

HOW TO FIX ELEVATOR CAMERA PROBLEMS

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Every CCTV technician knows that unforeseen problems can occur when they install cameras in a new location, and even swapping out one camera for another can cause a hidden problem to surface. When installing a CCTV camera in an elevator car to view the riders, these problems can be magnified by the elevator workings. So let's look at what makes the elevator car camera installation different from a stationary camera location and examine the cause of the magnified problems.

The first thing that sets the elevator car camera installation apart from a stationary camera installation is that the camera must move up and down with the elevator car from floor to floor continuously without any break in the video signal or camera power. The elevator car travels to each floor so the coaxial cable or wire pair that runs to the elevator is usually a bit longer than an average camera cable run. This additional length will add to the cable slope loss and that in turn causes weak, less than sharp pictures at the monitor end of the system.

Also when the elevator car goes down, the video cable is extended like an antenna to nearly its full length; and when the car goes up, the cable is folded in half by the hanging loop. If there are any interfering signals like AM Radio Broadcast or other radio frequency sources radiating into the cable, these signals will come and go in intensity depending on the floor the elevator car stops on. These interfering signals typically look like hundreds of tiny lines on the video screen; vertical and sometimes horizontal or both. It may appear like you are looking through a screen door and the closer the lines are together, the higher the frequency of interference. To minimize this issue, a fully shielded cable should be used when installing coaxial cable; and to minimize the natural cable slope loss you should use the highest quality lowest loss cable you can find and make sure that it is 75 Ohm pure copper cable used for CCTV cameras and plenum rated for fire. High frequency motor noise can originate from the elevator motors from both the car lift and car door motors. This shows an interference on the video when the doors open and close or when the car is moving.

Elevator installations have another problem that is usually the most difficult to solve and has to do with grounding of the CCTV camera in the elevator car. The camera in the car should never be grounded to the car or any metal inside the car nor should the cables outer shield. A ground connection from the camera body to the car ground will cause a ground loop to occur. Ground loop currents will cause interference on the video picture when current flows in the ground structure and can damage electronic equipment connected to the video cable. Ground loop currents look like horizontal bars on the video picture and sometimes the picture will tear at the top of the monitor.

Ground loop currents flow in every part of a building's metal structure due to the grounding or "bonding" of the electrical power used in the building and because the electric motors used in the elevator car to open the doors and the lift cage structure are grounded. Any current that is not returned to the power panel through the neutral wires will flow through the building ground and cause a ground loop. It will seek out the best conductor path to return the lost current to the building ground and it will jump onto the coaxial video cable when the camera or coaxial cable shield is grounded. So when the elevator car moves, its grounding changes radically even though there are grounds connected to it though the traveler cables and the power supplied to the car.

So why not just make sure the video camera body and cable shield are isolated from the elevator car ground? This is easier said than done, because the camera is powered by either AC or DC power normally derived from the elevator car itself.

When possible separate power should be supplied by the traveler cable connected to the car, however sometimes all you have is the car main power to power everything. When selecting cameras for elevator cars it is best to use AC powered cameras because they have a greater degree of isolation from the power source's ground.

Whereas DC powered cameras share a common connection from the negative power supply wire directly to the body of the camera. So any ground loop that manages to get through the power supply will jump onto the video cable and create a ground loop. Switching power supplies are extremely light weight without any iron core transformer and this type of power supply will induce a ground loop and a high frequency interference signal. The general rule of thumb is: if the power supply is a heavy it is probably an analog power supply and will give better results with ground loops because it has transformer magnetic coupling from the power source.

So you have done your installation and you find that you have an interfering signal, or a ground loop on your video from the elevator car, or the specification for the job requires the bonding of the camera cables or body of the camera. What can you do now? If you have done your best to avoid any grounds on the camera and its power supply then you must remove the ground loop or interfering signal a different way. It is possible to get rid of the problem at the end of the coaxial cable line by using a ground loop blocker. There are many types of these on the market but the best ones also remove high frequency common mode interfering signals like those created by radio stations, switching power supplies, and other Radio Frequency sources.

One such product is called the GB-1 Ground Loop Blocker with high frequency elimination and 60 Hz ground loop cancellation. This unit will block all forms of interference and even restore picture sharpness lost by cable sloop loss in the long cable runs. This unit is installed at the end of the video line near the DVR or Monitors and is low cost and compact to fit into any installation with ease. With controls for both low frequency and high frequency, you can sharpen the picture to a maximum for the best picture clarity and brightness.



The GB-1 also has two outputs so you can drive a DVR and a monitor separately or send the signal off to a video switch or other video devices. Since the unit is used at the monitor location, there is no need to use noisy elevator car power to solve the video interference problems. Use this ground loop blocker to remove undesirable picture issues associated with elevator camera installations and give your customers the clearest, sharpest pictures possible. Even if you don't work on the security camera end of the system, you can refer this information to the CCTV guys when the customer complains about video quality associated with the elevator cars. This product is also available for twisted pair wire "UTP" (Unshielded Twisted Pair) wire input for non coaxial cable installations called GB-1UTP.