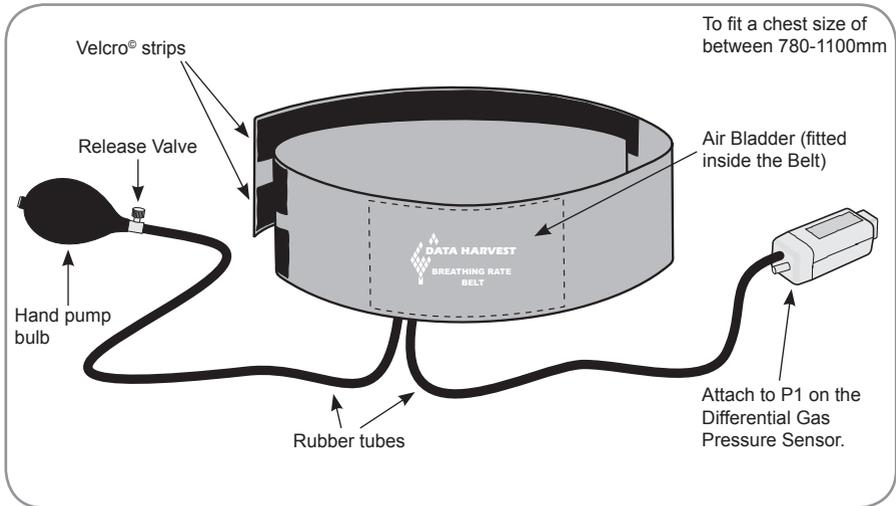


Sensor Accessories

Breathing Rate Belt

Product No. 3190

For use with Product No 3139 - the Smart Q Differential Gas Pressure Sensor (± 10 kPa range) - which is not supplied with this product and must be purchased separately.



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DS 053

No 3

Breathing Rate Belt

Introduction

The Breathing Rate Belt is used with the *Smart Q* Differential Gas Pressure Sensor (± 10 kPa range) to measure breathing rate. The Breathing Rate Belt is a wide nylon belt that can be wrapped around a person's abdomen or chest region. Fitted inside the Belt (positioned under the Data Harvest label) is an inflatable air bladder, which is moulded to two rubber tubes. One of these tubes finishes with a hand pump bulb that is used to inflate the air bladder. The other tube is used attached to the Differential Gas Pressure Sensor to monitor the change in pressure as the test subjects chest expands and contracts during breathing.

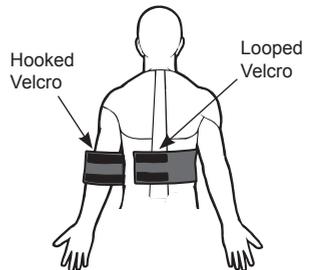
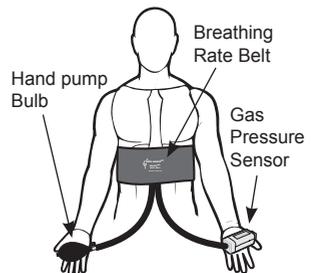
The *Smart Q* Differential Gas Pressure Sensor has two ports to give an output relative to the difference of pressure between the two ports. The second port is left open to atmosphere so that pressure will be measured relative to atmospheric pressure.

Measurement procedure

Note: It is easier to position the Breathing Rate Belt before connecting to the Gas Pressure Sensor.

1. Check the bladder in the Breathing Rate Belt is fully deflated. Wrap the Breathing Rate Belt round the chest of the person whose breathing rate is going to be measured. Arrange the Belt so the Data Harvest printed label is positioned in front resting over the base of the rib cage (as shown in the diagram).
2. Place the end of the Belt with the long length of looped Velcro against the test subjects back (fabric side down). Bring the other end (with the short length of hooked Velcro) over to fasten the Velcro strips together and hold the Belt firmly in place.

Note: If the Belt is fastened when the test subject is slumped over in a chair or breathing out then it will be too slack to give good results. Ideally the Belt should be fitted while the test subject is breathing in slightly to get a 'snug' enough fit.



3. Push the open-ended rubber tube into the port marked P1 on the Gas Pressure Sensor.

Note: If connected to P1 values will be in the positive range, if the other port is used values will be negative.

4. Close the thumbscrew valve on the pump bulb by turning it clockwise as far as it will go.



Breathing Rate Belt

5. With the test subject in position e.g. sitting upright in a chair, squeeze the pump bulb to pump air into the Belts bladder until the Belt is pressed firmly against the abdomen but is still comfortable.
6. Allow the test subject to sit for a couple of minutes to get used to the apparatus and the tension of the belt.
7. Start the **EASYSense** program; select one of the logging modes e.g. EasyLog from the Home page. Select **Test Mode** from the **Tools** menu. Check the value from the Gas Pressure Sensor - the aim is to get a value of around 5 kPa in mid breath position, alternatively increasing and decreasing over a range of about 2 to 3 kPa from this value when the test subject is breathing in and out normally. This value will be varied by how tightly the belt was initially wrapped round the subject. If the range is less than 1 kPa it may be necessary to tighten the Belt or to pump more air into the bladder.
8. Once normal breathing results in a pressure range of 2 to 3 kPa or more you will be ready to begin an investigation.
9. If more than one recording is to be conducted on the same graph select **Overlay**. If the investigation requires exercise to be undertaken disconnect the **Pressure Sensor** from its connection to the sensor cable (not the Belt connection) to allow the test subject to move around.
10. When the investigation is complete release the air pressure in the bladder by slowly turning the thumbscrew valve counter clockwise. Remove the Belt. You may need to apply gentle pressure to the air bladder to completely deflate the Belt.

Practical Information

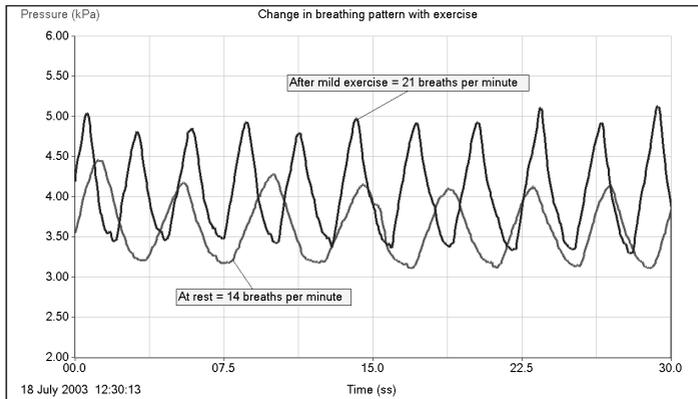
SAFETY:

Be careful that breathing investigations do not become competitions. Investigations on lung ventilation can be potentially dangerous to students with asthma or bronchitis.

- It may be necessary to remove the talc coating from the inside of the open ended rubber tube when first used - this is best done using damp cotton wool bud.
- Check that the test subject is comfortable with the belt on. If not then the results may be compromised, as physiological stress will create abnormal breathing patterns. Avoiding selecting students as test subjects who are sensitive to hyperventilation or who are nervous by nature.
- Coughing, sneezing, laughing, moving and talking will affect the reading. The test subject should be relaxed and motionless.
- Avoid the test subject viewing the data on the computer screen to ensure they do not subconsciously alter their breathing rate.
- If the test subject experiences dizziness, nausea or a headache, stop the investigation and remove the Belt immediately.

Investigations

- Comparing breathing patterns of different student groups e.g. athletes and non-athletes, wind-instrument players, female and males, different ages, etc.
- Relaxation Studies
- Recovery time after exercise



Warranty

This product is warranted to be free from defects in materials and workmanship for a period of 12 months from the date of purchase provided it has been used in accordance with any instructions, under normal laboratory conditions. This warranty does not apply if damaged by accident or misuse.

In the event of a fault developing within the 12-month period, this product must be returned to Data Harvest for repair or replacement at no expense to the user other than postal charges.

Note: Data Harvest products are designed for **educational** use and are not intended for use in industrial, medical or commercial applications.