

R6000

8-Channel Controller

3-349-157-03
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- 8 individually selectable regulating zones, thermocouples and Pt100
- Extremely short sampling interval for all channels (100 ms)
- Control functions: duty cycle controller, limit transducer, two and three-position controller, step-action controller, continuous-action controller
- Cascade, differential and hot-runner control
- Actual value management by groups for the avoidance of thermal stressing
- 16 binary inputs / outputs with short-circuit detection, can be freely assigned to controller states, functions and channels, factory default configuration: 2 actuator outputs per regulating zone
- Optional expansion to 20 binary inputs / outputs or 4 additional continuous outputs
- RS 232 service interface parameters configuration and data transfer via notebook with software tool
- Fieldbus interfaces: Profibus DP, CAN with CANOpen, RS 485 with EN 60870 or Modbus protocol for integration into controls and management systems
- 24 V DC auxiliary power supply



Optional



QUALITY MANAGEMENT SYSTEM



DQS Certified per
DIN EN ISO 9001 reg. no. 1262

Applications

The R6000 is a compact 8-channel temperature controller in a top-hat rail mount housing. The controller is used in machines or systems with centralized control and display concepts.

Communications are possible via a number of standardized fieldbus interfaces, or by means of the integrated service interface.

The controller's range of applications includes multi-channel temperature control for plastics processing machines (injection molding, extrusion, blow molding and hot runner technology), semiconductor manufacturing processes, industrial and laboratory ovens, textile machinery, climatic test cabinets, environmental simulation chambers, food and beverage vending machines, packaging machinery and process engineering.

Description

The controller can be snap-mounted to top-hat rails in accordance with DIN EN 50022. Reliable wiring is accomplished with the help of screw and clamp-type terminals which are separated according to function, allowing for rapid device replacement in the event that service is required.

The decentralized control unit is equipped with inputs for all common temperature sensors, and drives semiconductor relays or proportional actuators via freely assignable outputs. Parameters configuration for the control channels is performed via the service interface with a convenient software tool for use with a notebook. The control unit functions autonomously and exchanges actual values, setpoint values, alarm and status messages with the controls or the management system via the fieldbus interface. Complete parameters configuration can, of course, also be performed via the fieldbus interface.

Clear-cut status displays with LEDs keep the user informed concerning the status of switching outputs and inputs at the controller and the field bus. Readback outputs allow for automatic short-circuit detection and provide for a comprehensive errors recognition concept together with monitoring of sensor inputs and heating circuits.

R6000

8-Channel Controller

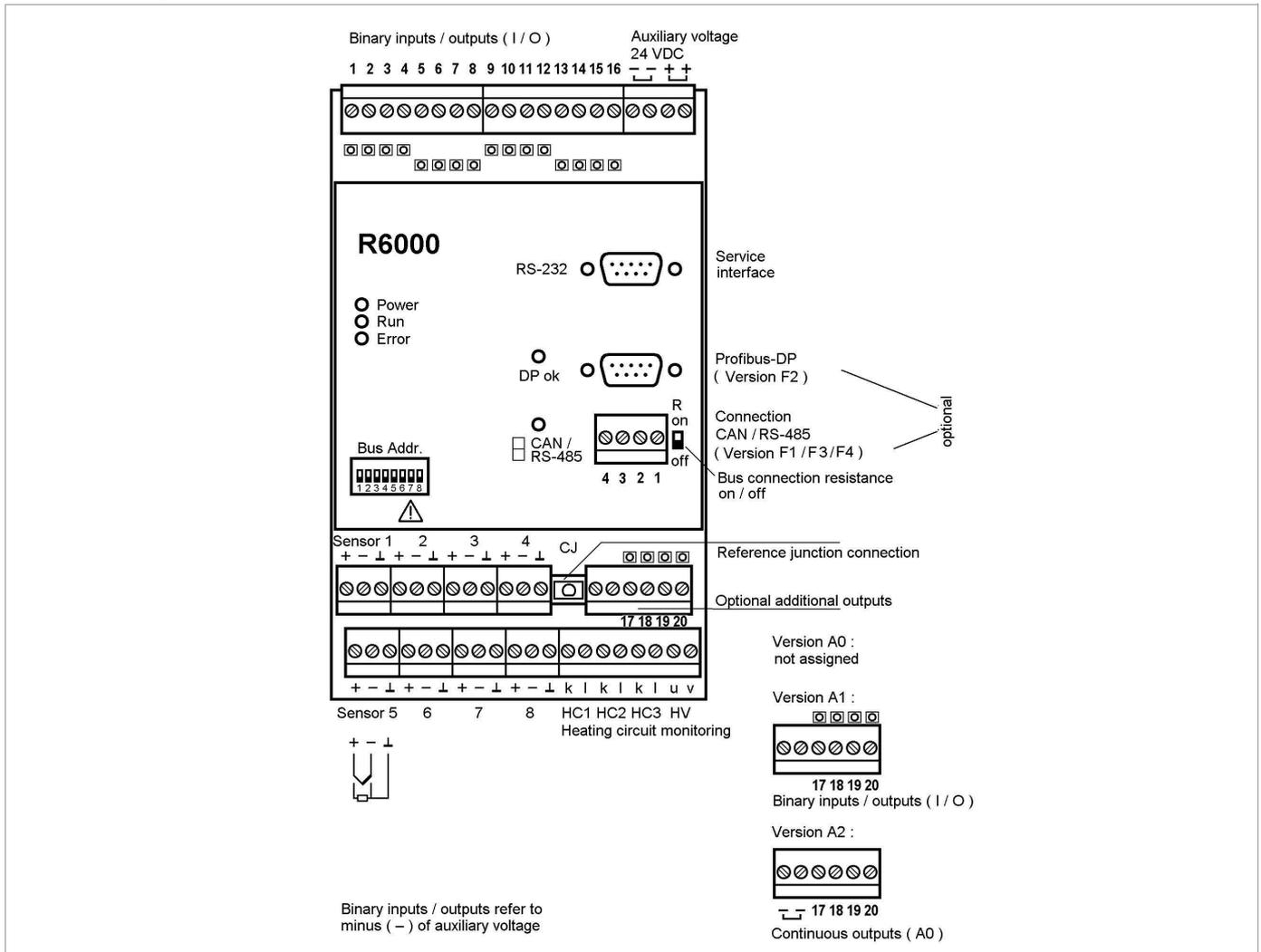
Features

- Integrated self-restoring overload protection
- Monitoring for sensor breakage, cable interruption, polarity reversal and short-circuiting
- Regulated value is active in the event of sensor breakage
- Immune to interference due to leakage current at thermocouples
- Setpoint ramp
- Feed-forward control: targeted alteration of controller state for the avoidance of overshooting and undershooting
- Regulating zones can be assigned to groups
- Deactivate zones as desired with internal or external signal
- Heating circuit monitoring without additional transformer
- Heating current monitoring with up to 3 external current transformers (3-phase current), and an optional voltage transformer for compensation of voltage fluctuation
- Remote diagnosis supported with numerous monitoring functions
- Can be adapted at any time
- 2nd set of parameters

Applicable Regulations and Standards

IEC 61010-1 / EN 61010-1 / VDE 0411, Part 1	Safety requirements for electrical equipment for measurement, control and laboratory use
IEC 60529 / EN 60529 DIN VDE 0470, Part 1	Protection provided by enclosures for electrical equipment (IP code)
DIN EN 60204-1 / VDE 0113, Part 1	Machine safety
DIN 3440	Temperature controllers and limiting devices for heating systems
IEC 61326-1 / EN 61326-1	Electromagnetic compatibility (EMC) interference emission
IEC 61326 / A1 / EN 61326 / A1	Electromagnetic compatibility (EMC) interference immunity
IEC 60584 / EN 60584 (DIN 43710)	Thermocouples
IEC 60751 / DIN EN 60751	Industrial platinum resistance thermometers and platinum resistance elements, Pt100 sensors
DIN EN 50022	Mounting rails, top-hat rail with 35 mm width for snap mounting devices
CSA	Canadian Standards Association, in preparation

Terminal Assignments



R6000

8-Channel Controller

Characteristic Values

Inputs / Outputs

Sampling Rates 100 ms for each controlled variable

Thermocouple Measurement Input

Thermocouples per IEC 60584 / EN 60584 / DIN 43710 type J, L, K, R, S, B and N

Measuring Range linear 0 ... 50 mV

Nominal Input Range for Type

J, L	0 ... 900 °C
K	0 ... 1300 °C
R, S	0 ... 1750 °C
B	0 ... 1800 °C
N	0 ... 1300 °C

Accuracy / Error < 0.7% of measuring range span for types J, L, K, N
< 2.0 % of measuring range span for types R, S, for Typ B from 600 °C onwards

Resolution 0.1 K

Cont. AC Overload 50 / 60 Hz / 50 V AC, sinusoidal
DC 1 V DC

Input Impedance > 50 k Ω

Error Messages for sensor breakage or polarity reversal, or temperature outside of measuring range

Reference Junction Measurement Input

Nominal Input Range 0 ... 70 °C

Accuracy ± 2 K

Reference Junction two-step

Pt100 Resistance Thermometer Measurement Input, 2 or 3-Wire Connection

Pt100 per IEC 60751 / DIN EN 60751

Measuring Range 60 ... 280 Ω

Nominal Input Range -100 ... 500 °C

Sensor Current < 0.2 mA

Offset Compensation possible by means of parameter entry

Accuracy / Error < 0.7 % of measuring range

Resolution 0.1 K

Cont. AC Overload 50 / 60 Hz / 50 V AC, sinusoidal
DC 1 V DC

Input Impedance 13 k Ω

Cable Resistance (both directions) 2-wire connection: 0 ... 30 Ω , adjustable
3-wire connection: 0 ... 30 Ω , compensated

Error Messages for sensor breakage or short-circuit, or temperature outside of measuring range

Sensor Input Configuration

Sensor type is selected separately for each input via the interface. Switching between thermocouple and Pt100 is accomplished with the DIP switch at the left-hand side of the housing.

Heating Current Monitoring Input

Measuring Range 1 A AC (direct connection of a commercially available measuring transducer)

Resolution < 0.1% of upper range value

Accuracy typically < 5% of upper range value

Reproducibility < (1% of measurement value + 0.5% of upper range value)

Heating Voltage Monitoring Input

Measuring Range 10 ... 50 A AC (direct connection of a commercially available measuring transducer)

Resolution < 0.1% of upper range value

Accuracy typically < 5% of upper range value

Reproducibility < (1% of measurement value + 0.5% of upper range value)

Binary Inputs / Outputs

Output Function Active switching outputs, supplied directly from auxiliary voltage

Function Switching output (heating/cooling, or more/less for step-action controllers)
Alarm output

Read-Out Cycle Adjustable within a range of 0.1 ... 300 s

Nominal Range of Use

H signal: $U \geq$ auxiliary voltage, -0.5 V
 $I \leq 500$ mA
Total current ≤ 3 A per device

L signal: < 0.1 mA
e.g. for driving up to 3 commercially available semiconductor relays (SSR) in series

Input Function Read back output status, external control of PLC etc.

Nominal Range of Use

H signal: > 14 V
8 ... 16 mA at 24 V

L signal: < 7 V / < 0.2 mA

Overrange Limit H, L Signal Continuous short-circuit, interruption

Continuous Outputs

Output Function Actuator Output for Proportional Actuator

Output Quantity 0 ... 10 V at > 1 k Ω load,
0 ... 20 mA at < 300 Ω load

Resolution 0.1% of upper range value

Accuracy < 3% of upper range value

Status Displays

Power on	green	} 3 mm dia. LEDs on metal housing
Run	green	
Bus communication active	yellow	
Error	red	
Binary Inputs / Outputs Active	yellow	SMD LEDs at clamp-type terminal blocks

R6000

8-Channel Controller

Reference Conditions

Reference Quantity	Reference Condition
Auxiliary voltage	24 V DC \pm 1 V
Superimposed alternating voltage	sinusoidal, or sinusoidal half-waves: 0.1 V AC
Allowable common-mode voltage	to electrically connected inputs: 0 V DC / AC
Ambient temperature	23 °C \pm 2 K
Reference junction temperature	23 °C \pm 2 K
Warm-up time	3 minutes
Measuring inputs	Thermocouple, low-resistance termination: \leq 10 Ω Pt100: 110 \pm 10 Ω

Influencing Quantities and Influence Error

Influencing Quantity	Nominal Range of Use	Maximum Influence Error
Ambient temperature – Thermocouple / Pt100 – Reference junction	0 °C ... + 50 °C 0 °C ... + 50 °C	\pm 0.05 % MRS ¹⁾ / K 0.1 K / K
Cable resistance – Thermocouple – Pt100, 2-wire – Pt100, 3-wire	R = 0 ... 200 Ω R = 0 ... 30 Ω R = 0 ... 30 Ω	\pm 0.1% MRS ¹⁾ / 10 Ω approx. 3 K / Ω (adjustable) \pm 2 K / 10 Ω
Warm-up influence	\leq 3 minutes	\pm 1 %

¹⁾ MRS = measuring range span

Electrical Safety

Standard	IEC 61010-1 / EN 61010-1 / VDE 0411, part 1
Safety class	II
Overvoltage category	CAT II
Fouling factor	2
Protection	IEC 60529 / EN 60529 / VDE 0470, part 1
Housing	IP 20
PCB	IP 10
Terminals	IP 20

Attention: The instrument is not equipped with an integrated circuit breaker.

Electromagnetic Compatibility

Interference Emission	IEC 61326-1 / EN 61326-1		
Interference Immunity	IEC 61326 / A1 / EN 61326 / A1		
Test type	Standard	Test Severity	Criterion
ESD	EN 61000-4-2	4 kV contact discharge	B
		8 kV atmospheric discharge	B
E field	EN 61000-4-3	10 V / m 80 ... 1000 MHz	A
Burst	EN 61000-4-4	2 kV at all connector cables	B
Surge	EN 61000-4-5	1 kV symmetrical	A
		2 kV asymmetrical	A
HF	EN 61000-4-6	3 V 0.15 ... 80 MHz, all terminals	A

Ambient Conditions

Annual mean relative humidity, no condensation	75%
Ambient temperature	
– Nominal range of use	0 °C ... + 50 °C
– Operating range	0 °C ... + 50 °C
– Storage range	– 25 °C ... + 70 °C

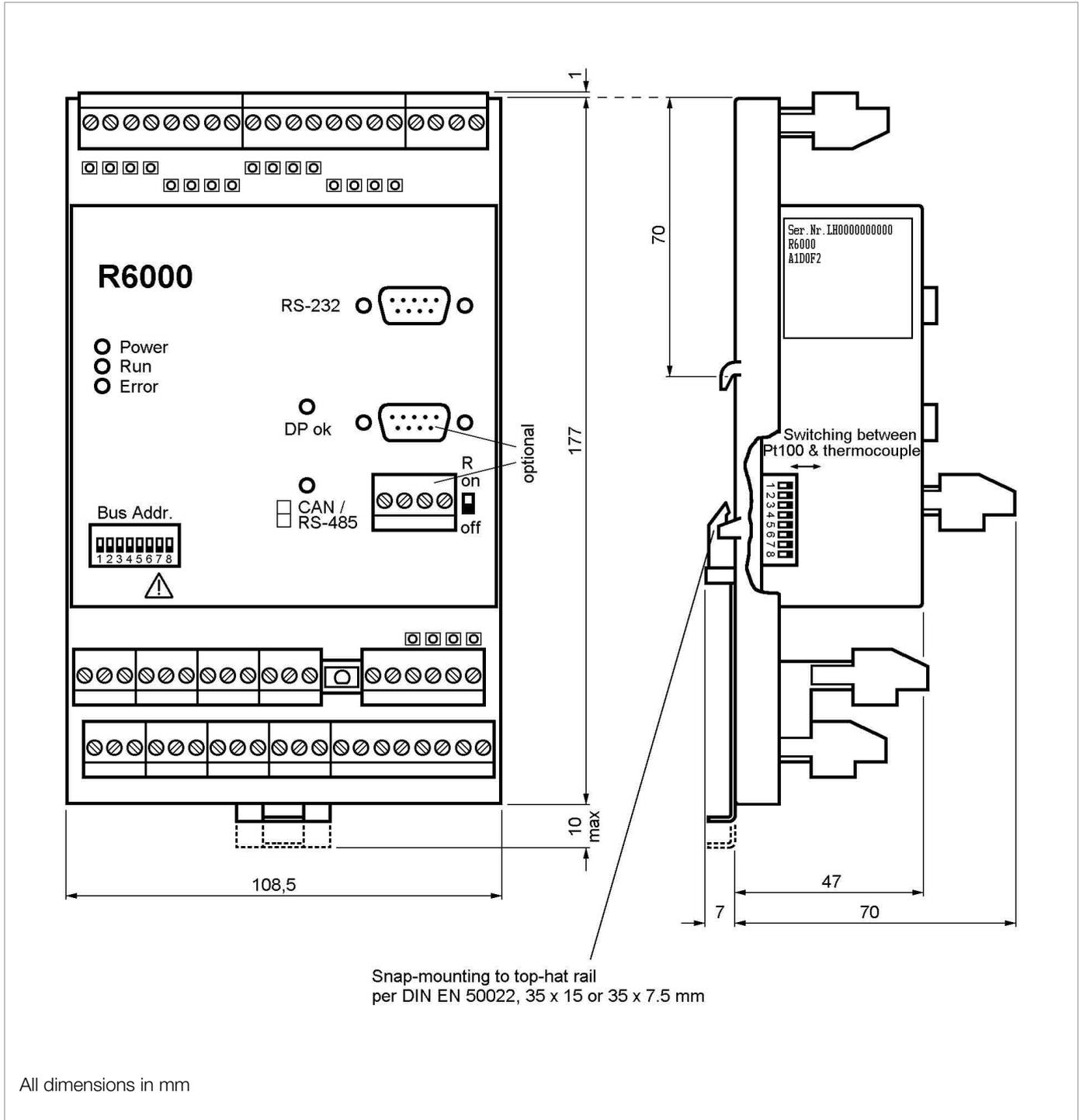
Mechanical Design

Housing	Sheet metal / plastic per UL-V0
Dimensions Including Terminal Blocks (H x W x D)	Max. 182 x 109 x 78 mm
Weight	Approx. 0.6 kg including terminal blocks
Connectors	Terminal blocks for wire cross-sections to 2.5 mm ² or double wire-end ferrules for 2 x 1.0 mm ²
Mounting	Integrated for top-hat rails per DIN EN 50022, 35 x 7.5 mm or 35 x 15 mm

R6000

8-Channel Controller

Dimensional Drawing



All dimensions in mm

R6000

8-Channel Controller

Order Information

Description	Article Number / Feature
8-channel controller with installation instructions	R6000
Inputs / Outputs	
16 binary inputs / outputs	A0
20 binary inputs / outputs	A1
16 binary inputs / outputs, 4 continuous outputs	A2
Connectors	
Screw terminal blocks	D0
Clamp-type terminal blocks	D1
Bus Interface	
CAN / CANOpen	F1
Profibus DP	F2
RS-485 / Modbus protocol	F3
RS 485 / EN 60870 protocol	F4

Accessories

Description	Article Number	
Two-step reference junction	Z306A	
Operating instructions	German	Z307A
	English	Z307B
	French	Z307C
	Italian	Z307D
Modem cable for connection of service interface	GTZ 3241000R0001	

R6000

8-Channel Controller

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