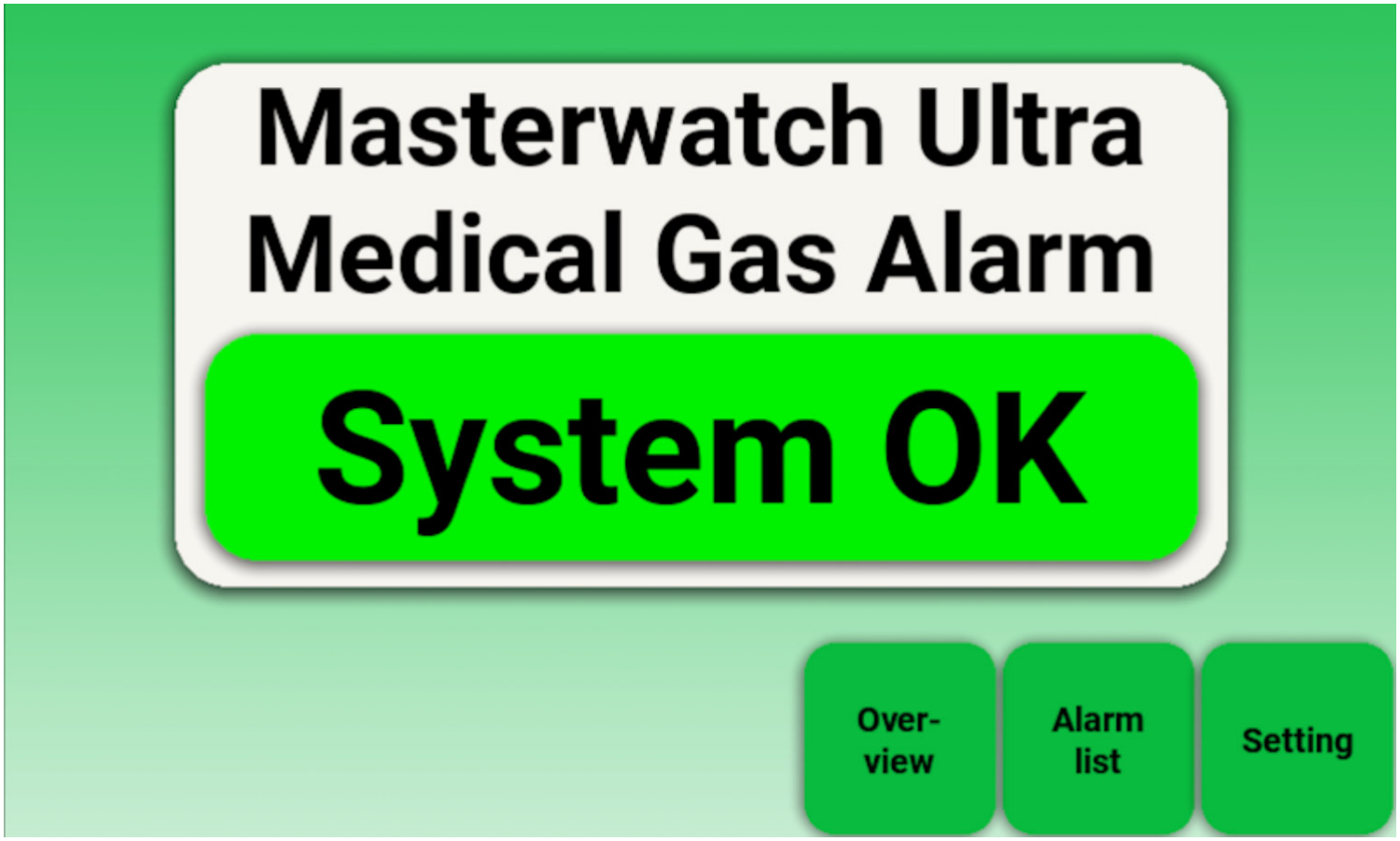
INSTRUCTION FOR USE

Masterwatch Ultra Switch-over station



QMT-tech AB
Amerikavägen 6
39354 Kalmar, Sweden

Telephone
+46(0)480 44 02 00

Website/E-mail
www.qmttech.se
info@qmt3.com

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Thank you for choosing Masterwatch Ultra from QMT-Tech ab

Your new Masterwatch Ultra is an advanced medical device with high-quality components and features for safe operation and high performance.

Read the information for use before installation, commissioning and use so that you are well informed about how it is installed, commissioned and used safely.

Information on use is supplemented with instructions on installation, operation and maintenance for a long and trouble-free use.

We wish you a long, safe and trouble-free use.

This manual describes the Masterwatch Ultra's functions for safe installation, commissioning and use.

The information for use should be read and understood by all intended users.

The following symbols are used in the user manual:

Warning

Note, important information

Read the information for use

Digital copy can be downloaded from qmt3.com

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Intended use:
Masterwatch Ultra is used to monitor the status of a medical switch-over station.
The system is designed to detect abnormal operating conditions, such as leaks or pressure deviations, and to raise an alarm so that action can be taken in good time.

The panel is typically installed in technical rooms next to the switch-over station.
The interface is designed to be clear and easy to use.

The system is an important tool for gas managers and operating engineers, both in daily operation and during troubleshooting or maintenance.

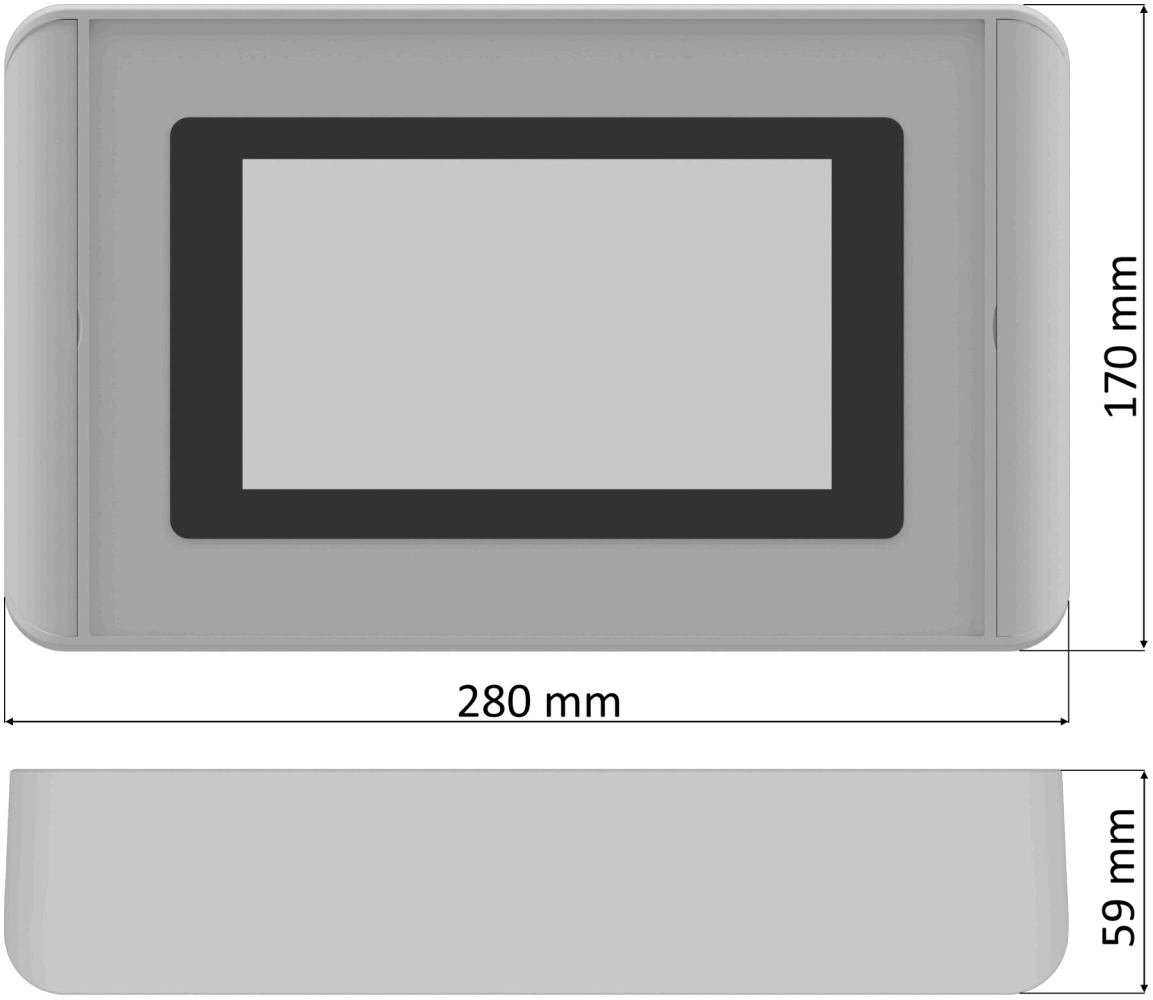
Intended users:
Installation – Installer, pipe fitter, electrician, etc.
Daily use – Healthcare staff and hospital maintenance/operations technicians
Maintenance – Technician from QMT-tech or another technician authorised for the task by QMT-tech AB.

Target group:
Not limited, since medical gases are used in all areas of the hospital.

Indications:
Non-specific since medical gases are used in all areas of the hospital for many different conditions.

Contra indications:
Non-specific since medical gases are used in all areas of the hospital for many different conditions.

The Masterwatch Ultra switch-over station is supplied as a wall-mounted unit.
Which is placed next to the switch-over station.



Each Masterwatch Ultra is intended to monitor a switch-over station, a separate alarm panel is required for each unit to be monitored.

It is recommended that the enclosure be mounted on the wall in direct connection to the switch-over station, for example to the side, to simplify wiring and facilitate operation and service.

The alarm is delivered mounted in a Rolec starCASE SC 172 enclosure with protection class IP66. The enclosure is delivered without pre-drilled holes, as the holes must be adapted to the cabling and the cable glands used in the specific installation.
It is recommended that cabling be introduced via the underside of the enclosure.
Install suitable cable glands for:

- Cables from the switch-over stations pressure transmitters and switches
- Power supply
- Any outgoing alarm signals

To access the terminal strip in the alarm system:

1. Fold away the covers on both sides of the front.
2. Under each cover are two screws - four in total.
3. Loosen all four screws and then remove the front to gain access to the back of the alarm and terminal board.

Note:
Behind the alarm, only a reasonable amount of wiring should be placed to connect the unit. Excess wiring must not be pushed in behind the unit, but should instead be routed elsewhere in a suitable manner.

Forcing too much wiring behind the alarm so that it presses against the display may cause the display to be pushed out or come loose from its mounting.

Note:
During installation, the commissioning lockout is active – meaning that sound, relay outputs and external alarm outputs are temporarily set to the non-alarm state, regardless of pressure status. This allows the alarm to be powered without sounding/triggering alarms in the ward before the gas supply is connected.

When the gas system is pressurised and the alarm is ready to be put into operation, the lockout must be deactivated.
See page 20 under *Commissioning*.

Cable specifications

Cable area	Recommended sleeve length
0,14 - 0,5 mm^2	6mm

Switch-over station equipped with pressure transmitter

Ter-minal	Designation	Signal source	Conductor marking
50	Left 24 VDC	High pressure transmitter left cylinder	White
51	Left 4-20 mA		Brown
52			
53	Right 24 VDC	High pressure transmitter right cylinder	White
54	Right 4-20 mA		Brown
55			
56	Reserve 24 VDC	High pressure transmitter reserve cylinder (optional)	White
57	Reserve 4-20 mA		Brown
58			
59	Nominal supply pressure 24VDC	Nominal supply pressure transmitter	White
60	Nominal supply pressure 4-20 mA		Brown
61			
62	Outlet pressure 24 VDC	Outlet pressure transmitter	White
63	Outlet pressure 4-20 mA		Brown
64			
65			
66			
67			
68			
69			
70			
71			
72			
73			
74			
75			
76			
77			
78			
79			
80	Operating side 3,3 VDC	Pressure switch indicating selected operating side	White
81	Operating side signal		Brown
82			
83			
84	Outlet switch 3,3VDC	Outlet valve limit switch (NC) (optional)	White
85	Outlet switch signal		Brown
86			
87			
88			
89			
90			
91			

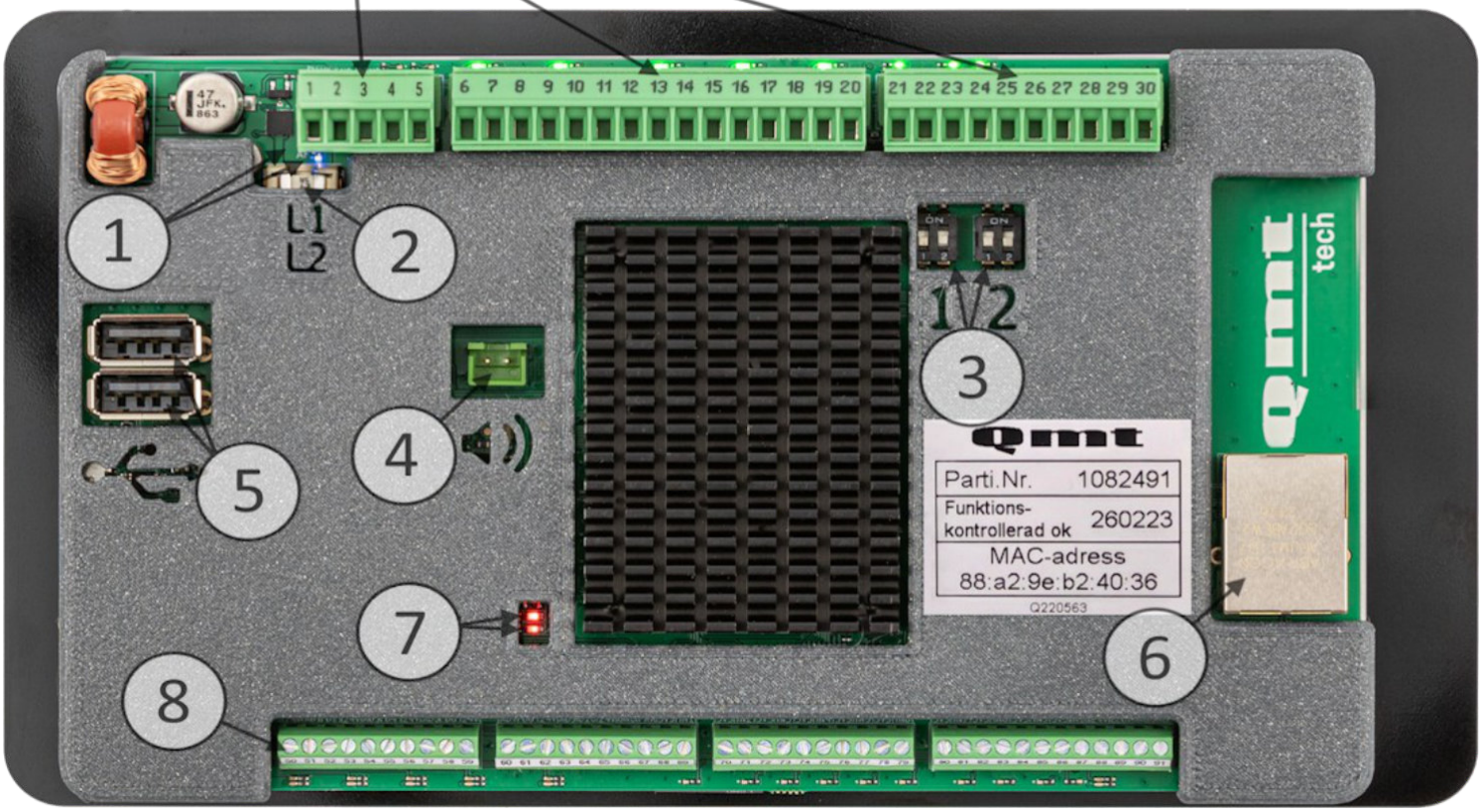
Cable specifications

Cable area	Recommended sleeve length
0,14 - 0,5 mm^2	6mm

Switch-over station equipped with signal gauge

Ter-minal	Designation	Signal source	Conductor marking
50	Left 24 VDC	Signal gauge left cylinder	4
51	Left digital empty cylinder		1
52	Left digital leaking cylinder		2
53	Right 24 VDC	Signal gauge right cylinder	4
54	Right digital empty cylinder		1
55	Right digital leaking cylinder		2
56	Reserve 24 VDC	Signal gauge reserve cylinder (optional)	4
57	Reserve digital empty cylinder		1
58	Reserve digital leaking cylinder		2
59	Nominal supply 24VDC	Nominal supply pressure signal gauge	4
60	Nominal supply digital low pressure		1
61	Nominal supply digital high pressure		2
62	Outlet 24 VDC	Outlet pressure signal gauge	4
63	Outlet digital low pressure		1
64	Outlet digital high pressure		2
65			
66			
67			
68			
69			
70			
71			
72			
73			
74			
75			
76			
77			
78			
79			
80	Operating side 3,3 VDC	Pressure switch indicating selected operating side	White
81	Operating side signal		Brown
82			
83			
84	Outlet switch 3,3VDC	Outlet valve limit switch (NC) (optional)	White
85	Outlet switch signal		Brown
86			
87			
88			
89			
90			
91			

Ferrules are recommended when connecting.
Conductor cross-section: 0.25 mm^2 – 1.5 mm^2
Stripping length: 7 mm



1. Status LEDs – indicate the alarm's power supply.
   (More information on page 12 under *Power supply*)
2. Fuse – protects the PCB against overload.
   (More information on page 12 under *Power supply*)
3. RS-485 termination. (More information on page 12 under *RS-485 termination*)
4. Connector for the alarm loudspeaker.
5. USB port – for updating the alarm and retrieving log files.
6. RJ45 connector – Modbus TCP/IP communication. (More information on page 14)
7. Heartbeat LED – lights and pulses when the system is active
8. Terminal strip – for pressure transmitters and limit switches. The alarm is delivered separately from the switch-over station to be monitored, connection instruction are on page 8 – 9

1. Power supply

To ensure correct function, connect a stabilised 24 VDC power supply as follows:

Terminal	Function	Specification
1	+24 VDC	**IMPORTANT! 24 VDC ±10% (Max ripple ≤ 200 mV)**, **(**More information on page 12 under *Power supply*)
2	0 VDC	
3	Protective earth	

NOTE! Verify the voltage before connection to avoid damage to the unit.

2. UPS

Signals from UPS, if QMT's UPS is used.

Terminal	Function
4	UPS battery operation
5	UPS battery alarm

3. Relay outputs

Relay outputs are used to send alarm signals to nurse call systems, DUC, or other systems.
(More information on page 13 under *Relay outputs*)

Terminal			Function	Max load
6 (NC)	7 (NO)	8 (COM)	Relay 1	4A, 250VAC
9 (NC)	10 (NO)	11 (COM)	Relay 2	4A, 250VAC
12 (NC)	13 (NO)	14 (COM)	Relay 3	4A, 250VAC
15 (NC)	16 (NO)	17 (COM)	Relay 4	4A, 250VAC
18 (NC)	19 (NO)	20 (COM)	Relay 5	4A, 250VAC

4. External alarm outputs

Connections for external control, such as remote alarm basic, remote lamp and remote buzzer.
(More information on page 13 under *External alarm outputs*)

Terminal		Function	Max load
21 (24VDC+)	22 (0V)	Remote alarm basic	1,5A
23 (24VDC+)	25 (0V)	Remote lamp	1,5A
24 (24VDC+)	25 (0V)	Remote buzzer	1,5A

5. Modbus communication

5.1 Modbus RTU (RS-485) to DUC

Communication to a supervisory system via Modbus RTU. (More information on page 14)

Terminal	Function
26	DUC Modbus A
27	DUC Modbus B

5.2 Modbus RTU (RS-485) QMT

Communication with QMT accessories via Modbus RTU. (More information on page 13)

Terminal	Function
28	QMT Modbus A
29	QMT Modbus B
30	GND Modbus DUC/QMT

5.3 Modbus TCP/IP

Connect the network cable to the RJ45 connector by the QMT logo.
(More information on page 14)

Power supply

Masterwatch Ultra must be supplied with 24 VDC ±10% (max rippel ≤200mV).
Only stabilized power supplies may be used.

Using non-stabilized power supply can cause voltage variations and ripple that may damage the unit or negatively affect operation.
During normal operation, current consumption is approximately 350 mA.
Recommended minimum power supply capacity is 1 A (24 W), which provides sufficient margin for safe operation and future options such as remote alarm outputs or other accessories.

> Note: If remote alarm outputs or other accessories are powered from the alarm unit, their current consumption must be included when sizing the power supply and fuse.

The unit has two status LEDs:

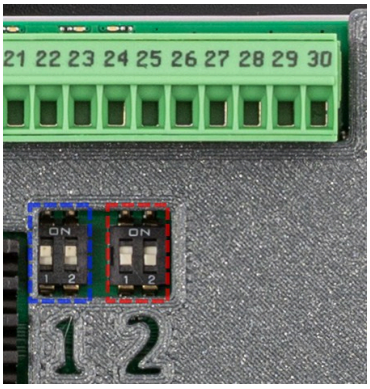
- L1 lights when the unit has supply voltage.
- L2 is located after the internal fuse.

If L1 is on but L2 is off, the PCB fuse (2) has blown. Replace with: Littelfuse SMD fuse, 5 A.

Important: The internal fuse is only a protective device for the device itself.
An external fuse must always be installed upstream, dimensioned for the system total current consumption.

RS-485 termination

Masterwatch Ultra is equipped with two DIP switches for RS-485 termination They are located under the terminals and are marked with numbers **1** (blue frame) and **2** (red frame) in the enclosure.



- Switch 1 (blue): Termination for Modbus RS-485 for other systems (e.g., DUC).

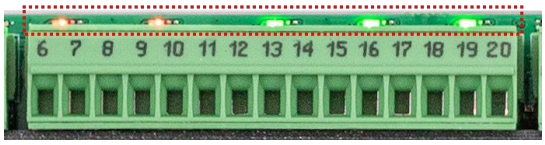
- Switch 2 (red): Termination for Modbus RS-485 to QMT accessories.

Each switch has two positions:
- ON on both 1 and 2 = termination enabled (120 ohm).

- OFF position on both = Termination disabled

Note:
For correct RS-485 communication, only one device at each end of the Modbus bus should be terminated.
Therefore, enable termination on Masterwatch Ultra only if it is located at the end of the Modbus line.

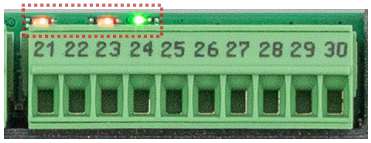
Relay outputs



Each relay has an LED indicating relay status:
Green – Relay is in normal state.
Red – Alarm condition is met and the relay is in alarm state.
Off (no red/green) No power to the alarm; the relay is in alarm state.

Information about relay configuration is found on page 24 under *Relay functions*.

Remote alarm outputs



Each output has an LED indicating output status:
Green – Output is in normal state. No 24 VDC is supplied.
Red – Alarm condition is met; output is in alarm state. 24 VDC is supplied.
Off (no red/green) No power to the alarm; no 24 VDC is supplied.

Each output has a safety function: If an alarm is active and the output supplies 24 VDC, but the current exceeds 1.5 A, the output is automatically shut off.

Note: The LED may still be red even if no 24 VDC is supplied.
To reset the safety function:

1. Reset/acknowledge so the output returns to green.
2. Troubleshoot the wiring and connections. The safety function is most often triggered by a short circuit downstream of the alarm.

Information about output configuration is found on page 25 under *External alarm outputs*.

Modbus RTU (RS-485) QMT

Accessories with Modbus RTU are connected to the Masterwatch Ultra QMT Modbus RTU port according to the table below.The terminal designations in the table apply to the connections on the respective accessory.
Make sure that Modbus A and B are connected correctly; otherwise, communication will not work. A Modbus RTU loop must always be connected in **series (daisy-chain)** and must never be connected in parallel or as a star connection.
The 24 VDC supply voltage for the accessories may be taken from Masterwatch Ultra, provided that the total current consumption does not exceed the rating of the power supply.
Only the QMT accessories listed in the table below may be connected, and only one of each type.

QMT-accessory	+24 VDC	0 VDC	Modbus A	Modbus B
Flowlog outlet	Red wire	Black wire	Green wire	Brown wire
Left cylinder scale	Terminal +	Terminal -	Terminal 1	Terminal 2
Right cylinder scale	Terminal +	Terminal -	Terminal 1	Terminal 2
Gasdetector oxygen	Terminal 1	Terminal 2	Terminal 5	Terminal 6
Gasdetector carbon dioxide	Terminal 1	Terminal 2	Terminal 5	Terminal 6
Room temperature sensor	Terminal +V	Terminal GND	Terminal A	Terminal B

	Information	Alarm class	R/W	Input coil
Alarm bits	Left cylinder empty	B	R	100010
	Left cylinder leaking secondary	A	R	100011
	Left cylinder selected emptying side		R	100012
	Left cylinder pressure sensor sensor error	B	R	100013
	Left low gas weight primary side	B	R	100014
	Left low gas weight secondary side	A	R	100015
	Left wave communication error	B	R	100016
	Right bottle empty	B	R	100020
	Right cylinder leaking secondary	A	R	100021
	Right cylinder selected emptying side		R	100022
	Right high pressure sensor sensor error	B	R	100023
	Right low gas weight primary side	B	R	100024
	Right low gas weight secondary side	A	R	100025
	Right wave communication error	B	R	100026
	Reserv cylinder empty	A	R	100030
	Reserv cylinder leaking secondary	A	R	100031
	Reserv cylinder in operation	A	R	100032
	Reserv high pressure sensor sensor error	B	R	100033
	Nominal supply pressure low	A	R	100040
	Nominal supply pressure high	A	R	100041
	Operating side shift	B	R	100042
	Operating error	A	R	100043
	Outlet pressure low	A	R	100050
	Outlet pressure high	A	R	100051
	Outlet valve closed	A	R	100052
	Unit in operation	B	R	100053
	Flowlog gas flows	B	R	100054
	Communication error with flowlog	B	R	100055
	Gas detector oxygen low level	A	R	100060
	Gas detector oxygen high level	A	R	100061
	Gas detector oxygen needs to be calibrated	B	R	100064
	Gas detector oxygen communication error	B	R	100065
	Gas detector carbon dioxide high level	A	R	100071
	Gas detector carbon dioxide needs to be calibrated	B	R	100074
	Gas detector carbon dioxide communication error	B	R	100075
	Room temperature sensor low temperature	B	R	100080
	Room temperature sensor high temperature	B	R	100081
	Room temperature sensor communication error	B	R	100085
	UPS battery operation	B	R	100090
	UPS battery alarm	B	R	100091
	Internal error	A	R	100092

Alarm bit is high when alarm is active

	Information	Scaling	R/W	Type	Input Registers
Value	Left cylinder pressure	xxx bar	R	uint 16	300010
	Left gas weight	xxxx kg	R	uint 16	300012
	Right cylinder pressure	xxx bar	R	uint 16	300020
	Right gas weight	xxxx kg	R	uint 16	300022
	Resserv cylinder pressure	xxx bar	R	uint 16	300030
	Nominal supply pressure	xx.x bar	R	uint 16	300040
	Outlet pressure	xx.x bar	R	uint 16	300050
	Outlet current flow	xxxx.x l/min	R	uint 32	300052
	Outlet accumulated flow	xxxxxxxx m^3	R	uint 32	300054
	Outlet accumulated flow decimals	.xxx m^3	R	uint 16	300056
	Gas detector oxygen	xx.x%	R	uint 16	300060
	Gas detector carbon dioxide	x.xx%	R	uint 16	300070
	Room temperature sensor	xx.x °C	R	int 16	300080

To read off the entire accumulated flow, both 300054, which is full cubic meters, is used. 300056 are decimals. If the accumulated flow is 3452.245 m^3. Then the value in tag 300054 is 3452 and in tag 300056 is 245

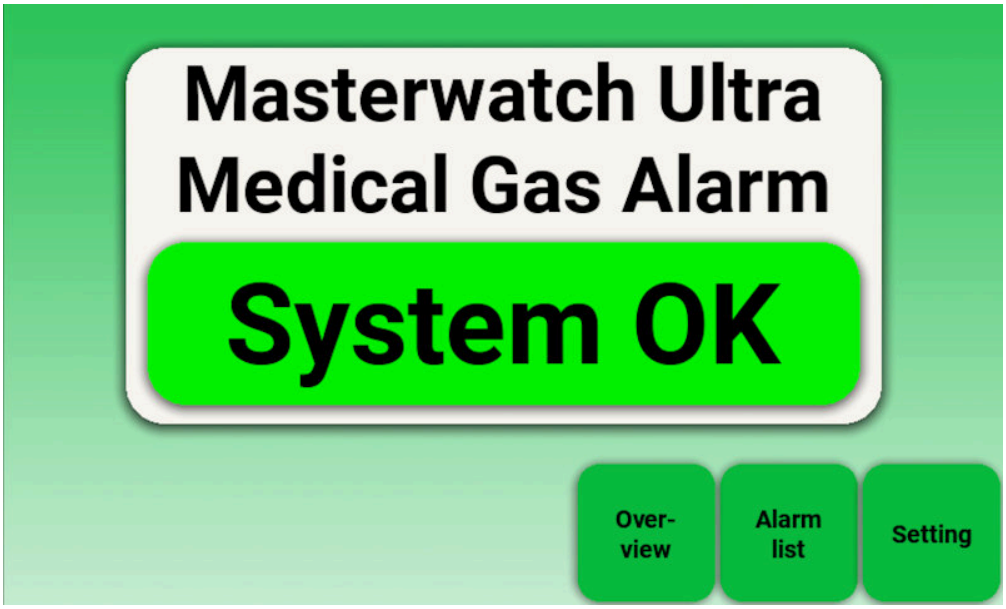
Alarm limits	Empty cylinder	xxx bar	R	uint 16	300110
	Leaking secondary cylinder	xxx bar	R	uint 16	300111
	Low gas weight primary	xxxx kg	R	uint 16	300120
	Low gas weight secondary	xxxx kg	R	uint 16	300121
	Reserv cylinder in operation	xx.x bar	R	uint 16	300130
	Nominal supply pressure low	xx.x bar	R	uint 16	300140
	Nominal supply pressure high	xx.x bar	R	uint 16	300141
	Operating side shift	xx.x bar	R	uint 16	300142
	Outlet pressure low	xx.x bar	R	uint 16	300150
	Outlet pressure high	xx.x bar	R	uint 16	300151
	Flowlog gas flows	xxxx.x l/min	R	uint 16	300152
	Unit in operation	xx.x bar	R	uint 16	300153
	Gas detector oxygen low	xx.x%	R	uint 16	300160
	Gas detector oxygen high	xx.x%	R	uint 16	300161
	Gas detector carbon dioxide high	x.xx %	R	uint 16	300171
	Room temperature sensor low	xx.x °C	R	uint 16	300180
	Room temperature sensor high	xx.x °C	R	uint 16	300181

Recommended polling interval: 0.5 - 1 second.

To read **Left cylinder selected emptying side** use function **Discrete Inputs** tag **00012**
To read **Right cylinder pressure** use function **Input Registers** tag **00020**

Information on how to set communication parameters for Modbus RTU and TCP/IP, as well as which tags are used in the alarm, can be found on pages 26 and 27.

Start screen



The start screen is the view normally shown during normal operation of Masterwatch Ultra.
It provides a quick overview of system status and is always available. If there is no activity within 5 minutes and no alarms are active, the system automatically returns to this view.

System status
The current system status is clearly displayed in the center in a colored box.
During normal operation, the text ”System OK” is shown in green.
If an alarm occurs, both text and color change automatically to indicate the deviation.

Navigation buttons

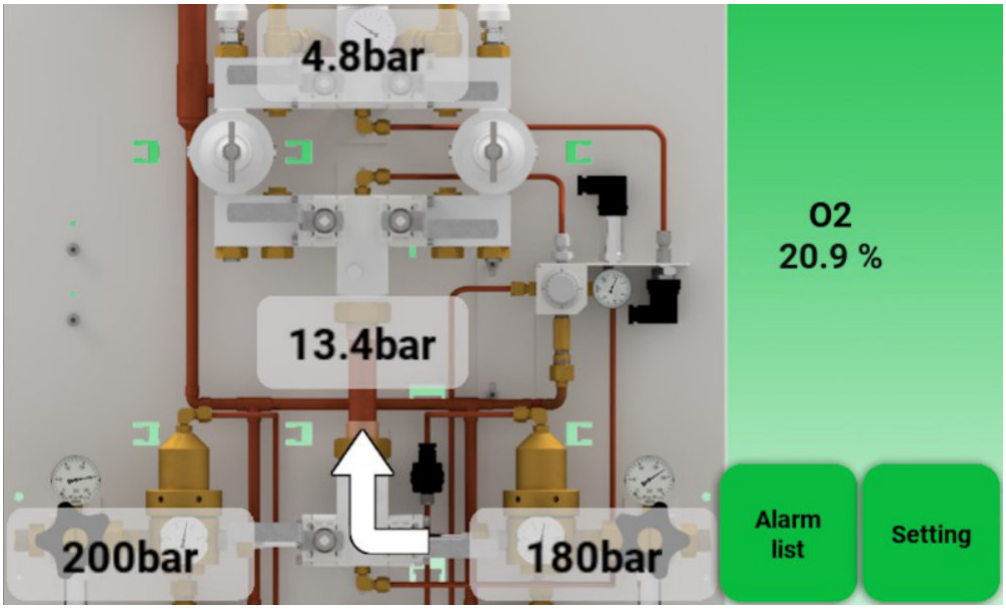
- **Overview** shows the switch-over station that is monitored by the system.
  By pressing an Overview, a window opens with an animated view of the switch-over station, where the pressure status and any alarms from the switch-over station are displayed.

- **Alarm list** shows all current and previous alarms.

- **Settings** provides access to system settings such as relay functions, communication and alarm limits. Access requires a code.

If you are in Overview or the Alarm list, you can quickly return to the start screen by swiping down on the display.

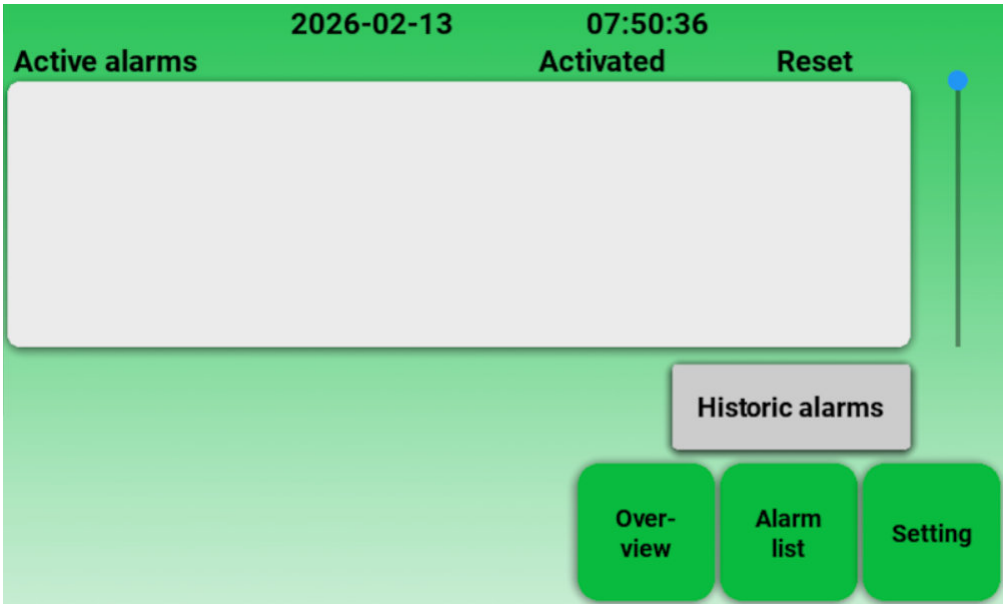
Overview



This view shows the current status of the switch-over station. All gas pressures and other information such as gas weight, temperature or gas detector value are displayed here – provided that these accessories are connected and monitored by the alarm system. In the event of an alarm, alarm texts are displayed together with the current measurement value directly in the view.

(If the pressure is not monitored with an analog pressure transmitter but instead with a signal gauge, the alarm cannot read any analog pressure value. Instead, only the message "OK" is displayed on the screen when the pressure is within acceptable limits.)

Alarm list



The alarm list provides an overview of all active alarms.
It makes it easy to see which alarms are active, when they occurred, and when they were restored provided the alarm has not been acknowledged.

Each entry shows alarm text, date/time of activation, and date/time of restoration (if restored). Restored and acknowledged alarms are automatically removed from the current alarm list.

Press Historical alarms to view earlier alarms, including restored ones. Deleting the historical alarm list requires the settings login code.

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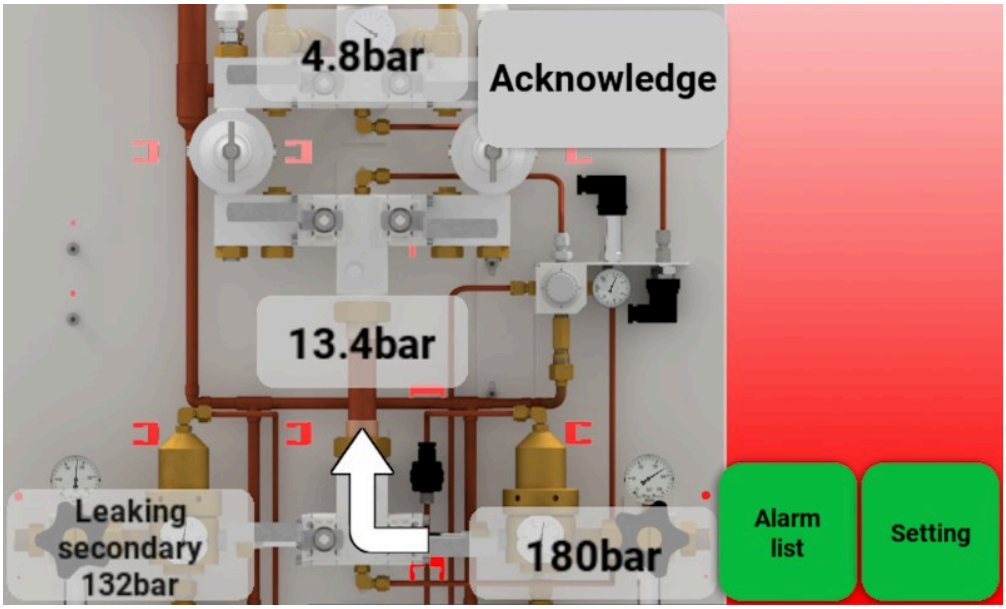
In alarm



When an alarm is activated in Masterwatch Ultra, the screen appearance changes to immediately attract the user's attention.

In the case of a B-alarm (less critical), the background color changes to yellow.
In the case of an A-alarm (critical), the background always changes to red, even if a B-alarm is active at the same time.

- In the event of an alarm, the system will display the overview view, where the user gets a clear graphic image of the status of the switch-over station.
  This remains until the alarm is acknowledged.
- In the view, the pressure value and the alarm text ("Low" or "High") pulsate if there is an incorrect gas pressure.
  (If a signal gauge is used, only "Low" or "High" are displayed because no pressure data is available.)
- If there are other types of alarms, these alarm texts will also be displayed and pulsate.

If an alarm is reset before it is acknowledged, the background returns to green, but the alarm sound continues. In this case, the Alarm List is automatically displayed, so the user immediately sees which alarms have been active but not acknowledged.

Acknowledgement
When the user presses "Acknowledge", the alarm sound is silenced.

Guide for gas cylinder replacement
From software version 2.07, a guide is available to help the user step by step when replacing a gas cylinder. When an empty gas cylinder alarm is active and the alarm is acknowledged, a popup is displayed where the guide can be started.

The guide uses text and video clips to show how the cylinder replacement is carried out safely and correctly.

Commissioning

On delivery, a commissioning lockout is active.
This allows the unit to be powered before the gas supply is connected, without unwanted alarms during installation.

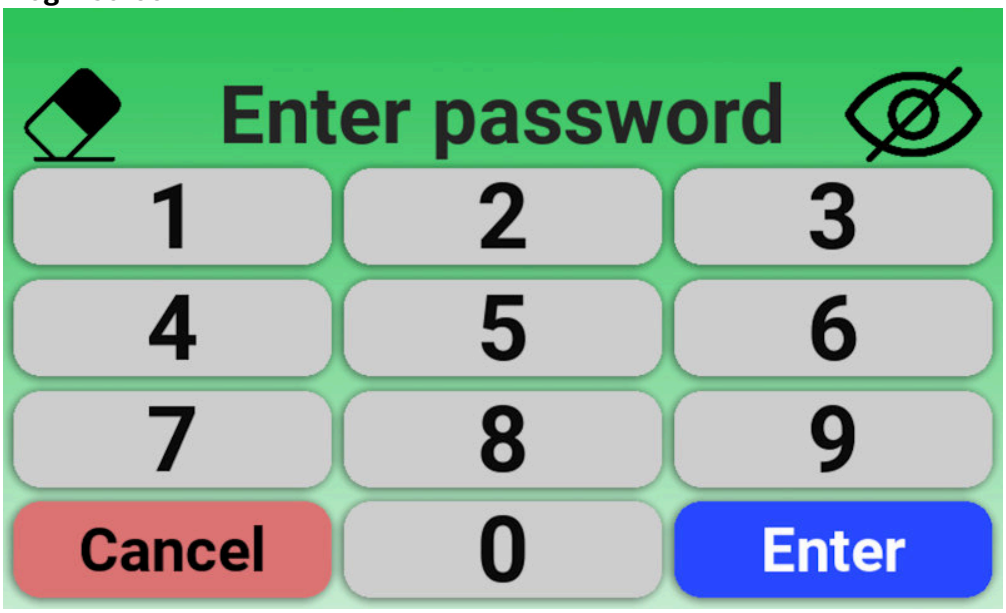
When commissioning lockout is active, the following remain in non-alarm state regardless of pressure:

- Buzzer (sound)
- Relay outputs
- External alarm outputs

On the start screen, a clear red message is shown: ”Press here, to activate the alarm”
When pressed, the user must log in with the same code used for the Settings menu.

After login, a dedicated view is shown where commissioning lockout can be removed.
Only deactivate when the gas system is connected, pressurized, and ready for normal

Login screen



Before access to system settings is granted, a login screen is shown.
Enter the code to gain authorization.

The screen includes:

- Delete symbol (top left), clears entered code.
- Eye symbol (top right), shows/hides the entered code (default hidden as ”X”)

If no code is entered within 60 seconds, the system returns to the start screen.

On delivery, the standard code is active from previous materwatch series. The code can be changed to a user-defined code up to 8 digits. To change the code, contact a QMT technician who will provide a temporary one-time code to change the code.

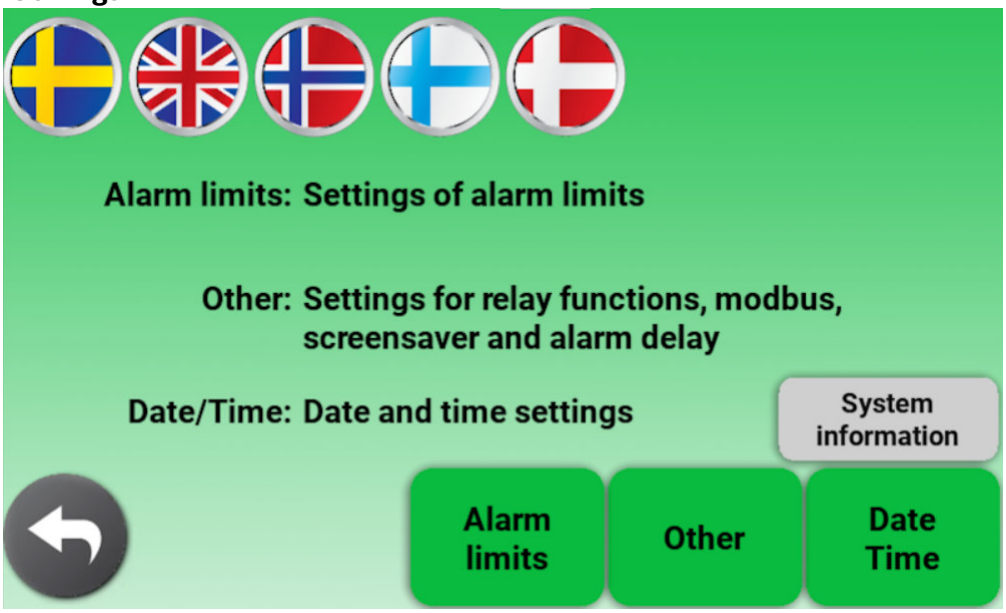
Traceability and security
After successful login, the user gets access to Settings.
All changes are automatically logged and cannot be deleted.

Path: Other > System configuration > Logged system changes
The log shows:

- Logged-in user type (customer or QMT)
- What was changed
- Date and time for each change

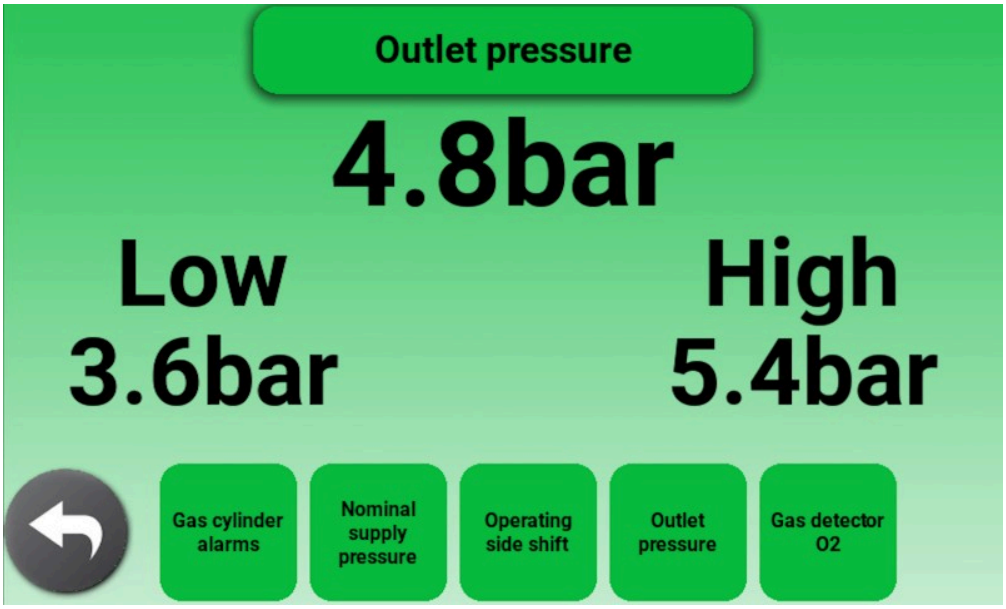
If the user is inactive in Settings for more than 10 minutes, the user is automatically logged out and returned to the start screen.

Settings



After login, the main Settings menu is shown.
At the top you can select the desired language for the user interface.

Alarm limits

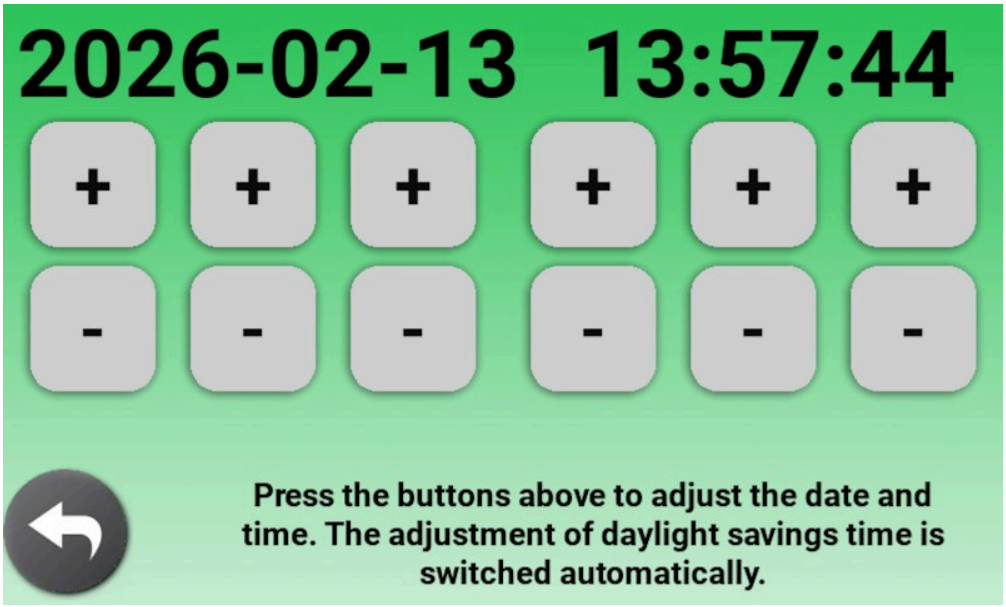


In this menu you can adjust alarm limits for functions and accessories monitored by the system.
Here's how:

1. Select the parameter you want to adjust by clicking the buttons at the bottom of the screen.
2. The current measurement value and alarm limits are displayed.
3. Click on the alarm limits on the left and right to edit the respective limit.
4. Enter the new limit value using the numeric keypad that appears.

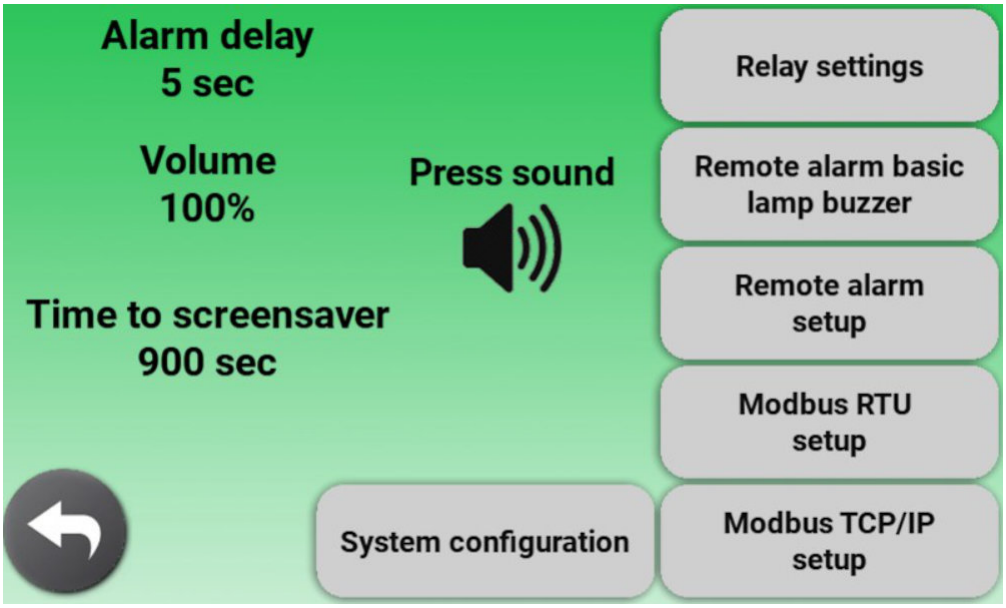
Note:
Changes do not take effect immediately. All changes are applied only when leaving Settings and returning to the start screen. While you are in Settings, monitoring is temporarily paused.

Date and time



Adjustment of date and time.

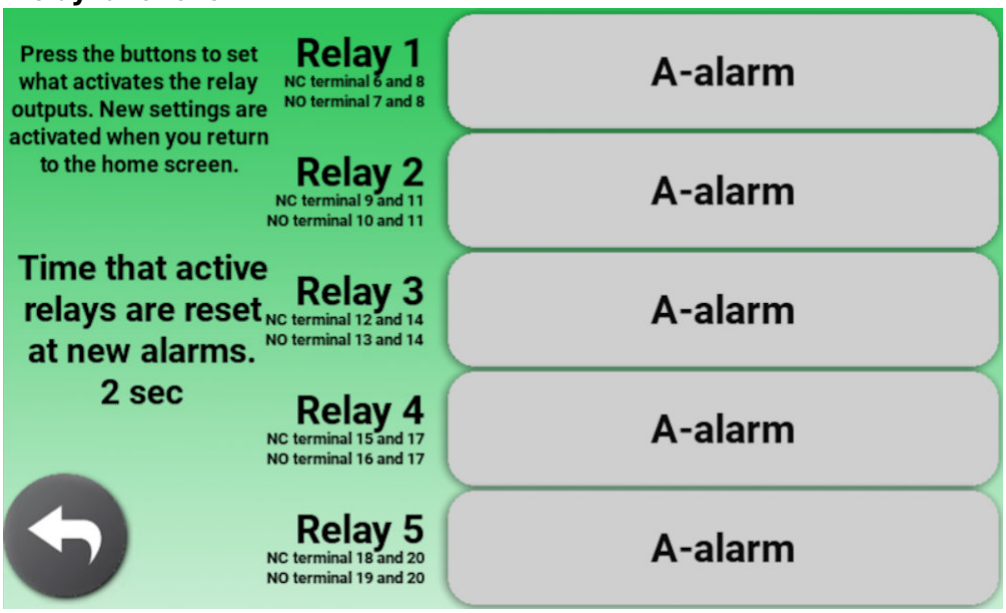
Other



The ”Other” menu contains settings related to volume, communication and relay functions.

Note:
System configuration is intended for technically skilled personnel.
It contains advanced settings affecting monitoring fundamentals, and functions such as logs, software update, and sensor calibration.
If unsure - contact QMT before making changes.

Relay functions

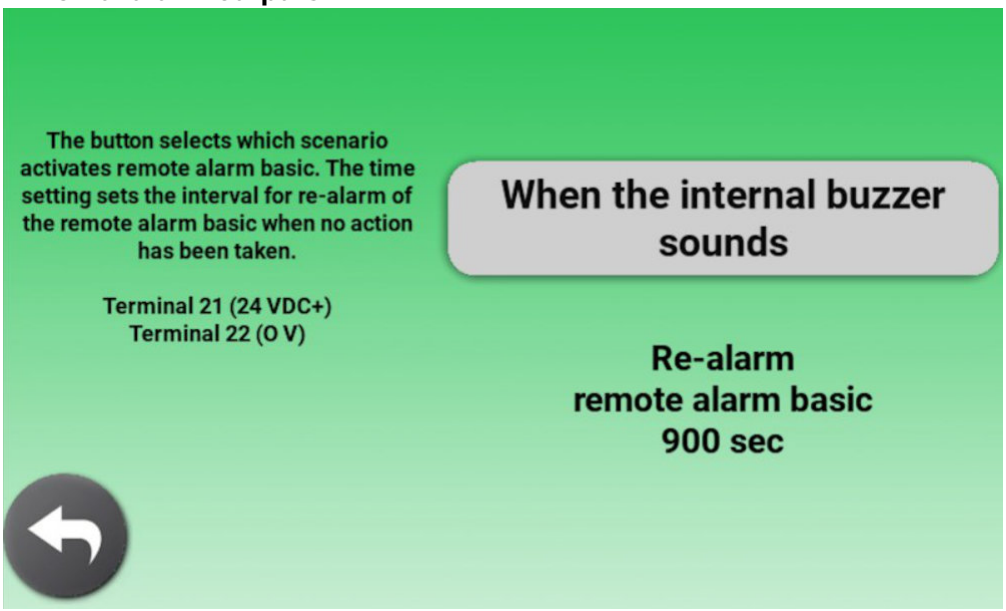


Here you define what activates each relay output. There are five relays, each programmable.
How it works:

- Select a relay (e.g., Relay 1).
- Choose the desired function from the list. Only the functions and gases that are activated in the system can be selected.
- Changes apply only when leaving Settings and returning to the start screen.

Function	Description
In the event of a power failure	The relay remains in the **non-alarmed state**. It only goes to the alarmed state when the alarm is de-energized. Used to indicate a power failure.
Common alarm	The relay is activated if any alarm is active in the alarm panel.
A-alarm	The relay is activated if any A-alarm is active in the alarm panel. A-alarms are critical alarms, e.g. in case of incorrect outlet pressure.
B-alarm	The relay is activated if any B-alarm is active in the alarm panel. B-alarms are non-critical alarms,e.g. in case of empty cylinder.
(Cylinder side) cylinder empty	The relay is activated if the cylinder on a specific cylinder side is empty.
Some cylinder empty	The relay is activated if any of the cylinder is empty.
(Cylinder side) cylinder leaking secondary	The relay is activated if leaking secondary is active for specific cylinder side.
Some cylinder leaking Secondary	The relay is activated if leaking secondary is active for any cylinder.
Any cylinder alarm	The relay is activated if any cylinder alarms.
Operation side changed	The relay is activated if a change of operating side has occurred.
Nominal supply alarm	The relay is activated if the nominal supply pressure is incorrect.
Outlet pressure alarm	The relay is activated if the outlet pressure is incorrect.
Outlet valve closed	The relay is activated if the outlet valve is closed.
Unit in operation	The relay is activated if the normal pressure has dropped so much that the unit has started to deliver gas.
Gas detector oxygen concentration alarm	The relay is activated if the measured oxygen concentration is outside the allowed range.
Gas detector carbon dioxide con centration alarm	The relay is activated if the measured carbon dioxide concentration is outside the permitted range.
Gas detector oxygen or carbon dioxide wrong concentration	The relay is activated if the measured concentration of either oxygen or carbon dioxide is outside the permitted range.
Room temperature sensor alarm	The relay is activated if the measured temperature in the room is outside the allowed range.
Buzzer	The relay is active as long as the internal buzzer in the alarm sounds.

External alarm outputs

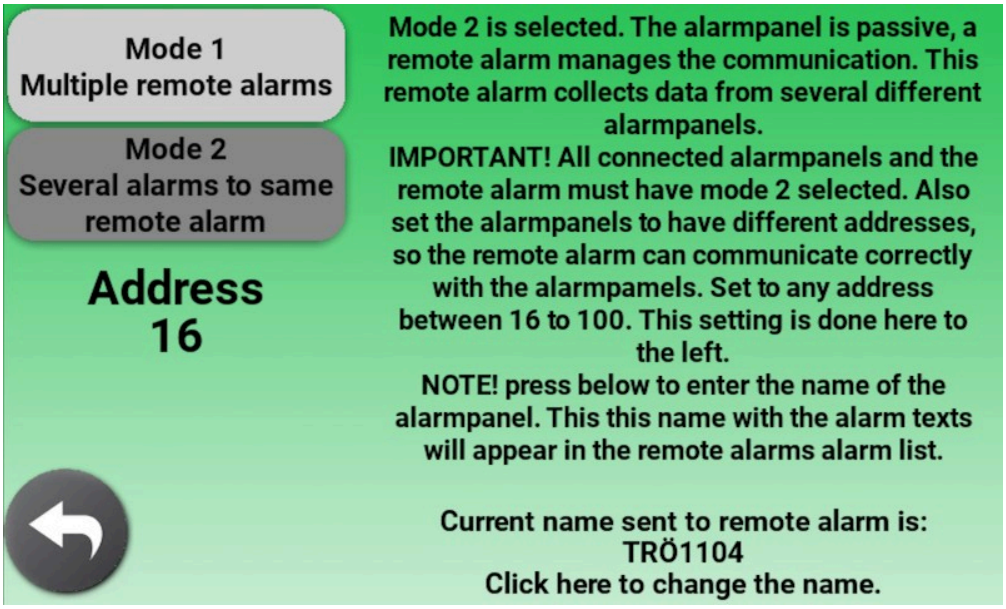


Here you define which scenario activates each external output (remote alarm basic, lamp, buzzer).
How it works:

- Select the output to configure.
- Choose the desired function from the list.
- Only functions and gases enabled in the system are shown.
- Additional options such as re-alarm time are described on the screen.

Function	Description
(Output) disabled	The output remains inactive regardless of which alarms are activated.
When the internal buzzer sounds	The output outputs 24V DC as long as the internal buzzer in the alarm sounds.
When an alarm is active in the panel	The output outputs 24V DC as long as any alarm is active in the alarm panel.
A-alarm	The output outputs 24V DC as long as an A-alarm is active in the alarm panel. A-alarms are critical alarms, e.g. in case of incorrect outlet pressure.
B-alarm	The output outputs 24V DC as long as a B-alarm is active in the alarm panel. B-alarms are non-critical alarms, e.g. during empty cylinder.
Some cylinder empty	The output outputs 24V DC as long as any cylinder alarms for empty cylinder.
Some cylinder leaking secondary	The output outputs 24V DC as long as any cylinder alarms for secondary leakage.
Any cylinder alarm	The output outputs 24V DC as long as any cylinder alarms.
Operation side changed	The output outputs 24V DC as long as a change of operating side has occurred.
Nominal supply alarm	The output outputs 24V DC as long as the nominal supply pressure is incorrect.
Outlet pressure alarm	The output outputs 24V DC as long as the outlet pressure is incorrect.
When any gas pressure is wrong in the unit	The output outputs 24V DC as long as any gas pressure in the unit is faulty.
Outlet valve closed	The output outputs 24V DC as long as the outlet valve is closed.
In case of wrong con-centration on gas detector(s)	The output outputs 24V DC as long as any gas detector's measured concentration is outside the allowed range.

Remote alarm

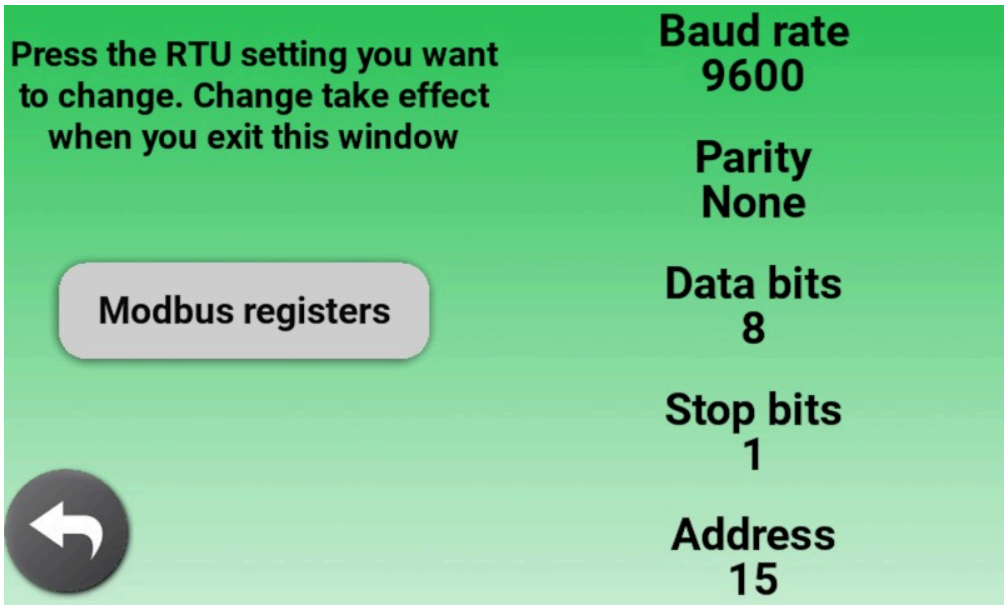


If one or more Masterwatch Ultra remote alarm panels will be used, configure communication here.

Follow the on-screen instructions carefully to ensure correct addressing and mode.

For wiring and detailed configuration, see the documentation provided with the Masterwatch Ultra remote alarm panel.

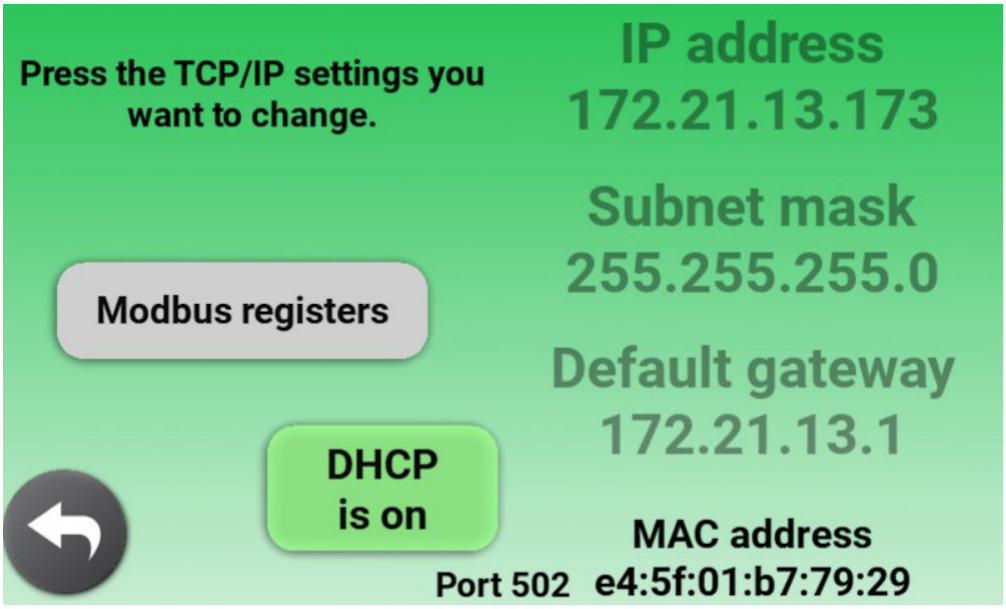
Modbus RTU



Configure Modbus RTU communication towards a DUC or other supervisory monitoring.

Press ”Modbus list” to view all current Modbus tags. Only tags active in the current configuration are shown.

Modbus TCP/IP

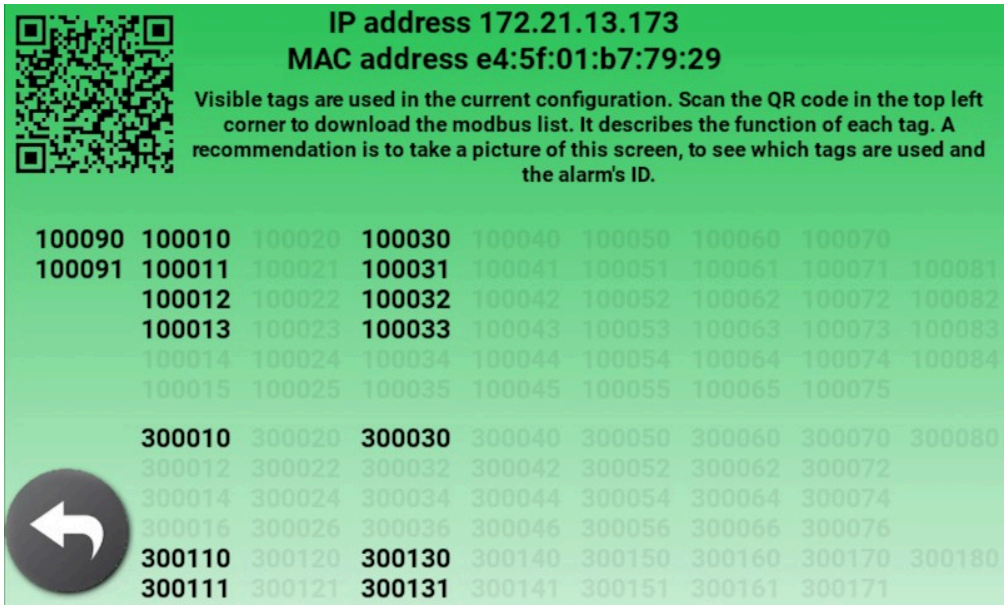


Configure Modbus TCP/IP communication for connection to a DUC or other Ethernet-based monitoring.

Network parameters are set here. The MAC address is shown in this menu and on a label on the back of the alarm.

Press ”Modbus list” to view all current Modbus tags. Only tags active in the current configuration are shown.

Modbuslist



This view shows which Modbus tags are active in the alarm system's current configuration.
As well as which Modbus address or IP address the alarm uses.

Only tags that are actually used are shown – which makes it easy to determine which registers need to be read.

In the upper left corner there is a QR code that can be scanned with a mobile phone. The QR code leads to a downloadable Modbus list that is adapted to the current configuration and with a detailed description of each tag. (Modbus list on pages 14 and 15)

Below is a guide to troubleshooting common questions and problems related to operating the Masterwatch Ultra.

The alarm does not start

- Verify that the power supply is connected correctly.
- See page 12 Power supply.

Alarms are active on startup

- Check that gas pressure is correct.
- Check that alarm limits are correctly set (page 22).

If system outlet pressure is normal but the displayed value is incorrect, it may be due to:

- Faulty pressure transmitter
- Sensor needs calibration

If deviation is less than 1 bar, calibration may solve it. Contact QMT for guidance.

Relay signal does not work as expected

- Check that the receiving equipment works correctly.
- Check wiring of the relay outputs (page 11 and page 13).
- Verify that the correct relay function is selected (page 24).

External alarm output does not work

- Check wiring of the output (page 13).

Masterwatch Ultra is designed to be maintenance-free during normal operation, except for the touch display.

Display – cleaning and care:

- Clean with a soft, lint-free cloth.
- Do not use cleaners containing alcohol, ammonia or solvents.
- If very dirty, wipe lightly with water or mild soap solution.

This product is a medical gas monitoring alarm system. To ensure safe and correct operation, the following points must be observed:

General warnings

- Masterwatch Ultra should be supplied with 24 VDC ±10% (max rippel ≤200mV). **Only stabilized power supplies may be used.**
- Installation must be performed by personnel with knowledge of Masterwatch Ultra and medical gas systems.
- Reconfiguration/service may only be performed by authorized personnel.
- Incorrect installation may result in the alarm not functioning.

During commissioning/configuration

- Keep commissioning lockout active during installation until the gas system is complete and pressurized.
- Do not leave the system in lockout after commissioning.
- Settings take effect only after leaving Settings.

Logging/traceability

- Changes are logged with date/time and user type.
- Logs cannot be deleted and provide full traceability over the system life cycle.

Manufacturer:	QMT-tech AB Amerikavägen 6 39354 Kalmar
Basic UDI-DI:	73402061007KD
UDI-DI:	7340206100061
Product name:	Masterwatch Ultra
Article number:	QMT8ULTRA53

Power consumption:	8,4 Watt
Supply voltage:	24 VDC ±10% (max rippel ≤200mV)
Display:	7-inch touchscreen, 800×480 pixels (RGB), active area 154,08×85,92 mm (B×H)
Relay outputs:	5 st potential-free changeover contacts (NO/NC), Max 4A, 250VAC
External alarm outputs:	3 st 24 VDC-outputs, max1,5 A per output
Communication:	2 st Modbus RTU (RS-485), 1 st Modbus TCP/IP (Ethernet)
Storage:	-20 till 70 °C dry indoor
Operating:	-20 till 70 °C dry indoor

Technical lifetime:	10 years (provided maintenance is performed according to this manual)

CE

Article number

- QMT8ULTRA53 – Masterwatch Ultra switch-over station

Accessories

Masterwatch Ultra is supplied as a complete product for monitoring the gas system. However, there are a number of accessories that can be used to power the unit, monitor or to forward alarms to other locations in the facility. Below is a list of available accessories with name, part number, power consumption (if applicable) and a short description:

- Power supply UNO-PS (QMT7TU6PS)
  60W, 24vdc transformer. Used to power Masterwatch Ultra if no 24vdc is available at the facility. QMT7TU6PSK transformer in plastic housing 130x180x125mm.

- Power supply UNO-UPS (QMT7TU6800)
  If the facility lacks priority power, this unit can power the alarm in the event of a power outage. Battery capacity: 0.8 Ah.

- Oxygen gas detector (QMT7221383) - approx. 70 mA
  Measures the oxygen concentration in the room.
  Communication takes place via Modbus RTU through the alarm's QMT port.
  Masterwatch Ultra generates alarms in case of deviating concentrations.

- Carbon dioxide gas detector (QMT7221382) - approx. 70 mA
  Measures the CO_2 concentration in the room.
  Communication takes place via Modbus RTU through the alarm's QMT port.
  Alarm is generated when the concentration is too high.

- Temperature sensor (QMT7GTMUMP1) - approx. 20 mA
  Measures the current room temperature.
  Communication takes place via Modbus RTU through the alarm's QMT port.
  Alarm is given when the temperature is outside the permitted limits.

- 150kg scale for gas cylinders (QMT7217150) - approx 80 mA
  Weighs gas cylinders on one of the operating sides. Communication is via Modbus RTU through the alarm's QMT port. Alarm is given when gas weight is low.

- 400kg scale for gas cylinders (QMT7221523) - approx. 80 mA
  Weighs gas cylinders on one of the operating sides. Communication is via Modbus RTU through the alarm's QMT port. Alarm is given when gas weight is low.

- 2000kg cylinder package scale (QMT7217150) - approx. 80 mA
  Used to monitor the weight of the cylinder package on one of the operating sides. Alarm is given when the gas level is low. Communication is via Modbus RTU through the alarm's QMT port.

- Flowmeter (QMTXXXXXXXX) - up to 100 mA
  Contact QMT for correct part number based on application.
  Measures both current and accumulated gas flow.
  The flowmeter is mounted on the outgoing gas line after the switch-over station.
  Communication is via Modbus RTU through the alarm's QMT port.

- Limit switch DN 28 - 35 (QMT7251349)
  Limit switch for mounting on shut-off valve after the switch-over station.
  Alarm is generated in Masterwatch Ultra if the valve is not fully open.

- Limit switch DN 42 - 54 (QMT7251350)
  Same function as above, but intended for DN 42 - 54 valves.

- Remote alarm basic (QMT704206U) - about 50 mA
  Remote alarm basic that is supplied with 24 VDC from Masterwatch Ultra in case of alarm.
  When activated, an LED lights up and a buzzer sounds.
  The buzzer can be silenced locally with the acknowledgement button on the box.
  The remote alarm basic is not IP65 rated and is therefore not intended for installation in a gas control panel.

- Indicator panel (QMT704209) - up to 150 mA
  An external box with lamp and buzzer that is powered by 24 VDC from the Masterwatch Ultra in the event of an alarm. Suitable for installations where the Masterwatch Ultra is placed in, for example, a gas niche cabinet and is not clearly visible or audible.
  The remote alarm basic is not IP65 rated and is therefore not intended for installation in a gas control panel.

- Masterwatch Ultra remote alarm, flush-mounted wall mounting (QMT8ULTRA01) - up to 350 mA. A Masterwatch Ultra alarm that does not monitor any one device, but instead retrieves alarm data from one or more Masterwatch Ultra units at devices. These alarms are presented in the panel's alarm list. Suitable for placement e.g. at an expedition or other manned location.

- Masterwatch Ultra remote alarm, surface-mounted wall mounting (QMT8ULTRA02)
  Same function as QMT8ULTRA01, but intended for surface mounting.

Manufacturer:	QMT-tech AB Amerikavägen 6 39354 Kalmar
SRN:	SE-MF-000007550
Basic UDI-DI:	73402061007KD
UDI-DI:	7340206100061
Product name:	Masterwatch Ultra
Article number:	QMT8ULTRA53
EMDN code:	Z120309

Complies with:

EN ISO 7396-1	2016
EN 60601-1	2006
IEC 60601-1-8	2006 + A1:2012
EN 61000-3-2	2014
EN 61000-3-3	2013
EN 61000-6-2	2005
EN 61000-6-4	2007 + A1:2011

CE

Masterwatch Ultra is an electronic product and must not be disposed of with household waste.

At end of life, handle as electrical and electronic waste according to local regulations.
Deliver the unit to an approved recycling facility or equivalent receiver.

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