SAE MALAYSIA
200501006853 (683900-A)

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Certificate No. FS808004

SAE DIS

Intelligence at the edge.

On-site PLC logic. Built-in HMI. Selectable local analytics.

Distribution Interface Switch





ENGINEERED & INTEGRATED BY SAE MALAYSIA

Field integration | Edge processing | Operational visibility

Rev 3.1

Process locally. Operate intelligently.

SAE DIS combines field connectivity, PLC logic and visualisation in one edge processing device.

Execute logic at the site, calculate derived values and present information through the built-in HMI. Add an optional analytics dashboard for on-site data analysis.

IEC 61131-3 logic

Develop on-site PLC functions using Function Block Diagram (FBD) or Structured Text (ST).

Local calculations

Process field values and implement complex mathematical equations within the engineered logic.

Built-in HMI

View equipment, operating status, alarms and events through the integrated HMI.

Optional analytics

Extend the local operating view with an analytics dashboard for on-site data analysis.

Configured to your application

Logic, runtime licensing, permissions and processing capacity follow the approved system design.

From field signals to on-site decisions.

SAE DIS supports IEC 61131-3 programming for engineered local operations and calculations.

FBD

Function Block Diagram connects reusable processing blocks for signal handling, comparisons, sequencing and control logic.

Structured Text

Structured Text expresses equations, conditions and algorithms for more complex calculations and operating sequences.

An illustrative processing sequence

01	**Acquire**	Read mapped field values
02	**Calculate**	Run logic and equations
03	**Evaluate**	Apply approved conditions
04	**Act & display**	Update outputs and HMI

Typical engineered functions

Scaling, derived parameters, thresholds, interlocks and operating sequences. Control actions require the agreed permissions and acceptance testing.

Connect the assets that matter.

Select the interfaces required by the field equipment and operating scope.

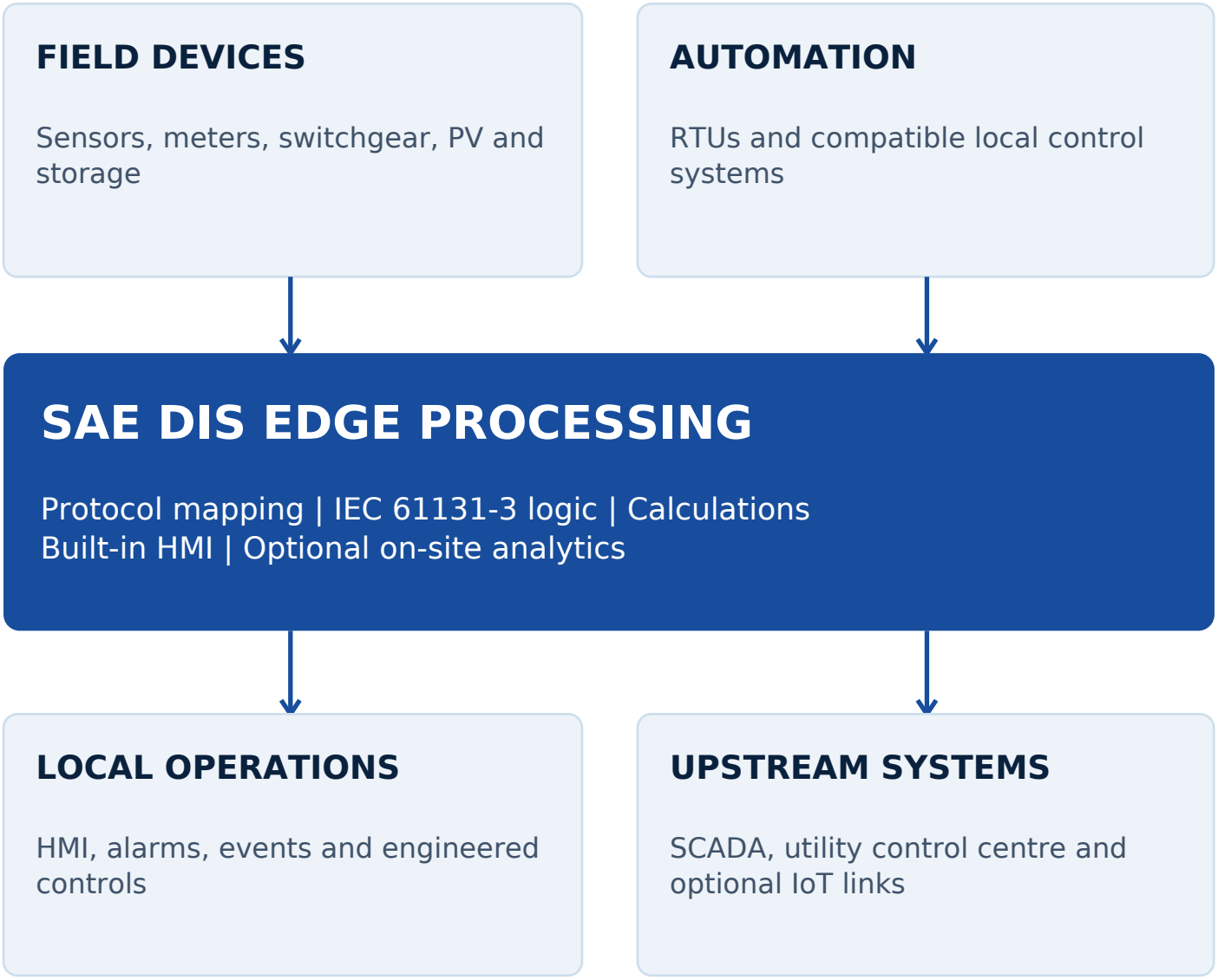
Transformer condition	PD, DGA, oil/winding temperature and VRDT parameters.
Distribution equipment	Online feeder pillars, RTUs, switchgear and iRCB.
Energy & metering	Power meters, PQM and generation metering systems.
Renewable & storage	PV dataloggers, BESS and community energy storage.
Site & environment	Thermal cameras, weather, flood and intrusion sensing.
Operations	Built-in HMI, SCADA and optional IoT or analytics dashboards.

A coordinated integration scope

Device compatibility, protocol licences and third-party equipment are defined in the project offer.

Connect. Process. Present and exchange.

Local logic and visualisation sit between field devices and upstream operational systems.



IEC 101/104 | Modbus RTU/TCP | IEC 62056-21 | MQTT

Additional protocols and APIs depend on the agreed configuration.

Select a package that fits the site.

Build around connectivity, edge processing, HMI and required field signals.

Core platform	FW-5-GATE series5X, power supply and selected protocol/runtime licences.
Digital inputs	Eight-input reference module for mapped indications and alarms.
I/O expansion	Optional relay outputs and analogue inputs.
Communications	Ethernet switching, SFP links, LTE or serial/Ethernet conversion.
Built-in HMI	Integrated visualisation; optional IPC/touchscreen extension.
Analytics & APIs	Optional local analytics and custom drivers for REST API, XML/SOAP or camera interfaces.

Define the configuration together

Confirm port counts, I/O voltage, CPU arrangement, PLC licence, HMI tags and analytics scope in the selected bill of materials.

Speak the language of your assets.

A broad protocol platform links field equipment, utility SCADA and IoT services.

Utility control & protection

IEC 60870-5-101 / -103 / -104; IEC 61850 for IED and protective-equipment integration; DNP3 master/outstation over serial or IP.

Metering & field automation

IEC 62056-21, SML over Ethernet, Modbus RTU/TCP master/slave, DSfG, Profibus-DP slave and MPI/3964R/RK512.

Cloud, timing & network services

MQTT for selected IoT data; NTP/SNTP/DCF time synchronisation; SNMP for network management. Serial and Ethernet interfaces support coordinated integration.

Transparent IEC 101 / 104 conversion

The 2022 datasheet identifies this function from setIT V5.4. Protocol roles, licences and firmware are selected for the approved project configuration.

Source: SAE FW-5-GATE datasheet, November 2022, pp. 1-3.

Expand the signals. Keep the footprint compact.

The FW-5-GATE base omits integrated process I/O and supports up to 12 expansion modules.

Indications & commands

8DI: 8 digital inputs; 8DO: 8 command outputs.
8DI2AI: 8 indications and 2 analogue measurements.

Measurements & set points

4AI: 4 analogue measurements.
2AO / 4AO: 2 or 4 analogue set points.

Application modules

4DI4DO, RES-1 and VPP-1 for specific applications; PM-1 / PM-2 power measurement; ISO-1 leakage detection; DSO-1 / DSO-2 command termination.

Bus, communications & power

PDPS-1 Profibus-DP slave; TBUS-T / TBUS-R for remote module placement; PWR-1 power booster; PS-60 for 24-60 V DC supply.

Platform reference

The supplied 2022 sheet describes CPU-5E / series5e. Confirm equivalence to the offered series5X CPU, firmware and module arrangement in the project BOM.

Source: SAE FW-5-GATE datasheet, November 2022, pp. 3-4.

Resilient uplink. Connected site network.

Pair cellular communications with copper and fibre access for the engineered DIS package.

RUT956 | Dual-SIM 4G LTE router

LTE Cat 4 up to 150 Mbps; automatic SIM switching for weak signal, loss of network or configured limits. Wired, mobile and Wi-Fi WAN failover; VRRP and multi-WAN load balancing.

Serial, Ethernet & remote integration

3 LAN + 1 WAN port at 10/100 Mbps; RS232 and RS485; Modbus TCP/RTU, MQTT gateway and DNP3. Wi-Fi, GNSS, USB, I/O and RMS remote management extend site connectivity.

TSW212 | Managed Gigabit & SFP

8 x 10/100/1000 Mbps RJ45 ports + 2 SFP ports; 20 Gbps non-blocking bandwidth. Layer 2 switching with additional Layer 3 functions, industrial network resilience and managed access.

Power and deployment

TSW212: 7-57 V DC input, maximum 6 W. RUT956: 9-30 V DC input, below 7 W maximum. Both: -40 to +75 °C, IP30. Provide rated DC supplies and select SFPs for the required fibre links.

Sources: RUT956 datasheet v13, pp. 3-7; TSW212 datasheet v1.08, pp. 2-4.

Segment the network. Maintain operational visibility.

TSW212 combines Gigabit access, fibre uplinks and TSWOS network management.

Resilient Layer 2 connectivity

IEEE 802.1Q VLANs, STP/RSTP, loop protection and IEEE 802.3ad LACP port aggregation; MRP client/manager roles for engineered ring networks.

Traffic management & routing

IGMP snooping and multicast querier; QoS by port, DSCP, 802.1p and TOS; rate limiting and storm control. Static IPv4/IPv6 routing and dynamic BGP, OSPF v2, RIP v1/v2 and EIGRP are listed.

Industrial & management services

EtherNet/IP, SNMP v2/v3 and LLDP. PROFINET Class B conformance requires the corresponding order code. HTTPS/CLI, SSH, port mirroring and cable diagnostics support maintenance.

Remote supervision & performance

Site Manager, FOTA, RMS firmware/configuration and backup profiles. 14.88 Mpps forwarding rate, 512 KB packet buffer, 8K MAC entries and 10,000-byte jumbo frames.

Source: TSW212 datasheet v1.08, dated 30 September 2026, pp. 2-5, 8.

Control access. Protect the exchange.

Apply the capabilities of each device within an approved OT security architecture.

DIS | Secure communications & services

The FW-5-GATE sheet lists IPsec IKEv1/IKEv2 and OpenVPN, LDAP/RADIUS server functions and MQTT with TLS in the communication diagram. Enable only the services required by the application.

RUT956 | Protected network boundary

IPsec, OpenVPN, ZeroTier and TLS via Stunnel; firewall/NAT rules; port/tag-based VLAN separation; X.509 certificates, RADIUS/TACACS+ authentication and login blocking; attack and port-scan prevention.

TSW212 | Managed network access

IEEE 802.1x port-based access control, IEEE 802.1Q VLANs, port isolation and MAC filtering; RADIUS/TACACS+ authentication and IP/login-attempt blocking. Configure secure management and monitoring; terminate WAN VPNs at the RUT956.

SAE integration approach

Restrict inbound access; use approved encrypted tunnels, unique credentials and certificate management; maintain firmware, configuration backups and logs. These are deployment measures, verified during acceptance testing.

Sources: FW-5-GATE p. 3; RUT956 v13, pp. 3-5; TSW212 v1.08, pp. 2-4.

Defined ratings. Traceable test evidence.

A clear distinction between manufacturer declarations and project-specific type-test records.

FW-5-GATE | Datasheet-declared standards

EMC: IEC 60870-2-1; EN 61000-6-2 / EN 61000-6-4; EN 55032, device class B. Declared surge strength: 5 kV supply/process I/O to PE; 2.5 kV to measurands, RS232 and USB.

FW-5-GATE | Environmental & mechanical ratings

-25 to +70 °C; 24-hour average maximum 55 °C; humidity below 95% without condensation; altitude up to 3,000 m. IP20, DIN-rail mounting.

RUT956 | Listed approvals & immunity standards

CE/RED, UKCA and CB. Listed tests include EN 61000-4-2 ESD, -4-3 radiated immunity, -4-4 EFT, -4-5 surge, -4-6 conducted immunity and -4-11 dips; safety includes IEC 62368-1:2018.

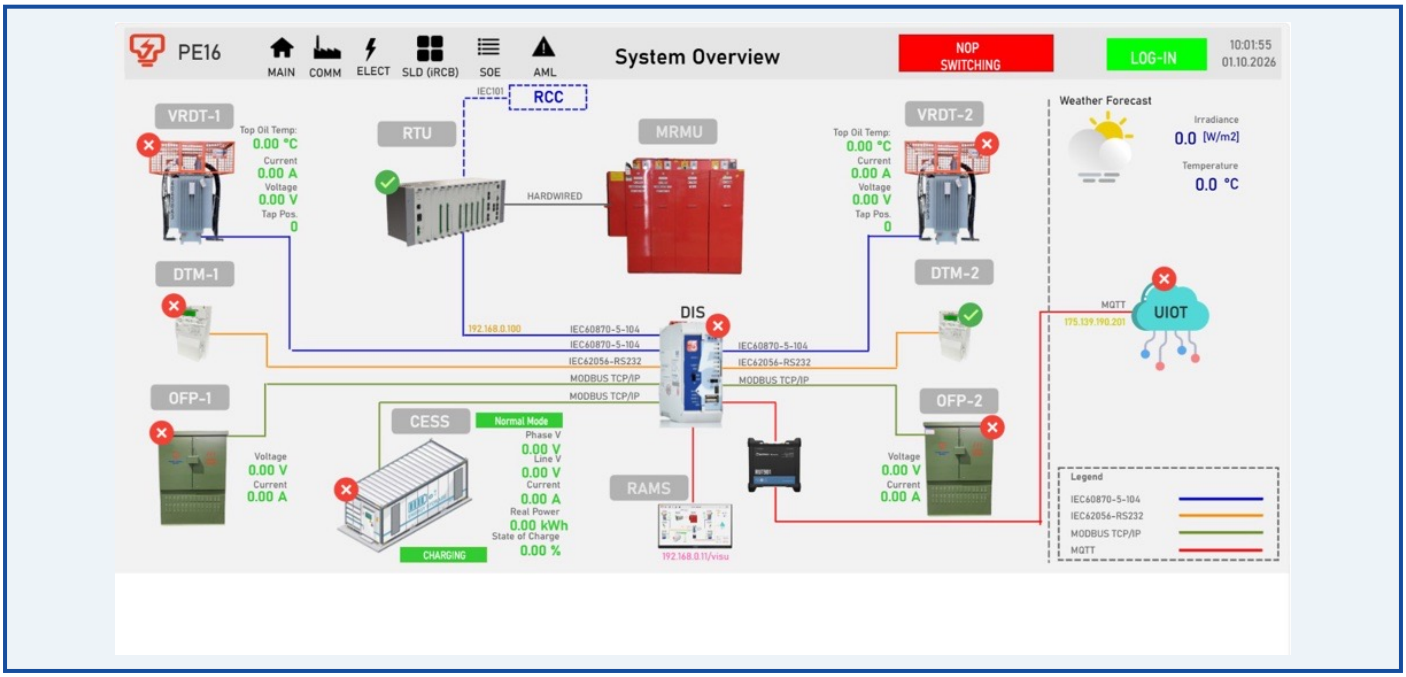
TSW212 | Certifications & declared surge tests

CE, UKCA, UL/CSA Safety and CB Scheme. IEC 61000-4-5 surge: Ethernet 1 kV line-to-ground.

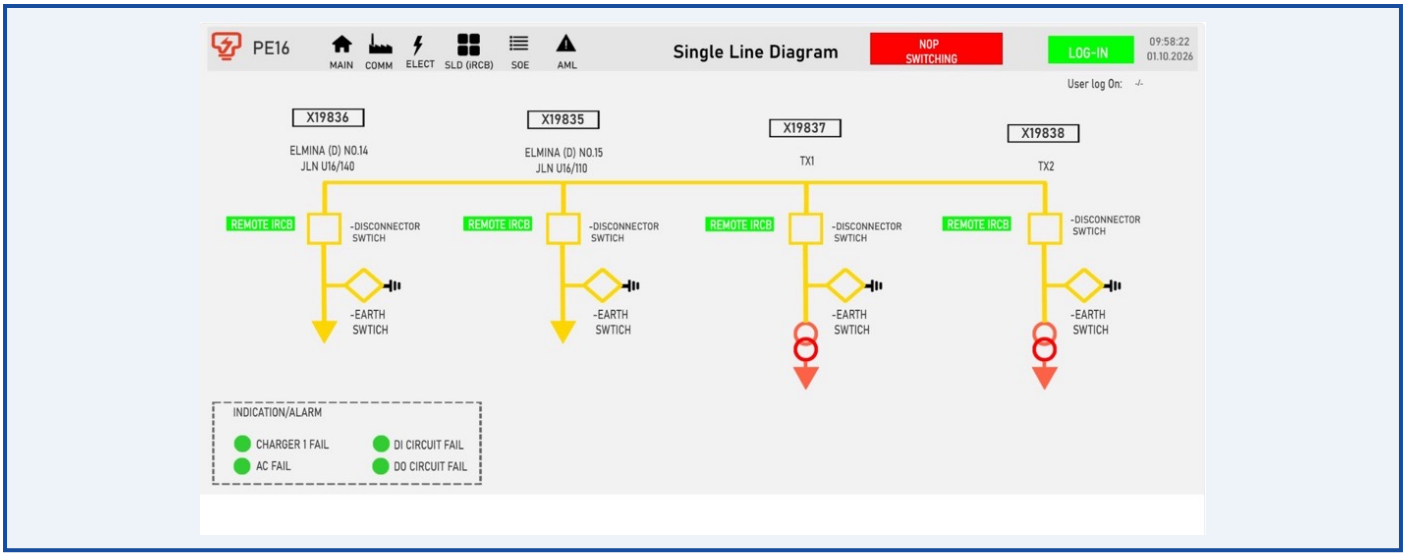
Sources: SAE FW-5-GATE pp. 3-4; RUT956 v13, pp. 6-7; TSW212 v1.08, pp. 3-5.

A clear operating view at the site.

Built-in HMI brings system relationships and operating information to the local user.



ELMINA PE 16 - system overview



ELMINA PE 16 - single-line diagram

Turn local data into useful analysis.

Add an analytics dashboard to extend the built-in HMI with on-site data analysis.

Combine measured data with values calculated by SAE DIS logic to support the analysis required by your engineering and operations teams.

Measured + derived data

Use field measurements alongside calculated parameters from FBD or Structured Text logic. Select the required data mapping, sampling and retention.

Application-specific views

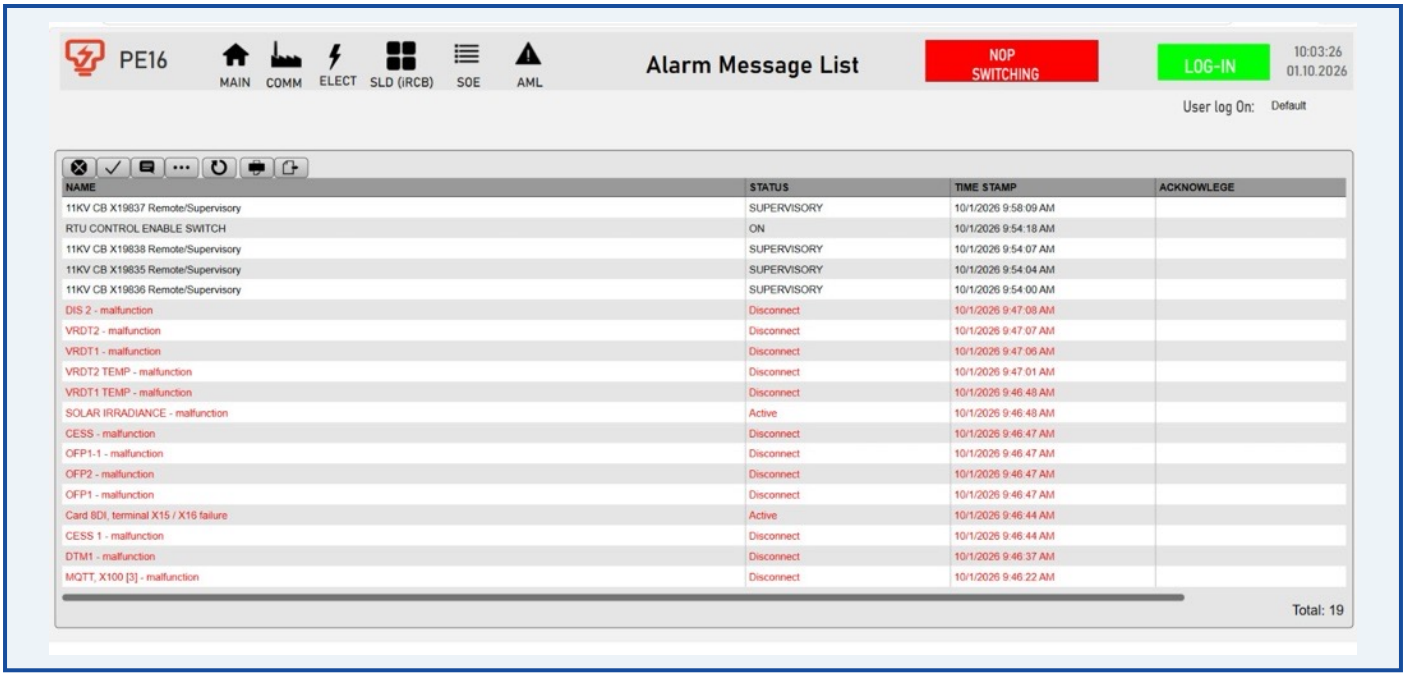
Configure the optional dashboard around agreed trends, comparisons and indicators for the site. The offer defines the analysis functions and dashboard scope.

Local processing. Local visibility.

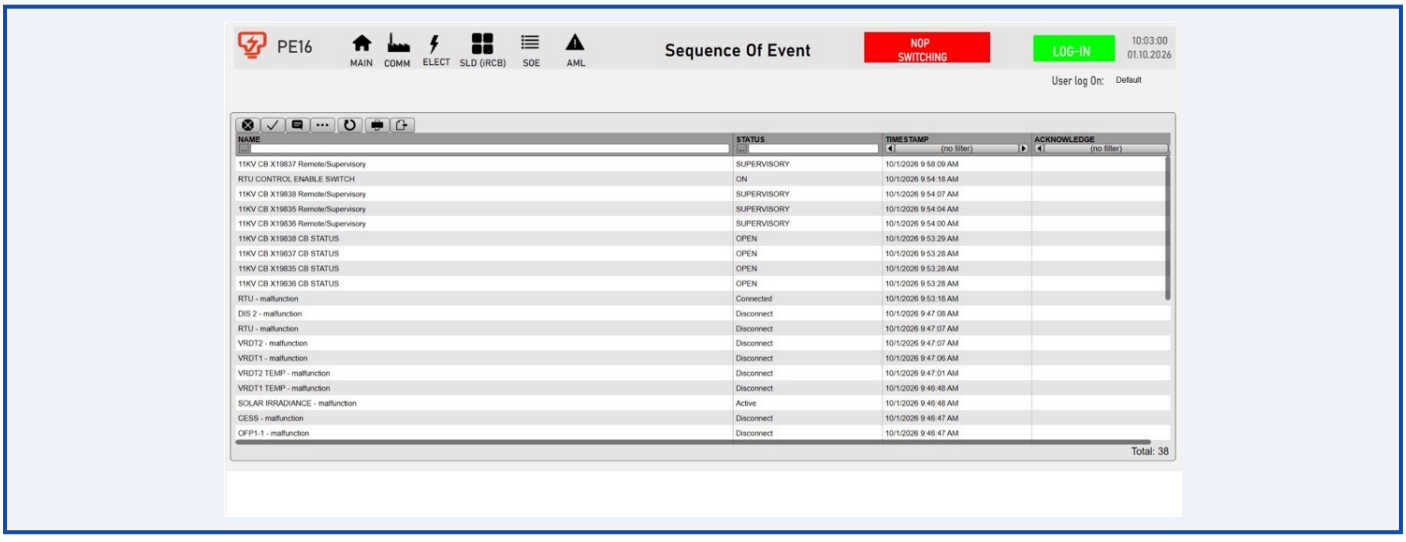
The edge device executes engineered logic; the HMI presents operations; the optional analytics dashboard supports deeper on-site review.

Alarms and events. Information for operators.

Dedicated HMI lists support the review of alarms and sequences of events.



ELMINA PE 16 - alarm message list



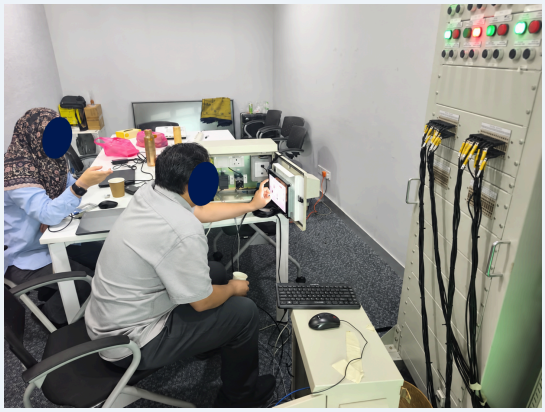
ELMINA PE 16 - sequence of events

Testing with TNB. Integration in the field.

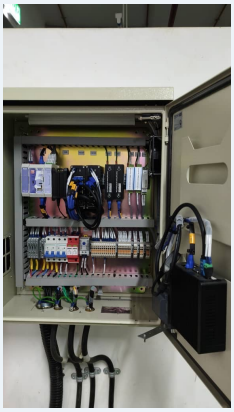
Authentic DIS testing and installation images from SAE Malaysia.



DIS test activities with TNB



Engineering team during testing



Panel internal integration

TNBR project records include DIS orders in 2024 and 2025, with eight systems for eight PPUs in the 2025 order.

Engineered for the installation.

Agree the enclosure, interface extensions and acceptance scope for the site.



DIS panel installation

Panel options	Wall-mounted, viewing-window or floor-standing layouts; stainless-steel option for coastal sites.
Reference 1026	Core DIS gateway package with configured hardware and runtimes.
Reference 1027	On-site IPC/touchscreen extension and HMI engineering.
Reference 1028	Custom interface/edge extension for non-standard APIs or camera data.

Supply, surge protection, IP rating, dimensions and FAT/SAT scope are specified in the offer.

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Connect the field. Process at the edge. See the result.

Talk to SAE Malaysia about your DIS application.

Bring your device list, logic requirements and operating objectives. We can define a coordinated edge processing, communications, HMI and analytics scope with clear testing and handover requirements.

SAE Malaysia Sdn. Bhd.

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