SHEARWATER SWIFT

OPERATING INSTRUCTIONS

SHEARWATER

Powerful • Simple • Reliable

Contents

WARNING

This device can fail. It is possible that it can stop reporting gas pressures or report an incorrect pressure. Never risk your life on only one source of information. Use a backup gauge for critical gas information. If you choose to make riskier dives, obtain the proper training and work up to them slowly to gain experience. This device will fail. It is not whether it will fail but when it will fail. Do not depend on it. Always have a plan on how to handle failures. Automatic systems are no substitute for knowledge and training. No technology will keep you alive. Knowledge, skill, and practiced procedures are your best defense. The use of this device requires appropriate diver training.

Conventions used in this manual

INFORMATION

Information boxes contain useful tips.

CAUTION

Caution boxes contain important instructions.

WARNING

Warning boxes contain critical information that may affect your personal safety.

INTRODUCTION

The Shearwater Swift is an advanced air integration transmitter for measuring scuba tank gas pressure and transmitting this information to a compatible dive computer. Please take some time to read this manual to get the best performance from your new transmitter. Diving involves risk and education is your best tool for managing this risk.

This manual provides installation and operating instructions for the **Shearwater Swift**.

FEATURES

- Compatible with all air integrated Shearwater dive computers
- Randomized transmit interval allows reliable simultaneous use of multiple SWIFT transmitters
- Advanced interference avoidance system ensures reliability using multiple transmitters
- Small size 76 x 34mm
- Easy ‘no tools’ installation and removal on regulators
- LED status indicator
- Depth rating 200msw
- User replaceable CR2 battery

AIR INTEGRATION (AI)

The Swift connects to Shearwater dive computers to provide air integration capability.

AI stands for Air Integration. This refers to a system that uses wireless transmitters to measure the gas pressure in a scuba tank and transmit this information to the dive computer for display and logging. Data is transmitted using low frequency (38kHz) radio communications. A receiver in the dive computer accepts this data and formats it for display. The communication is from the transmitter to the computer without requiring a response. Two (or more) dive computers may be programmed to receive the same transmitter(s).

Although the feature is named “Air” Integration, other gas mixtures can be used with the system as well. When using gas mixtures with oxygen content above 22%, be sure to have proper training on such mixtures, and follow proper cleaning and material compatibility guidelines. Swift transmitters are built with O2 compatible materials.

NOTE FOR PRESSURE MEASUREMENT WIRELESS TRANSMITTERS

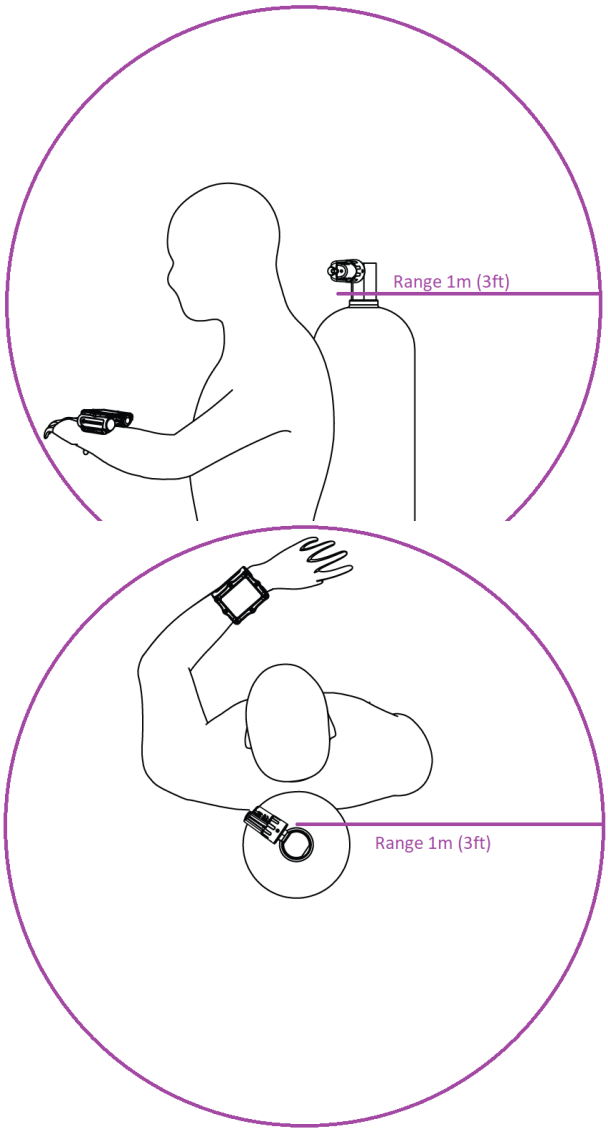
A component of self-contained breathing apparatus as defined by EN250:2014 is: Pressure Indicator, intended for use with air only. Products marked EN250 are intended for use with air only. Products marked EN13949 are intended for use with gases containing more than 22% oxygen and must not be used for air.

Installing the transmitter

Before using the AI system, you will need to install one or more transmitters on the HP (high pressure) port of the scuba tank first stage regulator. Use a first stage regulator with at least two HP ports, so that a backup submersible pressure gauge (SPG) can be used. Installation torque should be hand-tightened to snug, excessive force is not required. An 11/16" or 17mm wrench may be used if desired.

Position the transmitter such that it is on the same side of your body as you wear the dive computer. Range is limited to approximately 3ft (1m).

A high-pressure hose may be used to relocate the transmitter for better reception or convenience. Use hoses rated for a working pressure of 4350 psi (300 bar) or higher. **If using a hose the use of a 'spool' insert is required (not included). In this case the spool holds the air pressure and the transmitter base o-ring prevents water ingress to the hose fitting threads.**

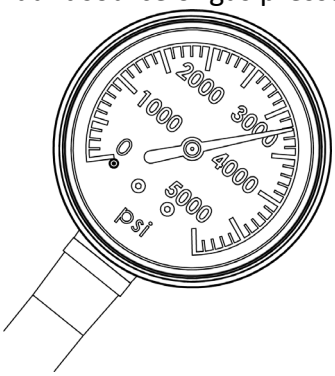


Always use a backup pressure gauge

Historically, wireless gas pressure transmitters have been reliable. However, like all other electromechanical systems they will eventually fail. When this happens, they might report a higher or lower gas pressure than remains in a SCUBA cylinder or they may report no pressure at all.
Unlike a mechanical pressure gauge, the failure of a transmitter will normally produce error messages on the attached dive computer.
However, there could be failures that produce no error messages and result in a sudden unexpected out of gas emergency that every diver must be prepared to manage.
Shearwater recommends using a backup submersible pressure gauge (SPG) as a redundant source of gas pressure information and regularly confirming the agreement of the gas pressure reading of the SPG and wireless transmitter.

USE A BACKUP ANALOG SPG

Always use a backup analog submersible pressure gauge as a redundant source of gas pressure information.



Turn on the Transmitter

Turn on the transmitter by opening the tank valve. The transmitter will automatically wake up when it detects pressure over 7 bar (100 psi). Pressure data is transmitted approximately every 5 seconds.

LED Indicator

The LED indicator on the top of the Swift will flash green when a transmission is sent. This helps to indicate that the transmitter is operating properly. The LED will flash red if an interfering signal is detected. The Swift will try to transmit again when the channel is free.

Setting up AI on the Dive Computer

- Enable AI on the dive computer
- Pair the Swift transmitter
- Configure AI display on home screen

Refer to the dive computer manual for details on setting up the AI system.

Pairing the Transmitter

Each transmitter has a six digit serial number etched on its body. AI communications are coded with this number so that the source of each pressure reading can be identified. Enter the six digit serial number (including any leading zeros) in to the transmitter serial number setting of the dive computer menu. Enter the rated (full tank) pressure value as well as desired reserve pressure level.

Turning off the Transmitter

To turn off the transmitter, close the tank valve and purge the second stage regulator to drain pressure from the hoses. The transmitter will automatically power down after 1 minute of no applied pressure (less than 3.5 bar or 50psi).

Purge Air from regulator when not in use

We recommend purging the air from the regulator when the system is not in use. This extends the battery life of the transmitter (as it will continue transmitting any time there is air pressure in the regulator system), as well as lowering the risk that a diver might enter the water with the air pressure turned off. Please ensure the air is turned back on before donning the gear.

CHECK THAT YOUR TANK VALVE IS OPEN

Always take a few breaths from your regulator or purge your regulator's second stage while monitoring your tank pressure for a full 10-15 seconds prior to entering the water to ensure your tank valve is turned on.

If the first stage regulator is charged but the tank valve has been closed, the breathing gas available to the diver will decrease rapidly and within a few breaths the diver will face an "out of air" situation. Unlike an analog gauge, the air pressure reported on the dive computer will only update every 5 seconds, so the pressure must be monitored for longer than that (we suggest 10-15 seconds) to ensure the tank valve is open.

Including a regulator purge test followed by 10-15 seconds of air pressure monitoring before entering the water as part of your pre-dive safety check is a good way to mitigate this risk.

Using Multiple Transmitters

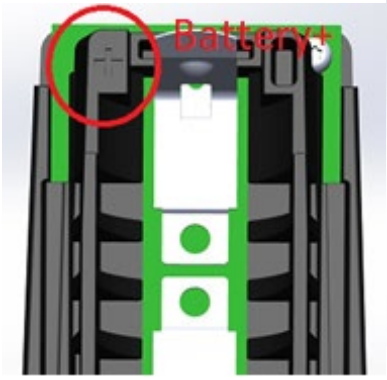
The Swift is designed with the use of multiple transmitters. The transmit interval of each transmitter varies within a 4.8 to 5.2 second time period and each Swift includes a receiver used to check for other transmitters and avoid colliding with their data. Four or more transmitters may be used simultaneously, without the need to use multiple transmitter types (colors used on legacy Shearwater transmitters). It is important to ensure the transmitter identification displayed on the dive computer matches the tank the transmitter is attached to. It may be useful to apply identifying paint or tape to transmitters if using multiple units. Legacy Shearwater transmitters may be used with the Swift in multiple transmitter configurations, although the maximum should be two (one grey, one yellow). Best results will be obtained by using all Swift transmitters, as the legacy transmitters do not avoid collisions and will increase the amount of lost data.

Using Swift with other brand dive computers

Swift transmitters may be used with other brands of dive computers that are compatible with Shearwater transmitters. However, this operation cannot be guaranteed.

CHANGING THE BATTERY

Remove the cover
Using the hex screwdriver provided, loosen and remove the 4 screws at the base of the transmitter. Grasp the cover and pull away from the base. This operation may be easier if the transmitter remains attached to the HP port of a regulator. Ensure no pressure is present at the HP port during the battery change operation.



Exchange the battery
Remove the existing battery from the battery clip. Dispose of the battery properly according to local regulations. It is recommended to leave the battery out for at least 1 minute to allow internal circuits to reset. Insert a new battery, negative towards the base, positive towards the top (a small + is marked at the top end). Push the battery down gently in to the clip. The status LED sequence red, yellow, green shows good battery contact.

Replace the cover
Ensure the base o-rings are clear of debris and are not damaged. Replace o-rings (see specifications page for dimensions) if damaged, using a small amount of O2-compatible lube. Carefully align the cover so the circuit board fits in the wide part of the case. The cover should slide down easily until the base o-rings engage. Do not force the cover down if it is not aligned. Press the cover down firmly until the screw holes line up with those in the base. Using the hex screwdriver provided, replace the 4 screws and tighten to snug.

Check Transmitter Operation
To ensure the new battery is installed properly and the Swift is working, install the regulator on a scuba tank and pressurize the system. Check that the pressure reading is reporting correctly.

LED Indicator
Normal transmit operation shows a quick green flash upon transmitting. A red flash indicates a detected collision, and if followed by a green flash this indicates the transmission was successfully delayed. Occasional red flashes when transmitting are not normally a cause for concern. Consistent red flashes at transmit interval indicate strong interference, and this should be resolved for best results from the Swift transmitter. Repeating red flashing after battery change indicates a self test failure – this could be due to a bad battery or other internal problem – **do not dive the unit if continuously flashing red**.

LED Flash Pattern	When Displayed	Meaning
Red, Yellow, Green	At battery change	Self Test
Yellow flashes	At battery change or wakeup from inactive	Firmware version code
Repeating Quick Red Flashes	Any time	Self Test failure – do not dive
Quick Green Flash	Transmitting	Normal Transmit
Quick Red Flash	Transmitting	Interference Detected

TROUBLESHOOTING

Battery life is short
Many divers will find the battery will last several years before requiring replacement. However, frequent use with long dive times or leaving the regulator charged when not diving could drain the battery more quickly. Ensure the regulator is purged when not in use. The Swift will continue to transmit if gas pressure is above 3.5 bar (50 psi). Ensure the use of a good battery. Counterfeit batteries are sometimes a problem. Test the battery with a load if unsure.

Battery warning levels (test with a 1mA load)
2.75V yellow (low) battery warning.
2.50V red (critical) battery warning.

Frequently dropped signals
Range is limited to about 1m and may be affected by alignment of the transmitter or receiver. Try to reposition the transmitter closer to the receiver or change its orientation so that it 'points' (body aligned towards) the receiver. A small HP hose may be useful for this purpose (if a hose is used, ensure a 'spool' is used on the inner diameter of the hose to transmitter coupling).

Interference
It is possible for high energy lights, scooters, or heated undergarments to generate interference in the RF frequencies used by the Swift transmitter. This can be checked by turning those devices off for 10-15 seconds to see if the signal returns. Keep interference generating devices away from the dive computers (the receivers are the most sensitive to interference) as much as possible.

STORAGE AND MAINTENANCE

- The Swift should be stored dry and clean. Battery may be left installed if desired.
- Do not allow salt deposits to build up on your Swift. Rinse in fresh water to remove salt and other contaminants. Allow to dry naturally before storing.
- Clean with water ONLY. Any solvents may damage the transmitter.
- Clean only when installed on a regulator. Do not allow water or other debris to enter the high pressure port.
- Do not wash under high pressure jets of water as it may cause damage.
- Store the Swift out of direct sunlight in a cool, dry and dust free environment.
- Avoid continuous exposure to direct ultra-violet radiation and radiant heat.

SERVICING

Service of the Swift may only be done at Shearwater Research, or by any of our authorized service centers. Your nearest service center can be found at:

www.shearwater.com/contact

DOCUMENT HISTORY

Document number 57025
RevG June 2, 2021

SPECIFICATIONS

Depth Limit	200msw
Operating Temperature Range	+4C to +34C
Short-Term (hours) Temperature Range	-10C to +50C
Long-Term Storage Temperature Range	+5C to +20C
Battery	CR2 3V User replaceable
Battery Operating Life	300 Dive Hours 5 year storage time
Power save mode	Extends non-diving pressurized time 2-3x
Weight	135 g
Size (L x D)	76 mm X 34 mm
Pressure port	7/16”-20 UNF
Rated Air Pressure	300 bar / 4350 psi
Pressure resolution	0.14 bar / 2 psi
Pressure reporting interval	4.8 – 5.2 seconds
HP port proof pressure	450 bar / 6525 psi
Overpressure port	Included
Accuracy	5% full scale
Zero offset	Less than 3.5 bar / 50 psi
Activation pressure	7 bar / 100 psi
De-activation pressure	3.5 bar / 50 psi
Cover screws	1.5mm hex 316SS
Spool recommended for hose use	21 x 4.25 mm
Body o-ring	24 x 1.5mm
HP port o-ring	AS568-904 75A Viton

FCC WARNING

a) USA-Federal Communications Commission (FCC)

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:
(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

Changes to or modification of this equipment are not authorized, doing so may void the user's authority to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

INDUSTRY CANADA WARNING

b) Canada - Industry Canada (IC)

This device complies with RSS 210 of Industry Canada.
Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of this device.
L'utilisation de ce dispositif est autorisée seulement aux conditions suivantes :
(1) il ne doit pas produire d'interference, et
(2) l'utilisateur du dispositif doit étre prêt à accepter toute interference radioélectrique reçu, même si celle-ci est susceptible de compromettre le fonctionnement du dispositif.

Caution: Exposure to Radio Frequency Radiation.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website.

Conformance Statements

- EC Type examination conducted by: SGS Fimko Oy Ltd, Takomotie 8, FI-00380 Helsinki, Finland. Notified Body No. 0598.
- UK EC Type examination conducted by: SGS United Kingdom Ltd, Rossmore Business Park, Ellesmere Port, South Wirral, Cheshire, CH65 3EN, United Kingdom. Approved Body No. 0120.
- High pressure gas sensing components are in conformity with EN250:2014 – respiratory equipment -open-circuit self-contained compressed air diving apparatus – requirements, testing and marking – clause 6.11.1 Pressure Indicator. EN 250:2014 is the standard describing certain minimum performance requirements for SCUBA regulators to be used with air only sold in EU. EN 250:2014 testing is performed

to a maximum depth of 50 M (165 FSW). A component of self-contained breathing apparatus as defined by EN250:2014 is: Pressure Indicator, for use with air only. Products marked EN250 are intended for air use only. Products marked EN 13949 are intended for use with gases containing more than 22% oxygen and must not be used for air.

- Depth and time measurements conform with EN13319:2000 - Diving Accessories - depth gauges and combined depth and time monitoring devices.
- The air used must comply with EN 12021. EN 12021 is a standard that specifies the allowable contaminates and component gases that make up compressed air. This is the equivalent of the USA Compressed Gas Association's Grade E air. Both standards allow very small amounts of contaminants that are not harmful to breathe but can cause a problem if present in systems using gases with a high percentage of oxygen.
- Electronic instruments are in compliance with ETSI EN 301 489-1 Electromagnetic compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements, EN 55035: 2017 Electromagnetic compatibility of multimedia equipment. Immunity requirements, EN 55032:2012/AC:2013 Electromagnetic compatibility of multimedia equipment. Emission requirements, and ETSI EN 300 330 Short Range Devices (SRD) Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz.
- Shearwater's EU Declaration of Conformity is available at: https://www.shearwater.com/iso-9001-2015-certified/

Shearwater EU Representative:
Machinery Safety, Compliance Services BV,
Zwolsestraat 156
2587 BW, The Hague
Netherlands

WARNING: Transmitters marked EN 250 are certified for use with air only. Transmitters marked EN 13949 are certified for use with Nitrox only.

Shearwater UK Representative:
Narked at 90 ltd
15 Bentley court, Paterson Rd, Wellingborough, Northants, NN84BQ
United Kingdom

CONTACT
Shearwater Research Inc.
Headquarters
100 – 10200 Shellbridge Way
Richmond, BC
V6X 2W7
Tel: +1.604.669.9958
info@shearwater.com

US Repair Centre
DIVE-Tronix
Richard Morton
+1-858-775-4099
Snohomish, WA, USA
usaservice@shearwater.com
https://www.divetronix.com/

Asia Pacific Repair Centre
Rob Edward
+64-21-535378
Wellington, NZ
asiapacservice@shearwater.com

United Kingdom Repair Centre
Narked at 90 Ltd.
+44-1933-681255
Northamptonshire, UK
info@narkedat90.com

www.shearwater.com
www.facebook.com/DiveShearwater
www.twitter.com/DiveShearwater
www.youtube.com/shearwaterresearch

www.shearwater.com