



XRGI[®]

MAINTENANCE INSTRUCTIONS
FOR PROFESSIONALS

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1 SYSTEM AND DOCUMENTATION INFORMATION

These XRGI® Maintenance Instructions provide detailed information about the maintenance the XRGI® system. Before commencing maintenance of the XRGI® system, read the XRGI® Maintenance Instructions carefully, especially the safety instructions. If you experience any problems understanding the contents, contact your EC POWER dealer before starting working.

1.1 ORIGINAL OPERATING INSTRUCTION

These XRGI® Maintenance Instructions contain original operating instructions in accordance with the Machinery Directive.

1.2 KEEP THE DOCUMENTS

Pass on these XRGI® Maintenance Instructions and all applicable documents to the system operator. The system operator keeps the XRGI® Maintenance Instructions and other instructions for future reference so that they are available when needed.

1.3 TARGET GROUP

These XRGI® Maintenance Instructions are intended for trained personnel authorised by EC POWER. This includes installers and service technicians who are trained for the respective task.

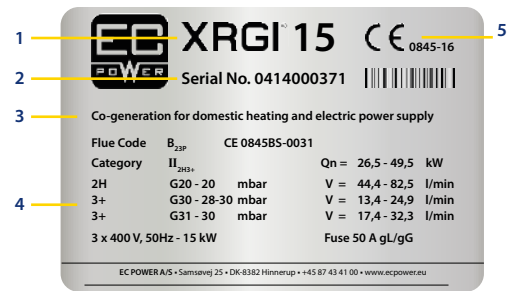
1.4 RATING PLATE

POWER UNIT

The rating plate is located on the rear of the Power Unit.

Legend

- 1 Type description of the XRGİ® system
- 2 Serial number of the Power Unit
- 3 Description of the type approval
- 4 Technical data of the Power Unit
- 5 CE marking



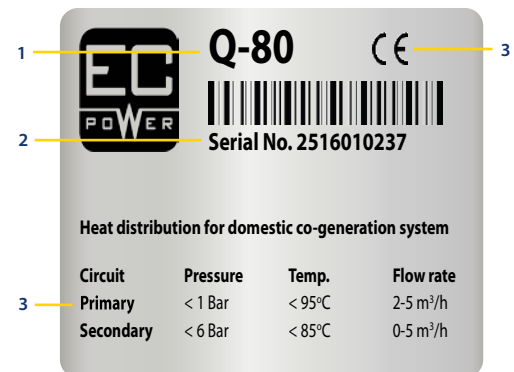
Power Unit

Q-HEAT DISTRIBUTOR

The rating plate is located on the inside of the Q-Heat Distributor below the electronics box.

Legend

- 1 Type description of the Q-Heat Distributor
- 2 Serial number of the Q-Heat Distributor
- 3 Technical data of the Q-Heat Distributor
- 4 CE marking



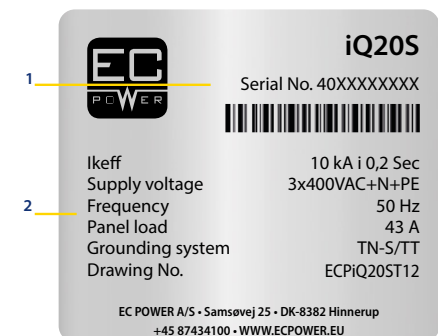
Q-Heat Distributor

iQ-CONTROL PANEL

The iQ-Control Panel is equipped with two rating plates. These are located on the inside of the iQ-Control Panel door and on the left side of the iQ-Control Panel below the main switch disconnecter.

Legend

- 1 iQ-Control Panel serial no.
- 2 Technical data of the iQ-Control Panel
- 3 Type description of the iQ-Control Panel
- 4 XRGİ®-ID of the XRGİ® system



iQ-Control Panel



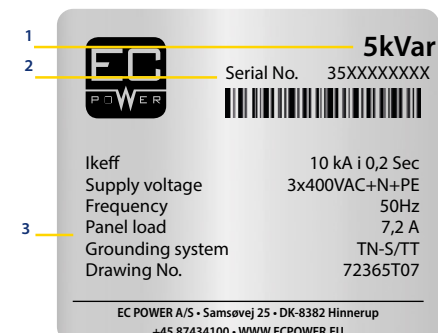
iQ-Control Panel

POWER FACTOR CORRECTOR

The rating plate is located on the inside of the power factor corrector.

Legend

- 1 Type description
- 2 Power factor corrector serial number
- 3 Technical data of the power factor corrector



Power factor corrector

The rating plates are for illustration purpose only.

1.5 VALIDITY OF THE GUIDE

These XRGi® Maintenance Instructions only apply to XRGi® systems with the following article numbers:

Type	Article number
XRGi® 6	X060001
XRGi® 6 LowNOx	X060003
XRGi® 9	X090001
XRGi® 15	X150001
XRGi® 15 LowNOx	X150003
XRGi® 20	X200001
XRGi® 20 BIOGENIC	X00006

1.6 CE MARKING



With the CE marking, products comply with the essential requirements of the relevant directives in accordance with the rating plate.

2 SAFETY INSTRUCTIONS

Read the following chapter carefully and adhere to the safety instructions. Contact your EC POWER dealer if you are unsure about anything or if any of the safety instructions are not clear to you. The XRGi® system was developed in accordance with the rules of technology and complies with and applies recognised, conventional safety measures. To achieve maximum possible safety, it is essential that all the safety instructions contained in these XRGi® Maintenance Instructions are adhered to and fully implemented. To avoid any potential hazards and/or risks, ensure that no unauthorised persons (especially children) come into contact with the XRGi® system.

2.1 INFORMATION, SAFETY AND WARNING INSTRUCTIONS

During maintenance of the XRGi® system, observe the information, safety and warning symbols.

This document uses symbols depending on the potential danger of the situation.



INFO!

The information symbol is not a safety symbol. It provides important and useful information on the topic.



CAUTION!

This safety symbol refers to a potentially hazardous situation that could lead to minor personal injury. It is also used in instances of imminent damage to property.



WARNING!

This safety symbol refers to a potentially hazardous situation that could lead to serious personal or fatal injury.

2.2 INTENDED USE

Improper or not intended use of the XRGi® system can result in danger to life and limb of the system operator or third parties or damage to the XRGi® system and other property.

The XRGi® system is a combined heat and power generation system and must be used for this purpose only in multi-family houses, small businesses, hotels, restaurants, residential homes, schools, etc. Moreover, the XRGi® system can be used in applications with biogenic gases such as wastewater treatment plants, recycling of organic waste and landfills. The XRGi® system is intended for:

- heat generation for closed hot water and central heating systems
- simultaneous generation of electrical energy and its supply to the public power grid
- central hot water heating in private homes and businesses
- generation of low-temperature process heat and electricity in applications with biogenic gases

Any other or further use is considered improper use. The manufacturer/supplier is not liable for resulting damages. The risk is borne by the system operator alone.



EC POWER assumes no liability for damages caused by non-compliance with these XRGi® Maintenance Instructions.

The intended use includes:

- compliance with the applicable commissioning, installation and maintenance instructions for the XRGi® system and other parts and components of the XRGi® system
- installation and assembly in accordance with the device and system approval
- compliance with all inspection and maintenance conditions specified in the instructions

Any improper use is prohibited!

2.3 GENERAL SAFETY INSTRUCTIONS

Only skilled personnel authorised by EC POWER who has undergone special training for the XRGI® system through EC POWER may commence maintenance on the XRGI® system. During maintenance, the installer must observe the existing rules, regulations and guidelines. The installer also assumes responsibility for the proper installation and maintenance.

Before installing the XRGI® system, ensure the following:

- Statement of the gas supply company
- Statement of the regional chimney sweep
- Approval of the utility company (DNO)

Before starting the installation, make sure that the system operator has carried out all the necessary applications for the connection of the XRGI® system.

Observe the following safety instructions for protection against electric shock, injury and fire risks.

- Only use the XRGI® system for its intended purpose.
- The XRGI® system must be installed on a stable foundation.
- Before commencing maintenance, ensure that the on-site mains voltage matches the line voltage specified on the rating plate. The mains voltage specified by the manufacturer must not be deviated from when using or replacing mains voltage cables on the XRGI® system. Never handle the mains plug with wet hands.
- Ensure that the power cable is undamaged. Any rough or sharp-edged object has the potential to damage the cable. Replace damaged cables immediately.
- Only connect the cable when the XRGI® system is switched off.
- Ensure that the supply line or extension cable is not damaged by being run over, crushed, stretched or similar. Protect cables from heat, oil and sharp edges. All cabling must comply with the diameter given in the XRGI® Installation Guide and be splash-proof. Ensure that cables are not in permanent contact with water.
- Only use the original EC POWER accessories and spare parts.
- Do not wear any jewellery or clothing that could be caught in moving parts.
- Protect electrical equipment from humidity and rain and never immerse it in water. Do not use in a humid environment or in areas with high levels of atmospheric humidity.
- Do not operate the XRGI® system under the influence of alcohol, medicines, drugs or if you experience symptoms like illness, fever or tiredness as they may impair your ability to react.
- Keep children away from the XRGI® system at all times. Only allow persons who have been trained in the handling of the XRGI® system or who have provided evidence of their ability to operate it and who have been expressly authorised to operate the XRGI® system. Do not allow children or young people to operate the XRGI® system. In addition, persons (including children) with limited physical, sensory or mental capabilities, or lack of experience and/or knowledge, are prohibited from operating the XRGI® system unless they are supervised or instructed in how to operate the XRGI® system by a person responsible for their safety.
- Never reach into the Power Unit with bare hands or other materials when the machine is running.
- Only clean the XRGI® system with a damp cloth. Never use solvents, turpentine, petrol, abrasive cleaning agents or similar. Ensure that all parts have dried out thoroughly before maintenance.
- Only allow skilled personnel authorised by EC POWER to perform repairs on the XRGI® system.
- Only allow skilled personnel authorised by EC POWER to remove the housing of the XRGI® system.
- If safety equipment has to be removed to permit work on the XRGI® system, then only switch on the XRGI® system when all the safety equipment has been refitted and checks have been made that it is working properly.
- Never start up the XRGI® system with faulty safety equipment or with safety equipment removed (turn off the main switch). Defective safety equipment must be repaired or replaced immediately. Missing safety equipment must be installed immediately.

2.3.1 HANDLING COOLANT AND ENGINE OIL



Always wear safety gloves and safety glasses when handling coolant and engine oil!

IN THE EVENT OF CONTACT WITH COOLANT AND ENGINE OIL

Property

- Use absorbent material to wipe off the oil and dispose it as hazardous waste. Replace clothing and shoes saturated with coolant and oil. Do not store any contaminated cloths in clothing pockets.

Skin

- In case of contact, immediately wash skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash contaminated clothing before reuse. Seek medical advice if symptoms persist.

Eyes

- Remove contact lenses. Rinse the eyes immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical advice if symptoms persist.



In addition, observe the respective safety data sheets for XRGi® Engine Coolant and Engine Oil. They contain detailed information on hazard warnings, protective and first-aid measures, handling, transportation, and disposal regulations.

2.3.2 ACTIONS WITH SMELL OF GAS IN BUILDINGS

A malfunction can cause gas to escape and cause poisoning and explosion hazards. Proceed as follows in the event of any smell of gas in buildings:

- Close the yellow gas valve on the main switch.
- Close the gas valve on the XRGi® system connection panel and check that the gas valves on all other equipment are closed!
- Close all gas fittings that are still open (pilot lights, gas-cooled fridges, etc.)!
- Do not operate any electrical switches!
- Do not unplug any electrical equipment!
- Do not operate any electrical bells!
- Do not use matches or cigarette lighters!
- Do not smoke!
- Do not use telephones, cordless telephones or mobile phones within the hazard area!
- Immediately open all doors and windows!
- Immediately extinguish all flames!
- Immediately close the gas solenoid valve on the gas meter or the main gas solenoid valve!
- Warn other occupants in the building and leave the building!
- Only turn the lights back on when there is no longer any smell of gas!
- Do not rely solely on your own sense of smell; involve other people as well!
- Contact the gas company immediately, if you cannot identify the cause of the gas smell even though all the gas valves are closed. Also if there is only a slight smell of gas and you cannot locate/identify the origin of the smell!
- If you smell gas from areas you cannot access directly, immediately call the police and/or fire service who are authorised to gain entry. At the same time, notify the gas supply company!
- If you suspect a gas leak, ventilate the room thoroughly but do not enter. Warn other occupants in the building. At the same time, notify the gas supply company!
- Do not attempt to repair faults or damage to gas systems yourself! Only allow skilled personnel (i.e., the operatives and installation contractors of your gas supplier) to remedy such faults!
- Ensure that the area affected is accessible to the emergency services!

2.3.3 ACTIONS WITH FIRE OR INGRESS OF WATER

Proceed as follows in the event of fire or the ingress of water:

- Switch off the all-pole circuit breaker!
- Switch off the main switch on the iQ-Control Panel of the XRGI® system!
- Close the gas valve on the gas pipe!
- Inform the responsible service department!
- In the event of the outbreak of fire, immediately close the gas valve on the connection panel and the main gas solenoid valve on the gas pipe, cut off the supply of fresh air to the fire and inform the local fire service!
- In case of flooding (e.g., flooding in the basement), do not step into the water!
- Only use approved fire extinguishers to put out the fire! Never use water!
- Warn other occupants of the building and leave the building!

2.3.4 ACTIONS WITH SMELL OF EXHAUST GAS IN BUILDINGS

A malfunction may cause exhaust gases to escape resulting in a risk of poisoning. If you smell exhaust gas in buildings, proceed as follows:

- Shut down the XRGI® system!
- Open windows and doors!
- Notify your heating specialist company or the EC POWER Hotline!

2.3.5 FROST PROTECTION

The engine circuit of the power unit is frost-proof when using XRGI® Engine Coolant and regularly maintained according to the applicable maintenance instructions (see the Engine Coolant data sheets from EC POWER).

2.3.6 CONTACT HAZARD

Components that can cause injury on contact (hot and/or electrically conductive parts) are concealed behind panels that can only be removed with keys or tools. Only allow skilled personnel authorised by EC POWER to remove these panels.

The door of the iQ-Control Panel is provided for your safety and may only be opened by trained personnel. The main switch (red switch) is located on the left-hand side of the iQ-Control Panel. When switched on, touching any of the control components poses a risk of electric shock. The iQ-Control Panel contains sensitive electronic components. Any improper handling may result in damage to the XRGI® system.



The power factor corrector is electrically conductive even when the main switch disconnecter of the iQ-Control Panel is switched off.

The cover of the Power Unit is provided for your safety. In particular, be aware of the following when opening the Power Unit:

- The engine generates heat. Touching the engine and numerous other components poses a risk of burns.
- The protective cover conceals parts that rotate when the XRGI® system starts up and during operation. Touching these parts during operation can be fatal. Only allow skilled personnel authorised by EC POWER to touch components under the protective cover during operation. During visual inspections during operation, be careful not to let loose clothing, jewellery or hair get caught in moving parts.
- The generator and many other parts are connected to the power supply system. Touching non-isolated parts can be fatal.
- When in close proximity to an operating XRGI® system with the hood open, there is a hazard of hearing damage. Wear approved hearing protection when the cover is open.

2.3.7 EXPLOSIVE AND EASILY FLAMMABLE MATERIALS

Do not use or store any explosive or easily flammable materials (e.g., petrol, paper, paint) in the installation room of the XRGI® system. Do not use any sprays, solvents, cleaning materials that contain chlorine, paints, adhesives etc. in the vicinity of the XRGI® system. These substances can, in addition to the risk of ignition, lead to corrosion – including in the exhaust system.

2.3.8 COMBUSTION AIR SUPPLY

Check that the supply of combustion air to the XRGi® system is unimpeded. Do not position any equipment with extraction such as fans, tumble driers or dehumidifiers, in the vicinity of the XRGi® system without consulting your authorised EC POWER specialist.

Check with your authorised EC POWER specialist to ensure that there is still a sufficient supply of combustion air to the XRGi® system before fitting moisture-tight windows. The combustion air of the Power Unit should not contain any solvents or halogen compounds, which can cause corrosion and damage when the XRGi® system is operated. Halogen compounds are used in industry, trade and household products.



Closed air supply inlets can result in incomplete combustion and a build-up of carbon monoxide, with the possibility of poisoning.

SOURCES OF HALOGEN COMPOUNDS

Industrial sources	
Chemical cleaners	Trichloroethylene, tetrachloroethylene, hydrofluorocarbons
Degreasing baths	Perchloroethylene, trichloroethylene, methylene chloride
Printing houses	Trichloroethylene
Cooling equipment	Methyl chloride, trichlorofluoromethane, dichlorodifluoromethane
Domestic sources	
Cleaners and degreasing agents	Perchloroethylene, methyl chloroform, trichloroethylene, methylene chloride, carbon tetrachloride, hydrochloric acid
DIY sources	
Solvents and thinners	Chlorinated hydrocarbons
Spray cans	Hydrofluorocarbons (Frigen)

This list is not an exhaustive list.

The solvents used for cleaning and contained in adhesives and paints are crucial. Chemical cleaning and degreasing baths can be sources of halogen compounds, as are floor adhesives and other adhesives. Construction varnishes, paints and adhesives have been produced without halogenated hydrocarbons for some years. Air-borne halogen compounds are often released when thinners containing chlorinated hydrocarbons or adhesive removers containing chlorinated hydrocarbons are used, as well as new coats of paint in boiler rooms. Bleaching solutions and hydrochloric acid, which are frequently used for disinfection and cleaning, must also be considered as potential causes of corrosion.

Spray paints or adhesives containing CFCs are rarely used today by professional tradesmen. If the source of halogenated hydrocarbons cannot be completely eliminated (e.g., hairdressing salons, swimming pools, dry cleaning premises etc.), then the supply of combustion air has to be solely supplied from an uncontaminated area.

2.3.9 MODIFICATIONS TO THE XRGi® SYSTEM COMPOUNDS

Do not carry out modifications to the XRGi® system compounds without the prior written consent of EC POWER.

- Never install an additional cover or enclosure around the XRGi® system.
- The required minimum clearances must be strictly observed.

2.3.10 XRGi® ENGINE COOLANT

Only use XRGi® Engine Coolant in the engine circuit. The use of other coolants or additives may cause damage. The XRGi® Engine Coolant is to be filled via the expansion vessel in the Q-heat distributor, following the level markings.

2.3.11 PROPERTY DAMAGE CAUSED BY IMPROPER USE OF AND/OR UNSUITABLE TOOLS

Improper use of and/or unsuitable tools can cause damage. Always use appropriate tools!

2.3.12 MODIFICATIONS IN THE VICINITY OF THE XRGi® SYSTEM

Do not carry out modifications to the following equipment without the prior written consent of EC POWER:

- XRGi® system
- Gas, supply air, water and electricity pipes and cables
- Exhaust gas system
- Condensate drain
- Safety valve and drain pipe for the heating water
- Structural objects that could affect the operational safety of the XRGi® system

2.3.13 OPERATION WITH LIQUIFIED GAS (LPG)

Bleeding of the LPG tank when installing the XRGi® system:

The LPG supplier is responsible for the proper bleeding of the tank.

Avoid wrong gas type:

The use of a wrong type of gas leads to ignition and combustion noises as well as to fault shut-downs.

An unstable gas pressure supply is technically very unfavourable for an XRGi® system. To counteract this, the gas supply must be dimensioned by the appropriate supplier as required with tank placement, pipe sizes, evaporator and gas pressure regulator.

2.3.14 OPERATION WITH BIOGENIC GASES

Biogenic gas can be odourless. Therefore, installations with an XRGi® BIOGENIC system require the installation of appropriate gas detectors and gas detector shut-off devices.



Even small amounts of hydrogen sulphide are hazardous to health.

National and regional rules and guidelines for safety equipment for the installation and the building must be met. These rules and guidelines can, among other things, include:

- a flame arrester on the gas pipe to secure against flashback
- methane and H₂S sensors to activate shut-off of gas supply
- an external main switch related to monitoring methane and H₂S
- a manual main switch outside the installation room of the XRGi® system

All installation material must be approved for biogenic gas applications.

Also note that the additional components that may be necessary to operate the XRGi® system with biogenic gases (gas filter, gas pressure booster, etc.) may be subject to the zone classification regarding the ATEX regulations. When installing electrical materials, these components must be approved for installation in ATEX zones.

2.3.15 WORKING ON THE ELECTRICAL SYSTEM



Danger to life when working on electrical and electronic components. Only allow skilled and qualified electricians to perform work on electrical or electronic components in accordance with current, applicable electrical regulations.

2.3.16 SAFETY EQUIPMENT ON THE XRG1® SYSTEM



If the safety devices are disabled, bridged, manipulated, damaged or removed, or if the XRG1® system is operated with defective safety devices, there is a risk of injury. Safety devices must not be manipulated or overruled.

The XRG1® system features a range of safety features to ensure safe operation. The safety features include:

- Main switch disconnector
- Sound insulation panels (all casing panels)

**Main switch disconnector
on the iQ-Control Panel**



**Sound insulation cladding
on the Power Unit**



The safety and warning labels (stickers) attached to the XRG1® system must always be clearly visible, undamaged and complete. Replace damaged or dirty stickers. New stickers are available from EC POWER.

2.3.17 SAFETY AND WARNING LABELS ON THE XRG1® SYSTEM

The XRG1® system is equipped with a series of safety and warning labels to protect the system operator. The safety and warning labels include:



POWER UNIT

CAUTION! HOT SURFACE

This warning label warns of hot surfaces. Contact with hot surfaces presents a risk of burns.



Q-HEAT DISTRIBUTOR

CAUTION! HIGH TEMPERATURE/HOT LIQUID

This warning label warns of high temperature/hot liquid. Contact with hot liquids presents a risk of burns.



IQ-CONTROL PANEL

CAUTION! VOLTAGE

This warning label warns of dangerous electrical voltage. Electrical voltage is dangerous to the human body and may result in personal injury and property damage.

2.3.18 RESIDUAL RISKS

Not all residual risks can be completely eliminated by proper use or by adhering to the protective features described in this XRGI® Installation Guide. When installing the XRGI® system, ensure sufficient space is available to minimize residual risks. Ensure that the installation room is always free of obstructions such as ladders, tools, containers, boxes, etc., and is clean, dry, and well-lit.

The following are the residual risks. The actions in question are improper and therefore strictly prohibited.

- Slipping or falling due to water or dirt on the floor of the installation room.
- Burns due to intentional or unintentional contact with the XRGI® system due to non-compliance of the protective devices described in this XRGI® Installation Guide.
- Tipping of loads when handling the packaged or unpacked XRGI® system using unsuitable lifting systems or due to unbalanced load distribution.
- Chemical hazards due to contact with chemicals, coolants, cleaning agents, etc. Observe the information in this XRGI® Installation Guide as well as in the data sheets and on the labels of the system components used.

2.4 WARRANTY INFORMATION

Comply with the following requirements to uphold the warranty:

- Proper assembly, installation, commissioning, operation, and maintenance in accordance with the applicable EC POWER instructions.
- Regular maintenance in accordance with the applicable maintenance instructions, carried out exclusively by trained and EC POWER-authorized qualified personnel.
- Compliance with the gas specification for installations with an XRGI® BIOGENIC system (even short-term operation outside the specified parameters may affect the warranty).

Warranty exclusions: The guarantee excludes damage over which the manufacturer has no direct or indirect influence, such as:

- Faulty planning and assembly (e.g., fuel supply, hydronic and electrical connections, exhaust gas extraction)
- Commissioning, maintenance and repairs by persons not authorised by EC POWER
- Natural wear and tear
- Faulty, negligent handling, modifications, repairs
- Use of unsuitable operating materials (e.g. in oil filters, spark plugs) or non-approved lubricants
- Use of heating water (first fill) that does not meet applicable technical guidelines
- Chemical, electro-chemical and electrical influences
- Climatic or other effects outside the specifications given in the XRGI® documentation (e.g., insufficient ventilation, lightning, overvoltage, severe weather, fire, etc.)

The current version of the guarantee and warranty stipulations in the EC POWER A/S General Terms and Conditions apply.

RETURN OBLIGATIONS

EC POWER is obliged to take back XRGI® systems after their use. After decommissioning, XRGI® systems must be reused or recycled. Components that cannot be recycled must be disposed of in an environmentally friendly manner.

2.5 REGULATIONS, STANDARDS AND LAWS

Adhere to and comply with the provisions, regulations and guidelines applicable in the individual country when commencing maintenance on the XRGI® system.

3 MAINTENANCE INSTRUCTIONS



Improper service and maintenance work can affect the system and cause damage! Installing non-approved components as well as unauthorized modifications and conversions may affect safety and reduce warranty.

- Only personnel authorised by EC POWER may perform service and maintenance work.
- Service and maintenance intervals must be observed.
- Only original spare parts and approved equipment (such as engine oil and coolant) may be used.

Carry out the following work with every maintenance.

- Visual check
- Scheduled maintenance
- Preventive maintenance of the wear parts

Always confirm in the XRGi® Service Booklet whether the maintenance and component replacement have been completed.

INFORMATION ON THE XRGi® SERVICE BOOKLET

- Confirm completed maintenance/inspection with a check mark. ✓
- Confirm uncompleted maintenance/inspection with a minus mark. —
- Send a manual call to the EC POWER Service Database before and after every maintenance.
- Confirm every maintenance with your signature.



MAINTENANCE INTERVALS

- Maintenance is required after fixed intervals to ensure that the XRGi® system always operates safely and reliably.
- The maintenance interval is indicated on the iQ-Control Panel display and in the EC POWER Service Database.
- Maintenance is performed after the number of operational hours listed below or no later than after 2 years (for XRGi® BIOGENIC systems no later than one year).

XRGi®-Typ/Maintenance

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
XRGi® 6	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000
XRGi® 6 LowNOx	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000
XRGi® 9	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000
XRGi® 15	8.500	17.000	25.500	34.000	42.500	51.000	59.500	68.000	76.500	85.000
XRGi® 15 BIOGENIC	4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
XRGi® 15 LowNOx	6.000	12.000	18.000	24.000	30.000	36.000	42.000	48.000	54.000	60.000
XRGi® 20	6.000	12.000	18.000	24.000	30.000	36.000	42.000	48.000	54.000	60.000
XRGi® 20 BIOGENIC	4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000



Use approved EC POWER spare parts and components only. All warranties provided will be invalidated if other components and materials are used.

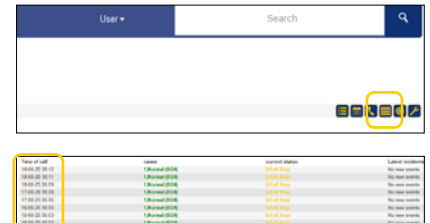
The following chapters describe the maintenance work. Follow the maintenance instructions step by step!

CHECKING THE EC POWER SERVICE DATABASE

- Enter the XRGI®-ID or the object name in the search field (on the top right side) in order to search for the desired XRGI® system.

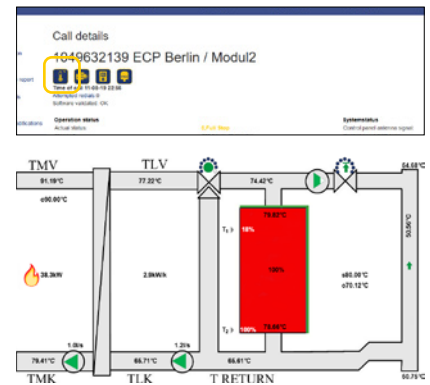
- Click on the **List of calls** icon on the top right side.
- Click on a **Time of call** to get a detailed indication of the call.

- most recent events/alarms
- length of operating times (under 10 minutes per start implies insufficient heat dissipation)
- hydronic problems

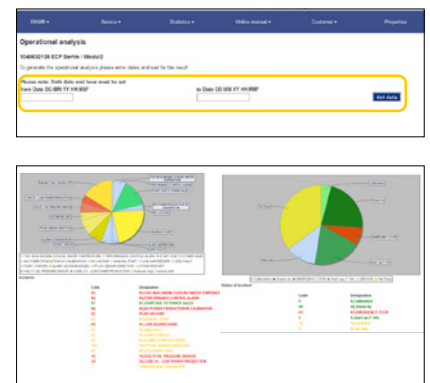


- Click on the **Heat Distributor** icon beneath the XRG®-ID to get an overview of the storage status.

- Is the TMV set point compensated (displayed as an operational set point below the actual value)?
- Are all temperatures shown in the Service Database and are the figures viable?
- Is the T-Return permanently below 65° C (max 70° C for XRG1® 6/XRG1® 6 LowNOx/XRG1® 9 and max 75° C for XRG1® 15/XRG1® 15 BIOGENIC/XRG1® 15 LowNOx/XRG1® 20/XRG1® 20 BIOGENIC)?
- Is the temperature difference between TMK - TLK ≤ 8K at full load when operationally warm?



- In the menu to the left, click on **Operational analysis** and enter the period of time in the search fields.
- Click on **Get data**.
- Check for abnormalities in the operating analysis.
 - Frequent faults
 - Manual switching on site
 - Operating time within the reference range



- Check the software version of the XRGI® system.

Control Panel	
Date:	10-01 24 00:12
Display PCB, Serial no.:	458B3CC196
Software version:	1.16.13 
HW version:	4

3.1.2 ON SITE CHECK



Do not reach into the machine during operation. Risk of injury from hot, rotating or electrical live parts!

Check the XRGi® system for the following:

- Noise from the Power Unit with the cover closed and afterwards with the hood open (rattling, hum)
- Occurrence of exhaust gas odour
- Check the certificate from the district chimney sweeper for the flue gas line.
- Check whether the flue gas system is equipped with an external exhaust heat exchanger and, if necessary, whether the external exhaust heat exchanger is installed correctly on the Power Unit.
- Check the condition of the flue gas line especially on wall and/or top glands.
- Check the ball siphon for leaks. While the XRGi® system is running, check whether condensate is present in the ball siphon and whether condensate can run freely from the ball siphon.
- Check the condensate drain for leaks.
- Check the mount of the flue gas line (fastening clamps - approx. 1.5m distance).
- Check the direction and lope ($> 5 \text{ cm/m}$) of the flue gas line.
- Ensure that combustion air openings on wall or doors of the installation room of the XRGi® system are open.

3.1.3 HYDRONIC CHECK

Make sure that the XRGi® system is installed according to the EC POWER regulations:

- Use the Commissioning Protocol in the XRGi® Service Booklet to check which hydronic solution has been applied.
- Check whether the XRGi® system is integrated according to the hydronic solution specified in the Commissioning Protocol.
- Check whether changes have been made to the XRGi® system/installation after commissioning.



**ARTICLE NO. 01KIT2611- SCOPE OF DELIVERY SERVICE KIT
STANDARD COMPONENTS**

Pos	Anzahl	Beschreibung
1	1	Air filter WIX 160
2	4	XRG [®] Engine Oil GD 447, 10L
3	2	XRG [®] Engine Coolant EC WB 104, 5L
4	1	Oil filter
5	3	Spark plugs
6	1	Plug for measuring point
7	1	Vacuum hose Ø5 L160
8	1	Vacuum hose Ø5 L400
9	2	Spring band clamp Ø35
10	1	Exhaust compensator Ø30 L180
11	1	Valve cover gasket


ADDITIONAL KITS/COMPONENTS

The standard service kit may contain additional kits or components. For replacement of these kits or components, follow the enclosed instructions.

REQUIRED TOOLS

- Engine oil suction pump
- Oil filter spanner
- Torque wrench
- Water pump pliers
- Spring clamp pliers
- Feeler gauge
- FS2009USB programming device
- Flue gas analyser
- 16 mm spark plug wrench
- 10 mm socket insert
- 17 mm socket insert
- 3 mm hex key
- 10 mm ring spanner
- 24 mm ring spanner
- 10 mm open-ended spanner
- 17 mm open-ended spanner
- 19 mm open-ended spanner
- 10 mm socket spanner
- 11 mm wrench

4.1 SERVICE KIT – COMPONENT REPLACEMENT



Suitable protective clothing i.e. goggles, gloves, and shoes shall be worn during maintenance of the XRGI® system.

Only commence maintenance work on the XRGI® system when it is not in operation and it is fully cooled down! Otherwise, there is a risk of burns from hot components and/or scalding if substances should leak.



Before commencing maintenance, shut down the XRGI® system at user level on the iQ-Control Panel and at the main switch. Shut down the power factor corrector. Close the gas valve and unplug the Q-Heat Distributor.



Follow the steps in this instruction. This will make your work easier and ensure a high quality conversion.

4.1.1 COOLANT

The XRGI® Engine Coolant must be checked at regular intervals for appearance, pH value, and glycol content. EC POWER recommends checking the values of the following parameters and, if necessary, replacing the coolant during each service. For accurate measurement of the values, EC POWER recommends using a pH meter and a refractometer. Please observe the operating instructions provided by the respective manufacturer(s).

- Appearance: The coolant must be light and clear. It must be free from deposits, flocculants, algae, bacteria, oil, and/or sludge of any kind.
- pH value: 7.5–10 at 20 °C
- Glycol: > 30 %



If a non-approved coolant has been used, or if the coolant is cloudy and/or contaminated with oil or sludge, EC POWER recommends flushing the XRGI® system with new XRGI® Engine Coolant. If flushing is required, flush the XRGI® system several times with water until all contamination has been removed. Then flush the XRGI® system with new XRGI® Engine Coolant and let the Power Unit run for one week before starting the bleeding procedure.

- Only proceed to the next step once the cooling and calibration process is complete (10–15 minutes).
- Release the cap on the expansion vessel on the Q-Heat Distributor.
- Drain the coolant by either opening the drain valve or removing the lower reinforced hose from the Power Unit. Release gradually to control coolant flow.
- Remove both reinforced hoses and loosen the bleed screw on the air pot to drain as much coolant as possible.
- When there is no more coolant in the system, close the drain valve and fasten the reinforced hoses.



Used coolant must be disposed in accordance with the applicable local regulations. Improper disposal of used coolant represents a hazard to the environment! Mixing foreign substances such as solvents, brake fluid, oil and chlorinated oil in used coolant is strictly prohibited!



4.1.2 USED OIL

- Open the Power Unit and unscrew the oil cap with **water pump pliers**.
- Extract some of the used oil using a **suction pump**.
- Wait 3-5 minutes before extracting the remaining used oil.

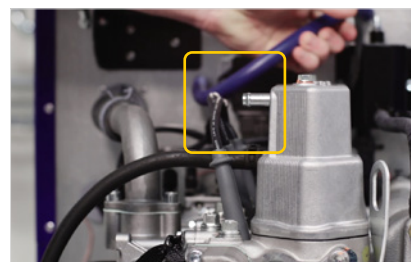


Used engine oil must be disposed in accordance with the applicable local regulations. Improper disposal of used oil represents a hazard to the environment! Mixing foreign substances such as solvents, brake fluid, coolant, and chlorinated oil in used oil is strictly prohibited!

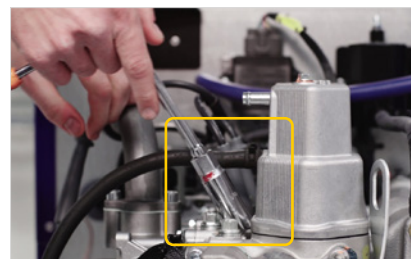


4.1.3 VALVE CLEARANCE ADJUSTMENT

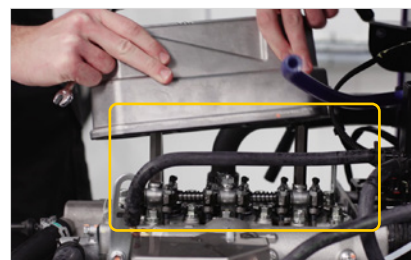
Remove the oil separator hose from the valve cover.



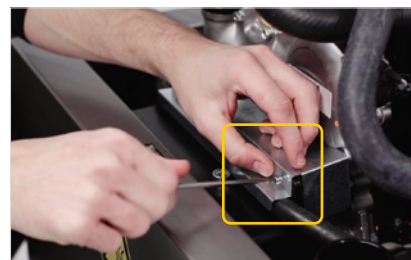
Remove the old spark plugs using a **torque wrench** with a **16 mm spark plug insert**.



Loosen the two bolts on the valve cover using a **10 mm socket spanner** and remove the valve cover.



Loosen the three screws on the pulley cover using a **3 mm Allan screwdriver** and remove the pulley cover.

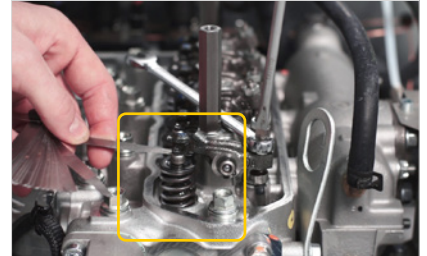


- Before the valve clearance adjustment, make sure that piston No. 1 is at the top dead centre (TDC) of the compression stroke. Rotate the crankshaft using a **19 mm open-end spanner** clockwise.
- Check the valve clearance using a **Feeler gauge**:
 - IN 0.20 mm (cool engine)
 - EX 0.20 mm (cool engine)
- If deviations occur, adjust the valve clearance.



4.1.3.1 VALVE CLEARANCE ADJUSTMENT

- Loosen the lock nut using a **10 mm ring spanner** and turn the adjusting screw for adjustment.
- Tighten the lock nut using a **torque wrench** with a **10 mm socket insert** and check the valve clearance again. Torque: 11 Nm
- With No. 1 piston at TDC of the compression stroke, check and adjust the valve clearances for the cylinders shown in the chart.
- Rotate the crankshaft one complete turn (360°) clockwise to check and adjust the remaining valves.
- Replace the old valve cover gasket with the new **valve cover gasket** and reinstall the valve cover with the two bolts. Torque: 10.5 ± 0.05 Nm
- Fasten the pulley cover with the three screws.



PISTON POSITION
CYLINDER

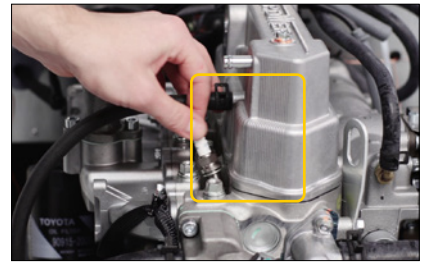
NO. 1 PISTON AT TDC, OF
COMPRESSION STROKE

ROTATE CRANKSHAFT
360° CLOCKWISE

	1	2	3
IN	•		•
EX	•	•	
IN		•	
EX			•

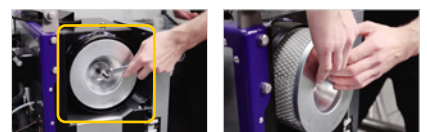
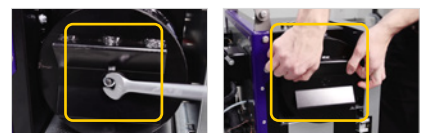
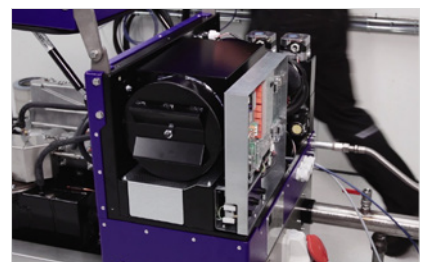
4.1.4 REPLACING USED SPARK PLUGS

- Check the electrode gap using a **Feeler gauge** and adjust if necessary. Standard gap: 0.4 – 0.5 mm
- Apply grease or lubricant.
- Insert the new spark plugs loosely to allow the temperature to balance out between the cylinder head and spark plugs.



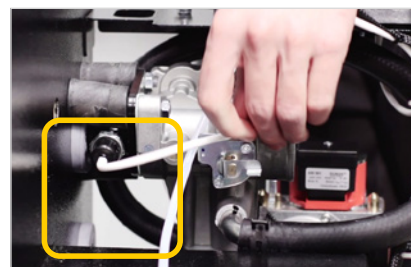
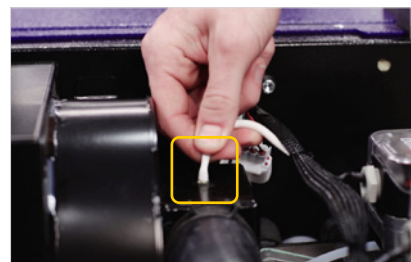
4.1.5 AIR FILTER

- Loosen the screws of the rear cover of the Power Unit using a **3 mm hex key** and remove the rear cover.
- Loosen the fixing bolt on the air filter cover using a **17 mm open-end spanner** and remove the cover.
- Loosen the fixing bolt on the air filter using a **17 mm open-end spanner** and pull the air filter off the threaded rod.
- Install the new **air filter** and the air filter cover.
- Tighten the bolts using a **torque wrench** with a **17 mm socket insert**. Torque: 5 Nm.



4.1.6 VACUUM HOSE

- Remove the vacuum hose from the air filter box and the vacuum sensor.
- Pull the vacuum hose off the vacuum filter.
- Place the new **vacuum hose Ø3ID L400** on the vacuum filter.
- Push the new **vacuum hose Ø3ID L160** onto the vacuum sensor and the air filter box.

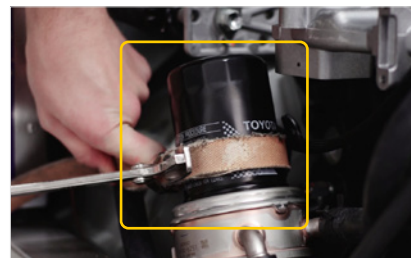


4.1.7 OIL FILTER

- Dismantle the used oil filter using an **oil filter spanner**.



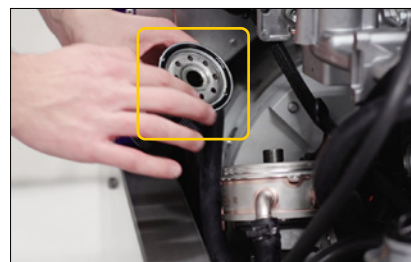
Used oil filters must be disposed in accordance with the applicable local regulations. Improper disposal of used filters endangers the environment!



- Apply a thin layer of oil to the rubber seal of the new **oil filter** and tighten the oil filter manually.



Do not use any tools to fit the oil filter to avoid damage to the filter.



4.1.8 PLUG FOR MEASURING POINT

- Depending on the type of exhaust gas pipe, replace the **plug** in the exhaust gas opening on the exhaust gas pipe upstream of the Power Unit.

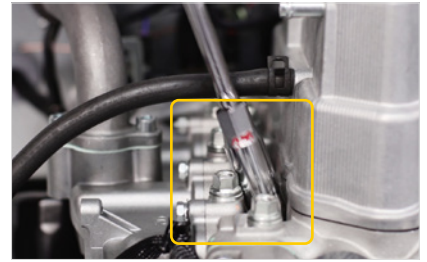


4.1.9 FASTENING NEW SPARK PLUGS

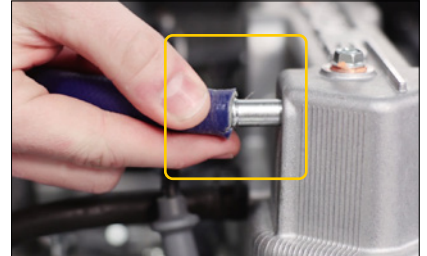
The temperatures of the spark plugs and the cylinder head have now equalised.

- Fasten the new **spark plugs** using a **torque wrench** with a **16 mm spark plug insert** and put the spark plug cap back on. Torque: 15 Nm

Follow the instructions in the package for further information on replacing the plugs.

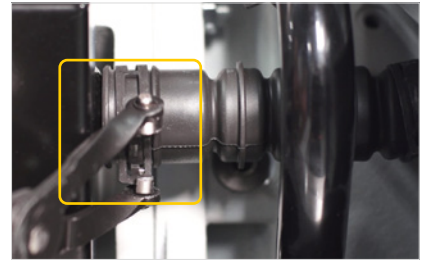


- Push the oil separator hose back onto the valve cover.

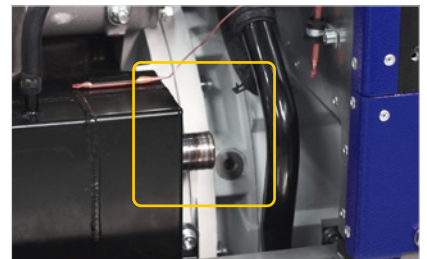


4.1.10 EXHAUST COMPENSATOR & SPRING BAND CLAMPS

- Loosen the spring band clamps on the exhaust compensator using a **spring band clamp** pliers and put them aside.

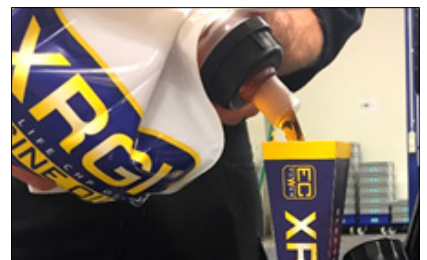


- Pull the exhaust compensator together with the two spring band clamps from both pipe studs.
- Slide the two new **spring band clamps** onto the new **exhaust compensator** and mount the new rubber compensator on the exposed stud.
- Fix the exhaust compensator with the two spring band clamps using a **spring clamp pliers**.

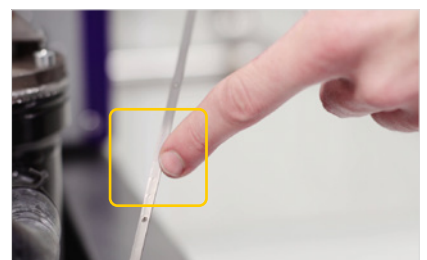


4.1.11 NEW OIL

- Fill the engine with a maximum of 40 litres **XRGi® Engine Oil** through the filler neck.

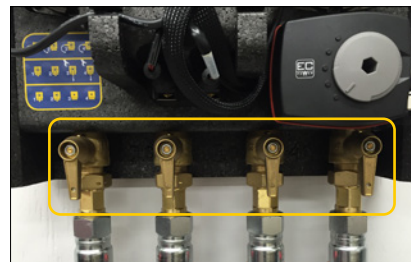


- Check the fill level on the oil dipstick to ensure that the engine is not overfilled. To do this, briefly screw on the oil cap and then remove it again.
- Reinstall the oil cap using a **water pump pliers**.



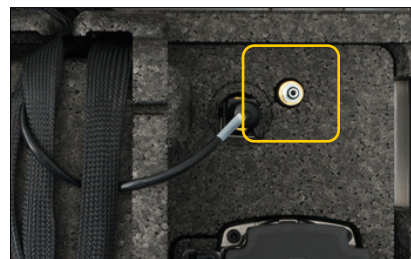
4.1.12 BLEEDING

- Check whether all four valves on the manifold are open on the Q-Heat Distributor. Open any closed valves.



4.1.12.1 Q-HEAT DISTRIBUTOR

- Use a bleed key to bleed the storage circuit on the Q-Heat Distributor. Attach a hose to the bleed screw to divert any leaking heating water and then use an **11 mm wrench** to loosen the bleed screw.
- When only heating water escapes from the bleed screw, tighten the screw.



- Fill with new **XRGI® Engine Coolant** up to the maximum mark.



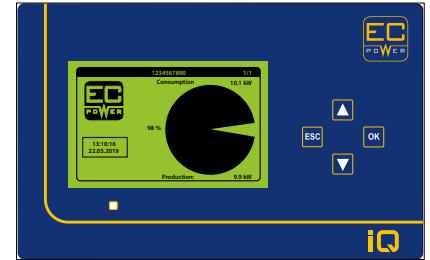
4.1.12.2 POWER UNIT

- Bleed the engine circuit at the air pot on the Power Unit. Attach a hose to the bleed screw to divert any leaking XRGI® Engine Coolant and then use an **11 mm wrench** to loosen the bleed screw.
- Bleed until only XRGI® Engine Coolant and no air escapes.
- When only XRGI® Engine Coolant escapes from the bleed screw, tighten the screw and check if there is still sufficient XRGI® Engine Coolant in the expansion vessel. If necessary, refill **XRGI® Engine Coolant** to the maximum mark.

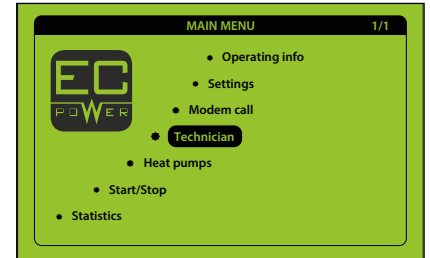


4.1.12.3 iQ-CONTROL PANEL

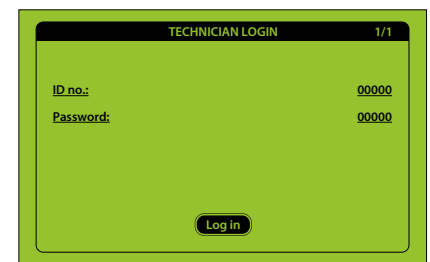
- Press any key on the user interface to activate the display and enter the menu.
- Press any button on the user interface again to enter the main menu.



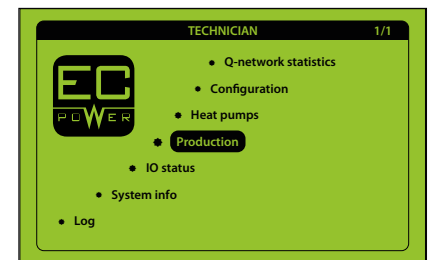
- Move the cursor to **Technician** by using the ▲ ▼ buttons and press **OK** on the user interface.



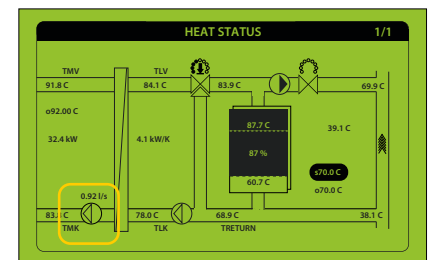
- Log in as technician.



- Move the cursor to **Production** by using the ▲ ▼ buttons and press **OK** on the user interface.



- Use the ▲ ▼ buttons to move to the page **Heat Status**.
- Move the cursor to the engine circuit pump by using the ▲ ▼ buttons and press **OK** on the user interface to activate the pump.
- Regulate the engine circuit pump up or down by using the ▲ ▼ buttons and press **ESC**.
- Check on the Q-Heat Distributor if the engine circuit pump is running.



Make sure that the expansion vessel does not run empty as this can cause damage to the XRGi® system.

- Bleed the XRGi® system for 10 minutes. Switch off the pump and wait for 5 minutes.
- Repeat the process.
- Repeat the bleeding process until you are sure that no more air is in the engine.
- Switch off the pump and exit the technician menu.
- Once the bleeding process is completed, refill **XRGi® Engine Coolant** to the maximum mark.

4.2 SOFTWARE UPDATE

- Once all parts of the service kit have been replaced on the XRG1® system, the software must be updated. Follow the Software update instructions from EC POWER.



If the latest software has already been installed, proceed to the next step.

4.3 REGULATION OF EMISSIONS

LAMBDA ADJUSTMENT

- In the technician menu, move the cursor to **Production** by using the ▲ ▼ buttons and press **OK** on the user interface.
- The ▲ ▼ buttons take you to the next page.
- Move the cursor to **Lambda adjustment** by using the ▲ ▼ buttons and press **OK** on the user interface to activate the field.
- Operate the flue gas analyser in line with the manufacturer's instructions and measure the flue gas emission.
- If the flue gas emissions are outside the required range, adjust the settings under **Lambda adjustment**.
- If the emissions values are too high/low press:
 - <O₂ ADJUST = Lambda adjustment increase by +1
 - >O₂ ADJUST = Lambda adjustment decrease by -1

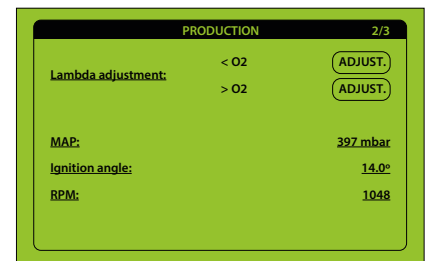
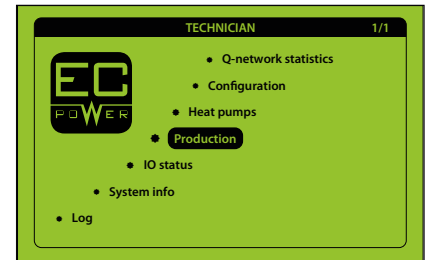


TABLE FOR REGULATION OF EMISSION VALUES

O₂-GUIDE VALUE
NO_x
CO

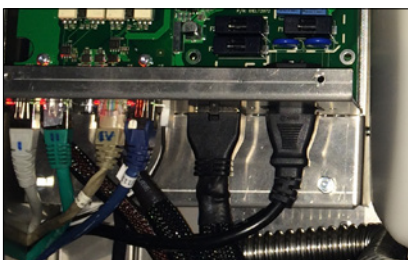
8,1 % at peak load
max 90 ppm
max 100 ppm



When reducing the O₂ values, it takes a couple of minutes before the change stabilises on your flue gas analyser. Make small adjustments at a time in order to achieve the correct values.

4.4 RECOMMISSIONING

- Once all parts of the service kit have been replaced on the XRG1® system and the latest software version has been installed on all components, close the Power Unit and reinstall the rear cover of the Power Unit.
- Recommission the XRG1® system by:
 - connecting the Q-Heat Distributor to the power supply
 - opening the gas supply to the Power Unit
 - switching on the XRG1® system on the iQ-Control Panel



5 MAINTENANCE XRGI® 6 LowNOx AND XRGI® 9**ARTICLE NO. 01KIT2612 - SCOPE OF DELIVERY SERVICE KIT
STANDARD COMPONENTS**

Pos	Qty.	Description
1	1	Air filter WIX 160
2	4	XRGI® Engine Oil GD 447, 10L
3	2	XRGI® Engine Coolant EC WB 104, 5L
4	1	Oil filter
5	3	Spark plugs
6	1	Plug for measuring point
7	1	Vacuum hose Ø3ID L160
8	1	Vacuum hose Ø3ID L400
9	2	Spring band clamp Ø35
10	1	Exhaust compensator Ø30 L180
11	1	Lambda sensor
12	1	Valve cover gasket

**ADDITIONAL KIT/COMPONENTS**

The standard service kit may contain additional kits or components. For replacement of these kits or components, follow the enclosed instructions.

REQUIRED TOOLS

- Engine oil suction pump
- Oil filter spanner
- Torque wrench
- Water pump pliers
- Spring clamp pliers
- Feeler gauge
- FS2009USB programming device
- Flue gas analyser
- Lambda sensor top long ½
- 16 mm spark plug wrench
- 10 mm socket insert
- 17 mm socket insert
- 3 mm hex key
- 5 mm hex key
- 10 mm ring spanner
- 24 mm ring spanner
- 10 mm open-ended spanner
- 17 mm open-ended spanner
- 19 mm open-ended spanner
- 10 mm socket spanner
- 11 mm wrench

5.1 SERVICE KIT – COMPONENT REPLACEMENT



Suitable protective clothing i.e. goggles, gloves, and shoes shall be worn during maintenance of the XRGI® system.

Only commence maintenance work on the XRGI® system when it is not in operation and it is fully cooled down! Otherwise, there is a risk of burns from hot components and/or scalding if substances should leak.



Before commencing maintenance, shut down the XRGI® system at user level on the iQ-Control Panel and at the main switch. Shut down the power factor corrector. Close the gas valve and unplug the Q-Heat Distributor.



Follow the steps in this instruction. This will make your work easier and ensure a high quality conversion.

5.1.1 COOLANT

The XRGI® Engine Coolant must be checked at regular intervals for appearance, pH value, and glycol content. EC POWER recommends checking the values of the following parameters and, if necessary, replacing the coolant during each service. For accurate measurement of the values, EC POWER recommends using a pH meter and a refractometer. Please observe the operating instructions provided by the respective manufacturer(s).

- Appearance: The coolant must be light and clear. It must be free from deposits, flocculants, algae, bacteria, oil, and/or sludge of any kind.
- pH value: 7.5–10 at 20 °C
- Glycol: > 30 %



If a non-approved coolant has been used, or if the coolant is cloudy and/or contaminated with oil or sludge, EC POWER recommends flushing the XRGI® system with new XRGI® Engine Coolant. If flushing is required, flush the XRGI® system several times with water until all contamination has been removed. Then flush the XRGI® system with new XRGI® Engine Coolant and let the Power Unit run for one week before starting the bleeding procedure.

- Only proceed to the next step once the cooling and calibration process is complete (10–15 minutes).
- Release the cap on the expansion vessel on the Q-Heat Distributor.
- Drain the coolant by either opening the drain valve or removing the lower reinforced hose from the Power Unit. Release gradually to control coolant flow.
- Remove both reinforced hoses and loosen the bleed screw on the air pot to drain as much coolant as possible.
- When there is no more coolant in the system, close the drain valve and fasten the reinforced hoses.



Used coolant must be disposed in accordance with the applicable local regulations. Improper disposal of used coolant represents a hazard to the environment! Mixing foreign substances such as solvents, brake fluid, oil and chlorinated oil in used coolant is strictly prohibited!

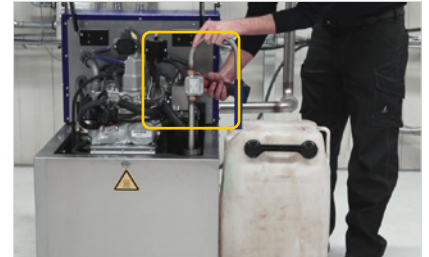


5.1.2 USED OIL

- Open the Power Unit and unscrew the oil cap with **water pump pliers**.
- Extract some of the used oil using a **suction pump**.
- Wait 3-5 minutes before extracting the remaining used oil.



Used engine oil must be disposed in accordance with the applicable local regulations. Improper disposal of used oil represents a hazard to the environment! Mixing foreign substances such as solvents, brake fluid, coolant, and chlorinated oil in used oil is strictly prohibited!

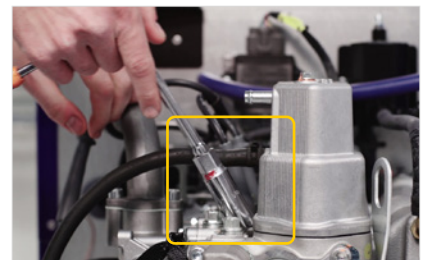


5.1.3 VALVE CLEARANCE ADJUSTMENT

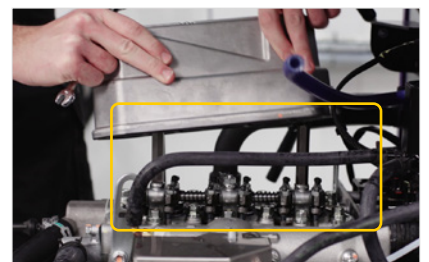
Remove the oil separator hose from the valve cover.



Remove the old spark plugs using a **torque wrench** with a **16 mm spark plug insert**.



Loosen the two bolts on the valve cover using a **10 mm socket spanner** and remove the valve cover.

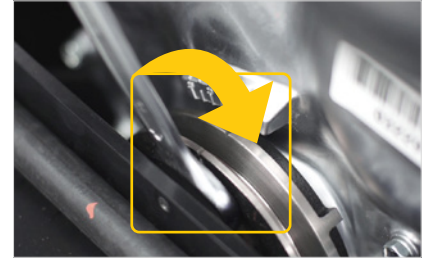


Loosen the three screws on the pulley cover using a **3 mm Allan screwdriver** and remove the pulley cover.



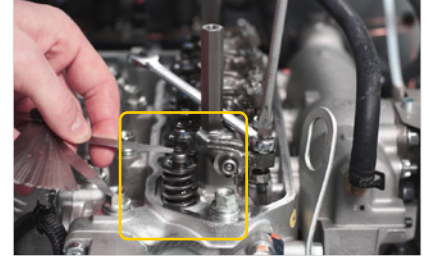
- Before the valve clearance adjustment, make sure that piston No. 1 is at the top dead centre (TDC) of the compression stroke. Rotate the crankshaft using a **19 mm open-end spanner** clockwise.
- Check the valve clearance using a **Feeler gauge**:
 - IN 0.20 mm (cool engine)
 - EX 0.20 mm (cool engine)

If deviations occur, adjust the valve clearance.



5.1.3.1 VALVE CLEARANCE ADJUSTMENT

- Loosen the lock nut using a **10 mm ring spanner** and turn the adjusting screw for adjustment.
- Tighten the locknut using a **torque wrench** with a **10 mm socket insert** and check the valve clearance again. Torque: 11 Nm
- With No. 1 piston at TDC of the compression stroke, check and adjust the valve clearances for the cylinders shown in the chart.
- Rotate the crankshaft one complete turn (360°) clockwise to check and adjust the remaining valves.
- Replace the old valve cover gasket with the new **valve cover gasket** and reinstall the valve cover with the two bolts. Torque: 10.5 ± 0.05 Nm
- Fasten the pulley cover with the three screws.



PISTON POSITION
CYLINDER

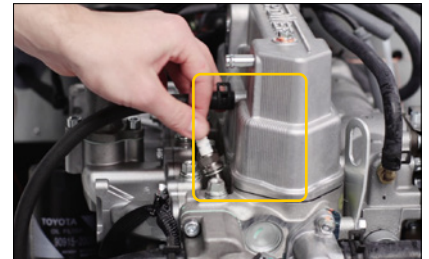
NO. 1 PISTON AT TDC, OF
COMPRESSION STROKE

ROTATE CRANKSHAFT
360° CLOCKWISE

	1	2	3
IN	•		•
EX	•	•	
IN		•	
EX			•

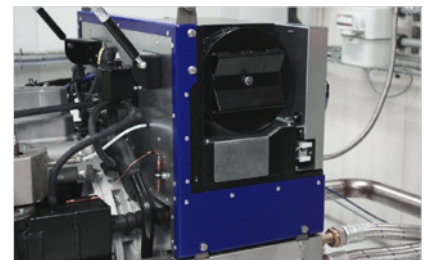
5.1.4 REPLACING USED SPARK PLUGS

- Check the electrode gap using a **Feeler gauge** and adjust if necessary. Standard gap: 0.4 – 0.5 mm
- Apply grease or lubricant.
- Insert the new spark plugs loosely to allow the temperature to balance out between the cylinder head and spark plugs.



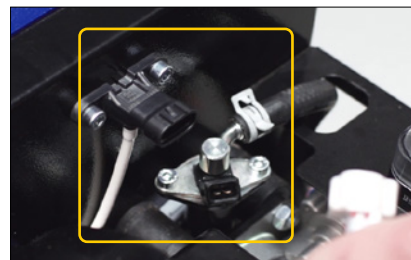
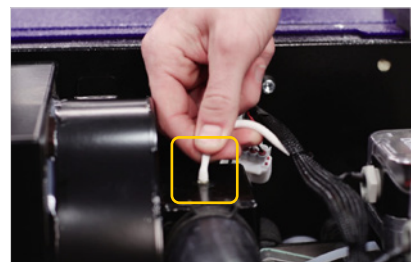
5.1.5 AIR FILTER

- Loosen the screws of the rear cover of the Power Unit using a **3 mm hex key** and remove the rear cover.
- Loosen the fixing bolt on the air filter cover using a **17 mm open-end spanner** and remove the cover.
- Loosen the fixing bolt on the air filter using a **17 mm open-end spanner** and pull the air filter off the threaded rod.
- Install the new **air filter** and put the air filter cover back on.
- Tighten the bolts using a **torque wrench** with a **17 mm socket insert**. Torque: 5 Nm.



5.1.6 VACUUM HOSE

- Remove the vacuum hose from the air filter box and the vacuum sensor.
- Pull the vacuum hose off the vacuum filter.
- Place the new **vacuum hose Ø3ID L400** on the vacuum filter.
- Push the **vacuum hose Ø3ID L160** onto the vacuum sensor and fasten it using a **5 mm hex key**.
- Put the vacuum hose back onto the intake sockets and use the two spring band clamps to fix it using a **spring clamp pliers**.

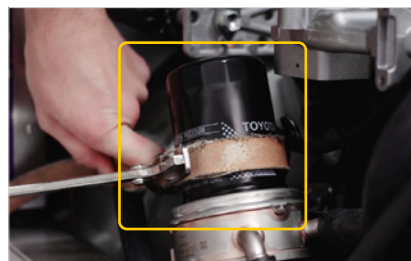


5.1.7 OIL FILTER

- Dismantle the used oil filter using an **oil filter spanner**.



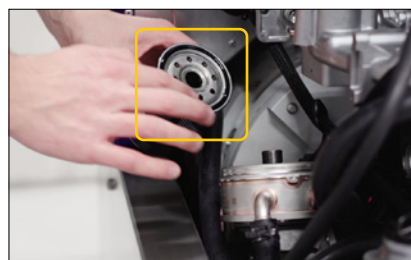
Used oil filters must be disposed in accordance with the applicable local regulations. Improper disposal of used filters endangers the environment!



- Apply a thin layer of oil to the rubber seal of the new **oil filter** and tighten the oil filter manually.



Do not use any tools to fit the oil filter to avoid damage to the filter.



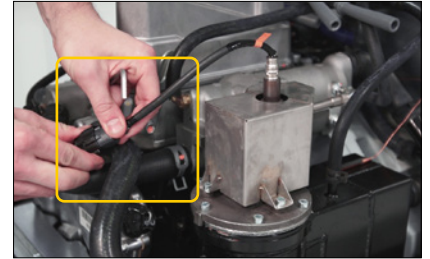
5.1.8 PLUG FOR MEASURING POINT

- Depending on the type of exhaust gas pipe, replace the **plug** in the exhaust gas opening on the exhaust gas pipe upstream of the Power Unit.

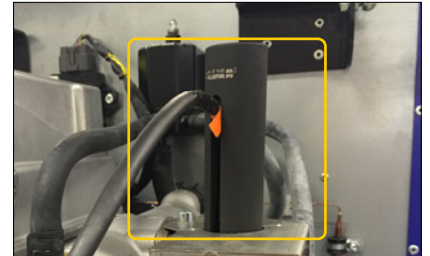


5.1.9 LAMBDA SENSOR

- Separate the lambda sensor cable from the harness at the plug-in contact.



- Dismantle the old lambda sensor from the socket using a **lambda sensor top long** and mount the new **Lambda sensor**.
- Reconnect the lambda sensor cable to the harness.



5.1.10 FASTENING NEW SPARK PLUGS

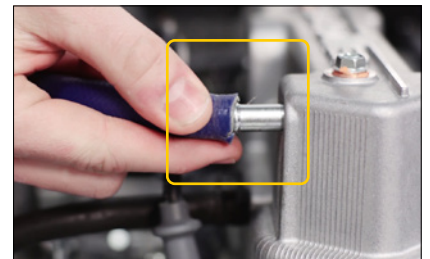
The temperatures of the spark plugs and the cylinder head have now equalised.

- Fasten the new **spark plugs** using a **torque wrench** with a **16 mm spark plug insert** and put the spark plug cap back on. Torque: 15 Nm

Follow the instructions in the package for further information on replacing the plugs.

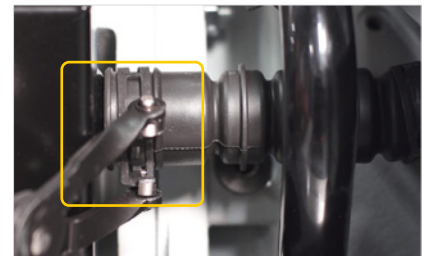


- Push the oil separator hose back onto the valve cover.

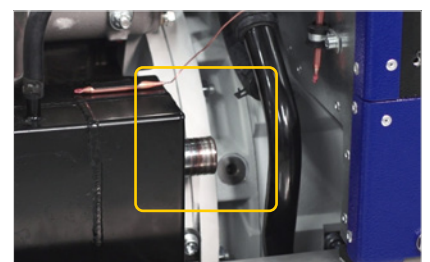


5.1.11 EXHAUST COMPENSATOR & SPRING BAND CLAMPS

- Loosen the spring band clamps on the exhaust compensator using a **spring band clamp** pliers and put them aside.

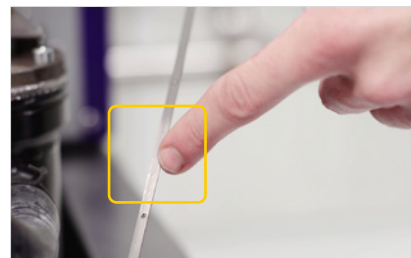


- Pull the exhaust compensator together with the two spring band clamps from both pipe studs.
- Slide the two new **spring band clamps** onto the new **exhaust compensator** and mount the new rubber compensator on the exposed stud.
- Fix the exhaust compensator with the two spring band clamps using a **spring clamp pliers**.



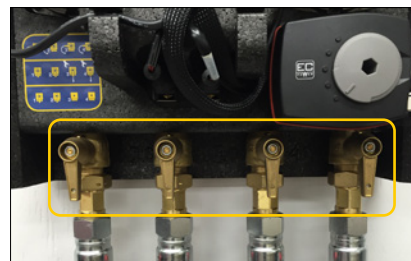
5.1.12 NEW OIL

- Fill the engine with a maximum of 40 litres **XRGi® Engine Oil** through the filler neck.
- Check the fill level on the oil dipstick to ensure that the engine is not overfilled. To do this, briefly screw on the oil cap and then remove it again.
- Reinstall the oil cap using a **water pump pliers**.



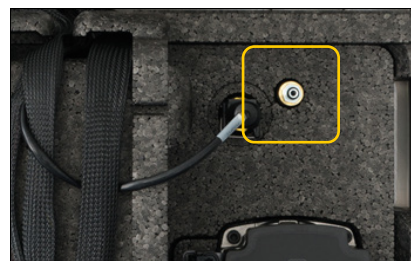
5.1.13 BLEEDING

- Check whether all four valves on the manifold are open on the Q-Heat Distributor. Open any closed valves.



5.1.13.1 Q-HEAT DISTRIBUTOR

- Use a bleed key to bleed the storage circuit on the Q-Heat Distributor. Attach a hose to the bleed screw to divert any leaking heating water and then use an **11 mm wrench** to loosen the bleed screw.
- When only heating water escapes from the bleed screw, tighten the screw.



- Fill with new **XRGi® Engine Coolant** up to the maximum mark.



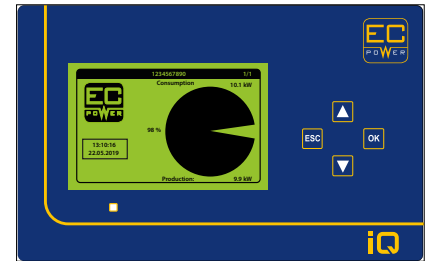
5.1.13.2 POWER UNIT

- Bleed the engine circuit at the air pot on the Power Unit. Attach a hose to the bleed screw to divert any leaking XRGi® Engine Coolant and then use an **11 mm wrench** to loosen the bleed screw.
- Bleed until only XRGi® Engine Coolant and no air escapes.
- When only XRGi® Engine Coolant escapes from the bleed screw, tighten the screw and check if there is still sufficient XRGi® Engine Coolant in the expansion vessel. If necessary, refill **XRGi® Engine Coolant** to the maximum mark.

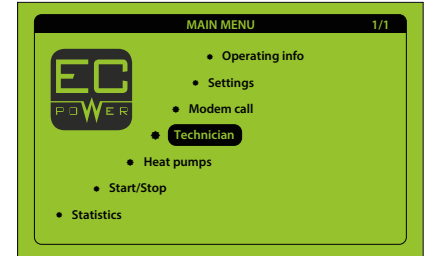


5.1.13.3 iQ-CONTROL PANEL

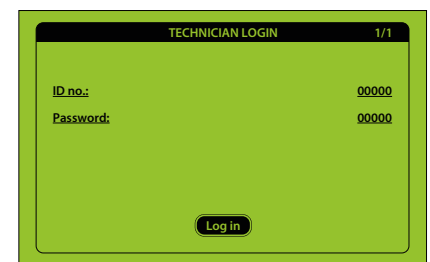
- Press any key on the user interface to activate the display and enter the menu.
- Press any button on the user interface again to enter the main menu.



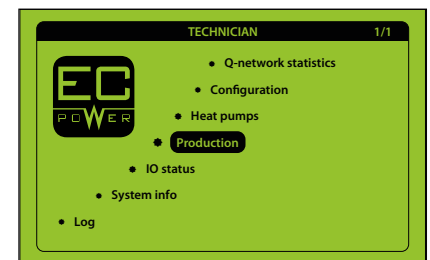
- Move the cursor to **Technician** by using the ▲ ▼ buttons and press **OK** on the user interface.



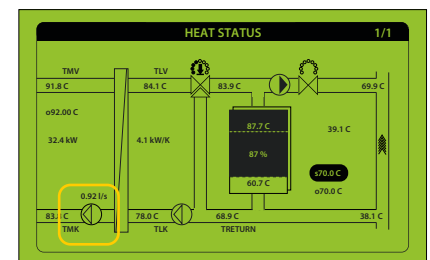
- Log in as technician.



- Move the cursor to **Production** by using the ▲ ▼ buttons and press **OK** on the user interface.



- Use the ▲ ▼ buttons to move to the page **Heat Status**.
- Move the cursor to the engine circuit pump by using the ▲ ▼ buttons and press **OK** on the user interface to activate the pump.
- Regulate the engine circuit pump up or down by using the ▲ ▼ buttons and press **ESC**.
- Check on the Q-Heat Distributor if the engine circuit pump is running.



Make sure that the expansion vessel does not run empty as this can cause damage to the XRGi® system.

- Bleed the XRGi® system for 10 minutes. Switch off the pump and wait for 5 minutes.
- Repeat the process.
- Repeat the bleeding process until you are sure that no more air is in the engine.
- Switch off the pump and exit the technician menu.
- Once the bleeding process is completed, refill **XRGi® Engine Coolant** to the maximum mark.

5.2 SOFTWARE UPDATE

- Once all parts of the service kit have been replaced on the XRGi® system, the software must be updated. Follow the Software update instructions from EC POWER.



If the latest software has already been installed, proceed to the next step.

5.3 REGULATION OF EMISSIONS

LAMBDA ADJUSTMENT

- In the technician menu, move the cursor to **Production** by using the ▲▼ buttons and press **OK** on the user interface.
- The ▲▼ buttons take you to the next page.
- Move the cursor to **Lambda adjustment** by using the ▲▼ buttons and press **OK** on the user interface to activate the field.
- Operate the flue gas analyser in line with the manufacturer's instructions and measure the flue gas emission.
- If the flue gas emissions are outside the required range, adjust the settings under **Lambda adjustment**.
- If the emissions values are too high/low press:
 - >NO_x ADJUST = Lambda adjustment increase by +1
 - >CO ADJUST = Lambda adjustment decrease by -1

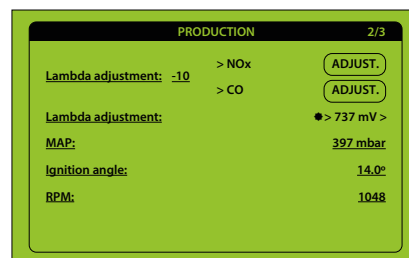
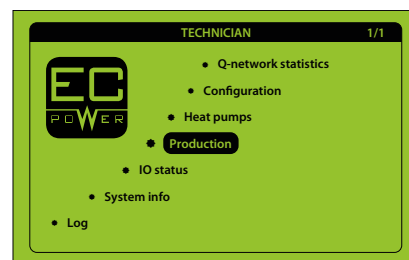


TABLE FOR REGULATION OF EMISSION VALUES

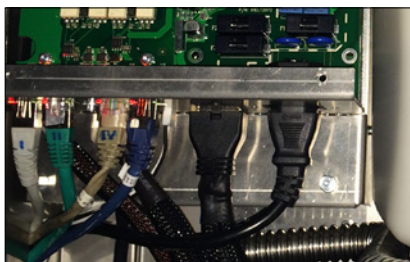
NO _x	max 60 ppm
CO	max 70 ppm



When reducing CO and/or NO_x values, it takes a couple of minutes before the change stabilises on your flue gas analyser. Make small adjustments at a time in order to achieve the correct values.

5.4 RECOMMISSIONING

- Once all parts of the service kit have been replaced on the XRGi® system and the latest software version has been installed on all components, close the Power Unit and reinstall the rear cover of the Power Unit.
- Recommission the XRGi® system by:
 - connecting the Q-Heat Distributor to the power supply
 - opening the gas supply to the Power Unit
 - switching on the XRGi® system on the iQ-Control Panel



ARTICLE NO. 01KIT2503 - SCOPE OF DELIVERY SERVICE KIT STANDARD COMPONENTS

Pos.	Qty.	Description
1	1	Air filter WIX 160
2	3	XRGI® Engine Oil GD 447, 10L
3	4	XRGI® Engine Coolant EC WB 104, 5L
4	1	Oil filter
5	4	Spark plugs
6	1	Plug for measuring point

**ADDITIONAL KIT/COMPONENTS**

The standard service kit may contain additional kits or components. For replacement of these kits or components, follow the enclosed instructions.

REQUIRED TOOLS

- Engine oil suction pump
- Oil filter spanner
- Torque wrench
- Water pump pliers
- Feeler gauge
- FS2009USB programming device
- 20.8 mm spark plug wrench
- 17 mm socket insert
- 3 mm hex key
- 17 mm open-ended spanner
- 11 mm wrench

6.1 SERVICE KIT – COMPONENT REPLACEMENT

Suitable protective clothing i.e. goggles, gloves, and shoes shall be worn during maintenance of the XRGI® system.

Only commence maintenance work on the XRGI® system when it is not in operation and it is fully cooled down! Otherwise, there is a risk of burns from hot components and/or scalding if substances should leak.



Before commencing maintenance, shut down the XRGI® system at user level on the iQ-Control Panel and at the main switch. Shut down the power factor corrector. Close the gas valve and unplug the Q-Heat Distributor.



Follow the steps in this instruction. This will make your work easier and ensure a high quality conversion.

6.1.1 COOLANT

The XRG1® Engine Coolant must be checked at regular intervals for appearance, pH value, and glycol content. EC POWER recommends checking the values of the following parameters and, if necessary, replacing the coolant during each service. For accurate measurement of the values, EC POWER recommends using a pH meter and a refractometer. Please observe the operating instructions provided by the respective manufacturer(s).

- Appearance: The coolant must be light and clear. It must be free from deposits, flocculants, algae, bacteria, oil, and/or sludge of any kind.
- pH value: 7.5–10 at 20 °C
- Glycol: > 30 %



If a non-approved coolant has been used, or if the coolant is cloudy and/or contaminated with oil or sludge, EC POWER recommends flushing the XRG1® system with new XRG1® Engine Coolant. If flushing is required, flush the XRG1® system several times with water until all contamination has been removed. Then flush the XRG1® system with new XRG1® Engine Coolant and let the Power Unit run for one week before starting the bleeding procedure.

- Only proceed to the next step once the cooling and calibration process is complete (10–15 minutes).
- Release the cap on the expansion vessel on the Q-Heat Distributor.
- Drain the coolant by either opening the drain valve or removing the lower reinforced hose from the Power Unit. Release gradually to control coolant flow.
- Remove both reinforced hoses and loosen the bleed screw on the air pot to drain as much coolant as possible.
- When there is no more coolant in the system, close the drain valve and fasten the reinforced hoses.



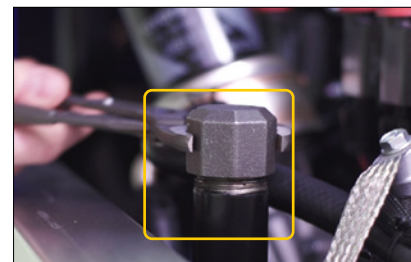
Used coolant must be disposed in accordance with the applicable local regulations. Improper disposal of used coolant represents a hazard to the environment! Mixing foreign substances such as solvents, brake fluid, oil and chlorinated oil in used coolant is strictly prohibited!

6.1.2 USED OIL

- Open the Power Unit and unscrew the oil cap with **water pump pliers**.
- Extract some of the used oil using a **suction pump**.
- Wait 3-5 minutes before extracting the remaining used oil.

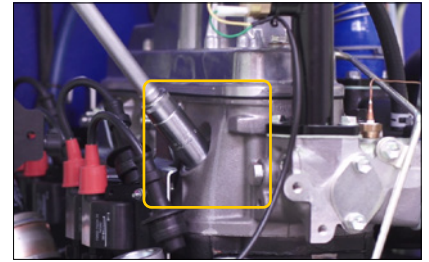


Used engine oil must be disposed in accordance with the applicable local regulations. Improper disposal of used oil represents a hazard to the environment! Mixing foreign substances such as solvents, brake fluid, coolant, and chlorinated oil in used oil is strictly prohibited!



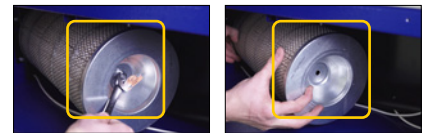
6.1.3 REPLACING USED SPARK PLUGS

- Remove the old spark plugs using a **torque wrench** with a **20.8 mm spark plug insert**.
- Check the electrode gap using a Feeler gauge before inserting the new spark plugs and adjust if necessary. Standard gap: 0.4 – 0.5 mm.
- Apply grease or lubricant.
- Insert the new spark plugs loosely to allow the temperature to balance out between the cylinder head and spark plugs.



6.1.4 AIR FILTER

- Loosen the screws of the rear cover of the Power Unit using a **3 mm hex key** and remove the rear cover.
- Loosen the fixing bolt on the air filter using a **17 mm open-end spanner** and pull the air filter off the threaded rod.
- Install the new **air filter** and tighten the bolt using a torque wrench with a 17 mm socket insert. Torque: 5 Nm.
- Replace the rear cover of the power unit.



6.1.5 OIL FILTER

- Dismantle the used oil filter using an **oil filter spanner**.



Used oil filters must be disposed in accordance with the applicable country regulations. Improper disposal of used filters endangers the environment!



- Take the new **oil filter**, put a little oil onto the rubber seal and tighten the oil filter manually.



Do not use any tools to fit the oil filter to avoid damage to the filter.



6.1.6 PLUG FOR MEASURING POINT

- Depending on the type of exhaust gas pipe, consider replacing the **plug** in the exhaust gas opening on the exhaust gas pipe upstream of the Power Unit.

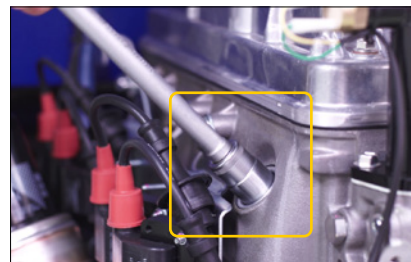


6.1.7 FASTENING NEW SPARK PLUGS

The temperatures of the spark plugs and the cylinder head have now equalised.

- Fasten the new spark plugs using a **torque wrench** with a **20.8 mm spark plug insert** and put the spark plug cap back on. Torque: 15 Nm.

Follow the instructions in the package for further information on replacing the plugs.



6.1.8 NEW OIL

- Fill the engine with a maximum of 30 litres **XRGi® Engine Oil** through the filler neck.

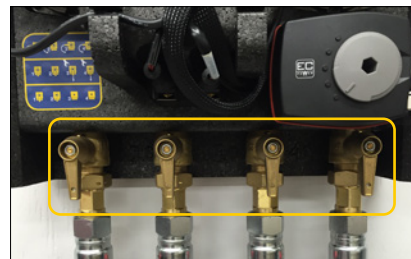


- Check the fill level on the oil dipstick to ensure that the engine is not overfilled. To do this, briefly screw on the oil cap and then remove it again.
- Reinstall the oil cap using a **water pump pliers**.



6.1.9 BLEEDING

- Check whether all four valves on the manifold are open on the Q-Heat Distributor. Open any closed valves.

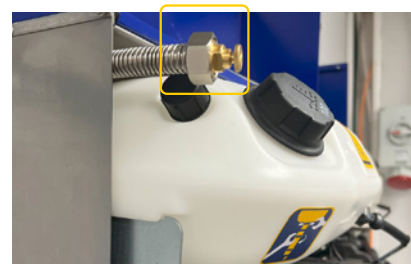


6.1.9.1 Q-HEAT DISTRIBUTOR

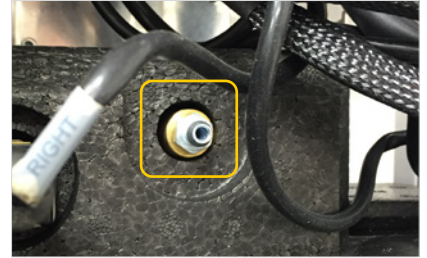


For bleeding of the Q-Heat Distributor, K000223 Coolant bleeding kit is available in the EC POWER e-shop.

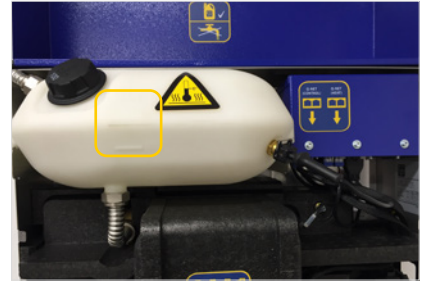
If the Q-Heat Distributor Coolant Press. Upgrade Kit (4Y) (K000226) is installed on the Q-Heat Distributor, loosen the bleed screw on the Q-Heat Distributor before proceeding to the next step.



- Use a bleed key to bleed the storage circuit on the Q-Heat Distributor. Attach a hose to the bleed screw to divert any leaking heating water and then use an **11 mm wrench** to loosen the bleed screw.
- When only heating water escapes from the bleed screw, tighten the screw.

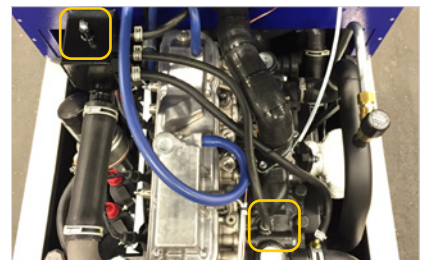


- Fill with new **XRG1® Engine Coolant** up to the maximum mark.



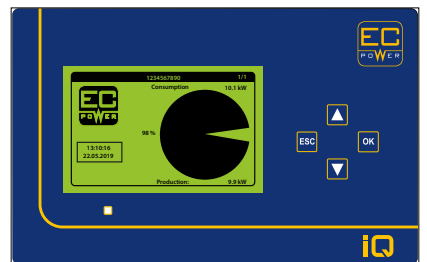
6.1.9.2 POWER UNIT

- Bleed the engine circuit at the air pot on the Power Unit. Attach a hose to the bleed screw to divert any leaking XRG1® Engine Coolant and then use an **11 mm wrench** to loosen the bleed screw.
- Bleed until only XRG1® Engine Coolant and no air escapes.
- When only XRG1® Engine Coolant escapes from the bleed screw, tighten the screw and check if there is still sufficient XRG1® Engine Coolant in the expansion vessel. If necessary, refill **XRG1® Engine Coolant** to the maximum mark.

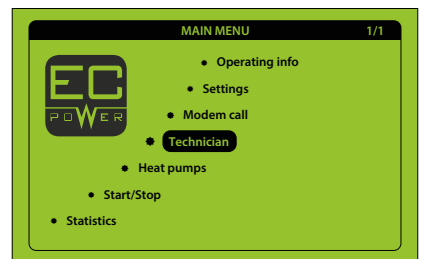


6.1.9.3 iQ-CONTROL PANEL

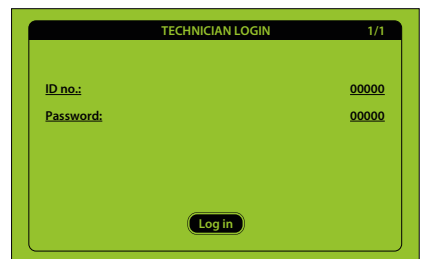
- Press any key on the user interface to activate the display and enter the menu.
- Press any button on the user interface again to enter the main menu.



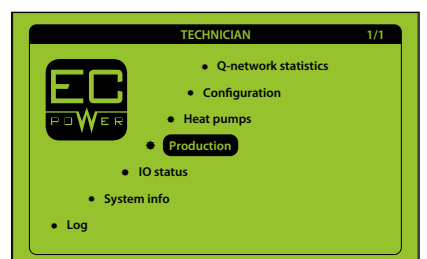
- Move the cursor to **Technician** by using the **▲ ▼** buttons and press **OK** on the user interface.



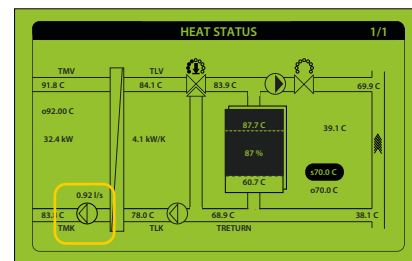
- Log in as technician.



- Move the cursor to **Production** by using the **▲ ▼** buttons and press **OK** on the user interface.



- Use the ▲ ▼ buttons to move to the page **Heat Status**.
- Move the cursor to the engine circuit pump by using the ▲ ▼ buttons and press **OK** on the user interface to activate the pump.
- Regulate the engine circuit pump up or down by using the ▲ ▼ buttons and press **ESC**.
- Check on the Q-Heat Distributor if the engine circuit pump is running.



Make sure that the expansion vessel does not run empty as this can cause damage to the XRGi® system.

- Bleed the XRGi® system for 10 minutes. Switch off the pump and wait for 5 minutes.
- Repeat the process.
- Repeat the bleeding process until you are sure that no more air is in the engine.
- Switch off the pump and exit the technician menu.
- Once the bleeding process is completed, refill **XRGi® Engine Coolant** to the maximum mark.

6.2 SOFTWARE UPDATE

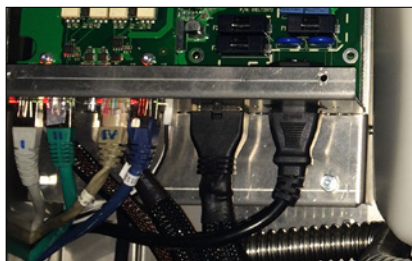
- Once all parts of the service kit have been replaced on the XRGi® system, the software must be updated. Follow the Software update instructions from EC POWER.



If the latest software has already been installed, proceed to the next step.

6.3 RECOMMISSIONING

- Once all parts of the service kit have been replaced on the XRGi® system and the latest software version has been installed on all components, close the Power Unit and reinstall the rear cover of the Power Unit.
- Recommission the XRGi® system by:
 - connecting the Q-Heat Distributor to the power supply
 - opening the gas supply to the Power Unit
 - switching on the XRGi® system on the iQ-Control Panel



6.4 ADDITIONAL COMPONENTS FOR OPERATION WITH BIOGENIC GASES

The XRGi® BIOGENIC system is operated with biogenic gas. This may require the installation of additional components such as activated carbon filter, carbon filter material, gas detector, shut-off valve for gas detector, methane sensor, hydrogen sulfide sensor, sound/light alarm, and flame shut-off device. Please refer to the respective manufacturer's instructions for commissioning these additional components.

During commissioning, test all safety devices to confirm they are functioning correctly.

7 MAINTENANCE XRGi® 15 LowNOx, XRGi® 20 AND XRGi® 20 BIOGENIC**ARTICLE NO. 01KIT2583 - SCOPE OF DELIVERY SERVICE KIT
STANDARD COMPONENTS**

Pos.	Qty.	Description
1	1	Air filter WIX 160
2	5	XRGi® Engine Oil GD 447, 10L
3	4	XRGi® Engine Coolant EC WB 104, 5L
4	1	Oil filter
5	4	Spark plugs
6	1	Plug for measuring point
7	1	Vacuum hose Ø3ID L160
8	1	Vacuum hose Ø3ID L580
9	2	Spring band clamp Ø47
10	1	Exhaust compensator Ø40 L176
11	1	Lambda sensor



During maintenance of XRGi® systems equipped with the Coil-on-Plug ignition system, two lambda sensors are required. Lambda sensors are available from EC POWER.

ADDITIONAL KIT/COMPONENTS

The standard service kit may contain additional kits or components. For replacement of these kits or components, follow the enclosed instructions.

REQUIRED TOOLS

- Engine oil suction pump
- Oil filter spanner
- Torque wrench
- Water pump pliers
- Spring clamp pliers
- Feeler gauge
- FS2009USB programming device
- Flue gas analyser
- Lambda sensor top long ½
- Snap ring pliers
- 20.8 mm spark plug wrench
- 17 mm socket insert
- 3 mm hex key
- 5 mm hex key
- 17 mm open-ended spanner
- 11 mm wrench
- 24 mm ring spanner

7.1 SERVICE KIT – COMPONENT REPLACEMENT



Suitable protective clothing i.e. goggles, gloves, and shoes shall be worn during maintenance of the XRGI® system.

Only commence maintenance work on the XRGI® system when it is not in operation and it is fully cooled down! Otherwise, there is a risk of burns from hot components and/or scalding if substances should leak.



Before commencing maintenance, shut down the XRGI® system at user level on the iQ-Control Panel and at the main switch. Shut down the power factor corrector. Close the gas valve and unplug the Q-Heat Distributor.



Follow the steps in this instruction. This will make your work easier and ensure a high quality conversion.

7.1.1 COOLANT

The XRGI® Engine Coolant must be checked at regular intervals for appearance, pH value, and glycol content. EC POWER recommends checking the values of the following parameters and, if necessary, replacing the coolant during each service. For accurate measurement of the values, EC POWER recommends using a pH meter and a refractometer. Please observe the operating instructions provided by the respective manufacturer(s).

- Appearance: The coolant must be light and clear. It must be free from deposits, flocculants, algae, bacteria, oil, and/or sludge of any kind.
- pH value: 7.5–10 at 20 °C
- Glycol: > 30 %



If a non-approved coolant has been used, or if the coolant is cloudy and/or contaminated with oil or sludge, EC POWER recommends flushing the XRGI® system with new XRGI® Engine Coolant. If flushing is required, flush the XRGI® system several times with water until all contamination has been removed. Then flush the XRGI® system with new XRGI® Engine Coolant and let the Power Unit run for one week before starting the bleeding procedure.

- Only proceed to the next step once the cooling and calibration process is complete (10–15 minutes).
- Release the cap on the expansion vessel on the Q-Heat Distributor.
- Drain the coolant by either opening the drain valve or removing the lower reinforced hose from the Power Unit. Release gradually to control coolant flow.
- Remove both reinforced hoses and loosen the bleed screw on the air pot to drain as much coolant as possible.
- When there is no more coolant in the system, close the drain valve and fasten the reinforced hoses.



Used coolant must be disposed in accordance with the applicable local regulations. Improper disposal of used coolant represents a hazard to the environment! Mixing foreign substances such as solvents, brake fluid, oil and chlorinated oil in used coolant is strictly prohibited!

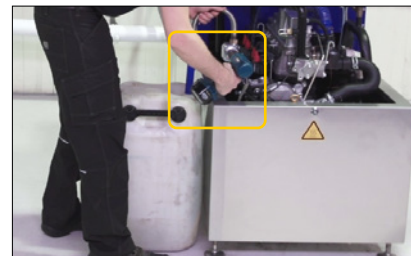


7.1.2 USED OIL

- Open the Power Unit and unscrew the oil cap with **water pump pliers**.
- Extract some of the used oil using a **suction pump**.
- Wait 3-5 minutes before extracting the remaining used oil.

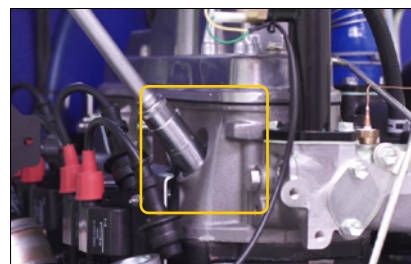


Used engine oil must be disposed in accordance with the applicable local regulations. Improper disposal of used oil represents a hazard to the environment! Mixing foreign substances such as solvents, brake fluid, coolant, and chlorinated oil in used oil is strictly prohibited!



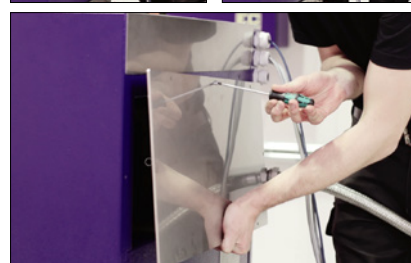
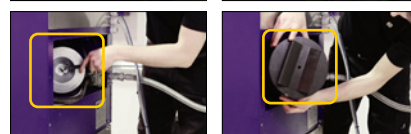
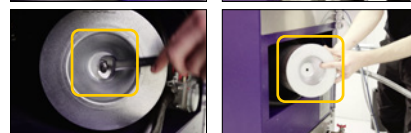
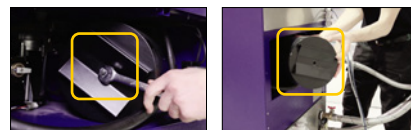
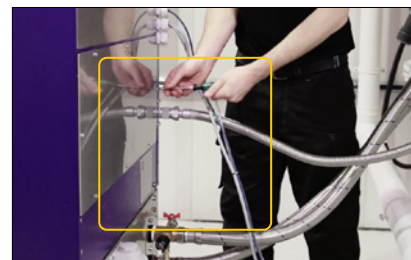
7.1.3 REPLACING USED SPARK PLUGS

- Remove the old spark plugs using a **torque wrench** with a **20.8 mm spark plug insert**.
- Check the electrode gap using a Feeler gauge before inserting the new spark plugs and adjust if necessary. Standard gap: 0.4 – 0.5 mm.
- Apply grease or lubricant.
- Insert the new spark plugs loosely to allow the temperature to balance out between the cylinder head and spark plugs.



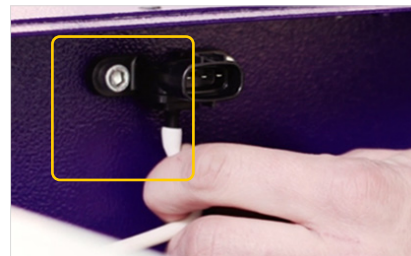
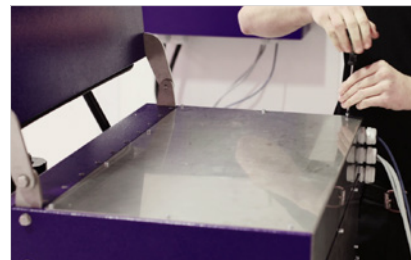
7.1.4 AIR FILTER

- Loosen the screws of the rear cover of the Power Unit using a **3 mm hex key** and remove the rear cover.
- Loosen the fixing bolt on the air filter box using a **17 mm open-end spanner** and remove the box.
- Loosen the fixing bolt on the air filter using a **17 mm open-end spanner** and pull the air filter off the threaded rod.
- Install the **air filter** and tighten the bolt using a **torque wrench** with a **17 mm socket insert**. Torque: 5 Nm.
- Put the air filter box on the air filter and tighten the bolt using a **torque wrench** with a **17 mm socket insert**. Torque: 5 Nm.
- Replace the rear cover of the power unit with the 8 bolts M4x10 using a **3 mm hex key**.



7.1.5 VACUUM HOSE

- Loosen the eight bolts from the electronics compartment using a **3 mm hex key** and remove the cover.
- In the electronics compartment remove the vacuum hose from the vacuum sensor.
- In the engine compartment pull the cable hose out of the cable entry and remove it from the vacuum filter.
- Pull the new **vacuum hose** through the cable entry and place it on the vacuum filter.



7.1.6 OIL FILTER

- Dismantle the used oil filter using an **oil filter spanner**.



Used oil filters must be disposed in accordance with the applicable country regulations. Improper disposal of used filters endangers the environment!



- Take the new **oil filter**, put a little oil onto the rubber seal and tighten the oil filter manually.



Do not use any tools to fit the oil filter to avoid damage to the filter.



7.1.7 PLUG FOR MEASURING POINT

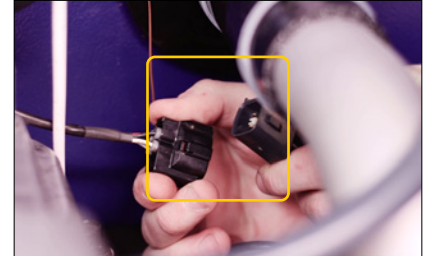
- Depending on the type of exhaust gas pipe, consider replacing the **plug** in the exhaust gas opening on the exhaust gas pipe upstream of the Power Unit.



7.1.8 LAMBDA SENSOR

i Wenn commensing maintenance on XRG1® systems with Coil-on-Plug, two lambda sensors are required. Lambda sensors are available from EC POWER.

- Separate the lambda sensor cable from the harness at the plug-in contact.
- Dismantle the old lambda sensor(s) from the socket using a **lambda sensor top** and mount the new **Lambda sensor**.
- Reconnect the lambda sensor cable to the harness.

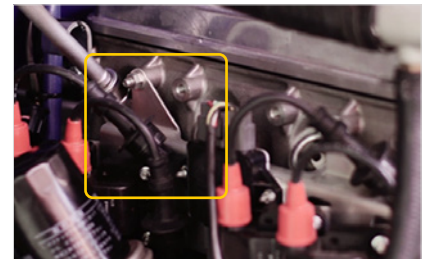


7.1.9 FASTENING NEW SPARK PLUGS

The temperatures of the spark plugs and the cylinder head have now equalised.

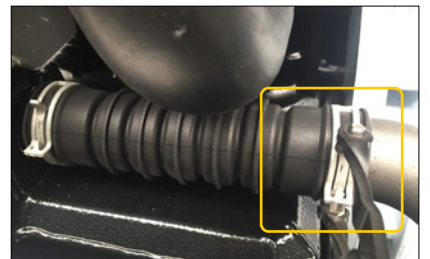
- Fasten the new spark plugs using a **torque wrench** with a **20.8 mm spark plug insert** and put the spark plug cap back on. Torque: 15 Nm.

Follow the instructions in the package for further information on replacing the plugs.



7.1.10 EXHAUST COMPENSATOR & SPRING BAND CLAMPS

- Loosen the spring band clamps on the exhaust compensator using a **spring band clamp** pliers and put them aside.
- Pull the exhaust compensator together with the two spring band clamps from both pipe studs.
- Slide the two new **spring band clamps** onto the new **exhaust compensator** and mount the new rubber compensator on the exposed stud.
- Fix the exhaust compensator with the two spring band clamps using a **spring clamp pliers**.



7.1.11 NEW OIL

- Fill the engine with a maximum of 30 litres **XRG1® Engine Oil** through the filler neck.

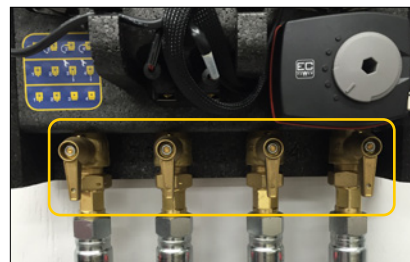


- Check the fill level on the oil dipstick to ensure that the engine is not overfilled. To do this, briefly screw on the oil cap and then remove it again.
- Reinstall the oil cap using a **water pump pliers**.



7.1.12 BLEEDING

- Check whether all four valves on the manifold are open on the Q-Heat Distributor. Open any closed valves.



7.1.12.1 Q-HEAT DISTRIBUTOR

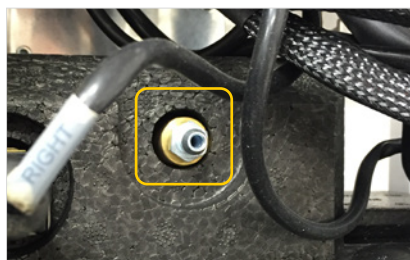


For bleeding of the Q-Heat Distributor, K000223 Coolant bleeding kit is available in the EC POWER e-shop.

If the Q-Heat Distributor Coolant Press. Upgrade Kit (4Y) (K000226) is installed on the Q-Heat Distributor, loosen the bleed screw on the Q-Heat Distributor before proceeding to the next step.



- Use a bleed key to bleed the storage circuit on the Q-Heat Distributor. Attach a hose to the bleed screw to divert any leaking heating water and then use an **11 mm wrench** to loosen the bleed screw.
- When only heating water escapes from the bleed screw, tighten the screw.



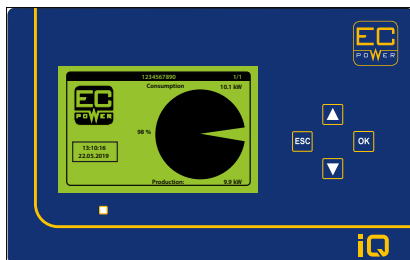
7.1.12.2 POWER UNIT

- Bleed the engine circuit at the air pot on the Power Unit. Attach a hose to the bleed screw to divert any leaking XRGI® Engine Coolant and then use an **11 mm wrench** to loosen the bleed screw.
- Bleed until only XRGI® Engine Coolant and no air escapes.
- When only XRGI® Engine Coolant escapes from the bleed screw, tighten the screw and check if there is still sufficient XRGI® Engine Coolant in the expansion vessel. If necessary, refill **XRGI® Engine Coolant** to the maximum mark.

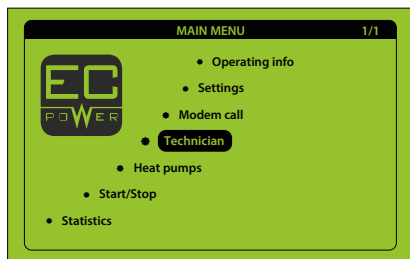


7.1.12.3 iQ-CONTROL PANEL

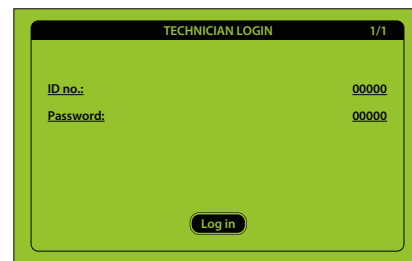
- Press any key on the user interface to activate the display and enter the menu.
- Press any button on the user interface again to enter the main menu.



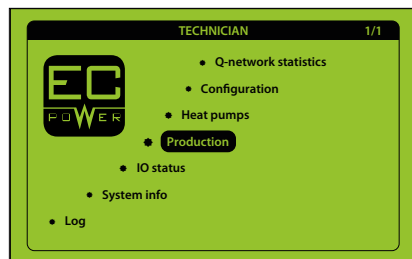
- Move the cursor to **Technician** by using the **▲ ▼** buttons and press **OK** on the user interface.



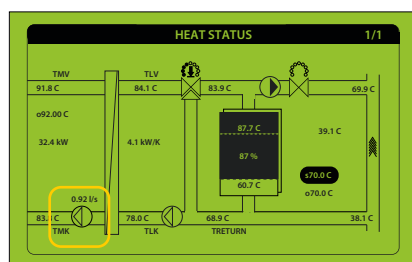
- Log in as technician.



- Move the cursor to **Production** by using the ▲ ▼ buttons and press **OK** on the user interface.



- Use the ▲ ▼ buttons to move to the page **Heat Status**.
- Move the cursor to the engine circuit pump by using the ▲ ▼ buttons and press **OK** on the user interface to activate the pump.
- Regulate the engine circuit pump up or down by using the ▲ ▼ buttons and press **ESC**.
- Check on the Q-Heat Distributor if the engine circuit pump is running.



Make sure that the expansion vessel does not run empty as this can cause damage to the XRGi® system.

- Bleed the XRGi® system for 10 minutes. Switch off the pump and wait for 5 minutes.
- Repeat the process.
- Repeat the bleeding process until you are sure that no more air is in the engine.
- Switch off the pump and exit the technician menu.
- Once the bleeding process is completed, refill **XRGi® Engine Coolant** to the maximum mark.

7.2 SOFTWARE UPDATE

- Once all parts of the service kit have been replaced on the XRGi® system, the software must be updated. Follow the Software update instructions from EC POWER.



If the latest software has already been installed, proceed to the next step.

7.3 REGULATION OF EMISSIONS

LAMBDA ADJUSTMENT

- In the technician menu, move the cursor to **Production** by using the ▲ ▼ buttons and press **OK** on the user interface.
- The ▲ ▼ buttons take you to the next page.
- Move the cursor to **Lambda adjustment** by using the ▲ ▼ buttons and press **OK** on the user interface to activate the field.
- Operate the flue gas analyser in line with the manufacturer's instructions and measure the flue gas emission.
- If the flue gas emissions are outside the required range, adjust the settings under **Lambda adjustment**.
- If the emissions values are too high/low press:
 - >NO_x ADJUST = Lambda adjustment increase by +1
 - >CO ADJUST = Lambda adjustment decrease by -1

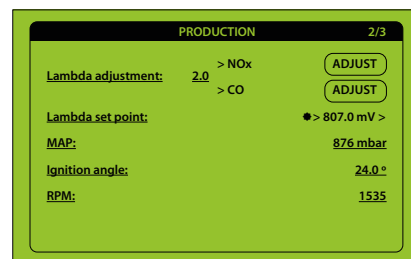
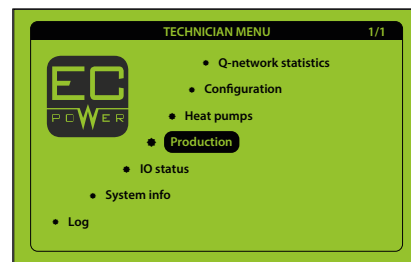


TABLE FOR REGULATION OF EMISSION VALUES

XRGi® 15 LowNOx/XRGi® 20	XRGi® 20 BIOGENIC
max. 60 ppm	max. 60 ppm
max. 70 ppm	max. 50 ppm

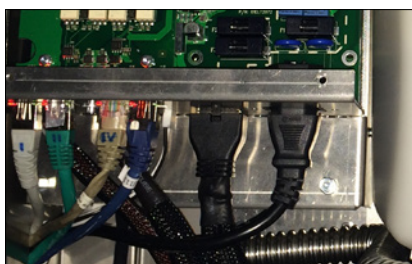
NO_x
CO



When reducing CO and/or NO_x values, it takes a couple of minutes before the change stabilises on your flue gas analyser. Make small adjustments at a time in order to achieve the correct values.

7.4 RECOMMISSIONING

- Once all parts of the service kit have been replaced on the XRGi® system and the latest software version has been installed on all components, close the Power Unit and reinstall the rear cover of the Power Unit.
- Recommission the XRGi® system by:
 - connecting the Q-Heat Distributor to the power supply
 - opening the gas supply to the Power Unit
 - switching on the XRGi® system on the iQ-Control Panel



7.5 ADDITIONAL COMPONENTS FOR OPERATION WITH BIOGENIC GASES

The XRGi® BIOGENIC system is operated with biogenic gas. This may require the installation of additional components such as activated carbon filter, carbon filter material, gas detector, shut-off valve for gas detector, methane sensor, hydrogen sulfide sensor, sound/light alarm, and flame shut-off device. Please refer to the respective manufacturer's instructions for commissioning these additional components.

During commissioning, test all safety devices to confirm they are functioning correctly.

8 PREVENTIVE MAINTENANCE OF WEAR PARTS

Once the maintenance service has been completed, check wear parts of the XRG[®] system components and, if necessary, replace components in order to ensure a long service life and safe operation of the XRG[®] system.

8.1 Q-HEAT DISTRIBUTOR

PLATE HEAT EXCHANGER

- While the engine is running, inspect the function of the plate heat exchanger on the iQ-Control Panel display (min.):
 - XRG[®] 6 = 1,0 kW/K
 - XRG[®] 6 LowNOx = 1,7 kW/K
 - XRG[®] 9 = 1,7 kW/K
 - XRG[®] 15 = 2,5 kW/K
 - XRG[®] 15 BIOGENIC = 2,5 kW/K
 - XRG[®] 15 LowNOx = 3,5 kW/K
 - XRG[®] 20 = 3,5 kW/K
 - XRG[®] 20 BIOGENIC = 3,5 kW/K



PUMPS

- Inspect all pumps for correct function and noise.

ESBE STEPPER MOTOR

- Inspect the ESBE valves for movement, etc.

HOSES

- Inspect the hoses for leak-tightness.

EXPANSION VESSEL

- Check the pressure/fill level of the expansion vessel.
- Check the expansion vessel for leak-tightness.

TEMPERATURE SENSOR

- Check the sensor values of the temperature sensors of the Q-Heat Distributor in the iQ-Control Panel display.

VERIFICATION OF THE TEMPERATURES

- The XRG[®] system is started and runs for a minimum of 30 minutes for all temperatures to be stabilized.
- The XRG[®] system is stopped for a minimum of 15 minutes. In this period, the temperature sensors are automatically calibrated to obtain the highest possible precision.
- The XRG[®] system is started again and after 5 minutes, the below relations are verified:
 - TMV is larger than TLV
 - TMV is larger than TMK
 - TMK is larger than TLK
 - TLV is larger than TLK

8.2 iQ-CONTROL PANEL

With the iQ-Control Panel switched on:

SURGE PROTECTION

- Inspect the surge protection for correct function.

DISPLAY

- Inspect the display of the central control PCB and the production meter for correct function and condition.

FAN

- Inspect the fan engine for correct function.

SOFT STARTER/SMART STARTER™

- Inspect the soft starter/Smart Starter™ for correct function.

TERMINALS

- Switch off the iQ-Control Panel and retighten all terminals in the iQ-Control Panel using a screwdriver.



8.3 POWER UNIT

SAFETY TEMPERATURE LIMITER

- Inspect the safety temperature limiter for correct function and wear to the capillary tubes.

STEPPER MOTOR

- Inspect the stepper motor for correct function.

PRESSURE GAUGE

- Inspect the flue gas and vacuum pressure gauge for correct function.
- At full load, measure the pressure in the crankshaft housing.
 - Positive pressure means the oil separator and the filter mats in the seal valve must be changed.
 - Negative pressure means the pressure switch is working correctly.
- Check for flow in the blow-by tube.



CABLE HARNESSES

- Inspect all cable harnesses for correct function and wear.

PRESSURE LOSS

- Check the exhaust heat exchanger/vibration damper for pressure loss.

VACUUM

- While the system is operating, check the oil sump for vacuum.
- Check the exhaust back pressure. If the pressure is higher than 250 mbar, check the following:
 - if the exhaust system is blocked
 - if there is water or condensate in the exhaust system and if the ball siphon works.
- If the exhaust back pressure can not be corrected, replace the exhaust gas heat exchanger.

CATALYST

- Check the catalyst for correct function.

ENGINE/GENERATOR MOUNT

- Visual inspection of the engine/generator mount.

8.4 XRG[®] ACCESSORIES

Q-NETWORK

- Inspect all Q-Network modules for correct function.

POWER FACTOR CORRECTOR

- Inspect the compensator and the protection in the power factor corrector.

8.5 CLEANING

GAS & WATER FILTER

- Clean the gas and water filter on the secondary circuit.

XRG[®] SYSTEM & COMPONENTS

- Clean the XRG[®] system and its components.



Clean the casing of the XRG[®] system with a damp cloth and some soap. Do not use any abrasive or cleaning agents that could damage the casing or the plastic operating elements.

9 RECORDING

Once all maintenance tasks have been carried out, they must be recorded in the XRG[®] Service Booklet and in the iQ-Control Panel on site.

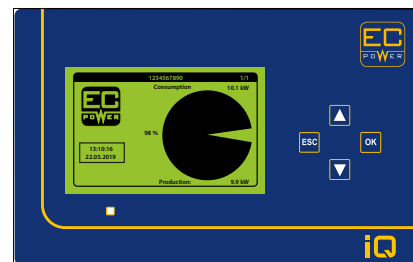
9.1 XRG[®] SERVICE BOOKLET

Complete the maintenance record in the XRG[®] Service Booklet and confirm with your signature.

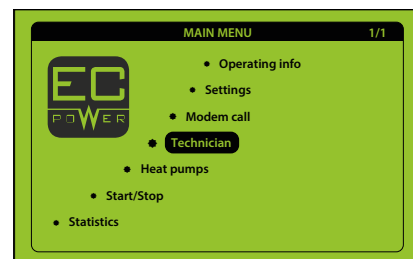


9.2 iQ-CONTROL PANEL

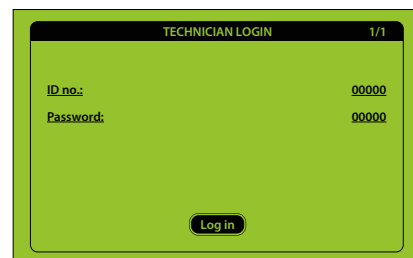
- Press any key on the user interface to activate the display and enter the menu.
- Press any button on the user interface again to enter the main menu.



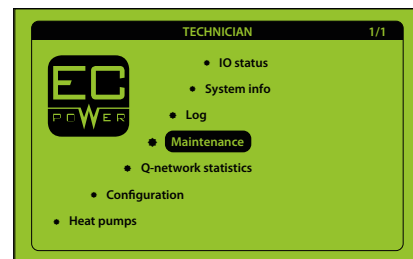
- Move the cursor to **Technician** by using the ▲ ▼ buttons and press **OK** on the user interface.



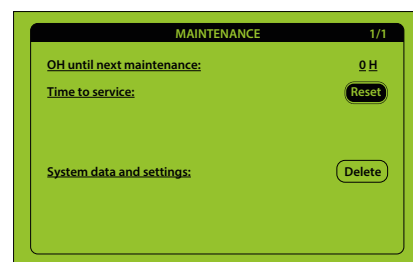
- Log in as technician.



- Move the cursor to **Maintenance** by using the ▲ ▼ buttons and press **OK**.



- While the cursor is on **Reset**, press **OK** to activate the field.
- Move the cursor to **Confirm** by using the ▲ ▼ buttons and press **OK** on the user interface. The correct maintenance interval for the XRG1® system will now be displayed.





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MAINTENANCE INSTRUCTIONS

FOR PROFESSIONALS