

ACTi

Physical Security End-to-End Solution Provider

White Paper | Vibration Proof Cameras

VIBRATION PROOF CAMERAS

A practical white paper for designing stable, reliable surveillance systems in vehicles, factories, logistics sites, and other high-vibration environments

Contents

- 1 Executive Summary
- 2 About ACTi Corporation
- 3 Definition of "Vibration Proof Cameras"
- 4 Core Technical Concepts
- 5 High-Value Applications
- 6 System Architecture
- 7 ACTi Product Portfolio Overview
- 8 Related Keywords and Terminology

Document purpose

This white paper explains what vibration proof cameras mean in professional video surveillance and how they should be specified, deployed, and evaluated in mobile, industrial, and machine-adjacent environments. It is written for system integrators, consultants, security managers, facility managers, procurement teams, and end users that need stable video in locations affected by continuous vibration, impact, moving platforms, or mechanical equipment.

The document references ACTi public product information for the Vibration Proof Cameras category and ACTi corporate information. It avoids model-specific naming so the content remains useful even as individual part numbers or product generations change.

Reading guide

Use Sections 3 and 4 to define the vibration problem and camera requirements, Section 5 to map use cases, Section 6 to check architecture, and Section 7 to align ACTi vibration-proof product categories with project needs.

1. Executive Summary

Vibration proof cameras are surveillance cameras selected or engineered to deliver stable, usable video in environments where movement, mechanical vibration, impact, or resonance can degrade image quality and system reliability. Typical sites include buses, trains, cranes, forklifts, elevators, factory lines, logistics facilities, workshops, and other locations where ordinary cameras may suffer from blurred video, unstable mounting, premature mechanical fatigue, or intermittent cabling issues.

ACTi positions its Vibration Proof Cameras category for vehicle and factory surveillance where vibration can interfere with video continuity. The official category page describes vibration-proof cameras for harsh environments such as vehicles and industrial settings and references vibration-proof environmental casing based on EN50155, broad operating temperature ranges, NDAA availability, digital input/output support, and product categories such as fixed dome, fixed box, covert camera, and outdoor door station form factors. [1]

For system integrators, vibration-proof surveillance creates differentiation when proposals address the full chain: site vibration source, mounting design, camera form factor, lens and angle, cabling, power, network path, recording, remote monitoring, maintenance access, and evidence handling. For consultants and end users, the correct specification should define the operating environment before selecting camera appearance or resolution.

Core message: Vibration proof cameras should be specified as part of a complete stable-video system. The enclosure, bracket, fasteners, cable routing, field of view, image settings, recording profile, health monitoring, and maintenance process all affect whether the system can provide reliable real-time visibility and usable evidence.

Key takeaways

- Vibration resistance protects video usability and system uptime, not only the physical camera housing.
- Vehicle and factory projects must evaluate vibration source, mounting surface, resonance, cable strain, temperature, dust, moisture, lighting, and service access.
- Fixed dome, fixed box, covert, door station, and other product categories can fit different vibration-affected scenarios when properly mounted and configured.
- Wide dynamic range, low-light performance, frame rate, lens selection, and recording settings determine whether stabilized video becomes usable evidence.
- Network reliability, secure accounts, event rules, DI/DO integration, NVR/VMS recording, CMS viewing, and system health management should be included in the project design.

Procurement principle: Do not specify vibration-proof only as a camera label. Specify vibration source, mounting method, environmental casing, operating temperature, viewing distance, lighting, video settings, network path, recording platform, service plan, and operator workflow together.

2. About ACTi Corporation

ACTi Corporation is the writer and publisher of this document. ACTi is a Taiwan-based international company founded in 2003 and serving customers in more than 100 countries. ACTi states that it has more than 20 years of security-industry experience and has been a pioneer in video-based security technology development and innovation. [2]

ACTi positions itself as a physical security end-to-end solution provider. Its ecosystem includes IP cameras, analog cameras, recording platforms, VMS, access control, central management, system health management, AI-enabled video technologies, and third-party system integration. [2]

This broader ecosystem matters for vibration-proof projects. A camera with a vibration-resistant casing helps protect field reliability, but the project succeeds only when the full system can keep the video available, record the correct stream, detect failures, support remote investigation, and preserve usable evidence in locations where vehicles, moving machinery, or industrial processes constantly affect the camera installation.

Why ACTi is relevant to vibration-proof surveillance projects

ACTi strength	Project relevance
End-to-end system scope	Vibration-proof cameras can be planned together with NVR, VMS, CMS, access control, alarms, third-party systems, and system health management instead of being treated as isolated devices.
Clear video as a foundation	ACTi states that clear video is the basis of its solution evolution because smart technology depends on high-quality source video. [2]
AI-enabled platform	Projects can combine stable field video with detection, classification, recognition, event metadata, alarm verification, and response workflow when the scene design supports analytics.
Compliance and project fit	ACTi public pages reference compliance and project considerations such as NDAA, TAICS, competitive pricing, vertical-market requirements, and end-to-end ecosystem value. [1][2]

3. Definition of "Vibration Proof Cameras"

A vibration proof camera is a video surveillance camera selected, mounted, and configured to maintain reliable operation and usable image quality in environments affected by vibration, shock, movement, or mechanical resonance. In practical project language, the camera hardware matters, but the installation method matters just as much: bracket rigidity, fastener selection, cable strain relief, viewing angle, shutter settings, network reliability, and maintenance access all influence the final result.

ACTi describes vibration-proof cameras as solutions for vehicle and factory surveillance in harsh environments where vibration can interfere with video. The category page references vibration-proof environmental casing based on EN50155 and lists related product form factors without requiring one fixed camera shape for every project. [1]

Project teams should treat vibration-proof as both a device capability and a lifecycle workflow: what is vibrating, how strong or continuous the vibration is, where the camera is mounted, how cables are routed, whether the view is wide or narrow, how evidence will be recorded, and how service teams can maintain the device without disrupting operations.

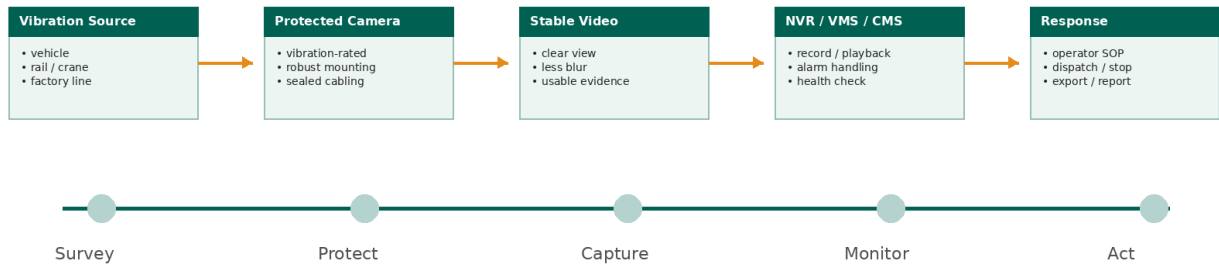
Vibration proof cameras vs. related concepts

Term	Meaning	Common misunderstanding
Vibration proof camera	Camera system or product category intended for stable video and reliable operation in moving or vibration-affected environments.	It is not only a rugged camera label; installation quality and scene design still determine usable video.
Shock-resistant installation	Mounting and mechanical design that reduces damage from impacts, sudden movement, or repeated mechanical stress.	Shock resistance does not automatically mean the image will be stable under continuous vibration.
Weatherproof camera	Camera designed to resist rain, dust, and outdoor exposure according to environmental ratings such as IP protection.	Weatherproofing does not automatically solve vibration, loose fasteners, or cable strain.
Vandal-resistant camera	Camera with physical protection against tampering or impact, often relevant in public or accessible areas.	Vandal resistance supports durability but does not replace vibration-rated selection or rigid mounting.
Image stabilization	Optical, electronic, mechanical, or configuration-based approach to reduce visible shake or blur.	Stabilization can help image usability, but it cannot compensate for poor mounting or unsuitable field of view.

Visual concept

How vibration-proof cameras protect video usability

From moving equipment and machine vibration to stable monitoring, recording, and response



Design principle: combine vibration resistance, mounting quality, image settings, recording workflow, and maintainability.

Design note

A vibration proof camera creates value when the system allows operators to observe moving assets, machine areas, production lines, logistics gates, and high-vibration locations without losing evidence quality. The complete chain must be planned: site survey, vibration source identification, camera form factor, bracket rigidity, fastener selection, cable strain relief, power and network path, recording, remote health monitoring, maintenance access, playback, export, and response.

Practical deployment interpretation: In a bus depot, railway vehicle, crane cabin, factory line, logistics loading dock, warehouse gate, or industrial machine room, the camera may be exposed to continuous vibration, sudden movement, dust, moisture, temperature change, cable movement, or difficult service access. The design should therefore protect both video stability and operational continuity while keeping operators able to verify alarms and export evidence without unnecessary site visits.

4. Core Technical Concepts

Camera selection should begin with the vibration and operational problem. The goal is to provide useful video at the required location, distance, angle, lighting condition, and maintenance interval while reducing blur, physical fatigue, loose mounting, cable stress, and recording failures. The following concepts help teams avoid under-designed specifications.

Concept	Practical meaning
Vibration source and frequency	Identify whether vibration comes from vehicles, engines, rails, cranes, conveyors, presses, fans, doors, nearby machines, or structural resonance.
Mounting rigidity	Use a stable surface, robust bracket, correct fasteners, thread-locking practice where appropriate, cable strain relief, and installation inspection to reduce image shake and mechanical loosening.
Camera form factor	Fixed dome, fixed box, covert, door station, or other form factors should be selected according to the scene, vandal risk, lens need, cabling path, service access, and appearance constraints.
Image performance	Resolution, WDR, low-light performance, frame rate, exposure time, lens type, field of view, and target size determine whether video remains usable under vibration.
Environmental protection	Operating temperature, dust, moisture, casing rating, vandal resistance, corrosion exposure, and maintenance interval should be matched to the application.
Network and power stability	PoE, switching, cabling, connectors, DI/DO, surge protection, grounding, bandwidth, VLANs, secure accounts, firmware policy, and remote access help preserve uptime and integrity.
Recording and evidence workflow	NVR/VMS profile, codec, bit rate, retention, playback, event search, export, audit trail, and operator SOPs determine whether recorded video becomes actionable evidence.
Maintenance and health monitoring	Remote health monitoring, cleaning access, vibration inspection, cable inspection, spare strategy, and scheduled maintenance reduce downtime and service cost.

Specification interpretation

A camera with strong image specifications can still fail a high-vibration project if the mounting surface shakes, the bracket resonates, the cable pulls on the connector, the exposure is too slow, the recorder uses the wrong profile, or operators cannot find and export events. Conversely, a correctly designed system can deliver high project value when vibration resistance, viewing goal, recording, health monitoring, and maintenance are designed together.

Capability matrix

Site challenge	What can go wrong	Capabilities to specify
Vehicle movement	Continuous motion, engine vibration, and road shock create blurred video or loose mounting.	Vibration-proof casing, stable bracket, cable strain relief, short exposure settings, suitable field of view, NVR/VMS retention.
Railway or transit environment	Rolling-stock vibration and temperature change affect camera uptime and evidence reliability.	EN50155-referenced vibration proof capability, wide temperature tolerance, rugged mounting, secure cabling, health monitoring.
Factory production line	Machine vibration and repetitive movement cause image shake, connector fatigue, and service interruptions.	Rigid mounting surface, robust bracket, low-light/WDR fit, DI/DO event linkage, remote maintenance workflow.
Cranes and logistics equipment	Moving platforms and changing view angles can reduce target detail or cause network interruptions.	Fixed or controlled-view design, shock-aware cabling, stable power/network path, CMS viewing, event export workflow.
Public or accessible areas	Vibration may combine with vandalism, cleaning, dust, or accidental impact.	Vandal-resistant and weatherproof casing when needed, protected cable routing, maintenance inspection, evidence audit trail.

How to use this matrix

Use the matrix during site survey and proposal design. Each vibration problem should be translated into a camera requirement, mounting requirement, cabling requirement, network/recording requirement, and maintenance requirement. This reduces the risk of specifying a vibration-proof product while leaving the rest of the system unable to preserve or use the captured evidence.

Tender writing guidance: Define the vibration source first. Then specify camera form factor, vibration-proof capability, environmental casing, mounting method, cable routing, lighting, recording platform, health monitoring, maintenance access, and evidence export workflow.

5. High-Value Applications

Vibration proof cameras are most valuable where movement, mechanical stress, image clarity, and security requirements overlap. ACTi highlights vehicle and factory surveillance as key scenarios for this product category and describes vibration-proof cameras for harsh environments affected by vibration. [1]

Application	Operational value	Typical locations
Vehicle and transit surveillance	Monitor passengers, drivers, doors, boarding points, cargo areas, vehicle surroundings, and events while maintaining usable video under movement.	Buses, trains, shuttles, vehicle depots, mobile units, service fleets
Factory and machine-area monitoring	Support safety observation, process monitoring, incident review, and access verification near machinery where vibration affects ordinary installations.	Production lines, machine rooms, presses, conveyors, robotic cells, workshops
Logistics and warehouse operations	Improve visibility around loading, unloading, forklift traffic, gate control, docking, and package handling where movement and impact are common.	Warehouses, loading docks, distribution centers, dock doors, material-handling routes
Cranes, ports, and heavy equipment	Provide remote visibility from moving or vibration-prone structures where operators and supervisors need stable situational awareness.	Cranes, port yards, cargo handling areas, industrial vehicles, equipment cabins
Access and communication points	Combine video, audio, DI/DO, and environmental durability where entrances are attached to moving structures or exposed to repeated vibration.	Vehicle gates, factory entrances, warehouse doors, protected access points
Remote industrial critical sites	Reduce site visits by combining stable field devices with NVR/VMS recording, health monitoring, and remote investigation.	Utilities, remote plants, maintenance yards, regional control centers

Value by stakeholder

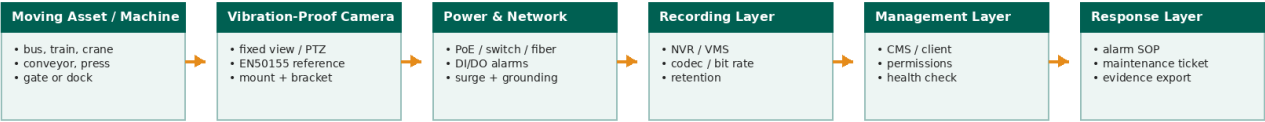
Stakeholder	Main benefit
System integrator	Stronger differentiation when proposals are built around vibration source, mounting quality, service-life planning, and total solution design.
Consultant	Clearer specification language for vibration-proof capability, form factor, mounting, cabling, recording, maintenance, and evidence export.
Security manager / operator	More reliable live monitoring, alarm verification, incident reconstruction, and lower disruption from field failures.
Procurement team	A more defensible buying decision based on reliability fit, lifecycle cost, application fit, compliance readiness, and maintenance risk.

6. System Architecture

Vibration-proof surveillance should be designed as a system architecture. The camera and casing support stable field deployment, but the full solution must preserve operational value through mounting, cable routing, transmission, recording, storage, live viewing, playback, search, export, alarm handling, system health monitoring, and maintenance workflow. If any layer is under-designed, the project may lose evidential value or require avoidable field service.

Reference system architecture for vibration-proof surveillance

Project value depends on the full path from stable field installation to video evidence handling.



Key question: Can operators reliably see, record, search, export, maintain, and act on captured details despite vibration?

Architecture layers

Layer	Role in vibration-proof surveillance
Field layer	Vibration source, camera form factor, casing, bracket, fasteners, viewing angle, lens, cable routing, strain relief, and maintenance access.
Network layer	PoE, switching, fiber or wireless links, VLANs, latency, surge protection, grounding, cybersecurity controls, and remote-access policy.
Recording layer	NVR or VMS storage, codec, bit rate, frame rate, retention period, redundancy, backup, playback performance, and export workflow.
Management layer	Client software, web access, CMS, TV wall, user permissions, event review, multi-site monitoring, and system health management.
Analytics layer	People, vehicle, object, face, or license-plate analytics; performance depends on image quality, target size, lens cleanliness, scene design, and lighting.
Response layer	Operator SOPs, alarms, access-control action, guard dispatch, maintenance ticketing, escalation, incident reporting, evidence export, and audit trail.
Architecture warning: A camera system can still underperform if the vibration source is underestimated, the bracket resonates, the cable entry is strained, the network drops, the recorder uses the wrong profile, or health alarms are not acted upon.	

7. ACTi Product Portfolio Overview

ACTi positions its Vibration Proof Cameras category around camera solutions for vehicle and factory surveillance, with public information that references vibration-proof environmental casing based on EN50155, harsh-environment use, broad operating temperature ranges, NDAA availability, digital input/output support, and a range of product categories for different deployment styles. [1]

Portfolio categories

Category	Where it fits	Use-case fit
Fixed dome cameras	Compact fixed views where a low-profile protected camera is required on moving assets or vibration-affected structures.	Vehicle interiors, transport areas, warehouse entrances, machine-adjacent indoor/outdoor views
Fixed box cameras	Lens-flexible fixed views where the installer needs a specific angle, lens, or enclosure strategy.	Factory lines, inspection lanes, gates, long corridors, equipment areas
Covert cameras	Discreet observation where the viewing point must be integrated into a small space or hidden installation area.	Vehicle interiors, access points, service desks, constrained equipment spaces
Outdoor door station / access-view cameras	Entry video, audio, and I/O functions where vibration and environmental conditions may affect access communication.	Vehicle gates, factory doors, industrial entrances, logistics check-in points
System recording and management	NVR, VMS, CMS, system health management, and event workflow that convert stable camera video into searchable evidence.	Single-site and multi-site operations, control rooms, remote investigation, maintenance teams

Portfolio-level capabilities to confirm

- Vibration source, camera form factor, casing, mounting method, cable routing, coverage area, target distance, target size, and lighting condition.
- Required resolution, lens type, WDR, low-light performance, IR or supplemental lighting needs, frame rate, analytics, event rules, and metadata requirements.
- Recorder/VMS compatibility, bit rate, codec, retention, playback, evidence export, CMS, remote access, and system health monitoring.
- Operating temperature, dust/moisture exposure, vandal resistance, cleaning process, service procedure, spare strategy, and maintenance access.
- Cybersecurity and compliance requirements such as NDAA, TAICS, firmware policy, secure access, product documentation, and regional availability.

Project note: Product availability, detailed specifications, compliance status, accessory compatibility, recorder compatibility, and regional part numbers should be confirmed from the latest ACTi product pages, datasheets, firmware release notes, safety documentation, and quotation documents before project submission.

8. Related Keywords and Terminology

The following keyword reference groups collect common terms related to vibration-proof surveillance, vehicle and industrial environments, camera form factors, system architecture, and project procurement.

Core topic keywords

vibration proof camera, vibration-proof security camera, vibration resistant camera, anti-vibration camera, stable video surveillance, rugged security camera, industrial security camera, vehicle surveillance camera, factory surveillance camera, harsh environment camera

Environment keywords

vehicle monitoring, train surveillance, bus surveillance, crane surveillance, forklift route monitoring, production line monitoring, machine room surveillance, factory floor security, warehouse surveillance, logistics dock monitoring

Mounting and protection keywords

vibration-rated mounting, robust camera bracket, cable strain relief, secure fasteners, shock-resistant installation, vandal-resistant camera, weatherproof camera, IP camera casing, operating temperature range, environmental casing

Image and performance keywords

wide dynamic range camera, low light camera, high resolution security camera, fixed dome camera, fixed box camera, covert camera, door station camera, clear video evidence, motion blur reduction, frame rate planning

Analytics and intelligent video keywords

AI camera analytics, people detection camera, vehicle detection camera, object classification, object recognition, alarm verification, event metadata, smart surveillance, video analytics for industrial security

Application keywords

vehicle security camera, factory security camera, logistics security camera, warehouse camera system, crane camera system, train camera system, bus camera system, production line camera, machine vibration monitoring video, industrial access control video

System and architecture keywords

IP camera system, NVR camera system, VMS camera system, CMS surveillance, remote security monitoring, multi-site surveillance, system health management, video retention planning, evidence export workflow, camera bandwidth planning

Procurement and project keywords

vibration proof camera specification, vibration resistant camera selection guide, vehicle surveillance white paper, factory camera white paper, camera for system integrators, camera for consultants, camera for end users, NDAA security camera, TAICS security camera, ACTi vibration proof camera

Common question phrases

what is a vibration proof camera, when do I need a vibration-proof camera, what is the difference between weatherproof and vibration-proof cameras, how to specify cameras for vehicles, how to choose cameras for factory surveillance, how to design surveillance for vibration-prone machines, how to protect camera cable connections in moving environments, what camera form factor is suitable for vehicle surveillance, how to reduce camera maintenance in factory environments, how to integrate vibration-proof cameras with NVR or VMS, how to monitor camera health remotely, how to plan evidence export for vehicle and industrial sites

Source notes

Ref.	Source
[1]	ACTi Corporation, "Vibration Proof Cameras," official product category page. URL: https://www.acti.com/products/vibration-proof-cameras . Accessed: June 29, 2026.
[2]	ACTi Corporation, "About ACTi," official corporate page. URL: https://www.acti.com/corporate/about . Accessed: June 29, 2026.

Revision note

Revision note: This document is a marketing and technical education white paper. It is not a vibration test report, safety standard, regulatory certification, final system design, or project-specific installation manual. Always validate vibration source, mounting surface, bracket design, environmental casing, cable routing, field of view, viewing distance, lighting, recording settings, storage, VMS control, system health monitoring, maintenance access, and operator workflow in the target scene before deployment.

Prepared by ACTi Corporation

For vibration-proof camera projects, confirm camera form factor selection, vibration-related requirements, mounting accessories, recording platform, compliance requirements, environmental conditions, and regional availability with your ACTi sales contact or authorized system integrator.

sales@acti.com | www.acti.com