

Universal Digital Gauge
The smart indication

SEMI s.r.l.

EPFS0000 is a smart gauge, configurable via software, protected by an International patent. It offers both digital and graphic indication and can replace any pointer gauge currently used in the boating or automotive sectors.



This innovative digital gauge offers significant advantages over all other gauges on the market today:

- It is easily configurable in a simple and intuitive way, thanks to a user friendly software freely available and to a programming interface.
- It can be reprogrammed to perform up to 10 different functions.
- No wear of mechanical parts.
- The shape is compatible with that of dashboard pointer gauges.
- Polycarbonate waterproof case.
- Polycarbonate shield for external protection.
- Polycarbonate bezel available in various colours.
- Bayonet connectors (wish-lock type).
- Possibility to save and recall the chosen configurations of those gauges to be

International Patent - CE - Made in Italy - Property: S.I.E.M. S.r.l.
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Absolute Maximum Ratings
Stresses in excess of the absolute maximum ratings may cause performance degradation, adversely affecting long-term reliability, and cause permanent damage to the digital gauge.

Parameter	Conditions/Descriptions	Min	Max	Units
Operating Temperature	Control-case Temperature	-5	+80	°C
Supply voltage		8	16	VDC
Max Voltage signal		0	5	VDC
Max current signal	Rsens= 0 Ohm	0	100	mADC
Max voltage alarm		4.5	5	VDC
Max current alarm		0	20	mADC

Parameter	Conditions/Descriptions	Min	Norm	Max	Units
Ambient temperature range		-5	25	80	°C
Storage temperature (Ts)		-5	25	120	°C
Weight		80.3	80.3	80.3	grams
Dimensions		71 (Diameter) x 55 (width)			mm

Electrical Specifications
Specifications apply to the input voltage from 8VDC a 16 VDC, ambient temperature from -5°C a +80°C.

Parameter	Conditions/Descriptions	Min	Norm	Max	Units
Supply voltage (V _s)	@25°C	8	13	16	VDC
Supply current (with load)	@25°C		100	120	mADC
Undervoltage lockout	@25°C	6	7		VDC
UART RX voltage	@25°C		5	5.5	VDC

Parameter	Conditions/Descriptions	Min	Norm	Max	Units
Output Current (I _{out}) Alarm	V _{in} < V _{max}		20		mADC
Output Current (I _{out}) of the sender	V _{in} < V _{max} & V _{in} < V _{max} in c.c.		100		mADC
Output-PIN voltage range (V _{in})	@25°C	4.5	5	5.5	VDC
UART RX voltage	@25°C		5	5.5	VDC
Precision			1		%
Accuracy	Typical		2		%

All specifications subject to change without notice.

programmed starting from the universal gauge.

- Certainty of the gauge's configuration through the use of data redundancy control and the handshaking between the PC and gauge (response confirming receipt of data by the gauge).
- On-line help, graphical environment and reminders for the wiring of the gauge.

Safety Instructions

- Read the manual thoroughly before installation.
- Misuse of these instructions may cause a malfunction of the gauge and/or its rupture.
- This gauge was built and has been subjected to rigorous testing, in accordance with the applicable technical standards.
- The installation and first power on of the gauge must be performed only by experienced staff.
- Always ensure that the gauge operates safely and avoid using it in unexpected situations such as for example high voltage and immersion in water.
- Use only the accessories and cables supplied by the manufacturer of the gauge.
- If the unit is installed where a malfunction or failure of the unit may cause damage to persons or property, additional security measures should be used, such as using a safety switch, periodic monitoring, etc.
- In the event of gauge's failure, it must be repaired only by experienced personnel. SIEM S.r.l. assumes no liability for damages caused by incorrect repair of the gauge.
- For more information, please contact us at info@siemsl.com.

Technical Features

- Functions of 10 separate gauges combined into a single gauge
- Supply voltage: 8VDC - 16VDC (new version 8 VDC - 30VDC)
- Low current absorption typical 100mA (depending on the transducer)
- Operating frequency: 6 MHz
- Working temperature: -5°C to +80°C
- Double indication of the measured value (graphic and digital)
- Innovative signalling of the anomalous situation by synchronous activation of visual and acoustic alarms as a result of communication between various gauges involved
- Complete compatibility with other gauges present in the market. The gauge replaces them with extreme ease
- Maximum reading precision
- No need for calibration
- The gauge can be reconfigured easily, as many times as wished, via a software interface available upon request
- Extreme flexibility: the choice of various combinations of gauges based on the needs of the boat and to the type of navigation
- Short circuit protection, polarity inversion protection and protection from incorrect connection of the connectors
- Immunity to overloads and to signal and alarm lines noises
- The gauge is illuminated by high efficiency powerful white LEDs
- It is easily adaptable to the various sensors available on the market

INSTRUCTION FOR CORRECT INSTALLATION

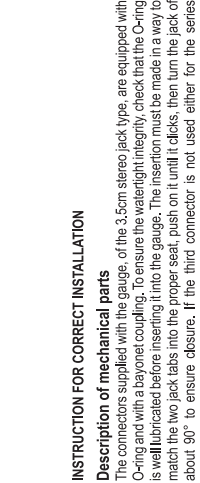
Description of mechanical parts

The connectors supplied with the gauge, of the 3,5cm stereo jack type, are equipped with a spring and a bayonet coupling. To ensure the watertight integrity, check that the O-ring is well lubricated before inserting it into the gauge. The insert must be made in a way to match the two jack tabs into the proper seat, push on it until it clicks, then turn the jack off about 90° to ensure closure. If the third connector is not used either for the series connection or for the connection to an alarm, it is important that it is closed with the plug supplied in order to ensure the watertight integrity of the system.

PIN assignment and description

PIN name	PIN No.	PIN Description
S (Signal)	1	TX - Signal - GND
B (Battery)	2	Positive Veat. - GND - Alarm
B (Battery)	3	Positive Veat. - GND - Alarm

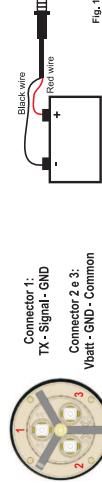
In the back of the gauge there are 3 connectors (see figure below). One of them is dedicated to the connection of the sensors or of the serial communication (Jack 1). The other two are used to connect power and to connect with each other more gauges (the connectors 2 and 3 are equivalent).



Connection

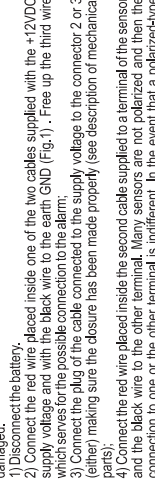
The gauge must be connected only after having disconnected the battery. Connect and disconnect the connectors only with the power off otherwise the gauge may be irreversibly damaged.

- 1) Disconnect the battery.
- 2) Connect the red wire placed inside one of the two cables supplied with the +12VDC supply voltage and with the black wire to the earth GND (Fig.1). - Free up the third wire which serves for the possible connection to the alarm.
- 3) Connect the plug of the cable connected to the supply voltage to the connector 2 or 3 (either) making sure the closure has been made properly (see description of mechanical parts).
- 4) Connect the red wire placed inside the second cable supplied to a terminal of the sensor and the black wire to the other terminal. Many sensors are not polarized and then the connection to one or the other terminal is indifferent. In the event that a polarized-type sensor is used, connect the positive terminal of the sensor to the red wire and the negative terminal to the black wire. (See Fig.2)

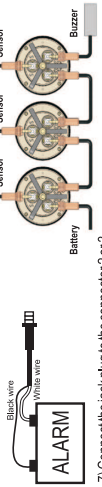


Start up

At the gauge start up, there will be three system screens before entering the measuring mode

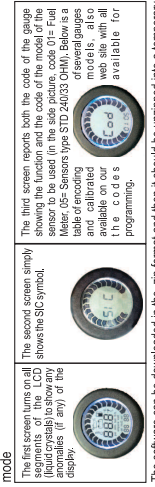


PROGRAMMABLE FUNCTIONS	
<p>VOLTMETER</p> <p>Graphic symbol: battery</p> <p>Measuring unit: Volt</p> <p>Measuring range: 0V - 16V</p> <p>Visual alarm in case of low battery: ± 90 A, ± 95 A, ± 100 A, ± 150 A, ± 20 A</p> <p>Connect only the Positive Volt to the terminals V1 and leave the rest closing it with the dedicated plug.</p>	<p>AMMETER</p> <p>Graphic symbol: zero current</p> <p>Measuring unit: Ampere</p> <p>Measuring range: 0 A - 50 A</p> <p>Visual alarm in case of absorption of 100%.</p>
<p>FUEL LEVEL</p> <p>Graphic symbol: fuel pump</p> <p>Measuring unit: %</p> <p>Measuring range: 0% - 100%</p> <p>Indication range: E=Empty, F= Full</p> <p>Visual alarm in case of low fuel level.</p>	<p>WATER LEVEL</p> <p>Graphic symbol: H2O</p> <p>Measuring unit: %</p> <p>Measuring range: 0% - 100%</p> <p>Indication range: E=Empty, F= Full</p> <p>Visual alarm in case of low water level.</p>
<p>ENGINE OIL TEMPERATURE</p> <p>Graphic symbol: thermometer</p> <p>Measuring unit: °C</p> <p>Measuring range: 40°C - 130°C</p> <p>Indication range: L=Low, H= High</p> <p>Visual alarm in case of temperature below 40°C or between 90°C and 100°C.</p> <p>Programmable thermostat function also available.</p>	<p>ENGINE WATER TEMPERATURE</p> <p>Graphic symbol: thermometer</p> <p>Measuring unit: °C</p> <p>Measuring range: 0°C - 150°C</p> <p>Indication range: L=Low, H= High</p> <p>Visual alarm in case of temperature below 5°C or between 90°C and 100°C.</p> <p>Programmable thermostat function also available.</p>
<p>WASTE WATER LEVEL</p> <p>Graphic symbol: H2O</p> <p>Measuring unit: %</p> <p>Measuring range: 0% - 100%</p> <p>Indication range: E=Empty, F= Full</p> <p>Visual alarm in case of high water level.</p>	<p>OIL PRESSURE</p> <p>Graphic symbol: oil pressure</p> <p>Measuring unit: ATM, PSI, BAR</p> <p>Measuring range: 0 BAR</p> <p>Indication range: L=Low, H= High</p> <p>Visual alarm in case the pressure is 0 bar.</p> <p>Programmable pressure switch function.</p>
<p>AIR TEMPERATURE</p> <p>Graphic symbol: thermometer</p> <p>Measuring unit: °C, °F</p> <p>Measuring range: 0°C - 100°C</p> <p>Indication range: L=Low, H= High</p> <p>Visual alarm in case of temperature below 5°C or higher than 80°C.</p> <p>Programmable thermostat function also available.</p>	<p>HOUR METER (upon request)</p> <p>Graphic symbol: h</p> <p>Measuring unit: h</p> <p>Measuring range: 0h - 9999.9h</p> <p>The function of the gauge is available upon request.</p>



- 5) Connect the jack plug of the cable connected to the sensor to the connector 1S (Signal Sender) (Fig.2). The cable shown in step 2 can be used or a third wire can be used to be inserted into the connector 3 (or 2) if for the battery the cable 3 has been used - provided on request. An alarm (either visual or acoustic) will can be connected as long as the maximum voltage is 5VDC and the voltage is less than 20mA. To connect alarms with a voltage higher than 5VDC, it is necessary to use a relay with equivalent 5VDC pliable device with the white wire acting as the alarm switch (+5VDC max current 20 mA) and the black wire as negative.
- 7) Connect the jack plug to the connector 2 or 3.
- 8) The connection between two or more gauges is called a series connection through connector 2 or 3. It is brought to others through some bridge cables provided on request (connect the free connector 2 or 3 of the other gauge). To obtain a better indication precision, it is recommended to connect the gauge which is programmed as a voltmeter as the first instrument of the series directly to the cable coming from the battery (gauge 1) and thus leaving the 1S connector (Signal sender) disconnected. It is recommended to close the free connector with the dedicated plug which is supplied with the gauge. The above diagram shows a general sequence of connection of the gauges.
- 9) RECONNECT THE GAUGE ONLY AFTER HAVING DISCONNECTED THE BATTERY BECAUSE THE GAUGE COULD BE OTHERWISE IRREPARABLY DAMAGED.
- 10) Reconnect the battery and proceed to the next Start Up phase.

IMPORTANT: Close all the open/free terminals with the dedicated plugs.



The software can be downloaded in the .zfp format and then it should be unzipped into a temporary folder. The gauge can be connected to the PC via a programming interface SEM code EPFS0003 or EPFS0051 (SERIAL COMMUNICATION) or code EPFS0010 (USB interface).