

Medical Oxygen

LIV[®] IQ Digital Therapy Device Instructions for Use

Version 0124



Introduction

Medical oxygen with live treatment time remaining display

The new oxygen therapy device from BOC Healthcare calculates the remaining time according to the gas content in the device and the selected flow rate. The result is shown on a large, clear digital display indicating content, selected flow rate and time remaining for patient treatment.

Digital display

- **Easy to read live Content Indicator**
Shows oxygen contents, even when the cylinder is turned off
- **Therapy time remaining**
Displays the time remaining in hours and minutes while the device is in use
- **Selected flow rate**
Displayed on screen while the device is in use
- **Visible and audible warning signals**
Alerts user to changes in device status

Other product features

- **Wireless communication system compatible with INETIQ**
Allows cylinders to be located wherever they are within the hospital and live contents to be viewed on the INETIQ platform
- **Built in regulator**
Eliminating the need to fit a separate regulator before the gas can be administered to the patient

- **Simple to use Cylinder Valve Handwheel**
Removes the need for a separate valve key to operate the valve
- **Residual Pressure Valve**
Retains a minimum positive pressure in the cylinder to prevent contamination when empty
- **Easy and Clear Flow Selector**
Firmly clicks into position to ensure the correct flowrates are delivered
- **Firtree Outlet and Pressure Outlet**
The valve outlets replicate the connections used in hospitals and ambulance settings for easy patient transfer
- **Clear Product Labelling**
Provides essential information and simplified instructions about the product and how to operate the valve correctly
- **Integrated Carry Handle**
Ergonomically designed to make the cylinder easy to carry
- **Hinged outlet cover and firtree cover**
Ensures the firtree and pressure outlets remain clean and uncontaminated when not in use



Golden Rules

Oxygen is a safe product and essential for life – it is one of the most commonly used medicinal products and is administered safely to thousands of patients every day. Although there are potential hazards associated with administering oxygen, provided you follow the basic instructions provided it is very safe.

There are five ‘Golden Rules’ that you should follow to ensure everyone’s safety, detailed below:

1. Training

Ensure you are formally trained in both the handling of medical oxygen cylinders and the correct way to operate the medical oxygen cylinder you have selected to use for patient treatment.

Although oxygen is a very safe product to use, it is important to remember that it is a strong oxidising gas and will allow things that don’t normally ignite in air, to burn violently in its presence. Understanding the potential hazards when using medical oxygen and the ways to avoid them occurring is a very important part of your training requirement. Training should cover the basic requirements for both storing and using the cylinders, including the specific operating procedures that should be used for each type of cylinder package.

The Instruction for Use covers the correct procedures for medical oxygen cylinders fitted with a LIV IQ digital integral regulator.

There are similar documents about how to use other types of cylinders available on the website.

2. Oxygen safety

Never permit smoking or use oxygen cylinders near naked flames or other sources of ignition.

Although oxygen is a non-flammable gas, its presence will strongly support combustion, and things that do not normally burn in air may burn violently in oxygen.

It is important to note that when oxygen is used in the vicinity of adsorbent material the material can become oxygen enriched during administration. The patient’s clothing and bedding is likely to become enriched, making it important to not permit smoking near the patient or to use your oxygen cylinder near naked flames or other sources of ignition, as these conditions will increase the risk of a fire occurring.

The oxygen released when treating the patient will disperse very quickly, but material, such as clothing and bedding can adsorb the oxygen, making them more likely to ignite.

3. Setting up the cylinder

Having sufficient gas to administer to the patient is essential.

When selecting a cylinder for use it is important to:

- Check the selected cylinder contains the correct gas – this can be found on the cylinder collar label and on the cylinder body.
- Check the small batch label to ensure that the oxygen is within its expiry date. If the expiry date has been exceeded, return the cylinder to the empty store, and select another cylinder.
- Check the contents indicator to make sure there is enough gas for patient treatment. If the black vertical segments are only in the red section, consider selecting a new cylinder.
- Follow the set-up procedure to ensure that the cylinder is functioning correctly before administering the gas to the patient.

4. Never use oils or grease

Never use oil or grease near an oxygen cylinder or on any oxygen delivery equipment.

It is important to be aware of the need to keep cylinders clean and free of any oils or greases, these can be transferred from your hands, non-approved lubricants should never be used with an oxygen system. As oils and greases can ignite automatically when in the presence of oxygen, ensure your hands and the equipment you are using are kept clean.

5. Opening the cylinder valve

Open the cylinder valve handwheel slowly with the outlets facing away from yourself and the patient.

The potential risk of an ignition occurring can increase when the gas temperature increases. Opening a cylinder valve quickly can cause the gas to become hot, which may lead to a fire in the valve, if any contamination is present.

Although incidents occur extremely rarely with medical oxygen cylinders, as opening the cylinder valve handwheel for the first time is when an incident is most likely to occur, it is recommended that you set up the cylinder away from the patient. Ensure that the outlets are pointing away from yourself and the patient when you turn the cylinder on, this helps protect you both from harm should an incident occur.

Following the **Golden Rules** should ensure that nothing goes wrong during patient administration, however should an incident occur having the outlets pointing away from yourself and the patient helps to protect you both from harm.

Basic Safety Information when Using Medical Oxygen

Cylinder storage

- **Store medical oxygen cylinders securely in a safe area.**
To avoid cylinders falling over and causing injury.
- **Do not store or use medical gas cylinders near naked flames, sources of ignition or combustible materials.**
These conditions increase the risk of a fire occurring.
- **Use appropriate signage to identify the approved storage areas, with separate areas for full and empty cylinders.**
To ensure staff select the correct cylinder for patient use.
- **Store medical cylinders separately from other non-medical cylinders.**
To avoid confusion when selecting medical gas cylinders for patient treatment.
- **Storage areas should be well ventilated, kept clean and dry, and preferably undercover.**
To ensure cylinders are maintained in a suitable condition for patient use.
- **Rotate the cylinder stock, by using the cylinder with the earliest expiry date on the batch label first.**
Ensure cylinders are always used within their expiry date. Cylinders past their expiry date should not be used and returned to BOC.

Cylinder use

- **When selecting the cylinder for use.**
Check that the cylinder is clean and not damaged. Ensure the cylinder, particularly the first free outlet and pressure outlet, are not contaminated with oils or grease such as those used in hand creams.
- **Before handling cylinders ensure your hands are clean.**
If you have been using alcohol based gel or liquids make sure the alcohol has totally evaporated before use.
- **Set up and test the cylinder before placing near the patient.**
By setting up the cylinder away from the patient, it ensures the cylinder is functioning correctly before administration. Never set up a cylinder on the patient's bed.
- **When opening the valve ensure the outlets are facing away from yourself and the patient.**
The safest way to prepare the cylinder is to slowly open the cylinder valve handwheel with the outlets facing away from you and the patient, should an incident occur.
- **Always use an appropriately designed cylinder support to hold the cylinder whilst in use near the patient.**
Avoid placing the cylinder on the patient's bed when in use. The cylinder support should keep the cylinder upright to prevent it from falling over and causing injury.
- **Always close the cylinder valve handwheel when the cylinder is not in use.**
Closing the cylinder valve handwheel stops unnecessary losses, which could lead to empty cylinders when oxygen is required.

General guidance

- **Never remove or de-face batch or collar labels.**
This ensures the correct information is available to the user to enable them to use the cylinder correctly. Unauthorised labels/tags must not be fitted.
- **Do not clean the cylinders with any materials which contain ammonium or chloride compounds.**
Ammonium and chloride compounds could cause corrosion of the brass valve which may result in problems with medical gas delivery.
- **Do not refill or tamper with the cylinder package.**
It is important that the cylinder is not contaminated during use as this may cause problems when refilled. Do not remove the white cylinder filling connection cover.

Setting Up Your LIV IQ Cylinder

Although every medical gas cylinder is rigorously checked before it is delivered, it is good practice, prior to initial use, to follow the simple setting up procedure below.

This will ensure that:

- you have chosen the correct cylinder and it contains sufficient gas for the patient's immediate treatment.
- you have followed the appropriate steps in the setup procedure to obtain the prescribed flow from the flow selector or a set pressure from the pressure outlet.
- the cylinder is functioning correctly.

Selecting the correct cylinder

- Check the cylinder contains the correct gas that has been prescribed for the patient.
- You will find the name of the gas on the collar label and in large letters down the cylinder.
- Check the batch label to make sure the gas is within its expiry date – the date is printed on the batch label located on the guard.
- For new cylinders, check the tamper evident seal is in place, indicated by a diamond symbol on the top left of the display, and the contents indicator indicates the cylinder is full.
- Where the cylinder has been previously used, check there is sufficient gas available for the patient – if the black vertical lines are only in the red section, consider using an alternative cylinder.

Preparing the cylinder

- Open the hinged outlet cover to access the pressure outlet or remove, without discarding, the firtree cover to use flexible tubing. Make sure you do not detach either cover from the cylinder, as they must be replaced when the valve is not in use to keep the outlets clean.
- Ensure the integral pressure regulator is empty before opening the cylinder valve handwheel. To do this, turn the flow selector to 5lpm and ensure no gas is flowing from the firtree. If gas continues to flow after 10 seconds, check the cylinder valve handwheel is closed. If the handwheel is closed and gas continues to flow return the flow selector to zero and segregate the cylinder for return to BOC.
- After the flow stops, return the flow selector to zero before connecting any equipment to the outlets.

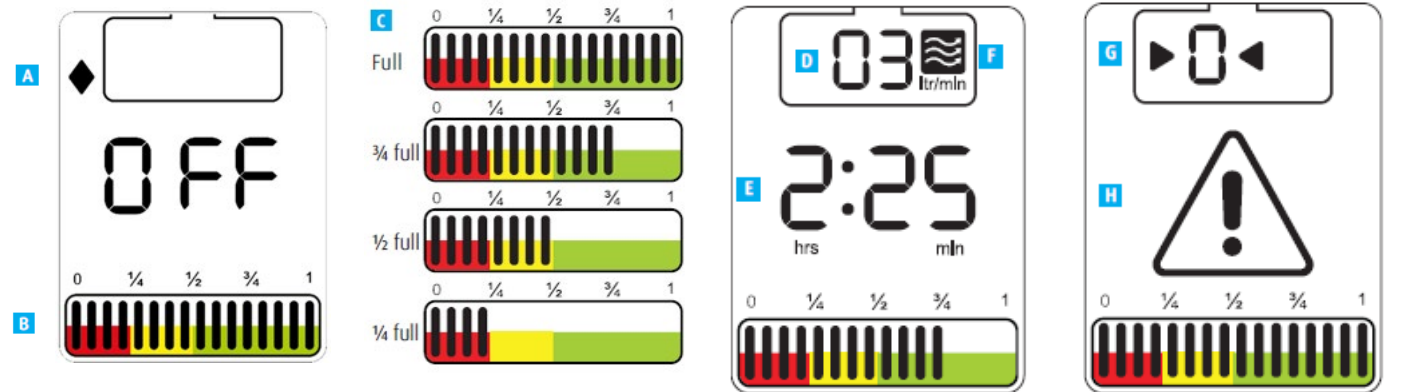
Checking the cylinder before use

- When turning on the cylinder, always point the outlets away from the patient and yourself. This is a safety requirement in case there is an issue when opening the cylinder valve handwheel.
- Open the cylinder by slowly turning the cylinder valve handwheel anti-clockwise until fully open.
- Select 5 lpm via the flow selector and check gas continues to flow for at least 5 seconds. This demonstrates that the cylinder is functioning correctly and can be used to treat the patient.
- Close the cylinder valve handwheel and when the gas stops flowing, return the flow selector to zero.
- Connect the equipment to the appropriate valve outlet connection in preparation to start administering gas to the patient.



LIV IQ – giving you safe guidance during patient treatment

Information on the LIV IQ display



A New, full therapy device.
The diamond acts as a tamper evident indicator and will disappear when the cylinder valve handwheel is first opened.

B Content indicator.

C As gas is consumed, the black vertical segments of the contents indicator will disappear. Prepare to change the device when the contents indicator shows only segments in the red area.

D Current set flow rate.
E Therapy time remaining at selected flow setting.
F Flow is active.

G Set flow selector to zero before opening shut-off valve.
H Warning triangle.

Warning signs on the LIV IQ display



Therapy device is too hot
Do not use at this time. Store within the temperature range -20 to +45°C. The warning signs will disappear when the device is at a usable temperature.



Therapy device is too cold
Do not use at this time. Store within the temperature range -20 to +45°C. The warning signs will disappear when the device is at a usable temperature.



Low flow
The device has detected that the flow from the cylinder is lower than the selected flow. Check the tube and medical device connected to the flow outlet. If no restriction is found do not use, return to BOC Healthcare.



Low battery
If therapy has not started use alternative therapy device. If the low battery symbol appears whilst the device is in use, it is safe to continue patient treatment, until the device is exchanged prior to it becoming empty.

HI/FLO

High flow
The device has detected that the flow from the cylinder is higher than the selected flow. If 2 devices are drawing gas, mute the alert. If a single device is drawing gas do not use, return to BOC Healthcare.



Strong magnetic field
The device has detected a strong magnetic field. Gas flow continues unaffected, but the digital display and audible alerts will not work while in this field. Removal of the device from the magnetic field recovers its normal functionality.



Has the mute button been pressed?
Yes – An active alert has been muted.
No – Due to a rapid change in temperature, the low flow or high flow alert is temporarily disabled.

The mute button can be pressed to silence audible alerts

When an active alert is muted, the icon will appear in the upper-left corner of the display.

A single short press of the button will mute the active alert for one minute.

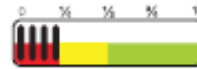
A single long press of three seconds will mute the active alert until the alert condition disappears or until the next alert condition occurs.



Mute button



An audible signal sounds in the following cases:



Gas contents low (contents bars 4 and 3) Change to an alternative therapy device.



Gas contents very low (contents bars 1 and 2). Change to an alternative therapy device.



Gas Contents Empty

SET/FLO

Incorrect use (flow selector is between two flow settings). Check the flow setting is not between two flow settings.



Incorrect use (flow selector set with cylinder valve handwheel closed). If the cylinder valve handwheel is closed and a flow selected, open the cylinder valve handwheel. If the cylinder valve handwheel is open, close and return to BOC Healthcare.

Instructions for Use

Step 1: Selecting the right cylinder



1.1 Check the collar label to ensure you have selected a medical oxygen cylinder.



1.2 Check the expiry date on the batch label. **The oxygen should not be used after this date and the cylinder returned to BOC.**



1.3 Check the content indicator to confirm the cylinder contents. **For new cylinders this should be in the green zone.**



1.4 If the cylinder has been used before, open the cylinder valve handwheel and select the required flow to check if enough gas remains in the cylinder for patient treatment.

Step 2: Preparing the cylinder for use



2.1 Having followed the setting up procedure, open the hinged outlet cover OR firetree cover. Do not remove these covers as they must be replaced after use to keep the outlets clean.



2.2 The cylinder valve handwheel must not be opened until after the equipment is connected. Turn the cylinder valve handwheel clockwise to check it is closed.



2.3 Turn the flow selector to 5lpm and allow any gas in the regulator to vent. Having vented the gas return flow selector to zero. **5lpm allows you to listen for the flow of gas to stop, this may take up to 10 seconds.**

Step 3 (a): Administering gas to the patient via the firetree outlet



3.1 (a) Check the cylinder has been set up, if you are unsure follow the set-up procedure. Turn the cylinder so that the outlets are facing away from yourself and the patient before turning on the cylinder. **Keep the cylinder away from the patient until set up has been completed.**



3.2 (a) Connect the tubing with the nasal canula or face mask to the firetree outlet. Ensure the tubing is pushed on securely.



3.3 (a) Open the cylinder by slowly turning the cylinder valve handwheel to the 'ON' position. Check for leaks which may be indicated by a hissing sound.



3.4 (a) Select the prescribed patient flow rate for the required therapy and fit the administration equipment to the patient. **Ensure that the correct flow rate number is clearly aligned with the flow indicator arrow.**

Step 3 (b): Administering gas to the patient via the pressure outlet



3.1 (b) Check the cylinder has been set up, if you are unsure follow the set-up procedure. Ensure the probe is clean and free from oil and grease before inserting. Push the probe into the pressure outlet firmly, applying moderate force until it clicks securely into position.



3.2 (b) Turn the cylinder so that the outlets are facing away from yourself and the patient before turning on the cylinder. Keep the cylinder away from the patient until set up has been completed.



3.3 (b) Open the cylinder by slowly turning the cylinder valve handwheel to the 'ON' position. Check for leaks which may be indicated by a hissing sound.



3.4 (b) Operate the attached medical device to start the patient's therapy.

Step 4: Monitoring during use



4.1 Keep the cylinder upright and facing away from the patient using a suitable cylinder holder. Avoid placing the cylinder on the patient's bed. If there is no alternative option when moving the patient, only place it on the bed after you have followed the setting up procedure.



4.2 Regularly check the patient's clinical condition during therapy. **If using a mask make sure that it remains fitted correctly. This will ensure that there are no leaks around the mask and that the patient is receiving the prescribed oxygen flow rate.**



4.3 Use pulse oximetry where appropriate. **If the pulse oximeter indicates a low oxygen saturation, check the cylinder contents, check for flow and that the administration equipment is fitted to the patient correctly. If you can't identify the problem seek advice.**



4.4 Check the time remaining and contents indicator at regular intervals. Listen for alarms alerting you to a change in cylinder content to ensure there is sufficient oxygen available. **Audible alarms or errors are indicated on the display accompanied with a warning symbol (see fault-cause-remedy table within the LIV IQ Manual).**

Step 5: After use



5.1 After administration to patient is complete, remove mask or nasal cannula or disconnect patient from auxiliary equipment.



5.2 Close the cylinder by turning the cylinder valve handwheel clockwise until it comes to a stop. **Do not use excessive force.**



5.3 If you have been using the firtree outlet then remove the tubing by firmly pulling the tube, whilst holding the cylinder handle.

When the gas stops flowing turn the flow selector to zero.



5.4 If you have been using the pressure outlet, check that the regulator has vented by selecting 5lpm on the flow selector. Turn the flow selector back to zero when there is no gas flow.



5.5 If you have been using the pressure outlet fitted with a capstan, release the probe by rotating the capstan clockwise. **If it is difficult to remove, push and slightly twist the probe whilst rotating the capstan.**



5.6 If you have been using the pressure outlet fitted with a push ring, release the probe by pushing the outer ring.



5.7 Replace the hinged outlet cover to protect the outlets from contamination when the cylinder is not in use and being returned to BOC for refilling.



5.8 Check the remaining cylinder contents using the gauge. If there is sufficient oxygen left for further treatments, return cylinder to designated "in use" store. **If the content indicator is in the red section return to the empty cylinder storage area.**

LIV IQ Oxygen therapy device data summary

Cylinder code	IQD	IQX
Cylinder order code	101-IQD	101-IQX
Nominal contents (litres)	460	2000
Nominal cylinder pressure (bar)	230	200
Nominal outlet pressure (bar)	4.5	4.5
Valve outlet flow connection	6mm Firtree	6mm Firtree
Valve outlet pressure connection	BS5682 Schrader	BS5682 Schrader
Valve operation	Handwheel	Handwheel
Flow rate (litres/min)	Firtree outlet: 0.5-15 Pressure outlet 40 (nominal)	Firtree outlet: 0.5-15 Pressure outlet 40 (nominal)
Dimensions (inc. valve) L x D (mm)	520 x 100	930 x 140
Water capacity (litres)	2	10
Nominal full weight (kg)	3.5	19

The LIV IQ contains a radio operating in the 2.4GHz frequency range complying to the following standards:

- Europe: ETSI EN 300 328 and EN 300 44 Class 2
- United States: FCC CFR47 Part 15
- Japan: ARIB STD-T66

The LIV IQ broadcasts one or more advertisement packages every 5 minutes, 21 seconds.

Checking for Leaks

When setting up the cylinder, if you suspect that you have a leak when you turn the cylinder on you should check the system set up carefully, following the instructions below:

If you are using the firtree outlet:



- 1 Turn off the cylinder by closing the cylinder valve handwheel slowly.
- 2 Allow any gas in the system to vent through the face mask/nasal cannula connected to the tubing.
- 3 Disconnect the tubing and inspect for damage.
- 4 Reconnect the tubing to the firtree outlet and turn on the cylinder valve handwheel slowly. Recheck for leaks.
- 5 If the leak continues and appears to be coming from the cylinder valve, close the cylinder valve handwheel and follow the Complaint Procedure.

If you are using the pressure outlet to connect tubing using a medical oxygen probe:



- 1 Turn off the cylinder by closing the cylinder valve handwheel slowly.
- 2 Turn off the medical device connected to the cylinder.
- 3 Select a flow using the flow selector and wait for any gas to stop flowing out of the firtree outlet. Return the flow selector to zero.
- 4 Remove the probe from the pressure outlet and inspect for any wear or damage.
- 5 Reconnect the probe, ensuring it clicks firmly into position and turn on the cylinder valve handwheel slowly. Recheck the probe/tubing for leaks.
- 6 Check the medical device for leaks. If the downstream equipment is leaking, replace as appropriate.
- 7 If the leak continues and appears to be coming from the cylinder valve, close the cylinder valve handwheel and follow the Complaint Procedure.

Complaint Procedure

Having filled the cylinders, we take great care to ensure that they are working correctly and safe to use.

But if you have a leak you cannot rectify or if you identify there is something else faulty with the cylinder, it is important that you report this immediately to BOC. We will try to help you fix it, but if this is not possible you will need to return it to BOC so we can identify the root cause for the fault.

Having identified a faulty cylinder, you need to:

1

Return the cylinder to the cylinder store, so that it can be securely stored in a designated area for return to BOC.

2

Attach a label to the cylinder, indicating the identified fault. Note the cylinder bar code number and the batch details as we will require you to give us this information so we can ensure that the correct cylinder is collected.

3

Phone BOC Customer Service on **0800 111 333**. The Customer Service Agent will ask you for the details about each cylinder under complaint, the bar code and batch details and the identified fault. You will be given a separate complaint reference number for each faulty cylinder.

4

When the BOC driver next comes to site, they will request that you identify the complaint cylinder so they can record its collection. A replacement cylinder will be supplied at the same time.

5

If you request a report, this will be provided once BOC has completed their investigation.

Complaint cylinder

Customer	
Location	
Barcode	
Date reported	
Complaint	

Phone complaint details

Barcode	
Complaint	
Batch number	
	BOC ref. <input type="text"/>

Customer receipt

1. Segregate complaint cylinder from all other cylinders
2. Fill in details on front of label as detailed in complaints procedure
3. Attached label to complaint cylinder with a cable tie
4. Remove customer receipt section, use these details to register complaint with CSC

1. Call CSC on 1890 355 255 to register complaint
 2. Provide CSC with cylinder batch number and barcode as detailed on reverse
 3. Record BOC complaint reference number on receipt

Part no: 19332748

To assist with reporting complaint cylinders, BOC can provide you with a simple leaflet describing the procedure and some labels to assist with the process. Ask your Customer Service Agent or your Account Manager, if you would like some labels sent to you.

Notes

The latest update includes the addition of:

- The IQD cylinder size
- Golden Rules
- Basic Safety information when using medical oxygen
- Setting up your LIV IQ cylinder
- Instructions for Use
- Checking for leaks
- Complaint procedure

Notes

Notes

BOC Healthcare

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