

Power profiles

Reduce power consumption with low power mode

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Summary

Axis cameras have internal heaters that enable them to operate in their entire specified temperature range. The heaters are efficiently controlled, and the temperature at which they turn on varies with camera model and other factors.

In selected Axis cameras, you can use the power profile *low power*, or the *low power mode*, which disables most of the heaters. Low power mode can reduce the camera's power consumption by up to 50%, depending on ambient temperature and camera-related circumstances.

Low power mode can be used in environments where the ambient temperature stays above a minimum recommended temperature. This temperature is specified in the camera's web interface. If the ambient temperature occasionally drops lower than that, it is recommended to run the camera in full power mode (default mode) instead.

We estimate that low power mode could reduce the yearly power consumption of a camera by as much as 24% for an installation in Lund, Sweden, 13% in New York, and 4% in the warmer climate of Dallas.

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1 Introduction

Reducing a camera's power consumption means lowering both the environmental footprint and the long-term cost of the surveillance system. One way to do this in an Axis camera is by using the power profile *low power*. This white paper provides an overview of what the low power mode is, its benefits, and its limitations.

2 Functionality of low power mode

Low power mode disables most of the heaters in the camera. This can reduce the camera's power consumption by as much as 50%, depending on the ambient temperature and circumstances such as camera model, firmware version, and camera workload.

Systems that monitor critical parts of the camera, such as lenses and motors, are active regardless of which power profile is used. Some heaters in individual camera models, such as the front glass heater on AXIS Q6225-LE PTZ Camera, can be manually started even in low power mode.

2.1 Power consumption at varying temperatures

To check a camera's power consumption at varying temperatures, we placed an Axis PTZ camera with power profiles in a climate chamber and slowly lowered the temperature from +50 °C to -5 °C (+122 °F to +23 °F).

We did this two times using the same camera – one time in full power mode (the default power setting) and one time in low power mode. The camera's *power meter* function monitored the power consumption throughout both sessions. The camera had one active video stream and was continuously recording to the SD card.

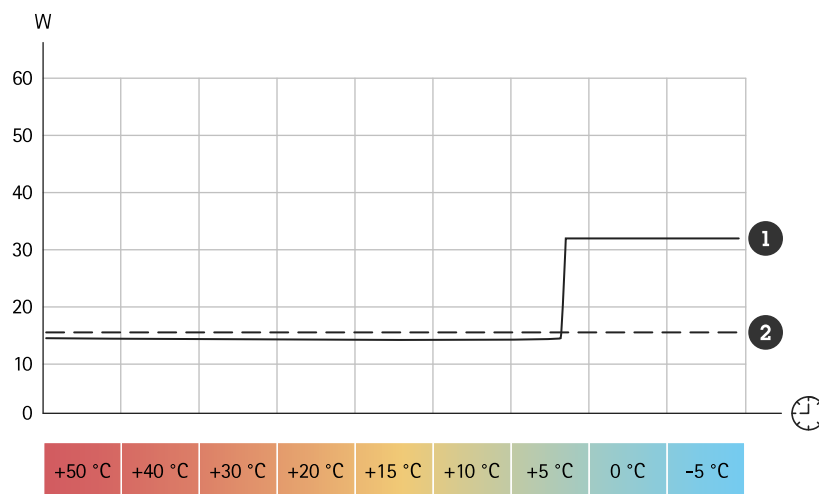


Figure 1. Power consumption in W at full power mode (1) and at low power mode (2) as the ambient temperature is decreasing. Below +6 °C, the low power mode substantially reduces the camera's power consumption. The slight offset between the graphs while the heaters are off is due to minor variations in the test conditions and is not related to the power profile.

When the ambient temperature dropped from +10 °C to +5 °C (+50 °F to +41 °F), the power consumption increased from about 15 W to about 32 W when the camera was using full power mode. This is because the heaters started when the ambient temperature dropped below +6 °C (+43 °F).

In the same temperature range, the power consumption stayed at 15 W when the camera was using low power mode. This is because the heaters remained off, which resulted in a reduction in power consumption by about 53% at temperatures below +6 °C (+43 °F).

Note that the graph displays a slight offset in power consumption between the two power modes when the heaters are off. This is due to minor variations in the test conditions, such as the position of the pan and tilt motors. The offset is not related to the power profile.

The temperature at which the heaters turn on varies with the camera model and other factors.

3 Requirements and configuration

Power profiles, including low power mode, are available for selected Axis cameras and might require an AXIS OS update.

You can select low power mode during the startup process the first time you start the camera, or after a factory reset. To use low power mode you must active select it. The default setting is full power mode.

You can also select low power mode in the camera settings after the initial startup. You find the power profiles in the camera's web interface under **System > Power settings**. Here, you can also turn on the power meter function, which is an easy way to measure and monitor the power consumption of the camera.

4 Power profiles and midspans

Low power mode is not related with the PoE power negotiation that is performed during startup. The camera performs the same PoE power negotiation regardless of the power profile, but will most likely use less power in low power mode. Low power mode is meant to make the camera consume less power on average. It is not meant to enable the use of a less powerful midspan.

With AXIS Q6225-LE PTZ Camera, for example, you need a 90 W midspan to be able to use the camera's IR functionality. The camera will, most likely, use less power in low power mode, but needs a 90 W midspan to enable IR.

The same applies to other Axis cameras. Based on the power consumption in some ambient temperatures it may seem like the camera could be used with a midspan of 30 W instead of 60 W. However, if a 60 W midspan is needed in full power mode, a 60 W midspan is needed also in low power mode. This is valid even though the camera will, most likely, use less power from the 60 W midspan in low power mode compared with full power mode.

5 Limitations of low power mode

Each camera that supports power profiles has a minimum recommended ambient temperature for using the low power mode. This temperature applies in a relatively dry environment with limited wind, and is specified in the web interface.

If a camera in low power mode is subjected to lower temperature than recommended there is a risk of ice and condensation, which might affect the camera's ability to pan and tilt and maintain a clear view of

the surveillance area. If the ambient temperature occasionally drops below the minimum recommended temperature, you should run the camera in full power mode instead.

6 Examples of possible power savings depending on ambient temperatures

The impact of low power mode, in terms of reduced power consumption, depends significantly on the temperature around the camera. It is difficult to calculate or predict how much reduced the power consumption can be, but the following example provides an indication. It involves a camera installation in Lund, Sweden. The graph shows the average ambient temperature in °C between March 2022 and March 2023, measured hourly. A dashed line has been added to indicate the temperature below which the camera's heaters turn on.

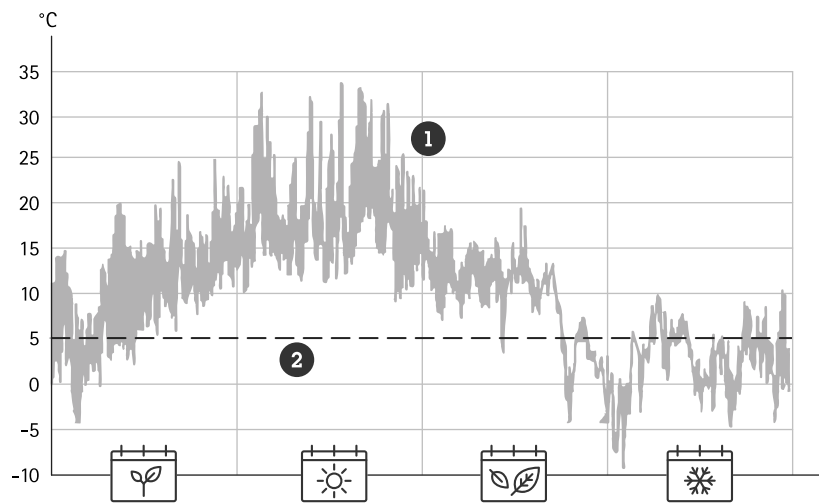


Figure 2. Ambient temperatures (1) throughout the year in Lund, measured hourly in °C. If the camera is in full power mode, it turns on the heaters at temperatures below the dashed line (2).

When the temperature is below the dashed line, low power mode could reduce the power consumption. This is the case during most of March, November, and December as well as parts of January, February, and April.

When we combine the temperature data with estimations of how much power is saved in low power mode, we find that the power consumption of the camera installed in Lund could be reduced by as much as 24% on a yearly basis.

It should be noted that the temperature in the example on occasion drops below -5 °C (+23 °F). When there is a risk of such low temperatures, you should use full power mode instead.

Using the same methodology with temperature data from other locations, we find that the same camera installed in New York could reduce its power consumption by as much as 13%. Even in a warm city like Dallas, the camera's yearly power consumption could be reduced by 4%, mainly during the relatively colder mornings in January and December.

About Axis Communications

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Axis has around 4,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden