ZEPHYR OPERATIONS PROCEDURE

V:1 2022

Industrial Performance Services

Industrial Tubular Catalyst Services

Zephyr Operations Procedure

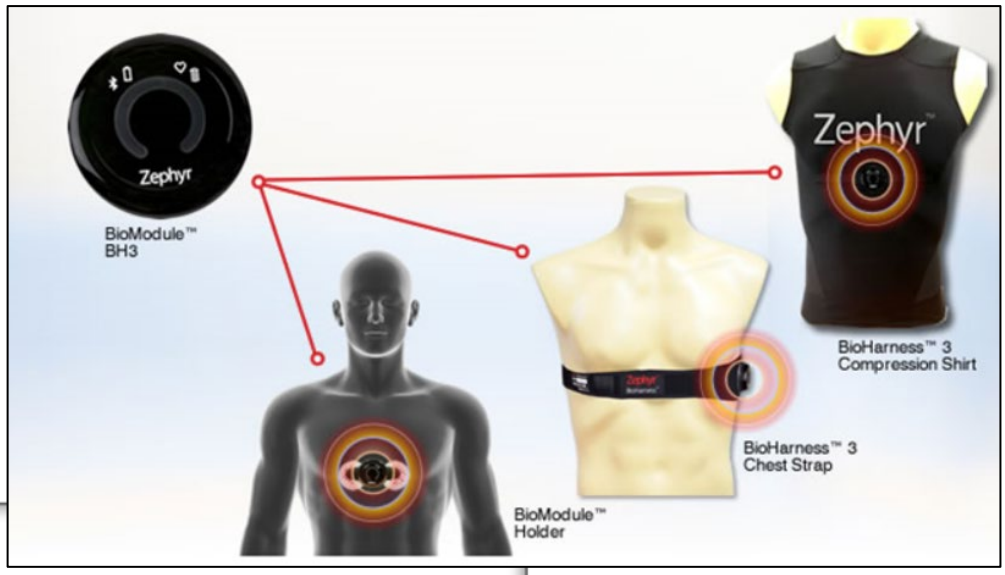
January 2022

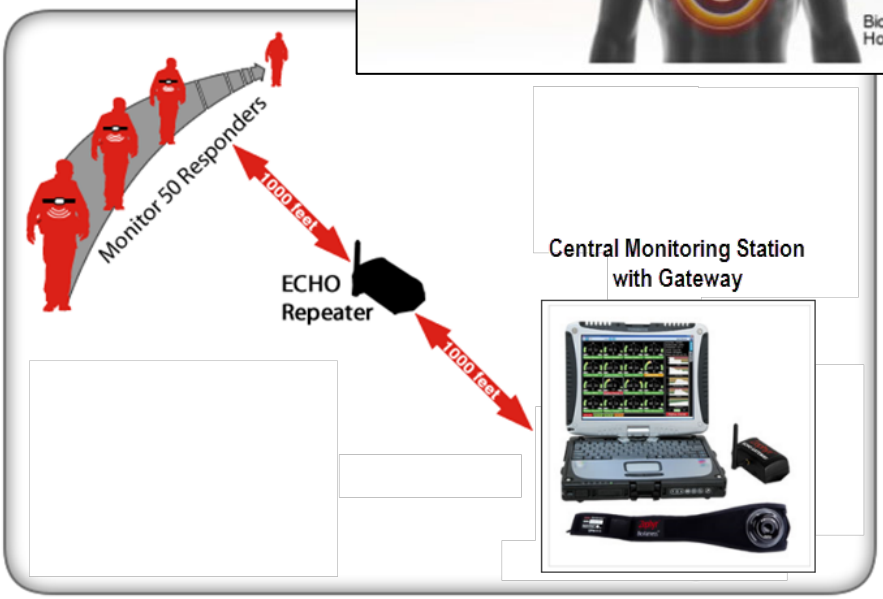
Edelhoff Technologies USA/Zephyr

Physiologic Status Monitoring System

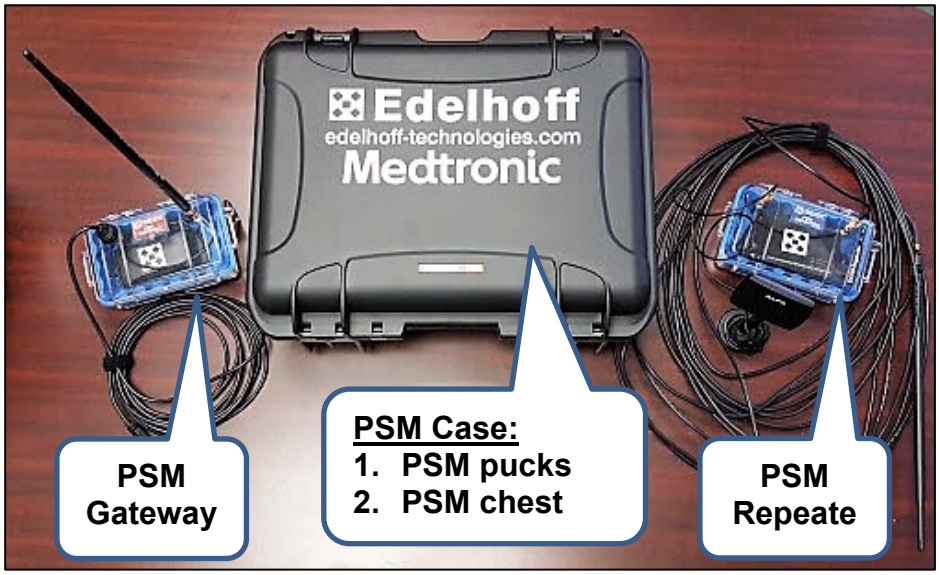
Edelhoff Technologies/Zephyr PSM Set-up and Use

Edelhoff Technologies has partnered with Medtronic to offer the Zephyr BioHarness PSM device. The Zephyr PSM (physiologic status monitor) is a wearable device that monitors a range of physical performance indicators including heart rate, breathing rate, core body temperature, body positioning and stress levels. All are key indicators of the technician's physiological condition when they're working in hazardous environments.

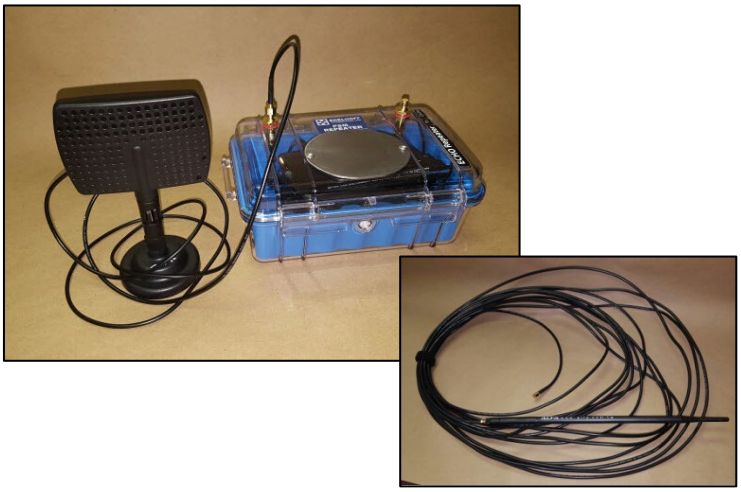




Equipment:



PSM Gateway



PSM Repeater

PSM Chest

PSM Puck

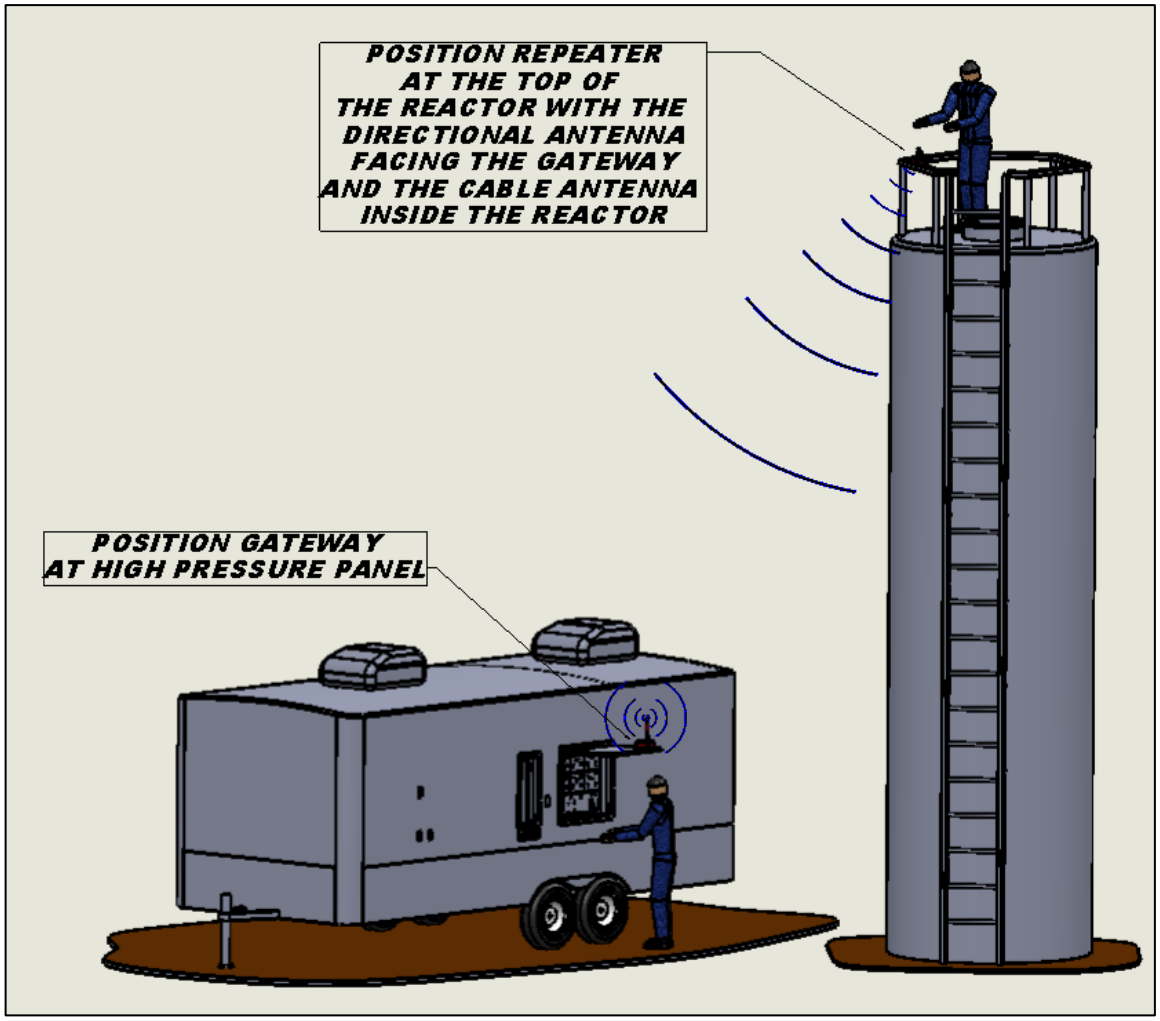
Antenna System Set-up:

Always insure that the PSM pucks and repeater battery is fully charged.

- **Gateway set-up:**
  - Position ***Gateway*** on the top of the open high pressure panel door (this should provide the clearest "line of sight" to the ***Repeater***).
  - Connect the ***Gateway*** into the LSS trailer high pressure panel (connection marked "***PSM Gateway Port***").
  - The ***Gateway*** signal lights will be active indicating communication between the PSM puck and ***Gateway***.

  - Position the ***Gateway*** so that the antenna is in direct "line of sight" with the Repeater's direction antenna.

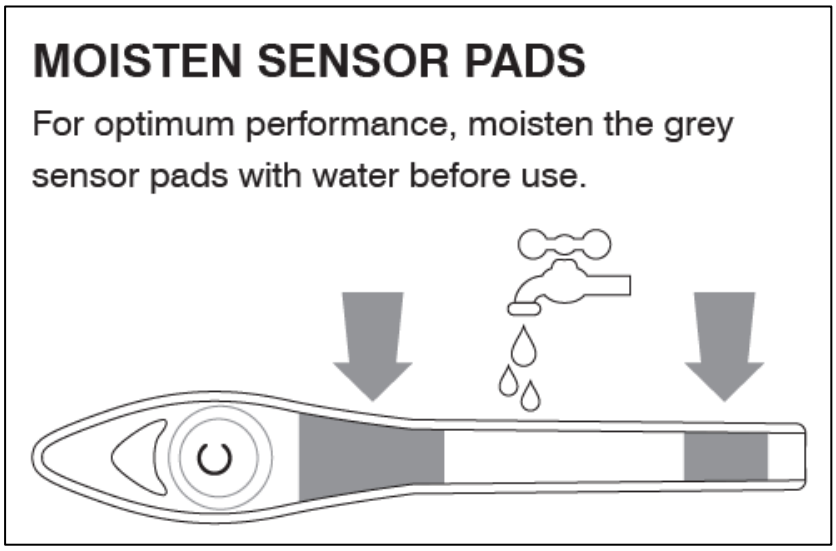
- **Repeater Set-up**
  - The ***Repeater*** is equipped with 2 antennas; 1 directional antenna and 1 omni-directional antenna.
  - Open the ***Repeate***r case and turn on the battery. Close the case.
  - The ***Repeater*** signal lights will be active while communicating with the ***Gateway***.
  - Position the ***Repeater*** at the top of the reactor so that the directional antenna is in direct "line of sight" with the ***Gateway*** antenna.
  - Position the cable antenna (50' length) inside the reactor.



- *The **Repeater** is not required if the technicians are working in "line of sight: of the Gateway antenna.*

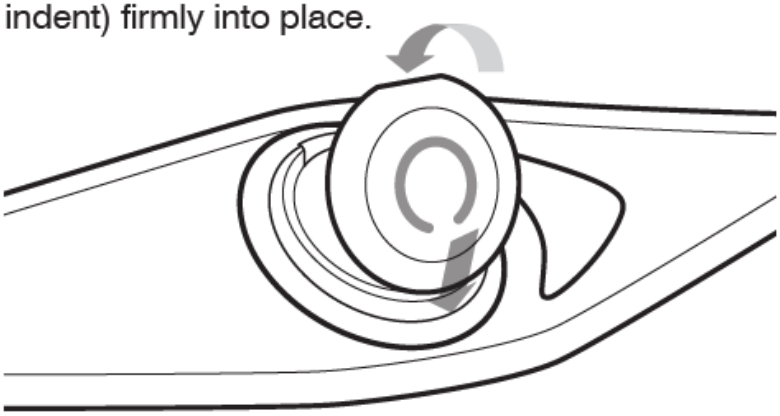
Repeater Direction Antenna

- **PSM Monitoring System (OmniSense Live)**
  - Fit each technician to be monitored with the chest harness and PSM puck.

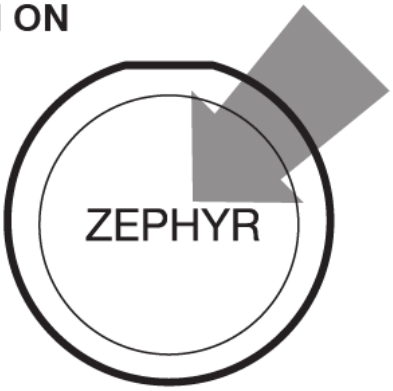


ATTACH TO STRAP

Locate the device lower edge first into the strap receptacle, then push the upper edge (with indent) firmly into place.

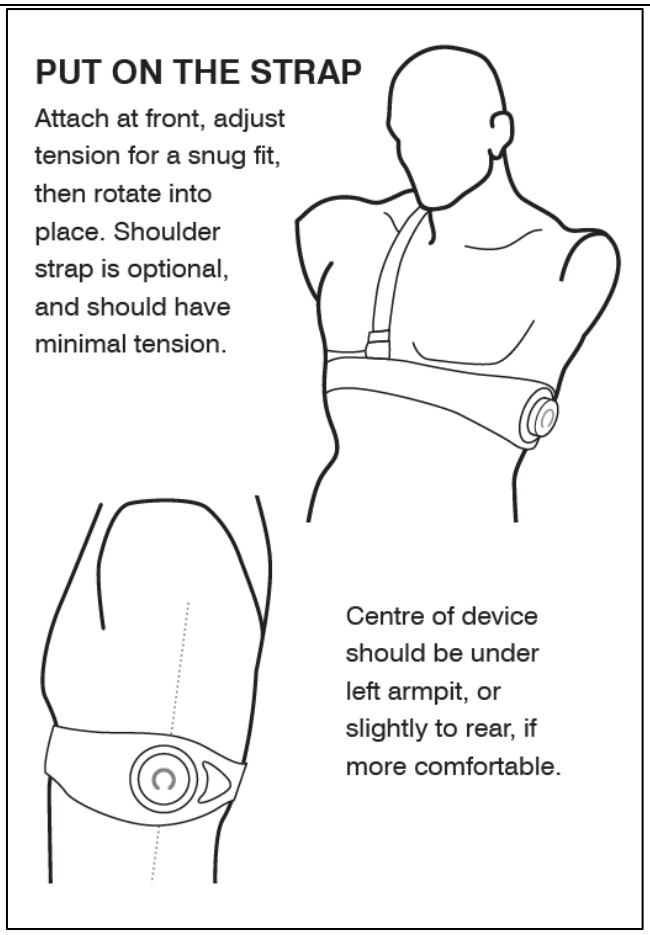


SWITCH ON



Press and hold centre button.
Initial 4-LED system check, then off.

Blue flashing..... Bluetooth connected
Red flashing .....Vital signs locked
Green flashing.....Logging
Orange flashing.....Battery >30%

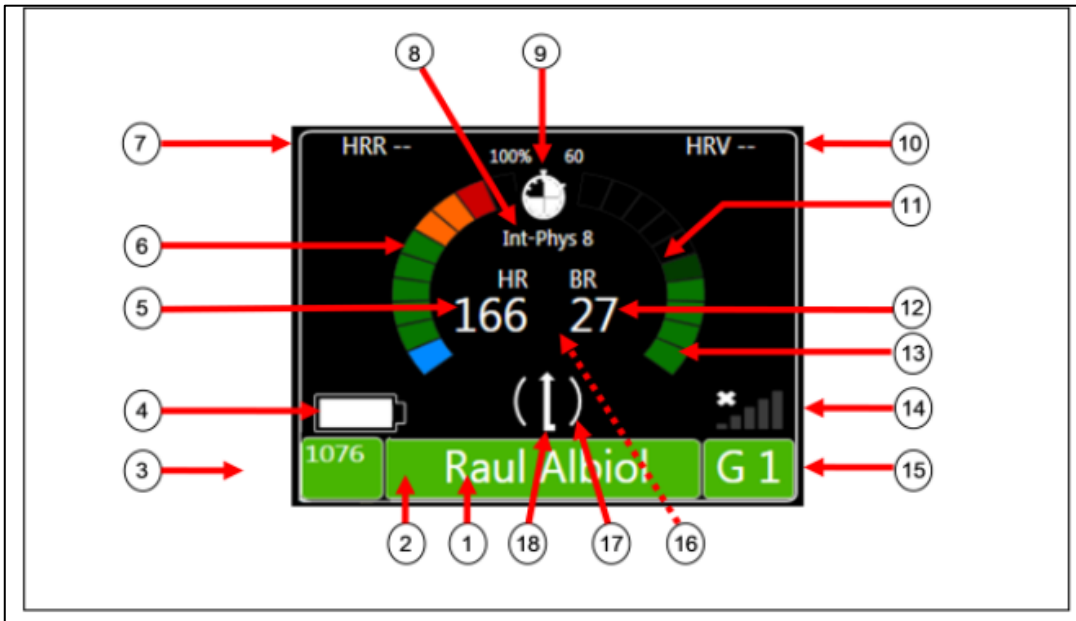


- On the LSS trailer's computer, start the app called OmniSense Live.

- The system dashboard will open:

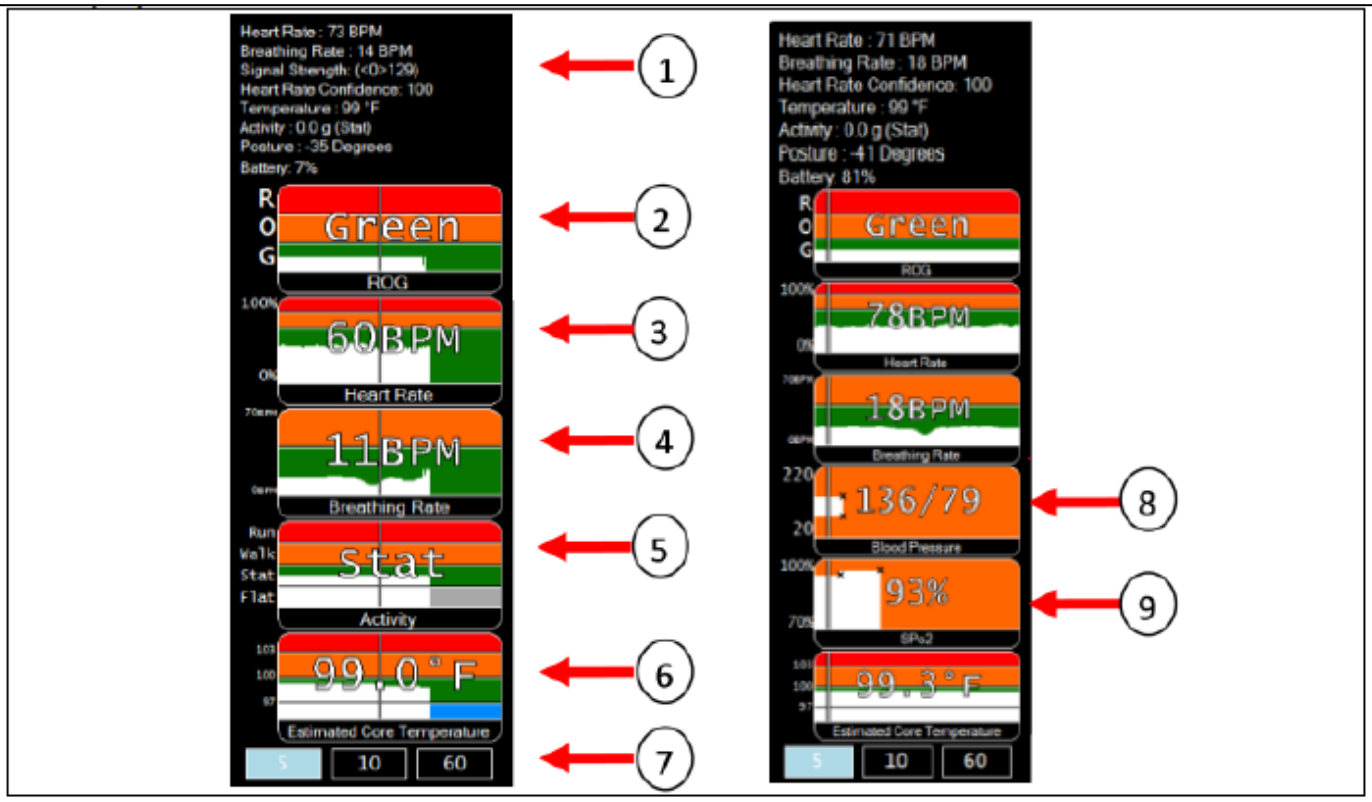
1. Team Tabs - click to select a team
2. Toolbar
3. BioGauge - live subject data
4. Details side panel - vital signs including trend graphs, for the selected BioGauge
5. Accelerometer side panel - three-axis accelerometer trace for the selected BioGauge
6. Comms side panel - shows diagrammatic location of any communications error
7. Map side panel - (ECHO systems only) for display of GPS locations
   Sensors side panel - (Bluetooth systems only) for display and assignment of external Bluetooth sensors
8. Workout side panel - shows target training zone for current and next segment of workout
9. Medic Tab
10. Training tab - shows Training BioGauge for each subject
11. Safety Tab - shows a tile for each subject, with name and ROG status and duration only

- ## BioGauge details:



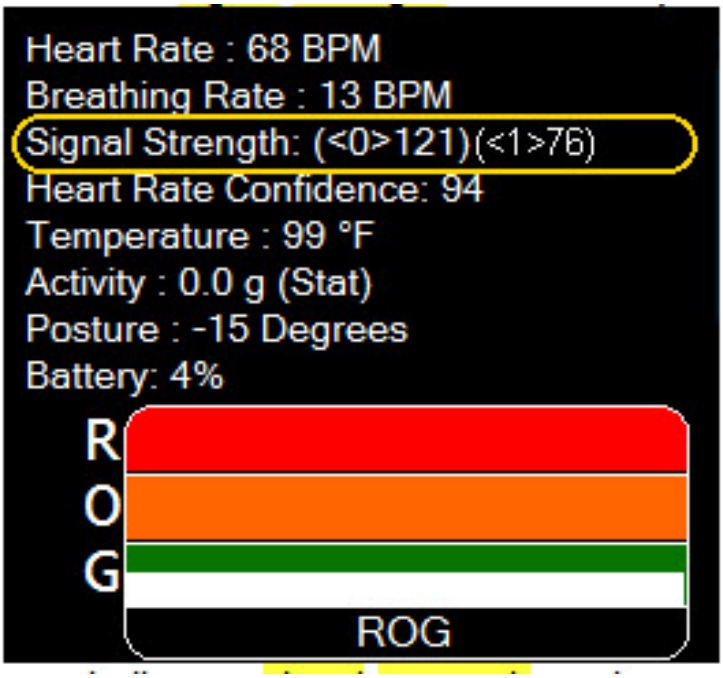
1. Name or identifier
2. Physiological (Red/Orange/Green) or Comms (Blue/Grey) status indication - name background color
3. BioHarness Identifier
4. BioHarness battery level
5. Configurable field 1
6. Sweep scale reflecting configurable field 1
7. Configurable field 2
8. Configurable field 3
9. Data age indication (4 x 1min quadrants) if Status = Blue
10. Configurable field 4
11. HR at Anaerobic Threshold (AT) graticule
12. Configurable field 5
13. Sweep scale reflecting configurable field 5
14. Device signal strength indication (ISM and ECHO systems only)
15. 'R', 'O', 'G' indication of ROG status | Time in status (0 - 99 minutes)
16. Red cross means BioGauge also displayed on Medic Tab (not visible)
17. Activity Level (↑) = walking equivalent ((↑)) = running equivalent
18. ↑= posture indication

- Detailed Side Panel (select an individual's BioGauge)



1. Subject ROG Physiological parameter details,
   battery & signal strengths
2. Subject ROG Status
3. Heart Rate
4. Breathing Rate
5. Activity Level
6. Estimated Core Temperature
7. 5/10/60 minute graph display options
8. Blood Pressure - activity removed
9. Blood Oxygen (%SPO2) - activity removed

- Signal Strength:
  - <0> indicates the **Gateway** signal strength (0 to 255)
  - <1> indicates the first **Repeater** signal strength (0 to 255) (up to 4 Repeaters)



  - Factors effecting signal strength:
    - Range from the PSM puck to the **Gateway** or **Repeater**
    - Body orientation of the subject
    - Material or objects blocking the line of sight to the antenna
    - Outside radio interference

Revision History

Rev	Rev Date	Rev By	Approved By	Description

Approvals:

Procedure Owner

_____ _____
Print Name Date

_____
Signature

Competency Assessment

No.	Questionnaire	C/NYC
Q1		
A1		
Q2		
A2		
Q3		
A3		
Q4		
A4		
Q5		
A5		

Enclosed Attachments	
Risk Assessment	☑
Environmental Aspect and Impact	☑
Training and Competency	☑
Measure and Evaluation Tools	☑

Competency Checklist

To be filled out by Trainer and signed by Employee, Assessor and Supervisor before being returned to the HSEQT Manager for recording purposes.

Procedure	Competency	Date	Competent YES / NO	Employee Signature

(please tick appropriate box)

This employee is competent in performing the job. ☐

This employee has not attained the competency level. ☐ *

* *If the employee has not attained all competency levels, the General Manager must assess the action to be taken, provide an extension of training or alternative action as listed below.*

Alternate action to be taken : _____

Signed By Employee: _____ Date: _____

Trainer: _____ Date: _____

Assessor: _____ Date: _____

Regional Manager: _____ Date: _____

Environmental Aspects and Impacts

Identified Environmental Aspects and Impacts

The following table is a summary of the likely environmental aspects and impacts that may be identified during site inspections. The significance of each impact needs to be assessed using the Risk Assessment Model.

Activity	Aspect	Impact
Purchasing & Administrative Work	Consumption of goods	Conservation of natural resources
	Consumption of energy (eg. Electrical equipment and facilities)	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Habitat loss
	Generation of waste (eg. Paper)	Consumption of space for waste disposal; Habitat loss
Climate Control	Consumption of energy	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Habitat loss
	Generation of noise	Disturbance to community; Habitat loss
Cleaning of – offices / vehicles	Storage, use and release of chemicals	Contamination of air, water or soil; Risk to human health
Transport (Fleet vehicles / staff travel)	Consumption of energy	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Loss of habitat at all stages of generation; Light pollution
	Consumption of goods (eg. Oil)	Consumption of natural resources; Generation of waste; Habitat loss; Biodiversity impacts
	Generation of waste (eg. Oil)	Consumption of space for waste disposal; Potential contamination of water or soil; Habitat loss
	Exhaust emission	Release of greenhouse gases and atmospheric pollution
	Use of dangerous goods (eg. Batteries)	Potential contamination of air, water or soil; Risk to human health
	Generation of noise	Disturbance to community; Habitat degradation
Operations		

Risk Assessment // insert name here					
Step No: Logical sequence	**Sequence of Basic Job Steps documented in the Procedure, Work Instruction and project plans. Break down Job into steps.** Each step should be logical and accomplish a major task.	**Potential Safety & Environmental Hazards/Impacts at the site of the Job** Identify the actual and potential health and safety hazards and the environmental impacts associated with each step of the job.	**Risk Rating** Refer to the risk matrix or HSEQT.PRO. Risk Mgt	**Recommended Corrective Action or Procedure** ***Determine the corrective actions necessary to reduce the risk to as low as reasonably practical (ALARP) refer to HSEQ.PRO.Risk Mgt. The risk must be rediced or controlled to ALARP before work commences.*** Document who is responsible for implementing the controls to manage each hazard identified.	**Risk Rating** refer to the risk matrix or HSEQT.PRO.Risk Mgt
1.					
2.					
3.					
4.					
5.					

Risk Assessment Audit

Process: insert// **Procedure**: Insert //	Date:	Audited by :
	Location of Audit:	Area Mgr/Supervisor:

Item	Question	Evidence Sited	Comments	Conformance Score 0,3,5
1.				
2.				
3.				
4.				
5.				
6.				
7.				

AUDITOR'S SIGNATURE: SAFETY REP'S SIGNATURE:	CONFORMANCE SCORE: / 25 CONFORMANCE %:	0 – Non Conformance 3 – Continuous Improvement Opportunity 5 – Total Conformance