Drive Recorder Compact

The Endurance Run Measurement System

IAV Drive Recorder Compact, front view

The **IAV Drive Recorder Compact** is a system for recording vehicle-specific data from vehicles ranging from passenger cars to commercial and special vehicles through their in-vehicle networking interfaces, in particular the CAN bus and K-line. In addition to this, the system is also capable to record analog and digital electrical variables. In terms of power supply, mechanical properties and permissible temperature range, it is suitable for automotive use. Compact mechanical design and straightforward data communication via WLAN make the system ideal for installing in endurance run vehicles or for use in long-term fleet management.
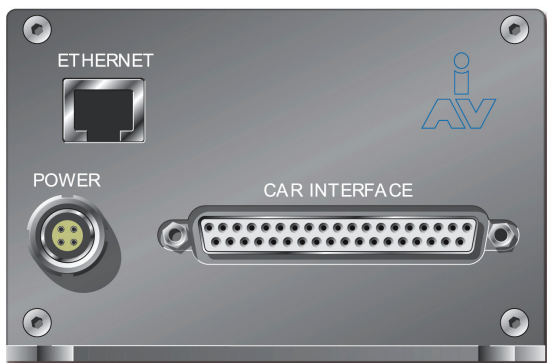
IAV Drive Recorder Compact, rear view

As high volumes of data occur at the vehicle interfaces in modern vehicles, the IAV Drive Recorder Compact comes with an effective system for pre-filtering data. This allows it to trigger client-relevant data. In permanent service, triggering can also be repeated in line with the measurement tasks configured.

Its compact concept enables the unit to be installed in confined spaces or accommodated almost invisibly in body cavities and niches. IAV Drive Recorder Compact routes its interfaces directly via a 37-way sub-D socket. Using a connection box or cable made up specifically for the application in hand, this is where the unit can be connected to the vehicle's interfaces.

IAV connection box

Application Areas:
- System monitoring
- Test drives
- Fleet trials
- Endurance runs
- Searching for hard-to-reproduce faults
- Verifying introductions to mass production
- Quality control

Main Features:
- Sturdy enclosure and plug connections
- Temperature and operating voltage range suitable for automotive use
- Quickly ready for operation (boot time after wake-up)
- High measurement data storage capacity (1 G-byte)
- User-friendly configuration of measurement task
- Extensive protocol handling capability
- Processing of A2L and DBC files
- Event management after triggering
- Extensive measurement data conversion
- On-line data display
- GSM connections
- WLAN

Interfaces:
- K-line
- CAN
- Analog inputs
- Ethernet/WLAN
- GSM
- GPS

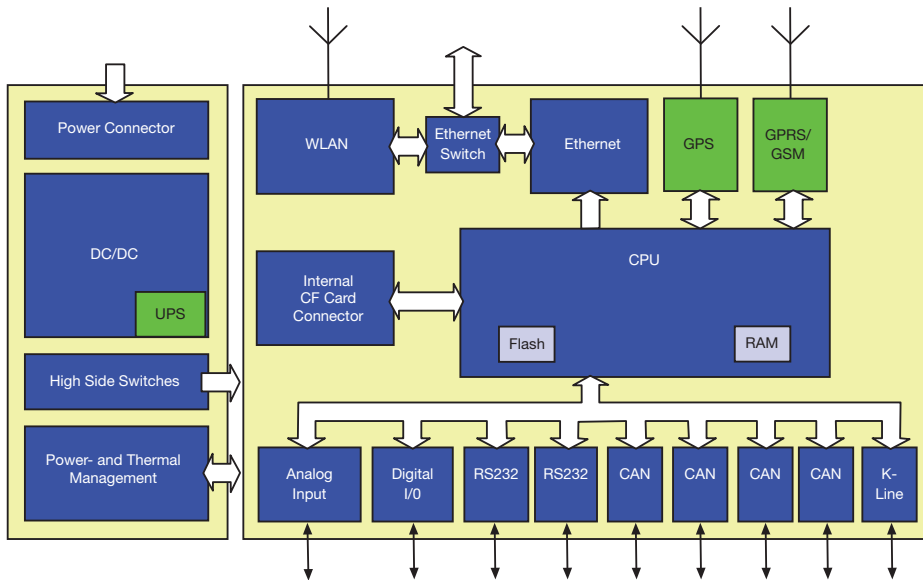### External Accessories:
- Connection box (Q2.05)
- Aerials

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Drive Recorder Compact

In its compact basic configuration, the IAV Drive Recorder Compact offers a variety of interfaces for conducting measuring tasks. These include four high-speed CAN interfaces, an interface to ISO 9141 (K-line), measurement of voltages at terminal 30 and terminal 15, digital inputs and outputs as well as a further eight analog inputs. Using the two serial RS232-type interfaces, the IAV Drive Recorder Compact is capable of performing a whole host of different measurement tasks. Among others, this includes the SMB (serial measurement bus). In addition, it is possible to evaluate the voltages at terminal 50 as well as the voltage of any door contact.

The CAN interfaces are equipped with high-speed transceivers. This permits operation on high and low-speed CAN buses. The option of connecting external low-speed transceivers is also provided when one-wire operation is tested as a specific fault condition on a low-speed CAN bus.

Equipment:	Standard	GPS	Full
Compact enclosure	X	X	X
Power Management	X	X	X
Ethernet	X	X	X
1st CAN	X	X	X
2nd CAN	X	X	X
3rd CAN	X	X	X
4th CAN	X	X	X
K-line	X	X	X
SMB	X	X	X
RS232	X	X	X
Digital I/O	X	X	X
Analog Inputs	X	X	X
CF Card 512 MB	X	X	O
CF Card 1 GB	O	O	X
GPS	-	X	X
GSM/GPRS	-	-	X
WLAN	X	X	X
Connection box	O	O	O
UPS	O	O	O

Legend:

Featured as standard
X

Optionally available
O

Not featured
-

The measurement task is prepared and processed using a user-friendly Windows program. The resultant measurement configuration is stored in an XML-based file that is transferred as standard to the IAV Drive Recorder Compact via a WLAN connection. The measurement configuration can also be communicated through the mobile telephone network or a user-friendly hard-wired Ethernet connection.
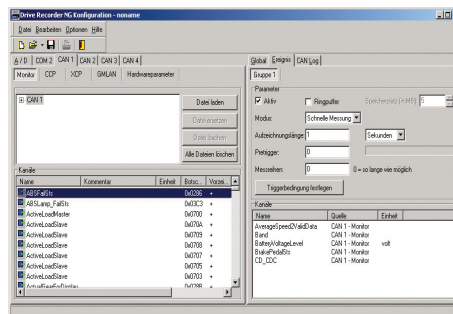
IAV Drive Recorder Compact records the data it measures on an internal CF card. To permit installation flexibility of the IAV Drive Recorder, this card cannot be changed by the user.

On completing the measurement task, the recorded readings can be transmitted to a host system. The PC-type network environment used makes data particularly easy to communicate. Needless to say, the data measured can also be transferred on a wireless basis by means of GSM or WLAN, or via an Ethernet cable.
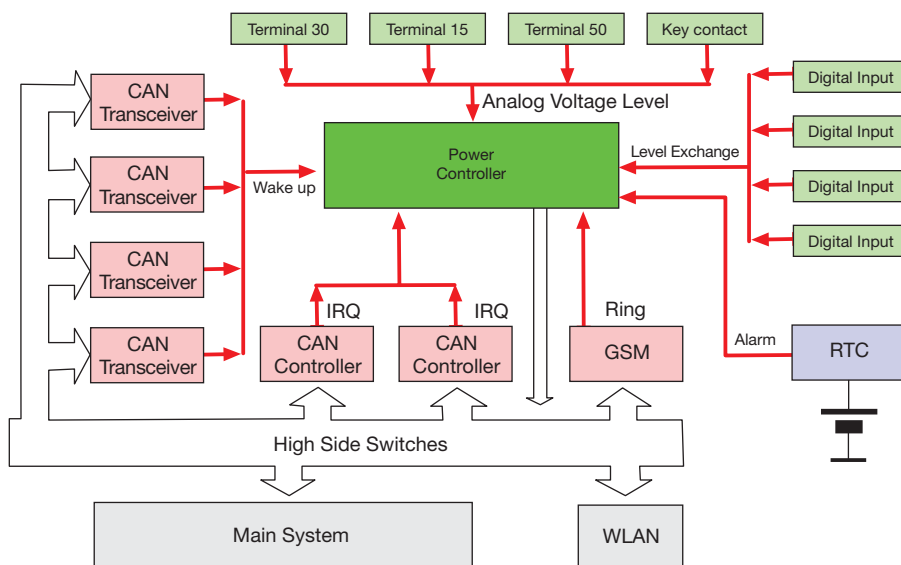
As IAV's Drive Recorder Compact is used chiefly as an endurance run measurement system, it comes with a perfected power management system. This encompasses a comprehensive range of settable input events for booting the system as well as configurable after-run times.

The pale green boxes displayed in the diagram show the system's permanently available wake-up sources. Using them places no extra drain on quiescent current. The boxes marked in pink characterise modules that require a separate quiescent current supply.

All units in the IAV Drive Recorder family are capable of handling a wide range of protocols on the vehicle interfaces. This includes the decoding of data while raw data are being monitored, the resultant responses to measurement events that may be of relevance to the further measurement process, and direct contact between the measurement system and control units connected to the vehicle interfaces. Simple diagnostic functions, such as reading out fault memories, complement this event management capability. As IAV's Drive Recorder family can look back on a long tradition, the Drive Recorder Compact is able to handle the protocol landscapes that have evolved over time in the automotive industry.

The philosophy of user-friendly equipment configuration implies the ability to upload information on the measurement object. To this end, the configuration tool is capable of processing common vehicle inter-face description files. Once measurement has been completed, most of the data measured can, of course, be converted back into formats that can be processed using tools familiar on the market.

The connection box is currently in preparation and will be available in the second quarter of 2005.

In addition to these hardware advances, IAV will be offering WEB-based teleservices providing support and maintenance expertise in fleet tests.

Protocols:
▸ ISO 9141 (K-line) based
 ● KWP 2000
 ● McMess

▸ CAN
 ● KWP 2000 (in preparation)
 ● CCP 2.0, 2.1
 ● XCP 1.0
 ● GMLAN

Input Formats:
▸ Vector-based
 ● DBC
 ● MDC
▸ ASAM-based
 ● A2L

Measurement Data Format:
▸ MDF
▸ CSV

Applications:
▸ Logging
▸ Monitoring
▸ Classifying
 ● linear (in preparation)
▸ OBD Analyse
 ● KWP 2000
 ● ISO
▸ Diagnostics (OEM-dependent)

Drive Recorder Compact

Technical Specifications: IAV Drive Recorder Compact		
Mechanical	Dimensions (w x h x d)	105 x 65 x 168 mm³ (without screw-on flange)
		105 x 68 x 205 mm³ (inc. screw-on flange)
	Weight	0.8 kg + modules (WLAN, GSM, GPS)
		approx. 1.1 kg inc. all modules
Interfaces	at DB 37 plug	4 x CAN (high speed)
		1 x K-line (185 k-baud, 9 bit)
		1 x SMB
		4 x digital out (OC, short-circuit-proof, 60 V, 470 ohms at 5 V)
		4 x digital in (1.6 volts low/ 2.5 volts high, Schmitt trigger input)
		Terminal 30, 15, 50, Door contact (analog evaluation)
		8 x analog in (10 k ohms, 10-bit resolution, 0 – 40.95 volts, 2-ms sampling)
		1 x RS232 (TxD, RxD, V.23 level)
	Lemosa plugs	Terminal 31, 30, 15
	HF-side	WLAN 802.11b
		GSM 900, 1800, 1900 MHz
		GPS (3.3-volt 20 mA aerial supply)
		RJ45 Ethernet 10 M bit
	Indicators	Operating status LED
		GSM Status LED
Storage capacity	Internal CF card	1 G-byte max.
Operating voltage	Input range	6.5 to 50 volts
	Power consumption	< 5 mA @ 13.8 volts (only terminal 15 awake)
		< 10 mA @ 13.8 volts (plus CAN transceiver)
		< 20 mA @ 13.8 volts (plus CAN controller)
		250 mA @ 13.8 volts (on)
		350 mA @ 13.8 volts (on with GSM or WLAN Burst)
Temperature range	Basic unit	-40 °C to +85 °C
	Application of GSM	-20 °C to +65 °C
	Application of WLAN	-20 °C to +50 °C

IAV Drive Recorder Compact Connection Box		
Mechanical	Dimensions (w x h x d)	105 x 20 x 168 mm³ (without screw-on flange)
		105 x 23 x 205 mm³ (inc. screw-on flange)
	Weight	0.4 kg
Interfaces	Rear	1 x DB37 for IAV Drive Recorder Compact
		1 x Lemosa for power supply from vehicle power supply system
	Top	4 x DB9 für CAN Interfaces (inc. 5 V for external low-speed CAN transceiver)
		1 x DB9 for K-line
		1 x DB9 for SMB
		1 x DB9 for RS232
		1 x DB9 for digital I/O, terminal 50 and key contact
contact		1 x DB25 for analog inputs
Operating voltage	Input range	6.5 to 60 volts
Temperature range		-40 °C to +85 °C

Product Numbers:

▸ **Drive Recorder Compact**
Standard
01005

▸ **Drive Recorder Compact**
GPS
01006

▸ **Drive Recorder Compact**
Full
01007

▸ **Drive Recorder Compact**
Special configuration
On request

▸ **Drive Recorder Compact**
Connection box
99040

▸ **Drive Recorder Compact Aerials, Plugs and Accessories**
IAV keeps a wide range of aerials, plugs and jack/socket systems for the plug connection systems used. In addition to these standard accessories, IAV will also be pleased to provide recommendations regarding the use of other peripherals in client projects.
Please ask for details.

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Drive Recorder NG®

The Modular Vehicle Measurement System

IAV Drive Recorder NG®, front view

The IAV Drive Recorder NG® is a system for recording vehicle-specific data from vehicles ranging from passenger cars to commercial and special vehicles through their in-vehicle networking interfaces, in particular the CAN bus and K-line. In addition to this, it is also possible to record analog and digital electrical variables. In terms of power supply, mechanical properties and permissible temperature range, it is ideal for automotive use.
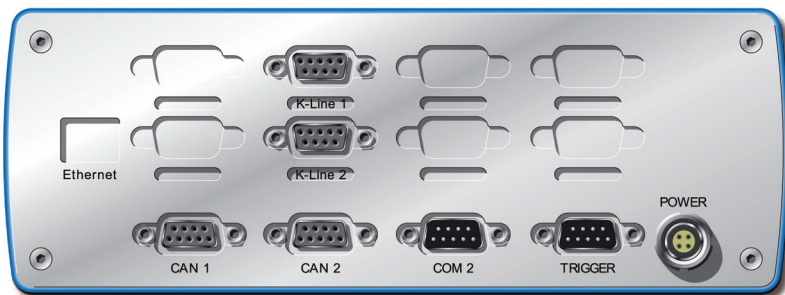
IAV Drive Recorder NG®, rear view with K-line module

As high volumes of data occur at the vehicle interfaces in modern vehicles, the IAV Drive Recorder NG® comes with an effective system for pre-filtering data. This permits the triggered recording of client-relevant data. In permanent service, triggering of this type can also be repeated in line with the measurement tasks configured.

Modular in concept, the system can be adapted to the particular measurement tasks in hand. In addition to the interfaces provided on the basic device, such as the CAN bus and serial measuring bus (SMB), the system's modular design permits the addition of additional interfaces, e.g. the vehicle-specific K-line, the CAN bus as well as a module for recording vehicle-specific voltages (as from the 1st quarter of 2005).

Application Areas:
▸ System monitoring
▸ Test drives
▸ Fleet trials
▸ Endurance runs
▸ Searching for hard-to-reproduce faults
▸ Verifying introductions to mass production
▸ Quality control
▸ Test benches

Main Features:
▸ Sturdy enclosure and plug connections
▸ Protected PC card drives
▸ Temperature and operating voltage range suitable for automotive use
▸ Quickly ready for operation (boot time after wake-up)
▸ High measurement data storage capacity (2 x 1 G-byte)
▸ User-friendly configuration of measurement task
▸ Extensive protocol handling capability
▸ Processing of A2L and DBC files
▸ Event management after triggering
▸ Extensive measurement data conversion
▸ On-line data display
▸ GSM connections
▸ WLAN

Internal Modules:
▸ K-line
▸ CAN
▸ Analog module (1st quarter/2005)
▸ Ethernet

## External Accessories:
▸ GSM
▸ GPS
▸ WLAN

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Drive Recorder NG®

In addition to vehicle-specific interfaces, the IAV Drive Recorder NG® also features numerous interfaces for data communication with a host system. This host system may be a PC/notebook or a remote server connected by GSM link or WLAN.

Even without extension modules, the IAV Drive Recorder NG® comes with a whole range of interfaces for conducting medium-complexity measurement tasks. These include two high-speed CAN interfaces, measurement of voltages at terminal 30 and terminal 15, an interface for manual triggering, digital inputs and outputs as well as a serial interface for the SMB. The two serial interfaces (RS232), the digital inputs/outputs and the IAV MobiDrive-Pro system enable the IAV Drive Recorder NG® to be used for communication via GSM and for receiving GPS data.
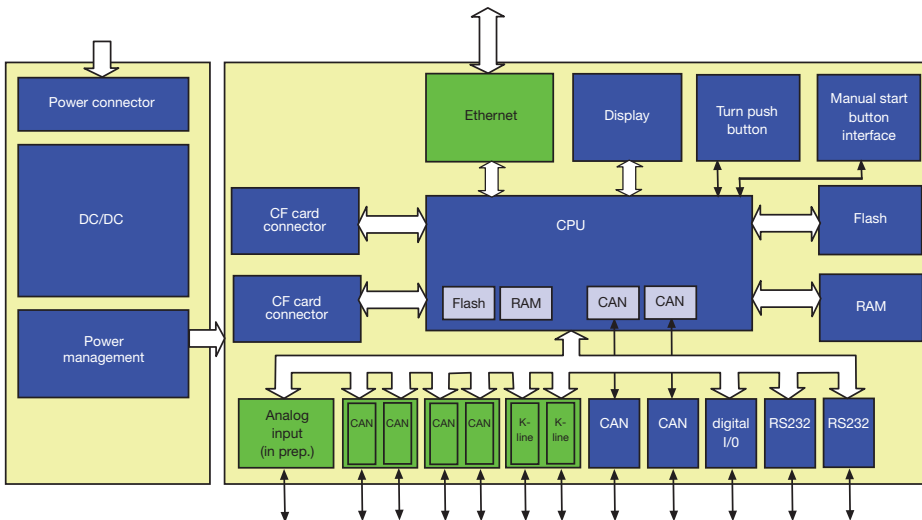
Equipment:	
Display	x
Power management	x
Ethernet	x
CAN 1	x
CAN 2	x
SMB (via RS232 no. 2)	x
RS232 1/2	x
Digital I/O	x
2 analog inputs	x
Manual button	o
CAN 3/4 high-speed module	o
CAN 3/4 low-speed module	o
CAN 5/6 high-speed module	o
CAN 5/6 low-speed module	o
K-Line 1/2 module	o
Analog module (1st quarter 2005)	o
CF card, 512 MB	o
CF card, 1 GB	o
GPS mouse	o
GSM/GPRS, see MobiDrive	o
WLAN, see MobiDrive	o

**Legend:**

Featured as standard
X

Optionally available
O

The measurement task is prepared and processed under a user-friendly Windows program. The resultant measurement configuration is stored in an XML-based file that is transferred as standard to the IAV Drive Recorder NG® via a PC or CF card. The measurement configuration can also be communicated on a wireless basis through the mobile telephone network using a GSM connection as well as by WLAN. Communication via a user-friendly hard-wired Ethernet connection, e.g. to a test bench, is also possible.

To produce the measurement configuration, the system offers import converters for DBC and A2L files. The bus signals being measured are simply selected by drag & drop. The system is capable of measuring up to 500 channels almost simultaneously. Here, the user is provided with up to 10 measurement groups with different scanning rates. The scanning bandwidth ranges from 0.1 Hz to 100 Hz.
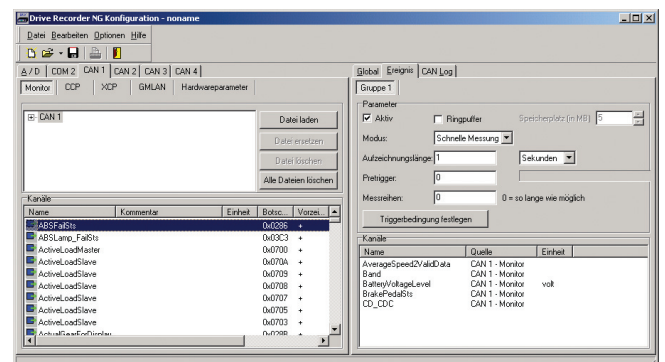
The IAV Drive Recorder NG® uses a PC or CF card for recording the data it measures. On completing the measurement task, these data can be transferred to a host system by means of PC-card drive. The PC-compatible file system used makes data particularly easy to communicate. Needless to say, the data measured can also be transferred on a wireless basis by means of GSM or WLAN, or via an Ethernet cable.

For evaluation purposes, the system is capable of converting recorded data into all typical file formats. This allows data to be evaluated and analyzed using familiar calibration and evaluation tools (INCA, DIADEM, SAM2000, UNIPLOT). We shall be pleased to be of help if you need support preparing evaluation standards or require a data format that is not implemented.

The IAV Drive Recorder NG® is designed to accept add-on modules for complex measurement tasks. This allows you to extend its hardware to suit your requirements. You can install up to four modules.

An ISO 9141 module with two interfaces is available for operation on the K-line. Both interfaces can be configured to support your particular needs and support baud rates up to 185 k baud as well as operation with 9 data bits.

The module supports McMess and KWP2000 protocols. Other protocols on request.

The CAN module supports two high or low-speed CAN interfaces. It is equipped for operation with high-speed transceivers (TJA1041) or low-speed transceivers (TJA1054).

It supports CCP 2.0 and 2.1, XCP 1.0 and GMLAN protocols. KWP on CAN is in preparation. Other protocols on request.

An Ethernet module is available for connecting Drive Recorder NG® to a LAN or WLAN system (MobiDrive-WLAN). This module permits the transmission of measurement data to a host without removing the PC or CF cards.

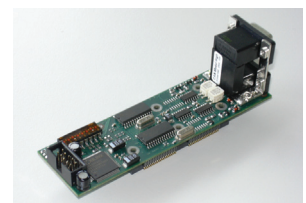We shall be pleased to offer all-in, client-specific solutions for setting up a fleet application.

An analog module will soon be available for measuring analog electrical variables. It will feature 12 analog voltage inputs with an input voltage range attractive to the automotive sector.

Modules:

K-line module
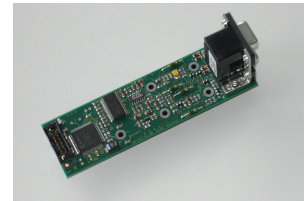
CAN module

Ethernet module

Drive Recorder NG®

Technical specifications:
IAV Drive Recorder NG®

Mechanical	Dimensions (w x h x d) Weight	210 x 74 x 150 mm^3 1.6 kg + modules (CAN, K-line, Ethernet)
Interfaces	DB 9 socket	2 x CAN (High speed)
	DB 9 plug	1 x RS232 for SMB or GPS
	DB 9 plug	4 x digital Out TTL level
	DB 9 plug	1 x RS232/PC interface
	Lemosa socket	Terminal 31, 30, 15
	Display	LCD
		LED operating status
		2 LED PC card slot status
	DB 9 socket	Manual button:
		Manual start (stop) via button,
		LED as recording monitor
Storage capacity	PC card/CF card	2 slots, each 1 G-byte max.
Operating voltage	Input range	6.5 to 50 volts, polarity reversal protection
	Power consumption	250 mA @ 13.8 volts (on)
Temperature range		-10 °C to +70 °C -20 °C to +80 °C (use of PC cards in extended range)

Product Numbers:

▸ Drive Recorder NG
  01001

▸ CAN high-speed module
  01102

▸ CAN low-speed module
  01103

▸ K-line module
  01104

▸ Ethernet module
  01105

▸ Manual button
  01107

▸ MobiDrive Family
  Please ask for details

▸ **Drive Recorder NG®**
  Plugs and Accessories
  IAV keeps a wide range of aerials, plugs and jack/socket systems for the plug connection systems used. In addition to these standard accessories, IAV will also be pleased to provide recommendations regarding the use of other peripherals in client projects. Please ask for details.

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MobiDrive Family

## Extensions for Drive Recorder NG®

The IAV MobiDrive family extends the application capabilities of the Drive Recorder NG®. All of the units belonging to this family feature a power management system capable of switching the Drive Recorder NG® on and off. In addition, all models are in a position to wake the Drive Recorder NG® in response to an activity registered at the CAN interface. Catering for different needs, the family encompasses the MobiDrive-WLAN, MobiDrive-NG, MobiDrive-Pro and MobiDrive-Powerbox.

The sophisticated power management system allows you to activate the Drive Recorder NG® via digital inputs as well as by GSM/GPRS. It also re-starts the Drive Recorder NG® after user-selectable delays in a range from one minute to 24 hours. To carry out specific investigations on the CAN bus, the system provides a function that uses the first bus activity in a CAN network to activate the Drive Recorder NG® (wake-up via CAN). This functionality is provided for a CAN interface. The overall system is ready for the measurement task once the boot time has run through.

IAV MobiDrive-WLAN, front view

Instead of a GSM module, MobiDrive-WLAN contains a WLAN module. This makes the Drive Recorder NG® even more convenient to use at short range. It can be configured, read out and updated without complicated wiring. Depending on the application, the user can decide whether to set up a point-to-point connection or – in a garage workshop for example – to access different vehicles in succession via an access point. IAV offers user-friendly PC software for this purpose. To facilitate handling, Drive Recorder NG® can be assigned to specific vehicles. This allows the software to display all vehicles located within the 'visible' range of a WLAN-capable PC/notebook. The measurement data recorded can be exported to the PC, filed separately by vehicle as well as by date and time and, if necessary, burned onto a CD.
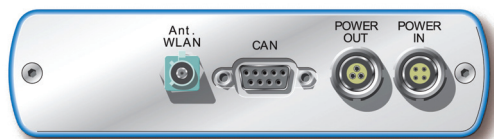
IAV MobiDrive-WLAN, rear view

Needless to say, it is also possible to carry out firmware updates on the Drive Recorder NG® or set the real-time clock (RTC). This module can be woken via CAN or WLAN.

Application Areas:
▸ Wake-up functionalities through new power management system
▸ External WLAN connection
▸ GSM/GPRS link
▸ Recording of GPS data
▸ Drive Recorder NG® remote configuration
▸ Remote data display
▸ Status text messaging

Main Features:
▸ Sturdy enclosure and plug connections
▸ Temperature and operating range suitable for automotive use
▸ Digital IN wake-up
▸ GSM/GPRS wake-up
▸ CAN wake-up
▸ RTC wake-up

Interfaces:
▸ Digital inputs
▸ CAN interface
▸ LAN
▸ Serial interface to GSM/GPRS module
▸ GPS aerial
▸ GSM/GPRS aerial
▸ WLAN aerial
▸ Power IN, Power OUT

External Accessories:
▸ Aerials

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MobiDrive Family

MobiDrive-NG features the functions of the MobiDrive-Powerbox and is also capable of activating the Drive Recorder NG® via GSM/GPRS. The integrated GSM/GPRS tri-band modem provides the connectivity required in Europe and the US for communicating with the Drive Recorder NG®.
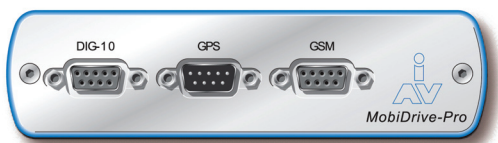
IAV MobiDrive-NG, front view
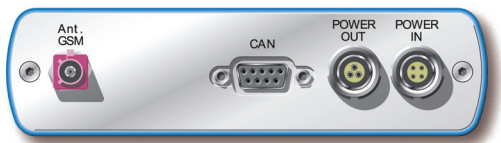
IAV MobiDrive-NG, rear view

MobiDrive-NG® provides the functions for uploading a new configuration to the remote Drive Recorder NG® via GSM/GPRS, as well as for reading out recorded measurement data, uploading new firmware and displaying current measurement values on a remote PC. MobiDrive-NG also makes it possible to send status text messages from the Drive Recorder NG® in configurable intervals ranging from 60 seconds to 65,535 minutes (approx. 1.5 months).

Equipment:	Powerbox	NG	Pro	WLAN
Compact enclosure	X	X	X	X
Power Management	X	X	X	X
CAN wake-up	X	X	X	X
GSM/GPRS	–	X	X	–
GPS	–	–	X	–
WLAN	–	–	–	X

Legend:

Featured as standard

X

Not featured

–

IAV MobiDrive-Pro, front view

IAV MobiDrive-Pro, rear view

In addition to the hardware components and functions of MobiDrive-NG, MobiDrive-Pro comes with an integrated GPS receiver which makes it possible to initiate the recording of measurement data in relation to vehicle location; GPS data (longitude, latitude and altitude information) can also be recorded as measurement variables.

The MobiDrive-Powerbox has been developed for applications in which the exclusive consideration is to extend the Drive Recorder NG® by sophisticated power management functions. It provides the functions necessary for activating the Drive Recorder NG® via digital inputs, waking up the recorder by CAN and re-starting it after selectable delays ranging from 60 seconds to 24 hours. Here, importance has been attached to keeping power consumption of the MobiDrive-Powerbox to an absolute minimum.

IAV MobiDrive-Powerbox, front view

IAV MobiDrive-Powerbox, rear view

Product Numbers:

▸ **MobiDrive-Powerbox**
01004

▸ **MobiDrive-NG**
01003

▸ **MobiDrive-Pro**
01002

▸ **MobiDrive-WLAN**
01011

▸ **MobiDrive Aerials, Plugs and Accessories**
IAV keeps a wide range of aerials, plugs and jack/socket systems for the plug connection systems used. In addition to these standard accessories, IAV will also be pleased to provide recommendations regarding the use of other peripherals in client projects.
Please ask for details.

Technical Specifications: IAV MobiDrive Family

Mechanical	Dimensions (w x h x d)	140 x 35 x 130 mm³
	Weight	approx. 0.4 kg with GSM module
Interfaces (depending on hardware configuration)	DB 9 plug	GPS (NMEA 0183)
	DB 9 socket	GSM
	DB 9 socket	4x digital IN, 4 x digital OUT (OC, short-circuit-proof, 60 V, 470 ohms at 5 V)
	DB 9 socket	CAN
	Lemosa plug	Terminal 31, 30, 15
	RF side	WLAN 802.11b GSM 900, 1800, 1900 MHz GPS (5 volts, 50 mA aerial supply)
	RJ45	Ethernet input 10M-bit
Operating voltage	Input range	6.5 to 50 volts
	Power consumption	250 mA @ 13.8 volts (on) 350 mA @ 13.8 volts (on with GSM or WLAN Burst)
Temperature range	Basic unit	-40°C to +85°C
	Use of GSM	-20°C to +65°C
	Use of WLAN	-20°C to +50°C

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