

الجمهورية الجزائرية الديموقراطية الشعبية République Algérienne démocratique et populaire

وزارة التعليم العالي و البحث العلمي Ministère de l'enseignement supérieur et de la recherche scientifique

> جامعة سعد دحلب البليدة Université SAAD DAHLAB de BLIDA

> > كلية التكفولوجيا Faculté de Technologie

قَسم الأُوتَوملَيْكَ و الأَلكَرُوتَكَنَيْكَ Département automatique et électrotechnique

Master's thesis

Option:

Automation and Industrial Computing

Presented by:

Berkane Lahcene Walid & Bendiba Nadhir

Study and Realization of Systems Supervision of a Pasta Production Line.

Submitted by: Dr. khalal (USDB 1) & Mr. Ameur Abdelatif (SIM)

Année Universitaire 2023-2024

First of all, I humbly extend my deepest gratitude to Allah, the Almighty, for granting me the strength, patience, and determination to embark on and complete this significant journey. This achievement stands as a testament to the collective efforts of many individuals over an extended period.

I am profoundly indebted to my esteemed teacher Madame Khalal, whose unwavering guidance, patience, and encouragement have been instrumental in my academic endeavors, paving the way for the completion of this graduation thesis.

To my beloved family, particularly my parents, I owe an immeasurable debt of gratitude. Their boundless patience, unwavering support, continuous encouragement, and steadfast belief in my abilities have been a source of strength and inspiration throughout my life. my brothers, Ayoub and Nour El Houda .Without their enduring love and guidance, I would not have reached this significant milestone.

This work is dedicated to you, my cherished family, bendiba and hassib whose sacrifices and unwavering faith have propelled me forward in pursuit of my dreams. May this achievement bring you immense joy and pride, for it is as much yours as it is mine.

Special thanks to H.belkacem and his And his beautiful family who supported me throughout my studies

To my dear friends, M. Amina, E. Widad, D. Sidali, and my binome, B. Lahcene Walid, I extend my heartfelt appreciation for your companionship, camaraderie, and unwavering support. Your friendship has been a source of comfort and encouragement, enriching my university experience beyond measure. May our bond continue to thrive, transcending borders and time.

Lastly, I extend my heartfelt thanks to all those who have placed their trust in me, whether through encouragement, support, or belief in my capabilities. Your confidence in my abilities has been a driving force behind my success, and for that, I am eternally grateful.

We begin by expressing our sincere gratitude to Allah, the Almighty, for providing us with the strength, patience, and determination needed to undertake and complete this important journey.

We express our deepest appreciation to Mrs.Al-Khalal, whose unwavering support and mentorship have been instrumental in navigating this challenging period.

To my beloved parents, your constant support and invaluable role in my life have been a source of immense strength. Your sacrifices and unwavering belief in me have made this achievement possible.

To my siblings, B.Basma, B.Muhammad, and B. Iyad, I express my heartfelt thanks. Your love and encouragement mean the world to me, and I wish you all a bright and prosperous future, God willing.

To the Barkane and Kahar families, your support has been deeply appreciated. Thank you for standing by me through this journey.

I am also profoundly grateful to those who supported me Abbasi Al-Mahjoub, Kahar Hadria, Abbasi Fattah, Sidali Azouz, Romaissa Lebaidi, and Haiba Shearer, Your support has been invaluable.

I extend my sincere thanks to my colleague, Nader Bendiba, for your collaboration and dedication to this project. Your efforts have been crucial to our success.

Lastly, I thank my classmates Bendjebbas Walid, Tawil Rahim, Ranan Rahim, Mamou Yacin, and all others who have been a part of this memorable journey. Your friendship and support have been essential in making this experience fulfilling and unforgettable.

This achievement is a collective triumph, and I am forever grateful to each one of you for your unwavering belief in me and your constant support.

BERKANE LAHCENE WALID

ملخص

تتناول هذه الدراسة خط إنتاج المعكرونة الخاصة، وتستكشف مشكلات الإشراف الناتجة عن نظام العرض 'ASEM' الحالي. الحل المقترح هو برنامج إشراف جديد يعتمد على WINCC ومتكامل مع واجهة إنسان-آلة منSIEMENS ، باستخدام وحدة التحكم المنطقية القابلة للبرمجة .Siemens S7-1200 الهدف من هذا الحل هو تعزيز دقة وموثوقية عملية الإشراف، مما يسمح بمراقبة وتحكم أفضل في خط الإنتاج

ASEM, WINCC, SIEMENS, HMI, PLC, S7-1200,TIA Portal : الكلمات الدالة

Abstract

This study focuses on the Special Pasta production line, exploring supervision issues caused by the existing 'ASEM' display system. The proposed solution is a new WINCC supervision program integrated with a SIEMENS HMI, using a Siemens S7-1200 PLC. The goal is to enhance the accuracy and reliability of the supervision process, allowing for better monitoring and control of the production line.

Keywords: ASEM, WINCC, SIEMENS, HMI, PLC, S7-1200, TIA Portal.

Résumé

Cette étude porte sur la ligne de production des pâtes spéciales et explore les problèmes de supervision causés par le système d'affichage existant 'ASEM'. La solution proposée est un nouveau programme de supervision WINCC intégré à une interface Homme-Machine SIEMENS, utilisant un automate programmable Siemens S7-1200. L'objectif est d'améliorer la précision et la fiabilité du processus de supervision, permettant une meilleure surveillance et un meilleur contrôle de la ligne de production.

Mots clés: ASEM, WINCC, SIEMENS, HMI, PLC, S7-1200, TIA Portal.

Contents

GEN	IERAI	LITIES	2
1.	1 Ir	NTRODUCTION	3
1.	2 P	PRESENTATION GENERAL OF THE SIM GROUP	3
	1.2.1	Presentation of the SIM company	3
1.	3 C	Company Storci Pasta Machinery	5
	1.3.1	THE LINES	6
	1.3.	1.1 Dry pasta lines	6
	1.3.	.1.2 Fresh pasta lines	7
	1.3.	1.3 Couscous lines	7
	1.3.	1.4 Ready meals lines	8
	1.3.		
	1.3.	.1.6 Dry gluten free pasta lines	9
	1.3.	.1.7 Fresh gluten free pasta lines	9
1.	4 C		. 10
2	SHOF	RT PASTA LINE AND USED PROGRAMMING TOOLS	11
2.	1 Ir	NTRODUCTION	. 12
2.	2 S	HORT-CUT PASTA LINE	. 12
	2.2.1	Production Capacity	. 12
2.	3 S	HORT 250-CUT PASTA LINE	. 13
	2.3.1	Machine Specification Short 250-cut Pasta Line	. 13
	2.3.2	Presentation of the Production Process	. 14
	2.3.3	Representation of the electrical part	. 15
2.	4 P	ROGRAMMABLE LOGIC CONTROLLER	. 15
	2.4.1		4.0
		Historic	. 16

2.4.3 PLC S7 1215C DC/DC/DC	18
2.5 SUPERVISOR CONTROLLER	19
2.5.1 SCADA (Supervisory Control And Data Acquisition)	19
2.5.1.1 Advantages of SCADA Systems for the Automation Industry	. 19
2.5.2 Human-Machine Interfaces (HMI)	19
2.5.3 ASEM HMI	20
2.5.4 HMI 30-TF "ASEM"	21
2.6 Pre-Actuators	24
2.7 Sensors	24
2.8 Software Description and Tools	26
2.8.1 TIA PORTAL Platform	26
2.8.1.1 Portal view	. 27
2.8.1.2 Project view	. 27
2.8.1.3 WinCC	. 28
2.8.2 Premium HMI	28
2.8.3 Canva	20
	29
2.8.4 PROFINET RJ45 cable	
2.8.4 PROFINET RJ45 cable3 REALIZATION SUPERVISION	30
	30 . 32
3 REALIZATION SUPERVISION	<i>30</i> . 32 33
3 REALIZATION SUPERVISION	<i>30</i> . 32 33 <i>33</i>
3 REALIZATION SUPERVISION 3.1 INTRODUCTION 3.1.1 technical specifications	<i>30</i> . 32 33 <i>33</i> 34
 3 REALIZATION SUPERVISION. 3.1 INTRODUCTION. 3.1.1 technical specifications. 3.2 BACKUP AND MIGRATION OF EXISTING PROGRAMS FROM PLC AND HMI SYSTEMS. 	30 . 32 33 33 33 34 34
 3 REALIZATION SUPERVISION. 3.1 INTRODUCTION. 3.1.1 technical specifications. 3.2 BACKUP AND MIGRATION OF EXISTING PROGRAMS FROM PLC AND HMI SYSTEMS 3.2.1 Backing Up the HMI Asem 30 Program	30 . 32 33 33 34 34 34 34
 3 REALIZATION SUPERVISION. 3.1 INTRODUCTION	30 . 32 33 33 34 34 34 34 35
 3 REALIZATION SUPERVISION. 3.1 INTRODUCTION	30 . 32 33 33 34 34 34 35 38

3	.4 Scre	EN DEVELOPMENT AND ORGANIZATION IN TIA PORTAL	40
	3.4.1 Cr	eating Screens	40
	3.4.2 Tr	ansferring Functions from HMI Premium to TIA Portal	
	3.4.2.1	Screens (Active Screens)	47
	3.4.2.2	Edit bits (Invertbit)	
	3.4.2.3	I/O field (Display Value)	51
	3.4.2.4	I/O field (Display Text)	53
	3.4.2.5	Animation (Appearance)	55
	3.4.2.6	Alarms	56
	3.4.2.7	Trends	58
	3.4.2.8	Users	59
	3.4.3 Or	rganizing Screens in TIA Portal as Structured in HMI ASEM	61
3	.5 CON	CLUSION	62
4	GENER	AL CONCLUSION	63
5	BIBLIOG	GRAPHY	64
6	ANNEX 0	1:	68
7	ANNEX 02	2:	69
8	ANNEX 0	3:	70

List of Figures

FIGURE 1 : LOGO SIM COMPANY
FIGURE 2: LOCATION OF SIM COMPANY
Figure 3: Storci company
Figure 4: Dry Pasta
Figure 5:Fresh pasta
Figure 6:Couscous
Figure 7:Ready meals
FIGURE 8:INSTANT PASTA
Figure 9: Dry gluten
Figure 10:Fresh gluten
Figure 11: Short 250-cut Pasta Line
FIGURE 12: PRESENTATION OF THE PRODUCTION PROCESS14
FIGURE 13: ELECTRICAL PART
FIGURE 14: DIFFERENT TYPES OF PROGRAMMABLE LOGIC CONTROLLER
FIGURE 15: ARCHITECTURE OF AN PLC
FIGURE 16: PLC S7 1215C DC/DC/DC 18
Figure 17: Human-Machine Interfaces
FIGURE 18:LOGO ASEM COMPANY
Figure 19:HMI 30-TF "ASEM"
Figure 20: Pre-actuators
Figure 21: Sensors
FIGURE 22: TIA PORTAL
Figure 23: Portal view
Figure 24: Project view
Figure 25: Software Premium HMI ASEM
Figure 26: CANVA Interface
FIGURE 27: PROFINET CABLE
FIGURE 28: PROGRAM EXISTING IN THE HMI ASEM 30
FIGURE 29: BACKING UP THE PROGRAM FROM PLC

FIGURE 30: MIGRATING PROGRAM FROM TIA PORTAL V13 TO V16	36
FIGURE 31: EXISTING DEVICE AND NETWORK	36
FIGURE 32: OBJECTS FROM PLC 1"SIM_111_SUPERIORE"	37
FIGURE 33: OBJECTS FROM PLC 2"SIM_113_INFERIORE"	37
FIGURE 34: INTEGRATION STEPS FOR WINCC RT PROFESSIONAL STATION	38
FIGURE 35: CONNECTING PC STATION TO PROFINET NETWORK	39
FIGURE 36: MAIN SCREEN (0001_MAIN) IN ASEM HMI INTERFACE	40
FIGURE 37: MAIN SCREEN (0001_MAIN) IN WINCC INTERFACE	40
FIGURE 38: LOWER PARAMETER SELECTION SCREEN (0003_SELEZIONE_PARAMETRI_INFERIORE) IN ASEN	1
HMI INTERFACE	41
FIGURE 39: LOWER PARAMETER SELECTION SCREEN (0003_SELEZIONE_PARAMETRI_INFERIORE) IN WINC	C
INTERFACE	41
FIGURE 40: CALIBRATOR SETTINGS SCREEN (0371_TARATURE_IMPILATORE) IN ASEM HMI INTERFACE	42
FIGURE 41: CALIBRATOR SETTINGS SCREEN (0371_TARATURE_IMPILATORE) IN WINCC INTERFACE	42
FIGURE 42: DOSING GROUP SCREEN (0400_GRUPPO_DOSAGGIO) IN ASEM HMI INTERFACE	43
FIGURE 43: DOSING GROUP SCREEN (0400_GRUPPO_DOSAGGIO) IN WINCC INTERFACE	43
FIGURE 44: NESTING GROUP SCREEN (0407_GRUPPO_NIDITRICE) IN ASEM HMI INTERFACE	44
FIGURE 45: NESTING GROUP SCREEN (0407_GRUPPO_NIDITRICE) IN WINCC INTERFACE	44
FIGURE 46: S7-1200 PLC FRAME SCREEN (0610_s71200_TELAIO_PLC) IN ASEM HMI INTERFACE	45
FIGURE 47: S7-1200 PLC FRAME SCREEN (0610_s71200_TELAIO_PLC) IN WINCC INTERFACE	45
FIGURE 48: SOME LOGOS AND INTERFACES DESIGNED WITH CANVA	46
FIGURE 49: SELECT AND NOTE DOWN BUTTON EVENT IN PREMIUM HMI	47
FIGURE 50 : CONFIGURE BUTTON EVENT IN TIA PORTAL	48
FIGURE 51 : SELECT AND NOTE DOWN COMMAND/STATE VARIABLE IN PREMIUM HMI	49
FIGURE 52 : CONFIGURE INVERT BIT EVENT IN TIA PORTAL	50
FIGURE 53 : SELECT AND SPECIFY INPUT AND OUTPUT SPACE IN PREMIUM HMI	51
FIGURE 54: CONFIGURE I/O FIELD IN TIA PORTAL	52
FIGURE 55: SPECIFY TAG RANGE IN TIA PORTAL	52
FIGURE 56: LOCATE AND UNDERSTAND PASTA RECIPES IN PREMIUM HMI	53
FIGURE 57: CREATE DATA BLOCK AND VARIABLES IN TIA PORTAL	54
FIGURE 58: DEVELOP FUNCTIONAL BLOCK AND PROGRAM IN TIA PORTAL	54

FIGURE 59: SELECT DISPLAY SPACE AND RECORD VARIABLES IN PREMIUM HMI	55
FIGURE 60: ENTER VARIABLE TAG AND RANGE IN TIA PORTAL	56
FIGURE 61 : OPENING THE ALARMS FOLDER AND RECORDING VARIABLES	56
FIGURE 62: CONFIGURING HMI ALARMS IN TIA PORTAL	57
FIGURE 63: OPENING AND DEFINING VARIABLES FOR CURVED SCREEN IN PREMIUM HMI	58
FIGURE 64: ENTERING VARIABLES AND CONFIGURING CURVE DISPLAY IN TIA PORTAL	58
FIGURE 65: ACCESSING AND RECORDING USER INFORMATION IN PREMIUM HMI	59
FIGURE 66: ENTERING USER INFORMATION IN TIA PORTAL	60
FIGURE 67: COMPARISON OF FOLDER STRUCTURE BETWEEN THE HMI ASEM PROGRAM AND	61

List of Tables

TABLE 1:PRODUCTION CAPACITY "SHORT-CUT PASTA LINE"	12
TABLE 2: Specification Short 250-cut Pasta Line	13
TABLE 3: HMI SPECIFICATIONS	23
TABLE 4: DEVICE NAMES AND IP ADDRESSES	39

list of abbreviations

- **SIM** Semoulerie Industrielle de la Mitidja.
- **PDR** Product Defect Reports.
- **HMI** Human-Machine Interface.
- **S.p.A** société pâte alimentaire.
- PLC programmable logic controller.
- **TIA Portal** Totally Integrated Automation Portal.
- (I/O) inputs and outputs.
- **SCADA** Supervisory Control And Data Acquisition.
- **CPU** Central processing unit.
- WinCC Windows Control Center.
- **AC** alternative courant.
- DC direct courant.
- **GUI** Graphical User Interfaces .
- **V16** version 16.
- **RAM** Randoom Access Memory.

General introduction

The "SIM SPA" factory specializes in the industrial production of pasta, which encompasses four distinct categories: short pasta, long pasta, couscous, and special pasta. This variety imposes unique demands on each stage of manufacturing, from processing to transportation and packaging. It also requires close coordination among various stakeholders who rely on different monitoring and supervisory systems.

Our research aims to streamline the supervision of the Special Pasta production line, covering the entire process from the semolina's arrival to the moment the pasta carts leave for the drying cells. Currently, supervision is conducted using an 'ASEM' display, which has led to several challenges, including maintenance issues, diagnostic complications, and managing Product Defect Reports (PDRs).

To resolve these issues, we propose implementing a new supervision system using a WINCC program integrated into a SIEMENS Human-Machine Interface (HMI). This approach is expected to standardize the supervision process within the company. The Siemens S7-1200 programmable logic controller will serve as the backbone of this new system, providing enhanced performance and memory management.

The proposed restructuring will be detailed in three key sections:

• Chapter 1: Generalities

This chapter will offer a comprehensive introduction to SIM company, providing an overview of the manufacturing process and delineating the various types of pasta manufactured at the factory.

• Chapter 2: Short Pasta Production Line and Programming Tools

Here, we will delve into the specifics of the short pasta production process and outline the software and hardware tools used to manage the line.

• Chapter 3: Supervision and simulation

This chapter will focus on the steps involved in developing and integrating the new WINCC supervision system with the Siemens S7-1200 controller. It will also cover the anticipated benefits and expected improvements in maintenance, diagnostics, and production efficiency.

By implementing this new supervision system, "SIM SPA" aims to improve reliability, streamline maintenance, and enhance overall productivity in its Special Pasta production line.

Chapter 1

Generalities

1.1 Introduction

Pasta and related grain-based products form a substantial part of the global food manufacturing industry. This chapter provides an overview of the SIM Group, a leading Algerian company with a pioneering role in flour milling and pasta production, and Storci S.p.A., an Italian manufacturer of pasta processing equipment known for its innovative technologies. And their manufacturing relationship with each other.

1.2 Presentation General of the SIM Group

The Company was founded in 1990 by Mr. TAIEB EZZRAIMI Abdelkader as a small family company in the field of flour-milling and semolina where it acted as a pioneer in its quality as the first private company in this branch of activity in Algeria.

1.2.1 Presentation of the SIM company

This group, known by the acronym "SIM" which stands for "Semoulerie Industrielle de la Mitidja", has firmly established its reputation. Its activities extend far beyond the borders of the country and have seen prestigious development. After establishing itself as a leader in the agro-food sector, its leaders decided to invest in several other areas. To achieve this, the group has five subsidiaries. Investments have been made in the healthcare, real estate development, energy, and agro-food sectors, in addition to acquiring two public companies, BEN HAROUN and MOUZAIA mineral water. The agro-food subsidiary's assets include:



Figure 1 : Logo SIM company

- semolina mills
- 8 couscous units
- 3 flour mills
- 4 long pasta units
- 5 short pasta units
- 1 production line for special pasta (Lasagna).
- 1 string bread production line.

The entire complex, sprawling over an area of 90,000 m2, boasts impressive overall capacities:

- Semolina (durum wheat): 1500 Tones/Day.
- Flour milling (soft wheat): 1000 Tons/Day.
- Pasta and couscous: 1000 Tons/Day.

Our end-of-studies project was implemented within the SIM company. It is located near the east-west highway A1, in the "Ain Romana" commune of Mouzaia in the Blida province.

SARL REDUMEC	: SOCIETE CATION D
raihane stadiu	
SIM AGRO spa	A REAL PROPERTY AND A REAL
Mouzaia plastique	
Cimetière Stdh	
Star Peinture Nouveau Site	حي الريجان Salon de coffure
Notes Sites	O HIRE HE
	BENYETTOU

Figure 2: location of SIM company

1.3 Company Storci Pasta Machinery

Storci S.p.A. is an Italian pasta processing equipment manufacturer. The company is based in Collecchio, Parma, Italy.

Storci manufactures equipment and machinery which produces different types of pasta such as dry pasta, fresh pasta, ready meals, gluten-free pasta, and special pasta. The company works in partnership with Fava S.p.A, based in Cento, Italy, and manufactures industrial lines for the production of dry pasta and couscous. It has a market share of around forty percent worldwide. According to another estimate, more than a thousand Storci plants are in use worldwide with a market share of forty-five percent (1).



Figure 3: Storci company

1.3.1 THE LINES

Storci's philosophy is to get back to the Italian tradition of manufacturing pasta, applying it to the most modern technologies of production and monitoring. It is vital for the Company that the same care, used in the past by master pasta makers, be kept along with the slow manufacturing, and the long drying. There are always researches and continuous tests to be carried out, in order to guarantee a very high-quality service to our Customers (2).

- Dry pasta lines
- Fresh pasta lines
- Couscous line
- Ready meals lines
- Dry gluten-free pasta lines
- Fresh gluten-free pasta lines
- Instant pasta lines

1.3.1.1 Dry pasta lines

Our pasta production lines are currently used for spaghetti production as well as penne, paccheri, long tubular fusilli, conchiglioni, ziti, macaroni production and many other shapes. We recapture the culture of the tradition and adopt it using advanced technologies to maintain the original philosophy of slow processing and long drying times, so that to combine tradition with the most high-tech equipment in the world and modern, reliable control systems. Our pasta line can be completely automatic up to trolley filling, for both short- and long-cut pasta, while leaving to traditional drying in the static chamber the task of completing shaping. However, nothing is left to chance and a personal computer controls all drying phases in order to obtain a constant quality. All this leads to a reduced need of manpower and to a final product as tradition dictates. Best pasta processing, best pasta plants (3).



Figure 4: Dry Pasta

1.3.1.2 Fresh pasta lines

The production of fresh pasta is a process that many pasta equipment manufacturers consider fully-developed a long time ago. Storci Spa disagrees and is ready to accept new challenges offered by the market: fresh pasta is just one of them. Our fresh pasta production machines prove the point. A market that is constantly growing ad increasingly demanding expertise and knowledge in the plant engineering sector. Pasta manufacturers require, for theirs pasta plants, a technology that can guarantee the excellent quality of the product but, most importantly, its safety for the consumers (3).



Figure 5:Fresh pasta

1.3.1.3 Couscous lines

Couscous is a natural product connected with an ancient tradition. Its preparation and cooking require care and skill, following specific rules which make it a healthy and enjoyable food. For this reason we have dedicated all our experience to the creation of a couscous line and equipment capable of obtaining the very best at each stage of the processing. The various machines making up the couscous line are built with the most valuable and resilient materials now available on the market. We have transferred all our technical know-how into this sector. The technology adopted strictly and scientifically adheres to the rules of the couscous tradition (3).



Figure 6:Couscous

1.3.1.4 Ready meals lines

Storci S.p.A. has further expanded the range of products offered such as engineering, technologies and pasta production lines, positioning itself as a partner for the customers who want to start or expand the production of pasta-based convenience food. Thanks to the Storci/BS Network pasta processing, we can offer, with our pasta plants, for the production of lasagna and cannelloni, the opportunity to choose between semiautomatic or automatic lines with different production capacities (all lines offer user-friendly control, top level automatisms, easy cleaning and servicing, vacuum technology): from 600 trays/hour, up to approximately 4,500 kg/h. On the other hand, for those interested in ready meals made of filled, short- and long-cut pasta, the multiproduct line is the answer, offering a large selection of pasta shapes as spaghetti, space-saving cooking and production capacity, maximum simplicity in terms of use and cleaning. The multiproduct line has a production capacity ranging from 600 to 5,000 trays/hour and, when necessary, products such as dry pasta, meat, rice, fish and vegetables can also be cooked (3).



Figure 7:Ready meals

1.3.1.5 Instant pasta lines

New markets? New technologies? Waste no time... Storci presents its new lines for instant pasta production, designed to competitively and successfully meet the very latest food trends. Versatile and customizable, they can make different types of instant pasta, creating a valid and quality alternative to instant Asian noodles. Ease of cleaning, flexibility.... discover all the benefits these pasta plants offer. A handy and versatile ready meal option with excellent profit margins (3).



Figure 8:Instant pasta

1.3.1.6 Dry gluten free pasta lines

Is it possible to make good dry pasta without durum wheat semolina? Sure! The consumer dedicates much more time in choosing these products than in choosing traditional pasta, so top quality is the indispensable key to success. Why producing this kind of pasta production lines? To guarantee growing market shares. Traditional systems produce dough mixes that are not very uniform and not of excellent quality. Additionally, they are complex and hence difficult to clean as well as being energy consuming. The difference? The Storci No-Glut pasta production lines are a concentration of experience and innovation with long-lasting guaranteed quality. Thanks to the new dough gelatinization system, it is possible to produce appetizing, high quality products for consumers requiring gluten-free pasta or for those who periodically like to choose alternative and healthy products. Advantages? Homogeneity in the pasta processing, high energy efficiency, control of the gelatinization level, easy cleaning. Choose the best pasta manufacturing, choose Storci pasta plants (3).



Figure 9: Dry gluten

1.3.1.7 Fresh gluten free pasta lines

Tortellini, ravioli, tagliatelle, orecchiette fresh and gluten-free? Why deprive gluten intolerant consumers of our traditional pasta dishes? Storci No-Glut pasta production lines responds to the requirements of customers who wish to produce high quality fresh pasta, making them happy and enthusiast to serve delicious pasta dishes. We guarantee, with our pasta machinery and pasta plants, the maximum quality of the dough mixes thanks to the patented gelatinization system for flour and starch varieties without gluten, such as for example maize, rice, potato flour and various starches (3).



Figure 10:Fresh gluten

1.4 Conclusion

SIM Group is an Algerian company that produces flour, semolina, and pasta. They have a huge facility and use equipment from Storci S.p.A., an Italian company known for its high-tech pasta production machinery. Storci is all about blending traditional Italian pasta-making techniques with modern technology.

The partnership between SIM Group and Storci shows how local companies can benefit from advanced technology to boost production and maintain high quality. Storci's equipment is designed to meet different market demands. This collaboration demonstrates that it's possible to mix tradition with innovation and succeed, offering a useful example for others in the food manufacturing industry.

Chapter 2

Short Pasta Line And Used Programming Tools

2.1 Introduction

In this chapter we talk about the Short-cut Pasta Line, revealing the sophisticated technology that powers this versatile production system. From the technical specifications of the pasta production machine to the complex electrical components, we examine the essential elements that make this line efficient and reliable. We explore the programmable logic controllers (PLCs) that control the system, the cutting-edge Human-Machine Interfaces (HMIs) that facilitate user interaction, and the software tools like TIA Portal and Premium HMI that drive automation. and we discuss how PROFINET ensures seamless communication within the production process.

2.2 Short-cut Pasta Line

With the short pasta line, you can produce standard short pasta such as penne or special pasta such as paccheri or also cut pasta such as farfalle. Production ranges from 100 to 1200 kg/h. Equipped with our lasagna production machine NEST, it enables a total automatic production of nests and lasagna (4).

2.2.1 Production Capacity

Production Capacity for Short-cut Pasta Line (5):

Models	Standard short pasta
Short 150	from 90 to 130 Kg/h
Short 250	from 180 to 220 Kg/h
Short 300	from 340 to 380 Kg/h
Short 600	from 550 to 650 Kg/h
Short 1000	from 900 to 1000 Kg/h
Short 1200	from 1100 to 1200 Kg/h

Table 1: Production Capacity "Short-cut Pasta Line"

2.3 Short 250-cut Pasta Line

Presenting the Short 250-cut Pasta Line, now available for company-level production.



Figure 11: Short 250-cut Pasta Line

2.3.1 Machine Specification Short 250-cut Pasta Line

The Short 250-cut Pasta Line is a semi-automatic machine for efficient pasta production. Below are the key specifications:

Machine Type	Semi-Automatic
Capacity	220Kg/Hour
Usage	Pasta Making
Power Consumption	35kw
Phase	Three Phase
Voltage	380V
Power Source	Electric

Table 2: Specification Short 250-cut Pasta Line

2.3.2 Presentation of the Production Process

Presentation of the Production Process for Short 250-cut Pasta Line (6):

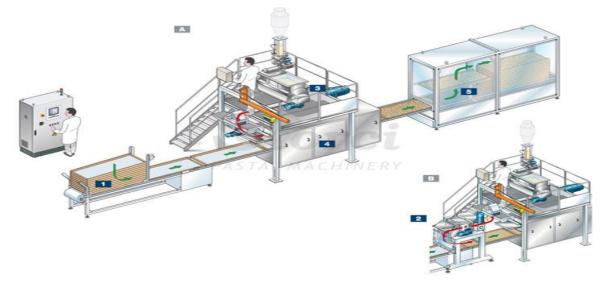


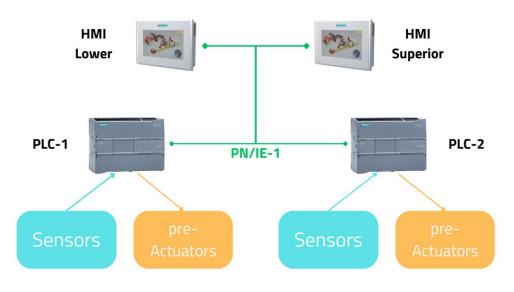
Figure 12: Presentation of the Production Process

Specification

- 1 -Trays feeder AT-12.60
- 2 -Nests and lasagna machine NEST-540/L
- $\underline{3}$ Press with a circular head
- 4 -Short pasta pre-drying shaker with trays inside passage
- 5 -Trays automatic stacking machine ROBO-T 12.60
- \underline{A} -Short pasta production
- <u>B</u>-Nests and lasagna production

2.3.3 Representation of the electrical part

To achieve effective control over this machine, we employed a dual-PLC setup, utilizing two Siemens Programmable Logic Controllers (PLCs), and integrated two Human-Machine Interfaces (HMIs) to enhance operational oversight and precision. In addition, various sensors and actuators were installed to ensure responsive and adaptable machine control, allowing for a more seamless and efficient management process.



Device and Network

Figure 13: Electrical part

2.4 Programmable logic controller

A programmable logic controller (PLC) or programmable controller is an industrial computer that has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, machines, robotic devices, or any activity that requires high reliability, ease of programming, and process fault diagnosis.

PLCs can range from small modular devices with tens of inputs and outputs (I/O), in a housing integral with the processor, to large rack-mounted modular devices with thousands of I/O, and which are often networked to other PLC and SCADA systems. They can be designed for many arrangements of digital and analog I/O, extended temperature ranges, immunity to electrical noise, and resistance to vibration and impact.

PLCs were first developed in the automobile manufacturing industry to provide flexible, rugged and easily programmable controllers to replace hard-wired relay logic systems. Dick Morley, who invented the first PLC, the Modicon 084, for General Motors in 1968, is considered the father of PLC.

A PLC is an example of a hard real-time system since output results must be produced in response to input conditions within a limited time, otherwise unintended operation may result. Programs to control machine operation are typically stored in battery-backed-up or non-volatile memory (7).



Figure 14: different types of Programmable logic controller

2.4.1 Historic

The PLC originated in the late 1960s in the automotive industry in the US and was designed to replace relay logic systems. Before, control logic for manufacturing was mainly composed of relays, cam timers, drum sequencers, and dedicated closed-loop controllers.

The hard-wired nature of these components made it difficult for design engineers to alter the automation process. Changes would require rewiring and careful updating of the documentation and troubleshooting was a tedious process. When general-purpose computers became available, they were soon applied to control logic in industrial processes. These early computers were unreliable and required specialist programmers and strict control of working conditions, such as temperature, cleanliness, and power quality (8).

PLCs are used across all industrial sectors for controlling machines (conveying, packaging, etc.), production lines (automotive, food processing, etc.), or for regulating process functions (metallurgy, chemistry, etc.). They are increasingly utilized in the building sector (commercial and industrial) for controlling heating, lighting, security, or alarms.

2.4.2 Internal architecture of an PLC

- A PLC is an industrial microprocessor-based controller with programmable memory used to store program instructions and various functions. It consists of:
- A processor unit (CPU) which interprets inputs, executes the control program stored in memory and sends output signals,
- A power supply unit which converts AC voltage to DC,
- A memory unit storing data from inputs and program to be executed by the processor,
- An input and output interface, where the controller receives and sends data from/to external devices,
- A communications interface to receive and transmit data on communication networks from/to remote PLCs (9).

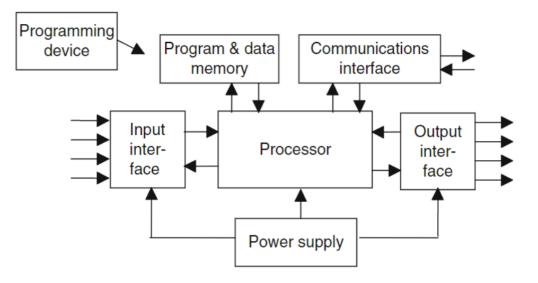


Figure 15: architecture of an PLC

2.4.3 PLC S7 1215C DC/DC/DC

The SIMATIC S7-1200 CPU 1215C is a compact central processing unit designed for industrial automation applications. This model features a DC/DC/DC power configuration with two PROFINET ports for network communication, allowing seamless integration with other systems and devices. Key specifications for this unit include:

- Onboard I/O: It has 14 digital inputs operating at 24 V DC and 10 digital relay outputs with a capacity of 2 A. Additionally, it offers 2 analog inputs ranging from 0 to 10 V, and 2 analog outputs programmable between 0 and 20 mA, providing flexibility in controlling various processes.
- **Power Supply:** The CPU is designed to work with a 24 V DC power supply, which is commonly used in industrial settings.
- **Memory:** With 125 kB of program and data memory, this CPU can accommodate complex automation logic and data storage needs.



Figure 16: PLC S7 1215C DC/DC/DC

2.5 Supervisor Controller

2.5.1 SCADA (Supervisory Control And Data Acquisition)

Technically, SCADA is an advanced industrial measurement and control system that comprises a central host or master, operating in data acquisition and control units in one or more fields, or consists of a collection of standard and custom software used for remote monitoring and control of devices and data elements. In this sense, SCADA software primarily performs monitoring, control, data collection, data recording and storage functions. The term SCADA stands for Supervisory Control And Data Acquisition, which highlights its focus on the supervisory level rather than being a comprehensive control system.

In this context, SCADA systems can be described as an automation system used for monitoring and controlling industrial processes. SCADA systems are used for real-time data collection, process control and process optimization. The systems manage and process data exchange between distributed hardware and software components through a central computer. These components carry out control and monitoring functions, thus ensuring the processes operate healthily and efficiently (10).

2.5.1.1 Advantages of SCADA Systems for the Automation Industry

SCADA systems are pivotal in the automation industry, facilitating the monitoring, control, and management of processes and systems. Here are some key advantages provided by SCADA systems:

- Real-Time Data Collection and Monitoring
- Remote Control and Management
- Alarm & Event Notification
- Data Analysis & Reporting
- Energy & Resource Usage Optimization
- support protocol integration

2.5.2 Human-Machine Interfaces (HMI)

A Human-Machine Interface (HMI) is a user interface or dashboard that connects a person to a machine, system, or device. While the term can technically be applied to any screen that allows a user to interact with a device, HMI is most commonly used in the context of an industrial process. HMIs are similar in some ways to Graphical User Interfaces (GUI) but they are not synonymous GUIs are often leveraged within HMIs for visualization capabilities. In industrial settings, HMIs can be used to:

19

- Visually display data
- Track production time, trends, and tags
- Oversee KPIs
- Monitor machine inputs and outputs

Basic HMI examples include built-in screens on machines, computer monitors, and tablets, but regardless of their format or which term you use to refer to them, their purpose is to provide insight into mechanical performance and progress (11).



Figure 17: Human-Machine Interfaces

2.5.3 ASEM HMI

ASEM is operating in the markets of Industrial Automation, Test, and Measurement with a complete range of industrial PCs and monitors and a complete range of HMI, control (PAC - Programmable Automation Controller), remote assistance, and Industrial IoT gateways, based on x86 (PC) and ARM hardware platforms and FT OptixTM, Premium HMI, UBIQUITY, SoftPLC and SOFTMOTION software platforms.

ASEM is characterized by its own hardware, firmware, software, mechanical, and system design capability, and by the ability to manage all the phases of the production process on its own, including the assembly and soldering of the electronic boards. The complete domain of hardware and

software technologies allows ASEM the maximum flexibility in realizing also products and systems customized for specific customer needs (12).



2.5.4 HMI 30-TF "ASEM"

We will proceed to unravel the basic functions of the HMI 30 (13):



Figure 19:HMI 30-TF "ASEM"

HMI SOFTWARE REMOTE ASSISTANCE SW O.S. LED backlight TFT LCD	Premium HMI Basic Premium HMI Advance UBIQUITY runtime PRO Windows Embedded Compact 7 Pro with Data light Reliance Nitro system 7" W - 800x480 12.1" - 800x600
SW O.S.	UBIQUITY runtime PRO Windows Embedded Compact 7 Pro with Data light Reliance Nitro system 7" W - 800x480 12.1" - 800x600
SW O.S.	Windows Embedded Compact 7 Pro withData light Reliance Nitro system7" W - 800x48012.1" - 800x600
O.S.	Data light Reliance Nitro system 7" W - 800x480 12.1" - 800x600
	Data light Reliance Nitro system 7" W - 800x480 12.1" - 800x600
LED backlight TFT LCD	7" W - 800x480 12.1" - 800x600
LED backlight TFT LCD	12.1" - 800x600
	12.1" - 1024x768
	12.1" W- 1280x800
	15" - 1024x768
	15.6" W - 1366x768
CUT-OUT	A/B
TOUCHSCREEN	Resistive 4 / 5 wires
FRONT PANEL Material	True Flat Aluminum
ASEM Logo	Silk screen printed
PROTECTION IP rating	IP65 - frontal
GRADE IP	
NEMA ratin	ug UL type 1, 4x (indoor only) and 12
CASE Installation	Panel mounting
Material	Zinc-coated skin pass steel
PROCESSOR (soldered	NXP [®] i.MX535 ARM Cortex [®] A8 1GHz •
on-board)	
SYSTEM MEMORY	integrated GPU
RAM	integrated GPU 1GB (DDR3 module)

MASS STORAGE		256MB NAND-FLASH 4GB eMMC pseudo-SLC 1x SD/SDHC slot on board with external access
INTERFACES	LAN	2x Fast Ethernet (RJ45)
	USB	2x USB 2.0 rear (Type-A)
	SERIAL	1x RS232/422/485 (DB15M)
POWER SUPPLY		24VDC (18 ÷ 36VDC) isolated
INPUT		
OPERATING		0° ÷ 50°C
TEMPERATURE		
STORAGE		-20° ÷ 60°C
TEMPERATURE		
OPERATING/STORAGE		20% ÷ 90% RH (non-condensing)
RELATIVE HUMIDITY		
APPROVALS		CE
		RoHS
		UKCA
		cULus Listed
		ATEX zone 2/22

Table 3: HMI Spécifications

2.6 Pre-Actuators

Pre-actuators are devices designed to channel various external energy sources to the actuators. They function by receiving electrical signals from the control system, then distributing energy to the appropriate actuators as specified by the operating instructions. Essentially, they bridge the gap between the control system and the actuators, ensuring the latter receive the correct energy source to perform their function.

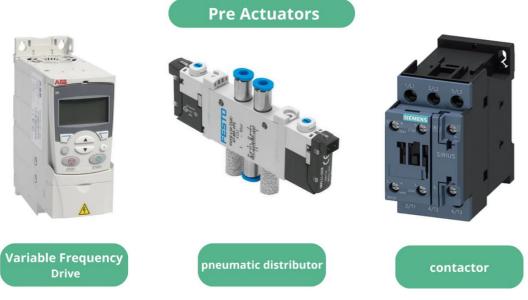


Figure 20: Pre-actuators

2.7 Sensors

Sensors can be thought of as the "eyes and ears" of a control system. They are sensitive components that detect changes in physical properties and convert this information into electrical signals that the control system can understand. Sensors play a crucial role in instrumentation by providing real-time feedback on various physical, thermal, magnetic, and chemical characteristics. In general, sensors fall into two broad categories:

Digital Sensors: These sensors output binary signals, typically used for detecting conditions that have only two states, such as on/off or true/false.

Analog Sensors: These sensors produce a range of values, allowing them to capture variable data from physical phenomena and convert it into electrical signals that the control system can process.

Sensors are responsible not only for detecting changes but also for providing crucial feedback to the control system about the status and progress of the system. This feedback loop helps maintain proper system operation and enables continuous monitoring and adjustment as needed.



Figure 21: Sensors

2.8 Software Description and Tools

2.8.1 TIA PORTAL Platform

TIA Portal = Totally Integrated Automation is a Siemens engineering platform that offers a package of complete automation solutions for an optimized solution in engineering processes and machine manufacturing.

Surely if you are starting out in the world of PLC programming you will start to hear about the TIA Portal, if you are already a veteran of programming you already have it very clear. Siemens is one of the main brands that you will find in any factory in the world and that is why it is highly recommended to know their equipment and their programming software.

In general, in an industrial automation project we will have to work and therefore program several components: Automata (PLC), HMI screens, Variable Speed Drives, Servos...

Until not long ago, each device had its own programming software which was a bit of a hassle. What platforms like Siemens TIA Portal have done is bring together in a single software everything that is needed to program a complete machine.

TIA Portal in addition to installing the basic software (STEP 7, WinCC, SINAMICS Startdrive, SIMOCODE ES and SIMOTION SCOUT TIA), also installs new functionalities such as multi-user and power management in a single interface.

With TIA Portal we can program the new series of PLCs S7-1200 and S7-1500. Besides the old range S7-300 and S7-400, this can also be programmed with STEP7 (The predecessor software for programming Siemens PLCs) (14).



Figure 22: TIA PORTAL

2.8.1.1 Portal view

The portal view provides an overview of all project configuration steps and task-oriented access to our automation tasks. The different portals clearly and systematically display all the work steps needed to perform an automation task. This allows for quick decision-making regarding what we want to do and which tool we need to call upon.

Un Siemens				_ • ×
				Totally Integrated Automation PORTAL
Start 🖌	▶	Open existing project		
Dreices & Streetweike	Create new project Migrate project	Recently used Project Project1.ap16	Path Cillisen HP EliteBook/Documents/Automation/Project1	Last change 2/24/2024 3:56:54 PM
Viscosification Online & Diagnostics	Welcome Tour	[x]		
	 Installed software Help 	Activate basic integrity check		Open
	🚯 User interface language			
Project view				

Figure 23: Portal view

2.8.1.2 Project view

The project view acts like a structured roadmap for all the bits and pieces of our project. It's like a directory that lets us quickly find and dive into any project element, its workspace, and the tools we need to work on it. With the editing tools at our fingertips, we can easily craft and tweak project components.

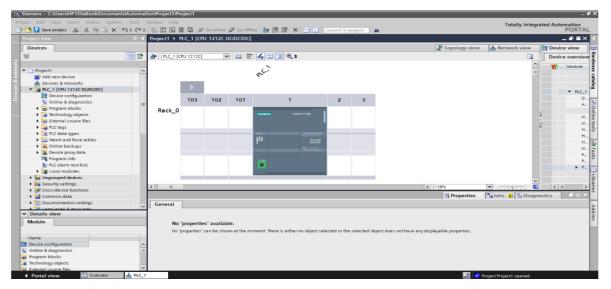


Figure 24: Project view

2.8.1.3 WinCC

SIMATIC WinCC is a supervisory control and data acquisition (SCADA) and human-machine interface (HMI) system from Siemens. SCADA systems are used to monitor and control physical processes involved in industry and infrastructure on a large scale and over long distances. SIMATIC WinCC can be used in combination with Siemens controllers. WinCC is written for the Microsoft Windows operating system. It uses Microsoft SQL Server for logging and comes with a VBScript and ANSI C application programming interface.

In 2010, WinCC and PCS 7 were the first known SCADA systems to be specifically targeted by malware. The Stuxnet worm can spy on and even reprogram infected systems (15).

2.8.2 Premium HMI

Premium HMI[®] is a SCADA/HMI visualization software which permits you to transform your PC, your TouchPanel, your Workstation or your mobile device into a data acquisition, processing and process control station, or to create Human-machine interfacing solutions.

Premium HMI allows you to generate and run any application within the industrial automation or supervision.

By means of the Premium HMI Drivers you can communicate with the process which Premium HMI has to interact with. The process managing devices, being PLC, Termoregulators, Intelligent cards, PC, etc, can be connected to the system where Premium HMI is installed (also in multitasking) through serial lines, modem, communication networks or other.

A Premium HMI project has the job of supervising production processes through animated video pages called Screen windows, or consents setting commands or set-points to the process through video pages called dialog windows, in addition to this there is a countless variety of functions to render process management complete and functional in the most easiest and safest way possible (16).



Figure 25: Software Premium HMI ASEM

2.8.3 Canva

Canva is a website that allows you to create and customize designs for any type of project, in a simple and intuitive way. It is very useful, especially for those who do not have particular graphics skills. The main feature of Canva is that it allows you to freely use already ready-made templates of good quality, and to both modify and conform them to your own taste or requirements. Which makes it a tool that guarantees a qualitatively high result, flexible, and adapted to all circumstances.

Through this short guide, we will try to explain how Canva works, in what situations it can help you, and how, from the project carried out using this instrument, it is possible to start printing the document just as easily and quickly (17).



Figure 26: CANVA Interface

2.8.4 PROFINET RJ45 cable

ProfNet cables are industrial Ethernet cables, also known as "Ethernet Cat. 5" or simply "Cat 5" cables, used for wiring industrial fieldbus systems according to the globally accepted TCP/IP protocol. They are suitable for fixed, dynamic, or flexible industrial automation applications. As required by the ProfNet system and Cat5e specifications, ProfNet cables are designed to be anti-interference cables, providing strong active and passive protection against unwanted signals.



Figure 27: PROFINET Cable

2.4 Conclusion

The Short-cut Pasta Line exemplifies the seamless integration of technology and efficiency in pasta production. With programmable logic controllers (PLCs), Human-Machine Interfaces (HMIs), and the versatility of tools like TIA Portal for the supervision and Canva for the design, this system delivers precision and adaptability. Through the use of PROFINET for connectivity the line ensures a reliable and efficient workflow.

This chapter highlights how these sophisticated components work together to create a robust and flexible system, paving the way for pasta manufacturing.

Chapter 3

Realization Supervision

3.1 Introduction

After presenting the software and tools used to develop our project, this chapter will delve into a step-by-step demonstration of our process.

We will detail how to create supervision with WinCC Professional and how we utilized the software and tools described in our project.

3.1.1 technical specifications

Problematic

The Special Pasta Production line is supervised using an 'ASEM' display, which generates numerous maintenance and diagnostic problems (and PDR management).

We propose for this system: the creation of a WINCC supervision program which will be introduced into a SIEMENS HMI, which will be part of the standard adopted in our company.

Work Plan:

- Backup and Migration of Existing Programs from PLC and HMI Systems
- Integrating WinCC RT Professional and Network Configuration
- Screen Development and Organization in TIA Portal

3.2 Backup and Migration of Existing Programs from PLC and HMI Systems

3.2.1 Backing Up the HMI Asem 30 Program

To back up the HMI Asem 30 program, we started by connecting our PC to the HMI Asem 30 using a USB cable. We then launched the Premium HMI software on our PC and configured it to recognize the HMI via USB. Using Project Manager, we downloaded the project from the HMI. After the download was complete, we saved the project file on our PC and verified its completeness.

Upon opening the project, we discovered numerous functions and screens, including alarms, trends, and scripts, totaling over 160 screens.

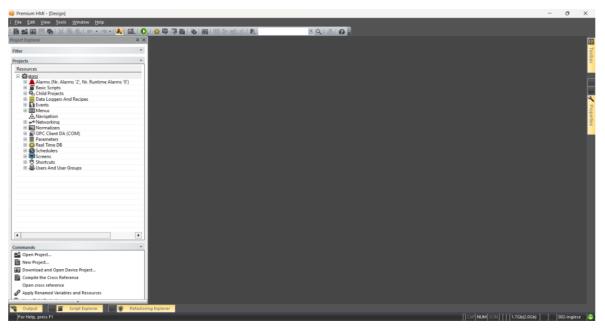


Figure 28: Program Existing in the HMI Asem 30

3.2.2 Backing Up the Program from Siemens S7-1215C PLC

We begin by connecting to PLCs using an Ethernet cable and adjusting our computer's IP address to match the PLCs' subnet. Then, we open the TIA Portal software and create a new project. Then we take the following steps:

Project 1 Control of Patient 2 Control of Patient 2 Control of Control of Patient 2 Control o	iemens - C:\Users\Eradato	com\OneDrive\Desktop\sim project\Supervision	of a Pasta	Production Line\Sup	pervision of a Pasta Produ	ction Line					- # X
Projects Confine		💋 Go online	Ctrl+K	Go online 🖉 Go offlir	• & D D × =	Search in proje	co in		Totally I	ntegrated Automation POR	TAL
Deckes Sinduktion Sing nutified sinulation			CtrlaM	tion Line + Device	es & networks				_ # # ×	Hardware ca 🗊 🏾	
Carding Control de to device: C			•				Topology view	Network view	Device view	Options	
Image: Second and Asset: Se	EN .	Stop runtime/simulation		M connection	💌 🛺 Relations 🔛 🗮			[]	Network overvie 4 >		Hardwa
Constrained of a result of a device Devices & networks Security settings Constrained are regions to Manual du belie Constrained are regions to Manual Constrained are regions to Manual		Download to device	Ctrl+L					^	Y Device	✓ Catalog	dwa
Devices & netrons Devices Devices & netrons Devices				Upload device to PG/P	c			×		<search></search>	int o
In Ungrouped dx/size <p< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Į.</td><td></td><td>Filter</td><td>atalog</td></p<>								Į.		Filter	atalog
S Sective strate values as a state values 2000 value as a state value 2000 value as a state value 2000 value as a state value 2000 valu					Type of the PGI	Cinterface: V PN/E		-			be
Common data Common da	Security settings	Load snapshots as actual values	2	-	PGF	Cinterface Drucsau	-				(n)
Image: Start Start Update device as mere station (Numbers at did Schwar) Image: Start Start Version control and where Image: Start Start Image: Start Start Image: Start Start Start Image: Start Start Start Start Image: Start S			5				2			Drives & starters	0
 Carguages & Result Carguages & Resul	Documentation set	Upload from device (software)	hun to l		Accessible nodes of the selected i	interface:	0			Network compon.	
Online accession Detection of the device configuration Image: Apply the instance Image: Apply the instance Image: Apply more information Image: Apply more information Image: Apply more information	Languages & resou	opione device as new standor (naroware and sor	cware)								e to
Implying intering Implying intering										Power supply and	slo
Water Construction of Adapting Accessible devices			•								-
 Index(8) Weife ACQ Start CV Corl-Shited Corl			•					1		Other field device	(ii) Tasks
Morosch WH Dig Spip CU Corristitie Corristit Corr								1			asks
 C Cristeria (Local) Online & diagnostics C Cristeria (Local) C C Cristeria (Local) C C	Microsoft Wi-Fi Direc	Start CPU Ct		Flesh LED				:			
Classification and a construction of the	PC internal [Local]										Libraries
Circle/more information Strategie more informatin Strategie more informatin Strategie more informatin S	+ _ PLCSIM [PN/IE]			Online status information	n:		Display only error				ibra
Cand ReaderiUSB memory		ormation									ries
Const Service (Automatic protocol detection)								4			
Carlo Reader/USB memory		2.168.0.113 [192.168		Scan and informatio	in retrieval completed.						Add-ins
		tic protocol detection]					Lipic	ed Gancel			d-in
	Card Reader/USB memo	ary									un .
											- 11
	1					> 100%			< II >		
Details view Qroperties Ulafo Upianostics Details view	4						Properties		- Annalised		× 1
< Portal view 🗈 Overview 💼 Devices & ne		Overview bevices & ne									B

Figure 29: Backing Up the Program from PLC

1. Select online

- In the toolbar we select Online.
- 2. Upload device
 - From the list of options we selected the upload device as a new station (hardware and software).
- 3. Select device
 - After selecting the network, we select the device that is on the same network.

4. Upload

- Download the chosen device in our project.
- we follow the same steps for the second PLC S7-1215C.

3.2.3 Migrating Program from TIA Portal V13 to V16

we will show you how to migrate PLC programs from TIA Portal V13 to V16, a process essential for ensuring compatibility with new features, improving performance, and maintaining and upgrading automation systems.

To begin, we select "Open Project," and navigate to the project file created in V13. When prompted to migrate the project, we follow the on-screen instructions to complete the migration.

After the migration, we review the project for any compatibility issues or necessary updates, and finally, we save the project in the new V16 format.

TIA Portal V13 SP1 Open project		
The project has a TIA Portal project version V13 SP1.		
To use this project with TIA Portal V16, it is upgraded to T	A Portal project version V16.	
C:\Users\Eradatcom\Downloads\8919_PLC_V13_SP1\891	9_PLC_V13_SP1_V16.	
	9_PLC_V13_SP1\8919_PLC_V13_SP	1.ap13
C:\Users\Eradatcom\Downloads\8919_PLC_V13_SP1\891	9_PLC_V13_SP1\8919_PLC_V13_SP	1.ap13 Upgrade is possible
C:\Users\Eradatcom\Downloads\8919_PLC_V13_SP1\891 PLC_V13_SP1\891	Les and the second s	
C:\Users\Eradatcom\Downloads\8919_PLC_V13_SP1\891 Product ② S7-1200 Motion Control	Version used	Upgrade is possible
Project: C:lUsers\Eradatcom\Downloads\8919_PLC_V13_SP1\891 Product ② S7-1200 Motion Control ③ STEP 7 Basic ④ Totally Integrated Automation Portal	Version used V11.0 SP2	Upgrade is possible

Figure 30: Migrating Program from TIA Portal V13 to V16

After we opened the obtained program, we discovered several functions and data blocks originating from the two PLCs interconnected via Profinet.

Siemens - C:\Users\Eradatcom\OneDrive\Desktop\si	m project\Supervision of a Pasta Production Line\Supervision of a Pasta Production Line		_ # X
o roject Edit View Insert Online Options Tools		Teteller	
	± 😼 🖥 🛄 🔛 🖳 💋 Go online 🖉 Go offline 🎂 📑 📳 🗶 🚽 📋 <re>search in project> 🍟</re>	Totally	ntegrated Automation PORTAL
Project tree	Supervision of a Pasta Production Line > Devices & networks	_ # = ×	Hardware ca 🗊 🗉 🕨
Devices	🖉 Topology view	Network view Device view	Options 😐
19 I I I I I I I I I I I I I I I I I I I	💦 Network 📋 Connections HM connection 💌 🔒 Relations 📅 📆 🔛 🛄 🔍 ±	Network overvie ()	T
		Device	Options Hardware
Supervision of a Pasta Production Line Add new device Action Devices & networks	SIM - 111 - Sup	Stazione SIMATI SIM-1111 Stazione SIMATI	Search> Mil Mil Controllers
SIM - 111 - Superiore [CPU 1215C DC/DC/ SIM - 113 - Inferiore [CPU 1215C DC/DC/ Gungrouped devices	CPU 1215C CPU 1215C	SIM-113 - I	▶ 🛅 HM
General Constructions	PN/RE_1: 192.168.0.111 [PN/RE_1: 192.168.0.113]		Drives & starters Drives & starters
Gommon data Gommon data Goumentation settings Goumentation settings			Detecting & Monit Distributed I/O Power supply and di
Version control interface			a la catalante
Card Reader/USB memory			Other field devices
			Libraries
			praries
			>
			Add-ins
		×	
<	< III > 100% <	······································	<
> Details view	C Properties	🗓 Info 😩 🗓 Diagnostics 👘 🗖 📼 🔶	> Information
Portal view Deview Deview	ices & ne	📑 😪 Project Supervision o	a Pasta Productio

Figure 31: Existing device and network

					Totally Integrated Automatic POR
		Device SIM-111-Superiore	Show all objects		
		Show all objects			Details List Thumbra
networks	1 A 1	Show an objects			
		Add new block	Security Cyclic 100ms	FB0101 - PID Dead Band	BB1105 - IO_Connection_DB
PLC			- Main	FB0211 - Gestione Sfarinato	DB1201 - IO-com Slave DB
programming			FC0001- Comandi Generali	FB0212 - Gestione Estrusore	BUT201 -IO-COIL SIEVE DD
programming			FC0002 - Uscite	FB0213 - Gestione Tagliapasta	
			FC0003 - Creazione Limiti	EB0300 - Taratura Portata	
Motion &	-		FC0004 - Gestione Ricette	FB1201 - IO-com Slave	
			FC0009 - Visualizzazioni HM	DB0001 - Alarms Warning Management 16 - Generali	
			FC0014 - Dati Comunicazione Invio	BB0002 - Alarms Warning Management 64 - Dosaggio	
			FC0015 - Dati Comunicazione Ricezione	BB0003 - Alarms Warning Management 64 - Estrusore	
			FC0201 - Generali - Allarmi	DB0004 - Alarms Warning Management 16 - Tagliapasta	
			FC0300 - Gr.Dos+Vasca - Timers Conversione	BB0009 - Gestione Ingredienti_DB	
		Show cross-references	FC0301 - Gr.Dos+Vasca - Allarmi	BB0020 - HM General Data	
		Show cross references	FC0302 - Gr.Dos+Vasca - Comandi Generali	DB0021 - HM Alarm and Warning Data	
		Show program structure	FC0303 - Gr.Dos+Vasca - Ciclo Automatico	BB0022 - HM Comand Data	
		Snow program structure	FC0304 - Gr.Dos+Vasca - Controllo Manuali	BB0023 - HMI Status Data	
Online &	~		FC0306 - Gr.Dos+Vasca - Acqua Impasto	DB0024 - HM Actual Value Data	
	15		FC0308 - Gr.Dos+Vasca - Timers	DB0025 - HMI Calibration Data	
			FC0400 - Estrusore+Termo - Timers Conversione	DB0026 - HM Parameters Data	
			- FC0401 - Estrusore+Termo - Allarmi	DB0027 - HMI Timers Data	
			FC0402 - Estrusore+Termo - Comandi Generali/Automatico	B0028 - HM Recipe	
			FC0406 - Estrusore+Termo - Termostatazione	DB0100 - PID Acqua Impasto	
			FC0407 - Estrusore+Termo - Estrazione Vite/Trafila	DB0101 - PID Additivo Liquido 1 Impasto	
			FC0408 - Estrusore+Termo - Timer	DB0106 - PID Ansa Sfoglia Lasagnatrice Niditrice Dead Band	
				DB0211 - Gestione Sfarinato	
		· · · · ·	🕿 FC0501 - Tagliapasta - Allarmi	DB0212 - Gestione Estrusore	
		Help	E FC0502 - Tagliapasta - Comandi Generali/Automatico	DB0213 - Gestione Tagliapasta	
			🐲 FC0600 - Estrusore - Controllo Ansa Sfoglia Lasagnatrice Niditrice	DB0300 - Taratura Portata	
			FC0606 - Estrusore - Pid Ansa Sfoglia Lasagnatrice Niditrice	DB0310 - Dati Pid Acqua	
			FB0001 - Alarms Warning Management 16	B0320 - Dati Pid Ansa	
			E FB0002 - Alarms Warning Management 32	DB 1000 - Timer Fissi	
			EB0003 - Alarms Warning Management 64	B DB 1001 - Timer Dosaggio-Premix-Vasca	
			EB0009 - Gestione Ingredienti	DB1002 - Timer Estrusore-Termostatazione	
			T FB0100 - PID Lean	🔋 DB1003 - Timer Tagliapasta	
			K		

Figure 32: Objects from PLC 1"sim_111_Superiore"

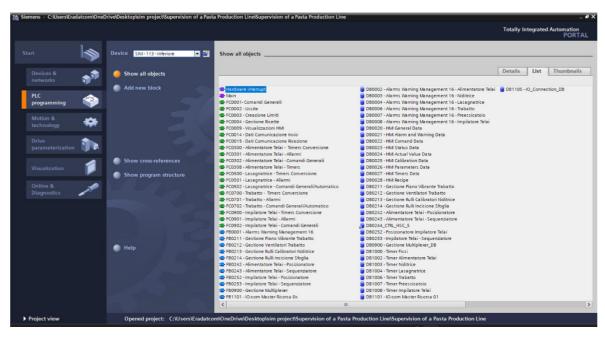


Figure 33: Objects from PLC 2"sim_113_Inferiore"

3.3 Integrating WinCC RT Professional and Network Configuration

3.3.1 Integrating WinCC RT Professional

We will integrate PC systems using "WinCC RT Professional" in our project. Initially, the project will be opened, followed by subsequent steps.



Figure 34: Integration Steps for WinCC RT Professional Station

1. add new device

• We select "Add a new device" from the list of devices and double-click on it.

2. select PC systems

• After displaying the various devices that can be added, we select and add the desired device.

3. Select WinCC RT Professional

• We select "WinCC RT Professional" from the folder level.

4. Confirm the device

• After selecting the device, we click "OK" to confirm the selection.

3.3.2 Network Configuration

In the network view, we drag the PC station onto the network and connect it to the same Profinet network as the PLCs. This is what (Figure 35) shows.

we selected different names for each device and assigned appropriate IP addresses within the same subnet. Names and addresses are shown in (Tab4),

	n project\Supervision of a Pasta Production Line\Supervision of a Pasta Production Line			_ # >
Project Edit View Insert Online Options Tools	Vindow Help t 😱 🚡 🗓 🛱 🔛 🧊 💋 Goonline 🖉 Gooffline 🏭 🖪 🕼 🛪 🖃 🕕 (Search in project) 🇌		Totally I	ntegrated Automation PORTAL
	Supervision of a Pasta Production Line > Devices & networks		_ # # ×	Hardware ca 🗊 🗉 🕨
Devices	🛃 Topology view	📥 Network view	Device view	Options 📑
, 🖬 📃 🖬	💦 Network 👖 Connections 🔣 IMI connection 💌 🔐 Relations 📅 📆 🔚 🛄 🔍 ±		Network overvie 🔹 🕨	Options
Add new device Add new device Add new device Device & Retworks Start 111 - Superiore (CPU 215 C COC/) Start 111 - Superiore (CPU 215 C COC/) Software (1 (SMARC K Station) Core Security settings Core Security settings	PO-System_1 SIM-TIT PO-System_1 PO-System_1 SIM-TIT PO-System_1 PO		Y Cexice Stations SMM1. Stations SMM1. Stations SMM1. Stations SMM1. SAM-113-L. SAM-113-L. SAM-113-L. KGystem_1 HMA_T1 K generaL1	Catalog describ- d
< III > 1	< III > 100% •	···· · · · · · · · · · · · · · · · · ·	< II >	<
> Details view	C Properties	🗓 Info 🔒 🗓 Diag	nostics 🛛 🗖 🗕 🔶	> Information
Portal view 🔂 Overview 🚠 Device	tes & ne		😪 Project Supervision of	a Pasta Productio

Figure 35: Connecting PC Station to Profinet Network

Device Name	IP Address
SIM_111_Superiore	192.168.0.111
SIM_113_Inferiore	192.168.0.113
PC System_1	192.168.0.1

Table 4: Device Names and IP Addresses

3.4 Screen Development and Organization in TIA Portal

3.4.1 Creating Screens

We've crafted approximately 130 screens, each bearing its own distinctive name yet upholding uniform properties: a resolution of 1920 x 1080, a scale of 250 ms, and a harmonious aesthetic. Our focal point, the primary screen, is marked as '0001_main', We will show a selection of these screens to demonstrate our exact work.



Figure 36: Main Screen (0001_main) in ASEM HMI Interface

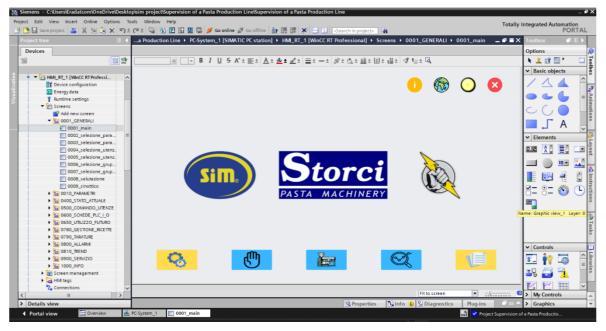


Figure 37: Main Screen (0001_main) in WinCC Interface



Figure 38: Lower Parameter Selection Screen (0003_selezione_parametri_inferiore) in ASEM HMI Interface

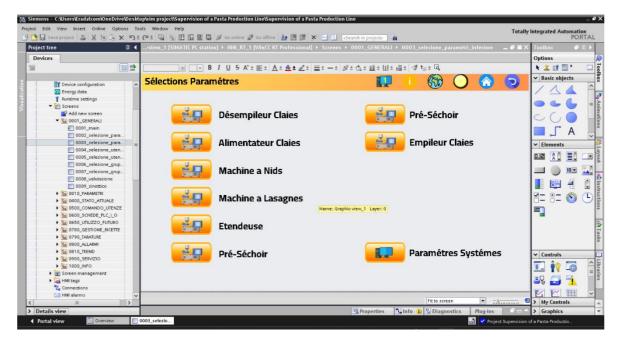


Figure 39: Lower Parameter Selection Screen (0003_selezione_parametri_inferiore) in WinCC Interface

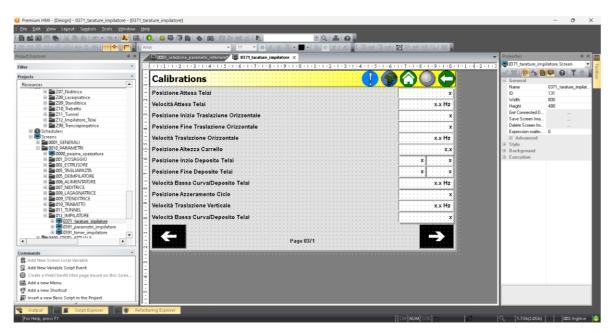


Figure 40: Calibrator Settings Screen (0371_tarature_impilatore) in ASEM HMI Interface

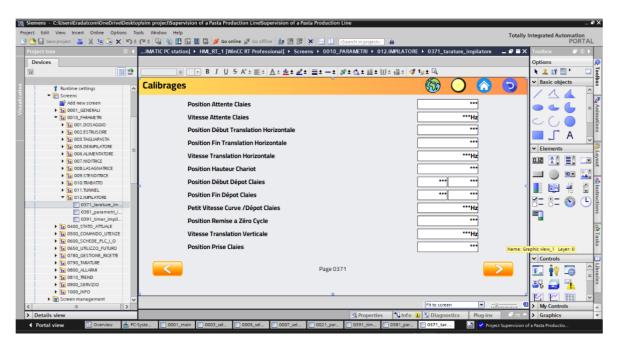


Figure 41: Calibrator Settings Screen (0371_tarature_impilatore) in WinCC Interface

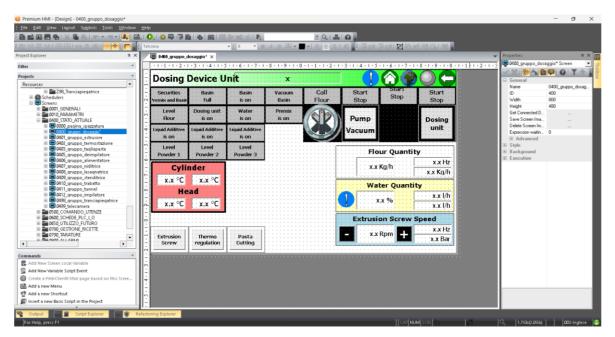


Figure 42: Dosing Group Screen (0400_gruppo_dosaggio) in ASEM HMI Interface

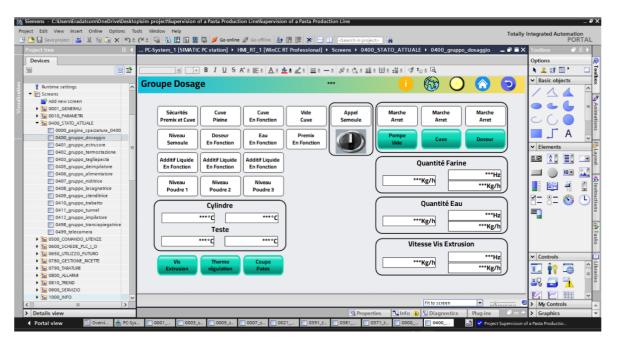


Figure 43: Dosing Group Screen (0400_gruppo_dosaggio) in WinCC Interface

tel 20 ità 20 ita an an an I <mark>nne (</mark>	Tshoma • 8 • 13				-		Properties	a :
	1 1 1 1 2 1 3 1 4 1 5 1 6 1 7 1						 0407_gruppo_nidit	
•				-311-4-11-5			 ~ 12 18 A B	
tourres	Niditrice	x			() =		General	
591557	-						Name	0407_gruppo_niditri
Z04_Zona_4 Z05_Deimpilatore_Telai	Controllo Ansa Sfoglia	x.x Hz	Start	Start	Start	Start	ID	407 800
E Z06_Alimentatore_Telai	(1)	x mm	Stop	Stop	Stop	Stop	Width Height	480
Z07_Niditrice	Abilitazione NO x mm	.xx T/min					Get Connected D	480
Z08_Lasaqnatrice Z09_Stenditrice		1.AA 1/1101					Save Screen Ima	
E ZUS_stendinice	Attivazione NO x mm		entilazion	Resistance	Fan	Screw	Delete Screen Im	
Z11_Tunnel	4						Expression waitin	0
E Z12_Impilatore_Telai							Advanced	
Schedulers	10 July 10 Jul			Extruci	on Screw	Speed	E Style	
Screens	Velocità Ventilazione Batteria Nidi	x.x Hz	x.x Hz	EAUUSI	onscrew		Background	
🗄 🚰 0001_GENERALI	0				Dom:	x.x Hz	Execution	
E 0010_PARAMETRI	Lunghezza Taglio Nidi		x.xx sec	- · · · · · · · · · · · · · · · · · · ·	Rpm +	x.x Bar		
	Discesa Tubi Formatori		x.x sec			terre and the second second		
0400_prepro_dosaggio*								
@ 0401_gruppo_estrusore	Soffic Formatura Nidi 1 Start		X.X Sec	Velocita	a Rulli Cali	bratori		
B 402_gruppo_termostazione	Soffic Formatura Nidi 2 Start			···· X.	x Hz	x.x Hz		
O403_qruppo_taqliapasta O405_gruppo_deimpilatore	Some Formatura Nici 2 Start		X.X Sec					
O405_gruppo_alimentatore	Soffic Formatura Nidi 1 Durata		x.x sec	Velocit	à Rulli Tag	gliatori		
Image: Example of the second					v Hz	x.x Hz		
🗄 🛄 0408_gruppo_lasagnatrice	Soffic Formatura Nidi 2 Durata		x.x sec	· · · · · · · · · · ·	A 1 12			
O409_gruppo_stenditrice O410_gruppo_trabatto	Salita Tubi Formatori		x.x sec	Depo	siti Su Te	laio		
Contraction of the second strength of the sec								
• •	Condizioni Ok Cambio Telaio		X.X Sec		X	X.		
ands *			L		and the second second second			
dd New Screen Local Variable								
dd New Variable Script Event								
reate a WebClientX html page based on this Scree								
Add a new Menu	4							
ldd a new Shortcut	1							
Add a new shortcut	m							

Figure 44: Nesting Group Screen (0407_gruppo_niditrice) in ASEM HMI Interface

V۵	Siemens - C:\Users\Eradatcom\OneDrive\Deskt	op\sim	project\Supervision of a	Pasta Production Lin	e\Supervision	i of a Pas	ta Production Line						_ • ×
Pr	roject Edit View Insert Online Options T	iools V	índow Help							Totally	Integra	ted Automa	ation
E	😚 🛅 🔚 Save project 📑 🐰 🛅 🛍 🗙 🏹	_								-	-	P	ORTAL
	Project tree	P	C-System_1 [SIMATIC F	℃station] HMI_R	[_1 [WinCC	RT Profes	ssional] > Screens > 04	DO_STATO_AT	TUALE > 0407_gruppo	_niditrice 💶 🖬 🗮 🗙	Toolb	ox	
	Devices										Optio	ins	A
	19 E		a - E	IUSA*±	E± A± 🕺	± 1 ±	물리 비 레리 스크 네	: 비: ::::	⊲ft⊵± G		N 2	2 🖬 🖬 M	Toolbox
											V Ra	asic objects	- ĕ
5	🕈 Runtime settings 🧄	Nie	is				***) (53) 🔾			are objecta	×
T.	▼ 🛅 Screens											Δ	
ľ.	Add new screen				_	_	\neg $-$						Ra Animatio
Vist	DOD1_GENERALI		(Control	e Ansa Abaisse)(·	Marche	Marche	Marche	Marche			/ = Ei
	DOID_PARAMETRI 0010_PARAMETRI	1					***Hz Arret	Arret	Arret	Arret	C .	(. (Tat
	B 0400_STATO_ATTUALE		Validation	NO	***mm		***mm			Allec	\sim	\cup	- Si
	0000_pagina_spazzatura_0400		Validation	NO	····mm							Γ° Α	۳ ۱
	0400_gruppo_dosaggio		Activation	NO	***mm		***mm Ventilation	Resistanc	e Vontilation	Vis		<u> </u>	~
	0401_gruppo_estrusore				ر						✓ El	ements	
	0402_gruppo_termostazione		=								51.0		
	0405_gruppo_deimpilatore		Vitesse Ventilat	ion Radiateur Nids			***Hz ***Hz][Quantité Farine		<u></u>		1 - 5
	0406_gruppo_alimentatore		\geq							***Hz		0	• 🔝 🗆
	0407_gruppo_niditrice		Longueur Coupe	Nide			***sec		***Rpm	***Bar		-	
	0408_gruppo_lasagnatrice									Bar		e i i i i i i i i i i i i i i i i i i i	i Ins
	0409_gruppo_stenditrice		Descente Tubes	Formeurs			***sec		Cylindre		2-	· - 🔊	
	0410_gruppo_trabatto		Souffle Formage	Nids 1 Start			***sec	II	Cylindre		M =	8= 🕙	
	0411_gruppo_tunnel								***Hz	***Hz			su
	0412_gruppo_impilatore		Souffle Formage	Nids 2 Start			***sec		Teste				
	0498_gruppo_tranciapiegatrice		Souffle Formage	Nids 1 Durée			***sec		***Hz	***Hz			Tasks
	0499_telecamera								***Hz	***Hz			Ta
	10500_COMANDO_UTENZE		Souffle Formage	Nids 2 Duree			***sec			$ \longrightarrow $			sks
	6600_SCHEDE_PLC_I_O 650_UTILIZZO_FUTURO		Montée Tubes F	ormeurs			***sec	16	Vitesse Vis Extrus	ion)			
	0780_GESTIONE_RICETTE		Conditions Ok C	hangement Claie			***sec		***	***	✓ Co	ontrols	
	ta 0790_TARATURE			langement claie			sec	Л —				i 👔 🗖	1 스탠
	B 0800_ALLARM							\sim				11 -4	Libraries
	• 10010_TREND										<u>=</u> Ç	- Cal - Sa	S
	• 1 0900_SERVIZIO												
	> 1000_INFO												~
	< III >								Fit to screen			y Controls	-
	> Details view						💁 Prope	rties 🚺 Inf	o 🚺 ዄ Diagnostics	Plug-ins 📑 📼 🔶	> Gr	raphics	
	◆ Portal view	000.	. 000 000	000 002	039	038	037 000 04	0 🔲 040	040 040	📑 😪 Project Supervision o	if a Pasta	Productio	

Figure 45: Nesting Group Screen (0407_gruppo_niditrice) in WinCC Interface

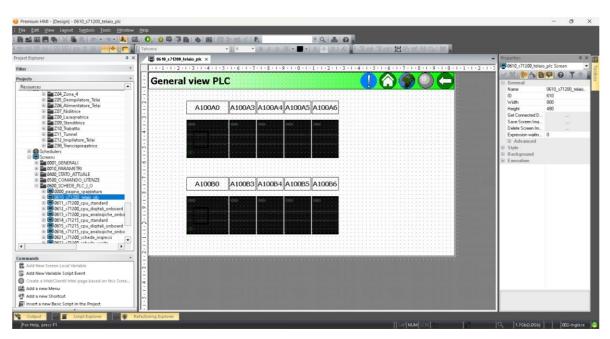


Figure 46: S7-1200 PLC Frame Screen (0610_s71200_telaio_plc) in ASEM HMI Interface

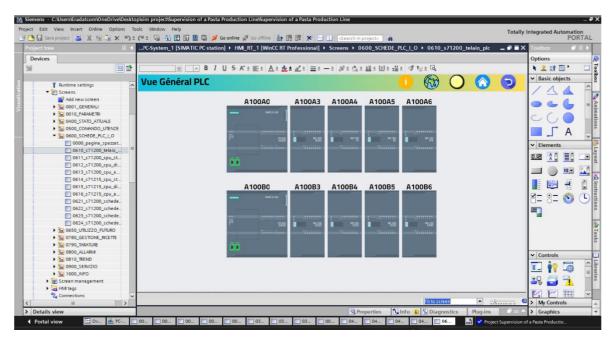


Figure 47: S7-1200 PLC Frame Screen (0610_s71200_telaio_plc) in WinCC Interface

We utilize Canva to meticulously design backgrounds, buttons, and logos. By leveraging Canva's advanced design tools, we ensure that each element is both aesthetically pleasing and intuitively crafted, contributing to a cohesive and professional user interface.

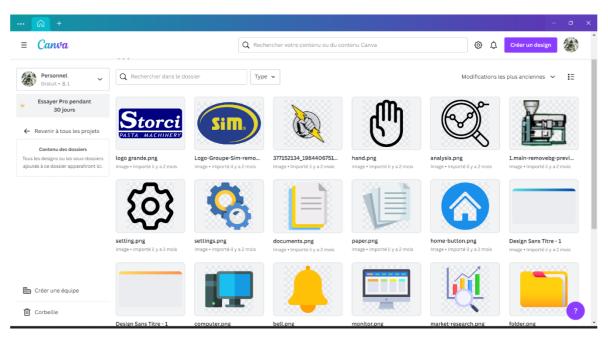


Figure 48: Some logos and interfaces designed with Canva

3.4.2 Transferring Functions from HMI Premium to TIA Portal

In this section, we will explore the process of transferring various functions from HMI Premium to TIA Portal so that the transfer maintains the same characteristics to ensure consistency. The different events we will cover include:

- Screens (Active Screens)
- Edit bits (Invertbit)
- I/O field (Display Value)
- I/O field (Display Text)
- Animation (Appearance)
- Trends
- Alarms
- Users

3.4.2.1 Screens (Active Screens)

We will explain how to we copied a button event "active screens" in Premium HMI to the TIA

Portal.

In Premium HMI

100 AN IN AN I 🕞 🖽 Lata ID AN I 🗰 🔶 🔽	Tahoma	- 6 - B Z U 🖾 -		7月7日日日日日日日	
roject Explorer	a × 0003 sele	ezione_parametri_inferiore ×	Properties		a ×
Filter	and the second se	2 - 1 - 3 1 - 5 - 1 - 6 - 1 - 7 - 1 - 8	Pulsante3 Button		•
Projects		2	× XIBA B910		
Resources	- Selec	tion 🖌 meters	3D Font	none	
Resources	- ·		Adapt Font		
0900_SERVIZIO			Auto Load File Settings		
1000_INFO		Deimpilatore Telai	Auto Save File Settings Automatic Enable and S		
0001_GENERALI			Back Color	(3DFACE SysColor #0000)	
@ @0000_pagina_spazzatura	and the second s		Birk	None	-
0002 selezione parametri superiore			Border	Smple	
🗄 🚍 0003_selezione_parametri_inferiore	7 199	Alimentatore Telai	Border Size	1	
Drawing Objects			Border Style	Nul	
El Alimentatore Telai El M Arrow, 46			Brush Style	I Nul	
Bel Display3		Niditrice	Central Zero		
I Home		Nidicice	Cickable		
(iii) 🛅 Impilatore Telai	-		Command Conditioned b Command Type	Execute Commands	
画)厦 Info 图)厦 Lampada			Command Type Command/State Variable	Execute commanos	
Im Lasagnatrice		Lasagnatrice	Commands On Pressed		
Memorizzazione Dati			Commands On Release	Screen - Open normal (screen change) - 0010_PARAMETRI\005_DEIMPILATORE\0131_tarature_deimpilatore	
Bill Niditrice C Rounded Rectangle1			Commands While Down	4	
Rounded Rectangle1 Itil Selezione HMI Superiore			Condition	equal	
El Selezione Zona		Stenditrice	Conditional Commands		
MI Pulsante3			Default Struct	0	
Wariable used in this script			Dynamic Property Inspector		
B B Wire&Cable_3 B Simbolo41		Techette	Edge-Text Color	BTNTEXT SysColor (000000)	
		Trabatto	Edit Background Colors Edit Filling Colors		
•		•• ••••••••••••••••••••••••••••••••••	Edit Images		
Commands	· Destaurant		Edit Path		
C Add New Screen Local Variable	-		Edit Text-Edge Colors		
Add New Variable Script Event			E Enable		
Create a WebClientX html page based on this Screen			Enable Background Color		
Add a new Menu	4		Enable Composed Move		
Add a new Menu Add a new Shortcut	-		Commands On Release		
P Add a new Shortcut	N.			or this button for the release action [ID12458]	

Figure 49: Select and Note Down Button Event in Premium HMI

1. Select the Screen

- We navigate to the "Screens" folder in the Project Explorer.
- We select the desired screen, such as (e.g., 0003_selezione_parametri_inferiore).

2. Select the Button

• In the screen editor, we click the button we want to copy, like (e.g., Pulsante 3).

3. Note the Command on release Variable

 In the properties window, we find and note down the command on release associated with the button, for example, (screen-open normal (screen change) 0010_PARAMETRI\005_ DEMPILATORE \0131_tarature deimpilatore).

In TIA Portal

joct tree 🛛 🕹 💥 🗎 🗟 🗙 🎝 🕯				Toolbox
Devices				Options
	- B I	U 5 A* = E ± A ± 2 ± 2 ± = = -	± #±☆±Ⅲ±Ⅲ±⊞± ダ ₩± ⊑	N 2 17 11 '
	Sélections Paran			Basic objects
SIM - 111 - Superiore [CPU 1215C	Selections Faran	5		
SIM - 113 - Inferiore [CPU 1215C				
C-System_1 [SIMATIC PC station] Device configuration	K		22	
Online & diagnostics		for the first	Defection in	
HMI_RT_1 [WinCC RT Professi		Désempileur Claies	Pré-Séchoir	
Device configuration	0 0 0			
Z Energy data				A L
Y Runtime settings	A	limentateur Claies	Empileur Claies	¥ Elements
🕶 🛅 Screens		internation chares		
Add new screen				
10001_GENERALI				
🐑 0001_main	N N	Aachine a Nids		
0002_selezione_para	6			
0003_selezione_par				
0004_selezione_v 7	Group_6 [Group]	2 ·	Properties Info 1 Diagnostics Plug-ins	`= 8= 6) (I
0005_selezione_t	Properties Animations	Events Texts		- 8 - °- 🔍 🤆
0007_selezione_grup		土丁曰自習習又		
0008 valutazione	3			K
0009_sinottico	Press left mouse button	· ActivateScreen		
10010_PARAMETRI	Press left mouse button Release left mouse button	ActivateScreen Screen name	0131 tarature deimpilatore	1
D400_STATO_ATTUALE	Press right mouse button	Object number	0131_tarature_beimpilature	(S) eee
1 0500_COMANDO_UTENZE	Release right mouse button	<add function=""></add>		✓ Controls
Tal 0600_SCHEDE_PLC_I_O	Press key on keyboard			
G650_UTILIZZO_FUTURO	Release keyboard key			
Galo Tabla Televice TE	Activate			
10 0790_TARATURE 10 0800_ALLARM	Object changed			- T 🖬 🐴
► 0800_ALLARM	 Graphic view_22 			RA MA III
	 Graphic view_21 			> My Controls
Details view		<	10	> Graphics

Figure 50 : Configure Button Event in TIA Portal

4. Select the Screen

• We navigated to the "Screens" folder in the project tree and selected the screen (0003 selezione parametri inferiore) where we wanted to configure the button event.

5. Select the Button

• In the screen editor, we clicked on the button we wanted to configure. This highlighted the button and displayed its properties and events in the lower part of the window.

6. Open the Events Tab

• With the button selected, we went to the "Events" tab in the properties panel at the bottom.

7. Configure the Event

• In the "Events" tab, we added a new event. We selected "Click" as the type of event for the button.

8. Select Action

- In the "Action" section, we chose "ActivateScreen" from the dropdown menu.
- We then specified the target screen name by setting the "Screen name" to (0131 tarature deimpilatore.)

9. Save the Configuration

• Finally, we saved the project to ensure all changes were stored.

3.4.2.2 Edit bits (Invertbit)

we will explain how we copied a button event "Invertbit" from Premium HMI to TIA Portal.

In Premium HMI

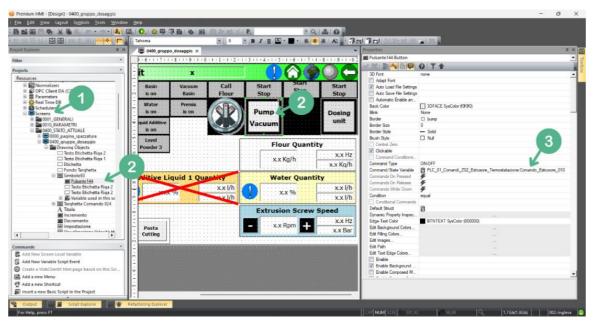


Figure 51 : Select and Note Down Command/State Variable in Premium HMI

1. Select the Screen

- We navigate to the "Screens" folder in the Project Explorer.
- We select the desired screen, such as (e.g., 0400_gruppo_dosaggio).

2. Select the Button

• In the screen editor, we click the button we want to copy, like (e.g., Pulsante144).

3. Note the Command/State Variable

 In the properties window, we find and note down the command on release associated with the button, (PLC_01_Comandi_202_Estrusore_ Termostatizzazione: Comando_ Estrusore_010).

In TIA Portal

	III III III III III Go online 🖉 Go offline 🛃 📑	rofessional] + Screens + 0400 STATO ATTUALE + 0	1400 gruppo dosaggio 🔔 🗗 🖬 🗙 Toolbox	DRTA
	and a second statement of the		Options	
			- Frank	-
	B I U S A	± E ± <u>A</u> ±		2
IN Device configuration	Groupe Dosage	•••	Basic objects	
Colline & diagnostics				
The state of				
Device configuration	Sécurités Cuve C	uve Vide Appel Marche	Marche	5
2 Energy data		nction Cuve Semoule Arret	Arret	
Y Runtime settings				
Kundme settings Screens	Niveau Doseur	Premix Pompe		
Add new screen	Semoule En Fonction En F	6 En Fonction	Cuve Doseur	1.1
+ 10001_GENERALI	Graphic view to view]	Properties	lagnostics Plug-ins - V Elements	
		Sciobernes 2 min 2 2 min		
• 10 0400_STATO_ATTUALE	Properties ations Events	Texts	DIE 🕅 8	-
0000_pagina_spazzati 0400	I Black Antonia Antonia Antonia		<u>me</u> <u>x.</u> 8	
0000_pagina_spazzah 0400 0400_gruppo_dosaggio	1.7	Texts E ≝ 12 12 ×		
0000_pagina_spazzata_p400 0400_gruppo_dosaggio 0401_gruppo_estrusore	1 T	DE 22 2 X		
0000_pagine_spazah 0400_gruppo_dosaggio 0401_gruppo_estrusore 0402_gruppo_ternostazione	T T			
0000_pagina_spazan 0400 0400_gruppo_dotaggio 0401_gruppo_tatmote 0402_gruppo_tstimote 0403_gruppo_tsgliapesta	1 T	DE 22 2 X		
0000_pagine_spazat_ 0400_grupp_dotaggio 0400_grupp_termostatione 0402_grupp_termostatione 0403_grupp_taglispasts 0403_grupp_taglispasts	Press left mouse button Release left mouse button	Rem 18 월 월 × Invertilis Tag (Inputiculput) valat bu		
000, puppdespt://despt	Press left mouse button Release left mouse button	E ■ 1 1 × Inventilit Tig Inputouput) vide fut → © Program blocks		
0000_pagina_spazah 0440_grupp_dotaggio 0440_grupp_detsaggio 0440_grupp_temostatione 0440_grupp_teglispasta 0440_grupp_teglispasta	Cick Press left mouse button Release left mouse button Press right mouse button	Nevertisit Tisg (hopotosupus) 		<u>л</u>
	Citit Press left mouse button Release left mouse button Release right mouse button		o V Name Addres	
0000 psipina spazza 6400 0400 gruppo dicesglio 0400 gruppo dicesglio 0401 gruppo termostasione 0402 gruppo termostasione 0403 gruppo termostasione 0403 gruppo termostasione 0403 gruppo terminatione 0400 gruppo terminatione	Press leit mouse button Release leit mouse button Press right mouse button Press right mouse button Press right mouse button	nventilit Ng (hopticutput) vidé fur P (Retroit - Alarms Warning Ma) P (Retroit - Alarms Warning	a b b b b b b b b b b b b b	14 14 15 15 15 15 15 15 15 15 15 15 15 15 15
000, paylop, dissipation 0401, gruppo, estimation 0401, gruppo, estimation 0401, gruppo, termost solone 0403, gruppo, desimplatore	the solet mouse button Retease left mouse button Retease left mouse button Retease left mouse button Retease leftpoard Retease leftpoard Retease leftpoard	the set of the se	Adramsko Resistenza Termostatalore Clindro Name Adramsko Resistenza Termostatalore Clindro NB22	11 12 12 10 13 12 10 10 10 10 10 10 10 10 10 10 10 10 10
0000 pagina spazza 6400 0400 gruppo dosagio 0401 gruppo territoria	Press left mouse button Release left mouse button Release left mouse button Press right mouse button Press legt on keyboard Release lefboard ley Activite		Adomatico Resistenza Termostatacione Clindro Noare Adomatico Resistenza Termostatacione Clindro Noaz Adomatico Noa Acqua Termostatacione Clindro Noaz Adomatico Noapa Termostatacione Clindro Noaz Adomatico Noapa Termostatacione Clindro Noaz	11 12 12 12 12 12 12 12 13 12 13 14 14 14 14 14 14 14 14 14 14 14 14 14
0000_paging 5000 0400_paging 5000 0401_gruppo_structore 6401_gruppo_structore 0401_gruppo_structore 6403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore 0403_gruppo_structore	Press left mouse button Release left mouse button Release left mouse button Press right mouse button Press legt on keyboard Release lefboard ley Activite	Invertitie Teg (Proputosopuct) ded tu Program Mochs Program Mo	Adomatico Resistencia fazione Clindro Adomatico Resistencia Termostata Jone Testata U022	2 DB 2 DB 2 DB
0000_psipe_spezze_6400 0000_psipe_decage0 0401_grupp0_temostatione 0403_grupp0_temostatione 0403_grupp0_tempilatore 0403_grupp0_tempilatore 0403_grupp0_teminatore 0403_grupp0_teminatore 0403_grupp0_teminatore 0403_grupp0_teminatore 0403_grupp0_teminatore 0403_grupp0_teminatore 0403_grupp0_teminatore 0401_grupp0_teminatore	Press left mouse button Release left mouse button Release left mouse button Press right mouse button Press legt on keyboard Release lefboard ley Activite		Adorna Sico Resistenca Termostatazione Ticlino 5022 Adorna Sico Resistenca Termostatazione Clindro 5022 Adorna Sico Nonga Termostatazione Testata 5022	2.08. 2.08. 2.08. 2.08.
000_stylep_diss_sparat 5400 0400_stylep_diss_sparat 5400 0401_stylep_dissparat 5600 0401_stylep_dissparat 5600 0403_stylep_dissparat 5600 04000 <	Press left mouse button Release left mouse button Release left mouse button Press right mouse button Press legt on keyboard Release lefboard ley Activite	Invertilit Tag (InputSeeppet) Odd fu	Adorea Sco Recisiona Termostatazione Clindro Adorea Sco Recisiona Termostatazione Clindro Adorea Sco Recisiona Termostatazione Testas Adorea Sco Recisiona Termostatazione Testas Adorea Sco Recisiona Termostatazione Testas UD22 Adorea Sco Recisiona	2.08 2.08 2.08 2.08 2.08 2.08 2.08
0000_psipin_spezza 6400 0000_psipin_dosspin 0401_grupp0_demoistaione 0401_grupp0_temoistaione 0403_grupp0_temoistaione 0403_grupp0_temoistaione 0403_grupp0_temoistone 0403_grupp0_temoistone 0403_grupp0_temoistone 0403_grupp0_temoistone 0411_grupp0_tmettone 0411_grupp0_tmettone 0411_grupp0_tmettone 0411_grupp0_tmettone	Press left mouse button Release left mouse button Release left mouse button Press right mouse button Press legt on keyboard Release lefboard ley Activite		Adorna šico Resistenza Termostatajone Clindro Name Adorna šico Resistenza Termostatajone Clindro N022 Adorna šico Renja Termostatajone Testata N023 Adorna šico Renja Termostatajone Testata N023 Adorna šico Renja Termostatajone Testata N023 Comendo 008 N022 Comendo 009 N022	2 DB 2 DB 2 DB 2 DB 2 DB 2 DB 2 DB 2 DB 2 DB
000.puppe, spezze 5400 0400.puppe, description 0401.puppe, settingen 0401.puppe, settingen 0401.puppe, settingen 0403.puppe, settingen 0403.puppe, settingen 0403.puppe, settingen 0400.puppe, settingen 0403.puppe, settingen 0400.puppe, settingen 0403.puppe, settingen 0400.puppe, settingen 0404.puppe, settingen 0400.puppe, settingen 0405.puppe, settingen 0400.puppe, settingen 0401.puppe, settingen 0401.puppe, settingen	Press left mouse button Release left mouse button Release left mouse button Press right mouse button Press legt on keyboard Release lefboard ley Activite	Add to Transmit Marine	Adornašco Recistroa Termostatačone Testa Adornašco Recistroa Termostatačone Testa Adornašco Recistroa Termostatačone Testa Adornašco Rukola Acquia Termostatačone Testa Adornašco Valoiza A	2 DB 2 DB
OOD paging spezze 6400 OOD paging spezze 64000 OOD paging spezze 64000 OOD paging spezze 64000 OOD paging spezze 64000 OOD paging spezze 640000 OOD paging spezze 640000 OOD paging spezze 640000 OOD paging spezze 6400000 OOD paging spezze 640000000 OOD paging spezze 64000000000000000000000000000000000000	Press left mouse button Release left mouse button Release left mouse button Press right mouse button Press legt on keyboard Release lefboard ley Activite		Adorna šico Resistenza Termostata Jone Clindro Name Adorna šico Resistenza Termostata Jone Clindro Natorna šico Varios Acqua Termostata Jone Clindro N0222 Adorna šico Reistenza Termostata Jone Testata N0222 Adorna šico Reistenza Termostata Jone Testata N0222 Consendo 000 N0222 Consendo 000 N0222 Adorna šico Reinga Studio N022 N022 N02 N02 N02 N02 N02 N02 N02 N	2 DB 2 DB
000.puppe, spezze 5400 0401_puppe, structor 0401_puppe, structor 0401_puppe_puter 0401_puppe, structor 0401_puppe_puter 0401_puppe_puter 0401_puppe_puter 0401_puppe_puter 0401_puppe_puter 0401_puppe_puter 0401_puppe_puter 0401_puppe_puter 0401_puter 0401_puter 0401_puter 0401_puter	Press left mouse button Release left mouse button Release left mouse button Press right mouse button Press legt on keyboard Release lefboard ley Activite	Add to Transmit Marine	Adomašco Peristenza Termostatajone Cilindo Adomašco Peristenza Termostatajone Cilindo Adomašco Peristenza Termostatajone Cilindo Adomašco Peristenza Termostatajone Cilindo Adomašco Peristenza Termostatajone Testas Adomašco Peristenza Termostatajone Testas Adomašco Peristenza Termostatajone Testas Adomašco Peristenza Termostatajone Testas Adomašco Peristenza Adomašco Peristenz Adomašco Peristenz Adomašco Peristenz Adomašco Periste	2 DB 2 DB

Figure 52 : Configure Invert Bit Event in TIA Portal

4. Select the Screen

- We navigated to the "Screens" folder in the project tree.
- We Select the corresponding screen (0400_gruppo_dosaggio).

5. Select the Button

• In the screen editor, we clicked on the button where we want to apply the event (Pompe Vide).

6. Open the Events Tab

• With the button selected, we went to the "Events" tab in the properties panel.

7. Configure the Event

• We selected "Click" as the type of event for the button.

8. Assign the Command/State Variable

- In the "Action" section, we choose "InvertBit" from the dropdown menu.
- In the "Tag" field, we entered the command/state variable noted from Premium HMI (Automatico Pompa Vuoto).

9. Save the Project

• Than we Clicked the "Save project" button to ensure all changes are stored.

3.4.2.3 I/O field (Display Value)

we will explain how we copied an I/O field "Display the Value" from Premium HMI to TIA

Portal.

In Premium HMI

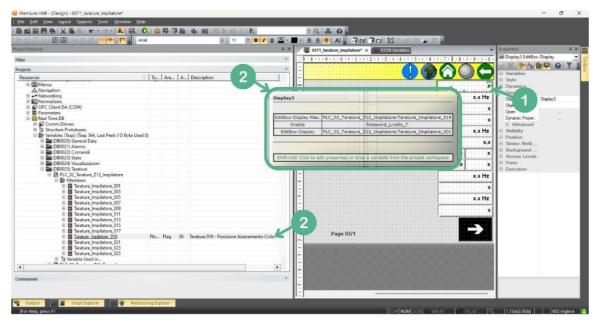


Figure 53 : Select and Specify Input and Output Space in Premium HMI

1. Select the Scree

- We navigate to the "Screens" folder in the Project Explorer.
- We select the desired screen, (e.g., Display3).

2. Specify the Input and Output Space

- In the screen editor, we clicked on the input and output space.
- Than we Note the tags associated with the space, such as the maximum limit, minimum limit, and whether it is an output unit or an input unit (e.g.,PLC_02_Tarature_ Z12_ Impilatore, PLC_02_Tarature_Z12_Impilatore).

In TIA Portal

			14		Professional] → Screens →	0010_PARAMETRI > 012.IMPILATORE >	0371_tarature_impilatore _	X Toolb	
Dev	ices								Optio	ins
9				Cairo	■ 32 • B	IUSA't	E: A: &: 2: =: -: 2:	A ± + ± ± +#± ≤ ≤ t= ± G.		🕻 💱 🛅 Classic default val 🖛
				-	rout, 1tree/					sic objects
	BB0022 - HM Comand Data	[D822]	^	Calibrages			3			
	DB0023 - HMI Status Data [D	0823]			Position Attent	to Chains				
	DB0024 - HMI Actual Value D	Data [DB24]						<u> </u>		
	DB0025 - HMI Calibration Da	ta [DB25]			Vitesse Attent	e Claies		***Hz		AL
	DB0026 - HMI Parameters De				Position Début	Translation Horize	ontale	***		
	DB0027 - HMI Timers Data [D		1		D	anslation Horizont				N
	DB0028 - HMI Recipe [DB28]				Position Fin Tra	ansiation Horizont	are			
	DB0211 - Gestione Plano Vib				Vitesse Transl	ation Horizontale		***Hz		
	BB0212 - Gestione Ventilato				Position Haute	ur Chariot			> Ele	ements
	DB0213 - Gestione Rulli Calit								V Co	ontrols
	DB0214 - Gestione Rulli Incis	sione Stoglia	IDB. V		Position Début	Dépot Claies				2. E = 0 / R
			/		Position Fin Dé	pot Claies				17
De	tails view				Datit Vitarra C	une /Dépot Claies				
				VO field 1 IVO		CONSTRUCTION OF	Properties *i Info (1)	P. Diagnostics Plug-in		
				2		1			-13	
						Events	Texts			
Nam	ne	Offset	D	Properties	Animations	L'rents				
Nam	ne Velocità Attesa Telai	Offset 404.0	D Real A	Properties	E1.	General				
Nam	Velocità Attesa Telai Posizione Inizio Traslazione Orizzo.	404.0	Real A	-	E1.	General				
Narr	Velocità Attesa Telai Posizione Inizio Traslazione Orizzo. Posizione Fine Traslazione Orizzon	404.0	Real	Property list	E1.			Format		
Nam	Velocità Attesa Telai Posizione Inizio Traslazione Orizzo. Posizione Fine Traslazione Orizzon Velocità Traslazione Orizzontale	404.0 	Real A Real Real Real	Property list	E1.	General	DR0035.4587aBbrationData_Innilistene_Tabi			
Nam	Velocità Attesa Telai Posizione Inizio Traslazione Orizzo. Posizione Fine Traslazione Orizzon Velocità Traslazione Orizzontale Altezza Carrello per Decremento P.	404.0 	Real Real Real Real Real	Property list General Appearance	E1.	General Process Tag:	DB0025+HMCalibrationData_Impilatore_Telai_	Posizione Azzeramento Ciclo at: Decimal		
Narr	Velocità Attesa Telai Posizione Inizio Traslazione Orizzo. Posizione Fine Traslazione Orizzon Velocità Traslazione Orizzontale Altezza Carrello per Decremento P Posizione Inizio Deposito Telai	404.0 408.0 412.0 416.0 420.0 424.0	Real Real Real Real Real Real	Property list General Appearance Characteristics	E1.	General Process Tag: PLC tag:	*D80025 - HM Celibration Data*.Impil 🥕	Posizione Azzeramento Ciclo at: Decimal Field length: 1		
Nam	Velocità Attesa Telai Posizione linizo Traslazione Orizzo Posizione Fine Traslazione Orizzont Velocità Traslazione Orizzontale Altezza Carrello per Decremento P Posizione Inizio Deposito Telai Posizione Fine Deposito Telai	404.0 408.0 412.0 416.0 420.0 424.0 428.0	Real Real Real Real Real Real	Property list General Appearance Characteristics Layout	E1.	General Process Tag:		Posizione Azzeramento Ciclo at: Decimal		
Nam	Velocità Attesa Telai Posizione Inizio Traslazione Orizzon Velocità Traslazione Orizzon Velocità Traslazione Orizzontale Altezza Carrello per Decremento P Posizione Inizio Deposito Telai Velocità Curva/Deposito Telai	404.0 408.0 412.0 416.0 420.0 424.0 428.0 432.0	Real Real Real Real Real Real Real	Property list General Appearance Characteristics Layout Text format	E1.	General Process Tag: PLC tag: Address:	*D80025 - HM Celibration Data*.Impil 🥕	Posizione Azzeramento Ciclo at: Decimal Field length: 1		
Nam	Velocità Attesa Telai Posizione inizio Traslazione Orizzon Posizione Fine Traslazione Orizzontale Altezza Carrello per Decremento P Posizione ninito Opposito Telai Posizione rine Deposito Telai Velocità Curval Deposito Telai Posizione etazenamento Ciclo	404.0 408.0 412.0 416.0 420.0 424.0 428.0 432.0 436.0	Real Real Real Real Real Real Real Real	Property list General Appearance Characteristics Layout Text format Flashing	E1.	General Process Tag: PLC tag:	*D80025 - HM Celibration Data*.Impil 🥕	Posizione Azzeramento Ciclo 81: Decimal Field length 1 章 Leading zeros:		
Nam	Velocità Attesa Telai Posizione inizio Traslazione Orizzon Posizione Erite Traslazione Orizzon Velocità Traslazione Orizzonta Alteza Carrello per Decremento P Posizione inizio Deposito Telai Velocità CurvalDeposito Telai Posizione Azeramento Ciclo Velocità Tatsiane Verticale	404.0 408.0 412.0 416.0 424.0 424.0 428.0 432.0 436.0 440.0	Real Real Real Real Real Real Real Real	Property list General Appearance Characteristics Layout Text format Flashing Limits	E1.	General Process Tag: PLC tag: Address: Type	"D80025 - HM Calibration Data" Impil 👗 Real	Posizione Azzeramento Ciclo 81: Decimal Field length 1 章 Leading zeros:		
Nam	Velocità Attesa Telai Posizione inizio Traslazione Orizzo. Posizione finie rasilazione Orizzo. Velocità Traslazione Orizzontale Altezza Carrello per Decremento P Posizione nizio Deposito Telai Velocità (curula Deposito Telai Posizione Fine Deposito Telai Posizione Azenamento Ciclo Velocità Traslazione Verticale Posizione Telai Presi	404.0 408.0 412.0 416.0 424.0 428.0 432.0 436.0 440.0 444.0	Real Real Real Real Real Real Real Real	Property list General Appearance Characteristics Layout Text format Flashing Limits Styles/Designs	E1.	General Process Tag: PLC tag: Address:	"D80025 - HM Calibration Data" Impil 👗 Real	Posizione Azzeramento Ciclo 81: Decimal Field length 1 章 Leading zeros:		
Narr	Velocità Attesa Telai Posizione inizio Traslazione Orizzon Posizione Erite Traslazione Orizzon Velocità Traslazione Orizzonta Alteza Carrello per Decremento P Posizione inizio Deposito Telai Velocità CurvalDeposito Telai Posizione Azeramento Ciclo Velocità Tatsiane Verticale	404.0 408.0 412.0 416.0 424.0 424.0 428.0 432.0 436.0 440.0	Real Real Real Real Real Real Real Real	Property list General Appearance Characteristics Layout Text format Flashing Limits Style:/Designs Miscellaneous	E1.	General Process Tag: PLC tag: Address: Type	"D80025 - HM Calibration Data" Impil 👗 Real	Posizione Azzeramento Ciclo 81: Decimal Field length 1 章 Leading zeros:		
Narr	Velocità Attesa Telai Posizione inizio Traslazione Orizzo. Posizione finie rasilazione Orizzo. Velocità Traslazione Orizzontale Altezza Carrello per Decremento P Posizione nizio Deposito Telai Velocità (curula Deposito Telai Posizione Fine Deposito Telai Posizione Azenamento Ciclo Velocità Traslazione Verticale Posizione Telai Presi	404.0 408.0 412.0 416.0 424.0 428.0 432.0 436.0 440.0 444.0	Real Real Real Real Real Real Real Real	Property list General Appearance Characteristics Layout Text format Flashing Limits Style:/Designs Miscellaneous	E1.	General Process Tag: PLC tag: Address: Type	"D80025 - HM Calibration Data" Impil 👗 Real	Posizione Azzeramento Ciclo 81: Decimal Field length 1 章 Leading zeros:		v Controls

Figure 54: Configure I/O Field in TIA Portal

3. Select I/O Space

• We selected the input and output filed on which we enter information

4. Enter Process Type and Format

- In the properties window, we entered the tag obtained from the previous step.
- Than we specify the Process Type and Format.

Project tree	ii 4		line 🖉 Gootline 🛃 🎚 🖪 🗶 🖃 🛄 search in project> 🐐 > PC-System 1 [SIMATIC PC station] → HMI RT 1 [V#nCC RT Advanced] → HMI tags → Default tag table [544] 📃 🖉 🗮 🗙	PORTA					
Devices		Pasta Production Line	PC-system_T [SIMARICPC station] / HHI_KI_T [VINCC KI Rovanced] / HMI tags / Default tag table [S44]	Options					
18		⇒ + 3	ag min tags aystem tags	Options					
<u>[1]</u>				✓ Find and rep.					
Device configuration		Default tag table							
Runtime settings	0		Name D00025-HMI Calibration Data, Estrusore, Temostatarione, Girl Vite Estrusione con Motore 50 Hz D00025-HMI Calibration Data, Impliatora, Telai - Atorza Carrello per Decemento Posizione Deposito Real HMI. Conneccio SMA.						
Screens									
Screen management			ation Data_Impliatore_Telai_Posizione Attesa Telai						
- 🛃 HMI togs			ation Data Impilatore Telai Positione Averamento Ciclo	Whole words a					
a Show all tags			ation Data_Impilatore_Telai_Posizione Fine Deposito Telai Real HML_Connectio	Match case					
💕 Add new tag table	=		ation Data_Impilatore_Telai_Posizione Fine Traslazione Orizzontale Real HM_Connectio Silk	Find in substr					
🕁 Default tag table [544]		DROODE HMLOSE	otion Doto, Immilatore, Teloi, Baciliano, Inizia Donacito, Teloi Baal UVI. Connessi Site	Find in hidde					
Galors [13]		DB0025 - HMI Calibration	Data_Impilatore_Telai_Posizione Attesa Telai (HMI_Tag) 👘 Properties 🚺 Info 🕦 🖞 Diagnostics 👘 🖛 🕶	Use wildcard					
Tag table_1 [1]		Properties Events	Texts	Use regular e					
2 Connections		rioperdes		e use regular e					
HMI alarms			Range	💿 Down					
Historical data		General	Settings	OUp					
Scripts		Settings	settings	- Fie					
5 Scheduled tasks		Range	Upper 2:						
Cycles		Lineer sceling	Upper 1: DB0025 - HMI Calibration Data_Impilatore_Telai_Positione Azzeramento Ciclo	Replace with:					
• 💽 Reports	100	Values	Lower 1: Ø+						
Details view		Comment		O whole docum					
Decails view		Multiplexing Good Manufacturing Pra	Lower 2:	From current					
		abod manufacturing rra							
				Oselection					
Name Data type Addre	55			Replace					
	-								
DB0022 - HMI Comend Dat Bool DB0022 - HMI Comend Dat Bool									
DB0022 - HMI Comend Det Bool									
DB0022 - HMI Comand Dat Bool									
DB0022 - HMI Comand Dat Bool									
DB0024 - HKI Actual Value Real									
DB0024 - HMI Actual Value Real	~	2		< II					
UD0024 - miki Actual Value Keal									

Figure 55: Specify Tag Range in TIA Portal

5. Select the Tag

- We navigate the "Tags" folder in the Project Explorer.
- We Selected the relevant tag for configuration.

6. Specify the Range

- We open the Properties window and we want to the Range property.
- We Specify the tag's upper and lower limits (e.g., PLC_02_Tarature_Z12_ Impilatore).

3.4.2.4 I/O field (Display Text)

we will explain how we copied an I/O field "Display the Text" from Premium HMI to TIA Portal.

In Premium HMI

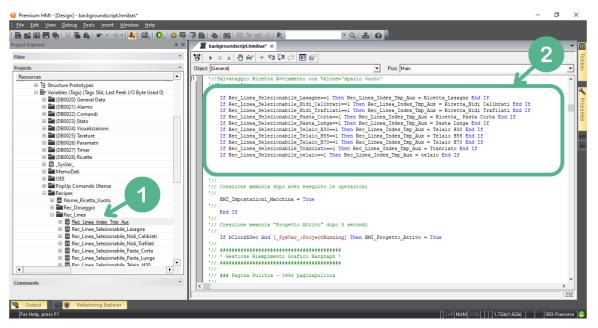


Figure 56: Locate and Understand Pasta Recipes in Premium HMI

1. Select the Folder

• We navigated the folder that contains the pasta recipes.

2. Locate the Pasta Recipes

- Than we Identified the location of the pasta recipes in the program developed in the C language.
- We Understand this part of the program to obtain the necessary information.

In TIA Portal:

	project 📇 📈 🗉 💽 🗙 🏷 ± 🖓 ± 🏹							POR
oject tree		□ ◀>	SIM - 111 - Superiore [CPU 12	15C DC/DC/DC]	Program blocks + Selecter	i recipe data bl	ok [D85] 💶 🗖	
Devices								ptions
E.		11 12 14 14 14 14 14 14 14 14 14 14 14 14 14	-0 8 8 00 Keen ach	alualuar 🖯 e	nanches 56, 56, Convenanches	to start values		
			elected recipe data blok					✓ Find and replace
	DB0026 - HM Parameters Data [DB26]		Name	Data type	Start value	Retain	Accessible fWrite	· I ma and replace
	DB0027 - HMI Timers Data [DB27]	1	Static	1	[13]			Find:
	D80028 - HM Recipe [D828]	2	 recipe line aux 	String				
	DB0100 - PID Acqua Impasto [DB100]	30	recipe line Lasagne	String	'Lasagnes'	Ē		
	DB0101 - PID Additivo Liquido 1 Impasto [D8	4	recipe line Nidi Calibrati	String	'Nids calibrés'	Ē		Hole words only
	DB0106 - PID Ansa Sfoglia Lasagnatrice Niditri.	5	a recipe line Nidi Trafilati	String	'Nids dessinés'	Ä		Match case
	DB0211 - Gestione Sfarinato [DB211]	6	recipe line pasta corta	String	'pâtes courtes'	8		Find in substructures
	DB0212 - Gestione Estrusore [DB212]	7	a recipe line pasta lunga	String	'pâtes longues'			P Find in hidden texts
	DB0213 - Gestione Tagliapasta [DB213]	8 -	recipe line Telaio H30	String	'Cadre H30'	ē		Use wildcards
	DB0300 - Taratura Portata [DB300]	9	a recipe line Telaio H55	String	'Cadre H55'			
	DB0310 - Dati Pid Acqua [DB310]	10	🖬 🔹 recipe line Telaio H70	String	'Cadre H70'	ē		Use regular expressions
	DB0320 - Dati Pid Ansa (DB320)	11	a recipe line Tranciato	String	'Plaqué'	A		Down
	DB1000 - Timer Fissi [DB1000] DB1001 - Timer Dosaggio-Premix-Vas	. 12	 recipe line Telaio 	String	'Châssis'	8		
	DB1001 - Timer Dosaggio-Premix-Vas							O up
	DB1002 - Timer Estrusore-Termostataz							Find
	DB1003 - Timer Tagliapasta [DB1003]							
	D81201 - IO-com Slave D8 [D812							Replace with:
	Selected recipe data blok [DB5]							
• E	System blocks							Whole document
) 📑 Te	echnology objects							
) (1) E	xternal source files							O From current position
- 🔄 PI	LC tags							Selection
	Show all tags							Replace Replace all
	Add new tag table							
1	Default tag table [381]							1
3	Tag table_1 [21]							
	LC data types							
• 🔜 W	latch and force tables							
	Inline backups							
🕨 💽 Tr	races	~						
		>	<		11		>	

Figure 57: Create Data Block and Variables in TIA Portal

3. Create a Data Block

• We developed a data block where the variables will be entered.

4. Create Variables

• We define the variables of type "string" and we assign each variable an initial value representing the name of the recipe (e.g., lasagna).

M Siemens - C:\Users\Eradatcom\OneDrive\Desktop\sim project\Su	ervision of a Pasta Production Line/Supervision of a Pasta Production Line	-
Project Edit View Insert Online Options Tools Window H	p	Totally Integrated Automation
📑 📑 🔚 Save project 🔠 🐰 🏥 🖹 🗙 🍤 🛨 (주 🛎 🖼 🐁] 🗓 🖳 💭 🂋 Go online 🖉 Go offline 🏭 🖪 📳 🗶 🚽 🛄 <search in="" project=""> 🕌</search>	PORTA
Project tree	Superiore [CPU 1215C DC/DC/DC] Program blocks Selected recipe factions [FC5]	
Devices		
1 III III III III III III III III III I		1 Sa 🏶 🔲 🖽
	Block interface Favorites	
 FC0402 - Estrusore+Termo - Comandi General. FC0406 - Estrusore+Termo - Termostatazione _ 	- +	
 FC0406 - Estrusore + Termo - Termostatazione . FC0407 - Estrusore + Termo - Estrazione Vitada. 	Extended instructions	
	Block title: Name	Description Version
FC0408 - Estrusore+Termo - Timer [F FC0500 - Tagliapasta - Timers Conv	Comment	V2.2
 FC0500 - Tagliapasta - Timers Conv FC0501 - Tagliapasta - Allarmi [FC5 	Network 1:	V3.7
FC0501 - Tagliapasta - Anarmi (FC5	S MOVE	Move character string V1.1
 FC0502 - Tagliapasta - Comandi Gen FC0600 - Estrusore - Controllo Ansa - Oglia ca. 	Comment S CONV	Convert character string V3.4
FC0606 - Estrusore - Pid Ansa Sura Lasagna.	MASSO 5 = STRG_VAL	Convert character strin V2.3
Selected recipe factions (FCS)	*MASSOS *ret* 5.MOVE *VAL_STRG	Convert numerical valu V2.3
FB0001 - Alarms Warning Management 16 [F	EN ENO	Convert character strin V1.0
FB0002 - Alarms Warning Management 32 [F	"Selected "Selected The Selected The Selecte	Convert Array of CHAR V1.0
FB0003 - Alarms Warning Management 64 [F	recipe data recipe data 🚍 MAX LEN	Determine the length o
FB0009 - Gestione Ingredienti [FB9]	blok "redpe blok" redpe line Latagne" line aux "	Convert ASCII string to V1.1
FB0100 - PID Lean [FB100]	IN OUT	Convert hexadecimal n V1.1
FB0101 - PID Dead Band [FB101]	a LEN	Determine the length o V1.2
FB0211 - Gestione Sfarinato [FB211]	- CONCAT	Combine character stri V1.5
FB0212 - Gestione Estrusore [FB212]	Network 2:	Read the left characters V1.3
FB0213 - Gestione Tagliapasta [FB213]	Comment PRGHT	Read the right characte V1.3
FB0300 - Taratura Portata [FB300]	- MD	Read the middle charac V1.3
FB1201 - IO-com Slave [FB1201]	NMS50.6	Delete characters in a c V1.3
DB0001 - Alarms Warning Management 16	"rec2" S_MONE 🚔 INSERT	Insert characters in a c V1.2
DB0002 - Alarms Warning Management 64	EN ENO	Replace characters in a . V1.3
DB0003 - Alarms Warning Management 64	"Selected "Selected 📮 FIND	Find characters in a ch V1.2
DB0004 - Alarms Warning Management 16	excipe data recipe data biol." recipe data biol." recipe data biol." recipe data recipe data biol." recipe data	
DB0009 - Gestione Ingredienti_DB [DB9]	line Nid out Distributed I/O	V2.7
DB0020 - HMI General Data [DB20]	Calibias" DWI PROFilenergy	V2.7
DB0021 - HMI Alarm and Warning Data [DB21]	▶ Call Interrupts	V1.2 N
DB0022 - HMI Comand Data [DB22]		II >
DB0023 - HM Status Data [DB23]	> Technology	
<	90% Communication	
> Details view	Properties Plunfo Diagnostics Plug-ins Plug-ins Plug-ins Optional packages	
Portal view Dvervi 0005_5 0007_5		ion to SIM - 111 - Superiore ab

Figure 58: Develop Functional Block and Program in TIA Portal

5. Create a Functional Block

• We develop a functional block that will contain the new program.

6. Develop the Program

- We Create a program consisting of 10 Networks.
- Than we Utilize the S_MOVE function, which transfers data from 'in' to 'out' if the condition at the 'En' input is met.

3.4.2.5 Animation (Appearance)

we will explain how we copied an Animation "Appearance" from Premium HMI to TIA Portal.

In Premium HMI

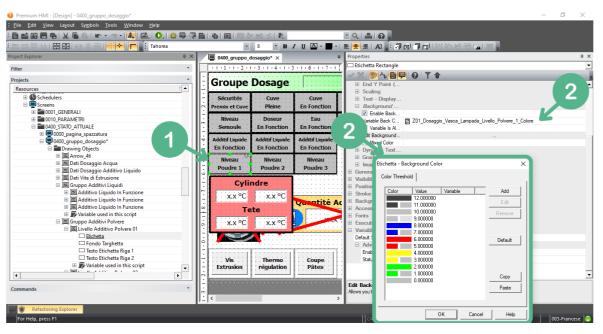


Figure 59: Select Display Space and Record Variables in Premium HMI

1. Select Display Space

• After opening the screen, we selected the display space from

2. Record Variable Tag and Range

• After the information appears, we note down the variable tag and the range for each color.

In TIA Portal

🔚 Save project 📑 🐰 🛅 🗊 🗙 🎝 🛨 (주 🛎 🖓							Totally Integrated Automation PORT
ect tree 🦻		CC RT Professional]	Screens > 0400_STA	TO_ATTUALE	▶ 0400_gruppo_dosaggio	_ # =×	Toolbox 🗗 🗓
evices	3						Options
II.		BIUSAt	≕: A: *: /: =	2 - 2 - 2 2	요 : 승 : 비 : 해 : 생 1~ :	EQ.	🖹 🤽 🛐 🎹 Classic default val 💌
							✓ Basic objects
DED 0600 SCHEDE PLC I O		liveau	Niveau		Niveau		• basic objects
10650_UTILIZZO_FUTURO		iveau	Iniveau		Niveau	4	/ 🛆 🕰 🗢 🗲 🕒
0780_GESTIONE_RICETTE	Pr Pr	oudre 1 🔡	Poudre 2		Poudre 3		
0790_TARATURE			I Oddie L		i oudre s		
0800_ALLARM					2		·
0810_TREND	6			(_	
0900_SERVIZIO	Rectangle_17 [Rectangle]		S Properties	🚹 Info 🚯	Diagnostics Plug-ins		
1000_INFO Implement	Properties Animatie	ons Events	Texts				
Image Screen management Image HMI tags		Π.					Elements
Hini tags Show all tags		Appearance					✓ Controls
Add new tag table	Overview	Tag			Туре		= 1 4 0 = 1 = 1 = 1 = 1
Default tag table [43]	Tag connections		ello_Polvere_1_Colore				🖭 🌓 🌆 📲 🔂 🚹
2 Connections	Animate property Bisplay		ello_Polvere_1_Colore	(3])	Range		K 🖂 III 🔛 💭 🚯
HMI alarms	Add new animation	Address:			O Multiple bits		
Recipes	Appearance				Single bit		-t' 📼 🖷 🕎
III Historical data	Movements	Range 🔺	Background color, Bor	der color. Bord	Elarbing Enable fl		
Scripts	, 2 morenter	0	192, 192, •			^	
5 Scheduled tasks		1	0,255,0		Fast	-	
Cycles		4 2	0, 255, 0	0, 255, 0	No		
Reports		3	255, 255, 0	192, 192, 192	Fast		
Text and graphic lists		4	255, 255, 0	255, 255, 0	No		
💱 User administration		5	255, 0, 0	192, 192, 192	Fast		
Local modules		6	255, 0, 0	255, 0, 0	No		
Ungrouped devices		7	51, 102, 255	192, 192, 192	Fast	- 111	
Cross-device functions		8		51, 102, 255	No	- 10	
Cross-device functions		9	150, 150, 150	192, 192, 192	Fast	- 11	
Documentation settings		10	150, 150, 150	150, 150, 150	No		
Languages & resources		11	51, 51, 51	192, 192, 192	Fast		
Version control interface	R	12 cAdd news	51, 51, 51	0, 0, 0	NO	~	My Controls
Details view	-	sedd news					> Graphics

Figure 60: Enter Variable Tag and Range in TIA Portal

3. Select Display Space

- We select display space.
- 4. Enter Information:
 - We enter the obtained information, including the variable tag and the range for each color.

3.4.2.6 Alarms

we will explain how to copy Alarms from Premium HMI to TIA Portal.

In Premium HMI

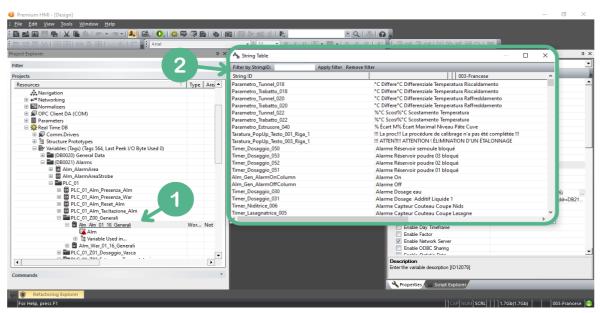


Figure 61 : Opening the Alarms Folder and Recording Variables

1. Open the Alarms Folder

• We navigate to the "Alarms" folder and open it.

2. Record Variables and Alarm Messages

• Than we Identified and note down the variables and alarm messages.

In TIA Portal

oject tree 🛛 🔲 🖣				SIMATIC PC station] > HM	and the second se		rms	_ 4	sks 🗊
Devices		Discrete alarms	Analog alarms	Controller alarms	User alarms	System events	Alarm cl	asses	Options
	⇒ ₩		1.	1.7				Ka	
	Discrete	alarme						-	
PC-System_1 [SIMATIC PC station]		Name	Alarm text		Alarm class	Trigger tag	Tringe	Acknowledg	Find and replace
Device configuration	51	Alarm_1	Alarme On			Alm_Gen_AlarmOffClumn	0	<no tag=""></no>	Find:
Colline & diagnostics	2	Alarm 2	Alarme Off			Alm_Gen_AlarmOnClumn	0	<no tag=""></no>	- Fillo.
• • HML RT 1 [WinCC RT Professio	3	Alarm_3	% Ecart Maximal N		Warnings	Parametro_Estrusore_040	0	<no tag=""></no>	7 L
Device configuration	4	Alarm_5		mperature Riscaldamento	Warnings	Parametro_trabatto_018	0	<no tag=""></no>	Whole words only
C Energy data	-74 *	Alarm_5		mperature Raffreddamento	Warnings	Parametro trabatto 020	0	<no tag=""></no>	Match case
Y Runtime settings	6	Alarm 6	%"C Scostamento		Warnings	Parametro trabatto 022	0	<no tag=""></no>	Find in substructures
Screens		Alarm 7		mperature Riscaldamento	Warnings	Parametro_Tunnel_018	0	<no tag=""></no>	
Screen management	7	Alarm 8		mperature Riscaldamento	Warnings	Parametro_Tunnel_018	0	<no tag=""></no>	- Find in hidden texts
HMI tags		Alarm 9	%"C Scostamento		Warnings		0		Use wildcards
2 Connections	-n 9	Alarm_10		calibrage n'a pas été complétée		Parametro_Tunnel_022		<no tag=""></no>	Use regular expressions
HMI alarms	10	Alarm_10		INATION D'UN ETALONNAGE	Errors	Taratura_PopUp_Testo_001			
A Recipes	11					Taratura_PopUp_Testo_003	0	<no tag=""></no>	Down
Historical data	12	Alarm_12	Alarme Dosage ea		Errors	Timer_Dosaggio_030	0	<no tag=""></no>	[™] ⊖ Up
Scripts	13	Alarm_13 Alarm_14	Alarme Dosage Ac		Errors	Timer_Dosaggio_031	0	<no tag=""></no>	Find
Scheduled tasks	A 14		Alarme Reservoir s		Errors	Timer_Dosaggio_050	0	<no tag=""></no>	- Find
Cycles	15	Alarm_15	Alarme Reservoir p		Errors	Timer_Dosaggio_051		<no tag=""></no>	Replace with:
	A 16	Alarm_16	Alarme Reservoir p		Errors	Timer_Dosaggio_052	0	<no tag=""></no>	Neplace with
Reports	17	Alarm_17	Alarme Reservoir p		Errors	Timer_Dosaggio_053	0	<no tag=""></no>	**
Text and graphic lists	18	Alarm_18		Couteau Coupe Lasagne	Errors	Timer_Lasagnatrice_005	0	<no tag=""></no>	Whole document
👔 User administration	- 19	Alarm_19	Alarme Capteurs C	Couteau Coupe Nids	Errors	Timer_Niditrice_006	0	<no tag=""></no>	From current position
E Local modules	<add r<="" td=""><td>new></td><td></td><td></td><td></td><td></td><td></td><td></td><td>○ Selection</td></add>	new>							○ Selection
End Ungrouped devices									
Security settings									Replace Replace a
Cross-device functions									
Common data Documentation settings									
Canguages & resources Canguages & resources									
Online access									
Card Reader/USB memory	<								-

Figure 62: Configuring HMI Alarms in TIA Portal

3. Open HMI Alarms

• We navigate to the HMI alarms configuration section in TIA Portal.

4. Enter Variables and Alarm Messages

• We Input the recorded variables and alarm messages, specifying the type of alarm.

3.4.2.7 Trends

we will explain how we copied Trends from Premium HMI to TIA Portal.

In Premium HMI

ject Explorer	a x a 0811 visualizzazione trend testata (第四月 23 路 26 网 63 1 周	
	w corrent and a contraction of a cine testate of			
Iter	* + 1 + 1 + 2 + 1 + 3 + 1 + 4 + 1 + 5 +	1.6.1.7.1.8.1.9.1.0.1.1.1.	2 • 1 • 3 • 1 • 4 • 1 • 5 • 1 • 6 • 1 • 7 • 1 • 8 • 1 • 9 • 1 • 1	3 • 1 • 1 • 1 • 2 • 1 • 3 • 1 • 4 • 1 • 3 • 1 •
ojects	Titolo_Stato_Ter	mostatazione		
Resources	· · · · · · · · · · · · · · · · · · ·			4 (2)
🗉 🔯 storci				
Alarms (Nr. Alarms '2', Nr. Runtime Alarms '0')				
B Basic Scripts				
画 嗨 Child Projects				
Data Loggers And Recipes	m			
Events		The second	e anaxaranana menenanana kenananan kanananan bara	
🕀 🥅 Menus				
A Navigation	The second secon	Trend		
Normalizers	A second	A REAL PROPERTY OF A REAL PROPER		
Ø OPC Client DA (COM)		Trend Pen - Tmp_Testata_SP	PLC_01_Parametro_Z02_Estrusore_Termos	statazione:Parametro 025
🗈 🧱 Parameters		Trend Pen - Tmp_Testata_Act		
🗉 🙀 Real Time DB	9		PLC_01_Visualizzazioni_Z02_Estrusore_Termostataz	
G Schedulers		Trend Pen - Tmp_Cilindro_Act	PLC_01_Visualizzazioni_Z02_Estrusore_Termostataz	ione:Visualizzazioni_Estrusore_020
🕀 🔲 Screens		Trend Pen - Tmp_Cilindro_SP	PLC_01_Parametro_Z02_Estrusore_Termos	statazione:Parametro_016
38 See 0001_GENERALI				
38 CO10_PARAMETRI				
🛞 🔤 0400_STATO_ATTUALE		CONTRACTOR AND		
IE COMANDO_UTENZE	· · · · · · · · · · · · · · · · · · ·			
10 0600_SCHEDE_PLC_I_O	- Description	Shift+Ubi Click to edit-add pens or d	rop variables from the project workspace. This trend ca	h be linked to a Data logger Database
I G50_UTILIZZO_FUTURO	Timp_Clindro_SP			and Management along processing the set
Image:	The Childro All	· · · · · · · · · · · · · · · · · · ·		
E COM TARATURE	Tmp_Testata_SP	52.0 0.0	0.0	
(ii) a 0800_ALLARMI	C M total related was a service a se			
0810_TREND		· · · · · · · · · · · · · · · · · · ·	· [· · · · · · · · · · · · · · · · · ·	1
Image:			والمستحيد والمستحد والم	J Provide the second se
B 0811 visualizzazione trend testata cilindro	The second secon			
Image:	01/01/2012 12:00			· · ·
O813 visualizzazione trend tunnel O813 visualizzazione trend O813 visualizzazione O813 visua	~			
O900_SERVIZIO				
1000_INFO				
The second				
(
•	4			
ommands				

Figure 63: Opening and Defining Variables for Curved Screen in Premium HMI

- 1. Open the Curved Screen
 - We opened the screen that displays the curves.
 - We defined the variables associated with the curves.
- 2. Record the Variables
 - Than we note the identified variables.

In TIA Portal

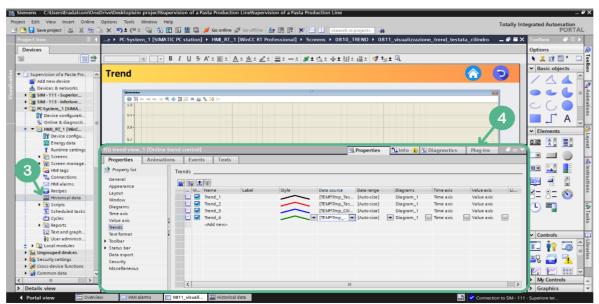


Figure 64: Entering Variables and Configuring Curve Display in TIA Portal

3. Enter Variables into Historical Data

- We navigate to the Historical Data section.
- We Inputted the recorded variables.

4. Configure Curve Display

- We Opened the screen that will display the variables.
- We want to the settings menu, we entered the variables, we specified line colors for each curve, we Assign names to each curves.

3.4.2.8 Users

we will explain how we copied Users from Premium HMI to TIA Portal.

In Premium HMI

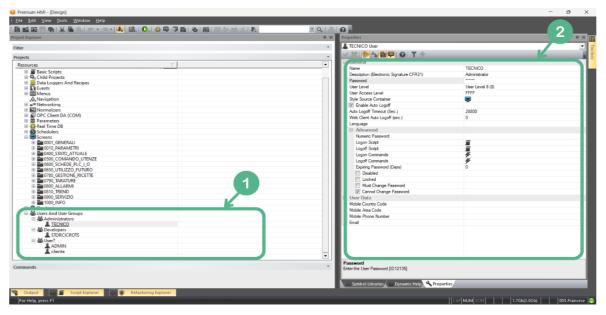


Figure 65: Accessing and Recording User Information in Premium HMI

1. Open the Users and User Groups Folder

- We navigated the "Users and User Groups" folder.
- Than we open the folder to access the user information.

2. Record Name and Password Information

• We Identified and noted down the name and password information for each user.

In TIA Portal

🔚 Save project 📑 🐰 🗐 🗎	< 5± (** 🖼 👪 🛄 🖬	📃 🞇 💋 Go online 🖉	Go offline 🛔 📗	. * =		9a		Totally Integrated Automation PORT
ect tree	🛛 🖣 📖			n_1 [SIMATIC PC:	station] + HMI_RT			4	Tasks 📑 🗊
evices							🕴 Users 🙀 Use	ar o	Options
	2								
		Jsers							 Find and replace
📥 Devices & networks	^	Name	Dynamic logon	User ID	Password	Automatic logoff	Logoff time WebNavi	igator s We	
SIM - 111 - Superiore [CPU 12		Administrator		1	•		5		Find:
SIM - 113 - Inferiore [CPU 121		STORCICRITS		2			5		
PC-System_1 [SIMATIC PC sta		ADMIN		3			5		
Device configuration		cliente		4			5		Whole words only
Q Online & diagnostics		<add new=""></add>							Match case
HMI_RT_1 [WinCC RT Prof									Find in substructures
Device configuration									Find in hidden texts
🕜 Energy data	-								
Runtime settings	-								Use wildcards
Screens									Use regular expressions
Screen management									
HMI tags									O Down
Connections									OUp
M HM alarms									Find
📑 Recipes									
Historical data									Replace with:
Scripts									
5 Scheduled tasks	$\left(\begin{array}{c} \mathbf{a} \end{array} \right)$								
Cycles	3								O Whole document
Reports									 From current position
Text and graphic lists									Selection
ig User administration									
Local modules									Replace Replace all
Ungrouped devices									
Security settings									
Cross-device functions									
Common data									
Documentation settings		<						>	
Languages & resources		`						7	
Version control interface	~ (Groups							
etails view						Ropertie	es 🚺 Info 🚺 🚺 Diagnostics	1000	> Languages & resources

Figure 66: Entering User Information in TIA Portal

3. Open User Administration in TIA Portal

- We navigated to the user administration section in TIA Portal.
- We Opened the user administration interface.

4. Enter Name and Password Information

- We inputted the recorded name and password information into the user administration.
- We Ensured that all details are correctly entered.

3.4.3 Organizing Screens in TIA Portal as Structured in HMI ASEM

Initially, our project was structured into folders aligned with the program specifications obtained from HMI ASEM. These folders were categorized into groups such as "general," "parametri," and "stato attuale." The organization of these folders in our project will be illustrated in (Figure 36).

In the figure, number one represents the folders present in the program at the HMI ASEM level, while number two represents the folders created within our project.

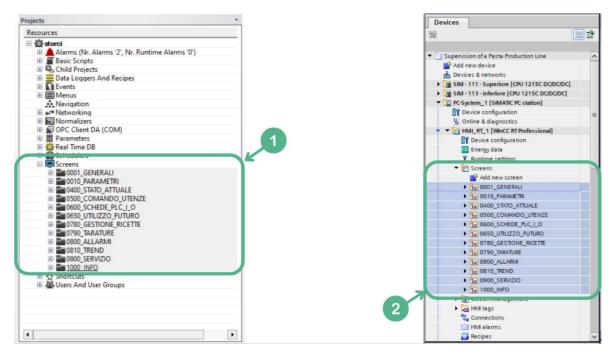


Figure 67: Comparison of Folder Structure between the HMI ASEM Program and Tia Portal

3.5 conclusion

In conclusion, our project involved backing up and migrating programs, integrating WinCC RT Professional and meticulously developing screens in TIA Portal. Through thorough execution, we've optimized automation processes, ensuring system robustness and user satisfactio

General conclusion

This project aimed to enhance the supervision of the pasta production line at SIM SPA by addressing the limitations of the existing ASEM display system. By implementing a new WINCC supervision system integrated with a Siemens S7-1200 PLC and HMI, the project significantly improved the accuracy and reliability of the production process.

The transition from the old system to the new one involved comprehensive steps, including program backup and migration, integration of WinCC RT Professional, and the development of user-friendly screens in TIA Portal. These steps were critical in ensuring seamless operation and improved functionality.

The new supervision system has optimized automation processes, leading to increased system robustness and user satisfaction. It has also enhanced monitoring and control capabilities, facilitating better maintenance and diagnostics. This project not only resolved the immediate challenges but also established a scalable and efficient framework for future improvements.

Overall, the implementation of the new WINCC supervision system has markedly improved the operational efficiency and reliability of the pasta production line at SIM SPA, ensuring better perfrmance and scalability for the future

Bibliography

1. Company Storci Pasta Machinery. Company Storci Pasta Machinery. [Online] https://en.wikipedia.org/wiki/Storci. 2. LINES storci company. [Online] https://www.storci.com/pdf/pages/COMPANY PROFILE ENG.pdf. 3. LINES. [Online] https://www.storci.com/Storci Page.asp?pid=7&gst=0&lang=EN.. 4. *Short-cut Pasta Line*. [Online] https://www.storci.com/src linee.asp?lang=EN&search=1&prodotto=Pasta+Secca. 5. *Production Capacity*. [Online] https://www.storci.com/pdf/lines/corta/Pasta Secca%20 ENG 2021.pdf. 6. Presentation of the Production Process. [Online] https://www.storci.com/Storci Pasta Production Line.asp?lang=EN&gst=0&line=15. 7. *Programmable logic controller*. [Online] https://en.wikipedia.org/wiki/Programmable logic controller. 8. *Historic PLC.* [Online] https://en.wikipedia.org/wiki/Programmable_logic_controller#:~:text=The%20PLC%20originated% 20in%20the,and%20dedicated%20closed%2Dloop%20controllers. 9. Architecture of a PLC. [Online] https://en.wikipedia.org/wiki/Programmable logic controller. 10. Introduction scada. [Online] https://www.mikrodev.com/scada-systems-and-their-role-inautomation-processes/. 11. Human-Machine Interfaces. [Online] https://inductiveautomation.com/resources/article/whatis-hmi. 12. ASEM HMI. [Online] https://www.asem.it/en/who-we-are.html. 13. HMI 30-TF "ASEM". [Online] https://www.asemautomation.com/en/products/54/hmi30-&lp30.html. 14. TIA PORTAL Platform. [Online] https://www.automation-fair.com/what-is-tia-portal-fromsiemens/. 15. WINCC. [Online] https://en.wikipedia.org/wiki/WinCC.

16. Logiciel Premiem HMI 3.0 introduction.

17. *Canva introduction.* [Online] https://www.stampaprint.fr/blog/communication/quest-cest-canva-guide-rapide-apprendre-a-lutiliser.

