ABB ROBOTICS

Integrator Reference Manual
PalletPack

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Integrator Reference Manual

PalletPack

3AEJ04PalletPack, Revision: 2.0

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Overview

About this manual

This manual contains instructions for installing, configuring and running a system with PalletPack function package.

Usage

This manual should be used during installation, commissioning, configuration of a PalletPack function package. It describes PalletPack control system and includes step-by-step instructions.

Who should read this manual?

This manual is intended for:

- System integrators
- ABB Service engineers

Prerequisites

The reader should be familiar with:

- Industrial robots and their terminology
- PLC programming
- Palletizing applications

Organization of chapters

The manual is organized in the following chapters:

Chapter	Contents
1. PalletPack Application	Introduction to PalletPack., Bill of materials, Description of important concepts.
2. PalletWare	A reference to PalletWare.
3. PLC Program	A description of PalletPack PLC program including: • Call tree diagram • Description of program organization units • Description of data types • Description of memory map
4. Safety PLC Program	Description of PalletPack safety PLC program
5. Interfaces	Description of the interfaces of PalletPack.

References

Reference	Document ID
PalletWare Application Manual	3AEJ04 PalletWare
ABB Control Builder CD including both AC500 and CodeSys documentation	1SAP190100R0002

Revisions

Revision	Description
1.0	First issue.
2.0	Review safety interface

1 PalletPack Application

1.1 Introduction

Definition

A pre-engineered package of standard products that are brought together, connected and tested in such a way that they deliver a plug and produce solution for a End of line palletizing without need to resort to RAPID programming.

Components

PalletPack contains 4 components:

- A Control PLC with a built-in program ready to control an end-of-line palletizing cell.
- A Safety PLC with a built-in program to handle cell safeties.
- A palletizing robot to palletize products.
- Palletizing robot software (PalletWare) designed to minimize learning and setup time.

PalletWare Components

PalletPack Control PLC

PalletPack Safety PLC

Palletizing robot

PalletWare Software

1.2 Bill of materials

Structure of this chapter

This chapter lists the PalletPack bill of materials.

Bill of material

Product Type	Quantity	Description
CM572-DP	1	AC500,Communication Module PROFIBUS-DP Master
PM573-ETH	1	AC500,Programmable Logic Controller
TB541-ETH	1	AC500,Terminal Base, 4slots, ETHERNET, 24VDC
TA524	3	AC500,Dummy Coupler Module
TA521	1	AC500,Lithium Battery Set
DC532	1	S500, Digital Input/Output Module 16DI/16DC
TU516	1	S500,I/O Terminal Unit,24VDC, Spring for DC I/O Modules
MC502	1	AC500,SD-Memory Card 512MB
IRC5	1	IRC5 Robot controller
IRB460	1	IRB 460 high speed robotic palletizer
Pluto S46	1	Jokab, Safety PLC
BT51	2	Jokab, Expansion relay
PalletWare	1	PalletWare IRC5 robotic software

1.3 PalletPack Concepts

The flow

The Flow concept defines the infeeder and the outfeeder where formats are picked and placed.

PalletWare is limited to a maximum of 2 flows.

One outfeeder can only be used on 1 flow.

The picking formats

The “picking formats” refer to different ways of picking items from the infeeder for a single job.

The device

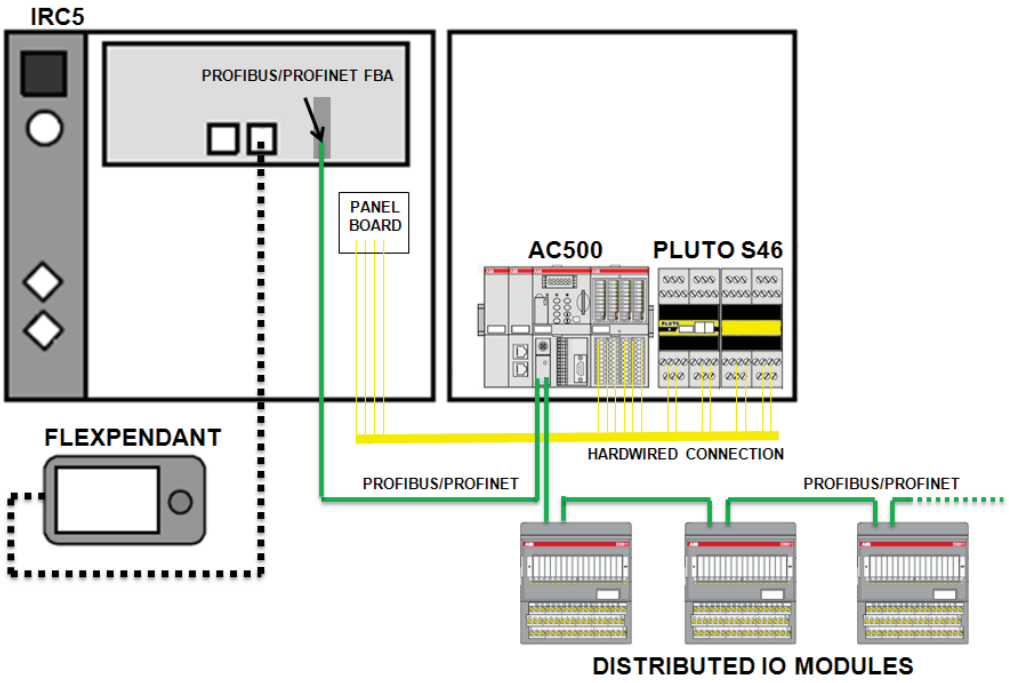
In PalletPack every area which might be occupied for robots or machines is identified as device, so signals, variables and any data are always referred to as devices.

The below table shows the different devices:

Device	Related to...
Device 1	Infeeder 1
Device 2	Infeeder 2
Device 3	Outfeeder 1
Device 4	Outfeeder 2
Device 5	Slip sheet stack station
Device 6	Pallet stack station

1.4 Control Diagram

Control diagram



2 PalletWare

2.1 Introduction

Overview

PalletWare is robot software running on the IRC5 controller for palletizing applications.

It is designed to minimize the learning and setup time. The modular program structure - program wizard and the graphical production window - together decrease the time for training. As a result it is easy & efficient to use during installation, production set-up and optimizing the robot cycle.

Related information

PalletWare Application Manual.

3 PLC Program

3.1 Introduction

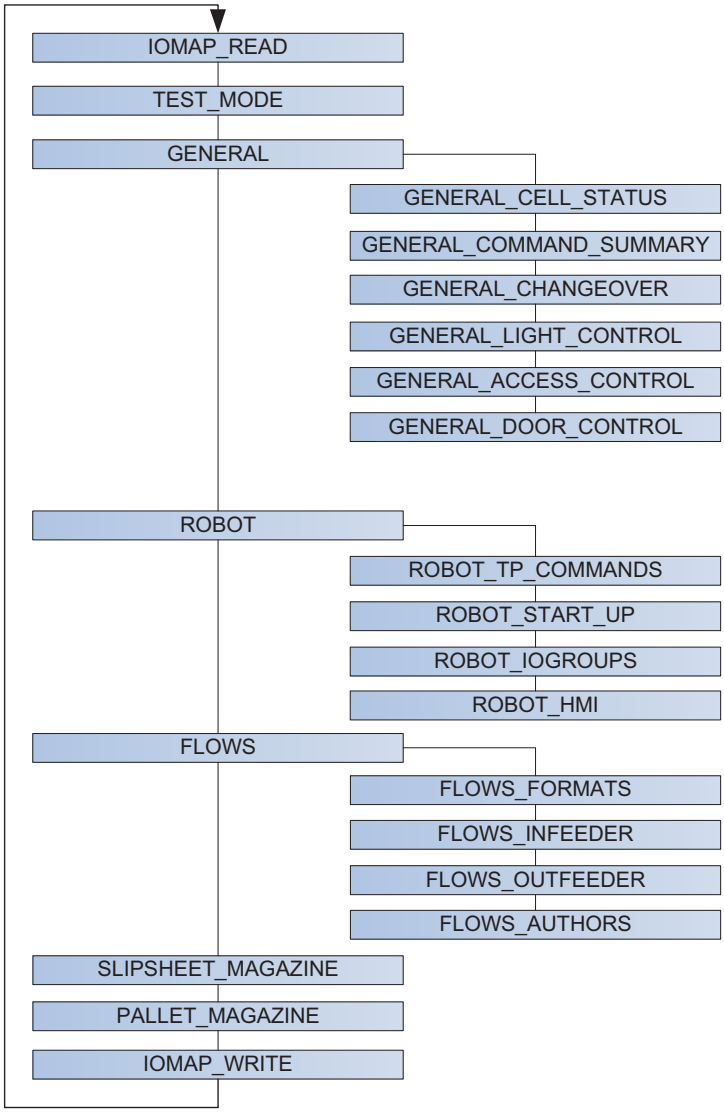
Structure of this chapter

This chapter describes the PLC program for the PalletPack and includes:

- The program organization tree.
- A description of the important program organization units (POU).
- The data types used on the program.
- The memory map.

3.2 Call Tree

Call tree diagram



3.3 Program Organization Units (POU)

Structure of this chapter

This chapter describes the different program organization units (POU).

3.3.1 Clock_Pulses_Generation

Usage

It is used to generate timing pulse variables to be used on the program as time base.

Type

Program

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Type	Name
Bool	Pulse0
Bool	Pulse1
Bool	Pulse2
Bool	Pulse3
Bool	Pulse4
Bool	Pulse5
Bool	Pulse6
Bool	Pulse7

Calling POU

None

3.3.2 Flows

Usage

This POU handles everything related to flows and current cycle.

Type

Program

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Type	Name
Bool	CellData.Infeeder1.SelectedForProduction
Bool	CellData.Infeeder2.SelectedForProduction
Bool	CellData.Outfeeder1.SelectedForProduction
Bool	CellData.Outfeeder2.SelectedForProduction
Bool	CellData.Flow1.OutOfInfeeder
Bool	CellData.Flow1.OutOfOutnfeeder
Bool	CellData.Flow2.OutOfInfeeder
Bool	CellData.Flow2.OutOfOutnfeeder
Bool	CellData.Robot.ForceItem1LoadedInfeeder1
Bool	CellData.Robot.ForceItem2LoadedInfeeder1
Bool	CellData.Robot.ForceItem3LoadedInfeeder1
Bool	doR1ChangeFlow
BYTE	Infeeder1.Outputs.QtyItemsFormat1
BYTE	Infeeder1.Outputs.QtyItemsFormat2
BYTE	Infeeder1.Outputs.QtyItemsFormat3
BYTE	Infeeder1.Outputs.CurrentFormatID

Type	Name
Bool	CellData.Robot.ForceItem1LoadedInfeeder2
Bool	CellData.Robot.ForceItem2LoadedInfeeder2
Bool	CellData.Robot.ForceItem3LoadedInfeeder2
BYTE	Infeeder2.Outputs.QtyItemsFormat1
BYTE	Infeeder2.Outputs.QtyItemsFormat2
BYTE	Infeeder2.Outputs.QtyItemsFormat3
BYTE	Infeeder2.Outputs.CurrentFormatID

Calling POU

```
Flows_Infeeder_Instance1: Flows_Infeeder;
Flows_Infeeder_Instance2: Flows_Infeeder;
Flows_Outfeeder_Instance1: Flows_Outfeeder;
Flows_Outfeeder_Instance2: Flows_Outfeeder;
Flows_Formats_Instance1: Flows_Formats;
Flows_Formats_Instance2: Flows_Formats;
Flow_Authors_Instance1: Flow_Authors;
Flow_Authors_Instance2: Flow_Authors;
```

3.3.3 Flows_Authors

Usage

Flows_Authors is used to inform robot if the production flow (Infeeder, Outfeeder) is ready for production and order the robot to pick and place items of that flow.

Type

Function block

Input arguments

Name	Type	A variable informing if...
diRobotOnFlow	Bool	Robot is executing the flow.
diPauseRequest	Bool	Pause mode is active.
diFlowStarted	Bool	Flow is started.
diFlowBreak Request	Bool	Break is requested.
diFlowBreakAfterLayer	Bool	Break at end of layer is requested.
diFlowBreakAfterPallet	Bool	Break at end of pallet is requested.
diProgramCodeOK	Bool	Loaded jobs on robot are correct.
diInfeeder1Ready	Bool	Infeeder 1 is ready.
diInfeeder1Selected	Bool	Infeeder 1 is selected on flow.
diInfeeder1 OnProduction	Bool	Infeeder 1 is in production.
diInfeeder1 ReadyToUnload	Bool	Infeeder 1 is ready for robot to pick item.
diInfeeder2Ready	Bool	Infeeder 2 is ready.
diInfeeder2Selected	Bool	Infeeder 2 is selected on flow.
diInfeeder2 OnProduction	Bool	Infeeder 2 is on production.
diInfeeder2 ReadyToUnload	Bool	Infeeder 2 is ready for robot to pick item.
diOutfeeder1Ready	Bool	Outfeeder 1 is ready.
diOutfeeder1Selected	Bool	Outfeeder 1 is selected on flow.
diOutfeeder1 OnProduction	Bool	Outfeeder 1 is in production.
diOutfeeder1	Bool	Outfeeder 1 is ready for robot to load

ReadyToLoad		item.

Name	Type	A variable informing if...
diOutfeeder2Ready	Bool	Outfeeder 2 is ready.
diOutfeeder2Selected	Bool	Outfeeder 2 is selected on flow.
diOutfeeder2 OnProduction	Bool	Outfeeder 2 is in production.
diOutfeeder2 ReadyToLoad	Bool	Outfeeder 2 is ready for robot to load item.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doFlowEnabled	Bool	Inform robot that flow is ready for production.
doPickPlace	Bool	Allow robot to pick and place item for that flow.

Processing global variables

None

Calling POU

None

3.3.4 Flows_Format

Usage

Flows_Format is used to store picking formats information on memory.

Robot and CellHMI send information related to flows and Flows_Format transform information in relation to infeeder.

Type

Function block

Input arguments

Name	Type	A variable informing if...
diInfeederSelectedOnFlow1	Bool	Infeeder is part of production flow 1.
diInfeederSelectedOnFlow1	Bool	Infeeder is part of production flow 2.
diFlow1Enabled	Bool	Flow 1 is enabled.
diFlow1Enabled	Bool	Flow 2 is enabled.
diTPPushButToggle Format1Flow1	Bool	Push button on CellHMI picking format 1 of flow 1 is pushed by user.
diTPPushButToggle Format2Flow1	Bool	Push button on CellHMI picking format 2 of flow 1 is pushed by user.
diTPPushButToggle Format3Flow1	Bool	Push button on CellHMI picking format 3 of flow 1 is pushed by user.
diTPPushButToggle Format1Flow2	Bool	Push button on CellHMI picking format 1 of flow 2 is pushed by user.
diTPPushButToggle Format2Flow2	Bool	Push button on CellHMI picking format 2 of flow 2 is pushed by user.
diTPPushButToggle Format3Flow2	Bool	Push button on CellHMI picking format 3 of flow 2 is pushed by user.

Name	Type	A variable informing about...
diFlow1QtyItem Format1	Byte	The quantity of items for picking format 1 to prepare on infeeder for the flow 1.
diFlow1QtyItem Format2	Byte	The quantity of items for picking format 2 to prepare on infeeder for the flow 1.
diFlow1QtyItem Format3	Byte	The quantity of items for picking format 3 to prepare on infeeder for the flow 1.
diFlow1CurrentItemID	Byte	The current picking format to prepare on flow 1.
diFlow2QtyItem Format1	Byte	The quantity of items for picking format 1 to prepare on infeeder for the flow 2.
diFlow2QtyItem Format2	Byte	The quantity of items for picking format 2 to prepare on infeeder for the flow 2.
diFlow2QtyItem Format3	Byte	The quantity of items for picking format 3 to prepare on infeeder for the flow 2.
diFlow2CurrentItemID	Byte	The current picking format to prepare on flow 2.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doInfeederTPToggle Format1	Bool	Hold the status of the push button for the picking format 1 on infeeder.
doInfeederTPToggle Format2	Bool	Hold the status of the push button for the picking format 2 on infeeder.
doInfeederTPToggle Format3	Bool	Hold the status of the push button for the picking format 3 on infeeder.

Name	Type	A variable to...
doInfeederQtyItem Format1	Byte	Hold the quantity of items for the picking format 1 on infeeder.
doInfeederQtyItem Format2	Byte	Hold the quantity of items for the picking format 2 on infeeder.
doInfeederQtyItem Format3	Byte	Hold the quantity of items for the picking format 3 on infeeder.

Processing global variables

None

Calling POU

None

3.3.5 Flows_Infeeder

Usage

Flows_Infeeder is used to control infeeder. It handles:

- Unloading authorization of robot on infeeder.
- Picking format memories ready on infeeder.
- Requests to prepare new picking formats on infeeder.

Type

Function block

Input arguments

Name	Type	A variable informing if...
diInfeederSelected ForProduction	Bool	Infeeder is selected for production.
diInfeederReady	Bool	Infeeder is ready
diInfeederSelectedFlow1	Bool	Infeeder is selected on flow 1
diInfeederSelectedFlow2	Bool	Infeeder is selected on flow 2
diItemDetectionOnInfeed	Bool	An item is detected on infeed
diRobotOufOfInfeeder	Bool	Robot is out of infeeder area
diRobotFlow1 NewItemReq	Bool	Robot requests a new item for flow 1.
diRobotFlow2 NewItemReq	Bool	Robot requests a new item for flow 2.
diRobotItemOnGripper	Bool	Robot is holding an item on gripper.
diRobotMonitorGripper	Bool	Robot request to monitor item transferring from infeeder to outfeeder.
diRobotTPToggle Format1OKInfeeder	Bool	Push button on CellHMI picking format 1 is pushed.
diRobotTPToggle Format2OKInfeeder	Bool	Push button on CellHMI picking format 2 is pushed.
diRobotTPToggle Format3OKInfeeder	Bool	Push button on CellHMI picking format 3 is pushed.

Name	Type	A variable informing about...
diInfeederQtyItem Format1	Byte	The quantity of items for the picking format 1 on infeeder.
diInfeederQtyItem Format2	Byte	The quantity of items for the picking format 2 on infeeder.
diInfeederQtyItem Format3	Byte	The quantity of items for the picking format 3 on infeeder.
diInfeeder CurrentItemID	Byte	The current picking format to prepare on infeeder.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doNewFormatRequest	Bool	Order a new format on infeeder.
doInfeederReady ToBeUnloaded	Bool	Inform infeeder is ready to be unloaded.
doFormat1Ready ToBeUnloaded	Bool	Hold status of picking format 1 ready to be unloaded on infeeder
doFormat2Ready ToBeUnloaded	Bool	Hold status of picking format 2 ready to be unloaded on infeeder
doFormat3Ready ToBeUnloaded	Bool	Hold status of picking format 3 ready to be unloaded on infeeder
doRobotOnInfeed	Bool	Inform robot is inside infeeder area.

Processing global variables

None

Calling POU

Toggle_Function_Instance1: Toggle_Function;
Toggle_Function_Instance2: Toggle_Function;
Toggle_Function_Instance3: Toggle_Function;

3.3.6 Flows_Outfeeder

Usage

Flows_Outfeeder is used to control outfeeder. It handles:

- Loading authorization of robot on outfeeder.
- Permission from user to work on outfeeder.
- Pallet empty and completed memories.

Type

Function block

Input arguments

Name	Type	A variable informing...
diOutfeederSelected ForProduction	Bool	If outfeeder is selected for production.
diOutfeederReady	Bool	If outfeeder is ready.
diRobotOufOfOutfeeder	Bool	Robot is out of outfeeder area.
diOutfeederPresent	Bool	If pallet is on place.
diOutfeederValidation	Bool	About status of outfeeder enabling push button.
diConfirmation NewPallet	Bool	Robot has placed a new pallet on outfeeder.
diConfirmation ItemLoadedFlow1	Bool	Robot has placed a new item on pallet flow 1.
diConfirmation ItemLoadedFlow2	Bool	Robot has placed a new item on pallet flow 2.
diUserConf EmptyOutfeeder	Bool	User confirms pallet is empty.

Name	Type	A variable informing...
diOutfeeder SelectedOnFlow1	Bool	Outfeeder is selected on flow 1
diOutfeeder SelectedOnFlow2	Bool	Outfeeder is selected on flow 2
diConfirmation PalletFinishFlow1	Bool	Robot has finished stacking pallet for flow 1.
diConfirmation PalletFinishFlow2	Bool	Robot has finished stacking pallet for flow 2.
diNewPalletOnOutfeeder Confimation	Bool	A new pallet has been placed on outfeeder.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doOutfeederEnabled	Bool	Hold outfeeder is enabled memory.
doOutfeederCompleted	Bool	Hold pallet full status memory.
doOutfeederEmpty	Bool	Hold pallet empty status memory.
doOutfeederReady ToBeLoaded	Bool	Hold outfeeder ready to load a new item status memory.
doAllowPallet LoadingOutfeeder	Bool	Inform robot that it is allowed to load a new pallet on outfeeder.
doOutputRobotOnArea	Bool	Inform to outfeeder system that robot is inside outfeeder area.
doOutputPalletFull	Bool	Inform to outfeeder system that pallet is full.
doOutputValidated	Bool	Inform to outfeeder system that is validated.
doOutputNewPalletLoaded	Bool	Inform to outfeeder system a new pallet is loaded.
doOutputPalletPresent	Bool	Inform to outfeeder system a pallet is present.

Processing global variables

None

Calling POU

```
Toggle_Function_Instance1: Toggle_Function;
```

3.3.7 General

Usage

This POU is used to control general status of the cell and production changeover. It handles:

- Automatic and manual mode.
- Cell Doors.
- Light stacks and lamps.
- Panel boxes push buttons.
- Access to cell.
- Changeover.

Type

Program

Input arguments

Program

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Name	Type
CellData.GENERAL.RequestStartCycleRobot	Bool
CellData.GENERAL.RequestAccess	Bool
CellData.GENERAL.PauseInCourse	Bool
CellData.GENERAL.Flow1BreakReq	Bool
CellData.GENERAL.Flow2BreakReq	Bool
CellData.GENERAL.BreakFlow1InCourse	Bool
CellData.GENERAL.BreakFlow1InCourse	Bool
CellData.GENERAL.RequestPause	Bool
CellData.General.ProductionChangeReq	Bool

Name	Type
CellData.General.Flow1Started	Bool
CellData.General.Flow1EndBatchReq	Bool
CellData.General.Flow2Started	Bool
CellData.General.Flow2EndBatchReq	Bool
doR1Flow1StopAfterItem	Bool
doR1Flow1StopAfterLayer	Bool
doR1Flow1StopAfterPallet	Bool
doR1Flow2StopAfterItem	Bool
doR1Flow2StopAfterLayer	Bool
doR1Flow2StopAfterPallet	Bool
Robot job number flow 1	Word
Robot job number flow 2	Word
Field.Outputs.doGreenStackLight1	Bool
Field.Outputs.doYellowStackLight1	Bool
Field.Outputs.doRedStackLight1	Bool
Field.Outputs.doGreenStackLight2	Bool
Field.Outputs.doYellowStackLight2	Bool
Field.Outputs.doRedStackLight2	Bool
Field.Outputs.doGreenPB_CMB1	Bool
Field.Outputs.doYellowPB_CMB1	Bool
Field.Outputs.doBluePB_CMB1	Bool
Field.Outputs.doGreenPB_CMB2	Bool
Field.Outputs.doYellowPB_CMB2	Bool
Field.Outputs.doBluePB_CMB2	Bool
Field.Outputs.doUnlockDoor1	Bool
Field.Outputs.doUnlockDoor2	Bool
Field.Outputs.doUnlockDoor3	Bool
Field.Outputs.doUnlockDoor4	Bool
Field.Outputs.doUnlockDoor5	Bool

Calling POU

General_Access_Control_Instance1: General_Access_Control;
General_Command_Summary_Instance1: General_Command_Summary;
General_Light_Control_Instance1: General_Light_Control;
General_Changeover_Instance1: General_Changeover;
General_Door_Control_Instance1: General_Door_Control;
General_Door_Control_Instance2: General_Door_Control;
General_Door_Control_Instance3: General_Door_Control;
General_Door_Control_Instance4: General_Door_Control;
General_Door_Control_Instance5: General_Door_Control;
General_Cell_Status_Instance1: General_Cell_Status;

3.3.8 General_Access_Control

Usage

General_Access_Control is used to check the conditions for the user access to cell and also give command to robot to go the Access Positon

Type

Function block

Input arguments

Name	Type	A variable informing...
diSummaryCellEStpOK	Bool	Emergencies are OK.
diSummaryCellDoorsOK	Bool	Doors are OK.
diRobotTaskExecuting	Bool	About status of task executing system output from robot.
diDevice1InMovement	Bool	Device 1 is moving in auto mode.
diDevice2InMovement	Bool	Device 2 is moving in auto mode.
diDevice3InMovement	Bool	Device 3 is moving in auto mode.
diDevice4InMovement	Bool	Device 4 is moving in auto mode.
diCellAccessRequest	Bool	User has request access to cell.
diCellStartOrder	Bool	Start order.
diTimeOut	Time	Command time out.

Input/Ouput arguments

Name	Type	A variable informing...
dioAccessCellRunning	Bool	Access request is in process.
dioAccessCellPermited	Bool	Access is allowed on cell.
dioModuleStatus	WORD	To hold the status of the access request process.
dioCommnadRobot	BYTE	Robot command

Ouput arguments

None

Processing global variables

None

Calling POU

None

3.3.9 General_Cell_Status

Usage

General_Cell_Status is used to inform the status of cell such:

- Auto and manual mode.
- Fault.
- Summary of emergencies.
- Summary of doors ok.

Type

Function block

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Name	Type
CellData.GENERAL.inAuto	Bool
CellData.GENERAL.inManual	Bool
CellData.GENERAL.inFault	Bool
CellData.GENERAL.SummaryEStpOK	Bool
CellData.GENERAL.SummaryDoorsOK	Bool
CellData.Flow1.UnloadingFault	Bool
CellData.Flow2.UnloadingFault	Bool
CellData.GENERAL.UnloadingFault	Bool
CellData.GENERAL.SummaryLampTest	Bool

Calling POU

None

3.3.10 General_Changeover

Usage

General_Changeover handles the job changeover. The process is as follows:

- User requests end batch through CellHMI.
- PLC informs robot about the order and resets job number to robot.
- Robot finishes batch after an item is place, at end of layer or at end of pallet as per the user request.
- Robot waits for new job number.
- User requests start new job from the CellHMI.
- PLC informs robot about the new job number to produce.
- Robot loads job and starts production.

Type

Function block

Input arguments

Name	Type	A variable...
diRobot TPCommandData	WORD	Holding the command data value from robot.
diRobotStartBatch1	Bool	To order start of batch on flow 1.
diEndBatchConfFlow1	Bool	To order end of batch on flow 1.
diRobotStartBatch2	Bool	To order start of batch on flow 2.
diEndBatchConfFlow2	Bool	To order end of batch on flow 2.
diRobotStopBatch Flow1AfterItem	Bool	To order stop of batch on flow 1 after an item is placed by robot.
diRobotStopBatch Flow1AfterLayer	Bool	To order stop of batch on flow 1 after robot has finished stacking a layer on pallet.
diRobotStopBatch Flow1AfterPallet	Bool	To order stop of batch on flow 1 after robot has finished stacking a pallet.
diRobotStopBatch Flow2AfterItem	Bool	To order stop of batch on flow 2 after an item is placed by robot.

Name	Type	A variable...
diRobotStopBatch Flow2AfterLayer	Bool	To order stop of batch on flow 2 after robot has finished stacking a layer on pallet.
diRobotStopBatch Flow2AfterPallet	Bool	To order stop of batch on flow 2 after robot has finished stacking a pallet.

Input/Ouputs arguments

None

Ouput arguments

Name	Type	A variable to...
doProdChangeReq	Bool	Inform a change of production has been requested.
doFlow1Started	Bool	Inform flow 1 is started.
doFlow1StopBatchReq	Bool	Inform end of batch has been requested for flow 1.
doFlow2Started	Bool	Inform flow 2 is started.
doFlow2StopBatchReq	Bool	Inform end of batch has been requested for flow 2.
doFlow1StopAfterItem	Bool	Order robot to stop flow 1 after an item is placed on pallet.
doFlow1StopAfterLayer	Bool	Order robot to stop flow 1 when finishing stacking current layer pallet.
doFlow1StopAfterLayer	Bool	Order robot to stop flow 1 when finishing stacking current pallet.
doFlow2StopAfterItem	Bool	Order robot to stop flow 2 after an item is placed on pallet.
doFlow2StopAfterLayer	Bool	Order robot to stop flow 2 when finishing stacking current layer pallet.

Name	Type	A variable...
doFlow2StopAfterPallet	Bool	Order robot to stop flow 2 when finishing stacking current pallet.
doRobotJobFlow1	WORD	Hold Job number to run on robot for flow 1.
doRobotJobFlow2	WORD	Hold Job number to run on robot for flow 2.

Processing global variables

None

Calling POU

None

3.3.11 General_Command_Summary

Usage

General_Command_Summary handles the cell commands. It summarizes all command sent from panel boxes and CellHMI into single Boolean variables.

Type

Function block

Input arguments

Name	Type	A variable...
diRobot MotorOnStart	Bool	To order robot motors on and start
diRobotBreak AfterItem	Bool	To order break cycle after robot placed the item.
diRobotBreak AfterLayer	Bool	To order break cycle after robot finishes stacking current layer.
diRobotBreak AfterPallet	Bool	To order break cycle after robot finishes stacking current pallet.
diRobotFlow1 ResumeCycle	Bool	To order resume cycle for flow 1.
diRobotFlow1 BreakAfterItem	Bool	To order break cycle on flow 1 after robot placed the item.
diRobotFlow1 BreakAfterLayer	Bool	To order break cycle on flow 1 after robot finishes stacking current layer.
diRobotFlow1 BreakAfterPallet	Bool	To order break cycle on flow 1 after robot finishes stacking current pallet.
diRobotFlow1 ConfEnditem	Bool	Informing robot has placed a new item for flow 1.
diRobotFlow1 ConfEndLayer	Bool	Informing robot has finished stacking layer for flow 1.
diRobotFlow1 ConfEndPallet	Bool	Informing robot has finished stacking pallet for flow 1.
diRobotFlow1 WorkingOn	Bool	Informing if robot is working on flow 1.

Name	Type	A variable...
diRobotFlow2 ResumeCycle	Bool	To order resume cycle for flow 2.
diRobotFlow2 BreakAfterItem	Bool	To order break cycle on flow 2 after robot placed the item.
diRobotFlow2 BreakAfterLayer	Bool	To order break cycle on flow 2 after robot finishes stacking current layer.
diRobotFlow2 BreakAfterPallet	Bool	To order break cycle on flow 2 after robot finishes stacking current pallet.
diRobotFlow2 ConfEnditem	Bool	Informing robot has placed a new item for flow 2.
diRobotFlow2 ConfEndLayer	Bool	Informing robot has finished stacking layer for flow 2.
diRobotFlow2 ConfEndPallet	Bool	Informing robot has finished stacking pallet for flow 2.
diRobotFlow2 WorkingOn	Bool	Informing if robot is working on flow 2.
diStartCycleCMB1	Bool	Informing about the status of start cycle push button from panel box 1.
diStartCycleCMB1	Bool	Informing about the status of start cycle push button from panel box 1.
diStartCycleCMB3	Bool	Informing about the status of start cycle push button from panel box 3.
diStartCycleCMB4	Bool	Informing about the status of start cycle push button from panel box 4.

Name	Type	A variable...
diAccessReqCMB1	Bool	Informing about the status of access request push button from panel box 1.
diAccessReqCMB2	Bool	Informing about the status of access request push button from panel box 2.
diAccessReqCMB3	Bool	Informing about the status of access request push button from panel box 3.
diAccessReqCMB4	Bool	Informing about the status of access request push button from panel box 4.
diPauseCycleCMB1	Bool	Informing about the status of pause push button from panel box 1.
diPauseCycleCMB2	Bool	Informing about the status of pause push button from panel box 2.
diPauseCycleCMB3	Bool	Informing about the status of pause push button from panel box 3.
diPauseCycleCMB4	Bool	Informing about the status of pause push button from panel box 4.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to inform...
CellData.GENERAL. RequestStartCycleRobot	Bool	Start cycle has been requested.
CellData.GENERAL. RequestAccess	Bool	Access to cell has been requested.
CellData.GENERAL. PauseInCourse	Bool	Pause request is in process.
CellData.GENERAL. Flow1BreakReq	Bool	Break on flow 1 has been requested.
CellData.GENERAL. Flow2BreakReq	Bool	Break on flow 2 has been requested.
CellData.GENERAL. BreakFlow1InCourse	Bool	Break request on flow 1 is in process.
CellData.GENERAL. BreakFlow2InCourse	Bool	Break request on flow 1 is in process.

Name	Type	A variable...
CellData.GENERAL. RequestPause	Bool	Pause has been requested.
doRobotFlow1 BreakAfteritem	Bool	Robot break cycle on flow 1 after an item is placed.
doRobotFlow1 BreakAfterLayer	Bool	Robot break cycle on flow 1 after finishing stacking current layer.
doRobotFlow1 BreakAfterPallet	Bool	Robot break cycle on flow 1 after finishing stacking current pallet.
doRobotFlow2 BreakAfteritem	Bool	Robot break cycle on flow 2 after an item is placed.
doRobotFlow2 BreakAfterLayer	Bool	Robot break cycle on flow 2 after finishing stacking current layer.
doRobotFlow2 BreakAfterPallet	Bool	Robot break cycle on flow 2 after finishing stacking current pallet.

Processing global variables

None

Calling POU

None

3.3.12 General_Door_Control

Usage

General_Door_Control is used to control cell door.

Once conditions are safe to grant access to cell, General_Door_Control will unlock cell door.

Type

Function block

Input arguments

Name	Type	A variable informing...
diAccessPermited	Bool	If access to cell is allowed.
diAccessCell	Bool	If access to cell is requested.
diStartCell	Bool	If start is requested.
diResetPB	Bool	About status of reset button.
diTimeRstUnlock	Time	Time out to unlock cell door.

Input/Ouput arguments

Name	Type	A variable...
dioModuleStatus	Bool	Holding module status.

Ouput arguments

Name	Type	A variable to...
doUnlockDoor	Bool	Unlock cell door.

Processing global variables

None

Calling POU

None

3.3.13 General_Light_Control

Usage

General_Light_Control is used to handle light stacks and push button lamps.

The below table describes the meaning of every light behaviour:

Color	It means...
Green	• Blinking. Cell is ready to start in auto mode. • Fix light. Cell is running in auto mode.
Yellow	• Blinking. Unloading fault on robot. • Fix light. Cell is in pause mode.
Red	• Blinking. Cell doors open. • Fix light. Emergency on cell.
Blue	• Blinking. Access request on process. • Fix light. Access to cell is allowed.

Type

Function block

Input arguments

Name	Type	A variable informing if...
diSummaryCellDoorsOK	Bool	Cell doors are OK.
diSummaryCellEStpOK	Bool	Cell Emergencies are OK.
diCellInAuto	Bool	Cell is in auto mode.
diRobotTaskExecuting	Bool	About status of task executing system output from robot.
diCellPaused	Bool	Cell is in pause mode.
diUnloadingFault	Bool	Unloading error is active.
diAccessPermited	Bool	Access is allowed in cell.
diAccessInCourse	Bool	Access request is in process.
diTestLamp	Bool	Test of lamps is required.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doGreenStackLight1	Bool	Activate green lamp on stack light 1.
doYellowStackLight1	Bool	Activate yellow lamp on stack light 1.
doRedStackLight1	Bool	Activate red lamp on stack light 1.
doGreenStackLight2	Bool	Activate green lamp on stack light 2.
doYellowStackLight2	Bool	Activate yellow lamp on stack light 2.
doRedStackLight2	Bool	Activate red lamp on stack light 2.
doGreenPB_CMB1	Bool	Activate lamp of green button (start button) of panel box 1.
doYellowPB_CMB1	Bool	Activate lamp of yellow button (pause button) of panel box 1.
doBluePB_CMB1	Bool	Activate lamp of yellow button (reset button) of panel box 1.
doGreenPB_CMB2	Bool	Activate lamp of green button (start button) of panel box 2.
doYellowPB_CMB2	Bool	Activate lamp of yellow button (pause button) of panel box 2.
doBluePB_CMB2	Bool	Activate lamp of yellow button (reset button) of panel box 2.

Processing global variables

None

Calling POU

None

3.3.14 IOMap_Read

Usage

IOMap_Read is used for mapping physical input addresses to memories. Then the memories are used on the program.

NOTE!

Replace “EditInputAddress” variables for the physical inputs you want to use.

Type

Program

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Name	Type
%MD0.0	Double
%MD0.1	Double
%MD0.2	Double
%MD0.3	Double
%MD0.4	Double
%MD0.5	Double
%MD0.6	Double
%MD0.7	Double

Name	Type
Field.Inputs	InputsField
Infeeder1.Inputs	InputsInfeeder
Infeeder2.Inputs	InputsInfeeder
Outfeeder1.Inputs	InputsOutfeeder
Outfeeder2.Inputs	InputsOutfeeder
SlipSheetMagazine.Inputs	InputsSlipSheetMagazine
PalletMagazine.Inputs	InputsPalletMagazine
CellData.GENERAL.LampTest1	Bool
CellData.GENERAL.LampTest2	Bool
Safety	SafetyInterface

Calling POU

None

3.3.15 IOMap_Write

Usage

IOMap_Write is used for assigning memory outputs map to physical output addresses.

NOTE!

Replace “EditOutputAddressBit” and “EditOutputAdressByte” variables for the physical outputs you want to use.

Type

Program

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

None

Calling POU

None

3.3.16 Pallet_Magazine

Usage

Pallet_Magazine is used to control those things related to pallet magazine station.

Type

Program

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Name	Type
CellData.PalletMagazine.Enabled	Bool
doR1RstHeightPalletMag	Bool

Calling POU

Toggle_Function_Instance1: Toggle_Function;

3.3.17 PLC_PRG

Usage

The PLC_PRG is a special predefined POU. It is the main program and it contains all the calls to program POU.

Type

Program

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Name	Type
Test_Mode_Instance1	Test_Mode
Test_Mode_Instance2	Test_Mode

Calling POU

Clock_Pulse_Generation;
IOMAP_Read;
Test_Mode_Instance1: Test_Mode;
Test_Mode_Instance2: Test_Mode;
General;
FlowData_Collect;
Robot;
Flows;
SlipSheet_Magazine;
Pallet_Magazine;
IOMAP_Write;

3.3.18 Robot

Usage

This POU is used to for everything related to robot. It handles:

- Robot commands.
- Robot start up.
- Robot inputs and outputs groups.
- Robot CellHMI.

Type

Program

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Name	Type
CellData.Robot.TPPushButFlow1Resume	Bool
CellData.Robot.TPPushButFlow1BreakAfterItem	Bool
CellData.Robot.TPPushButFlow1BreakAfterLayer	Bool
CellData.Robot.TPPushButFlow1BreakAfterPallet	Bool
CellData.Robot.TPPushButFlow1StartBatch	Bool
CellData.Robot.TPPushButFlow1StopAfterItem	Bool
CellData.Robot.TPPushButFlow1StopAfterLayer	Bool
CellData.Robot.TPPushButFlow1StopAfterPallet	Bool
CellData.Robot.TPPushButFlow1ToggleFormat1Loaded	Bool
CellData.Robot.TPPushButFlow1ToggleFormat2Loaded	Bool
CellData.Robot.TPPushButFlow1ToggleFormat3Loaded	Bool
CellData.Robot.TPPushButFlow1StopAtPick	Bool
CellData.Robot.TPPushButFlow1StopAtDrop	Bool
CellData.Robot.TPPushButFlow2Resume	Bool

Name	Type
CellData.Robot.TPPushButFlow2BreakAfterItem	Bool
CellData.Robot.TPPushButFlow2BreakAfterLayer	Bool
CellData.Robot.TPPushButFlow2BreakAfterPallet	Bool
CellData.Robot.TPPushButFlow2StartBatch	Bool
CellData.Robot.TPPushButFlow2StopAfterItem	Bool
CellData.Robot.TPPushButFlow2StopAfterLayer	Bool
CellData.Robot.TPPushButFlow2StopAfterPallet	Bool
CellData.Robot.TPPushButFlow2ToggleFormat1Loaded	Bool
CellData.Robot.TPPushButFlow2ToggleFormat2Loaded	Bool
CellData.Robot.TPPushButFlow2ToggleFormat3Loaded	Bool
CellData.Robot.TPPushButFlow2StopAtPick	Bool
CellData.Robot.TPPushButFlow2StopAtDrop	Bool
CellData.Robot.TPPushButAccess	Bool
CellData.Robot.TPPushButReset	Bool
CellData.Robot.TPPushButStopRobot	Bool
CellData.Robot.TPPushButStartRobot	Bool
CellData.Robot.TPPushButBreakAfterItem	Bool
CellData.Robot.TPPushButBreakAfterLayer	Bool
CellData.Robot.TPPushButBreakAfterPallet	Bool
CellData.Robot.TPPushButRobotToHome	Bool
CellData.Robot.TPPushButRobotOutOfLine	Bool
CellData.Robot.TPPushButEnableOutfeeder1	Bool
CellData.Robot.TPPushButEnableOutfeeder2	Bool
CellData.Robot.TPPushButEnableSlipSheetMag	Bool
CellData.Robot.TPPushButEnablePalletMag	Bool
CellData.Robot.CommandToRobot	Byte

Calling POU

Robot_Start_Up_Instance1: Robot_Start_Up;

Robot_IOGroups_Instance1: Robot_IOGroups;

Robot_HMI_Instance1: Robot_HMI;

Robot_TP_Commands_Instance1: Robot_TP_Commands;

3.3.19 Robot_HMI

Usage

The Robot_HMI handles the information displayed on the CellHMI.

Type

Function block

Input arguments

Name	Type	A variable informing if...
diCellInAutoInf	Bool	Cell is in automatic mode.
diCellPausedInf	Bool	Cell is in pause mode.
diFlow1BreakInCourseInf	Bool	Break request for flow 1 is in process.
diFlow2BreakInCourseInf	Bool	Break request for flow 2 is in process.
diCellPauseInCourseInf	Bool	Pause mode request is in process.
diFlow1Selected	Bool	Flow 1 is selected for production.
diFlow2Selected	Bool	Flow 2 os selected for production.
diFlow1BreakReq	Bool	Break has been requested on flow 1.
diFlow2BreakReq	Bool	Break has been requested on flow 2.
diCellAccessInf	Bool	Access to cell is allowed.
diCellAccessInCourseInf	Bool	Access request to cell is in process.
diCellSafetiesInf	Bool	Cell safeties are OK.
diCellFaultInf	Bool	There are faults in the cell.
diRobotTaskExecutingInf	Bool	Robot is executing program.
diDev1ReadyInf	Bool	Device 1 is ready.
diDev1FaultedInf	Bool	There is a fault on device 1.
diDev2ReadyInf	Bool	Device 2 is ready.
diDev2FaultedInf	Bool	There is a fault on device 2.
diDev3ReadyInf	Bool	Device 3 is ready.
diDev3FaultedInf	Bool	There is a fault on device 3.
diDev4ReadyInf	Bool	Device 4 is ready.
diDev4FaultedInf	Bool	There is a fault on device 4.

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Name	Type	A variable to ...
doR1Flow1RunningInf	Bool	Inform Flow 1 is Running
doR1Flow2RunningInf	Bool	Inform Flow 2 is Running
doR1CellRunningInf	Bool	Inform Cell is Running Inf
doR1CellAccessInf	Bool	Inform Cell in Access Inf
doR1CellSafetiesInf	Bool	Inform Cell Safety OK
doR1CellFaultsInf	Bool	Inform Cell Faults
doR1Flow1PauseInf	Bool	Inform Flow 1 is in Pause
doR1Flow2PauseInf	Bool	Inform Flow 2 is in Pause
doR1CellPauseInf	Bool	Inform Cell is in Pause
doR1CellDoor1Inf	Bool	Inform Cell Door 1 Status
doR1CellDoor2Inf	Bool	Inform Cell Door 2 Status
doR1CellDoor3Inf	Bool	Inform Cell Door 3 Status
doR1CellDoor4Inf	Bool	Inform Cell Door 4 Status
doR1CellDoor5Inf	Bool	Inform Cell Door 5 Status
doR1CellDoor6Inf	Bool	Inform Cell Door 6 Status
doR1CellDoor7Inf	Bool	Inform Cell Door 7 Status
doR1CellDoor8Inf	Bool	Inform Cell Door 8 Status
doR1CellEStop1Inf	Bool	Inform Cell EStop 1 Status
doR1CellEStop2Inf	Bool	Inform Cell EStop 2 Status
doR1CellEStop3Inf	Bool	Inform Cell EStop 3 Status
doR1CellEStop4Inf	Bool	Inform Cell EStop 4 Status
doR1CellEStop5Inf	Bool	Inform Cell EStop 5 Status
doR1CellEStop6Inf	Bool	Inform Cell EStop 6 Status
doR1CellEStop7Inf	Bool	Inform Cell EStop 7 Status
doR1CellEStop8Inf	Bool	Inform Cell EStop 8 Status

Name	Type	A variable informing ...
doR1OutOfInfeeder1	Bool	Robout out of Infeeder1
doR1Infeeder1ReadyInf	Bool	Infeeder1 is Ready
doR1Infeeder1ASInf	Bool	Infeeder 1 Auto Stop Info
doR1Infeeder1ESInf	Bool	Infeeder 1General Stop Info
doR1Infeeder1FaultedInf	Bool	Infeeder 1 faulted
doR1Infeeder1ItemSensor1Inf	Bool	Infeeder1 Item Sensor 1 status
doR1Infeeder1ItemSensor2Inf	Bool	Infeeder1 Item Sensor 2 status
doR1Infeeder1ItemSensor3Inf	Bool	Infeeder1 Item Sensor 3 status
doR1OutOfInfeeder2	Bool	Robout out of Infeeder2
doR1Infeeder2ReadyInf	Bool	Infeeder2 is Ready
doR1Infeeder2ASInf	Bool	Infeeder 2 Auto Stop Info
doR1Infeeder2ESInf	Bool	Infeeder 2 General Stop Info
doR1Infeeder2FaultedInf	Bool	Infeeder 2 faulted
doR1Infeeder2ItemSensor1Inf	Bool	Infeeder2 Item Sensor 1 status
doR1Infeeder2ItemSensor2Inf	Bool	Infeeder2 Item Sensor 2 status
doR1Infeeder2ItemSensor3Inf	Bool	Infeeder2 Item Sensor 3 status
doR1OutOfOutnfeeder1	Bool	Robout out of Outfeeder1
doR1Outfeeder1ReadyInf	Bool	Outfeeder1 is Ready
doR1Outfeeder1EmptyInf	Bool	Outfeeder1 is Empty
doR1Outfeeder1FullInf	Bool	Outfeeder1 is Full
doR1Outfeeder1PresentInf	Bool	Outfeeder 1 is Present
doR1Outfeeder1EnabledInf	Bool	Outfeeder 1 Enabled
doR1OutOfOutnfeeder2	Bool	Robout out of Outfeeder 2
doR1Outfeeder2ReadyInf	Bool	Outfeeder2 is Ready
doR1Outfeeder2EmptyInf	Bool	Outfeeder2 is Empty
doR1Outfeeder2FullInf	Bool	Outfeeder2 is Full
doR1Outfeeder2PresentInf	Bool	Outfeeder 2 is Present
doR1Outfeeder2EnabledInf	Bool	Outfeeder 2 Enabled

Name	Type	A variable informing ...
doR1OutOfSlipSheetMag	Bool	Robot out of Slip Sheet Magazine
doR1SlipSheetMagReadyInf	Bool	Slip Sheet Magazine Ready
doR1SlipSheetMagPresentInf	Bool	Slip Sheet Magazine Present
doR1SlipSheetMagEnabledInf	Bool	Slip Sheet Magazine Enabled
doR1OutOfPalletMag	Bool	Robot out of Pallet Magazine
doR1PalletMagReadyInf	Bool	Pallet Magazine Ready
doR1PalletMagPresentInf	Bool	Pallet Magazine is Present
doR1PalletMagEnabledInf	Bool	Pallet Magazine is Enabled

Calling POU

None

3.3.20 Robot_IOGroups

Usage

The Robot_IOGroups is used to handle group of outputs to robot.

Type

Program

Input arguments

Name	Type	A variable...
diReset	Bool	Holding the status of reset buttons.
diRobotOrderToSend	Byte	Holding the command data to send to robot.
diRobotEchoOrder	Byte	Holding the feedback order from robot.
diRobotEchoPositionCode	Byte	Holding the position value from robot.
diRobotEchoJobFlow1	Word	Holding the job number loaded on robot for flow 1.
diRobotEchoJobFlow2	Word	Holding the job number loaded on robot for flow 2.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doRobotFlow1Job CodeOk	Bool	Inform loaded job on robot for flow 1 is correct.
doRobotFlow2Job CodeOk	Bool	Inform loaded job on robot for flow 2 is correct.
doOrderReceived	Bool	Inform robot has received the order.
doOrderSent	Bool	Inform the order has been sent to robot.
doOrderExecuted	Bool	Inform robot has executed order.
doOrderTimeOut	Bool	Inform the order has expired.
doOrderSentToRobot	Byte	Hold the value of command to send to robot.
doRobotEchoInfoPosition	Byte	Hold the value of robot position.

Name	Type	A variable to...
doRobotEchoJobFlow1	Word	Hold the value of the loaded job on robot for flow 1.
doRobotEchoJobFlow2	Word	Hold the value of the loaded job on robot for flow 2.
doOrderToRobot	Byte	Hold the value of command to send to robot.

Processing global variables

None

Calling POU

None

3.3.21 Robot_Start_Up

Usage

Robot_Start_Up is used to start and stop robot when requested like motors On and Quick Stop to the Robot

Type

Function block

Input arguments

Name	Type	A variable...
diStartCycleOrder	Bool	To order robot start cycle.
diResetEmergencyReq	Bool	To reset emergency state on robot.
diRobotEmergency	Bool	Containing status of robot emergency state.
diRunchOk	Bool	Containing status of robot run chain state.
diRobotMotorOn	Bool	Containing status of robot motors on state.
diRobotInAuto	Bool	Containing status of robot auto mode.
diRobotTaskExecuting	Bool	Containing status of task executing system output from robot.
diStartfromMainNeeded	Bool	To inform if it is necessary to start robot at main routine.
diStopRobot	Bool	To order robot to stop.
diImmediateStopSelected	Bool	To select immediate stop type.
diStopAfterInstructionSelected	Bool	To select stop after instruction stop type.
diCommandToRobot	Byte	Containing the command to be sent to robot.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doResetEmStop	Bool	Reset emergencies on robot
doMotOnStart	Bool	Request robot to change to motors on and start program execution.
doPPToMain	Bool	Order robot start program at main routine.
doProductionMode	Bool	Inform robot production mode is active.
doPLCLifeBit	Bool	Inform robot communication with PLC is OK.
doQuickStop	Bool	Order robot to an immediate stop.
doStopInstr	Bool	Order robot stop at end of instruction.

Processing global variables

None

Calling POU

None

3.3.22 Robot_TP_Commands

Usage

Robot_TP_Commands reads the commands send from the CellHMI and store them on memory.

These memories are use later during the program.

Type

Function block

Input arguments

Name	Type	A variable...
diRobotTPCommand	Byte	Containing the command value of Flexpendant CellHMI.
diTPCommandReq	Bool	Informing if a new command is available on diRobotTPCommand
diFlow1JobCodeOK	Bool	Informing if the new job code for the flow 1 loaded in robot is correct.
diFlow2JobCodeOK	Bool	Informing if the new job code for the flow 2 loaded in robot is correct.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doFlow1Resume	Bool	Order to resume flow 1.
doFlow1BreakAfterItem	Bool	Order to break flow 1 after robot place an item.
doFlow1BreakAfterLayer	Bool	Order to break flow 1 after robot finish stacking current layer on pallet.
doFlow1BreakAfterPallet	Bool	Order to break flow 1 after robot finish stacking current pallet.

Name	Type	A variable to...
doFlow1StartBatch	Bool	Order to start batch on flow 1.
doFlow1StopBatchAfterItem	Bool	Order to stop batch on flow 1 after robot place an item.
doFlow1StopBatchAfterLayer	Bool	Order to stop batch on flow 1 after robot finish stacking current layer on pallet.
doFlow1StopBatchAfterPallet	Bool	Order to stop batch on flow 1 after robot finish stacking current pallet.
doFlow1ForceTogleFormat1	Bool	Hold the toggle status of picking format 1 for the flow 1.
doFlow1ForceTogleFormat2	Bool	Hold the toggle status of picking format 2 for the flow 1.
doFlow1ForceTogleFormat3	Bool	Hold the toggle status of picking format 3 for the flow 1.
doFlow1StopAtPick	Bool	Order robot to stop at pick position on flow 1.
doFlow1StopAtDrop	Bool	Order robot to stop at drop position on flow 1.
doFlow2Resume	Bool	Order to resume flow 2.
doFlow2BreakAfterItem	Bool	Order to break flow 2 after robot place an item.
doFlow2BreakAfterLayer	Bool	Order to break flow 2 after robot finish stacking current layer on pallet.
doFlow2BreakAfterPallet	Bool	Order to break flow 2 after robot finish stacking current pallet.
doFlow2StartBatch	Bool	Order to start batch on flow 2.
doFlow2StopBatchAfterItem	Bool	Order to stop batch on flow 2 after robot place an item.
doFlow2StopBatchAfterLayer	Bool	Order to stop batch on flow 2 after robot finish stacking current layer on pallet.
doFlow2StopBatchAfterPallet	Bool	Order to stop batch on flow 2 after robot finish stacking current pallet.

Name	Type	A variable to...
doAccess	Bool	Request robot go to access position.
doResetFault	Bool	Request robot reset faults.
doRobotStop	Bool	Request robot stop.
doRobotMotorOnStart	Bool	Request robot motors on and start program.
doRobotBreakAfterItem	Bool	Request robot break cycle after an item is placed by robot.
doRobotBreakAfterLayer	Bool	Request robot break cycle after robot finishes stacking current layer on pallet.
doRobotBreakAfterPallet	Bool	Request robot break cycle after robot finishes stacking current pallet.
doRobotToHome	Bool	Request robot to go home position.
doRobotToOutOfLine	Bool	Request robot to go out of line position.
doRobotEnableOutfeeder1	Bool	Inform robot outfeeder 1 is enabled.
doRobotEnableOutfeeder2	Bool	Inform robot outfeeder 2 is enabled.
doRobotEnableSlipSheetMag	Bool	Inform robot slip sheet stack station is enabled.
doRobotEnablePalletMag	Bool	Inform robot pallet stack station is enabled.
doCommandToRobot	Byte	Hold command value to send to robot.

Processing global variables

None

Calling POU

None

3.3.23 Slip_Sheet_Magazine

Usage

SlipSheet_Magazine is used to control everything related to pallet magazine station.

Type

Program

Input arguments

None

Input/Ouput arguments

None

Ouput arguments

None

Processing global variables

Type	Name
Bool	CellData.SlipSheetMagazine.Enabled
Bool	doR1RstHeightSlipSheetMag

Calling POU

Toggle_Function_Instance1: Toggle_Function;

3.3.24 Test_Mode

Usage

This POU is used during test to make possible running robot on dry cycle.
It emulates the behaviour of infeeder item sensor.

Type

Function block

Input arguments

None

Input/Ouput arguments

Name	Type	A variable...
diNewFormatReq OnInfeed	Bool	Informing there is a request to prepare a new format infeeder.
diInfeedSelected OnProduction	Bool	Informing infeeder is selected for production.
diFormatReqID	Bool	Informing about the type of picking format to prepare on infeeder.
diQtyItemsFormat1	Bool	Informing about the number of items to prepare for picking format 1.
diQtyItemsFormat2	Bool	Informing about the number of items to prepare for picking format 2.
diQtyItemsFormat3	Bool	Informing about the number of items to prepare for picking format 3.

Ouput arguments

Name	Type	A variable to...
doSensorSimulation	Bool	Simulate infeeder sensor

Processing global variables

None

Calling POU

None

3.3.25 Toggle_Function

Usage

It is used to handle toggle buttons of CellHMI and latch memories.

Type

Function block

Input arguments

Name	Type	A variable...
diToggleSignal	Bool	To change or swap output value.
diInputSetToggle	Bool	To set output.
diInputResetToggle	Bool	To reset output.

Input/Ouput arguments

None

Ouput arguments

Name	Type	A variable to...
doToggleSignal	Bool	Hold the toggle value.

Processing global variables

None

Calling POU

None

3.4 Data Types

Structure of this chapter

This chapter describes the different data types used in the PLC program.

3.4.1 CellDataMap

Usage

CellDataMap is used for mapping the cell data.

Structure

Name	Type	Component to hold data related to...
General	DataGeneral	General of cell.
Access	DataAccess	Access to cell.
Doors	DataDoor	Cell doors.
Robot	DataRobot	Robot.
Infeeder1	DataInfeeder	Infeeder 1.
Infeeder2	DataInfeeder	Infeeder 2.
Outfeeder1	DataOutfeeder	Outfeeder 1.
Outfeeder2	DataOutfeeder	Outfeeder 2.
PalletMagazine	DataPallet Magazine	Pallet magazine.
SlipSheetMagazine	DataSlipSheet Magazine	Slip sheet magazine.
Flow1	DataFlow	Production flow 1.
Flow2	DataFlow	Production flow 2.

3.4.2 DataAccess

Usage

DataAccess is used for mapping the access to cell data.

Structure

Name	Type	Component to hold...
PermittedToZone	BOOL	Access to cell allowed.
InCourse	BOOL	Access to cell is in process.
InCourseBypassed	BOOL	Access to cell process skipped.
ModuleStatus	WORD	Access process status.

3.4.3 DataDoor

Usage

DataDoor is used for mapping the door status data.

Structure

Name	Type	Component to map status of...
ModuleStatusDoor1	BYTE	Door 1
ModuleStatusDoor2	BYTE	Door 2
ModuleStatusDoor3	BYTE	Door 3
ModuleStatusDoor4	BYTE	Door 4
ModuleStatusDoor5	BYTE	Door 5

3.4.4 DataFlow

Usage

DataFlow is used for mapping the production flow data.

Structure

Name	Type	Component to map...
OutOfInfeeder	BOOL	Robot out of infeeder.
OutOfOutfeeder	BOOL	Robot out of outfeeder.
UnloadingFault	BOOL	Unloading fault.

3.4.5 DataGeneral

Usage

DataGeneral is used for mapping general data.

Structure

Name	Type	Component to map...
InManual	BOOL	Cell in manual mode.
InAuto	BOOL	Cell in auto mode.
InFault	BOOL	Cell in fault.
Flow1Started	BOOL	Flow 1 started.
Flow1BreakReq	BOOL	Break request on flow 1.
Flow2Started	BOOL	Flow 2 started.
Flow2BreakReq	BOOL	Break request on flow 2.
Flow1EndBatchReq	BOOL	End batch request flow 1.
Flow2EndBatchReq	BOOL	End batch request flow 2.
ProductionChangeReq	BOOL	Production change request.
RequestStartCycleRobot	BOOL	Request robot start cycle.
RequestPause	BOOL	Request pause mode/break mode.
RequestEndCycle	BOOL	Request end cycle.
RequestAccess	BOOL	Request access.
AccessPermittedCell	BOOL	Access to cell allowed.
AccessInCourse	BOOL	Access in course.
PauseInCourse	BOOL	Pause in course.
BreakFlow1InCourse	BOOL	Break flow 1 on course.
BreakFlow2InCourse	BOOL	Break flow 2 on course.
LampTest1	BOOL	Lamp test 1.
LampTest2	BOOL	Lamp test 2.

Name	Type	Component to map...
SummaryLampTest	BOOL	Summary lamp test
SummaryDoorsOK	BOOL	Summary cell doors ok.
SummaryEStpOK	BOOL	Summary cell emergencies ok.
SummarySafetiesOk	BOOL	Summary cell safeties ok.
SummaryPauseFromCellRob	BOOL	Summary pause mode.
SummaryAccessFromCellRob	BOOL	Summary access.
UnloadingFault	BOOL	Unloading fault.
AnyCommandRequested	BOOL	Command request.

3.4.6 DataInfeeder

Usage

DataInfeeder is used for mapping the infeeder data.

Structure

Name	Type	Component to map infeeder...
SelectedForProduction	BOOL	Selected for production.
ReadyToUnload	BOOL	Ready for robot to pick items.
Format1Loaded	BOOL	Picking format 1 ready on infeeder.
Format2Loaded	BOOL	Picking format 1 ready on infeeder.
Format2Loaded	BOOL	Picking format 1 ready on infeeder.

3.4.7 DataOutfeeder

Usage

DataOutfeeder is used for mapping the outfeeder data.

Structure

Name	Type	Component to map outfeeder...
SelectedForProduction	BOOL	Selected for production.
ReadyToLoad	BOOL	Ready for robot to place items.
Empty	BOOL	Empty.
Completed	BOOL	Completed. (Pallet finished)
Enabled	BOOL	Enabled for production.

3.4.8 DataPalletMagazine

Usage

DataPalletMagazine is used for mapping the pallet magazine data.

Structure

Name	Type	Component to map pallet magazine...
Enabled	BOOL	Enabled for production.

3.4.9 DataRobot

Usage

DataRobot is used for mapping the robot data.

Structure

Name	Type	Component to map robot...
CommandTimeOut	BOOL	Command time out.
CommandSent	BOOL	Command sent.
CommandReceived	BOOL	Command received.
CommandExecuted	BOOL	Command executed.
UnloadingFault	BOOL	Unloading fault status.
Fault	BOOL	Fault status.
Ready	BOOL	Ready status.
TPPushButFlow1Resume	BOOL	Resume push button. Flow 1.
TPPushButFlow1Break AfterItem	BOOL	Break after item is placed push button. Flow 1.
TPPushButFlow1Break AfterLayer	BOOL	Break when finish stacking current layer push button. Flow 1.
TPPushButFlow1Break AfterPallet	BOOL	Break when finish stacking current pallet push button. Flow 1.
TPPushButFlow1StartBatch	BOOL	Start batch push button. Flow 1.
TPPushButFlow1Stop AfterItem	BOOL	End batch after item is placed push button. Flow 1.
TPPushButFlow1Stop AfterLayer	BOOL	End batch when finish stacking current layer push button. Flow 1.

Name	Type	Component to map robot...
TPPushButFlow1Stop AfterPallet	BOOL	End batch when finish stacking current pallet push button. Flow 1.
TPPushButFlow1StopAtPick	BOOL	Stop at pick push button. Flow 1.
TPPushButFlow1StopAtDrop	BOOL	Stop at drop push button. Flow 1.
TPPushButFlow1 ToggleFormat1Loaded	BOOL	Toggle button picking format 1. Flow 1.
TPPushButFlow1 ToggleFormat2Loaded	BOOL	Toggle button picking format 2. Flow 1.
TPPushButFlow1 ToggleFormat3Loaded	BOOL	Toggle button picking format 3. Flow 1.
TPPushButFlow2Resume	BOOL	Resume push button. Flow 2.
TPPushButFlow2Break AfterItem	BOOL	Break after item is placed push button. Flow 2.
TPPushButFlow2Break AfterLayer	BOOL	Break when finish stacking current layer push button. Flow 2.
TPPushButFlow2Break AfterPallet	BOOL	Break when finish stacking current pallet push button. Flow 2.
TPPushButFlow2StartBatch	BOOL	Start batch push button. Flow 2.
TPPushButFlow2Stop AfterItem	BOOL	End batch after item is placed push button. Flow 2.
TPPushButFlow2Stop AfterLayer	BOOL	End batch when finish stacking current layer push button. Flow 2.
TPPushButFlow2Stop AfterPallet	BOOL	End batch when finish stacking current pallet push button. Flow 2.
TPPushButFlow2StopAtPick	BOOL	Stop at pick push button. Flow 1.
TPPushButFlow2StopAtDrop	BOOL	Stop at drop push button. Flow 1.
TPPushButFlow2 ToggleFormat1Loaded	BOOL	Toggle button picking format 1. Flow 2.
TPPushButFlow2 ToggleFormat2Loaded	BOOL	Toggle button picking format 2. Flow 2.
TPPushButFlow2 ToggleFormat3Loaded	BOOL	Toggle button picking format 3. Flow 2.

Name	Type	Component to map robot...
TPPushButBreakAfterItem	BOOL	Break after item is placed push button.
TPPushButBreakAfterLayer	BOOL	Break when finish stacking current layer push button. Flow 2.
TPPushButBreakAfterPallet	BOOL	Break when finish stacking current pallet push button. Flow 2.
TPPushButStartRobot	BOOL	Start push button.
TPPushButStopRobot	BOOL	Stop push button.
TPPushButAccess	BOOL	Access request push button.
TPPushButReset	BOOL	Reset push button.
TPPushButRobotToHome	BOOL	To home push button.
TPPushButRobotToAccess	BOOL	To access push button.
TPPushButRobotOutOfLine	BOOL	To out of line push button.
TPPushButEnableOutfeeder1	BOOL	Enable outfeeder 1 push button.
TPPushButEnableOutfeeder2	BOOL	Enable outfeeder 2 push button.
TPPushButEnableSlipSheetMag	BOOL	Enable slip sheet magazine push button.
TPPushButEnablePalletMag	BOOL	Enable pallet magazine push button.
ForceItem1LoadedInfeeder1	BOOL	Picking format 1 push button. Infeeder 1.
ForceItem2LoadedInfeeder1	BOOL	Picking format 2 push button. Infeeder 1.
ForceItem3LoadedInfeeder1	BOOL	Picking format 3 push button. Infeeder 1.
ForceItem1LoadedInfeeder2	BOOL	Picking format 1 push button. Infeeder 2.
ForceItem2LoadedInfeeder2	BOOL	Picking format 2 push button. Infeeder 2.
ForceItem3LoadedInfeeder2	BOOL	Picking format 3 push button. Infeeder 2.

Name	Type	Component to map robot...
RobotJobCodeFlow1OK	BOOL	Job code ok. Flow 1.
RobotJobCodeFlow2OK	BOOL	Job code ok. Flow 2.
EchoRobotJobCodeFlow1	WORD	Job code. Flow 1.
EchoRobotJobCodeFlow2	WORD	Job code. Flow 2.
TPCommandData	WORD	Command data.
EchoRobotPosition	BYTE	Position.
CommandToRobot	BYTE	Command to send.
CommandNumberSent	BYTE	Command sent.

3.4.10 DataSlipSheetMagazine

Usage

DataSlipSheetMagazine is used for mapping the slip sheet magazine data.

Structure

Name	Type	Component to map slip sheet magazine...
Enabled	BOOL	Enabled for production.

3.4.11 InputsField

Usage

InputsField is used for mapping field devices inputs.

Structure

Name	Type	Component to map...
diResetPB_CMB1	BOOL	Reset push button of panel box 1.
diResetPB_CMB2	BOOL	Reset push button of panel box 2.
diResetPB_CMB3	BOOL	Reset push button of panel box 3.
diResetPB_CMB4	BOOL	Reset push button of panel box 4.
diStartPB_CMB1	BOOL	Start push button of panel box 1.
diStartPB_CMB2	BOOL	Start push button of panel box 2.
diStartPB_CMB3	BOOL	Start push button of panel box 3.
diStartPB_CMB4	BOOL	Start push button of panel box 4.
diAccessPB_CMB1	BOOL	Access push button of panel box 1.
diAccessPB_CMB2	BOOL	Access push button of panel box 2.
diAccessPB_CMB3	BOOL	Access push button of panel box 3.
diAccessPB_CMB4	BOOL	Access push button of panel box 4.

Name	Type	Component to map...
diPausePB_CMB1	BOOL	Pause push button of panel box 1.
diPausePB_CMB2	BOOL	Pause push button of panel box 2.
diPausePB_CMB3	BOOL	Pause push button of panel box 3.
diPausePB_CMB4	BOOL	Pause push button of panel box 4.
diAutoSelector_CMB1	BOOL	Auto mode selector of panel box 1.
diAutoSelector_CMB2	BOOL	Auto mode selector of panel box 2.
diAutoSelector_CMB3	BOOL	Auto mode selector of panel box 3.
diAutoSelector_CMB4	BOOL	Auto mode selector of panel box 4.

3.4.12 InputsInfeeder

Usage

InputsInfeeder is used for mapping infeeder device inputs.

Structure

Name	Type	Component to map...
diReady	BOOL	Ready input.
diFault	BOOL	Fault input.
diAutoOn	BOOL	In auto mode switch.
diSensorItemOnInfeed	BOOL	Item present sensor.

3.4.13 InputsOutfeeder

Usage

InputsOutfeeder is used for mapping outfeeder device inputs.

Structure

Name	Type	Component to map...
diReady	BOOL	Ready input.
diFault	BOOL	Fault input.
diAutoOn	BOOL	In auto mode switch.
diPresent	BOOL	Pallet present sensor

3.4.14 InputsPalletMagazine

Usage

InputsPallettMagazine is used for mapping pallet magazine inputs.

Structure

Name	Type	Component to map...
diReady	BOOL	Ready input.
diFault	BOOL	Fault input.
diAutoOn	BOOL	In auto mode switch.
diPresent	BOOL	Stack present sensor.
diValidation	BOOL	Validate for production push button.

3.4.15 InputsSlipSheetMagazine

Usage

InputsSlipSheetMagazine is used for mapping slip sheet magazine inputs.

Structure

Name	Type	Component to map...
diReady	BOOL	Ready input.
diFault	BOOL	Fault input.
diAutoOn	BOOL	In auto mode switch.
diPresent	BOOL	Sensor stack present.
diValidation	BOOL	Validate for production push button.

3.4.16 IOMappingField

Usage

IOMappingField is used for mapping the cell field devices.

Structure

Name	Type	Component to map...
Inputs	InputsField	Cell field devices inputs.
Outputs	OutputsField	Cell field devices outputs.

3.4.17 IOMappingInfeeder

Usage

IOMappingInfeeder is used for mapping the infeeder device.

Structure

Name	Type	Component to map...
Inputs	InputsInfeeder	Infeeder inputs.
Outputs	OutputsInfeeder	Infeeder outputs.

3.4.18 IOMappingOutfeeder

Usage

IOMappingOutfeeder is used for mapping the outfeeder device.

Structure

Name	Type	Component to map...
Inputs	InputsOutfeeder	Outfeeder inputs.
Outputs	OutputsOutfeeder	Outfeeder outputs.

3.4.19 IOMappingPalletMagazine

Usage

IOMappingPalletMagazine is used for mapping the pallet magazine station.

Structure

Name	Type	Component to map...
Inputs	Inputs PalletMagazine	Pallet magazine inputs.
Outputs	Outputs PalletMagazine	Pallet magazine outputs.

3.4.20 IOMappingSlipSheetMagazine

Usage

IOMappingSlipSheetMagazine is used for mapping the slip sheet magazine station.

Structure

Name	Type	Component to map...
Inputs	Inputs SlipSheetMagazine	Slip sheet magazine inputs.
Outputs	Outputs SlipSheetMagazine	Slip sheet magazine outputs.

3.4.21 OutputsField

Usage

OutputField is used for mapping the cell field outputs.

Structure

Name	Type	Component to map output of...
doUnlockDoor1	Bool	Unlock door 1.
doUnlockDoor2	Bool	Unlock door 2.
doUnlockDoor3	Bool	Unlock door 3.
doUnlockDoor4	Bool	Unlock door 4.
doUnlockDoor5	Bool	Unlock door 5.
doGreenStackLight1	Bool	Green lamp on stack light 1.
doYellowStackLight1	Bool	Yellow lamp on stack light 1.
doRedStackLight1	Bool	Red lamp on stack light 1.
doGreenStackLight2	Bool	Green lamp on stack light 2.
doYellowStackLight2	Bool	Yellow lamp on stack light 2.
doRedStackLight2	Bool	Red lamp on stack light 2.
doGreenPB_CMB1	Bool	Green lamp button on panel box 1.
doYellowPB_CMB1	Bool	Yellow lamp button on panel box 1.
doBluePB_CMB1	Bool	Blue lamp button on panel box 1.
doGreenPB_CMB2	Bool	Green lamp button on panel box 2.
doYellowPB_CMB2	Bool	Yellow lamp button on panel box 2.
doBluePB_CMB2	Bool	Blue lamp button on panel box 2.
doGreenPB_CMB3	Bool	Green lamp button on panel box 3.
doYellowPB_CMB3	Bool	Yellow lamp button on panel box 3.
doBluePB_CMB3	Bool	Blue lamp button on panel box 3.
doGreenPB_CMB4	Bool	Green lamp button on panel box 4.
doYellowPB_CMB4	Bool	Yellow lamp button on panel box 4.
doBluePB_CMB4	Bool	Blue lamp button on panel box 4.

3.4.22 OuputsInfeeder

Usage

OutputInfeeder is used for mapping the inputs of outfeeder device.

Structure

Name	Type	Component to map...
RobotOnArea	Bool	Robot is inside infeeder area.
NewFormatRequest	Bool	Request to prepare a new picking format on outfeeder.
QtyItemsFormat1	Byte	Quantity of items to prepare on infeeder for the picking format 1.
QtyItemsFormat2	Byte	Quantity of items to prepare on infeeder for the picking format 2.
QtyItemsFormat3	Byte	Quantity of items to prepare on infeeder for the picking format 3.
CurrentFormatID	Byte	Picking format type to prepare on the infeeder.

3.4.23 OuputsOutfeeder

Usage

OutputOutfeeder is used for mapping the outputs of outfeeder device.

Structure

Name	Type	Component to map...
RobotOnArea	Bool	Robot is inside outfeeder area.
PalletPresent	Bool	Sensor pallet present on outfeeder.
PalletFull	Bool	Pallet is full.
Validated	Bool	Outfeeder is validated for production.
NewPalletLoaded	Bool	Signal robot place a new pallet on outfeeder.

3.4.24 OuputsPalletMagazine

Usage

OutputPalletMagazine is used for mapping the outputs of pallet magazine station.

Structure

Name	Type	Component to map...
RobotOnArea	Bool	Robot is inside pallet magazine area.
StackPresent	Bool	Sensor stack present on station.
Validated	Bool	Magazine is validated for production.
NewStackLoaded	Bool	Signal a new stack of pallets is loaded.

3.4.25 OuputsSlipSheetMagazine

Usage

OutputSlipSheetMagazine is used for mapping the outputs of slip sheet magazine station.

Structure

Name	Type	Component to map...
RobotOnArea	Bool	Robot is inside slip sheet magazine area.
StackPresent	Bool	Sensor stack present on station.
Validated	Bool	Magazine is validated for production.
NewStackLoaded	Bool	Signal a new stack of slip sheets is loaded.

3.4.26 SafetyInterface

Usage

SafetyInterface is used for mapping the cell safeties.

Structure

Name	Type	Component to hold status of...
Door1	SafetyStatusDevice	Cell door 1.
Door2	SafetyStatusDevice	Cell door 2.
Door3	SafetyStatusDevice	Cell door 3.
Door4	SafetyStatusDevice	Cell door 4.
Door5	SafetyStatusDevice	Cell door 5.
Door6	SafetyStatusDevice	Cell door 6.
Door7	SafetyStatusDevice	Cell door 7.
Door8	SafetyStatusDevice	Cell door 8.
DoorExtDevice	SafetyStatusDevice	Cell door of external device.
EStp1	SafetyStatusDevice	Cell emergency button 1.
EStp2	SafetyStatusDevice	Cell emergency button 2.
EStp3	SafetyStatusDevice	Cell emergency button 3.
EStp4	SafetyStatusDevice	Cell emergency button 4.
EStp5	SafetyStatusDevice	Cell emergency button 5.
EStp6	SafetyStatusDevice	Cell emergency button 6.
EStp7	SafetyStatusDevice	Cell emergency button 7.
EStp8	SafetyStatusDevice	Cell emergency button 8.
EStpExternalDevice	SafetyStatusDevice	Cell emergency of external device.
EStpRobot	SafetyStatusDevice	Cell emergency of robot.
EStpInfeeder1	SafetyStatusDevice	Infeeder 1 emergency stop.
EStpInfeeder2	SafetyStatusDevice	Infeeder 2 emergency stop.
DoorsInfeeder1	SafetyStatusDevice	Infeeder 1 doors.
DoorsInfeeder2	SafetyStatusDevice	Infeeder 2 doors.
EStpOutfeeder1	SafetyStatusDevice	Outfeeder 1 emergency stop.
EStpOutfeeder2	SafetyStatusDevice	Outfeeder 2 emergency stop.
DoorsOutfeeder1	SafetyStatusDevice	Outfeeder 1 doors.
DoorsOutfeeder2	SafetyStatusDevice	Outfeeder 2 doors.

Name	Type	Component to hold status of...
EStpPallet Magazine	SafetyStatusDevice	Pallet magazine station emergency stop.
DoorsPallet Magazine	SafetyStatusDevice	Pallet magazine station doors.
EStpSlipSheet Magazine	SafetyStatusDevice	Slip sheet magazine station emergency stop.
DoorsSlipSheet Magazine	SafetyStatusDevice	Slip sheet magazine station doors.

3.4.27 SafetyStatusDevice

Usage

SafetyStatusDevice is used for mapping status of safety devices.

Structure

Name	Type	Component to map safety sensor...
SOK_Rst	Bool	Ok and reset.
SOK	Bool	Ok.
Discrepancy	Bool	Channel discrepancy.
Null	Bool	Null.

3.5 Memory Map

Structure of this chapter

This chapter describes the memory map of the PLC program.

3.5.1 Constants

Usage

Constant variables are used for configuration purpose.

Variables

Name	Type	It is used to...
DRYCYCLE	Bool	Activate dry cycle mode.
INMEDIATESTOPSELECTED	Bool	To select robot immediate stop type.
STOPAFTERINSTRUCTION	Bool	To select robot stop at end of instruction type.

3.5.2 Addressable flag area (%M)

Usage

This memory area it is used for mapping the robot interface.

Variables

Address	It is used to...
From %MX0.0.0 to %MX0.39.7	Store the value of the robot outputs. Name structure: diR1%NAME%
From %MX0.64.0 to %MX0.103.7	Assign value to robot inputs. Name structure: doR1%NAME%

3.5.3 Global variables

Overview

Global variables are used to store all the data of the program.

Variables

Name	Type	Description
CellData	CellDataMap	It is used to hold the cell data.
Safety	SafetyInterface	It is used to map cell safeties.
Field	IOMappingField	It is used to map field devices.
SlipSheetMagazine	IOMapping SlipSheetMagazine	It is used to map slip sheet magazine interface.
PalletMagazine	IOMapping PalletMagazine	It is used to map pallet magazine interface
Infeeder1	IOMapping Infeeder	It is used to map infeeder 1 interface.
Infeeder2	IOMapping Infeeder	It is used to map infeeder 2 interface.
Outfeeder1	IOMapping Outfeeder	It is used to map outfeeder 1 interface.
Outfeeder2	IOMapping Outfeeder	It is used to map outfeeder 2 interface.

Name	Type	Description
Pulse0	Bool	Square wave. Time H=0.1sec , Time L=0.1sec
Pulse1	Bool	Square wave. Time H=0.2sec , Time L=0.2sec
Pulse2	Bool	Square wave. Time H=0.4sec , Time L=0.4sec
Pulse3	Bool	Square wave. Time H=0.5sec , Time L=0.6sec
Pulse4	Bool	Square wave. Time H=0.8sec , Time L=0.8sec
Pulse5	Bool	Square wave. Time H=1sec , Time L=1sec
Pulse6	Bool	Square wave. Time H=1.6sec , Time L=1.6sec
Pulse7	Bool	Square wave. Time H=2sec , Time L=2sec
BitTo0	Bool	Always TRUE.
BitTo1	Bool	Always FALSE.

4 Safety PLC Program

4.1 Introduction

Structure of this chapter

This chapter describes the PLC Safety program for the PalletPack and includes:

- A reference to built-in program.
- A description of the IO map.

4.2 Built-in program

Scope of the program

PalletPack safety program is ready to control:

- 4 emergency push buttons
- 4 cell doors.

Safety concepts

PalletPack safety program follows some rules and concepts:

- When a door is open it is not possible to operate robot and other devices in automatic mode.
- When an emergency is active it is not possible to operate robot and other devices.
- Once a door is closed it is necessary to push reset button to confirm safe status.
- Every reset button is associated to one door and cannot reset any other door.
- To recover system from an emergency it is necessary to release the emergency switch and push on any of the reset buttons.

4.3 IO Map

Fail safe inputs

Address	Name	Signal from...
I0.0	diEStop1_Ch1	Channel 1 of emergency 1.
I0.1	diEStop1_Ch2	Channel 2 of emergency 1.
I0.2	diEStop2_Ch1	Channel 1 of emergency 2.
I0.3	diEStop2_Ch2	Channel 2 of emergency 2.
I0.4	diEStopExtDevice_Ch1	Channel 1 from an external device emergency.
I0.5	diEStopExtDevice_Ch2	Channel 1 from an external device emergency.
I0.6	diEStopRobot_Ch1	Channel 1 of emergency from robot.
I0.7	diEStopRobot_Ch2	Channel 2 of emergency from robot.
I0.30	diDoor1_Ch1	Channel 1 of door 1.
I0.31	diDoor1_Ch2	Channel 2 of door 1
I0.32	diDoor2_Ch1	Channel 1 of door 2.
I0.33	diDoor2_Ch2	Channel 2 of door 2.
I0.34	diDoor3_Ch1	Channel 1 of door 3.
I0.35	diDoor3_Ch2	Channel 2 of door 3.
I0.36	diDoorExternalDevice_Ch1	Channel 1 of external device door.
I0.37	diDoorExternalDevice_Ch2	Channel 2 of external device door.
I0.40	diResetDoor1	Reset push button 1.
I0.41	diResetDoor2	Reset push button 2.
I0.42	diResetDoor3	Reset push button 3.
I0.43	diResetDoorExternalDevice	Reset push button of external device.
I0.44	Spare	Not used.
I0.45	Spare	Not used.
I0.46	Spare	Not used.
I0.47	Spare	Not used.

Non fail-safe outputs

Address	Name	Signal to...
IQ0.10	doEStop1OK	Inform control PLC about status of emergency 1.
IQ0.11	doEStop2OK	Inform control PLC about status of emergency 2.
IQ0.12	doEStopExternalDeviceOK	Inform control PLC about status of external device emergency.
IQ0.13	doEStopRobotOK	Inform control PLC about status of robot emergency.
IQ0.14	doDoor1OK	Inform control PLC about status of door 1.
IQ0.15	doDoor2OK	Inform control PLC about status of door 2.
IQ0.16	doDoor3OK	Inform control PLC about status of door 3.
IQ0.17	doDoorExtDeviceOK	Inform control PLC about status of external device door.
IQ0.20	Spare	Not used.
IQ0.21	Spare	Not used.
IQ0.22	Spare	Not used.
IQ0.23	Spare	Not used.
IQ0.24	Spare	Not used.
IQ0.25	Dynamic A	Dynamic signal A.
IQ0.26	Dynamic B	Dynamic signal B.
IQ0.27	Dynamic C	Dynamic signal C.

Non fail-safe outputs

Address	Name	Signal to...
Q0.0	doSpare1	Spare
Q0.1	doSpare2	Spare
Q0.2	doGStop	General stop via expansion relay
Q0.3	doAStop	Automatic stop via expansion relay
Q0.4	doSpare4	Spare
Q0.5	doSpare5	Spare

5 Interfaces

5.1 Robot

Structure of this chapter

This chapter contains a description of the interface between PLC and robot with PalletWare.

5.1.1 Inputs

List of inputs

Name	Type	Description
rdiMotOnStart	DI	It orders motors on and start.
rdiMotorOn	DI	It orders motors on.
rdiStartMain	DI	It orders start at main.
rdiResetEstop	DI	It resets Emergency Stop.
rdiPLCLifeBit	DI	It can be used to monitor PLC communication
rdiQuickStop	DI	It orders a quick stop.
rdiStopInstr	DI	It orders a stop at end of instruction.
rdiProductionMode	DI	High to select production mode.
rgiOrderRequest	GI	Order number. Length: 8 bits.
rgiF1JobNumber	GI	Job number to run on flow 1. Length: 16 bits.
rgiF2JobNumber	GI	Job number to run on flow 2. Length: 16 bits.
rdiOutOfInfeeder1	DI	It is connected to LED out of infeeder 1 of CellHMI.
rdiOutOfInfeeder2	DI	It is connected to LED out of infeeder 2 of CellHMI.
rdiOutOfOutfeeder1	DI	It is connected to LED out of oufeeder 1 of CellHMI.
rdiOutOfOutfeeder2	DI	It is connected to LED out of oufeeder 2 of CellHMI.
rdiOutOfSlipSheetMag	DI	It is connected to LED out of slip sheet magazine of CellHMI.
rdiOutOfPalletMag	DI	It is connected to LED out of pallet magazine of CellHMI.
rdiPickPlaceItemFlow1	DI	It oders to pick and place item on flow 1.
rdiPickPlaceItemFlow2	DI	It oders to pick and place item on flow 2.
rdiFlow1Ready	DI	It shows status of flow 1.
rdiFlow2Ready	DI	It shows status of flow 2.

Name	Type	Description
rdiFlow1BreakAfterItem	DI	It orders flow 1 to break after robot place next item.
rdiFlow1BreakAfterLayer	DI	It orders flow 1 to break when robot finishes stacking the current layer.
rdiFlow1BreakAfterPallet	DI	It orders flow 1 to break when robot finishes stacking the current pallet.
rdiFlow2BreakAfterItem	DI	It orders flow 2 to break after robot place next item.
rdiFlow2BreakAfterLayer	DI	It orders flow 2 to break when robot finishes stacking the current layer.
rdiFlow2BreakAfterPallet	DI	It orders flow 2 to break when robot finishes stacking the current pallet.
rdiFlow1StopAfterItem	DI	It orders flow 1 to stop job after robot place next item.
rdiFlow1StopAfterLayer	DI	It orders flow 1 to stop job when robot finishes stacking the current layer.
rdiFlow1StopAfterPallet	DI	It orders flow 1 to stop job when robot finishes stacking the current pallet.
rdiFlow2StopAfterItem	DI	It orders flow 2 to stop job after robot place next item.
rdiFlow2StopAfterLayer	DI	It orders flow 2 to stop job when robot finishes stacking the current layer.
rdiFlow2StopAfterPallet	DI	It orders flow 2 to stop job when robot finishes stacking the current pallet.
rdiAllowLoadPalletOutfeed1Inf	DI	It allows robot to load pallet on outfeed 1.
rdiAllowLoadPalletOutfeed2Inf	DI	It allows robot to load pallet on outfeed 2.
rdiCellRunningInf	DI	It is connected to LED Cell running of CellHMI.
rdiCellAccessInf	DI	It is connected to LED Cell Access running of CellHMI.
rdiCellSafetiesInf	DI	It is connected to LED Cell Safeties of CellHMI.
rdiCellFaultsInf	DI	It is connected to LED Cell Faults of CellHMI.
rdiCellPause	DI	It is connected to LED Cell Pause of CellHMI.
rdiCellEStop%NUMBER%Inf	DI	It is connected to LED Cell Emergency Stop %EMERGENCY_STOP_NUMBER% of CellHMI.

Name	Type	Description
rdiInfeeder1ReadyInf	DI	It is connected to LED Infeeder 1 ready of CellHMI.
rdiInfeeder1ASInf	DI	To inform about status of infeeder 1 fencing.
rdiInfeeder1ESInf	DI	To inform about status of infeeder 1 emergency stop.
rdiInfeeder1FaultedInf	DI	To inform about status of infeeder 1 fault.
rdiInfeeder1ItemSensor1Inf	DI	It is connected to LED status of format 1 on infeeder 1 of CellHMI.
rdiInfeeder1ItemSensor2Inf	DI	It is connected to LED status of format 2 on infeeder 1 of CellHMI.
rdiInfeeder1ItemSensor3Inf	DI	It is connected to LED status of format 3 on infeeder 1 of CellHMI.
rdiInfeeder2ReadyInf	DI	It is connected to LED Infeeder 2 ready of CellHMI.
rdiInfeeder2ASInf	DI	To inform about status of infeeder 2 fencing.
rdiInfeeder2ESInf	DI	To inform about status of infeeder 2 emergency stop.
rdiInfeeder2FaultedInf	DI	To inform about status of infeeder 2 fault.
rdiInfeeder2ItemSensor1Inf	DI	It is connected to LED status of format 2 on infeeder 2 of CellHMI.
rdiInfeeder2ItemSensor2Inf	DI	It is connected to LED status of format 2 on infeeder 2 of CellHMI.
rdiInfeeder2ItemSensor3Inf	DI	It is connected to LED status of format 3 on infeeder 2 of CellHMI.
rdiOutfeeder1ReadyInf	DI	It is connected to LED Outfeeder 1 ready of CellHMI.
rdiOutfeeder1EmptyInf	DI	It is connected to LED Outfeeder 1 empty of CellHMI.
rdiOutfeeder1FullInf	DI	It is connected to LED Outfeeder 1 full of CellHMI.
rdiOutfeeder1PresentInf	DI	It is connected to LED Outfeeder 1 present of CellHMI.
rdiOutfeeder1EnabledInf	DI	It is connected to LED Outfeeder 1 enabled of CellHMI.
rdiOutfeeder2ReadyInf	DI	It is connected to LED Outfeeder 2 ready of CellHMI.
rdiOutfeeder2EmptydInf	DI	It is connected to LED Outfeeder 2 empty of CellHMI.
rdiOutfeeder2FullInf	DI	It is connected to LED Outfeeder 2 full of CellHMI.
rdiOutfeeder2PresentInf	DI	It is connected to LED Outfeeder 2 present of CellHMI.
rdiOutfeeder2Enabled	DI	It is connected to LED Outfeeder 1 enabled of CellHMI.

Name	Type	Description
rdiSlipSheetMagReadyInf	DI	It is connected to LED slip sheet magazine ready of CellHMI.
rdiSlipSheetMagPresentInf	DI	It is connected to LED slip sheet magazine present of CellHMI.
rdiSlipSheetMagEnabledInf	DI	It is connected to LED slip sheet magazine enabled of CellHMI.
rdiPalletMagReadyInf	DI	It is connected to LED pallet magazine ready of CellHMI.
rdiPalletMagPresentInf	DI	It is connected to LED pallet magazine present of CellHMI.
rdiPalletMagEnabledInf	DI	It is connected to LED pallet magazine enabled of CellHMI.
rdiFlow1RunningInf	DI	It is connected to LED flow 1 running of CellHMI.
rdiFlow1PauseInf	DI	It is connected to LED flow 1 on pause of CellHMI.
rdiFlow2RunningInf	DI	It is connected to LED flow 2 running of CellHMI.
rdiFlow2PauseInf	DI	It is connected to LED flow 2 on pause of CellHMI.
rdiRstHeightPalletMag	DI	It orders to reset memory of pallet magazine height and start searching from top of the stack.
rdiRstHeightSlipSheetMag	DI	It orders to reset memory of slip sheet magazine height and start searching from top of the stack.

5.1.2 Outputs

List of ouputs

Name	Type	Description
rdoError	DO	It informs about a production execution error on robot. *System output.*
rdoEmStop	DO	High when robot is on emergency stop state. *System output.*
rdoRunchOk	DO	High when robot is on emergency stop state. *System output.*
rdoMotOnState	DO	High when robot is on motors on state. *System output.*
rdoMotOffState	DO	High when robot is on motors off state. *System output.*
rdoTaskExecuting	DO	High when main task is executing. *System output.*
rdoAutoOn	DO	High when robot is on automatic mode. *System output.*
rdoSpare7	DO	Spare
rgoOrderAck	GO	Order acknowledgement. 8 bits.
rgoFlow1JobNumber	GO	Feedback of loaded job on flow 1. 16 bits.
rgoFlow2JobNumber	GO	Feedback of loaded job on flow 2. 16 bits.
rgoPosNum	GO	Feedback job position. 8 bits.
rdoUnloadingFault	DO	It gets high when an unloading error occurs.
rdoItemOnGripper	DO	It gets high when an item is on gripper.
rdoMonitorGripper	DO	It request to monitor item on gripper.
rdoLoadAuthInfeeder1	DO	It informs robot is going out of infeeder 1. Pulse.Lenght=1sec.
rdoLoadAuthInfeeder2	DO	It informs robot is going out of infeeder 2. Pulse.Lenght=1sec.
rdoLoadConfOutfeeder1	DO	It informs robot has placed a new pallet on outfeeder 1. Pulse. Length=1sec.
rdoLoadConfOutfeeder2	DO	It informs robot has placed a new pallet on outfeeder 2. Pulse. Length=1sec.
rdoFlowChanged	DO	It confirms robot has changed of flow. Pulse. Length=1sec.

Name	Type	Description
rdoOutOfInfeeder1	DO	It gets low when robot enters on infeeder 1 area. Only when robot is executing program.
rdoOutOfInfeeder2	DO	It gets low when robot enters on infeeder 2 area. Only when robot is executing program.
rdoOutOfOutfeeder1	DO	It gets low when robot enters on outfeeder 1 area. Only when robot is executing program.
rdoOutOfOutfeeder2	DO	It gets low when robot enters on outfeeder 2 area. Only when robot is executing program.
rdoOutOfSlipSheetMag	DO	It gets low when robot enters on slip sheet stack station area. Only when robot is executing program.
rdoOutOfPalletMag	DO	It gets low when robot enters on pallet stack station area. Only when robot is executing program.
rdoOnFlow1	DO	It informs robot is executing flow 1.
rdoOnFlow2	DO	It informs robot is executing flow 2.
rdoFlow1Infeeder1Selected	DO	It informs infeeder 1 is selected on flow 1.
rdoFlow1Infeeder2Selected	DO	It informs infeeder 2 is selected on flow 1.
rdoFlow1Outfeeder1Selected	DO	It informs outfeeder 1 is selected on flow 1.
rdoFlow1Outfeeder2Selected	DO	It informs outfeeder 2 is selected on flow 1.
rdoFlow2Infeeder1Selected	DO	It informs infeeder 1 is selected on flow 2.
rdoFlow2Infeeder2Selected	DO	It informs infeeder 2 is selected on flow 2.
rdoFlow2Outfeeder1Selected	DO	It informs oufeeder 1 is selected on flow 2.
rdoFlow2Outfeeder2Selected	DO	It informs oufeeder 2 is selected on flow 2.
rdoRbtAtHome	DO	It gets high when robot is at Home position.
rdoRbtAtOutOfLine	DO	It gets high when robot is at Out of line position.
rdoRbtAtAccess	DO	It gets high when robot is at Access position.
rdoHeightPalletMagRst	DO	It confirms the memory of pallet magazine height has been reset and robot will search from top of the stack. Pulse. Length=1sec.
rdoHeightSlipSheetMagRst	DO	It confirms the memory of slip sheet magazine height has been reset and robot will search from top of the stack. Pulse. Length=1sec.

Name	Type	Description
rdoUserConfEmptyPallet1	DO	It informs user has confirmed the pallet 1 is empty. Pulse. Length=1sec.
rdoUserConfEmptyPallet2	DO	It informs user has confirmed the pallet 2 is empty. Pulse. Length=1sec.
rdoCommandRequest	DO	It informs a command has been sent. Pulse. Length=1sec.
rgoTpCommand	GO	Command Request. 8 bits.
rgoTpCommandData	GO	Command Data. 16 bits.
rgoFlow1Onlayer	GO	It informs layer number robot is stacking on flow 1. 8 bits.
rgoFlow1OnItem	GO	It informs item number robot is stacking on flow 1. 8 bits.
rgoFlow1Format1QtyItems	GO	It informs about the quantity of items to prepare for format 1 on flow 1. 8 bits.
rgoFlow1Format2QtyItems	GO	It informs about the quantity of items to prepare for format 2 on flow 1. 8 bits.
rgoFlow1Format3QtyItems	GO	It informs about the quantity of items to prepare for format 3 on flow 1. 8 bits.
rgoFlow2Format1QtyItems	GO	It informs about the quantity of items to prepare for format 1 on flow 2. 8 bits.
rgoFlow2Format2QtyItems	GO	It informs about the quantity of items to prepare for format 2 on flow 2. 8 bits.
rgoFlow2Format3QtyItems	GO	It informs about the quantity of items to prepare for format 3 on flow 2. 8 bits.
rgoFlow1NextFormat	GO	It informs about the format type to prepare on infeeder used on flow 1.
rgoFlow2NextFormat	GO	It informs about the format type to prepare on infeeder used on flow 2.

Name	Type	Description
rdoFlow1ConfEndItem	DO	It informs robot has placed an item when running flow 1. Pulse. Length=1sec.
rdoFlow1ConfEndLayer	DO	It informs robot has finished stacking a layer when running flow 1. Pulse. Length=1sec.
rdoFlow1ConfEndPallet	DO	It informs robot has finished stacking a pallet when running flow 1. Pulse. Length=1sec.
rdoFlow2ConfEndItem	DO	It informs robot has placed an item when running flow 2. Pulse. Length=1sec.
rdoFlow2ConfEndLayer	DO	It informs robot has finished stacking a layer when running flow 2. Pulse. Length=1sec.
rdoFlow2ConfEndPallet	DO	It informs robot has finished stacking a pallet when running flow 2. Pulse. Length=1sec.
rdoFlow1NextItemReq	DO	It request to prepare next format on flow 1. Pulse. Length=1sec.
rdoFlow2NextItemReq	DO	It request to prepare next format on flow 2. Pulse. Length=1sec.
rdoEndBatchConfFlow1	DO	It confirms batch has finished on flow 1. Pulse. Length=1sec.
rdoEndBatchConfFlow2	DO	It confirms batch has finished on flow 2. Pulse. Length=1sec.

5.1.3 Group Inputs Values

rgiOrderRequest

When value is...	It requests robot...
3	To stop.
4	To go home position and stop.
5	To go access position and stop.
6	To go out of line position and stop.
7	To stop at pick position when running flow 1.
8	To stop at pick position when running flow 2.
11	To stop at drop position when running flow 1.
12	To stop at drop position when running flow 2.
19	To end cycle. All flows.
20	To end cycle flow 1.
21	To end cycle flow 2.
22	To attend custom order 1.
23	To attend custom order 2.
24	To attend custom order 3.
25	To attend custom order 4.

rgiF1JobNumber

When value is...	Means run...
Any	Job number on flow 1.

rgiF2JobNumber

When value is...	Means run...
Any	Job number on flow 2.

5.1.4 Group Ouputs Values

rgoOrderAck

When value is...	It acknowledges order...
3	Robot stop.
4	Go home position and stop.
5	Go access position and stop.
6	Go out of line position and stop.
7	Stop at pick postion when running flow 1.
8	Stop at pick position when running flow 2.
11	Stop at drop position when running flow 1.
12	Stop at drop position when running flow 2.
19	End cycle. All flows.
20	End cycle flow 1.
21	End cycle flow 2.
22	Custom order 1.
23	Custom order 2.
24	Custom order 3.
25	Custom order 4.

rgoF1JobNumber

When value is...	Means...
Any	The number of job loaded on Flow 1.

rgoF2JobNumber

When value is...	Means...
Any	The number of job loaded on Flow 2.

rgoPosNum

When value is...	It means robot is at...
3	Stop.
4	Home position.
5	Access position.
6	Out of line position.
7	Stop at pick for flow 1.
8	Stop at pick for flow 2.
11	Stop at drop for flow 1.
12	Stop at drop for flow 2.
17	Waiting for flow selection.
18	Waiting for job selection.
22	Custom order 1.
23	Custom order 2.
24	Custom order 3.
25	Custom order 4.

rgoTpCommand

When value is...	On CellHMI user has pushed button...
1	Start button.
2	Reset.
3	Stop.
4	Robot to Home.
5	Access request.
6	Robot to Out of line.
7	Stop at pick for flow 1.
8	Stop at pick for flow 2.
11	Stop at drop for flow 1.
12	Stop at drop for flow 2.
22	Custom order 1.
23	Custom order 2.
24	Custom order 3.
25	Custom order 4.
27	Break cycle after robot placed an item. All flows.
28	Break cycle after robot finishes stacking current layer. All flows.
29	Break cycle after robot finishes stacking pallet. All flows.
30	Start batch on flow 1.
31	Resume flow 1.
32	Stop batch on flow 1 after item is placed.
33	Stop batch on flow 1 after robot finishes stacking current layer.
34	Stop batch on flow 1 after robot finishes stacking current pallet.
35	Break cycle after robot placed an item. Flow 1.
36	Break cycle after robot finishes stacking current layer. Flow 1.
37	Break cycle after robot finishes stacking pallet. Flow 1.
38	Start batch on flow 2.
39	Resume flow 2.
40	Stop batch on flow 2 after item is placed.
41	Stop batch on flow 2 after robot finishes stacking current layer.
42	Stop batch on flow 2 after robot finishes stacking current pallet.
43	Break cycle after robot placed an item. Flow 2.
44	Break cycle after robot finishes stacking current layer. Flow 2.
45	Break cycle after robot finishes stacking pallet. Flow 2.

When value is...	On CellHMI user has pushed button...
46	Enable outfeeder 1.
47	Enable outfeeder 2.
48	Enable pallet magazine.
49	Enable slip sheet magazine.
50	Format 1 ready on flow 1.
51	Format 2 ready on flow 1.
52	Format 3 ready on flow 1.
53	Format 1 ready on flow 2.
54	Format 2 ready on flow 2.
55	Format 3 ready on flow 2.

5.2 Human Machine Interface (HMI)

Overview

The communication with robot CellHMI takes place through robot interface.

For further information refer to *5.1 Robot on page 112.*

5.3 Infeeders

Structure of this chapter

This chapter contains a description of the interface between PLC and the infeeder.

5.3.1 Inputs

List of inputs

Type	A signal to inform...
Bit	Infeeder is ready for production.
Bit	There is a fault on infeeder.
Bit	Infeeder is in automatic mode.
Bit	There is an item on infeeder.

5.3.2 Outputs

List of inputs

Type	A signal to...
Bit	Inform robot is inside infeeder area.
Bit	Request a new format to infeeder.
Byte	Inform about the number of items for picking format 1.
Byte	Inform about the number of items for picking format 2.
Byte	Inform about the number of items for picking format 3.
Byte	Inform about the picking format to prepare on infeeder.

5.4 Outfeeders

Structure of this chapter

This chapter contains a description of the interface between PLC and the outfeeder.

5.4.1 Inputs

List of inputs

Type	A signal to inform...
Bit	Outfeeer is ready for production.
Bit	There is a fault on infeeder.
Bit	Outfeeder is in automatic mode.
Bit	There is a pallet detected on outfeeder.

5.4.2 Outputs

List of outputs

Type	A signal to...
Bit	Inform robot is inside outfeeder area.
Bit	Inform the current pallet is full.
Bit	Inform the outfeeder is validated for production.
Bit	Inform robot has placed a new pallet.
Bit	Inform there is a pallet on outfeeder.

5.5 Pallet Magazine

Structure of this chapter

This chapter contains a description of the interface between PLC and the pallet magazine.

5.5.1 Inputs

List of inputs

Type	A signal to inform...
Bit	Pallet magazine is ready for production.
Bit	There is a fault on pallet magazine station.
Bit	Pallet magazine is in automatic mode.
Bit	Stack is detected on station.
Bit	Pallet magazine is validated for production.

5.5.2 Outputs

List of outputs

Type	A signal to...
Bit	Inform robot is inside station area.
Bit	Inform stack of pallets is present.
Bit	Inform the pallet station is validated for production.
Bit	Inform a new stack is loaded.

5.6 Slip Sheet Magazine

Structure of this chapter

This chapter contains a description of the interface between PLC and the slip sheet magazine.

5.6.1 Inputs

List of inputs

Type	A signal to inform...
Bit	Slip sheet magazine is ready for production.
Bit	There is a fault on slip sheet magazine station.
Bit	Slip sheet magazine station is in automatic mode.
Bit	Stack is detected on station.
Bit	Slip sheet magazine is validated for production.

5.6.2 Outputs

List of outputs

Type	A signal to...
Bit	Inform robot is inside station area.
Bit	Inform stack of slip sheets is present.
Bit	Inform the slip sheet station is validated for production.
Bit	Inform a new stack is loaded.

5.7 Field Devices

Structure of this chapter

This chapter contains a description of the interface between PLC and field devices.

5.7.1 Inputs

List of inputs

Type	A signal for...
Bit	Reset push button on panel box 1.
Bit	Reset push button on panel box 2.
Bit	Reset push button on panel box 3.
Bit	Reset push button on panel box 4.
Bit	Start push button on panel box 1.
Bit	Start push button on panel box 2.
Bit	Start push button on panel box 3.
Bit	Start push button on panel box 4.
Bit	Access push button on panel box 1.
Bit	Access push button on panel box 2.
Bit	Access push button on panel box 3.
Bit	Access push button on panel box 4.
Bit	Pause push button on panel box 1.
Bit	Pause push button on panel box 2.
Bit	Pause push button on panel box 3.
Bit	Pause push button on panel box 4.
Bit	Automatic mode switch on panel box 1.
Bit	Automatic mode switch on panel box 2.
Bit	Automatic mode switch on panel box 3.
Bit	Automatic mode switch on panel box 4.

5.7.2 Outputs

List of outputs

Type	A signal to...
Bit	Unlock door 1.
Bit	Unlock door 2.
Bit	Unlock door 3.
Bit	Unlock door 4.
Bit	Unlock door 5.
Bit	Activate green push button lamp on panel box 1.
Bit	Activate green push button lamp on panel box 2.
Bit	Activate green push button lamp on panel box 3.
Bit	Activate green push button lamp on panel box 4.
Bit	Activate yellow push button lamp on panel box 1.
Bit	Activate yellow push button lamp on panel box 2.
Bit	Activate yellow push button lamp on panel box 3.
Bit	Activate yellow push button lamp on panel box 4.
Bit	Activate blue push button lamp on panel box 1.
Bit	Activate blue push button lamp on panel box 2.
Bit	Activate blue push button lamp on panel box 3.
Bit	Activate blue push button lamp on panel box 4.
Bit	Activate green light on stack light 1.
Bit	Activate green light on stack light 2.
Bit	Activate green light on stack light 3.
Bit	Activate green light on stack light 4.
Bit	Activate yellow light on stack light 1.
Bit	Activate yellow light on stack light 2.
Bit	Activate yellow light on stack light 3.
Bit	Activate yellow light on stack light 4.
Bit	Activate red light on stack light 1.
Bit	Activate red light on stack light 2.
Bit	Activate red light on stack light 3.
Bit	Activate red light on stack light 4.

5.8 Safety PLC

Structure of this chapter

This chapter contains a description of the interface between PLC and the safety PLC.

5.8.1 Inputs

List of inputs

Type	A signal to inform about status of...
Bit	Emergency stop 1.
Bit	Emergency stop 2.
Bit	Emergency stop of external device.
Bit	Emergency stop robot.
Bit	Cell door 1.
Bit	Cell door 2.
Bit	Cell door 3.
Bit	Cell door of external device.

5.8.2 Outputs

List of outputs

None

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