

Quick Start Guide

Model 3920 System Manual



Thunder Scientific Corporation

Model 3920 Low Humidity Generation System

Document #SG3920 - Edition 2.3

Quick Start Guide

IMPORTANT NOTICE

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For:

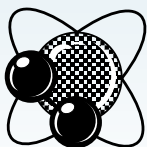
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IMPORTANT CONTROLOG PASSWORD INFORMATION

User: 3920

Manager: 3920.1

Administrator: Contact Thunder Scientific Technical Support
(1-800-872-7728 or support@thunderscientific.com)



Humidity Generation and Calibration Equipment
THUNDER SCIENTIFIC[®]
CORPORATION The Humidity Source

Thunder Scientific Corporation
623 Wyoming Blvd SE
Albuquerque, NM 87123-3198
U. S. A.



Model 3920

www.thunderscientific.com

3920 Item Check List

1. Certificate of Calibration Traceable to (SI) (On System)

2. 3920 Quick Start Guide

3. HumiCalc® with Uncertainty Software Download

4. T10 Torx Driver

5. 1/4" WVCR x 1/4" Tube Fittings

6. 1/4" WVCR x 1/8" Tube Fitting

7. Stainless Steel 1/4" VCR Face Seal Gaskets

8. Moxa USB Serial Converter

9. Power Cable

10. Stylus Pen

11. Display Cleaning Cloth

12. 1/4" 30 Micron Muffler

13. 5/32" Ball Driver Tool

14. Methanol Funnel Assy

15. Pure Water Funnel Assy

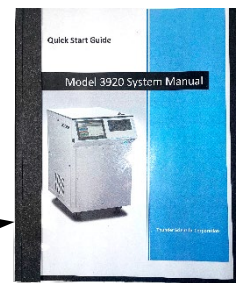
16. T2 Test Pressure Transducer Assy

17. T2 Test Pressure Cable Assy

18. RTD2 Test Temperature Probe & Cable Assy

19. Temp Probe Removal Tool

20. 1/4" Swagelok Nut & Ferrules



Suomi

Tämä tuote noudattaa WEEE-direktiivin (2002/96/EY) merkintävaatimuksia. Kiinnitetty etiketti osoittaa, että tätä sähkö-/elektroniikkalaitetta ei saa hävittää kotitalousjätteissä.

Tuoteluokka: Viitaten WEEE-direktiivin liitteessä I mainittuihin laitteisiin, tämä tuote on luokiteltu luokan 9 "Tarkkailu- ja ohjauslaitteet" -tuotteeksi.



Ei saa heittää kotitalousjätteiden mukana!

Palauta tarpeettomat tuotteet ottamalla yhteyttä valmistajan websivustoon, joka mainitaan tuotteessa tai paikalliseen myyntitoimistoon tai jakelijaan.

Dansk

Dette produkt er i overensstemmelse med kravene om afmærkning i WEEE-direktivet (2002/96/EC). Det påhæftede mærkat angiver, at du ikke må bortskaffe dette elektriske/elektroniske produkt via husholdningsaffald.

Produktkategori: Med reference til kravene i WEEE-direktivets bilag I klassificeres dette produkt som et produkt til "overvågning og kontrolinstrumentering" i kategori 9.



MÅ ikke bortskaffes via husholdningsaffald!

Hvis du vil returnere uønskede produkter, skal du besøge producentens websted, som vises på produktet, eller den lokale forhandler eller distributør.

English

This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product.



Do not dispose in domestic household waste!

To return unwanted products, contact the manufacturer's web site shown on the product or your local sales office or distributor.

Français

Ce produit est conforme aux normes de marquage de la directive DEEE (2002/96/CE). La présence de cette étiquette indique que cet appareil électrique/électronique ne doit pas être mis au rebut avec les déchets ménagers.

Catégorie de DEEE : Cet appareil est classé comme catégorie 9 parmi les « instruments de surveillance et de contrôle » en référence aux types d'équipements mentionnés dans l'Annexe I de la directive DEEE.



Ne pas éliminer avec les autres déchets ménagers !

Pour renvoyer les produits indésirables, contacter le site Web du fabricant mentionné sur le produit, ou son distributeur ou bureau de ventes local.

Español

Este producto cumple la Directiva WEEE (2002/96/EC) sobre requisitos de las marcas. La etiqueta que lleva pegada indica que no debe desechar este producto eléctrico o electrónico con los residuos domésticos.

Categoría del producto: con referencia a los tipos de equipo del anexo I de la Directiva WEEE, este producto está clasificado como categoría 9 de "Instrumentación de supervisión y control".



¡No lo deseche con los residuos domésticos!

Para devolver productos que no desee, póngase en contacto con el sitio Web del fabricante mostrado en el producto, o con la oficina de ventas o distribuidor local.

PN 2566073, 1/2006

Deutsch

Dieses Produkt stimmt mit den Kennzeichnungsanforderungen der WEEE-Richtlinie (2002/96/EC) überein. Das angebrachte Etikett weist darauf hin, dass dieses elektrische/elektronische Produkt nicht in Hausmüll entsorgt werden darf.

Produktkategorie: In Bezug auf die Gerätetypen in Anhang I der WEEE-Richtlinie ist dieses Produkt als Kategorie 9 "Überwachungs- und Kontrollinstrument" klassifiziert.



Nicht in Hausmüll entsorgen!

Zur Rückgabe von unerwünschten Produkten die auf dem Produkt angegebene Website des Herstellers oder die zuständige Verkaufsstelle bzw. den zuständigen Fachhändler konsultieren.

Italiano

Questo prodotto risponde ai requisiti sull'etichettatura stabiliti nella Direttiva RAEE (2002/96/CE). Il simbolo apposto indica che non si deve gettare questo prodotto elettrico o elettronico in un contenitore per rifiuti domestici.

Categoria del prodotto: con riferimento ai tipi di apparecchiature elencate nell'Allegato 1 della Direttiva RAEE, questo prodotto rientra nella categoria 9 "Strumenti di monitoraggio e di controllo".



Non gettare in un contenitore per rifiuti domestici.

Per restituire prodotti non desiderati, visitare il sito Web del produttore riportato sul prodotto o rivolgersi al distributore o all'ufficio vendite locale.

Português

Este produto está em conformidade com as exigências de rotulagem da Directiva WEEE (2002/96/EC). O rótulo afixado indica que o utilizador não deve deitar este produto eléctrico/electrónico fora juntamente com o lixo doméstico.

Categoria do produto: No que se refere aos tipos de equipamento listados no Anexo I da Directiva WEEE, este produto está classificado como produto da categoria 9, "Instrumentação de monitorização e controlo".



Não deite fora juntamente com o lixo doméstico!

Para devolver produtos indesejados, contacte o fabricante através do Website constante do produto ou contacte o seu representante de vendas ou distribuidor local.

Nederlands

Dit product voldoet aan de merktekenvereisten van de AEEA-richtlijn (2002/96/EG). Het aangebrachte merkteken duidt erop dat dit elektrische/elektronische product niet met het huishoudelijk afval mag worden afgevoerd.

Productcategorie: Met betrekking tot de apparatuurcategorieën van bijlage I van de AEEA-richtlijn, valt dit product onder categorie 9 'meet- en controle-instrumenten'.



Niet afvoeren met huishoudelijk afval!

Om ongewenste producten te retourneren, neemt u contact op met de website van de fabrikant die op het product staat vermeld, of met uw plaatselijke verkoopkantoor of distributeur.

Svenska

Denna produkt uppfyller märkningskraven enligt WEEE Directive (2002/96/EC). Märkningsetiketten anger att du inte får kassera denna elektriska/elektroniska produkt tillsammans med vanliga hushållssopor.

Produktkategori: Med hänvisning till utrustningstyperna i WEEE Directive Annex I, är denna produkt klassad som kategori 9 "Monitoring and Control Instrumentation" (Instrument för övervakning och styrning).



Får ej kasseras tillsammans med vanliga hushållssopor!

Returnera ej önskvärda produkter genom att gå till tillverkarens webbplats, vilken anges på produkten, eller till det lokala försäljningskontoret eller distributören.

Norsk

Dette produktet oppfyller bestemmelsene ifølge WEEE-direktiv (2002/96/EC) med krav til merking. Påsatt merke viser at det ikke er tillatt å kassere dette elektriske/elektroniske produktet sammen med husholdningsavfall.

Produktkategori: På grunnlag av utstyrstypene i WEEE-direktivet, vedlegg I, er dette produktet klassifisert i kategori 9, "Instrumentering for overvåking og kontroll".



Må ikke kastes sammen med husholdningsavfall!

Ved behov for returforsendelse av uønskede produkter må du gå til produsentens nettside som er angitt på produktet, eller du må kontakte det lokale salgskontoret eller den lokale forhandleren.

Quick Start Guide

For full version of this manual click on the Help Menu located on the upper right corner of the screen

Or go to www.thunderscientific.com/reference_manuals

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Reference Drawings 19D3920901-1, 2, 3 & 4 + 19D3920920-1

2 GETTING STARTED

This section will provide the user with information about the Model 3920 low humidity generator, where to obtain technical support, software license agreement, specifications, uncertainty, facility requirements and installation. The following sections will provide further details on how to use and operate the Model 3920 generator using the ControLog® software.

2.1 ABOUT

The Thunder Scientific Model 3920 Low Humidity Generation System is a self-contained system capable of producing atmospheres of known humidity using the fundamental, NIST proven, "two-pressure" principle. This system is capable of continuously supplying frost point, dew point, parts per million, relative humidity and other calculated values for instrument calibration and evaluation as well as for precision environmental testing. This system will automatically generate manually entered humidity values as well as user created multipoint profiles. Visual indications of system status are displayed in real time on the computer monitor.

The Model 3920 low humidity generator encompasses a high-performance Data Acquisition chassis along with a Human Machine Interface (HMI) computer running ControLog. ControLog is a software application that fully automates the operation of the Model 3920 humidity generator and allows various device connections through several different interfaces. Data from the generator and connected device or devices is automatically retrieved and stored for viewing in either numerical or graphical format in real time or post process. Data can be transferred off the system via a USB drive for further viewing, post processing and printing. The ControLog software also provides the primary interface to the operator via the multi-point touch display and keyboard.

Key features of the ControLog® software are:

- ControLog stores data into individual data sheets (tab). Each data sheet contains a spreadsheet type view that consists of a date/time stamp and the measured data items corresponding to that date/time stamp. Data sheets consist of three similar but different types: Device Data, File Data and Data Summary. Each type has the same spreadsheet type view and operation, but all three have different data sources.
- Graphing is a powerful tool used to view previously recorded data or to monitor the current data in real-time. The graph works hand in hand with the data sheets. While the generator is in operation, data sheets store the most recent data points from the generator and or connected devices at the desired interval. A graph can be used to create a visual picture of this stored data.
- The Auto Profiling feature is very similar to the Generate mode with the main exception that profiling relies on a predefined list of setpoints referred to as a profile. The user configurable profile is used as ControLog's road map during Auto Profile operation. It defines which setpoint values to go to, at what rate to go from one setpoint to another, and how long to stay at a specific setpoint before moving to the next setpoint.
- ControLog supports a customizable interface that works with most devices. ControLog will allow the user to create a new device connection using the "Connection Wizard" or open previously saved connections. The wizard will open a separate dialog window containing various steps that will guide the user in defining the communication required to receive the desired data items from the device. The user can create as many (up to 60) or as few data items as they see fit for any one

device. Each data item can be uniquely named and once connected will be recorded in its own data sheet. ControLog also allows the user to save these interfaces for future use. The “Connection Wizard” allows the user to step through the connection configuration. Using the “Next” and “Back” buttons the user is allowed to progress through the connection configuration steps. At any time, the user may cancel the new connection or opening of a connection by selecting the “Cancel” button. Once the last step has been completed the “Finish” button will be available to complete the new connection.

2.2 NOTICE

The specifications listed and the information contained in this document is subject to change without notice. Screen shots shown in this document may differ slightly from the actual product and are given to show functionality of the examples, procedures and program. Thunder Scientific Corporation makes no warranties, either express or implied, regarding the examples, procedures and program, or the fitness of these examples, procedures or program for a particular purpose. The examples, procedures and program are made available solely on an "as is" basis and the entire risk as to their quality and performance rests with the user. Thunder Scientific Corporation shall not be liable for any incidental or consequential damages in connection with or arising out of the furnishing, use, or performance of the examples, procedures or program.

2.3 SAFETY INFORMATION

Important safety guidelines need to be observed when operating this equipment. Precautions are highly advisable so that no personal injury will occur during the operation and maintenance of the system. Observation of local and national regulations must be adhered to regarding safety standards.

FCC Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Symbols

The symbols used in the manuals and on the Product are shown below in table 1-1.

Warning indicates a potential hazard may exist and the user should be extremely careful.

Caution! identifies a condition or action that may cause damage to the system or the user.

Symbol	Description
	This symbol is shown from the WEEE directive and indicates do not dispose of this product in any municipal waste area.
	This symbol means Caution and should be observed or important information.
	This symbol indicates a potential shock hazard may exist.
	This symbol means Earth Ground.
	This symbol denotes Heat or Hot Surface, or Gases.
	Symbol means flammable material avoid igniting or open flame or spark.
	This symbol signifies Carefully read all instructions.
	See FCC, Federal Communications Commission Statement above.

Table 1-1

 Warning!

To prevent possible electrical shock, fire, or personal injury:

- Carefully read all instructions.
- Read all safety information before using the Product.
- Read the safety data sheet (SDS) supplied with the purchased methanol and take necessary precautions.
- Use this Product indoors only.
- Do not put the Product where access to the mains power cord is blocked.
- Replace the power cord if the insulation is damaged or if the insulation shows signs of wear.
- Do not use an extension cord or adapter plug.
- Do not alter the Product. Use only as specified, or the protection supplied by the Product can be compromised.
- Do not use the Product if it is altered or damaged.
- Do not use the Product around explosive gas, vapor, or in damp or wet environments.
- Make sure the ground conductor in the power cord is connected to a protective earth ground. Disruption of the protective earth could put voltage on the chassis that could cause death.
- Make sure that the space around the Product meets minimum requirements.
- Use only specified replacement parts.
- Have an approved technician repair the Product.

- Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.

Safety Warning: High Pressure

- High pressure gases are potentially hazardous. Energy stored in these gases can be released suddenly and with extreme force. Proper safety precautions must be taken when applying any pressure to the Product. Before applying pressure to the Product, ensure that all pneumatic connections are properly secured and tightened. Make sure all pressure settings are set to the proper specifications before operation, testing, calibration or maintenance is performed.
- POSSIBLE INJURY! The tubing, valves, and other apparatus attached to the Product must be adequate for the maximum pressure which will be applied, otherwise physical injury to the operator or bystanders is possible.
- USE THE PROPER PRESSURE MEDIUM! Use only clean, dry, gaseous nitrogen or CO2 free air unless otherwise specified by Thunder Scientific.

Safety Warning: Methanol

Read the safety data sheet (SDS) supplied with the purchased methanol and take necessary precautions.

  **DANGER: Highly flammable liquid and vapor. Causes damage to organs.**

Prevention:

- Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- Keep container tightly closed.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ ventilating/ lighting/ equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Do not breathe dust/ fume/ gas/ mist/ vapor/ spray.
- Wash skin thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

- IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- IF exposed: Call a POISON CENTER or doctor/ physician.
- In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:

- Store in a well-ventilated place. Keep cool.
- Store locked up.

Disposal:

- Dispose of contents/ container to an approved waste disposal plant.

** *Safety Warning: This Product contains 16 oz. of R-513a refrigerant and 10 oz. of R-23 refrigerant***

R-23 EMERGENCY OVERVIEW: Colorless, volatile liquid with ethereal and faint sweetish odor. Non-flammable material. Overexposure may cause dizziness and loss of concentration. At higher levels, CNS depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (>250°C), decomposition products may include Hydrofluoric Acid (HF) and carbonyl halides.

** R-23 POTENTIAL HEALTH HAZARDS**

- **SKIN:** Irritation would result from a defatting action on tissue. Liquid contact could cause frostbite.
- **EYES:** Liquid contact can cause severe irritation and frostbite. Mist may irritate.
- **INHALATION:** R-23 is low in acute toxicity in animals. When oxygen levels in air are reduced to 12-14% by displacement, symptoms of asphyxiation, loss of coordination, increased pulse rate and deeper respiration will occur. At high levels, cardiac arrhythmia may occur.
- **INGESTION:** Ingestion is unlikely because of the low boiling point of the material. Should it occur, discomfort in the gastrointestinal tract from rapid evaporation of the material and consequent evolution of gas would result. Some effects of inhalation and skin exposure would be expected.

R-513A EMERGENCY OVERVIEW: Colorless, liquefied gas under pressure with a slight, faint ether-like odor. Nonflammable material under ambient conditions. Overexposure may cause dizziness, weakness, nausea, and loss of concentration. At higher exposure levels, central nervous system (CNS) depression and cardiac arrhythmia (abnormal heart rhythm) may occur and can prove suddenly fatal. In confined spaces, vapors are heavier than air, displace oxygen, and can cause rapid asphyxiation. At elevated temperatures (greater than 170 °C–250 °C), thermal decomposition will occur, resulting in the production of toxic and corrosive gases, including Hydrofluoric Acid (HF), carbon oxides, and carbonyl halides.

** R-513a POTENTIAL HEALTH HAZARDS**

- **SKIN:** Contact with liquid splashes or spray can cause severe freeze burns (frostbite). Repeated exposure may cause skin irritation from defatting action on tissue.
- **EYES:** Liquid contact or concentrated spray can cause severe irritation, corneal damage, and freeze burns (frostbite). Mist or high vapor concentrations may cause mild irritation.
- **INHALATION:** R-513A is low in acute toxicity. However, when oxygen levels in the air are reduced by displacement, symptoms of asphyxiation, loss of coordination, increased pulse rate, and deeper respiration will occur. Exposure to high atmospheric concentrations can cause anesthetic effects or myocardial sensitization, potentially leading to cardiac arrhythmia.
- **INGESTION:** Ingestion is highly unlikely due to the low boiling point of the material (rapidly converts to gas at ambient temperatures). Should it occur, liquid ingestion will cause severe freeze burns to the lips, mouth, and gastrointestinal tract, alongside rapid gas evolution and subsequent discomfort.

2.3.1 Personal Protective Equipment (PPE)

Safety glasses must be worn when performing maintenance, repairs or calibration when system panels have been removed. The following PPE is required when filling or draining the methanol heat transfer fluid.

- **Gloves:** Butyl rubber or Viton are recommended. **Note:** Nitrile gloves may only provide splash protection and can be permeated in less than a minute depending on thickness.
- **Eye Protection:** Tight-sealing safety goggles are required; a face shield is recommended.
- **Skin/Body Protection:** Chemical-resistant clothing or equivalent lab coat.

2.3.2 Methanol

Temperature conditioning of the 3920's saturator employs a fluid circulation system in conjunction with a cascade refrigeration system. Methyl alcohol (methanol) is used as the heat transfer fluid because of its low freezing point (-97.6 °C). Extreme caution is required due to the flammability and poisonous nature of methanol.



Warning!

USE CAUTION WHEN HANDLING METHANOL.
METHANOL IS FLAMMABLE AND POISONOUS
KEEP AWAY FROM SPARKS, FLAMES, OR OTHER IGNITION
SOURCES. AVOID PROLONGED OR REPEATED BREATHING OF
VAPORS OR CONTACT WITH SKIN. **SEE SECTION 2.3 FOR
IMPORTANT SAFETY INFORMATION.**



Warning: Methanol system is vented to atmosphere via overflow line. Refer to drawing:
19D3920901 Sheet 4



Warning: Using unapproved heat transfer fluid can cause fluid circulation issues and result in inaccurate humidity output due to thermal gradients forming within the saturator. Contact Thunder Scientific for more information.

2.4 TECHNICAL SUPPORT

If the user requires assistance with any aspect of the 3920 Humidity Generating System or the ControLog application, technical support can be obtained by contacting Thunder Scientific Corporation by any of the following means:

Web: www.ThunderScientific.com

Email: support@thunderscientific.com

Tel : 1-505-265-8701

FAX : 1-505-266-6203

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Should you have any questions concerning this Agreement, or if you desire to contact TSC for any reason, please write:
Thunder Scientific Corporation, 623 Wyoming NE, Albuquerque, NM 87123

2.6 WARRANTY

Thunder Scientific Corporation (TSC) warrants, to the Buyer, the Product manufactured by TSC to be free of defects in material and workmanship under normal use and service and to be free from inadequate mechanical design when operated within the specified design limitations for a period of one year from date of acceptance. TSC's obligation under this warranty shall be limited to the following: The Product is returned to TSC with transportation charges prepaid and that TSC's examination reveals the Product to be defective. TSC, at its option, shall either refund to the Buyer the purchase price of the product or repair or replace at TSC's plant, any part or parts of the Product which is or are defective. This warranty shall not apply to any Product which has been maintained, handled, stored, repaired or altered in any manner, or by anyone other than an authorized TSC representative, so as to affect adversely such Product or which has been subject to improper installation, misuse, negligence, accident or corrosion. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED, AND ALL OTHER LIABILITIES AND OBLIGATIONS ON THE PART OF TSC; TSC SHALL NOT BE LIABLE FOR ANY OTHER CLAIMS OR DAMAGES, EITHER DIRECT OR CONSEQUENTIAL, ARISING DIRECTLY OR INDIRECTLY OUT OF SUPPLYING THE PRODUCT. All warranties, express or implied, with respect to any device or component not manufactured by TSC but incorporated into its Product are the responsibility of the original manufacturer and shall not affect or apply to TSC.

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Albuquerque, New Mexico 87123, USA

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2.8 TRADEMARKS

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2.9 SPECIFICATIONS¹

Frost Point Temperature Range:	-95 to 0.01 °C
Dew Point Temperature Range:	-50 to 10 °C
Parts Per Million Range:	0.04 to 12300 PPMv
Relative Humidity Range:	0.00003% to ~50%
Temperature Specification:	0.027 °C
Saturation Temperature Range: ²	-80 to 12 °C
Saturation Temperature Control Stability: ³	0.008 °C
Saturation Temperature Cooling Rate: from 12 to -80 °C	0.33 °C per Minute (average)
Saturation Temperature Heating Rate: from -80 to 12 °C	0.33 °C per Minute (average)
Test Temperature Range (measured):	0 to 50 °C
Saturation Pressure Range:	~Ambient to 250 psiA
Saturation Pressure Specification:	0.02% of full scale
Test Pressure Range (measured):	Ambient to 50 psiA
Test Pressure Specification:	0.02% of full scale
Gas Type:	Gaseous Nitrogen or CO ₂ free Air
Supply Pressure Range:	80 to 250 psiG
Supply Pressure Specification:	±1.25 psiG
Gas Flow Rate Range:	0.5 to 10 SLPM
Gas Flow Rate Resolution:	0.2 SLPM
Gas Flow Rate Specification:	2% of full scale
Display Resolution:	0.001
Refrigeration:	1/3 HP R-513A & 1/3 HP R-23 in cascade
Heating:	Stainless Steel Immersion
Test Port:	1/4 Inch Swagelok VCR®
Gas Inlet:	1/4 Inch Swagelok VCR®
Maximum Load	100 Lbs. (45.3 Kg) Equally Distributed On Countertop
Physical Dimensions:	38" H x 23" W x 35" D (965.2 mm x 584.2 mm x 889 mm)
Generator Weight (Net):	400 Lbs. (181.4 Kg)

2.9.1 I/O Ports

USB Ports:	2 x USB 3.0
Serial Port:	1 x RS-232 COM

¹ Test pressure at 1 atmosphere.

² Using anhydrous methanol as the temperature heat transfer fluid from -80 to 12 °C.

³ Temperature Control Stability is defined as the standard deviation over a 10-minute period, as measured by the saturation temperature control sensor after being at point for 60 minutes.

2.10 UNCERTAINTY^{4 5 6}

Dew Point Uncertainty: -50 °C to 10 °C 0.01% |R| + 0.07 °C

*Example: If the dew Point reading is 10 °C. The uncertainty would then be: 0.01% *10 + 0.07 °C = 0.071*

Frost Point Uncertainty: >= -90 °C 0.05% |R| + 0.07 °C

*Example: If the frost Point reading is -60 °C, the uncertainty would then be: 0.05% *60 + 0.07 °C = 0.1*

Frost Point Uncertainty: < -90 °C 1.7% |R| - 1.415 °C

*Example: If the frost Point reading is -95 °C, the uncertainty would then be: 1.7% *95 - 1.415 °C = 0.2*

Temperature Uncertainty: 0 to 50 °C⁷ 0.031 °C

2.11 FACILITY REQUIREMENTS

2.11.1 Environment

Operating Temperature: 15 to 30 °C

Storage Temperature: 5 to 50 °C

Humidity: 5 to 90% RH Non-condensing

Pollution Degree: PD2

Maximum Operating Altitude: 7600 feet

2.11.2 Floor Space

A floor, capable of supporting approximately 500 pounds, with a minimum space of 40" (1.0m) deep x 35" (0.89m) wide.

Refer to drawings: [19D3920901-2](#), [19D3920901-3](#), [19D3920901-4](#), [19D3920901-5](#)

2.11.3 Power

Electrical Power: 220 V~ (±10 %), 10 A, 1 φ, 50 Hz or 60 Hz

Overvoltage: CAT II

2.11.4 Gas Supply

Semiconductor, 6.0 grade gaseous nitrogen or CO₂ free air is recommended. Gas supply must be filtered to a particle size of 0.5 microns or less.

Gas Supply Minimum Inlet Pressure: 80 psiG @ 10 L/min

Gas Supply Maximum Inlet Pressure: 250 psiG @ 10 L/min

⁴ Test pressure at 1 atmosphere

⁵ Uncertainty values represent an expanded uncertainty using a coverage factor, k=2, at an approximate level of confidence of 95%.

⁶ Uncertainty is based on the specifications from the 3920 uncertainty analysis

⁷ Includes saturation temperature and test temperature.

2.11.4.1 Pressure

The input gas supply should be regulated between 260 psiG and 250 psiG at 10 L/min. A regulated input supply pressure lower than 250 psiG is acceptable but may limit the lowest humidity obtainable from the generator and will require an internal pressure regulator (REG) adjustment.

Refer to section [2.12.4 Setting Supply Pressure Regulator](#) for more information on adjusting the internal pressure regulator (REG).

2.11.4.2 Dryness

The input gas supply should be dry (0.5 PPMv or less) with an ambient pressure frost point of -80 °C or less. Input supply gas wetter than -80 °C frost point is acceptable but will limit the lowest humidity obtainable from the generator. The supply gas is used to purge the outlet of the saturator and is used at the inlet of the saturator, so any gas wetter than the saturation temperature will cause condensation (icing) at the saturator inlet and outlet. If the measured ambient pressure frost point of the gas supply is wetter, for example -70°C, then the user must enter this value into the system for the 3920 to operate optimally.

Refer to section [2.13.7 Supply Gas Frost Point](#) for more information on entering the supply gas dryness.

2.11.5 Pure Water Supply

The 3920 requires pure water suitable for High-Performance Liquid Chromatography (HPLC) and Spectrophotometry such as Honeywell Burdick & Jackson® Water (MFR #365-4). The generator has a pure water capacity of 300 cc when completely full.

Refer to section [5.4 Saturator Filling](#) for detailed instruction on how to add pure water.

2.11.6 Methanol

1.5 gallons (5.675 Liters) of anhydrous methanol such as Honeywell Burdick & Jackson® Methanol (MFR #AH230-4) is used as the heat transfer fluid due to its low viscosity at the minimum saturator temperature of -80 °C. Extreme caution in handling is required due to the flammability and poisonous nature of methanol.

Refer to section [2.12.3.2 Methanol Filling Procedure](#) for more information on how to fill the unit.

2.12 INSTALLATION

2.12.1 Uncrating

Before uncrating, carefully inspect the crate and skid to be certain the unit was not subjected to damage. If there is damage, proceed no further and notify your inspection department and the shipping agent.

If the crate appears satisfactory:

1. Remove steel strapping.
2. Using "Clip Removal Tool" or thin pry-bar, remove top cover clips then remove top panel.
3. One panel at a time, remove the panel clips then remove panel.
4. Remove polyethylene covering from unit.
5. Inspect for any visible damage.
6. Remove any/all accessory boxes.
7. Using forklift or another suitable lifting device, lift unit from skid and place on floor.
8. The unit may now be rolled to its point of installation.

2.12.2 Positioning

Position the system to have access to all sides of the console. Remove cover panels and inspect for any visible damage that might have occurred during shipment.

2.12.3 Heat Transfer Fluid Filling Procedure

Temperature conditioning of the Model 3920 utilizes methanol as a heat transfer fluid. This fluid is circulated by a magnetically coupled centrifugal pump through the refrigeration and heating system and the fluid shell surrounding the saturator.



Warning!

USE CAUTION WHEN HANDLING METHANOL.
METHANOL IS FLAMMABLE AND POISONOUS
KEEP AWAY FROM SPARKS, FLAMES, OR OTHER IGNITION
SOURCES. AVOID PROLONGED OR REPEATED BREATHING OF
VAPORS OR CONTACT WITH SKIN. **SEE SECTION 2.3 FOR
IMPORTANT SAFETY INFORMATION.**

Refer to drawing: [19D3920920](#)

2.12.3.1 Equipment Required

1. Appropriate safety gear and equipment.
2. 5/32" hex ball driver.
3. 3/8" hex ball driver.
4. 7/8" Socket with 6" extension.
5. Funnel.

2.12.3.2 Methanol Filling Procedure

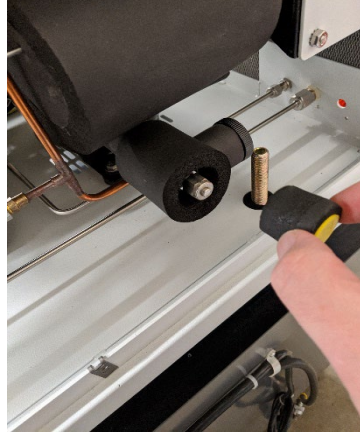
1. Ensure the main power switch is OFF.
2. Remove left and right side console panels.
3. Using the 5/32" hex ball driver, remove countertop screws.
4. Remove the countertop.
5. Remove RTD enclosure insulation.
6. Remove 7/8" Swagelok cap within RTD enclosure.
7. Locate expansion tank fill port (labeled "Fluid Fill Port").
8. Using the 3/8" hex ball driver, remove the expansion tank fill plug and insert funnel into fill port.
9. Slowly fill the system with methanol until methanol is observed within the neck of the 1/2" Swagelok fitting within RTD enclosure.

Note – *If filled too quick methanol may come out of the overflow under the unit.*

10. Remove funnel and replace expansion tank fluid fill port plug.
11. Replace 7/8" Swagelok cap.
12. Replace RTD enclosure insulation.
13. Replace countertop.
14. Replace left and right side console panels (**ensure condenser grill opening is on the left side**).

2.12.3.3 Methanol Draining Procedure

1. Ensure the main power switch is OFF.
2. Remove right side console panel.
3. Locate the drain valve at the lower right of the generator and remove the drain cap insulation.



4. Remove drain cap and connect a drain hose.
5. Open drain valve and empty the methanol into a clean container with a minimum size of 2 gallons. Save the methanol for refilling.
6. Close drain valve. Replace drain cap and drain cap insulation.
7. Replace console panel.

Refer to drawing: [19D3920901-4](#)

2.12.4 Setting Internal Supply Pressure Regulator

The supply pressure must be regulated to ensure proper control and operation.

Note – *It is always recommended to double regulate the gas supply; once at the input supply and again at the internal 3920 regulator.*

Adjust the 3920's internal pressure regulator (REG) to 10 psiG below the input gas supply pressure, but never above 250 psiG. For example, if the input supply pressure indicates 255 psiG, then adjust the internal pressure regulator to 245 psiG. For the best results operate the generator in run mode at the default flow rate to assure the regulator adjustment corrects for any pressure drop caused by the flow rate.

1. Open the Supply Pressure Dialog by selecting "Supply Pressure" from the Utilities Menu Tab
2. Rotate the internal regulator knob clockwise to increase pressure and counterclockwise to decrease pressure while monitoring the supply pressure dialog window.

Refer to drawing: [19D3920901-6](#)

2.12.5 Pure Water Filling Procedure

Refer to section [5.4 Saturator Filling](#) for detailed instruction on how to add pure water.

2.12.6 Supply Gas Connection Procedure

Equipment Required:

- Appropriate safety gear and equipment. See section 2.3.1 for PPE recommendations.
- 9/16" wrench.
- 3/4" wrench.
- Swagelok VCR gasket SS-4-VCR-2-ZC-VS or SS-4-VCR-2-GR-VS
- Pressure Vent Muffler (provided)

Warning!

USE CAUTION WHEN HANDLING PRESSURIZED GASES. **SEE SECTION 2.3 FOR IMPORTANT SAFETY INFORMATION.**

Refer to 3920 Operations Manual:

- Section 2.11.4 Gas Supply
 - Section 2.11.4.1 Pressure
 - Section 2.11.4.2 Dryness
 - Section 2.13.11 Fitting Instructions
1. Provide access to rear of console.



2. Remove VCR cap from "Gas Inlet". Remove plug from "Gas Vent".



3. Apply a ¼" VCR gasket if not already in place.
Before every connection, inspect the VCR glands. If dust or oil is present, wipe them with a lint-free cloth.



4. The ¼" VCR gasket must be in place before connecting input fitting.



5. Connect gas supply line to generator "Gas Inlet". Tighten VCR nut 1/8 turn past finger tight using a 3/4" wrench.



6. Connect the other end of the gas supply line to your gas supply's regulator output. Tighten 1/8 turn past finger tight using the 9/16" wrench.

NOTE: Never use any type of grease, tape, or thread sealant on any VRC fitting, gasket or connection.

7. Install pressure vent (noise reduction) filter into vent fitting. Place a water catch container below filter.



2.12.7 Storage

The following are required when the system is put into storage or is transported.

Warning!

USE CAUTION WHEN HANDLING METHANOL.
METHANOL IS FLAMMABLE AND POISONOUS
KEEP AWAY FROM SPARKS, FLAMES, OR OTHER IGNITION
SOURCES. AVOID PROLONGED OR REPEATED BREATHING OF
VAPORS OR CONTACT WITH SKIN. **SEE SECTION 2.3 FOR
IMPORTANT SAFETY INFORMATION.**

- Disconnect the supply and outlet lines.
- Seal all inlet and outlet ports with Swagelok VCR caps (SS-4-VCR-CP). Avoid using plastic "dust caps" for long-term storage.
- Drain the methanol following section 2.14.1.1 Methanol Draining Procedure

Storage Environment

- Storage Temperature: 5 to 50 °C (empty)
- Humidity: 5 to 95% RH Non-condensing

2.13 QUICK START

This section will provide the user with a quick start on operating the generator. For detailed information on operating the generator please refer to section [4 ControLog Interface](#).

CAUTION!

DO NOT OPERATE THE GENERATOR
WITHOUT HEAT TRANSFER FLUID.

2.13.1 Power-Up

To Power-Up the generator perform the following steps:

- Verify that the inlet gas supply connection has been made and verify that any On/Off valve on the inlet gas supply line is open.
- Verify that correct AC power is connected to the generator.

- Toggle the power switch located at the upper right rear of generator to ON. The generator will begin to boot up.

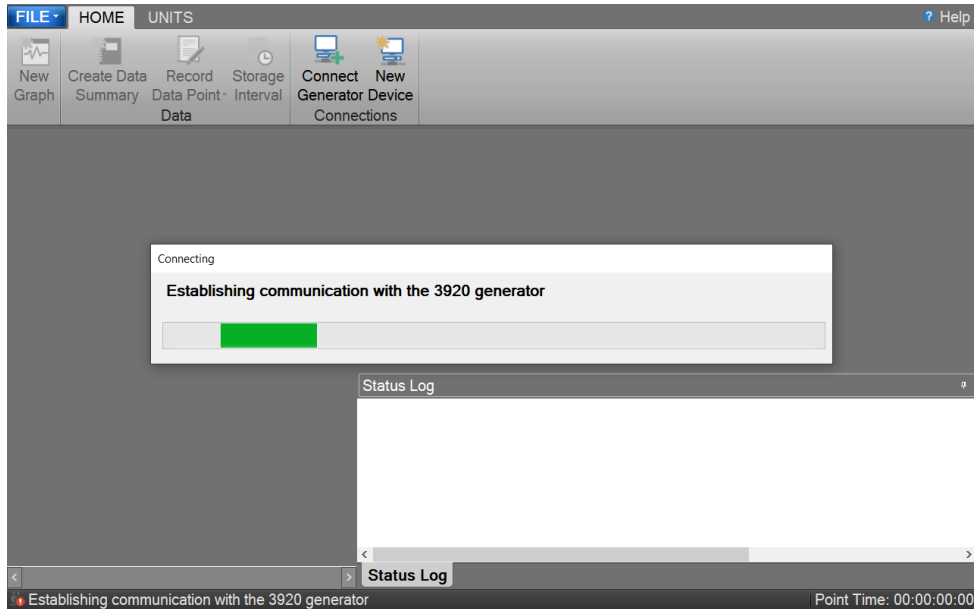
2.13.2 Loading Screen

After the system boots the generator will show a loading screen which will indicate the status of the loading process and will also show the software version of the generator.

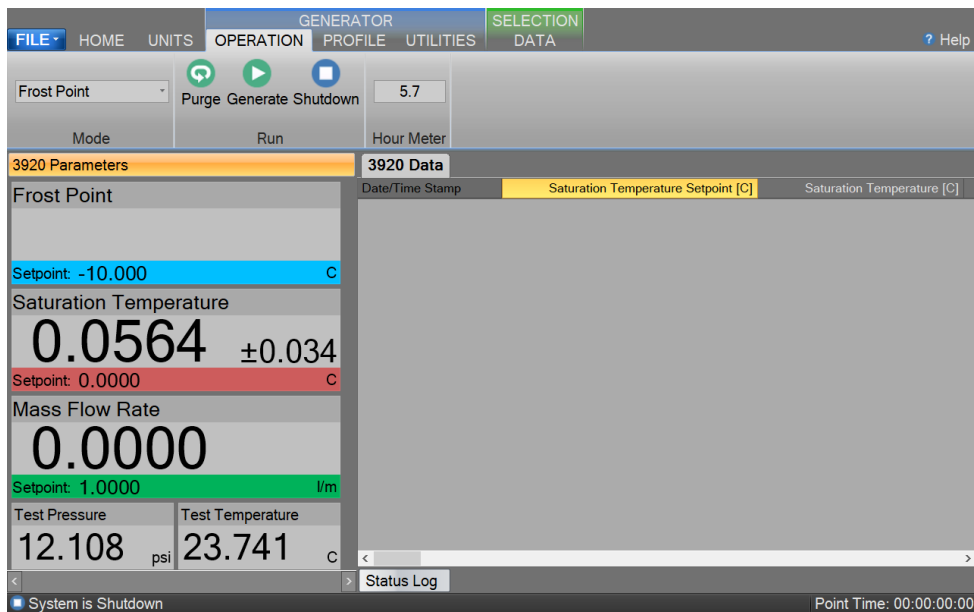


2.13.3 ControLog Screen

Upon completion of the loading process the generator will show the main ControLog page and a dialog showing the status of establishing communication with the generator.

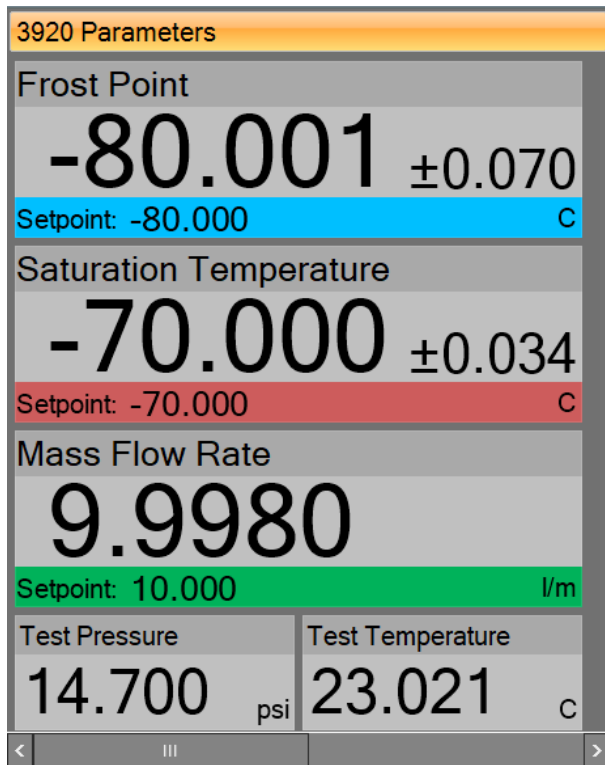


Once communication with the generator is established the generator's parameter and data tabs will be displayed.



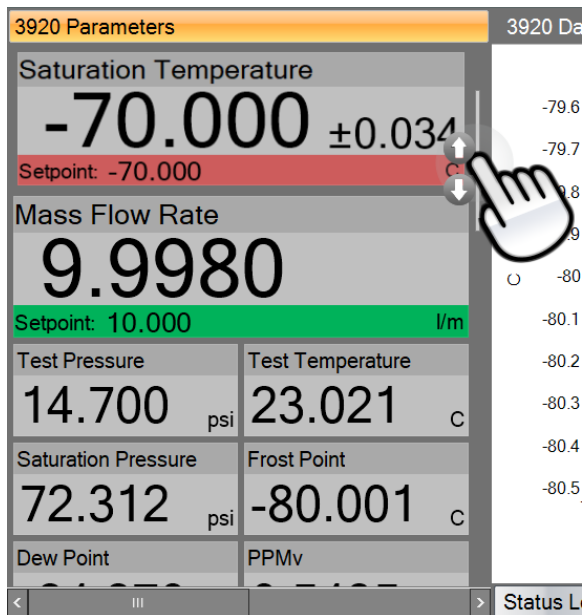
2.13.4 Control Parameters

The Parameter Tab Group is located on the left side of the application and contains a parameter tab for each connected device. The 3920 Parameters contain all the control and measurement parameters critical to the operation of the humidity generator.



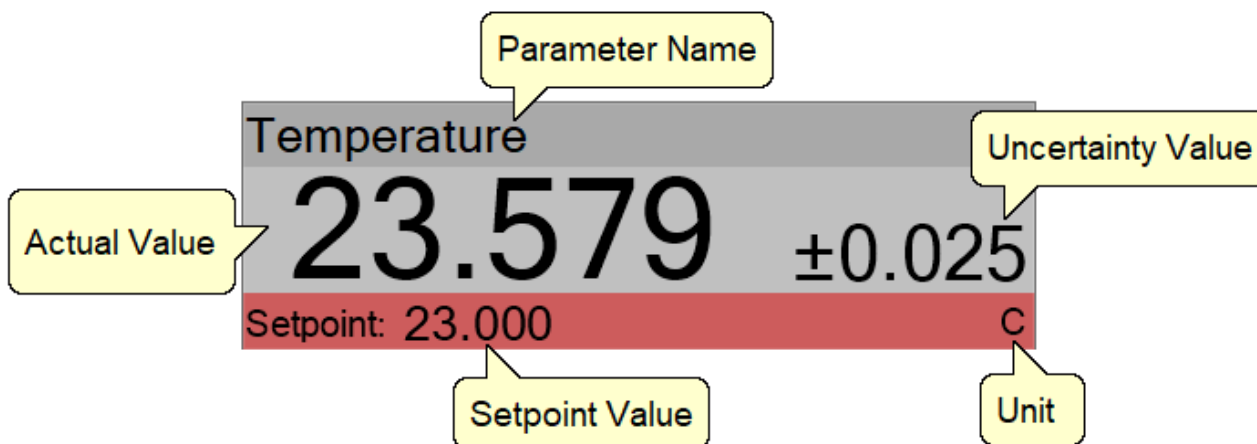
2.13.4.1 Scrolling the Parameters

Each Parameter Tab can be scrolled up and down to show additional parameters.



2.13.4.2 Setpoint Tile

The Setpoint Tiles allow the user to control the operation of the humidity generator by changing the desired setpoint that the generator will control to. The Tiles contain 5 key parts; a header with the Parameter Name, the Actual Value, the real-time Uncertainty Value, the Setpoint Value and the Unit the values are displayed in.



Note – The Actual Value for the blue humidity Setpoint Tile is not shown when purging.

Note – The real-time uncertainty can be turned off by setting the USER[12] “HumiCalc, k” system parameter to zero. Refer to section [2.13.7](#) for an example on how to set a user system parameter.

2.13.4.3 Changing Setpoints

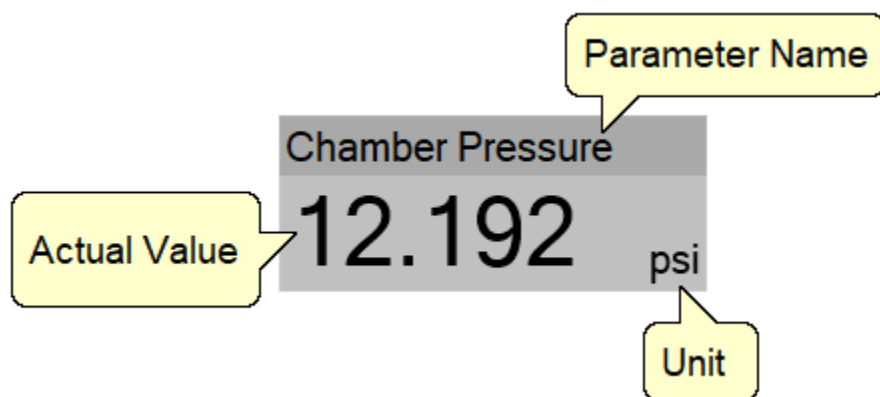
To change a setpoint, click on the setpoint tile that you would like to change. A setpoint entry box will appear. For example, to change the Frost Point setpoint click on the Frost Point setpoint tile.

The image shows a dialog box titled 'Enter Setpoint Value'. Inside, it says 'Enter the Frost Point you would like to generate.' Below this text is a text input field with a dropdown arrow on the right. At the bottom right of the dialog are two buttons: 'Ok' and 'Cancel'.

Enter the new value into the Setpoint Entry box and select Ok. Notice that the Frost Point humidity setpoint value updates to the new value and the actual values begin moving toward the new setpoint.

2.13.4.4 Value Tile

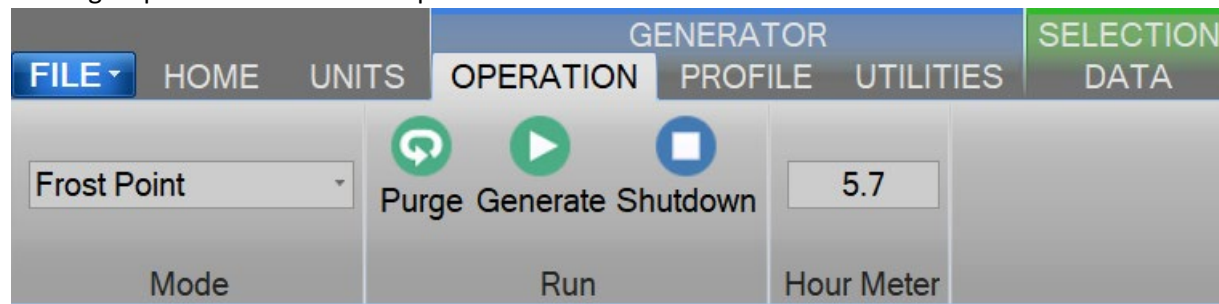
The Value Tiles display an actual value of a given parameter to the user. The Tiles contain 3 key parts; a header with the Parameter Name, the Actual Value and the Unit the value is displayed in.



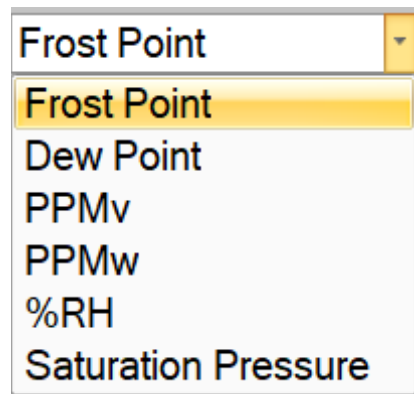
Note – The Actual Value for a humidity Value Tile is not shown when purging.

2.13.5 Control Modes

The user can change the operating mode of the 3920 by selecting from the drop-down menu within the Mode group on the Generator's Operation menu tab.

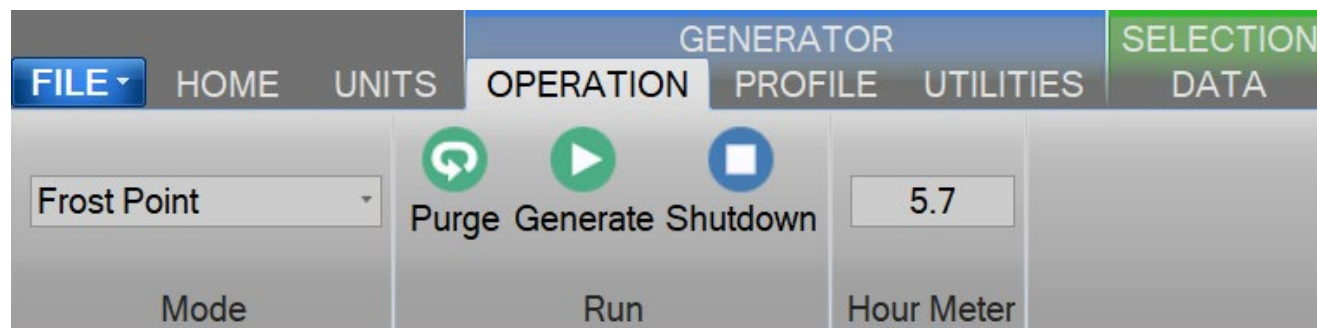


The drop-down allows the user to select between %RH, Frost Point, Dew Point, PPMv, PPMw, and Saturation Pressure.

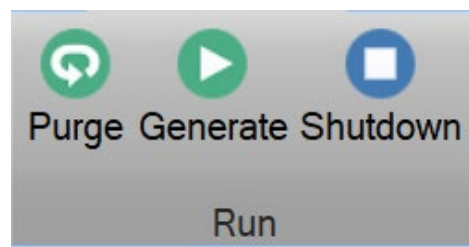


2.13.6 Purging, Generating and Shutting down

The Run Menu allows the user to run the 3920 manually.



The user can select to Purge, Generate or Shutdown. The general rule of thumb is to always use purge mode when going down in saturation temperature. This means you should purge to your lowest frost point overnight and then switch to generate and work up to your highest dew/frost. While going up in saturation temperature make sure you give adequate dwell time at each point to assure the system has reached equilibrium.



2.13.6.1 Purge Mode

Selecting Purge from the run menu commands the 3920 into purge mode. The purge mode is generally used to prevent icing within the saturator and dry the saturator outlet after movement (transportation), storage (power off, no gas flow, etc.), after performing the saturator fill procedure, or while transitioning the saturator from higher to lower temperatures. When the system is not being used (power off, no gas flow, etc.), the saturator is closed off and the gas within is static. As thermal equilibrium is reached, water vapor will condense on all inner surfaces between the saturator outlet and the expansion valve inlet. The Purge mode counteracts this condition by allowing the carrier gas to flow in the opposite direction (expansion valve to saturator), drying the affected sections of tubing. This is a necessary preparatory step in any low humidity system. As a general rule, when starting from an ambient condition the system should be purged for 24 hours or more before attempting to operate in the Generate mode. If sufficient purge time is not allowed, condensed or trapped water will remain and system accuracy will suffer. Insufficient purge time is usually indicated by higher than normal (wetter than normal) indications of the device under test. These indications can be as little as a few tenths of a degree to as much as several degrees' dew/frost point. Purging should also be performed while transitioning from warmer to colder saturation temperatures, and for approximately 5 hours after each 500 hours of continuous Generate mode operation. During Purge mode, both flow control and saturation temperature control are active, but saturation pressure control is

disabled. The generator will attempt to achieve the indicated flow and saturation temperature setpoint values.

Note – *When the saturation temperature is lowered, the fluid jacket surrounding the saturator cools to reduce the saturation temperature to its new setpoint value. As the saturator cools during this transition period, temperature gradients will exist between the inside of the saturator and the fluid jacket that surrounds it. The saturator outlet passes through this fluid jacket and will also exhibit temperature gradients along its length. If gas is allowed to flow normally through the saturator during this cooling period, the 100% humidified gas of the saturator may condense at the colder saturator outlet. Therefore, Purge mode should be used while cooling the saturator to lower temperatures. For this reason, the lowest humidity of a generation sequence or profile should be performed first. This low to high order requires that a Purge be performed only once prior to the generation sequence when cooling to the lowest saturation temperature. Then, as humidity values are increased, warming the saturator to higher values, further purging is not required.*

Note – *During Purge, limited gas flows to the 3920 Conditioned Gas Outlet, and consequently gas flows through the device under test if connected.*

2.13.6.2 Generate Mode

Selecting Generate from the run menu commands the 3920 into generate mode. Generate mode is used to operate the system when exact humidity points or associated time intervals have not been determined, when data must be viewed and/or verified manually before proceeding to the next humidity point, or when more immediate control over the generated humidity is required. When in the Generate mode of operation, the system will control at the currently entered setpoint indefinitely. Any time a setpoint is changed, the system immediately begins adjusting to that new value and will control at the new point indefinitely. Generate mode offers the flexibility to change the setpoint at any time and does not force you into any set sequence or for any prescribed amount of time. The Generate mode also allows you to change the humidity control mode at any time. For instance, the system may be controlling Frost Point, then immediately switched to PPMv control mode.

2.13.6.3 Shutdown

Selecting Shutdown from the run menu commands the 3920 to shut down. The 3920 may be shut down while either generating or purging. When stopped, all system functions shut down, pressure is vented, and the idle Control/Display screen is shown. During this idle time when the 3920 is stopped, gas is not flowing through the saturator. After extended periods of this idle time, the 3920 must be purged again prior to further use.

2.13.6.4 Operating Tips

Below are some key points to keep in mind when operating the 3920.

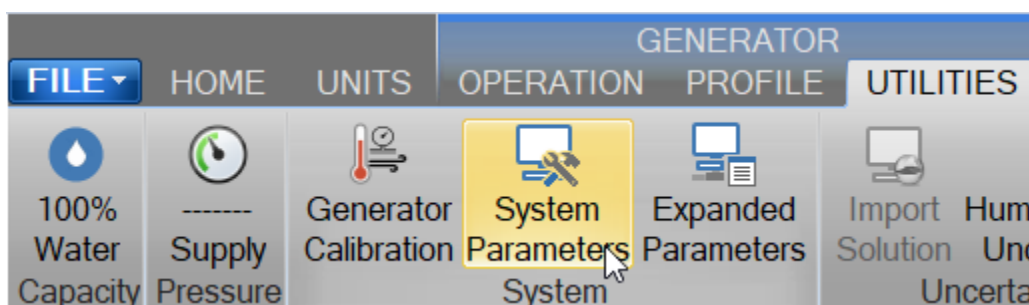
- A general rule of thumb with the 3920 is always to purge while going down in saturation temperature. For example, whenever you go to a colder frost point, you will typically operate in the purge mode down to your lowest humidity test point, switch to generate mode and then operate in generate mode as you go up in temperature. We recommend an 8-hour overnight purge before switching to generate.
- It is recommended to wait around 4 hours each time you transition from below zero to above zero. This ensures the saturator has time to completely change phases from ice to water. When you go

down in temperature, you need to do the same thing, but usually, the 8-hour overnight purge is perfect as it allows plenty of time for the saturator to phase change to ice.

- Low frost calibration is a slow process. Most of the battle is working to dry down the sensors under test. It is very important always to use stainless steel tubing and to keep things clean and well-maintained. It is good to limit connections in your setup. Each connection introduces “dead spaces” where moisture can accumulate, which can be difficult to remove during the dry-down process.

2.13.7 Supply Gas Frost Point

The user must enter the dryness of their supply gas if it is wetter than 0.5 PPMv or -80 °C at ambient. The supply gas is used to purge the outlet of the saturator and is used at the inlet of the saturator, so any gas wetter than the saturation temperature will cause condensation (icing) at the saturator inlet and outlet. If the measured ambient pressure frost point of the gas supply is wetter, for example -70°C, then the user must change the default “Supply Gas Frost Point” system parameter. To do this, select the Utilities tab from the Generator group and press System Parameters.



Under the User tab select the USER[6] system parameter.

System Parameters Wizard

System parameters

Variable	Description	Value
USER[0]	Setpoint on Power Up, Frost Point (C)	0
USER[1]	Setpoint on Power Up, Temperature (C)	10
USER[2]	Setpoint on Power Up, Test Pressure (psia)	14.7
USER[3]	Setpoint on Power Up, Test Temperature (C)	23
USER[4]	Setpoint on Power Up, Mass Flow Rate (l/min)	2
USER[5]	Setpoint on Power Up, Instrument Purge Open (%)	45
USER[6]	Supply Gas Frost Point (C)	-80

USER SYSTEM SERIAL LIMITS PRESSURE FLOW HEAT COOL LE...

The system parameters for each category are displayed in the corresponding tabs. To edit, select the row of the parameter within its tab, enter a new value in the edit box to the right and then click the update button.

-80

Update

< Back Next > Finish Cancel

In the edit box enter the dryness of the supply gas. In this example we will use -70 °C, so enter -70 and press the Update button.

System Parameters Wizard

System parameters

Variable	Description	Value
USER[0]	Setpoint on Power Up, Frost Point (C)	0
USER[1]	Setpoint on Power Up, Temperature (C)	10
USER[2]	Setpoint on Power Up, Test Pressure (psia)	14.7
USER[3]	Setpoint on Power Up, Test Temperature (C)	23
USER[4]	Setpoint on Power Up, Mass Flow Rate (l/min)	2
USER[5]	Setpoint on Power Up, Instrument Purge Open (%)	45
USER[6]	Supply Gas Frost Point (C)	-80

USER SYSTEM SERIAL LIMITS PRESSURE FLOW HEAT COOL LE... < >

The system parameters for each category are displayed in the corresponding tabs. To edit, select the row of the parameter within its tab, enter a new value in the edit box to the right and then click the update button.

-70

Update

< Back

Next >

Finish

Cancel

Press Next.

System Parameters Wizard

System parameters

Variable	Description	Value
USER[0]	Setpoint on Power Up, Frost Point (C)	0
USER[1]	Setpoint on Power Up, Temperature (C)	10
USER[2]	Setpoint on Power Up, Test Pressure (psia)	14.7
USER[3]	Setpoint on Power Up, Test Temperature (C)	23
USER[4]	Setpoint on Power Up, Mass Flow Rate (l/min)	2
USER[5]	Setpoint on Power Up, Instrument Purge Open (%)	45
USER[6]	Supply Gas Frost Point (C)	-70

USER SYSTEM SERIAL LIMITS PRESSURE FLOW HEAT COOL LE... < >

The system parameters for each category are displayed in the corresponding tabs. To edit, select the row of the parameter within its tab, enter a new value in the edit box to the right and then click the update button.

-70

Update

< Back

Next >

Finish

Cancel

Select yes to updated system parameters and press Next.

System Parameters Wizard

Would you like to save the updated system parameters?

☒ Yes
☐ No

Select 'Yes' if you would like to save the updated system parameters to the generator.

Select 'No' if you do not want to save the updated system parameters to the generator.
Any changes made to the system parameters will be lost.

< Back Next > Finish Cancel

A report of the current system parameters will be displayed, and the user has the option to save the file. Press Finish to close the dialog.

System Parameters Wizard

System parameters report

-Variable-	-----Description-----	-Value-
USER[0]	Setpoint on Power Up, Frost Point (C)	0
USER[1]	Setpoint on Power Up, Temperature (C)	10
USER[2]	Setpoint on Power Up, Test Pressure (psia)	14.7
USER[3]	Setpoint on Power Up, Test Temperature (C)	23
USER[4]	Setpoint on Power Up, Mass Flow Rate (l/min)	2
USER[5]	Setpoint on Power Up, Instrument Purge Open (%)	45
USER[6]	Supply Gas Frost Point (C)	-70
USER[7]	Supply Gas Pressure at Frost Point (psia)	14.6959
USER[8]	Two Temperature Mode	False
USER[9]	Auto Adjust Temperature	True
USER[10]	Default Clear-Cycle Pressure (psia)	25
USER[11]	Default Clear-Cycle Count	100
USER[12]	HumiCalc, k	2
USER[13]	HumiCalc, Ma	28.9645

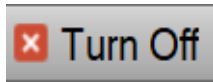
The system parameters report is displayed on the above for review. To save the report click the "Save" button.

 Save

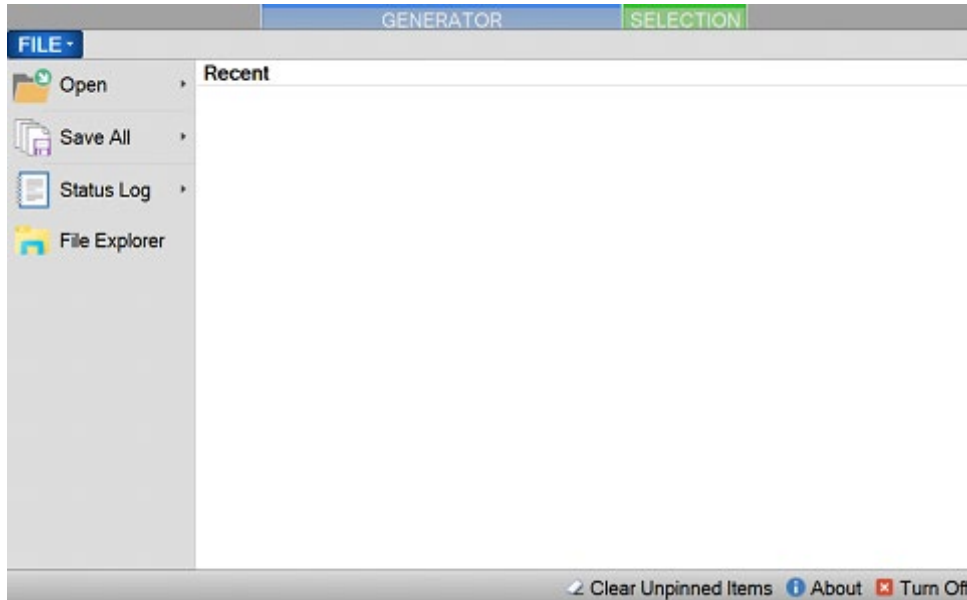
< Back Next > Finish Cancel

2.13.8 Power-Off

To turn the system off select the “Turn Off” command.



The “Turn Off” command is located under the “File” menu in the lower right corner.



The Turn Off command will properly exit the software and shutdown the computers so that the main power switch can be switched off.

Note – Always perform a [Shutdown](#) from the Operation Menu Tab before turning off the System.

If there is current data that has yet to be saved the user will be asked to save the data before the system shuts down. Selecting this command when the generator is generating will result in the automatic shutdown of the generator.

The user is safe to switch the power switch to OFF once the PC has shut down completely (display goes blank).

CAUTION!

TURNING OFF POWER WITHOUT SHUTTING DOWN THE SYSTEM
FIRST CAN CORRUPT THE EMBEDDED OPERATING SYSTEM.

2.13.9 Set Date and Time

The user can change the current system date and time through the status bar context menu.

Note – *To avoid time stamp confusion only change the system date and time when the generator is shutdown and not recording data.*

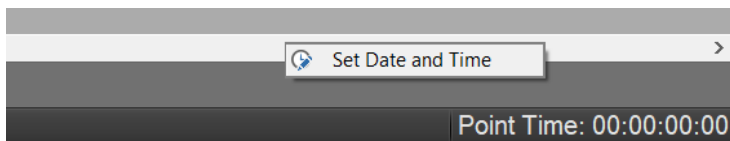
Start by long pressing or right clicking anywhere within the status bar. A long press is when you touch and hold the screen.



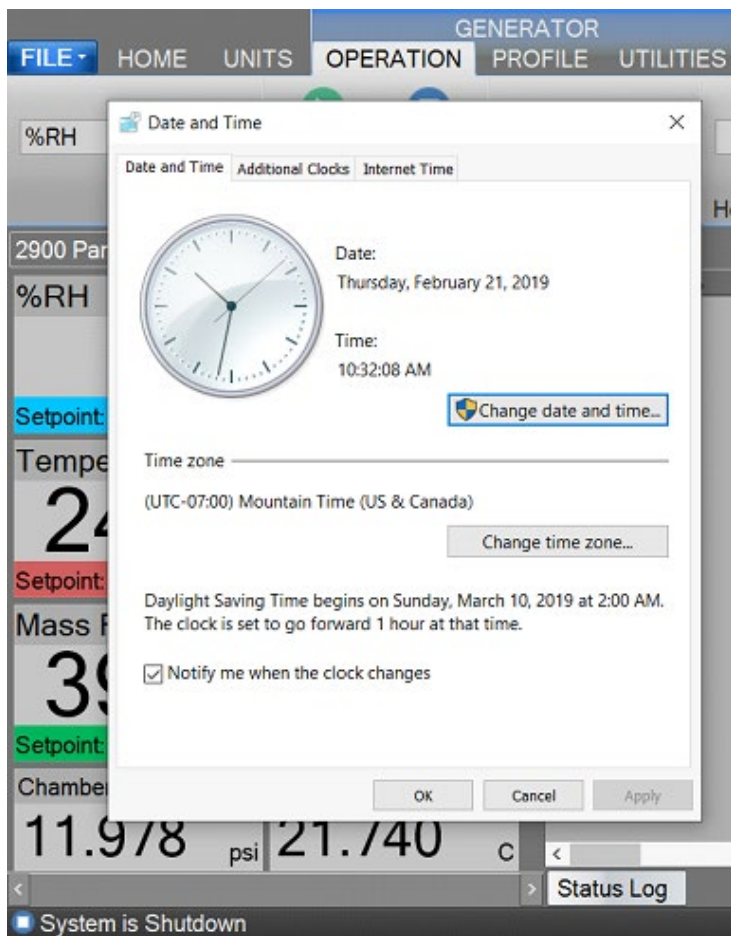
Long enough for a square selection box to appear.



Releasing will open the status bar context menu.

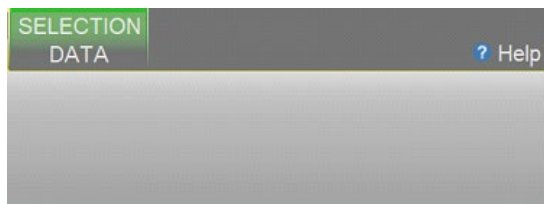


Select “Set Date and Time” from the context menu to open the system Date and Time dialog.



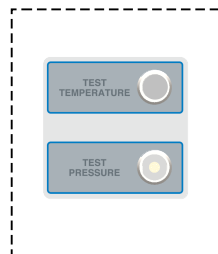
2.13.10 Help

The Help Menu located on the upper right side of the screen, allows the user to open the 3920 System Manual.

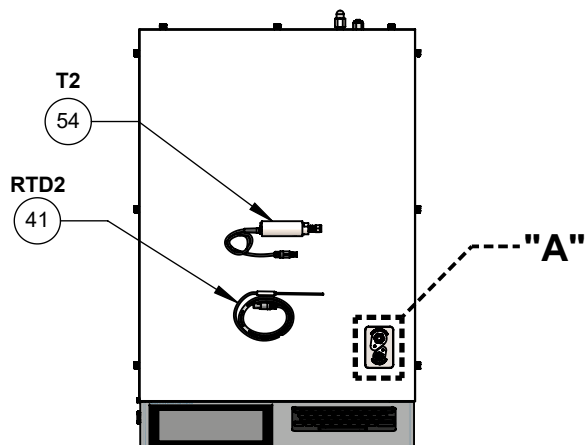


Note – Refer to the Thunder Scientific website (www.thunderscientific.com) for the latest manual edition and other information on your Model 3920 Low Humidity System.

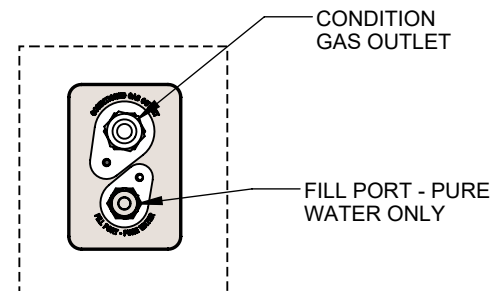
					REVISIONS				
					DWN	REV.	DESCRIPTION	DATE	APP. BY
					BRH	D	SHOW WIRING CHANGES FOR PUMP UPDATE & POWER SUPPLY UPDATES	01/07/2025	BB
					BRH	E	ADD WARNING SYMBOLS TO SHEET 4	03/31/2026	BB
					BAR	F	ADDED BALLOON FOR ITEM 44 PG 6 AND ITEM 29 PG 9 ; CORRECTED PORT LABELS FOR PORTS 1-4 AND HMI USB PORT 2 AND USB 4 PORT HUB	10/12/2026	BB
ITEM NO.	FIND #	TSC STOCKCODE	DESCRIPTION	QTY.	ITEM NO.	FIND #	TSC STOCKCODE	DESCRIPTION	QTY.
63	V1 - 2	D18A3920022	DIAPHRAGM VALVE ASSEMBLY	2	32	NI9209	N783729	±10V, 24-BIT ANALOG INPUT MODULE	1
62	TXV1	FJ-1/2-C	1/2 TON THERMOSTATIC EXPANSION VALVE	1	31	NI9174	N781157	CDAQ-9174 4 SLOT USB CHASSIS	1
61	TR5	D24A00352	TIMER RELAY ASSEMBLY	1	30	MUFFLER	MU002A	1/4" 80 MICRON MUFFLER	1
60	TM1	D95A00187	METHANOL EXPANSION TANK ASSY	1	29	MOXA	UPORT1450	USB - SERIAL HUB (4 PORT)	1
59	TE2	D95A00193	R-23 EXPANSION TANK ASSY	1	28	MOV1	MOV1	250V RMS METAL OXIDE VARISTOR	3
58	T6, T7, T8	P528-500	0 - 500 PSI PRESSURE SENSOR	3	27	LF1	SS-4F-VCR-7	1/4" SWAGelok 7 MICRON INLINE FILTER	1
57	T5	P528-100	0 - 100 PSI PRESSURE SENSOR	1	26	KB	KEYBD-CUST-42USB	42 KEY KEYBOARD	1
56	T4	BK5860E-VCR	MASS FLOW METER - VCR	1	25	HMI	UTC-510GP	UTC-510 10.1" TOUCH COMPUTER	1
55	T3	D19A3920072	SUPPLY PRESSURE HARNESS	1	24	HLS1	A19AAF-12	TEMP LIMIT SWITCH	2
54	T2	D20A3920091	T2 - TEST PRESSURE ASSEMBLY	1	23	H3	HK5537	7.8 OHM FOIL HEATER	3
53	T1	CPT6020-250	0-250 PSIA PRECISION TRANSDUCER	1	22	H2	HK5161	22.0 OHM FOIL HEATER	5
52	SSR-DC8	EL100D5-05	5 AMP SS RELAY, 3-100VDC	1	21	H1	N9N-1560	220 VAC 500 W CARTRIDGE HEATER	2
51	SSR-DC7	G4DC5	G4ODC5 OPTO 22 SSR (60 VDC / 3 A)	1	20	G4PB4	G4PB4	4 CHANNEL MOUNTING RACK	2
50	SSR-DC0-6	G4DC5A	G4ODC5A OPTO 22 SSR (200 VDC / 1 A)	7	19	G1	PG200-18N-LM-15D	0-200 PSI GAUGE	1
49	SSR-AC1-2	EL240A10-05	5 AMP SS RELAY	2	18	FS1	PS11	PRESSURE SWITCH	1
48	SSR-AC0	UPD2415DF	15 AMP SS RELAY	1	17	FP1	D19A3920034	FLUID PUMP ASSEMBLY	1
47	SOL6	REFSOL2W & 23A3920329	TWO WAY SOLENOID VALVE & COIL	1	16	FD1 / FD2	C-032-S	REFRIGERATION FILTER / DRYER	2
46	SOL5	A2012	2WNC 1/16 ORIFICE 24V SOLENOID VALVE	1	15	FB1	FERSPLTCORE	EMI FERRITE SUPPRESSION CORE (SPLIT)	1
45	SOL1-4	390707	3/2 WAY DIRECT ACTING 24 VDC SOLENOID	4	14	FAN2	FN624N	24 VDC FAN	1
44	RV1	S4C-150	1/4" MALE NPT ADJUSTABLE RELIEF VALVE	1	13	FAN1	FAN100CFM	HIGH AIR FLOW Ø 6.0" 24 VDC AXIAL FAN	6
43	RTD4	S17624	CABINET TEMPERATURE PROBE	1	12	EX2	D95A00186	INTERCOOLER ASSEMBLY	1
42	RTD3	S102619PD3S48	EXP VALVE TEMP PROBE	1	11	EX1	D95A00185	R23 EVAPORATOR ASSEMBLY	1
41	RTD2	D19A3920075	RTD2 TEST TEMP ASSEMBLY	1	10	DV1 - 3	6LVV-DPVR4-P-C	UHP DIAPHRAGM SEALED VALVE	3
40	RTD1	4551348-6	6" - 100 Ω PROBE -200 TO 350°C	1	9	DC4	DTJ1524D15	±15VDC POWER SUPPLY	1
39	REG2	KCP1GJA2P30000	0 - 500 PSI REGULATOR	1	8	DC3	DTJ1524S05	+5VDC POWER SUPPLY	1
38	REG1	KPR1JJAX12A20000	0 - 500 PSI REGULATOR	1	7	DC2	UHP-200-24	24V 200W AC-DC POWER SUPPLY	1
37	RECR	BT-RECR	REFRIGERATION RECEIVER	1	6	DC1	UHP-200-12	12V 200W AC-DC POWER SUPPLY	1
36	RECEPT	PC83011340	IEC 320 PANEL MOUNT POWER INLET	1	5	CV1	S4C-1/3	1/4" SWAGelok INLINE CHECK VALVE	1
35	NI9403	N779787	TTL DIGITAL I/O MODULE (32 CH)	1	4	CON	BT-COND	CONDENSER ASSEMBLY	1
34	NI9401	N779351	TTL DIGITAL I/O MODULE (8 CH)	1	3	CBS1	PWRSW-2P	220V AC/2-POLE CIRCUIT BREAKER 10A	1
33	NI9216	NI783863-02	24-BIT 100 Q RTD ANALOG INPUT MODULE, DSUB	1	2	C2	D19A3920023	REFRIGERATION COMP - R-23	1
					1	C1	D19A3920023	COMPRESSOR PREPARATION, R-134A / R23	1
					DO NOT SCALE FROM DRAWING THIRD ANGLE PROJECTION PROPRIETARY NOTICE THIS DRAWING AND INFORMATION CONTAINED WITHIN IS PROPRIETARY TO THUNDER SCIENTIFIC AND CANNOT BE COPIED OR REPRODUCED WITHOUT SPECIFIC WRITTEN PERMISSION TOLERANCES .XXX ±.010 .XX ±.015 ∠ ±.50° UNLESS NOTED OTHERWISE DRAWN FURRY 9/26/2019 APPROVED BB 11/27/2019 ISSUED DWF 11/27/2019 Thunder Scientific Corporation 623 Wyoming S.E. Albuquerque, NM 87123 3920 Components SIZE A DWG. NO. 19D3920901 REV F WT. 522.32 lb SHEET 1 OF 9				



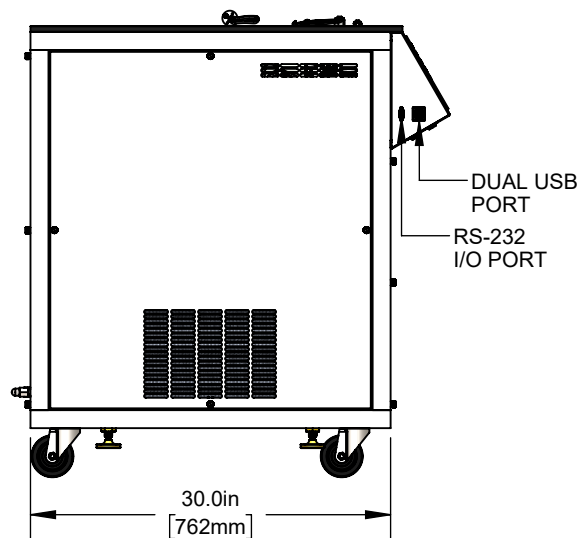
DETAIL "B"



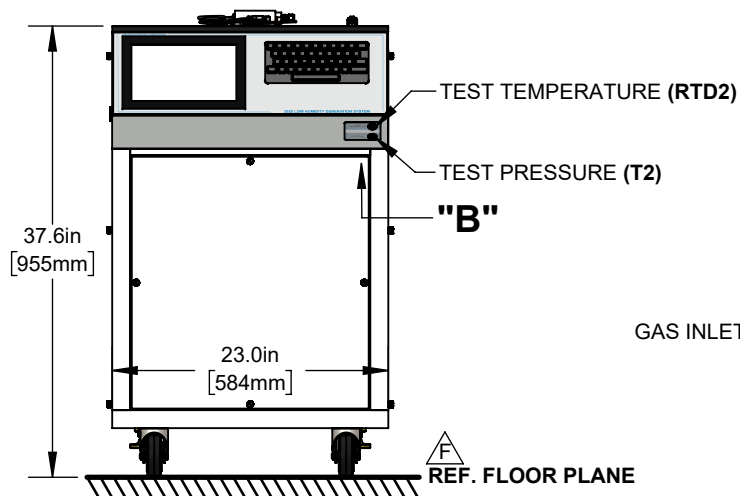
TOP VIEW



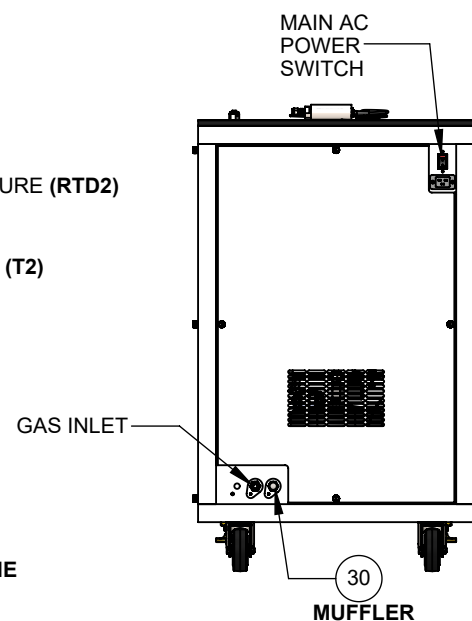
DETAIL "A"



LEFT VIEW

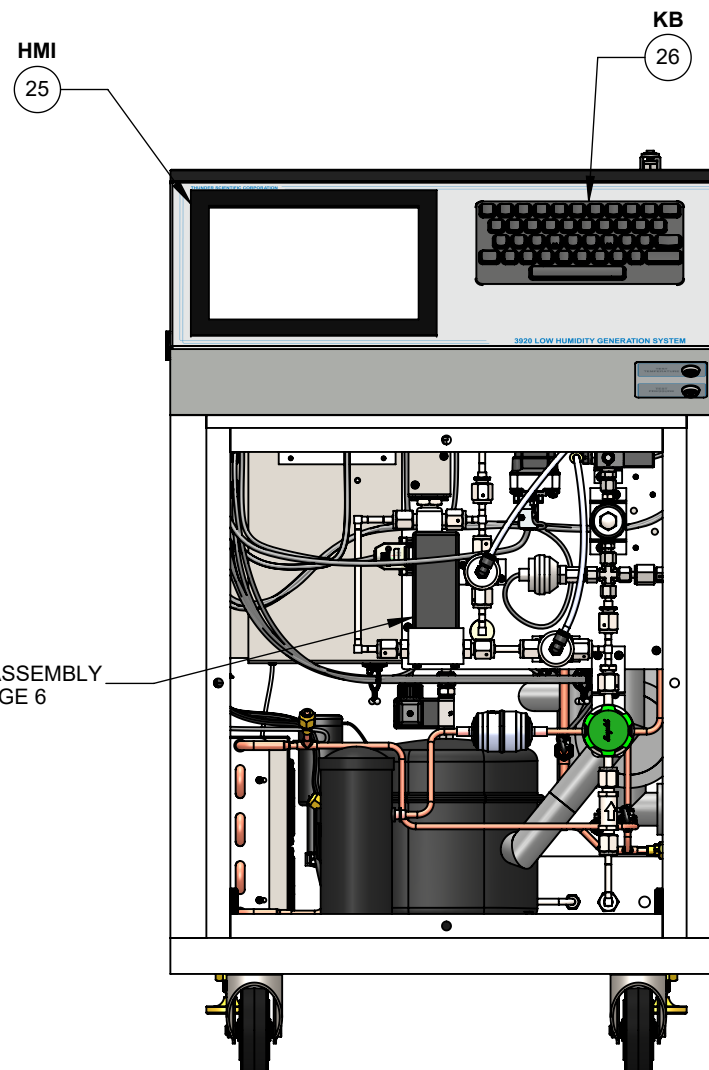
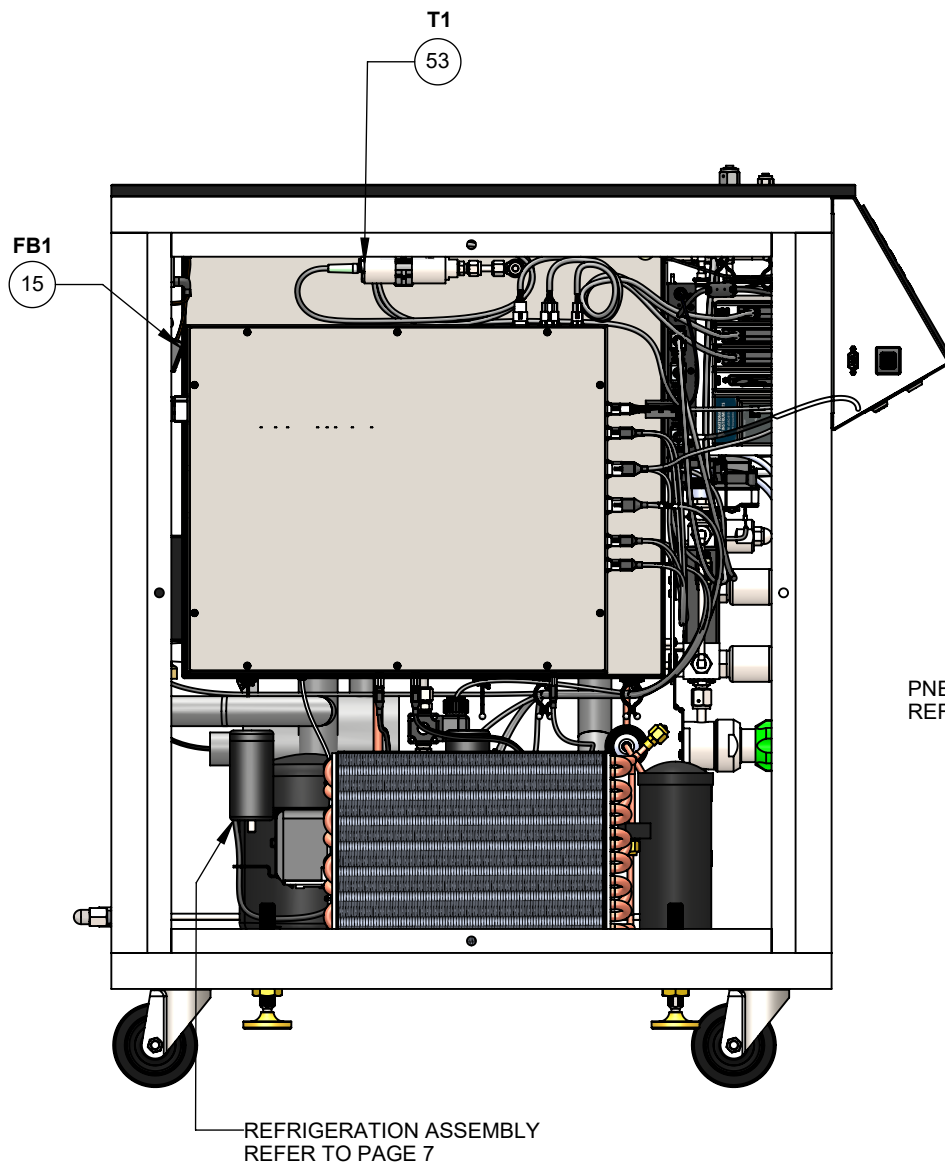


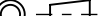
FRONT VIEW

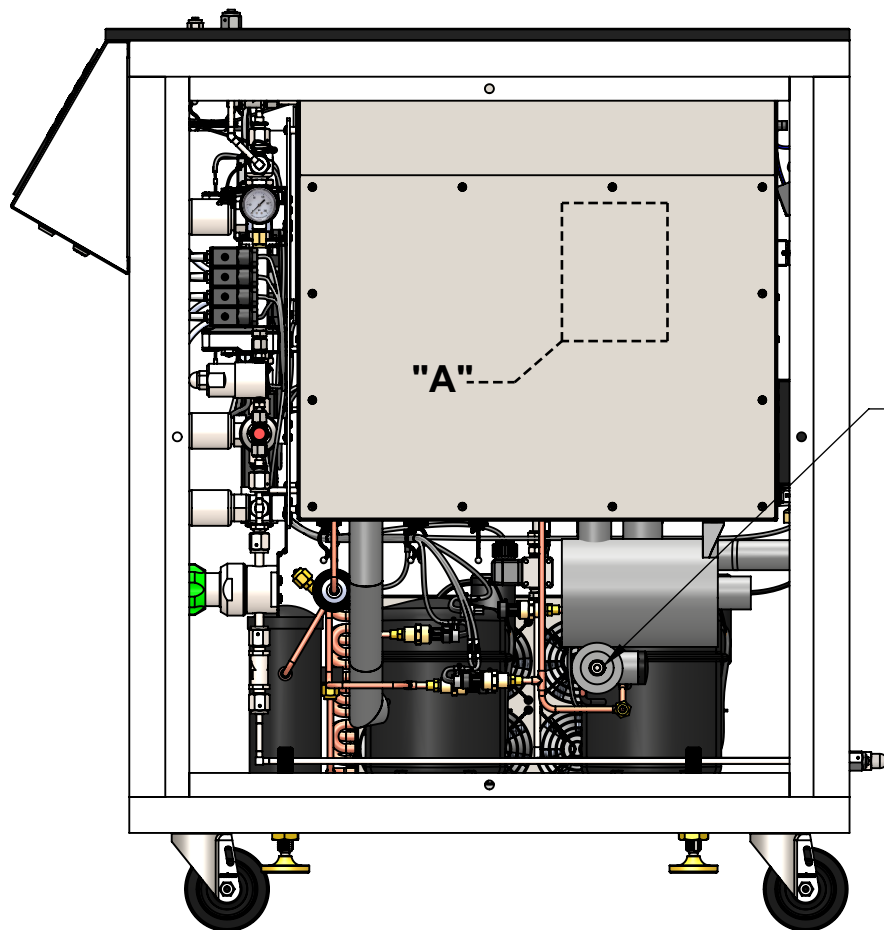


REAR VIEW

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			3920 Exterior Views							
	3920		TOLERANCES .XXX ±.010 .XX ±.015 ∠ ±.50° UNLESS NOTED OTHERWISE	DRAWN	FURRY	9/26/2019	SIZE A	DWG. NO. 19D3920901		REV F
NEXT ASSY	USED ON			APPROVED	BB	11/27/2019				
APPLICATION			ISSUED	DWF	11/27/2019	WT. 522.32 lb		SHEET 2 OF 9		

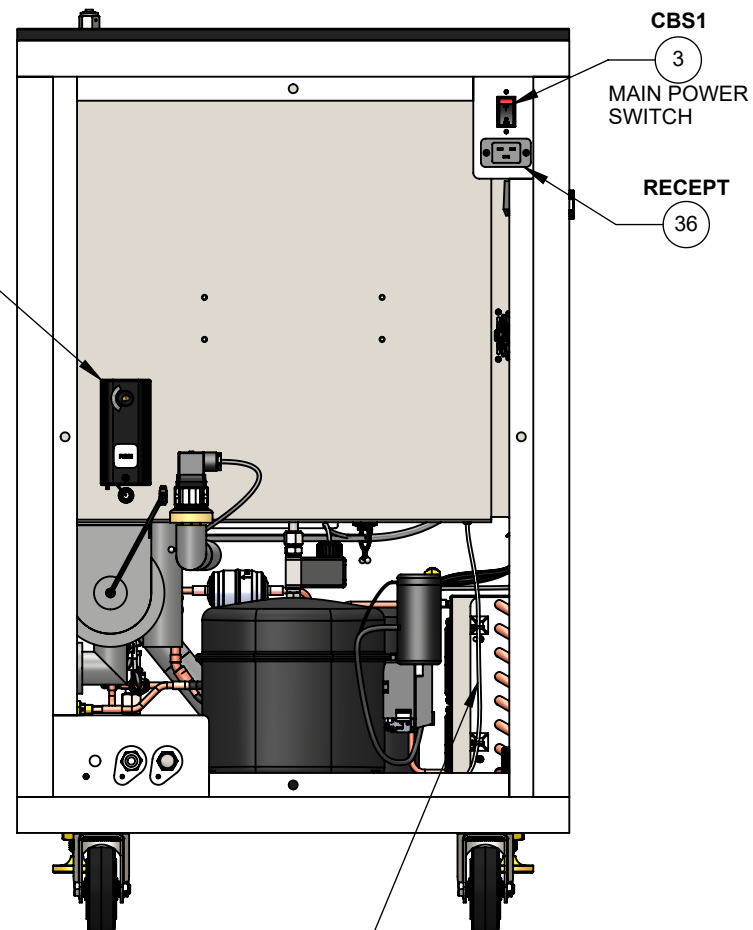


DO NOT SCALE FROM DRAWING		THIRD ANGLE PROJECTION 	PROPRIETARY NOTICE THIS DRAWING AND INFORMATION CONTAINED WITHIN IS PROPRIETARY TO THUNDER SCIENTIFIC AND CANNOT BE COPIED OR REPRODUCED WITHOUT SPECIFIC WRITTEN PERMISSION			Thunder Scientific Corporation			
						623 Wyoming S.E. Albuquerque, NM 87123			
						3920 Left & Front Views			
	3920								
NEXT ASSY	USED ON	TOLERANCES .XXX ±.010 .XX ±.015 ∠ ±.50° UNLESS NOTED OTHERWISE	DRAWN	FURRY	9/26/2019	SIZE A	DWG. NO. 19D3920901		REV F
			APPROVED	BB	11/27/2019		WT. 522.32 lb		SHEET 3 OF 9
APPLICATION			ISSUED	DWF	11/27/2019				



HLS1
24

 **HEAT TRANSFER
FLUID DRAIN**

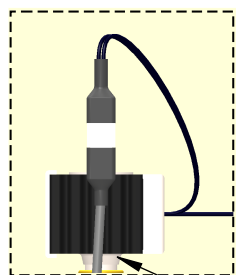


CBS1
3

MAIN POWER
SWITCH

RECEPT
36

 **HEAT TRANSFER
FLUID VENT**

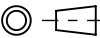


SOL6
47

DETAIL "A"
(BEHIND ACCESS PANEL)

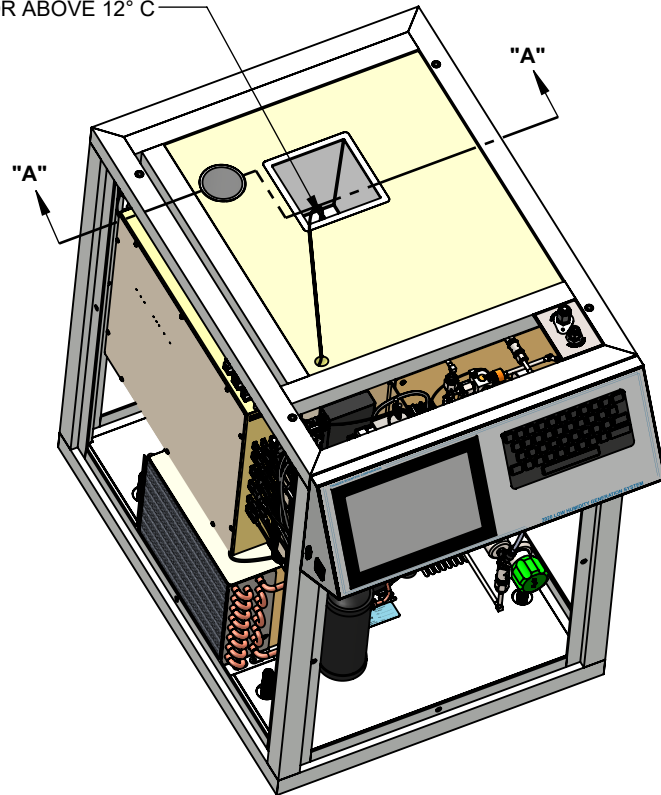
 **Warning!**

USE CAUTION WHEN HANDLING METHANOL.
METHANOL IS FLAMMABLE AND POISONOUS
KEEP AWAY FROM SPARKS, FLAMES, OR OTHER IGNITION SOURCES.
AVOID PROLONGED OR REPEATED BREATHING OF VAPORS OR CONTACT WITH SKIN.
SEE SECTION 2.3 FOR IMPORTANT SAFETY INFORMATION.

DO NOT SCALE FROM DRAWING		THIRD ANGLE PROJECTION 	PROPRIETARY NOTICE THIS DRAWING AND INFORMATION CONTAINED WITHIN IS PROPRIETARY TO THUNDER SCIENTIFIC AND CANNOT BE COPIED OR REPRODUCED WITHOUT SPECIFIC WRITTEN PERMISSION			Thunder Scientific Corporation 623 Wyoming S.E. Albuquerque, NM 87123		
	3920	TOLERANCES .XXX ±.010 .XX ±.015 ∠ ±.50° UNLESS NOTED OTHERWISE		DRAWN	FURRY	9/26/2019	3920 Right & Rear Views	
NEXT ASSY	USED ON			APPROVED	BB	11/27/2019		
APPLICATION				ISSUED	DWF	11/27/2019	SIZE A	DWG. NO. 19D3920901
							WT. 522.32	REV F
							lb	SHEET 4 OF 9

REVISIONS				
DWN	REV.	DESCRIPTION	DATE	APP. BY
BRH	A	ADDED WARNING STATEMENT FROM SECTION 2.3.2	03/31/2026	BB

ALL FITTINGS MUST BE TIGHT. OPEN ONLY WHEN SATURATION TEMPERATURE IS AT OR ABOVE 12° C



REMOVE SATURATOR ACCESS CAP AND OBSERVE HEAT TRANSFER FLUID LEVEL HERE

REMOVE EXPANSION TANK ACCESS PLUG AND ADD HEAT TRANSFER FLUID HERE

RTD1
(SATURATOR
TEMP PROBE)

HEAT TRANSFER FLUID
FULL LEVEL

EXPANSION
TANK

SECTION "A"-"A"

SATURATOR

1. ADD HEAT TRANSFER FLUID ONLY WHEN SYSTEM IS AT 12° C OR ABOVE
2. SLOWLY ADD HEAT TRANSFER FLUID TO THE EXPANSION TANK UNTIL FLUID IS OBSERVED IN THE SATURATOR ACCESS PORT.



Warning!

USE CAUTION WHEN HANDLING METHANOL. METHANOL IS FLAMMABLE AND POISONOUS. KEEP AWAY FROM SPARKS, FLAMES, OR OTHER IGNITION SOURCES. AVOID PROLONGED OR REPEATED BREATHING OF VAPORS OR CONTACT WITH SKIN. SEE SECTION 2.3 FOR IMPORTANT SAFETY INFORMATION.

MODEL 3920
LOW HUMIDITY
GENERATOR

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						Heat Transfer Fluid Fill Instructions						
	3920					TOLERANCES .XXX ±.010 .XX ±.015 ∠ ±.50° UNLESS NOTED OTHERWISE	DRAWN	FURRY	12/9/2019	SIZE A	DWG. NO. 19D3920920	REV A
NEXT ASSY	USED ON						APPROVED	FURRY	12/12/2019		WT. 523.02	lb
APPLICATION			ISSUED	DWF	12/9/2019							