



CENTRAL DATA NODE WITH AUTOMATION

SIPROTEC 6MU85

Merging Unit – Modular, interoperable, high-performance process data acquisition

Usage and description

The SIPROTEC 6MU85 merging unit, based on the flexible SIPROTEC 5 system, is designed for both conventional and non-conventional instrument transformers (LPIT¹) and enables the digitization of all primary data close to the process.

The SIPROTEC 5 process bus offers a wide range of solutions and migration concepts for new and existing plants.

Merging Unit application areas

Acquisition of analog measured values and digital inputs as well as the control of digital outputs as

- data source within a digital substation
- a central merging unit of a transformer feeder
- data source for centralized protection
- Bay Unit for decentralized busbar protection
- data source for process-bus fault recorder
- data source for centralized synchro check application
- data source for detection and recording of power-quality data in power system

Main functions

- Merging Unit,
- Circuit breaker and disconnecter control
- Backup protection functions,
- Additional functions

Benefits

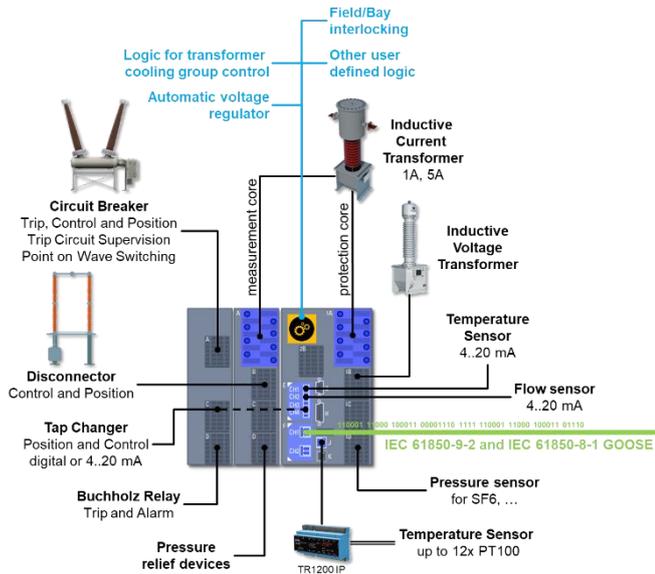
- Adaptable to a wide range of current and voltage transformer as well as LPIT¹ (Low-Power Instrument Transformer) sensors
- The number of binary inputs and outputs is scalable
- Expandable by a second row of expansion modules for additional analog inputs and digital inputs/outputs.
- Direct High-speed tripping of circuit-breakers (<1 ms)
- Additional data acquisition² (temperature, pressure, tap changer setting, ...)
- Optional backup protection functions
- Optional SCADA communication interfaces
- Can integrate AVR (Automatic Voltage Regulator)
- User defined logic to implement e.g., transformer cooling group control, field/bay interlocking, ...
- Cybersecurity in accordance with NERC CIP and BDEW Whitepaper requirements

Hardware

- Flexibly adjustable and expandable I/O quantity structure within the scope of the modular SIPROTEC 5 system
- Housing from 1/3 × 19 inches to 2/1 × 19 inches
- Highest availability even under extreme environmental conditions by standard conformal coating of the PCB boards
- Optional redundant power supply
- Expanded temperature ranges (-40 °C to 70 °C)

¹ For Siemens Energy GIS LPIT and Trench Optical Current Transformer

² May require plug-in modules or TR1200 temperature sensor box



SIPROTEC 6MU85 Merging Unit
Digitalization of all primary data close to the process

Merging Unit functionality³

- Up to 2 SMV (Sampled Measured Value) streams per access point
- Up to 4 access points for SMV publishing
- SMV Streams according to
 - IEC 61850-9-2 LE (4x current, 4x voltage)
 - IEC 61869 flexible streams (Up to 32 analog values in any combination of current and voltage)
- Reliable and seamless redundant data transmission via PRP or HSR regardless of the communication protocols used
- Compliant with IEC 61869-9, IEC 61869-13
- Sample synchronization via either IEEE 1588v2/PTP, IRIG-B or Optical/electrical PPS
- IEC 61850-8-1 GOOSE, MMS, and Merging Unit protocol on the same Ethernet module

Sampling rate [Hz]	ASDU	Remarks
4.000	1	For use at 50 Hz backward compatibility with 9-2LE guideline
4.800	1	For use at 60 Hz backward compatibility with 9-2LE guideline
4.800	2	Preferred rate for general measuring and protective applications, regardless of the power system frequency
12.800	8	Outdated, only for use on 50 Hz systems
14.400	6	Preferred rate for quality metering applications, regardless of the power system frequency
15.360	8	Outdated, only for use on 60 Hz systems

Supported standard sampling rates and stream types according to IEC 61869-9, IEC 61850-9-2 and 9-2 LE

³ Requires ETH-BD-2FO Ethernet plug-in module

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For all products using security features of OpenSSL, the following shall apply: This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (www.openssl.org), cryptographic software written by Eric Young (eay@cryptsoft.com) and software developed by Bodo Moeller.

Communication

- SMV publishing and SMV subscription are possible at the same access point.
- Pluggable communication modules, usable for different and redundant protocols (IEC 61850-8-1, IEC 61850-9-2 Merging Unit, IEC 60870-5-103, IEC 60870-5-104, MODBUS TCP, DNP3 serial and TCP, PROFINET IO, PROFINET IO S2 redundancy)
- Serial protection communication via optical fibers, two-wire connections, and communication networks (IEEE C37.94 and others), including automatic switchover between ring and chain topology.
- Extensive cybersecurity functionality, such as RBAC, logging of security-related events, signed firmware or authenticated IEEE 802.1X network access
- Simple, fast and secure access to the device via a standard Web browser to display all information and diagnostic data, vector diagrams, single line and device display pages
- Virtual network partitioning (IEEE 802.1Q - VLAN)

Circuit-breaker and disconnector-switch functions

- 1-pole and 3-pole breakers supported
- Control with switchgear interlocking
- Circuit-breaker failure protection (50BF)
- Circuit-breaker and disconnector monitoring
- Switching statistics
- Point-on-wave switching (PoW)
- Trip-circuit supervision (74TC)
- Automatic reclosing (79)
- Synchrocheck (25)

Backup protection functions

- Non-directional overcurrent protection (50/51, 50N/51N)
- Directional overcurrent protection (67/67N)
- Overvoltage and undervoltage protection (27/59)
- Thermal overload protection (49)

Additional protection functions

- Phasor Measurement Unit (PMU) for synchrophasor measured values and IEEE C37.118 protocol
- Arc protection
- Utility functions for simple commissioning and tests
- Temperature acquisition using a TR1200 RTD unit (7XV5662-6AD10 or 7XV5662-8AD10)
- Optional 20-mA measuring inputs for a wide range of analog process values, for example, pressure, tap-changer setting
- PQ-Basic: Voltage unbalance; voltage changes: overvoltage, dip, interruptions; TDD, THD, and harmonics