Portable Data Recorder
HMG 3010

Description:

The HMG 3010 is an impressive, top performance portable measuring and data recording device.

Automated setting procedures, a simple, self-explanatory operator guide and many comprehensive functions ensure the operator is able to carry out a wide range of measuring tasks within a very short time and to work in a way which is both time-saving and cost-effective.

The HMG 3010 thus quickly becomes a reliable and helpful tool in the working environment of service, maintenance, development, test rig technology, quality assurance or commissioning of systems and machines.

The HMG 3010 is designed primarily to record pressure, temperature and flow rate values which are the standard variables in hydraulics and pneumatics. For this purpose, special sensors are available, with which the variable, the measurement range and unit are automatically detected by the HMG 3010. The device also offers measurement inputs for standard sensors with current and voltage signals. In addition to the analogue inputs, the HMG 3010 also has two digital inputs (e.g. for frequency or rpm measurements).

The ability to connect the HMG 3010 to a CAN bus and thus to display messages from the CAN bus completes the range of applications.

Due to the wide range of functions and its simple handling, the HMG 3010 is just as appropriate for users who take measurements only occasionally as it is for professionals for whom measuring and documentation are routine.

The update capability of the HMG 3010 via the integral USB port ensures that the user can benefit from future upgrades of the device software.


Special features:

- Simple, user-friendly operation
- Practical, robust design
- Large, full-graphics colour display
- Quick and independent basic setting of the device through the use of automatic sensor recognition
- Up to 10 sensors can be connected simultaneously
- Up to 32 measurement channels can be displayed at a time
- Measuring rates up to 0.1 ms
- Extended voltage measurement -10 .. +10 V and 0 .. 50 V
- Can be connected to a CAN bus
- Very large data memory for archiving measurement curves
- Various measurement modes:
  – Normal measuring
  – Fast curve recording
  – Long term measuring
- 4 independent triggers, can be logically linked
- PC connection
  – USB
  – RS 232
- Convenient visualisation, archiving and data processing using the HMGWIN 3000 and CMWIN software supplied
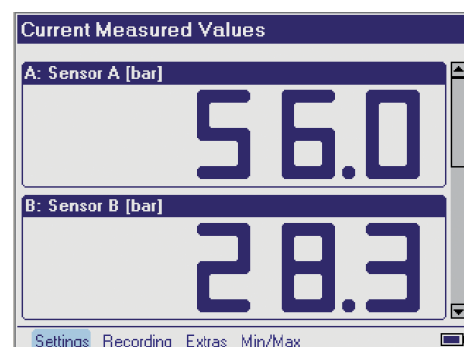
Function:

- Clear and graphical selection menus guide the operator very simply to all the device functions available. A navigation pad on the keypad ensures rapid operation.

- The HMG 3010 can monitor signals from up to **ten sensors simultaneously**. For this there are 5 robust standard input sockets. By using Y adapters, the number of inputs can be doubled individually to make a total of between 6 and 10.

- Up to 8 sensors can be connected to 4 of these input sockets:
  - 8 sensors (e.g. for pressure, temperature, and flow rate) with the special digital HSI interface (HYDAC Sensor Interface); this means the basic device settings (measured variable, range, and unit of measurement) are undertaken automatically
  - 8 standard analogue sensors with current and voltage signals
  - 4 Condition Monitoring sensors*) (SMART sensors); again, the basic device settings are carried out automatically

- Frequency measurements, counter functions, or triggers for data logging can be implemented via the fifth input socket with 2 digital inputs.

- For extended voltage measurement, the HMG 3010 offers the possibility of recording signals of 0 .. 50 V on two inputs and a signal of -10 .. +10 V on one input (e.g. proportional valve control).

- The connection to a **CAN bus** in conjunction with the CAN adapter ZBE 3010 makes it possible to record CAN messages (e.g. motor speed, motor oil pressure) in combination with measured data from the hydraulic system.

- HYDAC CAN bus sensors connected directly to the CAN adapter can be parameterized using the HMG 3010 (node ID and baud rate)

- All input channels can operate simultaneously at a **measurement rate** of 0.5 ms (1.0 ms for SMART sensors). To record highly dynamic processes, 2 analogue inputs are capable of recording measured values of 0.1 ms.

- The most impressive function of the HMG 3010 is its ability to record dynamic processes "online", i.e. in real-time, as a **measurement curve** and to render them as graphs in the field.
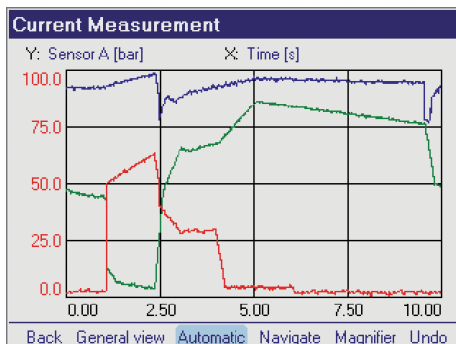

- The **data memory** for recording curves or logs can hold up to 500,000 measured values. At least 100 such full-length data records can be stored in an additional archive memory.

- For specific, **event-driven curves or logs,** the HMG 3010 has four independent triggers, which can be linked together logically.

- It is also possible to **determine differential values** between different input signals from sensors. Particularly when measuring flow rate by means of differential pressure measurement across a measuring orifice, the accuracy can be significantly improved by using a stored calibration curve. To generate such calibration curves, the HMG 3010 has an easy-to-use handheld recording function.

- User-specific device settings can be stored and re-loaded at any time as required. This means that repeat measurements can be carried out on a machine again and again using the same device settings.

- Measured values, curves or texts are visualized on a **full-graphics colour display** in different selectable formats and display forms.

- Numerous useful and easy-to-use **auxiliary functions** are available, e.g. zoom, ruler tool, differential value graph creation and individual scaling, which are particularly for use when analysing the recorded measurement curves.
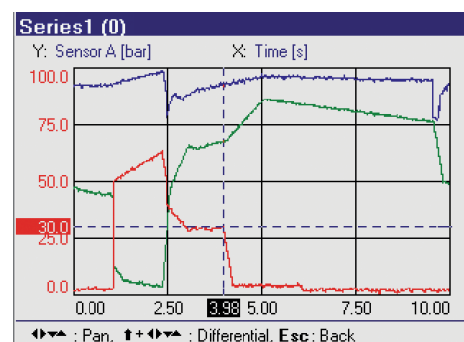
- The HMG 3010 communicates with a PC via the built-in USB port or RS 232 port.

HMGWIN 3000:

The PC software HMGWIN 3000 is also supplied with the device. This software is a convenient and simple package for analysing and archiving curves and logs which have been recorded using the HMG 3010, or for exporting the data for integration into other PC programs if required. It is also possible to operate the HMG 3010 directly from the computer, to undertake basic settings, and to start measurements online and display them directly on the PC screen as measurement curve progressions.

CMWIN:

The HYDAC software CMWIN is also supplied with the device.
This software enables you to communicate directly with SMART sensors *) connected to the HMG 3010 from your PC.

Both programs can be run on PCs with Windows Vista / XP / 2000 and Windows 7 operating systems.

Some examples of the numerous useful additional functions:

- **Transfer and archiving** of measurements recorded using the HMG 3010
- Display of the measurements in graph form or as a table
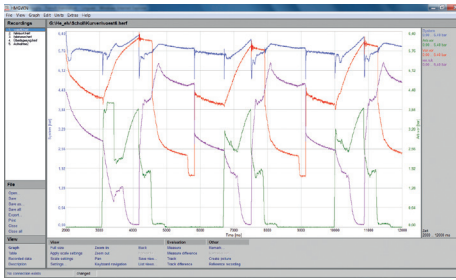
- **Zoom function:**
  Using the mouse, a frame is drawn around an interesting section of a measurement curve, which is then enlarged and displayed.
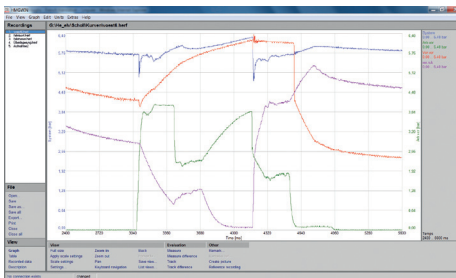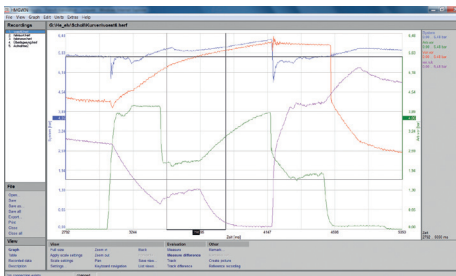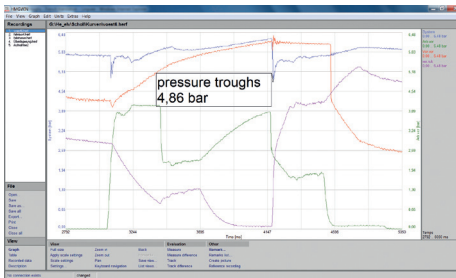

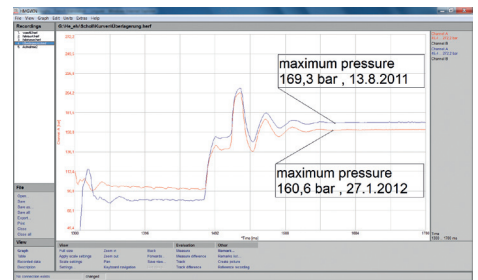Fig.: Zoomed section of measurement curve

- **Accurate measurement** of the curves using the ruler tool (time values, amplitude values, and differentials)


- Individual **comments** and measurement information can be inserted into the graph

- **Overlay** of curves, for example to document the wear of a machine (new condition/current condition)

- Using mathematical operations (calculation functions, filter functions) new curves can be added.
- Snap-shot function: comparable to the function of a digital camera, a picture can be taken immediately of any graph and saved as a jpg file.
- A **professional measurement report** can be produced at the click of a mouse: HMGWIN 3000 has an automatic layout function.
  Starting with a table of contents, all recorded data, descriptions, and graphics and/or tables are combined into a professional report and saved as a pdf file.
- **Online function:**
  Starting, recording, and online display of measurements (similar to the function of an oscilloscope)
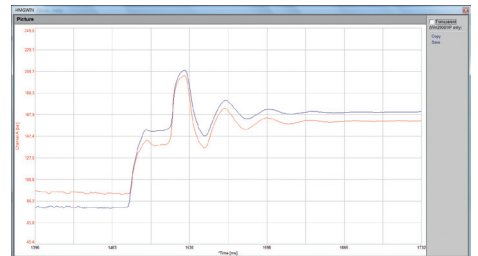
- Change of axis assignment of the recorded measurement parameters in graph mode (e.g. to produce a p-Q graph)

*) SMART sensors
  (Condition Monitoring Sensors) are a generation of sensors from HYDAC which can provide a variety of different measured values.

Technical data:

| Meas. inputs | • 4 input sockets (channels A-H) for connecting up to 8 analogue sensors or up to 4 SMART sensors. |
| | • 1 input socket with 2 digital inputs (channels I-J) and one voltage input of -10 V to + 10 V (shown on channel H) Sensors are connected using standard M12x1 male connectors (5 pole) |

Channels A, B, E, F, G (Accuracy)	HSI	(≤ ± 0.1 % FS max.)
	4 .. 20 mA	(≤ ± 0.1 % FS max.)
	0 .. 20 mA	(≤ ± 0.1 % FS max.)
	0 .. 4.5 V	(≤ ± 0.1 % FS max.)
	0 .. 5 V	(≤ ± 0.2 % FS max.)
	0 .. 10 V	(≤ ± 0.1 % FS max.)
	0.5 .. 4.5 V	(≤ ± 0.1 % FS max.)
	0.5 .. 5.5 V	(≤ ± 0.2 % FS max.)
	1 .. 5 V	(≤ ± 0.2 % FS max.)
	1 .. 6 V	(≤ ± 0.2 % FS max.)

Channels C and D (Accuracy)	HSI	(≤ ± 0.1 % FS max.)
	4 .. 20 mA	(≤ ± 0.1 % FS max.)
	0 .. 20 mA	(≤ ± 0.1 % FS max.)
	0 .. 4.5 V	(≤ ± 0.1 % FS max.)
	0 .. 5 V	(≤ ± 1.0 % FS max.)
	0 .. 10 V	(≤ ± 0.5 % FS max.)
	0 .. 50 V	(≤ ± 0.1 % FS max.)
	0.5 .. 4.5 V	(≤ ± 0.1 % FS max.)
	0.5 .. 5.5 V	(≤ ± 1.0 % FS max.)
	1 .. 5 V	(≤ ± 1.0 % FS max.)
	1 .. 6 V	(≤ ± 1.0 % FS max.)

Channel H (Accuracy)	HSI	(≤ ± 0.1 % FS max.)
	4 .. 20 mA	(≤ ± 0.1 % FS max.)
	0 .. 20 mA	(≤ ± 0.1 % FS max.)
	0 .. 4.5 V	(≤ ± 0.1 % FS max.)
	0 .. 5 V	(≤ ± 0.2 % FS max.)
	0 .. 10 V	(≤ ± 0.1 % FS max.)
	0.5 .. 4.5 V	(≤ ± 0.1 % FS max.)
	0.5 .. 5.5 V	(≤ ± 0.2 % FS max.)
	1 .. 5 V	(≤ ± 0.2 % FS max.)
	1 .. 6 V	(≤ ± 0.2 % FS max.)
	-10 .. +10 V	(≤ ± 0.5 % FS max.)

Channels I and J (Accuracy)	Frequency range: 1 .. 30 000 Hz (≤ ± 0.1 % FS max.) Switching / switch-back threshold: 2 V / 1 V Max. input voltage: 50 V

Differential channels	A - B C - D Difference channel for flow rate-measurement orifice (shown on channel B)

Measuring rate (dependent on the number of active channels)	0.1 ms, max. 2 analogue input channels 0.2 ms, max. 4 analogue input channels 0.5 ms, all 10 input channels 1.0 ms, for SMART sensors
Resolution	12 bit
Memory	At least. 100 measurement curves, each with up to 500,000 measured values
Display	3.5" colour display
Interfaces	1 USB, 1 serial port
(€ mark	EN 61000-1/2/3/4
Safety	EN 61010
Protection class	IP 40
Ambient conditions	Operating temp.: 0 .. +50 °C Storage temp.: -20 .. +60 °C Rel. humidity: 0 .. 70 %
Weight	1100 g

Note:
FS (**F**ull **S**cale) = relative to the full measuring range

Order details:

Operating manual and documentation ─────
D = German
E = English
F = French

Items supplied
- HMG 3010
- Power supply for 90 .. 230 V AC
- Operating manual
- CD-ROM containing USB drivers, HMGWIN 3000 and CMWIN software
- USB connection cable

Accessories:

- CAN adapter, required for CAN bus operation (to be ordered separately) ZBE 3010 CAN adapter for HMG 3010 Material No. 921238

- Additional accessories, such as electrical and mechanical connection adapters, power adapters, etc. can be found in the "Accessories - Service devices" catalogue section

Dimensions:

shown with protective cover open
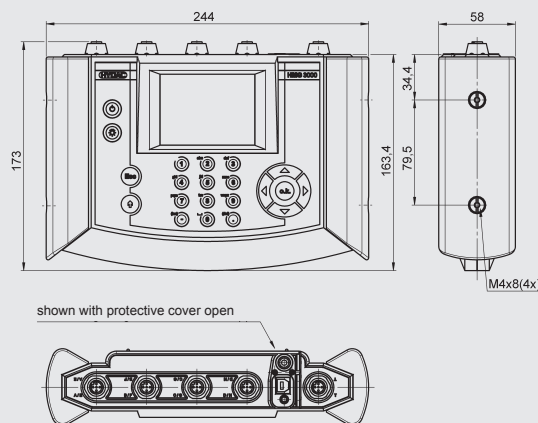
Note:

The information in this brochure relates to the operating conditions and applications described.
For applications or operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.