TESLA 4000-SV Firmware

v1.5

Release Description

DATE: 2026-01-05

FEATURE ENHANCEMENTS

- Cyber Security
  - None.
- General
  - Added support for a new communication board which brings many new features as follows:
    - multiple network redundancy: 401 A/B, 402 A/B, 410 A/B
    - configurable operation mode on each redundant A/B pair: Disabled, Non-redundant, PRP
    - PTP time sync can be enabled on any one of the redundancy pairs.
    - PTP over PRP when operates as PRP mode.
  - Added support for IEC 61869-9 sampled value subscription.
  - Added support for IEC 61850-9-2 Ed2.1 sampled value subscription.
  - Added support for 1TB storage drive which increases the CDR retention period to 30+ days with maximum sample rate and channel configuration.
  - Added support for Group Record Trigger mode. This feature allows cross-triggering and combining of records from up to 8 units which can be a mixed of TESLA 4000, TESLA 4000-A as well as TESLA 4000-SV recorders.
  - Enhanced chatter detection feature to include analog trigger chatter detection and user configurable chatter threshold.
  - Enhanced storage alarm to include the number of storage retention days as an additional alarm trigger condition.

CORRECTIONS TO ISSUES

- Cyber Security
  - None.
- General
  - Major: Fixed issue where the performance of the system may become slow if the PMU connection is established via port 401, and the PMU connection may drop as a consequence.
  - Major: Fixed issue where the PMU data incorrectly reports the nominal frequency as 60Hz when the unit system frequency is set as 50Hz.

COMPATIBILITY

TESLA Control Panel Software:	v4.3 and above
RecordGraph Software:	v6.5 and above
ERL 61850 Configurator Software:	v4.2 Rev0 and above
RecordBase Central Station Software:	v5.8 and above
RecordBase View Software:	v5.8 and above
ICD File Version:	v1.04 Rev 02
Setting Version:	704
TESLA 4000-SV User Manual	v1.6 Rev 0
Network Redundancy Module Firmware:	v1.1 and below
Security Notification System User Guide	v1.1 Rev 0

Minor releases, designated with a revision or letter (e.g. v3.4 Rev 1 or v3.4a), maintain the same compatibility as their base version (e.g. v3.4 Rev 0 or v3.4).

REVISION HISTORY

v1.4a – 2025-05-30

- Enhancement: Added support for 64 GB storage, this increases the minimum CDR retention period from 6 days to 22 days with maximum channel and sample rate configuration.
- Enhancement: Added support for new IEC 61850 Logical Node LCCH to supervise Ethernet port's connection status.
- Enhancement: Added ability to transmit Boolean GOOSE Virtual Inputs in PMU digitals.
- Enhancement: Made improvements to meet certification requirements of PMU to the latest Synchrophasor standards IEEE C37.118.1a™-2014, IEC/IEEE 60255-118-1-2018.
- Enhancement: Added support for 2 sample/cycle Swing record.
- Enhancement: Added data quality support for output contacts.
- Enhancement: Added support for fiber optical port in non-redundancy hardware configuration.
- Enhancement: Improved overall system stability and error handling at stress condition.
- Major: Fixed issue where the CDR data gets erased and starts over when the data has accumulated to more than 50% of expected retention period.
- Major: Fixed issue where TESLA 4000-SV failed to boot correctly if record was triggered when the associated sampled value is not available during system bootup.
- Minor: Fixed issue where DVI.LLN0.Beh.stVal shows invalid status if fault locator is operated.
- Minor: Fixed issue where the Storage Maintenance Commands do not work.
- Minor: Fixed issue where without angle offset correction the PMU angle is off by more than 2 degrees.
- Minor: Fixed issue where the current angle measurement becomes 0 degrees when its magnitude is less than 5% of nominal with Nominal Level set to 1A.
- Minor: Improved PMU Analog THD accuracy when signal level is low.

v1.3 – 2021-12-17

- Enhancement (General): Added support for publishing IEC 61850 GOOSE on any port. Publishing was only supported on port 401 previously.
- Enhancement (General): Added support for IEC 61850 simulation mode.
- Enhancement (General): Added IEC 61850 test mode support for the following:
  - Test Mode control via:
    - LD0.LLN0.Mod, to control Mode of the entire IED (all Logical Devices)
    - DVI.LLN0.Mod, to control Mode of the DVI LD (Virtual Inputs)
    - SVI.LLN0.Mod, to control Mode of the SVI LD (Sampled Values)
  - Beh status of each Logical Node reflects the Logical Device Mode it belongs to.

- Incoming GOOSE (DVI) and Sampled Values (SVI) data is processed according to the Logical Node Mode it is mapped into.
- Enhancement (General): Added filtering of excess event messages based on the data quality of the source.
- Enhancement (General): Added event quality information to the System Diagnostics event report.
- Enhancement (General): Added support for the RecordBase Central Station Notify feature.
- Minor: Fixed issue where false glitches appear in CDR, swing, and PMU analog channels at one second intervals at 50Hz and 80 samples per second sample rate.
- Minor: Fixed issue where PMU will report incorrect phase angles under the following conditions:
  - More than 32 analog channels are used in the system.
  - PMU has been selected as the channel reference.
  - More than 31 channels have a magnitude of greater than 10 volts or amps.
- Minor: Changed the default PPP IP addresses to avoid conflicting with the Ethernet network port IP addresses.
- Minor: Fixed issue where the published GOOSE trigger time did not match the time stamp shown for the same event in the event log.
- Minor: Fixed issue where some status values were not reported correctly after rebooting the IED.
- Minor: Fixed issue where enabling PRP redundancy on ports 410 & 412 would result in Ethernet frames greater than 1500 bytes on this port, which required that all devices on the network support Jumbo Ethernet frames.
- Minor: Fixed issue where the MAC addresses of ports 410 and 411 were swapped with each other when displayed in TESLA Control Panel.
- Minor: Fixed issue where 'IEC61850Mgr: application event with bad time ttag' messages were sometimes reported in the system log, and the status of some External Input or Logic Functions were incorrect, immediately after a unit restart without a valid time reference available.

v1.2a – 2021-09-09

- Enhancement (General): Added support for SNTP time synchronization.
- Enhancement (General): Added support for GOOSE and Sampled Value subscribers to receive messages with any MAC address.
- Minor: Fixed issue with GOOSE publishing where transmission time was dependent on the timestamp of the associated value (status).
- Minor: Fixed an issue where Units.SIUnit in a published IEC 61850 GOOSE Report Control Block was reported as "phi" instead of "deg" for configured Angle Channels.

- Minor: Fixed an issue where IEC 61850 communication failed when the domain name was configured to the maximum length of 64 characters.
- Minor: Fixed an issue where a change in MX data will not trigger the creation of an IEC 61850 Report Control Block. https://erlphase.atlassian.net/browse/P0324NGT4K-987
- Minor: Fixed an issue where the IEC 61850 GOOSE server allowed a report to be enabled when the client made a change to the DataSet, instead of blocking the request. https://erlphase.atlassian.net/browse/P0324NGT4K-989
- Minor: Fixed issue where a change in Dbpos data didn't trigger an IEC 61850 GOOSE message update.

v1.2 – 2021-02-24

- Enhancement (Cyber Security):
  - Added support for network redundancy.
  - Added support for file transfer using IEC 61850 MMS.
  - Changed the default security profile to not require a password change upon initial login.
- Enhancement (General):
  - Added support for IEEE 1588 (PTP) time synchronization for power profile C37.238-2017.
  - Improved fault location accuracy.
  - Changed the default Incoming "IRIG Time Signal Properties" setting to Auto instead of Manual. This setting is on the Time screen in TESLA Control Panel.
  - Added asset management information to LD0.LLN0 and LD0.LPHD1 Logical Nodes.

v1.1 – 2020-11-13

- Enhancement (Cyber Security): Added the ability to enable/disable IEC61850 protocols on a per port basis.
- Enhancement (Cyber Security): Increased the number of available Ethernet ports from 2 to 4 by enabling ports 410 and 411.
- Enhancement: Added support for GOOSE subscription of Virtual Inputs with data types of Dbpos (DPS Double Point Status), Health, INT32 and INT32U.
- Enhancement: Added the ability to record Logic digital channels in fault and swing recordings.
- Enhancement: Added support for cooperative mode.
- Enhancement: Added support for 80 samples per cycle sample rate.
- Enhancement: Added support for recording and reporting of Data Quality.
- Enhancement: Added support for the recording of sampled values when the Merging Unit is not synchronized to the same time reference as the TESLA 4000-SV.
- Enhancement: Enhanced the way the timestamps of received GOOSE messages are handled to allow reception of messages from IEDs that are not synchronized to the same time reference as the TESLA 4000-SV.
- Enhancement: Increased the supported number of Sequence Component channels from 12 to 24.

- Enhancement: Added support for GOOSE subscription on any Ethernet port and on multiple Ethernet ports simultaneously.
- Enhancement: Added support for an enhanced GOOSE subscription and data model, allowing for more flexibility and control in GOOSE subscription handling.
- Enhancement: Added support for using the Product Configuration ID from the TESLA 4000-SV Ordering Template to define the IED hardware configuration in the setting file.
- Enhancement: Added support for rear panel COM port 405.
- Enhancement: Added the ability to change the baud rate of the front panel USB port 450 and rear panel COM port 405.

v1.0 – 2020-04-24

- Enhancement: Initial release for general availability.

CLASSIFICATION OF CHANGES MADE

The issues fixed in software / firmware upgrades are classified as defined below. While the decision to upgrade installed products is the user's, these classifications provide a guideline for the need and priority of the upgrade.

Critical: Critical changes fix issues/problems that prevent the basic operation of the device and have no workaround. Critical changes merit a product upgrade as soon as possible, if that function is being used under the conditions causing the issue

Major: Major changes fix problems that prevent the basic operation of the device but do have a workaround. Any major changes merit a product upgrade as soon as possible if the function is being used under the conditions causing the issue and a workaround is not acceptable.

Minor: Minor changes fix non vital issues that do not prevent the basic operation of the device and may or may not have a workaround. Product upgrades for such changes are not necessary unless they apply to and are needed by the user.

Enhancement: Feature enhancements add a capability or extend existing capabilities of the product. Upgrades for such changes need be made only if and when that feature enhancement is desired**.**