

Standard Operating Procedure

Delivering Nitric Oxide Therapy using the INOmax delivery system

1. Scope

For use within the KIDS/NTS transport service operating within the Birmingham Women's and Children's NHS Foundation Trust.

2. Purpose

To provide safe, efficient and practical guidance for the use of the INOmax delivery system in KIDS/NTS.

This guideline identifies the key equipment to set up INOmax delivery system is safe and fit for use before and after any transfers take place.

The purpose of this document is to outline how to use the INOmax, the importance of a regular systematic checking procedure and a working knowledge of the equipment to ensure safe and effective transfers

3. Definitions and abbreviations

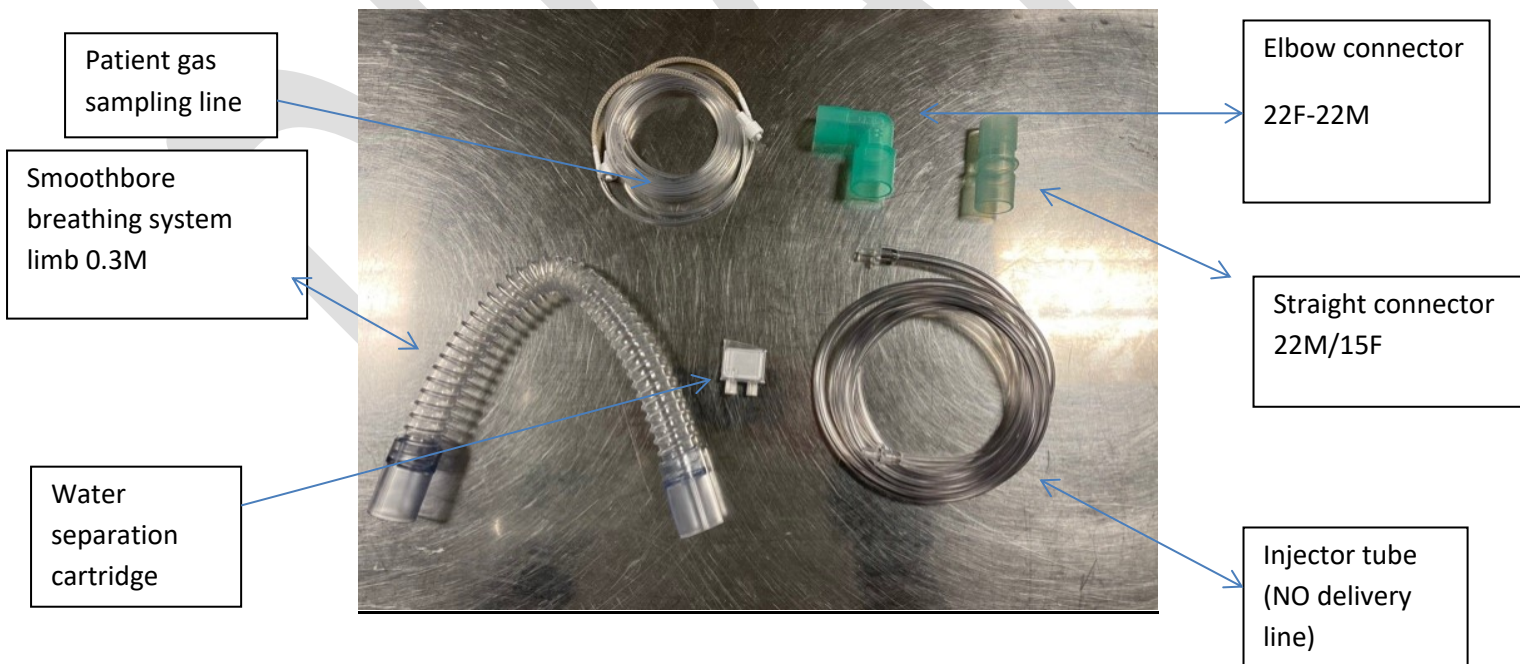
- NO- Nitric oxide
- NO₂- Nitrogen dioxide
- O₂- Oxygen
- PPM- Parts per million
- PSI- Pounds square inch
- L/Min- Litres per minute

4. Introduction

The INOmaxDSIR[®] (delivery system) delivers INOMAX[®] (nitric oxide for inhalation) therapy gas into the inspiratory limb of the patient breathing circuit in a way that provides a constant concentration of nitric oxide (NO), as set by the user, to the patient throughout the inspired breath. It uses a specially designed injector module, which enables tracking of the ventilator waveforms and the delivery of a synchronized and proportional dose of NO. It may be used with most ventilators

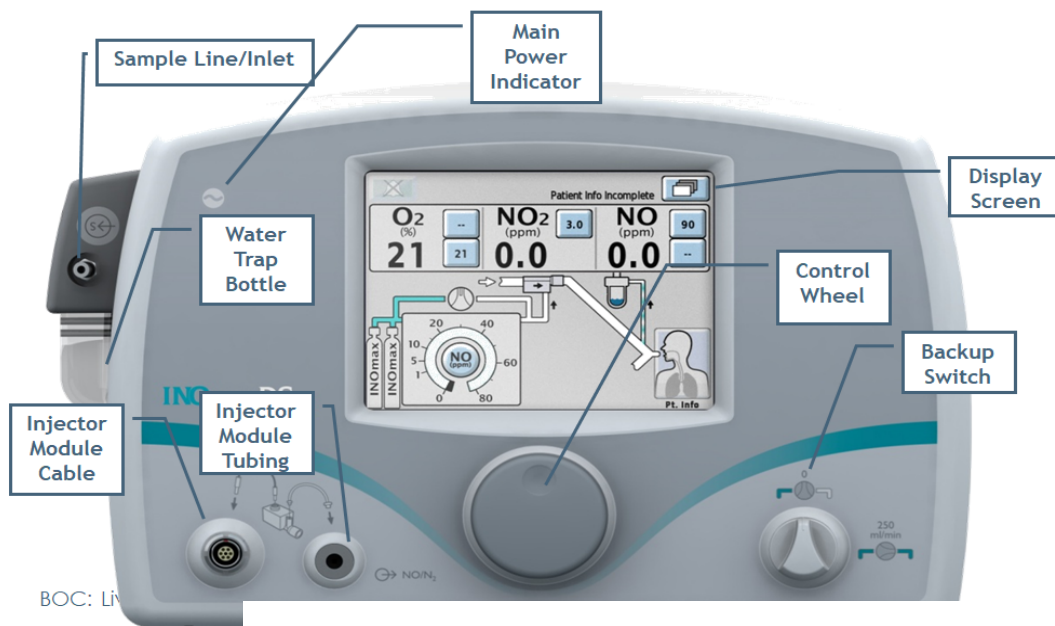
- The INOmax delivers a constant concentration of NO unaffected by ventilator mode
- Delivery range of 0.1 to 80ppm.
- Provides continuous monitoring of inspired NO, NO₂ and O₂.
- Integrated manual emergency backup NO delivery system
- Comprehensive alarm system includes
 - user adjustable alarms
 - system alarms
 - ability to review resolved alarms
- Integrated battery backup- can run up to 6 hours on full charge battery
- Low battery alarm- at least 30 minutes remaining
- A cylinder under 400PSI should be replaced
- Perform a low and a high calibration of NO, NO₂ and O₂ monthly.

5. Equipment required for delivering Nitric oxide via INOmax delivery system:

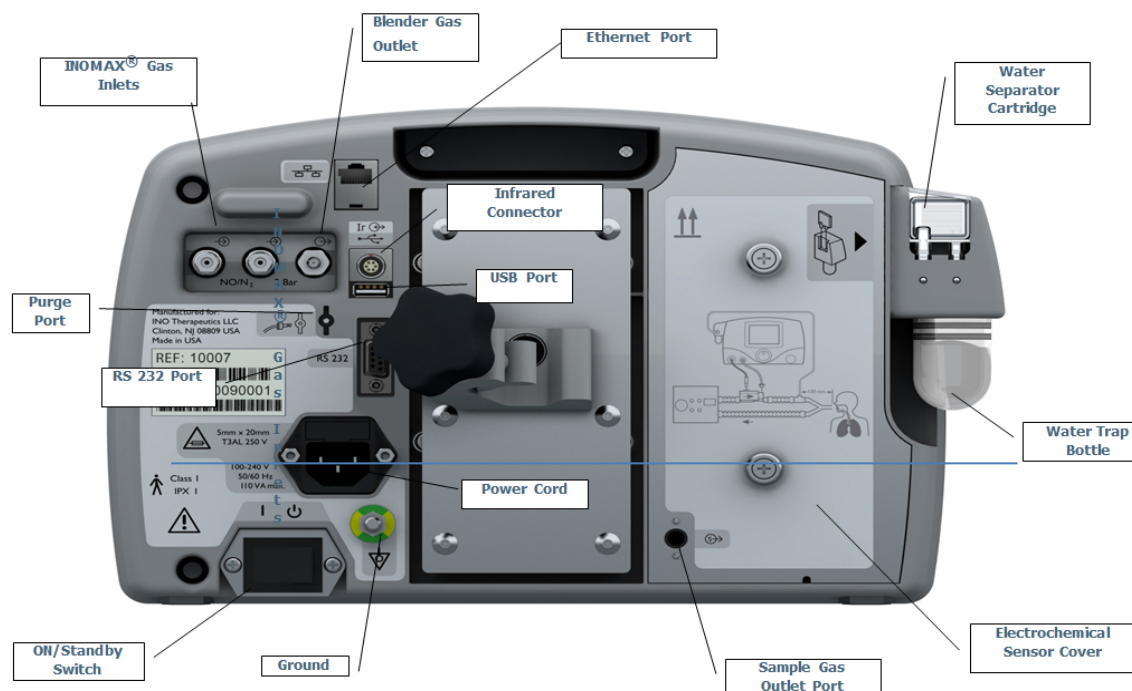


6. Front & Back View of INOmax delivery system:

INOmax[®] DS_{IR} Front View



INOmax[®] DS_{IR} Back View



7. Setting up the INOmax to deliver Nitric Oxide via Hamilton ventilator:

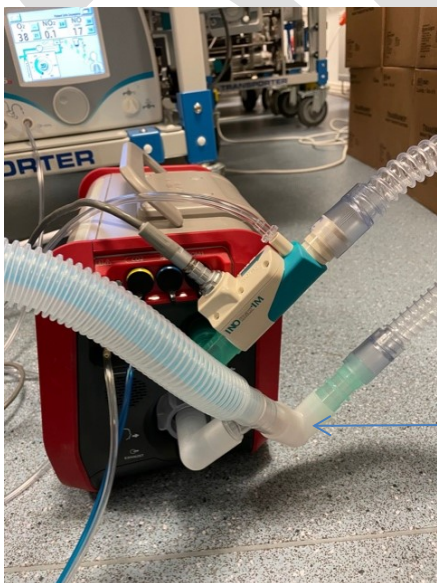
1: Connect all disposable consumables:



Connect Intersurgical smoothbore breathing system limb 0.3m direct to injector module and straight connector 22M/15F. This connector then fits into the fixed dual limb circuit of the Hamilton ventilator tubing.

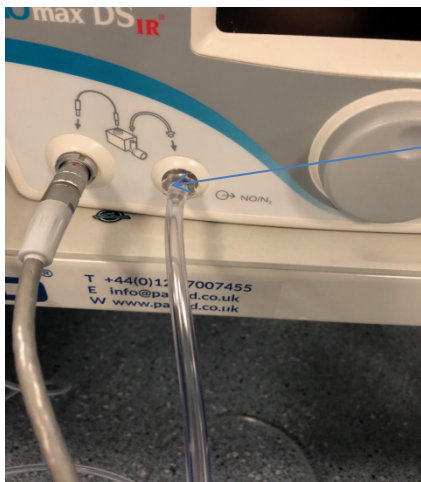
Connect elbow 22F-22M direct to inspiratory port. The injector module will connect directly to this, the arrow must be facing the way gas flows through (upwards)

Set up the ventilator tubing the usual way for the Hamilton set up

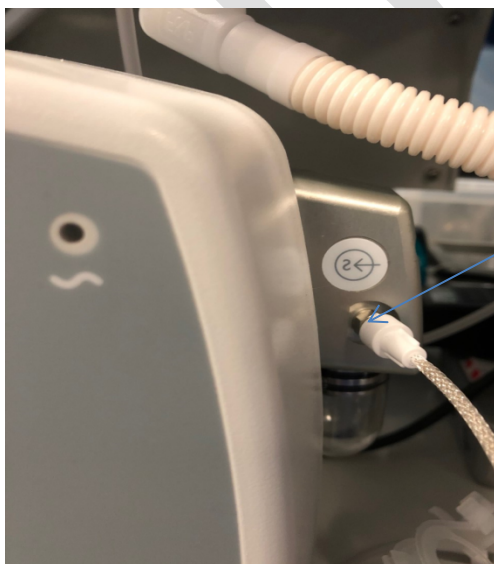


Side view set up of the large Hamilton nitric circuit

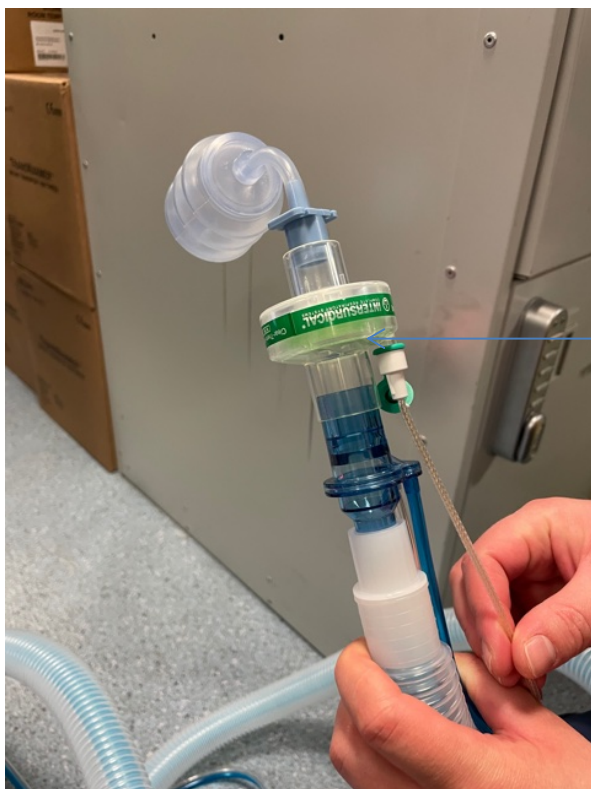
This fixed limb must be turned out slightly to be able to attach 22M/15F straight connector



Connect NO injector tube to port on INOmax machine.



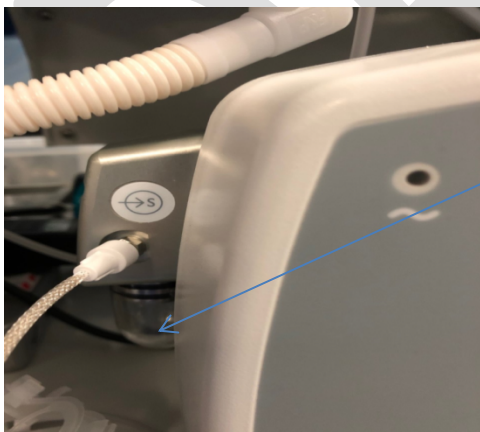
Connect gas sample line to connector at side of INOmax head.



Attach sampling line direct to HME port. Size depending on weight of patient.

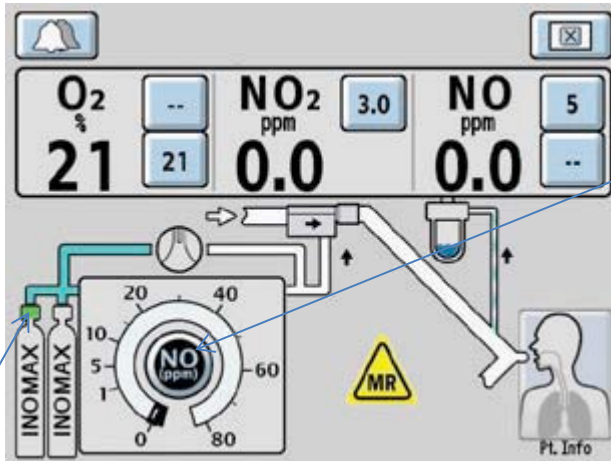


Insert water separation cartridge into slot at side of monitor (rear end).



The water trap is a plastic bottle that needs to stay on the INOmax machine at all times (not disposable)

Front screen set up:



Touchscreen frontage: either press on middle button and rotate the control wheel (found just under screen) to adjust nitric supply. The required amount of NO needs to be confirmed either by touching screen again or pressing the control wheel.

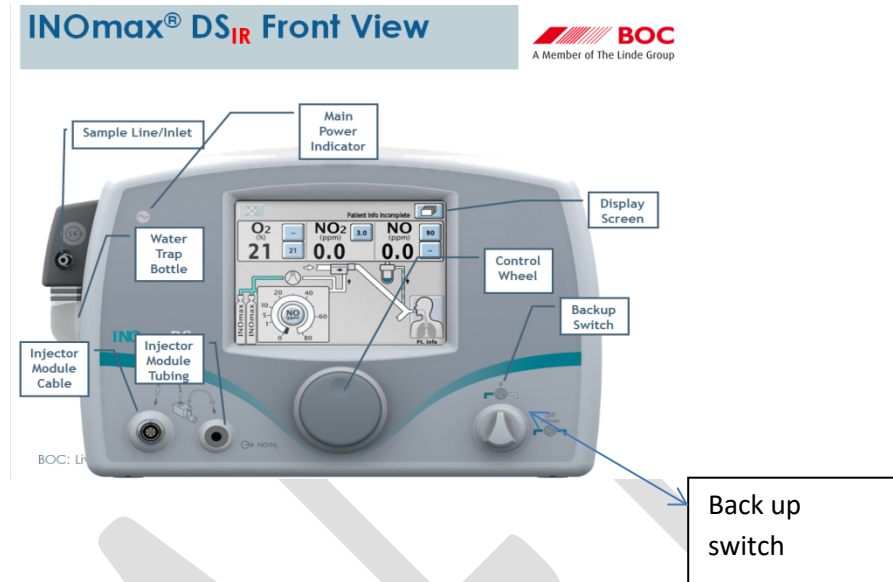
Green light = cylinder open



Control wheel

This will then allow the correct amount of NO to be delivered to the patient if following the set up and using the touchscreen delivery display. This can be adjusted as required.

Back up delivery system:



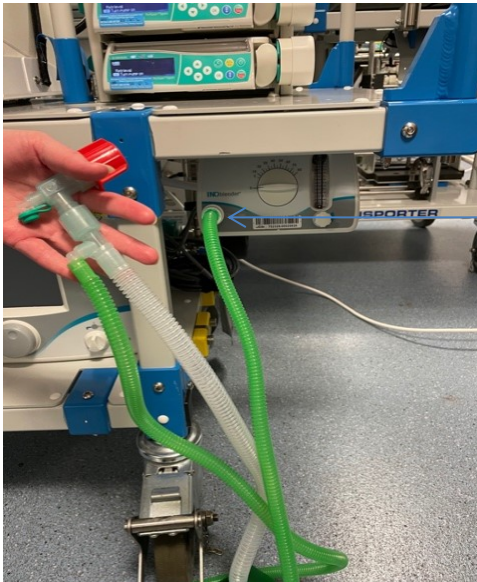
- 5 L/min, the delivered NO dose will be approximately 40 ppm. Breathing circuit
- The integrated pneumatic backup is intended for short term use when the electronic delivery system fails until a replacement NO delivery device can be brought to the bedside.
- The integrated pneumatic backup delivers a variable concentration of NO to the patient depending on the flow being used.

The integrated pneumatic backup delivery provides a fixed flow of 250ml/min of INOMAX into the ventilator circuit through the MR injector. Please see table below for estimations of flow rates and how much concentration of NO you would be delivering on back up mode.

This table indicates nominal NO concentrations delivered for different ventilator gas flows.

Ventilator Gas Flow	(L/min)	5	7.5	10	15	20
NO Concentration	(ppm)	40	27	20	13	10

Setting up Nitric Oxide bagging system



Connect bagging circuit direct to INOblender port.



Attach end of bagging circuit direct to INOblender port.

Dial up how much NO is required for patient

Turn the o2 flow metre to the desired flow rate (5L to 14L/min)

9. Depressurising and clearing the regulator supply line

- This should be done before any patient use and also off the patient as you may be purging NO₂.
- Open and close the cylinder.



Using the nitric delivery line from the back of the head, unclip this and press on to the purge port. An audible noise (hissing) should be heard.

This depressurises the regulator.



When the regulator pressure gauge reads zero, remove the regulator hose from the purge port and connect it to the INOMAX gas inlet ready for delivery.

Equality and diversity statement

This document complies with the Birmingham Women's and Children's NHS Foundation Trust service equality and diversity statement.

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