Better buildings
Better tomorrows



Better buildings
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ATK CORPORATION:



Mr. Chung Kim Van
Managing Director ATK Corporation
Phụ trách mảng thiết bị đóng ngắt hạ thế

ACB, MCCB, RCBO, DB,…

Hager

01

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Our vision - Tầm nhìn của chúng tôi

Shaping tomorrow's electrical world
Định hình thế giới điện của ngày mai

We are a family business shaping tomorrow's electrical world to make people's life on our planet safer, cleaner and more enjoyable.
Chúng tôi là một công ty gia đình đang định hình thế giới điện của tương lai, nhằm làm cho cuộc sống của con người trên hành tinh trở nên an toàn hơn, sạch hơn và thú vị hơn. Tòa nhà tốt hơn, tương lai tốt đẹp hơn



Our Business
Lĩnh vực kinh doanh

Hager is a leading supplier of solutions and services for electrical installations in residential, commercial and industrial buildings.



Hager là nhà cung cấp hàng đầu các giải pháp và dịch vụ cho lắp đặt điện trong các tòa nhà dân dụng, thương mại và công nghiệp



Organisation: Executive Board
Ban điều hành



From left to right:
Từ trái qua phải:

Michael Flieger (2023)
Chief Financial Officer
Giám Đốc Tài Chính

Ralph Fürderer (2020)
Chief Technical Officer
Giám Đốc Kỹ Thuật

Sabine Busse (2023)
Chief Executive Officer
Giám Đốc Kinh Doanh

Mike Elbers (2011)
Chief Marketing Officer
Giám Đốc Marketing

Franck Houdebert (2001)
Chief Human Resources Officer
Giám Đốc Nhân Sự

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Key figures

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Revenue – Doanh thu 3 tỷ Euro

€3bn

(including acquisitions)

Employees – Nhân sự

13.000

Production facility – nhà máy sản xuất

23

Locations worldwide – trên toàn cầu

Nationalities – Quốc tịch

90

Countries in which Hager Products are available
Sản phẩm có mặt tại hơn 100 quốc gia

100

Hager Group worldwide

Our 23 production facility locations

23 nhà máy trên toàn thế giới

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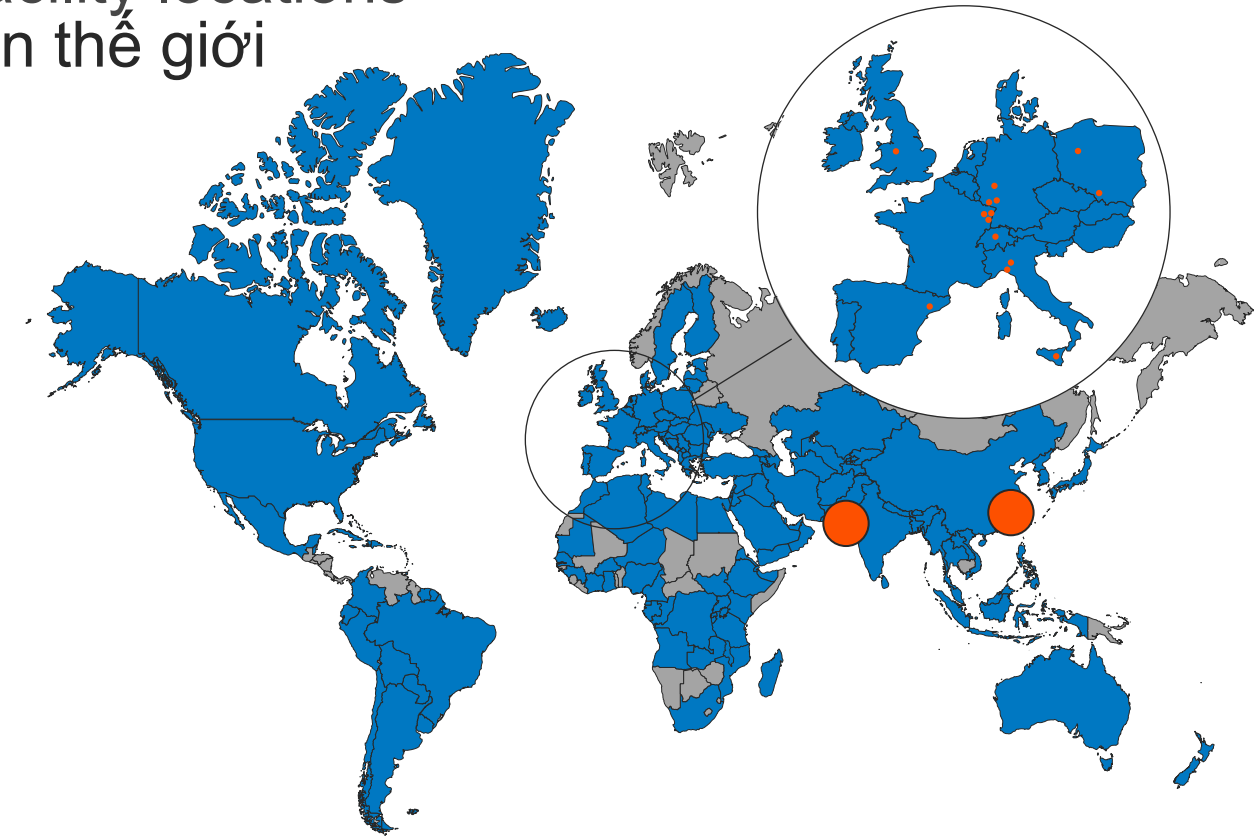
Components and solutions available in more than 100 countries .

Sản phẩm và giải pháp có mặt tại hơn **100 quốc gia**



- **Production facilities**
- **Distribution**

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Hager ISA
Singapore & Export



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ACB & MCCB advanced features Đặc Tính Nâng Cao

02

For training purpose only. Please do not distribute.

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Smart.
Safe.
Simple.

Range of Air Circuit Breakers from hager

hw+
hws

The choice is yours:

hw+	hws
Customized	Off – the – shelf
Smart	Standard
Accuracy	Basic Protection
Connectivity	Safe & simple
Energy Management	Energy Monitoring

New hws
Hager ACB

- **New ACB up to 4000A**
- Công suất: Dòng ACB mới hỗ trợ lên đến 4000A.

- **Designed by Hager**
- **Manufactured by Hager**
- Xuất xứ: Được thiết kế và sản xuất trực tiếp bởi Hager.

- **Future ready: Sẵn sàng cho tương lai**
- Premium performance - Hiệu suất cao cấp
- Easy to install and configure - dễ dàng lắp đặt và cấu hình
- Dòng cắt ngắn mạch: Icu=Ics=Icw 1sec (1 giây)
- Energy Trip unit - Bộ ngắt năng lượng
- Rotatable Terminal for horizontal/Vertical - Đầu nối có thể xoay dùng cho lắp đặt ngang/dọc

hws

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Product types
Loại sản phẩm

– Air circuit breaker
– *Máy cắt không khí*
– Switch-disconnector
– *Cầu dao phụ tải*

Available versions
Phiên bản có sẵn

– Fixed - Cố định
– Withdrawable - Có thể tháo
– 3 Pole / 4 Pole - 3 Pha/4 Pha
– Dòng cắt: 50kA / 66kA / 85kA

Full range of accessories
Đầy đủ dải phụ kiện

– Control & command
– Điều khiển & vận hành
– Signaling - Tín hiệu
– Locking - Khóa
– Interlocking - khóa liên động
– Safety - An toàn
– Connections - Kết nối

Different trip units – các loại bộ bảo vệ

– 3 Trip Units – Basic to advanced (LSI, LSIG)
– *3 loại – từ cơ bản đến nâng cao*
– Option of w/o display / with display
– *Tùy chọn: không màn hình / có màn hình*
– Energy version for advanced protection (LSIG) measurement & communication
– Chức năng đo lường năng lượng cho bảo vệ nâng cao (LSIG), hỗ trợ đo lường & truyền thông

Trip unit:

Type L (Basic)
Loại L (Cơ bản)
Type A (Basic + Amp)
Loại A (Cơ bản + màn hình
Type H (Advanced)
Loại H (Nâng cao)

L Type



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Trip unit: standard

- **LSI**
- **LSIG**

• Easy settings through dials - *Dễ dàng thiết lập thông qua các núm xoay*
• **Percentage Loading LED** - *Có đèn LED báo phần trăm tải*
• Fault Indication LED (separate for L/S/I/G) - *Đèn LED báo lỗi riêng biệt*
• Operation Indication LED (When TU is powered ON & in working condition) - *Đèn LED hiển thị trạng thái vận hành (khi TU được cấp nguồn và đang hoạt động)*

• 4 Function Keys (Query, Test / Self-Test, Clear Fault) - *4 phím chức năng (Truy vấn / Test / Tự kiểm tra / Xóa lỗi)*

• Neutral Protection: *Bảo vệ Trung tính*
4P: Inbuilt protection (same protections as Phases) - *Tích hợp sẵn*
3P: using external Neutral sensor ENCT (same protections as Phases) - *Sử dụng cảm biến trung tính ngoài ENCT (bảo vệ tương tự các Pha)*

• **Thermal Memory for overload protection** - *Ghi nhớ nhiệt, bảo vệ quá tải*
• Simulate and test the instantaneous function (directly on TU) - *Mô phỏng & kiểm tra chức năng tức thời*
• Automatically scan and check each LED indication - *Tự quét & kiểm tra từng đèn*

• Self-diagnosis: When the storage function is abnormal or the microcomputer crashes, it will output through the relay signal - *Tự chẩn đoán: Khi chức năng lưu trữ bị lỗi hoặc vi xử lý gặp sự cố, sẽ xuất tín hiệu qua rơ-le.*

• Fault Trip Record (downloadable using OCR Tool) - *Ghi lại lịch sử tác động*
• Fault Query on TU: Last Trip Record (through LED) - *Truy vấn lỗi trên TU*
• MCR Function: Protection during making / closing of the circuit breaker if fault is already existing in system - *Chức năng MCR: Bảo vệ khi đóng máy cắt nếu trong hệ thống đã tồn tại sự cố*

Alarms

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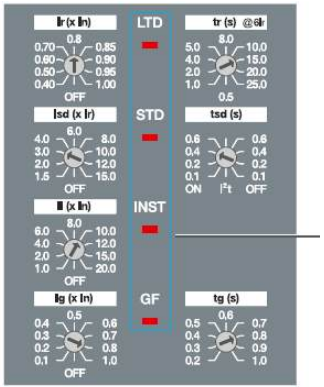
Type L trip unit

Trip alarm

In the event of an alarm, a fault LED indication and a screen of this type is displayed:



LED signaling



① and ②:

LED indication	Display	Tripping type
LTD	Long-time trip	Long time delay protection
STD	Short-time trip	Short time delay protection
INST	MCR and trip	Instantaneous protection
GF	Earth trip	Earth protection

③ : Current value of fault (only for long time delay, short time delay, instantaneous and earth protection trip causes) with indication of the phase affected by the fault.

④ : Phase concerned by the fault (only for Long time delay, Short time delay and instantaneous tripping causes)

FS will be activated

A Type



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Trip unit: standard

- LSI
- LSIG

• Easy settings through dials + LCD Display - Dễ cài đặt qua núm xoay + màn LCD
• Percentage Loading Bar Graph - Biểu đồ thanh hiển thị phần trăm tải
• Current Metering: Inst + Max value for each phase - Đo dòng điện: giá trị tức thời + giá trị lớn nhất cho từng pha

• Fault Indication LED (separate for L/S/I/G) - Đèn báo lỗi riêng cho từng chức năng
• Operation Indication LED (When TU is powered ON & in working condition) - Đèn LED hiển thị trạng thái vận hành (khi TU được cấp nguồn và hoạt động)
• 4 Function Keys (Home / Back, Up, Down, Confirm) - 4 phím chức năng (Trang chủ / Quay lại / Lên / Xuống / Xác nhận)

• Neutral Protection: Bảo vệ trung tính
• 4P: Inbuilt protection (same protections as Phases) - Tích hợp sẵn bảo vệ
• 3P: using external Neutral sensor ENCT (same protections as Phases) - Sử dụng cảm biến trung tính ngoài ENCT (bảo vệ tương tự các pha)

• Maintenance Indicators: Digital Operation Counter + Contact Wear Status - Chỉ thị bảo trì: Bộ đếm số lần đóng cắt + trạng thái mòn tiếp điểm
• ZSI: Zone Selective Interlocking - Liên động chọn lọc theo vùng
• Inbuilt Digital Output Contact (Programmable) + Load Monitoring - Tích hợp tiếp điểm đầu ra số (có thể lập trình) + giám sát tải

• Thermal Memory for overload protection - Ghi nhớ nhiệt cho bảo vệ quá tải
• Simulate and test the instantaneous function (directly on TU) - Mô phỏng và kiểm tra chức năng tức thời (trực tiếp trên TU)
• Automatically scan and check whether each LED indication is normal - Tự động quét và kiểm tra trạng thái hoạt động của các đèn LED
• Self-diagnosis - Tự chẩn đoán
• 10 Fault Trip Record (downloadable using OCR Tool) - Lưu 10 bản ghi sự cố
• Fault Query on TU: Last 10 Trip Record (through display) - Truy vấn lỗi trên TU
• MCR Function

Type A trip unit
Display and keyboard

Operating concept

To navigate through the main menu, use the following 4 keys:

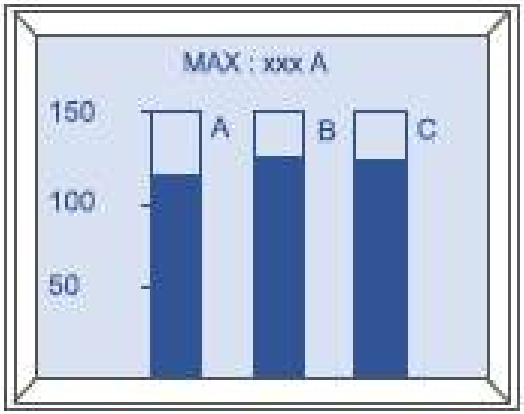


→ the BACK key to return to the previous step.

→ the move UP key to select the display.

→ the move DOWN key to select the display.

→ The OK key to activate the display and confirm a



Measurement display

When the trip unit is switched on, the interface immediately displays the diagram representing the load percentage of the currents for each phase: Ia, Ib, Ic.

Type A trip unit screen views: 1. Display

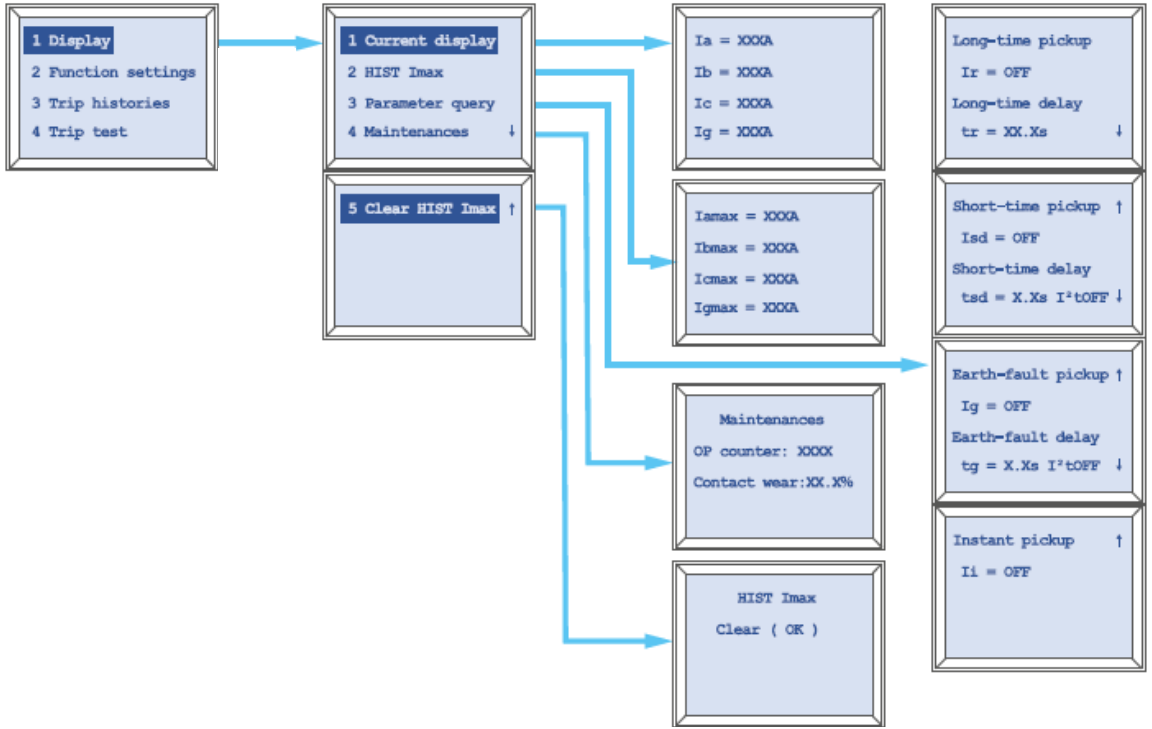
Press the key OK to enter the menu

Navigate through the different menus using the keys ↑ and ↓

press the key ⌂ to return to the previous step.



Protection value and delay with the knob to set and can be displayed through the LCD screen



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Type A trip unit

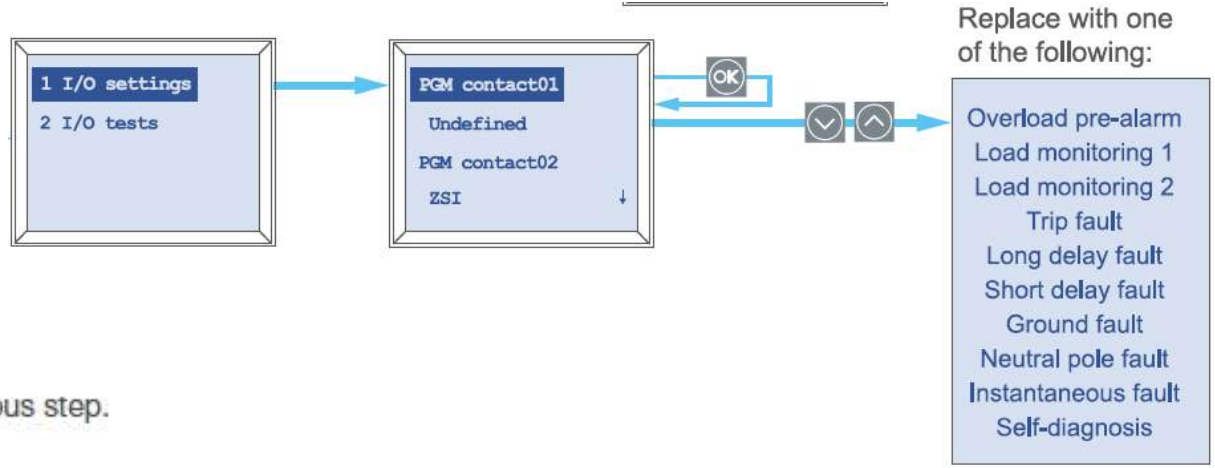
screen views: 2. Function Settings

Press the key OK to enter the menu

Navigate through the different menus using keys and

press the key to return to the previous step.





Load Monitoring:
Can independently control the two load through DO contacts, when the operating parameters exceed the set value (Inst. Current Value)

Trip History

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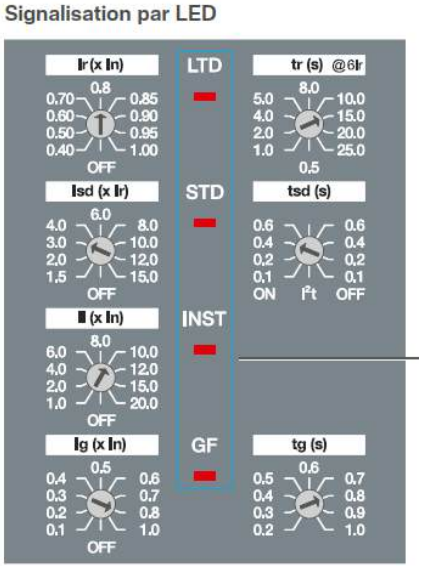
Type L and A trip unit
Trip History

Type L: 1 Trip
Type A: 10 Trip

Overload (L)
Short Circuit (S)
Instantaneous (I)
Earth Fault (G)
Neutral (N)





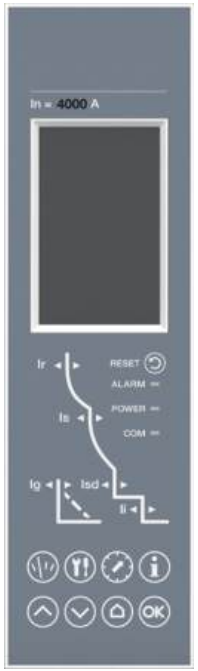


History of the last 10 faults



• Available with trip units equipped with a screen

H Type



trip unit: Advanced

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Basic protections: L, S, I, G

All functions of "A type" + additional functions as below: gồm chức năng bản A và:

- Inbuilt Voltage based Metering + MODBUS Communication - Tích hợp đo lường điện áp + truyền thông MODBUS
- Current + Voltage + Power + Frequency+ Energy Measurement - Đo lường: Dòng điện + Điện áp + Công suất + Tần số + Điện năng
- Harmonics (up to 31st order) - Phân tích sóng hài (đến bậc 31)
- Waveform Capture - Ghi dạng sóng
- Modbus Communication (4 functions) inbuilt in Trip Unit: Truyền thông Modbus
- Remote Measurement - Đo lường từ xa
- Remote Communication - Truyền thông từ xa
- Remote Operation (ON/OFF) - Điều khiển từ xa (BẬT/TẮT)
- Remote Adjustment (Protection Setting) - Cài đặt từ xa (tham số bảo vệ)
- Remote Reset (following a Trip) - Reset từ xa (sau khi xảy ra Trip)
- Option of 6 types of protection curves for "L" protection (SI, VI, General Prot., Motor Prot., HV, I2t) - Tùy chọn 6 dạng đường cong bảo vệ cho chức năng L:
- Adjustable Neutral Protection - 50%, 100%, 150%, 200%, OFF - Bảo vệ trung tính có thể điều chỉnh: 50%, 100%, 150%, 200%, OFF

Advanced Protections as below: Các chức năng bảo vệ nâng cao

- Current & Voltage Unbalance - Mất cân bằng dòng & điện áp
- Demand Current - Dòng nhu cầu
- Under Voltage / Over Voltage - Thấp áp / Quá áp
- Phase Sequence - Thứ tự pha
- Under Frequency / Over Frequency - Thấp tần / Quá tần
- Reverse Power - Công suất ngược

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Type H trip unit
Metering Functions

Multi-function Measurement + Harmonics

Measurement Function	Detailed Parameters
Current – Dòng điện	I_a, I_b, I_c, I_N, I_g, I_{unbal}
Voltage – Điện áp	V_{aN}, V_{bN}, V_{cN}, U_{ab}, U_{bc}, U_{ca}, U_{avg}, U_{unbal}, Phase Sequence
Power – Công suất	Active (P), Reactive (Q), Apparent (S), Power Factor, P_a Q_a S_a, P_b Q_b S_b, P_c Q_c S_c
Frequency – Tần số	F_{aN}, F_{bN}, F_{cN}
Energy – Năng lượng	Active (E_P), Reactive (E_Q), Apparent (E_S), E_{in}, E_{out}
Power Demand – Nhu cầu công suất	Active (P), Reactive (Q), Apparent (S), Max
Harmonics – Sóng hài	THD (I and V), % THD (I and V), FFT (I and V – 3rd to 31st order)
Harmonic waveform – Dạng sóng Sóng hài	I and V waveforms

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Type H trip unit
MODBUS Communication



Inbuilt RS485 MODBUS:

- Remote measurement
- Remote adjustment
- Remote ON / OFF command
- Remote reset

No additional accessories required

All Type H trip units have inbuilt COM function

Communication

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New hw+
Hager ACB

- **New ACB up to 6300A**
- Dải dòng điện "khủng": Hỗ trợ các mức dòng điện lên đến 6300A

- **Designed by Hager**
- **Manufactured by Hager**
- Xuất xứ: Được thiết kế và sản xuất trực tiếp bởi Hager.

- **Future ready:**
- Premium performance - Hiệu suất cao cấp
- Compact - Thiết kế nhỏ gọn
- Easy to install and configure - Rất dễ lắp đặt/cấu hình
- Connected - Kết nối mạnh mẽ
- Standard & Energy versions (class 1),
- Seamless solution with MCCB h3+ & Agardio



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HW1

400 – **1600A**



HW2

630 – **2500A**



HW4

1000 – **4000A**



HW6

3200 – **6300A**

Product types
Air Circuit Breakers Switch-disconnectors

Ratings
400A / 630A / 800A / 1000A / 1250A / 1600A / 2000A / 2500A / 3200A / 4000A / 5000A / 6300A

sentinel & sentinel Energy Trip Units
Protection curves possible: LI / LSI / LSIG
Advanced Protection, Measurement & Communication

Version
Withdrawable / fixed

Poles
3P / 4P

LCD Displays
Easy and fast commissioning on both versions sentinel & sentinel Energy

Possible breaking capacities
(Icu at 440V)
42kA / 55kA / 66kA / 85kA / 100kA / 120kA / 150kA

Full range of accessories
compatible for command, signalling, locking, interlocking and protection.

Targeted customer
Panelbuilders, Installers, Building managers, Specifiers

Premium system
Smart and ambitious

Basic protections - Bảo vệ cơ bản : L, S, I, G

Advanced protections: Reverse power…

Bảo vệ nâng cao: Công suất ngược…

Metering functions: Power, Energy…

Chức năng đo lường: Công suất, Năng lượng…

Advanced alarms: Custom, Dip, Swell

Cảnh báo nâng cao: Tùy chỉnh, Sụt áp, Quá áp

Communication: Modbus RTU, TCP…

Giao tiếp: Modbus RTU, TCP…

Control functions: On/Off command…

Additional display: Panel display

Maintenance functions: warnings, Trip test

Bluetooth connectivity: Hager Power touch

USB connectivity: Hager Power setup

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Sentinel Energy system



The trip unit
Sentinel Energy

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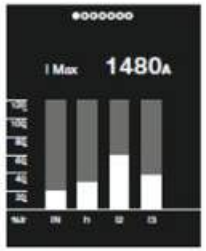
With the clear graphic TFT display, you always have all the important information in view and can make many settings directly on the device itself. This not only facilitates operation but also increases your response speed.
Với màn hình TFT đồ họa rõ nét, bạn luôn có thể theo dõi đầy đủ các thông tin quan trọng và thực hiện nhiều cài đặt trực tiếp trên thiết bị. Điều này không chỉ giúp vận hành dễ dàng hơn mà còn tăng tốc độ phản hồi.



Ampmeter screen.



Multimeter screen.



Long time settings screen.



Short time settings screen.

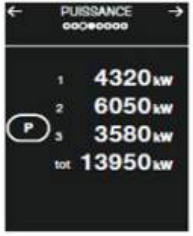
01 Live mode (chế độ)

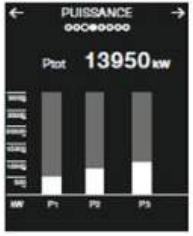
You can choose to scroll through your favourite settings or metering screens by activating Live mode. Up to 36 predefined screens are available.
Bạn có thể chọn cuộn qua các màn hình cài đặt hoặc đo lường yêu thích bằng cách kích hoạt chế độ Live.Có sẵn tối đa 36 màn hình được cài đặt sẵn.



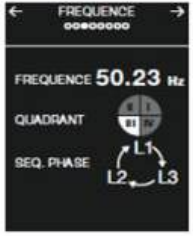
02 Measurement display (Hiển thị đo lường)

You can retrieve all parameters at any time by pressing the OK button.
Most measured values can be displayed both numerically and graphically.
Bạn có thể truy xuất tất cả các thông số bất kỳ lúc nào bằng cách nhấn nút OK.
Hầu hết các giá trị đo có thể được hiển thị dưới dạng số hoặc đồ thị.









03 Trip and alarm pop-ups (Cảnh báo và thông báo)

You can obtain further information on malfunctions and alarms by using the OK button.
Bạn có thể xem thêm thông tin về các lỗi và cảnh báo bằng cách sử dụng nút OK


Custom alarm pop-up.





Trip pop-up.



Sentinel Energy trip unit
Optional rating plugs vs as standard

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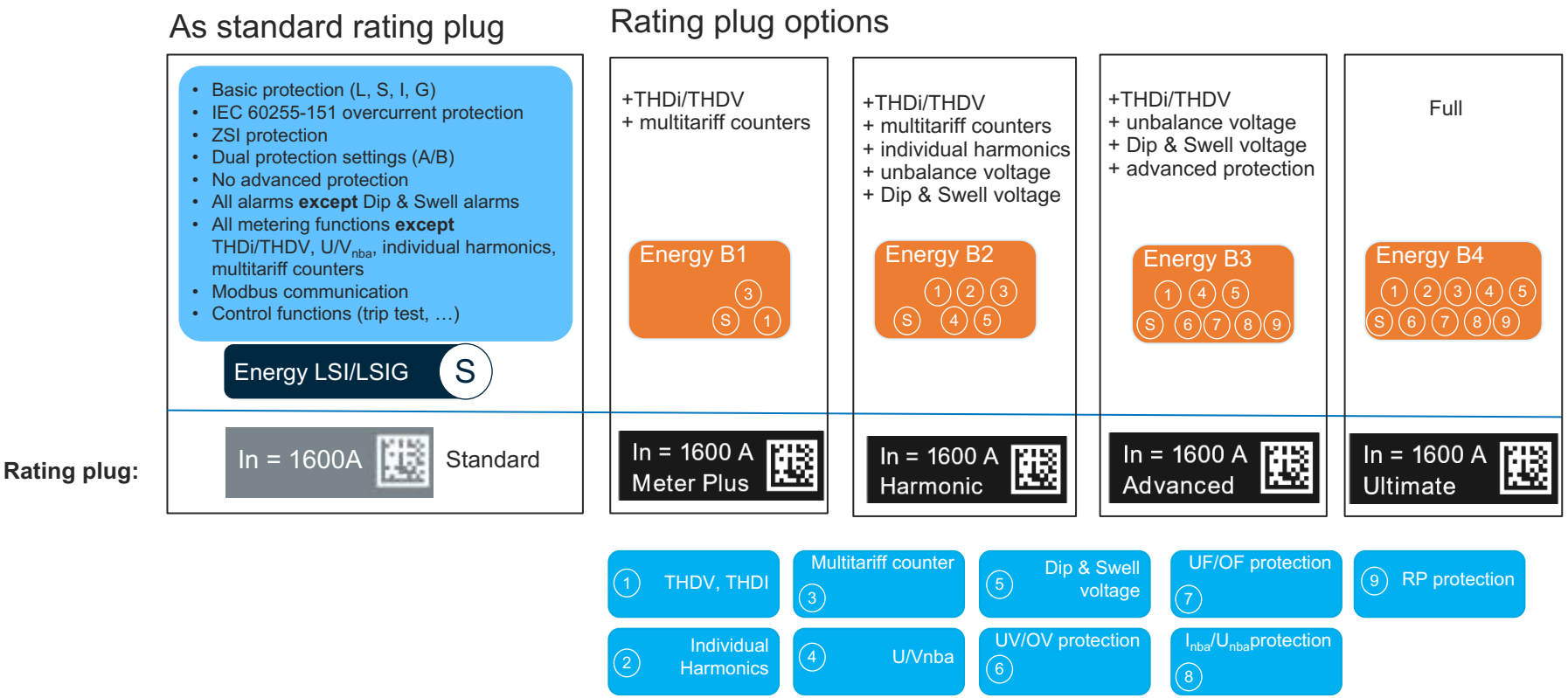

Sentinel Energy system

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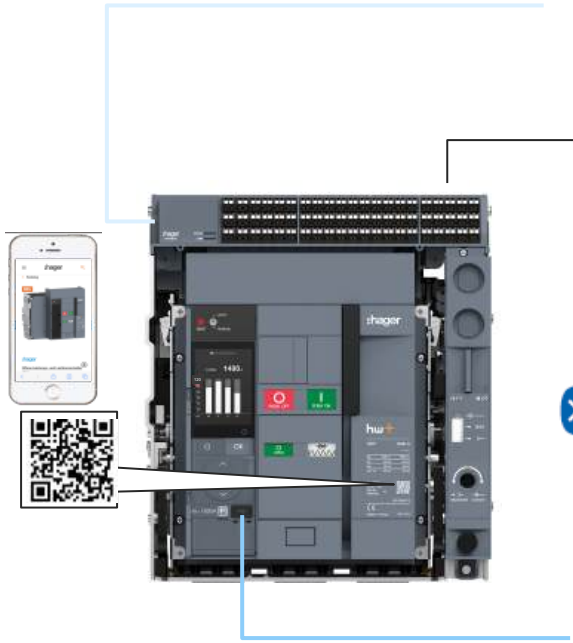


COM Modbus RTU
COM Modbus TCP

- Monitoring
- Supervising
- Remote control

System integrator

Panel display



- Monitoring
- Settings

Facility manager
End user

Hager Power touch



- On site monitoring

Facility manager
End user

Hager Power setup



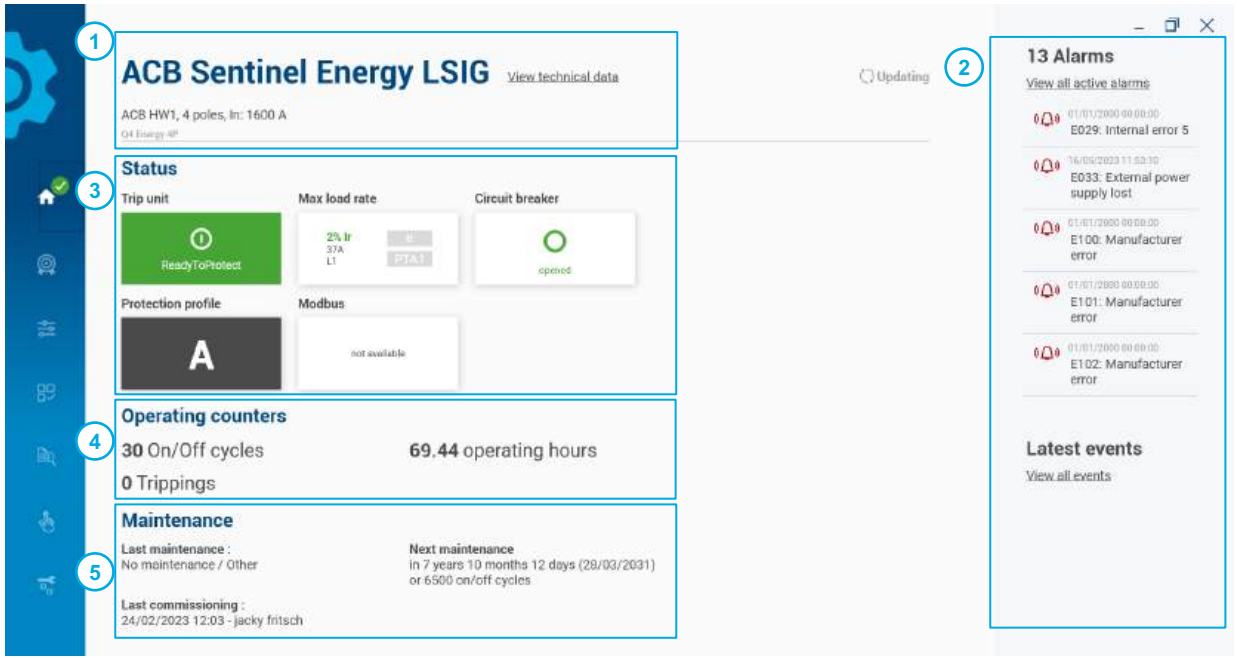
Required for testing

- Testing
- Commissioning
- Maintenance

Installer
Maintenance

Hager Power setup

Circuit breaker preview

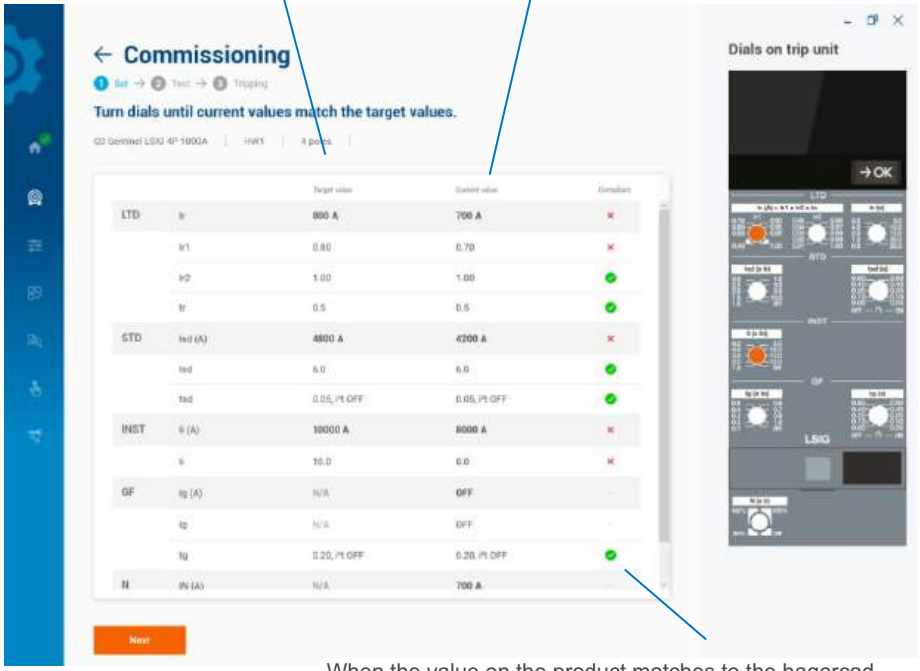


1. **Description of connected ACB**: frame, poles, rating, trip unit.
   Thông tin thiết bị: Dòng khung (frame), số cực (poles), dòng định mức (rating), loại Trip Unit
   Access to more technical data: software version, production date,... also viewing the Product code ID.
   Truy cập nhiều dữ liệu kỹ thuật: Phiên bản phần mềm, ngày sản xuất và cả mã vạch sản phẩm (Product code ID)
2. **Five last events** (go to History menu or click on View all to view all the events) - xem năm sự kiện gần nhất (vào menu History hoặc nhấp vào View all để xem tất cả các sự kiện)
3. **Status** of the trip unit (ReadyToProtect, internal battery, alarms). Status of the ACB (max load rate, open/closed). Running protection profile (A or B). Modbus communication – Trạng thái Trip Unit. Trạng thái của ACB. Cấu hình bảo vệ đang chạy
4. **Number of trippings** and alarms events since first installation (number of On/Off operations not available for the Sentinel trip unit), Operating time since first start - Số lần ngắt mạch (trippings) và các sự kiện cảnh báo kể từ lần cài đặt đầu tiên (số lần hoạt động Đóng/Mở - On/Off không khả dụng đối với bộ bảo vệ Sentinel trip unit), thời gian hoạt động kể từ lần khởi động đầu tiên.
5. **Last maintenance date, next maintenance date** and date of **last commissioning** with Hager Power setup - Ngày bảo trì gần nhất, ngày bảo trì tiếp theo và ngày vận hành thử (commissioning) gần nhất bằng phần mềm Hager Power setup

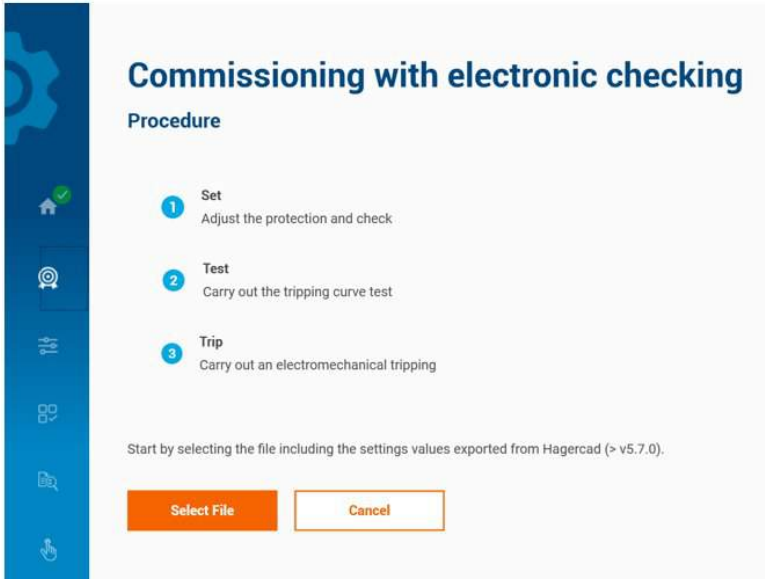
Hager power set up

Values from hagercad

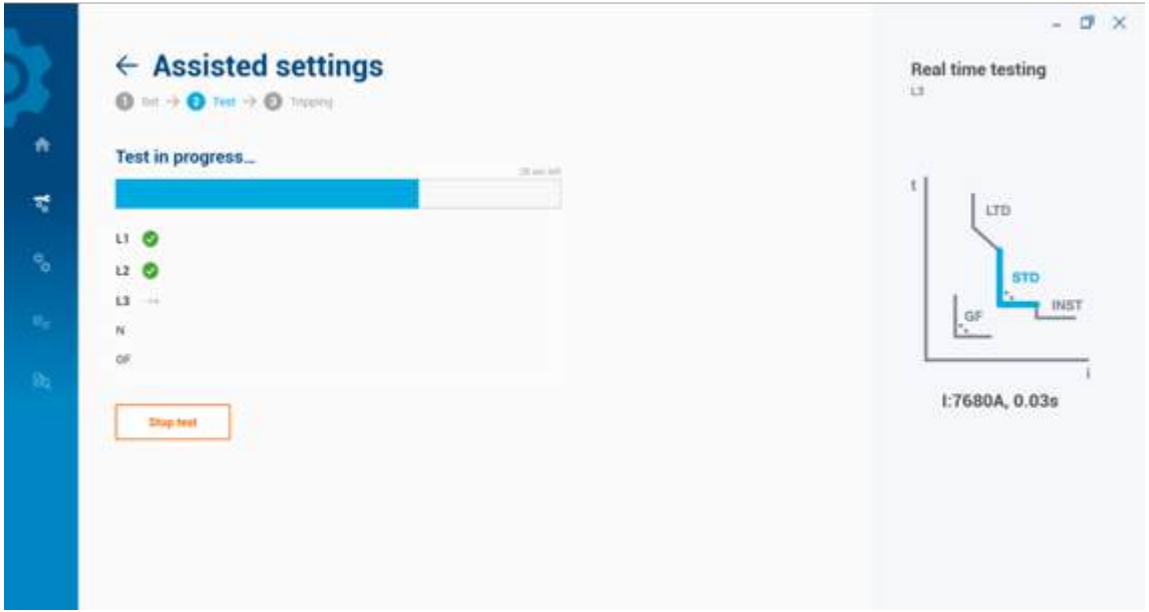
Current value in the trip unit



When the value on the product matches to the hagercad value, it turns to green colour.



Features
Assisted settings



1. Set
2. **Test**
3. Tripping

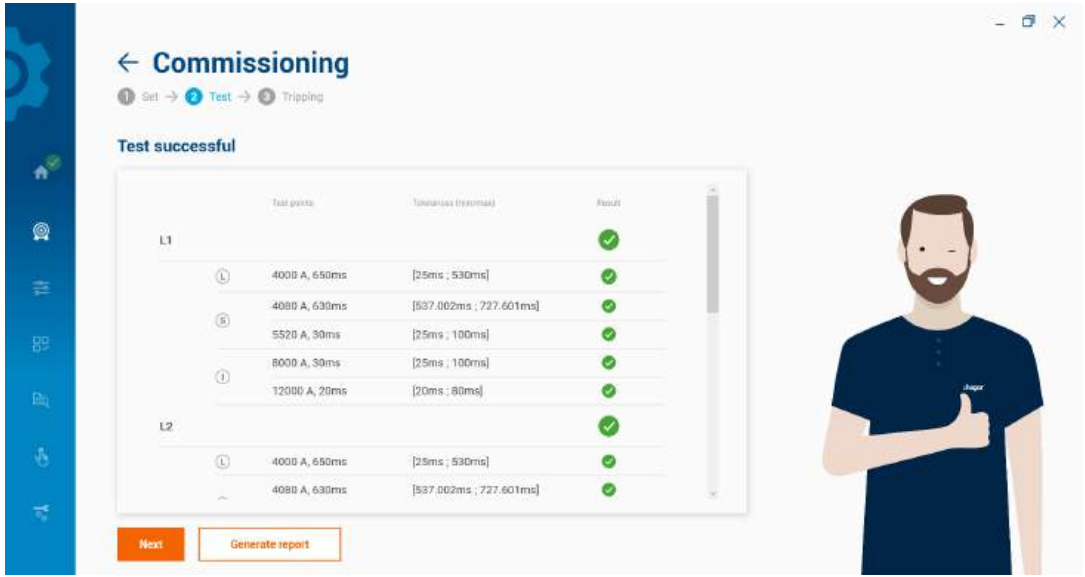
5 test points per pole are sent one by one to check if the trip unit is tripping in the time tolerances.

Not in the tolerances means that the test failed.

SAFETY-QUALITY-COMP

Hager Power setup

Commissioning



1. Set
2. **Test**
3. Tripping

5 test points per pole are sent one by one to check if the trip unit is tripping in the time tolerances.

Not in the tolerances means that the test failed.

SAFETY-QUALITY-COMP

Hager Power setup

Testing

ACB only



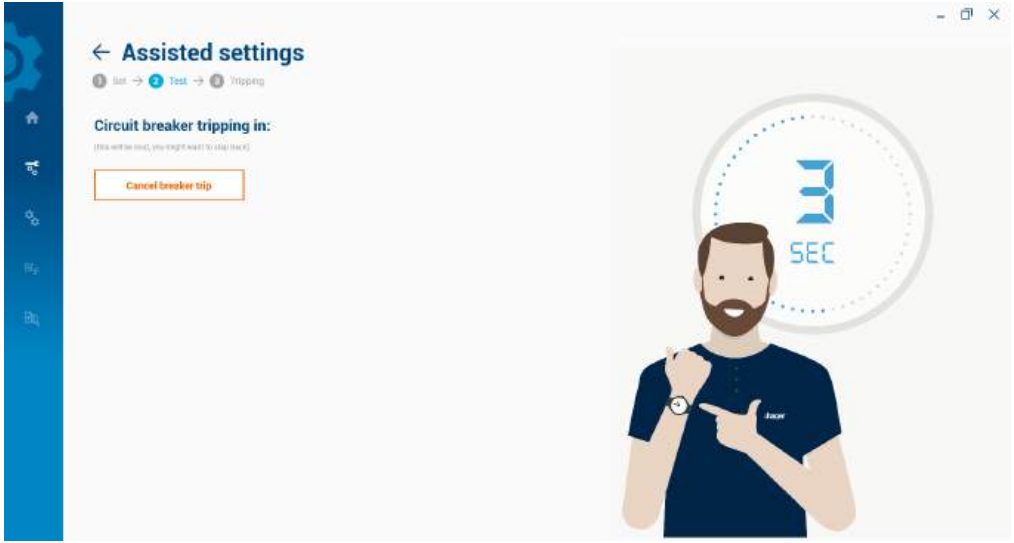
Tripping curve test

Test can be customisabled.

LTD test point can be set from 1.3to 10 xIr.

Estimated time gives an idea of duration of the test.

Features
Assisted settings



1. Set
2. Test
3. **Tripping**

After 5 seconds countdown the ACB
will really trip.

That means the electro-mechanical command circuit will be tested.

Features
Assisted settings

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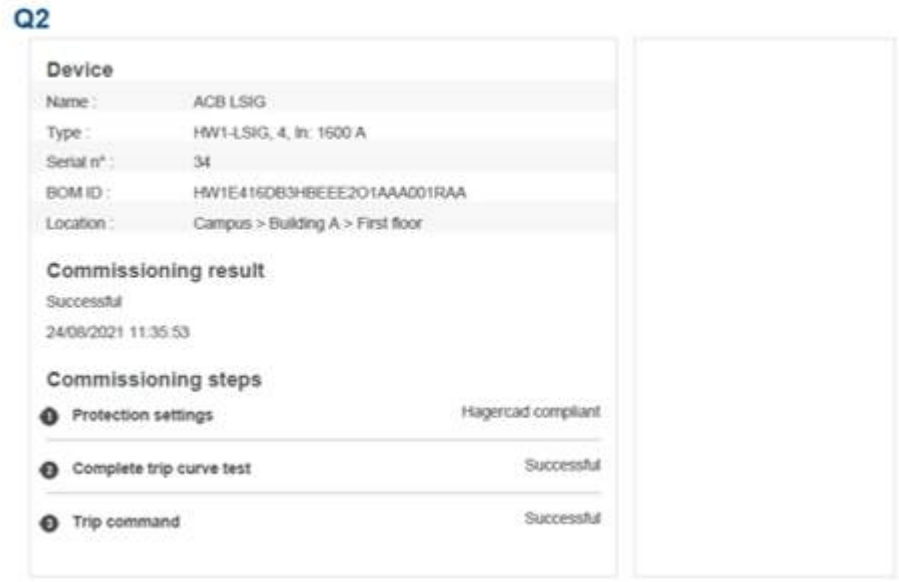

At the end of the Assisted settings procedure the detailed result can be saved in a com
Cuối cùng, sau khi quá trình Cài đặt có hỗ trợ hoàn thành, kết quả chi tiết có thể được lưu lại trong một bản

Commissioning report content
Nội dung Báo cáo Vận hành thử

- Area to write down the name, address, signature and stamp of company .
- *Khu vực điền tên, địa chỉ, chữ ký và con dấu của công ty.*
- Name of hagercad project, date of commissioning.
- *Tên dự án trong phần mềm hagercad, ngày tháng thực hiện quá trình vận hành thử .*
- Technical information of the ACB. Performed steps and commissioning results.
- *Thông tin chi tiết kỹ thuật của ACB. Các bước đã thực hiện và kết quả của quá trình vận hành thử*
- Sum up of current settings values.
- *Bảng tóm tắt các giá trị thiết lập dòng điện hiện tại*
- Details test points results missioning report.
- *Chi tiết kết quả của các điểm kiểm tra. Báo cáo vận hành thử*

Standard compliance

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Test Report issued under the responsibility of:

DEKRA

TEST REPORT
IEC 60947-2
Low-voltage switchgear and controlgear - Part 2: Circuit-breakers

Report Number	:	3325670.50
Date of issue	:	2022-11-24
Total number of pages	:	285
Name of Testing Laboratory preparing the Report	:	DEKRA Testing Services (Zhejiang) Co., Ltd.
Applicant's name	:	HAGER Electro SAS.
Address	:	132, Boulevard d'Europe, 67210, Obernai, France.
Test specification:		
Standard	:	IEC 60947-2:2016, AMD1:2019
Test procedure	:	CB Scheme
Non-standard test method	:	N/A
Test Report Form No.	:	IEC60947_2J
Test Report Form(s) Originator	:	DEKRA Certification B.V.
Master TRF	:	Dated 2020-03-31

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General disclaimer:

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TEST CERTIFICATE

DEKRA



TEST CERTIFICATE

DEKRA

Issued to: SL Electric Pte Ltd
No 2 Woodlands sector 1 #05-35 Woodlands Spectrum 1 Singapore 738068

For the product: Low-voltage power switchgear and controlgear assembly (PSC-assembly)

Trade name: SL

Type/Model: SL-25 (2500A)

Ratings: I_{nA} 2500 A, U_e 415 Vac, U_i 800 V, U_{imp} 8 kV, 50 Hz
I_{cu} 65 kA - 3 s, I_{cw} 65 kA at 415 Vac
IK 08, IP43, indoor use
For more details see annex

Manufactured by: SL Electric Pte Ltd
No 2 Woodlands sector 1 #05-35 Woodlands Spectrum 1 Singapore 738068

Subject: Design verification

Requirements: IEC 61439-2:2020 for use in conjunction with IEC 61439-1:2020
Clauses 10.2.2, 10.2.3.1, 10.2.3.2, 10.2.5, 10.2.6, 10.2.7, 10.2.8, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12 and 8.101

This Test Certificate is granted on account of an examination by DEKRA, the results of which are laid down in report no. 3332255.01-INC issued on 22 November 2024.

The examination has been carried out on one single specimen of the product, submitted by the manufacturer. The Attestation does not include an assessment of the manufacturer's production. Conformity of his production with the specimen tested by DEKRA is not the responsibility of DEKRA.

Arnhem, 22 November 2024 Number: 3332255.100

DEKRA Certification B.V.

H.L. Schendelok
Certification Manager



TEST CERTIFICATE

DEKRA

Issued to: SL Electric Pte Ltd
No 2 Woodlands sector 1 #05-35 Woodlands Spectrum 1 Singapore 738068

For the product: Low-voltage power switchgear and controlgear assembly (PSC-assembly)

Trade name: SL

Type/Model: SL-32 (3200A)

Ratings: I_{nA} 3200 A, U_e 415 Vac, U_i 800 V, U_{imp} 8 kV, 50 Hz
I_{cu} 65 kA - 3 s, I_{cw} 65 kA at 415 Vac
IK 08, IP43, indoor use
For more details see annex

Manufactured by: SL Electric Pte Ltd
No 2 Woodlands sector 1 #05-35 Woodlands Spectrum 1 Singapore 738068

Subject: Design verification

Requirements: IEC 61439-2:2020 for use in conjunction with IEC 61439-1:2020
Clauses 10.2.2, 10.2.3.1, 10.2.3.2, 10.2.5, 10.2.6, 10.2.7, 10.2.8, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12 and 8.101

This Test Certificate is granted on account of an examination by DEKRA, the results of which are laid down in report no. 3332256.01-INC issued on 18 November 2024.

The examination has been carried out on one single specimen of the product, submitted by the manufacturer. The Attestation does not include an assessment of the manufacturer's production. Conformity of his production with the specimen tested by DEKRA is not the responsibility of DEKRA.

Arnhem, 18 November 2024 Number: 3332256.100

DEKRA Certification B.V.

H.L. Schendelok
Certification Manager

Hager MSG
Project references

Better buildings
Better tomorrows


Food Vision @ Mandai


601 RIFFLE RANGE


Jalan Tukang Dormitory


PROJECT JLT5 Jurong Island

No.	Project Listing (Singapore)	Type	Rating	Product offer	Year
1	Technical research center (601 riffle range)	Commerical	2500A	MSB+SB+DB	2025
2	Jalan Tukang Dormitory	Industrial	2500A	MSB+SB+DB	2025
3	COMMERCIAL Building (7 Changi South Lane)	Commercial	4000A	MSB+SB+DB	2025
4	PROJECT JLT5 AT 1 BANYAN PLACE,JURONG ISLAND (WESTERN ISLAND)	Industrial	2500A	MSB+SB+DB	2025
5	10 Story Factory at 19&21 Mandai ESTATE	F&B	2500A	MSB+SB+DB	2025
6	5000A Motorized ACB at changi Navel base	Government	5000A	ACB replacement	2025
7	Junying Secondary SCH	Commercial	2000A	ACB replacement	2025
8	Worldwide hotel management building	Commerical	1600A	ACB replacement	2025
9	PASOR RIS CAMP	Industrial	1600A	ACB replacement	2025
10	Spring field Primary SCH	Commerical	1600A	ACB replacement	2025
11	ST HIDA'S SEC SCH	Commerical	1600A	ACB replacement	2025
12	POI CHING SCH	Commerical	1600A	ACB replacement	2025
13	Commerical building at 82 JOO KONG CIRCLE	Commerical	1600A	ACB replacement	2025
14	BLK 7004 TENGAH AIR BASE	Government	3200A	ACB replacement	2023
15	Holiday Inn-orchard	Commerical	2500A	New MSB	2024
16	6 boonlay AVE RIVER VALLEY High Sch	Sch	2500A	New MSB	2024
17	1600A MSB AT PASIR RIS CAMP	Government	1600A	New MSB	2024
18	1600A MSB LAKE SIDE Primary Sch	Sch	1600A	New MSB	2024
19	1600A MSB at 76 SENOKO Drive	Commerical	1600A	ACB replacement	2024
20	NIppon Paint 1 First Lok Yang Rd	Commerical	2500A	MSB+SB+DB	2024
21	DHL	Commerical	3200A	New MSB	2024
22	3200A MSB AT CAPITAL HUB	Commerical	3200A	MSB+SB+DB	2023
23	1600A MSB at Seleta Aerospace	Industrial	1600A	New MSB	2024
24	5000A MSB at changi Navel base	Government	5000A&below	ACB replacement	2024

Better buildings
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h3+ Hager MCCB

SAFETY - QUALITY - COMPLIANCE

Hager MCCB, whole offer
Up to 1600A

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MCCB h3 x160, x250

Eco range



Body colour:
- base light grey
- Front Hager grey

- From 16 to 250A
- TM fix
- Icu 18 to 40KA

available

MCCB h3e

Eco range



Body colour:
- base light grey
- Front Hager grey

- From 300 to 800A
- TM fix
- Icu 50KA

available

MCCB h3+ P160, P250,P630



Body colour:
- base light grey
- Front Hager grey



- From 15 to 630A
- TM Adj,LSI,Energy
- Icu 25 to 110KA



Ics = Icu up to 110kA

available

MCCB h3 h1000,h1600



Body colour:
- base hager grey
- Front Hager grey

- From 630A to 1600A
- LSI, TM adj
- Icu 50 to 70KA

available

For training purpose only. Please do not distribute.

h3+ User Friendly

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01 Secure screw

The quarter-turn auxiliary access system saves time when installing the product. The secure screw offers additional comfort.



02 Hinged front cover

The front cover offers multiple advantages. It is mounted on hinges. It remains integral with the case once opened, preventing incorrect refitting.



03 Auxiliary window

The type of auxiliaries can be seen directly through the windows on the front panel, without removing the cover.



04 Integrated padlock

The handle can be directly locked with no need for extra accessories.





05 Interface to configuration tools

- Configuration of the circuit breaker via tablet or pc
- Status display and test of tripping curve for system documentation

06 Front LED Indicator

- Indicate different type of fault include overheating
- Self check trip unit



07 OLED Measurement Display

- Measurements: I, U, P, Q, S, E, ∑I, ∑P, f, PF, THD, etc.
- Rotating OLED display with excellent readability in all levels of ambient lighting
- Class 1 accuracy for active powers and energy metering

Electronic trip unit front LED indicators

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T > 105°C	I > 112% Ir	I >= 90% Ir	Ready	Status	Comments
				OFF	No temperature alarm. The temperature of the internal TU is under the threshold
				ON	Alarm Indication. The temperature is above 105°C
				OFF	No alarm
				Blinking	I > 105%Ir. The breaker is in alarm mode. (No protection)
				ON	I > 112% Ir. The breaker will trip
				OFF	No Pre-alarm
				ON	Pre-alarm I >= 90%Ir
				OFF	Trip unit is not powered. Protection is not ensured
				ON	Ready to protect
				Blinking	Internal trip unit fault

Application Summary
Basic protection for cables and transformers

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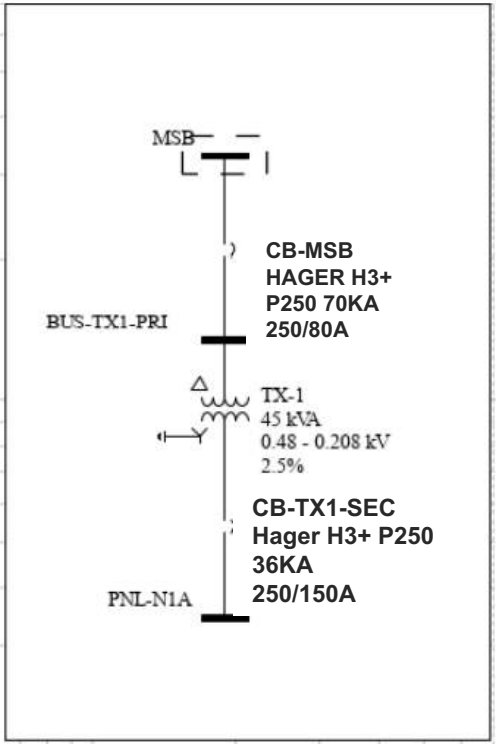

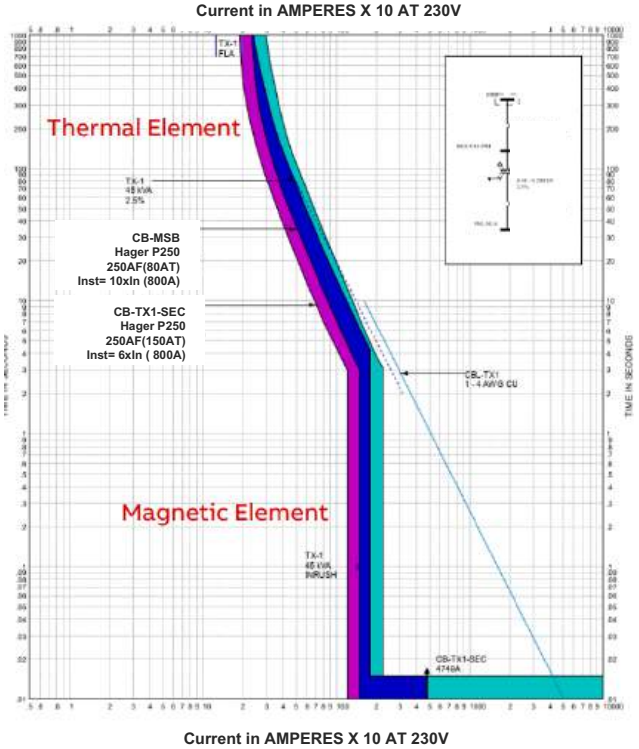

Application summary
Enhanced discrimination

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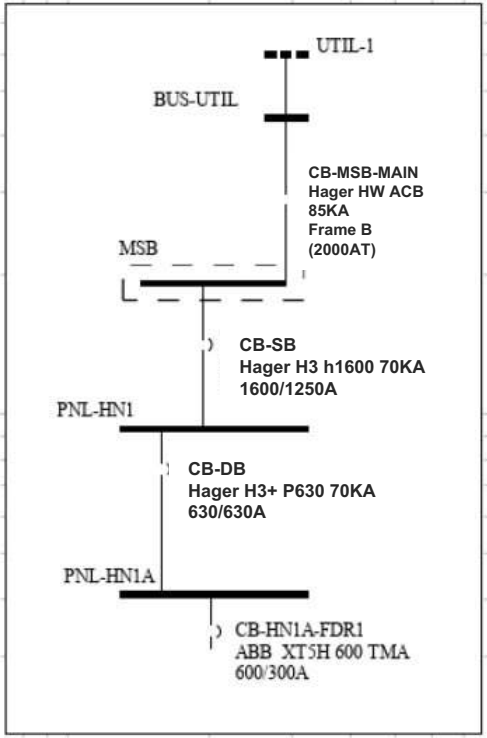

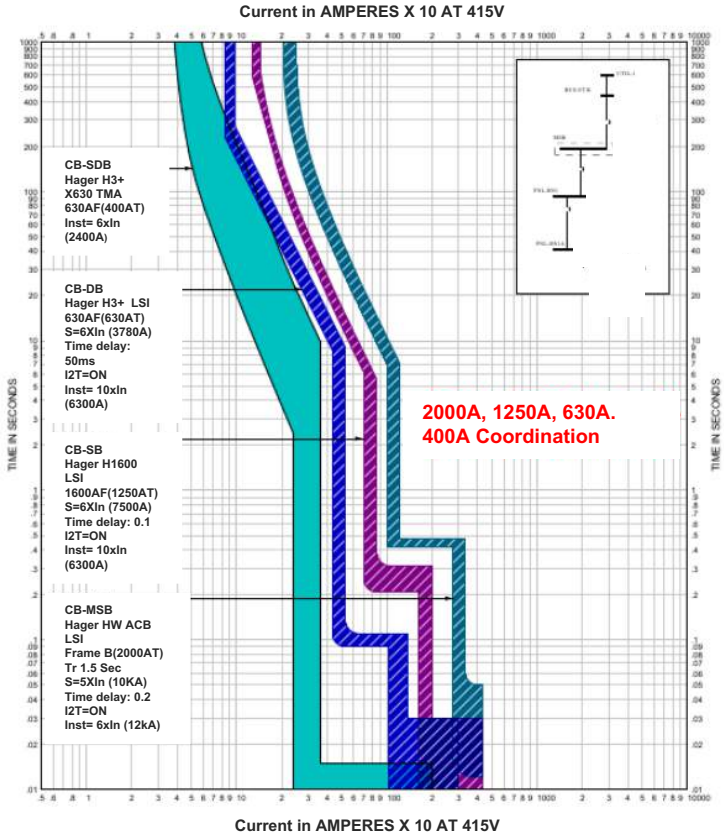

Energy distribution

Power at all times

- 40A to 630A
- Automatic switching
- Complete with controller
- Suitable for single and three-phase installation





Goal – Mục tiêu

- Reliability of Power at all times.
- *Đảm bảo nguồn điện luôn ổn định mọi lúc*
- Emergency and Safety.
- *Khẩn cấp và An toàn*

Benefit – Lợi ích

- Single- and three-phase 40A to 630A 4P with controller.
- *Dòng điện 1 pha và 3 pha, dải dòng từ 40A đến 630A, loại 4 cực (4P) tích hợp bộ điều khiển.*
- Flexibility and reliability for small to mid-sized critical installations
- *Sự linh hoạt và độ tin cậy cao dành cho các hệ thống trọng yếu có quy mô từ nhỏ đến trung bình*
- Ease of wiring and use.
- *Dễ dàng đấu nối dây và sử dụng.*

SAFETY-QUALITY-COMP

Hager Products

Auto transfer Switch





01

Three safe and stable positions :
I – 0 – II



02

Compact and simple switch structure, easy to install



03

Three control modes can be set at any time:
– Auto mode
– Manual mode
– Padlocked mode



04

Simple and fast commissioning, for single- or three-phase installation with 2 preset over-voltage and frequency monitoring. Din-rail or panel mounted. Dual power supply integrated.

Features



- **Automatically detect fault status of any power supply and can be set for wide type of networks**
- *Tự động phát hiện trạng thái lỗi của bất kỳ nguồn cấp điện nào và có thể cài đặt cho nhiều loại mạng điện khác nhau*

- Monitoring of the availablilty of Normal and Alternate source

- *Giám sát mức độ sẵn sàng của nguồn điện Thường (nguồn chính) và nguồn điện Thay thế (nguồn dự phòng)*

- **Efficient and simple, Fast commissioning:**
- **Hiệu quả và đơn giản, đưa vào vận hành nhanh chóng:**
  - **Din rail & door mounting**
  - *Lắp ráp trên thanh DIN & gắn trên cánh tủ*
  - **Integrated double power supply**
  - *Tích hợp bộ nguồn đôi*
  - **Single phase or 3 phase**
  - *Hệ thống 1 pha hoặc 3 pha*
  - **Monitoring rotation phase**
  - *Giám sát thứ tự pha*
  - **Monitoring voltage: 10% or 20% thresholds**
  - *Giám sát điện áp: theo các ngưỡng 10% hoặc 20%*
  - **Monitoring Frequency: 50/60Hz (5% or 10% thresholds)**
  - *Giám sát tần số: 50/60Hz (theo các ngưỡng 5% hoặc 10%)*
  - **Pre-setted Transfer time + return time**
  - *Thời gian chuyển đổi và thời gian phục hồi được cài đặt sẵn.*
  - **Genset tests on load**
  - *Chạy thử máy phát điện có mang tải*

Enhance final circuit protection
Tăng cường bảo vệ mạch cuối cùng

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Enhanced protection - Energy distribution
Tăng cường bảo vệ - Phân bổ năng lượng

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Goal – Mục tiêu

- **Safety without compromise**
- *An toàn tuyệt đối*
- **Highly reliable**
- *Độ tin cậy cao*
- **End to end solution**
- *Giải pháp toàn diện*
- **User friendly**
- *Thân thiện với người dùng*

Benefit – Lợi ích

- **Lower system stress - Energy Limiting Class 3**
- *Giảm áp lực lên hệ thống - Năng lượng giới hạn Class 3*
- **RCCBs with anti-nuisance tripping**
- *RCCB có khả năng chống nhảy điện*
- **Flexibility - Line Load reversibility**
- *Tính linh hoạt - Cho phép đảo ngược đường dây tải*
- **Safety - Suitable for Isolation**
- *An toàn - Phù hợp cho việc cách ly*
- **User friendly – RCCB and RCBO with separate Earth Fault indication**
- *Thân thiện với người dùng – RCCB và RCBO có đèn báo sự cố chạm đất riêng biệt*

Enhanced protection
Types of electrical fire risks

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Electrical fires can be caused by a number of malfunctions:

01



Short-circuits and overloads

MCBs

02



Leakage currents

RCDs

03



Lightning

SPDs

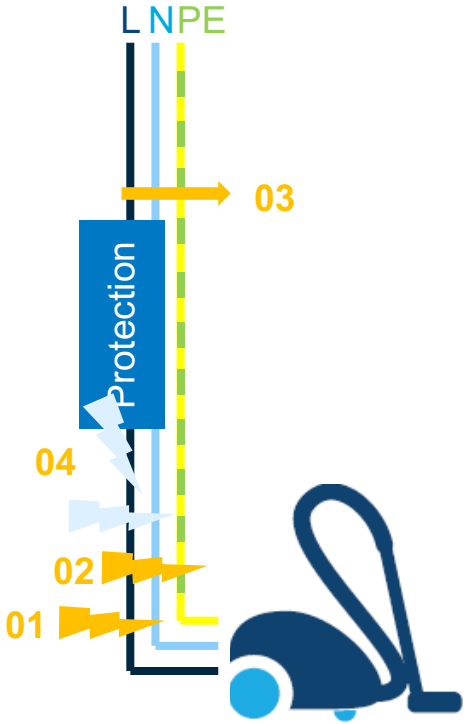
04



Dangerous electric arcs

AFDDs

AFDD : Arc Fault Detection Device
“device intended to mitigate the effects of arcing faults by disconnecting the circuit when an arc fault is detected » (acc.to IEC62606)



Selection of circuit breaker - MCB

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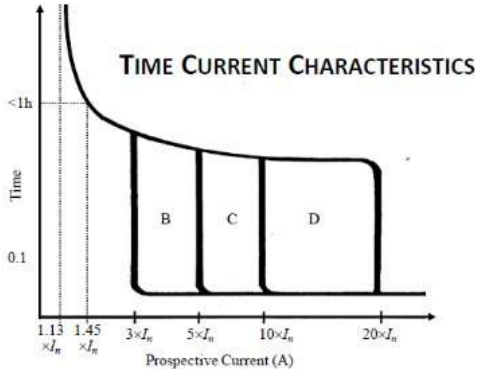
Summary of types of MCB



TRIPPING CHARACTERISTICS FOR MCB TYPES B, C AND D.

TYPE	THERMAL			MAGNETIC			TYPICAL APPLICATIONS
	NON-TRIP	TRIP	TIME	NON-TRIP	TRIP	TIME	
	I_1	I_2	t	I_4	I_5	t	
B	$1.13 \times I_n$		> 1h	$3 \times I_n$		≥ 0.1s	General purpose use
		$1.45 \times I_n$	< 1h		$5 \times I_n$	< 0.1s	
C	$1.13 \times I_n$		> 1h	$5 \times I_n$		≥ 0.1s	Commercial and industrial applications
		$1.45 \times I_n$	< 1h		$10 \times I_n$	< 0.1s	
D	$1.13 \times I_n$		> 1h	$10 \times I_n$		≥ 0.1s	Applications with high inrush currents (e.g. transformer, welding machine)
		$1.45 \times I_n$	< 1h		$20 \times I_n$	< 0.1s	

Special features of MCB
Types of electrical fire risks

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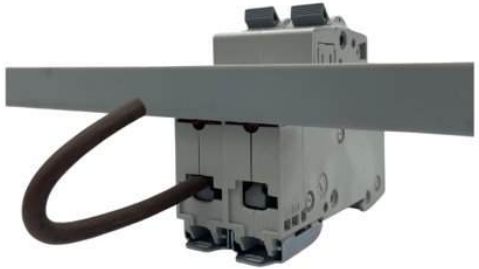
Separate busbar connection (Using forked busbar)

:hager



Fork busbar separated from cable connection

BEST CONNECTION



Pin busbar combined with cable connection

Special features







Cable:
- behind clamp

Cable guide
- no error

RCDs

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SS638: 2018

RCDs: a mechanical device intent to cause the opening of the contact when the residual currents attains a given value under specific condition



RCCB



RCBO



ELR

Types of RCCB

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Type AC
General purpose use

RCD can detect & respond to AC sinusoidal wave only.

Type A
Equipment incorporating electronic components

RCD can detect & respond the same as Type AC
+ pulsating DC components.

Type F
Equipment with frequency controlled speed drives

RCD can detect & respond the same as Type A
+ high frequency residual current.

Type B
Electric vehicle chargers, PV supplies

RCD can detect & respond the same as Type F
+ smooth DC residual current.





For training purpose only. Please do not distribute.

Types of RCCB

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A (Propose replacement from type **AC** to type **A**)	 **AC** with pulsating DC	Propose replacement from type **AC** to type **A**. (For residential application) Single Phase **with** DC electronic component. Example: - • Inverter Washing machine • Inverter Air conditioner • Inverter Refrigerator • Computer • LED light • Electric Vehicle (EV) charging only if the smooth DC fault current is < 6mA

Different Types of RCCB



Type	Symbol	Application
AC (Most common, General purpose)	 **AC**	Most common general purpose with limited protection. (For residential application) General purpose **without** any DC electronic component. Example: - • Water Heater • Halogen bulb • Water Pump (Non-Inverter) • Incandescent bulb

on indent order basis

F (For very high frequency equipment)		include type **AC** & **A**, and equipment with higher frequency. Example: Equipment with external VSD (Variable Speed Drive) such as big motors for chiller, sewerage pump, swimming pool, fountain, etc.
B (For EV charger & Solar power)		include type **AC** , **A**, **F**, and single or three phase Variable Speed Drive (VSD). Example: - Specifically for EV & Solar where the smooth DC fault current is > 6mA & other industrial equipment's such as Crane, UPS, etc.

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Special Features of RCCB

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1. PCI
2. Trip indicator
3. IP20
4. Cable guide
5. Built-in “Nuisance Tripping F
6. Accessories
   - Aux contact & alarm contact
   - Shunt trip
   - Under Voltage coil











Closer look inside : RCBO

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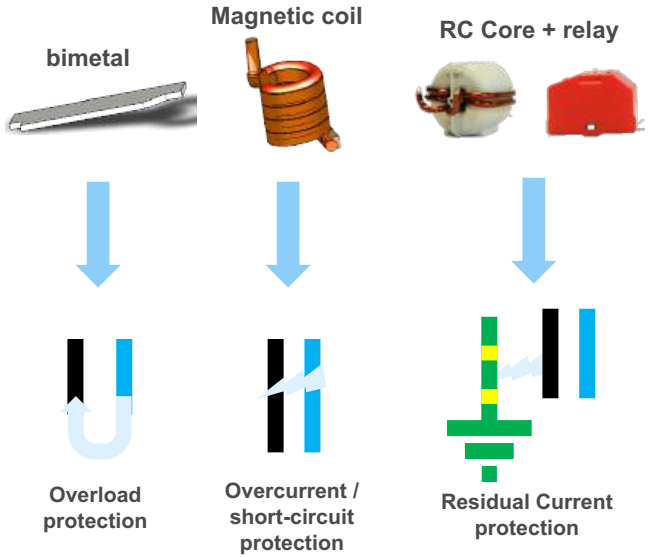


Residual Current circuit Breaker with Over-current protection (Electromechanical protection)

\+

MCB



=

RCBO

- Recommend to each individual circuit so that any faults will not affect other functionality

RCBO

Keep good habits



Bi-connect terminals enable supply from either cables in the cage or busbars in the slot; allowing full connection capacity.

Easier, safer, faster

01
Extra space when wiring
Reduced height allows more wiring space in the enclosure (up to 20% extra in Golf enclosure)

02
Electrically Bi-directional

03
Switched Neutral



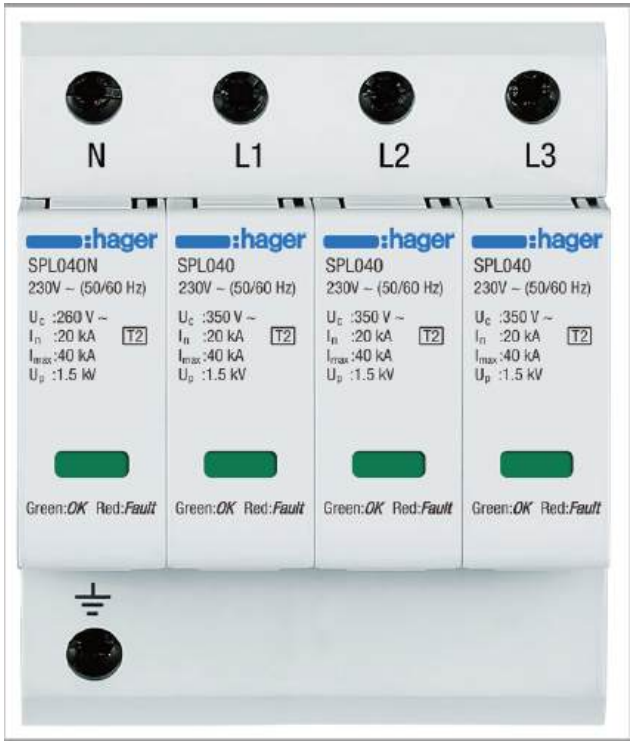


04
Insulation resistance test is faster to perform

05
Built in fault trip indicator

Surge Protection

Energy distribution



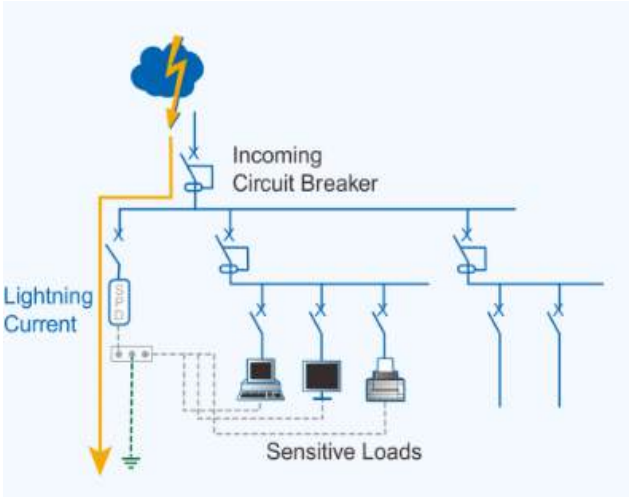
Goal – Mục tiêu

- Safety for equipment
- An toàn cho thiết bị
- User friendly
- Thân thiện với người dùng

Benefit – Lợi ích

- Protection against transient overvoltages due to lightnings or switchings.
- Bảo vệ chống lại quá điện áp tức thời do sét đánh hoặc do đóng cắt
- Easy to install
- Dễ dàng lắp đặt
- Safety - Indication of end of life
- An toàn - Chỉ báo hết tuổi thọ hoạt động

Working Principal of SPD
Nguyên lý hoạt động



During normal operation, the SPD act as an **open circuit** and maintains the isolation between active conductors and earth.
Trong điều kiện hoạt động bình thường, thiết bị chống sét lan truyền hoạt động như một mạch hở và duy trì sự cách điện giữa các dây dẫn mang điện và đất.

When a voltage surge occur, SPD reduce impedance within a few nanoseconds and diverts the impulse current to the earth. The SPD behaves like a closed circuit.
Khi xảy ra quá điện áp (sét lan truyền), SPD giảm trở kháng trong vòng vài nano giây và chuyển hướng dòng điện xung xuống đất. Khi đó, SPD hoạt động giống như một mạch kín .

Once the impulse surge stopped, the SPD return to its original impedance and return to the open circuit.
Khi xung sét đã ngừng SPD trở lại mức trở kháng ban đầu và trở về trạng thái mạch hở.

Type of SPDs

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Lightning protection
Diverts the energy content of the lightning and reduces the residual voltage to values < 6,000 - 1,300 V.

- Type 1 SPD is characterized by a 10/350 µs current wave

- It protects electrical installations against direct lightning strokes. It can discharge the back-current from lightning spreading from the earth conductor to the network conductors - *Nó bảo vệ các hệ thống điện chống lại dòng sét đánh trực tiếp (direct lightning strokes). Nó có thể xả dòng điện ngược từ dòng sét lan truyền từ dây nối đất sang các dây dẫn của mạng điện*



Surge protection
Reduces the remaining overvoltage to values < 2,000 - 600 V. The overvoltage must not exceed 4,000 V.

- Type 2 SPD is characterized by an 8/20 µs current wave.

- The Type 2 SPD is the main protection system for all low voltage electrical installations. Installed in each electrical switchboard, it prevents the spread of overvoltages in the electrical installations and protects the loads - *SPD Loại 2 là hệ thống bảo vệ chính cho tất cả các hệ thống điện hạ thế. Được lắp đặt trong mỗi tủ điện, nó ngăn chặn sự lây lan của quá điện áp trong các hệ thống điện và bảo vệ các tải*



Socket surge protection for terminals
Reduces or secures the remaining overvoltage to values that are for end devices < 1,500 V.

- Type 3 SPD is characterized by a combination of voltage waves (1.2/50 µs) and current waves (8/20 µs).

- These SPDs have a low discharge capacity. They must therefore mandatorily be installed as a supplement to Type 2 SPD and in the vicinity of sensitive loads - *Những SPD này có khả năng xả dòng thấp. Do đó, chúng bắt buộc phải được lắp đặt như một thiết bị bổ sung cho SPD Loại 2 và đặt gần các tải nhạy cảm*

Selection of Type 1 SPD

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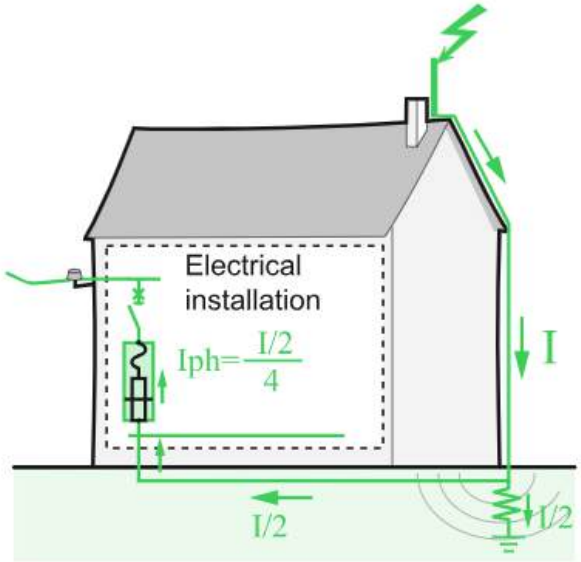
- The impulse current Iimp shall be at least 12.5 kA (10/350 µs wave) per branch in accordance with IEC 60364-5-534.

- Where regulations exist: standard IEC 62305-2 defines 4 levels: I, II, III and IV

– 1.27% of the lightning strikes are greater than 100 kA
– 0.33% of the lightning strikes are greater than 150 kA
– 0.1% of the lightning strikes are greater than 200 kA
– 0.03% of the lightning strikes are greater than 250 kA

Protection level as per EN 62305-2	External lightning protection system designed to handle direct flash of:	Minimum required Iimp for Type 1 SPD for line-neutral network	Application
I	200 kA	25 kA/pole	Higher risk, explosive area, power plant, data center
II	150 kA	18.75 kA/pole	Moderate strike risk, hospital, warehouse, telecom tower
III / IV	100 kA	12.5 kA/pole	Lower risk , house , office, industrial plant



Selection of Type 2 SPD

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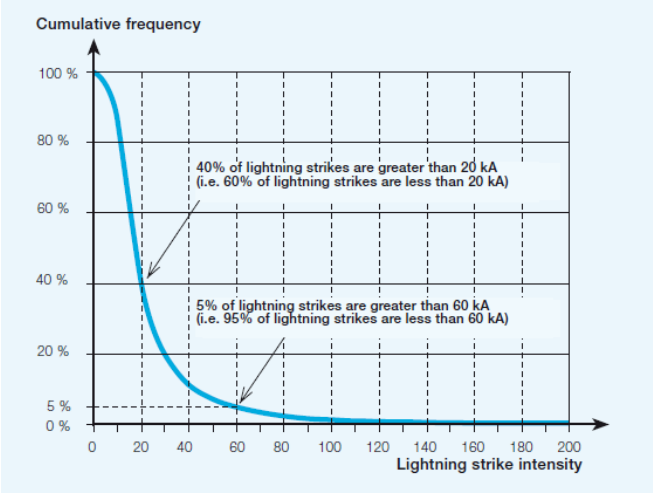
The maximum discharge current Imax is defined according to the estimated exposure level relative to the building's location.

The value of the maximum discharge current (Imax) is determined by a risk analysis

Exposure level			
Low	Medium	High	
Building environment	Building located in an urban or suburban area of grouped housing	Building located in a plain	Building where there is a specific risk: pylon, tree, mountainous region, wet area or pond, etc.
Recommended Imax value (KA)	20	40	65



Types of SPD

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Type 1 + 2 (Combined in a single device) (with lifetime indicator)													
Poles	**I_{imp} L-N**	**I_{imp} N-PE**	**I_n L-N**	**I_n N-PE**	**U_p kV**	**U_c V**	**Width (mm)**	**Single or Three phase**	**TNS**	**TNC-S**	**TT**	**Cat. Ref.**	**(with remote contact)**
2	12.5	25	25	25	≤ 1.5	350 V ac	35	Single	✓	✓	✓	-	**SPL212R**
4	12.5	50	25	50	≤ 1.5	350 V ac	70	Three	✓	X	✓	-	**SPL412R**
4	25	100	25	100	≤ 1.5	350 V ac	140	Three	✓	X	✓	-	SPA801
Class 2 (with lifetime indicator)													
2	-	-	10	20	≤ 1.3	350 V ac	35	Single	✓	✓	✓	**SPL220**	**SPL220R**
2	-	-	20	40	≤ 1.5	350 V ac	35	Single	✓	✓	✓	**SPL240**	**SPL240R**
2	-	-	35	65	≤ 1.5	350 V ac	35	Single	✓	✓	✓	**SPL265**	**SPL265R**
4	-	-	10	20	≤ 1.5	350 V ac	70	Three	✓	✓	✓	**SPNL420**	**SPL420R**
4	-	-	20	40	≤ 1.5	275 V ac	70	Three	✓	✓	✓	**SPL440**	**SPL440R**
4	-	-	35	65	≤ 1.9	275 V ac	70	Three	✓	✓	✓	**SPL465**	**SPL465R**
Class 3 (fine protection) (with lifetime indicator)													
2	-	-	-	-	-	-	-	-	✓	✓	✓	-	-
PV Applications (dc side) (with lifetime indicator)													
3	-	-	15	40	≤ 3.7	1000 V dc	52.5	-	-	-	-	**SPV340**	-

Contactors

Energy distribution





Goal – Mục tiêu

- AC1 & AC3 for different application
- *AC1 & AC3 cho ứng dụng khác nhau*
- Full range
- *Dải sản phẩm đầy đủ*

Benefit – Lợi ích

- Made in France
- *Sản xuất tại Pháp*
- Easy to install
- *Dễ dàng lắp đặt*
- Humfree
- *Vận hành êm ái, không gây tiếng ồn*
- Full range with overload relay for AC3 contactor
- *Dải sản phẩm đầy đủ đi kèm rơ le nhiệt cho khởi động từ AC3*
- Selection chart for easy selection.
- *Biểu đồ chọn lọc giúp dễ dàng lựa chọn sản phẩm*

Selection for AC3 Application

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MOTOR STARTERS
CONTACTORS & TORs SELECTION GUIDE

	MOTOR		DOL		STAR - DELTA				
	415V	FLC	KM1	TOR	KM1		KM2 & KM3		TOR
NO	KW	(A)	REF.	REF.	3	REF.	1.732	REF.	REF.
1	0.37	1.1	EW007	EWT015B	0.37	EW007	0.64	EW007	EWT007B
2	0.55	1.4	EW007	EWT021B	0.47	EW007	0.81	EW007	EWT010B
3	0.75	1.8	EW007	EWT027B	0.60	EW007	1.04	EW007	EWT015B
4	1.1	2.6	EW007	EWT036B	0.87	EW007	1.50	EW007	EWT021B
5	1.5	3.5	EW007	EWT050B	1.17	EW007	2.02	EW007	EWT027B
6	2.2	4.7	EW007	EWT060B	1.57	EW007	2.71	EW007	EWT036B
7	3	6.3	EW007	EWT085B	2.10	EW007	3.64	EW007	EWT050B
8	3.7	7.5	EW009	EWT085B	2.50	EW007	4.33	EW007	EWT050B
9	4	8.2	EW009	EWT085B	2.73	EW007	4.73	EW007	EWT060B
10	5.5	11.1	EW012	EWT112B	3.70	EW007	6.41	EW007	EWT085B
11	7.5	14.9	EW016	EWT118B	4.97	EW007	8.60	EW009	EWT112B
12	9	17	EW020	EWT118B	5.67	EW007	9.82	EW012	EWT112B
13	11	21.2	EW020	EWT124B	7.07	EW009	12.24	EW016	EWT112B
14	15	28	EW032	EWT132C	9.33	EW012	16.17	EW020	EWT118B
15	18.5	33.7	EW040	EWT140C	11.23	EW012	19.46	EW020	EWT124B
16	22	39.5	EW050	EWT150D	13.17	EW016	22.81	EW025	EWT124B
17	25	47	EW050	EWT150D	15.67	EW016	27.14	EW030	EWT132C
18	30	53	EW050	EWT165D	17.67	EW020	30.60	EW032	EWT132C
19	33	60	EW063	EWT165D	20.00	EW020	34.64	EW038	EWT140C
20	37	64	EW070	EWT180D	21.33	EW025	36.95	EW038	EWT140C
21	40	71	EW070	EWT180D	23.67	EW025	40.99	EW050	EWT150D
22	45	77	EW100	EWT180D	25.67	EW032	44.46	EW050	EWT150D
23	51	90	EW100	NA	30.00	EW032	51.96	EW050	EWT165D
24	55	93	EW100	NA	31.00	EW040	53.70	EW050	EWT165D
25	59	105	EW120	NA	35.00	EW040	60.62	EW063	EWT165D
26	63	115	EW150	NA	38.33	EW040	66.40	EW070	EWT180D
27	75	127	EW150	NA	42.33	EW050	73.33	EW100	EWT180D
28	80	138	EW150	NA	46.00	EW050	79.68	EW100	EWT180D

EW055



EW064



EW070







Projects References
Dự Án Tham Khảo

04

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Hager MSG Project References

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Food Vision @ Mandai


601 RIFFLE RANGE


Jalan Tukang Dormitory


PROJECT JLT5 Jurong Island

No.	Project Listing (Singapore)	Type	Rating	Product offer	Year
1	Technical research center (601 riffle range)	Commerical	2500A	MSB+SB+DB	2025
2	Jalan Tukang Dormitory	Industrial	2500A	MSB+SB+DB	2025
3	COMMERCIAL Building (7 Changi South Lane)	Commercial	4000A	MSB+SB+DB	2025
4	PROJECT JLT5 AT 1 BANYAN PLACE,JURONG ISLAND (WESTERN ISLAND)	Industrial	2500A	MSB+SB+DB	2025
5	10 Story Factory at 19&21 Mandai ESTATE	F&B	2500A	MSB+SB+DB	2025
6	5000A Motorized ACB at changi Navel base	Government	5000A	ACB replacement	2025
7	Junying Secondary SCH	Commercial	2000A	ACB replacement	2025
8	Worldwide hotel management building	Commerical	1600A	ACB replacement	2025
9	PASOR RIS CAMP	Industrial	1600A	ACB replacement	2025
10	Spring field Primary SCH	Commerical	1600A	ACB replacement	2025
11	ST HIDA'S SEC SCH	Commerical	1600A	ACB replacement	2025
12	POI CHING SCH	Commerical	1600A	ACB replacement	2025
13	Commerical building at 82 JOO KONG CIRCLE	Commerical	1600A	ACB replacement	2025
14	BLK 7004 TENGAH AIR BASE	Government	3200A	ACB replacement	2023
15	Holiday Inn-orchard	Commerical	2500A	New MSB	2024
16	6 boonlay AVE RIVER VALLEY High Sch	Sch	2500A	New MSB	2024
17	1600A MSB AT PASIR RIS CAMP	Government	1600A	New MSB	2024
18	1600A MSB LAKE SIDE Primary Sch	Sch	1600A	New MSB	2024
19	1600A MSB at 76 SENOKO Drive	Commerical	1600A	ACB replacement	2024
20	NIppon Paint 1 First Lok Yang Rd	Commerical	2500A	MSB+SB+DB	2024
21	DHL	Commerical	3200A	New MSB	2024
22	3200A MSB AT CAPITAL HUB	Commerical	3200A	MSB+SB+DB	2023
23	1600A MSB at Seleta Aerospace	Industrial	1600A	New MSB	2024
24	5000A MSB at changi Navel base	Government	5000A&below	ACB replacement	2024

SAFETY - QUALITY - COMPLIANCE

No.	Project Reference	Type	Rating	Product Refer	Year
1	Binh Duong Binh Duong Administrative Center	Government	4000A & Below	ACB+MCCB+FDB	2014
2	Binh Duong Hospital (1500 Beds)	Hospital	4000A & Below	ACB+MCCB+FDB	2014
3	Sokha Hotel (Phnompenh - Cambodia)	Hotel	4000A & Below	ACB+MCCB+FDB	2014
4	Sokha Hotel (Siem reap - Cambodia)	Hotel	4000A & Below	ACB+MCCB+FDB	2015
5	Pear Plaza	Commerical	4000A & Below	ACB+MCCB+FDB	
6	Diamond Island	Commerical	4000A & Below	ACB+MCCB+FDB	2019
7	Empire City	Commerical	4000A & Below	ACB+MCCB+FDB	
8	Mapletree Binh Duong	Industrial	2500A & Below	ACB+MCCB	2021
9	Metropole - M13	Commerical	4000A & Below	ACB+MCCB+FDB	2022
10	Radisson Resort Phan Thiet	Hotel	2000A & Below	ACB+MCCB+FDB	2022
11	Fusion - Phase 3	Industrial	2500A & Below	ACB+MCCB	2023
12	HIIVE	Industrial	2500A & Below	ACB+MCCB	2023
13	Mapletee Bac Ninh	Industrial	2500A & Below	ACB+MCCB	2023
14	BW Bau Bang	Industrial	2500A & Below	ACB+MCCB	2024
15	Urban Green	Commerical	3200A & Below	ACB+MCCB+FDB	2024
16	Mapletee Bac Giang (P1,2,3)	Industrial	2000A & Below	ACB+MCCB	2023-2025
17	Mapletee Thuan Thanh (P1,2,3)	Industrial	2500A & Below	ACB+MCCB	2024-2025
18	Ixora II	Commerical	4000A & Below	ACB+MCCB	2025
19	Eaton Park - 1	Commerical	4000A & Below	ACB+MCCB+FDB	2025





Metropoles
M13 Thủ Thêm

- MSB - 4000A – 2500A
- ACB : 98 pcs
- MCCB :
- MCB, RCBO, CONTACTOR, DB
- WA

Partner :
Đạt Vĩnh Tiến

Metropole M13

Owner: **Son Kim Land**

Consultant: **JRP –** J. Roger Preston

Project Standard**: LEED GOLD**

Switchboards Manufacturer: **Đạt Vĩnh Tiến**

Complex:

Chung cư 15-20USD/m2

Văn phòng cho thuê hạng A+

Hiện nay khoảng 5 năm vẫn trong trình trạng hoạt động ổn định.

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Ixora Hồ Tràm phase 2

Partner: **Vietpower**

- **MSB - 4000A-2500A-1600A**
- **ACB – 32 pcs**
- **MCCB – 980pcs**
- **MCB, RCBO, CONTACTOR, …**

Ixora Hồ Tràm

Owner: **VinaCapital**

Consultant: Fusion

Switchboards Manufacturer

Vietpower

Project Kind:

Resort biển 5 sao



Highlight 5 Projects # 10 Years

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- **Binh Duong Administrator Center**
- **Pearl Plaza**
- **Diamond Island**
- **Sea Links City (Resort Phan Thiet)**
- **Mien Dong Hospital (1500 beds)**



GAMUDA LAND

- Celadon City
- Eaton Park
- 10,000 apartments





Bình Dương Administrator Center

- MSB – 4000A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



Pearl Plaza

- MSB – 4000A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



Diamond Island

- MSB – 4000A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



Sea Link City Phan Thiết

- MSB – 4000A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



Mien Dong International Hospital

- MSB – 4000A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



BW Industrial Bau Bang

- MSB – 2500A & below
- ACB: 250 pcs



Mapletree
10 Projects

- MSB – 2500A & below
- ACB



Empire City

- MSB – 4000A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



Hiive

- MSB – 2500A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



Radission Phan Thiet

- MSB – 2000A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



Nguồn: https://angialand.com.vn/urban-green.html

Urban Green

- MSB – 3200A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …



Eaton Park

- MSB – 4000A
- ACB
- MCCB
- MCB, RCBO,
- CONTACTOR, …

Hager LV Components

Better buildings
Better tomorrows

- Safety - An toàn
- Quality - Chất Lượng
- Compliance - Đáp ứng

Hager Team + Partners

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- Compact - Tinh Gọn
- Effective - Hiệu Quả
- Quick decisions

  Quyết định nhanh cho dự án

Thanks!

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