

## HMG 3000 Series



The HMG 3000 was designed in particular for capturing typical measurement values (*pressure, temperature, flow rate*) in hydraulic and pneumatic systems. A variety of other measurement tasks can be performed by virtue of additional inputs for voltage measurement. Example: checking the actuation of a switching valve or plotting the characteristic curve of a valve setpoint. In addition, it is also possible to determine differential values between the measured values of individual sensors. One example of this is taking a flow measurement using a differential pressure orifice plate.

In addition to the analog measurement inputs, the HMG 3000 features two digital inputs, enabling frequencies or speeds to be recorded, thus expanding the unit's range of potential applications.

When taking measurements of rapid, dynamic machine processes, all 8 analog input signals can be concurrently captured at a rate of 0.5 ms.

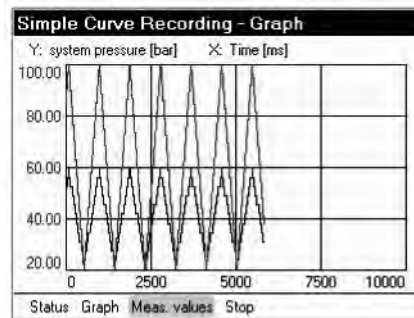
A special feature of the HMG 3000 is its ability to record measurements of highly dynamic processes in a machine. To this end, two input channels are featured which are capable of recording measured values at a rate of 0.1 ms. This feature is dependent on the use of suitable, fast-acting sensors.

Another feature offered by the HMG 3000 is its ability to record the dynamic processes of a machine in the form of a measurement curve and render them as a graph – on line and in real time.

### General

The HMG 3000 data recorder is a portable unit for simple measurement and data capturing tasks involving hydraulic and pneumatic systems. Applications extend primarily to maintenance and servicing, troubleshooting and test stands, as well as, quality inspecting.

The HMG 3000 can concurrently evaluate signals up to 10 sensors. The unit features 5 input jacks for connecting the sensors; if necessary this number can be doubled using a Y adapter for measurement operations involving more than 5 sensors. HYDAC offers matching HSI sensors (*HSI = HYDAC Sensor Interface*) for pressure, temperature and flow rate which are automatically recognized by the HMG 3000. Standard HYDAC sensors can also be used. However, these sensors do not feature any automatic sensor detection, consequently the initial setup has to be entered by hand.



Current Measured Values				
Designation	Value	Unit	Min	Max
A Sensor A	19.4	bar	0.0	100.0
B Sensor B	12.2	bar	4.5	49.5
C Sensor C	77.9	bar	0.0	99.9
D Sensor D	87.9	bar	0.0	100.0
E Sensor E	40.9	bar	0.6	100.0

Settings Recording Extras Min/Max Reset

### HMG Software

The HMG 3000 communicates with a computer via a USB or serial port. HYDAC offers HMGWIN 3000, the matching software for the HMG 3000, for convenient post-processing, rendering and evaluation of measurements at your computer. It also enables the HMG 3000 to be operated directly from your computer.

The HMG 3000 is equipped with specially developed software providing for fast data collection and processing. A measurement curve can comprise up to 500,000 measured values. The HMG 3000's measured value memory is capable of storing at least 100 of these measurement curves.

### Features

The HMG 3000 is user-friendly by virtue of its easy-access selection menus leading to all of the unit's functions and settings. The unit features a combination keypad for entering numeric values and text.

### Display Options

In addition to enabling simple measurement curves to be recorded, the HMG 3000 also features other functions enabling event-driven measurements to be taken and event logs to be recorded. Various trigger options are available for triggering events.

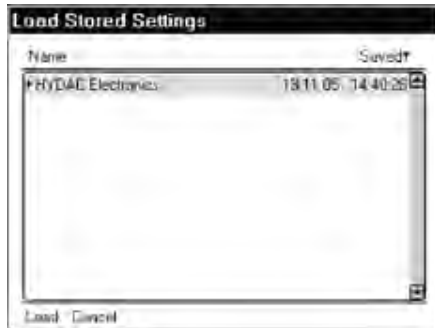
A: system pressure [psi]	B: Sensor B [psi]
358	205
C: Sensor C [psi]	D: Sensor D [psi]
626	1381
I: Sensor I [1/min]	J: motor [Hz]
0.0	0.0

Settings Recording Extras Min/Max

Current Measurement		
	system pre [bar]	Sensor B [bar]
0ms	36.32	13.5
1ms	36.16	13.5
2ms	36.00	13.5
3ms	35.76	13.5
4ms	35.60	13.5
5ms	35.44	13.5
6ms	35.28	13.5
7ms	35.04	13.5

Back Settings Info

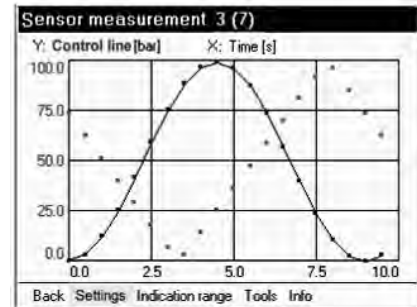
Apart from measurement curves, the HMG 3000 can store user-specific settings (user profiles). The main advantage of this is enabling identical measurements of various equipment items to be repeated for the purpose of preventive maintenance. All the user has to do is retrieve the respective user profile from the HMG 3000's memory.



The HMG 3000 features a 3.5" color full-graphics display enabling the measured values to be rendered in an easy-to-read form as text or a measurement curve. Individual measured values can be displayed in a large format (7-segment format), enabling them to be read at an extended distance.

The HMG 3000 also provides for a variety of user-friendly features for displaying, evaluating and processing measured values:

- Table
- Graph
- Scaling
- Ruler
- Tracker
- Zoom



Curve rendering: Dotted and Dotted and solid

## Technical Details

<b>Sensor Inputs</b>	<ul style="list-style-type: none"> <li>• 4 input jacks for 8 analog inputs (<i>channel A – H</i>)</li> <li>• 1 input jack for 2 digital inputs (<i>channel I – J</i>)</li> <li>• Voltage input of -10 V to 10 V (<i>shown at channel H</i>)</li> <li>• Connecting the sensors is done using a standard M12 x 1 plug connector (5-pin).</li> </ul>																																											
<b>Channel A to H</b>	<ul style="list-style-type: none"> <li>• Automatic detection for HSI sensors (<i>pressure, temperature, volumetric flow rate transducers</i>)</li> <li>• Connection of standard sensors with current or voltage signals</li> <li>• Differential channels for channel A – B; channel C – D</li> </ul> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">A &amp; B:</th> <th style="text-align: left;">C &amp; D:</th> <th style="text-align: left;">E to G:</th> <th style="text-align: left;">H:</th> </tr> </thead> <tbody> <tr> <td>4 to 20 mA</td> <td>4 to 20 mA</td> <td>4 to 20 mA</td> <td>4 to 20 mA</td> </tr> <tr> <td>0 to 20 mA</td> <td>0 to 20 mA</td> <td>0 to 20 mA</td> <td>0 to 20 mA</td> </tr> <tr> <td>0 to 10 V</td> <td>0 to 50 V</td> <td></td> <td>-10 to +10 V</td> </tr> <tr> <td>0 to 5 V</td> <td>0 to 10 V</td> <td></td> <td></td> </tr> <tr> <td>1 to 5 V</td> <td>0 to 5 V</td> <td></td> <td></td> </tr> <tr> <td>1 to 6 V</td> <td>1 to 5 V</td> <td></td> <td></td> </tr> <tr> <td>0.5 to 4.5 V</td> <td>1 to 6 V</td> <td></td> <td></td> </tr> <tr> <td>0.5 to 5.5 V</td> <td>0.5 to 4.5 V</td> <td></td> <td></td> </tr> <tr> <td></td> <td>0.5 to 5.5 V</td> <td></td> <td></td> </tr> </tbody> </table>				A & B:	C & D:	E to G:	H:	4 to 20 mA	4 to 20 mA	4 to 20 mA	4 to 20 mA	0 to 20 mA	0 to 20 mA	0 to 20 mA	0 to 20 mA	0 to 10 V	0 to 50 V		-10 to +10 V	0 to 5 V	0 to 10 V			1 to 5 V	0 to 5 V			1 to 6 V	1 to 5 V			0.5 to 4.5 V	1 to 6 V			0.5 to 5.5 V	0.5 to 4.5 V				0.5 to 5.5 V		
A & B:	C & D:	E to G:	H:																																									
4 to 20 mA	4 to 20 mA	4 to 20 mA	4 to 20 mA																																									
0 to 20 mA	0 to 20 mA	0 to 20 mA	0 to 20 mA																																									
0 to 10 V	0 to 50 V		-10 to +10 V																																									
0 to 5 V	0 to 10 V																																											
1 to 5 V	0 to 5 V																																											
1 to 6 V	1 to 5 V																																											
0.5 to 4.5 V	1 to 6 V																																											
0.5 to 5.5 V	0.5 to 4.5 V																																											
	0.5 to 5.5 V																																											
<b>Channel I and J</b>	Frequency channels ( <i>speed (rpm) measurement, counting function</i> ) Frequency range: 1 to 30 000 Hz Switching threshold: 2 V Maximum input voltage: 50 V																																											
<b>Sampling Rates</b> ( <i>The sampling rate which can be set is dependent on the active measurement channels.</i> )	The following applies: <ul style="list-style-type: none"> <li>• 0.1 ms = max. 2 analog input signals</li> <li>• 0.2 ms = max. 4 analog input signals</li> <li>• 0.5 ms = all 10 input channels</li> </ul>																																											
<b>Battery service times</b> ( <i>battery is fully charged</i> )	<ul style="list-style-type: none"> <li>• Without any sensors = ca. 11 hours</li> <li>• With 2 sensors = ca. 9 hours</li> <li>• With 4 sensors = ca. 7 hours</li> <li>• With 8 sensors = ca. 4 hours</li> </ul>		<b>Measured Value Memory</b> Single recording: up to 500,000 measured values Archive memory: 64 MB <i>(for approx. 60 individual recordings consisting of 500,000 measured values each)</i>																																									
<b>PC Link Interfaces</b>	<ul style="list-style-type: none"> <li>• USB port</li> <li>• Standard serial port (RS 232) for communication and evaluation using the HYDAC HMGWIN 3000 software</li> </ul>		<b>Dimensions and Weight</b> <ul style="list-style-type: none"> <li>• Measurements: 9.68 x 6.85 x 2.28 in. (246 x 174 x 58 mm)</li> <li>• Weight: 2.42 lbs. (1.10 kg)</li> </ul>																																									
<b>Operating and Ambient Conditions</b>	<ul style="list-style-type: none"> <li>• Operating temperature: 0 - 122°F (0 - 50°C)</li> <li>• Storage temperature: -4 - 140°F (-20 - 60°C)</li> <li>• Relative humidity: 0 - 70 %</li> </ul>		<b>Standards with which the HMG 3000 Complies</b> <ul style="list-style-type: none"> <li>• EMC: EN 6000-6-1, EN 6000-6-2, EN 6000-6-3, EN 6000-6-4</li> <li>• Safety: EN 61010</li> <li>• Protection type/rating: IP40</li> </ul>																																									

## HMG Display Panel & Connections

1. **On/Off button**
2. **Brightness/contrast setting** of the display
3. **ESC key**  
For canceling an entry or going Back step by step
4. **Shift key**  
Switches the numpad to a textpad when pressed; the textpad is active only as long as the Shift key is pressed.
5. **Keypad**  
Numbers and letters can be entered via the combination keypad in a fashion similar to that of mobile phones.

**Numbers:** 0 to 9; "." (decimal separator) and "-" (minus)

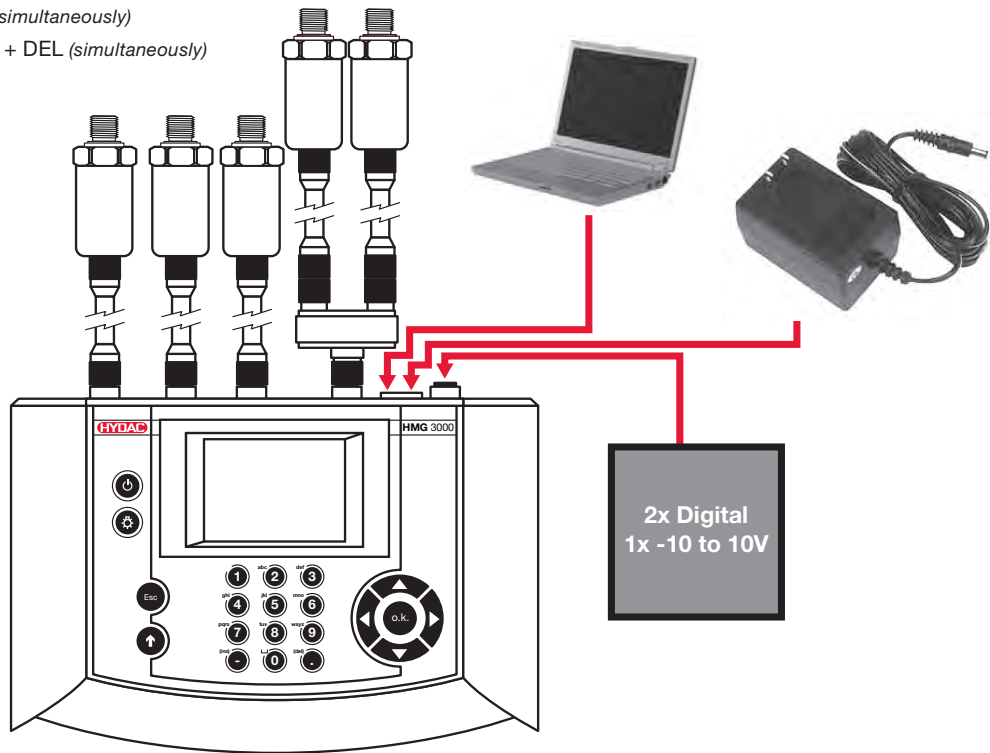
**Text Entry:** Capital ABC's and Lower case abc's  
**INS** = insert; **DEL** = delete;

**Entry of spaces:** SHIFT + INS (simultaneously)

**Deletion of characters:** SHIFT + DEL (simultaneously)

6. **Graphic display**  
Display of the menu and operating functions, measured values and measurement curves
7. **5-way navigation key**  
For navigating step by step in the display **OK** key for inputting, concluding, accepting or storing an entry

**Tip:** To accept characters: release the Shift key or press the right arrow of the 5-way navigation key.



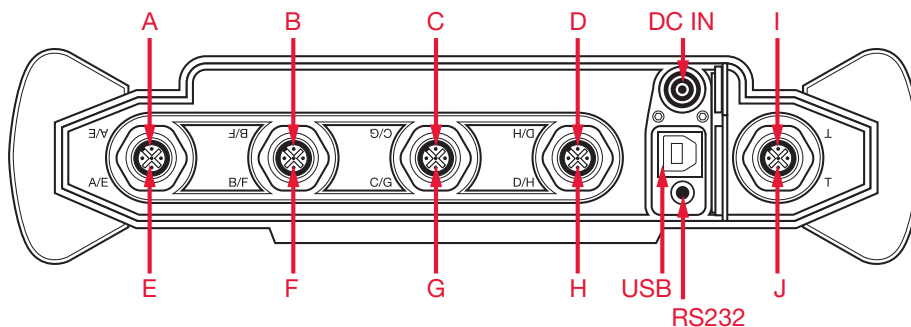
## Connections

**A - D & E - H** 4 sensor input jacks for up to 8 sensors with an analog signal (channel A - D and E - H\*), e.g. for sensors for measuring pressure, temperature or flow rate.

The 4 input jacks can be doubled by plugging in Y adapters.

\* Channel H can be used for sensors with an analog signal as well as for voltage measurements of -10V to 10V.

- I / J** 1 or 2 input jacks for:
- 2 digital signals, e.g. for frequency or speed measurements (channel I, J)
  - 1 voltage input (-10V to 10V, channel H\*)
- DC IN** Female connector for power supply
- USB** 1 USB connector
- RS232** 1 serial port



## Diagnostic Unit

Model Code	Description	Part No.
HMG 3000-000-E	Includes: <ul style="list-style-type: none"> <li>• HMG 3000-000 with Manual</li> <li>• Battery Set &amp; Charging Unit</li> <li>• HMGWIN software incl. USB cable</li> </ul>	02084116

## Pressure Transducer with HSI

(HYDAC Sensor Interface)

Model Code	Description	Part No.
HDA 4748-H-0009-000	-15 to 131 psi (-1 to 9 bar)	00909429
HDA 4748-H-0016-000	0 to 232 psi (0 to 16 bar)	00909425
HDA 4748-H-0060-000	0 to 870 psi (0 to 60 bar)	00909554
HDA 4748-H-0100-000	0 to 1450 psi (0 to 100 bar)	00909426
HDA 4748-H-0250-000	0 to 3626 psi (0 to 250 bar)	00909337
HDA 4748-H-0400-000	0 to 5802 psi (0 to 400 bar)	00909427
HDA 4748-H-0600-000	0 to 8702 psi (0 to 600 bar)	00909428

## Temperature Transducer with HSI

(HYDAC Sensor Interface)

Model Code	Description	Part No.
ETS 4548-H-000	-13° to 212°F (-25° to 100°C)	00909298

## Additional Sensors

Model Code	Description	Part No.
HDS 1000-002	RPM Sensor (plug M12x1) 2M Includes HDS 1000 Reflector Set (part no. 00904812)	00909436
HDS 1000 Reflector Set	Reflective foil set 25 pieces	00904812
SSH 1000	Sensor simulator for 2 HSI (ideal for training purposes)	00909414

## Flow Sensor with HSI (HYDAC Sensor Interface)

Model Code	Description - g/min (l/min)	Part No.
<b>Aluminum</b>		
EVS 3108-H-0020-000	0.3 to 5.3 (1.2 to 20)	00909405
EVS 3108-H-0060-000	1.6 to 15.9 (6 to 60)	00909293
EVS 3108-H-0300-000	4.0 to 79.3 (15 to 300)	00909404
EVS 3108-H-0600-000	10.6 to 159 (40 to 600)	00909403
<b>Stainless Steel</b>		
EVS 3118-H-0020-000	0.3 to 5.3 (1.2 to 20)	00909409
EVS 3118-H-0060-000	1.6 to 15.9 (6 to 60)	00909406
EVS 3118-H-0300-000	4.0 to 79.3 (15 to 300)	00909408
EVS 3118-H-0600-000	10.6 to 159 (40 to 600)	00909407

## Accessories

Model Code	Description	Part No.
USB Cable	Connection to PC	06040585
ZBE 30-02	cable for M12x1 - 2 meters	06040851
ZBE 30-05	cable for M12x1 - 5 meters	06040852
ZBE 34	M12x1 / Binder adaptor	03236597
ZBE 35	M12x1 / Hirschmann adaptor	03236601
ZBE 36	AS 1000 (Aqua Sensor) Adapter	00909737
ZBE 38	M12 Y-adaptor (doubles the inputs)	03224436
Hydraulic Adaptor Set (2 pieces each)	Adapter hose DN 2 / 1620/1620, 400mm and 1000 mm, pressure gauge connectors 1620 / G1/4, adapter 1615/1620, bulkhead couplings 1620/1620	00903083
UVM 3000	Universal connection module for HMG 3000	00909752
Bag	with carry strap	00909795
Aluminum Case	for HMG 3000 and accessories	06042959
Power Supply	DC Charging unit for HMG 3000	06054296
ZBE 31	Car Charger for HMG 3000	00909739

HYDAC HSI sensors are part of a new plug and play, self-identifying sensor line. HSI sensors must be used with the HMG 500 and facilitate easy use with the HMG 3000. The HMG 3000 is capable of reading standard sensors as well as competitive models.