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7	Machines, machine tools, power-operated tools; beverage preparation machines, electromechanical; control mechanisms for machines, engines or motors; cutting machines; industrial robots; packaging machines; packing machines; presses [machines for industrial purposes]; sorting machines for industry; spinning machines; vending machines

Centificate istration



This is to Certify That The Quality Management System of

### RAMANI PRECISION MACHINES PRIVATE LIMITED

PLOT NO. 162, SECTOR - 82, JLPL INDUSTRIAL AREA, S.A.S NAGAR MOHALI - 160055, PUNJAB, INDIA.

has been audited and conformed to be in accordance with the requirements of

# ISO 9001:2015

The Quality Management System is Applicable to :

DESIGN, DEVELOPMENT, MANUFACTURE AND SUPPLY OF MACHINES AND AUTOMATION SYSTEMS AND IMPLEMENTATION OF PROJECT ON TURN KEY BASIS FOR MASS PRODUCTION OF PRODUCTS.

Certificate No Initial Registration Date Date of Expiry 1st Surve. Due : **QDE431122** : 29/11/2022 : 28/11/2025 : 29/10/2023

Issuance Date : 29/11/2022 2nd Surve. Due : 29/10/2024





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## Certificate of Conformity

This certificate has been awarded to

Ramani Precision Machines Pvt. Ltd.

Plot No. C – 28, Industrial Focal Point, Derabassi-160022, Punjab (India)

In recognition of the organization's compliance to relevant clauses of

Low Voltage Directive (2014/35/EU), Machinery Directive (2006/42/EU) Electromagnetic Compatibility Directive (2014/30/EU) and in conformity with the harmonized standards

EN 60204-1:2018, EN ISO 12100:2010, EN 55011, IEC 61000-4-2:2008 IEC 61000-4-4:2012, IEC 61000-4-5:2014, IEC 61000-4-6:2013 EN 61000-6-2:2019, EN 61000-6-4:2007+A1:2011

#### for the product

#### ACAC Core Builder

Technical Specification: 400V, 50Hz, 45 Amp, 32KVA, 3-Phase Sr. No.: RPML/VM/1516/ACACCB02 & RPML/VM/1600/ACACCB03)

The technical report & documentation at the applicant's disposal

#### Conditions of issue:

This certificate refers to the information examined and read with the manufacturer's declaration of conformity.

Any modifications made subsequent to the examination of the documentation, unless approved by United Registrar of Systems Products Limited will nullify this certification.

Further, the product liability rests with the manufacturer, or his nominated representative, in accordance with the EU Directive 85/374/EEC.

Products entering the European Union are subjected to the requirements of the applicable European Directive(s).

Certificate Number CE/IN/021 TCF Reference RPM/2019/CACCB02 Date of Issue 28/05/2019

Issue Number 01

CE

Issued By:

CE

The CE Marking may be used when all the relevant & effective EU Directives are complied with

UNITED REGISTRAR OF SYSTEMS PRODUCTS LIMITED Derby Manor, Derby Road, Bournemouth, BH1 3QB. UK

Page | 1



EUROPEAN INSPECTION AND CERTIFICATION COMPANY S.A.

### CERTIFICATE OF CONFORMITY

#### FULLNESS EXAMINATION OF TECHNICAL FILE

IN.CE.EU.0156-A/15
: 15/09/2015
: 14/09/2020
RAMANI PRECISION MACHINES (P) LTD
PLOT NO. C-28, INDUSTRIAL FOCAL POINT , DERABASSI, 140 507 PUNJAB INDIA
SAME AS ABOVE
ITC/TEST/NS/1507/05-A
: N/A
RAMANI
OIL COOLER LEAK TEST MACHINE
Low Voltage Directive 2006/95/EC, Machinery Directive(2006/42/EC)
EN 12100 :2010, EN 60204-1:2006+A1:2009

This is to certify that, upon the relevant application of RAMANI PRECISION MACHINES (P) LTD as Third Party Authority has reviewed the Technical Construction File of the described product which found to fulfill the basic health and safety prerequisites of above mentioned Directive(s).

#### Note:

- The manufacturer should issue a Declaration of Conformity according to the basic requirements of the applicable and relevant directives.
- The CE marking can be affixed on the above mentioned product with the manufacturer's responsibility, if all relevant and applicable directives are complied with.
- All modifications to the Technical File should be first submitted to the Third Party Inspection Authority to ensure further validity of this attestation.
- This certificate is valid only for the product and configuration described and in conjunction with the technical data detailed above.



On Behalf of EUROCERT George N Sifonios Director of Development

89 CHLOIS STR & LIKOVRISEOS, 144 52 METAMORFOSI, ATHENS, GREECE Tel =+30 210 62 52 495, 30 210 62 53 927 Fax: ++30 210 62 03 018 Ibternet film www.eurocent.gr ==mail\_eurocent@ofenet.gr





## Certificate of Conformity

This certificate has been awarded to

Ramani Precision Machines Pvt. Ltd.

Plot No. C – 28, Industrial Focal Point, Derabassi-160022, Punjab (India)

In recognition of the organization's compliance to relevant clauses of

Low Voltage Directive (2014/35/EU), Machinery Directive (2006/42/EU) Electromagnetic Compatibility Directive (2014/30/EU) and in conformity with the harmonized standards

EN 60204-1:2018, EN ISO 12100:2010, EN 55011, IEC 61000-4-2:2008 IEC 61000-4-4:2012, IEC 61000-4-5:2014, IEC 61000-4-6:2013 EN 61000-6-2:2019, EN 61000-6-4:2007+A1:2011

for the product

#### ACAC Core Stacker

Technical Specification: 400V, 50Hz, 45 Amp, 32KVA, 3-Phase (Sr. No.: RPML/VM/1516/ACACCS02 & RPML/VM/1600/ACACCS03)

The technical report & documentation at the applicant's disposal

#### Conditions of issue:

This certificate refers to the information examined and read with the manufacturer's declaration of conformity.

Any modifications made subsequent to the examination of the documentation, unless approved by United Registrar of Systems Products Limited will nullify this certification.

Further, the product liability rests with the manufacturer, or his nominated representative, in accordance with the EU Directive 85/374/EEC.

Products entering the European Union are subjected to the requirements of the applicable European Directive(s).

 Certificate Number
 TCF Reference
 Date of Issue
 Issue Number

 CE/IN/022
 RPM/2019/CACCS02
 28/05/2019
 01

 Issued By:
 Issued With the contract of the co

Page | 1





## Certificate of Conformity

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Ramani Precision Machines Pvt. Ltd. Plot No. C – 28, Industrial Focal Point, Derabassi -160022, Punjab (India)

In recognition of the organization's compliance to relevant clauses of

Low Voltage Directive (2014/35/EU), Machinery Directive (2006/42/EU) and in conformity with the harmonized standards

> EN 60204-1:2018, EN ISO 12100:2010, EN ISO 4414:2010 EN ISO 13489-1:2015, EN ISO 13849-2:2012

> > for the product

#### Leak Control Machine

Technical Specification: 400V, 50Hz, 30 Amp, 20KVA, 3-Phase (Sr. No.: RPML/VM/1844/LCM01, RPML/VM/1844/LCM02, RPML/VM/1849/LCM03 & RPML/VM/1849/LCM04

The technical report & documentation at the applicant's disposal

Conditions of issue:

This certificate refers to the information examined and read with the manufacturer's declaration of conformity.

Any modifications made subsequent to the examination of the documentation, unless approved by United Registrar of Systems Products Limited will nullify this certification. Further, the product liability rests with the manufacturer, or his nominated

representative, in accordance with the EU Directive 85/374/EEC. Products entering the European Union are subjected to the requirements of the applicable European Directive(s).

Certificate Number

CE/IN/030

TCF Reference RPM/2019/LCM Date of Issue 11/07/2019

Issue Number 01

Issued By:

CE The CE Marking may be used when all the relevant & effective EU Directives are complied with

UNITED REGISTRAR OF SYSTEMS PRODUCTS LIMITED United House, 4 Hinton Road, Bournemouth, BH1 2EE, UK



CE

Page | 1

### Flex Core Build Machine PMRA

Report Version: 02



### Ramani Precision Machines Private Limited

Post Measure Risk Assessment







#### **Ramani Precision Machines Private Limited Details**

Mr. Rahul Verma C-28, Industrial Focal Point, Derabassi, Punjab, 140507. +91 9878411320 rahul@ramaniindia.com

#### **Pilz Details**

Rushiraj Patwardhan PILZ INDIA PVT LTD 6th Floor, "Cybernex", Shankar Seth Road, Swargate, Pune 411042 020-49221100 r.patwardhan@pilz.in

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#### 1 Document Identification

DOCUMENT IDENTIFICATION		
Project Name:	Flex Core Build Machine PMRA	
Document Number:	IND-RASVTCFAR-1913	
Version:	02	
Date:	Mar 12, 2019	

	Name	Sign	Date
Lead Author:	Rushiraj Patwardhan	Rushiray	Jul 02, 2019
Author:	Rushiraj Patwardhan	Rushiroy	Jul 02, 2019
Reviewed by:	Abhijit Kulkarni	Abrijut	Jun 08, 2020

Customer contact: Mr. Rahul Verma	
-----------------------------------	--

Table 1 Document Identification

#### 2 List of Revisions

Revision	Description	Changed by	Date	
A	Initial Draft	Rushiraj Patwardhan	Apr 18, 2019	
В	Internal Review	Abhijit Kulkarni	May 16, 2019	
с	Internal Review Accepted &	Rushiraj Patwardhan	May 16, 2019	
C	Document Updated	rtushiraj Fatwarunan	May 10, 2019	
0	Ver 0 Document Generated and	Rushiraj Patwardhan	Jun 27, 2019	
0	Submitted to Customer	rtushiraj Fatwarunan	Juli 27, 2019	
0A	Post Measure Initial Draft	Rushiraj Patwardhan	Jul 01, 2019	
0B	Post Measure Internal Review	Abhijit Kulkarni	Jun 08, 2020	
0C	Post Measure Internal Review	Rushiraj Patwardhan	Jun 08, 2020	
	Accepted & Document Updated	Rushiraj Fatwarunan	Juli 00, 2020	
01	Ver 01 Document Generated &	Rushiraj Patwardhan	Jun 10, 2020	
01	Submitted to Customer		Juli 10, 2020	
02	Ver 02 Document Generated &	Rushiraj Patwardhan	Jun 22, 2020	
02	Submitted to Customer	rushinaj ratwarunan	JUII 22, 2020	

Table 2 List of Revisions

#### 3 General Information

#### 3.1 **Project Information**

MACHINE INFORMATION	
Machine Name:	Flex Core Build Machine
Manufacturer:	Ramani Precision Machines Private Limited
Machine Type:	Assembly Machine
Serial Number:	RPM/DNMN/FOCCB01/94870
Date of Manufacture:	2019
Machine Certification:	To Be CE Marked

Table 3 Machine information

PILZ PERSONNEL / ASSESSMENT	DATE	
Initial Risk Assessment		
Lead Author:	Rushiraj Patwardhan	
Date of assessment:	Mar 12, 2019	
Post measures Risk Assessment		
Lead Author:	Rushiraj Patwardhan	
Date of assessment:	Mar 12, 2019	

Table 4 Pilz Personnel / Assessment Date

RAMANI PRECISION MACHINE	S PRIVATE LIMITED PERSONNEL	
Name:	Function / Job Title:	
Mr. Rahul Verma	Technical Director	

Table 5 Ramani Precision Machines Private Limited Personnel

#### 3.2 Motivation

According to Annex I of the Machinery Directive 2006/42/EC, "The manufacturer of machinery or his authorized representative must ensure that a risk assessment is carried out in order to determine the health and safety requirements which apply to the machinery. The machinery must then be designed and constructed taking into account the results of the risk assessment."

Annex I of the Machinery Directive 2006/42/EC also requires that the manufacturer shall by the iterative process of risk assessment:

- Determine the limits of the machinery, which include the intended use and any reasonably foreseeable misuse thereof
- Identify the hazards that can be generated by the machinery and the associated hazardous situations
- Estimate the risks, taking into account the severity of the possible injury or damage to health and the probability of its occurrence
- Evaluate the risks, with a view to determining whether risk reduction is required, in accordance with the objective of this Directive
- Eliminate the hazards or reduce the risks associated with these hazards by application of protective measures

To ensure their legislative responsibilities of placing machinery on the market that complies with the requirements of applicable directives, Ramani Precision Machines Private Limited Derabassi plant have requested Pilz to undertake a Risk Assessment on the Flex Core Build Machine.

To ensure the appropriate procedure for this Risk Assessment, the harmonised standard EN ISO 12100 "Safety of machinery - General principles for design - Risk assessment and risk reduction" has been followed. This standard gives guidance for decisions during the design of machinery by the manufacturer and describes principles for a consistent and systematic approach to risk assessment.

A Risk Assessment has been carried out on the Flex Core Build Machine at Ramani Precision Machines Private Limited Derabassi plant on the Mar 12, 2019.

After the risk reduction measures a Post Measure Risk Assessment has been carried out on the Flex Core Build Machine at Ramani Precision Machines Private Limited Derabassi plant on the Mar 12, 2019.

#### 3.3 Method of risk analysis

In accordance with ISO 12100, the risk assessment is implemented in a series of logical steps to enable a systematic examination of the hazards associated with machinery. Risk assessment is followed, whenever necessary by risk reduction as described in clause 6 of ISO 12100: 2010. When this process is repeated, it gives an iterative process for eliminating hazards as far as possible and for implementing safety measures.

The risk assessment methodology approach includes:

- Risk analysis
  - Determination of limits
  - Hazard identification
  - Risk estimation
- Risk evaluation

The risk assessment provides the information required for the risk evaluation, which in turn allows judgements to be made on the safety of machinery.

The following diagram shows the step-by-step process of risk analysis:



Figure 1 Method of Risk Analysis

#### 3.4 Limits of Report

This risk assessment report is based on information that was accumulated during the on-site risk assessment of the Flex Core Build Machine in Ramani Precision Machines Private Limited On the Mar 12, 2019. This risk assessment forms part of a CE Marking project.

The information was accumulated in the following fashion:

- 1. Discussions with engineering personnel
- 2. Reviewing all available machine technical information
- 3. Conducting a physical examination of the machine
- 4. Interviewing machine operators

In order to ensure the accuracy of the risk assessment for the machine, it is imperative that the information provided on the date of the risk assessment be correct and reliable. Pilz cannot take any responsibility for judgements made on inaccurate or lack of information.

DOCUMENTA	TION EXAMINED		
N°	Document Name	Туре	Issue Date
RPM/DNMN UK/2019	FOCCB FINAL CONTROL CIRCUIT.bak	Electrical Drawings	10/03/2019
01	FOCCB SAFETY PROGRAM1	Safety PLC Program	12-3-2019
DNMN- FOCCB- 175-00	FINAL PNEUMATIC CIRCUIT-FOCCB 180318 ( REV - R5)	Pneumatic Drawings	18-01-2018
FOCCB-00- 00	General Layout	Mechanical Drawings	09-03-2018
Not Available	SAFETY IO LIST FLEX	Safety I/O list	22-06-2018

The following technical information was made available for the Flex Core Build Machine:

#### Table 6 Documentation examined

The following technical information was made available for the Flex Core Build Machine during Post Measure Risk Assessment:

DOCUMENTA	TION EXAMINED		
N°	Document Name	Туре	Issue Date
RPM/DNMN UK/2019	FOCCB FINAL CONTROL CIRCUIT.bak	Electrical Drawings	10/03/2019
01	FOCCB SAFETY PROGRAM1	Safety PLC Program	12-3-2019
DNMN- FOCCB- 175-00	FINAL PNEUMATIC CIRCUIT-FOCCB 180318 ( REV - R5)	Pneumatic Drawings	18-01-2018
FOCCB-00- 00	General Layout	Mechanical Drawings	09-03-2018
Not Available	SAFETY IO LIST FLEX	Safety I/O list	22-06-2018
RPM/2019/F OCCB01	Machine Manual [FLEX CORE BUILD MACHINE]	Operating Manual	Jun 08, 2020

Table 7 Post Measure Documentation examined

Every effort is made to evaluate the risk associated with each hazard identified throughout the report, however it may not be possible to quantify the risk with all hazards. When this is not possible the hazards are assessed in relation to their conformance with all relevant Legislation. Each hazard is identified individually throughout the report; the outcome from the accumulation of hazards has not been evaluated.

Human error and misuse related to areas such as incorrect feeding of the machine, incorrect use of materials and operator ability to operate the machine are not considered to be under the scope of this report. Only clear foreseen misuse of the machine was considered.

#### 4 Machine Assessment

#### 4.1 Basic Machine Description

The machine is assembly machine by assembling a heat exchanger in semi-automatic mode. Operator loads the aluminium tubes into the fixture. Foot pedal switch is pressed by operator. Then operator loads the fins into the respective fixture and presses the foot pedal switch by coming out of light curtains. The Servo drives moved at desired position as per the recipe of the program. Operator checks and then carried out final tamping. LHS & RHS servo drives goes to final desired position for compressing the tubes and fins. LHS & RHS Servo retracts back to safe position where LHS & RHS Swivel servos can rotate to assemble header plate in tubes. Once the core is assembled, the LHS & RHS servos retract so that the operator can unload the assembled core.



Picture 1 Flex Core Build Machine general view

#### 4.2 Machine Control System Description

The control system for this machine is PLC based. An Allen Bradley make Compact Logix CAT 1769-ECR PLC carries out all standard control functions of the machine. A PILZ make PNOZ mB0 Safety PLC carries out the safety control functions of the machine. The emergency stop, door monitoring safety switches, light curtains, mode selection switches are monitored by safety PLC.



Picture 2 Flex Core Build Machine main control panel

#### 4.3 Machine Specifications

The following data contains the general specifications of the machine:

MACHINE LIMITS	
Intended Environment:	Industrial
Required Level of Training:	Introductory Training
Operated By:	Plant Operators, Maintenance and Technical Personnel
Intended Use:	The machine is assembly machine by assembling a heat
	exchanger in semi-automatic mode.
Machine Lifetime:	20 years
Machine Dimensions:	4562 (L) X 4824 (W) X 3123 (H) in mm
Machine Environment:	The machine is located on the shop floor of Ramani
	Precision Machines Private Limited Derabassi Plant. The
	shop floor is clean and dry with an ambient temperature
	suitable for the machine.

OPERATIONAL AND MAINTENANCE II	NFORMATION
Operational Information	
Raw Material:	Aluminium tubes, Fins & Header Plates
Emergency Stopping Time:	NA
Machine Cycle Time:	Depending upon the type of product
Number of Operators (Normal Use):	01
Number of Control Positions:	01
Maintenance Information	
Maintained By:	Trained Permanent Staff
Maintenance Frequency:	Monthly
Cleaning:	Maintenance Personnel
Jamming Repair:	Maintenance Personnel
Housekeeping:	The house keeping in the area of machine is good.

POWER SOURCES	
Control, Electrical Supply:	24V DC
Main feed, Electrical Supply:	400V AC - 50Hz
Pneumatic Supply:	5 bar
Hydraulic Supply:	Not Applicable

Table 8 Machine Specification and Limits

#### 4.4 Risk Estimation & Evaluation Criteria

In order to identify, estimate and reduce the hazards present in the machine a Preliminary Hazard Analysis was performed using Pilz Hazard Rating (PHR) techniques.

A preliminary hazard analysis produces a line item tabular inventory of non-trivial system hazards and an assessment of their remaining risk after countermeasures have been imposed. The Pilz Hazard Rating technique was used to analyse the risks associated with the machine. This technique offers an analytical approach to the Preliminary Hazard Analysis method.

The Evaluation methodology based on Pilz criteria and experience, an evaluation of the factors, Degree of Possible Harm (DPH), Probability of Occurrence of a Hazardous Event (PO), Possibility of Avoidance (PA) and Frequency and/or duration of Exposure (FE), and has been performed on the risk related with each hazard. A Pilz Hazard Rating has then been calculated from the following formula:

PHR = DPH x PO x PA x FE

Where the above parameters can take the following values:

#### Degree of Possible Harm (DPH)

0	.25	Scratch / Bruise
		Laceration / cut / mild ill health effect/ minor burns
3		Fracture minor bone – fingers, toes
5		Fracture major bone – hand, arm, leg
8		Loss of 1 or 2 fingers/ toes or major burns
11	1	Leg / hand amputation, partial loss of hearing or eye
15	5	Amputation of 2 legs/hands, total loss of hearing/sight in both ears/eyes
25	5	Critical injuries or permanent illness/condition/injury
4(	0	Single Fatality
65	5	Catastrophe
Possibilit	ty of C	Occurrence of Hazard Event (PO)
_		

- 0.05 Almost impossible
- 1.25 Unlikely
- 2.5 Possible
- 4 Probable
- 6 Certain

#### Possibility of Avoidance (PA)

- 0.75 Possible
- 2.5 Possible under certain circumstances
- 5 Not Possible

#### Frequency of Exposure (FE)

- 0.5 Annually
- 1 Monthly
- 2 Weekly
- 3 Daily
- 4 Hourly
- 5 Constantly

The maximum and minimum numerical values that could be assigned to each factor for every hazard are shown in the following table.

PHR	Risk	Comment
1 - 10	Negligible Risk	Presents practically no risk to health and safety, no further
		risk reduction measures are required.
11 - 20	Very Low Risk	Presents very little risk to health and safety, no significant risk
		reduction measures are required, may necessitate the use of
		personal protective equipment and/or training.
21 - 45	Low Risk	Risk to health and safety is present, but low. Risk reduction
		measures must be considered.
46 - 160	Significant Risk	The risk associated with the hazard is substantial enough to
		require risk reduction measures. These measures should be
		implemented at the next suitable opportunity.
161 - 500	High Risk	Potentially dangerous hazard, which requires risk reduction
		measures to be implemented urgently.
501+	Very High Risk	Risk reduction measures should be implemented
		immediately, corporate management should be notified.

Table 9 PHR Numerical Range

After a complete examination of the machine based on applicable standards, a numerical value was determined for each factor while conducting the Risk Assessment and the Pilz Hazard Rating was calculated. The calculated number was then used to evaluate the risk associated with the hazard by comparison with predetermined acceptable levels.

The calculated Pilz Hazard Rating ranges from 1 to 9750 where 1 is the lowest showing minimum and 9750 is the highest risk.

#### 4.5 Findings

The following tables contain detailed descriptions of the hazards found during the risk assessment. Each hazard is described individually but considered as a part of the system.

#### 4.5.1 Mechanical Section



This section covers all the hazards related to Mechanical parts of the machine.

Picture 3 Mechanical Section

Hazard Identifi	cation			Hazard No:	1.1
Title	Loading of components				
Location	Machine Front				
Target	Lower Limbs			Marine Al	3
Activity	Normal Operation		· .	10/	T
Task	Operation				12
Sub Task	Feeding, loading of raw ma	terial		15/GW/a/sr 12	
Hazard Type	Mechanical Hazard with the	consequence	e of		
Sub Type	Crushing				
Description	-	echanical Ha	onent and its child parts loading is zard with the consequence of Crus ponent.		-
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:	3	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		4
Pilz Hazard Ra	ting (PHR):	75	Summary Level:	Significant	Risk
Risk Reduction	ı			Reference	
as well as Oper operation. All th	e standard procedure which ir ator training. Use of adequate is information's should be ava ing should be provided to the	e PPE should ailable in oper		EN ISO 12100	
Possible Resid	lual Risk				
Degree of Poss	ible Harm:	3	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		4
Pilz Hazard Ra	ting (PHR):	1	Summary Possible Level:	Negligible	Diale

Post Measures Risk Assessmer			
Assessment Date	Jun 08, 2020	PLUX 0000 80	ED MADERE
Degree of Possible Harm	3	C. MACHINE OPPRATIONE CI. Loading of Comparations The operator has to load the comparation memory.	
Probability of Occurrence of a Hazardous Event	0.05	C2 Multi-o 4 Gyundian + Toter of Constraints. Solid - AUTORN 1700 C3. AUTO Syste Properties Constr Bases on Antonio 4 - Sum System 11, Constraints and Autornalist - Sum System 11, Constraints and Statements and - Sum System 11, Constraints and Statements and Statements and -	
Possibility of Avoidance	2.5	<ul> <li>A decays is ON and the AP Presence is ON</li> <li>States I have because must be ON</li> <li>States (have because must be ON</li> <li>States (have because must be ON</li> <li>The states of a set to be back the one back the ON (because theory from the ON). In ON</li> <li>The states of a set to back theory back the ON (because theory from the ON).</li> <li>Ch. Operation Statement C</li> </ul>	r Auto cycle. E puch hutton from opurating pacel
Frequency And / Or Duration of Exposure	4	Index (AVID outset Answers and an answers botts index (Spannaling Faund Answers and and answers in a straining Andre (Answers) and answers Mandel (Answers) answers Carel Result of Sami (Straining Control Sami (Spannaling Control Sami) Carel Result of Sami (Sami (Straining Control Sami)) Sami (Straining Control Sami)) Sami (Straining Control Sami)) Sami (Straining Control Sami)) Sami (Sami (Sami)) Sami (Sami (Sami))) Sami (Sami (Sami (Sami)))) Sami (Sami (Sami (Sami)))) Sami (Sami (Sami (Sami (Sami))))) Sami (Sami (Sami (Sami (Sami)))))) Sami (Sami (Sami (Sami (Sami)))))))) Sami (Sami (Sami (Sami (Sami))))))))))))))))))))))))))))))))))))	Ada Ada Ada Ada Ada Ada O Pada Ada O Pada Ada
Pilz Hazard Rating (PHR)	1	<ul> <li>U.K. 401 Take Alex Transmitter to process to gaming and Gamp Oracle 7 in a Stangarder of Take Alexand Oracle 7 in a Stangard Take and Take Have Stangard Take and Take Alexand Have Stangard to gamp and Alexangements to gamp and Have Stangard to gamp and Alexangements to gamp and Have Stangard to stangard to the stangard to the stangard Have Stangard to stangard to the stangard to the stangard Have Stangard to the stangard tot the stangard</li></ul>	Auto
Summary Level	1	Page 2014, 21 And Statution For Nation     Page 2014, 21 And Statution For Nation     Page 2014, 21 And Statution, 2014,	Auto
Negligible Risk			adaton Machines Private Limited
Risk Reduction Measures Desc	ription	1	Reference
suitable guidelines made available components. Use of adequate PP information's are made available i Considering risk reduction measu Limited the hazard is accepted. N	e which includes safe wa E is mandatory during th n operating manual. res implemented by Rar	ne machine operations. All this nani Precision Machines Private	EN ISO 12100
components. Use of adequate PP information's are made available i	e which includes safe wa E is mandatory during th n operating manual. res implemented by Rar	ay of handling for loading of ne machine operations. All this nani Precision Machines Private	EN ISO 12100
components. Use of adequate PP information's are made available i Considering risk reduction measu Limited the hazard is accepted. No	e which includes safe wa E is mandatory during th n operating manual. res implemented by Rar o further risk reduction r	ay of handling for loading of ne machine operations. All this nani Precision Machines Private neasures are necessary.	EN ISO 12100
components. Use of adequate PP information's are made available i Considering risk reduction measu Limited the hazard is accepted. N	e which includes safe wa E is mandatory during th n operating manual. res implemented by Rar o further risk reduction r	ay of handling for loading of ne machine operations. All this nani Precision Machines Private neasures are necessary.	EN ISO 12100

Hazard Identific	ation			Hazard No:	1.2
Title	Access to Pinch Points_Fro	nt			
Location	Machine Front				
Target	Finger/Hand		A REAL PROPERTY AND A REAL	-	
Activity	Normal Operation			an Kanin	-1
Task	Operation				
Sub Task	Driving the machine			tavararie tä:	IJ
Hazard Type	Mechanical Hazard with the	consequenc	e of		
Sub Type	Crushing				
Risk Estimatior	operations. This present Me accessed. and Evaluation	chanical Haz	zard with the consequence of Crus	hing to operator	when
Degree of Possil	ble Harm:	5	Possibility of Avoidance:		
Probability of Oc Event:	currence of a Hazardous	2.5	Frequency And / Or Duration of		2.5
			Exposure:		2.5 4
Pilz Hazard Rat	ing (PHR):	125	Exposure: Summary Level:	Significant	4
Pilz Hazard Rat Risk Reduction		125		Significant Reference	4
Risk Reduction The suitable gua machine should the components disturbed the ha	ards to prevent the possible a be installed. As the access re	ccess to haza equired is free illed at operation be stopped by	Summary Level: ardous movements of the quent for loading and unloading tor sides. When light curtains are y safety controller. The light	-	4 Risk
Risk Reduction The suitable gua machine should the components disturbed the ha	ards to prevent the possible a be installed. As the access re light curtains should be insta zardous movements should l be installed at safe distance i	ccess to haza equired is free illed at operation be stopped by	Summary Level: ardous movements of the quent for loading and unloading tor sides. When light curtains are y safety controller. The light	Reference EN ISO 13855 EN ISO 12100	4 Risk
Risk Reduction The suitable gua machine should the components disturbed the ha curtains should b	ards to prevent the possible a be installed. As the access re light curtains should be insta zardous movements should l be installed at safe distance i ual Risk	ccess to haza equired is free illed at operation be stopped by	Summary Level: ardous movements of the quent for loading and unloading tor sides. When light curtains are y safety controller. The light	Reference EN ISO 13855 EN ISO 12100	4 Risk
Risk Reduction The suitable gua machine should the components disturbed the ha curtains should the Possible Reside Degree of Possi	ards to prevent the possible a be installed. As the access re light curtains should be insta zardous movements should l be installed at safe distance i ual Risk	access to haza equired is free illed at operat be stopped by n accordance	Summary Level: ardous movements of the quent for loading and unloading tor sides. When light curtains are y safety controller. The light e with EN ISO 13855.	Reference EN ISO 13855 EN ISO 12100	4 Risk

Post Measures Risk Assessmer	nt			
Assessment Date	Mar 12, 2019			
Degree of Possible Harm	5			
Probability of Occurrence of a Hazardous Event	0.05	R		
Possibility of Avoidance	2.5			
Frequency And / Or Duration of Exposure	4			
Pilz Hazard Rating (PHR)	2			
Summary Level				
Negligible Risk				
Risk Reduction Measures Desc	ription		Reference	
The possible access to various mechanical pinch points are restricted by installing suitable sizes fixed covers. The operator loading & unloading area is also installed with Keyence make GL-R70HG light curtains. The light curtains are connected and monitored by PILZ PNOZ mB0 safety controller. The hazardous movements of the machine are stopped when this light curtains are interrupted.EN ISO 13855 EN ISO 12100 IEC 61496-1The stop time measurement of the machine is carried out by OEM. Based on the response 				
Residual Risk				
Residual Risk Operating and Safety instructions should be followed during operation of the machine.				

Hazard Identifi	cation			Hazard No:	1.3		
Title	Access to Pinch Points_LHS	3					
Location	Machine LHS						
Target	Finger/Hand						
Activity	Maintenance				E		
Task	Fault-finding/Troubleshootin	g					
Sub Task	Fault-finding				10		
Hazard Type	Mechanical Hazard with the	consequence	e of				
Sub Type	Crushing						
Description	<b>Description</b> There is possible access to various mechanical pinch points from LHS of the machine. This present Mechanical Hazard with the consequence of Crushing to operator when accessed.						
Risk Estimatio	n and Evaluation						
Degree of Poss	ible Harm:	5	Possibility of Avoidance:		2.5		
Probability of O Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		2		
Pilz Hazard Ra	ting (PHR):	62	Summary Level:	Significant	Dick		
<b>Risk Reduction</b>	ı			Reference	NISK		
The suitable guards to prevent the possible access to hazardous movements of the machine should be installed. As the access is required for fault findings, repairing activities the light curtains should be installed at this area. When light curtains are disturbed the hazardous movements should be stopped by safety controller. The light curtains should be installed at safe distance in accordance with EN ISO 13855.							
machine should the light curtains hazardous mov	be installed. As the access is s should be installed at this are ements should be stopped by	required for ea. When ligh safety contro	fault findings, repairing activities nt curtains are disturbed the Iler. The light curtains should be	EN ISO 13855 EN ISO 12100			
machine should the light curtains hazardous mov	be installed. As the access is s should be installed at this are ements should be stopped by distance in accordance with E	required for ea. When ligh safety contro	fault findings, repairing activities nt curtains are disturbed the Iler. The light curtains should be	EN ISO 13855 EN ISO 12100			
machine should the light curtains hazardous mov installed at safe	be installed. As the access is s should be installed at this are ements should be stopped by distance in accordance with E	required for ea. When ligh safety contro	fault findings, repairing activities nt curtains are disturbed the Iler. The light curtains should be	EN ISO 13855 EN ISO 12100			
machine should the light curtains hazardous movi installed at safe <b>Possible Resic</b> Degree of Poss	be installed. As the access is s should be installed at this are ements should be stopped by distance in accordance with E	required for ea. When ligh safety contro EN ISO 1385	fault findings, repairing activities at curtains are disturbed the Iler. The light curtains should be 5.	EN ISO 13855 EN ISO 12100			



Picture 4 Hazard 1.3, Image 1, LHS of the machine

\_\_\_\_\_

Post Measures Risk Assessme					
Assessment Date	Mar 12, 2019				
Degree of Possible Harm	5				
Probability of Occurrence of a Hazardous Event	0.05				
Possibility of Avoidance	2.5				
Frequency And / Or Duration of Exposure	2				
Pilz Hazard Rating (PHR)	1				
Summary Level					
Negligible Risk					
Risk Reduction Measures Desc	ription		Reference		
of the machine. The hazardous movements of the machine are stopped when this light curtains are interrupted. The stop time measurement of the machine is carried out by OEM. Based on the response time of the actuators the safety distances of light curtains are calculated and it would be 247 mm. The light curtains are installed at 342 mm from the hazardous points which is well beyond the calculated safety distance. Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.					
<b>Residual Risk</b> Operating and Safety instructions	should be followed durin	ng operation of the machine.			
Residual Risk Operating and Safety instructions should be followed during operation of the machine.					



Picture 5 Hazard 1.3, Image 1, Fixed guarding with warning signs Picture 6 Hazard 1.3, Image 2, LHS of the machine

Hazard Identifi	cation			Hazard No:	1.4	
Title	Access without Disturbing L	ight Curtain			I	
Location	Machine RHS					
Target	Finger/Hand				E	
Activity	Maintenance			NUT NUT C	-	
Task	Fault-finding/Troubleshootin	g				
Sub Task	Fault-findings				444 56)	
Hazard Type	Mechanical Hazard with the	consequenc	e of			
Sub Type	Crushing/Impact					
Description	Fault-finding/Troubleshootin there is possible access to t access finger scanner witho	g and cleanir he controls p ut disturbing	ntenance access the machine infe ng activities. Being present in mac resent on operating panel like safe light curtain installed at front side. e of Crushing Finger or impact wh	hine RHS infeed ety reset, secure This present	l area,	
Risk Estimatio	n and Evaluation					
Degree of Poss	ible Harm:	5	Possibility of Avoidance:		2.5	
Probability of O Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		2	
Pilz Hazard Ra	ting (PHR):	62	Summary Level:	Significant l	Risk	
Risk Reduction	n			Reference		
to the machine manner (for exa	Fixed guarding that confirms to ISO 14120 should be placed in this area to prevent access to the machine hazards in accordance with EN ISO 13857. Guards affixed in such a manner (for example, by screws, nuts, welding) that it can only be opened or removed by the use of tools or by destruction of the affixing means.					
Possible Resid	lual Risk					
Degree of Poss	ible Harm:	5	Possibility of Avoidance:		2.5	
Probability of O Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		2	
Pilz Hazard Ra	ting (PHR):	1	Summary Possible Level:	Negligible	Risk	

Assessment Date	Mar 12, 2019			
Degree of Possible Harm	5			
Probability of Occurrence of a Hazardous Event	0.05			
Possibility of Avoidance	2.5			
Frequency And / Or Duration of Exposure	2			
Pilz Hazard Rating (PHR)	1			
Summary Level				
Negligible Risk				
Risk Reduction Measures Desc	Risk Reduction Measures Description Reference			
machine hazards in accordance w example, by screws, nuts, welding	SO 14120 is placed in this vith EN ISO 13857. Guar g) that it can only be ope	ds affixed in such a manner (for	Reference EN ISO 12100 EN ISO 14120 EN ISO 13857	
machine hazards in accordance we example, by screws, nuts, welding tools or by destruction of the affix	60 14120 is placed in this vith EN ISO 13857. Guar g) that it can only be ope ing means. rres implemented by Ran	ds affixed in such a manner (for ned or removed by the use of nani Precision Machines Private	EN ISO 12100 EN ISO 14120	
machine hazards in accordance we example, by screws, nuts, welding tools or by destruction of the affix. Considering risk reduction measure Limited the hazard is accepted. Note: No	SO 14120 is placed in this vith EN ISO 13857. Guar g) that it can only be ope ing means. The simplemented by Ran to further risk reduction m	ds affixed in such a manner (for ned or removed by the use of nani Precision Machines Private neasures are necessary.	EN ISO 12100 EN ISO 14120	
machine hazards in accordance we example, by screws, nuts, welding tools or by destruction of the affix. Considering risk reduction measure Limited the hazard is accepted. Note: No	SO 14120 is placed in this vith EN ISO 13857. Guar g) that it can only be ope ing means. The simplemented by Ran to further risk reduction m	ds affixed in such a manner (for ned or removed by the use of nani Precision Machines Private neasures are necessary.	EN ISO 12100 EN ISO 14120	
machine hazards in accordance we example, by screws, nuts, welding tools or by destruction of the affix. Considering risk reduction measure Limited the hazard is accepted. Note: No	SO 14120 is placed in this vith EN ISO 13857. Guar g) that it can only be ope ing means. The simplemented by Ran to further risk reduction m	ds affixed in such a manner (for ned or removed by the use of nani Precision Machines Private neasures are necessary.	EN ISO 12100 EN ISO 14120	
machine hazards in accordance we example, by screws, nuts, welding tools or by destruction of the affix. Considering risk reduction measure Limited the hazard is accepted. Note: No	SO 14120 is placed in this vith EN ISO 13857. Guar g) that it can only be ope ing means. The simplemented by Ran to further risk reduction m	ds affixed in such a manner (for ned or removed by the use of nani Precision Machines Private neasures are necessary.	EN ISO 12100 EN ISO 14120	
machine hazards in accordance we example, by screws, nuts, welding tools or by destruction of the affix. Considering risk reduction measure Limited the hazard is accepted. Note that the hazard is accepted and the hazard is accepted.	SO 14120 is placed in this vith EN ISO 13857. Guar g) that it can only be ope ing means. The simplemented by Ran to further risk reduction m	ds affixed in such a manner (for ned or removed by the use of nani Precision Machines Private neasures are necessary.	EN ISO 12100 EN ISO 14120	
Fixed guarding that confirms to IS machine hazards in accordance v example, by screws, nuts, welding tools or by destruction of the affix Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions	SO 14120 is placed in this vith EN ISO 13857. Guar g) that it can only be ope ing means. The simplemented by Ran to further risk reduction m	ds affixed in such a manner (for ned or removed by the use of nani Precision Machines Private neasures are necessary.	EN ISO 12100 EN ISO 14120	

Hazard Identifie	cation			Hazard No:	1.5
Title	Crushing Hazard				
Location	Machine RHS & Rear				
Target	Finger/Hand		10.1.		1
Activity	Maintenance				
Task	Fault-finding/Troubleshooti	ng			
Sub Task	Fault-findings				46
Hazard Type	Mechanical Hazard with the	e consequence	e of		
Sub Type	Crushing				
Description	-		ments of the machine from RHS & equence of Crushing Finger or ha		
					Jou.
Risk Estimation	n and Evaluation				
Degree of Possi	ible Harm:	5	Possibility of Avoidance:		2.5
Probability of Oo Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		2
Pilz Hazard Rat	ting (PHR):	62	Summary Level:	Significant	Risk
<b>Risk Reductior</b>	ı			Reference	
Fixed guarding that confirms to ISO 14120 should be placed in this area to prevent access to the machine hazards in accordance with EN ISO 13857. Guards affixed in such a manner (for example, by screws, nuts, welding) that it can only be opened or removed by the use of tools or by destruction of the affixing means. OR If frequents access is required for maintenance personnel during maintenance or fault finding activities then the operable doors should be installed in accordance with EN ISO 13849-1.					
Possible Residual Risk					
Degree of Possi	ible Harm:	5	Possibility of Avoidance:		2.5
Probability of Oo Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		2
Pilz Hazard Rat	ting (PHR):	1	Summary Possible Level:	Negligible	Risk

Post Measures Risk Assessmer	ht in the second s					
Assessment Date	Mar 12, 2019					
Degree of Possible Harm	5					
Probability of Occurrence of a Hazardous Event	0.05					
Possibility of Avoidance	2.5					
Frequency And / Or Duration of Exposure	2					
Pilz Hazard Rating (PHR)	1					
Summary Level						
Negligible Risk						
Risk Reduction Measures Desc	ription		Reference			
Fixed guarding that confirms to ISO 14120 is placed in this area to prevent access to the machine hazards in accordance with EN ISO 13857. Guards affixed in such a manner (for example, by screws, nuts, welding) that it can only be opened or removed by the use of tools or by destruction of the affixing means.EN ISO 12100 						
Residual Risk						
Operating and Safety instructions	Operating and Safety instructions should be followed during operation of the machine.					


	ation			Hazard No:	1.6
Title	Falling of Assembled Comp	onent			
Location	Machine Front				
Target	Entire Body				X
Activity	Normal Operation		- tolet		Y
Task	Operation				
Sub Task	Feeding, filling, loading of ra	aw material		tursiage a	:00
Hazard Type	Other Hazards				
Sub Type					
Description	-		mponent from fixture. This present	crushing hazard	u as
		g that compo	nent while unloading from the fixtu	re.	
Risk Estimation	and Evaluation	g that compo	nent while unloading from the fixtu	re.	
Risk Estimation	and Evaluation	g that compo	nent while unloading from the fixtu Possibility of Avoidance:	re.	2.5
Degree of Possik	and Evaluation			re.	
Degree of Possik Probability of Oc	<b>a and Evaluation</b> ble Harm: currence of a Hazardous	3	Possibility of Avoidance: Frequency And / Or Duration of	re.	2.5
Degree of Possik Probability of Oc Event:	and Evaluation ble Harm: currence of a Hazardous ing (PHR):	3 2.5	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		2.5
Degree of Possik Probability of Oc Event: <b>Pilz Hazard Rati</b> <b>Risk Reduction</b>	and Evaluation ble Harm: currence of a Hazardous ing (PHR):	3 2.5 75	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level:	Significant	2.5 4 Risk
Degree of Possik Probability of Oc Event: <b>Pilz Hazard Rati</b> <b>Risk Reduction</b> Define the suitab Use of adequate	and Evaluation ble Harm: currence of a Hazardous ing (PHR):	3 2.5 75 ding and unlo	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level:	Significant Reference	2.5 4 Risk
Degree of Possik Probability of Oc Event: <b>Pilz Hazard Rati</b> <b>Risk Reduction</b> Define the suitab Use of adequate	a and Evaluation ble Harm: currence of a Hazardous ing (PHR): ble guidelines for manual load PPE should be mandatory of ivity of the machine.	3 2.5 75 ding and unlo	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level:	Significant Reference	2.5 4 Risk
Degree of Possik Probability of Oc Event: <b>Pilz Hazard Rati</b> <b>Risk Reduction</b> Define the suitab Use of adequate maintenance act	and Evaluation ble Harm: currence of a Hazardous ing (PHR): ble guidelines for manual load PPE should be mandatory of tivity of the machine.	3 2.5 75 ding and unlo	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level:	Significant Reference	2.5 4 Risk
Degree of Possik Probability of Oc Event: Pilz Hazard Ration Risk Reduction Define the suitab Use of adequate maintenance act Possible Residu Degree of Possik	and Evaluation ble Harm: currence of a Hazardous ing (PHR): ble guidelines for manual load PPE should be mandatory of tivity of the machine.	3 2.5 75 ding and unlo	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: Pading of the components. operation as well as	Significant Reference	2.5 4 Risk

Assessment Date       Jun 08, 2020         Degree of Possibile Harm       3         Probability of Occurrence of a fazardous Event       0.05         Possibility of Avoidance       2.5         Frequency And / Or Duration fazardous Event       1         Pilz Hazard Rating (PHR)       1         Summary Level       1         Negligible Risk       Reference         The machine operating manual is made available for this machine. In the manual, section C provides the suitable guidelines for safe handling of the components. In addition to this, there are safety instructions available in the operating manual.       EN ISO 1210         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 1210         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.       EN Ison the machine.         Very of adequate PPE is mandatory during normal operation as well as maintenance activity of the machine.       EN Ison tenance activity of the machine.	Post Measures Risk Assessme			
Degree of Possible Harm       3         Probability of Occurrence of a       0.05         Possibility of Avoidance       2.5         Frequency And / Or Duration       4         Pilz Hazard Rating (PHR)       1         Summary Level       Image: Comparison of the machine operating manual is made available for this machine. In the manual, section C provides the suitable guidelines for safe handling of the components. In addition to this, there are safety instructions available in the operating manual.       EN ISO 1210         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 1210         Residual Risk       Degreating and Safety instructions should be followed during operation of the machine.       Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 1210         Residual Risk       Depreating and Safety instructions should be followed during operation of the machine.       Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 1210         Residual Risk       Depreating and Safety instructions should be followed during operation of the machine.       En Iso 1200	Assessment Date	Jun 08, 2020		S MADERIE REMARKATION COOPER
Probability of Occurrence of a Pazardous Event       0.05         Possibility of Avoidance       2.5         Frequency And / Or Duration of Exposure       4         Pilz Hazard Rating (PHR)       1         Summary Level       1         Negligible Risk       Image: Comparison of the machine of the sum of the machine of the sum of the machine of the sum of	Degree of Possible Harm	3	O1. Loading of Components: The operator has to load the components manually.	
Possibility of Avoidance       2.5         Frequency And / Or Duration       4         Pilz Hazard Rating (PHR)       1         Summary Level       Image: Comparison of the section of the sec		0.05	C3. AUTO Cycle Preparation Check Ensure the Fallening • Main PORTE is CM from pain control panel • A Sure 1: CM (CM Panel 1: A MC Bernary in CM	
Frequency And / Or Duration of Exposure       4         Pilz Hazard Rating (PHR)       1         Summary Level          Negligible Risk          Risk Reduction Measures Description       Reference         The machine operating manual is made available for this machine. In the manual, section C provides the suitable guidelines for safe handling of the components. In addition to this, there are safety instructions available in the operating manual.       EN ISO 1210         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 1210         Residual Risk           Operating and Safety instructions should be followed during operation of the machine.       Section of the machine.	Possibility of Avoidance	2.5	to be at model home position) CA. Operation Sequence:	
Pilz Hazard Rating (PHR)       1       Image: Comparison of the machine.       Image: Comparison of the machine. <t< td=""><td></td><td>4</td><td>Finance model increase transmission from Operating Prevail     Totak Intel operating of Using in process     HED Tage phenology in process     Model Manual Intervents</td><td>Auto Auto Auto Auto Fedal Auto Fedal Auto</td></t<>		4	Finance model increase transmission from Operating Prevail     Totak Intel operating of Using in process     HED Tage phenology in process     Model Manual Intervents	Auto Auto Auto Auto Fedal Auto Fedal Auto
Negligible Risk       Reference         Risk Reduction Measures Description       Reference         The machine operating manual is made available for this machine. In the manual, section C provides the suitable guidelines for safe handling of the components. In addition to this, there are safety instructions available in the operating manual.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       Image: Considering Risk         Residual Risk       Sector Safety instructions should be followed during operation of the machine.       Sector Safety instructions should be followed during operation of the machine.	Pilz Hazard Rating (PHR)	1	<ul> <li>Check Tubes algorised then press Foot Padal</li> <li>Tube Final algorised in process</li> </ul>	Auto Auto Auto Auto Auto Auto Auto
Negligible Risk       Reference         Risk Reduction Measures Description       Reference         The machine operating manual is made available for this machine. In the manual, section C provides the suitable guidelines for safe handling of the components. In addition to this, there are safety instructions available in the operating manual.       EN ISO 1210         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       Final Accepted in the operating manual is accepted. No further risk reduction measures are necessary.         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.	Summary Level			Auto
The machine operating manual is made available for this machine. In the manual, section C provides the suitable guidelines for safe handling of the components. In addition to this, there are safety instructions available in the operating manual.       EN ISO 1210         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 1210         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.	Negligible Risk			
The machine operating manual is made available for this machine. In the manual, section C provides the suitable guidelines for safe handling of the components. In addition to this, there are safety instructions available in the operating manual.       EN ISO 1210         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 1210         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.				
Operating and Safety instructions should be followed during operation of the machine.	The machine operating manual is provides the suitable guidelines for there are safety instructions avail Considering risk reduction measu	made available for this mac or safe handling of the comp able in the operating manual ires implemented by Ramani	onents. In addition to this, Precision Machines Private	
	The machine operating manual is provides the suitable guidelines for there are safety instructions avail Considering risk reduction measu	made available for this mac or safe handling of the comp able in the operating manual ires implemented by Ramani	onents. In addition to this, Precision Machines Private	
Use of adequate PPE is mandatory during normal operation as well as maintenance activity of the machine	The machine operating manual is provides the suitable guidelines for there are safety instructions avail Considering risk reduction measu Limited the hazard is accepted. N	made available for this mac or safe handling of the comp able in the operating manual rres implemented by Ramani	onents. In addition to this, Precision Machines Private	
	The machine operating manual is provides the suitable guidelines for there are safety instructions avail Considering risk reduction measu Limited the hazard is accepted. N	made available for this mac or safe handling of the comp able in the operating manual ares implemented by Ramani to further risk reduction meas	onents. In addition to this, Precision Machines Private sures are necessary.	

Hazard Identifi	cation			Hazard No: 1.7
Title	Sharp Edges			
Location	Machine			
Target	Finger		00	$\Omega_{\Omega}$
Activity	Normal Operation			
Task	Operation			(
Sub Task	Driving the machine			
Hazard Type	Mechanical Hazard as a re	sult of		
Sub Type	Sharp edges			
Risk Estimatio	n and Evaluation			
Degree of Poss				
0	ible Harm:	0.5	Possibility of Avoidance:	5
Probability of O Event:	ible Harm: ccurrence of a Hazardous	0.5 2.5	Possibility of Avoidance: Frequency And / Or Duration of Exposure:	5 4
	ccurrence of a Hazardous		Frequency And / Or Duration of	
Event:	ccurrence of a Hazardous ting (PHR):	2.5	Frequency And / Or Duration of Exposure:	4
Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> The corners of t any sharp point The operator tra	ccurrence of a Hazardous ting (PHR): n the front fixed guard should k ed edge. aining should be provided for	2.5 25 be round in sha	Frequency And / Or Duration of Exposure:	4 Low Risk
Event: Pilz Hazard Ra Risk Reduction The corners of t any sharp point The operator tra Personal protect	ccurrence of a Hazardous ting (PHR): n the front fixed guard should b ed edge. aining should be provided for tive equipment as hand glov	2.5 25 be round in sha	Frequency And / Or Duration of Exposure: Summary Level: ape. Also, There should not be with spare parts / child parts.	4 Low Risk Reference
Event: Pilz Hazard Ra Risk Reduction The corners of t any sharp points The operator tra Personal protect machine.	ccurrence of a Hazardous ting (PHR): n the front fixed guard should be ed edge. aining should be provided for tive equipment as hand glov	2.5 25 be round in sha	Frequency And / Or Duration of Exposure: Summary Level: ape. Also, There should not be with spare parts / child parts.	4 Low Risk Reference
Event: Pilz Hazard Ra Risk Reduction The corners of t any sharp point The operator tra Personal protect machine. Possible Resid Degree of Poss	ccurrence of a Hazardous ting (PHR): n the front fixed guard should be ed edge. aining should be provided for tive equipment as hand glov	2.5 25 be round in sha	Frequency And / Or Duration of Exposure: Summary Level: ape. Also, There should not be with spare parts / child parts. varned during working on the	4 Low Risk Reference EN ISO 12100

Assessment Date	Mar 12, 2019		
Degree of Possible Harm	0.5		
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	5		
Frequency And / Or Duration of Exposure	4		
Pilz Hazard Rating (PHR)	1		
Summary Level			
Negligible Risk			3
Risk Reduction Measures Desc	ription		Reference
Considering risk reduction measu	res implemented by Rar	mani Precision Machines Private	EN ISO 12100
There are no sharp pointed edges Considering risk reduction measu Limited the hazard is accepted. N	res implemented by Rar	mani Precision Machines Private	EN ISO 12100
Considering risk reduction measu	res implemented by Rar	mani Precision Machines Private	EN ISO 12100
Considering risk reduction measu Limited the hazard is accepted. N	res implemented by Rar o further risk reduction r	mani Precision Machines Private neasures are necessary.	EN ISO 12100
Considering risk reduction measu Limited the hazard is accepted. No <b>Residual Risk</b> The operator training should be pr	res implemented by Rar o further risk reduction r	mani Precision Machines Private neasures are necessary.	
Considering risk reduction measu Limited the hazard is accepted. No <b>Residual Risk</b> The operator training should be pr	res implemented by Rar o further risk reduction r	mani Precision Machines Private neasures are necessary.	
Considering risk reduction measu Limited the hazard is accepted. No <b>Residual Risk</b> The operator training should be pr	res implemented by Rar o further risk reduction r	mani Precision Machines Private neasures are necessary.	
Considering risk reduction measu Limited the hazard is accepted. No <b>Residual Risk</b> The operator training should be pr	res implemented by Rar o further risk reduction r	mani Precision Machines Private neasures are necessary.	
Considering risk reduction measu Limited the hazard is accepted. No <b>Residual Risk</b> The operator training should be pr	res implemented by Rar o further risk reduction r	mani Precision Machines Private neasures are necessary.	

Hazard Identifi	ication			Hazard No:	1.8
Title	Slip Trip				
Location	Machine Perimeter				
Target	People		The second se	-	
Activity	Normal Operation				1
Task	Cleaning Maintenance				0
Sub Task	Housekeeping			12/10/2019 12	:03
Hazard Type	Mechanical Hazard with the	consequenc	ce of		
	Oligning, tripping, and folling				
Sub Type	Slipping, tripping and falling				
Sub Type Description		ne is not clea	n. All the cables are not routed cor	rectly.	
Description		ne is not clea	n. All the cables are not routed cor	rectly.	
Description	The area near to the machin	ne is not clea	n. All the cables are not routed cor Possibility of Avoidance:	rrectly.	2.5
Description Risk Estimation Degree of Poss	The area near to the machin				2.5
Description Risk Estimation Degree of Poss Probability of O	The area near to the machiner on and Evaluation Sible Harm:	5	Possibility of Avoidance: Frequency And / Or Duration of		4
Description Risk Estimation Degree of Poss Probability of O Event:	The area near to the machin on and Evaluation sible Harm: accurrence of a Hazardous	5	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		4
Description Risk Estimation Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction	The area near to the machine on and Evaluation sible Harm: eccurrence of a Hazardous ating (PHR):	5 1.25 62	Possibility of Avoidance: Frequency And / Or Duration of Exposure:	Significant	4 Risk
Description Risk Estimation Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction	The area near to the machine on and Evaluation sible Harm: eccurrence of a Hazardous ating (PHR): n	5 1.25 62	Possibility of Avoidance: Frequency And / Or Duration of Exposure: <b>Summary Level:</b>	Significant	4 Risk
Description Risk Estimation Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction The area near t	The area near to the machine on and Evaluation sible Harm: accurrence of a Hazardous ating (PHR): n to the machine should be clear	5 1.25 62	Possibility of Avoidance: Frequency And / Or Duration of Exposure: <b>Summary Level:</b>	Significant	4 Risk
Description Risk Estimation Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction The area near t Possible Resid	The area near to the machine on and Evaluation sible Harm: accurrence of a Hazardous ating (PHR): n to the machine should be clear	5 1.25 62 n. All the cab	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: les should be routed correctly.	Significant Reference EN ISO 12100	4 Risk

Post Measures Risk Assessmer	nt		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	5		
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	4		
Pilz Hazard Rating (PHR)	2		
Summary Level			
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
Residual Risk			
Operating and Safety instructions	should be followed durin	g operation of the machine.	

## 4.5.2 Hazard Related to energy equipment (Electrical & Pneumatic)

This section covers the hazards of the machine in relation to the energy types supplied to or generated within the equipment. The energy can be either supplied from outside (e.g. electrical mains) or generated within the machine (e.g. Pneumatic valves)



Picture 10 Hazard Related to energy equipment (Electrical & Pneumatic)

Hazard Identifi				Hazard No: 2.1
Title	Access to live parts		1	
Location	Electrical Panel			
Target	People / Machine			
Activity	Maintenance			
Task	various			
Sub Task	various			12703/2014 10:27
Hazard Type	Electrical Hazards		1	
Sub Type	Contact of persons with Live P	arts (Direc	ct Contact)	
	and the ground, or a metallic p conductor. The severity and effects of an o pathway through the body, the	art that ha electrical s amount of	es of an electrical circuit, one wire s become energized by contact wi shock depend on a number of facto f current, the length of time of the e hock may range from a slight tingle	th an electrical ors, such as the exposure, and whether
Risk Estimatio	n and Evaluation			
Degree of Poss	ible Harm:	40	Possibility of Avoidance:	5
Probability of O Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:	1
Pilz Hazard Ra	ting (PHR):	500	Summary Level:	High Risk
Risk Reduction	ı			Reference
panel for the ma and should cont might be neede 60204-1. Conductors and (for example vo external influent substances, me can exist. Flexible cables of external dam • coming into co	achine. All electrical devices and form to at least IP 2X. Depending d. The control cabinet should be cables shall be selected so as t ltage, current, protection against ces (for example ambient temper chanical stresses (including stre	I cable tern g on the er designed to be suital electric sh rature, pre sses durin I or protect ne followin	nvironment higher requirements and built to conform to EN ble for the operating conditions nock, grouping of cables) and sence of water or corrosive g installation, fire hazards) that ted as to minimize the possibility g cable use or potential abuse:	EN 60204-1

Possible Residual Risk			
Degree of Possible Harm:	40	Possibility of Avoidance:	5
Probability of Occurrence of a Hazardous Event:	0.05	Frequency And / Or Duration of Exposure:	1
Pilz Hazard Rating (PHR):	10	Summary Possible Level:	Negligible Risk



Assessment Date	Mar 12, 2019		
Degree of Possible Harm	40		
Probability of Occurrence of a Hazardous Event	0.05		N. C
Possibility of Avoidance	5		
Frequency And / Or Duration of Exposure	1		
Pilz Hazard Rating (PHR)	10		
Summary Level			
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
proof. There is IP2X acrylic cover access to live parts. Considering risk reduction measu	installed in front of main res implemented by Rar		EN 60204-1
proof. There is IP2X acrylic cover access to live parts. Considering risk reduction measu	installed in front of main res implemented by Rar	MCCB switch, which restricts the nani Precision Machines Private	EN 60204-1
proof. There is IP2X acrylic cover access to live parts. Considering risk reduction measu Limited the hazard is accepted. N	installed in front of main res implemented by Rar	MCCB switch, which restricts the nani Precision Machines Private	EN 60204-1
proof. There is IP2X acrylic cover access to live parts. Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions	installed in front of main res implemented by Rar o further risk reduction r should be followed duri	MCCB switch, which restricts the mani Precision Machines Private neasures are necessary.	
proof. There is IP2X acrylic cover access to live parts. Considering risk reduction measu Limited the hazard is accepted. No Residual Risk Operating and Safety instructions be implemented on the machine c	installed in front of main res implemented by Rar o further risk reduction r should be followed durin luring the maintenance a	MCCB switch, which restricts the mani Precision Machines Private neasures are necessary.	
proof. There is IP2X acrylic cover access to live parts. Considering risk reduction measu Limited the hazard is accepted. No Residual Risk Operating and Safety instructions be implemented on the machine c	installed in front of main res implemented by Rar o further risk reduction r should be followed durin luring the maintenance a	MCCB switch, which restricts the mani Precision Machines Private neasures are necessary.	
proof. There is IP2X acrylic cover access to live parts. Considering risk reduction measu Limited the hazard is accepted. No Residual Risk Operating and Safety instructions be implemented on the machine c	installed in front of main res implemented by Rar o further risk reduction r should be followed durin luring the maintenance a	MCCB switch, which restricts the mani Precision Machines Private neasures are necessary.	
proof. There is IP2X acrylic cover access to live parts. Considering risk reduction measu Limited the hazard is accepted. No	installed in front of main res implemented by Rar o further risk reduction r should be followed durin luring the maintenance a	MCCB switch, which restricts the mani Precision Machines Private neasures are necessary.	

Picture 13 Hazard 2.1, Image 1, No access to live part from Top & bottom side	

	ation			Hazard No:	2.2
Title	Protective Earth				
Location	Electrical Panel				
Target	Entire Body				
Activity	Maintenance			!//	
Task	Fault-finding/Troubleshootir	ng	a contra		
Sub Task	Fault-findings			NUMPER AND DESCRIPTION	105
Hazard Type	Electrical Hazards				
Sub Type	Parts which have become li	ve under faul	t conditions (Indirect Contact)		
	electric shock hazard to the conditions (Indirect Contact	-	ntact with parts that may become I	ive under faulty	
Risk Estimation	and Evaluation				
Degree of Possib	ole Harm:	40	Possibility of Avoidance:		5
	ble Harm: currence of a Hazardous	40 1.25	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		5
Probability of Oco	currence of a Hazardous		Frequency And / Or Duration of	High	1
Probability of Oco Event:	currence of a Hazardous	1.25	Frequency And / Or Duration of Exposure:	High	1
Probability of Occ Event: Pilz Hazard Rati Risk Reduction The electrical cor	currence of a Hazardous	1.25 250	Frequency And / Or Duration of Exposure:		1
Probability of Occ Event: Pilz Hazard Rati Risk Reduction The electrical cor to prevent indirect	currence of a Hazardous ing (PHR): ntrol panel doors of the macl	1.25 250 hine should b	Frequency And / Or Duration of Exposure: Summary Level: e earthed and bonded correctly	Reference	1
Probability of Occ Event: Pilz Hazard Rati Risk Reduction The electrical cor to prevent indirect The LOTO policie	currence of a Hazardous ing (PHR): ntrol panel doors of the macl ct contact with live parts. es should be implemented o	1.25 250 hine should b	Frequency And / Or Duration of Exposure: Summary Level: e earthed and bonded correctly	Reference	1
Probability of Occ Event: Pilz Hazard Rati Risk Reduction The electrical cor to prevent indirect The LOTO policie activities.	currence of a Hazardous ing (PHR): ntrol panel doors of the mach ct contact with live parts. es should be implemented o ual Risk	1.25 250 hine should b	Frequency And / Or Duration of Exposure: Summary Level: e earthed and bonded correctly	Reference	1
Probability of Occ Event: Pilz Hazard Rati Risk Reduction The electrical cor to prevent indirect The LOTO policie activities. Possible Residu Degree of Possib	currence of a Hazardous ing (PHR): ntrol panel doors of the mach ct contact with live parts. es should be implemented o ual Risk	1.25 250 hine should b	Frequency And / Or Duration of Exposure: Summary Level: e earthed and bonded correctly e during the maintenance	Reference	1 Risk

Assessment Date	Mar 12, 2019	
Degree of Possible Harm	40	
Probability of Occurrence of a lazardous Event	0.05	
Possibility of Avoidance	5	
Frequency And / Or Duration of Exposure	1	
Pilz Hazard Rating (PHR)	10	
Summary Level	Sumu	····
Negligible Risk		
The electrical control panel doors prevent indirect contact with live p Considering risk reduction measu	of the machine are earthed and bonded o	achines Private
The electrical control panel doors prevent indirect contact with live p Considering risk reduction measu	of the machine are earthed and bonded o arts. res implemented by Ramani Precision Ma	correctly to EN 60204-1
The electrical control panel doors prevent indirect contact with live p Considering risk reduction measu Limited the hazard is accepted. N	of the machine are earthed and bonded o arts. res implemented by Ramani Precision Ma	correctly to EN 60204-1
The electrical control panel doors prevent indirect contact with live p Considering risk reduction measu Limited the hazard is accepted. N <b>Residual Risk</b> Operating and Safety instructions	of the machine are earthed and bonded of arts. res implemented by Ramani Precision Ma o further risk reduction measures are nect should be followed during operation of the	correctly to EN 60204-1
The electrical control panel doors prevent indirect contact with live p Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions be implemented on the machine o	of the machine are earthed and bonded of arts. res implemented by Ramani Precision Ma o further risk reduction measures are nect should be followed during operation of the	e machine. The LOTO policies should
prevent indirect contact with live p Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions be implemented on the machine o	of the machine are earthed and bonded of arts. res implemented by Ramani Precision Ma o further risk reduction measures are nect further risk reduction measures are nect should be followed during operation of the uring the maintenance activities.	e machine. The LOTO policies should
The electrical control panel doors prevent indirect contact with live p Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions be implemented on the machine o	of the machine are earthed and bonded of arts. res implemented by Ramani Precision Ma o further risk reduction measures are nect further risk reduction measures are nect should be followed during operation of the uring the maintenance activities.	e machine. The LOTO policies should



Hazard Identifi	cation			Hazard No:	2.3
Title	Unstable power supply				
Location	Electrical Panel				
Target	People / Machine		a della d	1	HT H2
Activity	Maintenance				CIS
Task	Operation			0.00	R
Sub Task	Driving the machine			18708/2019-16	53 _
Hazard Type	Combination of Hazards				
Sub Type	N/A				
Description	process or an unexpected ir power outage, lightening or	njection. Thes	e, unexpected machine movemer e disturbances or disruptions can surges.	-	
Risk Estimatio	n and Evaluation				
Degree of Poss		40	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	1.25	Frequency And / Or Duration of Exposure:		1
Pilz Hazard Ra	ting (PHR):	125	Summary Level:	Significant	Risk
<b>Risk Reduction</b>	ı			Reference	
60204-1. Where a supply damage, under- machine at a pro To protect again	interruption or a voltage redu voltage protection shall be pro edetermined voltage level. ist the effects of over-voltage	ction can cau ovided by, for due to lightnir		EN 60204-1	
Possible Resid	lual Risk				
Degree of Poss	ible Harm:	40	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		1
Pilz Hazard Ra	ting (PHR):	5	Summary Possible Level:	Negligible	Risk

Assessment Date	Mar 12, 2019		
Degree of Possible Harm	40		
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	2.5	RFIDI RFID2 RFID3 RFID4 RF	
Frequency And / Or Duration of Exposure	1		
Pilz Hazard Rating (PHR)	5	and a second sec	
Summary Level			
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r Considering risk reduction measu	ply of the machine. If the disruptions as well as fau machine. rres implemented by Rar	Its in the power circuits then it will nani Precision Machines Private	EN 60204-1
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r	ply of the machine. If the disruptions as well as fau machine. rres implemented by Rar	e machine main power supply is ilts in the power circuits then it will nani Precision Machines Private	EN 60204-1
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r Considering risk reduction measu	ply of the machine. If the disruptions as well as fau machine. rres implemented by Rar	e machine main power supply is ilts in the power circuits then it will nani Precision Machines Private	EN 60204-1
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r Considering risk reduction measu Limited the hazard is accepted. N	ply of the machine. If the disruptions as well as fau machine. Ires implemented by Rar to further risk reduction n	e machine main power supply is ilts in the power circuits then it will nani Precision Machines Private neasures are necessary.	EN 60204-1
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions	ply of the machine. If the disruptions as well as fau machine. Ires implemented by Rar to further risk reduction n should be followed durin	e machine main power supply is ilts in the power circuits then it will nani Precision Machines Private neasures are necessary.	
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions	ply of the machine. If the disruptions as well as fau machine. Ires implemented by Rar to further risk reduction n should be followed durin	e machine main power supply is lits in the power circuits then it will nani Precision Machines Private neasures are necessary.	
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions	ply of the machine. If the disruptions as well as fau machine. Ires implemented by Rar to further risk reduction n should be followed durin	e machine main power supply is lits in the power circuits then it will nani Precision Machines Private neasures are necessary.	
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions	ply of the machine. If the disruptions as well as fau machine. Ires implemented by Rar to further risk reduction n should be followed durin	e machine main power supply is lits in the power circuits then it will nani Precision Machines Private neasures are necessary.	
to monitor the 3 phase power sup detected by any disturbances or o shut off the main power from the r Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Operating and Safety instructions	ply of the machine. If the disruptions as well as fau machine. Ires implemented by Rar to further risk reduction n should be followed durin	e machine main power supply is lits in the power circuits then it will nani Precision Machines Private neasures are necessary.	

Hazard Identifi	cation			Hazard No:	2.4
Title	Overload or Over current co	onditions due	to faults or misuse		
Location	Machine				
Target	People / Machine				-
Activity	Normal Operation				n
Task	Operation				2
Sub Task	Driving the machine			17(03/2019 14	28
Hazard Type	Electrical Hazards				
Sub Type	Overload				
Description	If the equipment is exposed fail dangerously, Examples • over current arising from a • overload and/or loss of co • over-speed of machines/m • over- pressure of the pneu	are short circuit, oling of moto nachine elem	rs,	and make the n	nachine
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:	40	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		1
Pilz Hazard Ra	ting (PHR):	250	Summary Level:	High	Risk
<b>Risk Reduction</b>	n			Reference	
either the rating whichever is the	of any component or the curr	ent carrying	nt in a machine circuit can exceed capacity of the conductors, umentation the data necessary for	EN 60204-1	
pressures and t		ous situation	temperatures (e.g. motors) or shall be provided with suitable		
Possible Resid	lual Risk				
Degree of Poss	ible Harm:	40	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		1
	ting (PHR):	5			

Assessment Date	Mar 12, 2019		
Degree of Possible Harm	40	8	
Probability of Occurrence of a Hazardous Event	0.05	M. Killinger	
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	1		
Pilz Hazard Rating (PHR)	5	9	
Summary Level			THE OTHER
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur	ake circuits breakers o ated to overload or ove res implemented by R	of different current capacities are ercurrent conditions. amani Precision Machines Private	EN 60204-1
The machine is installed with appr electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur Limited the hazard is accepted. No	ake circuits breakers o ated to overload or ove res implemented by R	of different current capacities are ercurrent conditions. amani Precision Machines Private	EN 60204-1
electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur Limited the hazard is accepted. No	ake circuits breakers o ated to overload or ove res implemented by R	of different current capacities are ercurrent conditions. amani Precision Machines Private	EN 60204-1
electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur Limited the hazard is accepted. No	ake circuits breakers o ated to overload or ove res implemented by R o further risk reduction	of different current capacities are ercurrent conditions. amani Precision Machines Private n measures are necessary.	EN 60204-1
electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur Limited the hazard is accepted. No <b>Residual Risk</b> Operating and Safety instructions	ake circuits breakers of ated to overload or over res implemented by R o further risk reduction	of different current capacities are ercurrent conditions. amani Precision Machines Private n measures are necessary.	
electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur Limited the hazard is accepted. No <b>Residual Risk</b> Operating and Safety instructions	ake circuits breakers of ated to overload or over res implemented by R o further risk reduction	of different current capacities are ercurrent conditions. amani Precision Machines Private n measures are necessary.	
electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur Limited the hazard is accepted. No <b>Residual Risk</b> Operating and Safety instructions	ake circuits breakers of ated to overload or over res implemented by R o further risk reduction	of different current capacities are ercurrent conditions. amani Precision Machines Private n measures are necessary.	
electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur Limited the hazard is accepted. No <b>Residual Risk</b> Operating and Safety instructions	ake circuits breakers of ated to overload or over res implemented by R o further risk reduction	of different current capacities are ercurrent conditions. amani Precision Machines Private n measures are necessary.	
electrical panel. The Schneider ma present to avoid any condition rela Considering risk reduction measur Limited the hazard is accepted. No <b>Residual Risk</b> Operating and Safety instructions	ake circuits breakers of ated to overload or over res implemented by R o further risk reduction	of different current capacities are ercurrent conditions. amani Precision Machines Private n measures are necessary.	

Hazard Identif	ication			Hazard No:	2.5
Title	Unexpected Start Up during	maintenance	e		
Location	Machine Front				
Target	People / Machine				
Activity	Maintenance		AWARNING	MAIN SWITCH	
Task	Setting Teaching/programmir process changeover	ng and/or	ELICETPOCUTION		
Sub Task	Mounting or changing tools, t	tool-setting	International Pairs Internation	12/03/2918 14	196
Hazard Type	Other Hazards				
Sub Type	Unintended/unexpected start	-up			
Description	-		nt of the Machine. Tool changes re		
Risk Estimatic	control circuit or start-up by a residual accumulator pressur	a third party	sures in place there is a possibility could lead to a full or part release parts as a result of stored pneumati	of stored energ	
	control circuit or start-up by a residual accumulator pressur on and Evaluation	a third party	could lead to a full or part release parts as a result of stored pneumation	of stored energ	y (e.g.
Degree of Poss	control circuit or start-up by a residual accumulator pressur on and Evaluation	a third party re, moving p	could lead to a full or part release	of stored energ	
Degree of Poss Probability of C Event:	control circuit or start-up by a residual accumulator pressur on and Evaluation sible Harm:	a third party re, moving p 40	could lead to a full or part release parts as a result of stored pneumati Possibility of Avoidance: Frequency And / Or Duration of	of stored energ ic energy).	y (e.g.
Degree of Poss Probability of C	control circuit or start-up by a residual accumulator pressur on and Evaluation sible Harm: Occurrence of a Hazardous	4 third party re, moving p 40 1.25	could lead to a full or part release parts as a result of stored pneumati Possibility of Avoidance: Frequency And / Or Duration of Exposure:	of stored energ ic energy).	y (e.g. 2.5 2
Degree of Poss Probability of C Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> Provide possibi starting the too	control circuit or start-up by a residual accumulator pressur on and Evaluation sible Harm: Occurrence of a Hazardous ating (PHR): n lities to ensure that all energy s I change or any other maintena	4 third party re, moving p 40 1.25 250 sources are nce activitie	could lead to a full or part release parts as a result of stored pneumation Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: isolated and dissipated prior to	of stored energ ic energy). High	y (e.g. 2.5 2
Degree of Poss Probability of C Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> Provide possibi starting the too Inform the user	control circuit or start-up by a residual accumulator pressur on and Evaluation sible Harm: Occurrence of a Hazardous ating (PHR): n lities to ensure that all energy s I change or any other maintena	a third party re, moving p 40 1.25 250 sources are nce activitie	could lead to a full or part release parts as a result of stored pneumation Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: isolated and dissipated prior to s.	of stored energ ic energy). High <b>Reference</b> EN 60204-1	y (e.g. 2.5 2
Degree of Poss Probability of C Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> Provide possibi starting the too Inform the user locks to preven Closing of the g	control circuit or start-up by a residual accumulator pressur on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n lities to ensure that all energy s I change or any other maintena	a third party re, moving p 40 1.25 250 sources are nce activitie pckout / Tag achine.	could lead to a full or part release parts as a result of stored pneumation Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: isolated and dissipated prior to is. out procedure and where to apply chine. The acknowledgments	of stored energ ic energy). High <b>Reference</b> EN 60204-1	y (e.g. 2.5 2
Degree of Poss Probability of C Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> Provide possibi starting the too Inform the user locks to preven Closing of the g	control circuit or start-up by a residual accumulator pressur on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n lities to ensure that all energy s change or any other maintena about necessary steps for a Lo t unauthorized re-start of the m guard should not initiate a restart e from points with clear visibility	a third party re, moving p 40 1.25 250 sources are nce activitie pckout / Tag achine.	could lead to a full or part release parts as a result of stored pneumation Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: isolated and dissipated prior to is. out procedure and where to apply chine. The acknowledgments	of stored energ ic energy). High <b>Reference</b> EN 60204-1	y (e.g. 2.5 2
Degree of Poss Probability of C Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> Provide possib starting the too Inform the user locks to preven Closing of the g have to be don <b>Possible Resi</b>	control circuit or start-up by a residual accumulator pressur on and Evaluation sible Harm: Occurrence of a Hazardous ating (PHR): n litites to ensure that all energy s I change or any other maintena a about necessary steps for a Lo t unauthorized re-start of the m guard should not initiate a restar e from points with clear visibility dual Risk	a third party re, moving p 40 1.25 250 sources are nce activitie pckout / Tag achine.	could lead to a full or part release parts as a result of stored pneumation Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: isolated and dissipated prior to is. out procedure and where to apply chine. The acknowledgments	of stored energ ic energy). High <b>Reference</b> EN 60204-1	y (e.g. 2.5 2
Degree of Poss Probability of C Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> Provide possibi starting the too Inform the user locks to preven Closing of the g have to be don <b>Possible Resi</b>	control circuit or start-up by a residual accumulator pressur on and Evaluation sible Harm: Occurrence of a Hazardous ating (PHR): n litites to ensure that all energy s I change or any other maintena a about necessary steps for a Lo t unauthorized re-start of the m guard should not initiate a restar e from points with clear visibility dual Risk	a third party re, moving p 40 1.25 250 sources are nce activitie ockout / Tag achine. rt of the mac / to the haza	could lead to a full or part release parts as a result of stored pneumation Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: isolated and dissipated prior to s. out procedure and where to apply chine. The acknowledgments ardous area.	of stored energ ic energy). High <b>Reference</b> EN 60204-1	y (e.g. 2.5 2 Risk

Assessment Date	Mar 12, 2019		
Degree of Possible Harm	40		
Probability of Occurrence of a Hazardous Event	0.05	MAINS	SWITCH
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	2		
Pilz Hazard Rating (PHR)	10		
Summary Level			
Negligible Risk			
The electric control panel is instatoriation. Electrical lockable isolatoriation is to enable or implem Considering risk reduction measu	led with an electric isola or removes all the elect ient LOTO process duri ires implemented by Ra	ng the maintenance activity. mani Precision Machines Private	Reference EN 60204-1 EN ISO 4414
position. Electrical lockable isolat It is possible to enable or implem	led with an electric isola or removes all the elect ient LOTO process duri ires implemented by Ra	rical power from the machine. ng the maintenance activity. mani Precision Machines Private	EN 60204-1
The electric control panel is insta position. Electrical lockable isolat It is possible to enable or implem Considering risk reduction measu Limited the hazard is accepted. N	led with an electric isola or removes all the elect ient LOTO process duri ires implemented by Ra	rical power from the machine. ng the maintenance activity. mani Precision Machines Private	EN 60204-1
The electric control panel is insta position. Electrical lockable isolat It is possible to enable or implem Considering risk reduction measu	led with an electric isola or removes all the elect ent LOTO process duri ares implemented by Ra lo further risk reduction	rical power from the machine. ng the maintenance activity. mani Precision Machines Private measures are necessary.	EN 60204-1

Hazard Identifi	cation			Hazard No:	2.6
Title	Remaining Pressure of Pne	umatic Syste	em		
Location	Pneumatic System				
Target	Entire Body		PREMARCEDING		
Activity	Maintenance				a
Task	Cleaning Maintenance				
Sub Task	Isolation and energy dissipa	tion			-455
Hazard Type	Mechanical Hazard as a res	ult of			
Sub Type	Stored energy				
Description	I he lincontrolled release of	tluide as a ré	esult of maintenance work could lea	ad to injection h	azard
Description			esult of maintenance work could lea	-	azard
				-	
	or damages to eyes or skin a			-	2.5
Risk Estimatio	or damages to eyes or skin a	as a result o	f the high pressure remaining in the	-	
<b>Risk Estimatio</b> Degree of Poss Probability of O	or damages to eyes or skin a <b>n and Evaluation</b> ible Harm: ccurrence of a Hazardous	as a result o	f the high pressure remaining in the Possibility of Avoidance: Frequency And / Or Duration of	-	2.5
<b>Risk Estimatio</b> Degree of Poss Probability of O Event:	or damages to eyes or skin and Evaluation ible Harm: ccurrence of a Hazardous ting (PHR):	as a result o 5 2.5	f the high pressure remaining in the Possibility of Avoidance: Frequency And / Or Duration of Exposure:	e system.	2.5 2
Risk Estimatio Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction A lockable pneu	or damages to eyes or skin and Evaluation ible Harm: ccurrence of a Hazardous ting (PHR):	as a result o 5 2.5 62 must be pro	f the high pressure remaining in the Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level:	system.	2.5 2
Risk Estimatio Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction A lockable pneu	or damages to eyes or skin a n and Evaluation ible Harm: ccurrence of a Hazardous ting (PHR): n umatic isolator with dissipation should be implemented during	as a result o 5 2.5 62 must be pro	f the high pressure remaining in the Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level:	Significant	2.5
Risk Estimatio Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction A lockable pneu LOTO policies s	or damages to eyes or skin a n and Evaluation ible Harm: ccurrence of a Hazardous ting (PHR): n imatic isolator with dissipation should be implemented during	as a result o 5 2.5 62 must be pro	f the high pressure remaining in the Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level:	Significant	2.5
Risk Estimatio Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction A lockable pneu LOTO policies s Possible Resid	or damages to eyes or skin a n and Evaluation ible Harm: ccurrence of a Hazardous ting (PHR): n imatic isolator with dissipation should be implemented during	as a result o 5 2.5 62 must be pro maintenanc	f the high pressure remaining in the Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: vided to the machine. e activities.	Significant	2.5 2 Risk

Post Measures Risk Assessmen	4		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	5	PARIMUM CLARING A PAR	-
Probability of Occurrence of a Hazardous Event	0.05	SH4	
Possibility of Avoidance	2.5	WATE SA	
Frequency And / Or Duration of Exposure	2		
Pilz Hazard Rating (PHR)	1		-
Summary Level			
Negligible Risk			-
Risk Reduction Measures Descr	iption		Reference
The machine is installed with a pro- Pneumatic lockable isolator dissip- possible to enable or implement Lo Considering risk reduction measur Limited the hazard is accepted. No	ates all the pneumatic en OTO process during the res implemented by Ram	nergy from the machine. It is maintenance activity. nani Precision Machines Private	EN ISO 4414
Residual Risk			
Operating and Safety instructions	should be followed durin	g operation of the machine.	
The LOTO policies should be impl	emented on the machine	e during the maintenance activities	5.



Hazard Identifi	cation			Hazard No:	2.7
Title	Operating Control Panel Ide	entification			
Location	Machine Front				
Target	People / Machine				-
Activity	Normal Operation		FLEX CORE BUILD	MACHINE	
Task	Operation				
Sub Task	Operating manual controls			is money of	-
Hazard Type	Ergonomic Hazard				
Sub Type	Inadequate design, location	or identificat	ion of control devices		
Description		on on the co	control panel to perform various open ntrol buttons indicating the control a ator during the operations.	-	
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:	3	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	1.25	Frequency And / Or Duration of Exposure:		4
Pilz Hazard Ra	ting (PHR):	37	Summary Level:	Low	Risk
Risk Reductio	n			Reference	
	e clear identification on the co e respective operations.	ntrol button i	ndicating the control actuators	EN 60204-1 EN ISO 12100	)
Possible Resid	dual Risk				
Possible Resid		3	Possibility of Avoidance:		2.5
Degree of Poss		3 0.05	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		2.5 4

Assessment Date	Mar 12, 2019		
Degree of Possible Harm	3		
Probability of Occurrence of a Hazardous Event	0.05		CHINE
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	4		
Pilz Hazard Rating (PHR)	1		
Summary Level			
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
Considering risk reduction measu			EN 60204-1 EN ISO 12100
		mani Precision Machines Private	
		mani Precision Machines Private	



Hazard Identifie	cation			Hazard No:	2.8
Title	Installation of Pneumatic Sy	stem			
Location	Machine Side				1 A
Target	Entire Body		PHELUMATIC CONTIOL PANEL	- 2	
Activity	Normal Operation		A A A A		
Task	Operation			2	
Sub Task	Driving the machine			12/03/2019 14	砺
					-
Hazard Type	Mechanical Hazard as a res	ult of			
Sub Type	High pressure				
Description		-	ed sections of air hoses or from val nay cause injury to operator or nea		or
	maintenance work is being t				
Risk Estimation	n and Evaluation				
Degree of Possi		5	Possibility of Avoidance:		2.5
	ccurrence of a Hazardous	1.25	Frequency And / Or Duration of Exposure:		3
Pilz Hazard Rat	ting (PHR):	46	Summary Level:	Significant	Risk
Risk Reduction	1			Reference	
against abrasior Whenever it is n connections sha with the data on Connecting and	n, contamination, ultra-violet, r ecessary to dismantle pneum Il be clearly identified. The ide any appropriate drawings. changing over air hoses cont	mechanical c latic systems entification sl aining high p	s, the piping and corresponding hall correspond to and not conflict pressure air must only be	EN ISO 12100 EN ISO 4414	
	vledge of this machine. Adequ		n handling high pressure air with uch as protective goggles, ear		
Possible Resid	ual Risk				
Degree of Possi	ble Harm:	5	Possibility of Avoidance:		2.5
Probability of Oc Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		3
Pilz Hazard Rat	ting (PHR):	1	Summary Possible Level:	Negligible	Risk

Assessment Date	Mar 12, 2019		
Degree of Possible Harm	5	yer weta)	<i>b</i>
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	2.5		8 (27 (26 (25)
Frequency And / Or Duration of Exposure	3		
Pilz Hazard Rating (PHR)	1		
Summary Level			ALA
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
During assessment it was observ quick fittings correctly. The piping and located to protect against for repairs or replacement of compor Considering risk reduction measu Limited the hazard is accepted. N	is mounted such a way eseeable damage and re nents. rres implemented by Rar	estricted access for adjustments nani Precision Machines Private	
quick fittings correctly. The piping and located to protect against for repairs or replacement of compor Considering risk reduction measu	is mounted such a way eseeable damage and re nents. rres implemented by Rar	to minimize the installation stress estricted access for adjustments nani Precision Machines Private	
quick fittings correctly. The piping and located to protect against for repairs or replacement of compor Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Connecting and changing over ai whose has been trained in handli	is mounted such a way eseeable damage and re- nents. ares implemented by Rar lo further risk reduction n r hoses connecting high ng high pressure air with	to minimize the installation stress estricted access for adjustments mani Precision Machines Private neasures are necessary. pressure air must only be performe throughout knowledge of this mac	•
quick fittings correctly. The piping and located to protect against for repairs or replacement of compor Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Connecting and changing over ai	is mounted such a way eseeable damage and re- nents. ares implemented by Rar lo further risk reduction n r hoses connecting high ng high pressure air with	to minimize the installation stress estricted access for adjustments mani Precision Machines Private neasures are necessary. pressure air must only be performe throughout knowledge of this mac	•
quick fittings correctly. The piping and located to protect against for repairs or replacement of compor Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Connecting and changing over ai whose has been trained in handli	is mounted such a way eseeable damage and re- nents. ares implemented by Rar lo further risk reduction n r hoses connecting high ng high pressure air with	to minimize the installation stress estricted access for adjustments mani Precision Machines Private neasures are necessary. pressure air must only be performe throughout knowledge of this mac	•
quick fittings correctly. The piping and located to protect against for repairs or replacement of compor Considering risk reduction measu Limited the hazard is accepted. N Residual Risk Connecting and changing over ai whose has been trained in handli	is mounted such a way eseeable damage and re- nents. ares implemented by Rar lo further risk reduction n r hoses connecting high ng high pressure air with	to minimize the installation stress estricted access for adjustments mani Precision Machines Private neasures are necessary. pressure air must only be performe throughout knowledge of this mac	•



## 4.5.3 Hazards related to the control system

While the hazards related to this section can have consequences of a various nature (mechanical, electrical, pneumatic etc.), the hazards are a result of the design of the control system and how personnel interact with the machine.



Picture 20 Hazards related to the control system

Hazard Identifi	cation			Hazard No:	3.1
Title	Emergency Situations				
Location	Machine				
Target	Entire Body				THE A
Activity	All Operations		FLEX CORE BUILD	MACHINE	B
Task	All Operations				
Sub Task	All Operations				
Hazard Type	Combination of Hazards				
Sub Type	n/a				
Risk Estimatic			ne and/or the occurrence of faults of ersonnel need to act appropriately.		
Degree of Poss	ible Harm:	5	Possibility of Avoidance:		
	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		2.5
Pilz Hazard Ra	ting (DUD).				2.5 2
	ung (FRK).	62	Summary Level:	Significant	2
Risk Reductio	•••	62	Summary Level:	Significant Reference	2
According the n emergency stop	n nachinery directive all areas o os, to facilitate an emergency	f the machine event as to E	e must be sufficiently covered by N ISO 13850.	-	2 Risk
According the n emergency stop The emergency	n nachinery directive all areas o os, to facilitate an emergency	f the machine event as to E	e must be sufficiently covered by	Reference EN ISO 13850 EN ISO 13849	2 Risk
According the n emergency stop The emergency	n nachinery directive all areas o os, to facilitate an emergency y stop safety control system sh h EN ISO 13849-1.	f the machine event as to E	e must be sufficiently covered by N ISO 13850.	Reference EN ISO 13850 EN ISO 13849	2 Risk
According the n emergency stop The emergency accordance with	n nachinery directive all areas o os, to facilitate an emergency of stop safety control system sh h EN ISO 13849-1. dual Risk	f the machine event as to E	e must be sufficiently covered by N ISO 13850.	Reference EN ISO 13850 EN ISO 13849	2 Risk
According the memory stop The emergency stop accordance with <b>Possible Resid</b> Degree of Poss	n nachinery directive all areas o os, to facilitate an emergency of stop safety control system sh h EN ISO 13849-1. dual Risk	f the machine event as to E nould achieve	e must be sufficiently covered by N ISO 13850. e required performance level in	Reference EN ISO 13850 EN ISO 13849 EN ISO 12100	2 Risk

Assessment Date	Jun 08, 2020		
Degree of Possible Harm	5		
Probability of Occurrence of a Hazardous Event	0.05		CHINE
Possibility of Avoidance	2.5		Aura I Mara
Frequency And / Or Duration of Exposure	2		
Pilz Hazard Rating (PHR)	1		
Summary Level			
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
through safety controller. The dual residual pressure releas	e valves (VP744R- 5DZ	nents of the machine are stopped 21-04-MA-X555) are controlled and ety controller. The STO signals of	
kinetix drives are routed through t The emergency stop safety contro accordance with EN ISO 13849-1 Considering risk reduction measu	fail safe PNOZ S7 safety ol system is achieving re ires implemented by Rai	y contact expansion module. equired performance in mani Precision Machines Private	
kinetix drives are routed through the emergency stop safety contro accordance with EN ISO 13849-1 Considering risk reduction measure Limited the hazard is accepted. N	fail safe PNOZ S7 safety ol system is achieving re ires implemented by Rai	y contact expansion module. equired performance in mani Precision Machines Private	
kinetix drives are routed through the emergency stop safety control accordance with EN ISO 13849-1 Considering risk reduction measure Limited the hazard is accepted. N Residual Risk	fail safe PNOZ S7 safety ol system is achieving re ures implemented by Rai lo further risk reduction i	y contact expansion module. equired performance in mani Precision Machines Private measures are necessary.	
kinetix drives are routed through the emergency stop safety contro accordance with EN ISO 13849-1 Considering risk reduction measu Limited the hazard is accepted. N Residual Risk	fail safe PNOZ S7 safety ol system is achieving re ures implemented by Rai lo further risk reduction i	y contact expansion module. equired performance in mani Precision Machines Private measures are necessary.	
kinetix drives are routed through the emergency stop safety contro accordance with EN ISO 13849-1 Considering risk reduction measu Limited the hazard is accepted. N Residual Risk	fail safe PNOZ S7 safety ol system is achieving re ures implemented by Rai lo further risk reduction i	y contact expansion module. equired performance in mani Precision Machines Private measures are necessary.	
kinetix drives are routed through the emergency stop safety control accordance with EN ISO 13849-1 Considering risk reduction measure Limited the hazard is accepted. N	fail safe PNOZ S7 safety ol system is achieving re ures implemented by Rai lo further risk reduction i	y contact expansion module. equired performance in mani Precision Machines Private measures are necessary.	
kinetix drives are routed through the emergency stop safety contro accordance with EN ISO 13849-1 Considering risk reduction measu Limited the hazard is accepted. N Residual Risk	fail safe PNOZ S7 safety ol system is achieving re ures implemented by Rai lo further risk reduction i	y contact expansion module. equired performance in mani Precision Machines Private measures are necessary.	



Hazard Identifie	cation			Hazard No:	3.2
Title	Access to Pinch Points_Fro	nt			
Location	Machine Front				
Target	Finger/Hand		and the second se		
Activity	Normal Operation				1
Task	Operation				
Sub Task	Driving the machine			12/10/2010 12	:0)
Hazard Type	Mechanical Hazard with the	consequenc	e of		
Sub Type	Crushing				
Description	-		nanical pinch points of machine fro ard with the consequence of Crus		-
Risk Estimation	n and Evaluation				
Degree of Possi	ble Harm:	5	Possibility of Avoidance:		2.5
Probability of Oo Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		4
Pilz Hazard Rat	ing (PHR):	125	Summary Level:		-
				Significant	
<b>Risk Reduction</b>				Significant Reference	
The suitable gua machine should As the access re should be install movements sho	ards to prevent the possible a be installed. equired is frequent for loading ed at operator sides. When li	g and unloadii ight curtains a troller. The lig	ng the components light curtains are disturbed the hazardous ht curtain safety control system		Risk
The suitable gua machine should As the access re should be install movements sho	ards to prevent the possible a be installed. equired is frequent for loading ed at operator sides. When li uld be stopped by safety con required performance level in	g and unloadii ight curtains a troller. The lig	ng the components light curtains are disturbed the hazardous ht curtain safety control system	Reference EN ISO 12100 IEC 61496-1	Risk
The suitable gua machine should As the access re should be install movements sho should achieve	ards to prevent the possible a be installed. equired is frequent for loading ed at operator sides. When li uld be stopped by safety con required performance level in ual Risk	g and unloadii ight curtains a troller. The lig	ng the components light curtains are disturbed the hazardous ht curtain safety control system	Reference EN ISO 12100 IEC 61496-1	Risk
The suitable gua machine should As the access re should be install movements sho should achieve <b>Possible Resid</b> Degree of Possi	ards to prevent the possible a be installed. equired is frequent for loading ed at operator sides. When li uld be stopped by safety con required performance level in ual Risk	g and unloadii ight curtains a troller. The lig accordance	ng the components light curtains are disturbed the hazardous ht curtain safety control system with EN ISO 13849-1.	Reference EN ISO 12100 IEC 61496-1	Risk ) )-1

Post Measures Risk Assessmer	nt		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	5		
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	4		
Pilz Hazard Rating (PHR)	2		
Summary Level			
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
curtains. The light curtains are cor controller. The hazardous movem are interrupted. The dual residual pressure releas monitored through safety output o kinetix drives are routed through f It is confirmed that light curtain sa in accordance with EN ISO 13849 Considering risk reduction measu Limited the hazard is accepted. No	nnected and monitored b ents of the machine are e valves (VP744R- 5DZ f PILZ PNOZ m B0 safe ail safe PNOZ S7 safety fety control system achie -1. res implemented by Ran	stopped when this light curtains 1-04-MA-X555) are controlled and ty controller. The STO signals of contact expansion module. eving required performance level nani Precision Machines Private	EN ISO 13849-1 IEC 61496-1
Residual Risk			
Operating and Safety instructions			


Hazard Identifie	cation			Hazard No:	3.3
Title	Access to Pinch Points_LH	S			
Location	Machine LHS				
Target	Finger/Hand				A State and
Activity	Maintenance				1
Task	Fault-finding/Troubleshootir	ng			
Sub Task	Fault-finding			P.T.B.W.C.	
Hazard Type	Mechanical Hazard with the	consequenc	e of		
Sub Type	Crushing				
	J present Mechanical Hazard	with the con	sequence of Crushing to operator	when accessed	
Risk Estimatio	n and Evaluation				
Risk Estimation		5	Possibility of Avoidance:		2.5
Degree of Poss		5 2.5	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		2.5 2
Degree of Poss Probability of Oo	ible Harm: ccurrence of a Hazardous		Frequency And / Or Duration of	Significant	2
Degree of Possi Probability of Od Event:	ible Harm: ccurrence of a Hazardous ting (PHR):	2.5	Frequency And / Or Duration of Exposure:		2
Degree of Possi Probability of Oc Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> The suitable gua machine should the light curtains hazardous move	ible Harm: ccurrence of a Hazardous <b>ting (PHR):</b> n ards to prevent the possible a	2.5 62 access to haz is required for rea. When lig is safety control	Frequency And / Or Duration of Exposure: Summary Level: ardous movements of the fault findings, repairing activities ht curtains are disturbed the oller. The light curtain safety	Significant	2 Risk
Degree of Possi Probability of Oc Event: Pilz Hazard Rat Risk Reduction The suitable gua machine should the light curtains hazardous move control system s	ible Harm: ccurrence of a Hazardous ting (PHR): n ards to prevent the possible a l be installed. As the access is s should be installed at this ar ements should be stopped by should achieve required perfo	2.5 62 access to haz is required for rea. When lig is safety control	Frequency And / Or Duration of Exposure: Summary Level: ardous movements of the fault findings, repairing activities ht curtains are disturbed the oller. The light curtain safety	Significant Reference EN ISO 12100 IEC 61496-1	2 Risk
Degree of Possi Probability of Oc Event: Pilz Hazard Rat Risk Reduction The suitable gua machine should the light curtains hazardous move control system s 13849-1.	ible Harm: ccurrence of a Hazardous ting (PHR): n ards to prevent the possible a l be installed. As the access is s should be installed at this ar ements should be stopped by should achieve required perfo	2.5 62 access to haz is required for rea. When lig is safety control	Frequency And / Or Duration of Exposure: Summary Level: ardous movements of the fault findings, repairing activities ht curtains are disturbed the oller. The light curtain safety	Significant Reference EN ISO 12100 IEC 61496-1	2 Risk
Degree of Possi Probability of Oc Event: Pilz Hazard Rat Risk Reduction The suitable gua machine should the light curtains hazardous move control system s 13849-1. Possible Resid Degree of Possi	ible Harm: ccurrence of a Hazardous ting (PHR): n ards to prevent the possible a l be installed. As the access is s should be installed at this ar ements should be stopped by should achieve required perfo	2.5 62 access to haz s required for rea. When lig safety contro- rmance level	Frequency And / Or Duration of Exposure: Summary Level: ardous movements of the fault findings, repairing activities ht curtains are disturbed the oller. The light curtain safety in accordance with EN ISO	Significant Reference EN ISO 12100 IEC 61496-1 EN ISO 13849	2 Risk ) )-1

Post Measures Risk Assessmer	nt		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	5		La Maria
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	2		
Pilz Hazard Rating (PHR)	1		
Summary Level		A.2	
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
sizes fixed covers. There is no set However, there is reflector arrange of the machine. The hazardous m curtains are interrupted. The dual residual pressure release monitored through safety output of kinetix drives are routed through f It is confirmed that light curtain sa in accordance with EN ISO 13849 Considering risk reduction measu Limited the hazard is accepted. Ne	ement for front side light ovements of the machine e valves (VP744R- 5DZ <sup>2</sup> f PILZ PNOZ m B0 safet ail safe PNOZ S7 safety fety control system achie I-1. res implemented by Ram	curtain which includes the LHS e are stopped when this light I-04-MA-X555) are controlled and cy controller. The STO signals of contact expansion module. eving required performance level nani Precision Machines Private	EN ISO 13849-1 IEC 61496-1
Residual Risk			
Operating and Safety instructions	should be followed durir	ng operation of the machine.	



Hazard Identifie	cation			Hazard No:	3.4
Title	Light Curtain Installation				<u> </u>
Location	Machine Front				
Target	Finger/Hand				1
Activity	Normal Operation				1
Task	Operation				
Sub Task	Driving the machine			14 15 16	
Hazard Type	Mechanical Hazard with the	consequence	e of		
Sub Type	Crushing				
Description	-		anical pinch points of machine fro ard with the consequence of Crus		-
Risk Estimation	n and Evaluation				
Degree of Possi	ble Harm:	5	Possibility of Avoidance:		2.5
Probability of Oc Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		4
Pilz Hazard Rat	ting (PHR):	125	Summary Level:	Significant	Risk
Risk Reduction	I			Reference	
machine should the components disturbed the ha		quired is freq led at operate e stopped by	uent for loading and unloading or sides. When light curtains are safety controller. The light	EN ISO 13855 EN ISO 12100 IEC 61496-1	
Possible Resid	ual Risk				
Degree of Possi	ble Harm:	5	Possibility of Avoidance:		2.5
Probability of Oc Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		4
Pilz Hazard Rat	ting (PHR):	2	Summary Possible Level:	Negligible	Risk

Post Measures Risk Assessmen	t		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	5		
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	4		
Pilz Hazard Rating (PHR)	2		
Summary Level			
Negligible Risk			
Risk Reduction Measures Descr	iption		Reference
beyond the calculated safety dista The operator loading & unloading curtains. The light curtains are con controller. The hazardous moveme are interrupted. Considering risk reduction measur Limited the hazard is accepted. No			
Residual Risk			
Operating and Safety instructions	should be followed durin	g operation of the machine.	

	Flex Core Build Machine_Rama	mi	
	LIGHT CURTAIN-Safety Distnace video reference -	MVI_4475	
	S = (K = T) + C where T= (T1+T2+T3+T4)	242	
	K - Approach speed of human hand	2000	mm/sec
	T1-Safety rolay response time	0	ms
	T2-Light curtain response time	0	ms
	T3- contactor/Drive response time	0	ma
	T4 - pneumatic oylinder	0	ms
	Total Stop Time of the Machine	77	ms
	T= (T1+T2+T3+T4)	0.077	Sec
	C = 8(d-14 mm),		-
	Where d - device resolution	25	-
	S - Distance between hazardous area and detection point,		TOT
	Actual distance	342	mm
the second se	Actual distance should be more than S	-	
10 0 0 0 0	Note: Consider this as Sample Calculation of Satety Distance	for Light Curtain	

installed at 342 mm

PILZ

Distance calculated S = 242 mm

Hazard Identifi	cation			Hazard No:	3.5
Title	Service Doors		1		
Location	Machine Perimeter				1L
Target	Finger/Hand				
Activity	Maintenance			N. Carlos	
Task	Fault-finding/Troubleshooting	9	0 4 5	and the sea	
Sub Task	Fault-findings				40
Hazard Type	Mechanical Hazard as a res	ult of			
Sub Type	Crushing				
Description	possible from RHS and rear	side of the m	of the machine during maintenan nachine. This presents drawing in nance personnel when accessed.	or trapping or cr	
Risk Estimatio	n and Evaluation				
Degree of Possi	ible Harm:	5	Possibility of Avoidance:		2.5
Probability of Oo Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		2
Pilz Hazard Ra	ting (PHR):	62	Summary Level:	Significant	Risk
Risk Reductior	1			Reference	
to the machine I manner (for exa the use of tools OR If frequents acco finding activities 14120 and these	hazards in accordance with EN	N ISO 13857 g) that it can g means. e personnel o Id be installe	only be opened or removed by during maintenance or fault d in accordance with EN ISO	EN ISO 13849 EN ISO 14120 EN ISO 13857 EN ISO 12100	
Possible Resid	lual Risk				
Degree of Poss	ible Harm:	5	Possibility of Avoidance:		2.5
Probability of Oo Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		2
Pilz Hazard Ra	ting (PHR):	1	Summary Possible Level:	Negligible	Risk

Post Measures Risk Assessmer	nt		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	5	0	
Probability of Occurrence of a Hazardous Event	0.05	DO NOT ENTE	R
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	2		
Pilz Hazard Rating (PHR)	1		1
Summary Level			
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
The area is installed with two oper hazardous movements of the mac with PILZ make magnetic safety d magnetic safety switches are conr mB0 safety controller. When any of the maintenance door machines are stopped through saf (VP744R- 5DZ1-04-MA-X555) are PNOZ m B0 safety controller. The PNOZ S7 safety contact expansio It is confirmed that door monitoring level in accordance with EN ISO 1 Considering risk reduction measur Limited the hazard is accepted. No	hine from these doors. To oor switches are installe nected in dual channel a pr is opened then all the fety controller. The dual is controlled and monitore STO signals of kinetix d n module. g safety control system a 3849-1. res implemented by Ran	The operable doors are installed d on the sliding door. PILZ make nd monitored by PILZ PNOZ hazardous movements of the residual pressure release valves ed through safety output of PILZ rives are routed through fail safe achieving required performance nani Precision Machines Private	EN ISO 13849-1 EN ISO 12100 EN ISO 14120 EN ISO 13857
Residual Risk			
Operating and Safety instructions	should be followed durir	ng operation of the machine.	



Hazard Identif	ication			Hazard No:	3.6
Title	Trapped Person				
Location	Machine Infeed				
Target	Entire Body				1
Activity	Maintenance				
Task	Fault-finding/Troubleshootir	ng		X	
Sub Task	Dismantling/removal of part components, devices of the				: DE
Hazard Type	Mechanical Hazard with the	consequenc	e of		
Sub Type	Crushing/Impact				
	-	-	ng activities. This present Mechani	ical Hazard with	the
Risk Estimatio	on and Evaluation	-	-	ical Hazard with	the
Risk Estimatio	consequence of Crushing o	-	-	ical Hazard with	2.5
Degree of Poss	consequence of Crushing o	r impact to o	perator when accessed.		
Degree of Poss Probability of O	consequence of Crushing o on and Evaluation sible Harm:	r impact to o	Possibility of Avoidance: Frequency And / Or Duration of		2.5 2
Degree of Poss Probability of O Event:	consequence of Crushing o on and Evaluation sible Harm: Occurrence of a Hazardous	r impact to op 5 2.5	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		2.5 2
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> The suitable gu machine should the light curtain hazardous mov	consequence of Crushing of on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n	5 2.5 62 access to haz s required for rea. When lig	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: ardous movements of the fault findings, repairing activities ht curtains are disturbed the oller. The light curtain safety	Significant	2.5 2 Risk
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> The suitable gu machine should the light curtain hazardous mov control system	consequence of Crushing of on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n ards to prevent the possible a d be installed. As the access is s should be installed at this ar rements should be stopped by should achieve required perfor	5 2.5 62 access to haz s required for rea. When lig	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: ardous movements of the fault findings, repairing activities ht curtains are disturbed the oller. The light curtain safety	Significant Reference EN ISO 12100 IEC 61496-1	2.5 2 Risk
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> The suitable gu machine should the light curtain hazardous mov control system 13849-1.	consequence of Crushing of on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n aards to prevent the possible a d be installed. As the access is s should be installed at this ar rements should be stopped by should achieve required perfo	5 2.5 62 access to haz s required for rea. When lig	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: ardous movements of the fault findings, repairing activities ht curtains are disturbed the oller. The light curtain safety	Significant Reference EN ISO 12100 IEC 61496-1	2.5 2 Risk
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> The suitable gu machine should the light curtain hazardous mov control system 13849-1. <b>Possible Resid</b> Degree of Poss	consequence of Crushing of on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n aards to prevent the possible a d be installed. As the access is s should be installed at this ar rements should be stopped by should achieve required perfo	5 2.5 62 access to haz s required for rea. When lig y safety contro-	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: ardous movements of the fault findings, repairing activities ht curtains are disturbed the oller. The light curtain safety in accordance with EN ISO	Significant Reference EN ISO 12100 IEC 61496-1 EN ISO 13849	2.5 2 Risk

Post Measures Risk Assessmen	ıt		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	5		
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	2		
Pilz Hazard Rating (PHR)	1		
Summary Level		1	
Negligible Risk			
Risk Reduction Measures Descr	iption		Reference
The light curtains are interface with is designed such a way that it will it operator got out from the hazardou Additionally, secured access finger front side. The main safety reset p the machine functionality after any residual pressure release valves (' monitored through safety output of kinetix drives are routed through fa It is confirmed that light curtain saf in accordance with EN ISO 13849 Considering risk reduction measur Limited the hazard is accepted. No	not be possible to start thus zone and closes the g rprint scanner is installed ush button is installed or whind of interruptions for VP744R- 5DZ1-04-MA-> f PILZ PNOZ m B0 safet all safe PNOZ S7 safety fety control system achie -1.	he machine unless the person or guards/doors. d on the main operating panel at n the operating panel to restart safety components. The dual (555) are controlled and y controller. The STO signals of contact expansion module. eving required performance level	EN ISO 13849-1 IEC 61496-1
Residual Risk			
Operating and Safety instructions	should be followed durin	g operation of the machine.	

## Picture 34 Hazard 3.6, Image 1, LHS light curtains Picture 35 Hazard 3.6, Image 2, PILZ PNOZ m B0 of the machine safety controller with PNOZ S7 Picture 36 Hazard 3.6, Image 3, Machine infeed Picture 37 Hazard 3.6, Image 4, Safety Reset light curtains Picture 38 Hazard 3.6, Image 5, Secured Access

	cation			Hazard No:	3.7
Title	Reset Button				
Location	Machine Front				
Target	People / Machine				
Activity	Normal Operation		FLEX CORE BUIL	DMACHINE	
Task	Operation				
Sub Task	Restarting the machine after stopping/interruption			2002010	
Hazard Type	Ergonomic Hazard				
Sub Type	Inadequate design, location of	or identificat	ion of control devices		
Description	The machine is not installed stopping/interruption.	with reset b	utton for restarting of the machine	e after	
Risk Estimatio	n and Evaluation				
Risk Estimatio			Possibility of Avoidance:		
Degree of Poss			Possibility of Avoidance: Frequency And / Or Duration o Exposure:	f	
Degree of Poss Probability of O	ible Harm: ccurrence of a Hazardous	N/A	Frequency And / Or Duration o	f Not Accep	table
Degree of Poss Probability of O Event:	ible Harm: ccurrence of a Hazardous ting (PHR):	N/A	Frequency And / Or Duration o Exposure:		table
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b>	ible Harm: ccurrence of a Hazardous ting (PHR):		Frequency And / Or Duration o Exposure: <b>Summary Level:</b>	Not Accep	
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b>	ible Harm: ccurrence of a Hazardous t <b>ing (PHR):</b> n e reset button should be blue in		Frequency And / Or Duration o Exposure: <b>Summary Level:</b>	Not Accep Reference EN 60204-1	
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> The color of the	ible Harm: ccurrence of a Hazardous ting (PHR): n e reset button should be blue in dual Risk		Frequency And / Or Duration o Exposure: <b>Summary Level:</b>	Not Accep Reference EN 60204-1	
Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction The color of the Possible Resid Degree of Poss	ible Harm: ccurrence of a Hazardous ting (PHR): n e reset button should be blue in dual Risk		Frequency And / Or Duration o Exposure: Summary Level:	Not Accep	

Assessment Date	Mar 12, 2019		
Degree of Possible Harm			
Probability of Occurrence of a Hazardous Event			ACHINE
Possibility of Avoidance			
Frequency And / Or Duration of Exposure			
Pilz Hazard Rating (PHR)	N/A		
Summary Level			
Acceptable			
Risk Reduction Measures Desc	ription		Reference
		amani Precision Machines Private	
Considering risk reduction measure Limited the hazard is accepted. No Residual Risk			

HANGE VER POS	
Picture 39 Hazard 3.7, Image 1, Blue Color Reset Push Button	

Hazard Identifi	cation			Hazard No:	3.8
Title	Operating mode Selection				
Location	Machine				
Target	People / Machine				and and
Activity	Normal Operation - Maintena	ance	FLEX CORE BUILD	MACHINE	
Task	Operation				
Sub Task	Driving the machine			12/07/2010	
Hazard Type	Other Hazards				
Sub Type	Unintended/unexpected star	t-up			
Description	-	perating mo	erating modes. If machinery is not des, it can act differently to the op	-	
	This is especially hazardous selectable.	where differ	ent protective measures and/or wo	ork procedures	are
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:	8	Possibility of Avoidance:		2.5
Probability of Oo Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		3
Pilz Hazard Ra	ting (PHR):	150	Summary Level:	Significant	Risk
Risk Reductior	ı			Reference	
of the selector s operating mode the use of certa codes for nume	hall be clearly identifiable and . The selector may be replace in functions of the machinery t	shall exclus d by another o certain cat orm that the	selection means, which restricts egories of operators (e.g. access key for the selector switch (or	EN 60204-1 EN ISO 13849 EN ISO 12100	
Possible Resid	lual Risk				
Degree of Poss	ible Harm:	8	Possibility of Avoidance:		2.5
Probability of Oo Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		3
Pilz Hazard Ra	ting (PHR):	3	Summary Possible Level:	Negligible	Risk

Assessment Date	Mar 12, 2010		
הססכססוווכוון שמופ	Mar 12, 2019		
Degree of Possible Harm	8		
Probability of Occurrence of a Hazardous Event	0.05		CHINE
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	3	5 = =	
Pilz Hazard Rating (PHR)	3		
Summary Level			
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
-	÷ .	-	
Additionally, for secured access, t the operating panel which gives th machine is also password protecto Considering risk reduction measu Limited the hazard is accepted. No	ne authorized access righed. res implemented by Ran	nts to mode of the machine. The nani Precision Machines Private	
the operating panel which gives the machine is also password protecter. Considering risk reduction measu Limited the hazard is accepted. No	ne authorized access rigited. res implemented by Ran o further risk reduction n	nts to mode of the machine. The mani Precision Machines Private neasures are necessary.	
the operating panel which gives the machine is also password protecter. Considering risk reduction measu Limited the hazard is accepted. No	ne authorized access rigited. res implemented by Ran o further risk reduction n	nts to mode of the machine. The mani Precision Machines Private neasures are necessary.	
the operating panel which gives the machine is also password protecter. Considering risk reduction measu Limited the hazard is accepted. No	ne authorized access rigited. res implemented by Ran o further risk reduction n	nts to mode of the machine. The mani Precision Machines Private neasures are necessary.	
the operating panel which gives the machine is also password protecter. Considering risk reduction measu Limited the hazard is accepted. No	ne authorized access rigited. res implemented by Ran o further risk reduction n	nts to mode of the machine. The mani Precision Machines Private neasures are necessary.	
the operating panel which gives the machine is also password protector Considering risk reduction measu	ne authorized access rigited. res implemented by Ran o further risk reduction n	nts to mode of the machine. The mani Precision Machines Private neasures are necessary.	
the operating panel which gives the machine is also password protecter. Considering risk reduction measu Limited the hazard is accepted. No	ne authorized access rigited. res implemented by Ran o further risk reduction n	nts to mode of the machine. The mani Precision Machines Private neasures are necessary.	
the operating panel which gives the machine is also password protecter. Considering risk reduction measu Limited the hazard is accepted. No	ne authorized access rigited. res implemented by Ran o further risk reduction n	nts to mode of the machine. The mani Precision Machines Private neasures are necessary.	



## 4.5.4 Ergonomic and work process related hazards

This section is concerned with the "fit" between the user, machine and their environment. It takes account of the interfaces to the machine and equipment and if it suits the user's physical and cognitive capabilities and limitations



Picture 44 Ergonomic and work process related hazards

Hazard Identifi	cation			Hazard No:	4.1
Title	Stability				
Location	Machine Perimeter				
Target	People / Machine				No.
Activity	Normal Operation		- to date		Y
Task	Operation				
Sub Task	Driving the machine			Australia a	10
Hazard Type	Mechanical Hazard as a res	sult of			
Sub Type	Instability				
Description		a result brea	rces. This could lead to the looseni ak the machine and harm people in		
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:	8	Possibility of Avoidance:		
Probability of O Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of		0.75
			Exposure:		0.75 4
Pliz Hazard Ra	ting (PHR):	60	Exposure: Summary Level:	Significant	4
Pilz Hazard Ra	•••	60	-	Significant Reference	4
Risk Reduction	1	ground. There	-	-	4 Risk
Risk Reduction	n nould be properly fixed to the g fall over or move unexpected	ground. There	Summary Level:	Reference	4 Risk
Risk Reduction	n nould be properly fixed to the g fall over or move unexpected lual Risk	ground. There	Summary Level:	Reference	4 Risk
Risk Reduction The machine sh the machine to b Possible Resid Degree of Poss	n nould be properly fixed to the g fall over or move unexpected lual Risk	ground. There	Summary Level:	Reference	4 Risk

Post Measures Risk Assessmer	nt		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	8		
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	0.75		
Frequency And / Or Duration of Exposure	4		
Pilz Hazard Rating (PHR)	1		
Summary Level			The
Negligible Risk			
Risk Reduction Measures Desc	ription		Reference
Considering risk reduction measur Limited the hazard is accepted. No			
Residual Risk			
Operating and Safety instructions	should be followed durin	g operation of the machine.	

	cation			Hazard No:	4.2
Title	Physical Handling Of Mach	nine Elements	And Parts		
Location	Machine				
Target	People / Machine			all.	
Activity	Normal Operation				
Task	Operation				N A
Sub Task	Control/inspection				
Hazard Type	Ergonomic Hazard				
Sub Type	Unhealthy posture				
Description	dimensions, strength and s		ws for the variability of the operato		
Risk Estimatio	n and Evaluation				
Risk Estimatio		8	Possibility of Avoidance:		0.75
Degree of Poss		8 2.5	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		0.75
Degree of Poss Probability of O	ible Harm: ccurrence of a Hazardous		Frequency And / Or Duration of		4
Degree of Poss Probability of O Event:	ible Harm: ccurrence of a Hazardous t <b>ing (PHR):</b>	2.5	Frequency And / Or Duration of Exposure:		4
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b>	ible Harm: ccurrence of a Hazardous t <b>ing (PHR):</b>	2.5 60	Frequency And / Or Duration of Exposure: Summary Level:	Significant	4 Risk
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> There should no	ible Harm: ccurrence of a Hazardous t <b>ting (PHR):</b> n ot be any repetitive activities d be highlighted where perso	2.5 60 or intensive p	Frequency And / Or Duration of Exposure: Summary Level: hysical strain foreseen.	Significant Reference	4 Risk
Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction There should no The area should maintenance ac However, there	ible Harm: ccurrence of a Hazardous t <b>ting (PHR):</b> n ot be any repetitive activities d be highlighted where perso ctivity. are areas where space for m	2.5 60 or intensive p nnel do not no	Frequency And / Or Duration of Exposure: Summary Level: hysical strain foreseen.	Significant Reference	4 Risk
Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction There should no The area should maintenance ad However, there These are only	ible Harm: ccurrence of a Hazardous t <b>ting (PHR):</b> n ot be any repetitive activities d be highlighted where perso ctivity. are areas where space for m in areas where personnel do	2.5 60 or intensive p nnel do not no	Frequency And / Or Duration of Exposure: Summary Level: hysical strain foreseen. eed to access without any the parts of the body is restricted.	Significant Reference	4 Risk
Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction There should no The area should maintenance ac However, there These are only maintenance.	iible Harm: ccurrence of a Hazardous tting (PHR): n ot be any repetitive activities d be highlighted where perso ctivity. are areas where space for m in areas where personnel do	2.5 60 or intensive p nnel do not no	Frequency And / Or Duration of Exposure: Summary Level: hysical strain foreseen. eed to access without any the parts of the body is restricted.	Significant Reference	4 Risk
Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction There should no The area should maintenance ac However, there These are only maintenance. Possible Resid	iible Harm: ccurrence of a Hazardous tting (PHR): n ot be any repetitive activities d be highlighted where perso ctivity. are areas where space for m in areas where personnel do	2.5 60 or intensive p nnel do not ne novements of not generally	Frequency And / Or Duration of Exposure: Summary Level: hysical strain foreseen. eed to access without any the parts of the body is restricted. need to access except for the	Significant Reference EN ISO 12100	4 Risk

\_\_\_\_\_

Post Measures Risk Assessmer	it		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm	8		
Probability of Occurrence of a Hazardous Event	0.05		
Possibility of Avoidance	0.75		
Frequency And / Or Duration of Exposure	4		here here
Pilz Hazard Rating (PHR)	1		
Summary Level			
Negligible Risk			
Risk Reduction Measures Desci	ription		Reference
Considering risk reduction measur Limited the hazard is accepted. No	· ·		
Residual Risk			
Operating and Safety instructions	should be followed durin	g operation of the machine.	

Hazard Identifi	cation			Hazard No:	4.3
Title	Physical and Psychological	Stress			
Location	Machine Front				
Target	Entire Body				
Activity	Normal Operation				
Task	Operation				
Sub Task	Control/inspection				
Hazard Type	Ergonomic Hazard				
Sub Type	Mental overload/boredom				
Description	concentration. There is no ir moving parts due to the ligh	ritating dazz ting. ıse faced by	ate or monitoring needed that require le and there are no dangerous stro the operator are likely to create dis me.	boscopic effects	
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:	5	Possibility of Avoidance:		
Deskahlling (C					0.75
Probability of O Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		0.75 4
Event:		2.5 37			0.75 4 Risk
	ting (PHR):		Exposure:		4
Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> The intended co discomfort, fatig	ting (PHR):	37 operator shou gical stress	Exposure: Summary Level: uld be unlikely to create over time.	Low	4 Risk
Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> The intended co discomfort, fatig	ting (PHR): n onditions of use faced by the o ue and physical and psycholo idelines should be mentioned	37 operator shou gical stress	Exposure: Summary Level: uld be unlikely to create over time.	Low Reference	4 Risk
Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> The intended co discomfort, fatig The suitable gui <b>Possible Resid</b>	ting (PHR): n onditions of use faced by the o lue and physical and psycholo idelines should be mentioned	37 operator shou gical stress	Exposure: Summary Level: uld be unlikely to create over time.	Low Reference EN ISO 12100	4 Risk
Event: Pilz Hazard Ra Risk Reduction The intended co discomfort, fatig The suitable gui Possible Resid Degree of Possi	ting (PHR): n onditions of use faced by the o lue and physical and psycholo idelines should be mentioned	37 operator shou gical stress in operating	Exposure: Summary Level: uld be unlikely to create over time. manual of the machine.	Low Reference EN ISO 12100	4 Risk

Assessment Date	Jun 08, 2020	-	
Degree of Possible Harm	5	MACHINE M.	ANUAL
Probability of Occurrence of a Hazardous Event	0.05	LIFLEX CORE BUILD MAD	HINE) water to code a filler Owa
Possibility of Avoidance	0.75		
Frequency And / Or Duration of Exposure	4		
Pilz Hazard Rating (PHR)	1		
Summary Level		NAMES PECIDIN MOVE THE KILL OF	ES PRIVITE LANTED
Negligible Risk		Qual addressionaux. Mr. secon	Te - (11) second
Risk Reduction Measures Desc	ription		Reference
The machine operating manual is suitable guidelines made available components. Use of adequate PP information's are made available in	which includes safe wa E is mandatory during th n operating manual.	y of handling for loading of le machine operations. All this	EN ISO 12100
suitable guidelines made available components. Use of adequate PP	which includes safe wa E is mandatory during th n operating manual. res implemented by Ran	y of handling for loading of le machine operations. All this nani Precision Machines Private	EN ISO 12100
suitable guidelines made available components. Use of adequate PP information's are made available in Considering risk reduction measure	which includes safe wa E is mandatory during th n operating manual. res implemented by Ran	y of handling for loading of le machine operations. All this nani Precision Machines Private	EN ISO 12100
suitable guidelines made available components. Use of adequate PP information's are made available in Considering risk reduction measur Limited the hazard is accepted. No	e which includes safe wa E is mandatory during th n operating manual. res implemented by Ran o further risk reduction m	y of handling for loading of le machine operations. All this nani Precision Machines Private neasures are necessary.	EN ISO 12100
suitable guidelines made available components. Use of adequate PP information's are made available in Considering risk reduction measur Limited the hazard is accepted. No <b>Residual Risk</b> Operating and Safety instructions It is necessary that well trained op	e which includes safe wa E is mandatory during th n operating manual. res implemented by Ran o further risk reduction m should be followed durin erator required for opera	y of handling for loading of he machine operations. All this hani Precision Machines Private heasures are necessary.	
suitable guidelines made available components. Use of adequate PP information's are made available in Considering risk reduction measur Limited the hazard is accepted. No <b>Residual Risk</b> Operating and Safety instructions It is necessary that well trained op	e which includes safe wa E is mandatory during th n operating manual. res implemented by Ran o further risk reduction m should be followed durin erator required for opera	y of handling for loading of he machine operations. All this hani Precision Machines Private heasures are necessary.	
suitable guidelines made available components. Use of adequate PP information's are made available in Considering risk reduction measur Limited the hazard is accepted. No	e which includes safe wa E is mandatory during th n operating manual. res implemented by Ran o further risk reduction m should be followed durin erator required for opera	y of handling for loading of he machine operations. All this hani Precision Machines Private heasures are necessary.	
suitable guidelines made available components. Use of adequate PP information's are made available in Considering risk reduction measur Limited the hazard is accepted. No <b>Residual Risk</b> Operating and Safety instructions It is necessary that well trained op	e which includes safe wa E is mandatory during th n operating manual. res implemented by Ran o further risk reduction m should be followed durin erator required for opera	y of handling for loading of he machine operations. All this hani Precision Machines Private heasures are necessary.	

Hazard Identifi	cation			Hazard No: 4.4	
				Hazard No: 4.4	+
Title	Noise generated from ma	chine	1		
Location	Entire Machine		-		-
Target	Entire Body		ACAL	TION	
Activity	Normal Operation		ACAU		
Task	Operation			ear aring	
Sub Task	Driving the machine		<b>P</b> rin	aring otection this area	
Hazard Type	Noise Hazards		I		
Sub Type	Whistling pneumatics				
Risk Estimatio	hearing loss.				
			Dessibility of Ausidemon		_
Degree of Poss Probability of O Event:	ccurrence of a Hazardous	11 1.25	Possibility of Avoidance: Frequency And / Or Duration of Exposure:	2.5	
Pilz Hazard Ra	ting (PHR):	171	Summary Level:	High Risk	(
Risk Reduction	ı			Reference	
noise is reduced completely enclo Inform the user Inform if hearing	d. Use low noise emission c ose. about the noise levels of the protection must be provide a of the operating machine i	e machine as in ed to personnel,	dicated in machinery directive. which must be worn constantly	EN ISO 12100	
equipment regu	lations.				
equipment regu Possible Resid					
	lual Risk	11	Possibility of Avoidance:	2.5	5
Possible Resid	lual Risk	11 0.05	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		

Post Measures Pick Assessment			
Post Measures Risk Assessment         Assessment Date         Degree of Possible Harm         Probability of Occurrence of a         Hazardous Event         Possibility of Avoidance         Frequency And / Or Duration         of Exposure         Pilz Hazard Rating (PHR)         Summary Level         Negligible Risk	Jun 12, 2020       11       0.05       2.5       5       6	Report No: TUV/PTL/19-20/EMC-ON/0006 12.8 Sound Pressure Test a) Test Condition: Specification: ISO 12100.2010 b) Test Procedure: Taiv measurement of sound at 1 meter distance c) Requirements: The weighted empsion sound pressure level at 1 d) Observations: PL see section 13.6 for table: a) Results: Compiled	
Risk Reduction Measures Desc	ription		Reference
It is confirmed by the manufacture machine. The noise measuremen guidelines are mentioned in the op Considering risk reduction measu Limited the hazard is accepted. N	t report is made available perating manual of the m res implemented by Ram	e for this machine. The suitable achine. nani Precision Machines Private	EN ISO 12100
Residual Risk			

## Residual Risk

Operating and Safety instructions should be followed during operation of the machine.

Information about measured noise level should be available into the operating manual.

Hazard Identif	cation			Hazard No:	4.5
Title	Lighting in work area				
Location	Machine Infeed				
Target	People / Machine			and the second s	1
Activity	Normal Operation		T.	Ja /	
Task	Operation				
Sub Task	Driving the machine			1276314241157112	·@
Hazard Type	Ergonomic Hazard				
Sub Type	Insufficient visibility				
Description		fficient Light	n and adjustment, and maintenar ing provision is available in opera operations.		
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:		Possibility of Avoidance:		
Probability of O Event:	ccurrence of a Hazardous		Frequency And / Or Duration of Exposure:	f	
Pilz Hazard Ra	ting (PHR):	N/A	Summary Level:	Further Re	eview
Risk Reductio	n			Reference	
	e sufficient Lighting provision a rator to visualize machine oper		perating area and so that it will	EN ISO 12100	)
Possible Resid	dual Risk				
Degree of Poss	ible Harm:		Possibility of Avoidance:		
Probability of O Event:	ccurrence of a Hazardous		Frequency And / Or Duration of Exposure:	f	

Post Measures Risk Assessme	nt	-	
Assessment Date	Mar 12, 2019		
Degree of Possible Harm		Villa	
Probability of Occurrence of a Hazardous Event			
Possibility of Avoidance			
Frequency And / Or Duration of Exposure			
Pilz Hazard Rating (PHR)	N/A		
Summary Level			
Acceptable			
Risk Reduction Measures Desc	ription		
There is sufficient Lighting provisi operator to visualize machine ope Considering risk reduction measu Limited the hazard is accepted. N	on available in operating erations. res implemented by Ran	nani Precision Machines Private	Reference EN ISO 12100
There is sufficient Lighting provisi operator to visualize machine ope Considering risk reduction measu	on available in operating erations. res implemented by Ran	nani Precision Machines Private	
There is sufficient Lighting provisi operator to visualize machine ope Considering risk reduction measu	on available in operating erations. res implemented by Ran	nani Precision Machines Private	



	ication			Hazard No:	4.6
Title	Transportation of machine				
Location	Entire Machine				
Target	People / Machine				
Activity	Transport		R		
Task	Transport		LITE LITE		
Sub Task	Lifting			0-0	
Hazard Type	From load falls, collisions, n	nachine tippi	ng caused by:		
Sub Type	Uncontrolled loading				
Description	transported complete assen entire machinery. There pre	nbly to their o	loor of Ramani Precision Machine I customer. During transportation, it is of falling machine tripping during lif	s planned to lift	the
	machine.			and loading	g
Risk Estimatic	machine.				g
	on and Evaluation	40	Possibility of Avoidance:		g 5
Degree of Poss	on and Evaluation	40 1.25	Possibility of Avoidance: Frequency And / Or Duration of		-
Degree of Poss Probability of O Event:	on and Evaluation sible Harm: occurrence of a Hazardous		Possibility of Avoidance:	Significant	5 0.5
Degree of Poss Probability of O	on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR):	1.25	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		5 0.5
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> There should b transportation of the machine by	on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n e suitable guidelines mentione of the machines. Also on the me	1.25 125 ed in their ma nachine lifting	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level:	Significant	5 0.5 Risk
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> There should b transportation of the machine by The instruction	on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n e suitable guidelines mentione of the machines. Also on the manuals sho mentioned in the manuals sho	1.25 125 ed in their ma nachine lifting	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: achine manuals for lifting and points should be provided to lift	Significant Reference	5 0.5 Risk
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reductio</b> There should b transportation of the machine by The instruction	on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n e suitable guidelines mentione of the machines. Also on the mer overhead crane. mentioned in the manuals sho dual Risk	1.25 125 ed in their ma nachine lifting	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: achine manuals for lifting and points should be provided to lift	Significant Reference	5 0.5 Risk
Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reductio There should b transportation of the machine by The instruction Possible Resid Degree of Poss	on and Evaluation sible Harm: occurrence of a Hazardous ating (PHR): n e suitable guidelines mentione of the machines. Also on the mer overhead crane. mentioned in the manuals sho dual Risk	1.25 125 ed in their ma lachine lifting build be follow	Possibility of Avoidance: Frequency And / Or Duration of Exposure: Summary Level: achine manuals for lifting and g points should be provided to lift wed strictly to avoid this hazard.	Significant Reference	5 0.5 Risk

	nt		
ssessment Date	Jun 08, 2020		
Degree of Possible Harm	40		
Probability of Occurrence of a Hazardous Event	1.25		
Possibility of Avoidance	0.75		
Frequency And / Or Duration of Exposure	0.5		4
Pilz Hazard Rating (PHR)	18		0-0
Summary Level			
Very Low Risk			
Risk Reduction Measures Desci	ription		Reference
machine. Considering risk reduction measur	res implemented by R	nes for transportation of the	
machine.	res implemented by R	amani Precision Machines Private	
machine. Considering risk reduction measur	res implemented by R	amani Precision Machines Private	
machine. Considering risk reduction measur Limited the hazard is accepted. No	res implemented by R o further risk reductior	amani Precision Machines Private n measures are necessary	
machine. Considering risk reduction measur Limited the hazard is accepted. No	res implemented by R o further risk reductior	amani Precision Machines Private n measures are necessary	
machine. Considering risk reduction measur Limited the hazard is accepted. No	res implemented by R o further risk reductior	amani Precision Machines Private n measures are necessary	
machine. Considering risk reduction measur Limited the hazard is accepted. No	res implemented by R o further risk reductior	amani Precision Machines Private n measures are necessary	
machine. Considering risk reduction measur Limited the hazard is accepted. No	res implemented by R o further risk reductior	amani Precision Machines Private n measures are necessary	
machine. Considering risk reduction measur Limited the hazard is accepted. No	res implemented by R o further risk reductior	amani Precision Machines Private n measures are necessary	
machine. Considering risk reduction measur Limited the hazard is accepted. No	res implemented by R o further risk reductior	amani Precision Machines Private n measures are necessary	

Hazard Identifie	cation			Hazard No:	4.7
Title	Maintenance Operations				
Location	Entire Machine		A second s	and the second se	and the second second
Target	Entire Body		Í.	-	
Activity	Maintenance			THE THE	
Task	Cleaning Maintenance				100
Sub Task	Dismantling/removal of part components, devices of the				
Hazard Type	Combination of Hazards				
Sub Type					
Description		-	ons are presents on entire machin ement of worn out parts, Falls durir		
Risk Estimation	n and Evaluation				
Degree of Possi	ble Harm:	5	Possibility of Avoidance:		2.5
Probability of Oo Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		2
Pilz Hazard Rat	ing (PHR):	62	Summary Level:	Significant	Risk
Risk Reduction	I			Reference	
gloves and safe standard proced polices should b user of means o manager in main	ty goggles should be mandat lure which includes safe way	ory during the of handling m ce activities. <sup>-</sup> ry. Training un ardous areas ore be carried	naintenance operations. LOTO There should be provision by the nder the responsibility of the requiring specific technical	EN ISO 12100	
•	,				
•					
persons (for exa	ual Risk	5	Possibility of Avoidance:		2.5
persons (for exa <b>Possible Resid</b> Degree of Possi	ual Risk	5 0.05	Possibility of Avoidance: Frequency And / Or Duration of Exposure:		2.5 2

Assessment Date	Jun 08, 2020				
Degree of Possible Harm	5	E	-	FLEX CORE BUILD MAC	HDIE RRW/2019/
Probability of Occurrence of a Hazardous Event	0.05		UNIT POSITION / ITEM	EVALUATION	PREVENTIVE ACT
Possibility of Avoidance	2.5	Whole Machine	Main Assembly Overall Dirt, Damage	CRITERIA No Loosening, No Wear No excess dirt, No damage.	Check & Tighten properly. Keep all the units of and dirt free
Frequency And / Or Duration of Exposure	2	Sensors	Cable and Air line crack, dir , damage Sensor Head Cable	No crack, dirt, damage No dirt, breakage, damage	Keep all the units of and dirt free Clean the sensor he
Pilz Hazard Rating (PHR)	1	Electric Control Pneumatic Control	Control, Operation Panel, Light button Piping soratch, Air Leakage Cylinder action	Wiring each cable Normal Functioning No Air Leakage Normal Function	Check daily Check daily
Summary Level					
Negligible Risk					
Risk Reduction Measures Desc In machine operating manual, ma scheduled maintenance. There and the machine and its component n instructions are also made availal There is standard procedure which	in section C provides the re tables available for the naintenance. In order to p ble for the machine maint	daily, weekly, n provide suitable renance activity.	nonthly check guidelines, sa	EN I afety	SO 12100
In machine operating manual, ma scheduled maintenance. There al the machine and its component n instructions are also made availa	in section C provides the re tables available for the naintenance. In order to p ble for the machine maint ch includes safe way of ha	daily, weekly, n provide suitable enance activity. andling mainten nani Precision M	nonthly check guidelines, si ance operatio lachines Priv	EN I afety ons.	
In machine operating manual, ma scheduled maintenance. There an the machine and its component n instructions are also made availa There is standard procedure whic Considering risk reduction measu	in section C provides the re tables available for the naintenance. In order to p ble for the machine maint ch includes safe way of ha	daily, weekly, n provide suitable enance activity. andling mainten nani Precision M	nonthly check guidelines, si ance operatio lachines Priv	EN I afety ons.	
In machine operating manual, ma scheduled maintenance. There an the machine and its component n instructions are also made availal There is standard procedure whic Considering risk reduction measu Limited the hazard is accepted. N	in section C provides the re tables available for the naintenance. In order to p ble for the machine maint th includes safe way of ha res implemented by Ram lo further risk reduction m	daily, weekly, n rovide suitable renance activity. andling mainten nani Precision M neasures are ne	ionthly check guidelines, sa ance operation lachines Priv cessary.	EN I afety ons.	

## 4.5.5 Adequacy of Information for Use and Training

While the hazards related to this section can be of various nature (mechanical, electrical, pneumatic etc.) the origin for those hazards often originate in a lack of information for use



Picture 46 Adequacy of Information for Use and Training

Hazard Identif	cation			Hazard No:	5.1
Title	Inadequate Marking and sign	IS			
Location	Machine Perimeter				
Target	People / Machine				
Activity	Various				
Task	Various			1	
Sub Task	Various			12/ <mark>13/</mark> 2 <b>9</b> 10 16:	25
Hazard Type	Combination of Hazards				
Sub Type	N/A				
Diak Estimation	supply. There is no name plate fixed machine certification serial n	on the mac	d to the electrical parts stating the hine indicating general machine ir e of manufacture etc.		
	n and Evaluation				
Degree of Poss Probability of O Event:	ccurrence of a Hazardous		Possibility of Avoidance: Frequency And / Or Duration of Exposure:	:	
Pilz Hazard Rating (PHR):					
Pilz Hazard Ra	ting (PHR):	N/A	Summary Level:	Further Re	view
		N/A	Summary Level:	Further Re	view
Risk Reductio	n e electrical warning sign affixed				
Risk Reductio There should b electrical supply There should b	n e electrical warning sign affixed /.	to the elect	trical parts stating the relevant	Reference	
Risk Reductio There should b electrical supply There should b	n e electrical warning sign affixed /. e name plate fixed on the mach le certification serial number, na	to the elect	trical parts stating the relevant	Reference	
Risk Reductio There should b electrical supply There should b such as machir Possible Resid	n e electrical warning sign affixed /. e name plate fixed on the mach e certification serial number, na dual Risk	to the elect	trical parts stating the relevant	Reference	
Risk Reductio There should b electrical supply There should b such as machir Possible Resid Degree of Poss	n e electrical warning sign affixed /. e name plate fixed on the mach e certification serial number, na dual Risk	to the elect	trical parts stating the relevant ng general machine information ufacture etc.	Reference EN ISO 12100	
Assessment Date	Mar 12, 2019				
---	--	--	-----------		
Degree of Possible Harm		0			
Probability of Occurrence of a Hazardous Event		Tourne of Consistence (TEMS Tables) States of Des Machine (TEMS Tables) Tele of Machine (States) Tele of Machine (States) Tele (States) Tele (States)			
Possibility of Avoidance		Ration Voltage 412 Volta Maximum Corrent 280 Annu- Rated Power: 100 KMA No. Of Power			
Frequency And / Or Duration of Exposure					
Pilz Hazard Rating (PHR)	N/A	Manufactured for Barran formation of Manufactured for the C-1 disk Andreading Formation	MANI		
Summary Level		And the second s			
Acceptable					
Risk Reduction Measures Desc	ription		Reference		
information such as machine certi	fication serial number,				
	fication serial number, res implemented by Ra	achine indicating general machine name of manufacture etc. amani Precision Machines Private			
information such as machine certi Considering risk reduction measu	fication serial number, res implemented by Ra	achine indicating general machine name of manufacture etc. amani Precision Machines Private			



Hazard Identifi	cation			Hazard No:	5.2
Title	Documentation -Operating Ma	anual			
Location	Machine				
Target	People / Machine			FRE	
Activity	Various				
Task	Various		0000000		
Sub Task	Various			10	0110
Hazard Type	Other Hazards		-		
Sub Type	Inadequate Documentation				
<b>Description</b> Inadequate Documentation can lead to errors of fitting, incorrect use of the machine, wrong or insufficient maintenance and other user mistakes during the life cycle of the machinery.					
Risk Estimatio					
	n and Evaluation				
Degree of Poss	ible Harm:		Possibility of Avoidance:		
			Possibility of Avoidance: Frequency And / Or Duration of Exposure:		
Probability of O	ible Harm: ccurrence of a Hazardous	N/A	Frequency And / Or Duration of	Further Re	view
Probability of O Event:	ible Harm: ccurrence of a Hazardous ting (PHR):	N/A	Frequency And / Or Duration of Exposure:		view
Probability of Od Event: Pilz Hazard Rat Risk Reduction A sufficient leve machine, taking the language(s) An integral part machinery. It sh	ible Harm: ccurrence of a Hazardous ting (PHR): I of information shall be provide into account all its operating m of the country in which the mac is the instruction handbook, wh all be legible; text should be su instructions should be provided	d to the use odes. Inforr chine will be ich should o pported by	Frequency And / Or Duration of Exposure: Summary Level: er about the intended use of the mation for use shall be given in a used in. cover all life phases of the	Further Re	
Probability of Oc Event: Pilz Hazard Ra Risk Reduction A sufficient leve machine, taking the language(s) An integral part machinery. It sh Safety-relevant	ible Harm: ccurrence of a Hazardous ting (PHR): I of information shall be provide into account all its operating m of the country in which the mad is the instruction handbook, wh all be legible; text should be su instructions should be provided ed for.	d to the use odes. Inforr chine will be ich should o pported by	Frequency And / Or Duration of Exposure: Summary Level: er about the intended use of the mation for use shall be given in e used in. cover all life phases of the illustrations.	Further Re Reference	
Probability of Od Event: Pilz Hazard Rat Risk Reduction A sufficient leve machine, taking the language(s) An integral part machinery. It sh Safety-relevant they are intende	ible Harm: ccurrence of a Hazardous ting (PHR): I of information shall be provide into account all its operating m of the country in which the mac is the instruction handbook, wh all be legible; text should be su instructions should be provided ed for.	d to the use odes. Inforr chine will be ich should o pported by	Frequency And / Or Duration of Exposure: Summary Level: er about the intended use of the mation for use shall be given in e used in. cover all life phases of the illustrations.	Further Re Reference	
Probability of Od Event: Pilz Hazard Rat Risk Reduction A sufficient leve machine, taking the language(s) An integral part machinery. It sh Safety-relevant they are intender Possible Resid Degree of Possi	ible Harm: ccurrence of a Hazardous ting (PHR): I of information shall be provide into account all its operating m of the country in which the mac is the instruction handbook, wh all be legible; text should be su instructions should be provided ed for.	d to the use odes. Inforr chine will be ich should o pported by	Frequency And / Or Duration of Exposure: Summary Level: er about the intended use of the mation for use shall be given in a used in. cover all life phases of the illustrations. eadily available to the personnel	Further Re Reference IEC 82079-1 EN ISO 12100	

	ent		
Assessment Date	Jun 08, 2020		•
Degree of Possible Harm		MACHINE M.	ANUAL
Probability of Occurrence of a Hazardous Event		FLEX CORE BUILD MAD	CHINE) wear to reade a FLEX Core
Possibility of Avoidance			
Frequency And / Or Duration of Exposure			20
Pilz Hazard Rating (PHR)	N/A		
Summary Level			es PRV/NE Lamito August Ana, Socie 13,
Acceptable		part instrumention, re-incom	Allowed an active ARMAN The of all 112 - active ARMAN and Annual Annual Arman and Arman Arman and Arman Arman and Arman Arman Arman Arman Arman Arman Arm Arman Arman Arm
Risk Reduction Measures Des	cription		Reference
Considering risk reduction meas	ures implemented by Rar	nani Precision Machines Private	
Considering risk reduction meas Limited the hazard is accepted.			
Limited the hazard is accepted.			
-	No further risk reduction n	neasures are necessary.	
Limited the hazard is accepted.	No further risk reduction n	neasures are necessary.	
Limited the hazard is accepted.	No further risk reduction n	neasures are necessary.	
Limited the hazard is accepted.	No further risk reduction n	neasures are necessary.	
Limited the hazard is accepted.	No further risk reduction n	neasures are necessary.	
Limited the hazard is accepted.	No further risk reduction n	neasures are necessary.	

Hazard Identifie	cation			Hazard No:	5.3
Title	Inadequate documentation -Dra	wings			
Location	Machine				
Target	People / Machine				
Activity	Various				
Task	Various				
Sub Task	Various				
Hazard Type	Combination of Hazards				
Sub Type	Combination of Hazards				
Description		drawing	pneumatic drawings have not be	en made available	e for
Description	-	-	nents installed are also not availa		
	-	-	o ensure the machine is assemble jor maintenance where the equipr	-	
Risk Estimatio	n and Evaluation				
Degree of Possi	ble Harm:		Possibility of Avoidance:		
Probability of Oo Event:	ccurrence of a Hazardous		Frequency And / Or Duration of Exposure:	:	
Pilz Hazard Rat	ting (PHR):	N/A	Summary Level:	Further Rev	/iew
Risk Reduction	1			Reference	
sheets are requi These drawings finding. Without direct contact wi	awings, mechanical drawings, pr ired, in order to verify if the Safet are also of significant importance correct documentation, there is a ith live parts as they would not be he electrical enclosures or parts o	ty Control to the m very real fully awa	System is adequate. aintenance team for fault- risk of personnel coming into re of the energies of	EN ISO 12100	
Possible Resid	ual Risk				
Degree of Possi	ble Harm:		Possibility of Avoidance:		
Probability of Oo Event:	ccurrence of a Hazardous		Frequency And / Or Duration of Exposure:	:	
Pilz Hazard Rat	ting (PHR):	N/A	Summary Possible Level:	Accept	able

Post Measures Risk Assessmer	nt		
Assessment Date	Mar 12, 2019		
Degree of Possible Harm			idanica Maria
Probability of Occurrence of a Hazardous Event			
Possibility of Avoidance			
Frequency And / Or Duration of Exposure			
Pilz Hazard Rating (PHR)	N/A		
Summary Level			Autor Concernation and Autor A
Acceptable			
Risk Reduction Measures Desc	ription		Reference
Considering risk reduction measur Limited the hazard is accepted. No			
Residual Risk			
Operating and Safety instructions	should be followed durin	g operation of the machine.	



	ication			Hazard No:	5.4
Title	Unsuitable tools or equipmen	ıt			
Location	Entire Machine				
Target	People / Machine				
Activity					
Task	Fault-finding/Troubleshooting	l			
Sub Task	Replacements of parts, comp devices of the machine	oonents,	The T	1	
Hazard Type	Other Hazards				
Sub Type	Inadequate Documentation				
Description	Unsuitable tools or equipmen entanglement and punctures.		e a variety of injuries including cutt	ing and severing	<b>g</b> ,
Risk Estimatio	on and Evaluation				
Risk Estimatio			Possibility of Avoidance:		
Degree of Poss			Possibility of Avoidance: Frequency And / Or Duration of Exposure:		
Degree of Poss Probability of O	ible Harm: ccurrence of a Hazardous	N/A	Frequency And / Or Duration of	Further Re	eview
Degree of Poss Probability of O Event:	bible Harm: Inccurrence of a Hazardous	N/A	Frequency And / Or Duration of Exposure:		eview
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> Ensure the corr	bible Harm: Inccurrence of a Hazardous		Frequency And / Or Duration of Exposure: Summary Level:	Further Re	
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> Ensure the corr equipment regu	sible Harm: Iccurrence of a Hazardous I <b>ting (PHR):</b> n rect equipment is used for maint ilarly for wear and tear.	tenance wo	Frequency And / Or Duration of Exposure: Summary Level: urk, also inform to check ent for adjustment and servicing	Further Re	
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> Ensure the corr equipment regu	sible Harm: eccurrence of a Hazardous a <b>ting (PHR):</b> n rect equipment is used for main alarly for wear and tear. be supplied with special tools a the tie bar nut) if those are not	tenance wo	Frequency And / Or Duration of Exposure: Summary Level: urk, also inform to check ent for adjustment and servicing	Further Re	
Degree of Poss Probability of O Event: <b>Pilz Hazard Ra</b> <b>Risk Reduction</b> Ensure the corr equipment regu Machine has to (e.g. spanning t	sible Harm: Incourrence of a Hazardous Inting (PHR): In Prect equipment is used for main Ilarly for wear and tear. It be supplied with special tools a the tie bar nut) if those are not Clual Risk	tenance wo	Frequency And / Or Duration of Exposure: Summary Level: urk, also inform to check ent for adjustment and servicing	Further Re	
Degree of Poss Probability of O Event: Pilz Hazard Ra Risk Reduction Ensure the corr equipment regu Machine has to (e.g. spanning t Possible Resid Degree of Poss	sible Harm: Incourrence of a Hazardous Inting (PHR): In Prect equipment is used for main Ilarly for wear and tear. It be supplied with special tools a the tie bar nut) if those are not Chual Risk	tenance wo	Frequency And / Or Duration of Exposure: Summary Level: rk, also inform to check ent for adjustment and servicing ilable on the market.	Further Reference	

Summary Level       Image: Image		nt		
Probability of Occurrence of a lazardous Event       Image: Comparison of the possibility of Avoidance         Possibility of Avoidance       Image: Comparison of the possibility of Avoidance         Frequency And / Or Duration of Exposure       N/A         Summary Level       Image: Comparison of the possibility of Avoidance         Acceptable       Reference         Risk Reduction Measures Description       Reference         The specific and special tools are supplied to the end user along with the machine. The maintenance instructions are made available in the operating manual. The maintenance instructions are made available in the operating manual in section C.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 12100         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.       the machine.	Assessment Date	Jun 08, 2020	-	
Probability of Occurrence of a hazardous Event       Image: Comparison of the special comparison of the machine.       EN ISO 12100         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.       Image: Special comparison of the machine.         the special comparison should be followed during operation of the machine.       Its necessary that any maintenance activity should be carried out by maintenance authorized competent	Degree of Possible Harm		MACHINE M	ANUAL
Frequency And / Or Duration       Indext         Pilz Hazard Rating (PHR)       N/A         Summary Level       Indext         Acceptable       Indext         Risk Reduction Measures Description       Reference         The specific and special tools are supplied to the end user along with the machine. The suitable guidelines are mentioned under section D of the operating manual. The maintenance instructions are made available in the operating manual in section C.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 12100         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.       It is necessary that any maintenance activity should be carried out by maintenance authorized competent			[FLEX CORE BUILD MAK	SHINE)
of Exposure       Image: Pilz Hazard Rating (PHR)       N/A         Summary Level       Image: Pilz Hazard Rating (PHR)       Reference       Image: Pilz Hazard Rating (PHR)       Reference       En ISO 12100       Image: Pilz Hazard Rating (PHR)       En ISO 12100       Image: Pilz Hazard Rating Rati	Possibility of Avoidance			
Summary Level       Image: Image				
The specific and special tools are supplied to the end user along with the machine. The suitable guidelines are mentioned under section D of the operating manual. The maintenance instructions are made available in the operating manual in section C.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 12100         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.       It is necessary that any maintenance activity should be carried out by maintenance authorized competent	Pilz Hazard Rating (PHR)	N/A		
Risk Reduction Measures Description       Reference         The specific and special tools are supplied to the end user along with the machine. The suitable guidelines are mentioned under section D of the operating manual. The maintenance instructions are made available in the operating manual in section C.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 12100         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.       It is necessary that any maintenance activity should be carried out by maintenance authorized competent	Summary Level		Seave Process and	ES PROVIE LANTED August Avenue 15.
The specific and special tools are supplied to the end user along with the machine. The suitable guidelines are mentioned under section D of the operating manual. The maintenance instructions are made available in the operating manual in section C.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 12100         Residual Risk       Operating and Safety instructions should be followed during operation of the machine.       It is necessary that any maintenance activity should be carried out by maintenance authorized competent	Acceptable		End independent by second	Ter of the opening of
suitable guidelines are mentioned under section D of the operating manual. The maintenance instructions are made available in the operating manual in section C. Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.  Residual Risk Operating and Safety instructions should be followed during operation of the machine. It is necessary that any maintenance activity should be carried out by maintenance authorized competent	Risk Reduction Measures Desc	ription		Reference
Operating and Safety instructions should be followed during operation of the machine. It is necessary that any maintenance activity should be carried out by maintenance authorized competent	-			
It is necessary that any maintenance activity should be carried out by maintenance authorized competent				
	Residual Risk		,	
personnel.				
	Operating and Safety instructions	should be followed durir	ng operation of the machine.	ed competent

Hazard Identifi	cation			Hazard No:	5.5
Title	EMC Disturbance				
Location	Electrical Panel				
Target	Environment				
Activity	Normal Operation				
Task	Operation				
Sub Task	Driving the machine				
					1
Hazard Type	Electrical Hazards				
Sub Type	Electromagnetic phenomena				
Description	· · ·		ontains electric or electronic circui that the machine will encounter de	•	ed by
	presence of electromagnetic di	sturbance sturbance	affecting its intended use. s (for example generated by the n	-	ı
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:		Possibility of Avoidance:		
Probability of O Event:	ccurrence of a Hazardous		Frequency And / Or Duration of Exposure:		
Pilz Hazard Ra	ting (PHR):	N/A	Summary Level:	Further Rev	view
Risk Reduction	ı			Reference	
electromagnetic and electronic c shall be applied Measures need RF disturbance. • design of a fur directly to earth • separation of s • enclosures de	ol systems shall be designed and interference and operate in a sta components, the information for u to limit electromagnetic emission to enhance the immunity of the e . This can include for example: inctional bonding system or the co sensitive circuits from disturbance signed to minimize RF transmiss MC wiring practices.	able state. Ise shall be ns. equipment onnection o e sources;	During installation of electrical e followed. Technical measures against conducted and radiated of sensitive electrical equipment	EN ISO 12100	
Possible Resid					
Degree of Poss	ible Harm:		Possibility of Avoidance:		
Probability of O Event:	ccurrence of a Hazardous		Frequency And / Or Duration of Exposure:		
Pilz Hazard Ra	ting (PHR):	N/A	Summary Possible Level:	Accept	able

Assessment Date       Mar 12, 2019         Degree of Possible Harm       Image: Construction of a fazardous Event         Possibility of Avoidance       Image: Construction of Exposure         Pilz Hazard Rating (PHR)       N/A         Summary Level       Image: Construction of Exposure         Acceptable       Image: Construction of Exposure         Risk Reduction Measures Description       Reference         Risk Reduction Measures Description       Reference         t is confirmed by the machine manufacturer that the EMC testing is carried out on the machine. The EMC report (TUV/PTL/19-20/EMC-ON/0006 is made available for the machine. The EMC report (TUV/PTL/19-20/EMC-ON/0006 is made available for the machine. The EMC filter is installed inside electrical control panel are CE marked components which are installed inside electrical control panel are CE marked components.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private inmited the hazard is accepted. No further risk reduction measures are necessary.       EN ISO 12100		Mar 12, 2010		
Probability of Occurrence of a lazardous Event       Image: Comparison of the second of	egree of Possible Harm	Wal 12, 2019		TIM
Iazardous Event       Image: Constitution of Avoidance         requency And / Or Duration f Exposure       N/A         illz Hazard Rating (PHR)       N/A         image: Comparison of Exposure       Image: Comparison of Exposure         illx Hazard Rating (PHR)       N/A         image: Comparison of Exposure       Image: Comparison of Exposure         illx Hazard Rating (PHR)       N/A         image: Comparison of Exposure       Image: Comparison of Exposure         issection Measures Description       Reference         iss confirmed by the machine manufacturer that the EMC testing is carried out on the nachine. The EMC report (TUV/PTL/19-20/EMC-ON/0006 is made available for the nachine. Additionally, EMC filter is installed inside electrical control panel are CE marked or panel. Majority of ne components which are installed inside electrical control panel are CE marked or ponents.       EN ISO 12100				Pg. 2 or 22
interception of Exposure       N/A         interception of Exposure       Interception of Exposure         interception of Exposure       Interception of Exposure         interception of Exposure       N/A         interception of Exposure       Interception of Exposure         interception of Exposure       Interception of Exposu			Vacuum         Same           11         Education of and Same Same Same Same Same Same Same Same	Paal tan Anni ba Innat ban Dongton Compani v Compani v
Image: Second	ossibility of Avoidance		22.4 Construct any intersemblance interviewing (Materia)     22. Construct any interviewing (Materia)     22. Construction of the requirements     22. Construction of the requirements     23. Constructions for the requirements     24. Enderstreaments form	Company D Company D Company 11 Company 15 Company 16 Company 16
Summary Level       Image: Image			(1) Foreign (even to the me     (1) Foreign (even to the	sing the all a set of the set of
Acceptable       Acceptable       Acceptable       Acceptable       Reference         Risk Reduction Measures Description       Reference       Reference         t is confirmed by the machine manufacturer that the EMC testing is carried out on the machine. The EMC report (TUV/PTL/19-20/EMC-ON/0006 is made available for the machine. Additionally, EMC filter is installed inside the electrical control panel. Majority of the components which are installed inside electrical control panel are CE marked components.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private       EN ISO 12100	ilz Hazard Rating (PHR)	N/A	Textures 1. Tas Telaciti as, tassi pi A, const ang S, to under ago reception 1. Tas Telaciti as, tassi pi A, constanti ang S, ang S, ang S, ang 100 relati P (A). Constanting Shares and and ang A, ang A, ang 2. Tas Technician reception and ang A, and A, and A, and A, and A.	red and an an an
Risk Reduction Measures Description       Reference         t is confirmed by the machine manufacturer that the EMC testing is carried out on the machine. The EMC report (TUV/PTL/19-20/EMC-ON/0006 is made available for the machine. Additionally, EMC filter is installed inside the electrical control panel. Majority of he components which are installed inside electrical control panel are CE marked components.       EN ISO 12100         Considering risk reduction measures implemented by Ramani Precision Machines Private       EN ISO 12100	ummary Level		3. The billions, is it is not part of address the cost is a loss as an a subject in the descention of the state is its and addressing theorem state of a which there the state of a loss.	nterine on the two angle performance. On two particles of 7107 (radio (Pat. 1991)
t is confirmed by the machine manufacturer that the EMC testing is carried out on the nachine. The EMC report (TUV/PTL/19-20/EMC-ON/0006 is made available for the nachine. Additionally, EMC filter is installed inside the electrical control panel. Majority of he components which are installed inside electrical control panel are CE marked components.	cceptable		Service of CLCS-A	Carr Departmenter av
nachine. The EMC report (TUV/PTL/19-20/EMC-ON/0006 is made available for the nachine. Additionally, EMC filter is installed inside the electrical control panel. Majority of he components which are installed inside electrical control panel are CE marked components.	isk Reduction Measures Desc	ription		Reference
	-			
	esidual Risk			



Hazard Identif	ication			Hazard No:	5.6
Title	Foreseeable misuse, unintend	ed behavio	bur		
Location	Machine				
Target	People / Machine		*	R	
Activity	Various				
Task	Various				
Sub Task	Various		0		
Hazard Type	Combination of Hazards				
Sub Type	N/A				
Description	<ul> <li>materials, an inadvertent operation.</li> <li>Unintended behaviour of the operation.</li> <li>Unintended behaviour of the operation.</li> <li>Ioss of control of the machine</li> <li>reflex behaviour of a person</li> <li>behaviour resulting from lack</li> <li>behaviour resulting from taking</li> </ul>	ation or wro aid, use in perator or by the op in case of i of concen ng the "line ssures to k	malfunction or incident during the tration or carelessness; of least resistance"; eep the machine running in all ci	of the machine. For ts, underground of the machine, ca e use of the mach	or an be
Risk Estimatio	on and Evaluation				
Degree of Poss	sible Harm:		Possibility of Avoidance:		
Probability of C Event:	occurrence of a Hazardous		Frequency And / Or Duration c Exposure:	f	
Pilz Hazard Ra	ating (PHR):	N/A	Summary Level:	Further Re	view
Risk Reductio	n			Reference	
<ul> <li>Instructions for should not be up</li> </ul>	or use should draw the user's attension attension of the second s	ention to wa	ays in which the machinery	IEC 82079-1 EN ISO 12100	)
Possible Resi	dual Risk				
Degree of Poss	sible Harm:		Possibility of Avoidance:		
Probability of C Event:	occurrence of a Hazardous		Frequency And / Or Duration c Exposure:	f	
Pilz Hazard Ra	ating (PHR):	N/A	Summary Possible Level:	Accep	table

Assessment Date	Jun 08, 2020	ALSY COME (INC.	
Degree of Possible Harm		SECTION -A CAUTION FOR OPE	RATION
-		The server of the machine must ensure that the safety devices or anot order is accordance with the Provision and Use of Horn Eculo National polysistem.	
Probability of Occurrence of a Hazardous Event		The sound of the machine must smooth that the personnel who is compared and theread for these personnel must in machine. Work and "Machine Statements" or work Machine Reserved Personnels. Only approximate personnel are permitted to load and transmitter the biostability and the only biostable of an of a piontenets, applicing and postability and the only biostable of an of a piontenets.	operate, maintain and repair it are ance with the intervant "Permit to te machine to its installation site.
		Opionstans must be fully trained in the use and patential hazards of a mental and physical ability, aptitude and redability are suitable for the any contact with the machine.	the marking Only administrative where
Possibility of Avoidance		Operations must have read and understood the instructions and no Minute forling termitted to use the matches. A number signer must be put this after by the overall accordance with RURD.	
Frequency And / Or Duration of Exposure		accordance with PCMER. The operator next be made huly sears, as part of the training proces and/or other protestive devices operate and their function must be i with.	m how the Emergency Step Justice,
		Under no nitrumstanses mer parties of store production devices be with its way way during the monoid production process. Quarts or protection devices resource or committee for maintenance	
Pilz Hazard Rating (PHR)	N/A	sharks only the darks with power (structure) provided with posterior) registed before bringing the matchine back into operation. Under no the new with quarks restricted.	from the machine. Devices must be circumptances should the machine
Summary Level		B is assumed that only product which is writen dimension and a machine Regars and modifications semind not by the server, or their parts an automated by manufacturer, will be the server responsibility of the ow any instant incrediment and and many season.	
			iane Mathine Physics (Joulan
Acceptable			
•			
<b>Risk Reduction Measures Desc</b> All the instructions related to the r manual for the machine. There are inspections, scheduled maintenar instructions available to draw atte the machine.	nachine operations are ma e suitable guidelines are a nce for the machine. In add	vailable for the daily lition to this, there are safety	Reference IEC 82079-1 EN ISO 1210
Risk Reduction Measures Desc All the instructions related to the r manual for the machine. There are inspections, scheduled maintenar instructions available to draw atte	nachine operations are ma e suitable guidelines are a ice for the machine. In ado ntion and create awarenes res implemented by Rama	vailable for the daily lition to this, there are safety s for the user while handling of ni Precision Machines Private	IEC 82079-1
<b>Risk Reduction Measures Desc</b> All the instructions related to the r manual for the machine. There are inspections, scheduled maintenar instructions available to draw atte the machine. Considering risk reduction measu	nachine operations are ma e suitable guidelines are a ice for the machine. In ado ntion and create awarenes res implemented by Rama	vailable for the daily lition to this, there are safety s for the user while handling of ni Precision Machines Private	IEC 82079-1
<b>Risk Reduction Measures Desc</b> All the instructions related to the r manual for the machine. There are inspections, scheduled maintenar instructions available to draw atte the machine. Considering risk reduction measu Limited the hazard is accepted. N	nachine operations are ma e suitable guidelines are a ace for the machine. In ado ntion and create awarenes res implemented by Rama o further risk reduction me	vailable for the daily lition to this, there are safety s for the user while handling of ni Precision Machines Private asures are necessary.	IEC 82079-1

Hazard Identifi	cation			Hazard No:	5.7
Title	Safety Degradation of Equip	ment due to	installation conditions and life time	•	
Location	Machine Perimeter				
Target	People / Machine				A
Activity	Normal Operation- Maintena	nce			E
Task	Cleaning Maintenance				
Sub Task	Dismantling/removal of parts components, devices of the r				:30
Hazard Type	Other Hazards				
Sub Type	Errors of fitting				
	<ul> <li>installed incorrectly. For exa</li> <li>Guards can be removed for</li> <li>Certain parts (e.g. plastic plifetime (mission time) after v</li> </ul>	mple: r maintenan parts of the g vhich the ma	s it is foreseeable that parts can be ce and not be properly re-attached guards) are subject to wear and tea aterial characteristics change ve guarding or safety function whicl	ir and have a lir	nited
Risk Estimatio	n and Evaluation				
Degree of Poss	ible Harm:	11	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	2.5	Frequency And / Or Duration of Exposure:		1
Pilz Hazard Ra	ting (PHR):	68	Summary Level:	Significant	Risk
Risk Reductio	n			Reference	
functions, safeg	r use shall contain the requiren juards. equency of inspections need to	-		EN ISO 12100	)
Possible Resid	dual Risk				
Degree of Poss	ible Harm:	11	Possibility of Avoidance:		2.5
Probability of O Event:	ccurrence of a Hazardous	0.05	Frequency And / Or Duration of Exposure:		1

Post Measures Risk Assessmen	ıt		
Assessment Date	Jun 08, 2020	-	
Degree of Possible Harm	ree of Possible Harm 11		ANUAL
Probability of Occurrence of a Hazardous Event	0.05	FLEX CORE BUILD MAD	HINE) webs to table a FLEE Clara
Possibility of Avoidance	2.5		
Frequency And / Or Duration of Exposure	1		
Pilz Hazard Rating (PHR)	1		
Summary Level			ES PRIXATE LAHTED
Negligible Risk		bal independent file inter	The second
Risk Reduction Measures Descr	ription		Reference
pneumatic drawings along with safety input & output list for the machine. The inspection & maintenance scheduled guidelines are mentioned under section C. Considering risk reduction measures implemented by Ramani Precision Machines Private Limited the hazard is accepted. No further risk reduction measures are necessary.			
Residual Risk			
Operating and Safety instructions	should be followed durin	g operation of the machine.	
It is necessary that any maintenance activity should be carried out by maintenance authorized competent personnel.			

# 4.6 Priority Listing

Priority	Hazard No	Hazard Name	PHR	Risk Level	Post PHR	Post Risk Level
1	4.6	Transportation of machine	125	Significant Risk	18	Very Low Risk
2	2.1	Access to live parts	500	High Risk	10	Negligible Risk
3	2.2	Protective Earth	250	High Risk	10	Negligible Risk
4	2.5	Unexpected Start Up during maintenance	250	High Risk	10	Negligible Risk
5	4.4	Noise generated from machine	171	High Risk	6	Negligible Risk
6	2.3	Unstable power supply	125	Significant Risk	5	Negligible Risk
7	2.4	Overload or Over current conditions due to faults or misuse	250	High Risk	5	Negligible Risk
8	3.8	Operating mode Selection	150	Significant Risk	3	Negligible Risk
9	1.2	Access to Pinch Points_Front	125	Significant Risk	2	Negligible Risk
10	1.8	Slip Trip	62	Significant Risk	2	Negligible Risk
11	3.2	Access to Pinch Points_Front	125	Significant Risk	2	Negligible Risk
12	3.4	Light Curtain Installation	125	Significant Risk	2	Negligible Risk
13	1.1	Loading of components	75	Significant Risk	1	Negligible Risk
14	1.3	Access to Pinch Points_LHS	62	Significant Risk	1	Negligible Risk
15	1.4	Access without Disturbing Light Curtain	62	Significant Risk	1	Negligible Risk
16	1.5	Crushing Hazard	62	Significant Risk	1	Negligible Risk
17	1.6	Falling of Assembled Component	75	Significant Risk	1	Negligible Risk
18	1.7	Sharp Edges	25	Low Risk	1	Negligible Risk
19	2.6	Remaining Pressure of Pneumatic System	62	Significant Risk	1	Negligible Risk
20	2.7	Operating Control Panel Identification	37	Low Risk	1	Negligible Risk
21	2.8	Installation of Pneumatic System	46	Significant Risk	1	Negligible Risk
22	3.1	Emergency Situations	62	Significant Risk	1	Negligible Risk
23	3.3	Access to Pinch Points_LHS	62	Significant Risk	1	Negligible Risk
24	3.5	Service Doors	62	Significant Risk	1	Negligible Risk

25	3.6	Trapped Person	62	Significant Risk	1	Negligible Risk
26	4.1	Stability	60	Significant Risk	1	Negligible Risk
27	4.2	Physical Handling Of Machine Elements And Parts	60	Significant Risk	1	Negligible Risk
28	4.3	Physical and Psychological Stress	37	Low Risk	1	Negligible Risk
29	4.7	Maintenance Operations	62	Significant Risk	1	Negligible Risk
30	5.7	Safety Degradation of Equipment due to installation conditions and life time	68	Significant Risk	1	Negligible Risk
31	3.7	Reset Button	N/A	Not Acceptable	N/A	Acceptable
32	4.5	Lighting in work area	N/A	Further Review	N/A	Acceptable
33	5.1	Inadequate Marking and signs	N/A	Further Review	N/A	Acceptable
34	5.2	Documentation -Operating Manual	N/A	Further Review	N/A	Acceptable
35	5.3	Inadequate documentation - Drawings	N/A	Further Review	N/A	Acceptable
36	5.4	Unsuitable tools or equipment	N/A	Further Review	N/A	Acceptable
37	5.5	EMC Disturbance	N/A	Further Review	N/A	Acceptable
38	5.6	Foreseeable misuse, unintended behaviour	N/A	Further Review	N/A	Acceptable

# 4.7 Risk Reduction

Due to the hazards detailed in the earlier section 4.6 Findings, it is necessary to carry out a risk reduction for each hazard where the estimated risk is determined to be unacceptable as detailed in the findings.

After the required safety measures are implemented it will be necessary to ensure that the risk posed by each hazard has been reduced to the level specified in this document by performing a final risk evaluation.

On completion of the risk reduction measures and the final risk evaluation, the residual risk associated with all hazards will have to be assessed and documented as part of the risk assessment report. This is the possible risk that a hazard may possess even after risk reduction measures have been implemented due to the fact that it was not possible to design a complete safety solution to eradicate the risk.

In order to inform the user of these residual risks related with the machine that have not been reduced by the design of contra measures, special indications should be included in the operator procedure documentation and warnings should be placed on the machine.

# 4.8 Hazard Checklist

Hazard Type	Report	Comment
Mechanical Hazard as a result of		
Acceleration, deceleration	N/A	
Angular parts	YES	
Approach of a moving element to a fixed part	YES	
Cutting parts	YES	
Elastic elements	N/A	
Falling or ejected objects	YES	
Gravity	YES	
Height from the ground	N/A	
High pressure	YES	
Instability	N/A	
Kinetic energy	YES	
Machinery mobility	N/A	
Moving elements	YES	
Rotating elements	YES	
Unlevelled, rough, slippery surface	N/A	
Sharp edges	YES	
Stored energy	YES	
Vacuum	N/A	
Mechanical Hazard with the consequence of		
Being run over	N/A	
Being thrown	N/A	
Crushing	YES	
Cutting or Severing	YES	
Drawing-in or Trapping	YES	
Entanglement	YES	
Friction or Abrasion	N/A	
Impact	YES	
Injection	N/A	
Shearing	N/A	
Slipping, tripping and falling	YES	
Stabbing or Puncture	N/A	
Suffocation	N/A	
Electrical Hazards		
Arc	YES	
Electromagnetic phenomena	YES	
Electrostatic phenomena	N/A	
Contact of persons with Live Parts (Direct Contact)	YES	

Not enough distance to live parts under high voltage	YES	
Overload	YES	
Parts which have become live under fault conditions (Indirect Contact)	YES	
Short-circuit	YES	
Thermal radiation	N/A	
Thermal Hazards		
Explosion	N/A	
Flame	N/A	
Objects, material or areas with a high or low temperature	N/A	
Radiation from heat sources	N/A	
Noise Hazards		
Cavitation phenomena	N/A	
Exhausting system	N/A	
Gas leaking at high speed	N/A	
Manufacturing process (stamping, cutting, etc.)	N/A	
Moving parts	YES	
Scraping surfaces	N/A	
Unbalanced rotating parts	N/A	
Whistling pneumatics	YES	
Worn parts	N/A	
Vibration Hazards	N/A	
Cavitation phenomena	N/A	
Misalignment of moving parts	N/A	
Mobile equipment	N/A	
Scraping surfaces	N/A	
Unbalanced rotating parts	N/A	
Vibrating equipment	N/A	
Worn parts	N/A	
Radiation Hazards		
lonizing radiation sources	N/A	
Low frequency electromagnetic radiation	N/A	
Optical radiation (infrared, visible and ultraviolet), including laser	N/A	
Radio frequency electromagnetic radiation	N/A	
Material/Substance Hazards		
Aerosol	N/A	
Biological or microbiological (viral or bacterial) agent	N/A	
Combustible	N/A	
Dust	N/A	

Ρ	L	Ζ

Explosive	N/A
Fibre	N/A
Flammable	N/A
Fluid	N/A
Fume	N/A
Gas leaking at high speed	N/A
Mist	N/A
Oxidizer	N/A
Ergonomic Hazard	
Access	YES
Inadequate design or location of indicators and visual display units	YES
Inadequate design, location or identification of control devices	YES
Excessive effort	YES
Flicker, dazzling, shadow, stroboscopic effect	N/A
Inadequate local lighting	YES
Mental overload/boredom	N/A
Unhealthy posture	N/A
Repetitive activity	YES
Insufficient visibility	N/A
Hazards associated with the environment in which the machine is used	
Dust and fog	YES
Electromagnetic disturbances	N/A
Lightning	YES
Moisture	N/A
Pollution	N/A
Snow	N/A
Temperature	N/A
Water	N/A
Wind	N/A
Lack of oxygen	N/A
Other Hazards	YES
Errors in Software	N/A
Failure of the Control System	YES
Unintended/unexpected start-up	YES
Inadequate Documentation	YES
Errors of fitting	YES
Breakage, Fatigue	YES
Combination of Hazards	

# 4.9 Marking and Documentation Listing

No	Document	Requ	uired	Avail	able	Acceptable		Comment
		Yes	No	Yes	No	Yes	No	1
1	EC Declaration of Conformity (DoC)	x			x		x	PILZ is not Authorized Representative for this machine.
2	Essential Health & Safety Requirements	х		Х		х		
3	IS report	x		х		x		
4	FS report	х		х		х		
5	Performance Level report	x		х		х		
6	Electrical Drawings	х		х		х		
7	Mechanical Drawings	х		х		х		
8	Pneumatic Drawings	х		х		х		
9	Instructions	х			х	х		
10	Test Reports	х		х		х		
11	Image of CE Plate	х		х		х		
12	Machine Component Specifications	х		х		х		

## 5 Conclusion

This Risk Assessment carried out on Flex Core Build Machine at Ramani Precision Machines Private Limited on the Mar 12, 2019 has found a few areas that need to be addressed in order to bring the machinery up to a level to meets ISO standards and requirements of the European Machinery Directive 2006/42/EC against which the machine was assessed.

The risk assessment has identified some same type of issues on each machine that should be addressed according the standards applicable. The main issues identified on the machines are as follows:

- All the electrical devices and cable terminations are not touch proof and not conforms to at least IP 2X.
- The machine emergency stop control system, door monitoring and light curtain safety control system is not achieving required performance level in accordance with EN ISO 13849-1.
- Noise Measurement report is not made available for the machine.
- Instructions/Suitable guidelines are not made available for this machine.
- The machine documents such as operating manual, maintenance instructions, safety instructions are not available for this machine.
- Operating & maintenance instructions are not directly available on this machine.
- There is no name plate fixed on the machine indicating general machine information such as machine certification serial number, name of manufacture etc.
- The EMC, LVD test report is not made available for this machine.

Pilz recommends that Ramani Precision Machines Private Limited set up a task force comprising members from Safety Management, Engineering, Maintenance and Production to develop a safety upgrade project to resolve safety and conformance issues with the machine.

Pilz and its recognized sub–contractors and suppliers have the ability to implement satisfactory safety solutions, to reduce the risk associated with each hazard that was found to an acceptable level. No machine/hazard was identified which presents an insurmountable challenge.

After the risk reductions measures implemented by Ramani Precision Machines Private Limited Post Measure risk assessment is carried out on Flex Core Build Machine at Ramani Precision Machine Pvt. Ltd Derabassi Plant on Mar 12, 2019 has found some of the risks addressed are reduced to negligible level but major risks require the necessary modification in design of the electrical circuit and machine guarding.

- All the electrical devices and cable terminations are not touch proof and not conforms to at least IP 2X.
- The machine emergency stop control system, door monitoring and light curtain safety control system is not achieving required performance level in accordance with EN ISO 13849-1.
- Noise Measurement report is not made available for the machine.
- Instructions/Suitable guidelines are not made available for this machine.
- The machine documents such as operating manual, maintenance instructions, safety instructions are not available for this machine.
- Operating & maintenance instructions are not directly available on this machine.
- There is no name plate fixed on the machine indicating general machine information such as machine certification serial number, name of manufacture etc.
- The EMC, LVD test report is not made available for this machine.

The Post Measure Risk Assessment report is updated on the basis of machine operating manual received from Ramani Precision Machines Private Limited on Jun 08, 2020, machine test reports on Jun 11, 2020 & photo evidences on Jun 12, 2020. All the risks addressed are reduced to negligible level by necessary modification in design of the electrical circuit and machine guarding except the residual risk remains for the machine transportation activity.

Pilz recommends that Ramani Precision Machine Pvt. Ltd Derabassi Plant should inform operators about the residual risks remaining on the machine and include special instructions in operating procedure documents of the machine. The appropriate warning signs should be placed on the machine to indicate residual risks remaining on the machine.

Pilz India Jun 22, 2020

## **APPENDIX 1 Terminology**

Machinery / Machine:

Assembly, fitted with or intended to be fitted with a drive system consisting of linked parts or components, at least one of which moves, and which are joined together for a specific application.

Reliability:

The ability of a machine or components, or equipment to perform a required function under specified conditions and for a given period of time without failing.

#### Safety of machine:

The ability of a machine to perform its function, to be transported, installed, adjusted, maintained, dismantled and disposed of under conditions of intended use specified in the instruction handbook without causing injury or damage to health.

#### Hazard:

A potential source of harm.

Hazardous situation:

Any situation in which a person is exposed to a hazard or to hazards.

Risk:

A combination of the probability of occurrence of harm and the severity of that harm.

#### Risk Assessment:

Overall process comprising a risk analysis and a risk evaluation.

Harm:

Physical injury or damage to health.

## Danger zone (or Hazard zone):

Any space within and/or around machinery in which a person can be exposed to a hazard.

## Exposed person:

Any person wholly or partially in a danger zone.

## Operator:

The person or persons given the task of mainly operating machinery. Minor adjusting, maintaining, and cleaning tasks might also be executed.

## Preliminary Hazard Analysis:

PHA is an inductive method, whose objective is to identify, for all phases of life of a specified system / subsystem / component the hazards, hazardous situations and hazardous events which could lead to an accident.

## Performance Level:

Discrete Level used to specify the ability of the safety-related parts of a control system to perform a safety function under unforeseeable conditions

## Safety Component:

A component placed on the market separately to fulfil a safety function when in use and the failure or malfunctioning of which endangers the safety or health of exposed persons

Warning devices:

Visible/audible alarms to trigger avoidance or corrective responses (e.g., signals, lights, signs, horns). Training and discipline in recognizing and responding is necessary. Their value to personnel with vision or hearing impairments is questionable.

#### Procedures and training:

Formal or informal training, checklists, certification or experience requirements, personal protective equipment use.

#### Residual risk:

Risk remaining after protective measures have been implemented.

#### Safeguarding:

Protective measure using safeguards to protect persons from the hazards which cannot reasonably be eliminated or from the risks which cannot be sufficiently reduced by inherently safe design measures

#### Safety function:

Function of a machine whose failure can result in an immediate increase of the risk(s)

Failure:

The termination of the ability of an item to perform a required function.

#### Emergency situation:

Hazardous situation needing to be urgently ended or averted.

#### Machine control system:

System which responds to an input from, for example, the process, other machine elements, an operator, external control equipment, and generates an output(s) causing the machine to behave in the intended manner.

#### Safety-related electrical control system (SRECS):

Electrical, electronic or programmable electronic part of a machine control system whose failure can result in an immediate increase of the risk(s)

## Safety Related Part of a Control System (SRP/CS):

Part of a control system that responds to safety-related input signals and generates safety-related output signals

## Diagnostic function:

Function intended to detect faults in the control system and produce a specified output information or activity when a fault is detected.

#### Safety Integrity:

Probability of a Safety Related Electrical Control System or its subsystem satisfactorily performing the required safety functions under all stated conditions

Task:

Specific activity performed by one or more persons on, or in the vicinity of, the machine during its life cycle.

#### Reasonably foreseeable misuse:

Use of a machine in a way not intended by the designer, but which can result from readily predictable human behaviour.

## Safety of control systems:

Ability of safety-related parts of a control system to perform their safety function(s) for a given time according to their specified category or performance level

#### Hazardous machine function:

Any function of a machine, which generates a hazard when operating.

#### Risk reduction, adequate:

Risk reduction at least in accordance with the legal requirements under consideration of the current state of the art.

#### Protective Measure:

Measure intended to achieve risk reduction.

## Inherently Safe Design Measure:

Protective measure which either eliminates hazards or reduces the risks associated with hazards by changing the design or operating characteristics of the machine without the use of guards or protective devices.

## Hazard, relevant:

Hazard which is identified (as part of the risk assessment process) as being present at, or associated with the machine.

## Hazard, significant:

Hazard which has been identified as relevant and which requires specific action to eliminate or to reduce the risk according to the risk assessment.

## Hazardous event:

Event that can cause harm. A hazardous event can occur over a short period of time or over an extended period of time.

## Inherently safe design measures:

Protective measure which either eliminates hazards or reduces the risks associated with hazards by changing the design or operating characteristics of the machine without the use of guards or protective devices.

## Information for use:

Protective measure consisting of communication links (for example, text, words, signs, signals, symbols, diagrams) used separately or in combination, to convey information to the user.

## Intended use:

Use of a machine in accordance with the information for use provided in the instructions.

## Risk analysis:

Combination of the specification of the limits of the machine, hazard identification and risk estimation.

## Risk estimation:

Defining likely severity of harm and probability of occurrence.

## Risk evaluation:

Judgement, on the basis of risk analysis, of whether the risk reduction objectives have been achieved.

# **APPENDIX 2 Abbreviations**

N/A:	Not Available, Not Applicable
Not Accept:	Not Acceptable
BPCS:	Basic Process Control System
SRS:	Safety Requirement Specification
FDS:	Functional Design Specification
HAZOP:	Hazard and Operability Study
EMC:	Electromagnetic Compatibility
CCF:	Common Cause Failure
PFD:	Probability of Failure on Demand
MTBF:	Mean Time Between Failures
MTTF:	Mean Time To Failure
MTTR:	Mean Time To Restoration
PHA:	Preliminary Hazard Analysis
PL:	Performance Level
SIF:	Safety Instrumented Function
SIL:	Safety Integrity Level
SIS:	Safety Instrumented System
SFF:	Safe Failure Fraction
DC:	Diagnostic Coverage
I/O:	Input/Output
FB:	Function Block
PFHD:	Probability of dangerous Failure per Hour
SRCF:	Safety-Related Control Function
SYS:	System
URS:	User Requirement Specification
SRP/CS:	Safety-related part of a control system
SRECS:	Safety-related electrical control system
PLC:	Programmable Logic Controller
FLU.	Frogrammable Logic Controller

# **APPENDIX 3 Legislative References**

Reference	Legislation - EU
2006/42/EC:	Machinery Safety
2014/30/EU:	Electromagnetic Compatibility
2014/35/EU:	Low Voltage equipment

Table 10 Legislative references EU

# **APPENDIX 4 Normative References**

Reference	Standards Title
EN ISO 12100: 2010	Safety of machinery - Basic concepts, general principles for design - Risk assessment and risk reduction
EN ISO 14120: 2015	Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards
EN ISO 13857: 2008	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
EN ISO 14119: 2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
EN ISO 13850: 2015	Safety of machinery. Emergency stop. Principles for design
EN ISO 13849-1: 2015	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
EN 60204-1: 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
IEC 82079-1: 2012	Preparation of instructions for use - Structuring, content and presentation - Part 1: General principles and detailed requirements
EN ISO 13855: 2010	Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855: 2010)
EN ISO 4414: 2010	Pneumatic fluid power - General rules and safety requirements for systems and their components
EN 61310-1: 2008	Safety of machinery - Indication, marking and actuation - Part 1: Requirements for visual, acoustic and tactile signals)
EN 61310-2: 2008	Safety of machinery - Indication, marking and actuation - Part 2: Requirements for marking
IEC 61496-1: 2012	Safety of machinery: electro sensitive protective equipment. Part 1: General prescriptions and tests.

Table 11 Normative references