Smart Terminal Block
Distributed Inputs/Outputs

Simplify digital substation and RTU

Product at a glance

- Plug-and-play distributed Input/Outputs
- Hot-swappable Inputs/Outputs
- Less copper wires, more optical links
- Interoperable with IEC 61850
- Reduced Total Cost of Ownership (TCO): up to 20%
- Faster project realization: up to 30%
- Local support by experts

The SMart Terminal Blocks (SMTB) is a Schneider Electric innovation to significantly simplify the panels, the marshalling kiosks, the Remote Terminal Units (RTU) and the substations operation and maintenance.

SMTB are adapted to smooth retrofit of existing installations with Inputs/Outputs: remote terminal units, protection and control systems. It offers unrivalled simplification for substations extensions and new sites.

Bringing digitization of the Inputs/Outputs (I/O) next to the primary equipment (transformers, circuit breakers, switches), the smart terminal blocks contribute to the digital substation simplification in HV and MV grids. SMTB modules offer easy installation, robustness, flexibility and security features for a smarter world.
A first step on the way of digital substation and smarter grids

Bringing digitization of the I/O next to the primary equipment (transformers, circuit breakers, switches), the smart terminal blocks contribute to the digital substation simplification in HV and MV grids. SMTB modules offer easy installation, robustness, flexibility and security features for a smarter world. The optical converter also complies IEC 61850 for large interoperability.

Reduce risk of electric shock, fire and potential rise propagation with optical fiber

With its robust design for substations and leveraging the optical fiber benefits, SMTB I/O modules are well adapted to the most demanding small and large electrical substations.

Simplified panels with reduced footprint

Thanks to its compacity and DIN rail installation, the SMTB I/O modules contribute to reduce the required space and weight.

Reduced maintenance and outages

The plug-and-play and hot-swappable SMTB I/O modules (no programming, no settings, communication with self-diagnosis) contribute to reduce the maintenance outages for retrofit and extensions of existing RTU or existing protection and control panels.

Dedicated to demanding system integration

Associated to RTU, protection and control relays, the smart terminal blocks inputs/outputs offer wiring simplification and huge opportunity for time and money savings.

Faster projects for utilities, critical infrastructures and electro-intensive industries

SMTB I/O modules in panels are designed to simplifying the installation, the tests and validation phases. It contributes to reduce the project duration and accelerate the plant start-up.
Smart Terminal Block

Product Description

Applications:

Direct optical link to distributed SMTB I/O on the field
Installed in the marshalling kiosk on field, the distributed SMTB I/O are connected to the RTU / BCU / protection relays or MiCOM C264 via an SMTB optical converter with Ethernet IEC 61850 interface.

Customer benefits:
- Reduce risk of electric shock and potential rise propagation with optical fiber
- Simplify I/O wiring over the substation
- Reduce copper over hundreds of meters
- Applicable to most of the protection and control IEDs in the panels
- Interoperable IEC 61850 (GOOSE)

Mirrored I/Os via optical link and SMTB:
Immediate copy of the digital input status and digital outputs position at the other extremity of the optical fiber link. The digital inputs and digital outputs are wired on SMTB DI & DO modules and converted by optical converter.

A digital input in the kiosk is transferred as a digital output in the control room. It can be wired on IEDs such as protection relays or RTU.

Applicable for:
- Substation retrofit with installation in marshalling kiosks
- Tele protection
- Logic selectivity on protection relays
- Tele alarms between buildings and sites
- Distributed I/O connexion: up to 1 km (multi-mode) and up to 15 km (single-mode)
- Extended I/O for protection relays and controllers installed in control room.

Customer benefits:
- Improved electrical isolation with optical fiber
- Reduced copper and wiring costs
- Plug-and-play modules (no configuration)
- Flexibility: multi-voltage I/O
- EMC compliant to HV and MV standards
- High-speed transmission over optical fiber
- Low consumption and heat dissipation.

SMTB in RTU Panel:
Installed on DIN rail in the RTU panel, the SMTB DI/DO modules are digitizing the input and outputs next to the terminal connexion coming from process. 16 copper wires are replaced by 1 standard RJ45 cable.

Customer benefits:
- Significant simplification of panel wiring and less copper
- Number of wired I/O (more than double in each MiCOM C264)
- Direct visualization of electrical situation
- Faster maintenance (hot swappable I/O)
Smart Terminal Block
Product Description

SMTB DI and DO

Direct visualization with explicit labels and LED
Operators immediately read the substation situation with large explicit labels and LED: no need for additional software or paper schemes.

Plug-and-play – hot swappable
SMTB DI are equipped with opto-couplers respecting standards for HV and MV substations.
SMTB DI & DO are programming and settings free: the module address is on the base.
Labels can be easily updated and transferred from one module to another.
It’s hot swappable and the module replacement can be done in less than 30 seconds.

Powered by RJ45 communication cable
SMTB DI & DO are powered via the standard RJ45 communication cable. Communication/power is supplied by the SMTB optical converter when installed on the field or by the MiCOM C264 when installed in the panel.

Panels footprint

With SMTB installed on DIN rail, the panel ground surface footprint can be divided by up to 2. A transparent panel door helps the operators to identify the primary devices operational status.

Less copper use and reduced panel size contribute to bring weight reduction of up to 30%.

Other features

Panel integration with MiCOM C264 multi functional IED:
When connected to the well knowned MiCOM C264 – multi functional IED (RTU, bay controller, MV feeder protection, automatic voltage regulator, PLC), SMTB bring higher integration with capability to connect up to 564 wired I/O locally in the panel or remotely via optical fiber.

Validation and test
SMTB DI & DO are equipped with test button for self-diagnosis and alarm LEDs. In addition, some SMTB test switches are offered to help to simulate inputs.

SMTB optical converter

Thanks to optical converter, remote I/O can be acquired from the field and marshalling kiosks with reducing risks of surges and EMC disturbances propagation.
- Optical fiber is multi-mode (up to 1 km) or single-mode (up to 15 km)
- Optical fiber communication is monitored and the watchdog facilitate the diagnosis

SMTB IEC 61850 optical converter
- Ethernet GOOSE messages
- Redundancy: HSR / PRP / RSTP
- Time synchronization: SNTP
SMTB base module:
• DIN Rail support
• Wires: up to 4 mm²

SMTB 8DI module with 8 digital inputs:
• Multi voltage: 24 Vdc Æ 250 Vdc (threshold selected by IED configuration)
• Hot swappable: 8 LEDs
• Test button and dedicated LED for diagnosis
• Powered by RJ45 cable

SMTB 8DO module with 8 digital outputs:
• With contact relays
• Make and carry: 8 Amps permanent
• Break: DC: 50 W resistive, 15 W inductive (L/R = 20 ms)
  AC: 1250 VA resistive, 1250 VA inductive (cos φ = 0,7)
• Operating time: ≤ 6 ms
• Hot swappable: 8 LEDs
• Test button and dedicated LED for diagnosis
• Powered by RJ45 cable

SMTB DI/DO modules:
• Electromagnetic tests (extract of global test report)
  EN / IEC 61000-4-18: 2007+A1: 2010 - Damped oscillatory waves: 2,5 kV CM
  EN / IEC 61000-4-4: 2012 - Electrical fast transients: 2 kV 5 kHz & 100 kHz
  IEC60555-27: High voltage withstand impulse: 5 kV peak value; 1.2/50 µs, 0.5 J
  IEC60555-27: Dielectric withstand: 2 kV rms - 1 kV rms

SMTB optical converters (IEC 61850 and FO):
• DIN rail support
• Power supply: 24 Vdc to 250 Vdc and 80 Vac to 240 Vac
• Watchdog by contact relay
• Up to 32 DI/DO

SMTB-ETH converter:
• Flexible SFP connectors are to be chosen separately:
  Multi-mode, Single-mode or RJ45

SMTB-FO converter:
Optical fiber: multi-mode; 1310 nm ; ST connector, up to 1 km

SMTB test switch:
• 4 switches

SMTB operating and storage temperature for all modules:
• -40 °C to +70 °C (-40 °F to +158 °F)
Smart Terminal Block
Customer Experiences

Digital substation with optical connection to marshalling kiosks

Customer: Large utility in Africa
Scope: Upgrade of 4* Electrical Substation 110 kV / 15 kV
Supply: EcoStruxure Substation Operation solution for protection, automation and control
Marshaling kiosk with distributed I/O - Smart terminal blocks for transformers and incoming line
Installation and commissioning on site, operator training.

Key challenges:
• Minimise installation costs and copper use
• Reduce the risk of electric shock
• Simplify maintenance for current staff

Customer benefits:
• Faster panel tests and installation on site with optical fiber links
• Reduced risk of potential rise propagation and electric shock, with the optical fiber links
• Higher availability with redundancy and hot swappable Digital Inputs (DI) and Digital Outputs (DO)

Delivery project: < 12 Months

HV/MV RTUs retrofit with minimum site impact

Customer: Distribution utility in Europe
Scope: Replacement of 3 aging RTUs in electrical substation 90kV / 20 kV
Supply: MiCOM C264 - RTU connected to smart terminal blocks Digital Inputs (DI) and Digital Outputs (DO)
Installation, validation, commissioning on site

Key challenges:
• Shorten dismantling old RTU and installation of new one
• Simplify maintenance and reduce costs

Customer benefits:
• Fast installation and tests: < 12 hours
• Accelerate maintenance with hot swappable I/O and direct visualization of I/O status
• Short substation unavailability

MV panels in large gas compression plant

Customer: Large industry in Algeria
Scope: MV panels in gas compression plant
Supply: MV Panels
Mirrored I/O using smart terminal blocks Digital Inputs (DI) and Digital Outputs (DO)
Installation, validation, commissioning on site.

Key challenges:
• Fast project delivery and accelerated plant start
• Reduce the risk of fire and electric shock
• Reduce maintenance costs.

Customer benefits:
• Reduced risk of fire and potential rise propagation, with MV panels connected via optical fiber links
• Faster installation and validation with less copper wiring
• Simpler maintenance with hot swappable I/O
• Reduced panel footprint
## Smart Terminal Block

### Ordering Codes

<table>
<thead>
<tr>
<th>Ordering reference</th>
<th>Short name</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>SMTB modules and bases</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHA98379</td>
<td>SMTB-M-8DO</td>
<td>Electronic module with 8 digital outputs (1*RJ45 port)</td>
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<tr>
<td>NHA98666</td>
<td>SMTB-M-8DI</td>
<td>Electronic module with 8 digital inputs (1*RJ45 port)</td>
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<td>NHA98465</td>
<td>SMTB-BCC-8DO</td>
<td>Terminal block base for 8 digital outputs module</td>
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<tr>
<td>NHA98669</td>
<td>SMTB-BCC-8DI</td>
<td>Terminal block base for 8 digital inputs module</td>
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<tr>
<td><strong>MiCOM C264 : acquisition boards</strong></td>
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<tr>
<td>2072141A01</td>
<td>SBU200</td>
<td>Smart terminal block acquisition board, with 8 x RJ45 ports</td>
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<tr>
<td>QGH86216</td>
<td>SBU400</td>
<td>Smart terminal block acquisition board, with 2 x optical ports (multimode fiber)</td>
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<td><strong>SMTB optical converter for connection to SBU 400</strong></td>
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<tr>
<td>QGH53624</td>
<td>SMTB-FO</td>
<td>Optical converter Power supply: 24 Vdc to 250 Vdc &amp; 80 Vac to 240 Vac for connection to SBU400 or to SMTB-FO-M-x</td>
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<tr>
<td><strong>SMTB optical converter: IEC 61850 for connection to IEC 61850 IEDs</strong></td>
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<tr>
<td>PHA82601</td>
<td>SMTB-ETH</td>
<td>Optical converter IEC 61850, Power supply: 24 Vdc to 250 Vdc and 80 Vac to 240 Vac</td>
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<td>HUA26158</td>
<td>ETH-MM</td>
<td>Multi-mode optical fiber SFP connector, LC interface, up to 2 km, 1300 nm, 50 or 62.5 µm/125 µm</td>
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<td>HUA26502</td>
<td>ETH-SM</td>
<td>Single-mode optical fiber SFP connector, LC interface, up to 15 km, 1310 nm</td>
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<td><strong>Consult us</strong></td>
<td>ETH-RJ</td>
<td>RJ45 copper interface for SMTB-ETH</td>
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<td><strong>SMTB accessories</strong></td>
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<tr>
<td>PHA16421</td>
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<td>Test block with 4 inputs and switches for SMTB-BCC-8DI</td>
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</tbody>
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