



**Measure and  
Control Technology**

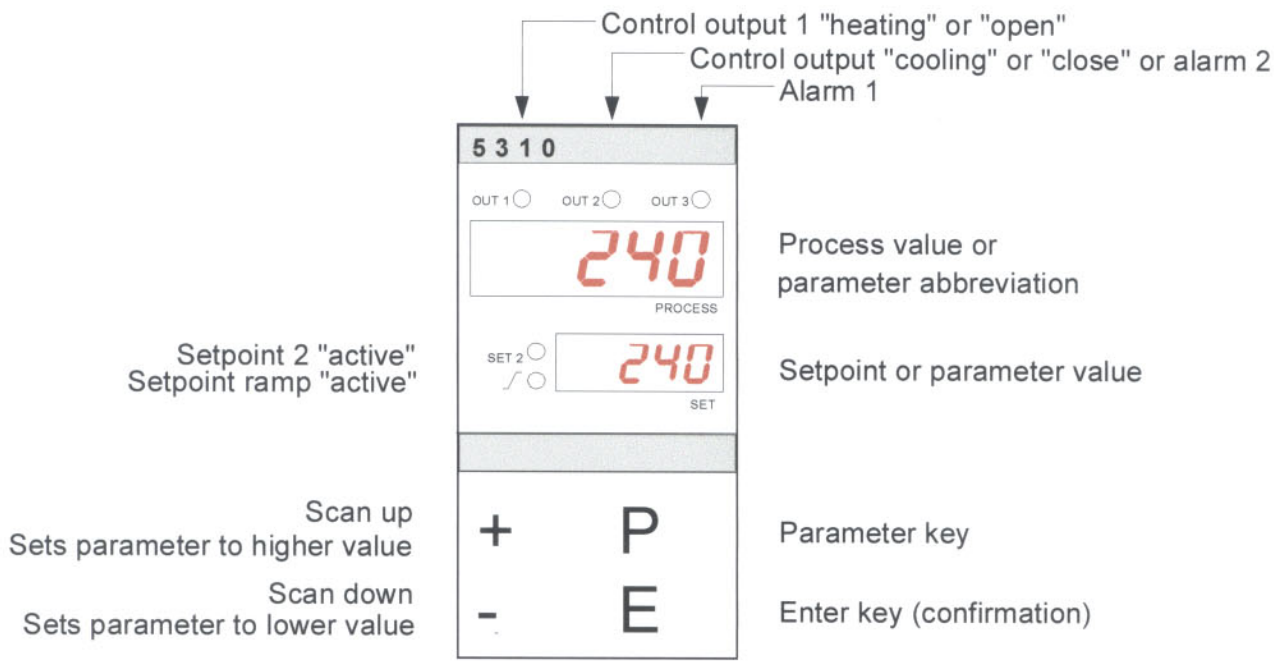
**Microprocessor-based  
Universal Controller**



**5310  
5320  
5350**



**DREWS®**  
MADE IN GERMANY



Operation of the controller is split into three levels using a clearly laid out membrane keyboard that uses scanning technology.

During operation, both setpoint and process value are indicated. All other parameters are presented in logical codes.

The operator levels can be secured against unauthorized program-ming. Additional gradings (lock-out parameter) can be defined on the configuration level.

Utilizing highly-integrated technology (SMT, mask-programmed CPU, multilayer technology), the series 53x0 devices provide a comprehensive range of advanced functions and high degree of reliability.

The controllers have three outputs as a default

- OUT 1 Actuating output „Heating“ or „Open“
- OUT 2 Actuating output „Cooling“ or „Close“
- OUT 3 Alarm output please see alarm contacts on next page

The actuating outputs are generally realized as relay and bistable voltage outputs

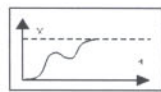
**Actuating performance**

The controller's actuating performance is adjustable.

- **Two- and three-point controller, continuous controller:** PD/- (approach without overshoot, control without offset) PD-, PI, P- or on-off with self-optimization. For two-point or continuous control, a falling (heating) or a rising (cooling) characteristic can be selected. It is possible to choose between a linear or a nonlinear (e.g. for evaporation cooling) rising characteristic. In addition, an operating point gap between „heating“ and „cooling“ can be set.
- **Three-point-step controller** In conjunction with motorized actuators, three-point step controllers exhibit PI-actuating characteristics. The distance between operating points (neutral zone) and the differential gap are programmable.

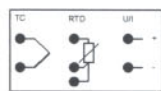
The optimum control parameters are determined by initiating self-optimization. After switching to manual operation the actuating outputs „OUT1/OUT2“ can be activated manually with the up/down buttons.

**Self-optimization**



Self-optimization facilitates matching of the controller to the controlled system. On demand (keypress), the closed-loop control circuit determines the characteristics of the controlled system and calculates the feedback parameters that apply to a wide range.

**Sensors**



All common thermocouples, resistance thermometers (platinum RTDs) and standard signals can be used as measuring devices. The availability of 13 selectable measuring ranges ensures the finest possible resolution of the measurement signal. Temperature can also be displayed in degrees Fahrenheit. The start and end value of the signal range for the standard signal inputs are programmable (including decimal places).

**Operating level**  
to lead the process

- Process value
- Set point
- Alarm values

**Parameter level**  
to adapt the controller to the process

- Self-optimization
- adjust control parameters xp, Tv, Tn

**Configuration level**  
to set the function of the controller

- Control configuration  
Two-point controller  
Three-point controller  
Three-point-step controller  
Continuous controller
- Measuring sensors  
Thermocouple  
PT100 (RTD)  
DC 0/4...20mA, 0...10V
- Function and configuration of the alarm contacts

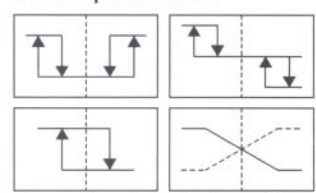
**The series 53x0 reduces**

- order and warehouse expenditure
- variety of types as well as education and documentation costs for customer

**The following are freely adjustable:**

- Control performance (with self-optimization)
- Actuating performance
- Sensors and control range
- Type and function of the alarm contacts

**Control performance**



Two-point controller, Three-point controller, Three-point-step controller, or Continuous controller are adjustable (configurable) by customer.

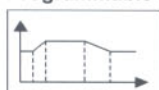
Fe-CuNi	(L)	0...400°C	Pt 100	-50...+100°C
Fe-CuNi	(L)	0...800°C	Pt 100	-90...+205°C
Fe-CuNi	(J)	0...800°C	Pt 100	-199...+100°C
CuCuNi	(T)	0...400°C	Pt 100	0...400°C
NiCr-CuNi	(E)	0...700°C	Pt 100	0...800°C
NiCr-Ni	(K)	0...1200°C	DC 0/4...20 mA, 0...10 V	
Pt10Rh-Pt	(S)	0...1600°C	The temperature levels can also be announced in °F.	
Pt13Rh-Pt	(R)	0...1600°C		



### Setpoint

- A minimum and a maximum value can be specified for the setting range.
- For temperature reduction or increase, a second, digital definable setpoint can be programmed. This setpoint is activated by the closing of an external, floating contact.

### Programmable setpoint ramp



For a timed approach of the setpoint, a separate gradient (K/min) can be programmed for setpoint increase and for setpoint reduction.

### Process value offset

For temperature and setpoint correction or for line compensation, an process value offset can be defined.

### Alarm contacts

Depending on the configuration of the controller, one or two alarm contacts are available by default.

Two-point controller:	2 alarm contacts can be configured
Continuous controller:	2 alarm contacts can be configured
Three-point controller:	1 alarm contact can be configured
Three-point-step controller:	1 alarm contact can be configured

The type and switching behavior of the alarm contacts is programmable. The following options are available:

- Signal contact (acting on setpoint; open-close- or close-open-operation)
- Limit contact (absolute; open-close- or close-open-operation)
- Limit comparator (acting on setpoint; open-close-open- or close-open-close-operation)

The limit comparator can also be configured with alarm suppression for the start phase.

### Soft start

For slow drying of high-performance heating cartridges, a soft start can be configured, the use of which extends cartridge life through gradual warming of the cartridges.

### Serial interface



A RS 485 serial interface is optionally provided for controlling and monitoring the control process.

### Technical datas

#### Sensors

- Thermocouples  
Broken sensor monitoring and internal reference point installed (external reference point can be configured). Reverse voltage protection present.  
Line resistance up to 50 Ohm; no compensation required.  
Sensor current:  $\leq 0,5$  mA  
Calibration accuracy:  $\leq 0,25\%$
- RTD (DIN)  
Two- or three-wire circuit  
Broken sensor and short-circuit monitoring present  
Maximum permissible line resistance for three-wire circuit:  
80 Ohm (Z-barriers)  
Sensor current:  $\leq 0,5$  mA  
Calibration accuracy:  $\leq 0,2\%$
- Standard signals  
DC 0...20mA, 4...20mA, internal resistance:  $<10$  Ohm  
DC 0...10V, internal resistance:  $> 100k$ -Ohm  
Calibration accuracy:  $\leq 0,2\%$   
Programmable range: min. -999, max. +9999  
Volume of range: max. 2000 digit  
Decimal points: max. 2, programmable

Linearity error:  $\leq 0,2\%$

Ambient temperature effect on measurement range:  $\leq 0,01\%/K$

### Control outputs

- **OUT 1:** relay, (n/o contact) max. AC 250V, 3A at  $\cos\text{-}\phi = 1$  and bistable voltage, DC 18V, max. 10mA, short-circuit proof
- **OUT2:** relay, (changeover contact) max. AC 250V, 3A at  $\cos\text{-}\phi = 1$  and bistable voltage, DC 18V, max. 10mA, short-circuit proof
- **OUT1:** continuous (additionally for type code version -611-) Output type (current or voltage) is determined automatically, dependent on load.  
DC 0/4...20mA (load of  $\leq 500$  Ohm)  
DC 0/2...10V (load of  $\leq 1$  k-Ohm)  
Linearity:  $<1,5\%$   
Delay time: app. 2s

### Alarm outputs

- **OUT 2:** relay (changeover contact) max. AC 250 V, 3A at  $\cos\text{-}\phi = 1$  only for 2-point controller (heat-only or cool-only) configuration and continuous-controller configuration.
- **OUT 3:** relay (changeover contact) max. AC 250 V, 3A at  $\cos\text{-}\phi = 1$

### Permissible operating conditions

Operating temperature: 0...50 °C / 32...122°F  
Storage temperature: -30...70 °C / -22...158 °F  
Climate class: KWF DIN 40 040

### EMC

CE-marked according to DIN 50 081-2 and EN 50 082-2

### Data protection

EEPROM

### 7-Segment display

10 mm red (process)  
7,6 mm red (set)

### Power supply

- AC 230 V (internal jumper AC 115 V),  $\pm 10\%$ , 48...62 Hz
- AC 24 V,  $\pm 10\%$ , 48...62 Hz
- DC 24 V,  $\pm 20\%$ , permissible residual ripple max. 5% r.m.s.

approx. 4,5 VA power consumption

### Connections

Screw terminals, Protection mode IP 20 (DIN 40 050),  
Insulation class C  
(connector / terminal board -5350)

### Casing

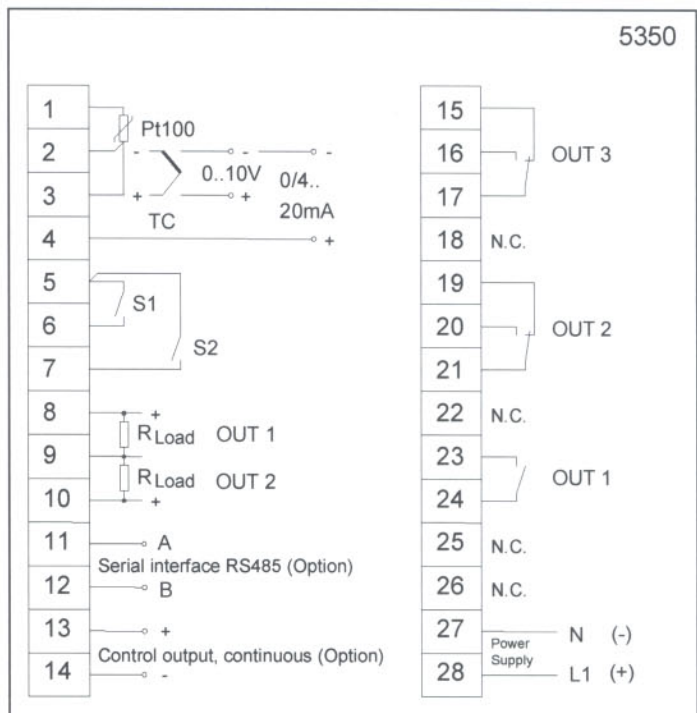
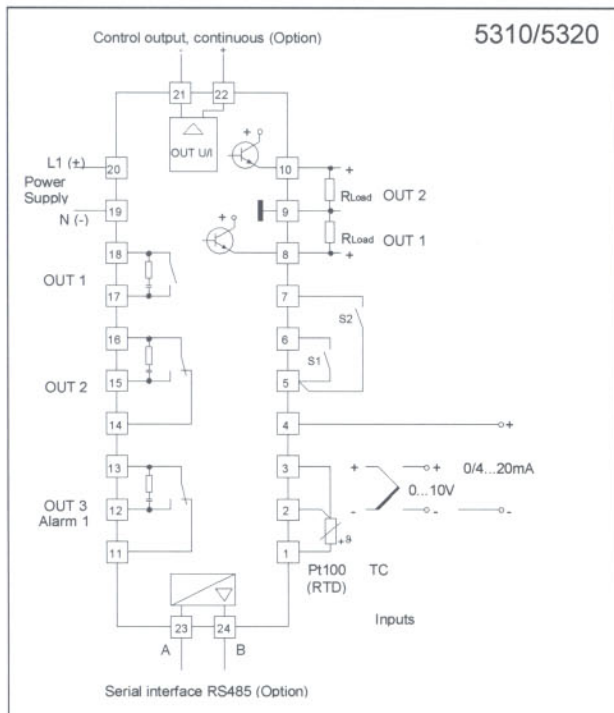
Format:  
48 x 96 mm (DIN 43 700), Installation depth 112 mm (5310)  
96 x 48 mm (DIN 43 700), Installation depth 112 mm (5320)  
96 x 96 mm (DIN 43 700), Installation depth 122 mm (5350)  
Panel output:  
45 mm +0,6 mm x 92 mm +0,8 mm (5310)  
92 mm +0,8 mm x 45 mm +0,6 mm (5320)  
92 mm +0,8 mm x 92 mm + 0,8 mm (5350)

Unit: replaceable from front (5310, 5320)  
Material: Noryl, self-extinguishing, non-drip, UL 94-V1  
Protection mode: IP 54 front side

### Weight

approx. 450 g (5310, 5320)  
approx. 600 g (5350)

### Subject to technical improvements!



#### Control output OUT 1

- a. 2-point / Continuous controller: „heating“ or „cooling“
- b. Heat-cool-controller: „heating“
- c. Three-point-step-controller: „open“

#### Control- or alarm output OUT 2

- a. 2-point / Continuous controller: „alarm 2“
- b. Heat-cool-controller: „cooling“
- c. Three-point-step-controller: „close“

#### Setpoint setting

- S1: open = SP1 valid
- S1: closed = SP2 valid

#### Adjustment lock (LOC)

- S2: open = Adjustment lock only via „software code“
- S2: closed = Adjustment locked (according to the chosen software code)

## Type code

