



TAM[©] Operator's Manual Addendum WRFG200 Series

1.) Intended Use:

The Echometer Total Asset Monitor System, TAM, is a comprehensive data collection and analysis system that permits the engineer to optimize oil and gas well performance. The system can monitor the pump inlet fluid level for artificial lift wells, providing the engineer with the data to set pump speed or duty cycle to maximize production. The WRFG200 is one of several HAZLOC instruments intended as a Total Asset Monitor system data source.

2.) Installation and Operation:

There is no field assembly of this instrument. This device is a transportable instrument. There is no provision for maintaining or charging while attached to the well. The installation and operating procedures are covered elsewhere in this TAM system manual.

3.) Parameters Measured:

- a. Pressure – WRFG200 provides excellent quality pressure data measured in the space between the casing and the production string.
- b. Acoustic Waveform– WRFG200, when commanded, produces an acoustic pressure pulse followed by recording the echo reflections.

4.) Specifications:

Working Casing Pressure	1500 PSIG
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Pressure Resolution	<0.1 PSIG
Acoustic Pulse	Positive Pressure
Acoustic Pulse Gas	CO ² or N
Microphone Signal Precision	24-bit delta-sigma ADC
Energy Source	Li-Ion 3.4 AH
Run Time per Charge	> 200 Hrs.
Charging Source	+5Volts DC
Charging Time	≤ 13 Hrs. 0 to 100%
Gas Gun Coupling	2" NPT Male

5.) Certification Standards:

UL HAZLOC Group evaluated this product against the following standards:

- a. UL913, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, Division 1, Group C & D Hazardous (Classified) Locations.
- b. UL60079-0 Explosive atmospheres – Part 0: Equipment – General requirements
- c. UL60079-11 EXPLOSIVE ATMOSPHERES – PART 11: EQUIPMENT PROTECTION BY INTRINSIC SAFETY (i).
- d. CSA C22.2 No. 60079-0 Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements.
- e. CSA C22.2 NO. 60079-11:14 EXPLOSIVE ATMOSPHERES — PART 11: EQUIPMENT PROTECTION BY INTRINSIC SAFETY "i."
- f. CENELEC EN IEC 60079-0 EXPLOSIVE ATMOSPHERES - PART 0: EQUIPMENT - GENERAL REQUIREMENTS.
- g. CENELEC EN 60079-11 EXPLOSIVE ATMOSPHERES - PART 11: EQUIPMENT PROTECTION BY INTRINSIC SAFETY 'i'.
- h. IEC 60079-0 Explosive atmospheres – Part 0: Equipment – General requirements
- i. IEC 60079-11 EXPLOSIVE ATMOSPHERES – PART 11: EQUIPMENT PROTECTION BY INTRINSIC SAFETY (i).

6.) CERTIFICATION FILE NUMBERS:

- | | | | |
|-----------|-------------------|----|--|
| a. UL | E496830 | US | Class I, Div 1, Groups C&D, T3C
Class I, Zone 0, AEx ia IIB T3 Ga |
| | | CA | Class I, Div 1, Groups C&D, T3C
Ex ia IIB T3 Ga X |
| b. ATEX | UL 24 ATEX 3218X | | II 1 G Ex ia IIB T3 Ga |
| c. IECEx | IECEx UL 24.0033X | | Ex ia IIB T3 Ga |
| d. UKCA | UL24UKEX2982X | | II 1 G Ex ia IIB T3 Ga |
| e. FCC ID | Q5Q-WRFG200 | | |
| f. IC ID | 10048A-WRFG200 | | |

7.) Equipment Certification Label:



8.) Hazards and Warnings:

- a. **WARNING:** Charging this instrument requires using the supplied 5-Volt charger. Note instrument marking UM 5-Volts. Use of an input greater than 5 VDC invalidates the certifications.

AVERTISSEMENT: La charge de cet instrument nécessite l'utilisation du chargeur. chargeur de 5 volts fourni. Notez le marquage de l'instrument UM 5-Volts. L'utilisation d'une entrée supérieure à 5 VDC invalide les certifications.

- b. **Warning:** Substitution of components may impair intrinsic safety.

Avertissement : La substitution de composants peut compromettre la sécurité intrinsèque.

- c. **Warning:** Operators of this instrument must have training in safety procedures for operating safely in a HAZLOC location before attempting to use this product. This training must include safety procedures when working with flammable pressured gases.

Avertissement: Les opérateurs de cet instrument doivent avoir suivi une formation sur les procédures de sécurité pour travailler en toute sécurité dans un endroit HAZLOC avant de tenter d'utiliser ce produit. Cette formation doit inclure les procédures de sécurité pour travailler avec des gaz inflammables sous pression.

- d. **Warning:** Items in this instrument's electronic enclosure must not be repaired or serviced in HAZLOC locations. Therefore, any disassembly or repair may invalidate the certification.

Avertissement: Les éléments du boîtier électronique de cet instrument ne doivent pas être réparés ou entretenus dans des zones HAZLOC. Par conséquent, tout démontage ou réparation peut invalider la certification.

- e. **Warning:** Should any problem occur with the battery assembly, contact your Echometer-authorized engineer for assistance.

Avertissement: En cas de problème avec l'assemblage de la

batterie, contactez votre ingénieur agréé Echometer pour obtenir de l'aide..

- f. **Warning:** Battery charging must occur in an ORDLOC.

Avertissement: La charge de la batterie doit se faire dans un ORDLOC.

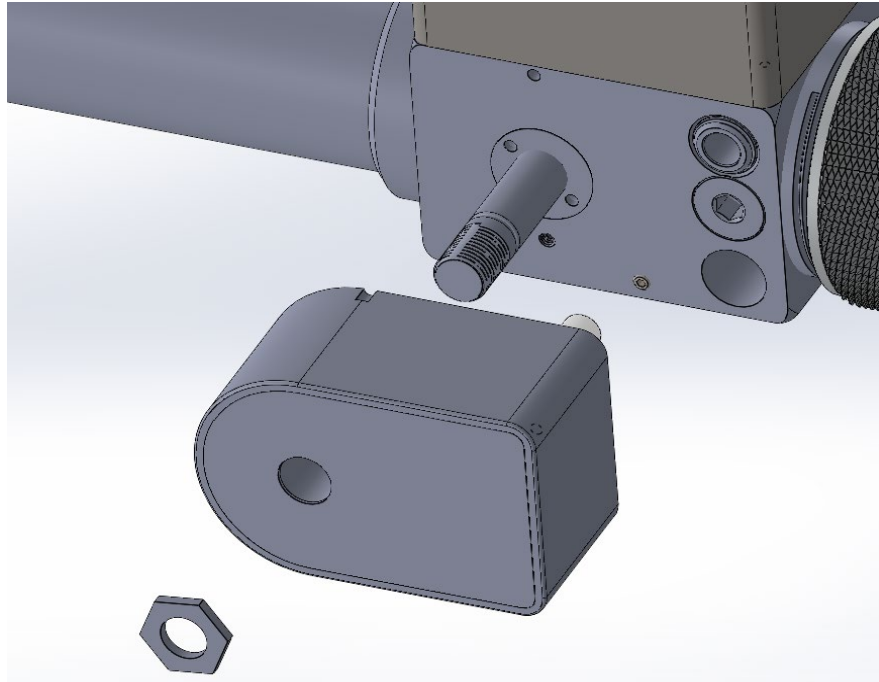
9.) Specific Conditions of Use:

- a. **Warning:** Enclosure contains aluminum. Care must be taken to avoid hazard due to impact or friction.

Avertissement : Le boîtier contient de l'aluminium. Des précautions doivent être prises pour éviter tout danger dû à un impact ou à un frottement.

10.) **Care and Maintenance:** Routine cleaning procedures are required. These procedures do not involve exposing any safety-relevant items.

- a. **Solenoid Valve Cleaning** - It has been observed from years of experience that solenoid valve sticking may occur when the casing gas transports contaminate to the needle valve. The solenoid driver assembly activates the needle valve. Open the Hoke valve to remove all pressure from the volume chamber.
 - i. To clean this assembly, remove the Solenoid Driver by removing the hex nut on the back of the label. Next, pull the Solenoid Driver away from the gun body. The O-ring should stay with the driver assembly connector.

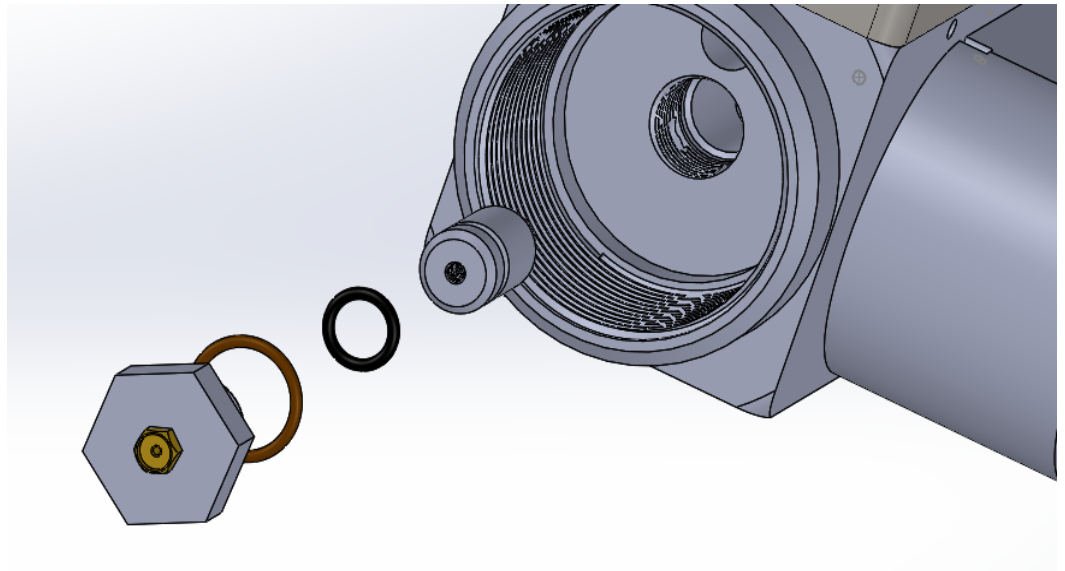


- ii. The tubular portion of the needle assembly contains loose parts, including a spring. Remove the needle assembly with a spanner wrench. Carefully remove the loose parts from the tube, noting the relationship between the components.

Clean the parts with alcohol and swab the inside tubular portion of the housing. Then, install the cleaned parts, assembled in the relative position you removed them.

- iii. Next, clean the valve seat opening at the bottom of the cavity in the gun body.
- iv. Reverse the procedure above to reinstall the components. Next, verify the operation of the valve by manually firing the gun. Again, you should hear the solenoid click.
- v. Pressure the gun (approximately 250 PSIG) and monitor the gauge for pressure decay. Any noticeable decrease in indicated pressure in ten minutes indicates leakage failure.
- vi. Restrain the gun in a manner that does not obstruct the open end of the gas gun. Manually fire the gas gun. After testing, open the Hoke valve to release residual pressure.

- b. **Main Gas Valve Service** – Open the Hoke valve to remove all pressure from the volume chamber.
- i. Remove the volume chamber from the gun body. Remove the residual fragments from thread mating surfaces.
 - ii. Remove the orifice assembly (the larger hex) using a socket wrench to unscrew it from the gun body
 - iii. Using a long 8-32 screw, such as McMaster 99117A320, attach the screw to the threaded hole in the gas valve spool. Extract the spool from the gun housing.



- iv. Clean the spool and replace the O-ring. Lubricate the O-ring and external surface of the spool.
- v. Use alcohol and a swab to clean residual contamination from the valve bore.
- vi. Insert the spool into the valve bore using the long screw in the spool and verify that no binding occurs.
- vii. Remove the screw from the valve spool. Clean, replace the O-ring, lubricate, and reinstall the orifice assembly.

- viii. Apply Teflon thread sealant tape to the volume chamber and reinstall the gas chamber on the gun body.
- ix. Pressure the gun (approximately 250 PSIG) and monitor the gauge for pressure decay. Any noticeable decrease in indicated pressure in ten minutes indicates leakage failure. Contact your Echometer technical service representative for further assistance.
- x. Manually fire the gun. After testing, open the Hoke valve to release residual pressure.

11.) Care of Battery:

- a. The Li-Ion battery has a rated total capacity for 300 complete charge/discharge cycles.
- b. The practice of shallow charge/discharge cycles will not reduce energy capacity.
- c. The battery operating temperature limits are -20° to 50°C..
- d. Use only the supplied Battery Charger.
- e. The battery temperature storage specification is -20°C to 50°C.

12.) Compliance Statements:

ISED non-interference disclaimer

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

This device complies with the Canadian ICES-003 Class A specifications. CAN ICES-003(A) / NMB-003 (A).

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempt de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

ISED/FCC RF Exposure statement

This equipment complies with FCC and ISED RSS-102 radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. In order to avoid the possibility of exceeding the FCC and ISED RSS-102 radio frequency exposure limits, this equipment should be installed and operated with minimum distance 20 cm (7.9 inches) between the antenna and your body during normal operation. Users must follow the specific operating instructions for satisfying RF exposure compliance.

Cet équipement est conforme aux limites d'exposition aux rayonnements FCC et ISED CNR-102 établies pour un environnement non contrôlé. Cet émetteur ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou un autre émetteur. Afin d'éviter la possibilité de dépasser les limites d'exposition aux radiofréquences FCC et ISED, cet équipement doit être installé et utilisé avec une distance minimale de 20 cm (7.9 pouces) entre l'antenne et votre corps pendant le fonctionnement normal. Les utilisateurs doivent suivre les instructions spécifiques d'utilisation pour respecter la conformité à l'exposition aux RF.

RSS-Gen Transmit antenna statement

This radio transmitter [IC: 10048A-WRFG200] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio [IC : 10048A-WRFG200] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Under Innovation, Science, and Economic Development regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by ISED. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p) is not more than that necessary for successful communication.

Conformément à la réglementation d'Innovation, Sciences et Développement économique Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Innovation, Sciences et Développement économique Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Approved Antenna Types:

	Antenna type 1
Maximum gain:	1.6 dBi
Antenna type:	Whip
Radiation pattern:	Omni-Directional
Impedance:	50 Ohm
Connector type:	RP-SMA

FCC Compliance Statement

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.

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. Please note that changes or modifications not

expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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13.) Revisions:

Revision Level	Date	Description
A	-	Initial Release
B	2/4/2025	Added Compliance Statements DCN-6103