EU Artificial Intelligence Act — Annex IV Companion Pack

PIRE-F–Aligned Technical Documentation for High-Risk Physical AI Systems

Prepared by Sentinel Physics™

Version 1.0 · Supporting Document

Purpose of This Companion Pack

This document is a companion to Annex IV of Regulation (EU) 2024/1689 (EU Artificial Intelligence Act). It provides a structured, behavior-based approach to generating the technical documentation required for high-risk AI systems, with particular emphasis on AI systems operating in physical environments.

The companion pack is designed to be used alongside a Sentinel Physics™ PIRE-F assessment or certification.

Annex IV Mapping Overview

The table below maps Annex IV documentation requirements to PIRE-F evidence artifacts.

Annex IV Requirement	**PIRE-F Evidence Artifact**
System description & intended purpose	Operational envelope (Ω) definition
Design & development information	Constraint architecture & authority model
Risk management system	PIRE-F domain risk metrics & Physical Risk Index
Human oversight measures	Authority reassertion & intervention logs
Accuracy, robustness, cybersecurity	Behavioral coherence & boundary integrity metrics
Post-market monitoring plan	Continuous monitoring dashboards & incident logs

System Description and Intended Purpose

Describe the AI system’s physical functions, deployment environment, and intended operational scope. PIRE-F requires formal definition of the operational envelope (Ω), including spatial, functional, temporal, and authority limits.

Risk Management System

PIRE-F provides continuous, domain-based risk management using six behavioral governance domains. Risk is quantified via the Physical Risk Index (PRI) and domain override rules, supporting Article 9 obligations.

Human Oversight Measures

Human oversight is evidenced through enforceable authority mechanisms, intervention latency measurements, and documented escalation procedures rather than policy statements alone.

Logging, Traceability, and Record-Keeping

PIRE-F evidence artifacts include tamper-evident behavioral logs sufficient to reconstruct incidents and near-misses, supporting Annex IV traceability and Article 12 requirements.

Post-Market Monitoring

This companion pack supports Article 61 by defining continuous behavioral monitoring, threshold alerts, incident reporting, and governance feedback loops.

Provider Instructions

Providers may attach this companion pack to Annex IV documentation submissions to demonstrate structured, behavior-based compliance for physical AI systems. This document does not replace Annex IV but augments it with enforceable governance evidence.

Legal Note and Limitations

This companion pack is a supporting governance document and does not constitute legal advice or regulatory approval.

Citation

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