

Parker Balston® TOC-1250 TOC Gas Generator

Installation, Operation, and Maintenance Manual

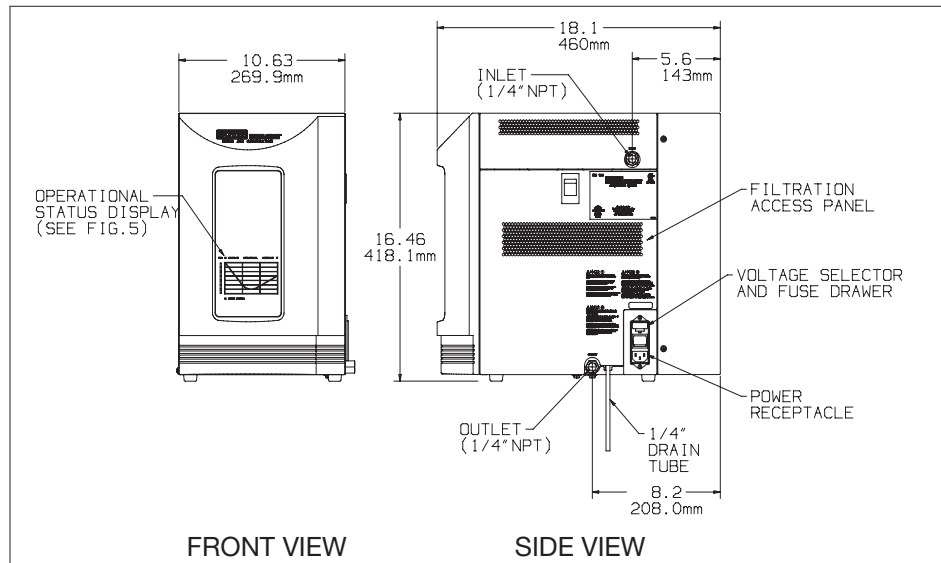


Figure 1 - Overall Dimensions

These instructions must be thoroughly read and understood before installing and operating this product. Failure to operate this product in accordance with these instructions could present a safety hazard to the user and will void the safety certification of this product. If you have any questions or concerns, please call the Technical Services Department at 800-343-4048, 8AM to 5PM Eastern Time (North America only) or email us at: balstontechsupport@parker.com. For other locations, please contact your local representative.

Please save product packaging for future use.

General Description

The Parker Balston TOC-1250 TOC Gas Generator (see Figure 1) is a completely engineered system designed to produce Total Organic Carbon (TOC) TOC Analyzer carrier/combustion gas, at a flow rate of up to 1250 cc/min., from compressed air. The generator utilizes a combination of filtration, combustion, and pressure swing absorption technologies to remove hydrocarbons, carbon dioxide (CO₂), and water from an on-site compressed air supply. The gas produced by the Parker Balston TOC-1250 TOC Gas Generator has a hydrocarbon level of less than 0.1 ppm (measured as methane), CO₂ level of less than 1 ppm, a CO level of less than 1 ppm, and a dewpoint of -100°F(-73°C).

Regulatory Compliance

These products are certified to the electrical safety requirements as specified by the IEC standards. Product supplied to Europe carries the CE mark (220/230/240 VAC units only). The product meets EMC compliance.

Engineered System

The Parker Balston TOC-1250 TOC Gas Generator includes all the components required to convert compressed air into a high purity carrier/combustion gas for a TOC Analyzer. The purified gas is delivered at a flow rate of 1250 cc/min., at a pressure slightly reduced from the inlet air supply pressure.

The flow schematic (see Figure 2) shows all of the major components of the generator. The purification process can be broken down into five primary stages: prefiltration, hydrocarbon removal, cooling, drying and CO₂ removal, and final filtration.

Prefiltration

Two stages of high efficiency coalescing prefiltration are incorporated into the Parker Balston TOC-1250 TOC Gas Generator to protect the catalyst bed from potential contamination. The prefilters are located on the right side of the unit (behind the filtration access panel), and they remove liquids and particulate matter from the incoming air supply to 0.01 micron. The filters are equipped with float drains which automatically open to empty any liquid which accumulates inside the filter housing. The drains are connected to 1/4" O.D. plastic tubing which discharges to atmosphere through the filtration access panel (see Figure 3).

Description

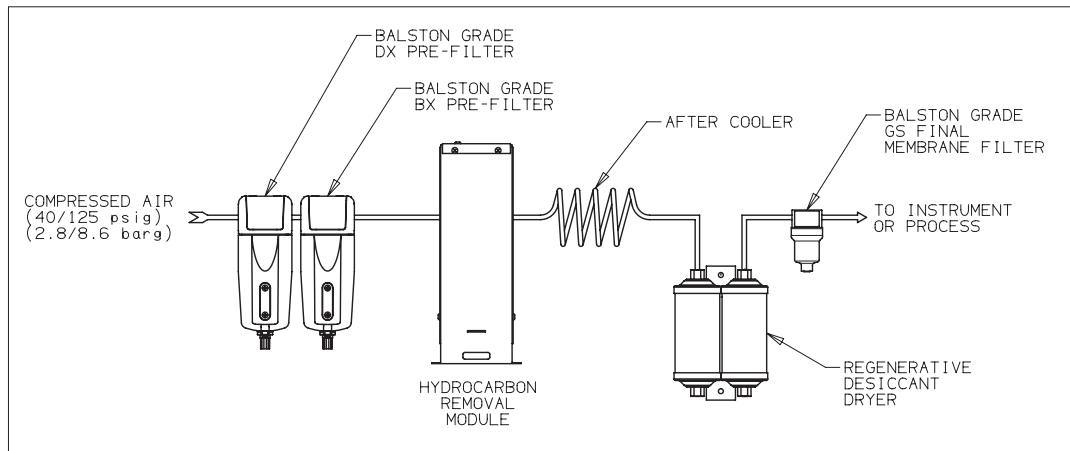


Figure 2 - Flow Schematic

Hydrocarbon Removal

The hydrocarbon catalyst module is a stainless steel vessel filled with catalyst and assembled with a cartridge heater. This assembly oxidizes hydrocarbons in the compressed air supply to water and carbon dioxide. A temperature controller operates the catalyst bed at the required temperature for optimal combustion of the hydrocarbons in the compressed air supply.

Cooling

The Parker Balston TOC-1250 is equipped with a coiled copper aftercooler to cool the hot outlet air from the hydrocarbon removal module to within 20°F (11°C) of ambient. Cooling the heated air enhances the operation of and prolongs the life of the regenerative dryer.

Drying and CO₂ Removal

The Parker Balston TOC-1250 TOC Gas Generator utilizes a regenerative desiccant dryer to dry the clean, hydrocarbon-free compressed air to -100°F (-73°C) dewpoint, and to remove carbon dioxide to less than 1 ppm.

Final Filtration

The final filter on the TOC-1250 is a Grade GS membrane filter which removes particulate contamination to 0.01 micron (absolute).

Installation



All installation, operation, and maintenance procedures for the Parker Balston TOC-1250 TOC Gas Generator should be performed by suitable personnel using reasonable care.

General

The Parker Balston TOC-1250 TOC Gas Generator is a free-standing benchtop unit. The inlet and outlet ports of the TOC-1250 are 1/4" female NPT, and both are located on the right side of the generator (see Figure 1). A 1/4" male NPT fitting which will withstand 125 psig and 2500 cc/min. (or equivalent fitting) should be used to connect to the generator.

A shut-off valve and a pressure regulator should be installed directly upstream from the Parker Balston TOC Gas Generator (see Figure 4). The shut-off valve isolates the unit from the air line for maintenance and troubleshooting tasks. The pressure regulator controls the inlet air pressure and should be set to maintain a constant pressure between 65 psig and 125 psig (4.5 barg and 8.6 barg). Maintaining a constant inlet air pressure will minimize any system pressure fluctuations which may affect the purity of the gas generated.

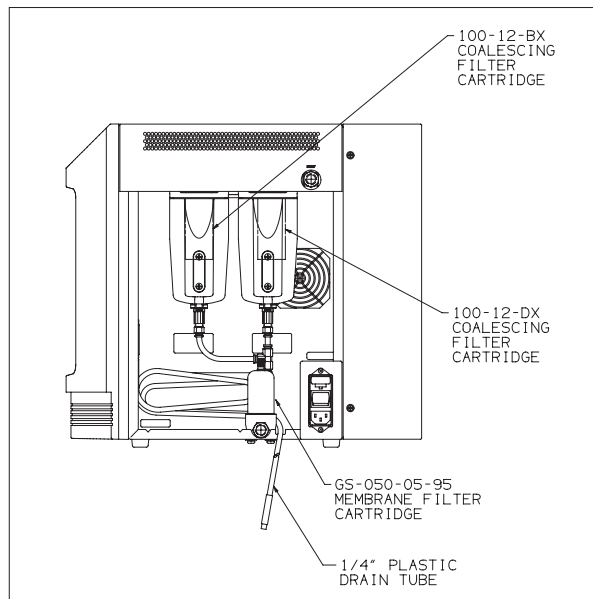


Figure 3 - Side View, Cover Removed

Location

The Parker Balston TOC-1250 TOC Gas Generator should be installed in an area relatively free of excessive dust and dirt, where the ambient temperature is between 60°F and 104°F (16°C and 40°C). Do not install the generator outdoors. There is no limit to the distance between the generator and the point of use as long as tubing type, size, cleanliness, and pressure drop are taken into consideration. Approximately 6" of space should be allowed along the top and sides of the generator to ensure proper ventilation.

Utilities

Compressed Air - The Parker Balston TOC Gas Generator requires a source of clean, dry compressed air (65 psig-125 psig/4.5 barg-8.6 barg) for optimal operation. The air should be as close to instrument quality as possible and supplied at a flow rate and pressure above those required at the point of use. The temperature and/or dewpoint of the supply air should be at room temperature (or lower), and the air should be relatively free of compressor oil, hydrocarbons, and particulate matter. Contamination of the catalyst bed may occur if it is exposed to certain compounds (see warning below). To prevent premature contamination of the catalyst module, the inlet to the compressed air supply compressor should be vented outdoors.



The catalyst module and TOC Gas Generator can be contaminated by high concentrations of lead, sulfur, or phosphorous compounds, heavy metals, long chain polymers, halogenated hydrocarbons, and chlorofluorocarbons. Care should be taken to avoid introducing these compounds to the TOC Gas Generator or compressed air supply. The intake for the compressor should be vented to the outdoors to ensure a clean air supply. Exposure of the TOC Gas Generator to any of these contaminants could damage the generator and void the warranty.

Power - The Parker Balston TOC Gas Generator may be operated by a 120 VAC, 220 VAC, 230 VAC, or 240 VAC, 50/60 Hz power supply. The generator is shipped with a tag at the power receptacle which specifies the factory setting of the voltage selector. For optimal performance of the generator, the operator should set the voltage selector to match the local power supply. To change the setting on the voltage selector, simply remove the selector/fuse drawer from the receptacle using a small screwdriver, turn the selector so the desired voltage shows in the window, and reassemble. (Note: "NA" versions of the TOC-1250 may only be operated at 120 VAC.) To connect the generator to the power supply, simply plug the female end of the electrical cord into the receptacle on the right side of the generator, and the opposite end into a three-pronged earthed power receptacle. Parker does not recommend the use of a ground fault circuit interruptor with this unit.

The main supply line voltage must be within 10% of nominal rated voltage for the generator.



Before plugging power cord into power receptacle, check the voltage selector setting. The voltage setting must match the local power supply voltage. The power receptacle used with the unit should have provision for protective earthing or grounding of the unit.

Installation

Utilities (continued)

Piping Components - The inlet and outlet ports for the Parker Balston TOC-1250 TOC Gas Generator are 1/4" NPT (female) and located on the side of the unit. Inlet tubing and fittings should be clean and rated for 125 psig (8.6 barg). The tubing and fittings used downstream from the TOC-1250 should be clean stainless steel or pre-cleaned refrigeration-grade copper (1/4" O.D. x .030" wall) and rated for 125 psig (8.6 barg). Do not use plastic tubing downstream from the TOC-1250. Outgassing from the plastic may contaminate the carrier/combustion gas. Use PTFE tape on all inlet and outlet NPT fittings. (Thread sealing compounds may contaminate the process stream.)

If pre-cleaned copper tubing is unavailable, standard copper tubing may be cleaned by the customer. First, connect the tubing to a supply of clean inert gas (N₂, He). Next, initiate the gas flow through the tubing (5-10 cc/min.). Finally, heat the tubing with a propane torch, moving the flame at a rate of approximately 1/2 in./sec. in the direction of flow. This procedure removes waxes and oils used in the manufacture of copper tubing.

Note: The use of plastic piping components or copper piping components which are not refrigeration-grade will result in the TOC Gas Generator failing to meet purity specifications.

Drain Lines - The 1/4" diameter plastic drain line on the side of the generator should be piped away to an appropriate disposal container. The liquid in this drainage will consist of water and compressor oil and should be disposed of properly.

Recommended Accessories

Pressure Regulator - To control the incoming air pressure to the TOC Gas Generator, install a pressure regulator directly upstream from the generator. The Parker Balston W-425-4032-000 Pressure Regulator is a pressure regulator with 1/2" NPT (female) inlet and outlet ports, assembled with a pressure gauge. For more information, please call your local representative to request the Gas Management Supplies Catalog.

Flow Controller - If the output capacity of the TOC-1250 is exceeded, the hydrocarbon, carbon dioxide, and water vapor content of the emergent gas may vary from specified levels. To ensure carrier/combustion gas integrity, install a flow meter designed for high purity applications downstream from the generator (if one has not been incorporated into the TOC analyzer design). The Parker Balston W-FM7583 is a flow controller sized to the capacity of the TOC Gas Generator.

Gas Receiver - Small pressure fluctuations may occur in the carrier/combustion gas stream generated by the TOC-1250 as a result of the pressure swing absorption drying and CO₂ removal process. If downstream instrumentation is sensitive to these fluctuations, install a small receiver tank downstream from the generator. The 72-007 Gas Receiver is a 3/4 gallon aluminum receiver which, when installed, will smooth pressure fluctuations from the generator. The combination of this receiver, a pressure regulator, and a flow controller will result in a carrier/combustion gas supply with very consistent flow characteristics (see Figure 4).

Installation Kit - The Parker Balston IK76803 Installation Kit consists of all the fittings required to bring the TOC-1250 on-line to supply two instruments/applications. The kit includes 50 feet of 1/4" copper tubing, 50 feet of 1/8" copper tubing, 1/8" tube tee fitting, 1/4" tube compression fitting, 1/8" tube compression fitting and extra nuts and ferrules.

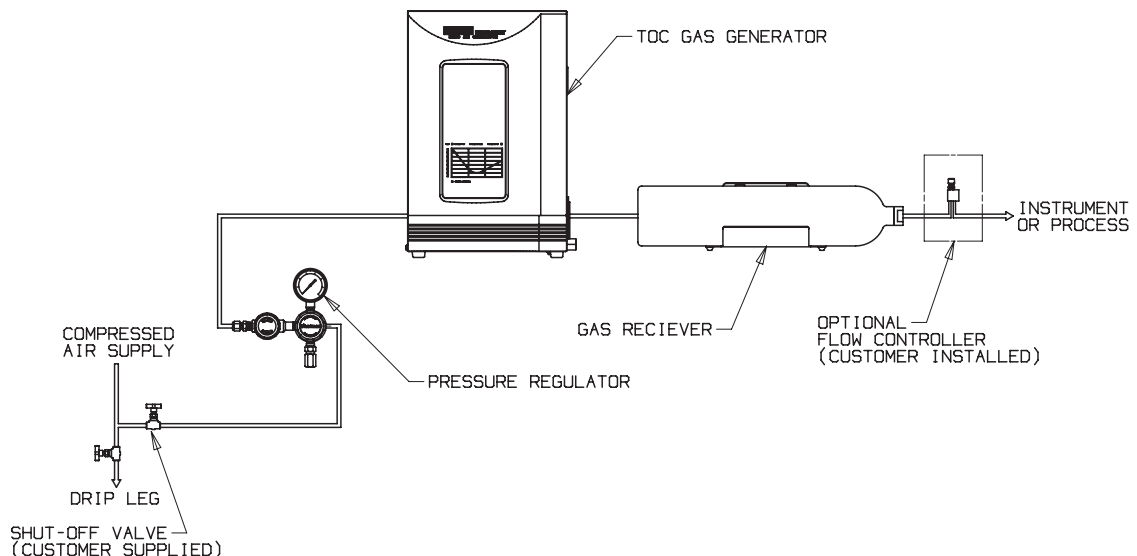


Figure 4 - Recommended Installation

Operation

Start-up

Open the inlet air supply valve (customer supplied, see Installation section) and adjust the inlet pressure to be between 65 psig and 125 psig (4.5 barg and 8.6 barg) using a (customer installed) pressure regulator. Turn the generator on using the power switch on the right side of the unit. Adjust the outlet flow using a (customer installed) flow controller. Set the flow to the required flow rate for the instrument or application. Do not exceed 1250 cc/min. flow.

During the 45 minute warm-up, the yellow "Start-Up" LED will remain illuminated, and the yellow "THC" LEDs will illuminate sequentially until the generator reaches the specified hydrocarbon removal level. After the warm-up period, the green "THC" LEDs will illuminate, showing minimal hydrocarbon levels. The Parker Balston TOC-1250 TOC Gas Generator requires 12 hours, upon initial start-up, to regenerate the dryer and CO₂ removal components. Upon subsequent start-ups, regeneration time may be reduced, depending upon the length of time the unit was inactive. After regeneration, the generator is ready to be brought on line and supply TOC combustion/carrier gas to downstream analytical equipment.

Note: If the "Start Up" LED goes dark, and the green "THC" LEDs do not illuminate, the yellow "Overflow" LED will illuminate. This indicates a downstream gas demand which exceeds the capacity of the generator. Please see the Troubleshooting section at the end of this bulletin.

Operation

The Parker Balston TOC-1250 TOC Gas Generator is designed to operate continuously, 24 hours per day, as long as the compressed air supply is not interrupted. The LED indicator lights on the front panel of the Parker Balston TOC Gas Generator give the operator instantaneous feedback regarding system function. The "Start-up" (yellow) and "THC" (yellow and green) LEDs show system operational status; the "Overflow" (yellow) and "Check System" (red) LEDs show the need for operator attention or system maintenance.

During normal operation, the display on the Parker Balston TOC-1250 TOC Gas Generator will have the green "THC" LED illuminated. If the "Overflow" LED, "Start-up" LED, "Check System" LED, or yellow "THC" LEDs illuminate (solid) during routine operation, please consult the Troubleshooting Guide at the end of this bulletin (the "check system" LED will blink approximately once per minute during normal operation.)

If the blinking frequency of the "Check System" LED increases, please consult the Maintenance section of this bulletin for instructions on how to replace the hydrocarbon removal module.

To prevent excess demand on the Parker Balston TOC Gas Generator, use a flow control device downstream from the unit. If the flow capacity of the generator is exceeded, the "Overflow" LED and a yellow "THC" LED will illuminate, indicating that hydrocarbon removal does not meet published specifications.

Shutdown

To shut down the Parker Balston TOC-1250 TOC Gas Generator, simply turn the power switch to the off position and turn off the compressed air supply to the generator.

Regeneration

To regenerate the system, open the inlet air valve (customer installed, see Installation section) and adjust the inlet pressure to be between 65 psig and 125 psig (4.5 barg and 8.6 barg), using a (customer installed) pressure regulator. Turn the generator on using the power switch on the side panel. Adjust the outlet flow (using a customer installed flow controller) to approximately 500 cc/min. Allow the unit to operate at this reduced flow rate for at least 12 hours (at first start-up).



After the generator has warmed up and regenerated itself completely (12 hours at first start-up), adjust the flow to meet the requirements of the application. Do not exceed the rated flow of the unit. If the rated flow of the TOC-1250 is exceeded, the life and performance of the generator may be adversely affected.

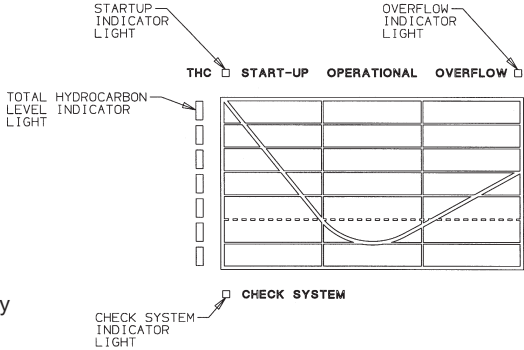


Figure 5 - Front Panel Display



All maintenance procedures for the Parker Balston TOC Gas Generator should be performed by suitable personnel using reasonable care.

Prior to servicing the Parker Balston TOC Gas Generator, turn off the compressed air and power supplies to the generator, and ensure that the system is depressurized. If the catalyst module is being serviced, allow the generator to cool for at least 2 hours.

To ensure consistent product performance and reliability, use only genuine Balston replacement parts and filter cartridges.

The primary maintenance tasks required by the Parker Balston TOC Gas Generator are changing the prefilter cartridges (annually), replacing the final membrane filter cartridge (annually), and replacing the catalyst module (3 years or when the “Check System” LED starts blinking). A summary of the replacement part numbers and recommended service frequency is shown at the end of this Maintenance section. See Figure 6 for the locations of the various maintenance items.

Additional coalescing prefilter cartridges and membrane filter cartridges for the Parker Balston TOC-1250 TOC Gas Generator may be ordered through your local representative. For convenience, a one-year supply of these replacement cartridges has been assembled into a maintenance kit (P/N MK7840). The MK7840 Maintenance Kit contains one coalescing first stage prefilter cartridge (P/N 100-12-DX), one coalescing second stage prefilter cartridge (P/N 100-12-BX), and one Grade GS final membrane filter cartridge (P/N GS-050-05-95).



If necessary, the TOC Gas Generator may be wiped clean with a dry cloth on an as needed basis. Do not use water, aerosols, or other cleaning agents to clean the unit. Use of any liquid detergent to clean the generator could present an electrical hazard.

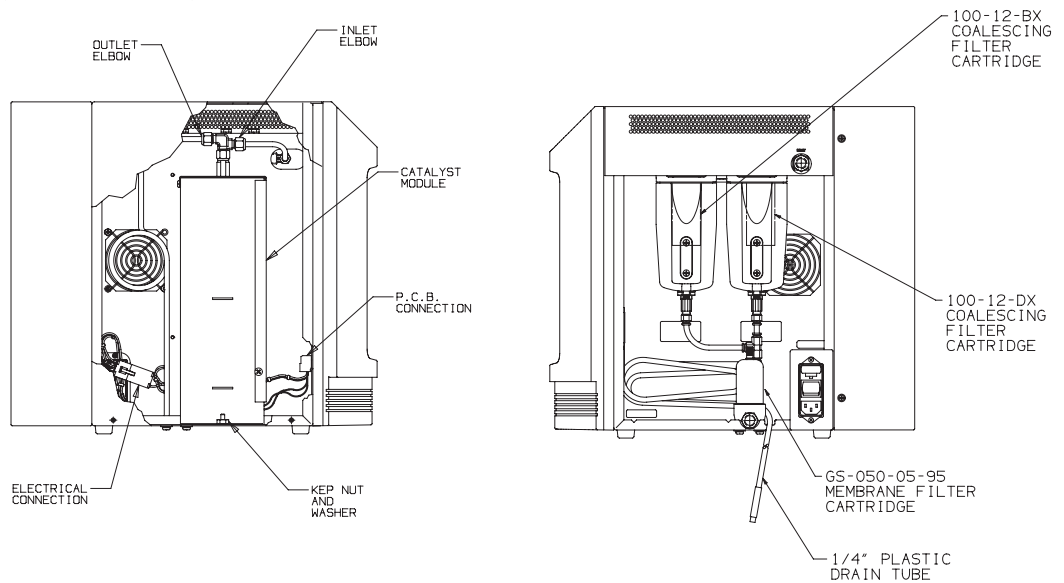


Figure 6 - Maintenance Items

Filter Cartridge Replacement

The Grade DX and Grade BX prefilters integral to the Parker Balston TOC Gas Generator are easily accessible on the right side, behind the removable filtration access panel (see Figure 6). The filter cartridges inside the prefilter housings should be changed on an annual basis to maintain efficient operation of the system. The filter cartridges housed in the prefilters are removed by unscrewing the bowl from the head of the filter assembly, lowering the bowl of the assembly, and removing the element retainer disc at the base of the cartridge. Insert the new filter cartridges (100-12-DX and 100-12-BX), and re-assemble in reverse order. (Note: The filter housings are labeled for Grade DXE and Grade BX filter cartridges. Please be sure to install replacement cartridges in the correct housing.)

The final membrane filter in the Parker Balston TOC Gas Generator is also easily accessible from the right side of the unit. The membrane filter should be changed every year, or as needed to maintain flow and minimize pressure drop. The membrane filter cartridge is removed by unscrewing the filter bowl from the filter head and sliding the spent cartridge off the support core. Replace the GS membrane cartridge (GS050-05-95) and re-assemble.

The time required to service all three stages of filtration integral to the Parker Balston TOC-1250 TOC Gas Generator is approximately 15 minutes.

Catalyst Module Maintenance



Allow unit to cool for at least 2 hours before removing the cover to service the catalyst module.

To prevent electrical shock, disconnect the generator from the power supply prior to servicing.

The catalyst module (P/N 76810) in the Parker Balston TOC-1250 TOC Gas Generator should be changed approximately every three years (or when the “Check System” LED starts blinking) to maintain the hydrocarbon removal specification for the unit. Contact the local representative for ordering information and pricing for a replacement catalyst module.

The tools required to change the catalyst module are: a Phillips head screwdriver and two 7/16" or adjustable wrenches. The procedure for replacing the catalyst module is as follows (see Figure 6 for component locations):

- 1 Switch off the power to the unit, unplug from the power receptacle, close the (customer installed) inlet air valve, and allow the unit to cool (2 hours, minimum) and depressurize.
- 2 Remove the four screws from the cover of the TOC Gas Generator. Lift cover off generator.
- 3 Using two wrenches (one as an anchor), disconnect the module inlet and outlet fittings at the elbow. Leave both elbows on the module (see Figure 6).
- 4 Remove the 11/32 kep nut and washer at the base of the module.
- 5 Remove the spent module from the TOC Gas Generator and disconnect the electrical connector and the PCB connector (see Figure 6).
- 6 Re-connect the replacement catalyst module by reversing the removal procedure. Hand tighten nuts on to ferrules and finish tightening with a wrench 1-1/2 turns for a tight seal. Prior to turning the TOC Gas Generator on, check for leaks by opening the compressed air supply to the unit. Use a soap or leak detecting solution to check the integrity of the piping and fittings.
- 7 Replace cover, without capturing any electrical wiring, and commence operation as detailed in the Start-Up section of this manual. The “Check System” indicator light on the front of the generator will flash for 2 to 3 minutes after start-up, until the circuit board and the catalyst module have been initialized. After the initialization period, the generator will commence operation from the warm-up stage. (Note: if the “Check System” indicator light continues to blink after 10 minutes, please contact the factory.)

Fuse Replacement



Occasionally, one or both of the fuses in the TOC Gas Generator may burn out. The fuses are located in the power receptacle on the left hand side of the generator. Before servicing the fuses, turn the generator off and disconnect the power cord from both the power supply and the generator power receptacle.



To access the fuses, use a small screwdriver to remove the fuse holder located in the power receptacle of the generator. In the TOC Gas Generator, both the phase and neutral are fused separately. As a result of this configuration, both fuses should be checked any time fuse replacement is warranted. Replace either one or both fuses as necessary and re-assemble. To maintain the safety and performance integrity of the product, use only fuses of the size and type detailed in the specifications section of this bulletin.



System Specifications

Max. Flow Rate (outlet)	1250 cc/min.
EMC Compliance	Directive 89/336/EEC
IEC 1010 Installation Category	Category II
IEC 1010 Pollution Degree	Degree 2
Outlet Hydrocarbon Concentration (as methane)	<0.1 ppm
Outlet CO ₂ Concentration	<1 ppm
Outlet CO Concentration	<1 ppm
Outlet Dewpoint	-100°F (-73°C)
Required Inlet Air Flow Rate	2500 cc/min.
Min/Max Inlet Air Pressure	65 psig/125 psig (4.5 barg / 8.6 barg)
Max Inlet Hydrocarbon Concentration (measured as methane)	100 ppm
Recommended Inlet Air Temperature	78°F (25°C)
Altitude	2000 m
Max Ambient Relative Humidity	80%
Pressure Drop at Max Flow Rate	7 psig (0.5 barg)
Inlet and Outlet Connections	1/4" NPT (female)
Warm-up Time	45 minutes
Electrical Requirements (1)	120 VAC or 230 VAC, 50/60 Hz
Fuse Type	Type T, 250 V, 1.0 amp at 230 VAC, 2.0 amp at 120 VAC
Current Rating	1.0 amp at 230 VAC, 2.0 amp at 120 VAC
Dimensions	11" w x 17" h x 17" d (28 cm x 43 cm x 43 cm)
Shipping Weight	48 lbs. (22 kg)

1 Main supply line voltage must be within 10% of nominal rated voltage for the generator.

Ordering Information

For assistance, call 800-343-4048, 8AM to 5PM Eastern Time (No. America only). Email: balstontechsupport@parker.com.

	Grade DX Prefilter	Grade BX Prefilter	Final Filter
Replacement Cartridge	100-12-DX	100-12-BX	GS050-05-95
Change Frequency	1 year	1 year	1 year
Maintenance Kit MK7840	1 each	1 each	1 each
Replacement Catalyst Module 76810	3 years		
Fuse	13192 (120 VAC) 13191 (230 VAC)		

Note: To ensure consistent product performance and reliability, use only genuine Balston replacement parts and filter cartridges.

Optional Accessories

Pressure Regulator	W-405-4032-000
Gas Receiver	72-007
Flow controller	W-FM7583
Installation Kit	IK76803

All troubleshooting and service activities should be performed by suitable personnel using reasonable care.



Disconnect electrical power before starting any maintenance procedure.

Symptom	Course of Action
No Flow From Generator	<p>Check drains on prefilters</p> <ul style="list-style-type: none"> - Remove drain tubing and hold finger over drain opening to allow pressure to build within housing. - Remove bowl from filter and rinse with warm water. - Replace automatic drain, P/N 21552. <p>Unplug generator, remove cover, and check for internal leaks.</p>
Low Pressure At Outlet	<p>Check inlet pressure. Pressure drop up to 4 psid is normal. Minimum inlet pressure is 65 psig.</p> <p>Check flow demand and "Overflow" LED. Flow demands in excess of capacity may cause high pressure drop through generator.</p>
"Overflow" LED illuminated/ Yellow THC LEDs illuminated	<p>Check downstream flow demand. If flow capacity of generator is exceeded, "Overflow" LED and yellow "THC" LEDs will illuminate. An excessive pressure drop (greater than 4 psig) may accompany an overflow situation.</p> <p>If demand exceeds capacity, install a flow controller downstream from the generator.</p>
No Power	<p>Check power switch to ensure generator is turned on.</p> <p>Check that the generator cord is firmly connected to the wall receptacle and the power receptacle on the unit.</p> <p>Check the generator fuses</p> <ul style="list-style-type: none"> - Unplug generator cord from wall and generator receptacle. - Using a small screwdriver, open the fuse drawer and check the fuses. - Change fuse if necessary <p>Warning: for continued protection against risk of fire, replace only with fuse of specified rating.</p> <p>Check that voltage selector reading matches local electrical supply.</p>
"Check System" LED Illuminated (solid)	<p>Turn generator off and check all electrical connections inside. Re-start generator.</p>
"Check System" LED blinking	<p>Replace hydrocarbon removal module. Call your local representative to order replacement module.</p>
Fluctuations in Baseline	<p>Install small receiver tank (P/N 72-007).</p>



If you have followed the troubleshooting procedures and are still having trouble, call Toll-Free 800-343-4048, 8AM to 5PM Eastern Time and request technical assistance or email us at: bal-stontechsupport@parker.com. For locations outside North America, please call your local representative. Please have the serial number of generator available. The serial number label is located near the power receptacle, behind the filtration access panel.

Please complete and mail or fax in your Warranty Registration Card.

WARRANTY (NORTH AMERICA ONLY)

(FOR INFORMATION CONTACT YOUR LOCAL REPRESENTATIVE)

Parker Hannifin guarantees to the original purchaser of this product, that if the product fails or is defective within 12 months from the date of purchase, when this product is operated and maintained according to the instructions provided with the product, then Parker guarantees, at Parker's option, to replace the product, repair the product, or refund the original price for the product. This warranty applies only to defects in material or workmanship and does not cover: ring and valve wear on compressors, routine maintenance recommended by the instructions provided with this product, or filter cartridges. Any modification of the product without written approval from Parker will result in voiding this warranty. Complete details of the warranty are available on request. This warranty applies to units purchased and operated in North America.

Explanation of Warning Symbols

Symbol

Description



Caution, refer to accompanying documents for explanation.



Refer to Installation and Operation Manual, warning note referenced for explanation.



Caution, risk of electric shock.

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