TestMate® Series   HMG 4000

CS 1000

CS 1939

CSI-C-11

HY-TRAX®

RBSA

CSM

TFL

TFH

FCU

MCS

AS

SMU

CTU

EPK

Trouble
Check Plus

HMG2500

HMG4000

ET-100-6

HTB

RFSA

HFS-BC

HFS-15

MFD-BC

MFS, MFD

HY-TRAX®
Retrofit System

MFD-MV

MFS-HV

AMS, AMD

FS

AMFS

KLS, KLD

MCO

AKS, AKD

LSN, LSA, LSW

X Series

OLF Compact

OLF

OLF-P

NxTM

VEU

IXU

Triton-A

Triton-E

NAV

SVD01

SVD

OXS

Appendix

Features and Benefits

- 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 HSCI 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
- 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
- PC interface via USB
- USB Host connection for USB memory sticks
- Convenient visualization, archiving and data processing using the HMGWIN software

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, Schroeder Industries 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 HSI Sensors (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 Schroeder SMART sensors to these inputs. SMART senors can display several different measured variables at a time.

Up to 28 special HCSI-Sensors (CAN Sensor Interface) can be connected additionally via the CAN bus 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 impressing 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.

Schroeder software HMGWIN which is specific to the HMG 4000, is supplied for convenient postprocessing, rendering and evaluation of measurements on your computer.

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 analogue sensors (e.g. for pressure, temperature and flow rate) with the special digital HSI interface (Sensor Interface); this means the basic device settings (measured variable, measuring 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 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 utilized via the red input socket.
  - Connection of up to 28 HCSI sensors (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 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 pressure, temperature or level switches with I/OLink 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.

- 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.
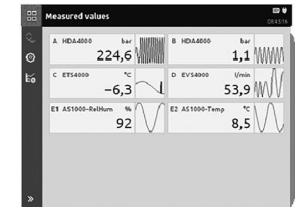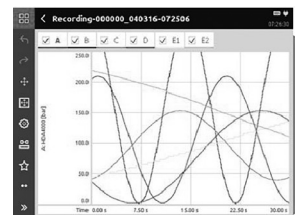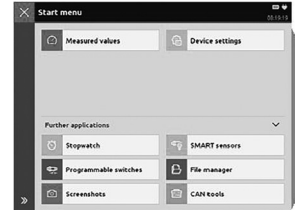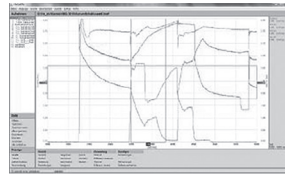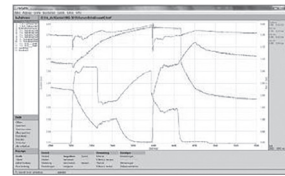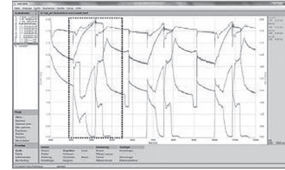
Software

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.

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

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

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

- Individual comments and measurement information can be added to 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 (HMGWIN only): 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

Analog Inputs

Input signals	HSI analogue sensors
8 channels M12x1 Ultra-Lock flange sockets (5 pole) channel A to channel H	HSI SMART sensors Voltage signals: i.e. 0.5 .. 4.5 V, 0 .. 10 V etc. (input ranges for 0 .. 50 V, 0 .. 10 V, 0 .. 4.5 V, -10 .. 10 V) 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 via M12x1 Ultra-Lock flange socket (5 pole) Channel I, J	Digital status (high/low) Frequency (0.01 to 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 to K28	HCSI sensors, CAN, J1939, CANopen PDO, CANopen SDO
Baud rate	10 kbit/s to 1 Mbit/s
Accuracy	$\leq \pm$ 0.1 %

Calculated channels

Quantity	4 channels via virtual port L (channel L1 to channel L4)

Technical Data

Programming interface	
For O-Link devices	1 channel via M12x1 Ultra-Lock flange socket (5 pole)
Voltage supply	
Network operation	9 to 36 V DC via standard round plug 2.1 mm
Battery	Lithium-Nickel-Kobalt-Aluminum-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 to 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°F to 122°F (0°C to 50°C)
Storage temperature	-4°F to 140°F (-20°C to 60°C)
Relative humidity	70%, non-condensing max
Dimensions	approx. 11.22 x 7.44 x 3.43 in (B x H x T)
Weight	approx. 4.08 lb (1.85 kg)
Housing material	Plastic (Elastollan® R 3000 - TPU-GF)

Order Details

Additional accessories, such as electrical and mechanical connection adapters, power adapters, etc. can be found in the "Accessories for HMG Series" catalog pages.

Model Code
Description: HMG 4000 - 000 - US
P/N 925283

Scope of delivery

■ HMG 4000

■ Power supply for 90 to 230 V AC

■ Strap

Operating manual and documentation
US = English

■ Operating Instructions

■ Data storage medium containing USB drivers HMGWIN and CMWIN software

■ USB connector cable