

**Praktikum automatizacije  
ak.g. 2019/2020**

**Laboratorijski blok 7 (Interaktivna vježba)**

**LB7-2 Konfiguracija sučelja čovjek-stroj na operatorskom panelu unutar programskog paketa Step7 WinCC Flexible**

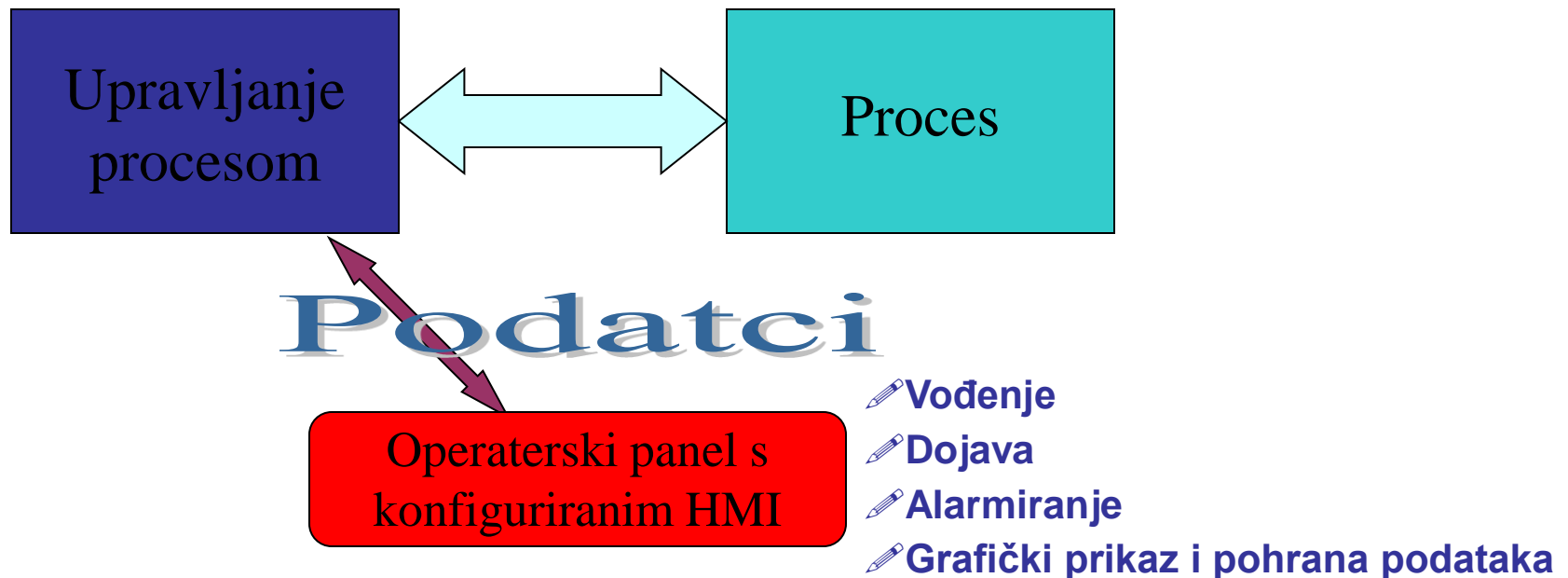
**Četvrtak, 14. svibnja 2020., 8-10**

# Pregled

- WinCC flexible – izgled, organizacija, princip rada
- Primjer

# WinCC flexible

Programski alat za konfiguriranje HMI na operatorskom panelu, te za njegovo testiranje na osobnom računalu (runtime)



# Svojstva SCADA programa

## WinCC flexible

- Definicija i manipuliranje bazom tagova (način pristupa podacima u procesu, vrijeme osvježavanja, format prikaza...)
- Stvaranje grafičkog sučelja
- Definiranje alarma, receptura, log-ova, trendova
- Prebacivanje konfiguracije na panel

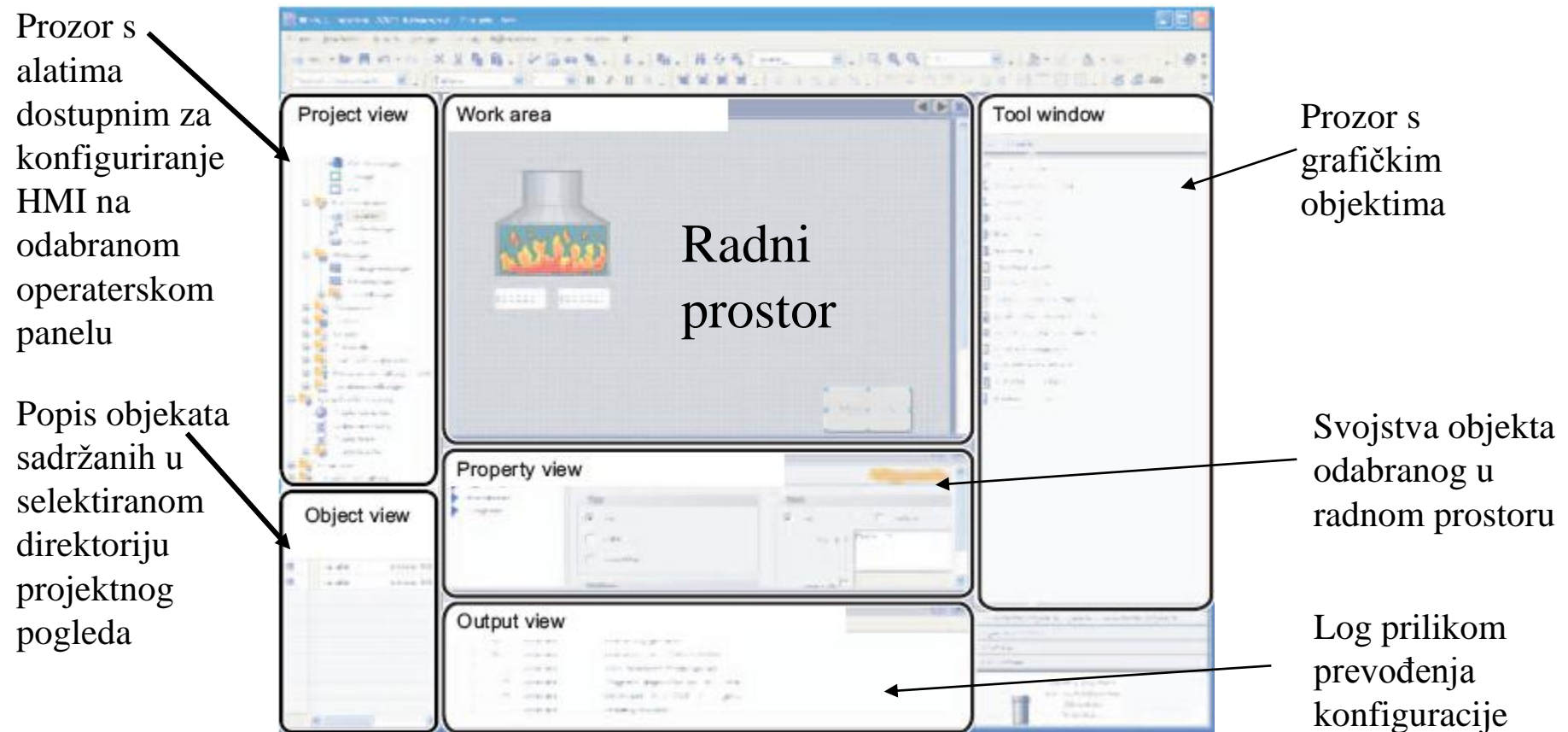
## WinCC flexible Runtime

### On-line rad na panelu ili simuliranje HMI računalom

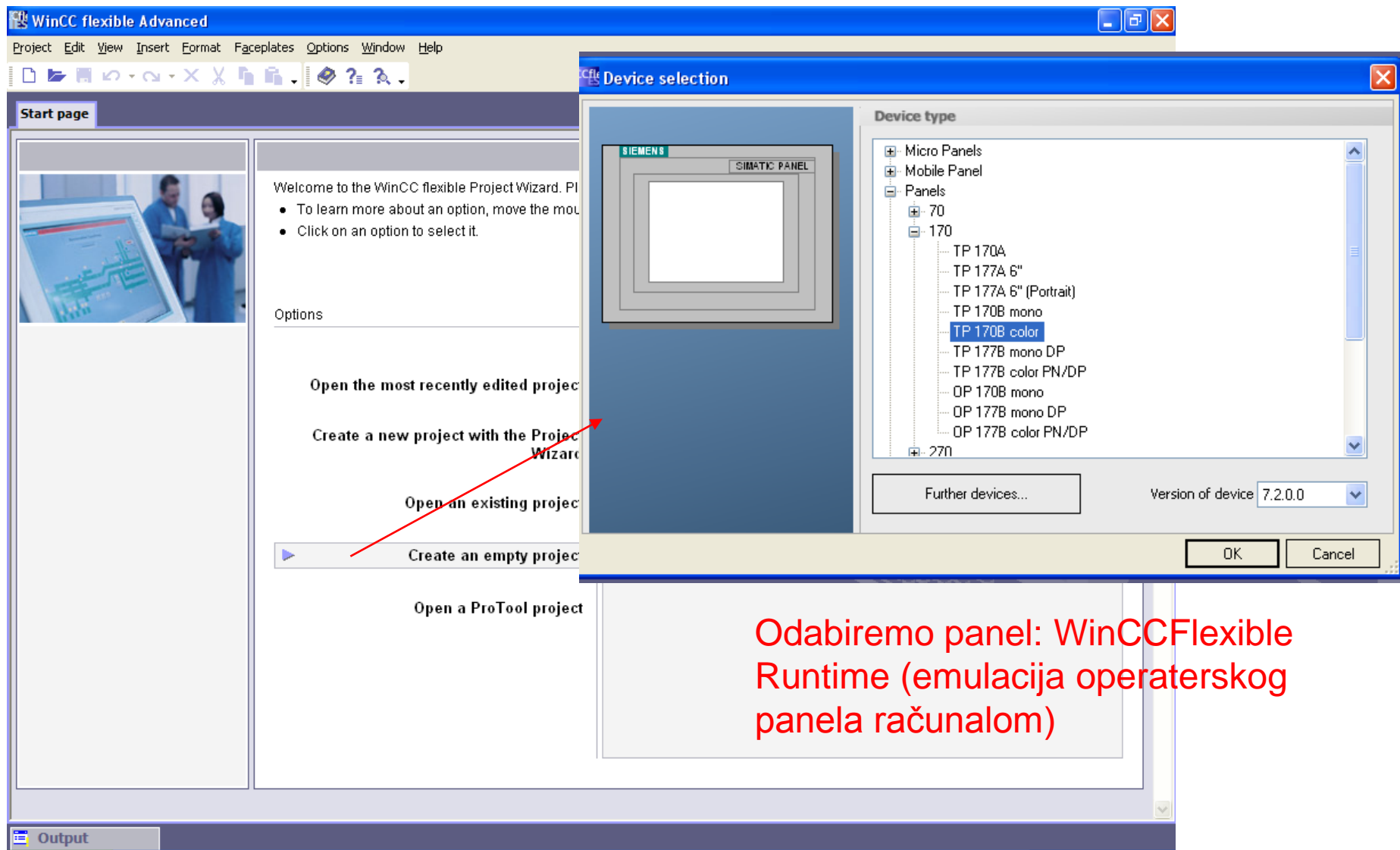
- Komunikacijski podsustav koji prikuplja podatke iz procesa
- Vremenski ovisna baza podataka sa slikom procesa
- Alarm log, tag log
- Operatorsko sučelje (dinamički prikaz)

# WinCC flexible

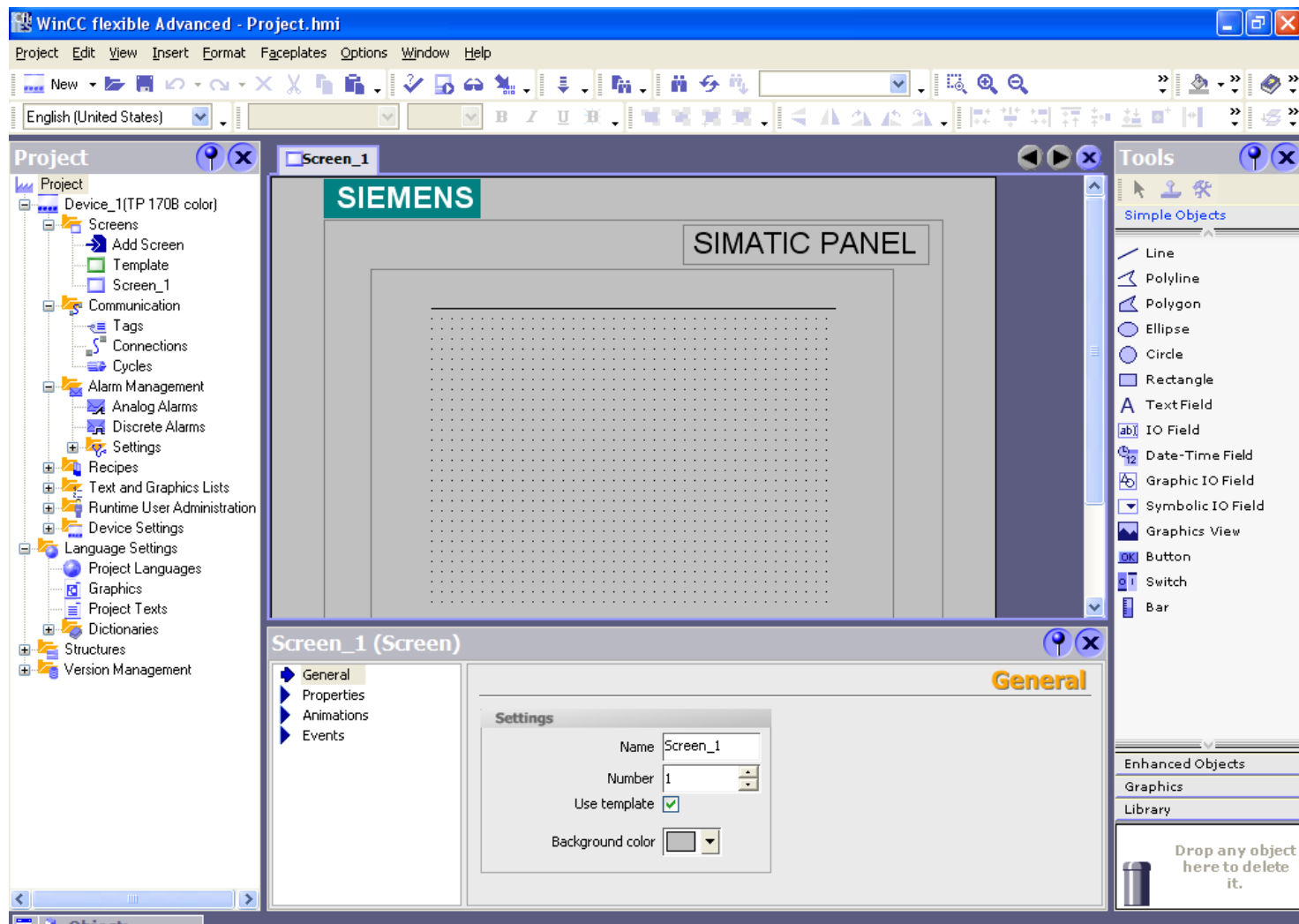
Slično kao i u SIMATIC Manageru, i u WinCC flexible radi se s objektima nalik Windows Exploreru, a osnovni (root) objekt je projekt unutar kojeg se kreira HMI



# WinCC flexible – stvaranje projekta



# Novostvoreni projekt



# Specificiranje HMI

- Na ovoj pokaznoj vježbi razmotrit ćemo stvaranje HMI za sustav upravljanja pokretnom trakom napravljen u pripremi za LB2
- Pritom upravljanje postrojenjem s preklopi I124.x spojenih na digitalne ulaze PLCa prebacujemo na memorijske lokacije M50.x kojima se upravlja putem tag-ova s HMI:

I124.0 → M50.0    Preklopka za uključenje postrojenja na brid

I124.1 → M50.1    Zaštita, mirni kontakt, '0' isključuje postrojenje

I124.2 → M50.2    Pokretanje trake naprijed u ručnom modu rada

I124.3 → M50.3    Pokretanje trake natrag u ručnom modu rada

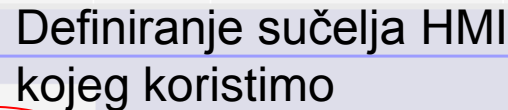
I124.4 → M50.4    Preselekcija moda rada: '0' – ručni, '1' – automatski

I124.5 → M50.5    Usvajanje preselektiranog moda rada na pozitivni brid

IW0 → MW52    Postavni broj predmeta kojeg se ne smije prekoračiti s C50



# Integriranje u postojeći Step7 projekt



Adresa TP

Adresa  
PLC-a

# Definiranje tag-ova

WinCC flexible Advanced - Project.hmi

Project Edit View Insert Format Faceplates Options Window Help

New [Icons] Motor naprijed\_0 [Icons] English (United States)

Project

- Device\_1(TP 170B color)
  - Screens
    - Add Screen
    - Template
    - Screen\_1
  - Communication
    - Tags**
    - Connections
    - Cycles
  - Alarm Management
    - Analog Alarms
    - Discrete Alarms
    - Settings
  - Recipes
  - Text and Graphics Lists
  - Runtime User Administration
  - Device Settings
  - Language Settings
  - Project Languages
  - Graphics
  - Project Texts
  - Dictionaries
  - Structures

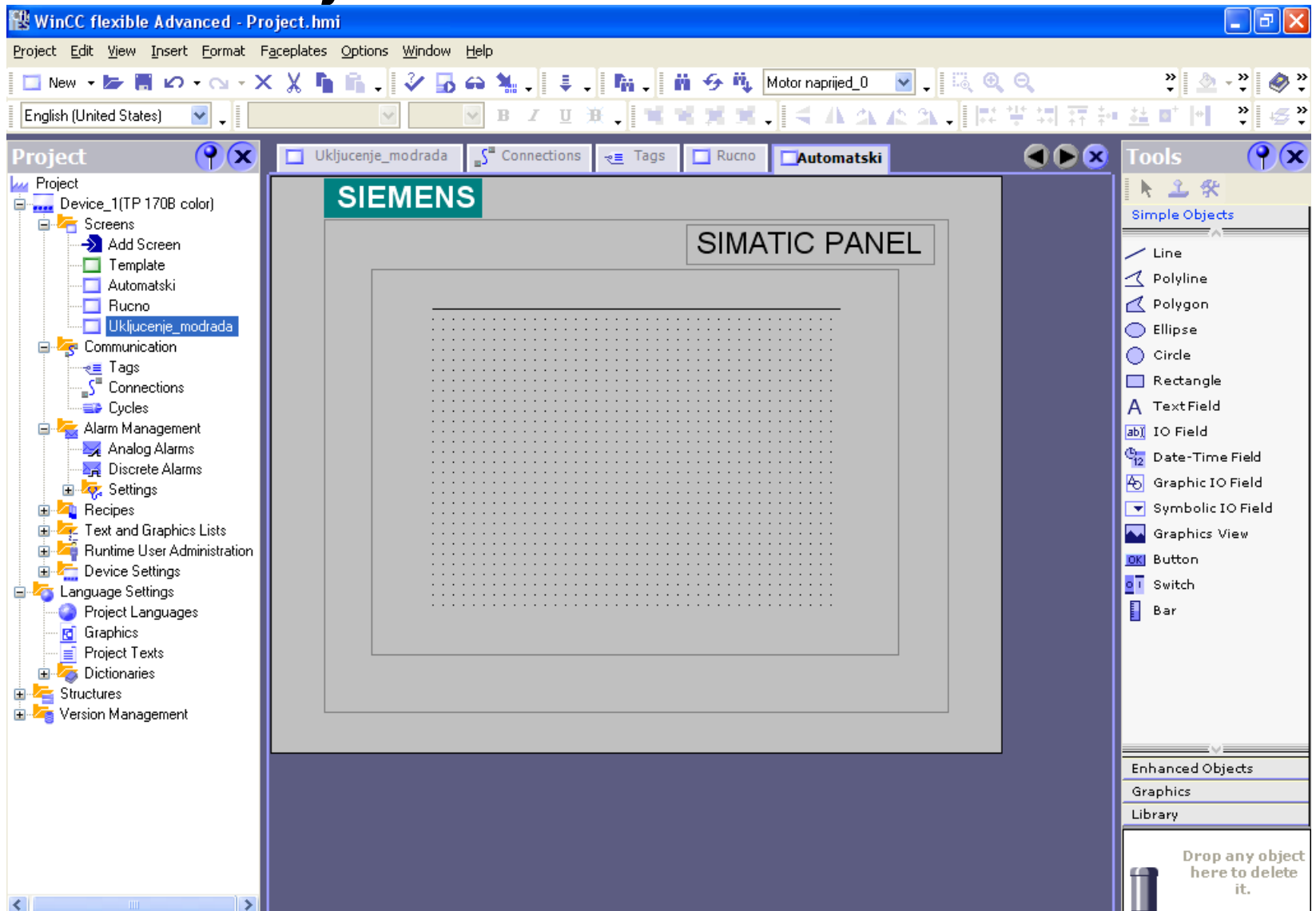
Screen\_1 Connections **Tags**

Name	Connection	Data type	Array count	Address	Acquisition cycle
Ukljucenje	Connection_1	Bool	1	M 50.0	1 s
Iskljucenje	Connection_1	Bool	1	M 50.1	1 s
Rucno_naprijed	Connection_1	Bool	1	M 50.2	1 s
Rucno_natrag	Connection_1	Bool	1	M 50.3	1 s
Preselekcija	Connection_1	Bool	1	M 50.4	1 s
Potvrda	Connection_1	Bool	1	M 50.5	1 s
Setpoint broj	Connection_1	Int	1	MW 52	1 s
Stvarni broj	Connection_1	Int	1	MW 54	1 s
Signalizacija ukljuceno	Connection_1	Bool	1	Q 124.1	1 s
Signalizacija rucni	Connection_1	Bool	1	Q 124.2	1 s
Signalizacija automatski	Connection_1	Bool	1	Q 124.3	1 s
Motor naprijed	Connection_1	Bool	1	Q 126.5	1 s
Motor natrag	Connection_1	Bool	1	Q 126.6	1 s

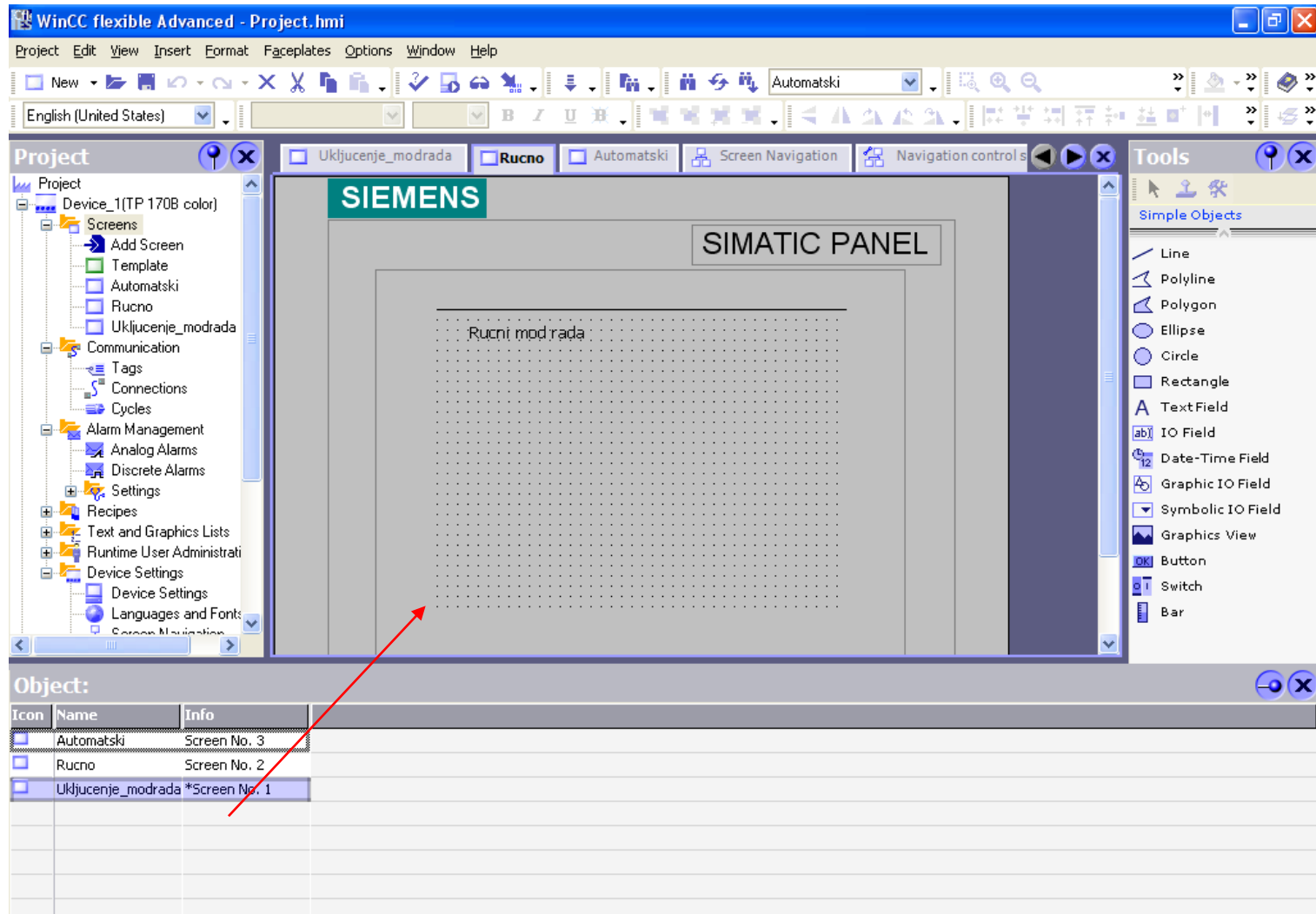
Object:

Icon	Name	Info
[Icon]	Iskljucenje	M 50.1
[Icon]	Ukljucenje	M 50.0
[Icon]	Rucno_naprijed	M 50.2
[Icon]	Rucno_natrag	M 50.3
[Icon]	Preselekcija	M 50.4
[Icon]	Potvrda	M 50.5
[Icon]	Setpoint broj	MW 52
[Icon]	Stvarni broj	MW 54

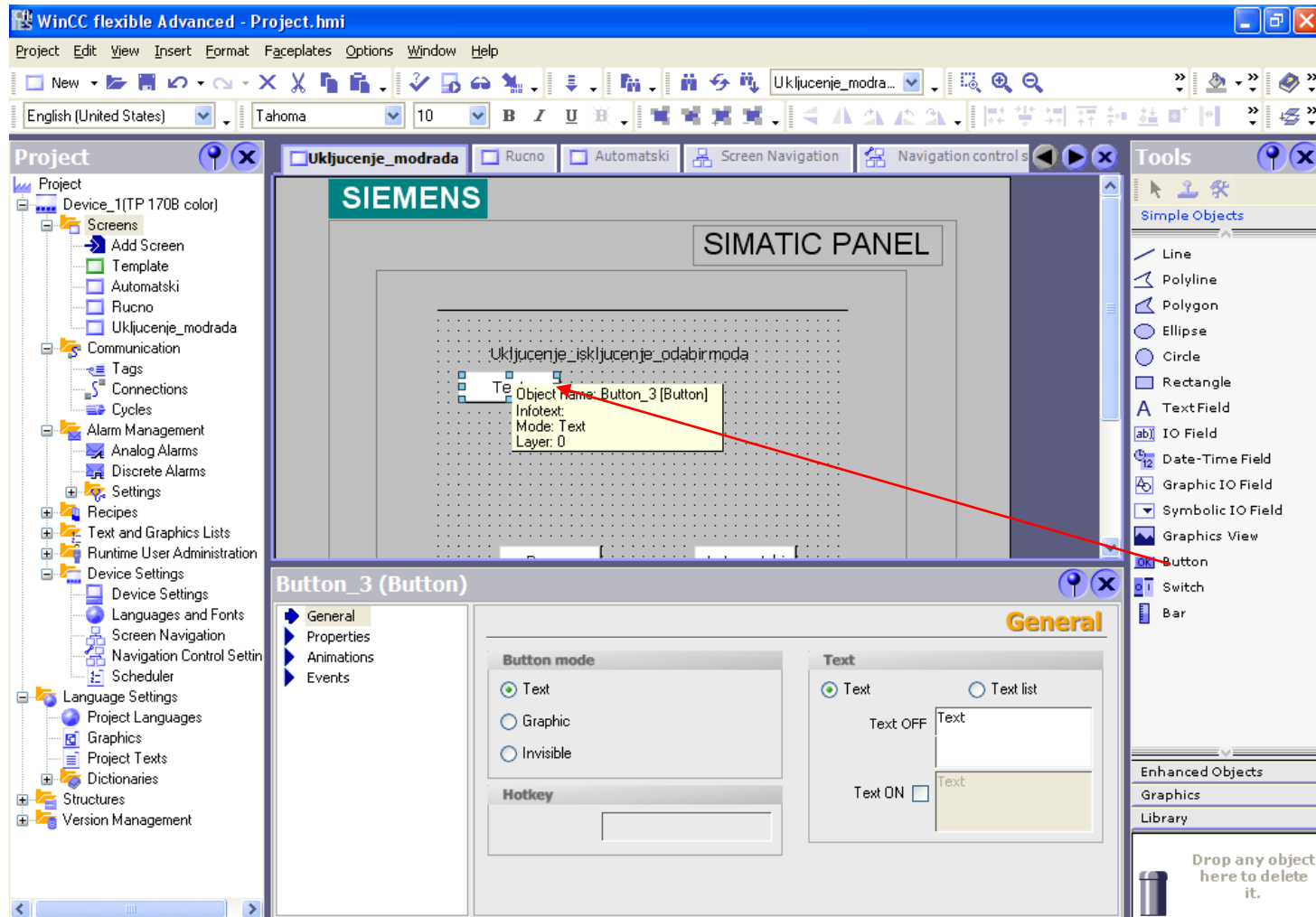
# Definiranje zasebnih ekrana na HMI



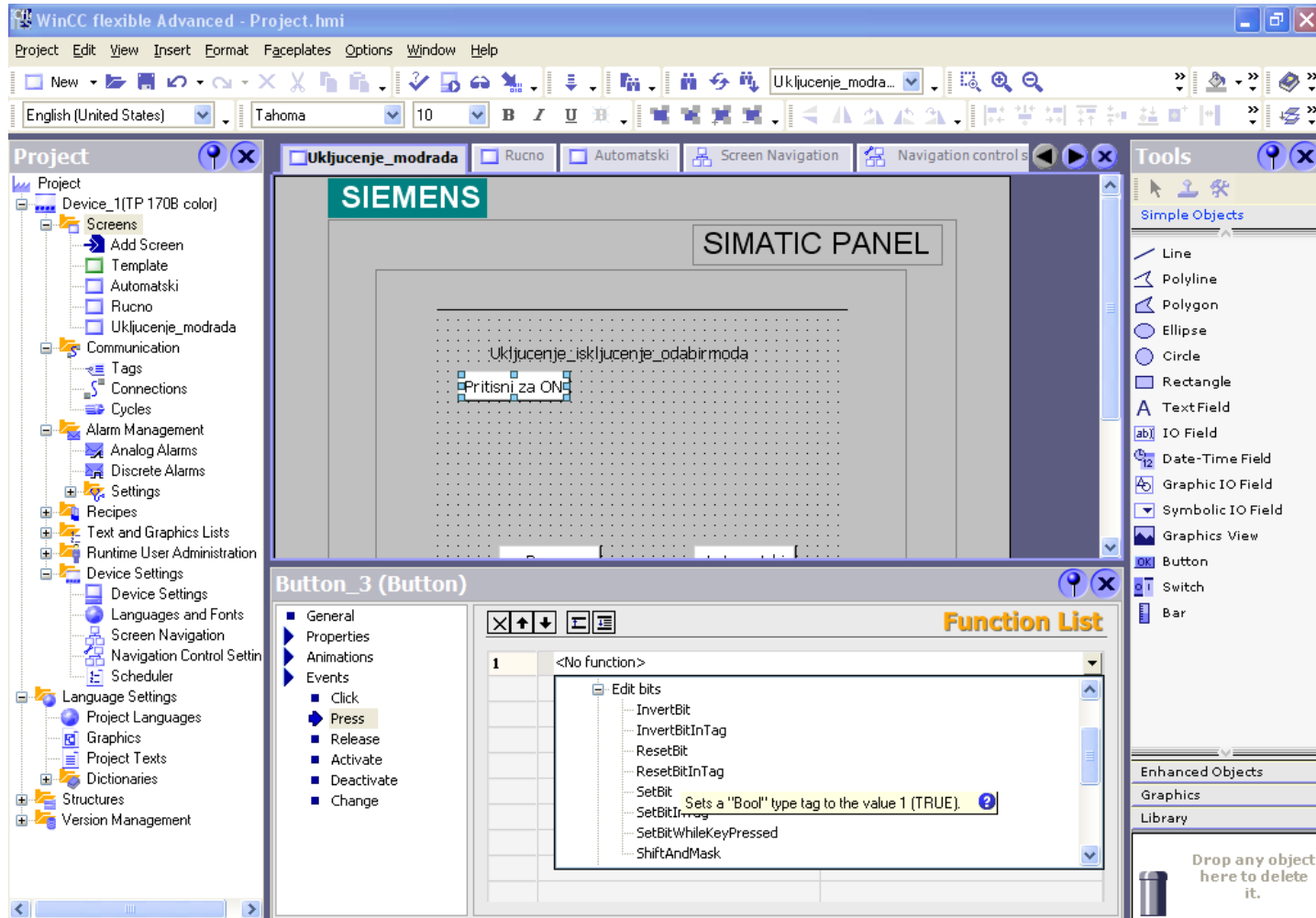
# Prebacivanje s jednog ekrana na drugi u runtime-u



# Parametriranje upravljačkog grafičkog objekta – button (1)



# Parametriranje upravljačkog grafičkog objekta – button (2)



# Parametriranje upravljačkog grafičkog objekta – button (3)

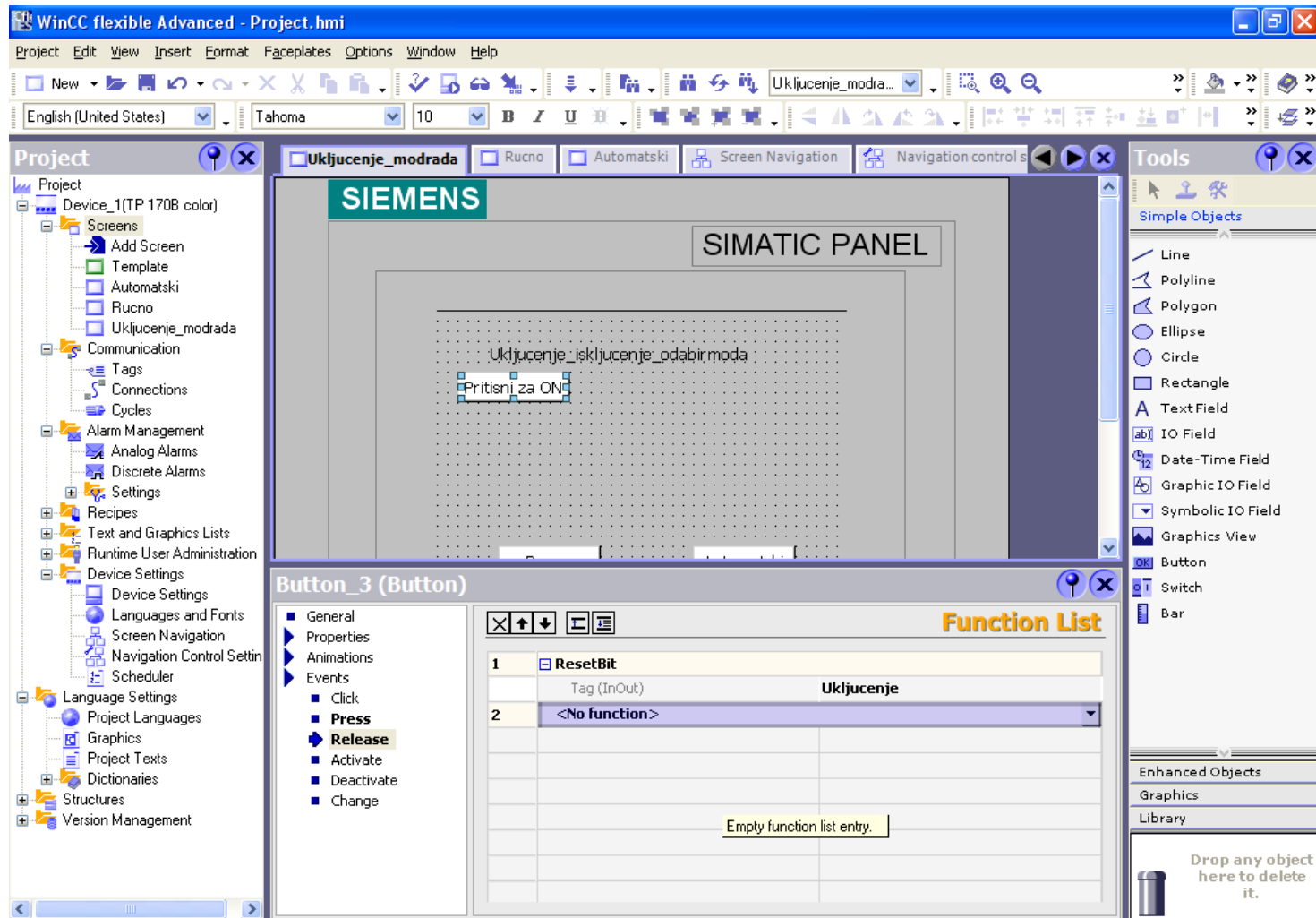
The screenshot displays the Siemens WinCC flexible Advanced software interface. The main workspace shows a SIMATIC PANEL with a button labeled 'Uključenje\_isključenje\_odabirmoda'. The 'Tools' palette on the right lists various objects, including 'Simple Objects' and 'Enhanced Objects'. A 'Button\_3 (Button)' configuration dialog is open, showing the 'Events' tab. The 'Press' event is selected, and the 'Tag (In/Out)' is set to 'Uključenje'. The 'Info' table lists various tags and their addresses.

Icon	Name	Info
	Potvrda	M 50.5
	Preselekcija	M 50.4
	Rucno_naprijed	M 50.2
	Rucno_natrag	M 50.3
	Setpoint broj	MW 52
	Signalizacija au...	Q 124.3
	Signalizacija rucni	Q 124.2
	Signalizacija ukl...	Q 124.1
	Stvarni broj	MW 54
	Uključenje	M 50.0

The 'Button\_3 (Button)' configuration dialog shows the following settings:

- General: Name: Button\_3, Properties: Tag (In/Out): Uključenje
- Events: Click: Press, Release: Activate, Activate: Deactivate, Deactivate: Change

# Parametriranje upravljačkog grafičkog objekta – button (4)





# Testiranje rada konfiguriranog button-a

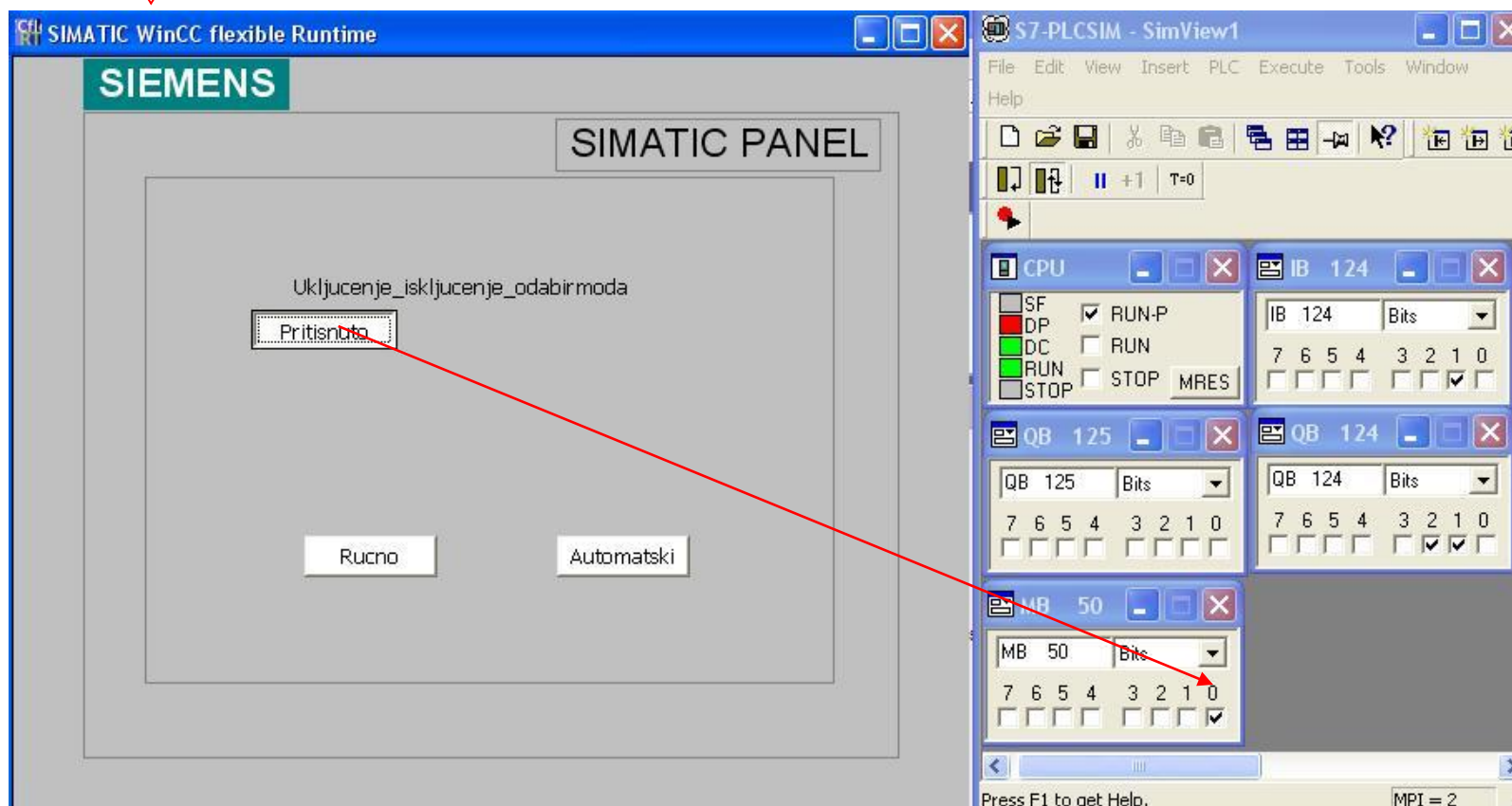
Save



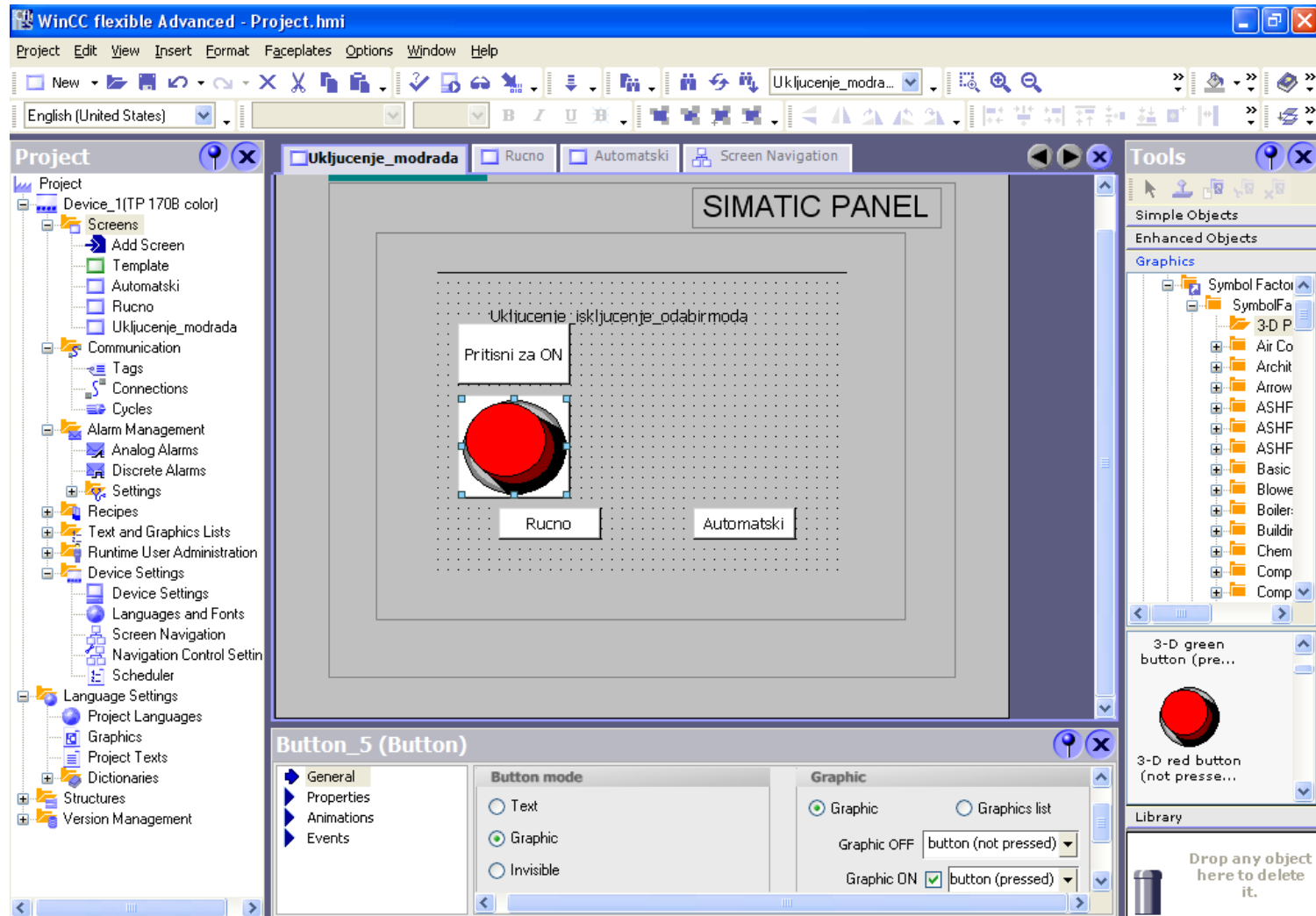
Generate



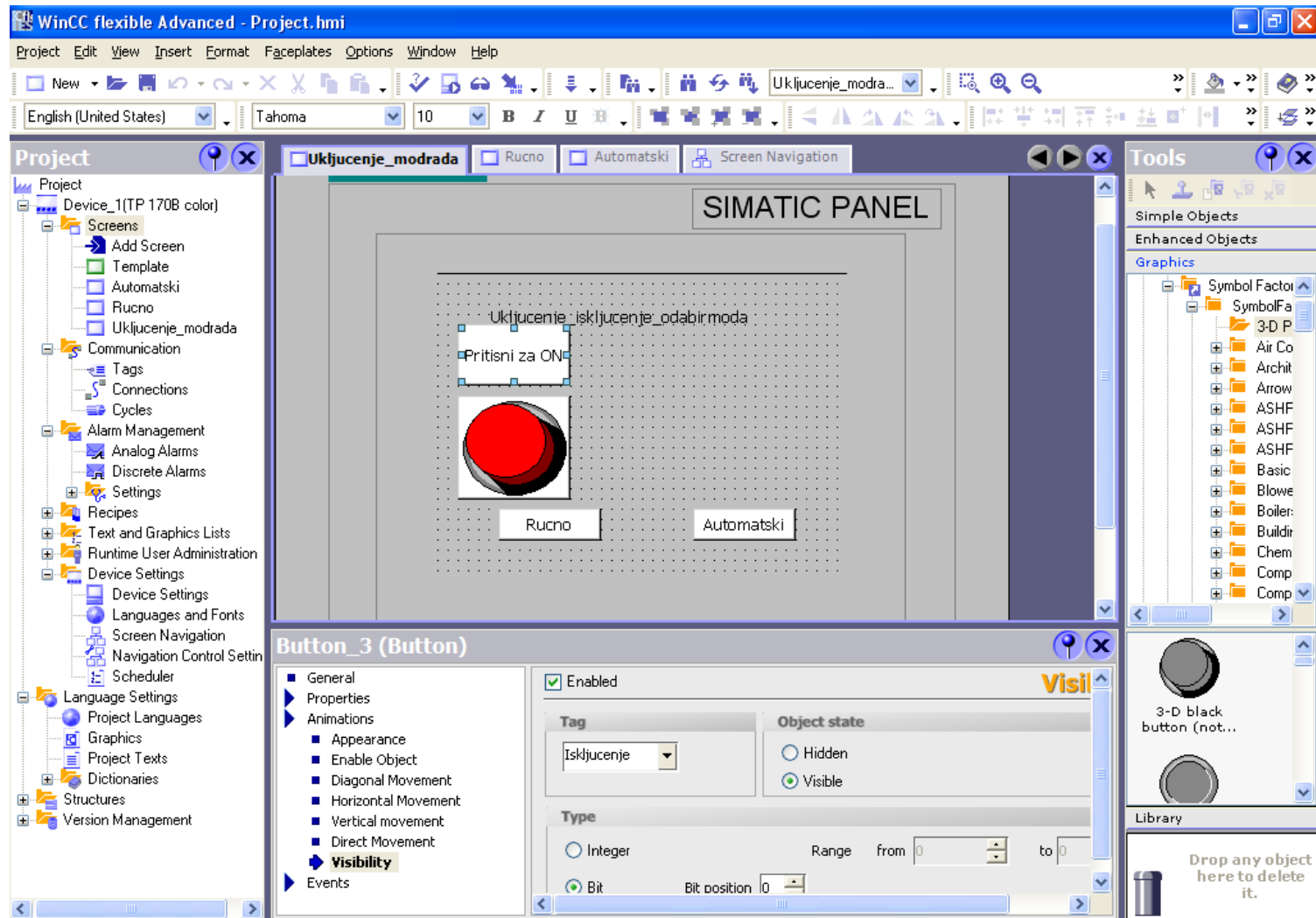
Runtime



# Konfiguriranje button-a za zaštitu (I124.1 → M50.1)



# Vežanje button-a uključenja s tag-om zaštite



# Prikazivanje tag-ova – grafičke liste i grafičko IO polje (1)

WinCC flexible Advanced - Project.hmi

Project Edit View Insert Format Faceplates Options Window Help

English (United States)

Project

- Project
  - Device\_1(TP 170B color)
    - Screens
      - Add Screen
      - Template
      - Automatski
      - Rucno
      - Uključenje\_modrada
    - Communication
      - Tags
      - Connections
      - Cycles
    - Alarm Management
      - Analog Alarms
      - Discrete Alarms
      - Settings
    - Recipes
    - Text and Graphics Lists
      - Text Lists
      - Graphics Lists
    - Runtime User Administration
    - Device Settings
    - Language Settings
    - Project Languages
    - Graphics
      - Project Texts
    - Dictionaries
    - Structures
    - Version Management

Uključenje\_modrada Graphics lists

## GRAPHICS LISTS

Name	Selection	Comment
Uključenje	Bit (0, 1)	
Automatski	Bit (0, 1)	
Rucno	Bit (0, 1)	

BMP slika napravljena Paint-om

Default	Value	Entry
<input type="radio"/>	0	neradi
<input type="radio"/>	1	radi

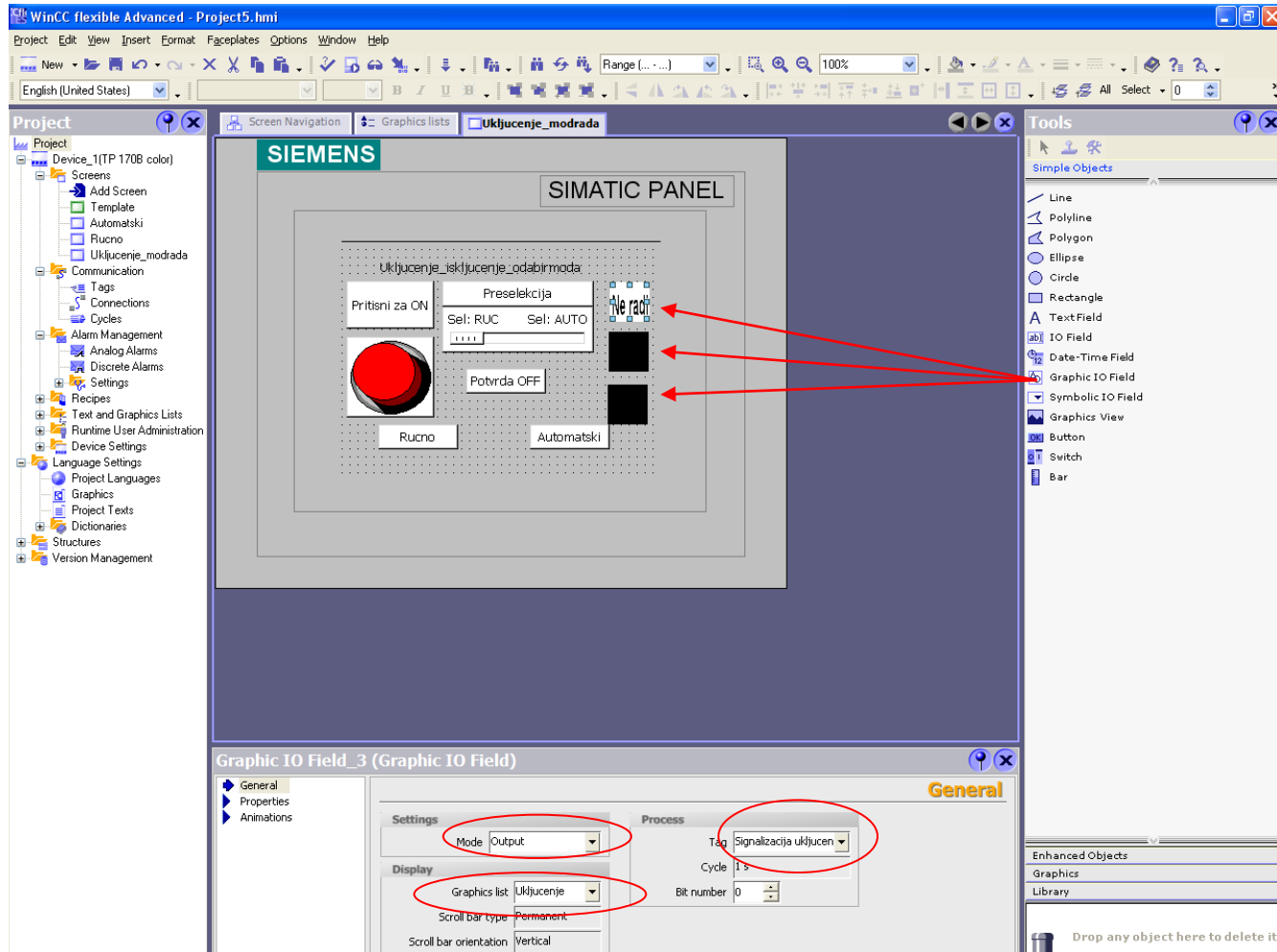
Ne radi

Radi

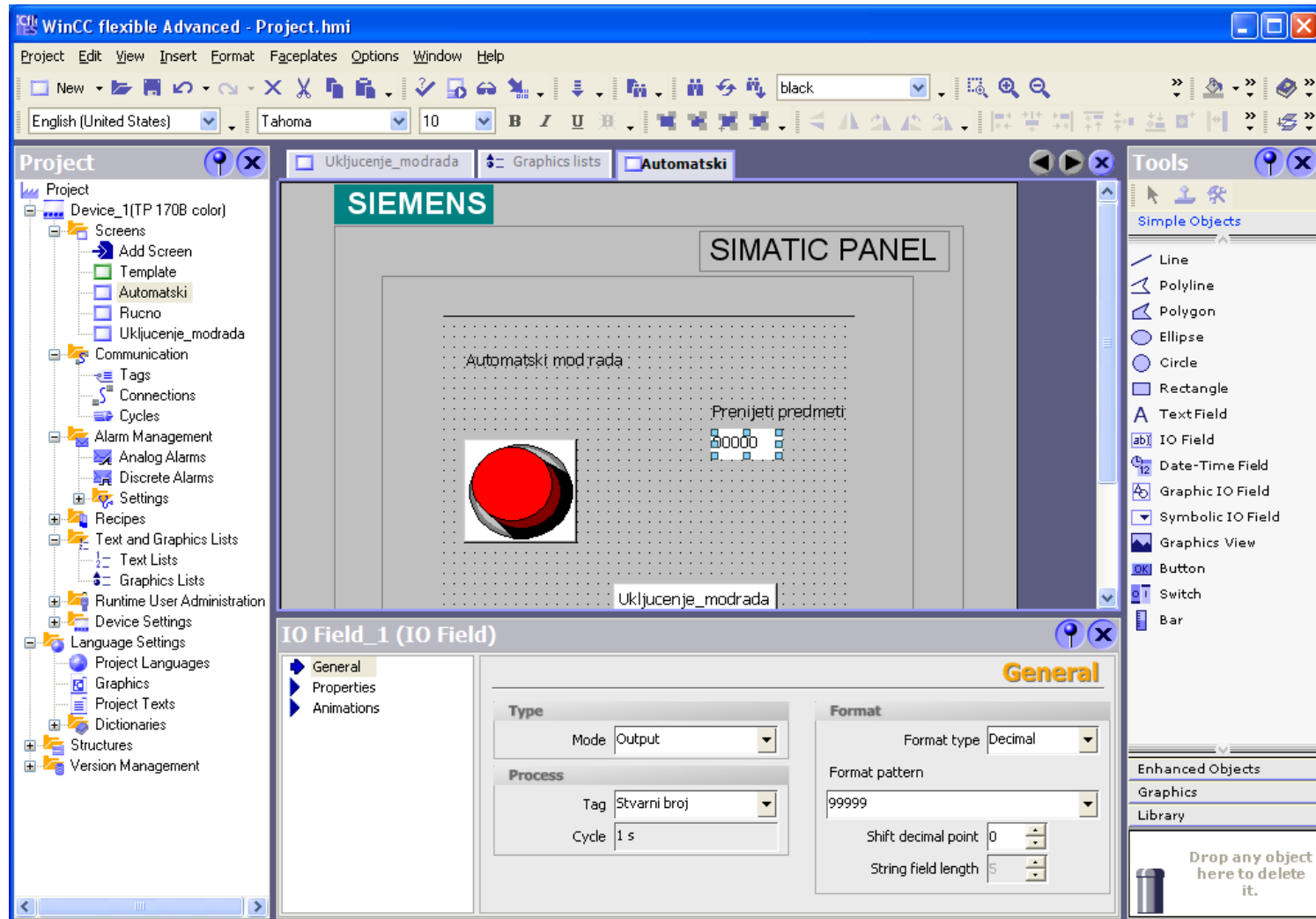
Properties

There is currently no object selected. Select an object in order to display and edit its properties.

# Prikazivanje tag-ova – grafičke liste i grafičko IO polje (2)



# Prikazivanje vrijednosti tag-a – IO Field



# Alarm – premašivanje setpoint broja predmeta (1)

The screenshot displays the WinCC flexible Advanced software interface for configuring an alarm. The main window is titled "ANALOG ALARMS" and contains a table with the following data:

Text	Number	Class	Trigger tag	Limit	Trigger mode
Broj prenijetih predmeta je <tag Stvarni broj>!!!	1	Errors	Stvarni broj	Setpoint broj	On rising edge

Below the table, the "Analog alarm 1 (Analog alarm)" configuration window is open, showing the "Function List" tab. The list contains the following entries:

Function	Alarm
1 SetBit	Tag (InOut)
2 <No function>	

The left sidebar shows the project structure, including "Device\_1(TP 170B color)", "Screens", "Communication", "Alarm Management", and "Settings". The "Settings" folder is expanded, showing "Alarm Settings", "Alarm Classes", and "Alarm Groups".

# Alarm – premašivanje setpoint broja predmeta (2)

The screenshot displays the WinCC flexible Advanced software interface for configuring alarms. The main window is titled "ANALOG ALARMS" and contains a table with the following columns: Text, Number, Class, Trigger tag, Limit, and Trigger mode. The first row is populated with the following data:

Text	Number	Class	Trigger tag	Limit	Trigger mode
Broj prenetih predmeta je <tag Stvarni broj>!!!	1	Errors	Stvarni broj	Setpoint broj	On rising edge

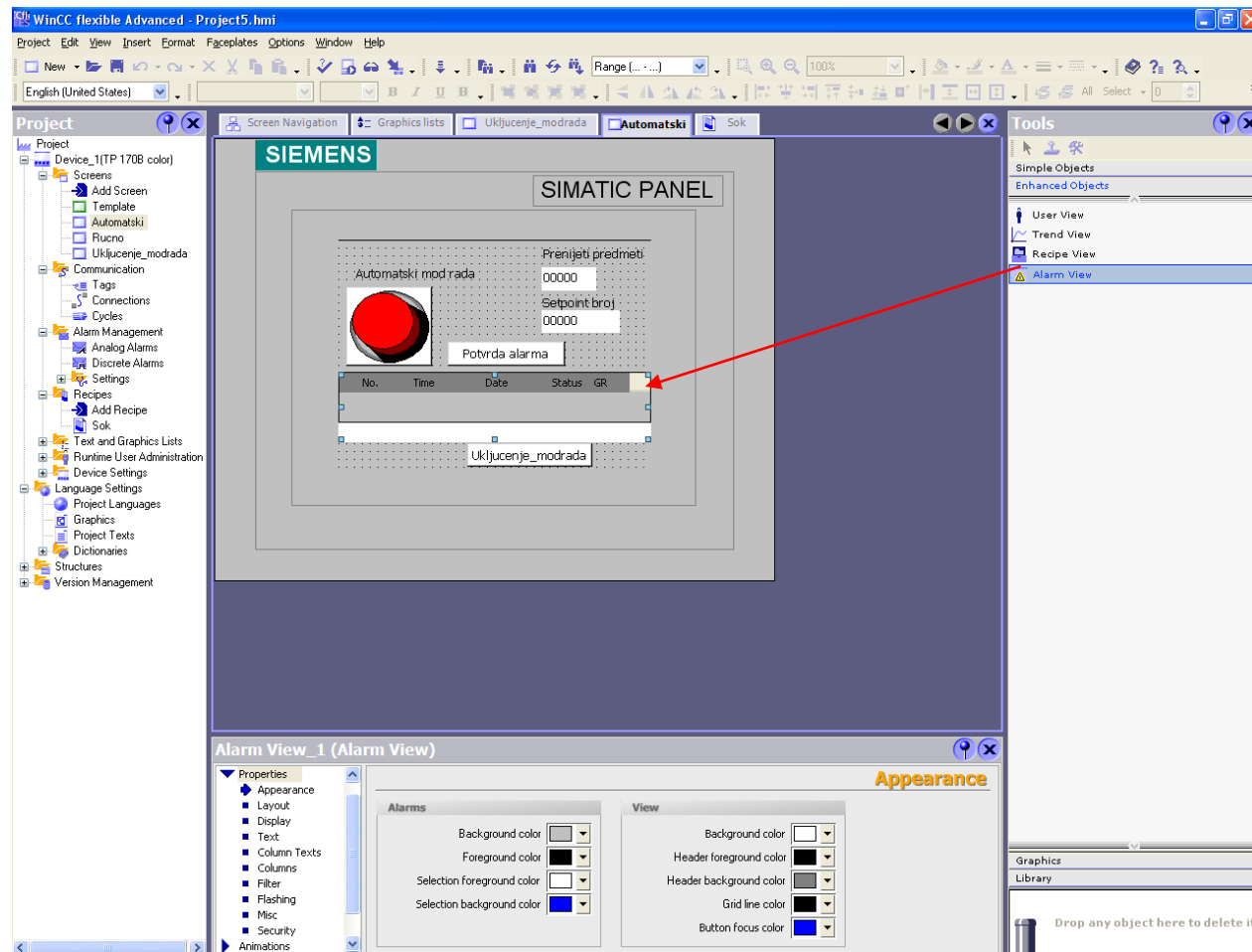
Below the main table, there is a section titled "Analog alarm 1 (Analog alarm)" which includes a "Function List" table. The "Function List" table has two rows:

Function	Tag (In/Out)	Alarm
1	ResetBit	
2	<No function>	

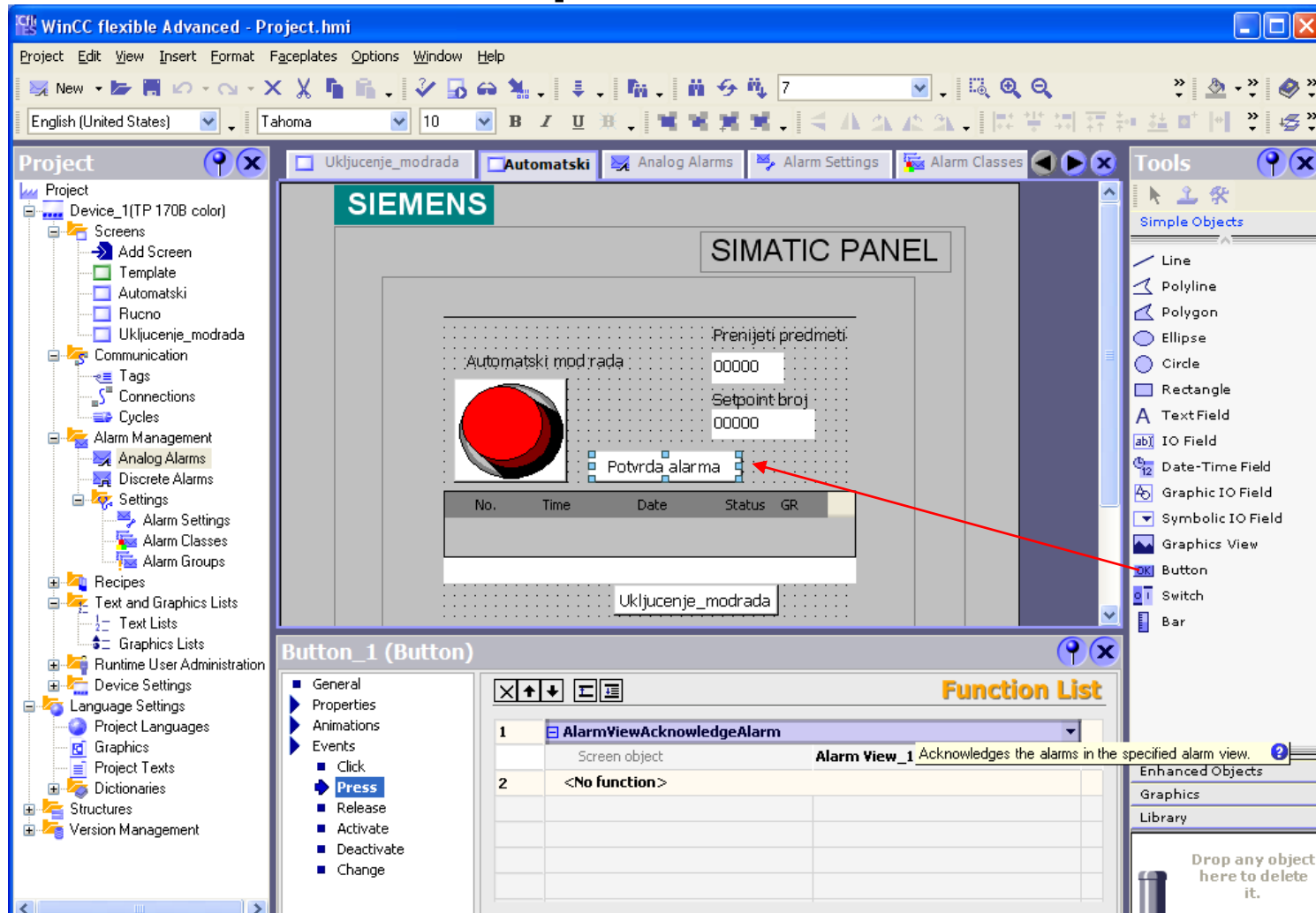
The left sidebar shows the project structure, including "Device\_1(TP 170B color)", "Screens", "Communication", "Alarm Management", and "Settings". The "Settings" folder is expanded, showing "Alarm Settings", "Alarm Classes", and "Alarm Groups".



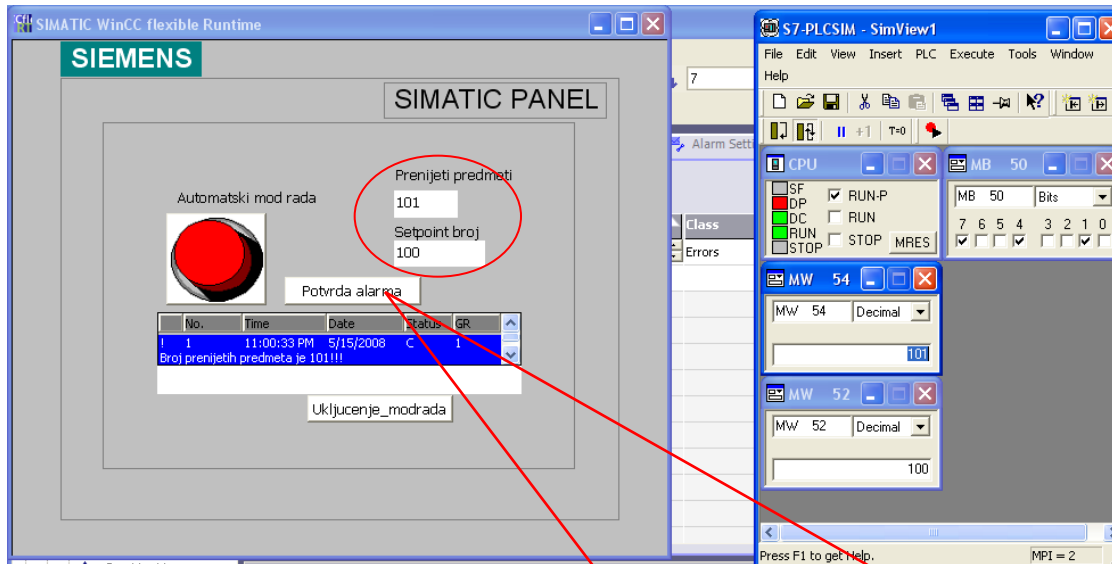
# Preglednik alarma u runtime prozoru (alarm view)



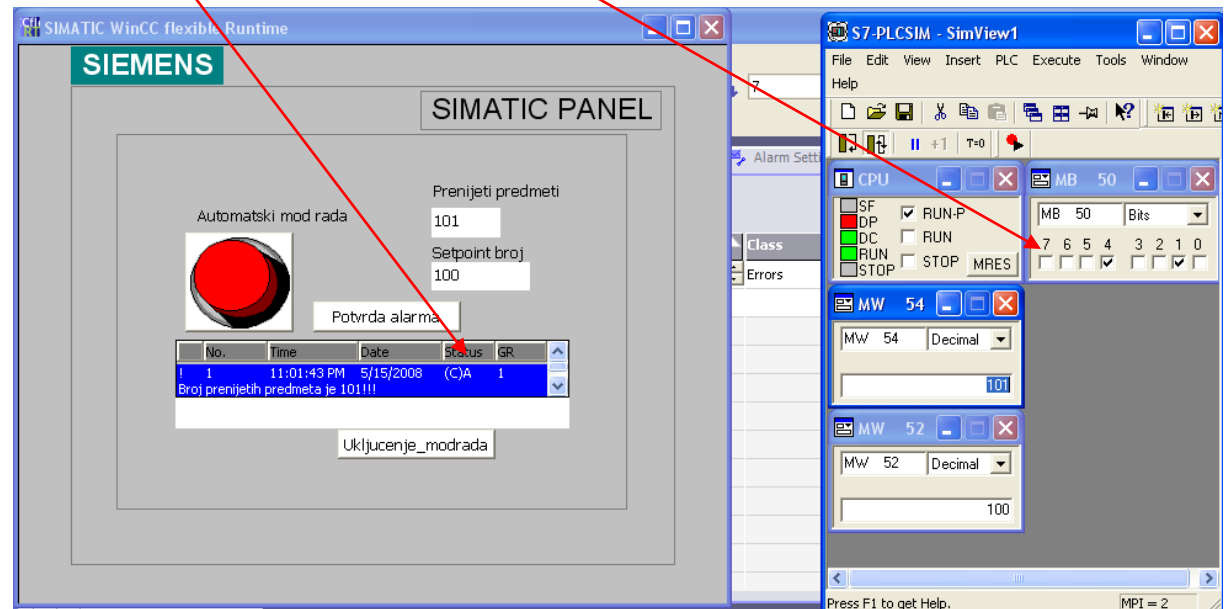
# Potvrđivanje alarma od strane operatera



# Događaj alarma u runtime-u



Tag Alarm = M50.7



# Konfiguriranje prikaza trenda tag-a

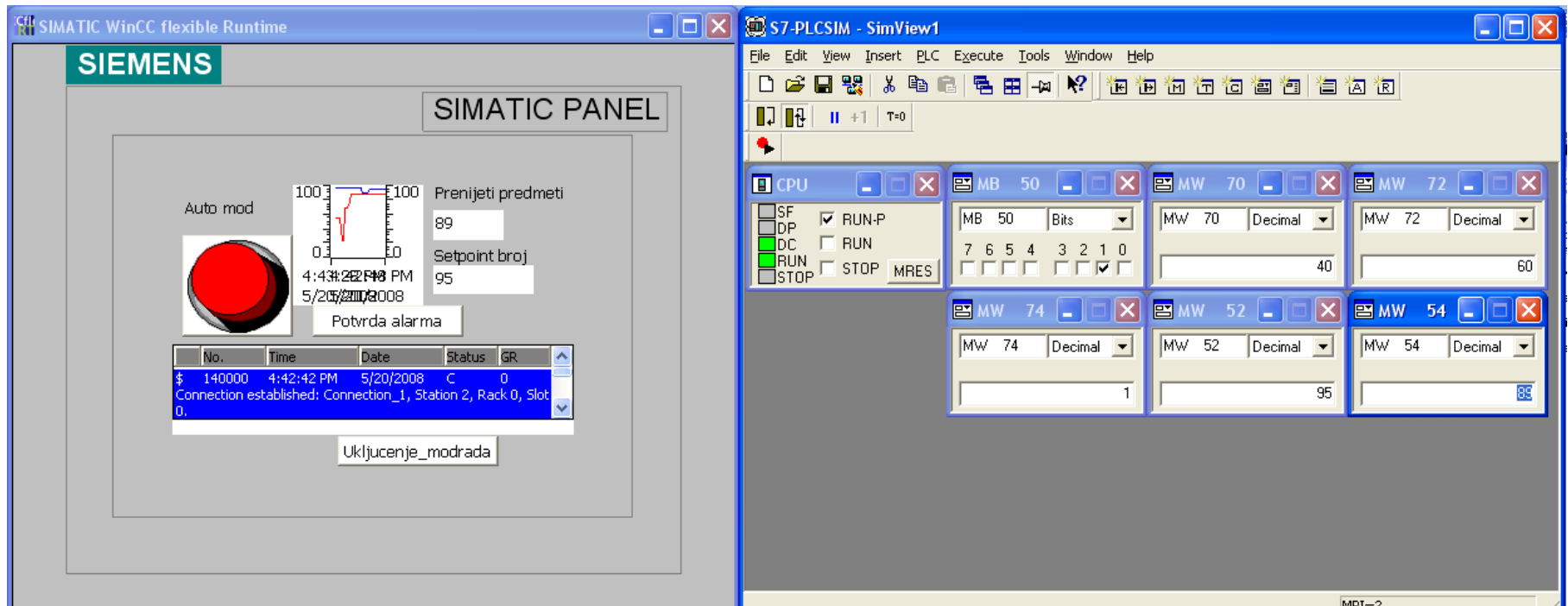
The screenshot displays the Siemens WinCC flexible Advanced interface for 'Project5.hmi'. The main workspace shows a 'SIMATIC PANEL' with a 'Trend View\_2 (Trend View)' object. A red arrow points from the 'Trend View' object in the workspace to the 'Trend View\_2 (Trend View)' configuration dialog box at the bottom. Another red arrow points from the 'Trend View' object in the workspace to the 'Tag' field in the 'Trend View\_2 (Trend View)' dialog box.

The 'Trend View\_2 (Trend View)' dialog box has the following configuration:

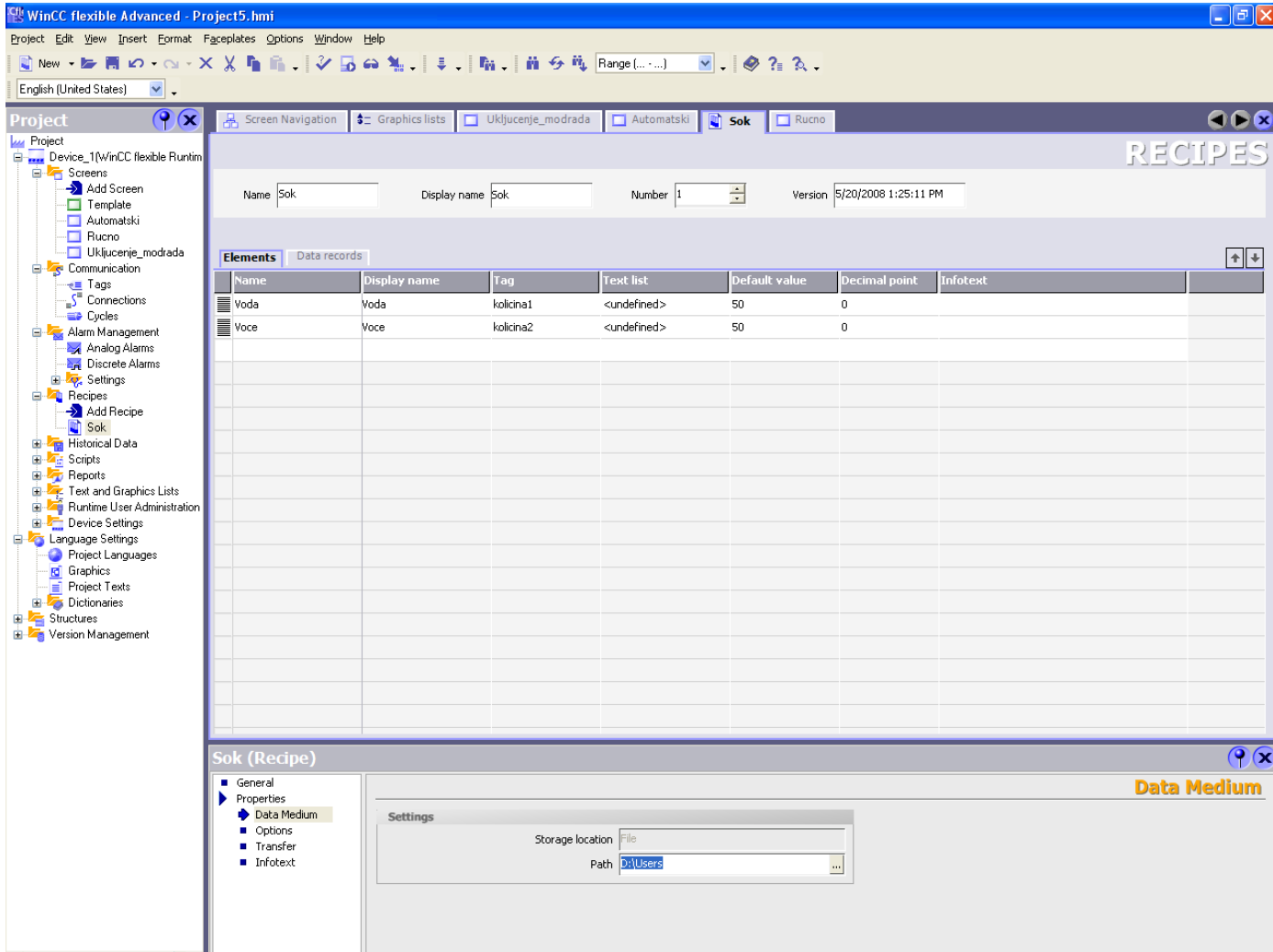
- Icon:**
- Name:** <undefined>
- Info:** IW 125, FC, kolicina1, MW 70, kolicina2, MW 72, Setpoint broj, MW 52, Stvarni broj, MW 54, Tag\_1, MW 74
- Display:** Lines
- Line type:** Solid
- Bar wid.:** 50
- Samples:** 100
- Display mode:** No
- Trend type:** Realtime
- Trend tag:** <undefined>
- Pulse:** 1.0 sec.

The 'Tag' field in the dialog box is set to 'Tag\_1'. The 'Trend View\_2 (Trend View)' dialog box also includes a 'Graphics' section with a 'Library' and a 'Drop any object here to delete it.' button.

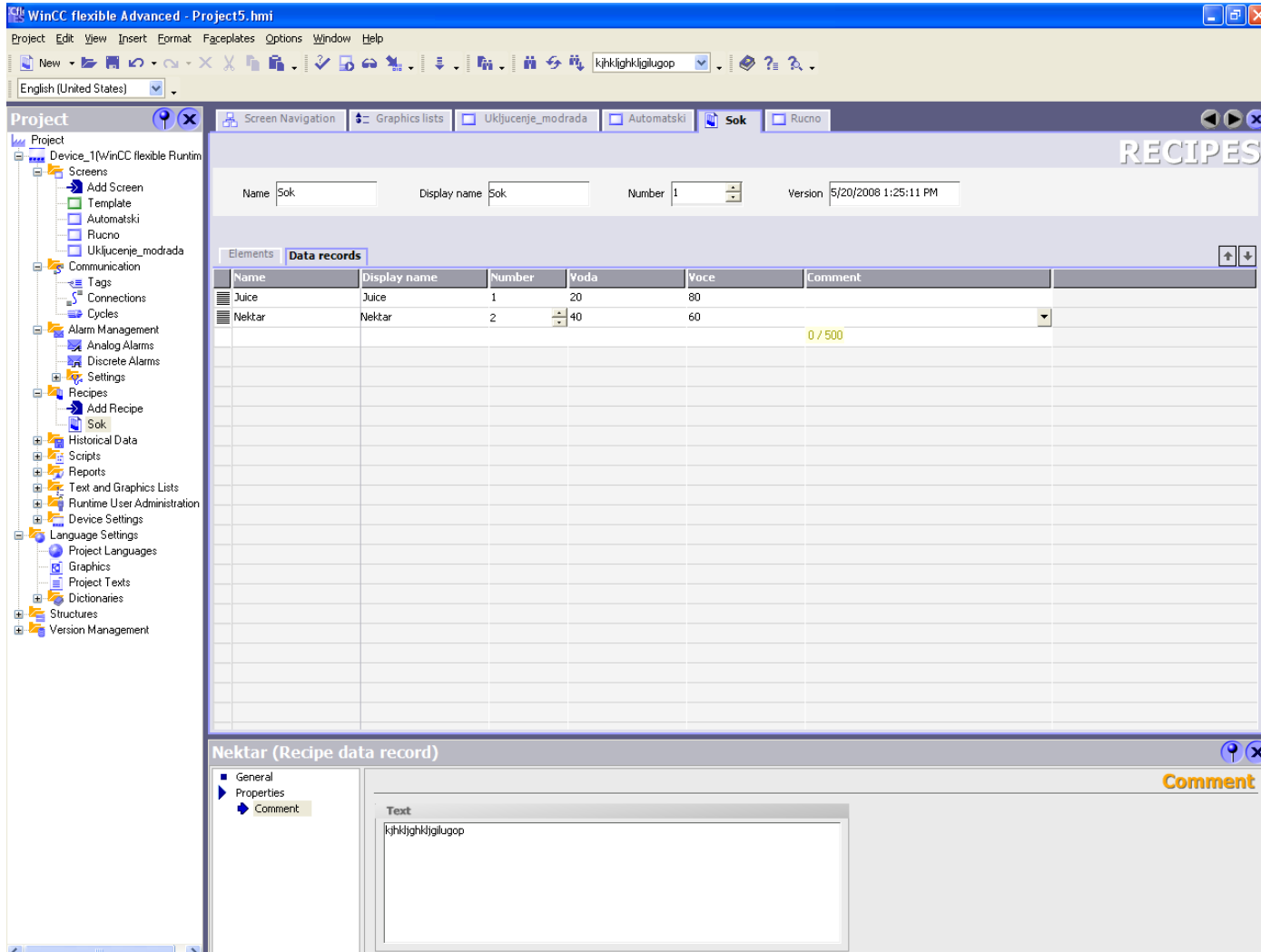
# Trend tag-a, runtime



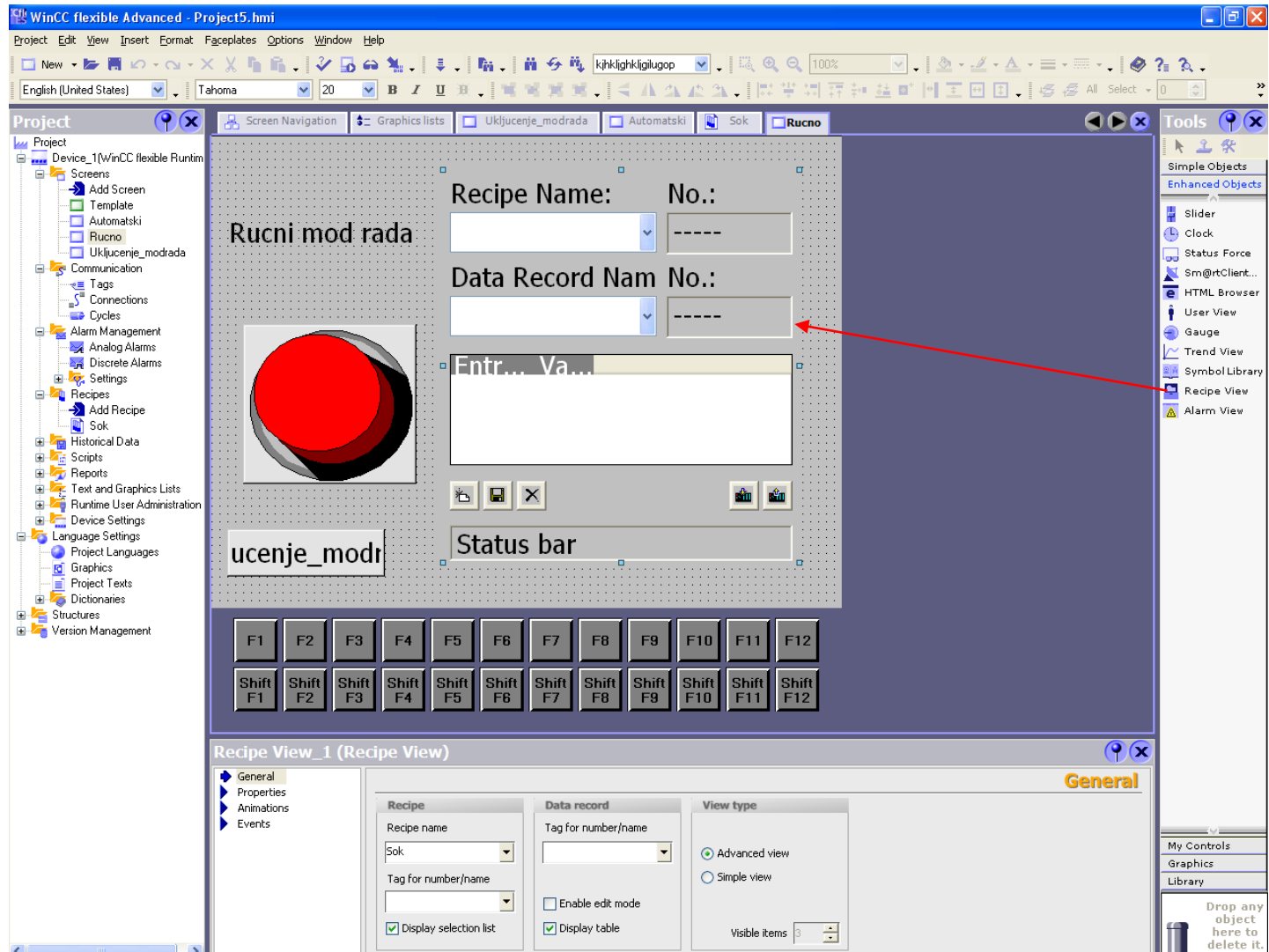
# Receptura – konfiguriranje elemenata



# Receptura – konfiguriranje skupova podataka



# Receptura – konfiguriranje prikaza





# Recepture – runtime rad

Rucni mod rada

Recipe Name:  No.:

Data Record Nar  No.:

Entr...	Va...
Voda	20
Voce	80

ucenje\_modr

S7-PLCSIM - SimView1

File Edit View Insert PLC Execute Tools Window Help

CPU

SF ☐ DP ☐ DC ☐ RUN ☒ STOP ☐ MRES

MB 50

MB 50 Bits

7 6 5 4 3 2 1 0

☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐

MW 70

MW 70 Decimal

20

MW 72

MW 72 Decimal

80

MPI=2

# Log-ovi tag-ova (1)

The screenshot shows the WinCC flexible Advanced interface for 'Project5.hmi'. The 'Data Logs' window is open, displaying a table with the following data:

Name	No. of data records per log	Storage location	Path	Data source mode	Data source name	Logging method	Number of logs	Fill level
Spremanje	500	File	F:\	System		Circular log	10	90

Below the table, the 'Spremanje (Data\_log)' configuration window is open, showing the 'General' tab. The 'Name' field is 'Spremanje'. The 'Storage' section shows 'Storage location' set to 'File' and 'Path' set to 'F:\'. A red arrow points to the 'Path' field.

Mjesto na disku gdje će se tijekom runtime-a spremati log-datoteka u .csv formatu

# Log-ovi tag-ova (2)

WinCC flexible Advanced - Project5.hmi

Project Edit View Insert Format Faceplates Options Window Help

English (United States)

Project

- Device\_1[WinCC flexible Runtime]
- Screens
  - Add Screen
  - Template
  - Automatski
  - Rucno
  - Uključenje\_modrada
- Communication
  - Tags
  - Connections
  - Cycles
- Alarm Management
  - Analog Alarms
  - Discrete Alarms
- Settings
  - Add Recipe
  - Sok
- Historical Data
  - Data Logs
  - Alarm Logs
- Scripts
  - Reports
  - Text and Graphics Lists
  - Runtime User Administration
- Device Settings
  - Language Settings
  - Project Languages
  - Graphics
  - Project Texts
  - Dictionaries
- Structures
  - Version Management

Tags

Name	Acquisition cycle	Comment	Data log	Logging acquisition mode	Logging cycle	Start value
Motor naprijed	1 s	Acquisition cycle.	<Undefined>	Cyclic continuous	<Undefined>	
Motor natrag	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Potvrda	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Preselekcija	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Rucno_naprijed	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Rucno_natrag	1 s		Spremanje	Cyclic continuous	5 s	
Setpoint broj	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Signalizacija au...	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Signalizacija ruci	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Signalizacija ukl...	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Stvarni broj	1 s		Spremanje	Cyclic continuous	5 s	
Tag_1	1 s		<Undefined>	Cyclic continuous	<Undefined>	1
Uključenje	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Uključenje_0	1 s		<Undefined>	Cyclic continuous	<Undefined>	
Uključenje_1	1 s		<Undefined>	Cyclic continuous	<Undefined>	

Alarm (Tag)

General

Properties

Events

General

Name Alarm

Connection Connection\_1

Data type Bool

Acquisition mode Cyclic on use

Acquisition cycle 1 s

Array count 1

Settings

Length 0

# Log-ovi alarma (1)

The screenshot displays the WinCC flexible Advanced software interface for Project5.hmi. The left sidebar shows a project tree with 'Alarm Logs' selected under 'Historical Data'. The main window features a table for 'Alarm Logs' with columns: Name, No. of data records, Storage location, Path, Data source name, Log alarm text and error location, and Data source. The table contains one entry: 'Alarm\_log\_1' with 500 records, stored as a File at path 'F:\'. Below the table, the 'Alarm\_log\_1 (Alarm\_log)' properties window is open, showing the 'General' tab. It includes fields for Name (Alarm\_log\_1), Size (No. of data records per log: 500, Min. 35 KB, Max. 104 KB), Storage location (File), and Path (F:\). A red arrow points to the Path field.

Name	No. of data re...	Storage location	Path	Data source name	Log alarm text and error location	Data sour...
Alarm_log_1	500	File	F:\	...	On	System

**Alarm\_log\_1 (Alarm\_log)**

**General**

Name: Alarm\_log\_1

Size: No. of data records per log: 500  
Min. 35 KB, Max. 104 KB

Storage location: File

Path: F:\

Mjesto na disku gdje će se tijekom runtime-a spremati log-datoteka u .csv formatu

# Log-ovi alarma (2)

WinCC flexible Advanced - Project5.hmi

Project Edit View Insert Format Faceplates Options Window Help

English (United States)

Project

Device\_1(WinCC flexible Runtime)

Screens

- Add Screen
- Template
- Automatski
- Rucno
- Uključenje/modrda

Communication

- Tags
- Connections
- Cycles

Alarm Management

- Analog Alarms
- Discrete Alarms
- Settings
- Alarm Settings
- Alarm Classes
- Alarm Groups

Recipes

- Add Recipe
- Sok

Historical Data

- Data Logs
- Alarm Logs

Scripts

Reports

Text and Graphics Lists

Runtime User Administration

Device Settings

Language Settings

Project Languages

Graphics

Project Texts

Dictionaries

Structures

Version Management

ALARM CLASSES

Name	Display name	Acknowledgm...	Log	E-mail address	C color	CD color	CA color	CDA color
Diagnosis Events	57	Off	<No log>					
Errors	!	On "activated"	Alarm_log_1					
System	\$	Off	<No log>					
Warnings		Off	<No log>					

Diagnosis Events (Alarm Class)

General

Properties

Settings

Name: Diagnosis Events

E-mail address:

Log: <No log>

Displayed name: 57

Acknowledgment mode: Off

Class number: 4