Assembly instructions
LK Wireless Room Control Cq (NC)

DESIGN

The LK Room Thermostat Cq (transmitter) regulates the temperature in a zone (e.g. a room) via radio signals to the receiver unit. Note: locate the receiver unit close to the heating circuit manifold.

The receiver unit converts radio signals to control signals to activate the actuators.

The receiver unit is available in three sizes:

- LK Cq 1 intended for 1 control zone.
- LK Cq 4 for a maximum of 4 control zones, (channel 1 - 4).
- LK Cq 6 for a maximum of 6 control zones, (channel 1 - 6).

The receiver unit functions along the same principles, but the Cq 1 unit, which only has one receiver channel, differs somewhat in its design. The instructions for this model therefore contain a few additions.

REQUIREMENTS

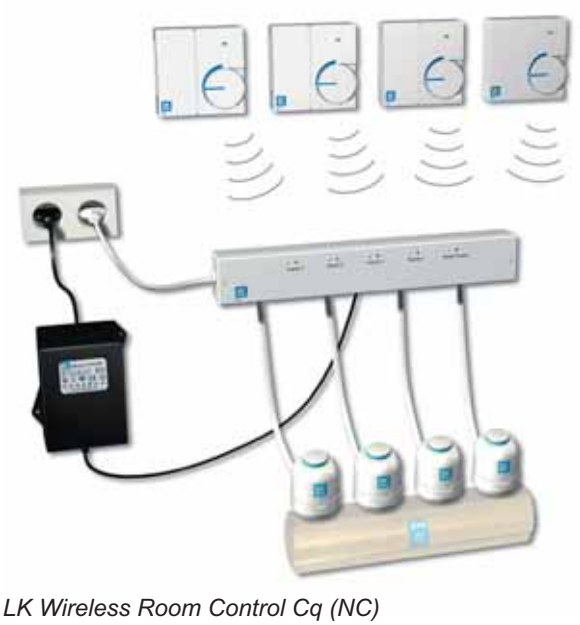
A suitably qualified electrician or installation engineer, must carry out electrical installation in accordance with the circuit diagram figs. 1 + 2. To achieve protection class 2, all necessary installation measures must be taken.

Installation and start-up (memorizing) is best carried out in the following order:

The receiver unit

The receiver unit should be located close to heating circuit manifold to avoid lengthening the actuator connection cables.

In certain circumstances, the transmitters (thermostat) signal may be too weak, e.g. if the receiver unit is assembled in a metal enclosure (e.g. LK Manifold Cabinet). In these cases, the LK Antenna Cq. Should is used. (See separate section, LK Antenna Cq.)



LK Wireless Room Control Cq (NC)

LK Actuator 24V AC

Connect the actuators, bearing in mind the following:

A control zone consists of 1 LK Room Thermostat (transmitter) but can contain one or more under floor heating loops equipped with actuators. All actuators in a control zone must be connected to a common channel on the receiver unit.

To aid assembly to the manifold, the actuators are supplied “open”. Once an actuator is powered (for a minimum of 6 minutes) an internal pin is released and the actuator will now operate.

LK Actuator.

Cq 4 and Cq 6 Control Unit

For the Cq 4 and Cq 6 Receiver Unit, a maximum of 4 actuators can be connected to each channel. The circuit diagram shows that all channels in Cq 4, and 2 channels in Cq 6, have double terminal boards, b or c respectively, for connecting the actuators. Cq 4 and Cq 6 receiver units can operate a maximum of 16 actuators.

When connecting two or more actuators to the same channel, the connections must be only to the double circuit boards.

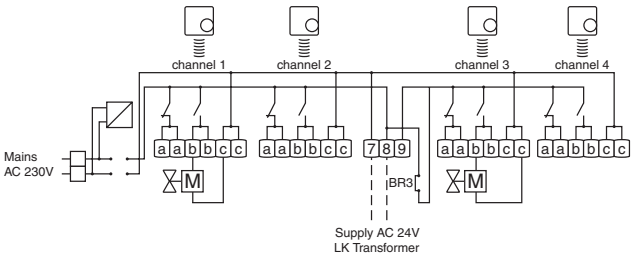


Fig. 1. Circuit diagram Cq 4, (M = actuator).

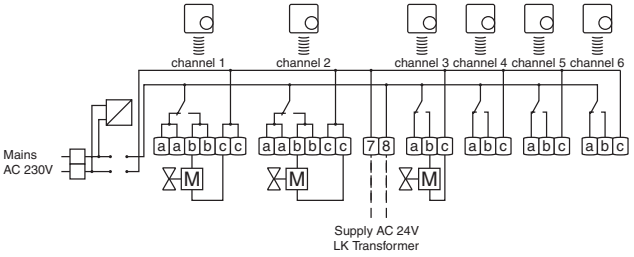


Fig. 2. Circuit diagram Cq 6, (M = actuator).

Cq 1 Receiver Unit

Cq 1 Receiver Unit differs from the other units as up to eight actuators can be connected.

Up to two actuators can be connected direct to Cq1. However, if necessary, it is possible to connect up to eight actuators to Cq1 by using an external wiring / junction box. In both cases the actuators are connected parrallel to each other and in line between terminal 9 and the LK Transformer.

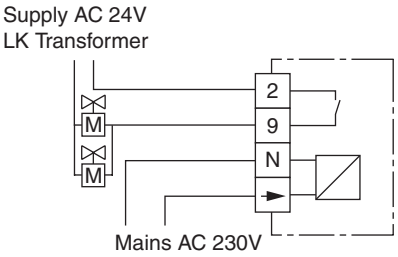


Fig. 3. Circuit diagram Cq 1, (M = Actuator).

LK Transformer 230/24 V AC

A transformer 60 VA for 24 V AC supply is connected in accordance with the circuit diagram for each receiver unit.

230 V mains voltage connection

- Connect the receiver unit and the transformer to the mains.
- Check the primary and secondary voltage.
- Reassemble the protection box on the receiver unit before Memorizing/Start-up.

MEMORIZING / ACTIVATION - START-UP

Reset

Always begin memorizing by first erasing all previous programming.

For Cq 4 and Cq 6 as follows:

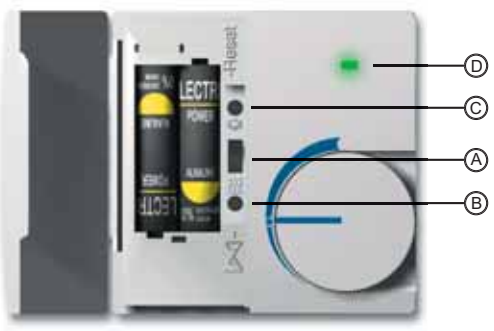
- Press the ”Reset” button and the button for ”Channel 1” at the same time.
- First release the ”Reset” button, followed by the ”Channel 1” button.

For Cq 1 as follows:

- Press the ”Reset” button and the button ⚠ at the same time.
- First release the ”Reset” button, followed by the button ⚠.
- Press ”Reset” again.

LK Room Thermostat Cq

Open the door on the room thermostat and remove the transport protection covering the batteries.



Check the mains switch (A) is in the lower position towards the heat symbol as shown in the picture. During memorizing, the thermostat will attempt to communicate with the activated channel on the receiver unit. Memorizing can take place before the thermostat is assembled in the intended place. The distance between the thermostat and the receiver should be at least 2 metres during memorizing.

NB: Mark the thermostat with the channel number that it will be sent to. (e.g. with tape on the inside of the door.)

Activating the receiver

For Cq 4 and Cq 6 as follows:

• To activate the memorizing phase on the receiver unit, press the button for the channel that is to be activated first. A weak sound signal is heard and the indicator light will come on.

For Cq 1 as follows:

• To activate the memorizing phase on the receiver unit, press the button ⚠. A weak sound signal is heard and the indicator light will come on.

Activating the room thermostat

- Press and hold the lower black button (B).
- Briefly press the upper black button (C).
- When the indicator light (D) is lit, release the lower button. Memorizing (the connection) between the thermostat and the channel selected now occur. Pay attention to the receiver. Once contact is established, the sound signal will cease and the indicator light will go out.
- Press the upper button on the room thermostat one more time to switch off the indicator light. (The indicator light on the thermostat in future use is only used to warn of low battery power.)

Function control

Place the room thermostat in the room where it is intended to be assembled according to the design. By turning the thermostat's adjustment dial, the indicator light on the receiver's channel will be lit or switched off respectively within approximately 30 seconds.

- Dial towards maximum temperature, the light on the receiver unit comes on.
- Dial towards minimum temperature, the light on the receiver unit goes off.

If the light switches off when it should come on, check that the mains switch's setting is in the lower position towards the heat symbol. See the section LK Room Thermostat Cq. If the setting was right and the problem continues, see the section "Heat/Cool".

NB: During set up (only) the indicator light on channel 4 or channel 6 comes on when one or more other channels trigger the heating. This function continues until all the channels are activated. For more information, see the section "Pump Control".

ADDITIONAL MEASURES

Assembling the room thermostat

Open the room thermostat by pulling the temperature scale dial right out and loosening the screw that becomes visible. Bend out the upper part to the left until it becomes loose. Position the room thermostat as per the design plan.

For the room thermostat to function properly, the following guidance should be followed:

- Mount it on an inner wall where it is ventilated but not in a draught. (NOTE FOR UK: in some home refurbishment projects where the building is poorly insulated, it may be prudent to place the thermostat on an outside, or coldest, wall. The thermostat will then compensate by calling for heat.)
- Do not expose it to direct sunlight or other heat sources.
- Mount it approximately 1.5 metres above the floor.
- Do not mount it near a radio, TV or other transmitter.
- Do not mount it near metal objects, such as metal doors, metal cupboards or similar.

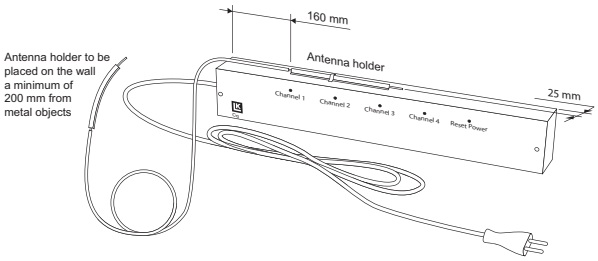
NB: after fixing to the wall, care must be taken to ensure buttons A, B & C are correctly located in the front cover; misalignment will cause malfunctions.

Completing activation / memorizing

Continue activation / memorizing in the same way as for the other channels, following the instructions for the LK Room Thermostat Cq.

LK Antenna Cq

The LK Antenna Cq is intended to be used when the radio connection between the room thermostat and the receiver unit is unsatisfactory.



The antenna is assembled as follows:

- The antenna holder is supplied with self-adhesive tape and is attached to the top of the receiver unit. The stripped part of the antenna is pulled through the antenna holder until it appears on the other side.
- The other end of the antenna is pulled to the outside of the enclosure and is assembled in the same way, placed at least 200 mm from any metal objects.

Pump control for Cq 4 and Cq 6

The last channels on the receiver Cq 4 (channel 4) and Cq 6 (channel 6) can start or stop a circulating pump. However, Cq 4 becomes 3 channel and Cq 6, 5 channel receiver. Pump control can be arranged via an external relay for 24/230 V (relay not supplied by LK). The 24 V side of the relay should be connected to terminals A and C of the channels. The channels have a time delay of 10 minutes for pump control.

Range control of Radio signal

To determine a connection's maximum range, the following check can be carried out:

- First, carry out activation/memorizing as the instructions.
- Then push the "Reset" button on the receiver unit at the same time as the button for "Channel 2".
- First release "Reset" followed by the "Channel 2" button. The sound signal and the indicator light will now pulse for about 2 seconds on, 8 seconds off.
- Next move the room thermostat far enough away from the receiver unit that the pulses almost stop. This is the maximum distance for radio connection.
- Finish the check by pressing "Reset" on the receiver unit.

The room thermostat returns to normal operation mode after a short time. Other channels are not affected by the check. If the connection is insufficient, the radio signal can be strengthened with another aerial. See the section "LK Antenna Cq".

Heating & Cooling

The equipment is constructed so that it can be used to heat (under floor heating) and cool. The functions are changed manually. When supplied, the components are set for heat. Switching to cool can be done in two ways.

Alternative 1

Change all room thermostats by moving the mains switch A to the upper position.

Alternative 2

Changing the whole installation by reprogramming the receiver unit as follows:

Change to cool (summer operation):

- Press the "Reset" button and the button for "Channel 3" at the same time.
- First release "Reset" followed by "Channel 3".

Change to heat (winter operation):

- Press the "Reset" button and the button for "Channel 4" at the same time.
- First release "Reset" followed by "Channel 4".

NB: For the Cq 1 unit, the change is made on the room thermostat.

Alarm

When a fault occurs, the indicator light begins to flash with an irregular time interval and a sound signal is heard. During signal disruption, the affected channel will deliver approximately 30% heat output.

Temporary interruption

If no signal is received from the room thermostat (transmitter) for a period between 1 to 10 hours, the indicator light on the receiver unit will display short flashes, but no sound signal. Acknowledgment of the alarm occurs automatically if the transmitter signal reoccurs.

Prolonged interruption

If no signal is received from the room thermostat (transmitter) for a period of more than 10 hours, the indicator light on the receiver unit will display short flashes and a sound signal is emitted. Acknowledgment of the alarm occurs automatically if the transmitter signal is regained. In the event of a loss of power in the receiver unit, no programming will be affected. Operation will continue as normal once power is restored.

Acknowledgment of the alarm

To acknowledge a disruption, interrupt “Memorizing”, or end a connection test, press “Reset” on the receiver unit. The output will return to the basic position. When the next control signal comes after approximately 10 - 20 minutes, the output will return to its correct position. Any radio connection established will not be affected.

Valve exercising

The actuator disconnects once a day for 3 minutes and opens the valve on the heating circuit distributor. This function prevents valves from sticking, for instance, during the summer period.

If valve exercising is not required, this function can be disconnected using vertical 1 in the room thermometer. Remove the temperature dial, loosen the screw and lift the cover. Remove vertical 1, which is marked with BR1 on the printed circuit card.

Description of Functions - Room Thermostat

Control occurs using pulse width modulation (PBM), which is intended for actuators. The control signal, which is calculated from the difference between the actual temperature and the temperature entered, is emitted in the form of a signal with different pulse and rest ratios. The sum of the signal and rest period is always 10 minutes. With large temperature variations, the thermostat is constantly switching on or off.

Changing the batteries on the room thermostat

When the indicator light fl ashes with 15-second intervals, the batteries should be changed within a few days. The batteries are located under the battery cover. For information about battery type, see “Technical data.”

After changing the batteries, the thermostat will continue to operate according to the chosen mode of operation. With depleted batteries, the receiver channel will continuously deliver 30 % heat output.

Connection check

After using the receiver unit’s “Reset” function, the respective channel’s indicator light will indicate, by a short flash, that the connection has been established.

TECHNICAL DATA FOR RECEIVER CQ1, CQ4 & CQ6

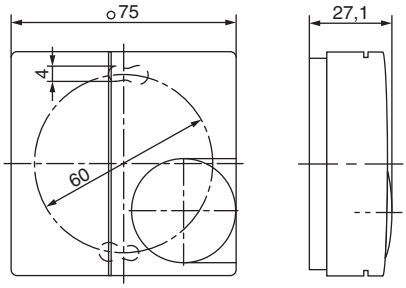
Supply voltage	AC 230V + 24V, 50/60HZ
Power requirement	Approx. 3 VA for Cq 4 - 6 Approx. 12 VA for Cq 1
Operating temperature	0 - +50°C
Storage temperature	-20 - +60°C
Disconnecting sound signal	Vertical BR1 for Cq 4 - 6 Vertical J2 for Cq 1
Aerial	Internal
Reception frequency	868 MHz
Protection mode	IP 40
Protection class	2
Output signal, type	Relay, 1 alternating potential free
AC24V - 230V for Cq 4 - 6	Max. 8 A cos φ = 1 Max. 2 A cos φ = 0.6
AC24V - 230V for Cq 1	Max. 16 A cos φ = 1 Max. 2 A cos φ = 0.6
Number of actuators AC 24V 2-3 VA NC, which can be controlled per relay output	For Cq 4 - 6 = 4 For Cq 1 = 8
Maximum number of actuators within same receiver unit	16

NB: Trouble free operation cannot always be guaranteed due to possible external interference sources.

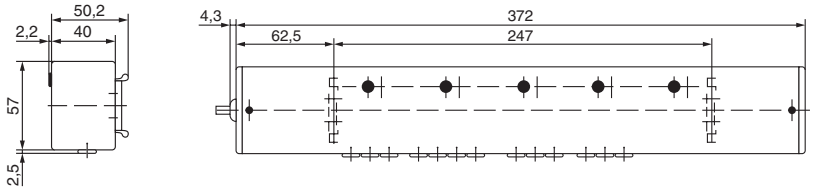
TECHNICAL DATA FOR TRANSMITTER

Type designation	LK Room Thermostat Cq
Setting range	+5 - +30°C
Supply voltage	2 x 1.5V batteries = 3V, alkaline (LR03)
Battery life	Approximately 3 years
Control function	PBM (optional 2 point)
Cycle time	approximately 10 minutes (total on and off time)
Measurement interval	approximately 10 minutes
Type	Heat/Cool
Valve exercising	Once a day for 3 minutes (can be switched off, BR1)
Temperature sensor	NTC
Transfer frequency	868 MHz
Modulation	FM
Aerial	Intern
Transmission interval	< 10 minutes
Range (typical)	100 metres free air or 2 floors or 3 walls
Protection mode	IP 40
Protection class	2
Operating temperature	-25 - +40°C
Storage temperature	-25 - +70°C
Temperature limit	On the adjustment dial

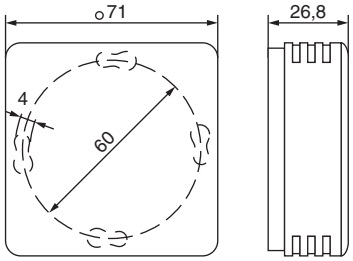
MEASUREMENTS



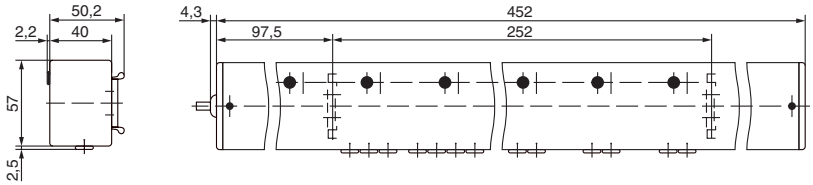
LK Room Thermostat Cq.



LK Receiver Unit Cq 4.



LK Receiver Unit Cq 1.



LK Receiver Unit Cq 6.