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This document describes the functions of devices of the GL Logger family. Product information and technical data related to accessories for the GL loggers are provided in a separate document.
1 Introduction to the GL Logger

Loggers of the GL model series are optimal tools for logging CAN/CAN FD, LIN, FlexRay and MOST150 data communication. In addition, the loggers support logging of analog measurement data such as battery voltage, as well as logging of internal ECU parameters via diagnostics and CCP/XCP during a test drive.

Because of their low current consumption in sleep mode, the loggers are excellently suited for vehicle tests and use in test fleets. The robust housing simplifies installation in your vehicles – and the high memory capacities of the memory cards make them suitable for long-duration logging as well.

1.1 Overview of Advantages

> Use as stand-alone tool for challenging logging tasks
> Use in test fleets and for in-vehicle testing
> Supports CAN and LIN bus wake-up and sleep modes
> Data is saved to SD/SDHC memory cards (GL1000/GL2000 families) or CF memory cards, SSD (GL3000/GL4000/GL5000 families)
> Short startup time
> Extensive filter and trigger conditions
> Support of diagnostics via UDS, KWP2000 on CAN and OBD II
> Support of CCP/XCP with Seed & Key
> Quick read-out of the measurement data over USB interface or via commercially available card readers
> Wireless data transmission for the GL2000/GL3000/GL4000/GL5000 families, via cellular radio or WLAN depending on the logger type
> Offline analysis in CANoe, CANalyzer, CANape, vSignalyzer
> Easy to configure with graphical configuration program and LTL support (Log Task Language)
> GL1010 and GL2010 can be used as IP65 variant
1.2 Bus Systems and Interfaces

This figure illustrates the supported bus systems of the individual GL Logger families, their memory media and transmission paths.

<table>
<thead>
<tr>
<th>PC/Notebook</th>
<th>PC/Notebook/Server</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USB</strong> SD/SDHC card</td>
<td><strong>USB LTE</strong> SD/SDHC card</td>
</tr>
<tr>
<td><strong>GL1000 Family</strong> 2 digital I/O, 4 analog inputs</td>
<td><strong>GL2000 Family</strong> 4 digital I/O, 4 analog inputs</td>
</tr>
<tr>
<td><strong>GL3000 Family</strong> 8 digital inputs, 14 analog inputs</td>
<td><strong>GL4000 Family</strong> 8 digital inputs, 14 analog inputs</td>
</tr>
<tr>
<td><strong>GL5000 Family</strong> 4 digital inputs, 14 analog inputs</td>
<td></td>
</tr>
</tbody>
</table>

*GL2400, GL5350: 4 CAN FD, GL5370: 12 CAN FD*

Figure 2: Overview of bus systems and interfaces (for details see also technical data in chapter 4)

2 Functions

GL Loggers are used to log the data communications of CAN, CAN FD, LIN, FlexRay, MOST150 and RS232 bus systems as well as analog and digital measurement data. Internal ECU data can also be requested and logged via diagnostics and CCP/XCP. The Vector Logger Configurator is used to configure the data loggers for different uses. The data is logged according to the configured filter and trigger conditions, and it is transferred to the PC via USB or memory card. Loggers of the GL2000/GL3000/GL4000/GL5000 families also permit wireless data transmission. After automatic conversion of the raw data, you can evaluate the logging data with CANalyzer, CANoe, CANape or vSignalizer.

The configuration program and its various functions are described below.

2.1 Graphical Configuration Program

The Vector Logger Configurator is the comfortable program for creating configurations for all loggers of the GL families. The program is already included in the scope of delivery.

The Vector Logger Configurator is used to configure hardware settings for the CAN, CAN FD, LIN, FlexRay and MOST150 channels. This includes configuration of the filter and trigger conditions, logging of analog and digital inputs and the CCP/XCP measurements. The diagnostic requests for reading out internal ECU data are also configured with this program. LEDs can be set to indicate individual events. The Vector Logger Configurator supports reading out the logged data and converting it to a variety of logging formats.

System requirements: Operating systems Windows 7/8.1 (each 32/64 bit) and Windows 10 (64 bit).
2.2 Graphical Logging Export Program

The new Vector Logging Exporter is a separate program for readout stations that enables convenient and intuitive conversion of the logged data of all Vector loggers in the necessary target formats for the various target groups. The program is included in the scope of delivery.

The Vector Logging Exporter automatically determines the logger type and the associated analysis package from the logging files. The data is selectively read from the connected logger, card reader, or a directory on a hard disk or server. You can quickly select the export settings for each target group using preset conversion profiles. With the Vector Logging Exporter, you thus provide the logged data promptly in the desired target formats to all target groups. In addition, the logging files can be easily exported from archived raw data (ZIP format) to other formats or with additional options – even later on.

System requirements: Operating systems Windows 7/8.1 (each 32/64 bit) and Windows 10 (64 bit).
2.3 Logging Modes

The loggers support 3 different selectable logging modes:

- Permanent logging, i.e. automatic logging as soon as the logger is switched on
- Triggered logging with configurable trigger events with pre-trigger and post-trigger times
- Logging with configurable start/stop conditions

Figure 4: Data export with Vector Logging Exporter
2.4 Filter Functions
Filter functions are used to select which data should be logged. Without filters, all data is logged. The use of filters leads to
data reduction. This makes it possible to conduct longer test drives.
Possible filters:
> Filtering on CAN, CAN FD and LIN identifiers and on FlexRay frames
> Filtering with symbolic selection of messages from DBC, LDF, FIBEX and AUTOSAR files
> Filtering of entire channels
> Filtering to record only one message per configurable interval (Limit filter)
> Stop or pass filters

2.5 Trigger / Marker Functions
Trigger functions are used as events both for triggered logging and for start/stop conditions for permanent logging.
Markers are available for the GL2000/GL3000/GL4000/GL5000 families and are defined as triggers for certain events. In the
case of permanent logging, they mark only a point in time. The markers are displayed on a time bar in the Navigator. For
reading out the data, the pre- and post-trigger time can be flexibly set.
> Configurable events for trigger and marker
> Configurable events for start/stop conditions
> Configurable post-trigger time for triggered logging
> Trigger types:
  > Standard trigger: Trigger is initiated whenever a configured event occurs
  > Single shot trigger: Trigger is initiated just once, regardless of how often the event occurs
  > End measurement trigger: Logging is stopped after this event and is not resumed until the logger is restarted.
> Trigger and marker
  > on CAN/LIN identifiers, data contents and message timeout
  > by symbolic selection of signals and messages from databases (DBC, LDF, FIBEX and AUTOSAR files)
  > on CCP/XCP signals and diagnostic signals
  > on CAN bus statistics (busload, error frames)
  > on buttons from remote control, on digital and analog inputs
> Combination of events via AND/OR conditions
> Logging via ring buffers:
  > GL1000/GL2000 families: Ring buffers on the memory card
  > GL3000/GL4000/GL5000 families: Two separately configurable ring buffers, filter and trigger conditions separately
    configurable for each ring buffer
2.6 Functions for CAN

These CAN/CAN FD functions are included in the loggers:

- **CAN channels:**
  - GL1000 family: 2 channels, user-configurable with piggyback boards
  - GL2000/GL2010: 4 channels, of which 2 channels are user-configurable via piggyback boards (electrically decoupled upon request)
  - GL2400: 4 channels, all with CAN FD support, user-configurable with GLT piggyback boards
  - GL3000/GL4000 families: 9 channels, of which 4 channels are user-configurable with piggyback boards (electrically decoupled upon request)
  - GL5350: 20 channels, of which 4 CAN FD channels and 4 CAN channels are user-configurable with GLT piggyback boards
  - GL5370: 24 channels, of which 12 CAN FD channels are user-configurable with GLT piggyback boards

- **Message filters**
  - Triggering on messages, signal values, Error Frames and message timeouts
  - Logging of error frames on CAN with ECC information (Error Code Information)
  - Diagnostics on CAN via UDS, KWP2000 on CAN and OBD II (On-Board Diagnostics)
  - Integration of CAN/CAN FD databases (DBC and AUTOSAR format) to select filter and trigger conditions
  - Sleep mode and wake-up over CAN/CAN FD
  - Sending of messages on CAN
  - Gateway functionality on CAN
  - Online classing, Rainflow analysis (GL2000/GL3000/GL4000/GL5000 families)
  - Tachograph function (GL2000/GL3000/GL4000/GL5000 families)
  - Optional: CCP/XCP on CAN with Seed & Key (Seed & Key algorithms can be generated with CANape V8.0 or higher)

2.7 Functions for LIN

In logging tasks on the LIN bus, the loggers support you with the following functions:

- **LIN channels**
  - GL1000/GL4000 families: 2 channels
  - GL5000 family: 6 channels, of which 4 are user-configurable with GLT piggyback boards

- **LINprobe extends the loggers, including channels for sending LIN frames:**
  - GL1000/GL2000 families: max. 5 LINprobes (10 additional channels)
  - GL3000/GL4000 families: max. 7 LINprobes (14 additional channels)
  - GL5000 family: max 5 LINprobes (10 additional channels)

- **Recording of the LIN frames with automatic recognition of the protocol version**

- **LINprobe permits spatially close coupling to the LIN bus**

- **Message filters**
  - Triggering on messages, signal values and message timeouts

- **Online classing, Rainflow analysis (GL2000/GL3000/GL4000/GL5000 families)**

- **Gateway functionality**
> Integration of LIN databases (LDF and AUTOSAR format) for filter and trigger conditions
> Sleep mode and wake-up over LIN

**2.8 Functions for FlexRay (GL4000/GL5000 Families)**

The GL4000/GL5000 families offers you the following functions for use on the FlexRay bus:

- Logging of 2 independent FlexRay channels A (without XCP on FlexRay)
- Logging of 1 FlexRay cluster, i.e. channels A and B (with XCP on FlexRay)
- Filters for frames
- Triggering on frames, signal values and frame timeouts
- Online classing, Rainflow analysis
- Evaluation of bus states
- Integration of the system description in FIBEX 2.0/3.0/3.1 and AUTOSAR format for selecting the filter and trigger conditions
- Logging without precise knowledge of bus parameters
- Logging also possible with non-synchronized bus
- Optional: XCP on FlexRay (FIBEX 2.0/3.0/3.1) with Seed & Key (generation of Seed & Key algorithms with CANape V8.0 or higher; license also includes CCP/XCP on CAN)

**2.9 Functions for MOST150 (optional for GL3000/GL4000/GL5000 Families)**

Loggers of the GL3000/GL4000/GL5000 families can be extended to handle MOST150 with the external GLA150 module offering the following functions:

- Interfacing of the GLA150 module to the loggers over Ethernet
- Logging of MOST150 data:
  - Control channel
  - Asynchronous channel with both MOST Data Packs (MDP) and MOST Ethernet Packs (MEP)
- Export to ASC, BLF, IMG and CLF formats

The GLA150 is the first MOST150 interface for loggers which is listed as MOST Compliant by the MOST Cooperation.
2.10 Functions for RS232

The serial interface offers the following functions:

- Logging of serial data as CAN message
- Transmission of serial data

2.11 Diagnostic Functions

Logging of diagnostic data over the CAN bus:

- Time-synchronous logging of diagnostic data
- Symbolic selection of diagnostic requests for frame-oriented logging
- Symbolic selection of the diagnostic data directly via the signal name (signal requests) for signal-oriented logging
- Sending of diagnostic requests on configurable events
- Trigger/marker on diagnostic signals
- Parameterization via diagnostic descriptions in CDD, ODX 2.0.1/2.2.0, PDX, MDX 3.0 formats
- Support by UDS, KWP2000 on CAN and OBD II
- Support of On-Board Diagnostics (OBD II), no diagnostic description required

2.12 CCP/XCP Logging Functions (Optional)

Logging of internal ECU parameters over CCP, XCP on CAN, XCP on CAN FD and XCP on FlexRay:

- Support of CCP 2.1, XCP on CAN 1.x and XCP on FlexRay
- Cyclic time-synchronous measurement via DAQ and polling mode (polling not for XCP on FlexRay)
- Direct assignment of A2L files for CAN and FlexRay
- Signal selection and parameterization of CCP/XCP measurement directly in the configuration program
- Statistics view for assessment of the additional bus load and fill level of DAQ lists
- Trigger/marker on CCP/XCP signals
- Easy export of signals from the measurement list to LAB files and SelectX files (CFG)
- Easy import of signals to the measurement list from CSV, LAB or SelectX files
- Supports Seed & Key for protected ECUs, generation of Seed & Key algorithms with CANape 8.0 or higher
- CCP/XCP license required for loggers

2.13 ECU Measurement with VX Modules

Logging of internal ECU parameters with VX modules and serial PODs over XCP on Ethernet:

- Record internal variables and parameters in parallel to bus communication
- XCP on Ethernet allows a higher data rate (up to approx. 1 MByte/s) than XCP on CAN
- Data transmission via DAQ mode
- XCP on Ethernet for VX modules is not protected by Seed & Key
- Simultaneous operation of VX module and GLA150 (MOST150) not supported
Hardware requirements:

> VX base module (e.g. VX1060, VX1132)
> POD compatible with the ECU architecture (incl. connection cable to the VX module)
> ECU with software prepared for use of the VX module
> Access to the data trace or debug interface of the ECU
> Logger of the GL3000/GL4000/GL5000 family with CCP/XCP license

Configuration programs and description file:

> Configuration program from VXtools V1.92 or higher
> Vector Logger Configurator 2.5 SP3 (GL3000/GL4000) or 2.8 (GL5000) or higher
> Description file of the ECU (A2L file)

File must correspond to the current version of the ECU firmware and contain the addresses of the ECU signals.

Selection and setup of the VX measurement hardware:

Which VX measurement hardware you need depends on the ECU architecture, the data trace or debug interfaces of the ECU, and the number and frequency of occurrence (needed bandwidth) of the transmitted data. An overview is available on vector.com under keyword VX1000.

2.14 Inputs/Outputs

The GL loggers have multiple analog inputs as well as digital inputs and outputs as standard features. For the loggers of the GL3000/GL4000/GL5000 families the number of analog inputs can be increased using an expansion card.

The loggers support the following functions:

> Logging of analog measured values of external modules in parallel with the bus communication
> Logging of the state of the digital inputs in parallel with the bus communication
> Use of the analog and digital inputs as a condition for markers and triggers
> Control of external modules via the digital outputs (e.g. in order to switch these on or off)

![Figure 6: Analog inputs and digital inputs/outputs](image)

2.15 Monitoring with GL2000/GL3000/GL4000/GL5000 Families

The loggers can be used alternatively as a monitoring interface for monitoring purposes:

> Display of all incoming data in the logger, such as messages and error frames in CANoe and CANalyzer (from 7.6 SP3 for GL3000/GL4000, from 8.2 for GL2000, from 11.0 SP3 for GL5000)
> Supported bus systems: CAN, LIN and FlexRay
> License required for CAN, LIN or FlexRay in CANoe/CANalyzer
> Logging in the logger interrupted during monitoring
> Logger is connected to the PC over Ethernet
2.16 Other Functions

Along with the many different functions already listed, the following additional functions also support you:

- Logging of date and clock time with the help of the battery buffered real-time clock
- Configurable signal tone for indicating trigger events, for example
- Support of logger accessories (see chapter 6, Optional Accessories)

2.17 Data Transfer

The following options are available for transferring the logged data to the PC and updating the configuration:

For all GL Loggers:

<table>
<thead>
<tr>
<th>Accessories</th>
<th>GL1000 Family</th>
<th>GL2000 Family</th>
<th>GL3000 Family</th>
<th>GL4000 Family</th>
<th>GL5000 Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 2.0 on the logger</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Memory card in card reader</td>
<td>✓</td>
<td>✓</td>
<td>✓ (GL3000/ GL3100)</td>
<td>✓ (GL3000/ GL3100)</td>
<td>—</td>
</tr>
<tr>
<td>SSD hard drive via eSATAp</td>
<td>—</td>
<td>—</td>
<td>✓ (GL3200)</td>
<td>✓ (GL4200)</td>
<td>✓</td>
</tr>
<tr>
<td>WLAN 802.11b/g</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cellular radio</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ethernet</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

2.18 Wireless Data Transmission (optional for GL2000/GL3000/GL4000/GL5000 Families)

For the wireless transmission of logging data from vehicles the options WLAN and cellular radio are available for the GL2000/GL3000/GL4000/GL5000 families (depending on the logger type). If necessary, a new configuration can be loaded from the server to the loggers.

The same concept is applied to the data transmission via WLAN and cellular radio:

- Logger initiates data transmission to the server
- Configurable condition for starting the connection operation
- Transmission of logged data to server
- Transmission of selected data (e.g. Memory 1/2/1+2, classification) configurable
- Raw data is saved on the server well-structured for each logger
- Afterwards, automatic conversion to the desired logging format, e.g. BLF, ASC, MDF
- Update of a new logger configuration (if necessary)
- GL3000/GL4000: Combination of WLAN and cellular radio: use of WLAN, if an Access Point is found, otherwise fallback to 3G

Standard product components allow the simultaneous connection of up to 2 loggers to one server and data exchange with the basic server software.

The ML Server fleet management software that is additionally available offers the following functions:

- Convenient server software for transferring data between a data server and any number of loggers
- Monitoring program can be used for vehicle management and to display connections and statistics
- Synchronization of logging data between several servers
2.18.1 Data Transmission via Wireless LAN (GL3000/GL4000/GL5000 Families)

This WLAN solution can be used for wireless transmission of the logging data from vehicles that are parked at stationary locations. Access points are needed at these locations for the transmission. After the connection is successfully established, data is transferred, logging stops during data transmission.

The option includes:

- Built-in WLAN card
- Transmission via WLAN according to IEEE 802.11b/g (54 Mbit/s)
- Security mechanisms:
  - WEP or WPA/WPA2 (with Pre-Shared Key or certificates)
  - EAP/TLS, TKIP, RADIUS support
  - MAC address filtering
- Connection to several servers in different locations possible

Scope of delivery:

- WLAN card (installed)
- Glass-mounted antenna with 3 m connection cable
- Basic server software
- WLAN access points are not included with the product

2.18.2 Data Transmission via 3G/UMTS (GL3000/GL4000 Families)

This UMTS solution with the USB modem GLA320 is used for wireless transmission of logging data from vehicles independent from their position. Data is transferred according to the configured time intervals optionally parallel to recording of logging data.

Support of 3G/UMTS:

- Tri-band 850/1900/2100 MHz WCDMA
- HSDPA Category 8 (7.2 Mbps downlink)
- HSUPA Category 6 (5.76 Mbps uplink)

Support of GSM/GPRS/EDGE:

- Quad-band 850/900/1800/1900 MHz
- EDGE/GPRS MS Class 12 (236 Kbps downlink/uplink)

The GLA320 module is certified for the use in the following regions:

- in the EU Member States
- in North America
- in Japan and Malaysia
Scope of delivery:
- Compact and robust USB modem GLA320
- 2 UMTS antennas (short rod antennas) with SMA connector
- Basic Server Software (like with WLAN)
- UMTS contract and SIM card are not included with the product

Figure 7: GLA320

2.18.3 Data Transmission via 3G/UMTS (GL2000 Family)

This UMTS solution with the GL2000 3G router is used for wireless transmission of logging data from vehicles independent from their position. Data is transferred according to the configured time intervals optionally parallel to recording of logging data. The 3G router is connected to the logger via the GLA600 switch-on adapter.

Support of 3G/UMTS:
- 3G via HSPA+, fallback GSM/GPRS/EDGE
- HSDPA Category 10 (14.4 Mbps downlink)
- HSUPA Category 6 (5.76 Mbps uplink)

The 3G router is certified for the use in the following regions:
- in the EU Member States

Scope of delivery:
- Compact and robust 3G router
- 2 antennas (short rod antennas) with SMA connector
- Basic Server Software (like with WLAN)
- UMTS contract and SIM card are not included with the product

Additionally required:
- Transfer license for the logger
- GLA600 switch-on adapter
2.18.4 Data Transmission via LTE (GL2000/GL3000/GL4000/GL5000 Family)

An LTE router can also be used for data transfer which is connected to the Ethernet port of the logger. The router is either permanently supplied externally or via the GLA600 adapter. In the latter case, the router is switched on by the logger only for the duration of the transmission. The Online Data Transfer license must be installed on the logger. For further information on the LTE router, please contact logger@vector.com.

2.19 Pack & Go

With Pack&Go, you can export your logger project, consisting of the configuration (GLC) and all its referenced project files (e.g. databases), as a Pack&Go file and then load it together with the compiled configuration (COD) to the logger during configuring. Thus, on a test drive you will have with you on the logger all the files that are needed to view the configuration, change the configuration, or analyze the log data with the appropriate databases. You can also save the Pack&Go file on your hard disk in order to forward your logger project along with its associated files in a compact form to a colleague.

To protect the data on the logger from unauthorized access, you can assign a password to the Pack&Go file. Likewise, you can exclude certain file types from the export if their export is not desired for safety reasons. For example, it is possible to save only the configuration (GLC) and not the databases on the logger. Please note for changing the configuration all files must be available.

2.20 Navigator versus Classic View

The logged data are displayed in the Vector Logger Configurator in two views:

The Classic View displays the raw files. For converting, all logging files are always transferred from the memory medium to the PC and then converted to the selected format. The logging files can be additionally saved as a raw file (CLF) on the PC. This gives you the option of converting data from the CLF format to other formats at a later time.

Besides the raw files, information on the recorded markers, triggers, and voice recordings in the logging file are displayed with the Navigator (except the GL1000 family). This is also displayed on a time bar. You thus get a quick overview of the number of measurements that were recorded over a particular time period. You can also replay the voice recordings directly.

In addition, you can use the Navigator to select specific data to be read out and thus restrict the converting to areas of interest. Markers will help you to quickly locate the time ranges of interest. By including less data, the readout and conversion are completed much faster.

2.21 Analysis Package

All databases and information of a project that are needed for interpretation and conversion of the recorded data are stored compactly in an analysis package. The analysis package is automatically stored in the project directory and reloaded from there for the conversion. Optionally, it can be stored on the memory card so that it is available for the conversion in the readout station right next to the logging data. It can be protected from unauthorized access using a password.

2.22 Data Export

The recorded data are stored in the logger as raw format. The Vector Logger Configurator can be used to export the data into various logging formats in order to then evaluate them in the analysis programs.

For the export of the logging files numerous options are available:

> Conversion of the raw data into ASCII, BLF, MDF, MAT (MATLAB® V7.3), H5/HE5/HDF5, ADTF, TXT, IMG, CLF format
> Flexible formation of the file name, selectively with
  > Date and time of the logging
  > Name and index of the triggers/markers
  > Type and serial number of the loggers
  > Vehicle name
  > VIN (Vehicle Identification Number)
  > Start/Finish odometer
  > Memory index
GL Logger Families

- Decimal/hexadecimal notation for identifier and signal values
- Relative/absolute time stamp
- Database management for signal-oriented export of logging files, independent of the selected databases in the configuration
- Channel mapping for changing the channel number of the CAN, LIN, and FlexRay channels
- Split options to split big logging files into multiple small files.
- Use of compact ZIP archives as source data (GL2000/GL3000/GL4000/GL5000 families)

The conversion settings for the logging files can be stored in conversion profiles. This allows fast and easy access to different sets of settings.

### 2.23 Analysis Programs

The logged data can be analyzed in the different logging formats offline in CANoe, CANalyzer, CANape, vSignalyzer and third party tools:

<table>
<thead>
<tr>
<th>Logging Format</th>
<th>CANoe</th>
<th>CANalyzer</th>
<th>CANape</th>
<th>Third Party Tools</th>
<th>Signal-oriented</th>
<th>Message-oriented</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASC</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>ASCII (for Vector tools)</td>
</tr>
<tr>
<td>BLF</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>Binary</td>
</tr>
<tr>
<td>MDF</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
<td>—</td>
<td>—</td>
<td>Binary, MDF versions 2.0 to 4.1, message-oriented with version 4</td>
</tr>
<tr>
<td>IMG</td>
<td>✓</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>—</td>
<td>Only MOST data</td>
</tr>
<tr>
<td>MAT</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
<td>—</td>
<td>MATLAB® V7.3 (for third party tools)</td>
</tr>
<tr>
<td>HDF5</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
<td>—</td>
<td>HS, HE5, HDF5 (for third party tools, e.g. Mathematica)</td>
</tr>
<tr>
<td>ADTF</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
<td>—</td>
<td>For third party tools</td>
</tr>
<tr>
<td>TXT</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
<td>Text format (e.g. for MS Excel)</td>
</tr>
<tr>
<td>CLF</td>
<td>✓</td>
<td>✓</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>✓</td>
<td>Raw format of the GL Loggers</td>
</tr>
</tbody>
</table>

The Vector programs CANoe, CANalyzer, CANape and vSignalyzer also support direct import of the recorded logging data in CLF raw format. In CANape and vSignalyzer, the associated databases are needed for signal-oriented display.

The GPS positions and the analog measurement data can be stored selectively in a system channel (except for the GL1000 family). For the analysis in CANoe, CANalyzer, CANape, and vSignalyzer, a database (DBC) is therefore no longer needed.
3 Logger Variants

3.1 GL1000 Family

The compact form of the GL1000 family simplifies installation in your vehicles. The GL1010 is the IP65 variant for use under harsh environmental conditions.

The GL1010 differs from the GL1000 as follows:

- Memory card installed internally, i.e. inaccessible from outside (data transfer only over USB)
- Watertight USB connector with cap
- Watertight D-Sub 25 connector, therefore temperature range is -20 °C to +80°C
- No hole for signal tone
- Approx. 20 mm longer housing

Other hardware and logging functions are identical to those of the GL1000.
3.2 GL2000 Family

The GL2000 also has a compact form, which makes it easy to handle. The GL2010 is the IP65 variant for use under harsh environmental conditions. The GL2400 supports CAN FD.

The GL2000 V2.0 is the improved version of the established GL2000:

- Compact housing (same height as GL2010)
- Separate event connector on top cover for the direct connection of the Switch Box E2T2L
- Support of 24V LIN buses
- Shutdown button and LED for the safe removal of the memory card during logging

The GL2400 offers the functions of the GL2000 V2.0 and additionally supports CAN FD.

The GL2010 differs from the GL2000 as follows:

- Memory card installed internally, i.e. inaccessible from outside (data transfer only over USB)
- Watertight connectors for USB, Ethernet and AUX, each with cap
- Watertight D-Sub 25 and D-Sub 15 connectors, therefore temperature range is -20 °C to + 80°C
- No hole for signal tone

Other hardware and logging functions are identical to those of the GL2000.
3.3 GL3000/GL4000 Families

The loggers of the GL3000 family are multi-bus logger for CAN, LIN and MOST150. Additionally, the GL4000 family supports FlexRay. The GL3000/GL3100/GL3200 loggers differ in the availability of display and pushbuttons and supported memory media. The GL4000/GL4200 loggers only differ in the memory media they support.

Figure 11: GL3000 (left) for logging CAN and LIN buses; GL4000 (right) for supplemental logging of FlexRay buses

Overview of hardware functions of the individual variants:

<table>
<thead>
<tr>
<th>Hardware Functions</th>
<th>GL3000</th>
<th>GL3100</th>
<th>GL3200</th>
<th>GL4000</th>
<th>GL4200</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN channels</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>LIN channels</td>
<td>2 ... 16</td>
<td>2 ... 16</td>
<td>2 ... 16</td>
<td>2 ... 16</td>
<td>2 ... 16</td>
</tr>
<tr>
<td>FlexRay channels</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>MOST150 channel</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
</tr>
<tr>
<td>RS232</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>LEDs</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Display</td>
<td>—</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Buttons</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Digital inputs and outputs</td>
<td>8/8</td>
<td>8/8</td>
<td>8/8</td>
<td>8/8</td>
<td>8/8</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Analog inputs on expansion card</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Ethernet</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>WLAN</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
</tr>
<tr>
<td>Cellular radio</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
<td>optional</td>
</tr>
<tr>
<td>Memory media</td>
<td>CF card</td>
<td>CF card</td>
<td>SSD</td>
<td>CF card</td>
<td>SSD</td>
</tr>
</tbody>
</table>
3.4 GL5000 Family

GL5350 and GL5370 are multi-bus logger for CAN, LIN, FlexRay and MOST150 with powerful hardware for complex tasks and additionally supports CAN FD. With the high number of CAN and LIN channels, you can record extensive networks with only one logger. The GL5370 offers up to 24 CAN channels, including 12 CAN FD channels.

![GL5350 and GL5370](image)

4 Technical Data

4.1 GL1000 Family

4.1.1 General Technical Data

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN channels</td>
<td>2 user-configurable CAN channels</td>
</tr>
<tr>
<td>LIN channels</td>
<td>2 independent LIN channels</td>
</tr>
<tr>
<td>RS232</td>
<td>1 user-configurable serial logging interface</td>
</tr>
<tr>
<td>Bus errors</td>
<td>Logging of CAN Error Frames, Remote Frames and LIN bus errors</td>
</tr>
<tr>
<td>PC interface</td>
<td>USB 2.0</td>
</tr>
<tr>
<td>Memory</td>
<td>SD memory cards up to 2 GB SDHC memory cards up to 32 GB</td>
</tr>
<tr>
<td>Logger capacity 2 GB</td>
<td>Approx. 100 million CAN messages (with DLC 8)</td>
</tr>
<tr>
<td>Display</td>
<td>4 user-configurable LEDs</td>
</tr>
<tr>
<td>Inputs, outputs</td>
<td>4 analog inputs, 2 digital inputs/outputs</td>
</tr>
<tr>
<td>Beep</td>
<td>Programmable signal tone</td>
</tr>
<tr>
<td>Real-time clock</td>
<td>Logging of date and clock time (battery buffered)</td>
</tr>
<tr>
<td>Startup time</td>
<td>Typ. 150 ms with 2 GB Xmore SD memory card, time varies with memory card’s capacity and type</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>5 V ... 30 V</td>
</tr>
<tr>
<td>Current consumption (at 12 V)</td>
<td>Sleep mode: typ. 160 µA Operating: typ. 65 mA</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40 °C ... +85 °C (GL1000) -20 °C ... +80 °C (GL1010)</td>
</tr>
<tr>
<td>Dimensions (w x h x d)</td>
<td>Approx. 107 mm x 85 mm x 35 mm (GL1000) Approx. 130 mm x 85 mm x 35 mm (GL1010)</td>
</tr>
<tr>
<td>IP degree of protection</td>
<td>IP65 in accordance with ISO 20653 (only GL1010)</td>
</tr>
</tbody>
</table>
4.1.2 Technical Data of Inputs/Outputs

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
</table>
| Internal analog inputs    | 4 analog inputs, freely available  
Measurement range 0 V ... 16 V  
Resolution 10 bit  
Precision 1 %  
Sampling rate 1 kHz |
| Internal digital inputs/outputs | Voltage range 0 V ... 36 V |

4.2 GL2000 Family

4.2.1 General Technical Data

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
</table>
| CAN channels     | GL2000/GL2010:  
> CAN1 ... CAN2: 2 x fixed (High-Speed, wake-up capable)  
> CAN3 ... CAN6: 2 x user-configurable by piggyback boards, also electrically decoupled  
GL2400:  
> CAN(FD)1 ... CAN(FD)4: 4 x user-configurable by piggyback boards |
| LiN channels     | 2 independent LIN channels                                                                                                                                                                                   |
| RS232            | 1 user-configurable serial logging interface                                                                                                                                                                 |
| Bus errors       | Logging of CAN Error Frames, Remote Frames and LIN bus errors                                                                                                                                               |
| PC interface     | USB 2.0                                                                                                                                                                                                      |
| Memory           | SD memory cards up to 2 GB  
SDHC memory cards up to 32 GB                                                                                                                                                                                |
| Logger capacity  | GL2000/G2010:  
> CAN1 ... CAN2: 2 x fixed (High-Speed, wake-up capable)  
> CAN3 ... CAN6: 2 x user-configurable by piggyback boards, also electrically decoupled  
GL2400:  
> CAN(FD)1 ... CAN(FD)4: 4 x user-configurable by piggyback boards |
| Display          | 4 user-configurable LEDs                                                                                                                                                                                     |
| Inputs, outputs  | GL2000/GL2010:  
> CAN1 ... CAN2: 2 x fixed (High-Speed, wake-up capable)  
> CAN3 ... CAN6: 2 x user-configurable by piggyback boards, also electrically decoupled  
GL2400:  
> CAN(FD)1 ... CAN(FD)4: 4 x user-configurable by piggyback boards |
| Beep             | Programmable signal tone                                                                                                                                                                                     |
| Real-time clock  | Logging of date and clock time (battery buffered)                                                                                                                                                            |
| Startup time     | Sleep mode: typ. 170 ms with 2 GB resp. 8GB Xmore SD/SDHC memory card, time varies with memory card’s capacity and type.  
Standby mode: immediately (GL2000, GL2010, planned for GL2400)                                                                                   |
| Supply voltage   | 6 V ... 30 V                                                                                                                                                                                                  |
| Current consumption (at 12 V) | Sleep mode: typ. < 1 mA  
Standby mode: typ. 60 mA (GL2000, GL2010)  
Operating: typ. 170 mA (GL2000, GL2010)  
typ. 190 mA (GL2400) |
| Temperature range| -40 °C ... +80 °C (GL2000, GL2400)  
-20 °C ... +80 °C (GL2010)                                                                                                                                                                                   |
| Dimensions (w x h x d) | Approx. 175 mm x 137 mm x 35 mm (GL2010, GL2000 V2.0, GL2400)                                                                                                                                         |
| IP degree of protection | IP65 (only GL2010)                                                                                                                                         |

4.2.2 Technical Data of Inputs/Outputs

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
</table>
| Internal analog inputs    | 4 analog inputs, freely available  
Measurement range 0 V ... 18 V  
Resolution 10 bit  
Precision 1 %  
Sampling rate 1 kHz |
| Internal digital inputs/outputs | Voltage range -0.3 V ... 36 V |


### 4.2.3 Technical Data of the 3G Router

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3G/GSM/GPRS/EDGE</td>
<td>3G via HSPA+, fallback to GSM/GPRS/EDGE HSDPA Category 10 (14.4 Mbps downlink) HSUPA Category 6 (5.76 Mbps uplink)</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>7V ... 28 V</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-30 °C ... +70 °C (operating)</td>
</tr>
<tr>
<td>Dimensions (w x h x d)</td>
<td>Approx. 76 mm x 90 mm x 25 mm</td>
</tr>
</tbody>
</table>

### 4.2.4 Technical Data of the GLA600 Switch-on Adapter

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>8V ... 28 V</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40 °C ... +85 °C (operating)</td>
</tr>
<tr>
<td>Dimensions (w x h x d)</td>
<td>Approx. 80 mm x 40 mm x 20 mm</td>
</tr>
</tbody>
</table>

### 4.3 GL3000/GL4000 Families

#### 4.3.1 General Technical Data

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
<th>GL3000/3100</th>
<th>GL3200</th>
<th>GL4000/4200</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN channels</td>
<td>CAN1 ... CAN4: 4 x user-configurable by piggyback boards, also electrically decoupled</td>
<td>optional</td>
<td></td>
<td>optional</td>
</tr>
<tr>
<td></td>
<td>CAN5 ... CAN8: 4 x fixed (High-Speed, wake-up capable)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Additional CAN9 (AUX) for accessories</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>LIN channels</td>
<td>2 independent LIN channels</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>FlexRay channels</td>
<td>1 FlexRay cluster (channel A and B; with XCP on FlexRay) or 2 independent FlexRay channels A (only Rx; not XCP on FlexRay)</td>
<td>—</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>MOST150 channel</td>
<td>Via GLA150 module</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>RS232</td>
<td>2 user-configurable serial logging interfaces</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Bus errors</td>
<td>Logging of CAN Error Frames, Remote Frames and LIN bus errors</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Data transfer</td>
<td>USB 2.0, Ethernet (10/100 Mbit/s)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WLAN, cellular radio</td>
<td>optional</td>
<td></td>
<td>optional</td>
</tr>
<tr>
<td>Memory</td>
<td>Compact flash cards (internal), USB memory media (external)</td>
<td>GL3000/3100</td>
<td>GL4000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hard drive cassette with 512 GB eSATA solid-state drive (SSD)</td>
<td>GL3200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keypad/display</td>
<td>5 programmable LEDs</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 programmable buttons, display with 1 line à 8 characters</td>
<td>GL3100/3200</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Inputs/outputs</td>
<td>8 digital inputs, 8 digital outputs</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 analog inputs (single-ended to GND)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 analog inputs (differential)</td>
<td>optional</td>
<td></td>
<td>optional</td>
</tr>
<tr>
<td>Beep</td>
<td>Programmable signal tone</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Real-time clock</td>
<td>Logging of date and clock time (battery buffered)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Sleep/Standby mode</td>
<td>For bus quiet on CAN, LIN, FlexRay, MOST150</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Current consumption (at 12 V)</td>
<td>For CAN, LIN, FlexRay: Sleep: typ. 1 mA, Standby: typ. 300 mA</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operating: typ. 700 mA (without hard drive)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Startup time</td>
<td>Sleep: max. 20 ms, Standby: immediate</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>6 V ... 36 V</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
### Temperature range
-60 °C ... +70 °C (operating, without WLAN, cellular radio)

### Dimensions (w x h x d)
Approx. 213 mm x 78 mm x 235 mm

### 4.3.2 Technical Data for the Inputs/Outputs

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
</table>
| Internal analog inputs      | 4 analog inputs, freely available  
2 analog inputs, fixed: Terminal 30 and Terminal 15  
Measurement range 0 V ... 18 V  
Resolution 10 Bit  
Precision 1.0 %  
Sampling rate 1 kHz                                                                    |
| Analog extension A8l        | 8 analog inputs  
Measurement range 0 V ... 18 V  
Resolution 12 bit  
Precision 0.2 %  
Sampling rate 1 kHz                                                                    |
| Internal digital inputs     | Voltage range -0.8 V ... 50 V                                                                                                             |
| Internal digital outputs    | Voltage range -0.3 V ... 40 V                                                                                                             |

### 4.3.3 Technical Data of the GLA320 (USB Modem)

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
</table>
| 3G                          | Tri-band 850/1900/2100 MHz WCDMA  
HSDPA Category 8 (7.2 Mbps downlink)  
HSUPA Category 6 (5.76 Mbps uplink)                                                                 |
| GSM/GPRS/EDGE               | Quad-band 850/900/1800/1900 MHz  
EDGE/GRPS MS Class 12 (236 Kbps downlink/uplink)                                                                 |
| Supply voltage              | From logger via USB 2.0 (5 V)                                                                                                             |
| Temperature range           | Max. +55 °C (GPRS Class 12)                                                                                                              |
| Dimensions (w x h x d )     | Approx. 65 mm x 85 mm x 25 mm                                                                                                             |

### 4.4 GL5000 Family

#### 4.4.1 General Technical Data

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
</table>
| CAN/CAN FD channels         | GL5350: 20 CAN channels, including 4 CAN FD channels  
12 x CAN fixed, 4 x CAN and 4 x CAN FD by piggyback boards                                                                 |
| GL5370: 24 CAN channels, including 12 CAN FD channels  
12 x CAN fixed, 12 x CAN FD by piggyback boards                                                                 |
| Additional CAN (AUX) for accessories |                                                                                     |
| LIN channels                | LIN1 ... LIN2: 2 x fixed  
LIN3 ... LIN6: 4 x user-configurable by piggyback boards                                                                 |
| FlexRay channels            | 1 FlexRay cluster (channel A and B; with XCP on FlexRay) or 2 independent FlexRay channels A (only Rx; not XCP on FlexRay)                  |
| MOST150 channel             | Via GLA150 Modul, optional                                                                                                               |
| RS232                       | 4 fixed serial logging interfaces                                                                                                         |
| Bus error                   | Logging CAN Error Frames, Remote Frames and LIN bus errors                                                                                   |
| Data transfer               | USB 2.0, Ethernet (10Gbit/s)                                                                                                               |
| Memory                      | WLAN, cellular radio                                                                                                                        |
| Keypad/display              | Hard drive cassette with 512 GB eSATA solid-state drive (SSD)                                                                                    |
| 5 programmable LEDs         | 4 programmable buttons, display with 3 lines à 16 characters                                                                                |
| Inputs/outputs              | 4 digital inputs, 4 digital outputs                                                                                                         |
| 6 analog inputs (single-ended to GND) |                                                                                     |
### GL Logger Families

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 analog inputs</td>
<td>(differential), optional</td>
</tr>
<tr>
<td>Beep</td>
<td>Programmable signal tone</td>
</tr>
<tr>
<td>Real-time clock</td>
<td>Logging of date and clock time (battery buffered)</td>
</tr>
<tr>
<td>Sleep mode</td>
<td>For bus quiet on CAN/CAN FD, LIN, FlexRay, MOST150 Planned standby mode</td>
</tr>
<tr>
<td>Current consumption (at 12 V)</td>
<td>For CAN, LIN, FlexRay: Sleep: typ. 2 mA Operating: typ. 860 mA</td>
</tr>
<tr>
<td>Startup time</td>
<td>Sleep: max. 40 ms</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>7 V ... 50 V</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-40 °C ... +70 °C</td>
</tr>
<tr>
<td>Dimensions (w x h x d)</td>
<td>Approx. 290 mm x 74 mm x 212 mm</td>
</tr>
</tbody>
</table>

#### 4.4.2 Technical Data for the Inputs/Outputs

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal analog inputs</td>
<td>4 analog inputs, freely available</td>
</tr>
<tr>
<td></td>
<td>2 analog inputs, fixed for Terminal 30 and Terminal 15</td>
</tr>
<tr>
<td></td>
<td>Measurement range 0 V ... 32 V</td>
</tr>
<tr>
<td></td>
<td>Resolution: AnalogIn1 to 4: 10 Bit</td>
</tr>
<tr>
<td></td>
<td>AnalogIn5 and 6: 12 Bit (KL30, KL15)</td>
</tr>
<tr>
<td></td>
<td>Precision 1,0 %</td>
</tr>
<tr>
<td></td>
<td>Sampling rate 1 kHz</td>
</tr>
<tr>
<td>Analog extension A8I</td>
<td>8 analog inputs</td>
</tr>
<tr>
<td></td>
<td>Measurement range 0 V ... 18 V</td>
</tr>
<tr>
<td></td>
<td>Resolution 12 Bit</td>
</tr>
<tr>
<td></td>
<td>Precision 0,2 %</td>
</tr>
<tr>
<td></td>
<td>Sampling rate 1 kHz</td>
</tr>
<tr>
<td>Internal digital inputs</td>
<td>Voltage range -0,8 ... 50 V</td>
</tr>
<tr>
<td>Internal digital outputs</td>
<td>Voltage range -0,3 ... 40 V</td>
</tr>
</tbody>
</table>

#### 4.5 Overview of CAN Piggyback Boards for GL Loggers

**Piggyback boards for CAN:**

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Transceiver Type</th>
<th>Wake-up capable</th>
<th>GL1000 Family</th>
<th>GL2000 Family</th>
<th>GL3000 Family</th>
<th>GL4000 Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Speed</td>
<td>TJA1043¹</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>TJA1043mag¹ (electrically decoupled)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>TJA1042²</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>TJA1050</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Low-Speed</td>
<td>TJA1055³</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>TJA1055mag³ (electrically decoupled)</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Single Wire</td>
<td>TLE6255G</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Truck &amp; Trailer</td>
<td>WABCO</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

¹ TJA1043 as successor of TJA1041
² TJA1042 as successor of 82C251
³ TJA1055 as successor of TJA1054
GLT Piggyback boards for CAN/CAN FD/LIN:

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>Transceiver Type</th>
<th>Wake-up capable</th>
<th>GL2400</th>
<th>GL5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN/CAN FD High-Speed</td>
<td>TJA1043TK</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CAN Low-Speed</td>
<td>TJA1055</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>LIN</td>
<td>TJA1021</td>
<td>✓</td>
<td>—</td>
<td>✓</td>
</tr>
</tbody>
</table>

5 Product Components

5.1 GL1000 Family

- GL1000 or GL1010 data logger
- Fast automotive-capable 2 GB SD memory card
- Connection cable with open ends for supply voltage, CAN, LIN and for inputs and outputs (not IP65)
- USB cable
- Mounting bracket (GL1000 only)
- GL Logger DVD
  - Vector Logger Configurator (Windows 7/8.1/10)
  - Vector Logging Exporter (Windows 7/8.1/10)
  - Configuration program for LTL
  - Manuals

5.2 GL2000 Family

- GL2000 or GL2010 or GL2400 data logger
- Fast automotive-capable SD/SDHC memory card (GL2000: 2 GB, GL2010: 8 GB)
- Switch Box E2T2L (2 pushbuttons, 2 LEDs)
- Connection cable **Vehicle** for D-Sub 25 for supply voltage, CAN, LIN and for inputs and outputs
- USB cable
- Mounting bracket (GL2000 and GL2400 only)
- GL Logger DVD
  - Vector Logger Configurator (Windows 7/8.1/10)
  - Vector Logging Exporter (Windows 7/8.1/10)
  - Configuration program for LTL
  - Basic version of the MultiLogger ML Server software
  - Manuals

Handheld device and connection cables are not IP65.

5.3 GL3000/GL4000 Families

- GL3000 or GL3100 or GL3200 or GL4000 or GL4200 data logger
- Switch Box E2T2L (2 pushbuttons, 2 LEDs)
- Connector set 2x25 pin and 1x 50-pin with contacts and shells from the automotive field
- USB cable
- Ethernet cable
> CONSOLE cable
> eSATAp connection cable (only GL3200 and GL4200)
> GL Logger DVD
> Vector Logger Configurator (Windows 7/8.1/10)
> Vector Logging Exporter (Windows 7/8.1/10)
> Configuration program for LTL
> Basic version of the MultiLogger ML Server software
> Manuals

5.4 GL5000 Family
> GL5350 or GL5370 data logger
> Switch Box E2T2L (2 pushbuttons, 2 LEDs)
> Power supply socket with metal hoods and contacts
> Vehicle and Extension connector set with contacts
> USB cable
> GL Logger DVD
> Vector Logger Configurator (Windows 7/8.1/10)
> Vector Logging Exporter (Windows 7/8.1/10)
> Configuration program for LTL
> Basic version of the MultiLogger ML Server software
> Manuals

6 Optional Accessories

Product information and technical data for accessories of the GL Logger are provided in a separate document.

The following accessories are available for GL Loggers:
> Various CAN bus transceivers on piggyback boards
> Fast automotive-capable memory cards or SSDs
> LINprobe R, LINprobe X, LINprobe G for additional LIN channels
> GLA150 for logging MOST150 data
> VX modules with POD (plug-on-device)
> GLA320 for wireless data transmission via 3G/UMTS
> 3G Router for GL2000 family
> LTE route (on request)
> GL2010 Ethernet cable IP65/IP20
> CANgps for logging GPS data
> Compact serial GPS receiver for logging GPS data
> LOGview for viewing data in the display
> Cameras (HostCAM, F44) for logging digital color images
> CASM2T3L for logging speech with 2 pushbuttons, 3 LEDs, 1 signal tone and microphone
> VoCAN for logging and replaying speech, device with 1 pushbutton, 4 LEDs, 1 signal tone and microphone (VoCAN at GL2000 family without replaying speech)

> Switch Box E2T2L with 2 pushbuttons and 2 LEDs (for GL2000 – GL5000 families included in scope of delivery)

### Accessories

<table>
<thead>
<tr>
<th></th>
<th>GL1000 Family</th>
<th>GL2000 Family</th>
<th>GL3000 Family</th>
<th>GL4000 Family</th>
<th>GL5000 Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piggyback boards</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SD/SDHC memory cards</td>
<td>✓</td>
<td>✓</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>CF memory cards</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>SSD hard disks</td>
<td>–</td>
<td>–</td>
<td>✓ (GL3200)</td>
<td>✓ (GL4200)</td>
<td>✓</td>
</tr>
<tr>
<td>LINprobe</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>GLA150</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>VX modules</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>GLA320 (via USB)</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>LTE Router (via Ethernet)</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3G Router (via Ethernet)</td>
<td>–</td>
<td>✓</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Ethernet cable IP65/IP20</td>
<td>–</td>
<td>✓ (GL2010)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>CANgps</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>GPS receiver (serial)</td>
<td>–</td>
<td>✓</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>LINprobe</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>LOGview</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>HostCAM</td>
<td>–</td>
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<td>✓</td>
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</tr>
<tr>
<td>F44</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CASM2T3L</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>VoCAN</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Switch Box E2T2L</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Services

In the framework of our support and services program, we can offer you customized solutions for GL Loggers as special customer projects.

Please contact us at: logger@vector.com