HAAKE MARS iQ and HAAKE MARS iQ Air Firmware

This document describes the Thermo Scientific™ HAAKE™ MARS™ iQ and HAAKE MARS iQ Air firmware version release history in chronological order.

The latest firmware version can be found at the end of the list.

Release date: 30 july 2019

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.01.000	01.01.000
µP2	01.01.001	01.01.001
µP3	01.01.002	01.01.002

These are the first release versions.

Release date: 18 december 2019

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.02.001	01.03.000
µP2	01.03.001	01.02.000
µP3	01.03.00	01.02.000

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

MARS iQ Air : µP1, µP2 and µP3 firmware

1. The motor/bearing friction correction was slightly modified.
2. Touching an "empty" space on the touchscreen lead to an unintended reaction. This has been solved

MARS iQ: µP1, µP2 and µP3 firmware

1. The logaritmic data point distribution of an OSC Amplitude Sweep element was modified. It is now identical to that of a MARS 40/60.
2. The ROT Multistep element has been implemented.
3. The new TM-PE-P Air is now recognized.
4. The motor/bearing friction correction has been slightly modified.
5. The number of repetitions and number of waiting periods for all OSC elements are now user definable (in RheoWin).
6. Certain internal lift functionality has been optimized.
7. The ConnectAssist geometry recognition functionality has been optimized.
8. The instrument type indentification was not completely correct. This has been solved.
9. Touching an "empty" space on the touchscreen lead to an unintended reaction. This has been solved.

Release date: 30 january 2020

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.03.007	none
µP2	01.04.003	none
µP3	01.03.000	none

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Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1 and µP2 firmware

1. The CD-OSC control loop has been improved.
2. Several bugfixes for lift control related functionality.

Release date: 14 may 2020

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.05.001	01.05.001
µP2	01.06.000	01.06.000
µP3	01.05.000	01.05.000

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware

1. The OSC frequency sweep and Osc amplitude sweep now work with tabular set values for the frequency resp. amplitude. (With RheoWin version 4.86.0017 or higher).
2. The ROT Multistep element has been implemented.
3. The CD-OSC control loop has been further improved.
4. Normal force control has been improved.
5. The raw phase angle was missing in the OSC data. This has been solved.
6. The accuracy of the lift positioning for intermediate positions has been improved.
7. The ConnectAssist geometry recognition functionality has been optimized.
8. Under certain circumstances the Lift control did not work properly. That has been solved.
9. The MARS iQ (Air) is now compatible with the new TM-P-PE Air (air cooled Peltier plate module).
10. The MARS iQ (Air) is now compatible with the new Protect Assist sample area shield door.

Touchscreen user interface (HMI)

1. A splash screen is displayed for a few seconds after switching on.
2. The initialisation screen has been enhanced and now contains a progress bar.
3. The geometry and temperature control unit information screens can now be accessed directly from the home screen by tapping on the corresponding area of the status bar.
4. The temperature can now be controlled from a popup dialog which is opened by tapping on the temperature area in the statusbar. A temperature value can be entered, temperature control can be started and stopped.
5. The home screen now has an android style Configuration menu with the following menu items: **Temperature control**, **Network**, **Start menu**, **Language**, **Lift**.
6. On the Temperature control men an initial start temperature value be set.
7. On the Network menu the instruments IP adress can be set.
8. On the Startmenu menu either the Home screen or the Lift control screen or the Job launch screen can be selected as the default start menu.
9. On the Language menu the language for the touchscreen user interface can be selected. Currently 18 languages are available: English, German, Dutch, French, Spanish, Italian, Portugese, Polish, Czech, Slovakian, Finnish, Russian, Turkish, Chinese, Japanese, Korean, Thai, Indonesian.
10. On the Configuration Lift menu the lift speed for the slow up/down lift button can be set.
11. The current lift position can be set as the zero position by tapping the lift zero button for more than 3 seconds.
12. A lower stop position for the lift can be set (in a popup dialog) by tapping the fast down lift button for more than 3 seconds.
13. The Lift screen now displays a clear message when the lift is moving slower as expected.
14. The Job Launch list is now numbered.

15. The temperature control information screen shows the status of the upper and/or lower valve in the valve block or the status of the TM-PE-P Air fan if applicable.
16. The range bars for torque, angular velocity and angle have been improved.

Release date: 13 august 2020

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.06.003	01.06.003
µP2	01.06.002	01.06.002
µP3	01.05.001	01.05.001

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware

1. The temperature offset tables (in the MTMC driver) can now contain upto 20 values.
2. The temperature offset tables are now also available for the TM-LI-C, TM-LI-C48, TM-LI-C32 and TM-LI-P modules.
3. Lift control for the following measuring geometries was improved: Interfacial Ring rotor, interfacial double bi-cone rotor, ISO (Brookfield) spindles, the universal adapters U1, U2, and U3, the UV upper plate and the pressure cell magnetic coupler.
4. The TM-EL-C module is now always recognized correctly.

Note For 1. and 2. a new RheoWin MTMC driver (file name MARSIQT.dll) is needed.

IMPORTANT Before updating the firmware save any existing temperature offest table! Updating the firmware will delete any existing temperarature offset table! Either take note of existing offset tables, or export the tables to a *.tot file first. After the firmware update manually enter the table values again, or import the previously exported *.tot file.

Release date: 25 november 2020

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.07.000	01.07.000
µP2	01.06.002	01.06.002
µP3	01.05.001	01.05.001

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1 firmware

1. The lift control for the combination of a TM-xx-C (C=Cylinder) temperature module plus the TMP adapter and a plate or cone rotor (upper part of the measuring geometry) has been improved.

Release date: 21 december 2020

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.08.001	none
µP2	01.08.002	none
µP3	01.06.000	none

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware

1. Oscillation frequency and amplitude sweep measurements can now contain up to 350 steps.
2. Time keeping during ramp and sweep measurements has been improved.
3. The bearing friction compensation has been improved.
4. The set value distribution during a rotational ramp with log set value distribution was not correct under certain circumstances. This has been improved.
5. Temperature alarm (=limitation) values can now be defined using RheoWin.
6. The torque measurement for low torque values has been improved.
7. The temperature set functionality for TM-xx-LI modules has been removed from the touchscreen menu.

Release date: 20 april 2021

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.09.001	01.09.000
µP2	01.09.004	01.09.005
µP3	01.09.000	01.09.000

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware

1. Initialization issues are now displayed on the instrument's touchscreen in a more understandable way.
2. Under certain circumstance the automatic geometry recognition did not work correctly. This has been solved.
3. Under certain circumstances the torque and angular velocity values measured during a CR ramp were suboptimal. This has been improved.
4. The low torque performance of the MARS iQ Air (only) has been improved.
5. Network IP address configuration:
   - Changing the static IP address now takes immediate effect (that is, the instrument does not need to be switched off/on for the new IP address to be applied).
   - The instrument will now automatically be assigned an IP address by a network DHCP server when the instrument is switched on.
   - The instrument will now automatically be assigned an IP address by a network DHCP server when the instrument is connected to a network when the instrument is already up and running.
6. When a TM-LI-X temperature control module is connected to instrument, the corresponding (lower) valve in the valve block is automatically opened completely.

   Note A TM-LI-X module must only be connected to the valve block when the temperature of the circulating fluid is in the range of -25 °C < T < 60 °C. See the MARS TM-XX-X instruction manual.

   Note When disconnecting a TM-LI-X from the rheometer first unplug the electrical connection and give the instruments a few seconds time to close the valve automatically.
7. The display of information on the instrument's touchscreen when a RheoWin Job is running has been improved for several Job elements.

   Note RheoWin 4.87.0010 must be used for this to take full effect.
8. In the configuration menu on instrument's touchscreen there is a new menu item Corrections. Tapping the menu item will open the Corrections dialog. From that dialog the instruments bearing friction calibration routine and the instrument torque mapping calibration routine can be started.
9. The temperature set dialog can not be accessed anymore when no TM-XX-X or a TM-LI-X is connected the instrument.

Release date: 05 august 2021

	MARS iQ firmware version
µP1	01.09.007
µP2	01.00.005
µP3	01.09.000

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1 firmware

1. The tolerance for the friction determination which is part of the initialization routine was modified.

Release date: 15 february 2022

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.10.020	01.10.021
µP2	01.10.022	01.10.024
µP3	01.10.004	01.10.004
HMI	01.03.09	01.03.09

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware, touchscreen user interface (HMI)

1. Under certain circumstances starting a Job from the MARS iQ touchscreen did not work correctly. This has been solved.

   Note Further changes regarding this functionality have been made in RheoWin 4.88.0000 and newer.

2. A screensaver for the touchscreen has been implement. The screen saver becomes active after not using the touchscreen for 30 minutes. To stop the screensaver just tap the touchscreen.
3. Under certain circumstances the OSC Temperature Stepped Ramp element did not work as intended. This has been solved.
4. When the max. torque or the max. speed is reached during a ROT measurement, the active element in RheoWin will be stopped and the Job will continue with the next element.
5. When the max. torque is reached during an OSC frequency or amplitude sweep, the active element in RheoWin will be stopped and the Job will continue with the next element.
6. Under certain circumstances the CS OSC Time curve element did not work as intended. This has been solved.
7. The sample volume needed for the attached rotor (measuring system) is now displayed on the touchscreen (in the geometry status information menu).
8. Other minor bugs have been solved.

Release date: 30 august 2022

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.12.001	01.12.000
µP2	01.10.022	01.10.024
µP3	01.12.000	01.12.000
HMI	01.03.09	01.03.09

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1 and µP3 firmware, touchscreen user interface (HMI)

1. The acoustic signal which alerts the operator to remove any rotor from the drive motor shaft (in order to be able to continue the initialisation of the instrument) has been modified. It is now active until the rotor is removed.
2. The initialisation of the valves in the valve block has been optimized.
3. Under certain (very rare) circumstances a problem in the temperature control electronics could lead to an unexpected heating-up of a TM-xx-x. This has been solved.
4. Under certain circumstances the touchscreen would not work as intended after waking the instrument up from the standby mode. This has been solved.
5. Setting Temperature Offset values from RheoWin did not work correctly. This has been solved.
6. The new TM-LI-C28 is now recognized by the instrument.

Release date: 30 january 2023

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.13.001	01.14.000
µP2	01.10.022	01.10.024
µP3	01.12.000	01.12.000
HMI	01.03.09	01.03.09

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1 firmware

1. Under certain circumstances updating the firmware (with version 01.12.000) did not work correctly. This has been solved for this version.
2. Under certain circumstances a erroneous problem with the Peltier heat exchanger temperature was reported. This has been solved.
3. An unnecessary pause in the execution of an axial ramp has been removed.

Release date: 26 april 2023

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.16.001	01.16.000
µP2	01.15.001	01.15.000
µP3	01.15.000	01.15.000
HMI	01.04.00	01.04.00

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware, touchscreen user interface (HMI)

1. The upper temperature alarm limits for the individual TM-xx-x have been modified and are now set to 2 °C above the maximum specified temperatures.
2. The new TM-PE-C32 Air is now recognized and controlled by the instrument.
3. The control of the TM-PE-x and TM-PE-x Air modules has been improved.
4. A possible overheating of the TM-PE-x modules due to a lack of counter-cooling is now recognized and stopped earlier and more effective.
5. The MARS iQ firmware now includes two operation-hour counters. One for counting the power-on time and one for counting the actual measurement time. The counter values are displayed in the **Configuration > Device info** menu on the instruments touch screen. Starting from RheoWin 4.91.0010 these values are stored in every RheoWin *.rwd data file.

> **Note** Of course both counters start with zero hours from the moment this new firmware is installed.

6. After using the **Lock** button on the Lift page of the touchscreen user interface the geometry recognition did not work correctly anymore. This has been solved.
7. There was a problem with the lift zero-point for certain geometries that are based on a ConnectAssist adapter. This has been solved.
8. The lift speed during a Job is not limited anymore when the measuring geometry (rotor) was not correctly recognized.
9. The CR-Mode control loop has been improved.

Release date: 16 june 2023

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.17.001	01.17.000
µP2	01.15.001	01.15.000
µP3	01.17.000	01.17.000
HMI	01.17.00	01.17.00

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware, touchscreen user interface (HMI)

1. The new tribology rotors are now recognized by the instrument.
2. The AutoTension control loop has been improved.
3. The error handling for the normal force sensor has been improved.
4. The error handling for the temperature control has been improved.

Release date: 10 january 2024

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.18.009	01.18.008
µP2	01.18.011	01.18.010
µP3	01.18.001	01.18.001
HMI	01.18.000	01.18.000

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware, touchscreen user interface (HMI)

1. Under certain circumstances a time-out in the communication (for example due to certain windows power saving options) between the instrument and RheoWin would lock up the instrument. This has been solved
2. The CD-OSC control loop can now (optionally) switch to CS mode when the torque is below a certain value. RheoWin 4.92.0000 or higher is needed for using this option.
3. The MARS iQ is now compatible with the new TM-CR-0450 oven.
4. When the air pressure for the airbearing is above 3.0 bar the instrument will now display an error message.
5. The MARS iQ is now compatible with the new Tribology measuring geometries.

   Note For tribology measurements the air pressure must be set to 2.5 bar. The instrument will display an error message when this is not the case.
6. Under certain circumstances not all data points, to be acquired as part an oscillation measurement, were actually transfered to RheoWin and saved. This has been solved.
7. The instruments touchscreen now always displays the (uncorrected) motor torque and motor angle values.
8. The temperature control of the TM-PE-x Air modules (around ambient temperature) has been improved.

9. The functionality of the LOCK button has been enhanced. When touching the LOCK button for more then 3 seconds a menu will be displayed which allows the operator to select the current angular position as the lock position.
10. Some display text in Italian (and a few other) language(s) were not displayed correctly. This has been solved.
11. The autotension control loop has been improved.
12. The CR ROT control loop has been improved.
13. The MARS iQ can now control an external gas valve for the air-bearing air/gas supply. This is meant for use in a glove box when using inert gas for the air-bearing.

Release date: 27. february 2024

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.18.043	01.18.042
µP2	01.18.023	01.18.022
µP3	01.18.012	01.18.012
HMI	01.18.000	01.18.000

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware, touchscreen user interface (HMI)

1. The γ (deformation) value measured and displayed (on the touchscreen and in RheoWin) during oscillation measurements was not correct in the previous firmware version only. This has been solved.

   Note The value of all other oscillation data (G' G" etc.) was not affected by this.

2. The data acquisition during a ROT ramp in CS-Mode was improved.
3. The control of the measurement gap (during a measurement) has been improved.
4. Under certain circumstances the "maximum normal force error message" was not cleared correctly and was displayed at a jo start. This has been solved.
5. Under certain circumstances reading temperature offset values from the TM-CR-O control box did not work correctly. This has been solved.
6. The handling of the TM-CR-O "oven not closed" message was improved.
7. The max. allowed motor temperature was increased for use at ambient temperatures up to 35 °C.
8. The max. cooling power of the TM-PE-P Air for T > 180 °C was slightly reduced due to safety issues.
9. At ambient temperatures above 26 °C (which are not recommended) the max. heating power of the TM-EL-P + TM-EL-H combination was slightly reduced.

Release date: 28 august 2024

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.18.079	01.18.078
µP2	01.18.023	01.18.022
µP3	01.18.017	01.18.017
HMI	01.18.011	01.18.011

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware, touchscreen user interface (HMI)

1. This firmware version is compatible with and needed for the following new hardware that will be released in the near future:
   - an updated version of the touchscreen PCB,

- an updated version of the main MARS iQ (Air) PCB,
- an new version of the submersion flow cell,
- the new TM-PE-C48 module,
- the new CM-OP-P module,
- an updated version of the D170/300 pressure cell.

2. Several optional safety features for use in combination with the ProtectAssist door have been implemented.

Note RheoWin 4.94.0000 or newer is needed for using these features.

3. There was a problem when using table set values for the amplitude of an OSC amplitude measurement in CS mode. This has been solved.
4. The operator is now warned (and the temperature control is stopped) when the outside shell of the TM-CR-O450 is too hot due to insufficient cooling.
5. In certain rare occasions the automatic lift zero finding routine did not work correctly. This has been solved.
6. When using a vane type rotor (measuring geometry) the downard lift speed will not be restricted anymore when no lower TM-xx-x was detected.
7. The max. lift speed in axial ramps is now 20 mm/s (instead of 15 mm/s).
8. The gap value set for a certain rotor using the touchscreen menu is now memorized.
9. The TM-EL-H can now be used alone (that is without a lower TM-xx-x).
10. The valve control for the TM-PE-x modules was not working correctly for low temperatures. This has been solved.
11. The valve control for the TM-EL-P and TM-EL-H has been improved.
12. The short name of the combination of the TM-PE-C + TM-EL-H was not correctly displayed in the touchscreen statusbar. This has been solved.
13. A proper error message is now displayed when the 2nd connector plug (for the fan) of an TM-PE-x Air is not connected to the instrument.
14. Temperature offset values > 25 °C are now ignored.
15. Certain checks during instrument initialisation are now less stringent.

Release date: 15 july 2025

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.20.001	01.20.000
µP2	01.20.001	01.20.000
µP3	01.20.000	01.20.000
HMI	01.20.000	01.20.000

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware, touchscreen user interface (HMI)

1. A new CD ROT control mode is now available.
2. New functionality for Powder rheology has been implemented.

Note RheoWin 4.95.0000 or newer is needed for using the above two features.

Note When the new Powder rheology tools are to be used, the new `Powder_ZIP_HMI.zip` file must be uploaded separately using firmware upload tool. Uploading this file takes around 14.5 minutes. It is recommended *not* to upload this file when it is *not* needed.

3. The timing at the end of an axial ramp was optimized.
4. Under certain circumstances reset time and reset angle functionality used in ROT mode did not work correctly. This has been solved.
5. Under certain circumstances there was a problem with initializing the lift at instrument startup. This has been solved.

Uploading the HMI zip file from subdirectories did not work. This has been solved.

Release date: 02 october 2025 (this is the latest version)

	MARS iQ Air firmware version	MARS iQ firmware version
µP1	01.21.001	01.21.000
µP2	01.20.001	01.20.000
µP3	01.21.000	01.21.000
HMI	01.20.000	01.20.000

Below is a list of things that are new and/or changed in this version compared with the previous firmware version.

µP1, µP2 and µP3 firmware, touchscreen user interface (HMI)

1. In the previous version, during OSC measurements, the values of G' and G" were displayed with the wrong unit. This has been solved.
2. In the previous version the lift zero point determination routine did not work correctly. This has been solved.
3. The friction, TMC and inertia determination routines started from RheoWin did not work correctly. This has been solved.
4. The friction determination routine has been optimized.
5. Axial ramps with a ramp speed of 20 mm/s were not executed. This has been solved.
6. On the touchscreen the RheoScope module is now displayed as CM-MS-P or MS-P, this name stands for Combined Module-MicroScope-Plate.
7. Plugging the network cable in/out during device initialisation caused spurious ConnectAssist behaviour. This has been solved.

Updating the firmware

How to update the HAAKE MARS iQ or HAAKE MARS iQ Air firmware is described in Appendix A Firmware Update in the HAAKE MARS iQ (Air) Rheometer Reference Manual (part no. 006-3802). This manual is included in the RheoWin download ZIP file.

Contacting Thermo Fisher Scientific

If you have any questions and or suggestions regarding the MARS (firmware) please send an e-mail to:

support.mc.de@thermofisher.com