



Compact Substation TNB

Model:	TNB
OEM and ODM Services:	Available
Enclosure:	PINEELE standard
Brand:	PINEELE, a Brand Under ZHENGXI
Form:	All- packaged Type
Scope of Application:	Suitable for industrial power distribution, voltage stabilization, and transformer protection. Widely used in commercial buildings, manufacturing plants, and utility substations.
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What Is a Compact Substation (TNB Type)?

A **Compact Substation (CSS)** is a fully enclosed prefabricated unit that integrates a **medium-voltage switchgear**, **distribution transformer**, and **low-voltage switchboard** into one weatherproof enclosure. The **TNB-compliant CSS** is specifically engineered to meet the design, safety, and installation requirements of **Tenaga Nasional Berhad (TNB)** — Malaysia's national electricity utility.



Used widely in Malaysia's power distribution system, TNB-style compact substations offer fast deployment, space efficiency, and reliable operation in urban, commercial, and industrial environments.

TNB Compact Substation Standards

Compact substations designed for use in TNB networks must comply with the following:

- **TNB Technical Guidebook (latest edition)**
- **IEC 62271-202** – High-voltage switchgear and controlgear – Prefabricated substation
- **IEC 60076** – Power transformers
- **TNB Specification No: TNBES 198, 201, 203** (project-dependent)
- **Suruhanjaya Tenaga (Energy Commission)** electrical safety code
- Local authority approvals (e.g., SIRIM, ST registration)



Typical Configuration of TNB Compact Substation

COMPONENT	DESCRIPTION
MV Switchgear	11kV SF6-insulated RMU (typically 3 or 4-way), TNB-approved brand
Transformer	315–1000 kVA, 11/0.433kV oil-immersed sealed type (ONAN)
LV Switchboard	Outgoing MCCBs, metering panel, CTs, and terminals for low-voltage loads
Enclosure	Compartmentalized mild steel or stainless-steel structure (IP54–IP65)
Ventilation	Natural or forced air, louvers, and filters
Cable Termination	Bottom-entry cable ducts, earthing bar and links
Protection	Surge arresters, protection relays, fault indicators
Lighting & Socket	Internal service lighting, 13A plug, exhaust fan (optional)

Standard Ratings

SPECIFICATION	VALUE
Rated Power	315 kVA / 500 kVA / 630 kVA / 1000 kVA
Primary Voltage	11 kV
Secondary Voltage	400/230 V
Frequency	50 Hz
Cooling	ONAN (Oil Natural Air Natural)
Insulation Class	Class A / B
Enclosure Protection	IP54 (minimum), IP65 (optional)
Temperature Rise	≤ 60°C on windings
Earthing	TN-S or TT system compliant

Design Features of TNB-Approved Compact Substation

- **Three-compartment structure** (MV, Transformer, LV) with individual access doors

- **Internal arc-tested RMUs** with SF6 insulation
- **Corrosion-resistant enclosure** with epoxy powder coating
- **HV & LV compartments separated by metallic barriers**
- **TNB-type lock and interlock systems** for safety
- **Forced-air ventilation optional** in high-load zones
- **Lifting hooks, base frame, and anti-vibration pads** for transport and installation
- **Pad-mounted or skid-mounted options** available



Application Areas

TNB Compact Substations are widely used in:

- Residential developments (terrace housing, condominiums)
- Commercial areas (malls, supermarkets, retail parks)
- Light industrial parks and SME zones
- Government facilities and schools
- **Urban substations** and transformer upgrading projects
- Renewable energy projects connected to the 11kV grid
- Temporary power supply in construction and mobile applications

Advantages of TNB Compact Substation

Space-saving: All-in-one design ideal for urban or limited-space environments

Quick Installation: Factory-assembled and pre-tested before delivery

TNB Compliance: Meets all utility specifications for fast approval

Safety Assured: Arc-proof, compartmentalized, and interlock-secured

Minimal Civil Work: Requires only a level concrete pad

Customization: Available with solar-ready features or hybrid modules

Low Maintenance: Sealed transformer and RMU reduce site servicing needs

Maintenance & Inspection

TNB recommends periodic inspection and maintenance to ensure substation reliability:

- Visual inspection of transformer tank, bushings, and oil level
- Cleaning of air vents and filters in the enclosure
- Infrared scanning of LV terminations (annually)
- Functional testing of MCCBs, relays, and indicators
- Oil dielectric strength (BDV) test every 3–5 years

Price Range in Malaysia (2024–2025)

As of current market estimates, a **TNB-compliant 315–1000 kVA compact substation** costs approximately:

RM 85,000 – RM 180,000


(subject to configuration, transformer rating, RMU brand, and materials)

The **Compact Substation TNB** type is the ideal solution for medium-voltage to low-voltage step-down transformation in Malaysia. Designed to meet TNB's strict standards, these substations offer reliable performance, compactness, and easy integration into residential, commercial, or light industrial zones.


With factory-tested modular design, built-in safety features, and full compliance with TNB and IEC requirements, compact substations are the smart choice for modern power distribution infrastructure in Malaysia.

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