



AA Gas Supplement
Guide

English

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Tempus Pro

Patient monitor

PHILIPS

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Manufacturer's address

Tempus Pro is designed and manufactured by:



Remote Diagnostic Technologies Ltd.
Ascent 1
Farnborough Aerospace Centre
Aerospace Boulevard
Farnborough
Hampshire
GU14 6XW
United Kingdom

Tel: +44 (0) 1256 362 400
Email: rdt_info@philips.com
www.philips.com



0413



Philips Medical Systems Nederland B.V.
Veenpluis 6
5684PC Best
The Netherlands

Australian TGA sponsor:
Philips Electronics Australia Ltd
65 Epping Road
North Ryde
NSW Australia 2113

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About this guide

This guide describes how to display anaesthetic agent gas vital signs on the Tempus Pro using the Masimo ISA OR+ Anaesthetic Gas module ('ISA OR+ sidestream analyzer', RDT part number 01-2167). This guide must be read in conjunction with the Masimo document *ISA User's Guide* supplied with the ISA OR+ module.

The ISA OR+ module connects to Tempus Pro using a proprietary isolated USB cable. When connected, the module allows the Tempus Pro to monitor volatile anaesthetic agent (AA) gases, CO₂, O₂ and optionally N₂O. During monitoring, the value of minimum alveolar concentration (MAC) is calculated and trended. Typically one anaesthetic agent (the primary agent) is monitored, but during changeover of gases a secondary agent will be displayed if detected by the module.

To be compatible with the AA gas module, the Tempus Pro must be installed with software version 4.14 or higher.

The Tempus Pro accessory range includes the AA gas monitoring items listed in "[2.3 Anesthetic gas monitoring accessories](#)".

Before attempting to work with this equipment, the user must read, understand, note and strictly observe all warnings, cautions and safety markings in this supplement guide, the *Tempus Pro User/Operator Manual* from RDT and the *ISA User's Guide* from Masimo.

Document library

Consult the instructions for use. These are provided in electronic format in the Philips Document Library.



www.philips.com/IFU



Important

Please check the Philips Document Library regularly for new versions of this document.

A paper copy of this document may be requested from the Philips Document Library or by sending a request to RDT_Customerservice@philips.com.

Safety and note icons

The following icons are used to indicate safety, caution and warning messages (per ISO 3864-2):



DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

The note icon is used for important and helpful information:



Important

Indicates a condition that may lead to equipment damage or malfunction.



A point of particular interest or emphasis intended to provide more effective or convenient operation.

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The purpose of this document is to provide the user with adequately detailed information to efficiently install, operate, maintain and order spare parts for the Tempus Pro. Every effort has been made to keep the information contained in this document current and accurate as of the date of publication or revision. However, no guarantee is given or implied that the document is error free or that it is accurate with regard to any specification. RDT reserves the right to change specifications without notice.

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Restrictions on use

EMC statements

EMC compliance statements for the Tempus Pro and AA gas module are available in the following documents:

- For the Tempus Pro, please refer to the *Tempus Pro User/Operator Manual*.
- For the Masimo ISA OR+ Anaesthetic Gas module, please refer to the *ISA User's Guide* from Masimo.

Indications and contraindications for use

For indications and contraindications for use of the Tempus Pro, refer to the *Tempus Pro User/Operator Manual*.

For indications and contraindications for use of the Masimo ISA OR+ Anaesthetic Gas module, refer to the *ISA User's Guide*.

FDA prescription statement

Federal law (USA) restricts the use or sale of this device by, or on the order of, a physician.

CE statement



Marking by the symbol indicates compliance of this medical device to the Medical Devices Directive (MDD) 93/42/EEC (as amended).

General warnings, cautions and notes

Remote Diagnostic Technologies Ltd. assumes no liability for customer failure to comply with the information contained in this manual and its supporting manuals.



WARNING

Failure to comply with the information contained in this manual, the *Tempus Pro User/Operator Manual* and the *ISA User's Guide* from Masimo (e.g. warnings, precautions, instructions etc.) will violate the safety standards of design, manufacture and intended use of the product.



WARNING

The Tempus is intended to be operated by clinically qualified personnel only. This supplement guide, *Tempus Pro User/Operator Manual* and the *ISA User's Guide* manual, as well as accessory directions for use and all precautionary information and specifications should be read before use.



WARNING

Always maintain a charge level of at least 10% in the Tempus Pro's battery. If the Tempus Pro's battery charge is below 10%, the USB interfaces (and therefore the AA gas module) will not work.

**WARNING**

Check the AA gas monitoring equipment prior to each use to ensure that it functions correctly and has been properly cleaned and disinfected.

**CAUTION**

To conserve the Tempus Pro battery charge, always disconnect the AA gas module after use.

**CAUTION**

This manual is intended for the clinical operator of the device. Separate manuals are provided for the setup and maintenance of the Tempus Pro.

**Important**

- The feature setting for AA Gas will be automatically enabled if an AA Gas module is connected.
- The AA Gas feature is switched off if Tempus Pro is connected to i2i. AA Gas cannot be used at the same time as a connection to i2i. A warning will be displayed if this is attempted.
- The AA gas USB connector is not compatible with the USB port in the Tempus Pro Smart Mount.

1 AA gas monitoring

1.1 Connecting the AA gas module



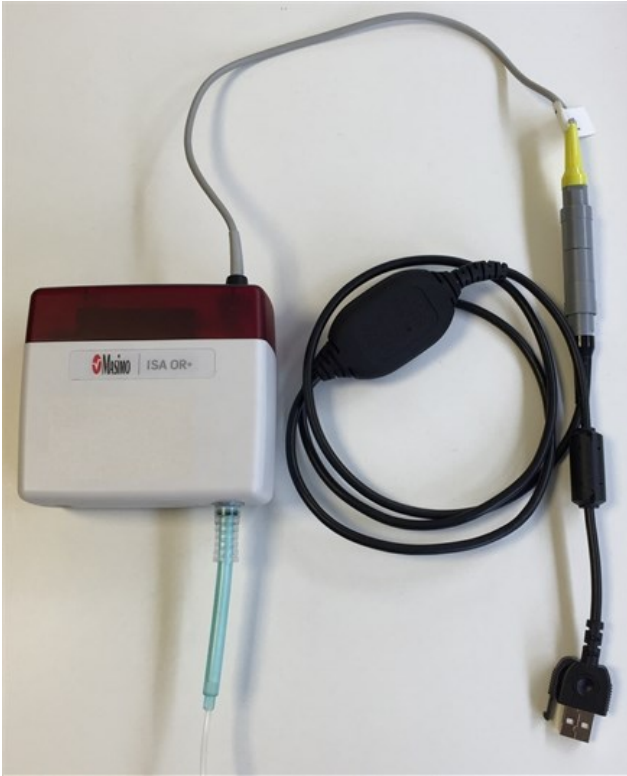
WARNING

When in use, the exhaust port on the ISA OR+ module must be connected to a gas recovery / scavenging inlet on the ventilator. A tube kit is available to connect the exhaust port to the ventilator (RDT part number 01-2255) (Masimo #4409).



CAUTION

- ▲ The internal capnometer is disabled when the AA gas module is connected. CO₂ and respiration will be monitored instead through the AA gas module. Therefore, do not use the capnometer (CO₂) inlet on the Tempus when AA gas is connected.
- ▲ The USB invasive pressure module (3rd and 4th channel IP) cannot be used while the anaesthetic agent module is in use.
- ▲ The O₂ sensor is a paramagnetic sensor; for this reason the module must not be subject to vibration or movement during operation.
- ▲ Ensure that the O₂ sensor calibration is checked regularly - see "[2.1 AA gas module menu](#)".

Step	Description	Photos and notes
1.	Plug the Masimo ISA OR+ module into the Tempus Pro AA gas USB cable.	

Step	Description	Photos and notes
2.	Plug the other end of the USB cable into one of the Tempus Pro USB sockets (1). A USB symbol  will appear at the top of the Tempus Pro screen to show the module is connected	
3.	Perform the system setup and check procedures described in Masimo document <i>ISA User's Guide</i> .	AA gas monitoring waveforms and vital signs will be displayed in the Tempus Pro home page.  You may need to wait for up to 10 seconds for a waveform to appear.

1.2 Mounting the AA gas module (optional)

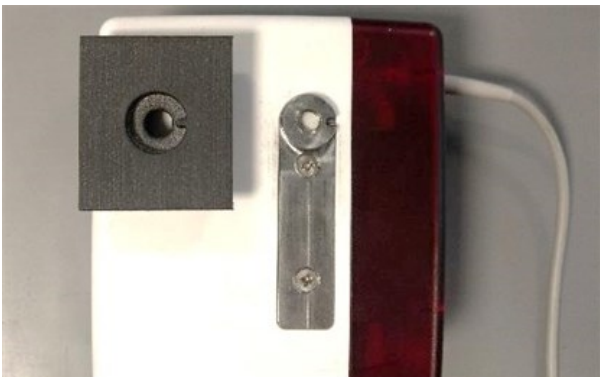
The AA gas module can be mounted on the Tempus Pro Litter Mount (part number 01-2035).

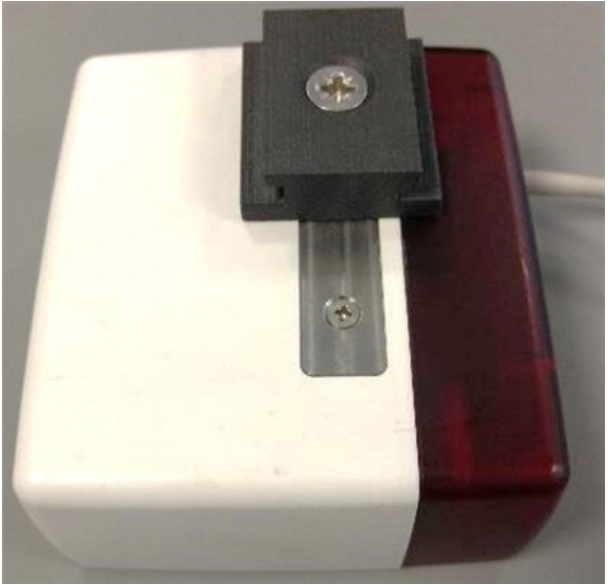
Parts required:

- M6 x 12 mm screw
- ISA Ferno mount bracket – slide & bracket
- Tempus Pro Litter Mount (part number 01-2035)

Tools required:

- Torque driver set to 40 cNm
- Pozidriv 2 driver bit

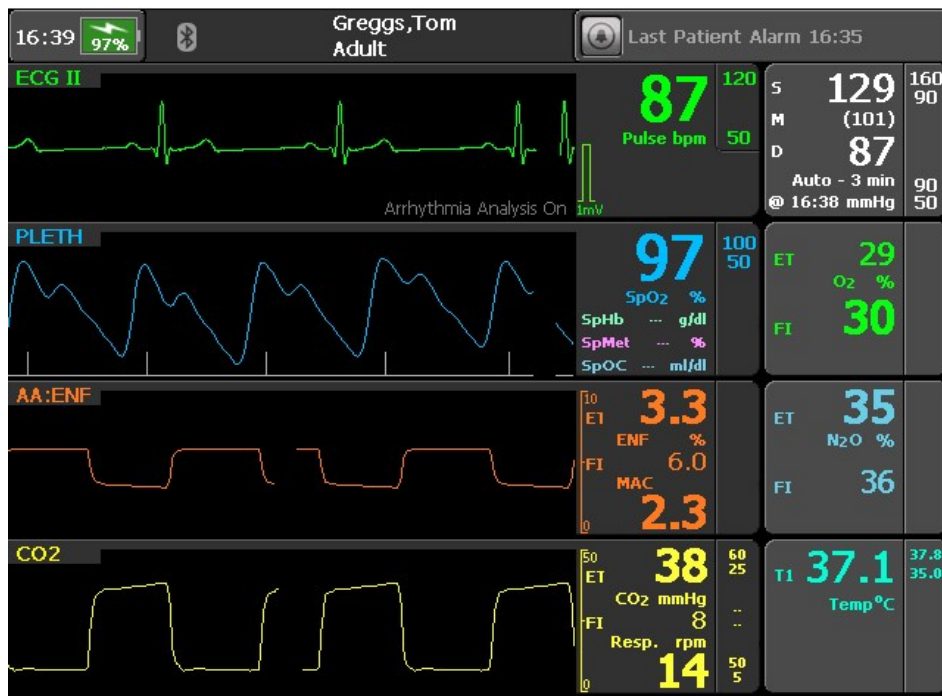
Step	Description	Photos and notes
1.	Fit the ISA Ferno mount bracket slide, making sure to align the positioning feature on the slide with the mounting feature on the ISA module.	

Step	Description	Photos and notes
2.	Fit M6 x 12 mm screw and torque to 40 cNm.	
3.	Prepare the ISA Ferno mount bracket for fitting to the Tempus Pro Litter Mount (part number 01-2035).	
4.	Fit the upper edge of the bracket by clipping it over the top rail on the rear of the litter mount.	

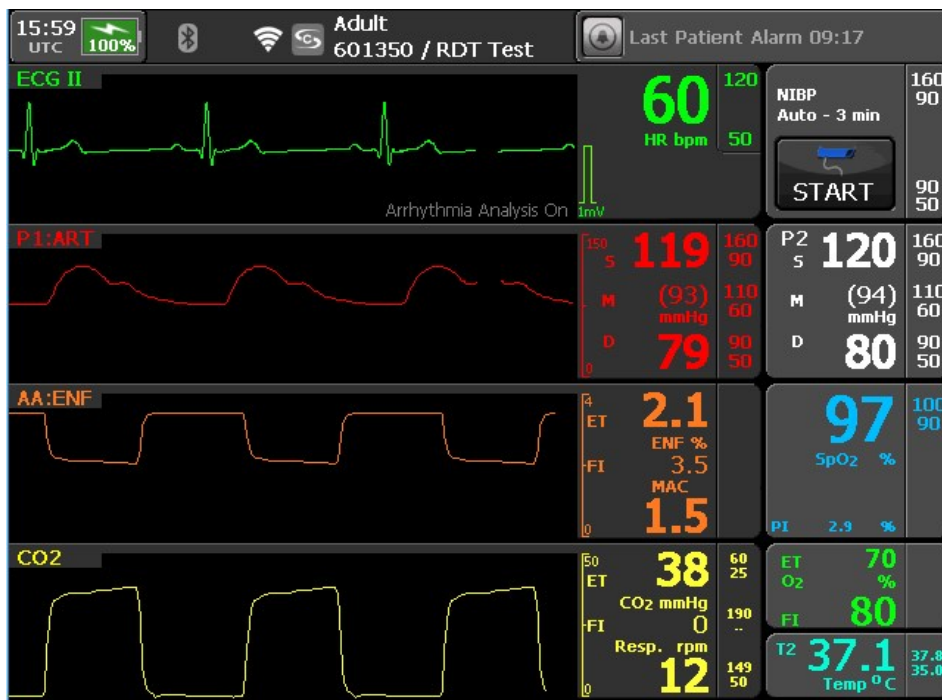
Step	Description	Photos and notes
5.	Rotate the bracket to clip the lower edge of the bracket onto the bottom rail on the rear of the litter mount.	
6.	Slide the two parts together to fit the AA gas module to the litter mount.	

1.3 Taking readings

The examples below show the Tempus Pro home page when monitoring AA gases with the Masimo ISA OR+ module.



AA gas (Enflurane) monitoring with CO2, O2 and N2O



AA gas monitoring with 2 channels of invasive pressure

AA gas parameters

Values in bold below are displayed with larger digits and are trended.

Parameter	Measurements
Anaesthetic Agents: • SEV (sevoflurane) • HAL (halothane) • ISO (isoflurane) • DES (desflurane) • ENF (enflurane)	ETAA and FIAA (%)
Carbon Dioxide (CO2)	ETCO2 and FICO2 (% , mmHg, kPA)
Oxygen (O2)	ETO2 and FIO2 (%)
Minimum Alveolar Concentration (MAC)	The MAC value is calculated from the primary AA1 value, the secondary AA2 value and N2O. $MAC = \frac{\%Et(AA1)}{X(AA1)} + \frac{\%Et(AA2)}{X(AA2)} + \frac{\%Et(N2O)}{100}$ X(AA): HAL=0.75%, ENF=1.7%, ISO=1.15%, SEV=2.05%, DES=6.0%

1.4 AA gas waveform selection

While the AA Gas module is plugged in the waveform selection screen includes buttons to select waveforms from AA, CO2, O2, N2O according to user preference. The positions of the waveforms on screen can also be adjusted.

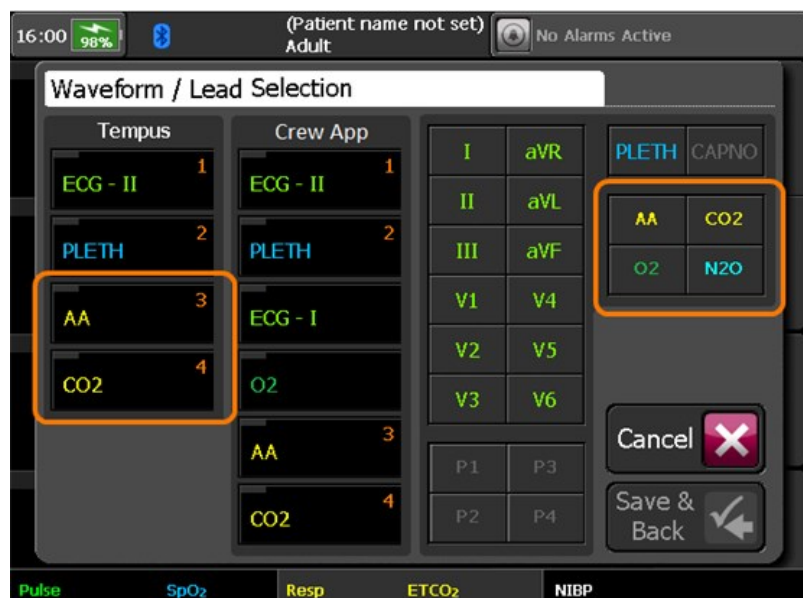
To access this screen:

1. Press the **Display Mode**



button

2. Press **Waveform / Lead Selection**.



AA gas waveform selection

1.5 AA gas module settings

To change AA gas module alarm limits, press any part of the **AA**, **CO2**, **N2O** or **O2** areas of the touchscreen. Alternatively, press **All Alarms** to change any parameter setting: the AA module alarm limit settings are displayed on pages 9 to 12 of the All Alarms Menu.



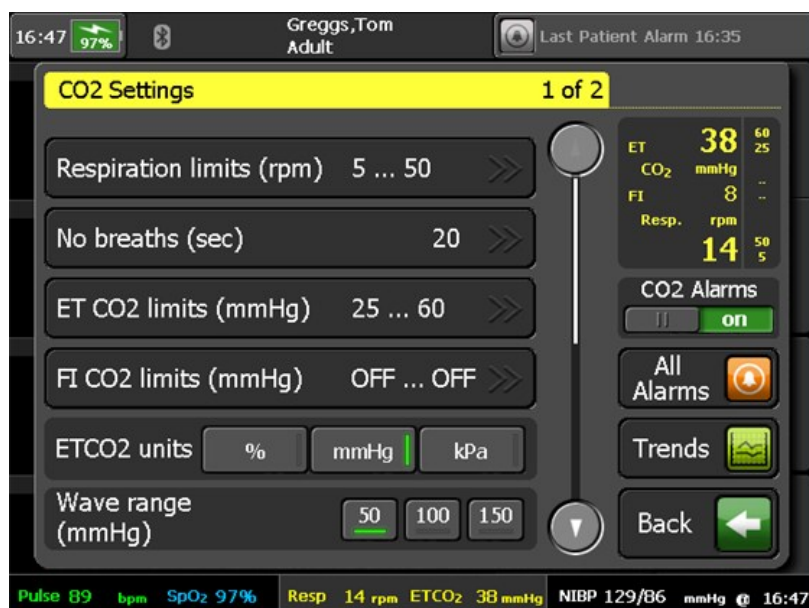
- AA gas module alarm limit settings are distinct from the internal capnometer alarm limits on page 5 of the All Alarms Menu (ETCO2, Capno no breaths and Respiration rate).
- AA gas settings are NOT configurable in the Configuration Utility, but when configured on one Tempus the settings can be transferred to another device using the import/export features.

If you press the **AA** area (e.g. **AA:HAL**), the Anaesthetic Agent Settings menu will open with the currently monitored anaesthetic agent alarm limits displayed. To adjust the limits for other agents, press one of the other tabs at the top of the menu.



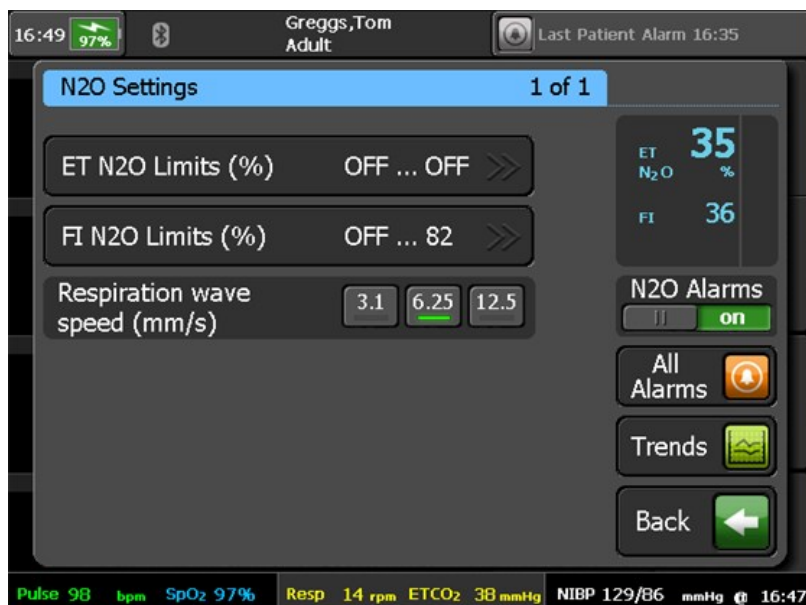
Anaesthetic Agent Settings menu

If you press the **CO2** area, the CO2 Settings menu will open.



CO2 Settings menu

If you press the **N2O** area, the N2O Settings menu will open.



N2O Settings menu

If you press the **O2** area, the O2 Settings menu will open.



O2 Settings menu

1.6 AA gas trends

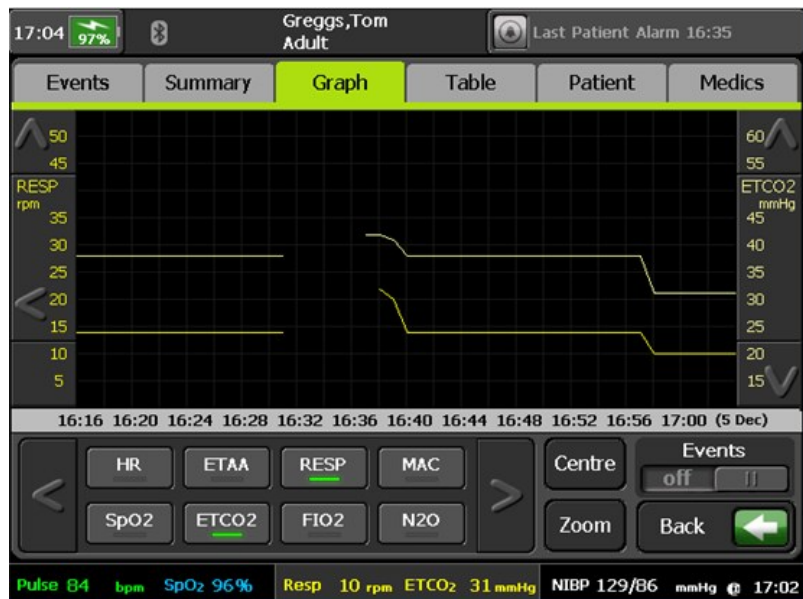
The following parameters are trended while using the AA Gas module:

- ETCO₂
- ETAA
- MAC
- FIO₂
- ETN₂O

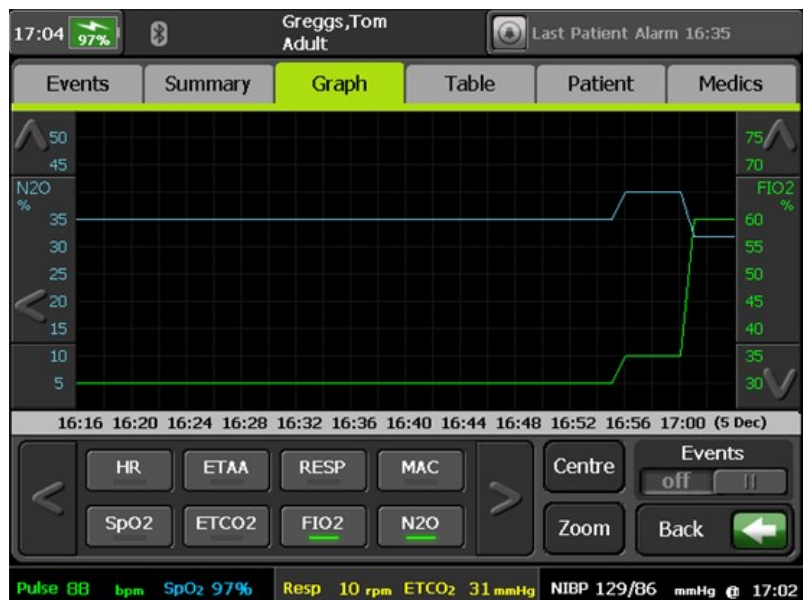
From the Home Screen, press and hold any AA gas waveform - the SRoC Graph tab is displayed with the results of the waveform you pressed. Press the Table tab to view the trend table.



AA gas trend graph showing MAC and AA



AA gas trend graph showing RESP and ETCO2



AA gas trend graph showing ETN20 and FIO2

17:05 97%

Greggs, Tom
Adult

Last Patient Alarm 16:35

Events	Summary	Graph	Table	Patient	Medics		
Date					05 Dec		
Time	16:59	17:00	17:01	17:02	17:03	17:04	17:05
HR (bpm)	88	87	90	84	91	83	87
ST1 (mm)	-	-	-	-	-	-	-
ST2 (mm)	-	-	-	-	-	-	-
QT (ms)	-	-	-	-	-	-	-
NIBP (mmHg)	-	129/86	-	-	129/86	-	-
Resp. (rpm)	10	10	10	10	10	10	10
ETCO2 (mmHg)	31	31	31	31	31	31	31
ETAA (%)	1.2	1.8	1.8	1.8	1.8	1.8	1.8
FIO2 (%)	35	35	60	60	60	60	60
ETN2O (%)	40	40	32	32	32	32	32
MAC	1.0	2.0	1.9	1.9	1.9	1.9	1.9

1 min

5 mins

1 hr

2 hrs

Events on

Back

Pulse 97 bpm

SpO2 97%

Resp 10 rpm

ETCO2 31 mmHg

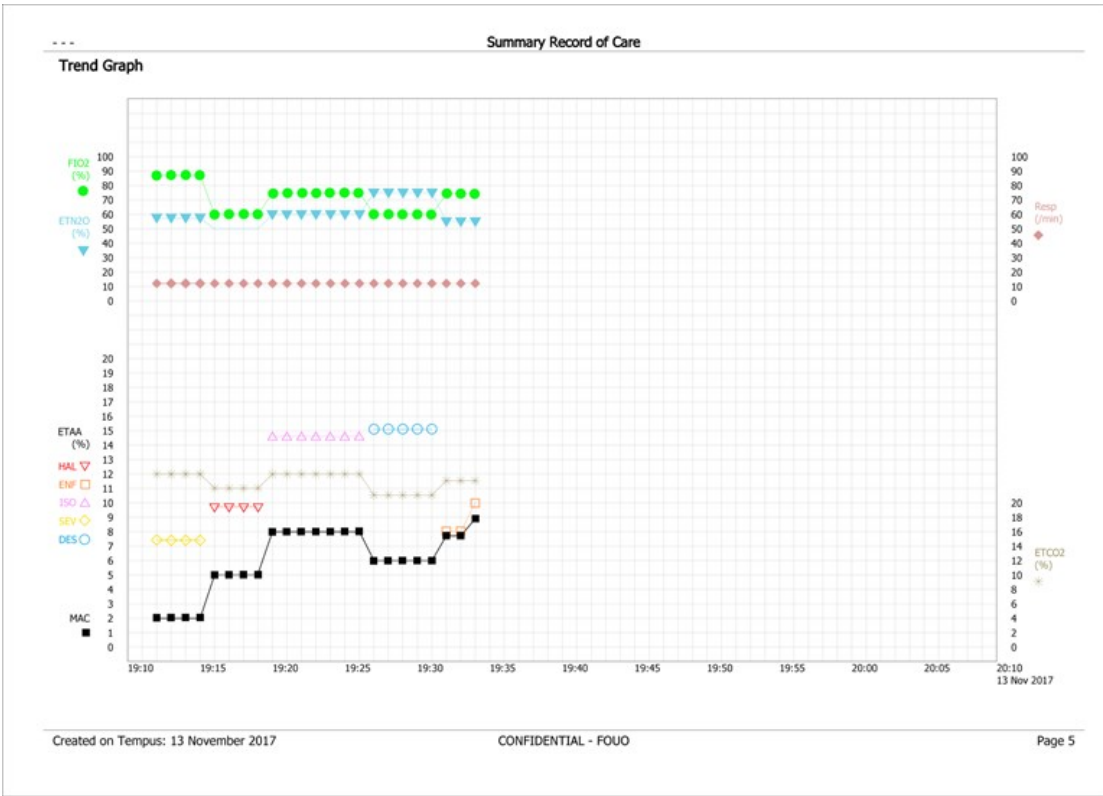
NIBP 129/86 mmHg

17:05

AA gas trend table (3rd page of trend table)

PDF report

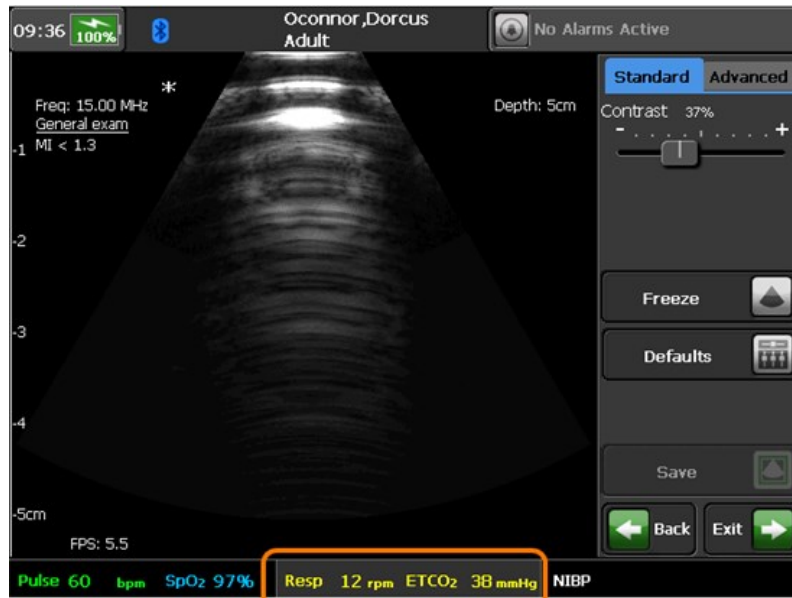
If you output patient data to a PDF report, the report will include an AA gas trend graph:



AA gas trend graph in PDF report

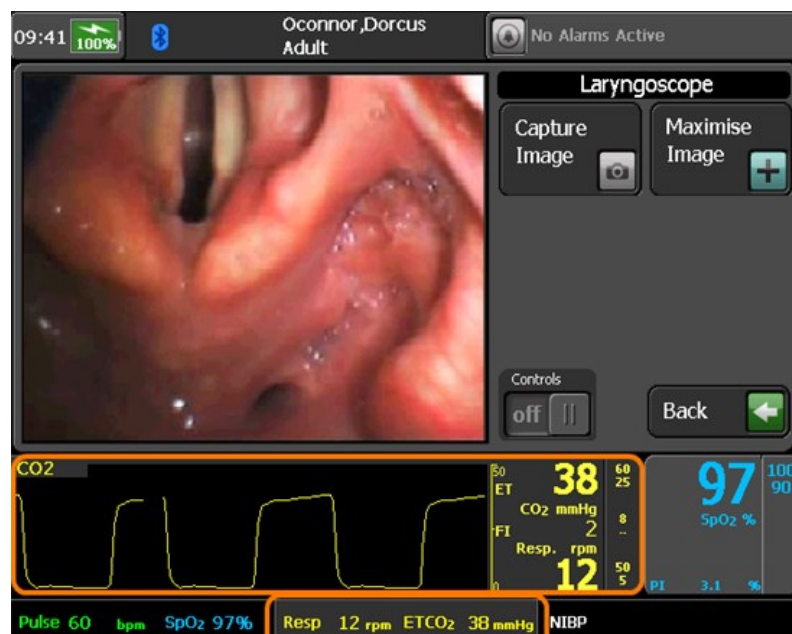
1.7 Ultrasound and laryngoscope display with AA gas vitals

When the ultrasound probe is plugged into the Tempus Pro, the ultrasound screen is displayed but AA gas monitoring continues in the background. A set of AA gas module vitals is displayed in the footer of the ultrasound screen: respiration rate and ETCO₂.



Ultrasound display with AA gas vitals

When the laryngoscope is plugged into the Tempus Pro, the laryngoscope screen is displayed but AA gas monitoring continues in the background. A set of AA gas module vitals is displayed in the footer of laryngoscope screen: CO₂ waveform, ETCO₂, FICO₂ and respiration rate.



Laryngoscope display with AA gas vitals

2 AA gas maintenance

2.1 AA gas module menu

The AA Gas Module menu allows you to disable N2O monitoring and calibrate the O2 sensor. To access these features:

1. Press the **Main Menu**  button.
2. Press **Maintenance and Settings**.
3. Enter your password (default 1234 or 123456).
4. Press **Medical Modules > AA Gas Module**.

5. Select an option:

N2O Monitoring - select 'no' to disable this feature if not required, or 'yes' to enable it again.

O2 Calibration - see "[2.2 AA gas O2 calibration](#)".

6. Press **Back**.



AA Gas Module menu

2.2 AA gas O2 calibration

The O2 sensor is a paramagnetic sensor which, if subjected to vibration or movement during operation, may go out of calibration. For this reason you should regularly check the calibration of the O2 sensor. The baseline (zero) value in atmosphere is typically 21%, and a calibrated supply of 100% would typically be available from an anaesthesia respirator or clinical grade O2 sample gas bottle.

Use the AA Module O2 Calibration menu to check typical readings and start calibration:

Zero Cal. - typical value 21% atmosphere.

Span Cal. - typical value 100% calibrated gas from ventilator.



Sensor calibration requires a careful sequence of actions including the use of clinical grade 100% O2:

Prepare gas bottle and sampling line

Typical gas bottle shown.

Step	Description	Photos and notes
1.	O2 gas flow  Sampling line 	

Step	Description	Photos and notes
2.	O2 gas flow  Sampling line 	
3.	To start the gas flow, open the control port fully.  WARNING Close the control port when not in use.	
4.	Adjust the regulator to give a reasonable gas flow rate (e.g. setting 3 or 4).	

Checking O2 sensor calibration

1. Connect the ISA OR+ module to the Tempus Pro with the sample line open to atmospheric air (21%) and allow warm up to complete. Let the module run for at least 1 minute.

2. Ensure the sample line is NOT connected to the O2 gas bottle tubing.
3. Enter the AA Module O2 Calibration screen.
4. Check the measurement displays 21% +/- 1%.
5. If the reading is out of range and normal atmospheric air is being sampled then zeroing is required (see below).
6. Connect the sampling line to the O2 gas bottle tubing.
7. Open the gas bottle control port and then set the regulator to a reasonable flow (approx rate 3 or 4).
8. Wait at least 30 seconds.
9. Check the measurement displays 100% +/- 1%.
10. If the reading is out of range span calibration is required (see below).

O2 sensor zero calibration sequence

1. Connect the ISA OR+ module to the Tempus Pro with the sample line open to atmospheric air (21%) and allow warm-up to complete. Let the module run for at least 1 minute.
2. Ensure the sample line is NOT connected to the O2 gas bottle tubing.
3. Enter the AA Module O2 Calibration screen.
4. Check the measurement displays 21% +/- 1%.
5. If the reading is out of range and normal atmospheric air is being sampled, press the **Zero Cal 21%** button. The status will display "Calibration in progress".

O2 sensor Span Calibration Sequence

Span calibration can only be performed after zero calibration.

1. Following on from the zero calibration, connect the sampling line to the O2 gas bottle tubing.
2. Open the gas bottle control port and then set the regulator to a reasonable flow (approx rate 3 or 4).
3. Wait at least 30 seconds.
4. Check the measurement displays 100% +/- 1%.
5. If the reading is out of range while the 100% O2 is being sampled press the **Span Cal 100%** button. The status will display "Calibration in progress". Wait for the calibration to complete.

2.3 Anesthetic gas monitoring accessories

Product name and description	Part number (RDT)
ISA OR+ sidestream analyzer	01-2167
Tempus to ISA OR+ adaptor cable	01-2168
Nomoline 2.0m (Box of 25) Sampling line with male luer lock connector, single-patient use, Adult/Pediatric/Infant. Requires T adaptor	01-2169
Nomoline Adapter 0.1m (Box of 25) Sampling line with female luer lock connector. Adult/Pediatric/Infant. Requires Nomo Extension and T adaptor	01-2170
Nomoline Airway Adapter Set 2.0m (Box of 20) Sampling line with straight airway adapter, single-patient use, Adult/Pediatric	01-2171
Nomo Extension 2.0m (Box of 25) Sampling line with male luer lock connector	01-2172
Nomo Extension 3.0m (Box of 25) Sampling line with male luer lock connector	01-2173
T-adaptor (Box of 25) Airway adapter with female luer lock connector, Adult/Pediatric	01-2174
AA gas exhaust port kit (Masimo #4409)	01-2255
ISA OR+ Ferno Mount Bracket	01-2258

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3 AA gas alarms and messages

3.1 Status information

The table below lists status messages relating to the AA Gas module that may be displayed in the waveform area:

Message	Comment
AA gas module initialising	Wait until AA Gas module warms up: it takes up to 20 seconds.
No agent detected	This message is displayed if no anaesthetic agent is detected.

3.2 Patient alarms

The tables below list all AA Gas module patient alarms (as they appear in the alarm status bar) with their parameters, ranges and priorities.

The default alarm values can be updated - please refer to the *Tempus Pro User-Operator Manual*, "All alarms menu".

ETAA high, ETAA low, FIAA high, FIAA low

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
ET SEV (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	4.0	0.0 – 25.0	Medium
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	4.0	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	4.0	0.0 – 25.0	
FI SEV (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	8.0	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	8.0	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	8.0	0.0 – 25.0	
ET HAL (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	1.5	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	1.5	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	1.5	0.0 – 25.0	
FI HAL (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	2.2	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	2.2	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	2.2	0.0 – 25.0	
ET ENF (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	3.4	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	3.4	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	3.4	0.0 – 25.0	
FI ENF (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	5.1	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	5.1	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	5.1	0.0 – 25.0	
ET ISO (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	2.3	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	2.3	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	2.3	0.0 – 25.0	
FI ISO (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	3.4	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	3.4	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	3.4	0.0 – 25.0	
ET DES (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	10.0	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	10.0	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	10.0	0.0 – 25.0	
FI DES (%)	0.0 – 25.0 %	Adult	OFF	0.0 – 20.0	12.0	0.0 – 25.0	
	0.0 – 25.0 %	Pediatric	OFF	0.0 – 20.0	12.0	0.0 – 25.0	
	0.0 – 25.0 %	Neonate	OFF	0.0 – 20.0	12.0	0.0 – 25.0	

MAC high, MAC low

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
MAC	0.0 – 15.0	Adult	OFF	0.0 – 10.0	OFF	0.0 – 15.0	Medium
	0.0 – 15.0	Pediatric	OFF	0.0 – 10.0	OFF	0.0 – 15.0	
	0.0 – 15.0	Neonate	OFF	0.0 – 10.0	OFF	0.0 – 15.0	

Respiration rate

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
Respiration (rpm)	2 – 149 rpm	Adult	5	2 – 145	50	5 – 149	Medium
	2 – 149 rpm	Pediatric	5	2 – 145	50	5 – 149	
	2 – 149 rpm	Neonate	12	2 – 145	80	5 – 149	

No breath detected

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
No breaths (sec)	20 – 60 sec	Adult	20	20 – 60	-	-	Medium
	20 – 60 sec	Pediatric	20	20 – 60	-	-	
	20 – 60 sec	Neonate	20	20 – 60	-	-	

ETCO2 high, ETCO2 low

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
ETCO2	0 – 190 mmHg 0.0 – 25.3 kPa 0.0 – 25.0 %	Adult	25 mmHg 3.3 kPa 3.3 %	0 - 145 mmHg 0 - 24.7 kPa 0 - 24.3 %	60 mmHg 8 kPa 7.9 %	5 - 150 mmHg 0.7 – 25.3 kPa 0.0 - 25 %	Medium
	0 – 190 mmHg 0.0 – 25.3 kPa 0.0 – 25.0 %	Pediatric	25 mmHg 3.3 kPa 3.3 %	0 - 185 mmHg 0 - 24.7 kPa 0 - 24.3 %	60 mmHg 8 kPa 7.9 %	5 - 190 mmHg 0.7 – 25.3 kPa 0.0 - 25 %	
	0 – 190 mmHg 0.0 – 25.3 kPa 0.0 – 25.0 %	Neonate	25 mmHg 3.3 kPa 3.3 %	0 - 185 mmHg 0 - 24.7 kPa 0 - 24.3 %	60 mmHg 8 kPa 7.9 %	5 - 190 mmHg 0.7 – 25.3 kPa 0.0 - 25 %	

FICO2 high, FICO2 low

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
FICO2	0 – 190 mmHg 0.0 – 25.3 kPa 0.0 – 25.0 %	Adult	OFF	0 - 185 mmHg 0 - 24.7 kPa 0 - 24.3 %	8 mmHg 1.0 kPa 1.0 %	0 - 190 mmHg 0.7 – 25.3 kPa 0.0 - 25 %	Medium
	0 – 190 mmHg 0.0 – 25.3 kPa 0.0 – 25.0 %	Pediatric	OFF	0 - 185 mmHg 0 - 24.7 kPa 0 - 24.3 %	8 mmHg 1.0 kPa 1.0 %	0 - 190 mmHg 0.7 – 25.3 kPa 0.0 - 25 %	
	0 – 190 mmHg 0.0 – 25.3 kPa 0.0 – 25.0 %	Neonate	OFF	0 - 185 mmHg 0 - 24.7 kPa 0 - 24.3 %	8 mmHg 1.0 kPa 1.0 %	0 - 190 mmHg 0.7 – 25.3 kPa 0.0 - 25 %	

ETO2 high, ETO2 low

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
ETO2	0 – 115 %	Adult	10.0	0 – 110	OFF	0 – 115	Medium
	0 – 115 %	Pediatric	10.0	0 – 110	OFF	0 – 115	
	0 – 115 %	Neonate	10.0	0 – 110	OFF	0 – 115	

FIO2 high, FIO2 low

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
FIO2	0 – 115 %	Adult	18.0	18 – 110	OFF	18 – 115	High
	0 – 115 %	Pediatric	18.0	18 – 110	OFF	18 – 115	
	0 – 115 %	Neonate	18.0	18 – 110	OFF	18 – 115	

ETN2O high, ETN2O low

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
ETN2O	0 – 115 %	Adult	OFF	0 – 82	OFF	0 – 82	Medium
	0 – 115 %	Pediatric	OFF	0 – 82	OFF	0 – 82	
	0 – 115 %	Neonate	OFF	0 – 82	OFF	0 – 82	

FIN2O high, FIN2O low

Parameter (Settings menu)	Measurement range	Patient type	Default alarm low	Alarm low range	Default alarm high	Alarm high range	Alarm priority
FIN2O	0 – 115 %	Adult	OFF	0 – 82	82	0 – 82	Medium
	0 – 115 %	Pediatric	OFF	0 – 82	82	0 – 82	
	0 – 115 %	Neonate	OFF	0 – 82	82	0 – 82	

3.3 Technical alarms

AA Gas technical alarms relate to the state of Masimo ISA OR+ AA Gas module. Technical alarms are low priority alarm states as defined by IEC60601-1-8.

The majority of technical alarms are self-explanatory and should be addressed by following the on-screen instructions. Additional information is provided below for certain technical alarm conditions.

Technical alarms can be cleared by the operator - please refer to the *Tempus Pro User/Operator Manual*, “Viewing and clearing alarms”.

Alarm on status bar	Comment
AA module fault	AA gas module fault. Unplug and reconnect the module.
AA O2 sensor fault	Please unplug and replug the AA gas module USB cable. If the problem persists contact your service representative.
AA sample line clogged	Disconnect and replace the AA gas module sampling line.
AA sampling line	AA gas module sampling line is not connected or is loose. Plug-in the sampling line, making sure it is firmly connected.
AA O2 port fault	AA gas module internal O2 port failure. Please unplug and plug back in. If the problem persists, contact your service representative.
AA motor speed	Motor speed error, check the AA gas module is not vibrating.
AA multiple agents	AA gas multiple agents detected. (when MAC < 3.0).
AA multiple agents	AA gas multiple agents detected with high MAC. (MAC >= 3.0).
AA agent out of range	AA gas module anaesthetic agent is out of range. Please unplug and plug back in. If the problem persists, contact your service representative.
AA CO2 out of range	AA gas module CO2 is out of range. Please unplug and plug back in. If the problem persists, contact your service representative.
AA O2 out of range	AA gas module O2 is out of range. Please unplug and plug back in. If the problem persists, contact your service representative.
AA N2O out of range	AA gas module N2O is out of range. Please unplug and plug back in. If the problem persists, contact your service representative.
AA temperature	AA gas module internal temperature is outside of operating range. Please unplug and plug back in. If the problem persists, contact your service representative.
AA ambient pressure	AA gas module ambient pressure is outside of operating range. Please unplug and plug back in. If the problem persists, contact your service representative.
AA zeroing required	AA gas module zeroing is required. Please refer to the maintenance manual.
Zero cal failed (*)	AA gas module O2 zeroing has not been successful this time. Please unplug and plug back in the AA gas module, then repeat Zero Cal 21%. If the problem persists, contact your service representative.
Span cal failed (*)	AA gas module O2 span calibration has not been successful this time. Please unplug and plug back in the AA gas module, then follow the calibration steps described in " 2.2 AA gas O2 calibration ". If the problem persists, contact your service representative.
AA agent ID unreliable	AA gas module agent identification and concentration are unreliable. Please refer to the maintenance manual.
AA O2 cal. required	AA gas module O2 calibration required. Please refer to the maintenance manual.
AA gas module unplugged	The AA gas module has been unplugged.

(*) 'Zero cal failed' and 'Span cal failed' are displayed on the AA Module O2 Calibration screen and can be cleared by unplugging the AA gas module.

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Annex A

Symbols used

The following symbols are used either on this product or on the accessories and packaging provided with it:



Consult the instructions for use. These are provided in electronic format in the Philips Document Library.



Consult the instructions for use (for an electronic IFU). These are provided in electronic format in the Philips Document Library.



Signifies European technical conformity for a device/accessory, CE marked by notified body number 0413.



Indicates the legal manufacturer of the device.



Name and address of the European Union Authorized Representative.

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Remote Diagnostic Technologies Ltd
Ascent 1
Farnborough Aerospace Centre
Aerospace Boulevard
Farnborough
Hampshire
GU14 6XW
United Kingdom

Tel: +44 (0) 1256 362 400
www.philips.com

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