

Z1

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Rysunek 1 Model systemu produkcyjnego w Factory I/O.

Do modelu wchodzi elementy typu *Raw Material*, następnie są obrabiane na dwóch zrobotyzowanych stanowiskach. Na pierwszym z nich wytwarzane są elementy *Product Base* a na drugim *Product Lid*. Za stanowiskami umieszczone są sensory wizyjne, które rozpoznają wadliwe elementy (w modelu identyfikowane przez kolor). Są one następnie odrzucane z taśmociągu przez *Pivot Arm Sorter*. Później, za pomocą manipulatora dwuosiowego *Pick & Place*, pokrywa łączona jest z bazą. Gotowy produkt zostaje usuwany z symulacji.

← DRIVER

OPC Client DA/UA



DISCONNECT

CONFIGURATION

CLEAR

SENSORS











FACTORY I/O (Paused) 
FACTORY I/O (Reset) 
FACTORY I/O (Running) 
FACTORY I/O (Time Scale) 
iBusyMcL 
iBusyMcU 
iManipMovingX 
iManipMovingZ 
iPositionerClampedL 
iPositionerClampedU 
iProgressMcL 
iProgressMcU 
iSensClampInL 
iSensClampInU 
iSensManipInL 
iSensManipInU 
iSensManipOutL 
iSensMcL 
iSensMcU 
iSensTestL 
iSensTestOutL 
iSensTestOutU 
iSensTestU 
Machining Center 0 (Opened) 
Machining Center 1 (Opened) 
Machining Center 0 (Has Error) 
Machining Center 1 (Has Error) 
Right Positioner 0 (Limit) 
Right Positioner 1 (Limit) 
Two-Axis Pick & Place 0 (Detected) 
Two-Axis Pick & Place 0 (Rotating) 
Axis Pick & Place 0 (Gripper Rotating) 

iSensTestL
iSensTestOutL
iSensTestOutU
iSensTestU

iSensTestL
iSensTestOutL
iSensTestOutU
iSensTestU

oBeltC1L
oBeltC1U
oBeltC2L
oBeltC2U
oBeltManipL
oBeltManipU
oBeltMcL
oBeltMcU
oBeltOut
oBeltSHL
oBeltSHU
oBeltTestL
oBeltTestU
oBeltVL
oBeltVU
oEmitBadL
oEmitBadU
oEmitGoodL
oEmitGoodU
oManipGrab
oManipMoveX
oManipMoveZ
oPivotArmL
oPivotArmRollL
oPivotArmRollU
oPivotArmU
oPositionerClampL
oPositionerClampU
oPositionerRaise
oStartMcL
oStartMcU

ACTUATORS



FACTORY I/O (Camera Position) 
FACTORY I/O (Pause) 
FACTORY I/O (Reset) 
FACTORY I/O (Run) 
Machining Center 0 (Stop) 
Machining Center 1 (Stop) 
Machining Center 0 (Reset) 
Machining Center 1 (Reset) 
Machining Center 0 (Produce Lids) 
Machining Center 1 (Produce Lids) 
oBeltC1L
oBeltC1U
oBeltC2L
oBeltC2U
oBeltManipL
oBeltManipU
oBeltMcL
oBeltMcU
oBeltOut
oBeltSHL
oBeltSHU
oBeltTestL
oBeltTestU
oBeltVL
oBeltVU
oEmitBadL
oEmitBadU
oEmitGoodL
oEmitGoodU
oManipGrab
oManipMoveX
oManipMoveZ
oPivotArmL
oPivotArmRollL
oPivotArmRollU
oPivotArmU
oPositionerClampL
oPositionerClampU
oPositionerRaise
oStartMcL
oStartMcU

■ Bool ■ Float ■ Int ■ Any



SENSORS





































FACTORY I/O (Paused) 
FACTORY I/O (Reset) 
FACTORY I/O (Running) 
FACTORY I/O (Time Scale) 
iBusyMcL 
iBusyMcU 
iManipMovingX 
iManipMovingZ 
iPositionerClampedL 
iPositionerClampedU 
iProgressMcL 
iProgressMcU 
iSensClampInL 
iSensClampInU 
iSensManipInL 
iSensManipInU 
iSensManipOutL 
iSensMcL 
iSensMcU 
iSensTestL 
iSensTestOutL 
iSensTestOutU 
iSensTestU 
Machining Center 0 (Opened) 
Machining Center 1 (Opened) 
Machining Center 0 (Has Error) 
Machining Center 1 (Has Error) 
Right Positioner 0 (Limit) 
Right Positioner 1 (Limit) 
Two-Axis Pick & Place 0 (Detected) 
Two-Axis Pick & Place 0 (Rotating) 
Axis Pick & Place 0 (Gripper Rotating) 

 Bool  Float  Int  Any

Server:
OPCUAServer@DESKTOP-VTM
F616 (UA) (48)

iManipMovingX	iManipMovingX
iManipMovingZ	iManipMovingZ
iPositionerClampedL	iPositionerClampedL
iPositionerClampedU	iPositionerClampedU
iProgressMcL	iProgressMcL
iProgressMcU	iProgressMcU
iSensClampInL	iSensClampInL
iSensClampInU	iSensClampInU
iSensManipInL	iSensManipInL
iSensManipInU	iSensManipInU
iSensManipOutL	iSensManipOutL
iSensMcL	iSensMcL
iSensMcU	iSensMcU
iSensTestL	iSensTestL
iSensTestOutL	iSensTestOutL
iSensTestOutU	iSensTestOutU
iSensTestU	iSensTestU
	oBeltC1L
	oBeltC1U
	oBeltC2L
	oBeltC2U
	oBeltManipL
	oBeltManipU
	oBeltMcL
	oBeltMcU
	oBeltOut
	oBeltSHL
	oBeltSHU
	oBeltTestL
	oBeltTestU
	oBeltVL
	oBeltVU
	oEmitBadL

ACTUATORS

FACTORY I/O (Camera Position) 
FACTORY I/O (Pause) 
FACTORY I/O (Reset) 
FACTORY I/O (Run) 
Machining Center 0 (Stop) 
Machining Center 0 (Reset) 
Machining Center 1 (Reset) 
 Machining Center 0 (Produce Lids) 
Machining Center 1 (Produce Lids) 
oBeltC1L 
oBeltC1U 
oBeltC2L 
oBeltC2U 
oBeltManipL 
oBeltManipU 
oBeltMcL 
oBeltMcU 
oBeltOut 
oBeltSHL 
oBeltSHU 
oBeltTestL 
oBeltTestU 
oBeltVL 
oBeltVU 
oEmitBadL 
oEmitBadU 
 oEmitGoodL 
 oEmitGoodU 
oManipGrab 
oManipMoveX 
oManipMoveZ 
oPivotArmL 
oPivotArmRollL 

Z1.project - CODESYS

File Edit View Project FBD/LD/IL Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

- Z1
- Device (CODESYS Control Win V3)
- PLC Logic
- Application
 - Library Manager
 - PLC_PRG (PRG)
 - Symbol Configuration
 - Task Configuration
 - MainTask (EC-Tasks)
 - PLC_PRG

FIO

1 Sterowanie dolnym taśmociągami wstępnym:

2

FIO.iSensMcL → F_TRIG_NEG2 → SET → RS_0 → Q1 → FIO.oBeltMcL

FIO.iProgressMcL → GT → R_TRIG_1 → RESET1

3

4 Sterownia górnym taśmociągami wstępnym:

5

6 Sterowanie odrzucaniem źle wykonanych części z taśmociągu dolnego:

inputCounterL → EQ → RESET1 → RS_2 → Q1 → FIO.oBeltTestL

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build

0 error(s) 0 warning(s) 0 message(s)

Description

The application is up to date

Build complete -- 0 errors, 0 warnings : Ready for download

Project Object Position

Last build: 0 0 0 Precompile Project user: (nobody) INS Ln 8 Col 5 Ch 2

Z1.project - CODESYS

File Edit View Project FBD/LD/L Network Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices: Z1, Device (CODESYS Control Win V3), PLC Logic, Application, FIO, Library Manager, PLC_PRG (PRG), Symbol Configuration, Task Configuration, MainTask (EC-Task), PLC_PRG

PLC_PRG

Sterowanie odrzucaniem złe wykonanych części z taśmociągu dolnego:

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Z1.project - CODESYS

File Edit View Project FBD/LD/Ladder Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices FIO PLC_PRG Symbol Configuration Device

Device (CODESYS Control Win V3)

- FIO
- Library Manager
- PLC_PRG (PRG)
- Symbol Configuration
- MainTask (EC-Task)
- PLC_PRG

9

FIO.iSensTestL 6

EQ

IN

TOF_0

Q

ET

tOET

T#5S

PT

FIO.iSensTestOutL

R_TRIG_3

CLK

Q

OR

F_TRIG_0

CLK

Q

CTU_1

CU

Q

CV

outputCounterL

resetCounters

RESET

10

11

SystemOn

SEI

Q1

FIO.oBeltTestU

EQ

RESET1

12

inputCounterU

outputCounterU

EQ

CLK

R_TRIG_9

Q

resetCounters3

13

FIO.iProgressMcU

GT

90

CLK

R_TRIG_10

Q

CTU_4

CU

Q

CV

inputCounterU

resetCounters3

RESET

100 %

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build 0 error(s) 0 warning(s) 0 message(s)

Description

The application is up to date

Build complete -- 0 errors, 0 warnings - Ready for download

Project Object Position

Last build: 0 0 0 Precompile Project user: (nobody) INS Ln 8 Col 5 Ch 2

Z1.project - CODESYS

File Edit View Project FBD/LD/IL Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices: Z1, Device (CODESYS Control Win V3), Application, FIO, Library Manager, PLC_PRG (PRG), Symbol Configuration, Task Configuration, MainTask (EC-Task), PLC_PRG

PLC_PRG

13

FIO.iProgressMcU > R_TRIG_10 CLK Q CU CTU_4 Q CV inputCounterU

resetCounters3 RESET 10 PV

14

FIO.iSensTestU = EQ IN TOF_2 Q ET tOET FIO.oPivotArmU FIO.oPivotArmRollU F_Trig_2 CLK Q Q1 OR CTU_5 Q CV outputCounterU

T#5S PT

resetCounters3 RESET 10 PV

15

Sterowanie taśmociągami dojazdowymi dolnymi do manipulatora:

16

inputCounterManipQueueL GT outputCounterManipQueueL SET RS_3 Q1 FIO.oBeltC1L FIO.oBeltC2L FIO.oBeltSHL FIO.oBeltVL

inputCounterManipQueueL = EQ R_TRIG_33 CLK Q RESET1 resetCounters2

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build 0 error(s) 0 warning(s) 0 message(s)

Description

The application is up to date

Build complete -- 0 errors, 0 warnings - Ready for download

Project Object Position

Last build: 0 0 0 Precompile Project user: (nobody) INS Ln 8 Col 5 Ch 2

Z1.project - CODESYS

File Edit View Project FBD/LD/Ladder Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices: Z1, Device (CODESYS Control Win V3), PLC Logic, Application, FIO, Library Manager, PLC_PRG (PRG), Symbol Configuration, Task Configuration, MainTask (EC-Task), PLC_PRG

PLC_PRG

Sterowanie taśmociągami dojazdowymi dolnymi do manipulatora:

15

16

inputCounterManipQueueL

outputCounterManipQueueL

GT

SET

RS_3

Q1

FIO.oBeltC1L

FIO.oBeltC2L

FIO.oBeltSHL

FIO.oBeltVL

inputCounterManipQueueL

outputCounterManipQueueL

R_TRIG_33

CLK

Q

resetCounters2

RESET1

17

FIO.iSensTestOutL

CLK

Q

CU

CTU_2

CV

Q

inputCounterManipQueueL

resetCounters2

RESET

10

FV

18

FIO.iSensManipInL

CLK

Q

CU

CTU_3

CV

Q

outputCounterManipQueueL

resetCounters2

RESET

10

FV

19

FIO.iSensManipInL

CLK

Q

CU

CTU_20

CV

Q

SET1

SR_4

Q1

SystemOn

AND

SET

RS_22

Q1

FIO.oBeltManipL

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build

0 error(s) 0 warning(s) 0 message(s)

Description

The application is up to date

Build complete -- 0 errors, 0 warnings - Ready for download

Project Object Position

Last build: 0 0 0 Precompile Project user: (nobody) IWS Ln 8 Col 5 Ch 2

Z1.project - CODESYS

File Edit View Project FBD/LD/IL Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices: Z1, Device (CODESYS Control Win V3), FIO, PLC_PRG (PRG), Symbol Configuration, Task Configuration, MainTask (EC-Tasks), PLC_PRG

Diagram:

19

resetCounter2 — RESET

10 FV

FIO.oPositionerClampL — CLK — R_TRIG31 — Q — IN — TOF_8 — Q — ET — t8Et — F_TRIG_26 — CLK — Q — SET — RS_23 — Q1 — RESET1

T#500MS — PT

FIO.oPositionerRaise — CLK — R_TRIG_32 — Q — RESET1

SystemOn — AND — SET — RS_22 — Q1 — FIO.oBeltManipL

SR_4 — SR — Q1 — RESET

FALSE — RESET

20

Sterowanie taśmociągami dojazdowymi górnym do manipulatora:

21

inputCounterManipQueueU — GT — SET — RS_24 — Q1 — FIO.oBeltC1U, FIO.oBeltC2U, FIO.oBeltSRU, FIO.oBeltVU

outputCounterManipQueueU — EQ — CLK — R_TRIG_34 — Q — RESET1

resetCounter4

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build: 0 error(s), 0 warning(s), 0 message(s)

Description:

The application is up to date

Build complete -- 0 errors, 0 warnings : Ready for download

Project: Object: Position:

Ln 8 Col 5 Ch 2

Last build: 0 error(s), 0 warning(s), 0 message(s) Precompile

Project user: (nobody) INVS

Z1.project - CODESYS

File Edit View Project FBD/LD/IL Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

- Z1
 - Device (CODESYS Control Win V3)
 - PLC Logic
 - FIO
 - Library Manager
 - PLC_PRG (PRG)
 - Symbol Configuration
 - Task Configuration
 - MainTask (EC-Tasks)
 - PLC_PRG

PLC_PRG

22

F_TRIG_3 F_TRIG Q CU CTU_6 Q CV inputCounterManipQueueU

resetCounter4 RESET 10 FV

23

F_TRIG_NEG4 F_TRIG Q CU CTU_7 Q CV outputCounterManipQueueU

resetCounter4 RESET 10 FV

24

F_TRIG_21 F_TRIG Q SET1 SR_5 SR Q1

SystemOn AND & SET RS_20 RS Q1 FIO.oBeltManipU

FIO.iSensManipInU CLK FALSE RESET

R_TRIG29 R_TRIG Q IN TOF_7 Q ET t7Et F_TRIG_25 F_TRIG Q SET RS_21 RS Q1 RESET1

FIO.oPositionerClampU CLK T#500MS PT

R_TRIG_30 R_TRIG Q RESET1

FIO.oPositionerRaise CLK

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build 0 error(s) 0 warning(s) 0 message(s)

Description

The application is up to date

Build complete -- 0 errors, 0 warnings : Ready for download

Project Object Position

Last build: 0 0 0 Precompile Project user: (nobody) IN5 Ln 8 Col 5 Ch 2

Z1.project - CODESYS

File Edit View Project FBD/LD/L Application [Device: PLC Logic] Build Online Debug Tools Window Help

Devices FIO PLC_PRG Symbol Configuration Device

Application (CODESYS Control Win V3)

- PLC Logic
- Application
 - FIO
 - Library Manager
 - PLC_PRG (PRG)
 - Symbol Configuration
 - Task Configuration
 - MainTask (EC-Tasks)
 - PLC_PRG

25 Sterowanie pozycjonerem:

26 FIO.iSensClampInL — CLK F_TRIG_4 Q SET1 SR_0 Q1 — FIO.oPositionerClampL

FIO.iPositionerClampedL — CLK R_TRIG_19 Q RESET

27 FIO.iSensClampInU — CLK F_TRIG_5 Q SET1 SR_1 Q1 — FIO.oPositionerClampU

FIO.iPositionerClampedU — CLK R_TRIG_20 Q RESET

28 Sterowanie manipulatorem:

29 FIO.iPositionerClampedL — CLK R_TRIG_21 Q SET1 SR_2 Q1 — fBaseReady

resetFlags1 — RESET

30 FIO.iPositionerClampedU — CLK R_TRIG_22 Q SET1 SR_3 Q1 — fLidReady

resetFlags1 — RESET

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build 0 error(s) 0 warning(s) 0 message(s)

Description	Project	Object	Position
The application is up to date			
Build complete -- 0 errors, 0 warnings - Ready for download			

Project user: (nobody) INS Ln 8 Col 5 Ch 2

Z1.project - CODESYS

File Edit View Project FBD/LD/IL Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices FIO PLC_PRG Symbol Configuration Device

Device (CODESYS Control Win V3)

- PLC Logic
- Application
 - FIO
 - Library Manager
 - PLC_PRG (PRG)
 - Symbol Configuration
 - Task Configuration
 - MainTask (EC-Tasks)
 - PLC_PRG

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Z1.project - CODESYS

File Edit View Project FBD/LD/IL Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

- Z1
 - Device (CODESYS Control Win V3)
 - PLC Logic
 - Application
 - Library Manager
 - PLC_PRG (PRG)
 - Symbol Configuration
 - Task Configuration
 - MainTask (EC-Task)
 - PLC_PRG

PLC_PRG

Diagram:

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Diagram components and connections:

- Inputs: FIO.iManipMovingX, FIO.oManipMoveX, FIO.iManipMovingZ, FIO.oManipMoveZ
- Triggers: F_TRIG_6, F_TRIG_13, F_TRIG_14, F_TRIG_15
- Timers: TOF_3, TOF_4, R_TRIG_25, R_TRIG_26
- Logic: AND, OR, SET, RS, RESET
- Outputs: Q1, Q2, Q3, Q4

Diagram description: The diagram shows a control logic for a manipulator. It uses four input variables (FIO.iManipMovingX, FIO.oManipMoveX, FIO.iManipMovingZ, FIO.oManipMoveZ) and four output variables (Q1, Q2, Q3, Q4). The logic is implemented using four AND gates, two OR gates, two SET gates, and two RESET gates. The AND gates are connected to the input variables. The OR gates are connected to the outputs of the AND gates. The SET gates are connected to the outputs of the OR gates. The RESET gates are connected to the outputs of the SET gates. The diagram also includes two time delay blocks (TOF_3 and TOF_4) and two reset blocks (R_TRIG_25 and R_TRIG_26).

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build

0 error(s) 0 warning(s) 0 message(s)

Description

The application is up to date

Build complete -- 0 errors, 0 warnings : Ready for download

Project Object Position

Project user: (nobody) INS Ln 8 Col 5 Ch 2

Z1.project - CODESYS

File Edit View Project FBD/LD/IL Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices FIO PLC_PRG Symbol Configuration Device

Device (CODESYS Control Win V3)

PLC Logic

Application

FIO

Library Manager

PLC_PRG (PRG)

Symbol Configuration

Task Configuration

MainTask (EC-Tasks)

PLC_PRG

T#300MS PT

35 Sterowanie chwytakiem:

36

FIO.oManipMoveX AND SET RS_17 Q1 FIO.oManipGrab

FIO.oManipMoveZ AND RESET1

FIO.oManipMoveX F_TRIG_16 F_TRIG Q

FIO.oManipMoveZ CLK Q

37 Sterowanie podnoszeniem dolnego pozycjonera:

38

F_TRIG_17 TOF_5 F_TRIG_19 RS_18 Q1 FIO.oPositionerRaise

FIO.oManipGrab CLK Q IM Q tSet

T#500MS PT

FIO.iSensManipOutL F_TRIG_18 F_TRIG Q RESET1

39 Sterowanie taśmociągami wyjściowymi:

40

FIO.iSensManipOutL F_TRIG_22 F_TRIG Q SET RS_25 Q1 FIO.oBeltOut

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build 0 error(s) 0 warning(s) 0 message(s)

Description

The application is up to date

Build complete -- 0 errors, 0 warnings : Ready for download

Project Object Position

Devices POUs

Last build: 0 0 0 Precompile Project user: (nobody) INS Ln 8 Col 5 Ch 2

Z1.project - CODESYS

File Edit View Project FBD/LD/IL Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

- Z1
 - Device (CODESYS Control Win V3)
 - PLC Logic
 - Application
 - FIO
 - Library Manager
 - PLC_PRG (PRG)
 - Symbol Configuration
 - Task Configuration
 - MainTask (EC-Tasks)
 - PLC_PRG

PLC_PRG

Symbol Configuration

Device

FIO.oManipMoveZ

FIO.oManipMoveX

F_TRIG_16

F_TRIG

Q

AND

RESET1

37

Sterowanie podnoszeniem dolnego pozycjonera:

38

FIO.oManipGrab

CLK

F_TRIG_17

Q

TOF_5

IN

TOP

Q

ET

t5Et

F_TRIG_19

CLK

Q

SET

RS_18

RS

Q1

FIO.oPositionerRaise

T#500MS

PT

FIO.iSensManipOutL

CLK

F_TRIG_18

Q

RESET1

39

Sterowanie taśmociągami wyjściowymi:

40

FIO.iSensManipOutL

CLK

F_TRIG_24

Q

TOF_6

IN

TOP

Q

ET

t6Et

F_TRIG_23

CLK

Q

RESET1

F_TRIG_22

CLK

Q

SET

RS_25

RS

Q1

FIO.oBeltOut

T#4S

PT

Messages - Total 0 error(s), 0 warning(s), 0 message(s)

Build

0 error(s) 0 warning(s) 0 message(s)

Description

The application is up to date

Build complete -- 0 errors, 0 warnings : Ready for download

Project Object Position

Last build: 0 0 0 Precompile Project user: (nobody) INS Ln 8 Col 5 Ch 2

