

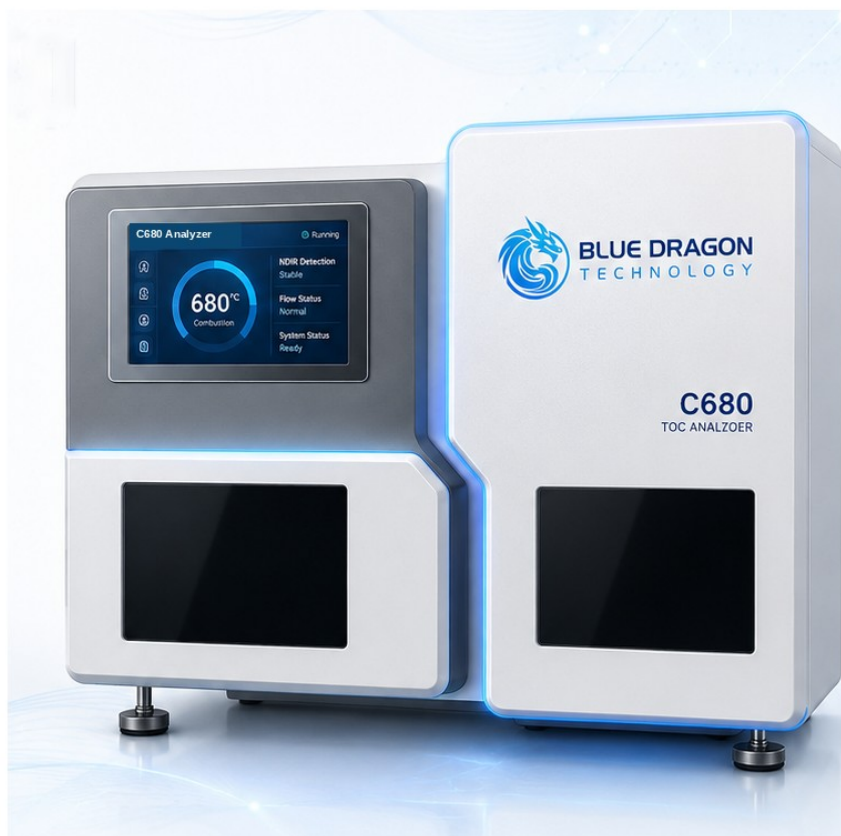


BLUE DRAGON TECHNOLOGY

C680

HIGH-TEMPERATURE COMBUSTION TOC ANALYZER

Operation, Installation & Maintenance Manual



Blue Dragon Water Quality & Organic Carbon Series

Document No. BD-C680-MAN-EN | Revision A | 2 August 2026

For trained installation, operation, calibration and maintenance personnel



Document Control

This manual defines the approved operating, installation, calibration and maintenance guidance for the Blue Dragon C680 High-Temperature Combustion TOC Analyzer. The delivered nameplate, packing list, factory test report, calibration data, software configuration and serial-number-specific documents govern the exact supplied configuration.

Field	Details
Product	Blue Dragon C680 High-Temperature Combustion TOC Analyzer
Document	Operation, Installation & Maintenance Manual
Document number	BD-C680-MAN-EN
Revision	A - Initial customer publication
Release date	2 August 2026
Language	English
Product family	Blue Dragon Water Quality & Organic Carbon Series
Standard configuration	Manual-injection laboratory TOC analyzer; high-temperature catalytic combustion; separate TC and IC paths; NDIR CO ₂ detection; local touchscreen
Standard warranty	12 months, subject to the sales contract
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IMPORTANT

The source documentation publishes more than one measurement-range statement and both a nominal 680 C method temperature and a broader furnace-temperature specification. Never select a range, curve or temperature outside the delivered factory test report, installed method and approved application validation.



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1. About This Manual

1.1 Purpose

This manual provides the information required to receive, inspect, install, connect, commission, operate, calibrate, maintain, store and troubleshoot the C680. It covers the standard manual-injection analyzer and identifies configuration-dependent details that must be confirmed from the delivered documents.

1.2 Intended Audience

- Laboratory analysts and water-quality personnel responsible for TOC, TC, IC and NPOC measurements.
- Instrumentation and electrical technicians responsible for power, grounding, oxygen and tubing connections.
- Calibration and quality personnel responsible for standards, curve approval, verification and records.
- Maintenance personnel trained to service reagent lines, sample pads, peristaltic-pump tubing, the combustion tube and catalyst.

1.3 Configuration Control

The delivered analyzer may include order-specific ranges, calibration curves, accessories and software functions. Screen labels and button positions may vary with the installed interface revision. The nameplate, factory test report, packing list, calibration sheet and approved method always take precedence over generic information in this manual.

1.4 Terminology

Term	Meaning
TC	Total Carbon: organic plus inorganic carbon converted to CO ₂ in the combustion path.
IC / TIC	Inorganic Carbon / Total Inorganic Carbon. The source uses both terms; this manual normally uses IC.
TOC	Total Organic Carbon, calculated as $TOC = TC - IC$.
NPOC	Non-Purgeable Organic Carbon after acidification and removal of inorganic carbon.
NDIR	Non-dispersive infrared gas detection of carbon dioxide.
F.S.	Full scale of the configured measurement range.
Calibration curve	Stored relationship between prepared standards and detector response for a defined analytical range.
Carrier gas	High-purity oxygen used to transport the sample reaction products to the detector.



2. Safety Information

WARNING

The C680 combines mains power, a high-temperature furnace, fragile glass components, high-purity oxygen and phosphoric-acid reagent. Only trained personnel may install, operate or service the analyzer.

2.1 General Safety Rules

- Read and understand the complete manual before unpacking, installing or operating the analyzer.
- Do not operate damaged equipment, damaged tubing, leaking reagent containers or a cracked combustion tube.
- Use the analyzer indoors on a stable laboratory bench. No hazardous-area certification is stated in the source documentation; treat the standard C680 as general-purpose, non-classified laboratory equipment.
- Only authorised service personnel may disassemble internal electronics, circuit boards, furnace wiring or detector assemblies.

2.2 Electrical Safety

- Use only a 220-240 VAC, 50 Hz supply with reliable protective grounding and suitable overcurrent protection.
- Confirm socket polarity and grounding before connection. The source specifies verification with a power-polarity tester.
- For normal shutdown, switch the analyzer off but leave the mains plug connected while the cooling fan is operating.
- Before maintenance, wait until the furnace is at room temperature and the fan has completed cooling; then disconnect the mains supply.
- After switching off, wait at least 3 minutes before restarting the analyzer.

2.3 Thermal and Mechanical Safety

- The furnace and combustion tube may remain hot after testing. Do not touch or remove them until room temperature is confirmed.
- The combustion tube is fragile. Support it during removal and installation; never force it through the furnace or lower support.
- Keep at least 20 cm clearance around the analyzer and do not place objects above or against ventilation openings.

2.4 Oxygen-Cylinder Safety

1. Do not store oxygen cylinders in the same room as flammable-gas cylinders.
2. Prohibit smoking and open flames in the oxygen-cylinder area.
3. Keep cylinders away from heat sources; the source specifies at least 10 m from open flame.
4. Stand to the side when opening the cylinder valve and regulator, and open slowly.
5. Do not use flame, impact or metal tools to thaw a frozen regulator or line; never force the regulator screw.
6. Never use an oxygen cylinder without a suitable regulator. Regulator repair is restricted to qualified personnel.

2.5 Reagent, Sample and Waste Safety

- Wear site-specified eye protection and gloves when preparing or handling 0.1 mol/L phosphoric acid, samples and waste.
- Follow the reagent safety data sheet and local laboratory chemical-handling procedures.
- Review samples for strong acidity, alkalinity, toxicity, biological hazards, solvents, salts and suspended solids before injection.
- Collect acidic liquid waste and sample residues in a compatible, labelled container. Dispose of waste according to its actual composition and local requirements.

CAUTION

The source states that the instrument is not suitable for strongly acidic or strongly alkaline water samples. Do not inject such samples without a written application review and approved pretreatment method.



3. Product Overview

3.1 Description

The Blue Dragon C680 is a precision laboratory analyzer for quantitative carbon measurement in water. It uses high-temperature catalytic combustion for Total Carbon, a separate acidification path for Inorganic Carbon, and NDIR carbon-dioxide detection. The controller calculates Total Organic Carbon from the difference between TC and IC.



Figure 1. Blue Dragon C680 High-Temperature Combustion TOC Analyzer.

3.2 Intended Applications

- Purified water, ultrapure water, drinking water and water for production or cleaning control.
- Surface water, groundwater and environmental monitoring samples.
- Municipal raw water, treated water, distribution water, sewage influent, effluent and reclaimed water.
- Industrial wastewater, circulating cooling water, boiler feedwater and process-water monitoring.
- Pharmaceutical, food, chemical, power, research and third-party laboratory applications.

3.3 Analytical Capability

Mode	Function
TC	Measures all carbon converted to CO ₂ in the 680 C combustion path.
IC	Acidifies the sample and measures CO ₂ released from carbonate, bicarbonate and other inorganic carbon.
TOC	Measures TC first, then IC, and calculates TOC = TC - IC.
NPOC	Acidifies and purges the sample to remove inorganic carbon, then combusts the remaining non-purgeable organic carbon.



3.4 Published Range Qualification

IMPORTANT

The source overview states an applicable range of 0.050-35,000.0 mg/L, while the technical specification table states 0-100,000 mg/L. These values are not automatically interchangeable. Use only the installed calibration curve and the validated range documented for the delivered analyzer and sample matrix.



4. Measurement Principle and Analytical Modes

4.1 Functional Flow

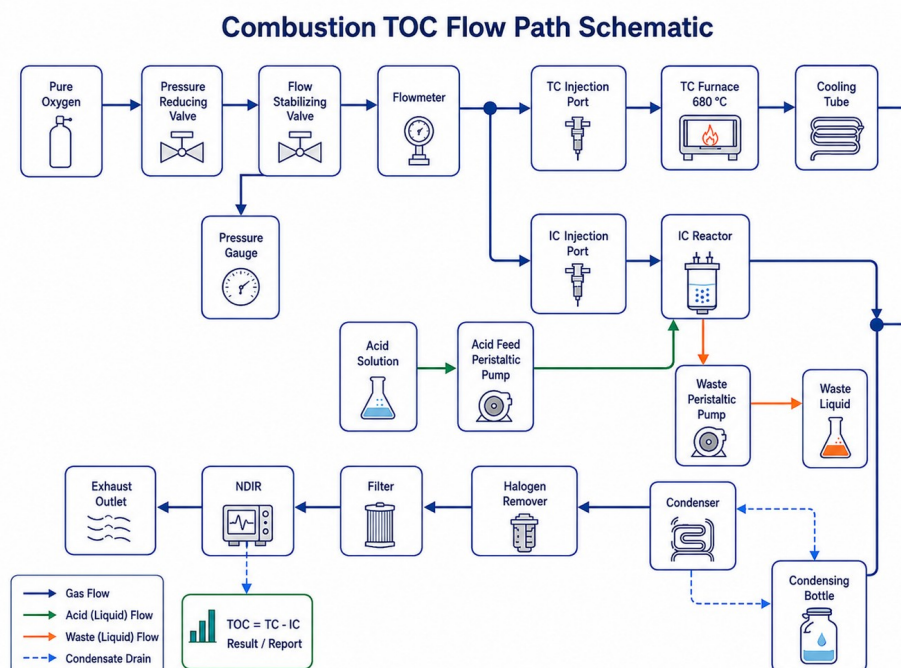


Figure 2. C680 gas, reaction, purification, detection and waste-flow schematic.

4.2 Gas Supply and Pretreatment

High-purity oxygen is reduced to the analyzer working pressure by a suitable regulator. A flow-stabilising valve and flowmeter control carrier-gas flow, while the pressure gauge provides real-time indication. Stable, clean gas flow is required for repeatable reaction and detector response.

4.3 Total Carbon Path

The sample is injected through the TC injection port and enters the high-temperature furnace with the oxygen carrier gas. At the nominal 680 °C method temperature and in the presence of platinum-alumina catalyst, organic and inorganic carbon are oxidised to carbon dioxide. The hot gas is cooled and condensed to remove most water vapour before purification and detection.

4.4 Inorganic Carbon Path

The sample is injected through the IC port into the IC reaction vessel. The acid-inlet peristaltic pump delivers phosphoric acid. Carbonate and bicarbonate species release carbon dioxide under acidic conditions. The waste-liquid pump removes the reacted liquid while the carrier gas transports CO₂ to the common gas path.

4.5 Gas Purification and NDIR Detection

Gas from the TC or IC path passes through a condenser, halogen-removal stage and particle filter. The purified gas enters the NDIR detector, which measures the characteristic infrared absorption of CO₂. The instrument converts detector response into TC or IC concentration using the selected calibration curve.

4.6 TOC and NPOC Calculation

For TOC, the controller measures TC and IC and calculates $TOC = TC - IC$. For NPOC, the sample is acidified and purged before combustion so that the remaining carbon response represents non-purgeable organic carbon.



5. Technical Specifications and Performance Qualifications

5.1 Published Technical Specifications

Parameter	Published value
Sample injection	Manual injection
Nominal combustion method temperature	680 C
Published furnace temperature specification	680-1000 C
Injection volume	10-500 uL
Published measurement range - overview	0.050-35,000.0 mg/L
Published measurement range - specification table	0-100,000 mg/L
Detection limit	≤ 0.5 mg/L (HJ501-2009)
Repeatability	$\leq 3\%$
TC indication error	$\pm 0.1\%$ F.S. or $\pm 5\%$, whichever is greater
IC indication error	$\pm 0.1\%$ F.S. or $\pm 4\%$, whichever is greater
Linearity	$R^2 \geq 99.9\%$, as published in the source
Response time	4-10 minutes
Carrier gas	High-purity oxygen, $\geq 99.99\%$
Acidifying reagent	0.1 mol/L phosphoric acid
Standard/reagent water	CO ₂ -free high-purity water, TOC ≤ 0.1 mg/L

5.2 Operating Environment

Condition	Requirement
Ambient temperature	10-40 C
Relative humidity	10-85%
Installation	Indoor laboratory; level bench; at least 20 cm clearance around the analyzer
Power supply	220-240 VAC, 50 Hz, protective grounding mandatory
Power consumption	1200 W during furnace heating
Bench capacity	Support at least 25 kg
Storage relative humidity	Not more than 80%; cool, clean, ventilated and free from corrosive gas

5.3 Performance Qualifications

- The detection limit, repeatability, indication error and linearity values are published specifications, not universal guarantees for every matrix or concentration.
- Actual performance depends on the installed calibration, standard quality, blank contamination, injection technique, sample matrix, catalyst condition and gas stability.
- Validate the method for the intended application before compliance, release or critical process decisions.



6. Receiving, Inspection and Storage Before Use

6.1 Receiving Inspection

1. Inspect the shipping carton for impact, moisture, puncture or compression damage before opening.
2. Photograph any damage and compare the contents with the packing list.
3. Confirm the analyzer identity, power configuration, accessories, combustion tube, tubing, bottles and documentation.
4. Do not install damaged glassware, cables, fittings or tubing. Report discrepancies before commissioning.
5. Preserve the original carton and protective materials for future transport or return.

6.2 Storage Before Installation

Store the packaged analyzer indoors in a cool, clean and well-ventilated area with relative humidity not exceeding 80%. Protect it from corrosive gas, direct sunlight, vibration, collision and moisture. Keep the carton upright and do not stack loads that may damage the instrument.

IMPORTANT

Installation, disassembly and reinstallation should be completed by Blue Dragon Technology or authorised technical personnel. Use the original packaging for any return shipment.



7. Analyzer Components and Controls

7.1 External Views

C680 Analyzer - External Views



Figure 3. C680 external views. The delivered connection labels and serial-number-specific arrangement govern.

7.2 Main Functional Components

Component	Function
Combustion furnace	Provides controlled high-temperature oxidation for the TC path.
Combustion tube	Contains quartz wool and platinum-alumina catalyst for sample oxidation.
Condensation assembly	Cools reaction gas and removes water vapour before detection.
IC module	Acidifies sample, releases inorganic carbon as CO ₂ and removes waste liquid.
NDIR detector	Measures carbon-dioxide response for TC and IC calculations.
Pressure gauge and rotameter	Indicate carrier-gas pressure and flow.
Acid-inlet peristaltic pump	Feeds phosphoric acid to the IC reaction vessel.
Waste-liquid peristaltic pump	Transfers reacted liquid to the waste bottle.
Touchscreen controller	Provides time, test, calibration and historical-data functions.



7.3 IC Operation Chamber

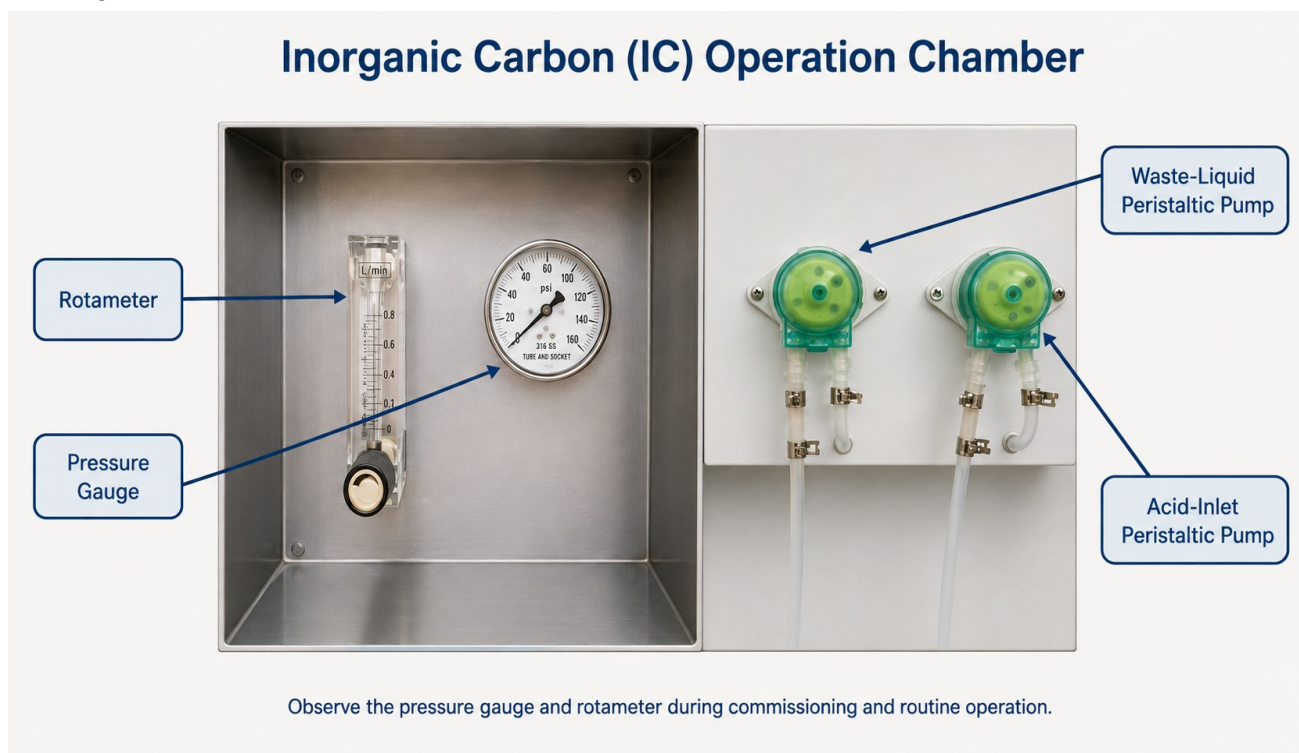


Figure 4. IC chamber components: rotameter, pressure gauge, waste-liquid pump and acid-inlet pump.

NOTE

The source photographs show an earlier enclosure appearance. The delivered C680 may have updated Blue Dragon exterior panels while retaining the same analytical functions. Use the delivered labels and drawings for exact component location.



8. Installation and Connections

8.1 Location and Bench

- Place the analyzer on a level laboratory bench capable of supporting at least 25 kg.
- Maintain at least 20 cm clearance behind and at both sides; maintain free space above for heat dissipation and service.
- Avoid direct sunlight, abnormal temperatures, corrosive vapours, excessive dust and vibration.
- Provide safe, secured space for the oxygen cylinder and regulator.

8.2 Electrical Supply and Grounding

1. Confirm a 220-240 VAC, 50 Hz supply with protective grounding and capacity for 1200 W furnace heating.
2. Insert a power-polarity tester into the intended outlet. Confirm the indicator pattern matches the tester instructions for correct polarity and grounding.
3. Do not connect the analyzer until the gas, reagent and waste arrangements are complete.
4. Provide an accessible disconnect and follow local electrical requirements.

8.3 Combustion Tube Installation

Install the combustion tube in the correct orientation before operation. Handle the glass only when the furnace is at room temperature. Do not strike, twist excessively or force the tube through the furnace support. Confirm that the assembly is fully seated and uniformly secured.

8.4 Oxygen Connection

1. Secure the oxygen cylinder upright and fit a regulator suitable for high-purity oxygen service.
2. Connect one end of the clean gas tube to the regulator adapter and the other end to the analyzer rear gas inlet.
3. Open the cylinder and regulator slowly. Leak-check every joint using the site-approved method.
4. Establish the pressure and flow specified by the delivered commissioning record. The source does not publish a universal setpoint.

8.5 Acid, Waste and Exhaust Connections

1. Place the labelled 0.1 mol/L phosphoric-acid bottle and compatible waste bottle in their designated positions.
2. Insert the acid-inlet tubing into the acid bottle and the waste tubing into the waste bottle. Ensure tubing reaches the liquid correctly without kinks.
3. Keep the waste bottle vented as required by the supplied cap and do not allow waste to overflow.
4. Keep the NDIR exhaust outlet unobstructed and route it to a safe atmospheric location without backpressure.
5. Connect mains power last.

CAUTION

Do not allow phosphoric acid or waste liquid to contact electrical components. Immediately isolate and clean any spill according to the laboratory spill procedure.



9. Standards, Reagents and Sample Preparation

9.1 Water for Standards and Reagents

Prepare all TOC, TC, IC/TIC and NPOC standards and reagents with freshly prepared high-purity deionised water having TOC below 0.1 mg/L. Store it sealed and protected from light, and minimise exposure to air to prevent absorption of CO₂ or volatile organic compounds. Do not substitute ordinary distilled water or tap water.

- Spot-check the water blank before preparation when required by the laboratory quality plan.
- Reprepare the water if the blank does not meet the approved criterion.
- Use clean containers and volumetric equipment reserved for low-carbon work where practical.

9.2 Phosphoric-Acid Reagent

Use 0.1 mol/L phosphoric acid prepared from analytical/reagent-grade material and the high-purity water described above. The reagent acidifies IC samples and is also used for NPOC pretreatment.

- Store sealed, protected from light and refrigerated according to the laboratory procedure.
- Label the preparation date, concentration and expiry date.
- Reprepare when expired, contaminated, evaporated or otherwise unsuitable.
- Use the acid amount and purge time defined by the approved method. Insufficient acid may leave IC; excessive acid may shift the baseline.

9.3 Sample Handling

- Minimise open exposure so atmospheric carbon does not change the sample.
- Thoroughly mix samples containing suspended solids before injection while avoiding loss of volatile material.
- For NPOC, fully acidify and purge the sample according to the approved method before combustion.
- Dilute high-concentration samples stepwise when necessary to remain within the selected calibration curve and reduce contamination of the tube and catalyst.
- High-salinity samples can shorten catalyst life. Dilute only when the approved method permits and record the dilution factor.
- Do not inject strongly acidic or alkaline samples without an approved application method.



10. Start-up and Commissioning

10.1 Pre-start Checks

Check	Acceptance
Installation	Analyzer level; ventilation clear; packaging removed; no visible damage.
Power	Correct voltage and frequency; protective earth verified; plug and cord secure.
Oxygen	Purity $\geq 99.99\%$; cylinder secured; regulator fitted; leak-free tubing; pressure and flow available.
Combustion tube	Correctly installed; catalyst and quartz wool dry, evenly loaded and serviceable.
Reagent and waste	Fresh 0.1 mol/L phosphoric acid available; tubing correctly immersed; waste bottle empty and connected.
Sample system	Injection ports, pads, syringe and tubing clean and undamaged.
Records	Correct method, calibration curve and analyst authorisation available.

10.2 Power-on and Preheating

1. Open the oxygen cylinder and establish the approved carrier-gas pressure and flow.
2. Switch on the analyzer. Allow the controller to complete initialization and enter the main interface.
3. Confirm that furnace, pump and fan status indicators are normal.
4. Allow the combustion furnace and NDIR detector to preheat until temperature and baseline are stable.
5. Run the required blank and calibration verification before sample analysis.

IMPORTANT

Do not calibrate or measure samples before the furnace and detector have reached stable operating conditions. Replace damp or exhausted catalyst, quartz wool or combustion-tube components before use.

10.3 Commissioning Acceptance

- No oxygen, reagent or waste leaks.
- Stable pressure, flow, furnace temperature and detector baseline.
- Blank and verification standards within the laboratory acceptance criteria.
- TC and IC injection ports seal correctly and produce repeatable peak shapes.
- Date, time, selected curves and data records are correct.



11. User Interface and Menu Structure

11.1 Main Interface

C680 TOC Analyzer Blue Dragon C680

Time Setting Test

Calibration Historical Data

Furnace: On Oxygen Pump: On Exhaust Fan 1: On Exhaust Fan 2: On

Status: Ready Language: English

Figure 5. Recreated C680 main interface. Build numbers and third-party identifiers are intentionally omitted.

The standard main interface provides four core modules: Time Setting, Test, Calibration and Historical Data. Status indicators show the heater, oxygen pump and exhaust-fan states. Button names or positions may vary slightly with the delivered interface revision.

11.2 Time Setting

C680 TOC Analyzer Blue Dragon C680

Date and time

Year Month Day Hour Minute Second

2026 08 02 18 09 00

1 2 3 4

5 6 7 8

9 0 Back OK

Figure 6. Date and time configuration screen.

1. From the main interface, select Time Setting.
2. Select the date or time field to be changed and enter the value using the on-screen keypad.
3. Select OK to save. Use Back to return without continuing to other menus.



4. Confirm the displayed time before testing because it is used in historical records and reports.

11.3 Operator-Interface Conventions

Control	Function
Confirm / OK	Save the entered values and continue.
Cancel	Discard the current edit.
Back	Return to the previous menu. Do not use Back while a test is running.
Start	Begin the configured measurement.
Stop	Terminate the active measurement safely.
Print	Send the displayed or selected record to the configured printer, if installed.
Up / Down / Next	Navigate records or list entries.



12. Calibration and Curve Management

12.1 Select Calibration Type

C680 TOC Analyzer

Blue Dragon C680

TC Calibration

IC Calibration

Back

Figure 7. TC or IC calibration selection.

From the main interface, select Calibration, then select TC Calibration or IC Calibration. Calibrate and verify each analytical path used by the approved method.

12.2 Curve List

C680 TOC Analyzer

Blue Dragon C680

Calibration curves

Curve name	Creation time	K	B	Q
TC-LOW	2026-08-02 09:30	1.000	0.000	0.000
TC-HIGH	2026-08-02 09:45	1.000	0.000	0.000
IC-STD	2026-08-02 10:00	1.000	0.000	0.000

Add

Delete

Edit

Confirm

Figure 8. Calibration-curve list with Add, Delete, Edit and Confirm controls.

- Select the target curve before editing or calibrating.
- Use Add to create a new curve, Delete to remove an authorised obsolete curve and Edit to change parameters.
- Protect approved curves from unauthorised change and retain calibration records before deletion.



12.3 Curve Parameters

C680 TOC Analyzer

Blue Dragon C680

Curve parameters

Curve name

TC-LOW

K value

1.000

B value

0.000

Q value

0.000

Calibration

Confirm

Cancel

Figure 9. Curve name and K, B and Q coefficient fields.

CAUTION

K, B and Q are stored curve parameters. Do not alter them manually unless the change is part of an approved calibration procedure and the previous values are recorded.

12.4 Calibration Points

C680 TOC Analyzer

Blue Dragon C680

Calibration point list

X	Y

X / Area

0

Y / Vol

0

Edit

Add

Delete

[] Force linear

Confirm

Cancel

Figure 10. Calibration-point list, X/Y entry fields and Force Linear option.

Add the required calibration points using the standard values and responses specified by the delivered calibration method. Screen labels may show X, Y, Area or Vol depending on the interface build. Confirm the axis assignment from the delivered calibration sheet; do not infer or reverse it from translated labels alone.



12.5 Calibration Procedure

1. Prepare the required blank and standards with high-purity water and approved stock solutions.
2. Allow the analyzer to preheat and stabilise. Confirm oxygen pressure and flow.
3. Select TC or IC Calibration and open the intended curve.
4. Create or edit the curve name and approved parameters.
5. Add each calibration point. Inject the standard through the correct port and follow the on-screen prompts.
6. Repeat points when required by the quality plan and review response, peak shape, residuals and linearity.
7. Select Force Linear only when required by the approved method.
8. Confirm and save the curve, then return to the main interface.
9. Verify the saved curve with an independent standard before routine use.

12.6 Acceptance and Records

- The source publishes linearity as $R^2 \geq 99.9\%$. Confirm the displayed calculation and the factory or laboratory acceptance criterion.
- Blank response must be acceptable and standards must remain within the selected range.
- Record curve name, standards, response, coefficients, date, analyst and verification result.
- Recalibrate or verify after replacement of catalyst, combustion tube, sample pads, pump tubing or other response-critical consumables.



13. Routine Measurement

13.1 Configure the Test

C680 TOC Analyzer

Blue Dragon C680

Test setup

Test type	TC - Total Carbon Test	Test code	20260802180900
Preheat temperature	600 C	Test count	1
Temperature	0 C	TC curve	TC-LOW
Current flow	0 mL/min	IC curve	IC-STD

Confirm

Cancel

Figure 11. Test setup screen for mode, temperatures, flow, code, count and curves.

C680 TOC Analyzer

Blue Dragon C680

Test setup - select analytical mode

TC - Total Carbon Test

TC - Total Carbon Test

TOC - Total Organic Carbon Test

IC - Inorganic Carbon Test

NPOC Test

Confirm

Cancel

Figure 12. Available analytical modes: TC, TOC, IC and NPOC.

1. From the main interface, select Test.
2. Select TC, TOC, IC or NPOC as required.
3. Review the preheat temperature, displayed temperature, current flow, test code and test count.
4. Select the approved TC and/or IC calibration curve for the measurement.
5. Select Confirm to save the test parameters.



NOTE

Values shown in the recreated screens are illustrative only. Use the delivered method and approved commissioning settings.

13.2 Start, Stop and Injection

C680 TOC Analyzer

Blue Dragon C680

Live measurement

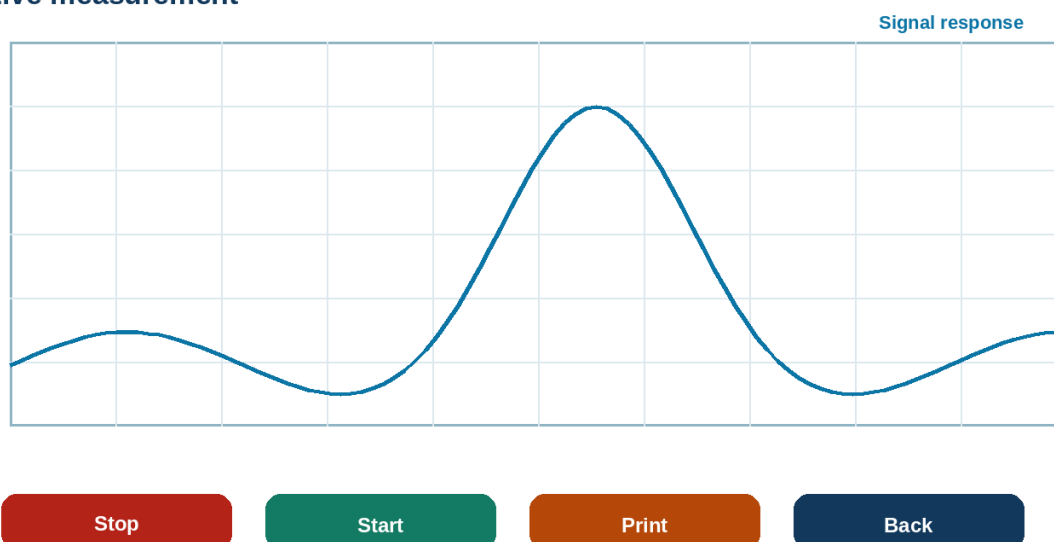


Figure 13. Live response screen with Start, Stop, Print and Back controls.

1. Select Start to begin the configured test.
2. Follow the on-screen prompt and inject the required volume into the indicated port.
3. Observe the response curve and wait for the system to request the next injection or complete the result.
4. If the test must be terminated, select Stop. Always stop the test before selecting Back.
5. Print or record the result as required by the laboratory procedure.

13.3 Mode-Specific Sequence

Mode	Required sequence
TC	Inject through the TC port. The sample is combusted and the CO ₂ response is converted to TC.
IC	Inject through the IC port. The sample is acidified and the released CO ₂ is converted to IC.
TOC	Inject the sample into the TC port first. When prompted, inject the same sample into the IC port. Do not reverse, advance or delay the order. The analyzer calculates $TOC = TC - IC$.
NPOC	Acidify and purge the sample according to the approved method, then inject through the TC port for combustion measurement.

13.4 Measurement Precautions

- Do not leave samples exposed for extended periods.
- Mix particulate samples thoroughly before injection to reduce sampling bias and blockage.
- Complete NPOC acidification and purge fully.
- Dilute high-concentration samples to remain within the curve and protect the catalyst.
- Use a clean, suitable syringe and avoid carryover between standards and samples.
- Do not navigate Back while a test is active; stop the test first to prevent program or data errors.



14. Historical Data and Reporting

C680 TOC Analyzer

Blue Dragon C680

Historical data

No.	Start time	Test type	TC	TOC	IC	Test code
1	2026-08-02 17:40	TOC	12.4	10.8	1.6	RUN-001
2	2026-08-02 17:55	TC	5.2	-	-	RUN-002
3	2026-08-02 18:05	IC	-	-	0.8	RUN-003

Scroll Up

Next

Print

Back

Figure 14. Historical-data list and navigation/print controls.

1. From the main interface, select Historical Data.
2. Use the navigation controls to review saved test time, test type, parameters and results.
3. The source states that the most recent records are located at the bottom of the list; scroll down to access them.
4. Select the required record and use Print when a compatible printer is configured.
5. Return to the main interface after review.

14.1 Data Integrity

- Confirm date and time before analysis.
- Use unique test codes and retain dilution, sample-preparation and curve information in the laboratory record.
- Do not rely on local history as the only archive. Export, print or transcribe results according to the quality system.
- Investigate blank, curve, peak-shape or sequence anomalies before releasing results.



15. Normal Shutdown

15.1 End-of-Run Flush

1. Complete or stop the active test and return to a safe standby state.
2. Flush the sample injection system and relevant lines with ultrapure water to remove residual sample and reagent.
3. Inspect the waste level and empty the bottle if required by the laboratory procedure.

15.2 Controlled Cool-down

1. Initiate the normal furnace cool-down and allow temperature to fall under controller supervision.
2. Close the oxygen supply according to the approved shutdown sequence.
3. Switch off the analyzer. Do not unplug the mains supply while the cooling fan is operating.
4. After the fan has stopped and the furnace is at room temperature, disconnect power only when maintenance or extended storage requires isolation.

WARNING

Do not abruptly cut power or gas during a test or while the furnace requires controlled cooling. Before opening the analyzer for maintenance, verify room temperature and disconnect the mains supply.

15.3 Post-Run Care

Regularly inspect and clean the combustion tube, replace exhausted catalyst, and check the condenser and moisture-removal components. Carbon deposits, wet gas paths and degraded catalyst can cause baseline drift, low response and poor peak shape.



16. Routine Maintenance

16.1 Maintenance Precautions

- Isolate power only after the controlled cool-down is complete and the furnace is at room temperature.
- Clean the microsampler promptly when insoluble particles may block the needle.
- High-salinity samples shorten catalyst life; apply approved dilution and inspect more frequently.
- Do not test strongly acidic or alkaline samples without an approved method.
- Wait at least 3 minutes before restarting after power-off.
- Perform calibration verification after any maintenance that can affect response, flow or sealing.

16.2 Recommended Maintenance Schedule

Interval	Action
Each run	Check oxygen pressure/flow, reagent level, waste capacity, injection-port sealing and baseline.
Daily / after use	Flush sample paths with ultrapure water; wipe external surfaces; inspect leaks and waste.
Weekly or by workload	Inspect syringe/microsampler, tubing, condensation path and pump operation.
Every 50-100 injections or 1-2 months	Replace the 11.5 x 3.5 mm TC chromatography sample pad when worn or leaking.
Every 3-6 months	Inspect/replace butterfly filter, high-temperature gaskets and quartz wool as condition requires.
Every 12-18 months	Inspect/replace 6 mm and 3 mm chromatography sample pads as condition requires.
Every 12-24 months or 2,000 tests	Inspect/replace combustion tube and platinum-alumina catalyst; replace peristaltic-pump tubing as required.
After response-critical replacement	Calibrate or verify TC and IC before sample release.

16.3 Restricted Service

Internal circuit boards, furnace electrical components, NDIR electronics and controller hardware are restricted to Blue Dragon Technology or authorised service personnel. Do not attempt component-level repair in the laboratory.



17. Consumable Replacement and Service Procedures

17.1 Consumables List

No.	Consumable	Specification	Recommended cycle
1	Combustion tube	Custom	12-24 months or every 2,000 tests
2	TC chromatography sample pad / septum	11.5 x 3.5 mm, Teflon-silicone composite	Every 50-100 injections or 1-2 months
3	6 mm chromatography sample pad	Outer 6 mm, inner 4 mm	12-18 months
4	3 mm chromatography sample pad	Outer 3 mm, inner 1 mm	12-18 months
5	Butterfly filter	0.22 um	3-6 months
6	High-temperature gasket	10 mm and 18 mm	3-6 months
7	Quartz wool	Approved high-temperature grade	3-6 months or with catalyst
8	Catalyst	Platinum-alumina	12-24 months or every 2,000 tests
9	Acid-inlet and waste-pump tubing	Custom peristaltic-pump tubing	12-24 months or by condition
10	Phosphoric acid	0.1 mol/L, analytical grade	Follow reagent expiry and condition

NOTE

Replacement cycles are guidance only. Adjust them for sample characteristics, usage frequency, salt loading, peak shape, baseline stability and physical condition. Keep critical consumables in stock.

17.2 Acid-Reagent Replacement

1. Switch off the analyzer after normal cool-down.
2. Remove the acid-inlet tubing from the existing bottle cap.
3. Replace the reagent with freshly prepared 0.1 mol/L phosphoric acid.
4. Tighten the bottle cap and insert the pump tubing correctly.
5. Prime or verify acid delivery according to the approved procedure and check for leaks.

17.3 Combustion Tube and Catalyst Removal

WARNING

Confirm that the analyzer is powered off, disconnected from mains and at room temperature before removing the combustion tube or catalyst.



Combustion Tube Assembly - Removal Points

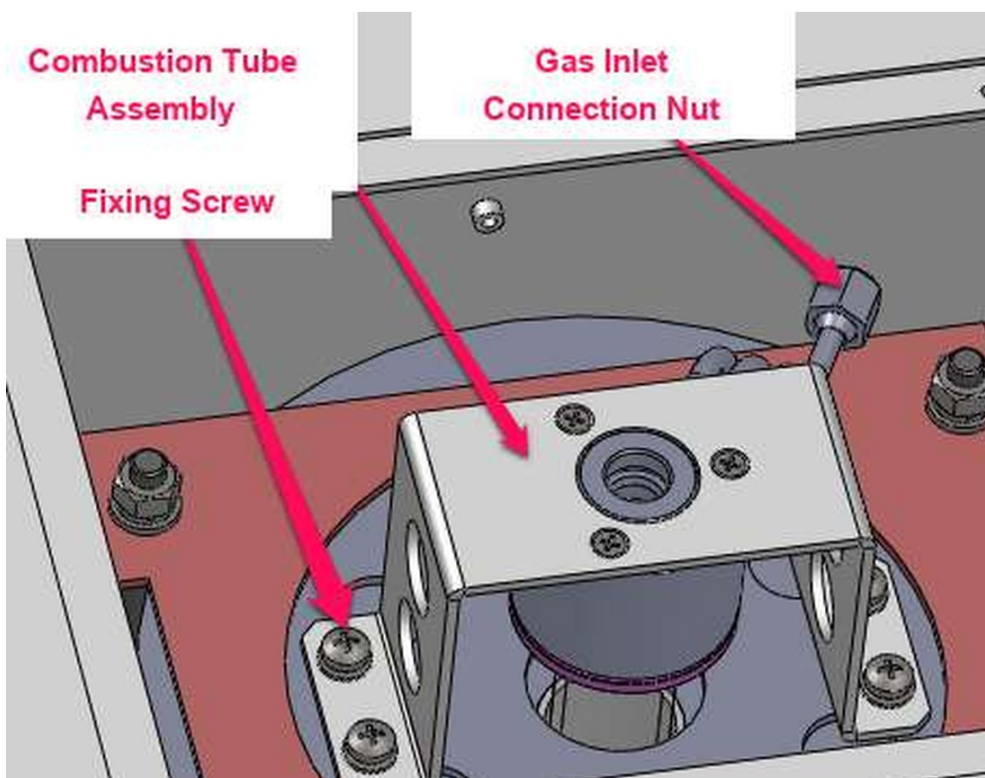


Figure 15. Combustion-tube assembly fixing screws and gas-inlet connection nut.

1. Unscrew the four combustion-tube assembly fixing screws.
2. Loosen the gas-inlet connection nut and detach the inlet-gas tubing.
3. Hold the assembly head, rotate gently and lift the assembly from the furnace.
4. Loosen the combustion-tube locking screw and remove the tube with a gentle rotating motion.
5. Clean the sample seat and replace the sealing ring when required.



17.4 Catalyst and Quartz-Wool Loading

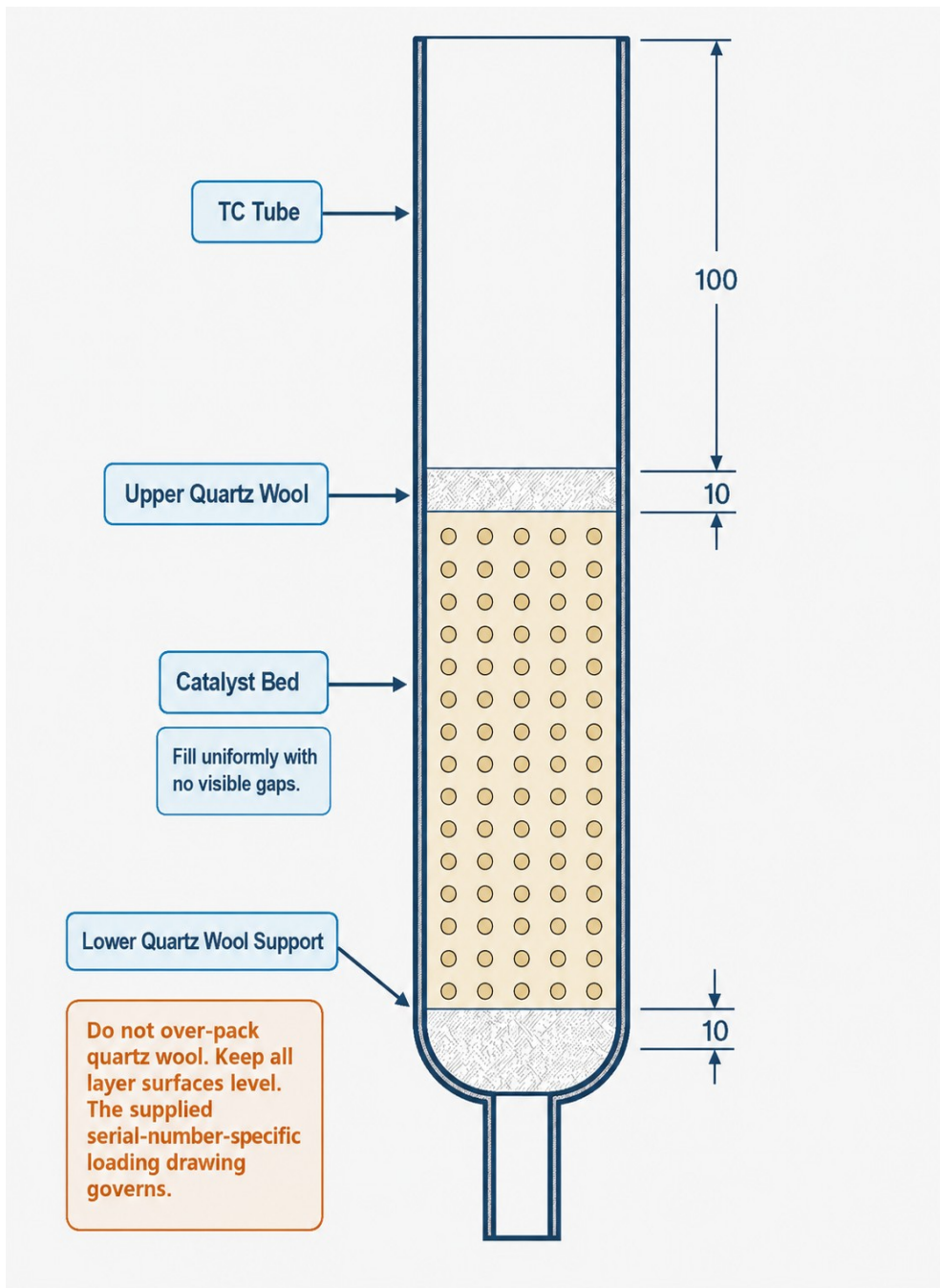


Figure 16. Reference combustion-tube loading arrangement. The supplied service drawing governs exact dimensions.

- Do not pack quartz wool tightly. Keep the ends flat and level.
- Fill platinum-alumina catalyst uniformly. Gently shake the tube during filling to remove obvious gaps and level the surface.
- Ensure the upper quartz wool contacts the catalyst without a visible gap; a gap can cause abnormal peak shape.
- A thin protective layer of quartz-glass chips may be placed above the upper quartz wool, but it must not be excessive.

17.5 Reinstall the Combustion Tube

1. Reassemble in the reverse order of removal.
2. Push the tube fully into position and tighten locking screws evenly so that they share the load.
3. Gently pull the tube to confirm it does not move.
4. Insert the assembly into the furnace with a gentle twisting motion while aligning the lower support. Never force the glass.
5. Reconnect the gas line, leak-check and complete calibration verification before sample analysis.

17.6 TC Sample-Pad Replacement

1. Unscrew the fixing screws and remove the sample-pad clamp.
2. Remove the old pad and inspect the seat for contamination or damage.
3. Install the new pad in the same orientation as the removed pad and the supplied spare-parts drawing.



4. Reinstall the clamp and tighten screws evenly only until secure. Do not overtighten.
5. If leakage remains, tighten slightly and recheck.

IMPORTANT

The legacy source text describes the pad face orientation inconsistently. Preserve the original orientation during removal and follow the supplied spare-parts drawing or Blue Dragon service instruction.

17.7 IC Sample-Pad Replacement

1. Loosen the IC injection-port screw cap.
2. Remove the exposed old sample pad.
3. Install the correct replacement pad and tighten the screw cap.
4. Leak-check the port before calibration or testing.

17.8 Peristaltic-Pump Tubing Replacement

1. Rotate the plastic pump cover to the right and remove it.
2. Remove the tubing clamp at the movable end, rotate the pump head and withdraw the tubing.
3. Cut the nylon ties at both ends of the clamp and remove the old tubing.
4. Install approved new tubing and secure it with small nylon ties. Align the raised tie section with the raised clamp section and keep it below the clamp height.
5. Install the fixed-end clamp in the slot and rotate the pump head to feed the tubing fully into the head.
6. Refit the plastic cover, prime the line and check acid delivery or waste removal.

CAUTION

Do not use sharp objects to force peristaltic-pump tubing into the pump head.



18. Troubleshooting and Fault Analysis

18.1 Troubleshooting Method

1. Stop the test safely and record the displayed condition, method, curve and recent maintenance.
2. Check power, grounding, oxygen, pressure, flow, reagent, waste, tubing and injection-port sealing.
3. Inspect for leaks, blockage, wet gas-path components, degraded catalyst and abnormal pump operation.
4. Use only the operator actions listed below. Isolate the analyzer and contact authorised service for internal faults.
5. After corrective work, run blank and calibration verification before releasing results.

No.	Fault	Probable cause	Operator action
1	Screen blank after power-on	Power cord loose, outlet/supply fault or internal power fault	Verify outlet, cord, plug and switch. If the screen remains blank, isolate power and contact authorised service.
2	Furnace cannot reach the set value after prolonged heating	Mainboard or furnace fault	Stop operation and contact authorised service.
3	Flowmeter indicates zero or very low flow	Leak or restriction in the gas path	Check cylinder, regulator, tubing and fittings segment by segment; correct leaks or restrictions.
4	CO ₂ reading does not change or immediately shows 20	NDIR address/configuration error or NDIR fault	Confirm the approved detector address only if authorised; otherwise contact service.
5	Touchscreen unresponsive	Controller frozen or touchscreen damaged	Restart only after a normal stop and 3-minute wait. If unresolved, contact service.
6	Touchscreen unresponsive; suspected internal foreign object	Foreign object or internal obstruction stated in the source	Do not open internal electronics. Isolate and contact service.
7	Peristaltic pump noisy or cannot draw acid	Pump tubing aged/sticky or pump damaged	Replace approved pump tubing; if unresolved, contact service.
8	TC unstable or peak shape poor	Combustion tube aged, catalyst depleted, quartz-wool loading unsuitable or leak	Inspect/reinstall the tube, refill catalyst and quartz wool, leak-check and recalibrate.
9	TC sample inlet leaks	Injection-port gasket/sample pad worn or not sealing	Replace the correct inlet gasket or sample pad and leak-check.

NOTE

The legacy source troubleshooting table contained an apparent cross-row action for the blank-screen fault. This edition aligns the operator action with the stated power-connection cause and directs internal faults to authorised service.



19. Storage, Transportation, Disposal and Technical Support

19.1 Extended Storage

1. Flush the sample and reagent paths, empty waste and complete normal cool-down.
2. Disconnect power only after the fan stops and the furnace is at room temperature.
3. Remove or secure reagent and waste bottles to prevent leakage.
4. Protect injection ports, gas fittings and fragile glass components.
5. Store indoors in a clean, cool, ventilated area with relative humidity not exceeding 80% and no corrosive gas.

19.2 Transportation

- Use the original carton and protective packaging.
- Keep the analyzer upright, dry and protected from collision and vibration.
- Transport oxygen cylinders separately under applicable cylinder-transport controls.
- Contact Blue Dragon Technology before disassembly or reinstallation.

19.3 Disposal

Dispose of electronic equipment, glass, catalyst, quartz wool, phosphoric acid, sample residues and contaminated consumables according to the actual hazards and applicable local requirements. Do not place chemical waste or contaminated parts in ordinary waste unless authorised by the site procedure.

19.4 Warranty and Technical Support

The standard warranty is 12 months, subject to the sales contract. Before requesting support, record the analyzer serial number, power configuration, selected range and curves, fault description, displayed values, recent maintenance, sample type and clear photographs or screen images.

NOTE

Technical support and current product information: bluedragontechnology.com. The sales contract and order documents govern warranty scope, supplied options and service arrangements.



Appendix A. Quick Start Checklist

Stage	Checklist
Before power	Level bench; 20 cm clearance; grounded 220-240 VAC supply; oxygen connected and leak-free; acid/waste bottles installed; tube and catalyst serviceable.
Start	Open oxygen slowly; establish approved pressure/flow; power on; allow furnace and NDIR to stabilise.
Quality check	Run blank and verification standard; confirm correct curve and acceptable response.
Test	Select TC/IC/TOC/NPOC; enter test code; confirm curves; select Start; inject only when prompted.
TOC sequence	TC injection first, then IC injection when prompted.
Stop	Select Stop before Back; print or record the result.
Shutdown	Flush with ultrapure water; controlled cool-down; close oxygen; switch off; keep mains connected while fan runs.



Appendix B. Installation and Commissioning Checklist

Item	Status
Shipping damage inspected and recorded	[]
Packing list and accessories verified	[]
Bench level and rated for at least 25 kg	[]
20 cm ventilation clearance maintained	[]
220-240 VAC, 50 Hz and protective earth verified	[]
Power-polarity tester result acceptable	[]
Oxygen cylinder secured; regulator suitable; purity confirmed	[]
Gas tubing connected and leak-checked	[]
Combustion tube installed and secured	[]
0.1 mol/L phosphoric acid and waste bottle connected	[]
Exhaust unobstructed	[]
Date/time and interface checked	[]
Furnace/detector preheat stable	[]
Blank acceptable	[]
TC calibration/verification acceptable	[]
IC calibration/verification acceptable	[]
Commissioning record completed	[]

Commissioned by: _____ Date: _____

Approved by: _____ Serial No.: _____



Appendix C. Calibration and Verification Record

Field	Record
Analyzer serial number	
Analytical path / mode	TC / IC / TOC / NPOC
Curve name	
Date and time	
Analyst	
High-purity water blank result	
Oxygen pressure / flow	
Furnace temperature	
Curve coefficients K / B / Q	
Force Linear selected	Yes / No
Published/approved R2 criterion	
Calculated R2	
Independent verification result	
Acceptance decision	Accepted / Rejected

Calibration Points

Point	Standard value	Displayed X/Y entry	Response / area	Replicate result	Accepted
1					
2					
3					
4					
5					
6					
7					
8					

Comments / corrective action:



Appendix D. Measurement Record

Field	Record
Sample ID	
Test code	
Date/time	
Analyst	
Mode	TC / IC / TOC / NPOC
TC curve	
IC curve	
Injection volume	
Dilution factor	
Sample preparation / purge	
TC result	
IC result	
TOC or NPOC result	
Peak/response review	Acceptable / Investigate
Report reference	

Observations:



Appendix E. Maintenance Log

Date	Operating count	Maintenance / part replaced	Reason / condition	Verification result	Technician



Appendix F. Suggested Consumables and Spare Parts

Item	Specification	Planning note
Combustion tube	Custom; confirm delivered part number	Critical glass spare
Platinum-alumina catalyst	Approved C680 catalyst	Keep sufficient quantity for planned replacement
Quartz wool	Approved high-temperature grade	Replace with catalyst or by condition
TC sample pad / septum	11.5 x 3.5 mm Teflon-silicone composite	High-use consumable
6 mm sample pad	Outer 6 mm, inner 4 mm	IC/connection spare as supplied
3 mm sample pad	Outer 3 mm, inner 1 mm	IC/connection spare as supplied
Butterfly filter	0.22 um	Gas-path filtration
High-temperature gaskets	10 mm and 18 mm	Sealing spare
Peristaltic-pump tubing	Approved custom tubing	Acid and waste lines
Phosphoric acid	Analytical grade for 0.1 mol/L preparation	Laboratory-supplied reagent
Clean gas tubing and fittings	Oxygen-compatible, configuration-specific	Installation/service spare
Injection syringe / microsampler	Approved volume range	Routine operation

IMPORTANT

Confirm all configuration-specific part numbers against the packing list, service drawing or Blue Dragon quotation before ordering. Similar-looking pads, gaskets and pump tubing may not be interchangeable.



Appendix G. Configuration and Service Record

Configuration field	Delivered / approved value
Product	Blue Dragon C680 High-Temperature Combustion TOC Analyzer
Serial number	
Date received	
Power configuration	220-240 VAC, 50 Hz / confirm nameplate
Published range(s)	0.050-35,000.0 mg/L overview; 0-100,000 mg/L specification / delivered validated range: _____
Installed TC curves	
Installed IC curves	
Approved injection volumes	
Approved furnace/method temperature	
Oxygen pressure / flow setpoints	
Interface revision / configuration	
Printer or output options	
Commissioning date	
Last calibration date	
Last catalyst/tube replacement	
Blue Dragon service reference	

Service notes:

END OF MANUAL