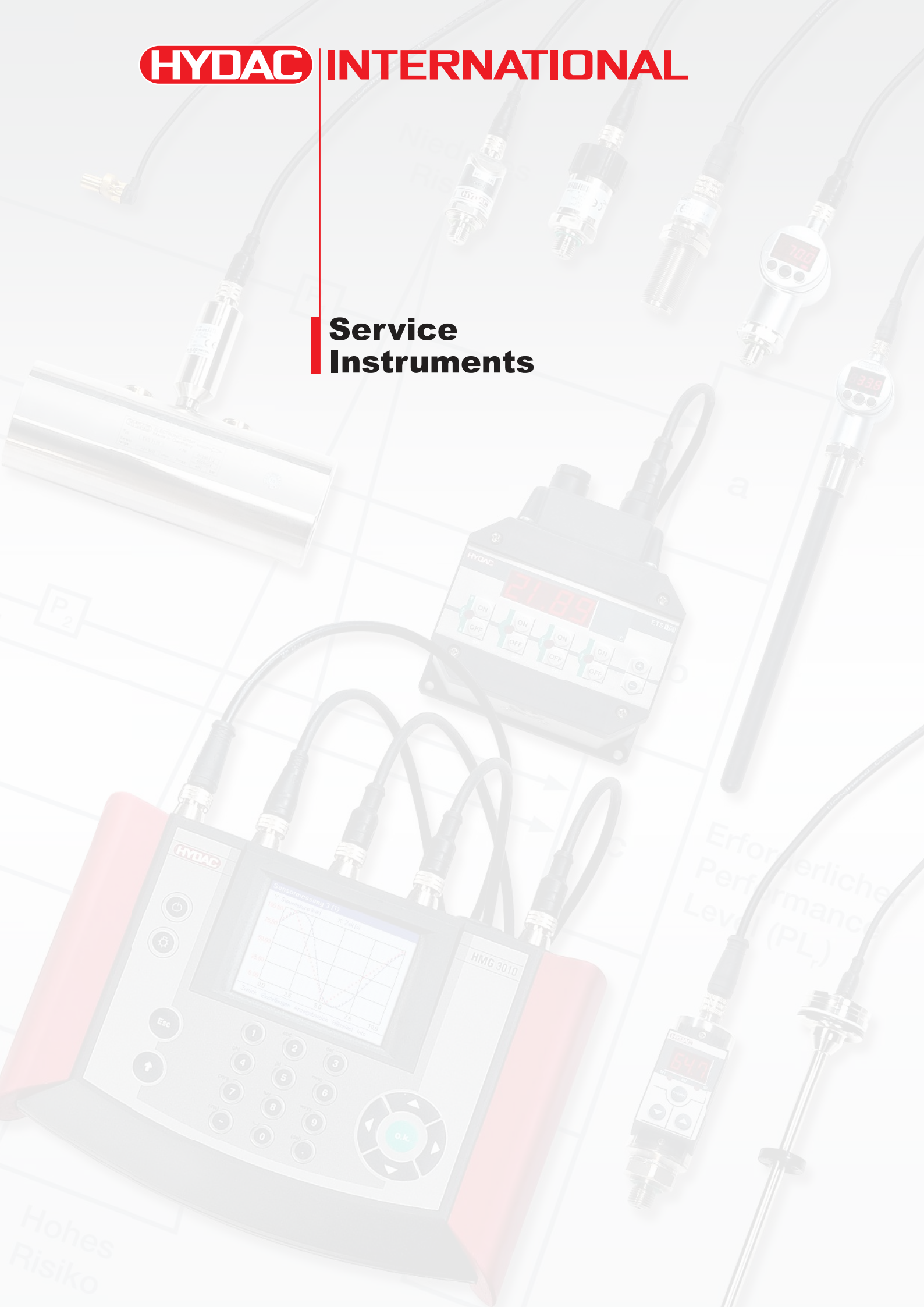


Service Instruments



SERVICE INSTRUMENTS

Our service instruments have been specially developed for use in servicing, maintenance and the laboratory, as well as for commissioning.

All commonly available sensors (e.g. pressure, temperature, flow rate, condition monitoring, ...) with a very wide range of output signals can be connected to these instruments.

Service instruments for general applications:

HMG 500

HMG 510

HMG 2500

HMG 3010

HMG 4000

HDA 4778-H (Accessories)

ETS 4178-H (Accessories)

EVS 3100-H (Accessories)

Portable Data Recorder HMG 500

Description:

The HMG 500 is a portable measuring instrument for simple measuring tasks in fluid technology such as hydraulics, pneumatics, lubrication, process, refrigeration and air conditioning.

Up to two sensors with the **HYDAC Sensor Interface (HSI)** can be connected to the HMG 500 to measure pressure, temperature or flow rate (except for SMART sensors). The HMG 500 automatically recognizes these sensors and takes all of the necessary basic settings from each sensor. The measurement values and the corresponding physical unit are displayed on an easy-to-read LCD display.

In addition, the HMG 500 offers a wealth of other advantages over mechanical pressure gauges, for example, for measuring pressure on machines and systems.

The user benefits from a technologically high level of measuring accuracy and dynamics.

The HMG 500 measures values at a very high sampling rate. It can therefore record and display pressure peaks in the maximum value memory or rapid pressure discharges in the minimum value memory, for example.

Furthermore, differential measurements can be carried out using two sensors of a similar type, to calculate pressure drops or temperature differentials.

To further extend the application range, HMG 500 has a function for setting mechanical pressure and temperature switches precisely and reliably.

Compact, simple and versatile - the HMG 500 is an invaluable tool for all those involved in maintenance, commissioning and service.



Special features:

- Portable 2-channel data recorder
- Simple and user-friendly key operation
- Large LCD display including battery status indication
- 2 sensor inputs, automatic sensor recognition
- Measuring range and unit of measurement of the sensors connected to it are recognized automatically
- Zeroing (taring) of the individual measurement channels
- Display of the actual measured values
- Display of the differential (channel A minus channel B)
- Minimum or maximum value indication, with reset function
- Setting device for mechanical pressure and temperature switches

Technical data:

Measurement inputs	2 analog inputs for HYDAC measurement transmitters with HSI interface (except for SMART sensors**)
Accuracy*	≤ ± 0.1 % FS max.
Functions	<ul style="list-style-type: none">● Automatic recognition of measuring range and unit of measurement● Taring of the measuring channels● Display of the actual meas. value● Min./max. indication● Reset of the min./max. values● Measured values differential channel A - channel B● Display of units, selectable● Setting device for mechanical pressure and temperature switches
Display	4-digit 7 segment LCD display with battery status indication; 2 measurement values incl. unit displayed simultaneously
Measurement unit (depending on the sensors connected to HMG)	Selectable Pressure: bar, psi, MPa Temperature: °C, K, °F Flow rate: l/min, gallon/min (1 US gallon = 3.7853 l)
Sampling rate	0.1 ms
Resolution	12 bit
CE mark	EN 61000-6-1 / 2 / 3 / 4
Safety	EN 61010
Protection class	IP 54
Voltage supply	<ul style="list-style-type: none">● 9 V battery Oper. time: approx. 10 h (with 2 sensors)● Euro plug power supply (230 V AC) (available as an accessory)
Environmental conditions	Operating temp.: +41 .. +140 °F Storage temp.: -40 .. +158 °F Rel. humidity: 0 .. 70 %
Weight	410 g

Note:

* **FS (Full Scale)** = relative to complete measuring range

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

Dimensions:



Note:

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

Ordering details:

HMG 500 - 000

Items supplied

- HMG 500
- Operating manual D/E/F
- 9 V battery

HMG 500-Set 01

Items supplied

- HMG 500
- Operating manual D/E/F
- 9 V battery
- HDA 4748-H-0600-000
- ZBE 30-02, sensor cable M12x1, 2 m
- Connection adapter G1/4 female to Minimes 16X2
- Case for HMG 500 / 510

HMG 500-Set 02

Items supplied

- HMG 500
- Operating manual D/E/F
- 9 V battery
- 2 off HDA 4748-H-0600-000
- 2 off ZBE 30-02, sensor cable M12x1, 2 m
- 2 off connection adapter G1/4 female to Minimes 16X2
- Case for HMG 500 / 510

Accessories:

Appropriate accessories, such as electrical and mechanical connection adapters, power supply, etc. can be found in the Accessories brochure.

Examples of main accessories:

- **Pressure transmitter**
HDA 4000 with HSI interface
Pressure ranges: -14 .. 135.5 psi, 0 .. 150 psi, 0 .. 1500 psi, 0 .. 3000 psi, 0 .. 6000 psi, 0 .. 9000 psi
- **Temperature transmitter**
ETS 4000 with HSI interface
Measuring range: -25 .. 100 °C (-13 .. 212 °F)
- **Flow rate transmitter**
EVS 3000 with HSI interface
Measuring ranges: 1.2 .. 20 l/min (0.26 .. 5.28 gpm), 6 .. 60 l/min (1.59 .. 15.9 gpm), 15 .. 300 l/min (3.96 .. 79.3 gpm), 40 .. 600 l/min (10.6 .. 159 gpm)
- **Sensor simulator**
SSH 1000, ideal for training purposes
- **Electrical connection adapter**
UVM 3000, for mechanical pressure and temperature switches
- **Hydraulic adapters**

HYDAC ELECTRONICS

90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Portable Data Recorder HMG 510

Description:

The HMG 510 is a hand-held instrument for simple measurement tasks on hydraulic and pneumatic systems in mobile and industrial applications.

Compact and simple to use, the HMG 510 is an ideal tool for all those involved in maintenance, commissioning and service.

Up to two sensors with the **HYDAC Sensor Interface (HSI)** can be connected to the HMG 510.

Sensors are available to measure pressure, temperature and flow rate as well as sensors for condition monitoring (also known as SMART sensors). Some examples of SMART sensors are the HYDACLAB® Oil Condition Sensor, the AS 1000 AquaSensor and the CS 1000 Contamination Sensor.

The HMG 510 automatically recognizes these sensors and takes all the necessary basic settings from each sensor.

The measurement values and the corresponding physical unit are displayed on an easy-to-read LCD display.

In addition to this, the HMG 510 enables measured values which have been saved in the SMART sensors to be uploaded to a PC.

With the aid of the HYDAC PC software "CMWIN", the measurement data stored in the SMART sensors can be displayed on a PC screen in the form of a graph, then analyzed, edited and saved. The HMG has a standard integrated USB port to enable this data transfer.

To further extend the application range, the HMG 510 has a function for setting mechanical pressure and temperature switches precisely and reliably.



Special features:

- Portable 2-channel data recorder
- Simple and user-friendly key operation
- Large LCD display including battery status indication
- 2 sensor inputs, automatic sensor recognition
- Specially designed to display measured values from condition monitoring sensors (SMART sensors)
- Measuring range and unit of measurement of the sensors connected to it are recognized automatically
- Zeroing (taring) of the individual measurement channels
- Display of the actual measured values
- Display of the differential (channel A minus channel B)
- Min. or max. value indication, with reset function
- Setting device for mechanical pressure and temperature switches
- USB port

Technical data:

Measurement inputs	2 analog inputs for HYDAC measurement transmitters with HSI interface and SMART sensors
Accuracy*	≤ ± 0.1 % FS max.
Functions	<ul style="list-style-type: none">● Automatic recognition of measuring range and unit of measurement● Taring of the measuring channels● Display of the actual measured value● Min./max. indication● Reset of the min./max. values● Measured values differential channel A - channel B● Display of units, selectable● Setting device for mechanical pressure and temperature switches● Communication bridge to a connected PC
Display	4-digit 7 segment LCD display with battery status indication; 2 measured values incl. unit displayed simultaneously
Measurement unit (depending on the sensors connected)	<ul style="list-style-type: none">● Selectable for<ul style="list-style-type: none">Pressure: bar, psi, MPaTemperature: °C, K, °FFlow rate: l/min, gallon/min (1 US gallon = 3.7853 l)● Permanently pre-set on SMART sensors
Sampling rate	0.1 ms
Resolution	12 bit
CE mark	EN 61000-6-1 / 2 / 3 / 4
Safety	EN 61010
Protection class	IP 54
Voltage supply	<ul style="list-style-type: none">● 9 V batteryOperating time: approx. 10 h (with 2 sensors)**● Euro plug power supply (230 V AC) (available as an accessory)
Environmental conditions	<ul style="list-style-type: none">● Operating temperature: +41 .. +140 °F● Storage temperature: -40 .. +158 °F● Rel. humidity: 0 .. 70 %
Weight	410 g

* FS (Full Scale) = relative to complete measuring range

**Not applicable to SMART sensors, as they require an external voltage.

Dimensions:



Ordering details:

HMG 510 - 000

Items supplied

- Case for HMG 500 / 510
- HMG 510
- Operating manual D/E/F
- 9 V battery
- USB cable
- Y adapter blue (for HLB 1300)
- Y adapter yellow (for CS 1000)
- ZBE 30-02, sensor cable M12x1, 2m
- Software CD with "CMWIN"

Accessories:

Appropriate accessories, such as electrical and mechanical connection adapters, power supply, etc. can be found in the Accessories brochure.

Examples of main accessories:

● **Pressure transmitter**
HDA 4000 with HSI interface
Pressure ranges: -14.5 .. 135.5 psi, 0 .. 150 psi, 0 .. 1500 psi, 0 .. 3000 psi, 0 .. 3000 psi, 0 .. 6000 psi, 0 .. 9000 psi

● **Temperature transmitter**
ETS 4000 with HSI interface
Measuring range: -25 .. 100 °C (-13 .. 212°F)

● **Flow rate transmitter**
EVS 3000 with HSI interface
Measuring ranges: 1.2 .. 20 l/min (0.26 .. 5.28 gpm), 6 .. 60 l/min (1.59 .. 15.9 gpm), 15 .. 300 l/min (3.96 .. 79.3 gpm), 40 .. 600 l/min (10.6 .. 159 gpm)

● **Sensor simulator**
SSH 1000, ideal for training purposes

● **Electrical connection adapter**
UVM 3000, for mechanical pressure or temperature switches

● **Hydraulic adapters**

Note:

The information in this brochure relates to the operating conditions and applications described.

For applications and operating conditions not described, please contact the relevant technical department. Subject to technical modifications.

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Portable Data Recorder HMG 2500

Description:

The HMG 2500 is an impressive, top performance portable measuring and data logging 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.

This makes the HMG 2500 an ideal companion for employees in maintenance, commissioning and service.

The device 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. HMG 2500 recognizes the measured value, measuring range and the unit of these sensors and automatically carries out the basic device settings accordingly.

In addition to this, the HMG 2500 has a digital input, i.e. for frequency or speed measurement, as well as a virtual measuring channel for the measurement of difference or performance.

Due to the wide range of functions and its simple handling, the HMG 2500 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 2500 ensures that the user can benefit from future upgrades of the device software.

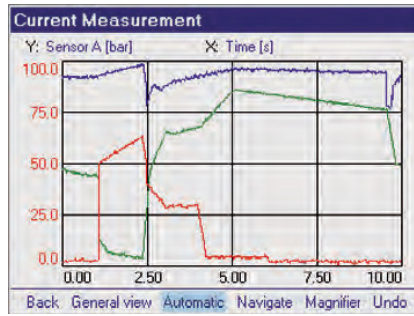


Special features:

- Simple and user-friendly operation
- Practical, robust design
- Large, full-graphics color display
- Quick and independent basic setting of the units by the use of automatic sensor recognition
- Up to 4 sensors can be connected simultaneously
- Up to 32 measurement channels can be depicted simultaneously
- Measurement rates up to 0.1 ms
- Very large data memory for archiving measurement curves
- Various measurement modes:
 - Measuring
 - Fast curve recording
 - Long term measurements
- 2 independent triggers, can be linked logically
- Simple sensor connection by means of M12x1 push-pull connector
- PC connection
 - USB
 - RS 232
- Convenient visualization, archiving and data processing using the HMGWIN 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.
- HMG can detect the signals of **up to 4 sensors simultaneously**. For this there are 4 robust standard input sockets.
- The following sensors can be connected to 3 of these input sockets:
 - 3 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
 - 3 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 fourth input socket with one digital input.
- Additionally, the HMG 2500 has a virtual measuring channel. The virtual measuring channel enables a differential measurement or a performance measurement by means of the sensors connected to the measuring channels "A" and "B".
- All input channels can work simultaneously with a **sampling rate** of 0.5 ms (1.0 ms in SMART Sensors). For the recording of highly dynamic processes, a sampling rate of 0.1 ms can be achieved.
- The most impressive function of the HMG 2500 is surely the capability of the recording and the graphical illustration of dynamic processes "online", which means in real time, as a measuring curve.

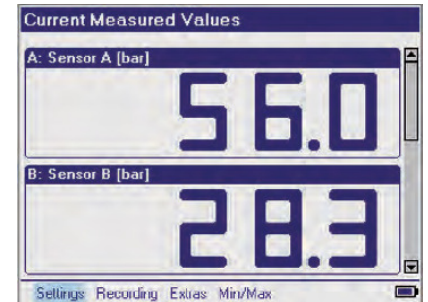


- The **data storage** for the recording of curves or reports can memorize up to 500,000 measured values. A minimum of 100 of such data recordings in full length can be stored in an additional archive memory.
- For the targeted **event driven curve or report recording**, the HMG 2500 has two independent triggers which can be linked together logically.
- User-specific instrument 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.

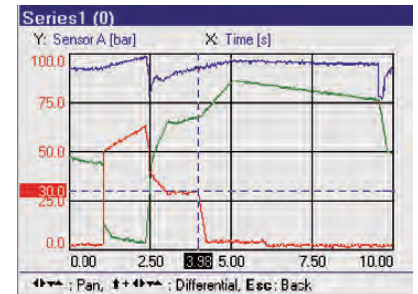
Name	Savedt
power unit 10	28.06.06 12:44:58
injection machine 17	28.06.06 12:44:41
hydraulic press	28.06.06 12:43:04
power unit	28.06.06 12:42:03
injection machine 12	28.06.06 12:41:14

Load Cancel

- Measured values, curves or texts are visualized on a **full-graphics color 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 analyzing the recorded measurement curves.



- The HMG 2500 communicates with a PC via the built-in USB port or RS 232 port.

HMGWIN:

The software program HMGWIN is included with the delivery. This software is a convenient and simple package for analyzing and archiving curves and logs which have been recorded using the HMG 2500, or for exporting the data for integration into other PC programs if required. In addition it is also possible to operate the HMG 2500 directly from the computer. Basic settings can be made, and measurements can be started online and displayed directly on the PC screen in real-time as measurement curves progress.

CMWIN:

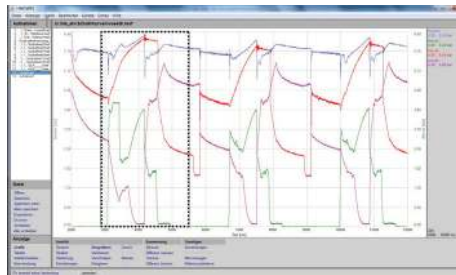
The HYDAC software CMWIN is also supplied with the device. This software enables you to communicate directly with SMART sensors^{*)} connected to the HMG 2500 from your PC.

Both programs can be run on PCs with Windows Vista / XP / 2000 and Windows 7 and 8.1 operating systems.

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

Some examples of the numerous useful additional functions:

- **Transfer and archiving** of measurements recorded using the HMG 2500.
- 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.

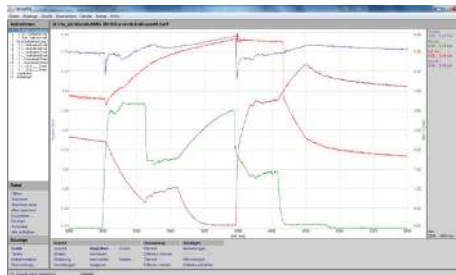
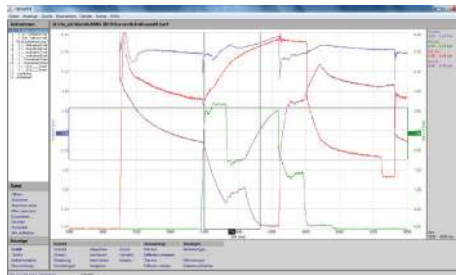
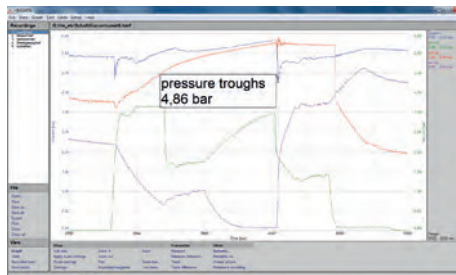


Fig.: Zoomed section of measurement curve

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



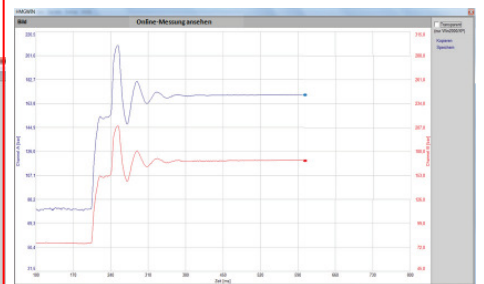
- Individual **comments** and measurement information can be added into the graph



- **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 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)

Technical Data:

Measuring inputs:

- 3 sensor input jacks (channel A – C) for up to 3 HYDAC HSI or SMART sensors and
- 1 input jack with a digital input (channel T).
The sensors are connected via a M12x1 push-pull connector cable or a standard M12x1 plug connector (5 polie.)

Channel A / B / C (Accuracy) HSI (± 0.1 % FS max.)

Channel T (Accuracy) Frequency range: 1..30.000 Hz (± 0.1 %FS max.)
Switching/ switch-back threshold : 2 V / 1 V max. Input voltage: 50 V

Measuring rate (dependent on number of active channels) 0.1 ms, max. 1 input channel
0.2 ms, max. 2 analog input channels
0.5 ms, all 3 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" color display
7-segment display

Interfaces 1 USB, 1 serial port RS 232

CE mark EN 61000-6-1 / 2 / 3 / 4

Safety EN 61010

Protection class IP 40

Environmental conditions Operating temp.: 32 ..+122°F
Storage temperature: -4 ..+140°F
rel. Humidity: 0 .. 70 %

Weight 1100 g

Note:

FS (Full Scale) = relative to the full measuring range

Order details:

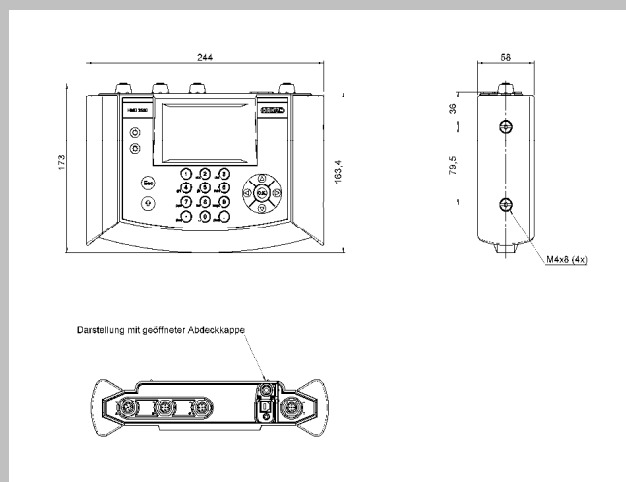
HMG 2500 – 000 - US

Operating manual and documentation
US = English

Scope of delivery

- HMG 2500
- Power supply for 90 .. 230 V AC
- Extract of Operating Instructions
- CD-ROM containing USB drivers HMGWIN and CMWIN software
- USB connector cable

Dimensions:



Note:

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HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronic@hydacusa.com
Website: www.hydacusa.com

Pressure Transducer with HSI

(HYDAC Sensor Interface)

Model Code	Description	Part No.
HDA 4748-H-0009-000	-14.5 to 130.5 psi (-1 to 9 bar)	00909429
HDA 4748-H-0016-000	0 to 230 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 3625 psi (0 to 250 bar)	00909337
HDA 4748-H-0400-000	0 to 5800 psi (0 to 400 bar)	00909427
HDA 4748-H-0600-000	0 to 8700 psi (0 to 600 bar)	00909428
HDA 4778-H-0135-000	-14.5 to 135.5 psi (-1 to 9.34 bar)	00920755
HDA 4778-H-0150-000	0 to 150 psi (0 to 10 bar)	00920663
HDA 4778-H-1500-000	0 to 1500 psi (0 to 103 bar)	00920757
HDA 4778-H-3000-000	0 to 3000 psi (0 to 207 bar)	00920756
HDA 4778-H-6000-000	0 to 6000 psi (0 to 413 bar)	00920664
HDA 4778-H-9000-000	0 to 9000 psi (0 to 621 bar)	00920665

Accessories

Model Code	Description	Part No.
USB Cable	Connection to PC	6040585
ZBE 30-02	cable for M12x1 - 6'	6040851
ZBE 30-05	cable for M12x1 - 15'	6040852
ZBE 36	AS 1000 (Aqua Sensor) Adapter	909737
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	903083
Bag	with carry strap	909795
Power Supply	DC Charging unit for HMG 2500	6054296
ZBE 31	Car Charger for HMG 2500	909739
Pelican Case	for HMG 2500 and accessories (Pelican pick n pull foam case)	2703369
Aluminum Case	for HMG 2500 and accessories	6179836

Flow Sensor with HSI (HYDAC Sensor Interface)

Model Code	Description - g/min (l/min)	Part No.
Aluminum		
EVS 3108-H-0020-000	0.26 to 5.28 (1.2 to 20)	00909405
EVS 3108-H-0060-000	1.59 to 15.9 (6 to 60)	00909293
EVS 3108-H-0300-000	3.96 to 79.3 (15 to 300)	00909404
EVS 3108-H-0600-000	10.6 to 159 (40 to 600)	00909403
Stainless Steel		
EVS 3118-H-0020-000	0.26 to 5.28 (1.2 to 20)	00909409
EVS 3118-H-0060-000	1.59 to 15.9 (6 to 60)	00909406
EVS 3118-H-0300-000	3.96 to 79.3 (15 to 300)	00909408
EVS 3118-H-0600-000	10.6 to 159 (40 to 600)	00909407

Temperature Transducer with HSI

(HYDAC Sensor Interface)

Model Code	Description	Part No.
ETS 4148-H-006-000	-13° to 212°F (-25° to 100°C)	923398
ETS 4578-H-000	-13° to 212°F (-25° to 100°C)	920662

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

Note:

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90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com

Hand-held Measuring Unit HMG 4000

5.7" Color Touchscreen

Up to 38 sensors can be connected

Automatic Sensor Detection

Description:

The HMG 4000 hand-held measuring unit is a portable measuring and data logging device. It was mainly developed for all values measured in relation with hydraulic systems, such as pressure, temperature, flow rate and position. Moreover, it provides a very high flexibility, even when it comes to evaluating other measuring values. The main applications are servicing, maintenance or test rigs.

The HMG 4000 has a very easy-to-operate user interface due to its large 5.7" touchscreen. The operator can access all of the unit's functions and settings by means of clearly presented selection menus.

The HMG 4000 can record the signals of up to 38 sensors at once.

For this purpose, HYDAC offer special sensors, which are automatically detected by the HMG 4000 and whose parameters such as measurement values, measuring ranges and measuring units can be set.

On the one hand, there are the HYDAC **HSI-Sensors (HYDAC Sensor Interface)** for the measurement of pressure, temperature and flow rate, for the connection of which there are 8 analog input channels.

Furthermore, there is the option of connecting HYDAC SMART sensors to these inputs. SMART sensors can display several different measured variables at a time.

Up to 28 special HYDAC **HCSI-Sensors (HYDAC CAN Sensor Interface)** can be connected additionally via the CANbus port, also supporting automatic sensor detection.

HMG 4000 can optionally be connected to an existing CAN network. This enables the recording of measured data transmitted via CAN bus (e.g. motor speed, motor pressure) in combination with the measured data from the hydraulic system.

The device also offers measurement inputs for standard sensors with current and voltage signals. The HMG 4000 rounds off the application, providing two additional digital inputs (e.g. for frequency or rpm measurements).

The most impressive feature of the HMG 4000 is its ability to record the dynamic processes of a machine in the form of a measurement curve and render them as a graph — and, moreover, online and in real time.

HYDAC software HMGWIN which is specific to the HMG 4000, is supplied for convenient post-processing, rendering and evaluation of measurements on your computer.

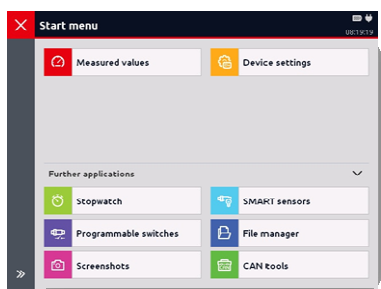


Special features:

- Large, full graphics color display 5.7" touch screen
- Capable of recording up to 38 sensors at once, 8 analog, 2 digital sensors and 28 HCSI sensors via CAN bus.
- Up to 100 measurement channels can be depicted simultaneously
- High-speed measuring rate, up to 8 sensors at 0.1 ms at a time.
- Rapid and automatic basic setting of the device by means of automatic sensor detection
- Analog inputs 0.. 20 mA, 4 .. 20 mA Voltage 0 .. 50V, -10 .. 10 V
- PT 100/1000 input
- Connection to a CAN bus system (also J1939)
- Simple and user-friendly operation, intuitive menu
- Practical, robust design
- Very large data memory for archiving measurement curves enables the storage of 500 measurements with up to 8 Million measured values
- Various measurement modes:
 - Measuring
 - Fast curve recording
 - Long term measurements
- Recording of dynamic processes "online" in real time
- Event-driven measurements with several triggering options
- Programming function for HYDAC switch devices
- PC interface via USB
- USB Host connection for USB memory sticks
- Convenient visualization, archiving and data processing using the HMGWIN software

Function:

- Clear and graphical selection menus intuitively guide the operator to all the device functions available and ensure fast implementation.



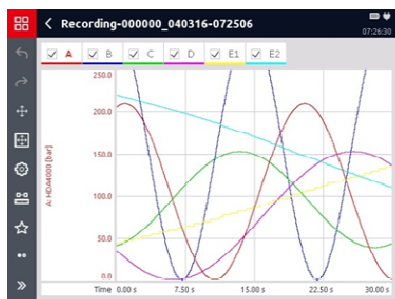
- HMG 4000 can detect the signals of up to **38 sensors simultaneously**. 11 Push-pull M12x1 input sockets are available as sensor interfaces. Apart from the push-pull sensor connection cable, M12x1 standard cables can also be used.

- The following sensors can be connected to 8 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 performed automatically
 - 8 standard analog sensors with current and voltage signals
 - 8 condition monitoring sensors *) (SMART sensors), the basic device settings are also performed automatically.
- The blue input socket provides 2 digital inputs, i.e. for 1 or 2 HYDAC speed sensors (2nd speed sensor connection via Y adapter). Frequency measurements, counting functions or triggers can as well be implemented for data recording.

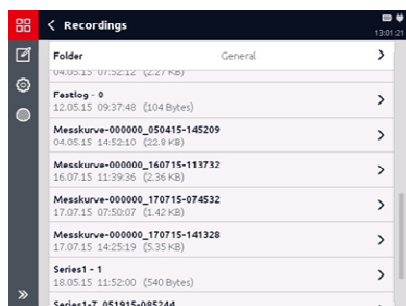
- Different **CAN bus** functions can be implemented via the red input socket.
 - Connection of up to 28 HYDAC HCSI sensors (**HYDAC CAN Sensor Interface**) by setting up a CAN bus with HCSI sensors and the relevant connection accessories, also with automatic parameterization.
 - Connecting to a CAN bus, you have the option of evaluating up to 28 CAN messages.
 - Configuration of HYDAC **CAN sensors**, the parameterization is performed by means of EDS files, which can be stored and administrated in the HMG 4000.

- The yellow input socket serves as the interface for HYDAC pressure, temperature or level switches with **I/O-Link** as well as for the programming device HPG P1. These devices can be parameterized by means of the HMG 4000.

- The most impressive function of the HMG 4000 is its ability to record dynamic processes "online", i.e. in real-time, as a **measurement curve** and to render them as graphs. During the recording process of a measuring curve, you can zoom in the curve sections of interest using gestures on the touchscreen.



- For the purpose of recording highly dynamic processes, all 8 analog input channels can be operated simultaneously at a **measuring rate** of 0.1 ms.
- The **data memory** for the recording of curves or logs can memorize up to 8 million measured values. At least 500 of such data recordings in full length can be stored in an additional archiving memory.
- For the targeted **event-driven curve or log recording**, the HMG 4000 has two independent triggers which can be linked together logically. In addition, there is a "start/stop" condition, by means of which a measurement can be initiated or finished.
- User-specific instrument 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 color 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 analyzing the recorded measurement curves.



Fig.: Using the magnifying gesture with two fingers, the operation is carried out - Zooming in this case.

- The communication between the HMG 4000 and a PC is performed via the built-in USB port.

A HMG 4000 connected to your PC is recognized and depicted as a directory by the PC. You can conveniently move measured data to your PC. Optionally, data transfers can be carried out via a file manager by means of a USB memory stick.

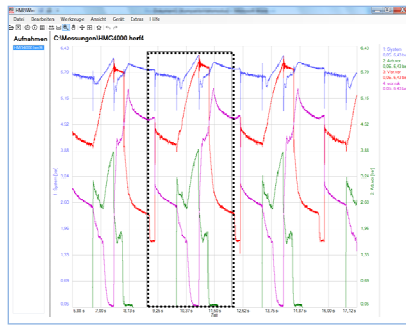
HMGWIN:

The PC software HMGWIN is also supplied with the device. This software is a convenient and simple package for analyzing and archiving curves and logs which have been recorded using the HMG 4000, or for exporting the data for integration into other PC programs if required. In addition it is also possible to operate the HMG 4000 directly from the computer. Basic settings can be made, and measurements can be started online and displayed directly on the PC screen in real-time as measurement curves progress.

HMGWIN can be run on PCs with Windows 7, Windows 8.1 as well as Windows 10 operating systems.

Some examples of the numerous useful additional functions:

- 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.

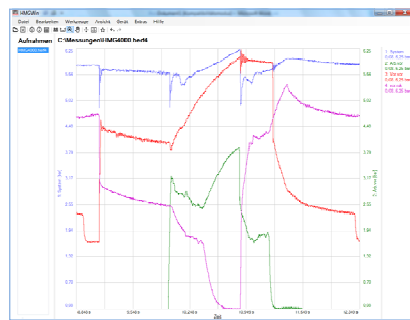
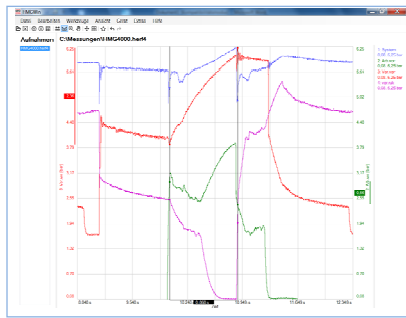
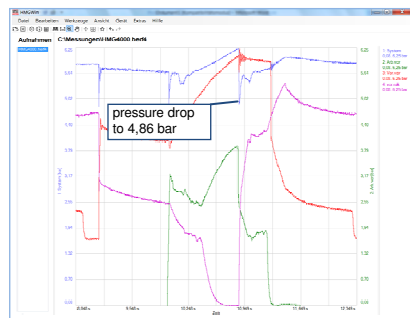


Fig.: Zoomed section of measurement curve

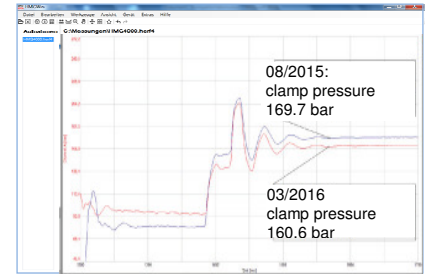
- **Accurate measurement** of the curves using the ruler tool (time values, amplitude values, and differentials)



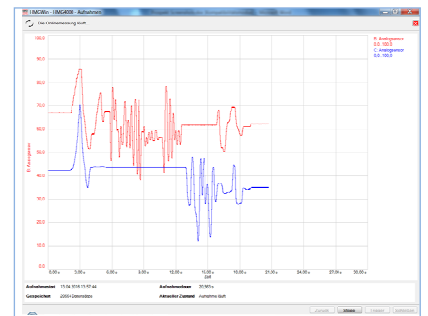
- **Individual comments** and relating measurement information can be added into the graph. (function available from Q4/2016)



- **Overlay** of curves, for example to document the wear of a machine (new condition/current condition). (Function available from Q4/2016)



- 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 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 (only HMGWIN): Start, recording and online-display of measurements (comparable with the function of an oscilloscope) change of axis assignment of the recorded measurement variables 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 measurement variables.

Technical Data:

Analog inputs	
Input signals 8 channels M12x1 Ultra-Lock Flange sockets (5 pole) channel A, ... channel H	HYDAC HSI Analog sensors HYDAC HSI SMART sensors Voltage signals: i.e. 0.5..4.5 V, 0..10 V etc. (input ranges for 0 .. 50V, 0..10 V, 0..4.5V, -10 .. 10V) Current signals, i. e. 4..20mA, 0..20mA (input range 0..20 mA) 1 x PT 100 / PT 1000 (on channel H)
Accuracy dependence of the input range	$\leq \pm 0.1\%$ FS at HSI, voltage, current $\leq \pm 1\%$ FS at PT 100 / PT 1000
Digital inputs	
Input signals 2 channels M12x1 Ultra-Lock Flange socket (5 pole) channel I, J	Digital status (high / low) Frequency (0.01... 30,000 Hz) PWM duty cycle Durations (i.e. Period length)
Level	Switching threshold / switch-back threshold: 2 V/1 V Max input voltage: 50 V
Accuracy	$\leq \pm 0.1\%$
CAN	
Input signals 28 channels M12x1 Ultra-Lock Flange socket (5 pole) channel K1.. K28	HYDAC HCSI sensors, CAN, J1939, CANopen PDO, CANopen SDO
Baud rate	10 kbit/s ... 1 Mbit/s
Accuracy	$\leq \pm 0.1\%$
Calculated channels	
Quantity	4 channels via virtual port L (channel L1 ... channel L4)
Programming interface	
For HYDAC I/O-Link devices	1 channel via M12x1 Ultra-Lock Flange socket (5 pole)
Voltage supply	
Network operation	9 ... 36 V DC via standard round plug 2.1 mm
Battery	Lithium-Nickel-Kobalt-Aluminium-Oxide 3.6 V; 9300 mAh
Battery charging time	approx. 5 hours
Service Life	without sensors: approx. 11 hours with 2 sensors: approx. 9 hours with 4 sensors: approx. 7 hours with 8 sensors: approx. 4 hours
Display	
Type	TFT-LCD Touchscreen
Quantity	5.7 "
Resolution	VGA 640 x 480 Pixel
Backlight	10 ... 100 % adjustable
Interfaces	
USB Host	
Plug-in connection	USB socket, Type A, screened
USB Standard	2.0 (USB Full speed)
Transmission rate	12 Mbit/s
Voltage supply	5 V DC
Power supply	100 mA max.
Protection	short circuit protection to GND (0 V)
USB Slave	
Plug-in connection	USB socket, Type B, screened
USB Standard	2.0 (USB High speed)
Transmission rate	480 Mbit/s
Voltage supply	5 V DC
Power supply	100 mA max.
Protection	short circuit protection to GND (0 V)
Memory	
Measured value memory	16 GB for min. 500 measurements, each containing 8 Million measured values
Technical standards	
EMC	IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8
Safety	EN 61010
IP class	IP 40
Ambient conditions	
Operating temperature	32 ... 122°F
Storage temperature	-4 ... 140°F
Relative humidity	0 ... 70 %
Max. operating altitude	2000 m
DIMENSIONS	
Weight	approx. 285 x 189 x 87 mm (B x H x T)
Housing material	approx. 1,850 g Plastic (Elastollan® R 3000 – TPU-GF)

Order details:

HMG 4000 – 000 - US

Operating manual and documentation
US = English

Items Supplied

- HMG 4000
- Power supply for 90 .. 230 V AC
- Strap
- Operating Instructions
- Data storage medium containing USB drivers HMGWIN and CMWIN software
- USB connector cable

Accessories:

- Pressure, temperature, flow rate transmitters with HSI sensor detection as well as CAN pressure transmitters with HCSI sensor detection, see separate data sheet.

Note:

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Subject to technical modifications.

HYDAC ELECTRONICS
90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronic@hydacusa.com
Website: www.hydacusa.com

Pressure Transducer with HSI

(HYDAC Sensor Interface)

Model Code	Description	Part No.
HDA 4748-H-0009-000	-14.5 to 130.5 psi (-1 to 9 bar)	00909429
HDA 4748-H-0016-000	0 to 230 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 3625 psi (0 to 250 bar)	00909337
HDA 4748-H-0400-000	0 to 5800 psi (0 to 400 bar)	00909427
HDA 4748-H-0600-000	0 to 8700 psi (0 to 600 bar)	00909428
HDA 4778-H-0135-000	-14.5 to 135.5 psi (-1 to 9.34 bar)	00920755
HDA 4778-H-0150-000	0 to 150 psi (0 to 10 bar)	00920663
HDA 4778-H-1500-000	0 to 1500 psi (0 to 103 bar)	00920757
HDA 4778-H-3000-000	0 to 3000 psi (0 to 207 bar)	00920756
HDA 4778-H-6000-000	0 to 6000 psi (0 to 144 bar)	00920664
HDA 4778-H-9000-000	0 to 9000 psi (0 to 621 bar)	00920665

HCSI Pressure Measuring Transducer

Model Code	Description	Part No.
HDA 4748-HC-0009-000 (-1...+9bar)	-1 ... 9 bar	925287
HDA 4748-HC-0016-000	0 ... 16 bar	925298
HDA 4748-HC-0060-000	0 ... 60 bar	925305
HDA 4748-HC-0100-000	0 ... 100 bar	925299
HDA 4748-HC-0160-000	0 ... 160 bar	925286
HDA 4748-HC-0250-000	0 ... 250 bar	925304
HDA 4748-HC-0400-000	0 ... 400 bar	925303
HDA 4748-HC-0600-000	0 ... 600 bar	925301
HDA 4748-HC-1000-000	0...1000 bar	925300

HCSI Temperature Measuring Transducer

Model Code	Description	Part No.
ETS 4148-HC-006-000	-25 to +100 °C	925302

Speed Sensors

Model Code	Description	Part No.
HDS 1000-002	RPM Sensor (plug M12x1) 2M Includes HDA 1000 Reflector Set (part no. 904812)	909436
HDS 1000 Reflector Set	Reflective foil set 25 pieces	904812
HSS 210-3-050-000	RPM Sensor (in connection with ZBE 46)	923193
HSS 220-3-046-000	RPM Sensor (in connection with ZBE 46)	923195

Sensor Cables

Model Code	Description	Part No.
Push-pull connection on plug-side		
ZBE 40-02	(CABLE M12X1/5P, PUSH- PULL) 2M length	6177158
ZBE 40-05	(CABLE M12X1/5P, PUSH- PULL) 5M length	6177159
ZBE 40-10	(CABLE M12X1/5P, PUSH- PULL)10M length	6177160
Screw connection		
ZBE 30-02	(Sensor cable M12x1, 5-pin) 2M length	6040851
ZBE 30-05	(Sensor cable M12x1, 5-pin) 5M length	6040852

Flow Sensor with HSI (HYDAC Sensor Interface)

Model Code	Description - g/min (l/min)	Part No.
Aluminum		
EVS 3108-H-0020-000	0.26 to 5.28 (1.2 to 20)	00909405
EVS 3108-H-0060-000	1.59 to 15.9 (6 to 60)	00909293
EVS 3108-H-0300-000	3.96 to 79.3 (15 to 300)	00909404
EVS 3108-H-0600-000	10.6 to 159 (40 to 600)	00909403
Stainless Steel		
EVS 3118-H-0020-000	0.26 to 5.28 (1.2 to 20)	00909409
EVS 3118-H-0060-000	1.59 to 15.9 (6 to 60)	00909406
EVS 3118-H-0300-000	3.96 to 79.3 (15 to 300)	00909408
EVS 3118-H-0600-000	10.6 to 159 (40 to 600)	00909407

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
ETS 4578-H-000	-13° to 212°F (-25° to 100°C)	00920662

Other Accessories

Model Code	Description	Part No.
Aluminum case for HMG 4000	Case for HMG 4000 and accessories	6179836
Large Pelican Case	For HMG 4000 and accessories	2702730
Compact Pelican Case	For HMG 4000 and accessories (Pelican pick n pull foam case)	2703369
ZBE 31	Car charger for HMG 4000	909739
HCSI Y splitter	Y splitter for HCSI sensors	6178196
HCSI bus termination	Termination connector for HCSI Sensors	6178198
ZBE 46	Pin adapter HMG (for three-wire signals, AS, ...)	925725
ZBE 100	Adapter for TFP 100	925726
ZBE 38	Y adapter, black for jack I/J	3224436
ZBE 26	Y adapter, blue for HLB 1000	3304374
ZBE 41	Y adapter, yellow for CS 1000	910000
UVM 3000	Universal connection module for HMG 4000	909752
Hydraulic Adapter set	Adapter hose DN 2 / 1620/ 1620, 400 mm and 1000 mm, pressure gauge connection 1620/ G1/4, adapter 1615/ 1620, bulkhead couplings 1620/ 1620	903083
SSH 1000	Sensor simulator for HMG 4000 (ideal for training and learning purposes)	909414

Note:

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HYDAC ELECTRONICS

90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com



Electronic Pressure Transmitter with HSI Sensor Recognition HDA 4778-H

Description:

The pressure transmitter HDA 4778-H with HSI sensor recognition has been specially developed for use in conjunction with HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 and CMU 1000.

For data transmission, the HDA 4778-H has an HSI interface (HYDAC Sensor Interface).

The HSI sensors are automatically recognized via the HSI interface by the above-mentioned HYDAC measuring instruments and all necessary basic device settings are taken from each sensor.

Like all pressure transmitters of the HDA 4700 series, the HDA 4778-H also has a very accurate and robust sensor cell with a thin-film strain gauge on a stainless steel membrane. It combines excellent technical specifications with a very compact design.

Special features:

- Fully automatic recognition by, and voltage supply from, HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 or CMU 1000
- Automatic transfer of measuring range, measured value and measurement unit
- Accuracy $\leq \pm 0.25\%$ FS B.F.S.L.
- Highly robust sensor cell
- Very small temperature error
- Excellent EMC characteristics
- Excellent long term stability
- Very compact design

Technical data:

Input data	
Measuring ranges ¹⁾	150, 1500, 3000, 5000, 9000, 15000 psi
Overload pressures	290, 2900, 7250, 11600, 14500, 23200 psi
Burst pressures	1450, 7250, 14500, 29000, 29000, 43500 psi
Mechanical connection ¹⁾ (torque value)	SAE 6 9/16-18 UNF 2A SF 250 CS20, Autoclave(7/16-20-UNF 2B) 15lb-ft(20Nm) - SAE 6 30lb-ft(40Nm) SF 250 CX20
Parts in contact with medium	Mech. connection: Stainless steel Seal: FPM
Output data	
Output signal	HSI (HYDAC Sensor Interface) Automatic sensor recognition
Accuracy to DIN 16086	$\leq \pm 0.25\%$ FS typ.
Max. setting	$\leq \pm 0.5\%$ FS max.
Accuracy at min. setting (B.F.S.L.)	$\leq \pm 0.15\%$ FS typ. $\leq \pm 0.25\%$ FS max.
Temperature compensation	$\leq \pm 0.0045\%$ FS/°F typ.
Zero point	$\leq \pm 0.0085\%$ FS/°F max.
Temperature compensation	$\leq \pm 0.0045\%$ FS/°F typ.
Over range	$\leq \pm 0.0085\%$ FS/°F max.
Non-linearity at max. setting to DIN 16086	$\leq \pm 0.3\%$ FS max.
Hysteresis	$\leq \pm 0.1\%$ FS max.
Repeatability	$\leq \pm 0.05\%$ FS
Rise time	≤ 0.5 ms
Long-term drift	$\leq \pm 0.1\%$ FS typ. / year
Environmental conditions	
Compensated temperature range	-13..+185°F
Operating temperature range ²⁾	-40..+185°F/-13..+185°F
Storage temperature range	-40..+212°F
Fluid temperature range ²⁾	-40..+212°F/-13..+212°F
CE mark	EN 61000-6-1 / 2 / 3 / 4
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 20 g
Protection class to IEC 60529	IP 67 (when an IP 67 connector is used)
Other data	
Voltage supply	via HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 or CMU 1000
Life expectancy	> 10 million cycles 0 .. 100 % FS
Weight	~ 150 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.

FS (Full Scale) = relative to the complete measuring range,

B.F.S.L. = Best Fit Straight Line

¹⁾ 15000 psi only with mechanical connection SF 250 CX20, Autoclave

²⁾ -13 °F with FPM seal, -40 °F on request

Model code:

HDA 4 7 7 8 - H - XXXX - 000

Mechanical connection

7 = SAE 6, 9/16-18 UNF 2A male (psi ranges only)
C = SF 250 CX20, Autoclave (only for "15000 psi"
press. range)

Electrical connection

8 = Male, M12x1, 5 pole
(connector not supplied)

Signal

H = HSI (automatic sensor recognition)

Pressure ranges in psi

0135 (14.5..130.5 psi), 0150, 1500, 3000, 6000, 9000,
15000 psi (only in conjunction with mechanical connection type "C")

Modification number

000 = Standard

Accessories:

Appropriate accessories, such as electrical connectors, can be found in
the Accessories brochure.

Note:

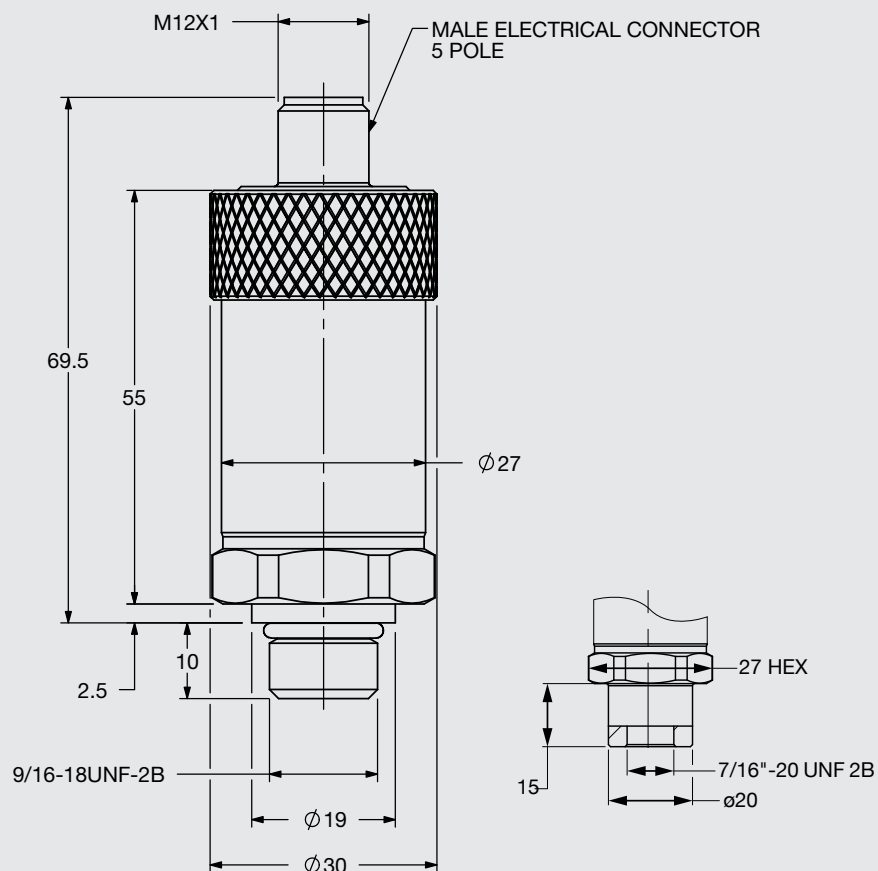
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not described, please contact the relevant
technical department.

Subject to technical modifications.

For European mechanical connection
and bar ranges see European Catalog

Dimensions:



HYDAC ELECTRONICS

90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com



Electronic Temperature Transmitter with HSI Sensor Recognition ETS 4178-H

Description:

The electronic temperature transmitter ETS 4178-H with HSI sensor recognition has been specially developed for use in conjunction with HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 and CMU 1000.

For data transmission, the ETS 4178-H has an HSI interface (HYDAC Sensor Interface). The HSI sensors are automatically recognized by the above-mentioned HYDAC measuring instruments and all necessary basic settings are taken from each sensor.

Like all temperature transmitters of the ETS 4000 series, the ETS 4178-H features a robust design and excellent EMC properties. Based on corresponding evaluation electronics, the temperature sensor is designed to measure temperatures in the range -25 °C to +100 °C (-13°F to 212°F).

Special features:

- Fully automatic sensor recognition by, and voltage supply from, HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 and CMU 1000
- Automatic transfer of measuring range, measured value and measurement unit
- Accuracy $\leq \pm 0.8\%$ FS
- Robust design
- Excellent EMC characteristics
- Excellent long term stability
- Standard protection class IP 67

Technical data:

Input data	
Measuring principle	PT 1000
Measuring range	-13°F .. 212°F (-25°C .. +100°C)
Probe length	6 mm
Probe diameter	4.5 mm
Pressure resistance	8700 psi
Overload pressure	13050 psi
Mechanical connection	SAE 6 9/16-18 UNF 2A
Torque value	15 lb-ft (20 Nm)
Parts in contact with medium ¹⁾	Mech. conn.: Stainless steel Seal: FPM
Output data	
Output signal	HSI (HYDAC Sensor Interface) Automatic sensor recognition through HMG
Accuracy (at room temperature)	$\leq \pm 0.4\%$ FS typ. $\leq \pm 0.8\%$ FS max.
Temperature drift (environment)	$\leq \pm 0.006\%$ FS/°F typ.
Rise time to DIN EN 60751	t_{50} : ~4 s t_{90} : ~8 s
Environmental conditions	
Operating temperature range ²⁾	-40..+185°F/-13..+185°F
Storage temperature range	-40..+212°F
Fluid temperature range ²⁾	-40..+257°F/-13..+257°F
CE mark	EN 61000-6-1 / 2 / 3 / 4
Vibration resistance to DIN EN 60068-2-6 at 10 .. 500 Hz	≤ 25 g
Protection class to IEC 60529	IP 67 (when an IP 67 connector is used)
Other data	
Electrical connection	M12x1, 5 pole
Voltage supply	via HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 or CMU
Weight	~ 200 g

Note: Reverse polarity protection of the supply voltage, excess voltage, override and short circuit protection are provided.

FS (Full Scale) = relative to complete measuring range

¹⁾ Other seal materials available on request

²⁾ -13 °F with FPM seal, -40 °F on request

Model code:

ETS 4 1 7 8 - H - 006 - 000

Mechanical connection

7 = SAE 6, 9/16-18 UNF 2A male

Electrical connection

8 = Male, M12x1, 5 pole
(connector not supplied)

Signal

H = HSI (automatic sensor recognition)

Probe length

006 = 6 mm

Modification number

000 = Standard

Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

Note:

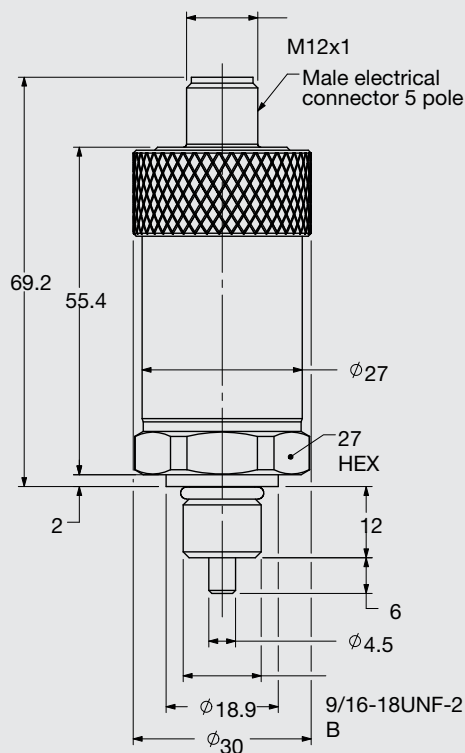
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Subject to technical modifications.

For European mechanical connection see European Catalog

Dimensions:



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90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com



Electronic Flow Rate Transmitter with HSI-Sensor Recognition

EVS 3100-H

EVS 3110-H

Description:

The flow rate transmitters in the series EVS 3100-H and EVS 3110-H with HSI sensor recognition have been specially developed for use in conjunction with HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 and CMU 1000.

For data transmission, the EVS 31x0-H has an HSI interface (HYDAC Sensor Interface).

The HSI sensors are recognized automatically via the HSI interface by the above-mentioned HYDAC measuring instruments, and all the necessary basic settings are taken from each instrument.

As with all flow rate transmitters in the series EVS 3100 and EVS 3110, the EVS 31x0-H also operates according to the turbine principle. The speed of an impeller turning in the fluid flow is measured and converted into an electronic signal.

Special features:

- Fully automatic recognition by, and voltage supply from, HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 or CMU 1000
- Automatic transfer of measuring range, measured value and measurement unit
- Viscosities of 1 .. 100 cSt
- Additional connection of temperature and / or pressure transmitters possible

Technical data:

Input data		
Measuring ranges ¹⁾ and operating pressure		
EVS 3108-H-0020	0.26 .. 5.28 gpm	5800 psi
EVS 3118-H-0020		
EVS 3108-H-0060	1.59 .. 15.9 gpm	5800 psi
EVS 3118-H-0060		
EVS 3108-H-0300	3.96 .. 79.3 gpm	5800 psi
EVS 3118-H-0300		
EVS 3108-H-0600	10.6 .. 159 gpm	4567.5 psi
EVS 3118-H-0600	10.6 .. 159 gpm	5800 psi
Additional connection options	2 x G1/4 female threads for pressure and/or temperature sensors	
Output data		
Output signal	HSI (HYDAC Sensor Interface) Automatic sensor recognition	
Accuracy	≤ 2 % of the actual value	
Environmental conditions		
Compensated temperature range	-4 .. 150°F (-20 .. +70°C)	
Operating temperature range	-4 .. 150°F (-20 .. +70°C)	
Storage temperature range	-40 .. +212°F (-40 .. +100°C)	
Fluid temperature range	-4 .. 194°F (-20 .. +90°C)	
CE mark	EN 61000-6-1 / 2 / 3 / 4	
Protection class to IEC 60529	IP 67 (when an IP 67 connector is used)	
Other data		
Housing material	EVS 3100-H:	Aluminium
	EVS 3110-H:	Stainless steel
Measuring medium ²⁾	EVS 3100-H:	Hydraulic oils
	EVS 3110-H:	Water-based media
Viscosity range	1 .. 100 cSt	
Calibration viscosity	EVS 3100-H:	30 cSt
	EVS 3110-H:	5 cSt
Voltage supply	via HYDAC measuring instruments HMG 500, HMG 510, HMG 3000, HMG 3010 or CMU 1000	

Note: ¹⁾ Other measuring ranges on request

²⁾ Other fluids on request

Model code:

EVS 3 1 X 8 - H - XXXX - 000

Housing material

- 0 = Aluminium
1 = Stainless steel

Electrical connection

- 8 = Male M12x1, 5 pole
(connector not supplied)

Signal

- H = HSI (Automatic Sensor Recognition)

Measuring range

- 0020 = 0.26 .. 5.28 gpm
0060 = 1.59 .. 15.9 gpm
0300 = 3.96 .. 79.3 gpm
0600 = 10.6 .. 159 gpm

Modification number

- 000 = Standard

Accessories:

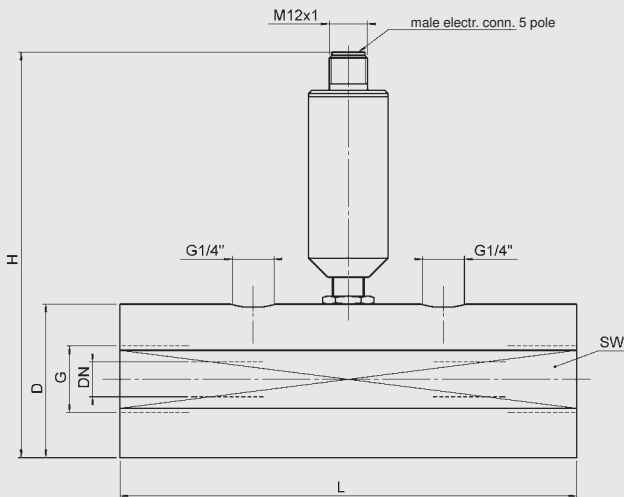
Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

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.

Dimensions:

Model	Meas. range [gpm]	L [mm]	H [mm]	D / SW [mm]	G [mm]	Torque value [lb-ft(Nm)]	DN [mm]
EVS 3108-H-0020	0.26..5.28	117	135	47 / 46	G1/4"	44 lb-ft (60)	7
EVS 3108-H-0060	1.59..15.9	144	135	48.5 / 46	G1/2"	95 lb-ft (130)	11
EVS 3108-H-0300	3.96..79.3	155	150	63.5 / 60	G1 1/4"	370 lb-ft (500)	22
EVS 3108-H-0600	10.6..159	181	150	63.5 / 60	G1 1/2"	440 lb-ft (600)	30
EVS 3118-H-0020	0.26..5.28	117	135	47 / 46	G1/4"	44 lb-ft (60)	7
EVS 3118-H-0060	1.59..15.9	144	135	48.5 / 46	G1/2"	95 lb-ft (130)	11
EVS 3118-H-0300	3.96..79.3	155	150	63.5 / 60	G1 1/4"	370 lb-ft (500)	22
EVS 3118-H-0600	10.6..159	181	150	63.5 / 60	G1 1/2"	440 lb-ft (600)	30

HYDAC ELECTRONICS

90 Southland Dr. Bethlehem, PA 18017
Telephone +1 (610) 266-0100
E-mail: electronics@hydacusa.com
Website: www.hydacusa.com