



Technical Hotline
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MK Echo™ Technical

Transmitters

Standards and approvals

BS EN 60669-1, BS EN 60669-2-1,
ETSI EN301 489-1 & -3, ETSI EN61000-6-2,
ETSI EN300 220-3

TECHNICAL SPECIFICATION

PHYSICAL

AMBIENT OPERATING TEMPERATURE
-5°C to + 40°C

OPERATING FREQUENCY
868.3 MHz

IP RATING
IP2XD

MAX. INSTALLATION ALTITUDE
2000 meters



Dimensions

Transmitters: 86mm x 86mm
Fixing centres: 60.3mm

Mounting Transmitters

- All Transmitters can be mounted to any 1-gang back box.
- All can be mounted directly to the wall surface – screws supplied.
- All can be mounted to back boxes – screws supplied.
- Logic Plus™ and Aspect type Transmitters can also be mounted using supplied adhesive pads

Description

Echo™ is an innovative range of entirely wireless, batteryless and self powered switches, only available from MK Electric.

Wireless – allows for instant switch installation and location flexibility, reducing disruption and cost, as there is no need to run switching cables.

Self-Powered – Innovative patented technology to ‘harvest’ energy means zero maintenance as there are no batteries to change.

Ultimate Flexibility – Each receiver can be controlled by up to 32 switches/transmitters.

Features

- Wireless and Batteryless – using RF technology with ranges up to 30m indoors
- Available in all MK wiring device aesthetics
- Quick and easy to install with no need for cabling from the switch to the lighting circuit
- Robust Metalclad Plus™ and Masterseal Plus™ available
- 400w and 10AX receiver/repeaters available to cover most installation needs
- Switch Receivers are capable of switching all lighting types
- Each receiver can be controlled by up to 32 switches/transmitters

For a full range of corresponding products, see pages 21-31 in the product selector.

Switch Receivers and Repeater

Standards and approvals

BS EN 60669-1, BS EN 60669-2-1,
ETSI EN301 489-1 & -3, ETSI EN61000-6-2,
ETSI EN300 220-3



K5420R

TECHNICAL SPECIFICATION

ELECTRICAL

K5420R (WHEN USED AS A RECEIVER)

VOLTAGE RATING

250V a.c. 50Hz

CURRENT RATINGS

10AX – No de-rating when used on standard magnetic ballast fluorescent loads.

TERMINALS

Terminal screw size: M3
Rated terminal screw torque: 0.5 Nm

TERMINAL CAPACITY

4 x 1mm²
3 x 1.5mm²
2 x 2.5mm²

PHYSICAL

OPERATING TEMPERATURE

-5°C to +40°C

IP RATING

IP2XD

MAX. INSTALLATION ALTITUDE

2000 meters

K5420R

The 10AX Receiver/Repeater can function both as a 1 level repeater and as a 10AX Switch Receiver.

Dimensions

10AX Switch Receiver/Repeater – K5420R

Length: 175.5mm

Width: 50.3mm

Height: 33.25mm

Transmitters, Receivers and Accessories

Echo™ Installer Guide

1. INTRODUCTION

The MK Echo™ range of products are different from all other products in MK's Wiring Devices portfolio in so far as the "switches" are RF transmitters which communicate with Switch Receivers. It is the Switch Receivers that actually switch the mains power.

Echo™ Transmitters send an RF signal at 868.3 MHz. The unique feature of these products is that the signal transmission is made without the need for mains power, or batteries.

Compared to installing hard-wired systems, wireless systems are much simpler and provide the flexibility to relocate or add to a system.

A symbol is visible on all Switch Receivers to indicate the position of the antenna. Although not always possible, the best reception will always be achieved if the front face of the Transmitter is directly facing the surface of the Switch Receiver on which the antenna symbol is shown.

2. PRINCIPLES OF RADIO SIGNALS IN BUILDINGS

Echo™ Transmitters send wireless transmissions to the Echo™ Switch Receivers. The receiver checks the incoming signal for accuracy and uses the data to control outputs. Radio signals are electromagnetic waves; hence the signal becomes weaker the further it travels.

Please note that RF signals also decrease in strength when they pass through certain materials between the transmitted signal and the receiver.

While radio waves can penetrate a wall, they are dampened more than on a direct line-of-sight path. A few examples of different types of wall and the realistic typical reduction in signal strength that can be seen are:

MATERIAL	ATTENUATION
Wood, plaster, uncoated glass, with no metal content	0 – 10%
Brick, pressed board	5 – 35%
Ferro-concrete	10 – 90%
Metal, aluminium lining	90 – 100%

In practice, this means that the material used in a building must be taken into consideration during any assessment for radio coverage.

Here are some typical guideline figures when using Logic Plus style Transmitters with plastic frontplates:

Line-of-sight connections:	typically 30m range in corridors, or up to 100m in halls
Plasterboard walls / dry wood:	typically 30m range, through 5 walls
Brick walls / aerated concrete:	typically 20m range, through 3 walls
Ferro-concrete walls / ceilings:	typically 10m range, through 1 ceiling

All other Transmitters in the range that have metal frontplates, do of course cause a reduction in the signal strength and therefore the transmission distance. Generally, the line of site distance in a hall is reduced from 100m described above for Logic Plus™, down to 30m.

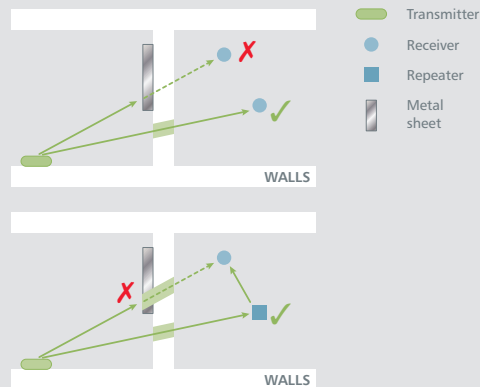
3. SCREENING

Objects made of metal, such as wall reinforcements, the metal foil often used in certain forms of insulation, or metallised heat protected glass, reflect electromagnetic waves and thus create what is known as a radio shadow and thereby a reduction in transmission distance.

The main factors decreasing coverage include:

- A Transmitter mounted on metal surfaces (typically 30% loss of range).
- Transmitters with metal frontplates (typically 60% loss of range).
- Hollow lightweight walls filled with insulating wool on metal foil.
- Inserted ceilings with panels made of metal or carbon fibre.
- Lead glass or glass with metallised coating, steel furniture.

Please note: Fire-safety walls, elevator shafts, staircases and supply areas should be considered as screening.



Simple example of a possible screening problem.

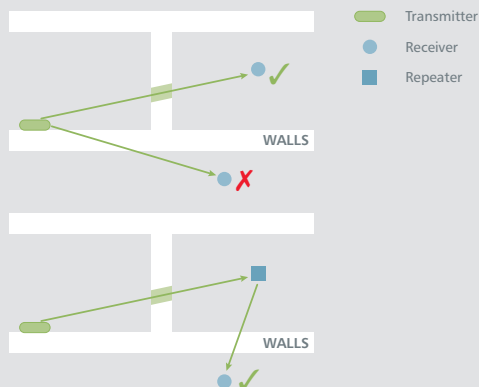
Depending on the material used to build the walls and assuming the distance between the transmitters and receivers are within specification, the illustrations above show a typical screening problem.

For the best range performance a minimum distance of 10mm to 20mm should be allowed from the whole length of the antenna to any conductive objects, which effectively means the area surrounding the Switch Receiver module.

Avoid screening by repositioning the Transmitter and / or Switch Receiver away from the screening objects (radio shadow), or if this is not possible, by using a Repeater.

4. PENETRATION ANGLE

The angle at which the transmitted signal hits the wall is very important. The effective wall thickness – and with it the signal attenuation – varies according to this angle. Signals should be transmitted as directly as possible through the wall. Wall niches should be avoided.

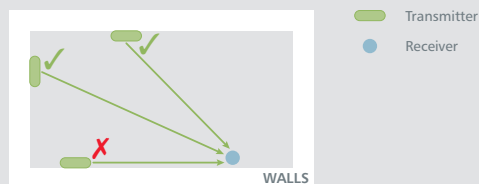


Avoid an unfavourable penetration angle by repositioning the Transmitter and / or Receiver, or by using a Repeater.

Do not position a Switch Receiver behind a Transmitter. In this position the signal strength is greatly reduced, even if there is no wall in-between.

5. ANTENNA INSTALLATION

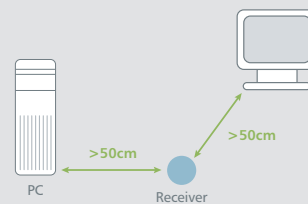
Switch Receivers should not be installed on the same wall as the Transmitter. When positioned near a wall, the radio waves are likely to be subject to interfering dispersions or reflections.



In a similar manner to the comment in the previous section, positioning transmitters and receivers along the same wall will mean the signal strength is greatly reduced.

6. DISTANCE BETWEEN SWITCH RECEIVERS AND A SOURCE OF INTERFERENCE

The distance between Switch Receivers and other transmitters (e.g. GSM / DECT / wireless LAN) or high-frequency sources of interference (computers, audio and video equipment) should be at least 500mm. However, Echo™ Transmitters can be installed next to any other high-frequency transmitter without a problem.



7. USE OF REPEATERS

In the case of poor reception, it may be helpful to use the repeater functionality built into switch receivers or a dedicated Repeater.

The 10AX Switch Receiver/Repeater (K5420R) is also a repeater when not programmed with any switches. The various possibilities of use are shown by the illustrations in sections 3. SCREENING and 4. PENETRATION ANGLE.

A Repeater has similar requirements in being positioned as a Switch Receiver, i.e. it too has an antenna and needs to receive the signal from the Transmitter and be within range of the Switch Receiver with which it is intended to communicate.

While planning, it may be worth considering retrofitting the system with a Repeater.