



Die flexiblen Verteilersysteme aus Kunststoff für Sanitär und Heizung

# Operating Guide

## SBK TwinCo 3000 distribution station



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## **Technical Data**

Suitable for floor surfaces to max. 1,200 l/h (approx. 28,800 kJ) with completely open throttle valve.

### **The connecting pipe is laid out for:**

- Preliminary heat temperature heating system: + 50°C to + 70°C
- Preliminary heat temperature floor: + 20°C to + 50°C
- Middle temperature difference: 6 to 8 K and approx. 75 W/m<sup>2</sup>
- Max. positive operating pressure: 6 bar

### **Pump data: (Please read the attached operating instructions!)**

- High Efficiency Pump: HEP Optimo 25-6.0 G130
- Pressure head: 6m at Q = 0 m<sup>3</sup>/h
- Control range: 4 – 50 W
- Regulation: proportional or constant pressure or constant speed
- Protection class: IP 42
- Sound pressure level: < 45 dB(A)

### **Regulator data Tempus control unit:**

- Connection tension: 230 V ~, 50 hertz
- Achievement admission: 1.5 VA
- Protective kind: IP 42
- Surroundings terms: – 20°C to + 50°C

### **Control valve:**

About the control valve the required quantity of water (warm amount) is supplied to the floor circulation to reach the desired preliminary heat temperature.

### **Throttle valve:**

The quantity of water which should flow in by the control valve onto the floor circle can be limited by the fine regulating spindle in the throttle valve. The volume stream from the secondary circle of the floor system in the primary circle of the heater arrangement flows back and becomes braked. Thereby becomes the raised assembly line speed which arises from the addition of the primary pump pressure and the secondary pump pressure, reduces again.

### **Security temperature limiter:**

The arrangement is equipped with a security temperature limiter which switches off the complete arrangement at a floor preliminary heat temperature > 60°C.

### **Pump:**

The secondary pump becomes with the modes of operation

- Steady preliminary heat temperature
  - Preliminary heat temperature as a leadership size
- when long term runners pursued. A combination with the control distributor with integrated pump switch off modul (option kind no.:6.013.048.030) allows a regulated disconnection of the control and therefore also of the pump and is to be advised for the lengthening of the life span of the pump and the energy conservation.

**To the avoidance of hydraulic problems we recommend the additional installation of hydraulic points.**

## **SBK TEMPUS CONTROL**

### **Overview**

Tempus is a modern digital controller which combines the simple operation known from normal analogue devices with the precision and wide-ranging functions of a digital device.

- Tempus controls the flow temperature based on the outside temperature with automatic limitation of the maximum flow temperature.
- Tempus controls the flow temperature by getting the outside temperature information from the boiler flow temperature.
- Tempus can also be used as a fixed value controller, i.e. the set flow temperature is adhered to precisely (standard model).
- Tempus controls valves to set the afflux. The valves open and close slowly (approx. 5 minutes). The controller is optimal for use with underfloor heating.

### **Integrated safety functions**

In addition, Tempus has numerous integrated safety functions to protect the system.

- **Safety temperature limitation**  
Every heating system should be secured by a double safety function, therefore a safety thermostat (safety temperature limiter) has also been integrated in addition to the safety functions of the controller to limit the maximum performance of the heating system.
- **Anti-block logic for the pump**  
When the system is controlled by the outside temperature or boiler temperature, the pump switches off as soon as the outside temperature is approximately 1 °C higher than the set room temperature (control knob B). The pump is switched back on again as soon as the outside temperature drops approximately 2 °C below the set room temperature.  
If the outside temperature is higher than the room temperature for a longer period of time e.g. in the summer, the pump is switched off and only switched on again for a short period at fixed intervals to prevent the pump from getting stuck.  
If control knob C is turned to OFF, this function is activated automatically.
- **Anti-blocking logic for valve**  
The valve is also switched on for a short period of time in the same way as the pump is in order to prevent it from getting stuck.
- **Failure of a sensor**  
If the outside sensor is missing or has failed, the system automatically switches into the “constant flow temperature” mode.  
  
If the flow sensor is missing or has failed, the valve is controlled with the opening half open and therefore a basic heating is established for safety reasons.

### Thermal function of the SBK TwinCo 3000

The well know principle of heating circuit distribution for underfloor heating made up of flow distributor and return distributor is supplemented by a control valve and a pump.

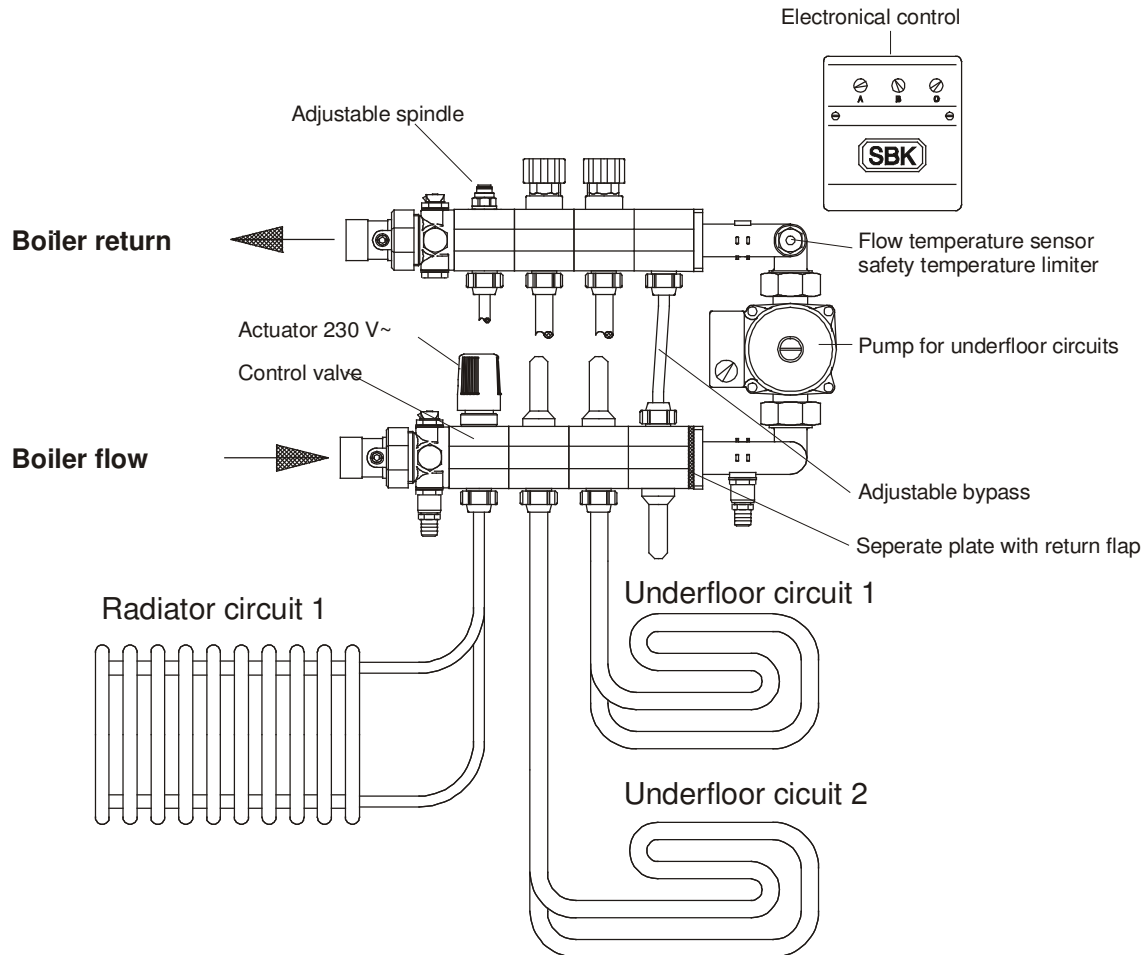


Fig. 1: TwinCo 3000

Warm heating water flows from the flow distributor through the underfloor heating pipes – during which it cools down – and then into the return flow distributor. Here it is mixed with the warm heating water from the heat generator (boiler, gas circulator) and then pressed back into the flow distributor by a pump. This pump also serves as the transport pump of the water in the underfloor heating circuit. The volume of heating water coming from the heat generator is controlled by a valve. However, in this particular case, the boiler flow is connected to the underfloor distributor return flow and the boiler return flow is connected to the underfloor distributor flow. The control valve is positioned in front of the supply line of the underfloor return distributor beam (see diagram).

SBK Tempus controls the pump and the valve which influences the flow of heating water into the return flow distributor. If the required flow temperature has not been reached, the valve is opened. If the required flow temperature is exceeded, the valve is closed. The valve opens and closes slowly in small steps.

The required flow temperature is set either by selecting the flow temperature using control knob "C" (see page 4) or by calculation using the current outside or boiler flow temperature.

## Installation and connection

### **Attention: Risk of electrical voltage on electrical components!**

If the connection is faulty, there is a risk of personal injury or material damage, i.a. Fire. There is a risk of electric shock with health or death. Therefore, the installation of the Tempus control unit may only be carried out by qualified electricians.

The system is installed and connected according to Fig. 2. If used, the outside temperature sensor (special accessory) must be mounted in a wind and sun protected area (northern hemisphere, e.g. north wall). As a connection cable between outside sensor and Tempus control unit we recommend a standardized installation cable. (e.g. NYM-J 3x1.5mm<sup>2</sup>, J-Y (St) Y 2x2x0.6mm<sup>2</sup>)

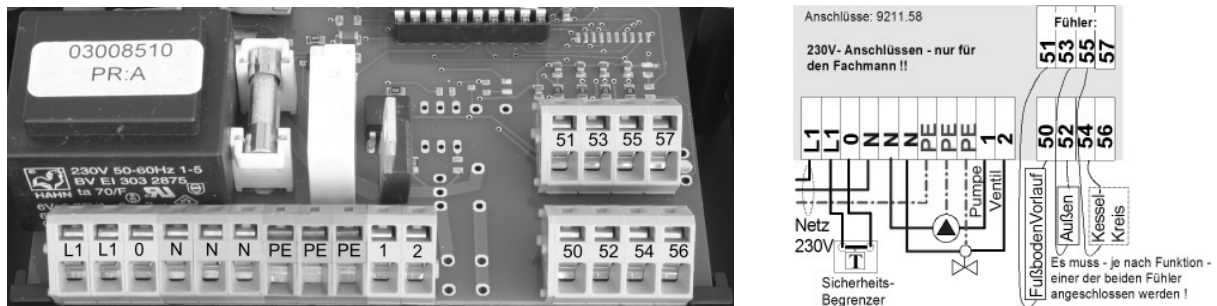


Fig. 2: Connecting diagram (Schematic please see also inside of the cover/housing)

### **Attention:**

If the original high-efficiency pump is replaced by a third-party brand, all warranty claims expire because the replacement may result in damage to the Tempus control unit!

### **Terminal connection** **flow temperature fixed value**

Voltage supply 230 V	L1, N, PE
Safety temperature limiter	L1, 0
Pump	1, N, PE
Actuator for control valve	2, N
Flow sensor underfloor heating circuit	50, 51

**Terminal connection**  
**flow temperature as a function of outside temperature**

Voltage supply 230 V	L1, N, PE
Safety temperature limiter	L1, 0
Pump	1, N, PE
Actuator for control valve	2, N
Flow sensor underfloor heating circuit	50, 51
Outside temperature sensor (optional)	52, 53

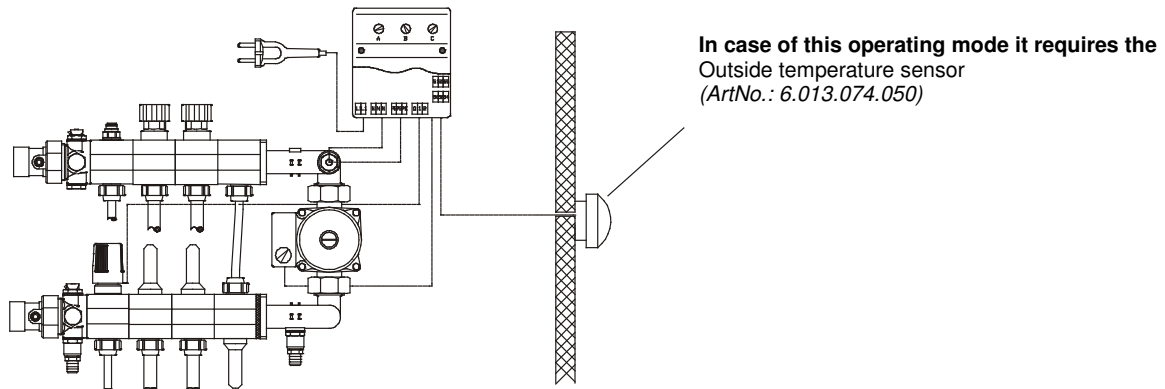


Fig. 3 TwinCo 3000 with outside temperature sensor

**Terminal connection**  
**flow temperature as a function of boiler flow temperature**

Voltage supply 230 V	L1, N, PE
Safety temperature limiter	L1, 0
Pump	1, N, PE
Actuator for control valve	2, N
Flow sensor underfloor heating circuit	50, 51
Flow sensor for boiler temperature (optional)	54, 55

In case of this operating mode it requires the

Bypass  
 (OrderNo. 6.013.074.070)

supply sensor  
 (Order No.: 6.013.074.051)

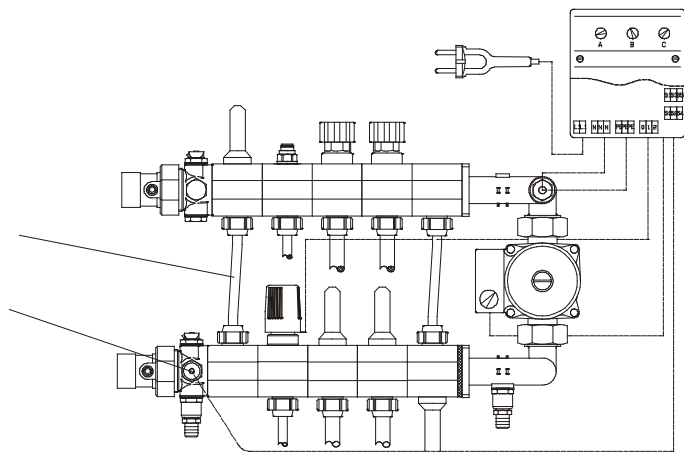


Fig. 4: TwinCo 3000 with supply sensor

## Operation and operating modes

The controller SBK Tempus can work in three different modes

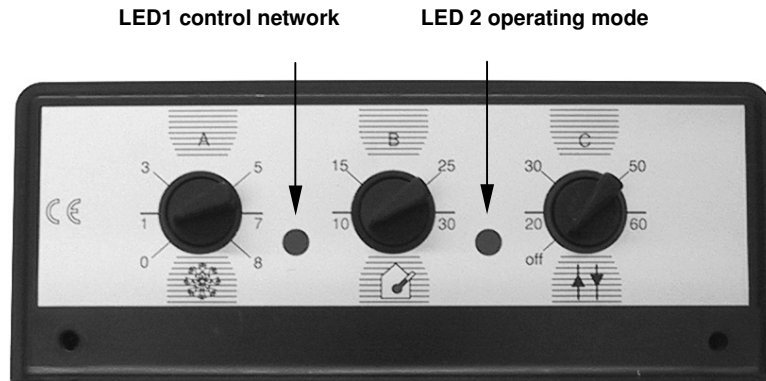


Fig. 5: Operating panel of the control unit

### Constant flow temperature

If it controls an additional heating system, in the bathroom or conservatory, the floor should always have a constant temperature. An outside sensor may not be connected for this operating mode

**Control knob A** has no function (**do not turn all the way to the right**)

**Control knob B** has no function (**do not turn all the way to the right**)

**Control knob C** is used to set the required flow temperature

### Climate controlled or outside temperature controlled flow temperature

The heating curve is set in accordance with the planning documents. In compliance with DIN 4701, the planning data is always based on a room temperature of 20°C at an outside temperature of -15°C.

**Control knob A** is used to set the calculated flow temperature (diagram 1 page 7)

**Control knob B** is used to set the required room temperature

**Control knob C** is used to set the maximum admissible flow temperature.

**ATTENTION: The set temperature must be higher than the temperature set at control knob A.**

### Boiler controlled flow temperature

The heating curve is set in accordance with the planning documentation. The data is always based on a room temperature of 20°C at a boiler flow temperature of 70°C.

**Control knob A** is used to set the calculated flow temperature (diagram 2 page 8)

**Control knob B** is used to set the required room temperature

**Control knob C** is used to set the maximum admissible flow temperature.

**ATTENTION: The set temperature must be higher than the temperature set at control knob A.**

### Special operating mode

**Pump test mode:** Control knob A must be turned all the way to the right, the pump is switched on, the valve is switched off.

**Valve test run:** Control knob C must be turned all the way to the right. Both the pump and the valve are switched on.

**Switching off pump:** Control knob C must be turned all the way to the left, the pump is switched off (summer mode: function anti-block logic for pump and valve is active).



**Settings of control knob A for outside temperature controlled operating mode**

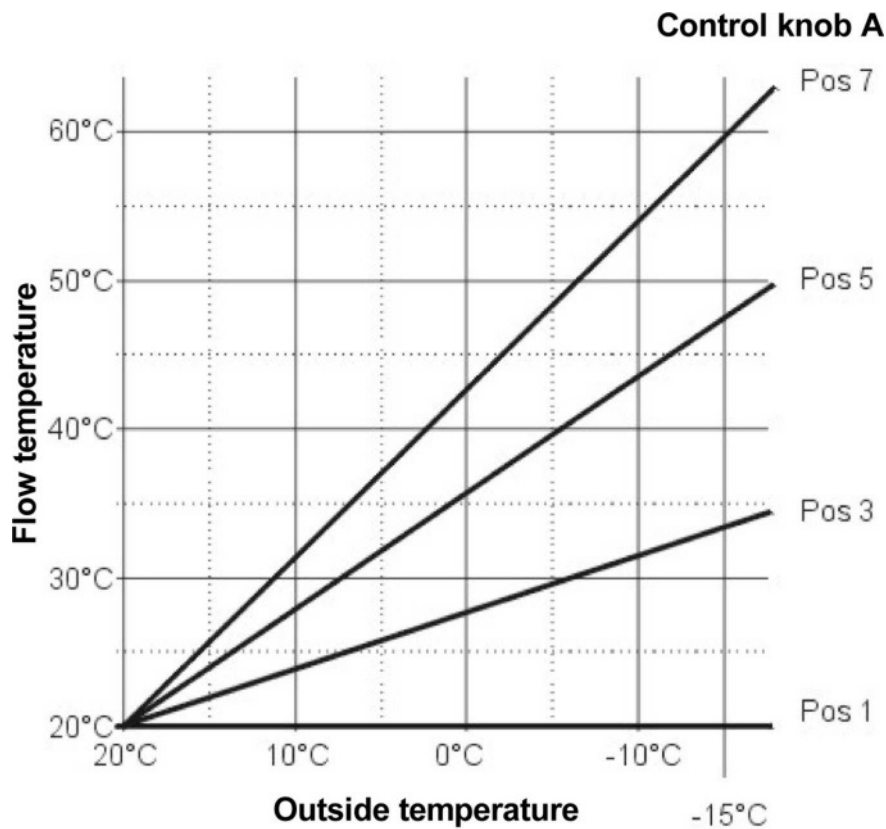


Fig. 6: Diagram 1 heating curve for operation controlled by outside temperature

The heating curve is set in accordance with the planning documentation. According to DIN 4701 the planning data is always based on a room temperature of 20°C at an outside temperature of -15°C.

**Control knob A in position 1**

Calculated flow temperature 20°C at an outside temperature of -15 °C and 20°C room temperature

**Control knob A in position 3**

Calculated flow temperature 33°C at an outside temperature of -15°C and 20 °C room temperature

**Control knob A in position 5**

Calculated flow temperature 48°C at an outside temperature of -15°C and 20 °C room temperature

**Control knob A in position 7**

Calculated flow temperature 60°C at an outside temperature of -15°C and 20 °C room temperature.

**Settings of control knob A for boiler temperature controlled operating mode**

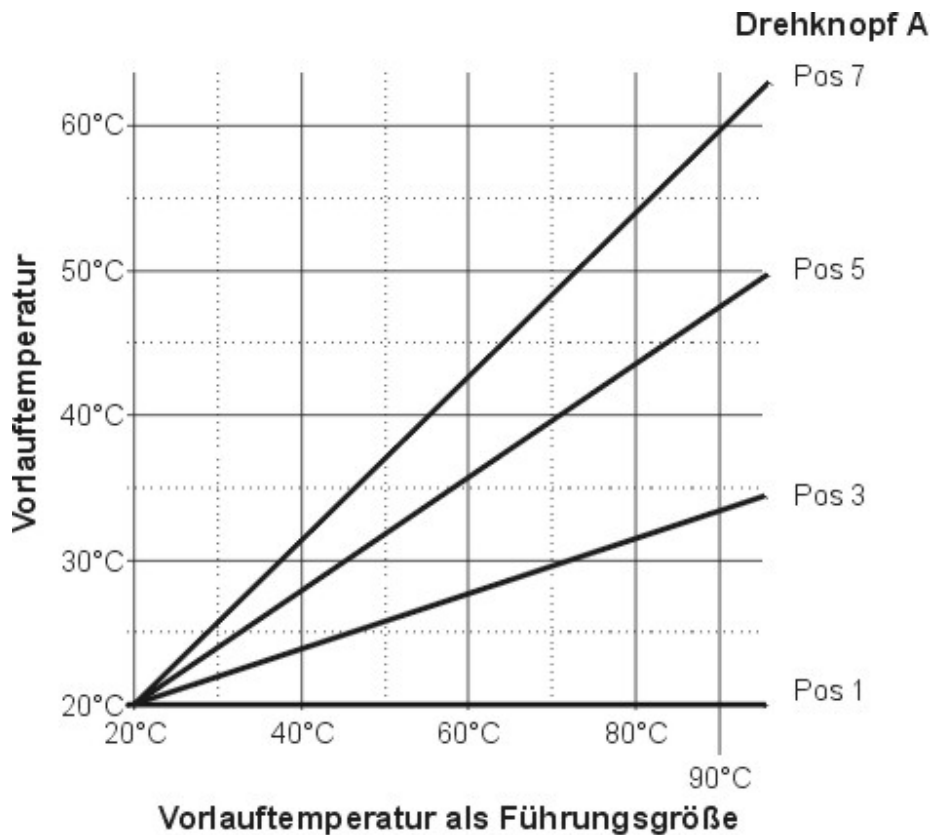


Fig. 7: Diagram 2 heating curve for operation controlled by boiler flow temperature

The heating curve is set in accordance with the planning documentation. The data is always based on a room temperature of 20°C at a boiler flow temperature of 70°C.

**Control knob A in position 1**

Calculated flow temperature 20°C at an boiler flow temperature of 70 °C and 20°C room temperature

**Control knob A in position 3**

Calculated flow temperature 29°C at a boiler flow temperature of 70°C and 20 °C room temperature

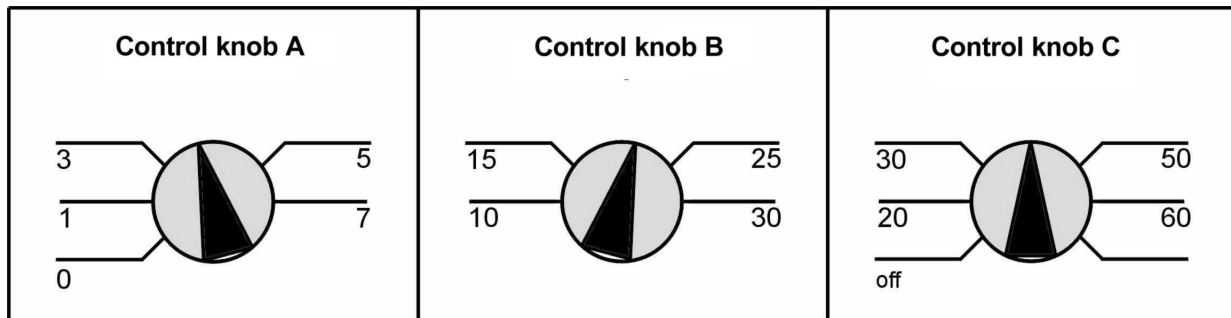
**Control knob A in position 5**

Calculated flow temperature 38°C at a boiler flow temperature of 70°C and 20 °C room temperature

**Control knob A in position 7**

Calculated flow temperature 47°C at a boiler flow temperature of 70°C and 20 °C room temperature.

**Function of control knobs**



Operating mode based on climate or outside temperature controlled		
<p>This control knob is used to set the heating circuit flow temperature which is to be realized by the control system according to the design of the heating system (DIN 4701)</p> <p><b>Together with control knob B is it used to calculate the heating curve</b></p> <p><b>Special function</b> Turn the control knob all the way to the right, pump starts up, valve remains closed</p>	<p>This control knob is used to specify which required set value temperature is to be realized.</p> <p><b>It is used to calculate the heating curve together with control knob A.</b></p> <p><b>Special function:</b> Turn the control knob all the way to the right, Outside temperature sensor/ supply sensor has no function</p>	<p>This control knob is used to set the maximum permissible flow temperature for the heating circuits.</p> <p><b>Attention: The set temperature must be higher than the temperature set using control knob A</b></p> <p><b>Special function:</b> Turn control knob all the way to the right. Pump is activated. Valve is opened. Turn the control knob all the way to the left. Pump is switched off</p>
Operating mode constant flow temperature		
<p>No function.</p> <p><b>Special function</b> Turn the control knob all the way to the right, pump starts up, valve remains closed</p>	<p>No function.</p> <p><b>Special function:</b> Turn the control knob all the way to the right, Outside temperature sensor/ supply sensor has no function</p>	<p>Use this control knob to set the permissible flow temperature for the heating circuits.</p> <p><b>Special function:</b> Turn the control knob all the way to the right. Pump starts up, valve is opened. Turn the control knob all the way to the left. Pump is switched off.</p>
<p><b>Attention: Never turn all three knobs at the same time in the operating state to the right, otherwise an unwanted internal test function will be activated, which can lead to controller errors.</b></p>		

**Attention safety information:**  
**(Please fix this sheet in a clearly visible place on the station)**

Before starting up the TwinCo 3000 distributor station, the system must be filled with water and completely de-aired to protect the pump.

**Attention: Risk of electrical voltage on electrical components!**

If the connection is faulty, there is a risk of personal injury or material damage, i.a. Fire. There is a risk of electric shock with health or death. Therefore, the installation of the Tempus control unit may only be carried out by qualified electricians.

**Started up by:**

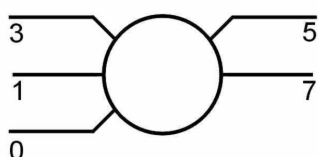
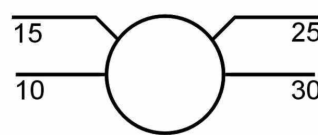
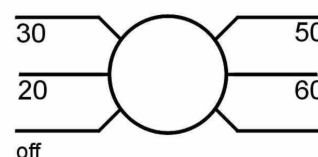
Company: \_\_\_\_\_

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Please enter the position of the control knobs here when starting up the system.**

Control knob A	Control knob B	Control knob C
		

**Calibration for sensor BEC-UNISENS1**

**Outside temperature sensor, flow temperature sensor, boiler flow sensor for the SBK TwinCo 3000 distribution station**

Technical data

Typ BEC-UNISENS 1  
 IP 65  
 Temperature range: -20 °C up to 100 °C

Mounting location outside temperature sensor

The sensor should be mounted directly on the house wall in northern direction (northern hemisphere). The mounting location should be a wind and sun protected area.

Calibration for sensor BEC-UNISENS1

Temp °C	kΩ	Ω
-20	229,31	229310,00
- 15	169,02	169020,00
-10	125,85	12850,00
- 5	94,15	94153,00
0	71,12	71126,00
5	54,23	54237,00
10	41,71	41719,00
15	32,40	32409,00
20	25,36	25367,00
25	20,00	20000,00 <i>i</i>
30	15,88	15884,00
35	12,65	12654,00

Temp °C	kΩ	Ω
40	10,14	10148,00
45	8,20	8205,30
50	6,67	6672,60
55	5,44	5448,60
60	4,47	4473,90
65	3,69	3691,80
70	3,06	3060,90
75	2,55	2551,00
80	2,13	2135,50
85	1,79	1798,60
90	1,52	1521,40
95	1,29	1290,50
100	1,09	1098,80

**Appendix SBK TwinCo 3000 individual parts**

Pos.	Name	Quant.
1	SBK throttle valve	1
2	Adjust spindle	1
3	Seperating plate with return valve	1
4	Mains plug 230 V~	1
5	SBK HKV 2000 flow segment	1
6	Connectng arm for pump	2
7	Electronic control	1
8	Immersion sleeve with flow temperatur sensor and safety temperature limiter	1
9	Flat packing	2
10	Union nut	2
11	Pump	1
12	SBK HKV 3000 return flow segment DFM 177	1
13	Locking cap 3/4"	2
14	SBK controle valve	1
15	SBK actuator 230V~	1
16	Bypasspipe 16x2 MSV-pipe With connections	1
17	Filling and drain valve	1

