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DR-300 Multi-Function Recorder

For Generation, Transmission and Distribution Power System Monitoring

AMETEK
POWER INSTRUMENTS

The DR-300 is designed and optimized for the Distributed Energy Resources market with Class A PQ and traditional DFR capabilities to capture and diagnose power system anomalies in today's inverter-based applications. With multiple recording modes and continuous transient oscillography, you will never miss an event. The DR-300 captures high speed transients and long-term system disturbances with more record storage capacity, feature capabilities and process power to give you a complete view of the system disturbance.

Multi-Function Capability

The DR-300 is packaged in a compact 3U X 19" rack mount chassis taking the place of several devices, by providing fault and disturbance recording, continuous logging, power quality monitoring and sequence of events recording. All recording modes operate simultaneously and independently to provide a complete picture of system events.

Ease of Use

The DR-300 leverages our more than 50 years of experience with digital fault recorder hardware and software, making it easy to configure, install and update. The compact modular architecture is suited for all applications by adding up to four input modules to the chassis to fit your needs.

High Reliability

The DR-300 is highly reliable, incorporating a low-power fan-less operation with no moving parts and a 64 GB solid state drive for long-term storage. Each chassis can be equipped with up to four input modules, configured with six analog and 12 digital inputs, for a maximum 24 analog and 48 digitals inputs, multiple time sync options, three programmable contact outputs and optional battery backup. Input modules each have their own

dedicated processor for independent monitoring.

Multiple independent ethernet ports support simultaneous connections for reliable network communications and secure data transfers.

Field Proven Technology - Never Miss An Event

The core strength of AMETEK Recorders is the extensive triggering and recording capabilities to ensure you never miss an event. Flexible triggering options make it easy to capture a simple fault or uncover a complex system anomaly. Independent provides continuous waveform recording for four¹ days to capture events that are too sensitive for your triggers or to extend pre-and post-fault data recorded.

FEATURES AND BENEFITS

- 1 Multiple recording modes—capture high speed transient faults and long-term disturbances
- 2 Never miss an event—flexible triggering, continuous transient oscillography and longer recording times
- 3 Ease of use—100% software configurable, no jumpers or switches
- 4 High reliability—64 GB solid-state memory, no moving parts
- 5 Field proven display Station Software—single software platform for all products

Triggering

The system can be triggered with independent settings for transient and disturbance recording or combined settings for both transient and disturbance recording modes. This allows you to customize the recording for your specific application; including fault analysis, switchgear operation, grid instability, circuit breaker performance and power quality.

Type	Measurement	Trigger	Per Channel	Phase Group	Line Group
Transient and Disturbance Triggers	Analog (Voltage/Current)	Over, Under, Rate of Change, Channel Difference	X		
	Analog (Harmonics)	Over (THD & 2 specified Individual Harmonics per channel.	X		
	Digital Inputs	Level, Edge, Return to Normal	X		
	Phase Group	Zero, Negative, Positive Sequence, PQ (Sags, Swells, Interruptions)		X	
	Frequency	Over, Under, Rate of Change	2		
	Timed	Daily, Weekly, Monthly & Time selectable automatic Triggers			
Transient and Disturbance Triggers	Voltage Imbalance	Over		X	
	PF & Displacement PF	Over, Under, Rate of Change			X
	Impedance	Over, Under, Rate of Change			X
	Analog Fundamental	Over, Under, Rate of Change	X		
	Frequency Oscillation ¹	4 Frequency Bands	2		
	Power Oscillation ¹	4 Frequency Bands			X
	Power (Watts, VARS, VA)	Over, Under, Rate of Change			X

Recording Modes

The DR-300 has both triggered recording modes and continuous recording modes. Both recording modes are enabled simultaneously for capturing high resolution data from a system anomaly and performing long term trending. The 64 GB solid state drive provides ample storage for all your data.

Triggered Recording Modes			
Type	Measurement	Pre-Trigger Data	Post-Trigger Data
Transient	32 - 256 Samples/Cycle 1.6 - 12.8 kHz (50 Hz), 1.9 - 15.36 kHz (60 Hz)	2 - Cycles to 5 Seconds	8 - Cycles to 30 Seconds
Disturbance	0.5 - 2 Samples/Cycle 25 - 100 Hz (50 Hz), 30 - 120 Hz (60 Hz)	10 Seconds - 5 Minutes	30 Seconds - 25 Minutes

Continuous Recording Modes

Type	Measurement	Values	Per Phase Line Recording Interval Channel Group Group			Duration
Logger	Voltage/Current	Min/Max/Avg	X			1 Minute 26 Weeks
	Frequency	Min/Max/Avg	2			1 Minute 26 Weeks
	Power (Watts)	Min/Max/Avg		X		1 Minute 26 Weeks
Power Quality	Voltage Imbalance	Min/Max/Avg		X		10 Minutes 26 Weeks
	Flicker (Short & long-term)	Min/Max/Avg		X		10 Minutes 26 Weeks
	Harmonics (Voltage/Current)	Magnitude/Phase Angle/ Min/Max/ Avg (Up to 128th)	X			10 Minutes 26 Weeks
SER	Digital Inputs	On/Off	X			Millisecond 26 Weeks
Transient Oscillography	Voltage/Current	Waveform	X			8, 16 or 32 Samples/Cycle (480 - 1,920 Hz /400 - 1,600 Hz) 14 - 60 Days ¹
Disturbance Logger	Voltage/Current	RMS, Fundamental, Phase Angle	X			30/60/120 Hz (25/50/100 Hz) 14 - 60 Days ¹
	Frequency	Magnitude	2			30/60/120 Hz (25/50/100 Hz) 14 - 60 Days ¹

Fault recording data is stored in COMTRADE format inside the recorder for convenient retrieval and analysis. All recorded data can be retrieved by date/time frame and at lower resolutions than what was recorded. This lets you quickly retrieve data at lower sample rates with the assurance that high resolution data can be reviewed at another time.

Power Quality Recording

The power quality at your site is recorded automatically with logs to store individual current and voltage Harmonics up to the 128th, Flicker, imbalance, frequency and steady state RMS voltage/current with 26 weeks of internal storage. Data can be retrieved and displayed graphically in the display station analysis software using preconfigured templates for voltage sags and swells, harmonics and comparisons to PQ standards (IEC 61000-4-30 Class A).

Sequence of Events Recording

The digital inputs are timestamped to the millisecond during an event, recording alarms and return to normal states in a separate log.

System Architecture

The 3U chassis holds up to four input modules that can accept six analog and 12 digital inputs each for a system capacity of 24 analog and 48 digital inputs. Multiple chassis can be combined together for larger systems. Each input module provides its own processing with a system control module managing the flow of data to and from the recorder. A universal AC/DC power supply is provided with each chassis and there is a slot available for a redundant power supply. The hot-swappable input modules are accessible from the front of the unit.

Options & Accessories

A battery backup module (one or two battery packs) can be added in place of one of the Input Modules to provide up to 30 minutes¹ of uninterruptible power in the event the main power source is compromised.

Upgraded Functionality

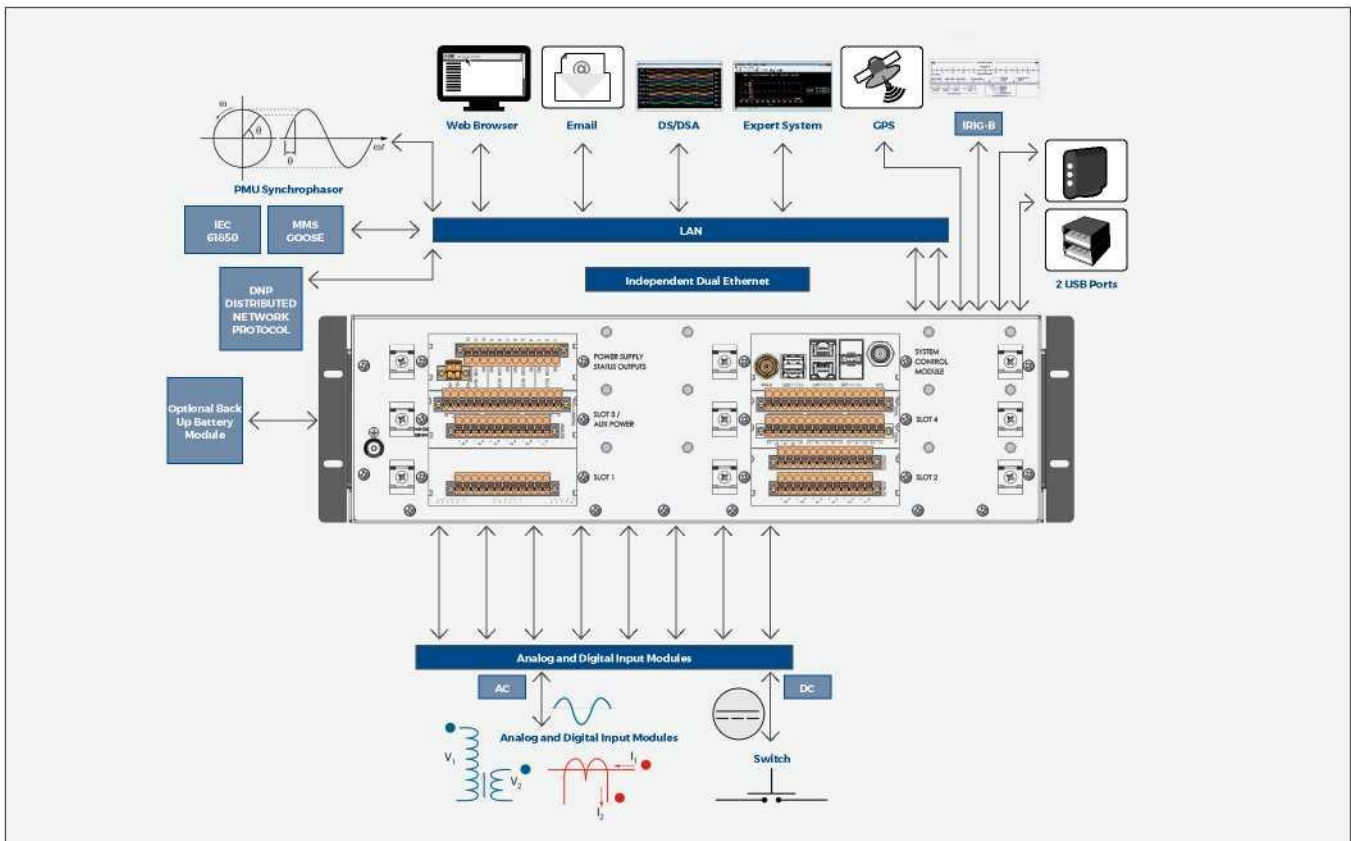
Many features are upgradable to the match the TR-3000 Digital Fault Recorder's capabilities and functionality with additional licensing. Some include sample rate, SSD size, logger durations (DL, CTO, PQL) and more. Contact us to learn what features are upgradable.

Communications

The DR-300 front panel has a local ethernet port for communications and USB port for configuration of the unit. The rear of the unit has dual independent ethernet ports, each with its own IP address for configuration and data retrieval. The unit has a built-in web server for system configuration and updates. Communications are secured using SSH encryption and data can be manually or automatically retrieved using our Autocall/Autopoll functions.

Time Sync

Several time sync options are available including a built-in GPS receiver for connecting to external antennas, IRIG-B, SNTP and PTP.



Note:

¹Additional licensing required

SPECIFICATIONS

INPUTS

Analog Inputs

- Built in DSP for computations
- 16 bits, 32,768 levels (12.8 KHz/15.36 KHz)
- Fixed 256 samples/cycle (26 kHz/31 kHz)
- Accuracy Better Than 0.1%
 - o f Reading Down to 3% of Full-Scale

Voltage Input Ranges

- 1.414, 10, 150, 300 V RMS full-scale or custom range (AC or DC compatible)

Current Input Ranges

- 1 A or 5 A RMS nominal (thru current shunts/ CICT's)

Frequency Response

- DC-1/2 sampling rate

Digital Inputs

- 24 to 250 VDC normally open or closed wetted contact

Input Modules Types - up to 4 IMs

- 6 Analog (current or voltage) and 12 Digital Inputs
- 6 or 12 Analog (current or voltage) Inputs
- 12 or 24 Digital Inputs

System Capacity

- 6, 12, 18... up to 48 Analog (current or voltage)
- 12, 24, 36... up to 96 Digital
- Multiple units tied together for larger systems

TRIGGERING

(TRANSIENT/DISTURBANCE)

Analog Channels

- Voltage/current: over/under, rate of change (ROC)
- Harmonics: THD and individual harmonics (2 per channel)

Phase Group Sequence Triggers

- Over zero, over negative, over/under and ROC positive sequence

Frequency

- Frequency channels 1 & 2, frequency differential, over/under, ROC

Digital Channels

- Normal to alarm state and return to normal state. Edge or level sensitive.

TRIGGERING (DISTURBANCE)

Analog Channels

- Over/under level of fundamental and ROC, frequency and ROCOF

Line Group Triggers

- Over/under, ROC
- Impedance, power factor, power factor displacement, power oscillation, power (watts, VARs, VA)

RECORDING (TRANSIENT)

Recording Rate

- 32, 64, 128 & 256 samples/cycle
- 1.6, 3.2, 6.4, 12.8 & 25.6 kHz (50 Hz)
- 1.9, 3.8, 7.7, 15.6 & 30.7 kHz (60 Hz)

Pre-fault time

- 2 to 300 cycles

Post-fault time

- 8 to 60 cycles. Fault length extends as long as trigger condition exists

Safety Window

- 0 to 8 cycles recording time after active trigger

Recording Duration

- 0 to 30 sec. (prevents memory filling with a continuous trigger)

RECORDING (DISTURBANCE)

Recording Rate

- 0.5, 1.0 & 2.0 samples/cycle
- й, 1 or 2 X supply frequency (25/50/100 Hz or 30/60/120 Hz)

Pre-fault Time

- 10 sec. to 5 min.

Post-fault Time

- 30 sec. to 2 min.
- Fault length extends as long as trigger point condition exists

Safety Window

- 30 sec. to 1 min. recording time after active trigger

Recording Duration

- 60 sec. to 20 min.

Recorded Values

- Voltage and current phasor and RMS values and frequency (x2)

CONTINUOUS RECORDING

(LOGGING)

Recording Rate

- 1 min.

Recording Time

- 52 weeks

Stored Parameters

- Voltage and current per channel, watts (per circuit)
- Frequency (2 channels)

CONTINUOUS RECORDING

(POWER QUALITY)

Recording Rate

- 10 min.

Recording Time

- 52 weeks

Stored Parameters

- Voltage imbalance, flicker, individual harmonics to 128th

SER RECORDING

- 1 msec. recording of all digital inputs

CONTINUOUS RECORDING

(TRANSIENT OSCILLOGRAPHY)

Recording Interval

- 8, 16, 32 samples/cycle
- 400, 800, 1,600 Hz (50 Hz)
- 480, 960, 1,440 Hz (60 Hz)

Recording duration

- 1 to 4¹ days (depending on sample rate)

CONTINUOUS RECORDING

(DISTURBANCE LOGGER)

Recording Rate

- й or 1 x supply frequency
- (25/50 Hz or 30/60 Hz)

Recording Time

- 14 to 28 days (based on recording rate)

Stored Parameters

- Voltage and current phasors RMS values and frequency +(x2)

SYSTEM TIMING

Time Synchronization Accuracy

- Internal GPS receiver
- IRIG-B (Mod & TTL)
- Network Time Protocol (SNTP)

COMMUNICATIONS

Network Protocol: TCP/IP

- 10/100 Base-TX, (1 Front, 2 Rear)
- 3 X RJ/45 type (1 Front, 2 Rear)

USB Serial Ports

- 3 x USB -2 (1 Front, 2 Rear)

DATA STORAGE

Solid State Storage

- 64 GB internal solid state memory

POWER SUPPLY

Input Voltage Options

- 88 to 373 VDC, 85 to 264 VAC
- 24 to 75 VDC

Power Requirement

- 10 to 50 Watts¹ (# of IMs)

Battery Backup (Optional)

- 20 min. duration

ENCLOSURE

Chassis

- Cabinet mount (11.75 in x 16.0 in x 8.25 in) (300 mm x 400 mm x 210 mm)
- 3U (7") 19" chassis mount

ENVIRONMENT

Operating Temperature

- 14°F to 131°F (-10°C to 55°C)

Relative Humidity

- 0 to 97% non-condensing

CERTIFICATIONS & STANDARDS

CE

- Complies with Power Industry Substation Standards Including: Vibration Tests for Relays and Protection Equipment

- IEC 60255-21-(1, 2, 3)
- Measuring Relays and Protection Equipment, Electromechanical Compatibility - For Class B Installations

- IEC 61326-1
- IEC 60255-26 (IEC 61000-4-(2-6, 8-12, 16-18), 29)
- CISPR11, 22
- IEC 60255-27

Electrical Equipment for Measurement, Control & Laboratory Use - EMC

- EC 61326-1 (IEC 61000-4-(2-6, 8-12, 16-18), 29)
- Environmental testing
- IEC 60068-2-(1, 2, 14, 30)

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