurable controller structure	10
1-setpoint controller, S function (relay de-energized at x < w), configurable controller structure	20
2-setpoint controller, configurable controller structure	30
Modulating controller, configurable controller structure	40
Proportional controller, configurable controller structure and output signal	50
Proportional controller, with integral actuator driver for motor actuators	80

(2) Input 1 Probe type	Code
Pt100 resistance thermometer in 3-wire circuit	001
NiCr-Con E	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
NiCrSi-NiSi N	048
linear standard signals	
0 – 20mA	052
4 – 20mA	053
0 – 1V	062
0 – 10V	063
0 – 50mV	064
0 – 2V (C-level controller)	073
Resistance transmitter	021

- Basic version:** 703565 / (1) 10 - (2) 001 - (3) 1 - (4) 1 - (5) 01 / (6) 00
Sales No. 70/00331192
- Your version:** 703565 / .. - ... - . - . - .. / .. *
- Stock version:** ER8
Sales No. 70/00325805

* list in sequence, separated by commas.

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

(4) Language	Code
German	1
English	2
French	3

(5) Supply	Code
93 – 263V AC, 48 – 63Hz	01
20 – 53V AC/DC, 48 – 63Hz	22

(6) Hardware extras	Code
no extra code	00
analog inputs 3 + 4 ¹ (A/D converter II)	01
Output 3	3.*
Output 4	4.*
*digits as output 1	

(6) Hardware extras	Code
RS422 interface	52
RS485 interface	53
PROFIBUS-DP interface	64
CANopen master interface	40
CANopen slave interface	39
Controller meets requirements of Underwriters Laboratories Inc.	61
C-level controller (only factory-configured)	04

1. specify probe type, input or output signals in full.

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

Accessories
External relay module ER8 Supply 93 – 263V AC Sales No. 70/00325805
Supply 20 – 53V AC/DC Sales No. 70/00325806
PC interface with TTL/RS232 converter Sales No. 70/00301315
PC interface with RS232/CAN converter Sales No. 70/00377612
Setup program (3.5" diskette)
PC profile program editor