

2-Stage, Three-Phase Controller 1.96

With Timing Switch and Room Temperature Controller
Type 30277



Operating instructions

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

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Symbols:



Important!
Danger!

Non-observance of this information may cause serious damage to persons or property.



Danger of electrocution!

Non-observance of this information may cause serious damage to persons or property by electric current.

Read this manual through carefully before commencement of installation!

All persons involved in the installation, commissioning and use of this product are duty bound to pass this manual onto subsequent tradespersons and then to the end user or operator. Retain this manual until the system is ultimately decommissioned!

Amendments to the content of this manual may take place without prior notice being given!

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Carefully read through the instructions prior to installing the 2-stage three-phase controller:

1. Correct and proper use

Kampmann 2-stage controller Type 30277 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 controller Type 30277 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.

The designated use also includes the adherence to the notes on installation rendered in these instructions. The installation of this product requires special skills in the fields of heating, cooling, ventilation and electrical engineering. These skills are usually taught during vocational training in the indicated professions and are not described separately here. Any damage caused by inexpert installation must be borne by the operator.

The following Kampmann air treatment units can be combined with stage switch type 30277:

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

These instructions cover the following areas:

Installation

Electrical installation

Start-up and operation

Regulations

Accident Prevention Regulations VBG, VBG4, VBG9a

DIN VDE 0100, DIN VDE 0105

EN 60730-1 (part 1)

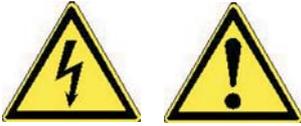
Regulations (TABs) of the local electricity boards

As well as the generally recognised rules of technology.

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2. Safety advice

This 2-stage three-phase controller has been developed and produced with state-of-the-art technology and in accordance with the current legal standards and regulations. 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. Any alterations made to the equipment could lead to loss of warranty! Warranty void if unit is opened.

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!



Important! 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



Fig. 1: Opening the unit

- De-energise all parts of the system that are to be worked on and ensure that they cannot be reconnected without authorisation!
- Consider the protection class of the controller before selecting where it should be mounted (See the technical data)!
- The (wall-mounted) unit must only be installed on a flat surface.
- Before installing it, remove the plate covering the screws shown in Fig. 1 and unscrew the screws. Remove the terminal block cover. The spacing between the drill holes is indicated on the back of the casing.
- Screw the device onto the wall and then replace the terminal block cover. Replace the screw covers.

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.

The unit should be mounted approx. 1.5 – 2 m off the floor. The units should not be mounted:

- on poorly-insulated exterior walls,
- right next to doors and windows (because of draughts),
- behind curtains or furnishings,
- in direct sunlight,
- in the current of air emitted by the heaters,
- above or near to other external sources of heat, such as radiators, TV sets, lamps, etc.

Please observe the permissible sensor cable length!
(See page 6: Installing the Cables)



Fig. 2: Installing the room temperature sensor

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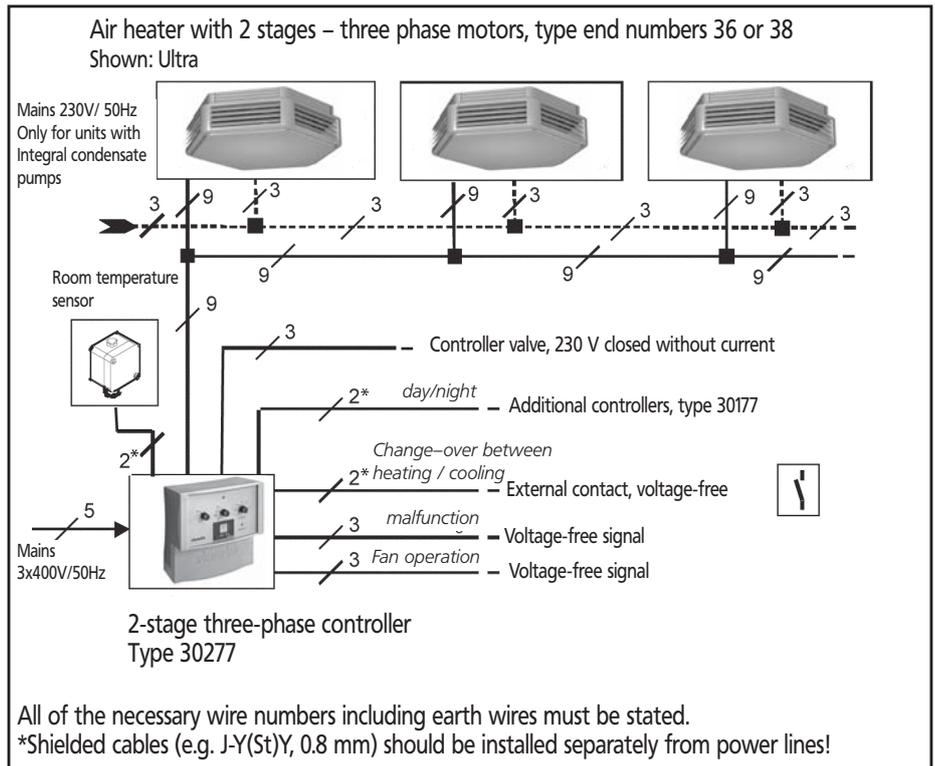
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3.1 Laying the Cables

General Information

- Install all low voltage lines (room temperature sensors, digital inputs) taking the shortest route.
- 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 (all!)	max. 250 m
Room temperature sensors	max. 100 m
External change-over contacts	max. 200 m

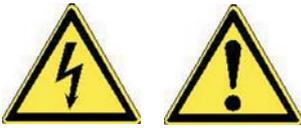
3.2 Protection

Fuses for the equipment should be provided by the customer. 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.



3.3 Electrical Connection

Safety Information

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 information has to be checked and observed before any work may be carried out on the controller and the devices:



- De-energise the equipment and ensure that no unauthorised restart can occur.
- Wire the unit in accordance with the enclosed wiring diagrams.
- Wire the unit in accordance with current German Association of Electricians (VDE) and EN guidelines as well as the connection requirements (TAB) of the regional power supply companies.
- The unit should only be wired using fixed cables.

Important! 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 (figure 3); see P.5 above too)
- Make all connections in accordance with the enclosed wiring diagram.

Parallel operation of several units

If the following information is observed several heating units can be operated in parallel with a single 2-stage controller type 30277:

- 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 (see wiring diagram).
- Connect all thermal contacts for all motors in series (see wiring diagram).

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Digital inputs and outputs

Digital inputs		
Change-over between heating/cooling	Heating	Input DE2-GND open
	Cooling	Input DE2-GND closed
Digital outputs		
Notification of day/night	Night	Output DE/A-GND closed
	Day	Output DE/A-GND open
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 $< 5^{\circ}\text{C}$

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4. Operation

- ① Pilot lamp
- ② Speed selector switch
- ③ Operating mode selector switch
- ④ Temperature adjustment, day
- ⑤ Adjustment of lowering value, night
- ⑥ Digital timing switch



① Pilot 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

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

Functions in Auto-day-heating mode

1. If the poles are reversed or the sensor cable short circuits, turn off the stages.
2. If the sensor cable breaks or there is frost, stage 2 is turned on.

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② Speed selector switch

The signal lamp indicates the current operating status of the equipment:

0	Equipment turned off
1	Operation only in stage 1
2	Operation only in stage 2
auto	Automatic speed change-over regardless of the room temperature set-point 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	The integrated timer switches over between the day temperature and the lower temperature
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 Night mode, temperature lowering setting

For setting the required temperature reduction during the night mode phase.

⑥ Timing switch

For setting the times at which the day/night mode is switched over. For a description of this, see timing switch operation (Chapter 4.1 ff)



Fig. 4: Setting the differential gap

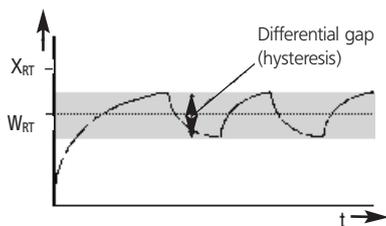


Fig. 5: Differential gap of the room temperature controller

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 (see 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

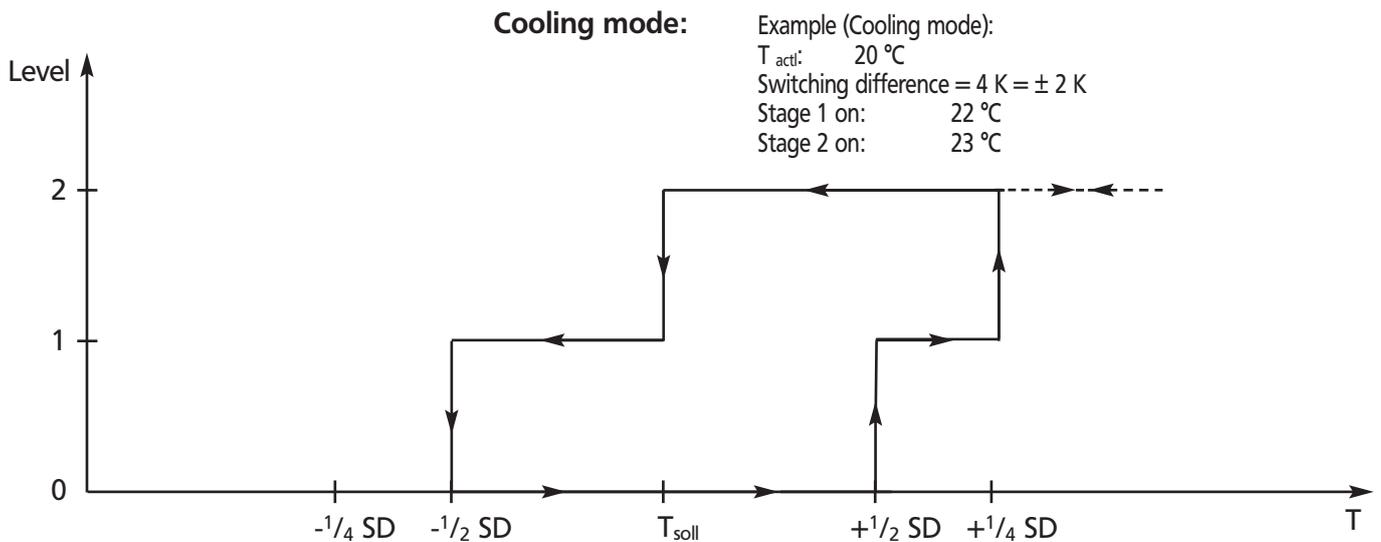
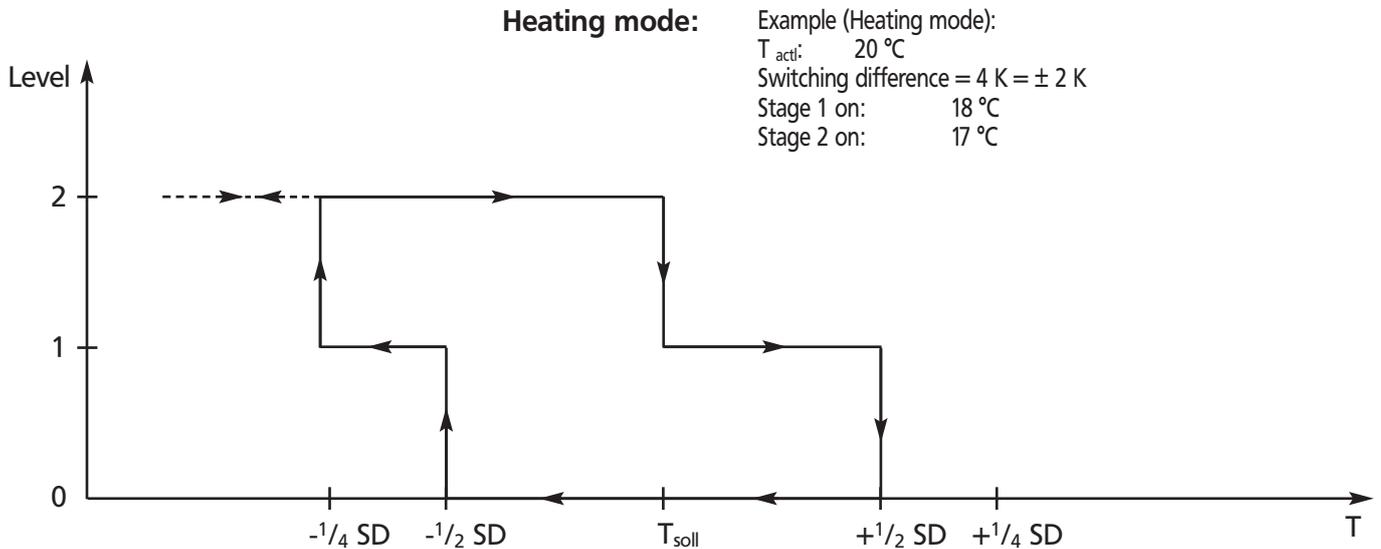
We recommend a setting of approx. +/- 1 Kelvin.

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Switching difference between the stages



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

If the actual room temperature remains more or less the same for approx. 10 minutes when running in stage 1, stage 2 will switch on, irrespective of the switching difference between the stages, in order to reach the target room temperature.

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4.1 Timing Switch Operation

Safety Information



Any defect on the timer must be repaired and tested by a qualified engineer or can also be repaired under the supervision and guidance of a qualified engineer.

Installation instructions:

The unit is suitable for use in ambient conditions with normal levels of pollution in the air.

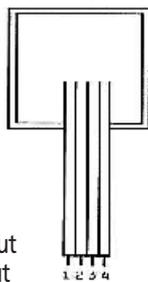
Operating instructions:

During the development of our products, we place very high demands on the electromagnetic compatibility (EMC) of the electronic components. The interference immunity achieved clearly exceeds the currently-valid requirements of the corresponding EN standards. Check in each individual case whether additional protection measures are needed, e.g., the integration of respective components (Varistor, suppressor diode, RC element).

In extreme cases, it is recommended that an additional assembly group be included, e.g., an isolating relay or switching contact, interference suppression filter.

User instructions:

Do not use metallic pointed or sharp objects (e.g. needles) to press buttons which are tool-operated.



- 1 = +3.4 V (red)
- 2 = 0 V
- 3 = Channel 1 output
- 4 = Channel 2 output
(Channel 2 is not used)

Fig. 6: Connection

4.2 Connection

see Fig. 6

4.3 Display / operating elements (Figure 7)

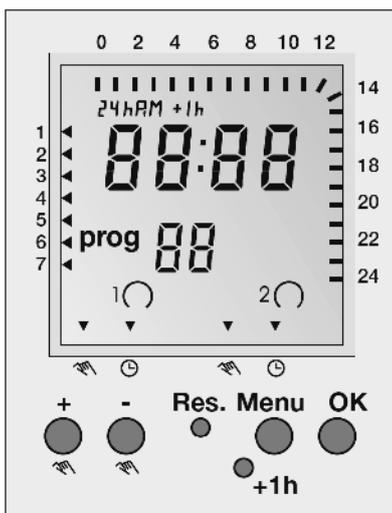


Fig. 7: User interface

■ Overview of daily switching program

- 24hRM** Setting of 24h or am/pm
- +1h** Summer/winter clock changes
- ◀ Weekday display
- ⊙ Switching status display ON/OFF
- ⚡ Manual operation / fixed ON / fixed OFF
- ⊙ Automatic operation

+/- Adjustment keys: By pressing the key longer than 2 sec. you can adjust the timer in steps of 5 units.

Res. Reset

Menu By pressing the menu key programming is terminated and the system reverts to automatic operation

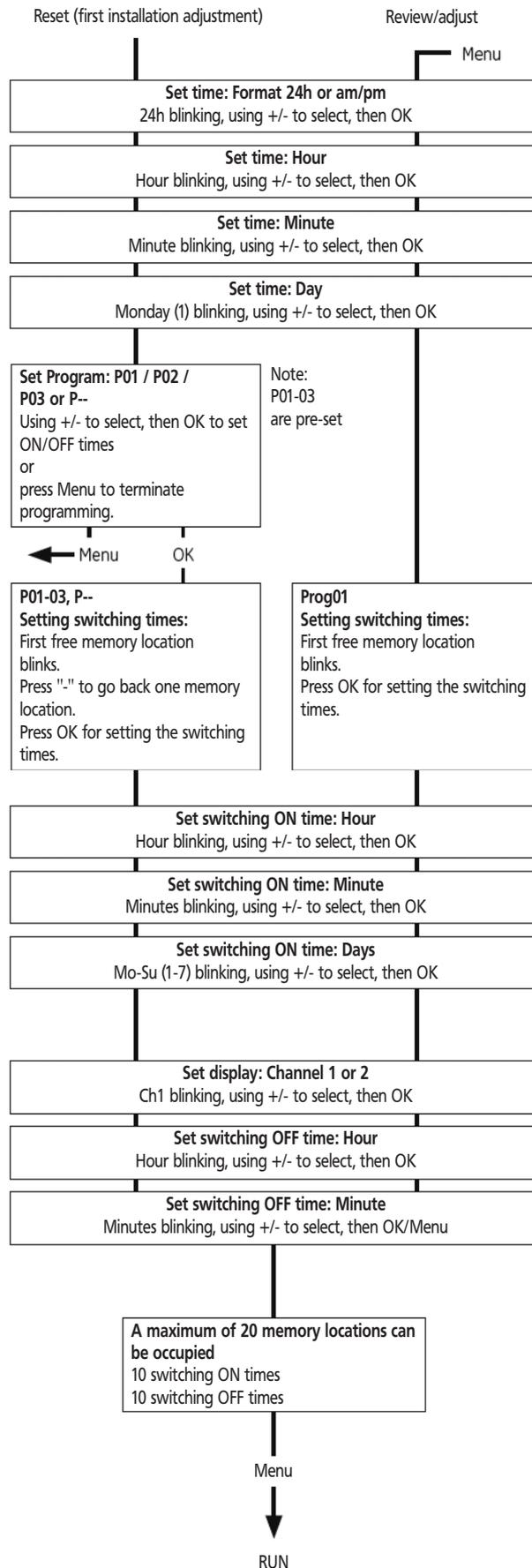
OK Confirmation of programming

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4.4 Program structure



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4.5 Setting the timer

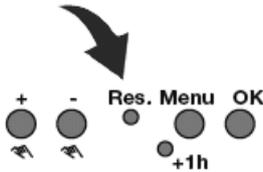
Setting of this programmable timer is depending of the user preference to use pre-set programs or defining own programming.

Using Pre-set programs (first time installation):

The following values can be set. Settings can be made using the reset button:

- 24h or am/pm
- Time (hour and minutes)
- Week day
- Pre-set programs P01 to P03

→ For Settings see Chapters 4.6 and 4.7

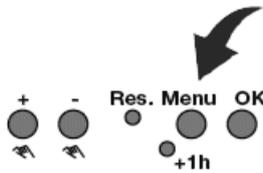


User defined programming by Menu mode:

The following values can be set. Settings can be made using the menu button:

- 24h or am/pm
- Time (hour and minutes)
- Week day
- Programs P--

→ For Settings see Chapters 4.6 and 4.8



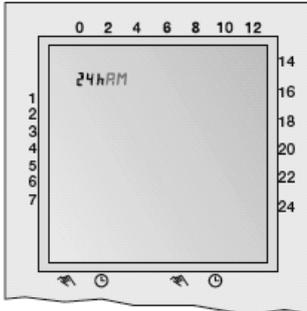
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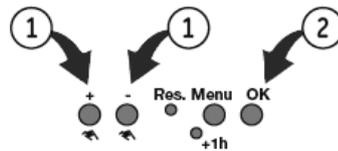
Operating instructions

4.6 Setting the time format, time and day of the week

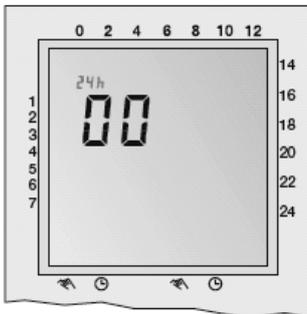
- Firstly select the type of programming i.e. Reset or Menu mode (see chapter 4.5 above), then continue as follows:



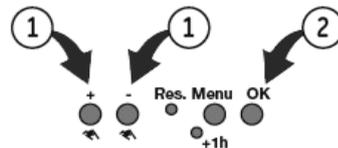
Set display format 24h or am/pm



- Select 24 hr or AM/PM (+/-) and confirm with OK.



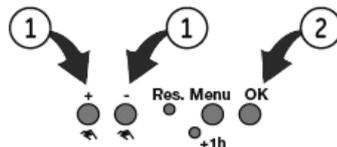
Set hour



- Select the hour (+/-) and confirm with OK.



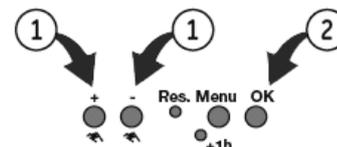
Set minutes



- Select the minutes (+/-) and confirm with OK.



Set week day



- Select the day (+/-) and confirm with OK.

1 = Monday 5 = Friday
2 = Tuesday 6 = Saturday
3 = Wednesday 7 = Sunday
4 = Thursday

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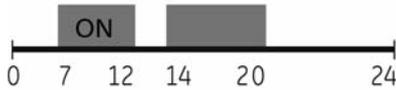
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P01: Mo - Su, 1 x ON/OFF



P01: Mo - Su, 2 x ON/OFF



P01: Mo - Su, 3 x ON/OFF



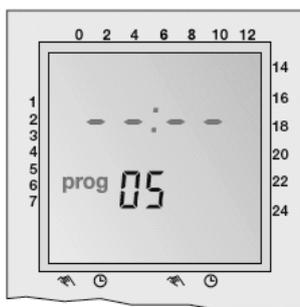
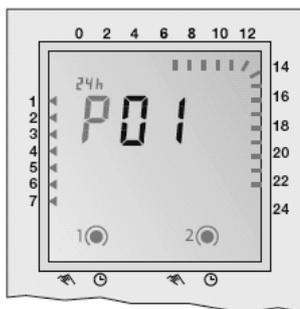
4.7 Pre-set programs

Programs P01-03

The switching on and off times for programs P01 to P03 are preset (pre). The user can change these programs.

Individual program, P--

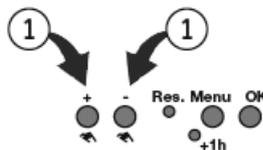
Under the menu option P-- you have the option of creating a user-defined program. This program can be changed at any time. There are up to 20 memory locations available for 10 OFF and 10 ON commands. You can allocate a corresponding weekday or week block to each memory location.



Selecting pre-set programs:

Sequence to follow after setting time in the Reset mode.:

- Select a pre-set program.



Once selected the program desired there are following options:

Menu: terminate programming

OK: Call up pre-set programs using OK either to change the selection (any program ON or OFF can be modified by using "+" or "-" keys and confirming with OK) or accept it using OK. This also allows you to move to the next available memory field to add new programs (see the following page).

after selecting P02 you should also program:

Sa-Su 22:30 ON (prog05)
23:00 OFF (prog06)

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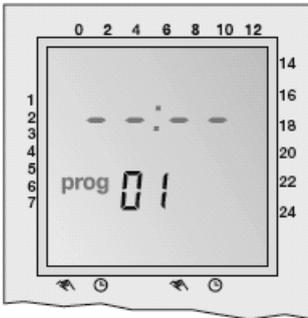
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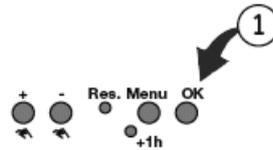
4.8 User defined programs



Sequence to follow after setting time and week day while running Menu mode or adding programs to the pre-set P01 to P03:



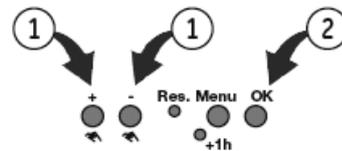
Select program ON



- Set the program and confirm with OK.



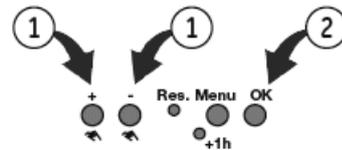
Set hour ON



- Select the hour (+/-) and confirm with OK.



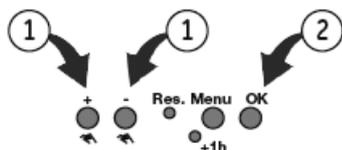
Set minutes ON



- Select the minutes (+/-) and confirm with OK.



Set week day ON



Possible week blocks and individual days

	↓	↓	↓	↓	↓	↓
1	◀	◀	◀	◀	◀	▶
2	◀	◀	◀	◀	◀	▶
3	◀	◀	◀	◀	◀	▶
4	◀	◀	◀	◀	◀	▶
5	◀	◀	◀	◀	◀	▶
6	◀	◀	◀	◀	◀	▶
7	◀	◀	◀	◀	◀	▶

- Select the day (+/-) and confirm with OK.

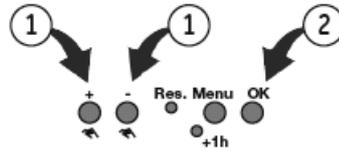
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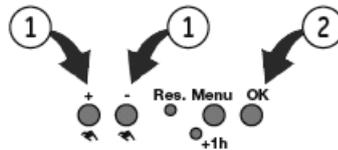
Set hour OFF



- Select the hour (+/-) and confirm with OK.



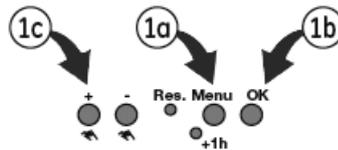
Set minutes OFF



- Select the minutes (+/-) and confirm with OK.



Set week day OFF



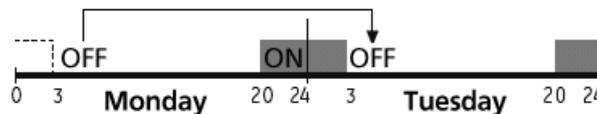
- Should the OFF command be the same day of ON command then select **Menu** to terminate programming or select OK to go to a new program ON setting.

Shift

- Should the OFF command be the following day of ON command then select "+" key then select **Menu** or **OK**.

Example:

Mo - Fr		Mo - Fr
20:00 p.m. - 03:00 a.m. ON	→	20:00 p.m. - 03:00 a.m. ON
03:00 a.m. - 20:00 p.m. OFF		Tu - Sa
		03:00 a.m. - 20:00 p.m. OFF



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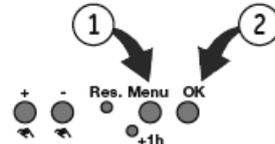
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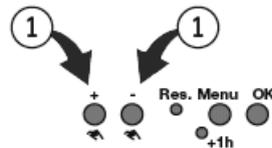
4.9 Deleting programs



- Select Menu, then select OK key until getting onto the ON time of the program you want to delete.

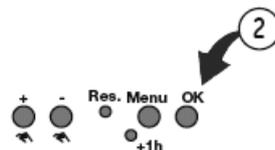
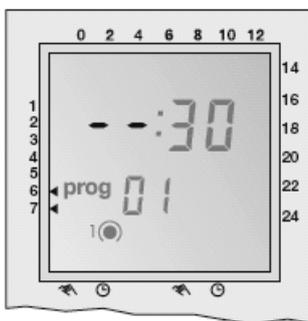


- Then select "--" (+/-) and confirm with OK.



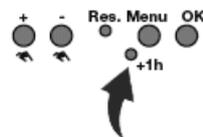
Note:

Switching programmes are deleted in ON-OFF pairs. If you delete a single ON instruction, the corresponding OFF instruction is also deleted.



4.10 Changeover from summer to winter time

- The +1h key is for the changeover from summer to winter time.



- Press the +1h button to switch the clock 1 hour forward.
- +1h is shown on the display.
- By pressing +1h again 1 hour is subtracted from the current time.



4.11 Automatic mode/continuous mode

- The "+" button allows you to switch between Automatic mode, , permanently ON  and permanently OFF (Ch1).



1.96 2-Stage, Three-Phase Controller

With Timing Switch and Room Temperature Controller, Type 30277

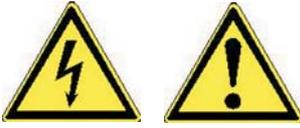
Operating instructions

4.12 Technical data on timer

Dimensions W×H×D	23,4 x 41,6 x 14,9 mm
Installation depth	12 mm
Weight approx	22 g
Rated voltage	3,4 - 6 V DC
Power consumption without load	0,015 mA at 3,4 V DC
Switching output -Transistor	CMOS
DC switching capacity -CMOS	0,1 mA at 3,4 V DC
Time reserve*	3 years from the factory at 20 °C
Time precision	typ. $\pm 2,5$ s/Day at 20 °C
Ambient temperature**	-10 °C to + 55 °C
Shortest switching time	1 min
Shortest switching distance	1 min
Number of channels	1
Memory capacity	20
Switching pre-selection (override)	Yes
Switching status display	Yes
Changeover from summer/winter time	Button ± 1 h
Connection type	4-pole flat cable
Approved in accordance with	EN 60730-1 EN 60730-2-7

* Battery not rechargeable

** - 25 °C with limited display function



5. Start-Up

During the examination, you must work on live equipment. The inspections must only be performed by professionals while observing the specified safety measures.

Caution!

Due to automatic restart after a power failure, the speed dial switch should be in the "0" position before reconnecting to the mains!

The following examinations must be performed prior to start-up:

- Have all of the equipment components been connected properly in accordance with the valid connection diagrams?
- Has the earth wire (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?
- Has the room sensor been connected properly? 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. No fan stage can be selected with voltage reversal in automatic mode. The room sensor has been calibrated by the manufacturer. However, if necessary, an offset value can be entered. The potentiometer (sensor offset) required for this can be found behind the front panel under the LED.

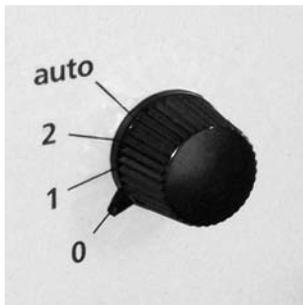


Fig. 8: Speed selector switch

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!

Start-up

- Switch the power supply on.
- Turn the mode selector switch to the "Manual" position.
- Switch stages 1 and 2 on with the speed selector switch and check that they are working.

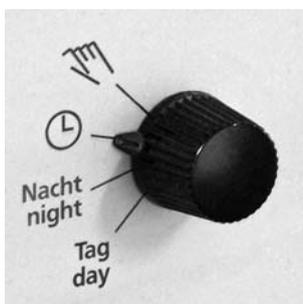


Fig. 9: Mode selector switch

1.96 2-Stage, Three-Phase Controller

With Timing Switch and Room Temperature Controller, Type 30277

Operating instructions

Inspection while the equipment is running

- Check the function of the thermal contacts on the connected motors by disconnecting the wires on terminals TK/TK on the controller. This check must be performed on each unit individually and in sequence.
 - After disconnecting any of the wires on terminals TK/TK, all motors for the corresponding unit heater groups should switch off.
 - The pilot lamp flashes "quickly" (0.2 seconds LED on – 0.2 seconds LED off)
 - When disconnected it cannot be unlocked via stage 0.
- Reconnect the wire to the TC terminal.
 - Although connected, the motors will not yet start up and the pilot lamp will continue blinking.
- Release the thermal contacts via the zero reference point of the speed selector switch.
 - The fans must restart when requested.
- Automatic restart after a power failure applies to all speed stages when a short interruption to the power supply has occurred.
- Check the other operating and control functions according to the instructions (Operating section P. 9 ff).
- Check the direction of rotation of the fan.

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

With Timing Switch and Room Temperature Controller, Type 30277

Operating instructions

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 $\cos \phi$ for afore-mentioned values	-	0,6
Permissible ambient temperature	°C	0-40
Temperature, set-point value, setting range	°C	5-35
Temperature lowering 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
Max. switching load of potential-free contacts	V/A	230/2,5
Room temperature sensors		
Protection type	-	IP 54
Dimensions W x H x D	mm	50 x 50 x 35



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