

APLIKASI **ETS6** DALAM SISTEM **KNX**

MOHD FARIZUL IRNI BIN ISMAIL

AMAN ZAKI BIN MAMAT

ROHAILA BINTI MOHD RADİ

APLIKASI ETS6 DALAM SISTEM KNX

ETS6 (Engineering Tool Software Versi 6)

**MOHD FARIZUL IRNI BIN ISMAIL
AMAN ZAKI BIN MAMAT
ROHAILA BINTI MOHD RADİ**



First Edition 2026

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PUBLISHED BY

Politeknik Port Dickson

KM 14 Jalan Pantai, 71050 Si Rusa

Negeri Sembilan

Jabatan Kejuruteraan Elektrik

06-662 2023 (Librarian)

06-662 2048 (Counter)

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Data Pengkatalogan-dalam-Penerbitan

Perpustakaan Negara Malaysia

Rekod katalog untuk buku ini boleh didapati dari
Perpustakaan Negara Malaysia

eISBN 978-629-7643-95-3

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Prakata

eBook Aplikasi ETS6 Dalam Sistem KNX ini dihasilkan sebagai rujukan ringkas dan praktikal kepada para pelajar, tenaga pengajar, juruteknik, integrator sistem, serta individu yang ingin memahami penggunaan perisian ETS6 dalam pembangunan sistem automasi bangunan berasaskan KNX. Teknologi KNX kini menjadi antara standard utama dalam bidang automasi bangunan moden kerana keupayaannya mengintegrasikan pelbagai sistem seperti pencahayaan, penghawa dingin, kawalan tirai, keselamatan, dan pengurusan tenaga dalam satu platform yang cekap dan fleksibel. Dalam proses pembangunan sistem KNX, perisian ETS6 memainkan peranan yang sangat penting sebagai alat konfigurasi, pengaturcaraan, dan pengujian keseluruhan sistem. eBook ini disusun dalam bentuk langkah demi langkah bagi memudahkan pembaca memahami aliran kerja penggunaan ETS6 bermula daripada penciptaan projek, konfigurasi peranti, penetapan alamat kumpulan (group address), parameter peranti, proses muat turun program ke peranti KNX, sehinggalah kepada pengujian sistem. Pendekatan yang digunakan adalah ringkas, praktikal, dan sesuai dijadikan panduan pantas semasa latihan, pembelajaran, mahupun kerja lapangan. Penulis berharap kandungan eBook ini dapat membantu pembaca menjimatkan masa dalam memahami asas penggunaan ETS6 serta meningkatkan keyakinan dalam membangunkan sistem automasi bangunan menggunakan KNX. Walaupun panduan ini dihasilkan secara ringkas, usaha telah dibuat untuk memastikan setiap langkah diterangkan dengan jelas dan mudah diikuti. Akhir kata, semoga eBook ini memberi manfaat kepada semua pembaca dan menjadi salah satu sumber rujukan berguna dalam memperkembangkan kemahiran dalam bidang automasi bangunan dan teknologi KNX.

1

PENGENALAN

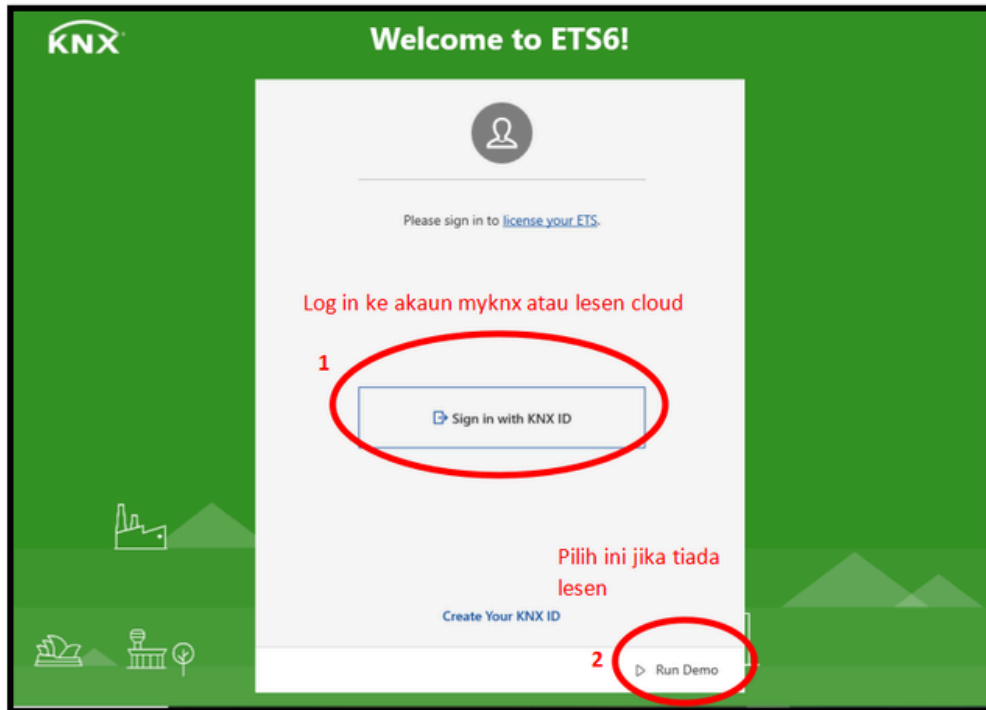
Perisian ETS6 (Engineering Tool Software versi 6) ialah platform kejuruteraan terkini yang digunakan dalam pembangunan, konfigurasi, dan penyelenggaraan sistem automasi bangunan berasaskan piawaian KNX. Dibangunkan oleh KNX Association, ETS6 berfungsi sebagai alat bersepadu yang membolehkan integrasi pelbagai peranti pintar dalam satu rangkaian yang seragam serta terselaras. ETS6 memainkan peranan penting dalam menyokong kebolehoperasian dan piawaian dalam bidang automasi bangunan. Perisian ini membolehkan peranti daripada pelbagai pengeluar dikonfigurasi dan berkomunikasi melalui protokol yang seragam, sekali gus mengurangkan kebergantungan kepada sistem pemilikan eksklusif. Selain itu, ETS6 menyediakan persekitaran pembangunan yang sistematik melalui struktur projek, pengalamatan peranti, dan pemetaan fungsi yang terperinci untuk memastikan kecekapan operasi sistem. Tambahan pula, ETS6 dilengkapi dengan ciri keselamatan terkini seperti KNX Secure, yang meningkatkan perlindungan data dan komunikasi dalam rangkaian. Antara muka pengguna yang dipertingkatkan dan sokongan terhadap teknologi moden menjadikan perisian ini relevan untuk memenuhi keperluan semasa industri automasi bangunan pintar. Kesimpulannya, ETS6 merupakan komponen kritikal dalam ekosistem KNX yang menyokong pembangunan sistem automasi yang efisien, fleksibel, dan berskala selaras dengan keperluan bangunan pintar masa kini.



2

PAPARAN ANTARAMUKA PERISIAN ETS6

1. Lesen (License).



Rajah 1: Gambaran papan pemuka hadapan ETS6.

Untuk menggunakan perisian ETS6, pengguna perlu memiliki lesen perisian yang boleh dilanggan melalui website KNX. Pengguna perlu log masuk ke akaun MyKNX, dan perisian ETS6 akan secara automatik mengesan serta memaparkan lesen yang tersedia untuk diaktifkan. Sekiranya pengguna tidak memiliki lesen perisian, pengguna boleh menggunakan perisian ETS6 ini dengan memilih Run Demo (penggunaan terhad).

Terdapat 3 versi lesen perisian ETS6:



Demo



Berfungsi sepenuhnya, dengan bilangan maksimum 5 peranti bagi setiap projek.



Lite



Berfungsi sepenuhnya, terhad kepada maksimum 20 peranti bagi setiap projek



Profesional

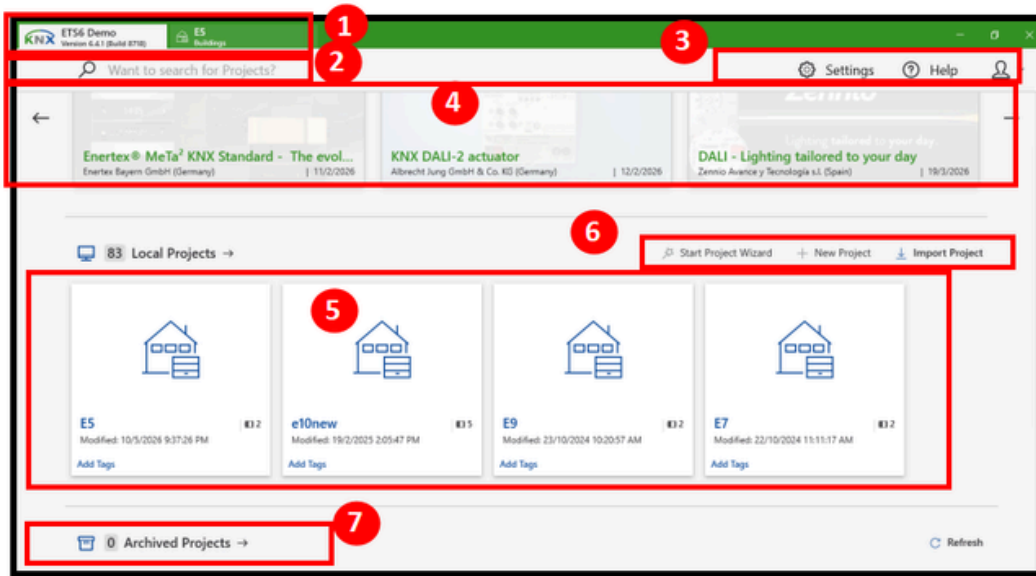


Berfungsi sepenuhnya, tanpa had bilangan peranti bagi setiap projek.

Versi Tambahan (Supplementary):

Lesen tambahan bagi versi Profesional penuh untuk digunakan pada komputer kedua.

2. Paparan Pemuka (Dashboard Overview).

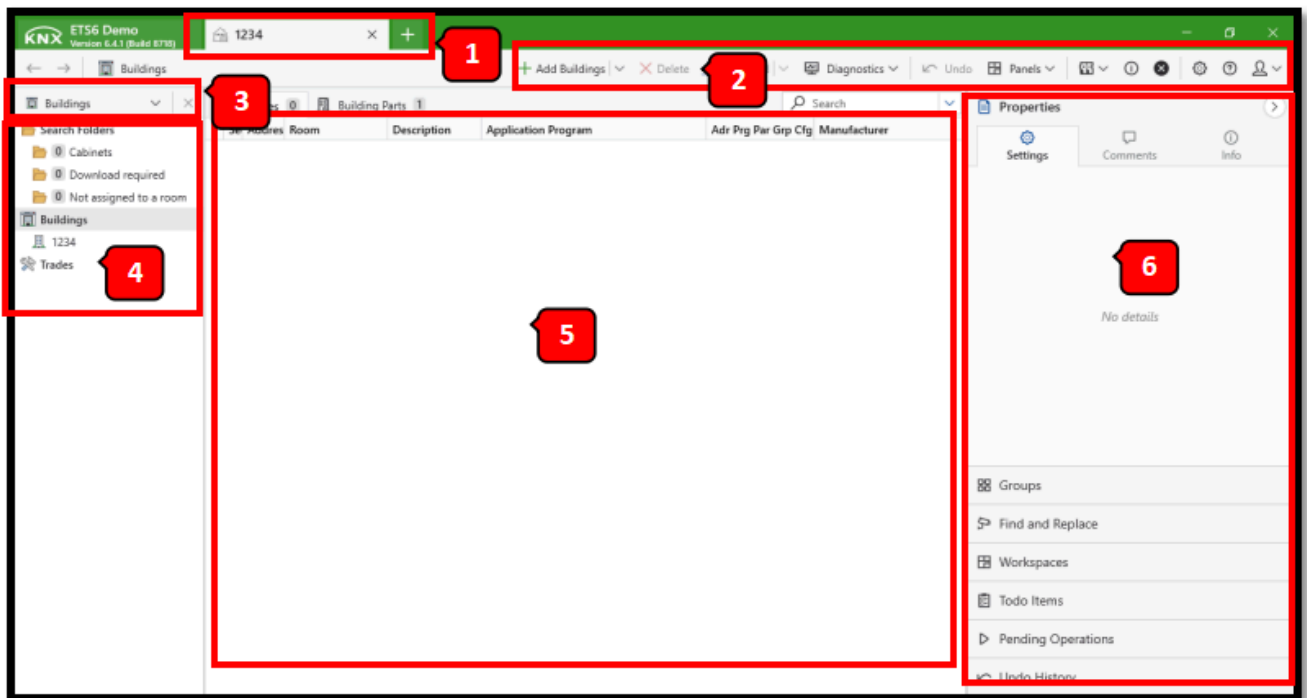


Rajah 2: Gambaran keseluruhan papan pemuka.

Jadual 1: Maklumat papan pemuka.

Petunjuk	Nama
1	Tab handling
2	Search bar
3	Main toolbar
4	KNX product information
5	Local projects
6	Project toolbar
7	Project Archive

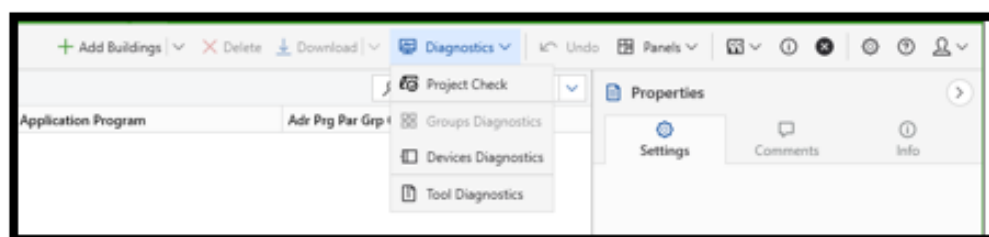
3. Paparan Panel Bangunan (Building Panels).



Rajah 3: Paparan panel bangunan.

Jadual 2: Maklumat panel paparan.

Petunjuk	Nama
1	Project tab
2	Toolbar
3	Panel selector
4	Tree view
5	List view
6	Navigator bar / Sidebar



Rajah 4: Paparan menu pilihan.

3

REKA BENTUK PROJEK KNX MENGGUNAKAN ETS 6

Reka Bentuk Projek KNX Menggunakan ETS 6

Terdapat 11 Langkah Untuk Membangunkan Reka Bentuk Projek:

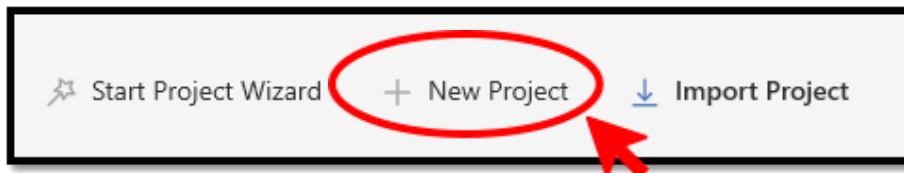
- 1. Mewujudkan Projek Baharu (Creating A New Project).**
- 2. Membina Struktur Bangunan (Creating A Building Structure).**
- 3. Memasukkan Peranti (Add Devices).**
- 4. Membina Topologi Bas (Creating A Bus Topology).**
- 5. Menetapkan Parameter (Parameter Settings).**
- 6. Mewujudkan Alamat Kumpulan (Creating A Group Address).**
- 7. Menghubungkan Alamat Kumpulan Kepada Objek Kumpulan (Linking A Group Address (GA) To A Group Object (GO)).**
- 8. Memuat Turun Dan Memprogram Konfigurasi (Download The Programming Configuration).**
- 9. Melaksanakan Diagnostik Sistem Untuk Pengujian, Pengesanan Ralat Dan Pengesahan Operasi Projek (Run System Diagnostics).**
- 10. Memuat Turun Laporan Akhir Projek (Download Final Reports).**
- 11. Nyahmuat Peranti Daripada Projek Atau Sistem Apabila Perlu, Seperti Untuk Penyelenggaraan, Penggantian, Atau Pengemaskinian Konfigurasi (Unload Devices From The System).**

4

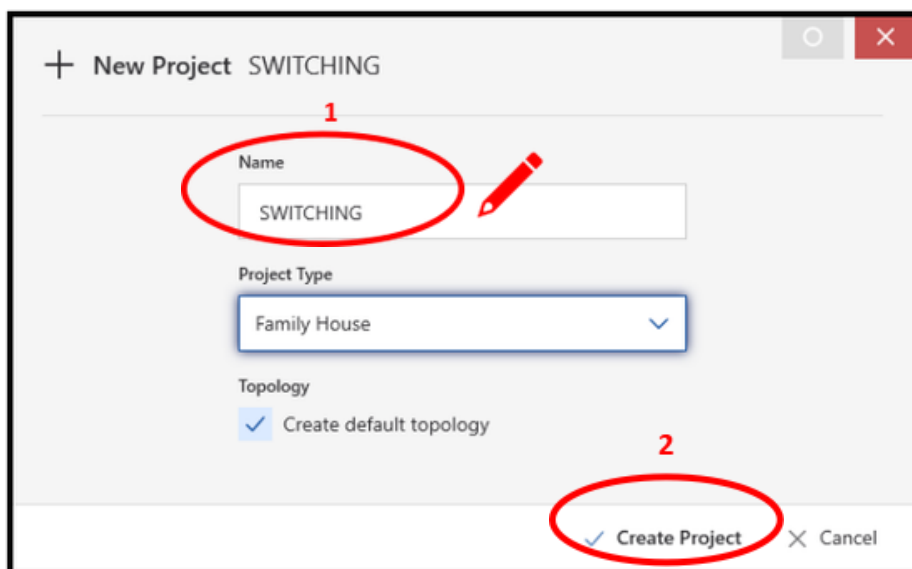
LANGKAH UNTUK MEMBANGUNKAN REKA BENTUK PROJEK

1. Mewujudkan Projek Baharu (Creating A New Project).

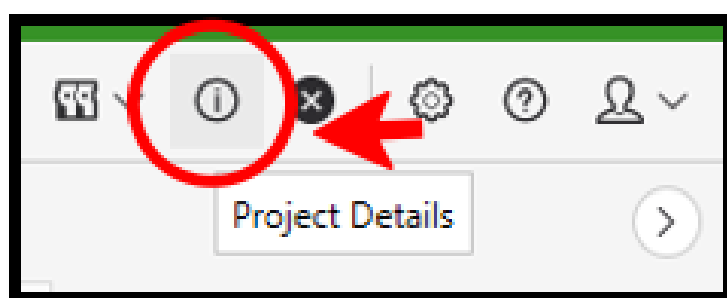
i. Klik pada New Project:

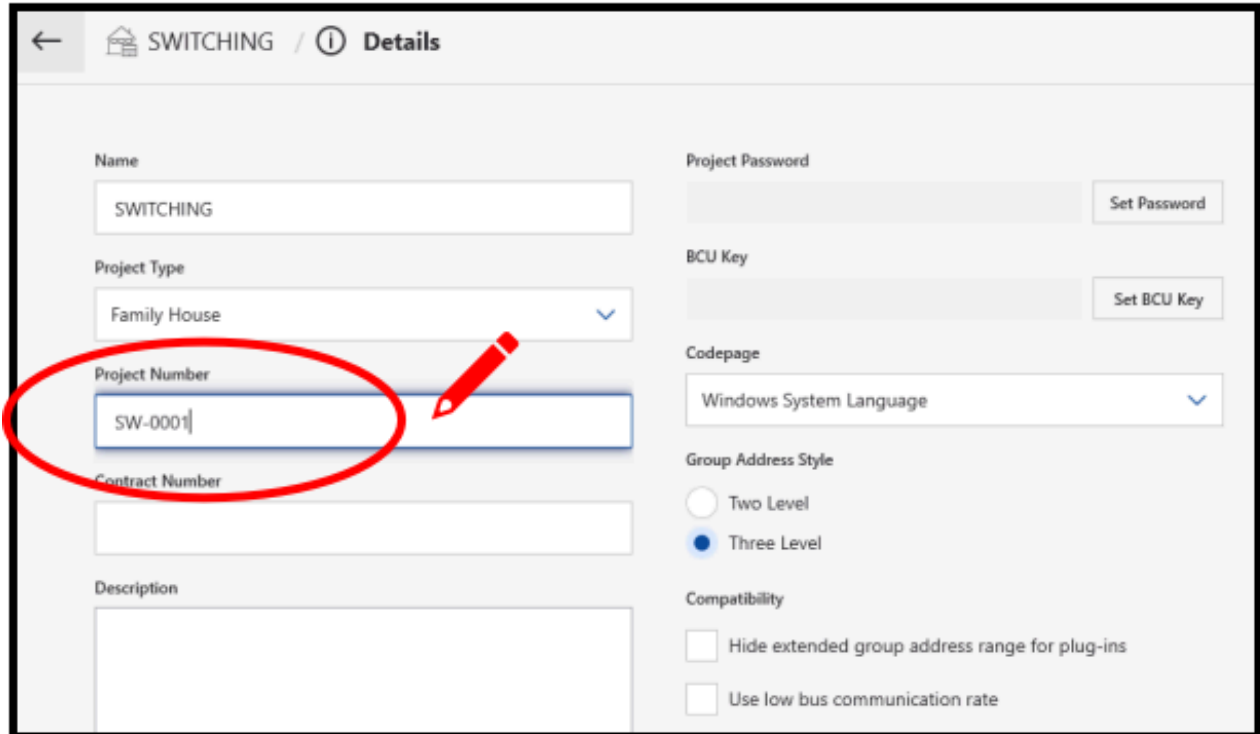
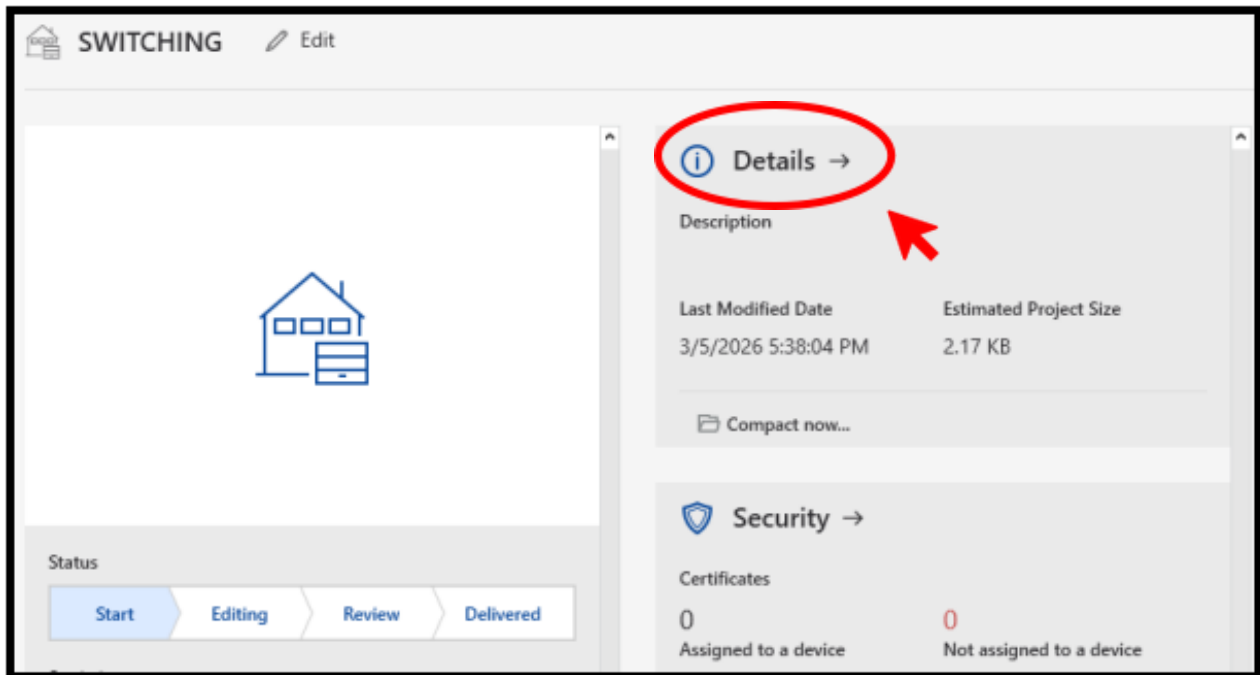


ii. Masukkan tajuk projek dan klik Create Project:



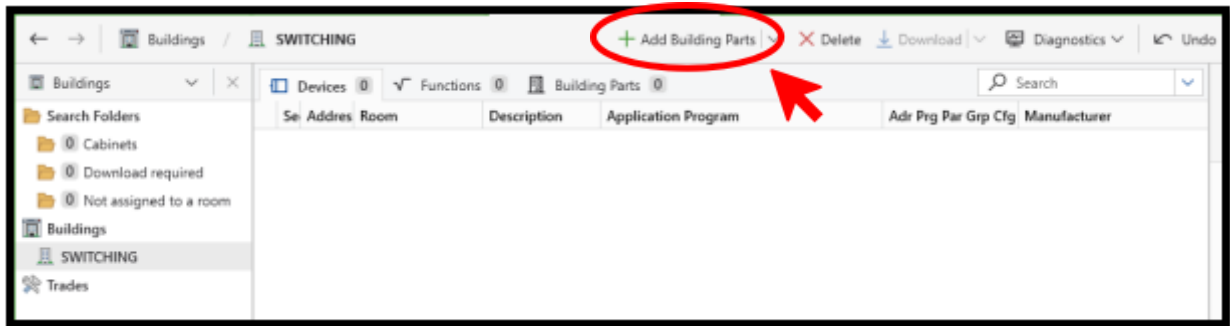
iii. Untuk masukkan Project No.:



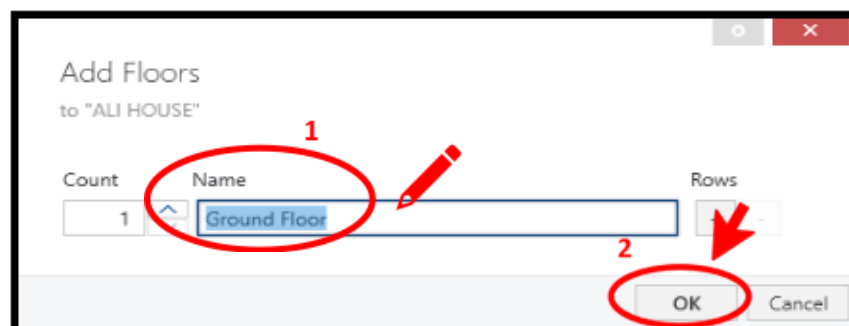
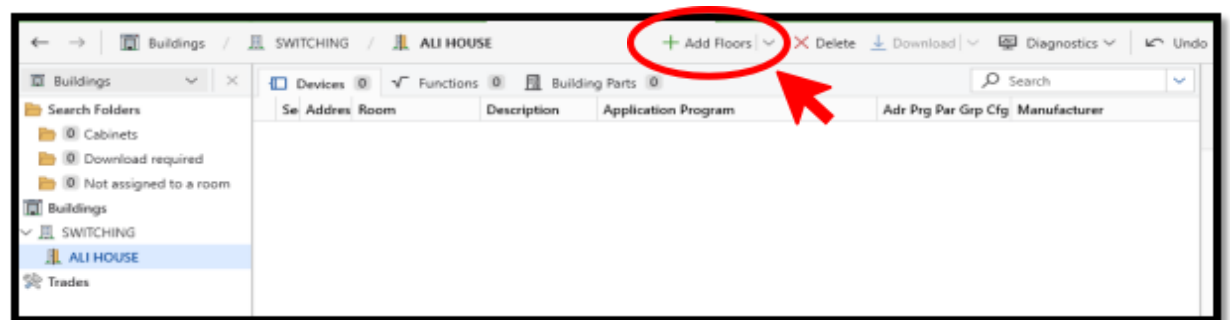


2. Membina Struktur Bangunan (Creating A Building Structure).

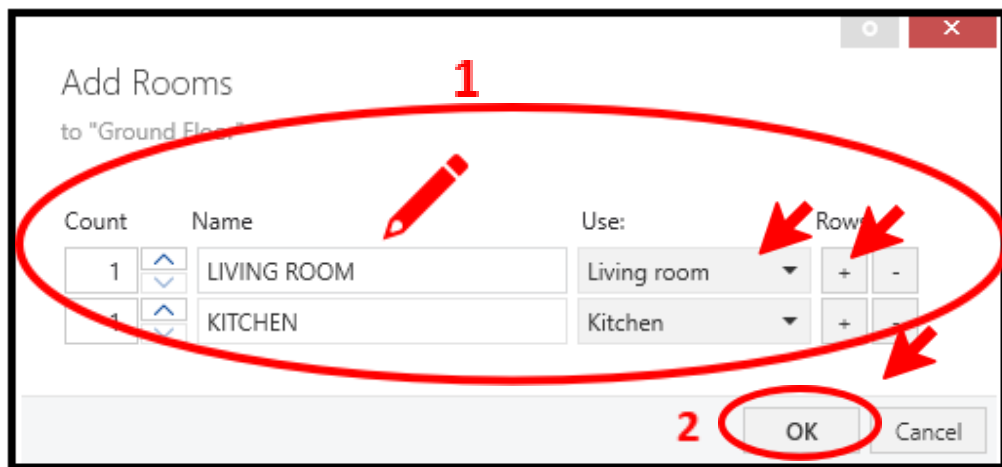
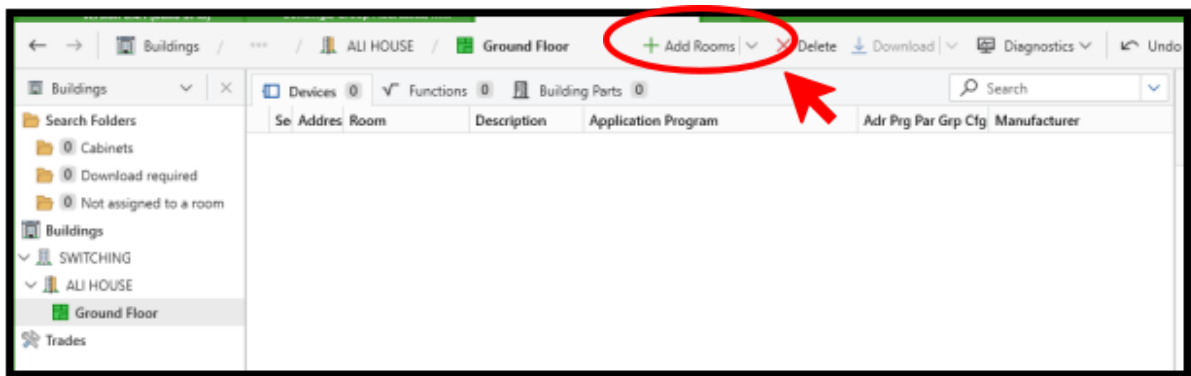
i. Klik pada + Add Building Parts:



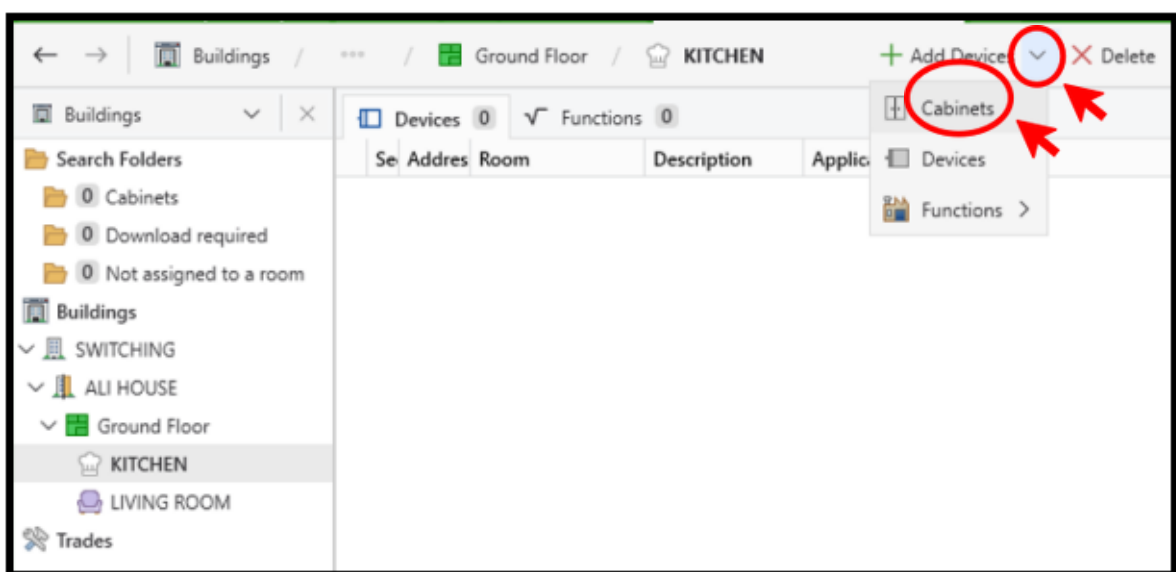
ii. Klik pada + Add Floors:

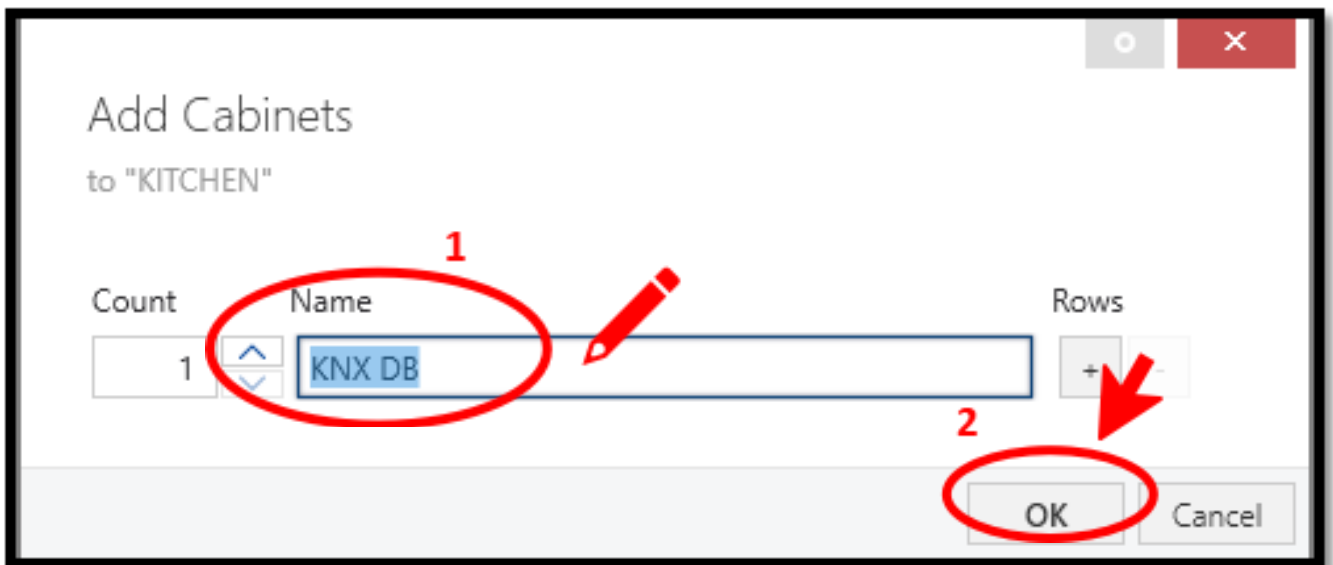


iii. Klik pada + Add Rooms:



iv. Memasukkan KNX di Kitchen, klik pada drop down pada + Add Devices, klik pada Cabinets:



A screenshot of a software dialog box titled "Add Cabinets to 'KITCHEN'". The dialog has a standard Windows-style title bar with a maximize button (disabled), a close button (red with a white 'X'), and a minimize button (disabled). The main content area contains three labels: "Count", "Name", and "Rows". Under "Count" is a spinner box with the value "1". Under "Name" is a text box containing "KNX DB", which is highlighted with a blue selection background. A red circle with the number "1" is drawn around the "Name" text box, and a red pencil icon is positioned over it. Under "Rows" is a button with a "+" sign. A red circle with the number "2" is drawn around the "OK" button at the bottom right of the dialog, with a red arrow pointing to it. The "Cancel" button is located to the right of the "OK" button.

Add Cabinets
to "KITCHEN"

Count 1

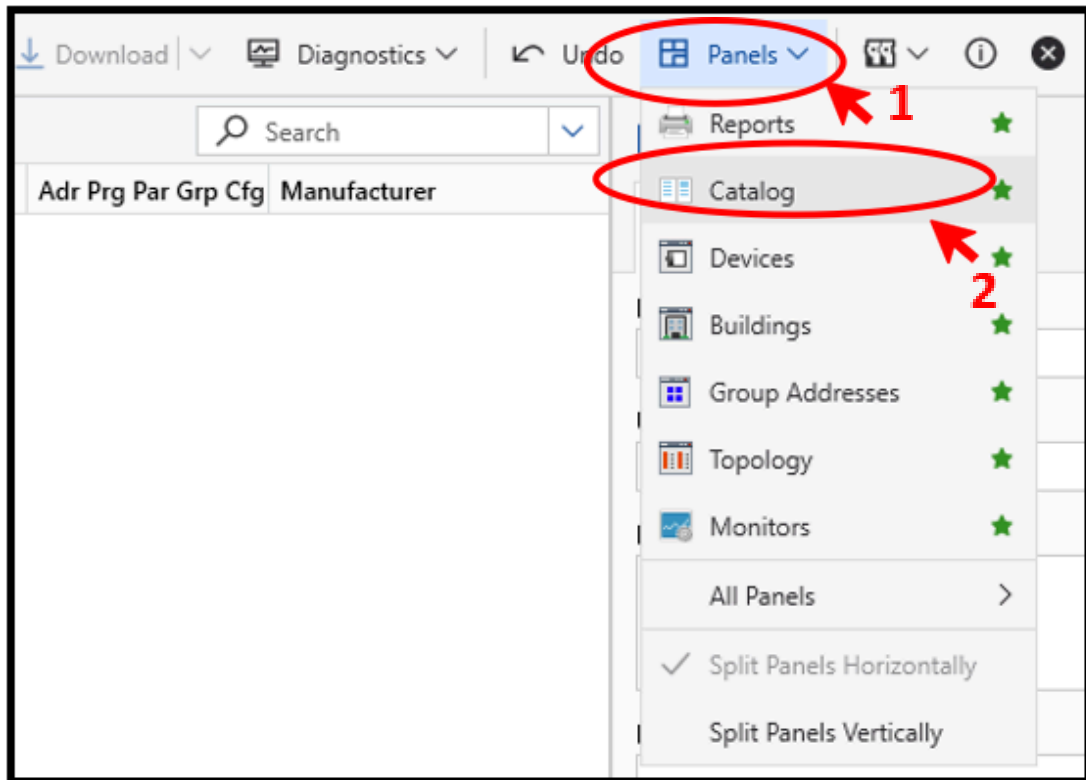
Name KNX DB

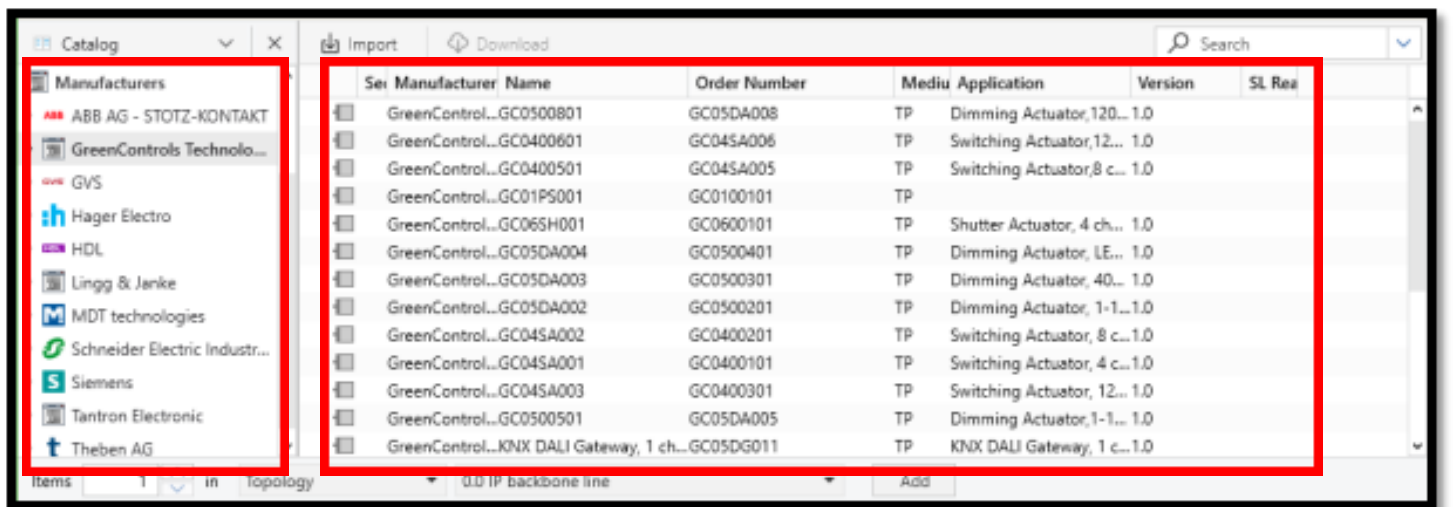
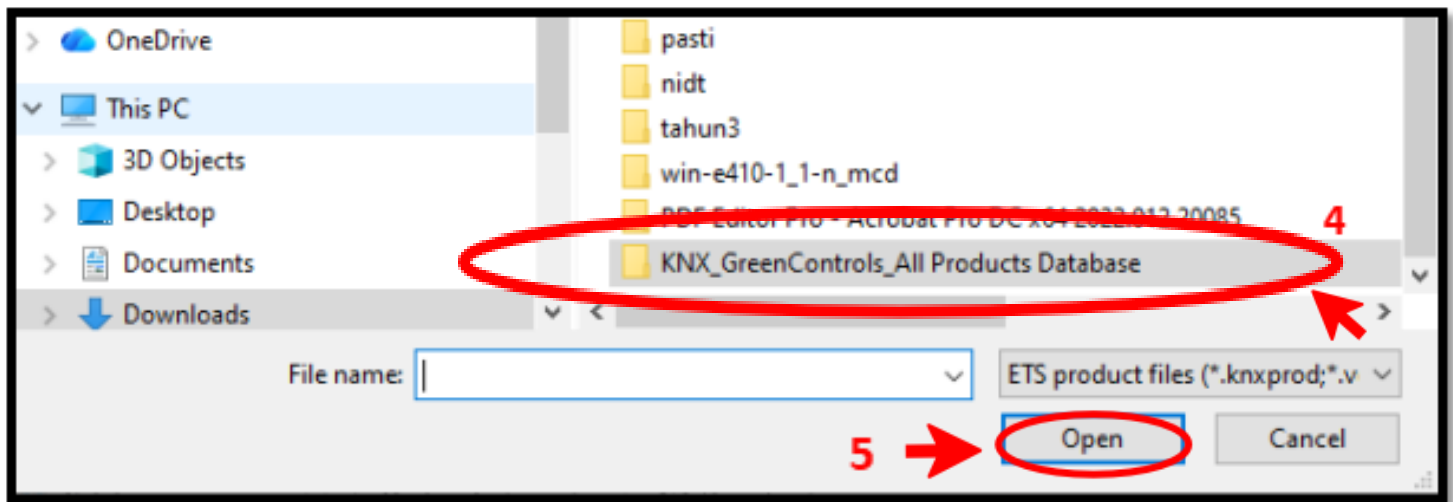
Rows +

OK Cancel

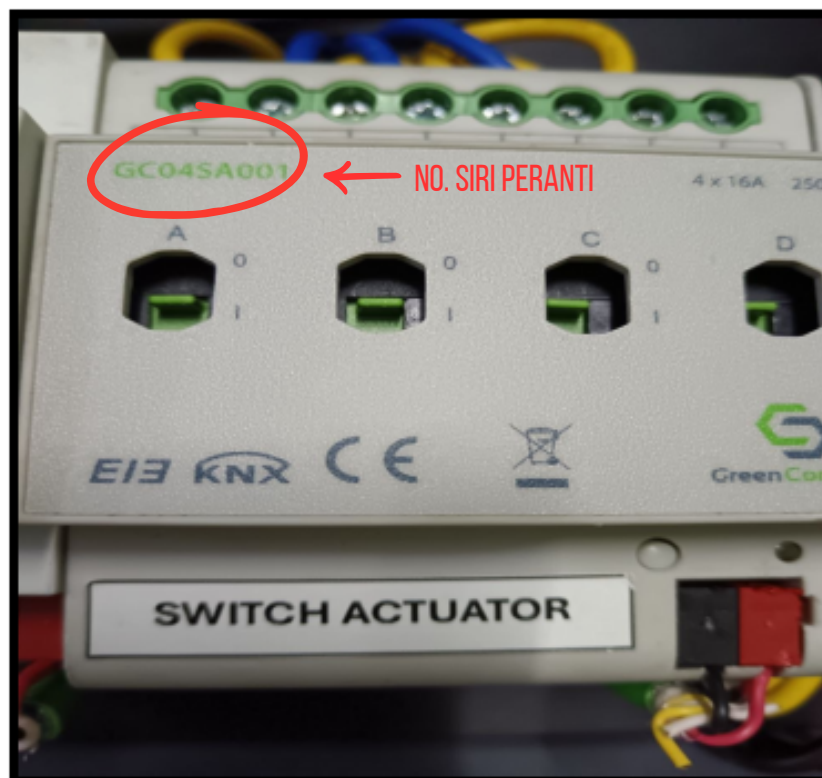
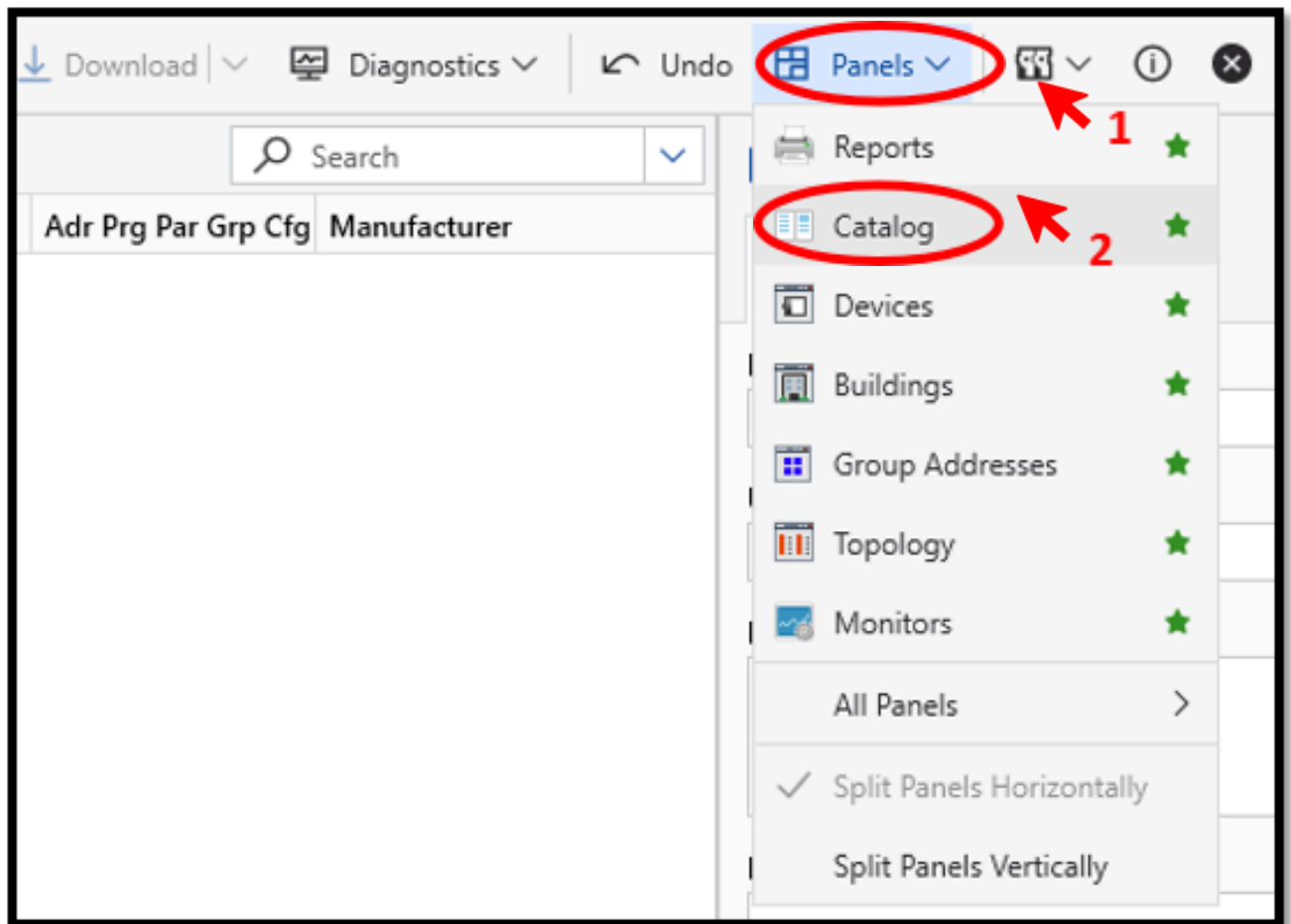
3. Memasukkan Peranti (Add Devices).

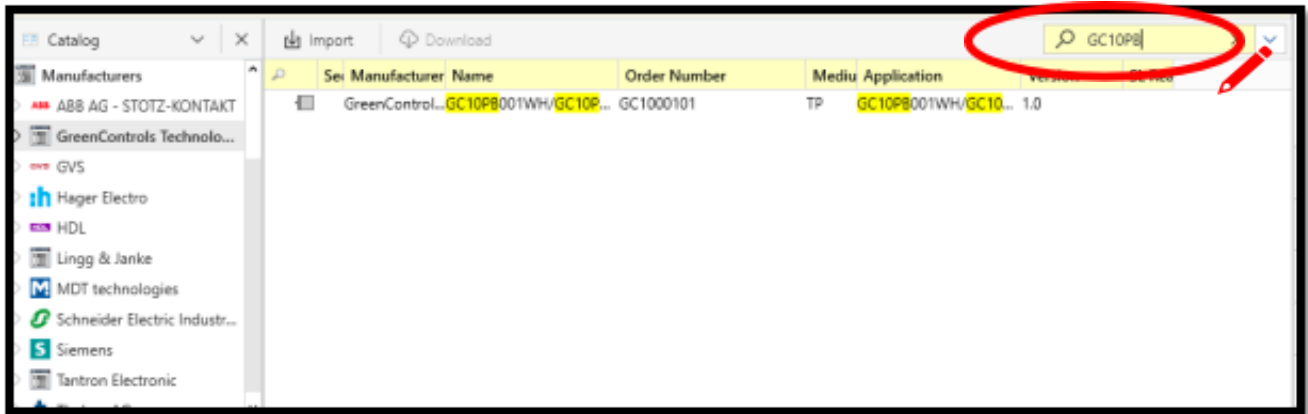
- i. Sekiranya belum ada peranti dalam library ETS6, maka perlu muatnaik dahulu senarai peranti. Senarai peranti boleh diperolehi dan dimuat turun melalui laman sesawang syarikat yang menghasilkan peranti KNX (mengikut jenama). Klik pada Panels, klik pada Catalog, klik Import, cari folder yang ada product database, select all, klik open, kemudian ikuti langkah seterusnya dengan klik Yes:



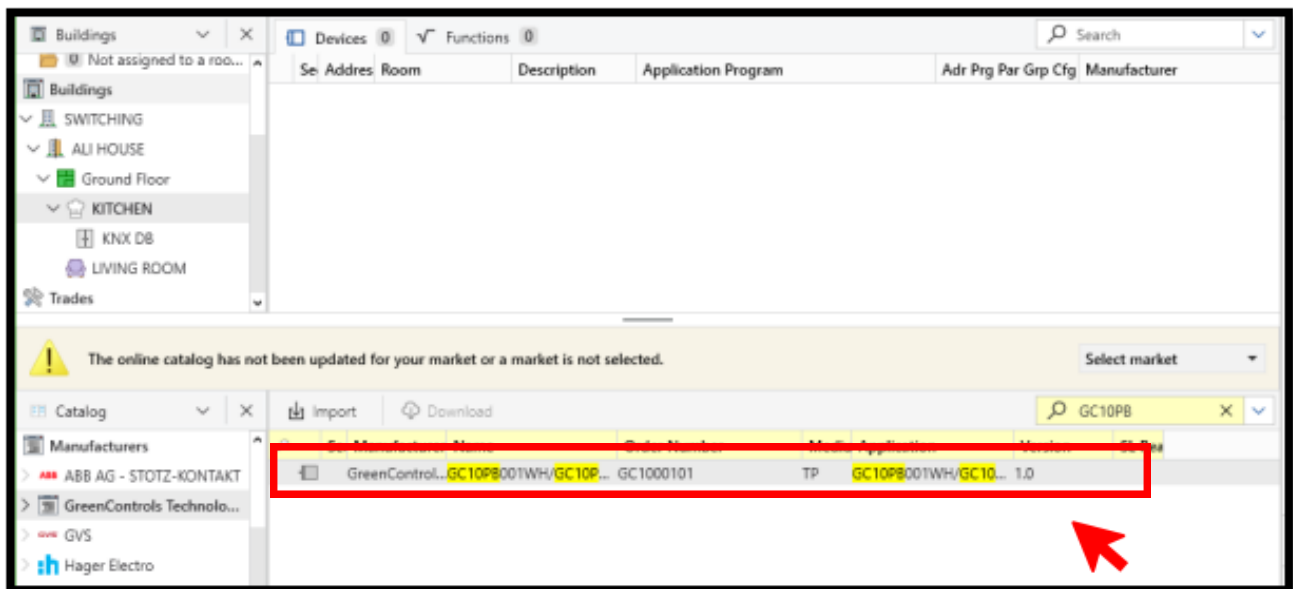


- ii. Memasukkan peranti, klik pada Panels, klik pada Catalog, pada search taip nombor siri peranti (no. siri peranti ada pada badan peranti)

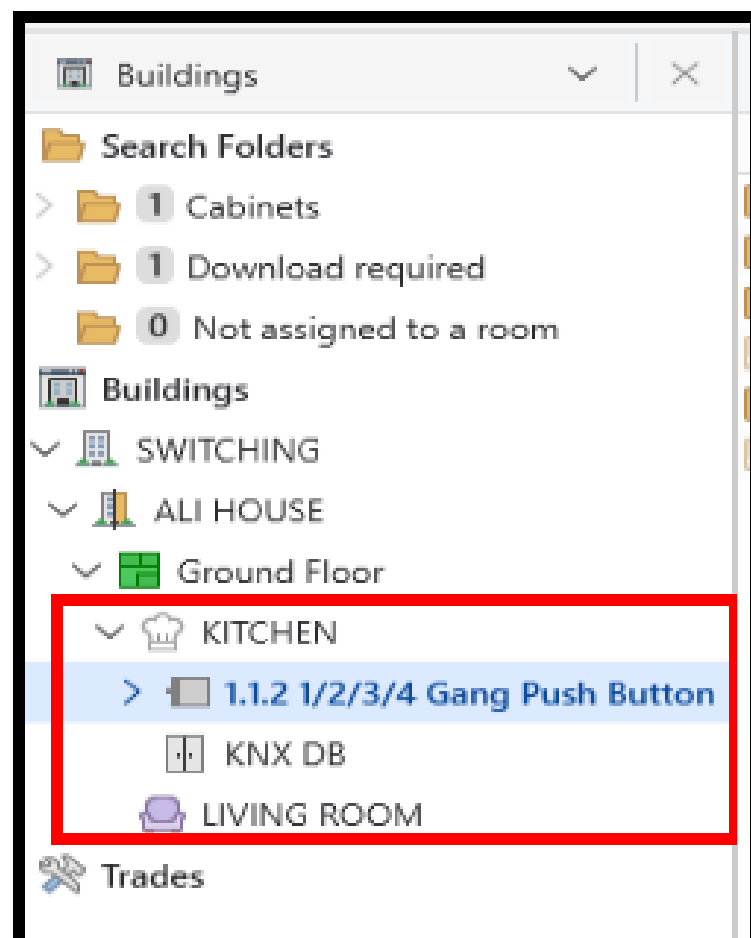
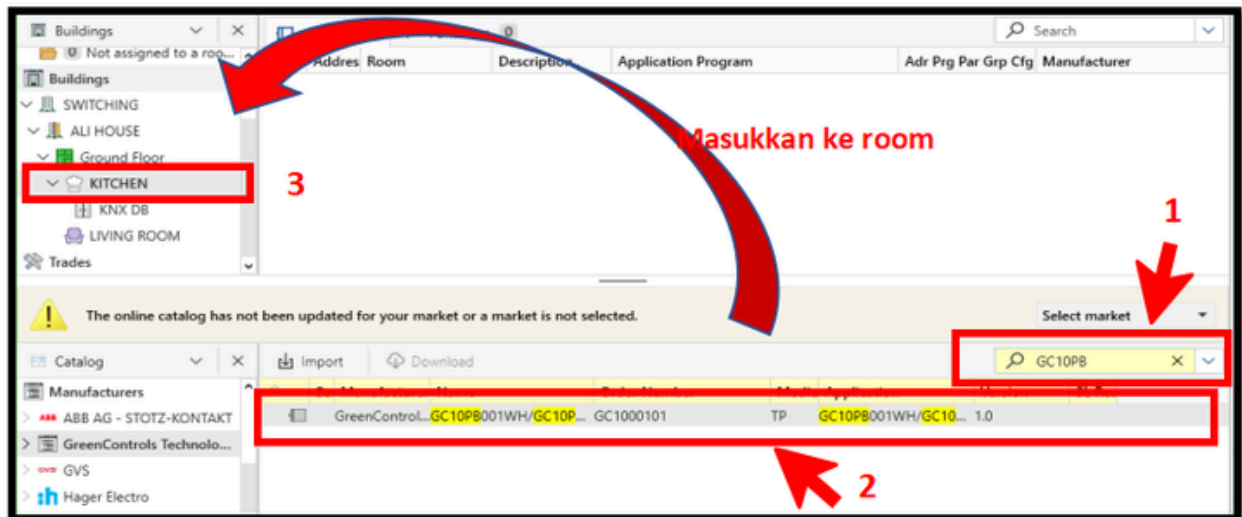




- iii. Klik pada no. siri peranti dan double klik atau masukkan peranti tersebut ke dalam room yang sesuai dibahagian Tree view:

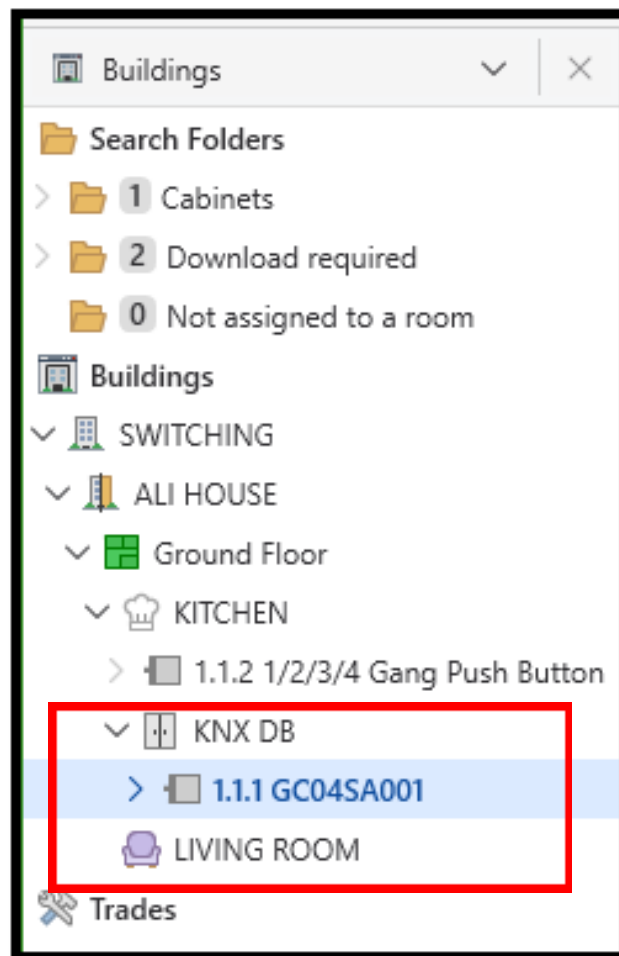
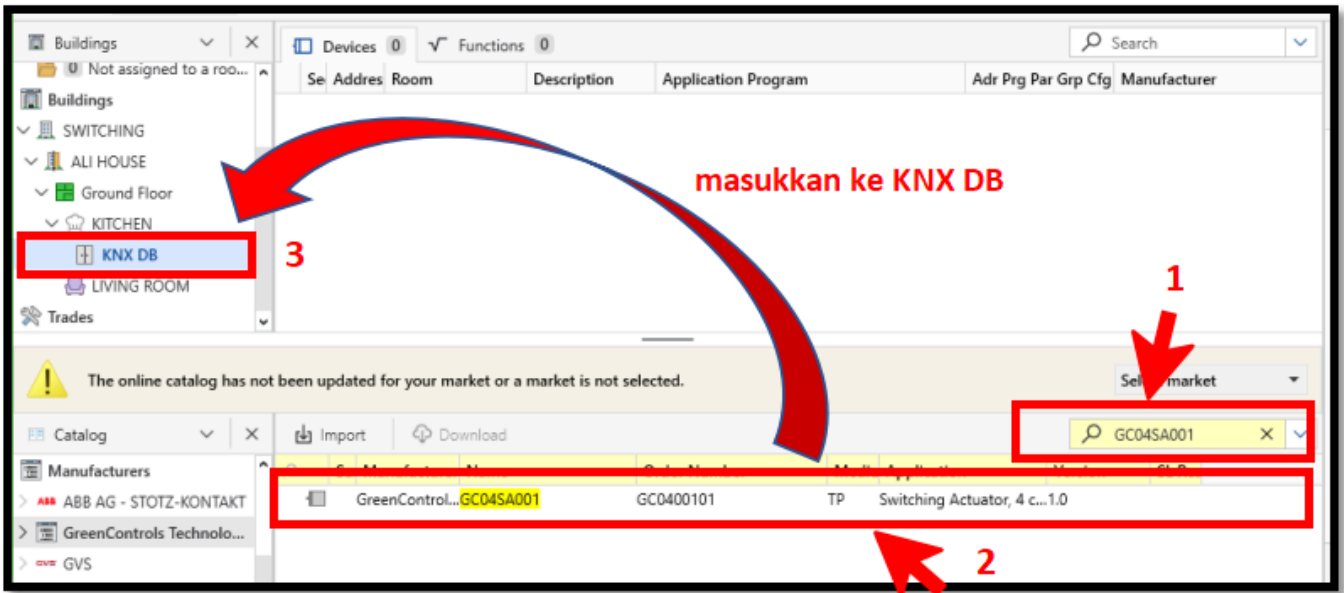


- V. Peranti penerima (sensors) perlu diletakkan pada room yang sesuai, contoh: peranti suis (push button), masukkan no. siri peranti pada bahagian search, klik pada no. siri peranti dan double klik atau masukkan peranti tersebut ke dalam room yang ditetapkan dibahagian Tree view:



vi.

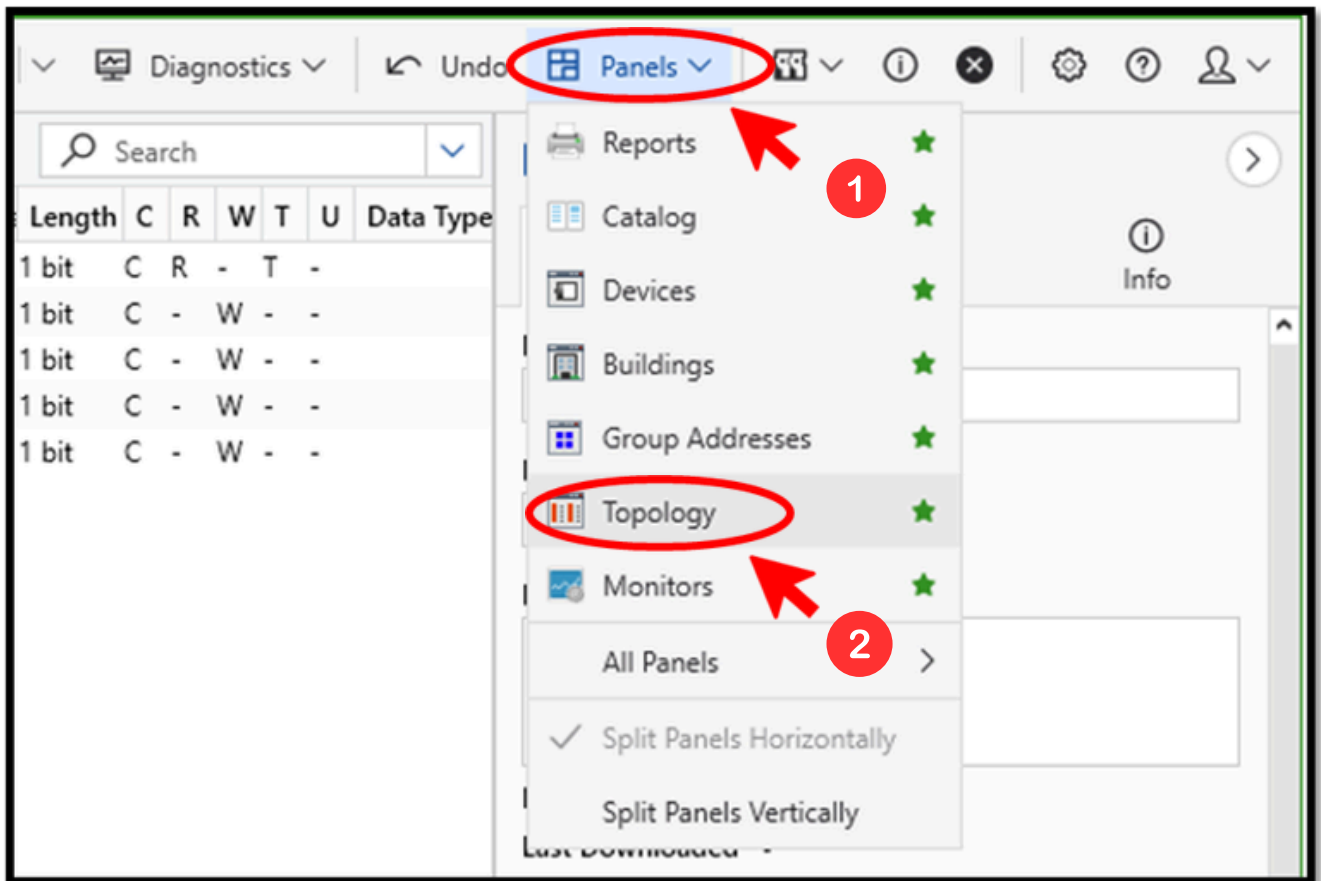
Semua peranti kawalan (actuator) perlu diletakkan pada KNX DB. Masukkan no. siri peranti pada bahagian search, klik pada no. siri peranti, double klik atau masukkan peranti actuator tersebut ke dalam KNX DB dibahagian Tree view:



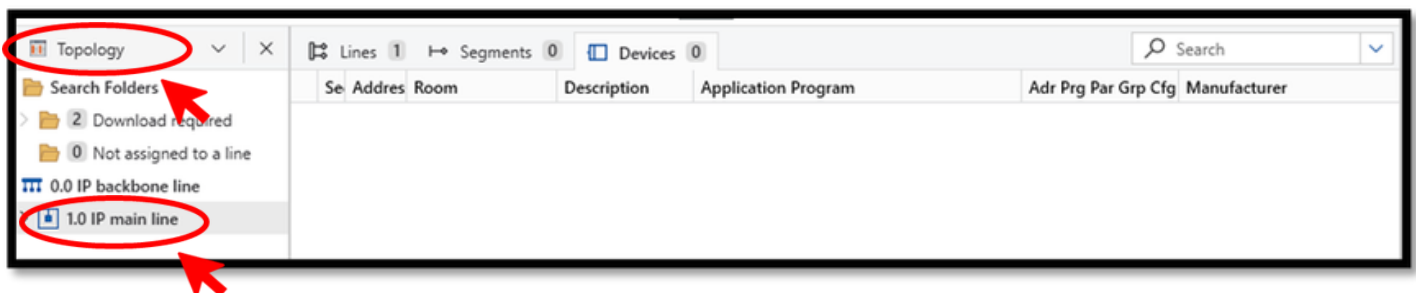
4. Membina Topologi Bas (Creating A Bus Topology).

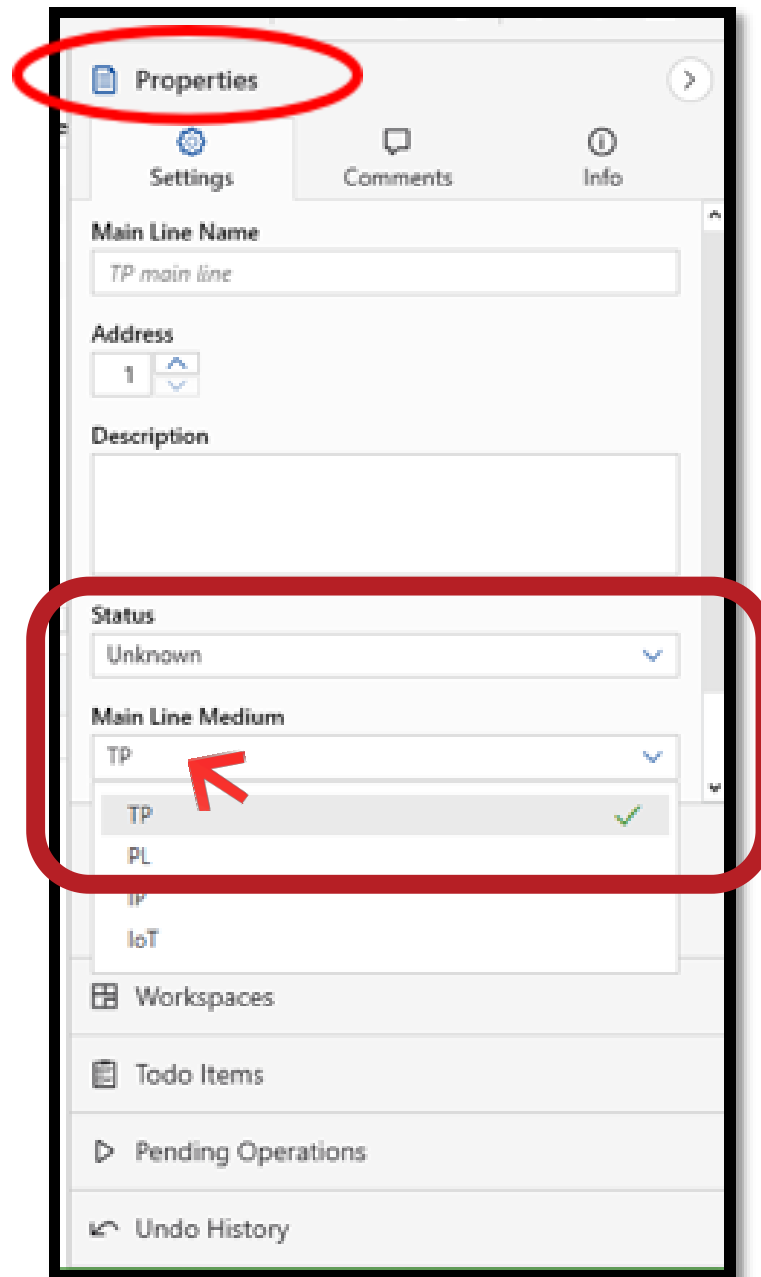
a) 1 talian topologi

- i. Klik Panels, klik Topology:

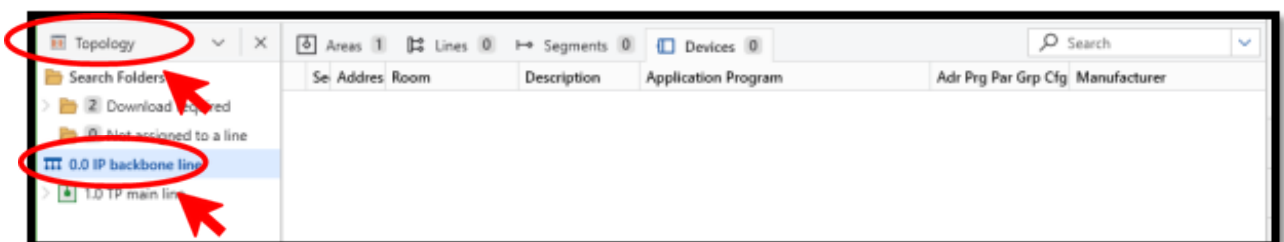


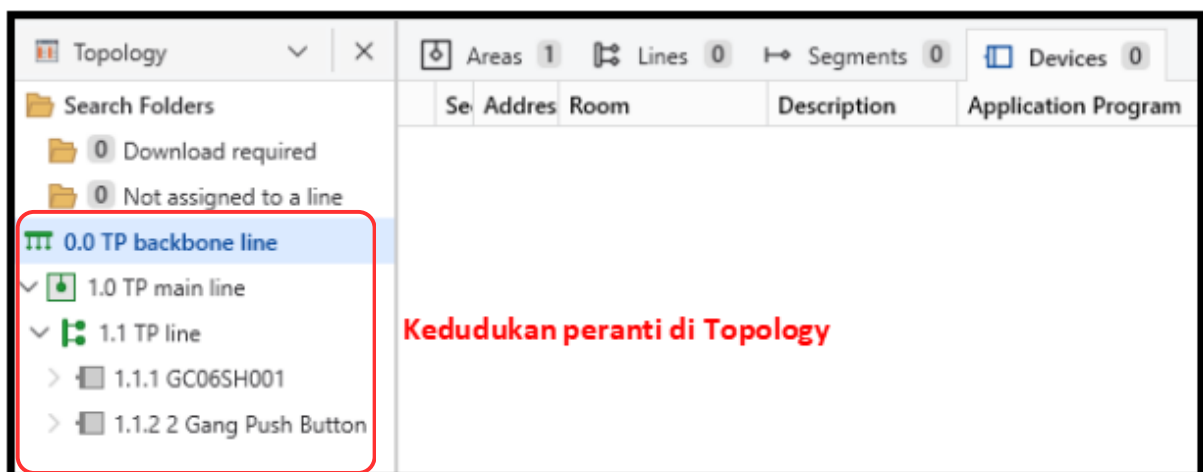
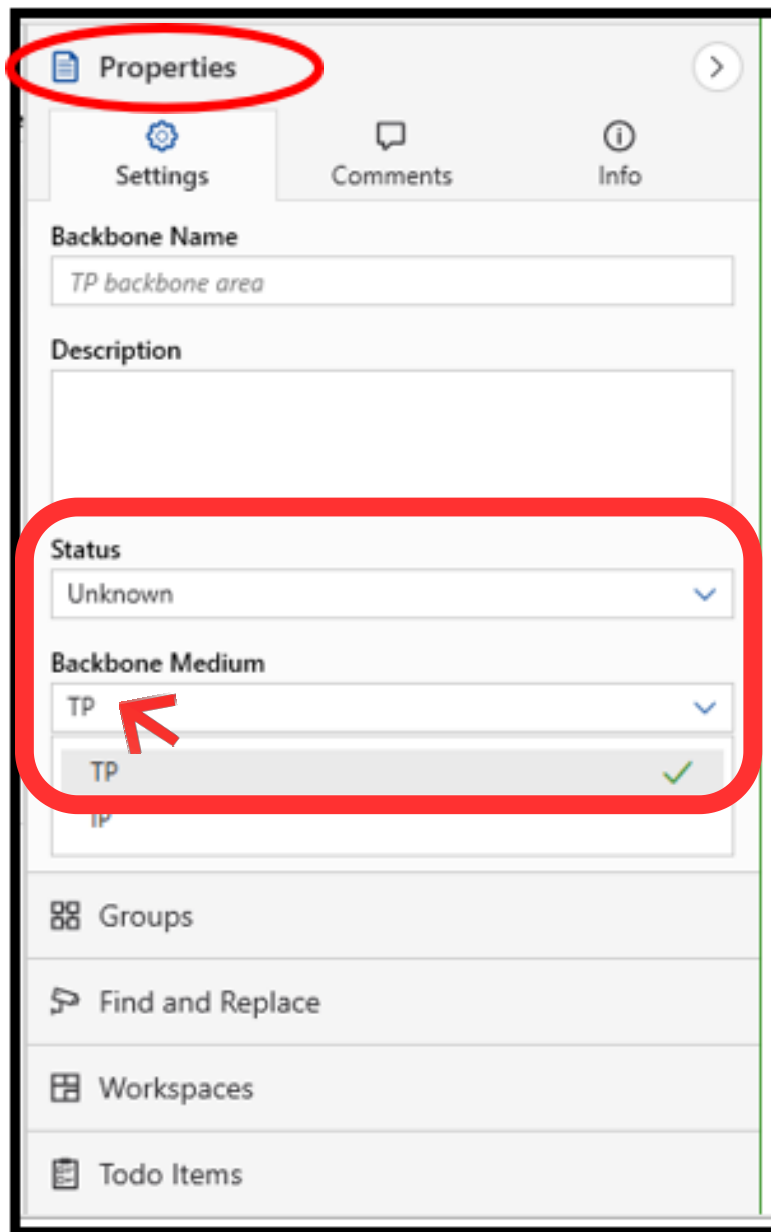
- ii. Pada paparan Topology, klik pada IP main line, pada Properties (pada Navigator bar) cari Main Line Medium dan tukar ke TP (Twisted Pair).





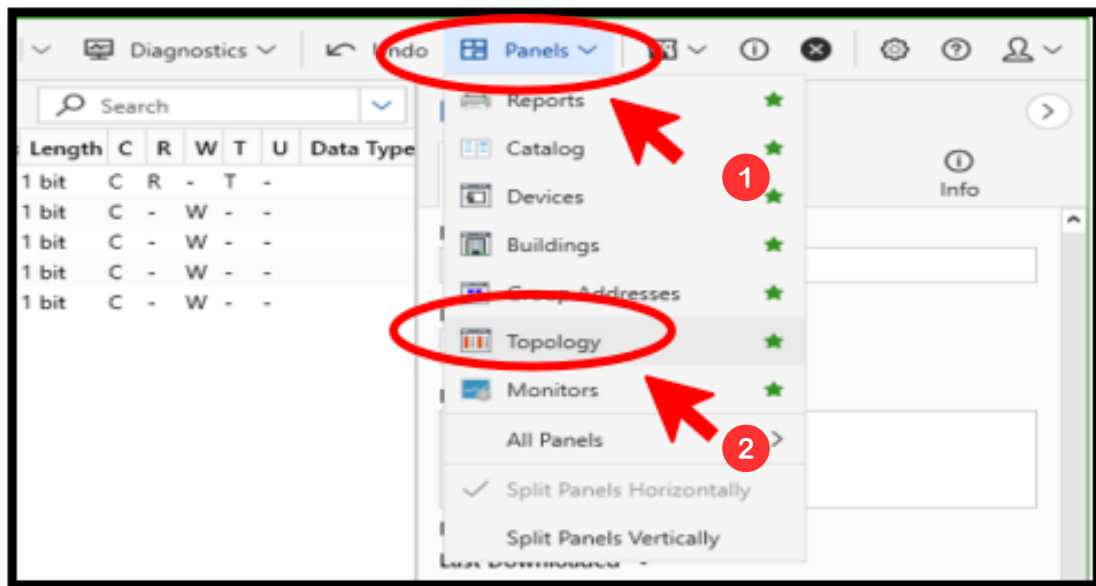
- iii. Pada paparan Topology, klik pada IP backbone line, pada Properties (pada Navigator bar) cari Backbone Medium dan tukar ke TP (Twisted Pair).



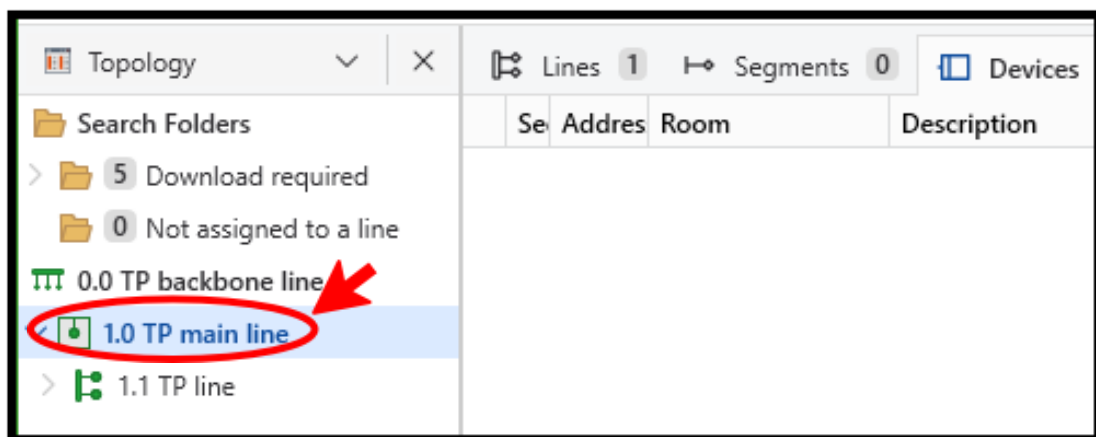


b) Talian topologi menggunakan Line Coupler (membina subline)

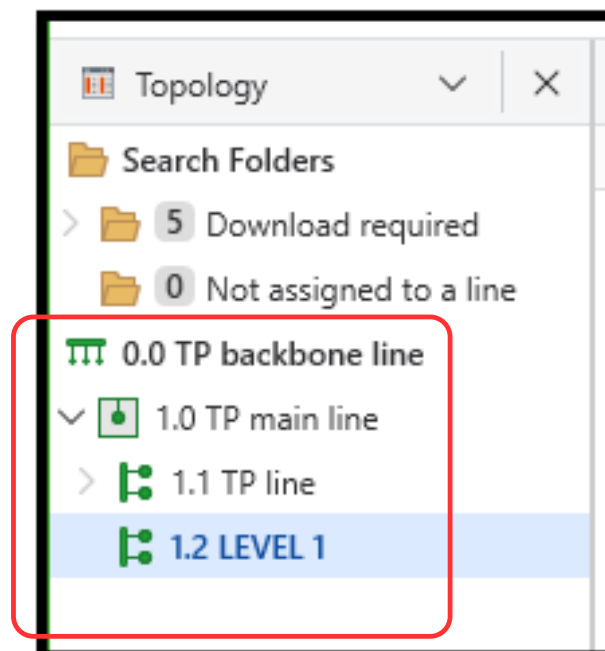
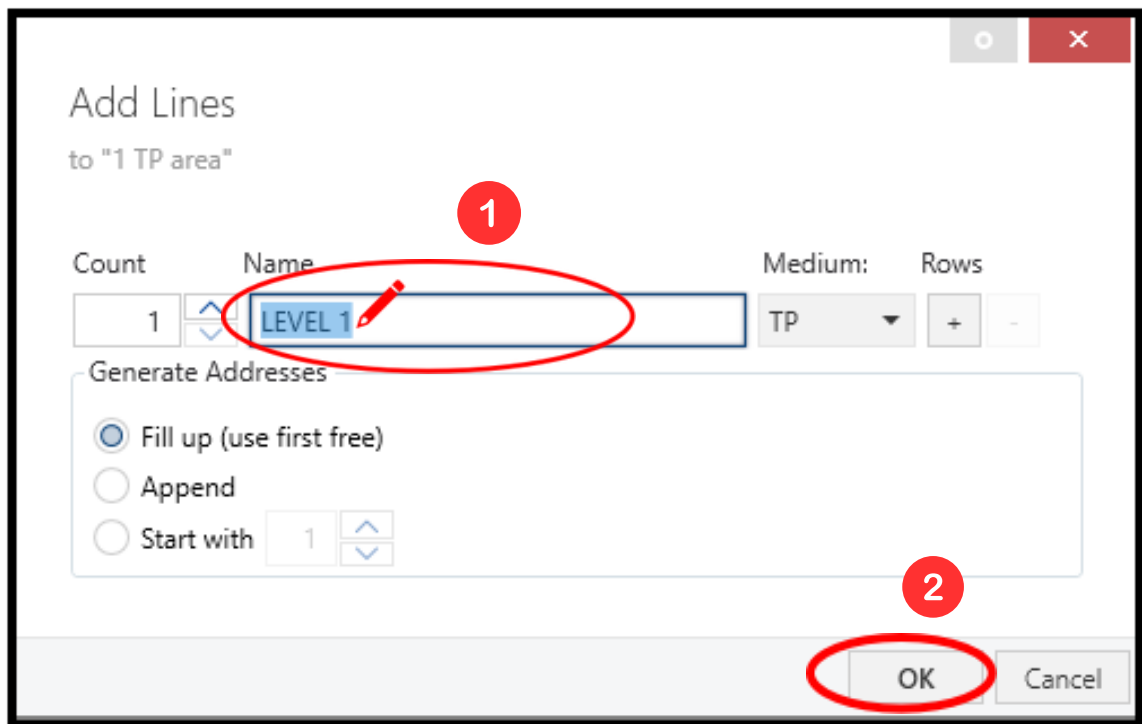
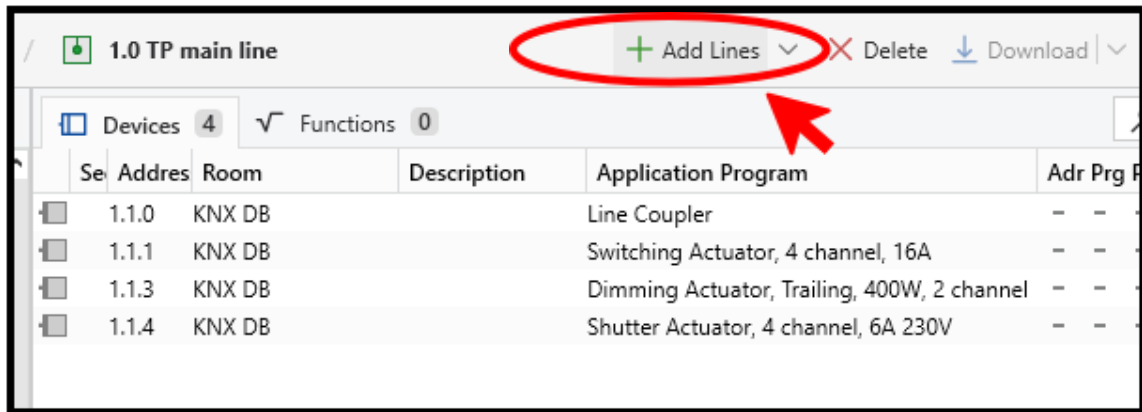
i. Klik Panels, klik Topology:



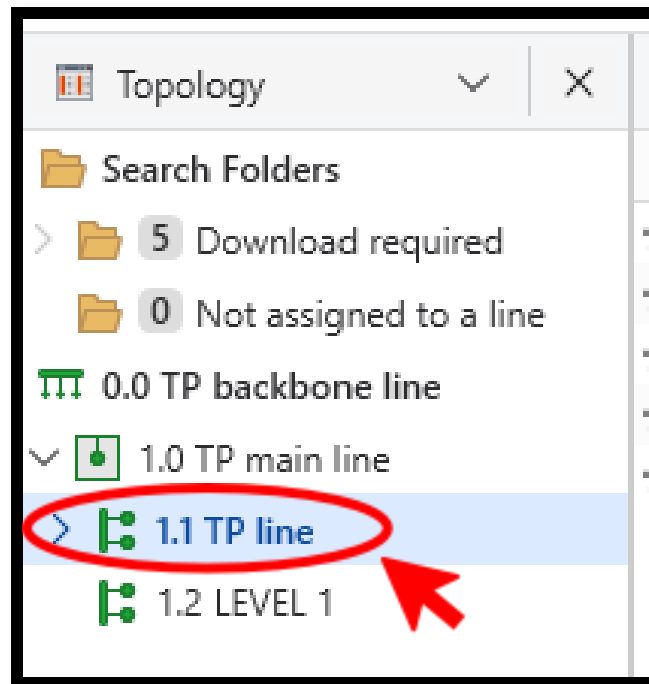
ii. Pada Topology, klik pada 1.0 TP main line:



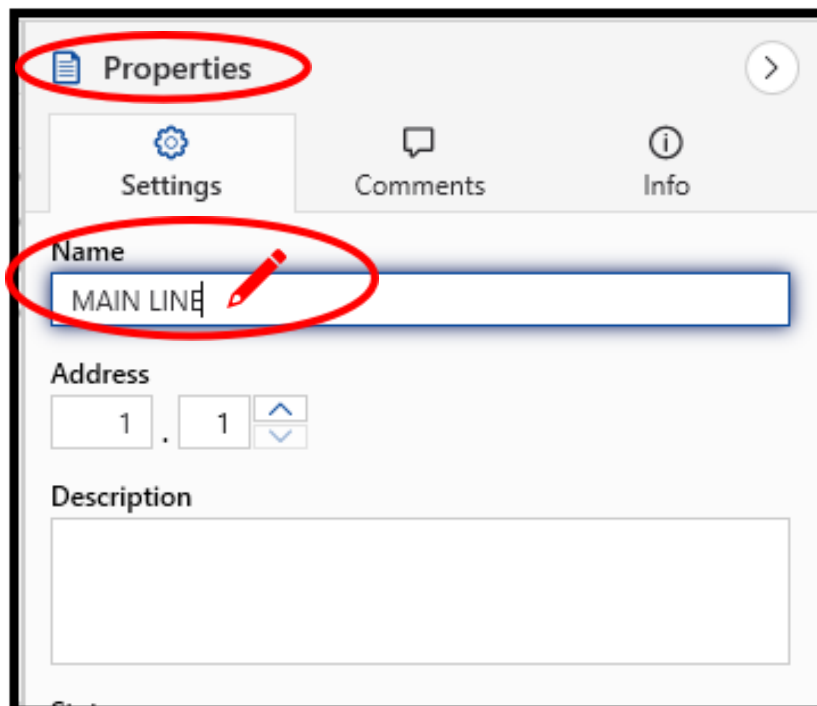
iii. Klik pada + Add Lines:

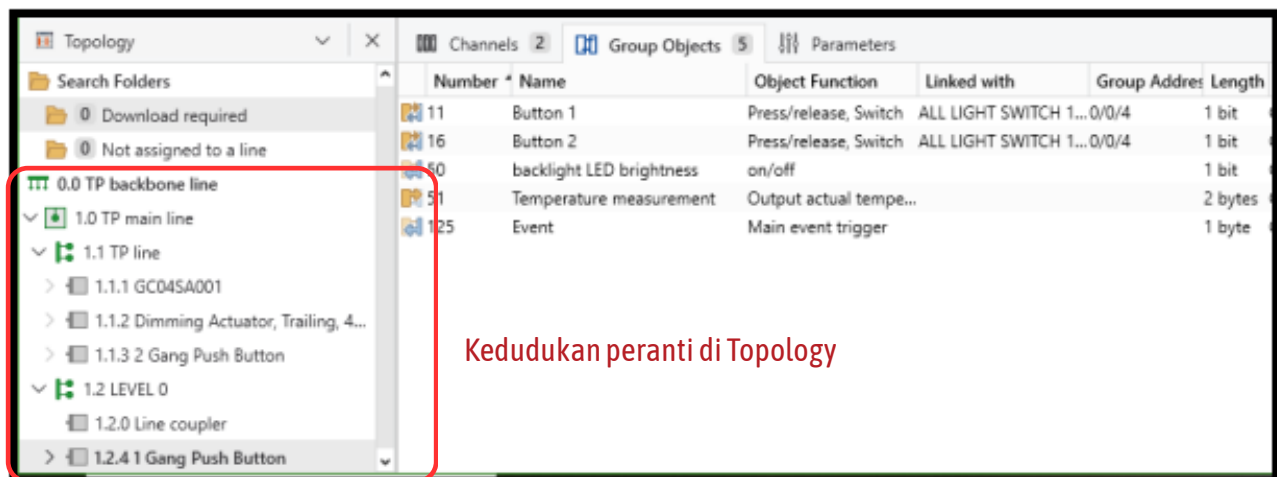
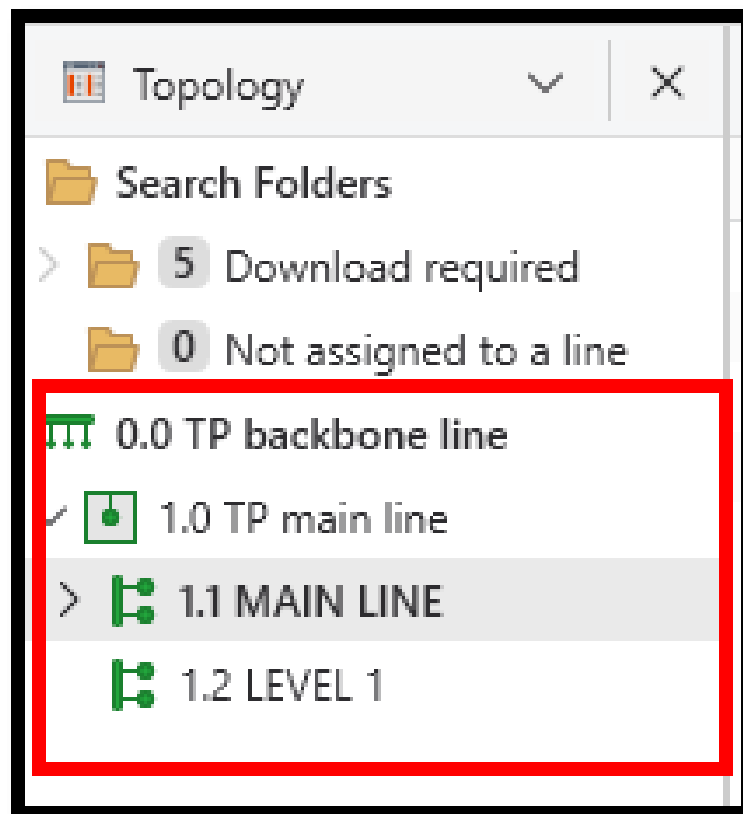


iv. Tukar nama 1.1 TP line kepada MAIN LINE, klik pada 1.1 TP Line:



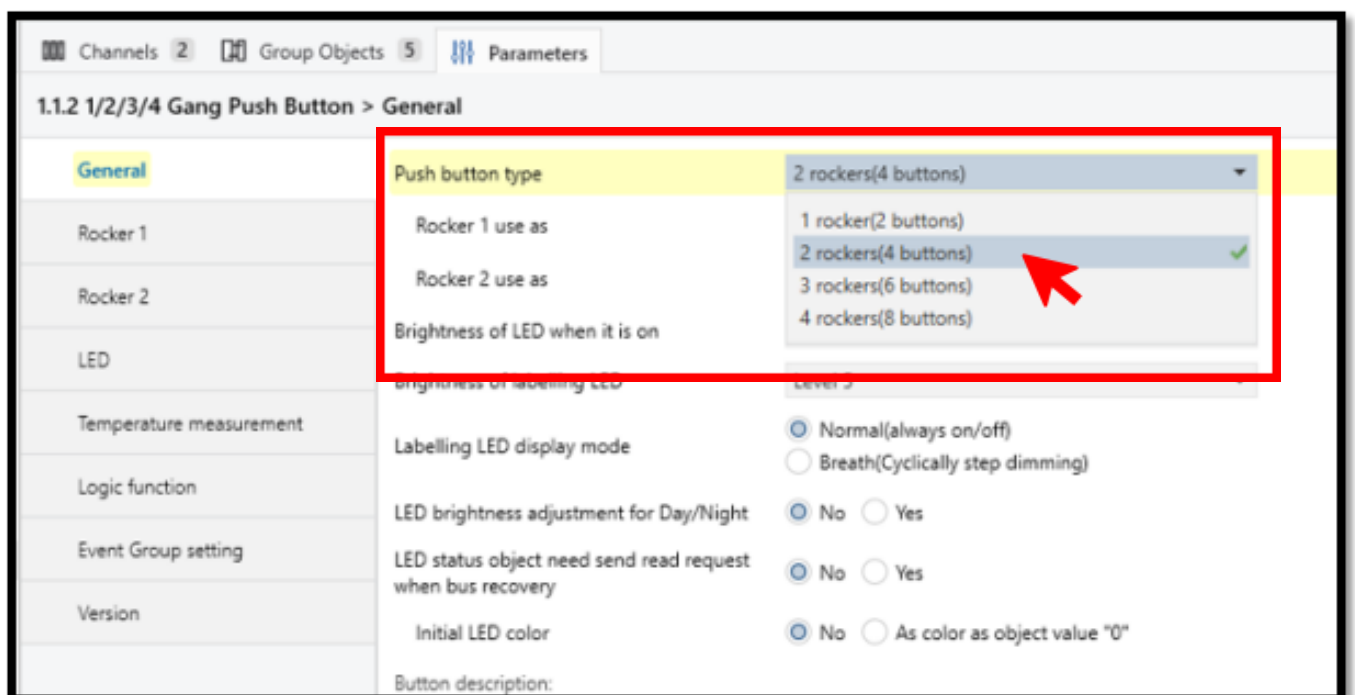
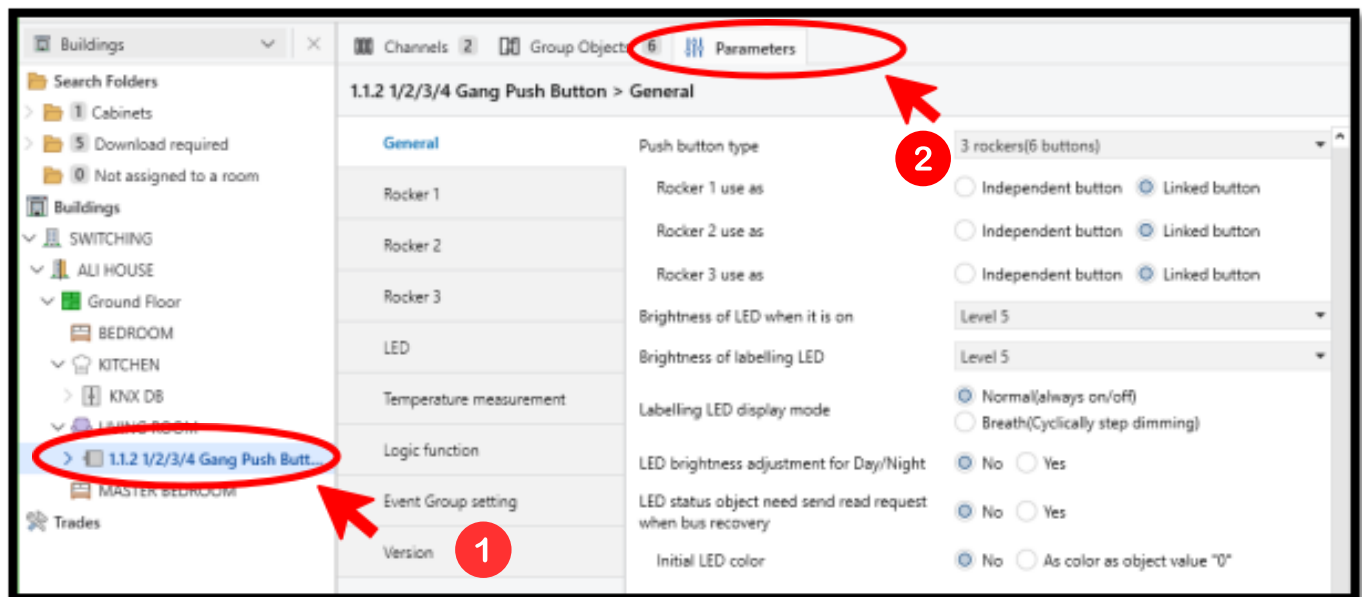
v. Pada Properties (pada Navigator bar), pada Name masukkan MAIN LINE:





5 . Menetapkan Parameter (Parameter Settings).

- i. Parameter untuk suis (push button), klik pada push button (pada Tree view), klik pada Parameters:



1.1.2 1/2/3/4 Gang Push Button > General

General		Push button type	2 rockers(4 buttons)
Button 1	Rocker 1 use as	☒ Independent button	☐ Linked button
Button 2	Rocker 2 use as	☒ Independent button	☐ Linked button
Button 3	Brightness of LED when it is on	Level 5	
Button 4	Brightness of labelling LED	Level 5	
LED	Labelling LED display mode	☒ Normal(always on/off) ☐ Breath(Cyclically step dimming)	
	LED brightness adjustment for Day/Night	☒ No ☐ Yes	

Channels 2 Group Objects 7 Parameters

1.1.2 1/2/3/4 Gang Push Button > Button 1

General	Function of the channel	Switch
Button 1	Distinction between long and short operation	No Function
Button 2	Reaction on short operation or press the button	Switch
Button 3	Reaction on long operation or release the button	Switch/Dimming
Button 4	Disable function	Value/Forced output
LED		Scene control
Temperature measurement		Shutter Control
Logic function		Shift register
Event Group setting		RGB dimming
Version		Multiple operation
		Delay mode

Channels 2 Group Objects 7 Parameters

1.1.2 1/2/3/4 Gang Push Button > Button 1

General	Function of the channel	Switch
Button 1	Distinction between long and short operation	☒ No ☐ Yes
Button 2	Reaction on short operation or press the button	TOGGLE
Button 3	Reaction on long operation or release the button	no action
Button 4	Disable function	OFF
LED		ON
		TOGGLE

Default Value: TOGGLE

1.1.2 1/2/3/4 Gang Push Button > Button 1

General	Function of the channel	Switch
Button 1	Distinction between long and short operation	☒ No ☐ Yes
Button 2	Reaction on short operation or press the button	TOGGLE
Button 3	Reaction on long operation or release the button	no action
Button 4	Disable function	☒ disable ☐ enable
LED		

ii. Contoh parameter suis (push button) untuk kecerahan lampu (dimmer):

1.1.2 4 Gang Push Button > Button 1

General	Function of the channel	Switch/Dimming
Button 1	Long operation after(*0.1s)	5
Button 2	Reaction on short operation	TOGGLE
Button 3	Reaction on long operation	brighter/darker
Button 4	Dimming mode	☒ Start-stop-Dimming ☐ Steps dimming
Rocker 3	Disable function	☒ disable ☐ enable

Channels 2 Group Objects 13 Parameters

1.1.2 4 Gang Push Button > Button 3

General	Function of the channel	Switch/Dimming
Button 1	Long operation after(*0.1s)	5
Button 2	Reaction on short operation	ON
Button 3	Reaction on long operation	brighter/darker
Button 4	Dimming mode	☒ Start-stop-Dimming ☐ Steps dimming
Rocker 3	Disable function	☒ disable ☐ enable

1.1.2 4 Gang Push Button > Button 4

General	Function of the channel	Switch/Dimming
Button 1	Long operation after(*0.1s)	5
Button 2	Reaction on short operation	OFF
Button 3	Reaction on long operation	brighter/darker
Button 4	Dimming mode	☒ Start-stop-Dimming ☐ Steps dimming
Rocker 3	Disable function	☒ disable ☐ enable

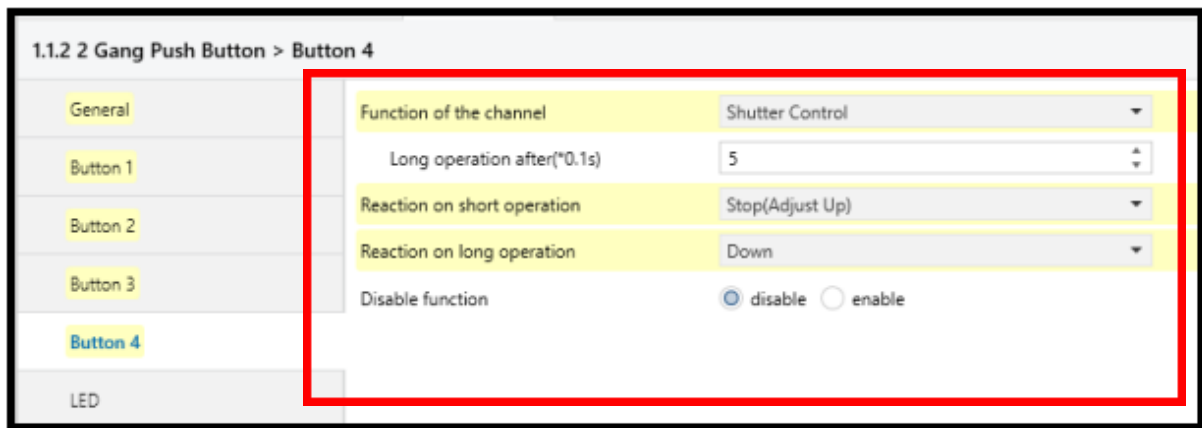
iii. Contoh parameter suis (push button) untuk shutter/blind control:

1.1.2 2 Gang Push Button > Button 1

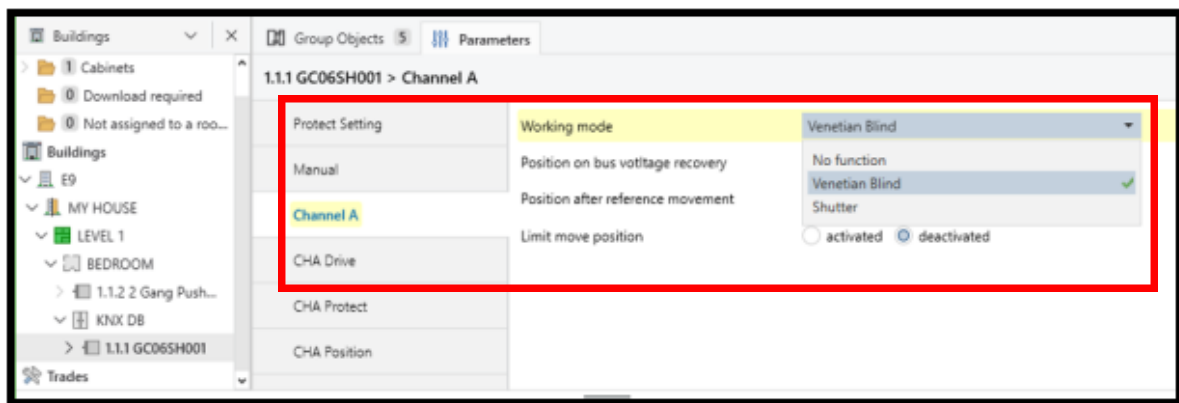
General	Function of the channel	Shutter Control
Button 1	Long operation after(*0.1s)	5
Button 2	Reaction on short operation	Stop(Adjust Up/Down)
Button 3	Reaction on long operation	Up/Down
Button 4	Disable function	☒ disable ☐ enable
LED		

1.1.2 2 Gang Push Button > Button 3

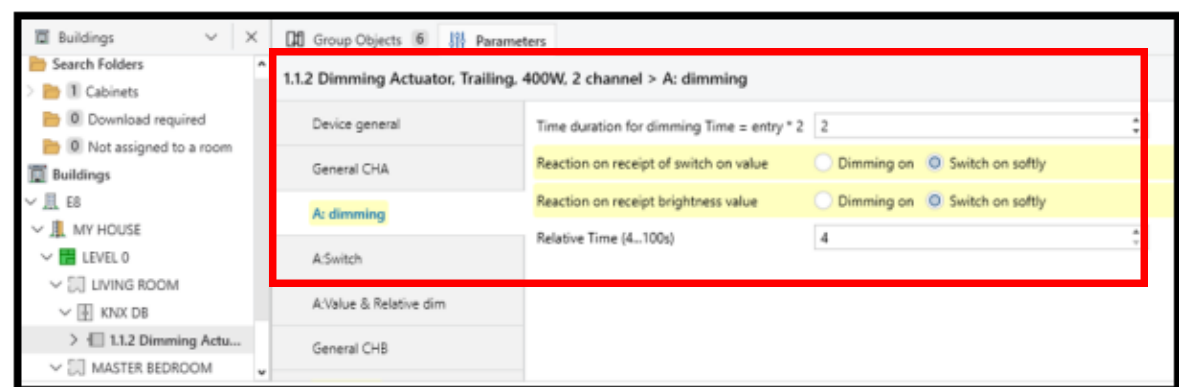
General	Function of the channel	Shutter Control
Button 1	Long operation after(*0.1s)	5
Button 2	Reaction on short operation	Stop(Adjust Down)
Button 3	Reaction on long operation	Up
Button 4	Disable function	☒ disable ☐ enable
LED		



vi. Parameter untuk peranti Shutter Actuator:

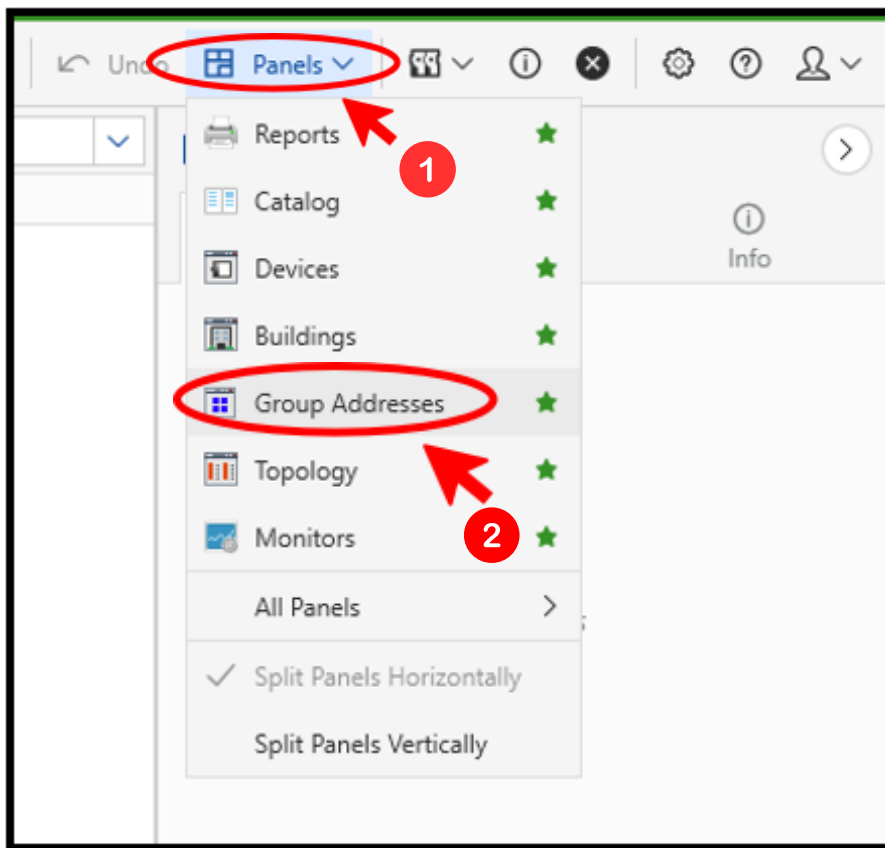


v. Parameter untuk peranti Dimming Actuator:

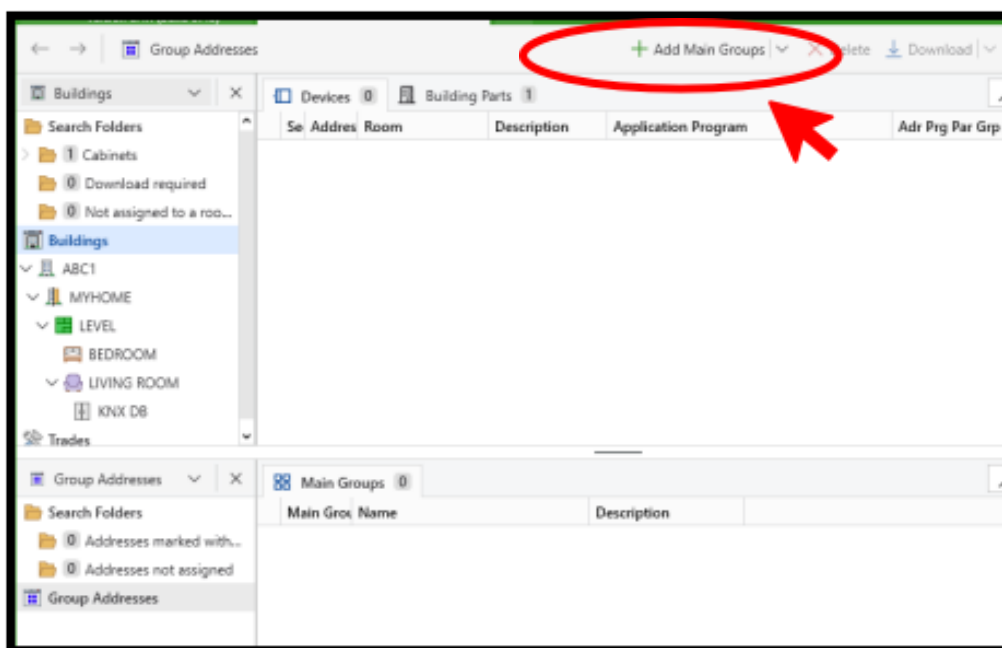


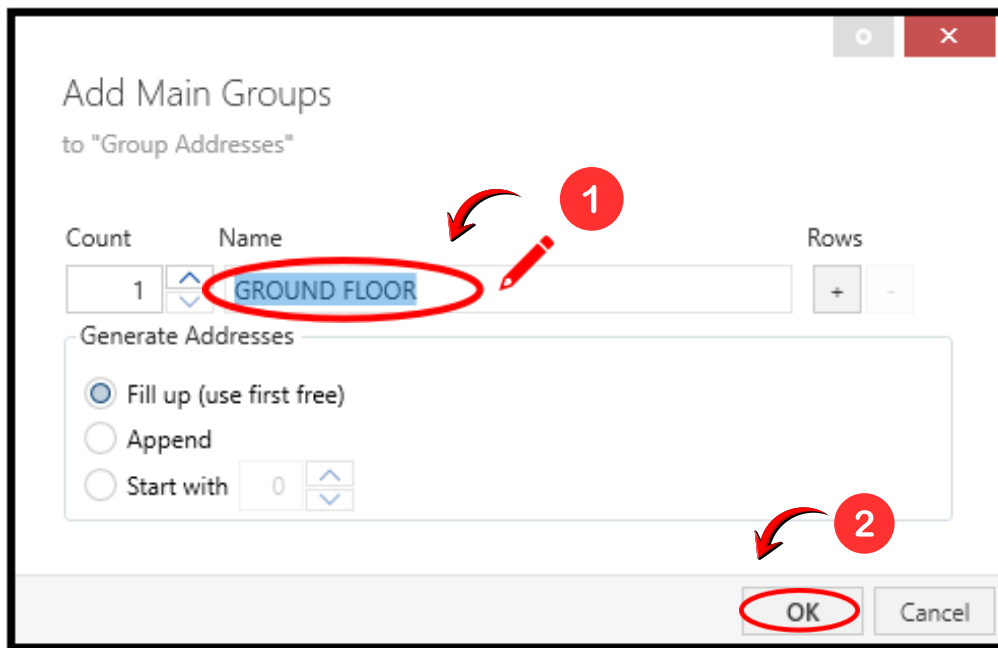
6. Mewujudkan Alamat Kumpulan (Creating A Group Address).

i. Klik Panels, klik Group Addresses:

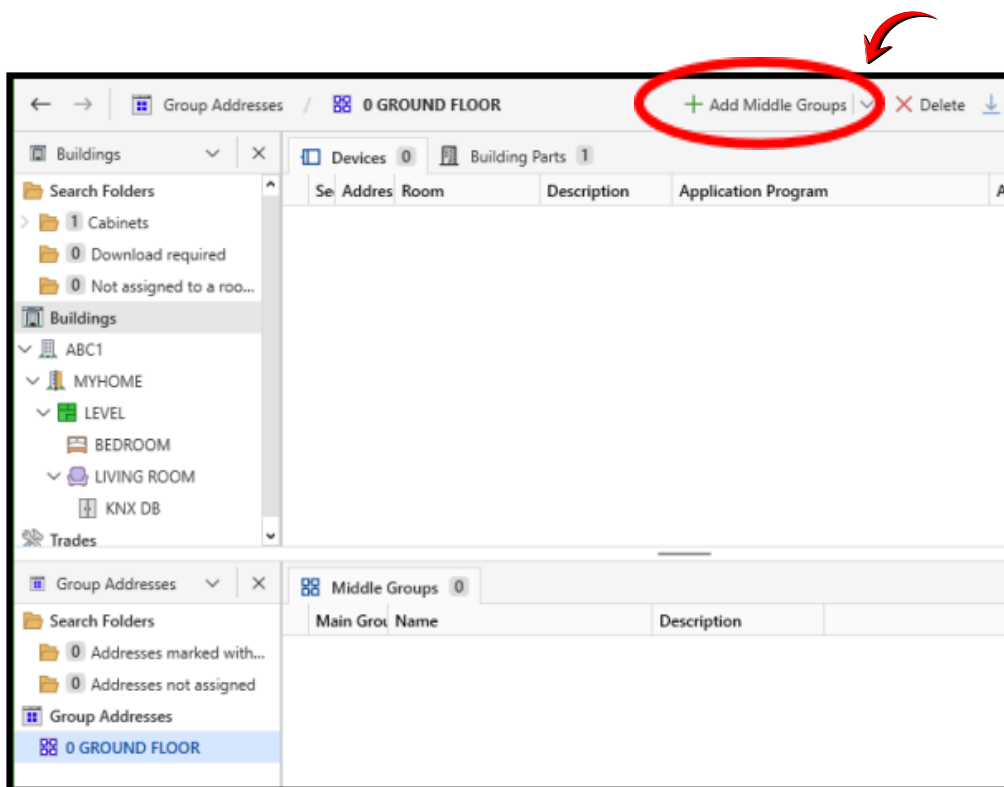


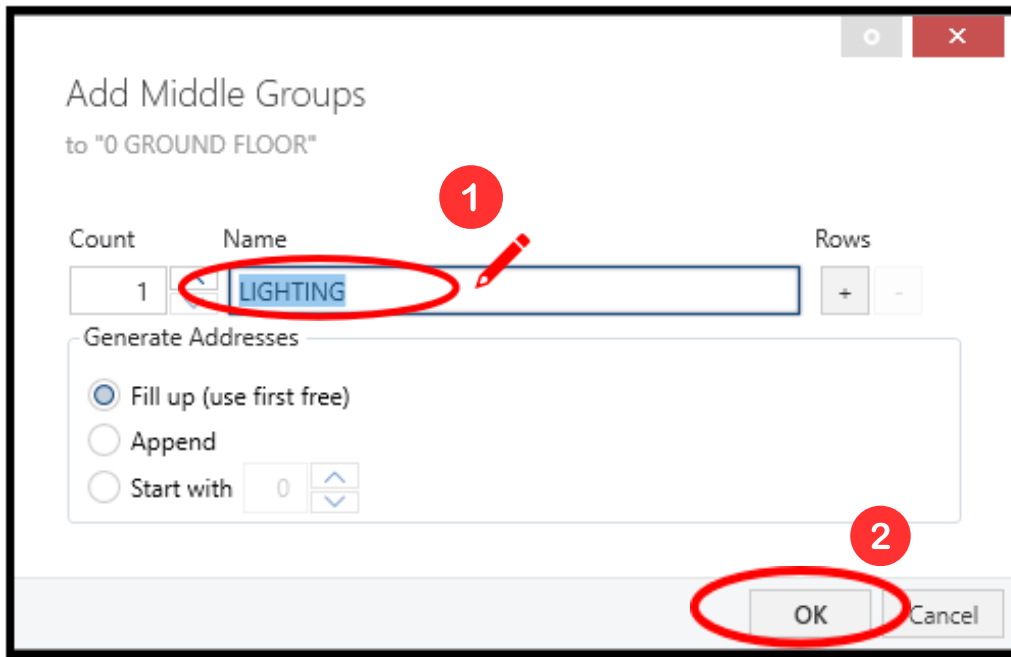
ii. Klik + Add Main Groups:



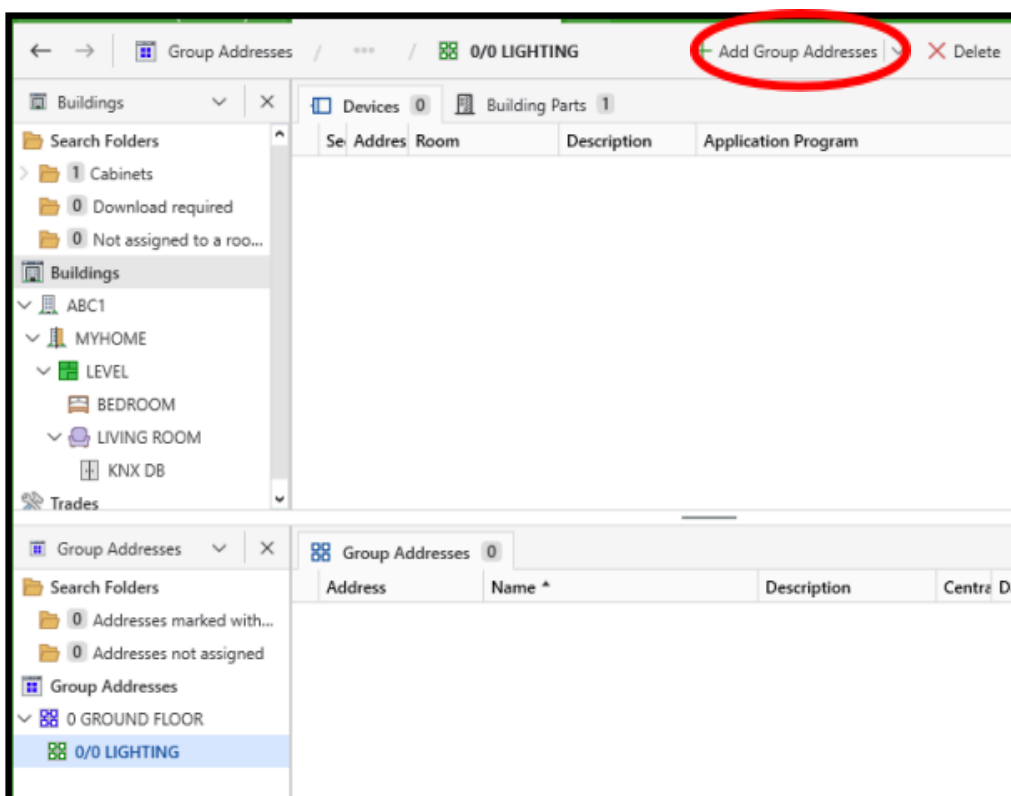


iii. Klik + Add Middle Groups:





iv. Klik + Add Group Addresses:



Add Group Addresses

to "0/0 LIGHTING"

Count	Name	Rows
1	LIVING ROOM SWITCH 1 BIT	+ -
1	BEDROOM DIMM 4 BIT	+ -
1	SHUTTER UP/DOWN 1 BIT	+ -
1	SHUTTER STOP 1 BIT	+ -

Generate Addresses

☒ Fill up (use first free)
☐ Append
☐ Start with

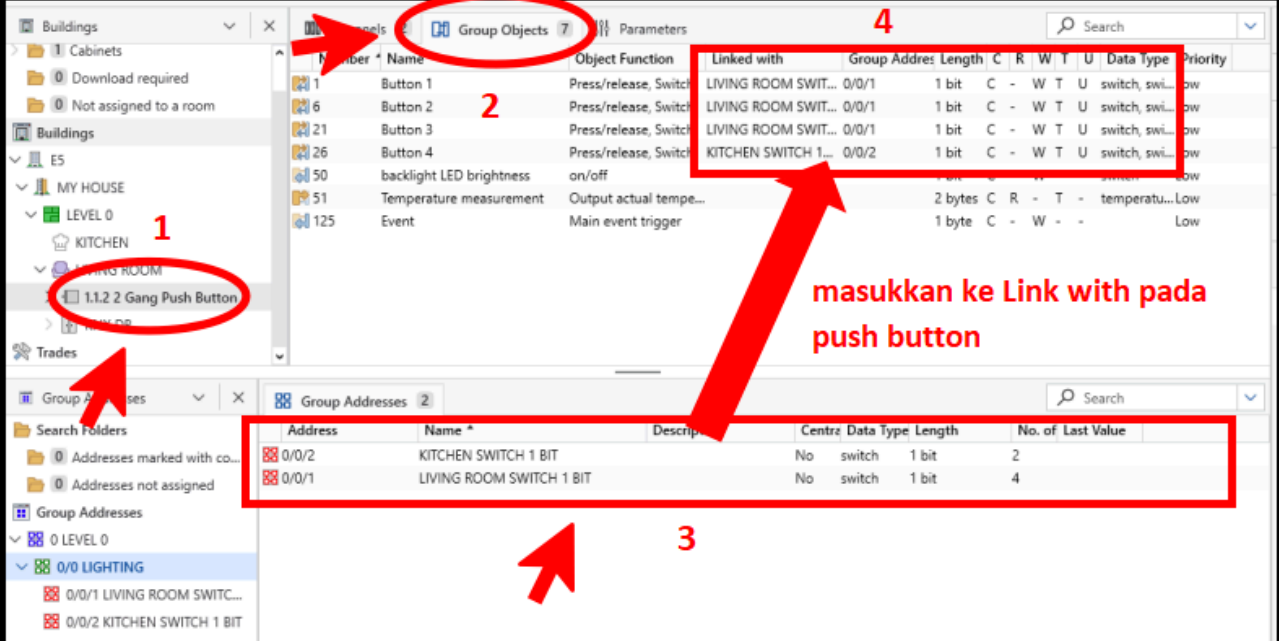
OK Cancel

Group Addresses		Group Addresses 4						
Search Folders		Address	Name *	Description	Central	Data Type	Length	No. of Last Value
0 Addresses marked with comments		0/0/2	BEDROOM DIMM 4 BITS		No			0
4 Addresses not assigned		0/0/1	LIVING ROOM SWITCH 1 BIT		No			0
Group Addresses		0/0/4	SHUTTER STOP 1 BIT		No			0
0 GROUND FLOOR		0/0/3	SHUTTER UP/DOWN 1 BIT		No			0
0/0 LIGHTING								
0/0/1 LIVING ROOM SWITCH 1 BIT								
0/0/2 BEDROOM DIMM 4 BITS								
0/0/3 SHUTTER UP/DOWN 1 BIT								
0/0/4 SHUTTER STOP 1 BIT								

7. Menghubungkan Alamat Kumpulan Kepada Objek Kumpulan (Linking A Group Address (GA) To A Group Object (GO)).

a) Menghubungkan Group Address (GA) ke Group Object (GO) pada peranti push button dan peranti switch actuator

- Klik pada peranti push button, cari Group Objects, masukkan group address ke Button 1 – Button 4 mengikut operasi:



1 Klik pada peranti push button (1.1.2 2 Gang Push Button).

2 Cari Group Objects.

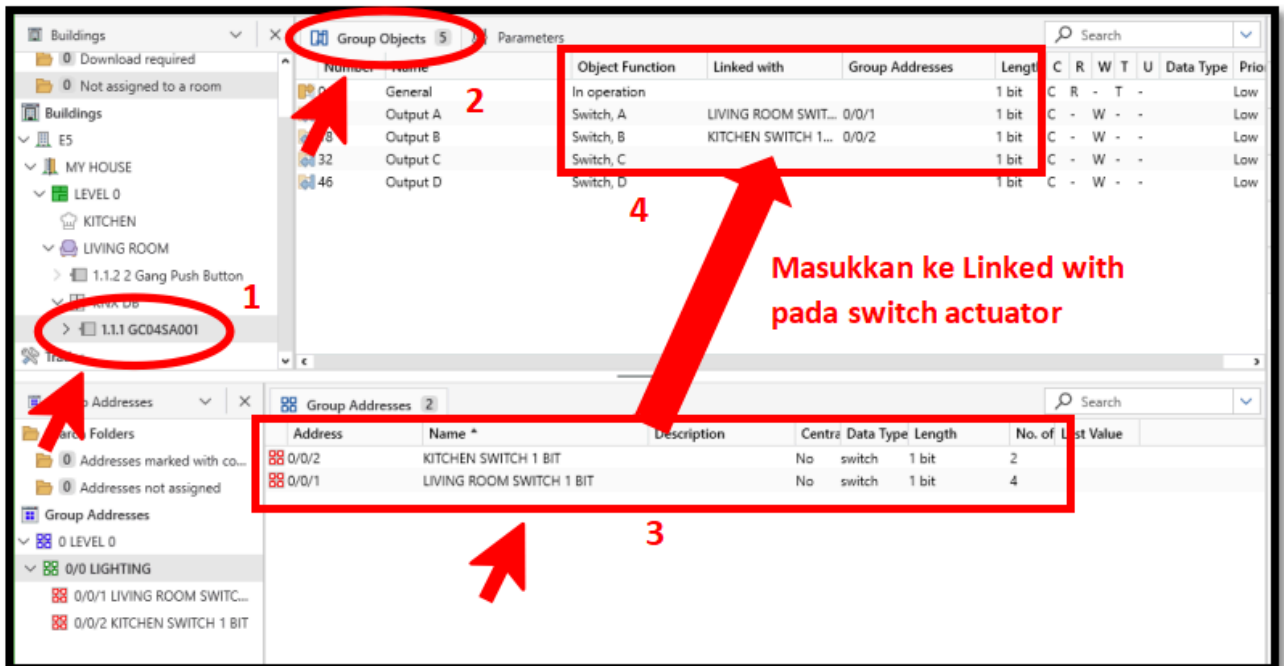
3 Masukkan group address ke Button 1 – Button 4 mengikut operasi.

4 Masukkan ke Link with pada push button.

Number	Name	Object Function	Linked with	Group Address	Length	C	R	W	T	U	Data Type	Priority
1	Button 1	Press/release, Switch	LIVING ROOM SWITCH 1 BIT	0/0/1	1 bit	C	-	W	T	U	switch, swi...	Low
6	Button 2	Press/release, Switch	LIVING ROOM SWITCH 1 BIT	0/0/1	1 bit	C	-	W	T	U	switch, swi...	Low
21	Button 3	Press/release, Switch	LIVING ROOM SWITCH 1 BIT	0/0/1	1 bit	C	-	W	T	U	switch, swi...	Low
26	Button 4	Press/release, Switch	KITCHEN SWITCH 1 BIT	0/0/2	1 bit	C	-	W	T	U	switch, swi...	Low
50	backlight LED brightness	on/off			2 bytes	C	R	-	T	-	temperatu...	Low
51	Temperature measurement	Output actual tempe...			1 byte	C	-	W	-	-		Low
125	Event	Main event trigger										

Address	Name *	Description	Centrx	Data Type	Length	No. of	Last Value
0/0/2	KITCHEN SWITCH 1 BIT		No	switch	1 bit	2	
0/0/1	LIVING ROOM SWITCH 1 BIT		No	switch	1 bit	4	

- ii. Klik pada peranti switch actuator, cari Group Objects, masukkan group address ke Button 1 – Button 4 mengikut operasi:



The screenshot shows the KNX software interface with two main windows: 'Group Objects' and 'Group Addresses'. Red arrows and numbers indicate the steps for linking a switch actuator to group addresses.

Group Objects Table:

Number	Name	Object Function	Linked with	Group Addresses	Length	C	R	W	T	U	Data Type	Prio
0	General	In operation			1 bit	C	R	-	T	-		Low
8	Output A	Switch, A	LIVING ROOM SWIT...	0/0/1	1 bit	C	-	W	-	-		Low
16	Output B	Switch, B	KITCHEN SWITCH 1...	0/0/2	1 bit	C	-	W	-	-		Low
32	Output C	Switch, C			1 bit	C	-	W	-	-		Low
46	Output D	Switch, D			1 bit	C	-	W	-	-		Low

Group Addresses Table:

Address	Name *	Description	Centre	Data Type	Length	No. of List Value
0/0/2	KITCHEN SWITCH 1 BIT		No	switch	1 bit	2
0/0/1	LIVING ROOM SWITCH 1 BIT		No	switch	1 bit	4

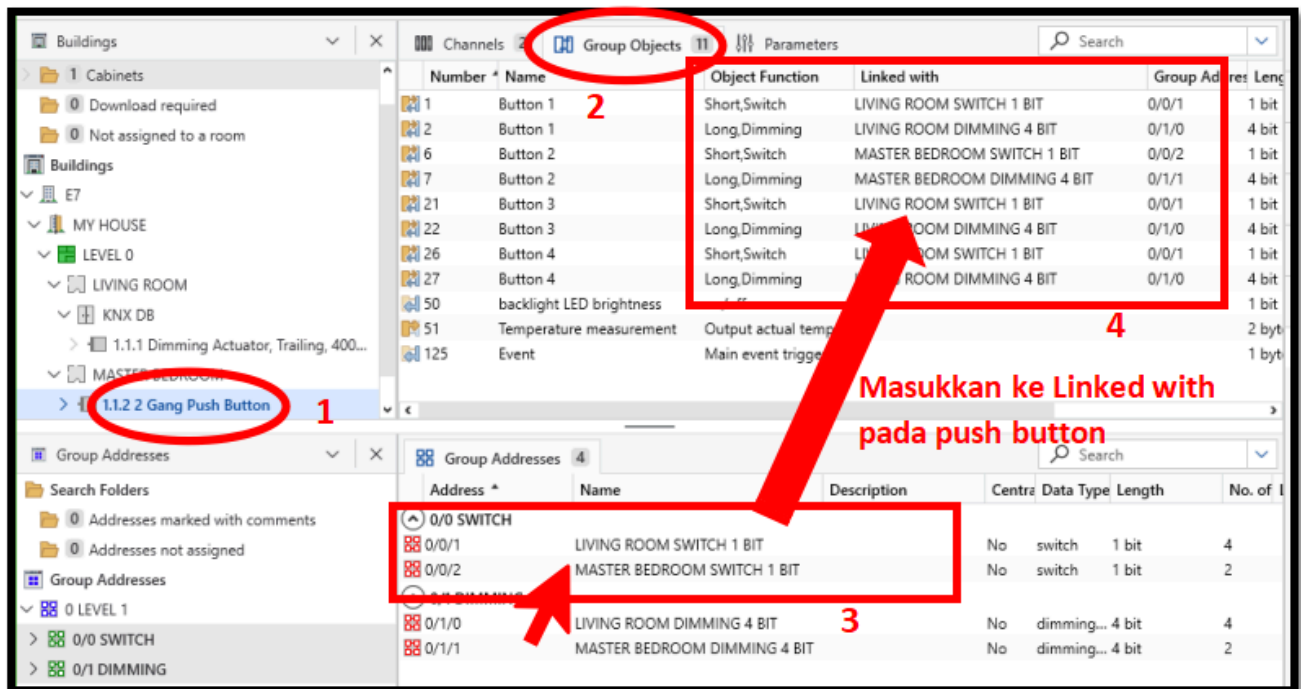
Annotations:

- 1:** Points to the '1.1.1 GC04SA001' device in the left sidebar.
- 2:** Points to the 'Group Objects' tab.
- 3:** Points to the 'Group Addresses' table.
- 4:** Points to the 'Linked with' column in the 'Group Objects' table.

Text Annotation: 'Masukkan ke Linked with pada switch actuator' (Enter into Linked with on the switch actuator) with an arrow pointing to the 'Linked with' column.

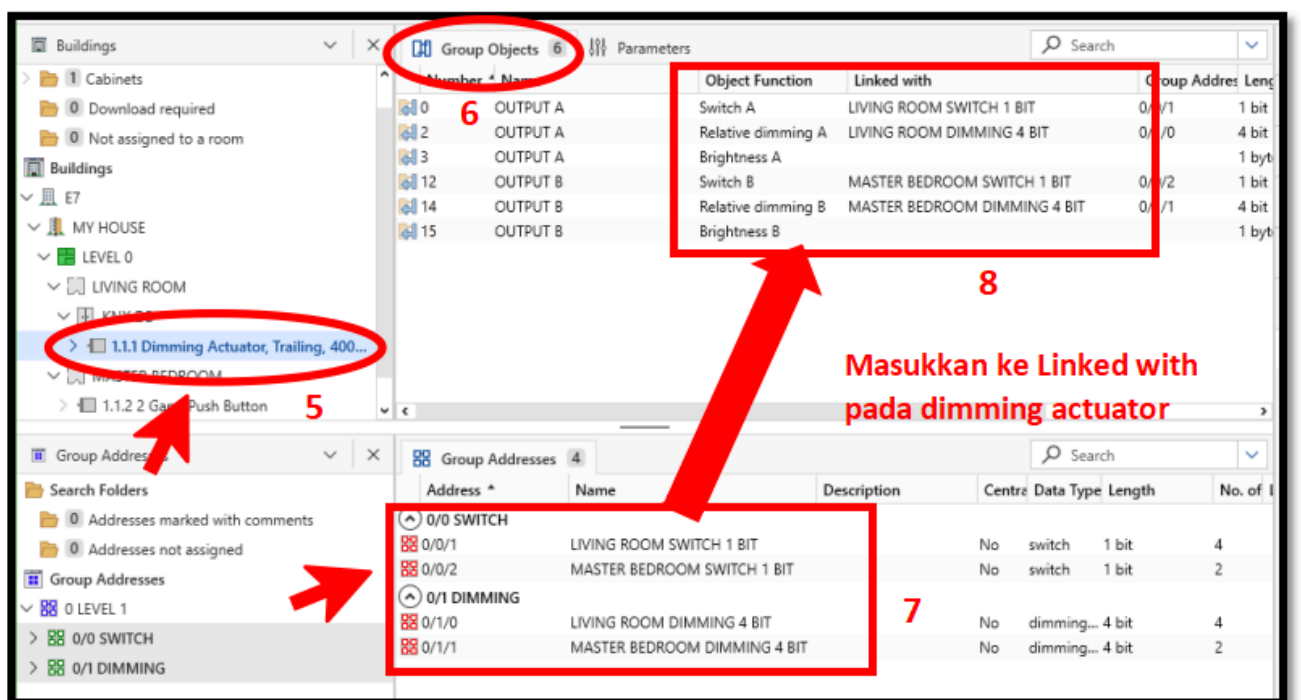
b) Menghubungkan Group Address (GA) ke Group Object (GO) pada peranti push button dan peranti dimming actuator

- Klik pada peranti push button, cari Group Objects, masukkan group address ke Button 1 – Button 4 mengikut operasi. Klik pada dimming actuator, cari Group Objects, masukkan group address ke output A-B mengikut operasi:



Number	Name	Object Function	Linked with	Group Address	Length
1	Button 1	Short,Switch	LIVING ROOM SWITCH 1 BIT	0/0/1	1 bit
2	Button 1	Long,Dimming	LIVING ROOM DIMMING 4 BIT	0/1/0	4 bit
6	Button 2	Short,Switch	MASTER BEDROOM SWITCH 1 BIT	0/0/2	1 bit
7	Button 2	Long,Dimming	MASTER BEDROOM DIMMING 4 BIT	0/1/1	4 bit
21	Button 3	Short,Switch	LIVING ROOM SWITCH 1 BIT	0/0/1	1 bit
22	Button 3	Long,Dimming	LIVING ROOM DIMMING 4 BIT	0/1/0	4 bit
26	Button 4	Short,Switch	LIVING ROOM SWITCH 1 BIT	0/0/1	1 bit
27	Button 4	Long,Dimming	LIVING ROOM DIMMING 4 BIT	0/1/0	4 bit
50	backlight LED brightness	Output actual temp			2 byt
51	Temperature measurement	Main event trigger			1 byt
125	Event				

Address *	Name	Description	Centre	Data Type	Length	No. of I
0/0 SWITCH						
0/0/1	LIVING ROOM SWITCH 1 BIT		No	switch	1 bit	4
0/0/2	MASTER BEDROOM SWITCH 1 BIT		No	switch	1 bit	2
0/1 DIMMING						
0/1/0	LIVING ROOM DIMMING 4 BIT		No	dimming...	4 bit	4
0/1/1	MASTER BEDROOM DIMMING 4 BIT		No	dimming...	4 bit	2

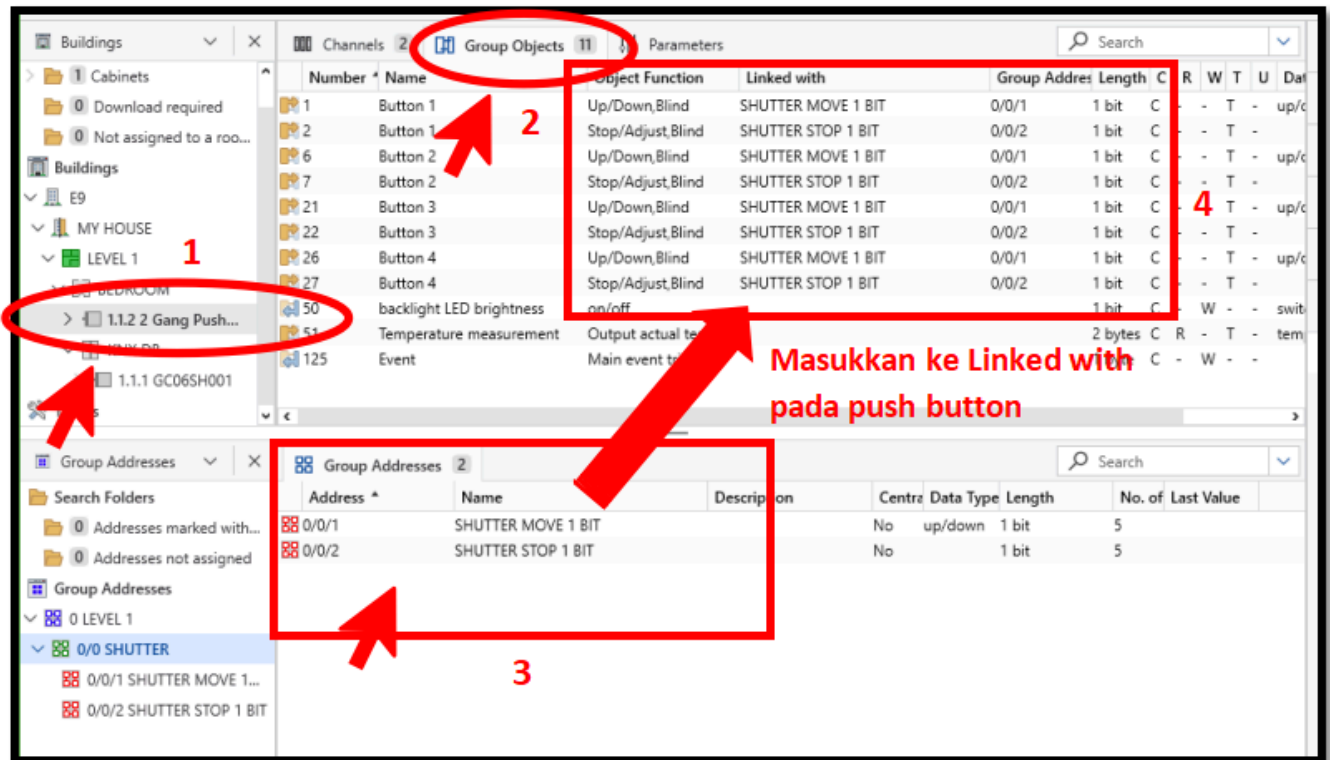


Number	Name	Object Function	Linked with	Group Address	Length
0	OUTPUT A	Switch A	LIVING ROOM SWITCH 1 BIT	0/0/1	1 bit
2	OUTPUT A	Relative dimming A	LIVING ROOM DIMMING 4 BIT	0/1/0	4 bit
3	OUTPUT A	Brightness A			1 byt
12	OUTPUT B	Switch B	MASTER BEDROOM SWITCH 1 BIT	0/0/2	1 bit
14	OUTPUT B	Relative dimming B	MASTER BEDROOM DIMMING 4 BIT	0/1/1	4 bit
15	OUTPUT B	Brightness B			1 byt

Address *	Name	Description	Centre	Data Type	Length	No. of I
0/0 SWITCH						
0/0/1	LIVING ROOM SWITCH 1 BIT		No	switch	1 bit	4
0/0/2	MASTER BEDROOM SWITCH 1 BIT		No	switch	1 bit	2
0/1 DIMMING						
0/1/0	LIVING ROOM DIMMING 4 BIT		No	dimming...	4 bit	4
0/1/1	MASTER BEDROOM DIMMING 4 BIT		No	dimming...	4 bit	2

c) Menghubungkan Group Address (GA) ke Group Object (GO) pada peranti push button dan peranti shutter actuator

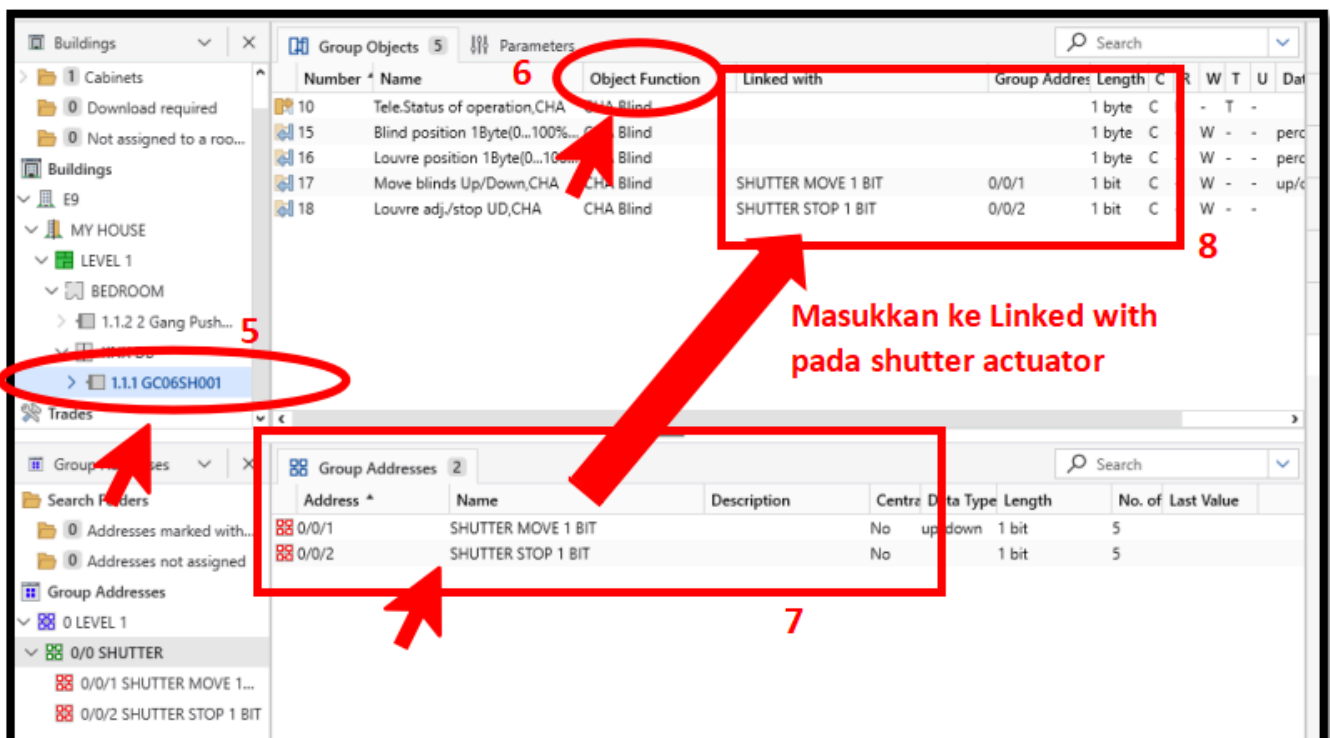
- i. Klik pada peranti push button, cari Group Objects, masukkan group address ke Button 1 – Button 4 mengikut operasi. Klik pada shutter actuator, cari Group Objects, masukkan group address ke output A-B mengikut operasi:



The screenshot shows the KNX software interface with the following components:

- Left Panel:** A tree view showing the project structure. A red circle labeled '1' highlights the '1.1.2 2 Gang Push...' device under the 'LEVEL 1' folder.
- Top Panel:** The 'Group Objects' tab is selected. A red circle labeled '2' highlights the 'Group Objects' header. Below it, a table lists objects for Button 1 through Button 4, each linked to a shutter function (SHUTTER MOVE 1 BIT or SHUTTER STOP 1 BIT) and a group address (0/0/1 or 0/0/2). A red circle labeled '4' highlights the 'Linked with' column.
- Bottom Panel:** The 'Group Addresses' tab is selected. A red circle labeled '3' highlights the 'Group Addresses' header. Below it, a table lists addresses 0/0/1 (SHUTTER MOVE 1 BIT) and 0/0/2 (SHUTTER STOP 1 BIT). A red arrow points from the 'Linked with' column of the top panel to this table.

Masukkan ke Linked with pada push button



The screenshot shows the KNX software interface with the following components:

- Left Panel:** A tree view showing the project structure. A red circle labeled '5' highlights the '1.1.1 GC06SH001' device under the 'LEVEL 1' folder.
- Top Panel:** The 'Group Objects' tab is selected. A red circle labeled '6' highlights the 'Group Objects' header. Below it, a table lists objects for the shutter actuator, including 'Blind position' and 'Move blinds', each linked to a shutter function (SHUTTER MOVE 1 BIT or SHUTTER STOP 1 BIT) and a group address (0/0/1 or 0/0/2). A red circle labeled '8' highlights the 'Linked with' column.
- Bottom Panel:** The 'Group Addresses' tab is selected. A red circle labeled '7' highlights the 'Group Addresses' header. Below it, a table lists addresses 0/0/1 (SHUTTER MOVE 1 BIT) and 0/0/2 (SHUTTER STOP 1 BIT). A red arrow points from the 'Linked with' column of the top panel to this table.

Masukkan ke Linked with pada shutter actuator

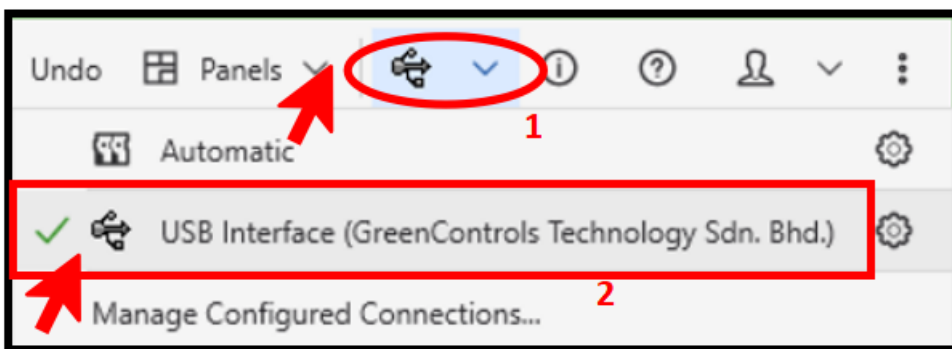
8. Memuat Turun Dan Memprogram Konfigurasi (Download The Programming Configuration).

Terdapat 2 perkara penting semasa melaksanakan proses muat turun (Download) program pada peranti fizikal:

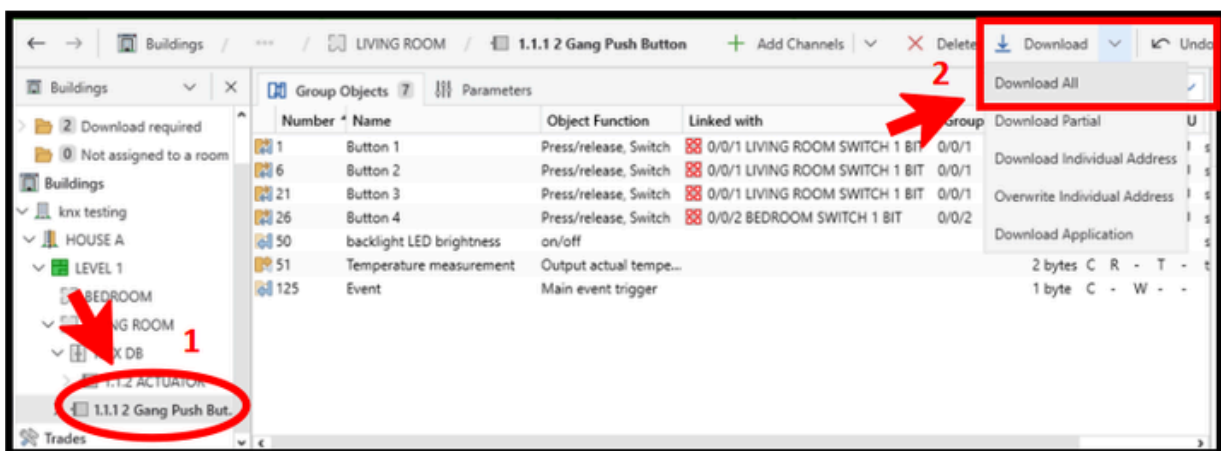
- (i) Sekiranya projek hanya mempunyai 1 topologi sahaja, maka proses muat turun (Download) boleh dilaksanakan terus pada setiap peranti fizikal.
- (ii) Sekiranya projek mempunyai topologi yang menggunakan peranti Line Coupler, maka proses muat turun (download) perlu dilaksanakan pada Line Coupler terlebih dahulu (termasuk peranti pada subline) sebelum memuat turun pada peranti yang lain.

a) Memuat turun programming ke dalam peranti push button (fizikal)

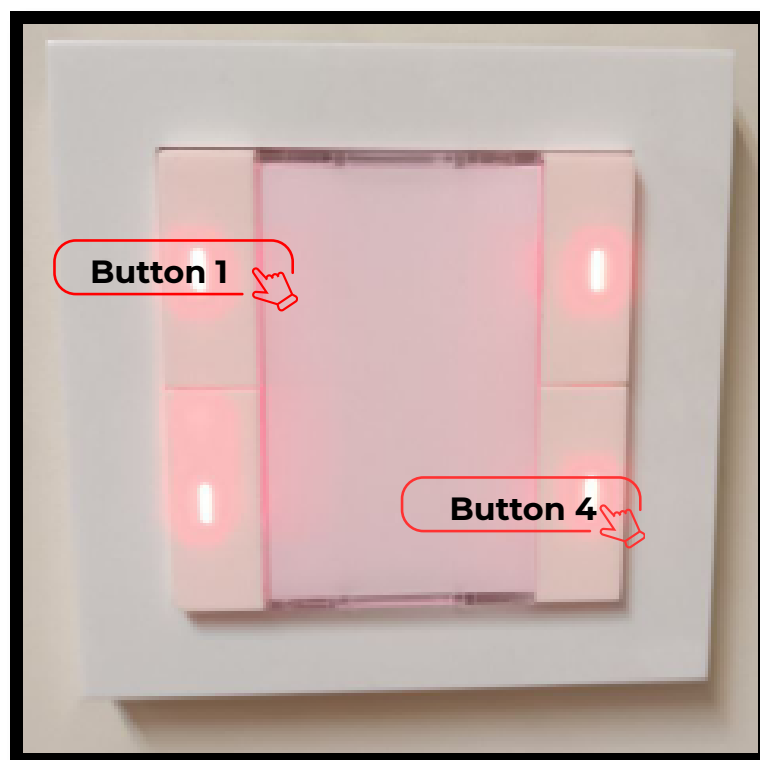
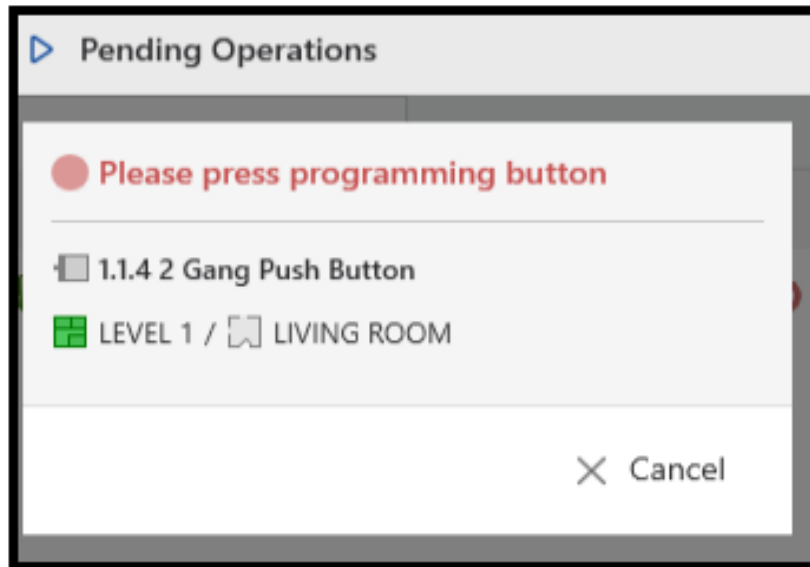
- i. Memastikan sambungan USB Interface dipilih:



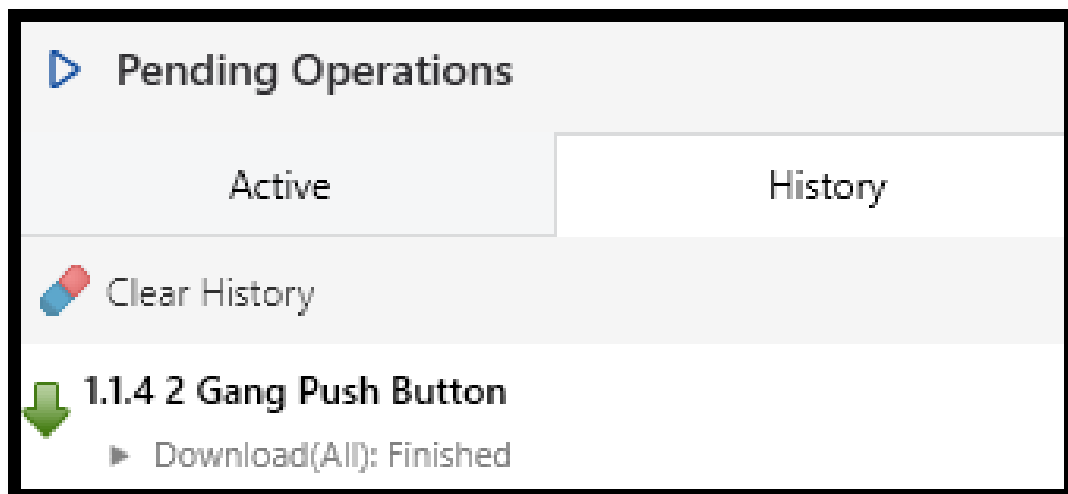
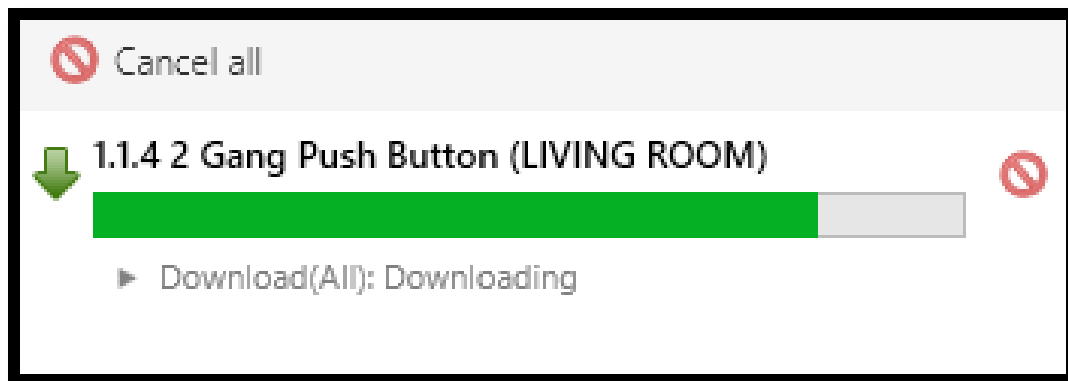
- ii. Klik pada push button di Tree view, cari menu Download, klik pada drop down menu, klik Download All:



- iii. Tekan button 1 and 4 serentak pada peranti push button (fizikal) apabila keluar arahan "Please press programming button":

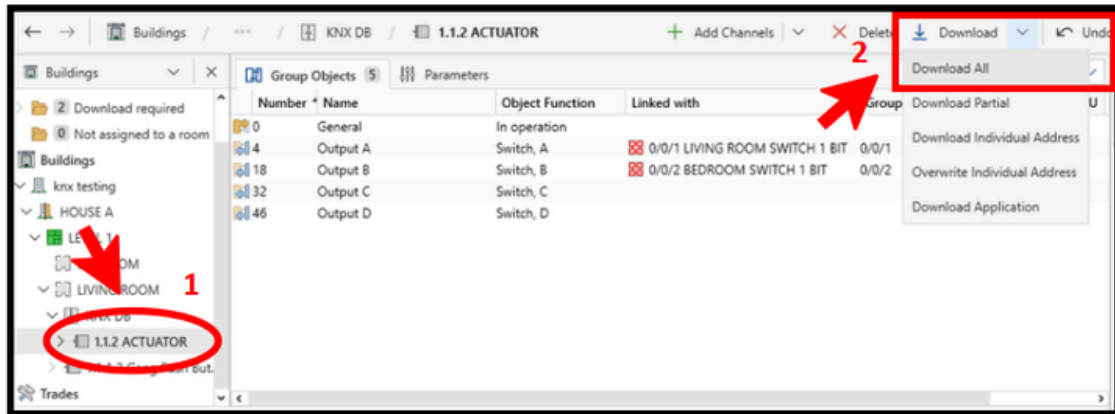


iv. Muat turun berjaya:

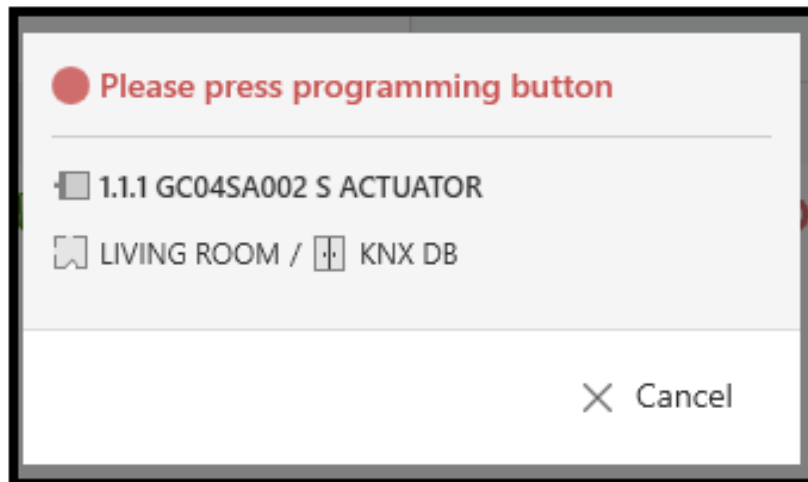


b) Memuat turun programming ke dalam peranti switch actuator

- i. Klik pada switch actuator di Tree view, cari menu Download, klik pada drop down menu, klik Download All:

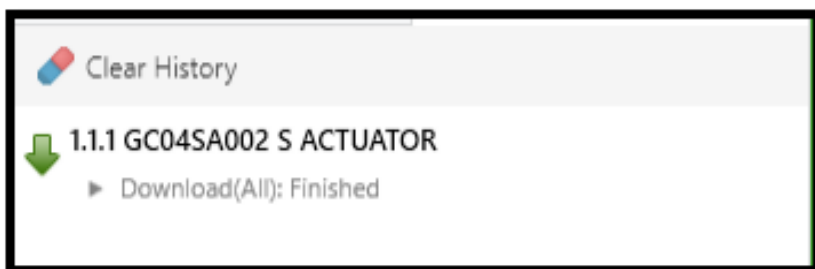
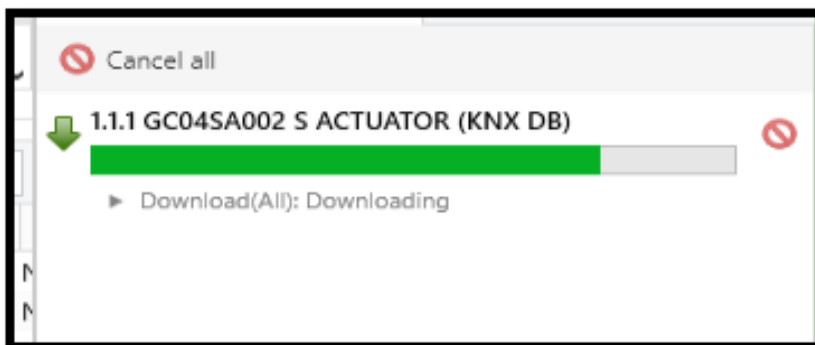


- ii. Cari dan tekan programming button pada switch actuator (fizikal) apabila keluar arahan "Please press programming button":





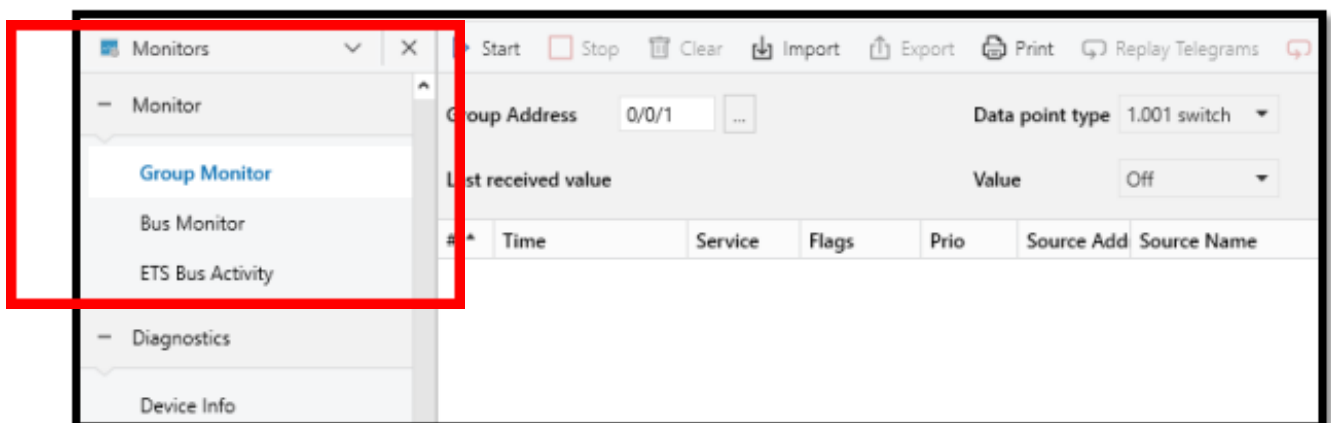
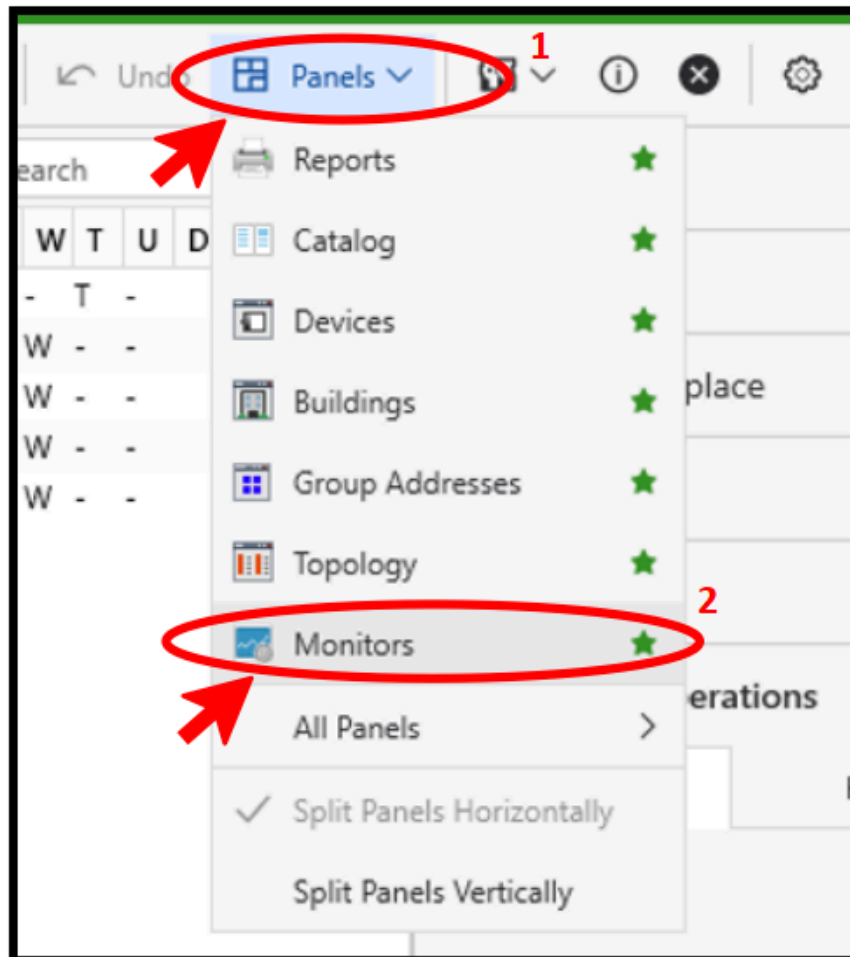
v. Muat turun berjaya:



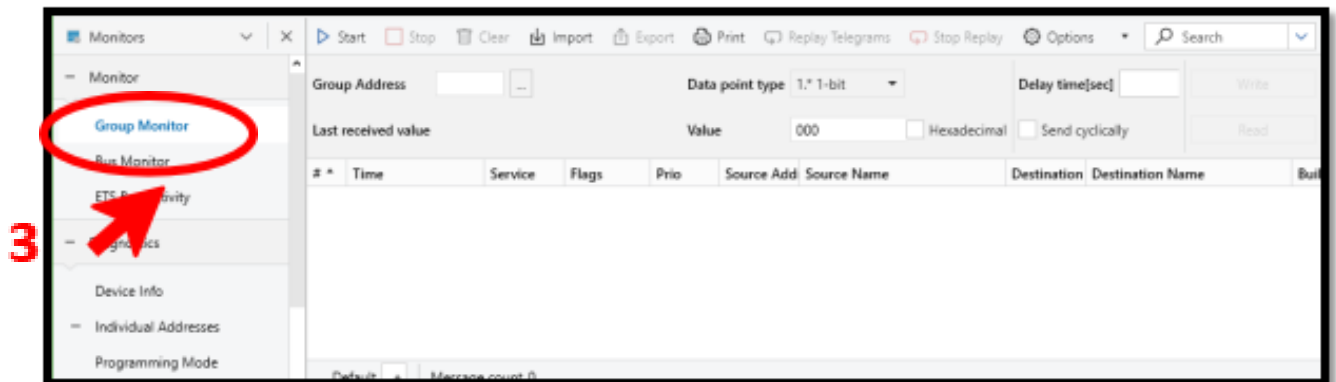
9. Melaksanakan Diagnostik Sistem Untuk Pengujian, Pengesanan Ralat, Dan Pengesanan Operasi Projek (Run System Diagnostics).

a) **Diagnostik Monitor:** memantau pergerakan dan komunikasi semua telegram dalam sistem KNX

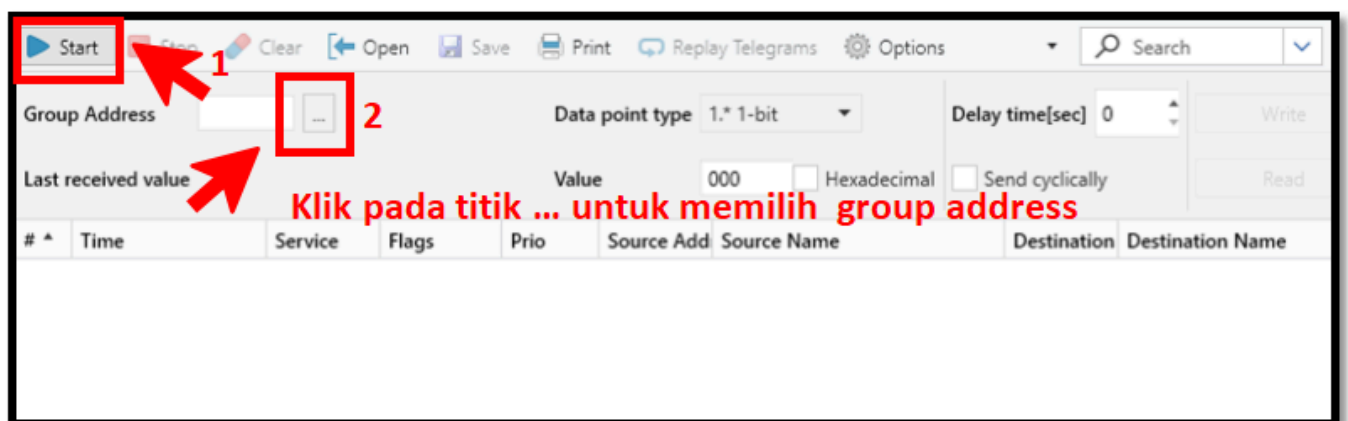
i. Klik Panels, klik Monitors:



ii. Group Monitor: pada paparan Monitor di Tree view, klik Group Monitor:



iii. Group Monitor: klik Start, pilih group address:



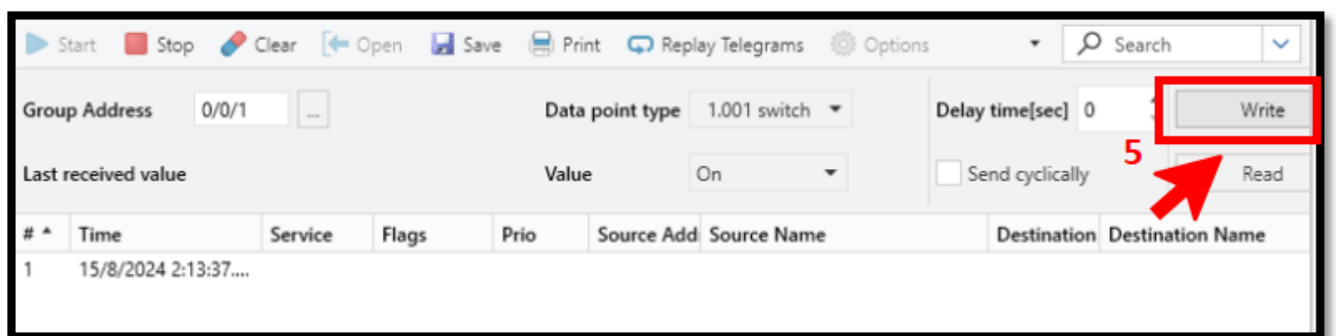
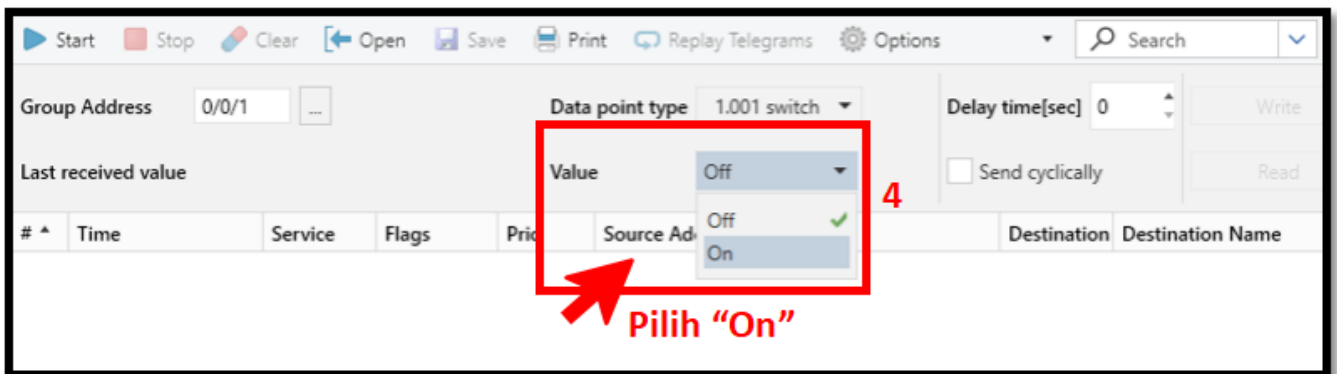
Select existing Group Address

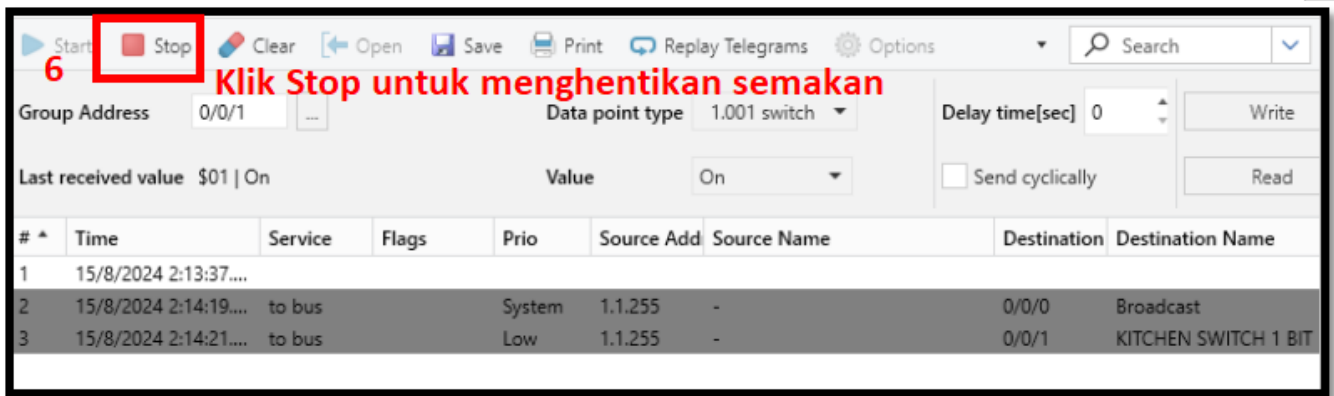
Sec	Group Address	Name	Description
0/0/1		KITCHEN SWITCH 1 BIT	
0/0/2		WC SWITCH 1 BIT	
0/0/3		LIVING ROOM SWITCH 1 BIT	
0/1/0		LIVING ROOM DIMM 4 BIT	
0/2/0		LIVING ROOM UPDOWN 1 BIT	
0/2/1		LIVING ROOM STOP 1 BIT	


3

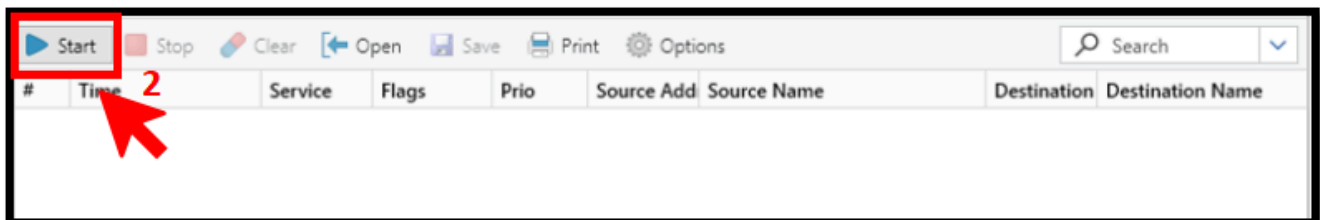
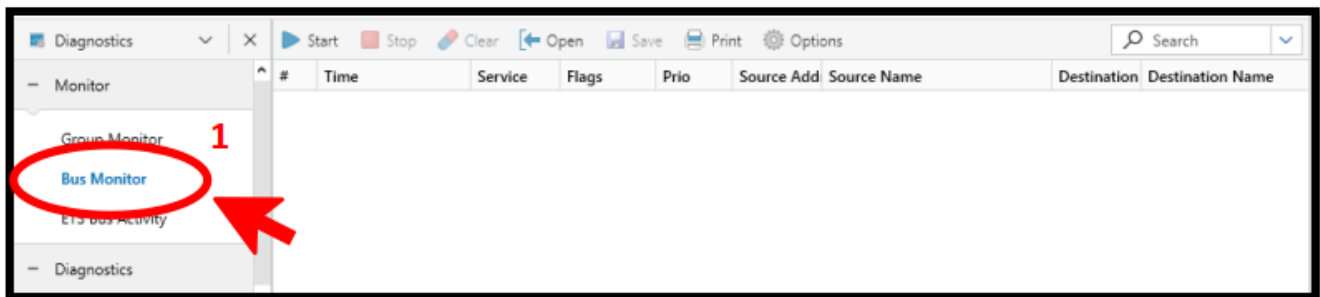
Pilih salah satu group address untuk membuat semakan

- iv. Group Monitor: klik “On” pada Value, klik Write, lampu akan menyala, akhir sekali klik Stop:

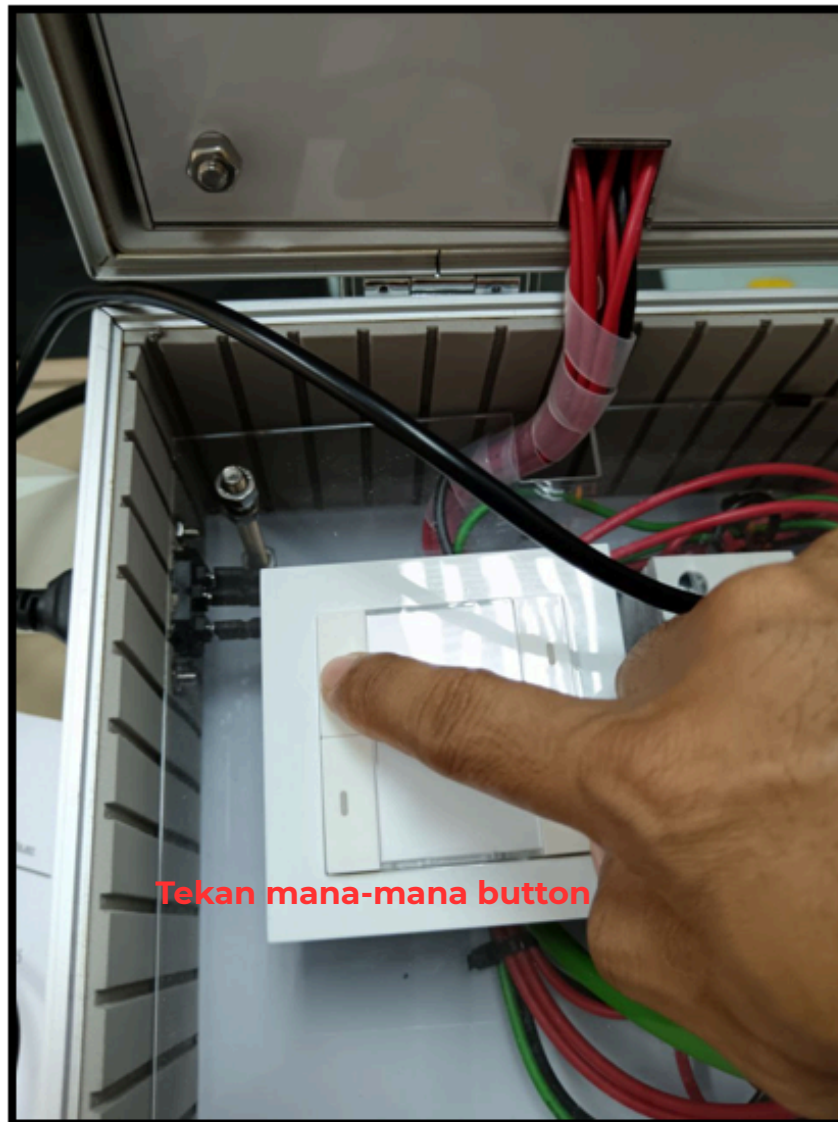




v. Bus Monitor: pada paparan Monitor di Tree view, klik Bus Monitor, klik Start:



- vi. Bus Monitor: tekan mana-mana pilihan button pada push button (fizikal), maklumat operasi akan dipaparkan, akhir sekali klik Stop:

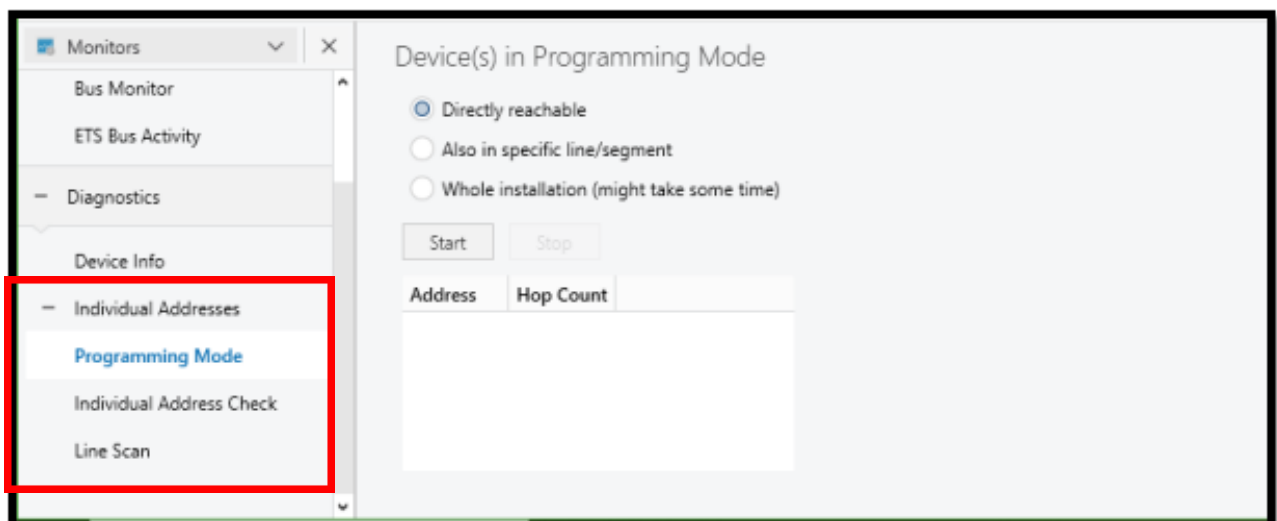
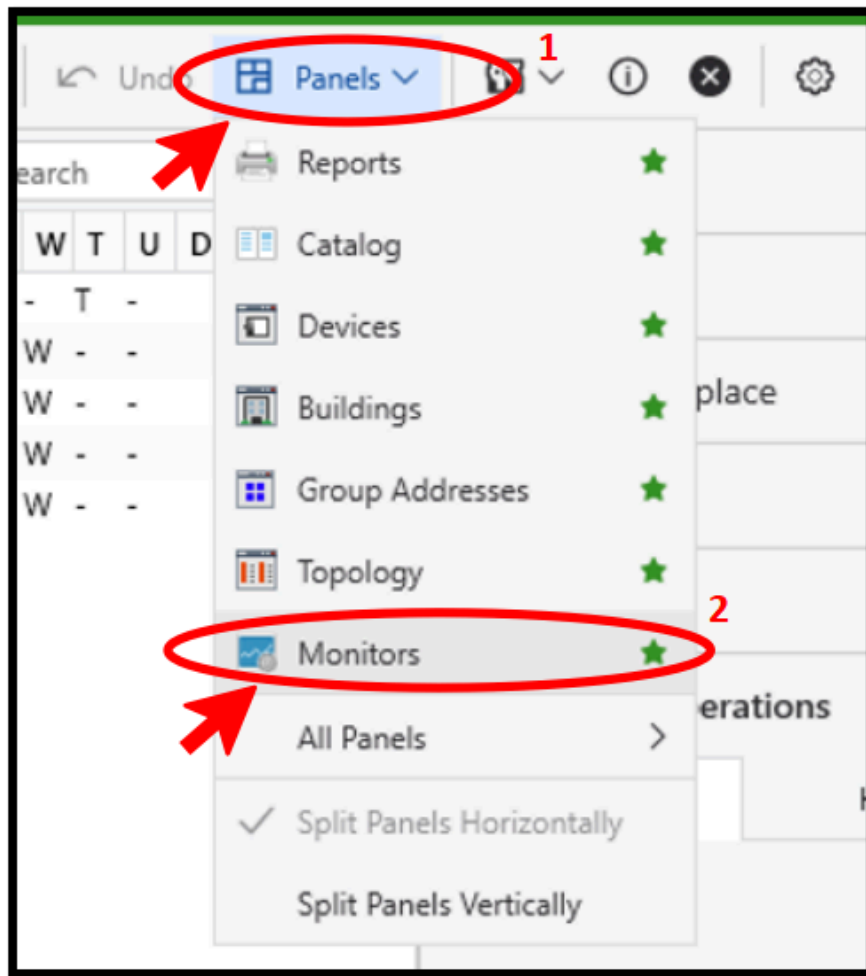


Start Stop Clear Open Save Print Options Search									
#	Time	Service	Flags	Prio	Source Add	Source Name	Destination	Destination Name	Building
1	15/8/2024 2:18:28...								
2	15/8/2024 2:18:53...	from bus	S=2	Low	1.1.4	2 Gang Push Button	0/0/3	LIVING ROOM SWITCH 1 BIT	
3	15/8/2024 2:19:08...	from bus	S=4	Low	1.1.4	2 Gang Push Button	0/2/1	LIVING ROOM STOP 1 BIT	
4	15/8/2024 2:19:09...	from bus	S=6	Low	1.1.4	2 Gang Push Button	0/0/1	KITCHEN SWITCH 1 BIT	
5	15/8/2024 2:19:12...	from bus	S=0	Low	1.1.4	2 Gang Push Button	0/0/3	LIVING ROOM SWITCH 1 BIT	

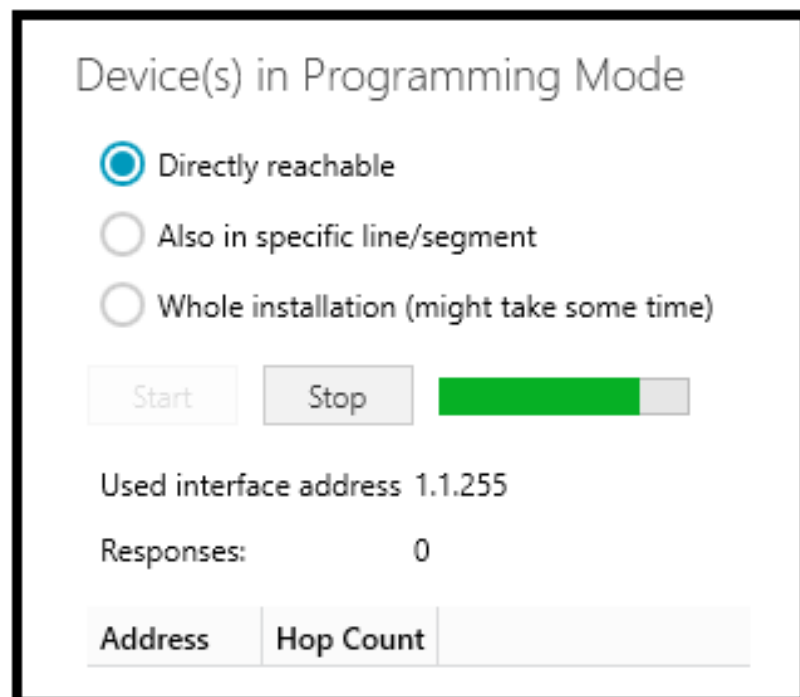
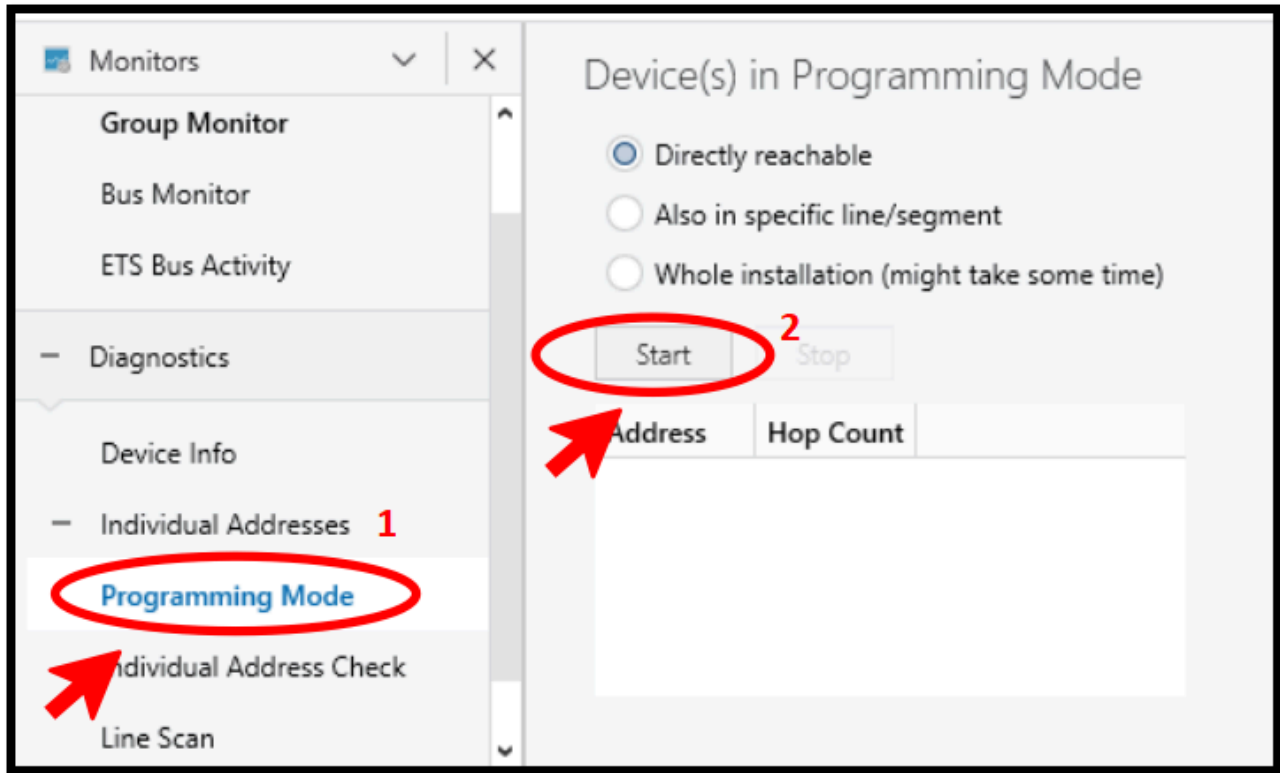
Start Stop Clear Open Save Print Options Search									
#	Time	Service	Flags	Prio	Source Add	Source Name	Destination	Destination Name	Building
1	15/8/2024 2:18:28...								
2	15/8/2024 2:18:53...	from bus	S=2	Low	1.1.4	2 Gang Push Button	0/0/3	LIVING ROOM SWITCH 1 BIT	
3	15/8/2024 2:19:08...	from bus	S=4	Low	1.1.4	2 Gang Push Button	0/2/1	LIVING ROOM STOP 1 BIT	
4	15/8/2024 2:19:09...	from bus	S=6	Low	1.1.4	2 Gang Push Button	0/0/1	KITCHEN SWITCH 1 BIT	
5	15/8/2024 2:19:12...	from bus	S=0	Low	1.1.4	2 Gang Push Button	0/0/3	LIVING ROOM SWITCH 1 BIT	

b) **Diagnostik Individual Addresses:** memastikan setiap alamat kumpulan (GA) dan peranti yang berkaitan berfungsi dengan betul, selaras dengan konfigurasi rangkaian KNX

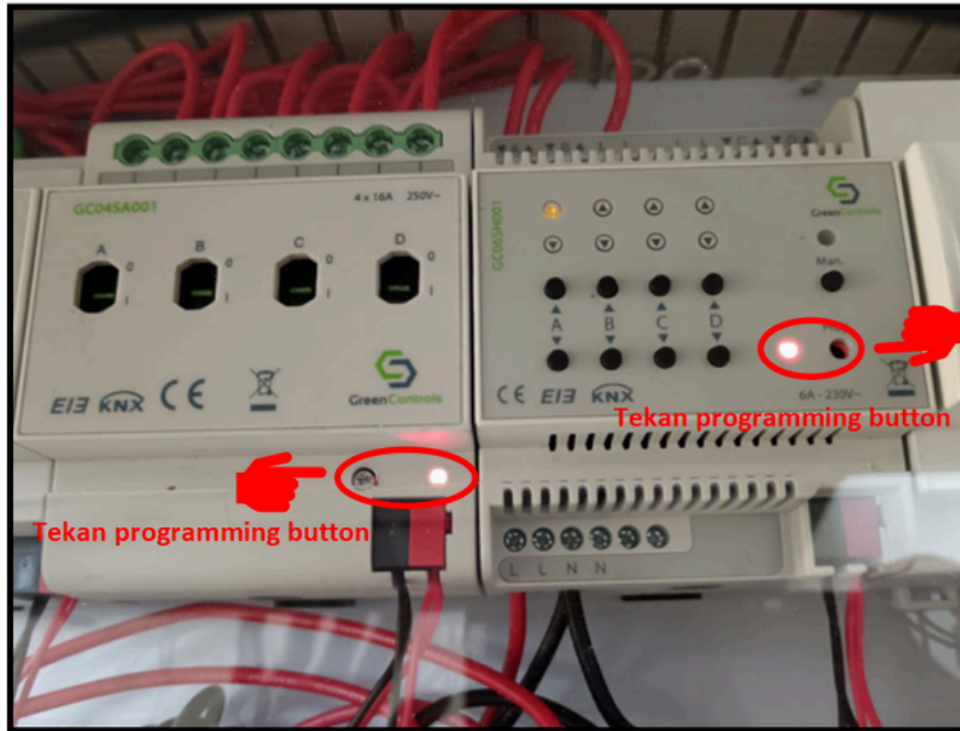
i. Klik Panels, klik Monitors:



ii. Programming mode: pada paparan Monitors di Tree view, klik Programming mode, klik Start, paparan imbasan akan terpapar:



iii. Programming mode: tekan programming button pada peranti fizikal iaitu switch actuator atau shutter actuator, Individual address bagi peranti yang berada dalam keadaan programming mode akan dipaparkan, akhir sekali klik Stop:



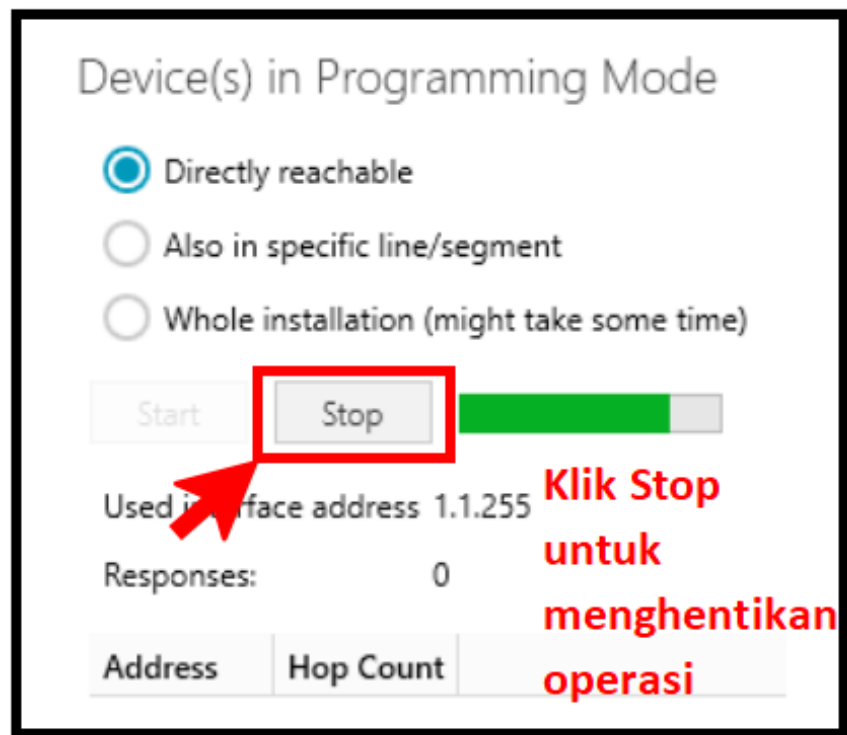
Device(s) in Programming Mode

☒ Directly reachable
☐ Also in specific line/segment
☐ Whole installation (might take some time)

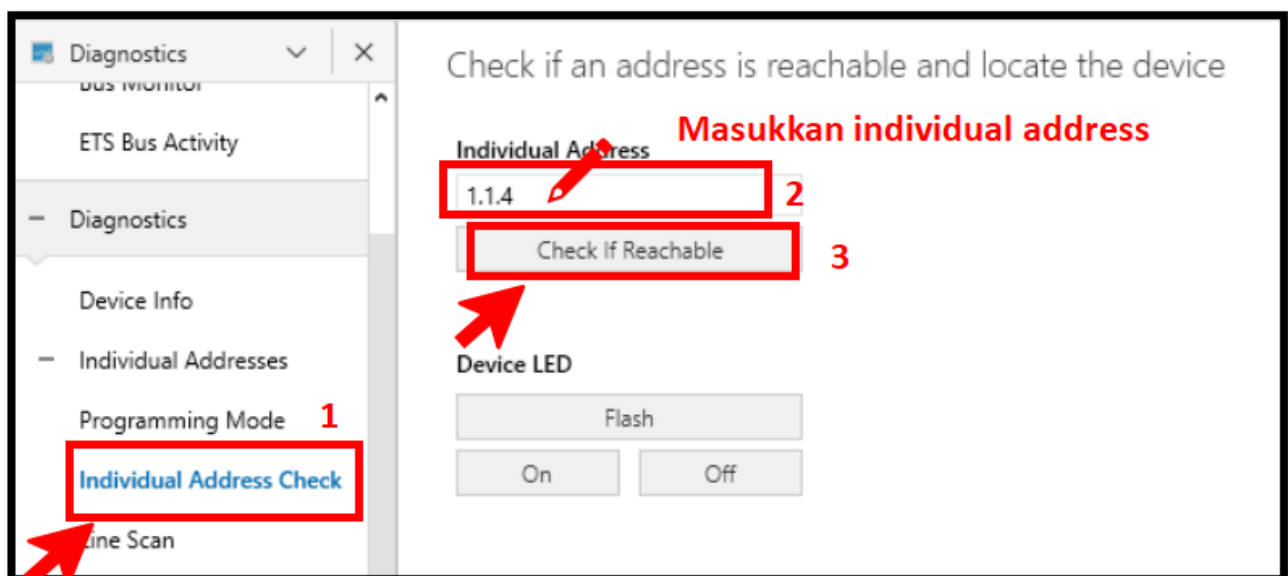
Used interface address 1.1.255

Responses: 2

Address	Hop Count	Address
1.1.1	6	Individual Address peranti akan dipaparkan
1.1.3	6	



iv. Individual Address Check: klik pada Individual Address Check, masukkan individual address, klik Check If Reachable:



v. Individual Address Check: sekiranya individual address yang dimasukkan adalah wujud maka lampu penunjuk akan menyala warna hijau, sebaliknya akan menyala warna merah:

Check if an address is reachable and locate the device

Individual Address 

1.1.2

Check If Reachable

Device exists and can be connected

Check if an address is reachable and locate the device

Individual Address 

1.1.6

Check If Reachable

Not found

vi. Individual Address Check: boleh juga membuat pemeriksaan menggunakan pilihan pada Device LED (Flash/On/Off): masukkan individual address, pilih salah satu operasi pada Device LED, cth: klik Flash, sekiranya individual address yang dimasukkan wujud maka lampu penunjuk akan berkelip-kelip (pada masa yang sama lampu penunjuk programming mode pada peranti fizikal juga akan berkelip-kelip), akhir sekali klik Stop Flash:

Check if an address is reachable and locate the device

Individual Address

1.1.3

1 Masukkan individual address

Check If Reachable

Not found

Device LED

Flash

On Off

2

Check if an address is reachable and locate the device

Individual Address

1.1.3

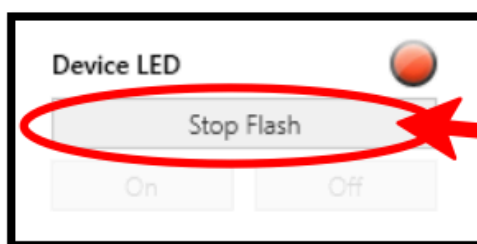
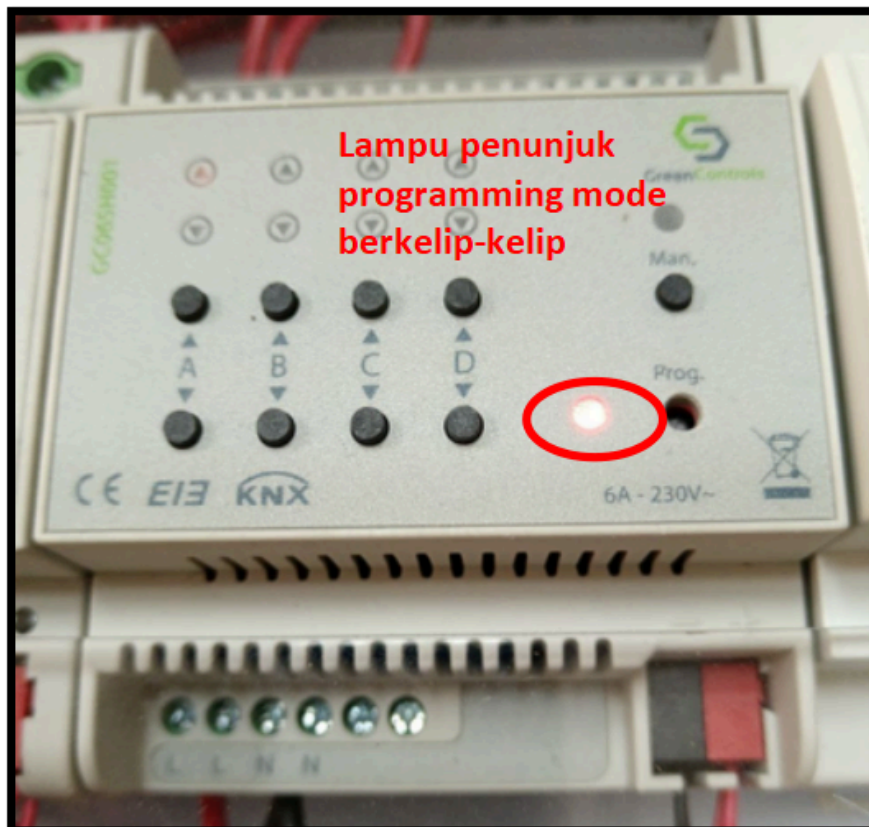
Check If Reachable

Device exists and can be connected

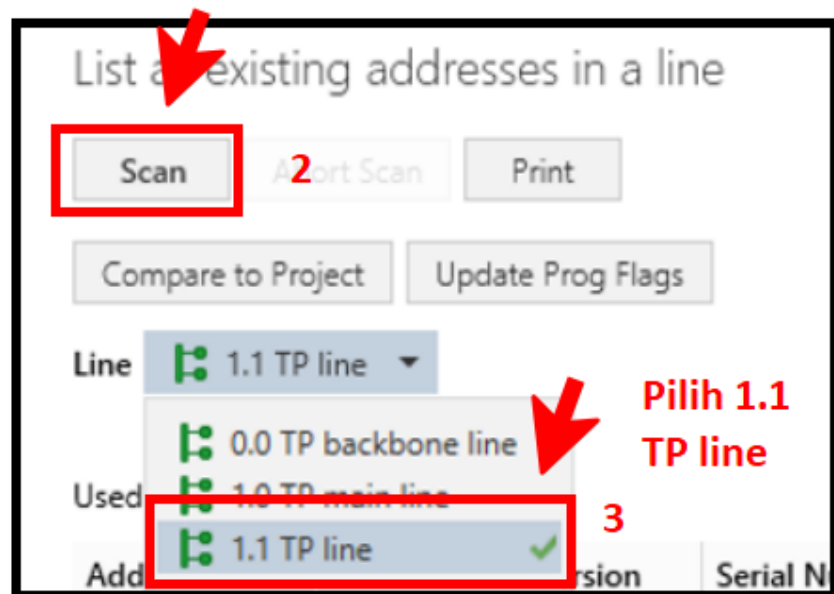
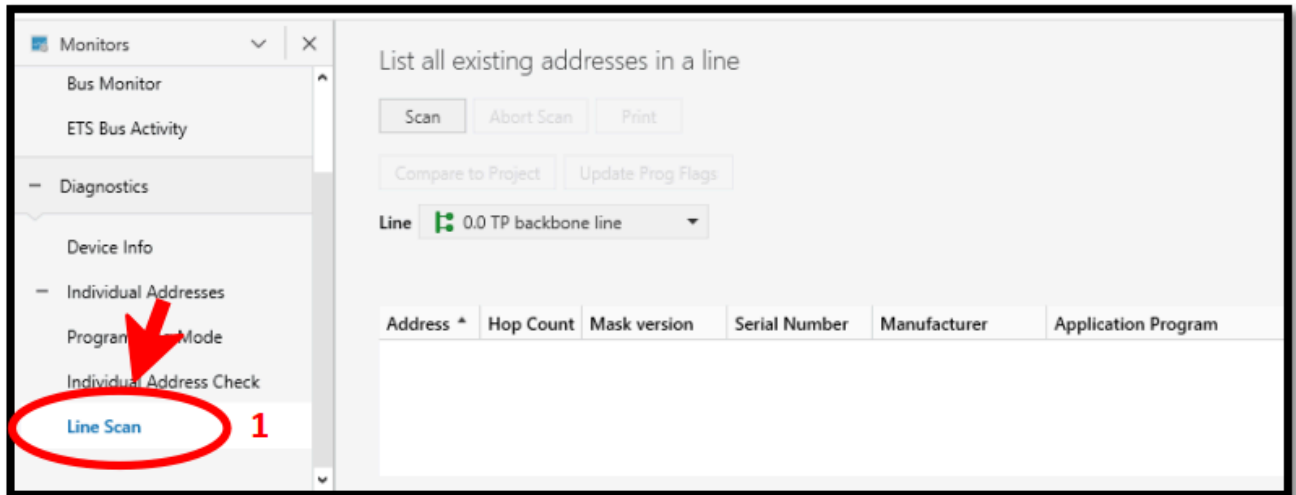
Device LED

Stop Flash

Blinking



vii. Line Scan: klik pada Line Scan, klik Scan, pada Line pilih 1.1 TP Line:



viii. Proses imbasan akan berlaku, maklumat semua individual address yang wujud pada line tersebut akan dipaparkan, akhir sekali klik Abort Scan:

List all existing addresses in a line

Scan Abort Scan Print

Compare to Project Update Prog Flags

Line  1.1 TP line ▼

Used interface address 1.1.255

Address *	Hop Count	Mask version	Serial Number	Manufacturer	Application Program
1.1.1	6				
1.1.2	6				
1.1.3	6				
1.1.4	6				
1.1.255	(local)				

List all existing addresses in a line

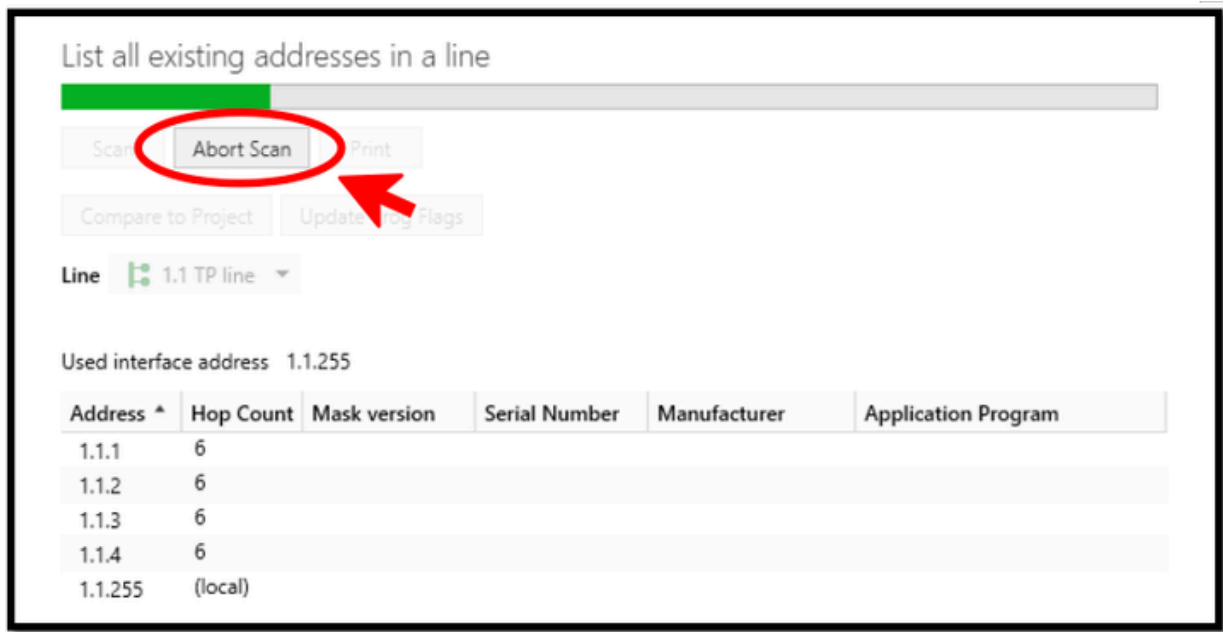
Scan Abort Scan Print

Compare to Project Update Prog Flags

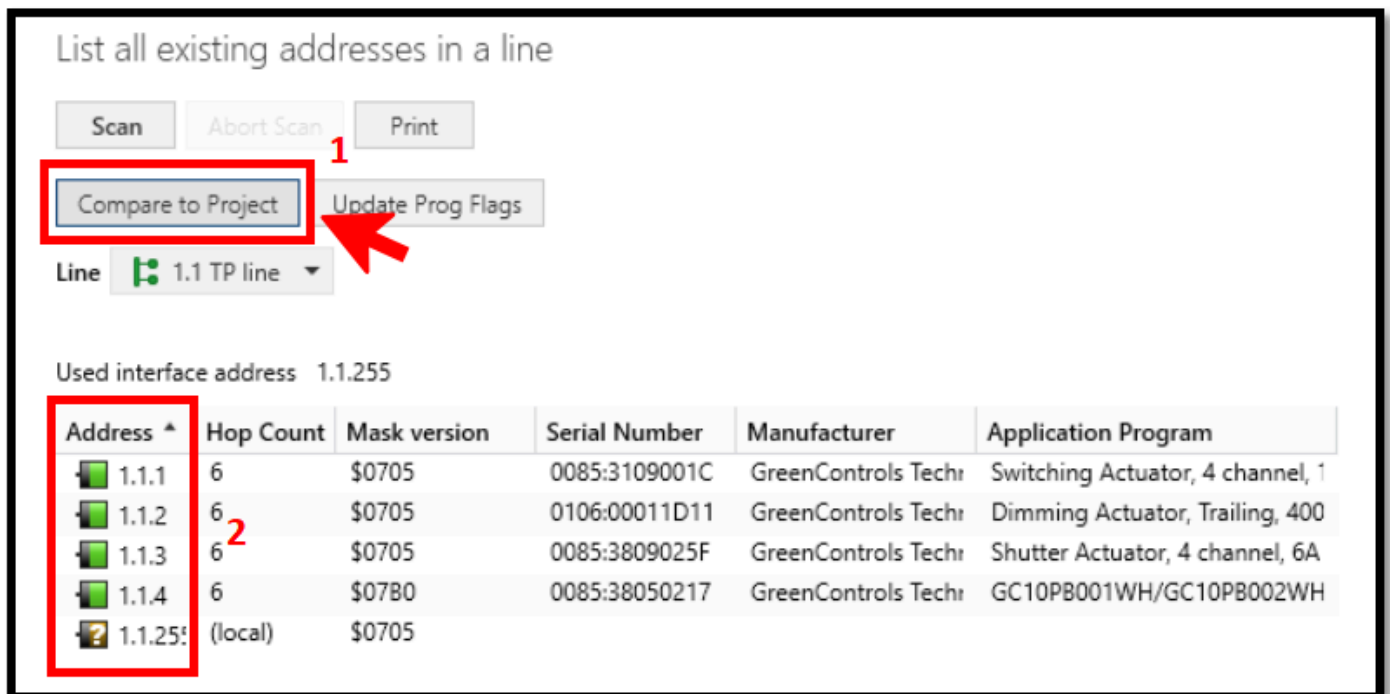
Line  1.1 TP line ▼

Used interface address 1.1.255

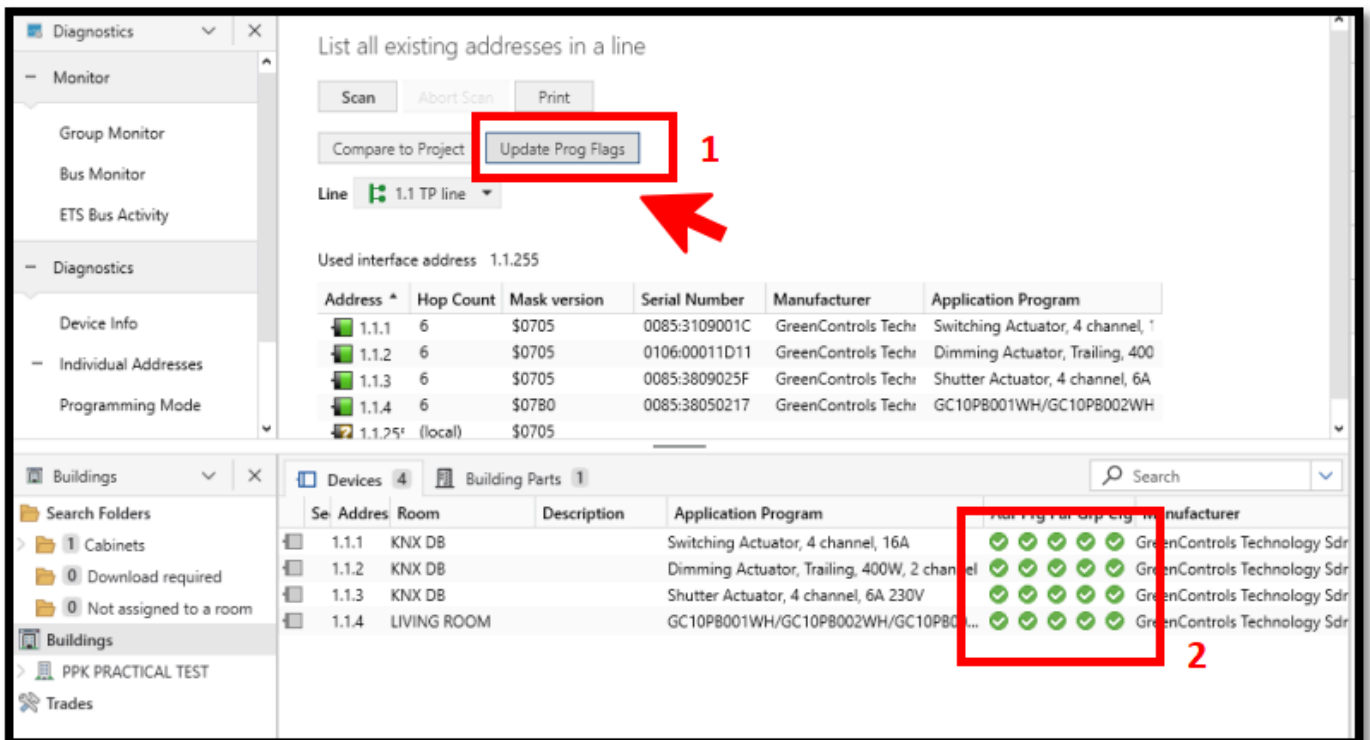
Address *	Hop Count	Mask version	Serial Number	Manufacturer	Application Program
1.1.1	6	\$0705	0085:3109001C	GreenControls Tech	Switching Actuator, 4 channel, 1
1.1.2	6	\$0705	0106:00011D11	GreenControls Tech	Dimming Actuator, Trailing, 400
1.1.3	6	\$0705	0085:3809025F	GreenControls Tech	Shutter Actuator, 4 channel, 6A
1.1.4	6	\$0780	0085:38050217	GreenControls Tech	GC10PB001WH/GC10PB002WH
1.1.255	(local)	\$0705			



ix. Line Scan: Pilihan Compare to Project (untuk menyemak samada individual address pada peranti sama seperti individual address pada programming): klik pada Compare to Project, paparan lampu penunjuk akan menyala warna hijau:



x. Line Scan: Pilihan Update Program Flags (untuk menyemak atau membuat kemaskini pada Flags):



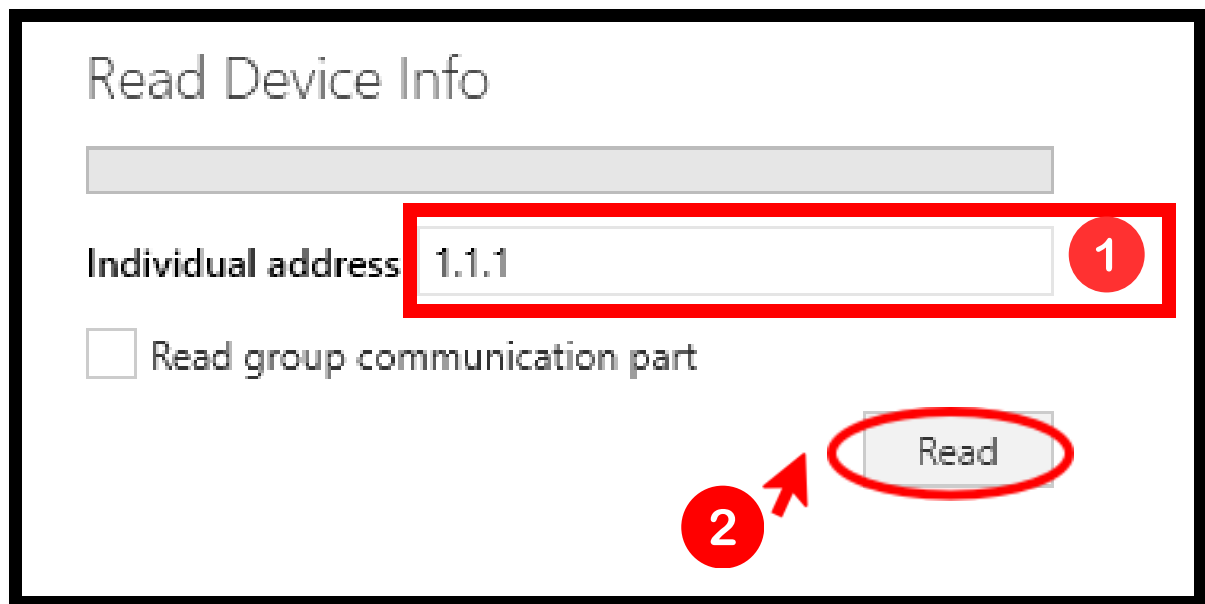
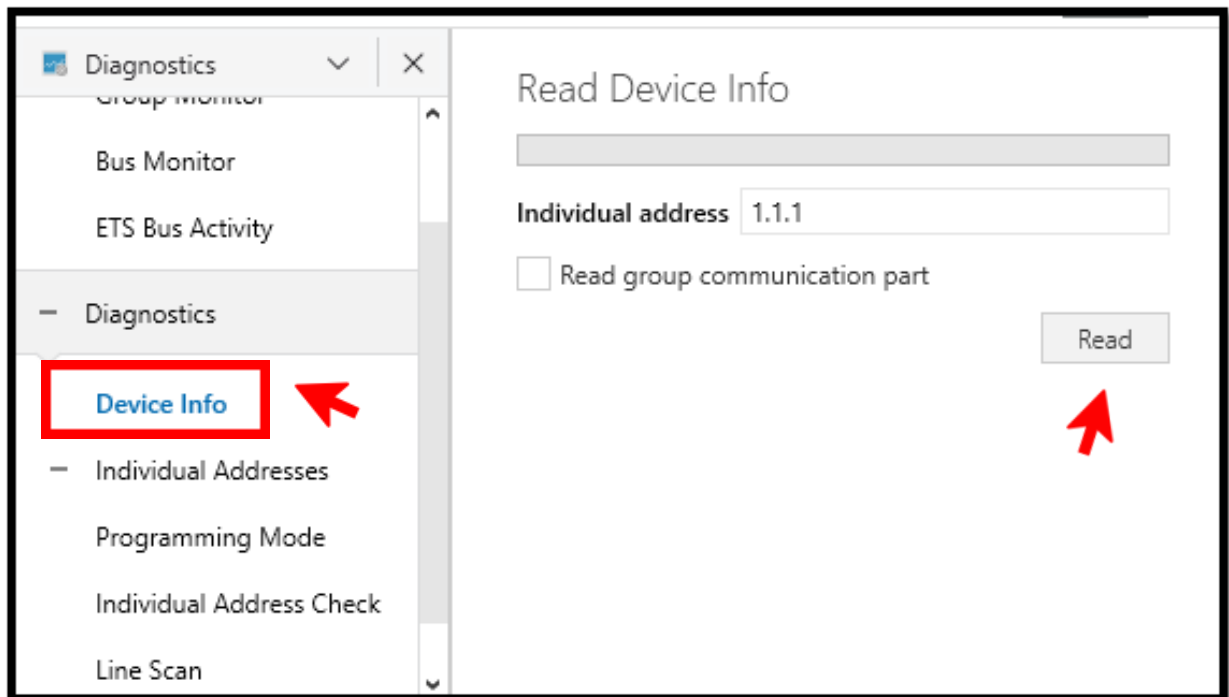
The screenshot shows the ETS software interface. In the top right, the 'Update Prog Flags' button is highlighted with a red box and a red arrow labeled '1'. Below this, a table lists existing addresses in a line. In the bottom right, a table shows the status of flags for various devices, with a red box and a red arrow labeled '2' pointing to the flag status columns.

Address *	Hop Count	Mask version	Serial Number	Manufacturer	Application Program
1.1.1	6	\$0705	0085:3109001C	GreenControls Tech	Switching Actuator, 4 channel, 1
1.1.2	6	\$0705	0106:00011D11	GreenControls Tech	Dimming Actuator, Trailing, 400
1.1.3	6	\$0705	0085:3809025F	GreenControls Tech	Shutter Actuator, 4 channel, 6A
1.1.4	6	\$0780	0085:38050217	GreenControls Tech	GC10PB001WH/GC10PB002WH
1.1.255	(local)	\$0705			

Se	Address	Room	Description	Application Program	Manufacturer
	1.1.1	KNX DB		Switching Actuator, 4 channel, 16A	GreenControls Technology Sdr
	1.1.2	KNX DB		Dimming Actuator, Trailing, 400W, 2 channel	GreenControls Technology Sdr
	1.1.3	KNX DB		Shutter Actuator, 4 channel, 6A 230V	GreenControls Technology Sdr
	1.1.4	LIVING ROOM		GC10PB001WH/GC10PB002WH/GC10PB003WH	GreenControls Technology Sdr

c) Devices Info: Menyemak maklumat peranti fizikal yang digunakan

i. Klik pada Device Info pada Tree view, masukkan individual address, klik Read:



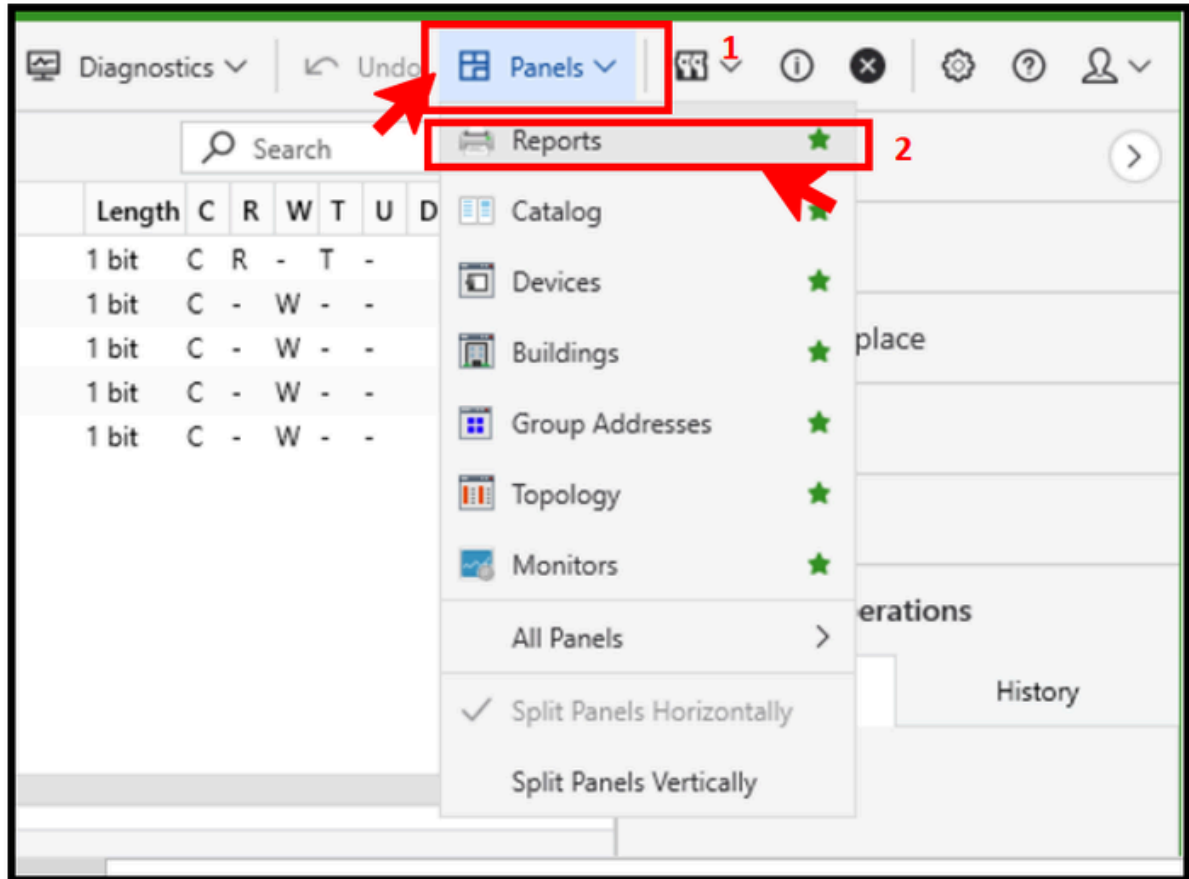
Device Info of Device 1.1.1

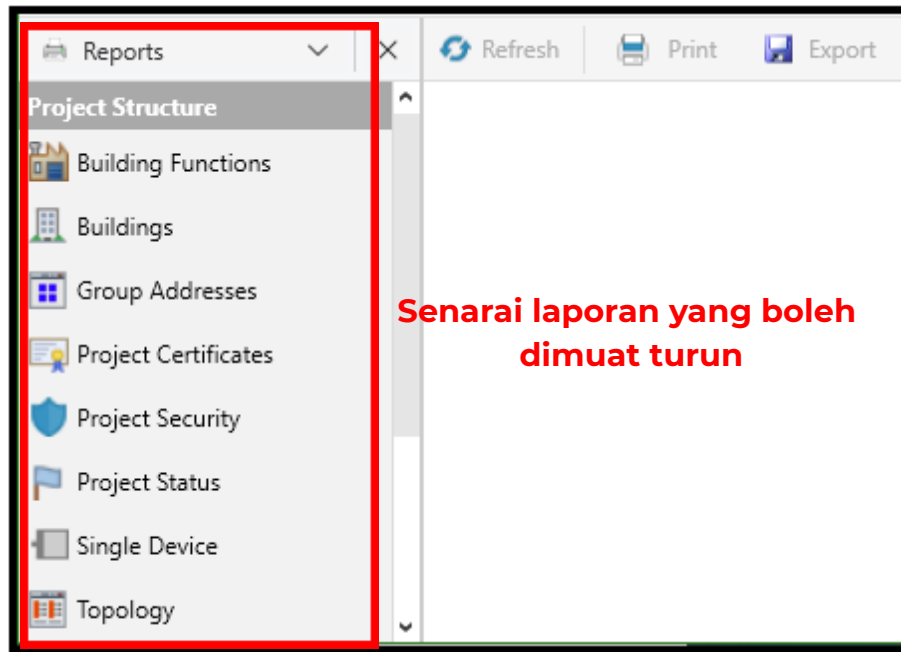
General

Item	Value
Mask Version	0705
Individual Address	1.1.1
Device Manufacturer	GreenControls Technology Sdn. Bhd.
Order Number	\$47433034303031303100
Serial Number	0085:3109001C
Hardware Type	\$313730343031

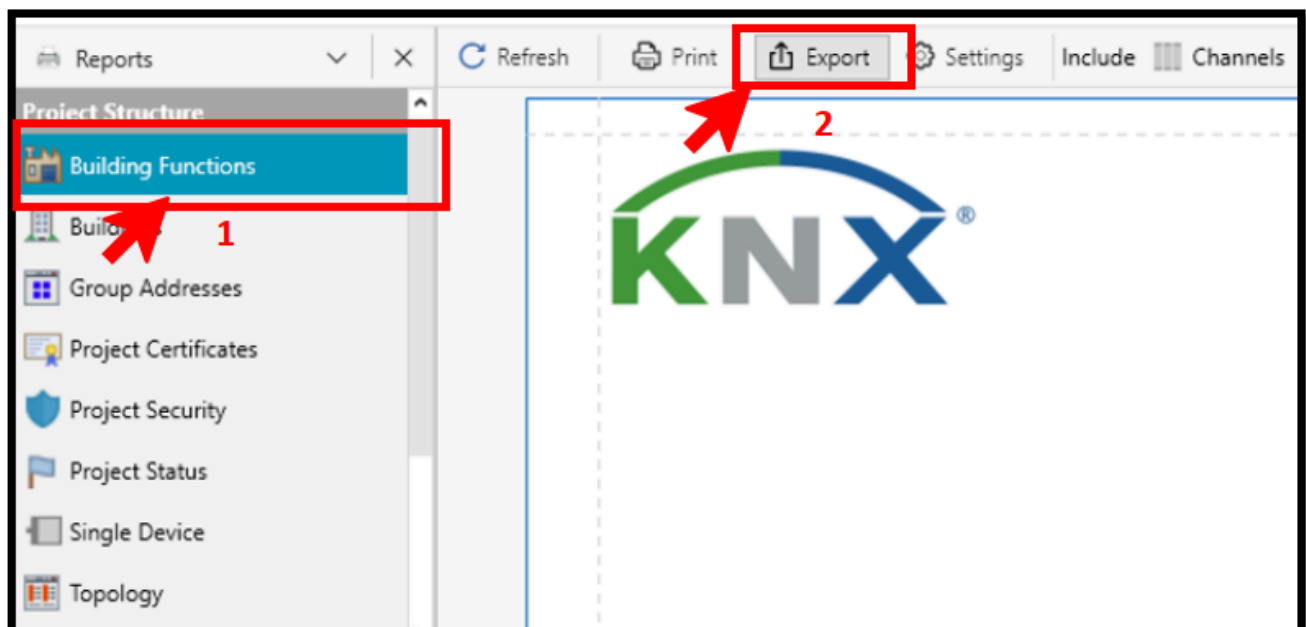
10. Memuat Turun Laporan Akhir Projek (Download Final Reports).

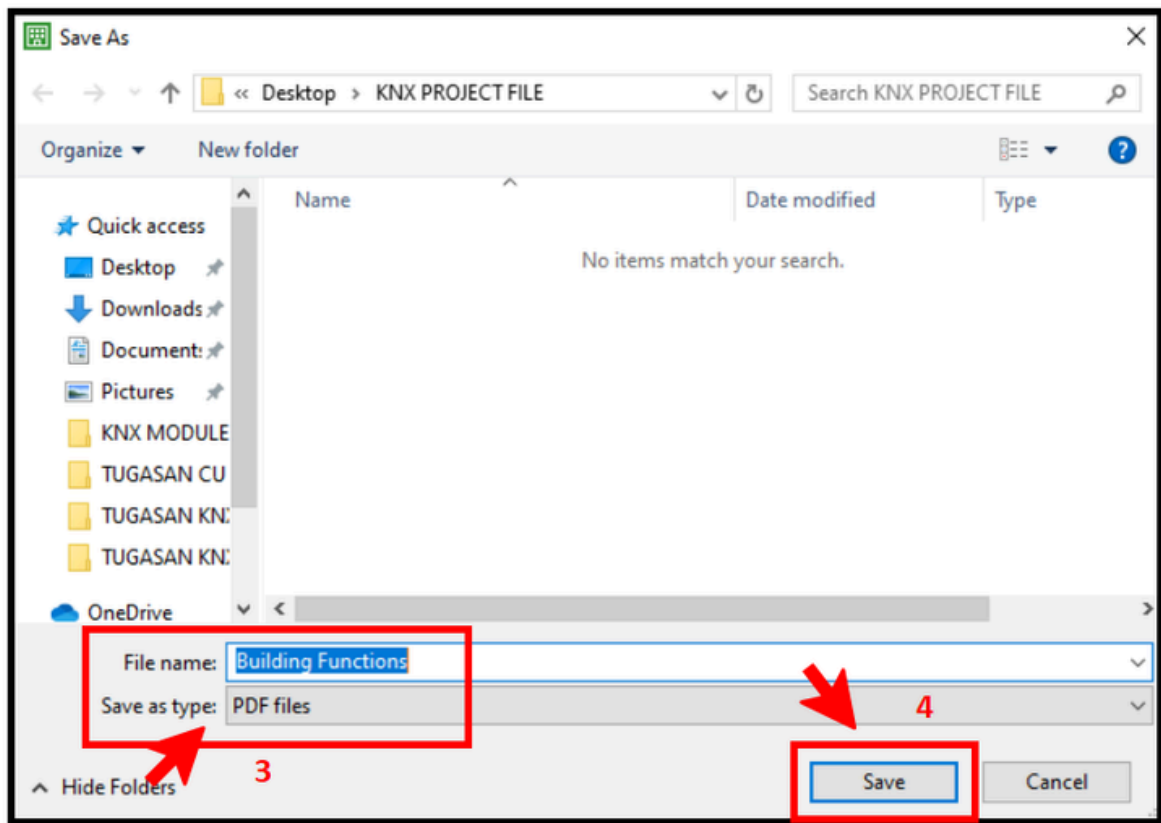
i. Klik Panels, klik Reports, paparan senarai laporan yang boleh dimuat turun:





ii. Klik pada pilihan laporan yang dikehendaki, klik Export, simpan dalam format fail PDF:







Building Functions

Project: knx testing

Start date: Monday, 3 June, 2024

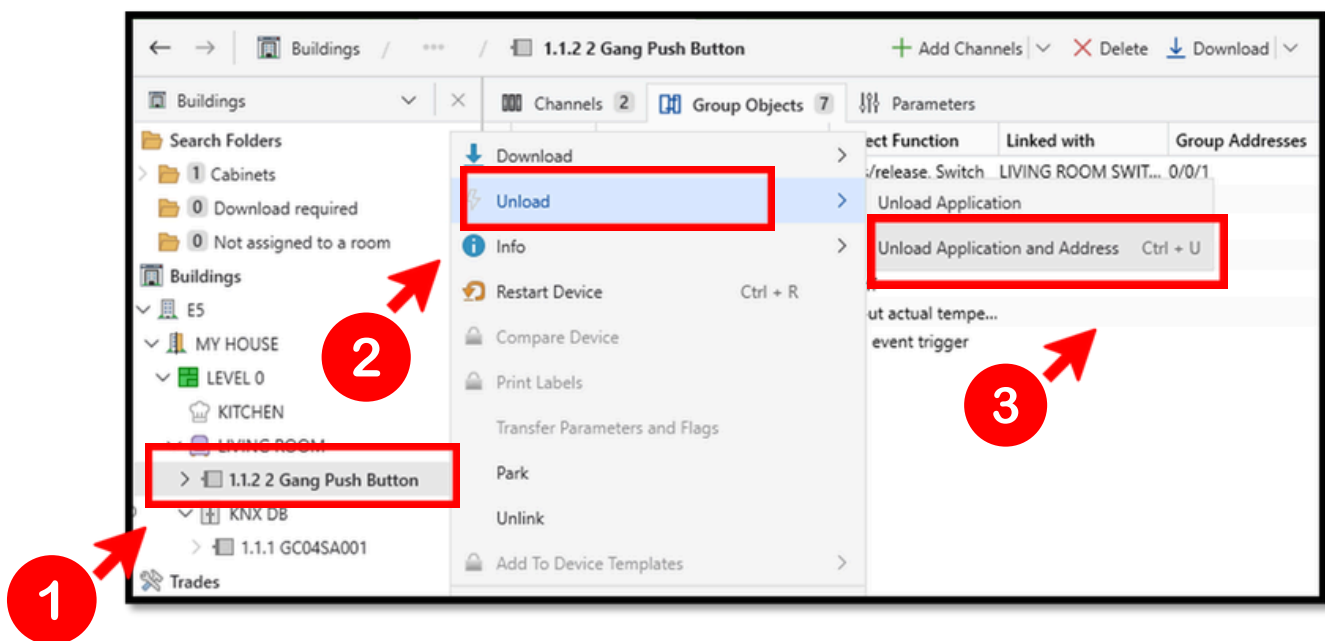
Print date: Thursday, 6 June, 2024

Print time: 11:47:00 AM

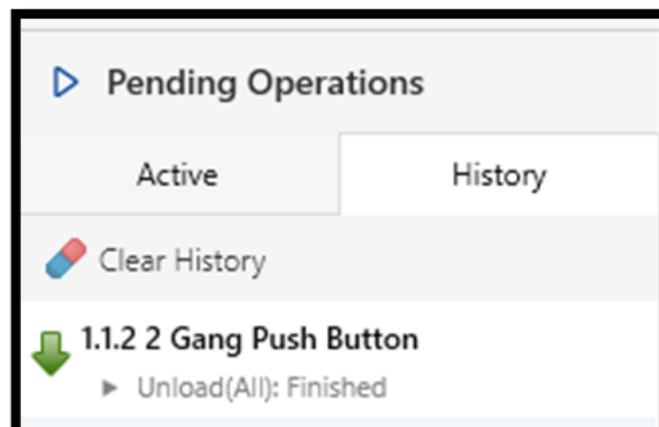
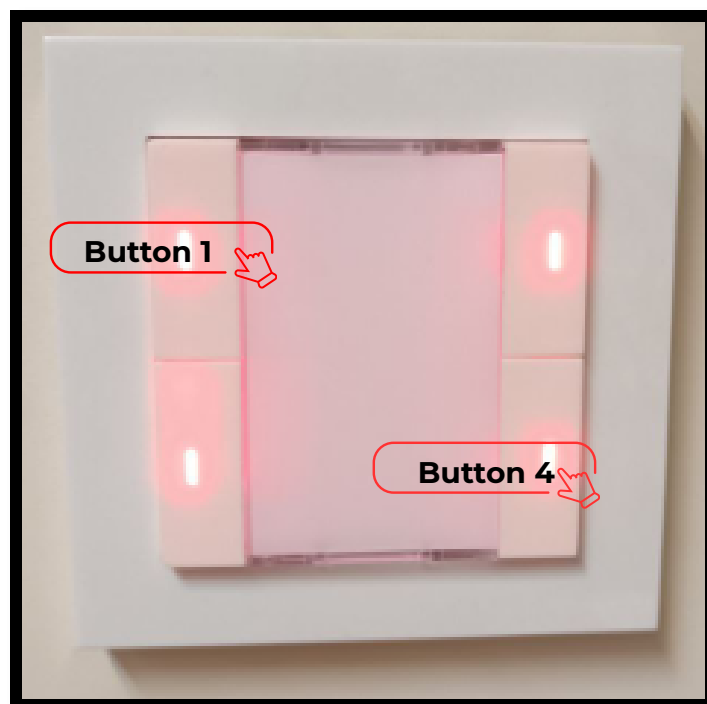
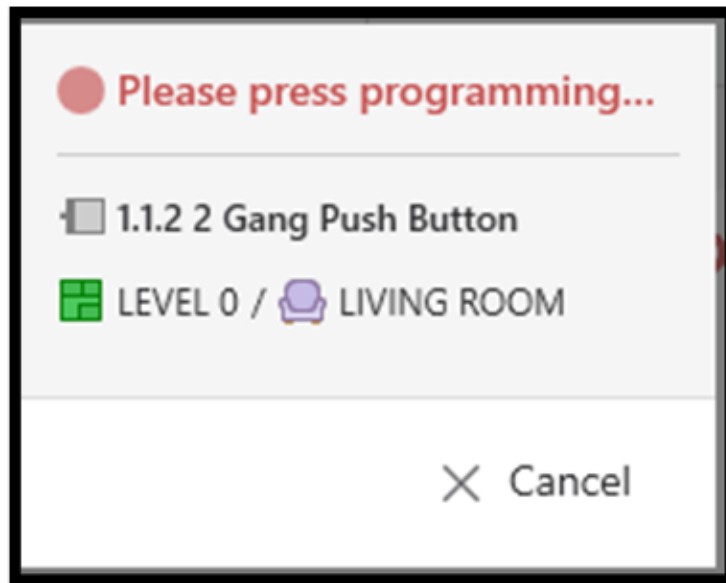
11. Nyahmuat Peranti Daripada Projek Atau Sistem Apabila Perlu, Seperti Untuk Penyelenggaraan, Penggantian, Atau Pengemaskinian Konfigurasi (Unload Devices from the System).

Terdapat 3 perkara penting dalam melaksanakan proses nyahmuat (Unload) program yang telah dimuat turun (Download) pada peranti fizikal:

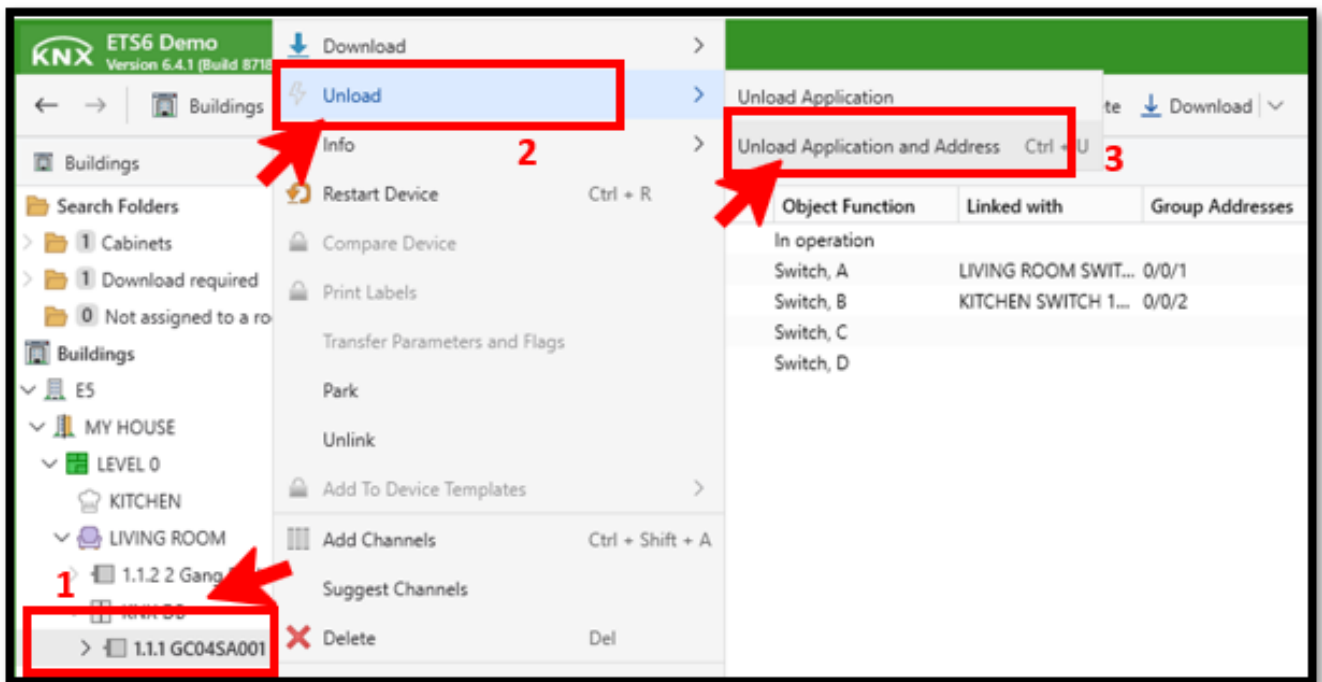
- a) Sekiranya projek hanya mempunyai 1 topologi sahaja, maka proses nyahmuat (unload) boleh dilaksanakan terus pada setiap peranti fizikal.
- b) Sekiranya projek mempunyai topologi yang menggunakan peranti Line Coupler, maka proses nyahmuat perlu dilaksanakan diakhir sekali selepas peranti lain dinyahmuat (unload) terlebih dahulu.
- c) Memastikan semua peranti telah dinyahmuat daripada sebarang program.
 - i. Klik pada peranti push button, right klik, pilih Unload, pilih Unload Application and Address:



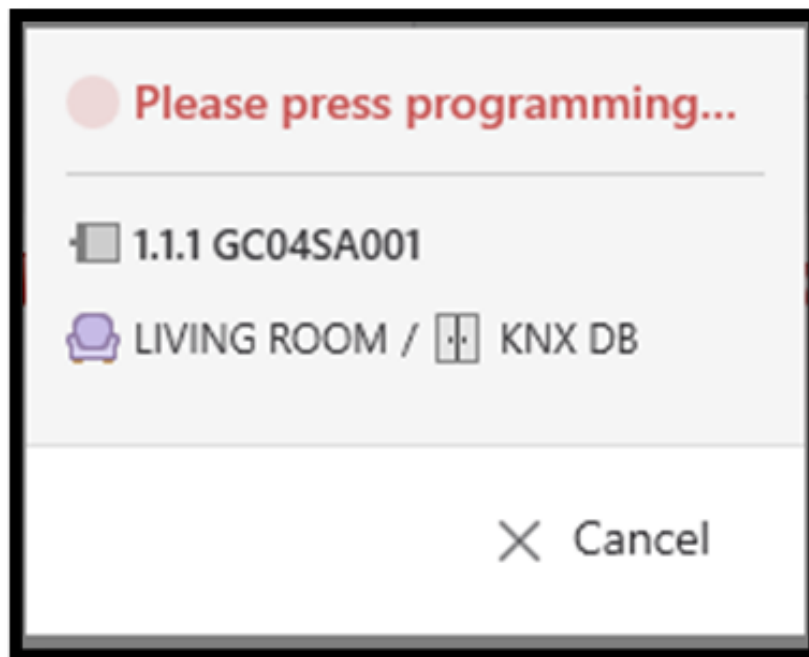
- ii. Tekan programming button pada push button: tekan serentak button 1 dan button 4 pada push button, proses unload program akan berlaku dan Unload Finish:

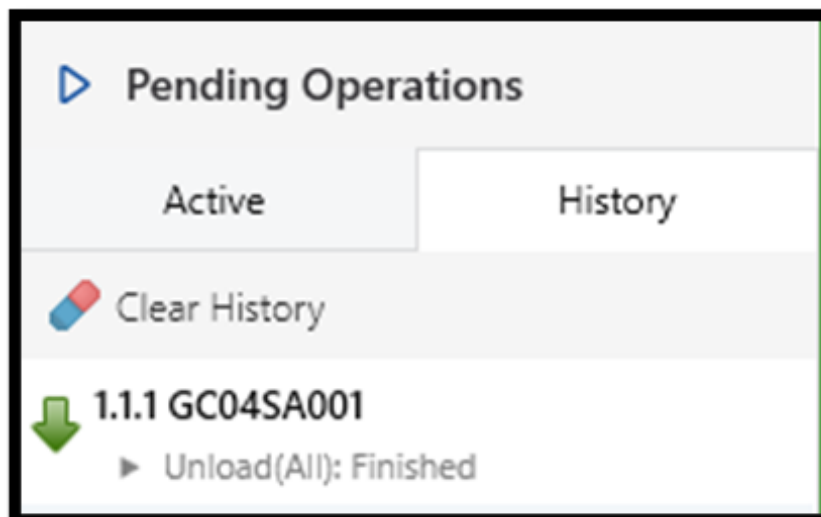


iii. Klik pada peranti switch aktuator, right klik, pilih Unload, pilih Unload Application and Address:



iv. Tekan programming button pada switch aktuator, proses unload program akan berlaku dan Unload Finish:





RUJUKAN

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2. Hermann Merz, Thomas Hansemann, Christof Hubner (2018). Building Automation: Communication Systems with EIB/KNX, LON and BACnet (2nd Edition). Springer
3. KNX Association (2025). KNX Basic Course Documentation (3rd version). KNX Association
4. KNX Association (2021). KNX Basic Course Documentation (2nd version). KNX Association

Aplikasi ETS6 dalam Sistem KNX

eISBN 978-629-7643-95-3



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