

Portable Data Recorder HMG 1000

Application:

The HMG 1000 is a portable data recorder for recording measurements in hydraulic and pneumatic systems in the industrial and mobile sectors.

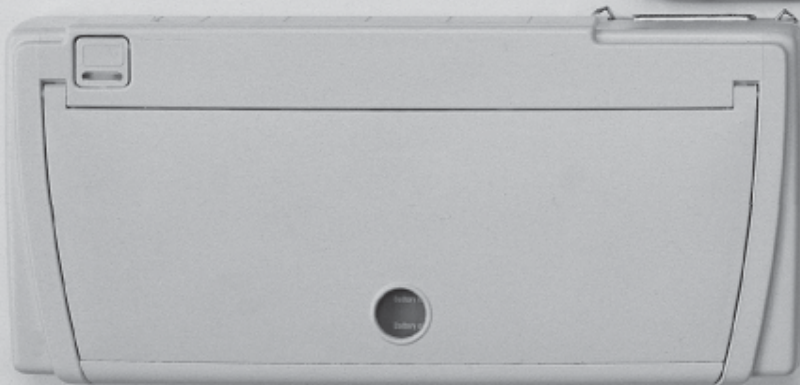
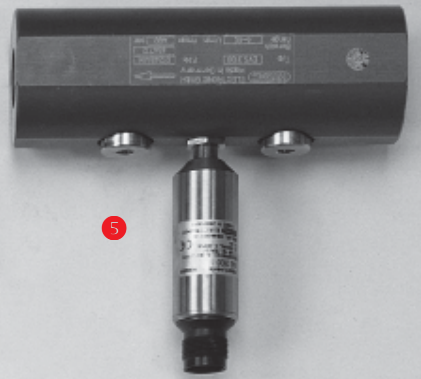
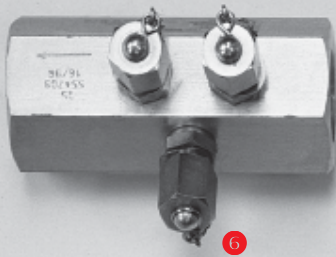
The unit has three signal inputs to which sensors for measuring pressure, temperature, flow rate, etc. can be connected.

As well as normal measuring operation the HMG 1000 can record a measurement curve with a different recording time. This can be printed out or downloaded to a PC.

Special features:

- Simultaneous recording from three sensors with current signal 4 .. 20 mA
- Flow rate measurement can be via differential pressure measuring orifices
- Measuring ranges can be set as required
- Peak value measurement to record rapid pressure peaks and pressure troughs
- Recording of measurement curves
- Print-out facility on external printer





① HMG 1000

Up to three sensors can be connected to the portable data recorder HMG 1000. The sensors are connected via three analogue inputs for 4 .. 20 mA signals.

The measurement range and the unit for each sensor can be set as required (e.g. 0 .. 400 bar, -25 .. 100 °C, 0 .. 128 kg).

As well as the actual measured values the unit also records the minimum and maximum values.

In addition, it is possible to measure differential pressure and therefore also to carry out a flow rate measurement via a measuring orifice.

The HMG 1000 has two different measuring facilities: normal measuring operation and recording of measurement curves.

In normal measuring operation measured values are read at intervals of 100 ms and shown on the display. When measuring pressure the unit acts as a gauge. If, in this mode, rapid measuring is switched on as well, the measuring rate is reduced from 100 ms to approx. 2 ms. This enables dynamic processes such as pressure peaks or pressure troughs to be displayed.

With the recording of measurement curves the actual measured values are displayed and simultaneously stored in an internal memory. Three different recording times with different measuring rates can be selected:

- Recording time 10 s, measuring rate 2 ms
- Recording time 100 s, measuring rate 20 ms
- Recording time 1000 s, measuring rate 200 ms

Once a measurement curve has been recorded it can be printed out on a printer as a graph. A variety of commercially available printers (black & white or colour) can be connected to the built-in parallel interface. Curve sections that are of interest can be printed out using the zoom function (magnifying glass function).

At the touch of a button the user can choose whether the text in the display or on the print-out appears in German, French or English.

② PC software HMGWIN

The HMGWIN program enables the user to download the measurement curve recorded with the HMG 1000 to a PC. HMGWIN is compatible with Windows 95/98/NT operating systems. For older DOS computers, our PC software HMGDESK is still available on request.

Performance features:

- Downloading the measurement curve from the HMG 1000 to a PC.
- Storing the data on a PC.
- Viewing the recorded curve on the monitor.
- Up to four different curves can be displayed simultaneously on the monitor.
- Superimposition of curves: i.e. parts of different curves can be superimposed in a new graph, for example to show the wear and tear of a machine (new condition/current condition).
- Ruler function: the curves can be measured accurately using the mouse (time and amplitude value). Absolute and relative measured values (measurement in relation to a set marker) can be displayed.
- ZOOM: using the mouse, parts of a measurement curve can be framed. The framed area appears enlarged accordingly.
- Data conversion: HMGWIN can convert the HMG 1000 measurement data into other data formats. This means that the recorded curves can be transferred to many other PC programs (spreadsheets, databases, word processors, etc.) and further processed.

③ Pressure transmitter

For pressure measurement, pressure transmitters are available in the accuracy classes 0.3%, 0.5% and 1%, with many different measuring ranges up to 600 bar. For connection to the HMG 1000 the output signal 4 .. 20 mA is required.

④ Temperature sensor

The temperature sensor ETS 4000 has a measuring range of -25 .. +100 °C with current output 4 .. 20 mA. It is pressure resistant up to 600 bar.

⑤ Flow rate sensor

For accurate flow rate measurement ($\leq +2\%$ of the instantaneous value), aluminium turbines are available as standard in the measuring ranges 1.2 .. 20 l/min; 6 .. 60 l/min; 15 .. 300 l/min and 40 .. 600 l/min. They supply an output signal of 4 .. 20 mA. They have two G $\frac{1}{4}$ threaded connections for connecting pressure transmitters and temperature sensors. The Hydac range also includes stainless steel turbines with various measuring ranges.

⑥ Flow rate measuring orifice

The measuring orifice EVS 1000 enables cost-effective flow rate recording via differential pressure measurement. The following measuring ranges are available as standard 5 .. 20 l/min, 20 .. 80 l/min and 80 .. 350 l/min. The test points of the measuring orifice are in each case Minimes connections, series 1620.

⑦ SSS 1000

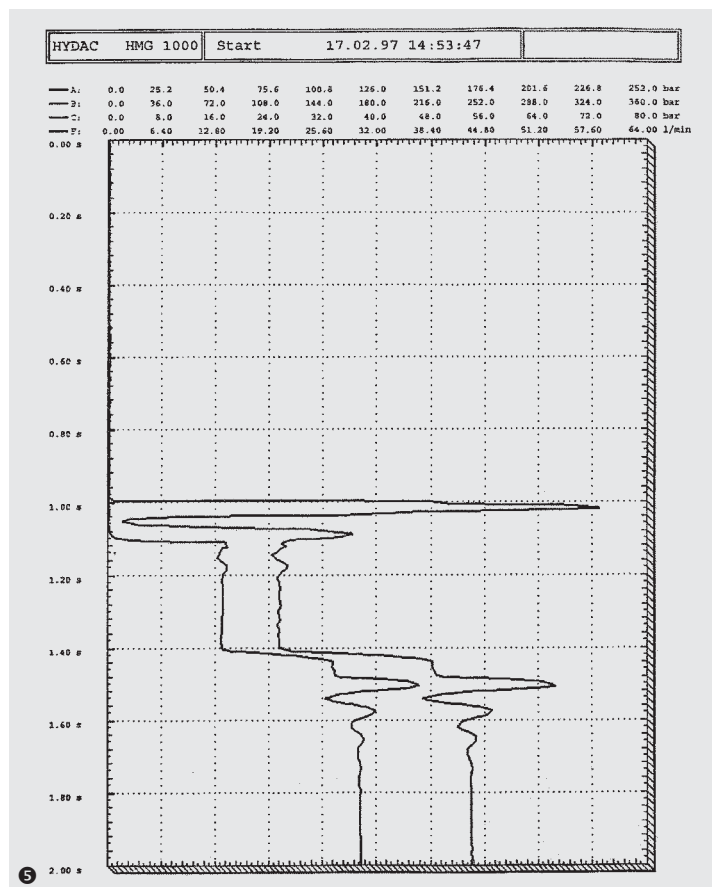
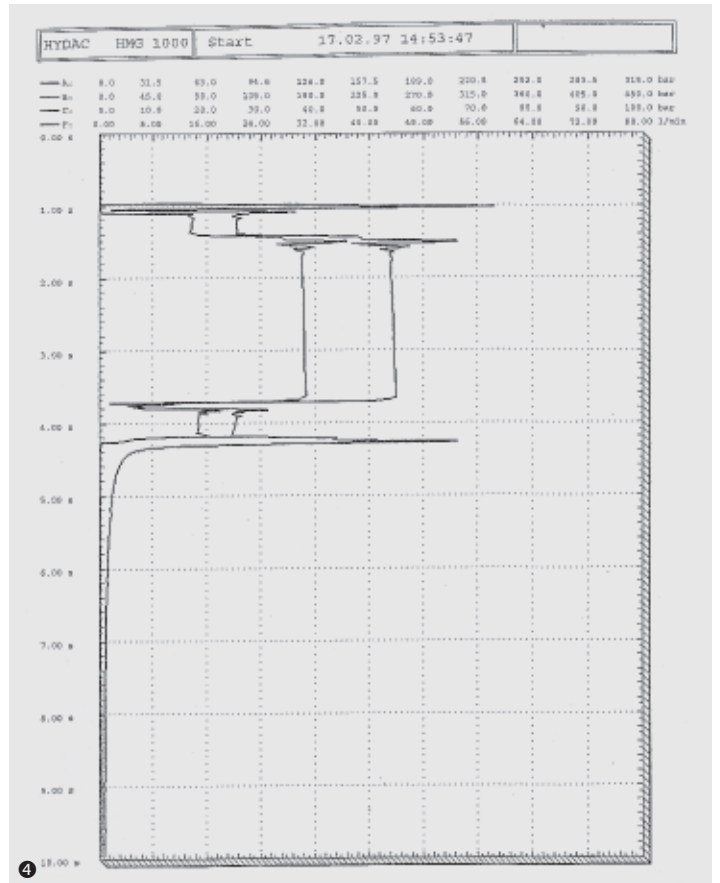
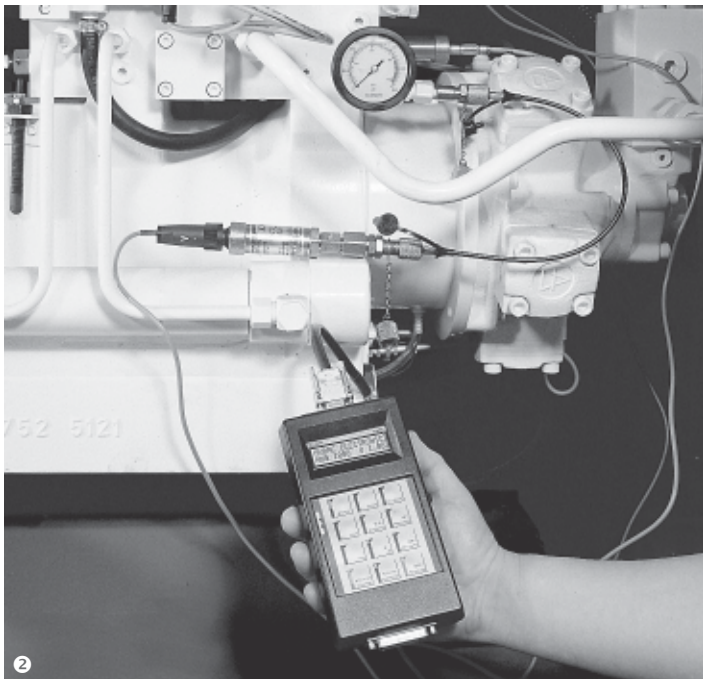
The current sensor simulator SSS 1000 was designed for teaching purposes. It can be used to simulate two current sensors (4 .. 20 mA) via rotary potentiometers. Consequently personnel can learn how to use the HMG 1000, or consolidate their knowledge of the unit, in the office. The current sensor simulator is particularly suitable for staff training.

⑧ Hydraulic adaptor kit

The hydraulic adaptor kit allows pressure transmitters with G $\frac{1}{4}$ A external thread to be connected to existing Minimes pressure connections, series 1620 or 1615.

⑨ Ink jet printer

Using the compact mini-printer measurement curves can be printed out immediately on site. The unit can be either mains or battery operated. The print-outs are A4 size.



- ① HMG in its case with accessories
- ② HMG being used for measuring
- ③ HMG printing out the previously recorded measurement curve
- ④ HMG print-out of a measurement curve
- ⑤ HMG print-out of the above measurement curve with zoom function applied

Technical specifications HMG 1000

Measurement inputs	3 analogue inputs
Channel A, channel B, channel C	4 .. 20 mA, Ri approx. 100 Ω
Accuracy for measuring channels A, B, C	± 0.25 % of the measuring range
Measuring rate	
Normal operation	100 ms
Fast measurement	can be reduced right down to approx. 2 ms
Resolution	10 bit
Display	LCD display, 2 lines, each with 16 characters
Interfaces	
Serial (RS 232) for PC connection	300 .. 38400 baud, 8 data bits, 1 stop bit, 1 start bit, no parity check, handshake with CTS on pin 5 Note: The plug connection on the HMG does not correspond to the RS 232 standard.
Parallel for printer connection	standard connection, compatible with Centronics
Plug connections	
Sensor connection	D-sub 9-pole, socket
Interfaces	D-sub 25-pole, socket
Voltage supply	
External voltage supply	12 .. 30 V DC charging current max. 500 mA constant supply possible charging time approx. 3 hours when batteries flat
Internal voltage supply	4 x NiMH batteries 1.2 V, Mignon
Battery life	
with NiMH 1 AH batteries	depending on the type of sensors connected e.g.: with 2 HYDAC pressure transmitters (4 .. 20 mA signal) approx. 10 hours operation possible
CE mark	
Operating temperature	+10 .. + 40 °C
Air humidity	0 .. 70 % relative, non-condensing
Weight	approx. 500 g
Dimensions (L x W x H)	180 x 100 x 45 mm

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.

Model code

HMG 1000 - 000 - X

Modification number _____
(determined by manufacturer)
000 = standard

User manual and documentation _____

D = German
E = English
F = French

The following are supplied: four NiMH batteries, power supply unit for 230 V AC, 2 m A/B/C cable (connection cable with three Binder plugs for pressure, temperature or flow rate sensors), an operating manual.

Accessories must be ordered with full details:

- **Plastic case** with foam rubber insert and one plastic container
- **Aluminium case** with foam rubber insert and two plastic containers (suitable to include the ink jet printer)
- **Pressure transmitter HDA 3744-A (0.5%)**
(available ranges: -1 .. 9; 6; 16; 60; 100; 250; 400; 600 bar)
- **Pressure transmitter HDA 3844-A (0.3%)**
(available ranges: 6; 16; 60; 100; 250; 400; 600 bar)
- **Pressure transmitter HDA 3444-A (1%)**
(available ranges: 16; 60; 100; 250; 400; 600 bar)
- **Temperature sensor ETS 4144-A-000**
Measuring range (-25 .. +100 °C), pressure resistant
- **Flow rate sensor**
EVS 3100-5 (1.2 .. 20 l/min)
EVS 3100-1 (6 .. 60 l/min)
EVS 3100-2 (40 .. 600 l/min)
EVS 3100-3 (15 .. 300 l/min)
- **Measuring orifices** for determining flow rate via differential pressure
EVS 1000-020 (5 .. 20 l/min)
EVS 1000-080 (20 .. 80 l/min)
EVS 1000-350 (80 .. 350 l/min)
- **Current sensor simulator SSS 1000**
- **Hydraulic adaptor kit** (Minimess series) consisting of:
2 off adaptor hoses DN 2 / 400 mm 1620 / 1620
2 off adaptor hoses DN 2 / 1000 mm 1620 / 1620
2 off pressure gauge direct connections 1620 / G¼
2 off adaptors 1615 / 1620
2 off bulkhead couplings 1620 / 1620
- **HMGWIN PC software** (3½" disk), with PC connection cable (for serial interface) and 9-pole to 25-pole adaptor
- **Ink jet printer** with mains supply unit, connection cable (parallel), operating manual
- **Battery pack** for printer (NiMH)
- **Replacement print-head** for printer (including three ink cartridges)
- **Replacement ink cartridges** (pack of six) for printer
- **ZBE 04 (Binder plug adaptor, series 714, to Hirschmann DIN 43650)**
enables connection of pressure transmitters HDA 3XX5-A (2-conductor 4 .. 20 mA signal with Hirschmann plug) via the A/B/C connection cable