



Operating Manual

EN

RS MH 5130 + RS MSD 2,5 BAE

RS MH 5130 + RS MSD 10 BAE

RS MH 5130 + RS MSD 350 MR

RS MH 5130 + RS MSD 10 BRE

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1 General Note

Read this document carefully and get used to the operation of the device before you use it. Keep this document within easy reach near the device for consulting in case of doubt.

Mounting, start-up, operating, maintenance and removing from operation must be done by qualified, specially trained staff that have carefully read and understood this manual before starting any work.

The manufacturer will assume no liability or warranty in case of usage for other purpose than the intended one, ignoring this manual, operating by unqualified staff as well as unauthorized modifications to the device. The manufacturer is not liable for any costs or damages incurred at the user or third parties because of the usage or application of this device, in particular in case of improper use of the device, misuse or malfunction of the connection or of the device.

The manufacturer is not liable for misprints.

2 Safety

2.1 Intended Use

This device must only be used with one pressure sensors of the typ "RS MSD ..." or "RS MSDE" with connection cable RS MSD-K51.

Other usages are not intended.

The safety requirements (see below) have to be observed.

The device must be used only according to its intended purpose and under suitable conditions.

Use the device carefully and according to its technical data (do not throw it, strike it, ...)

Protect the device from dirt.

2.2 Safety signs and symbols

Warnings are labeled in this document with the followings signs:



Caution! This symbol warns of imminent danger, death, serious injuries and significant damage to property at non-observance.



Attention! This symbol warns of possible dangers or dangerous situations which can provoke damage to the device or environment at non-observance.



Note! This symbol point out processes which can indirectly influence operation or provoke unforeseen reactions at non-observance.

2.3 Safety guidelines

This device has been designed and tested in accordance with the safety regulations for electronic devices. However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under "Specification".

If the device is transported from a cold to a warm environment condensation may cause in a failure of the function. In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.

2. If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.



Operator safety may be a risk if:

- there is visible damage to the device
- the device is not working as specified
- the device has been stored under unsuitable conditions for a longer time.

In case of doubt, please return device to manufacturer for repair or maintenance.

3. When connecting the device to other devices the connection has to be designed most thoroughly as internal connections in third-party devices (e.g. connection GND with protective earth) may lead to undesired voltage potentials that can lead to malfunctions or destroying of the device and the connected devices.



This device must not be run with a defective or damaged power supply unit.
Danger to life due to electrical shock!

4. Do not use these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury or material damage.
Failure to comply with these instructions could result in death or serious injury and material damage.



5. This device must not be used at potentially explosive areas! The usage of this device at potentially explosive areas increases danger of deflagration, explosion or fire due to sparking.



6. This device is not constructed for use in medical applications.



3 Product Specification

3.1 Scope of supply

- device with 2 AAA batteries
- Operation manual
- Pressure sensor

3.2 Operation and maintenance advice

1. Battery operation:

If 'bAt' is shown in the lower display the battery has been used up and needs to be replaced. However, the device will operate correctly for a certain time. If 'bAt' is shown in the upper display the voltage is too low to operate the device; the battery has been completely used up. Battery change: p.r.t. chapter 0.



The battery has to be taken out, when storing device above 50 °C.
We recommend taking out battery if device is not used for a longer period of time.
After recommissioning the real-time clock has to be set again.

2. Mains operation



The output voltage of a connected power supply unit has to be between 4.5 and 5.5 V DC.
Don't apply overvoltage!

3. Treat device and sensor carefully. Use only in accordance with above specification. (do not throw, hit against etc.). Protect plug and socket from soiling.

4. Connecting/changing sensors



Use only suitable pressure sensors!
Other sensors may lead to damage to the device and the sensor.

Switch off device before changing the sensor.

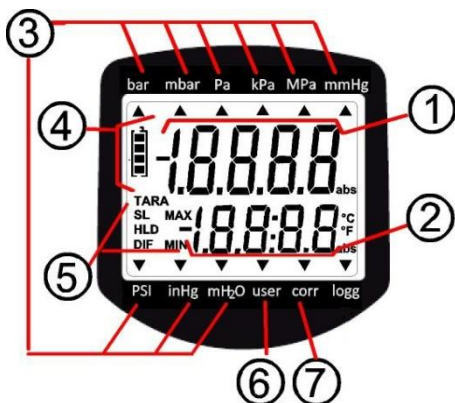
The sensors are coupled to the instrument via bayonet connectors

To connect a sensor, plug in the connector in the right position and then rotate the ribbed ring ½ turn.

To disconnect rotate the ribbed ring ½ turn and then pull out the connector.

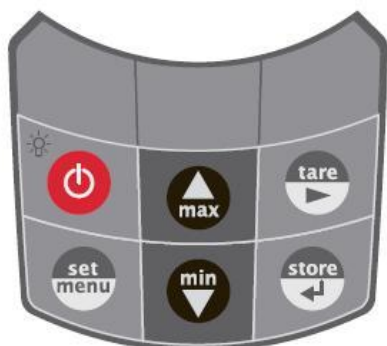
4 Handling

4.1 Display elements



- | | | |
|---|--|---|
| 1 | Main display: | measuring value |
| 2 | Secondary display: | display of minimum / maximum / memorized measuring value |
| 3 | Arrows for selected measuring unit | |
| 4 | Rating of battery status | |
| 5 | Display elements to show minimum / maximum / memorized measuring value as well as tare-function and sea-level-correction | |
| 6 | user arrow: | measuring value is shown in freely adjustable user-unit (please refer to chapter 7.1) |
| 7 | corr arrow: | zero-point or slope correction is active |

4.2 Pushbuttons



On / off key, backlight

press shortly: activate backlight or switch on instrument
 press longer: switch off instrument



set / menu:

press for 2 sec. (menu): invoke configuration menu



min / max:

press shortly: min. or max. value is displayed
 press for 2 sec: the corresponding value is deleted



press shortly: tare-function: display is set to 0. All measuring values are displayed relatively to this set tare-value from now on.

press for 2 sec: deactivate tare-function



store / enter:

hold and save current measuring value ('HLD' is displayed)
 (Set/Menu: confirm settings, return to measuring)

4.3 Connections



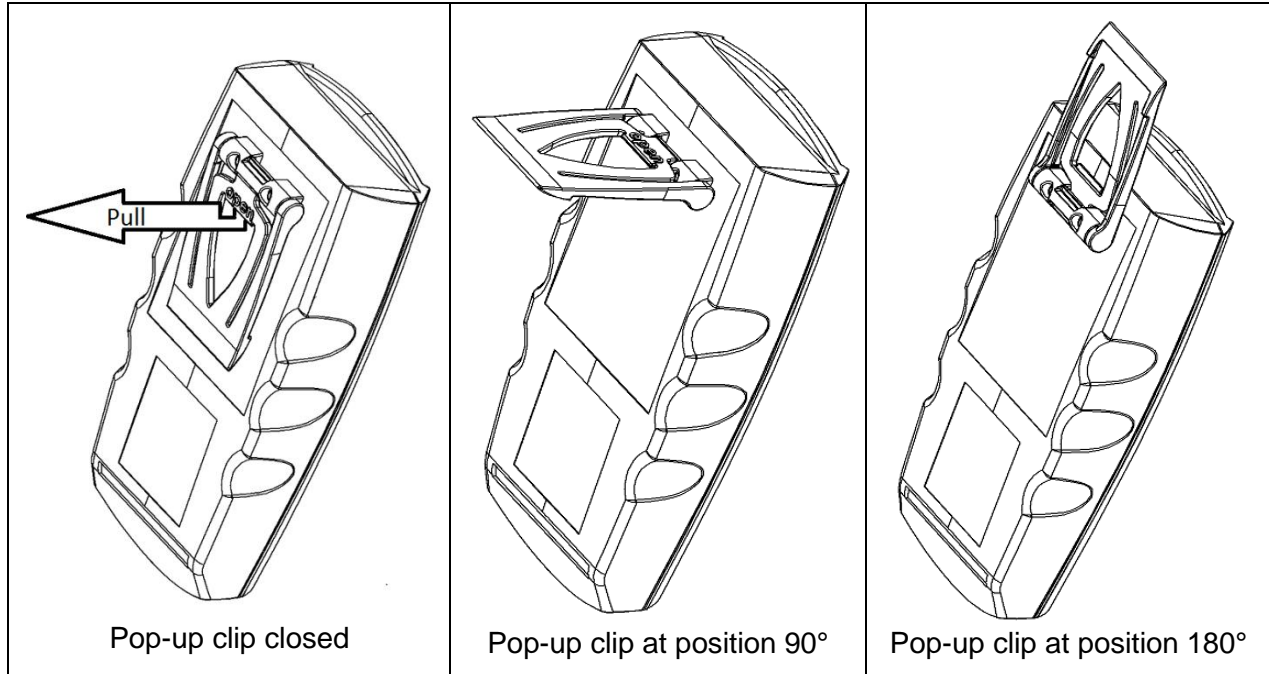
Universal output: interface, power supply (p.r.t. chapter 8)

7-pole bayonet connector: connection for sensor

4.4 Pop-up clip

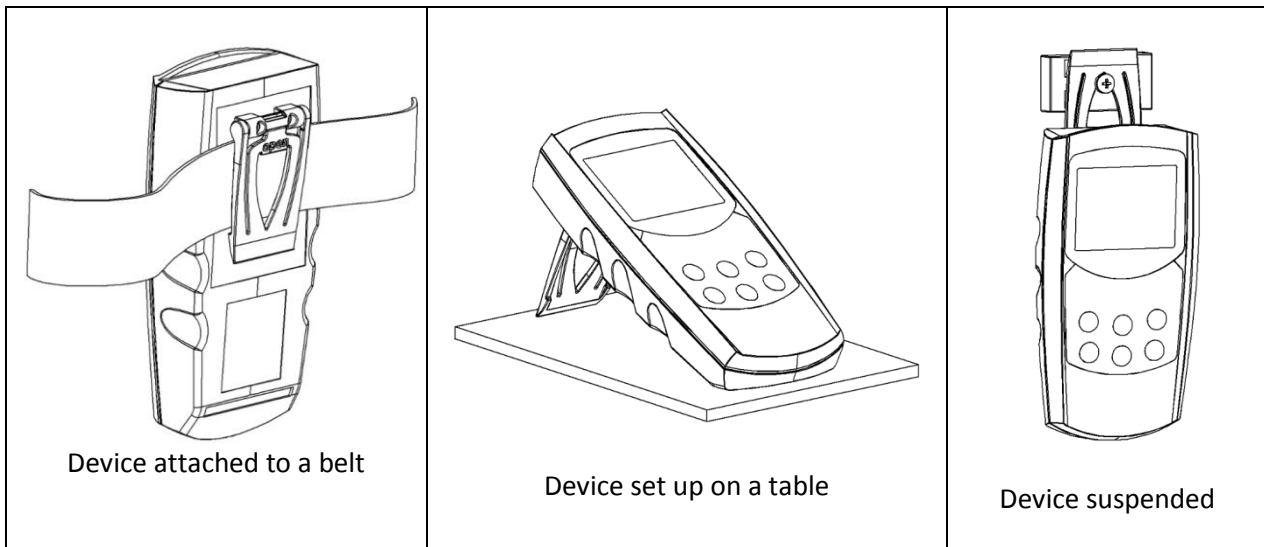
Handling:

- Pull at label “open” in order to swing open the pop-up clip.
- Pull at label “open” again to swing open the pop-up clip further.



Function:

- The device with a closed pop-up clip can be plainly laid onto a table or attached to a belt, etc.
- The device with pop-up clip at position 90° can be set up on a table, etc.
- The device with pop-up clip at position 180° can be suspended from a screw.



5 Start Operation

Connect sensors, turn device on via key.



After segment test the device displays some configuration:

if standard measurement is selected

if fast measurement is selected

if peak value detection is selected

After that the device is ready for measuring.

6 Configuration



Some menu points depend on current device settings.

To change device settings, press “**menu**” for 2 seconds. This will activate the configuration menu (main display: “SEt”). Pressing “**menu**” changes between the menus points, pressing jumps to the referring parameters, which can be selected with key .

The parameters can be changed with or .

Pressing “**menu**” again jumps back to the main configuration menu and saves the settings.

“**enter**” finishes the configuration and returns to standard measuring operation.



Pressing “**menu**” and “**store**” at the same time for more than 2 seconds will reset the device to factory defaults.

If no key is pressed for more than 2 minutes the configuration will be aborted. All changes will not be saved!

Menu	Parameter	Value	Description	
		or		
	Set Configuration: General configurations			
	Unit	Unit: Select measuring unit		**
		Arrow to bar , mbar ...	Measuring value is displayed in corresponding unit, the selectable units depend on connected sensor	
		Arrow to “ user ”	Measuring value is displayed in freely adjustable user-unit	
	base <small>USER</small>	bar, mbar	Unit “user”: base unit	
	dp <small>USER</small>	0000, 000.0,0000“	Unit “user”: decimal point setting (only if user-unit selected)	
	FAÇt <small>USER</small>	-19999...19999	Unit “user”: multiplication factor	
	SL	Sea Level: Sea-level correction		**
		oFF	Sea-level correction off	
		oN	Sea-level correction on (<i>p.r.t. 7.4</i>)	
	ALt,	-2000 ... 9999	Sea-level in [m]	**

	rAtE	Rate: Measuring rate	
		Slo	Slow measuring rate (4 Hz filtered, low power consumption)
		FASt	Fast measuring rate, filtered (1000 Hz)
		P.dEt	Peak detection: fast measuring rate, unfiltered (1000 Hz)
	t.AvG	Averaging Filter	
		1 ... 120	Averaging period in seconds
		oFF	Averaging function is deactivated
	P.oFF	Auto Power-Off: Select power-off delay	
		1 ... 120	Power-off delay in minutes. Device will be automatically switched off as soon as this time has elapsed if no key is pressed/no interface communication takes place.
		oFF	Automatic power-off function deactivated (continuous operation)
	LiTE	Background illumination	
		oFF	Illumination deactivated
5 ... 120		Turn off illumination after 5 ... 120s (factory settings: 5 s)	
on		Illumination always on	
SEt Out	Set Output: Universal output adjustments		
	oFF	Interface and analog output off	
	SEr:	Serial interface activated	
Adr.	01, 11..91	Base address for serial interface communication (only at Out = SEr)	
SEt Corr	Set Corr: Input adjustment		
	OFFS	Zero adjustment/offset of sensors	
		oFF	No zero adjustment of sensors
		Sensor dep. e.g. -5.00..5.00 mbar	The offset of sensor will be displaced by this value to compensate for deviations of the probe or of the measuring device.
	SCAL	Slope adjustment of sensors	
		oFF	No slope adjustment of sensor
-2.000 ... 2.000		The slope of sensor will be changed by this factor [%] to compensate deviations of probe or measuring device	

(**) *Parameter can only be called if corresponding sensor is plugged.*

7 Remarks to Special Features

7.1 Different Pressure Units

Depending on the connected sensors different units can be selected via menu (Unit). The measuring range of the sensors may restrict the choice!

User-Unit

For pressure units, which are not covered by the ones printed on the display, there can be done a manual setting for a "user-defined" unit.

	kg/cm ²	Torr	atm	at
bASE user:	bar	mbar	bar	bar
DP user:	.0000	.0000	.0000	.0000
FAcT user:	1.0197	.7433	0.9869	1.0197



7.2 Different kinds of measuring

Three different kinds of pressure measuring are supported. Two of them (P.dEt and FASt) are working with high measuring frequency of more than 1000 measurings per second.

7.2.1 Standard measuring (slow)

rAtE
SLo

Measuring rate 4 Hz, averaging and filter functions are active.

Application: Measuring of slowly changing or static pressures, e.g. measuring of leakproofness, atmospheric pressure...

Highest accuracy, high noise immunity, low power consumption.

7.2.2 Peak detection (Peak detection)

rAtE
P.dEt

Measuring rate >1000 Hz, the value is displayed unfiltered.

Application with logger function: Measuring of short pressure peaks or fast changing pressures with a resolution of <1 ms. The cyclic logger function records the arithmetic mean value, the highest and the lowest peak of the referring time interval.

Attention: higher power consumption, measuring is sensitive to noise (EMI, ...).



Measuring is sensitive to noise (EMI, ...) and higher power consumption.

7.2.3 Fast filtered measuring (fast)

rAtE
FASt

Measuring rate >1000 Hz, but the value is filtered (higher noise immunity than P.dEt, small peaks will be filtered out), apart from that identical behavior like rAtE-P.dEt.

7.3 Water depth / level measurement



Water-proof sensors have to be used for water depth / level measurement.

Select the unit [m] for meters water column (selection mH₂O) in menu "Unit". 10 m water column (=water depth) corresponds roughly 1 bar overpressure.

Measurements can be made e.g. like described below: (for abs. pressure sensors SL has to be deactivated)

- With an abs. pressure sensor: Press 'Tara' when sensor is at ambient air and then bring sensor to the depth to be measured. The display shows now the depth in [m].
- With a rel. pressure sensor: bring tube connection for lower press. in contact to ambient air by means of a tube (no water contact!) and bring the sensor with its open pressure connection for higher pressure to water depth to be measured (display and is compensated for pressure changes in ambient air).

7.4 Sea-level correction for absolute pressure sensors

The device displays the absolute pressure. This is not necessarily the same like the values given by weather stations! The weather stations are displaying the pressure at sea level. Usually the sensor is placed above sea level and therefore the pressure loss resulting from the actual level above sea level has to be considered, if the value at sea level (zero) should be measured! To correct the measuring display, activate the "Sea-Level-Function" (SL, p.r.t. chapter 0, setting is only possible, if an abs. pressure sensor is connected). Then enter the altitude above sea level of the sensor's location in meters (Alti, p.r.t. chapter 6). When activated, the display shows the SL-arrow and the device displays the pressure value at sea level.

7.5 Averaging function



The averaging function concerns the display values (LCD and interface).

The averaging integrates the measuring values during a selectable period of time and then calculates the average display value. It is independent from the selected kind of measuring (slow, fast, peak detect).

As long as not enough values have been collected (i. e. for the selected averaging time) to calculate an average value, the upper display shows “----“, the lower display a ‘countdown‘.

Function of min-/max-value memory during averaging:

- If averaging is activated and slow measuring is selected (rAtE-Slo), the min-/max-value memory refers to the average display value.
- If averaging is activated and fast measuring is selected (rAtE-FASt or P.dEt), the min-/max-value memory refers to the internal measured values (fast peaks can be detected).

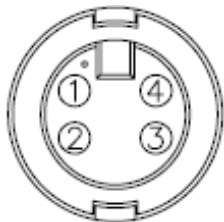
8 Output

The output can be used as serial interface (for optional USB 5100 interface converter).

If the output is not needed, it is strongly recommended to deactivate it (Out oFF) to lower power consumption. This increases battery life time.

If the device is used together with interface adapter USB 5100 the device is supplied from the interface.

Pin assignment:



- 1: external supply +5V, 50 mA
- 2: GND
- 3: TxD/RxD (3.3V Logic)
- 4: not used



Only suitable adaptor cables are permitted (accessories)!

8.1 Interface

The device can be connected to a USB interface of a PC by the electrically isolated interface converter USB 5100 (accessory). The data is transmitted binary-coded and protected against transmission errors by complex safety mechanism (CRC).

The following standard software packages are available:

- **EBS20M / -60M:** 20-/60-channel software for measuring value display
- **GMHKonfig:** Configuration Software (for free on internet)

In case you want to develop your own software we offer a **development package** including:

- a universally applicable Windows functions library ('GMH3x32e.DLL') with documentation, can be used by all 'established' programming languages, suitable for:
Windows XP™, Windows Vista™, Windows 7™
- Programming examples Visual Basic 4.0™, Delphi 1.0™, Testpoint™ etc.

The device has 3 channels:

- Channel 1: current measuring value (sensor 1) and base address
- Channel 2: min peak
- Channel 3: max peak



The measuring-/ alarm- and display range values read back from the interface are always in the selected measurement unit (mbar, bar...)!

9 Input Adjustment

The zero point and slope of each measuring inputs can be adjusted with the parameters offset (“OFFS”) and scale (“SCAL”).

A reasonable adjustment presumes reliable references (e.g. ice water, controlled precision water bath, etc.).

If the inputs are adjusted (i.e. offset and scale are different from default settings) the device will shortly display “Corr” after turned on.

Default setting for offset and scale are ‘off’ = 0.0, i.e. inputs are not changed.

Zero point correction:

$$\text{Displayed value} = \text{measured value} - \text{OFFS}$$

Zero point and slope correction:

$$\text{Displayed value} = (\text{measured value} - \text{OFFS}) * (1 + \text{SCAL} / 100)$$

10 Pressure Connection to the Sensors

The device is designed to be connected to the sensors of the RS MSD ... -series without a new calibration being necessary. Therefore a great variety of replaceable sensors of e.g. -1.999 ... 2.500 mbar relative up to 0 ... 1000 bar absolute pressure can be connected to the device.

Plastic relative pressure sensors (types: RS MSD ... MR, RS MSD ... BR)

- **For measurements of over- or under pressure:**

Pressure sensors with lower as 1 bar relative allow for measurements of under pressure up to the entire over pressure measuring range by re-plugging the tube to pressure port “A”.

Please note that all values are displayed as positive values. No minus sign will be shown.

(Example for RS MSD 350 MR: For tube connection “B” the measuring range covers -199.9 to 350.0 mbar. If you replug to port “A” under pressure measurements down to -350.0 mbar could be carried out with the display showing the value 350.0 (no minus sign).

- **For measurements of pressure differences:**

Connect both plastic tubes with an internal diameter of 4 mm to pressure port “B” and “A”; make sure to apply higher pressure to port “B”.

Plastic absolute pressure sensors (types: RS MSD ... BA)

Connect plastic tube with an inner diameter of 4 mm to pressure port “A”. (Port “B” is not used.)

Stainless steel sensors (types: RS MSD ... MRE, RS MSD ... BRE, RS MSD ... BAE)

For measurements of over-, under- or absolute pressure screw sensor to G1/2" pressure terminal or plug plastic tube to a suitable adapter. Connection to instrument: Use cable RS MSD-K51.

11 Accuracy Check / Adjustment Service

You can send the device to the manufacturer for adjustment and inspection.

Calibration certificate - DKD certificate - official certifications:

If the measuring instrument is supposed to receive a calibration certificate, it has to be sent to the manufacturer (declare test points).

If the device is certificated together with a suitable sensor very high overall accuracies are possible.

Basic settings can only be checked and – if necessary – corrected by the manufacturer.

A calibration protocol is enclosed to the device ex works. This documents the precision reached by the production process.

12 Replacing Batteries

Before changing batteries, please read the following instruction and follow it step by step.

Not following the instruction may cause harm to the instrument or the protection against ingress of water and dust may be lost!
 Avoid unnecessary opening of the instrument!

1. Open the 3 Phillips screws at the backside of the instrument.
2. Lay down the still closed instrument, so that the display side points upwards.
 The lower half of the housing incl. the electronics should be kept lying down during battery change.
 This avoids loss of the sealing rings of the screw holes..
3. Lift upper half of housing. Keep an eye on the six function keys, to be sure not to damage them.
4. Change carefully the two batteries (Type: AAA).
5. Check: Are the 3 sealing rings placed in the housing?
 Is the circumference seal of the upper half sound and clean?
6. Close the housing, taking care that it is positioned correctly, otherwise the sealing may be damaged. Afterwards press the two halves together, lay the instrument with display pointing downwards and screw it together again
Take care to screw only until you feel increasing resistance, higher screwing force does not result in higher water protection!



13 Error and System Messages

Display	Description	What to do?
5Err5 Err0 or Err.9	No sensor connected	Switch off device and connect sensor
	Connected sensor or device defective	If 2nd sensor available, check if device is ok. Return defective device/sensor to manufacturer for repair
	Value extremely out of measuring range	Check: pressure not within sensor range?
No display or confused characters, device does not react on keypress	Battery empty	Replace battery
	Mains operation: wrong voltage or polarity	Check power supply, replace it when necessary
	System error	Disconnect battery and power supplies, wait shortly, then reconnect
	Device defective	Return to manufacturer for repair
Err.1	Measured value above allowable range	Check: pressure not within sensor range? -> measuring value to high!
	Sensor defective	Return to manufacturer for repair
Err.2	Measured value below allowable range	Check: pressure not within sensor range? -> measuring value to low!
	Sensor defective	Return to manufacturer for repair
Err.3	Display range overflow	Check: value above 19999 -> to high to be displayed
Err.4	Display range underflow	Check: value below -19999 (Tara?) -> to low
Er.11	Value could not be calculated	Choose different unit
	Calculation overflow happened	Choose different unit

Err.7	System error	Return to manufacturer for repair
----	Sensor not present / recognised	reconnect sensor, during logging: stop the logger and restart it
	could not calculate value	suitable sensor / unit combination necessary

If “bAt” is flashing, the battery will be exhausted soon. Further measurements are possible for short time. If “bAt” is displayed continuously the battery is ultimately exhausted and has to be replaced. Further measurements aren’t possible any more.

14 Reshipment und Disposal

14.1 Reshipment



All devices returned to the manufacturer have to be free of any residual of measuring media and/or other hazardous substances. Measuring residuals at housing or sensor may be a risk for persons or environment



Use a adequate transport package for reshipment, especially for fully functional devices. Please make sure that the device is protected in the package by enough packing materials.

14.2 Disposal instructions



Batteries must not be disposed in the regular domestic waste but at the designated collecting points.

The device must not be disposed in the unsorted municipal waste! Send the device directly to us (sufficiently stamped), if it should be disposed. We will dispose the device appropriate and environmentally sound.

WEEE-Reg.-Nr.: WEE/GF0002ZR

15 Manufacturer / distributor

RS Components Limited

Birchington Road
Corby
Northamptonshire
NN17 9RS

16 Specifications

Display range	maximal -19999...19999 digit, depends on used sensor	
Number of channels	1	
Suitable probes	RS MSD ... and RS MSDE sensors with connection cable RS MSD-K51	
Available ranges / resolutions	ranging from -1.999 ... 2.500 mbar / 0.001 mbar to 0.0 ... 1000 bar / 1 bar	
Connections	sensor	7-pole bayonet connector
	output / ext. supply	4-pole connector for serial interface and supply (optional USB Adapter USB 5100)
Display units	depends on meas. range selection (depends on connected sensor): mbar, bar, Pa, kPa, MPa, mmHg, inHg, PSI, mH ₂ O	
User unit	freely adjustable	
Measuring frequency	4 / s or 1000 / s	
Accuracy	± 0.1 % FS ± 1 digit	
Working conditions	-25 ... 50 °C; 0 ... 95 %RH (non condensing)	
Storage conditions	-25 ... 70 °C	
Display	4 ½ digit 7-segment display, illuminated (white)	
Correction function	offset / slope (via menu), if offset/slope value not equal zero: "corr" is displayed	
Additional functions	min- / max- / hold- function	
Averaging	adjustable, 1 ... 120 seconds	
Housing	protection class	IP65 and IP67
	dimensions L*W*H [mm]	160 * 86 * 37 incl. protective covering
	weight	approx. 250 g incl. batteries and protective covering
Power supply		2*AAA-batteries (included in delivery)
	current consumption	2.0 mA (at Out = Off, equivalent to 500 h), illumination ~10mA (turns off automatically)
Battery-change indicator	automatically if battery exhausted "bAt", warning "bAt" flashing	
Auto-off-function	Device will be automatically switched off if no key is pressed/no interface communication takes place for the time of the power-off delay. The power-off delay can be set to values between 1 and 120 min.; it can be completely deactivated.	
Directives / standards	<p>The instruments confirm to following European Directives:</p> <p>2014/30/EU EMC Directive 2011/65/EU RoHS</p> <p>Applied harmonized standards:</p> <p>EN 61326-1 : 2013 emissions level: class B emi immunity according to table 3 and A.1 Additional fault: <1%</p> <p>EN 50581 : 2012</p>	



17 Pressure sensors

17.1 Intended use

The pressure sensors are designed for the connection to an hand-held instrument of the following types:

RS MH 5130

The sensors have following application areas:

 <p>Design type = st. steel</p> <ul style="list-style-type: none"> • air, aggressive gases • water, aggressive media, etc. 	 <p>Design type = plastic</p> <ul style="list-style-type: none"> • air • non-corrosive, non-ionising gases
---	--

17.2 General

Read through this document attentively and make yourself familiar to the of the device before you use it. Keep this document in a ready-to-hand way in order to be able to look up in the case of doubt.

17.3 Operating and Maintenance Advice

- a.) You must only use the sensor with suitable devices!
Usage of other devices may result in destruction of sensor and device.
- b) Treat sensor and device carefully. Use only in accordance with above specification. (do not throw, hit against etc.).
Protect plug from soiling.
- c) To disconnect pressure sensor adapter cable from the device do not pull at the cable but at the plug (to open lock).
When connecting the sensor make sure that arrows are pointing upwards and that plug is entered into device socket centrally. Do not twist plug when entering socket.
If plug is entered correctly, it will slide in smoothly
If plug is twisted or entered incorrectly the connecting pins of the plug can be spoilt by bending or broken
=> Plug can no longer be used and connecting cable needs to be replaced.
- d) **Standard (plastic) pressure sensors:**
Be careful when mounting tubes to the pressure ports!
Only press tubes on port in straight direction – avoid side forces to the ports, because these may break the port.
Only use plastic tubes with inner diameter of 4 mm, e.g. 6/4 (Ø 6 mm outside / Ø 4 mm inside).
Connection diagram for sensor tube connection:
For measurements of over pressure (relative pressure sensor):
- Connect plastic tube with internal dia of 4 mm to cable gland "B".
Connection "A" will not be used!

For measurements of pressure differences (relative pressure sensor):

- Connect both plastic tubes with an internal dia of 4 mm to cable gland "B" and "A"; make sure to apply higher pressure to connection "B"

For measurements of absolute pressure (absolute pressure sensor):

- Connect plastic tube with an internal dia of 4 mm to cable gland "A". (Cable gland "B" is not used.)

e) St. steel pressure sensor:

Caution: The pressure compensation hole has to be kept clean! It is placed at the back part of the housing.

Do not cover with stickers or similar things!

Instructions for mounting:

- When mounting the instrument, ensure that the sealing faces of the instrument and the measuring point are clean and undamaged.
- Screw in or unscrew the instrument only via the flats using a suitable tool (fixed spanner, wrench size 27mm) and the prescribed torque. The appropriate torque depends on the dimension of the pressure connection and on the sealing element used (form/material).
A maximum torque of 50 Nm must not be exceeded. Do not use the case as working surface for screwing in or unscrewing the instrument.
- When screwing the transmitter in, ensure that the threads are not jammed.
- As described in the installation example the sealing must be made at the face surface of the pressure connection.



17.4 General Safety requirements

This device has been designed and tested in accordance with the safety regulations for electronic devices. However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under "Specification".
2. If the device is transported from a cold to a warm environment condensation may result in a failure of the device.
In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.

3. If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.

Operator safety may be at risk if:

- there is visible damage to the device.
- the device is not working as specified.
- the device has been stored under unsuitable conditions for a longer time.

In case of doubt, please return device to manufacturer for repair or maintenance.

4. **Warning:** Do not use this product as safety or emergency stop device or in any other application where failure of the product could result in personal injury or material damage.
Failure to comply with these instructions could result in death or serious injury and material damage.

- 5. Any changes or repair of the device is not allowed.**
Please return device to manufacturer for repair or maintenance.

17.5 Disposal



This device must not be disposed as "residual waste".
To dispose this device, please send it directly to us (adequately stamped).
We will dispose it appropriately and environmentally friendly

18 Specification plastic sensors

18.1 Specifications (RS MSD ... MR):

RS MSD 350 MR

Measuring range:	-199,9 ... 350,0 mbar
Overload:	max. 1 bar
Resolution:	0,1 mbar
Accuracy: (typ. values)	±0,2 %FS (hysteresis and linearity) ±0,4 %FS (temperature influence from 0-50°C)
Sensor:	piezoresistive relative pressure sensor. For over-/under- and difference pressure measuring. Suitable for air and/or non-corrosive and non-ionising gas. <i>If sensor is to be used in water, use air cushion!</i>
Pressure connection:	2 nylon connecting pins for tubes 6 x 1 mm (6 mm outer Ø, 4mm internal Ø)
Electronics:	PC-board with amplifier and data memory for sensor data (measuring data, calibration etc.) integrated in sensor housing.
Nominal temperature:	25 °C
Operating conditions:	0 ... 50 °C, 0 ... 95 %RH (non condensing)
Storage temperature:	-25 ... +70 °C
Housing:	68 x 32,5 x 15 mm (L x W X D) without connection pin; 68 x 32,5 x 27,5 mm incl. connection pin. ABS housing with integrated suspension eye
Device Connection:	1m PVC connection cable, screened with 7-pin bayonet plug.
Weight:	approx. 82 g
Directives / standards:	The sensors confirm to following European Directives: 2014/30/EU EMC Directive 2011/65/EU RoHS Applied harmonized standards: EN 61326-1 : 2013 emissions level: class B emi immunity according to table 3 and A.1 Additional fault: <1% EN 50581 : 2012

19 Specification st. steel sensors

19.1 Specification (RS MSD ... BAE):

	... 2.5 BAE	... 10 BAE
Measuring range:	0 ... 2500 mbar abs.	0 ... 10,00 bar abs.
Overload: (max.)	10 bar abs.	35 bar abs.
Resolution:	1 mbar	0,01 bar

Sensor type: stainless steel absolute pressure sensor.
Suitable for aggressive media, water, etc.

19.2 Specification (RS MSDRE):

	... 10 BRE
Measuring range:	0 ... 10,00 bar rel.
Overload: (max.)	35 bar rel.
Resolution:	0,01 bar

Sensor type: stainless steel relative pressure sensor for overpressure measuring.
Suitable for aggressive media, water, etc.

Caution: The pressure compensation hole at the back part of the housing has to be kept clean!

19.3 Common specifications (RS MSDE):

Accuracy: (typ. values) $\pm 0,2\%$ FS (hysteresis and linearity)
 $\pm 0,4\%$ FS (temperature influence from 0-50°C)

Pressure connection: connections thread G1/4. Key width: 27 mm

Device Connection: M12-plug, for connection cable RS MSD-K51

Electronics: PC-board with amplifier and data memory for sensor data (measuring data, calibration etc.) integrated in sensor housing.

Nominal temperature: 25 °C

Operating conditions: -20 to +70 °C (compensated range: 0 to 70 °C)

Storage temperature: -40 to +80 °C

Housing: made of stainless steel (CrNi steel or Elgiloy®)

Weight: 220 g

IP rating: IP 67 (sensor), IP 54 (plug)

Directives / standards: The sensors confirm to following European Directives:

2014/30/EU EMC Directive

2011/65/EU RoHS

Applied harmonized standards:

EN 61326-1 : 2013 emissions level: class B
emi immunity according to table 3 and A.1
Additional fault: <1%

EN 50581 : 2012

