

2-Stage, 3-Phase Controller **1.96**

with integral room temperature controller
Typ 30177



Operating manual

Please retain this manual carefully for future use!
Read prior to commissioning!

1.96 2-Stage, 3-Phase Controller

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Assembly and installation

Explanation of the symbols:



Caution! Danger!

The non-observance of this instruction can lead to severe damage to people or property.



Danger of electrocution!

The non-observance of this instruction can lead to severe damage to people or property through electrocution.

Read these instructions carefully prior to starting any assembly and installation work!

All tradespersons involved in the installation, commissioning and operation of this equipment are duty-bound to pass this manual onto any tradespersons currently or subsequently working on this equipment, including the end user. Retain this manual until final decommissioning of the equipment!

Amendments to the content or style of this manual can be made without prior notice!

1. Correct and Proper Use	3
2. Safety Advice	4
3. Assembly and installation	5
3.1 Laying the Cables	6
3.2 Protection	6
3.3 Electrical Connection	7
4. Operation	9
5. Commissioning	12
6. Technical Data	14



Carefully read this manual in full prior to installing the 2-stage, 3-phase controller!

1. Correct and Proper Use

Kampmann 2-Stage, 3-Phase Controller Type 30177 has been built according to the latest state of the art and the recognised safety regulations. Nonetheless, its use may be hazardous to persons, or may have an adverse effect on the device or other material, if the units are not installed and put to operation in an expert manner or if they are employed for undesignated use.

Kampmann 2-Stage, 3-Phase Controller Type 30177 is to be used exclusively for indoor areas (e. g., industrial halls and warehouses, sales areas, exhibitions, etc.). The unit shall not be used in wet areas, in potentially explosive areas, in rooms with aggressive atmospheres or in the open. The products must be protected against moisture during installation. If in doubt, their use must firstly be agreed with the manufacturer. Any other or exceeding use is deemed as being undesignated. The unit operator is liable for any resulting damage.

Correct and proper use is also deemed to include compliance with the information on assembly and installation described in this manual. The assembly and installation of this product requires specialist knowledge of heating, cooling, ventilation and electrical engineering. This knowledge, generally learned in vocational training, is not described separately. Any damage caused by inexpert installation must be borne by the operator.

The following Kampmann air handling units can be combined with stage switch type 30177:

Kompakt series TOP, Ultra, TIP, Resistent
(type ending in the number 36 or 38)

These instructions cover the following areas:

Installation
Electrical installation
Commissioning and operation

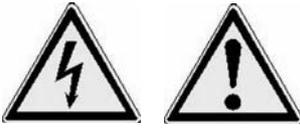
Regulations

Accident Prevention Regulations VBG, VBG4, VBG9a
DIN VDE 0100, DIN VDE 0105
EN 60730-1 (part 1)
Regulations (TABs) of the local electricity boards
as well as the generally recognised rules of technology.

1.96 2-Stage, 3-Phase Controller

with integral room temperature controller, Type 30177

Assembly and installation



2. Safety Advice

This 2-stage, 3-phase controller has been developed and produced in accordance with the state of the art and current statutory standards and guidelines. Observe the contents of these instructions to ensure that the unit is installed and works properly.

The installation of this product requires special skills in the fields of heating, cooling, ventilation and in electrical engineering. These skills are usually taught during vocational training in the indicated professions and are not described separately here. Any damage caused by inexperienced installation must be borne by the operator.

On account of his professional education, the fitter of this device should, among other things, also have sufficient knowledge of:

- the safety and accident prevention regulations
- the guidelines and the recognised rules of technology, such as VDE directives
- DIN and EN standards

How to work in a safety-conscious manner



- Disconnect all equipment you need to work on from the power supply.
- Make sure that this equipment cannot be turned on again by unauthorised persons! Wait until the fan comes to a standstill!
- For installation, only use stable lifting platforms and scaffolding!

Modifications on the device

Do not carry out any modifications, reconstructions or installation work on the device without prior harmonisation with the manufacturer as this may impair the safety and operation. Opening the unit cancels the guarantee!

Incorrectly connected products may become damaged! The manufacturer will not be liable for injuries and material damage caused when the device has been wrongly connected and/or incorrectly used!



Caution! Due to the fact that the unit is switched on again automatically after a power failure, the speed selector switch should be in the 0 position once the power is resumed!

3. Assembly and installation

Controller installation

- Disconnect all parts of the system that are worked on and prevent from unauthorised reconnection!
- Take into consideration the enclosure class of the controller (cf. Technical data) when selecting the position of the unit!
- The (wall-mounted) unit must only be installed on a flat surface..
- To fit the cover, remove the screws highlighted in Fig. 1 and loosen them. Then remove the cover for the terminal box. The distances between the boreholes are indicated on the reverse of the housing.
- Screw the unit to the wall and replace the terminal box cover. Replace the screw cover.



Fig. 1: Opening the unit

Installing the room temperature sensor

The room temperature sensor records the temperature at the place of installation. For this reason, select the place of installation so that the temperature measurement process is not hindered:

Position at a height of 1.5 - 2 metres above the floor. Do not position the units on

- Poorly insulated external walls,
- Directly adjacent to doors and windows (draught),
- Behind curtains, blinds or fixtures,
- In areas in direct sunlight,
- In the air stream of heaters,
- Over or beside external heat sources, like heaters, TVs, lamps etc.

Note the permitted length of the sensor cable! (cf. page 6: Cabling)



Fig. 2: Assembling the room temperature sensor

1.96 2-Stage, 3-Phase Controller

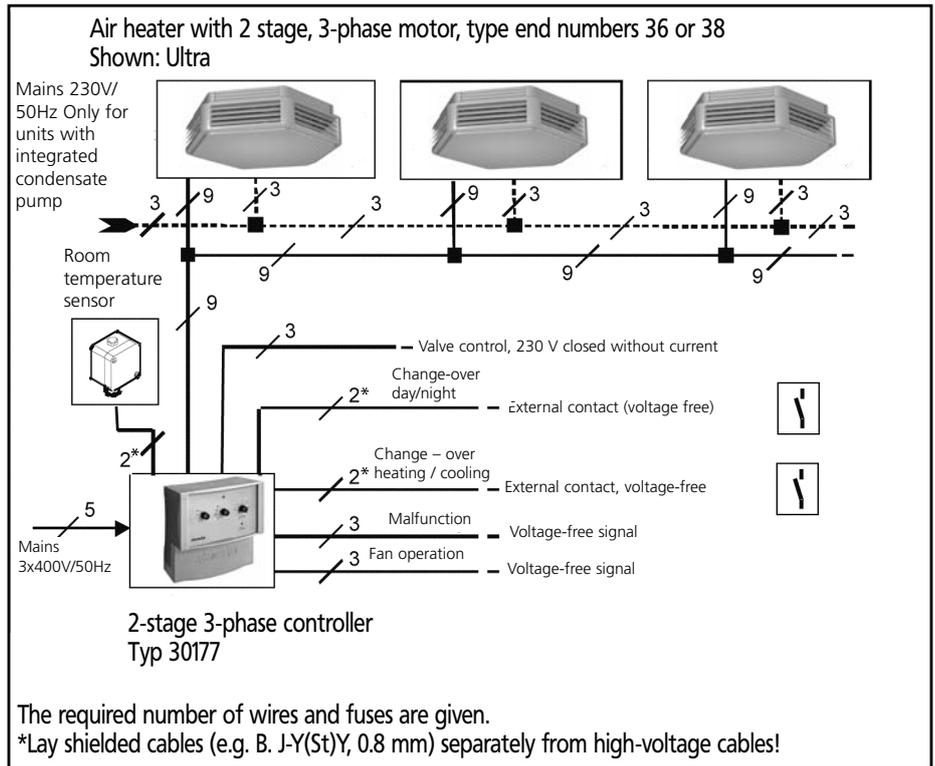
with integral room temperature controller, Type 30177

Assembly and installation

3.1 Laying the Cables

General notes

- Lay all low voltage cables along the shortest route (room temperature sensor, digital inputs).
- It must be guaranteed that the extra low-voltage cables and the high-voltage cables are physically separated, e.g., using metallic divider plates on cable ducts.



Maximum permissible cable lengths	
Mains	Depending on the load and cable cross-section
Air heaters (total!)	max. 250 m
Room temperature sensors	max. 100 m
External change-over contacts	max. 200 m

3.2 Protection

Provide a fuse for the system on site. The protective organs upstream must be adapted to suit the maximum possible current provided by the controller (refer to the technical data).

The inside of the controller is equipped with 2 miniature fuses (ø 5*20 mm) in the connection area.

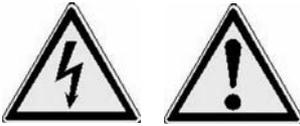
F1 (on the left): primary 230V/500mA delay fuse for electronic components.

F2 (on the right): secondary 315mA delay fuse for electronic components.

2-Stage, 3-Phase Controller **1.96**

with integral room temperature controller, Type 30177

Assembly and installation



3.3 Electrical Connection

Safety Advice

The electrical installation of this product requires special skills in electrical engineering. These skills are usually taught during vocational training in the indicated professions and are not described separately here. The following safety advice has to be checked and observed before any work may be carried out on the controller and the devices:



- Disconnect the system and prevent it from unauthorised reconnection.
- Wire the unit in accordance with the enclosed wiring diagrams.
- Only wire the unit in accordance with currently applicable VDE and EN guidelines, as well as Technical Wiring Regulations stipulated by the regional energy supply companies.
- Only connect the unit to fixed cables.

Caution! Incorrectly connected products may become damaged! The manufacturer will not be held liable for injuries and material damage caused if the device has been wrongly connected and/or incorrectly used!



Fig. 3: Opening the unit

Wiring

- Remove the terminal covers (Fig. 3; refer also to top of page 5)
- Wire all cables in accordance with the wiring diagram enclosed.

Parallel operation of several units

Several unit heaters can be operated in parallel to a 2-stage controller type 30177 by noting the following information: Fig. 3: Opening the unit:

- Parallel operation is only possible with units which have the same motor circuit diagrams (types ending in the number 36/38). Their electrical power consumptions may differ.
- The total cable length of 250 m to the air heaters must not be exceeded.
- The maximum current carrying capacity of the controller must not be exceeded (see the technical data).
- Connect all motor windings in parallel (cf. wiring diagram).
- Connect all thermal contacts of all motors in series (cf. wiring diagram).

1.96 2-Stage, 3-Phase Controller

with integral room temperature controller, Type 30177

Assembly and installation

Digital inputs and outputs

Digital inputs		
Change-over day/night	Night	Input DE1-GND closed
	Day	Input DE1-GND open
Change-over heating/cooling	Heating	Input DE2-GND open
	Cooling	Input DE2-GND closed
Digital outputs		
Notification of ventilator operation	Operation	Output closed
	No operation	Output open
Malfunction warning*	Malfunction	Output closed
	No malfunction	Output open

*The voltage-free relay contact "malfunction" is activated in the following situations:

- Motor thermal contact triggered
- Condensate alarm (only for units with integral condensate pump)
- Broken sensor cable
- Sensor cable short circuit
- Reverse polarity of sensor cable
- Measured temperature $< 5^{\circ}\text{C}$

2-Stage, 3-Phase Controller 1.96

with integral room temperature controller, Type 30177

Assembly and installation

4. Operation

- ① Signal lamp
- ② Speed selector switch
- ③ Operating mode selector switch
- ④ Temperature adjustment, day
- ⑤ Set-back temperature setting, night mode



① Signal Lamp

The pilot lamp displays the current operating status of the equipment:

Off	No supply voltage
Continuously ON	Power supply provided, ready for operation
Blinking signal, 0,8 sec. LED On 0,8 sec. LED Off	Control active, heating mode
Blinking signal,, 2 sec. LED On 2 sec. LED Off	Control active, cooling mode
Blinking signal,, 0,2 sec. LED On 0,2 sec. LED Off	Motor thermal contact triggered (TC fault or condensate overflow)
Blinking signal,, 0,05 sec. LED On 0,5 sec. LED Off	Sensor fault

The TC and sensor fault occur simultaneously, the sensor fault is displayed.

Functions in **Auto-day-heating mode**:

1. In case of reverse polarity or short-circuit of the sensor cable, stages will turn of.
2. If the sensor cable breaks or there is frost, stage 2 is turned on.

1.96 2-Stage, 3-Phase Controller

with integral room temperature controller, Type 30177

Assembly and installation

② Speed selector switch

The indicator light shows the unit's current operating mode:

0	System turned off
1	Operation only in stage 1
2	Operation only in stage 2
auto	Automatic speed change-over dependent on the difference between room temperature set value and actual value.

③ Operating mode selector switch

Day	Room temperature regulated to the day temperature which has been set
Night	Room temperature regulated to the lower temperature which has been set
Timer	Automatic change-over between day and set-back temperature by external timer
Man	*Continuous fan operation at the set speed level

*If the speed selector switch is in the "Auto" position, the "Day" mode of operation is active.

④ Temperature setting, day mode

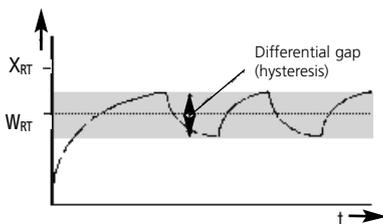
For setting the required room temperature during the "day mode" phase.

⑤ Set-back temperature setting, night-mode

For setting the required set-back temperature during the night mode phase.



Fig. 4: Setting the differential gap



5: Switching differential of room temperature controller

Releasing the motor malfunction (thermal contact triggered)

A malfunction can be released via the zero reference position of the speed selector switch. If the malfunction has not been eliminated, the malfunction signal will reappear (cf. page 9).

Differential gap of the room temperature controller

If necessary, the differential gap (hysteresis) of the temperature controller can be changed:

Hysteresis	Switching frequency	Control deviation
Small	High	Low
Large	Low	Large

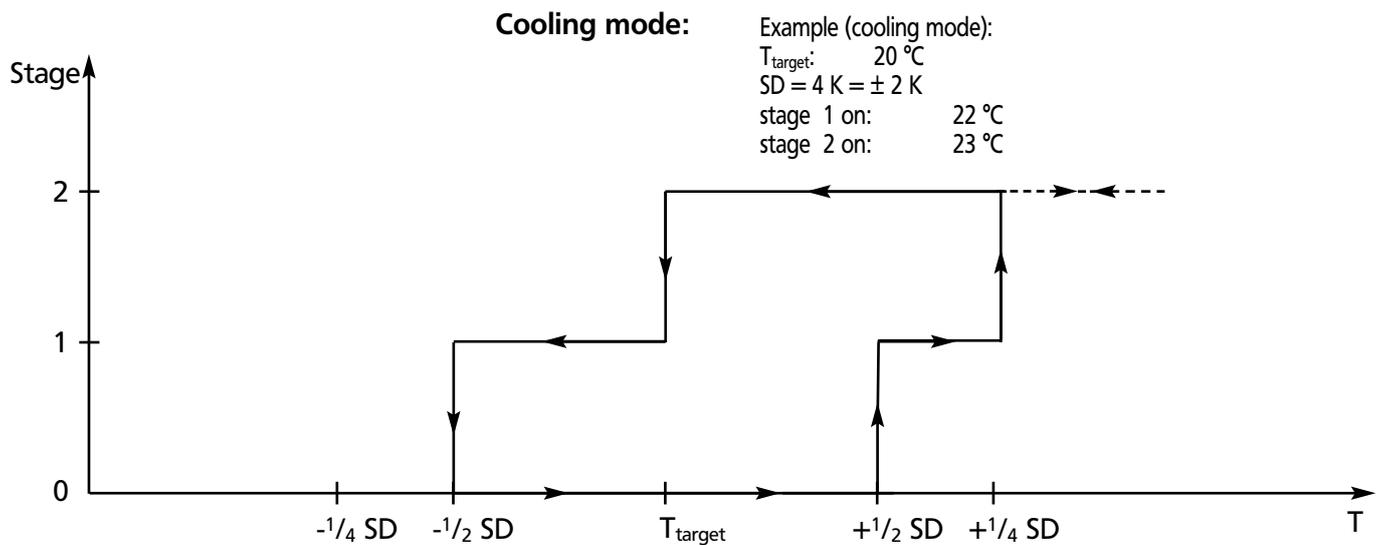
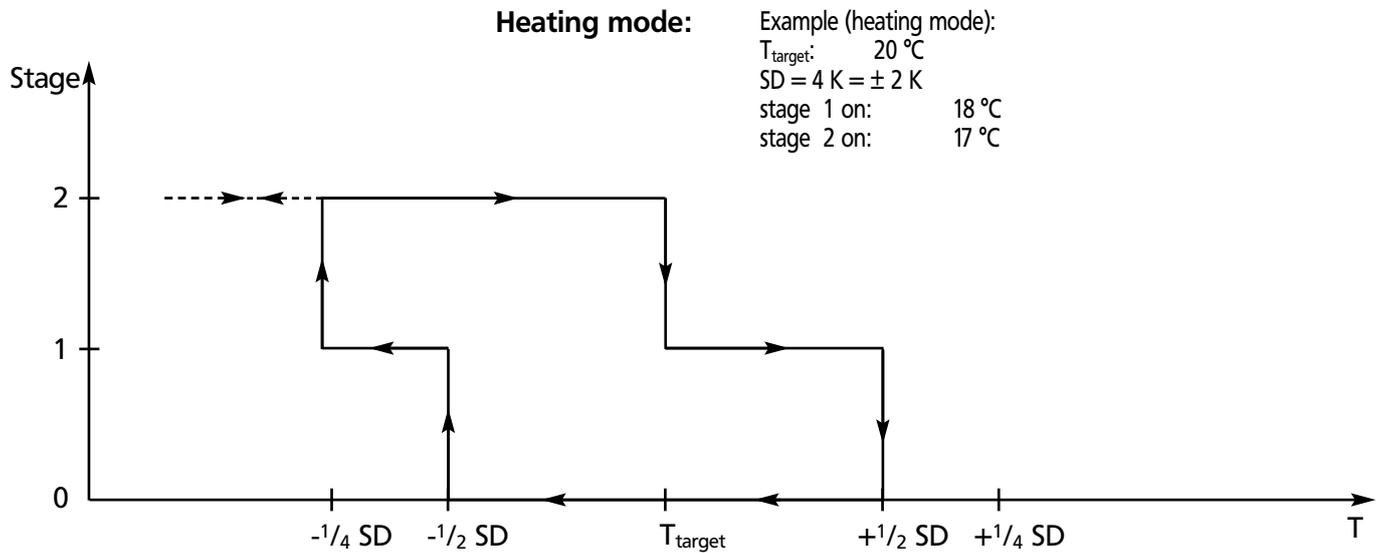
We recommend a setting of approx. +/- 1 Kelvin.

2-Stage, 3-Phase Controller 1.96

with integral room temperature controller, Type 30177

Assembly and installation

Switching differential between the stages



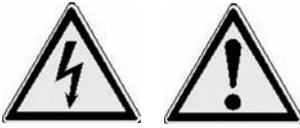
SD = Switching differential of temperature control, adjustable 0.5 to 5 K

If the actual room temperature value remains virtually unchanged when operating in stage 1 for approx. 10 minutes, the unit switches to stage 2 independently of the switching difference between the stages, in order to be able to reach the room temperature target value.

1.96 2-Stage, 3-Phase Controller

with integral room temperature controller, Type 30177

Assembly and installation



5. Commissioning

You have to work on live parts of the system during testing. Testing should only be performed by technicians at the same time as complying with safety precautions.

Caution!

As the unit automatically switches on again after power failure, before switching on mains voltage, switch the speed selector switch to 0.

The following examinations must be performed prior to commissioning:

- Have all of the equipment components been connected properly in accordance with the valid connection diagrams?
- Has the protective earth (PE) been connected properly for all equipment components?
- Have all of the thermal contacts for the fan motors been connected properly? (All of the thermal contacts for a fan group been switched in series).

If a malfunction occurs and it cannot be eliminated, the input voltage, the fan motor and the thermal contacts must be checked!

- Has the supply voltage (400V) been provided between terminals L1, L2 and L3?
- Is the room temperature sensor connected correctly? If the operating mode selector switch is not in the "Manual" position, then the room sensor cable is interrupted or reverse poled meaning that the equipment is not working. If the sensor cable short circuits, the equipment is in continuous mode. Fan stages cannot be selected in Automatic mode if the wires are crossed. The room temperature sensor is calibrated by the manufacturer. An offset value can be set if required. The potentiometer needed for this (sensor offset) is located under the front cover underneath the LED.

Caution! The equipment may only be started up once all of the line components have been installed properly and all connections have been checked for correctness.

Commissioning

- Switch on the supply voltage.
- Turn the operating mode selector switch to "Manual".
- Switch the speed selector switch to stages 1 and 2 and check the operation.

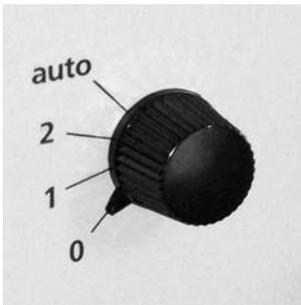


Fig. 6: Speed selector switch

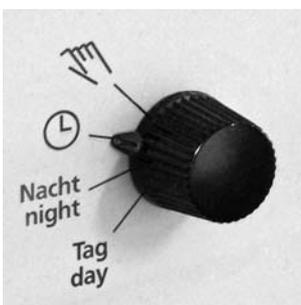


Fig. 7: Operating mode selector switch

2-Stage, 3-Phase Controller **1.96**

with integral room temperature controller, Type 30177

Assembly and installation

Inspection while the equipment is running

- Check that the thermal contacts of the connected motors are working correctly by disconnecting one of the wires on terminals TK/TK in the controller. Carry out this check on each unit in turn.
 - After disconnecting one of the wires in turn on terminals TK/TK, disconnect all the motors in the relevant unit heater group.
 - Indicator light flashes quickly (0.2 secs LED ON - 0.2 secs. LED OFF)

 - It is now not possible to unlock via stage 0 when disconnected.

- Reconnect the wire to the TC terminal.
 - Although connected, the motors will not yet start up and the signal lamp will continue blinking.

- Release the thermal contacts via the zero reference point of the speed selector switch.
 - The fans must restart when requested.

- Power is automatically reconnected following a power failure in all fan speeds when the supply voltage is interrupted for a short period of time.

- Check both operating and control functions in accordance with the instructions (Operation chapter on page 9f).

- Check the direction of rotation of the fan.

1.96 2-Stage, 3-Phase Controller

with integral room temperature controller, Type 30177

Assembly and installation

6. Technical Data

Rated voltage	V	3 x 400
Max. motor switching capacity	kW	4
Max. motor rated current	A	10
Max. rated current valve output 230V	A	4
Min. performance factor $\cos \varphi$ for afore-mentioned values	-	0,6
Permissible ambient temperature	°C	0-40
Temperature set-point value, setting range	°C	5-35
Set-back temperature value, setting range (heating) Temperature raising value, setting range (cooling)	K	2-10
Switching difference, temperature control	K	0,5-5
Protection type	-	IP 40
Dimensions W x H x D	mm	262 x 277 x 153
Maximum switching load of potential-free contacts	V/A	230/2,5
Room temperature sensor		
Protection type	-	IP 54
Dimensions W x H x D	mm	50 x 50 x 35

2-Stage, 3-Phase Controller **1.96**

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Notes



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