

# LGR-5320 Series

Stand-Alone, High-Speed, Multifunction Data Loggers



*LGR-5320 Series of high-speed, stand-alone data loggers allow users to collect correlated analog and digital data without a computer*

## Features

- 16-bit analog inputs
- Up to 200 kS/s sample rate
- 16 TTL or industrial digital inputs
- Single Form C relay digital output; configurable for triggering/alarming
- 4 counter inputs; quadrature available
- 4 GB Secure Digital (SD) memory card included; supports up to 32 GB
- Multichannel analog and digital triggering
- Push-button controls for field operation
- External power supply included

## Software

- DAQLog™ software to easily set up, configure, and retrieve data
- Multiple trigger and alarming functions
- csv format supported for easy import into Excel®

## Supported Operating Systems

- Windows® 10/8/7/Vista®/XP 32/64-bit

## Overview

The LGR-5320 Series are high-speed, stand-alone data loggers for analog and digital signals. Each device offers 16 analog inputs, 16 digital inputs, one single Form C relay (0.5 A) digital output for triggering/alarming, and four counter/encoder inputs. Use these devices to collect high-speed correlated analog and digital data without a computer.

LGR-5320 devices perform correlated measurements at up to 200 kS/s directly to a SD or Secure Digital High Capacity (SDHC) memory card. Use the advanced analog and digital triggering options to collect data and monitor systems and events without dedicating a computer. With the easy-to-use DAQLog software (included), you can configure LGR-5320 loggers to retrieve data through the USB interface or SD memory card.

## Analog Input

Each LGR-5320 Series data logger includes 16 SE/8 DIFF analog inputs with 16-bit resolution. The LGR-5325 features analog input gain ranges up to  $\pm 10$  V. The LGR-5327 and LGR-5329 add a  $\pm 30$  V analog input range for increased measurement capability.

## Correlated, High-Speed Sampling

The LGR-5327 and LGR-5329 can sample input data at up to 200 kS/s while the LGR-5325 offers a 100 kS/s sample rate. Each device can sample all analog, digital, and counter data synchronously, making it easy to compare time between all channels.

LGR-5320 Series Selection Chart

| Feature            | LGR-5325         | LGR-5327         | LGR-5329                       |
|--------------------|------------------|------------------|--------------------------------|
| Sample Rate*       | 100 kS/s         | 200 kS/s         | 200 kS/s                       |
| Analog Inputs      | 16 SE/8 DIFF     | 16 SE/8 DIFF     | 16 SE/8 DIFF                   |
| Analog Input Range | Up to $\pm 10$ V | Up to $\pm 30$ V | Up to $\pm 30$ V               |
| Digital Inputs**   | 16-channel TTL   | 16-channel TTL   | 16-channel Industrial Isolated |
| Counters           | 4 Conventional   | 4 Conventional   | 4 Quadrature                   |
| Triggering         | Single-channel   | Multichannel     | Multichannel                   |

\* Sample rates aggregate

\*\* Each logger includes one single Form C relay output

## Configuration, Data Storage, and Retrieval

Each data logger can be configured through the SD memory card or through the onboard USB port. Simply configure the logging session with the included DAQLog software. All logging parameters are captured on the SD memory card. A 4 GB SD memory card is included with each data logger. Memory cards up to 32 GB are supported for extended data collection. To retrieve data, either remove the SD memory card from the logger and upload to a computer, or connect a computer to the USB port on the logger.

# LGR-5320 Series

## Features



### Triggering

LGR-5320 Series data loggers offer multiple triggering options for starting and stopping a data scan. These options vary by model.

- The LGR-5325 features single-channel analog and digital triggering.
- The LGR-5327 and LGR-5329 offer multichannel and pattern triggering options.

With multiple trigger options, you can collect only the data you want. External clocking is also supported.

### Digital I/O

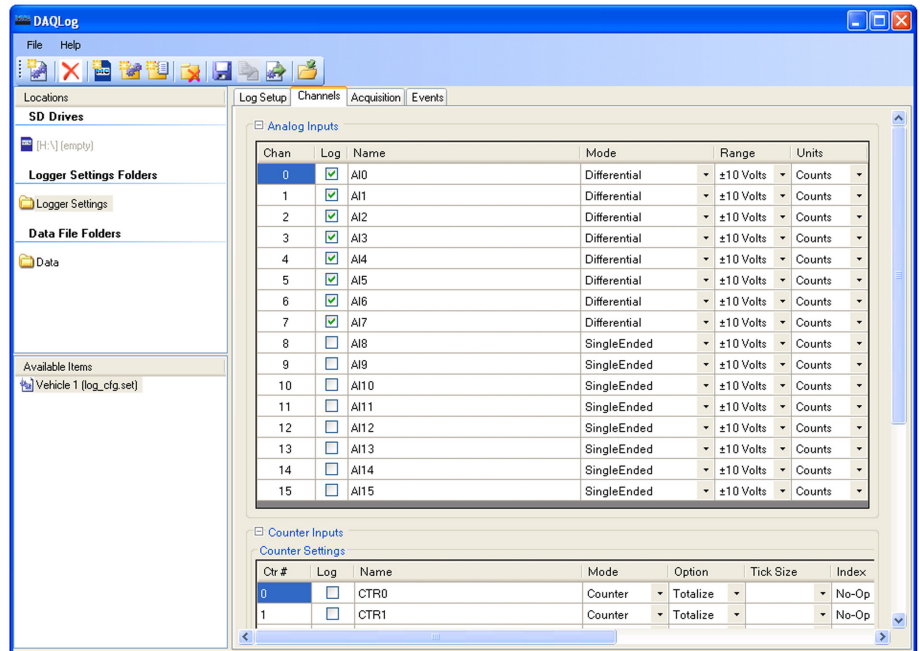
Each data logger includes 16 digital inputs. These inputs can be sampled synchronously with analog input data.

- The LGR-5325 and LGR-5327 feature up to 28 V digital inputs
- The LGR-5329 features up to 30 V digital inputs with 500 VDC isolation.

Each data logger also features one digital output relay channel. You can program the Form C relay using DAQLog software to alarm when desired conditions are met.

### Counters

Four counter inputs are built into the LGR-5320 Series. The LGR-5325 features conventional up/down counters. The LGR-5327 and LGR-5329 have both quadrature and conventional counter inputs. Multiple count modes are also supported.



DAQLog software is included to configure the device, set up channels and logging parameters, and to retrieve data

### Push Button Logging Controls

Onboard one touch logging controls are featured on each device can be used for a variety of functions, including:

- Load configuration from SD memory card
- Start/stop logging
- Force trigger/user event
- Reset the device
- Control the status LEDs

Onboard LEDs provide the logging, trigger and activity status.

Refer to “Controls/indicators” on page 5 for additional information about the buttons and status LED indicators on each device.

### Power

LGR-5320 Series devices receive power from the 9-30 VDC external supply that ships with each device.

### DAQLog Software

DAQLog Software is an easy to use application included with each LGR-5320 Series data logger. DAQLog uses a spreadsheet style interface that allows simple setup of channel and logging parameters.

DAQLog includes the following functions:

- Data logger configuration
- Channel setup
- Trigger setup
- Data conversion
- Scan rate and acquisition length
- Trigger, event, and alarm parameters

Data can be saved in .csv format for easy import into Excel.

# LGR-5320 Series

## Features



### Configuring, Data Logging, and Retrieving Data

#### Configuration through USB or SD Memory Card



Logging parameters are configured using DAQLog software. The LGR-5320 Series data logger can be set up over a USB connection or by inserting the SD memory card into a computer.

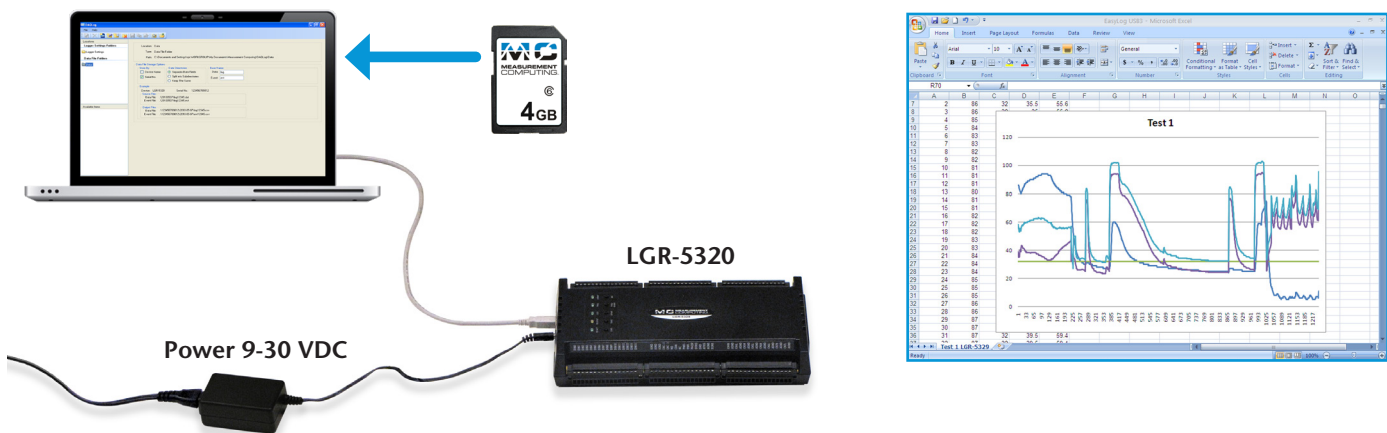
Data rate, scan length, channel parameters, triggers, and alarms are all quickly and easily configured using spreadsheet-style setup pages in DAQLog.

#### Data Logging



The LGR-5320 Series logs data when pre-defined trigger conditions are met. You can also start/stop logging and set trigger, alarm, and event conditions with the push-button controls located on top of the device.

#### Data Retrieval and Analysis



Retrieve data by connecting the logger to a computer through USB or by removing the SD memory card and inserting it into a computer.

Once data is uploaded to a computer, the .csv file can be opened in programs such as Excel.

# LGR-5320 Series

## Specifications



All specifications are subject to change without notice.  
Typical for 25°C unless otherwise specified.

### Analog Input

**A/D Converter:** 16-bit successive approximation type

**Input Ranges:** Software-selectable per channel

LGR-5325:  $\pm 10$  V,  $\pm 5$  V,  $\pm 1$  V

LGR-5327/5329:  $\pm 30$  V,  $\pm 10$  V,  $\pm 5$  V,  $\pm 1$  V

**Number of Channels:** 8 differential (DIFF)/16 single-ended (SE), software-selectable

**Input Configuration:** Multiplexed

**Absolute Max Input Voltage**

LGR-5325: CH<sub>x</sub> to AGND,  $\pm 25$  V max (power ON/OFF)

LGR-5327/5329: CH<sub>x</sub> to AGND,  $\pm 38$  V max (power ON/OFF)

**Input Impedance**

LGR-5325:  $\pm 10$  V,  $\pm 5$  V,  $\pm 1$  V range, 10 G $\Omega$  (power ON), 1 k $\Omega$  (power OFF)

LGR-5327/5329:  $\pm 30$  V range, 1 M $\Omega$  (power ON), 1 G $\Omega$  (power OFF);

$\pm 10$  V,  $\pm 5$  V,  $\pm 1$  V range, 10 G $\Omega$  (power ON), 1 G $\Omega$  (power OFF)

**Input Leakage Current:**  $\pm 100$  pA

**Input Capacitance**

$\pm 30$  V Range, 90 pF;  $\pm 10$  V,  $\pm 5$  V,  $\pm 1$  V range, 55 pF

**Max Working Voltage** (Signal+ Common Mode):  $\pm 30$  V range,  $\pm 30.05$  V;

$\pm 10$  V,  $\pm 5$  V,  $\pm 1$  V range,  $\pm 10.2$  V

**Common Mode Rejection Ratio:** fin = 60 Hz,  $\pm 30$  V range, 65 dB min;  
fin = 60 Hz, all other ranges, 75 dB min

**Crosstalk:** DC to 25 kHz, adjacent DIFF mode channels, -80 dB

**ADC Resolution:** 16 bits

**Input Bandwidth** (-3 dB): All input ranges, 450 kHz min

**Input Coupling:** DC

**Max Sample Rate**

LGR-5325: 100 kS/s

LGR-5327/5329: 200 kS/s

**A/D Pacing Sources:** See "Input Sequencer" below

**Warm Up Time:** 30 minutes, min

**Absolute Accuracy:** All ranges, 0.07% FSR

**Noise:** DIFF mode, 2 LSB rms

### Analog Input Calibration

**Calibration Method:** Factory calibration

**Calibration Interval:** 1 year

### External Clock Input

**External Clock I/O:** PACER pin, software-selectable as input or output

**Input High Voltage:** 2.2 V max

**Input Low Voltage:** 0.6 V min

**Output High Voltage**

IOH = -8 mA: 3.8 V min

**Output Low Voltage**

IOL = 8 mA: 0.4 V max

**Pacer Rate**

LGR-5325: 100 kHz max

LGR-5327/5329: 200 kHz max

**Minimum Pulse Width:** 2.5  $\mu$ s

### Input Sequencer

**Pacer Clock Sources**

Internal

LGR-5325: 10  $\mu$ s to 85.9 s in 20 ns steps

LGR-5327/5329: 5  $\mu$ s to 85.9 s in 20 ns steps

External (PACER)

LGR-5325: 10  $\mu$ s min

LGR-5327/5329: 5  $\mu$ s min

**Programmable Parameters Per Scan**

Channel Type: DIFF analog, SE analog, counter, digital input)

Channel Number: Random order

Gain: Any channel specified with a  $\pm 30$  V range (LGR-5327/5329 only)  
cannot be specified with any other range in the sequence)

**Depth:** 512 locations

**Pacer Interval**

LGR-5325: 10  $\mu$ s min (100 kHz max pacer rate)

LGR-5327/5329: 5  $\mu$ s min (200 kHz max pacer rate)

**Channel to Channel Sampling Period** (Scan Clock)

Analog Inputs: 5  $\mu$ s, fixed

Digital Channels (Counters, Digital Inputs): Sampled simultaneously at the beginning of the pacer interval

### Triggering

**Mode**

External Digital through DTRIG (pin 76): Software-selectable for rising or falling edge

External Analog through ATRIG (pin 78, see "External Analog Trigger" below)

Multi-Channel Analog LGR-5327/5329: Level-sensitive based on acquired data.

Digital Pattern Trigger: Triggers when a user-defined 1- to 16-bit digital pattern is matched on the DIN0-DIN15 pins. Programmable mask bits.

**External Digital Trigger Latency**

**Non-Pretrigger Acquisition:** 100 ns typ, 1  $\mu$ s max

Pretrigger Acquisition: 1 scan period max

**External Trigger Pulse Width:** 1  $\mu$ s min

**Internal Trigger Latency:** 2 \* (1/per-channel sample rate)

### External Analog Trigger

**External Analog Trigger Source:** ATRIG input (pin 78)

**Analog Trigger Input Ranges**

LGR-5325:  $\pm 10$  V

LGR-5327/5329:  $\pm 30$  V,  $\pm 10$  V, software-selectable

**Absolute Maximum Input Voltage** (ATRIG\_IN to AGND)

LGR-5325:  $\pm 25$  V max (power ON/OFF)

LGR-5327/5329:  $\pm 38$  V max (power ON/OFF)

**Input Impedance**

LGR-5325

$\pm 10$  V Range: 10 G $\Omega$  (power ON), 1 k $\Omega$  (power OFF)

LGR-5327/5329

$\pm 30$  V Range: 1 M $\Omega$  (power ON), 1 G $\Omega$  (power OFF)

$\pm 10$  V Range: 10 G $\Omega$  (power ON), 1 G $\Omega$  (power OFF)

**Trigger Modes:** Configurable for positive or negative slope, level

**Trigger/Hysteresis Resolution:** 12 bits, 1 in 4096

**Trigger/Hysteresis Levels:**  $\pm 10$  V/4096 or  $\pm 30$  V/4096, software-selectable

**Trigger/Hysteresis Accuracy:**  $\pm 2\%$  of reading,  $\pm 50$  mV offset

**Latency:** 1.5  $\mu$ s

**Full Power Bandwidth** (-3 dB): 1 MHz

### Digital Input

**Number of Inputs:** 16 channels

**Input Type**

LGR-5325/5327: TTL

LGR-5329: Industrial

**Input Voltage Range**

LGR-5325/5327: 0 V to 28 V

LGR-5329: 0 V to 30 V

**Input Characteristics**

LGR-5325/5327: 47 k $\Omega$  pull-down resistor, 39.2 k $\Omega$  series resistor

LGR-5329: Resistor divider 39.2 k $\Omega$  series resistor and 10 k $\Omega$  shunt resistor connected to IGND

**Isolation** (LGR-5329 Only): 500 VDC min

**Maximum Input Voltage Level**

LGR-5325/5327: 32 V (power ON/OFF)

LGR-5329: 36 V (power ON/OFF)

**Minimum High-Level Input Voltage Threshold**

LGR-5325/5327: 2.0 V max

LGR-5329: 10.04 V max

**Maximum Low-Level Input Voltage Threshold**

LGR-5325/5327: 0.8 V min

LGR-5329: 3.85 V min

**Event Logging:** Change of state, pattern recognition

Event time-stamped using real time clock

### Digital Output

**Number of Outputs:** 1

**Type:** Mechanical relay, NEC ED2/EF2 series

**Relay Configuration:** 1 Form C

**Relay Contact Resistance:** 0.075  $\Omega$

**Relay Contact Operate Time:** 3 ms (excluding bounce)

**Relay Contact Release Time:** 2 ms (excluding bounce)

**Relay Insulation Resistance:** 1000 M $\Omega$  at 500 VDC

**Relay Contact Ratings**

Maximum Switching Voltage: 220 VDC/250 VAC

Maximum Switching Current: 1.0 A

Maximum Carrying Current: 2.0 A



# LGR-5320 Series

## Specifications and Ordering



### Counters

#### Counter Type

LGR-5325: Conventional  
LGR-5327/5329: Quadrature and conventional (x1, x2, x4)

#### Number of Channels: 4

#### Inputs

LGR-5325: Counter, Up/Down, Gate  
LGR-5327/5329: Phase A+/A-, Phase B+/B-, Index +/-

#### Resolution: Fixed 32-bit or as sized by the modulo register

#### Count Modes

All LGR-5320 Series: Up/down, period/frequency, modulo n  
LGR-5327/5329: Quadrature

#### Debounce Times (software-selectable): 16 steps from 500 ns to 25 ms; positive or negative edge-sensitive; glitch detect mode or debounce mode

#### Timebase Accuracy: 50 ppm

#### Receiver Type (LGR-5327/5329): Quad DIFF receiver

#### Configuration (LGR-5327/5329): Each channel consists of Phase A input, Phase B input and Index input; each input switch-selectable as SE or DIFF

#### Differential: Phase A, Phase B and Index (+) inputs at user connector routed to (+) inputs of DIFF receiver. Phase A, Phase B and Index (-) inputs at user connector routed to (-) inputs of DIFF receiver.

#### Single-Ended: Phase A, Phase B and Index (+) inputs at user connector routed to (+) inputs of DIFF receiver. Phase A, Phase B and Index (-) inputs at user connector routed to ground. (-) Inputs of DIFF receiver routed to 3 V reference.

#### Voltage Ranges

##### LGR-5325

Input Voltage Range: 0 V to 5.5 V  
Maximum Input Voltage Range: -0.5 V to 7.0 V  
Input High Voltage: 2.0 V  
Input Low Voltage: 0.8 V

##### LGR-5327/5329

Common Mode Input Voltage Range:  $\pm 12$  V max  
Differential Input Voltage Range:  $\pm 12$  V max  
Input Sensitivity:  $\pm 200$  mV  
Input Hysteresis: 50 mV typ  
Input Impedance: 12 k $\Omega$  min  
Absolute Maximum Input Voltage: DIFF,  $\pm 14$  V max

#### Input Type (LGR-5325): TTL

#### Input Characteristics (LGR-5325): 49.9 k $\Omega$ pull-down resistor

### Power

**External Power Supply** (included): 9 V min, 30 V max; refer to the "LGR-5320 Series User Guide" for complete power specifications.

### Environmental

**Operating Temperature Range:** 0 °C to 55 °C

**Storage Temperature Range:** -40 °C to 85 °C

**Humidity:** 0 % to 90% non-condensing

### Mechanical

**Dimensions** (L  $\times$  W  $\times$  H): 241.3  $\times$  127  $\times$  44.45 mm (9.5  $\times$  5.0  $\times$  1.75 in.) max

### Shock and Vibration

#### Mechanical Shock

Operating: 50 g, 3 ms half sine; 30 g, 11 ms half sine; 3 hits per face for a total of 18 hits (18 hits at 50 g, 18 hits at 30 g)

Standard: IEC 60068-2-27

#### Random Vibration

Frequency: 10 Hz to 500 Hz

Vibration Level: 5 g<sub>rms</sub>

Test Time: 100 minutes/axis

Standard: IEC 60068-2-64

### Controls/indicators

**LOAD button:** Loads a configuration from the SD card/enters USB bootloader (hold while applying power)

**SAVE button:** Saves configuration to the SD card

**START button:** Starts an acquisition

**TRIG/EVENT button:** Forces a trigger / logs an event

**IND button:** Turns LED indicators on/off in 3 steps: All on – Top indicators only – All off

**Reset button:** Resets the device

**SD ACT indicator:** Indicates SD card read/write activity

**SD STAT indicator:** Indicates SD card/device error condition if blinking

**LOG indicator:** Indicates acquisition in progress

**TRIG indicator:** Indicates trigger occurred

**EVENT indicator:** Flashes when an event is logged or configuration is loaded or saved

**Power indicator:** (Top LED on case end) Indicates power is good and device is ready

**USB indicator:** (Bottom LED on case end) Indicates USB connection is active, blinks off for USB activity

**Analog input indicators:** Indicates corresponding analog input is in the acquisition

**Digital input indicators:** Indicates presence of a voltage at the corresponding digital input pin (not necessarily a high logic level)

**Digital output indicator:** Indicates relay state

**Counter input indicators:** Indicates corresponding counter activity

## Order Information

### Hardware

| Part No. | Description  |
|----------|--|
| LGR-5325 | Stand-alone, high-speed 100 kS/s, multifunction data logger; includes a 4 GB SD memory card, USB cable, and external power supply                              |
| LGR-5327 | Stand-alone, high-speed 200 kS/s, multifunction data logger; includes a 4 GB SD memory card, USB cable, and external power supply                              |
| LGR-5329 | Stand-alone, high-speed 200 kS/s, multifunction data logger with isolated digital inputs; includes a 4 GB SD memory card, USB cable, and external power supply |

### Accessories

| Part No.       | Description                               |
|----------------|---|
| ACC-202        | DIN-rail kit                              |
| ACC-216        | DST kit with 6 detachable screw terminals |
| PS-9V1AEPS230V | 9 VDC, 1.67 A replacement power supply    |

### Software

| Part No.               | Description  |
|------------------------|--|
| <a href="#">DAQLog</a> | Configuration and data logging software for the LGR-5320 Series. |