



## TR-3000 & DR-300 Digital Fault Recorder Fault and Disturbance Analysis for IEC 61850 Substations

### FR, DDR, PQ, SER, PMU and DNP3 functionality for Process Bus and hard-wired inputs together

The AMETEK Power Instruments' TR-3000 and DR-300 are multi-function digital fault recorders which support traditional hard-wired analog and digital inputs as well as IEC 61850 Station Bus and Process Bus virtual inputs. All of the following functions use both hard-wired and IEC 61850 virtual inputs in the same records and protocols.

- High speed transient fault triggered and continuous recording (FR)
- Slow scan disturbance triggered and continuous recording (DDR)
- Sequence of events recording (SER)
- Class A power quality
- Synchrophasors (PMU)
- DNP3

For triggered transient records, different sample rate data is stored in separate files without resampling to maintain an accurate record of events. These can be resampled and merged during analysis if needed.

### IEC 61850-8-1 Station Bus Ed 2.1

Using standard TR-3000 and DR-300 hardware, up to 256 virtual digital inputs can be mapped to published GOOSE messages from other substation IEDs and provides the same functionality for triggering, logging and protocols as hard-wired digital inputs. GOOSE messages for alarms and hard-wired digital inputs are published for other IEDs to subscribe to. Records and continuous logger data can be downloaded using the IEC 61850 MMS protocol and analog and digital measurements and derived values such as sequence components and power are available by buffered and unbuffered reports.

### IEC 61850-9-2 Process Bus Ed 2.1 (COMING SOON)

Up to four Process Bus Input Modules can be installed in one chassis, each capable of subscribing to 24 Sampled Values analog input channels at 80 samples per cycle (IEC 61850-9-2 LE) and 32 GOOSE messages. This provides up to 96 analog and 128 digital Process Bus inputs in one chassis with additional capacity for hard-wired input modules.

IEC 61869-9 and IEC 61850-9-2 LE profiles are supported providing greater flexibility and more efficient use of data packets.

### PTP - IEEE 1588 with C37.238 and 61850-9-3 Profiles

Precision Time Protocol (PTP) is becoming the most important method of time synchronization between substation IEDs, particularly in digital substations. The TR-3000 and DR-300 support IEEE 1588 with the IEEE C37.238 Power Profile and the IEC 61850-9-3 Power Utility Profile. PTP provides the time accuracy required for IEEE/IEC 60255-118-1 synchrophasors. TR-3000 and DR-300 also supports PTP, GPS and IRIG-B all at the same time with automatic failover to the next preferred time synchronization source with timestamped entries in the event log for traceability.

### PRP and HSR Redundancy Protocols (COMING SOON)

TR-3000 and DR-300 support the redundancy protocols defined in IEC 62439-3 without the need for external RedBox devices. LAN A and LAN B Process Bus and Station Bus electrical or fiber optic connections are supported.

### Environmental Standards

The TR-3000 and DR-300 comply with safety and EMC standards defined in IEC 61850-3, and protection relay 60255-26 and 60255-27 standards.



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