



Compact Unit Substation

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24kV SF₆ insulated RMU + 500 kVA Distribution Transformer + LV compartment



Ring Main Unit

LBS

LBS

Metering unit

Accuracy: $\pm 1.0 \%$

LBS w/ HRC Fuse

Distribution Transformer

24 kV

416/240 V

500 kVA

KNAN

Dyn1

Low Voltage Compartment

Incoming
MCCB $\times 1$

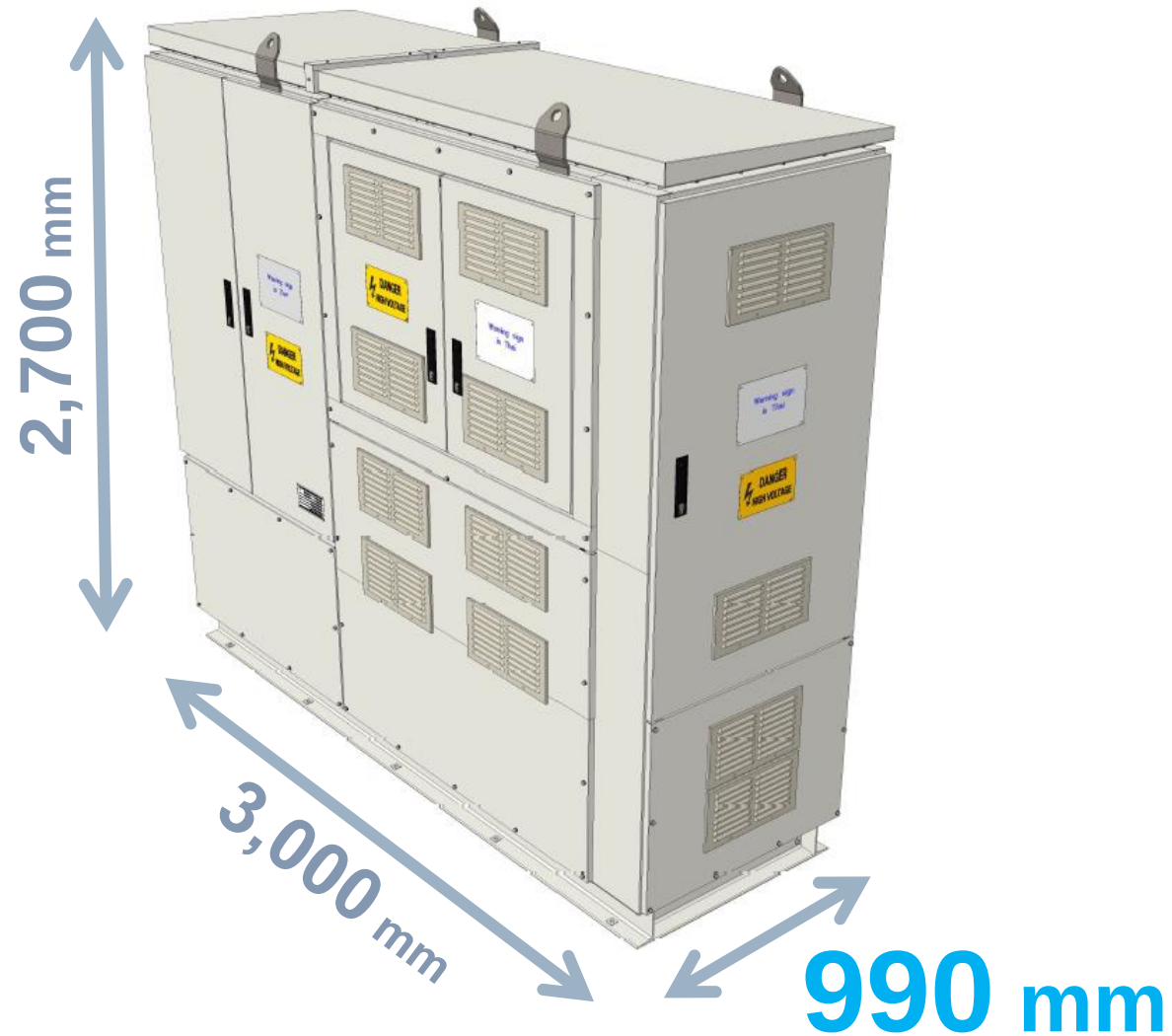
Voltmeter

Accuracy: $\pm 1.5 \%$

Outgoing
MCCB $\times 6$

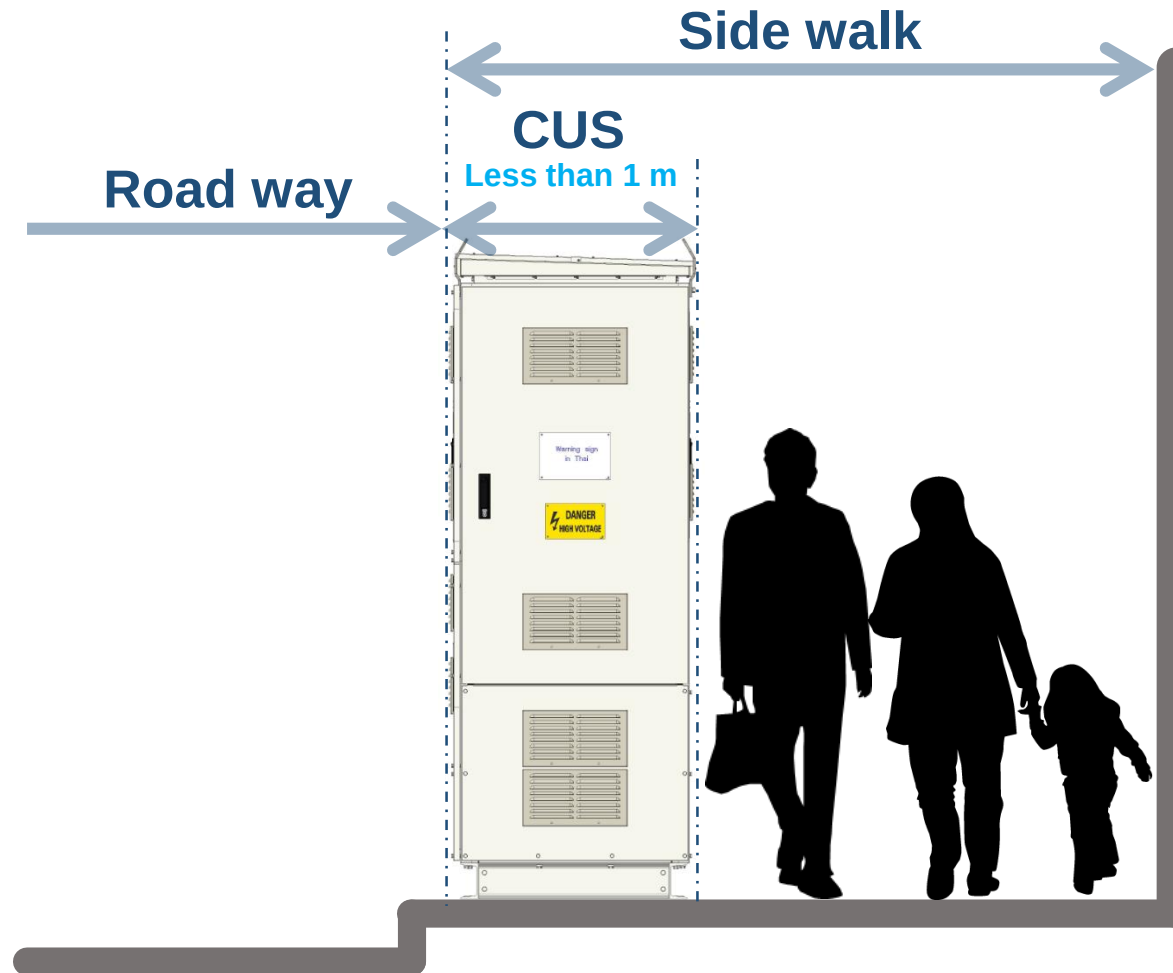
Ammeter w/ Demand indicator
Accuracy: $\pm 1.0 \%$ / $\pm 3.0 \%$ /

The Slim Size Advantage



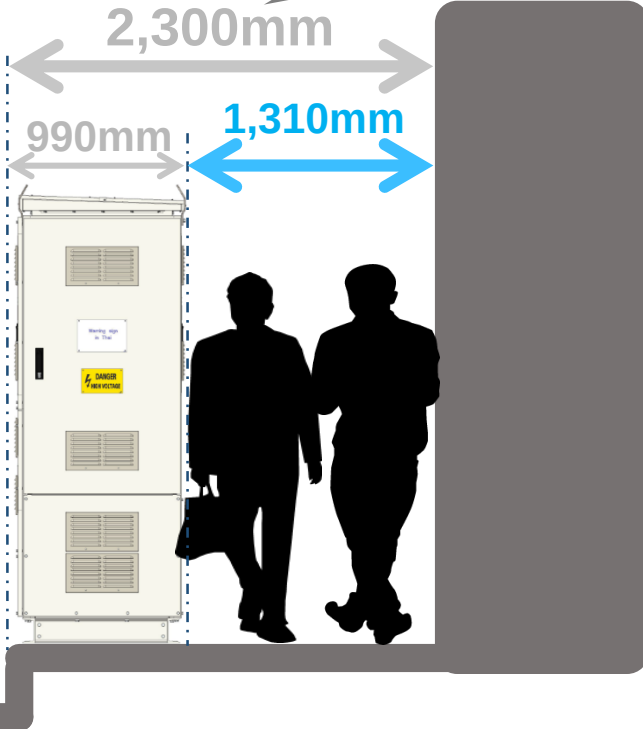
Total mass: 5,000 kg

Secure a space for pedestrians

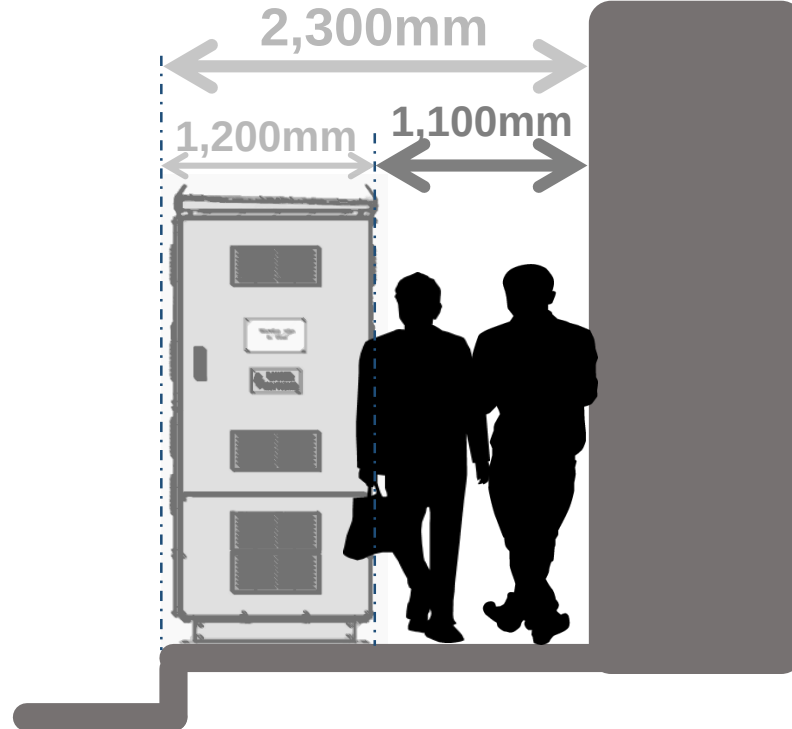


The Slim Size Advantage

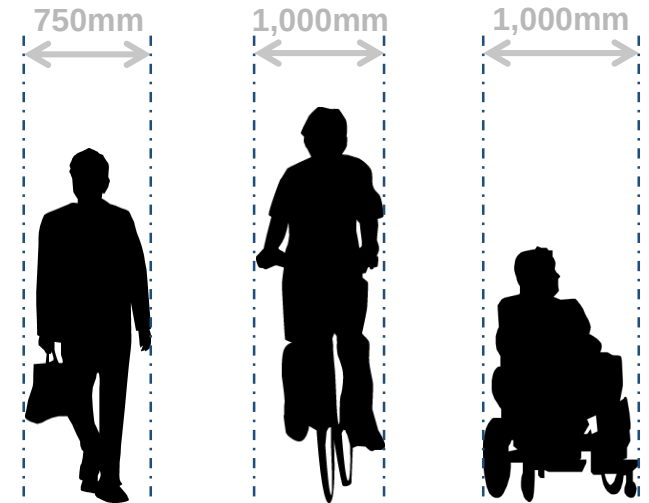
Typical minimum width in an urban area.



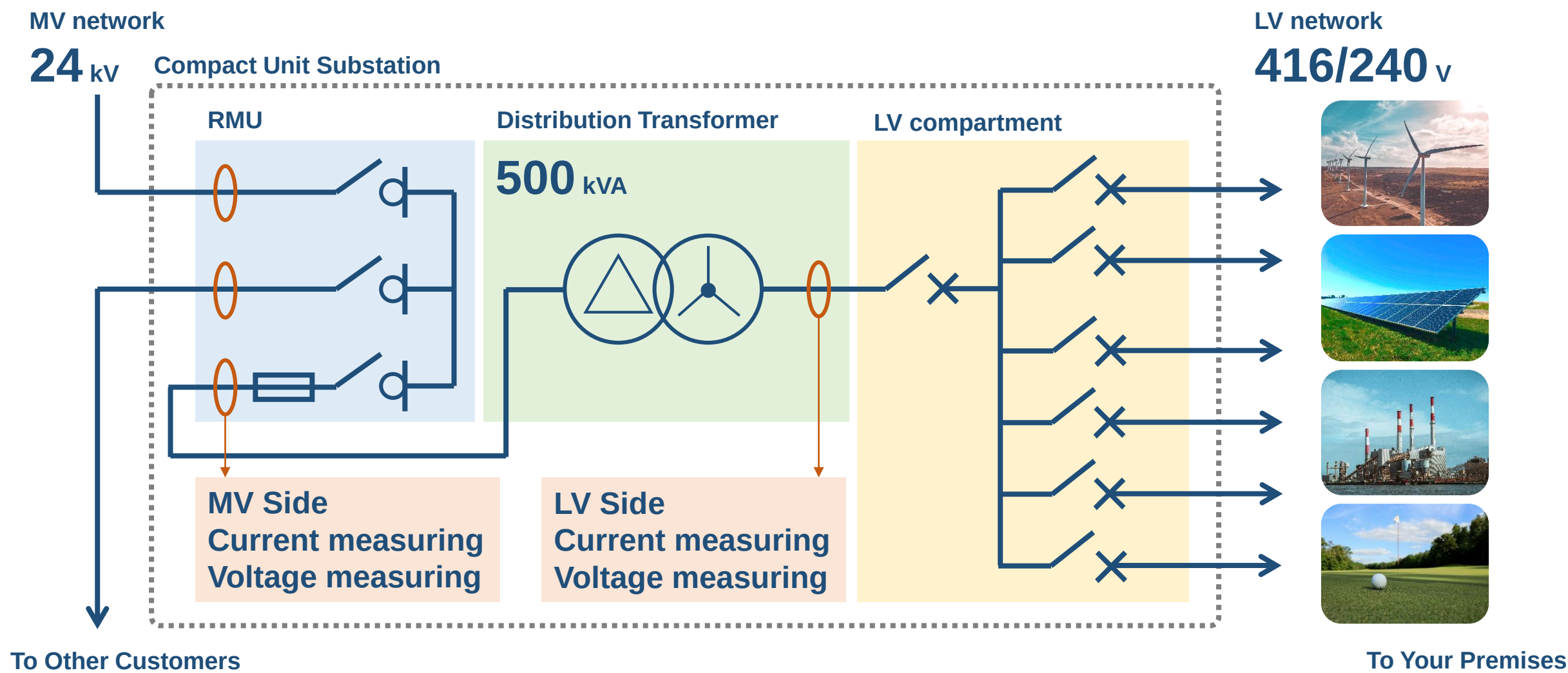
CUS type III



Other types



ALL-IN-ONE Package



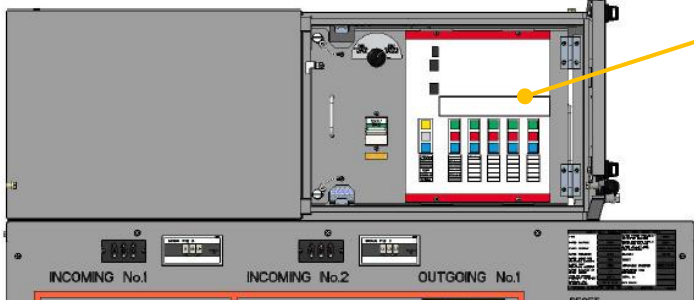
Reliable Support for The Product



We, **Togami** manufacture CUS in cooperation with **PRECISE**.

SCADA-Ready RMU

Controller of RMU



INGEPAC™ DA PT by *Ingeteam*

Multifunction protection IED

Functions

Overcurrent, voltage, power and frequency functions

Motor protection functions

51LR locked rotor, **37, 66**,
Inhibition due to excessive number of pick-ups,
48 protection against excessive starting times

Native platform

IEC 61850

PRP, HSR and link failover redundancy

Automatisms, logics

IEC 61131-3

Cybersecurity features

sFTP, HTTPs, firewall, audit log,
Password accessing

Slave protocol

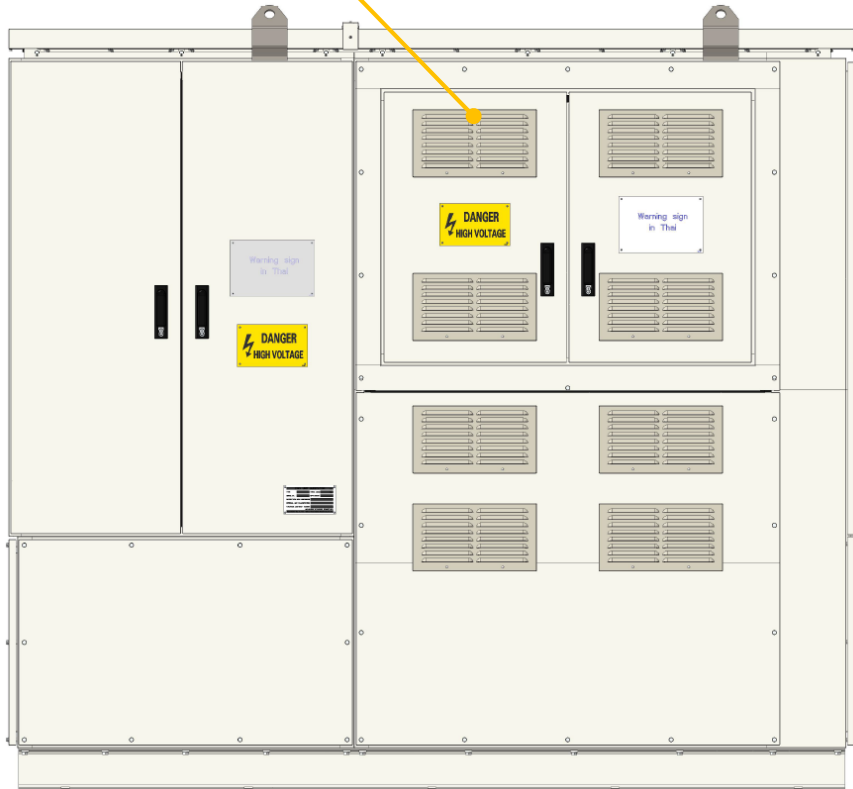
IEC 61850, DNP3.0,
IEC 870-5-103, PROCOME

[Feeder protection relay](#) | [INGEPAC™ DA PT product range](#) | [Ingeteam](#)

High-Efficiency Ventilation System

The rated class of the enclosure complies with **Class 15**.

Ventilation louvers



Temperature rise test result

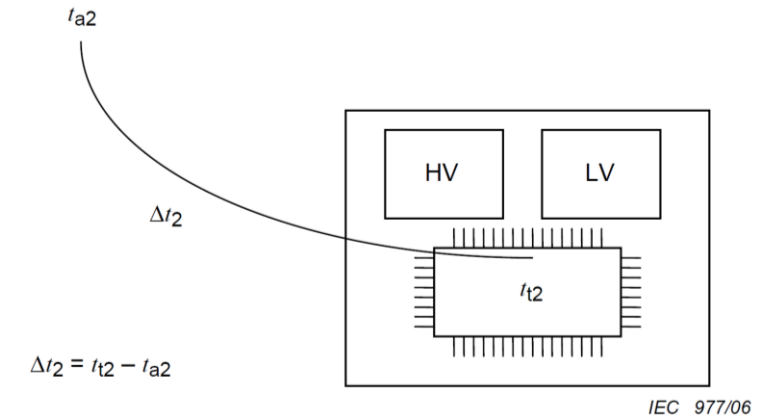
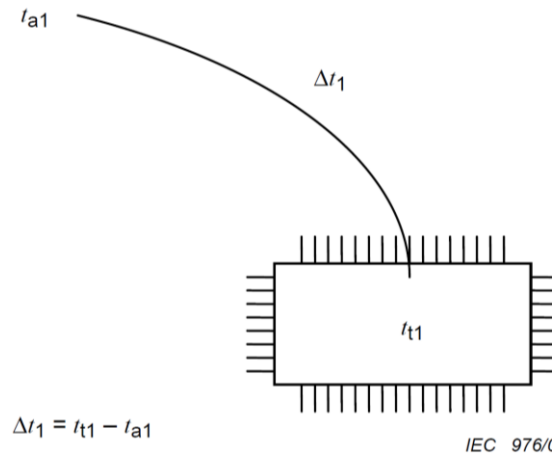
Temp. rise value
of the top oil of the transformer
[Applied total loss : 100 %]

Δt_1 **45.7 K** [without the enclosure]

Δt_2 **58.8 K** [with the enclosure]

The class of the enclosure

$\Delta t_2 - \Delta t_1$ **13.1 K** < **Class 15**



Temperature rise tests for definition of The class of the enclosure
According to IEC62271-202

Protection Degrees (IP, IK degree)



Impact Protection **IK 10**

Weight
5.0 kg

Fall
400 mm

Energy
20 Joule



4
Protected against
A solid object ≥ 1 mm



Ingress Protection **IP 4 3**

3
Protected against
Water spray at 60°



1st digit
Degree of solid particle protection

2nd digit
Degree of liquid ingress protection

Heavy Duty Coating for The Enclosure



2-coat 2-bake coating	
Pretreatment	Zinc phosphate chemical conversion
Base coating	Epoxy-based powder coating
Top coating	Polyester-based powder coating
Min. coating thickness	80 μm
Munsell color system	5Y7/1 [Semi gloss]

Design test item (Partial list)	
Accelerated Weathering test [SWOM]	Test cycle (60 min)
	Light only :12 min
	Light and water splay :48 min
Test duration:2,000 h	
Cycle corrosion test	Test cycle (60 min)
	Hot water immersed (95°C) :30 min
	Cold water immersed (5°C) :30 min
Test duration:360 h	
Neutral salt spray test [NSS]	Test cycle (8 h)
	Salt spray(2 h)→Drying(4 h)→Wetting(2 h)
	Salt concentration: 5%
Test duration:3,750 h	

The coating meets Togami internal criteria standard.

Internal Arc Safety Design

Our CUS is certificated in STL laboratory.(IEC62271-202 6.102)
The test is carried out 4 patterns [IAC-A,B and 2 arc ignition points]

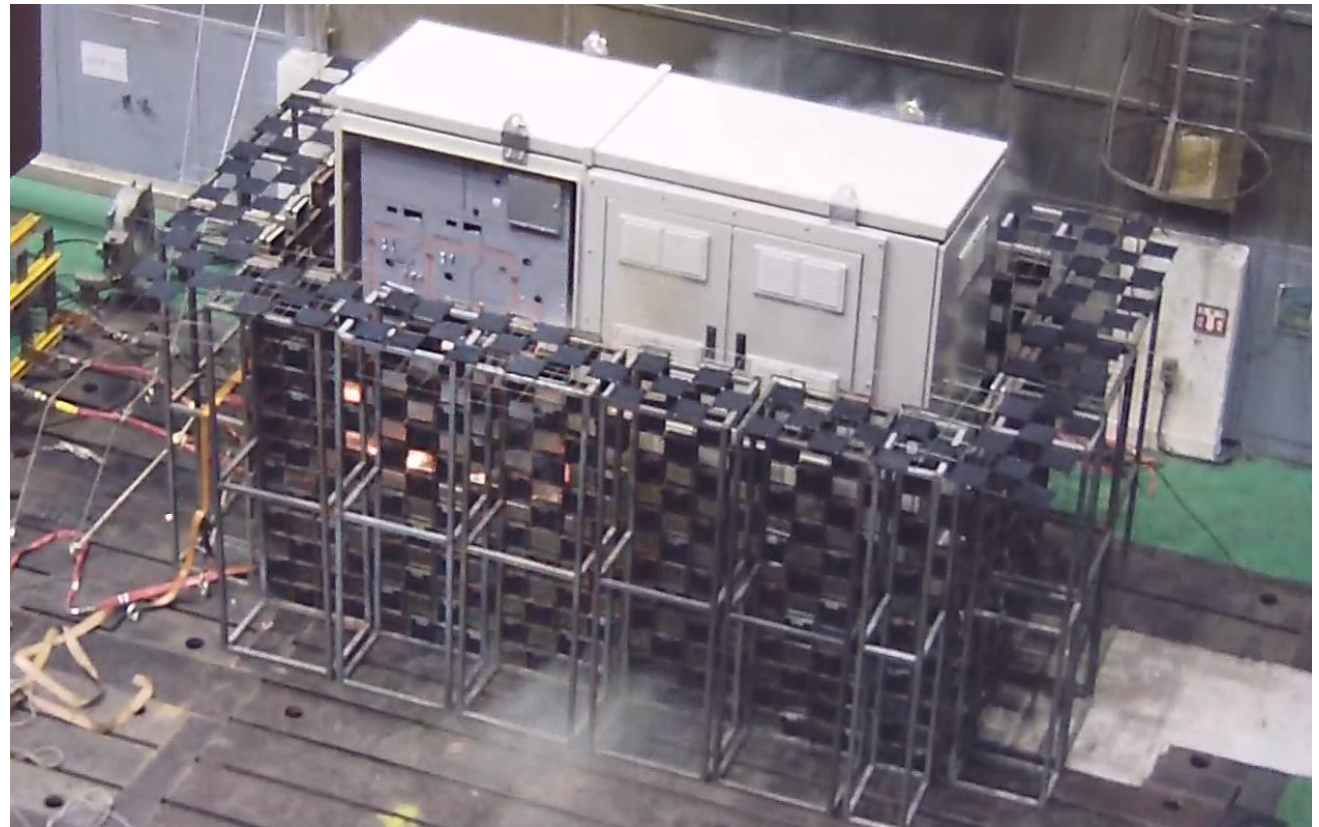
Test current	16 kA_{r.m.s}
Test duration	1 s
Internal Arc Classification	IAC-A, B
Arc ignition point	Point A: MV cable box in RMU Point B: Inside RMU



IAC-A
(Door open condition)

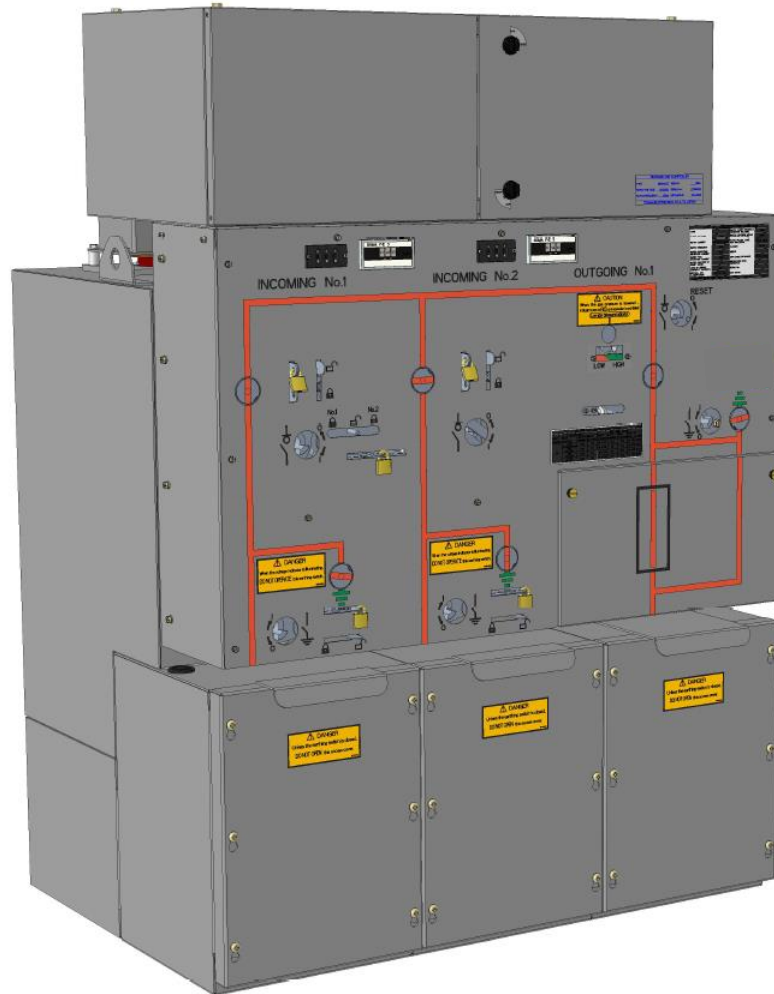


IAC-B
(Door closed condition)



16kA,1 sec. IAC-A(Door open condition)
Arc ignited in the cable compartment (CC)

Specification : Ring Main Unit



Rated voltage	24 kV
Rated current	630 A (2-IN), 200 A (1-OUT)
Rated frequency	50 Hz
Rated short time withstand current (LBS, ES)	16 kA_{r.m.s} 1 sec.
Rated short circuit making current (LBS, ES)	40 kA_{peak}
Rated power frequency withstand voltage	50 kV (Dry)
Lightning impulse withstand voltage	125 kV

Specification : Distribution Transformer



Rated primary and secondary voltage

24 kV / 416/240 v

Percent of rated voltage each tapping

-4×2.5 %

Connection symbol

Dyn1

Type of cooling

KNAN

Load loss at rated current (Max.)

4,200 w

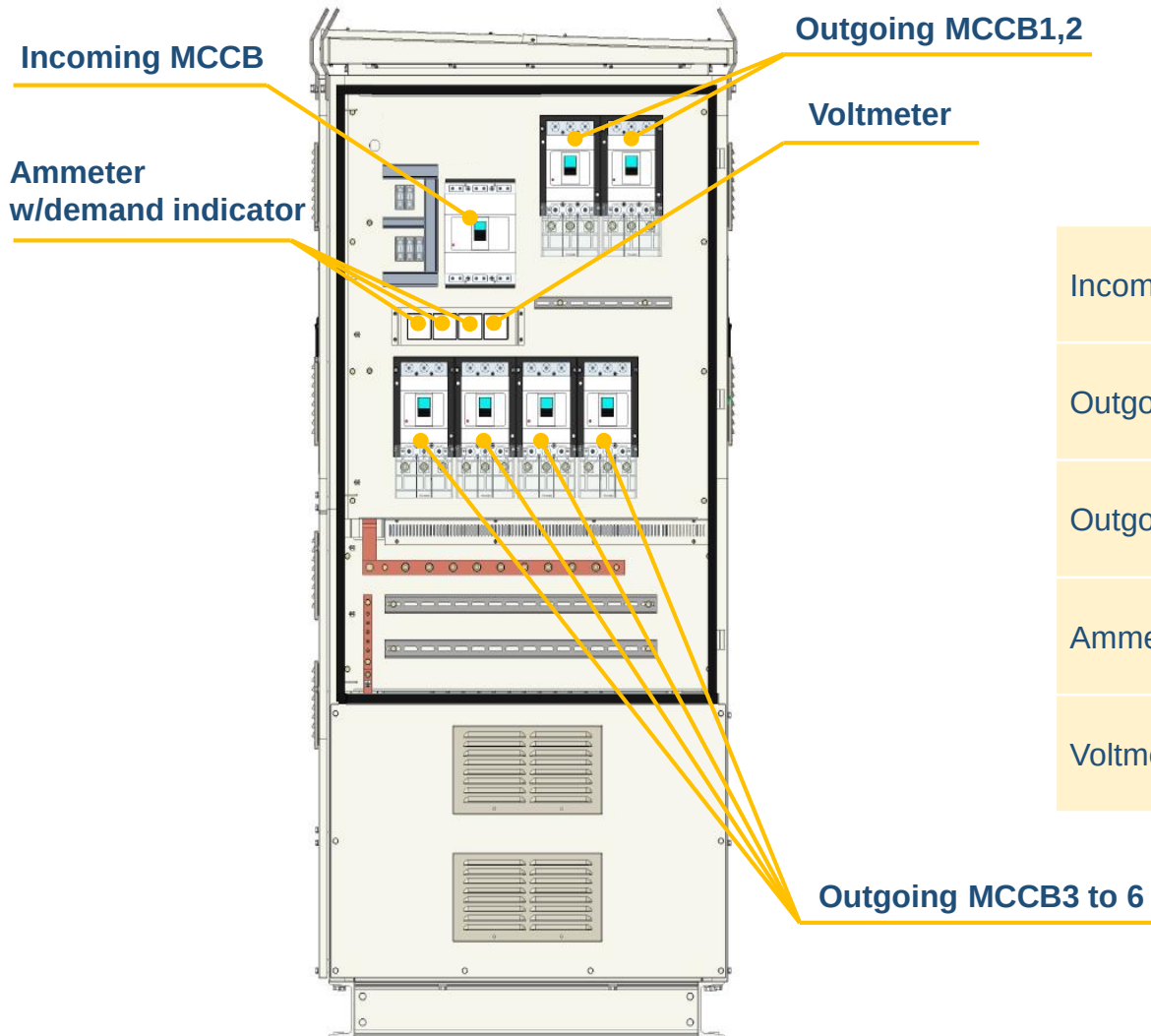
No load loss at rated voltage (Max.)

790 w

Impedance voltage at 75 °C

3.25 % or more

Specification : Low Voltage Compartment



Incoming MCCB

800AT/800AF

Outgoing MCCB 1 and 2

400AT/250AF

$I_{cu}=30\text{ kA}$ at 400V

Outgoing MCCB 3 to 6

400AT/400AF

$I_{cu}=30\text{ kA}$ at 400V

Ammeter w/ demand indicator_(15min. Delay)

±1.5 % / ±3.0 %

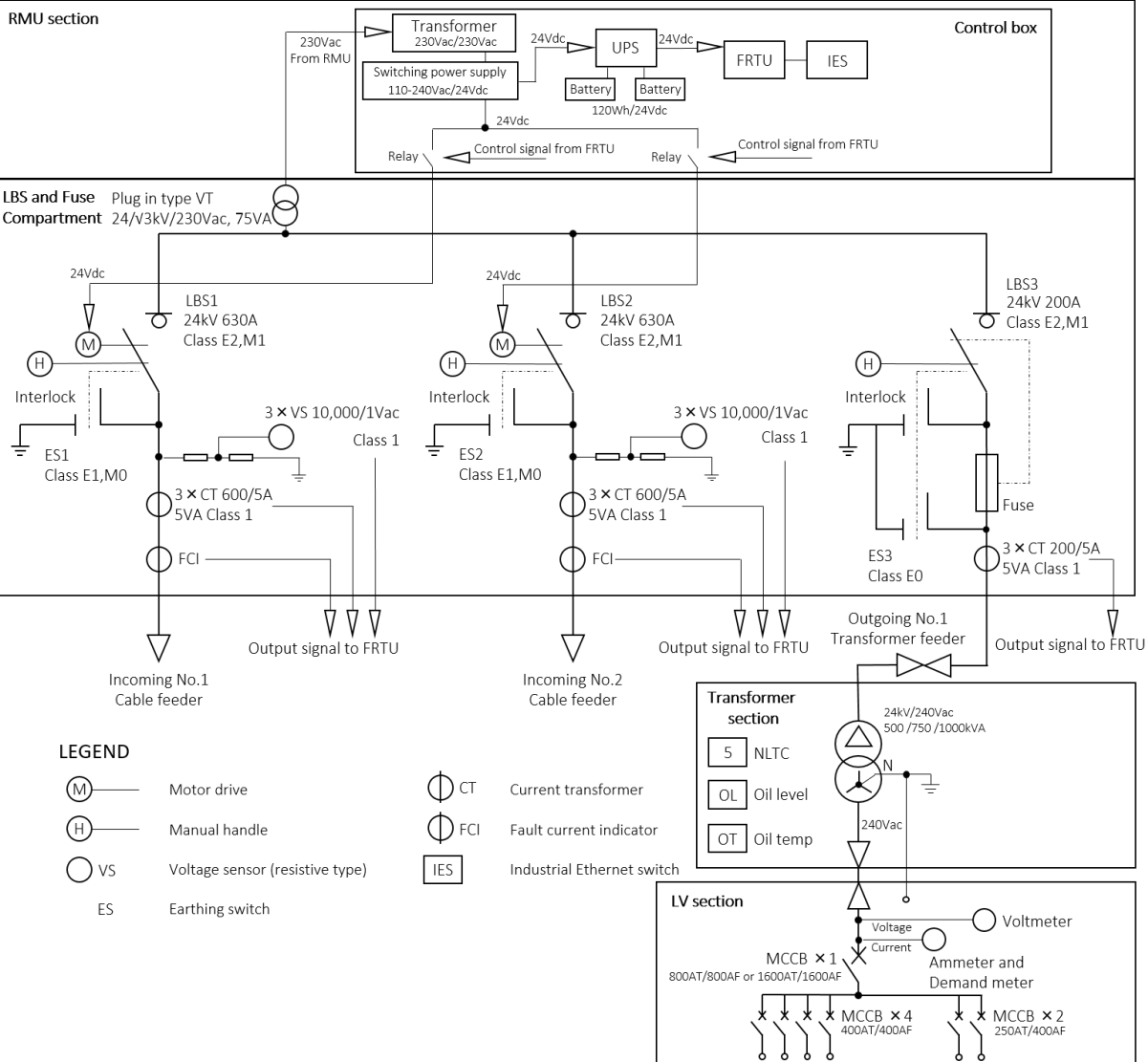
Voltmeter w/ selector switch

±1.5 %

Outgoing MCCB3 to 6

Single Line Diagram

Single line diagram of CUS [RMU with plug in voltage transformer]





**Make society, Earth, and
the future prosperous!**