



Operating Manual

M1 Control Module

Integrated Personal Alert Safety System (PASS)



Order No.: 10205429/00



The Safety Company

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1 Safety Regulations

1.1 Correct Use

The M1 Control Module, in this manual also referred to as device, is a personal monitoring unit that monitors the proper functioning of a respiratory protective device. It displays the current operating data of the respiratory protective device and signals danger conditions (visually and acoustically).

It is imperative that this operating manual be read and observed when using the device. In particular, the safety instructions, as well as the information for the use and operation of the device, must be carefully read and observed. Furthermore, the national regulations applicable in the user's country must be taken into account for a safe use.



WARNING!

This product is supporting life and health. Inappropriate use, maintenance or servicing may affect the function of the device and thereby seriously compromise the user's life.

Before use, the product operability must be verified. The product must not be used if the function test is unsuccessful, it is damaged, a competent servicing/maintenance has not been made, genuine MSA spare parts have not been used.

Alternative use, or use outside this specification will be considered as non-compliance. This also applies especially to unauthorised alterations to the product and to commissioning work that has not been carried out by MSA or authorised persons.

1.2 Liability Information

MSA accepts no liability in cases where the device has been used inappropriately or not as intended. The selection and use of the device are the exclusive responsibility of the individual operator.

Product liability claims, warranties and guarantees made by MSA with respect to the device are voided, if it is not used, serviced or maintained in accordance with the instructions in this manual.

2 Description

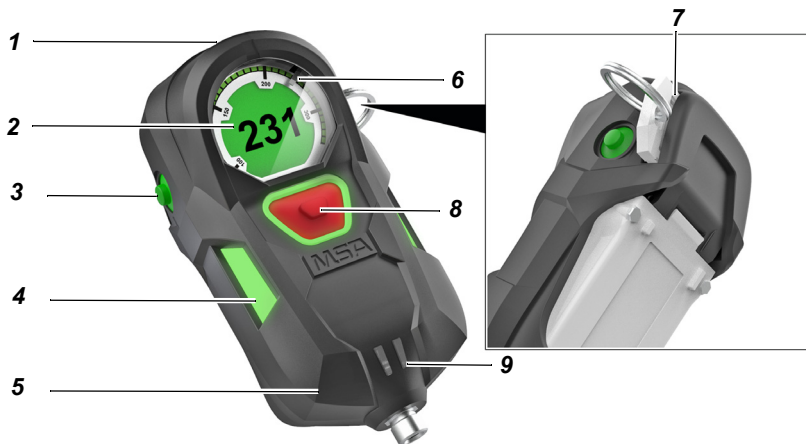


Fig. 1 Overview M1 Control Module

- | | | | |
|---|------------------------------|---|--|
| 1 | RFID Reader | 6 | Mechanical gauge with needle |
| 2 | Integrated display | 7 | Piezo sound generator and safety key port (accessible from both sides) |
| 3 | Mode button (on both sides) | 8 | Alarm button |
| 4 | Buddy lights (on both sides) | 9 | Battery state LEDs |
| 5 | Rubber boot | | |

The M1 Control Module (see Fig. 1) is connected at the end of the high pressure gauge line of an applicable MSA SCBA.

The device monitors the proper functioning of the respiratory protective device and signals danger conditions (visually and acoustically). The digital display shows the current operating data of the respiratory protective device, especially the pressure level which is also visible via the mechanical gauge. In addition, the device automatically triggers an alarm if the apparatus user is not moving and provides the opportunity for manual alarm triggering.

Green, yellow and red LEDs - buddy lights - mounted on both sides of the device indicate the pressure state of the device. In the event of pressure alarm, motionless alarm or a manual alarm activation via button, bright red buddy lights flash highly visible.

The device is equipped with an internal data memory for saving the operational data for more than 30 sessions with up to 20 min working time.

An RFID reader is located in the head of the device to read M1 TAGs for personalizing the device.

3 Installation

Installations can only be done by certified MSA technicians outside of hazardous areas.

4 Use

4.1 Before Use

Before using the device, it is recommended to perform a short check to test for any leakage in the system.

- (1) Open compressed air cylinder.
- (2) When device is started, close compressed air cylinder.
- (3) Double press the alarm button.

300_{bar}



The display turns white, shows the actual pressure and a progress bar.



If a green tick is displayed and the device turns on, the device can be used.



If a red cross is displayed, usage of the device is not recommended. Return the device to a technical expert for check.

4.2 Switching on

- (1) Open compressed air cylinder.
If pressure < 30 bar, the device does not start up.
If pressure ≥ 30 bar, the device starts up.

Electronic component check is performed:

All LEDs are flashing once, an acoustic signal occurs and the display lights up. The device is ready for use.



If red LEDs light up and low battery symbol is displayed, the battery capacity might be low, see section 4.9 "Battery Charging".

4.3 Switching off/into Standby

The device is considered to be "off" when in Standby mode and monitoring the pressure level exclusively. It is only possible to switch into Standby mode in the pressure-free status which is a measured pressure below 15 bar.

To switch into Standby mode:

- (1) Close the valve(s) of the compressed air cylinder(s) and vent the compressed air breathing apparatus via the lung governed demand valve (see operating manual for compressed air breathing apparatus).
An acoustic signal occurs between 60 and 0 bar.
- (2) Push one of the mode buttons twice.
The pressure alarm turns off.
- (3) Push one of the mode buttons twice.
An acoustic signal occurs.
The device turns into Standby mode.

Completely switching off the device is only possible by removing the battery.

4.4 Operating Modes

Mode	Description
Standby Mode	The display is turned off and the device only monitors the pressure level. To leave this mode, pressurize the device.
Reading Mode	This mode is used before device start-up to read in information stored on a TAG, see section 4.11 "Personalization".
Scout Mode	The device is turned on and monitors the proper functioning of the SCBA. The LEDs indicate the battery life and the buddy lights indicate the pressure level in the compressed air cylinder. By pressing one of the green mode buttons, the user can switch between the pressure level and the remaining time display.
Service Mode	This mode can be used in combination with MSA A2 Software to change device settings and read out log memory.

Service Mode

To activate the Service Mode:

- (1) Press one of the green buttons longer than 5 sec.
The Service mode is activated.
- (2) Use the green mode buttons to switch between the separate menu and submenu options.

For more information, see MSA A2 Software.

Menu		
About this M1	M1 Device	Serial Number
		Pressure Sensor S/N
		Hardware
	Main Module	Application
		Firmware Updater
		Bootloader
	Display Module	Application
		Bootloader
		Hardware
	Long Range Radio	Version
		Serial
	Status	System
Date		
Errors		
Main Battery		State of Charge
		Production Date
Service Info	On Pressure	
	Since Last Service	
	Last Service	
Shut down		

4.5 Pressure Status Message

While operating in Scout mode, the device makes an acoustic sound at the following pressure thresholds:

- 1st pressure threshold – Single beep (standard setting: 200 bar)
- 2nd pressure threshold – Double beep (standard setting: 100 bar)
- Low pressure threshold – Double beep (60 bar) repeated until confirmed, see section 4.8 "Confirming Alarms"

These thresholds, except from the low pressure warning, can be changed using the MSA A2 Software in combination with a Bluetooth enabled PC.

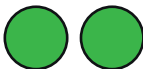

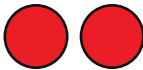
See MSA A2 Software for more details.

Cylinder Pressure Display

The cylinder pressure is displayed via the integrated mechanical gauge and additionally displayed on the integrated display. Current pressure can be read from both, the gauge or display.

The following display thresholds represent the standard setting and, excluding the < 60 bar threshold, can be changed using MSA A2 Software in combination with a Bluetooth enabled PC.

See MSA A2 Software for more details.







Pressure level in compressed air cylinder	Display	Buddy lights
> 100 bar	green	
between 100 bar and > 60 bar	yellow	
< 60 bar	red	

4.6 Display

Illuminating the Display during Operation

- Lift up the device over an angle of 45°.
The display turns on.

Display Symbols

Symbol	Description
	Bluetooth connection active
	Radio connection active
	Battery full
	Battery half empty
	Battery empty
	Safety key inserted

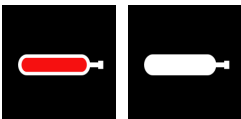
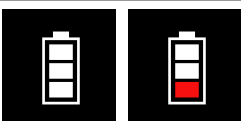
4.7 Initiating Manual Alarm Calls during Use







The full alarm can be triggered manually by the user. This can be done during use as well as in Standby mode and even without any pressure in the system.

Initiating a manual alarm:

- Press the manual alarm button until the alarm sounds and buddy lights are turned on.
The device is activated in full alarm.

Alarm States and Indication Display

Alarm	Display View	Display and Buddy Lights	Acoustic
1st threshold		Display is lighted green, Buddy lights are blinking green every 20 sec	1 Beep
2nd threshold		Display is lighted yellow, Buddy lights are blinking yellow every 6 sec	2 Beep
Low pressure warning (≤ 60 bar)		Display is lighted red, Buddy lights are blinking red	2 Beep
Battery warning		Bottom red	1 Beep repeatedly

Alarm	Display View	Display and Buddy Lights	Acoustic
Motion pre-alarm		Display is lighted red, Buddy lights are blinking red	Increasingly louder consecu- tive variable tones
Motion and manual alarm		Display is lighted red, Buddy lights are blinking red	Distinct pattern
Evacuation alarm			
Withdrawal alarm			
Freefall alarm			
Overhaul error alarm			








The thresholds, except from the low pressure warning, can be changed using the MSA A2 Software in combination with a Bluetooth enabled PC.

See MSA A2 Software for more details.

For confirmation of alarms see section 4.8 "Confirming Alarms".

4.8 Confirming Alarms

The user can confirm an alarm after it is triggered as follows:

Alarm	Confirmation	Display Symbol
1st threshold	Not necessary, since short acoustic signal.	
2nd threshold	Not necessary, since short acoustic signal.	
Low pressure warning (≤ 60 bar)	Confirmation only possible when pressure < 15 bar: Press one of the mode buttons twice.	
	Pneumatic whistle of SCBA cannot be confirmed. Alarm will continuously appear.	
Battery warning	Recharge/exchange batteries – outside of hazardous area only.	
Manual alarm	Press one of the mode buttons twice.	
Motion pre-alarm	Move the device.	
Motion alarm	Press one of the mode buttons twice.	
Evacuation alarm	Press one of the mode buttons twice.	
Withdrawal alarm	Press one of the mode buttons twice.	
Freefall alarm	Press one of the mode buttons twice.	

Once an alarm has been confirmed, the device changes the main display view back to review main information in combination with a reminder symbol below the main information.

4.9 Battery Charging

Charging the Battery



WARNING!

Do not charge the battery in hazardous areas.
Charge battery only with MSA approved charger.



WARNING!

The magnetic field of the battery charger can disturb pacemaker operation and result in serious injury or death.

- Keep pacemaker and similar devices more than 10 cm away from the battery charger.

NOTICE

Charge the battery only in a control module which is turned off.
If a battery is detected as empty by the control module, charge it promptly.
Charge the battery in a temperature range between 5 °C to 40 °C.
Charge the battery completely before first use.
Charge the battery completely if it is stored for more than 2 months.

Charging the battery within the device

- (1) Connect the power supply to the power outlet and to the charging adapter.
- (2) Connect the charging adapter on the back of the battery pack.
 - a) Make sure the charging adapter is aligned correctly and the contacts are free of dirt.
Charging is indicated by the green status LED on the front of the device:
Charging: green blinking every 3 sec.
Charging 100%: green blinking every 45 sec.

The battery life of the device is indicated as follows:

Battery is OK	The device starts in Scout mode. The battery state LED blinks green for 100 ms every 45 seconds.
	In Standby mode: The battery state LED blinks red for 100 ms every 30 seconds. The battery must be recharged or exchanged.
	During start-up:
Battery is empty	The device does not start properly. The buddy lights and the battery state LED lighten up red, display shows battery alarm icon and an acoustic signal sounds. The battery must be recharged or exchanged.
	If the device does not start even if a battery is connected, the battery must be recharged or exchanged.

4.10 Using a Safety Key

The device can be used with a safety key (Part Number 10186697).

Activation and Deactivation of Motion Detection

The device automatically detects if a key is placed in the safety key port.

If a key is detected during start-up, the motion detection is deactivated and can be activated by removing the key.

To deactivate Motion Detection:

- (1) Before start-up, push the key in the safety key port of the device.
Motion Detection is deactivated.
All warnings and alarm sounds are deactivated.

To activate Motion Detection:

- (1) Remove the key from the safety key port of the device.
Removal is confirmed with a single sound signal.
Motion Detection is activated.
All warnings and alarm sounds are activated.

Muting Alarms during Rapid Intervention Team (RIT) Missions

The key can be used during RIT missions to mute device alarms.

- (1) In alarm state, push the key in the safety key port of the device.
Active alarms are muted.
Pressure warnings and pressure alarm sounds will still occur.

4.11 Personalization

In the Reading mode, the device can be personalized with an M1 TAG to support:

- User name
- Team information
- Preferred Base ID

To activate the Reading Mode:

- (1) In Standby mode, press both green mode buttons until the Reading mode is started.
The display shows a progress bar to indicate the reading time slot.
- (2) Place an M1 Tag in front of the RFID reader.
Successful reading: display shows the read information or positive reading icon depending on read information.
Non successful reading: sound and an error symbol occur.

Tags can be created using the M1 TAG programming kit (Part Number 10199159) in combination with the MSA A2 Software. See A2 Software manual for detailed description.

4.12 Bluetooth® Connection

Reading out the Device using a Bluetooth enabled PC

It is possible to read out the data from the M1 Control Module. Settings can be changed to a certain extent and copied back to the device. The device can be read out while the Service mode is active and a Bluetooth connection is enabled. This can be done after the MSA A2 Software is installed on the PC. See MSA A2 Software manual.

The device can be paired via Bluetooth with other supported portable devices, e.g. ALTAIR 5X.

For information on supported gas detectors and sensors see relevant reference sheet.

For pairing instructions see operating manual of the relevant gas detector.

To enable Bluetooth functionality with MSA gas detectors (described for the ALTAIR 5X)

- (1) Power on the MSA gas detector per the device instructions.
- (2) Wait for the sensor warm-up phase to complete.
Due to the device calibration and start up times, MSA recommends powering on the gas detector device first. Allow the gas detector to completely start up before moving on to the next step.
The device is ready for pairing once the Blue LED begins to blink quickly.
- (3) Open compressed air cylinder. Wait until device has started up completely and is ready for use.
- (4) Activate Reading mode of the M1 Control Module:
 - a) Press both green mode buttons until the Reading mode is started.



- (5) Place the RFID chip of the gas detector onto the RFID reader of the M1 Control Module.
 - a) The gas detector RFID chip location differs depending on which model is in use.
 - b) The ALTAIR 5X RFID tag is located under the MSA logo on the front of the device.
A green RFID icon will display on the M1 Control Module.



- (6) Accept the pairing request when it is displayed on the gas detector.
The random number appearing below the pairing request is not needed and can be ignored.



- (7) The gas detector is now successfully paired to the M1 Control Module.
A successful Bluetooth wireless connection will result in a slow blinking BLUE LED on the ALTAIR 5X and a blue Bluetooth icon on the M1 Control Module display.
If the pairing process is unsuccessful, there will be no slow blinking LED on the gas detector and the steps above will need to be repeated.

5 Cleaning and Maintenance

5.1 Cleaning

 **WARNING!**

Do not use any organic cleaning material for the cleaning of the individual components, such as nitro thinners, alcohol, white spirit, petrol etc.

NOTICE

The device shall not be removed from pneumatics and needs to be pressurized > 60 bar during (hand) washing. Otherwise, ingress of water may damage the system or any components.

The device components should be cleaned after each operation and, if badly contaminated, with a damp cloth (tepid water) and a little detergent.

For mechanical washing, follow detailed washing instructions for self-contained breathing apparatus and lung governed demand valves.

The battery should always be connected to the device and the battery U-clip should be in the device. Use the safety key to mute alarms.

5.2 Maintenance

The device is largely maintenance-free. It is recommended that the device is subject to regular visual inspections to check whether there are any faults or damage.

If there are any faults, the device must be replaced. The device must not be repaired by the user. Repairs must only be carried out by the manufacturer or by a repair service authorized by the manufacturer.

Maintenance and Test Schedules

Type of work	After use	Every 10 years
Cleaning	X	
Recommended basic overhaul by manufacturer		X

Follow the SCBA guidelines for testing and maintenance.

Replacing the Battery

Due to storage and delivery times, it might be necessary to exchange batteries before putting the device into first service.

The charging status of the batteries is monitored by the device. Low battery conditions can be recognised by the user, see section 4.9 "Battery Charging".

Use approved batteries only.

The operational time might vary depending on ambient conditions and usage.

 **WARNING!**

Remove battery if device is stored for more than six months.

Never change batteries in hazardous areas.



WARNING!

Avoid short circuits between the electronic contacts of the battery pack.

Never use or charge batteries which are visibly damaged.



WARNING!

Only use fully charged batteries. Do not use batteries that trigger a battery alarm. Otherwise, the full functionality of the device is not ensured.

NOTICE

Do not damage the battery. Be especially cautious with the exposed battery contacts.

Avoid condensed water on the inner electronic contacts of the battery pack.

Clean the inner electronic contacts only dry without the help of chemical cleaning compounds.

Otherwise, the full functionality of the device is not ensured.

Exchanging the battery

- (1) Remove U-clip from housing completely.
- (2) Pull battery carefully out of its compartment by lifting the exposed end.
- (3) Move battery out of the rubber boot.
- (4) Slide new battery underneath the rubber boot.
- (5) Push the exposed battery end down towards the device.
- (6) Push U-clip completely into housing.

Rubber Boot Exchange

The rubber boot must be exchanged from authorized workshop personnel only.

If the device is removed and reattached to the SCBA, the SCBA has to be tested following the SCBA testing guidelines.

6 Troubleshooting

Error	Remedy
Battery communication error: The error code 0333 is shown on the display.	If the error occurs during start-up, remove and reinsert battery. If the error code still shows, replace the battery.
Any other error	Usage of the device is not recommended. Return device to an MSA service center.

7 Technical Data

High pressure	:	200 bar resp. 300 bar
Operating	:	-30 °C to +60 °C
Storage	:	0 °C to +40 °C
Dimensions	:	Length: 156 mm Width: 78 mm Height: 71 mm
Weight	:	350 g (without M1 Battery Pack) 500 g (with M1 Battery Pack)
Ingress protection	:	IP66/67
Bluetooth BR/EDR/LE		
Operation frequency range	:	2402 MHz...2480 MHz
Max. emission power	:	+10 dbm (10 mW)
Near field radio		
Operation frequency range	:	13.553 MHz...13.567 MHz
Max. emission power	:	100 mW

8 Marking/Certification

8.1 Marking

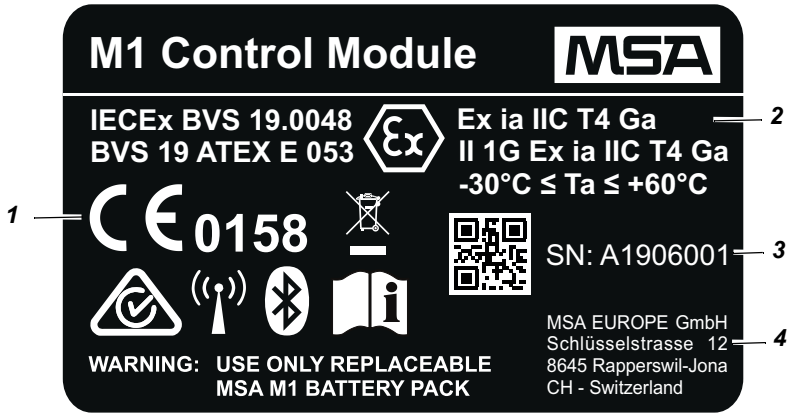


Fig. 2 Example for type label, M1 Control Module (device label may vary)

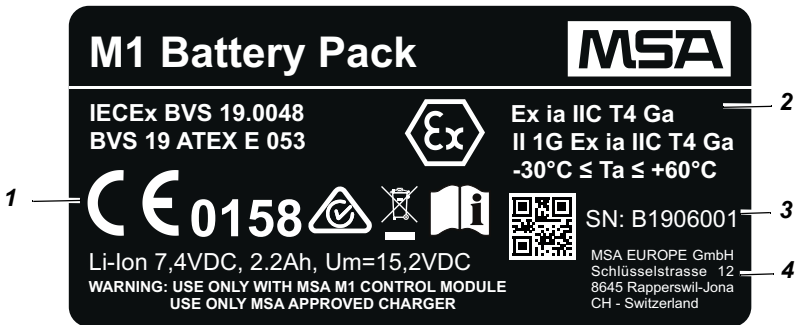



Fig. 3 Example for type label, M1 Battery Pack (device label may vary)

- 1 CE marking
- 2 ATEX information
- 3 Serial number consisting of:
 - Device ID (e.g. "A" for main device, "B" for battery pack etc.)
 - Production year, two digits (e.g. 19)
 - Production week, two digits (e.g. 06)
 - Consecutive number (e.g. 001)
- 4 Address of manufacturer

GB

8.2 Certification

Approvals

	0158
PPE	EN 137:2007, type 2
DEKRA	DEKRA Testing and Certification GmbH Notified Body number: 0158

The Declaration of Conformity can be found under the following link: <https://MSAsafety.com/DoC>

Marking, Certificates and Approvals according to the Directive 2014/34/EU (ATEX) and National Standards

Manufacturer: MSA Europe GmbH
Schlüsselstr. 12
CH - 8645 Rapperswil-Jona


Product: M1 Control Module

EU-Type Examination Certificate: BVS 19 ATEX E 053

Standards: EN IEC 60079-0: 2018,
EN 60079-11: 2012

Marking:  II 1G Ex ia IIC T4 Ga
-30 °C ≤ Ta ≤ +60 °C

Battery: M1 Battery Pack

 II 1G Ex ia IIC T4 Ga
-30 °C ≤ Ta ≤ +60 °C

Special Conditions for Safe Use: None

Quality Assurance Notification: 0158

Year of Manufacture: see Label

Serial No.: see Label

Marking and Certificates according to IECEx

Manufacturer:	MSA Europe GmbH Schlüsselstr. 12 CH - 8645 Rapperswil-Jona
Product:	M1 Control Module
IECEX-Type Examination Certificate:	IECEX BVS 19.0048
Standards:	IEC 60079-0: 2017 IEC 60079-11: 2011+Cor.:2012
Marking:	Ex ia IIC T4 Ga -30 °C ≤ Ta ≤ +60 °C
Battery:	M1 Battery Pack Ex ia IIC T4 Ga -30 °C ≤ Ta ≤ +60 °C
Special Conditions for Safe Use:	None
Quality Assurance Notification:	0158
Year of Manufacture:	see Label
Serial No.:	see Label

9 Ordering Information

Description	Part Number
M1 Control Module - no telemetry	10198774
M1 Control Module - UK telemetry	10198773
M1 Control Module - AUS telemetry	10198772
M1 Control Module - EU telemetry	10198771
M1 Control Module - TAG (5 pcs.)	10199149
M1 Control Module - Programming kit	10199150
M1 Replacement battery	10201874
M1 Battery U-clip (5 pcs.)	10201875
M1 Control Module charger	10201876
M1 Battery charging adapter	10201877
SCBA Safety Key (10 pcs.)	10186697
M1 Control Module rubber boot (2 pcs.)	10196877-SP
M1 Control Module - charging adapter set	10203487

