



GDPA-61850 Analog-digital Wave Record Analyzer



General Information

Due to the rapid development of intelligent substation, the communication network message of substation station control layer, interval layer and process layer has become a major way of information interaction and sharing among intelligent substation devices. The condition of smart devices and communication network will directly affect the communication of the whole smart substation. Any problems at the sender, receiver or communication network could lead to major accidents in power system, so it is necessary to monitor, record and diagnose network message, find network weakness and faulty equipment in advance. When the power system fault occurs, not only the original network message needs to be recorded, but also the network message needs to be analyzed and recovered as fault waveform of primary side equipment and action

records of secondary side equipment, so as to analyze and quickly find the fault cause after the accident.

GDPA-61850 Portable Analog-digital Wave Record Analyzer (hereinafter referred to as GDPA-61850) can be directly accessed to DL/T 860-9-2, GOOSE and IEEE 1588 time synchronization message of process layer of intelligent substation network, when power system fails, fault wave recording is started, record waveform of primary voltage and current of the system and the action of secondary equipment, realize power system fault analysis and fault location. GdPA-61850 also has the function of continuous data recording, which continuously records the data related to the electrical quantity of the power system, and marks the disturbance characteristics on the continuously recorded data according to the built-in criterion, so as to facilitate the disturbance data retrieval.

The communication between GDPA-61850 and station control layer equipment adopts IEC61850 MMS communication protocol to realize the inter-operation with station control layer equipment.

GDPA-61850 is a fault recording and analysis device for the process layer network of smart substations. It has the functions of condition monitoring, early warning and fault analysis of the secondary network system and primary system of smart substations. It is widely used in smart substations and provides reference for the safe and reliable operation and management of smart substations.

Specification

Item	Version
General Specification of Power System Dynamic Recording Equipment	DL/T 553-2013

<p>Communication Networks and Systems in Substations</p> <p>Part 7-2: Basic Communication Structure for Substation and Feeder Equipment -- Abstract Communication Service Interfaces (idt IEC 61850-7-2: 2003)</p>	<p>DL/T 860.72-2004</p>
<p>Communication Networks and Systems in Substations</p> <p>Part 7-3: Basic Communication Structure for Substation and Feeder Equipment -- Common Data Classes (idt IEC 61850-7-3: 2003)</p>	<p>DL/T 860.73-2004</p>
<p>Communication Networks and Systems in Substations</p> <p>Part 7-4: Basic Communication Structure for Substation and Feeder Equipment -- Compatible Logical Node Classes and Data Classes (idt IEC 61850-7-4: 2003)</p>	<p>DL/T 860.74-2004</p>
<p>Communication Networks and Systems in Substations</p> <p>Part 8-1: Specific Communication Service Mapping (SCSM) -- Mapping to MMS (ISO/IEC 9506-1 and ISO/IEC 9506-2) and ISO/IEC 8802-3 (idt IEC 61850-8-1: 2004)</p>	<p>DL/T 860.81-2006</p>
<p>Communication Networks and Systems in Substations</p> <p>Part 9-1: Specific Communication Service Mapping (SCSM) -- Sampled Values over Serial Unidirectional Multidrop Point to Point Link (idt IEC 61850-9-1: 2003)</p>	<p>DL/T 860.91-2006</p>

Communication Networks and Systems in Substations Part 9-2: Specific Communication Service Mapping (SCSM) -- Sampled Values over ISO/IEC 8802-3 (idt IEC 61850-9-2: 2004)	DL/T 860.92-2006
Communication Networks and Systems in Substations Part 10: Conformance Testing (idt IEC 61850-10: 2005)	DL/T 860.10-2006
Technical Specification for Intelligent Recorder by China Southern Power Grid	Q/CSG xxxxx
Common Format for Transient Data Exchange (COMTRADE latest national standard) for Power Systems	GB/T 22386-200

1. Acquisition unit

The acquisition unit can work independently and has the functions of data acquisition, analysis and processing, anomaly judgement, fault analysis, data recording and data remote transmission.

The acquisition unit is directly connected to the process layer network and/or station control layer network of the substation, receives all messages from the process layer network and/or station control layer network (process layer network messages mainly include SMV, GOOSE, GMRP, PTP, etc.). Network messages of station control layer mainly include MMS, TCP/IP, UDP/IP, NTP/SNTP, FTP, ARP, ICMG, IGMP, etc.), and these messages are decoded and analyzed in real time to check for various abnormal states such as frame loss, wrong order, out of step, timeout, interruption, invalid encoding, traffic mutation, etc., and abnormal event warnings are given in real time.

When the original message storage module is configured, the original message data can be in cyclic storage, and can be read and analyzed at any time on the management interface according to the event label.

The acquisition unit is also responsible for the acquisition and recording of the switch and analog quantities of circuit breakers, disconnecting switches and relay protection on each side of the circuit and the main transformer, fault starting discrimination, signal conversion and other functions.

The acquisition unit runs on the embedded real-time operating system, which can be configured with up to 2 2.5-inch SATA ports at the same time, can support hard compression, and can effectively store data up to 2TB+.

No.	Item	Parameters
1	CPU	Embedded multi-core CPU
2	Storage	Standard 500GB*2, hardware compression card is optional
3	Acquisition port	<p>Acquisition card below can be selected:</p> <p>Ø Digital message acquisition card F800(100Mb*8), F1600(100Mb*16), F4000(1000Mb*4)</p> <p>Ø General quantity acquisition card: 32 channel analog quantity, 64 channel analog quantity, 32 channel analog quantity +32 channel switch quantity</p> <p>A single device is equipped with with 4pcs cards at most, module type can be arbitrarily combined, the following are 4 combinations:</p> <p>Configuration 1: 0~32pcs100Mb SFP module;</p> <p>Configuration 2: 0~16pcs 100Mb SFP module+ 4~8pcs 1000Mb SFP module;</p> <p>Configuration 3: 0~24pcs 100Mb SFP module + 64 channel general analog quantity;</p> <p>Configuration 4 : 0~16pcs 100Mb SFP module + 4~8pcs 1000Mb SFP module + 16 channel general analog quantity +32 channel general switch quantity</p>

		Note: the SFP module can be plugged in LC multi-mode /single-mode fiber Ethernet interface or RJ45 Ethernet interface.
4	Communication	100Mb/1000Mb self-adaptive RJ45 Ethernet port * 4
5	Time synchronization port	1 IRIG-B (DC) code port; 1 IRIG-B (fiber optic) code port
6	Indicator light	Work, fault, record wave, time synchronization
7	Switch-out hard contact	Start recording wave, abnormal state of device, power loss of device, backup
8	Size	4U in height, 19 inches in width
9	Power supply	100V~250V AC/DC power supply

2. Transient recording

- Channel number of starting sampled value: up to 128;
- Channel number of recording sampled value: ≥ 384 ;
- Channel number of recording switch quantity (GOOSE): ≥ 1024 ;
- Channel number of starting switch quantity (GOOSE): ≥ 1024 ;

3. Continuous recording

- Continuous recording can be configured;
- Sampling rate: 1000Hz (20 dots/wave cycle), 2000Hz (40 dots/wave cycle);
- Channel number of sampled value: ≥ 384 ;
- Channel number of switch quantity (GOOSE): ≥ 1024 ;

4. Time synchronization

- With time synchronization of IRIG-B optical/electronic code;
- Accuracy of clock synchronization: $\leq 300\text{ns}$;
- Synchronous source is lost after clock synchronization, time-keeping accuracy of the device in 24 hours $\leq 100\text{ms}$;
- Resolution of message timescale: 40ns ;
- Max. timescale deviation of multiport: 40ns ;

5. Electromagnetic compatibility

- Electrostatic discharge immunity: conforming to acceptance criterion B as set forth in GB/T14598.26 (severity class 4 as set forth in the original GB/T14598.14);
- Surge immunity test: conforming to acceptance criterion B as set forth in GB/T14598.26 (severity class 4 as set forth in the original GB/T14598.18);
- Fast transient/burst immunity: conforming to acceptance criterion B as set forth in GB/T14598.26 (severity class A as set forth in the original GB/T14598.10);
- Burst immunity: Conforming to acceptance criterion A as set forth in GB/T14598.26 (severity class 3 as set forth in the original GB/T14598.13);

- Radiated, radio frequency electromagnetic field immunity: acceptance criterion B as set forth in GB/T14598.26 (severity class 3 as set forth in the original GB/T17626.3).