Welch Allyn®
Surveyor™ S4 Mobile Monitor
SERVICE MANUAL

Manufactured by Welch Allyn, Inc., Skaneateles Falls, NY U.S.A.

CAUTION: *United States federal law restricts this device to sale by or on the order of a physician*.

For patent information, please visit www.welchallyn.com/patents

For information about any Welch Allyn product, visit: https://www.welchallyn.com/en/about-us/locations.html

Customer Service and Technical Support: https://www.welchallyn.com/en/other/contact-us.html 1.888.667.8272, mor_tech.support@hillrom.com

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\# **901137 MONITORING CENTRAL STATION**

Welch Allyn, Inc.
4341 State Street Road
Skaneateles Falls, NY 13153 USA

www.welchallyn.com

EC REP EU IMPORTER

Welch Allyn Limited
Navan Business Park, Dublin Road,
Navan, Co. Meath C15 AW22
Ireland

TABLE OF CONTENTS

NOTICES

Manufacturer's Responsibility

Welch Allyn, Inc. (Welch Allyn) is responsible for the effects on safety and performance of the Surveyor™ S4 mobile monitor, as indicated by the CE label, onlyif article 2 of 93/42/EEC directive is applied, in particular:

WARNING: *Only Welch Allyn authorized service providers should perform servicing of the S4 to ensure that the correct maintenance and calibration procedures are followed and that the S4 is returns to proper operation.*

- The mobile monitor is used in accordance with the instructions for use.
- The mobile monitor is correctly maintained according to the standards authorized by Welch Allyn using original spare parts.
- The mobile monitor is used with original accessories and supplies that are in compliance with the standard specifications described in this manual.
- The electrical installation of the relevant room complies with the requirements of appropriate regulations.

Responsibility of the Customer

The user of this mobile monitor is responsible for ensuring the implementation of a satisfactory maintenance schedule. Failure to do so may cause undue failure and possible health hazards. This manual must be kept in a safe place to prevent its deterioration and/or alteration. The user and Welch Allyn authorized personnel must have access to this manual at any time. The user of this mobile monitor must periodically check the accessories, their functionality and integrity.

Equipment Identification

Welch Allyn equipment is identified by a serial and reference number on the back of the mobile monitor. Care should be taken so that these numbers are not defaced.

Copyright and Trademark Notices

Other Important Information

The information in this document is subject to change without notice.

Welch Allyn makes no warranty of any kind with regard to this material including, but not limited to, implied warranties of merchantability and fitness for a particular purpose. Welch Allyn assumes no responsibility for any errors or omissions that may appear in this document. Welch Allyn makes no commitment to update or to keep current the information contained in this document.

Notice to EU Users and/or Patients

Any serious incident that has occurred in relation to the device, should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established.

Disposal

This product and its accessories must be disposed of according to local laws and regulations. Do not dispose of this product as unsorted municipal waste. For more specific disposal information see www.welchallyn.com/weee.

WARRANTY INFORMATION

Your Welch Allyn Warranty

WELCH ALLYN, INC. (hereafter referred to as "Welch Allyn") warrants that components within Welch Allyn products (hereafter referred to as "Product/s") will be free from defects in workmanship and materials for the number of years specified on documentation accompanying the product, or previously agreed to by the purchaser and Welch Allyn, or if not otherwise noted, for a period of twelve (12) months from the date of shipment.

Consumable, disposable or single use products such are warranted to be free from defects in workmanship and materials for a period of 90 days from the date of shipment or the date of first use, whichever is sooner.

Reusable product such as, but not limited to, BATTERIES, PATIENT CABLES, LEAD WIRES, MAGNETIC STORAGE MEDIUMS, CARRY CASES or MOUNTS, are warranted to be free from defects in workmanship and materials for a period of 90 days. This warranty does not apply to damage to the Product/s caused by any or all of the following circumstances or conditions:

a) Freight damage;
b) Supplies, accessories and internal parts NOT approved by Welch Allyn;
c) Misapplication, misuse, abuse, and/or failure to follow the Product/s instruction sheets and/or information guides;
d) Accident;
e) A disaster affecting the Product/s;
f) Alterations and/or modifications to the Product/s not authorized by Welch Allyn;
g) Other events outside of Welch Allyn's reasonable control or not arising under normal operating conditions.

THE REMEDY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT WITHOUT CHARGE FOR LABOR OR MATERIALS, OR ANY PRODUCT/S FOUND UPON EXAMINATION BY WELCH ALLYN TO HAVE BEEN DEFECTIVE. This remedy shall be conditioned upon receipt of notice by Welch Allyn of any alleged defects promptly after discovery thereof within the warranty period. Welch Allyn's obligations under the foregoing warranty will further be conditioned upon the assumption by the purchaser of the Product/s (i) of all carrier charges with respect to any Product/s returned to Welch Allyn's principal place or any other place as specifically designated by Welch Allyn or an authorized distributor or representative of Welch Allyn, and (ii) all risk of loss in transit. It is expressly agreed that the liability of Welch Allyn is limited and that Welch Allyn does not function as an insurer. A purchaser of a Product/s, by its acceptance and purchase thereof, acknowledges and agrees that Welch Allyn is not liable for loss, harm, or damage due directly or indirectly to an occurrence or consequence there from relating to the Product/s. If Welch Allyn should be found liable to anyone under any theory (except the expressed warranty set forth herein) for loss, harm, or damage, the liability of Welch Allyn shall be limited to the lesser of the actual loss, harm, or damage, or the original purchase price of the Product/s when sold.

EXCEPT AS SET FORTH HEREIN WITH RESPECT TO REIMBURSEMENT OF LABOR CHARGES, A PURCHASER'S SOLE EXCLUSIVE REMEDY AGAINST WELCH ALLYN FOR CLAIMS RELATING TO THE PRODUCT/S FOR ANY AND ALL LOSSES AND DAMAGES RESULTING FROM ANY CAUSE SHALL BE THE REPAIR OR REPLACEMENT OF DEFECTIVE PRODUCT/S TO THE EXTENT THAT THE DEFECT IS NOTICED AND WELCH ALLYN IS NOTIFIED WITHIN THE WARRANTY PERIOD. IN NO EVENT, INCLUDING THE CLAIM FOR NEGLIGENCE, SHALL WELCH ALLYN BE LIABLE FOR INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES, OR FOR ANY OTHER LOSS, DAMAGE, OR EXPENSE OF ANY KIND, INCLUDING LOSS OF PROFITS, WHETHER UNDER TORT, NEGLIGENCE OR STRICT LIABILITY THEORIES OF LAW, OR OTHERWISE. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

USER SAFETY INFORMATION

WARNING: Means there is the possibility of personal injury to you or others.

CAUTION: Means there is the possibility of damage to the mobile monitor.

Note: Provides information to further assist in the use of the mobile monitor.

***NOTE**: This manual may contain screen shots and pictures. Any screen shots and pictures are provided for reference only and are not intended to convey actual operating techniques. Consult the actual screen in the host language for specific wording.*

Safety Regulations

- The Surveyor S4 (henceforth referred to as either Surveyor S4 or S4) is a medical mobile monitor.
- The S4 and its accessories are CE labeled, according to applicable standards.
- The S4 with all accessories that have a physical or logical connection with it, forms part of a Medical Electrical System.
- The S4 complies with various safety and performance regulations as mentioned in this manual (Applied Standards).

WARNINGS

- This manual gives important information about the use and safety of this mobile monitor. Deviating from operating procedures, misuse or misapplication of the mobile monitor, or ignoring specifications and recommendations could result in increased risk of harm to users, patients and bystanders, or damage to the mobile monitor.

- Users are expected to be licensed clinical professionals knowledgeable about medical procedures and patient care, and adequately trained in the use of this mobile monitor. The S4 mobile monitor captures and presents data reflecting a patient's physiological condition that when reviewed by a trained physician or clinician can be useful in determining a diagnosis; however, the data should not be used as a sole means for determining a patient's diagnosis.

- Before attempting to use this device for clinical applications, the operator must read and understand the contents of the user manual and other accompanying documents. Inadequate knowledge or training could result in increased risk of harm to users, patients and bystanders, or damage to the mobile monitor. Contact Welch Allyn for additional training options.

- Operation of the equipment beyond its specified ranges, or beyond normal physiological conditions of human subjects, may cause inaccurate results.

- A possible explosion hazard exists. Do not use the device in the presence of a flammable anesthetic mixture. Do not mount any part of the device closer than 25 cm from outlets of flammable gases, including oxygen.

- For proper operation and the safety of users or patients and bystanders, equipment and accessories must be connected only as described in the user manual.

- Repairs and modification must be made by authorized and trained technical personnel. Unauthorized modifications and repairs will void the S4 warranty and may pose a danger to patients and users.

- If additional devices beyond the S4 are connected to the patient, leakage currents could add up and should be accounted for.

- The S4, as all medical equipment or systems, requires special precautions regarding EMC, and should be installed and put into service according to the EMC information provided in the installation procedure to obtain a sufficient degree of immunity as well as not to create disturbance to other equipment. Refer to the specific EMC instructions in the user manual.

- The quality of the signal produced by the device may be adversely affected by the use of other medical equipment, including but not limited to electrosurgery and ultrasound machines. Do not use the S4 system in the presence of imaging equipment such as magnetic resonance imaging (MRI) and tomography systems. Simultaneous operation may damage the device or lead to erroneous results.

- There is no known safety hazard if other equipment, such as pacemakers or other stimulators, is used simultaneously with the device; however, disturbance to the signal may occur.

- Portable and mobile RF communications equipment may affect medical electrical equipment or systems as well as the S4 and its accessories. Do not operate the S4 near sources of high frequency emissions (e.g. microwaves). Unauthorized wireless devices, such as personal access points and WiFi hotspots including those available on personal smartphones, may also interfere with the operation of the system.

- A mobile monitor is not intended to replace clinical assessments. It is important that a qualified individual regularly supervise the patient.

- The S4 is restricted to use on one patient at a time.

Power Supply Warnings

- Only use the recommended batteries. Use of alternate batteries may damage the device or cause other hazards.

- Only charge Welch Allyn Rechargeable Battery (Welch Allyn Re-Order Number 4800-018) in the Welch Allyn Li-Ion Battery Charger. Attempting to charge unauthorized batteries may result in damage to the unauthorized battery and/or the Li-Ion Battery Charger.

- The S4 is a battery operated device that transmits data reflecting a patient's physiological condition to a receiving device. During operation failure, data transmission and LCD information will cease to occur. In the case of battery depletion, replace the batteries on the device to resume monitoring. In mission critical conditions, it is advisable to have a backup device available.

- Only use the Welch Allyn-provided external battery charger and adapter with the S4. Ensure that the electrical installation also complies with local safety requirements for the environment where it is used.

- Regularly check all cables for damage and proper connection. Do not use equipment with a damaged cable.

- The S4 contains an internal battery. The following precautions should be taken regarding the internal battery:
    - Do not immerse in water.
    - Do not heat or throw in fire.
    - Do not leave in conditions over 60 ºC.
    - Do not crush or drop.
    - Only use the approved batteries.
    - Follow the instructions in the disposal section of this manual when taken out of service.

- The S4 rechargeable battery must be initially fully charged prior to use.
- When the S4 initially powers on, the screen will illuminate if the batteries are installed properly and charged. Remove the S4 from service and contact Welch Allyn if the screen does not activate when new or fully charged batteries are initially installed.
- AA batteries are known to leak their contents when stored for an extended period of time in unused equipment. Always remove the batteries after completing operating the mobile monitor. Always place rechargeable batteries in the battery charger when not in use. This ensures that the batteries are recharged for the next time the mobile monitor is operated.
- There is a potential pinch hazard when applying the battery compartment cover to the device that could result in minor injury. Care should be taken to avoid entrapment of fingers when performing this operation.

Accessories, Cables, and External Connections Warnings

- The S4 is designed to meet applicable specifications when using Welch Allyn-approved patient cables and accessories. Use of non-approved cables and accessories may result in reduced performance or electromagnetic interference, and may pose possible patient and user safety concerns.
- Do not use excessive force on any of the connection cables and handle all accessories with care.
- Conductive parts of the ECG patient cables, electrodes, and associated connections of type CF applied parts, including the neutral conductor of the patient cable and electrode should not come into contact with other conductive parts including earth ground.
- To avoid the possibility of serious injury or death during patient defibrillation, do not come into contact with mobile monitor or patient cables.
- Accessories may be provided with separate user manuals. Read these manuals thoroughly and refer to them for specific functions. It is recommended to keep all manuals together.
- To avoid potential for spread of disease or infection, single-use components and accessories (e.g., electrodes, disposable SpO_2 sensors, pouches, etc.) must not be reused. To maintain safety and effectiveness, ECG electrodes and sensors must not be used beyond their expiration date or useful life.
- All accessories including cables, connectors and other patient-applied parts supplied with the S4 do NOT contain any Latex. If the patient develops an allergic reaction or rash, immediately remove the accessory and inform Welch Allyn.

Defibrillation and Electro Surgery Warnings

- The S4 has not been designed for use together with Electro Surgery Units.
- The S4 is defibrillator protected in compliance with IEC 60601-2-25 and IEC 60601-2-27 standards if used with Welch Allyn-approved patient cables. Defibrillation while using non-approved patient cables may damage the device beyond repair and cause a safety hazard to the patient.

ECG Warnings

- Excessive patient movement could interfere with the operation of the system.
- Proper clinical procedure must be employed to prep the electrode and sensor sites, and to monitor the patient for excessive skin irritation, inflammation, or other adverse reactions. Electrodes and other sensors that are intended for short-term use should be removed from the patient promptly following use.
- 12-lead ECGs acquired through the S4 will normally use a modified lead system with the limb electrodes positioned on the torso. Although this is a generally accepted practice (e.g., in stress testing), the different electrode positions can cause morphology changes on the ECG, thus influencing their interpretation. Most frequently seen differences are a vertical and rightward axis shift, minor changes of evidence of old inferior infarction and changes in the T-wave in the limb leads. It is recommended that you place the electrodes as close as possible to the normal limb positions avoiding the possibility of causing artifact. The right arm and left arm electrodes should be placed on the clavicles as close as possible to the arms. The left leg electrode should be placed as close as possible to the left leg without subjecting it to the possibility of motion artifact.
- During periods of lead fail and when a reduced lead set is used for the S4, 12-lead ECG interpretation cannot be reliably used in determining a diagnosis.
- When using the 5-wire ECG cable, it is not possible to acquire a 12-lead ECG with the S4.

The following warnings concern the pacemaker pulses management performed by Surveyor Central:

- Rate meters may continue to count the pacemaker rate during occurrences of cardiac arrest or some arrhythmias. Do not rely entirely upon heart rate meter ALARM SIGNALS. Keep pacemaker PATIENTS under close surveillance. See this manual for disclosure of the pacemaker pulse rejection capability of this instrument.
- With the Surveyor S4 when used with the 4-wire, 5-wire or 10-wire ECG cable, all pacemaker spikes are rejected per the IEC 60601-2-27 standard (0.1 - 2 ms duration, 2 - 700 mV amplitude). Signals are recognized as pacemaker spikes when they have a slew rate over 4 V/s, as measured according to the IEC 60601-2-27 standard. Abnormally high or wide pacemaker spikes might be recognized as QRS if their amplitude and pulse width exceed these values.
- With the Surveyor S4 when used with the 3-wire ECG cable, pacemaker spikes are not rejected consistently. For this reason, do not rely upon heart rate meter ALARM SIGNALS, when using a 3-wire cable.
- Welch Allyn does not claim, verify, or validate support for all available pacemakers.

SpO_2 Warnings

- Use only pulse oximetry sensors, cables, and accessories specifically intended for this patient monitor. Unapproved components may result in injury, degraded performance and/or device malfunction. Refer to Chapter 17 of the User Manual, for a list of compatible oximetry sensors, cables, and accessories.
- Use only pulse oximetry sensors specified for the correct patient mode and for the correct application position.
- Check the application site of the pulse oximetry sensor no less frequently than every 4 hours to evaluate the condition of the patient’s skin, moving the sensor to an alternate site as necessary.
- Reposition the sensor at least once every 24 hours to allow the patient’s skin to breathe.
- Apply pulse oximetry sensors as directed in the Instructions for Use provided with the sensor to avoid possible tissue damage or inaccurate measurement due to errors such as use of an inappropriate sensor for the application, incorrect placement, wrapping too tightly, or other.
- Do not sterilize or immerse pulse oximetry sensors in liquid.

- Always clean and/or disinfect reusable sensors between patients.

- Shield the sensor application site from excessive ambient light as necessary when used in the presence of strong light sources such as surgical lights, xenon light sources, ambient photodynamic therapy (e.g. Bilirubin lamps), fluorescent lights, infrared heating lamps, and direct sunlight, to avoid potential interference that may affect the operation of the SpO_2 function.

- Factors that may cause inaccurate readings and alarms, decreased perfusion, and or low signal strength include:

Interfering substances:

  - Carboxyhemoglobin may erroneously increase SpO_2 reading.
  - Methemoglobin (MetHb), which usually represents less than 1% of the total Hgb, but in the case of methemoglobinemia that can be congenital or induced by some IV dyes, antibiotics (such as sulphas) inhaled gases etc., this level increases sharply and thus can confound the SpO_2 reading.
  - Intravascular dyes (e.g. methylene blue, indocyanine green, indigo, carmine, fluorescein, etc…) introduced into the bloodstream.

Physiological conditions:

  - Cardiac arrest
  - Hypotension
  - Shock
  - Severe vasoconstriction
  - Severe anemia
  - Hypothermia
  - Venous pulsations
  - Ventricular septal defects (VSDs)
  - Extremes in systemic vascular resistance

Sensor placement:

  - Incorrect sensor placement
  - Co-placement of the sensor on a limb where a blood pressure cuff and/or supplemental tape is used
  - Poor sensor fit

- Certain conditions such as physical movement (patient and imposed motion), diagnostic testing, low perfusion, electromagnetic interference, electrosurgical patient monitors, dysfunctional hemoglobin, and inappropriate positioning of the pulse oximeter sensor may result in pulse oximetry readings that are unreliable.

- If the accuracy of a measurement seems incorrect, first check the patient's vital signs, and then check for conditions that may cause inaccurate SpO_2 readings. If the problem is still not resolved, check the monitor, cable, and/or sensor for proper functioning.

- A pulse oximeter is not an apnea monitor. A pulse oximeter should be considered an early warning device. As a trend toward patient deoxygenation is indicated, blood samples should be analyzed by a laboratory CO-oximeter to completely understand the patient's condition. Check that the pulse oximetry waveform is physiological in shape.

- Do not use sensors and/or cables showing signs of physical damage, as these may produce erroneous measurements.

- Pulse oximetry performance may be compromised by excessive motion including tremors or shivering.

- Nail polish and/or artificial fingernails can affect the accuracy of pulse oximetry and should be removed.

- Pulse rate measurement is based on the optical detection of a peripheral flow pulse. While a pulse rate does assist with the detection or absence of a peripheral pulse, the pulse oximeter should not be used as a replacement or substitute for ECG-based arrhythmia analysis.
- In certain situations such as low perfusion or weak signal strength, such as with patients who have pigmented or thick skin, inaccurate SpO_2 measurements may be reported. Verification of oxygenation should be made through other means, particularly in patients with chronic lung disease, prior to instituting any therapy or intervention.
- Always monitor ECG for arrhythmia detection purposes. Pulse rate calculated from pulsatile SpO_2 waveform may differ significantly from heart rate measured by the ECG.

CAUTIONS

- This device must be installed as part of a system in conjunction with the Surveyor Central Station and in accordance to guidance and minimum characteristics per requirements provided by Welch Allyn for deployment of the system on the hospital/clinic's IT network. Refer to those requirements as well as Manufacturer Disclosure Statement for Medical Device Security (MDS2) statements provided by Welch Allyn before deploying and using the system.
- The device and patient cable should be cleaned between each use. Cleaning must be performed with the system turned off and battery removed. Let all parts dry well before turning the power back on.
- Prevent liquids from penetrating the system, components, or the monitor. Do not spray the system with liquid cleaning agents. Do not allow the system, components or accessories to become in contact with unknown substances which may compromise its mechanical or electrical integrity. If liquids have penetrated the system, open by authorized personnel for inspection and let dry completely.
- Do not attempt to clean the mobile monitor or patient cables by submersing into a liquid, autoclaving, or steam cleaning as this may damage equipment or reduce its usable life. Wipe the exterior surfaces with a warm water and mild detergent solution and then dry with a clean cloth. Use of unspecified cleaning/disinfecting agents, failure to follow recommended procedures, or contact with unspecified materials could result in increased risk of harm to users, patients and bystanders, or damage to the mobile monitor.
- No user-serviceable parts inside. Screw removal by authorized service personnel only. Damaged or suspected inoperative equipment must be immediately removed from use and must be checked/repaired by authorized service personnel prior to continued use.

- The S4 accommodates single-use or rechargeable internal batteries. If the rechargeable battery appears to become defective, refer to Welch Allyn Technical Support.

- Do not pull or stretch patient cables as this could result in mechanical and/or electrical failures. Patient cables should be stored off of the floor away from bedrails and wheels to avoid cable damage. Roll the patient cables into a loose loop prior to storage.

- When necessary, dispose of the mobile monitor, its components and accessories (e.g., batteries, cables, electrodes), and/or packing materials in accordance with local regulations.

- Check that all operating and environment conditions such as ambient temperature meet the device's specifications. Allow the device to stabilize within its intended operating environment for a minimum of two hours prior to use.

- Do not exert excessive pressure on the touchscreen LCD or use a sharp or hard object with it. Excessive pressure may permanently damage the display.

- This device is not recommended for use in the presence of imaging equipment such as Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) devices, etc.

- The device is UL classified:

UL-classified device in the USA and Canada.

EQUIPMENT SYMBOLS AND MARKINGS

CE 0459	Indicates compliance to applicable European Union directives		Do not dispose as unsorted municipal waste. Requires separate handling for waste disposal according to local requirements
IPX4	Indicates the device has been tested for safety and shall have no harmful effect from water splashing against the enclosure from any direction		Defibrillator-proof type CF applied part
	CAUTION The caution statements in this manual identify conditions or practices that could result in damage to the equipment or other property, or loss of data.	7d welchallyn.com	Follow instructions/directions for use (DFU) – mandatory action. A copy of the DFU is available on this website. A printed copy of the DFU can be ordered from Welch Allyn for delivery within 7 calendar days.
	Mains power input	MD	Medical Device
REF	Reorder Number	SN	Serial number
	This end up		Keep away from sunlight
	Fragile, handle with care		Keep dry
-20°C -4°F 60°C 140°F	Temperature limitation		Nurse Call/Control Button
	The illuminated LED below this icon indicates the Power On/Off status		*The illuminated LED below this icon indicates the status of the WiFi connection*
	Speaker *(RESERVED FOR FUTURE USE)*	ECG	*Patient Cable Input*
#	Model Identifier		
	WARNING The warning statements in this manual identify conditions or practices that could lead to illness, injury, or death. In addition, when used on a patient applied part, this symbol indicates defibrillation protection is in the cables. Warning symbols will appear with a grey background in a black and white document.		

ELECTROMAGNETIC COMPATIBILITY (EMC)

When using the mobile monitor, assess the electromagnetic environment affected by surrounding devices.

An electronic device may either generate or receive electromagnetic interference. Testing for electromagnetic compatibility (EMC) has been performed on the mobile monitor according to the applicable international standards.

The mobile monitor should not be used adjacent to or stacked with other equipment. If the mobile monitor is used in this manner, verify the mobile monitor operates in an acceptable manner in the configuration in which it will be used.

Fixed, portable, and mobile radio frequency communications equipment may affect the performance of medical equipment. See the appropriate EMC table for recommended separation distances between the radio equipment and the mobile monitor.

The use of accessories, transducers, and cables other than those specified by Welch Allyn may result in increased emissions or decreased immunity of the equipment.

Guidance and Manufacturer's Declaration: Electromagnetic Emissions

The equipment is intended for use in the electromagnetic environment specified in the table below. The customer or the user of the equipment should ensure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment: Guidance
RF Emissions CISPR 11	Group 2	The S4 must emit electromagnetic energy in order to perform its intended function. Nearby electronic equipment may be affected
RF Emissions CISPR 11	Class A	The S4 is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	Not Applicable	
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	Not Applicable	

Guidance and Manufacturer's Declaration: Electromagnetic Immunity

The equipment is intended for use in the electromagnetic environment specified in the table below. The customer or the user of the equipment should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment: Guidance
Electrostatic discharge (ESD) EN 61000-4-2	+/- 6 kV contact +/- 8 kV air	+/- 6 kV contact +/- 8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst EN 61000-4-4	+/- 2 kV for power supply lines +/- 1 kV for input/output lines	+/- 2 kV for power supply lines +/- 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	+/- 1 kV differential mode +/- 2 kV common mode	+/- 1 kV differential mode +/- 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage fluctuations and Interruptions	<5% UT for 0.5 cycles 40% UT for 5 cycles 70% UT for 25 cycles <5% UT for 5s	<5% UT for 0.5 cycles 40% UT for 5 cycles 70% UT for 25 cycles <5% UT for 5s	Note that monitoring is interrupted at the level "< 5% UT for 5s", but equipment remains safe (as specified in EN 60601-1-2).
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE: *UT is the AC Mains voltage prior to application of the test level.*

Guidance and Manufacturer's Declaration: Electromagnetic Immunity

The equipment is intended for use in the electromagnetic environment specified in the table below. The customer or the user of the equipment should ensure that it is used in such an environment.

<table>
<tr><th>Immunity Test</th><th>IEC 60601 Test Level</th><th>Compliance Level</th><th>Electromagnetic Environment: Guidance</th></tr>
<tr><td>Conducted RF
EN 61000-4-6</td><td>3 Vrms
150 kHz to
80 MHz</td><td>3 Vrms
150 kHz to
80 MHz</td><td rowspan="2">Portable and mobile RF communications equipment should be used no closer to any part of the equipment, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.

Recommended separation distance

d = 1.2 $\sqrt{P}$

d = 1.2 $\sqrt{P}$ 80 MHz to 800 MHz

d = $\sqrt{P}$ 800 MHz to 2.5 GHz

Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).

Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b].

Interference may occur in the vicinity of equipment marked with the following symbol:

  </td></tr>
<tr><td>Radiated RF
IEC 61000-4-3</td><td>3 V/m
80 MHz to
2.5 GHz</td><td>3 V/m
80 MHz to
2.5 GHz</td></tr>
</table>

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radios, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the equipment is used exceeds the applicable RF compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the equipment.

b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [3] V/m.

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the Equipment

The equipment is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the equipment can help to prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the equipment as recommended in the table below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter (W)	Separation Distance According to Frequency of Transmitter (m)		
	150 KHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 2.3\sqrt{P}$
0.01	0.12 m	0.12 m	0.23 m
0.1	0.38 m	0.38 m	0.73 m
1	1.2 m	1.2 m	2.3 m
10	3.8 m	3.8 m	7.3 m
100	12.0 m	12.0 m	23.0 m

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE: *At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.*

NOTE: *These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.*

USA and Canada Radio Regulations

USA (FCC)

This device is equipped with Transmitter Module with FCC ID:RYYWYSAAVDX7.

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.

CAUTION: *Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

This device with transmitter module has been tested to SAR and complies with FCC exposure requirements for portable devices. SAR testing has been done at a distance of 10mm from the face and 0mm from the body.

Canada (IC)

This device is equipped with Transmitter Module with IC:4389B-WYSAAVDX7.

This device complies with Industry Canada license-exempt RSS standard(s).

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 the device.

This device with transmitter module has been tested to SAR and complies with IC exposure requirements for portable devices. SAR testing has been done at a distance of 10mm from the face and 0mm from the body.

French Translation

Cet appareil est équipé d'un module émetteur avec marque IC:4389B-WYSAAVDX7

L'appareil conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet appareil avec module émetteur a été testé pour les taux d'absorption spécifique (DAS) et est conforme aux normes d'exposition d'IC pour les appareils portables. Tests de DAS ont été réalisés à une distance de 10mm du visage et du corps 0mm.

MAINTENANCE & CLEANING

WARNING: Servicing of this device should only be performed by Welch Allyn authorized service personnel.

Equipment needed:

- Clean lint free cloth
- Mild detergent and water
- 10% Household bleach and water solution (Sodium Hypochlorite solution consisting of a minimum 1:500 dilution and maximum of 1:10 dilution for disinfecting use only)

Preventive Maintenance Schedule

Maintenance to be Performed	Period	Notes
Device Cleaning	As Needed	Refer to the device cleaning section below.
Visual Inspection	12 Months	Refer to inspection criteria listed in Visual Inspection section.
Battery Door Replacement	36 Months	Replacement period varies based on frequency of use; refer to visual inspection criteria for areas of concern.

Visual Inspection

Perform a visual inspection of the following items:

Patient input connector - Verify the pins on the patient input connector are all present and are not bent or damaged in any way. The recessed area for the patient connector should be free from debris and clean. Use compressed air to remove any debris that has entered into the connector area.

Display – Verify there are no deep scratches or physical damage to the device display. Inspect the display bezel to ensure it is firmly adhered to the device housing. Contact Welch Allyn technical support if the display or display bezel require replacement.

Battery Door – Verify the battery door can be easily removed and that the spring contacts compress and decompress with minimal force applied. Inspect the plastic door assembly for signs of excessive wear or cracking, including the door seal to prevent fluid ingress. Replace the battery door assembly if necessary.

Battery Compartment – Inspect the battery spring contacts and the battery door latching mechanism for signs of excessive wear. If the battery compartment has been damaged, contact Welch Allyn technical support for assistance.

Device Labeling – Inspect the device labeling for signs of wear and legibility. If the labeling is no longer clear and legible, contact Welch Allyn technical support for assistance.

Cleaning and Disinfecting

The following section provides information on proper cleaning directions for the S4, patient accessories, Li-Ion battery Charger, AC Power Pack and AC Power Cord. Patient accessories should be cleaned before they are applied to a new patient. The mobile monitor should be cleaned as per facility standard of care. The Li-Ion battery Charger, AC Power pack and AC Power Cord should be cleaned in accordance with facility standards pertaining to power components.

WARNINGS*:*

- *Remove the batteries from the device before inspecting or cleaning.*
- *Do not immerse the device in water or other fluids.*
- *Do not drop the device or subject it to shock and/or vibration.*
- *Do not use organic solvents, ammonia-based solutions, or abrasive cleaning agents which may damage equipment surfaces.*
- *Be careful not to use an excessive amount of disinfecting solution that could lead to fluid entering the device. Fluid ingress may cause irreparable damage to the internal circuitry.*

CAUTIONS:

- Always disconnect the S4 from power source before cleaning.
- Do not use harsh chemicals for cleaning. Do not use disinfectants that contain phenol as they can spot plastics. Do not steam autoclave, gas sterilize, irradiate, subject to intense vacuum, or immerse in water or cleaning solution. Be careful to avoid getting cleaning liquids into connectors or the mobile monitor. If this occurs, allow the mobile monitor to dry in warm air for 2 hours, then check to make sure all monitoring functions are working properly.
- Keep the patient accessories off of the floor. Accessories that fall on the floor should be inspected for defects, contamination, proper functionality, and cleaned or discarded according to the approved recommendations.
- The user has the responsibility to validate any deviations from the recommended method of cleaning and disinfection.

Clean the exterior surface of the device and patient cables with a mild soap and water solution. After cleaning thoroughly dry off the device with a clean, lint-free, soft cloth.

Disinfect the device after cleaning the exterior surface as required. To disinfect the device wipe the exterior surface with a damp, soft, lint-free cloth using a solution of 10% household bleach and water (Sodium Hypochlorite solution consisting of a minimum 1:500 dilution and maximum of 1:10 dilution). Dry off the device with a clean, lint-free, soft cloth.

Disinfecting agents

The S4 and its Li-ion battery charger are compatible with the following disinfectants:

- Clorox Healthcare® Bleach Germicidal Wipes (use according to instructions on product label), or
- a soft, lint-free cloth dampened with a solution of sodium hypochlorite (10% household bleach and water solution) minimum 1:500 dilution (minimum 100 ppm free chlorine) and maximum 1:10 dilution as recommended by the APIC Guidelines for Selection and Use of Disinfectants.

Cleaning and disinfecting the S4 monitor

***WARNING**: Do not immerse the S4 in water or any other fluids. The S4 is not designed to be immersed in liquid and doing so may result in liquid entering the device leading to possible safety hazards and/or device malfunction.*

***CAUTION**: Do not steam autoclave, gas sterilize, or irradiate the S4 as these may result in damage to the device.*

***WARNING**: Ensure the battery door is securely in place when cleaning the S4 to avoid risk of liquid entering into the device which may lead to a possible hazard and/or device malfunction.*

To clean the S4:

1. Switch off the touchscreen display. If on, press the Nurse Call button once to turn off the display
2. Disconnect patient cables from the S4.
3. If the S4 is configured with the SpO_2 option, install the SpO_2 wash plug in the SpO_2 port.

   Press the SpO_2 wash plug into the SpO_2 port until the top of the plug is flush with the top surface of the S4. Do not apply excessive force. If the plug resists complete insertion, check the port for obstructions and/or check the wash plug to ensure it has not been deformed.

4. Thoroughly wipe the surface of the S4 with a clean, lint-free cloth dampened with water for general cleaning, or use one of the above recommended agents for disinfection.

   ***WARNING**: Do not oversaturate the cleaning cloth. Liquid pooling on the device may enter into the device possibly leading to a safety hazard and/or device malfunction.*

5. Dry the device with a clean, soft, dry, lint-free cloth.

Cleaning and disinfecting the Li-ion battery charger

***WARNING**: Do not immerse the battery charger in water or any other fluids. The charger is not designed to be immersed in liquid and doing so may result in liquid entering the device leading to possible safety hazards and/or device malfunction.*

***CAUTION**: Do not steam autoclave, gas sterilize or irradiate the battery charger as these may result in damage to the device.*

1. Disconnect the AC power cord from the mains supply.
2. Thoroughly wipe the surface of the battery charger with a clean, lint-free cloth dampened with water for general cleaning, or use one of the above recommended agents for disinfection.

   ***WARNING**: Do not oversaturate the cleaning cloth. Liquid pooling on the device may enter into the device possibly leading to a safety hazard and/or device malfunction.*
3. Dry the device with a clean, soft, lint-free cloth.
4. Allow the equipment to dry for 2 hours before reconnecting to the mains supply.

Cleaning sensors and other accessories

The S4 is compatible with a number of sensors and accessories, each with unique cleaning needs. Follow the cleaning instructions provided in the directions for use shipped with those items.

***WARNING**: Do not reuse sensors or accessories indicated as single-patient use; as this may facilitate the spread of infectious agents between persons.*

***WARNING**: Always clean and/or disinfect reusable sensors and accessories between patients to reduce the risk of spreading infectious agents between persons.*

Maintenance

The following table shows the recommended maintenance procedures for the S4, patient accessories, Li-Ion Battery Charger, AC Power Pack and AC Power Cord. The S4 should be serviced once a year by a Welch Allyn authorized service technician; however, it is good practice to periodically ensure the mobile monitor is in proper working order. This can be performed by a clinician or biomed at the hospital or healthcare delivery organization familiar with the S4 mobile monitor, ECG signal acquisition, as well as general maintenance/calibration of biomedical equipment.

To accomplish these steps in their entirety and verify the correct operation of the system, appropriate patient simulators or other equipment may be required. Refer to the service manual for further details.

Functionality	Procedure
Mechanical Integrity	Check for cracks, abrasive edges and other signs of damage.
ECG	• Connect ECG leads to Patient Simulator. • Start a new monitoring session. • Verify that waveforms for all leads are properly shown on the LCD.

Functionality	Procedure
Li-Ion Battery Charger, AC Power Pack, AC Power Cord	• Check for cracks, abrasive edges and other signs of damage. • Check that all connectors and AC cord length is unbroken and smooth along its length. • Verify proper LED indicators during battery charging.
ECG Cables	**Approved Cleaning Agents** • Enzymatic detergent such as ENZOL (US) or CIDEZYME (outside the US). • Distilled water. • Disinfectant solution (such as CIDEX OPA, or a 10% solution of household bleach (5.25% sodium hypochlorite) in distilled water). • Soft, lint-free cloths and/or soft-bristled brushes. • Protective gloves and eyewear. **Procedure** 1. Disconnect the mobile monitor from its power source. 2. Put on gloves and protective eyewear. 3. Prepare the detergent according to the manufacturer's instructions, and also the disinfectant solution, in separate containers. 4. Apply detergent to product using a soft, lint-free cloth. If material is dried on, allow to sit for 1 minute. Do not immerse cable ends or lead wires in liquid as it can cause corrosion. 5. Wipe smooth surfaces with the cloth. 6. Use a soft-bristle brush on visibly soiled areas and irregular surfaces. 7. Remove detergent from product using cloth dampened in distilled water. 8. Repeat as necessary. 9. Apply disinfectant solution on affected area using a soft cloth. Allow product to sit for 5 minutes. 10. Wipe excess solution and clean product again with cloth dampened in distilled water. 11. Allow 2 hours for drying.

UNIT DISASSEMBLY

This section describes the methods used to disassemble the generation 2 S4 mobile monitor, and the tools required to perform the steps defined.

The generation 1 S4 units have reached End of Service and are no longer supported, GEN1 units can be identified by the flat smooth call button or by PN: S4-P-B.

The generation 2 S4 unit can be identified by the indented call button surrounded by a raised ring or by PN:S4-Q-XXX-XXX.

Tools Required:

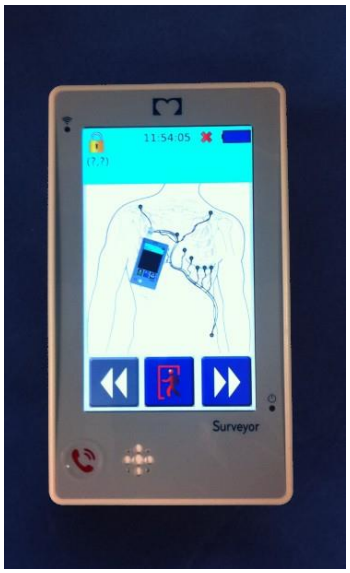
- Phillips screwdriver
- T10 Torx driver
- Torque driver (2 inch/pounds)
- Needle nose pliers

Cautions and Special Instructions

ATTENTION: PCB assembly contains ESD sensitive devices. Use appropriate precautions when handling electronic assemblies.

ATTENTION: PCB assembly contains mechanically sensitive electrical devices. Handle with extreme care to reduce the stress on solder connections.

ATTENTION: Before applying all adhesive backed materials, clean surface with alcohol to make sure it is clean and oil free.



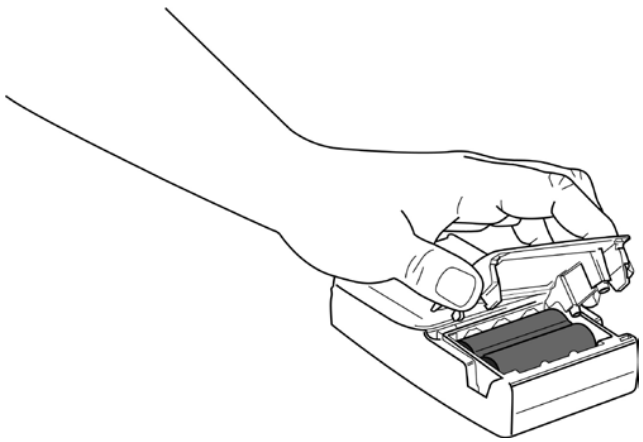
S4 Mobile Monitor – Gen 2 (Front View)

S4 Mobile Monitor (Rear View)

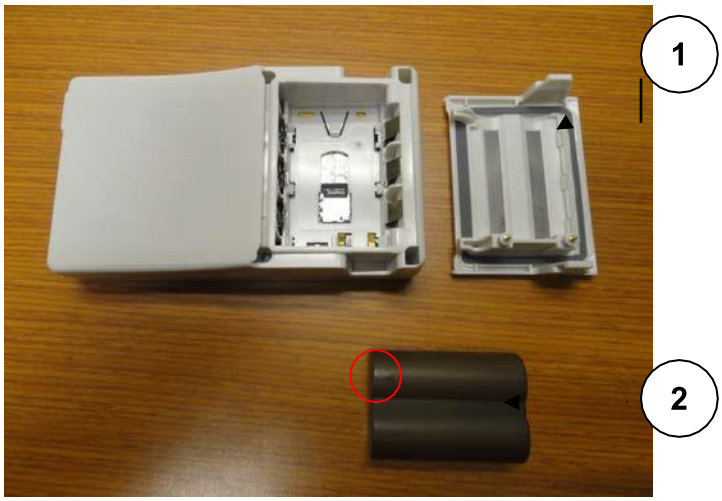
Battery Removal

The battery compartment is accessible via the removable battery door.

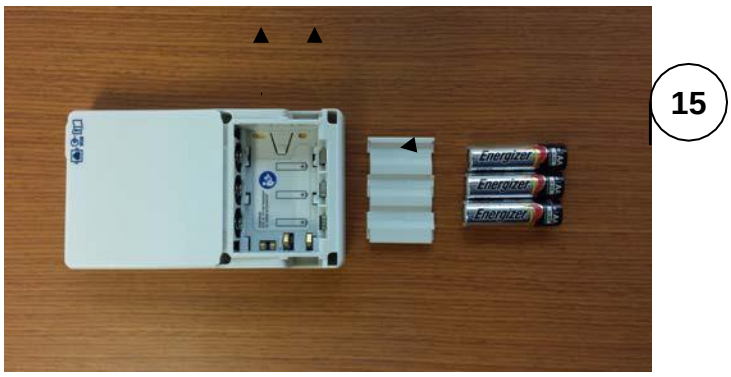
1. Remove the Battery Door by pinching the grips located on each side of the door and remove.



2. With the battery door assembly (item 1) removed, the battery can be slid away from the battery contacts, in the opposite direction of the battery insertion arrow marked on the lithium-ion battery pack (item 2 shown below).



AA Battery removal – Remove the three AA batteries. If the device will continue being operated with AA batteries, the AA Battery Tray (Item 15) can remain inside the battery compartment. If switching to a lithium-ion battery pack, the AA Battery Tray should be removed by sliding it in the direction indicated by the arrows below.



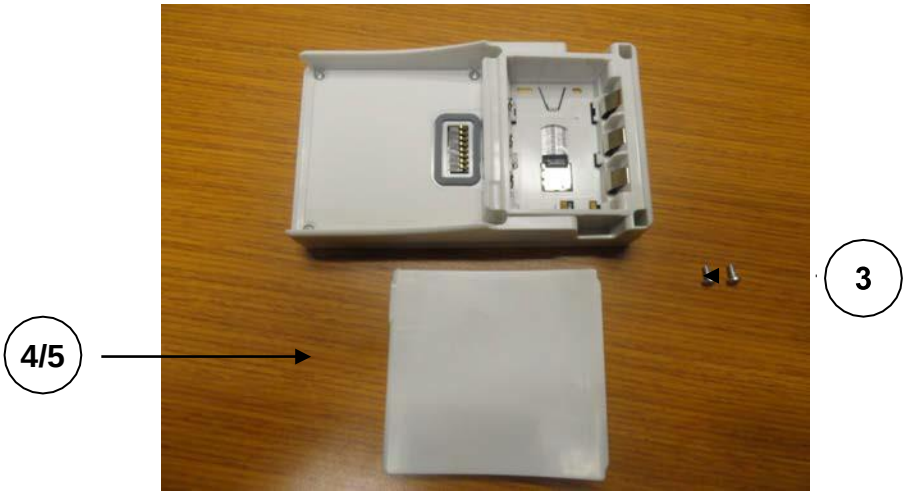
SAM/Housing Removal

3. Remove the Surveyor ECG Acquisition Module (SAM) from the unit by removing the two Phillips head screws (item 3) from the recessed areas indicated below.

   Screws should be installed to2 inch/pounds of torque.

4. Slide the SAM from the device housing as shown below.

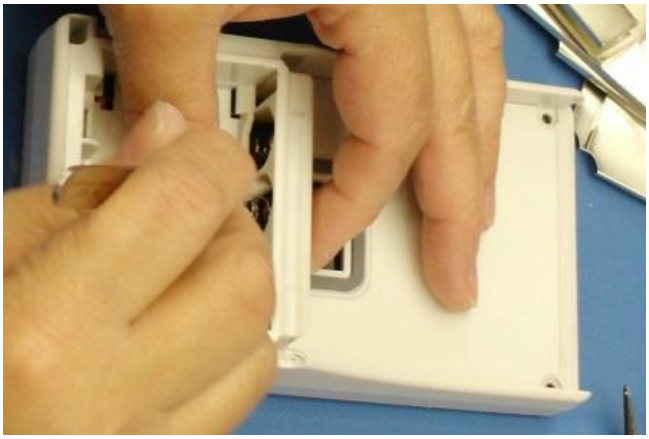
   Older units were manufactured with a 6 mm screw, which was replaced with an M8 screw (item 3) and 2 washers (item 16) each to add 1mm additional screw engagement.



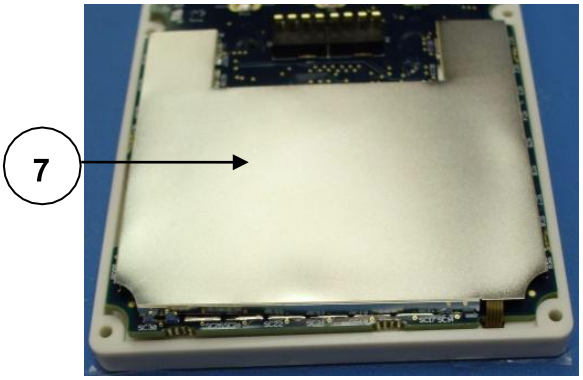
5. Remove the six (6) Torx housing screws (item 6) from the areas indicated below.

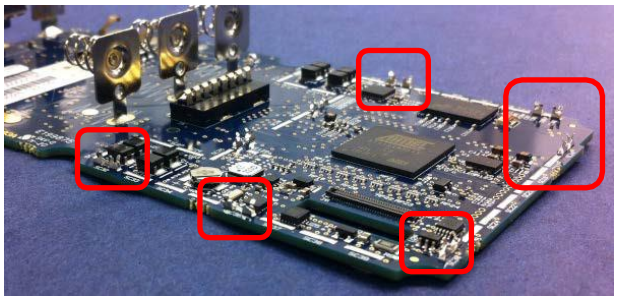
   Screws should be installed to 2 inch/pounds of torque.

6. Using a needle nose pliers or tweezers, carefully guide the battery springs and contacts through the housing openings as shown below.



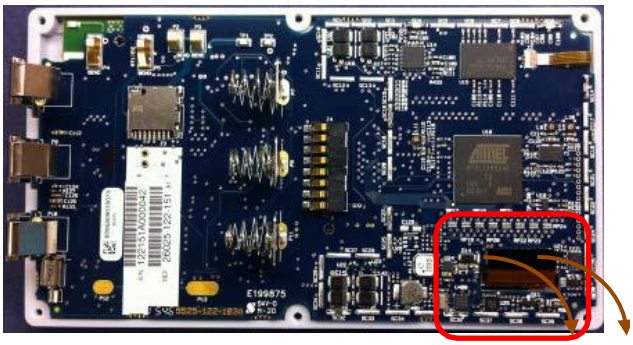
7. Carefully remove the Shield Can (item 7), which is held in place by shield can retention clips mounted to the edge of the PCBA and retain it for reassembly.





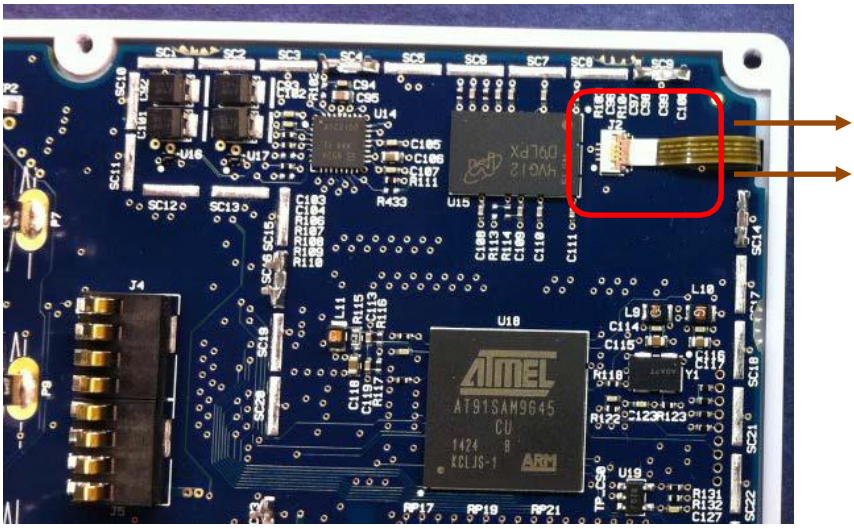
S4 PCBA – Gen 2

8. Remove the wider ribbon cable of LCD assembly by gently moving the latch mechanism in the direction of the arrows with a tweezers.



S4 PCBA – Gen 2

9. Remove the narrow ribbon cable of LCD assembly by gently moving the latch mechanism in the direction of the arrows with a tweezers.

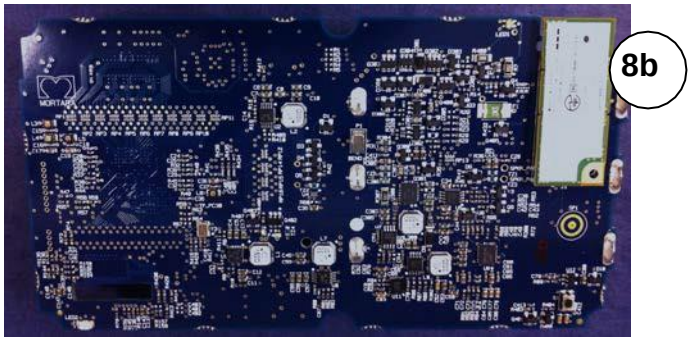


S4 PCBA – Gen 2

PCBA Replacement

10. Remove the printed circuit board assembly (PCBA – item 8) from the display assembly (item 9).

Main PCBA – Gen 2

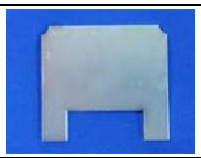
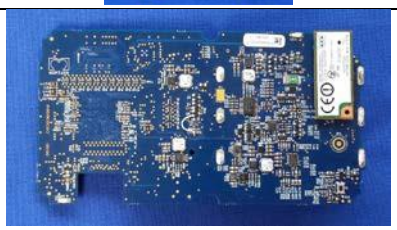


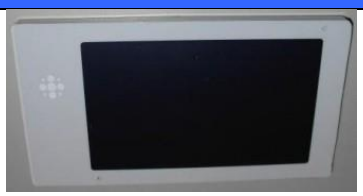
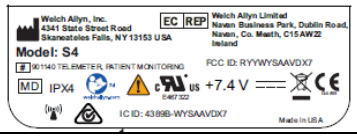
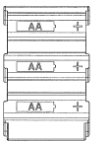
Display Assembly – Gen 2

The items listed in the S4 GEN2 mobile monitor item description listing identify the serviceable level of the device. Subcomponents of assemblies listed are not available as individual service items from Welch Allyn, the assembly level item must be used for servicing purposes.

S4 GEN2 Mobile Monitor Item Description Listing (GEN 2 units can be identified by PN: S4-Q-xxx-xxx)		
Item #	**Part #**	**Description**
1	76190-002-70	S4 BATTERY DOOR WITH INSERT
2	4800-018	BATTERY LI-ION 7.4V 1600mAh
3	774399	SCREW PHIL PANHD M2.5X8MM STL ZN
4b	**SERV 76190-002-51	S4 10-WIRE SAM GEN2 -TESTED
4c	**SERV 76190-002-100	S4 10-WIRE SpO2 SAM GEN2 -TESTED
5b	**SERV 76190-002-61	S4 5-WIRE SAM GEN2 - TESTED
5c	**SERV 76190-002-110	S4 5-WIRE SpO2 SAM GEN2 - TESTED
6	6020-066	SCREW THD-FORM PAN HD TORX K25X1.12X6mm
7	8312-033-01	SHIELD CAN
8b	**SERV 26025-122-151	S4 MAIN PCB GEN 2 – w/RADIO,NO SD CARD
9b	**8364-001-52	LCD + TOUCHPANEL STRENGTHENED S4 GEN 2
10	8364-002-51	HOUSING MAIN + GASKETS
11b	11083-003-51	S4 V1.1.0 uSD MEM CARD ASSY W/ SERV CONF
11c	**11083-004-51	S4 V1.2.0 uSD MEM CARD GEN2 W/ SERV CONF
11d	**11083-005-51	S4 V1.2.1 uSD MEM CARD GEN2 W/ SERV CONF
11e	**11083-006-51	S4 V1.2.2 uSD MEM CARD GEN2 W/ SERV CONF
12	749264	LABEL PRODUCT SURVEYOR S4
13	9042-082-10	LABEL BATTERY SURVEYOR S4
14	9910-025-50	WLAN RADIO MODULE WITH ADHESIVE
15	8364-005-50	TRAY AA BATTERY SURVEYOR S4
16	774769	WASHER M2.5 X .5 MM ZINC PLATED

(**) indicates Part # is not compatible with the S4 **GEN1**

S4 Mobile Monitor Item Identification Table		
Item #	**Part #**	**Picture**
1	76190-002-70	
2	4800-018	
3	774399	
4a 4b 4c	SERV 76190-002-50 SERV 76190-002-51 SERV 76190-002-100	 SERV 76190-002-50
5a 5b 5c	SERV 76190-002-60 SERV 76190-002-61 SERV 76190-002-110	 SERV 76190-002-60
6	6020-066	
7	8312-033-01	
8b	SERV 26025-122-151	 SERV 26025-122-150

S4 Mobile Monitor Item Identification Table		
Item #	**Part #**	**Picture**
9b	8364-001-52	
10	8364-002-51	
11a 11b 11c 11d 11e	11083-002-51 (Pictured) 11083-003-51 11083-004-51 11083-005-51 11083-006-51	 (includes label)
12	749264	
13	9042-082-10	
14	9910-025-50	
15	8364-005-50	 
16	774769	

CONFORMANCE TESTING

Conformance testing is to be performed by Authorized Welch Allyn Service Representatives to verify the device is functioning correctly after repair operations have been performed. Testing results should be documented on the test data record at the end of this section of the manual.

Required Equipment

Functional Testing:

- Lithium-Ion battery
- 3 – AA batteries
- 8364-005-50 AA battery tray (if not installed in unit)
- Touchscreen stylus
- Patient simulator
- ECG and SPO2 Patient cables (type dependent on model of S4)
- Surveyor Central with 4.1x or 4.3x or newer software and WLAN connectivity
- 11010-037-03 Rev xx S4 service utility software
- TF-0620 Lead Fail Test Fixture

IPX Vacuum Leak Testing:

- Vacuum Generator
- TF-0582 S4 battery door seal test fixture
- TF-0583 S4 IPX leak test fixture

Safety Testing:

- DC Hi-Pot Tester
- TF-0579 S4 Hi-Pot test fixture
- TF-0580 S4 Hi-Pot test fixture insert for 3, 4, 5-wire SAM
- TF-0581 S4 Hi-Pot test fixture insert for 10-wire SAM
- TF-0619 S4 Hi-Pot test fixture for 10 wire SAM
- TF-0633 S4 Hi-Pot test fixture insert for 3,5-wire SPO2 SAM
- TF-0634 S4 Hi-Pot test fixture insert for 10- wire SPO2 SAM
- TF-0643 Lead Shorting Test Fixture

Unit Vacuum Leak Test (IPX4 Rating)

Setup and verification of test equipment:

- Turn on vacuum generator.
- Turn off the **Vacuum** switch on TF-0583.
- Turn off the **Batt Door** and **Main Unit** switches on TF-0583.
- Verify the vacuum reads 35.0 +/- 5 in/H_2O on TF-0583 (adjust vacuum generator if necessary).
- Turn on the **Vacuum** switch on TF-0583.
- Verify the gauge on TF-0583 reads 35.0 +/- 5 in/H_2O (adjust if necessary).

Test Process (for Unit Body)

- Connect TF-0582, to the vacuum hose of TF-0583 marked Main Housing.
- Turn on the vacuum generator.
- Turn ON the **Vacuum** switch on TF-0583.
- Connect TF-0582 to the main body of the unit under test.
- Verify the vacuum reading is 35.0 +/- 5 in/H_2O.
- Turn the **Batt Door** switch on TF-0583 to the ON position.
- Turn off the **Vacuum** switch on TF-0583 and then turn off the vacuum generator.
- Verify the time elapsed until the pressure gauge returns to ambient pressure is longer than 1 second.

If the pressure returns to ambient prior to 1 second, the UUT fails the test.

Switch the **Vacuum** switch on to release the vacuum pressure so the Plexiglas cover can be removed.

Test Process (for Battery Door)

- Turn off the **Batt Door** and **Main Unit** switches on TF-0583.
- Turn on the vacuum generator.
- Place the battery door under test onto Part of TF-0583 connected to the **Main Unit** vacuum hose.
- Turn ON the **Vacuum** switch on TF-0583.
- Verify the vacuum reading is 35.0 +/- 5 in/H_2O.
- Turn the **Main Unit** switch on TF-0583 to the ON position.
- Turn off the **Vacuum** switch on TF-0583 and then turn off the vacuum generator .
- Verify the time elapsed until the pressure gauge returns to ambient pressure is longer than 1 second.

If the pressure returns to ambient prior to 1 second, the UUT fails the test.

Functional Testing

Power/LED Testing

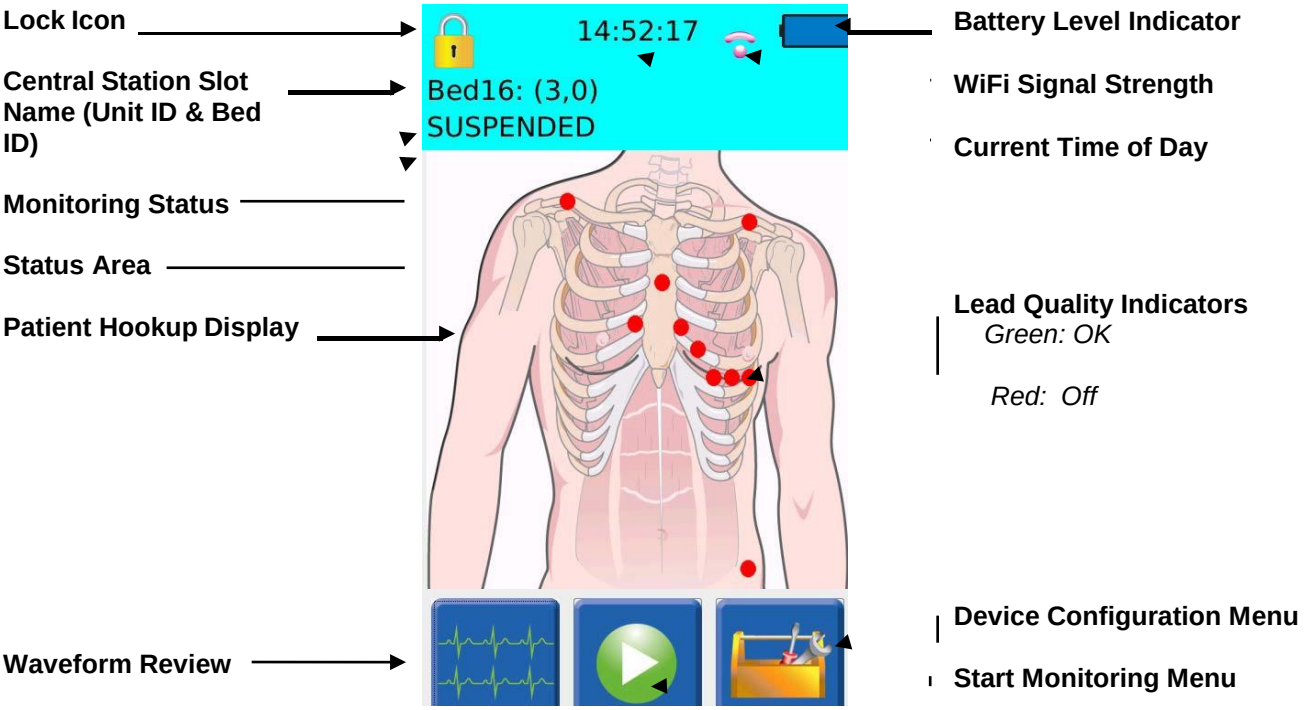
Install a Lithium-Ion battery into the battery compartment and install the battery door. The Gen 2 device will require the Call Button to be pressed to initiate power up. The unit should indicate it is receiving power, by the power LED flashing green and the WiFi LED flashing blue.

The unit should momentarily display the Welch Allyn logo, then power up to the main screen.

Repeat the power up process using the AA battery tray and AA batteries.

Main Screen

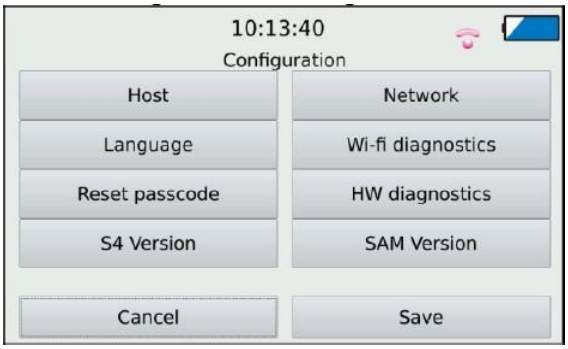
The following diagram depicts the main screen of the S4 with the patient hookup display.

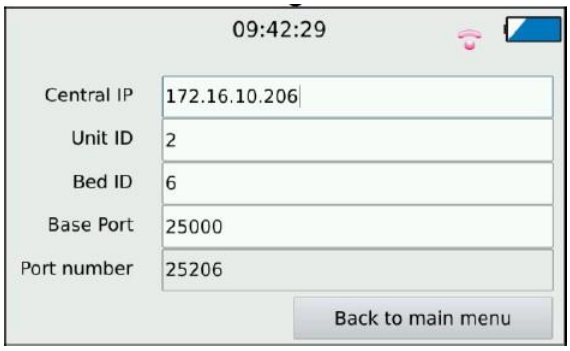


Main Screen with Patient Hookup Display

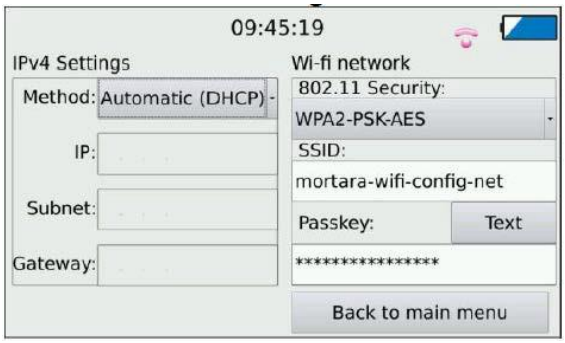
WiFi Connectivity Test

Access the Device Configuration Menu (password 7865) and select the **Host** button. Enter the host IP information, Unit ID, and Bed ID for the Surveyor Central station the S4 will be connecting to, then go back to the main menu.





Press the **Network** button and enter the appropriate method for obtaining an IP address, IP address (if applicable), and security information to connect to the Surveyor Central system. Return to the main menu.



Press the **WiFi Diagnostics** button to test the WiFi connection to the Surveyor Central system. Verify connectivity is established and signal quality information is displayed.

Press the **Ping** button to perform a ping test to the Surveyor Central. Verify successful transmission of data occurs. Return to main menu.

Verify Version Information

Access the Device Configuration Menu (password 7865) and select S4 Version to verify serial number, part number and software version.

If device serial number and part number fields are blank follow instructions for EEPROM write, otherwise skip to display test.

EEPROM Write

On the Surveyor Central System, type Ctrl+Shift+ESC to open Task Manager.
Select **New Task.**
Type **CMD.exe** into the open field and select **OK** to run the command prompt
Type **cd** and type in the file path the 11010-037 S4 Service and Utility Software is located to change the directory to the S4 test software folder
Power on the S4

Access the Device Configuration Menu (password 7865) and access the Wi-fi diagnostics menu to find the S4 IP address
In the cmd prompt type **S4EepromWrite**
When prompted to **Insert S4 IP address/name:** enter the IP address found previously on the S4 device
When prompted to **Insert S4 Serial Number:** enter the device serial number
When prompted to **Insert S4 Part Number:** enter the device part number
Press any key to exit and return to the directory

Display Test (Gen 2 device only)

On the UUT access the Service Test Utility Menu by pressing and holding the Call Button beyond the splash screen, until the green cursor appears. Enter 5687 into the passcode field. Select LCD Test from the menu. Touch screen to cycle through the following LCD test displays:
Solid blue display
Solid green display
Solid red display
Solid white display
Black/white checker display
Blue gradient display
Green gradient display
Red gradient display
White gradient display
During these test displays watch the LCD display and note any missing pixels or unusual coloring.
After the test, device automatically reboots. Press and hold Call Button to return to Service Test Utility Menu to continue onto Gen 2 Touch Screen Calibration.

Touch Screen Calibration (Gen 2 device only)

On the UUT, after accessing the Service Test Utility Menu by pressing and holding the Call Button beyond the splash screen until the green cursor appears, enter 5687 into the passcode field. Select Reset Screen Calibration (device reboots into Calibration screen). Touch each crosshair on the S4 device to set the touch screen calibration. The S4 unit will then boot into the main screen.

Lead Failure Test

Connect the applicable patient cable to the patient input of the SAM, with the other end connected to a lead failure box (TF-0603). Using the lead fail box, open the patient leads one at a time and verify the display indicates an open lead condition for the corresponding lead.

S4 / Surveyor Central ECG Performance Test

Note: When starting a session on Surveyor Central, the Unit ID and Bed ID must match between UUT and Central.

With the S4 connected to a patient simulator and Surveyor Central, verify ECG performance of the UUT. Press the **Play** button on the main screen of the S4 to enter the "Start Monitoring" menu. Press the smaller green **Play** button once displayed on the screen. Select test or default profile, then select green check icon to advance.

Set the patient simulator for a heart rate (HR) of 60 bpm and verify the UUT is reading within tolerance. Press the Waveform Review Icon on the display and verify the ECG data is presented on the UUT display. Verify that the simulator data for this device is also being shown on the Surveyor Central display. Select the traces tab on the Surveyor Central software to view all ECG traces, verifying the ECG waveforms are presented without excessive noise or artifact. Set the simulator for a HR of 300 bpm and verify the UUT is reading within tolerance.

Set the patient simulator for a pace spike at 80 bpm, TV Paced, and verify the spike on the UUT.

S4 / Surveyor Central SPO2 Test (Gen 2 Device Only)

Note: When starting a session on Surveyor Central, the Unit ID and Bed ID must match between UUT and Central.

Verify a normal SPO2 waveform is presented without excessive noise or artifact when clip sensor is placed on the finger.

With the S4 connected to a patient simulator and Surveyor Central, verify SPO2 performance of the UUT. Press the **Play** button on the main screen of the S4 to enter the "Start Monitoring" menu. Press the smaller green **Play** button once displayed on the screen. Select test or default profile, then select green check icon to advance.

Set the patient simulator for a blood oxygen level of 96% setting the SpO2 Type to Phillips and verify the UUT is reading within tolerance. Press the Waveform Review Icon on the display and verify the SPO2 data is presented on the UUT display. Verify that the simulator data for this device is also being shown on the Surveyor Central display. Set the patient simulator for a blood oxygen level of 70% and verify the UUT is reading within tolerance.

Remove finger sensor clip from patient simulator and verify "CHECK SENSOR" message is displayed on UUT.

Remove sensor clip cable from UUT and verify "NO SENSOR" message is displayed on UUT.

Safety Testing

DC Dielectric Withstand – Patient to Enclosure

Test Criteria:

Test Voltage – 5 KVDC
Current Limit – 200 µA Maximum
Ramp time – 3 to 4 seconds
Dwell Time – 1.0 seconds Minimum

WARNING:

Use of an insulated floor mat recommended during high voltage testing.

Recommend the use of only one hand to make and remove electrical connections one at a time throughout the testing process.

Make all test connections before energizing high voltage power source. Turn off the high voltage power source and wait 5 seconds prior to disconnecting test lead wires.

Test Process

- Place the appropriate Test Fixture Insert into Test Fixture (TF-0579) as follows. For Gen 2 device use TF-0633 for the 3,5- wire SAM, or the TF-0634 for the 10-wire SAM.

- Plug the patient cable end on the S4 Hi-Pot Test Fixture (TF-0619 for 10 Lead SAM) or (TF-0612 for 3/4/5 Lead SAM) into the patient input on the UUT, then insert the UUT into TF-0579 and close the fixture.

- Connect the **Red** (positive) test lead of the DC Hi-Pot tester to the terminal on (TF-0619 For 10 Lead SAM) or (TF-0612 For 3/4/5 Lead SAM)

- Connect the **Black** (negative) test lead of the DC Hi-Pot tester to the black terminal of TF-0579.

- Set the DC Hi-Pot tester to 5 KVDC and apply power to the test setup by pressing the **Test** button.
- Verify the current draw remains less than 200uA for a minimum of 1 second. The display of the Hi-Pot tester will display a PASS result is the test limits are met or a FAIL result if test limits are not met.
- Press the **Reset** button on the Hi-Pot Tester,
- If the S4 has the SpO2 option, remove TF-0579 from the black terminal, and connect TF-0643 to the black terminal of the DC Hi-Pot Tester.
- Apply power to the test setup by pressing the **Test** button.
- Turn the DC Hi-Pot tester off, and wait 5 seconds.
- Remove the UUT from the fixture.

  Record a passing test result by checking the box on the test data record. If the test failed, write the reason for failure underneath the safety testing heading on the test data record and do NOT check the box.

Device Cleaning

Clean device per the instructions provided in the Maintenance & Cleaning section of the Service Manual prior to packaging for storage/shipment.

S4 Mobile Monitor Conformance Test Data Record

Unit Serial #:_____Software Version:_____

Unit Part #:_____

Indicate the step was performed successfully by checking the corresponding check box, and recording test result.

☐ IPX4 Vacuum Leak Testing

- ☐ Unit Body Pass/Fail
- ☐ Battery Door Pass/Fail

☐ Verify Power Up / LED Operation

- ☐ Lithium Ion Battery Pass/Fail
- ☐ AA Battery Pass/Fail

☐ Verify WiFi Connectivity Pass/Fail

☐ Verify Version Information

- ☐ Serial number Pass/Fail
- ☐ Part Number Pass/Fail
- ☐ Software Version Pass/Fail

☐ Perform LCD Check Pass/Fail

☐ Perform Touch Screen Calibration Pass/Fail

☐ Perform Lead Failure Test Pass/Fail

☐ Perform S4 / Surveyor Central ECG Performance Test Pass/Fail

- ☐ Verify Waveform Display Quality
- ☐ Verify HR @ 60 bpm +/- 3bpm _____ Pass/Fail
- ☐ Verify HR @ 300 bpm +/- 3bpm _____ Pass/Fail

- ☐ Verify Pace Spike @ 80 bpm Pass/Fail

☐ Perform S4 / Surveyor Central SPO2 Performance Test ☐ N/A

☐ Verify Operation with finger / Waveform Display Quality Pass/Fail

☐ Verify 96% +/- 2% _____ Pass/Fail
☐ Verify 70% +/- 2% _____ Pass/Fail

☐ Verify "CHECK SENSOR" Message with Signal Removed Pass/Fail
☐ Verify "NO SENSOR" Message with Cable Removed Pass/Fail

☐ Perform Safety Testing

☐ Hi-Pot Test Pass/Fail
☐ SpO2 Option Hi-Pot Test Pass/Fail/not Installed

☐ Device Cleaning Completed

Performed by:_____Date:_____/_____/_____

DEVICE SPECIFICATIONS

General

Instrument Type	ECG digital mobile monitor
Dimensions	5.5” x 3.1” x 1.3” (139 x 79 x 33 mm)
Input Channels	Continuous 12-lead signal acquisition and transmission with 10-wire LeadForm cable Continuous 7-lead signal acquisition and transmission with 5-wire cables
ECG Leads Transmitted	10-wire: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5 and V6 5-wire: I, II, III, aVR, aVL, aVF, V 3-wire: I, II or III
Device Classification	Type CF, battery operated
Special Functions	Lead impedance check, ECG display, lead fail, battery notification, multi-purpose call; 10-wire
Defibrillator Protection	Complies with IEC 60601-2-25 (with 10-wire cable) and/or IEC 60601-2-27
Function Keys	Control button; touchscreen menu navigation
Display type	High definition, antiglare Color TFT-LCD with LED backlight and resistive touch panel controls
Display size	4.3 inches (11 cm) diagonal; active area
Display resolution	480 x 800 pixels

Environmental

Temperature	Operating temperature: +10° to +40° C (+50° to +104° F) Storage temperature: -40° to +70° C (-40° to +158° F)
Humidity	Operating humidity: 10% to 95% RH, non-condensing Storage humidity: 10% to 95% RH, non-condensing
Altitude	Operating & Storage: 62 kPa to 106 kPa corresponds to an approx. altitude range of -380 m to 4000 m (-1250 ft to 13000 ft)
Cooling	Passive (no fan)
Weight	300g (10.6 oz) with rechargeable battery pack
IP classification	IPX4 – This device is protected against harmful effects of water splashed from any direction per IEC 60529.

Power Requirements & Battery

Disposable Battery Type	Three (3) AA alkaline batteries
Disposable Battery Life	12 Hours
Rechargeable Battery Type	Rechargeable Lithium-Ion battery pack
Rechargeable Battery Run-Time	20 Hours
Battery Charging Time	8 Hours

ECG Specifications

ECG	12-lead ECG with specific Signal Acquisition Module (SAM10) 7-lead ECG with specific Signal Acquisition Module (SAM 5)
Simultaneous Leads Available	10-wire: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6 5-wire: I, II, III, aVR, aVL, aVF, V 3-wire: I, II, or III
Acquisition Rate:	40,000 samples/s. for pacemaker detection, 500 samples/s. for analysis
Resolution:	.117µV originally, reduced to 2.5 µV for processing and transmission
Dynamic Range	± 350mV
ECG Gain	½x, 1x, 2x
Trace Speed	slow, normal, fast
CMRR:	According to applicable standards (IEC 60601-2-25 and/or IEC 60601-2-27)
Pacemaker Spikes	When used with 4-wire, 5-wire or 10-wire ECG cable detect and report pacemaker spikes up to 2 ms duration with 1 samples precision
Max. Auxiliary Patient Current:	< 10 µA
Frequency Response:	0.05 to 150 Hz
Input Impedance:	>2.5 M Ω at 10 Hz
Electrodes:	Compatible with Ag/AgCl disposable electrodes
HR Report from the Central Station	Less than one second. Heart rate is only available when the S4 is actively communicating with the Central Station.
Minimum QRS Amplitude:	160µV
Recovery from Defibrillation Discharge	Less than 5 seconds, compliant with IEC 60601-2-25 and/or IEC 60601-2-27.

SpO_2 specifications

Technology	Welch Allyn SpO_2
Method	Absorption – Spectrophotometric (dual wavelength) (Functional oxygen saturation of arterial hemoglobin)
Patient populations	Child (greater than 2 through 12 years of age) Adolescent (greater than 12 through 21 years of age) Adult (greater than 21 years of age)
Parameters	% SpO_2 Pulse rate Plethysmograph
Resolution SpO_2: PR:	 1 % SpO_2 1 bpm
Range SpO_2: PR:	 30 – 100 %, calibrated range 70-100% 30 – 240 bpm
Accuracy (RMS) 70% to 100% SpO_2: Less than 70% SpO_2:	 FingerClip type sensor: 2.1% SoftTip type sensor: 1.3% Disposable Wrap type sensor: 3.0% Unspecified
PR:	±3 bpm
Update interval	1 second Numeric values held < 30 seconds
Wavelength * Red: Infrared:	 660 nm, nominal 890 nm, nominal
Optical output power Red: Infrared:	 0.5 mW – 4.5 mW 0.5 mW – 3.0 mW

* This information may be useful for clinicians performing photodynamic therapy.

Wireless Network Specifications

Wireless protocol	802.11 g/n 2.4GHz
Frequency Range	2400.96 MHz to 2482.56 MHz
802.11g supported rates	6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11n supported rates	MCS0 through MCS7 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps
Transmit Power	15 dBm Configure WLAN APs maximum transmitting power to 15 dBm

Channels	1 to 13 supported. Need to configure used channels on devices prior to installation (default is 1, 6, 11) If dynamic channel selection on WLAN infrastructure is enabled, channels change will cause short data gaps. Reduce the number of channel changes per day.
Wireless security protocols	WPA2-PSK-AES WPA2-PSK-TKIP (supported but not recommended) WPA-PSK-AES (supported but not recommended) WPA-PSK-TKIP (supported but not recommended) Passphrase or HEX psk
WMM / QoS	Yes Device uses class AC_VI (Video)
SSID Requirements	Dedicated SSID. Hidden SSID not supported. SSID can be up to 32 ASCII characters long, per 802.11. SSID prioritization and minimum bandwidth configuration on WLAN infrastructure is recommended. Period Session Timeout or similar policies should be disabled or excluded in the SSID dedicated to the S4: these policies might cause data gaps of a few seconds whenever the AP terminates the session. Dedicated Monitoring VLAN is recommended.
IP address assignment	Static or DHCP
IP protocols and ports	UDP: one port per device, according to the system configuration (i.e. 20100, 20101, 20102, etc…). Actual ports will be communicated upon definition of the system configuration; SSH ICMP and mDNS for management and service
Maximum devices per Access Point	16
Data Rate (payload)	Outbound: up to 140 kbps (depending on configuration) Inbound: < 16 kbps
Minimum RSSI / SNR	-75 dB in the coverage area
Minimum SNR	20 dB in the coverage area

TROUBLESHOOTING

Power and Battery

Symptom	Possible Causes	Suggested Resolution
The S4 is not working and display does not light up.	Internal system failure.	Power cycle the S4 with fresh batteries and try again. If problems persist, stop using the S4 and contact Welch Allyn Technical Support.
	Battery Contacts	Remove the battery(s) and inspect the battery contacts to ensure they are making a proper connection.
	Battery will not hold charge.	Replace the battery according to instructions in the General Care & Maintenance chapter.

Display and Touchscreen

Symptom	Possible Causes	Suggested Resolution
The touchscreen is not working properly.	Touchscreen failure.	Power cycle the S4 and try again. If problems persist, stop using the S4 and contact Welch Allyn Technical Support.
The display is not working properly.	Display failure.	Power cycle the S4 and try again. If problems persist, stop using the S4 and contact Welch Allyn Technical Support.

ECG Trace

Symptom	Possible Causes	Suggested Resolution
ECG signal is noisy.	Excessive patient movement.	Confirm electrode site preparation; confirm correct ECG positioning, move electrodes if needed.
	Electrical noise from auxiliary equipment.	Isolate the patient from auxiliary equipment, if possible.
	Bad electrode contact.	Check to make sure electrodes are still securely attached to the patient, and reattach if necessary. Remember the importance of good skin preparation techniques.

Pulse oximetry (SpO_2)

Symptom	Possible causes	Suggested remedies
Signal Quality Indicator is yellow;SpO_2 values continue to be shown.	The physiological signal sensed by the SpO_2 sensor is weak	Check patient status. Consider dark skin pigmentation, low perfusion, venous pulsation, dysfunctional hemoglobins as potential factors. Remove nail polish from sensor site. Confirm the fit of the sensor at the measurement site – not too loose, nor too tight that circulation may be affected in the extremity. Try alternate measurement sites.
Intermittent dropouts of pleth waveform and SpO_2 values	Circulation is being cutoff at the SpO_2 measurement which is distal to a NIBP cuff	Select an alternate measurement site for NIBP or SpO_2.
Inaccurate values	Interfering substances in the patient's bloodstream	Check the patient condition for carboxyhemoglobin, methemoglobin, intravascular dyes, or similar.
	Physiological conditions	Check the patient condition for cardiac arrest, hypotension, shock, severe vasoconstriction, severe anemia, hypothermia, venous pulsations, ventral septal defects, extremes in systemic vascular resistance, or similar.
Cannot obtain SpO_2 reading	The signal sensed by the SpO_2 sensor is so weak that it is not recognized as physiological	Refer the row further above for possible ways to improve signal strength.
	Excessive artifact on the sensor signal makes it impossible to calculate SpO_2	Refer the row below describing "'Artifact' status message".
	No signal is being received from the sensor	Refer to the row further below describing "Pleth waveform is a square wave"
	Electromagnetic interference from external equipment	Do not use the S4 with electrosurgery equipment. Check the immediate area of the S4 for other electronic equipment. Increase the separation distance between them. Consider discontinuing their use if not needed for patient care.

Symptom	Possible causes	Suggested remedies
“Artifact” status message	Excessive patient movement	Advise patient to keep the measurement site still. Select an alternate measurement site less prone to movement.
	External light source produces interference at the sensor	Redirect the external light source away from the measurement site. Cover the sensor site.
	No signal is being received from the sensor	Confirm the sensor has not been damaged. Replace if necessary. Confirm the sensor and/or extension cable being used are one of those recommended in this manual for use with the S4.
Pleth waveform is a square wave	A physiological signal is not being detected by the sensor	Confirm that the sensor is still applied to the patient. Confirm connections of sensor and extension cable to the S4.
	Sensor and/or extension cable is damaged	Replace sensor and/or extension cable

Network Transmission

Symptom	Possible Causes	Suggested Resolution
1. "No ECG Monitoring" alarm. 2. “Trying to connect to Central" error message displayed. 3. X symbol on WiFi signal indicator. 4. Fast blinking blue LED. 5. "AP MAC: Not-Associated" in the WiFi diagnostic screen. 6. Invalid IP address if configured for DHCP. 7. Inability to ping in WiFi diagnostic screen.	Incorrect WLAN configuration (e.g., SSID, Security protocol, Passkey, Passkey type).	Check WiFi network settings; contact your IT Network Administrator to correct issues.
	WLAN infrastructure issues (e.g. device placed on black list).	Check WiFi network settings; contact your IT Network Administrator to correct issues.
1. "No ECG Monitoring" alarm and no traces on the Central Station. 2. “Trying to connect to Central" error message displayed. 3. Normal symbol on WiFi signal indicator. 4. Slow blinking blue LED. 5. Network info correctly populated in WiFi diagnostic screen. 6. Invalid IP address if configured for DHCP. 7. Inability to ping in WiFi diagnostic screen.	Incorrect LAN configuration (Method, IP, Subnet, Gateway).	Check LAN network settings; contact your IT Network Administrator to correct issues.
	LAN infrastructure issues (e.g. DHCP server is not providing an IP address).	Check LAN IPv4 network settings; contact your IT Network Administrator to correct issues.

Symptom	Possible Causes	Suggested Resolution
1. "No ECG Monitoring" alarm and no traces on the Central Station. 2. “Trying to connect to Central" error message displayed. 3. Normal symbol on WiFi signal indicator. 4. Slow blinking blue LED. 5. Network info correctly populated in WiFi diagnostic screen. 6. Valid IP address if configured for DHCP. 7. Ping successful for some IP addresses in WiFi diagnostic screen.	Incorrect Host/Central stations configuration.	Check S4 Host settings and/or Central Station configuration.
	Mismatch between Unit/Bed ID and Base Port configuration on S4 and Central stations.	Check S4 Host settings and/or Central Station configuration.
	Surveyor Central Station is not running.	Check Central Station configuration.
	Security router not correctly configured.	Check Security router configuration and status.
	LAN infrastructure issues (i.e. ports not routed to Security router, disconnected cables).	Check LAN IPv4 network settings; contact your IT Network Administrator to correct issues.
Any of the following: 1. Intermittent traces on Central Station, intermittent "No ECG Monitoring" alarm. 2. Intermittent "Trying to connect to Central" error in top bar. 3. X or low signal symbol on WiFi signal indicator. 4. Intermittent fast blinking blue LED. 5. Intermittent "AP MAC: Not-Associated" in WiFi diagnostic screen, low signal, high noise, low quality indexes. 6. Intermittent Valid IP address if configured for DHCP. 7. Inconsistent Ping results in WiFi diagnostic screen.	Poor WLAN network coverage.	Check IT Network Administrator to correct issues.

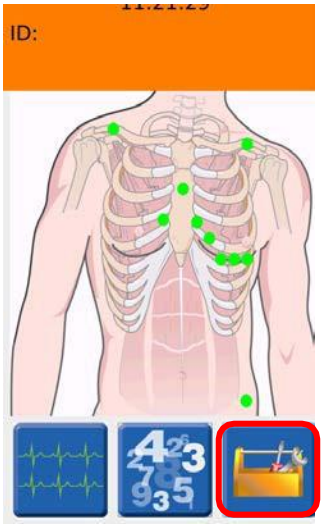
Error Messages

Message	Possible Causes	Suggested Resolution
Trying to connect to Central...	Not able to connect to the Surveyor Central Station.	Check network settings and access of WiFi network. Also refer to the Network Transmission items above.
The configured slot is already used by another device.	Selected slot for the Surveyor Central Station is currently in use.	Select a different slot for this monitor.
Unlock failed.	Incorrect passcode used.	Enter the correct passcode.
Enter New Passcode.	Mismatch of passcodes entered.	Ensure that the configuration passcode entered as well as the confirmation passcode values match.
ECG Frontend calibration failed, restart the device. If the problem persists contact service.	Calibration of the ECG frontend failed.	Power the system on and off. Contact Welch Allyn if the problem persists.
Unable to open ECG Frontend, restart the device. If the problem persists contact service.	Interface to the ECG frontend failed.	Power the system on and off. Contact Welch Allyn if the problem persists.

WiFi Diagnostics

The WiFi Diagnostics screen is for assessing the network interface including confirming network settings, determining signal strength and using a PING tool to test the connection to the Central Station. The IP address of the Central Station defined in the host settings is automatically populated. Another address may be manually entered to test alternative IP address as necessary.

To access the WiFi diagnostic screen, press the toolkit icon from the main screen, then press the gears icon.



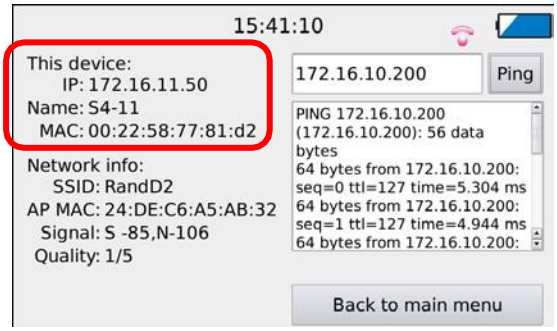
The following pass code screen will appear to limit access to certain device functions.

The S4 is factory shipped with passcode 7865. Refer to your facility's administrator for additional information.

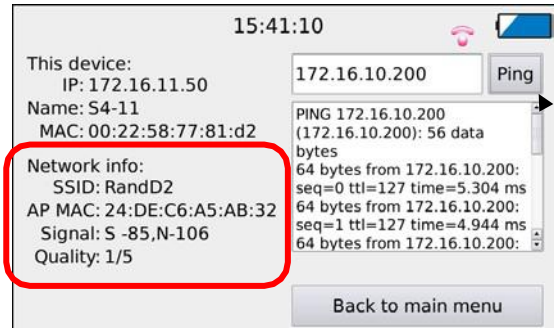
Pass code Entry Screen

Once the pass code is correctly entered, the following configuration menu appears, select the WiFi diagnostics option.

The WiFi diagnostic screen provides information regarding the IP address, device name, and the MAC address of the S4 monitor.



The diagnostic screen also provides information regarding the SSID of the network it is configured to connect to, the MAC address of the access point it is currently connected to, the signal strength (S), the noise floor (N), and the overall quality of the connection to the access point (number of bars).



The diagnostic screen is also equipped with a PING tool to test the connection to the Central Station. The IP address of the Central Station defined in the host settings is automatically populated. Another address may be manually entered to test alternative IP address as necessary.