PILZ

THE SPIRIT OF SAFETY

Safe & Secure Access Management

Contents – Subjects Covered (Quick Links)

PILZ

- Safeguarding Support Systems

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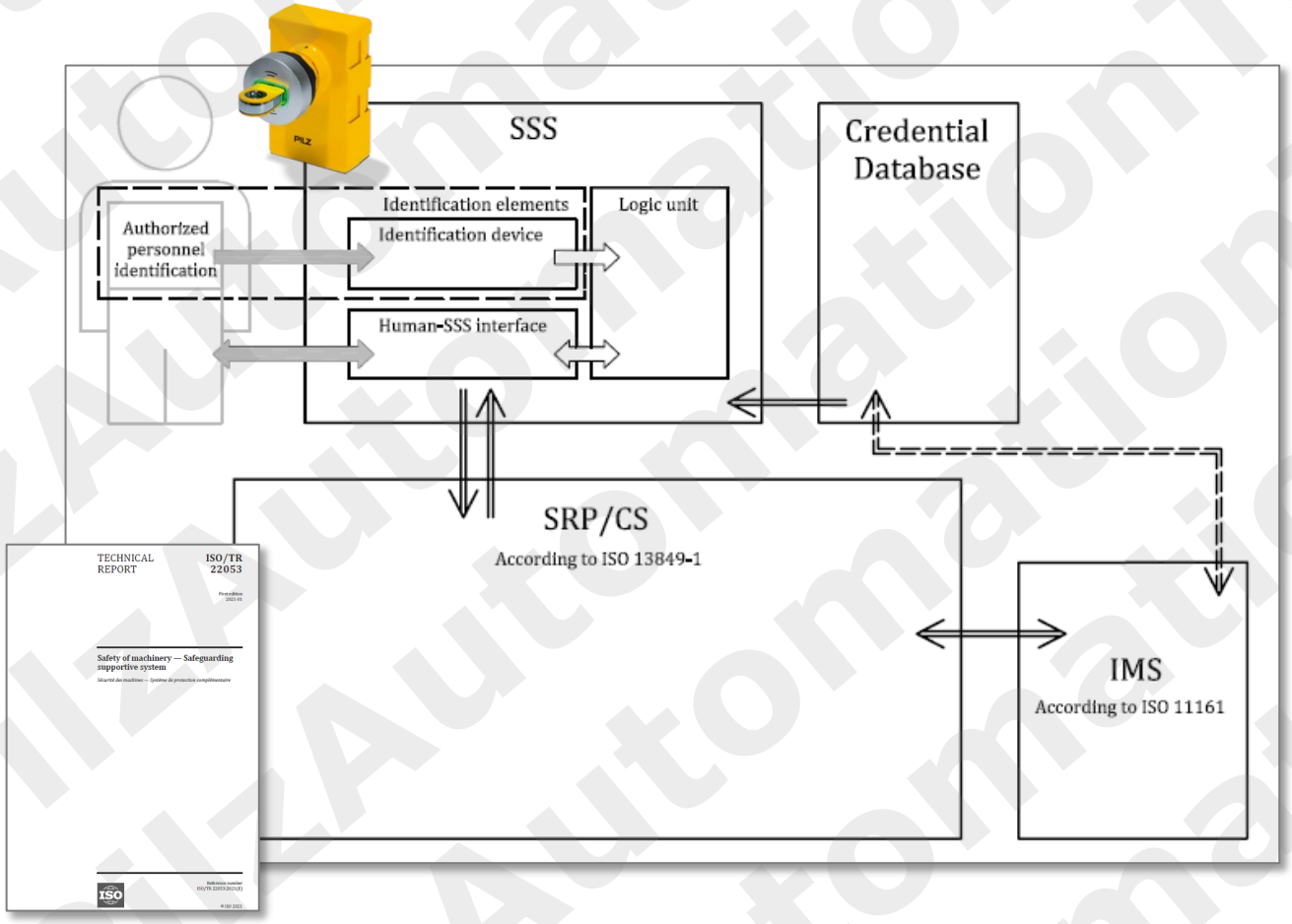
ISO TR 22053

Safeguarding supportive system



Safeguarding supportive system (SSS) provides the following functions:

- a) **Identification** of authorised personnel;
- b) **Verification** that the **authorisation** for the selected task **matches** the identified personnel;
- c) **Informing** the **user** of the authorised task(s);
- d) **Enabling** the **mode of safe operation** corresponding to the selected task(s);
- e) **Specifying** the **zones** to which the authorised personnel have access.

This means, in effect, that "anonymous, non-individualised keys, (e.g., mechanical type), that are permanently stuck in the machine, will not be allowed in the future!"

- Identification & Access Management

Definition of Identification & Access Management

Identification

Who am I?

→ Persons

→ Hardware

→ Process

Qualifications & Skills

What is my ***qualification?***

- Operator
- Service
- Inspector
- Line manager
- …

What are my ***level of education?***

- Beginner
- Expert
- Responsible
- Supervisor
- …

Personalized identity & attributes

Access

What are my ***permissions?***

- Robot Level = 2
- Access Door 4 = Yes
- Access HMI Page 14
- Language = English
- …

Authorization

Why Safe And Secure Access Management?

SECURITY SAFETY

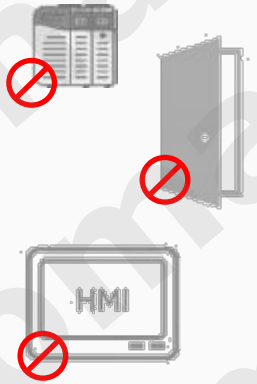
Introduction

Safety and Security: Solution & Concept

Benefits

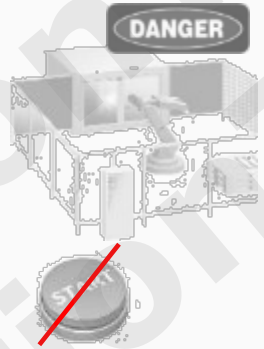
- ***Employee*** *Protection*
- ***Liability*** *Protection*
- ***Productivity*** *Protection*
- ***Data*** *Protection*

Access control

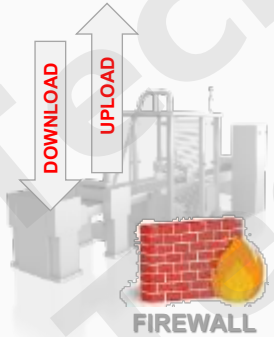


Safe operating mode selection

General safeguarding



Machine security



Persona Identification

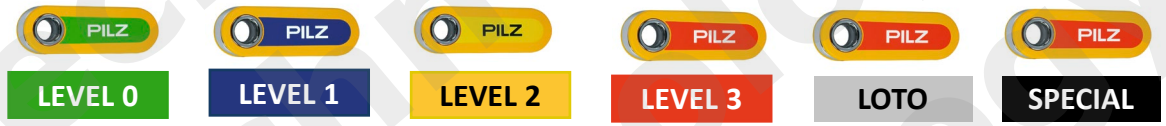
- ***Operator***
- ***Maintenance Engineer***
- ***HSE Manager***
- ***Service Engineer*** *(ext.)*
- ***Purchaser***

Safety
Protects your staff from hazards due to machinery.

Security
Protects your machine and data from manipulation and unauthorized access

Safety and Security: Components

Task & Role & Access Level matrix



Example

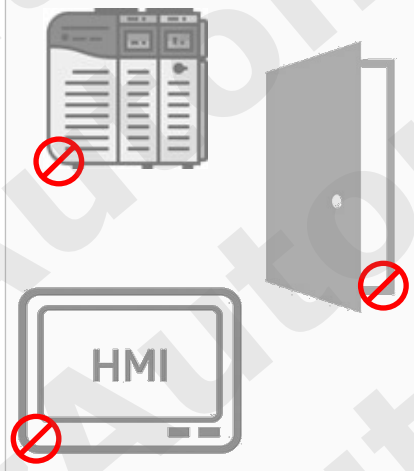
Task	Minor Intervention	Whole Body Access	#People	Operator	Maintenance operator	Site Maintenance Manager / Specialised personnel
Manually load cartons onto infeed magazine	no	no	1	LEVEL 1	LEVEL 1	LEVEL 1
Reach through infeed light curtain to straighten fallen carton	yes	yes	1	LEVEL 1	LEVEL 2	LEVEL 2
Visual inspection of conveyors chains/belts	yes	yes/no	1	LEVEL 0	LEVEL 2	LEVEL 3
Adjust conveyor side guides for stability	yes	yes	2		LEVEL 2	LEVEL 3
Disassemble conveyor drive unit to replace damaged bearings	no	yes	3		LOTO	LOTO
Clean inside cell	yes	yes	1	LEVEL 2	LEVEL 2	LEVEL 2
Remove fallen cartons/bundles in cell	yes	yes	1	LEVEL 2	LEVEL 2	LEVEL 2
Clear jams / Reposition misaligned pallet	yes	yes	1	LEVEL 2	LEVEL 2	LEVEL 3
Remove damaged/broken pallets from cell	yes	yes	2		LEVEL 2	LEVEL 3
Teach pick/place positions for new carton size	yes	yes	2		LEVEL 2	LEVEL 3
Change gripper for different product	no	yes	1		LOTO	LEVEL 3
Replace vacuum cups on EOAT	no	yes	1		LOTO	LEVEL 3
Reset and restart from un-common safety stops or warning messages	yes	yes	1			SPECIAL
Restart confirmation after applying Multi people LoToTo	no	yes	>1			SPECIAL

Why Safe And Secure Access Management?

SECURITY SAFETY

Safety and Security: Key Functions

Access control



authentication / authorization

Safe operating mode selection

span of control

mode selection

special control

General safeguarding

prevent access

minor maintenance

major maintenance (LOTO)

unexpected start-up prevention

Machine security

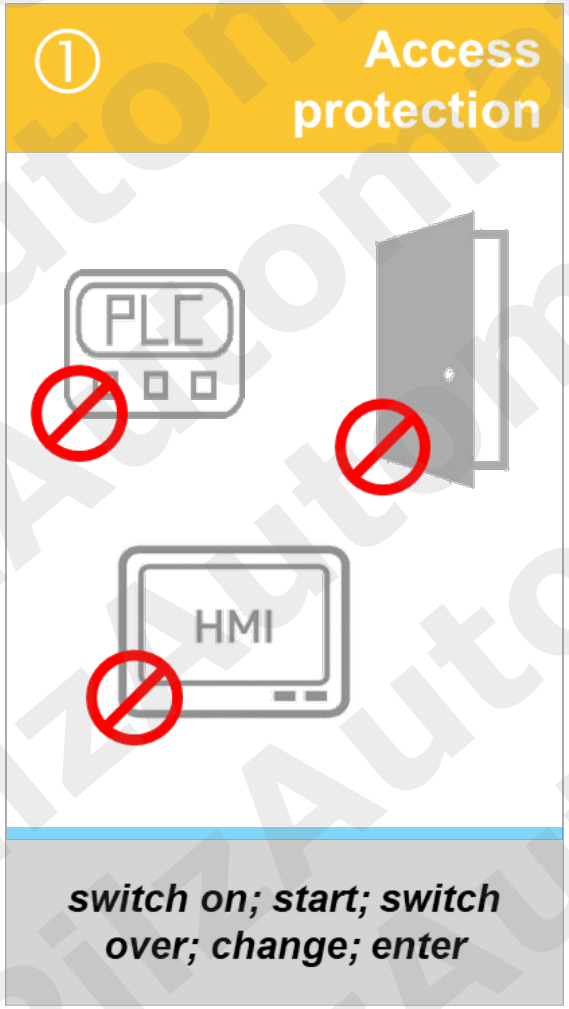
keeping log

software modifications

remote access/teleservice

Safe and Secure Access Management

Example of realisation



- Work processes have to be readjusted, adjustments ("process value inputs") have to be made or small cleaning tasks have to be performed.
- Process and Access protection:
  - Define who should start/stop machine processes
  - Authorise machine access
  - Reset of normal operation intervention
  - Define who should start machine process
  - …

Foundational requirements and influences on SRP/CS

Use control

Level: 3 / T.Bauer

System | Referenzieren | Grenzwerte | HIOKI | Berechtigungen | Wartungscenter | LEER

Funktionsgruppe	Bediener	Technologe	Mechaniker	Schichtleiter	GIA
Probewickelprüfung	■	■	■	■	■
Einfachmessreihe		■	■	■	■
Mehrfachmessreihe		■	■	■	■
C-Vergleich Tempern		■	■	■	■
C-Vergleich Stoßstrom					■
Überwachungsprüfung	■	■	■	■	■
Reserve					■
Reserve					■
Einstellungen		■	■	■	■
Konfiguration		■			■
Wartungscenter			■		■

Zurück

Foundational requirements and influences on SRP/CS

Identification and authentication control

Before

- No identification
- Key always inserted
- I/O coupling
- USB direct connection
- ETH direct connection

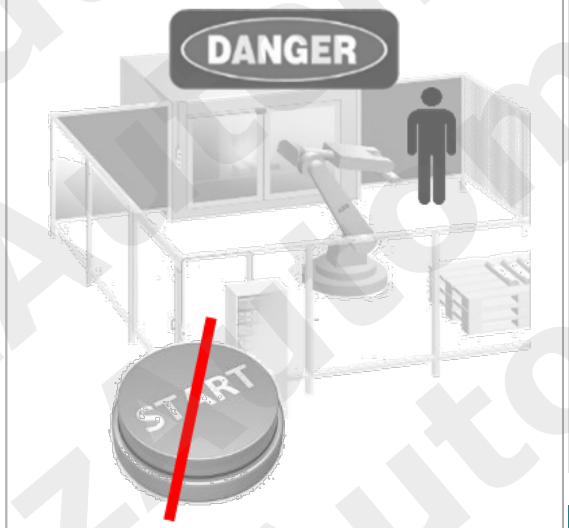
After

- Identification and tracking system
- Operating Mode Selection
- Data protection via USB and ETH
- Direct communication with PLC/HMI (fieldbus)
- Possibility to use customer cards

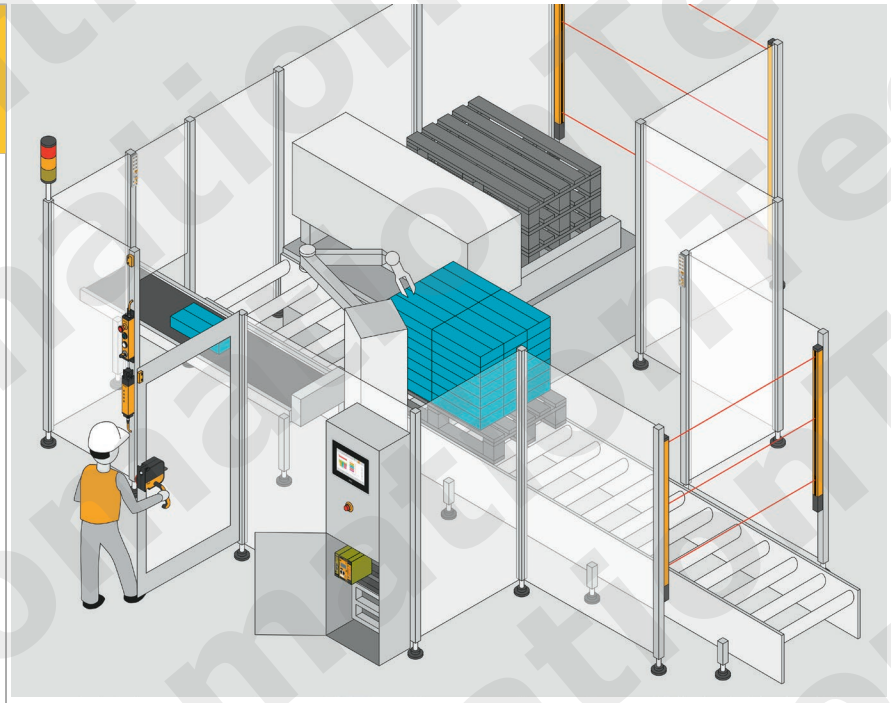
Safe and Secure Access Management

Example of realisation

③ Maintenance safeguarding



protect from unexpected start-up of the machine



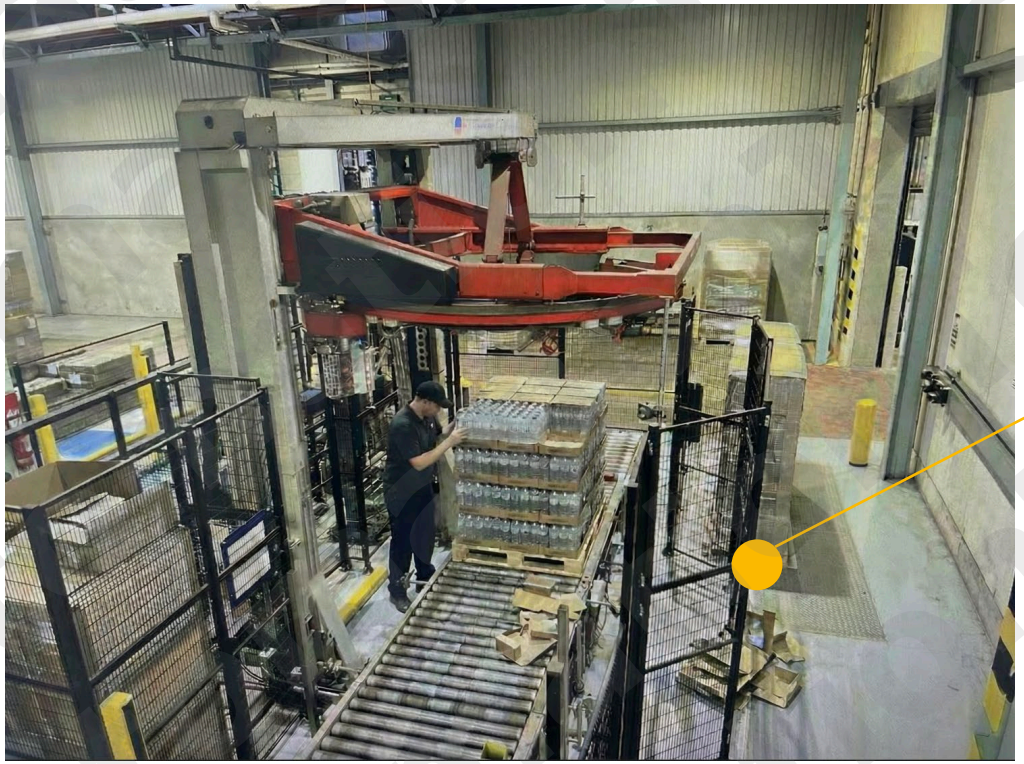
Personal Identification & Access

- As long as at least one person is in the dangerous zone to perform minor maintenance, the machine must **not** be **switched on** again **by anyone**
- Maintenance authorisation
  - Check-In and Check-Out of people involved in (minor) maintenance activities
  - …
- Prevent unexpected start-up:
  - Define Reset and restart after maintenance activities
  - …

Task & Role & Level matrix

Examples

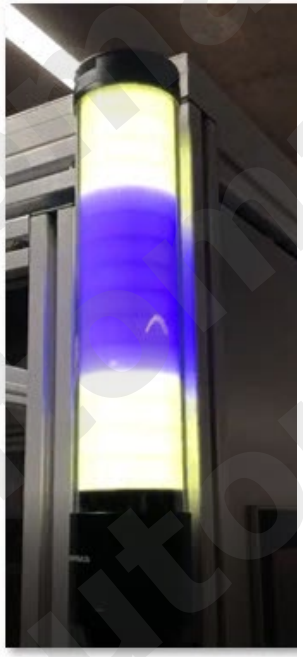
Task	Minor Intervention	Whole Body Access	#People	Operator	Maintenance operator	Site Maintenance Manager / Specialised personnel
Remove fallen cartons/bundles in cell	yes	yes	1	LEVEL 2	LEVEL 2	LEVEL 2



AI generated image

Display: WERMA lamp as „HMI“ + Pilz HMI software

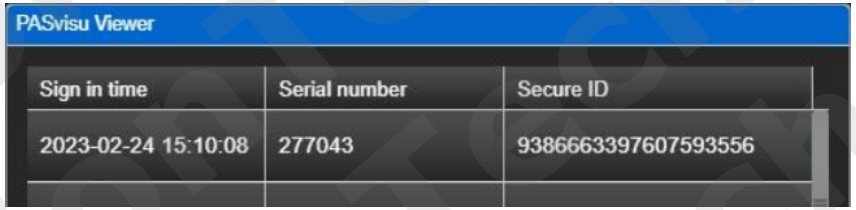
Production
„active“



1 Person
in Safe List

2 Persons
in Safe List

3 Persons
in Safe List

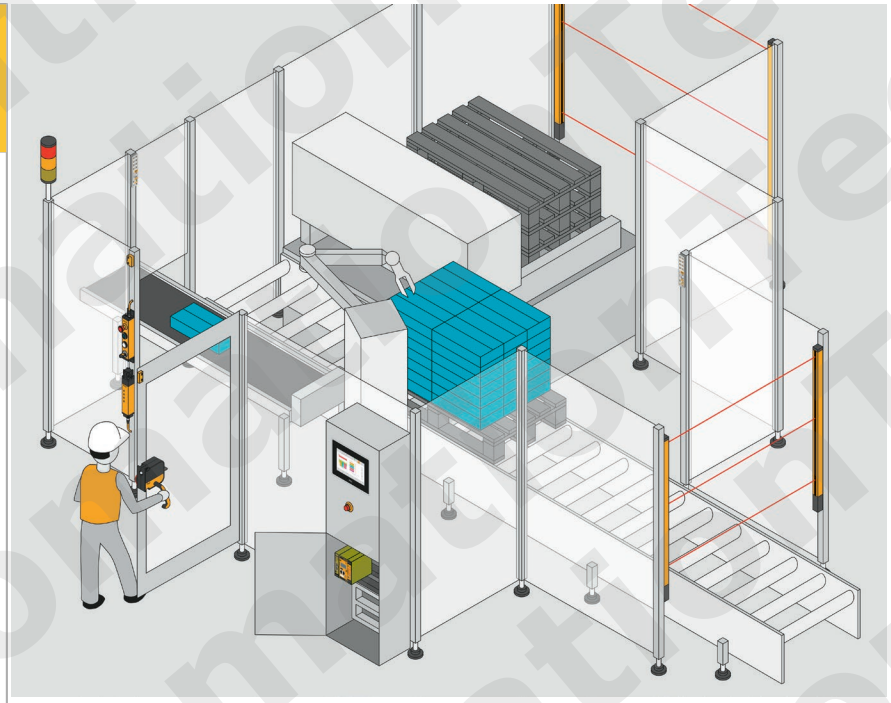


Safe and Secure Access Management

Example of realisation

② Safe operating mode selection

switch operating modes safely



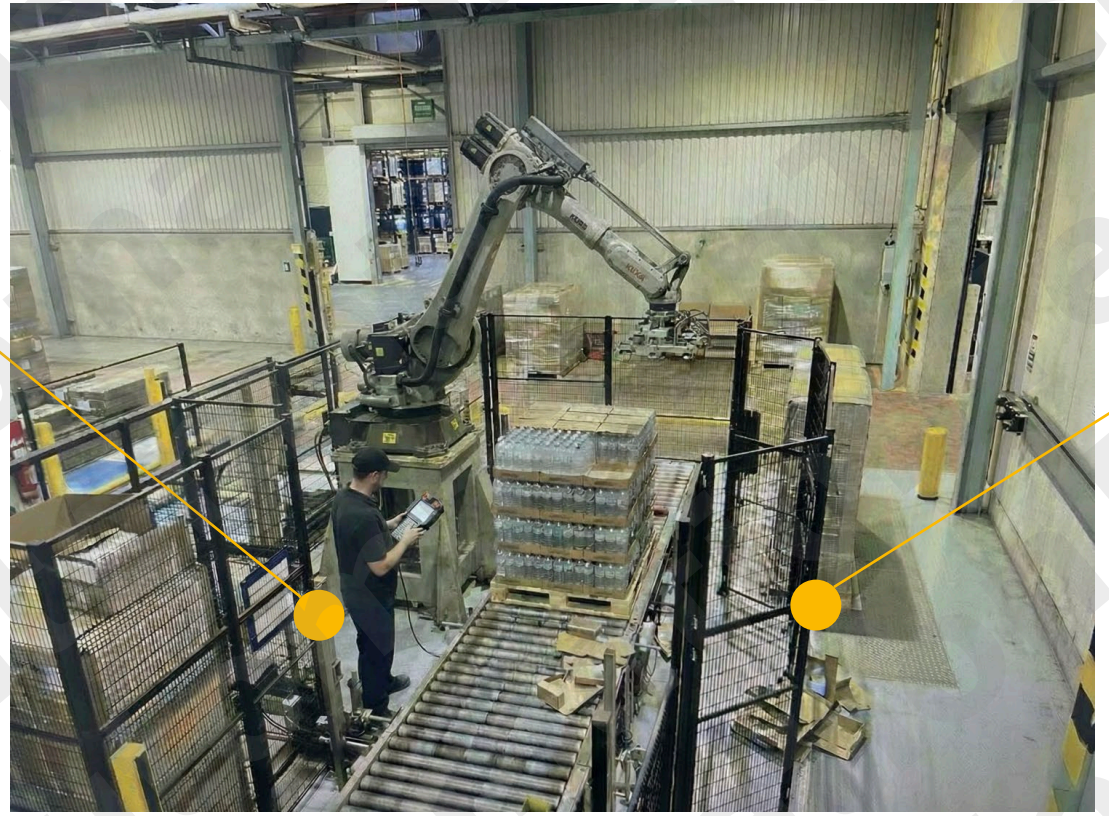
Personal Identification & Access

- When the **operating modes** of machines **are switched,** the safety level can change because **protective measures** will be **overridden** / switched off.
- Operating Mode selection:
  - Authorise operation mode
  - Link Control Devices to right amount of persons involved in the task
  - …
- Reset and Restart protection:
  - Define Reset and restart after operation mode change
  - Reset of unusual intervention (Via Muting Lightcurtain, E-Stop)

Task & Role & Level matrix

Examples

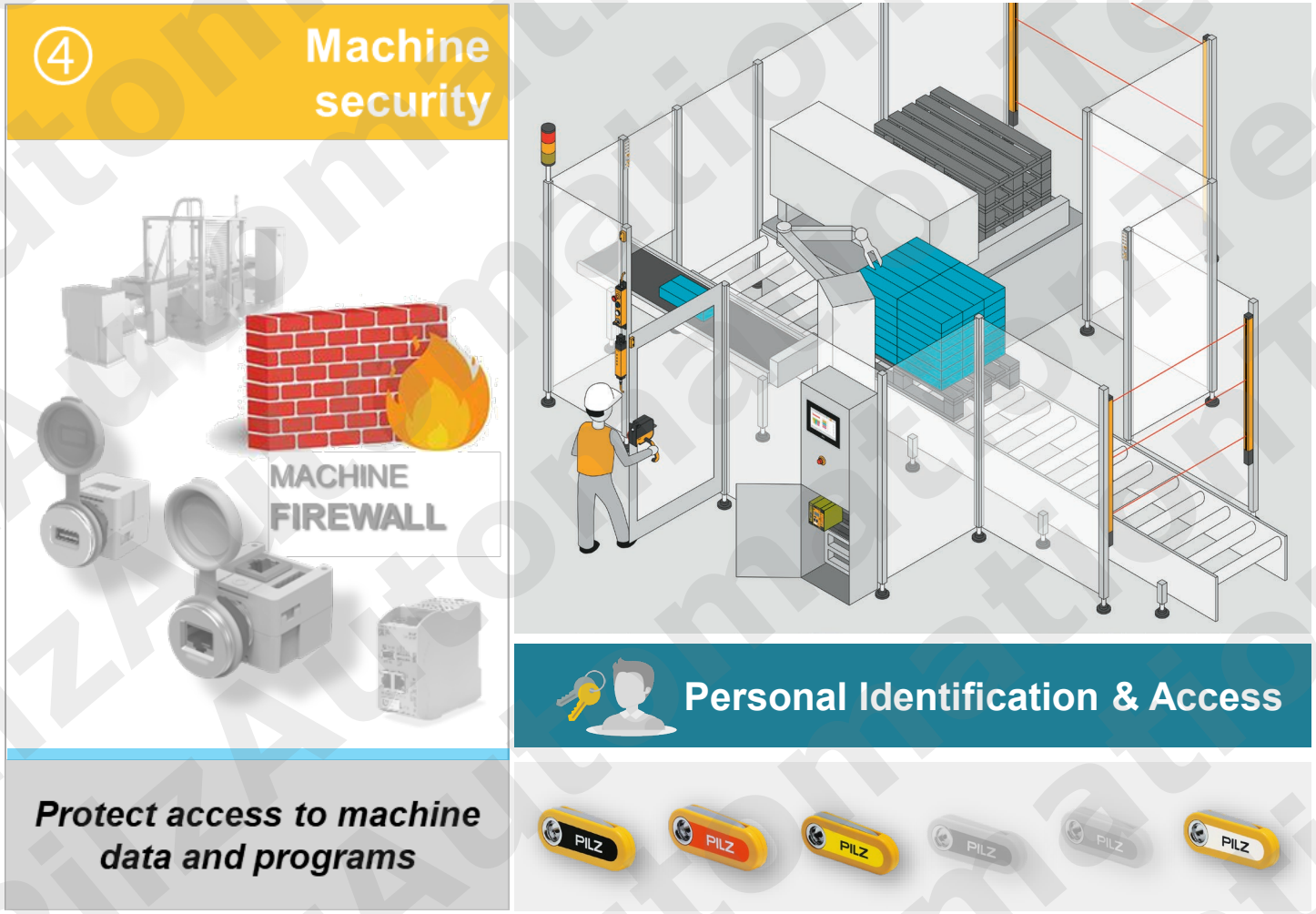
Task	Minor Intervention	Whole Body Access	#People	Operator	Maintenance operator	Site Maintenance Manager / Specialised personnel
Teach pick/place positions for new carton size	yes	yes	2		LEVEL 2	LEVEL 3



AI generated image

Safe and Secure Access Management

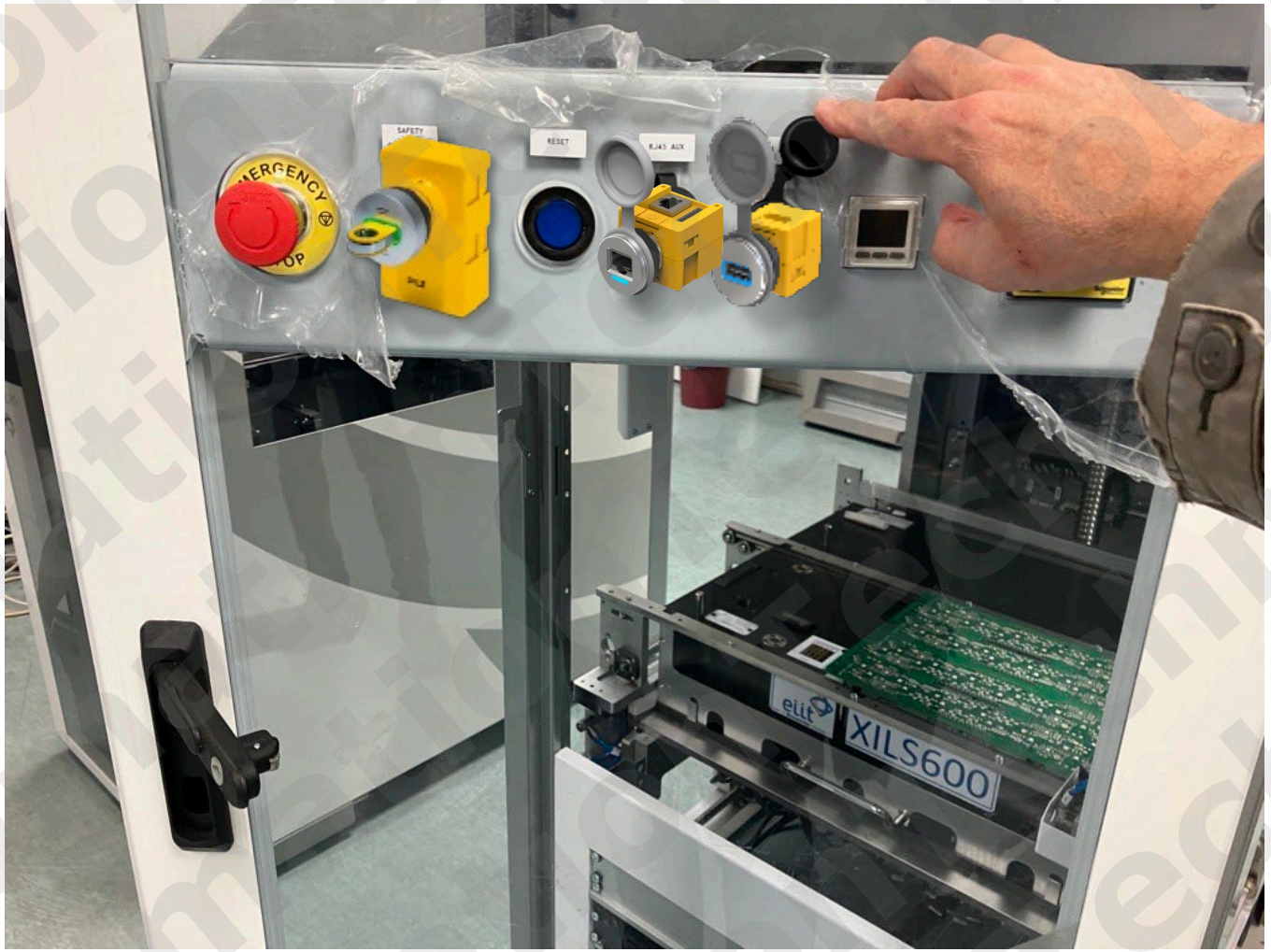
Example of realisation



- Machine data and program protection
  - Keep an individual machine access log
  - Authorised Key to access and change programmes (instead of passwords)
  - Remote Access to machines only via locally authorised opening of ports
  - ...

Data protection example

Prevention of malicious access to USB port on operator panel



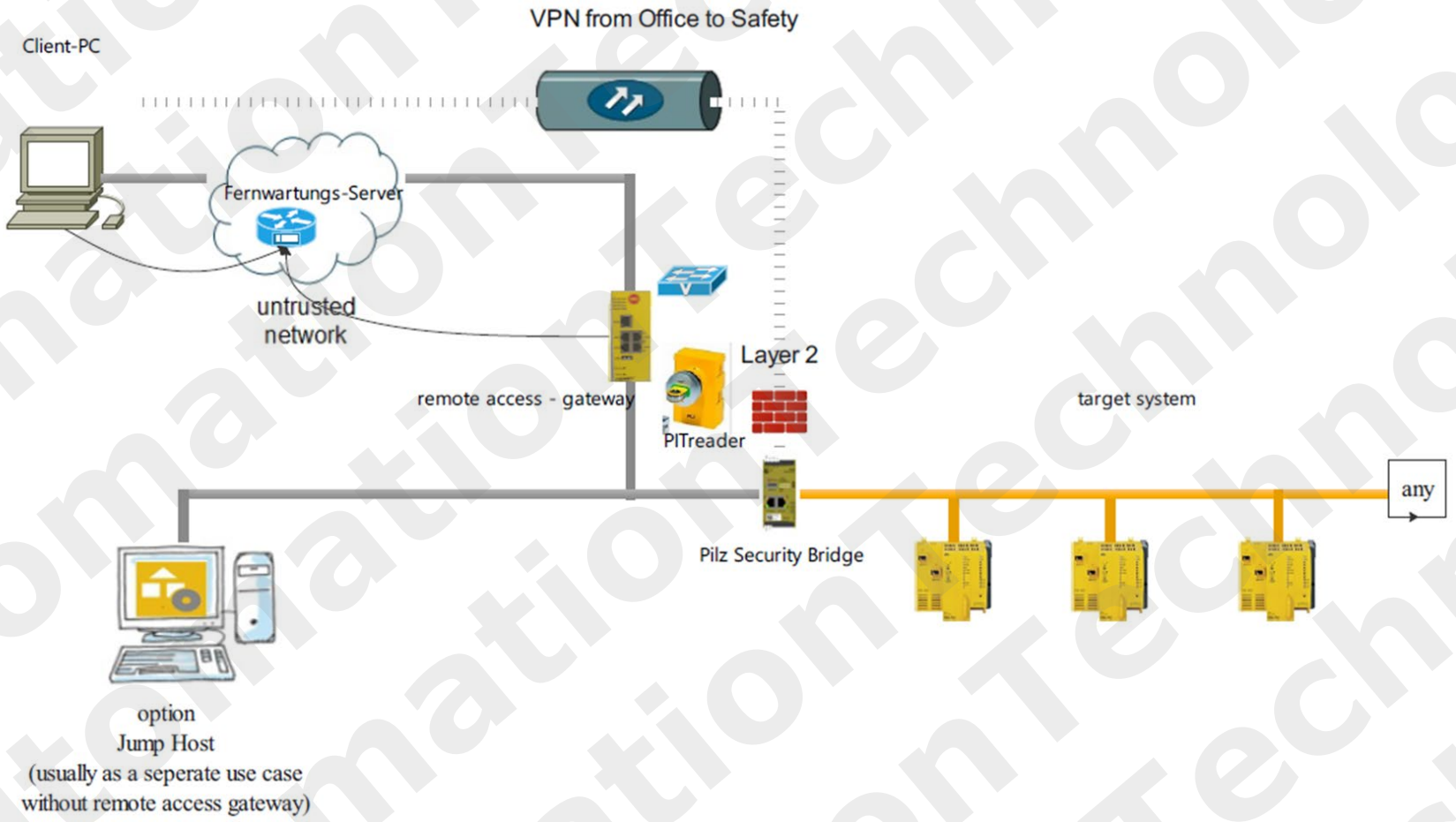
Catalog of Measures VPN

VPN means "Virtual Private Network". Via the VPN tunnel, the user can see the zone as if it were physically directly connected to the zone.

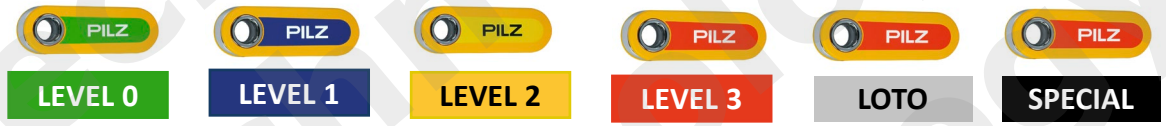
- The data is transmitted encrypted.

Possible **foundational requirements** through VPN:

- **FR 2 (use control)**
- **FR 3 (system integrity)**
- **FR 4 (data confidentiality)**



Task & Role & Access Level matrix



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Safe and Secure Access Management

Possible Access Solutions around a Stretch wrapper application

LEVEL 0 Machine Safeguarding – No Access

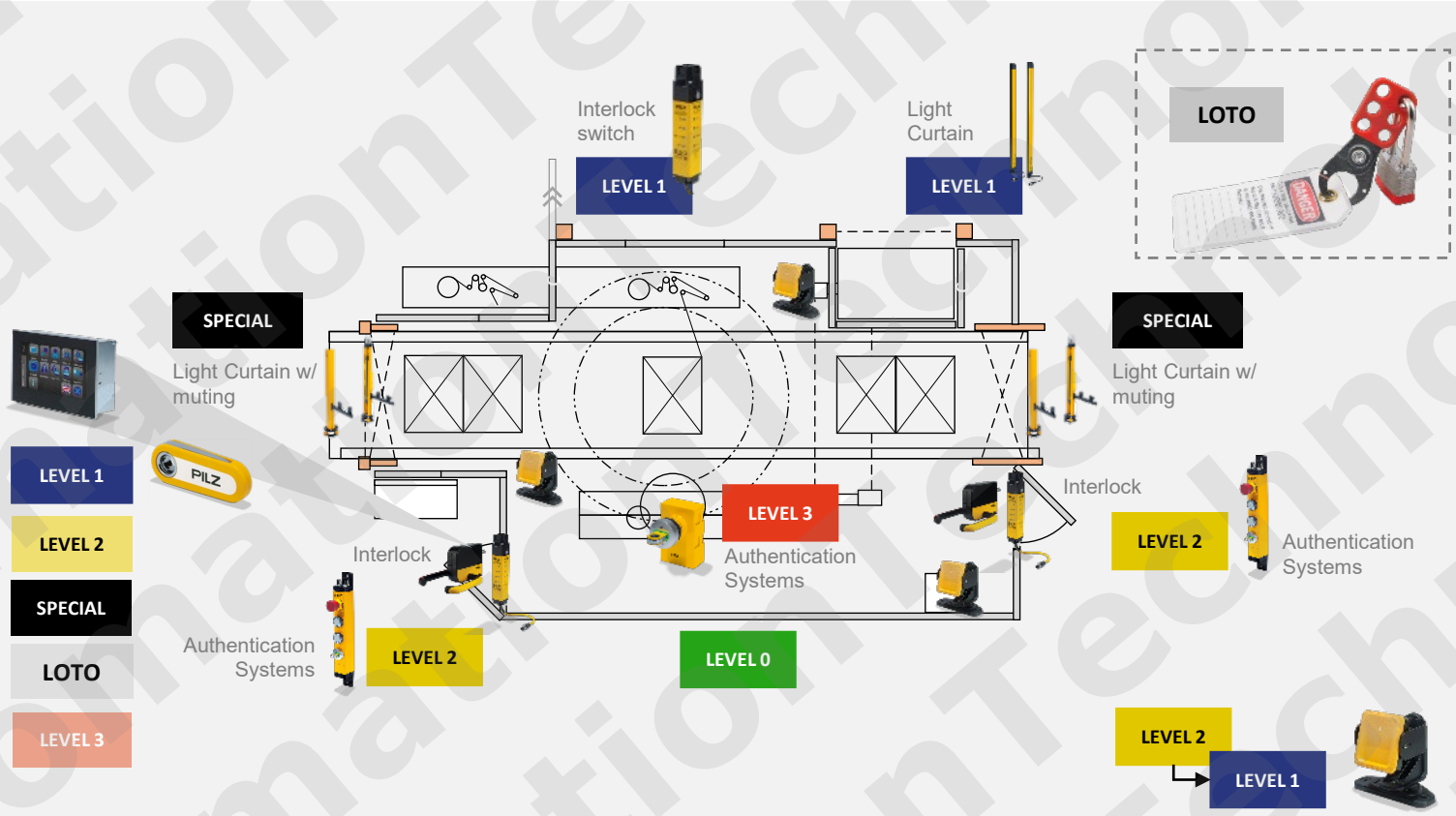
LEVEL 1 Load/Unload - No full body access possible

LEVEL 2 Enter for Cleaning - Full body access possible

LEVEL 3 Set-Up / Tool change - Full body access

LOTO Major maintenance - Full body access

SPECIAL In-/Out-feed - Foreseeable misuse access



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Safe and Secure Access Management

Summary & Benefits

Reliability: Reduced unplanned downtime through better asset reliability

Visibility: Clear visibility and data for faster, smarter decisions

Acceptance: Processes that remove daily firefighting and integrate seamless with plant needs

PILZ

THE SPIRIT OF SAFETY

ISCS Service:

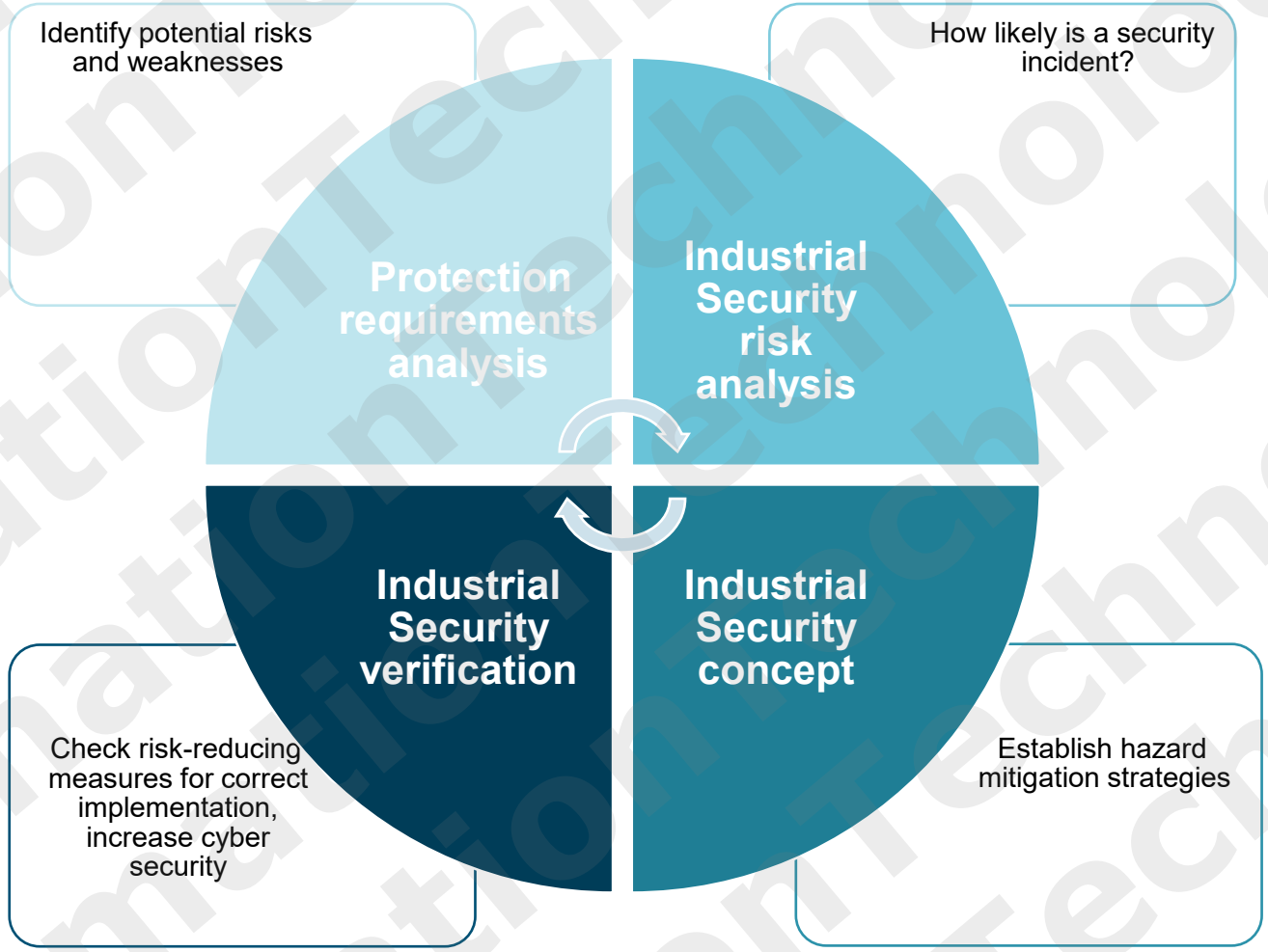
Industrial Security Consulting Service

ISCS – Industrial Security Consulting Service

Industrial Security on the machine – because Safety matters

- The ISCS is cutting edge, with its finger on the pulse of the market:
- As a machine manufacturer and operator, Industrial Security measures are the only way to meet the normative and legal requirements
- Expand your processes and take Industrial Security into account
- Have your machinery examined specifically for cyber weaknesses

- A new service from Pilz: The ISCS is made up of 4 modules and helps you to implement Industrial Security on your machines



ISCS – Industrial Security Consulting Service

Industrial Security on the machine – because Safety matters

- Step 1:
  Protection requirements analysis
- Identify the applicable standards and regulations
- Determine the limits of the system under consideration
- Identify the protection objectives of each of the system's assets, based on the expected level of damage if confidentiality, integrity or availability is lost

- **Advantage to you:**
  Identify potential risks and weaknesses

- **Benefit to you:**
  Raise awareness of the hazard

ISCS – Industrial Security Consulting Service

Industrial Security on the machine – because Safety matters

- Step 2:
  Industrial Security risk evaluation
- Identify every risk for each asset within each life phase of the system, with regard to the considered protection goals
- Recommended approach for reducing risk
- As an option, identify the system stability and vulnerabilities
- Document the weaknesses and relevant hazard

- **Advantage to you:**
  Risk is evaluated

- **Benefit to you:**
  Extent of the risk is estimated

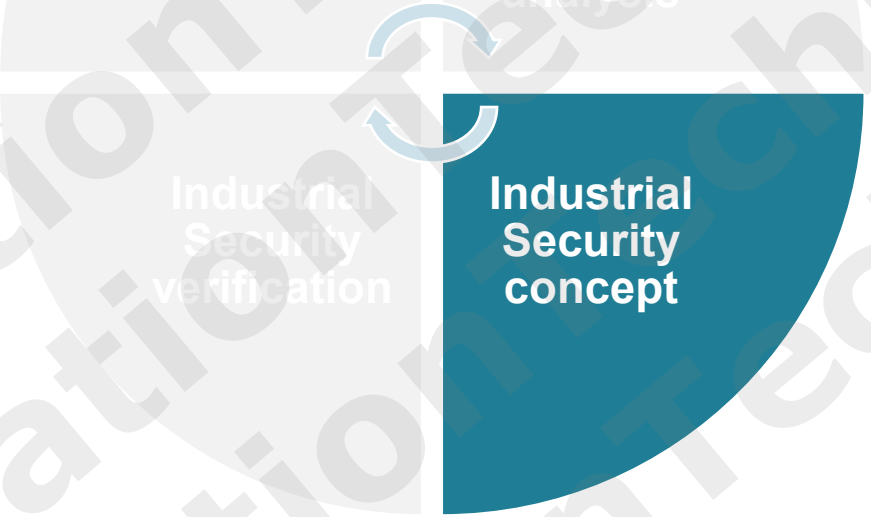
ISCS – Industrial Security Consulting Service

Industrial Security on the machine – because Safety matters

- Step 3:
  Industrial Security concept
  (identify hazard mitigation strategies)
- Determine the security level for each system section
- Define and specify potential countermeasures
- Consider availability and productivity
- Detailed assignment of safety measures to identified risks
- Create policies, rules and guidelines for reducing the risk over the whole machine lifecycle.
- Document the requirements and implementation recommendations

- **Advantage to you:**
  Productivity-optimised strategy for protection and strengthening against cyber attacks or misuse and manipulation

- **Benefit to you:**
  Ability to plan countermeasures



ISCS – Industrial Security Consulting Service

Industrial Security on the machine – because Safety matters

- Step 4:
  Industrial Security system verification

- Check the effectiveness of the measures implemented
- Produce a test report with information about the results and possible non-compliances

- **Advantage to you:**
  Risk-reducing measures with correct implementation, increased cyber security

- **Benefit to you:**
  Liability protection, cost savings, plant availability, image protection

ISCS – Industrial Security Consulting Service

Industrial Security on the machine – because Safety matters

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- In a nutshell:
- The ISCS service from Pilz ensures that security incidents are reduced (including those that are triggered unintentionally)
  - You'll achieve increased machine availability
  - A cyber-attack is prevented or mitigated, with fewer repercussions

  → Cost savings

- Through ISCS you ensure that the Machinery Regulation and relevant standards are applied and implemented correctly
  - You minimise Industrial Security weaknesses and ensure verifiable countermeasures to qualify CE marking,

  → liability protection, maintain profitability