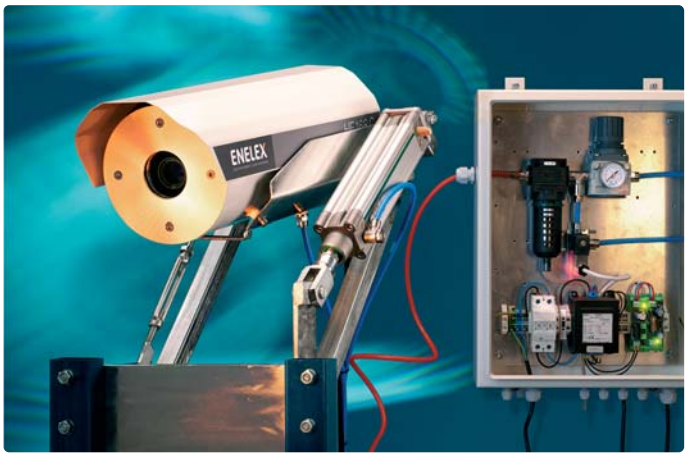
ENELEX
COAL QUALITY MANAGEMENT SYSTEMS

Camera systems for heavy industry



ENELEX camera systems (CCTV) are optimized for monitoring industrial and chemical processes. We focus on installation of CCTV systems in extreme conditions, and produce specially designed housings for camera protection.

Main features

- Work in extreme climatic conditions
- Reliability under high vibrations or mechanical load
- Highly dust-resistant
- Air-cooled housing (HE168 COOL) for high temperatures
- Highly resistant to electrical and electromagnetic interference

Basic description

Enelex has long-term experience with installation of CCTV systems in demanding conditions such as coal stockyards, power stations and other facilities, mostly in the power sector. Most of our applications involve CCTV systems at open pit mines.

Installation of CCTV systems in a heavy industry environment is accompanied by various difficulties, vibrations, high dust levels, aggressive atmosphere or risk of physical damage. Common CCTV systems are not designed for such severe conditions. We use only carefully selected cameras, lenses, camera housings, mounting consoles and electrical equipment, and we strive for the most suitable solution for each special application. For extreme conditions, HE168 series camera housings are available, which offer a range of accessories.

Using this technology, we can install the CCTV cameras in highly demanding conditions and extreme temperatures.

System use

The systems are designed and delivered mainly for monitoring coal transfer points, machinery monitoring and surveillance. Systems range from a simple configuration to large, fully digital systems.

Depending on customer needs, we prepare an offer, project documentation, deliver and install the technology, train the users and also provide servicing and maintenance.

System integration

A fully digital system is suitable for connecting to larger systems. Usually, the image information from some cameras in a local system is transferred into the general plant CCTV system. The system can be suitably enhanced using thermal imaging cameras to monitor selected locations in the infrared spectrum.

Basic technical data

Power feed*	230VAC, 24VDC
Working temperature*	-35°C to +50°C (or higher, with air-cooled housing)
Environmental protection*	IP 65, IP 66
Signal transmission*	Ethernet – optical fiber, wireless, metallic Analog – composite video, Pelco D control
Recording and displaying*	Milestone Xprotect IP systems

*** Options available on request**

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Possible applications

Stacker machine
- Transfer points monitoring
- Stacking/reclaiming of material
- Tow cable drum monitoring

Large excavator
- Transfer points monitoring
- Machine movement monitoring
- Monitoring of the bucket wheel

Coal stockyard monitoring
- Machinery and personnel movement
- Transfer points monitoring
- Coal crusher monitoring

Underground mine
- Processing technology monitoring

Train loading station
- Monitoring of trucks and loading equipment

Combustion process
- Boiler equipment monitoring
- Flame/chamber monitoring

Industrial facility
- Surveillance monitoring
- Machinery operation
- Production monitoring

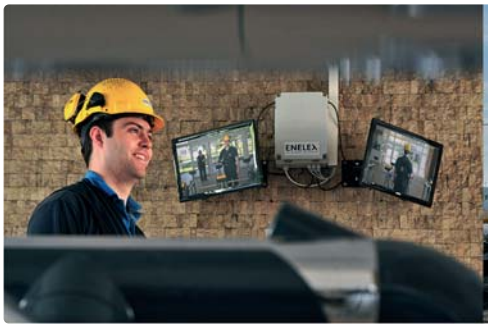
Monitoring vehicles and transported material

The system is used for online and offline monitoring and identification of vehicles as well as material being transported on the truck deck at the gates. IR cameras with IR illumination and a quick shutter speed are used to identify vehicles. This makes it possible to identify and record the vehicle's license plate in the dark without stopping it. The system is decentralized, consisting of several independent subsystems, each monitoring one gate. The subsystems are connected to a central server via Ethernet. Such a design can be expanded almost without limit. The system uses Milestone XProtect™ software and networked IP cameras. The images are recorded both at the central server and also within individual subsystems.

Local users use PC's to view and control the cameras at the subsystem level. Network users can access the camera views, archives or system setup via the central server according to their user permissions.

Users can easily watch live images, zoom in, control PTZ cameras, record and replay images and search the archive using the control software.

In case of a network communication failure between the subsystems and the central server, the subsystems remain fully functional.



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Thermovision surveillance system for intruder detection

Aside from traditional CCTV cameras, the system is equipped with special thermal imaging cameras to be able to detect intruders in total darkness without any additional illumination, in fog, rain or through bushes. The thermal imaging cameras detect objects' heat dissipation, and so offer exceptional performance in detection of persons, animals or machines.

The system uses Milestone XProtect™ software to combine a number of network or analog cameras into one or more servers. The network server provides a range of operations required for protected area monitoring. The system's open structure supports a wide range cameras and manufacturers.

All camera application requirements are analyzed individually for each installation location according to customer needs. These can include monitoring of critical locations at specified times, interconnection of alarms (PIR sensors, motion detection) with PTZ positioning of the cameras. The functions are provided automatically based on system settings.

Camera systems with air-cooled housings

If cameras need to be installed in a hot environment, very often with radiant heat, the camera's operating temperature may exceed maximum values specified by the manufacturer. In this case, the camera needs to be cooled to normal operating temperature.

A specially designed HE series cooled camera housing is used for this purpose. Cooling is provided by an air stream fed through a pressure regulator and filter into the housing, and is distributed via small nozzles to cool down the housing window and to protect it from dust. The system usually utilizes the facility's existing pressurized air supply.

In case of a compressed air outage, the camera is automatically removed from the high-temperature location by a pneumatic or electrical positioning device. The camera housing uses special window glass to shield the camera lens and sensor from heat radiation.

The images from the camera are then transferred, viewed and recorded in a standard manner.

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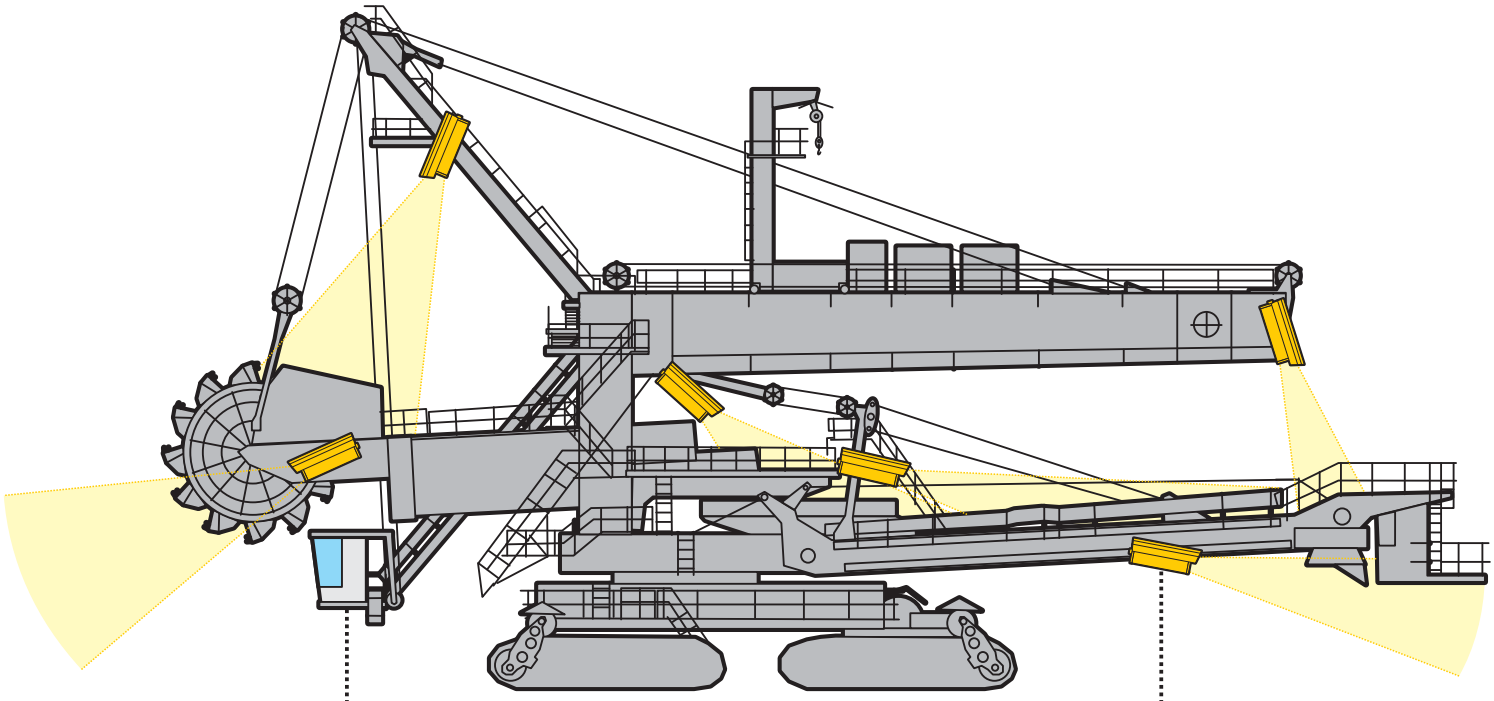
Mining and stockyard machine camera systems

The cameras are used to monitor areas important for machine operation, especially the transfer points where there is a risk of cave-in and therefore forced machine stoppage, monitoring conveyor belt integrity and detection of foreign objects on them, as well as locations outside the scope of view of the operator.

These and other important locations have fixed cameras installed to monitor the given subject. To monitor the movement of personnel on the machine and for locations that do not need to be monitored continuously, PTZ cameras are used. These cameras, usually controlled from the operator cabin, are also equipped with remote-controlled zoom, providing the operator with a detailed view of equipment or workers.

Due to extreme dustiness and vibrations, all components are dimensioned to take these conditions into account. An LCD display equipped with additional components is used, enabling all cameras to be displayed on one monitor and control of PTZ cameras.

The systems are usually only local, with one display in the operator cabin.



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