



Software Switch (SOFTSW) Configuration Guidance for **GR200-Series**

Toshiba Transmission & Distribution Systems (Vietnam) Ltd. - **TTDV**
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01

Software Switch Function Introduction

Software Switch Introduction

Software Switches (S43) are provided in the GR200 as virtual switches.

They are used to determine the operation of internal processes in the IED. Either the criteria "Enable (On)" or "Disable (Off)" may be applied for each software switch

The first three have been pre-defined for special purposes, the rest are provided for general purpose usage

Setting Items	Current Val...	New Value	Unit	Range
 CBK-EN	On			Off / On
 CBK-NAME	CMDBLK			14 characters
 CBK-OFFNAME	Off			14 characters
 CBK-ONNAME	Blocked			14 characters
 CBK-CTRMENU	Off			Off / On
 CBK-CTRAHMI	SBO			DIR / SBO
 ICB-EN	On			Off / On
 ICB-NAME	ILKBYP			14 characters
 ICB-OFFNAME	Off			14 characters
 ICB-ONNAME	Bypass			14 characters
 ICB-CTRMENU	Off			Off / On
 ICB-CTRAHMI	SBO			DIR / SBO
 SCB-EN	On			Off / On
 SCB-NAME	SYNCBYP			14 characters
 SCB-OFFNAME	Off			14 characters
 SCB-ONNAME	Bypass			14 characters
 SCB-CTRMENU	Off			Off / On
 SCB-CTRAHMI	SBO			DIR / SBO

CBK: Command Blocking

ICB: Interlock Bypassing

SCB: Synchronism Bypassing

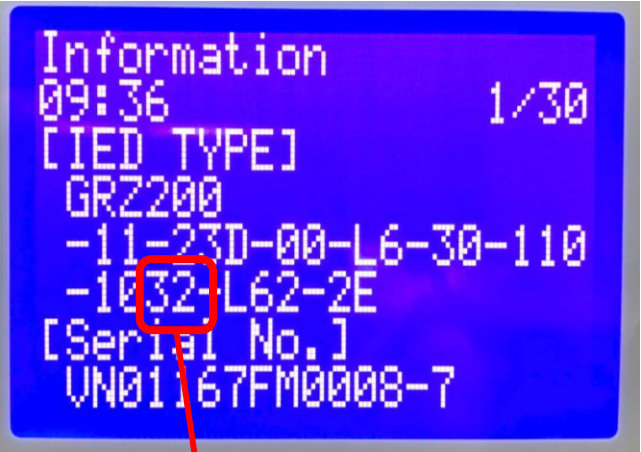
Setting Items	Current Val...	New Value	Unit	Range
 S4301-EN	Off			Off / On
 S4302-EN	Off			Off / On
 S4303-EN	Off			Off / On
 S4304-EN	Off			Off / On
 S4305-EN	Off			Off / On
 S4306-EN	Off			Off / On
 S4307-EN	Off			Off / On
 S4308-EN	Off			Off / On
 S4309-EN	Off			Off / On
 S4310-EN	Off			Off / On
 S4311-EN	Off			Off / On
 S4312-EN	Off			Off / On
 S4313-EN	Off			Off / On
 S4314-EN	Off			Off / On
 S4315-EN	Off			Off / On
 S4316-EN	Off			Off / On
 S4317-EN	Off			Off / On

Other switches ranging from
S4301 to S4361

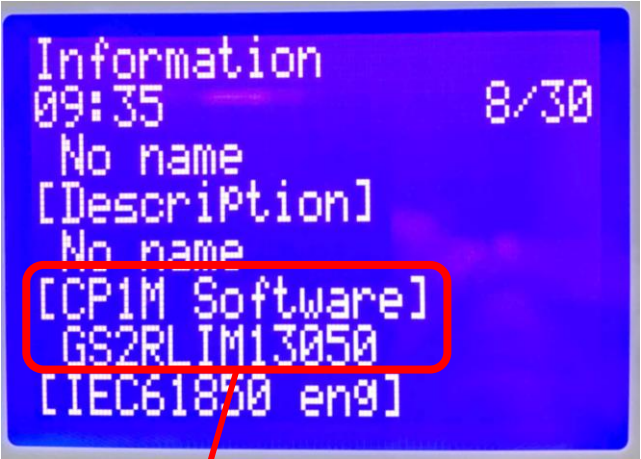
Software Switch Function Confirmation

❖ On LCD screen

Go to Main Menu -> Information to check software code and firmware version



Software code
1032



Firmware version
GS2RLIM13050

Software Switch Function Confirmation

Relays with these codes have Softswitch Control Function

Relay type	Software code	Firmware
GBU200	34,35	Any version
GRD200	3D, 3E	Any version
GRL200	37	Any version
GRZ200	32	Any version
GRB200-decentralized	31,32	Any version
GRB200-centralized	30	At least GS2RBIM13022
	31	
	32	
	33	
	34	
GRT200	3D	At least GS2RTIM13024
	3E	
	3F	

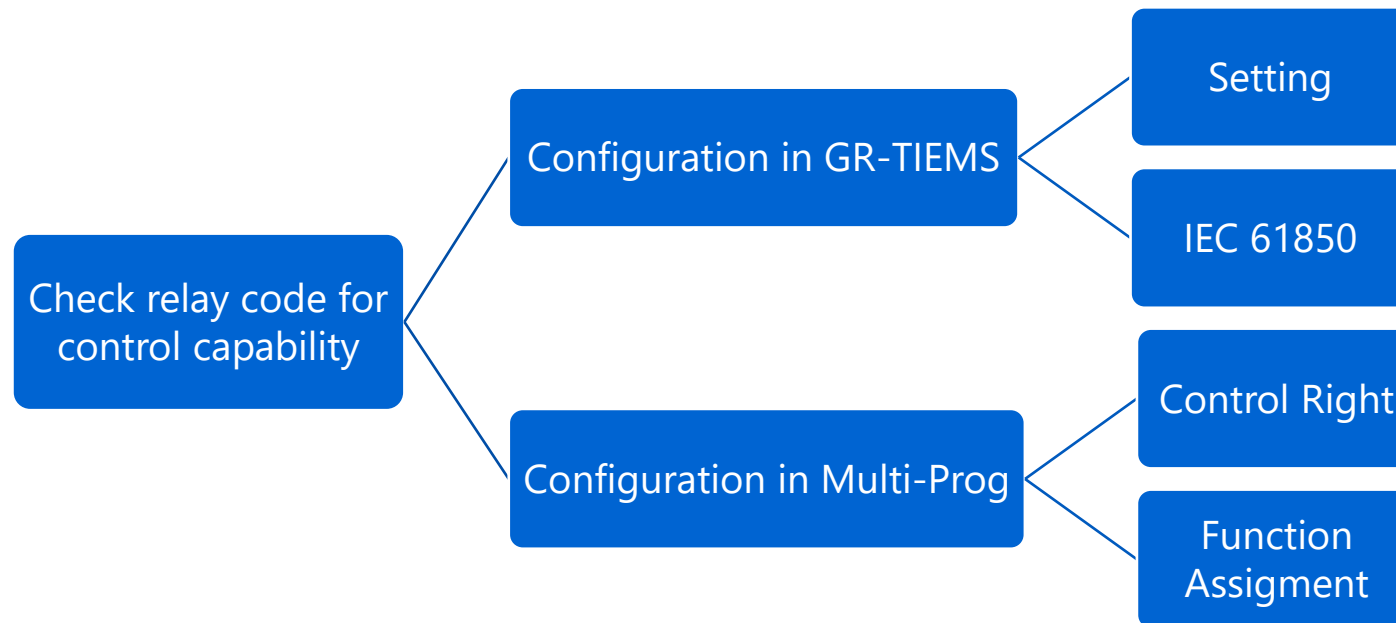
02

Application Sample

Application Sample

Case study: Using Software Switch (S4301) to control On/Off 87L Function

The configuration steps must be followed to configure Software Switch (SOFTSW).



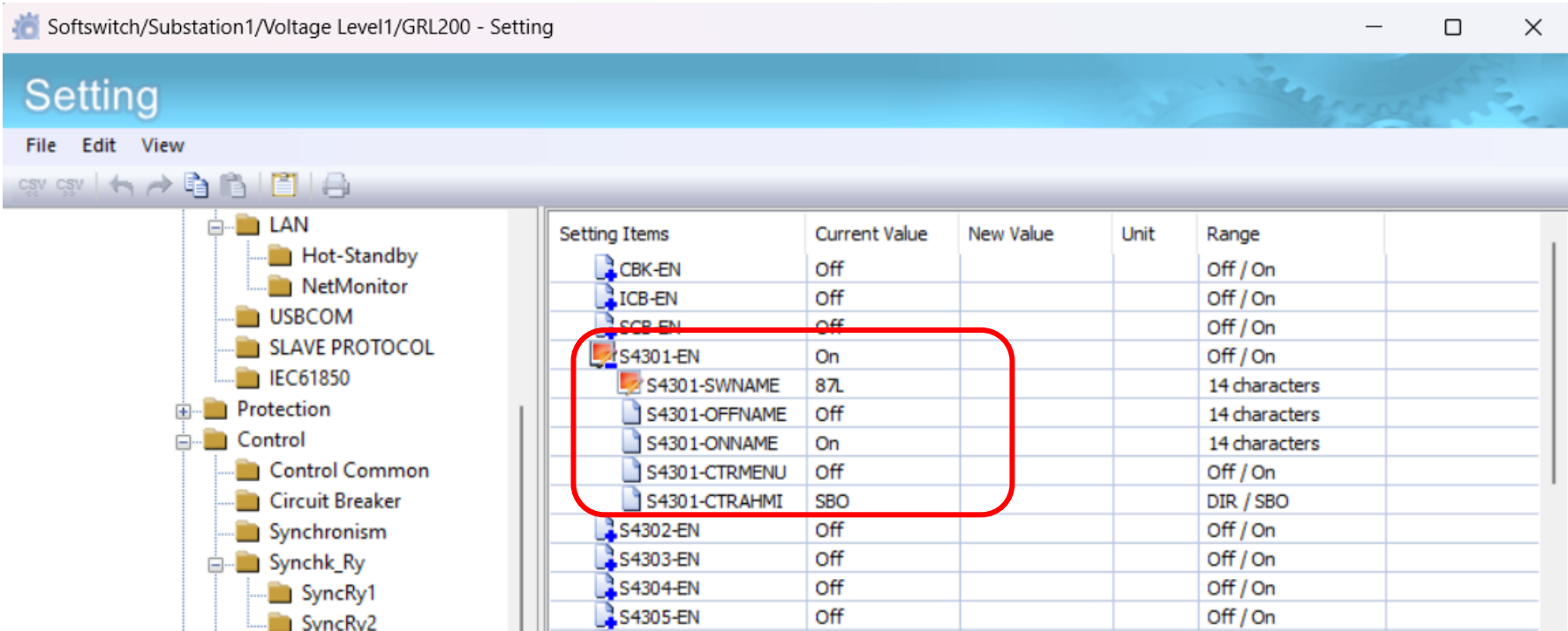
Overview of configuration steps

2.1

Configuration in GR-TIEMS

GR-TIEMS – Settings

Step 1: Enable Software Switch in GR-TIEMS Setting



Example for settings of S4301 using to control 87L on/off

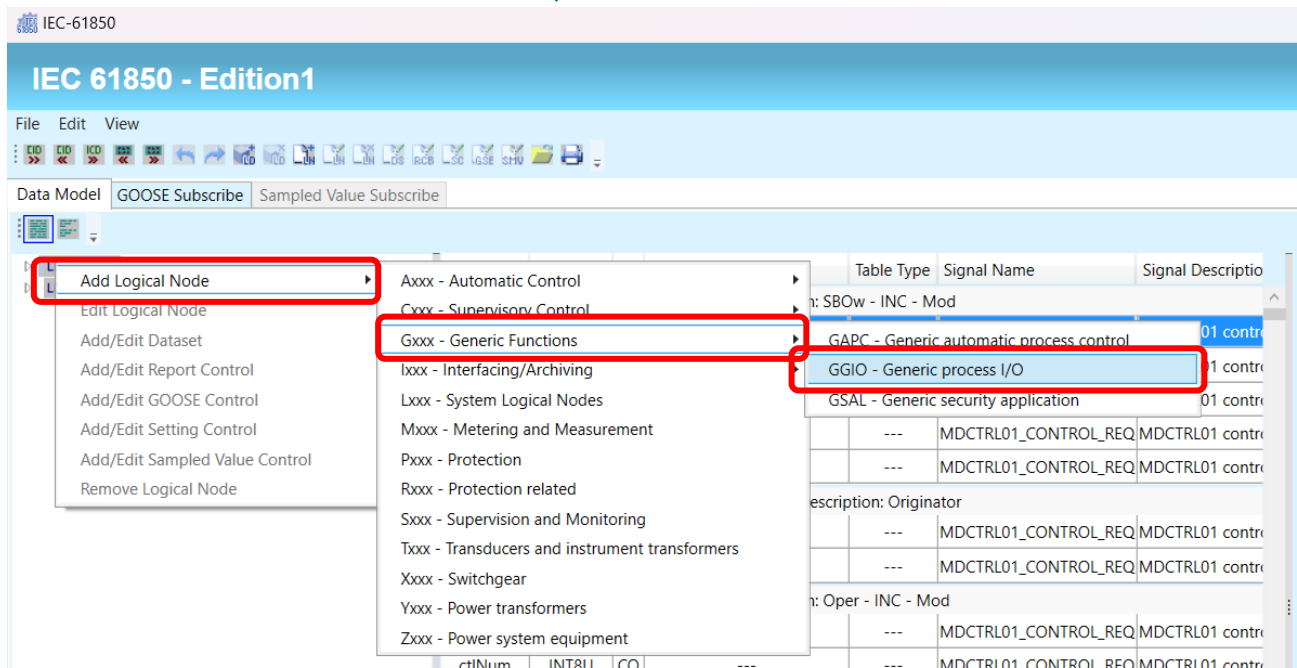
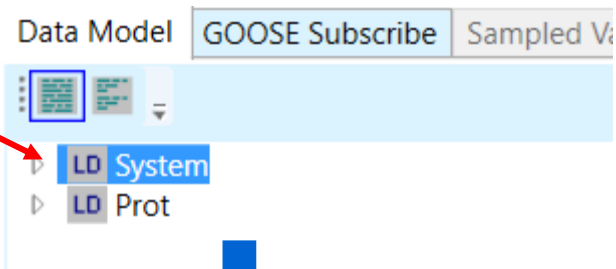
Step 2: IEC 61850 configuration



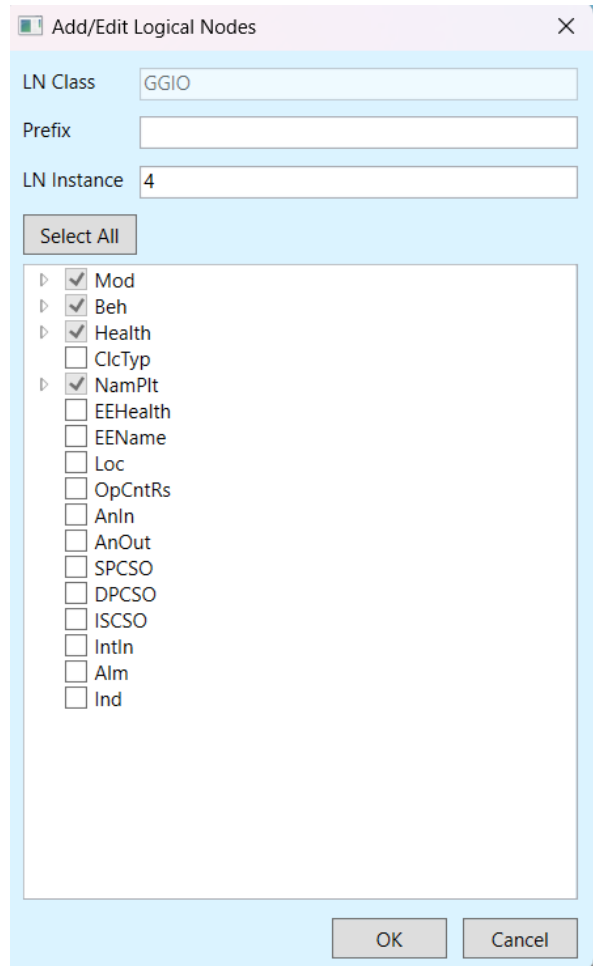
GR-TIEMS – IEC 61850

❖ Logical Node

Right click



User can define Prefix and LN Instance
Logical Node can be added to any Logical Device



GR-TIEMS – IEC 61850

❖ Logical Node

Select SPCSO and tick these following categories

For SBO mode

For DIR mode

Select as below

System/GGIO4\$SPCSO			Description: Controllable single point (SPC)		
stVal	BOOLEAN	ST	---	---	---
q	Quality	ST	---	---	---
t	Timestamp	ST	---	---	---
stSeld	BOOLEAN	ST	---	---	---
ctlModel	INT8	CF	sbo-with-enhanced-security	---	---
sboClass	INT8	CF	operate-once	---	---

For SBO

System/GGIO4\$SPCSO			Description: Controllable single point (SPC)		
stVal	BOOLEAN	ST	---	---	---
q	Quality	ST	---	---	---
t	Timestamp	ST	---	---	---
ctlModel	INT8	CF	direct-with-enhanced-security	---	---

For DIR

GR-TIEMS – IEC 61850

❖ Mapping signals

Map signals as below

Signal Name	Signal Description
---	---
---	---
---	---
---	---
---	---
S4301_CONTROL_REQ	SOFT 43 switch1 control request
---	---
---	---
---	---
---	---
---	---
inator	---
---	---
---	---

Search

Signal Number

Signal Name

Description

s4301_control_req

Clear

Type

☒ Signal

☒ Measurement

Export

Source of Signal

☒ IED

☐ GOOSE

IO Type

☒ Output

☒ Input

Signal Number

Signal Name

Description

522001700A046D08

S4301_CONTROL_REQ

SOFT 43 switch1 control request

Object_reference	Attribute	Type	FC	Signal Number	Signal Name
Ctrl/GGIO701\$SPCSO\$origin	orCat	orCategory	ST	522001 310A041008	S4301_ORCAT
Ctrl/GGIO701\$SPCSO\$origin	orIdent	Octet64	ST	522001 6A0A041009	S4301_ORIDENT
Ctrl/GGIO701\$SPCSO	stVal	INT32	ST	522001 000A041001	S4301_STATE
Ctrl/GGIO701\$SPCSO	q	Quality	ST	522001 310A041005	S4301_QUALITY
Ctrl/GGIO701\$SPCSO	t	Timestamp	ST	522001 900A041006	S4301_TIME
Ctrl/GGIO701\$SPCSO	stSeld	BOOLEAN	ST	522001 000A041D90	S4301_STSELD

Object_reference	Attribute	Type	FC	Signal Number	Signal Name
Ctrl/GGIO701\$SPCSO\$SBOw	ctlVal	BOOLEAN	CO	522001 700A046D08	S4301_CONTROL_REQ
Ctrl/GGIO701\$SPCSO\$SBOw	ctlNum	INT8U	CO		
Ctrl/GGIO701\$SPCSO\$SBOw	T	Timestamp	CO		
Ctrl/GGIO701\$SPCSO\$SBOw	Test	BOOLEAN	CO		
Ctrl/GGIO701\$SPCSO\$SBOw	Check	Check	CO		
Ctrl/GGIO701\$SPCSO\$SBOw\$origin	orCat	orCategory	CO		
Ctrl/GGIO701\$SPCSO\$SBOw\$origin	orIdent	Octet64	CO		
Ctrl/GGIO701\$SPCSO\$Oper	ctlVal	BOOLEAN	CO		
Ctrl/GGIO701\$SPCSO\$Oper	ctlNum	INT8U	CO		
Ctrl/GGIO701\$SPCSO\$Oper	T	Timestamp	CO		
Ctrl/GGIO701\$SPCSO\$Oper	Test	BOOLEAN	CO		
Ctrl/GGIO701\$SPCSO\$Oper	Check	Check	CO		
Ctrl/GGIO701\$SPCSO\$Oper\$origin	orCat	orCategory	CO		
Ctrl/GGIO701\$SPCSO\$Oper\$origin	orIdent	Octet64	CO		
Ctrl/GGIO701\$SPCSO\$Cancel	ctlVal	BOOLEAN	CO		
Ctrl/GGIO701\$SPCSO\$Cancel	ctlNum	INT8U	CO		
Ctrl/GGIO701\$SPCSO\$Cancel	T	Timestamp	CO		
Ctrl/GGIO701\$SPCSO\$Cancel	Test	BOOLEAN	CO		
Ctrl/GGIO701\$SPCSO\$Cancel\$origin	orCat	orCategory	CO		
Ctrl/GGIO701\$SPCSO\$Cancel\$origin	orIdent	Octet64	CO		
Ctrl/GGIO701\$SPCSO	ctlModel	ctlModel	CF		
Ctrl/GGIO701\$SPCSO	sboClass	sboClass	CF		

Not apply for DIR

TTDV-EN-PRC-007_R0

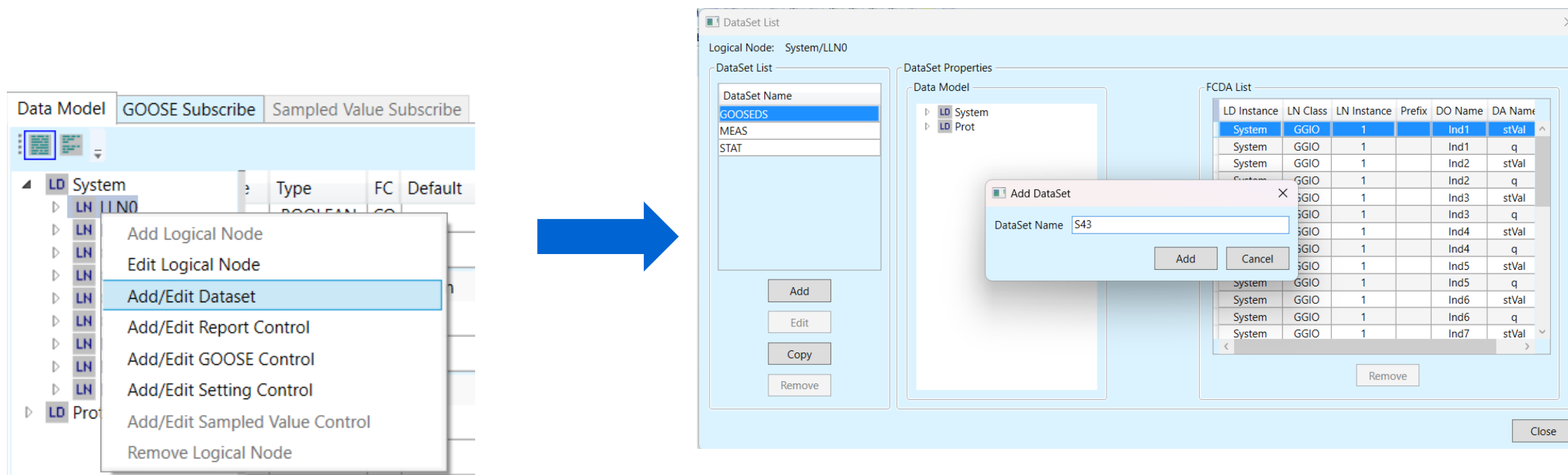
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GR-TIEMS – IEC 61850

❖ Dataset

Right click at LLN0, select “Add/Edit Dataset”, click “Add” and type the name



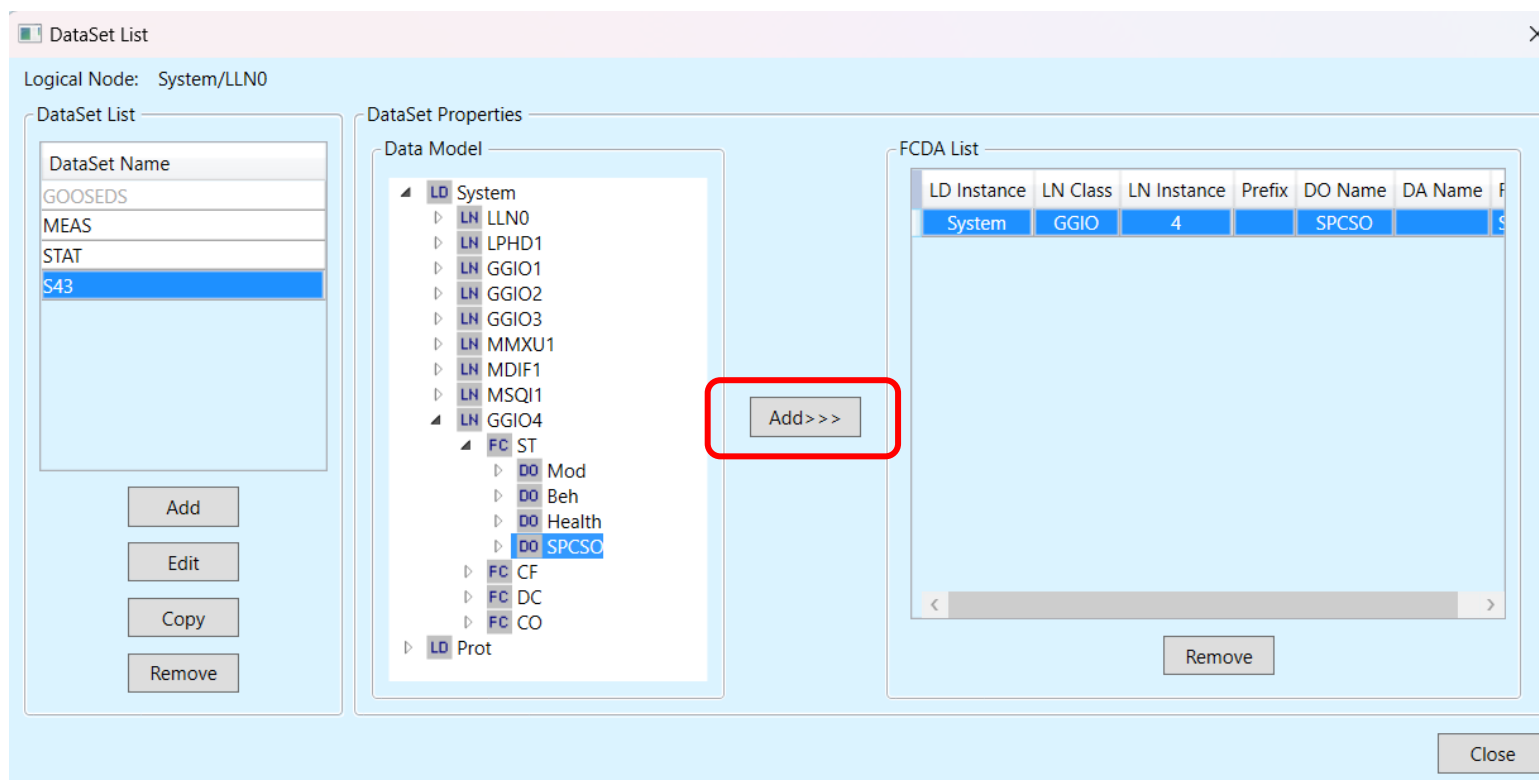
Example configuration, name can be changed

GR-TIEMS – IEC 61850

❖ Dataset

Select "S43", then add Data Model as below

Note: Select the Logical Device that contains the Softswitch Logical Node



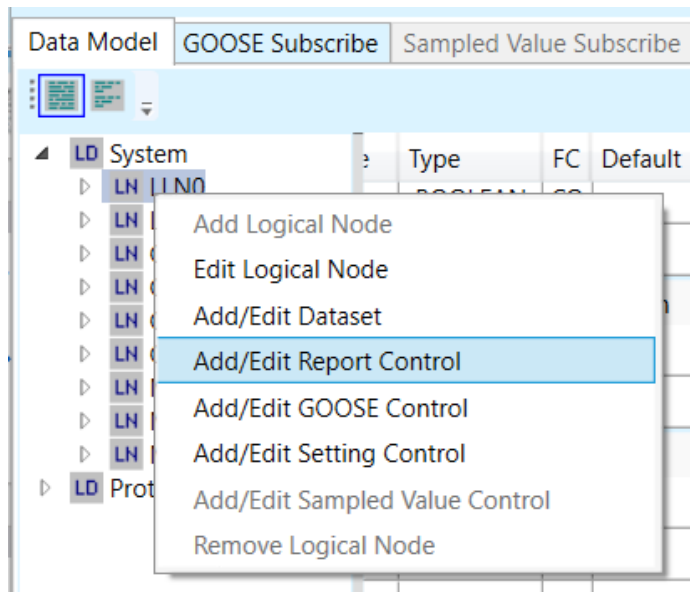
Example configuration, name can be changed

GR-TIEMS – IEC 61850

❖ Report Control

Right click at LLN0, select “Add/Edit Report Control”

Note: Edit Report Control in the same Logical Device that contains the Softswitch



Select “Add” and type the name

The screenshot shows the 'Add/Edit Report Control Block' dialog box. The 'Logical Node' is set to 'System/LLN0'. The 'RCB List' on the left contains 'brcbMX' and 'brcbST'. The 'Report Control Properties' section on the right includes fields for Name (brcbMX), Description, DataSet (MEAS), Integrity Period (0), and Report ID (RPT). Below these are checkboxes for 'Data Change', 'Data Update', 'Quality Change', 'Period', and 'General Interrogation'. The 'Optional Fields' section has checkboxes for 'Sequence Number', 'TimeStamp', 'DataSet', 'Data Attribute Reference', and 'Entry ID'. A smaller 'Add Report Control Block' sub-dialog is open in the foreground, showing the 'RCB Name' field with 'brcb-sw' entered. The 'Add' button is highlighted. At the bottom of the main dialog are 'Add', 'Edit', 'Copy', 'Remove', 'Save', and 'Close' buttons.

GR-TIEMS – IEC 61850

❖ Report Control

Select the added RCB list, and tick as below

Logical Node: System/LLN0

RCB List

RCB Name
brcbMX
brcbST
brcb-sw

Report Control Properties

Report Control

Name: brcb-sw

Description:

DataSet: S43

Integrity Period: 0

Report ID: RPT

Config Revision: 1

Buffered: true

Buffer Time: 0

Optional Fields

- ☒ Sequence Number
- ☒ TimeStamp
- ☒ DataSet
- ☒ Data Attribute Reference
- ☒ Entry ID
- ☒ Configuration Revision
- ☒ Reason Code

Trigger Options

- ☒ Data Change
- ☐ Period
- ☐ Data Update
- ☒ General Interrogation
- ☒ Quality Change

Report Enabled

Description:

Max: 2

Save

Close

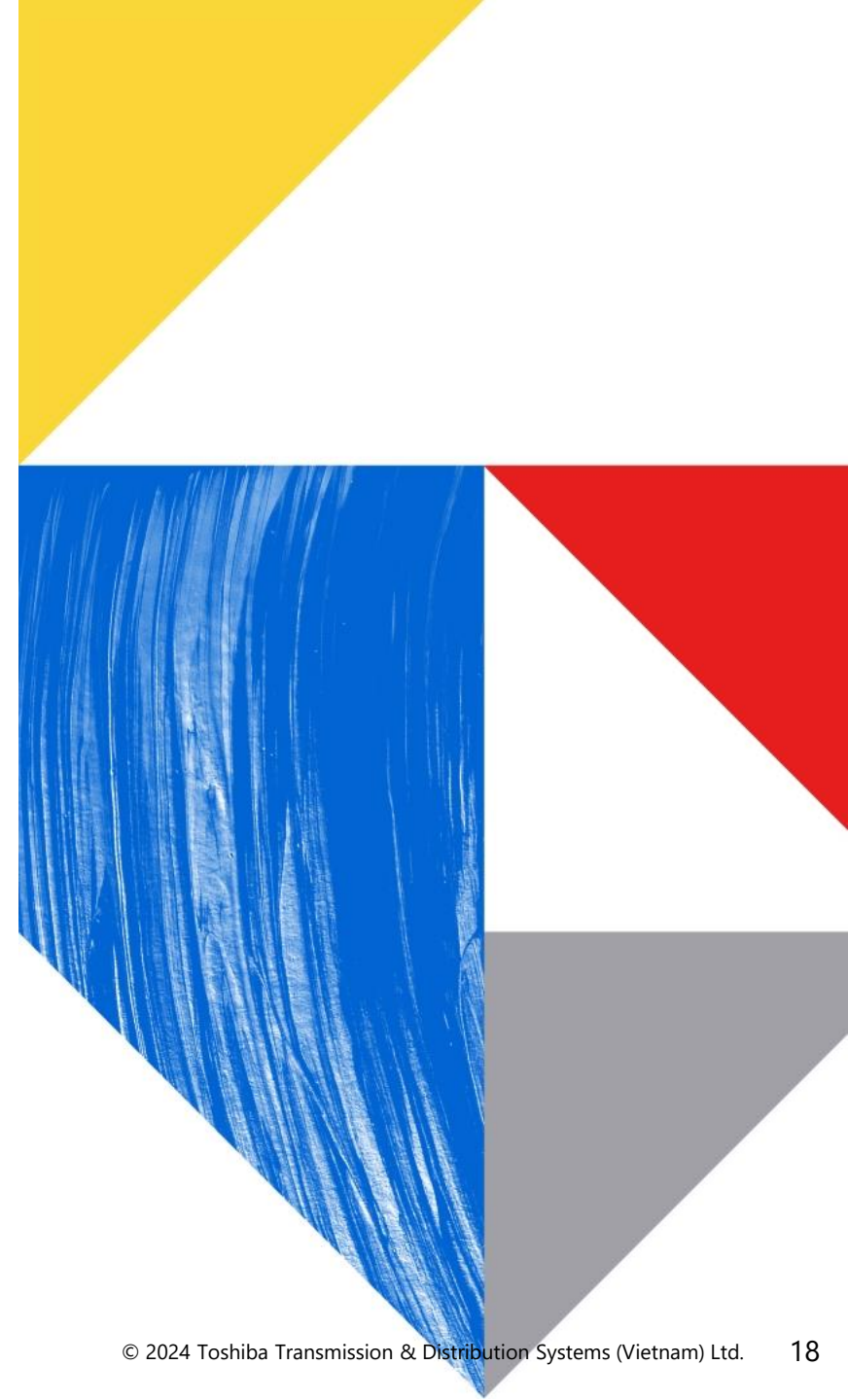
Select recently added Dataset

Example configuration, name, trigger options, optional fields, report enabled, buffer setting can be changed

Finally, click "Save"

2.2

Configuration in MULTIPROG

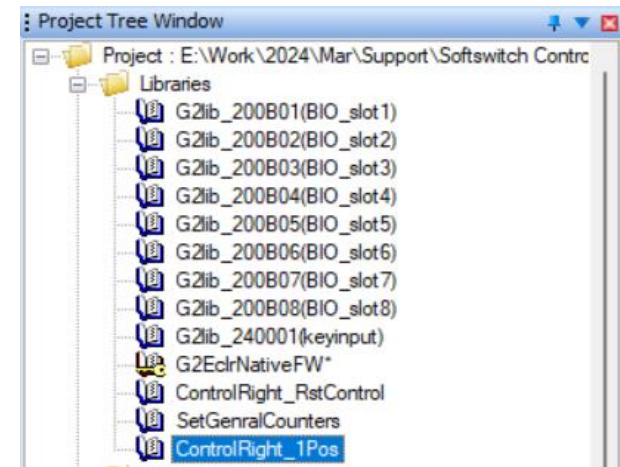
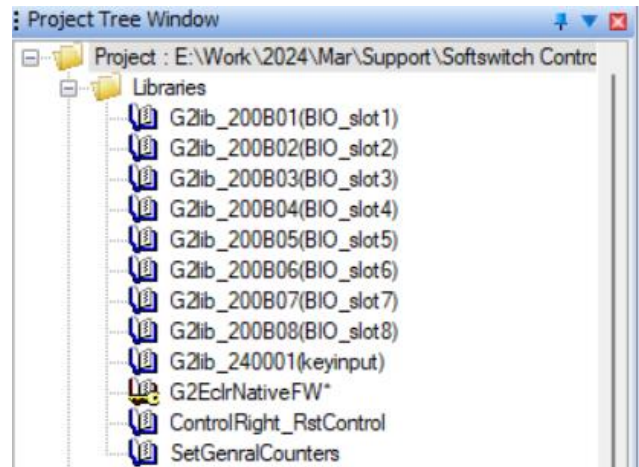
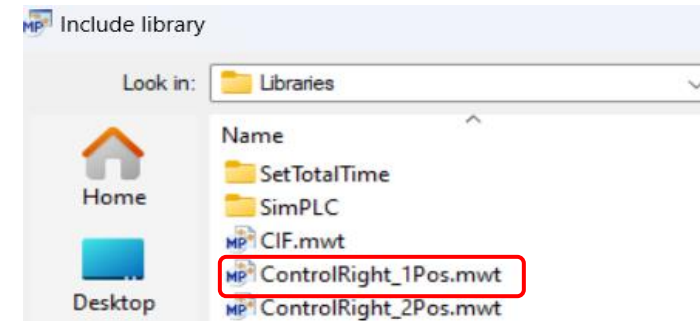
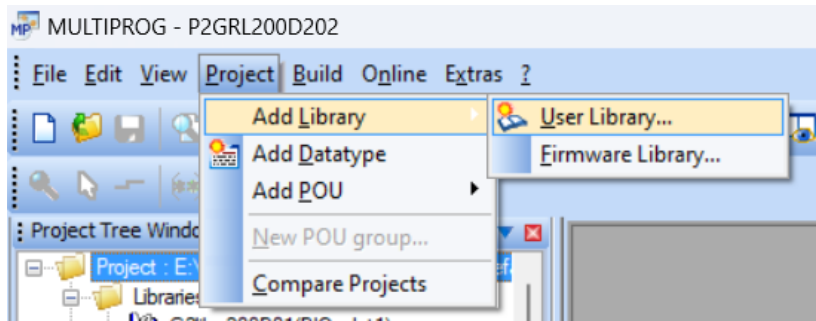


MULTIPROG – Control Right Configuration

Step 1: Control Right Configuration

❖ Add Library

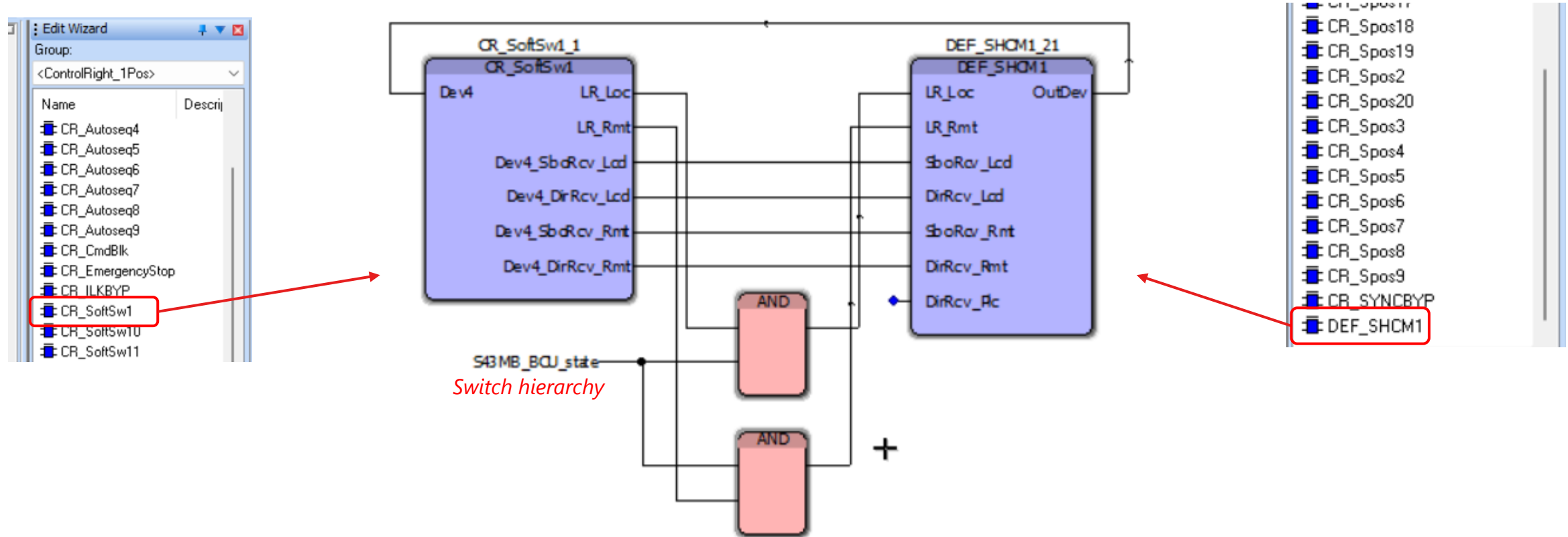
Click “Project” → “Add Library” → “User Library” → Double Click at “ControlRight_1Pos.mwt”



Confirm library has been added

MULTIPROG – Control Right Configuration

❖ Add block to code worksheet



Make sure there is only **ONE** Control Right block for S4301 in Multi Prog

MULTIPROG – SOFTSW Function Configuration

Step 2: SOFTSW Function Configuration

❖ Example of applying softswitch state to block function 87L (DIFL and DIFGL)

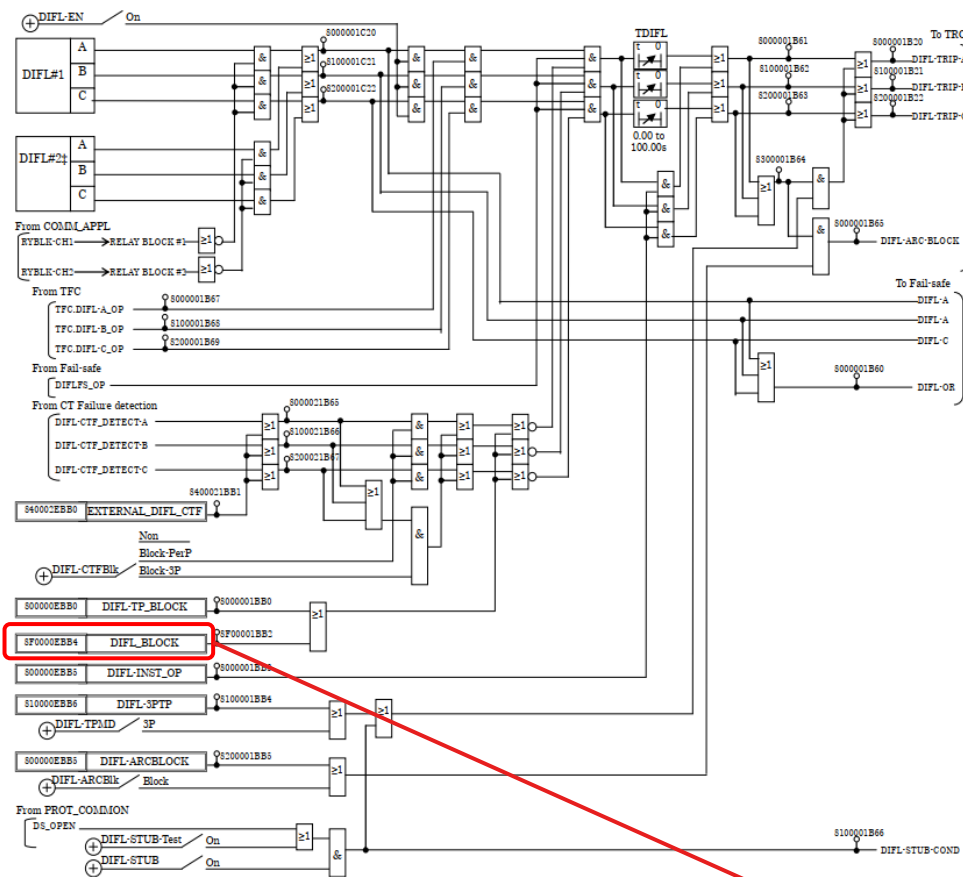


Figure 2.2-3 Generation of trip signals in the DIFL function

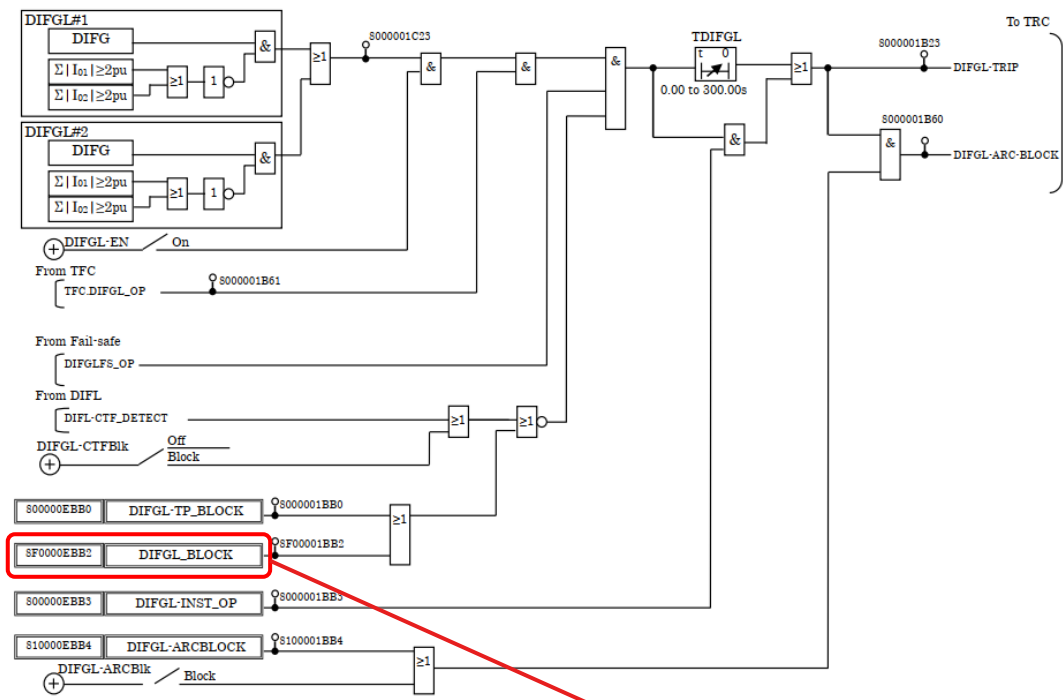
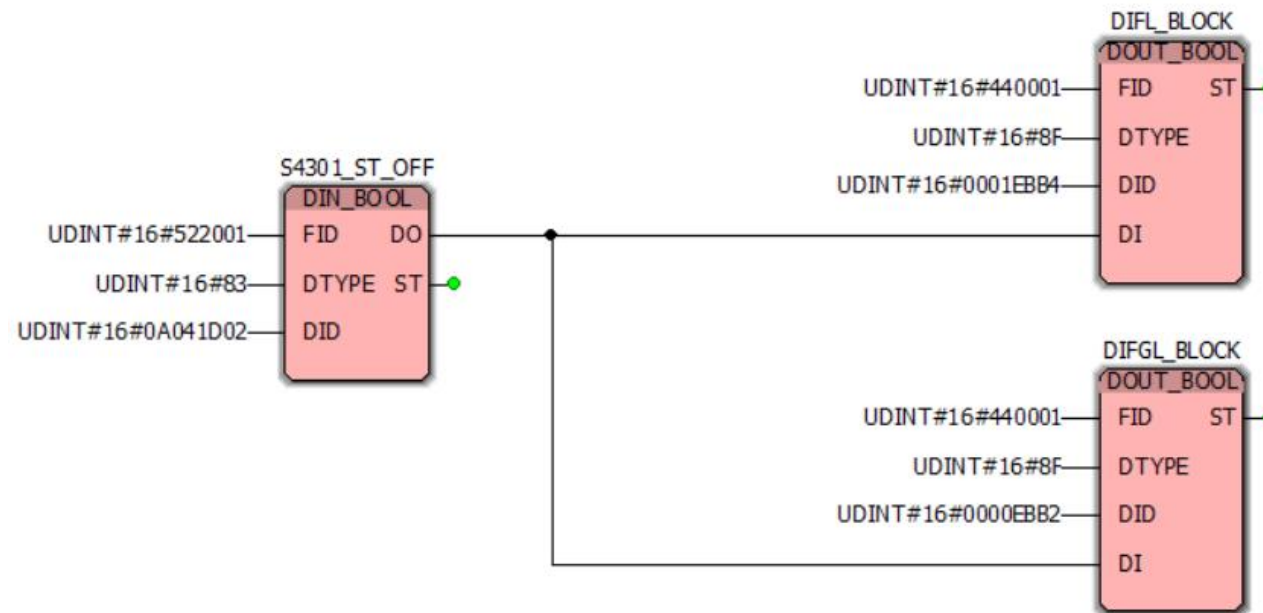


Figure 2.3-3 Generation of trip signal in the DIFGL function



MULTIPROG – SOFTSW Function Configuration

Example of applying softswitch state to block function 87L (DIFL and DIFGL)



Sample configuration for 87L on/off control

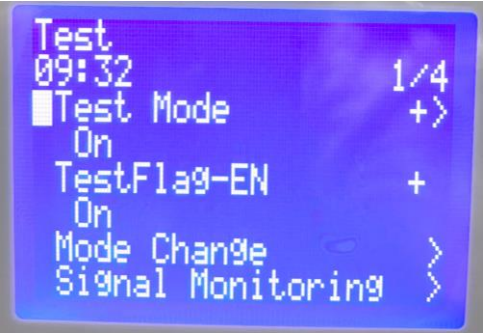
03

Troubleshooting

Troubleshooting

In case you have trouble in SOFTSW control from IEC 61850, the cause may come from the below issues:

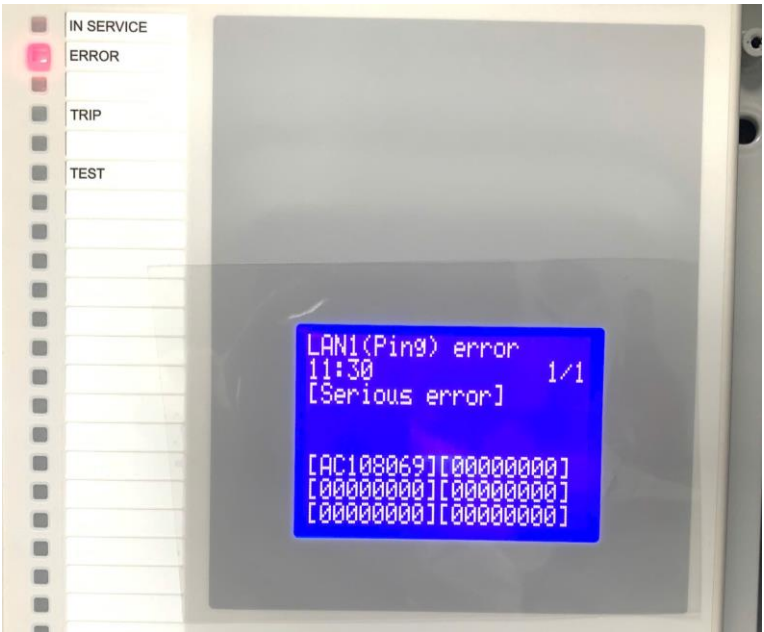
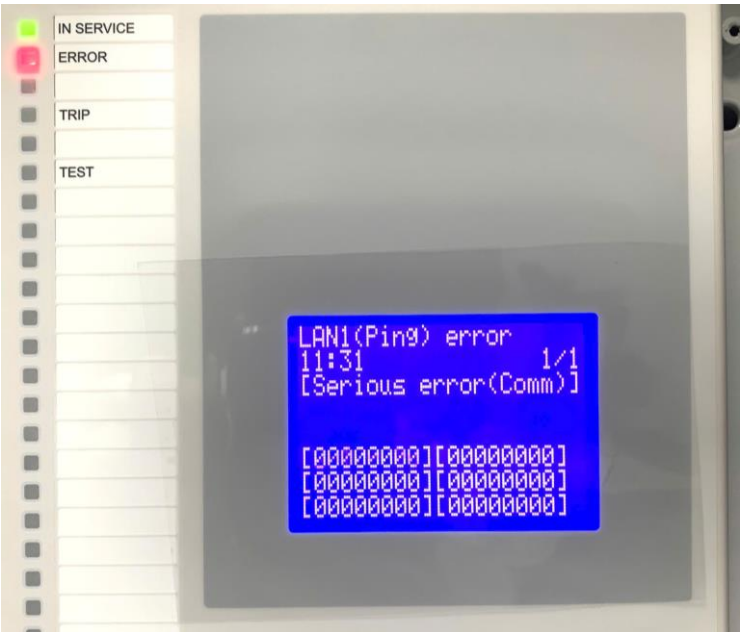
1. Relay is in Test mode



2. Remote/Local button is in Local mode



3. Relay Error: Serious or Serious (Comm)



Revision Up Record

Revision	Date of issuance	Change log	Information	Issued by
0	02/10/2024	All	First Issued	P&C Engineer Department



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