WEBINAR TRAINING , 10 SEP 2020

การออกแบบและเลือกใช้อุปกรณ์สับเปลี่ยนแหล่งจ่ายไฟอัตโนมัติ
(ATS Solution by Breker and Switch)

Chindanai , Charnchanok (Product Marketing Team)

Agenda and The key takeaways

01 : Webinar

60 Minutes after this session start included Question

The key takeaways

- Standard of Automatic transfer switching equipment
- ATS Concept
- Common question
- ATS from ABB Switch Solution

About me

Product Marketing Team

Big Chindanai Lertvirutchainun

5Y Project and design engineer at ABB Low voltage system

5Y Product Marketing at ABB Low voltage product

Main product take care

- Breaker for LV (SACE) : ACB ,MCCB
- Switch for LV (Stromberg) : SWD ,SWF ,Enclosed ,ATS

About me

Service Engineer Supervisor

Kor Charnchanok Thongprad

13Y Join in ABB Service team

ABB Electrification Products Certificate

- Level 3 Expert to service low voltage circuit breaker
- First line commissioning and service training Terra High Power Charger (HPC)
- ABB Ability EDCS
- Level 3 Expert in order to provide service on ;ABB's block contactors and softstarters

Standard

Standard

To design and select

Breaker type

IEC60947-2

Switch type

IEC60947-6-1

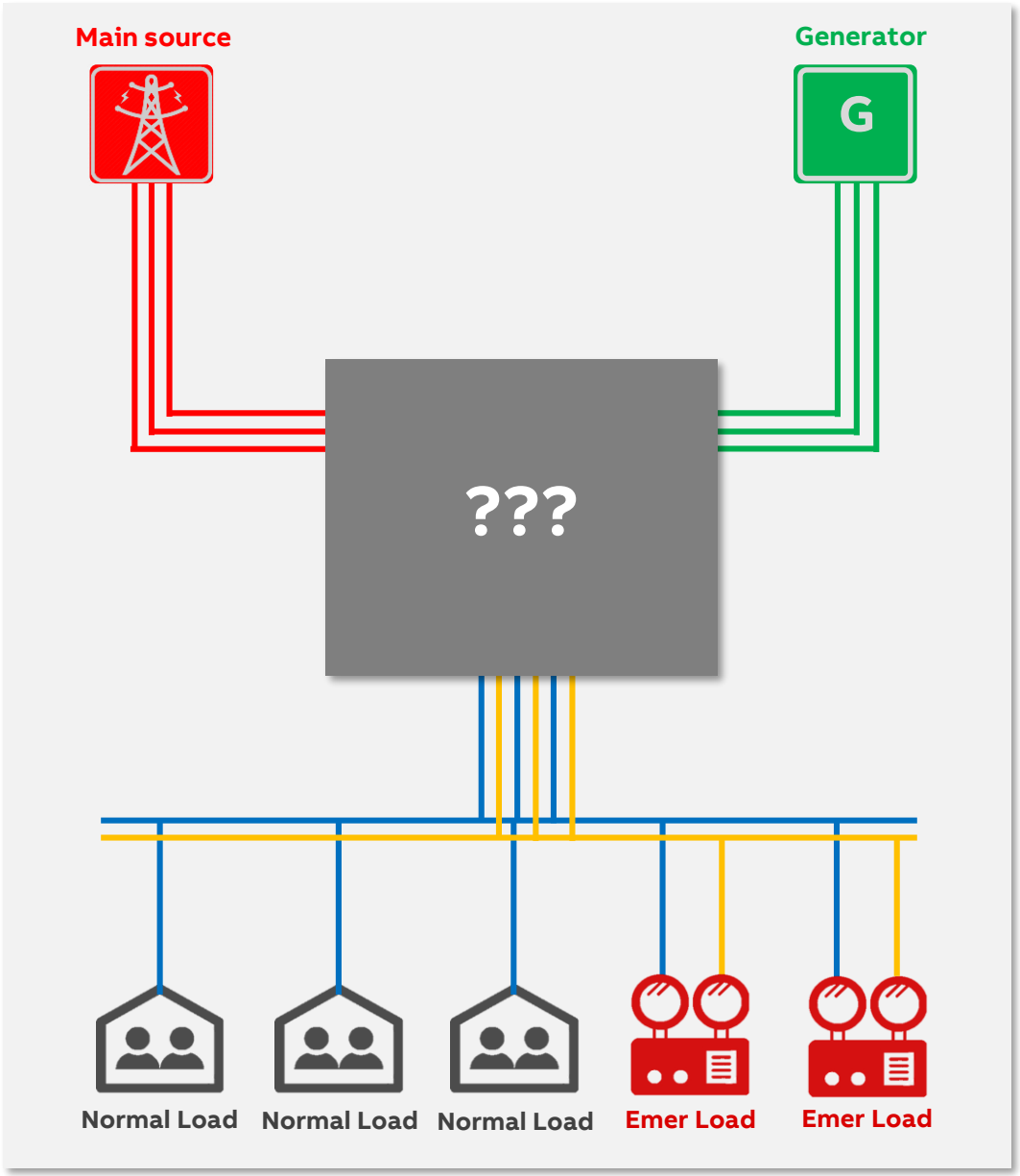
UL1008

ATS

- **ATS Concept**
- Common question
- Our solution
- About TruOne

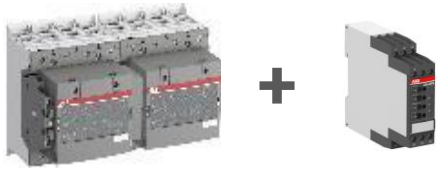
ATS Concept

- Utility supply to all load
- Utility fail
- Gen start
- Transfer to Gen supply
- Shedding load
- Utility come back / Transfer back
- Load come back



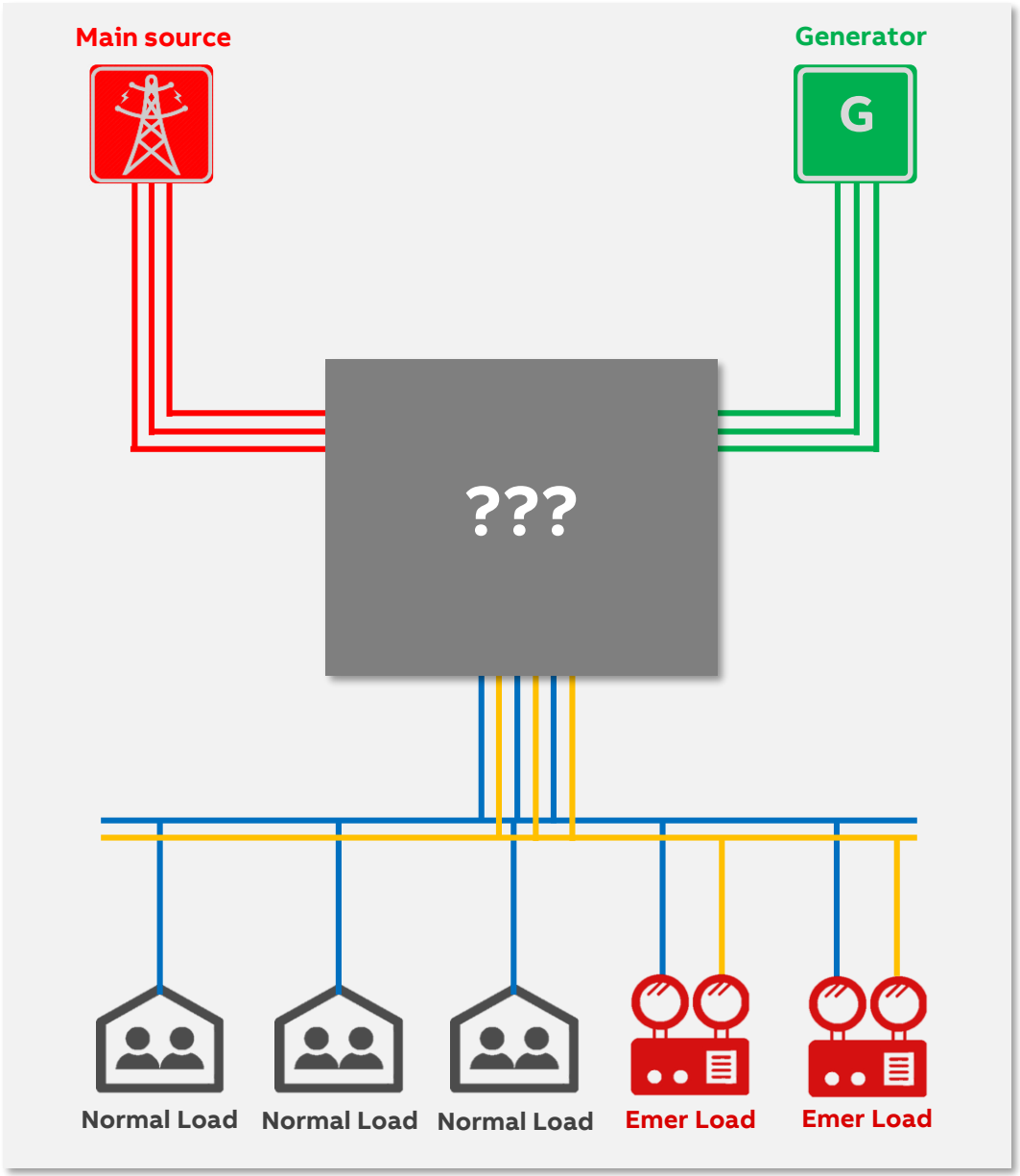
ATS Concept

1. Contactor with relay monitoring



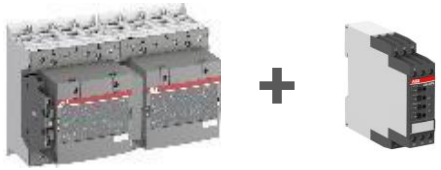
2. Breaker with ATS Controller

3. Change-over switch with Controller



ATS Concept

1. Contactor with relay monitoring

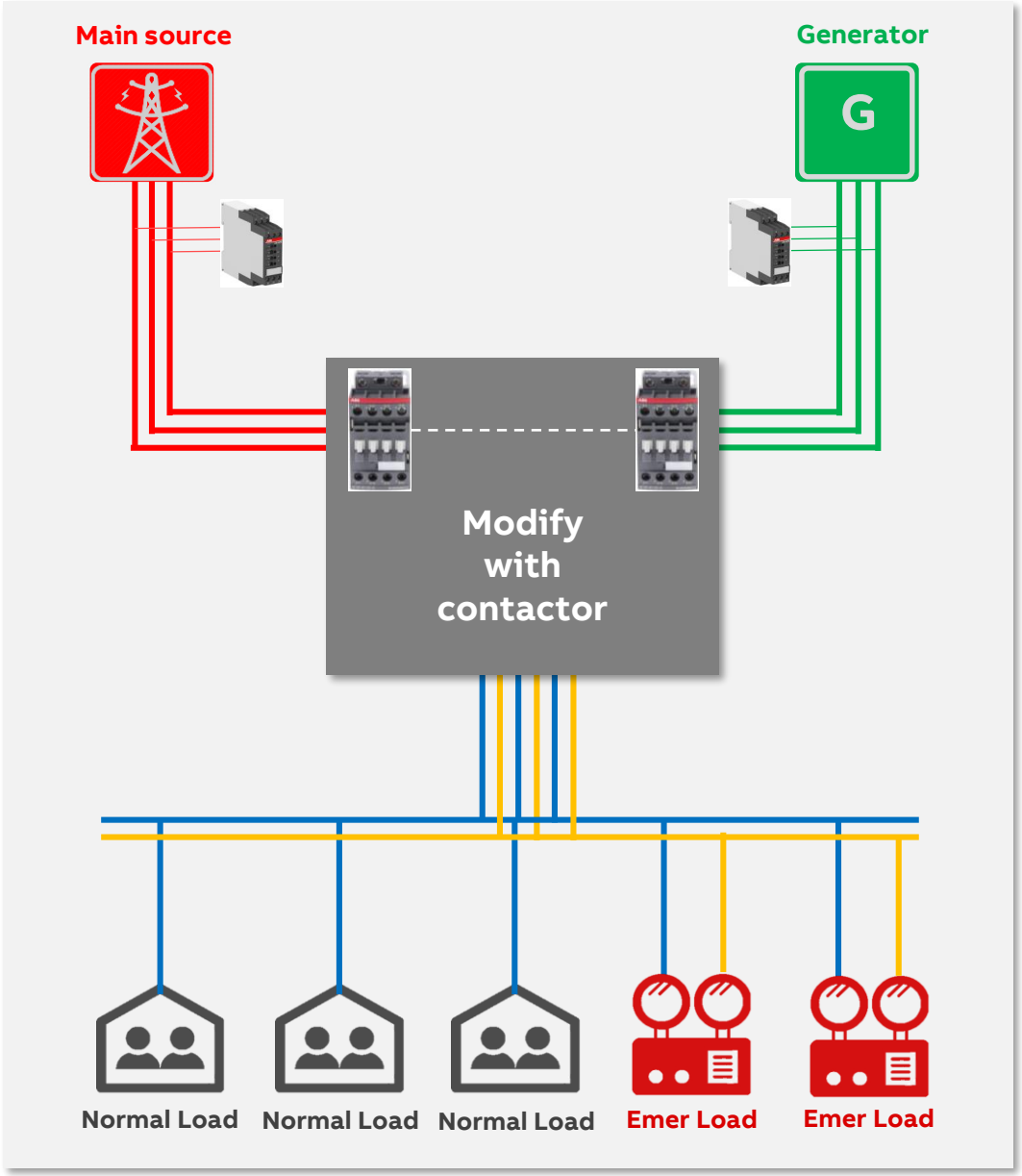


Point ☺

- Save cost
- Save space

Point ☹

- No standard
- Transfer time
- Many cables
- Easy to mistake
- 2 Sources interrupt
- ….



ATS Concept

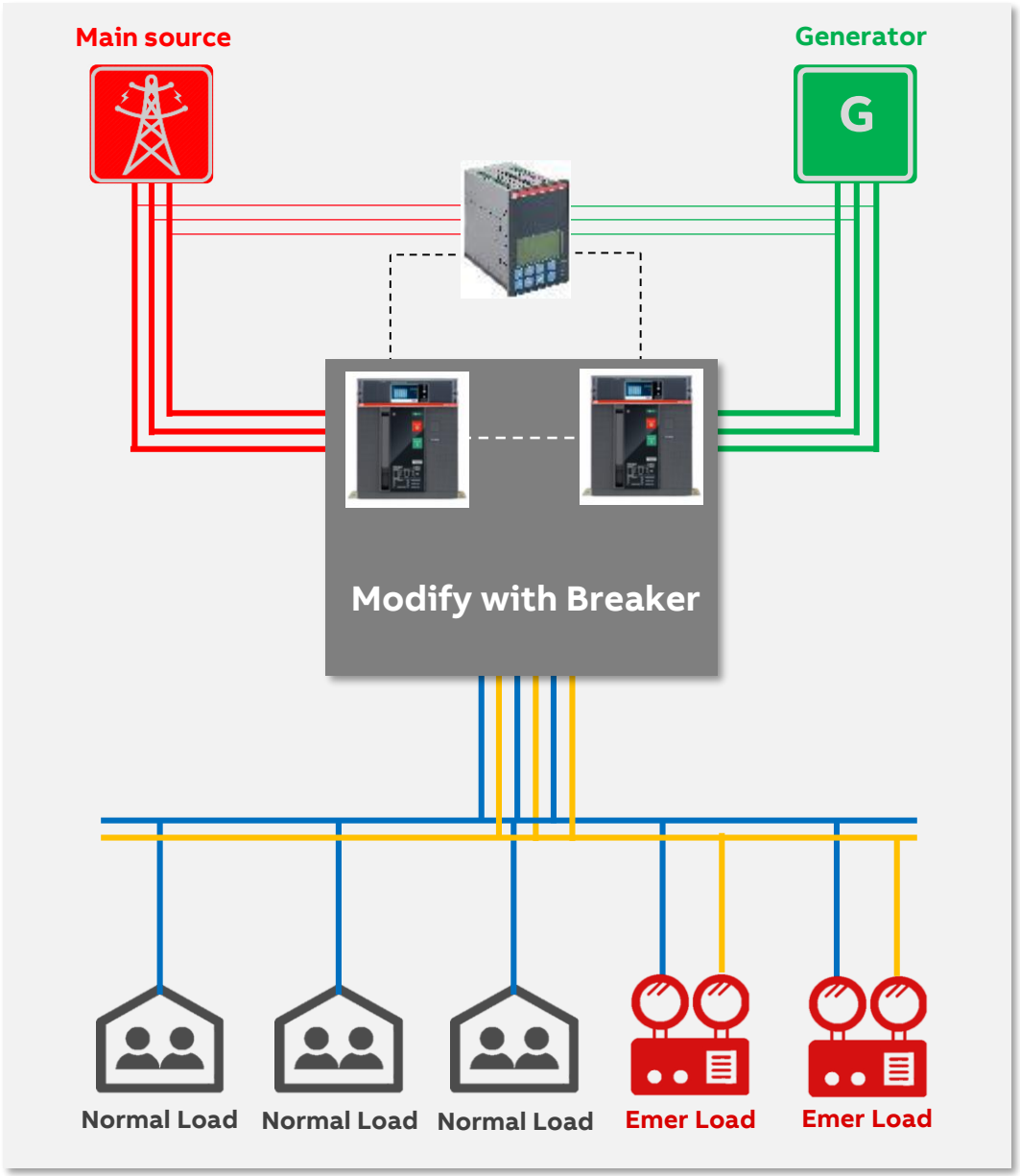
2. Breaker with ATS Controller

Point ☺

- Save cost .. ?
- Save space
- Protection completed
- Close transition addition

Point ☹

- Standard IEC60947-2
- Transfer time
- Many cables
- Easy to mistake
- 2 Sources interrupt
- ….



ATS Concept

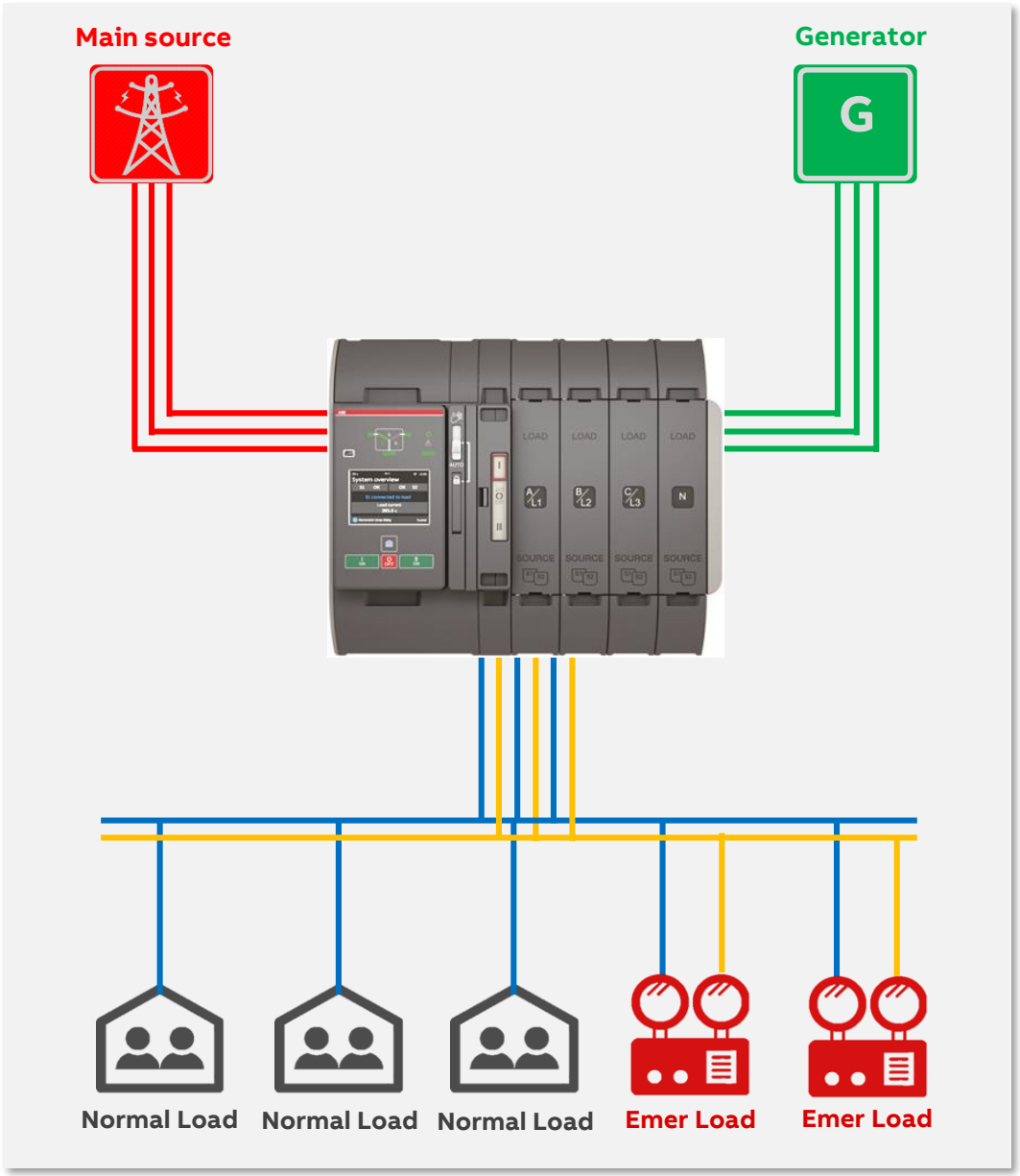
3. Change-over switch with Controller

Point ☺

- Save space
- Transfer time guarantee
- Make sure 2 source s separate
- IEC60947-6 , UL1008 Standard
- Gen start ,stop ,exercise

Point ☹

- Addition cost
- New technology
- ….



ATS

- ATS Concept
- **Common question**
- Our solution
- About TruOne

ATS Common question

1. Type

Open Transition

จังหวะไป – กลับ ไฟหาย (Brake before make)

Close Transition

จังหวะไปไฟหาย จังหวะกลับไฟไม่หาย
(Make before Brake)

ATS with Bypass

ATS Common question

1. Type

แบบไหนดีกว่ากัน ?

- Open Transition
- Close Transition

ATS Common question

1. Type

ทำ Close Transition
ต้องระวังเรื่องอะไร ?

ATS Common question

1. Type

แล้วการใช้ Close Transition ตอบโจทย์ทุกอย่างไหม ?

ทางแก้ไข ?

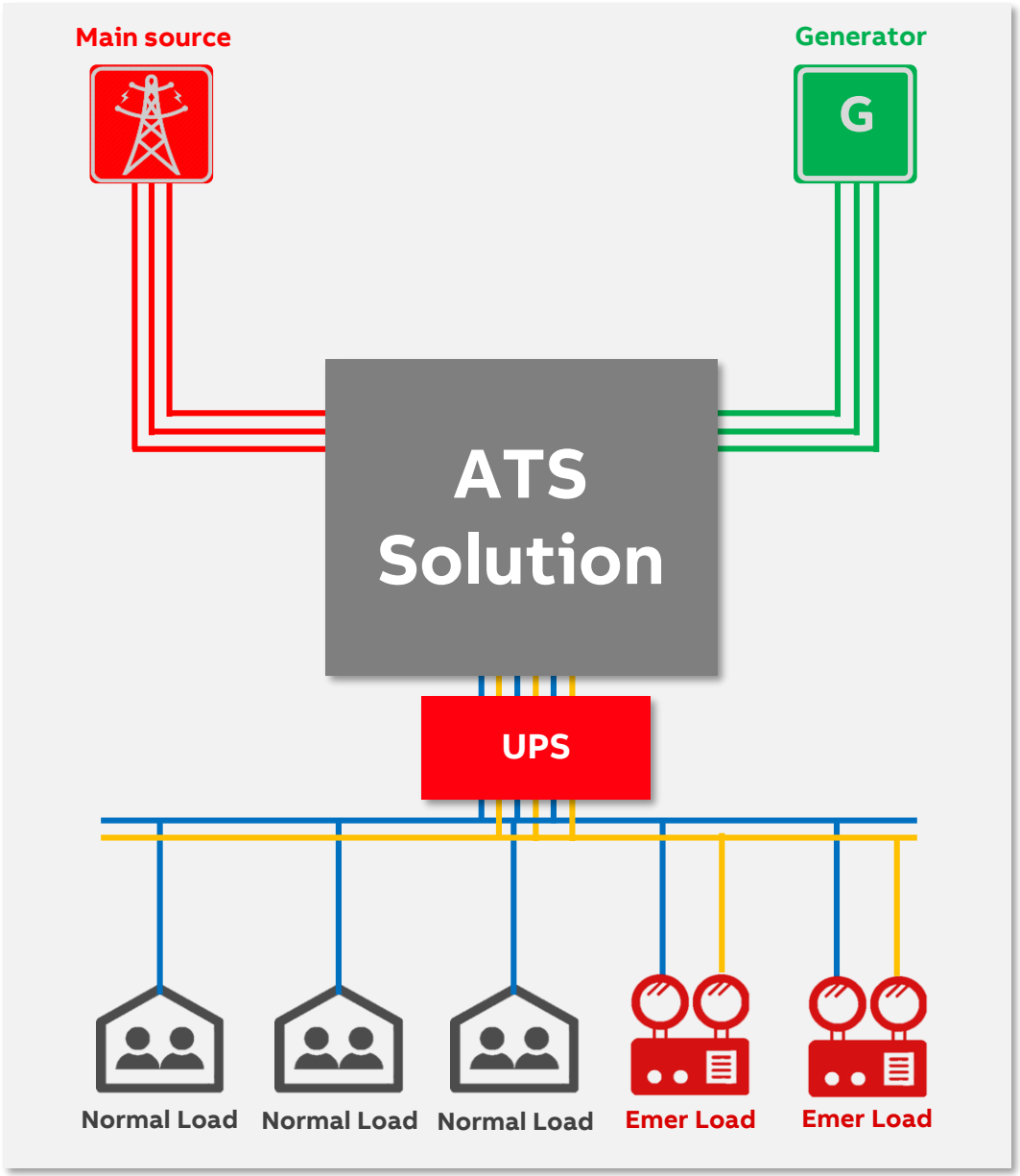
ATS Common question

1. Type

ทางแก้ไข ?

เพิ่ม UPS !!!

ติดต่อ น้องธีรภัท ได้ ขายอยู่

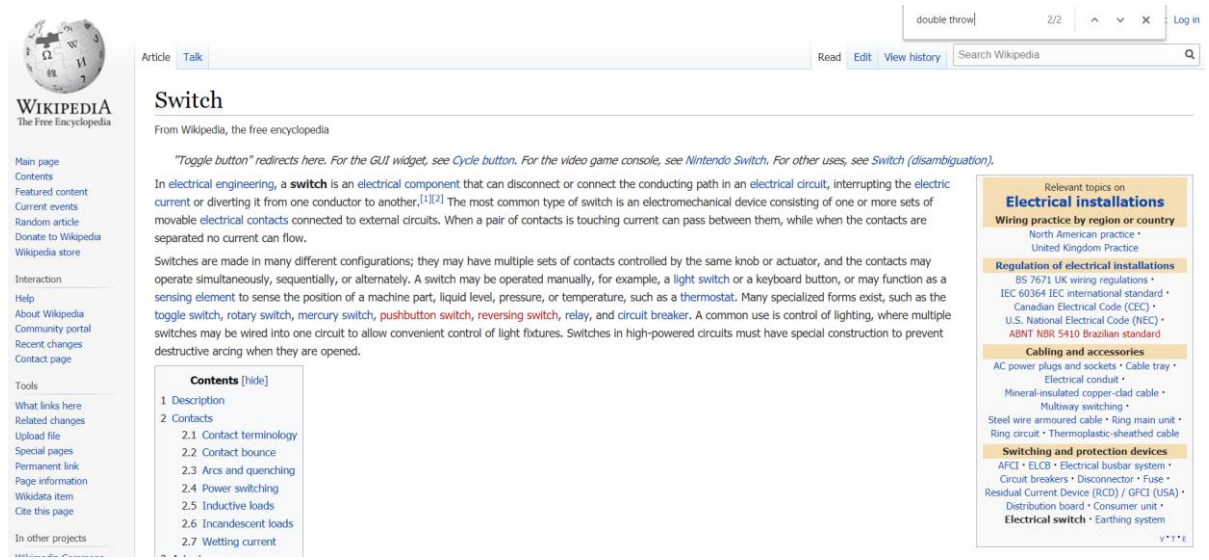


ATS Common question

2. Double throw switch

A **double-throw** switch has a contact that can be connected to either of two other contacts

หน้าสัมผัสปลายทางจะต่อแค่หนึ่งในสองของต้นทาง



Switch

From Wikipedia, the free encyclopedia

"Toggle button" redirects here. For the GUI widget, see Cycle button. For the video game console, see Nintendo Switch. For other uses, see Switch (disambiguation).

In electrical engineering, a **switch** is an electrical component that can disconnect or connect the conducting path in an electrical circuit, interrupting the electric current or diverting it from one conductor to another.[1][2] The most common type of switch is an electromechanical device consisting of one or more sets of movable electrical contacts connected to external circuits. When a pair of contacts is touching current can pass between them, while when the contacts are separated no current can flow.

Switches are made in many different configurations; they may have multiple sets of contacts controlled by the same knob or actuator, and the contacts may operate simultaneously, sequentially, or alternately. A switch may be operated manually, for example, a light switch or a keyboard button, or may function as a sensing element to sense the position of a machine part, liquid level, pressure, or temperature, such as a thermostat. Many specialized forms exist, such as the toggle switch, rotary switch, mercury switch, pushbutton switch, reversing switch, relay, and circuit breaker. A common use is control of lighting, where multiple switches may be wired into one circuit to allow convenient control of light fixtures. Switches in high-powered circuits must have special construction to prevent destructive arcing when they are opened.

Contents [hide]

1 Description
2 Contacts
2.1 Contact terminology
2.2 Contact bounce
2.3 Arcs and quenching
2.4 Power switching
2.5 Inductive loads
2.6 Incandescent loads
2.7 Wetting current

Electronics specification and abbreviation	Expansion of abbreviation	Symbol
SPST	Single pole, single throw	
DPST	Double pole, single throw	
SPDT Form C[4]	Single pole, double throw	
DPDT	Double pole, double throw	

ABB Change-over เป็น Double throw ทุกๆตัว

ABB TruOne เป็น Double throw เหมือนกัน

ATS Common question

3. Utilization for ATS

Refer IEC standard (60947-3).

Switch, Switch disconnect ,Fuse connector type

AC-20	Connecting and disconnecting under no-load conditions	947-3
AC-21	Switching of resistive loads, including moderate loads	
AC-22	Switching of mixed resistive and inductive loads, including moderate overloads	
AC-23	Switching of motor loads or other highly inductive loads	

Refer IEC standard (60947-6).

Change-over switch ,ATS type

AC-31	Switching of resistive loads, including moderate loads	947-6
AC-32	Switching of mixed resistive and inductive loads, including moderate overloads	
AC-33	Switching of motor loads or other highly inductive loads	

ATS Common question

3. Utilization for ATS

Refer IEC standard

A Utilization categories

(Frequent Operation)

Table 9 – Number and duration of operating cycles for the electrical and mechanical operational performance tests for operation A utilization categories

Rated operational current I_e A	Duration of operating cycle min [a]	Number of operating cycles		
		Without current	With current	Total
$0 < I_e \leq 100$	1	–	6 000	6 000
$100 < I_e \leq 300$	1	–	6 000	6 000
$300 < I_e \leq 400$	1	–	4 000	4 000
$400 < I_e \leq 630$	1	1 000	2 000	3 000
$630 < I_e \leq 800$	1	1 000	2 000	3 000
$800 < I_e \leq 1\,600$	2	1 500	1 500	3 000
$1\,600 < I_e \leq 2\,500$	4	2 000	1 000	3 000
$2\,500 < I_e$	4	2 000	1 000	3 000

[a] The duration of operating cycle may be reduced with the consent of the manufacturer.

B Utilization categories

(Infrequent Operation)

Table 10 – Number and duration of operating cycles for the electrical and mechanical operational performance tests for operation B utilization categories

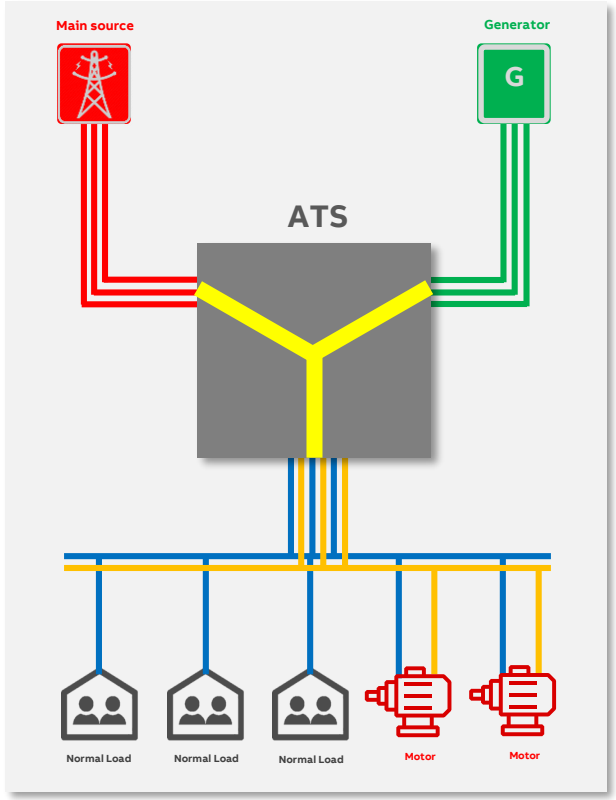
Rated operational current I_e A	Duration of operating cycle min [a]	Number of operating cycles		
		Without current	With current	Total
$0 < I_e \leq 100$	1	4 500	1 500	6 000
$100 < I_e \leq 300$	1	5 000	1 000	6 000
$300 < I_e \leq 400$	1	3 000	1 000	4 000
$400 < I_e \leq 630$	1	2 000	1 000	3 000
$630 < I_e \leq 800$	1	2 500	500	3 000
$800 < I_e \leq 1\,600$	3	2 500	500	3 000
$1\,600 < I_e \leq 2\,500$	6	1 500	500	2 000
$2\,500 < I_e$	6	1 500	500	2 000

[a] The duration of operating cycle may be reduced with the consent of the manufacturer.

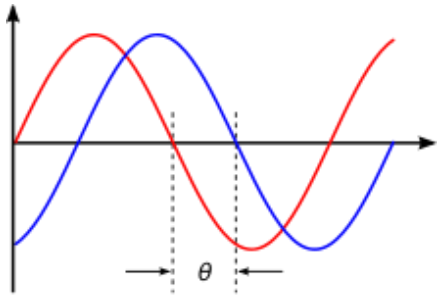
ATS Common question

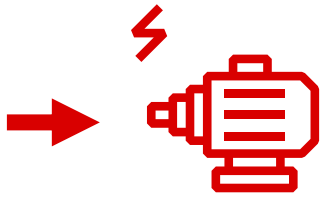
4. In-phase

Fast transfer without In-Phase

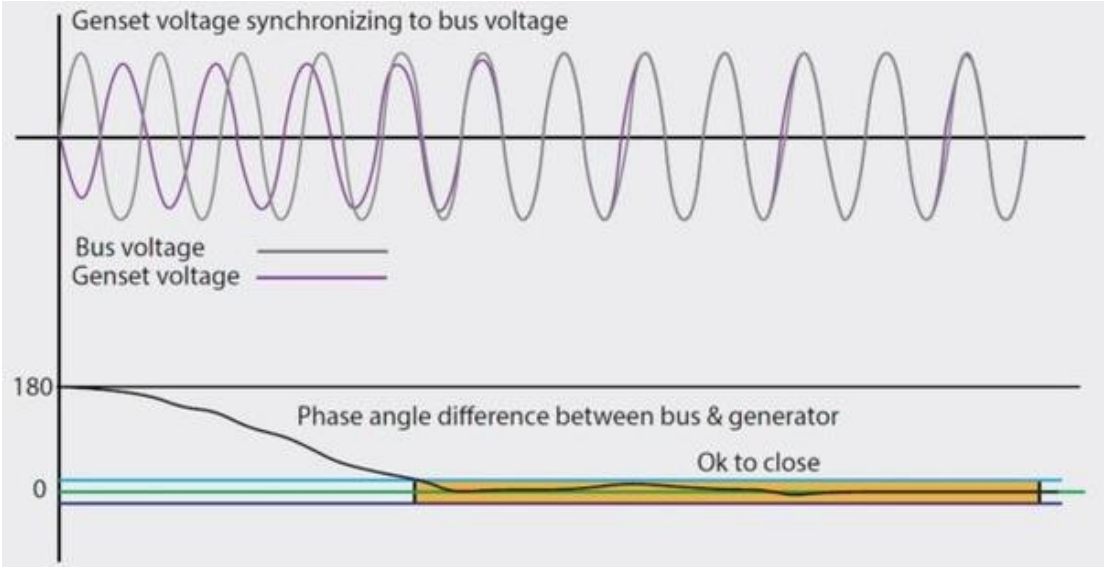


Different phase angle
Utility vs **Gen**





Fast transfer with In-Phase



ATS จะตรวจสอบความเหมาะสมก่อนสับเปลี่ยนแหล่งจ่าย

- มุมเฟสของแรงดัน และความถี่ที่เหมาะสมกัน
- ขนาดของแรงดัน และความถี่ที่เหมาะสมกัน

ATS Common question

5. ATS vs Auto Reclose

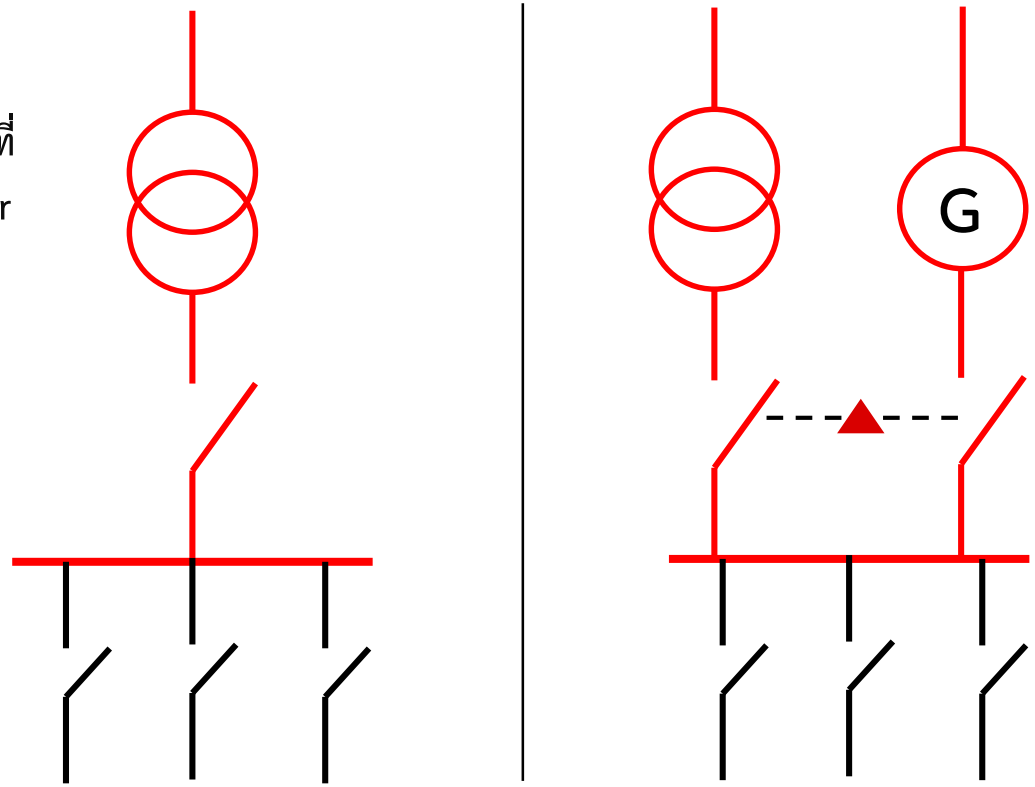
Auto Reclose or ATS จะเลือกออกแบบยังไง

Auto Reclose

ต้องการความสะดวกขณะเกิดไฟตกชั่วขณะ (ที่ยังอยู่ในขอบเขตเวลาที่ตั้งไว้) เพื่อสั่ง Breaker Close โดยไม่ต้อเดินมาที่หน้าตู้ไฟฟ้า

อุปกรณ์หลัก :

1. Breaker
2. Shunt closing
3. Under voltage release
4. Ready to close contact
5. Voltage measuring relay.



ATS (Breaker)

ต้องการควบคุมการสั่งการสับเปลี่ยนแหล่งจ่ายไฟ แบบอัตโนมัติ ระหว่าง 2 แหล่งจ่าย

อุปกรณ์หลัก :

1. Breaker x 2
2. ATS022
3. Interlock (Mechanical/Electrical)
4. Shunt closing
5. Shunt opening

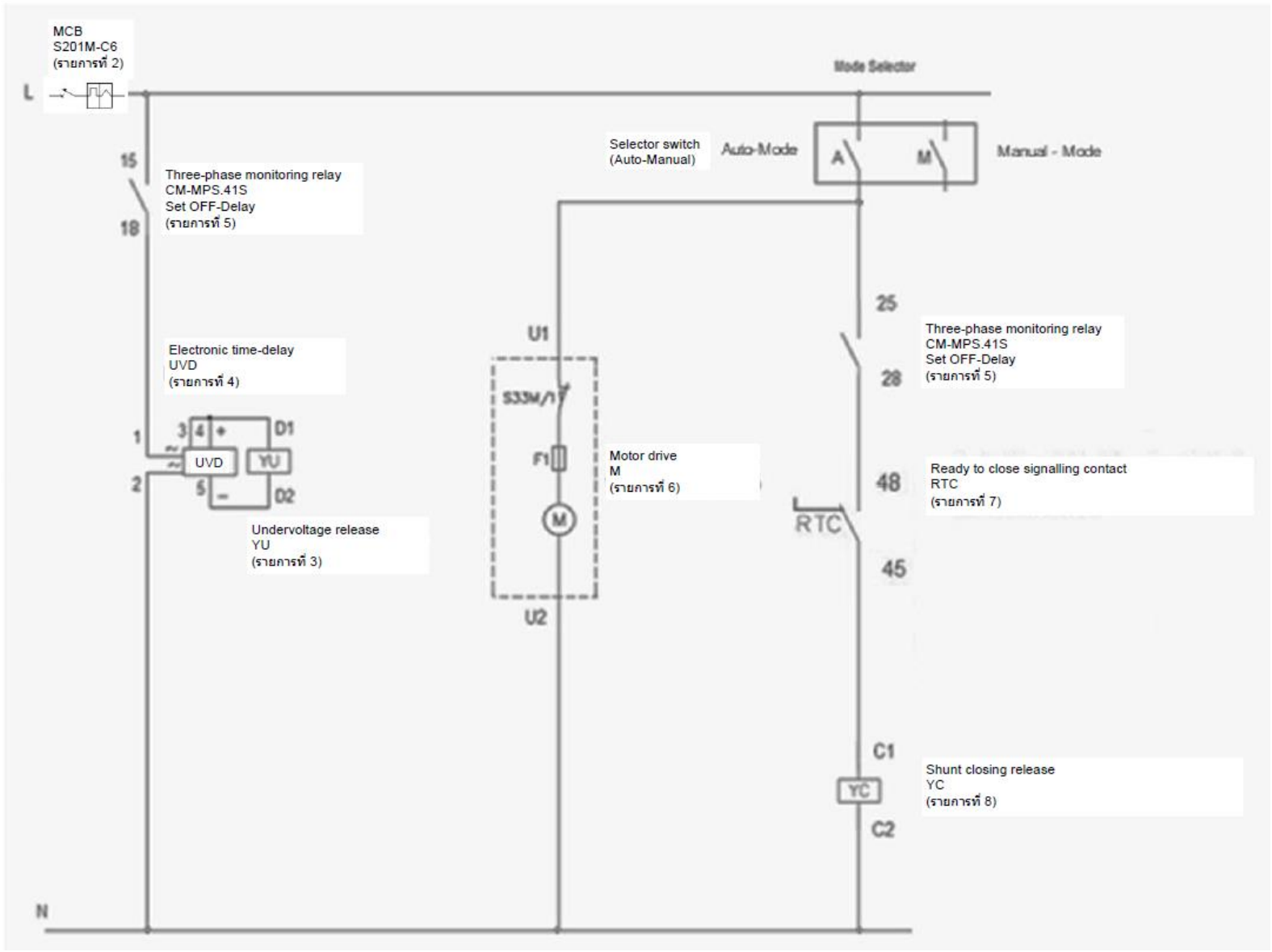
ATS Common question

5. ATS vs Auto Reclose

Auto Reclose ตัวอย่างวงจร

Emax 2 ,E2.2 - E6.2			
รายการที่	รหัสสั่งสินค้า	รายละอียด	จำนวน
1	xxxxxxx	Breaker Emax 2 รุ่น E2.2-E6.2 Ekip Touch	1
2	2CDS271001R0064	S201M-C6	1
3	1SDA073700R1	YU E1.2..E6.2 220-240 V AC/DC	1
4	1SDA038320R1	UVD 220/250VE1/6-T7-X1-T8-E1.2/6.2-XT7/M	1
5	1SVR730884R3300	CM-MPS.41S ,3x300-500 VAC (L-L)	1
6	1SDA073725R1	M E2.2...E6.2 220-250 VAC/DC	1
7	1SDA073773R1	RTC 250VAC E2.2...E6.2	1
8	1SDA073687R1	YC E1.2..E6.2 220-240 VAC/DC	1
ราคารวมอุปกรณ์ (ไม่รวมราคาเบรกเกอร์)			

วงจรAuto Recloser สำหรับ Emax2



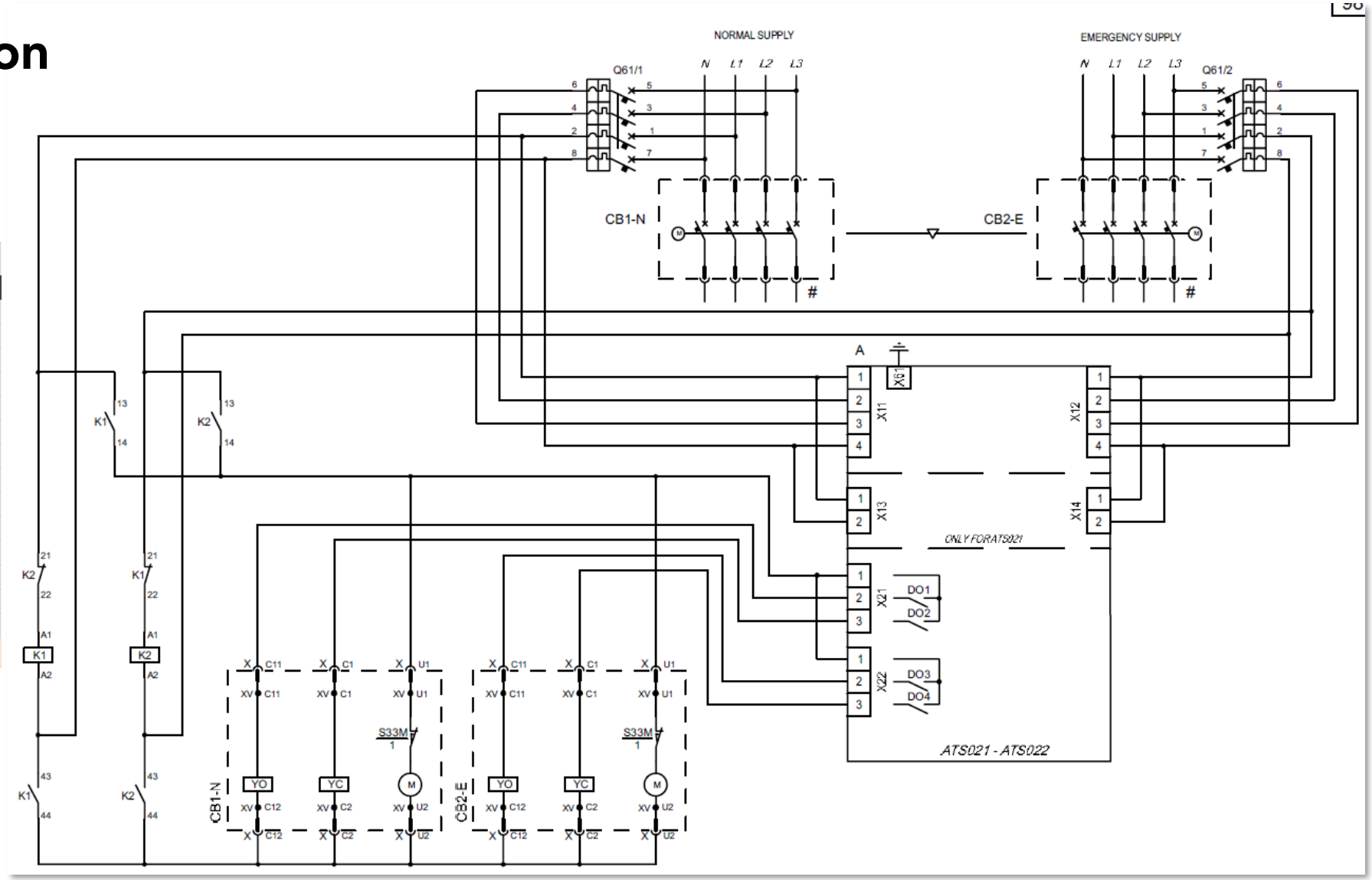
ATS Common question

5. ATS vs Auto Reclose

ATS (Breaker) ตัวอย่างวงจร

Emax 2 ,E2.2 Fixed Horizontal

รายการที่	รหัสสั่งสินค้า	รายละอียด	จำนวน
1	xxxxxxx	Breaker Emax2 รุ่น E2.2	2
2	2CDS271001R0064	S201M-C6	2
3	1SDA073725R1	Motor Charging Spring E2.2-E6.2 220-240V AC/DC	1
4	1SDA073687R1	Shunt Closing Release E1.2..E6.2 ,220-240V AC/DC	1
5	1SDA073674R1	Shunt Opening Release E1.2..E6.2 ,220-240V AC/DC	1
6	MIAF-E2.2-DT	Mechanical Interlock Type A Fixed E2.2	1
	1SDA073881R1	*1 x Cable kit for interlock E1.2-E6.2 Horizontal*	*1*
	1SDA073889R1	*1 x Lever for mechanical interlock E2.2*	*2*
	1SDA073895R1	*2 x Type A - floor mounted E2.2-E6.2*	*2*
7.1	1SCA116892R1001	ODPSE230C	1
7.2	AF09x2-VM4	Contactor set	1
	1SBL137001R1310	*AF09-30-10-13 100-250V50/60HZ-DC Contactor*	*2*
	1SBN030105T1000	*VM4 Mechanical Interlock Unit*	*1*
8	1SDA065524R1	ATS022 Controller	1
ราคารวมอุปกรณ์ (ไม่รวมราคาเบรกเกอร์)			



ATS

- ATS Concept
- Common question
- **Our solution**
- About TruOne

Our ATS Solution

Product Type

	SWITCHES		CONTACTOR	CIRCUIT BREAKER	
					
	Compact ATS	**TruONE ATS**	**AF contractors with relays**	**Emax 2 and Tmax XT with ATS021/ATS022**	**Embedded ATS**
Current Range	From 40 to 125 A	From 200 to 1200 (UL) /1600(IEC) A	From 9 to 1650 A	From 16 to 6300 A	From 800 to 6300 A
Transfer Type	Delayed[1] : I-0-II	Open: I-II Delayed[1]: I-0-II In-phase monitor	Open: I-II Delayed[1]:I-0-II	Delayed[1]: I-0-II	Delayed[1]: I-0-II Closed: I-I+II-II Synchrocheck
Standard	IEC 60947-6-1 IEC 60947-3 GB/T14048.11	UL 1008 IEC 60947-6-1 GB/T14048.11	IEC/UL 60947-4-1 GB/T14048.4	UL1066, UL489 IEC 60947-2 GB14048.2	UL1066 IEC 60947-2 GB14048.2

AUTOMATIC TRANSFER SWITCH

[1] Delayed transition is also know as Open transition with stable OFF between positions I and II

Our ATS Solution

Enclosed Type

	TruONE ATS Enclosed	Zenith ZTX	Zenith ZTG	Zenith ZTS
				
Current Range	From 200 to 1600A	From 30 to 1200 A	From 40 to 3000 A	From 40 to 4000 A
Transfer Type	Delayed[1] : I-0-II In-phase monitor	Open: I-II In-phase monitor	Open: I-II Delayed[2]:I-0-II In-phase monitor	Open: I-II Delayed[2]: I-0-II Closed: I-I+II-II Bypass withdrawable In-phase monitor
Standard	IEC 60947-6-1	UL 1008	UL 1008 IEC 60947-6-1[3] GB/T14048.11[3]	UL 1008 IEC 60947-6-1 GB/T14048.11

AUTOMATIC TRANSFER SWITCH

[1] Zenith and TruONE are also known as power contactor based solutions in NEMA/UL market
[2] Delayed transition is also know as Open transition with stable OFF between positions I and II
[3] IEC 60947-6-1 and GB/T 14048.11 certification is available for the current range 1600...3000 A

Our ATS Portfolio (Focus on Switch)

IEC Standard																	
Series	**40**	**60/ 63**	**80**	**100**	**125**	**160/200**	**250/315**	**400**	**500**	**630**	**800**	**1000**	**1250**	**1600**	**2000**	**2500**	**3200**
ABB (Open) IEC (Delayed Transition)	**Compact ATS (OTM_21D)**					**TruOne OXB_ Level2/Level3/Level4**									**OTM2000-3200+OMD300/800**		

OTM...21D Types

OXB.... Types

OTM...+OMD Types

Our ATS Portfolio (Focus on Switch)

UL Standard																		
Series	**40**	**60/ 63**	**80**	**100**	**125**	**160/200**	**250/315**	**400**	**500**	**630**	**800**	**1000**	**1200**	**1600**	**2000**	**2500**	**3200**	**4000**
ABB (Open) UL Fast /InPhase transistion	**TruOne OXA_Level3/Level4**													**ZTG/ZTS**				

OXA…. Types

ZTG / ZTS
only loose part Types

Our ATS Portfolio (Focus on Switch)

UL Standard																		
Series	**40**	**60/ 63**	**80**	**100**	**125**	**160/200**	**250/315**	**400**	**500**	**630**	**800**	**1000**	**1200**	**1600**	**2000**	**2500**	**3200**	**4000**
ABB (Enclosed) UL Fast /InPhase transistion	**30A..1200 ZTG with TruOne Inside**													**ZTG Traditional offer**				

ZTG with TruOne inside

ZTG

Our ATS Portfolio (Focus on Switch)

UL Standard																	
Series	**40**	**60/ 63**	**80**	**100**	**125**	**160/200**	**250/315**	**400**	**500**	**630**	**800**	**1000**	**1200**	**1600**	**2000**	**2500**	**3200**	**4000**
ABB Enclosed Bypass & Closed	**ZTS**																	

ZTS

Our ATS Portfolio (Focus on Switch)

ZTG with TruOne inside
30-1200A UL1008

ZTG with GE-Zenith inside
>1200A UL1008
ZTS with GE-Zenith

We're taking Zenith ATS performance to new heights.

ZTG Series
General purpose commercial and industrial applications

ZTX Series
Residential and light commercial applications

ZTG Series
Standard (Open) or Delayed Transition – 1600 – 3000 A

ZTG Series
Service Entranced Rated

ZTS Series
Standard (Open), Delayed or Closed Transition

ZBTS
Bypass/Isolation

ZTE Series
Standard (Open), Delayed or Closed transition

ZBTE
Bypass/Isolation

ATS

- ATS Concept
- Common question
- Our solution
- **About TruOne**

TruOne

About it !!!

Highlight Feature

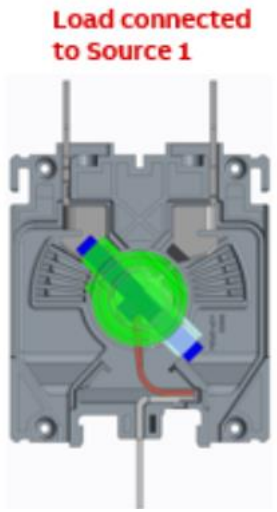
Standard Feature

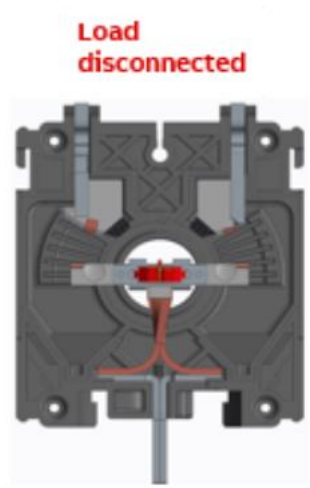
TruOne

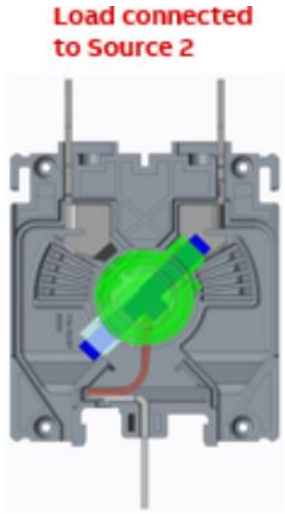
Standard Feature

Standard feature

- Open Transition (I – II)
- Delay Transition (I – 0 – II)







TruOne

Standard Feature

Standard

- IEC 60947-6
- UL 1008

Current range

- IEC : 200 – 1600A
- UL : 200 – 1200A

Standard feature

- Complete with controller and cable 1.5m
- Solenoid
- 3poles ,4poles
- Double throw
- Auto and Manual transfer
- LCD Display
- Voltage drop, pick-up setting range
- Frequency drop, pick-up setting range

TruOne

Highlight Feature

Highlight Feature

- Transfer time below 50ms
- In-phase monitoring
- Load shedding function
- Programable DI/DO
- Event log
- Predictive maintenance (Level 4 version)
- Harmonic measuring

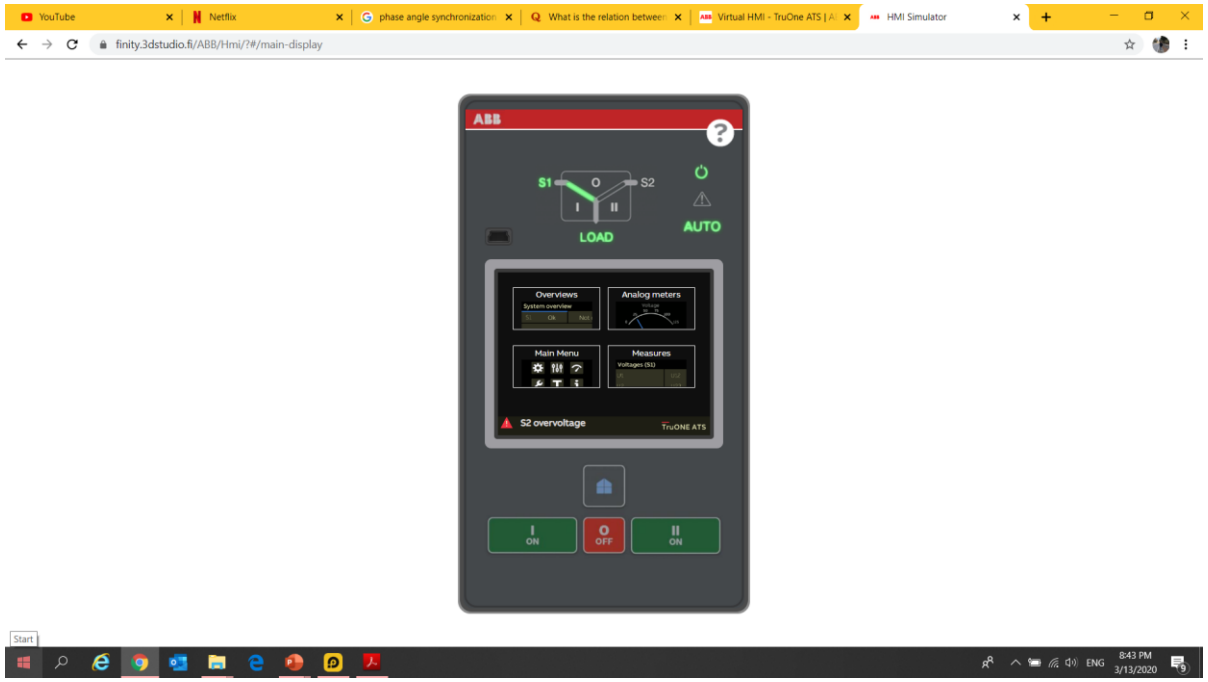
Communication & Measuring

- Optional communication : Modbus ,Profibus ,Ethernet
- Optional Cloud monitoring
- Current ,Power ,VAR ,VA monitoring display (Level 4 version)

TruOne

Virtual HMI

https://new.abb.com/low-voltage/launches/truone-ats/Virtual-HMI



Q & Q

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