TELEDYNE LECROY
Everywhereyoulook™

MDA800A Series Motor Drive Analyzers

Key Features

Complete Motor Drive System Debug and Validation in One Instrument

Three-Phase Power Measurements; Real, Apparent, Reactive Power

Efficiency Measurements

User-Configurable Numerics Table

Two- and Three-Wattmeter Methods Supported

Per-Cycle Time-Correlated Waveforms From Power Values

Harmonics Calculations and Filtering (optional)

Dynamic Drive Response Analysis, From Startup To Overload

Unique Zoom+Gate Mode

Line-Line To Line-Neutral Voltage Conversion

Up to 6000 V_{RMS} Isolation with HVD Series Differential Probes

Easily Interface Other Current Measurement Devices

Complete Motor Interface (Torque, Speed, Position)

Graphical User Interface

Motor Drive Analyzers provide complete three-phase electrical and mechanical power analysis with static power results in a convenient, configurable Numeric table and dynamic power displayed as per-cycle Waveforms. Motor speed, position, and torque integration are the most complete available. Zoom+Gate mode provides ability to understand and isolate dynamic behaviors. Long memory, 8 analog input channels (MSO optional) with high resolution (12-bits), sample rate, bandwidth and memory (up to 250 Mpt/ch) provides unique capability to perform complete system debug on the inverter subsection, embedded control system, and motor mechanical performance.

Complete Drive System Debug

The Motor Drive Analyzer acquires power and control system signals and performs three-phase power analysis of the power section waveforms. Correlation of drive system behaviors to embedded control loop signals enables debug and analysis of all aspects of the complete motor drive.

Numerics Measurement Table

Various voltage, current, power (real, apparent, and reactive), phase angle/ power factor, and efficiency parameters are calculated on acquired voltage and current waveforms and displayed in a table. The table is displayed along with the acquisition waveforms.

Zoom+Gate Dynamic Analysis

Capture long acquisitions and Zoom+Gate with instant table value updates and views of dynamic three-phase power and motor performance.

Most Complete Motor Mechanical Interface

Simple integration is provided for nearly any type of speed, rotation or position sensor, including analog and digital (pulse) tachometers, Brushless DC (BLDC) Hall sensor, Quadrature Encoder Interface (QEI), and Resolvers. Additionally, Hall sensor and QEI signals can be integrated through digital inputs, preserving valuable analog input channels for other signals.

THE MOTOR DRIVE ANALYZER – A NEW CLASS OF INSTRUMENT

Instrument Evolution

The increasing speed, size, and complexity of three-phase power electronics and drives systems calls for new instruments that can acquire any drive or motor signal and perform debug, validation and analysis on the complete drive system, including three-phase power and efficiency calculations.

That new instrument is the Teledyne LeCroy Motor Drive Analyzer. It has capabilities that previously required multiple instruments. It is built on the HDO8000A oscilloscope platform, so it also functions as complete 8 channel high-definition oscilloscope for general purpose debug as well as performing electrical and mechanical power analysis.

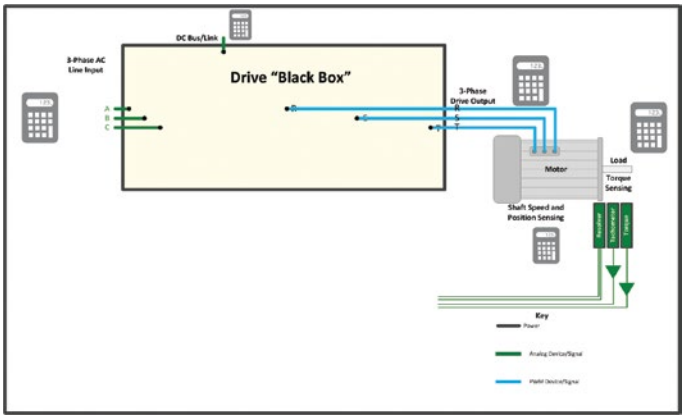
The Motor Drive Analyzer has the bandwidth (1 GHz at 2.5 GS/s), inputs (8 analog channels + 16 optional digital channels), acquisition memory (50 Mpts/ch standard, up to 250 Mpts/ch optional) to acquire any signal, from high-speed embedded control signals to low-speed mechanical signals, and the power system signals in between. Then, it performs three-phase electrical and mechanical power analysis beyond what a simple power analyzer instrument can do. One acquisition system means one result on one display, and faster understanding.

Motor Drive Analyzer Complete Capability

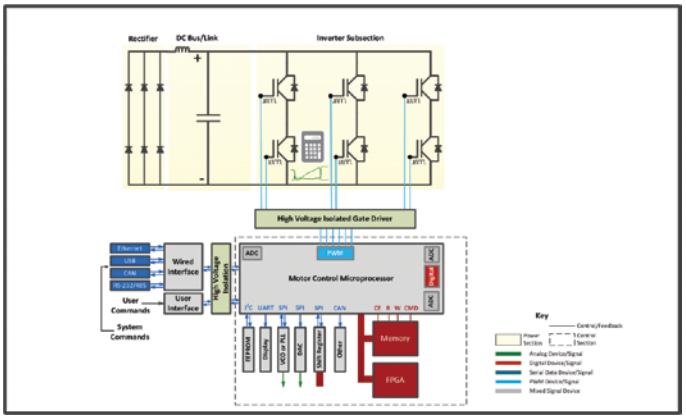
Power analyzers perform a single function, and have their place as a “golden-reference” power measurement device. But they are limited to steady-state power analysis and provide simple “black-box” analysis. 4 channel and/or 8-bit oscilloscopes are good for basic embedded control debug and validation, but they lack enough inputs for complex drive system and control loop analysis, and don’t have enough resolution to precisely measure power and efficiency values.

The Motor Drive Analyzer has none of these limitations, can acquire any analog, digital, serial data, or power signal and perform complex three-phase electrical and mechanical power calculations and dynamic drive and control loop analysis.

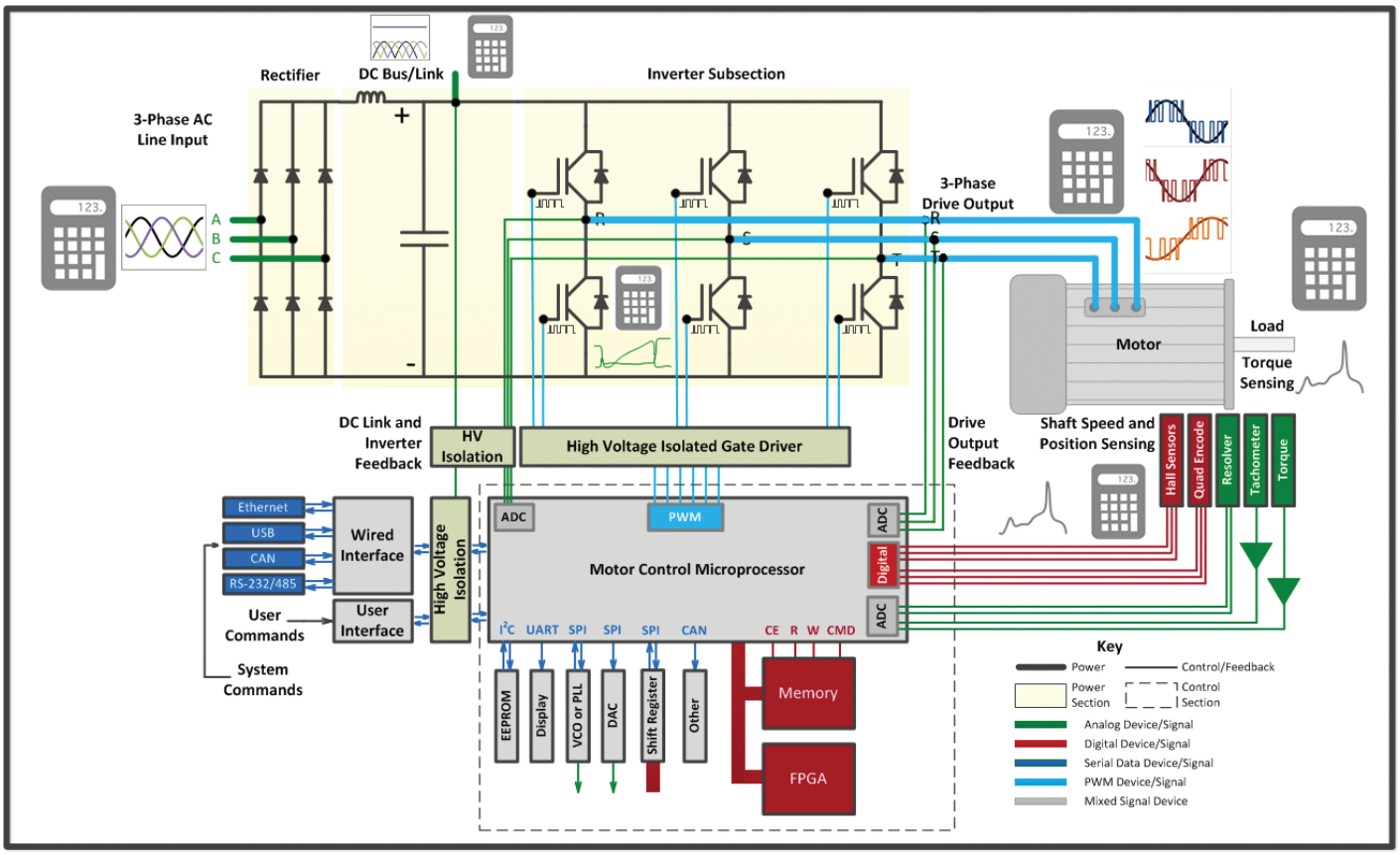
Power Analyzer Test Coverage



4 Channel and 8-bit Oscilloscope Test Coverage

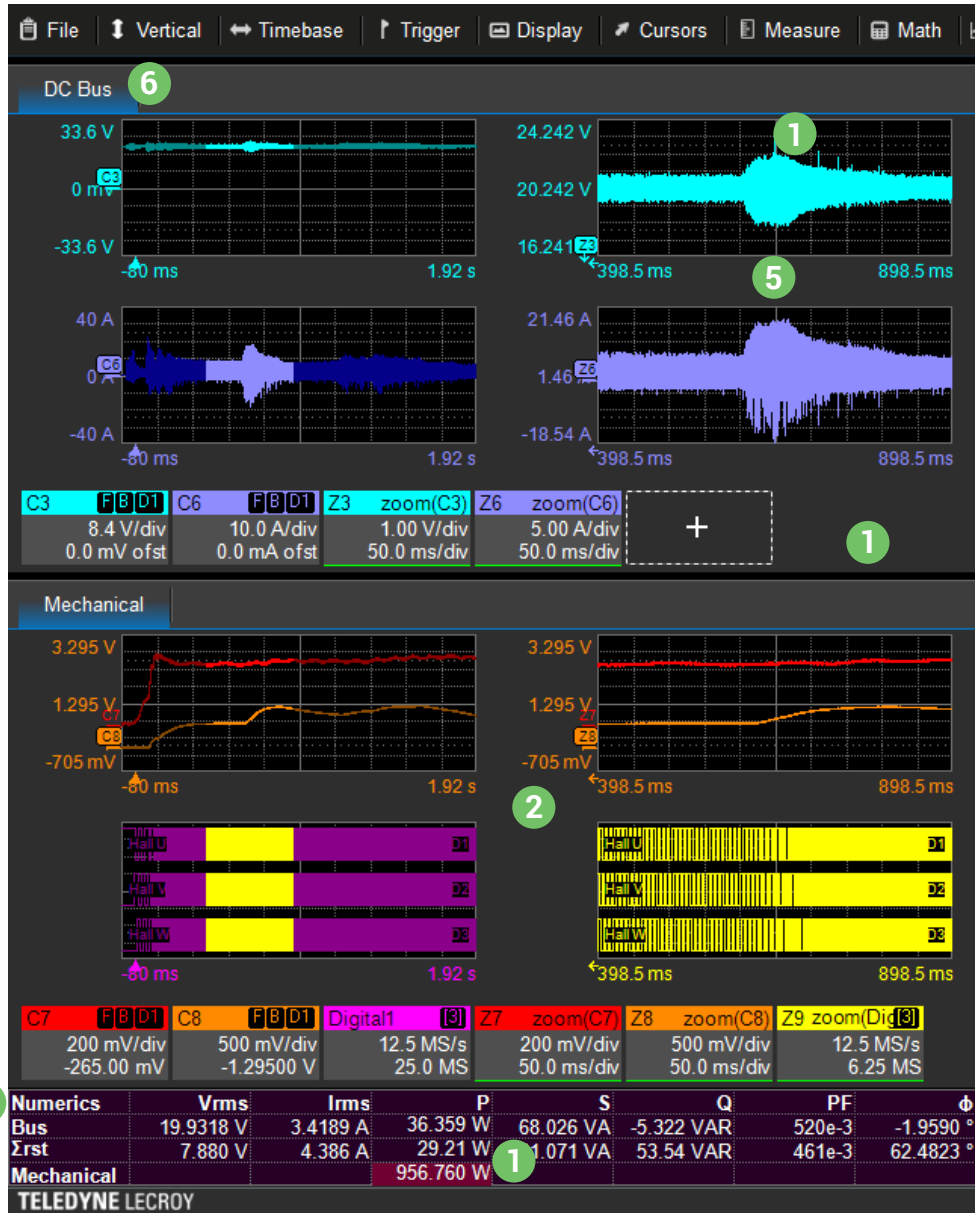


Teledyne LeCroy Motor Drive Analyzer Test Coverage



MORE CAPABILITY THAN YOU EVER IMAGINED

The Motor Drive Analyzer provides an extensive range of capabilities to allow you to debug your three-phase power electronics or motor drive design faster than ever before. Don't limit yourself to one screen – attach a UHD (4k) monitor and create a larger palette to perform your analysis on.



1. Zoom+Gate Mode

Take a single long acquisition of a dynamic event, and with the press of one button, zoom through the waveforms and gate the measurement results to the zoomed area. Change the zoom position and the measurement tables and per-cycle "synthesized" Waveforms update instantly. Gain faster understanding of dynamic drive and motor behaviors.

2. Comprehensive Speed Integration

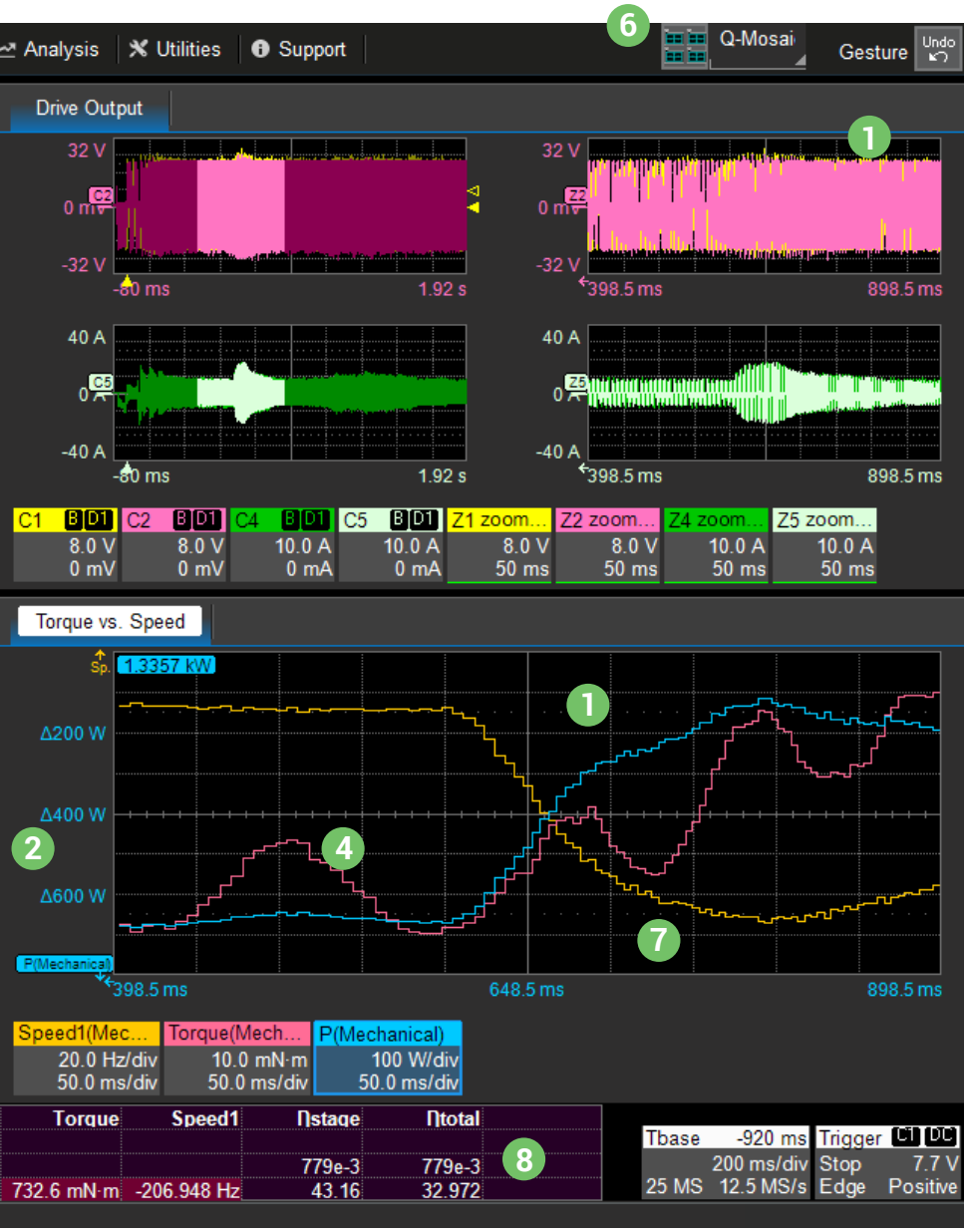
Supports Hall sensors, Quadrature Encoder Interface (QEI), Resolver, SinCos, KMZ60 and many other interfaces for speed and angle calculations

3. Numerics Table

User-definable and quickly summarizes the mean value for the entire acquisition

4. Dynamic Power Waveform Displays

Simply touch a measurement and a per-cycle "synthesized" Waveform is created showing the change in that measurement over time



5. Vertical Zooming

Capture then vertically zoom for detail, as shown here in the DC bus voltage and current signals

6. Q-Scape Displays

Use Q-Scape multi-tabbed displays to organize waveforms onto separate tabs, then view them all at once, or one tab at a time

7. Per-cycle "Synthesized" Waveforms

Enhances and speeds understanding of complex behaviors. Note the red trace (Torque) clearly shows torque ripple behaviors.

8. Multi-Stage Power Analysis with Efficiency

Calculated stage-stage and overall (cumulative) efficiency independently for greater understanding

Cursors

Place a cursor on any waveform and get an instantaneous reading of drive behavior

XY Displays

Up to 12 different XY displays on up to 8 different XY grids, or conventional grids

Statistics Table

Displays the complete measurement set statistical data for any Numerics table measurement

Numerics Measurement Table

Like a power analyzer, a user-configurable table is provided for display of a selection of power (real, apparent, reactive), power factor, phase angle, efficiency, voltage, current or motor mechanical parameters. Up to 120 values total may be displayed in 10 rows and 12 columns for any selection of input or output individual phase or total three-phase, DC bus/link, or motor mechanical values. Efficiency, slip, and rotor angle may also be displayed.

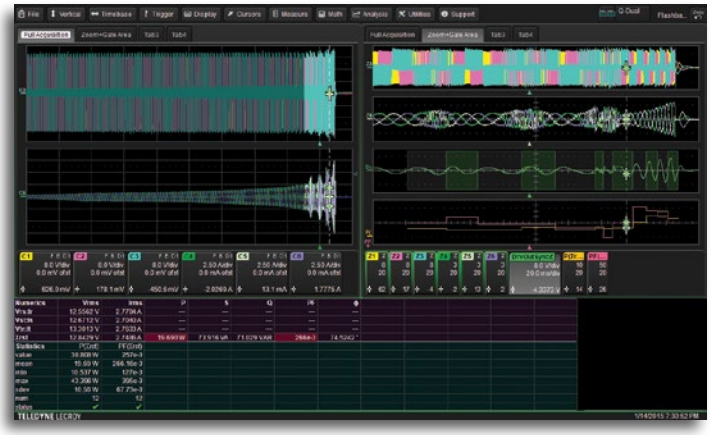
The numeric values displayed are mean values from a statistical data set that is calculated on a “per-cycle” basis using a user-defined synchronization source signal. This display corresponds to what is normally provided by a dedicated power analyzer instrument.

Numerics		Vrms	Irms	P	S	Q	PF	ϕ
Vr:Ir	LL to LN	68.43 V	651.2 mA	35.120 W	44.563 VA	27.428 VAR	788e-3	37.9908 °
Vs:Is	LL to LN	69.09 V	655.4 mA	35.528 W	45.276 VA	28.065 VAR	785e-3	38.3062 °
Vt:It	LL to LN	69.65 V	658.6 mA	36.145 W	45.870 VA	28.239 VAR	788e-3	37.9991 °
Σrst	LL to LN	69.06 V	655.1 mA	106.794 W	135.71 VA	83.735 VAR	787e-3	38.0997 °

This two second capture shows the drive output waveforms on the left and the Torque, Speed and Mechanical Power Waveform per-cycle values over time are shown to the right.

Per-cycle “Synthesized” Waveforms

A single averaged value “hides” dynamic behaviors. Simply “touch” the value in the Numerics table and a detailed per-cycle Waveform will be created from the complete per-cycle measurement set and then automatically displayed time-correlated to the original acquisition. Statistical values (min, max, number, etc.) can also be displayed. Use this advanced capability to correlate complex drive behaviors to other control or power system waveforms, and to debug drive system problems. This capability is not provided in any Power Analyzer instrument.



Zoom+Gate Mode

Enable Zoom+Gate mode to create zooms of all channel acquisitions and gate the Numerics and Statistics measurement tables to the zoomed area. Per-cycle displayed Waveforms will be zoomed and time-correlated to the other Zoomed waveforms. Change the zoom location and size and the data will instantly update. Scroll quickly through your measurement set to gain fast and deep insight into dynamic drive and control system behaviors.

MORE DEBUG AND VALIDATION FLEXIBILITY

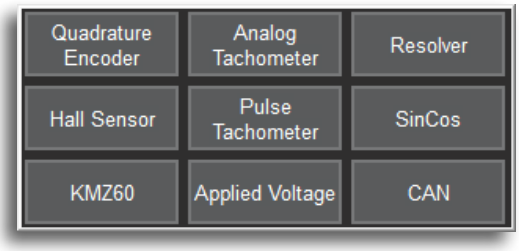
Dynamic Drive Response

The long acquisition memory in the Motor Drive Analyzers (up to 250 Mpts/Ch) provides unique capabilities for motor and drive dynamic response analysis. For example, 25 seconds of continuous acquisition capture is possible at a sample rate of 10 MS/s. This permits complete understanding of dynamic drive behaviors, such as startup, application of load, or fast changing load conditions, and correlation of drive response problems to control system instructions or power section failures.

This 480V drive has 10 second acquisitions for the AC Input and Drive Output (on the left) and on the right are shown power, efficiency and power factor Waveforms over time.

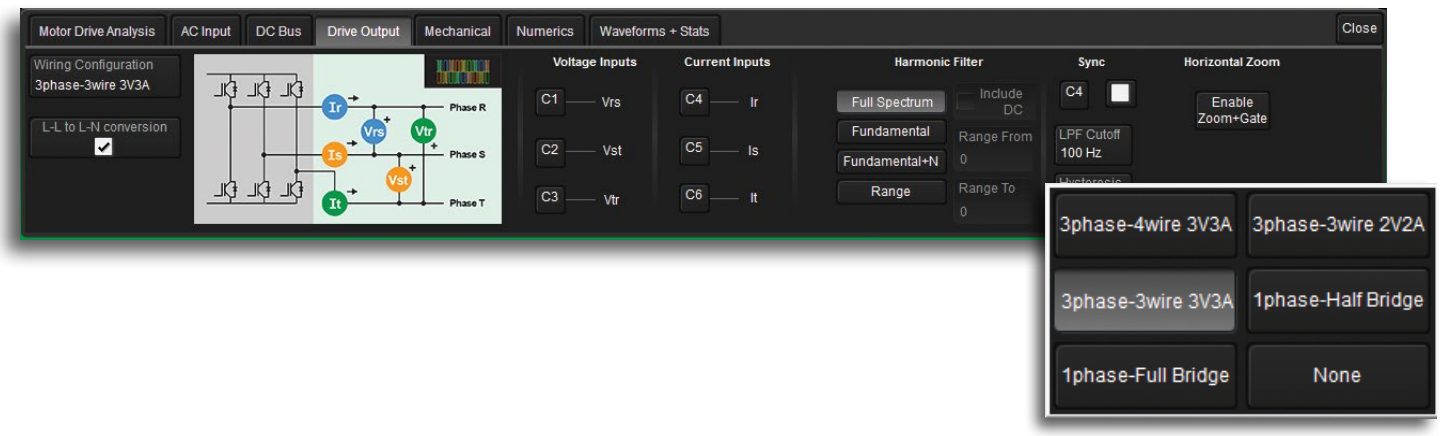
Motor Mechanical Integration

The combination of 8 analog and 16 digital inputs (optional) in the Motor Drive Analyzers provides more motor integration capability than a power analyzer instrument. For instance, not only can standard analog and digital (pulse) tachometers be integrated for speed sensing, but analog Resolvers, digital Quadrature Encoder Interface, Brushless DC Hall Sensors, and many others may also be used to provide speed, direction, and absolute position information, not normally possible with a power analyzer. Many



Flexible Setup Capability

The eight analog input channels provide capability for direct measurement of three voltage and three current signals from an AC Line input or Drive Output. However, support is also provided for a two-wattmeter measurement method for three-phase power, which allows three-phase measurements to be made using two voltage and two current signals. Therefore, input/output efficiency measurements of a complete drive can be performed using the eight analog input channels. Support is also provided for a Line-Line to Line-Neutral voltage conversion so as to allow intuitive line-line probing with per-phase line-neutral reported results.



CAPABILITIES AND PERFORMANCE

Motor Drive Analyzer Capabilities

Setup Capability

Measurement Locations	AC Input, DC Bus (Link), Drive Output, Mechanical Output
Wiring Configurations	AC Input: 1-phase / 2-wire (1V1A); 1-phase / 3-wire (2V/2A); 3-phase / 3-wire (2V2A); 3-phase / 3-wire (3V3A); 3-phase / 4-wire (3V3A); None DC Bus: 1-phase / 2-wire (1V1A); None Drive Output: 1-phase / Half-Bridge (1V1A); 1-phase / Full-Bridge (1V1A); 3-phase / 3-wire (2V2A); 3-phase / 3-wire (3V3A); 3-phase / 4-wire (3V3A); None
Harmonic Filter	Select either Full Spectrum or Fundamental only. With MDA800-HARMONICS option, also select Fundamental + N Harmonics or Range (maximum 50th harmonic in both cases).
Sync (per-cycle) Measurement Signal	Independently settable for AC Input, DC Bus, Drive Output and Mechanical Output. Low pass filter (LPF) cutoff settable from 20 Hz to 1 MHz. Hysteresis settable from 0-100% full amplitude. Source can be any input analog channel, memory trace, or math function.
Voltage Measurement Method	Line-Line or Line-Neutral (with L-L to L-N conversion supported)
Calculation Waveform Sources	Any input channel or stored memory trace

Numerics Measurement Table Selections (Per-cycle Calculated, Mean Value Displayed)

Voltage	RMS voltage, AC Voltage, DC Voltage, Peak Positive Voltage, Peak Negative Voltage, Peak-Peak Voltage, Voltage Crest Factor, Voltage Total Harmonic Distortion (THD) (with the MDA800-HARMONICS option)
Current	RMS Current, AC Current, DC Current, Peak Positive Current, Peak Negative Current, Peak-Peak Current, Current Crest Factor, Current Total Harmonic Distortion (THD) (with the MDA800-HARMONICS option)
Power, Efficiency, + Other	Real, Apparent, and Reactive Power, Peak Positive Real Power, Peak Negative Real Power, Power Total Harmonic Distortion (THD) (with the MDA800-HARMONICS option), Power Factor, Phase Angle, Incremental Efficiency, Total Efficiency, Frequency
Motor Mechanical	Torque, Speed1, Speed2, Angle1, Angle2 (as defined by sensor, or adjusted with Offset Angle setting), Mechanical Power, AC induction motor Slip
Source Selections	Voltage: Va, Vb, Vc, Va-b, Vb-c, Vc-a, Vr, Vs, Vt, Vr-s, Vs-t, Vt-r, Ia, Ib, Ic, Ir, Is, It, Vbus, Ibus, Mechanical. Up to 10 rows (sources) and 12 columns (measurements) may be displayed in the table at any time. Source selections dependent on Wiring Configuration selections and Line-Line to Line-Neutral selections.

Per-cycle "Synthesized" Waveforms and Statistics

Waveforms	A time-correlated waveform of any per-cycle Numerics Table measurement parameter may be created and displayed anywhere on the grid. Up to 12 detailed per-cycle Waveforms may be displayed at one time, with up to 40 waveforms total (channels, memories, zooms, math, and per-cycle Waveforms) displayed at any one time.
Statistics	Detailed statistics on up to 12 per-cycle Numerics Table measurement parameters may be displayed at one time.

Motor Mechanical Interface

Speed + Direction	Analog Tachometer (0-xVdc = speed). Source is analog input. Digital Tachometer (x pulse/revolution = speed). Source may be digital or analog input. Applied Voltage. Source is one analog input. Controlled Area Network (CAN) Serial Data. Source is CAN message with embedded digital data. CANbus TDM or TDME option must be ordered separately. Hall Sensors (three digital inputs). Source may be digital or analog input. Angle Tracking Observer filter may be applied to this selection.
Speed + Direction + Position	Resolver. Source is three analog inputs. SinCos. Source is two analog inputs. KMZ60. Source is two analog inputs. Quadrature Encoder Interface (QEI) (A, B, and optional Z input). Source may be digital or analog input. Angle Tracking Observer filter may be applied to all selections.
Torque	Analog 0-Vdc = Torque. Source is one analog input. Analog mV/V = Torque. Source is one analog input. Analog Frequency Modulated = Torque. Source is one analog input. Motor Constant K * Current = Torque. Source is MDA calculated per-cycle current value. Controlled Area Network (CAN) Serial Data = Torque. Source is CAN message with embedded digital data. CANbus TDM or TDME option must be ordered separately.

Zoom+Gate Mode

Operation	Press "Zoom+Gate" button to create zooms of all voltage, current and mechanical signals (analog or digital) and simultaneously gate the Numerics and Statistics tables to the zoomed area. Displayed per-cycle "synthesized" Waveforms are simultaneously time-correlated to the zoomed area. Scroll through the full acquisition using Zoom position and ratio (size) controls and view instantaneous updates of table values.

Typical Accuracy

Voltage, Current and Power	Typically within 1%, depending on voltage and current measurement device. Recommended voltage probe (line-line voltage sensing) = Teledyne LeCroy HVD Series High Voltage Differential Probe (1kV, 2kV and 6kV isolated models available). Recommended voltage probe (line-neutral or line-reference voltage sensing) = Teledyne LeCroy HVD Series HV Differential Probe for voltages >50Vrms, Teledyne LeCroy passive probe (Qty. 4 included) for voltages <=50Vrms Recommended current probes = Teledyne LeCroy CP Series Current Probes Other voltage and current measurement devices may be interfaced to the oscilloscope and analysis software using built-in rescaling and unit selection capabilities. The CA10 current sensor adapter provides programmability for rescaling and unit selection. .

Harmonics Calculation Option (part number MDA800-HARMONICS)

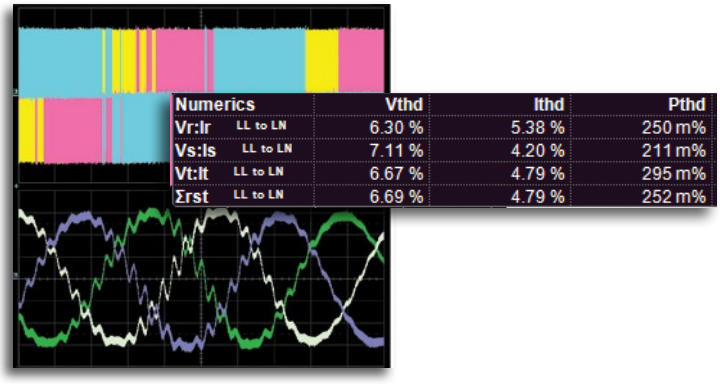
Fundamental Frequency Detection	Fixed Frequency Detection mode (for Line AC inputs only) or Varying Frequency Detection Mode (for Line AC inputs or Inverter PWM outputs).
Number of Harmonics Calculated	Up to 100 (Fixed Frequency) or up to 50 (Varying Frequency)
Harmonics Table and Spectral Waveform Display	Display values by Harmonic Order for up to 9 quantities (Voltage, Current and Power) for any or all of three phases (limited to Voltage and Current in Fixed Frequency mode).
Units/Limits Selection	"Select from either Amps/Volts/Watts, %, or dB. For Fixed Frequency, selection Limits file or create and assign custom limits file. "

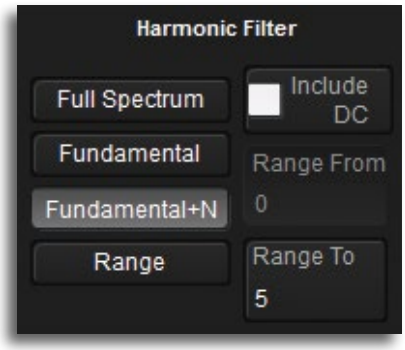
Other Available Options & Accessories

Acquisition Memory	100 Mpt/ch (HDO8kA-L) and 250 Mpt/ch (HDO8kA-XL)
Mixed Signal Option	16 digital input capability (HDO8k-MSO). Up to 250 MHz digital clock rate, flexible analog and digital cross-pattern trigger and use of digital logic lines for mechanical speed sensing and serial data clock, data, and chip select probing, including (optional) serial data triggers and decoding
Serial Triggers, Decoders, Measure/Graph and Eye Diagram options	A wide variety are available including I2C, SPI, UART-RS232, CAN, LIN, FlexRay, ARINC429, Audio (I2S), DPHY, DigRF3G, DigRFv4, ENET, Manchester, MIL1553, SENT, USB2, and USB2-HSIC. Symbolic triggering and decoding is available for CAN. TDME options provide automatic serial message timing measurements and serial (digital) data extraction and conversion (D-A capability) and eye diagram capabilities.
Probes and Accessories	A comprehensive list of voltage and current probes is supported on the Motor Drive Analyzer. Additionally, rackmounts, carts, soft carrying cases and local language front panel overlays are also available.
Software Options	Include Power (Semiconductor Device and Switch-mode Power Supply) Analysis, Digital Filtering, Jitter, EMC/EMI Measurements, and Developer's Toolkit.

Harmonics Calculation Option (MDA800-HARMONICS)

Harmonics calculations on the line-side (fixed frequency) or inverter/drive output (variable frequency) up to a user-defined harmonic order can be calculated and displayed in a table with concurrent spectral views. THD per-cycle measurement capability is added to the Numerics table, with per-cycle Waveforms of THD over time. Two new harmonic filter settings are added to the AC Input and Drive Output setups - "Fundamental + N" and "Range".





ORDERING INFORMATION

Product Description	Product Code
MDA800A Motor Drive Analyzers	
350 MHz, 8 Ch, 12-bit, 10 GS/s, 50 Mpts/Ch Motor Drive Analyzer with 12.1" WXGA Color Multi-touch Color Display and Ultra HD (UHD) Extended Desktop	MDA803A
500 MHz, 8 Ch, 12-bit, 10 GS/s, 50 Mpts/Ch Motor Drive Analyzer with 12.1" WXGA Color Multi-touch Color Display and Ultra HD (UHD) Extended Desktop	MDA805A
1 GHz, 8 Ch, 12-bit, 10 GS/s, 50 Mpts/Ch Motor Drive Analyzer with 12.1" WXGA Color Multi-touch Color Display and Ultra HD (UHD) Extended Desktop	MDA810A
Included with Standard MDA800A Configurations	
3-phase electrical and mechanical power analysis software, ÷10 Passive Probe (Qty. 4), HDO8kA Getting Started Guide, MDA Software Instruction Manual, Anti-virus Software (Trial Version), Microsoft Windows Embedded Standard 7 P 64-Bit License, Commercial NIST Traceable Calibration with Certificate, Power Cable for the Destination Country, 3-year Warranty	
Mixed Signal Oscilloscope Option	
HDO8000A Series Model Mixed Signal Option	HDO8k-MSO
Included with HDO8k-MSO Option	
16 Channel Digital Leadset, Extra Large Gripper Probe Set (Qty. 22), Ground Extenders (Qty. 20), Flexible Ground Leads (Qty. 5)	
Memory Options	
100 Mpts/ch Memory Option	HDO8KA-L
250 Mpts/ch Memory Option	HDO8KA-XL
Hardware Options	
16GB to 32GB CPU RAM Upgrade Option. (32 GB of RAM is included standard with HDO8KA-L and HDO8KA-XL memory options)	HDO8KA-16-UPG-32GBRAM
Additional 256GB Removable Solid-state Drive for HDO8000A Series. Includes Windows 7 OS, Teledyne LeCroy oscilloscope software and critical scope operational file duplicates	HDO8k-256GB-SSD-02
General Accessories	
External GPIB Accessory	USB2-GPIB
Soft Carrying Case	HDO8k-SOFTCASE
Rack Mount Accessory	HDO8k-RACKMOUNT
Accessory Pouch	HDO8k-POUCH
Oscilloscope Cart	OC1021-A
Oscilloscope Cart with additional shelf and drawer	OC1024-A
Local Language Overlays	
Front Panel Overlays are available in a wide variety of local languages	Consult Factory
Software Options	
Device and Switch-mode Power Supply Analysis Option	HDO8k-PWR
Digital Filter Option	HDO8k-DFP2
Serial Data Mask Option	HDO8k-SDM
Clock and Clock-Data Timing Jitter Analysis Package	HDO8k-JITKIT
Advanced Customization Option	HDO8k-XDEV
EMC Pulse Parameter Software Package	HDO8k-EMC
VectorLinQ Vector Signal Analysis	HDO8K-VECTORLINQ

Product Description	Product Code
Serial Data Options	
MIL-STD-1553 Trigger and Decode Option	HDO8K-1553 TD
MIL-STD-1553 Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-1553 TDME
ARINC 429 Bus Symbolic Decode Option	HDO8K-ARINC429BUS DSYMBOLIC
ARINC 429 Bus Symbolic Decode, Measure/Graph, and Eye Diagram Option	HDO8K-ARINC429BUS DME SYMBOLIC
AudioBus Trigger and Decode Option	HDO8K-Audiobus TD
AudioBus trigger, decode, and graph Option	HDO8K-Audiobus TDG
CAN FD Trigger and Decode Option	HDO8K-CAN FDBUS TD
CAN FD Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-CAN FDBUS TDME
CAN FD Symbolic Trigger, Decode, and Measure/Graph, and Eye Diagram Option	HDO8K-CAN FDBUS TDME SYMBOLIC
CAN Trigger & Decode Option	HDO8K-CANBUS TD
CAN Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-CANBUS TDME
CAN Symbolic Trigger, Decode, and Measure/Graph, and Eye Diagram Option	HDO8K-CANBUS TDME SYMBOLIC
DigRF 3G Bus Decode Option	HDO8K-DigRF3Gbus D
DigRF V4 Bus Decode Option	HDO8K-DigRFV4bus D
MIPI D-PHY CSI-2, DSI Bus Decode Option	HDO8K-DPHYbus D
MIPI D-PHY CSI-2, DSI Bus Decode and Physical Layer Test Option	HDO8K-DPHYbus DP
ENET Bus Decode Option	HDO8K-ENETbus D
Bundle: Includes I2C, SPI, UART-RS232 Trigger and Decode Option	HDO8K-EMB TD
Bundle: Incl. I2C, SPI, UART-RS232 Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-EMB TDME
FlexRay Trigger and Decode Option	HDO8K-FLEXRAYBUS TD
FlexRay Trigger, Decode, Measure/Graph and Physical Layer Option	HDO8K-FLEXRAYBUS TDMP
I2C Trigger and Decode Option	HDO8K-I2CBUS TD
I2C Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-I2CBUS TDME
LIN Trigger and Decode Option	HDO8K-LINBUS TD
LIN Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-LINBUS TDME
Manchester Bus Decode Option	HDO8K-MANCHESTERbus D
MDIO Decode Option	HDO8K-MDIObus D
NRZ Bus Decode Option	HDO8K-NRZbus D
SENT Bus Decode Option	HDO8K-SENTbus D
SpaceWire Decode Option	HDO8K-SPACEWIREbus D
SPI Trigger and Decode Option	HDO8K-SPIBUS TD
SPI Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-SPIBUS TDME
SPMI Decode Option	HDO8K-SPMIbus D
UART-RS232 Trigger and Decode Option	HDO8K-UART-RS232BUS TD
UART-RS232 Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-UART-RS232BUS TDME
USB 2.0 HSIC Decode Option	HDO8K-USB2-HSICbus D
USB 2.0 Trigger and Decode Option	HDO8K-USB2bus TD
USB 2.0 Trigger, Decode, Measure/Graph, and Eye Diagram Option	HDO8K-USB2BUS TDME

ORDERING INFORMATION

Product Description	Product Code
High Voltage Differential Probes	
1kV, 120 MHz High Voltage Differential Probe	HVD3106
1kV, 80 MHz High Voltage Differential Probe with 6m cable	HVD3106-6M
1kV, 120 MHz High Voltage Differential Probe without tip Accessories	HVD3106-NOACC
1kV, 25 MHz High Voltage Differential Probe	HVD3102
1kV, 25 MHz High Voltage Differential Probe without tip Accessories	HVD3102-NOACC
2kV, 120 MHz High Voltage Differential Probe	HVD3206
2kV, 80 MHz High Voltage Differential Probe with 6m cable	HVD3206-6M
6kV, 100 MHz High Voltage Differential Probe	HVD3605
Current Probes and Sensor Adapters	
30 A; 100 MHz Current Probe – AC/DC; 30 A_{rms}; 50 A_{peak} Pulse	CP031
30 A; 100 MHz High Sensitivity Current Probe – AC/DC; 30 A_{rms}; 50 Apeak Pulse	CP031A
30 A; 50 MHz Current Probe – AC/DC; 30 A_{rms}; 50 A_{peak} Pulse	CP030
30A, 50 MHz Current Probe with 3 meter cable	CP030-3M
30 A; 50 MHz High Sensitivity Current Probe – AC/DC; 30 A_{rms}; 50 Apeak Pulse	CP030A
150 A; 10 MHz Current Probe – AC/DC; 150 A_{rms}; 500 A_{peak} Pulse	CP150
150 A, 5 MHz Current Probe with 6 meter cable	CP150-6M
500 A; 2 MHz Current Probe – AC/DC; 500 A_{rms}; 700 A_{peak} Pulse	CP500
Programmable ProBus Current Adapter	CA10
Set of 4 CA10	CA10-QUADPAK
High Voltage Fiber Optic Probes	
High Voltage Fiber Optic Probe, 60 MHz (requires accessory tip)	HVFO103
±1V (1x) Tip Accessory for HVFO103	HVFO100-1X-TIP
±5V (5x) Tip Accessory for HVFO103	HVFO100-5X-TIP
±20V (20x) Tip Accessory for HVFO103	HVFO100-20X-TIP
High Voltage Passive Probes	
400 MHz, 1kV Vrms High-Voltage Passive Probe	HVP120
100:1 400 MHz 50 MΩ 4 kV High-voltage Probe	PPE4KV
1000:1 400 MHz 50 MΩ 5 kV High-voltage Probe	PPE5KV
1000:1 400 MHz 50 MΩ 6 kV High-voltage Probe	PPE6KV
Differential Amplifiers and HV Probe Pairs	
1 Ch, 100 MHz Differential Amplifier with Precision Voltage Source	DA1855A
100:1 or 10:1 Selectable, 250 MHz Passive Diff. Probe Pair	DXC100A
1:1, 50 MHz Passive Differential Probe Pair	DXC200
100:1, 250 MHz, 2.5kV High Voltage Probe Pair	DXC5100
10x, 1 MΩ Passive Attenuator for DXC Series Probes	DA101
Deskew Calibration Source for CP031, CP030 and HV Differential Probes	DCS015

Product Description	Product Code
Additional Low Voltage Passive Probes	
Additional 500 MHz Passive Probe, 10:1, 10 MΩ, 2.5 mm tip	PP023
Set of 2 PP023	PP023-2
Additional 500 MHz Passive Probe, 10:1, 10 MΩ, 5 mm tip	PP026
Set of 2 PP026	PP026-2
Active Voltage Rail Probes	
Power/Voltage Rail Probe. 4 GHz bandwidth, 1.2x attenuation, ±30V offset, ±800mV	RP4030
Browser for use with RP4030	RP4000-BROWSER
Low Voltage Differential Probes	
500 MHz, 3.1 pF, 1 MΩ Active Differential Probe, ±40 V, with 10X Gain, 42V common-mode	AP033
200 MHz, 3.5 pF, 1 MΩ Active Differential Probe, ±20 V, 60V common-mode	ZD200
500 MHz, 1.0 pF, 1 MΩ Active Differential Probe, ±8 V, 10V common-mode	ZD500
1 GHz, 1.0 pF, 1 MΩ Active Differential Probe, ±8 V, 10V common-mode	ZD1000
1.5 GHz, 1.0 pF, 1 MΩ Active Differential Probe, ±8 V, 10V common-mode	ZD1500
Low Voltage Single-ended Probes	
1 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS1000
Set of 4 ZS1000	ZS1000-QUADPAK
1.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS1500
Set of 4 ZS1500	ZS1500-QUADPAK
Probe Adapters	
TekProbe to ProBus Probe Adapter	TPA10
Set of 4 TPA10	TPA10-QUADPAK

Customer Service

Teledyne LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year. This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

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